STATE OF MINNESOTA DEPARTMENT OF TRANSPORTATION
District 3
7694 Industrial Park Road, Baxter, MN 56425-8096

Categorical Exclusion Determination (CATEX)

Review: Draft (X) Final ( ) **Date:** 02/02/2023 **Trunk Highway:** 210

State Project Number: 1805-80 **Federal Project Number:**

Project Termini: from Baxter Dr. to Pine Shores Rd (Ref. Point 121+00.500 to 125+00.500)

City(ies): Baxter, Brainerd **County(ies):** Crow Wing

Section, Township, Range:

SECTION	TOWNSHIP	RANGE
04, 05	133N	28W
24, 25	45N	31W
17, 19, 20, 30	45N	30W

Program: NHS Pavement

Brief Project Description: 1805-80: TH 210 Mill & Overlay, TH 210 Reconstruction, Storm Sewer, Signals, Lighting, ADA, Trails

Letting Date: September 26, 2025 **Date Construction Expected to Begin:** March 2026

District Determination and Approval

Based on the evaluation of this project and the attached documentation, it is determined that the project meets the criteria of and is properly classified as a Federal Categorical Exclusion (Class II Action Category 23 CFR 771.117 (c) (26) and (c) (28). (It is also below the State EAW threshold).

There are no extraordinary circumstances such as:

1. Significant impacts on the environment;
2. Substantial controversy on environmental grounds;
3. Significant impacts to Section 4(f) or 106 property;
4. Inconsistency with any federal, state or local law or administrative determination relating to the environment.

It has been determined to be a:

☐ PROGRAMMATIC CATEGORICAL EXCLUSION. Does not exceed any threshold in Attachment B of the *Programmatic Categorical Exclusion Approval Agreement Between FHWA & MnDOT*.
(Only District Signature is required)

☒ CATEGORICAL EXCLUSION (CE): It is a CE, but concerns exist regarding one or more thresholds in Attachment B of the *Programmatic CE Approval Agreement Between FHWA & MnDOT*. (Requires OES and FHWA signatures).

Submitted by (Project Manager):	Approved by (District Engineer)
Luke Wehseler, Project Manager Date	[name, title] Date

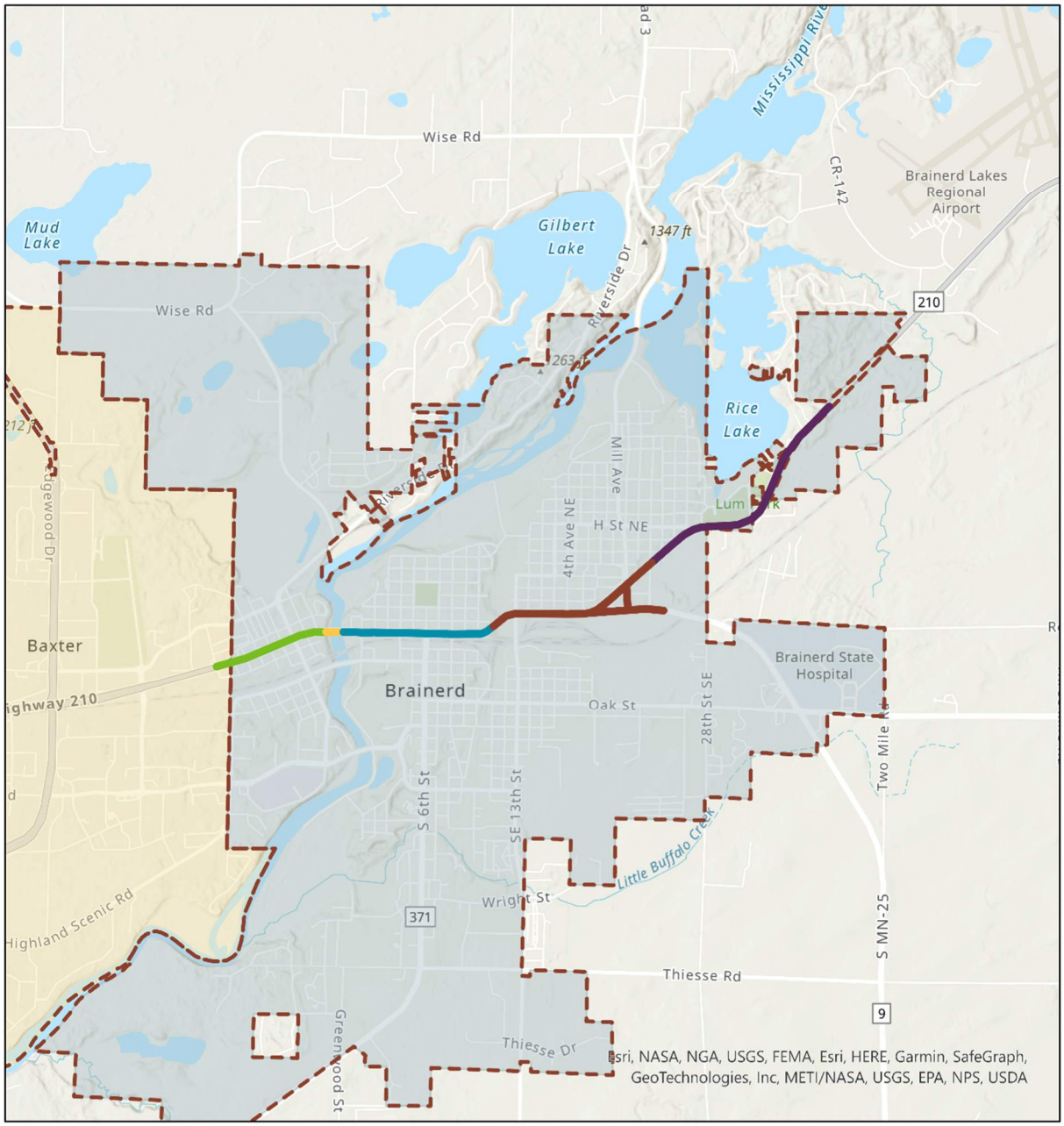
OES and FHWA Approvals (***OES / FHWA signatures required if the project is NOT a Programmatic categorical exclusion)***

Based on the evaluation of this project and the attached documentation, it is determined that the project meets the criteria of and is properly classified as a Categorical Exclusion.

Approved:	Approved:
MnDOT Chief Environmental Officer Date	FHWA Area Engineer Date

This document is available in alternative formats to individuals with disabilities by calling the Project Manager at the phone number listed above or through the Minnesota Relay Service at 1-800-627-3529.

Project Map



Project Location Map

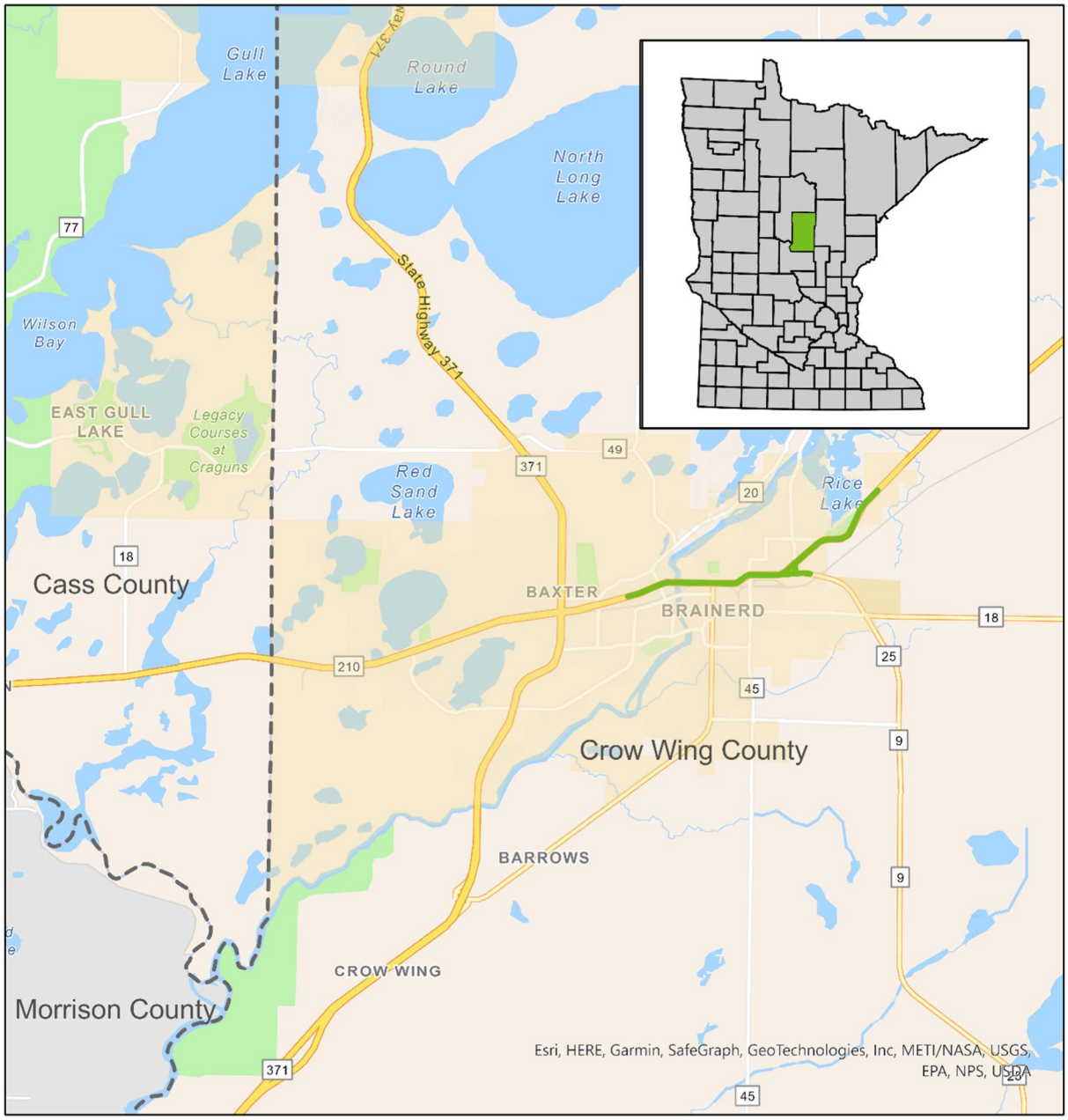
TH 210
Brainerd, MN and Baxter, MN
Crow Wing County

City Boundary
Segment
West
Bridge
Central
Mall/Railyard
East

N

0 0.35 0.7 Miles

Area Map



Project Area Map

TH 210
Brainerd, MN and Baxter, MN
Crow Wing, Cass, and Morrison Counties

Legend
- Project Area
- County Boundaries
- City Boundaries

N

0 1 2 Miles

Report Purpose

This report for this Class II (Categorical Exclusion) action documents the project's need and description, as well as social, economic and environmental impacts.

Project Description

Existing Condition

The TH 210 corridor located between Baxter Drive and Pine Shores Rd is largely four-lane urban low-speed road, which becomes a rural section for the last 0.15 miles west of Pine Shores Rd, as well as along the south side of TH 210 between TH 25 and 8th Ave NE. The first half of this 4.0-mile long corridor, from Baxter Dr. to 4th Ave NE is posted at 35 mph, increasing to 45 mph between 4th Ave NE and 14th Ave NE. East of 14th Ave NE the posted speed becomes 50 mph to the east end of the project when TH 210 transitions to a two-lane highway, increasing to 60 mph just outside the project limits. The Pavement Quality ranges from 2.8 to 4.5 on the pavement quality index as of 2020, with the majority of the pavement reaching the end of its service life. Traffic volumes that use this corridor 11,800 – 32,500 AADT (daily traffic averaged over the year 2019), with the western portion seeing significantly more traffic than the eastern portion. Heavy truck use stays consistently around 4% - 6%. Since the Brainerd region is a heavy tourist destination, particularly for summer cabins, traffic demands fluctuate significantly and can be heavier on summer weekends. Bridge 5060 over the Mississippi River is located within this corridor and is a concrete arch bridge that is 630.6 feet long and 79.0 feet wide, with a sufficiency rating of 65.3 as of 08/31/2021.

Proposed Project

The proposed project will include the following:

- The bituminous mill and overlay of the western half mile from Baxter Dr. to NW 4th St.
- The reconstruction of the middle 3.4 miles from NW 4th St. to 10th Ave NE
- The bituminous mill and overlay of the eastern 1.4 miles from 10th Ave NE to 0.1 miles east of Pine Shores Rd.
- Replacement and widening of the sidewalk and ADA improvements, which includes
    - A bump out at Baxter Dr
    - Bump outs at NW 7th St
    - Replacement of DNR trail from 5th Ave NE to 14th Ave NE
    - New connections to DNR trail from TH 210 to TH 25 along 8th Ave NE and from the TH 210 & TH 25 intersection to the TH 25 & 10th Ave NE intersection along TH 25
- Traffic Improvements
    - Signal replacement at Baxter Dr
    - Right-in, right-out access restriction at NW 9th St
    - Right-in, right-out access restriction at NW 5th St, allowing for a lengthened turn lane at the adjacent signalized intersection
    - Dual-left turn lanes for the north-to-west movement at NW 4th St
    - Right-in, right-out access restriction at NW 3rd St, allowing for a lengthened turn lane at the adjacent signalized intersection
    - East-to-north left-turn movement added at NW 2nd St
    - East-to-north left-turn movement removed at Chippewa St
    - Right-in, right-out access restriction at N 3rd St, allowing for a lengthened turn lane at the adjacent signalized intersection
    - Signal replacement at N 4th St
    - South-to-east left-turn movement removed at N 5th St
    - Right-in, right-out access restriction at N 7th St, allowing for lengthened turn lanes at adjacent signalized intersections
    - Right-in, right-out access restriction at N 9th St, allowing for a lengthened turn lane at the adjacent signalized intersection
    - South-to-east left-turn movement removed at N 10th St
    - Signal replacement at Gillis Ave
    - Right-in, right-out access restriction at 1st Ave NE
    - South-to-east left-turn movement removed at 2nd Ave NE
    - North-to-west left-turn movement removed at 4th Ave NE
    - Replace TH 210 & TH 25 intersection with a roundabout, include a fourth leg to mall area to the north, connecting into B St NE
    - Replace 8th Ave NE intersection with a roundabout, eliminate 8th Ave NE connection between TH 210 and TH 25

  - Offset the skewed intersection at 10th Ave NE and eliminate the east-to-north left-turn movement
  - Right-in, right-out access restriction at Wonderland Park Rd NE / Rice Lake Ln, allowing for a lengthen turn lane at Pine Shores Rd
- Storm sewer and culvert improvements in the resurfacing segments, and complete replacement of storm sewer system within the reconstruction segment
- Both temporary easements and additional right-of-way will be acquired throughout the corridor as needed to improve ADA facilities and achieve ADA compliance

Cost and Funding Source

Project Cost: $41,250,000

Funding Source(s): Surface Transportation Block Grant Program (STBGP), State, Local, DNR, and Federal Funding

Schedule and Project Manager

Project Letting Date: 09/26/2025

Date construction expected to begin: January 2026

Highway open to Traffic: October 2027

*MnDOT's Project Management System (Primavera P6) will contain the latest estimated letting date and pre-letting activity status information.

The Project Manager is: Name: Luke Wehseler Address: 7694 Industrial Park Rd Baxter, MN 56425-8096 Phone: (218) 828-5700 Email: luke.wehseler@state.mn.us	This report was prepared by: Name: Jarred Paquin Address: 12800 Whitewater Drive, Suite 300 Minnetonka, MN 55343 Phone: (763) 259 - 6677 Email: jpaquin@sambatek.com

Project letting in September of 2025 will allow construction to begin in winter to do any tree clearing, order materials, and prepare to begin major construction in spring 2026. Construction is anticipated to take two seasons and conlcude in fall (October) of 2027.

Need for Project

The primary need for this project is pavement condition which is reaching the end of its service life. Secondary needs are bridge #5060 condition, ADA compliance, traffic safety and operations, city utilities, storm sewer, downtown visual quality, and pedestrian/bicycle safety and mobility. The project purpose is to improve pavement and infrastructure condition, while simultaneously addressing safety and mobility. Project termini were selected based on both historic project paving termini and road characteristic transitions. The west terminus is where the low speed nature of TH 210 ends and increases in speed heading west out of the city of Brainerd. The east terminus is where the four-lane section of TH 210 transitions to a two-lane section and increases speed out of town.

Primary Needs –

Pavement Improvements

The pavement throughout this corridor is nearing the end of its service life. The entire corridor was reviewed for reconstruction of either bituminous or concrete pavement to address condition. Upon further analysis, it was determined that the west and east ends are sufficient to undergo another bituminous resurfacing cycle prior to

replacement. Between NW 4th St and 10th Ave NE, the pavement will be reconstructed with bituminous since service life can no longer be extended with resurfacing and the LCCA resulted in bituminous pavement selection. The existing ride quality length weighted averages for the corridor are as follows:

Westbound TH 210	Eastbound TH 210
RQI = 3.1	RQI = 3.1
SR = 3.4	SR = 3.2
PQI = 3.2	PQI = 3.1

Secondary Needs –

Traffic Safety and Operations Improvements

This arterial state highway also splits the city of Brainerd into two north and south halves. While TH 210 serves as a regional throughfare, it also connects the community and is lined with businesses and destinations. Significant traffic and summer weekend tourism has led to delay and capacity issues and an increasing barrier to bike and pedestrian crossing. The project analyzed the traffic safety and operations to identify issues and propose solutions. To improve safety raised medians will be added throughout the corridor, creating right-in / right-outs at several intersections. This allowed for the extension of left turn lanes at signalized intersections to address queuing issues in the thru lanes at peak times.

The project will also remove parking spaces between 1st St N and 9th St N and Gillis Ave and 5th Ave NE to limit the potential for delay and accidents. To improve traffic flow, this project will make several changes to turn lanes and access from minor roads. Five signal systems will be replaced (Baxter Dr, NW 4th St, N 4th St, N 8th St, and Gillis Ave).

The mall area between 4th Ave NE and 10th Ave NE experiences some of the highest delays, particularly at the 8th Ave NE intersection. Multiple alternatives were considered to improve the level of service, which are discussed further below in the Alternatives section. Ultimately, signal systems at 4th Ave NE and 8th Ave NE will be removed, and roundabouts will be placed at the TH 25 intersection and 8th Ave NE intersection. Of the 3 alternatives considered, the two proposed roundabouts provide the best overall traffic operations in the mall area, with both intersections operating at a LOS A and the worst approach operating at LOS C. Alternatively, the existing signalized intersection at 8th Ave NE would operate at a LOS D with the worst approaches operating at LOS E and F. The two roundabouts are also estimated to reduce severe and fatal crashes by over 85%. 10th Ave NE will be offset to fix the skew.

Between NW 4th St and 5th Ave NE, thru lanes will be reduced to 11-foot effective widths to calm traffic and optimize use of width of the constrained right-of-way.

Bicycle and Pedestrian Connectivity and ADA Compliance:

There are pedestrian origins and destinations along the corridor, such as parks, historic sites, retail, restaurants, banks, and convenience stores, among other commercial uses. However, there are issues with bicycle and pedestrian connectivity to these destinations. Sidewalks and curb ramps in the project area are not fully ADA compliant. There is a DNR trail that is part of the Cuyuna Trail system from 5th Ave NE to Lum Park that is not ADA compliant and not connected to the rest of the trail system. This project will include replacing that trail to bring it to full ADA compliance and rerouting the trail along 8th Ave NE to TH 25 to connect into the trail system being constructed in 2023 along TH 25 east of 10th Ave NE.

Hydraulic Improvements

Where reconstructing TH 210, the storm sewer system will be replaced. In the resurfacing segments, the existing storm sewer is general in good condition and will only need to be addressed as impacted by the project. Some culverts at the east end of the project may require improvements to be included in this project. It is anticipated that, while likely not required, this project will propose water treatment BMPs to be included in the project. Potential locations have been identified and are included on the geometric layout.

Utilities

The City of Brainerd has identified water and sanitary sewer improvements that they intend to make within the reconstruct area that will be part of this project.

Alternatives

"No Build" Alternative

The No Build Alternative would involve no improvements being made. Normal maintenance activities, however, are assumed to continue. The No Build Alternative was not recommended because it would not address the need for the project, which is to address deteriorated roadway and sidewalk pavement needs.

Alternatives Considered

Location Alternatives

No location alternatives were considered for this project because TH 210 is an established route and improvements at any other location would result in substantially greater impacts on the built and natural environment.

Alternatives Development and Evaluation Process

Early in the process, the study corridor was divided into five segments, each of which are defined by different land use characteristics. They include:

- West Segment – Baxter Drive to Mississippi River
- Mississippi River Bridge
- Central Segment – Mississippi River to Kingwood Street
- East Mall Area/Railyard Segment – Kingwood Street to 10th Ave NE
- East Segment – 10th Avenue NE to Pine Shores Road

Potentially feasible improvement within each segment were limited by the constrained right-of-way, the river bridge, and the overall project scope which assumed full roadway reconstruction limited to the segment of the corridor between NW 4th Street and 10th Avenue NE. These constraints combined with the high traffic volumes limited overall options to intersection improvements and accommodations to improve pedestrian and bicyclist movements.

West Segment

Improvement considerations in the west segment focused on enhancements to the NW 4th Street intersection and median extensions to improve safety and operations.

Mississippi River Bridge

Due to bridge design limitations, the process assumed that any improvements to the river bridge needed to be within the dimensions of the existing bridge deck. As a result, improvements focused on widening the sidewalks along the bridge to the extent practical.

Central Segment

Improvement options through the Central Segment were limited by the 80-foot right-of-way. With the goal of improving safety and accommodations for pedestrian and bicyclists, the primary considerations were removing on-street parking and adding a raised center median.

East Mall Area/Railyard Segment

The focus in this segment was addressing traffic operation issues in and around the 8th Avenue NE intersection along with improving overall safety and enhancing pedestrian and bicyclist accommodations. Three primary options were considered, they included enhancing the existing 8th Avenue NE signalized intersection, converting the 8th Avenue NE intersection to a roundabout, and constructing two roundabouts.

East Segment

Given relatively lower traffic volumes and that this segment is programmed as a mill and overlay project, no major geometric improvements were considered.

Preferred Alternative

Following in-depth traffic analysis, public outreach, and coordination with the City of Brainerd the following key improvements were selected as part of the overall preferred alternative:

West Segment

- Add northbound left turn lane at NW 4th Street
- Extend center median through NW 9th Street, NW 5th Street and NW 3rd Street
- Widen sidewalks from 5 to 7-8 feet
- Add a bumpout in the southeast quadrant of the TH 210/Baxter Drive intersection
- Add bumpouts in the northwest, southwest, and southeast quadrants of the TH 210/NW 7th Street intersection

Mississippi River Bridge

- Widen the sidewalks on both sides of the bridge from 6 feet to 9 feet
- Add a barriers between the outside traffic lanes and the sidewalk

Central Segment

- Add a raised median between 2nd Street and 9th Street
- Extend the new raised median through the 3rd Street, 7th Street and 9th Street intersections
- Widen the northside sidewalks from 6 feet to between 7 and 9 feet
- Widen the southside sidewalk from 2 feet to between 5 feet and 7 feet

East Mall Area/Railyard Segment

- Construct a 4-leg roundabout at TH 25 and a 3-leg roundabout at 8th Avenue NE
- Extend the raised median through the 1st Avenue NE intersection
- Remove eastbound to northbound left turn movement at 10th Avenue NE

SOCIAL, ECONOMIC, AND ENVIRONMENTAL (SEE) IMPACTS

This project has been reviewed for its potential effects on the environment and community. Information is presented for those items checked "yes" and meriting individual discussion. If items are checked in the "no effect" box, they have been considered, relative to appropriate laws, executive orders, rules, and regulations.

Social, Economic, and Environmental Impacts				
Issue	**Questions**	**Degree of Impact**		
	Will the project . . .	**Yes**	**No**	**Impact Description or Page Reference**
NATURAL ENVIRONMENT				
Farmland Impacts	Require any right of way?		X	No farmland will be impacted by the right of way acquisitions required for this project.
Fish and Wildlife	Affect fish or wildlife? (including Migratory Birds)		X	Bridge No. 5060 crosses the Mississippi River, though no work is proposed that impacts these waters. Strict pollution, erosion, and sediment control measures will be utilized at this location to prevent any negative effect on water quality the rare species in the area. Peregrine Falcons have been documented nesting on Bridge #5060. Please see the mitigation and commitments section. See DNR Questionnaire Responses Letter in the attachments.
Threatened and Endangered Species, Federal	Affect any Federal endangered species due to project location and design?	X		A determination of no effect was made for the gray wolf and associated designated critical habitat. A determination of no jeopardy was made for the tricolored bat and monarch butterfly and associated designated critical habitat. A determination of may affect, not likely to adversely affect was made for the northern long-eared bat (NLEB). No roosts or hibernacula were identified within the project area. Required Avoidance and Minimization Measures (AMMs) will be provided in the list of Mitigation and Commitments. See MnDOT Office of Environmental Stewardship Section 7 Determination Letter in Appendix B. A determination of no effect was made for all other species on the FWS IPaC species list. See the DOT Determination of Effect Letter in the attachments.
Threatened and Endangered Species, Species of Special Concern, State	Affect any State endangered species due to project location and design?		X	The Minnesota Natural Heritage Information System (NHIS) identified that the Blanding's turtles (emydoidea blandingii), Peregrine Falcons (Falco peregrinus), and northern long-eared bat (NLEB) are known to occur within a one-mile radius of the project area and *may be* impacted by the Project.
Visual Quality	Affect visual quality to or from natural visual resources, cultural visual resources, or project environment?		X	The project is not expected to significantly alter the existing roadway. The project will not affect visual quality to or from natural visual resources, cultural visual resources, or the project environment.

Social, Economic, and Environmental Impacts				
Issue	**Questions**	**Degree of Impact**		
	Will the project . . .	**Yes**	**No**	**Impact Description or Page Reference**
Vegetation	Affect any of the four vegetation categories?	X		No noxious weeds have been identified in the project area. There will be impacts to herbaceous vegetation and turf reestablishment will have to be completed. Further guidelines can be found in the Mitigation and Commitments Section Standard Specification 2572 will be followed for tree and vegetation protection. Further guidelines can be found in the Mitigation and Commitments section. See MnDOT Roadside Vegetation Management Unit Review in the Appendix B.
Water-Related Issues				
Floodplains	Cross or lie adjacent to any floodplain area?	X		The project is not expected to reduce the capacity of any floodplain area.
Wetlands	Have wetlands present within the construction limits?	X		Wetlands will be impacted in the TH 210 / TH 25 / 8th Ave NE triangle area. Anticipated impact area is 0.8 acres. These impacts will be minimized as possible as the design is refined. The project is currently considering expanding existing wetlands as well by up to 1.5 acres. Pending Wetland Two Part Finding to verify habitat impacts.
	Affect wetland habitat?	X		
Stream or Water Body Modification	Change the course, current, or cross section of any stream?		X	The project does not change or diminish the course, current, or cross-section of public waters, by any means, including filling excavating, or placing of materials in or on the beds of public waters.
Special River Concerns	Affect > a state or federal **Wild & Scenic River;** > a federal candidate **Wild & Scenic River;** > a state **Canoe & Boating River**; > **MNRRA**		X	The project does not change or diminish the course, current, or cross-section of public waters, by any means, including filling excavating, or placing of materials in or on the beds of public waters. All work on Bridge 5060 will be above deck and will not affect the navigability of the Mississippi River. The Mississippi River is a designated State Water Trail and it anticipated to not be affected by this project. VERIFY: would bridge work necessitate any temporary closure of the Mississippi River State Water canoe trail beneath?

Social, Economic, and Environmental Impacts				
Issue	**Questions**	**Degree of Impact**		
	Will the project . . .	**Yes**	**No**	**Impact Description or Page Reference**
Erosion Control	Involve major soil disturbance (depth or volume) or have erosion potential due to land form, wind patterns, or water volume?	X		There is potential for erosion along the road slopes where the slopes are regraded, and culverts are replaced. A NPDES Construction Stormwater Permit will be required. A SWPPP will be developed for the project. Best Management Practices will be used where there is risk of soil erosion. BMPs contained in MnDOT's standard specifications, details, and special provisions will also be used. This will include the use of natural netting to stabilize the soil.
Water Quality	Affect water quality of lakes, streams, wetlands, etc.?		X	The Project crosses the Mississippi River which is listed as impaired on the MPCA's website. The proposed project is not expected to contribute to the impairment or otherwise cause any negative effects to the river.
Section 404 Permit (COE)		X		Need to determine whether USACE 404 permit is relevant based on upcoming Wetland Impact Assessment and Two Part Finding to be completed spring 2023. Very likely needed due to wetland impacts at TH 25 that seem to drain to a stream.
Coast Guard Permits			X	VERIFY: This project does not require a USCG bridge permit for work on the 5060 bridge over the Mississippi River.
Coastal Zone Impacts	Affect highways along Lake Superior?		X	This project does not affect highways along Lake Superior.

Social, Economic, and Environmental Impacts				
Issue	**Questions**	**Degree of Impact**		
	Will the project . . .	**Yes**	**No**	**Impact Description or Page Reference**
PHYSICAL / CONSTRUCTION				
Air Quality	Affect air quality?		X	This project is not located within an area where conformity requirements apply, and the project scope does not indicate that air quality impacts would be expected. Therefore, no further air quality analysis is necessary. This project is exempt from conducting a Mobile Source Air Toxic (MSAT) analysis. The purpose of this project is to improve the condition of the road by resurfacing and reconstructing the pavement. This project has been determined to generate minimal air quality impacts for Clear Air Act criteria pollutants and has not been linked with any special mobile source air toxic (MSAT) concerns. As such, this project will not cause a meaningful increase in MSAT impacts when compared to that of the no-build alternative. Moreover, Environmental Protection Agency (EPA) regulations for vehicle engines and fuels will cause overall MSAT emissions to decline significantly over the next several decades. Based on regulations now in effect, an analysis of national trends with EPA's MOVES2014 model forecasts a combined reduction of over 90 percent in the total annual emissions rate for the priority MSAT from 2010 to 2050 while vehicle-miles of travel are projected to increase by over 45 percent (Updated Interim Guidance on Mobile Source Air Toxic Analysis in NEPA Documents, Federal Highway Administration, October 12, 2016). This will both reduce the background level of MSAT as well as the possibility of even minor MSAT emissions from this project. This project requires a Greenhouse Gas Analysis.
Noise	Affect noise sensitive receptors?		X	The Project does not meet the Federal Type I criteria for noise analysis. This Project meets the criteria for a Type III project as established in 23 CFR 772. Therefore, the project requires no analysis of highway traffic noise. Type III projects do not involve added capacity, construction of new through lanes or auxiliary lanes, substantial changes in the horizontal or vertical alignment of the roadway nor any action that may substantially change the existing exposure of noise sensitive land uses due to highway traffic noise.
Utilities	Affect utilities?	X		The proposed project may require the adjustment or relocation of some utilities. Coordination with the affected utility companies will be required in order for the relocation to be completed prior to or concurrent with the commencement of construction activities.

Social, Economic, and Environmental Impacts				
Issue	**Questions**	**Degree of Impact**		
	Will the project . . .	**Yes**	**No**	**Impact Description or Page Reference**
Construction Impacts	Cause construction impacts (erosion, noise, air, vibration, etc.)?	X		There will be noise and dust associated with the construction activities. No unique concerns have been identified. Standard noise and dust specifications will be followed, in addition to adherence to the local ordinances. Disposal of excess material will follow the guidelines listed in the standard specifications, and will not occur in wetlands, floodplains, or other sensitive areas. Erosion and sedimentation will be controlled in accordance with an erosion control plan and MnDOT standard specifications. Exposed soil surfaces will receive permanent cover.
Contaminated Properties or Materials	Involve excavation (including utilities) in any known or potentially contaminated property, or handling of any contaminated materials?	X		The Minnesota Pollution Control Agency regulatory files were reviewed and multiple contaminated sites are located within approximately 500 feet of the project area, including one Superfund Site (BN Car Shops). The project has a medium to high chance of impacting these contaminated sites. Therefore, additional evaluation of the project area for potential contamination is necessary as detailed in the Mitigations and Commitments Section. Lead paint testing revealed that paint on some of the component of the signal poles at N 4th St, N 8th St, and Gillis Ave are above the 0.5 milligrams per square centimeter threshold. Potentially contaminated materials encountered during construction will be handled and treated in accordance with applicable state and federal regulations. See MnDOT Office of Environmental Stewardship Contaminated Properties Letter in the Appendix.
Excess Materials	Involve disposal of excess materials outside planned construction limits?	X		Excess materials and debris from this project will be disposed of in accordance with MnDOT Standard Specifications for construction, 2104.3C and Minnesota Rule 7035.2825. In particular, excess materials and debris will not be placed in wetlands or floodplains.
Groundwater Geology, Earthborne Vibration	Affect groundwater, geology, or cause earthborne vibrations?		X	Potential for groundwater, geotechnical geology and earthborn vibration impacts have been considered, and no significant impacts are anticipated. A DNR water use permit will not be required as per the MNDNR's response. A separate water use permit would be required for withdrawal of more than 10,000 gallons of water per day or 1 million gallons per year from surface or groundwater.

Social, Economic, and Environmental Impacts				
Issue	**Questions**	**Degree of Impact**		
	Will the project . . .	**Yes**	**No**	**Impact Description or Page Reference**
Traffic Detour	Require a traffic detour?	X		This project will require traffic detours that have not yet been decided. These detours will be signed and communicated to the public and stakeholders consistent with MnDOT standards and practices. It is possible that detours may last longer than a single construction season.
SOCIAL-ECONOMIC				
Access Control	Change access to properties (close, change location, make one-way, etc.)?	X		The following properties have additional accesses along TH 210 that are no longer in use and will be closed as part of this Project: - Thrifty White Pharmacy at N 2nd St (PID 41241380) - Little Caesars Pizza at N 8th St (PID 41241486) The following properties have two accesses along TH 210 and will be consolidated to a single access as part of this Project: - Cenex Gas Station at N 4th St (PID 41241398) - State Farm Insurance at N 6th St (PID 41241428) Access will be added to the mall area from TH 210 via B St as the north leg of the proposed roundabout at TH 25. 8th Ave NE will be closed between TH 25 and TH 210, though the single business access along that section of road will retain right in, right out access to TH 210. This proposed configuration is preferred by these businesses over direct access to TH 25, which was the other alternative considered. The Project is not expected to negatively affect access to any of these parcels.
Land Use Impacts	Be inconsistent with local and regional land use plans?		X	No significant changes to the surrounding land uses are expected to occur as part of this project.
Relocation	Require any relocation of homes or businesses?		X	The proposed project is located in an urban area and will not require any relocation of homes or businesses.

Social, Economic, and Environmental Impacts				
Issue	**Questions**	**Degree of Impact**		
	Will the project . . .	**Yes**	**No**	**Impact Description or Page Reference**
Right of Way	Require any right of way (or easements)?	X		Temporary easement will be required for ADA, walk, and driveway work adjacent to the right-of-way. Temporary Orders will be needed a several side streets to tie roadway and ADA work into the existing configurations, most notably at the roundabout approaches and for lane changes at the south leg of the NW 4th St intersection. Permanent easement will be required at several pedestrian ramps to achieve ADA compliance. The roundabouts will require right-of-way to fit the larger footprint and to construct. Total temporary easement is anticipated to be 2.5 acres. Total permanent easement is anticipated to be 0.5 acres. Acquisition is anticipated to be 1.0 acres. The maximum 1-mile permanent right-of-way is anticipated to be 1.0 acres. These are rough numbers that will be updated when the District drafts proposed ROW linework based on the construction limits submitted on 01/18/23.
Parks, Recreation, Section 4(f) or 6(f)(LAWCON)	Use any significant public park, recreation, or wildlife or waterfowl refugees, or any historical site? Will the project affect any LAWCON land?		X	No significant impacts to public parks, recreation, wildlife, nor waterfowl refuges or any historical sites. There are 3 known historic properties within the project corridor: Brainerd Water Tower at N 6th St, Brainerd Public Library at N 7th St, and the Franklin Arts Center at Kingwood St. It is anticipated that there will be temporary easements needed at both the Brainerd Public Library and at the Brainerd Water Tower to restore turf behind the walk construction. We are working through 4(f) letters of temporary occupancy and anticipate a determination of no adverse impact.
Economic Impacts	Affect business activity or have other economic impacts?	X		The project may have possible short-term effects to business activity due to construction activities. MnDOT will prepare traffic plans to minimize disruptions to the local community. The project may have possible long-term effects to business due to the removal of on-street parking spaces, though parking on side streets should be able to meet the demand.

Social, Economic, and Environmental Impacts				
Issue	**Questions**	**Degree of Impact**		
	Will the project . . .	**Yes**	**No**	**Impact Description or Page Reference**
Environmental Justice	Have disproportionately high and adverse human health or environmental effects on minority populations and low-income populations?	X		The U.S. Environmental Protection Agency (EPA) EJSCREEN tool was used to access U.S. Census Bureau Community Survey (ACS) 2016-2020 data for the Project Corridor. A search along the segment with a ¼ mile buffer on either side of the roadway produced summary reports with data specific to the Project Corridor. Crow Wing County has a total population of 64,775 people, with 95% of the population being white, 1% being Hispanic, 1% being Black, 1% being American Indian, and 2% being multiracial. The Project Corridor contains 2,691 people, with 90% of the population being white, 4% Hispanic, 2% Black, 2% American Indian, 1% Asian, and 1% multiracial. Approximately, 10% of the population within the Project Area reported as part of the BIPOC community. This is double that of Crow Wing County where 5% of the population identifies as BIPOC. Approximately 26% of the households along the Project Corridor have incomes under $25,000. This is greater than the 19% of households in Crow Wing County with incomes under $25,000 Therefore, there is a greater BIPOC and low income populations within the project area who are more likely to be impacted by the environmental and human health impacts of this project. See EPA EJSCREEN Environmental Justice reports for additional environmental justice information in the Appendix D.

Social, Economic, and Environmental Impacts				
Issue	**Questions**	**Degree of Impact**		
	Will the project . . .	**Yes**	**No**	**Impact Description or Page Reference**
Social	Affect public safety (i.e. police or fire protection)?	X		A communication plan will be developed during the final design phase of the Project to address construction activities that may impact access to the Project Corridor and surrounding area by emergency vehicles.
	Impact sensitive groups (children, handicapped, minorities, poor, etc.)?		X	The Project is not expected to have any effect on surrounding communities or neighborhoods. No categories of people uniquely sensitive to transportation will be unduly impacted.
	Affect accessibility to schools, churches, recreation facilities, etc.?	X		It is anticipated that there will only be short term delays to access businesses and residences along the Project. Staging plans will be designed to minimize effects to properties near the construction.
	Affect community cohesion?	X		The Project has the potential to have a beneficial impact and increase community cohesion by making TH 210 easier to cross for all modalities, helping to connect the community.
Bikeways & Pedestrians	Affect bicycle and/or pedestrian movements?	X		The project will likely affect bicycle and pedestrian use surrounding the project. Detour warning signs will be placed where they are convenient for pedestrians and bicyclists to limit interruptions to pedestrian services. Additional commitments can be found in the Mitigations and Commitments Section.
Accessibility	Affect sidewalk or curb and gutter (design for)?	X		This project will include improvements to sidewalks, pedestrian ramps, curbs, and gutters. This project will move to bring the corridor to full ADA compliance.
Transit	Affect transit routes?		X	No transit routes are identified along or near the Project Corridor. The project will not affect any transit routes.
Controversy	Be controversial or be likely to cause controversy?		X	The project is not expected to cause controversy or be controversial.

Social, Economic, and Environmental Impacts				
Issue	**Questions**	**Degree of Impact**		
	Will the project . . .	**Yes**	**No**	**Impact Description or Page Reference**
CULTURAL RESOURCES				
Historical Archaeological Cultural	Affect any historical, archaeological, or cultural site?		X	There are no known properties that appear to be included in the Right of Way for this project. There are three properties that are adjacent to the right-of-way, two of which will require temporary easement to construact sidwalk up to the right-of-way line – Brainerd Water Tower and Brainerd Public Library. It is anticipated that these will be deemed as having no adverse impacts and be processed via temporary occupancy. The Bethlehem Evangelical Church at 8th Ave NE is under review for eligibility as a historic property, with draft determination expected in May 2023. At this time it is not known whether this property will be designated as historic or whether the current project will have any impact. Further coordination with CRU and SHPO is needed in the coming months to resolve these sites.
Tribal Lands	Affect Tribal Lands?		X	The project will not affect any tribal lands.

Notes clarifying SEE concerns:

MITIGATION and COMMITMENTS

Table 1. Mitigation Commitments

Topic	Commitment
Northern Long Eared Bat	**General AMM 1**: Ensure all operators, employees, and contractors working in areas of known or presumed bat habitat are aware of all FHWA/FRA/FTA (Transportation Agencies) environmental commitments, including all applicable AMMs. *Notify contractor(s) during the pre-construction meeting. Bat sightings (including sick, injured, and/or dead bats) on the project must be reported to OES wildlife ecologist (612-741-7678).* **Lighting AMM 1 & AMM 2:** Direct temporary lighting, if used, away from wooded areas during the bat active season (April 1 to Oct 31, inclusive). If installing new or replacing existing permanent lights, use downward facing, full cut-off lens lights (with same intensity or less for replacement lighting); or for those transportation agencies using the BUG system developed by the Illuminating Engineering Society, be as close to 0 for all three ratings with a priority of "uplight" of 0 and "backlight" as low as practicable. *Please contact Susan Zarling (MnDOT Lighting Engineer) at 651-234-7052 with questions about approved products.* **Tree Removal AMM 2:** Restrict all tree clearing activities to when NLEB are not likely to be present. *Winter tree clearing required – tree clearing allowed November 1 to March 31, inclusive.* **Tree Removal AMM 3**: Tree removal must be limited to that specified in project plans and ensure that contractors understand clearing limits and how they are marked in the field (e.g., install bright colored flagging/fencing prior to any tree clearing to ensure contractors stay within clearing limits). **Tree Removal AMM 4***:* Tree removal must not remove documented NLEB roosts, or trees within 0.25 miles of roosts; or documented foraging habitat any time of the year.
Migratory Birds	The proposed action may impact protected birds (see bridge inspection report). The proposed action should follow guidance included in the documents below to avoid and minimize impacts to protected birds (e.g., netting, etc.). Bridges, see MnDOT Boiler Plate, Protection of Fish and Wildlife Resources Tree Clearing, see: Tree Clearing Timing Requirement Technical Memo (22-05-ENV-01) USFWS Conservation Measures, see: https://www.fws.gov/media/nationwide-standard-conservation-measures
Bald and Golden Eagles	It has been determined that the project will not affect eagles protected under the Federal Bald and Golden Eagle Protection Act.
MNDNR	1There is one Public Waters watercourse within the current project limits: Mississippi River at Bridge #5060. All DNR Public Waters should be identified as an 'Area of Environmental Sensitivity' on plans. This designation assures special protection during construction though your Standard Specifications for Construction #1717 (Air, Land, and Water Pollution), #2573.3 (A.3 stage the work to minimize sediment entering these waters) & use native vegetation per your vegetation establishment recommendations. The Mississippi River is a DNR public water, a public water work permit will be required. The project will require review and authorization under a DNR Public Waters Work Permit. The DNR General Permit (GP2004-0001) is typically applied to MnDOT bridge/culvert projects. As the project moves forward, design of the crossing should meet the conditions listed in the GP. The design and timing of the work will need to follow DNR standard requirements, including use of natural net erosion control blanket, use of native vegetation, crossings designed for fish passage requirements, and limits to work in the water (Work Exclusion dates) for allowing undisturbed fish migration and spawning. Please review all the conditions of the Public Waters Work General Permit (state.mn.us) and integrate their requirements into the project design. Specific items to incorporate into design and construction are also listed below. Additional information, including options on how to meet the conditions of the GP are presented in the collection Best Practices for Meeting DNR General Public Waters Work Permit GP 2004-0001 (state.mn.us).

- Construction and demolition methods shall be submitted for review and approval at a later date. See the GP2004-0001 condition 'TEMPORARY IMPACTS DURING CONSTRUCTION' and items 'A' though 'L' for subjected conditions. This is normal procedure for bridge or culvert projects as we recognize that construction methods are not finalized until a contractor is chosen. Construction contractors shall be made aware of this condition as they may be held responsible for compliance.

- Remind contractors that a separate DNR water use permit is required if the projects construction will require the use of more than 10,000 gallons of water per day or 1 million gallons per year from any surface water or ground water. DNR GP1997-0005 (temporary water appropriations) covers a variety of temporary activities associated with road construction. Applications should be submitted when dewatering results in transferring water to a differing waterbody (groundwater to surface water or from one surface water to another) or withdrawing water for use as dust control. Typically, temporary stream diversions do not require a separate water use permit, particularly if there is a separate Public Waters permit for the project and diversion plans are approved through that permits construction method approval process. An additional Infested Water Diversion or Transportation Permit may be required if the project will pump water from a surface water designated as an infested water. For projects lasting longer than one year or exceeding 50 million gallons an individual appropriations permit may be required. Information is located at: http://www.dnr.state.mn.us/waters/watermgmt_section/appropriations/permits.html

- Revegetation of disturbed soils should include native mixes in areas that are not proposed for mowed turf grass. Please utilize the native recommendations developed by BWSR (https://bwsr.state.mn.us/vegetation-establishment-and-management) or MnDOT' in the 'Vegetation Establishment Recommendations' (https://www.dot.state.mn.us/environment/erosion/vegetation.html). In addition, for meeting DNR concerns, revegetation may include woody vegetation (trees and shrubs) in addition to grasses and/or forbs. Please contact District representatives for the Erosion Control & Stormwater Management Unit, Roadside Vegetation Management Unit, and the Districts Maintenance staff to help determine appropriate permanent revegetation plans.

- If scope is expanded or there is opportunity, the incorporation of a passage bench is a standard design feature for MnDOT bridges. "Aggregate surfacing" is an alternative design to allow animal passage below the bridge, which may be a better alternative depending on the landscape of the site.

- Riprap and geotextile fabric. Be aware that we are increasingly recommending not using geotextile under in water riprap. This is due to concerns of micro plastic contribution to the water as well as concerns of severing ecological connectivity within the streambank profile. It is recommended that riprap along streambanks and/or culvert aprons be installed with a granular filter per MnDOT specifications for riprap (Spec 2511.3.B, Spec 3601.B.1 and Table 3601-2).

Blanding's turtles (Emydoidea blandingii), a state-listed threatened species, have been reported from the vicinity of the proposed project and may be encountered on site. If Blanding's turtles are found on the site, please remember that state law and rules prohibit the destruction of threatened or endangered species, except under certain prescribed conditions. If turtles are in imminent danger, they should be moved by hand out of harm's way, otherwise they should be left undisturbed.

- Due to entanglement issues with small animals, use of erosion control blanket shall be limited to biodegradable or "natural net" types, and specifically not allow products containing plastic mesh netting or other plastic components. In the 2018 MnDOT Standards Specifications for Construction, Category 3N or 4N products meet these concerns. The new 2020 Standard Specifications no longer

	have plastic mesh in any temporary rolled product, as plastic mesh has been eliminated from all these categories. Thus all categories of temporary rolled products now meet these concerns. Though be aware that hydro-mulch products may contain small plastic fibers to aid in its matrix strength. These loose fibers could potentially re-suspend and make their way into Public Waters. Please review mulch products and not utilize any materials with plastic fiber additives in areas that drain to Public Waters. In addition, inspectors should be also looking for the presence of turtles when erosion control inspections occur. Further details for turtle protection will be provided by the DNR to the winning bidder and workers on site. Also be aware that hydro-mulch products may contain small plastic fibers to aid in its matrix strength. These loose fibers could potentially re-suspend and make their way into Public Waters. As such, please review mulch products and not allow any materials with plastic fiber additives in areas that drain to Public Waters. • The Blanding's Turtle Fact Sheet (state.mn.us) describes the habitat use and life history of this species. The fact sheet also provides two lists of recommendations for avoiding and minimizing impacts to this rare turtle. Please refer to both lists of recommendations and apply those that are relevant to your project. Please note the items for road design. These include new curb being a mountable design (Type D, Type R, or Type S) in order to also allow animals to exit the roadway should they attempt to cross the road. On culverts between wetlands and on streams they should be oversized (min 36") to allow them opportunity to utilize these structures for safe passage under the road. If greater protection for turtles is desired, the second list of additional recommendations can also be implemented. The attached flyer should be given to all contractors working in the area. • On culverts between wetlands and on streams they should be oversized (minimum 36") and without a safety grate to allow them opportunity to utilize these structures for safe passage under the road. Note that "minimum 36" is a rule of thumb. Arch culverts are preferred over round pipes for critter movement, but safety grates (or large riprap) are an impediment regardless of shape. A round pipe without grates is better than an arch pipe with grates. A key to animal movement through structure is a clear access and sight line. **Peregrine Falcons** (Falco peregrinus), a state-listed species of special concern, have been documented nesting on Bridge #5060. Please avoid construction during the breeding season (April through July). If construction will take place during this time, the bridge should be inspected for falcon activity prior to the onset of any work activity on the actual structure of the bridge. Please report any nest or other sightings during the breeding season to, DNR Regional Nongame Specialist. **The Mississippi River** is a designated State Water Trail. Construction should be aware of this use and plan for recreational use during construction. Should there be impact that will require temporary obstruction of this trail, work with MnDOT in alerting the general public during times when conditions are unsafe. Please continue to coordinate with the DNR Parks and Trails Area Supervisor Wade Miller. Should a temporary occupancy letter be required for 4(f) determination, it should follow the new outline for 4(f) coordination between DNR and MnDOT.
Vegetation Protection	There may be an opportunity to protect existing trees located adjacent to MnDOT right of way. Areas of primary concern are trees located along TH 210 just east of NW 4th Street on the south side of highway, and between NW 3rd Street & the Mississippi River Bridge on both sides of the highway. The use of temporary fence per MnDOT 2572.3A.2 will be the protection item of choice in these locations. Additionally, Temporary Fence - 2572.3A.1 and Clean Root Cutting - 2572.3A.2 will be followed.

Regulated Waste	**Treated Wood** – Treated wood must be disposed of at a Minnesota MPCA permitted mixed municipal solid waste landfill or MPCA permitted industrial landfill. This material needs documentation showing the landfill received that material. **Mercury Lamps** – TH HID bulbs must be recycled with MnDOT's approved regulated waste contractor, Green Lights Recycling. This material needs documentation showing the recycler received the material. We also have the option to reuse on site, if so, document. **PCB Containing Electronic Components** – The construction contractor will need to use a MnDOT Pre-Qualified Asbestos Abatement contractor for the removal of electronics. Coordination should be included in the contract to ensure the oversight contractor is on site during removal. The capacitors must be recycled with MnDOT's approved regulated waste contractor, Green Lights Recycling. This material needs documentation showing the recycler received the material. We also have the option to reuse on site, if so, document. **Bridge Approach Panels** – During removals, there is potential for bit-felt to be found in this area and that could contain asbestos or PCBs. If found, please contact Victoria Swanson immediately to get an emergency consultant hired to investigate. **Traffic Signals / Lighting** – If any known Transite™ or Asbestos Cement Pipes (ACP) are removed under the signals, contact Victoria Swanson. A MnDOT Pre-Qualified contractor is required to oversee the removal. The HID bulbs must be recycled with MnDOT's approved regulated waste contractor. This material needs documentation showing the recycler received the material. The capacitors must be treated as a PCB waste unless it states "No PCBs" on the capacitor. The capacitors must be recycled with MnDOT's approved regulated waste contractor. This material needs documentation showing the recycler received the material. If the capacitors state "No PCBs", they can recycle or dispose of at an MPCA-permitted sanitary or industrial waste landfill. Documentation should be obtained that shows this was handled properly and that documentation placed in the project pile for future reference. The paint on some of the component of the signal poles at Gillis Ave & TH 210, N 8th St & TH 210, and N 4th St & TH 210 is above the 1.0 milligrams per square centimeter threshold per the attached District 3 Lead Paint Testing Report. Any light posts and signal poles containing lead paint will need to be disposed of per the following website: http://www.dot.state.mn.us/environment/regulatedmaterials/paintremoval.html
Construction Impacts	• Utilize standard noise and dust specifications. Adhere to local ordinances during construction. • Conduct pre-construction surveys and vibration monitoring of any buildings or features of any areas of concern as required. • A Business Liaison will be provided by MnDOT for the project and will communicate with affected businesses before and during construction. • MnDOT will notify emergency responders of traffic changes and detours in advance of construction
Pedestrian and Bicycle	• 10-ft shoulders should be provided where a shared-use path is not present • Consider narrowing driveways or tightening the curb radii • Roundabouts with multilane approaches should be avoided whenever possible • Railings on the trail side of a bridge should be at least 4'6" tall • Provide high-visibility crosswalk markings and warning signs for active transportation users crossing TH 210 at unsignalized intersections and roundabouts • Consider adding either advanced yield signs or pedestrian hybrid beacons at unsignalized intersections • Ensure adequate lighting for active transportation users crossing TH 210

PUBLIC AND AGENCY INVOLVEMENT (PERMITS/APPROVALS)

An Early Notification Memo was distributed to various individuals at MnDOT and the Minnesota Department of Natural Resources (DNR). Responses received are included in Appendix B. The following permits/ approvals are required for the project:

Approval of this Categorical Exclusion by MnDOT and the Federal Highway Administration.

Section 404 Regional General Permit (RGP) US Army Corps of Engineers

DNR Public Water Works Permit

NPDES/SDS Construction Stormwater General Permit from the Minnesota Pollution Control Agency

Wetland Conservation Act Wetland Replacement Plan

Temporary Occupancy for Historical Properties – Brainerd Water Tower (pending)

Temporary Occupancy for Historical Properties – Brainerd Public Library (pending)

Public Involvement

The public involvement activities for the project focused on three phases:

- Phase 1 occurred in the Fall of 2020 and focused on collecting public input regarding key issues and concerns in the project area. The input was gathered via an online survey.
- Phase 2 occurred in Fall of 2021 and served as an opportunity for the Brainerd Lakes community to learn more about the improvement options being considered provide feedback on the potential solutions. Phase 2 efforts included online engagement with an interactive comment map, detailed information packets, Chamber of Commerce meetings (both in-person and virtual), social media, and email and phone calls with project team members.
- Phase 3 took place in the Summer of 2022. As part of Phase 3 MnDOT connected with the Brainerd area general public and business community to inform and gain feedback on the proposed design. Outreach activities included an in-person business meeting and open house on Aug. 31, 2022 and an online self-paced engagement site that was available to the public from Aug. 22—Sept. 12, 2022.

Further coordination will occur throughout the project development process, including the construction phase. MnDOT's project website for the project is available at Hwy 210/Washington St. Brainerd - MnDOT (state.mn.us). The website includes all materials and summaries from these meetings. Visitors can also sign up at the site for periodic email updates as the project progresses.

Attachments

Appendix A – Draft ICE Reports

- ICE Memo TH 210 at Baxter Drive
- ICE Memo TH 210 at NW 4th Street
- ICE Memo TH 210 at N 4th Street
- ICE Memo TH 210 at N 6th Street
- ICE Memo TH 210 at N 8th Street
- ICE Memo TH 210 at 13th Street-Gillis Avenue
- ICE Report TH 210 East Mall Area

Appendix B – Correspondence / Miscellaneous

- FHWA/MnDOT Programmatic Categorical Exclusion Attachment "B'
- DNR ENM Response Letter
- MnDOT Cultural Resources Determination Letter (pending)
- SHPO response Letter (response to request for consultation) (pending)
- MnDOT Office of Environmental Stewardship Contaminated Properties Letter and Draft Phase I
- MnDOT Office of Environmental Stewardship Section 7 Determination Letter
- US Fish and Wildlife Determination Letter
- Bridge Response and Inventory & Inspection Report
- MnDOT Office of Transit, Bicycle and Pedestrian Section Review
- MnDOT Roadside Vegetation Management Unit Review
- MnDOT Noise Unit Review
- MnDOT Context Sensitive Solutions Review
- MnDOT Railroad Review
- MnDOT Tribal Notification

Appendix C – Wetland and Floodplain Assessments

- Floodplain Assessment
- Wetland Impact Assessment and Two Part Finding

Appendix D – Environmental Justice

- EJ Screen Data Tables
- Minority Populations Map
- Low Income Populations Map

Appendix E – Figures

- Draft Geometric Layout with Typical Sections
- MPCA Construction Stormwater E-Map

APPENDICES

APPENDIX A

Draft Ice Reports

MEMORANDUM

TO: Ken Hansen, PE
MnDOT District 3 Traffic Engineer

FROM: Graham Johnson, PE, PTOE (Lic.MN, IA, SD)
Justin Anibas, PE (Lic. MN)

DATE: August 9, 2022

RE: TH 210 at Baxter Drive Intersection Control Evaluation (ICE) Report
SEH No. MNT03 152201 14.00

INTRODUCTION

This memorandum summarizes the Intersection Control Evaluation (ICE) process for the intersection of Trunk Highway (TH) 210 and Baxter Drive in Brainerd, Minnesota. The Minnesota Department of Transportation (MnDOT) ICE is an objective process used to investigate and determine the optimal traffic control that should be provided at an intersection to serve the existing conditions and future needs. This memorandum was prepared for MnDOT by SEH Inc.

As part of a project along TH 210 between Baxter Drive and Pine Shores Road, the intersection of TH 210 and Baxter Drive was evaluated and is proposed to remain under traffic signal control after the project is complete.

The location of the study intersection for this ICE report is shown in **Figure 1**. The proposed intersection control for the TH 210 and Baxter Drive intersection was analyzed based on safety, signal warrants, traffic operations, and pedestrian and bicycle accommodations.

The scope and content of this ICE report was reviewed and agreed to by MnDOT prior to the layout and ICE submittal process. This report summarizes the ICE process and recommendation for the TH 210 and Baxter Drive intersection based on a Phase I analysis according to the *2017 MnDOT ICE Manual*.

APPROVAL

I hereby certify that this report was prepared by me or under my direct supervision, and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.

_____ _____
Graham Johnson, PE, PTOE, MN License No. 45429 Date

Approved By:

_____ _____
MnDOT District 3 Traffic Engineer Date

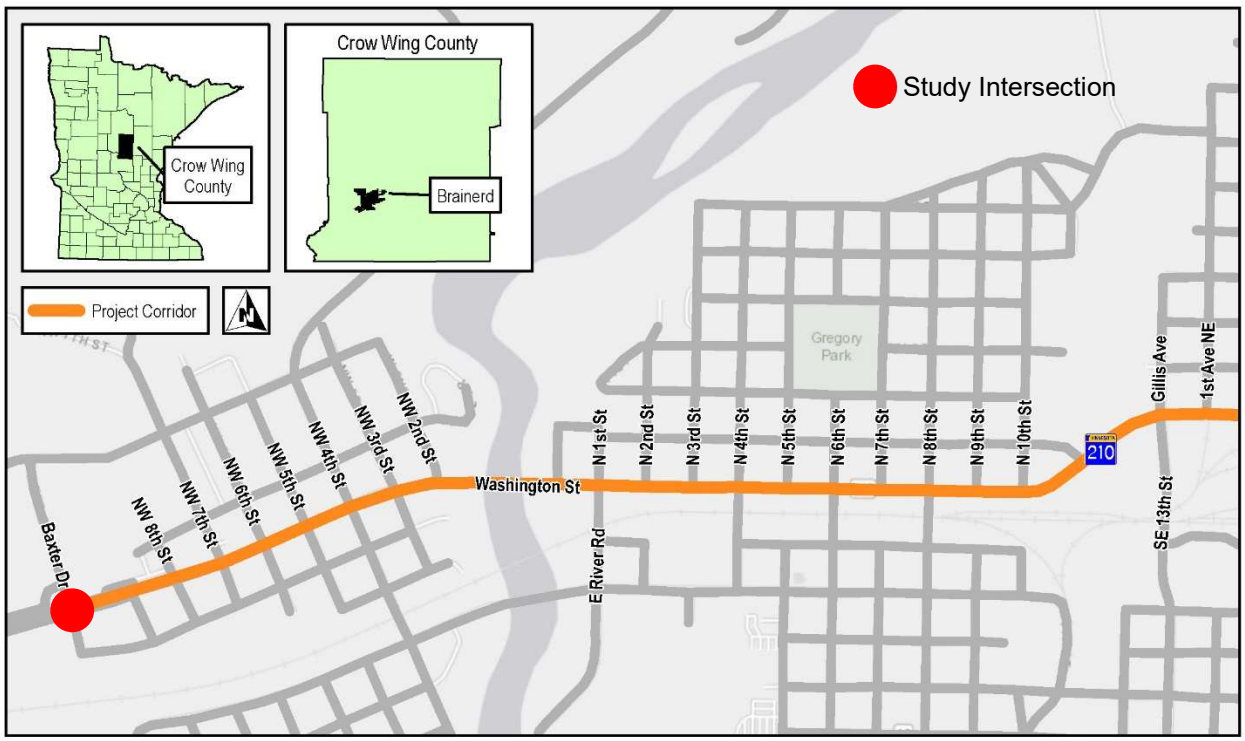
PROJECT DESCRIPTION

MnDOT is conducting the corridor planning study along a 3.9-mile segment of TH 210 to identify the future vision for highway corridor through Brainerd. Reconstruction of TH 210 between Baxter Drive and Pine Shores Road is anticipated to begin in 2025; SP 1805-80.

The primary purpose of the corridor study is to better understand the community issues, needs and use of the roadway, assess improvement options, select a preferred alternative, and prepare a geometric layout. The focus of the improvements is to improve pavement conditions and traveler safety, accommodate the Americans with Disabilities Act (ADA) requirements, and enhance pedestrian accommodations.

For more detailed traffic information, see both the *Existing and 2045 No Build Conditions Report – TH 210/Washington Street Corridor Study* and the *TH 210 Build Conditions Report*.

Figure 1 Project Location



EXISTING CONDITIONS

TH 210 is a major east-west principal arterial through the City of Brainerd that connects near-by cities and regional commerce. TH 210 is generally a 4-lane divided roadway through the City of Brainerd; the posted speed limit is 35 miles-per-hour (mph) at the study intersection; the west leg transitions to 45 mph approximately 400 feet west of the intersection.

Baxter Drive is a local roadway providing access to commercial land uses north and south of TH 210; the posted speed limit is 30 mph.

The nearest existing traffic signals along TH 210 include Cypress Drive approximately 2,300 feet west and NW 4th Street approximately 2,400 feet east.

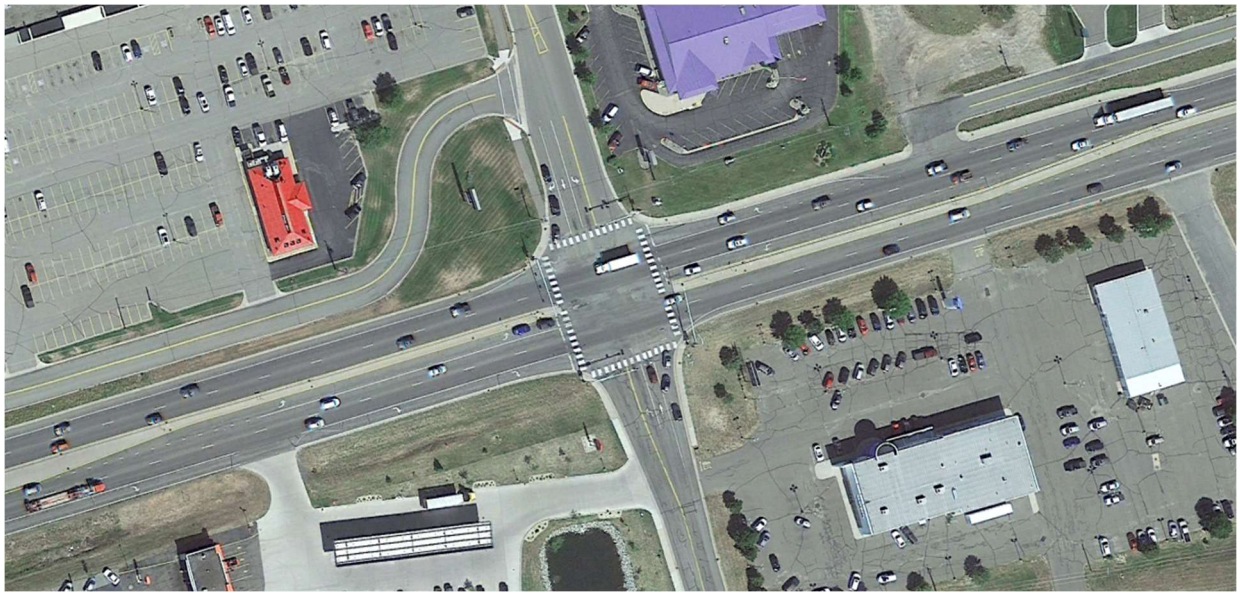
Intersection Characteristics

The existing intersection currently operates with traffic signal control and includes marked pedestrian crossings on all four legs. Eastbound and westbound TH 210 left turns operate with protected left turn phasing only, while the minor street approach left turns operate with protected and permissive left turn phasing.

The existing lane geometrics are described below and shown in **Figure 2**.

- Eastbound Approach: left turn lane, two through lanes, and a right turn lane.
- Westbound Approach: left turn lane, two through lanes, and a right turn lane.
- Northbound Approach: separate left, through, and right turn lanes.
- Southbound Approach: separate left, through, and right turn lanes

Figure 2 Existing Intersection



Traffic Volumes

TH 210 has an existing 2019 Average Annual Daily Traffic (AADT) volume of 24,100 vehicles west of the intersection. While no AADT volumes are provided on the minor street, the existing intersection count data suggests approximately 6,000 on the north leg and 4,000 on the south leg.

The existing intersection turning movement data was collected in August of 2018 as part of a signal timing project along TH 210 and TH 371. **Figure 3** includes the existing AM and PM peak hour volumes; **Attachment 1** includes the raw existing intersection count data.

Crash Analysis

Intersection crash data for the study intersection was collected from the MnDOT Crash Mapping Analysis Tool (MnCMATv2) for a five-year period between 2014 and 2018 as part of the larger corridor study.

The crash rate at an intersection is expressed as a number of crashes per million entering vehicles (MEV). The critical crash rate is a statistical value that is unique to each intersection and is based on

vehicular exposure and the statewide average crash rate for similar intersections. An intersection with a crash rate higher than the critical rate can indicate a safety concern at the intersection and the site should be further reviewed.

The intersection had a total of 33 crashes during the 5-year analysis period:

- 29 of the 33 crashes were rear end crashes: 15 of the rear end crashes were in the westbound direction and 10 were in the eastbound direction, 2 in the northbound direction and 2 southbound. This could indicate that backups are worse for westbound vehicles.
- 3 of the 33 crashes were sideswipe crashes, likely due to vehicles changing lanes to avoid vehicles that are slowing or stopping during congestion.

Table 1 summarizes the crashes for the study intersection; additional crash information is provided in **Attachment 2**. Based on the crash rate, the intersection does not exceed the critical crash rate.

Table 1 Intersection Crash History (2014-2018)

TH 210 at:	Crash Severity					Crash Rates	
	Fatal & Severity A	Severity B	Severity C	Property Damage	Total	Int. Rate	Critical Rate
Baxter Drive	0	0	6	27	33	0.69	1.02

PROPOSED CONDITIONS

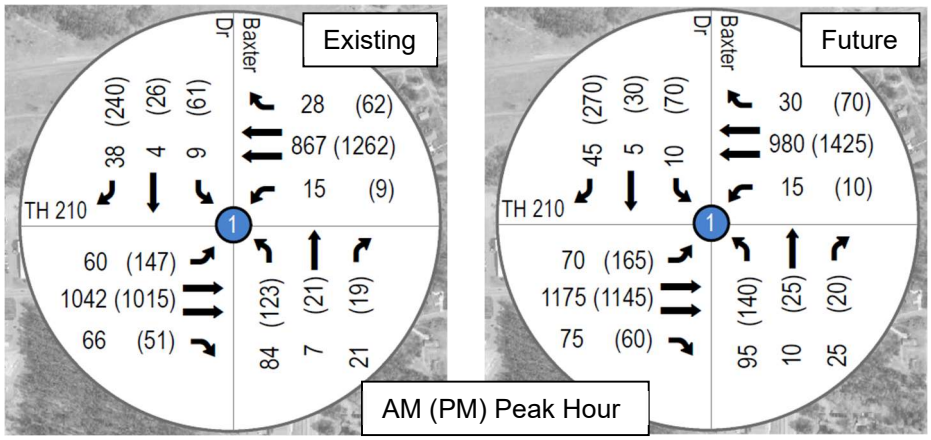
The current layout for the TH 210 corridor between Baxter Drive and Pine Shores Road addresses the needs and use of the roadway, improves pavement conditions, safety, and meets ADA requirements.

The TH 210 and Baxter Drive intersection is located in a segment of the reconstruction project that will primarily include mill and overlay of TH 210 to improve pavement conditions, with modifications for full ADA compliance and wider sidewalks. Therefore, no geometric changes are proposed at this intersection.

Future Traffic Volumes

Traffic forecasts were developed for the entire TH 210 corridor as part of the larger study effort. Future 2045 forecast volumes were developed based on a linear growth rate of 0.5% per year based on historical AADT volumes, population data, and input from the project team. **Figure 3** presents both the existing and future 2045 AM and PM peak intersection volumes.

Figure 3 Existing and Future 2045 Intersection Volumes



Warrant Analysis

Traffic control warrant analysis was conducted on the existing and future traffic volumes following the Minnesota Manual on Uniform Traffic Control Devices (MnMUTCD) guidelines; all-way stop control warrants were not analyzed as it is not considered a viable control option along TH 210.

Warrants 1 (8-hour), 2 (4-hour), 3 (peak hour), and 7 (crash warrant) were included in the analysis. The following assumptions were used in the analysis:

- All minor street right turning volume was removed from the approaches.
- 70% thresholds used; west leg has adjacent posted speed exceeding 40 mph; posted at 45 mph.
- Warrant 7 was not applicable at the intersection due to insufficient correctable crashes.

The results of the traffic signal warrant analysis are provided in **Table 2**. The intersection currently meets Warrants 1, 2, and 3; the detailed signal warrant analysis is provided as **Attachment 3**.

Table 2 Traffic Signal Warrant Analysis Summary

MnMUTCD Signal Warrant	Hours Needed	Existing		Future 2045	
		Hours Met	Warrant Met?	Hours Met	Warrant Met?
Warrant 1A – 8-hour Minimum Volume	8	5	Not Met	**8**	**MET**
Warrant 1B – 8-hour Interruption of Flow	8	**11**	**MET**	**11**	**MET**
Combination of Warrant 1A and 1B	8	**9**	**MET**	**10**	**MET**
Warrant 2 – 4-hours	4	**11**	**MET**	**11**	**MET**
Warrant 3 – Peak Hour	1	**10**	**MET**	**11**	**MET**

System Limitations and Consistency

TH 210 is a principal arterial through the City of Brainerd that experiences heavy directional volumes in both the AM and PM peak hours, throughout the day, and in the summer months with high tourist traffic. The two adjacent major intersections are both currently signalized.

The study intersection is part of an existing TH 210 signal system coordinated to provide priority to the peak direction of flow, reduce mainline delays, and provide a high level of vehicle progression through the corridor. The coordinated signal system includes all existing traffic signals along TH 210 between TH 371, in the City of Baxter, and 4th Avenue NE in east Brainerd.

Due to limited right-of-way along the TH 210 corridor, expansion of the roadway to accommodate a larger intersection footprint is not feasible. Roundabout intersection control would result in major impacts to adjacent parcels and structures adjacent to the intersection and along the corridor.

In addition, both all-way stop control and roundabout control would alter the traffic flow along TH 210 and severely impede the progression of traffic from the adjacent coordinated signal systems.

Therefore, all-way stop and roundabout intersection control was not considered feasible for this intersection due to right-of-way limitations and the interruption to the existing coordinated signal system.

Traffic Operations

Evaluation of the intersection traffic operations were conducted as part of the overall corridor study using VISSIM software. The evaluation included analysis of the existing conditions, 2045 No Build conditions, and the recommended 2045 Build conditions, which included no geometric changes at the intersection.

The average delay per vehicle and Level of Service (LOS) results for each approach and the overall intersection are provided in **Table 3** for each scenario; all three scenarios include traffic signal control. For more detailed traffic information, see both the *Existing and 2045 No Build Conditions Report – TH 210/Washington Street Corridor Study* and the *TH 210 Build Conditions Report*.

Table 3 Traffic Operations Summary

Scenario	Peak Hour	Approach Delay (sec/veh / LOS)				Intersection Delay (sec/veh / LOS)
		Eastbound	Westbound	Northbound	Southbound	
Existing Conditions	AM	7.9 / A	6.0 / A	**42.0 / D**	19.0 / B	9.1 / A
	PM	20.8 / C	20.5 / C	**45.3 / D**	32.2 / C	23.2 / C
2045 No Build Conditions	AM	9.0 / A	5.8 / A	**43.6 / D**	18.8 / B	9.7 / A
	PM	17.0 / B	14.6 / B	**52.7 / D**	**43.0 / D**	20.6 / C
2045 Build Conditions	AM	15.5 / B	15.1 / B	**36.1 / D**	18.3 / B	16.4 / B
	PM	22.6 / C	29.3 / C	**47.3 / D**	**46.5 / D**	29.3 / C

Based on the results, the intersection is expected to operate at a LOS C or better in all scenarios. The minor street approaches operate with longer delays due to the long cycle length required for coordination along TH 210. It should be noted; the Build conditions do operate slightly worse than the No Build conditions, this is due to more vehicles entering the intersection with improvements to the adjacent intersections along the corridor.

Pedestrian Considerations

The existing intersection provides crosswalks on all four legs of the intersection; however, the existing facilities are not ADA compliant.

As part of the TH 210 reconstruction project, the intersection will be improved to meet ADA requirements. New Accessible Pedestrian Systems (APS) pedestrian push buttons are proposed to be installed and made operational as part of this project, and all pedestrian curb ramps will be upgraded to be ADA compliant.

Revised Signal System

The existing signal system is vehicle actuated and coordinated along TH 210. The TH 210 left turn phases operate under protected phasing only; the minor street approaches have both protected and permissive left turn phasing.

As part of the signal replacement, the new signal system is to remain vehicle actuated and coordinated along TH 210. All four approaches will include Flashing Yellow Arrow (FYA) which provides the flexibility of running both protected and permissive phasing by time-of-day schedules on all approaches and improves the overall safety of the intersection.

RECOMMENDATION

Based on the analysis included in this report, and as part of the larger TH 210 corridor study, it is recommended to retain traffic signal control at the intersection of TH 210 and Baxter Drive.

Traffic signal control is currently warranted at the intersection and traffic operations are acceptable in both the existing conditions and future forecast year. The improvements at the existing intersection will continue to provide a safe intersection for all users.

Roundabout and all-way stop control was not considered feasible at this intersection due to potential right-of-way constraints and impacts, and the impact to the coordinated signal system that provides positive vehicle progression along TH 210.

Attachment 1: Turning Movement Data
Attachment 2: Crash Data
Attachment 3: Warrant Analysis

cc: Luke Wehseler, PE MnDOT District 3
Zachary Whitley, PE MnDOT District 3

File Name: S:\2018\180119\TO OTHERS\TMC\PETRO\342_TH 320 AND BAXTER DRIVE.ppd
Start Date: 8/23/2018
Start Time: 6:00:00 AM
Site Code: 00000342
Comment 1: 342_TH 210 AND BAXTER DRIVE
Comment 2: 0
Comment 3: data by: Alliant Inc
Comment 4: TURN MOVEMENT COUNT

	BAXTER DRIVE Southbound				TH 210 Westbound				BAXTER DRIVE Northbound				TH 210 Eastbound			
Start Time	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds
06:00 AM	1	1	0	0	1	57	1	0	3	0	2	0	1	59	0	0
06:15 AM	1	0	1	0	2	65	1	0	6	0	3	0	1	88	0	0
06:30 AM	1	0	5	0	2	103	2	0	8	0	6	0	4	148	1	0
06:45 AM	4	1	3	0	2	125	2	0	11	0	4	0	5	154	7	0
07:00 AM	2	0	2	0	1	98	3	0	10	0	2	0	3	143	14	0
07:15 AM	1	0	3	0	4	125	0	1	15	0	1	0	3	186	9	0
07:30 AM	1	0	6	0	6	193	1	0	16	0	7	0	8	227	14	0
07:45 AM	1	0	7	0	3	186	8	0	26	3	2	0	11	237	18	0
08:00 AM	1	1	14	0	3	165	8	0	20	3	7	0	17	163	14	1
08:15 AM	6	3	11	0	3	178	11	0	22	1	5	0	24	192	20	0
08:30 AM	8	1	22	0	4	170	7	0	26	3	4	0	24	193	14	0
08:45 AM	7	3	23	0	5	208	9	0	23	3	2	0	27	206	14	0
09:00 AM	3	6	28	0	2	194	12	0	20	2	2	0	16	159	13	1
09:15 AM	6	2	26	0	6	184	6	0	26	4	5	0	22	222	18	0
09:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
09:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10:30 AM	13	2	43	0	5	250	11	0	34	9	4	0	33	238	18	0
10:45 AM	13	5	57	0	3	269	14	0	30	7	13	0	38	210	9	0
11:00 AM	7	7	66	1	10	224	17	0	34	7	8	0	40	224	22	0
11:15 AM	11	2	55	0	7	235	21	0	24	5	5	0	48	263	15	0
11:30 AM	8	6	62	0	2	263	13	0	31	9	10	0	46	243	16	0
11:45 AM	20	3	58	0	5	236	20	0	37	9	5	0	38	244	22	0
12:00 PM	12	7	72	0	8	263	12	0	34	11	6	0	46	247	23	0
12:15 PM	12	7	62	0	6	259	11	0	53	8	8	0	55	238	22	0
12:30 PM	13	7	64	0	8	257	12	1	52	4	4	1	37	247	25	0
12:45 PM	16	7	63	0	6	275	16	0	34	6	5	0	32	255	24	1
01:00 PM	21	6	51	1	0	249	11	0	33	8	1	0	52	286	20	1
01:15 PM	8	17	54	0	7	217	12	0	42	6	7	0	36	237	33	1
01:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
01:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
02:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
02:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
02:30 PM	15	9	62	0	2	280	7	0	23	5	5	0	35	250	21	0
02:45 PM	10	7	49	0	1	226	16	0	40	4	5	0	47	245	27	0
03:00 PM	16	7	48	0	4	254	4	0	29	5	6	1	31	238	28	0
03:15 PM	12	9	53	0	3	255	10	0	32	2	3	0	23	237	18	0
03:30 PM	14	7	54	0	4	263	17	0	28	4	2	0	39	230	19	0
03:45 PM	12	6	37	0	5	258	6	0	27	7	2	0	37	256	16	1
04:00 PM	14	5	57	0	2	269	16	0	30	5	4	0	27	226	15	1
04:15 PM	19	4	55	0	2	241	14	0	29	4	5	0	38	231	9	0
04:30 PM	19	8	63	0	1	323	13	0	32	8	4	0	36	233	18	0
04:45 PM	10	7	40	0	3	331	19	0	26	3	5	0	44	277	7	2
05:00 PM	14	4	87	0	1	299	12	2	36	7	6	1	33	238	10	0
05:15 PM	18	7	50	0	4	309	18	0	29	3	4	0	34	267	16	2
05:30 PM	10	7	45	0	5	256	10	0	30	4	3	0	33	226	15	0
05:45 PM	11	7	46	0	5	216	8	0	27	2	7	0	28	221	6	0

Intersection Safety Screening

Intersection: TH 210 at Baxter Drive

Crash Data: 2014 to 2018 (5-years)

Crashes by Crash Severity	
Fatal	0
Incapacitating Injury	0
Non-incapacitating Injury	0
Possible Injury	6
Property Damage	27
Total Crashes	33

Intersection Characteristics	
Entering Volume	26,100
Traffic Control	Signals
Environment	Urban
Speed Limit	35 mph

Annual crash cost = $140,640

Statewide Comparison

Signals: high volume, low speed

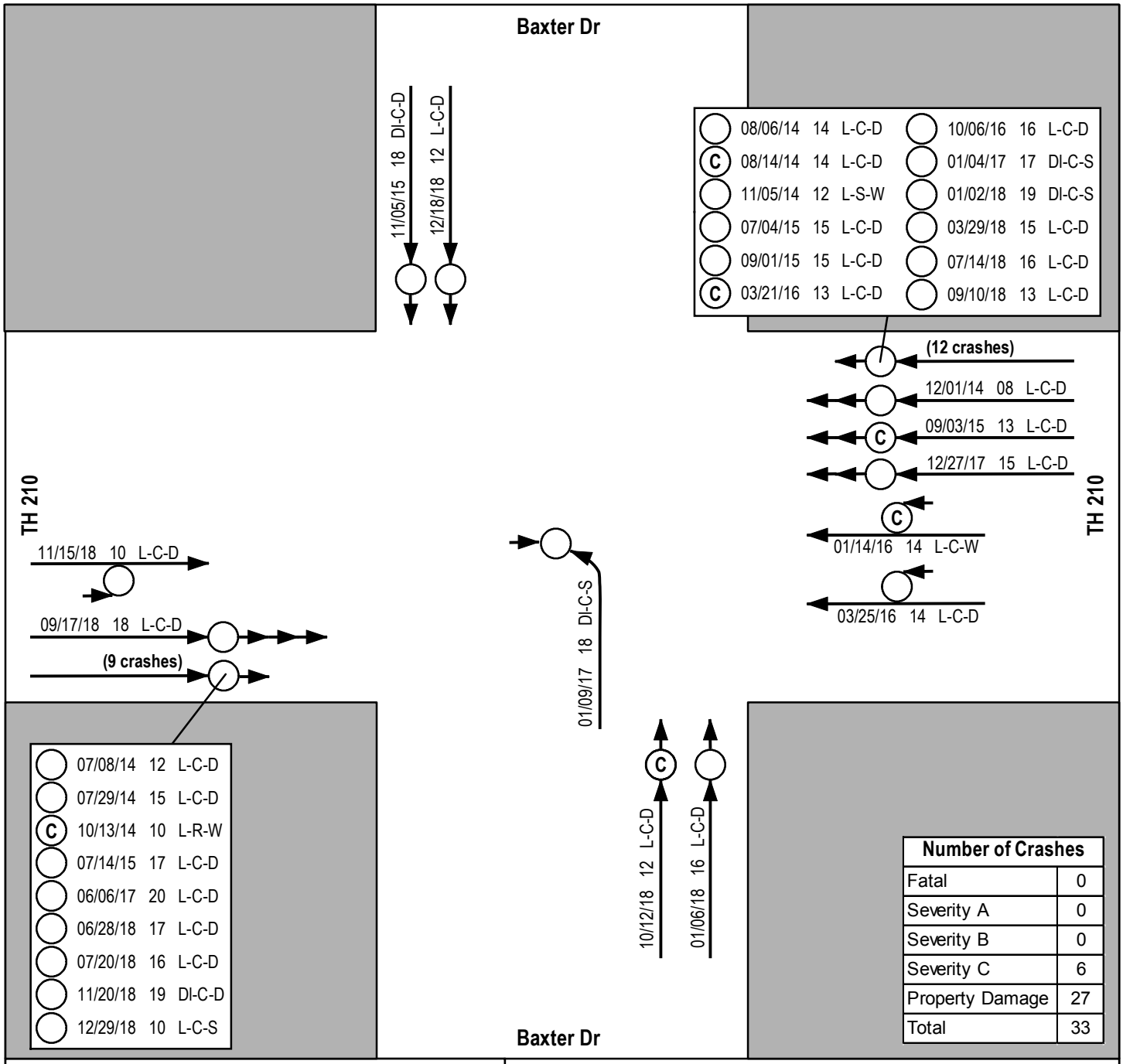
Total Crash Rate	
Observed	0.69
Statewide Average	0.70
Critical Rate	1.02
Critical Index	**0.68**

Fatal & Serious Injury Crash Rate	
Observed	0.00
Statewide Average	0.76
Critical Rate	3.44
Critical Index	**0.00**

The observed crash rate is the number of crashes per million entering vehicles (MEV). The critical rate is a statistical comparison based on similar intersections statewide. An observed crash rate greater than the critical rate indicates that the intersection operates outside the expected, normal range. The critical index reports the magnitude of this difference.

The observed total crash rate for this period is 0.69 per MEV; this is 32% below the critical rate. Based on similar statewide intersections, an additional 16 crashes over the five years would indicate this intersection operaters outside the normal range.

The observed fatal and serious injury crash rate for this period is 0.00 per 100 MEV; this is 100% below the critical rate. The intersection operates within the normal range.



Number of Crashes	
Fatal	0
Severity A	0
Severity B	0
Severity C	6
Property Damage	27
Total	33

Passenger Vehicle
Heavy Vehicle
Bus
Motorcycle
Fixed Object
Pedestrian
Bicycle

Fatal
Severity A
Severity B
Severity C
Property Damage Only
Vehicle Out of Control

Light
L = Daylight
Dn = Dawn
Du = Dusk
Dl = Dark, Lighted
Do = Dark, Lights Off
D = Dark, Unlighted
X = Unkown

Weather
C = Clear or Cloudy
R = Rain
S = Snow/Sleet/Hail/Freexing Rain
F = Fog/Smog/Smoke
B = Blowing Sand/Dust/Snow
W = Severe Cross Winds
X = Other or Unknown

Surface
D = Dry
W = Wet or Water
S = Snow/Slush/Ice
M = Muddy
Db = Debris
O = Oily
X = Other or Unkown

Date Time(Hr) Light-Weather-Surface → Injury Type → Other Vehicle(s)

Notes:

Project: MNT03 152201
Print Date: 2/27/2020

Map by: jdanibas
Projection:
Source:

Crash Diagrams (2014-2018)
TH 210 at Baxter Dr
TH 210/Washington Street Corridor Study
Brainerd, MN

Figure A1

Path: S:\KO\M\Mnt03\152201\8-planning\Traffic\crashes\Crash Diagrams\A1_TH 210 at Baxter Dr_Crash Diagrams.mxd

2019 Existing - TH 210 at Baxter Dr
SIGNAL WARRANT
ANALYSIS

LOCATION: TH 210 at Baxter Dr
COUNTY: Crow Wing
REF. POINT: 0
DATE: 3/12/2020
OPERATOR: JDA

85th% Speed	Approach Description		Lanes	Approach
45	Major App1:	TH 210 EB	4	13374
35	Major App3:	TH 210 WB	4	11871
30	Minor App2:	Baxter Dr NB	3	1557
30	Minor App4:	Baxter Dr SB	3	727

40 MPH OR FASTER?	YES
POPULATION < 10,000?	NO
VOLUME REQ. AT 70%?	**YES**
CORRECTABLE CRASHES: (12-month period)	0

	Minimum Volume Requirement		
	1A	1B	1A&B (80%)
Major Total	420	630	504
Minor Approach	140	70	112

HOUR	MAJOR APP. 1	MAJOR APP. 3	MINOR APP. 2	MINOR APP. 4	MAJOR APPROACH TOTAL Σ (APP.1 + APP. 3)	MAX MINOR APPROACH (APP. 2 or 4)	WARRANT 1A - 8 hr MAJOR/MINOR	WARRANT 1B - 8 hr MAJOR/MINOR	WARRANT 1A & B MAJOR/MINOR
0:00 - 1:00	0	0	0	0	0	0	NO / NO	NO / NO	NO / NO
1:00 - 2:00	0	0	0	0	0	0	NO / NO	NO / NO	NO / NO
2:00 - 3:00	0	0	0	0	0	0	NO / NO	NO / NO	NO / NO
3:00 - 4:00	0	0	0	0	0	0	NO / NO	NO / NO	NO / NO
4:00 - 5:00	0	0	0	0	0	0	NO / NO	NO / NO	NO / NO
5:00 - 6:00	0	0	0	0	0	0	NO / NO	NO / NO	NO / NO
6:00 - 7:00	559	433	28	9	992	28	YES / NO	YES / NO	YES / NO
7:00 - 8:00	1055	749	70	5	1804	70	YES / NO	**YES / YES**	YES / NO
8:00 - 9:00	1095	916	101	30	2011	101	YES / NO	**YES / YES**	YES / NO
9:00 - 10:00	1060	979	112	39	2039	112	YES / NO	**YES / YES**	**YES / YES**
10:00 - 11:00	1090	1088	154	63	2178	154	**YES / YES**	**YES / YES**	**YES / YES**
11:00 - 12:00	1221	1053	156	64	2274	156	**YES / YES**	**YES / YES**	**YES / YES**
12:00 - 13:00	1251	1133	202	81	2384	202	**YES / YES**	**YES / YES**	**YES / YES**
13:00 - 14:00	1321	1003	175	103	2324	175	**YES / YES**	**YES / YES**	**YES / YES**
14:00 - 15:00	1262	1057	150	86	2319	150	**YES / YES**	**YES / YES**	**YES / YES**
15:00 - 16:00	1172	1083	134	83	2255	134	YES / NO	**YES / YES**	**YES / YES**
16:00 - 17:00	1161	1234	137	86	2395	137	YES / NO	**YES / YES**	**YES / YES**
17:00 - 18:00	1127	1143	138	78	2270	138	YES / NO	**YES / YES**	**YES / YES**
18:00 - 19:00	0	0	0	0	0	0	NO / NO	NO / NO	NO / NO
19:00 - 20:00	0	0	0	0	0	0	NO / NO	NO / NO	NO / NO
20:00 - 21:00	0	0	0	0	0	0	NO / NO	NO / NO	NO / NO
21:00 - 22:00	0	0	0	0	0	0	NO / NO	NO / NO	NO / NO
22:00 - 23:00	0	0	0	0	0	0	NO / NO	NO / NO	NO / NO
23:00 - 24:00	0	0	0	0	0	0	NO / NO	NO / NO	NO / NO
Daily	**13374**	**11871**	**1557**	**727**					

		Met (Hr)	Required (Hr)	WARRANT MET:
Warrant 1	**Eight Hour Volumes**	**11**	8	**Satisfied**
Warrant 1A	Minimum Vehicular Volume	5	8	Not satisfied
Warrant 1B	Interruption of Continuous Flow	**11**	8	**Satisfied**
1A & 1B	Combination of Warrants	**9**	8	**Satisfied**
Warrant 2	**Four Hour Volumes**	**11**	4	**Satisfied**
Warrant 3	**Peak Hour Volumes**	**10**	1	**Satisfied**
Warrant 7	**Crash Experience**	**10**	8	Crashes Insufficient

COMMENTS:

2019 Existing - TH 210 at Baxter Dr
SIGNAL WARRANT
ANALYSIS

LOCATION: TH 210 at Baxter Dr
COUNTY: Crow Wing
REF. POINT: 0
DATE: 3/12/2020

OPERATOR: JDA

40 MPH OR FASTER?	YES
POPULATION < 10,000?	NO
VOLUME REQ. AT 70%?	**YES**

85th% Speed	Approach Description		Lanes	Approach
45	Major App1:	TH 210 EB	4	13374
35	Major App3:	TH 210 WB	4	11871
30	Minor App2:	Baxter Dr NB	3	1557
30	Minor App4:	Baxter Dr SB	3	727

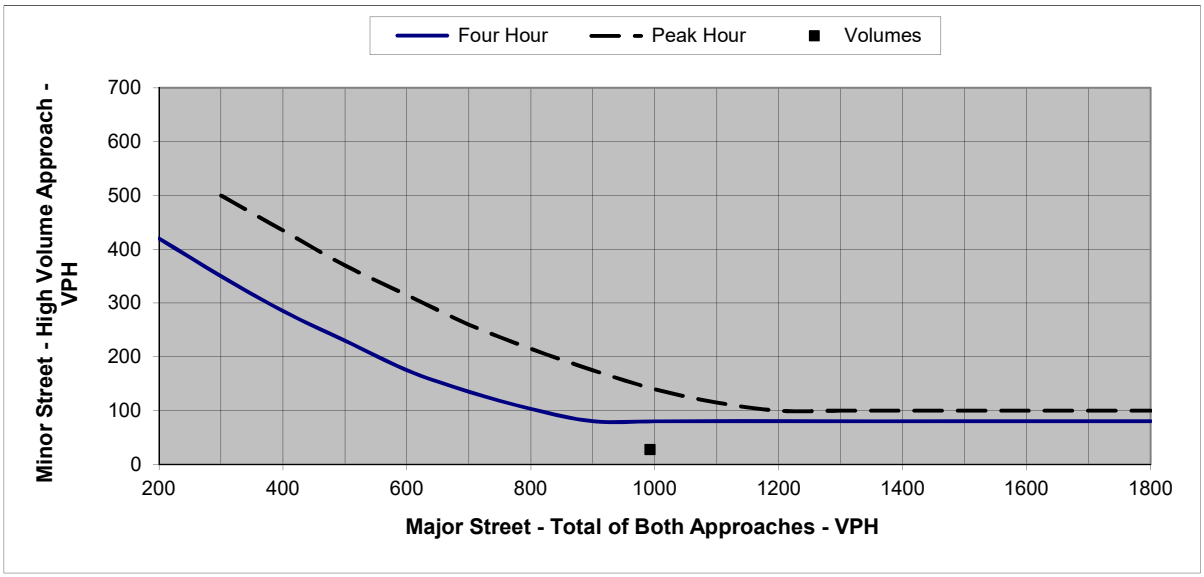


Figure 1. Four Hour and Peak Hour Warrant Analysis

Note: For data points outside the graph range, check the minor street volume against the lower thresholds

Warrant Criteria (Graph)		
Major	Minor App.	Minor App.
Approach	Four Hour	Peak Hour
200	420	
300	350	500
400	285	435
500	230	370
600	175	315
700	135	260
800	103	215
900	80	175
1000	80	140
1100	80	115
1200	80	100
1300	80	100
1400	80	100
1500	80	100
1600	80	100
1700	80	100
1800	80	100

Actual Hourly Count			Warrants Met:	
			Warrant 2	Warrant 3
HOUR	Sum Major App.	Max Minor App.	Four Hour	Peak Hour
0:00 - 1:00	0	0	NO	NO
1:00 - 2:00	0	0	NO	NO
2:00 - 3:00	0	0	NO	NO
3:00 - 4:00	0	0	NO	NO
4:00 - 5:00	0	0	NO	NO
5:00 - 6:00	0	0	NO	NO
6:00 - 7:00	992	28	NO	NO
7:00 - 8:00	1804	70	**YES**	NO
8:00 - 9:00	2011	101	**YES**	**YES**
9:00 - 10:00	2039	112	**YES**	**YES**
10:00 - 11:00	2178	154	**YES**	**YES**
11:00 - 12:00	2274	156	**YES**	**YES**
12:00 - 13:00	2384	202	**YES**	**YES**
13:00 - 14:00	2324	175	**YES**	**YES**
14:00 - 15:00	2319	150	**YES**	**YES**
15:00 - 16:00	2255	134	**YES**	**YES**
16:00 - 17:00	2395	137	**YES**	**YES**
17:00 - 18:00	2270	138	**YES**	**YES**
18:00 - 19:00	0	0	NO	NO
19:00 - 20:00	0	0	NO	NO
20:00 - 21:00	0	0	NO	NO
21:00 - 22:00	0	0	NO	NO
22:00 - 23:00	0	0	NO	NO
23:00 - 24:00	0	0	NO	NO

2045 Future - TH 210 at Baxter Dr
SIGNAL WARRANT
ANALYSIS

LOCATION: TH 210 at Baxter Dr
COUNTY: Crow Wing
REF. POINT: 0
DATE: 3/12/2020

OPERATOR: JDA

85th% Speed	Approach Description		Lanes	Approach
45	Major App1:	TH 210 EB	4	15114
35	Major App3:	TH 210 WB	4	13418
30	Minor App2:	Baxter Dr NB	3	1756
30	Minor App4:	Baxter Dr SB	3	819

40 MPH OR FASTER?	YES
POPULATION < 10,000?	NO
VOLUME REQ. AT 70%?	**YES**
CORRECTABLE CRASHES: (12-month period)	0

	Minimum Volume Requirement		
	1A	1B	1A&B (80%)
Major Total	420	630	504
Minor Approach	140	70	112

HOUR	MAJOR APP. 1	MAJOR APP. 3	MINOR APP. 2	MINOR APP. 4	MAJOR APPROACH TOTAL Σ (APP.1 + APP. 3)	MAX MINOR APPROACH (APP. 2 or 4)	WARRANT 1A - 8 hr MAJOR/MINOR	WARRANT 1B - 8 hr MAJOR/MINOR	WARRANT 1A & B MAJOR/MINOR
0:00 - 1:00	0	0	0	0	0	0	NO / NO	NO / NO	NO / NO
1:00 - 2:00	0	0	0	0	0	0	NO / NO	NO / NO	NO / NO
2:00 - 3:00	0	0	0	0	0	0	NO / NO	NO / NO	NO / NO
3:00 - 4:00	0	0	0	0	0	0	NO / NO	NO / NO	NO / NO
4:00 - 5:00	0	0	0	0	0	0	NO / NO	NO / NO	NO / NO
5:00 - 6:00	0	0	0	0	0	0	NO / NO	NO / NO	NO / NO
6:00 - 7:00	632	490	31	10	1122	31	YES / NO	YES / NO	YES / NO
7:00 - 8:00	1193	846	79	5	2039	79	YES / NO	**YES / YES**	YES / NO
8:00 - 9:00	1237	1035	114	33	2272	114	YES / NO	**YES / YES**	**YES / YES**
9:00 - 10:00	1198	1106	126	44	2304	126	YES / NO	**YES / YES**	**YES / YES**
10:00 - 11:00	1232	1230	174	71	2462	174	**YES / YES**	**YES / YES**	**YES / YES**
11:00 - 12:00	1380	1190	176	73	2570	176	**YES / YES**	**YES / YES**	**YES / YES**
12:00 - 13:00	1413	1281	228	91	2694	228	**YES / YES**	**YES / YES**	**YES / YES**
13:00 - 14:00	1493	1134	197	117	2627	197	**YES / YES**	**YES / YES**	**YES / YES**
14:00 - 15:00	1426	1196	170	97	2622	170	**YES / YES**	**YES / YES**	**YES / YES**
15:00 - 16:00	1324	1224	150	94	2548	150	**YES / YES**	**YES / YES**	**YES / YES**
16:00 - 17:00	1312	1394	155	97	2706	155	**YES / YES**	**YES / YES**	**YES / YES**
17:00 - 18:00	1274	1292	156	87	2566	156	**YES / YES**	**YES / YES**	**YES / YES**
18:00 - 19:00	0	0	0	0	0	0	NO / NO	NO / NO	NO / NO
19:00 - 20:00	0	0	0	0	0	0	NO / NO	NO / NO	NO / NO
20:00 - 21:00	0	0	0	0	0	0	NO / NO	NO / NO	NO / NO
21:00 - 22:00	0	0	0	0	0	0	NO / NO	NO / NO	NO / NO
22:00 - 23:00	0	0	0	0	0	0	NO / NO	NO / NO	NO / NO
23:00 - 24:00	0	0	0	0	0	0	NO / NO	NO / NO	NO / NO
Daily	**15114**	**13418**	**1756**	**819**					

		Met (Hr)	Required (Hr)	WARRANT MET:
Warrant 1	**Eight Hour Volumes**	11	8	**Satisfied**
Warrant 1A	Minimum Vehicular Volume	8	8	**Satisfied**
Warrant 1B	Interruption of Continuous Flow	11	8	**Satisfied**
1A & 1B	Combination of Warrants	10	8	**Satisfied**
Warrant 2	**Four Hour Volumes**	11	4	**Satisfied**
Warrant 3	**Peak Hour Volumes**	11	1	**Satisfied**
Warrant 7	**Crash Experience**	10	8	Crashes Insufficient

COMMENTS:

2045 Future - TH 210 at Baxter Dr
SIGNAL WARRANT
ANALYSIS

LOCATION: TH 210 at Baxter Dr
COUNTY: Crow Wing
REF. POINT: 0
DATE: 3/12/2020

OPERATOR: JDA

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40 MPH OR FASTER?	YES
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VOLUME REQ. AT 70%?	**YES**

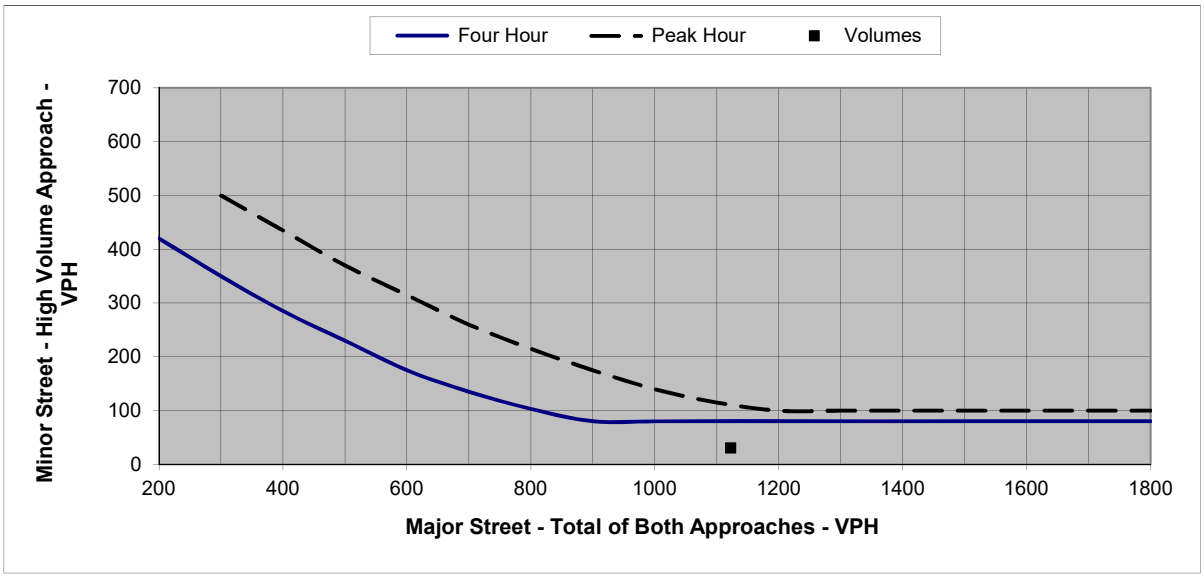


Figure 1. Four Hour and Peak Hour Warrant Analysis

Note: For data points outside the graph range, check the minor street volume against the lower thresholds

Warrant Criteria (Graph)		
Major Approach	Minor App. Four Hour	Minor App. Peak Hour
200	420	
300	350	500
400	285	435
500	230	370
600	175	315
700	135	260
800	103	215
900	80	175
1000	80	140
1100	80	115
1200	80	100
1300	80	100
1400	80	100
1500	80	100
1600	80	100
1700	80	100
1800	80	100

Actual Hourly Count			Warrants Met:	
			Warrant 2	Warrant 3
HOUR	Sum Major App.	Max Minor App.	Four Hour	Peak Hour
0:00 - 1:00	0	0	NO	NO
1:00 - 2:00	0	0	NO	NO
2:00 - 3:00	0	0	NO	NO
3:00 - 4:00	0	0	NO	NO
4:00 - 5:00	0	0	NO	NO
5:00 - 6:00	0	0	NO	NO
6:00 - 7:00	1122	31	NO	NO
7:00 - 8:00	2039	79	**YES**	**YES**
8:00 - 9:00	2272	114	**YES**	**YES**
9:00 - 10:00	2304	126	**YES**	**YES**
10:00 - 11:00	2462	174	**YES**	**YES**
11:00 - 12:00	2570	176	**YES**	**YES**
12:00 - 13:00	2694	228	**YES**	**YES**
13:00 - 14:00	2627	197	**YES**	**YES**
14:00 - 15:00	2622	170	**YES**	**YES**
15:00 - 16:00	2548	150	**YES**	**YES**
16:00 - 17:00	2706	155	**YES**	**YES**
17:00 - 18:00	2566	156	**YES**	**YES**
18:00 - 19:00	0	0	NO	NO
19:00 - 20:00	0	0	NO	NO
20:00 - 21:00	0	0	NO	NO
21:00 - 22:00	0	0	NO	NO
22:00 - 23:00	0	0	NO	NO
23:00 - 24:00	0	0	NO	NO

MEMORANDUM

TO: Ken Hansen, PE
MnDOT District 3 Traffic Engineer

FROM: Graham Johnson, PE, PTOE (Lic.MN, IA, SD)
Justin Anibas, PE (Lic. MN)

DATE: August 9, 2022

RE: TH 210 at NW 4th Street Intersection Control Evaluation (ICE) Report
SEH No. MNT03 152201 14.00

INTRODUCTION

This memorandum summarizes the Intersection Control Evaluation (ICE) process for the intersection of Trunk Highway (TH) 210 and NW 4th Street in Brainerd, Minnesota. The Minnesota Department of Transportation (MnDOT) ICE is an objective process used to investigate and determine the optimal traffic control that should be provided at an intersection to serve the existing conditions and future needs. This memorandum was prepared for MnDOT by SEH Inc.

As part of a project along TH 210 between Baxter Drive and Pine Shores Road, the intersection of TH 210 and NW 4th Street was evaluated and is proposed to remain under traffic signal control after the project is complete.

The location of the study intersection for this ICE report is shown in **Figure 1**. The proposed intersection control for the TH 210 and NW 4th Street intersection was analyzed based on safety, signal warrants, traffic operations, and pedestrian and bicycle accommodations.

The scope and content of this ICE report was reviewed and agreed to by MnDOT prior to the layout and ICE submittal process. This report summarizes the ICE process and recommendation for the TH 210 and NW 4th Street intersection based on a Phase I analysis according to the *2017 MnDOT ICE Manual*.

APPROVAL

I hereby certify that this report was prepared by me or under my direct supervision, and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.

_____ _____
Graham Johnson, PE, PTOE, MN License No. 45429 Date

Approved By:

_____ _____
MnDOT District 3 Traffic Engineer Date

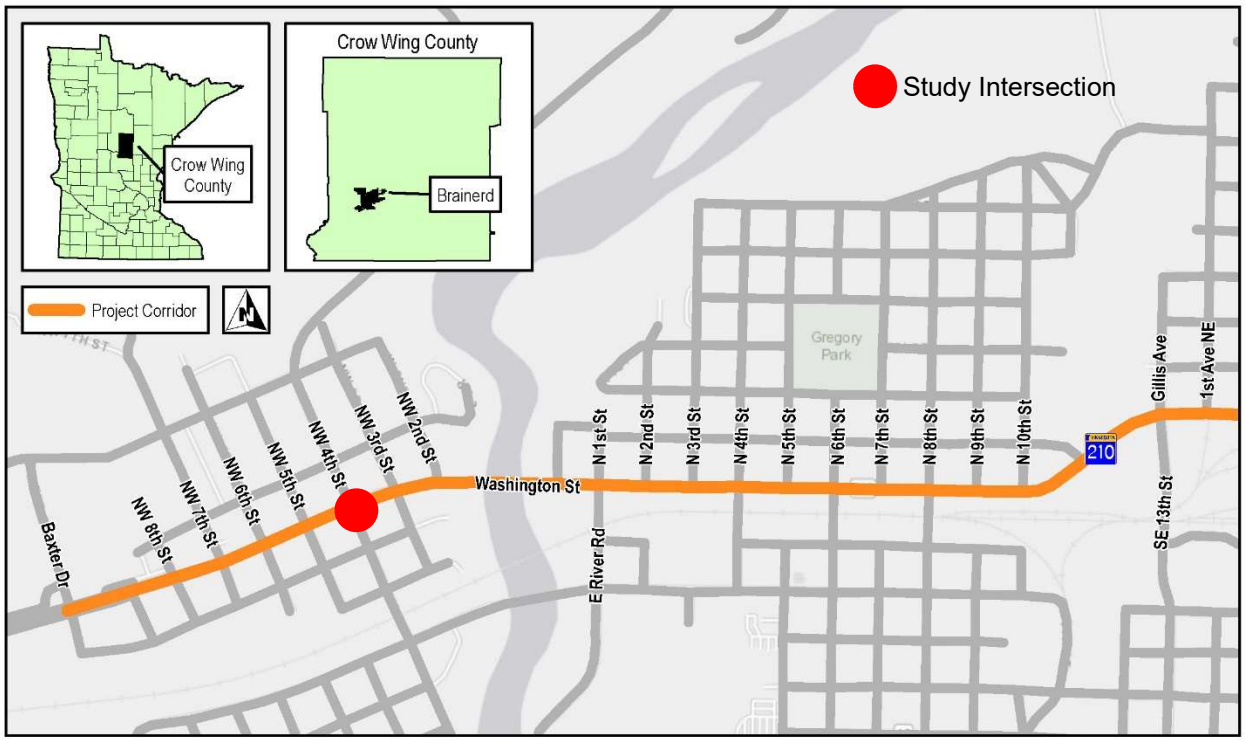
PROJECT DESCRIPTION

MnDOT is conducting the corridor planning study along a 3.9-mile segment of TH 210 to identify the future vision for highway corridor through Brainerd. Reconstruction of TH 210 between Baxter Drive and Pine Shores Road is anticipated to begin in 2025; SP 1805-80.

The primary purpose of the corridor study is to better understand the community issues, needs and use of the roadway, assess improvement options, select a preferred alternative, and prepare a geometric layout. The focus of the improvements is to improve pavement conditions and traveler safety, accommodate the Americans with Disabilities Act (ADA) requirements, and enhance pedestrian accommodations.

For more detailed traffic information, see both the *Existing and 2045 No Build Conditions Report – TH 210/Washington Street Corridor Study* and the *TH 210 Build Conditions Report*.

Figure 1 Project Location



EXISTING CONDITIONS

TH 210 is a major east-west principal arterial through the City of Brainerd that connects near-by cities and regional commerce. TH 210 is generally a 4-lane divided roadway through the City of Brainerd; the posted speed limit is 35 miles-per-hour (mph) at the study intersection.

NW 4th Street is a minor arterial providing access to both commercial and residential land uses to the north and south of TH 210; the posted speed limit is 30 mph.

The nearest existing traffic signals along TH 210 include Baxter Drive approximately 2,400 feet west and N 4th Street approximately 3,200 feet east.

Intersection Characteristics

The existing intersection currently operates with traffic signal control and includes marked pedestrian crossings on all four legs. Eastbound and westbound TH 210 left turns operate with protected left turn phasing only. The minor street approaches operate under split phasing with northbound and southbound having separate protected phases for each approach. The north leg of NW 4th Street was recently reconstructed as part of a City of Brainerd led project.

The existing lane geometrics are described below and shown in **Figure 2**.

- Eastbound Approach: left turn lane, two through lanes, and a right turn lane.
- Westbound Approach: left turn lane, two through lanes, and a right turn lane.
- Northbound Approach: separate left, and a shared through-right lane.
- Southbound Approach: dual left turn lanes, and a shared through-right lane.

Figure 2 Existing Intersection

Traffic Volumes

TH 210 has an existing 2019 Average Annual Daily Traffic (AADT) volume of 32,500 vehicles east of the intersection. NW 4th Street has an existing 2019 AADT of 9,900 vehicles to the north and 9,100 vehicles to the south.

The existing intersection turning movement data was collected in August of 2018 as part of a signal timing project along TH 210 and TH 371. **Figure 3** includes the existing AM and PM peak hour volumes; **Attachment 1** includes the raw existing intersection count data.

Crash Analysis

Intersection crash data for the study intersection was collected from the MnDOT Crash Mapping Analysis Tool (MnCMATv2) for a five-year period between 2014 and 2018 as part of the larger corridor study.

The crash rate at an intersection is expressed as a number of crashes per million entering vehicles (MEV). The critical crash rate is a statistical value that is unique to each intersection and is based on vehicular exposure and the statewide average crash rate for similar intersections. An intersection with a

crash rate higher than the critical rate can indicate a safety concern at the intersection and the site should be further reviewed.

The intersection had a total of 74 crashes during the 5-year analysis period:

- 53 of the 74 crashes were rear end crashes: 35 of the rear end crashes were in the westbound direction and 11 were in the eastbound direction, 5 were northbound and 2 southbound. This could indicate that backups are worse for westbound vehicles.
- 14 of the 74 crashes were sideswipe crashes, likely due to vehicles changing lanes to avoid vehicles that are slowing or stopping during congestion.

Table 1 summarizes the crashes for the study intersection; additional crash information is provided in **Attachment 2**. Based on the crash rate, the intersection is just under the critical crash rate indicating safety improvements should be considered.

Table 1 Intersection Crash History (2014-2018)

TH 210 at:	Crash Severity					Crash Rates	
	Fatal & Severity A	Severity B	Severity C	Property Damage	Total	Int. Rate	Critical Rate
NW 4th Street	0	2	9	63	74	**0.94**	0.95

PROPOSED CONDITIONS

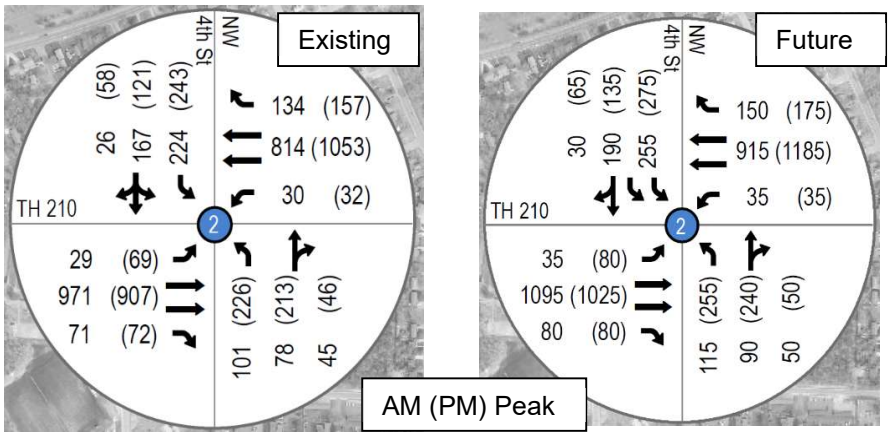
The current layout for the TH 210 corridor between Baxter Drive and Pine Shores Road addresses the needs and use of the roadway, improves pavement conditions, safety, and meets ADA requirements.

The TH 210 and NW 4th Street intersection is located in a segment of the project that will include mill and overlay west of the intersection to improve pavement conditions and reconstruction of TH 210 to the east, with modifications for full ADA compliance, and wider sidewalks. Lane improvements include extending the TH 210 left turn lanes and adding capacity on the south leg to remove the split phasing.

Future Traffic Volumes

Traffic forecasts were developed for the entire TH 210 corridor as part of the larger study effort. Future 2045 forecast volumes were developed based on a linear growth rate of 0.5% per year based on historical AADT volumes, population data, and input from the project team. **Figure 3** presents both the existing and future 2045 AM and PM peak intersection volumes.

Figure 3 Existing and Future 2045 Intersection Volumes



Warrant Analysis

Traffic control warrant analysis was conducted on the existing and future traffic volumes following the Minnesota Manual on Uniform Traffic Control Devices (MnMUTCD) guidelines; all-way stop control warrants were not analyzed as it is not considered a viable control option along TH 210.

Warrants 1 (8-hour), 2 (4-hour), 3 (peak hour), and 7 (crash warrant) were included in the analysis. The following assumptions were used in the analysis:

- All minor street right turning volume was removed from the approaches.
- Warrant 7 was not applicable at the intersection due to insufficient correctable crashes.

The results of the traffic signal warrant analysis are provided in **Table 2**. The intersection currently meets Warrants 1, 2, and 3; the detailed signal warrant analysis is provided as **Attachment 3**.

Table 2 Traffic Signal Warrant Analysis Summary

MnMUTCD Signal Warrant	Hours Needed	Existing		Future 2045	
		Hours Met	Warrant Met?	Hours Met	Warrant Met?
Warrant 1A – 8-hour Minimum Volume	8	**11**	**MET**	**11**	**MET**
Warrant 1B – 8-hour Interruption of Flow	8	**11**	**MET**	**12**	**MET**
Combination of Warrant 1A and 1B	8	**12**	**MET**	**12**	**MET**
Warrant 2 – 4-hours	4	**11**	**MET**	**11**	**MET**
Warrant 3 – Peak Hour	1	**11**	**MET**	**11**	**MET**

System Limitations and Consistency

TH 210 is a principal arterial through the City of Brainerd that experiences heavy directional volumes in both the AM and PM peak hours, throughout the day, and in the summer months with high tourist traffic. The two adjacent major intersections are both currently signalized.

The study intersection is part of an existing TH 210 signal system coordinated to provide priority to the peak direction of flow, reduce mainline delays, and provide a high level of vehicle progression through the corridor. The coordinated signal system includes all existing traffic signals along TH 210 between TH 371, in the City of Baxter, and 4th Avenue NE in east Brainerd.

Due to limited right-of-way along the TH 210 corridor, expansion of the roadway to accommodate a larger intersection footprint is not feasible. Roundabout intersection control would result in major impacts to adjacent parcels and structures adjacent to the intersection and along the corridor.

In addition, both all-way stop control and roundabout control would alter the traffic flow along TH 210 and severely impede the progression of traffic from the adjacent coordinated signal systems.

Therefore, all-way stop and roundabout intersection control was not considered feasible for this intersection due to right-of-way limitations and the interruption to the existing coordinated signal system.

Traffic Operations

Evaluation of the intersection traffic operations were conducted as part of the overall corridor study using VISSIM software. The evaluation included analysis of the existing conditions, 2045 No Build conditions,

and the recommended 2045 Build conditions, which included extending the TH 210 left turn lanes and adding capacity on the south leg to remove the split phasing.

The average delay per vehicle and Level of Service (LOS) results for each approach and the overall intersection are provided in **Table 3** for each scenario; all three scenarios include traffic signal control. For more detailed traffic information, see both the *Existing and 2045 No Build Conditions Report – TH 210/Washington Street Corridor Study* and the *TH 210 Build Conditions Report*.

Table 3 Traffic Operations Summary

Scenario	Peak Hour	Approach Delay (sec/veh / LOS)				Intersection Delay (sec/veh / LOS)
		Eastbound	Westbound	Northbound	Southbound	
Existing Conditions**	AM	18.8 / B	17.2 / B	**47.0 / D**	**45.1 / D**	24.6 / C
	PM	30.4 / C	**41.8 / D**	**60.0 / E**	**60.5 / E**	**43.2 / D**
2045 No Build Conditions	AM	23.1 / C	21.0 / C	**48.8 / D**	**45.7 / D**	27.9 / C
	PM	31.7 / C	33.5 / C	**72.5 / E**	**60.4 / E**	**42.1 / D**
2045 Build Conditions	AM	24.0 / C	22.0 / C	**45.3 / D**	**46.2 / D**	28.4 / C
	PM	20.3 / C	19.3 / B	**75.1 / E**	**62.1 / E**	33.2 / C

Notes: **Existing conditions did not include the NW 4th Street Project on the southbound approach; No Build included improvements.

Based on the results, the existing conditions show both of the NW 4th Street approaches operating at a LOS E in the PM peak. In the future No Build conditions, with the southbound improvements, both NW 4th Street approaches would still operate at a LOS E due to the cycle length and time required to serve the northbound left in a single turn lane.

With the proposed Build conditions, the intersection is expected to operate at a LOS C or better in the future Build scenario. The minor street approaches still operate with longer delays due to the long cycle length required for coordination along TH 210 but the additional capacity allows TH 210 additional green time to improve the eastbound and westbound approaches.

Extending both the eastbound and westbound left turn lanes along TH 210 are necessary to improve the efficiency of the intersection; the existing left turn volumes are low, but vehicles cannot access the turn lanes due to through queue blocking. The extensions allow the left turning vehicles to enter the storage and approach the signal, shortening the through queues and improving the efficiency of the signal operations. The extensions do require both the NW 5th Street and NW 3rd Street intersections to be converted to right-in/right-out (RI/RO) intersections.

The northbound NW 4th Street approach mitigations include dual left turns and a separate through-right lane; this requires a single departing lane and mirrors the recently constructed southbound approach. While additional capacity would improve operations further, the right-of-way impacts were considered too extensive.

Pedestrian Considerations

The existing intersection provides crosswalks on all four legs of the intersection; however, all of the existing facilities are not ADA compliant.

As part of the TH 210 reconstruction project, the intersection will be improved to meet ADA requirements. New Accessible Pedestrian Systems (APS) pedestrian push buttons are proposed to be installed and

made operational as part of this project, and all pedestrian curb ramps will be upgraded to be ADA compliant.

Revised Signal System

The existing signal system is vehicle actuated and coordinated along TH 210. The TH 210 left turn phases operate under protected phasing only; the minor street approaches operate under split phasing.

As part of the signal replacement, the new signal system is to remain vehicle actuated and coordinated along TH 210. All four approaches will include Flashing Yellow Arrow (FYA) which provides the flexibility of running both protected and permissive phasing by time-of-day schedules on all approaches and improves the overall safety of the intersection.

The minor approach lane improvements allow the removal of the existing split phasing to improve the overall efficiency of the signal, coordination along TH 210, and improved intersection safety. Vehicle turning paths of the northbound and southbound dual left turn lanes do overlap, therefore the protected left turn phases should run separate from each other in a lead-lag operation.

RECOMMENDATION

Based on the analysis included in this report, and as part of the larger TH 210 corridor study, it is recommended to retain traffic signal control at the intersection of TH 210 and NW 4th Street.

Traffic signal control is currently warranted at the intersection and traffic operations are acceptable in the future Build conditions. The improvements at the existing intersection will continue to provide a safe intersection for all users.

Roundabout and all-way stop control was not considered feasible at this intersection due to potential right-of-way constraints and impacts, and the impact to the coordinated signal system that provides positive vehicle progression along TH 210.

Attachment 1: Turning Movement Data
Attachment 2: Crash Data
Attachment 3: Warrant Analysis

cc: Luke Wehseler, PE MnDOT District 3
Zachary Whitley, PE MnDOT District 3

File Name: S:\2018\180119\TO OTHERS\TMC\PETRO\343_TH 210 AND 4TH STREET NW.ppd
Start Date: 8/23/2018
Start Time: 6:00:00 AM
Site Code: 00000343
Comment 1: 343_TH 210 AND 4TH STREET NW
Comment 2: 0
Comment 3: data by: Alliant Inc
Comment 4: TURN MOVEMENT COUNT

	BAXTER DRIVE Southbound				TH 210 Westbound				BAXTER DRIVE Northbound				TH 210 Eastbound			
Start Time	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds
06:00 AM	6	7	5	0	1	64	5	0	7	1	7	1	2	50	5	0
06:15 AM	15	10	6	0	1	58	7	0	4	5	5	0	0	78	7	0
06:30 AM	35	18	6	0	1	107	12	0	5	13	9	0	2	131	9	0
06:45 AM	39	33	6	0	7	119	12	0	15	8	7	0	5	139	14	0
07:00 AM	33	22	8	0	4	87	10	0	12	6	8	0	3	120	16	0
07:15 AM	48	21	9	1	3	117	21	0	15	10	8	0	5	145	14	1
07:30 AM	67	59	2	0	8	175	34	0	26	20	9	0	7	193	16	0
07:45 AM	64	47	8	0	9	174	40	2	26	21	16	0	9	204	14	2
08:00 AM	47	36	8	1	8	164	34	1	27	21	10	0	5	141	24	0
08:15 AM	46	25	8	0	5	165	26	0	22	16	10	0	8	154	17	0
08:30 AM	45	38	20	0	9	178	25	1	24	36	11	0	11	159	16	0
08:45 AM	49	34	11	0	5	170	28	0	28	31	11	0	13	152	19	0
09:00 AM	39	29	20	0	8	181	33	0	25	19	17	0	8	108	13	0
09:15 AM	34	24	17	1	8	170	22	0	32	27	14	0	15	139	18	0
09:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
09:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10:30 AM	43	29	20	2	10	248	32	1	43	26	13	0	17	164	23	0
10:45 AM	47	26	18	0	18	220	40	1	36	28	13	0	10	121	39	0
11:00 AM	35	35	20	0	10	237	34	0	40	20	20	1	7	127	41	1
11:15 AM	37	30	17	3	19	187	26	1	51	33	21	1	8	117	23	0
11:30 AM	33	31	15	0	10	223	29	1	52	34	19	0	14	128	29	0
11:45 AM	38	38	24	1	21	214	27	0	40	24	13	1	14	150	35	0
12:00 PM	61	41	14	0	10	188	42	0	56	41	14	0	7	98	42	1
12:15 PM	35	32	12	2	10	264	30	1	48	32	27	0	11	139	41	0
12:30 PM	46	39	16	0	16	236	29	0	42	32	9	0	13	133	46	0
12:45 PM	45	53	19	0	10	210	37	1	51	25	11	0	8	111	35	0
01:00 PM	45	33	19	1	12	223	43	4	35	33	14	0	5	134	28	0
01:15 PM	65	49	12	0	14	207	31	0	41	36	24	1	6	86	22	0
01:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
01:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
02:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
02:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
02:30 PM	46	26	18	0	13	237	31	1	43	25	16	0	19	170	42	0
02:45 PM	50	41	17	0	7	192	39	0	36	27	8	0	10	176	27	1
03:00 PM	40	27	11	2	7	219	28	0	42	32	18	0	13	207	21	0
03:15 PM	39	29	23	0	3	181	29	0	50	40	14	0	14	191	18	0
03:30 PM	32	27	9	0	7	251	35	0	60	38	12	0	9	219	21	0
03:45 PM	53	28	14	1	6	229	51	1	39	28	7	0	23	193	14	0
04:00 PM	65	26	22	3	11	183	35	0	47	55	11	2	17	185	11	0
04:15 PM	41	25	8	0	13	245	50	2	36	36	19	0	14	243	20	0
04:30 PM	61	42	9	0	10	264	52	0	56	65	7	0	15	190	18	0
04:45 PM	51	29	17	2	5	278	40	1	59	60	13	0	18	224	17	0
05:00 PM	66	31	14	0	7	285	33	2	55	40	11	1	19	212	22	1
05:15 PM	65	19	18	1	10	226	32	2	56	48	15	1	17	235	15	0
05:30 PM	41	27	8	0	4	221	32	1	49	43	10	0	20	194	12	0
05:45 PM	37	16	9	0	8	211	15	0	31	22	6	0	17	193	14	0

Intersection Safety Screening

Intersection: TH 210 at NW 4th Street

Crash Data: 2014 to 2018 (5-years)

Crashes by Crash Severity	
Fatal	0
Incapacitating Injury	0
Non-incapacitating Injury	2
Possible Injury	9
Property Damage	63
Total Crashes	74

Intersection Characteristics	
Entering Volume	43,200
Traffic Control	Signals
Environment	Urban
Speed Limit	35 mph

Annual crash cost = $313,160

Statewide Comparison

Signals: high volume, low speed

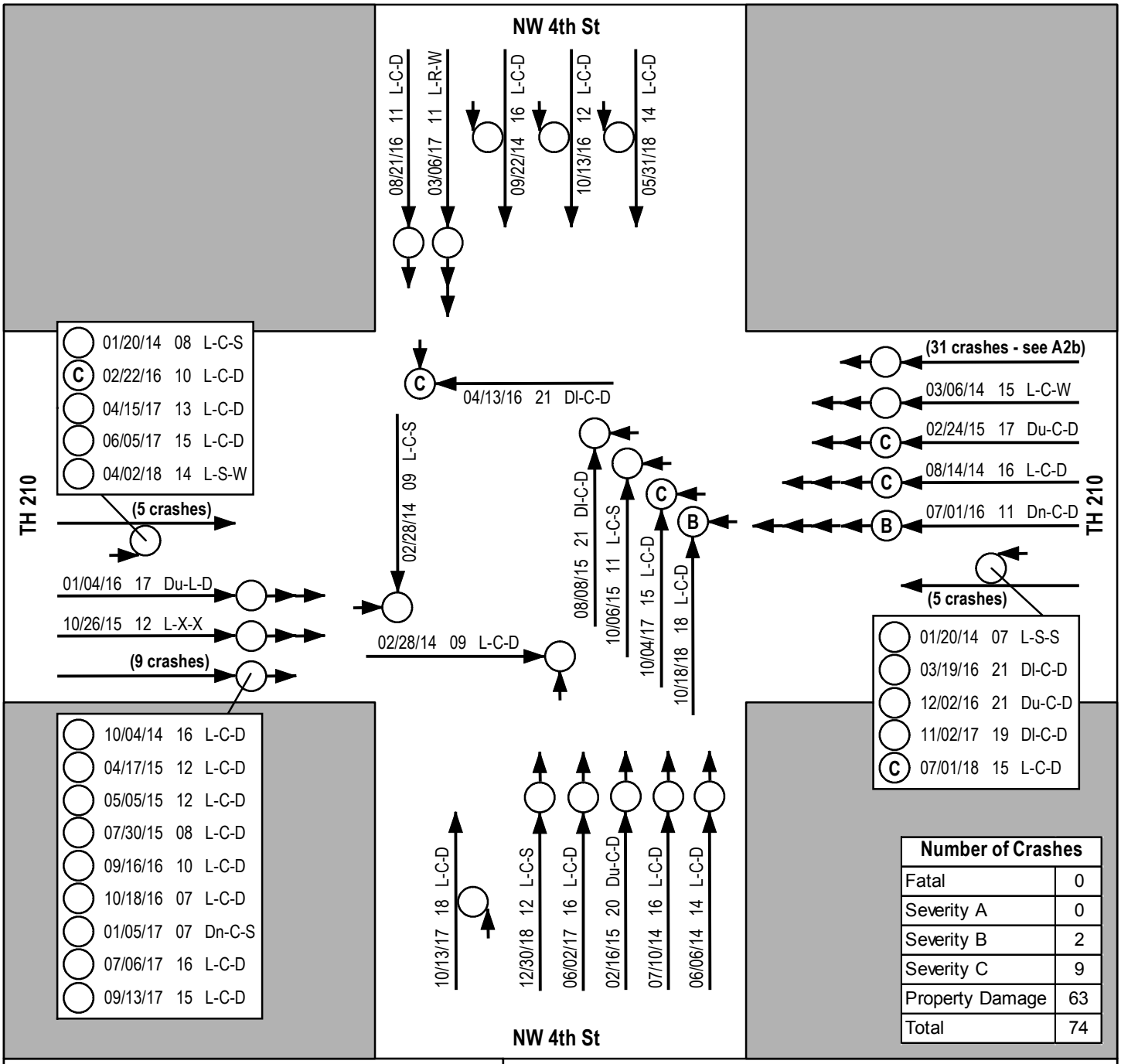
Total Crash Rate	
Observed	0.94
Statewide Average	0.70
Critical Rate	0.95
Critical Index	**0.99**

Fatal & Serious Injury Crash Rate	
Observed	0.00
Statewide Average	0.76
Critical Rate	2.66
Critical Index	**0.00**

The observed crash rate is the number of crashes per million entering vehicles (MEV). The critical rate is a statistical comparison based on similar intersections statewide. An observed crash rate greater than the critical rate indicates that the intersection operates outside the expected, normal range. The critical index reports the magnitude of this difference.

The observed total crash rate for this period is 0.94 per MEV; this is 1% below the critical rate. Based on similar statewide intersections, an additional 1 crashes over the five years would indicate this intersection operaters outside the normal range.

The observed fatal and serious injury crash rate for this period is 0.00 per 100 MEV; this is 100% below the critical rate. The intersection operates within the normal range.



Number of Crashes	
Fatal	0
Severity A	0
Severity B	2
Severity C	9
Property Damage	63
Total	74

Passenger Vehicle
Heavy Vehicle
Bus
Motorcycle
Fixed Object
Pedestrian
Bicycle

Fatal
A Severity A
B Severity B
C Severity C
Property Damage Only
Vehicle Out of Control

Light
L = Daylight
Dn = Dawn
Du = Dusk
Dl = Dark, Lighted
Do = Dark, Lights Off
D = Dark, Unlighted
X = Unkown

Weather
C = Clear or Cloudy
R = Rain
S = Snow/Sleet/Hail/Freexing Rain
F = Fog/Smog/Smoke
B = Blowing Sand/Dust/Snow
W = Severe Cross Winds
X = Other or Unknown

Surface
D = Dry
W = Wet or Water
S = Snow/Slush/Ice
M = Muddy
Db = Debris
O = Oily
X = Other or Unkown

Date Time(Hr) Light-Weather-Surface → Injury Type → Other Vehicle(s)

Notes:

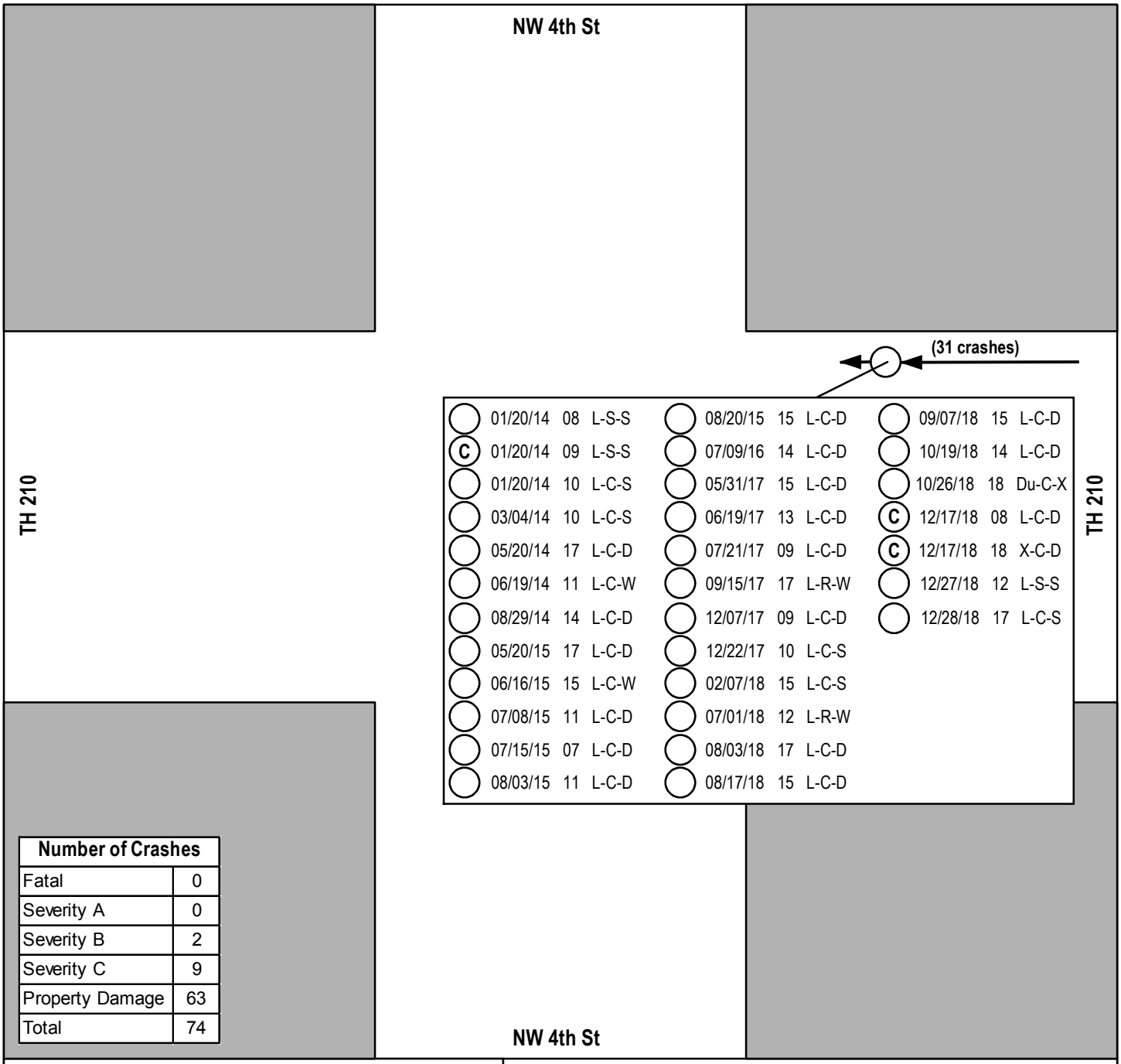
Project: MNT03 152201
Print Date: 2/27/2020

Map by: jdanibas
Projection:
Source:

Crash Diagrams (2014-2018)
TH 210 at NW 4th St
TH 210/Washington Street Corridor Study
Brainerd, MN

Figure A2a

Path: S:\KO\M\Mnt03\152201\8-planning\Traffic\crashes\Crash Diagrams\A2a_TH 210 at NW 4th St_Crash Diagrams.mxd



	01/20/14	08	L-S-S		08/20/15	15	L-C-D		09/07/18	15	L-C-D
C	01/20/14	09	L-S-S		07/09/16	14	L-C-D		10/19/18	14	L-C-D
	01/20/14	10	L-C-S		05/31/17	15	L-C-D		10/26/18	18	Du-C-X
	03/04/14	10	L-C-S		06/19/17	13	L-C-D	C	12/17/18	08	L-C-D
	05/20/14	17	L-C-D		07/21/17	09	L-C-D	C	12/17/18	18	X-C-D
	06/19/14	11	L-C-W		09/15/17	17	L-R-W		12/27/18	12	L-S-S
	08/29/14	14	L-C-D		12/07/17	09	L-C-D		12/28/18	17	L-C-S
	05/20/15	17	L-C-D		12/22/17	10	L-C-S				
	06/16/15	15	L-C-W		02/07/18	15	L-C-S				
	07/08/15	11	L-C-D		07/01/18	12	L-R-W				
	07/15/15	07	L-C-D		08/03/18	17	L-C-D				
	08/03/15	11	L-C-D		08/17/18	15	L-C-D				

Number of Crashes	
Fatal	0
Severity A	0
Severity B	2
Severity C	9
Property Damage	63
Total	74

Passenger Vehicle
Heavy Vehicle
Bus
Motorcycle
Fixed Object
Pedestrian
Bicycle

Fatal
Severity A
Severity B
Severity C
Property Damage Only
Vehicle Out of Control

Light
L = Daylight
Dn = Dawn
Du = Dusk
Dl = Dark, Lighted
Do = Dark, Lights Off
D = Dark, Unlighted
X = Unkown

Weather
C = Clear or Cloudy
R = Rain
S = Snow/Sleet/Hail/Freexing Rain
F = Fog/Smog/Smoke
B = Blowing Sand/Dust/Snow
W = Severe Cross Winds
X = Other or Unknown

Surface
D = Dry
W = Wet or Water
S = Snow/Slush/Ice
M = Muddy
Db = Debris
O = Oily
X = Other or Unkown

Date Time(Hr) Light-Weather-Surface → Injury Type → Other Vehicle(s)

Notes:
Westbound rear ends only, see Figure A1a for other crashes

Project: MNT03 152201
Print Date: 2/27/2020

Map by: jdanibas
Projection:
Source:

Crash Diagrams (2014-2018)
TH 210 at NW 4th St (WB Rear Ends)
TH 210/Washington Street Corridor Study
Brainerd, MN

Figure A2b

Path: S:\KO\M\Mnt03\152201\8-planning\Traffic\crashes\Crash Diagrams\A2b_TH 210 at NW 4th St (WB Rear Ends)_Crash Diagrams.mxd

2019 Existing - TH 210 at NW 4th St
SIGNAL WARRANT
ANALYSIS

LOCATION: TH 210 at NW 4th St
COUNTY: Crow Wing
REF. POINT: 0
DATE: 3/12/2020
OPERATOR: JDA

85th% Speed	Approach Description		Lanes	Approach
35	Major App1:	TH 210 EB	4	10169
35	Major App3:	TH 210 WB	4	11917
30	Minor App2:	NW 4th St NB	2	3137
30	Minor App4:	NW 4th St SB	2	3649

40 MPH OR FASTER?	NO
POPULATION < 10,000?	NO
VOLUME REQ. AT 70%?	**NO**
CORRECTABLE CRASHES: (12-month period)	0

	Minimum Volume Requirement		
	1A	1B	1A&B (80%)
Major Total	600	900	720
Minor Approach	200	100	160

HOUR	MAJOR APP. 1	MAJOR APP. 3	MINOR APP. 2	MINOR APP. 4	MAJOR APPROACH TOTAL Σ (APP.1 + APP. 3)	MAX MINOR APPROACH (APP. 2 or 4)	WARRANT 1A - 8 hr MAJOR/MINOR	WARRANT 1B - 8 hr MAJOR/MINOR	WARRANT 1A & B MAJOR/MINOR
0:00 - 1:00	0	0	0	0	0	0	NO / NO	NO / NO	NO / NO
1:00 - 2:00	0	0	0	0	0	0	NO / NO	NO / NO	NO / NO
2:00 - 3:00	0	0	0	0	0	0	NO / NO	NO / NO	NO / NO
3:00 - 4:00	0	0	0	0	0	0	NO / NO	NO / NO	NO / NO
4:00 - 5:00	0	0	0	0	0	0	NO / NO	NO / NO	NO / NO
5:00 - 6:00	0	0	0	0	0	0	NO / NO	NO / NO	NO / NO
6:00 - 7:00	397	464	58	163	861	163	YES / NO	NO / YES	**YES / YES**
7:00 - 8:00	916	816	136	361	1732	361	**YES / YES**	**YES / YES**	**YES / YES**
8:00 - 9:00	775	929	205	320	1704	320	**YES / YES**	**YES / YES**	**YES / YES**
9:00 - 10:00	609	1005	215	259	1614	259	**YES / YES**	**YES / YES**	**YES / YES**
10:00 - 11:00	789	1118	260	287	1907	287	**YES / YES**	**YES / YES**	**YES / YES**
11:00 - 12:00	877	1037	294	277	1914	294	**YES / YES**	**YES / YES**	**YES / YES**
12:00 - 13:00	934	1132	327	352	2066	352	**YES / YES**	**YES / YES**	**YES / YES**
13:00 - 14:00	891	1058	288	378	1949	378	**YES / YES**	**YES / YES**	**YES / YES**
14:00 - 15:00	1030	1042	267	335	2072	335	**YES / YES**	**YES / YES**	**YES / YES**
15:00 - 16:00	1016	1046	329	275	2062	329	**YES / YES**	**YES / YES**	**YES / YES**
16:00 - 17:00	999	1186	414	340	2185	414	**YES / YES**	**YES / YES**	**YES / YES**
17:00 - 18:00	936	1084	344	302	2020	344	**YES / YES**	**YES / YES**	**YES / YES**
18:00 - 19:00	0	0	0	0	0	0	NO / NO	NO / NO	NO / NO
19:00 - 20:00	0	0	0	0	0	0	NO / NO	NO / NO	NO / NO
20:00 - 21:00	0	0	0	0	0	0	NO / NO	NO / NO	NO / NO
21:00 - 22:00	0	0	0	0	0	0	NO / NO	NO / NO	NO / NO
22:00 - 23:00	0	0	0	0	0	0	NO / NO	NO / NO	NO / NO
23:00 - 24:00	0	0	0	0	0	0	NO / NO	NO / NO	NO / NO
Daily	**10169**	**11917**	**3137**	**3649**					

		Met (Hr)	Required (Hr)	WARRANT MET:
Warrant 1	**Eight Hour Volumes**	12	8	**Satisfied**
Warrant 1A	Minimum Vehicular Volume	11	8	**Satisfied**
Warrant 1B	Interruption of Continuous Flow	11	8	**Satisfied**
1A & 1B	Combination of Warrants	12	8	**Satisfied**
Warrant 2	**Four Hour Volumes**	11	4	**Satisfied**
Warrant 3	**Peak Hour Volumes**	11	1	**Satisfied**
Warrant 7	**Crash Experience**	12	8	Crashes Insufficient

COMMENTS:

2019 Existing - TH 210 at NW 4th St
SIGNAL WARRANT
ANALYSIS

LOCATION: TH 210 at NW 4th St
COUNTY: Crow Wing
REF. POINT: 0
DATE: 3/12/2020

OPERATOR: JDA

40 MPH OR FASTER?	NO
POPULATION < 10,000?	NO
VOLUME REQ. AT 70%?	**NO**

85th% Speed	Approach Description		Lanes	Approach
35	Major App1:	TH 210 EB	4	10169
35	Major App3:	TH 210 WB	4	11917
30	Minor App2:	NW 4th St NB	2	3137
30	Minor App4:	NW 4th St SB	2	3649

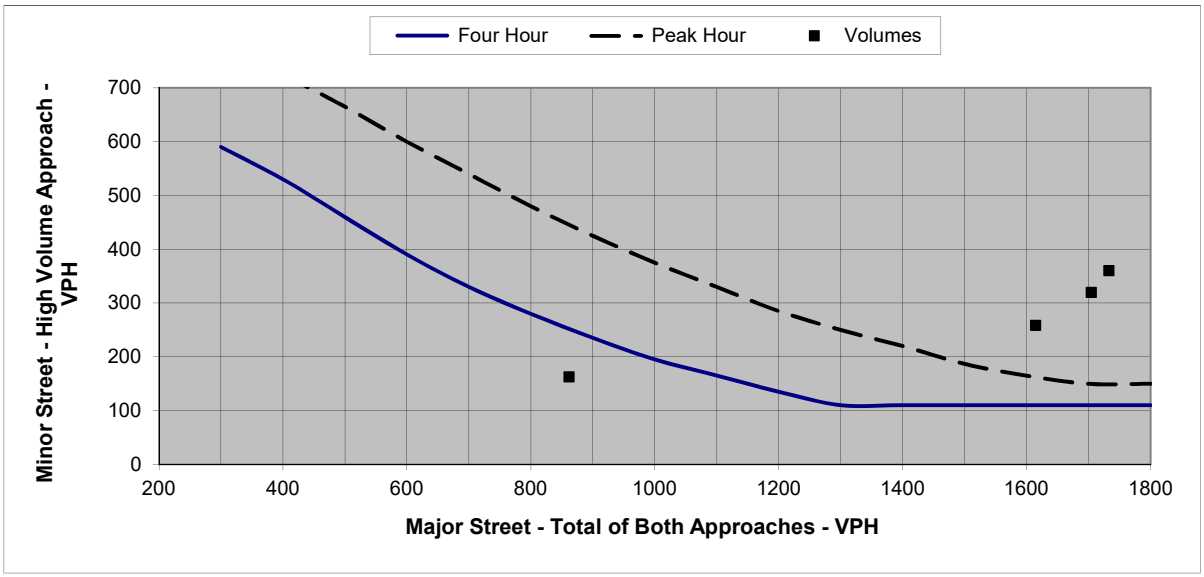


Figure 1. Four Hour and Peak Hour Warrant Analysis

Note: For data points outside the graph range, check the minor street volume against the lower thresholds

Warrant Criteria (Graph)		
Major	Minor App.	Minor App.
Approach	Four Hour	Peak Hour
200		
300	590	
400	530	725
500	460	665
600	390	600
700	330	540
800	280	480
900	235	425
1000	195	375
1100	165	330
1200	135	285
1300	110	250
1400	110	220
1500	110	187
1600	110	165
1700	110	150
1800	110	150

Actual Hourly Count			Warrants Met:	
			Warrant 2	Warrant 3
HOUR	Sum Major App.	Max Minor App.	Four Hour	Peak Hour
0:00 - 1:00	0	0	NO	NO
1:00 - 2:00	0	0	NO	NO
2:00 - 3:00	0	0	NO	NO
3:00 - 4:00	0	0	NO	NO
4:00 - 5:00	0	0	NO	NO
5:00 - 6:00	0	0	NO	NO
6:00 - 7:00	861	163	NO	NO
7:00 - 8:00	1732	361	**YES**	**YES**
8:00 - 9:00	1704	320	**YES**	**YES**
9:00 - 10:00	1614	259	**YES**	**YES**
10:00 - 11:00	1907	287	**YES**	**YES**
11:00 - 12:00	1914	294	**YES**	**YES**
12:00 - 13:00	2066	352	**YES**	**YES**
13:00 - 14:00	1949	378	**YES**	**YES**
14:00 - 15:00	2072	335	**YES**	**YES**
15:00 - 16:00	2062	329	**YES**	**YES**
16:00 - 17:00	2185	414	**YES**	**YES**
17:00 - 18:00	2020	344	**YES**	**YES**
18:00 - 19:00	0	0	NO	NO
19:00 - 20:00	0	0	NO	NO
20:00 - 21:00	0	0	NO	NO
21:00 - 22:00	0	0	NO	NO
22:00 - 23:00	0	0	NO	NO
23:00 - 24:00	0	0	NO	NO

2045 Future - TH 210 at NW 4th St
SIGNAL WARRANT
ANALYSIS

LOCATION: TH 210 at NW 4th St
COUNTY: Crow Wing
REF. POINT: 0
DATE: 3/12/2020
OPERATOR: JDA

85th% Speed	Approach Description		Lanes	Approach
35	Major App1:	TH 210 EB	4	11492
35	Major App3:	TH 210 WB	4	13467
30	Minor App2:	NW 4th St NB	2	3546
30	Minor App4:	NW 4th St SB	2	4124

40 MPH OR FASTER?	NO
POPULATION < 10,000?	NO
VOLUME REQ. AT 70%?	**NO**
CORRECTABLE CRASHES: (12-month period)	0

	Minimum Volume Requirement		
	1A	1B	1A&B (80%)
Major Total	600	900	720
Minor Approach	200	100	160

HOUR	MAJOR APP. 1	MAJOR APP. 3	MINOR APP. 2	MINOR APP. 4	MAJOR APPROACH TOTAL Σ (APP.1 + APP. 3)	MAX MINOR APPROACH (APP. 2 or 4)	WARRANT 1A - 8 hr MAJOR/MINOR	WARRANT 1B - 8 hr MAJOR/MINOR	WARRANT 1A & B MAJOR/MINOR
0:00 - 1:00	0	0	0	0	0	0	NO / NO	NO / NO	NO / NO
1:00 - 2:00	0	0	0	0	0	0	NO / NO	NO / NO	NO / NO
2:00 - 3:00	0	0	0	0	0	0	NO / NO	NO / NO	NO / NO
3:00 - 4:00	0	0	0	0	0	0	NO / NO	NO / NO	NO / NO
4:00 - 5:00	0	0	0	0	0	0	NO / NO	NO / NO	NO / NO
5:00 - 6:00	0	0	0	0	0	0	NO / NO	NO / NO	NO / NO
6:00 - 7:00	449	524	65	184	973	184	YES / NO	**YES / YES**	**YES / YES**
7:00 - 8:00	1036	922	153	407	1958	407	**YES / YES**	**YES / YES**	**YES / YES**
8:00 - 9:00	876	1050	232	362	1926	362	**YES / YES**	**YES / YES**	**YES / YES**
9:00 - 10:00	688	1136	244	293	1824	293	**YES / YES**	**YES / YES**	**YES / YES**
10:00 - 11:00	892	1264	294	323	2156	323	**YES / YES**	**YES / YES**	**YES / YES**
11:00 - 12:00	991	1172	332	313	2163	332	**YES / YES**	**YES / YES**	**YES / YES**
12:00 - 13:00	1056	1280	370	398	2336	398	**YES / YES**	**YES / YES**	**YES / YES**
13:00 - 14:00	1006	1195	325	427	2201	427	**YES / YES**	**YES / YES**	**YES / YES**
14:00 - 15:00	1163	1178	302	379	2341	379	**YES / YES**	**YES / YES**	**YES / YES**
15:00 - 16:00	1148	1182	373	312	2330	373	**YES / YES**	**YES / YES**	**YES / YES**
16:00 - 17:00	1129	1340	467	384	2469	467	**YES / YES**	**YES / YES**	**YES / YES**
17:00 - 18:00	1058	1224	389	342	2282	389	**YES / YES**	**YES / YES**	**YES / YES**
18:00 - 19:00	0	0	0	0	0	0	NO / NO	NO / NO	NO / NO
19:00 - 20:00	0	0	0	0	0	0	NO / NO	NO / NO	NO / NO
20:00 - 21:00	0	0	0	0	0	0	NO / NO	NO / NO	NO / NO
21:00 - 22:00	0	0	0	0	0	0	NO / NO	NO / NO	NO / NO
22:00 - 23:00	0	0	0	0	0	0	NO / NO	NO / NO	NO / NO
23:00 - 24:00	0	0	0	0	0	0	NO / NO	NO / NO	NO / NO
Daily	**11492**	**13467**	**3546**	**4124**					

		Met (Hr)	Required (Hr)	WARRANT MET:
Warrant 1	**Eight Hour Volumes**	12	8	**Satisfied**
Warrant 1A	Minimum Vehicular Volume	11	8	**Satisfied**
Warrant 1B	Interruption of Continuous Flow	12	8	**Satisfied**
1A & 1B	Combination of Warrants	12	8	**Satisfied**
Warrant 2	**Four Hour Volumes**	11	4	**Satisfied**
Warrant 3	**Peak Hour Volumes**	11	1	**Satisfied**
Warrant 7	**Crash Experience**	12	8	Crashes Insufficient

COMMENTS:

2045 Future - TH 210 at NW 4th St
SIGNAL WARRANT
ANALYSIS

LOCATION: TH 210 at NW 4th St
COUNTY: Crow Wing
REF. POINT: 0
DATE: 3/12/2020

OPERATOR: JDA

40 MPH OR FASTER?	NO
POPULATION < 10,000?	NO
VOLUME REQ. AT 70%?	**NO**

85th% Speed	Approach Description		Lanes	Approach
35	Major App1:	TH 210 EB	4	11492
35	Major App3:	TH 210 WB	4	13467
30	Minor App2:	NW 4th St NB	2	3546
30	Minor App4:	NW 4th St SB	2	4124

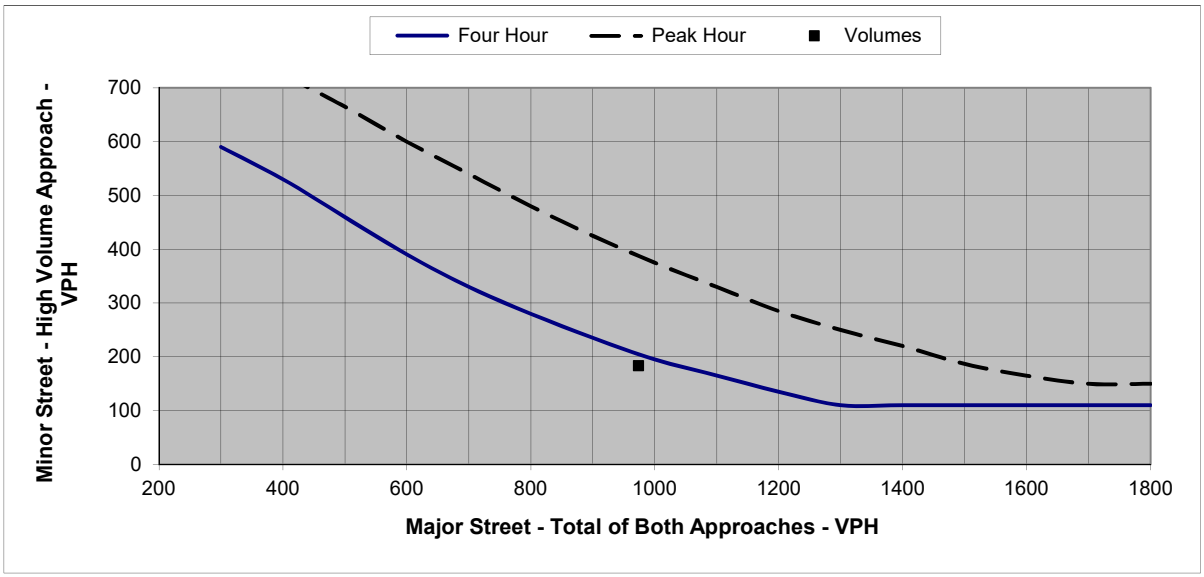


Figure 1. Four Hour and Peak Hour Warrant Analysis

Note: For data points outside the graph range, check the minor street volume against the lower thresholds

Warrant Criteria (Graph)		
Major Approach	Minor App. Four Hour	Minor App. Peak Hour
200		
300	590	
400	530	725
500	460	665
600	390	600
700	330	540
800	280	480
900	235	425
1000	195	375
1100	165	330
1200	135	285
1300	110	250
1400	110	220
1500	110	187
1600	110	165
1700	110	150
1800	110	150

Actual Hourly Count			Warrants Met:	
			Warrant 2	Warrant 3
HOUR	Sum Major App.	Max Minor App.	Four Hour	Peak Hour
0:00 - 1:00	0	0	NO	NO
1:00 - 2:00	0	0	NO	NO
2:00 - 3:00	0	0	NO	NO
3:00 - 4:00	0	0	NO	NO
4:00 - 5:00	0	0	NO	NO
5:00 - 6:00	0	0	NO	NO
6:00 - 7:00	973	184	NO	NO
7:00 - 8:00	1958	407	**YES**	**YES**
8:00 - 9:00	1926	362	**YES**	**YES**
9:00 - 10:00	1824	293	**YES**	**YES**
10:00 - 11:00	2156	323	**YES**	**YES**
11:00 - 12:00	2163	332	**YES**	**YES**
12:00 - 13:00	2336	398	**YES**	**YES**
13:00 - 14:00	2201	427	**YES**	**YES**
14:00 - 15:00	2341	379	**YES**	**YES**
15:00 - 16:00	2330	373	**YES**	**YES**
16:00 - 17:00	2469	467	**YES**	**YES**
17:00 - 18:00	2282	389	**YES**	**YES**
18:00 - 19:00	0	0	NO	NO
19:00 - 20:00	0	0	NO	NO
20:00 - 21:00	0	0	NO	NO
21:00 - 22:00	0	0	NO	NO
22:00 - 23:00	0	0	NO	NO
23:00 - 24:00	0	0	NO	NO

MEMORANDUM

TO: Ken Hansen, PE
MnDOT District 3 Traffic Engineer

FROM: Graham Johnson, PE, PTOE (Lic.MN, IA, SD)
Justin Anibas, PE (Lic. MN)

DATE: August 9, 2022

RE: TH 210 at N 4th Street Intersection Control Evaluation (ICE) Report
SEH No. MNT03 152201 14.00

INTRODUCTION

This memorandum summarizes the Intersection Control Evaluation (ICE) process for the intersection of Trunk Highway (TH) 210 and N 4th Street in Brainerd, Minnesota. The Minnesota Department of Transportation (MnDOT) ICE is an objective process used to investigate and determine the optimal traffic control that should be provided at an intersection to serve the existing conditions and future needs. This memorandum was prepared for MnDOT by SEH Inc.

As part of a project along TH 210 between Baxter Drive and Pine Shores Road, the intersection of TH 210 and N 4th Street was evaluated and is proposed to remain under traffic signal control after the project is complete.

The location of the study intersection for this ICE report is shown in **Figure 1**. The proposed intersection control for the TH 210 and N 4th Street intersection was analyzed based on safety, signal warrants, traffic operations, and pedestrian and bicycle accommodations.

The scope and content of this ICE report was reviewed and agreed to by MnDOT prior to the layout and ICE submittal process. This report summarizes the ICE process and recommendation for the TH 210 and N 4th Street intersection based on a Phase I analysis according to the *2017 MnDOT ICE Manual*.

APPROVAL

I hereby certify that this report was prepared by me or under my direct supervision, and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.

_____ _____
Graham Johnson, PE, PTOE, MN License No. 45429 Date

Approved By:

_____ _____
MnDOT District 3 Traffic Engineer Date

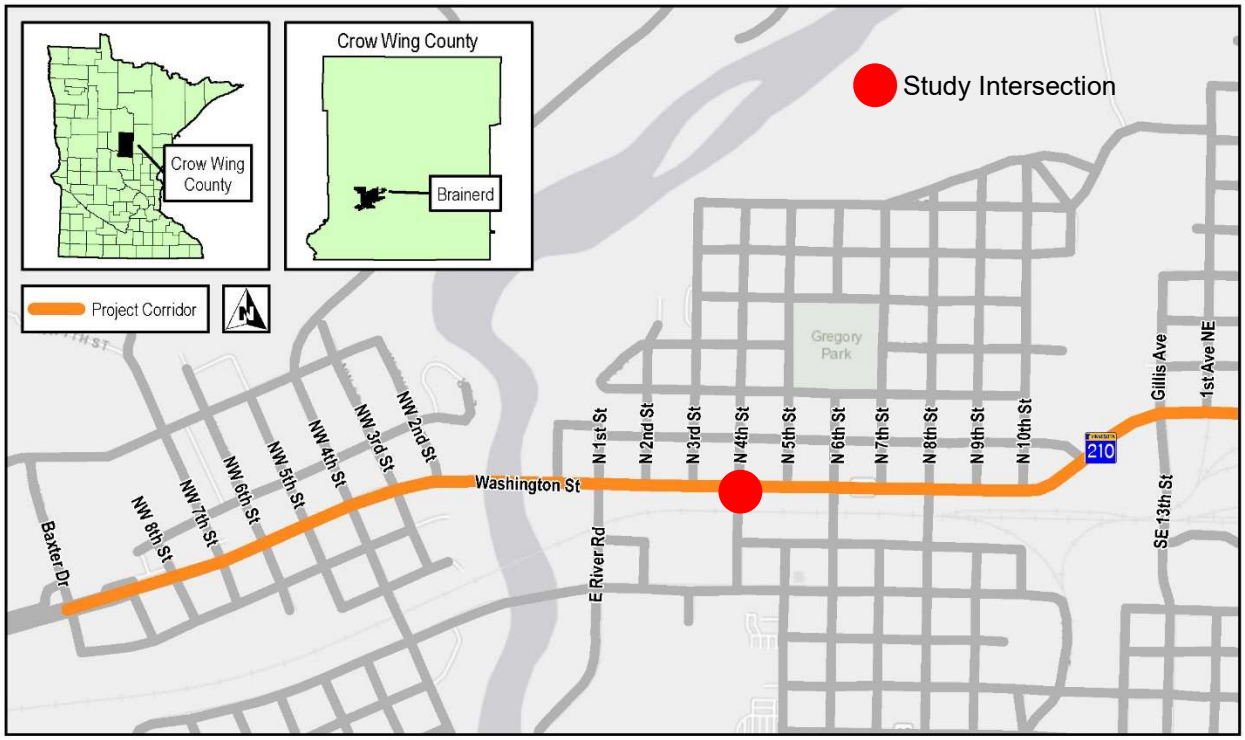
PROJECT DESCRIPTION

MnDOT is conducting the corridor planning study along a 3.9-mile segment of TH 210 to identify the future vision for highway corridor through Brainerd. Reconstruction of TH 210 between Baxter Drive and Pine Shores Road is anticipated to begin in 2025; SP 1805-80.

The primary purpose of the corridor study is to better understand the community issues, needs and use of the roadway, assess improvement options, select a preferred alternative, and prepare a geometric layout. The focus of the improvements is to improve pavement conditions and traveler safety, accommodate the Americans with Disabilities Act (ADA) requirements, and enhance pedestrian accommodations.

For more detailed traffic information, see both the *Existing and 2045 No Build Conditions Report – TH 210/Washington Street Corridor Study* and the *TH 210 Build Conditions Report*.

Figure 1 Project Location



EXISTING CONDITIONS

TH 210 is a major east-west principal arterial through the City of Brainerd that connects near-by cities and regional commerce. TH 210 is generally a 4-lane divided roadway through the City of Brainerd; the posted speed limit is 35 miles-per-hour (mph) at the study intersection.

N 4th Street is a major collector providing access to commercial land uses to the south, the downtown business district, and residential land uses to the north of TH 210; the posted speed limit is 30 mph.

The nearest existing traffic signals along TH 210 include NW 4th Avenue approximately 3,200 feet west and N 6th Street approximately 750 feet east.

Intersection Characteristics

The existing intersection currently operates with traffic signal control and includes marked pedestrian crossings on all four legs. Eastbound and westbound TH 210 left turns operate with protected left turn phasing only, while the minor street approach left turns operate with protected and permissive left turn phasing.

The existing lane geometrics are described below and shown in **Figure 2**.

- Eastbound Approach: left turn lane, one through lane, and a shared through-right lane.
- Westbound Approach: left turn lane, one through lane, and a shared through-right lane.
- Northbound Approach: separate left, through, and right turn lanes.
  - Approach storage lanes are limited due to proximity of railroad crossing.
- Southbound Approach: separate left, and a shared through-right lane.

Figure 2 Existing Intersection

Traffic Volumes

TH 210 has an existing 2019 Average Annual Daily Traffic (AADT) volume of 32,500 vehicles west of the intersection and 26,000 to the east. N 4th Street has an existing 2019 AADT of 2,400 vehicles to the north and 4,200 vehicles to the south.

The existing intersection turning movement data was collected in August of 2018 as part of a signal timing project along TH 210 and TH 371. **Figure 3** includes the existing AM and PM peak hour volumes; **Attachment 1** includes the raw existing intersection count data.

Crash Analysis

Intersection crash data for the study intersection was collected from the MnDOT Crash Mapping Analysis Tool (MnCMATv2) for a five-year period between 2014 and 2018 as part of the larger corridor study.

The crash rate at an intersection is expressed as a number of crashes per million entering vehicles (MEV). The critical crash rate is a statistical value that is unique to each intersection and is based on vehicular exposure and the statewide average crash rate for similar intersections. An intersection with a crash rate higher than the critical rate can indicate a safety concern at the intersection and the site should be further reviewed.

The intersection had a total of 49 crashes during the 5-year analysis period:

- 41 of the 49 crashes were rear end crashes: 25 of the rear end crashes were in the eastbound direction and 15 were in the westbound direction, and 1 southbound. This could indicate that backups are worse for eastbound vehicles and influenced by the high right turn volume in the shared through-right lane.

Table 1 summarizes the crashes for the study intersection; additional crash information is provided in **Attachment 2**. Based on the crash rate, the intersection does not exceed the critical crash rate.

Table 1 Intersection Crash History (2014-2018)

TH 210 at:	Crash Severity					Crash Rates	
	Fatal & Severity A	Severity B	Severity C	Property Damage	Total	Int. Rate	Critical Rate
N 4th Street	0	1	9	39	49	0.87	0.99

PROPOSED CONDITIONS

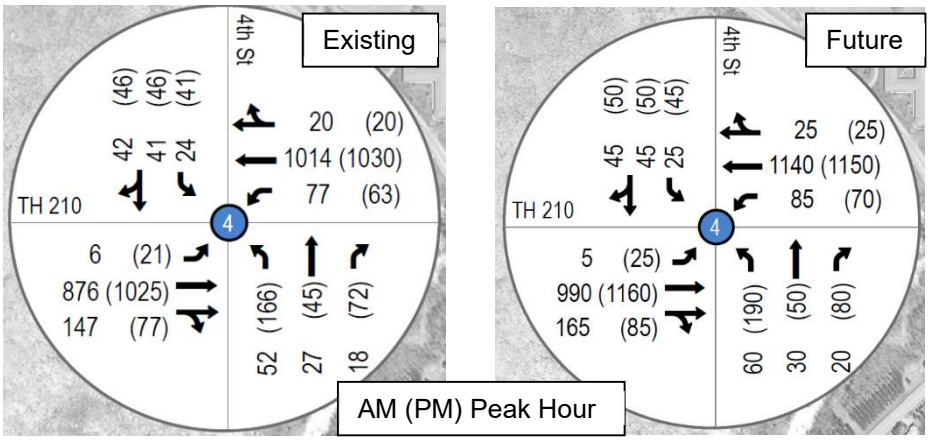
The current layout for the TH 210 corridor between Baxter Drive and Pine Shores Road addresses the needs and use of the roadway, improves pavement conditions, safety, and meets ADA requirements.

The TH 210 and N 4th Street intersection is located in a segment of the project that will primarily include reconstruction of the roadway, with modifications for full ADA compliance, wider sidewalks, and medians. Lane improvements include extending the eastbound and westbound left turn lanes on TH 210.

Future Traffic Volumes

Traffic forecasts were developed for the entire TH 210 corridor as part of the larger study effort. Future 2045 forecast volumes were developed based on a linear growth rate of 0.5% per year based on historical AADT volumes, population data, and input from the project team. **Figure 3** presents both the existing and future 2045 AM and PM peak intersection volumes.

Figure 3 Existing and Future 2045 Intersection Volumes



Warrant Analysis

Traffic control warrant analysis was conducted on the existing and future traffic volumes following the Minnesota Manual on Uniform Traffic Control Devices (MnMUTCD) guidelines; all-way stop control warrants were not analyzed as it is not considered a viable control option along TH 210.

Warrants 1 (8-hour), 2 (4-hour), 3 (peak hour), and 7 (crash warrant) were included in the analysis. The following assumptions were used in the analysis:

- All minor street right turning volume was removed from the approaches.
- Warrant 7 was not applicable at the intersection due to insufficient correctable crashes.

The results of the traffic signal warrant analysis are provided in **Table 2**. The intersection currently meets Warrants 1, 2, and 3; the detailed signal warrant analysis is provided as **Attachment 3**.

Table 2 Traffic Signal Warrant Analysis Summary

MnMUTCD Signal Warrant	Hours Needed	Existing		Future 2045	
		Hours Met	Warrant Met?	Hours Met	Warrant Met?
Warrant 1A – 8-hour Minimum Volume	8	3	Not Met	6	Not Met
Warrant 1B – 8-hour Interruption of Flow	8	**10**	**MET**	**10**	**MET**
Combination of Warrant 1A and 1B	8	7	Not Met	**8**	**MET**
Warrant 2 – 4-hours	4	**10**	**MET**	**11**	**MET**
Warrant 3 – Peak Hour	1	**9**	**MET**	**9**	**MET**

System Limitations and Consistency

TH 210 is a principal arterial through the City of Brainerd that experiences heavy directional volumes in both the AM and PM peak hours, throughout the day, and in the summer months with high tourist traffic. The two adjacent major intersections are both currently signalized.

The study intersection is part of an existing TH 210 signal system coordinated to provide priority to the peak direction of flow, reduce mainline delays, and provide a high level of vehicle progression through the corridor. The coordinated signal system includes all existing traffic signals along TH 210 between TH 371, in the City of Baxter, and 4th Avenue NE in east Brainerd.

Due to limited right-of-way along the TH 210 corridor, expansion of the roadway to accommodate a larger intersection footprint is not feasible. Roundabout intersection control would result in major impacts to adjacent parcels and structures adjacent to the intersection and along the corridor.

In addition, both all-way stop control and roundabout control would alter the traffic flow along TH 210 and severely impede the progression of traffic from the adjacent coordinated signal systems.

Therefore, all-way stop and roundabout intersection control was not considered feasible for this intersection due to right-of-way limitations and the interruption to the existing coordinated signal system.

Traffic Operations

Evaluation of the intersection traffic operations were conducted as part of the overall corridor study using VISSIM software. The evaluation included analysis of the existing conditions, 2045 No Build conditions,

and the recommended 2045 Build conditions, which included extending the eastbound and westbound left turn lanes on TH 210.

The average delay per vehicle and Level of Service (LOS) results for each approach and the overall intersection are provided in **Table 3** for each scenario; all three scenarios include traffic signal control. For more detailed traffic information, see both the *Existing and 2045 No Build Conditions Report – TH 210/Washington Street Corridor Study* and the *TH 210 Build Conditions Report*.

Table 3 Traffic Operations Summary

Scenario	Peak Hour	Approach Delay (sec/veh / LOS)				Intersection Delay (sec/veh / LOS)
		Eastbound	Westbound	Northbound	Southbound	
Existing Conditions	AM	14.4 / B	5.5 / A	**36.7 / D**	**38.2 / D**	12.3 / B
	PM	11.5 / B	8.1 / A	**41.4 / D**	**47.7 / D**	15.3 / B
2045 No Build Conditions	AM	11.0 / B	7.4 / A	**37.7 / D**	**36.4 / D**	11.6 / B
	PM	15.0 / B	7.9 / A	**44.5 / D**	**52.0 / D**	17.3 / B
2045 Build Conditions	AM	15.4 / B	10.6 / B	34.3 / C	34.2 / C	14.8 / B
	PM	21.2 / C	9.3 / A	**41.2 / D**	**49.8 / D**	20.0 / C

Based on the results, the intersection is expected to operate at a LOS B or better in all scenarios. The minor street approaches operate with longer delays due to the long cycle length required for coordination along TH 210.

Extending the eastbound and westbound left turn lanes allows vehicles to enter the storage lane without being blocked by the through vehicle queues. It should be noted; the Build conditions can operate slightly worse than the No Build conditions, this is due to more vehicles entering the intersection with improvements to the adjacent intersections along the corridor.

Pedestrian Considerations

The existing intersection provides crosswalks on all four legs of the intersection; however, the existing facilities are not ADA compliant.

As part of the TH 210 reconstruction project, the intersection will be improved to meet ADA requirements. New Accessible Pedestrian Systems (APS) pedestrian push buttons are proposed to be installed and made operational as part of this project, and all pedestrian curb ramps will be upgraded to be ADA compliant.

Revised Signal System

The existing signal system is vehicle actuated and coordinated along TH 210. The TH 210 left turn phases operate under protected phasing only; the minor street approaches have both protected and permissive left turn phasing.

As part of the signal replacement, the new signal system is to remain vehicle actuated and coordinated along TH 210. All four approaches will include Flashing Yellow Arrow (FYA) which provides the flexibility of running both protected and permissive phasing by time-of-day schedules on all approaches and improves the overall safety of the intersection.

RECOMMENDATION

Based on the analysis included in this report, and as part of the larger TH 210 corridor study, it is recommended to retain traffic signal control at the intersection of TH 210 and N 4th Street.

Traffic signal control is currently warranted at the intersection and traffic operations are acceptable in both the existing conditions and future forecast year. The improvements at the existing intersection will continue to provide a safe intersection for all users.

Roundabout and all-way stop control was not considered feasible at this intersection due to potential right-of-way constraints and impacts, and the impact to the coordinated signal system that provides positive vehicle progression along TH 210.

Attachment 1: Turning Movement Data
Attachment 2: Crash Data
Attachment 3: Warrant Analysis

cc: Luke Wehseler, PE MnDOT District 3
Zachary Whitley, PE MnDOT District 3

File Name: S:\2018\180119\TO OTHERS\TMC\PETRO\344_TH 210 AND 4TH STREET.ppd
Start Date: 8/23/2018
Start Time: 6:00:00 AM
Site Code: 00000344
Comment 1: 344_TH 210 AND 4TH STREET
Comment 2: 0
Comment 3: data by: Alliant Inc
Comment 4: TURN MOVEMENT COUNT

	N 4TH STREET Southbound				TH 210 Westbound				N 4TH STREET Northbound				TH 210 Eastbound			
Start Time	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds
06:00 AM	1	1	0	0	5	73	1	0	5	2	0	1	0	49	4	0
06:15 AM	1	2	3	0	2	70	0	0	7	3	2	0	1	65	5	0
06:30 AM	4	3	7	0	6	115	9	0	8	4	6	0	0	112	17	0
06:45 AM	2	5	3	0	4	151	7	0	9	7	4	0	4	107	12	1
07:00 AM	1	6	5	0	4	104	1	0	4	5	4	0	1	106	19	0
07:15 AM	2	8	8	1	13	154	13	2	6	9	4	0	2	132	20	0
07:30 AM	8	7	15	0	11	179	7	0	6	8	4	0	2	161	25	0
07:45 AM	9	17	10	1	26	221	4	0	14	7	5	0	3	170	49	3
08:00 AM	5	8	10	0	20	183	6	0	16	3	3	0	1	130	30	0
08:15 AM	2	9	7	0	20	168	3	1	16	9	6	0	0	134	18	0
08:30 AM	4	5	6	1	17	159	4	2	18	7	5	0	2	143	27	1
08:45 AM	7	3	9	0	13	141	3	1	29	11	12	0	4	156	33	0
09:00 AM	3	9	9	1	19	191	2	3	28	4	10	0	5	125	17	0
09:15 AM	6	3	4	1	12	181	10	1	23	4	9	0	2	140	20	1
09:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
09:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10:30 AM	6	4	11	0	19	226	3	1	34	10	10	0	0	116	12	0
10:45 AM	8	10	4	2	16	223	5	1	39	13	10	1	5	117	8	1
11:00 AM	9	7	10	0	14	210	7	3	42	12	27	3	2	122	5	0
11:15 AM	6	14	14	0	19	183	6	2	36	16	22	0	5	124	7	7
11:30 AM	14	15	12	0	21	221	2	4	35	16	18	0	2	118	6	0
11:45 AM	9	14	3	1	24	233	5	0	37	16	16	0	2	131	5	0
12:00 PM	9	11	14	1	17	209	5	0	45	20	23	0	6	132	9	1
12:15 PM	8	9	8	2	15	239	7	3	33	15	30	0	2	122	7	2
12:30 PM	11	11	5	0	17	238	6	2	43	7	10	0	1	131	6	3
12:45 PM	8	12	12	1	27	216	8	0	33	17	19	0	4	124	15	1
01:00 PM	9	18	12	2	21	192	8	2	33	9	19	0	2	105	9	0
01:15 PM	8	12	9	1	21	201	2	0	35	20	26	1	2	110	4	0
01:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
01:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
02:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
02:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
02:30 PM	7	12	13	3	20	212	12	0	36	10	20	0	3	193	15	3
02:45 PM	8	22	4	0	9	195	8	0	31	14	19	0	3	194	19	0
03:00 PM	16	9	7	0	16	182	5	0	26	8	16	0	8	211	14	2
03:15 PM	15	10	8	1	17	187	4	2	31	15	11	0	3	253	27	5
03:30 PM	19	14	12	0	16	235	6	1	36	11	22	0	4	189	22	2
03:45 PM	14	10	13	0	12	217	5	3	37	7	10	1	4	210	17	2
04:00 PM	14	16	6	1	13	219	6	0	39	15	11	0	4	207	20	0
04:15 PM	9	15	4	1	16	222	2	1	41	14	17	0	4	252	12	4
04:30 PM	14	15	15	2	19	266	6	0	56	15	31	1	0	227	12	1
04:45 PM	5	8	12	0	16	238	3	1	37	12	15	0	7	243	22	0
05:00 PM	11	10	12	0	12	278	6	1	39	11	11	2	8	225	19	1
05:15 PM	11	13	7	2	16	234	5	0	34	7	15	1	6	240	12	0
05:30 PM	11	6	7	0	10	210	4	0	21	10	11	0	4	189	8	0
05:45 PM	8	3	6	1	7	183	0	0	18	8	13	0	5	210	7	3

Intersection Safety Screening

Intersection: TH 210 at N 4th Street

Crash Data: 2014 to 2018 (5-years)

Crashes by Crash Severity	
Fatal	0
Incapacitating Injury	0
Non-incapacitating Injury	1
Possible Injury	9
Property Damage	39
Total Crashes	49

Intersection Characteristics	
Entering Volume	30,750
Traffic Control	Signals
Environment	Urban
Speed Limit	35 mph

Annual crash cost = $242,680

Statewide Comparison

Signals: high volume, low speed

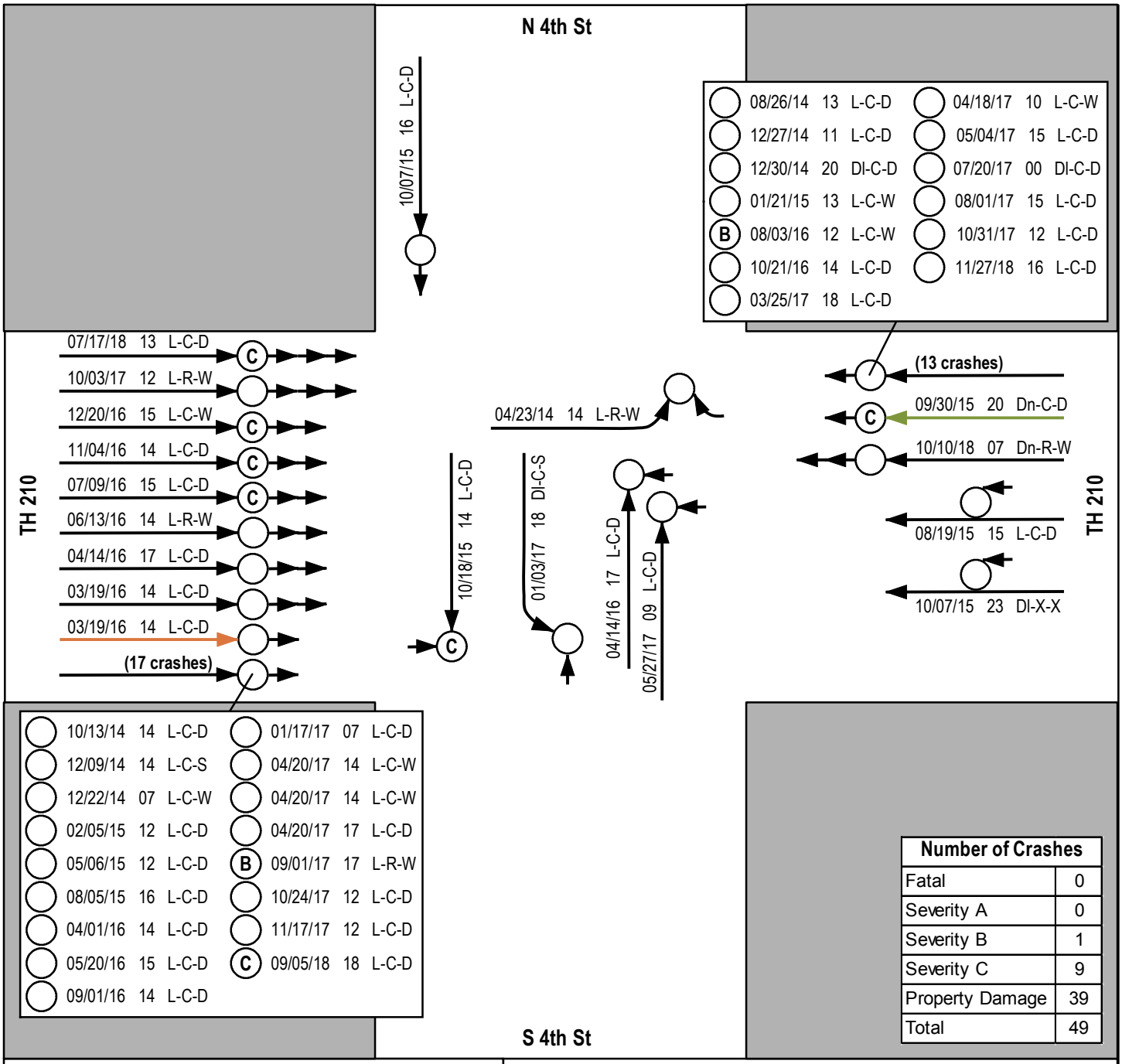
Total Crash Rate	
Observed	0.87
Statewide Average	0.70
Critical Rate	0.99
Critical Index	**0.88**

Fatal & Serious Injury Crash Rate	
Observed	0.00
Statewide Average	0.76
Critical Rate	3.15
Critical Index	**0.00**

The observed crash rate is the number of crashes per million entering vehicles (MEV). The critical rate is a statistical comparison based on similar intersections statewide. An observed crash rate greater than the critical rate indicates that the intersection operates outside the expected, normal range. The critical index reports the magnitude of this difference.

The observed total crash rate for this period is 0.87 per MEV; this is 12% below the critical rate. Based on similar statewide intersections, an additional 7 crashes over the five years would indicate this intersection operaters outside the normal range.

The observed fatal and serious injury crash rate for this period is 0.00 per 100 MEV; this is 100% below the critical rate. The intersection operates within the normal range.



Number of Crashes	
Fatal	0
Severity A	0
Severity B	1
Severity C	9
Property Damage	39
Total	49

Passenger Vehicle
Heavy Vehicle
Bus
Motorcycle
Fixed Object
Pedestrian
Bicycle

Fatal
Severity A
Severity B
Severity C
Property Damage Only
Vehicle Out of Control

Light
L = Daylight
Dn = Dawn
Du = Dusk
Dl = Dark, Lighted
Do = Dark, Lights Off
D = Dark, Unlighted
X = Unkown

Weather
C = Clear or Cloudy
R = Rain
S = Snow/Sleet/Hail/Freexing Rain
F = Fog/Smog/Smoke
B = Blowing Sand/Dust/Snow
W = Severe Cross Winds
X = Other or Unknown

Surface
D = Dry
W = Wet or Water
S = Snow/Slush/Ice
M = Muddy
Db = Debris
O = Oily
X = Other or Unkown

Date Time(Hr) Light-Weather-Surface → Injury Type → Other Vehicle(s)

Notes:

Project: MNT03 152201
Print Date: 3/2/2020

Map by: jdanibas
Projection:
Source:

Crash Diagrams (2014-2018)
TH 210 at N 4th St
TH 210/Washington Street Corridor Study
Brainerd, MN

Figure A4

Path: C:\Traffic Projects\Brainerd- TH 210\Crashes\Crash Diagrams\A4_TH 210 at N 4th St_Crash Diagrams.mxd

2019 Existing - TH 210 at N 4th ST
SIGNAL WARRANT
ANALYSIS

LOCATION: TH 210 at N 4th ST
COUNTY: Crow Wing
REF. POINT: 0
DATE: 3/12/2020

OPERATOR: JDA

85th% Speed	Approach Description		Lanes	Approach
35	Major App1:	TH 210 EB	3	10622
35	Major App3:	TH 210 WB	3	11517
30	Minor App2:	N 4th St NB	2	1877
30	Minor App4:	N 4th St SB	2	858

40 MPH OR FASTER?	NO
POPULATION < 10,000?	NO
VOLUME REQ. AT 70%?	**NO**
CORRECTABLE CRASHES: (12-month period)	0

	Minimum Volume Requirement		
	1A	1B	1A&B (80%)
Major Total	600	900	720
Minor Approach	200	100	160

HOUR	MAJOR APP. 1	MAJOR APP. 3	MINOR APP. 2	MINOR APP. 4	MAJOR APPROACH TOTAL Σ (APP.1 + APP. 3)	MAX MINOR APPROACH (APP. 2 or 4)	WARRANT 1A - 8 hr MAJOR/MINOR	WARRANT 1B - 8 hr MAJOR/MINOR	WARRANT 1A & B MAJOR/MINOR
0:00 - 1:00	0	0	0	0	0	0	NO / NO	NO / NO	NO / NO
1:00 - 2:00	0	0	0	0	0	0	NO / NO	NO / NO	NO / NO
2:00 - 3:00	0	0	0	0	0	0	NO / NO	NO / NO	NO / NO
3:00 - 4:00	0	0	0	0	0	0	NO / NO	NO / NO	NO / NO
4:00 - 5:00	0	0	0	0	0	0	NO / NO	NO / NO	NO / NO
5:00 - 6:00	0	0	0	0	0	0	NO / NO	NO / NO	NO / NO
6:00 - 7:00	453	505	45	19	958	45	YES / NO	YES / NO	YES / NO
7:00 - 8:00	973	929	59	58	1902	59	YES / NO	YES / NO	YES / NO
8:00 - 9:00	868	1017	109	43	1885	109	YES / NO	**YES / YES**	YES / NO
9:00 - 10:00	712	823	129	45	1535	129	YES / NO	**YES / YES**	YES / NO
10:00 - 11:00	793	940	185	55	1733	185	YES / NO	**YES / YES**	**YES / YES**
11:00 - 12:00	786	1026	210	88	1812	210	**YES / YES**	**YES / YES**	**YES / YES**
12:00 - 13:00	911	1085	213	79	1996	213	**YES / YES**	**YES / YES**	**YES / YES**
13:00 - 14:00	865	990	194	96	1855	194	YES / NO	**YES / YES**	**YES / YES**
14:00 - 15:00	1036	1025	185	99	2061	185	YES / NO	**YES / YES**	**YES / YES**
15:00 - 16:00	1111	1128	171	107	2239	171	YES / NO	**YES / YES**	**YES / YES**
16:00 - 17:00	1114	1102	229	96	2216	229	**YES / YES**	**YES / YES**	**YES / YES**
17:00 - 18:00	1000	947	148	73	1947	148	YES / NO	**YES / YES**	YES / NO
18:00 - 19:00	0	0	0	0	0	0	NO / NO	NO / NO	NO / NO
19:00 - 20:00	0	0	0	0	0	0	NO / NO	NO / NO	NO / NO
20:00 - 21:00	0	0	0	0	0	0	NO / NO	NO / NO	NO / NO
21:00 - 22:00	0	0	0	0	0	0	NO / NO	NO / NO	NO / NO
22:00 - 23:00	0	0	0	0	0	0	NO / NO	NO / NO	NO / NO
23:00 - 24:00	0	0	0	0	0	0	NO / NO	NO / NO	NO / NO
Daily	**10622**	**11517**	**1877**	**858**					

		Met (Hr)	Required (Hr)	WARRANT MET:
Warrant 1	**Eight Hour Volumes**	**10**	8	**Satisfied**
Warrant 1A	Minimum Vehicular Volume	3	8	Not satisfied
Warrant 1B	Interruption of Continuous Flow	**10**	8	**Satisfied**
1A & 1B	Combination of Warrants	7	8	Not satisfied
Warrant 2	**Four Hour Volumes**	**10**	4	**Satisfied**
Warrant 3	**Peak Hour Volumes**	**9**	1	**Satisfied**
Warrant 7	**Crash Experience**	**10**	8	Crashes Insufficient

COMMENTS:

2019 Existing - TH 210 at N 4th ST
SIGNAL WARRANT
ANALYSIS

LOCATION: TH 210 at N 4th ST
COUNTY: Crow Wing
REF. POINT: 0
DATE: 3/12/2020

OPERATOR: JDA

40 MPH OR FASTER?	NO
POPULATION < 10,000?	NO
VOLUME REQ. AT 70%?	**NO**

85th% Speed	Approach Description		Lanes	Approach
35	Major App1:	TH 210 EB	3	10622
35	Major App3:	TH 210 WB	3	11517
30	Minor App2:	N 4th St NB	2	1877
30	Minor App4:	N 4th St SB	2	858

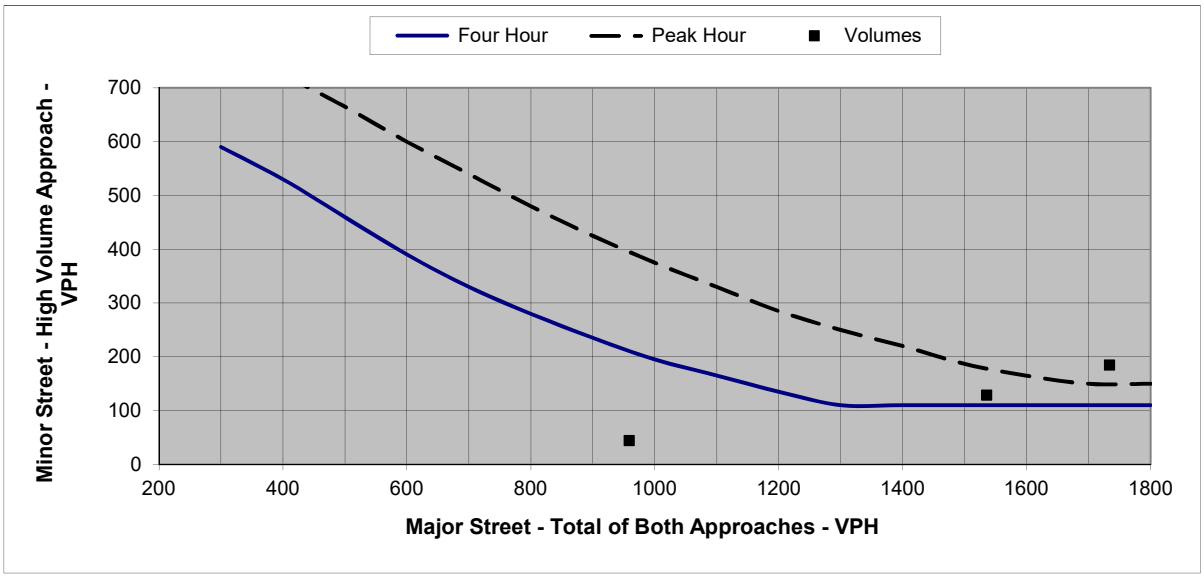


Figure 1. Four Hour and Peak Hour Warrant Analysis

Note: For data points outside the graph range, check the minor street volume against the lower thresholds

Warrant Criteria (Graph)		
Major	Minor App.	Minor App.
Approach	Four Hour	Peak Hour
200		
300	590	
400	530	725
500	460	665
600	390	600
700	330	540
800	280	480
900	235	425
1000	195	375
1100	165	330
1200	135	285
1300	110	250
1400	110	220
1500	110	187
1600	110	165
1700	110	150
1800	110	150

Actual Hourly Count			Warrants Met:	
			Warrant 2	Warrant 3
HOUR	Sum Major App.	Max Minor App.	Four Hour	Peak Hour
0:00 - 1:00	0	0	NO	NO
1:00 - 2:00	0	0	NO	NO
2:00 - 3:00	0	0	NO	NO
3:00 - 4:00	0	0	NO	NO
4:00 - 5:00	0	0	NO	NO
5:00 - 6:00	0	0	NO	NO
6:00 - 7:00	958	45	NO	NO
7:00 - 8:00	1902	59	NO	NO
8:00 - 9:00	1885	109	**YES**	**YES**
9:00 - 10:00	1535	129	**YES**	NO
10:00 - 11:00	1733	185	**YES**	**YES**
11:00 - 12:00	1812	210	**YES**	**YES**
12:00 - 13:00	1996	213	**YES**	**YES**
13:00 - 14:00	1855	194	**YES**	**YES**
14:00 - 15:00	2061	185	**YES**	**YES**
15:00 - 16:00	2239	171	**YES**	**YES**
16:00 - 17:00	2216	229	**YES**	**YES**
17:00 - 18:00	1947	148	**YES**	**YES**
18:00 - 19:00	0	0	NO	NO
19:00 - 20:00	0	0	NO	NO
20:00 - 21:00	0	0	NO	NO
21:00 - 22:00	0	0	NO	NO
22:00 - 23:00	0	0	NO	NO
23:00 - 24:00	0	0	NO	NO

2045 Future - TH 210 at N 4th ST
SIGNAL WARRANT
ANALYSIS

LOCATION: TH 210 at N 4th ST
COUNTY: Crow Wing
REF. POINT: 0
DATE: 3/12/2020
OPERATOR: JDA

85th% Speed	Approach Description		Lanes	Approach
35	Major App1:	TH 210 EB	3	12005
35	Major App3:	TH 210 WB	3	13016
30	Minor App2:	N 4th St NB	2	2119
30	Minor App4:	N 4th St SB	2	968

40 MPH OR FASTER?	NO
POPULATION < 10,000?	NO
VOLUME REQ. AT 70%?	**NO**
CORRECTABLE CRASHES: (12-month period)	0

	Minimum Volume Requirement		
	1A	1B	1A&B (80%)
Major Total	600	900	720
Minor Approach	200	100	160

HOUR	MAJOR APP. 1	MAJOR APP. 3	MINOR APP. 2	MINOR APP. 4	MAJOR APPROACH TOTAL Σ (APP.1 + APP. 3)	MAX MINOR APPROACH (APP. 2 or 4)	WARRANT 1A - 8 hr MAJOR/MINOR	WARRANT 1B - 8 hr MAJOR/MINOR	WARRANT 1A & B MAJOR/MINOR
0:00 - 1:00	0	0	0	0	0	0	NO / NO	NO / NO	NO / NO
1:00 - 2:00	0	0	0	0	0	0	NO / NO	NO / NO	NO / NO
2:00 - 3:00	0	0	0	0	0	0	NO / NO	NO / NO	NO / NO
3:00 - 4:00	0	0	0	0	0	0	NO / NO	NO / NO	NO / NO
4:00 - 5:00	0	0	0	0	0	0	NO / NO	NO / NO	NO / NO
5:00 - 6:00	0	0	0	0	0	0	NO / NO	NO / NO	NO / NO
6:00 - 7:00	512	572	51	21	1084	51	YES / NO	YES / NO	YES / NO
7:00 - 8:00	1100	1050	67	65	2150	67	YES / NO	YES / NO	YES / NO
8:00 - 9:00	981	1150	122	48	2131	122	YES / NO	**YES / YES**	YES / NO
9:00 - 10:00	805	930	146	51	1735	146	YES / NO	**YES / YES**	YES / NO
10:00 - 11:00	896	1062	209	62	1958	209	**YES / YES**	**YES / YES**	**YES / YES**
11:00 - 12:00	889	1160	238	100	2049	238	**YES / YES**	**YES / YES**	**YES / YES**
12:00 - 13:00	1030	1225	241	90	2255	241	**YES / YES**	**YES / YES**	**YES / YES**
13:00 - 14:00	977	1119	218	109	2096	218	**YES / YES**	**YES / YES**	**YES / YES**
14:00 - 15:00	1171	1159	209	111	2330	209	**YES / YES**	**YES / YES**	**YES / YES**
15:00 - 16:00	1255	1274	193	120	2529	193	YES / NO	**YES / YES**	**YES / YES**
16:00 - 17:00	1259	1245	258	109	2504	258	**YES / YES**	**YES / YES**	**YES / YES**
17:00 - 18:00	1130	1070	167	82	2200	167	YES / NO	**YES / YES**	**YES / YES**
18:00 - 19:00	0	0	0	0	0	0	NO / NO	NO / NO	NO / NO
19:00 - 20:00	0	0	0	0	0	0	NO / NO	NO / NO	NO / NO
20:00 - 21:00	0	0	0	0	0	0	NO / NO	NO / NO	NO / NO
21:00 - 22:00	0	0	0	0	0	0	NO / NO	NO / NO	NO / NO
22:00 - 23:00	0	0	0	0	0	0	NO / NO	NO / NO	NO / NO
23:00 - 24:00	0	0	0	0	0	0	NO / NO	NO / NO	NO / NO
Daily	**12005**	**13016**	**2119**	**968**					

		Met (Hr)	Required (Hr)	WARRANT MET:
Warrant 1	**Eight Hour Volumes**	**10**	8	**Satisfied**
Warrant 1A	Minimum Vehicular Volume	6	8	Not satisfied
Warrant 1B	Interruption of Continuous Flow	**10**	8	**Satisfied**
1A & 1B	Combination of Warrants	**8**	8	**Satisfied**
Warrant 2	**Four Hour Volumes**	**11**	4	**Satisfied**
Warrant 3	**Peak Hour Volumes**	**9**	1	**Satisfied**
Warrant 7	**Crash Experience**	**10**	8	Crashes Insufficient

COMMENTS:

2045 Future - TH 210 at N 4th ST
SIGNAL WARRANT
ANALYSIS

LOCATION: TH 210 at N 4th ST
COUNTY: Crow Wing
REF. POINT: 0
DATE: 3/12/2020

OPERATOR: JDA

40 MPH OR FASTER?	NO
POPULATION < 10,000?	NO
VOLUME REQ. AT 70%?	**NO**

85th% Speed	Approach Description		Lanes	Approach
35	Major App1:	TH 210 EB	3	12005
35	Major App3:	TH 210 WB	3	13016
30	Minor App2:	N 4th St NB	2	2119
30	Minor App4:	N 4th St SB	2	968

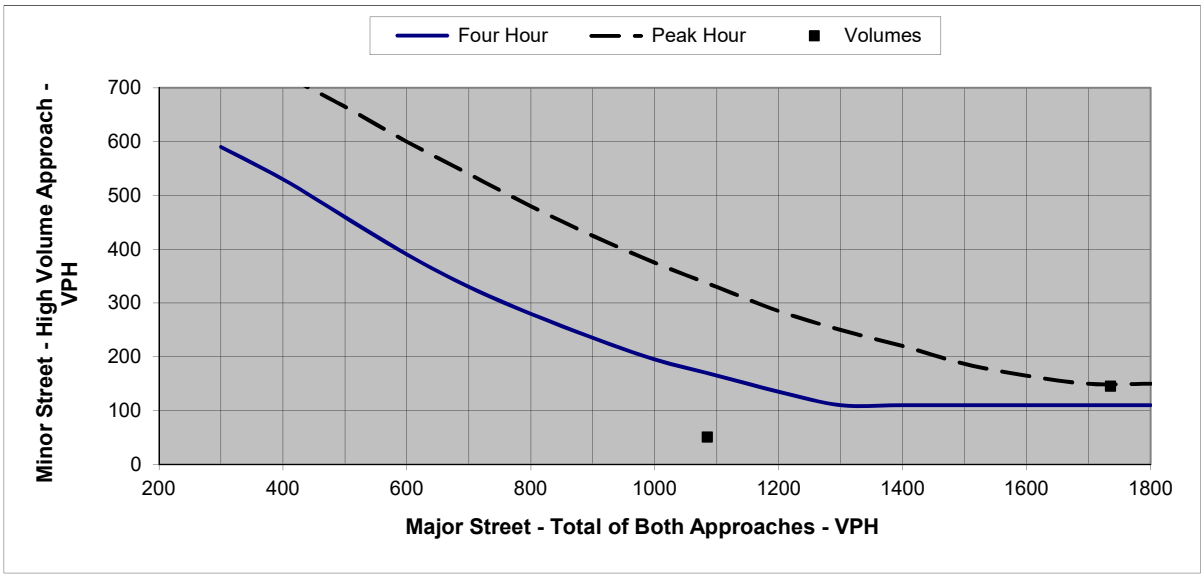


Figure 1. Four Hour and Peak Hour Warrant Analysis

Note: For data points outside the graph range, check the minor street volume against the lower thresholds

Warrant Criteria (Graph)		
Major Approach	Minor App. Four Hour	Minor App. Peak Hour
200		
300	590	
400	530	725
500	460	665
600	390	600
700	330	540
800	280	480
900	235	425
1000	195	375
1100	165	330
1200	135	285
1300	110	250
1400	110	220
1500	110	187
1600	110	165
1700	110	150
1800	110	150

Actual Hourly Count			Warrants Met:	
			Warrant 2	Warrant 3
HOUR	Sum Major App.	Max Minor App.	Four Hour	Peak Hour
0:00 - 1:00	0	0	NO	NO
1:00 - 2:00	0	0	NO	NO
2:00 - 3:00	0	0	NO	NO
3:00 - 4:00	0	0	NO	NO
4:00 - 5:00	0	0	NO	NO
5:00 - 6:00	0	0	NO	NO
6:00 - 7:00	1084	51	NO	NO
7:00 - 8:00	2150	67	**YES**	NO
8:00 - 9:00	2131	122	**YES**	**YES**
9:00 - 10:00	1735	146	**YES**	NO
10:00 - 11:00	1958	209	**YES**	**YES**
11:00 - 12:00	2049	238	**YES**	**YES**
12:00 - 13:00	2255	241	**YES**	**YES**
13:00 - 14:00	2096	218	**YES**	**YES**
14:00 - 15:00	2330	209	**YES**	**YES**
15:00 - 16:00	2529	193	**YES**	**YES**
16:00 - 17:00	2504	258	**YES**	**YES**
17:00 - 18:00	2200	167	**YES**	**YES**
18:00 - 19:00	0	0	NO	NO
19:00 - 20:00	0	0	NO	NO
20:00 - 21:00	0	0	NO	NO
21:00 - 22:00	0	0	NO	NO
22:00 - 23:00	0	0	NO	NO
23:00 - 24:00	0	0	NO	NO

MEMORANDUM

TO: Ken Hansen, PE
MnDOT District 3 Traffic Engineer

FROM: Graham Johnson, PE, PTOE (Lic.MN, IA, SD)
Justin Anibas, PE (Lic. MN)

DATE: August 9, 2022

RE: TH 210 at N 6th Street Intersection Control Evaluation (ICE) Report
SEH No. MNT03 152201 14.00

INTRODUCTION

This memorandum summarizes the Intersection Control Evaluation (ICE) process for the intersection of Trunk Highway (TH) 210 and N 6th Street in Brainerd, Minnesota. The Minnesota Department of Transportation (MnDOT) ICE is an objective process used to investigate and determine the optimal traffic control that should be provided at an intersection to serve the existing conditions and future needs. This memorandum was prepared for MnDOT by SEH Inc.

As part of a project along TH 210 between Baxter Drive and Pine Shores Road, the intersection of TH 210 and N 6th Street was evaluated and is proposed to remain under traffic signal control after the project is complete.

The location of the study intersection for this ICE report is shown in **Figure 1**. The proposed intersection control for the TH 210 and N 6th Street intersection was analyzed based on safety, signal warrants, traffic operations, and pedestrian and bicycle accommodations.

The scope and content of this ICE report was reviewed and agreed to by MnDOT prior to the layout and ICE submittal process. This report summarizes the ICE process and recommendation for the TH 210 and N 6th Street intersection based on a Phase I analysis according to the *2017 MnDOT ICE Manual*.

APPROVAL

I hereby certify that this report was prepared by me or under my direct supervision, and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.

_____ _____
Graham Johnson, PE, PTOE, MN License No. 45429 Date

Approved By:

_____ _____
MnDOT District 3 Traffic Engineer Date

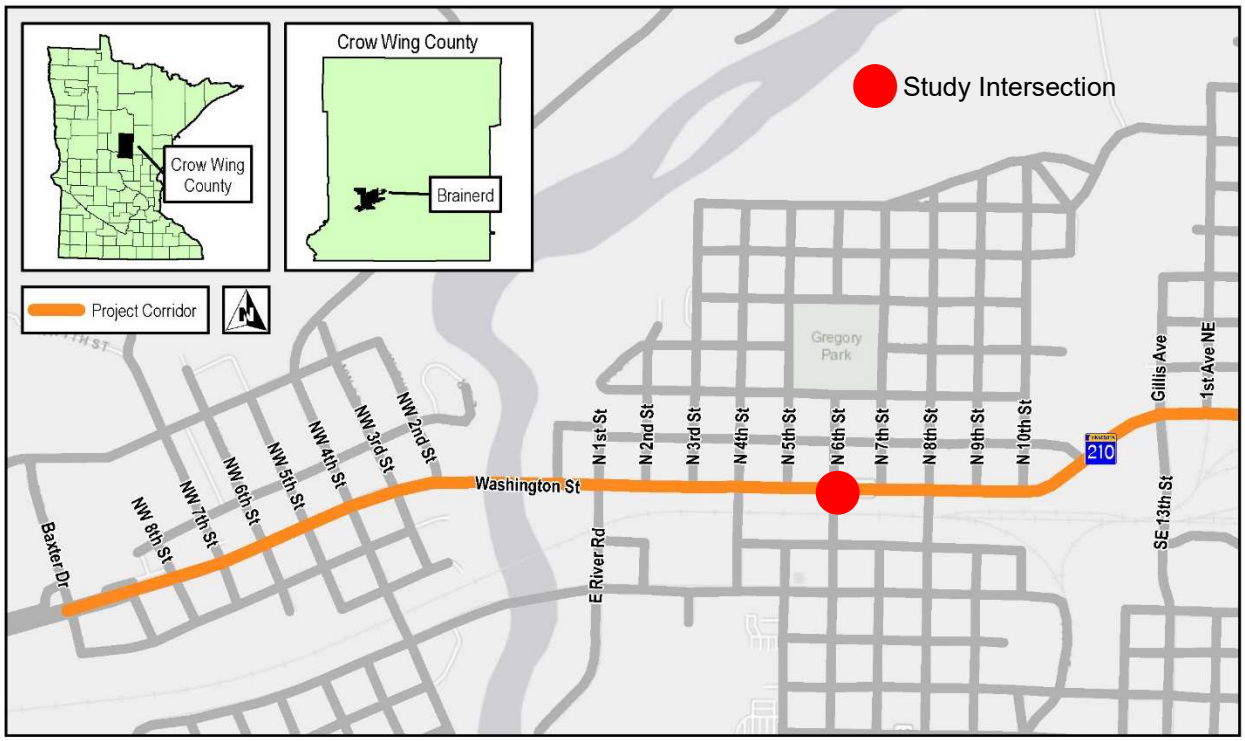
PROJECT DESCRIPTION

MnDOT is conducting the corridor planning study along a 3.9-mile segment of TH 210 to identify the future vision for highway corridor through Brainerd. Reconstruction of TH 210 between Baxter Drive and Pine Shores Road is anticipated to begin in 2025; SP 1805-80.

The primary purpose of the corridor study is to better understand the community issues, needs and use of the roadway, assess improvement options, select a preferred alternative, and prepare a geometric layout. The focus of the improvements is to improve pavement conditions and traveler safety, accommodate the Americans with Disabilities Act (ADA) requirements, and enhance pedestrian accommodations.

For more detailed traffic information, see both the *Existing and 2045 No Build Conditions Report – TH 210/Washington Street Corridor Study* and the *TH 210 Build Conditions Report*.

Figure 1 Project Location



EXISTING CONDITIONS

TH 210 is a major east-west principal arterial through the City of Brainerd that connects near-by cities and regional commerce. TH 210 is generally a 4-lane divided roadway through the City of Brainerd; the posted speed limit is 35 miles-per-hour (mph) at the study intersection.

N 6th Street is a principal arterial to the south, providing a regional connection to TH 371 via TH 371B and access to commercial and residential land uses; to the north it is a local roadway providing access to residential land uses; the posted speed limit is 30 mph.

The nearest existing traffic signals along TH 210 include N 4th Street approximately 750 feet west and N 8th Street approximately 750 feet east.

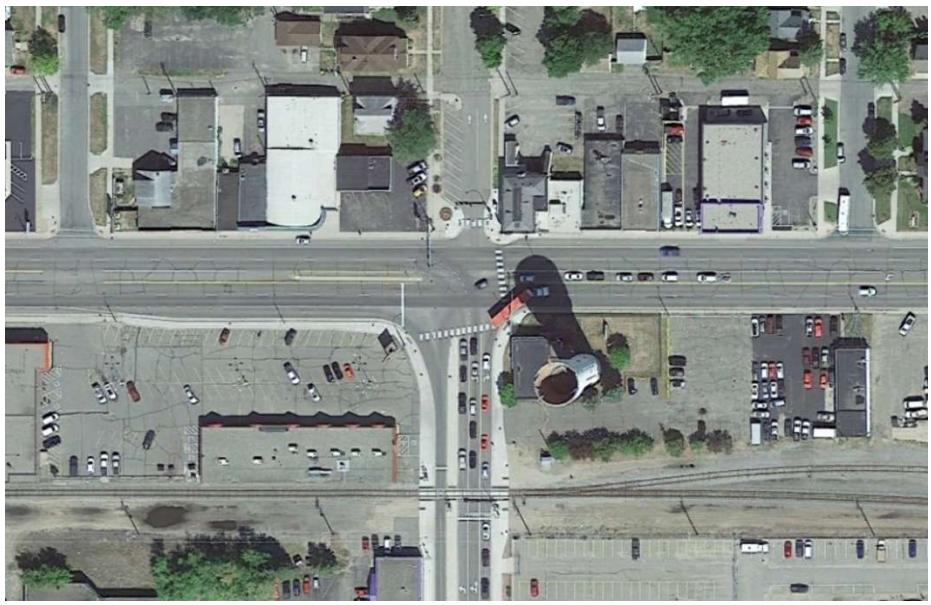
Intersection Characteristics

The existing intersection currently operates with traffic signal control and includes marked pedestrian crossings on three legs; no crossing provided on the west leg. Westbound TH 210 left turns operate with protected left turn phasing only, the eastbound left turn movement is not allowed. With no southbound approach, the northbound approach operates on its own protected phasing.

The existing lane geometrics are described below and shown in **Figure 2**.

- Eastbound Approach: two through lanes, and a right turn lane; no left turns allowed.
- Westbound Approach: left turn lane, one through lane, and a shared through-right lane.
- Northbound Approach: separate left, a shared left-through, and right turn lane.
  - Approach storage lanes are limited due to proximity of railroad crossing.
- Southbound Approach: no approach movements provided.

Figure 2 Existing Intersection



Traffic Volumes

TH 210 has an existing 2019 Average Annual Daily Traffic (AADT) volume of 26,000 vehicles on both the east and west side of the intersection. N 6th Street has an existing 2019 AADT of 11,000 vehicles to the south, no posted AADT on the north leg.

The existing intersection turning movement data was collected in November of 2018 as part of a signal timing project along TH 210 and TH 371. **Figure 3** includes the existing AM and PM peak hour volumes; **Attachment 1** includes the raw existing intersection count data.

Crash Analysis

Intersection crash data for the study intersection was collected from the MnDOT Crash Mapping Analysis Tool (MnCMATv2) for a five-year period between 2014 and 2018 as part of the larger corridor study.

The crash rate at an intersection is expressed as a number of crashes per million entering vehicles (MEV). The critical crash rate is a statistical value that is unique to each intersection and is based on vehicular exposure and the statewide average crash rate for similar intersections. An intersection with a crash rate higher than the critical rate can indicate a safety concern at the intersection and the site should be further reviewed.

The intersection had a total of 61 crashes during the 5-year analysis period:

- 40 of the 61 crashes were rear end crashes: 20 of the rear end crashes were in the eastbound direction and 17 were in the westbound direction, and 3 northbound.
- 12 of the 61 crashes were side-swipe collisions, likely due to vehicles changing lanes to avoid vehicles that are slowing or stopping during congestion.

Table 1 summarizes the crashes for the study intersection; additional crash information is provided in **Attachment 2**. Based on the crash rate, the intersection does exceed the critical crash rate and safety improvements should be considered.

Table 1 Intersection Crash History (2014-2018)

TH 210 at:	Crash Severity					Crash Rates	
	Fatal & Severity A	Severity B	Severity C	Property Damage	Total	Int. Rate	Critical Rate
N 6th Street	0	1	10	50	61	**1.06**	0.99

PROPOSED CONDITIONS

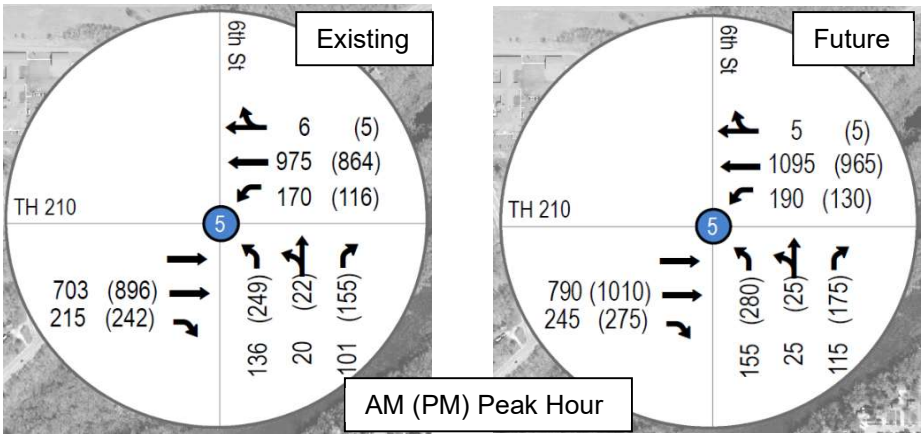
The current layout for the TH 210 corridor between Baxter Drive and Pine Shores Road addresses the needs and use of the roadway, improves pavement conditions, safety, and meets ADA requirements.

The TH 210 and N 6th Street intersection is located in a segment of the project that will primarily include reconstruction of the roadway, with modifications for full ADA compliance, wider sidewalks, and medians. No geometric changes are proposed at this intersection.

Future Traffic Volumes

Traffic forecasts were developed for the entire TH 210 corridor as part of the larger study effort. Future 2045 forecast volumes were developed based on a linear growth rate of 0.5% per year based on historical AADT volumes, population data, and input from the project team. **Figure 3** presents both the existing and future 2045 AM and PM peak intersection volumes.

Figure 3 Existing and Future 2045 Intersection Volumes



Warrant Analysis

Traffic control warrant analysis was conducted on the existing and future traffic volumes following the Minnesota Manual on Uniform Traffic Control Devices (MnMUTCD) guidelines; all-way stop control warrants were not analyzed as it is not considered a viable control option along TH 210.

Warrants 1 (8-hour), 2 (4-hour), 3 (peak hour), and 7 (crash warrant) were included in the analysis. The following assumptions were used in the analysis:

- All minor street right turning volume was removed from the approaches.
- Warrant 7 was not applicable at the intersection due to insufficient correctable crashes.

The results of the traffic signal warrant analysis are provided in **Table 2**. The intersection currently meets Warrants 1, 2, and 3; the detailed signal warrant analysis is provided as **Attachment 3**.

Table 2 Traffic Signal Warrant Analysis Summary

MnMUTCD Signal Warrant	Hours Needed	Existing		Future 2045	
		Hours Met	Warrant Met?	Hours Met	Warrant Met?
Warrant 1A – 8-hour Minimum Volume	8	**8**	**MET**	**8**	**MET**
Warrant 1B – 8-hour Interruption of Flow	8	**11**	**MET**	**11**	**MET**
Combination of Warrant 1A and 1B	8	**10**	**MET**	**10**	**MET**
Warrant 2 – 4-hours	4	**11**	**MET**	**11**	**MET**
Warrant 3 – Peak Hour	1	**10**	**MET**	**11**	**MET**

System Limitations and Consistency

TH 210 is a principal arterial through the City of Brainerd that experiences heavy directional volumes in both the AM and PM peak hours, throughout the day, and in the summer months with high tourist traffic. The two adjacent major intersections are both currently signalized.

The study intersection is part of an existing TH 210 signal system coordinated to provide priority to the peak direction of flow, reduce mainline delays, and provide a high level of vehicle progression through the corridor. The coordinated signal system includes all existing traffic signals along TH 210 between TH 371, in the City of Baxter, and 4th Avenue NE in east Brainerd.

Due to limited right-of-way along the TH 210 corridor, expansion of the roadway to accommodate a larger intersection footprint is not feasible. Roundabout intersection control would result in major impacts to adjacent parcels and structures adjacent to the intersection and along the corridor.

In addition, both all-way stop control and roundabout control would alter the traffic flow along TH 210 and severely impede the progression of traffic from the adjacent coordinated signal systems.

Therefore, all-way stop and roundabout intersection control was not considered feasible for this intersection due to right-of-way limitations and the interruption to the existing coordinated signal system.

Traffic Operations

Evaluation of the intersection traffic operations were conducted as part of the overall corridor study using VISSIM software. The evaluation included analysis of the existing conditions, 2045 No Build conditions, and the recommended 2045 Build conditions, which included no geometric changes at the intersection.

The average delay per vehicle and Level of Service (LOS) results for each approach and the overall intersection are provided in **Table 3** for each scenario; all three scenarios include traffic signal control. For more detailed traffic information, see both the *Existing and 2045 No Build Conditions Report – TH 210/Washington Street Corridor Study* and the *TH 210 Build Conditions Report*.

Table 3 Traffic Operations Summary

Scenario	Peak Hour	Approach Delay (sec/veh / LOS)				Intersection Delay (sec/veh / LOS)
		Eastbound	Westbound	Northbound	Southbound	
Existing Conditions	AM	5.0 / A	7.0 / A	32.2 / C		9.1 / A
	PM	4.8 / A	11.4 / B	**41.7 / D**		13.4 / B
2045 No Build Conditions	AM	8.3 / A	6.8 / A	32.1 / C		10.4 / B
	PM	6.7 / A	11.2 / B	**42.9 / D**		14.4 / B
2045 Build Conditions	AM	9.6 / A	6.4 / A	30.7 / C		10.5 / B
	PM	10.0 / B	11.3 / B	**41.8 / D**		15.7 / B

Based on the results, the intersection is expected to operate at a LOS B or better in all scenarios. The minor street approaches operate with longer delays due to the long cycle length required for coordination along TH 210.

Pedestrian Considerations

The existing intersection provides crosswalks on three of the four legs of the intersection; however, the existing facilities are not ADA compliant.

As part of the TH 210 reconstruction project, the intersection will be improved to meet ADA requirements. New Accessible Pedestrian Systems (APS) pedestrian push buttons are proposed to be installed and made operational as part of this project, and all pedestrian curb ramps will be upgraded to be ADA compliant.

Revised Signal System

The existing signal system is vehicle actuated and coordinated along TH 210. The TH 210 left turn phase for westbound operates under protected phasing only; the northbound minor street approach operates under protected phasing as there is no southbound approach. The existing signal system was installed in the fall of 2018 as part of a project along N 6th Street.

As part of the reconstruction project, the existing signal system can be reinstalled at the intersection. The current signal system is less than 5-years old and is still fully functional; the signal system is to remain vehicle actuated and coordinated along TH 210. The westbound and northbound approaches will be upgraded to include Flashing Yellow Arrow (FYA) which provides the flexibility of running both protected and permissive phasing by time-of-day schedules on all approaches and improves the overall safety of the intersection.

RECOMMENDATION

Based on the analysis included in this report, and as part of the larger TH 210 corridor study, it is recommended to retain traffic signal control at the intersection of TH 210 and N 6th Street.

Traffic signal control is currently warranted at the intersection and traffic operations are acceptable in both the existing conditions and future forecast year. The improvements at the existing intersection will continue to provide a safe intersection for all users.

Roundabout and all-way stop control was not considered feasible at this intersection due to potential right-of-way constraints and impacts, and the impact to the coordinated signal system that provides positive vehicle progression along TH 210.

Attachment 1: Turning Movement Data
Attachment 2: Crash Data
Attachment 3: Warrant Analysis

cc: Luke Wehseler, PE MnDOT District 3
Zachary Whitley, PE MnDOT District 3

File Name: S:\2018\180119\TO OTHERS\TMC\PETRO\345_TH 210 AND 6TH STREET.ppd
Start Date: 11/13/2018
Start Time: 6:00:00 AM
Site Code: 00000345
Comment 1: 345_TH 210 AND 6TH STREET
Comment 2: 0
Comment 3: data by: Alliant Inc
Comment 4: TURN MOVEMENT COUNT

	BAXTER DRIVE Southbound				TH 210 Westbound				BAXTER DRIVE Northbound				TH 210 Eastbound			
Start Time	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds
06:00 AM	0	0	0	0	6	43	0	0	9	0	6	0	0	55	7	0
06:15 AM	0	0	0	0	12	81	1	0	23	0	9	0	0	59	19	0
06:30 AM	0	0	0	0	17	89	0	0	20	1	11	0	0	85	17	0
06:45 AM	0	0	0	0	21	139	1	0	30	2	10	0	0	86	25	0
07:00 AM	0	0	0	0	29	95	0	0	16	0	14	0	0	102	23	0
07:15 AM	0	0	0	0	40	149	0	0	30	7	19	0	0	129	38	0
07:30 AM	0	0	0	0	36	205	2	0	38	5	29	0	0	135	39	0
07:45 AM	0	0	0	0	49	228	1	0	32	6	24	0	0	201	54	0
08:00 AM	0	0	0	0	42	188	1	1	28	6	24	0	0	136	46	0
08:15 AM	0	0	0	1	43	191	2	0	38	3	24	0	0	114	40	0
08:30 AM	0	0	0	0	32	173	1	0	43	4	15	0	0	106	46	0
08:45 AM	0	0	0	0	37	176	3	0	34	5	8	0	0	107	52	0
09:00 AM	0	0	0	1	23	124	2	0	35	0	19	0	0	118	34	0
09:15 AM	0	0	0	1	24	147	1	0	41	6	28	1	0	92	27	0
09:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
09:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10:30 AM	0	0	0	0	26	185	2	0	40	2	34	0	0	141	45	0
10:45 AM	0	0	0	0	33	193	2	0	61	3	25	0	0	145	56	0
11:00 AM	0	0	0	0	30	191	0	0	49	1	39	0	0	132	38	0
11:15 AM	0	0	1	0	38	176	3	0	62	6	29	0	0	147	40	0
11:30 AM	0	0	0	0	28	195	3	2	79	3	34	0	0	163	55	0
11:45 AM	0	0	0	0	26	205	0	0	69	4	37	0	0	205	52	0
12:00 PM	0	0	0	0	42	228	2	0	67	4	46	0	0	171	53	0
12:15 PM	0	0	0	0	36	178	3	1	44	7	28	0	0	172	57	0
12:30 PM	0	0	0	0	28	229	3	0	66	1	42	0	0	194	53	0
12:45 PM	0	0	0	0	23	207	2	1	66	3	33	0	0	192	39	0
01:00 PM	0	0	0	0	32	175	1	2	68	3	36	0	0	190	49	0
01:15 PM	0	0	0	0	37	188	2	0	60	1	34	0	0	148	52	0
01:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
01:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
02:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
02:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
02:30 PM	0	0	0	0	29	176	1	0	49	11	43	0	0	226	49	0
02:45 PM	0	0	0	0	39	227	1	1	62	4	36	0	0	188	54	0
03:00 PM	0	0	0	0	53	245	0	3	52	10	34	1	0	200	76	0
03:15 PM	0	0	0	0	36	197	0	3	60	3	66	0	0	212	48	0
03:30 PM	0	0	0	0	42	196	1	3	77	2	38	1	0	232	53	0
03:45 PM	0	0	0	0	32	240	0	2	61	3	35	0	0	211	43	0
04:00 PM	0	0	0	0	23	195	2	1	66	1	39	0	0	214	50	0
04:15 PM	0	0	0	0	31	212	2	1	67	2	42	0	0	232	49	0
04:30 PM	0	0	0	0	26	199	1	0	58	6	40	0	0	244	41	0
04:45 PM	0	0	0	0	33	232	2	1	73	4	40	0	1	215	53	0
05:00 PM	0	0	0	0	28	228	1	2	61	5	39	0	0	217	53	0
05:15 PM	0	0	0	0	29	205	1	1	57	7	36	2	0	220	54	0
05:30 PM	0	0	0	0	25	162	0	0	54	2	32	0	0	163	42	0
05:45 PM	0	0	0	0	26	140	0	0	40	2	32	0	0	185	41	0

Intersection Safety Screening

Intersection: TH 210 at N 6th Street

Crash Data: 2014 to 2018 (5-years)

Crashes by Crash Severity	
Fatal	0
Incapacitating Injury	0
Non-incapacitating Injury	1
Possible Injury	10
Property Damage	50
Total Crashes	61

Intersection Characteristics	
Entering Volume	31,500
Traffic Control	Signals
Environment	Urban
Speed Limit	35 mph

Annual crash cost = $276,000

Statewide Comparison

Signals: high volume, low speed

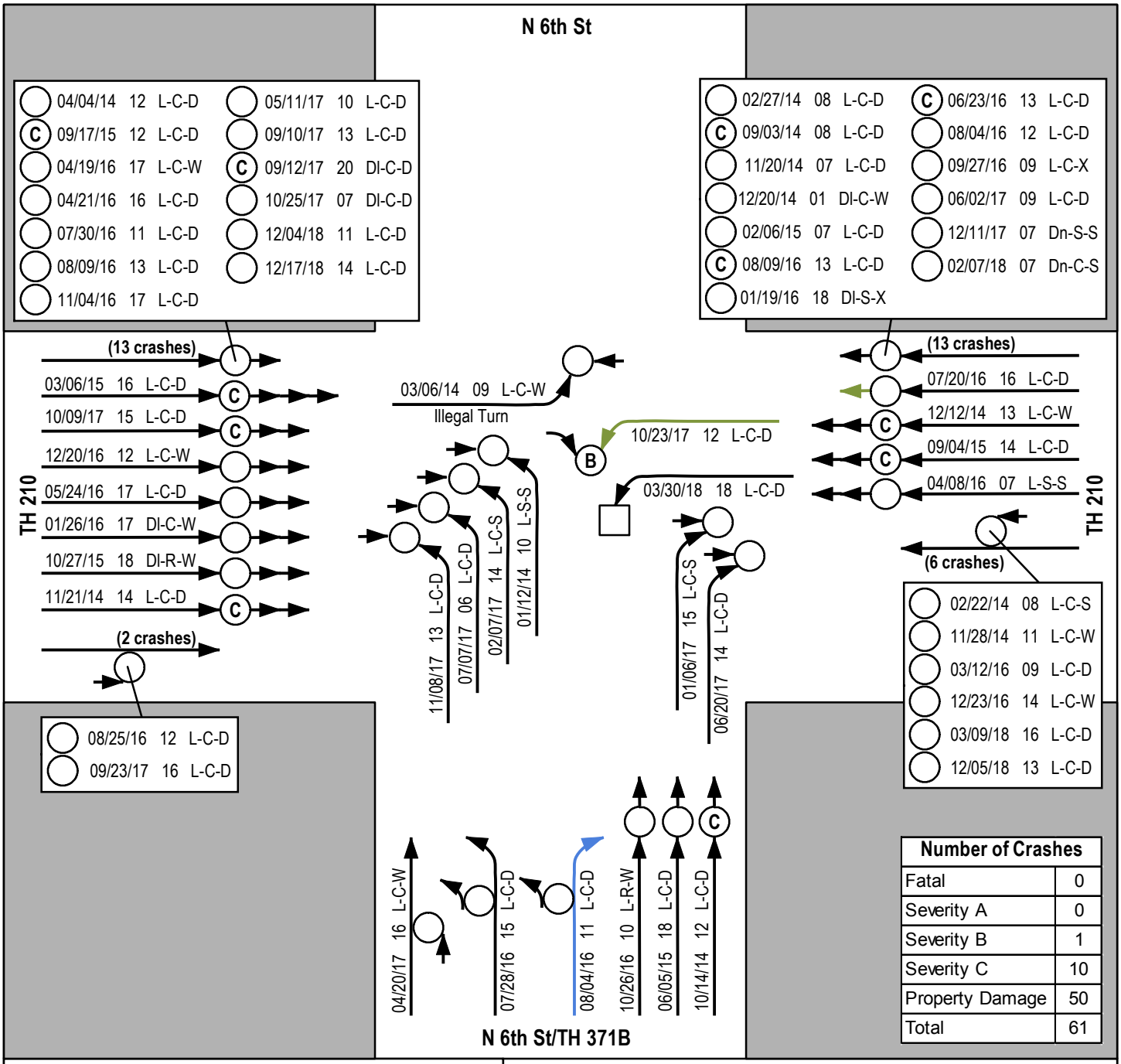
Total Crash Rate	
Observed	1.06
Statewide Average	0.70
Critical Rate	0.99
Critical Index	**1.07**

Fatal & Serious Injury Crash Rate	
Observed	0.00
Statewide Average	0.76
Critical Rate	3.11
Critical Index	**0.00**

The observed crash rate is the number of crashes per million entering vehicles (MEV). The critical rate is a statistical comparison based on similar intersections statewide. An observed crash rate greater than the critical rate indicates that the intersection operates outside the expected, normal range. The critical index reports the magnitude of this difference.

The observed total crash rate for this period is 1.06 per MEV; this is 1.1 times the critical rate. If crashes were reduced by 4 over five years, this intersection would perform within normal range.

The observed fatal and serious injury crash rate for this period is 0.00 per 100 MEV; this is 100% below the critical rate. The intersection operates within the normal range.



Number of Crashes	
Fatal	0
Severity A	0
Severity B	1
Severity C	10
Property Damage	50
Total	61

Passenger Vehicle
Heavy Vehicle
Bus
Motorcycle
Fixed Object
Pedestrian
Bicycle

Fatal
Severity A
Severity B
Severity C
Property Damage Only
Vehicle Out of Control

Light
L = Daylight
Dn = Dawn
Du = Dusk
Dl = Dark, Lighted
Do = Dark, Lights Off
D = Dark, Unlighted
X = Unkown

Weather
C = Clear or Cloudy
R = Rain
S = Snow/Sleet/Hail/Freexing Rain
F = Fog/Smog/Smoke
B = Blowing Sand/Dust/Snow
W = Severe Cross Winds
X = Other or Unknown

Surface
D = Dry
W = Wet or Water
S = Snow/Slush/Ice
M = Muddy
Db = Debris
O = Oily
X = Other or Unkown

Date Time(Hr) Light-Weather-Surface → Injury Type → Other Vehicle(s)

Notes:

Project: MNT03 152201
Print Date: 3/2/2020

Map by: jdanibas
Projection:
Source:

Crash Diagrams (2014-2018)
TH 210 at N 6th St/TH 371B
TH 210/Washington Street Corridor Study
Brainerd, MN

Figure A5

Path: C:\Traffic Projects\Brainerd- TH 210\Crashes\Crash Diagrams\A5_TH 210 at N 6th St_Crash Diagrams.mxd

2019 Existing - TH 210 at N 6th St/TH 371B
SIGNAL WARRANT
ANALYSIS

LOCATION: TH 210 at N 6th St/TH 371B
COUNTY: Crow Wing
REF. POINT: 0
DATE: 3/12/2020
OPERATOR: JDA

85th% Speed	Approach Description		Lanes	Approach
35	Major App1:	TH 210 EB	3	10638
35	Major App3:	TH 210 WB	3	10665
30	Minor App2:	N 6th St (TH 371B) NB	3	2581
30	Minor App4:	N 6th St SB (no approach volumes)	0	0

40 MPH OR FASTER?	NO
POPULATION < 10,000?	NO
VOLUME REQ. AT 70%?	**NO**
CORRECTABLE CRASHES: (12-month period)	0

	Minimum Volume Requirement		
	1A	1B	1A&B (80%)
Major Total	600	900	720
Minor Approach	200	100	160

HOUR	MAJOR APP. 1	MAJOR APP. 3	MINOR APP. 2	MINOR APP. 4	MAJOR APPROACH TOTAL Σ (APP.1 + APP. 3)	MAX MINOR APPROACH (APP. 2 or 4)	WARRANT 1A - 8 hr MAJOR/MINOR	WARRANT 1B - 8 hr MAJOR/MINOR	WARRANT 1A & B MAJOR/MINOR
0:00 - 1:00	0	0	0	0	0	0	NO / NO	NO / NO	NO / NO
1:00 - 2:00	0	0	0	0	0	0	NO / NO	NO / NO	NO / NO
2:00 - 3:00	0	0	0	0	0	0	NO / NO	NO / NO	NO / NO
3:00 - 4:00	0	0	0	0	0	0	NO / NO	NO / NO	NO / NO
4:00 - 5:00	0	0	0	0	0	0	NO / NO	NO / NO	NO / NO
5:00 - 6:00	0	0	0	0	0	0	NO / NO	NO / NO	NO / NO
6:00 - 7:00	423	481	85	0	904	85	YES / NO	YES / NO	YES / NO
7:00 - 8:00	866	970	134	0	1836	134	YES / NO	**YES / YES**	YES / NO
8:00 - 9:00	775	1035	161	0	1810	161	YES / NO	**YES / YES**	**YES / YES**
9:00 - 10:00	672	769	171	0	1441	171	YES / NO	**YES / YES**	**YES / YES**
10:00 - 11:00	795	867	208	0	1662	208	**YES / YES**	**YES / YES**	**YES / YES**
11:00 - 12:00	869	895	273	0	1764	273	**YES / YES**	**YES / YES**	**YES / YES**
12:00 - 13:00	972	981	258	0	1953	258	**YES / YES**	**YES / YES**	**YES / YES**
13:00 - 14:00	939	883	263	0	1822	263	**YES / YES**	**YES / YES**	**YES / YES**
14:00 - 15:00	1057	939	255	0	1996	255	**YES / YES**	**YES / YES**	**YES / YES**
15:00 - 16:00	1120	1042	268	0	2162	268	**YES / YES**	**YES / YES**	**YES / YES**
16:00 - 17:00	1137	958	277	0	2095	277	**YES / YES**	**YES / YES**	**YES / YES**
17:00 - 18:00	1013	845	228	0	1858	228	**YES / YES**	**YES / YES**	**YES / YES**
18:00 - 19:00	0	0	0	0	0	0	NO / NO	NO / NO	NO / NO
19:00 - 20:00	0	0	0	0	0	0	NO / NO	NO / NO	NO / NO
20:00 - 21:00	0	0	0	0	0	0	NO / NO	NO / NO	NO / NO
21:00 - 22:00	0	0	0	0	0	0	NO / NO	NO / NO	NO / NO
22:00 - 23:00	0	0	0	0	0	0	NO / NO	NO / NO	NO / NO
23:00 - 24:00	0	0	0	0	0	0	NO / NO	NO / NO	NO / NO
Daily	**10638**	**10665**	**2581**	**0**					

		Met (Hr)	Required (Hr)	WARRANT MET:
Warrant 1	**Eight Hour Volumes**	11	8	**Satisfied**
Warrant 1A	Minimum Vehicular Volume	8	8	**Satisfied**
Warrant 1B	Interruption of Continuous Flow	11	8	**Satisfied**
1A & 1B	Combination of Warrants	10	8	**Satisfied**
Warrant 2	**Four Hour Volumes**	11	4	**Satisfied**
Warrant 3	**Peak Hour Volumes**	10	1	**Satisfied**
Warrant 7	**Crash Experience**	12	8	Crashes Insufficient

COMMENTS:

2019 Existing - TH 210 at N 6th St/TH 371B
SIGNAL WARRANT
ANALYSIS

LOCATION: TH 210 at N 6th St/TH 371B
COUNTY: Crow Wing
REF. POINT: 0
DATE: 3/12/2020

OPERATOR: JDA

85th% Speed	Approach Description		Lanes	Approach
35	Major App1:	TH 210 EB	3	10638
35	Major App3:	TH 210 WB	3	10665
30	Minor App2:	N 6th St (TH 371B) NB	3	2581
30	Minor App4:	N 6th St SB (no approach volumes)	0	0

40 MPH OR FASTER?	NO
POPULATION < 10,000?	NO
VOLUME REQ. AT 70%?	**NO**

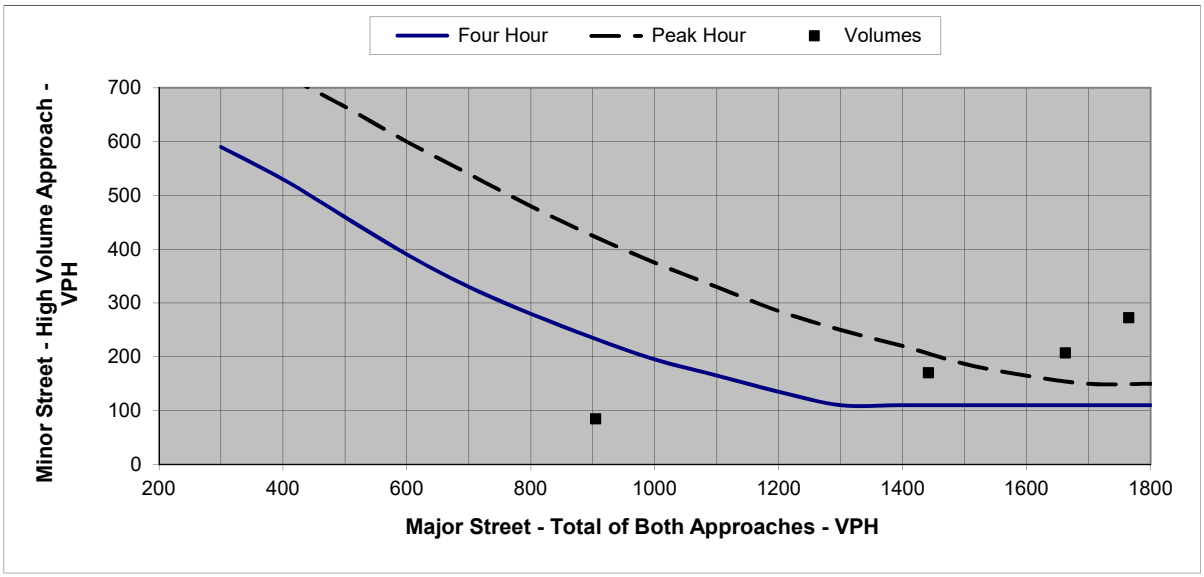


Figure 1. Four Hour and Peak Hour Warrant Analysis

Note: For data points outside the graph range, check the minor street volume against the lower thresholds

Warrant Criteria (Graph)		
Major Approach	Minor App. Four Hour	Minor App. Peak Hour
200		
300	590	
400	530	725
500	460	665
600	390	600
700	330	540
800	280	480
900	235	425
1000	195	375
1100	165	330
1200	135	285
1300	110	250
1400	110	220
1500	110	187
1600	110	165
1700	110	150
1800	110	150

Actual Hourly Count			Warrants Met:	
			Warrant 2	Warrant 3
HOUR	Sum Major App.	Max Minor App.	Four Hour	Peak Hour
0:00 - 1:00	0	0	NO	NO
1:00 - 2:00	0	0	NO	NO
2:00 - 3:00	0	0	NO	NO
3:00 - 4:00	0	0	NO	NO
4:00 - 5:00	0	0	NO	NO
5:00 - 6:00	0	0	NO	NO
6:00 - 7:00	904	85	NO	NO
7:00 - 8:00	1836	134	**YES**	**YES**
8:00 - 9:00	1810	161	**YES**	**YES**
9:00 - 10:00	1441	171	**YES**	NO
10:00 - 11:00	1662	208	**YES**	**YES**
11:00 - 12:00	1764	273	**YES**	**YES**
12:00 - 13:00	1953	258	**YES**	**YES**
13:00 - 14:00	1822	263	**YES**	**YES**
14:00 - 15:00	1996	255	**YES**	**YES**
15:00 - 16:00	2162	268	**YES**	**YES**
16:00 - 17:00	2095	277	**YES**	**YES**
17:00 - 18:00	1858	228	**YES**	**YES**
18:00 - 19:00	0	0	NO	NO
19:00 - 20:00	0	0	NO	NO
20:00 - 21:00	0	0	NO	NO
21:00 - 22:00	0	0	NO	NO
22:00 - 23:00	0	0	NO	NO
23:00 - 24:00	0	0	NO	NO

2045 Future - TH 210 at N 6th St/TH 371B
SIGNAL WARRANT
ANALYSIS

LOCATION: TH 210 at N 6th St/TH 371B
COUNTY: Crow Wing
REF. POINT: 0
DATE: 3/12/2020
OPERATOR: JDA

85th% Speed	Approach Description		Lanes	Approach
35	Major App1:	TH 210 EB	3	12023
35	Major App3:	TH 210 WB	3	12055
30	Minor App2:	N 6th St (TH 371B) NB	3	2914
30	Minor App4:	N 6th St SB (no approach volumes)	0	0

40 MPH OR FASTER?	NO
POPULATION < 10,000?	NO
VOLUME REQ. AT 70%?	**NO**
CORRECTABLE CRASHES: (12-month period)	0

	Minimum Volume Requirement		
	1A	1B	1A&B (80%)
Major Total	600	900	720
Minor Approach	200	100	160

HOUR	MAJOR APP. 1	MAJOR APP. 3	MINOR APP. 2	MINOR APP. 4	MAJOR APPROACH TOTAL Σ (APP.1 + APP. 3)	MAX MINOR APPROACH (APP. 2 or 4)	WARRANT 1A - 8 hr MAJOR/MINOR	WARRANT 1B - 8 hr MAJOR/MINOR	WARRANT 1A & B MAJOR/MINOR
0:00 - 1:00	0	0	0	0	0	0	NO / NO	NO / NO	NO / NO
1:00 - 2:00	0	0	0	0	0	0	NO / NO	NO / NO	NO / NO
2:00 - 3:00	0	0	0	0	0	0	NO / NO	NO / NO	NO / NO
3:00 - 4:00	0	0	0	0	0	0	NO / NO	NO / NO	NO / NO
4:00 - 5:00	0	0	0	0	0	0	NO / NO	NO / NO	NO / NO
5:00 - 6:00	0	0	0	0	0	0	NO / NO	NO / NO	NO / NO
6:00 - 7:00	478	544	96	0	1022	96	YES / NO	YES / NO	YES / NO
7:00 - 8:00	979	1096	152	0	2075	152	YES / NO	**YES / YES**	YES / NO
8:00 - 9:00	876	1170	181	0	2046	181	YES / NO	**YES / YES**	**YES / YES**
9:00 - 10:00	759	870	193	0	1629	193	YES / NO	**YES / YES**	**YES / YES**
10:00 - 11:00	899	981	234	0	1880	234	**YES / YES**	**YES / YES**	**YES / YES**
11:00 - 12:00	982	1011	309	0	1993	309	**YES / YES**	**YES / YES**	**YES / YES**
12:00 - 13:00	1099	1108	292	0	2207	292	**YES / YES**	**YES / YES**	**YES / YES**
13:00 - 14:00	1061	998	297	0	2059	297	**YES / YES**	**YES / YES**	**YES / YES**
14:00 - 15:00	1195	1062	288	0	2257	288	**YES / YES**	**YES / YES**	**YES / YES**
15:00 - 16:00	1265	1177	302	0	2442	302	**YES / YES**	**YES / YES**	**YES / YES**
16:00 - 17:00	1285	1083	313	0	2368	313	**YES / YES**	**YES / YES**	**YES / YES**
17:00 - 18:00	1145	955	257	0	2100	257	**YES / YES**	**YES / YES**	**YES / YES**
18:00 - 19:00	0	0	0	0	0	0	NO / NO	NO / NO	NO / NO
19:00 - 20:00	0	0	0	0	0	0	NO / NO	NO / NO	NO / NO
20:00 - 21:00	0	0	0	0	0	0	NO / NO	NO / NO	NO / NO
21:00 - 22:00	0	0	0	0	0	0	NO / NO	NO / NO	NO / NO
22:00 - 23:00	0	0	0	0	0	0	NO / NO	NO / NO	NO / NO
23:00 - 24:00	0	0	0	0	0	0	NO / NO	NO / NO	NO / NO
Daily	**12023**	**12055**	**2914**	**0**					

		Met (Hr)	Required (Hr)	WARRANT MET:
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Warrant 1A	Minimum Vehicular Volume	8	8	**Satisfied**
Warrant 1B	Interruption of Continuous Flow	11	8	**Satisfied**
1A & 1B	Combination of Warrants	10	8	**Satisfied**
Warrant 2	**Four Hour Volumes**	11	4	**Satisfied**
Warrant 3	**Peak Hour Volumes**	11	1	**Satisfied**
Warrant 7	**Crash Experience**	12	8	Crashes Insufficient

COMMENTS:

2045 Future - TH 210 at N 6th St/TH 371B
SIGNAL WARRANT
ANALYSIS

LOCATION: TH 210 at N 6th St/TH 371B
COUNTY: Crow Wing
REF. POINT: 0
DATE: 3/12/2020

OPERATOR: JDA

85th% Speed	Approach Description		Lanes	Approach
35	Major App1:	TH 210 EB	3	12023
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30	Minor App2:	N 6th St (TH 371B) NB	3	2914
30	Minor App4:	N 6th St SB (no approach volumes)	0	0

40 MPH OR FASTER?	NO
POPULATION < 10,000?	NO
VOLUME REQ. AT 70%?	**NO**

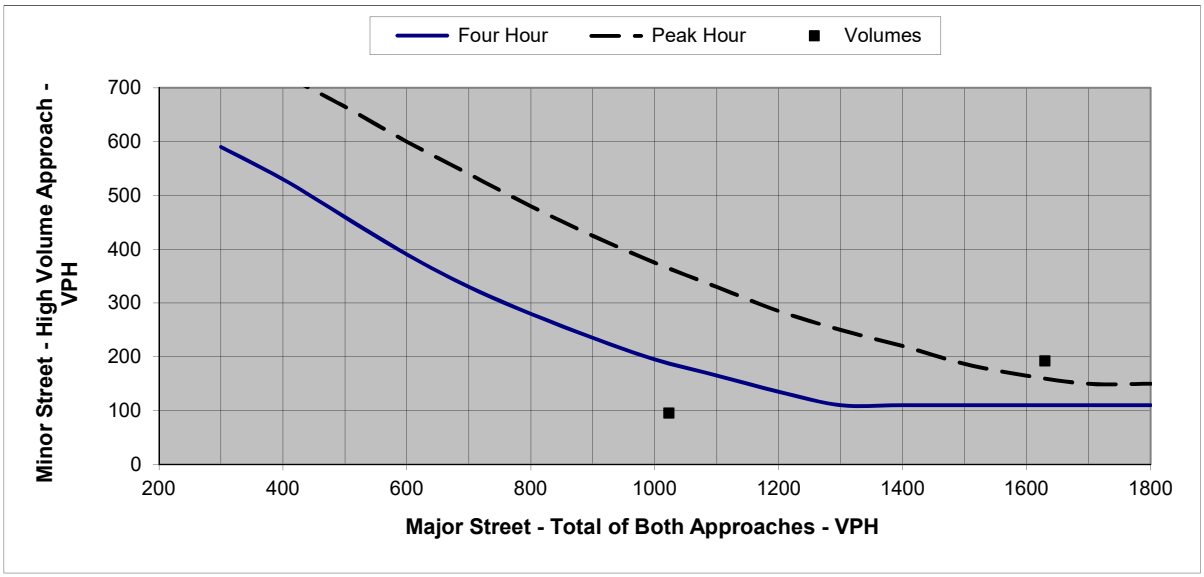


Figure 1. Four Hour and Peak Hour Warrant Analysis

Note: For data points outside the graph range, check the minor street volume against the lower thresholds

Warrant Criteria (Graph)		
Major Approach	Minor App. Four Hour	Minor App. Peak Hour
200		
300	590	
400	530	725
500	460	665
600	390	600
700	330	540
800	280	480
900	235	425
1000	195	375
1100	165	330
1200	135	285
1300	110	250
1400	110	220
1500	110	187
1600	110	165
1700	110	150
1800	110	150

Actual Hourly Count			Warrants Met:	
			Warrant 2	Warrant 3
HOUR	Sum Major App.	Max Minor App.	Four Hour	Peak Hour
0:00 - 1:00	0	0	NO	NO
1:00 - 2:00	0	0	NO	NO
2:00 - 3:00	0	0	NO	NO
3:00 - 4:00	0	0	NO	NO
4:00 - 5:00	0	0	NO	NO
5:00 - 6:00	0	0	NO	NO
6:00 - 7:00	1022	96	NO	NO
7:00 - 8:00	2075	152	**YES**	**YES**
8:00 - 9:00	2046	181	**YES**	**YES**
9:00 - 10:00	1629	193	**YES**	**YES**
10:00 - 11:00	1880	234	**YES**	**YES**
11:00 - 12:00	1993	309	**YES**	**YES**
12:00 - 13:00	2207	292	**YES**	**YES**
13:00 - 14:00	2059	297	**YES**	**YES**
14:00 - 15:00	2257	288	**YES**	**YES**
15:00 - 16:00	2442	302	**YES**	**YES**
16:00 - 17:00	2368	313	**YES**	**YES**
17:00 - 18:00	2100	257	**YES**	**YES**
18:00 - 19:00	0	0	NO	NO
19:00 - 20:00	0	0	NO	NO
20:00 - 21:00	0	0	NO	NO
21:00 - 22:00	0	0	NO	NO
22:00 - 23:00	0	0	NO	NO
23:00 - 24:00	0	0	NO	NO

MEMORANDUM

TO: Ken Hansen, PE
MnDOT District 3 Traffic Engineer

FROM: Graham Johnson, PE, PTOE (Lic.MN, IA, SD)
Justin Anibas, PE (Lic. MN)

DATE: August 9, 2022

RE: TH 210 at N 8th Street Intersection Control Evaluation (ICE) Report
SEH No. MNT03 152201 14.00

INTRODUCTION

This memorandum summarizes the Intersection Control Evaluation (ICE) process for the intersection of Trunk Highway (TH) 210 and N 8th Street in Brainerd, Minnesota. The Minnesota Department of Transportation (MnDOT) ICE is an objective process used to investigate and determine the optimal traffic control that should be provided at an intersection to serve the existing conditions and future needs. This memorandum was prepared for MnDOT by SEH Inc.

As part of a project along TH 210 between Baxter Drive and Pine Shores Road, the intersection of TH 210 and N 8th Street was evaluated and is proposed to remain under traffic signal control after the project is complete.

The location of the study intersection for this ICE report is shown in **Figure 1**. The proposed intersection control for the TH 210 and N 8th Street intersection was analyzed based on safety, signal warrants, traffic operations, and pedestrian and bicycle accommodations.

The scope and content of this ICE report was reviewed and agreed to by MnDOT prior to the layout and ICE submittal process. This report summarizes the ICE process and recommendation for the TH 210 and N 8th Street intersection based on a Phase I analysis according to the *2017 MnDOT ICE Manual*.

APPROVAL

I hereby certify that this report was prepared by me or under my direct supervision, and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.

_____ _____
Graham Johnson, PE, PTOE, MN License No. 45429 Date

Approved By:

_____ _____
MnDOT District 3 Traffic Engineer Date

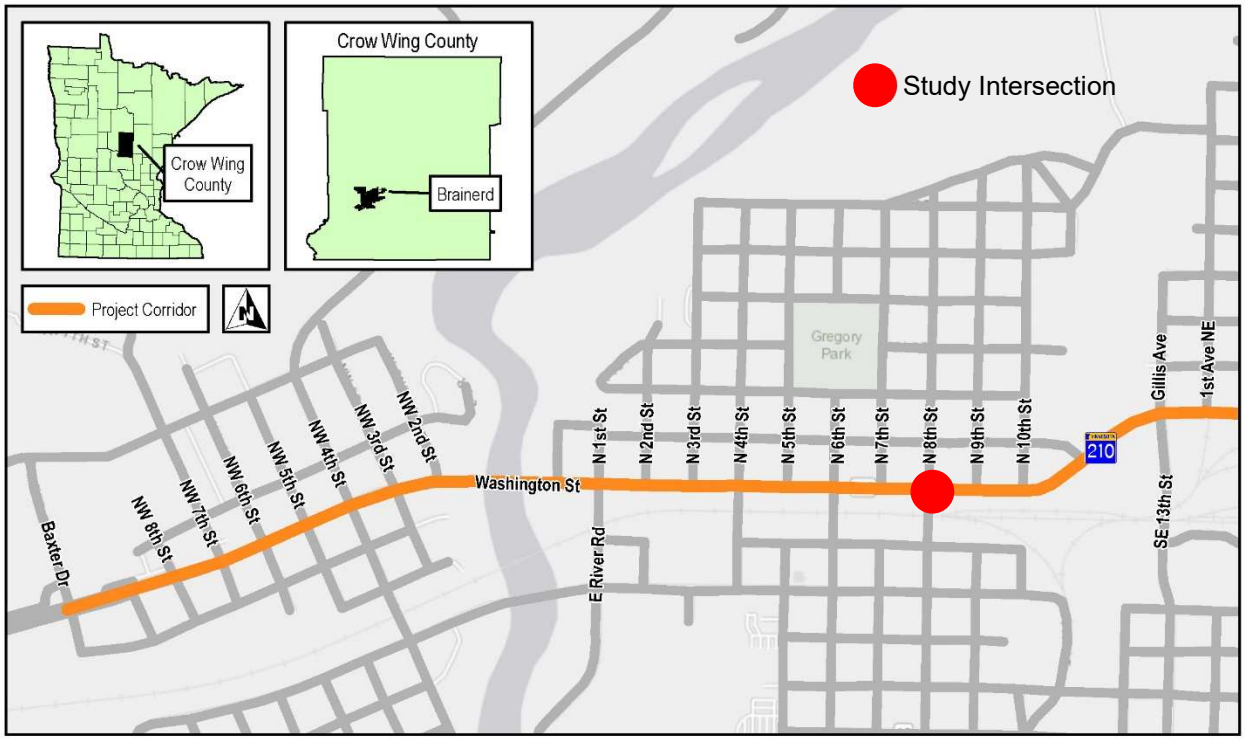
PROJECT DESCRIPTION

MnDOT is conducting the corridor planning study along a 3.9-mile segment of TH 210 to identify the future vision for highway corridor through Brainerd. Reconstruction of TH 210 between Baxter Drive and Pine Shores Road is anticipated to begin in 2025; SP 1805-80.

The primary purpose of the corridor study is to better understand the community issues, needs and use of the roadway, assess improvement options, select a preferred alternative, and prepare a geometric layout. The focus of the improvements is to improve pavement conditions and traveler safety, accommodate the Americans with Disabilities Act (ADA) requirements, and enhance pedestrian accommodations.

For more detailed traffic information, see both the *Existing and 2045 No Build Conditions Report – TH 210/Washington Street Corridor Study* and the *TH 210 Build Conditions Report*.

Figure 1 Project Location



EXISTING CONDITIONS

TH 210 is a major east-west principal arterial through the City of Brainerd that connects near-by cities and regional commerce. TH 210 is generally a 4-lane divided roadway through the City of Brainerd; the posted speed limit is 35 miles-per-hour (mph) at the study intersection.

N 8th Street is a major collector providing access to commercial and residential land uses to the south and residential land uses to the north of TH 210; the posted speed limit is 30 mph.

The nearest existing traffic signals along TH 210 include N 6th Street approximately 750 feet west and 13th Street/Gillis Avenue approximately 2,000 feet east.

Intersection Characteristics

The existing intersection currently operates with traffic signal control and includes marked pedestrian crossings on all four legs. Eastbound and westbound TH 210 left turns operate with protected left turn phasing only, while the minor approach left turns operate with protected and permissive left turn phasing.

The existing lane geometrics are described below and shown in **Figure 2**.

- Eastbound Approach: left turn lane, one through lane, and a shared through-right lane.
- Westbound Approach: left turn lane, one through lane, and a shared through-right lane.
- Northbound Approach: separate left, through, and right turn lanes.
  - Approach storage lanes are limited due to proximity of railroad crossing.
- Southbound Approach: separate left, through, and right turn lanes.

Figure 2 Existing Intersection

Traffic Volumes

TH 210 has an existing 2019 Average Annual Daily Traffic (AADT) volume of 26,000 vehicles west of the intersection. N 8th Street has an existing 2019 AADT of 2,050 vehicles to the north and 4,700 vehicles to the south.

The existing intersection turning movement data was collected in August of 2018 as part of a signal timing project along TH 210 and TH 371. **Figure 3** includes the existing AM and PM peak hour volumes; **Attachment 1** includes the raw existing intersection count data.

Crash Analysis

Intersection crash data for the study intersection was collected from the MnDOT Crash Mapping Analysis Tool (MnCMATv2) for a five-year period between 2014 and 2018 as part of the larger corridor study. The crash rate at an intersection is expressed as a number of crashes per million entering vehicles (MEV). The critical crash rate is a statistical value that is unique to each intersection and is based on vehicular exposure and the statewide average crash rate for similar intersections. An intersection with a

crash rate higher than the critical rate can indicate a safety concern at the intersection and the site should be further reviewed.

The intersection had a total of 31 crashes during the 5-year analysis period:

- 24 of the 31 crashes were rear end crashes: 16 of the rear end crashes were in the eastbound direction and 7 were in the westbound direction, and 1 northbound. This could indicate that backups are worse for eastbound vehicles and influenced by the high right turn volume in the shared through-right lane.
- 6 of the 31 crashes were right-angle crashes: all disregarded the traffic control or failure to yield.
- One pedestrian and one bicycle crash occurred on the west leg crossing TH 210.

Table 1 summarizes the crashes for the study intersection; additional crash information is provided in **Attachment 2**. Based on the crash rate, the intersection does not exceed the critical crash rate.

Table 1 Intersection Crash History (2014-2018)

TH 210 at:	Crash Severity					Crash Rates	
	Fatal & Severity A	Severity B	Severity C	Property Damage	Total	Int. Rate	Critical Rate
N 8th Street	0	3	4	24	31	0.61	1.01

PROPOSED CONDITIONS

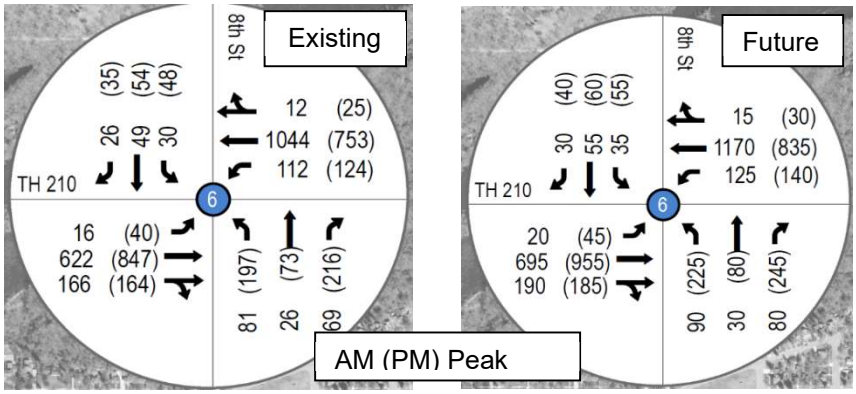
The current layout for the TH 210 corridor between Baxter Drive and Pine Shores Road addresses the needs and use of the roadway, improves pavement conditions, safety, and meets ADA requirements.

The TH 210 and N 8th Street intersection is located in a segment of the project that will primarily include reconstruction of the roadway, with modifications for full ADA compliance, wider sidewalks, and medians. Lane improvements include extending the westbound left turn lane on TH 210.

Future Traffic Volumes

Traffic forecasts were developed for the entire TH 210 corridor as part of the larger study effort. Future 2045 forecast volumes were developed based on a linear growth rate of 0.5% per year based on historical AADT volumes, population data, and input from the project team. **Figure 3** presents both the existing and future 2045 AM and PM peak intersection volumes.

Figure 3 Existing and Future 2045 Intersection Volumes



Warrant Analysis

Traffic control warrant analysis was conducted on the existing and future traffic volumes following the Minnesota Manual on Uniform Traffic Control Devices (MnMUTCD) guidelines; all-way stop control warrants were not analyzed as it is not considered a viable control option along TH 210.

Warrants 1 (8-hour), 2 (4-hour), 3 (peak hour), and 7 (crash warrant) were included in the analysis. The following assumptions were used in the analysis:

- All minor street right turning volume was removed from the approaches.
- Warrant 7 was not applicable at the intersection due to insufficient correctable crashes.

The results of the traffic signal warrant analysis are provided in **Table 2**. The intersection currently meets Warrants 1, 2, and 3; the detailed signal warrant analysis is provided as **Attachment 3**.

Table 2 Traffic Signal Warrant Analysis Summary

MnMUTCD Signal Warrant	Hours Needed	Existing		Future 2045	
		Hours Met	Warrant Met?	Hours Met	Warrant Met?
Warrant 1A – 8-hour Minimum Volume	8	3	Not Met	5	Not Met
Warrant 1B – 8-hour Interruption of Flow	8	**10**	**MET**	**11**	**MET**
Combination of Warrant 1A and 1B	8	7	Not Met	**8**	**MET**
Warrant 2 – 4-hours	4	**10**	**MET**	**11**	**MET**
Warrant 3 – Peak Hour	1	**7**	**MET**	**10**	**MET**

System Limitations and Consistency

TH 210 is a principal arterial through the City of Brainerd that experiences heavy directional volumes in both the AM and PM peak hours, throughout the day, and in the summer months with high tourist traffic. The two adjacent major intersections are both currently signalized.

The study intersection is part of an existing TH 210 signal system coordinated to provide priority to the peak direction of flow, reduce mainline delays, and provide a high level of vehicle progression through the corridor. The coordinated signal system includes all existing traffic signals along TH 210 between TH 371, in the City of Baxter, and 4th Avenue NE in east Brainerd.

Due to limited right-of-way along the TH 210 corridor, expansion of the roadway to accommodate a larger intersection footprint is not feasible. Roundabout intersection control would result in major impacts to adjacent parcels and structures adjacent to the intersection and along the corridor.

In addition, both all-way stop control and roundabout control would alter the traffic flow along TH 210 and severely impede the progression of traffic from the adjacent coordinated signal systems.

Therefore, all-way stop and roundabout intersection control was not considered feasible for this intersection due to right-of-way limitations and the interruption to the existing coordinated signal system.

Traffic Operations

Evaluation of the intersection traffic operations were conducted as part of the overall corridor study using VISSIM software. The evaluation included analysis of the existing conditions, 2045 No Build conditions,

and the recommended 2045 Build conditions, which included extending the westbound left turn lane on TH 210.

The average delay per vehicle and Level of Service (LOS) results for each approach and the overall intersection are provided in **Table 3** for each scenario; all three scenarios include traffic signal control. For more detailed traffic information, see both the *Existing and 2045 No Build Conditions Report – TH 210/Washington Street Corridor Study* and the *TH 210 Build Conditions Report*.

Table 3 Traffic Operations Summary

Scenario	Peak Hour	Approach Delay (sec/veh / LOS)				Intersection Delay (sec/veh / LOS)
		Eastbound	Westbound	Northbound	Southbound	
Existing Conditions	AM	5.9 / A	15.4 / B	31.5 / C	**39.9 / D**	14.3 / B
	PM	7.5 / A	28.5 / C	32.8 / C	**40.2 / D**	21.2 / C
2045 No Build Conditions	AM	5.9 / A	14.2 / B	30.7 / C	**38.4 / D**	13.7 / B
	PM	9.1 / A	29.3 / C	**38.1 / D**	**43.5 / D**	23.3 / C
2045 Build Conditions	AM	10.4 / B	20.1 / C	26.6 / C	32.9 / C	17.8 / B
	PM	13.0 / B	29.5 / C	**35.9 / D**	**40.5 / D**	24.5 / C

Based on the results, the intersection is expected to operate at a LOS C or better in all scenarios. The minor street approaches operate with longer delays due to the long cycle length required for coordination along TH 210.

Extending the westbound left turn lane to approximately 420 feet allows the queued left turning vehicles to stack without blocking the westbound through lanes. The extension does require the N 9th Street intersections to be converted to a right-in/right-out (RI/RO) access. It should be noted; the Build conditions can operate slightly worse than the No Build conditions, this is due to more vehicles entering the intersection with improvements to the adjacent intersections along the corridor.

Pedestrian Considerations

The existing intersection provides crosswalks on all four legs of the intersection; however, the existing facilities are not ADA compliant.

As part of the TH 210 reconstruction project, the intersection will be improved to meet ADA requirements. New Accessible Pedestrian Systems (APS) pedestrian push buttons are proposed to be installed and made operational as part of this project, and all pedestrian curb ramps will be upgraded to be ADA compliant.

Revised Signal System

The existing signal system is vehicle actuated and coordinated along TH 210. The TH 210 left turn phases operate under protected phasing only; the minor street approaches have both protected and permissive left turn phasing.

As part of the signal replacement, the new signal system is to remain vehicle actuated and coordinated along TH 210. All four approaches will include Flashing Yellow Arrow (FYA) which provides the flexibility of running both protected and permissive phasing by time-of-day schedules on all approaches and improves the overall safety of the intersection.

RECOMMENDATION

Based on the analysis included in this report, and as part of the larger TH 210 corridor study, it is recommended to retain traffic signal control at the intersection of TH 210 and N 8th Street.

Traffic signal control is currently warranted at the intersection and traffic operations are acceptable in both the existing conditions and future forecast year. The improvements at the existing intersection will continue to provide a safe intersection for all users.

Roundabout and all-way stop control was not considered feasible at this intersection due to potential right-of-way constraints and impacts, and the impact to the coordinated signal system that provides positive vehicle progression along TH 210.

Attachment 1: Turning Movement Data
Attachment 2: Crash Data
Attachment 3: Warrant Analysis

cc: Luke Wehseler, PE MnDOT District 3
Zachary Whitley, PE MnDOT District 3

File Name: S:\2018\180119\TO OTHERS\TMC\PETRO\346_TH 210 AND 8TH STREET.ppd
Start Date: 8/23/2018
Start Time: 6:00:00 AM
Site Code: 00000346
Comment 1: 346_TH 210 AND 8TH STREET
Comment 2: 0
Comment 3: data by: Alliant Inc
Comment 4: TURN MOVEMENT COUNT

	BAXTER DRIVE Southbound				TH 210 Westbound				BAXTER DRIVE Northbound				TH 210 Eastbound			
Start Time	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds
06:00 AM	3	0	5	0	1	63	0	1	6	1	2	1	0	45	4	1
06:15 AM	4	1	3	0	7	60	1	1	9	7	4	0	4	49	9	1
06:30 AM	8	6	5	0	11	125	0	1	9	10	8	0	5	93	20	0
06:45 AM	4	2	3	0	19	139	3	0	16	4	10	0	2	80	17	0
07:00 AM	3	7	5	0	17	82	0	0	12	4	9	0	1	97	21	0
07:15 AM	4	9	6	0	28	156	0	0	17	4	15	0	3	90	21	3
07:30 AM	9	18	5	0	28	171	3	0	20	5	22	0	6	115	35	1
07:45 AM	11	14	6	0	28	195	3	2	26	8	22	0	5	135	38	2
08:00 AM	7	11	9	0	28	180	1	1	16	5	11	0	4	105	29	0
08:15 AM	3	6	6	1	28	164	5	1	19	8	14	0	1	88	36	0
08:30 AM	11	8	6	0	34	179	5	1	30	6	9	0	6	92	40	1
08:45 AM	3	6	4	0	30	168	1	3	34	5	20	0	4	105	48	1
09:00 AM	3	9	7	1	23	155	1	2	27	5	22	0	2	100	29	1
09:15 AM	6	10	5	1	24	169	2	0	25	3	26	0	1	108	27	1
09:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
09:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10:30 AM	4	12	6	0	18	186	0	0	33	5	31	0	0	107	30	1
10:45 AM	7	11	5	0	31	191	1	4	39	13	29	0	4	103	16	3
11:00 AM	14	8	4	0	26	160	2	1	33	14	39	0	7	118	20	0
11:15 AM	15	5	7	0	23	152	0	2	23	13	45	0	3	127	11	1
11:30 AM	18	8	5	1	28	157	0	2	34	12	47	0	6	120	18	0
11:45 AM	12	16	5	1	39	135	5	2	46	11	49	0	5	130	16	1
12:00 PM	17	15	6	2	33	152	5	2	47	10	57	0	7	125	11	1
12:15 PM	18	18	8	1	24	166	3	2	43	9	57	0	3	123	17	2
12:30 PM	15	20	6	1	33	226	5	3	32	12	47	0	6	120	17	2
12:45 PM	17	10	7	0	32	211	4	7	27	11	38	0	2	119	19	1
01:00 PM	7	18	10	1	24	173	6	3	31	9	43	0	8	121	11	1
01:15 PM	20	8	11	2	23	193	3	0	35	11	40	0	4	112	13	4
01:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
01:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
02:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
02:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
02:30 PM	10	13	8	0	33	194	3	3	47	10	51	0	5	149	29	4
02:45 PM	8	14	5	0	22	171	4	4	35	10	47	0	9	176	25	1
03:00 PM	13	11	6	1	18	163	7	2	20	9	53	0	8	174	47	0
03:15 PM	11	10	10	0	18	161	2	3	32	10	25	0	1	178	34	4
03:30 PM	7	16	5	0	39	184	4	0	29	13	46	0	5	173	37	0
03:45 PM	14	14	9	0	31	167	8	6	35	9	43	0	8	161	43	2
04:00 PM	8	15	11	0	21	171	4	5	29	5	44	0	6	175	33	3
04:15 PM	12	7	10	2	22	195	4	4	43	11	51	0	4	167	40	3
04:30 PM	14	10	10	2	38	197	6	3	49	15	57	1	12	190	21	0
04:45 PM	10	19	10	0	26	196	8	0	50	19	50	0	5	183	46	0
05:00 PM	11	14	9	0	23	220	8	3	53	18	52	0	11	167	31	4
05:15 PM	13	11	6	0	37	200	3	0	45	21	57	1	12	181	39	4
05:30 PM	11	15	3	0	18	180	6	1	30	16	41	0	7	174	32	0
05:45 PM	9	4	9	2	22	157	10	5	25	6	24	0	9	163	29	2

Intersection Safety Screening

Intersection: TH 210 at N 8th Street

Crash Data: 2014 to 2018 (5-years)

Crashes by Crash Severity	
Fatal	0
Incapacitating Injury	0
Non-incapacitating Injury	3
Possible Injury	4
Property Damage	24
Total Crashes	31

Intersection Characteristics	
Entering Volume	28,030
Traffic Control	Signals
Environment	Urban
Speed Limit	35 mph

Annual crash cost = $204,880

Statewide Comparison

Signals: high volume, low speed

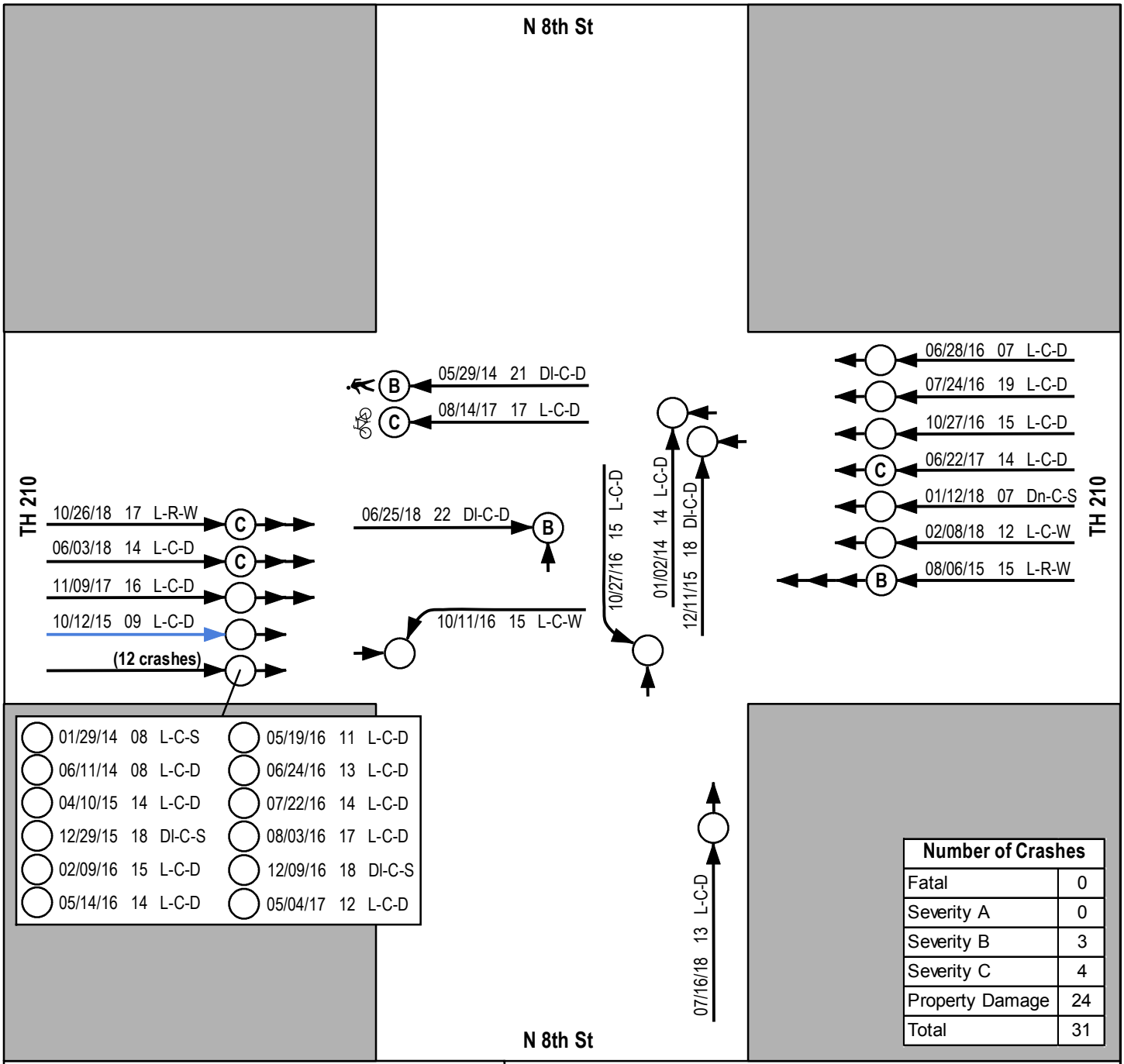
Total Crash Rate	
Observed	0.61
Statewide Average	0.70
Critical Rate	1.01
Critical Index	**0.60**

Fatal & Serious Injury Crash Rate	
Observed	0.00
Statewide Average	0.76
Critical Rate	3.31
Critical Index	**0.00**

The observed crash rate is the number of crashes per million entering vehicles (MEV). The critical rate is a statistical comparison based on similar intersections statewide. An observed crash rate greater than the critical rate indicates that the intersection operates outside the expected, normal range. The critical index reports the magnitude of this difference.

The observed total crash rate for this period is 0.61 per MEV; this is 40% below the critical rate. Based on similar statewide intersections, an additional 21 crashes over the five years would indicate this intersection operaters outside the normal range.

The observed fatal and serious injury crash rate for this period is 0.00 per 100 MEV; this is 100% below the critical rate. The intersection operates within the normal range.



Number of Crashes	
Fatal	0
Severity A	0
Severity B	3
Severity C	4
Property Damage	24
Total	31

Passenger Vehicle
Heavy Vehicle
Bus
Motorcycle
Fixed Object
Pedestrian
Bicycle

Fatal
Severity A
Severity B
Severity C
Property Damage Only
Vehicle Out of Control

Notes:

Light
L = Daylight
Dn = Dawn
Du = Dusk
Dl = Dark, Lighted
Do = Dark, Lights Off
D = Dark, Unlighted
X = Unkown

Weather
C = Clear or Cloudy
R = Rain
S = Snow/Sleet/Hail/Freexing Rain
F = Fog/Smog/Smoke
B = Blowing Sand/Dust/Snow
W = Severe Cross Winds
X = Other or Unknown

Surface
D = Dry
W = Wet or Water
S = Snow/Slush/Ice
M = Muddy
Db = Debris
O = Oily
X = Other or Unkown

Date Time(Hr) Light-Weather-Surface → Injury Type → Other Vehicle(s)

Project: MNT03 152201
Print Date: 3/2/2020

Map by: jdanibas
Projection:
Source:

Crash Diagrams (2014-2018)
TH 210 at N 8th St
TH 210/Washington Street Corridor Study
Brainerd, MN

Figure A6

Path: C:\Traffic Projects\Brainerd- TH 210\Crashes\Crash Diagrams\A6_TH 210 at N 8th St_Crash Diagram.mxd

2019 Existing - TH 210 at N 8th St
SIGNAL WARRANT
ANALYSIS

LOCATION: TH 210 at N 8th St
COUNTY: Crow Wing
REF. POINT: 0
DATE: 3/12/2020
OPERATOR: JDA

85th% Speed	Approach Description		Lanes	Approach
35	Major App1:	TH 210 EB	3	9551
35	Major App3:	TH 210 WB	3	10225
30	Minor App2:	N 8th St NB	3	1927
30	Minor App4:	N 8th St SB	3	992

40 MPH OR FASTER?	NO
POPULATION < 10,000?	NO
VOLUME REQ. AT 70%?	**NO**
CORRECTABLE CRASHES: (12-month period)	0

	Minimum Volume Requirement		
	1A	1B	1A&B (80%)
Major Total	600	900	720
Minor Approach	200	100	160

HOUR	MAJOR APP. 1	MAJOR APP. 3	MINOR APP. 2	MINOR APP. 4	MAJOR APPROACH TOTAL Σ (APP.1 + APP. 3)	MAX MINOR APPROACH (APP. 2 or 4)	WARRANT 1A - 8 hr MAJOR/MINOR	WARRANT 1B - 8 hr MAJOR/MINOR	WARRANT 1A & B MAJOR/MINOR
0:00 - 1:00	0	0	0	0	0	0	NO / NO	NO / NO	NO / NO
1:00 - 2:00	0	0	0	0	0	0	NO / NO	NO / NO	NO / NO
2:00 - 3:00	0	0	0	0	0	0	NO / NO	NO / NO	NO / NO
3:00 - 4:00	0	0	0	0	0	0	NO / NO	NO / NO	NO / NO
4:00 - 5:00	0	0	0	0	0	0	NO / NO	NO / NO	NO / NO
5:00 - 6:00	0	0	0	0	0	0	NO / NO	NO / NO	NO / NO
6:00 - 7:00	378	467	62	28	845	62	YES / NO	NO / NO	YES / NO
7:00 - 8:00	766	980	96	75	1746	96	YES / NO	YES / NO	YES / NO
8:00 - 9:00	626	1043	123	55	1669	123	YES / NO	**YES / YES**	YES / NO
9:00 - 10:00	612	738	128	60	1350	128	YES / NO	**YES / YES**	YES / NO
10:00 - 11:00	680	808	173	69	1488	173	YES / NO	**YES / YES**	**YES / YES**
11:00 - 12:00	786	861	186	96	1647	186	YES / NO	**YES / YES**	**YES / YES**
12:00 - 13:00	878	944	191	130	1822	191	YES / NO	**YES / YES**	**YES / YES**
13:00 - 14:00	840	820	176	106	1660	176	YES / NO	**YES / YES**	**YES / YES**
14:00 - 15:00	967	874	200	94	1841	200	**YES / YES**	**YES / YES**	**YES / YES**
15:00 - 16:00	1028	1023	157	96	2051	157	YES / NO	**YES / YES**	YES / NO
16:00 - 17:00	1066	875	221	95	1941	221	**YES / YES**	**YES / YES**	**YES / YES**
17:00 - 18:00	924	792	214	88	1716	214	**YES / YES**	**YES / YES**	**YES / YES**
18:00 - 19:00	0	0	0	0	0	0	NO / NO	NO / NO	NO / NO
19:00 - 20:00	0	0	0	0	0	0	NO / NO	NO / NO	NO / NO
20:00 - 21:00	0	0	0	0	0	0	NO / NO	NO / NO	NO / NO
21:00 - 22:00	0	0	0	0	0	0	NO / NO	NO / NO	NO / NO
22:00 - 23:00	0	0	0	0	0	0	NO / NO	NO / NO	NO / NO
23:00 - 24:00	0	0	0	0	0	0	NO / NO	NO / NO	NO / NO
Daily	**9551**	**10225**	**1927**	**992**					

		Met (Hr)	Required (Hr)	WARRANT MET:
Warrant 1	**Eight Hour Volumes**	**10**	8	**Satisfied**
Warrant 1A	Minimum Vehicular Volume	3	8	Not satisfied
Warrant 1B	Interruption of Continuous Flow	**10**	8	**Satisfied**
1A & 1B	Combination of Warrants	7	8	Not satisfied
Warrant 2	**Four Hour Volumes**	**10**	4	**Satisfied**
Warrant 3	**Peak Hour Volumes**	**7**	1	**Satisfied**
Warrant 7	**Crash Experience**	**11**	8	Crashes Insufficient

COMMENTS:

2019 Existing - TH 210 at N 8th St
SIGNAL WARRANT
ANALYSIS

LOCATION: TH 210 at N 8th St
COUNTY: Crow Wing
REF. POINT: 0
DATE: 3/12/2020

OPERATOR: JDA

40 MPH OR FASTER?	NO
POPULATION < 10,000?	NO
VOLUME REQ. AT 70%?	**NO**

85th% Speed	Approach Description		Lanes	Approach
35	Major App1:	TH 210 EB	3	9551
35	Major App3:	TH 210 WB	3	10225
30	Minor App2:	N 8th St NB	3	1927
30	Minor App4:	N 8th St SB	3	992

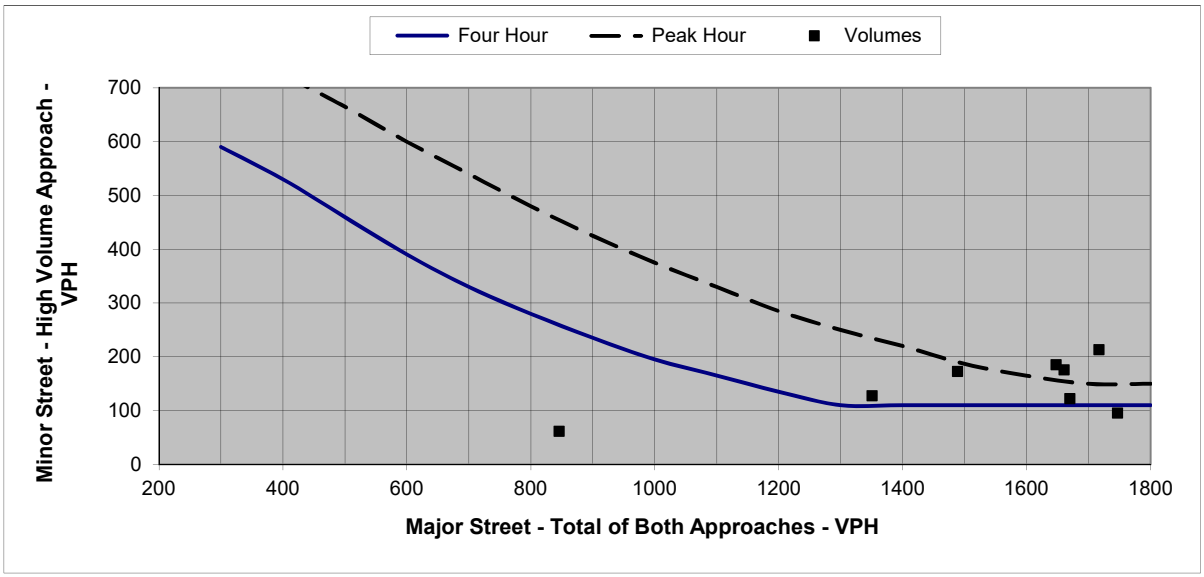


Figure 1. Four Hour and Peak Hour Warrant Analysis

Note: For data points outside the graph range, check the minor street volume against the lower thresholds

Warrant Criteria (Graph)		
Major	Minor App.	Minor App.
Approach	Four Hour	Peak Hour
200		
300	590	
400	530	725
500	460	665
600	390	600
700	330	540
800	280	480
900	235	425
1000	195	375
1100	165	330
1200	135	285
1300	110	250
1400	110	220
1500	110	187
1600	110	165
1700	110	150
1800	110	150

Actual Hourly Count			Warrants Met:	
			Warrant 2	Warrant 3
HOUR	Sum Major App.	Max Minor App.	Four Hour	Peak Hour
0:00 - 1:00	0	0	NO	NO
1:00 - 2:00	0	0	NO	NO
2:00 - 3:00	0	0	NO	NO
3:00 - 4:00	0	0	NO	NO
4:00 - 5:00	0	0	NO	NO
5:00 - 6:00	0	0	NO	NO
6:00 - 7:00	845	62	NO	NO
7:00 - 8:00	1746	96	NO	NO
8:00 - 9:00	1669	123	**YES**	NO
9:00 - 10:00	1350	128	**YES**	NO
10:00 - 11:00	1488	173	**YES**	NO
11:00 - 12:00	1647	186	**YES**	**YES**
12:00 - 13:00	1822	191	**YES**	**YES**
13:00 - 14:00	1660	176	**YES**	**YES**
14:00 - 15:00	1841	200	**YES**	**YES**
15:00 - 16:00	2051	157	**YES**	**YES**
16:00 - 17:00	1941	221	**YES**	**YES**
17:00 - 18:00	1716	214	**YES**	**YES**
18:00 - 19:00	0	0	NO	NO
19:00 - 20:00	0	0	NO	NO
20:00 - 21:00	0	0	NO	NO
21:00 - 22:00	0	0	NO	NO
22:00 - 23:00	0	0	NO	NO
23:00 - 24:00	0	0	NO	NO

2045 Future - TH 210 at N 8th St
SIGNAL WARRANT
ANALYSIS

LOCATION: TH 210 at N 8th St
COUNTY: Crow Wing
REF. POINT: 0
DATE: 3/12/2020

OPERATOR: JDA

85th% Speed	Approach Description		Lanes	Approach
35	Major App1:	TH 210 EB	3	10792
35	Major App3:	TH 210 WB	3	11554
30	Minor App2:	N 8th St NB	3	2178
30	Minor App4:	N 8th St SB	3	1121

40 MPH OR FASTER?	NO
POPULATION < 10,000?	NO
VOLUME REQ. AT 70%?	**NO**
CORRECTABLE CRASHES: (12-month period)	0

	Minimum Volume Requirement		
	1A	1B	1A&B (80%)
Major Total	600	900	720
Minor Approach	200	100	160

HOUR	MAJOR APP. 1	MAJOR APP. 3	MINOR APP. 2	MINOR APP. 4	MAJOR APPROACH TOTAL Σ (APP.1 + APP. 3)	MAX MINOR APPROACH (APP. 2 or 4)	WARRANT 1A - 8 hr MAJOR/MINOR	WARRANT 1B - 8 hr MAJOR/MINOR	WARRANT 1A & B MAJOR/MINOR
0:00 - 1:00	0	0	0	0	0	0	NO / NO	NO / NO	NO / NO
1:00 - 2:00	0	0	0	0	0	0	NO / NO	NO / NO	NO / NO
2:00 - 3:00	0	0	0	0	0	0	NO / NO	NO / NO	NO / NO
3:00 - 4:00	0	0	0	0	0	0	NO / NO	NO / NO	NO / NO
4:00 - 5:00	0	0	0	0	0	0	NO / NO	NO / NO	NO / NO
5:00 - 6:00	0	0	0	0	0	0	NO / NO	NO / NO	NO / NO
6:00 - 7:00	427	528	70	32	955	70	YES / NO	YES / NO	YES / NO
7:00 - 8:00	866	1108	108	85	1974	108	YES / NO	**YES / YES**	YES / NO
8:00 - 9:00	707	1179	140	61	1886	140	YES / NO	**YES / YES**	YES / NO
9:00 - 10:00	692	834	145	68	1526	145	YES / NO	**YES / YES**	YES / NO
10:00 - 11:00	768	913	196	77	1681	196	YES / NO	**YES / YES**	**YES / YES**
11:00 - 12:00	888	973	210	109	1861	210	**YES / YES**	**YES / YES**	**YES / YES**
12:00 - 13:00	992	1066	216	148	2058	216	**YES / YES**	**YES / YES**	**YES / YES**
13:00 - 14:00	950	927	199	120	1877	199	YES / NO	**YES / YES**	**YES / YES**
14:00 - 15:00	1093	988	226	106	2081	226	**YES / YES**	**YES / YES**	**YES / YES**
15:00 - 16:00	1161	1156	177	109	2317	177	YES / NO	**YES / YES**	**YES / YES**
16:00 - 17:00	1205	988	249	107	2193	249	**YES / YES**	**YES / YES**	**YES / YES**
17:00 - 18:00	1043	894	242	99	1937	242	**YES / YES**	**YES / YES**	**YES / YES**
18:00 - 19:00	0	0	0	0	0	0	NO / NO	NO / NO	NO / NO
19:00 - 20:00	0	0	0	0	0	0	NO / NO	NO / NO	NO / NO
20:00 - 21:00	0	0	0	0	0	0	NO / NO	NO / NO	NO / NO
21:00 - 22:00	0	0	0	0	0	0	NO / NO	NO / NO	NO / NO
22:00 - 23:00	0	0	0	0	0	0	NO / NO	NO / NO	NO / NO
23:00 - 24:00	0	0	0	0	0	0	NO / NO	NO / NO	NO / NO
Daily	**10792**	**11554**	**2178**	**1121**					

		Met (Hr)	Required (Hr)	WARRANT MET:
Warrant 1	**Eight Hour Volumes**	**11**	8	**Satisfied**
Warrant 1A	Minimum Vehicular Volume	5	8	Not satisfied
Warrant 1B	Interruption of Continuous Flow	**11**	8	**Satisfied**
1A & 1B	Combination of Warrants	**8**	8	**Satisfied**
Warrant 2	**Four Hour Volumes**	**11**	4	**Satisfied**
Warrant 3	**Peak Hour Volumes**	**10**	1	**Satisfied**
Warrant 7	**Crash Experience**	**11**	8	Crashes Insufficient

COMMENTS:

2045 Future - TH 210 at N 8th St
SIGNAL WARRANT
ANALYSIS

LOCATION: TH 210 at N 8th St
COUNTY: Crow Wing
REF. POINT: 0
DATE: 3/12/2020

OPERATOR: JDA

40 MPH OR FASTER?	NO
POPULATION < 10,000?	NO
VOLUME REQ. AT 70%?	**NO**

85th% Speed	Approach Description		Lanes	Approach
35	Major App1:	TH 210 EB	3	10792
35	Major App3:	TH 210 WB	3	11554
30	Minor App2:	N 8th St NB	3	2178
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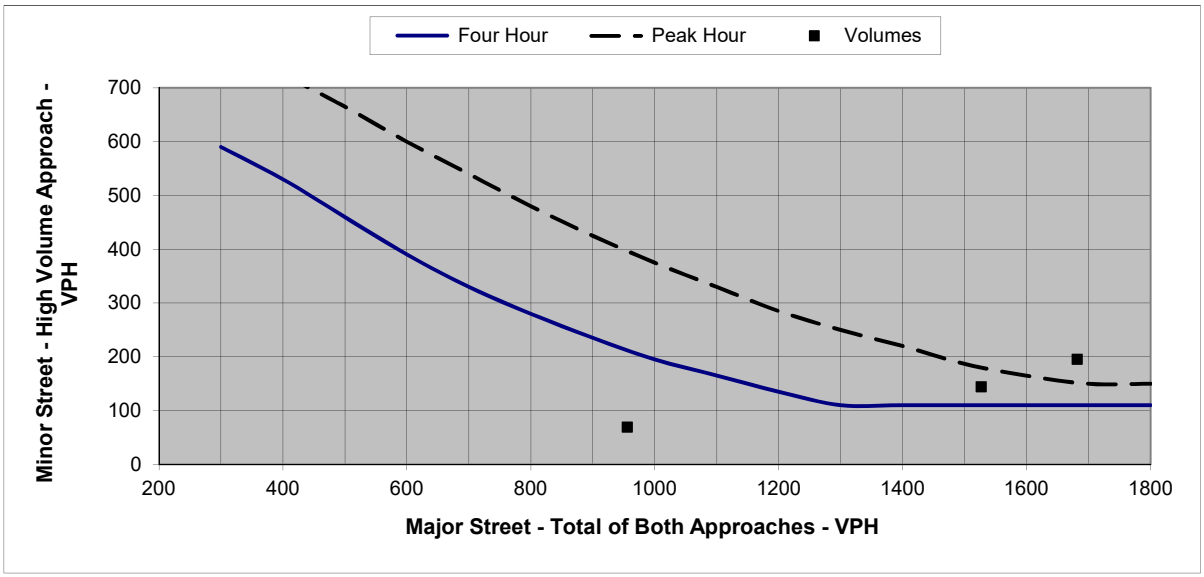


Figure 1. Four Hour and Peak Hour Warrant Analysis

Note: For data points outside the graph range, check the minor street volume against the lower thresholds

Warrant Criteria (Graph)		
Major	Minor App.	Minor App.
Approach	Four Hour	Peak Hour
200		
300	590	
400	530	725
500	460	665
600	390	600
700	330	540
800	280	480
900	235	425
1000	195	375
1100	165	330
1200	135	285
1300	110	250
1400	110	220
1500	110	187
1600	110	165
1700	110	150
1800	110	150

Actual Hourly Count			Warrants Met:	
			Warrant 2	Warrant 3
HOUR	Sum Major App.	Max Minor App.	Four Hour	Peak Hour
0:00 - 1:00	0	0	NO	NO
1:00 - 2:00	0	0	NO	NO
2:00 - 3:00	0	0	NO	NO
3:00 - 4:00	0	0	NO	NO
4:00 - 5:00	0	0	NO	NO
5:00 - 6:00	0	0	NO	NO
6:00 - 7:00	955	70	NO	NO
7:00 - 8:00	1974	108	**YES**	**YES**
8:00 - 9:00	1886	140	**YES**	**YES**
9:00 - 10:00	1526	145	**YES**	NO
10:00 - 11:00	1681	196	**YES**	**YES**
11:00 - 12:00	1861	210	**YES**	**YES**
12:00 - 13:00	2058	216	**YES**	**YES**
13:00 - 14:00	1877	199	**YES**	**YES**
14:00 - 15:00	2081	226	**YES**	**YES**
15:00 - 16:00	2317	177	**YES**	**YES**
16:00 - 17:00	2193	249	**YES**	**YES**
17:00 - 18:00	1937	242	**YES**	**YES**
18:00 - 19:00	0	0	NO	NO
19:00 - 20:00	0	0	NO	NO
20:00 - 21:00	0	0	NO	NO
21:00 - 22:00	0	0	NO	NO
22:00 - 23:00	0	0	NO	NO
23:00 - 24:00	0	0	NO	NO

MEMORANDUM

TO: Ken Hansen, PE
MnDOT District 3 Traffic Engineer

FROM: Graham Johnson, PE, PTOE (Lic.MN, IA, SD)
Justin Anibas, PE (Lic. MN)

DATE: August 9, 2022

RE: TH 210 at 13th Street/Gillis Avenue Intersection Control Evaluation (ICE) Report
SEH No. MNT03 152201 14.00

INTRODUCTION

This memorandum summarizes the Intersection Control Evaluation (ICE) process for the intersection of Trunk Highway (TH) 210 and 13th Street/Gillis Avenue in Brainerd, Minnesota. The Minnesota Department of Transportation (MnDOT) ICE is an objective process used to investigate and determine the optimal traffic control that should be provided at an intersection to serve the existing conditions and future needs. This memorandum was prepared for MnDOT by SEH Inc.

As part of a project along TH 210 between Baxter Drive and Pine Shores Road, the intersection of TH 210 and 13th Street/Gillis Avenue was evaluated and is proposed to remain under traffic signal control after the project is complete.

The location of the study intersection for this ICE report is shown in **Figure 1**. The proposed intersection control for the TH 210 and 13th Street/Gillis Avenue intersection was analyzed based on safety, signal warrants, traffic operations, and pedestrian and bicycle accommodations.

The scope and content of this ICE report was reviewed and agreed to by MnDOT prior to the layout and ICE submittal process. This report summarizes the ICE process and recommendation for the TH 210 and 13th Street/Gillis Avenue intersection based on a Phase I analysis according to the *2017 MnDOT ICE Manual*.

APPROVAL

I hereby certify that this report was prepared by me or under my direct supervision, and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.

_____ _____
Graham Johnson, PE, PTOE, MN License No. 45429 Date

Approved By:

_____ _____
MnDOT District 3 Traffic Engineer Date

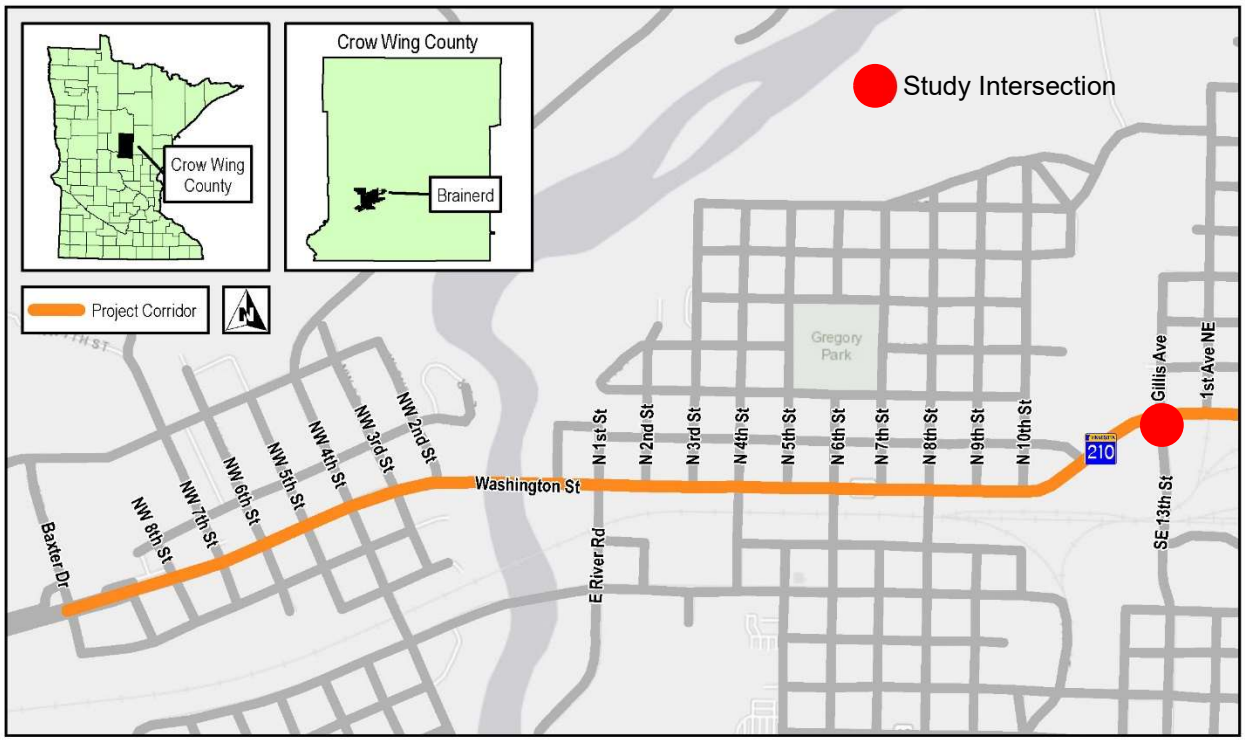
PROJECT DESCRIPTION

MnDOT is conducting the corridor planning study along a 3.9-mile segment of TH 210 to identify the future vision for highway corridor through Brainerd. Reconstruction of TH 210 between Baxter Drive and Pine Shores Road is anticipated to begin in 2025; SP 1805-80.

The primary purpose of the corridor study is to better understand the community issues, needs and use of the roadway, assess improvement options, select a preferred alternative, and prepare a geometric layout. The focus of the improvements is to improve pavement conditions and traveler safety, accommodate the Americans with Disabilities Act (ADA) requirements, and enhance pedestrian accommodations.

For more detailed traffic information, see both the *Existing and 2045 No Build Conditions Report – TH 210/Washington Street Corridor Study* and the *TH 210 Build Conditions Report*.

Figure 1 Project Location



EXISTING CONDITIONS

TH 210 is a major east-west principal arterial through the City of Brainerd that connects near-by cities and regional commerce. TH 210 is generally a 4-lane divided roadway through the City of Brainerd; the posted speed limit is 35 miles-per-hour (mph) at the study intersection.

13th Street, southern leg, is a north-south minor arterial that connects the east side of the City of Brainerd and provides access to both commercial and residential lane uses. Gillis Avenue, northern leg, is a local roadway providing access to residential land uses; the posted speed limit on both roads is 30 mph.

The nearest existing traffic signals along TH 210 include N 8th Street approximately 2,000 feet west and 4th Avenue NE approximately 1,500 feet east.

Intersection Characteristics

The existing intersection currently operates with traffic signal control and includes marked pedestrian crossings on all four legs. Eastbound and westbound TH 210 left turns operate with protected left turn phasing only, while the minor street approach left turns operate under permissive phasing only.

The existing lane geometrics are described below and shown in **Figure 2**.

- Eastbound Approach: left turn lane, two through lanes, and a right turn lane.
- Westbound Approach: left turn lane, one through lanes, and one shared through-right lane.
- Northbound Approach: shared left-through lane, and a separate right turn lane.
- Southbound Approach: shared left-through lane, and a separate right turn lane

Figure 2 Existing Intersection

Traffic Volumes

TH 210 has an existing 2019 Average Annual Daily Traffic (AADT) volume of 25,500 vehicles east of the intersection; Gillis Avenue has an existing 2019 AADT of 560 vehicles and 13th Street has an existing 2019 AADT of 6,900 vehicles.

The existing intersection turning movement data was collected in October of 2019 as part of a signal timing project along TH 210 and TH 371. **Figure 3** includes the existing AM and PM peak hour volumes; **Attachment 1** includes the raw existing intersection count data.

Crash Analysis

Intersection crash data for the study intersection was collected from the MnDOT Crash Mapping Analysis Tool (MnCMATv2) for a five-year period between 2014 and 2018 as part of the larger corridor study.

The crash rate at an intersection is expressed as a number of crashes per million entering vehicles (MEV). The critical crash rate is a statistical value that is unique to each intersection and is based on vehicular exposure and the statewide average crash rate for similar intersections. An intersection with a

crash rate higher than the critical rate can indicate a safety concern at the intersection and the site should be further reviewed.

The intersection had a total of 51 crashes during the 5-year analysis period:

- 41 of the 51 crashes were rear end crashes: 24 of the rear end crashes were in the eastbound direction and 16 were in the westbound direction, 1 in the northbound direction. This could indicate that backups are worse for eastbound vehicles.
- 4 of the 51 crashes were sideswipe crashes, likely due to vehicles changing lanes to avoid vehicles that are slowing or stopping during congestion.

Table 1 summarizes the crashes for the study intersection; additional crash information is provided in **Attachment 2**. Based on the crash rate, the intersection is just under the critical crash rate indicating safety improvements should be considered.

Table 1 Intersection Crash History (2014-2018)

TH 210 at:	Crash Severity					Crash Rates	
	Fatal & Severity A	Severity B	Severity C	Property Damage	Total	Int. Rate	Critical Rate
13th Street/Gillis Avenue	0	2	11	38	51	**0.99**	1.01

PROPOSED CONDITIONS

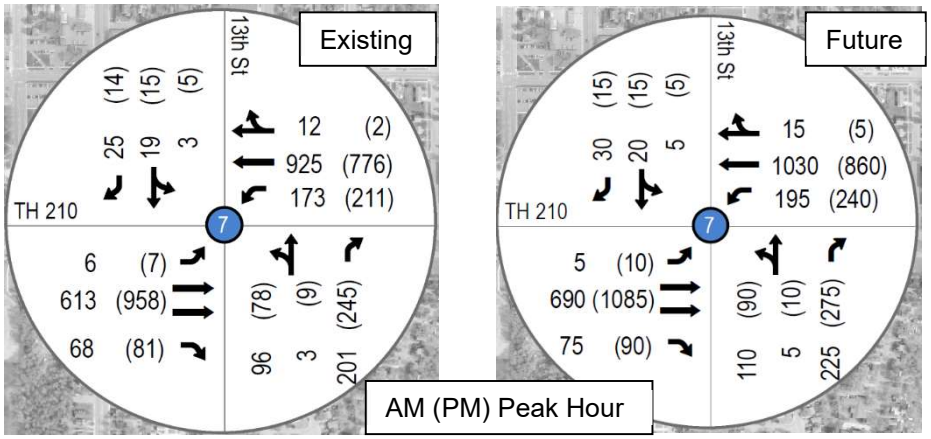
The current layout for the TH 210 corridor between Baxter Drive and Pine Shores Road addresses the needs and use of the roadway, improves pavement conditions, safety, and meets ADA requirements.

The TH 210 and 13th Street/Gillis Avenue intersection is located in a segment of the reconstruction project that will include mill and overlay west of the intersection on TH 210 to improve pavement conditions, and reconstruction of TH 210 to the east, with modifications for full ADA compliance and wider sidewalks. The westbound left turn lane will be extended to keep turning vehicles out of the TH 210 through lanes.

Future Traffic Volumes

Traffic forecasts were developed for the entire TH 210 corridor as part of the larger study effort. Future 2045 forecast volumes were developed based on a linear growth rate of 0.5% per year based on historical AADT volumes, population data, and input from the project team. **Figure 3** presents both the

Figure 3 Existing and Future 2045 Intersection Volumes



Warrant Analysis

Traffic control warrant analysis was conducted on the existing and future traffic volumes following the Minnesota Manual on Uniform Traffic Control Devices (MnMUTCD) guidelines; all-way stop control warrants were not analyzed as it is not considered a viable control option along TH 210.

Warrants 1 (8-hour), 2 (4-hour), 3 (peak hour), and 7 (crash warrant) were included in the analysis. The following assumptions were used in the analysis:

- All minor street right turning volume was removed from the approaches.
- Warrant 7 was not applicable at the intersection due to insufficient correctable crashes.

The results of the traffic signal warrant analysis are provided in **Table 2**. The intersection currently meets Warrants 1, 2, and 3; the detailed signal warrant analysis is provided as **Attachment 3**.

Table 2 Traffic Signal Warrant Analysis Summary

MnMUTCD Signal Warrant	Hours Needed	Existing		Future 2045	
		Hours Met	Warrant Met?	Hours Met	Warrant Met?
Warrant 1A – 8-hour Minimum Volume	8	0	Not Met	0	Not Met
Warrant 1B – 8-hour Interruption of Flow	8	6	Not Met**	**8**	**MET**
Combination of Warrant 1A and 1B	8	0	Not Met	1	Not Met
Warrant 2 – 4-hours	4	**5**	**MET**	**7**	**MET**
Warrant 3 – Peak Hour	1	**5**	**MET**	**6**	**MET**

Note: ** 80% thresholds for Warrant 1B are met for 10 hours in 2019, indicating the existing signal is justified based on the MnDOT Traffic Engineering Manual (TEM) guidance in Chapter 9, section 9-5.02.05.

System Limitations and Consistency

TH 210 is a principal arterial through the City of Brainerd that experiences heavy directional volumes in both the AM and PM peak hours, throughout the day, and in the summer months with high tourist traffic. The two adjacent major intersections are both currently signalized.

The study intersection is part of an existing TH 210 signal system coordinated to provide priority to the peak direction of flow, reduce mainline delays, and provide a high level of vehicle progression through the corridor. The coordinated signal system includes all existing traffic signals along TH 210 between TH 371, in the City of Baxter, and 4th Avenue NE in east Brainerd.

Due to limited right-of-way along the TH 210 corridor, expansion of the roadway to accommodate a larger intersection footprint is not feasible. Roundabout intersection control would result in major impacts to adjacent parcels and structures adjacent to the intersection and along the corridor.

In addition, both all-way stop control and roundabout control would alter the traffic flow along TH 210 and severely impede the progression of traffic from the adjacent coordinated signal systems.

Therefore, all-way stop and roundabout intersection control was not considered feasible for this intersection due to right-of-way limitations and the interruption to the existing coordinated signal system.

Traffic Operations

Evaluation of the intersection traffic operations were conducted as part of the overall corridor study using VISSIM software. The evaluation included analysis of the existing conditions, 2045 No Build conditions, and the recommended 2045 Build conditions, which included extending the westbound left turn lane at the intersection.

The average delay per vehicle and Level of Service (LOS) results for each approach and the overall intersection are provided in **Table 3** for each scenario; all three scenarios include traffic signal control. For more detailed traffic information, see both the *Existing and 2045 No Build Conditions Report – TH 210/Washington Street Corridor Study* and the *TH 210 Build Conditions Report*.

Table 3 Traffic Operations Summary

Scenario	Peak Hour	Approach Delay (sec/veh / LOS)				Intersection Delay (sec/veh / LOS)
		Eastbound	Westbound	Northbound	Southbound	
Existing Conditions	AM	6.7 / A	10.0 / B	23.8 / C	22.2 / C	11.1 / B
	PM	7.4 / A	16.4 / B	29.4 / C	33.7 / C	14.3 / B
2045 No Build Conditions	AM	5.3 / A	10.9 / B	24.0 / C	26.1 / C	11.2 / B
	PM	6.7 / A	19.6 / B	33.4 / C	**38.9 / D**	15.9 / B
2045 Build Conditions	AM	7.5 / A	13.6 / B	24.2 / C	25.6 / C	13.4 / B
	PM	7.9 / A	17.7 / B	33.7 / C	34.9 / C	15.7 / B

Based on the results, the intersection is expected to operate at a LOS B in all scenarios. The minor street approaches operate with longer delays due to the long cycle length required for coordination along TH 210.

Extending the westbound left turn lane to approximately 470 feet allows the queued left turning vehicles to stack without blocking the westbound through lanes. The extension does require the 1st Avenue NE intersection to be converted to a right-in/right-out (RI/RO) access. It should be noted; the Build conditions can operate slightly worse than the No Build conditions, this is due to more vehicles entering the intersection with improvements to the adjacent intersections along the corridor.

Pedestrian Considerations

The existing intersection provides crosswalks on all four legs of the intersection; however, the existing facilities are not ADA compliant.

As part of the TH 210 reconstruction project, the intersection will be improved to meet ADA requirements. New Accessible Pedestrian Systems (APS) pedestrian push buttons are proposed to be installed and made operational as part of this project, and all pedestrian curb ramps will be upgraded to be ADA compliant.

Revised Signal System

The existing signal system is vehicle actuated and coordinated along TH 210. The TH 210 left turn phases operate under protected phasing only; the minor street approaches only operate under permissive phasing.

As part of the signal replacement, the new signal system is to remain vehicle actuated and coordinated along TH 210. Both major TH 210 approaches will include Flashing Yellow Arrow (FYA) which provides the flexibility of running both protected and permissive phasing by time-of-day schedules and improves the overall safety of the intersection. The minor street approaches will remain under permissive phasing.

RECOMMENDATION

Based on the analysis included in this report, and as part of the larger TH 210 corridor study, it is recommended to retain traffic signal control at the intersection of TH 210 and 13th Street/Gillis Avenue.

Traffic signal control is currently warranted at the intersection and traffic operations are acceptable in both the existing conditions and future forecast year. The improvements at the existing intersection will continue to provide a safe intersection for all users.

Roundabout and all-way stop control was not considered feasible at this intersection due to potential right-of-way constraints and impacts, and the impact to the coordinated signal system that provides positive vehicle progression along TH 210.

Attachment 1: Turning Movement Data
Attachment 2: Crash Data
Attachment 3: Warrant Analysis

cc: Luke Wehseler, PE MnDOT District 3
Zachary Whitley, PE MnDOT District 3

File Name: TH 210 AND 13TH STREET
Start Date: 10/14/2019
Start Time: 6:00:00 AM
Site Code:
Comment 1:
Comment 2:
Comment 3:
Comment 4: TURN MOVEMENT COUNT

	Gillis Avenue Southbound				TH 210 Westbound				13th Street Northbound				TH 210 Eastbound			
Start Time	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds
06:00 AM	0	4	0	0	17	54	0	0	5	0	20	0	1	52	4	0
06:15 AM	0	2	0	0	19	81	0	0	7	0	29	0	0	62	3	0
06:30 AM	1	3	1	1	38	109	0	1	7	0	30	0	0	86	11	0
06:45 AM	0	0	0	0	33	131	0	0	15	1	33	0	0	109	7	0
07:00 AM	0	2	4	1	23	145	1	0	9	0	34	0	0	85	4	0
07:15 AM	1	8	2	0	45	189	0	1	17	1	48	0	2	112	7	0
07:30 AM	1	5	8	0	49	261	1	1	36	0	57	1	0	165	16	0
07:45 AM	1	6	6	0	45	269	3	1	28	2	53	0	5	153	20	0
08:00 AM	0	6	7	0	40	218	4	1	13	0	40	0	0	148	18	0
08:15 AM	1	2	4	0	39	177	4	0	19	1	51	0	1	147	14	0
08:30 AM	0	0	5	0	31	175	1	0	20	0	33	0	0	122	10	0
08:45 AM	0	3	3	0	33	167	2	0	9	3	36	0	0	96	8	0
09:00 AM	1	1	3	0	22	133	0	0	9	0	27	0	2	117	8	0
09:15 AM	0	4	0	0	21	171	0	0	11	1	30	0	3	116	15	0
09:30 AM	0	2	3	0	24	162	0	0	9	1	32	0	2	140	8	0
09:45 AM	0	5	2	1	26	175	1	1	11	2	29	0	0	123	9	0
10:00 AM	0	1	3	0	15	180	2	1	8	1	43	0	1	140	7	0
10:15 AM	0	2	4	0	27	175	1	2	18	2	37	0	0	166	15	0
10:30 AM	0	5	2	0	28	184	1	0	18	3	37	0	1	119	9	0
10:45 AM	0	1	3	0	19	160	0	1	14	1	34	2	3	126	11	0
11:00 AM	1	4	2	1	31	165	0	0	16	1	40	2	2	163	5	0
11:15 AM	1	3	3	0	31	171	1	1	17	2	25	0	2	142	13	0
11:30 AM	0	4	4	0	34	164	0	0	14	2	29	0	3	167	13	0
11:45 AM	2	0	5	0	33	124	1	0	16	2	32	0	6	131	8	0
12:00 PM	0	2	5	0	36	207	1	0	13	5	47	2	7	221	16	0
12:15 PM	1	6	5	1	34	205	1	0	23	0	49	2	3	206	8	0
12:30 PM	1	5	5	1	45	228	2	1	19	1	49	0	4	174	9	0
12:45 PM	1	1	4	0	42	192	1	1	16	6	43	0	4	202	14	0
01:00 PM	1	3	10	1	29	205	0	1	15	2	40	0	6	206	14	0
01:15 PM	1	2	4	0	29	199	1	0	13	2	32	0	5	195	11	0
01:30 PM	0	6	2	0	32	154	0	0	13	0	34	0	6	178	5	0
01:45 PM	2	0	6	0	38	188	0	0	14	1	42	0	6	172	17	0
02:00 PM	0	2	4	0	30	193	3	0	18	2	50	0	1	217	13	0
02:15 PM	2	4	1	0	36	189	4	1	21	3	43	0	4	224	16	0
02:30 PM	1	3	10	0	38	201	0	0	18	3	55	1	4	253	17	0
02:45 PM	1	7	7	1	48	193	0	2	23	2	63	1	5	201	15	0
03:00 PM	2	8	5	0	38	239	0	0	18	3	45	0	2	252	17	0
03:15 PM	1	4	1	0	35	193	0	0	28	1	43	0	4	257	16	0
03:30 PM	0	1	1	1	48	262	0	1	24	3	50	0	3	268	12	0
03:45 PM	1	3	1	0	39	185	0	0	26	2	53	0	3	240	17	0
04:00 PM	4	3	5	0	49	218	3	0	16	3	54	0	1	261	19	0
04:15 PM	1	4	6	0	41	204	4	0	20	0	67	1	4	202	13	0
04:30 PM	1	5	4	0	44	180	0	1	21	6	66	0	2	269	17	0
04:45 PM	0	3	5	0	58	196	1	0	12	2	56	0	0	236	21	0
05:00 PM	3	3	3	0	45	233	0	0	28	1	66	0	4	243	22	0
05:15 PM	1	4	2	0	64	167	1	0	17	0	57	0	1	210	21	0
05:30 PM	2	3	3	2	52	179	0	0	21	1	52	0	2	200	23	0
05:45 PM	0	0	3	0	39	142	1	0	17	2	39	0	0	137	18	0

Intersection Safety Screening

Intersection: TH 210 at 13th Street-Gillis Avenue

Crash Data: 2014 to 2018 (5-years)

Crashes by Crash Severity	
Fatal	0
Incapacitating Injury	0
Non-incapacitating Injury	2
Possible Injury	11
Property Damage	38
Total Crashes	51

Intersection Characteristics	
Entering Volume	28,160
Traffic Control	Signals
Environment	Urban
Speed Limit	35 mph

Annual crash cost = $308,360

Statewide Comparison

Signals: high volume, low speed

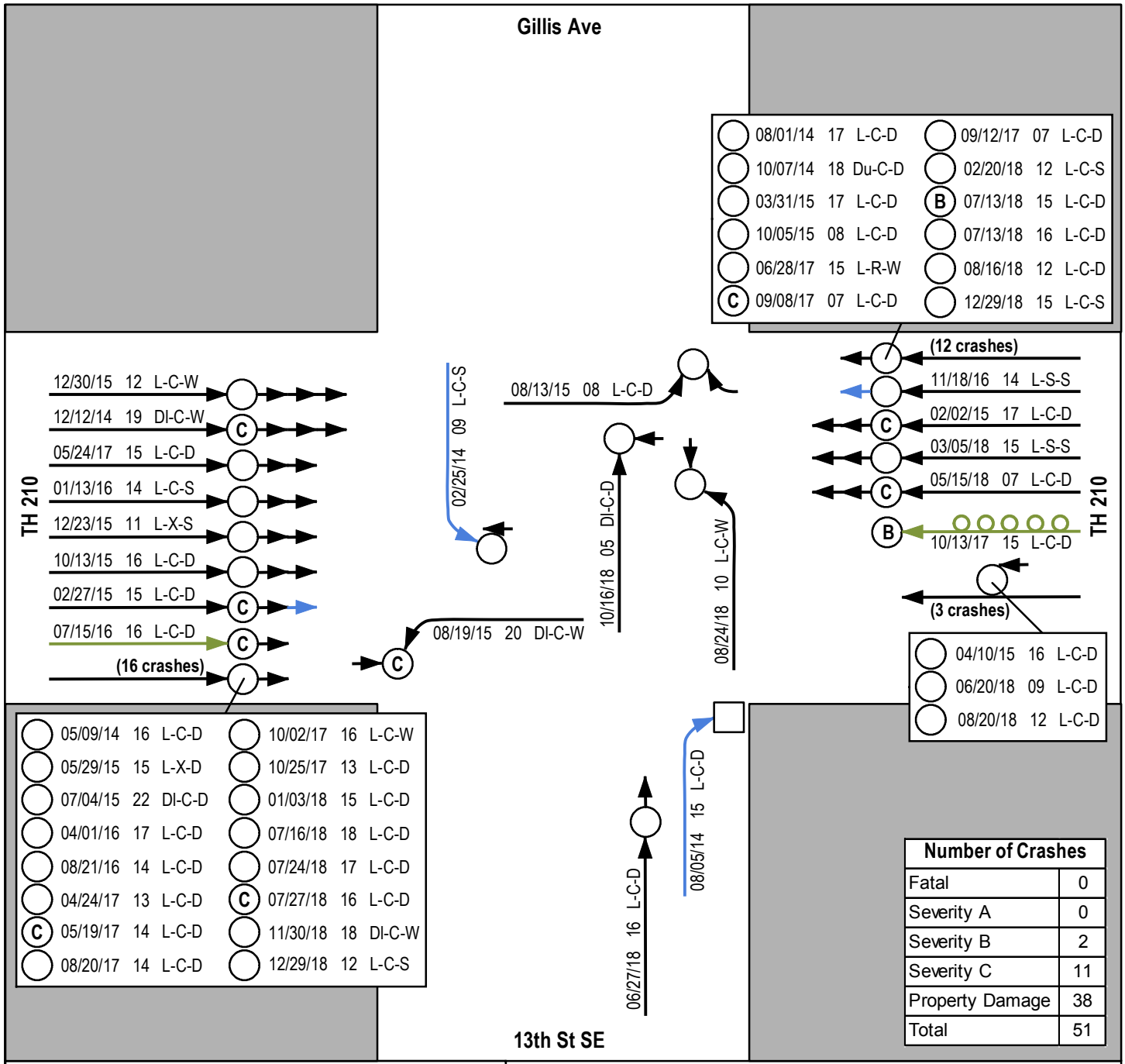
Total Crash Rate	
Observed	0.99
Statewide Average	0.70
Critical Rate	1.01
Critical Index	**0.98**

Fatal & Serious Injury Crash Rate	
Observed	0.00
Statewide Average	0.76
Critical Rate	3.30
Critical Index	**0.00**

The observed crash rate is the number of crashes per million entering vehicles (MEV). The critical rate is a statistical comparison based on similar intersections statewide. An observed crash rate greater than the critical rate indicates that the intersection operates outside the expected, normal range. The critical index reports the magnitude of this difference.

The observed total crash rate for this period is 0.99 per MEV; this is 2% below the critical rate. Based on similar statewide intersections, an additional 1 crashes over the five years would indicate this intersection operaters outside the normal range.

The observed fatal and serious injury crash rate for this period is 0.00 per 100 MEV; this is 100% below the critical rate. The intersection operates within the normal range.



Number of Crashes	
Fatal	0
Severity A	0
Severity B	2
Severity C	11
Property Damage	38
Total	51

Passenger Vehicle
Heavy Vehicle
Bus
Motorcycle
Fixed Object
Pedestrian
Bicycle

Fatal
Severity A
Severity B
Severity C
Property Damage Only
Vehicle Out of Control

Light
L = Daylight
Dn = Dawn
Du = Dusk
Dl = Dark, Lighted
Do = Dark, Lights Off
D = Dark, Unlighted
X = Unkown

Weather
C = Clear or Cloudy
R = Rain
S = Snow/Sleet/Hail/Freexing Rain
F = Fog/Smog/Smoke
B = Blowing Sand/Dust/Snow
W = Severe Cross Winds
X = Other or Unknown

Surface
D = Dry
W = Wet or Water
S = Snow/Slush/Ice
M = Muddy
Db = Debris
O = Oily
X = Other or Unkown

Date Time(Hr) Light-Weather-Surface → Injury Type → Other Vehicle(s)

Notes:

Project: MNT03 152201
Print Date: 3/2/2020

Map by: jdanibas
Projection:
Source:

Crash Diagrams (2014-2018)
TH 210 at Gillis Ave/13th St SE
TH 210/Washington Street Corridor Study
Brainerd, MN

Figure A7

Path: C:\Traffic Projects\Brainerd- TH 210\Crashes\Crash Diagrams\A7_TH 210 at 13th St SE_Crash Diagram.mxd

2019 Existing - TH 210 at 13th St SE/Gillis Ave
SIGNAL WARRANT
ANALYSIS

LOCATION: TH 210 at 13th St SE/Gillis Ave
COUNTY: Crow Wing
REF. POINT: 0
DATE: 3/12/2020
OPERATOR: JDA

85th% Speed	Approach Description		Lanes	Approach
35	Major App1:	TH 210 EB	4	8940
35	Major App3:	TH 210 WB	3	10450
30	Minor App2:	13th St SE NB	1	877
30	Minor App4:	Gillis Ave SB	1	192

40 MPH OR FASTER?	NO
POPULATION < 10,000?	NO
VOLUME REQ. AT 70%?	**NO**
CORRECTABLE CRASHES: (12-month period)	0

	Minimum Volume Requirement		
	1A	1B	1A&B (80%)
Major Total	600	900	720
Minor Approach	150	75	120

HOUR	MAJOR APP. 1	MAJOR APP. 3	MINOR APP. 2	MINOR APP. 4	MAJOR APPROACH TOTAL Σ (APP.1 + APP. 3)	MAX MINOR APPROACH (APP. 2 or 4)	WARRANT 1A - 8 hr MAJOR/MINOR	WARRANT 1B - 8 hr MAJOR/MINOR	WARRANT 1A & B MAJOR/MINOR
0:00 - 1:00	0	0	0	0	0	0	NO / NO	NO / NO	NO / NO
1:00 - 2:00	0	0	0	0	0	0	NO / NO	NO / NO	NO / NO
2:00 - 3:00	0	0	0	0	0	0	NO / NO	NO / NO	NO / NO
3:00 - 4:00	0	0	0	0	0	0	NO / NO	NO / NO	NO / NO
4:00 - 5:00	0	0	0	0	0	0	NO / NO	NO / NO	NO / NO
5:00 - 6:00	0	0	0	0	0	0	NO / NO	NO / NO	NO / NO
6:00 - 7:00	335	482	35	10	817	35	YES / NO	NO / NO	YES / NO
7:00 - 8:00	569	1031	93	24	1600	93	YES / NO	**YES / YES**	YES / NO
8:00 - 9:00	564	891	65	12	1455	65	YES / NO	YES / NO	YES / NO
9:00 - 10:00	543	735	44	13	1278	44	YES / NO	YES / NO	YES / NO
10:00 - 11:00	598	792	65	9	1390	65	YES / NO	YES / NO	YES / NO
11:00 - 12:00	655	755	70	15	1410	70	YES / NO	YES / NO	YES / NO
12:00 - 13:00	868	994	83	17	1862	83	YES / NO	**YES / YES**	YES / NO
13:00 - 14:00	821	875	60	15	1696	60	YES / NO	YES / NO	YES / NO
14:00 - 15:00	970	935	90	20	1905	90	YES / NO	**YES / YES**	YES / NO
15:00 - 16:00	1091	1039	105	20	2130	105	YES / NO	**YES / YES**	YES / NO
16:00 - 17:00	1045	998	80	21	2043	80	YES / NO	**YES / YES**	YES / NO
17:00 - 18:00	881	923	87	16	1804	87	YES / NO	**YES / YES**	YES / NO
18:00 - 19:00	0	0	0	0	0	0	NO / NO	NO / NO	NO / NO
19:00 - 20:00	0	0	0	0	0	0	NO / NO	NO / NO	NO / NO
20:00 - 21:00	0	0	0	0	0	0	NO / NO	NO / NO	NO / NO
21:00 - 22:00	0	0	0	0	0	0	NO / NO	NO / NO	NO / NO
22:00 - 23:00	0	0	0	0	0	0	NO / NO	NO / NO	NO / NO
23:00 - 24:00	0	0	0	0	0	0	NO / NO	NO / NO	NO / NO
Daily	**8940**	**10450**	**877**	**192**					

		Met (Hr)	Required (Hr)	WARRANT MET:
Warrant 1	**Eight Hour Volumes**	6	8	Not satisfied
Warrant 1A	Minimum Vehicular Volume	0	8	Not satisfied
Warrant 1B	Interruption of Continuous Flow	6	8	Not satisfied
1A & 1B	Combination of Warrants	0	8	Not satisfied
Warrant 2	**Four Hour Volumes**	**5**	4	**Satisfied**
Warrant 3	**Peak Hour Volumes**	**5**	1	**Satisfied**
Warrant 7	**Crash Experience**	**10**	8	Crashes Insufficient

COMMENTS:

2019 Existing - TH 210 at 13th St SE/Gillis Ave
SIGNAL WARRANT
ANALYSIS

LOCATION: TH 210 at 13th St SE/Gillis Ave
COUNTY: Crow Wing
REF. POINT: 0
DATE: 3/12/2020

OPERATOR: JDA

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POPULATION < 10,000?	NO
VOLUME REQ. AT 70%?	**NO**

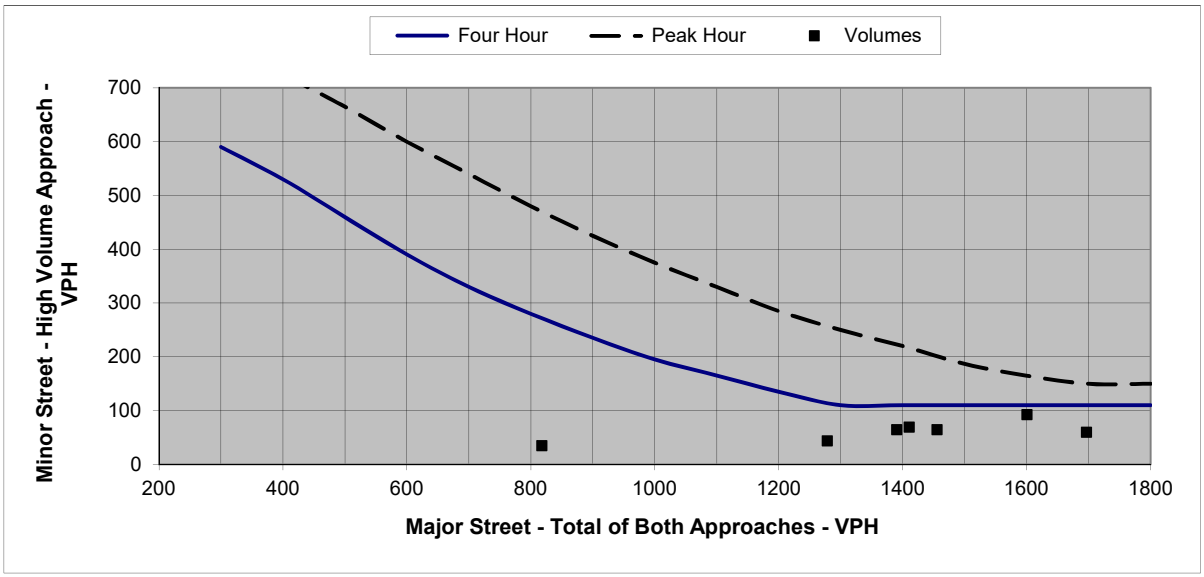

Figure 1. Four Hour and Peak Hour Warrant Analysis

Note: For data points outside the graph range, check the minor street volume against the lower thresholds

Warrant Criteria (Graph)		
Major Approach	Minor App. Four Hour	Minor App. Peak Hour
200		
300	590	
400	530	725
500	460	665
600	390	600
700	330	540
800	280	480
900	235	425
1000	195	375
1100	165	330
1200	135	285
1300	110	250
1400	110	220
1500	110	187
1600	110	165
1700	110	150
1800	110	150

Actual Hourly Count			Warrants Met:	
			Warrant 2	Warrant 3
HOUR	Sum Major App.	Max Minor App.	Four Hour	Peak Hour
0:00 - 1:00	0	0	NO	NO
1:00 - 2:00	0	0	NO	NO
2:00 - 3:00	0	0	NO	NO
3:00 - 4:00	0	0	NO	NO
4:00 - 5:00	0	0	NO	NO
5:00 - 6:00	0	0	NO	NO
6:00 - 7:00	817	35	NO	NO
7:00 - 8:00	1600	93	NO	NO
8:00 - 9:00	1455	65	NO	NO
9:00 - 10:00	1278	44	NO	NO
10:00 - 11:00	1390	65	NO	NO
11:00 - 12:00	1410	70	NO	NO
12:00 - 13:00	1862	83	**YES**	**YES**
13:00 - 14:00	1696	60	NO	NO
14:00 - 15:00	1905	90	**YES**	**YES**
15:00 - 16:00	2130	105	**YES**	**YES**
16:00 - 17:00	2043	80	**YES**	**YES**
17:00 - 18:00	1804	87	**YES**	**YES**
18:00 - 19:00	0	0	NO	NO
19:00 - 20:00	0	0	NO	NO
20:00 - 21:00	0	0	NO	NO
21:00 - 22:00	0	0	NO	NO
22:00 - 23:00	0	0	NO	NO
23:00 - 24:00	0	0	NO	NO

SHORT ELLIOTT HENDRICKSON INC.

10901 Red Circle Drive, Suite 200
Minnetonka, MN 55343

2019 Existing - TH 210 at 13th St SE/Gillis Ave
SIGNAL WARRANT
ANALYSIS

Volume Threshold Reduced to 80% of Full Volume Warrant Thresholds

LOCATION: TH 210 at 13th St SE/Gillis Ave
COUNTY: Crow Wing
REF. POINT: 0
DATE: 3/12/2020
OPERATOR: JDA

85th% Speed	Approach Description		Lanes	Approach
35	Major App1:	TH 210 EB	4	8940
35	Major App3:	TH 210 WB	3	10450
30	Minor App2:	13th St SE NB	1	877
30	Minor App4:	Gillis Ave SB	1	192

40 MPH OR FASTER?	NO
POPULATION < 10,000?	NO
VOLUME REQ. AT 70%?	**NO**
CORRECTABLE CRASHES: (12-month period)	0

	80%		
	Minimum Volume Requirement		
	1A	1B	1A&B (80%)
Major Total	480	720	576
Minor Approach	120	60	96

HOUR	MAJOR APP. 1	MAJOR APP. 3	MINOR APP. 2	MINOR APP. 4	MAJOR APPROACH TOTAL Σ (APP.1 + APP. 3)	MAX MINOR APPROACH (APP. 2 or 4)	WARRANT 1A - 8 hr MAJOR/MINOR	WARRANT 1B - 8 hr MAJOR/MINOR	WARRANT 1A & B MAJOR/MINOR
0:00 - 1:00	0	0	0	0	0	0	NO / NO	NO / NO	NO / NO
1:00 - 2:00	0	0	0	0	0	0	NO / NO	NO / NO	NO / NO
2:00 - 3:00	0	0	0	0	0	0	NO / NO	NO / NO	NO / NO
3:00 - 4:00	0	0	0	0	0	0	NO / NO	NO / NO	NO / NO
4:00 - 5:00	0	0	0	0	0	0	NO / NO	NO / NO	NO / NO
5:00 - 6:00	0	0	0	0	0	0	NO / NO	NO / NO	NO / NO
6:00 - 7:00	335	482	35	10	817	35	YES / NO	YES / NO	YES / NO
7:00 - 8:00	569	1031	93	24	1600	93	YES / NO	**YES / YES**	YES / NO
8:00 - 9:00	564	891	65	12	1455	65	YES / NO	**YES / YES**	YES / NO
9:00 - 10:00	543	735	44	13	1278	44	YES / NO	YES / NO	YES / NO
10:00 - 11:00	598	792	65	9	1390	65	YES / NO	**YES / YES**	YES / NO
11:00 - 12:00	655	755	70	15	1410	70	YES / NO	**YES / YES**	YES / NO
12:00 - 13:00	868	994	83	17	1862	83	YES / NO	**YES / YES**	YES / NO
13:00 - 14:00	821	875	60	15	1696	60	YES / NO	**YES / YES**	YES / NO
14:00 - 15:00	970	935	90	20	1905	90	YES / NO	**YES / YES**	YES / NO
15:00 - 16:00	1091	1039	105	20	2130	105	YES / NO	**YES / YES**	**YES / YES**
16:00 - 17:00	1045	998	80	21	2043	80	YES / NO	**YES / YES**	YES / NO
17:00 - 18:00	881	923	87	16	1804	87	YES / NO	**YES / YES**	YES / NO
18:00 - 19:00	0	0	0	0	0	0	NO / NO	NO / NO	NO / NO
19:00 - 20:00	0	0	0	0	0	0	NO / NO	NO / NO	NO / NO
20:00 - 21:00	0	0	0	0	0	0	NO / NO	NO / NO	NO / NO
21:00 - 22:00	0	0	0	0	0	0	NO / NO	NO / NO	NO / NO
22:00 - 23:00	0	0	0	0	0	0	NO / NO	NO / NO	NO / NO
23:00 - 24:00	0	0	0	0	0	0	NO / NO	NO / NO	NO / NO
Daily	**8940**	**10450**	**877**	**192**					

		Met (Hr)	Required (Hr)	WARRANT MET:
Warrant 1	**Eight Hour Volumes**	**10**	8	**Satisfied**
Warrant 1A	Minimum Vehicular Volume	0	8	Not satisfied
Warrant 1B	Interruption of Continuous Flow	**10**	8	**Satisfied**
1A & 1B	Combination of Warrants	1	8	Not satisfied

COMMENTS:

2045 Future - TH 210 at 13th St SE/Gillis Ave
SIGNAL WARRANT
ANALYSIS

LOCATION: TH 210 at 13th St SE/Gillis Ave
COUNTY: Crow Wing
REF. POINT: 0
DATE: 3/12/2020
OPERATOR: JDA

85th% Speed	Approach Description		Lanes	Approach
35	Major App1:	TH 210 EB	4	10103
35	Major App3:	TH 210 WB	3	11806
30	Minor App2:	13th St SE NB	1	995
30	Minor App4:	Gillis Ave SB	1	220

40 MPH OR FASTER?	NO
POPULATION < 10,000?	NO
VOLUME REQ. AT 70%?	**NO**
CORRECTABLE CRASHES: (12-month period)	0

	Minimum Volume Requirement		
	1A	1B	1A&B (80%)
Major Total	600	900	720
Minor Approach	150	75	120

HOUR	MAJOR APP. 1	MAJOR APP. 3	MINOR APP. 2	MINOR APP. 4	MAJOR APPROACH TOTAL Σ (APP.1 + APP. 3)	MAX MINOR APPROACH (APP. 2 or 4)	WARRANT 1A - 8 hr MAJOR/MINOR	WARRANT 1B - 8 hr MAJOR/MINOR	WARRANT 1A & B MAJOR/MINOR
0:00 - 1:00	0	0	0	0	0	0	NO / NO	NO / NO	NO / NO
1:00 - 2:00	0	0	0	0	0	0	NO / NO	NO / NO	NO / NO
2:00 - 3:00	0	0	0	0	0	0	NO / NO	NO / NO	NO / NO
3:00 - 4:00	0	0	0	0	0	0	NO / NO	NO / NO	NO / NO
4:00 - 5:00	0	0	0	0	0	0	NO / NO	NO / NO	NO / NO
5:00 - 6:00	0	0	0	0	0	0	NO / NO	NO / NO	NO / NO
6:00 - 7:00	378	544	40	12	922	40	YES / NO	YES / NO	YES / NO
7:00 - 8:00	644	1164	105	27	1808	105	YES / NO	**YES / YES**	YES / NO
8:00 - 9:00	638	1007	75	13	1645	75	YES / NO	**YES / YES**	YES / NO
9:00 - 10:00	614	830	50	15	1444	50	YES / NO	YES / NO	YES / NO
10:00 - 11:00	676	895	74	10	1571	74	YES / NO	YES / NO	YES / NO
11:00 - 12:00	740	853	78	18	1593	78	YES / NO	**YES / YES**	YES / NO
12:00 - 13:00	981	1124	94	19	2105	94	YES / NO	**YES / YES**	YES / NO
13:00 - 14:00	927	988	68	17	1915	68	YES / NO	YES / NO	YES / NO
14:00 - 15:00	1097	1056	102	23	2153	102	YES / NO	**YES / YES**	YES / NO
15:00 - 16:00	1233	1174	120	23	2407	120	YES / NO	**YES / YES**	**YES / YES**
16:00 - 17:00	1180	1127	91	24	2307	91	YES / NO	**YES / YES**	YES / NO
17:00 - 18:00	995	1044	98	19	2039	98	YES / NO	**YES / YES**	YES / NO
18:00 - 19:00	0	0	0	0	0	0	NO / NO	NO / NO	NO / NO
19:00 - 20:00	0	0	0	0	0	0	NO / NO	NO / NO	NO / NO
20:00 - 21:00	0	0	0	0	0	0	NO / NO	NO / NO	NO / NO
21:00 - 22:00	0	0	0	0	0	0	NO / NO	NO / NO	NO / NO
22:00 - 23:00	0	0	0	0	0	0	NO / NO	NO / NO	NO / NO
23:00 - 24:00	0	0	0	0	0	0	NO / NO	NO / NO	NO / NO
Daily	**10103**	**11806**	**995**	**220**					

		Met (Hr)	Required (Hr)	WARRANT MET:
Warrant 1	**Eight Hour Volumes**	**8**	8	**Satisfied**
Warrant 1A	Minimum Vehicular Volume	0	8	Not satisfied
Warrant 1B	Interruption of Continuous Flow	**8**	8	**Satisfied**
1A & 1B	Combination of Warrants	1	8	Not satisfied
Warrant 2	**Four Hour Volumes**	**7**	4	**Satisfied**
Warrant 3	**Peak Hour Volumes**	**6**	1	**Satisfied**
Warrant 7	**Crash Experience**	**10**	8	Crashes Insufficient

COMMENTS:

2045 Future - TH 210 at 13th St SE/Gillis Ave
SIGNAL WARRANT
ANALYSIS

LOCATION: TH 210 at 13th St SE/Gillis Ave
COUNTY: Crow Wing
REF. POINT: 0
DATE: 3/12/2020

OPERATOR: JDA

85th% Speed	Approach Description		Lanes	Approach
35	Major App1:	TH 210 EB	4	10103
35	Major App3:	TH 210 WB	3	11806
30	Minor App2:	13th St SE NB	1	995
30	Minor App4:	Gillis Ave SB	1	220

40 MPH OR FASTER?	NO
POPULATION < 10,000?	NO
VOLUME REQ. AT 70%?	**NO**

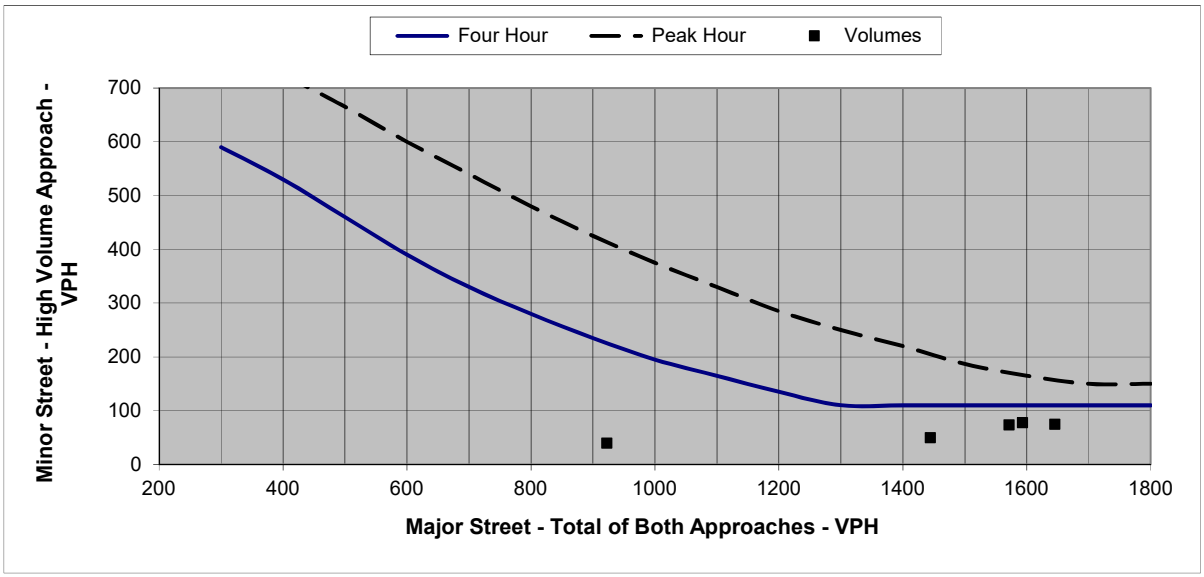

Figure 1. Four Hour and Peak Hour Warrant Analysis

Note: For data points outside the graph range, check the minor street volume against the lower thresholds

Warrant Criteria (Graph)		
Major Approach	Minor App. Four Hour	Minor App. Peak Hour
200		
300	590	
400	530	725
500	460	665
600	390	600
700	330	540
800	280	480
900	235	425
1000	195	375
1100	165	330
1200	135	285
1300	110	250
1400	110	220
1500	110	187
1600	110	165
1700	110	150
1800	110	150

Actual Hourly Count			Warrants Met:	
			Warrant 2	Warrant 3
HOUR	Sum Major App.	Max Minor App.	Four Hour	Peak Hour
0:00 - 1:00	0	0	NO	NO
1:00 - 2:00	0	0	NO	NO
2:00 - 3:00	0	0	NO	NO
3:00 - 4:00	0	0	NO	NO
4:00 - 5:00	0	0	NO	NO
5:00 - 6:00	0	0	NO	NO
6:00 - 7:00	922	40	NO	NO
7:00 - 8:00	1808	105	**YES**	**YES**
8:00 - 9:00	1645	75	NO	NO
9:00 - 10:00	1444	50	NO	NO
10:00 - 11:00	1571	74	NO	NO
11:00 - 12:00	1593	78	NO	NO
12:00 - 13:00	2105	94	**YES**	**YES**
13:00 - 14:00	1915	68	**YES**	NO
14:00 - 15:00	2153	102	**YES**	**YES**
15:00 - 16:00	2407	120	**YES**	**YES**
16:00 - 17:00	2307	91	**YES**	**YES**
17:00 - 18:00	2039	98	**YES**	**YES**
18:00 - 19:00	0	0	NO	NO
19:00 - 20:00	0	0	NO	NO
20:00 - 21:00	0	0	NO	NO
21:00 - 22:00	0	0	NO	NO
22:00 - 23:00	0	0	NO	NO
23:00 - 24:00	0	0	NO	NO

Intersection Control Evaluation Report

TH 210 (Washington Street) - 4th Avenue NE to 10th Avenue NE

MNT03 152201
S.P. No. 1805-80 |

Brainerd, Minnesota | August 9, 2022

Intersection Control Evaluation Report

TH 210 (Washington Street) - 4th Avenue NE to 10th Avenue NE
Brainerd, Minnesota

S.P. No. 1805-80
SEH No. MNT03 152201

August 9, 2022

I hereby certify that this report was prepared by me or under my direct supervision, and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.

_____

Graham Johnson, PE (MN), PTOE

Date: _____ License No.: 45429

Approved By:

_____

MnDOT District 3 Traffic Engineer Date

_____

Crow Wing County Engineer Date

_____

City of Brainerd Engineer Date

Short Elliott Hendrickson Inc.
10400 Yellow Circle Drive, Suite 500
Minnetonka, MN 55343-9302
952.912.2600

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Intersection Control Evaluation Report

TH 210 (Washington Street) - 4th Avenue NE to 10th Avenue NE

Prepared by Short Elliott Hendrickson, Inc. for the Minnesota Department of Transportation (MnDOT) District 3, in cooperation with Crow Wing County and the City of Brainerd.

1 Background and Description

Trunk Highway (TH) 210, also known as Washington Street, is an east-west principal arterial roadway through the City of Brainerd. TH 210 spans across north-central Minnesota and within the project area has daily traffic volumes ranging from 11,800 to 32,500 vehicles per day (vpd).

MnDOT is conducting a corridor planning study along a 3.9-mile segment of TH 210 to identify the future vision for the corridor through Brainerd. Reconstruction of TH 210 between Baxter Drive and Pine Shores Road is anticipated to begin in 2025.

The primary purpose of the corridor study is to better understand the community issues, needs and use of the roadway, assess improvement options, select a preferred alternative, and prepare a geometric layout. The focus of the future improvements is to improve pavement conditions and travel safety, accommodate ADA requirements, and enhance pedestrian and bicyclist accommodations.

This Intersection Control Evaluation (ICE) Report emphasizes the evaluated and proposed improvements along TH 210 between 4th Avenue NE and 10th Avenue NE. The existing conditions, future No Build conditions, and future Build conditions were previously documented for the entire corridor; for more detailed information, see the *Existing and 2045 No Build Conditions Report – TH 210/Washington Street Corridor Study* and the *TH 210 Build Conditions Report*.

The ICE study intersections include multiple MnDOT State Aid routes for both the County and City; County State Aid Highway (CSAH) 3 is the main study intersection with TH 210, and three of the adjacent study intersections are Municipal State Aid Streets (MSAS).

1.1 Overview

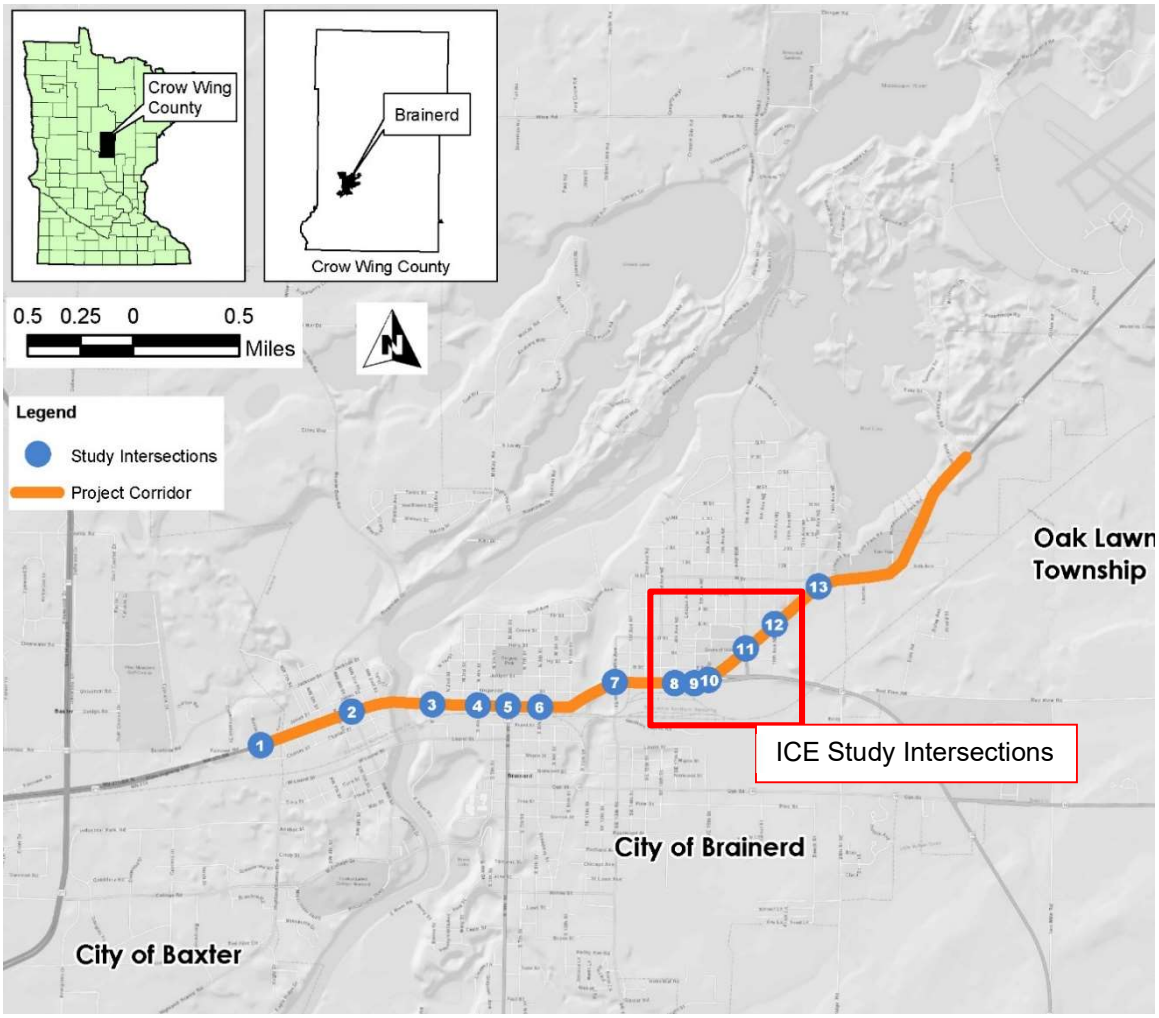
The primary purpose of this report is to determine the optimal alternative and intersection control needed for the study intersections along TH 210 from 4th Avenue NE to 10th Avenue NE.

- TH 210 at 4th Avenue NE (MSAS 118) (traffic signal control)
- TH 210 at 5th Avenue NE (MSAS 141) (3/4-access)
- TH 210 at TH 25 Connections (EB ramp & closed intersection)
- TH 210 at East Brainerd Mall Access (WB Right-in/Right-Out)
- TH 210 at 8th Avenue NE (CSAH 3) (traffic signal control)
- TH 210 at 10th Avenue NE (MSAS 115) (minor stop control)

The MnDOT Intersection Control Evaluation (ICE) is an objective process used to investigate and determine the optimal type of traffic control that should be provided at each intersection to serve the existing conditions and future needs. The investigation includes analyzing traffic operations during the AM and PM peak hours for the existing year (2019) and forecast year (2045) traffic conditions; in addition, a Friday and Summer peak hour were evaluated. The evaluations include assessing traffic control volume warrants, intersection and roadway safety, and traffic operations.

Figure 1 depicts the corridor study intersections and reconstruction area in a location map; the intersections included in this evaluation are highlighted.

Figure 1 – Corridor Study Project Location



Due to the proximity to the East Brainerd Mall on the north side of TH 210, this study area has been named the **East Mall Area**.

2 Existing Conditions

TH 210 is a major east-west principal arterial through the City of Brainerd that connects near-by cities and regional commerce. TH 210 is generally a 4-lane divided roadway through the City of Brainerd. The posted speed limit is 35 miles-per-hour (mph) west of 5th Avenue NE and 45 mph east of 5th Avenue NE.

4th Avenue NE (MSAS 118) is a minor collector providing access to residential land uses north of TH 210. The TH 210 intersection is currently controlled by a traffic signal, with access to the rail yard property to the south.

5th Avenue NE (MSAS 141) is a local roadway providing access to residential land uses to the north as well as to the commercial land uses, including the East Brainerd Mall area. The existing TH 210 intersection is a ¾-access control; minor street can only make a right turn.

8th Avenue NE (CSAH 3) is a minor arterial north of TH 210 providing access to residential land uses along the corridor as well as a regional connection to communities north of the city. The TH 210 intersection is currently controlled by a traffic signal.

TH 25 is a minor arterial providing regional connections to the south and east. The existing connections have been modified in recent years. Currently, eastbound TH 210 has a direct ramp connection to TH 25; all other connections occur at the 8th Avenue NE connection to TH 210.

10th Avenue NE (MSAS 115) major collector between TH 210 and TH 25, and a local roadway north of TH 210. The TH 210 intersection is currently a full access, minor stop control with TH 210 unrestricted.

In addition to the five main study intersections, the East Brainerd Mall has a right-in/right-out (RI/RO) access along westbound TH 210 that was included in the analysis.

2.1 Crash History

Crash data from January 1, 2014 through December 31, 2018 was provided by MnDOT. The type and severity of crashes were reviewed, and crash rates were calculated for each study intersection. There was a total of 75 crashes over the 5 years analyzed at the 5 intersections along TH 210.

The crash rate at each intersection is expressed as a number of crashes per million entering vehicles (MEV). The critical crash rate is a statistical value that is unique to each intersection and is based on vehicular exposure and the statewide average crash rate for similar intersections. An intersection with a crash rate higher than the critical rate can indicate a safety concern at the intersection and the site should be further reviewed.

Crash severity is separated into five categories based on injuries sustained during the crash.

- Fatal – Crash that results in a death
- Severity A – Crash that results in an incapacitating injury or serious injury
- Severity B – Crash that results in a non-incapacitating injury or minor injury
- Severity C – Crash that results in possible injury
- Property Damage – Crash that results in property damage only; with no injuries

Table 1 presents the 5-year crash history; no intersection in the East Mall Area is above the critical rate; however, two are within 15% of the critical rate. **Appendix A** includes additional crash details.

Table 1 – Intersection Crash History (2014-2018)

TH 210 at:	Crash Severity					Crash Rates	
	Fatal & Severity A	Severity B	Severity C	Property Damage	Total Crashes	Int. Rate	Critical Rate
4th Ave NE	0	1	1	20	22	0.47	1.02
5th Ave NE	0	0	2	5	7	0.15	0.32
TH 25 Exit Ramp	0	0	0	2	2	0.06	0.34
TH 25 Entrance Ramp*	1	1	2	8	12	0.36	0.39
8th Ave NE	0	0	8	20	28	0.74	0.75
10th Ave NE	1	0	0	3	4	0.17	0.54
TOTAL	**2**	**2**	**13**	**58**	**75**	n/a	n/a

Note: *Intersection currently closed (2018).

Above Critical Rate

Within 15% of Critical Rate

The following trends are evident from each of the main study intersections along TH 210

- TH 210 at 4th Ave NE (Traffic Signal)
  - 15 of the 22 crashes at this intersection were rear end crashes, likely the result of backups at the intersection, 8 of the rear ends were in the eastbound direction, 6 were in the westbound direction, and 1 crash occurred in the southbound direction, which indicates backups may be similar between the eastbound and westbound direction.
  - There was one bicycle crash at this intersection; a southbound right turning vehicle looking for a gap in traffic did not see a bicycle on the north leg of the intersection (Severity C crash).
- TH 210 at 5th Ave NE (Minor Street Stop)
  - 4 of the 7 crashes at this intersection were right angle/left turn crashes, a majority of which are the result of eastbound left turning vehicles failing to yield to westbound vehicles.
- TH 210 at TH 25 Eastbound Ramp Connection (Exit Ramp)
  - With only 2 crashes over the 5-year analysis period no crash patterns could be identified at this intersection.
- TH 210 at TH 25 Entrance Ramp (Minor Street Stop) – Removed in 2018
  - 7 of the 12 crashes were right angle crashes, a majority of which involved vehicles taking a left off TH 25 failing to yield to TH 210 traffic.
  - 1 Severity A: northbound left turning vehicle failed to yield to an eastbound vehicle.
  - The TH 25 approach to TH 210 was closed in 2018 and westbound TH 25 traffic is now routed through the 8th Avenue NE intersection (approximately 850 feet east), therefore, any safety concerns for this intersection have been removed.

- TH 210 at 8th Ave NE (Traffic Signal)
  - 22 of the 28 crashes at this intersection were rear end crashes, likely the result of backups at the intersection. 10 of the rear ends were in the westbound direction, 7 were in the eastbound direction, 1 northbound and 4 southbound. The crash data indicates that backups are similar between the eastbound and westbound direction.
- TH 210 at 10th Ave NE (Minor Street Stop)
  - All 4 crashes at this intersection were right angle crashes (one of which resulted in a severity A injury), a majority of which were the result of northbound or southbound vehicles turning onto or crossing TH 210 failing to yield to TH 210 vehicles.
  - 1 Severity A: northbound through vehicle failed to yield to an eastbound vehicle.

2.2 Existing Traffic Volumes

MnDOT's Traffic Mapping Application (https://www.dot.state.mn.us/traffic/data/tma.html) was utilized to collect both the most recent and historical Average Annual Daily Traffic (AADT) information for the study area; MnDOT coordinated with all Cities and Counties to keep their roadway information current.

The most current "official" AADT's in the study area are from 2019 along the study roadways; the following **Table 2** presents the current AADT's from the MnDOT application.

Table 2 – 2019 Existing AADTs

Roadway	Description	Year	AADT
TH 210	13th St SE to 4th Ave NE	2019	25,500
	4th Ave NE to TH 25 Exit Ramp	2019	23,600
	TH 25 Exit Ramp to 8th Ave NE	2019	17,100
	8th Ave NE to Pine Shores Rd	2019	11,800
4th Ave NE	North of TH 210	2019	1,200
5th Ave NE	North of TH 210	2019	4,300
8th Ave NE	North of TH 210	2019	8,400
	South of TH 210	2019	4,950
10th Ave NE	South of TH 210	2019	1,400

2.2.1 Intersection Volumes

Existing traffic volumes throughout the TH 210 study corridor were collected from different sources including previous projects and studies, as well as new field information. MnDOT provided intersection counts for the East Mall Area intersections that were captured between October and November of 2019.

The existing corridor wide intersection traffic volumes from the 2018 and 2019 traffic counts were balanced along TH 210 to determine the 2019 existing traffic volumes. From the 2019 existing traffic volumes, the AM peak hour was determined to be 7:30 to 8:30 AM and the PM peak hour was 4:30 to 5:30 PM.

Based on historical traffic counts along TH 210, including weekday and weekend counts from other studies, typically Friday afternoon traffic volumes are higher than normal. A review of the historical data suggests the PM peak hour on a Friday was approximately 5% higher than a typical weekday PM peak. The main difference between the Friday peak period and the PM peak period is the sustained volumes along the corridor. The PM peak period on a typical weekday is contained to approximately a 1 ½ hour period of increased traffic along TH 210. In contrast, the Friday count data shows a relatively constant volume between 1 PM through 5 PM.

Summer peak traffic demands were developed using StreetLight data for the study area; the next section will discuss the data and results. Based on the information from StreetLight data, the summer peak traffic demands are approximately a 10% increase in the PM peak hour volumes.

The balanced existing 2019 vehicle turning movement volumes for the AM, PM, Friday, and summer peak hours as well as the existing roadway geometrics can be found in **Appendix B**; the raw traffic counts are also provided.

2.2.2 Vehicle Origin-Destination Study

To better understand the existing travel patterns along the TH 210 corridor, an origin-destination (OD) study was conducted using StreetLight Data. The platform uses location-based service (LBS) information from connected trucks and cell phones.

An OD study was conducted along TH 210 in the project study area, results can be found in the *Technical Memorandum - TH 210 Corridor Study - Origin-Destination Study*. All results of the OD study were incorporated into the micro simulation traffic models.

StreetLight was also used to assess different seasonal variations. Combined spring and fall data were collected and compared to summer data from the platform, the summer months had an approximate 25% increase in daily trips along the corridor.

A 3-hour PM peak period had a total increase of 18% between the two seasonal periods. Based on PMT input, a conservative 10% increase in the PM peak hour data was used to account for a “Summer Peak” hour; the additional 8% increase would then be assumed to occur on the two remaining hours of the 3-hour PM peak period.

In addition, a small OD study was conducted for the existing 5th Avenue NE traffic volumes. The analysis resulted in the following:

- From TH 210: Approximately 63% of vehicles from TH 210 enter the East Brainerd Mall commercial area via B Street, C Street, or D Street.
- To TH 210: approximately 59% of the vehicles entering westbound TH 210 are from the commercial area via B Street, C Street, or D Street.
- Approximately 8% of the vehicles on 5th Avenue NE connect to 8th Avenue NE (CSAH 3); meaning they use 5th Avenue NE as a bypass route of the 8th Avenue NE signal.
- The remaining 29% to 33% of trips are local trips not captured in the analysis.

A figure representing the results of the 5th Avenue NE OD analysis can be found in **Appendix B**.

3 Future Conditions

This study includes evaluation of the study area to determine improvements along TH 210 to serve the long-term needs of the corridor and the community. To capture future changes along the corridor, a future year analysis was conducted. Based on the current anticipated project year of 2025, the future design year of 2045 was selected for evaluation.

Traffic forecasts were developed for the entire TH 210 corridor as part of the larger corridor study effort. Future 2045 forecast volumes were developed based on a linear growth rate of 0.5% per year based on historical AADT volumes, population data, and input from the project team.

Table 3 shows the 2019 AADTs, the forecasted 2045 AADTs and corresponding linear growth rate for each project roadway. Mainline TH 210 forecasted 2045 AADTs within the study area range from 13,350 to 28,800

Table 3 – 2045 Future AADTs

Roadway	Description	2019 Existing AADT	2045 Forecast AADT	Linear Growth Rate
TH 210	13th St SE to 4th Ave NE	25,500	28,800	0.5%
	4th Ave NE to TH 25 Exit Ramp	23,600	26,650	0.5%
	TH 25 Exit Ramp to 8th Ave NE	17,100	19,300	0.5%
	8th Ave NE to Pine Shores Rd	11,800	13,350	0.5%
4th Ave NE	North of TH 210	1,200	1,350	0.5%
5th Ave NE	North of TH 210	4,300	4,850	0.5%
8th Ave NE	North of TH 210	8,400	9,500	0.5%
	South of TH 210	4,950	5,600	0.5%
10th Ave NE	South of TH 210	1,400	1,600	0.5%

The forecasted 2045 No Build intersection traffic volumes for the AM, PM, Friday, and summer peak hours can be found in **Appendix B**.

4 Analysis of Alternatives

Intersection control evaluations rely on traffic control warrants to assess the different options available at any intersection. To determine the control options, warrants are evaluated to assess where control changes can be made based on volumes. The results are used to aid in the evaluation of traffic safety and traffic operations at the study intersections.

4.1 Warrant Analysis Guidance

The Minnesota Manual on Uniform Traffic Control Devices (MnMUTCD) provides guidance on when it may be appropriate to use all-way stop or signal control at an intersection. This guidance is provided in the form of "warrants", or criteria, and engineering analysis of the intersection's design factors to determine when all-way stop or signal control may be justified. All-way stop or signal control should not be installed at an intersection unless a MnMUTCD warrant is met. Meeting a warrant at an intersection does not in itself require the installation of a particular control type. The particular control type also requires an engineering analysis of the intersection's design in order for it to be justified.

Under the MnDOT ICE process, roundabouts are considered to be warranted if traffic volumes meet the criteria for either all-way stop or traffic signal control.

All-way stop control warrants were not evaluated as it is not considered a viable control option along TH 210 as an Interregional Corridor (IRC).

4.1.1 Requirements for Installation of a Traffic Signal

For traffic signal installation, MnDOT typically requires volume thresholds for Warrant 1 to be satisfied, which requires 8-hours of combined major approach volumes and the highest minor street approach volume to meet MnMUTCD thresholds. These thresholds vary with the number of approach lanes on the major and minor street. Other warrants may be used as indicators of a need to consider traffic control change; an engineering study that considers factors, including warrants, should be performed to determine the optimum type of control at an intersection.

4.1.2 Requirements for Removal of an Existing Traffic Signal

The MnDOT Traffic Engineering Manual (TEM) provides guidance on volume requirements to remove an existing traffic signal. Based on Chapter 9, section 9-5.02.05 of the TEM, an intersection that meets 80 percent of the volume requirements of Warrant 1 should be considered justified and should not be removed. A signalized intersection that does not meet 60 percent of the volume requirements of Warrant 1, and meets no other Warrant, is an unjustified traffic signal and should be removed.

A signalized intersection that does not meet 80 percent of the volume requirements but does meet 60 percent of the volume requirements of Warrant 1 is in a "gray area" and may be considered for traffic signal removal. Additional studies, findings, engineering judgment and documentation beyond the volume requirements are needed to justify retaining the signal.

4.2 Warrant Analysis Assumptions and Results

MnDOT guidelines suggest that for the purpose of warrant analysis, 100% of right turning traffic from the minor leg should be removed because right turning vehicles are typically able to enter

the traffic stream with minimal delay or conflict; the right turning traffic would not require a traffic signal to reduce delay or improve safety. In certain circumstances (i.e. high right turn volume, minimum mainline gaps, etc.), MnDOT procedures allow for the inclusion of 50% of the minor street right turning traffic in the analysis. The MnDOT guidance states "if right turning volume exceeds 70% of its potential capacity for any hour for each approach, 50% of the right turning volume for all hours should be added back in."

- Based upon MnDOT guidance, the analysis of the five study intersections includes removal of 100% of the right turning traffic on the minor approaches.

MnDOT guidelines suggest that the warrant thresholds may also be reduced based on the roadway speeds and population of the city the intersection is within. If either major approach to the intersection has a posted speed, or 85th percentile speed, that exceeds 40 mph, then a reduction to 70% threshold volumes is allowed. If the population of the city is less than 10,000 people, a reduction to 70% threshold volumes is allowed.

- Based upon MnDOT guidance, the analysis of the 4th Avenue NE intersections does not include reductions based on speeds; however, all other intersections do include a reduction as the posted speed is at 45 mph for at least 1 leg of the intersection.

Traffic warrants were completed for the existing and forecasted 2045 traffic demands.

4.2.1 Warrant Results Summary

Based on the existing and 2045 forecast traffic demands, the study intersection traffic signal warrant analysis is as follows:

- **TH 210 at 4th Avenue NE**: existing traffic signal is not warranted and should be removed.
  - The intersection does not meet the 60% criteria thresholds for Warrant 1 and is therefore justified for removal.
  - Minor stop control may be considered at this intersection.
- **TH 210 at 5th Avenue NE**: traffic signal warrants met.
  - Using the eastbound left turn volumes as the minor street and only the westbound through vehicles for the major, the intersection does meet Warrant 1 criteria.
  - Traffic signal control may be considered at this intersection.
- **TH 210 at TH 25**: no warrants evaluated.
  - Eastbound off ramp cannot meet warrants with no minor approach.
  - Westbound T-intersection is currently closed.
- **TH 210 at 8th Avenue NE**: traffic signal warrants met.
  - Traffic signal control may be considered at this intersection.
- **TH 210 at 10th Avenue NE**: no warrants met, retain minor stop control.
  - Minor stop control may be considered at this intersection.

Table 4 provides the traffic signal warrant summary for the 2019 existing and 2045 future volume conditions. Complete traffic signal warrant analyses can be found in **Appendix C**.

Table 4 – Traffic Signal Warrant Analysis Summary

Intersection	2019 Existing		2045 Future	
TH 210 at: (Existing Control)	Warrant 1 (8 Hr)	Notes	Warrant 1 (8 Hr)	Notes
4th Ave NE (Traffic Signal)	Not Met 0 of 8 hours	60% warrant not met[4]	Not Met 0 of 8 hours	60% warrant not met[4]
5th Ave NE[1] (Minor Street Stop)	**MET** **11 of 8 hours**	Warrants 2 & 3 met[2]	**MET** **11 of 8 hours**	Warrants 2 & 3 met[2]
8th Ave NE (Traffic Signal)	**MET** **12 of 8 hours**	Warrants 2 & 3 met[2]	**MET** **12 of 8 hours**	Warrants 2 & 3 met[2]
10th Ave NE (Minor Street Stop)	Not Met 0 of 8 hours	Retain stop control	Not Met 0 of 8 hours	Retain stop control

Notes:

1. The 5th Ave NE traffic signal warrants were analyzed with the eastbound left turn volume as the minor street volume and the westbound volume as the major street volume.
2. Warrant 2 is the 4-hour volume warrant and Warrant 3 is the peak hour volume warrant.
3. Existing signal meets 80% of the volume thresholds for Warrant 1 and is considered justified.
4. 60% of the warrant volume thresholds for Warrant 1 were not met and removal of the existing signal is justified.

4.3 Alternatives

The East Mall Area was considered for potential major design changes to improve the overall corridor performance. Based on the previous information documented in this report, as well as input from the PMT, the following intersection changes were considered.

- **4th Avenue NE** – signal not warranted, remove signal and reduce access.
- **5th Avenue NE** – signal is warranted with high eastbound left turn demands, add traffic signal or reduce access.
- **Eastbound TH 25 Ramp** – high speed exit ramp to TH 25, remove direct ramp.
- **Westbound TH 25** – previously closed access, remain closed.
- **East Brainerd Mall** – RI/RO access or convert to ¾-access.
- **8th Avenue NE** – signal warranted, requires additional capacity at signal or alternative intersection design, including roundabouts.
- **10th Avenue NE** – signal not warranted, reduce access.

Based on intersection safety, traffic volumes, traffic control warrants, non-motorized accommodations, input from the PMT, and other considerations, alternatives were developed for the East Mall Area.

A total of seven design alternatives were developed to address the existing corridor issues within the East Mall Area. After initial screening, three alternatives were carried through the safety and operations analysis.

Refer to the *TH 210 Build Conditions Report* for more information on how the alternatives were developed, including the initially dismissed alternatives.

4.3.1 Alternative 1

The first alternative includes adding traditional intersection capacity to the existing traffic signal, as shown in **Figure 2**, below. Changes to the East Mall Area with this alternative:

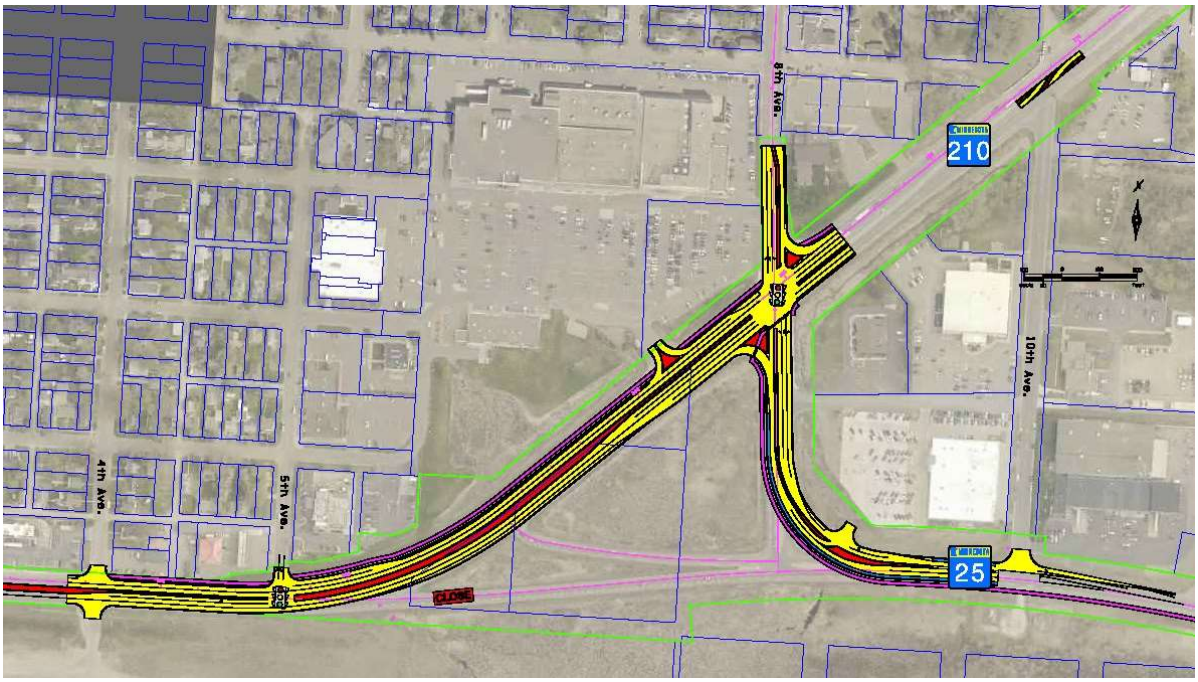
- 4th Avenue NE: remove signal, modify to RI/RO.
- 5th Avenue NE: install traffic signal.
- TH 25 Ramps: remove TH 25 ramp connections.
- Mall Access: retain existing RI/RO.
- 8th Avenue NE: retain existing traffic signal.
  - Add northbound and southbound left turn lanes for both approaches.
  - Separate left, through, and right turn lanes allows removal of the split phasing and the signal timings to operate more efficiently.
- 10th Avenue NE: modify to ¾-access.

This alternative will provide acceptable traffic operations and improve safety over the existing conditions. The standard design includes traffic signal spacing that provides over ¼-mile between signals which is positive for coordination and traffic progression along TH 210.

The new traffic signal at 5th Avenue NE would require an eastbound left turn lane extension for additional storage; this change reduces access at 4th Avenue NE to the railyard south of TH 210. The existing 45-mph posted speed limit through this area would remain.

The preliminary cost estimate for the entire East Mall Area for Alternative 1 is **$7.3 million**.

Figure 2 – East Mall Area – Alternative 1



4.3.2 Alternative 2

The second alternative replaces the existing 8th Avenue NE traffic signal with roundabout control, as shown in **Figure 3**, below. Changes to the East Mall Area with this alternative include:

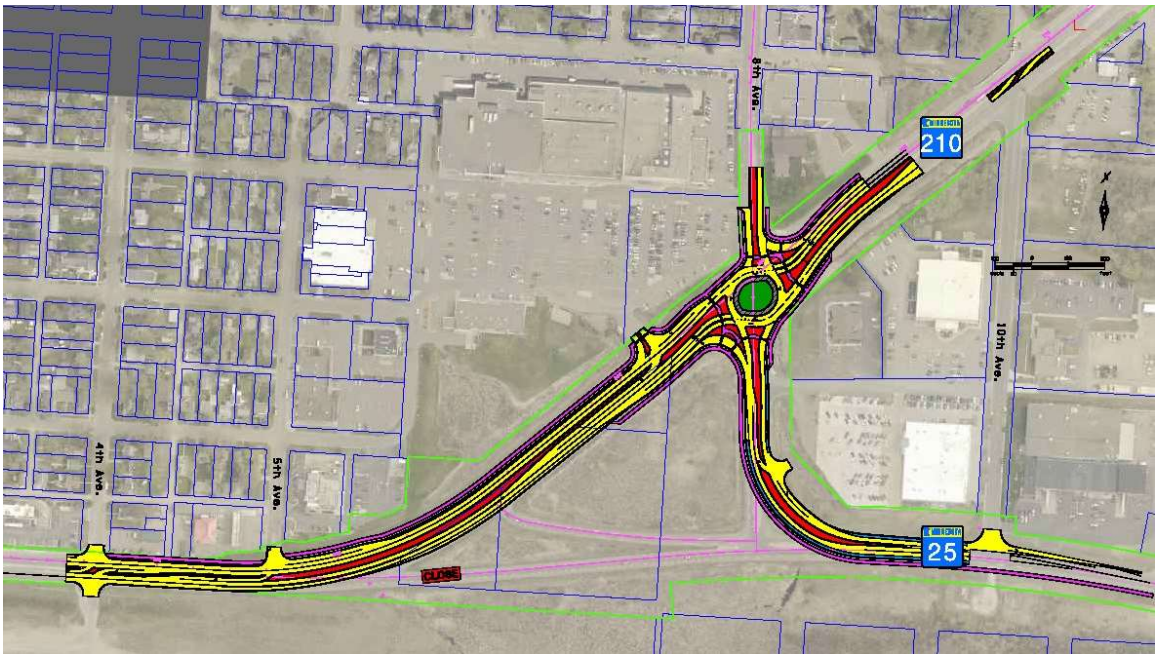
- 4th Avenue NE: remove signal, modify to ¾-access.
- 5th Avenue NE: retain existing ¾-access.
- TH 25 Ramps: remove TH 25 ramp connections.
- Mall Access: convert to ¾-access.
  - The roundabout reduces speeds along TH 210 to allow additional access.
- 8th Avenue NE: convert intersection to roundabout control.
  - Maintain 2-through lanes in each direction along TH 210.
  - 8th Avenue NE and TH 25 have single lane approaches.
- 10th Avenue NE: modify to ¾-access.

This alternative will provide acceptable traffic operations and improve safety over the existing conditions.

The roundabout controlled intersection will reduce all vehicles speeds at the 8th Avenue NE intersection, allowing the 35-mph posted speed limit at 5th Avenue NE to be extended to east of 8th Avenue NE. This reduction in travel speeds allows for the inclusion of additional access at the existing mall access. The 3/4 -access at the East Brainerd Mall and commercial area is expected to reduce the eastbound left turn volumes that currently use 5th Avenue NE to access the commercial area.

The preliminary cost estimate for the entire East Mall Area for Alternative 2 is **$7.25 million**.

Figure 3 – East Mall Area – Alternative 2



4.3.3 Alternative 3

The third alternative replaces the existing 8th Avenue NE traffic signal with two roundabouts, as shown in **Figure 4**, below. Changes to the East Mall Area with this alternative include:

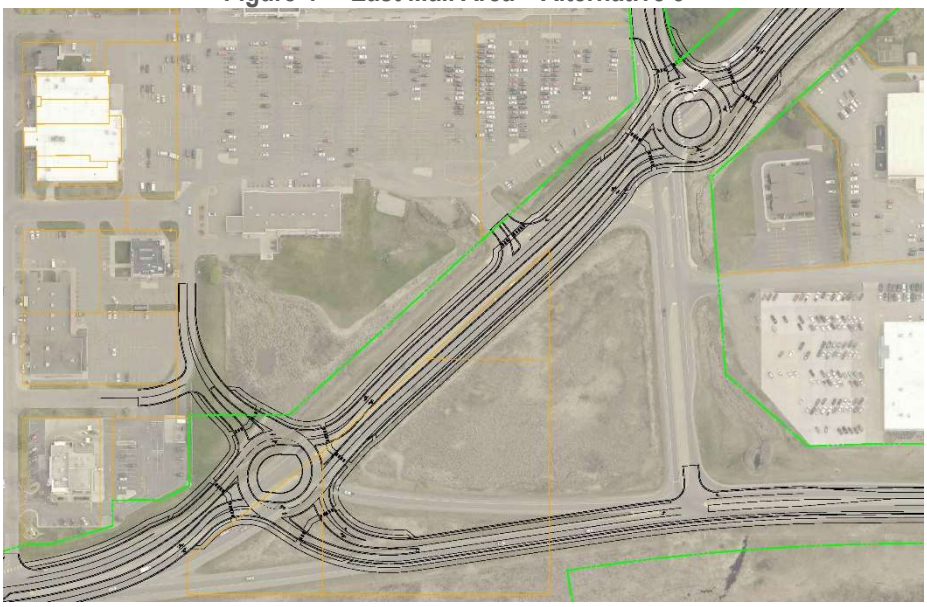
- 4th Avenue NE: remove signal, modify to ¾-access.
- 5th Avenue NE: retain existing ¾-access.
- TH 25 Ramps: connect TH 25 to TH 210 with roundabout control.
  - Maintain 2-through lanes in each direction along TH 210.
  - TH 25 has two approach lanes to accommodate permitted trucks.
  - 4th leg into the retail center for local connections
- Mall Access: retain existing westbound RI/RO.
- 8th Avenue NE: convert intersection to roundabout control.
  - Relocate TH 25, south leg, connection to west.
  - Maintain 2-through lanes in each direction along TH 210.
  - 8th Avenue NE has a single lane approach southbound.
- 10th Avenue NE: modify to ¾-access.

This alternative will provide acceptable traffic operations and improve safety over the existing conditions. Like Alternative 2, the two roundabouts allow for a reduced speed limit along TH 210.

The split intersections allow for simplified movements at each intersection and separates the competing movements at the existing intersection. Northbound TH 25 has a high left turn volume to travel west on TH 210, which is shifted to the west roundabout. Southbound 8th Avenue NE has a high right turn volume to west on TH 210, which no longer competes with TH 25 traffic.

The preliminary cost estimate for the entire East Mall Area for Alternative 3 is **$7.3 million**.

Figure 4 – East Mall Area – Alternative 3



4.4 Safety Review

Future crash estimates were prepared by applying existing and MnDOT statewide average (5-year) crash rates to the 2045 projected traffic volumes for the study intersections in each alternative. In addition, intersection conflict points were compared between the alternatives.

The following crash rates were utilized in this analysis:

- No Build estimates are based on the existing crash rates described in Section 2.
- The MnDOT statewide average crash rate for urban minor street stop-controlled intersections is 0.18 crashes per million entering vehicles (MEV).
- Signalized intersection rates are based on the MnDOT statewide average crash rates for:
  - Low speed (<45 mph), high volume (>15,000 vpd on highest volume leg) signalized intersections; the average crash rate is 0.70 crashes per MEV.
  - High speed (>45 mph), high volume (>15,000 vpd on highest volume leg) signalized intersections; the average crash rate is 0.45 crashes per MEV.
- Roundabout crash estimation was done using MnDOT's *A Study of the Traffic Safety at Roundabouts in Minnesota*; the study concluded the following:
  - Single-lane roundabouts have a crash rate of 0.32 crashes per MEV.
  - Hybrid roundabouts (2x1 design) have a crash rate of 0.76 crashes per MEV.
  - Multi-lane roundabouts (2x2 design) have a crash rate of 2.18 crashes per MEV.
  - The National Cooperative Highway Research Program (NCHRP) Report 672 on roundabouts suggests a 3-leg hybrid roundabout (2x1 design) has an approximate 50% reduction in the crash rate when compared to a 4-leg hybrid roundabout.
- For reduced conflict intersections like ¾ access or right-in/right-out (RI/RO) the MnDOT statewide average crash rate for "other" intersection types was used; the average crash rate is 0.16 crashes per MEV.

4.4.1 Conflict Points

TH 210 is functionally classified as a principal arterial corridor, mobility and safety are a major characteristic of this type of corridor. To improve the safety and mobility of the corridor, some intersections will include reduced access configurations. Reductions of intersection movements can have a significant reduction in vehicle conflict points, which can dramatically improve the safety and operations of the intersection.

A conflict point is any point where vehicles cross, merge, or diverge at an intersection and are the points at which a crash is most likely to occur. Reducing the number of conflict points at an intersection by reducing access can improve vehicle safety.

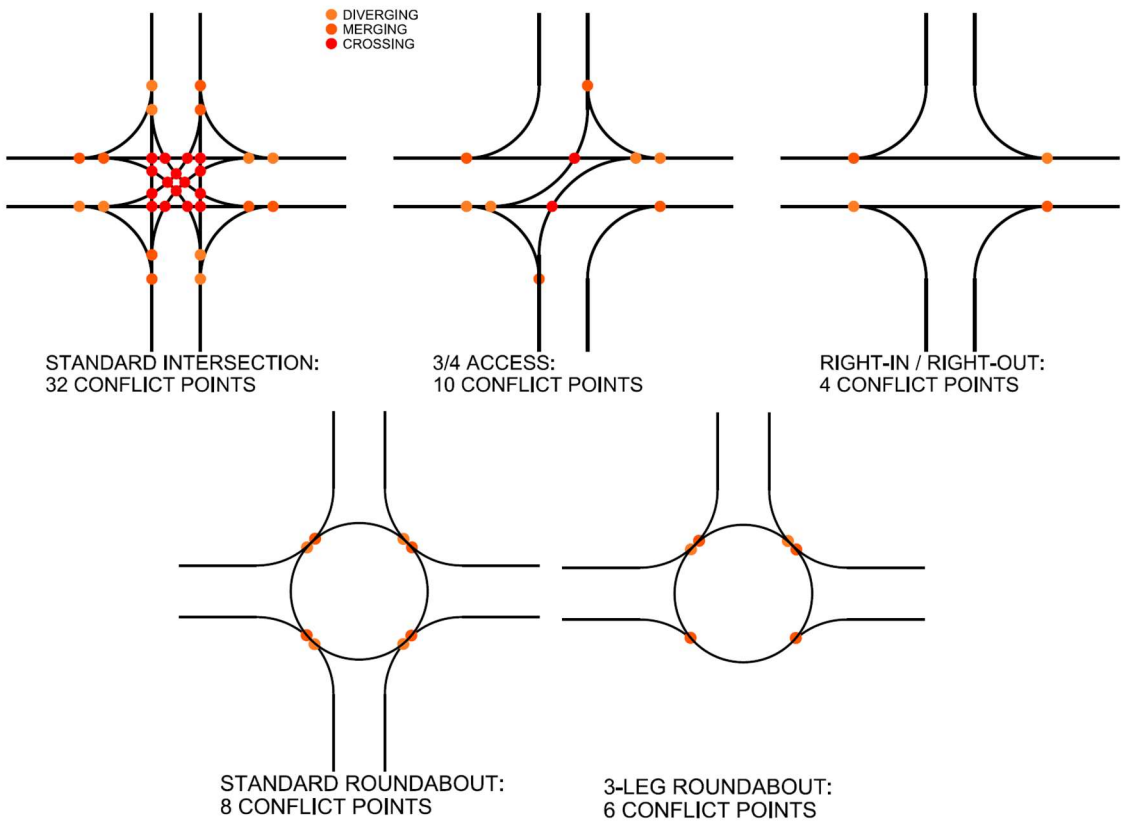
An existing full access, four-leg intersection has a total of 32 conflict points. Reduction in access at an intersection to a ¾ Access or RI/RO configuration has a significant impact on the safety of an intersection.

Figure 5 presents vehicle conflict points at standard intersection configurations.

- A ¾ access intersection has a reduction of almost 70% of the total vehicle conflict points, while only removing some minor street movements.

- A RI/RO access intersection has a reduction of almost 90% of the total vehicle conflict points; this does remove a significant portion of the vehicle turns at an intersection.
- To maintain full access at an intersection, the only way to reduce conflict points is to construct a roundabout. Due to the one-way circulating design, a full movement roundabout has only 8 vehicle conflict points.
  - A 3-legged roundabout intersection has only 6 vehicle conflict points.

Figure 5 – Vehicle Conflict Points



4.4.2 Predicted Crashes

Based on the average crash rates for each intersection type, a comparison of the alternatives was completed to assess the safety impact of each design alternative.

Table 5 presents the crash rates used for each intersection within the East Mall Area, as well as the estimated crashes expected in 2045, and a comparison of the vehicle conflict points at each intersection.

Alternative 1 would have a significant reduction in vehicle conflict points; however, the overall estimation of crashes is similar to the No Build conditions. This is due to the high-volume, high-speed traffic signal proposed at 5th Avenue NE, which has an average MnDOT crash rate that is high.

Alternative 2 has the fewest vehicle conflict points and the fewest total estimated crashes in 2045. The full access, 4-leg, hybrid roundabout design has the highest crash rate of all the control types; however, it should be noted there is a significant reduction in fatal and severe crashes under roundabout control.

Alternative 3 has the 2nd lowest vehicle conflict points and the 2nd lowest estimated crashes in 2045. The 3-leg hybrid roundabouts are estimated to have a crash rate of 0.36. NCHRP 672 suggests a 3-leg roundabout has an approximate 50% reduction in crashes when compared to a similar 4-leg roundabout.

Table 5 – East Mall Area 2045 Crash Estimates

Alternative		East Mall Area Intersections						Total	Change from No Build
		4th Avenue	5th Avenue	TH 25 West	Mall Access	8th Ave/ TH 25 East	10th Avenue		
No Build	Crash Rate[1]	0.47	0.15	0.06	0.05	0.74	0.17	--	--
	Crashes[2]	4.9	1.6	0.5	0	6.3	0.9	14.2	--
	Conflict Points	9	5	1	2	32	32	81	--
Alt 1	Crash Rate[1]	0.16	0.70		0.05	0.45	0.16	--	--
	Crashes[2]	1.7	7.4		1.1	3.8	0.8	14.8	-4%
	Conflict Points	4	9		2	32	10	57	30%
Alt 2	Crash Rate[1]	0.16	0.16		0.16	0.76	0.16	--	--
	Crashes[2]	1.7	1.7		1.1	6.5	0.8	11.8	17%
	Conflict Points	5	5		5	8	10	33	59%
Alt 3	Crash Rate[1]	0.16	0.16	0.76	0.05	0.36[3]	0.16	--	--
	Crashes[2]	1.7	1.7	5.6	0	2.6	0.8	12.4	13%
	Conflict Points	5	5	8	2	6	10	36	56%

1- Crash Rates for No Build condition are existing crashes; MnDOT average rates used for Build Alternatives

2- Estimated crashes in year 2045 based on crash rates and forecast volumes.

3- NCHRP 672 suggests a 3-leg Hybrid Roundabout (2x1) has an approximate 50% reduction in the crash rate compared to a 4-leg Hybrid Roundabout (2x1).

4.5 Traffic Operations

Traffic operations analyses for the existing conditions, future No Build, and three future build alternatives were conducted to determine the level of service (LOS), delay, and queueing information for the AM, PM, Friday, and summer peak hour conditions.

LOS is a qualitative rating system used to describe the efficiency of traffic operations at an intersection. Six LOS levels are defined, designated by letters A through F. LOS A represents the best operating conditions (no congestion), and LOS F represents the worst operating conditions (severe congestion).

LOS for intersections is determined by the average control delay per vehicle. The range of control delay for each LOS is different for signalized and unsignalized intersections (including roundabouts). The expectation is that a signalized intersection is designed to carry higher traffic volumes and will experience greater delays than an unsignalized intersection; driver tolerance for delay is greater at a signal than a stop sign. Therefore, LOS thresholds for each LOS category are lower for unsignalized intersections than for signalized intersections.

Table 6 shows the LOS thresholds for signalized and unsignalized control.

Table 6 – Level of Service Threshold

Level of Service	Average Control Delay (sec/veh)	
	Signalized Intersection	Unsignalized (Stop or Roundabout) Intersection
A	0 to 10	0 to 10
B	> 10 and ≤ 20	> 10 and ≤ 15
C	> 20 and ≤ 35	> 15 and ≤ 25
D	> 35 and ≤ 55	> 25 and ≤ 35
E	> 55 and ≤ 80	> 35 and ≤ 50
F	> 80	> 50

For the entire corridor, it was assumed that a LOS D or better represents acceptable conditions for intersections. However, due to the long cycle lengths along TH 210, some movements may have higher delays, LOS E/F, but are still expected to be served within one signal cycle.

The traffic operations analyses were conducted using the VISSIM (version 2020) software package; an average of 10 simulation runs was used for each modeling result.

Appendix D includes all operational tables and summary for the operations analysis.

4.5.1 Existing Conditions

Many of the existing intersections operate acceptably in all peak hours analyzed. The intersections of TH 210 at 4th Avenue NE, the Mall Access, and 10th Avenue NE all operate acceptably in all peak hours.

The AM peak hour operations are all LOS D or better in the existing conditions. The 8th Avenue NE intersection can have long queues due to the split phase timing, and the eastbound left turn at 5th Avenue NE can extend out of the turn lane and block the through lane.

In the PM, Friday, and Summer peak hours the operations are significantly worse. The two problematic intersections are still the main concern.

At 5th Avenue NE the eastbound left turn volume is one of the highest along the corridor, it is within 5% of the left turn volume at 8th Avenue NE. While the intersection operates at a LOS A, the eastbound left turn must yield to the heavy westbound approach traffic along TH 210. As a platoon of traffic approaches the intersection, the left turns must yield for a longer time and the queue builds and quickly spills out of the storage lane and blocks an eastbound through lane; this is a major safety concern.

The TH 210 at 8th Avenue NE/TH 25 incurs the most delay in the study area. The existing split phase signal timing adds delays for all users as the minor approaches do not have enough capacity to serve the demands. Due to the long cycle length required to serve all of the volumes, there are many movements that operate at a LOS E or LOS F, and the intersection as a whole operates at a LOS E in the PM, Friday, and Summer peaks.

The delays result in long queues at the intersection. The eastbound left turn from TH 210 to 8th Avenue NE extends past the available storage and blocks the through lane. The TH 25 approach operates with the most delay and queues that can extend up to 1,700 feet in the summer peak.

Table 7 presents the existing traffic operations for the AM, PM, Friday, and Summer peak hours.

Table 7 – Existing Conditions – East Mall Area Traffic Operations

Peak	Intersection	Approach Delay (sec/veh / LOS)				Int. Delay (s/veh / LOS)
	TH 210 at:	EB	WB	NB	SB	
AM	4th Avenue NE	1.2 / A	3.9 / A	**43.9 / D**	**37.5 / D**	4.5 / A
	5th Avenue NE	6.4 / A	0.2 / A		10.5 / B	3.3 / A
	Mall Access	0.0 / A	0.9 / A		8.8 / A	
	TH 25/8th Avenue	33.4 / C	**38.7 / D**	**50.5 / D**	27.0 / C	**36.7 / D**
	10th Avenue NE	1.4 / A	0.3 / A	12.5 / B	10.8 / B	2.3 / A
PM	4th Avenue NE	1.3 / A	4.3 / A	**75.1 / E**	**37.4 / D**	4.1 / A
	5th Avenue NE	4.6 / A	0.2 / A		12.7 / B	3.6 / A
	Mall Access	0.0 / A	0.9 / A		9.4 / A	
	TH 25/8th Avenue	**53.0 / D**	**54.2 / D**	**67.3 / E**	**50.0 / D**	**55.6 / E**
	10th Avenue NE	1.2 / A	0.3 / A	15.3 / C	8.8 / A	1.8 / A
Friday	4th Avenue NE	1.5 / A	4.1 / A	**74.9 / E**	**37.7 / D**	4.1 / A
	5th Avenue NE	5.1 / A	0.1 / A		13.7 / B	3.9 / A
	Mall Access	0.0 / A	0.9 / A		9.7 / A	
	TH 25/8th Avenue	**59.1 / E**	**56.6 / E**	**69.8 / E**	**53.9 / D**	**59.6 / E**
	10th Avenue NE	1.3 / A	0.3 / A	16.1 / C	8.4 / A	1.9 / A
Summer	4th Avenue NE	1.2 / A	2.7 / A	**71.7 / E**	**43.5 / D**	3.6 / A
	5th Avenue NE	6.5 / A	0.2 / A		15.0 / C	4.8 / A
	Mall Access	0.0 / A	0.9 / A		10.0 / B	
	TH 25/8th Avenue	**66.9 / E**	**63.2 / E**	**77.9 / E**	**59.3 / E**	**66.6 / E**
	10th Avenue NE	1.3 / A	0.4 / A	23.6 / C	8.3 / A	2.4 / A

4.5.2 2045 Future No Build Conditions

The future No Build condition has increased volumes with added delay and queueing.

The intersections of TH 210 at 4th Avenue NE, the Mall access, and 10th Avenue NE all continue to operate acceptably through the 2045 design year in all peak hours evaluated. The northbound 10th Avenue NE approach will have less gaps in TH 210 traffic and is expected to operate at a LOS E in the summer peak; the southbound approach operates acceptably as most vehicles make a southbound right turn at the intersection.

The eastbound left turn from TH 210 to 5th Avenue NE is expected to continue to have queueing issues in all peak hours that spill out of the available storage lane.

The TH 210 at 8th Avenue NE/TH 25 intersection is expected to have worsening conditions. The existing split phase signal timing and lack of intersection capacity cannot serve the existing and expected traffic volumes. Due to the long cycle length required to serve all of the volumes, there are many movements that operate at a LOS E or LOS F, and the intersection will have failing operations in the PM, Friday, and Summer peaks.

The delays continue to result in long queues at the intersection. The eastbound left turn from TH 210 to 8th Avenue NE extends past the available storage and blocks the through lane at a much higher frequency than the existing conditions. The TH 25 approach operates with high delays and queues that can extend up to 2,800 feet in the summer peak.

Table 8 – 2045 No Build Conditions – East Mall Area Traffic Operations

Peak	Intersection	Approach Delay (sec/veh / LOS)				Int. Delay (s/veh / LOS)
	TH 210 at:	EB	WB	NB	SB	
AM	4th Avenue NE	5.1 / A	4.5 / A	**46.8 / D**	**40.0 / D**	6.7 / A
	5th Avenue NE	11.6 / B	0.2 / A		12.0 / B	5.6 / A
	Mall Access	0.1 / A	0.2 / A		9.0 / A	
	TH 25/8th Avenue	**42.8 / D**	**48.5 / D**	**60.6 / E**	**33.5 / C**	**45.5 / D**
	10th Avenue NE	1.5 / A	0.4 / A	14.9 / B	13.1 / B	2.8 / A
PM	4th Avenue NE	1.9 / A	3.1 / A	**73.2 / E**	**40.6 / D**	4.0 / A
	5th Avenue NE	7.9 / A	0.2 / A		16.3 / C	5.7 / A
	Mall Access	0.3 / A	0.4 / A		10.3 / B	
	TH 25/8th Avenue	**72.6 / E**	**64.8 / E**	**83.5 / F**	**61.6 / E**	**70.6 / E**
	10th Avenue NE	1.4 / A	0.4 / A	25.1 / D	8.1 / A	2.6 / A
Friday	4th Avenue NE	2.6 / A	3.4 / A	**68.7 / E**	**44.0 / D**	4.7 / A
	5th Avenue NE	8.9 / A	0.2 / A		16.5 / C	6.2 / A
	Mall Access	0.5 / A	0.4 / A		11.0 / B	
	TH 25/8th Avenue	**91.4 / F**	**71.7 / E**	**88.4 / F**	**64.8 / E**	**80.1 / F**
	10th Avenue NE	1.3 / A	0.5 / A	29.1 / D	8.8 / A	2.8 / A
Summer	4th Avenue NE	5.4 / A	3.3 / A	**69.7 / E**	**45.0 / D**	6.1 / A
	5th Avenue NE	12.4 / B	0.3 / A		19.6 / C	8.4 / A
	Mall Access	2.5 / A	0.4 / A		11.3 / B	
	TH 25/8th Avenue	**117.4 / F**	**75.2 / E**	**99.4 / F**	**70.0 / E**	**92.6 / F**
	10th Avenue NE	1.2 / A	0.5 / A	**36.4 / E**	9.2 / A	3.3 / A

4.5.3 2045 Alternative 1

Changes to the East Mall Area intersections included with Alternative 1 are as follows:

- 4th Avenue NE: remove signal, modify to RI/RO
- 5th Avenue NE: install traffic signal
- TH 25 Ramps: remove TH 25 ramp connections
- Mall Access: retain existing RI/RO
- 8th Avenue NE: retain existing traffic signal
  - Add northbound and southbound left turn lanes for both approaches.
  - Separate left, through, and right turn lanes allows removal of the split phasing and the signal timings to operate more efficiently
- 10th Avenue NE: modify to ¾-access

To address the TH 210 at 8th Avenue NE intersection, an added lane separates the existing shared left-through lanes and provides the minor approaches with separate left, through, and right turn lanes. This added capacity allows the removal of the existing split phasing and for the signal cycle length to be reduced. The separate left turn lanes allow the minor street approaches to have a protected and permitted left turn phases that run concurrently.

The existing eastbound left turn lane queue issues at 5th Avenue NE will become worse under traffic signal control as the movement is no longer permissive but requires a protected left turn signal phase. The new traffic signal control at TH 210 and 5th Avenue NE would operate at a LOS B in all 2045 peak periods. To contain the eastbound left turn queue so it doesn't impact the through traffic, the left turn lane needs to be extended to approximately 500 feet, which extends through the 4th Avenue NE intersection, converting it to a RI/RO.

The TH 210 at 8th Avenue NE/TH 25 traffic signal will operate at a LOS D or better in all 2045 peak periods. The additional capacity at the traffic signal allows for significantly more efficient operations which results in the overall intersection delay being reduced by more than 50%. The signal does require a long cycle length to effectively process all the volumes on each approach. Three of the four approaches operate at a LOS D, with some of the movements operating at LOS E and F during the PM peak, Friday and summer peak times.

The eastbound approach is the only approach operating at a LOS C, this is due to the long eastbound left turn phase required to serve the major movement. The eastbound left turn volume is at the capacity of a single left turn lane. The expansion to a dual left turn was not considered feasible due to right-of-way constraints along TH 210 and along 8th Avenue NE to accept two northbound lanes. The eastbound left turn lane would need to be extended to approximately 700 feet to contain the maximum queues for this movement; however, this may not fully contain the summer peak queue.

Table 9 presents the proposed 2045 Build Alternative 1 operations for each peak period.

Table 9 – 2045 Build Alternative 1 – East Mall Area Traffic Operations

Peak	Intersection	Approach Delay (sec/veh / LOS)				Int. Delay (s/veh / LOS)
	TH 210 at:	EB	WB	NB	SB	
AM	4th Avenue NE	0.3 / A	0.4 / A	9.7 / A	10.6 / B	0.6 / A
	5th Avenue NE	10.9 / B	13.4 / B		11.4 / B	12.3 / B
	Mall Access	0.0 / A	0.9 / A		8.9 / A	0.9 / A
	TH 25/8th Avenue	25.6 / C	**35.7 / D**	33.8 / C	25.8 / C	29.9 / C
	10th Avenue NE	1.7 / A	0.5 / A	7.0 / A	6.8 / A	1.8 / A
PM	4th Avenue NE	1.1 / A	0.4 / A	12.4 / B	9.9 / A	0.9 / A
	5th Avenue NE	12.0 / B	15.0 / B		15.3 / B	13.4 / B
	Mall Access	0.0 / A	1.0 / A		9.9 / A	2.1 / A
	TH 25/8th Avenue	28.2 / C	**40.4 / D**	**46.3 / D**	**37.3 / D**	**35.9 / D**
	10th Avenue NE	1.3 / A	0.5 / A	8.1 / A	6.4 / A	1.4 / A
Friday	4th Avenue NE	0.7 / A	0.4 / A	12.4 / B	10.2 / B	0.8 / A
	5th Avenue NE	12.2 / B	17.4 / B		16.6 / B	14.6 / B
	Mall Access	0.0 / A	1.0 / A		11.0 / B	2.2 / A
	TH 25/8th Avenue	32.9 / C	**43.4 / D**	**48.3 / D**	**38.8 / D**	**39.1 / D**
	10th Avenue NE	1.3 / A	0.5 / A	8.1 / A	6.6 / A	1.4 / A
Summer	4th Avenue NE	1.1 / A	0.4 / A	13.2 / B	10.1 / B	0.9 / A
	5th Avenue NE	11.1 / B	16.5 / B		18.8 / B	13.8 / B
	Mall Access	0.0 / A	1.0 / A		11.2 / B	2.2 / A
	TH 25/8th Avenue	**35.8 / D**	**47.0 / D**	**54.2 / D**	**43.6 / D**	**43.1 / D**
	10th Avenue NE	1.4 / A	0.5 / A	8.9 / A	6.5 / A	1.5 / A

4.5.4 2045 Alternative 2

Changes to the East Mall Area intersection included with Alternative 2 are as follows:

- 4th Avenue NE: remove signal, modify to ¾-access
- 5th Avenue NE: retain existing ¾-access
- TH 25 Ramps: remove TH 25 ramp connections, all movements to 8th Avenue NE
- Mall Access: convert to ¾-access
  - The roundabout reduces speeds along TH 210 to allow additional access
- 8th Avenue NE: convert intersection to roundabout control
  - Maintain 2-through lanes in each direction along TH 210
  - 8th Avenue NE and TH 25 have single lane approaches
- 10th Avenue NE: modify to ¾-access

The proposed Alternative 2 access and control changes result in all intersections operating at LOS C or better in all time periods for the future 2045 volumes. The combination of restricted access and efficient roundabout control, reduces vehicle speeds and allows all movements to operate acceptably.

From an origin-destination study conducted in the existing conditions, it is understood that over 60% of the eastbound left turns at 5th Avenue NE are destined to the East Brainerd Mall area and most would likely shift to the new ¾ access provided on TH 210 at the mall.

While the single roundabout control at 8th Avenue NE/TH 25 operates with overall LOS C or better, with all movements at one single intersection, the minor single lane approaches have more delay with longer queues.

In the AM peak hour, the southbound approach will operate at a LOS D. The single lane southbound approach will have an average queue of approximately 200 feet, but the maximum queue is approaching 1,000 feet, which will extend through the upstream E Street intersection and impact the F Street intersection.

During the PM peak hour, the southbound approach operates at a LOS C with a maximum queue of 650 feet; this would just extend through the E Street intersection. In the Summer peak the approach will operate at a LOS E, with an average and maximum queue similar to the AM peak hour.

Table 10 presents the proposed 2045 Build Alternative 2 operations for each peak period.

Table 10 – 2045 Build Alternative 2 – East Mall Area Traffic Operations

Peak	Intersection	Approach Delay (sec/veh / LOS)				Int. Delay (s/veh / LOS)
	TH 210 at:	EB	WB	NB	SB	
AM	4th Avenue NE	1.3 / A	0.3 / A	10.9 / B	11.8 / B	1.3 / A
	5th Avenue NE	2.5 / A	0.2 / A		10.4 / B	1.7 / A
	Mall Access	7.6 / A	0.3 / A		2.3 / A	2.5 / A
	TH 25/8th Avenue	1.9 / A	4.8 / A	4.3 / A	**34.0 / D**	11.3 / B
	10th Avenue NE	1.4 / A	0.5 / A	6.7 / A	6.6 / A	1.7 / A
PM	4th Avenue NE	2.6 / A	0.3 / A	13.2 / B	12.2 / B	2.0 / A
	5th Avenue NE	1.9 / A	0.2 / A		13.4 / B	2.1 / A
	Mall Access	3.1 / A	0.3 / A		2.3 / A	1.7 / A
	TH 25/8th Avenue	3.4 / A	10.4 / B	16.6 / C	15.1 / C	9.6 / A
	10th Avenue NE	1.1 / A	0.5 / A	7.6 / A	6.1 / A	1.3 / A
Friday	4th Avenue NE	2.7 / A	0.3 / A	13.4 / B	12.2 / B	2.0 / A
	5th Avenue NE	2.3 / A	0.2 / A		14.0 / B	2.4 / A
	Mall Access	3.8 / A	0.3 / A		2.6 / A	2.1 / A
	TH 25/8th Avenue	3.6 / A	13.6 / B	19.0 / C	24.3 / C	12.6 / B
	10th Avenue NE	1.1 / A	0.6 / A	7.7 / A	6.3 / A	1.4 / A
Summer	4th Avenue NE	3.2 / A	0.3 / A	14.5 / B	13.4 / B	2.3 / A
	5th Avenue NE	2.7 / A	0.2 / A		16.0 / C	2.8 / A
	Mall Access	4.4 / A	0.3 / A		2.5 / A	2.4 / A
	TH 25/8th Avenue	4.3 / A	14.8 / B	**26.7 / D**	**33.8 / D**	16.4 / C
	10th Avenue NE	1.2 / A	0.5 / A	8.1 / A	6.1 / A	1.4 / A

4.5.5 2045 Alternative 3

Changes to the existing East Mall Area intersections included with Alternative 3 are as follows:

- 4th Avenue NE: remove traffic signal and modify to ¾-access
- 5th Avenue NE: retain existing ¾-access
- TH 25 Ramps: connect TH 25 to TH 210 with roundabout control
  - Maintain 2-through lanes in each direction along TH 210
  - TH 25 has two approach lanes to accommodate permitted trucks
  - 4th leg into the retail center for local connections
- Mall Access: retain existing westbound RI/RO
- 8th Avenue NE: convert intersection to roundabout control
  - Relocate TH 25, south leg, connection to west
  - Maintain 2-through lanes in each direction along TH 210
  - 8th Avenue NE has a single lane approach southbound
- 10th Avenue NE: modify to ¾-access

The proposed Alternative 3 access and control changes result in all intersections operating at LOS A in all time periods for the future 2045 volumes. The combination of restricted access and roundabout control, reduces vehicle speeds and allows all movements to operate acceptably.

From an origin-destination study conducted in the existing conditions, it is understood that over 60% of the eastbound left turns at 5th Avenue NE are destined to the East Brainerd Mall area and most would likely shift to the new Th 25 roundabout with the 4th leg provided to the mall area.

Providing the two separate roundabout intersection design for TH 25 and 8th Avenue NE provides two simplified intersections with less turning traffic at each intersection, resulting in more efficient operations.

The roundabout control is an efficient design that operates with a LOS A in all peak hours. In the AM peak hour, the eastern roundabout at 8th Street NE will have an average queue of less than 50 feet, but a maximum queue that can reach 400 feet; this will just reach the E Street intersection. Queues at the western TH 25 intersection are all 200 feet or less.

In the PM peak hour, all average queues at both intersections are less than 50 feet, and all maximum queues are approximately 400 feet or less.

In the summer peak, the eastbound approach to the western TH 25 roundabout has an average queue of less than 50 feet and a maximum queue of just under 550 feet; this queue would not reach the 5th Avenue NE intersection.

Table 11 presents the proposed 2045 Build Alternative 3 operations for each peak period.

Table 11 – 2045 Build Alternative 3 – East Mall Area Traffic Operations

Peak	Intersection	Approach Delay (sec/veh / LOS)				Int. Delay (s/veh / LOS)
	TH 210 at:	EB	WB	NB	SB	
AM	4th Avenue NE	0.2 / A	0.1 / A	11.8 / B	10.5 / B	0.4 / A
	5th Avenue NE	3.8 / A	0.4 / A		12.5 / B	2.3 / A
	TH 25	3.1 / A	3.7 / A	3.9 / A	22.4 / C	3.5 / A
	Mall Access	0.2 / A	0.2 / A		4.2 / A	0.2 / A
	8th Avenue NE	0.7 / A	2.9 / A		4.5 / A	2.7 / A
	10th Avenue NE	1.3 / A	0.5 / A	6.7 / A	6.7 / A	1.6 / A
PM	4th Avenue NE	0.4 / A	0.2 / A	15.6 / B	10.3 / B	0.5 / A
	5th Avenue NE	2.8 / A	0.4 / A		15.0 / C	2.6 / A
	TH 25	7.7 / A	3.7 / A	11.2 / B	18.0 / C	5.3 / A
	Mall Access	0.4 / A	0.2 / A		3.1 / A	0.5 / A
	8th Avenue NE	1.4 / A	7.4 / A		3.0 / A	3.4 / A
	10th Avenue NE	1.1 / A	0.6 / A	7.6 / A	6.4 / A	1.4 / A
Friday	4th Avenue NE	0.4 / A	0.2 / A	17.2 / B	11.0 / B	0.5 / A
	5th Avenue NE	3.7 / A	0.4 / A		16.5 / C	3.1 / A
	TH 25	8.8 / A	4.2 / A	11.6 / B	19.2 / C	6.0 / A
	Mall Access	0.4 / A	0.2 / A		3.1 / A	0.5 / A
	8th Avenue NE	1.5 / A	8.4 / A		3.1 / A	3.8 / A
	10th Avenue NE	1.2 / A	0.6 / A	7.9 / A	6.9 / A	1.4 / A
Summer	4th Avenue NE	0.9 / A	0.2 / A	21.8 / C	11.1 / B	0.8 / A
	5th Avenue NE	4.7 / A	0.4 / A		18.3 / C	3.8 / A
	TH 25	9.6 / A	5.0 / A	14.5 / B	22.7 / C	6.8 / A
	Mall Access	0.6 / A	0.2 / A		3.6 / A	0.6 / A
	8th Avenue NE	1.9 / A	10.6 / B		3.6 / A	4.7 / A
	10th Avenue NE	1.2 / A	0.6 / A	8.1 / A	6.4 / A	1.4 / A

4.6 Comparison of Alternatives

All three East Mall Area alternatives provide acceptable safety and operations. To assess the impacts of the East Mall Area changes on the entire TH 210 corridor, network wide Measures of Effectiveness (MOE's) were pulled from each modeled alternative.

Network wide statistics for the entire TH 210 corridor include average vehicle delay, vehicle miles traveled (VMT), vehicle hours traveled (VHT), and average vehicle speeds.

- The VMT has negligible differences between alternatives and was not considered further.
- Alternative 2 and 3 both reduce the posted speed limit for just under ½ mile of TH 210, resulting in slightly lower average speeds.

Table 12 presents the network wide average vehicle delay for each alternative, the existing MOE's are also shown for comparison.

Table 12 – Network Wide MOE – Average Delay (seconds/vehicle)

Peak	Existing	No Build	Alternative 1	Alternative 2	Alternative 3
AM	136.8	141.8	70.7	58.6	56.5
PM	72.8	157.0	82.0	69.6	68.1
Friday	77.2	171.4	90.7	77.6	75.3
Summer	144.3	181.4	102.6	90.6	90.1
Weighted Average	**106.8**	**164.6**	**87.7**	**75.4**	**73.7**
Reduction From No Build			**47%**	**54%**	**55%**

Table 13 presents the network wide VHT for each alternative, the existing MOE's are also shown for comparison. VHT includes both the delay time and general travel time for all vehicles in the network.

Table 13 – Network Wide MOE – VHT

Peak	Existing	No Build	Alternative 1	Alternative 2	Alternative 3
AM	476.4	561.2	442.8	424.8	427.6
PM	467.2	724.8	563.7	542.2	548.3
Friday	499.5	792.9	612.0	588.1	590.3
Summer	669.0	845.9	670.2	649.0	654.5
Weighted Average	**534.1**	**743.5**	**581.6**	**560.4**	**564.5**
Reduction From No Build			**22%**	**25%**	**24%**

From these two metrics, each alternative has a significant improvement compared to the No Build conditions. Alternative 1 has the least improvement, and Alternatives 2 and 3 have similar results between the two.

These results are similar to the predicted crashes for each alternative in Section 4.4.

5 Findings and Conclusions

MnDOT is planning to reconstruct TH 210/Washington Street between Baxter Drive and Pine Shores Road beginning in 2025. MnDOT is currently studying the corridor to better understand the community issues, needs and use of the roadway, assess improvement options, select a preferred alternative, and prepare a geometric layout.

This document provides information for the alternatives analysis and control options for the East Mall Area. The main topics evaluated for the intersections consist of intersection safety and operations.

The existing traffic control and intersection designs will continue to have operational and safety issues as traffic grows.

- The 4th Avenue NE traffic signal does not meet signal warrants and should be removed.
- The 5th Avenue NE intersection has a high eastbound left turn volume that creates a safety concern as the queue blocks the through lane; the left turn volume does meet the traffic signal warrants. Many of these left turns are destined to the Brainerd Mall retail area; over 60% based on Origin-Destination study.
- The eastbound TH 25 exit ramp design promotes high speeds along TH 210.
- The Mall access is currently RI/RO and has limited use due to the limited movements allowed.
- The TH 210 at 8th Avenue NE/TH 25 has a high volume of traffic entering the intersection, the limited capacity and signal timing issues result in long delays and extensively long queues at the intersection.
- The 10th Avenue NE intersection will begin to have fewer gaps along TH 210 as traffic increases, and the intersection design has safety concerns due to the high speeds.

To improve the operations in the East Mall Area, seven concepts were initially developed. Some of these concepts were screened out, and the remaining three were evaluated in this document.

Alterative 1 includes converting 4th Avenue NE to a RI/RO, adding a traffic signal at 5th Avenue NE, removing the TH 25 direct connections, no change to the Mall access, providing additional capacity at 8th Avenue/TH 25, and converting 10th Avenue NE to a ¾-access.

The design of this alternative reduces the vehicle conflict points to a total of 57, a 30% reduction compared to the No Build conditions. The predicted crashes within the East Mall Area for this alternative is estimated to be 14.8 crashes in 2045, a nominal increase from the No Build.

All intersections would operate acceptably with LOS D or better under this alternative. The intersection of 8th Avenue NE would operate with three of the four approaches operate at a LOS D and with some of the individual movements operating at LOS E and F during the PM peak, Friday and summer peak times.

This alternative has a preliminary cost estimate of $7.3 million.

Alternative 2 includes converting 4th Avenue NE to a ¾-access, converting 5th Avenue NE to a ¾-access, removing the TH 25 direct connections, converting the Mall access to ¾-access, providing a hybrid roundabout at 8th Avenue NE/TH 25, and converting 10th Avenue NE to a ¾-access.

The design of this alternative reduces the vehicle conflict points to a total of 33, a 59% reduction compared to the No Build conditions. The predicted crashes within the East Mall Area for this alternative is estimated to be 11.8 crashes in 2045, a 17% reduction from the No Build.

All intersections would operate with LOS C or better under this alternative. The roundabout intersection at 8th Avenue NE would have long queues on the single lane, minor street approaches that can reach 1,000 feet.

This alternative has a preliminary cost estimate of $7.25 million.

Alternative 3 includes converting 4th Avenue NE to a ¾-access, converting 5th Avenue NE to a ¾-access, providing a hybrid roundabout at the new TH 25 intersection with a connection into the retail area, retaining the Mall access RI/RO, providing a hybrid roundabout at 8th Avenue NE, and converting 10th Avenue NE to a ¾-access.

The design of this alternative reduces the vehicle conflict points to a total of 36, a 56% reduction compared to the No Build conditions. The predicted crashes within the East Mall Area for this alternative is estimated to be 12.4 crashes in 2045, a 13% reduction from the No Build.

All intersections would operate with a LOS A under this alternative, with the worst approach operating at a LOS C. The two separate 3-legged roundabouts not only reduce the delays, but the maximum queues are also reduced to under 600 feet on any approach.

This alternative has a preliminary cost estimate of $7.3 million.

5.1 Recommendations

Based on the analysis documented in this report, and input from the Project Management Team, Alternative 3 is recommended for the East Mall Area for the following reasons:

- Provides the best overall traffic operations at all intersections in the East Mall Area.
- Provides the 2nd lowest number of expected crashes in the 2045 design year.
  - Roundabouts also reduce severe and fatal crashes by over 85%.
- Reduces vehicle speeds through the East Mall Area under roundabout control, allowing the posted speed limit to be reduced between 5th Avenue NE and 8th Avenue NE.
- All three alternatives have similar costs.

All three alternative layouts can be found in **Appendix E.**

Appendix A

Crash Information

Intersection Safety Screening

Intersection: TH 210 at 4th Avenue NE

Crash Data: 2014 to 2018 (5-years)

Crashes by Crash Severity	
Fatal	0
Incapacitating Injury	0
Non-incapacitating Injury	1
Possible Injury	1
Property Damage	20
Total Crashes	22

Intersection Characteristics	
Entering Volume	25,400
Traffic Control	Signals
Environment	Urban
Speed Limit	35 mph

Annual crash cost = $81,000

Statewide Comparison

Signals: high volume, low speed

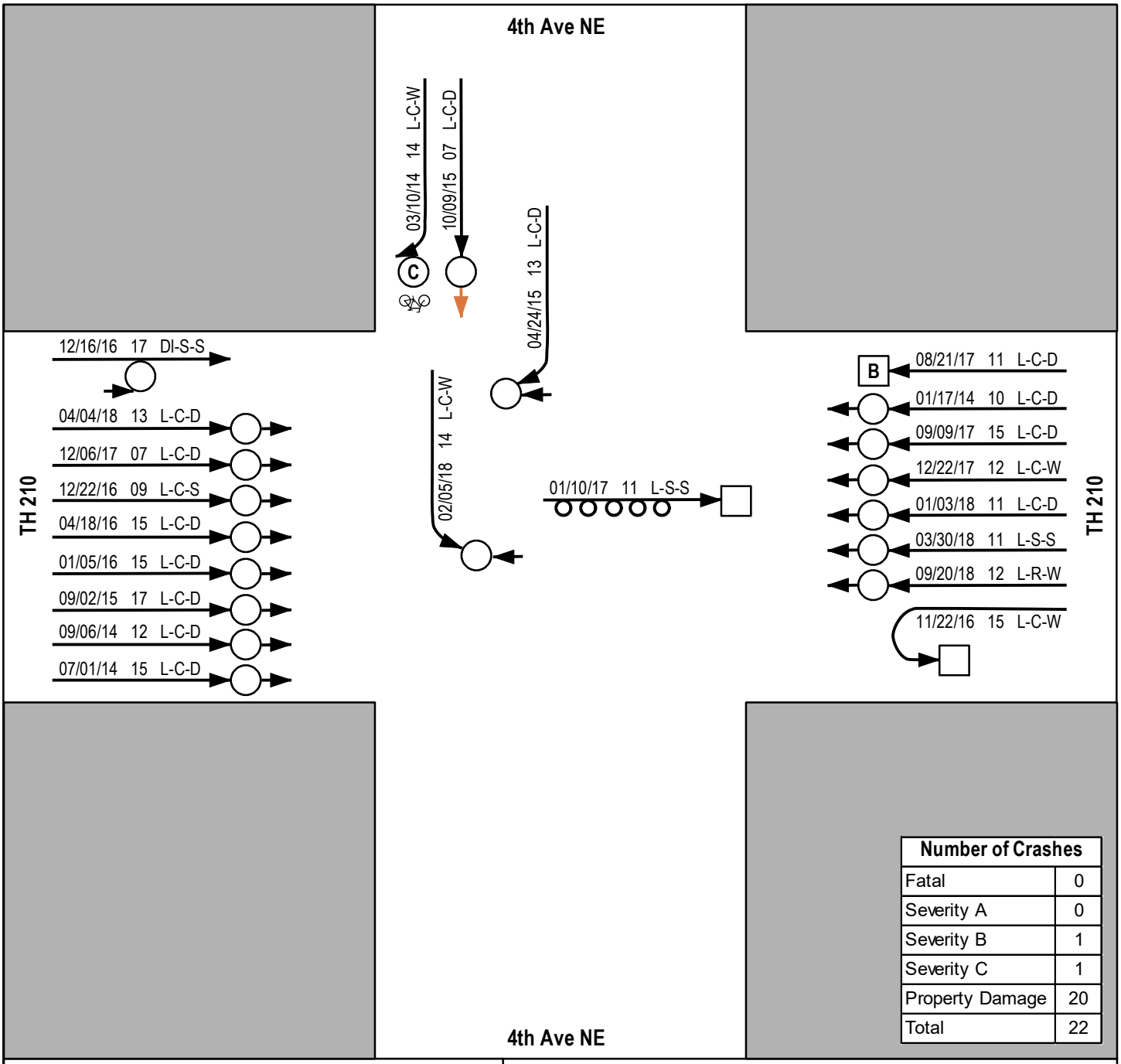
Total Crash Rate	
Observed	0.47
Statewide Average	0.70
Critical Rate	1.02
Critical Index	**0.46**

Fatal & Serious Injury Crash Rate	
Observed	0.00
Statewide Average	0.76
Critical Rate	3.49
Critical Index	**0.00**

The observed crash rate is the number of crashes per million entering vehicles (MEV). The critical rate is a statistical comparison based on similar intersections statewide. An observed crash rate greater than the critical rate indicates that the intersection operates outside the expected, normal range. The critical index reports the magnitude of this difference.

The observed total crash rate for this period is 0.47 per MEV; this is 54% below the critical rate. Based on similar statewide intersections, an additional 26 crashes over the five years would indicate this intersection operaters outside the normal range.

The observed fatal and serious injury crash rate for this period is 0.00 per 100 MEV; this is 100% below the critical rate. The intersection operates within the normal range.



Number of Crashes	
Fatal	0
Severity A	0
Severity B	1
Severity C	1
Property Damage	20
Total	22

Passenger Vehicle
Heavy Vehicle
Bus
Motorcycle
Fixed Object
Pedestrian
Bicycle

Fatal
Severity A
Severity B
Severity C
Property Damage Only
Vehicle Out of Control

Notes:

Light
L = Daylight
Dn = Dawn
Du = Dusk
Dl = Dark, Lighted
Do = Dark, Lights Off
D = Dark, Unlighted
X = Unkown

Weather
C = Clear or Cloudy
R = Rain
S = Snow/Sleet/Hail/Freexing Rain
F = Fog/Smog/Smoke
B = Blowing Sand/Dust/Snow
W = Severe Cross Winds
X = Other or Unknown

Surface
D = Dry
W = Wet or Water
S = Snow/Slush/Ice
M = Muddy
Db = Debris
O = Oily
X = Other or Unkown

Date Time(Hr) Light-Weather-Surface → Injury Type → Other Vehicle(s)

DEPARTMENT OF TRANSPORTATION

Project: MNT03 152201
Print Date: 3/15/2022

Map by: jdanibas
Projection:
Source:

Crash Diagrams (2014-2018)
TH 210 at 4th Ave NE
TH 210/Washington Street Corridor Study
Brainerd, MN

Figure A1

Path: S:\KO\M\Mnt03\152201\8-planning\Traffic\crashes\Crash Diagrams\A9_TH 210 at 4th Ave NE_Crash Diagram.mxd

Intersection Safety Screening

Intersection: TH 210 at 5th Avenue NE

Crash Data: 2014 to 2018 (5-years)

Crashes by Crash Severity	
Fatal	0
Incapacitating Injury	0
Non-incapacitating Injury	0
Possible Injury	2
Property Damage	5
Total Crashes	7

Intersection Characteristics	
Entering Volume	25,750
Traffic Control	Other
Environment	Urban
Speed Limit	35 mph

Annual crash cost = $40,800

Statewide Comparison *Other Unsignalized*

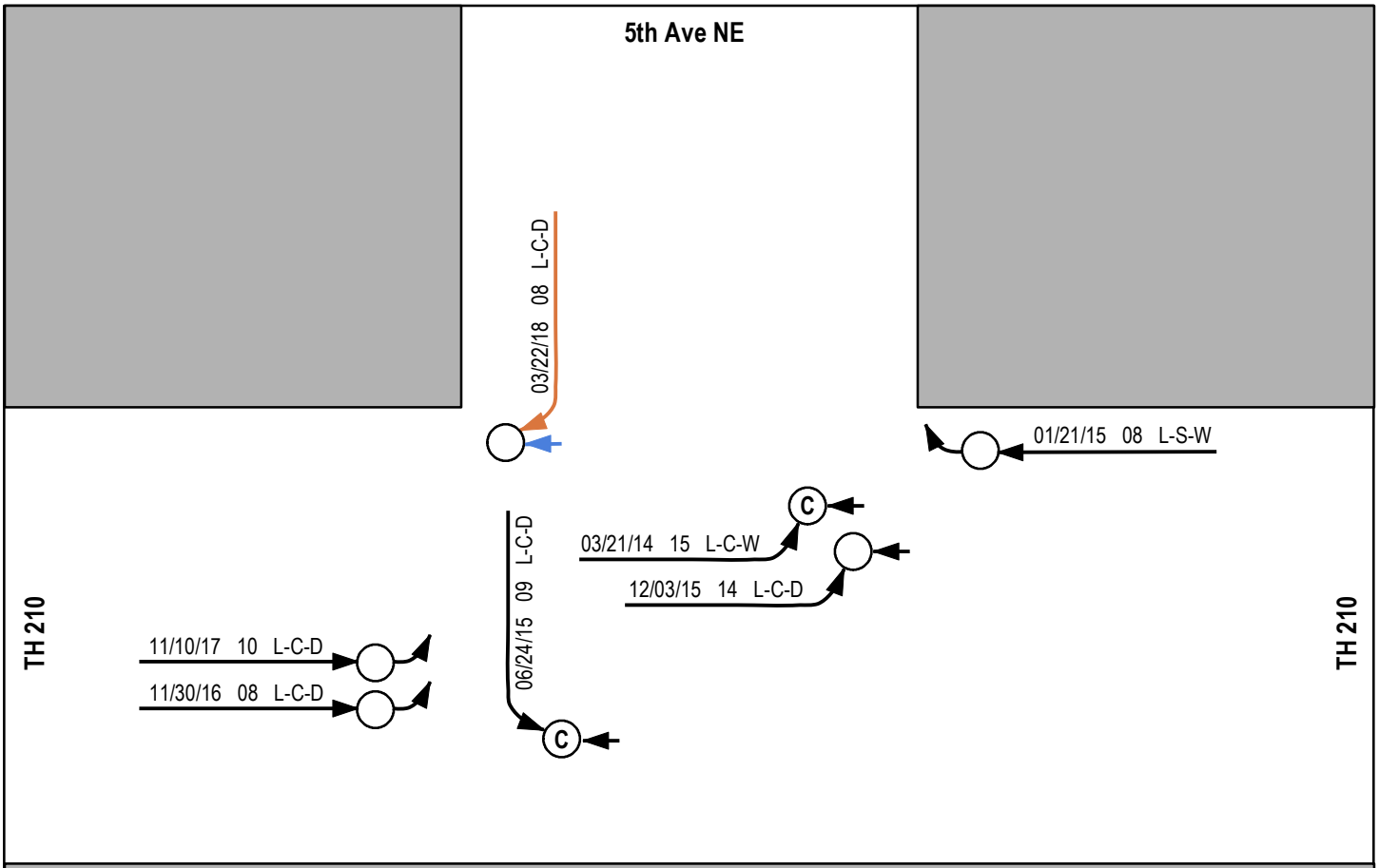
Total Crash Rate	
Observed	0.15
Statewide Average	0.16
Critical Rate	0.32
Critical Index	**0.47**

Fatal & Serious Injury Crash Rate	
Observed	0.00
Statewide Average	0.17
Critical Rate	2.00
Critical Index	**0.00**

The observed crash rate is the number of crashes per million entering vehicles (MEV). The critical rate is a statistical comparison based on similar intersections statewide. An observed crash rate greater than the critical rate indicates that the intersection operates outside the expected, normal range. The critical index reports the magnitude of this difference.

The observed total crash rate for this period is 0.15 per MEV; this is 53% below the critical rate. Based on similar statewide intersections, an additional 9 crashes over the five years would indicate this intersection operaters outside the normal range.

The observed fatal and serious injury crash rate for this period is 0.00 per 100 MEV; this is 100% below the critical rate. The intersection operates within the normal range.



Number of Crashes	
Fatal	0
Severity A	0
Severity B	0
Severity C	2
Property Damage	5
Total	7

Passenger Vehicle
Heavy Vehicle
Bus
Motorcycle
Fixed Object
Pedestrian
Bicycle

Fatal
Severity A
Severity B
Severity C
Property Damage Only
Vehicle Out of Control

Notes:

Light
L = Daylight
Dn = Dawn
Du = Dusk
Dl = Dark, Lighted
Do = Dark, Lights Off
D = Dark, Unlighted
X = Unkown

Weather
C = Clear or Cloudy
R = Rain
S = Snow/Sleet/Hail/Freexing Rain
F = Fog/Smog/Smoke
B = Blowing Sand/Dust/Snow
W = Severe Cross Winds
X = Other or Unknown

Surface
D = Dry
W = Wet or Water
S = Snow/Slush/Ice
M = Muddy
Db = Debris
O = Oily
X = Other or Unkown

Date Time(Hr) Light-Weather-Surface → Injury Type → Other Vehicle(s)

DEPARTMENT OF TRANSPORTATION

Project: MNT03 152201
Print Date: 3/15/2022

Map by: jdanibas
Projection:
Source:

Crash Diagrams (2014-2018)
TH 210 at 5th Ave NE
TH 210/Washington Street Corridor Study
Brainerd, MN

Figure A2

Path: S:\KO\M\Mnt03\152201\8-planning\Traffic\crashes\Crash Diagrams\A10_TH 210 at 5th Ave NE_Crash Diagram.mxd

Intersection Safety Screening

Intersection: TH 210 at TH 25 EB Off Ramp

Crash Data: 2014 to 2018 (5-years)

Crashes by Crash Severity	
Fatal	0
Incapacitating Injury	0
Non-incapacitating Injury	0
Possible Injury	0
Property Damage	2
Total Crashes	2

Intersection Characteristics	
Entering Volume	19,900
Traffic Control	Other
Environment	Urban
Speed Limit	45 mph

Annual crash cost = $3,040

Statewide Comparison *Other Unsignalized*

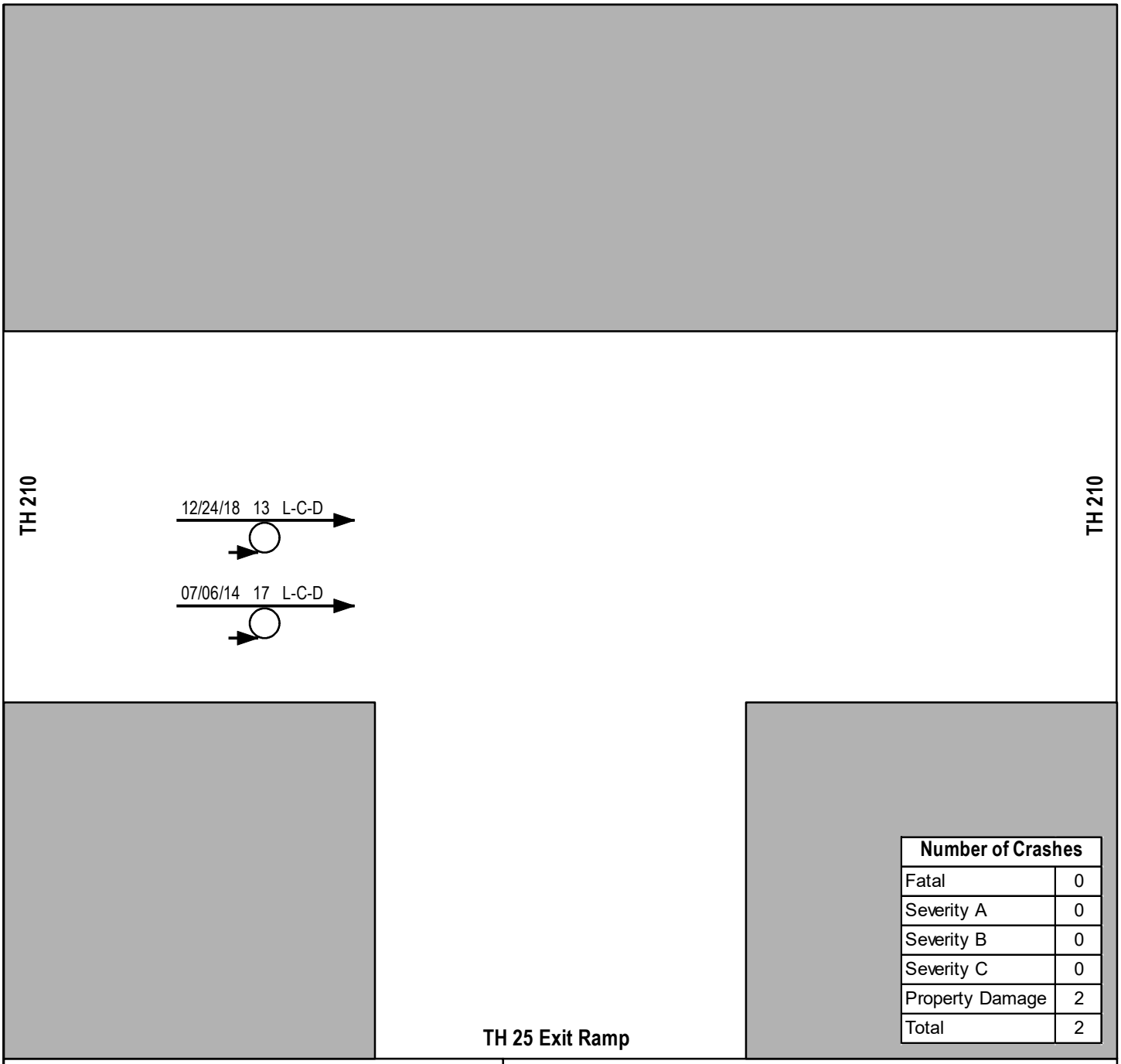
Total Crash Rate	
Observed	0.06
Statewide Average	0.16
Critical Rate	0.34
Critical Index	**0.18**

Fatal & Serious Injury Crash Rate	
Observed	0.00
Statewide Average	0.17
Critical Rate	2.42
Critical Index	**0.00**

The observed crash rate is the number of crashes per million entering vehicles (MEV). The critical rate is a statistical comparison based on similar intersections statewide. An observed crash rate greater than the critical rate indicates that the intersection operates outside the expected, normal range. The critical index reports the magnitude of this difference.

The observed total crash rate for this period is 0.06 per MEV; this is 82% below the critical rate. Based on similar statewide intersections, an additional 11 crashes over the five years would indicate this intersection operaters outside the normal range.

The observed fatal and serious injury crash rate for this period is 0.00 per 100 MEV; this is 100% below the critical rate. The intersection operates within the normal range.



Number of Crashes	
Fatal	0
Severity A	0
Severity B	0
Severity C	0
Property Damage	2
Total	2

Passenger Vehicle
Heavy Vehicle
Bus
Motorcycle
Fixed Object
Pedestrian
Bicycle

Fatal
Severity A
Severity B
Severity C
Property Damage Only
Vehicle Out of Control

Notes:

Light
L = Daylight
Dn = Dawn
Du = Dusk
Dl = Dark, Lighted
Do = Dark, Lights Off
D = Dark, Unlighted
X = Unkown

Weather
C = Clear or Cloudy
R = Rain
S = Snow/Sleet/Hail/Freexing Rain
F = Fog/Smog/Smoke
B = Blowing Sand/Dust/Snow
W = Severe Cross Winds
X = Other or Unknown

Surface
D = Dry
W = Wet or Water
S = Snow/Slush/Ice
M = Muddy
Db = Debris
O = Oily
X = Other or Unkown

Date Time(Hr) Light-Weather-Surface → Injury Type → Other Vehicle(s)

DEPARTMENT OF TRANSPORTATION

Project: MNT03 152201
Print Date: 3/15/2022

Map by: jdanibas
Projection:
Source:

Crash Diagrams (2014-2018)
TH 210 at TH 25 Exit Ramp
TH 210/Washington Street Corridor Study
Brainerd, MN

Figure A3

Path: S:\KO\M\Mnt03\152201\8-planning\Traffic\crashes\Crash Diagrams\A11_TH 210 at TH 25 Exit Ramp_Crash Diagram.mxd

Intersection Safety Screening

Intersection: TH 210 at TH 25 T-Intersection

Crash Data: 2014 to 2018 (5-years)

Crashes by Crash Severity	
Fatal	0
Incapacitating Injury	1
Non-incapacitating Injury	1
Possible Injury	2
Property Damage	8
Total Crashes	12

Intersection Characteristics	
Entering Volume	18,200
Traffic Control	Thru / stop
Environment	Urban
Speed Limit	45 mph

Annual crash cost = $193,360

Statewide Comparison *Urban Thru / Stop*

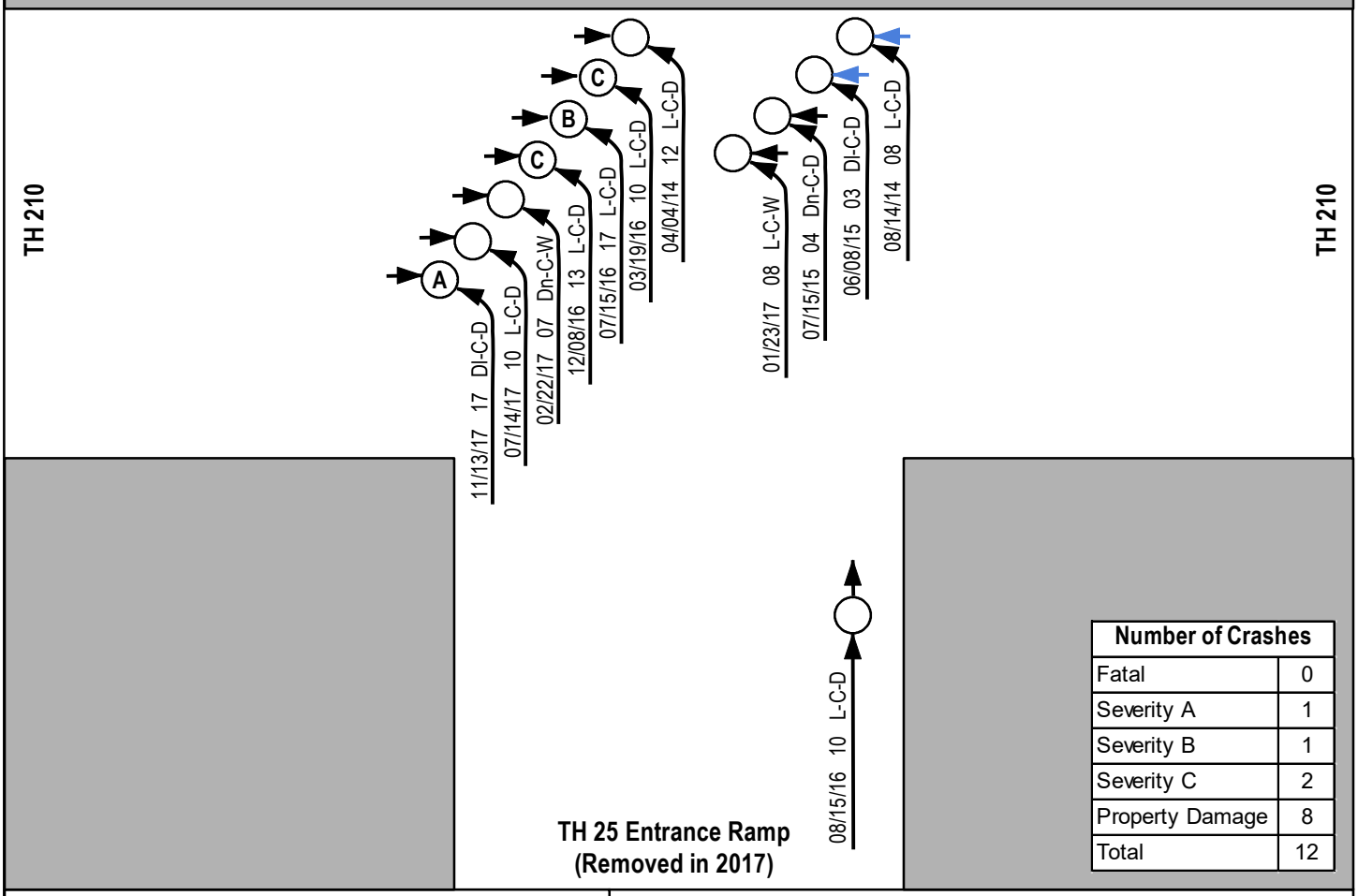
Total Crash Rate	
Observed	0.36
Statewide Average	0.18
Critical Rate	0.39
Critical Index	**0.92**

Fatal & Serious Injury Crash Rate	
Observed	3.01
Statewide Average	0.33
Critical Rate	3.10
Critical Index	**0.97**

The observed crash rate is the number of crashes per million entering vehicles (MEV). The critical rate is a statistical comparison based on similar intersections statewide. An observed crash rate greater than the critical rate indicates that the intersection operates outside the expected, normal range. The critical index reports the magnitude of this difference.

The observed total crash rate for this period is 0.36 per MEV; this is 8% below the critical rate. Based on similar statewide intersections, an additional 1 crashes over the five years would indicate this intersection operaters outside the normal range.

The observed fatal and serious injury crash rate for this period is 3.01 per 100 MEV; this is 3% below the critical rate. The intersection operates within the normal range.



Number of Crashes	
Fatal	0
Severity A	1
Severity B	1
Severity C	2
Property Damage	8
Total	12

Passenger Vehicle
Heavy Vehicle
Bus
Motorcycle
Fixed Object
Pedestrian
Bicycle

Fatal
Severity A
Severity B
Severity C
Property Damage Only
Vehicle Out of Control

Light
L = Daylight
Dn = Dawn
Du = Dusk
Dl = Dark, Lighted
Do = Dark, Lights Off
D = Dark, Unlighted
X = Unkown

Weather
C = Clear or Cloudy
R = Rain
S = Snow/Sleet/Hail/Freexing Rain
F = Fog/Smog/Smoke
B = Blowing Sand/Dust/Snow
W = Severe Cross Winds
X = Other or Unknown

Surface
D = Dry
W = Wet or Water
S = Snow/Slush/Ice
M = Muddy
Db = Debris
O = Oily
X = Other or Unkown

Date Time(Hr) Light-Weather-Surface → Injury Type → Other Vehicle(s)

Notes:
The TH 25 entrance ramp was closed in 2017

Path: S:\KO\M\Mnt03\152201\8-planning\Traffic\crashes\Crash Diagrams\A12_TH 210 at TH 25 Entrance Ramp_Crash Diagram.mxd

DEPARTMENT OF TRANSPORTATION

Project: MNT03 152201
Print Date: 3/15/2022

Map by: jdanibas
Projection:
Source:

Crash Diagrams (2014-2018)
TH 210 at TH 25 Entrance Ramp
TH 210/Washington Street Corridor Study
Brainerd, MN

Figure A4

Intersection Safety Screening

Intersection: TH 210 at 8th Avenue (CSAH 3)/TH 25

Crash Data: 2014 to 2018 (5-years)

Crashes by Crash Severity	
Fatal	0
Incapacitating Injury	0
Non-incapacitating Injury	0
Possible Injury	8
Property Damage	20
Total Crashes	28

Intersection Characteristics	
Entering Volume	20,680
Traffic Control	Signals
Environment	Urban
Speed Limit	50 mph

Annual crash cost = $163,200

Statewide Comparison

Signals: high volume, high speed

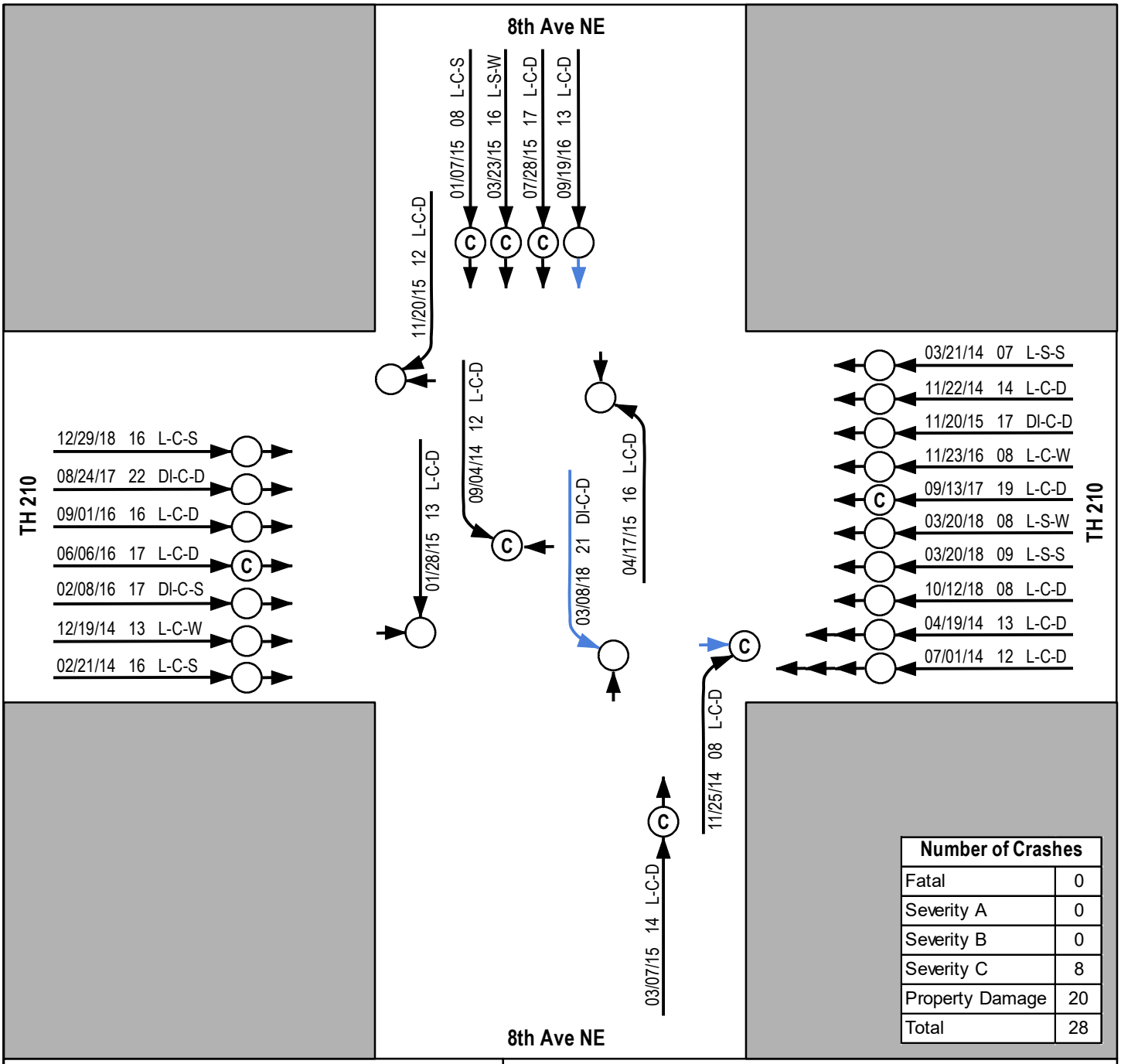
Total Crash Rate	
Observed	0.74
Statewide Average	0.45
Critical Rate	0.75
Critical Index	**0.99**

Fatal & Serious Injury Crash Rate	
Observed	0.00
Statewide Average	0.48
Critical Rate	3.24
Critical Index	**0.00**

The observed crash rate is the number of crashes per million entering vehicles (MEV). The critical rate is a statistical comparison based on similar intersections statewide. An observed crash rate greater than the critical rate indicates that the intersection operates outside the expected, normal range. The critical index reports the magnitude of this difference.

The observed total crash rate for this period is 0.74 per MEV; this is 1% below the critical rate. Based on similar statewide intersections, an additional 1 crashes over the five years would indicate this intersection operaters outside the normal range.

The observed fatal and serious injury crash rate for this period is 0.00 per 100 MEV; this is 100% below the critical rate. The intersection operates within the normal range.



Number of Crashes	
Fatal	0
Severity A	0
Severity B	0
Severity C	8
Property Damage	20
Total	28

Passenger Vehicle
Heavy Vehicle
Bus
Motorcycle
Fixed Object
Pedestrian
Bicycle

Fatal
Severity A
Severity B
Severity C
Property Damage Only
Vehicle Out of Control

Notes:

Light
L = Daylight
Dn = Dawn
Du = Dusk
Dl = Dark, Lighted
Do = Dark, Lights Off
D = Dark, Unlighted
X = Unkown

Weather
C = Clear or Cloudy
R = Rain
S = Snow/Sleet/Hail/Freexing Rain
F = Fog/Smog/Smoke
B = Blowing Sand/Dust/Snow
W = Severe Cross Winds
X = Other or Unknown

Surface
D = Dry
W = Wet or Water
S = Snow/Slush/Ice
M = Muddy
Db = Debris
O = Oily
X = Other or Unkown

Date Time(Hr) Light-Weather-Surface → Injury Type → Other Vehicle(s)

DEPARTMENT OF TRANSPORTATION

Project: MNT03 152201
Print Date: 3/15/2022
Map by: jdanibas
Projection:
Source:

Crash Diagrams (2014-2018)
TH 210 at 8th Ave NE
TH 210/Washington Street Corridor Study
Brainerd, MN

Figure A5

Path: S:\KO\M\Mnt03\152201\8-planning\Traffic\crashes\Crash Diagrams\A13_TH 210 at 8th Ave NE_Crash Diagram.mxd

Intersection Safety Screening

Intersection: TH 210 at 10th Avenue NE

Crash Data: 2014 to 2018 (5-years)

Crashes by Crash Severity	
Fatal	0
Incapacitating Injury	1
Non-incapacitating Injury	0
Possible Injury	0
Property Damage	3
Total Crashes	4

Intersection Characteristics	
Entering Volume	12,750
Traffic Control	Thru / stop
Environment	Rural
Speed Limit	45 mph

Annual crash cost = $118,560

Statewide Comparison *Rural Thru / Stop*

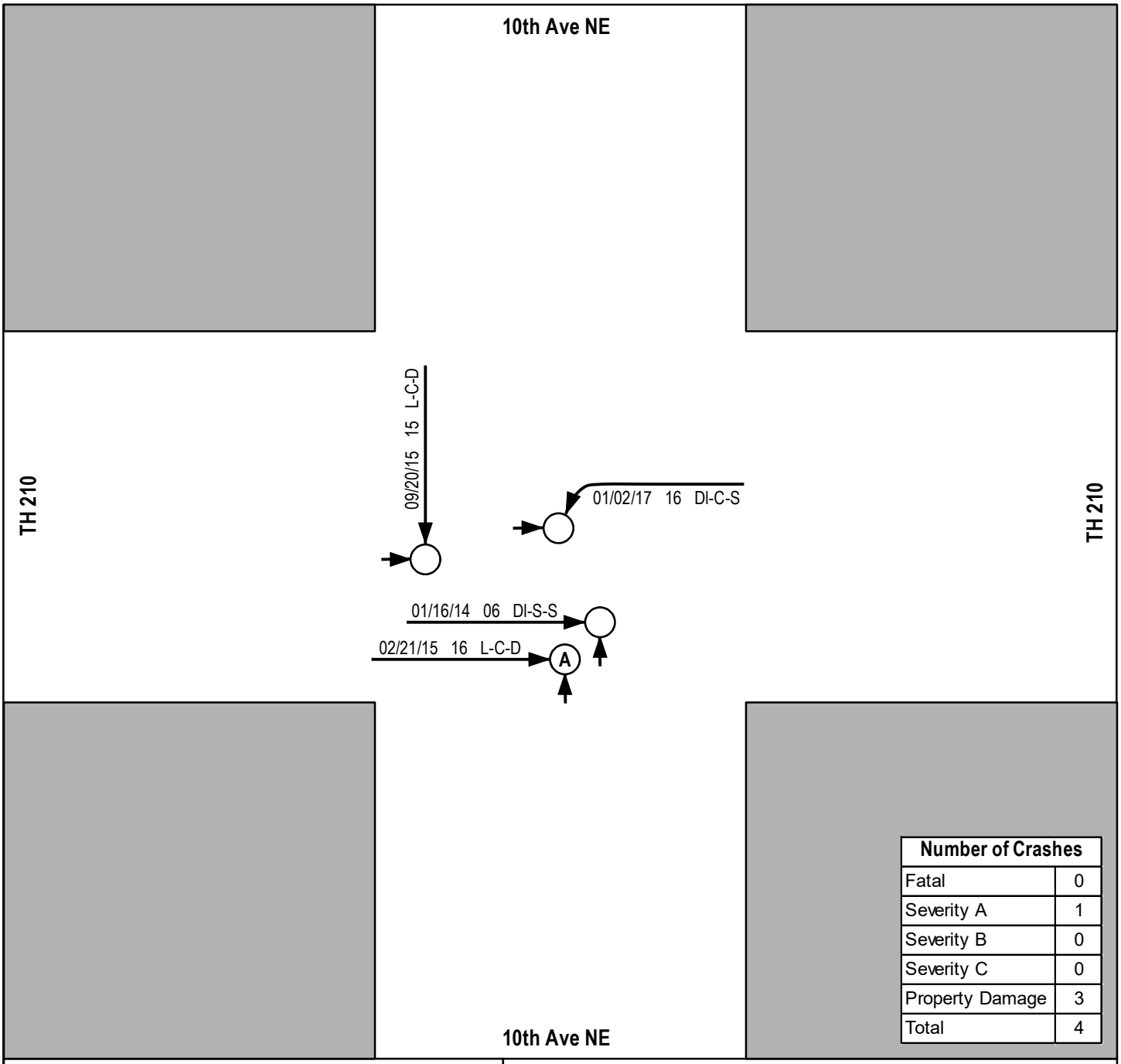
Total Crash Rate	
Observed	0.17
Statewide Average	0.25
Critical Rate	0.54
Critical Index	**0.31**

Fatal & Serious Injury Crash Rate	
Observed	4.30
Statewide Average	1.05
Critical Rate	5.92
Critical Index	**0.73**

The observed crash rate is the number of crashes per million entering vehicles (MEV). The critical rate is a statistical comparison based on similar intersections statewide. An observed crash rate greater than the critical rate indicates that the intersection operates outside the expected, normal range. The critical index reports the magnitude of this difference.

The observed total crash rate for this period is 0.17 per MEV; this is 69% below the critical rate. Based on similar statewide intersections, an additional 9 crashes over the five years would indicate this intersection operaters outside the normal range.

The observed fatal and serious injury crash rate for this period is 4.30 per 100 MEV; this is 27% below the critical rate. The intersection operates within the normal range.



Number of Crashes	
Fatal	0
Severity A	1
Severity B	0
Severity C	0
Property Damage	3
Total	4

Passenger Vehicle
Heavy Vehicle
Bus
Motorcycle
Fixed Object
Pedestrian
Bicycle

Fatal
Severity A
Severity B
Severity C
Property Damage Only
Vehicle Out of Control

Notes:

Light
L = Daylight
Dn = Dawn
Du = Dusk
Dl = Dark, Lighted
Do = Dark, Lights Off
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X = Unkown

Weather
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R = Rain
S = Snow/Sleet/Hail/Freexing Rain
F = Fog/Smog/Smoke
B = Blowing Sand/Dust/Snow
W = Severe Cross Winds
X = Other or Unknown

Surface
D = Dry
W = Wet or Water
S = Snow/Slush/Ice
M = Muddy
Db = Debris
O = Oily
X = Other or Unkown

Date Time(Hr) Light-Weather-Surface → Injury Type → Other Vehicle(s)

Path: S:\KO\M\Mnt03\152201\8-planning\Traffic\crashes\Crash Diagrams\A14_TH 210 at 10th Ave NE_Crash Diagram.mxd

DEPARTMENT OF TRANSPORTATION

Project: MNT03 152201
Print Date: 3/15/2022

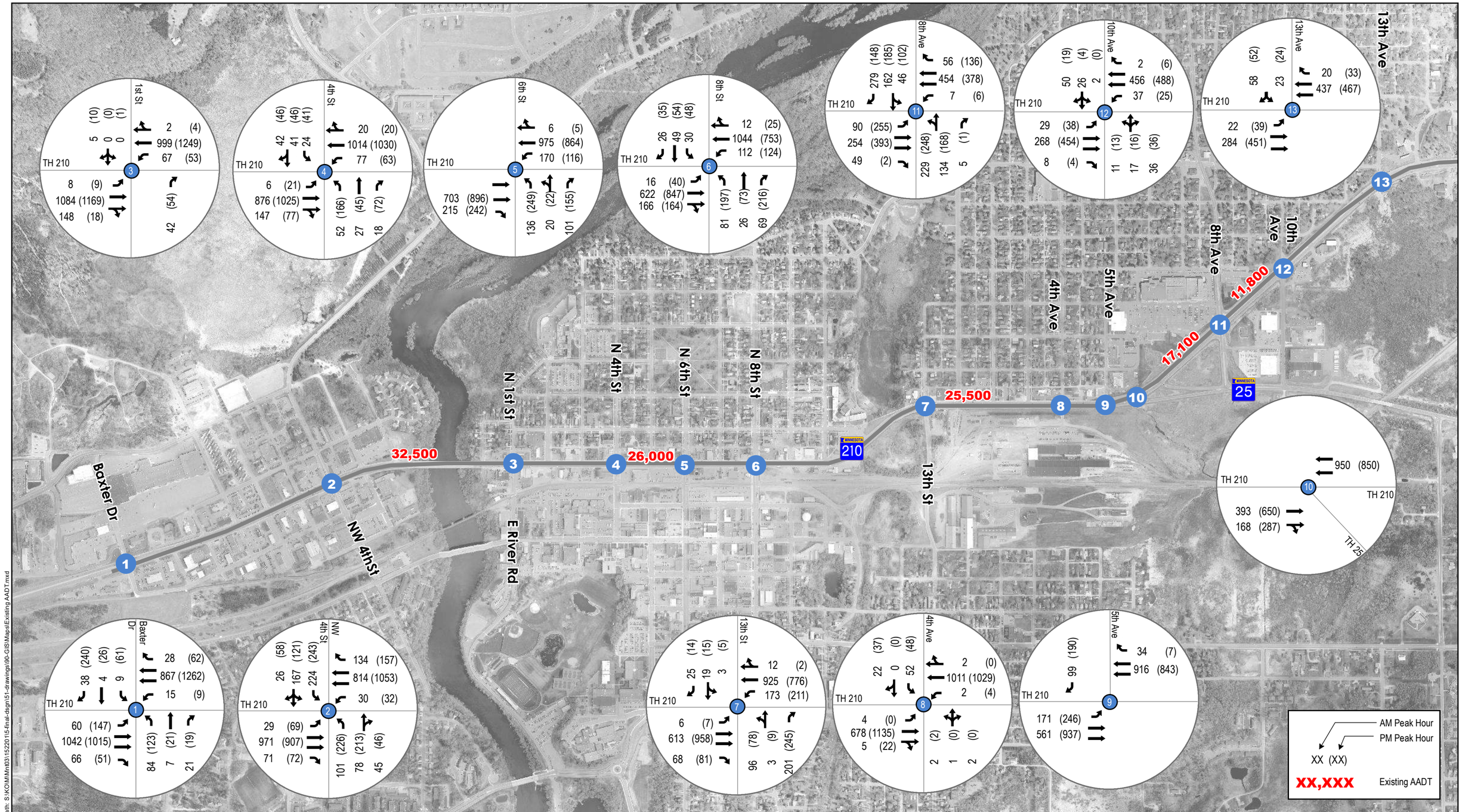
Map by: jdanibas
Projection:
Source:

Crash Diagrams (2014-2018)
TH 210 at 10th Ave NE
TH 210/Washington Street Corridor Study
Brainerd, MN

Figure A6

Appendix B

Traffic Volumes



Path: S:\KO\M\Mnt03\152201\5-final-dsgn\51-drawings\90-GIS\Maps\Existing AADT.mxd

DEPARTMENT OF TRANSPORTATION

0 250 500 1,000 Feet

Project: MNT01 152201
Print Date: 3/15/2022

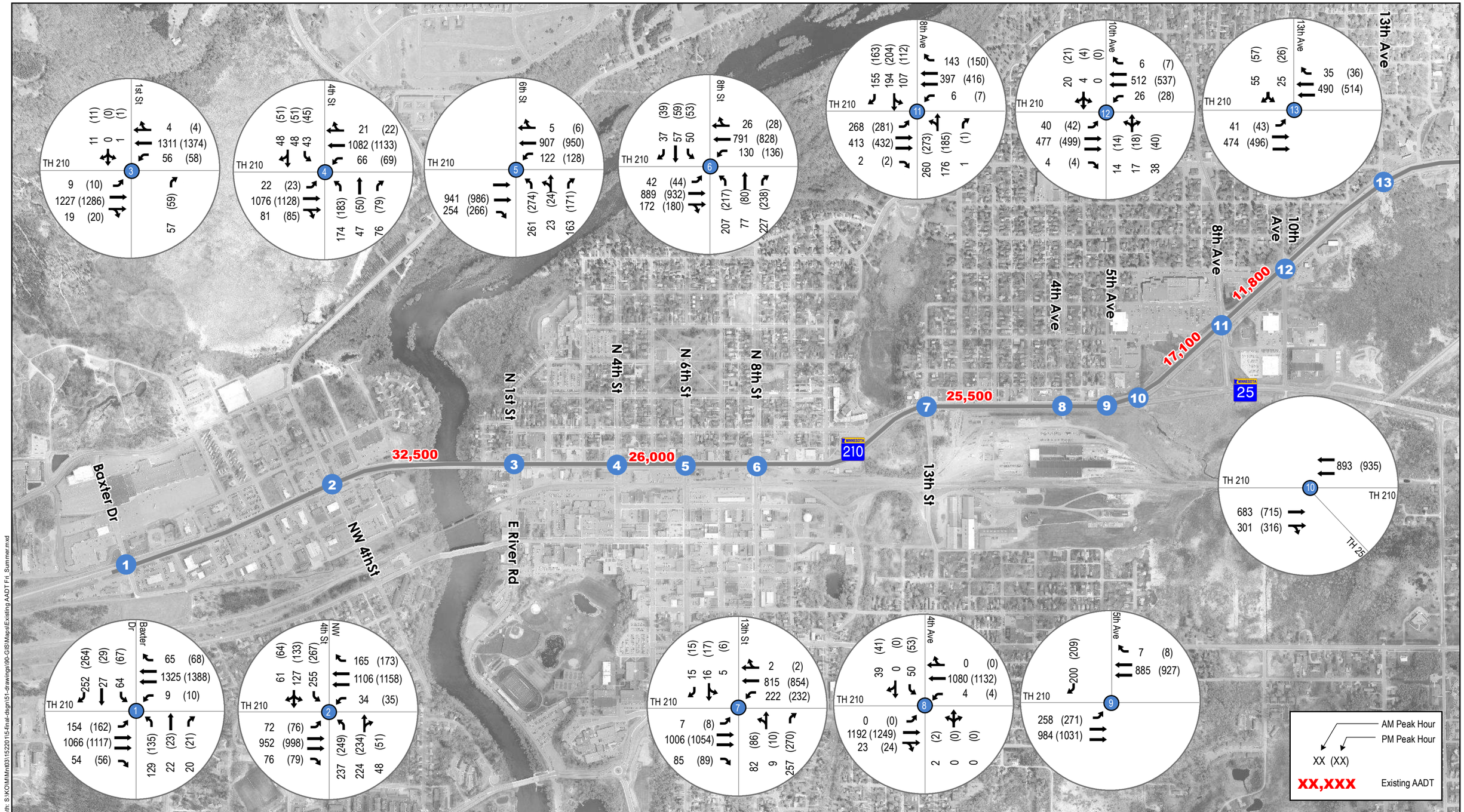
User Name: jdanibas
Projection: Crow Wing County Coords.
Source:

2019 Existing Conditions - AM / PM Weekday

TH 210/Washington Street Corridor Study
Brainerd, Minnesota

Figure B1

This map is neither a legally recorded map nor a survey map and is not intended to be used as one. This map is a compilation of records, information, and data gathered from various sources listed on this map and is to be used for reference purposes only. SEH does not warrant that the Geographic Information System (GIS) Data used to prepare this map are error free, and SEH does not represent that the GIS Data can be used for navigational, tracking, or any other purpose requiring exacting measurement of distance or direction or precision in the depiction of geographic features. The user of this map acknowledges that SEH shall not be liable for any damages which arise out of the user's access or use of data provided.



Path: S:\KO\M\Mnt03\152201\5-final-dsgn\51-drawings\90-GIS\Maps\Existing AADT Fri_Summer.mxd

DEPARTMENT OF TRANSPORTATION

0 250 500 1,000 Feet

Project: MNT01 152201
Print Date: 3/15/2022

User Name: jdanibas
Projection: Crow Wing County Coords.
Source:

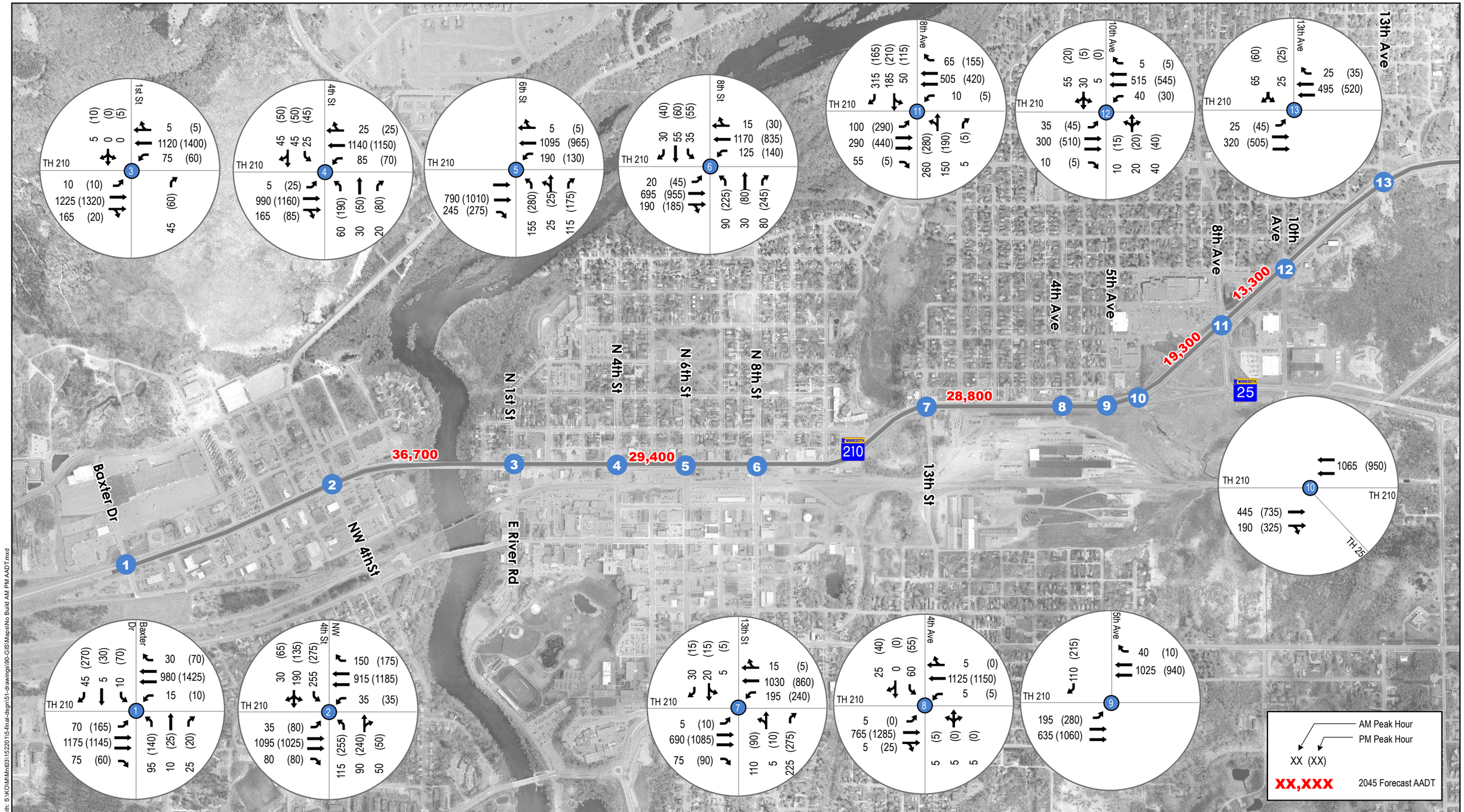
2019 Existing Conditions - Friday and Summer

TH 210/Washington Street Corridor Study

Brainerd, Minnesota

Figure B2

This map is neither a legally recorded map nor a survey map and is not intended to be used as one. This map is a compilation of records, information, and data gathered from various sources listed on this map and is to be used for reference purposes only. SEH does not warrant that the Geographic Information System (GIS) Data used to prepare this map are error free, and SEH does not represent that the GIS Data can be used for navigational, tracking, or any other purpose requiring exacting measurement of distance or direction or precision in the depiction of geographic features. The user of this map acknowledges that SEH shall not be liable for any damages which arise out of the user's access or use of data provided.



Path: S:\KO\M\Mnt03\152201\5-final-dsgn\51-drawings\90-GIS\Maps\No Build AM PM AADT.mxd

DEPARTMENT OF TRANSPORTATION

0 250 500 1,000 Feet

Project: MNT01 152201
Print Date: 3/15/2022

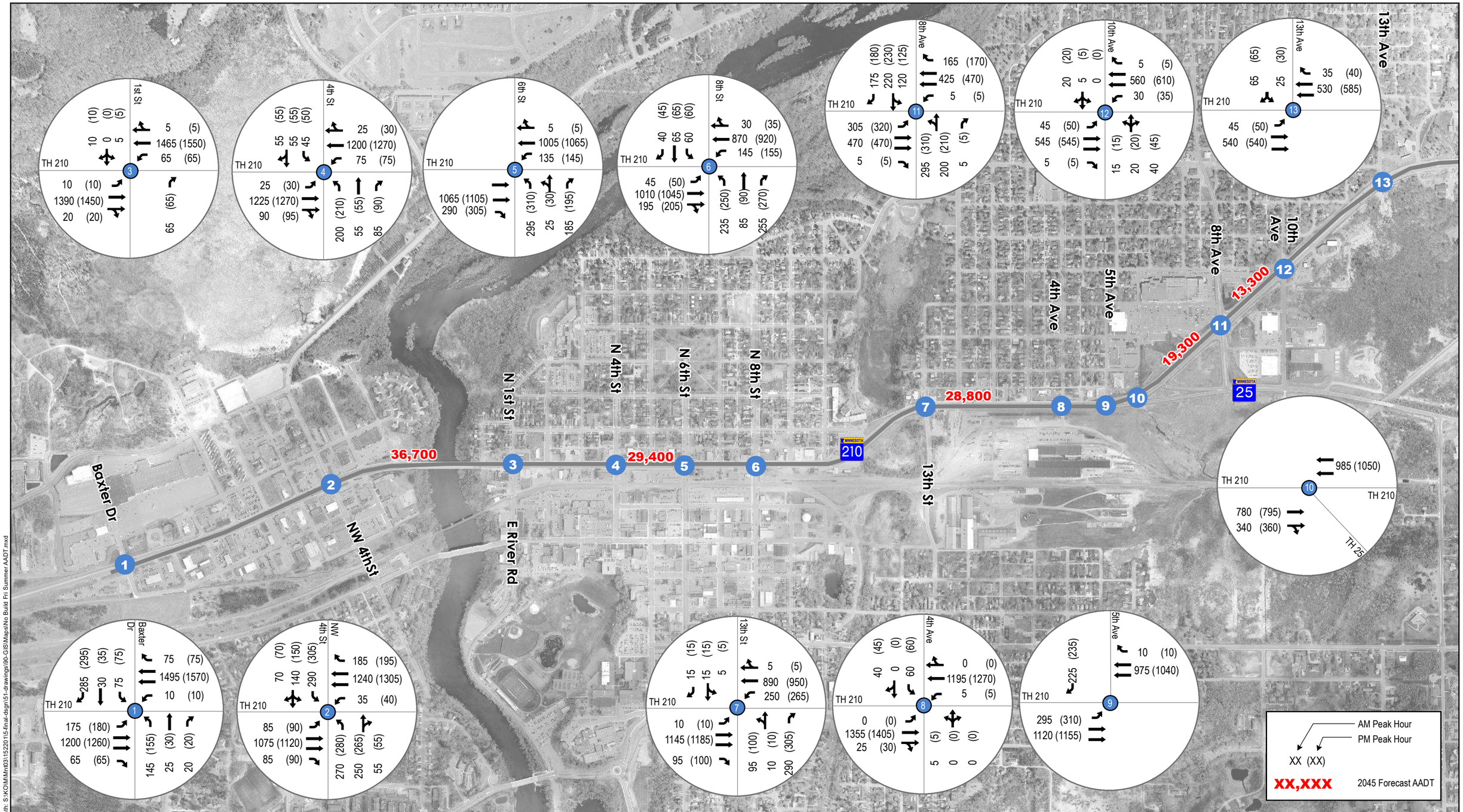
User Name: jdanibas
Projection: Crow Wing County Coords.
Source:

2045 No Build Conditions - AM / PM Weekday

TH 210/Washington Street Corridor Study
Brainerd, Minnesota

Figure B3

This map is neither a legally recorded map nor a survey map and is not intended to be used as one. This map is a compilation of records, information, and data gathered from various sources listed on this map and is to be used for reference purposes only. SEH does not warrant that the Geographic Information System (GIS) Data used to prepare this map are error free, and SEH does not represent that the GIS Data can be used for navigational, tracking, or any other purpose requiring exacting measurement of distance or direction or precision in the depiction of geographic features. The user of this map acknowledges that SEH shall not be liable for any damages which arise out of the user's access or use of data provided.



Path: S:\KO\M\Mnt03\152201\5-final-dsgn\51-drawings\90-GIS\Maps\No Build Fri Summer AADT.mxd

DEPARTMENT OF TRANSPORTATION

0 250 500 1,000 Feet

Project: MNT01 152201
Print Date: 3/15/2022

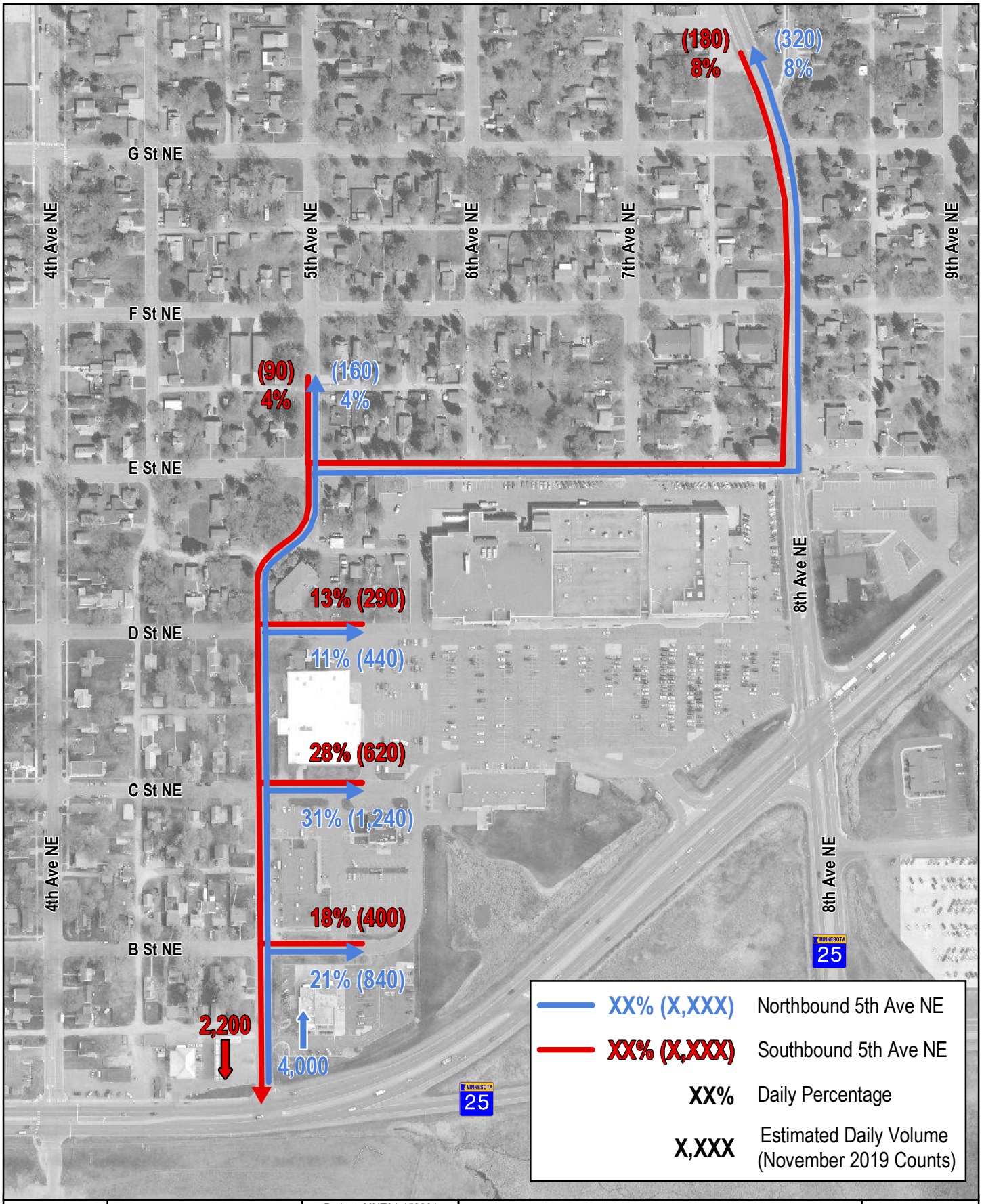
User Name: jdanibas
Projection: Crow Wing County Coords.
Source:

2045 No Build Conditions - Friday and Summer

TH 210/Washington Street Corridor Study
Brainerd, Minnesota

Figure B4

This map is neither a legally recorded map nor a survey map and is not intended to be used as one. This map is a compilation of records, information, and data gathered from various sources listed on this map and is to be used for reference purposes only. SEH does not warrant that the Geographic Information System (GIS) Data used to prepare this map are error free, and SEH does not represent that the GIS Data can be used for navigational, tracking, or any other purpose requiring exacting measurement of distance or direction or precision in the depiction of geographic features. The user of this map acknowledges that SEH shall not be liable for any damages which arise out of the user's access or use of data provided.



Path: S:\KO\M\Mnt03\152201\5-final-dsgn\51-drawings\90-GIS\Maps\5th Ave OD.mxd

Project: MNT01 152201
Print Date: 2/18/2020

Map by: jdanibas
Projection: Crow Wing Co. Coords.
Source:

5th Avenue NE Origin-Destination

TH 210/Washington Street Corridor Study
Brainerd, MN

Figure B5

This map is neither a legally recorded map nor a survey map and is not intended to be used as one. This map is a compilation of records, information, and data gathered from various sources listed on this map and is to be used for reference purposes only. SEH does not warrant that the Geographic Information System (GIS) Data used to prepare this map are error free, and SEH does not represent that the GIS Data can be used for navigational, tracking, or any other purpose requiring exacting measurement of distance or direction or precision in the depiction of geographic features. The user of this map acknowledges that SEH shall not be liable for any damages which arise out of the user's access or use of data provided.

JAMAR Technologies, Inc.
151 Keith Valley Road
Horsham, PA 19044
File Name : TH 210 & 4th Ave NE_AM_Brainerd_
Site Code : 00000000
Start Date : 10/21/2019
Page No : 1

Change These In PREFERENCES

Groups Printed- Unshifted

	4th Ave NE From North					TH210 From East					4th Ave NE From South					TH210 From West					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
Factor	1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0		
06:00 AM	3	0	2	0	5	0	56	6	0	62	0	0	0	0	0	0	54	0	0	54	121
06:15 AM	4	0	0	0	4	1	109	12	0	122	0	0	1	0	1	4	79	0	0	83	210
06:30 AM	3	1	2	0	6	0	142	21	0	163	0	0	0	0	0	8	101	0	0	109	278
06:45 AM	5	2	2	0	9	0	155	11	1	167	0	0	0	0	0	13	91	2	0	106	282
Total	15	3	6	0	24	1	462	50	1	514	0	0	1	0	1	25	325	2	0	352	891
07:00 AM	4	0	0	0	4	0	139	0	0	139	0	0	0	0	0	2	101	1	0	104	247
07:15 AM	9	0	1	0	10	0	217	0	0	217	0	0	0	0	0	0	136	1	0	137	364
07:30 AM	14	0	9	0	23	0	245	0	0	245	0	0	1	0	1	0	163	3	0	166	435
07:45 AM	12	0	5	0	17	2	307	0	0	309	0	0	0	0	0	1	189	2	0	192	518
Total	39	0	15	0	54	2	908	0	0	910	0	0	1	0	1	3	589	7	0	599	1564
08:00 AM	16	0	4	0	20	0	213	1	0	214	1	0	1	0	2	2	170	0	0	172	408
08:15 AM	10	0	4	0	14	0	195	1	0	196	1	1	0	0	2	1	156	0	0	157	369
08:30 AM	6	1	0	0	7	0	196	0	0	196	0	0	1	0	1	0	140	1	0	141	345
08:45 AM	4	0	4	0	8	0	186	0	0	186	0	0	0	0	0	0	119	2	0	121	315
Total	36	1	12	0	49	0	790	2	0	792	2	1	2	0	5	3	585	3	0	591	1437
09:00 AM	3	0	4	0	7	0	167	1	0	168	3	0	0	0	3	1	134	2	0	137	315
09:15 AM	4	0	2	0	6	1	159	2	0	162	0	0	0	0	0	0	125	4	0	129	297
09:30 AM	4	0	3	0	7	1	181	1	0	183	1	0	3	0	4	0	151	1	0	152	346
09:45 AM	6	0	1	0	7	0	196	0	0	196	0	0	1	0	1	0	128	3	0	131	335
Total	17	0	10	0	27	2	703	4	0	709	4	0	4	0	8	1	538	10	0	549	1293
10:00 AM	6	0	2	0	8	0	148	0	0	148	0	0	0	0	0	0	150	4	0	154	310
10:15 AM	11	0	3	0	14	2	187	0	0	189	0	0	0	0	0	1	114	1	0	116	319
10:30 AM	8	0	3	0	11	1	189	1	0	191	0	0	0	0	0	1	175	4	0	180	382
10:45 AM	7	1	10	0	18	1	236	0	0	237	0	0	2	0	2	0	140	2	0	142	399
Total	32	1	18	0	51	4	760	1	0	765	0	0	2	0	2	2	579	11	0	592	1410
11:00 AM	6	0	2	0	8	1	215	1	0	217	0	0	0	0	0	0	172	4	0	176	401
11:15 AM	7	0	8	0	15	2	197	1	0	200	0	0	2	0	2	1	172	4	0	177	394
11:30 AM	13	1	7	0	21	1	210	2	0	213	1	0	1	0	2	1	210	7	0	218	454
11:45 AM	10	0	4	0	14	1	224	0	0	225	1	0	1	0	2	0	167	6	0	173	414
Total	36	1	21	0	58	5	846	4	0	855	2	0	4	0	6	2	721	21	0	744	1663
12:00 PM	12	4	6	0	22	2	198	2	0	202	9	0	3	0	12	5	196	3	0	204	440
12:15 PM	11	0	12	0	23	3	219	4	0	226	0	0	0	0	0	1	185	5	0	191	440
Grand Total	198	10	100	0	308	19	4886	67	1	4973	17	1	17	0	35	42	3718	62	0	3822	9138
Apprch %	64.3	3.2	32.5	0.0		0.4	98.3	1.3	0.0		48.6	2.9	48.6	0.0		1.1	97.3	1.6	0.0		
Total %	2.2	0.1	1.1	0.0	3.4	0.2	53.5	0.7	0.0	54.4	0.2	0.0	0.2	0.0	0.4	0.5	40.7	0.7	0.0	41.8	

JAMAR Technologies, Inc.
151 Keith Valley Road
Horsham, PA 19044
File Name : TH 210 & 4th Ave NE_PM_Brainerd_
Site Code : 00000000
Start Date : 10/16/2019
Page No : 1

Change These In PREFERENCES

Groups Printed- Unshifted

	4th Ave NE From North					TH210 From East					4th Ave NE From South					TH210 From West					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
Factor	1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0		
12:30 PM	6	0	7	0	13	2	210	0	0	212	1	0	0	0	1	1	183	5	0	189	415
12:45 PM	7	0	9	0	16	0	204	0	0	204	1	0	0	0	1	0	212	4	0	216	437
Total	13	0	16	0	29	2	414	0	0	416	2	0	0	0	2	1	395	9	0	405	852
01:00 PM	8	0	5	0	13	1	196	0	0	197	0	0	0	0	0	1	192	5	0	198	408
01:15 PM	7	0	5	1	13	1	179	3	0	183	0	0	0	0	0	0	206	3	0	209	405
01:30 PM	5	2	2	1	10	0	199	0	0	199	1	0	1	0	2	0	199	4	0	203	414
01:45 PM	10	0	4	0	14	1	192	1	0	194	0	0	0	0	0	1	186	4	0	191	399
Total	30	2	16	2	50	3	766	4	0	773	1	0	1	0	2	2	783	16	0	801	1626
02:00 PM	7	0	3	0	10	1	154	0	0	155	0	0	1	0	1	0	184	1	0	185	351
02:15 PM	10	0	12	1	23	2	175	0	0	177	1	0	0	0	1	1	232	2	0	235	436
02:30 PM	12	0	8	0	20	2	146	0	2	150	3	0	0	0	3	0	221	8	0	229	402
02:45 PM	21	0	6	0	27	1	237	0	0	238	0	0	0	0	0	1	213	8	0	222	487
Total	50	0	29	1	80	6	712	0	2	720	4	0	1	0	5	2	850	19	0	871	1676
03:00 PM	11	0	13	0	24	3	200	0	1	204	2	0	1	0	3	0	258	8	0	266	497
03:15 PM	12	0	12	0	24	0	197	0	0	197	4	1	8	0	13	0	283	3	0	286	520
03:30 PM	19	0	13	0	32	1	213	0	0	214	32	1	26	0	59	0	268	6	0	274	579
03:45 PM	11	0	3	0	14	1	241	0	0	242	0	0	0	0	0	0	272	1	0	273	529
Total	53	0	41	0	94	5	851	0	1	857	38	2	35	0	75	0	1081	18	0	1099	2125
04:00 PM	10	0	5	1	16	3	231	0	0	234	0	0	0	0	0	0	247	3	0	250	500
04:15 PM	10	0	3	0	13	2	202	0	0	204	0	0	0	0	0	0	267	5	0	272	489
04:30 PM	11	0	12	0	23	0	230	0	0	230	0	0	0	0	0	0	279	9	0	288	541
04:45 PM	9	0	8	0	17	2	237	0	0	239	2	0	0	0	2	0	251	4	0	255	513
Total	40	0	28	1	69	7	900	0	0	907	2	0	0	0	2	0	1044	21	0	1065	2043
05:00 PM	16	0	7	0	23	1	272	0	0	273	0	0	0	0	0	0	321	5	0	326	622
05:15 PM	12	0	10	0	22	1	212	0	0	213	0	0	0	0	0	0	284	4	0	288	523
05:30 PM	10	0	9	0	19	0	197	0	0	197	0	0	0	0	0	1	229	2	0	232	448
05:45 PM	6	0	4	0	10	2	184	0	0	186	1	0	0	0	1	0	231	3	0	234	431
Total	44	0	30	0	74	4	865	0	0	869	1	0	0	0	1	1	1065	14	0	1080	2024
Grand Total	230	2	160	4	396	27	4508	4	3	4542	48	2	37	0	87	6	5218	97	0	5321	10346
Apprch %	58.1	0.5	40.4	1.0		0.6	99.3	0.1	0.1		55.2	2.3	42.5	0.0		0.1	98.1	1.8	0.0		
Total %	2.2	0.0	1.5	0.0	3.8	0.3	43.6	0.0	0.0	43.9	0.5	0.0	0.4	0.0	0.8	0.1	50.4	0.9	0.0	51.4	

JAMAR Technologies, Inc.
151 Keith Valley Road
Horsham, PA 19044
Change These In PREFERENCES

5th Avenue NE

File Name : TH210 & 5th St _Brainerd
Site Code : 00000000
Start Date : 11/19/2019
Page No : 1

Groups Printed- Unshifted

	5th St From North					TH210 From East					From South					TH210 From West					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
Factor	1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0		
06:00 AM	4	0	0	0	4	4	65	0	0	69	0	1	0	0	1	0	68	9	0	77	151
06:15 AM	5	0	1	0	6	8	93	0	0	101	0	0	0	0	0	0	74	9	0	83	190
06:30 AM	9	0	0	0	9	14	130	0	0	144	0	0	0	0	0	0	98	13	0	111	264
06:45 AM	11	0	1	0	12	6	172	0	0	178	0	0	0	0	0	0	126	14	0	140	330
Total	29	0	2	0	31	32	460	0	0	492	0	1	0	0	1	0	366	45	0	411	935
07:00 AM	15	0	0	0	15	14	151	0	0	165	0	0	0	0	0	0	95	25	0	120	300
07:15 AM	16	0	0	0	16	10	215	0	0	225	0	0	0	0	0	0	115	22	0	137	378
07:30 AM	19	0	0	0	19	4	271	0	0	275	0	0	0	0	0	0	146	36	0	182	476
07:45 AM	19	0	0	0	19	11	263	0	0	274	0	0	0	0	0	0	165	55	0	220	513
Total	69	0	0	0	69	39	900	0	0	939	0	0	0	0	0	0	521	138	0	659	1667
08:00 AM	33	0	0	0	33	12	187	0	0	199	0	0	0	0	0	0	170	46	0	216	448
08:15 AM	28	0	0	0	28	7	195	0	0	202	0	0	0	0	0	0	162	34	0	196	426
08:30 AM	15	0	0	0	15	8	185	0	0	193	0	0	0	0	0	0	138	27	0	165	373
08:45 AM	28	0	0	0	28	8	182	0	0	190	0	0	0	0	0	0	118	37	0	155	373
Total	104	0	0	0	104	35	749	0	0	784	0	0	0	0	0	0	588	144	0	732	1620
09:00 AM	26	0	0	0	26	7	155	0	0	162	0	0	0	0	0	0	135	36	0	171	359
09:15 AM	23	0	0	0	23	10	168	0	0	178	0	0	0	0	0	0	128	31	0	159	360
09:30 AM	34	0	0	0	34	9	162	0	0	171	0	0	0	0	0	0	145	36	0	181	386
09:45 AM	18	0	0	0	18	4	185	0	0	189	0	0	0	0	0	0	132	35	0	167	374
Total	101	0	0	0	101	30	670	0	0	700	0	0	0	0	0	0	540	138	0	678	1479
10:00 AM	36	0	0	0	36	6	163	0	0	169	0	0	0	0	0	0	142	39	0	181	386
10:15 AM	29	0	1	0	30	19	153	0	0	172	0	0	0	0	0	0	120	52	0	172	374
10:30 AM	31	0	0	0	31	5	171	0	0	176	0	0	0	0	0	0	170	47	0	217	424
10:45 AM	42	0	0	0	42	4	208	0	0	212	0	0	0	0	0	0	150	44	0	194	448
Total	138	0	1	0	139	34	695	0	0	729	0	0	0	0	0	0	582	182	0	764	1632
11:00 AM	47	0	0	0	47	12	210	0	0	222	0	0	0	0	0	0	170	49	0	219	488
11:15 AM	48	0	0	0	48	7	197	0	0	204	0	0	0	0	0	0	172	50	0	222	474
11:30 AM	36	0	0	0	36	17	199	0	0	216	0	0	0	0	0	0	200	58	0	258	510
11:45 AM	44	0	0	0	44	15	221	0	0	236	0	0	0	0	0	0	198	87	0	285	565
Total	175	0	0	0	175	51	827	0	0	878	0	0	0	0	0	0	740	244	0	984	2037
12:00 PM	37	0	0	0	37	17	204	0	0	221	0	0	0	0	0	0	192	91	0	283	541
12:15 PM	47	0	0	0	47	10	210	0	0	220	0	0	0	0	0	0	188	80	0	268	535
12:30 PM	53	0	0	0	53	9	211	0	0	220	0	0	0	0	0	0	149	65	0	214	487
12:45 PM	44	0	0	0	44	8	206	0	0	214	0	0	0	0	0	0	198	88	0	286	544
Total	181	0	0	0	181	44	831	0	0	875	0	0	0	0	0	0	727	324	0	1051	2107
01:00 PM	45	0	0	0	45	5	197	0	0	202	0	0	0	0	0	0	185	72	0	257	504
01:15 PM	36	0	0	0	36	7	188	0	0	195	0	0	0	0	0	0	203	69	0	272	503
01:30 PM	35	0	0	0	35	9	187	0	0	196	0	0	0	0	0	0	201	62	0	263	494
01:45 PM	30	0	0	0	30	6	192	0	0	198	0	0	0	0	0	0	199	72	0	271	499
Total	146	0	0	0	146	27	764	0	0	791	0	0	0	0	0	0	788	275	0	1063	2000
02:00 PM	31	0	0	0	31	7	162	0	0	169	0	0	0	0	0	0	179	74	0	253	453
02:15 PM	32	0	0	0	32	2	177	0	0	179	0	0	0	0	0	0	220	77	0	297	508
02:30 PM	48	0	0	0	48	2	151	0	0	153	0	0	0	0	0	0	225	68	0	293	494
02:45 PM	35	0	0	0	35	4	182	0	0	186	0	0	0	0	0	0	210	79	0	289	510
Total	146	0	0	0	146	15	672	0	0	687	0	0	0	0	0	0	834	298	0	1132	1965
03:00 PM	41	0	0	0	41	9	210	0	0	219	0	0	0	0	0	0	248	61	0	309	569
03:15 PM	34	0	0	0	34	5	198	0	0	203	0	0	0	0	0	0	275	85	0	360	597
03:30 PM	41	0	0	0	41	8	218	0	0	226	0	0	0	0	0	0	266	89	0	355	622
03:45 PM	35	0	0	0	35	8	232	0	0	240	0	0	0	0	0	0	271	79	0	350	625
Total	151	0	0	0	151	30	858	0	0	888	0	0	0	0	0	0	1060	314	0	1374	2413

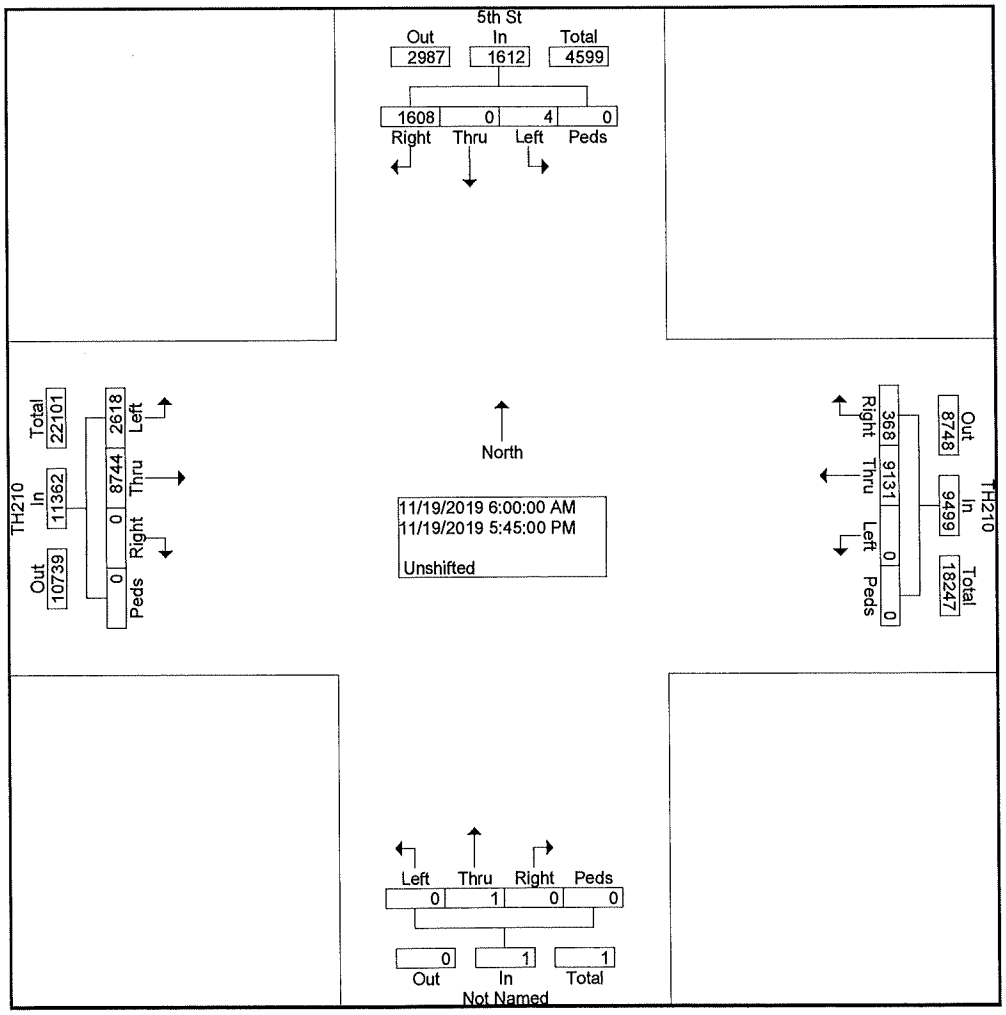
JAMAR Technologies, Inc.
151 Keith Valley Road
Horsham, PA 19044
Change These In PREFERENCES

5th Avenue NE

File Name : TH210 & 5th St _Brainerd
Site Code : 00000000
Start Date : 11/19/2019
Page No : 2

Groups Printed- Unshifted

	5th St From North					TH210 From East					From South					TH210 From West					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
Factor	1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0		
04:00 PM	54	0	0	0	54	9	225	0	0	234	0	0	0	0	0	0	238	73	0	311	599
04:15 PM	49	0	1	0	50	8	193	0	0	201	0	0	0	0	0	0	257	90	0	347	598
04:30 PM	46	0	0	0	46	3	224	0	0	227	0	0	0	0	0	0	245	61	0	306	579
04:45 PM	53	0	0	0	53	2	229	0	0	231	0	0	0	0	0	0	251	51	0	302	586
Total	202	0	1	0	203	22	871	0	0	893	0	0	0	0	0	0	991	275	0	1266	2362
05:00 PM	42	0	0	0	42	2	268	0	0	270	0	0	0	0	0	0	255	68	0	323	635
05:15 PM	49	0	0	0	49	0	216	0	0	216	0	0	0	0	0	0	275	66	0	341	606
05:30 PM	53	0	0	0	53	3	195	0	0	198	0	0	0	0	0	0	235	58	0	293	544
05:45 PM	22	0	0	0	22	4	155	0	0	159	0	0	0	0	0	0	242	49	0	291	472
Total	166	0	0	0	166	9	834	0	0	843	0	0	0	0	0	0	1007	241	0	1248	2257
Grand Total	1608	0	4	0	1612	368	9131	0	0	9499	0	1	0	0	1	0	8744	2618	0	11362	22474
Apprch %	99.8	0.0	0.2	0.0		3.9	96.1	0.0	0.0		0.0	100.0	0.0	0.0		0.0	77.0	23.0	0.0		
Total %	7.2	0.0	0.0	0.0	7.2	1.6	40.6	0.0	0.0	42.3	0.0	0.0	0.0	0.0	0.0	0.0	38.9	11.6	0.0	50.6	



TH 25 Eastbound Ramp Connection

	18-Nov	19-Nov	20-Nov
12:00AM		9	7
1:00AM		7	13
2:00AM		5	5
3:00AM		4	2
4:00AM		7	10
5:00AM		49	31
6:00AM	86	93	
7:00AM	146	169	
8:00AM	132	137	
9:00AM	111	108	
10:00AM	120	128	
11:00AM	180	174	
12:00PM	214	203	
1:00PM	192	162	
2:00PM	206	189	
3:00PM	231	260	
4:00PM	251	257	
5:00PM	224	212	
6:00PM	168	152	
7:00PM	59	126	
8:00PM	92	100	
9:00PM	38	63	
10:00PM	32	36	
11:00PM	16	12	
Total			5128

JAMAR Technologies, Inc.
151 Keith Valley Road
Horsham, PA 19044
Change These In PREFERENCES

File Name : TH 210 & 10th Ave NE_AM_Brainerd_
Site Code : 00000000
Start Date : 11/5/2019
Page No : 1

Groups Printed- Unshifted

	10th Ave From North					TH210 From East					10th Ave From South					TH210 From West					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
Factor	1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0		
06:00 AM	1	0	0	0	1	0	51	1	0	52	5	2	0	0	7	0	48	1	0	49	109
06:15 AM	3	0	0	0	3	1	66	3	0	70	12	0	1	0	13	0	63	3	0	66	152
06:30 AM	1	1	0	0	2	0	74	5	0	79	9	0	1	0	10	1	53	0	0	54	145
06:45 AM	2	1	0	0	3	0	61	12	0	73	10	0	1	0	11	1	62	0	0	63	150
Total	7	2	0	0	9	1	252	21	0	274	36	2	3	0	41	2	226	4	0	232	556
07:00 AM	2	1	0	0	3	0	82	5	0	87	7	1	1	0	9	1	61	1	0	63	162
07:15 AM	4	4	0	0	8	1	109	8	0	118	14	2	2	0	18	2	79	7	0	88	232
07:30 AM	21	4	2	0	27	1	134	9	0	144	14	5	1	0	20	1	74	12	0	87	278
07:45 AM	14	9	0	0	23	0	115	18	0	133	6	6	4	0	16	2	76	8	0	86	258
Total	41	18	2	0	61	2	440	40	0	482	41	14	8	0	63	6	290	28	0	324	930
08:00 AM	10	9	0	0	19	1	83	3	0	87	9	4	4	0	17	2	65	6	0	73	196
08:15 AM	5	4	0	0	9	0	108	7	0	115	7	2	2	0	11	3	75	3	0	81	216
08:30 AM	4	1	0	0	5	1	111	10	0	122	3	2	2	0	7	0	57	4	0	61	195
08:45 AM	4	2	0	0	6	0	89	4	0	93	5	1	0	0	6	0	52	1	0	53	158
Total	23	16	0	0	39	2	391	24	0	417	24	9	8	0	41	5	249	14	0	268	765
09:00 AM	1	1	0	0	2	0	50	7	0	57	8	2	3	0	13	4	62	0	0	66	138
09:15 AM	3	0	0	0	3	0	104	2	0	106	4	0	1	0	5	2	65	2	0	69	183
09:30 AM	1	0	0	0	1	0	90	4	0	94	3	1	0	0	4	1	74	2	0	77	176
09:45 AM	2	1	0	0	3	2	86	5	0	93	6	0	2	0	8	0	66	1	0	67	171
Total	7	2	0	0	9	2	330	18	0	350	21	3	6	0	30	7	267	5	0	279	668
10:00 AM	2	0	0	0	2	1	97	4	0	102	8	0	0	0	8	1	51	2	0	54	166
10:15 AM	1	2	0	0	3	0	93	7	0	100	2	1	2	0	5	0	68	2	0	70	178
10:30 AM	2	3	0	0	5	0	94	4	0	98	3	2	0	0	5	2	77	7	0	86	194
10:45 AM	0	3	0	0	3	0	82	2	0	84	5	2	0	0	7	1	82	3	0	86	180
Total	5	8	0	0	13	1	366	17	0	384	18	5	2	0	25	4	278	14	0	296	718
11:00 AM	2	2	0	0	4	1	86	8	0	95	10	0	2	0	12	0	82	2	0	84	195
11:15 AM	0	1	2	0	3	0	80	2	0	82	8	0	0	0	8	0	72	4	0	76	169
11:30 AM	3	2	1	0	6	2	96	4	0	102	4	2	0	0	6	0	82	3	0	85	199
11:45 AM	1	0	1	0	2	0	99	6	0	105	12	2	2	0	16	1	107	3	0	111	234
Total	6	5	4	0	15	3	361	20	0	384	34	4	4	0	42	1	343	12	0	356	797
12:00 PM	2	0	0	0	2	0	94	11	0	105	8	4	9	0	21	2	93	7	0	102	230
12:15 PM	2	1	2	0	5	0	70	8	0	78	5	1	3	0	9	3	101	7	0	111	203
Grand Total	93	52	8	0	153	11	2304	159	0	2474	187	42	43	0	272	30	1847	91	0	1968	4867
Apprch %	60.8	34.0	5.2	0.0		0.4	93.1	6.4	0.0		68.8	15.4	15.8	0.0		1.5	93.9	4.6	0.0		
Total %	1.9	1.1	0.2	0.0	3.1	0.2	47.3	3.3	0.0	50.8	3.8	0.9	0.9	0.0	5.6	0.6	37.9	1.9	0.0	40.4	

JAMAR Technologies, Inc.
151 Keith Valley Road
Horsham, PA 19044
File Name : TH210 & 10th Ave NE_PM_Brainerd
Site Code : 00000000
Start Date : 11/6/2019
Page No : 1

Groups Printed- Unshifted

	10th Ave From North					TH210 From East					10th Ave From South					TH210 From West					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
Factor	1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0		
12:30 PM	6	2	0	0	8	0	88	2	0	90	5	0	0	0	5	0	72	0	0	72	175
12:45 PM	3	1	0	0	4	0	81	5	0	86	6	2	1	0	9	1	68	1	0	70	169
Total	9	3	0	0	12	0	169	7	0	176	11	2	1	0	14	1	140	1	0	142	344
01:00 PM	4	1	0	0	5	0	85	6	0	91	8	0	2	0	10	2	112	2	0	116	222
01:15 PM	2	1	0	0	3	2	104	3	0	109	2	1	2	0	5	1	68	0	0	69	186
01:30 PM	1	1	0	0	2	0	98	2	0	100	4	0	3	0	7	0	83	2	0	85	194
01:45 PM	3	1	1	0	5	0	76	8	0	84	4	2	3	0	9	2	101	7	0	110	208
Total	10	4	1	0	15	2	363	19	0	384	18	3	10	0	31	5	364	11	0	380	810
02:00 PM	4	0	0	0	4	1	58	0	0	59	6	2	1	0	9	1	110	4	0	115	187
02:15 PM	1	1	1	0	3	2	86	8	0	96	5	8	0	0	13	2	121	9	0	132	244
02:30 PM	9	2	1	0	12	3	69	8	0	80	12	5	3	0	20	2	94	11	0	107	219
02:45 PM	10	8	0	0	18	2	83	10	0	95	11	4	2	0	17	0	110	4	0	114	244
Total	24	11	2	0	37	8	296	26	0	330	34	19	6	0	59	5	435	28	0	468	894
03:00 PM	4	3	1	0	8	0	90	4	0	94	8	2	4	0	14	2	100	7	0	109	225
03:15 PM	2	4	1	0	7	0	91	10	0	101	13	4	6	0	23	1	103	11	0	115	246
03:30 PM	4	2	0	0	6	0	102	9	0	111	9	3	4	0	16	3	113	4	0	120	253
03:45 PM	3	0	0	0	3	0	100	5	0	105	7	2	4	0	13	1	108	13	0	122	243
Total	13	9	2	0	24	0	383	28	0	411	37	11	18	0	66	7	424	35	0	466	967
04:00 PM	5	4	0	0	9	1	110	9	0	120	12	2	2	0	16	1	122	5	0	128	273
04:15 PM	2	0	0	0	2	0	96	13	0	109	15	0	6	0	21	1	131	7	0	139	271
04:30 PM	5	0	0	0	5	1	130	4	0	135	7	2	0	0	9	1	145	7	0	153	302
04:45 PM	5	1	0	0	6	0	131	6	0	137	8	2	1	0	11	1	85	4	0	90	244
Total	17	5	0	0	22	2	467	32	0	501	42	6	9	0	57	4	483	23	0	510	1090
05:00 PM	6	2	0	0	8	4	115	11	0	130	16	12	10	0	38	2	108	18	0	128	304
05:15 PM	3	1	0	0	4	1	79	4	0	84	5	0	2	0	7	0	106	9	0	115	210
05:30 PM	4	1	0	0	5	1	81	9	0	91	6	1	1	0	8	2	71	6	0	79	183
05:45 PM	0	1	0	0	1	0	57	2	0	59	5	3	1	1	10	0	86	1	0	87	157
Total	13	5	0	0	18	6	332	26	0	364	32	16	14	1	63	4	371	34	0	409	854
Grand Total	86	37	5	0	128	18	2010	138	0	2166	174	57	58	1	290	26	2217	132	0	2375	4959
Apprch %	67.2	28.9	3.9	0.0		0.8	92.8	6.4	0.0		60.0	19.7	20.0	0.3		1.1	93.3	5.6	0.0		
Total %	1.7	0.7	0.1	0.0	2.6	0.4	40.5	2.8	0.0	43.7	3.5	1.1	1.2	0.0	5.8	0.5	44.7	2.7	0.0	47.9	

JAMAR Technologies, Inc.
151 Keith Valley Road
Horsham, PA 19044
File Name : TH210 & TH25 & CR3_AM (Brainerd)
Site Code : 00000000
Start Date : 10/10/2019
Page No : 1

Change These In PREFERENCES

Groups Printed- Unshifted

	CR3 From North					TH210 From East					TH25 From South					TH210 From West					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
Factor	1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0		
06:00 AM	23	15	18	0	56	10	44	0	0	54	1	12	23	0	36	1	41	6	0	48	194
06:15 AM	30	19	18	0	67	8	45	0	0	53	0	13	25	0	38	0	53	12	0	65	223
06:30 AM	40	24	18	0	82	12	78	0	0	90	1	24	38	0	63	0	54	18	0	72	307
06:45 AM	42	29	8	0	79	10	86	1	0	97	0	20	48	0	68	1	55	22	0	78	322
Total	135	87	62	0	284	40	253	1	0	294	2	69	134	0	205	2	203	58	0	263	1046
07:00 AM	32	24	14	0	70	6	68	1	1	76	1	23	35	0	59	5	52	17	0	74	279
07:15 AM	59	32	15	0	106	12	101	0	0	113	1	35	53	0	89	12	65	12	0	89	397
07:30 AM	72	19	11	0	102	20	123	2	0	145	3	36	58	0	97	8	75	19	0	102	446
07:45 AM	96	54	5	0	155	14	106	2	0	122	0	21	65	0	86	20	55	28	0	103	466
Total	259	129	45	0	433	52	398	5	1	456	5	115	211	0	331	45	247	76	0	368	1588
08:00 AM	66	46	11	0	123	10	82	2	0	94	1	39	47	0	87	9	70	27	0	106	410
08:15 AM	45	43	19	0	107	12	81	1	0	94	1	38	59	0	98	12	54	16	0	82	381
08:30 AM	50	24	9	1	84	21	91	0	0	112	1	29	52	1	83	4	59	23	0	86	365
08:45 AM	44	19	16	0	79	11	88	2	0	101	0	23	29	0	52	0	47	29	0	76	308
Total	205	132	55	1	393	54	342	5	0	401	3	129	187	1	320	25	230	95	0	350	1464
09:00 AM	33	15	20	0	68	11	54	0	0	65	3	24	33	0	60	2	51	14	0	67	260
09:15 AM	36	16	12	0	64	10	64	0	0	74	0	24	31	0	55	5	68	23	0	96	289
09:30 AM	39	15	8	0	62	18	88	0	0	106	1	26	44	0	71	1	44	24	0	69	308
09:45 AM	49	17	18	0	84	11	87	1	0	99	1	19	44	0	64	3	49	20	0	72	319
Total	157	63	58	0	278	50	293	1	0	344	5	93	152	0	250	11	212	81	0	304	1176
10:00 AM	45	24	10	0	79	9	87	0	0	96	1	22	37	0	60	3	61	19	0	83	318
10:15 AM	35	32	5	0	72	19	97	0	0	116	0	25	58	0	83	8	53	25	0	86	357
10:30 AM	49	16	9	0	74	23	89	0	0	112	1	23	61	0	85	3	48	31	0	82	353
10:45 AM	40	21	18	0	79	19	77	2	0	98	0	30	58	0	88	1	57	32	0	90	355
Total	169	93	42	0	304	70	350	2	0	422	2	100	214	0	316	15	219	107	0	341	1383
11:00 AM	45	41	6	0	92	11	73	1	0	85	2	27	50	0	79	0	60	30	0	90	346
11:15 AM	37	27	17	0	81	15	97	0	0	112	1	22	58	0	81	2	77	35	0	114	388
11:30 AM	43	31	12	0	86	11	76	2	0	89	0	29	58	0	87	5	62	27	0	94	356
11:45 AM	41	27	16	0	84	11	93	3	1	108	0	16	74	0	90	6	73	37	0	116	398
Total	166	126	51	0	343	48	339	6	1	394	3	94	240	0	337	13	272	129	0	414	1488
Grand Total	1091	630	313	1	2035	314	1975	20	2	2311	20	600	1138	1	1759	111	1383	546	0	2040	8145
Apprch %	53.6	31.0	15.4	0.0		13.6	85.5	0.9	0.1		1.1	34.1	64.7	0.1		5.4	67.8	26.8	0.0		
Total %	13.4	7.7	3.8	0.0	25.0	3.9	24.2	0.2	0.0	28.4	0.2	7.4	14.0	0.0	21.6	1.4	17.0	6.7	0.0	25.0	

JAMAR Technologies, Inc.
151 Keith Valley Road
Horsham, PA 19044
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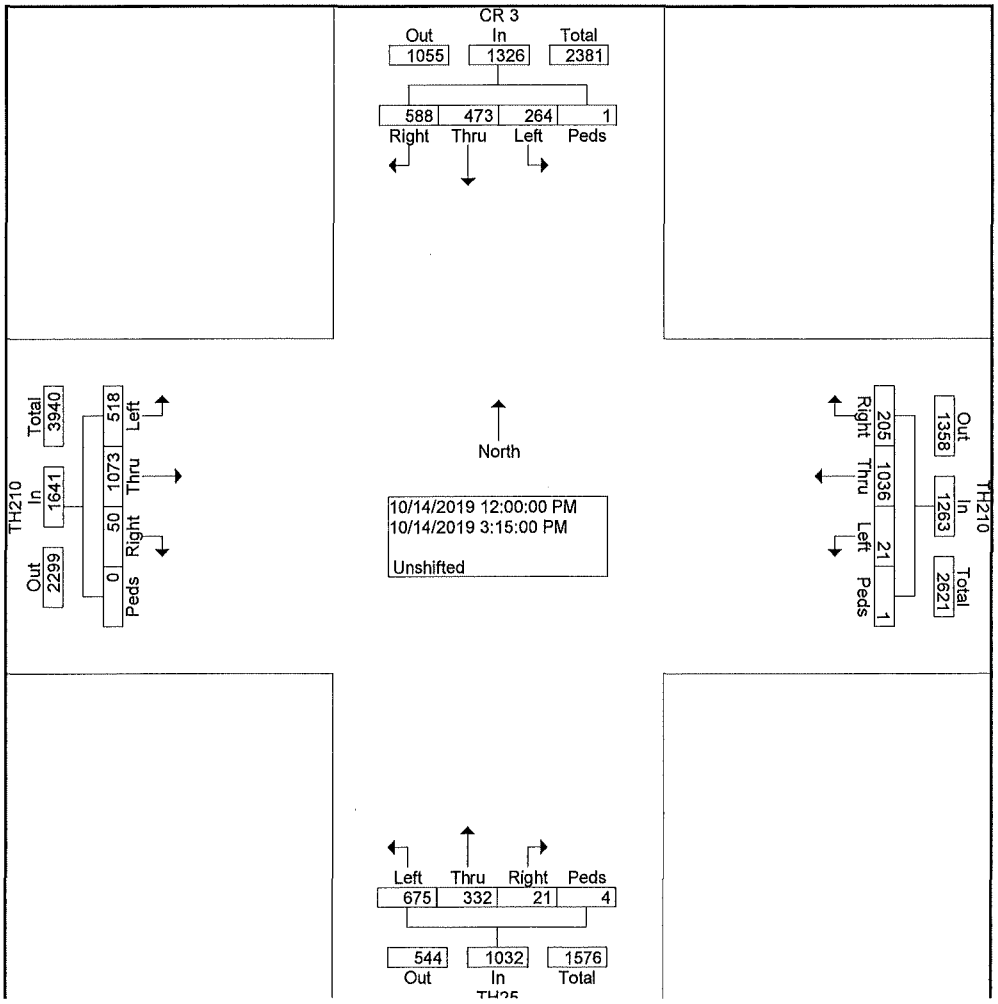
File Name : TH210 & TH25 & CR3_12 to 3_PM
Site Code : 00000000
Start Date : 10/14/2019
Page No : 1

Groups Printed- Unshifted

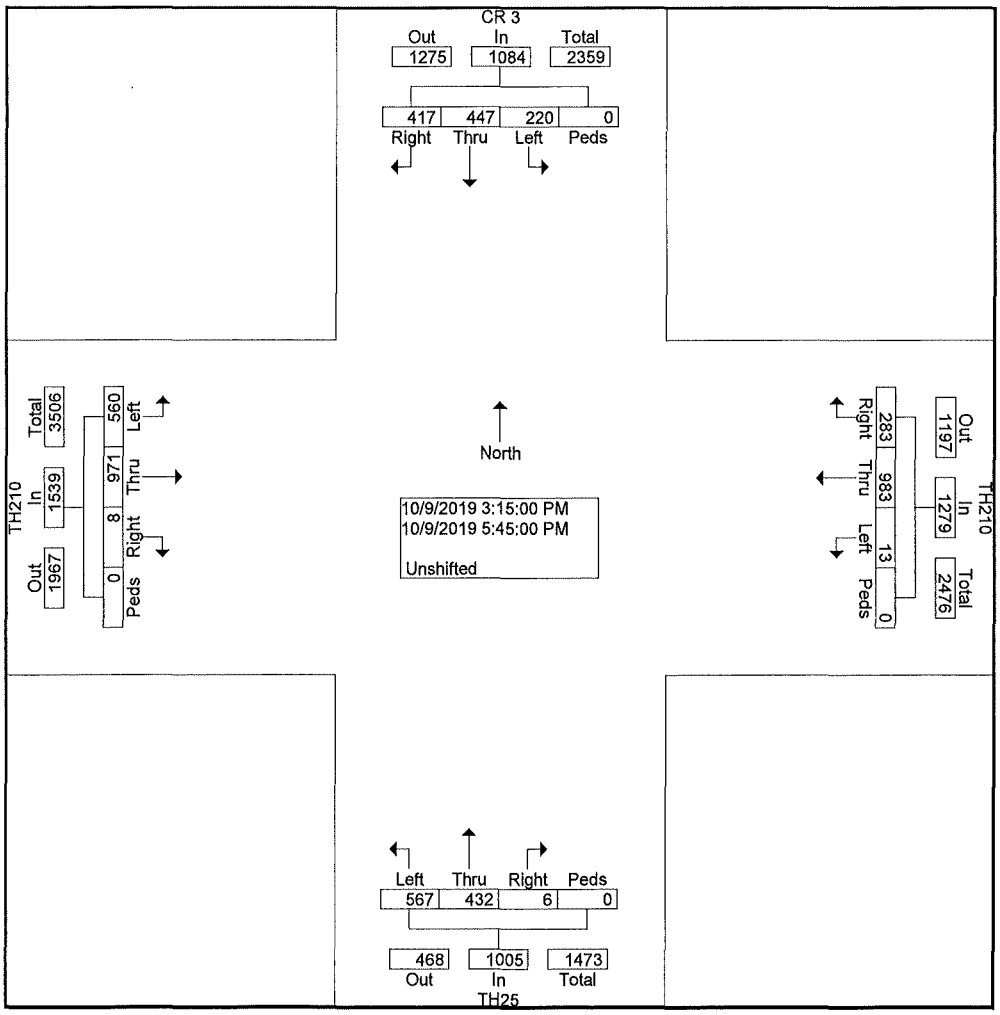
	CR 3 From North					TH210 From East					TH25 From South					TH210 From West					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
Factor	1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0		
12:00 PM	31	23	27	0	81	25	70	0	0	95	2	27	93	0	122	8	73	46	0	127	425
12:15 PM	42	38	23	0	103	15	81	0	0	96	3	21	50	0	74	4	76	32	0	112	385
12:30 PM	55	31	18	0	104	18	77	2	0	97	0	30	55	0	85	4	81	32	0	117	403
12:45 PM	40	29	11	0	80	11	82	0	0	93	1	26	43	1	71	4	65	34	0	103	347
Total	168	121	79	0	368	69	310	2	0	381	6	104	241	1	352	20	295	144	0	459	1560
01:00 PM	39	32	26	0	97	8	77	2	0	87	1	26	40	0	67	1	67	36	0	104	355
01:15 PM	41	33	9	0	83	10	87	0	0	97	5	18	41	1	65	6	81	39	0	126	371
01:30 PM	34	37	13	0	84	12	74	1	0	87	5	23	45	0	73	4	61	38	0	103	347
01:45 PM	26	33	22	0	81	15	50	0	0	65	2	12	51	0	65	1	56	35	0	92	303
Total	140	135	70	0	345	45	288	3	0	336	13	79	177	1	270	12	265	148	0	425	1376
02:00 PM	32	21	9	0	62	12	43	4	0	59	0	15	32	0	47	2	80	34	0	116	284
02:15 PM	58	43	19	1	121	11	57	1	0	69	1	22	43	1	67	2	73	31	0	106	363
02:30 PM	48	36	29	0	113	8	78	7	0	93	1	17	37	0	55	8	89	34	0	131	392
02:45 PM	51	45	16	0	112	13	91	2	1	107	0	26	69	1	96	3	92	38	0	133	448
Total	189	145	73	1	408	44	269	14	1	328	2	80	181	2	265	15	334	137	0	486	1487
03:00 PM	55	43	19	0	117	26	104	2	0	132	0	34	41	0	75	3	79	32	0	114	438
03:15 PM	36	29	23	0	88	21	65	0	0	86	0	35	35	0	70	0	100	57	0	157	401
Grand Total	588	473	264	1	1326	205	1036	21	1	1263	21	332	675	4	1032	50	1073	518	0	1641	5262
Apprch %	44.3	35.7	19.9	0.1		16.2	82.0	1.7	0.1		2.0	32.2	65.4	0.4		3.0	65.4	31.6	0.0		
Total %	11.2	9.0	5.0	0.0	25.2	3.9	19.7	0.4	0.0	24.0	0.4	6.3	12.8	0.1	19.6	1.0	20.4	9.8	0.0	31.2	



JAMAR Technologies, Inc.
151 Keith Valley Road
Horsham, PA 19044 File Name : TH210 & TH25 & CR3_3-6-PM
Change These In PREFERENCES Site Code : 00000000
Start Date : 10/9/2019
Page No : 1

Groups Printed- Unshifted

	CR 3 From North					TH210 From East					TH25 From South					TH210 From West					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
Factor	1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0		
03:15 PM	37	28	25	0	90	22	76	3	0	101	1	47	43	0	91	0	81	46	0	127	409
03:30 PM	49	39	15	0	103	29	86	0	0	115	0	26	44	0	70	1	78	50	0	129	417
03:45 PM	42	53	19	0	114	30	90	2	0	122	2	49	55	0	106	2	86	36	0	124	466
Total	128	120	59	0	307	81	252	5	0	338	3	122	142	0	267	3	245	132	0	380	1292
04:00 PM	25	29	5	0	59	16	92	0	0	108	0	51	48	0	99	1	92	49	0	142	408
04:15 PM	37	44	27	0	108	20	104	2	0	126	0	40	35	0	75	2	108	46	0	156	465
04:30 PM	48	51	33	0	132	37	85	2	0	124	0	35	76	0	111	0	89	51	0	140	507
04:45 PM	31	45	23	0	99	40	115	2	0	157	0	32	34	0	66	2	106	69	0	177	499
Total	141	169	88	0	398	113	396	6	0	515	0	158	193	0	351	5	395	215	0	615	1879
05:00 PM	30	32	23	0	85	40	83	2	0	125	1	67	95	0	163	0	94	59	0	153	526
05:15 PM	39	57	23	0	119	19	80	0	0	99	0	34	43	0	77	0	104	76	0	180	475
05:30 PM	35	37	14	0	86	15	88	0	0	103	2	20	47	0	69	0	65	38	0	103	361
05:45 PM	44	32	13	0	89	15	84	0	0	99	0	31	47	0	78	0	68	40	0	108	374
Total	148	158	73	0	379	89	335	2	0	426	3	152	232	0	387	0	331	213	0	544	1736
Grand Total	417	447	220	0	1084	283	983	13	0	1279	6	432	567	0	1005	8	971	560	0	1539	4907
Apprch %	38.5	41.2	20.3	0.0		22.1	76.9	1.0	0.0		0.6	43.0	56.4	0.0		0.5	63.1	36.4	0.0		
Total %	8.5	9.1	4.5	0.0	22.1	5.8	20.0	0.3	0.0	26.1	0.1	8.8	11.6	0.0	20.5	0.2	19.8	11.4	0.0	31.4	



Appendix C

Warrant Analysis

2019 Existing - TH 210 at 4th Ave NE
SIGNAL WARRANT
ANALYSIS

LOCATION: TH 210 at 4th Ave NE
COUNTY: Crow Wing
REF. POINT: 0
DATE: 3/12/2020
OPERATOR: JDA

85th% Speed	Approach Description		Lanes	Approach
35	Major App1:	TH 210 EB	3	9507
35	Major App3:	TH 210 WB	3	10071
30	Minor App2:	4th Ave NE NB	1	68
30	Minor App4:	4th Ave NE SB	2	440

40 MPH OR FASTER?	NO
POPULATION < 10,000?	NO
VOLUME REQ. AT 70%?	**NO**
CORRECTABLE CRASHES: (12-month period)	0

	Minimum Volume Requirement		
	1A	1B	1A&B (80%)
Major Total	600	900	720
Minor Approach	200	100	160

HOUR	MAJOR APP. 1	MAJOR APP. 3	MINOR APP. 2	MINOR APP. 4	MAJOR APPROACH TOTAL Σ (APP.1 + APP. 3)	MAX MINOR APPROACH (APP. 2 or 4)	WARRANT 1A - 8 hr MAJOR/MINOR	WARRANT 1B - 8 hr MAJOR/MINOR	WARRANT 1A & B MAJOR/MINOR
0:00 - 1:00	0	0	0	0	0	0	NO / NO	NO / NO	NO / NO
1:00 - 2:00	0	0	0	0	0	0	NO / NO	NO / NO	NO / NO
2:00 - 3:00	0	0	0	0	0	0	NO / NO	NO / NO	NO / NO
3:00 - 4:00	0	0	0	0	0	0	NO / NO	NO / NO	NO / NO
4:00 - 5:00	0	0	0	0	0	0	NO / NO	NO / NO	NO / NO
5:00 - 6:00	0	0	0	0	0	0	NO / NO	NO / NO	NO / NO
6:00 - 7:00	352	489	0	18	841	18	YES / NO	NO / NO	YES / NO
7:00 - 8:00	599	969	0	39	1568	39	YES / NO	YES / NO	YES / NO
8:00 - 9:00	591	853	3	37	1444	37	YES / NO	YES / NO	YES / NO
9:00 - 10:00	549	737	4	17	1286	17	YES / NO	YES / NO	YES / NO
10:00 - 11:00	620	764	0	33	1384	33	YES / NO	YES / NO	YES / NO
11:00 - 12:00	887	919	2	37	1806	37	YES / NO	YES / NO	YES / NO
12:00 - 13:00	955	929	11	40	1884	40	YES / NO	YES / NO	YES / NO
13:00 - 14:00	839	833	1	32	1672	32	YES / NO	YES / NO	YES / NO
14:00 - 15:00	871	751	4	50	1622	50	YES / NO	YES / NO	YES / NO
15:00 - 16:00	1099	923	40	53	2022	53	YES / NO	YES / NO	YES / NO
16:00 - 17:00	1085	987	2	40	2072	40	YES / NO	YES / NO	YES / NO
17:00 - 18:00	1060	917	1	44	1977	44	YES / NO	YES / NO	YES / NO
18:00 - 19:00	0	0	0	0	0	0	NO / NO	NO / NO	NO / NO
19:00 - 20:00	0	0	0	0	0	0	NO / NO	NO / NO	NO / NO
20:00 - 21:00	0	0	0	0	0	0	NO / NO	NO / NO	NO / NO
21:00 - 22:00	0	0	0	0	0	0	NO / NO	NO / NO	NO / NO
22:00 - 23:00	0	0	0	0	0	0	NO / NO	NO / NO	NO / NO
23:00 - 24:00	0	0	0	0	0	0	NO / NO	NO / NO	NO / NO
Daily	**9507**	**10071**	**68**	**440**					

		Met (Hr)	Required (Hr)	WARRANT MET:
Warrant 1	**Eight Hour Volumes**	0	8	Not satisfied
Warrant 1A	Minimum Vehicular Volume	0	8	Not satisfied
Warrant 1B	Interruption of Continuous Flow	0	8	Not satisfied
1A & 1B	Combination of Warrants	0	8	Not satisfied
Warrant 2	**Four Hour Volumes**	0	4	Not satisfied
Warrant 3	**Peak Hour Volumes**	0	1	Not satisfied
Warrant 7	**Crash Experience**	0	8	Not satisfied

COMMENTS:

2019 Existing - TH 210 at 4th Ave NE
SIGNAL WARRANT
ANALYSIS

LOCATION: TH 210 at 4th Ave NE
COUNTY: Crow Wing
REF. POINT: 0
DATE: 3/12/2020

OPERATOR: JDA

40 MPH OR FASTER?	NO
POPULATION < 10,000?	NO
VOLUME REQ. AT 70%?	**NO**

85th% Speed	Approach Description		Lanes	Approach
35	Major App1:	TH 210 EB	3	9507
35	Major App3:	TH 210 WB	3	10071
30	Minor App2:	4th Ave NE NB	1	68
30	Minor App4:	4th Ave NE SB	2	440

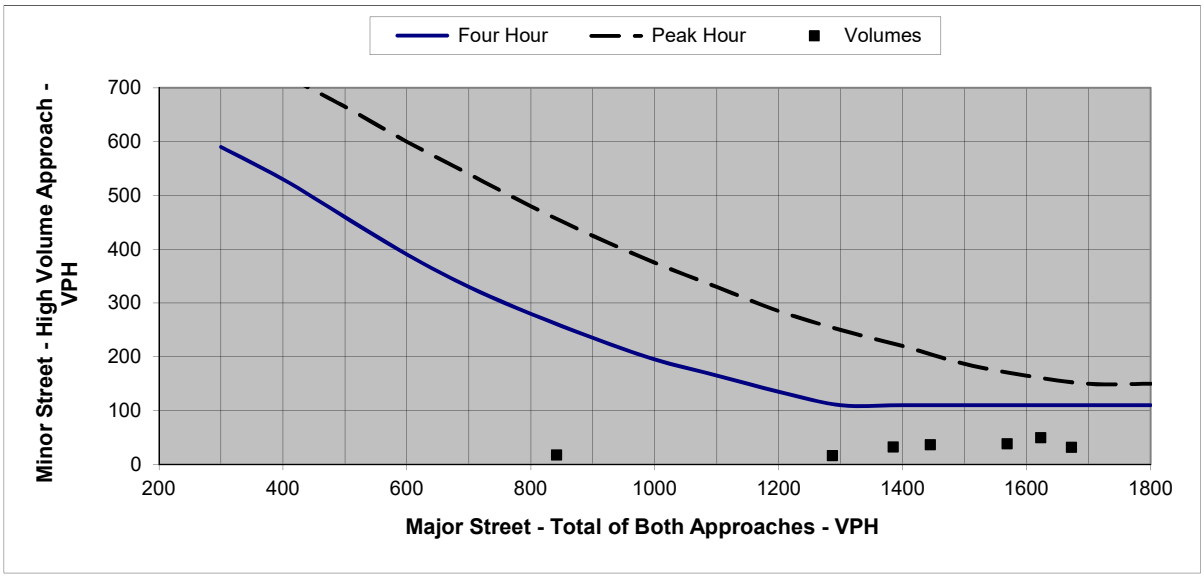


Figure 1. Four Hour and Peak Hour Warrant Analysis

Note: For data points outside the graph range, check the minor street volume against the lower thresholds

Warrant Criteria (Graph)		
Major Approach	Minor App. Four Hour	Minor App. Peak Hour
200		
300	590	
400	530	725
500	460	665
600	390	600
700	330	540
800	280	480
900	235	425
1000	195	375
1100	165	330
1200	135	285
1300	110	250
1400	110	220
1500	110	187
1600	110	165
1700	110	150
1800	110	150

Actual Hourly Count			Warrants Met:	
			Warrant 2	Warrant 3
HOUR	Sum Major App.	Max Minor App.	Four Hour	Peak Hour
0:00 - 1:00	0	0	NO	NO
1:00 - 2:00	0	0	NO	NO
2:00 - 3:00	0	0	NO	NO
3:00 - 4:00	0	0	NO	NO
4:00 - 5:00	0	0	NO	NO
5:00 - 6:00	0	0	NO	NO
6:00 - 7:00	841	18	NO	NO
7:00 - 8:00	1568	39	NO	NO
8:00 - 9:00	1444	37	NO	NO
9:00 - 10:00	1286	17	NO	NO
10:00 - 11:00	1384	33	NO	NO
11:00 - 12:00	1806	37	NO	NO
12:00 - 13:00	1884	40	NO	NO
13:00 - 14:00	1672	32	NO	NO
14:00 - 15:00	1622	50	NO	NO
15:00 - 16:00	2022	53	NO	NO
16:00 - 17:00	2072	40	NO	NO
17:00 - 18:00	1977	44	NO	NO
18:00 - 19:00	0	0	NO	NO
19:00 - 20:00	0	0	NO	NO
20:00 - 21:00	0	0	NO	NO
21:00 - 22:00	0	0	NO	NO
22:00 - 23:00	0	0	NO	NO
23:00 - 24:00	0	0	NO	NO

2019 Existing - TH 210 at 4th Ave NE
SIGNAL WARRANT
ANALYSIS

Volume Threshold Reduced to 80% of Full Volume Warrant Thresholds

LOCATION: TH 210 at 4th Ave NE
COUNTY: Crow Wing
REF. POINT: 0
DATE: 3/12/2020

OPERATOR: JDA

85th% Speed	Approach Description		Lanes	Approach
35	Major App1:	TH 210 EB	3	9507
35	Major App3:	TH 210 WB	3	10071
30	Minor App2:	4th Ave NE NB	1	68
30	Minor App4:	4th Ave NE SB	2	440

40 MPH OR FASTER?	NO
POPULATION < 10,000?	NO
VOLUME REQ. AT 70%?	**NO**
CORRECTABLE CRASHES: (12-month period)	0

	80%		
	Minimum Volume Requirement		
	1A	1B	1A&B (80%)
Major Total	480	720	576
Minor Approach	160	80	128

HOUR	MAJOR APP. 1	MAJOR APP. 3	MINOR APP. 2	MINOR APP. 4	MAJOR APPROACH TOTAL Σ (APP.1 + APP. 3)	MAX MINOR APPROACH (APP. 2 or 4)	WARRANT 1A - 8 hr MAJOR/MINOR	WARRANT 1B - 8 hr MAJOR/MINOR	WARRANT 1A & B MAJOR/MINOR
0:00 - 1:00	0	0	0	0	0	0	NO / NO	NO / NO	NO / NO
1:00 - 2:00	0	0	0	0	0	0	NO / NO	NO / NO	NO / NO
2:00 - 3:00	0	0	0	0	0	0	NO / NO	NO / NO	NO / NO
3:00 - 4:00	0	0	0	0	0	0	NO / NO	NO / NO	NO / NO
4:00 - 5:00	0	0	0	0	0	0	NO / NO	NO / NO	NO / NO
5:00 - 6:00	0	0	0	0	0	0	NO / NO	NO / NO	NO / NO
6:00 - 7:00	352	489	0	18	841	18	YES / NO	YES / NO	YES / NO
7:00 - 8:00	599	969	0	39	1568	39	YES / NO	YES / NO	YES / NO
8:00 - 9:00	591	853	3	37	1444	37	YES / NO	YES / NO	YES / NO
9:00 - 10:00	549	737	4	17	1286	17	YES / NO	YES / NO	YES / NO
10:00 - 11:00	620	764	0	33	1384	33	YES / NO	YES / NO	YES / NO
11:00 - 12:00	887	919	2	37	1806	37	YES / NO	YES / NO	YES / NO
12:00 - 13:00	955	929	11	40	1884	40	YES / NO	YES / NO	YES / NO
13:00 - 14:00	839	833	1	32	1672	32	YES / NO	YES / NO	YES / NO
14:00 - 15:00	871	751	4	50	1622	50	YES / NO	YES / NO	YES / NO
15:00 - 16:00	1099	923	40	53	2022	53	YES / NO	YES / NO	YES / NO
16:00 - 17:00	1085	987	2	40	2072	40	YES / NO	YES / NO	YES / NO
17:00 - 18:00	1060	917	1	44	1977	44	YES / NO	YES / NO	YES / NO
18:00 - 19:00	0	0	0	0	0	0	NO / NO	NO / NO	NO / NO
19:00 - 20:00	0	0	0	0	0	0	NO / NO	NO / NO	NO / NO
20:00 - 21:00	0	0	0	0	0	0	NO / NO	NO / NO	NO / NO
21:00 - 22:00	0	0	0	0	0	0	NO / NO	NO / NO	NO / NO
22:00 - 23:00	0	0	0	0	0	0	NO / NO	NO / NO	NO / NO
23:00 - 24:00	0	0	0	0	0	0	NO / NO	NO / NO	NO / NO
Daily	**9507**	**10071**	**68**	**440**					

		Met (Hr)	Required (Hr)	WARRANT MET:
Warrant 1	**Eight Hour Volumes**	0	8	Not satisfied
Warrant 1A	Minimum Vehicular Volume	0	8	Not satisfied
Warrant 1B	Interruption of Continuous Flow	0	8	Not satisfied
1A & 1B	Combination of Warrants	0	8	Not satisfied

COMMENTS:

2019 Existing - TH 210 at 4th Ave NE
SIGNAL WARRANT
ANALYSIS

Volume Threshold Reduced to 60% of Full Volume Warrant Thresholds

LOCATION: TH 210 at 4th Ave NE
COUNTY: Crow Wing
REF. POINT: 0
DATE: 3/12/2020

OPERATOR: JDA

85th% Speed	Approach Description		Lanes	Approach
35	Major App1:	TH 210 EB	3	9507
35	Major App3:	TH 210 WB	3	10071
30	Minor App2:	4th Ave NE NB	1	68
30	Minor App4:	4th Ave NE SB	2	440

40 MPH OR FASTER?	NO
POPULATION < 10,000?	NO
VOLUME REQ. AT 70%?	**NO**
CORRECTABLE CRASHES: (12-month period)	0

60%

	Minimum Volume Requirement		
	1A	1B	1A&B (80%)
Major Total	360	540	432
Minor Approach	120	60	96

HOUR	MAJOR APP. 1	MAJOR APP. 3	MINOR APP. 2	MINOR APP. 4	MAJOR APPROACH TOTAL Σ (APP.1 + APP. 3)	MAX MINOR APPROACH (APP. 2 or 4)	WARRANT 1A - 8 hr MAJOR/MINOR	WARRANT 1B - 8 hr MAJOR/MINOR	WARRANT 1A & B MAJOR/MINOR
0:00 - 1:00	0	0	0	0	0	0	NO / NO	NO / NO	NO / NO
1:00 - 2:00	0	0	0	0	0	0	NO / NO	NO / NO	NO / NO
2:00 - 3:00	0	0	0	0	0	0	NO / NO	NO / NO	NO / NO
3:00 - 4:00	0	0	0	0	0	0	NO / NO	NO / NO	NO / NO
4:00 - 5:00	0	0	0	0	0	0	NO / NO	NO / NO	NO / NO
5:00 - 6:00	0	0	0	0	0	0	NO / NO	NO / NO	NO / NO
6:00 - 7:00	352	489	0	18	841	18	YES / NO	YES / NO	YES / NO
7:00 - 8:00	599	969	0	39	1568	39	YES / NO	YES / NO	YES / NO
8:00 - 9:00	591	853	3	37	1444	37	YES / NO	YES / NO	YES / NO
9:00 - 10:00	549	737	4	17	1286	17	YES / NO	YES / NO	YES / NO
10:00 - 11:00	620	764	0	33	1384	33	YES / NO	YES / NO	YES / NO
11:00 - 12:00	887	919	2	37	1806	37	YES / NO	YES / NO	YES / NO
12:00 - 13:00	955	929	11	40	1884	40	YES / NO	YES / NO	YES / NO
13:00 - 14:00	839	833	1	32	1672	32	YES / NO	YES / NO	YES / NO
14:00 - 15:00	871	751	4	50	1622	50	YES / NO	YES / NO	YES / NO
15:00 - 16:00	1099	923	40	53	2022	53	YES / NO	YES / NO	YES / NO
16:00 - 17:00	1085	987	2	40	2072	40	YES / NO	YES / NO	YES / NO
17:00 - 18:00	1060	917	1	44	1977	44	YES / NO	YES / NO	YES / NO
18:00 - 19:00	0	0	0	0	0	0	NO / NO	NO / NO	NO / NO
19:00 - 20:00	0	0	0	0	0	0	NO / NO	NO / NO	NO / NO
20:00 - 21:00	0	0	0	0	0	0	NO / NO	NO / NO	NO / NO
21:00 - 22:00	0	0	0	0	0	0	NO / NO	NO / NO	NO / NO
22:00 - 23:00	0	0	0	0	0	0	NO / NO	NO / NO	NO / NO
23:00 - 24:00	0	0	0	0	0	0	NO / NO	NO / NO	NO / NO
Daily	**9507**	**10071**	**68**	**440**					

		Met (Hr)	Required (Hr)	WARRANT MET:
Warrant 1	**Eight Hour Volumes**	0	8	Not satisfied
Warrant 1A	Minimum Vehicular Volume	0	8	Not satisfied
Warrant 1B	Interruption of Continuous Flow	0	8	Not satisfied
1A & 1B	Combination of Warrants	0	8	Not satisfied

COMMENTS:

2045 Future - TH 210 at 4th Ave NE
SIGNAL WARRANT
ANALYSIS

LOCATION: TH 210 at 4th Ave NE
COUNTY: Crow Wing
REF. POINT: 0
DATE: 3/12/2020
OPERATOR: JDA

85th% Speed	Approach Description		Lanes	Approach
35	Major App1:	TH 210 EB	3	10744
35	Major App3:	TH 210 WB	3	11386
30	Minor App2:	4th Ave NE NB	1	74
30	Minor App4:	4th Ave NE SB	2	498

40 MPH OR FASTER?	NO
POPULATION < 10,000?	NO
VOLUME REQ. AT 70%?	**NO**
CORRECTABLE CRASHES: (12-month period)	0

	Minimum Volume Requirement		
	1A	1B	1A&B (80%)
Major Total	600	900	720
Minor Approach	200	100	160

HOUR	MAJOR APP. 1	MAJOR APP. 3	MINOR APP. 2	MINOR APP. 4	MAJOR APPROACH TOTAL Σ (APP.1 + APP. 3)	MAX MINOR APPROACH (APP. 2 or 4)	WARRANT 1A - 8 hr MAJOR/MINOR	WARRANT 1B - 8 hr MAJOR/MINOR	WARRANT 1A & B MAJOR/MINOR
0:00 - 1:00	0	0	0	0	0	0	NO / NO	NO / NO	NO / NO
1:00 - 2:00	0	0	0	0	0	0	NO / NO	NO / NO	NO / NO
2:00 - 3:00	0	0	0	0	0	0	NO / NO	NO / NO	NO / NO
3:00 - 4:00	0	0	0	0	0	0	NO / NO	NO / NO	NO / NO
4:00 - 5:00	0	0	0	0	0	0	NO / NO	NO / NO	NO / NO
5:00 - 6:00	0	0	0	0	0	0	NO / NO	NO / NO	NO / NO
6:00 - 7:00	398	553	0	21	951	21	YES / NO	YES / NO	YES / NO
7:00 - 8:00	678	1096	0	45	1774	45	YES / NO	YES / NO	YES / NO
8:00 - 9:00	667	964	3	42	1631	42	YES / NO	YES / NO	YES / NO
9:00 - 10:00	621	833	4	20	1454	20	YES / NO	YES / NO	YES / NO
10:00 - 11:00	700	864	0	37	1564	37	YES / NO	YES / NO	YES / NO
11:00 - 12:00	1002	1039	2	42	2041	42	YES / NO	YES / NO	YES / NO
12:00 - 13:00	1080	1051	12	45	2131	45	YES / NO	YES / NO	YES / NO
13:00 - 14:00	948	941	1	36	1889	36	YES / NO	YES / NO	YES / NO
14:00 - 15:00	985	849	4	57	1834	57	YES / NO	YES / NO	YES / NO
15:00 - 16:00	1242	1044	45	59	2286	59	YES / NO	YES / NO	YES / NO
16:00 - 17:00	1226	1115	2	44	2341	44	YES / NO	YES / NO	YES / NO
17:00 - 18:00	1197	1037	1	50	2234	50	YES / NO	YES / NO	YES / NO
18:00 - 19:00	0	0	0	0	0	0	NO / NO	NO / NO	NO / NO
19:00 - 20:00	0	0	0	0	0	0	NO / NO	NO / NO	NO / NO
20:00 - 21:00	0	0	0	0	0	0	NO / NO	NO / NO	NO / NO
21:00 - 22:00	0	0	0	0	0	0	NO / NO	NO / NO	NO / NO
22:00 - 23:00	0	0	0	0	0	0	NO / NO	NO / NO	NO / NO
23:00 - 24:00	0	0	0	0	0	0	NO / NO	NO / NO	NO / NO
Daily	**10744**	**11386**	**74**	**498**					

		Met (Hr)	Required (Hr)	WARRANT MET:
Warrant 1	**Eight Hour Volumes**	0	8	Not satisfied
Warrant 1A	Minimum Vehicular Volume	0	8	Not satisfied
Warrant 1B	Interruption of Continuous Flow	0	8	Not satisfied
1A & 1B	Combination of Warrants	0	8	Not satisfied
Warrant 2	**Four Hour Volumes**	0	4	Not satisfied
Warrant 3	**Peak Hour Volumes**	0	1	Not satisfied
Warrant 7	**Crash Experience**	0	8	Not satisfied

COMMENTS:

2045 Future - TH 210 at 4th Ave NE
SIGNAL WARRANT
ANALYSIS

LOCATION: TH 210 at 4th Ave NE
COUNTY: Crow Wing
REF. POINT: 0
DATE: 3/12/2020

OPERATOR: JDA

40 MPH OR FASTER?	NO
POPULATION < 10,000?	NO
VOLUME REQ. AT 70%?	**NO**

85th% Speed	Approach Description		Lanes	Approach
35	Major App1:	TH 210 EB	3	10744
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30	Minor App2:	4th Ave NE NB	1	74
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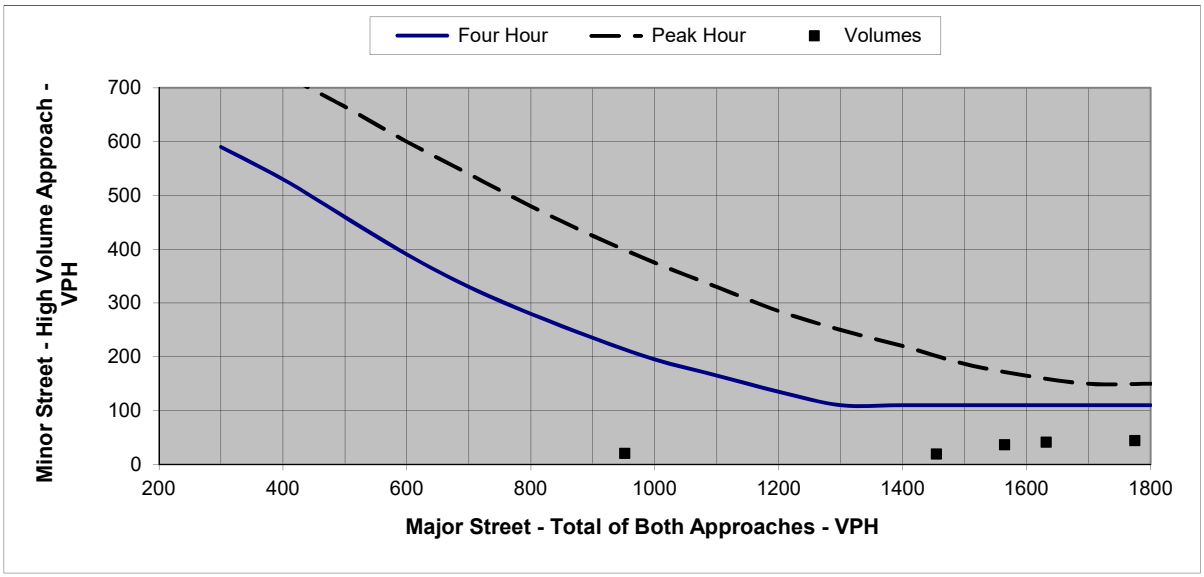

Figure 1. Four Hour and Peak Hour Warrant Analysis

Note: For data points outside the graph range, check the minor street volume against the lower thresholds

Warrant Criteria (Graph)		
Major Approach	Minor App. Four Hour	Minor App. Peak Hour
200		
300	590	
400	530	725
500	460	665
600	390	600
700	330	540
800	280	480
900	235	425
1000	195	375
1100	165	330
1200	135	285
1300	110	250
1400	110	220
1500	110	187
1600	110	165
1700	110	150
1800	110	150

Actual Hourly Count			Warrants Met:	
			Warrant 2	Warrant 3
HOUR	Sum Major App.	Max Minor App.	Four Hour	Peak Hour
0:00 - 1:00	0	0	NO	NO
1:00 - 2:00	0	0	NO	NO
2:00 - 3:00	0	0	NO	NO
3:00 - 4:00	0	0	NO	NO
4:00 - 5:00	0	0	NO	NO
5:00 - 6:00	0	0	NO	NO
6:00 - 7:00	951	21	NO	NO
7:00 - 8:00	1774	45	NO	NO
8:00 - 9:00	1631	42	NO	NO
9:00 - 10:00	1454	20	NO	NO
10:00 - 11:00	1564	37	NO	NO
11:00 - 12:00	2041	42	NO	NO
12:00 - 13:00	2131	45	NO	NO
13:00 - 14:00	1889	36	NO	NO
14:00 - 15:00	1834	57	NO	NO
15:00 - 16:00	2286	59	NO	NO
16:00 - 17:00	2341	44	NO	NO
17:00 - 18:00	2234	50	NO	NO
18:00 - 19:00	0	0	NO	NO
19:00 - 20:00	0	0	NO	NO
20:00 - 21:00	0	0	NO	NO
21:00 - 22:00	0	0	NO	NO
22:00 - 23:00	0	0	NO	NO
23:00 - 24:00	0	0	NO	NO

2045 Future - TH 210 at 4th Ave NE
SIGNAL WARRANT
ANALYSIS

Volume Threshold Reduced to 80% of Full Volume Warrant Thresholds

LOCATION: TH 210 at 4th Ave NE
COUNTY: Crow Wing
REF. POINT: 0
DATE: 3/12/2020

OPERATOR: JDA

85th% Speed	Approach Description		Lanes	Approach
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35	Major App3:	TH 210 WB	3	11386
30	Minor App2:	4th Ave NE NB	1	74
30	Minor App4:	4th Ave NE SB	2	498

40 MPH OR FASTER?	NO
POPULATION < 10,000?	NO
VOLUME REQ. AT 70%?	**NO**
CORRECTABLE CRASHES: (12-month period)	0

	80%		
	Minimum Volume Requirement		
	1A	1B	1A&B (80%)
Major Total	480	720	576
Minor Approach	160	80	128

HOUR	MAJOR APP. 1	MAJOR APP. 3	MINOR APP. 2	MINOR APP. 4	MAJOR APPROACH TOTAL Σ (APP.1 + APP. 3)	MAX MINOR APPROACH (APP. 2 or 4)	WARRANT 1A - 8 hr MAJOR/MINOR	WARRANT 1B - 8 hr MAJOR/MINOR	WARRANT 1A & B MAJOR/MINOR
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1:00 - 2:00	0	0	0	0	0	0	NO / NO	NO / NO	NO / NO
2:00 - 3:00	0	0	0	0	0	0	NO / NO	NO / NO	NO / NO
3:00 - 4:00	0	0	0	0	0	0	NO / NO	NO / NO	NO / NO
4:00 - 5:00	0	0	0	0	0	0	NO / NO	NO / NO	NO / NO
5:00 - 6:00	0	0	0	0	0	0	NO / NO	NO / NO	NO / NO
6:00 - 7:00	398	553	0	21	951	21	YES / NO	YES / NO	YES / NO
7:00 - 8:00	678	1096	0	45	1774	45	YES / NO	YES / NO	YES / NO
8:00 - 9:00	667	964	3	42	1631	42	YES / NO	YES / NO	YES / NO
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10:00 - 11:00	700	864	0	37	1564	37	YES / NO	YES / NO	YES / NO
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12:00 - 13:00	1080	1051	12	45	2131	45	YES / NO	YES / NO	YES / NO
13:00 - 14:00	948	941	1	36	1889	36	YES / NO	YES / NO	YES / NO
14:00 - 15:00	985	849	4	57	1834	57	YES / NO	YES / NO	YES / NO
15:00 - 16:00	1242	1044	45	59	2286	59	YES / NO	YES / NO	YES / NO
16:00 - 17:00	1226	1115	2	44	2341	44	YES / NO	YES / NO	YES / NO
17:00 - 18:00	1197	1037	1	50	2234	50	YES / NO	YES / NO	YES / NO
18:00 - 19:00	0	0	0	0	0	0	NO / NO	NO / NO	NO / NO
19:00 - 20:00	0	0	0	0	0	0	NO / NO	NO / NO	NO / NO
20:00 - 21:00	0	0	0	0	0	0	NO / NO	NO / NO	NO / NO
21:00 - 22:00	0	0	0	0	0	0	NO / NO	NO / NO	NO / NO
22:00 - 23:00	0	0	0	0	0	0	NO / NO	NO / NO	NO / NO
23:00 - 24:00	0	0	0	0	0	0	NO / NO	NO / NO	NO / NO
Daily	**10744**	**11386**	**74**	**498**					

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COMMENTS:

2045 Future - TH 210 at 4th Ave NE
SIGNAL WARRANT
ANALYSIS

Volume Threshold Reduced to 60% of Full Volume Warrant Thresholds

LOCATION: TH 210 at 4th Ave NE
COUNTY: Crow Wing
REF. POINT: 0
DATE: 3/12/2020

OPERATOR: JDA

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40 MPH OR FASTER?	NO
POPULATION < 10,000?	NO
VOLUME REQ. AT 70%?	**NO**
CORRECTABLE CRASHES: (12-month period)	0

60%

	Minimum Volume Requirement		
	1A	1B	1A&B (80%)
Major Total	360	540	432
Minor Approach	120	60	96

HOUR	MAJOR APP. 1	MAJOR APP. 3	MINOR APP. 2	MINOR APP. 4	MAJOR APPROACH TOTAL Σ (APP.1 + APP. 3)	MAX MINOR APPROACH (APP. 2 or 4)	WARRANT 1A - 8 hr MAJOR/MINOR	WARRANT 1B - 8 hr MAJOR/MINOR	WARRANT 1A & B MAJOR/MINOR
0:00 - 1:00	0	0	0	0	0	0	NO / NO	NO / NO	NO / NO
1:00 - 2:00	0	0	0	0	0	0	NO / NO	NO / NO	NO / NO
2:00 - 3:00	0	0	0	0	0	0	NO / NO	NO / NO	NO / NO
3:00 - 4:00	0	0	0	0	0	0	NO / NO	NO / NO	NO / NO
4:00 - 5:00	0	0	0	0	0	0	NO / NO	NO / NO	NO / NO
5:00 - 6:00	0	0	0	0	0	0	NO / NO	NO / NO	NO / NO
6:00 - 7:00	398	553	0	21	951	21	YES / NO	YES / NO	YES / NO
7:00 - 8:00	678	1096	0	45	1774	45	YES / NO	YES / NO	YES / NO
8:00 - 9:00	667	964	3	42	1631	42	YES / NO	YES / NO	YES / NO
9:00 - 10:00	621	833	4	20	1454	20	YES / NO	YES / NO	YES / NO
10:00 - 11:00	700	864	0	37	1564	37	YES / NO	YES / NO	YES / NO
11:00 - 12:00	1002	1039	2	42	2041	42	YES / NO	YES / NO	YES / NO
12:00 - 13:00	1080	1051	12	45	2131	45	YES / NO	YES / NO	YES / NO
13:00 - 14:00	948	941	1	36	1889	36	YES / NO	YES / NO	YES / NO
14:00 - 15:00	985	849	4	57	1834	57	YES / NO	YES / NO	YES / NO
15:00 - 16:00	1242	1044	45	59	2286	59	YES / NO	YES / NO	YES / NO
16:00 - 17:00	1226	1115	2	44	2341	44	YES / NO	YES / NO	YES / NO
17:00 - 18:00	1197	1037	1	50	2234	50	YES / NO	YES / NO	YES / NO
18:00 - 19:00	0	0	0	0	0	0	NO / NO	NO / NO	NO / NO
19:00 - 20:00	0	0	0	0	0	0	NO / NO	NO / NO	NO / NO
20:00 - 21:00	0	0	0	0	0	0	NO / NO	NO / NO	NO / NO
21:00 - 22:00	0	0	0	0	0	0	NO / NO	NO / NO	NO / NO
22:00 - 23:00	0	0	0	0	0	0	NO / NO	NO / NO	NO / NO
23:00 - 24:00	0	0	0	0	0	0	NO / NO	NO / NO	NO / NO
Daily	**10744**	**11386**	**74**	**498**					

		Met (Hr)	Required (Hr)	WARRANT MET:
Warrant 1	**Eight Hour Volumes**	0	8	Not satisfied
Warrant 1A	Minimum Vehicular Volume	0	8	Not satisfied
Warrant 1B	Interruption of Continuous Flow	0	8	Not satisfied
1A & 1B	Combination of Warrants	0	8	Not satisfied

COMMENTS:

2019 Existing - TH 210 at 5th Ave NE (EBL as Minor Approach)
SIGNAL WARRANT
ANALYSIS

LOCATION: TH 210 at 5th Ave NE (EBL as Minor
COUNTY: Crow Wing
REF. POINT: 0
DATE: 3/12/2020
OPERATOR: JDA

85th% Speed	Approach Description		Lanes	Approach
35	Major App1:	N/A	0	0
45	Major App3:	TH 210 WB	3	8831
35	Minor App2:	TH 210 EBL	1	2618
30	Minor App4:	N/A	0	0

40 MPH OR FASTER?	YES
POPULATION < 10,000?	NO
VOLUME REQ. AT 70%?	**YES**
CORRECTABLE CRASHES: (12-month period)	0

	Minimum Volume Requirement		
	1A	1B	1A&B (80%)
Major Total	420	630	504
Minor Approach	105	53	84

HOUR	MAJOR APP. 1	MAJOR APP. 3	MINOR APP. 2	MINOR APP. 4	MAJOR APPROACH TOTAL Σ (APP.1 + APP. 3)	MAX MINOR APPROACH (APP. 2 or 4)	WARRANT 1A - 8 hr MAJOR/MINOR	WARRANT 1B - 8 hr MAJOR/MINOR	WARRANT 1A & B MAJOR/MINOR
0:00 - 1:00	0	0	0	0	0	0	NO / NO	NO / NO	NO / NO
1:00 - 2:00	0	0	0	0	0	0	NO / NO	NO / NO	NO / NO
2:00 - 3:00	0	0	0	0	0	0	NO / NO	NO / NO	NO / NO
3:00 - 4:00	0	0	0	0	0	0	NO / NO	NO / NO	NO / NO
4:00 - 5:00	0	0	0	0	0	0	NO / NO	NO / NO	NO / NO
5:00 - 6:00	0	0	0	0	0	0	NO / NO	NO / NO	NO / NO
6:00 - 7:00	0	492	45	0	492	45	YES / NO	NO / NO	NO / NO
7:00 - 8:00	0	939	138	0	939	138	**YES / YES**	**YES / YES**	**YES / YES**
8:00 - 9:00	0	784	144	0	784	144	**YES / YES**	**YES / YES**	**YES / YES**
9:00 - 10:00	0	666	138	0	666	138	**YES / YES**	**YES / YES**	**YES / YES**
10:00 - 11:00	0	660	182	0	660	182	**YES / YES**	**YES / YES**	**YES / YES**
11:00 - 12:00	0	795	244	0	795	244	**YES / YES**	**YES / YES**	**YES / YES**
12:00 - 13:00	0	792	324	0	792	324	**YES / YES**	**YES / YES**	**YES / YES**
13:00 - 14:00	0	714	275	0	714	275	**YES / YES**	**YES / YES**	**YES / YES**
14:00 - 15:00	0	620	298	0	620	298	**YES / YES**	NO / YES	**YES / YES**
15:00 - 16:00	0	802	314	0	802	314	**YES / YES**	**YES / YES**	**YES / YES**
16:00 - 17:00	0	807	275	0	807	275	**YES / YES**	**YES / YES**	**YES / YES**
17:00 - 18:00	0	760	241	0	760	241	**YES / YES**	**YES / YES**	**YES / YES**
18:00 - 19:00	0	0	0	0	0	0	NO / NO	NO / NO	NO / NO
19:00 - 20:00	0	0	0	0	0	0	NO / NO	NO / NO	NO / NO
20:00 - 21:00	0	0	0	0	0	0	NO / NO	NO / NO	NO / NO
21:00 - 22:00	0	0	0	0	0	0	NO / NO	NO / NO	NO / NO
22:00 - 23:00	0	0	0	0	0	0	NO / NO	NO / NO	NO / NO
23:00 - 24:00	0	0	0	0	0	0	NO / NO	NO / NO	NO / NO
Daily	**0**	**8831**	**2618**	**0**					

		Met (Hr)	Required (Hr)	WARRANT MET:
Warrant 1	**Eight Hour Volumes**	11	8	**Satisfied**
Warrant 1A	Minimum Vehicular Volume	11	8	**Satisfied**
Warrant 1B	Interruption of Continuous Flow	10	8	**Satisfied**
1A & 1B	Combination of Warrants	11	8	**Satisfied**
Warrant 2	**Four Hour Volumes**	10	4	**Satisfied**
Warrant 3	**Peak Hour Volumes**	6	1	**Satisfied**
Warrant 7	**Crash Experience**	11	8	Crashes Insufficient

COMMENTS:

2019 Existing - TH 210 at 5th Ave NE (EBL as Minor Approach)
SIGNAL WARRANT
ANALYSIS

LOCATION: TH 210 at 5th Ave NE (EBL as Minor Approach)
COUNTY: Crow Wing
REF. POINT: 0
DATE: 3/12/2020

OPERATOR: JDA

85th% Speed	Approach Description		Lanes	Approach
35	Major App1:	N/A	0	0
45	Major App3:	TH 210 WB	3	8831
35	Minor App2:	TH 210 EBL	1	2618
30	Minor App4:	N/A	0	0

40 MPH OR FASTER?	YES
POPULATION < 10,000?	NO
VOLUME REQ. AT 70%?	**YES**

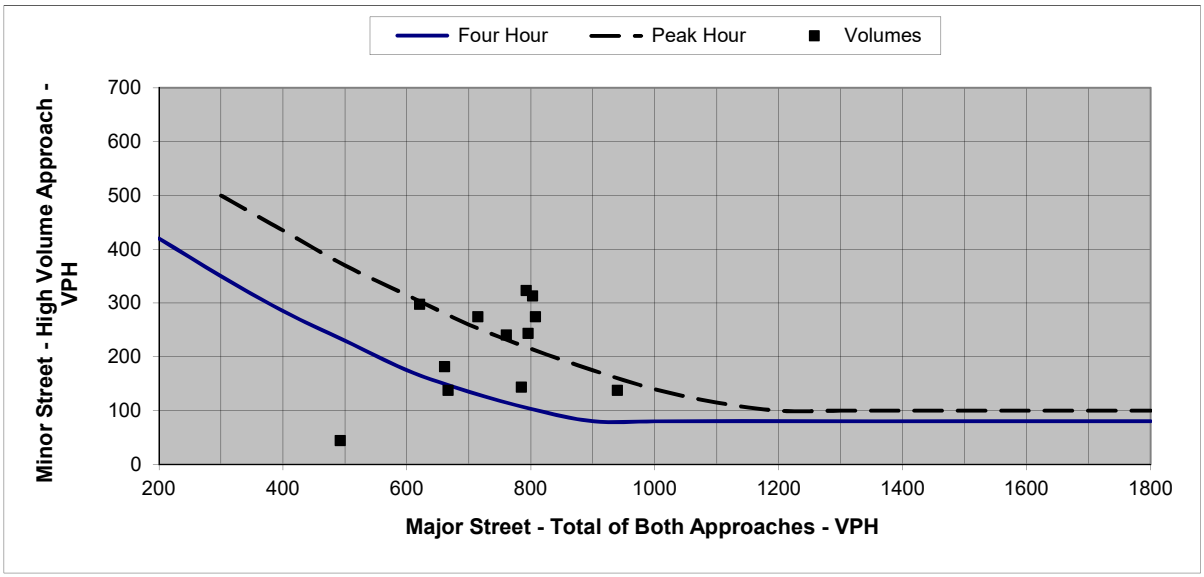

Figure 1. Four Hour and Peak Hour Warrant Analysis

Note: For data points outside the graph range, check the minor street volume against the lower thresholds

Warrant Criteria (Graph)		
Major Approach	Minor App. Four Hour	Minor App. Peak Hour
200	420	
300	350	500
400	285	435
500	230	370
600	175	315
700	135	260
800	103	215
900	80	175
1000	80	140
1100	80	115
1200	80	100
1300	80	100
1400	80	100
1500	80	100
1600	80	100
1700	80	100
1800	80	100

Actual Hourly Count			Warrants Met: Warrant 2	Warrant 3
HOUR	Sum Major App.	Max Minor App.	Four Hour	Peak Hour
0:00 - 1:00	0	0	NO	NO
1:00 - 2:00	0	0	NO	NO
2:00 - 3:00	0	0	NO	NO
3:00 - 4:00	0	0	NO	NO
4:00 - 5:00	0	0	NO	NO
5:00 - 6:00	0	0	NO	NO
6:00 - 7:00	492	45	NO	NO
7:00 - 8:00	939	138	**YES**	NO
8:00 - 9:00	784	144	**YES**	NO
9:00 - 10:00	666	138	NO	NO
10:00 - 11:00	660	182	**YES**	NO
11:00 - 12:00	795	244	**YES**	**YES**
12:00 - 13:00	792	324	**YES**	**YES**
13:00 - 14:00	714	275	**YES**	**YES**
14:00 - 15:00	620	298	**YES**	NO
15:00 - 16:00	802	314	**YES**	**YES**
16:00 - 17:00	807	275	**YES**	**YES**
17:00 - 18:00	760	241	**YES**	**YES**
18:00 - 19:00	0	0	NO	NO
19:00 - 20:00	0	0	NO	NO
20:00 - 21:00	0	0	NO	NO
21:00 - 22:00	0	0	NO	NO
22:00 - 23:00	0	0	NO	NO
23:00 - 24:00	0	0	NO	NO

2045 Future - TH 210 at 5th Ave NE (EBL as Minor Approach)
SIGNAL WARRANT
ANALYSIS

LOCATION: TH 210 at 5th Ave NE (EBL as Minor
COUNTY: Crow Wing
REF. POINT: 0
DATE: 3/12/2020
OPERATOR: JDA

85th% Speed	Approach Description		Lanes	Approach
35	Major App1:	N/A	0	0
45	Major App3:	TH 210 WB	3	9981
35	Minor App2:	TH 210 EBL	1	2960
30	Minor App4:	N/A	0	0

40 MPH OR FASTER?	YES
POPULATION < 10,000?	NO
VOLUME REQ. AT 70%?	**YES**
CORRECTABLE CRASHES: (12-month period)	0

	Minimum Volume Requirement		
	1A	1B	1A&B (80%)
Major Total	420	630	504
Minor Approach	105	53	84

HOUR	MAJOR APP. 1	MAJOR APP. 3	MINOR APP. 2	MINOR APP. 4	MAJOR APPROACH TOTAL Σ (APP.1 + APP. 3)	MAX MINOR APPROACH (APP. 2 or 4)	WARRANT 1A - 8 hr MAJOR/MINOR	WARRANT 1B - 8 hr MAJOR/MINOR	WARRANT 1A & B MAJOR/MINOR
0:00 - 1:00	0	0	0	0	0	0	NO / NO	NO / NO	NO / NO
1:00 - 2:00	0	0	0	0	0	0	NO / NO	NO / NO	NO / NO
2:00 - 3:00	0	0	0	0	0	0	NO / NO	NO / NO	NO / NO
3:00 - 4:00	0	0	0	0	0	0	NO / NO	NO / NO	NO / NO
4:00 - 5:00	0	0	0	0	0	0	NO / NO	NO / NO	NO / NO
5:00 - 6:00	0	0	0	0	0	0	NO / NO	NO / NO	NO / NO
6:00 - 7:00	0	556	51	0	556	51	YES / NO	NO / NO	YES / NO
7:00 - 8:00	0	1061	156	0	1061	156	**YES / YES**	**YES / YES**	**YES / YES**
8:00 - 9:00	0	886	163	0	886	163	**YES / YES**	**YES / YES**	**YES / YES**
9:00 - 10:00	0	752	157	0	752	157	**YES / YES**	**YES / YES**	**YES / YES**
10:00 - 11:00	0	746	206	0	746	206	**YES / YES**	**YES / YES**	**YES / YES**
11:00 - 12:00	0	898	276	0	898	276	**YES / YES**	**YES / YES**	**YES / YES**
12:00 - 13:00	0	895	365	0	895	365	**YES / YES**	**YES / YES**	**YES / YES**
13:00 - 14:00	0	807	310	0	807	310	**YES / YES**	**YES / YES**	**YES / YES**
14:00 - 15:00	0	701	337	0	701	337	**YES / YES**	**YES / YES**	**YES / YES**
15:00 - 16:00	0	907	355	0	907	355	**YES / YES**	**YES / YES**	**YES / YES**
16:00 - 17:00	0	913	311	0	913	311	**YES / YES**	**YES / YES**	**YES / YES**
17:00 - 18:00	0	859	273	0	859	273	**YES / YES**	**YES / YES**	**YES / YES**
18:00 - 19:00	0	0	0	0	0	0	NO / NO	NO / NO	NO / NO
19:00 - 20:00	0	0	0	0	0	0	NO / NO	NO / NO	NO / NO
20:00 - 21:00	0	0	0	0	0	0	NO / NO	NO / NO	NO / NO
21:00 - 22:00	0	0	0	0	0	0	NO / NO	NO / NO	NO / NO
22:00 - 23:00	0	0	0	0	0	0	NO / NO	NO / NO	NO / NO
23:00 - 24:00	0	0	0	0	0	0	NO / NO	NO / NO	NO / NO
Daily	**0**	**9981**	**2960**	**0**					

		Met (Hr)	Required (Hr)	WARRANT MET:
Warrant 1	**Eight Hour Volumes**	11	8	**Satisfied**
Warrant 1A	Minimum Vehicular Volume	11	8	**Satisfied**
Warrant 1B	Interruption of Continuous Flow	11	8	**Satisfied**
1A & 1B	Combination of Warrants	11	8	**Satisfied**
Warrant 2	**Four Hour Volumes**	11	4	**Satisfied**
Warrant 3	**Peak Hour Volumes**	8	1	**Satisfied**
Warrant 7	**Crash Experience**	11	8	Crashes Insufficient

COMMENTS:

2045 Future - TH 210 at 5th Ave NE (EBL as Minor Approach)

SIGNAL WARRANT ANALYSIS

LOCATION: TH 210 at 5th Ave NE (EBL as Minor Approach)
COUNTY: Crow Wing
REF. POINT: 0
DATE: 3/12/2020

OPERATOR: JDA

85th% Speed	Approach Description		Lanes	Approach
35	Major App1:	N/A	0	0
45	Major App3:	TH 210 WB	3	9981
35	Minor App2:	TH 210 EBL	1	2960
30	Minor App4:	N/A	0	0

40 MPH OR FASTER?	YES
POPULATION < 10,000?	NO
VOLUME REQ. AT 70%?	**YES**

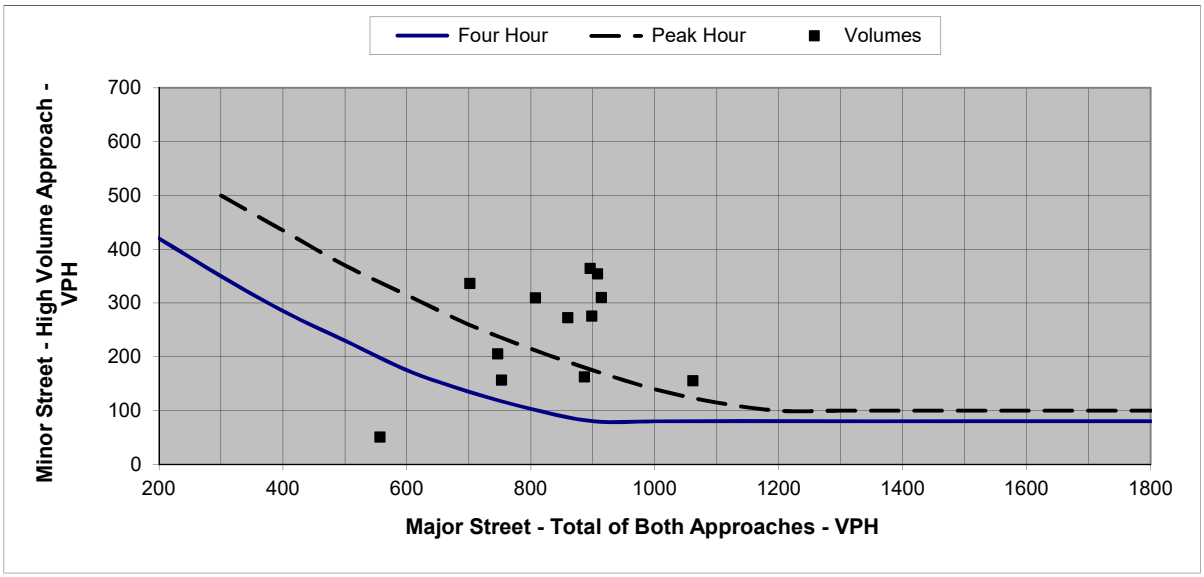

Figure 1. Four Hour and Peak Hour Warrant Analysis

Note: For data points outside the graph range, check the minor street volume against the lower thresholds

Warrant Criteria (Graph)		
Major Approach	Minor App. Four Hour	Minor App. Peak Hour
200	420	
300	350	500
400	285	435
500	230	370
600	175	315
700	135	260
800	103	215
900	80	175
1000	80	140
1100	80	115
1200	80	100
1300	80	100
1400	80	100
1500	80	100
1600	80	100
1700	80	100
1800	80	100

Actual Hourly Count			Warrants Met: Warrant 2	Warrant 3
HOUR	Sum Major App.	Max Minor App.	Four Hour	Peak Hour
0:00 - 1:00	0	0	NO	NO
1:00 - 2:00	0	0	NO	NO
2:00 - 3:00	0	0	NO	NO
3:00 - 4:00	0	0	NO	NO
4:00 - 5:00	0	0	NO	NO
5:00 - 6:00	0	0	NO	NO
6:00 - 7:00	556	51	NO	NO
7:00 - 8:00	1061	156	**YES**	**YES**
8:00 - 9:00	886	163	**YES**	NO
9:00 - 10:00	752	157	**YES**	NO
10:00 - 11:00	746	206	**YES**	NO
11:00 - 12:00	898	276	**YES**	**YES**
12:00 - 13:00	895	365	**YES**	**YES**
13:00 - 14:00	807	310	**YES**	**YES**
14:00 - 15:00	701	337	**YES**	**YES**
15:00 - 16:00	907	355	**YES**	**YES**
16:00 - 17:00	913	311	**YES**	**YES**
17:00 - 18:00	859	273	**YES**	**YES**
18:00 - 19:00	0	0	NO	NO
19:00 - 20:00	0	0	NO	NO
20:00 - 21:00	0	0	NO	NO
21:00 - 22:00	0	0	NO	NO
22:00 - 23:00	0	0	NO	NO
23:00 - 24:00	0	0	NO	NO

2019 Existing - TH 210 at 8th Ave NE (TH 25)
SIGNAL WARRANT
ANALYSIS

LOCATION: TH 210 at 8th Ave NE (TH 25)
COUNTY: Crow Wing
REF. POINT: 0
DATE: 3/12/2020
OPERATOR: JDA

85th% Speed	Approach Description		Lanes	Approach
45	Major App1:	TH 210 EB	4	5093
45	Major App3:	TH 210 WB	4	4646
30	Minor App2:	8th Ave NE (TH 25) NB	1	3654
30	Minor App4:	8th Ave NE SB	1	2294

40 MPH OR FASTER?	YES
POPULATION < 10,000?	NO
VOLUME REQ. AT 70%?	**YES**
CORRECTABLE CRASHES: (12-month period)	0

	Minimum Volume Requirement		
	1A	1B	1A&B (80%)
Major Total	420	630	504
Minor Approach	105	53	84

HOUR	MAJOR APP. 1	MAJOR APP. 3	MINOR APP. 2	MINOR APP. 4	MAJOR APPROACH TOTAL Σ (APP.1 + APP. 3)	MAX MINOR APPROACH (APP. 2 or 4)	WARRANT 1A - 8 hr MAJOR/MINOR	WARRANT 1B - 8 hr MAJOR/MINOR	WARRANT 1A & B MAJOR/MINOR
0:00 - 1:00	0	0	0	0	0	0	NO / NO	NO / NO	NO / NO
1:00 - 2:00	0	0	0	0	0	0	NO / NO	NO / NO	NO / NO
2:00 - 3:00	0	0	0	0	0	0	NO / NO	NO / NO	NO / NO
3:00 - 4:00	0	0	0	0	0	0	NO / NO	NO / NO	NO / NO
4:00 - 5:00	0	0	0	0	0	0	NO / NO	NO / NO	NO / NO
5:00 - 6:00	0	0	0	0	0	0	NO / NO	NO / NO	NO / NO
6:00 - 7:00	263	258	203	149	521	203	**YES / YES**	NO / YES	**YES / YES**
7:00 - 8:00	368	503	326	174	871	326	**YES / YES**	**YES / YES**	**YES / YES**
8:00 - 9:00	350	427	316	187	777	316	**YES / YES**	**YES / YES**	**YES / YES**
9:00 - 10:00	304	349	245	121	653	245	**YES / YES**	**YES / YES**	**YES / YES**
10:00 - 11:00	341	373	314	135	714	314	**YES / YES**	**YES / YES**	**YES / YES**
11:00 - 12:00	414	351	334	177	765	334	**YES / YES**	**YES / YES**	**YES / YES**
12:00 - 13:00	459	361	345	200	820	345	**YES / YES**	**YES / YES**	**YES / YES**
13:00 - 14:00	425	395	256	205	820	256	**YES / YES**	**YES / YES**	**YES / YES**
14:00 - 15:00	486	328	261	218	814	261	**YES / YES**	**YES / YES**	**YES / YES**
15:00 - 16:00	524	417	319	240	941	319	**YES / YES**	**YES / YES**	**YES / YES**
16:00 - 17:00	615	511	351	257	1126	351	**YES / YES**	**YES / YES**	**YES / YES**
17:00 - 18:00	544	373	384	231	917	384	**YES / YES**	**YES / YES**	**YES / YES**
18:00 - 19:00	0	0	0	0	0	0	NO / NO	NO / NO	NO / NO
19:00 - 20:00	0	0	0	0	0	0	NO / NO	NO / NO	NO / NO
20:00 - 21:00	0	0	0	0	0	0	NO / NO	NO / NO	NO / NO
21:00 - 22:00	0	0	0	0	0	0	NO / NO	NO / NO	NO / NO
22:00 - 23:00	0	0	0	0	0	0	NO / NO	NO / NO	NO / NO
23:00 - 24:00	0	0	0	0	0	0	NO / NO	NO / NO	NO / NO
Daily	**5093**	**4646**	**3654**	**2294**					

		Met (Hr)	Required (Hr)	WARRANT MET:
Warrant 1	**Eight Hour Volumes**	12	8	**Satisfied**
Warrant 1A	Minimum Vehicular Volume	12	8	**Satisfied**
Warrant 1B	Interruption of Continuous Flow	11	8	**Satisfied**
1A & 1B	Combination of Warrants	12	8	**Satisfied**
Warrant 2	**Four Hour Volumes**	11	4	**Satisfied**
Warrant 3	**Peak Hour Volumes**	10	1	**Satisfied**
Warrant 7	**Crash Experience**	12	8	Crashes Insufficient

COMMENTS:

2019 Existing - TH 210 at 8th Ave NE (TH 25)
SIGNAL WARRANT
ANALYSIS

LOCATION: TH 210 at 8th Ave NE (TH 25)
COUNTY: Crow Wing
REF. POINT: 0
DATE: 3/12/2020

OPERATOR: JDA

85th% Speed	Approach Description		Lanes	Approach
45	Major App1:	TH 210 EB	4	5093
45	Major App3:	TH 210 WB	4	4646
30	Minor App2:	8th Ave NE (TH 25) NB	1	3654
30	Minor App4:	8th Ave NE SB	1	2294

40 MPH OR FASTER?	YES
POPULATION < 10,000?	NO
VOLUME REQ. AT 70%?	**YES**

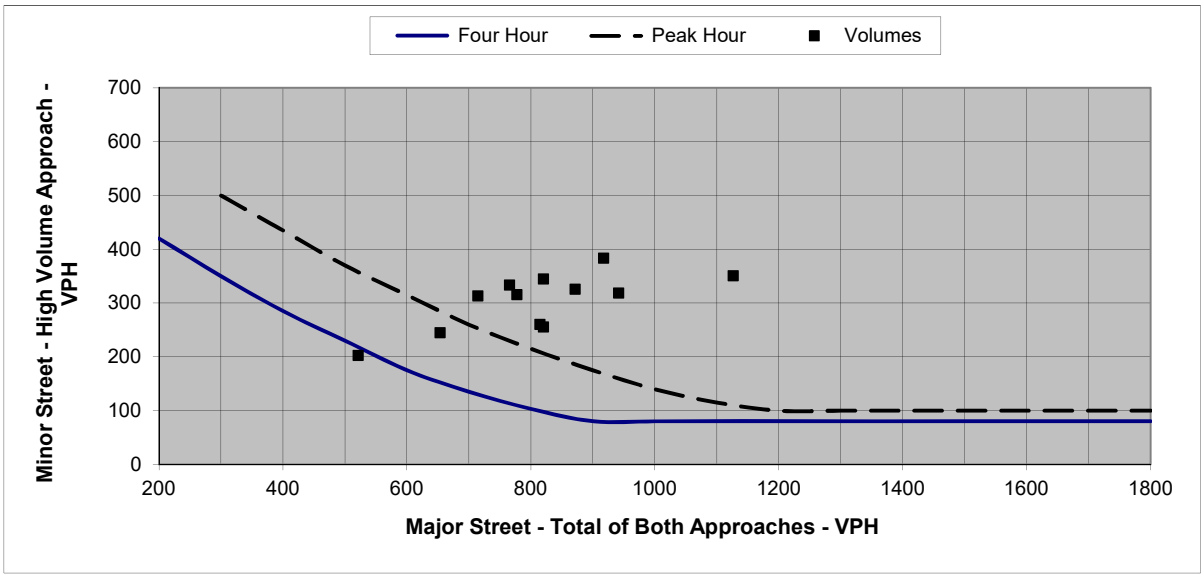

Figure 1. Four Hour and Peak Hour Warrant Analysis

Note: For data points outside the graph range, check the minor street volume against the lower thresholds

Warrant Criteria (Graph)		
Major	Minor App.	Minor App.
Approach	Four Hour	Peak Hour
200	420	
300	350	500
400	285	435
500	230	370
600	175	315
700	135	260
800	103	215
900	80	175
1000	80	140
1100	80	115
1200	80	100
1300	80	100
1400	80	100
1500	80	100
1600	80	100
1700	80	100
1800	80	100

Actual Hourly Count			Warrants Met:	
			Warrant 2	Warrant 3
HOUR	Sum Major App.	Max Minor App.	Four Hour	Peak Hour
0:00 - 1:00	0	0	NO	NO
1:00 - 2:00	0	0	NO	NO
2:00 - 3:00	0	0	NO	NO
3:00 - 4:00	0	0	NO	NO
4:00 - 5:00	0	0	NO	NO
5:00 - 6:00	0	0	NO	NO
6:00 - 7:00	521	203	NO	NO
7:00 - 8:00	871	326	**YES**	**YES**
8:00 - 9:00	777	316	**YES**	**YES**
9:00 - 10:00	653	245	**YES**	NO
10:00 - 11:00	714	314	**YES**	**YES**
11:00 - 12:00	765	334	**YES**	**YES**
12:00 - 13:00	820	345	**YES**	**YES**
13:00 - 14:00	820	256	**YES**	**YES**
14:00 - 15:00	814	261	**YES**	**YES**
15:00 - 16:00	941	319	**YES**	**YES**
16:00 - 17:00	1126	351	**YES**	**YES**
17:00 - 18:00	917	384	**YES**	**YES**
18:00 - 19:00	0	0	NO	NO
19:00 - 20:00	0	0	NO	NO
20:00 - 21:00	0	0	NO	NO
21:00 - 22:00	0	0	NO	NO
22:00 - 23:00	0	0	NO	NO
23:00 - 24:00	0	0	NO	NO

2045 Future - TH 210 at 8th Ave NE (TH 25)
SIGNAL WARRANT
ANALYSIS

LOCATION: TH 210 at 8th Ave NE (TH 25)
COUNTY: Crow Wing
REF. POINT: 0
DATE: 3/12/2020
OPERATOR: JDA

85th% Speed	Approach Description		Lanes	Approach
45	Major App1:	TH 210 EB	4	5753
45	Major App3:	TH 210 WB	4	5248
30	Minor App2:	8th Ave NE (TH 25) NB	1	4130
30	Minor App4:	8th Ave NE SB	1	2593

40 MPH OR FASTER?	YES
POPULATION < 10,000?	NO
VOLUME REQ. AT 70%?	**YES**
CORRECTABLE CRASHES: (12-month period)	0

	Minimum Volume Requirement		
	1A	1B	1A&B (80%)
Major Total	420	630	504
Minor Approach	105	53	84

HOUR	MAJOR APP. 1	MAJOR APP. 3	MINOR APP. 2	MINOR APP. 4	MAJOR APPROACH TOTAL Σ (APP.1 + APP. 3)	MAX MINOR APPROACH (APP. 2 or 4)	WARRANT 1A - 8 hr MAJOR/MINOR	WARRANT 1B - 8 hr MAJOR/MINOR	WARRANT 1A & B MAJOR/MINOR
0:00 - 1:00	0	0	0	0	0	0	NO / NO	NO / NO	NO / NO
1:00 - 2:00	0	0	0	0	0	0	NO / NO	NO / NO	NO / NO
2:00 - 3:00	0	0	0	0	0	0	NO / NO	NO / NO	NO / NO
3:00 - 4:00	0	0	0	0	0	0	NO / NO	NO / NO	NO / NO
4:00 - 5:00	0	0	0	0	0	0	NO / NO	NO / NO	NO / NO
5:00 - 6:00	0	0	0	0	0	0	NO / NO	NO / NO	NO / NO
6:00 - 7:00	296	292	230	168	588	230	**YES / YES**	NO / YES	**YES / YES**
7:00 - 8:00	416	568	368	197	984	368	**YES / YES**	**YES / YES**	**YES / YES**
8:00 - 9:00	396	483	358	211	879	358	**YES / YES**	**YES / YES**	**YES / YES**
9:00 - 10:00	343	394	276	138	737	276	**YES / YES**	**YES / YES**	**YES / YES**
10:00 - 11:00	386	421	355	152	807	355	**YES / YES**	**YES / YES**	**YES / YES**
11:00 - 12:00	468	397	377	201	865	377	**YES / YES**	**YES / YES**	**YES / YES**
12:00 - 13:00	519	407	390	226	926	390	**YES / YES**	**YES / YES**	**YES / YES**
13:00 - 14:00	480	446	290	232	926	290	**YES / YES**	**YES / YES**	**YES / YES**
14:00 - 15:00	549	370	294	246	919	294	**YES / YES**	**YES / YES**	**YES / YES**
15:00 - 16:00	592	471	361	271	1063	361	**YES / YES**	**YES / YES**	**YES / YES**
16:00 - 17:00	694	578	397	290	1272	397	**YES / YES**	**YES / YES**	**YES / YES**
17:00 - 18:00	614	421	434	261	1035	434	**YES / YES**	**YES / YES**	**YES / YES**
18:00 - 19:00	0	0	0	0	0	0	NO / NO	NO / NO	NO / NO
19:00 - 20:00	0	0	0	0	0	0	NO / NO	NO / NO	NO / NO
20:00 - 21:00	0	0	0	0	0	0	NO / NO	NO / NO	NO / NO
21:00 - 22:00	0	0	0	0	0	0	NO / NO	NO / NO	NO / NO
22:00 - 23:00	0	0	0	0	0	0	NO / NO	NO / NO	NO / NO
23:00 - 24:00	0	0	0	0	0	0	NO / NO	NO / NO	NO / NO
Daily	**5753**	**5248**	**4130**	**2593**					

		Met (Hr)	Required (Hr)	WARRANT MET:
Warrant 1	**Eight Hour Volumes**	12	8	**Satisfied**
Warrant 1A	Minimum Vehicular Volume	12	8	**Satisfied**
Warrant 1B	Interruption of Continuous Flow	11	8	**Satisfied**
1A & 1B	Combination of Warrants	12	8	**Satisfied**
Warrant 2	**Four Hour Volumes**	12	4	**Satisfied**
Warrant 3	**Peak Hour Volumes**	11	1	**Satisfied**
Warrant 7	**Crash Experience**	12	8	Crashes Insufficient

COMMENTS:

2045 Future - TH 210 at 8th Ave NE (TH 25)
SIGNAL WARRANT
ANALYSIS

LOCATION: TH 210 at 8th Ave NE (TH 25)
COUNTY: Crow Wing
REF. POINT: 0
DATE: 3/12/2020

OPERATOR: JDA

85th% Speed	Approach Description		Lanes	Approach
45	Major App1:	TH 210 EB	4	5753
45	Major App3:	TH 210 WB	4	5248
30	Minor App2:	8th Ave NE (TH 25) NB	1	4130
30	Minor App4:	8th Ave NE SB	1	2593

40 MPH OR FASTER?	YES
POPULATION < 10,000?	NO
VOLUME REQ. AT 70%?	**YES**

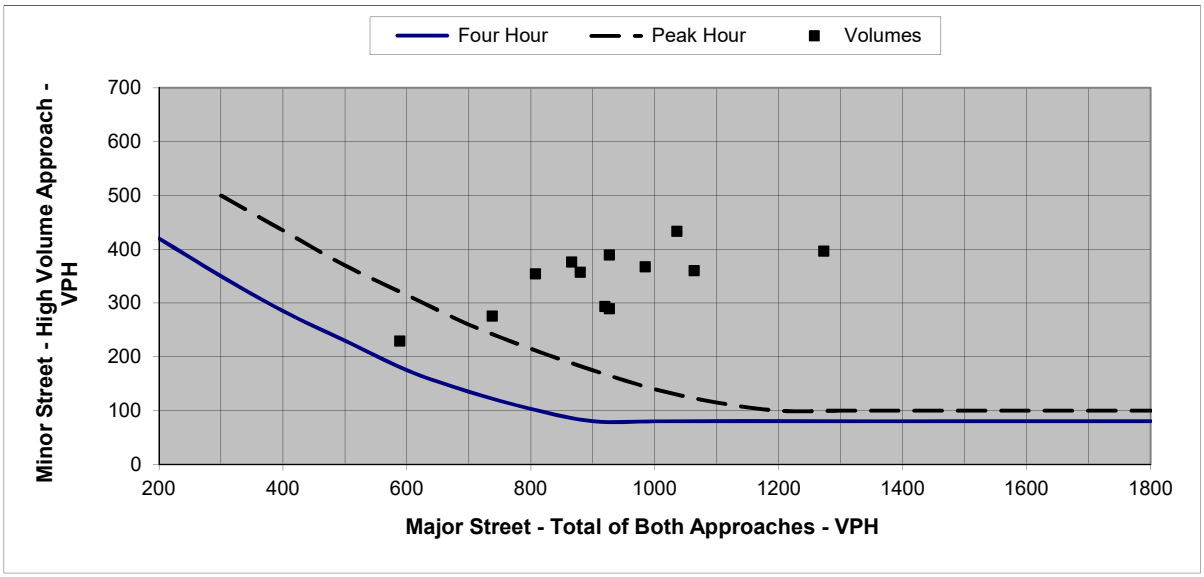

Figure 1. Four Hour and Peak Hour Warrant Analysis

Note: For data points outside the graph range, check the minor street volume against the lower thresholds

Warrant Criteria (Graph)		
Major Approach	Minor App. Four Hour	Minor App. Peak Hour
200	420	
300	350	500
400	285	435
500	230	370
600	175	315
700	135	260
800	103	215
900	80	175
1000	80	140
1100	80	115
1200	80	100
1300	80	100
1400	80	100
1500	80	100
1600	80	100
1700	80	100
1800	80	100

Actual Hourly Count			Warrants Met: Warrant 2	Warrant 3
HOUR	Sum Major App.	Max Minor App.	Four Hour	Peak Hour
0:00 - 1:00	0	0	NO	NO
1:00 - 2:00	0	0	NO	NO
2:00 - 3:00	0	0	NO	NO
3:00 - 4:00	0	0	NO	NO
4:00 - 5:00	0	0	NO	NO
5:00 - 6:00	0	0	NO	NO
6:00 - 7:00	588	230	**YES**	NO
7:00 - 8:00	984	368	**YES**	**YES**
8:00 - 9:00	879	358	**YES**	**YES**
9:00 - 10:00	737	276	**YES**	**YES**
10:00 - 11:00	807	355	**YES**	**YES**
11:00 - 12:00	865	377	**YES**	**YES**
12:00 - 13:00	926	390	**YES**	**YES**
13:00 - 14:00	926	290	**YES**	**YES**
14:00 - 15:00	919	294	**YES**	**YES**
15:00 - 16:00	1063	361	**YES**	**YES**
16:00 - 17:00	1272	397	**YES**	**YES**
17:00 - 18:00	1035	434	**YES**	**YES**
18:00 - 19:00	0	0	NO	NO
19:00 - 20:00	0	0	NO	NO
20:00 - 21:00	0	0	NO	NO
21:00 - 22:00	0	0	NO	NO
22:00 - 23:00	0	0	NO	NO
23:00 - 24:00	0	0	NO	NO

2019 Existing - TH 210 at 10th Ave NE
SIGNAL WARRANT
ANALYSIS

LOCATION: TH 210 at 10th Ave NE
COUNTY: Crow Wing
REF. POINT: 0
DATE: 3/12/2020

OPERATOR: JDA

85th% Speed	Approach Description		Lanes	Approach
45	Major App1:	TH 210 EB	4	4164
45	Major App3:	TH 210 WB	4	4692
30	Minor App2:	10th Ave NE NB	1	200
30	Minor App4:	10th Ave NE SB	1	102

40 MPH OR FASTER?	YES
POPULATION < 10,000?	NO
VOLUME REQ. AT 70%?	**YES**
CORRECTABLE CRASHES: (12-month period)	0

	Minimum Volume Requirement		
	1A	1B	1A&B (80%)
Major Total	420	630	504
Minor Approach	105	53	84

HOUR	MAJOR APP. 1	MAJOR APP. 3	MINOR APP. 2	MINOR APP. 4	MAJOR APPROACH TOTAL Σ (APP.1 + APP. 3)	MAX MINOR APPROACH (APP. 2 or 4)	WARRANT 1A - 8 hr MAJOR/MINOR	WARRANT 1B - 8 hr MAJOR/MINOR	WARRANT 1A & B MAJOR/MINOR
0:00 - 1:00	0	0	0	0	0	0	NO / NO	NO / NO	NO / NO
1:00 - 2:00	0	0	0	0	0	0	NO / NO	NO / NO	NO / NO
2:00 - 3:00	0	0	0	0	0	0	NO / NO	NO / NO	NO / NO
3:00 - 4:00	0	0	0	0	0	0	NO / NO	NO / NO	NO / NO
4:00 - 5:00	0	0	0	0	0	0	NO / NO	NO / NO	NO / NO
5:00 - 6:00	0	0	0	0	0	0	NO / NO	NO / NO	NO / NO
6:00 - 7:00	267	270	5	2	537	5	YES / NO	NO / NO	YES / NO
7:00 - 8:00	297	496	22	20	793	22	YES / NO	YES / NO	YES / NO
8:00 - 9:00	288	422	17	16	710	17	YES / NO	YES / NO	YES / NO
9:00 - 10:00	275	356	9	2	631	9	YES / NO	YES / NO	YES / NO
10:00 - 11:00	263	384	7	8	647	8	YES / NO	YES / NO	YES / NO
11:00 - 12:00	326	364	8	9	690	9	YES / NO	YES / NO	YES / NO
12:00 - 13:00	380	361	20	6	741	20	YES / NO	YES / NO	YES / NO
13:00 - 14:00	348	396	13	5	744	13	YES / NO	YES / NO	YES / NO
14:00 - 15:00	409	332	25	13	741	25	YES / NO	YES / NO	YES / NO
15:00 - 16:00	421	414	29	11	835	29	YES / NO	YES / NO	YES / NO
16:00 - 17:00	483	519	15	5	1002	15	YES / NO	YES / NO	YES / NO
17:00 - 18:00	407	378	30	5	785	30	YES / NO	YES / NO	YES / NO
18:00 - 19:00	0	0	0	0	0	0	NO / NO	NO / NO	NO / NO
19:00 - 20:00	0	0	0	0	0	0	NO / NO	NO / NO	NO / NO
20:00 - 21:00	0	0	0	0	0	0	NO / NO	NO / NO	NO / NO
21:00 - 22:00	0	0	0	0	0	0	NO / NO	NO / NO	NO / NO
22:00 - 23:00	0	0	0	0	0	0	NO / NO	NO / NO	NO / NO
23:00 - 24:00	0	0	0	0	0	0	NO / NO	NO / NO	NO / NO
Daily	**4164**	**4692**	**200**	**102**					

		Met (Hr)	Required (Hr)	WARRANT MET:
Warrant 1	**Eight Hour Volumes**	0	8	Not satisfied
Warrant 1A	Minimum Vehicular Volume	0	8	Not satisfied
Warrant 1B	Interruption of Continuous Flow	0	8	Not satisfied
1A & 1B	Combination of Warrants	0	8	Not satisfied
Warrant 2	**Four Hour Volumes**	0	4	Not satisfied
Warrant 3	**Peak Hour Volumes**	0	1	Not satisfied
Warrant 7	**Crash Experience**	0	8	Not satisfied

COMMENTS:

2019 Existing - TH 210 at 10th Ave NE
SIGNAL WARRANT
ANALYSIS

LOCATION: TH 210 at 10th Ave NE
COUNTY: Crow Wing
REF. POINT: 0
DATE: 3/12/2020

OPERATOR: JDA

40 MPH OR FASTER?	YES
POPULATION < 10,000?	NO
VOLUME REQ. AT 70%?	**YES**

85th% Speed	Approach Description		Lanes	Approach
45	Major App1:	TH 210 EB	4	4164
45	Major App3:	TH 210 WB	4	4692
30	Minor App2:	10th Ave NE NB	1	200
30	Minor App4:	10th Ave NE SB	1	102

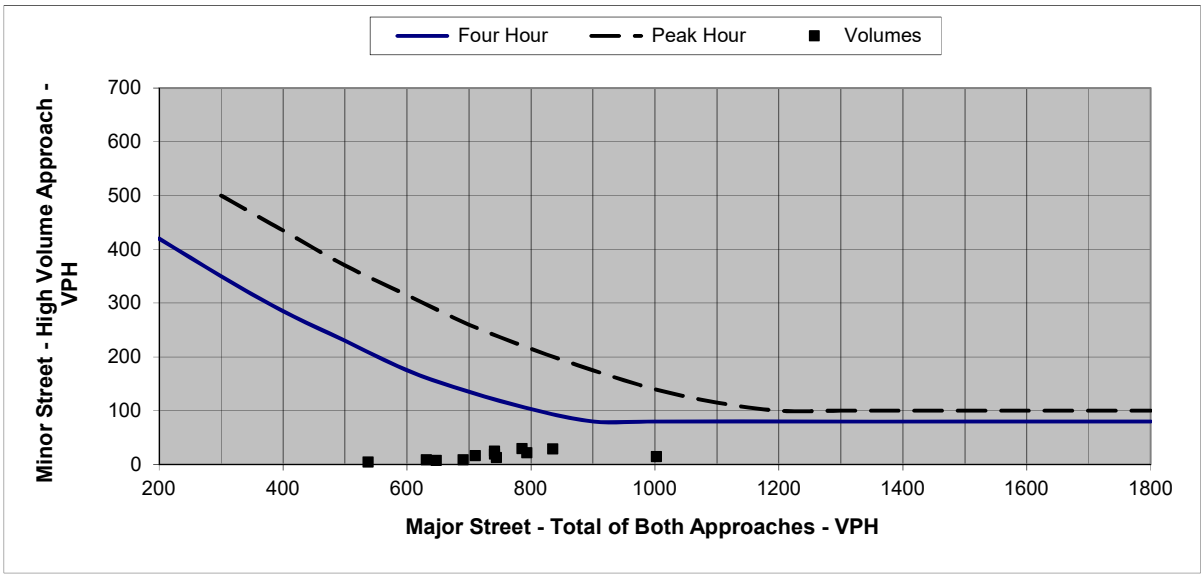

Figure 1. Four Hour and Peak Hour Warrant Analysis

Note: For data points outside the graph range, check the minor street volume against the lower thresholds

Warrant Criteria (Graph)		
Major	Minor App.	Minor App.
Approach	Four Hour	Peak Hour
200	420	
300	350	500
400	285	435
500	230	370
600	175	315
700	135	260
800	103	215
900	80	175
1000	80	140
1100	80	115
1200	80	100
1300	80	100
1400	80	100
1500	80	100
1600	80	100
1700	80	100
1800	80	100

Actual Hourly Count			Warrants Met:	
			Warrant 2	Warrant 3
HOUR	Sum Major App.	Max Minor App.	Four Hour	Peak Hour
0:00 - 1:00	0	0	NO	NO
1:00 - 2:00	0	0	NO	NO
2:00 - 3:00	0	0	NO	NO
3:00 - 4:00	0	0	NO	NO
4:00 - 5:00	0	0	NO	NO
5:00 - 6:00	0	0	NO	NO
6:00 - 7:00	537	5	NO	NO
7:00 - 8:00	793	22	NO	NO
8:00 - 9:00	710	17	NO	NO
9:00 - 10:00	631	9	NO	NO
10:00 - 11:00	647	8	NO	NO
11:00 - 12:00	690	9	NO	NO
12:00 - 13:00	741	20	NO	NO
13:00 - 14:00	744	13	NO	NO
14:00 - 15:00	741	25	NO	NO
15:00 - 16:00	835	29	NO	NO
16:00 - 17:00	1002	15	NO	NO
17:00 - 18:00	785	30	NO	NO
18:00 - 19:00	0	0	NO	NO
19:00 - 20:00	0	0	NO	NO
20:00 - 21:00	0	0	NO	NO
21:00 - 22:00	0	0	NO	NO
22:00 - 23:00	0	0	NO	NO
23:00 - 24:00	0	0	NO	NO

2045 Future - TH 210 at 10th Ave NE
SIGNAL WARRANT
ANALYSIS

LOCATION: TH 210 at 10th Ave NE
COUNTY: Crow Wing
REF. POINT: 0
DATE: 3/12/2020

OPERATOR: JDA

85th% Speed	Approach Description		Lanes	Approach
45	Major App1:	TH 210 EB	4	4709
45	Major App3:	TH 210 WB	4	5299
30	Minor App2:	10th Ave NE NB	1	225
30	Minor App4:	10th Ave NE SB	1	111

40 MPH OR FASTER?	YES
POPULATION < 10,000?	NO
VOLUME REQ. AT 70%?	**YES**
CORRECTABLE CRASHES: (12-month period)	0

	Minimum Volume Requirement		
	1A	1B	1A&B (80%)
Major Total	420	630	504
Minor Approach	105	53	84

HOUR	MAJOR APP. 1	MAJOR APP. 3	MINOR APP. 2	MINOR APP. 4	MAJOR APPROACH TOTAL Σ (APP.1 + APP. 3)	MAX MINOR APPROACH (APP. 2 or 4)	WARRANT 1A - 8 hr MAJOR/MINOR	WARRANT 1B - 8 hr MAJOR/MINOR	WARRANT 1A & B MAJOR/MINOR
0:00 - 1:00	0	0	0	0	0	0	NO / NO	NO / NO	NO / NO
1:00 - 2:00	0	0	0	0	0	0	NO / NO	NO / NO	NO / NO
2:00 - 3:00	0	0	0	0	0	0	NO / NO	NO / NO	NO / NO
3:00 - 4:00	0	0	0	0	0	0	NO / NO	NO / NO	NO / NO
4:00 - 5:00	0	0	0	0	0	0	NO / NO	NO / NO	NO / NO
5:00 - 6:00	0	0	0	0	0	0	NO / NO	NO / NO	NO / NO
6:00 - 7:00	301	305	5	2	606	5	YES / NO	NO / NO	YES / NO
7:00 - 8:00	337	560	25	23	897	25	YES / NO	YES / NO	YES / NO
8:00 - 9:00	326	476	20	18	802	20	YES / NO	YES / NO	YES / NO
9:00 - 10:00	311	402	10	2	713	10	YES / NO	YES / NO	YES / NO
10:00 - 11:00	298	435	7	8	733	8	YES / NO	YES / NO	YES / NO
11:00 - 12:00	369	410	9	9	779	9	YES / NO	YES / NO	YES / NO
12:00 - 13:00	429	408	23	6	837	23	YES / NO	YES / NO	YES / NO
13:00 - 14:00	392	447	14	5	839	14	YES / NO	YES / NO	YES / NO
14:00 - 15:00	462	375	28	14	837	28	YES / NO	YES / NO	YES / NO
15:00 - 16:00	476	467	33	13	943	33	YES / NO	YES / NO	YES / NO
16:00 - 17:00	547	587	17	6	1134	17	YES / NO	YES / NO	YES / NO
17:00 - 18:00	461	427	34	5	888	34	YES / NO	YES / NO	YES / NO
18:00 - 19:00	0	0	0	0	0	0	NO / NO	NO / NO	NO / NO
19:00 - 20:00	0	0	0	0	0	0	NO / NO	NO / NO	NO / NO
20:00 - 21:00	0	0	0	0	0	0	NO / NO	NO / NO	NO / NO
21:00 - 22:00	0	0	0	0	0	0	NO / NO	NO / NO	NO / NO
22:00 - 23:00	0	0	0	0	0	0	NO / NO	NO / NO	NO / NO
23:00 - 24:00	0	0	0	0	0	0	NO / NO	NO / NO	NO / NO
Daily	**4709**	**5299**	**225**	**111**					

		Met (Hr)	Required (Hr)	WARRANT MET:
Warrant 1	**Eight Hour Volumes**	0	8	Not satisfied
Warrant 1A	Minimum Vehicular Volume	0	8	Not satisfied
Warrant 1B	Interruption of Continuous Flow	0	8	Not satisfied
1A & 1B	Combination of Warrants	0	8	Not satisfied
Warrant 2	**Four Hour Volumes**	0	4	Not satisfied
Warrant 3	**Peak Hour Volumes**	0	1	Not satisfied
Warrant 7	**Crash Experience**	0	8	Not satisfied

COMMENTS:

2045 Future - TH 210 at 10th Ave NE
SIGNAL WARRANT
ANALYSIS

LOCATION: TH 210 at 10th Ave NE
COUNTY: Crow Wing
REF. POINT: 0
DATE: 3/12/2020

OPERATOR: JDA

40 MPH OR FASTER?	YES
POPULATION < 10,000?	NO
VOLUME REQ. AT 70%?	**YES**

85th% Speed	Approach Description		Lanes	Approach
45	Major App1:	TH 210 EB	4	4709
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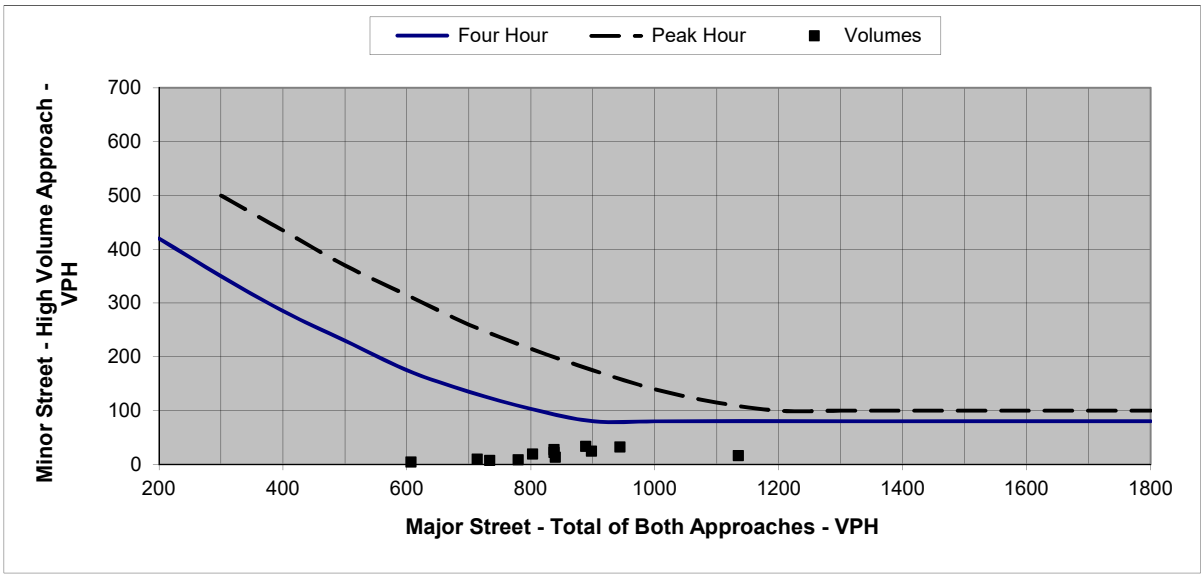

Figure 1. Four Hour and Peak Hour Warrant Analysis

Note: For data points outside the graph range, check the minor street volume against the lower thresholds

Warrant Criteria (Graph)		
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300	350	500
400	285	435
500	230	370
600	175	315
700	135	260
800	103	215
900	80	175
1000	80	140
1100	80	115
1200	80	100
1300	80	100
1400	80	100
1500	80	100
1600	80	100
1700	80	100
1800	80	100

Actual Hourly Count			Warrants Met:	
			Warrant 2	Warrant 3
HOUR	Sum Major App.	Max Minor App.	Four Hour	Peak Hour
0:00 - 1:00	0	0	NO	NO
1:00 - 2:00	0	0	NO	NO
2:00 - 3:00	0	0	NO	NO
3:00 - 4:00	0	0	NO	NO
4:00 - 5:00	0	0	NO	NO
5:00 - 6:00	0	0	NO	NO
6:00 - 7:00	606	5	NO	NO
7:00 - 8:00	897	25	NO	NO
8:00 - 9:00	802	20	NO	NO
9:00 - 10:00	713	10	NO	NO
10:00 - 11:00	733	8	NO	NO
11:00 - 12:00	779	9	NO	NO
12:00 - 13:00	837	23	NO	NO
13:00 - 14:00	839	14	NO	NO
14:00 - 15:00	837	28	NO	NO
15:00 - 16:00	943	33	NO	NO
16:00 - 17:00	1134	17	NO	NO
17:00 - 18:00	888	34	NO	NO
18:00 - 19:00	0	0	NO	NO
19:00 - 20:00	0	0	NO	NO
20:00 - 21:00	0	0	NO	NO
21:00 - 22:00	0	0	NO	NO
22:00 - 23:00	0	0	NO	NO
23:00 - 24:00	0	0	NO	NO

Appendix D

Operations Analysis

Table 1a
Existing Conditions (2019)
AM Peak Hour (VISSIM)

Queue Storage Issues
Queue extends through intersection.

Coordinated Cycle Length: 115 Seconds
(Baxter Dr, NW 4th, N 4th, N 6th, N 8th, 13th/Gillis, NE 4th Ave; NE 8th Ave runs Free)

Peak	Intersection	Approach	Demand Volumes (Veh/Hr)				Delay (S/Veh)						LOS By Approach		LOS By Intersection		Queue (feet)								
																	Left Turn			Through			Right Turn		
			L	T	R	Total	L	LOS	T	LOS	R	LOS	Delay (S/Veh)	LOS	Delay (S/Veh)	LOS	Storage	Avg.	Max	Link Length	Avg.	Max	Storage	Avg.	Max
AM PEAK HOUR	TH 210 at NE 4th Ave (Signal Control)	EB	4	678	5	687	43.7	D	0.9	A	1.3	A	1.2	A	4.5	A	175	1	40	700	2	77		1	78
		WB	2	1011	2	1,015	69.1	E	3.7	A	3.1	A	3.9	A			150	1	29	425	10	280		10	280
		NB	2	1	2	5	38.8	D	71.4	E	39.9	D	43.9	D			500	6	137	500	0	0	500	4	110
		SB	52		22	74	50.4	D	0.0	A	7.9	A	37.5	D			150	14	105	500	0	42			
	NE 5th Ave (Stop Control)	EB	171	561		732	27.1	D	0.3	A	0.0	A	6.4	A	3.3	A	175	28	**251**	425	0	0			
		WB		916	34	950	0.0	A	0.1	A	1.5	A	0.2	A						600	0	0	150	0	5
		SB			99	99	0.0	A	0.0	A	10.5	B	10.5	B									500	4	84
	TH 25 Ramp (Stop Control)	EB		393	168	561	0.0	A	0.1	A	0.2	A	0.1	A	0.2	A				600	0	37	150	0	37
		WB		950		950	0.0	A	0.2	A	0.0	A	0.2	A						550	0	0			
		NB					0.0	A	0.0	A	0.0	A	0.0	A			700	0	0						
	Mall RI/RO (Stop Control)	WB		945	17	962	0.0	A	0.9	A	0.6	A	0.9	A	0.9	A				300	0	0			
		SB			5	5	0.0	A	0.0	A	8.8	A	8.8	A									500	0	61
	TH 210 at NE 8th Ave (Signal Control)	EB	90	254	49	393	65.3	E	28.1	C	1.1	A	33.4	C	36.7	D	400	37	222	800	22	169	350	0	20
		WB	7	454	56	517	74.1	E	42.5	D	1.1	A	38.7	D			400	3	53	850	65	309	400	0	52
		NB	229	134	5	368	50.9	D	51.3	D	6.8	A	50.5	D						600	97	**540**	400	0	55
		SB	46	162	279	487	46.2	D	50.8	D	10.6	B	27.0	C						1000	67	365	1000	67	365
	NE 10th Ave (Stop Control)	EB	29	268	8	305	5.2	A	0.9	A	1.5	A	1.4	A	2.3	A	300	1	53	850	0	0	200	0	0
		WB	37	456	2	495	1.9	A	0.2	A	0.6	A	0.3	A			200	0	35	1400	0	0	300	0	0
		NB	11	17	36	64	14.9	B	22.1	C	7.8	A	12.5	B						1000	2	83			
		SB	2	26	50	78	13.8	B	17.4	C	7.3	A	10.8	B						500	3	67			
	NE 13th Ave (Stop Control)	EB	22	284		306	3.7	A	0.2	A	0.0	A	0.4	A	1.0	A	350	0	47	1400	0	0			
		WB		437	20	457	0.0	A	0.1	A	0.9	A	0.2	A						5000	0	0	150	0	0
		SB	23		58	81	13.2	B	0.0	A	6.8	A	8.8	A			500	2	69				500	2	69
	TH 25 at 8th (Stop Control)	EB		168		168	0.0	A	0.3	A	0.0	A	0.3	A	1.0	A	300	0	0	1000	0	0			
		WB			368	368	0.0	A	0.0	A	1.0	A	1.0	A						2500	0	0	400	1	75
	(used for WB Queue)	SB	218			218	1.6	A	0.0	A	0.0	A	1.6	A			575	1	135					0	86

Signal Major Approach Delays:	197.0	Total Seconds
Signal Minor Approach Delays:	543.5	Total Seconds
Total All Approach Delays:	898.3	Total Seconds

LEGEND:
Queue length at or above 75% of the available storage
Queue length at or above available Storage

Table 1b
Existing Conditions (2019)
PM Peak Hour (VISSIM)

Queue Storage Issues
Queue extends through intersection.

Coordinated Cycle Length: 150 Seconds
(Baxter Dr, NW 4th, N 4th, N 6th, N 8th, 13th/Gillis, NE 4th Ave; NE 8th Ave runs Free)

Peak	Intersection	Approach	Demand Volumes (Veh/Hr)				Delay (S/Veh)						LOS By Approach		LOS By Intersection		Queue (feet)								
																	Left Turn			Through			Right Turn		
			L	T	R	Total	L	LOS	T	LOS	R	LOS	Delay (S/Veh)	LOS	Delay (S/Veh)	LOS	Storage	Avg.	Max	Link Length	Avg.	Max	Storage	Avg.	Max
PM PEAK HOUR	TH 210 at NE 4th Ave (Signal Control)	EB		1135	22	1,157	0.0	A	1.3	A	1.2	A	1.3	A	4.1	A	175	0	0	700	3	110		2	111
		WB	4	1029		1,033	76.7	E	4.0	A	0.0	A	4.3	A			150	2	40	425	13	**413**		13	413
		NB	2			2	75.1	E	0.0	A	0.0	A	75.1	E			500	3	95	500	0	0	500	2	71
		SB	48		37	85	60.9	E	0.0	A	7.9	A	37.4	D			150	17	**117**	500	1	64			
	NE 5th Ave (Stop Control)	EB	246	937		1,183	20.5	C	0.6	A	0.0	A	4.6	A	3.6	A	175	32	**353**	425	0	7			
		WB		843	7	850	0.0	A	0.2	A	1.6	A	0.2	A						600	0	3	150	0	0
		SB			190	190	0.0	A	0.0	A	12.7	B	12.7	B									500	11	145
	TH 25 Ramp (Stop Control)	EB		650	287	937	0.0	A	0.2	A	0.4	A	0.3	A	0.3	A				600	1	112	150	1	112
		WB		850		850	0.0	A	0.3	A	0.0	A	0.3	A						550	0	0			
		NB					0.0	A	0.0	A	0.0	A	0.0	A			700	0	0						
	Mall RI/RO (Stop Control)	WB		744	30	774	0.0	A	0.9	A	0.8	A	0.9	A	1.9	A				300	0	0			
		SB			106	106	0.0	A	0.0	A	9.4	A	9.4	A									500	9	139
	TH 210 at NE 8th Ave (Signal Control)	EB	255	393	2	650	80.2	F	34.2	C	1.2	A	53.0	D	55.6	E	400	147	**632**	800	42	295	350	0	0
		WB	6	378	136	520	102.3	F	68.2	E	3.1	A	54.2	D			400	3	45	850	94	378	400	2	98
		NB	248	168	1	417	66.5	E	68.9	E	5.7	A	67.3	E						600	138	**595**	400	0	20
		SB	102	185	148	435	74.6	E	71.0	E	7.6	A	50.0	D						1000	137	530	1000	137	530
	NE 10th Ave (Stop Control)	EB	38	454	4	496	5.1	A	0.8	A	1.4	A	1.2	A	1.8	A	300	1	67	850	0	0	200	0	0
		WB	25	488	6	519	3.7	A	0.2	A	0.7	A	0.3	A			200	0	38	1400	0	0	300	0	0
		NB	13	16	36	65	18.5	C	27.6	D	9.8	A	15.3	C						1000	4	110			
		SB		4	19	23	0.0	A	23.5	C	6.5	A	8.8	A						500	1	37			
	NE 13th Ave (Stop Control)	EB	39	451		490	5.6	A	0.3	A	0.0	A	0.7	A	1.1	A	350	1	67	1400	0	0			
		WB		467	33	500	0.0	A	0.1	A	1.0	A	0.2	A						5000	0	0	150	0	0
		SB	24		52	76	17.3	C	0.0	A	7.0	A	10.7	B			500	2	61				500	2	61
	TH 25 at 8th (Stop Control)	EB		287		287	0.0	A	0.4	A	0.0	A	0.4	A	8.0	A	300	0	0	1000	0	0			
		WB			417	417	0.0	A	0.0	A	15.9	C	15.9	C						2500	0	0	400	49	**717**
	(used for WB Queue)	SB	193			193	3.1	A	0.0	A	0.0	A	3.1	A			575	3	208					1	158

Signal Major Approach Delays:	321.9	Total Seconds
Signal Minor Approach Delays:	706.1	Total Seconds
Total All Approach Delays:	1263.0	Total Seconds

LEGEND:
Queue length at or above 75% of the available storage
Queue length at or above available Storage

Table 1c

Existing Conditions (2019)

Friday Peak Hour (VISSIM) - 5% Increase of PM Peak Hour

Queue Storage Issues

Queue extends through intersection.

Coordinated Cycle Length: 150 Seconds

(Baxter Dr, NW 4th, N 4th, N 6th, N 8th, 13th/Gillis, NE 4th Ave; NE 8th Ave runs Free)

Peak	Intersection	Approach	Demand Volumes (Veh/Hr)				Delay (S/Veh)						LOS By Approach		LOS By Intersection		Queue (feet)								
																	Left Turn			Through			Right Turn		
			L	T	R	Total	L	LOS	T	LOS	R	LOS	Delay (S/Veh)	LOS	Delay (S/Veh)	LOS	Storage	Avg.	Max	Link Length	Avg.	Max	Storage	Avg.	Max
FRIDAY PEAK HOUR	TH 210 at NE 4th Ave (Signal Control)	EB		1192	23	1,215	0.0	A	1.5	A	1.6	A	1.5	A	4.1	A	175	0	0	700	4	149		3	149
		WB	4	1080		1,084	79.8	E	3.8	A	0.0	A	4.1	A			150	2	40	425	12	**351**		12	351
		NB	2			2	74.9	E	0.0	A	0.0	A	74.9	E			500	3	96	500	0	0	500	2	71
		SB	50		39	89	61.2	E	0.0	A	8.3	A	37.7	D			150	18	**144**	500	1	56			
	NE 5th Ave (Stop Control)	EB	258	984		1,242	22.3	C	0.8	A	0.0	A	5.1	A	3.9	A	175	38	**396**	425	0	9			
		WB		885	7	892	0.0	A	0.1	A	1.3	A	0.1	A						600	0	0	150	0	5
		SB			200	200	0.0	A	0.0	A	13.7	B	13.7	B									500	13	150
	TH 25 Ramp (Stop Control)	EB		683	301	984	0.0	A	0.2	A	0.4	A	0.3	A	0.3	A				600	1	118	150	1	**118**
		WB		893		893	0.0	A	0.3	A	0.0	A	0.3	A						550	0	0			
		NB					0.0	A	0.0	A	0.0	A	0.0	A			700	0	0						
	Mall RI/RO (Stop Control)	WB		781	32	813	0.0	A	0.9	A	0.8	A	0.9	A	2.0	A				300	0	0			
		SB			111	111	0.0	A	0.0	A	9.7	A	9.7	A									500	10	141
	TH 210 at NE 8th Ave (Signal Control)	EB	268	413	2	683	87.5	F	39.3	D	0.8	A	59.1	E	59.6	E	400	166	**672**	800	52	325	350	0	0
		WB	6	397	143	546	111.4	F	71.4	E	2.8	A	56.6	E			400	3	45	850	103	425	400	2	114
		NB	260	176	1	437	69.8	E	70.2	E	18.4	B	69.8	E						600	166	**611**	400	0	10
		SB	107	194	155	456	79.7	E	77.6	E	7.3	A	53.9	D						1000	154	571	1000	154	571
	NE 10th Ave (Stop Control)	EB	40	477	4	521	6.3	A	0.9	A	1.5	A	1.3	A	1.9	A	300	1	106	850	0	0	200	0	0
		WB	26	512	6	544	3.4	A	0.2	A	0.6	A	0.3	A			200	0	51	1400	0	0	300	0	0
		NB	14	17	38	69	22.9	C	24.3	C	10.6	B	16.1	C						1000	5	118			
		SB		4	20	24	0.0	A	19.7	C	6.1	A	8.4	A						500	1	37			
	NE 13th Ave (Stop Control)	EB	41	474		515	6.2	A	0.3	A	0.0	A	0.7	A	1.1	A	350	1	82	1400	0	0			
		WB		490	35	525	0.0	A	0.2	A	1.0	A	0.2	A						5000	0	0	150	0	0
		SB	25		55	80	17.3	C	0.0	A	7.1	A	10.9	B			500	2	68				500	2	68
	TH 25 at 8th (Stop Control)	EB		301		301	0.0	A	0.4	A	0.0	A	0.4	A	9.9	A	300	0	0	1000	0	0			
		WB			438	438	0.0	A	0.0	A	19.6	C	19.6	C						2500	0	0	400	67	**844**
	(used for WB Queue)	SB	203			203	4.5	A	0.0	A	0.0	A	4.5	A			575	5	261					3	212

Signal Major Approach Delays:	348.2	Total Seconds
Signal Minor Approach Delays:	718.8	Total Seconds
Total All Approach Delays:	1358.8	Total Seconds

LEGEND:

###	Queue length at or above 75% of the available storage
###	Queue length at or above available Storage

Table 1d

Existing Conditions (2019)

Summer Peak Hour (VISSIM) - 10% Increase of PM Peak Hour

Queue Storage Issues

Queue extends through intersection.

Coordinated Cycle Length: 160 Seconds

(Baxter Dr, NW 4th, N 4th, N 6th, N 8th, 13th/Gillis, NE 4th Ave; NE 8th Ave runs Free)

Peak	Intersection	Approach	Demand Volumes (Veh/Hr)				Delay (S/Veh)						LOS By Approach		LOS By Intersection		Queue (feet)								
																	Left Turn			Through			Right Turn		
			L	T	R	Total	L	LOS	T	LOS	R	LOS	Delay (S/Veh)	LOS	Delay (S/Veh)	LOS	Storage	Avg.	Max	Link Length	Avg.	Max	Storage	Avg.	Max
SUMMER PEAK HOUR	TH 210 at NE 4th Ave (Signal Control)	EB		1249	24	1,273	0.0	A	1.2	A	1.6	A	1.2	A	3.6	A	175	0	0	700	2	147		2	148
		WB	4	1132		1,136	87.6	F	2.4	A	0.0	A	2.7	A			150	2	43	425	7	**327**		7	327
		NB	2			2	71.7	E	0.0	A	0.0	A	71.7	E			500	4	93	500	0	0	500	3	71
		SB	53		41	94	73.3	E	0.0	A	8.2	A	43.5	D			150	23	**148**	500	1	51			
	NE 5th Ave (Stop Control)	EB	271	1031		1,302	29.2	D	0.9	A	0.0	A	6.5	A	4.8	A	175	54	**457**	425	0	8			
		WB		927	8	935	0.0	A	0.2	A	1.3	A	0.2	A						600	0	0	150	0	0
		SB			209	209	0.0	A	0.0	A	15.0	B	15.0	C									500	15	157
	TH 25 Ramp (Stop Control)	EB		715	316	1,031	0.0	A	0.2	A	0.5	A	0.3	A	0.3	A				600	1	109	150	1	109
		WB		935		935	0.0	A	0.4	A	0.0	A	0.4	A						550	0	0			
		NB					0.0	A	0.0	A	0.0	A	0.0	A			700	0	0						
	Mall RI/RO (Stop Control)	WB		818	33	851	0.0	A	0.9	A	0.8	A	0.9	A	2.0	A				300	0	0			
		SB			117	117	0.0	A	0.0	A	10.0	B	10.0	B									500	10	141
	TH 210 at NE 8th Ave (Signal Control)	EB	281	432	2	715	98.3	F	45.1	D	0.8	A	66.9	E	66.6	E	400	202	**713**	800	63	330	350	0	0
		WB	7	416	150	573	106.5	F	79.9	E	3.5	A	63.2	E			400	3	48	850	121	461	400	2	125
		NB	273	185	1	459	77.4	E	78.9	E	11.2	B	77.9	E						600	198	**636**	400	0	24
		SB	112	204	163	479	89.0	F	84.0	F	9.0	A	59.3	E						1000	179	585	1000	179	585
	NE 10th Ave (Stop Control)	EB	42	499	4	545	6.3	A	0.9	A	1.6	A	1.3	A	2.4	A	300	1	85	850	0	0	200	0	0
		WB	28	537	7	572	5.1	A	0.2	A	0.6	A	0.4	A			200	1	53	1400	0	0	300	0	0
		NB	14	18	40	72	37.0	E	32.2	D	15.4	C	23.6	C						1000	8	168			
		SB		4	21	25	0.0	A	17.9	C	6.4	A	8.3	A						500	1	42			
	NE 13th Ave (Stop Control)	EB	43	496		539	7.2	A	0.3	A	0.0	A	0.9	A	1.2	A	350	1	78	1400	0	0			
		WB		514	36	550	0.0	A	0.2	A	1.0	A	0.2	A						5000	0	0	150	0	0
		SB	26		57	83	19.1	C	0.0	A	7.1	A	11.3	B			500	3	66				500	3	66
	TH 25 at 8th (Stop Control)	EB		316		316	0.0	A	0.5	A	0.0	A	0.5	A	17.7	C	300	0	0	1000	0	0			
		WB			459	459	0.0	A	0.0	A	36.1	E	36.1	E						2500	0	0	400	134	**1088**
	(used for WB Queue)	SB	212			212	5.6	A	0.0	A	0.0	A	5.6	A			575	6	258					4	208

Signal Major Approach Delays:	347.4	Total Seconds
Signal Minor Approach Delays:	887.8	Total Seconds
Total All Approach Delays:	1580.9	Total Seconds

LEGEND:

###	Queue length at or above 75% of the available storage
###	Queue length at or above available Storage

Table 2a
No Build Conditions (2045)
AM Peak Hour (VISSIM)

Note: NW 4th Street improvements included.

Queue Storage Issues
Queue extends through intersection.

Coordinated Cycle Length: 115 Seconds
(Baxter Dr, NW 4th, N 4th, N 6th, N 8th, 13th/Gillis, NE 4th Ave; NE 8th Ave runs Free)

Peak	Intersection	Approach	Demand Volumes (Veh/Hr)				Delay (S/Veh)						LOS By Approach		LOS By Intersection		Queue (feet)								
																	Left Turn			Through			Right Turn		
			L	T	R	Total	L	LOS	T	LOS	R	LOS	Delay (S/Veh)	LOS	Delay (S/Veh)	LOS	Storage	Avg.	Max	Link Length	Avg.	Max	Storage	Avg.	Max
AM PEAK HOUR	TH 210 at NE 4th Ave (Signal Control)	EB	5	765	5	775	49.2	D	4.8	A	3.7	A	5.1	A	6.7	A	175	2	54	700	11	206		11	207
		WB	5	1125	5	1,135	58.9	E	4.4	A	8.8	A	4.5	A			150	1	31	425	16	**398**		16	398
		NB	5	5	5	15	47.4	D	45.2	D	46.6	D	46.8	D			500	16	208	500	0	0	500	12	181
		SB	60		25	85	52.8	D	0.0	A	8.5	A	40.0	D			150	18	**120**	500	0	45			
	NE 5th Ave (Stop Control)	EB	195	635		830	49.2	E	0.5	A	0.0	A	11.6	B	5.6	A	175	67	**380**	425	0	0			
		WB		1025	40	1,065	0.0	A	0.2	A	1.5	A	0.2	A						600	0	0	150	0	5
		SB			110	110	0.0	A	0.0	A	12.0	B	12.0	B									500	5	101
	TH 25 Ramp (Stop Control)	EB		445	190	635	0.0	A	0.1	A	0.1	A	0.1	A	0.2	A				600	0	33	150	0	33
		WB		1065		1,065	0.0	A	0.2	A	0.0	A	0.2	A						550	0	0			
		NB					0.0	A	0.0	A	0.0	A	0.0	A			700	0	0						
	Mall RI/RO (Stop Control)	WB		1060	20	1,080	0.0	A	0.9	A	0.7	A	0.9	A	0.9	A				300	0	0			
		SB			5	5	0.0	A	0.0	A	9.0	A	9.0	A									500	0	61
	TH 210 at NE 8th Ave (Signal Control)	EB	100	290	55	445	79.0	E	37.5	D	1.2	A	42.8	D	45.5	D	400	51	264	800	36	249	350	0	18
		WB	10	505	65	580	95.3	F	53.3	D	1.3	A	48.5	D			400	5	65	850	93	419	400	0	74
		NB	260	150	5	415	60.7	E	61.7	E	10.2	B	60.6	E						600	121	**576**	400	0	50
		SB	50	185	315	550	62.4	E	62.0	E	13.0	B	33.5	C						1000	98	465	1000	98	465
	NE 10th Ave (Stop Control)	EB	35	300	10	345	6.0	A	1.0	A	1.8	A	1.5	A	2.8	A	300	1	67	850	0	0	200	0	0
		WB	40	515	5	560	2.6	A	0.2	A	0.5	A	0.4	A			200	0	51	1400	0	0	300	0	0
		NB	10	20	40	70	18.1	C	24.7	C	9.9	A	14.9	B						1000	4	105			
		SB	5	30	55	90	30.4	D	20.2	C	9.0	A	13.1	B						500	4	85			
	NE 13th Ave (Stop Control)	EB	25	320		345	6.5	A	0.3	A	0.0	A	0.7	A	1.1	A	350	1	59	1400	0	0			
		WB		495	25	520	0.0	A	0.2	A	0.9	A	0.2	A						5000	0	0	150	0	0
		SB	25		65	90	14.2	B	0.0	A	6.6	A	8.9	A			500	3	73				500	3	73
	TH 25 at 8th (Stop Control)	EB		190		190	0.0	A	0.3	A	0.0	A	0.3	A	2.7	A	300	0	0	1000	0	0			
		WB			415	415	0.0	A	0.0	A	3.9	A	3.9	A						2500	0	0	400	7	**307**
	(used for WB Queue)	SB	245			245	2.4	A	0.0	A	0.0	A	2.4	A			575	2	225					1	182

Signal Major Approach Delays:	229.6 Total Seconds
Signal Minor Approach Delays:	570.0 Total Seconds
Total All Approach Delays:	999.9 Total Seconds

LEGEND:
Queue length at or above 75% of the available storage
Queue length at or above available Storage

Table 2b
No Build Conditions (2045)
PM Peak Hour (VISSIM)

Note: NW 4th Street improvements included.

Queue Storage Issues
Queue extends through intersection.

Coordinated Cycle Length: 150 Seconds
(Baxter Dr, NW 4th, N 4th, N 6th, N 8th, 13th/Gillis, NE 4th Ave; NE 8th Ave runs Free)

Peak	Intersection	Approach	Demand Volumes (Veh/Hr)				Delay (S/Veh)						LOS By Approach		LOS By Intersection		Queue (feet)								
																	Left Turn			Through			Right Turn		
			L	T	R	Total	L	LOS	T	LOS	R	LOS	Delay (S/Veh)	LOS	Delay (S/Veh)	LOS	Storage	Avg.	Max	Link Length	Avg.	Max	Storage	Avg.	Max
PM PEAK HOUR	TH 210 at NE 4th Ave (Signal Control)	EB		1285	25	1,310	0.0	A	1.9	A	1.7	A	1.9	A	4.0	A	175	0	0	700	6	220		5	221
		WB	5	1150		1,155	71.9	E	2.9	A	0.0	A	3.1	A			150	2	51	425	10	**391**		10	391
		NB	5			5	73.2	E	0.0	A	0.0	A	73.2	E			500	7	135	500	0	0	500	5	108
		SB	55		40	95	67.1	E	0.0	A	8.9	A	40.6	D			150	21	**140**	500	1	56			
	NE 5th Ave (Stop Control)	EB	280	1060		1,340	35.7	E	1.1	A	0.0	A	7.9	A	5.7	A	175	69	**468**	425	0	39			
		WB		940	10	950	0.0	A	0.2	A	1.4	A	0.2	A						600	0	5	150	0	0
		SB			215	215	0.0	A	0.0	A	16.3	C	16.3	C									500	18	183
	TH 25 Ramp (Stop Control)	EB		735	325	1,060	0.0	A	0.2	A	0.5	A	0.3	A	0.3	A				600	1	145	150	1	**145**
		WB		950		950	0.0	A	0.4	A	0.0	A	0.4	A						550	0	0			
		NB					0.0	A	0.0	A	0.0	A	0.0	A			700	0	0						
	Mall RI/RO (Stop Control)	WB		830	35	865	0.0	A	0.9	A	0.9	A	0.9	A	2.1	A				300	0	0			
		SB			120	120	0.0	A	0.0	A	10.3	B	10.3	B									500	11	145
	TH 210 at NE 8th Ave (Signal Control)	EB	290	440	5	735	109.5	F	47.5	D	1.0	A	72.6	E	70.6	E	400	235	**802**	800	67	358	350	0	0
		WB	5	420	155	580	126.5	F	82.1	F	3.9	A	64.8	E			400	3	48	850	126	463	400	3	116
		NB	280	190	5	475	83.0	F	84.7	F	17.1	B	83.5	F						600	223	**636**	400	0	15
		SB	115	210	165	490	88.9	F	89.3	F	8.4	A	61.6	E						1000	196	634	1000	196	634
	NE 10th Ave (Stop Control)	EB	45	510	5	560	7.6	A	0.8	A	1.5	A	1.4	A	2.6	A	300	2	129	850	0	0	200	0	0
		WB	30	545	5	580	4.2	A	0.2	A	0.7	A	0.4	A			200	0	41	1400	0	0	300	0	0
		NB	15	20	40	75	35.3	E	37.5	E	16.5	C	25.1	D						1000	10	177			
		SB		5	20	25	0.0	A	16.5	C	6.5	A	8.1	A						500	1	37			
	NE 13th Ave (Stop Control)	EB	45	505		550	7.5	A	0.3	A	0.0	A	0.9	A	1.2	A	350	1	84	1400	0	0			
		WB		520	35	555	0.0	A	0.2	A	0.9	A	0.2	A						5000	0	0	150	0	0
		SB	25		60	85	19.1	C	0.0	A	6.6	A	11.0	B			500	2	65				500	2	65
	TH 25 at 8th (Stop Control)	EB		325		325	0.0	A	0.5	A	0.0	A	0.5	A	29.4	D	300	0	0	1000	0	0			
		WB			470	470	0.0	A	0.0	A	61.6	F	61.6	F						2500	0	0	400	244	**1550**
	(used for WB Queue)	SB	220			220	6.0	A	0.0	A	0.0	A	6.0	A			575	7	311					4	261

Signal Major Approach Delays:	344.7 Total Seconds
Signal Minor Approach Delays:	792.0 Total Seconds
Total All Approach Delays:	1505.6 Total Seconds

LEGEND:
Queue length at or above 75% of the available storage
Queue length at or above available Storage

Table 2c

No Build Conditions (2045)

Friday Peak Hour (VISSIM) - 5% Increase of PM Peak Hour

Note: NW 4th Street improvements included.

Queue Storage Issues

Queue extends through intersection.

Coordinated Cycle Length: 150 Seconds

(Baxter Dr, NW 4th, N 4th, N 6th, N 8th, 13th/Gillis, NE 4th Ave; NE 8th Ave runs Free)

Peak	Intersection	Approach	Demand Volumes (Veh/Hr)				Delay (S/Veh)						LOS By Approach		LOS By Intersection		Queue (feet)								
																	Left Turn			Through			Right Turn		
			L	T	R	Total	L	LOS	T	LOS	R	LOS	Delay (S/Veh)	LOS	Delay (S/Veh)	LOS	Storage	Avg.	Max	Link Length	Avg.	Max	Storage	Avg.	Max
FRIDAY PEAK HOUR	TH 210 at NE 4th Ave (Signal Control)	EB		1349	26	1,375	0.0	A	2.6	A	1.8	A	2.6	A	4.7	A	175	0	0	700	9	251		8	252
		WB	5	1208		1,213	65.2	E	3.2	A	0.0	A	3.4	A			150	2	42	425	12	**398**		12	398
		NB	5			5	68.7	E	0.0	A	26.5	C	68.7	E			500	8	139	500	0	0	500	6	112
		SB	58		42	100	72.8	E	0.0	A	9.1	A	44.0	D			150	23	**139**	500	1	62			
	NE 5th Ave (Stop Control)	EB	294	1113		1,407	39.4	E	1.4	A	0.0	A	8.9	A	6.2	A	175	84	**492**	425	1	77			
		WB		987	11	998	0.0	A	0.2	A	1.3	A	0.2	A						600	0	32	150	0	0
		SB			226	226	0.0	A	0.0	A	16.5	C	16.5	C									500	19	166
	TH 25 Ramp (Stop Control)	EB		772	341	1,113	0.0	A	0.5	A	0.5	A	0.5	A	0.5	A				600	2	154	150	2	**154**
		WB		998		998	0.0	A	0.4	A	0.0	A	0.4	A						550	0	0			
		NB					0.0	A	0.0	A	0.0	A	0.0	A			700	0	0						
	Mall RI/RO (Stop Control)	WB		872	37	909	0.0	A	0.9	A	0.8	A	0.9	A	2.1	A				300	0	0			
		SB			126	126	0.0	A	0.0	A	11.0	B	11.0	B									500	12	149
	TH 210 at NE 8th Ave (Signal Control)	EB	305	462	5	772	145.6	F	55.0	E	2.3	A	91.4	F	80.1	F	400	**341**	**880**	800	81	490	350	0	0
		WB	5	441	163	609	102.4	F	91.3	F	4.6	A	71.7	E			400	3	47	850	148	535	400	4	130
		NB	294	200	5	499	88.9	F	88.2	F	10.9	B	88.4	F						600	252	**632**	400	0	15
		SB	121	221	173	515	92.8	F	94.6	F	10.2	B	64.8	E						1000	217	646	1000	217	646
	NE 10th Ave (Stop Control)	EB	47	536	5	588	6.7	A	0.8	A	1.4	A	1.3	A	2.8	A	300	1	91	850	0	0	200	0	0
		WB	32	572	5	609	5.4	A	0.2	A	0.7	A	0.5	A			200	1	50	1400	0	0	300	0	0
		NB	16	21	42	79	39.9	E	45.7	E	18.9	C	29.1	D						1000	12	182			
		SB		5	21	26	0.0	A	20.4	C	6.6	A	8.8	A						500	1	39			
	NE 13th Ave (Stop Control)	EB	47	530		577	7.5	A	0.3	A	0.0	A	0.9	A	1.2	A	350	2	93	1400	0	0			
		WB		546	37	583	0.0	A	0.2	A	1.0	A	0.2	A						5000	0	0	150	0	0
		SB	26		63	89	18.2	C	0.0	A	7.3	A	11.1	B			500	3	72				500	3	72
	TH 25 at 8th (Stop Control)	EB		341		341	0.0	A	0.5	A	0.0	A	0.5	A	41.5	E	300	0	0	1000	0	0			
		WB			494	494	0.0	A	0.0	A	87.7	F	87.7	F						2500	0	0	400	**367**	**1770**
	(used for WB Queue)	SB	231			231	5.8	A	0.0	A	0.0	A	5.8	A			575	8	329					5	279

Signal Major Approach Delays:	396.3 Total Seconds
Signal Minor Approach Delays:	821.7 Total Seconds
Total All Approach Delays:	1854.9 Total Seconds

LEGEND:

###	Queue length at or above 75% of the available storage
###	Queue length at or above available Storage

Table 2d

No Build Conditions (2045)

Summer Peak Hour (VISSIM) - 10% Increase of PM Peak Hour

Note: NW 4th Street improvements included.

Queue Storage Issues

Queue extends through intersection.

Coordinated Cycle Length: 160 Seconds

(Baxter Dr, NW 4th, N 4th, N 6th, N 8th, 13th/Gillis, NE 4th Ave; NE 8th Ave runs Free)

Peak	Intersection	Approach	Demand Volumes (Veh/Hr)				Delay (S/Veh)						LOS By Approach		LOS By Intersection		Queue (feet)								
																	Left Turn			Through			Right Turn		
			L	T	R	Total	L	LOS	T	LOS	R	LOS	Delay (S/Veh)	LOS	Delay (S/Veh)	LOS	Storage	Avg.	Max	Link Length	Avg.	Max	Storage	Avg.	Max
SUMMER PEAK HOUR	TH 210 at NE 4th Ave (Signal Control)	EB		1414	28	1,442	0.0	A	5.5	A	3.2	A	5.4	A	6.1	A	175	0	0	700	30	403		30	404
		WB	6	1265		1,271	87.2	F	3.0	A	0.0	A	3.3	A			150	2	54	425	14	**448**		14	448
		NB	6			6	69.7	E	0.0	A	16.5	B	69.7	E			500	8	153	500	0	0	500	6	126
		SB	61		44	105	73.4	E	0.0	A	9.5	A	45.0	D			150	26	**156**	500	1	62			
	NE 5th Ave (Stop Control)	EB	308	1166		1,474	48.8	E	3.4	A	0.0	A	12.4	B	8.4	A	175	119	**576**	425	7	163			
		WB		1034	11	1,045	0.0	A	0.3	A	1.3	A	0.3	A						600	0	27	150	0	0
		SB			237	237	0.0	A	0.0	A	19.6	C	19.6	C									500	24	204
	TH 25 Ramp (Stop Control)	EB		809	358	1,167	0.0	A	3.1	A	1.1	A	2.5	A	1.5	A				600	8	199	150	8	**199**
		WB		1045		1,045	0.0	A	0.4	A	0.0	A	0.4	A						550	0	0			
		NB					0.0	A	0.0	A	0.0	A	0.0	A			700	0	0						
	Mall RI/RO (Stop Control)	WB		913	39	952	0.0	A	0.9	A	0.9	A	0.9	A	2.2	A				300	0	0			
		SB			132	132	0.0	A	0.0	A	11.3	B	11.3	B									500	13	151
	TH 210 at NE 8th Ave (Signal Control)	EB	319	484	6	809	201.1	F	62.3	E	12.2	B	117.4	F	92.6	F	400	**494**	**932**	800	77	448	350	0	0
		WB	6	462	171	639	116.1	F	95.4	F	5.0	A	75.2	E			400	3	42	850	162	598	400	4	130
		NB	308	209	6	523	100.4	F	98.3	F	26.1	C	99.4	F						600	309	**622**	400	0	20
		SB	127	231	182	540	101.9	F	100.7	F	10.7	B	70.0	E						1000	247	664	1000	247	664
	NE 10th Ave (Stop Control)	EB	50	561	6	617	7.0	A	0.7	A	1.3	A	1.2	A	3.3	A	300	1	92	850	0	0	200	0	0
		WB	33	600	6	639	6.2	A	0.2	A	0.6	A	0.5	A			200	1	67	1400	0	0	300	0	0
		NB	17	22	44	83	49.6	E	57.7	F	23.6	C	36.4	E						1000	17	209			
		SB		6	22	28	0.0	A	22.5	C	6.7	A	9.2	A						500	1	39			
	NE 13th Ave (Stop Control)	EB	50	556		606	8.1	A	0.3	A	0.0	A	0.9	A	1.4	A	350	2	91	1400	0	0			
		WB		572	39	611	0.0	A	0.2	A	1.0	A	0.2	A						5000	0	0	150	0	0
		SB	28		66	94	23.1	C	0.0	A	9.7	A	14.3	B			500	4	79				500	4	79
	TH 25 at 8th (Stop Control)	EB		358		358	0.0	A	0.5	A	0.0	A	0.5	A	66.2	F	300	0	0	1000	0	0			
		WB			517	517	0.0	A	0.0	A	144.8	F	144.8	F						2500	0	0	400	**647**	**2179**
	(used for WB Queue)	SB	242			242	7.6	A	0.0	A	0.0	A	7.6	A			575	11	351					8	301

Signal Major Approach Delays:	443.9 Total Seconds
Signal Minor Approach Delays:	1044.7 Total Seconds
Total All Approach Delays:	2104.6 Total Seconds

LEGEND:

###	Queue length at or above 75% of the available storage
###	Queue length at or above available Storage

Table 3a

Build Alternative 1 - Conditions (2045) **Added Capacity at 8th Ave Signal**

AM Peak Hour (VISSIM)

Note: NW 4th Street improvements included.

Queue Storage Issues

Queue extends through intersection.

Coordinated Cycle Length: 115 Seconds

(Baxter Dr, NW 4th, N 4th, N 6th, N 8th, 13th/Gillis, NE 4th Ave; NE 8th Ave runs Free)

Peak	Intersection	Approach	Demand Volumes (Veh/Hr)				Delay (S/Veh)						LOS By Approach		LOS By Intersection		Queue (feet)								
																	Left Turn			Through			Right Turn		
			L	T	R	Total	L	LOS	T	LOS	R	LOS	Delay (S/Veh)	LOS	Delay (S/Veh)	LOS	Storage	Avg.	Max	Link Length	Avg.	Max	Storage	Avg.	Max
AM PEAK HOUR	TH 210 at NE 4th Ave (Stop Control)	EB	5	765	5	775	0.0	A	0.3	A	0.8	A	0.3	A	0.6	A				700	0	48			
		WB	5	1125	5	1,135	0.0	A	0.4	A	1.3	A	0.4	A						425	0	11			
		NB	5	5	5	15	0.0	A	0.0	A	9.9	A	9.9	A									0	2	105
		SB			25	25	0.0	A	0.0	A	10.2	B	10.2	B									500	0	48
	NE 5th Ave (Signal Control)	EB	195	635		830	31.6	C	3.7	A	0.0	A	10.5	B	13.3	B	500	38	279	425	7	153			
		WB		1025	40	1,065	0.0	A	13.5	B	5.8	A	13.2	B						1000	55	566	150	1	62
		SB	60		110	170	52.7	D	0.0	A	11.7	B	26.8	C									500	4	100
	TH 25 Ramp (Stop Control)	EB		635		635	0.0	A	0.4	A	0.0	A	0.4	A	0.4	A				600	0	0	150	0	0
		WB		1065		1,065	0.0	A	0.4	A	0.0	A	0.4	A						550	0	27			
		NB					0.0	A	0.0	A	0.0	A	0.0	A			700	0	0						
	Mall RI/RO (Stop Control)	WB		1060	20	1,080	0.0	A	0.9	A	0.7	A	0.9	A	0.9	A				300	0	0			
		SB			5	5	0.0	A	0.0	A	10.5	B	10.5	B									500	0	61
	TH 210 at NE 8th Ave (Signal Control)	EB	100	290	245	635	64.7	E	29.1	C	2.5	A	25.0	C	29.6	C	**700**	41	241	800	30	218	350	1	129
		WB	10	505	65	580	64.7	E	38.7	D	1.9	A	35.3	D			400	13	105	850	70	397	400	1	67
		NB	260	150	5	415	33.2	C	33.4	C	4.5	A	32.9	C			400	60	**452**	600	33	259	400	0	66
		SB	50	185	315	550	26.9	C	49.8	D	13.0	B	26.4	C			250	7	102	1000	69	437	1000	69	437
	NE 10th Ave (3/4 Access)	EB	35	300	10	345	6.5	A	1.0	A	2.8	A	1.7	A	1.8	A	300	1	72	850	0	0	200	0	30
		WB	40	515	5	560	2.6	A	0.3	A	1.8	A	0.5	A			200	0	50	1400	0	0	300	0	0
		NB	10	20	40	70	0.0	A	0.0	A	7.0	A	7.0	A						1000	0	0	1000	2	86
		SB	5	30	55	90	0.0	A	0.0	A	6.8	A	6.8	A						500	0	0	1000	3	72
	NE 13th Ave (Stop Control)	EB	25	320		345	6.0	A	0.3	A	0.0	A	0.7	A	1.2	A	350	1	125	1400	0	0			
		WB		495	25	520	0.0	A	0.2	A	0.9	A	0.2	A						5000	0	0	150	0	0
		SB	25		65	90	16.7	C	0.0	A	7.5	A	10.3	B			500	3	79				500	3	79

Signal Major Approach Delays:	181.2	Total Seconds
Signal Minor Approach Delays:	467.4	Total Seconds
Total All Approach Delays:	871.9	Total Seconds

LEGEND:

###	Queue length at or above 75% of the available storage
###	Queue length at or above available Storage

Table 3b

Build Alternative 1 - Conditions (2045) **Added Capacity at 8th Ave Signal**

PM Peak Hour (VISSIM)

Note: NW 4th Street improvements included.

Queue Storage Issues

Queue extends through intersection.

Coordinated Cycle Length: 150 Seconds

(Baxter Dr, NW 4th, N 4th, N 6th, N 8th, 13th/Gillis, NE 4th Ave; NE 8th Ave runs Free)

Peak	Intersection	Approach	Demand Volumes (Veh/Hr)				Delay (S/Veh)						LOS By Approach		LOS By Intersection		Queue (feet)								
																	Left Turn			Through			Right Turn		
			L	T	R	Total	L	LOS	T	LOS	R	LOS	Delay (S/Veh)	LOS	Delay (S/Veh)	LOS	Storage	Avg.	Max	Link Length	Avg.	Max	Storage	Avg.	Max
PM PEAK HOUR	TH 210 at NE 4th Ave (Stop Control)	EB		1285	25	1,310	0.0	A	0.9	A	1.9	A	0.9	A	0.9	A				700	3	310			
		WB	5	1150		1,155	0.0	A	0.4	A	0.0	A	0.4	A						425	0	0			
		NB	5			5	0.0	A	0.0	A	12.7	B	12.7	B									0	1	78
		SB			40	40	0.0	A	0.0	A	10.7	B	10.7	B									500	1	56
	NE 5th Ave (Signal Control)	EB	280	1060		1,340	53.5	D	1.7	A	0.0	A	12.3	B	14.7	B	500	97	**424**	425	5	152			
		WB		940	10	950	0.0	A	15.2	B	7.1	A	15.1	B						1000	55	481	150	0	44
		SB	55		215	270	67.1	E	0.0	A	15.1	B	26.1	C									500	14	161
	TH 25 Ramp (Stop Control)	EB		1060		1,060	0.0	A	0.5	A	0.0	A	0.5	A	0.5	A				600	0	0	150	0	0
		WB		950		950	0.0	A	0.5	A	0.0	A	0.5	A						550	0	0			
		NB					0.0	A	0.0	A	0.0	A	0.0	A			700	0	0						
	Mall RI/RO (Stop Control)	WB		830	35	865	0.0	A	1.0	A	0.9	A	1.0	A	2.1	A				300	0	0			
		SB			120	120	0.0	A	0.0	A	10.1	B	10.1	B									500	11	144
	TH 210 at NE 8th Ave (Signal Control)	EB	290	440	330	1,060	59.7	E	24.0	C	4.9	A	27.8	C	35.5	D	**700**	121	**558**	800	32	255	350	6	244
		WB	5	420	155	580	77.6	E	51.5	D	4.7	A	41.2	D			400	3	47	850	81	363	400	4	111
		NB	280	190	5	475	43.9	D	46.6	D	6.5	A	44.9	D			400	85	**527**	600	63	423	400	0	15
		SB	115	210	165	490	34.5	C	58.5	E	8.0	A	36.5	D			250	21	**198**	1000	88	502	1000	88	502
	NE 10th Ave (3/4 Access)	EB	45	510	5	560	6.8	A	0.8	A	1.8	A	1.3	A	1.4	A	300	1	89	850	0	0	200	0	0
		WB	30	545	5	580	3.8	A	0.3	A	1.8	A	0.5	A			200	0	44	1400	0	0	300	0	0
		NB	15	20	40	75	0.0	A	0.0	A	8.1	A	8.1	A						1000	0	0	1000	3	98
		SB		5	20	25	0.0	A	0.0	A	6.4	A	6.4	A						500	0	0	500	1	37
	NE 13th Ave (Stop Control)	EB	45	505		550	7.3	A	0.3	A	0.0	A	0.8	A	1.2	A	350	3	135	1400	0	0			
		WB		520	35	555	0.0	A	0.2	A	1.0	A	0.2	A						5000	0	0	150	0	2
		SB	25		60	85	19.1	C	0.0	A	7.3	A	11.5	B			500	3	73				500	3	73

Signal Major Approach Delays:	245.8	Total Seconds
Signal Minor Approach Delays:	642.0	Total Seconds
Total All Approach Delays:	1169.0	Total Seconds

LEGEND:

###	Queue length at or above 75% of the available storage
###	Queue length at or above available Storage

Table 3c

Build Alternative 1 - Conditions (2045) **Added Capacity at 8th Ave Signal**

Friday Peak Hour (VISSIM) - 5% Increase of PM Peak Hour

Note: NW 4th Street improvements included.

Queue Storage Issues

Queue extends through intersection.

Coordinated Cycle Length: 150 Seconds

(Baxter Dr, NW 4th, N 4th, N 6th, N 8th, 13th/Gillis, NE 4th Ave; NE 8th Ave runs Free)

Peak	Intersection	Approach	Demand Volumes (Veh/Hr)				Delay (S/Veh)						LOS By Approach		LOS By Intersection		Queue (feet)								
																	Left Turn			Through			Right Turn		
			L	T	R	Total	L	LOS	T	LOS	R	LOS	Delay (S/Veh)	LOS	Delay (S/Veh)	LOS	Storage	Avg.	Max	Link Length	Avg.	Max	Storage	Avg.	Max
FRIDAY PEAK HOUR	TH 210 at NE 4th Ave (Stop Control)	EB		1349	26	1,375	0.0	A	1.1	A	2.7	A	1.1	A	1.0	A				700	5	321			
		WB	5	1208		1,213	0.0	A	0.4	A	0.0	A	0.4	A						425	0	0			
		NB	5			5	0.0	A	0.0	A	12.1	B	12.1	B									0	1	82
		SB			42	42	0.0	A	0.0	A	10.5	B	10.5	B									500	1	61
	NE 5th Ave (Signal Control)	EB	294	1113		1,407	54.4	D	2.0	A	0.0	A	12.8	B	15.7	B	500	105	**449**	425	7	156			
		WB		987	11	998	0.0	A	16.6	B	8.1	A	16.5	B						1000	66	548	150	0	51
		SB	58		226	284	71.7	E	0.0	A	16.1	B	27.7	C									500	16	186
	TH 25 Ramp (Stop Control)	EB		1113		1,113	0.0	A	0.5	A	0.0	A	0.5	A	0.5	A				600	0	0	150	0	0
		WB		998		998	0.0	A	0.6	A	0.0	A	0.6	A						550	0	7			
		NB					0.0	A	0.0	A	0.0	A	0.0	A			700	0	0						
	Mall RI/RO (Stop Control)	WB		872	37	909	0.0	A	1.0	A	0.9	A	1.0	A	2.1	A				300	0	0			
		SB			126	126	0.0	A	0.0	A	10.4	B	10.4	B									500	11	147
	TH 210 at NE 8th Ave (Signal Control)	EB	305	462	346	1,113	68.3	E	28.0	C	5.7	A	32.3	C	39.1	D	**700**	147	**651**	800	41	268	350	8	**281**
		WB	5	441	163	609	79.3	E	54.6	D	5.3	A	43.8	D			400	4	57	850	89	388	400	5	129
		NB	294	200	5	499	49.6	D	46.2	D	6.0	A	48.1	D			400	105	**579**	600	63	387	400	0	36
		SB	121	221	173	515	37.7	D	63.2	E	8.0	A	39.3	D			250	24	**201**	1000	102	523	1000	102	523
	NE 10th Ave (3/4 Access)	EB	47	536	5	588	6.8	A	0.9	A	1.7	A	1.4	A	1.5	A	300	1	110	850	0	0	200	0	0
		WB	32	572	5	609	4.5	A	0.3	A	1.9	A	0.5	A			200	1	49	1400	0	0	300	0	0
		NB	16	21	42	79	0.0	A	0.0	A	8.5	A	8.5	A						1000	0	0	1000	3	98
		SB		5	21	26	0.0	A	0.0	A	6.5	A	6.5	A						500	0	0	500	1	37
	NE 13th Ave (Stop Control)	EB	47	530		577	8.8	A	0.3	A	0.0	A	0.9	A	1.4	A	350	3	115	1400	0	0			
		WB		546	37	583	0.0	A	0.2	A	1.0	A	0.2	A						5000	0	0	150	0	4
		SB	26		63	89	23.5	C	0.0	A	9.3	A	14.2	B			500	3	72				500	3	72

Signal Major Approach Delays:	269.2	Total Seconds
Signal Minor Approach Delays:	654.6	Total Seconds
Total All Approach Delays:	1329.8	Total Seconds

LEGEND:

###	Queue length at or above 75% of the available storage
###	Queue length at or above available Storage

Table 3d

Build Alternative 1 - Conditions (2045) **Added Capacity at 8th Ave Signal**

Summer Peak Hour (VISSIM) - 10% Increase of PM Peak Hour

Note: NW 4th Street improvements included.

Queue Storage Issues

Queue extends through intersection.

Coordinated Cycle Length: 160 Seconds

(Baxter Dr, NW 4th, N 4th, N 6th, N 8th, 13th/Gillis, NE 4th Ave; NE 8th Ave runs Free)

Peak	Intersection	Approach	Demand Volumes (Veh/Hr)				Delay (S/Veh)						LOS By Approach		LOS By Intersection		Queue (feet)								
																	Left Turn			Through			Right Turn		
			L	T	R	Total	L	LOS	T	LOS	R	LOS	Delay (S/Veh)	LOS	Delay (S/Veh)	LOS	Storage	Avg.	Max	Link Length	Avg.	Max	Storage	Avg.	Max
SUMMER PEAK HOUR	TH 210 at NE 4th Ave (Stop Control)	EB		1414	28	1,442	0.0	A	1.1	A	2.1	A	1.1	A	1.0	A				700	14	335			
		WB	6	1265		1,271	0.0	A	0.4	A	0.0	A	0.4	A						425	0	8			
		NB	6			6	0.0	A	0.0	A	11.7	B	11.7	B									0	1	83
		SB			44	44	0.0	A	0.0	A	10.8	B	10.8	B									500	1	55
	NE 5th Ave (Signal Control)	EB	308	1166		1,474	53.7	D	1.0	A	0.0	A	12.0	B	16.5	B	500	110	**509**	425	12	158			
		WB		1034	11	1,045	0.0	A	19.2	B	9.0	A	19.1	B						1000	83	632	150	0	38
		SB	61		237	298	73.2	E	0.0	A	19.0	B	30.3	C									500	22	227
	TH 25 Ramp (Stop Control)	EB		1166		1,166	0.0	A	0.6	A	0.0	A	0.6	A	0.7	A				600	13	66	150	0	0
		WB		1045		1,045	0.0	A	0.9	A	0.0	A	0.9	A						550	0	36			
		NB					0.0	A	0.0	A	0.0	A	0.0	A			700	0	0						
	Mall RI/RO (Stop Control)	WB		913	39	952	0.0	A	1.0	A	0.8	A	1.0	A	2.3	A				300	0	0			
		SB			132	132	0.0	A	0.0	A	11.3	B	11.3	B									500	13	147
	TH 210 at NE 8th Ave (Signal Control)	EB	319	484	364	1,167	74.8	E	29.9	C	5.7	A	34.8	C	42.8	D	**700**	170	**787**	800	69	373	350	33	**400**
		WB	6	462	171	639	93.4	F	59.3	E	5.6	A	47.7	D			400	5	52	850	102	424	400	5	123
		NB	308	209	6	523	55.7	E	51.8	D	3.8	A	54.0	D			400	141	**666**	600	73	442	400	0	20
		SB	127	231	182	540	41.5	D	69.6	E	8.9	A	43.2	D			250	26	**212**	1000	140	650	1000	140	650
	NE 10th Ave (3/4 Access)	EB	50	561	6	617	6.7	A	0.9	A	1.6	A	1.3	A	1.5	A	300	1	91	850	0	0	200	0	0
		WB	33	600	6	639	4.4	A	0.3	A	2.0	A	0.5	A			200	0	53	1400	0	0	300	0	0
		NB	17	22	44	83	0.0	A	0.0	A	8.5	A	8.5	A						1000	0	0	1000	3	98
		SB		6	22	28	0.0	A	0.0	A	6.5	A	6.5	A						500	0	0	500	1	37
	NE 13th Ave (Stop Control)	EB	50	556		606	8.7	A	0.3	A	0.0	A	1.0	A	1.6	A	350	4	136	1400	0	0			
		WB		572	39	611	0.0	A	0.2	A	1.0	A	0.3	A						5000	0	0	150	0	2
		SB	28		66	94	25.7	D	0.0	A	10.2	B	15.5	C			500	4	84				500	4	84

Signal Major Approach Delays:	298.2	Total Seconds
Signal Minor Approach Delays:	736.4	Total Seconds
Total All Approach Delays:	1591.9	Total Seconds

LEGEND:

###	Queue length at or above 75% of the available storage
###	Queue length at or above available Storage

Table 4a

Build Alternative 2 - Conditions (2045) **Single Roundabout at TH 25/8th Ave**

AM Peak Hour (VISSIM)

Note: NW 4th Street improvements included.

Queue Storage Issues

Queue extends through intersection.

Coordinated Cycle Length: 115 Seconds

(Baxter Dr, NW 4th, N 4th, N 6th, N 8th, 13th/Gillis, NE 4th Ave)

Peak	Intersection	Approach	Demand Volumes (Veh/Hr)				Delay (S/Veh)						LOS By Approach		LOS By Intersection		Queue (feet)								
																	Left Turn			Through			Right Turn		
			L	T	R	Total	L	LOS	T	LOS	R	LOS	Delay (S/Veh)	LOS	Delay (S/Veh)	LOS	Storage	Avg.	Max	Link Length	Avg.	Max	Storage	Avg.	Max
AM PEAK HOUR	TH 210 at NE 4th Ave (3/4 Access)	EB		765	5	770	0.0	A	1.3	A	5.9	A	1.4	A	1.2	A	175	0	0	700	0	72			
		WB	5	1125	5	1,135	0.0	A	0.2	A	7.0	A	0.2	A			150	0	0	425	0	60			
		NB			15	15	0.0	A	0.0	A	11.9	B	11.9	B									500	2	109
		SB			85	85	0.0	A	0.0	A	11.5	B	11.5	B									500	3	89
	NE 5th Ave (3/4 Access)	EB	95	735		830	18.2	C	0.2	A	0.0	A	2.4	A	1.6	A	275	13	159	425	0	0			
		WB		1025	40	1,065	0.0	A	0.1	A	1.2	A	0.2	A						600	0	0	150	0	41
		SB			110	110	0.0	A	0.0	A	10.0	A	10.0	B									500	4	88
	TH 25 Ramp (Stop Control)	EB		735		735	0.0	A	0.2	A	0.0	A	0.2	A	0.1	A				600	0	0			
		WB		1065		1,065	0.0	A	0.1	A	0.0	A	0.1	A						550	0	0			
		NB					0.0	A	0.0	A	0.0	A	0.0	A											
	Mall 3/4 Access (3/4 Access)	EB	100	635		735	37.0	E	0.3	A	0.0	A	7.0	A	2.4	A	300	21	167	300	0	0			
		WB		1060	20	1,080	0.0	A	0.3	A	0.7	A	0.3	A						550	0	0			
		SB			5	5	0.0	A	0.0	A	2.9	A	2.9	A									500	0	22
	TH 210 at NE 8th Ave (Roundabout Control)	EB	100	290	245	635	2.3	A	1.5	A	2.2	A	1.9	A	10.6	B				1500	2	103	1500	1	139
		WB	10	505	65	580	5.6	A	4.8	A	3.3	A	4.6	A						850	8	152			
		NB	260	150	5	415	4.3	A	4.3	A	0.0	A	4.3	A						600	0	64			
		SB	50	185	315	550	18.3	C	34.3	D	31.9	D	31.5	D						1000	180	**960**			
	NE 10th Ave (3/4 Access)	EB	35	300	10	345	5.3	A	0.8	A	1.6	A	1.3	A	1.6	A	300	1	57	850	0	0	200	0	2
		WB	40	515	5	560	3.1	A	0.3	A	1.7	A	0.5	A			200	0	56	1400	0	0	300	0	0
		NB	10	20	40	70	0.0	A	0.0	A	6.7	A	6.7	A									150	2	87
		SB	5	30	55	90	0.0	A	0.0	A	6.6	A	6.6	A									500	3	72
	NE 13th Ave (Stop Control)	EB	25	320		345	6.0	A	0.2	A	0.0	A	0.6	A	1.1	A	350	1	73	1400	0	0			
		WB		495	25	520	0.0	A	0.2	A	0.9	A	0.2	A						5000	0	0	150	0	8
		SB	25		65	90	15.9	C	0.0	A	6.7	A	9.5	A			500	3	78				500	3	78

Signal Major Approach Delays:	127.6	Total Seconds
Signal Minor Approach Delays:	447.4	Total Seconds
Total All Approach Delays:	748.6	Total Seconds

LEGEND:

###	Queue length at or above 75% of the available storage
###	Queue length at or above available Storage

Table 4b

Build Alternative 2 - Conditions (2045) **Single Roundabout at TH 25/8th Ave**

PM Peak Hour (VISSIM)

Note: NW 4th Street improvements included.

Queue Storage Issues

Queue extends through intersection.

Coordinated Cycle Length: 150 Seconds

(Baxter Dr, NW 4th, N 4th, N 6th, N 8th, 13th/Gillis, NE 4th Ave)

Peak	Intersection	Approach	Demand Volumes (Veh/Hr)				Delay (S/Veh)						LOS By Approach		LOS By Intersection		Queue (feet)								
																	Left Turn			Through			Right Turn		
			L	T	R	Total	L	LOS	T	LOS	R	LOS	Delay (S/Veh)	LOS	Delay (S/Veh)	LOS	Storage	Avg.	Max	Link Length	Avg.	Max	Storage	Avg.	Max
PM PEAK HOUR	TH 210 at NE 4th Ave (3/4 Access)	EB		1285	25	1,310	0.0	A	2.7	A	9.0	A	2.8	A	2.1	A	175	0	0	700	5	293			
		WB	5	1150		1,155	0.0	A	0.3	A	0.0	A	0.3	A			150	0	0	425	0	0			
		NB			5	5	0.0	A	0.0	A	13.8	B	13.8	B									500	1	79
		SB			95	95	0.0	A	0.0	A	12.1	B	12.1	B									500	3	97
	NE 5th Ave (3/4 Access)	EB	180	1160		1,340	15.7	C	0.3	A	0.0	A	1.8	A	2.1	A	275	13	162	425	0	0			
		WB		940	10	950	0.0	A	0.2	A	1.4	A	0.2	A						600	0	0	150	0	17
		SB			215	215	0.0	A	0.0	A	13.5	B	13.5	B									500	14	167
	TH 25 Ramp (Stop Control)	EB		1160		1,160	0.0	A	0.3	A	0.0	A	0.3	A	0.2	A				600	0	3			
		WB		950		950	0.0	A	0.1	A	0.0	A	0.1	A						550	0	0			
		NB					0.0	A	0.0	A	0.0	A	0.0	A											
	Mall 3/4 Access (3/4 Access)	EB	100	1060		1,160	17.7	C	0.7	A	0.0	A	3.5	A	1.9	A	300	15	171	300	0	0			
		WB		830	35	865	0.0	A	0.3	A	0.8	A	0.3	A						550	0	0			
		SB			120	120	0.0	A	0.0	A	2.1	A	2.1	A									500	1	66
	TH 210 at NE 8th Ave (Roundabout Control)	EB	290	440	330	1,060	4.3	A	2.6	A	3.7	A	3.4	A	10.0	B				1500	8	207	1500	6	276
		WB	5	420	155	580	14.3	B	11.5	B	6.6	A	10.4	B						850	21	202			
		NB	280	190	5	475	16.2	C	17.4	C	0.0	A	16.7	C						600	5	266			
		SB	115	210	165	490	17.4	C	16.7	C	16.2	C	16.7	C						1000	76	647			
	NE 10th Ave (3/4 Access)	EB	45	510	5	560	4.8	A	0.8	A	1.3	A	1.1	A	1.3	A	300	1	58	850	0	0	200	0	0
		WB	30	545	5	580	4.8	A	0.2	A	1.7	A	0.5	A			200	0	58	1400	0	0	300	0	0
		NB	15	20	40	75	0.0	A	0.0	A	7.8	A	7.8	A									150	3	94
		SB		5	20	25	0.0	A	0.0	A	6.1	A	6.1	A									500	1	37
	NE 13th Ave (Stop Control)	EB	45	505		550	6.3	A	0.1	A	0.0	A	0.6	A	1.2	A	350	2	91	1400	0	0			
		WB		520	35	555	0.0	A	0.2	A	0.9	A	0.2	A						5000	0	0	150	0	9
		SB	25		60	85	23.3	C	0.0	A	7.3	A	13.0	B			500	3	69				500	3	69

Signal Major Approach Delays:	196.6	Total Seconds
Signal Minor Approach Delays:	597.5	Total Seconds
Total All Approach Delays:	1166.1	Total Seconds

LEGEND:

###	Queue length at or above 75% of the available storage
###	Queue length at or above available Storage

Table 4c

Build Alternative 2 - Conditions (2045) **Single Roundabout at TH 25/8th Ave**

Friday Peak Hour (VISSIM) - 5% Increase of PM Peak Hour

Note: NW 4th Street improvements included.

Queue Storage Issues

Queue extends through intersection.

Coordinated Cycle Length: 150 Seconds

(Baxter Dr, NW 4th, N 4th, N 6th, N 8th, 13th/Gillis, NE 4th Ave)

Peak	Intersection	Approach	Demand Volumes (Veh/Hr)				Delay (S/Veh)						LOS By Approach		LOS By Intersection		Queue (feet)								
																	Left Turn			Through			Right Turn		
			L	T	R	Total	L	LOS	T	LOS	R	LOS	Delay (S/Veh)	LOS	Delay (S/Veh)	LOS	Storage	Avg.	Max	Link Length	Avg.	Max	Storage	Avg.	Max
FRIDAY PEAK HOUR	TH 210 at NE 4th Ave (3/4 Access)	EB		1349	26	1,375	0.0	A	2.9	A	8.6	A	3.0	A	2.2	A	175	0	0	700	5	258			
		WB	5	1208		1,213	0.0	A	0.3	A	0.0	A	0.3	A			150	0	0	425	0	0			
		NB			5	5	0.0	A	0.0	A	14.7	B	14.7	B									500	1	84
		SB			100	100	0.0	A	0.0	A	12.1	B	12.1	B									500	4	95
	NE 5th Ave (3/4 Access)	EB	194	1213		1,407	21.4	C	0.4	A	0.0	A	2.4	A	2.4	A	275	19	203	425	0	0			
		WB		987	11	998	0.0	A	0.2	A	1.1	A	0.2	A						600	0	0	150	0	20
		SB			226	226	0.0	A	0.0	A	13.8	B	13.8	B									500	16	156
	TH 25 Ramp (Stop Control)	EB		1213		1,213	0.0	A	0.3	A	0.0	A	0.3	A	0.2	A				600	0	0			
		WB		998		998	0.0	A	0.1	A	0.0	A	0.1	A						550	0	0			
		NB					0.0	A	0.0	A	0.0	A	0.0	A											
	Mall 3/4 Access (3/4 Access)	EB	100	1113		1,213	18.9	C	0.7	A	0.0	A	3.6	A	2.0	A	300	17	175	300	0	9			
		WB		872	37	909	0.0	A	0.3	A	0.8	A	0.3	A						550	0	0			
		SB			126	126	0.0	A	0.0	A	2.5	A	2.5	A									500	1	69
	TH 210 at NE 8th Ave (Roundabout Control)	EB	305	462	346	1,113	4.6	A	2.9	A	3.6	A	3.6	A	12.3	B				1500	9	208	1500	5	222
		WB	5	441	163	609	19.3	C	14.1	B	7.6	A	12.7	B						850	28	227			
		NB	294	200	5	499	19.1	C	21.8	C	0.0	A	20.2	C						600	8	377			
		SB	121	221	173	515	24.3	C	22.8	C	21.9	C	22.8	C						1000	113	**767**			
	NE 10th Ave (3/4 Access)	EB	47	536	5	588	5.8	A	0.8	A	1.4	A	1.2	A	1.4	A	300	1	70	850	0	0	200	0	0
		WB	32	572	5	609	6.0	A	0.2	A	1.9	A	0.6	A			200	1	58	1400	0	0	300	0	0
		NB	16	21	42	79	0.0	A	0.0	A	7.9	A	7.9	A									150	3	96
		SB		5	21	26	0.0	A	0.0	A	6.2	A	6.2	A									500	1	37
	NE 13th Ave (Stop Control)	EB	47	530		577	5.5	A	0.1	A	0.0	A	0.5	A	1.2	A	350	2	86	1400	0	0			
		WB		546	37	583	0.0	A	0.2	A	1.0	A	0.2	A						5000	0	0	150	0	4
		SB	26		63	89	26.0	D	0.0	A	8.5	A	14.6	B			500	4	73				500	4	73

Signal Major Approach Delays:	208.8	Total Seconds
Signal Minor Approach Delays:	634.1	Total Seconds
Total All Approach Delays:	1327.5	Total Seconds

LEGEND:

###	Queue length at or above 75% of the available storage
###	Queue length at or above available Storage

Table 4d

Build Alternative 2 - Conditions (2045) **Single Roundabout at TH 25/8th Ave**

Summer Peak Hour (VISSIM) - 10% Increase of PM Peak Hour

Note: NW 4th Street improvements included.

Queue Storage Issues

Queue extends through intersection.

Coordinated Cycle Length: 160 Seconds

(Baxter Dr, NW 4th, N 4th, N 6th, N 8th, 13th/Gillis, NE 4th Ave)

Peak	Intersection	Approach	Demand Volumes (Veh/Hr)				Delay (S/Veh)						LOS By Approach		LOS By Intersection		Queue (feet)								
																	Left Turn			Through			Right Turn		
			L	T	R	Total	L	LOS	T	LOS	R	LOS	Delay (S/Veh)	LOS	Delay (S/Veh)	LOS	Storage	Avg.	Max	Link Length	Avg.	Max	Storage	Avg.	Max
SUMMER PEAK HOUR	TH 210 at NE 4th Ave (3/4 Access)	EB		1414	28	1,442	0.0	A	3.7	A	9.7	A	3.8	A	2.7	A	175	0	0	700	12	381			
		WB	6	1265		1,271	0.0	A	0.3	A	6.8	A	0.3	A			150	0	0	425	0	16			
		NB			6	6	0.0	A	0.0	A	16.8	C	16.8	C									500	1	89
		SB			105	105	0.0	A	0.0	A	13.7	B	13.7	B									500	4	97
	NE 5th Ave (3/4 Access)	EB	208	1266		1,474	27.1	D	0.4	A	0.0	A	3.0	A	3.0	A	275	28	**240**	425	0	0			
		WB		1034	11	1,045	0.0	A	0.2	A	1.1	A	0.2	A						600	0	0	150	0	23
		SB			237	237	0.0	A	0.0	A	16.5	C	16.5	C									500	20	188
	TH 25 Ramp (Stop Control)	EB		1266		1,266	0.0	A	0.3	A	0.0	A	0.3	A	0.2	A				600	0	6			
		WB		1045		1,045	0.0	A	0.1	A	0.0	A	0.1	A						550	0	0			
		NB					0.0	A	0.0	A	0.0	A	0.0	A											
	Mall 3/4 Access (3/4 Access)	EB	100	1166		1,266	21.5	C	0.9	A	0.0	A	4.2	A	2.3	A	300	21	169	300	0	0			
		WB		913	39	952	0.0	A	0.3	A	0.8	A	0.3	A						550	0	0			
		SB			132	132	0.0	A	0.0	A	2.7	A	2.7	A									500	1	81
	TH 210 at NE 8th Ave (Roundabout Control)	EB	319	484	364	1,167	5.2	A	3.4	A	3.9	A	4.1	A	16.2	C				1500	13	230	1500	7	281
		WB	6	462	171	639	21.7	C	16.8	C	7.4	A	14.8	B						850	36	253			
		NB	308	209	6	523	24.2	C	25.7	D	0.0	A	24.8	C			600	117	442	600	11	391	600	117	442
		SB	127	231	182	540	38.5	E	35.1	E	33.7	D	35.4	E						1000	186	**964**			
	NE 10th Ave (3/4 Access)	EB	50	561	6	617	5.1	A	0.9	A	1.4	A	1.2	A	1.4	A	300	1	54	850	0	0	200	0	0
		WB	33	600	6	639	5.8	A	0.3	A	2.0	A	0.6	A			200	1	51	1400	0	0	300	0	0
		NB	17	22	44	83	0.0	A	0.0	A	8.1	A	8.1	A									150	3	96
		SB		6	22	28	0.0	A	0.0	A	6.2	A	6.2	A									500	1	37
	NE 13th Ave (Stop Control)	EB	50	556		606	6.6	A	0.2	A	0.0	A	0.6	A	1.4	A	350	2	90	1400	0	0			
		WB		572	39	611	0.0	A	0.2	A	1.0	A	0.3	A						5000	0	0	150	0	9
		SB	28		66	94	27.2	D	0.0	A	11.1	B	16.6	C			500	5	89				500	5	89

Signal Major Approach Delays:	243.1	Total Seconds
Signal Minor Approach Delays:	708.3	Total Seconds
Total All Approach Delays:	1565.4	Total Seconds

LEGEND:

###	Queue length at or above 75% of the available storage
###	Queue length at or above available Storage

Table 5a

Build Alternative 3 - Conditions (2045) **Two Roundabouts at TH 25/8th Ave**

AM Peak Hour (VISSIM)

Note: NW 4th Street improvements included.

Queue Storage Issues

Queue extends through intersection.

Coordinated Cycle Length: 115 Seconds

(Baxter Dr, NW 4th, N 4th, N 6th, N 8th, 13th/Gillis, NE 4th Ave; NE 8th Ave runs Free)

Peak	Intersection	Approach	Demand Volumes (Veh/Hr)				Delay (S/Veh)						LOS By Approach		LOS By Intersection		Queue (feet)								
																	Left Turn			Through			Right Turn		
			L	T	R	Total	L	LOS	T	LOS	R	LOS	Delay (S/Veh)	LOS	Delay (S/Veh)	LOS	Storage	Avg.	Max	Link Length	Avg.	Max	Storage	Avg.	Max
AM PEAK HOUR	TH 210 at NE 4th Ave (3/4 Access)	EB	5	765	5	775	0.0	A	0.2	A	0.6	A	0.2	A	0.4	A	200	0	0	700	0	0			
		WB	5	1125	5	1,135	0.0	A	0.2	A	1.3	A	0.2	A			100	0	0	425	0	5			
		NB			15	15	0.0	A	0.0	A	11.8	B	11.8	B									0	2	114
		SB			85	85	0.0	A	0.0	A	9.7	A	9.7	A									500	0	47
	NE 5th Ave (3/4 Access)	EB	75	705		780	31.6	D	0.2	A	0.0	A	3.9	A	2.5	A	250	23	**206**	425	0	0			
		WB		1025	40	1,065	0.0	A	0.4	A	1.1	A	0.4	A						700	0	0	150	0	6
		SB			110	110	0.0	A	0.0	A	12.5	B	12.5	B									500	5	86
	TH 25 T-Intersection (Roundabout Control)	EB		460	245	705	0.0	A	2.3	A	2.7	A	2.4	A	2.6	A				700	3	172	700	3	172
		WB	195	805		1,000	2.4	A	1.9	A	0.0	A	2.0	A			375	5	154	375	5	154			
		NB	260		155	415	5.3	A	0.0	A	3.0	A	4.3	A			600	7	217				300	1	98
	Mall 3/4 Access (3/4 Access)	EB	120	495		615	45.4	E	0.9	A	0.0	A	7.4	A	3.1	A	250	33	**273**	375	0	0			
		WB		995	20	1,015	0.0	A	0.2	A	0.6	A	0.2	A						350	0	0	350	0	2
		SB			5	5	0.0	A	0.0	A	2.9	A	2.9	A									500	0	21
	NE 8th Ave T-Intersection (Roundabout Control)	EB	250	245		495	0.8	A	0.6	A	0.0	A	0.7	A	3.6	A	350	0	80	350	0	80			
		WB		515	65	580	0.0	A	3.2	A	2.8	A	3.2	A						850	4	128	400	4	128
		SB	50		500	550	4.6	A	0.0	A	7.1	A	6.9	A			1000	33	503				1000	33	503
	NE 10th Ave (3/4 Access)	EB	35	220	40	295	5.5	A	0.8	A	1.4	A	1.3	A	1.7	A	300	1	56	850	0	0	200	0	0
		WB		490	25	515	2.7	A	0.3	A	1.7	A	0.5	A			200	0	51	1400	0	0	300	0	0
		NB			70	70	0.0	A	0.0	A	6.8	A	6.8	A									1000	2	83
		SB			90	90	0.0	A	0.0	A	6.7	A	6.7	A									500	3	72
	NE 13th Ave (Stop Control)	EB	25	320		345	4.6	A	0.2	A	0.0	A	0.5	A	1.1	A	350	1	86	1400	0	0			
		WB		495	25	520	0.0	A	0.2	A	0.9	A	0.2	A						5000	0	0	150	0	0
		SB	25		65	90	15.9	C	0.0	A	6.9	A	9.7	A			500	3	78				500	3	78

Signal Major Approach Delays:	123.6	Total Seconds
Signal Minor Approach Delays:	#REF!	Total Seconds
Total All Approach Delays:	735.7	Total Seconds

LEGEND:

###	Queue length at or above 75% of the available storage
###	Queue length at or above available Storage

Table 5b

Build Alternative 3 - Conditions (2045) **Two Roundabouts at TH 25/8th Ave**

PM Peak Hour (VISSIM)

Note: NW 4th Street improvements included.

Queue Storage Issues

Queue extends through intersection.

Coordinated Cycle Length: 150 Seconds

(Baxter Dr, NW 4th, N 4th, N 6th, N 8th, 13th/Gillis, NE 4th Ave; NE 8th Ave runs Free)

Peak	Intersection	Approach	Demand Volumes (Veh/Hr)				Delay (S/Veh)						LOS By Approach		LOS By Intersection		Queue (feet)								
																	Left Turn			Through			Right Turn		
			L	T	R	Total	L	LOS	T	LOS	R	LOS	Delay (S/Veh)	LOS	Delay (S/Veh)	LOS	Storage	Avg.	Max	Link Length	Avg.	Max	Storage	Avg.	Max
PM PEAK HOUR	TH 210 at NE 4th Ave (3/4 Access)	EB		1285	25	1,310	0.0	A	0.5	A	1.0	A	0.5	A	0.6	A	200	0	0	700	0	66			
		WB	5	1150		1,155	0.0	A	0.2	A	0.0	A	0.2	A			100	0	0	425	0	0			
		NB			5	5	0.0	A	0.0	A	16.8	B	16.8	B									0	1	82
		SB			95	95	0.0	A	0.0	A	10.1	B	10.1	B									500	1	59
	NE 5th Ave (3/4 Access)	EB	160	1130		1,290	21.1	C	0.4	A	0.0	A	2.3	A	2.8	A	250	18	**196**	425	0	0			
		WB		940	10	950	0.0	A	0.4	A	1.1	A	0.4	A						700	0	0	150	0	0
		SB			215	215	0.0	A	0.0	A	17.5	C	17.5	C									500	19	171
	TH 25 T-Intersection (Roundabout Control)	EB		800	330	1,130	0.0	A	5.0	A	6.5	A	5.4	A	4.7	A				700	24	421	700	24	421
		WB	215	670		885	2.1	A	1.8	A	0.0	A	1.9	A			375	4	138	375	4	138			
		NB	280		195	475	11.2	B	0.0	A	4.8	A	8.2	A			600	19	346				300	3	134
	Mall 3/4 Access (3/4 Access)	EB	120	875		995	15.9	C	0.4	A	0.0	A	2.7	A	1.7	A	250	15	**220**	375	0	0			
		WB		765	35	800	0.0	A	0.2	A	0.7	A	0.2	A						350	0	0	350	0	7
		SB			120	120	0.0	A	0.0	A	3.0	A	3.0	A									500	1	72
	NE 8th Ave T-Intersection (Roundabout Control)	EB	480	395		875	1.6	A	0.9	A	0.0	A	1.3	A	3.6	A	350	2	185	350	2	185			
		WB		425	155	580	0.0	A	7.4	A	7.4	A	7.4	A						850	15	190			
		SB	115		375	490	3.6	A	0.0	A	3.6	A	3.6	A			1000	13	326				1000	13	326
	NE 10th Ave (3/4 Access)	EB	45	455	10	510	4.8	A	0.8	A	1.3	A	1.1	A	1.3	A	300	1	62	850	0	0	200	0	0
		WB		555	25	580	4.2	A	0.2	A	1.8	A	0.5	A			200	0	53	1400	0	0	300	0	0
		NB			75	75	0.0	A	0.0	A	7.6	A	7.6	A									1000	3	93
		SB			25	25	0.0	A	0.0	A	6.5	A	6.5	A									500	1	37
	NE 13th Ave (Stop Control)	EB	45	505		550	5.8	A	0.1	A	0.0	A	0.6	A	1.2	A	350	2	100	1400	0	0			
		WB		520	35	555	0.0	A	0.2	A	0.9	A	0.2	A						5000	0	0	150	0	9
		SB	25		60	85	23.6	C	0.0	A	7.3	A	13.0	B			500	3	71				500	3	71

Signal Major Approach Delays:	187.1	Total Seconds
Signal Minor Approach Delays:	#REF!	Total Seconds
Total All Approach Delays:	1126.3	Total Seconds

LEGEND:

###	Queue length at or above 75% of the available storage
###	Queue length at or above available Storage

Table 5c

Build Alternative 3 - Conditions (2045) **Two Roundabouts at TH 25/8th Ave**

Friday Peak Hour (VISSIM) - 5% Increase of PM Peak Hour

Note: NW 4th Street improvements included.

Queue Storage Issues

Queue extends through intersection.

Coordinated Cycle Length: 150 Seconds

(Baxter Dr, NW 4th, N 4th, N 6th, N 8th, 13th/Gillis, NE 4th Ave; NE 8th Ave runs Free)

Peak	Intersection	Approach	Demand Volumes (Veh/Hr)				Delay (S/Veh)						LOS By Approach		LOS By Intersection		Queue (feet)								
																	Left Turn			Through			Right Turn		
			L	T	R	Total	L	LOS	T	LOS	R	LOS	Delay (S/Veh)	LOS	Delay (S/Veh)	LOS	Storage	Avg.	Max	Link Length	Avg.	Max	Storage	Avg.	Max
FRIDAY PEAK HOUR	TH 210 at NE 4th Ave (3/4 Access)	EB		1349	26	1,375	0.0	A	0.4	A	0.9	A	0.4	A	0.5	A	200	0	0	700	0	32			
		WB	5	1208		1,213	0.0	A	0.2	A	0.0	A	0.2	A			100	0	0	425	0	0			
		NB			5	5	0.0	A	0.0	A	16.9	B	16.9	B									0	1	82
		SB			100	100	0.0	A	0.0	A	10.4	B	10.4	B									500	1	64
	NE 5th Ave (3/4 Access)	EB	174	1180		1,354	27.5	D	0.4	A	0.0	A	3.0	A	3.4	A	250	27	**279**	425	0	0			
		WB		987	11	998	0.0	A	0.4	A	1.2	A	0.4	A						700	0	0	150	0	8
		SB			226	226	0.0	A	0.0	A	20.3	C	20.3	C									500	24	182
	TH 25 T-Intersection (Roundabout Control)	EB		834	346	1,180	0.0	A	5.7	A	7.3	A	6.1	A	5.3	A				700	31	455	700	31	455
		WB	226	704		930	2.3	A	1.9	A	0.0	A	2.0	A			375	5	148	375	5	148			
		NB	294		205	499	12.7	B	0.0	A	5.4	A	9.3	A			600	23	350				300	4	157
	Mall 3/4 Access (3/4 Access)	EB	120	919		1,039	18.6	C	0.6	A	0.0	A	3.2	A	2.0	A	250	20	**240**	375	0	14			
		WB		804	37	841	0.0	A	0.2	A	0.8	A	0.2	A						350	0	0	350	0	9
		SB			126	126	0.0	A	0.0	A	3.4	A	3.4	A									500	1	80
	NE 8th Ave T-Intersection (Roundabout Control)	EB	505	414		919	1.8	A	1.0	A	0.0	A	1.4	A	4.0	A	350	3	207	350	3	207			
		WB		447	163	610	0.0	A	8.5	A	8.0	A	8.4	A						850	19	215	400	19	215
		SB	121		394	515	4.2	A	0.0	A	4.0	A	4.1	A			1000	16	359				1000	16	359
	NE 10th Ave (3/4 Access)	EB	47	478	10	535	5.8	A	0.8	A	1.4	A	1.2	A	1.4	A	300	1	63	850	0	0	200	0	0
		WB		584	26	610	6.0	A	0.2	A	1.9	A	0.6	A			200	1	62	1400	0	0	300	0	2
		NB			79	79	0.0	A	0.0	A	7.8	A	7.8	A									1000	3	93
		SB			26	26	0.0	A	0.0	A	6.7	A	6.7	A									500	1	37
	NE 13th Ave (Stop Control)	EB	47	530		577	6.4	A	0.1	A	0.0	A	0.6	A	1.3	A	350	2	81	1400	0	0			
		WB		546	37	583	0.0	A	0.2	A	1.1	A	0.2	A						5000	0	0	150	0	4
		SB	26		63	89	27.1	D	0.0	A	9.9	A	15.8	C			500	4	82				500	4	82

Signal Major Approach Delays:	199.7	Total Seconds
Signal Minor Approach Delays:	#REF!	Total Seconds
Total All Approach Delays:	1232.7	Total Seconds

LEGEND:

###	Queue length at or above 75% of the available storage
###	Queue length at or above available Storage

Table 5d

Build Alternative 3 - Conditions (2045) **Two Roundabouts at TH 25/8th Ave**

Summer Peak Hour (VISSIM) - 10% Increase of PM Peak Hour

Note: NW 4th Street improvements included.

Queue Storage Issues

Queue extends through intersection.

Coordinated Cycle Length: 160 Seconds

(Baxter Dr, NW 4th, N 4th, N 6th, N 8th, 13th/Gillis, NE 4th Ave; NE 8th Ave runs Free)

Peak	Intersection	Approach	Demand Volumes (Veh/Hr)				Delay (S/Veh)						LOS By Approach		LOS By Intersection		Queue (feet)								
																	Left Turn			Through			Right Turn		
			L	T	R	Total	L	LOS	T	LOS	R	LOS	Delay (S/Veh)	LOS	Delay (S/Veh)	LOS	Storage	Avg.	Max	Link Length	Avg.	Max	Storage	Avg.	Max
SUMMER PEAK HOUR	TH 210 at NE 4th Ave (3/4 Access)	EB		1414	28	1,442	0.0	A	0.9	A	1.4	A	0.9	A	0.8	A	200	0	0	700	3	142			
		WB	6	1265		1,271	0.0	A	0.2	A	0.0	A	0.2	A			100	0	0	425	0	0			
		NB			6	6	0.0	A	0.0	A	21.9	C	21.9	C									0	1	87
		SB			105	105	0.0	A	0.0	A	11.2	B	11.2	B									500	1	61
	NE 5th Ave (3/4 Access)	EB	188	1232		1,420	33.4	D	0.6	A	0.0	A	3.7	A	3.9	A	250	37	**303**	425	0	7			
		WB		1034	11	1,045	0.0	A	0.4	A	1.1	A	0.4	A						700	0	0	150	0	3
		SB			237	237	0.0	A	0.0	A	23.1	C	23.1	C									500	28	200
	TH 25 T-Intersection (Roundabout Control)	EB		868	364	1,232	0.0	A	7.4	A	8.0	A	7.6	A	6.9	A				700	43	**547**	700	43	**547**
		WB	237	737		974	2.9	A	2.2	A	0.0	A	2.4	A			375	7	189	375	7	189			
		NB	308		215	523	18.3	C	0.0	A	8.2	A	13.7	B			600	42	368				300	6	**258**
	Mall 3/4 Access (3/4 Access)	EB	120	963		1,083	23.3	C	0.7	A	0.0	A	4.1	A	2.5	A	250	29	**287**	375	0	2			
		WB		842	39	881	0.0	A	0.2	A	0.9	A	0.2	A						350	0	0	350	0	9
		SB			132	132	0.0	A	0.0	A	3.6	A	3.6	A									500	2	85
	NE 8th Ave T-Intersection (Roundabout Control)	EB	528	435		963	2.0	A	1.0	A	0.0	A	1.6	A	5.1	A	350	4	262	350	4	262			
		WB		468	171	639	0.0	A	11.1	B	10.4	B	10.9	B						850	26	245	400	26	245
		SB	127		413	540	5.4	A	0.0	A	5.3	A	5.3	A			1000	24	404				1000	24	404
	NE 10th Ave (3/4 Access)	EB	50	500	12	562	5.7	A	0.8	A	1.3	A	1.2	A	1.4	A	300	1	61	850	0	0	200	0	0
		WB		611	28	639	5.4	A	0.3	A	2.0	A	0.5	A			200	1	64	1400	0	0	300	0	0
		NB			83	83	0.0	A	0.0	A	8.0	A	8.0	A									1000	3	98
		SB			28	28	0.0	A	0.0	A	6.4	A	6.4	A									500	1	37
	NE 13th Ave (Stop Control)	EB	50	556		606	7.0	A	0.2	A	0.0	A	0.7	A	1.4	A	350	3	102	1400	0	0			
		WB		572	39	611	0.0	A	0.2	A	1.1	A	0.3	A						5000	0	0	150	0	3
		SB	28		66	94	25.7	D	0.0	A	9.5	A	15.1	C			500	4	79				500	4	79

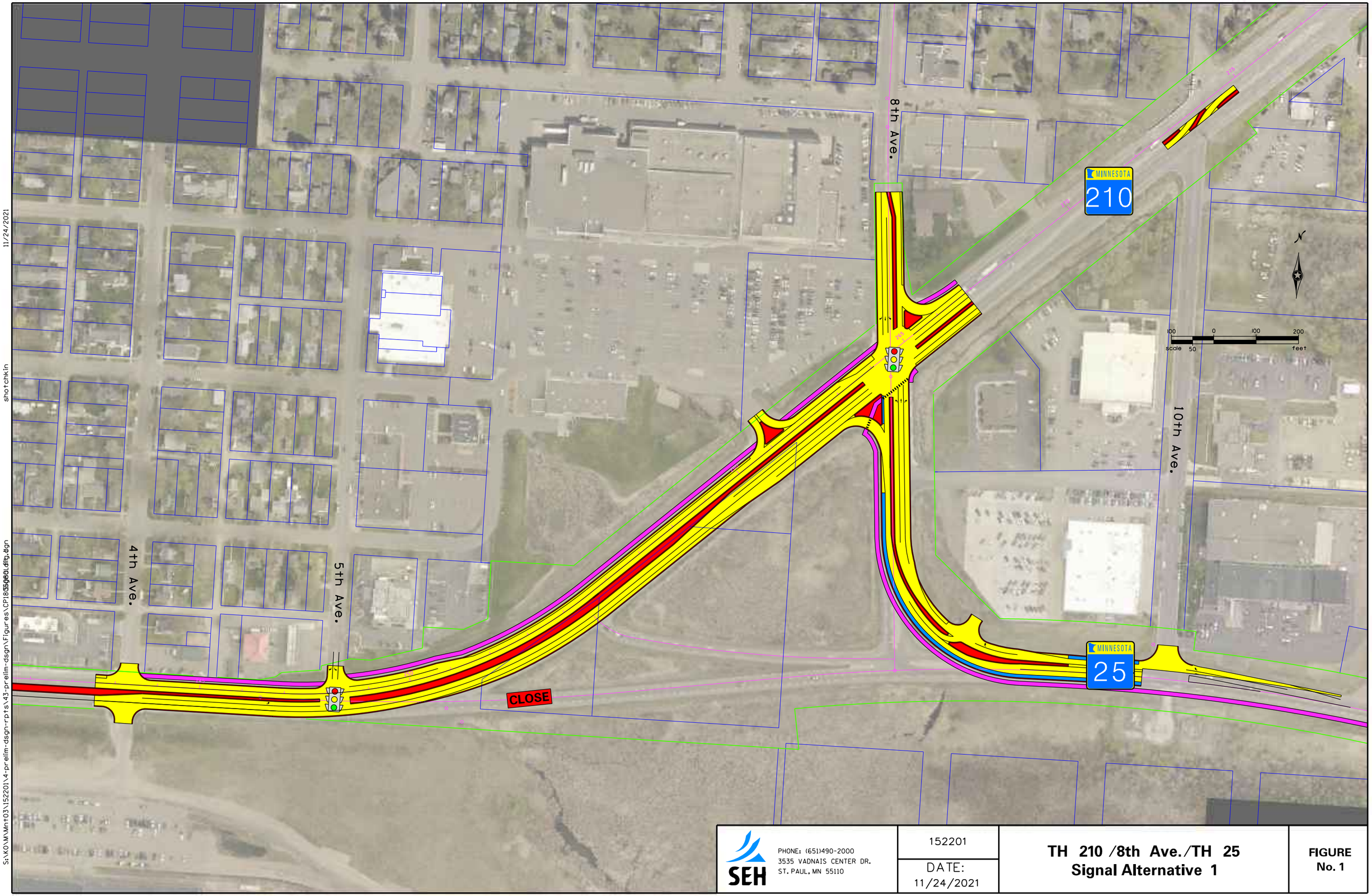
Signal Major Approach Delays:	234.1	Total Seconds
Signal Minor Approach Delays:	#REF!	Total Seconds
Total All Approach Delays:	1631.1	Total Seconds

LEGEND:

###	Queue length at or above 75% of the available storage
###	Queue length at or above available Storage

Appendix E

Alternative Layouts



SEH

PHONE: (651)490-2000
3535 VADNAIS CENTER DR.
ST. PAUL, MN 55110

152201

DATE:
11/24/2021

TH 210 /8th Ave./TH 25
Signal Alternative 1

FIGURE No. 1

11/24/2021

shotchkin

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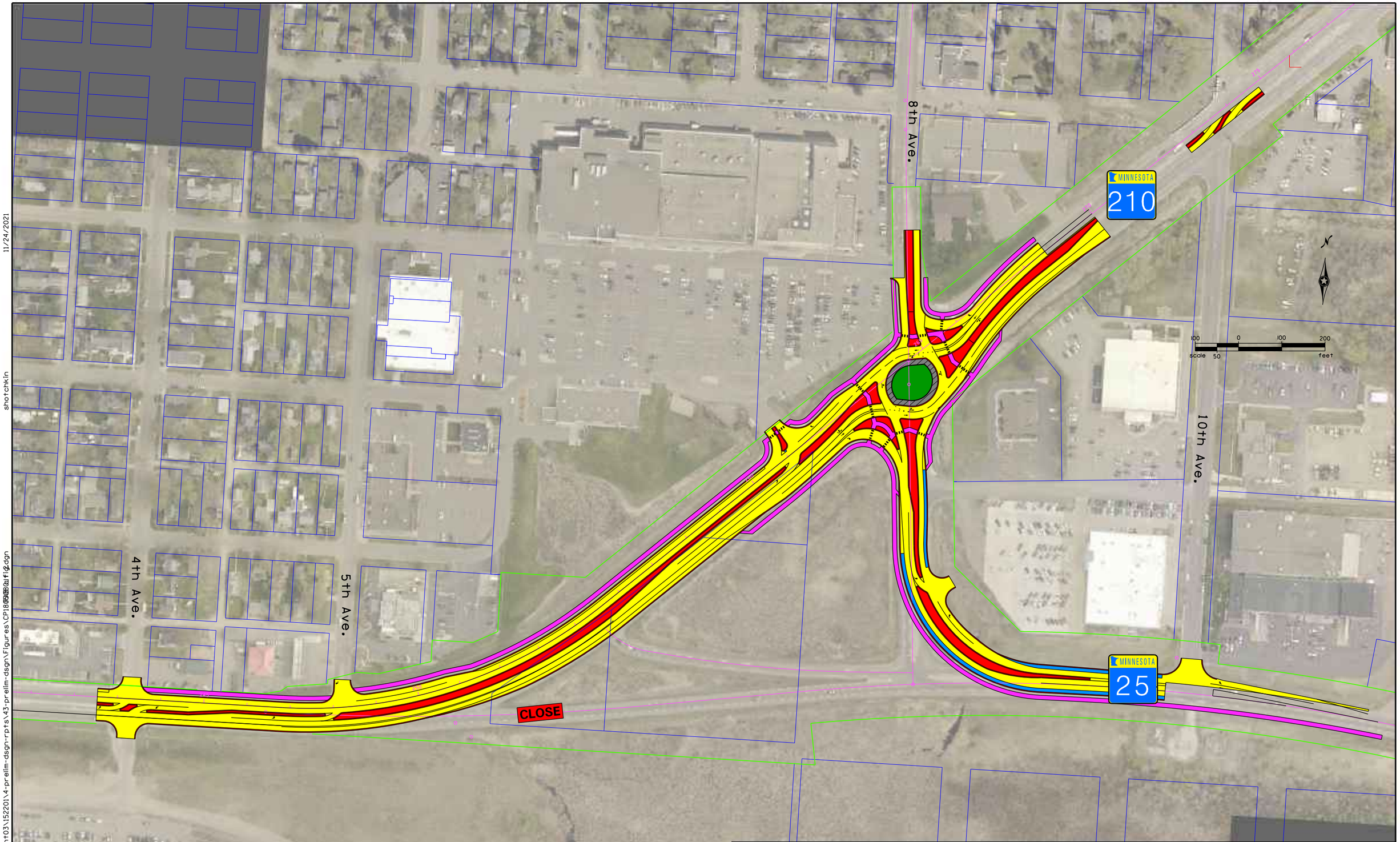

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PHONE: (651)490-2000
3535 VADNAIS CENTER DR.
ST. PAUL, MN 55110

152201

DATE:
11/24/2021

TH 210 /8th Ave./TH 25
Roundabout Alternative 2

FIGURE
No. 2

11/24/2021

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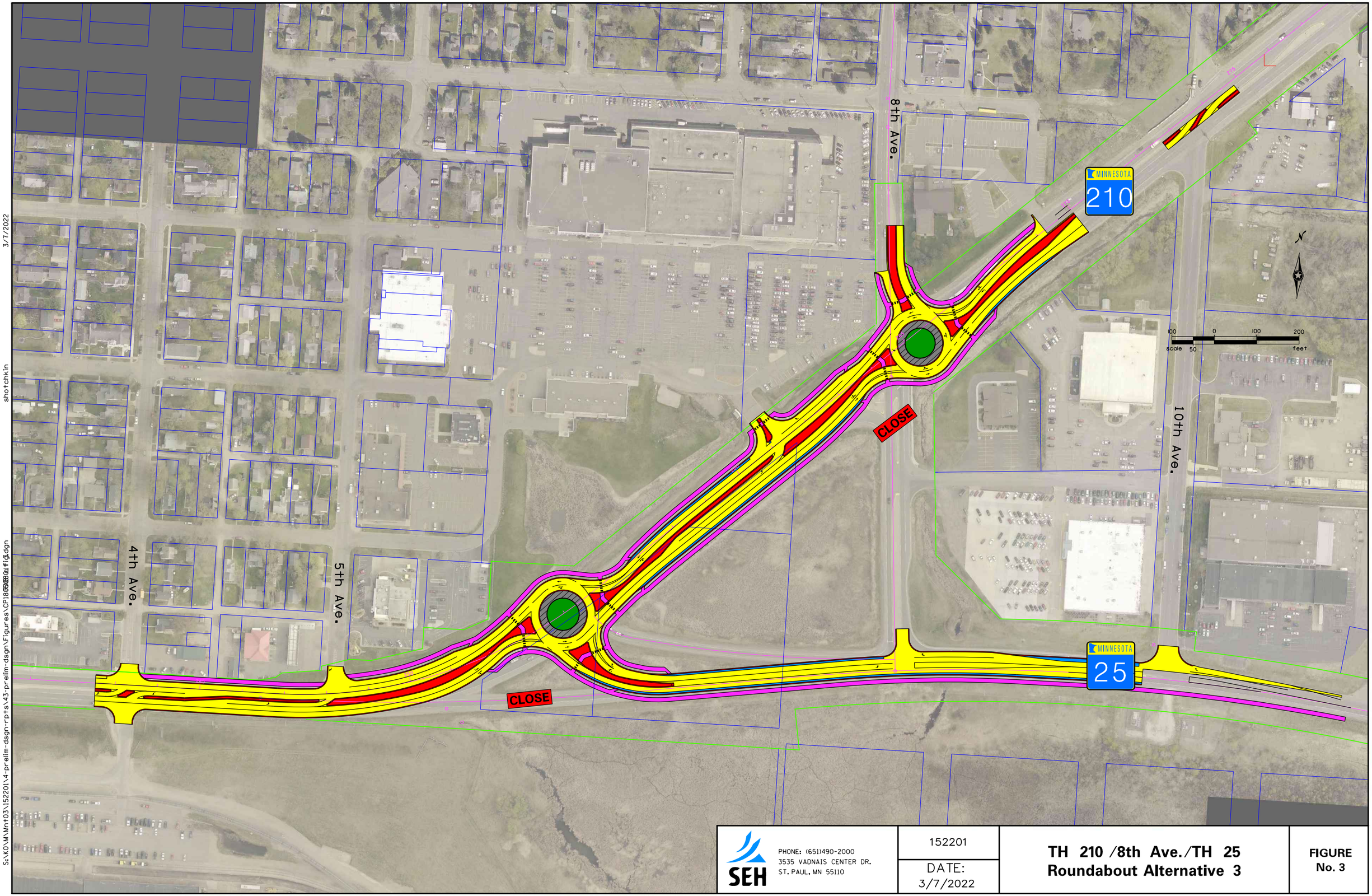

SEH

PHONE: (651)490-2000
3535 VADNAIS CENTER DR.
ST. PAUL, MN 55110

152201

DATE:
3/7/2022

TH 210 /8th Ave./TH 25
Roundabout Alternative 3

FIGURE
No. 3

3/7/2022

shotchkin

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APPENDIX B

Correspondence / Miscellaneous

DEPARTMENT OF TRANSPORTATION

Attachment B Checklist

Based upon the following, it is determined that the project does not exceed the thresholds in Attachment "B" of the Programmatic Categorical Exclusion Agreement between FHWA and MnDOT, effective 05/01/2020. Note: The Attachment B Checklist is not required for Programmatic Categorical Exclusion Determinations classified under 23 CFR 771.117 (c). The Attachment B Checklist is required for Programmatic Categorical Exclusion Determinations classified under 23 CFR 771.117 (d) and for Non-Programmatic Categorical Exclusion Determinations.

X _____

Ben Lodin, Consultant Project Manager (Sambatek), 01/23/2023

Section 4(f)	☐	The project does not use Section 4(f) lands or properties.
	or ☐	The project is an independent bikeway/walkway covered by the FHWA Section 4(f) Statement and Determination for Independent Bikeways or Walkways (Negative Declaration statement) dated May 23, 1977.
	and / or ☒	The project meets temporary occupancy conditions that do not constitute a Section 4(f) use per 23 CFR 774.13(d).
	or ☐	The project meets the conditions of a De Minimis impact finding.
Section 6(f)	☒	The project requires no acquisition of real property interest subject to Section 6(f) or encumbered by similar public-use funding that restricts conversion to other uses.
Historic/ Archeological	☐	The provisions of the National Historic Preservation Act have been satisfied by a Section 106 finding of *no historic properties affected*.
	or ☒	For NRHP-listed or eligible properties the provisions of the National Historic Preservation Act have been satisfied by a Section 106 finding of *no adverse effect* per the current Programmatic Agreement (PA) among FHWA, the Minnesota Historic Preservation Office (MnHPO), the Advisory Council on Historic Preservation (ACHP), the United States Army Corps of Engineers (USACE) and MnDOT.
	and ☒	No Section 106 Agreement or known post-NEPA plan review by CRU and the MnSHPO or a Tribal Historic Preservation Office (THPO) is deemed appropriate by MnDOT and FHWA.
	and ☒	The undertaking has not been formally elevated to dispute resolution with the Advisory Council on Historic Preservation per 36 CFR 800.7
Threatened and Endangered Species – Federal	☐	The provisions of the Endangered Species Act (ESA) have been satisfied by a Section 7 determination of *no effect* to threatened or endangered species or critical habitat.
	or ☐	The scope of work and impacts fall within the applicability criteria of a USFWS-issued species-specific range wide programmatic agreement (PA) that outlines mitigation (e.g. avoidance and minimization measures - AMMs). All terms and mitigation required by the USFWS-issued PA plus any measures deemed prudent by the MnDOT Wildlife Ecologist shall be incorporated into the scope of work as environmental commitments.
	or ☒	The provisions of the ESA have been satisfied by a Section 7 determination, per written correspondence with the USFWS, of *may affect, not likely to adversely affect* threatened or endangered species or critical habitat, or *may affect but will not cause prohibited take* of the Northern Long-eared Bat (NLEB).
	or ☐	The provisions of the ESA have been satisfied by a Section 7 determination of *no jeopardy* for any species proposed for listing under the ESA.
	and ☒	Tree clearing, if required, must be completed during the winter months (November 1 to March 31, inclusive), unless the MnDOT Wildlife Ecologist determines the area is unsuitable habitat.
Right of Way	☐	The project does not require any new right of way, permanent easement, or temporary easement.
	or	The project requires only minor amounts of new right of way, permanent easement or temporary easement, defined as one of the following:

			☒ -Up to 5 acres per linear mile (absolute, not average), but total permanent not more than 25 acres plus total temporary not more than 40 acres.**–OR–** ☐ -Up to 10 acres (permanent plus temporary) for spot improvements (such as bridge replacement).
	and	☒	The project requires no more than four residential relocations;
	and	☒	The project requires no more than one business relocation;
	and	☒	Property acquisition or change in access to property required for the project will not affect the use of the property;
	and	☒	An environmental justice analysis has been completed when there are relocations of any residence or business.
Highway Access Change	and	☒	The project does not add or remove a ramp on an existing expressway or freeway interchange.
		☒	The project does not add an interchange to an expressway or freeway.
Traffic Disruption		☐	The project does not involve construction of temporary access or closure of an existing road, bridge or ramp.
	or		The project does involve construction of temporary access or closure of an existing road, bridge or ramp, but the following conditions are met: ☐ For projects outside of the boundaries of a metropolitan planning organization (MPO), temporary access would not last for more than one construction season and road, bridge or ramp closure would not result in a detour that would last for more than one construction season or increase (one-way, out-of-direction) travel distance greater than 5 miles in an urban area or 25 miles in a rural area. ☐ For projects within the boundaries of an MPO, the project would not require a Level 1 traffic management plan (TMP) per the Minnesota Work Zone Safety and Mobility Policy (or subsequent replacement policy). If the Level 1 traffic management plan is undefined, then temporary access would not last for more than one construction season and road, bridge or ramp closure would not result in a detour that would last for more than one construction season or increase (one-way, out-of-direction) travel distance greater than 5 miles in an urban area or 25 miles in a rural area.
Contamination Hazards		☒	The project does not have a high risk of causing direct or indirect impacts to human health or sensitive environmental resources due to encountering contamination or hazardous materials.
Farmland		☒	The Farmland Protection Policy Act (FPPA) does not apply.
	or	☐	Form AD-1006 or Form NRCS-CPA-106 has been completed and provided to NRCS.
Section 404		☐	The project does not involve placement of fill into Waters of the U.S.
	or	☒	The project is anticipated to be covered by a USACE Section 404 Nationwide or Regional General Permit.
	and	☒	The project is anticipated to have no more than 10 acres of permanent wetland impacts.
Floodplains		☒	The project does not encroach into a floodplain.
	or	☐	Floodplain encroachment will not have a significant impact, as defined in 23 CFR 650.105 and E.O. 11988 and documented by a Floodplain Assessment including Hydraulic Analysis and Risk Assessment.
Wetlands		☒	The project does not impact or encroach into wetlands *(check applicable condition).* ☐ The project is not expanding the existing ground disturbance footprint. **OR** ☐ The project is expanding the existing ground disturbance footprint, but a review of maps, indicates that there are no wetlands in the vicinity of the project limits. **OR** ☐ The project is expanding the existing ground disturbance footprint and there are wetlands in the vicinity of the project limits but the attached project map showing construction limits and boundaries of wetlands in the project area demonstrates no permanent impact.

	or ☒	Wetland encroachment(s) are all of the following: ☒ Not greater than 10 acres of permanent impacts. The project will require approximately 0.8 acres of permanent impacts. and ☐ Not significant, as documented by a Two-Part Wetland Finding, demonstrating (1) no practical avoidance and (2) all measures to minimize harm are incorporated when avoidance is not practical.
Coast Guard Permit	☒	The project does not require a Coast Guard bridge permit.
Sole Source Aquifer	☐	No portion of the project is located within Crow Wing, Aitkin, Mille Lacs, or Morrison Counties
	or ☒	Portions of the project are within Crow Wing, Aitkin, Mille Lacs, or Morrison Counties but the entire project is located outside of the Sole Source Aquifer (SSA) project review area designated by the US Environmental Protection Agency (USEPA) for any Minnesota SSA.
	or ☐	The project in part or in whole, is within the project review area designated by the USEPA for a Minnesota SSA but does not require a detailed groundwater impact assessment to be submitted to USEPA for review.
Wild and Scenic Rivers	☐	The project does not require construction adjacent to the boundaries a river designated as a component of, or proposed for inclusion in, the National System of Wild and Scenic Rivers. The St. Croix River is the only river in Minnesota within this definition.
	or ☒	The project requires work within the boundaries of a river designated as a component of, or proposed for inclusion in, the National System of Wild and Scenic Rivers, but the scope of work (temporary and permanent) is within existing operational-right-of-way and is limited to maintaining the existing roadway profile and prism and will not induce an adverse effect to the Wild and Scenic River. and ☐ All necessary permits and approvals have been obtained by the National Park Service. Additional guidance can be found on the Wild and Scenic River chapter of the HPDP.
Noise	☒	The project is not a Type I noise project as defined by 23 CFR 772(e.g. construction of a highway on a new location which significantly changes either the horizontal or vertical alignment or changes the number of through-traffic lanes). In Minnesota, if a project is not a Type I noise project, then it is a Type III project.
	or ☐	The project is a Type I project as defined by 23 CFR 772, but either has no receptors or no impacted receptors.
	and	MnDOT Noise Specialists have reviewed/accepted the following: ☒ Agree with noise determination type. ☒ Agree with receptor type and locations. ☒ Agree with noise study
Air	☒	The project is located outside of Ramsey County **–OR–** If located within Ramsey County, the project is outside of the P.M. 10 area.
	or ☒	The project conforms to the state implementation plan.
	and ☒	The project does not add significant capacity to urban highways with design year average daily traffic of 140,000 or more (i.e. does not need a quantitative mobile source air toxics [MSAT] analysis).
International	☒	The project is not an international project.
Controversy	☒	The project is not anticipated to be controversial.

Ben Lodin, PE (MN)

From: Fowler, Patty (DOT)
Sent: Friday, July 1, 2022 10:05 AM
To: Wehseler, Luke (DOT)
Cc: Bump, Samantha (DNR); Joyal, Lisa (DNR); Smith, Christopher E (DOT); Brown, Elizabeth A (DOT); Krinke, Andrew (DOT); Bacigalupi, Marc (DNR); Crozier, Gaea (DNR); Miller, Wade (DNR); Parson, Jessica (DNR); Goreham, Seth (DNR); Fowler, Patty (DOT)
Subject: DNR Comments on MnDOT Early Notification Memo for TH210/Washington Street Improvements (SP1805-80) Crow Wing County
Attachments: 1-29-22 OneENM SP 1805-80 (TH 210)-1836508-v66.pdf; 20220129_SP180580 _Layout.pdf; AES (w veg protection sheet).pdf

Luke,

This email is the DNR response for your project records. I have not sent this Early Notification Memo (ENM) out for full DNR review. As such, additional comments from DNR area managers may be received at a later date. However based on the information in the submitted documents regarding the proposed road surface, intersections, and sidewalk construction and improvements along a four mile segment of TH210/Washington Street between Baxter Drive and the east end of the 4-lane segment in Brainerd, please consider the following comments as final designs and special provisions are developed:

1. There is one Public Waters watercourse within the current project limits: Mississippi River at Bridge #5060. Proposed work is to re-deck with major preservation; although it is understood it is currently being studied to identify full detailed project scope. All DNR Public Waters should be identified as an 'Area of Environmental Sensitivity' on plans. This designation assures special protection during construction though your Standard Specifications for Construction #1717 (Air, Land, and Water Pollution), #2573.3 (A.3 stage the work to minimize sediment entering these waters), & use native vegetation per your vegetation establishment recommendations.

   The Mississippi River is a DNR public water, a public water work permit will be required. The project will require review and authorization under a DNR Public Waters Work Permit. The DNR General Permit (GP2004-0001) is typically applied to MnDOT bridge/culvert projects. This is the DNR GP for MnDOT Bridge or culvert work. As the project moves forward, design of the crossing should meet the conditions listed in the GP. The design and timing of the work will need to follow DNR standard requirements, including use of natural net erosion control blanket, use of native vegetation, crossings designed for fish passage requirements, and limits to work in the water (Work Exclusion dates) for allowing undisturbed fish migration and spawning. Please review all the conditions of the Public Waters Work General Permit (state.mn.us) and integrate their requirements into the project design. Specific items to incorporate into design and construction are also listed below. Additional information, including options on how to meet the conditions of the GP are presented in the collection Best Practices for Meeting DNR General Public Waters Work Permit GP 2004-0001 (state.mn.us) .

   a. Construction and demolition methods shall be submitted for review and approval at a later date. See the GP2004-0001 condition 'TEMPORARY IMPACTS DURING CONSTRUCTION' and items 'A' though 'L' for subjected conditions. This is normal procedure for bridge or culvert projects as we recognize that construction methods are not finalized until a contractor is chosen. Construction contractors shall be made aware of this condition as they may be held responsible for compliance.

b. Remind contractors that a separate DNR water use permit is required if the projects construction will require the use of more than 10,000 gallons of water per day or 1 million gallons per year from any surface water or ground water. DNR GP1997-0005 (temporary water appropriations) covers a variety of temporary activities associated with road construction. Applications should be submitted when dewatering results in transferring water to a differing waterbody (groundwater to surface water or from one surface water to another) or withdrawing water for use as dust control. Typically, temporary stream diversions do not require a separate water use permit, particularly if there is a separate Public Waters permit for the project and diversion plans are approved through that permits construction method approval process. An additional Infested Water Diversion or Transportation Permit may be required if the project will pump water from a surface water designated as an infested water. For projects lasting longer than one year or exceeding 50 million gallons an individual appropriations permit may be required. Information is located at: http://www.dnr.state.mn.us/waters/watermgmt_section/appropriations/permits.html

c. Revegetation of disturbed soils should include native mixes in areas that are not proposed for mowed turf grass. Please utilize the native recommendations developed by BWSR (https://bwsr.state.mn.us/vegetation-establishment-and-management) or MnDOT' in the 'Vegetation Establishment Recommendations' (https://www.dot.state.mn.us/environment/erosion/vegetation.html). In addition, for meeting DNR concerns, revegetation may include woody vegetation (trees and shrubs) in addition to grasses and/or forbs. Please contact your Districts representatives for the Erosion Control & Stormwater Management Unit, Roadside Vegetation Management Unit, and the Districts Maintenance staff to help determine appropriate permanent revegetation plans.

d. If scope is expanded or there is opportunity, the incorporation of a passage bench is a standard design feature for MnDOT bridges. "Aggregate surfacing" is alternative design that we are looking to have as an option for allowing animal passage below the bridge, which may be a better alternative depending on the landscape of the site.

e. Riprap and geotextile fabric. Be aware that we are increasingly recommending not using geotextile under in water riprap. This is due to concerns of micro plastic contribution to the water as well as concerns of severing ecological connectivity within the streambank profile. We recommend that riprap along streambanks and/or culvert aprons be installed with a granular filter per MnDOT specifications for riprap (Spec 2511.3.B, Spec 3601.B.1 and Table 3601-2).

2. The Minnesota Natural Heritage Information System (NHIS) has been queried to determine if any rare plant or animal species, native plant communities, or other significant natural features are known to occur within an approximate one-mile radius of the project area. There were rare features identified in this query. In order to prevent the inadvertent release of the location of specific listed or rare species contained in the NHIS, I have not identified the species or their location. If these details are needed for documentation, please contact me. Please note that the following rare features were identified in the query and *may* be impacted by the proposed project. Suggested avoidance and/or protection measures are also identified:

   a. Blanding's turtles (*Emydoidea blandingii)*, a state-listed threatened species, have been reported from the vicinity of the proposed project and may be encountered on site. If Blanding's turtles are found on the site, please remember that state law and rules prohibit the destruction of threatened or endangered species, except under certain prescribed conditions. If turtles are in imminent danger they should be moved by hand out of harm's way, otherwise they should be left undisturbed.

   b. Due to entanglement issues with small animals, use of erosion control blanket shall be limited to biodegradable or "natural net" types, and specifically not allow products containing plastic mesh netting or other plastic components. In the 2018 MnDOT Standards Specifications for Construction, Category

3N or 4N products meet these concerns. The new 2020 Standard Specifications no longer have plastic mesh in *any* temporary rolled product, as plastic mesh has been eliminated from all these categories. Thus all categories of temporary rolled products now meet these concerns. Though be aware that hydro-mulch products may contain small plastic fibers to aid in its matrix strength. These loose fibers could potentially re-suspend and make their way into Public Waters. Please review mulch products and not utilize any materials with plastic fiber additives in areas that drain to Public Waters. In addition, inspectors should be also looking for the presence of turtles when erosion control inspections occur. Further details for turtle protection will be provided by the DNR to the winning bidder and workers on site. Also be aware that hydro-mulch products may contain small plastic fibers to aid in its matrix strength. These loose fibers could potentially re-suspend and make their way into Public Waters. As such, please review mulch products and not allow any materials with plastic fiber additives in areas that drain to Public Waters.

c. The Blanding's Turtle Fact Sheet (state.mn.us) describes the habitat use and life history of this species. The fact sheet also provides two lists of recommendations for avoiding and minimizing impacts to this rare turtle. **Please refer to both lists of recommendations and apply those that are relevant to your project.** Please note the items for road design. These include new curb being a mountable design (Type D, Type R, or Type S) in order to also allow animals to exit the roadway should they attempt to cross the road. On culverts between wetlands and on streams they should be oversized (min 36") to allow them opportunity to utilize these structures for safe passage under the road. If greater protection for turtles is desired, the second list of additional recommendations can also be implemented. The attached flyer should be given to all contractors working in the area.

d. On culverts between wetlands and on streams they should be oversized (minimum 36") and without a safety grate to allow them opportunity to utilize these structures for safe passage under the road. Note that "minimum 36" is a rule of thumb. Arch culverts are preferred over round pipes for critter movement, but safety grates (or large riprap) are an impediment regardless of shape. So a round pipe without grates is better than an arch pipe with grates. A key to animal movement through structure is a clear access and sight line.

e. Peregrine Falcons (*Falco peregrinus*), a state-listed species of special concern, have been documented nesting on Bridge #5060. Please avoid construction during the breeding season (April through July). If construction will take place during this time, the bridge should be inspected for falcon activity prior to the onset of any work activity on the actual structure of the bridge. Please report any nest or other sightings during the breeding season to, DNR Regional Nongame Specialist.

f. The Natural Heritage Information System (NHIS) tracks bat roost trees and hibernacula plus some acoustic data, but this information is not exhaustive. Even if there are no bat records listed below, all seven of Minnesota's bats, including the federally threatened northern long-eared bat (*Myotis septentrionalis*), can be found throughout Minnesota. Tree removal can negatively impact bats by destroying roosting habitat, especially during the pup rearing season when females are forming maternity roosting colonies and the pups cannot yet fly. To minimize these impacts, the DNR recommends that tree removal be avoided during the months of June and July.

The Natural Heritage Information System (NHIS) is not an exhaustive inventory and thus does not represent all of the occurrences of rare features within the state. If information becomes available indicating additional listed species or other rare features, further review may be necessary.

3. The Mississippi River is also a designated State Water Trail. Construction should be aware of this use and plan for recreational use during construction. Should there be impact that will require temporary obstruction of this trail, we can work with MnDOT in alerting the general public during times when conditions are unsafe. Please continue to coordinate with the DNR Parks and Trails Area Supervisor Wade Miller (copied on this email). Should

a temporary occupancy letter be required for 4(f) determination, it should follow the a new outline for 4(f) coordination between DNR and MnDOT.

This ENM has not been circulated to DNR field staff for comment. I will let you know if any additional comments on design requirements are returned to me due to this email.

DNR folks, if I've missed anything, or have any suggestions for MnDOT to consider, please respond to Luke Wehseler, and myself.

Patty Fowler
Transportation Hydrologist (DNR-MnDOT Liaison) | Division of Ecological & Water Resources

Minnesota Department of Natural Resources
Office location: MnDOT Office of Environmental Stewardship
1123 Mesaba Avenue
Duluth MN 55811
Cell Phone: 612-708-7732
Email: patricia.fowler@state.mn.us

DEPARTMENT OF NATURAL RESOURCES

Ben Lodin, PE (MN)

From: Pizza, Andrea (DOT)
Sent: Friday, April 29, 2022 10:06 AM
To: Wehseler, Luke (DOT); Kurth, Andrew (DOT)
Subject: RE: SP 1805-80 (TH 210/Washington Street) in Brainerd ENM

Sure; based on the data we have, the only known historic property along the project corridor is the Brainerd Water Tower (se corner at 6th Street), which is listed in the National Register of Historic Places. Other potential historic properties (unevaluated) may exist, but because the project outside of the roundabouts is essentially replacement in kind, the CRU is limiting the identification of such properties to the vicinity of the roundabouts.

Andrea Pizza
MnDOT Cultural Resources Unit
PLEASE NOTE: I am in the office on a once-per-week basis. If your need for a response regarding a project is urgent, please contact Andrew Kurth at andrew.kurth@state.mn.us.

From: Wehseler, Luke (DOT) <luke.wehseler@state.mn.us>
Sent: Thursday, April 28, 2022 1:19 PM
To: Kurth, Andrew (DOT) <andrew.kurth@state.mn.us>
Cc: Pizza, Andrea (DOT) <andrea.pizza@state.mn.us>
Subject: RE: SP 1805-80 (TH 210/Washington Street) in Brainerd ENM

Thanks! In the meantime, for project understanding and design can you send us a list of properties on this project that are historic.

From: Kurth, Andrew (DOT) <andrew.kurth@state.mn.us>
Sent: Thursday, April 28, 2022 12:38 PM
To: Wehseler, Luke (DOT) <luke.wehseler@state.mn.us>
Cc: Pizza, Andrea (DOT) <andrea.pizza@state.mn.us>
Subject: RE: SP 1805-80 (TH 210/Washington Street) in Brainerd ENM

Hi Luke,

The church has been identified as having potential historic significance; however, we won't know until the evaluation is complete whether it is actually eligible for the National Register. Meaning we don't know if avoidance in needed. If it is found eligible, the evaluation will identify the historic character-defining features of the church property, which will inform what areas of the property need to be avoided or, if they cannot be avoided, how to best mitigate the effects through the design. If it is found not eligible, the church property would not need to be avoided.

If you prefer to proactively adjust the design to avoid direct impacts to the church parcel, that would certainly facilitate a finding of no direct effects if the church is found eligible, however you may want to leave the layout as is and see what changes if any are necessary. In either case, we still need to complete the evaluation to make an assessment of indirect effects under Section 106.

Please let me know if you have any additional questions.

Sincerely,

Andrew Kurth (he/him/his)
T: 612-263-5188
Currently working from home

DEPARTMENT OF TRANSPORTATION

From: Wehseler, Luke (DOT) <luke.wehseler@state.mn.us>
Sent: Thursday, April 28, 2022 7:01 AM
To: Kurth, Andrew (DOT) <andrew.kurth@state.mn.us>; Pizza, Andrea (DOT) <andrea.pizza@state.mn.us>
Subject: RE: SP 1805-80 (TH 210/Washington Street) in Brainerd ENM

Thanks for the update Andrew. We will work with that schedule. Should we be trying to avoid this church and their property with their design?

Thanks,
-Luke

From: Kurth, Andrew (DOT) <andrew.kurth@state.mn.us>
Sent: Wednesday, April 27, 2022 4:04 PM
To: Wehseler, Luke (DOT) <luke.wehseler@state.mn.us>; Pizza, Andrea (DOT) <andrea.pizza@state.mn.us>
Subject: RE: SP 1805-80 (TH 210/Washington Street) in Brainerd ENM

Hi Luke,

We are still in the process of conducting our review. A National Register of Historic Places evaluation is needed for the church as the intersection of TH 210 and 8th Ave NE where the round-a-about is proposed. This work is anticipated to be completed later this summer. Our Unit will provide you with a determination letter once the work is complete.

Sincerely,

Andrew Kurth (he/him/his)
T: 612-263-5188
Currently working from home

DEPARTMENT OF TRANSPORTATION

From: Wehseler, Luke (DOT) <luke.wehseler@state.mn.us>
Sent: Wednesday, April 27, 2022 2:39 PM
To: Pizza, Andrea (DOT) <andrea.pizza@state.mn.us>
Cc: Kurth, Andrew (DOT) <andrew.kurth@state.mn.us>
Subject: RE: SP 1805-80 (TH 210/Washington Street) in Brainerd ENM

Hello Andrea,

Any chance we have the review for this project? We will be wrapping up the environmental portion of this project this summer.

Thanks,
-Luke

From: Wehseler, Luke (DOT)
Sent: Monday, March 14, 2022 9:51 AM
To: Pizza, Andrea (DOT) <andrea.pizza@state.mn.us>
Cc: Kurth, Andrew (DOT) <Andrew.Kurth@state.mn.us>
Subject: RE: SP 1805-80 (TH 210/Washington Street) in Brainerd ENM

Hello Andrea,

Attached is the preliminary layout for the project with the limits. Let me know if you need anything else.

Thanks,
-Luke

From: Pizza, Andrea (DOT) <andrea.pizza@state.mn.us>
Sent: Thursday, February 10, 2022 4:25 PM
To: Wehseler, Luke (DOT) <luke.wehseler@state.mn.us>
Cc: Kurth, Andrew (DOT) <andrew.kurth@state.mn.us>
Subject: RE: SP 1805-80 (TH 210/Washington Street) in Brainerd ENM

Given that there's plenty of time before the letting, it would be ideal to have more finalized limits, especially if they're coming next month. So we'll just make a note that those are pending and keep an eye out for them. Thanks, Luke!

Andrea Pizza
MnDOT Cultural Resources Unit
PLEASE NOTE: I am in the office on a once-per-week basis. If your need for a response regarding a project is urgent, please contact Andrew Kurth at andrew.kurth@state.mn.us.

From: Wehseler, Luke (DOT) <luke.wehseler@state.mn.us>
Sent: Thursday, February 10, 2022 4:21 PM
To: Pizza, Andrea (DOT) <andrea.pizza@state.mn.us>
Cc: Kurth, Andrew (DOT) <andrew.kurth@state.mn.us>
Subject: RE: SP 1805-80 (TH 210/Washington Street) in Brainerd ENM

Hello Andrea,

These limits are very preliminary to give a general idea of impact. Would it be better to have more finalized limits before we send you a kmz or updated layout? We should have a preliminary layout to submit to GDSU in the middle of March.

Thanks,

-Luke

From: Pizza, Andrea (DOT) <andrea.pizza@state.mn.us>
Sent: Thursday, February 10, 2022 3:58 PM
To: Wehseler, Luke (DOT) <luke.wehseler@state.mn.us>
Cc: Kurth, Andrew (DOT) <andrew.kurth@state.mn.us>
Subject: RE: SP 1805-80 (TH 210/Washington Street) in Brainerd ENM

Hi Luke-

The red construction limits seem to get lost (maybe under other layers) in the second page of the layout, and overall it would be easier for us to gauge impacts for this project if we could see the construction limits juxtaposed with the existing conditions present underneath the other layers. Would you be able to provide either a kmz file or a different set of aerial maps showing just the construction limits?

Thank you,
Andrea

Andrea Pizza
MnDOT Cultural Resources Unit
PLEASE NOTE: I am in the office on a once-per-week basis. If your need for a response regarding a project is urgent, please contact Andrew Kurth at andrew.kurth@state.mn.us.

From: Wehseler, Luke (DOT) <luke.wehseler@state.mn.us>
Sent: Saturday, January 29, 2022 11:25 AM
To: Elliott, Lisa (DOT) <lisa.elliott@state.mn.us>; Leete, Peter (DOT) <peter.leete@state.mn.us>; Smith, Christopher E (DOT) <christopher.e.smith@state.mn.us>; Berger, John (DOT) <John.Berger@state.mn.us>; Swanson, Victoria (DOT) <Victoria.Swanson@state.mn.us>; Bottolfson, Harold (DOT) <harold.bottolfson@state.mn.us>; Markeson, Christina (DOT) <tina.markeson@state.mn.us>; Roseen, Melvin (DOT) <melvin.roseen@state.mn.us>; Bistodeau, Lucas (DOT) <lucas.bistodeau@state.mn.us>; Brown, Elizabeth A (DOT) <elizabeth.a.brown@state.mn.us>; Tiedeken, Nicklas (DOT) <nick.tiedeken@state.mn.us>; Zoff, Carol (DOT) <carol.zoff@state.mn.us>; Kurth, Andrew (DOT) <Andrew.Kurth@state.mn.us>; Weber, Andrea (DOT) <Andrea.Weber@state.mn.us>; Slagle, Holly (DOT) <holly.slagle@state.mn.us>; Dallman, Amber (DOT) <amber.dallman@state.mn.us>; Grugel, Todd (DOT) <todd.grugel@state.mn.us>; VanWagner, Richard (DOT) <rick.vanwagner@state.mn.us>; MN_DOT_AviationPlanning <aviationplanning.dot@state.mn.us>; Hicks, Gene (DOT) <gene.hicks@state.mn.us>; Carter, Douglas (DOT) <douglas.carter@state.mn.us>; Pilarski, Paul (DOT) <paul.pilarski@state.mn.us>; Milkert, Anjani (DOT) <minnie.milkert@state.mn.us>
Cc: chiniker <chiniker@sehinc.com>; Ben Lodin <blodin@sambatek.com>; Nelson, Darren (DOT) <darren.nelson@state.mn.us>; Meister, Benjamin (DOT) <benjamin.meister@state.mn.us>; Miller, Robert (DOT) <robert.miller@state.mn.us>; william.lohr@dot.gov; Wasko, Peter (DOT) <peter.wasko@state.mn.us>; Wilcox, Timothy (DOT) <timothy.wilcox@state.mn.us>; Hallgren, James (DOT) <james.hallgren@state.mn.us>
Subject: SP 1805-80 (TH 210/Washington Street) in Brainerd ENM

Hello Everyone,

Attached is an early notification memo for SP 1805-80 which is planned to be constructed in 2025. We are currently developing the preliminary layout (see attached draft) and will look to finalize the environmental document this spring. Please respond by **Friday, February 28th, 2022.** More information can by found in the draft scope at 1-29-22 Draft 1805-80 scoping_report_major_transportation_proj.pdf

Thanks,

Luke Wehseler, PE
District 3 Project Development-State Aid
Project Manager/Consultant Coordinator/
Local Partnership Program (LPP) Manager - LPP
7694 Industrial Park Road
Baxter, MN 56425
Direct (cell): 218-821-0618
mndot.gov/

Ben Lodin, PE (MN)

From: Weber, Andrea (DOT)
Sent: Tuesday, February 22, 2022 11:18 AM
To: Wehseler, Luke (DOT)
Subject: RE: SP 1805-80 (TH 210/Washington Street) in Brainerd ENM

Hi Luke,
In response to ENM SP 1805-80 for Historic Roadside Properties (HRP), there are no known properties that appear to be included in the Right of Way for this project.

Cultural Resources will comment on the Brainerd Water Tower since it is not on MnDOT property.

There are not concerns or comments from HRP. Thanks for the opportunity to review this project.

Thanks,
Andrea

Andrea S. Weber, PLA (she/her)
MnDOT Historic Roadside Properties and Waysides Program Manager |***CELL PHONE: 651-403-3746***
Working remotely, please contact me via email or cell.

From: Wehseler, Luke (DOT) <luke.wehseler@state.mn.us>
Sent: Saturday, January 29, 2022 11:25 AM
To: Elliott, Lisa (DOT) <lisa.elliott@state.mn.us>; Leete, Peter (DOT) <peter.leete@state.mn.us>; Smith, Christopher E (DOT) <christopher.e.smith@state.mn.us>; Berger, John (DOT) <John.Berger@state.mn.us>; Swanson, Victoria (DOT) <Victoria.Swanson@state.mn.us>; Bottolfson, Harold (DOT) <harold.bottolfson@state.mn.us>; Markeson, Christina (DOT) <tina.markeson@state.mn.us>; Roseen, Melvin (DOT) <melvin.roseen@state.mn.us>; Bistodeau, Lucas (DOT) <lucas.bistodeau@state.mn.us>; Brown, Elizabeth A (DOT) <elizabeth.a.brown@state.mn.us>; Tiedeken, Nicklas (DOT) <nick.tiedeken@state.mn.us>; Zoff, Carol (DOT) <carol.zoff@state.mn.us>; Kurth, Andrew (DOT) <andrew.kurth@state.mn.us>; Weber, Andrea (DOT) <andrea.weber@state.mn.us>; Slagle, Holly (DOT) <holly.slagle@state.mn.us>; Dallman, Amber (DOT) <amber.dallman@state.mn.us>; Grugel, Todd (DOT) <todd.grugel@state.mn.us>; VanWagner, Richard (DOT) <rick.vanwagner@state.mn.us>; MN_DOT_AviationPlanning <aviationplanning.dot@state.mn.us>; Hicks, Gene (DOT) <gene.hicks@state.mn.us>; Carter, Douglas (DOT) <douglas.carter@state.mn.us>; Pilarski, Paul (DOT) <paul.pilarski@state.mn.us>; Milkert, Anjani (DOT) <minnie.milkert@state.mn.us>
Cc: chiniker <chiniker@sehinc.com>; Ben Lodin <blodin@sambatek.com>; Nelson, Darren (DOT) <darren.nelson@state.mn.us>; Meister, Benjamin (DOT) <benjamin.meister@state.mn.us>; Miller, Robert (DOT) <robert.miller@state.mn.us>; william.lohr@dot.gov; Wasko, Peter (DOT) <peter.wasko@state.mn.us>; Wilcox, Timothy (DOT) <timothy.wilcox@state.mn.us>; Hallgren, James (DOT) <james.hallgren@state.mn.us>
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Thanks,

Luke Wehseler, PE
District 3 Project Development-State Aid
Project Manager/Consultant Coordinator/
Local Partnership Program (LPP) Manager - LPP
7694 Industrial Park Road
Baxter, MN 56425
Direct (cell): 218-821-0618
mndot.gov/

Ben Lodin, PE (MN)

From: Swanson, Victoria (DOT)
Sent: Thursday, February 3, 2022 12:39 PM
To: Wehseler, Luke (DOT); Miller, Robert (DOT)
Cc: Neisse, Jeffrey (DOT)
Subject: RE: SP 1805-80 (TH 210/Washington Street) in Brainerd ENM

Good morning,

I have reviewed the ENM for SP1805-80 including Bridge 5060. The following Regulated Materials may need special handling:

Treated Wood- This material must be disposed of at an MPCA-permitted mixed municipal solid waste or industrial waste landfill. This material needs documentation showing the landfill received the material. Use Special Provision 2104 Remove and Dispose of Treated Wood.

Potential Asbestos Culverts- if plans indicate any of the culverts are asbestos bonded (AB) or if there are any coatings on the interior or exterior of them, then contact me immediately so I can get a consultant hired to investigate.
Are the pipe/coatings accessible for testing?
Do the (hydraulic) plans identify coatings?
USE Special Provision 2104 Abate Asbestos -Containing Pipes or Culverts

Traffic Signals/Lighting- If any known Transite™ or Asbestos Cement Pipes (ACP) are removed under the signals, please contact me. A MnDOT Pre-Qualified contractor is required to oversee the removal.
The HID bulbs must be recycled with MnDOT's approved regulated waste contractor. This material needs documentation showing the recycler received the material.
The capacitors must be treated as a PCB waste unless it states "No PCBs" on the capacitor. The capacitors must be recycled with MnDOT's approved regulated waste contractor, Green Lights Recycling. This material needs documentation showing the recycler received the material. If the capacitors state "No PCBs", they can recycle or dispose of at an MPCA-permitted sanitary or industrial waste landfill. Documentation should be obtained that shows is was handled properly and that documentation placed in the project pile for future reference.

Electronics-- The construction contractor will need to use a MnDOT Pre-Qualified Asbestos Abatement contractor for the removal. RMU will oversee the removal but the construction contractor must hire the removal contractor. Coordination should be included in the contract to ensure the oversight contractor is on site during removal.

Bridge approach panel- Please note during the removals, there is potential for bit-felt to be found in this area and that could contain asbestos or PCB's. If found, please contact me immediately so I can get an emergency consultant hired to investigate.

MnDOT approved regulated waste contractors can be found at:
http://www.dot.state.mn.us/environment/regulatedmaterials/wastemgmt.html and click on MnDOT Approved Contractors.

Once the work on the Bridge has been established, additional items may need to be addressed. RMU will need to hire a Consultant to perform a complete Bridge Assessment if the Bridge approaches will be disturbed in the Rehab on the Bridge. The Bridge was built in 1932 and had rehab performed in 1984 but there hasn't been an Asbestos/Regulated Assessment done on this Bridge, not listed in eDOCS.

If you have any questions, please contact me.

Thank you

Victoria Swanson

From: Wehseler, Luke (DOT) <luke.wehseler@state.mn.us>
Sent: Saturday, January 29, 2022 11:25 AM
To: Elliott, Lisa (DOT) <lisa.elliott@state.mn.us>; Leete, Peter (DOT) <peter.leete@state.mn.us>; Smith, Christopher E (DOT) <christopher.e.smith@state.mn.us>; Berger, John (DOT) <John.Berger@state.mn.us>; Swanson, Victoria (DOT) <Victoria.Swanson@state.mn.us>; Bottolfson, Harold (DOT) <harold.bottolfson@state.mn.us>; Markeson, Christina (DOT) <tina.markeson@state.mn.us>; Roseen, Melvin (DOT) <melvin.roseen@state.mn.us>; Bistodeau, Lucas (DOT) <lucas.bistodeau@state.mn.us>; Brown, Elizabeth A (DOT) <elizabeth.a.brown@state.mn.us>; Tiedeken, Nicklas (DOT) <nick.tiedeken@state.mn.us>; Zoff, Carol (DOT) <carol.zoff@state.mn.us>; Kurth, Andrew (DOT) <andrew.kurth@state.mn.us>; Weber, Andrea (DOT) <andrea.weber@state.mn.us>; Slagle, Holly (DOT) <holly.slagle@state.mn.us>; Dallman, Amber (DOT) <amber.dallman@state.mn.us>; Grugel, Todd (DOT) <todd.grugel@state.mn.us>; VanWagner, Richard (DOT) <rick.vanwagner@state.mn.us>; MN_DOT_AviationPlanning <aviationplanning.dot@state.mn.us>; Hicks, Gene (DOT) <gene.hicks@state.mn.us>; Carter, Douglas (DOT) <douglas.carter@state.mn.us>; Pilarski, Paul (DOT) <paul.pilarski@state.mn.us>; Milkert, Anjani (DOT) <minnie.milkert@state.mn.us>
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Subject: SP 1805-80 (TH 210/Washington Street) in Brainerd ENM

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Thanks,

Luke Wehseler, PE
District 3 Project Development-State Aid
Project Manager/Consultant Coordinator/
Local Partnership Program (LPP) Manager - LPP
7694 Industrial Park Road
Baxter, MN 56425
Direct (cell): 218-821-0618
mndot.gov/

DEPARTMENT OF TRANSPORTATION

Ben Lodin, PE (MN)

From: Swanson, Victoria (DOT)
Sent: Friday, July 1, 2022 4:11 PM
To: Wehseler, Luke (DOT)
Cc: Klein, Jacqueline (DOT)
Subject: BRIDGE 5060 Asbestos & Regulated Waste Assessment Report
Attachments: Bridge 5060 Asbestos & Regulated Waste Assessment 6.27.2022.pdf

Good afternoon Luke,

Please see attached assessment report for Bridge 5060. Twenty six asbestos samples were taken from the Bridge abutments, approaches, deck, guardrails, piers, superstructure and wing walls. They also sampled and analyzed from the utility conduits including electrical lines and domestic waster lines.

No asbestos was found.

They also assessed for possible PCBs(bituminous felt from the concrete seam and curb on the center median. None were identified.
Mercury- None
Lead- None
Treated Wood-None
Sheet Lead Plates-None
LED-6 street lights on N & S sidewalks. If these will be replaced, manage disposal properly.
Hazardous Waste-None

I have uploaded this report to eDOCS today-#19192577.

The Bridge is clear for your work.

Thank you

Regards

Victoria Swanson

Asbestos and Regulated Waste Assessment Report

Bridge #5060

MN 210 over the Mississippi River

Brainerd, Minnesota

SP 1805-80

Prepared for:

Minnesota Department of Transportation
Office of Environmental Stewardship
395 John Ireland Boulevard, M.S. 620
St. Paul, Minnesota 55155

Prepared by:

Groundwater and Environmental Services, Inc.
1301 Corporate Center Drive, Suite 190
Eagan, Minnesota 55121
800-735-1077

June 27, 2022

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Section 2 – Summary of Actions Required For This Demolition

Section 3 – Summary of All Asbestos and Regulated Wastes

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Appendix I – Chain-of-Custody Forms and Analytical Results

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Structure Inventory Report
Site Photographs

Appendix III – Licenses and Accreditations

Section 1: Site Specifics and Certification

Bridge #5060

SP: 1805-80.

Location: MN 210 over the Mississippi River, Minnesota (see copy of site map in **Appendix II**).

Number and Type of Structure/s: One structure, Bridge #5060**.**

Current Owner: Minnesota Department of Transportation (MnDOT).

Expected Disposition of the Structure: Demolition/Renovation.

Licensure: MDH-certified asbestos inspectors conducted the assessment (**Appendix III**).

Certification: The undersigned certifies that this asbestos assessment was performed in compliance with MN Rules 4620.3460.

Signature: _____ Date: 6/27/2022
Nicholas Schlagel, Asbestos Inspector #AI12854

Signature: _____ Date: 6/27/2022
Robert E. Jenson, MDH Building Inspection #AI3648

Certification: The undersigned certifies that this asbestos and regulated waste assessment and report was performed under my direct supervision and I have reviewed its contents and find it to meet or exceed MnDOT's contract requirements.

Signature: _____ Date: 6/27/2022
Robert E. Jenson, CHMM #11334

Section 2: Summary of Actions Required for this Demolition

Bridge #5060

Review Bridge Drawings: Review Bridge Drawings: GES reviewed the following MnDOT construction drawings:

- 1931 Construction Drawings
- 1973 Reconstruction Drawings
- 1984 Reconstruction Drawings
- Bridge Inventory and Inspection Report (2/25/2022)

The bridge inventory report is included in **Appendix II**.

Asbestos Summary: The bridge was inspected for asbestos in preparation for demolition/rehabilitation. A total of 26 samples were collected from materials suspect for containing asbestos. The laboratory identified no materials containing asbestos. (**See Section 3**). Chain-of-custody forms and laboratory analytical reports are provided in **Appendix I**.

The following locations were inspected for asbestos-containing materials:

- The bridge abutments, approaches, deck, guardrails, piers, superstructure and wing walls.
- Utility conduits, including electrical lines and domestic water lines.
- East abutment cavity (non-permit required confined space)

In addition to regulated waste, a cursory assessment was conducted at the bridge for the presence of bats including signs of bat droppings, urine staining and chirping noises. A bat was seen under the bridge while accessing the east abutment cavity.

Regulated Waste Summary: The following regulated waste was found on the bridge or along the roadway immediately before and after the bridge. The following waste is required to be removed before demolition (See attached documents in **Section 3** for the detailed inventory of all regulated wastes):

PCBs: *Bituminous Felt* – None identified. Samples were collected from bituminous felt (PCB-1 and PCB-2) and analyzed for PCB content. The samples were collected from concrete seam at the south sidewalk and the curb on the center median. Laboratory analysis indicates that the samples did not contain detectable concentrations of PCBs. Laboratory Reports are provided in **Appendix I**.

Caulk – None.

Waterproofing – None identified.

Ballasts – None.

Capacitors – None.

Mercury: *HID Lamp Fixtures - None*.

CFCs: *Fire Extinguishers* – None.

Lead: *Lead-Based Paint* – None.

Sheet Lead Plates – None.

LED Lamp Fixtures – 6 street lights (North and South sidewalks).

Printed Circuit Boards – Electrical Equipment (East abutment cavity).

Treated Wood: *Treated Wood* – None Identified.

Treated Wood – None Identified.

Hazardous/ Regulated Waste: *Hazardous and Regulated Wastes* – None.

Solid Waste: *Municipal Solid Waste* – 55-gallon oil drum (empty) – (East abutment cavity).

Other: *Tires* – None.

Section 3: Summary of all Asbestos and Regulated Wastes

Bridge #5060

The following asbestos and regulated materials/wastes must be removed prior to rehabilitation/demolition:

SP: 1805-80
Parcel Number: Not Applicable
Location: MN 210 over the Mississippi River
Assessment Date(s): 5/11/2022 and 6/10/2022

Category I and II Non-friable Asbestos					
Location	Sample Description	% Asbestos	Quantity (ft^2)	Condition	Sample #
	None Identified				

Total Square Feet = **0 SF**

Friable Asbestos					
Location	Sample Description	% Asbestos	Quantity (ft^2)	Condition	Sample #
	None Identified				

Total Square Feet = **0 SF**

MnDOT Building Regulated Waste Assessment Form
One Form Per Structure

MnDOT District	3
State Project Number	1805-80
Parcel Number	Not Applicable
Structure Name	Bridge #5060
Address of Structure	MN 210 over the Mississippi River
Assessment Date	5/11/2022 and 6/10/2022

Inspected Items	Item	Quantity	Location
	(If none found, state "none")		
PCB			
PCB Bituminous Felt / Caulk (<50 ppm)		None	
PCB Bituminous Felt / Caulk (>50 ppm)		None	
Three-Ply Waterproofing		None	
Ballasts		None	
Capacitors		None	
Mercury			
HID Lamp Fixtures		None	
CFC			
Fire Extinguisher		None	
Lead			
Lead Paint System		None	
% Peeling Paint (lead-based)		None	
% Peeling Paint (non lead-based)		None	
Sheet Lead Plates		None	
LED Lamp Fixtures	Street Lamp Fixtures	6	North & South Sidewalks
Printed Circuit Board	Electrical Equipment	1	East Abutment Cavity
Treated Wood			
CCA (green-treat)		None	
Creosote-Treated		None	
Hazardous/Regulated Wastes			
Oil		None	
Solid Wastes			
Municipal Solid Waste (MSW)	55-gallon Oil Drum (empty)	1	East Abutment Cavity
Other			
Tires		None	

Appendix I

Bridge #5060
MN 210 over the Mississippi River
Brainerd, Minnesota

Chain-of-Custody Forms and Analytical Results

Asbestos Bulk Sample Analytical Results

eurofins | Built Environment Reservoirs

June 16, 2022

Subcontractor Number:
Laboratory Report: **RES 527902-1**
Project #/P.O. #: **3502315.50.871**
Project Description: **MnDOT BR 5060, Brainerd**

Rob Jenson
GES, Inc.
1301 Corporate Center Dr. Ste. 190
Eagan MN 55121

Dear Rob,

Eurofins Reservoirs is an analytical laboratory accredited for the analysis of Industrial Hygiene and Environmental matrices by the National Voluntary Laboratory Accreditation Program (NVLAP), Lab Code 101896-0 for Transmission Electron Microscopy (TEM) and Polarized Light Microscopy (PLM) analysis and the American Industrial Hygiene Association (AIHA LAP, LLC), Lab ID 101533 for Phase Contrast Microscopy (PCM) analysis. This laboratory is currently proficient in both Proficiency Testing and PAT programs respectively.

Eurofins Reservoirs has analyzed the following samples for asbestos content as per your request. The analysis has been completed in general accordance with the appropriate methodology as stated in the attached analysis table. The results have been submitted to your office.

RES 527902-1 is the job number assigned to this study. This report is considered highly confidential and the sole property of the customer. Eurofins Reservoirs will not discuss any part of this study with personnel other than those of the client. The results described in this report only apply to the samples analyzed, as received by the customer. This report must not be used to claim endorsement of products or analytical results by NVLAP or any agency of the U.S. Government. This report shall not be reproduced except in full, without written approval from Eurofins Reservoirs Samples will be disposed of after sixty days unless longer storage is requested. If you have any questions about this report, please feel free to call 303-964-1986.

Sincerely,

by Stephanie Schindler

Jeanne Spencer
President

DATA QA
06/16/2022

EUROFINS RESERVOIRS ENVIRONMENTAL, INC

NVLAP Lab Code 101896-0
AIHA LAP, LLC. LAB ID 101533

TABLE: I ANALYSIS: PLM BULK ANALYSIS, PERCENTAGE COMPOSITION BY VOLUME

RES Job Number: **RES 527902-1**
Client: **GES, Inc.**
Client Project/P.O.: **3502315.50.871**
Client Project Description: **MnDOT BR 5060, Brainerd**
Date Samples Received: **June 15, 2022**
Analysis Type: **EPA 600/R-93/116 - Short Report, Bulk**
Turnaround: **Standard**
Date Samples Analyzed: **June 16, 2022**

NA = Not Analyzed
NR = Not Received
ND = None Detected
TR = Trace; <1 % Visual Estimate
Trem-Act = Tremolite-Actinolite

Laboratory Sample ID / Client Sample Number	LAYER	Physical Description	Sub Part (%)	Asbestos Content: Mineral	Asbestos Content: Visual Estimate (%)	Non-Asbestos Fibrous Components (%)	Non-Fibrous Components (%)
527902 - 1	A	Gray granular material w/ beige paint	100		ND	0	100
527902 - 2	A	Orange resinous material	100		ND	0	100
527902 - 3	A	Orange resinous material	100		ND	0	100
527902 - 4	A	Gray granular resinous material	35		ND	0	100
	B	Orange resinous material	65		ND	0	100
527902 - 5	A	Gray granular material w/ gray paint	100		ND	0	100
527902 - 6	A	Gray granular resinous material	5		ND	0	100
	B	Dark brown fibrous material	95		ND	95	5
527902 - 7	A	Gray granular material w/ gray paint	100		ND	0	100
527902 - 8	A	Black tar w/ gray resinous material	100		ND	0	100
527902 - 9	A	Orange resinous material	100		ND	0	100
527902 - 10	A	Brown fibrous material w/ black tar	100		ND	85	15
527902 - 11	A	Black resinous material w/ brown debris	100		ND	0	100
527902 - 12	A	Black tar	100		ND	0	100
527902 - 13	A	Black tar	100		ND	0	100
527902 - 14	A	Black tar	100		ND	0	100

TEM Analysis recommended for organically bound material (i.e. floor tile) if PLM results are <1%.

EUROFINS RESERVOIRS ENVIRONMENTAL, INC

NVLAP Lab Code 101896-0
AIHA LAP, LLC. LAB ID 101533

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Turnaround: **Standard**
Date Samples Analyzed: **June 16, 2022**

NA = Not Analyzed
NR = Not Received
ND = None Detected
TR = Trace; <1 % Visual Estimate
Trem-Act = Tremolite-Actinolite

Laboratory Sample ID / Client Sample Number	LAYER	Physical Description	Sub Part (%)	Asbestos Content: Mineral	Asbestos Content: Visual Estimate (%)	Non-Asbestos Fibrous Components (%)	Non-Fibrous Components (%)
527902 - 15	A	Yellow foam	100		ND	0	100
527902 - 16	A	Brown insulation w/ black tar	100		ND	80	20
527902 - 17	A	Brown insulation	100		ND	95	5
527902 - 18	A	Brown insulation	100		ND	95	5
527902 - 19	A	Black fibrous tar	100		ND	20	80
527902 - 20	A	Tan paper w/ black resinous material	100		ND	95	5
527902 - 21	A	Tan paper w/ black resinous material	45		ND	95	5
	B	Brown insulation w/ black tar	55		ND	90	10
527902 - 22	A	Black tar paper w/ orange debris	100		ND	80	20
527902 - 23	A	Black tar paper w/ orange debris	100		ND	80	20
527902 - 24	A	Black tar paper w/ orange debris	100		ND	80	20
527902 - 25	A	Black tar	100		ND	0	100
527902 - 26	A	Black tar	100		ND	0	100

TEM Analysis recommended for organically bound material (i.e. floor tile) if PLM results are <1%.

Stephanie Schindler
Stephanie Schindler
Analyst

eurofins | Built Environment Reservoirs

RES Job #: 527902

SUBMITTED BY		INVOICE TO		CONTACT INFORMATION		SERIES
Company:	GES, Inc.	Company:	GES, Inc.	Contact:	Rob Jenson	-1 PLM Standard
Address:	1301 Corporate Center Dr. Ste. 190	Address:	1301 Corporate Center Dr. Ste. 190	Phone:	(651) 238-5540	
				Fax:	(651) 405-1036	
	Eagan, MN 55121		Eagan, MN 55121	Cell:		
Project Number and/or P.O. #:	3502315.50.871			Final Data Deliverable Email Address:		
Project Description/Location:	MnDOT BR 5060, Brainerd			rjenson@gesonline.com (+ 2 ADDNL. CONTACTS)		

ASBESTOS LABORATORY HOURS: Weekdays: 7am - 7pm & Sat. 8am - 5pm

PLM / PCM / TEM DTL RUSH PRIORITY STANDARD

CHEMISTRY LABORATORY HOURS: Weekdays: 8am - 5pm

Dust RUSH PRIORITY STANDARD

Metals RUSH PRIORITY STANDARD

*PRIOR NOTICE REQUIRED FOR SAME DAY TAT

Organics* SAME DAY RUSH PRIORITY STANDARD

MICROBIOLOGY LABORATORY HOURS: Weekdays: 8am - 5pm

Viable Analysis** PRIORITY STANDARD

**TAT DEPENDENT ON SPEED OF MICROBIAL GROWTH

Medical Device Analysis RUSH STANDARD

Mold Analysis RUSH PRIORITY STANDARD

****Turnaround times establish a laboratory priority, subject to laboratory volume and are not guaranteed. Additional fees apply for afterhours, weekends and holidays.****

Special Instructions:

VALID MATRIX CODES

Air = A	Bulk = B
Dust = D	Food = F
Paint = P	Soil = S
Surface = SU	Swab = SW
Tape = T	Wipe = W
Drinking Water = DW	
Waste Water = WW	
ASTM E1792 approved wipe media only	

REQUESTED ANALYSIS

- **PLM** - PLM Short Report (EPA/600/R-93/116)
- **TEM** - AHERA (+/- or Quantified), Microvac (+/- or Quantified), Wipe (+/- or Quantified), NIOSH 7402, Yamate Level II, ISO 10312, ISO 13794, Chatfield, Drinking Water, Waste Water, Bulk +/-, CARB Modified Ahera
- **PCM** - 7400A, 7400B, OSHA
- **DUST** - Total, Respirable
- **METALS** - Analyte(s) Lead Only (7082, 7420, Waste Water, Foodware), Multi Metals (7303,6020A, 200.8, Waste Water, Foodware, OSHA ID-125G), pH (Liquid or Non-Liquid), TCLP, RCRA 8 Scan, Welding Fume Scan, Full Metals Scan
- **ORGANICS** - Methamphetamine, TSS
- **VIABLES** - Campylobacter, Bacillus, Salmonella (Culturable or 1-2), Listeria, E.coli O157:H7, E.coli/Coliforms - Plated, S.aureus, Yeast & Mol, Aerobic Plate Count, Coliforms/E.coli - (State Water, Drinking Water, Non-Drinking Water, +/-, Quantification), Lactic Acid, Viable Microbial Count (wo/ID or w/ID), Enterococcus (+/- or Quantification), Legionella (P, NP, C)
- **MEDICAL** - Bioburden, LAL
- **MOLD** - Spore Trap, Bulk Mold, Particulate Identification

Client Sample ID Number (Sample ID's must be unique)	ASBESTOS			CHEMISTRY			MICROBIOLOGY			Sample Volume (L) / Area	Length(or Aliquots) x Width(or Area per Aliquot)	Matrix Code	# of Containers	Date Collected mm/dd/yy	Time Collected hh:mm	Laboratory Analysis Instructions
1 1	X											B	1	05/10/22		
2 2	X											B	1	05/10/22		
3 3	X											B	1	05/10/22		
4 4	X											B	1	05/10/22		
5 5	X											B	1	05/10/22		
6 6	X											B	1	05/10/22		
7 7	X											B	1	05/10/22		
8 8	X											B	1	05/10/22		
9 9	X											B	1	06/08/22		
10 10	X											B	1	05/10/22		
11 11	X											B	1	05/10/22		
12 12	X											B	1	06/08/22		
13 13	X											B	1	06/08/22		

EREI establishes a unique Lab Sample ID, for each sample, by preceding each unique Client Sample ID with the laboratory RES Job Number.
EREI will analyze incoming samples based on information received and will not be responsible for errors or omissions in calculations resulting from the inaccuracy of original data. By signing, client/company representative agrees that submission of the following samples for requested analysis as indicated on this Chain of Custody shall consitute an analytical services agreement with payment terms of NET 30 days. Failure to comply with payment terms may result in a 1.5% monthly interest surcharge.

Relinquished By:	Rob Jenson	Date/Time: 06/13/2022 8:05:20	Sample Condition: Acceptable
Received By:	Jessica Shapiro	Date/Time: 06/15/2022 10:10:59	Carrier: Fed-Ex

eurofins | Built Environment Reservoirs

Res Job#: **527902**

Submitted By: **GES, Inc.**

REQUESTED ANALYSIS

VALID MATRIX CODES

Air = A | Bulk = B
Dust = D | Food = F
Paint = P | Soil = S
Surface = SU | Swab = SW
Tape = T | Wipe = W
Drinking Water = DW
Waste Water = WW
ASTM E1792 approved wipe media only

Client Sample ID Number (Sample ID's must be unique)	**PLM - PLM Short Report (EPA/600/R-93/116)**	**TEM** - AHERA (+/- or Quantified), Microvac (+/- or Quantified), Wipe (+/- or Quantified), NIOSH 7402, Yamate Level II, ISO 10312, ISO 13794, Chatfield, Drinking Water, Waste Water, Bulk +/-, CARB Modified Ahera	**PCM** - 7400A, 7400B, OSHA	**DUST** - Total, Respirable	**METALS** - Analyte(s) Lead Only (7082, 7420), Waste Water, Foodware), Multi Metals (7303,6020A, 200.8, Waste Water, Foodware, OSHA ID-125G), pH (Liquid or Non-Liquid), TCLP, RCRA 8 Scan, Welding Fume Scan, Full Metals Scan	**ORGANICS** - Methamphetamine, TSS	**VIABLES** - Campylobacter, Bacillus, Salmonella (Culturable or 1-2), Listeria, E.coli O157:H7, E.coli/Coliforms - Plated, S.aureus, Yeast & Mol, Aerobic Plate Count, Coliforms/E.coli - (State Water, Drinking Water, Non-Drinking Water, +/- Quantification), Lactic Acid, Viable Microbial Count (wo/ID or w/ID), Enterococcus (+/- or Quantification), Legionella (P, NP, C)	**MEDICAL** - Bioburden, LAL	**MOLD** - Spore Trap, Bulk Mold, Particulate Identification	Sample Volume (L) / Area	Length(or Aliquots) x Width(or Area per Aliquot)	Matrix Code	# of Containers	Date Collected mm/dd/yy	Time Collected hh:mm	**Laboratory Analysis Instructions**
	ASBESTOS			**CHEMISTRY**			**MICROBIOLOGY**									
14 14	X											B	1	06/08/22		
15 15	X											B	1	06/08/22		
16 16	X											B	1	06/08/22		
17 17	X											B	1	06/08/22		
18 18	X											B	1	06/08/22		
19 19	X											B	1	06/08/22		
20 20	X											B	1	06/08/22		
21 21	X											B	1	06/08/22		
22 22	X											B	1	06/08/22		
23 23	X											B	1	06/08/22		
24 24	X											B	1	06/08/22		
25 25	X											B	1	06/08/22		
26 26	X											B	1	06/08/22		

GES, Inc. Sample Notes

RES #: 527902
Project Number and/or P.O. #: 3502315.50.871
Project Description/Location:
MnDOT BR 5060, Brainerd

Client Sample ID	Sample Note	Quantity	Sampler(s)
1	Concrete Spray	1	REJ
2	Epoxy	1	REJ
3	Epoxy	1	REJ
4	Seam Tar	1	REJ
5	Concrete Spray	1	REJ
6	Bituminous Felt	1	REJ
7	Concrete Spray	1	REJ
8	Bituminous Felt	1	REJ
9	Epoxy	1	REJ
10	Bituminous Felt	1	REJ
11	Gland	1	REJ
12	Water Proofing	1	REJ
13	Water Proofing	1	REJ
14	Water Proofing	1	REJ
15	Pipe Insulation	1	REJ
16	Pipe Insulation	1	REJ
17	Pipe Insulation	1	REJ
18	Pipe Insulation	1	REJ
19	Paper Insulation Upper Layer	1	REJ
20	Paper Insulation Upper Layer	1	REJ
21	Paper Insulation Upper Layer	1	REJ
22	Tar Paper Insulation Bottom Layer	1	REJ
23	Tar Paper Insulation Bottom Layer	1	REJ
24	Tar Paper Insulation Bottom Layer	1	REJ
25	Seam Tar	1	REJ
26	Seam Tar	1	REJ

PCB Bulk Sample Analytical Results

Pace Analytical Services, LLC
1700 Elm Street
Minneapolis, MN 55414
(612)607-1700

May 25, 2022

Rob Jenson
Groundwater and Environmental Services, Inc.
1301 Corporate Center Dr
Suite 190
Eagan, MN 55121

RE: Project: 3502315.50.871
Pace Project No.: 10608751

Dear Rob Jenson:

Enclosed are the analytical results for sample(s) received by the laboratory on May 17, 2022. The results relate only to the samples included in this report. Results reported herein conform to the applicable TNI/NELAC Standards and the laboratory's Quality Manual, where applicable, unless otherwise noted in the body of the report.

The test results provided in this final report were generated by each of the following laboratories within the Pace Network:

- Pace Analytical Services - Minneapolis

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Bryan Nguyen

Bryan Nguyen
bryan.nguyen@pacelabs.com
612-656-2286
Project Manager

Enclosures

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Pace Analytical Services, LLC
1700 Elm Street
Minneapolis, MN 55414
(612)607-1700

CERTIFICATIONS

Project: 3502315.50.871
Pace Project No.: 10608751

Pace Analytical Services, LLC - Minneapolis MN

1700 Elm Street SE, Minneapolis, MN 55414
1800 Elm Street SE, Minneapolis, MN 55414--Satellite Air Lab
A2LA Certification #: 2926.01*
Alabama Certification #: 40770
Alaska Contaminated Sites Certification #: 17-009*
Alaska DW Certification #: MN00064
Arizona Certification #: AZ0014*
Arkansas DW Certification #: MN00064
Arkansas WW Certification #: 88-0680
California Certification #: 2929
Colorado Certification #: MN00064
Connecticut Certification #: PH-0256
EPA Region 8 Tribal Water Systems+Wyoming DW Certification #: via MN 027-053-137
Florida Certification #: E87605*
Georgia Certification #: 959
Hawaii Certification #: MN00064
Idaho Certification #: MN00064
Illinois Certification #: 200011
Indiana Certification #: C-MN-01
Iowa Certification #: 368
Kansas Certification #: E-10167
Kentucky DW Certification #: 90062
Kentucky WW Certification #: 90062
Louisiana DEQ Certification #: AI-03086*
Louisiana DW Certification #: MN00064
Maine Certification #: MN00064*
Maryland Certification #: 322
Michigan Certification #: 9909
Minnesota Certification #: 027-053-137*
Minnesota Dept of Ag Approval: via MN 027-053-137
Minnesota Petrofund Registration #: 1240*
Mississippi Certification #: MN00064
Missouri Certification #: 10100
Montana Certification #: CERT0092
Nebraska Certification #: NE-OS-18-06
Nevada Certification #: MN00064
New Hampshire Certification #: 2081*
New Jersey Certification #: MN002
New York Certification #: 11647*
North Carolina DW Certification #: 27700
North Carolina WW Certification #: 530
North Dakota Certification (A2LA) #: R-036
North Dakota Certification (MN) #: R-036
Ohio DW Certification #: 41244
Ohio VAP Certification (1700) #: CL101
Ohio VAP Certification (1800) #: CL110*
Oklahoma Certification #: 9507*
Oregon Primary Certification #: MN300001
Oregon Secondary Certification #: MN200001*
Pennsylvania Certification #: 68-00563*
Puerto Rico Certification #: MN00064
South Carolina Certification #:74003001
Tennessee Certification #: TN02818
Texas Certification #: T104704192*
Utah Certification #: MN00064*
Vermont Certification #: VT-027053137
Virginia Certification #: 460163*
Washington Certification #: C486*
West Virginia DEP Certification #: 382
West Virginia DW Certification #: 9952 C
Wisconsin Certification #: 999407970
Wyoming UST Certification #: via A2LA 2926.01
USDA Permit #: P330-19-00208
*Please Note: Applicable air certifications are denoted with an asterisk (*).

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Pace Analytical Services, LLC
1700 Elm Street
Minneapolis, MN 55414
(612)607-1700

SAMPLE SUMMARY

Project: 3502315.50.871
Pace Project No.: 10608751

Lab ID	Sample ID	Matrix	Date Collected	Date Received
10608751001	**PCB-1**	Solid	05/11/22 08:30	05/17/22 16:55
10608751002	**PCB-2**	Solid	05/11/22 08:40	05/17/22 16:55

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SAMPLE ANALYTE COUNT

Project: 3502315.50.871
Pace Project No.: 10608751

Lab ID	Sample ID	Method	Analysts	Analytes Reported
10608751001	**PCB-1**	EPA 8082A	RAG	9
10608751002	**PCB-2**	EPA 8082A	RAG	9

PASI-M = Pace Analytical Services - Minneapolis

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ANALYTICAL RESULTS

Project: 3502315.50.871
Pace Project No.: 10608751

Sample: PCB-1 **Lab ID: 10608751001** Collected: 05/11/22 08:30 Received: 05/17/22 16:55 Matrix: Solid

Results reported on a "wet-weight" basis

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8082A GCS PCB	Analytical Method: EPA 8082A Preparation Method: EPA 3546							
	Pace Analytical Services - Minneapolis							
PCB-1016 (Aroclor 1016)	ND	ug/kg	201	1	05/18/22 16:25	05/19/22 22:55	12674-11-2	
PCB-1221 (Aroclor 1221)	ND	ug/kg	201	1	05/18/22 16:25	05/19/22 22:55	11104-28-2	
PCB-1232 (Aroclor 1232)	ND	ug/kg	201	1	05/18/22 16:25	05/19/22 22:55	11141-16-5	
PCB-1242 (Aroclor 1242)	ND	ug/kg	201	1	05/18/22 16:25	05/19/22 22:55	53469-21-9	
PCB-1248 (Aroclor 1248)	ND	ug/kg	201	1	05/18/22 16:25	05/19/22 22:55	12672-29-6	
PCB-1254 (Aroclor 1254)	ND	ug/kg	201	1	05/18/22 16:25	05/19/22 22:55	11097-69-1	
PCB-1260 (Aroclor 1260)	ND	ug/kg	201	1	05/18/22 16:25	05/19/22 22:55	11096-82-5	
Surrogates								
Tetrachloro-m-xylene (S)	86	%.	53-125	1	05/18/22 16:25	05/19/22 22:55	877-09-8	P1
Decachlorobiphenyl (S)	58	%.	41-125	1	05/18/22 16:25	05/19/22 22:55	2051-24-3	CL

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1700 Elm Street
Minneapolis, MN 55414
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ANALYTICAL RESULTS

Project: 3502315.50.871
Pace Project No.: 10608751

Sample: PCB-2 **Lab ID: 10608751002** Collected: 05/11/22 08:40 Received: 05/17/22 16:55 Matrix: Solid

Results reported on a "wet-weight" basis

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8082A GCS PCB	Analytical Method: EPA 8082A Preparation Method: EPA 3546							
	Pace Analytical Services - Minneapolis							
PCB-1016 (Aroclor 1016)	ND	ug/kg	269	1	05/23/22 11:11	05/24/22 11:30	12674-11-2	
PCB-1221 (Aroclor 1221)	ND	ug/kg	269	1	05/23/22 11:11	05/24/22 11:30	11104-28-2	
PCB-1232 (Aroclor 1232)	ND	ug/kg	269	1	05/23/22 11:11	05/24/22 11:30	11141-16-5	
PCB-1242 (Aroclor 1242)	ND	ug/kg	269	1	05/23/22 11:11	05/24/22 11:30	53469-21-9	
PCB-1248 (Aroclor 1248)	ND	ug/kg	269	1	05/23/22 11:11	05/24/22 11:30	12672-29-6	
PCB-1254 (Aroclor 1254)	ND	ug/kg	269	1	05/23/22 11:11	05/24/22 11:30	11097-69-1	
PCB-1260 (Aroclor 1260)	ND	ug/kg	269	1	05/23/22 11:11	05/24/22 11:30	11096-82-5	
Surrogates								
Tetrachloro-m-xylene (S)	55	%.	53-125	1	05/23/22 11:11	05/24/22 11:30	877-09-8	P1
Decachlorobiphenyl (S)	46	%.	41-125	1	05/23/22 11:11	05/24/22 11:30	2051-24-3	CL

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Pace Analytical Services, LLC
1700 Elm Street
Minneapolis, MN 55414
(612)607-1700

QUALITY CONTROL DATA

Project: 3502315.50.871
Pace Project No.: 10608751

QC Batch: 816148
QC Batch Method: EPA 3546
Analysis Method: EPA 8082A
Analysis Description: 8082A GCS PCB
Laboratory: Pace Analytical Services - Minneapolis
Associated Lab Samples: 10608751001

METHOD BLANK: 4325812 Matrix: Solid
Associated Lab Samples: 10608751001

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
PCB-1016 (Aroclor 1016)	ug/kg	ND	50.0	05/19/22 21:36	
PCB-1221 (Aroclor 1221)	ug/kg	ND	50.0	05/19/22 21:36	
PCB-1232 (Aroclor 1232)	ug/kg	ND	50.0	05/19/22 21:36	
PCB-1242 (Aroclor 1242)	ug/kg	ND	50.0	05/19/22 21:36	
PCB-1248 (Aroclor 1248)	ug/kg	ND	50.0	05/19/22 21:36	
PCB-1254 (Aroclor 1254)	ug/kg	ND	50.0	05/19/22 21:36	
PCB-1260 (Aroclor 1260)	ug/kg	ND	50.0	05/19/22 21:36	
Decachlorobiphenyl (S)	%.	93	41-125	05/19/22 21:36	CL
Tetrachloro-m-xylene (S)	%.	91	53-125	05/19/22 21:36	

LABORATORY CONTROL SAMPLE: 4325813

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
PCB-1016 (Aroclor 1016)	ug/kg	1000	980	98	68-125	
PCB-1260 (Aroclor 1260)	ug/kg	1000	980	98	70-125	
Decachlorobiphenyl (S)	%.			92	41-125	CL
Tetrachloro-m-xylene (S)	%.			91	53-125	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 4325814 4325815

Parameter	Units	10608316001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
PCB-1016 (Aroclor 1016)	ug/kg	ND	1240	1260	753	856	61	68	53-125	13	30	
PCB-1260 (Aroclor 1260)	ug/kg	ND	1240	1260	653	724	52	58	30-143	10	30	
Decachlorobiphenyl (S)	%.						51	58	41-125			CL
Tetrachloro-m-xylene (S)	%.						54	64	53-125			

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

REPORT OF LABORATORY ANALYSIS

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Minneapolis, MN 55414
(612)607-1700

QUALITY CONTROL DATA

Project: 3502315.50.871
Pace Project No.: 10608751

QC Batch: 816957
QC Batch Method: EPA 3546
Analysis Method: EPA 8082A
Analysis Description: 8082A GCS PCB
Laboratory: Pace Analytical Services - Minneapolis
Associated Lab Samples: 10608751002

METHOD BLANK: 4329950 Matrix: Solid
Associated Lab Samples: 10608751002

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
PCB-1016 (Aroclor 1016)	ug/kg	ND	50.0	05/24/22 09:40	
PCB-1221 (Aroclor 1221)	ug/kg	ND	50.0	05/24/22 09:40	
PCB-1232 (Aroclor 1232)	ug/kg	ND	50.0	05/24/22 09:40	
PCB-1242 (Aroclor 1242)	ug/kg	ND	50.0	05/24/22 09:40	
PCB-1248 (Aroclor 1248)	ug/kg	ND	50.0	05/24/22 09:40	
PCB-1254 (Aroclor 1254)	ug/kg	ND	50.0	05/24/22 09:40	
PCB-1260 (Aroclor 1260)	ug/kg	ND	50.0	05/24/22 09:40	
Decachlorobiphenyl (S)	%.	80	41-125	05/24/22 09:40	CL
Tetrachloro-m-xylene (S)	%.	75	53-125	05/24/22 09:40	

LABORATORY CONTROL SAMPLE: 4329951

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
PCB-1016 (Aroclor 1016)	ug/kg	1000	815	81	68-125	
PCB-1260 (Aroclor 1260)	ug/kg	1000	806	81	70-125	
Decachlorobiphenyl (S)	%.			80	41-125	CL
Tetrachloro-m-xylene (S)	%.			78	53-125	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 4329952 4329953

Parameter	Units	10609169001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
PCB-1016 (Aroclor 1016)	ug/kg	ND	1050	1050	837	858	80	82	53-125	2	30	
PCB-1260 (Aroclor 1260)	ug/kg	ND	1050	1050	797	799	76	76	30-143	0	30	
Decachlorobiphenyl (S)	%.						70	72	41-125			CL
Tetrachloro-m-xylene (S)	%.						80	84	53-125			

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REPORT OF LABORATORY ANALYSIS

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1700 Elm Street
Minneapolis, MN 55414
(612)607-1700

QUALIFIERS

Project: 3502315.50.871
Pace Project No.: 10608751

DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to dilution of the sample aliquot.

ND - Not Detected at or above adjusted reporting limit.

TNTC - Too Numerous To Count

J - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.

MDL - Adjusted Method Detection Limit.

PQL - Practical Quantitation Limit.

RL - Reporting Limit - The lowest concentration value that meets project requirements for quantitative data with known precision and bias for a specific analyte in a specific matrix.

S - Surrogate

1,2-Diphenylhydrazine decomposes to and cannot be separated from Azobenzene using Method 8270. The result for each analyte is a combined concentration.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

U - Indicates the compound was analyzed for, but not detected.

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

Reported results are not rounded until the final step prior to reporting. Therefore, calculated parameters that are typically reported as "Total" may vary slightly from the sum of the reported component parameters.

Pace Analytical is TNI accredited. Contact your Pace PM for the current list of accredited analytes.

TNI - The NELAC Institute.

ANALYTE QUALIFIERS

CL	The continuing calibration for this compound is outside of Pace Analytical acceptance limits. The results may be biased low.
P1	Routine initial sample volume or weight was not used for extraction, resulting in elevated reporting limits.

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1700 Elm Street
Minneapolis, MN 55414
(612)607-1700

QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: 3502315.50.871
Pace Project No.: 10608751

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
10608751001	**PCB-1**	EPA 3546	816148	EPA 8082A	816537
10608751002	**PCB-2**	EPA 3546	816957	EPA 8082A	817168

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Pace Analytical

CHAIN-OF-CUSTODY Analytical Request Document

Submitting a sample via this chain of custody constitutes acknowledgment and acceptance of the Pace Terms and Conditions found at: https://info.pacelabs.com/hubfs/pas-standard-terms.pdf

Chain-of-Custody is a LEGAL DOCUMENT - Complete all relevant fields

LAB US... A... WO#: 10608751 10608751 ...mber or ...LY

Company: GES, Inc	Billing Information: 3502315.50.871, 1435
Address: 1301 Corporate Center Drive, Suite 190	
Report To: Rob Jenson	Email To: rjenson@gesonline.com
Copy To: (FinanceAPVIR@gesonline.com) gesinbox@gesonline.com,	Site Collection Info/Address: Br. 5060, Brainerd, MN
Customer Project Name/Number: 3502315.50.871	State: MNDOT/Brainerd County/City: Time Zone Collected: [ ]PT [ ]MT [ ]CT [ ]ET

Phone: Email:	Site/Facility ID #: Br. 5060	Compliance Monitoring? [ ] Yes [ ] No
Collected By (print): Jenson	Purchase Order # : Quote #:	DW PWS ID #: DW Location Code:
Collected By (signature): [signature]	Turnaround Date Required: Standard	Immediately Packed on Ice: [ ] Yes [ ] No
Sample Disposal: [ ] Dispose as appropriate [ ] Return [ ] Archive: ____ [ ] Hold:	Rush: (Expedite Charges Apply) [ ] Same Day [ ] Next Day [ ] 2 Day [ ] 3 Day [ ] 4 Day [ ] 5 Day	Field Filtered (if applicable): [ ] Yes [ ] No Analysis: ____

* Matrix Codes (Insert in Matrix box below): Drinking Water (DW), Ground Water (GW), Wastewater (WW), Product (P), Soil/Solid (SL), Oil (OL), Wipe (WP), Air (AR), Tissue (TS), Bioassay (B), Vapor (V), Other (OT)

Container Preservative Type

** Preservative Types: (1) nitric acid, (2) sulfuric acid, (3) hydrochloric acid, (4) sodium hydroxide, (5) zinc acetate, (6) methanol, (7) sodium bisulfate, (8) sodium thiosulfate, (9) hexane, (A) ascorbic acid, (B) ammonium sulfate, (C) ammonium hydroxide, (D) TSP, (U) Unpreserved, (O) Other ____

Analyses

Customer Sample ID	Matrix *	Comp / Grab	Collected (or Composite Start) Date	Collected (or Composite Start) Time	Composite End Date	Composite End Time	Res Cl	# of Ctns	Container Type: Plastic (P) or Glass (G)	PCBs (8082A)	Lab Profile/Line:
PCB-1	SL	G	5/11/22	0830						X	001
PCB-2	SL	G	5/11/22	0840						X	002

Lab Sample Receipt Checklist:

Custody Seals Present/Intact	Y	N	NA
Custody Signatures Present	Y	N	NA
Collector Signature Present	Y	N	NA
Bottles Intact	Y	N	NA
Correct Bottles	Y	N	NA
Sufficient Volume	Y	N	NA
Samples Received on Ice	Y	N	NA
VOA - Headspace Acceptable	Y	N	NA
USDA Regulated Soils	Y	N	NA
Samples in Holding Time	Y	N	NA
Residual Chlorine Present	Y	N	NA
Cl Strips: ____			
Sample pH Acceptable	Y	N	NA
pH Strips: ____			
Sulfide Present	Y	N	NA
Lead Acetate Strips: ____			

LAB USE ONLY:
Lab Sample # / Comments:

Customer Remarks / Special Conditions / Possible Hazards:

Type of Ice Used: Wet Blue Dry None

Packing Material Used:

Radchem sample(s) screened (<500 cpm): Y N NA

SHORT HOLDS PRESENT (<72 hours): Y N N/A

Lab Tracking #:

Samples received via: FEDEX UPS Client Courier Pace Courier

LAB Sample Temperature Info:
Temp Blank Received: Y N NA
Therm ID#: ____
Cooler 1 Temp Upon Receipt: 23.9 oC
Cooler 1 Therm Corr. Factor: ____ oC
Cooler 1 Corrected Temp: ____ oC
Comments:

Relinquished by/Company: (Signature)	Date/Time:	Received by/Company: (Signature)	Date/Time:
[signature]	5/12/22	Charles G/ Pace	5/17/22 0500
Charles G/ Pace	5/17/22 1655	[signature] /PACE	5.17.22 16:55

MTJL LAB USE ONLY
Table #:
Acctnum:
Template:
Prelogin:
PM:
PB:

Trip Blank Received: Y N NA
HCL MeOH TSP Other

Non Conformance(s): YES / NO

Page: ____ of: ____

Pace	DC#_Title: ENV-FRM-MIN4-0150 v05_Sample Condition Upon Receipt (SCUR)
	Effective Date: 04/12/2022

Sample Condition Upon Receipt

Client Name: GES, Inc

Project #:

WO#: 10608751

PM: TS1 Due Date: 06/01/22

CLIENT: GES INC

Courier: ☐ Fed Ex ☐ UPS ☐ USPS ☑ Client ☐ Pace ☐ SpeeDee ☐ Commercial

See Exceptions ☐ ENV-FRM-MIN4-0142

Tracking Number:

Custody Seal on Cooler/Box Present? ☐ Yes ☑ No

Seals Intact? ☐ Yes ☑ No

Biological Tissue Frozen? ☐ Yes ☐ No ☑ N/A

Packing Material: ☐ Bubble Wrap ☐ Bubble Bags ☐ None ☑ Other: Ziplock

Temp Blank? ☐ Yes ☑ No

Thermometer: ☐ T1(0461) ☐ T2(1336) ☐ T3(0459) ☐ T4(0254) ☐ T5(0489) ☐ T6(0235) ☑ T7 (0042) ☐ 01339252/1710 ☐ 122639816 ☐ 140792808

Type of Ice: ☐ Wet ☐ Blue ☑ None ☐ Dry ☐ Melted

Did Samples Originate in West Virginia? ☐ Yes ☑ No

Were All Container Temps Taken? ☐ Yes ☐ No ☑ N/A

Temp should be above freezing to 6°C

Cooler Temp Read w/temp blank: _____ °C

Average Corrected Temp (no temp blank only): 23.9 °C

☑ See Exceptions ENV-FRM-MIN4-0142 ☐ 1 Container

Correction Factor: True

Cooler Temp Corrected w/temp blank: _____ °C

USDA Regulated Soil: (☑ N/A, water sample/Other: Solid)

Date/Initials of Person Examining Contents: KN 05/17/22

Did samples originate in a quarantine zone within the United States: AL, AR, CA, FL, GA, ID, LA. ~~MS, NC, NM, NY, OK, OR, SC, TN, TX or VA (check maps)?~~ ☐ Yes ☐ No

Did samples originate from a foreign source (internationally, including Hawaii and Puerto Rico)? ☐ Yes ☐ No

If Yes to either question, fill out a Regulated Soil Checklist ENV-FRM-MIN4-0154 and include with SCUR/COC paperwork.

Location (check one): ☐ Duluth ☑ Minneapolis ☐ Virginia

				COMMENTS:
Chain of Custody Present and Filled Out?	☑ Yes	☐ No		1.
Chain of Custody Relinquished?	☑ Yes	☐ No		2.
Sampler Name and/or Signature on COC?	☑ Yes	☐ No	☐ N/A	3.
Samples Arrived within Hold Time?	☑ Yes	☐ No		4. If Fecal: ☐ <8 hrs ☐ >8hr, <24 hrs, ☐ >24 hrs
Short Hold Time Analysis (<72 hr)?	☐ Yes	☑ No		5. ☐ Fecal Coliform ☐ HPC ☐ Total Coliform/E coli ☐ BOD/cBOD ☐ Hex Chrome ☐ Turbidity ☐ Nitrate ☐ Nitrite ☐ Orthophos ☐ Other
Rush Turn Around Time Requested?	☐ Yes	☑ No		6.
Sufficient Volume?	☐ Yes	☑ No		7.
Correct Containers Used?	☑ Yes	☐ No		8.
-Pace Containers Used?	☑ Yes	☐ No		
Containers Intact?	☑ Yes	☐ No		9.
Field Filtered Volume Received for Dissolved Tests?	☐ Yes	☐ No	☑ N/A	10. Is sediment visible in the dissolved container? ☐ Yes ☐ No
Is sufficient information available to reconcile the samples to the COC? Matrix: ☐ Water ☐ Soil ☐ Oil ☑ Other- Solid	☑ Yes	☐ No		11. If no, write ID/ Date/Time on Container Below: See Exception ☐ ENV-FRM-MIN4-0142
All containers needing acid/base preservation have been checked?	☐ Yes	☐ No	☑ N/A	12. Sample #
All containers needing preservation are found to be in compliance with EPA recommendation? (HNO_3, H_2SO_4, <2pH, NaOH >9 Sulfide, NaOH>10 Cyanide)	☐ Yes	☐ No	☑ N/A	☐ NaOH ☐ HNO_3 ☐ H_2SO_4 ☐ Zinc Acetate
Exceptions: VOA, Coliform, TOC/DOC Oil and Grease, DRO/8015 (water) and Dioxin/PFAS	☐ Yes	☐ No	☑ N/A	Positive for Res. Chlorine? ☐ Yes ☐ No pH Paper Lot# See Exception ☐ ENV-FRM-MIN4-0142
				Res. Chlorine / 0-6 Roll / 0-6 Strip / 0-14 Strip
Headspace in Methyl Mercury Container?	☐ Yes	☐ No	☑ N/A	
Extra labels present on soil VOA or WIDRO containers?	☐ Yes	☐ No	☑ N/A	13.
Headspace in VOA Vials (greater than 6mm)?	☐ Yes	☐ No	☑ N/A	See Exception ☐ ENV-FRM-MIN4-0140
Trip Blank Present?	☐ Yes	☐ No	☑ N/A	14.
Trip Blank Custody Seals Present?	☐ Yes	☐ No	☑ N/A	Pace Trip Blank Lot # (if purchased):

CLIENT NOTIFICATION/RESOLUTION

Person Contacted: _____ Date/Time: _____ Field Data Required? ☐ Yes ☐ No

Comments/Resolution: _____

Project Manager Review: Bryan Nguyen Date: 05/18/22

Note: Whenever there is a discrepancy affecting North Carolina compliance samples, a copy of this form will be sent to the North Carolina DEHNR Certification Office (i.e.,, out of hold, incorrect preservative, out of temp, incorrect containers).

Labeled by: _____

KN (2)

Pace Analytical®	Document Name: **Sample Condition Upon Receipt (SCUR) Exception Form**	Document Revised: O4Jun2020 **Page 1 of 1**
	Document No.: **ENV-FRM-MIN4-0142 Rev.01**	Pace Analytical Services - **Minneapolis**

SCUR Exceptions:

Workorder #: 10608751

Out of Temp Sample IDs	Container Type	# of Containers

PM Notified? ☐Yes ☐No

If yes, indicate who was contacted/date/time.
If no, indicate reason why.

PCB Solids BN2 05/18/22

Multiple Cooler Project? ☐Yes ☐No
If you answered yes, fill out information to the left.

No Temp Blank

Read Temp	Corrected Temp	Average Temp
23.9	23.9	23.9
24.0	24.0	

Tracking Number/Temperature	

Issue Type:

Sample ID	Container Type	# of Containers

pH Adjustment Log for Preserved Samples

Sample ID	Type of Preserv.	pH Upon Receipt	Date Adjusted	Time Adjusted	Amount Added (mL)	Lot # Added	pH After	In Compliance after addition?	Initials
								☐Yes ☐No	
								☐Yes ☐No	
								☐Yes ☐No	
								☐Yes ☐No	

Comments:

Appendix II

Bridge #5060
MN 210 over the Mississippi River
Brainerd, Minnesota

Sample Location Map
Structure Inventory Report
Site Photographs

Asbestos Survey Sample Location Map

MNDOT - Bridge #5060
SP 1805-80 (TH210)
Brainerd, Minnesota

Drawn
GKS
Designed
DMC
Approved
RTF

Date
6/17/22
Figure
1

N

Scale In Feet (Approximate)
0 65

GES
Groundwater & Environmental Services, Inc.

L:\Projects\MnDOT\Brainerd_MN\GIS\BrainerdMN.mxd - Scale 1:780 - 6/17/2022 9:59:40 AM - GStewart - NAD 1983 StatePlane Minnesota South FIPS 2203 Feet

MINNESOTA STRUCTURE INVENTORY REPORT

Bridge ID: 5060 **MN 210 over MISSISSIPPI RIVER** Date: 02/25/2022

+ GENERAL +

Agency Br. No. 5060 **Crew**
District 3 **Maint. Area** 3A
County 18 - CROW WING
City BRAINERD
Township
Desc. Loc. 1.6 MI E OF W JCT TH 371
Sect., Twp., Range 04 - 133N - 28W
Latitude 46d 21m 29.12s
Longitude 94d 12m 40.56s
Custodian STATE HWY
Owner STATE HWY
Insp Responsibility DISTRICT 3
Year Built 1932
Date Opened to Traffic 05-01-1985
MN Year Remodeled 1984
FHWA Year Reconstructed 1984
Bridge Plan Location CENTRAL
Potential ABC YES

+ STRUCTURE +

Service On HWY;PED
Service Under STREAM
Main Span Type CONC ARCH
Main Span Detail OPEN SPANDREL ARC
Appr. Span Type CONC SLAB SPAN
Appr. Span Detail
Skew
Culvert Type
Barrel Length

Number of Spans
MAIN: 5 APPR: 2 TOTAL: 7

Main Span Length 124.0 ft
Structure Length 630.6 ft
Deck Width 79.0 ft
Deck Material C-I-P CONCRETE
Wear Surf Type LOW SLUMP CONC
Wear Surf Install Year 1984
Wear Course/Fill Depth
Deck Membrane NONE
Deck Rebars EPOXY COATED REBAR
Deck Rebars Install Year 1984
Structure Area 49,817 sq ft
Roadway Area 31,527 sq ft
Sidewalk Width - L/R 6.0 ft 6.0 ft
Curb Height - L/R 0.83 ft 0.83 ft
Rail Codes - L/R 27 27

+ ROADWAY ON BRIDGE +

Facility MN 210
Functional Class URB/OTH PR ART
ADT (YEAR) 32,500 (2019)
HCADT 1,300
National Highway System Y
Route Sys/Nbr (TIS) MNTH 210
Ref. Point (TIS) 122+00.155
Detour Length 60 mi.
Lanes 4 Lanes ON Bridge
Control Section (TH Only) 1805
Function MAINLINE
Type 2 WAY TRAF
Bridge Match ID 1
Roadway Key 1-ON

+ RDWY DIMENSIONS ON BRIDGE +

If Divided	NB-EB	SB-WB
Roadway Width	25.0 ft	25.0 ft
Vertical Clearance		
Max. Vert. Clear.		
Horizontal Clear.	63.9 ft	
Appr. Surface Width	64.0 ft	
Bridge Roadway Width	50.0 ft	
Median Width on Bridge	14.0 ft	

+ MISC. BRIDGE DATA +

Structure Flared NO
Parallel Structure NONE
Field Conn. ID
Cantilever ID

Foundations
Abut. CONC - UNKN
Pier CONC - FTG PILE
Historic Status POSSIBLY ELIGIBLE
On - Off System ON

+ PAINT +

Year Painted
Painted Area
Primer Type
Finish Type

+ BRIDGE SIGNS +

Posted Load NOT REQUIRED
Traffic NOT REQUIRED
Horizontal OBJECT MARKERS
Vertical NOT APPLICABLE

+ INSPECTION +

Deficient Status F.O.
Sufficiency Rating 65.3
Last Routine Insp Date 08-31-2021
Routine Insp Frequency 24
Inspector Name DISTRICT 3
Status A-OPEN

+ NBI CONDITION RATINGS +

Deck 6
Superstructure 6
Substructure 6
Channel 6
Culvert N

+ NBI APPRAISAL RATINGS +

Structure Evaluation 6
Deck Geometry 3
Underclearances N
Waterway Adequacy 9
Approach Alignment 8

+ SAFETY FEATURES +

Bridge Railing 1-MEETS STANDARDS
GR Transition N-NOT REQUIRED
Appr. Guardrail N-NOT REQUIRED
GR Termini N-NOT REQUIRED

+ SPECIAL INSPECTIONS +

Frac. Critical N
Underwater Y 60 mo 05/2021
Pinned Asbly. N

+ WATERWAY +

Drainage Area
Waterway Opening 15000 sq ft
Navigation Control NO PRMT REQD
Pier Protection
Nav. Vert./Horz. Clr.
Nav. Vert. Lift Bridge Clear.
MN Scour Code L-STBL;LOW RISK
Scour Evaluation Year 1998

+ CAPACITY RATINGS +

Design Load HS 20
Operating Rating HS 40.40
Inventory Rating HS 21.40
Posting
Rating Date 02-23-2010

Overweight Permit Codes
A: 1 B: 1 C: 1

Asbestos and Regulated Waste Assessment Report
Bridge #5060
MN 210 Over the Mississippi River
State Project: 1805-80

Westward view from northeast corner of bridge

Bridge name plate at the east end of the north side of the bridge

Sample #1 – Concrete spray collected from the north guardrail

Sample #2 – Epoxy collected from the north sidewalk.

Sample #3 – Epoxy collected from the north sidewalk.

Sample #4 – Seam tar collected from the north sidewalk.

Sample #5 – Concrete spray collected from the west end of the north guardrail.

Sample #6 and Sample #PCB-1 – Bituminous felt collected form the west end of the north sidewalk

Sample #7 – Concrete spray collected from the south guardrail

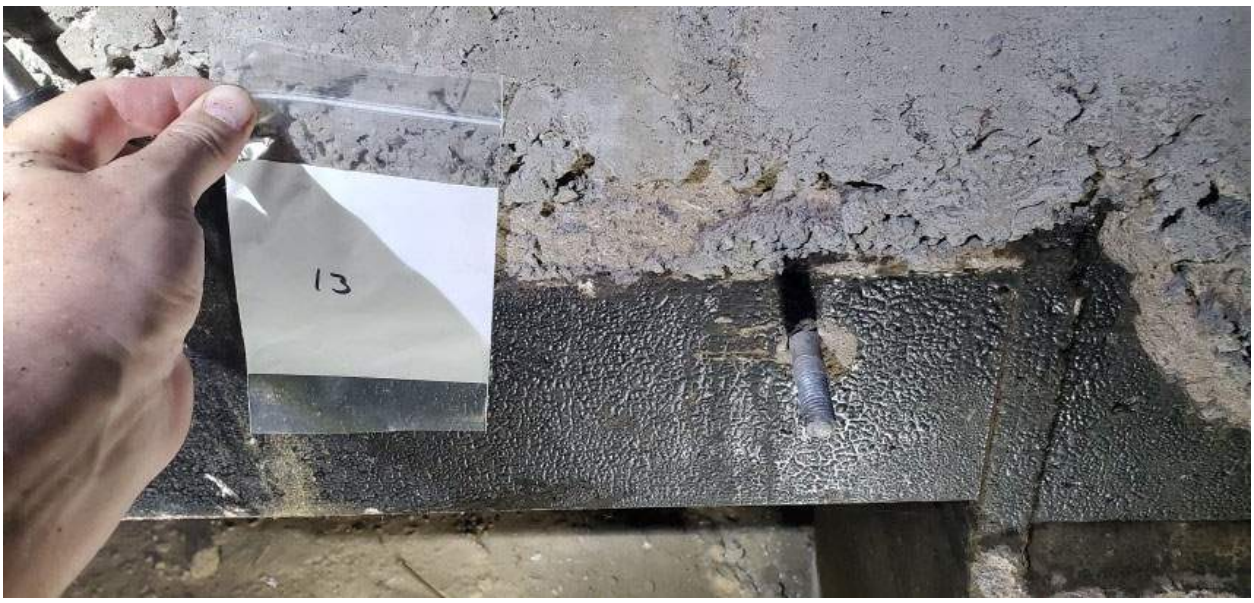
Sample #8 and Sample #PCB-1 – Bituminous felt collected from the west end of center median

Sample #9 – Epoxy collected from the east end of south sidewalk

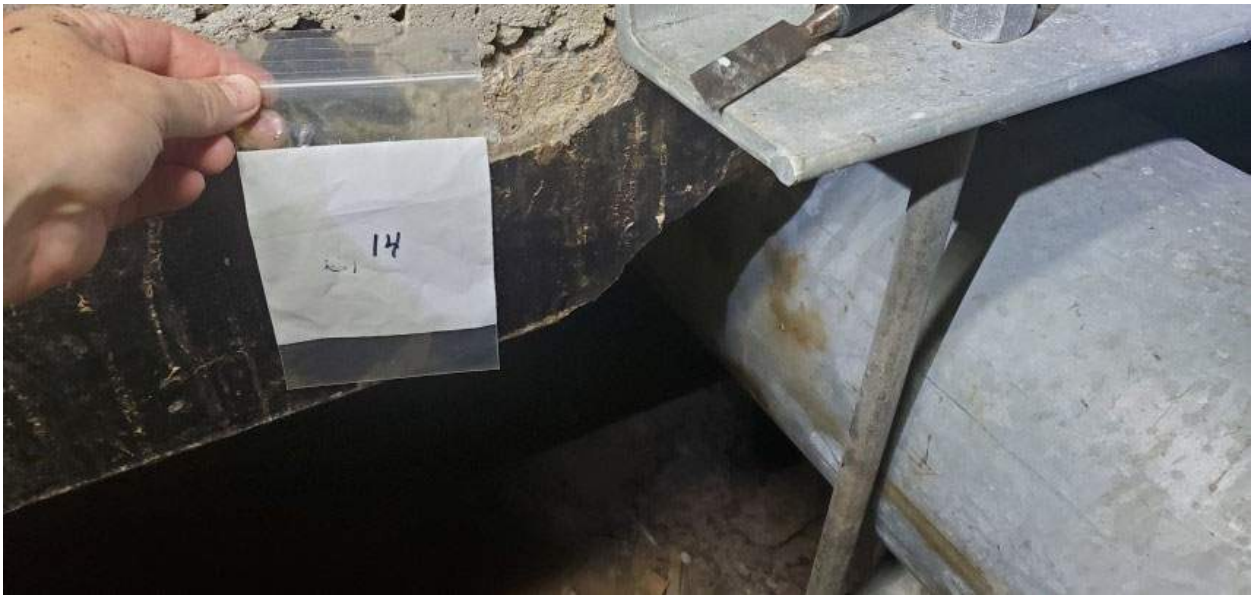
Sample #10 – Bituminous felt collected from the west end of south sidewalk

Sample #11 – Gland collected from east expansion joint

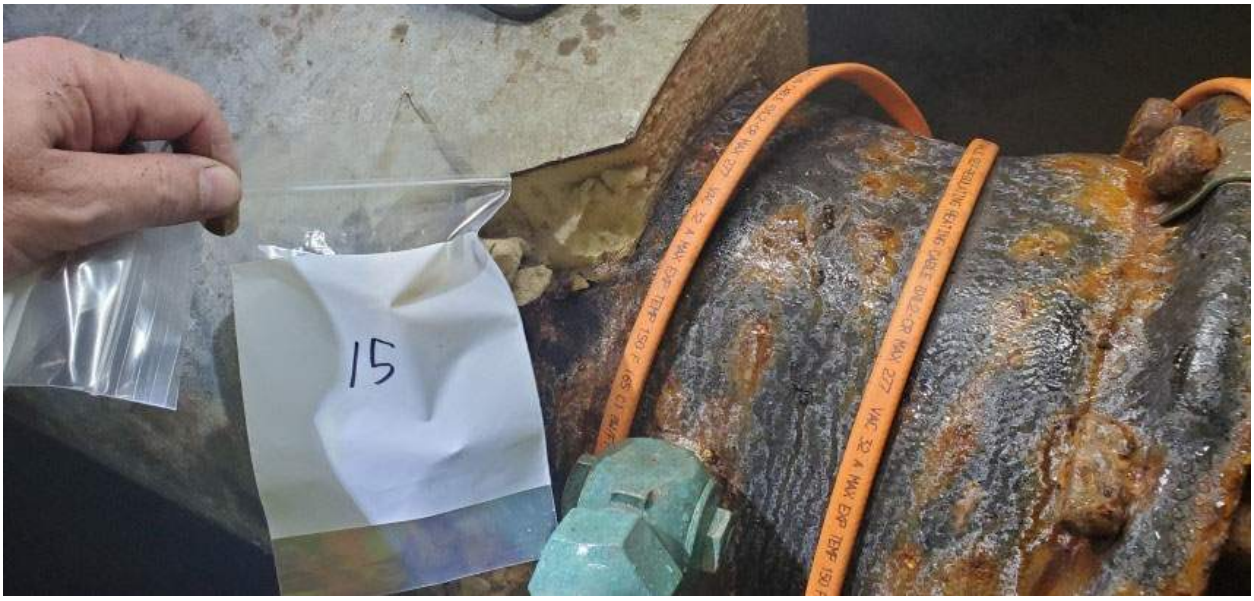
Sample #12 – Waterproofing collected from the east abutment wall



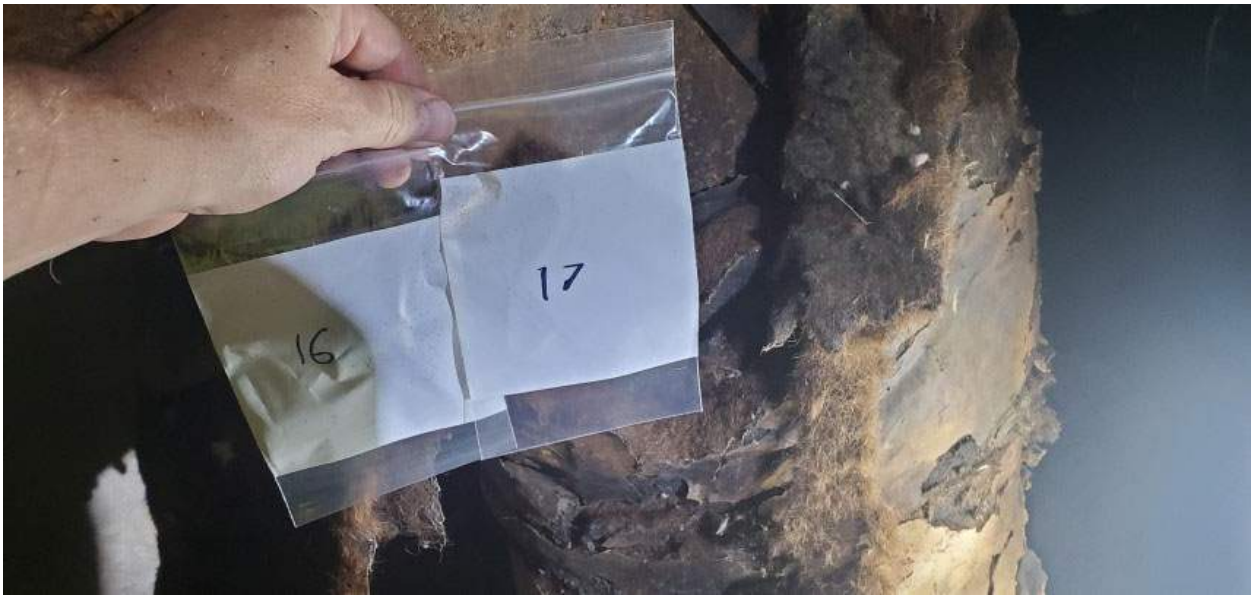
Sample #13 – Waterproofing collected from the east abutment wall



Sample #14 – Waterproofing collected from the east abutment wall



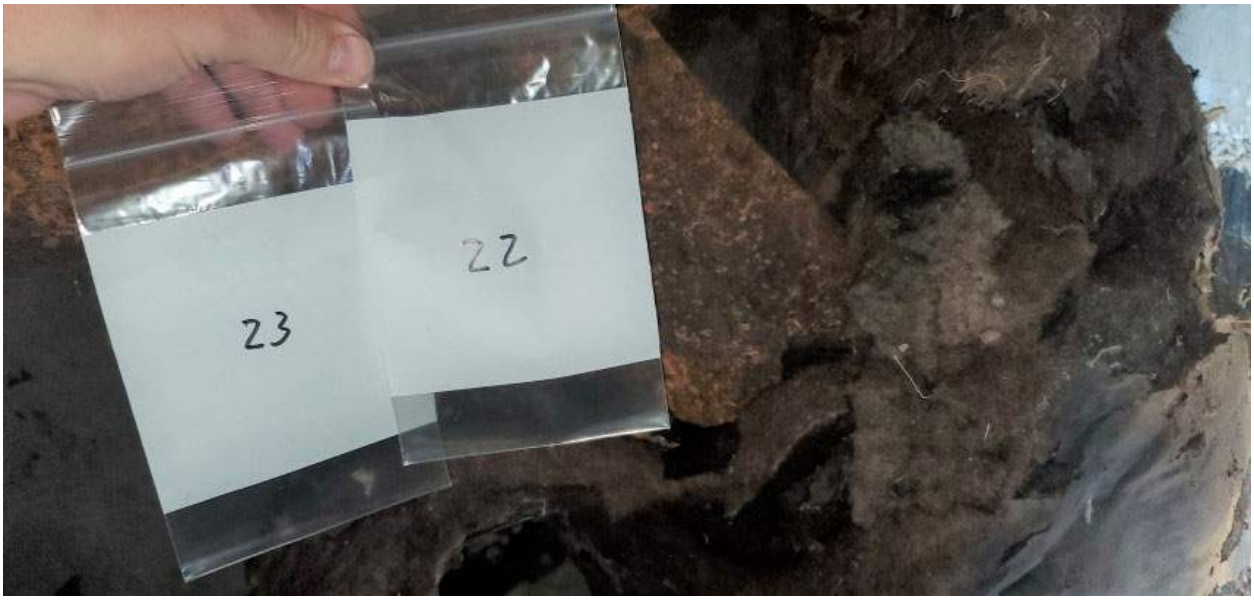
Sample #15 – collected from pipe insulation on active water line at the east abutment



Sample #16 and Sample #17 – collected from pipe insulation on abandoned water line at the east abutment

Sample #18 & Sample #19 collected from pipe insulation on the abandoned water line at the east abutment

Sample #20 and Sample #21 collected from paper insulation on the abandoned water line at the east abutment



Sample #22 and Sample #23 collected from tar paper insulation at the east abutment

Sample #24 – collected from tar paper insulation on the abandoned water line at the east abutment

Sample #25 – Seam tar collected from the east end of the south sidewalk

Sample #26 – Seam tar collected from east end of the south sidewalk

Westward view from east side of bridge. Note street lamp fixtures on each side of bridge

Northwestward view from the southeast corner of the bridge

View from west bank of Mississippi River

Southeast view from west river bank. Note water line under bridge superstructure

Preparing to enter the east abutment cavity

Empty 55-gallon oil drum located inside the east abutment cavity

View of active water line (foreground) and abandoned water line (background) located in the east abutment cavity

Temperature control electrical equipment located in the east abutment cavity

Appendix III

Bridge #5060
MN 210 over the Mississippi River
Brainerd, Minnesota

Licenses and Accreditation

Certificate No: 5LM02042208IR

Expiration Date: February 4, 2023

This is to certify that

Nicholas J. Schlagel

has attended and successfully completed an

ASBESTOS INSPECTOR

REFRESHER TRAINING COURSE

permitted by

the State of Minnesota under Minnesota Rules 4620.3702 to 4620.3722

and meets the requirements of

Section 206 of Title II of the Toxic Substances Control Act (TSCA)

conducted by

Lake States Environmental, Ltd.

in

Remotely Attended on February 4, 2022

Examination Date: February 4, 2022

Lake States Environmental, Ltd.
P. O. Box 645, Rice Lake, WI 54868
(800) 254-9811

Grant J Grassle

Training Instructor

Certificate No: 5LM01252217IR

Expiration Date: January 25, 2023

This is to certify that

Robert E. Jenson

has attended and successfully completed an

ASBESTOS INSPECTOR

REFRESHER TRAINING COURSE

permitted by

the State of Minnesota under Minnesota Rules 4620.3702 to 4620.3722

and meets the requirements of

Section 206 of Title II of the Toxic Substances Control Act (TSCA)

conducted by

Lake States Environmental, Ltd.

in

White Bear Lake, MN on January 25, 2022

Examination Date: January 25, 2022

Lake States Environmental, Ltd.
P. O. Box 645, Rice Lake, WI 54868
(800) 254-9811

Todd Lewis

Training Instructor

Director, Env. Health Div.

No. AI3648 Issued: 02/01/2022

DEPARTMENT OF HEALTH

ASBESTOS INSPECTOR

Certified by:
State of Minnesota
Department of Health

Expires: 01/25/2023

Robert E Jenson
2734 Park Row
North St Paul, MN 55109

INSTITUTE OF HAZARDOUS MATERIALS MANAGEMENT

THIS CERTIFIES THAT

ROBERT E. JENSON

HAS SUCCESSFULLY MET ALL THE REQUIREMENTS OF EDUCATION, EXPERIENCE AND EXAMINATION, AND IS HEREBY DESIGNATED A

CERTIFIED HAZARDOUS MATERIALS MANAGER
CHMM

May 31, 2002
DATE OF CERTIFICATION

11334
CREDENTIAL NUMBER

May 31, 2023
CERTIFICATION EXPIRES

EXECUTIVE DIRECTOR

VALID SO LONG AS THIS CREDENTIAL IS RENEWED ACCORDING TO SCHEDULE AND IS NOT OTHERWISE REVOKED.

ANSI Accredited Program PERSONNEL CERTIFICATION

Accredited by the American National Standards Institute and the Council of Engineering and Scientific Specialty Boards

Minnesota Department of Health

Asbestos Contractor License

License Number: AC836 **Issued on: October 5, 2021**

To:

Groundwater and Environmental Services, Inc.
1301 Corporate Center Drive, Suite 190
Eagan, Minnesota 55121-

Responsible Individual: Robert E. Jenson

This license is valid from October 14, 2021 to October 13, 2022.

Pursuant to Minnesota Statutes, section 144.99, this license may be suspended or revoked for failure to conduct asbestos-related work in compliance with applicable regulations.

Asbestos-related work must be conducted according to Minnesota Statutes, sections 326.70 to 326.81 and Minnesota Rules, parts 4620.000 to 4620.3724.

Thomas P. Hogan, Director
Environmental Health Division

United States Department of Commerce
National Institute of Standards and Technology

Certificate of Accreditation to ISO/IEC 17025:2017

NVLAP LAB CODE: 101896-0

Reservoirs Environmental, Inc.

Denver, CO

is accredited by the National Voluntary Laboratory Accreditation Program for specific services, listed on the Scope of Accreditation, for:

Asbestos Fiber Analysis

This laboratory is accredited in accordance with the recognized International Standard ISO/IEC 17025:2017. This accreditation demonstrates technical competence for a defined scope and the operation of a laboratory quality management system (refer to joint ISO-ILAC-IAF Communique dated January 2009).

2021-07-01 through 2022-06-30

Effective Dates

For the National Voluntary Laboratory Accreditation Program

Environmental Laboratory Accreditation Program - Summary of Scope Certification

Pace Analytical Services, LLC - Minneapolis MN

Address: 1700 Elm Street SE
Minneapolis, MN 55414-2485

Phone: (612)607-1700

State Lab ID: 027-053-137

EPA Lab Code: MN00064

Expiration Date: 12/31/2022

Issue Date: 12/21/2021

Clean Air Act

Method: EPA 3C
Preparation Techniques: N/A

Program	Method	Category	Technology	Analyte	Matrix	Primary	SOP
CAA	EPA 3C	Volatile Organic Compounds	Other	Carbon dioxide	AIR	MN	
CAA	EPA 3C	Volatile Organic Compounds	Other	Carbon monoxide	AIR	MN	
CAA	EPA 3C	Volatile Organic Compounds	Other	Helium	AIR	MN	
CAA	EPA 3C	Volatile Organic Compounds	Other	Methane	AIR	MN	
CAA	EPA 3C	Volatile Organic Compounds	Other	Nitrogen	AIR	MN	
CAA	EPA 3C	Volatile Organic Compounds	Other	Oxygen	AIR	MN	

Method: EPA Method 23
Preparation Techniques: N/A

Program	Method	Category	Technology	Analyte	Matrix	Primary	SOP
CAA	EPA Method 23	Volatile Organic Compounds	Gas Chromatography - Mass Spectrometry - High Resolution	1,2,3,4,6,7,8,9-Octachlorodibenzo-p-dioxin (OCDD)	AIR	MN	
CAA	EPA Method 23	Volatile Organic Compounds	Gas Chromatography - Mass Spectrometry - High Resolution	1,2,3,4,6,7,8,9-Octachlorodibenzofuran (OCDF)	AIR	MN	
CAA	EPA Method 23	Volatile Organic Compounds	Gas Chromatography - Mass Spectrometry - High Resolution	1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin (1,2,3,4,6,7,8-hpcdd)	AIR	MN	
CAA	EPA Method 23	Volatile Organic Compounds	Gas Chromatography - Mass Spectrometry - High Resolution	1,2,3,4,6,7,8-Heptachlorodibenzofuran (1,2,3,4,6,7,8-hpcdf)	AIR	MN	
CAA	EPA Method 23	Volatile Organic Compounds	Gas Chromatography - Mass Spectrometry - High Resolution	1,2,3,4,7,8,9-Heptachlorodibenzofuran (1,2,3,4,7,8,9-hpcdf)	AIR	MN	
CAA	EPA Method 23	Volatile Organic Compounds	Gas Chromatography - Mass Spectrometry - High Resolution	1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin (1,2,3,4,7,8-Hxcdd)	AIR	MN	
CAA	EPA Method 23	Volatile Organic Compounds	Gas Chromatography - Mass Spectrometry - High Resolution	1,2,3,4,7,8-Hexachlorodibenzofuran (1,2,3,4,7,8-Hxcdf)	AIR	MN	
CAA	EPA Method 23	Volatile Organic Compounds	Gas Chromatography - Mass Spectrometry - High Resolution	1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin(1,2,3,6,7,8-Hxcdd)	AIR	MN	
CAA	EPA Method 23	Volatile Organic Compounds	Gas Chromatography - Mass Spectrometry - High Resolution	1,2,3,6,7,8-Hexachlorodibenzofuran (1,2,3,6,7,8-Hxcdf)	AIR	MN	
CAA	EPA Method 23	Volatile Organic Compounds	Gas Chromatography - Mass Spectrometry - High Resolution	1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin (1,2,3,7,8,9-Hxcdd)	AIR	MN	
CAA	EPA Method 23	Volatile Organic Compounds	Gas Chromatography - Mass Spectrometry - High Resolution	1,2,3,7,8,9-Hexachlorodibenzofuran (1,2,3,7,8,9-Hxcdf)	AIR	MN	
CAA	EPA Method 23	Volatile Organic Compounds	Gas Chromatography - Mass Spectrometry - High Resolution	1,2,3,7,8-Pentachlorodibenzo-p-dioxin (1,2,3,7,8-Pecdd)	AIR	MN	
CAA	EPA Method 23	Volatile Organic Compounds	Gas Chromatography - Mass Spectrometry - High Resolution	1,2,3,7,8-Pentachlorodibenzofuran (1,2,3,7,8-Pecdf)	AIR	MN	
CAA	EPA Method 23	Volatile Organic Compounds	Gas Chromatography - Mass Spectrometry - High Resolution	2,3,4,6,7,8-Hexachlorodibenzofuran	AIR	MN	
CAA	EPA Method 23	Volatile Organic Compounds	Gas Chromatography - Mass Spectrometry - High Resolution	2,3,4,7,8-Pentachlorodibenzofuran	AIR	MN	
CAA	EPA Method 23	Volatile Organic Compounds	Gas Chromatography - Mass Spectrometry - High Resolution	2,3,7,8-Tetrachlorodibenzo- p-dioxin (2,3,7,8-TCDD)	AIR	MN	
CAA	EPA Method 23	Volatile Organic Compounds	Gas Chromatography - Mass Spectrometry - High Resolution	2,3,7,8-Tetrachlorodibenzofuran	AIR	MN	

Method: EPA TO-15
Preparation Techniques: N/A

Program	Method	Category	Technology	Analyte	Matrix	Primary	SOP
CAA	EPA TO-15	Volatile Organic Compounds	Gas Chromatography - Mass Spectrometry	1,2,3-Trimethylbenzene	AIR	MN	User Defined: ENV-SOP-MIN4-0005 Rev.: 05

Method: EPA 8082A (Rev 2007)
Preparation Techniques: Extraction, separatory funnel liquid-liquid (LLE); Extraction, EPA 1312 SPLP, non-volatiles; Waste Dilution (EPA 3580A); Extraction, ultrasonic; Extraction, microwave;

Program	Method	Category	Technology	Analyte	Matrix	Primary	SOP
RCRP	EPA 8082A (Rev 2007)	Other Organic Compounds	Gas Chromatography - Electron Capture Detection	Aroclor-1016 (PCB-1016)	SCM	MN	
RCRP	EPA 8082A (Rev 2007)	Other Organic Compounds	Gas Chromatography - Electron Capture Detection	Aroclor-1016 (PCB-1016)	NPW	MN	
RCRP	EPA 8082A (Rev 2007)	Other Organic Compounds	Gas Chromatography - Electron Capture Detection	Aroclor-1221 (PCB-1221)	NPW	MN	
RCRP	EPA 8082A (Rev 2007)	Other Organic Compounds	Gas Chromatography - Electron Capture Detection	Aroclor-1221 (PCB-1221)	SCM	MN	
RCRP	EPA 8082A (Rev 2007)	Other Organic Compounds	Gas Chromatography - Electron Capture Detection	Aroclor-1232 (PCB-1232)	SCM	MN	
RCRP	EPA 8082A (Rev 2007)	Other Organic Compounds	Gas Chromatography - Electron Capture Detection	Aroclor-1232 (PCB-1232)	NPW	MN	
RCRP	EPA 8082A (Rev 2007)	Other Organic Compounds	Gas Chromatography - Electron Capture Detection	Aroclor-1242 (PCB-1242)	SCM	MN	
RCRP	EPA 8082A (Rev 2007)	Other Organic Compounds	Gas Chromatography - Electron Capture Detection	Aroclor-1242 (PCB-1242)	NPW	MN	
RCRP	EPA 8082A (Rev 2007)	Other Organic Compounds	Gas Chromatography - Electron Capture Detection	Aroclor-1248 (PCB-1248)	NPW	MN	
RCRP	EPA 8082A (Rev 2007)	Other Organic Compounds	Gas Chromatography - Electron Capture Detection	Aroclor-1248 (PCB-1248)	SCM	MN	
RCRP	EPA 8082A (Rev 2007)	Other Organic Compounds	Gas Chromatography - Electron Capture Detection	Aroclor-1254 (PCB-1254)	NPW	MN	
RCRP	EPA 8082A (Rev 2007)	Other Organic Compounds	Gas Chromatography - Electron Capture Detection	Aroclor-1254 (PCB-1254)	SCM	MN	
RCRP	EPA 8082A (Rev 2007)	Other Organic Compounds	Gas Chromatography - Electron Capture Detection	Aroclor-1260 (PCB-1260)	SCM	MN	
RCRP	EPA 8082A (Rev 2007)	Other Organic Compounds	Gas Chromatography - Electron Capture Detection	Aroclor-1260 (PCB-1260)	NPW	MN	
RCRP	EPA 8082A (Rev 2007)	Other Organic Compounds	Gas Chromatography - Electron Capture Detection	Aroclor-1262 (PCB-1262)	SCM	MN	
RCRP	EPA 8082A (Rev 2007)	Other Organic Compounds	Gas Chromatography - Electron Capture Detection	Aroclor-1262 (PCB-1262)	NPW	MN	
RCRP	EPA 8082A (Rev 2007)	Other Organic Compounds	Gas Chromatography - Electron Capture Detection	Aroclor-1268 (PCB-1268)	NPW	MN	
RCRP	EPA 8082A (Rev 2007)	Other Organic Compounds	Gas Chromatography - Electron Capture Detection	Aroclor-1268 (PCB-1268)	SCM	MN	
RCRP	EPA 8082A (Rev 2007)	Other Organic Compounds	Gas Chromatography - Electron Capture Detection	PCBs	SCM	MN	
RCRP	EPA 8082A (Rev 2007)	Other Organic Compounds	Gas Chromatography - Electron Capture Detection	PCBs	NPW	MN	User Defined: ENV-SOP-MIN4-0013 Rev.: 01

Method: EPA 8270D (Rev 2014)
Preparation Techniques: Extraction, separatory funnel liquid-liquid (LLE); Extraction, EPA 1312 SPLP, non-volatiles; Extraction, continuous liquid-liquid (LLE); Extraction, EPA 1311 TCLP, non-volatiles; Waste Dilution (EPA 3580A); Extraction, ultrasonic; Extraction, microwave;

Program	Method	Category	Technology	Analyte	Matrix	Primary	SOP
RCRP	EPA 8270D (Rev 2014)	Other Organic Compounds	Gas Chromatography - Mass Spectrometry	1,2,4-Trichlorobenzene	SCM	MN	
RCRP	EPA 8270D (Rev 2014)	Other Organic Compounds	Gas Chromatography - Mass Spectrometry	1,2,4-Trichlorobenzene	NPW	MN	
RCRP	EPA 8270D (Rev 2014)	Other Organic Compounds	Gas Chromatography - Mass Spectrometry	1,2-Dichlorobenzene	NPW	MN	
RCRP	EPA 8270D (Rev 2014)	Other Organic Compounds	Gas Chromatography - Mass Spectrometry	1,2-Dichlorobenzene	SCM	MN	
RCRP	EPA 8270D (Rev 2014)	Other Organic Compounds	Gas Chromatography - Mass Spectrometry	1,2-Diphenylhydrazine	SCM	MN	
RCRP	EPA 8270D (Rev 2014)	Other Organic Compounds	Gas Chromatography - Mass Spectrometry	1,2-Diphenylhydrazine	NPW	MN	
RCRP	EPA 8270D (Rev 2014)	Other Organic Compounds	Gas Chromatography - Mass Spectrometry	1,3-Dichlorobenzene	NPW	MN	
RCRP	EPA 8270D (Rev 2014)	Other Organic Compounds	Gas Chromatography - Mass Spectrometry	1,3-Dichlorobenzene	SCM	MN	
RCRP	EPA 8270D (Rev 2014)	Other Organic Compounds	Gas Chromatography - Mass Spectrometry	1,4-Dichlorobenzene	NPW	MN	
RCRP	EPA 8270D (Rev 2014)	Other Organic Compounds	Gas Chromatography - Mass Spectrometry	1,4-Dichlorobenzene	SCM	MN	
RCRP	EPA 8270D (Rev 2014)	Other Organic Compounds	Gas Chromatography - Mass Spectrometry	1,4-Dioxane (1,4- Diethyleneoxide)	NPW	MN	
RCRP	EPA 8270D (Rev 2014)	Other Organic Compounds	Gas Chromatography - Mass Spectrometry	1-Methylnaphthalene	NPW	MN	
RCRP	EPA 8270D (Rev 2014)	Other Organic Compounds	Gas Chromatography - Mass Spectrometry	1-Methylnaphthalene	SCM	MN	
RCRP	EPA 8270D (Rev 2014)	Other Organic Compounds	Gas Chromatography - Mass Spectrometry	2,2'-Oxybis(1-chloropropane),bis(2-Chloro-1-methylethyl)ether	SCM	MN	
RCRP	EPA 8270D (Rev 2014)	Other Organic Compounds	Gas Chromatography - Mass Spectrometry	2,2'-Oxybis(1-chloropropane),bis(2-Chloro-1-methylethyl)ether	NPW	MN	User Defined: ENV-SOP-MIN4-0062 Rev.: 02

Ben Lodin, PE (MN)

From: Berger, John (DOT)
Sent: Friday, December 30, 2022 10:44 AM
To: Wehseler, Luke (DOT)
Subject: RE: SP 1805-80 Possible Contaminated Areas
Attachments: Tables from 210_1805-80_Phase I.pdf; Figures from 210_1805-80_Phase I.pdf

Luke,

Attached are the tables and figures from the Draft Phase I. High (red) and Medium (yellow) risk ranked sites in the figures and tables are sites that pose particular risk of encountering contamination in ROW.

There is a lot of high risk ranked sites within the project corridor (including multiple former bulk oil storage facilities, former laundry facilities, former/current filling stations, and multiple chlorinated solvent concerns). Residual soil and/or groundwater contamination plumes emanating from former or current petroleum and chlorinated solvent source areas are suspected at multiple sites adjacent to the project corridor.

A brief summary of sites of particular concern are:

-Site 126 (Minnesota T's) located on the corner of Front Street and S 9th Street: documented petroleum impacts to soil-gas and groundwater, and chlorinated solvents in soil gas. Currently listed under MPCA as an Active Site Assessment.
-Site 133 (Brainerd Wetland Creosote) located near southwest corner of TH210 and 13th Street intersection: MPCA Active Site Assessment for inferred dumping of creosote-containing wastes or wastewater.
-Site 139 (NE Liquor) located at 210 and 1st Ave NE: former filling station, documented off-site, downgradient petroleum and non-petroleum impacts in groundwater including in the 1st Ave NW ROW.
-Site 59 (legends Outdoors Ice Houses & RVs) located at TH210 and N 1st Street: former zinc and nickel electroplating facility and potential source of PFAS and residual petroleum impacts in groundwater from adjacent properties.
-Site 001 (Former BN Brainerd Tie Plant) near western extent of corridor: Active Superfund site.

We can discuss further after the holidays.

Thanks,

John Berger, PG, CHMM
Hydrogeologist
*****Work cell: 651-508-3469*****
John.Berger@state.mn.us

From: Berger, John (DOT)
Sent: Monday, December 12, 2022 10:13 AM
To: Wehseler, Luke (DOT) <luke.wehseler@state.mn.us>
Subject: RE: SP 1805-80 Possible Contaminated Areas

Luke,

I just got off the phone with my consultant. I am anticipating the draft Phase I report on Wednesday. I will follow up with you after I get a chance to take a look at the figures.

Thanks,

John Berger, PG, CHMM
Hydrogeologist
*****Work cell: 651-508-3469*****
John.Berger@state.mn.us

From: Wehseler, Luke (DOT) <luke.wehseler@state.mn.us>
Sent: Wednesday, December 7, 2022 1:55 PM
To: Berger, John (DOT) <John.Berger@state.mn.us>
Subject: SP 1805-80 Possible Contaminated Areas

Hello John,

Could you please send me the locations of the possible contaminated areas you found in the Phase 1 of this project. We are drafting the CatEx now and would like to include the most current information.

Thanks,

Luke Wehseler, PE
District 3 Project Development-State Aid
Project Manager/Consultant Coordinator/
Local Partnership Program (LPP) Manager - LPP
7694 Industrial Park Road
Baxter, MN 56425
Direct (cell): 218-821-0618
mndot.gov/

FIGURES

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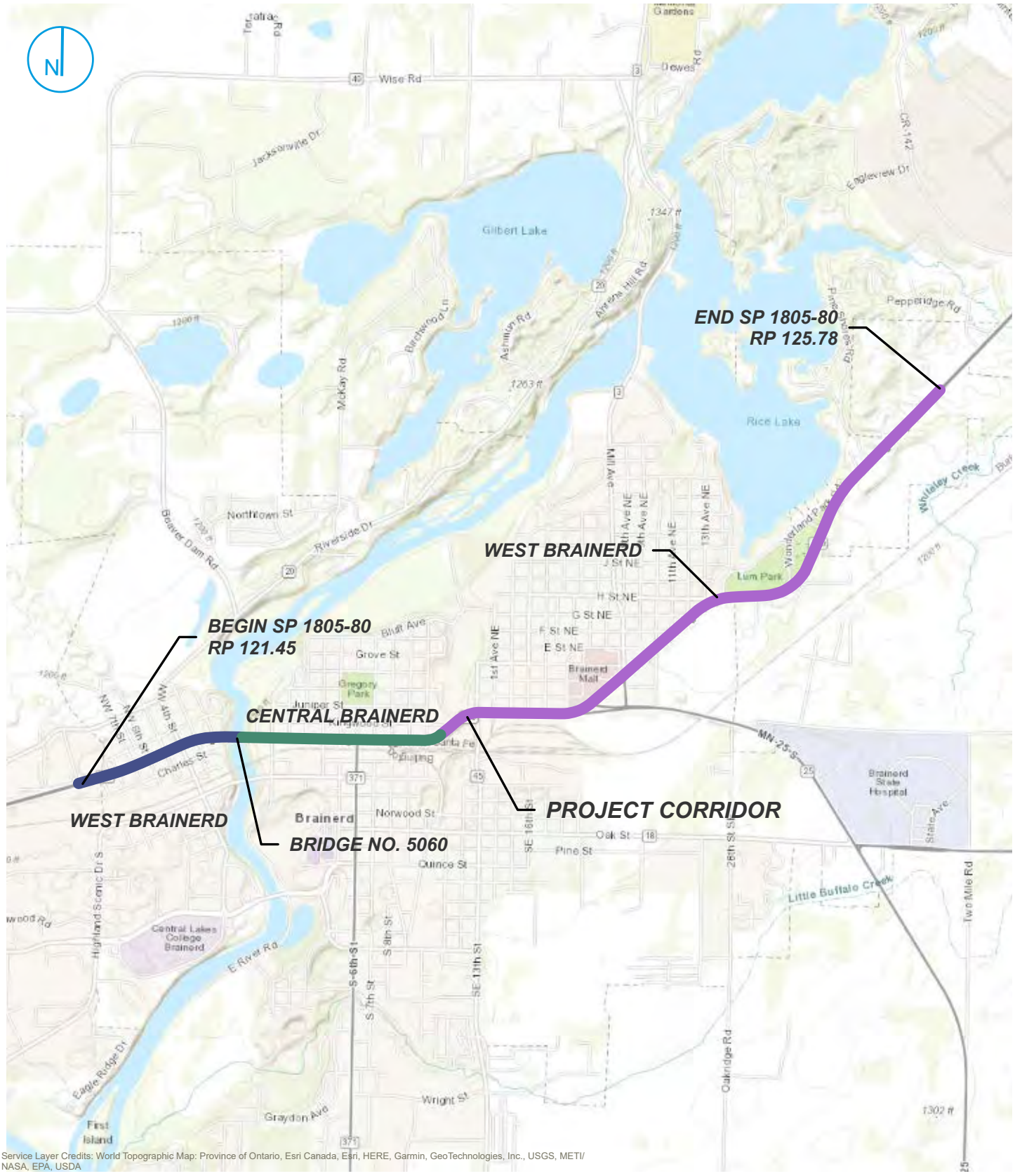

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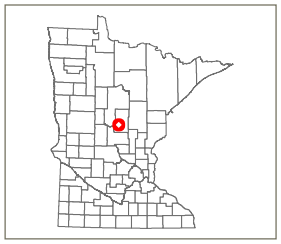

KEY MAP

Map Scale: 1:1:23,330,961;
Map Center: 94°11'15"W 46°22'3"N

TH 210 Alignment - West Brainerd

TH 210 Alignment - Central Brainerd

TH 210 Alignment - East Brainerd

0 2,000 4,000 Feet

PROJECT LOCATION MAP
TH 210 BRAINERD
LIMITED PHASE I ESA

Trunk Highway 210
MnDOT S.P.1805-80
Brainerd, MN

FIGURE 1

DEPARTMENT OF TRANSPORTATION

RAMBOLL US CONSULTING, INC
A RAMBOLL COMPANY

RAMBOLL

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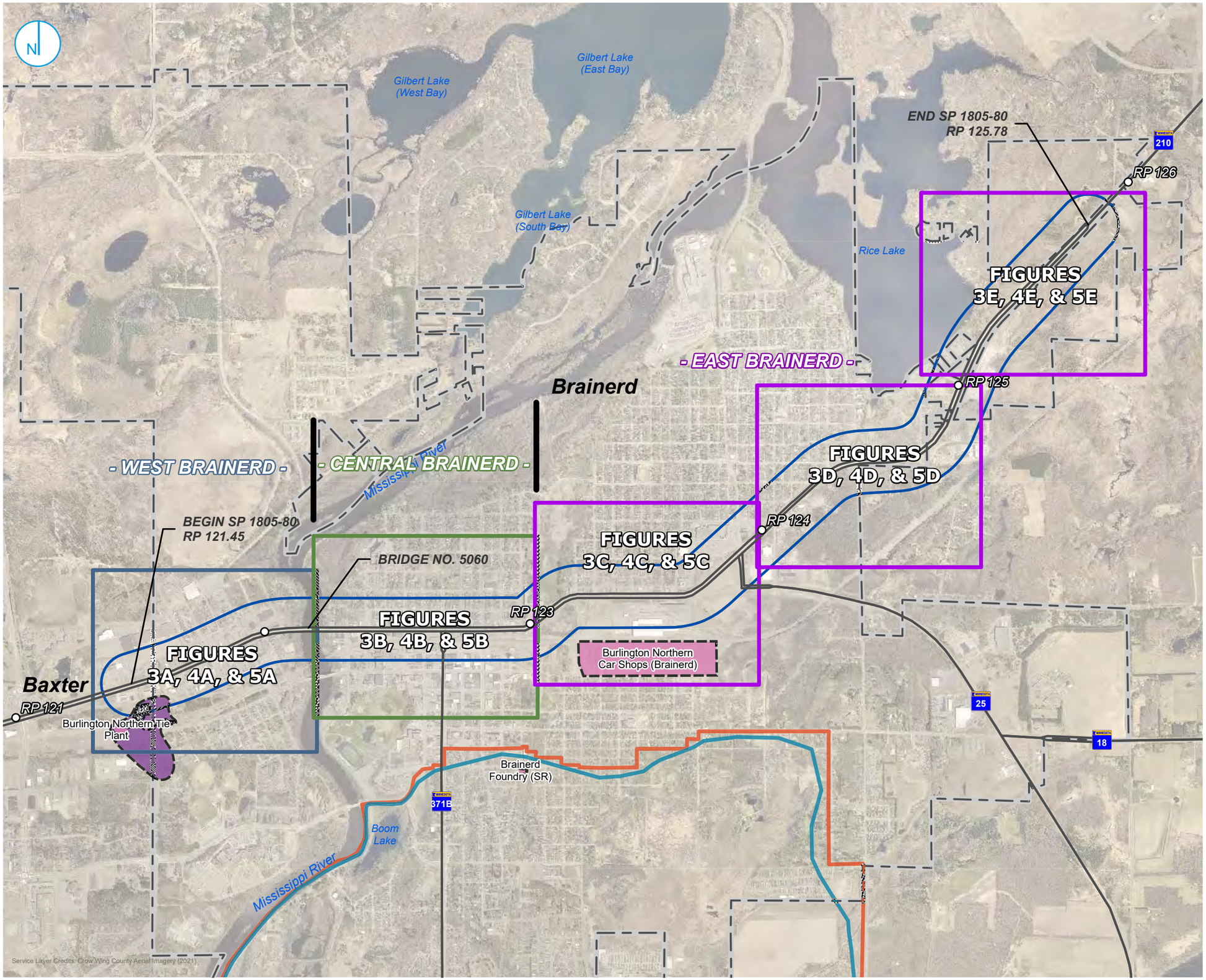

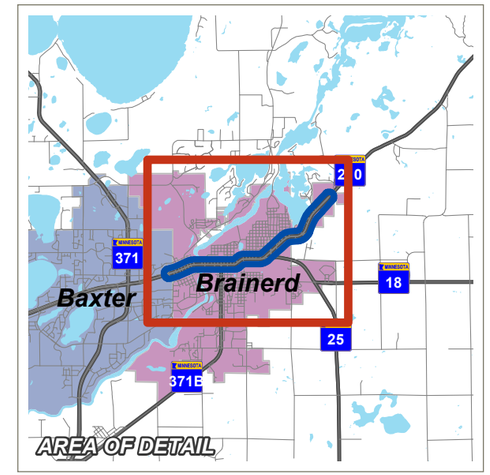

- Highway Reference Point (RP)
- 500ft Area of Investigation (AOI)
- Brainerd Wellhead Protection Area (WPA)
- Brainerd Drinking Water Supply Management Area (DWSMA)
- MPCA Potential Contamination Source
- MPCA Delineated Contamination Area
- Municipal Boundary

0 2,000 4,000 Feet

PROJECT OVERVIEW & FIGURE INDEX MAP

TH 210 BRAINERD LIMITED PHASE I ESA

DEPARTMENT OF TRANSPORTATION

Trunk Highway 210
MnDOT S.P.1805-80
Brainerd, MN

FIGURE 2

RAMBOLL US CONSULTING, INC
A RAMBOLL COMPANY

RAMBOLL

PROJECT: 1690026440 | DATED: 12/14/2022 | DESIGNER: SBUSKEY

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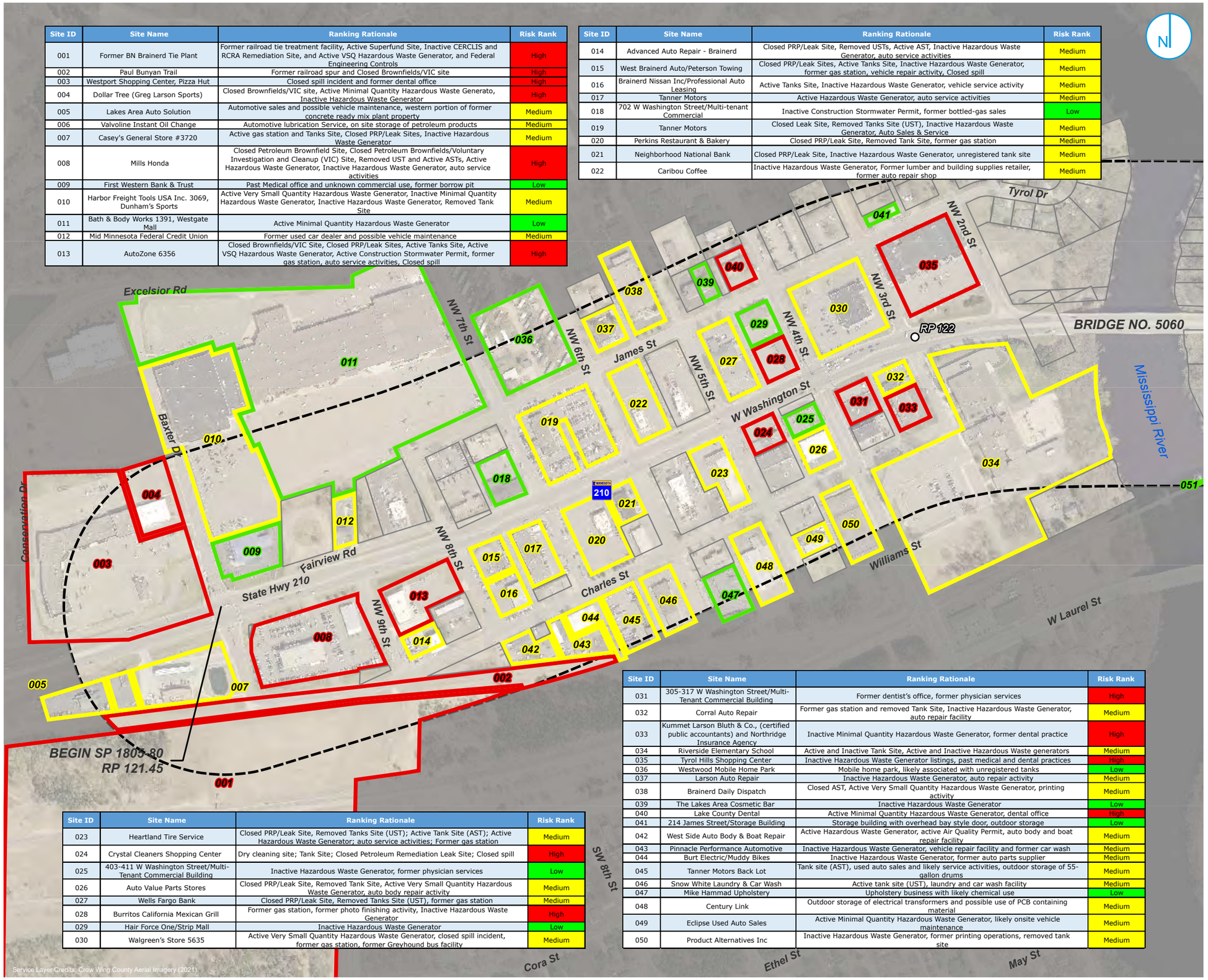
Site ID	Site Name	Ranking Rationale	Risk Rank
001	Former BN Brainerd Tie Plant	Former railroad tie treatment facility, Active Superfund Site, Inactive CERCLIS and RCRA Remediation Site, and Active VSQ Hazardous Waste Generator, and Federal Engineering Controls	High
002	Paul Bunyan Trail	Former railroad spur and Closed Brownfields/VIC site	High
003	Westport Shopping Center, Pizza Hut	Closed spill incident and former dental office	High
004	Dollar Tree (Greg Larson Sports)	Closed Brownfields/VIC site, Active Minimal Quantity Hazardous Waste Generato, Inactive Hazardous Waste Generator	High
005	Lakes Area Auto Solution	Automotive sales and possible vehicle maintenance, western portion of former concrete ready mix plant property	Medium
006	Valvoline Instant Oil Change	Automotive lubrication Service, on site storage of petroleum products	Medium
007	Casey's General Store #3720	Active gas station and Tanks Site, Closed PRP/Leak Sites, Inactive Hazardous Waste Generator	Medium
008	Mills Honda	Closed Petroleum Brownfield Site, Closed Petroleum Brownfields/Voluntary Investigation and Cleanup (VIC) Site, Removed UST and Active ASTs, Active Hazardous Waste Generator, Inactive Hazardous Waste Generator, auto service activities	High
009	First Western Bank & Trust	Past Medical office and unknown commercial use, former borrow pit	Low
010	Harbor Freight Tools USA Inc. 3069, Dunham's Sports	Active Very Small Quantity Hazardous Waste Generator, Inactive Minimal Quantity Hazardous Waste Generator, Inactive Hazardous Waste Generator, Removed Tank Site	Medium
011	Bath & Body Works 1391, Westgate Mall	Active Minimal Quantity Hazardous Waste Generator	Low
012	Mid Minnesota Federal Credit Union	Former used car dealer and possible vehicle maintenance	Medium
013	AutoZone 6356	Closed Brownfields/VIC Site, Closed PRP/Leak Sites, Active Tanks Site, Active VSQ Hazardous Waste Generator, Active Construction Stormwater Permit, former gas station, auto service activities, Closed spill	High

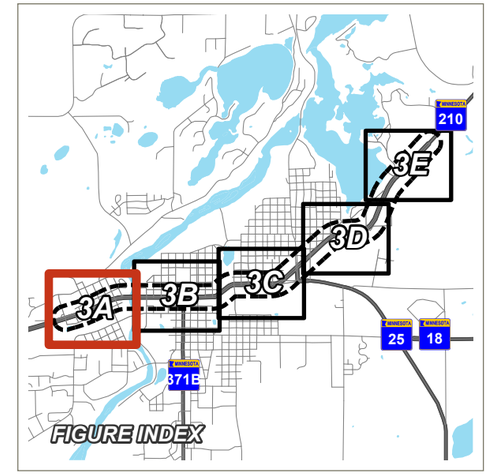
Site ID	Site Name	Ranking Rationale	Risk Rank
014	Advanced Auto Repair - Brainerd	Closed PRP/Leak Site, Removed USTs, Active AST, Inactive Hazardous Waste Generator, auto service activities	Medium
015	West Brainerd Auto/Peterson Towing	Closed PRP/Leak Sites, Active Tanks Site, Inactive Hazardous Waste Generator, former gas station, vehicle repair activity, Closed spill	Medium
016	Brainerd Nissan Inc/Professional Auto Leasing	Active Tanks Site, Inactive Hazardous Waste Generator, vehicle service activity	Medium
017	Tanner Motors	Active Hazardous Waste Generator, auto service activities	Medium
018	702 W Washington Street/Multi-tenant Commercial	Inactive Construction Stormwater Permit, former bottled-gas sales	Low
019	Tanner Motors	Closed Leak Site, Removed Tanks Site (UST), Inactive Hazardous Waste Generator, Auto Sales & Service	Medium
020	Perkins Restaurant & Bakery	Closed PRP/Leak Site, Removed Tank Site, former gas station	Medium
021	Neighborhood National Bank	Closed PRP/Leak Site, Inactive Hazardous Waste Generator, unregistered tank site	Medium
022	Caribou Coffee	Inactive Hazardous Waste Generator, Former lumber and building supplies retailer, former auto repair shop	Medium



Site ID	Site Name	Ranking Rationale	Risk Rank
023	Heartland Tire Service	Closed PRP/Leak Site, Removed Tanks Site (UST); Active Tank Site (AST); Active Hazardous Waste Generator; auto service activities; Former gas station	Medium
024	Crystal Cleaners Shopping Center	Dry cleaning site; Tank Site; Closed Petroleum Remediation Leak Site; Closed spill	High
025	403-411 W Washington Street/Multi-Tenant Commercial Building	Inactive Hazardous Waste Generator, former physician services	Low
026	Auto Value Parts Stores	Closed PRP/Leak Site, Removed Tank Site, Active Very Small Quantity Hazardous Waste Generator, auto body repair activity	Medium
027	Wells Fargo Bank	Closed PRP/Leak Site, Removed Tanks Site (UST), former gas station	Medium
028	Burritos California Mexican Grill	Former gas station, former photo finishing activity, Inactive Hazardous Waste Generator	High
029	Hair Force One/Strip Mall	Inactive Hazardous Waste Generator	Low
030	Walgreen's Store 5635	Active Very Small Quantity Hazardous Waste Generator, closed spill incident, former gas station, former Greyhound bus facility	Medium

Site ID	Site Name	Ranking Rationale	Risk Rank
031	305-317 W Washington Street/Multi-Tenant Commercial Building	Former dentist's office, former physician services	High
032	Corral Auto Repair	Former gas station and removed Tank Site, Inactive Hazardous Waste Generator, auto repair facility	Medium
033	Kummet Larson Bluth & Co., (certified public accountants) and Northridge Insurance Agency	Inactive Minimal Quantity Hazardous Waste Generator, former dental practice	High
034	Riverside Elementary School	Active and Inactive Tank Site, Active and Inactive Hazardous Waste generators	Medium
035	Tyrol Hills Shopping Center	Inactive Hazardous Waste Generator listings, past medical and dental practices	High
036	Westwood Mobile Home Park	Mobile home park, likely associated with unregistered tanks	Low
037	Larson Auto Repair	Inactive Hazardous Waste Generator, auto repair activity	Medium
038	Brainerd Daily Dispatch	Closed AST, Active Very Small Quantity Hazardous Waste Generator, printing activity	Medium
039	The Lakes Area Cosmetic Bar	Inactive Hazardous Waste Generator	Low
040	Lake County Dental	Active Minimal Quantity Hazardous Waste Generator, dental office	High
041	214 James Street/Storage Building	Storage building with overhead bay style door, outdoor storage	Low
042	West Side Auto Body & Boat Repair	Active Hazardous Waste Generator, active Air Quality Permit, auto body and boat repair facility	Medium
043	Pinnacle Performance Automotive	Inactive Hazardous Waste Generator, vehicle repair facility and former car wash	Medium
044	Burt Electric/Muddy Bikes	Inactive Hazardous Waste Generator, former auto parts supplier	Medium
045	Tanner Motors Back Lot	Tank site (AST), used auto sales and likely service activities, outdoor storage of 55-gallon drums	Medium
046	Snow White Laundry & Car Wash	Active tank site (UST), laundry and car wash facility	Medium
047	Mike Hammad Upholstery	Upholstery business with likely chemical use	Low
048	Century Link	Outdoor storage of electrical transformers and possible use of PCB containing material	Medium
049	Eclipse Used Auto Sales	Active Minimal Quantity Hazardous Waste Generator, likely onsite vehicle maintenance	Medium
050	Product Alternatives Inc	Inactive Hazardous Waste Generator, former printing operations, removed tank site	Medium

Service Layer Credits: Crow Wing County Aerial Imagery (2021)



- Highway Reference Point (RP)
- 500ft Area of Investigation (AOI)

Phase I ESA Risk Ranking and Site ID

- 001 High Risk
- 002 Medium Risk
- 003 Low Risk
- De Minimis Property
- Crow Wing County Parcel Boundary

0 400 800 Feet

ENVIRONMENTAL SITES OF CONCERN - WEST BRAINERD

TH 210 BRAINERD LIMITED PHASE I ESA

DEPARTMENT OF TRANSPORTATION

Trunk Highway 210
MnDOT S.P.1805-80
Brainerd, MN

FIGURE 3A

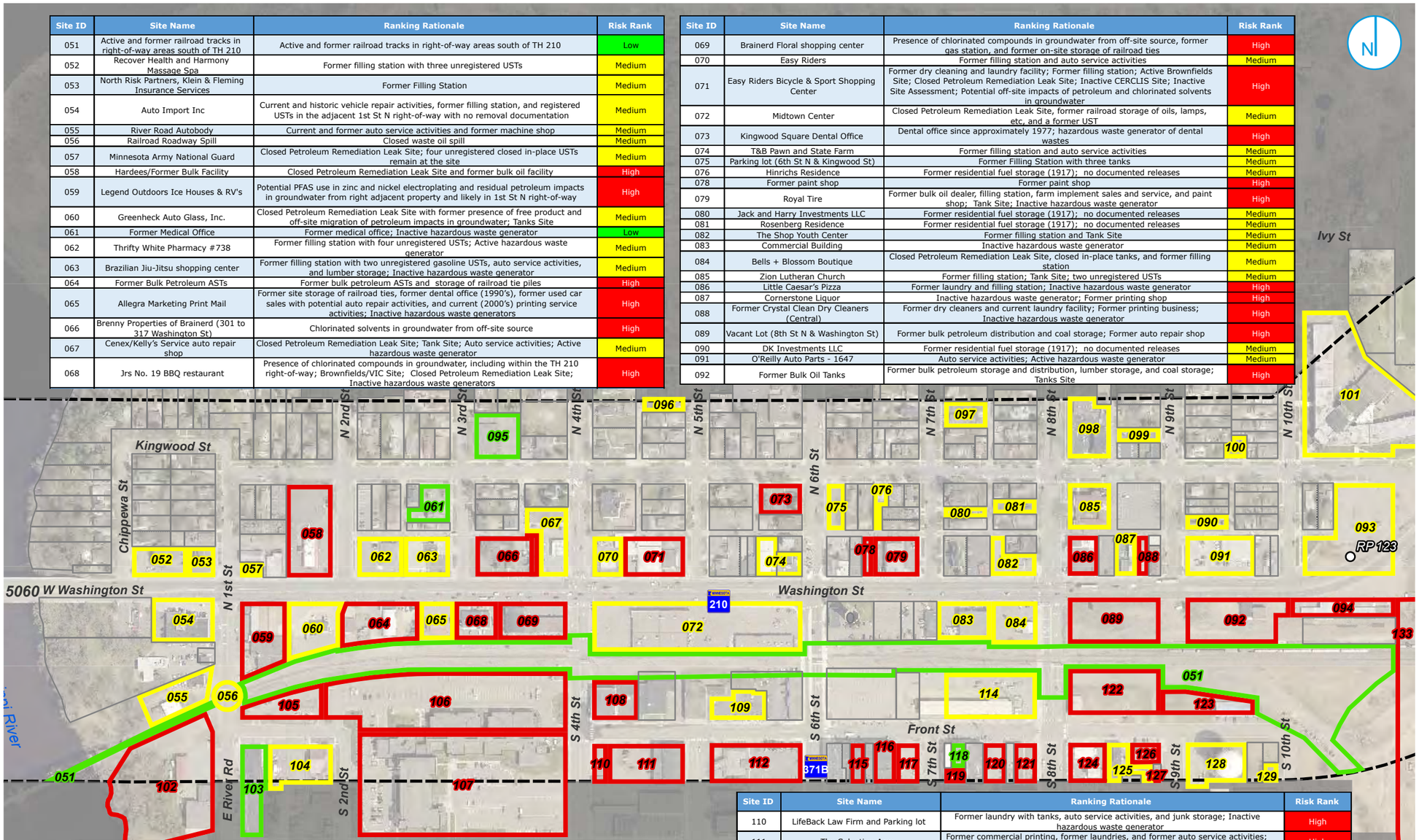
RAMBOLL US CONSULTING, INC
A RAMBOLL COMPANY

RAMBOLL

PROJECT: 1690026440 | DATED: 12/14/2022 | DESIGNER: SBUSKEY

Site ID	Site Name	Ranking Rationale	Risk Rank
051	Active and former railroad tracks in right-of-way areas south of TH 210	Active and former railroad tracks in right-of-way areas south of TH 210	Low
052	Recover Health and Harmony Massage Spa	Former filling station with three unregistered USTs	Medium
053	North Risk Partners, Klein & Fleming Insurance Services	Former Filling Station	Medium
054	Auto Import Inc	Current and historic vehicle repair activities, former filling station, and registered USTs in the adjacent 1st St N right-of-way with no removal documentation	Medium
055	River Road Autobody	Current and former auto service activities and former machine shop	Medium
056	Railroad Roadway Spill	Closed waste oil spill	Medium
057	Minnesota Army National Guard	Closed Petroleum Remediation Leak Site; four unregistered closed in-place USTs remain at the site	Medium
058	Hardees/Former Bulk Facility	Closed Petroleum Remediation Leak Site and former bulk oil facility	High
059	Legend Outdoors Ice Houses & RV's	Potential PFAS use in zinc and nickel electroplating and residual petroleum impacts in groundwater from right adjacent property and likely in 1st St N right-of-way	High
060	Greenheck Auto Glass, Inc.	Closed Petroleum Remediation Leak Site with former presence of free product and off-site migration of petroleum impacts in groundwater; Tanks Site	Medium
061	Former Medical Office	Former medical office; Inactive hazardous waste generator	Low
062	Thrifty White Pharmacy #738	Former filling station with four unregistered USTs; Active hazardous waste generator	Medium
063	Brazilian Jiu-Jitsu shopping center	Former filling station with two unregistered gasoline USTs, auto service activities, and lumber storage; Inactive hazardous waste generator	Medium
064	Former Bulk Petroleum ASTs	Former bulk petroleum ASTs and storage of railroad tie piles	High
065	Allegra Marketing Print Mail	Former site storage of railroad ties, former dental office (1990's), former used car sales with potential auto repair activities, and current (2000's) printing service activities; Inactive hazardous waste generators	High
066	Brenny Properties of Brainerd (301 to 317 Washington St)	Chlorinated solvents in groundwater from off-site source	High
067	Cenex/Kelly's Service auto repair shop	Closed Petroleum Remediation Leak Site; Tank Site; Auto service activities; Active hazardous waste generator	Medium
068	Jrs No. 19 BBQ restaurant	Presence of chlorinated compounds in groundwater, including within the TH 210 right-of-way; Brownfields/VIC Site; Closed Petroleum Remediation Leak Site; Inactive hazardous waste generators	High

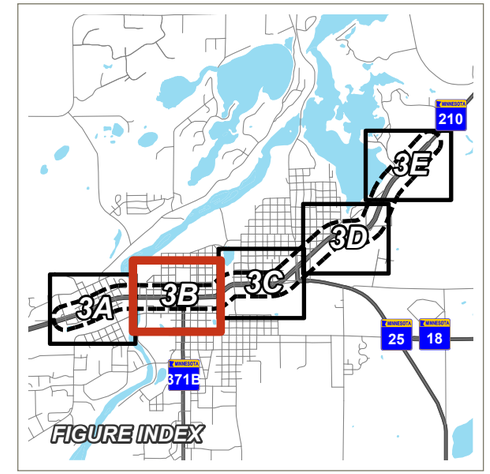
Site ID	Site Name	Ranking Rationale	Risk Rank
069	Brainerd Floral shopping center	Presence of chlorinated compounds in groundwater from off-site source, former gas station, and former on-site storage of railroad ties	High
070	Easy Riders	Former filling station and auto service activities	Medium
071	Easy Riders Bicycle & Sport Shopping Center	Former dry cleaning and laundry facility; Former filling station; Active Brownfields Site; Closed Petroleum Remediation Leak Site; Inactive CERCLIS Site; Inactive Site Assessment; Potential off-site impacts of petroleum and chlorinated solvents in groundwater	High
072	Midtown Center	Closed Petroleum Remediation Leak Site, former railroad storage of oils, lamps, etc, and a former UST	Medium
073	Kingwood Square Dental Office	Dental office since approximately 1977; hazardous waste generator of dental wastes	High
074	T&B Pawn and State Farm	Former filling station and auto service activities	Medium
075	Parking lot (6th St N & Kingwood St)	Former Filling Station with three tanks	Medium
076	Hinrichs Residence	Former residential fuel storage (1917); no documented releases	Medium
078	Former paint shop	Former paint shop	High
079	Royal Tire	Former bulk oil dealer, filling station, farm implement sales and service, and paint shop; Tank Site; Inactive hazardous waste generator	High
080	Jack and Harry Investments LLC	Former residential fuel storage (1917); no documented releases	Medium
081	Rosenberg Residence	Former residential fuel storage (1917); no documented releases	Medium
082	The Shop Youth Center	Former filling station and Tank Site	Medium
083	Commercial Building	Inactive hazardous waste generator	Medium
084	Bells + Blossom Boutique	Closed Petroleum Remediation Leak Site, closed in-place tanks, and former filling station	Medium
085	Zion Lutheran Church	Former filling station; Tank Site; two unregistered USTs	Medium
086	Little Caesar's Pizza	Former laundry and filling station; Inactive hazardous waste generator	High
087	Cornerstone Liquor	Inactive hazardous waste generator; Former printing shop	High
088	Former Crystal Clean Dry Cleaners (Central)	Former dry cleaners and current laundry facility; Former printing business; Inactive hazardous waste generator	High
089	Vacant Lot (8th St N & Washington St)	Former bulk petroleum distribution and coal storage; Former auto repair shop	High
090	DK Investments LLC	Former residential fuel storage (1917); no documented releases	Medium
091	O'Reilly Auto Parts - 1647	Auto service activities; Active hazardous waste generator	Medium
092	Former Bulk Oil Tanks	Former bulk petroleum storage and distribution, lumber storage, and coal storage; Tanks Site	High



Site ID	Site Name	Ranking Rationale	Risk Rank
093	Franklin Arts Center parking lot	Former auto servie shop and former buildings in TH 210 right-of-way; inactive hazardous waste generator	Medium
094	Brainerd Hydraulics/Air and Integrity Auto Repair	Closed Petroleum Remediation Leak Site; Current auto repair; Former bulk petroleum storage; Former unregistered tanks	High
095	St. Joseph Medical Center – Home Care and Hospice	Inactive hazardous waste generator	Low
096	Ressen Residence	Former residential fuel storage (1917); no documented releases	Medium
097	Erfurth Residence	Closed Petroleum Remediation Leak Site	Medium
098	Lakes Area Senior Activity Center	Tank Site	Medium
099	Lakes Area Senior Activity Center Parking Lot	Former residential fuel storage (1917); no documented releases	Medium
100	Voss Residence	Former residential fuel storage (1917); no documented releases	Medium
101	Franklin Arts Center	Closed Petroleum Remediation Leak Site; Tanks Site; Closed spill	Medium
102	Brainerd City Fire Department	Active oil drop site and former site dumping; Tank Site	High
103	Brainerd Police Station	Inactive hazardous waste generator	Low
104	Fraternal Order of Eagles Non-profit and Bar	Former lumber posts and shingles storage	Medium
105	Brainerd Police Station Parking Lot	Former bulk oil storage; Closed Petroleum Remediation Leak Site	High
106	Crow Wing County Jail Parking Lot	Multiple former petroleum wholesale distributors; Former coal storage; Former auto service activities; Tanks Site; Closed Petroleum Remediation Leak Site; Closed spill	High
107	Crow Wing County Jail	Former filling station, laundry shops, printing shop, and blacksmith; Former site storage of wrecked automobiles and auto parts scrap	High
108	First Impression Printing Inc	Former laundry, current printing	High
109	Former Paramount Property	Former UST	Medium

Site ID	Site Name	Ranking Rationale	Risk Rank
110	LifeBack Law Firm and Parking lot	Former laundry with tanks, auto service activities, and junk storage; Inactive hazardous waste generator	High
111	The Salvation Army	Former commercial printing, former laundries, and former auto service activities; Inactive hazardous waste generator	High
112	Mid Minnesota Federal Credit Union - Brainerd	Active Petroleum Remediation Leak Site, former printing shop, auto repair shop, undertaker, and a former UST in the Front St right-of-way	High
114	Former Freight Depot	Former freight depot with rail spurs and closed diesel spill	Medium
115	Sports Card Central	Former commercial photography and printing; Inactive hazardous waste generator	High
116	Former printing and photography	Former printing and photography	High
117	Former printing	Former printing	High
118	Iron Hills Gun & Pawn	Hazardous waste generator	Low
119	Former Chinese Laundry	Former Chinese laundry, undertaker, and paint storage	High
120	Parking lot	Former dry cleaners (1937-1975); Former photography shop and refrigerator service shop	High
121	Arcadia Building	Former dental offices (1960's until recent); Former undertaker/coroner; Inactive hazardous waste generators	High
122	Former Bulk Oil Site	Former bulk oil storage and distribution	High
123	Bjerga's Feed Store	Former wholesale gas station	High
124	Northland Fire Protection	Former bulk petroleum storage facility; Tank Site; Closed Petroleum Remediation Leak Site	High
125	Brainerd Skate Co	Former auto service activities	Medium
126	Minnesota T's	Off-site and right-of-way petroleum impacts to soil-gas and groundwater, and chlorinated solvents in soil-gas; Former presence of free product; Former blacksmith shop; Active Site Assessment; Closed Petroleum Remediation Leak Site; Tank Site	High
127	Former blacksmith shop	Former blacksmith shop	High
128	Brainerd water tower	Petroleum impacts to soil-gas and groundwater from upgradient closed leak site at 824 Front St; Former auto repair shops and salvage	Medium
129	First Impression Print & Design	Active hazardous waste generator and former auto repair activities	Medium

Service Layer Credits: Crow Wing County Aerial Imagery (2021).



- Highway Reference Point (RP)
- 500ft Area of Investigation (AOI)

Phase I ESA Risk Ranking and Site ID

- 001 High Risk
- 002 Medium Risk
- 003 Low Risk
- De Minimis Property
- Crow Wing County Parcel Boundary

0 400 800 Feet

ENVIRONMENTAL SITES OF CONCERN - CENTRAL BRAINERD

TH 210 BRAINERD LIMITED PHASE I ESA

DEPARTMENT OF TRANSPORTATION

Trunk Highway 210
MnDOT S.P.1805-80
Brainerd, MN

FIGURE 3B

RAMBOLL US CONSULTING, INC
A RAMBOLL COMPANY

RAMBOLL

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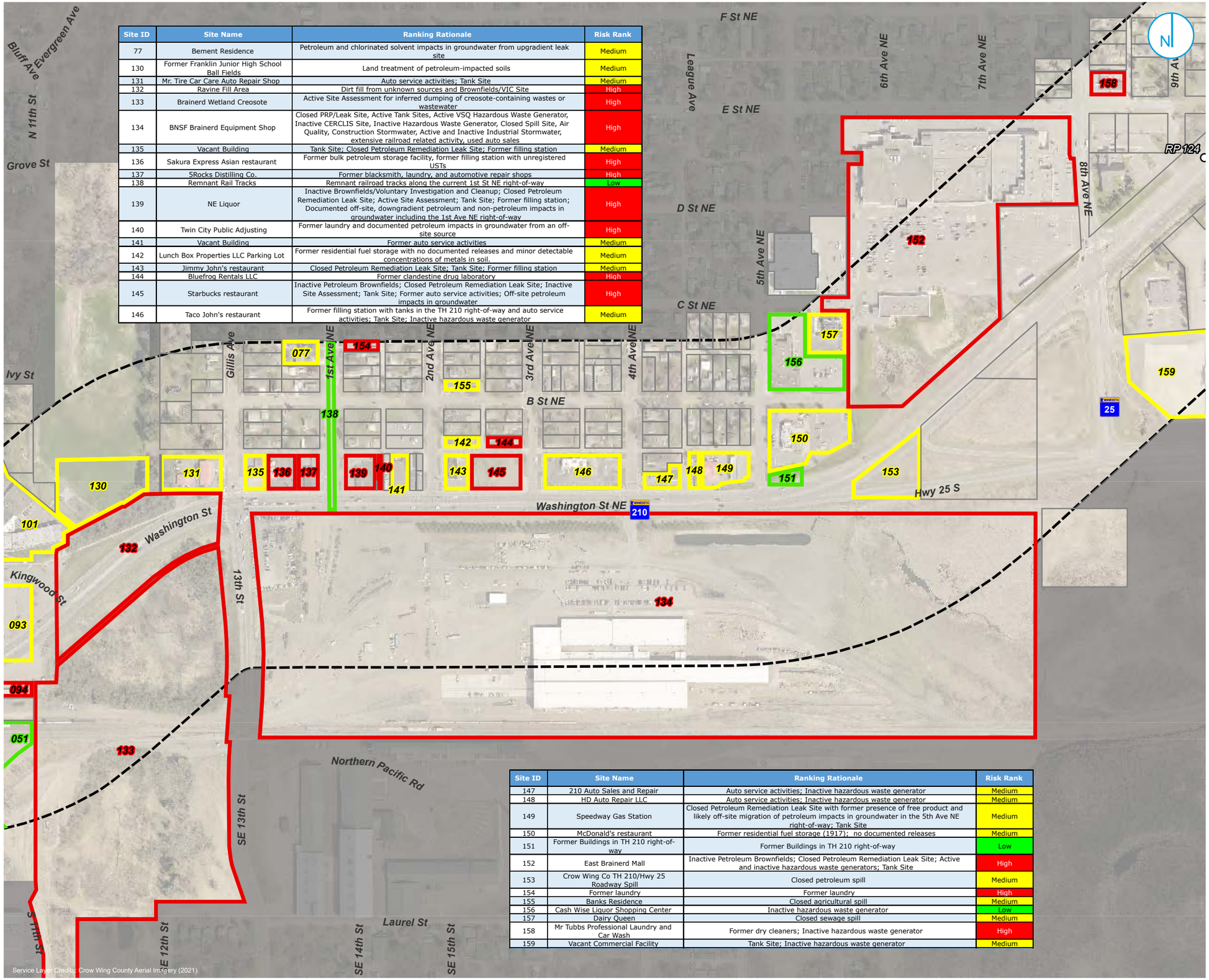
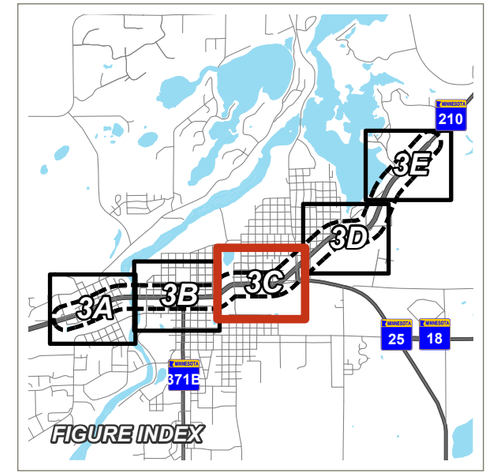
PROJECT: 1690026440 | DATED: 12/14/2022 | DESIGNER: SBUSKEY



Site ID	Site Name	Ranking Rationale	Risk Rank
77	Bement Residence	Petroleum and chlorinated solvent impacts in groundwater from upgradient leak site	Medium
130	Former Franklin Junior High School Ball Fields	Land treatment of petroleum-impacted soils	Medium
131	Mr. Tire Car Care Auto Repair Shop	Auto service activities; Tank Site	Medium
132	Ravine Fill Area	Dirt fill from unknown sources and Brownfields/VIC Site	High
133	Brainerd Wetland Creosote	Active Site Assessment for inferred dumping of creosote-containing wastes or wastewater	High
134	BNSF Brainerd Equipment Shop	Closed PRP/Leak Site, Active Tank Sites, Active VSQ Hazardous Waste Generator, Inactive CERCLIS Site, Inactive Hazardous Waste Generator, Closed Spill Site, Air Quality, Construction Stormwater, Active and Inactive Industrial Stormwater, extensive railroad related activity, used auto sales	High
135	Vacant Building	Tank Site; Closed Petroleum Remediation Leak Site; Former filling station	Medium
136	Sakura Express Asian restaurant	Former bulk petroleum storage facility, former filling station with unregistered USTs	High
137	5Rocks Distilling Co.	Former blacksmith, laundry, and automotive repair shops	High
138	Remnant Rail Tracks	Remnant railroad tracks along the current 1st St NE right-of-way	Low
139	NE Liquor	Inactive Brownfields/Voluntary Investigation and Cleanup; Closed Petroleum Remediation Leak Site; Active Site Assessment; Tank Site; Former filling station; Documented off-site, downgradient petroleum and non-petroleum impacts in groundwater including the 1st Ave NE right-of-way	High
140	Twin City Public Adjusting	Former laundry and documented petroleum impacts in groundwater from an off-site source	High
141	Vacant Building	Former auto service activities	Medium
142	Lunch Box Properties LLC Parking Lot	Former residential fuel storage with no documented releases and minor detectable concentrations of metals in soil.	Medium
143	Jimmy John's restaurant	Closed Petroleum Remediation Leak Site; Tank Site; Former filling station	Medium
144	Bluefrog Rentals LLC	Former clandestine drug laboratory	High
145	Starbucks restaurant	Inactive Petroleum Brownfields; Closed Petroleum Remediation Leak Site; Inactive Site Assessment; Tank Site; Former auto service activities; Off-site petroleum impacts in groundwater	High
146	Taco John's restaurant	Former filling station with tanks in the TH 210 right-of-way and auto service activities; Tank Site; Inactive hazardous waste generator	Medium

Site ID	Site Name	Ranking Rationale	Risk Rank
147	210 Auto Sales and Repair	Auto service activities; Inactive hazardous waste generator	Medium
148	HD Auto Repair LLC	Auto service activities; Inactive hazardous waste generator	Medium
149	Speedway Gas Station	Closed Petroleum Remediation Leak Site with former presence of free product and likely off-site migration of petroleum impacts in groundwater in the 5th Ave NE right-of-way; Tank Site	Medium
150	McDonald's restaurant	Former residential fuel storage (1917); no documented releases	Medium
151	Former Buildings in TH 210 right-of-way	Former Buildings in TH 210 right-of-way	Low
152	East Brainerd Mall	Inactive Petroleum Brownfields; Closed Petroleum Remediation Leak Site; Active and inactive hazardous waste generators; Tank Site	High
153	Crow Wing Co TH 210/Hwy 25 Roadway Spill	Closed petroleum spill	Medium
154	Former laundry	Former laundry	High
155	Banks Residence	Closed agricultural spill	Medium
156	Cash Wise Liquor Shopping Center	Inactive hazardous waste generator	Low
157	Dairy Queen	Closed sewage spill	Medium
158	Mr Tubbs Professional Laundry and Car Wash	Former dry cleaners; Inactive hazardous waste generator	High
159	Vacant Commercial Facility	Tank Site; Inactive hazardous waste generator	Medium



Highway Reference Point (RP)
500ft Area of Investigation (AOI)

Phase I ESA Risk Ranking and Site ID

- 001 High Risk
- 002 Medium Risk
- 003 Low Risk
- De Minimis Property
- Crow Wing County Parcel Boundary

0 400 800 Feet

ENVIRONMENTAL SITES OF CONCERN - EAST BRAINERD

TH 210 BRAINERD
LIMITED PHASE I ESA

DEPARTMENT OF TRANSPORTATION

Trunk Highway 210
MnDOT S.P.1805-80
Brainerd, MN

FIGURE 3C

RAMBOLL US CONSULTING, INC
A RAMBOLL COMPANY

RAMBOLL

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PROJECT: 1690026440 | DATED: 12/14/2022 | DESIGNER: SBUSKEY

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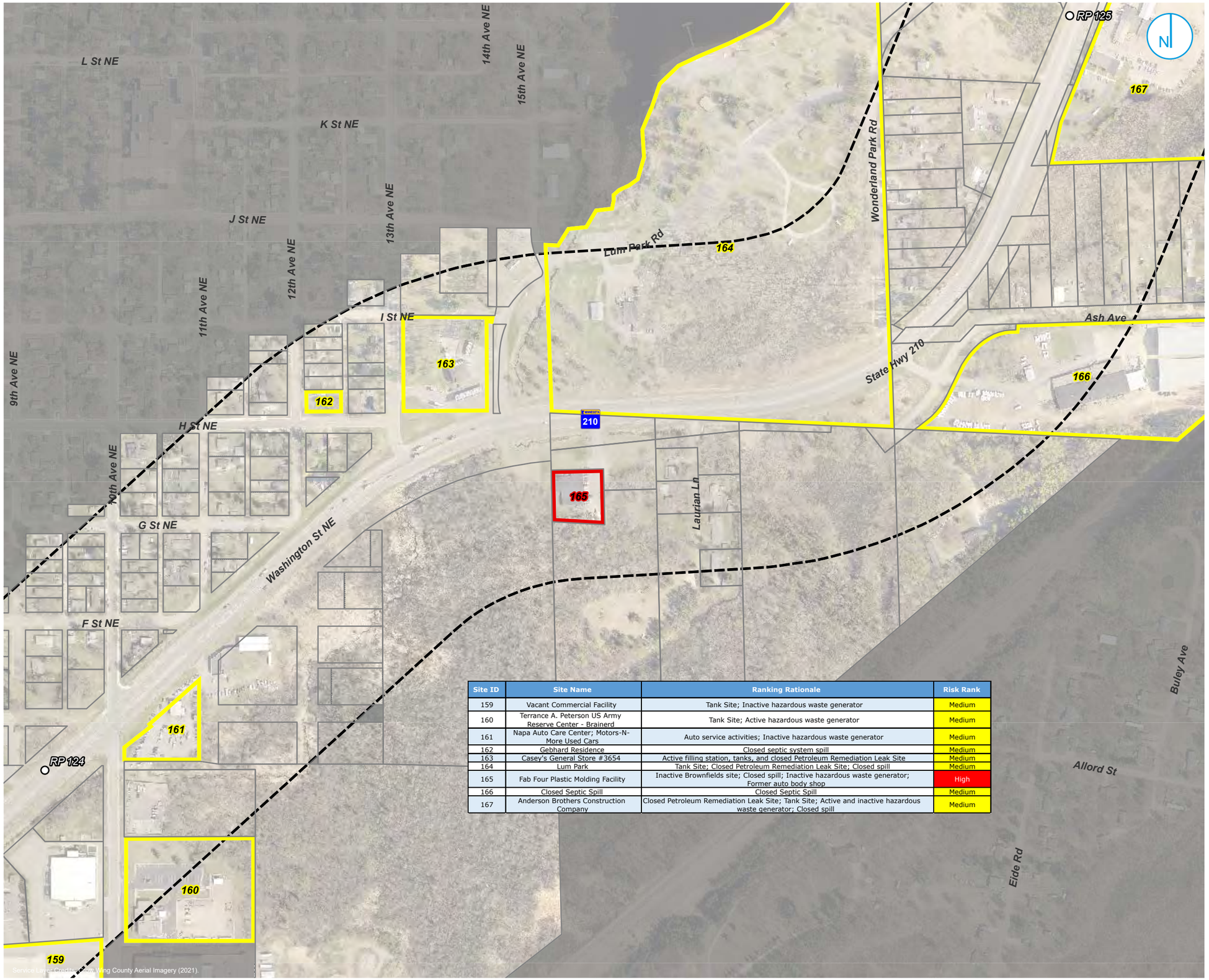
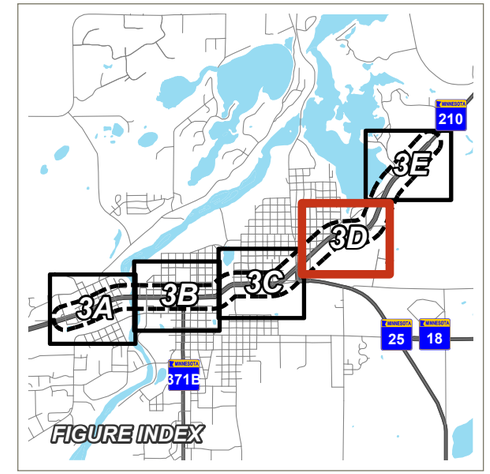


Site ID	Site Name	Ranking Rationale	Risk Rank
159	Vacant Commercial Facility	Tank Site; Inactive hazardous waste generator	Medium
160	Terrance A. Peterson US Army Reserve Center - Brainerd	Tank Site; Active hazardous waste generator	Medium
161	Napa Auto Care Center; Motors-N-More Used Cars	Auto service activities; Inactive hazardous waste generator	Medium
162	Gebhard Residence	Closed septic system spill	Medium
163	Casey's General Store #3654	Active filling station, tanks, and closed Petroleum Remediation Leak Site	Medium
164	Lum Park	Tank Site; Closed Petroleum Remediation Leak Site; Closed spill	Medium
165	Fab Four Plastic Molding Facility	Inactive Brownfields site; Closed spill; Inactive hazardous waste generator; Former auto body shop	High
166	Closed Septic Spill	Closed Septic Spill	Medium
167	Anderson Brothers Construction Company	Closed Petroleum Remediation Leak Site; Tank Site; Active and inactive hazardous waste generator; Closed spill	Medium



- Highway Reference Point (RP)
- 500ft Area of Investigation (AOI)

Phase I ESA Risk Ranking and Site ID

- 001 High Risk
- 002 Medium Risk
- 003 Low Risk
- De Minimis Property
- Crow Wing County Parcel Boundary

0 400 800 Feet

ENVIRONMENTAL SITES OF CONCERN - EAST BRAINERD

TH 210 BRAINERD
LIMITED PHASE I ESA

DEPARTMENT OF TRANSPORTATION

Trunk Highway 210
MnDOT S.P.1805-80
Brainerd, MN

FIGURE 3D

RAMBOLL US CONSULTING, INC
A RAMBOLL COMPANY

RAMBOLL

PROJECT: 1690026440 | DATED: 12/14/2022 | DESIGNER: SBUSKEY

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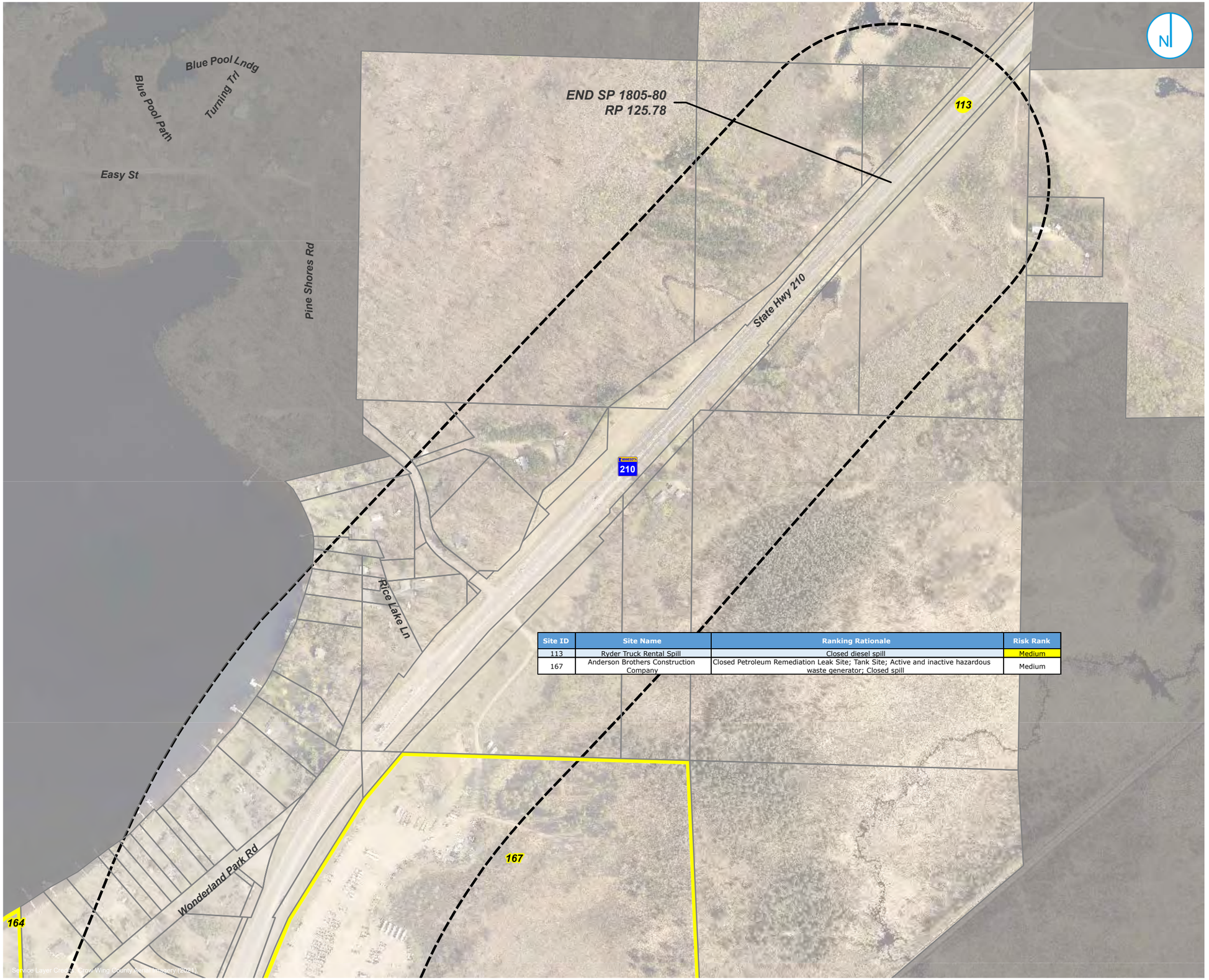
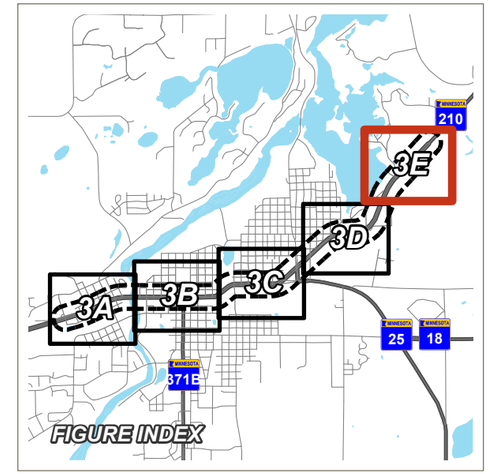


Site ID	Site Name	Ranking Rationale	Risk Rank
113	Ryder Truck Rental Spill	Closed diesel spill	Medium
167	Anderson Brothers Construction Company	Closed Petroleum Remediation Leak Site; Tank Site; Active and inactive hazardous waste generator; Closed spill	Medium



- Highway Reference Point (RP)
- 500ft Area of Investigation (AOI)

Phase I ESA Risk Ranking and Site ID

- 001 High Risk
- 002 Medium Risk
- 003 Low Risk
- De Minimis Property
- Crow Wing County Parcel Boundary

0 400 800 Feet

ENVIRONMENTAL SITES OF CONCERN - EAST BRAINERD

TH 210 BRAINERD
LIMITED PHASE I ESA

DEPARTMENT OF TRANSPORTATION

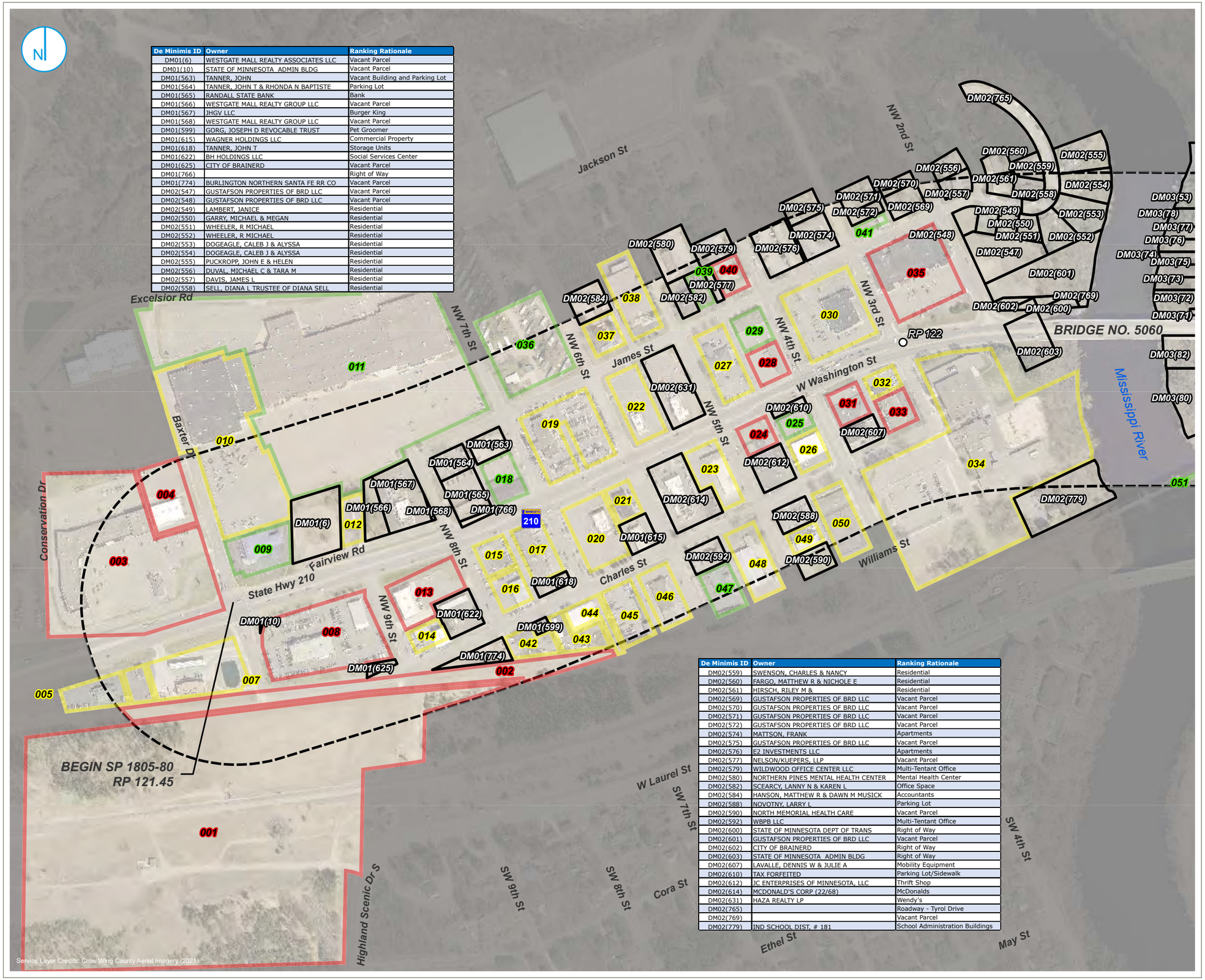
Trunk Highway 210
MnDOT S.P.1805-80
Brainerd, MN

FIGURE 3E

RAMBOLL US CONSULTING, INC
A RAMBOLL COMPANY

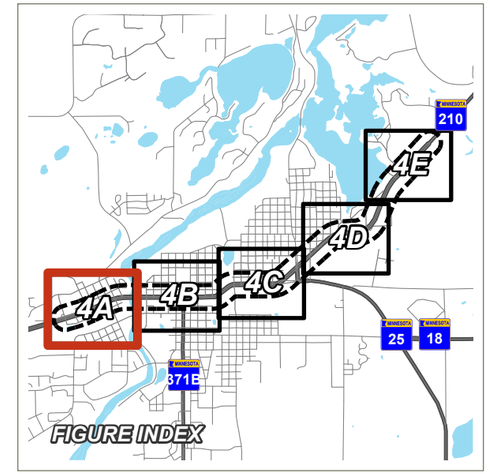
RAMBOLL

PROJECT: 1690026440 | DATED: 12/14/2022 | DESIGNER: SBUSKEY



De Minimis ID	Owner	Ranking Rationale
DM01(6)	WESTGATE MALL REALTY ASSOCIATES LLC	Vacant Parcel
DM01(10)	STATE OF MINNESOTA ADMIN BLDG	Vacant Parcel
DM01(563)	TANNER, JOHN	Vacant Building and Parking Lot
DM01(564)	TANNER, JOHN T & RHONDA N BAPTISTE	Parking Lot
DM01(565)	RANDALL STATE BANK	Bank
DM01(566)	WESTGATE MALL REALTY GROUP LLC	Vacant Parcel
DM01(567)	JHGV LLC	Burger King
DM01(568)	WESTGATE MALL REALTY GROUP LLC	Vacant Parcel
DM01(599)	GORG, JOSEPH D REVOCABLE TRUST	Pet Groomer
DM01(615)	WAGNER HOLDINGS LLC	Commercial Property
DM01(618)	TANNER, JOHN T	Storage Units
DM01(622)	BH HOLDINGS LLC	Social Services Center
DM01(625)	CITY OF BRAINERD	Vacant Parcel
DM01(766)		Right of Way
DM01(774)	BURLINGTON NORTHERN SANTA FE RR CO	Vacant Parcel
DM02(547)	GUSTAFSON PROPERTIES OF BRD LLC	Vacant Parcel
DM02(548)	GUSTAFSON PROPERTIES OF BRD LLC	Vacant Parcel
DM02(549)	LAMBERT, JANICE	Residential
DM02(550)	GARRY, MICHAEL & MEGAN	Residential
DM02(551)	WHEELER, R MICHAEL	Residential
DM02(552)	WHEELER, R MICHAEL	Residential
DM02(553)	DOGEAGLE, CALEB J & ALYSSA	Residential
DM02(554)	DOGEAGLE, CALEB J & ALYSSA	Residential
DM02(555)	PUCKROPP, JOHN E & HELEN	Residential
DM02(556)	DUVAL, MICHAEL C & TARA M	Residential
DM02(557)	DAVIS, JAMES L	Residential
DM02(558)	SELL, DIANA L TRUSTEE OF DIANA SELL	Residential

De Minimis ID	Owner	Ranking Rationale
DM02(559)	SWENSON, CHARLES & NANCY	Residential
DM02(560)	FARGO, MATTHEW R & NICHOLE E	Residential
DM02(561)	HIRSCH, RILEY M &	Residential
DM02(569)	GUSTAFSON PROPERTIES OF BRD LLC	Vacant Parcel
DM02(570)	GUSTAFSON PROPERTIES OF BRD LLC	Vacant Parcel
DM02(571)	GUSTAFSON PROPERTIES OF BRD LLC	Vacant Parcel
DM02(572)	GUSTAFSON PROPERTIES OF BRD LLC	Vacant Parcel
DM02(574)	MATTSON, FRANK	Apartments
DM02(575)	GUSTAFSON PROPERTIES OF BRD LLC	Vacant Parcel
DM02(576)	E2 INVESTMENTS LLC	Apartments
DM02(577)	NELSON/KUEPERS, LLP	Vacant Parcel
DM02(579)	WILDWOOD OFFICE CENTER LLC	Multi-Tentant Office
DM02(580)	NORTHERN PINES MENTAL HEALTH CENTER	Mental Health Center
DM02(582)	SCEARCY, LANNY N & KAREN L	Office Space
DM02(584)	HANSON, MATTHEW R & DAWN M MUSICK	Accountants
DM02(588)	NOVOTNY, LARRY L	Parking Lot
DM02(590)	NORTH MEMORIAL HEALTH CARE	Vacant Parcel
DM02(592)	WBPB LLC	Multi-Tentant Office
DM02(600)	STATE OF MINNESOTA DEPT OF TRANS	Right of Way
DM02(601)	GUSTAFSON PROPERTIES OF BRD LLC	Vacant Parcel
DM02(602)	CITY OF BRAINERD	Right of Way
DM02(603)	STATE OF MINNESOTA ADMIN BLDG	Right of Way
DM02(607)	LAVALLE, DENNIS W & JULIE A	Mobility Equipment
DM02(610)	TAX FORFEITED	Parking Lot/Sidewalk
DM02(612)	JC ENTERPRISES OF MINNESOTA, LLC	Thrift Shop
DM02(614)	MCDONALD'S CORP (22/68)	McDonalds
DM02(631)	HAZA REALTY LP	Wendy's
DM02(765)		Roadway - Tyrol Drive
DM02(769)		Vacant Parcel
DM02(779)	IND SCHOOL DIST. # 181	School Administration Buildings



- Highway Reference Point (RP)
- 500ft Area of Investigation (AOI)

Phase I ESA Risk Ranking and Site ID

- D001 De Minimis Property
- 001 High Risk
- 002 Medium Risk
- 003 Low Risk

0 400 800 Feet

DE MINIMIS PROPERTIES - WEST BRAINERD

TH 210 BRAINERD
LIMITED PHASE I ESA

DEPARTMENT OF TRANSPORTATION

Trunk Highway 210
MnDOT S.P.1805-80
Brainerd, MN

FIGURE 4A

RAMBOLL US CONSULTING, INC
A RAMBOLL COMPANY

RAMBOLL

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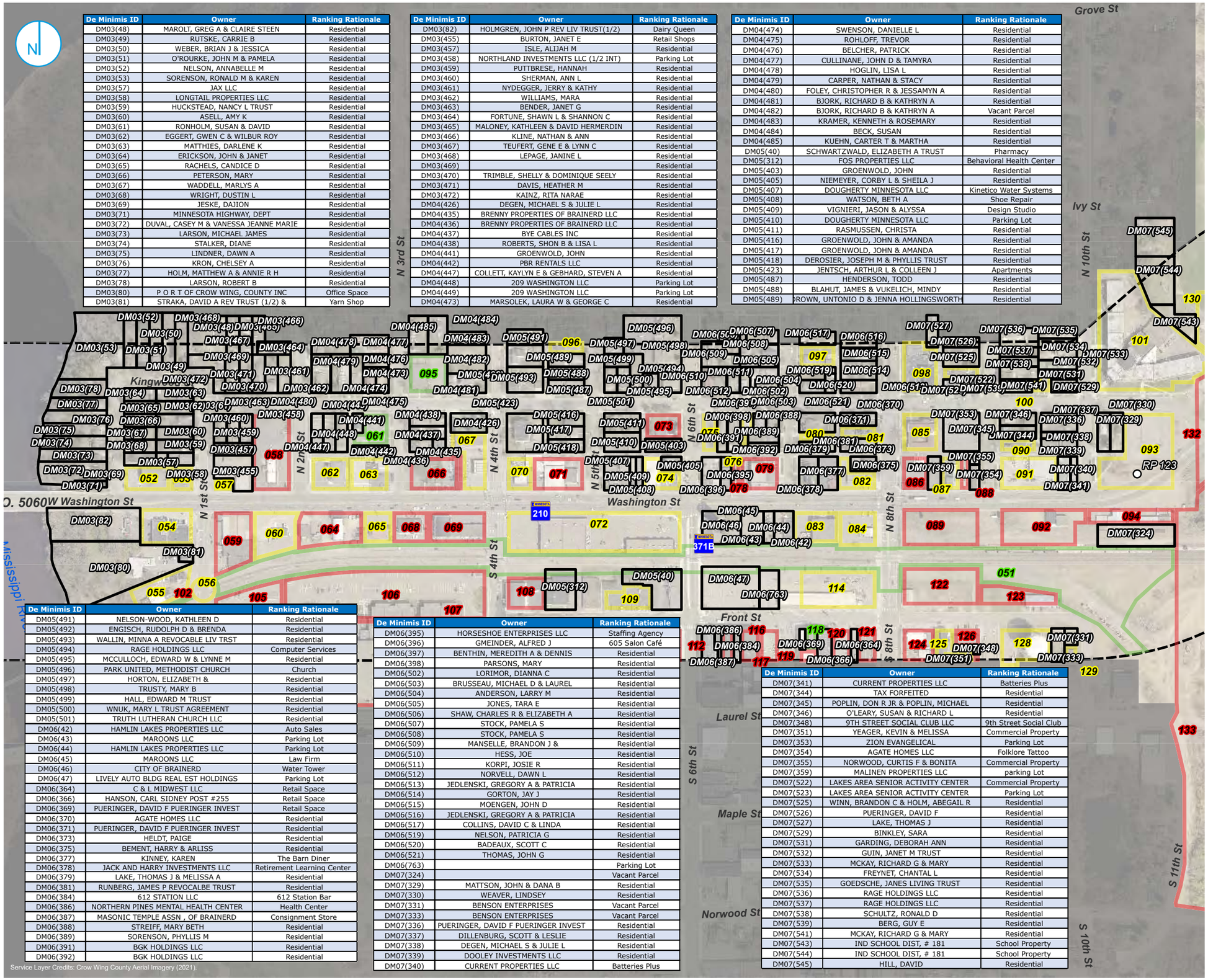
PROJECT: 1690026440 | DATED: 12/15/2022 | DESIGNER: SBUSKEY



De Minimis ID	Owner	Ranking Rationale
DM03(48)	MAROLT, GREG A & CLAIRE STEEN	Residential
DM03(49)	RUTSKE, CARRIE B	Residential
DM03(50)	WEBER, BRIAN J & JESSICA	Residential
DM03(51)	O'ROURKE, JOHN M & PAMELA	Residential
DM03(52)	NELSON, ANNABELLE M	Residential
DM03(53)	SORENSON, RONALD M & KAREN	Residential
DM03(57)	JAX LLC	Residential
DM03(58)	LONGTAIL PROPERTIES LLC	Residential
DM03(59)	HUCKSTEAD, NANCY L TRUST	Residential
DM03(60)	ASELL, AMY K	Residential
DM03(61)	RONHOLM, SUSAN & DAVID	Residential
DM03(62)	EGGERT, GWEN C & WILBUR ROY	Residential
DM03(63)	MATTHIES, DARLENE K	Residential
DM03(64)	ERICKSON, JOHN & JANET	Residential
DM03(65)	RACHELS, CANDICE D	Residential
DM03(66)	PETERSON, MARY	Residential
DM03(67)	WADDELL, MARLYS A	Residential
DM03(68)	WRIGHT, DUSTIN L	Residential
DM03(69)	JESKE, DAJION	Residential
DM03(71)	MINNESOTA HIGHWAY, DEPT	Residential
DM03(72)	DUVAL, CASEY M & VANESSA JEANNE MARIE	Residential
DM03(73)	LARSON, MICHAEL JAMES	Residential
DM03(74)	STALKER, DIANE	Residential
DM03(75)	LINDNER, DAWN A	Residential
DM03(76)	KRON, CHELSEY A	Residential
DM03(77)	HOLM, MATTHEW A & ANNIE R H	Residential
DM03(78)	LARSON, ROBERT B	Residential
DM03(80)	P O R T OF CROW WING, COUNTY INC	Office Space
DM03(81)	STRAKA, DAVID A REV TRUST (1/2) &	Yarn Shop

De Minimis ID	Owner	Ranking Rationale
DM03(82)	HOLMGREN, JOHN P REV LIV TRUST(1/2)	Dairy Queen
DM03(455)	BURTON, JANET E	Retail Shops
DM03(457)	ISLE, ALIJAH M	Residential
DM03(458)	NORTHLAND INVESTMENTS LLC (1/2 INT)	Parking Lot
DM03(459)	PUTTBRESE, HANNAH	Residential
DM03(460)	SHERMAN, ANN L	Residential
DM03(461)	NYDEGGER, JERRY & KATHY	Residential
DM03(462)	WILLIAMS, MARA	Residential
DM03(463)	BENDER, JANET G	Residential
DM03(464)	FORTUNE, SHAWN L & SHANNON C	Residential
DM03(465)	MALONEY, KATHLEEN & DAVID HERMERDIN	Residential
DM03(466)	KLINE, NATHAN & ANN	Residential
DM03(467)	TEUFERT, GENE E & LYNN C	Residential
DM03(468)	LEPAGE, JANINE L	Residential
DM03(469)		Residential
DM03(470)	TRIMBLE, SHELLY & DOMINIQUE SEELY	Residential
DM03(471)	DAVIS, HEATHER M	Residential
DM03(472)	KAINZ, RITA NARAE	Residential
DM04(426)	DEGEN, MICHAEL S & JULIE L	Residential
DM04(435)	BRENNY PROPERTIES OF BRAINERD LLC	Residential
DM04(436)	BRENNY PROPERTIES OF BRAINERD LLC	Residential
DM04(437)	BYE CABLES INC	Residential
DM04(438)	ROBERTS, SHON B & LISA L	Residential
DM04(441)	GROENWOLD, JOHN	Residential
DM04(442)	PBR RENTALS LLC	Residential
DM04(447)	COLLETT, KAYLYN E & GEBHARD, STEVEN A	Residential
DM04(448)	209 WASHINGTON LLC	Parking Lot
DM04(449)	209 WASHINGTON LLC	Parking Lot
DM04(473)	MARSOLEK, LAURA W & GEORGE C	Residential

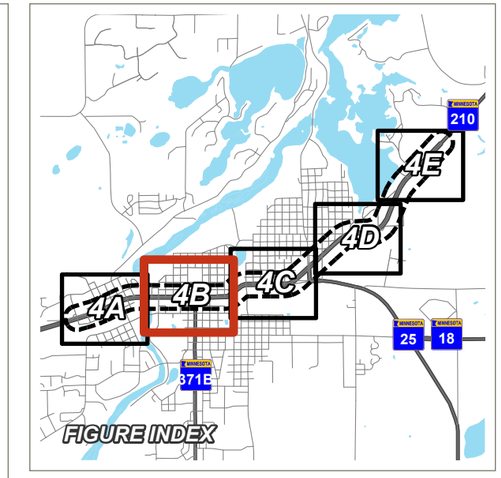
De Minimis ID	Owner	Ranking Rationale
DM04(474)	SWENSON, DANIELLE L	Residential
DM04(475)	ROHLOFF, TREVOR	Residential
DM04(476)	BELCHER, PATRICK	Residential
DM04(477)	CULLINANE, JOHN D & TAMYRA	Residential
DM04(478)	HOGLIN, LISA L	Residential
DM04(479)	CARPER, NATHAN & STACY	Residential
DM04(480)	FOLEY, CHRISTOPHER R & JESSAMYN A	Residential
DM04(481)	BJORK, RICHARD B & KATHRYN A	Residential
DM04(482)	BJORK, RICHARD B & KATHRYN A	Vacant Parcel
DM04(483)	KRAMER, KENNETH & ROSEMARY	Residential
DM04(484)	BECK, SUSAN	Residential
DM04(485)	KUEHN, CARTER T & MARTHA	Residential
DM05(40)	SCHWARTZWALD, ELIZABETH A TRUST	Pharmacy
DM05(312)	FOS PROPERTIES LLC	Behavioral Health Center
DM05(403)	GROENWOLD, JOHN	Residential
DM05(405)	NIEMEYER, CORBY L & SHEILA J	Residential
DM05(407)	DOUGHERTY MINNESOTA LLC	Kinetico Water Systems
DM05(408)	WATSON, BETH A	Shoe Repair
DM05(409)	VIGNIERI, JASON & ALYSSA	Design Studio
DM05(410)	DOUGHERTY MINNESOTA LLC	Parking Lot
DM05(411)	RASMUSSEN, CHRISTA	Residential
DM05(416)	GROENWOLD, JOHN & AMANDA	Residential
DM05(417)	GROENWOLD, JOHN & AMANDA	Residential
DM05(418)	DEROSIER, JOSEPH M & PHYLLIS TRUST	Residential
DM05(423)	JENTSCH, ARTHUR L & COLLEEN J	Apartments
DM05(487)	HENDERSON, TODD	Residential
DM05(488)	BLAHUT, JAMES & VUKELICH, MINDY	Residential
DM05(489)	BROWN, UNTONIO D & JENNA HOLLINGSWORTH	Residential

De Minimis ID	Owner	Ranking Rationale
DM05(491)	NELSON-WOOD, KATHLEEN D	Residential
DM05(492)	ENGISCH, RUDOLPH D & BRENDA	Residential
DM05(493)	WALLIN, MINNA A REVOCABLE LIV TRST	Residential
DM05(494)	RAGE HOLDINGS LLC	Computer Services
DM05(495)	MCCULLOCH, EDWARD W & LYNNE M	Residential
DM05(496)	PARK UNITED, METHODIST CHURCH	Church
DM05(497)	HORTON, ELIZABETH &	Residential
DM05(498)	TRUSTY, MARY B	Residential
DM05(499)	HALL, EDWARD M TRUST	Residential
DM05(500)	WNUK, MARY L TRUST AGREEMENT	Residential
DM05(501)	TRUTH LUTHERAN CHURCH LLC	Residential
DM06(42)	HAMLIN LAKES PROPERTIES LLC	Auto Sales
DM06(43)	MAROONS LLC	Parking Lot
DM06(44)	HAMLIN LAKES PROPERTIES LLC	Parking Lot
DM06(45)	MAROONS LLC	Law Firm
DM06(46)	CITY OF BRAINERD	Water Tower
DM06(47)	LIVELY AUTO BLDG REAL EST HOLDINGS	Parking Lot
DM06(364)	C & L MIDWEST LLC	Retail Space
DM06(366)	HANSON, CARL SIDNEY POST #255	Retail Space
DM06(369)	PUERINGER, DAVID F PUERINGER INVEST	Retail Space
DM06(370)	AGATE HOMES LLC	Residential
DM06(371)	PUERINGER, DAVID F PUERINGER INVEST	Residential
DM06(373)	HELDT, PAIGE	Residential
DM06(375)	BEMENT, HARRY & ARLISS	Residential
DM06(377)	KINNEY, KAREN	The Barn Diner
DM06(378)	JACK AND HARRY INVESTMENTS LLC	Retirement Learning Center
DM06(379)	LAKE, THOMAS J & MELISSA A	Residential
DM06(381)	RUNBERG, JAMES P REVOCALBE TRUST	Residential
DM06(384)	612 STATION LLC	612 Station Bar
DM06(386)	NORTHERN PINES MENTAL HEALTH CENTER	Health Center
DM06(387)	MASONIC TEMPLE ASSN , OF BRAINERD	Consignment Store
DM06(388)	STREIFF, MARY BETH	Residential
DM06(389)	SORENSON, PHYLLIS M	Residential
DM06(391)	BGK HOLDINGS LLC	Residential
DM06(392)	BGK HOLDINGS LLC	Residential

De Minimis ID	Owner	Ranking Rationale
DM06(395)	HORSESHOE ENTERPRISES LLC	Staffing Agency
DM06(396)	GMEINDER, ALFRED J	605 Salon Café
DM06(397)	BENTHIN, MEREDITH A & DENNIS	Residential
DM06(398)	PARSONS, MARY	Residential
DM06(502)	LORIMOR, DIANNA C	Residential
DM06(503)	BRUSSEAU, MICHAEL D & LAUREL	Residential
DM06(504)	ANDERSON, LARRY M	Residential
DM06(505)	JONES, TARA E	Residential
DM06(506)	SHAW, CHARLES R & ELIZABETH A	Residential
DM06(507)	STOCK, PAMELA S	Residential
DM06(508)	STOCK, PAMELA S	Residential
DM06(509)	MANSELLE, BRANDON J &	Residential
DM06(510)	HESS, JOE	Residential
DM06(511)	KORPI, JOSIE R	Residential
DM06(512)	NORVELL, DAWN L	Residential
DM06(513)	JEDLENSKI, GREGORY A & PATRICIA	Residential
DM06(514)	GORTON, JAY J	Residential
DM06(515)	MOENGEN, JOHN D	Residential
DM06(516)	JEDLENSKI, GREGORY A & PATRICIA	Residential
DM06(517)	COLLINS, DAVID C & LINDA	Residential
DM06(519)	NELSON, PATRICIA G	Residential
DM06(520)	BADEAUX, SCOTT C	Residential
DM06(521)	THOMAS, JOHN G	Residential
DM06(763)		Parking Lot
DM07(324)		Vacant Parcel
DM07(329)	MATTSON, JOHN & DANA B	Residential
DM07(330)	WEAVER, LINDSEY	Residential
DM07(331)	BENSON ENTERPRISES	Vacant Parcel
DM07(333)	BENSON ENTERPRISES	Vacant Parcel
DM07(336)	PUERINGER, DAVID F PUERINGER INVEST	Residential
DM07(337)	DILLENBURG, SCOTT & LESLIE	Residential
DM07(338)	DEGEN, MICHAEL S & JULIE L	Residential
DM07(339)	DOOLEY INVESTMENTS LLC	Residential
DM07(340)	CURRENT PROPERTIES LLC	Batteries Plus

De Minimis ID	Owner	Ranking Rationale
DM07(341)	CURRENT PROPERTIES LLC	Batteries Plus
DM07(344)	TAX FORFEITED	Residential
DM07(345)	POPLIN, DON R JR & POPLIN, MICHAEL	Residential
DM07(346)	O'LEARY, SUSAN & RICHARD L	Residential
DM07(348)	9TH STREET SOCIAL CLUB LLC	9th Street Social Club
DM07(351)	YEAGER, KEVIN & MELISSA	Commercial Property
DM07(353)	ZION EVANGELICAL	Parking Lot
DM07(354)	AGATE HOMES LLC	Folklore Tattoo
DM07(355)	NORWOOD, CURTIS F & BONITA	Commercial Property
DM07(359)	MALINEN PROPERTIES LLC	parking Lot
DM07(522)	LAKES AREA SENIOR ACTIVITY CENTER	Commercial Property
DM07(523)	LAKES AREA SENIOR ACTIVITY CENTER	Parking Lot
DM07(525)	WINN, BRANDON C & HOLM, ABEGAIL R	Residential
DM07(526)	PUERINGER, DAVID F	Residential
DM07(527)	LAKE, THOMAS J	Residential
DM07(529)	BINKLEY, SARA	Residential
DM07(531)	GARDING, DEBORAH ANN	Residential
DM07(532)	GUIN, JANET M TRUST	Residential
DM07(533)	MCKAY, RICHARD G & MARY	Residential
DM07(534)	FREYNET, CHANTAL L	Residential
DM07(535)	GOEDSCHE, JANES LIVING TRUST	Residential
DM07(536)	RAGE HOLDINGS LLC	Residential
DM07(537)	RAGE HOLDINGS LLC	Residential
DM07(538)	SCHULTZ, RONALD D	Residential
DM07(539)	BERG, GUY E	Residential
DM07(541)	MCKAY, RICHARD G & MARY	Residential
DM07(543)	IND SCHOOL DIST, # 181	School Property
DM07(544)	IND SCHOOL DIST, # 181	School Property
DM07(545)	HILL, DAVID	Residential

Service Layer Credits: Crow Wing County Aerial Imagery (2021).



- Highway Reference Point (RP)
- 500ft Area of Investigation (AOI)

Phase I ESA Risk Ranking and Site ID

- D001 De Minimis Property
- 001 High Risk
- 002 Medium Risk
- 003 Low Risk

0 400 800 Feet

DE MINIMIS PROPERTIES - CENTRAL BRAINERD

TH 210 BRAINERD LIMITED PHASE I ESA

DEPARTMENT OF TRANSPORTATION

Trunk Highway 210
MnDOT S.P.1805-80
Brainerd, MN

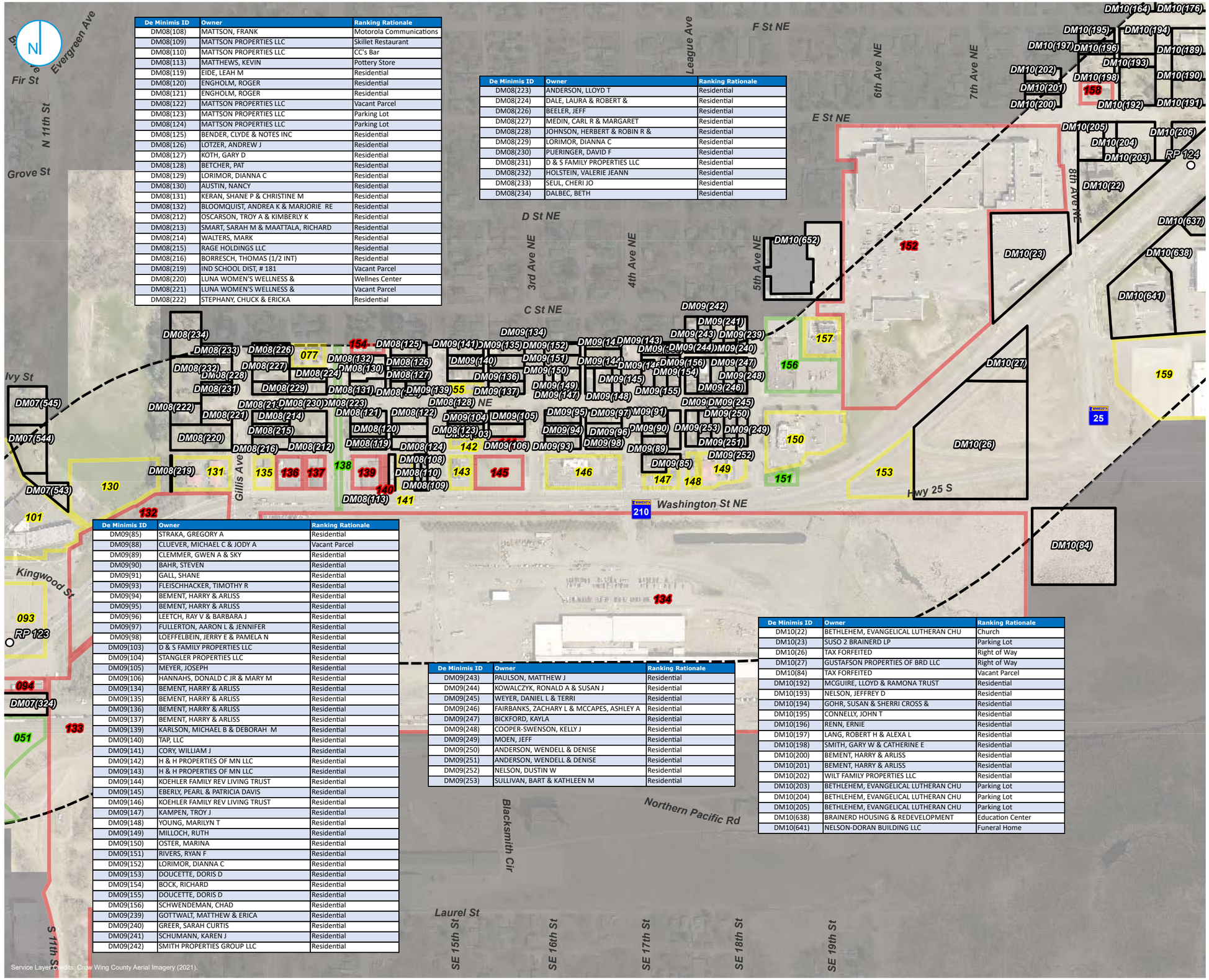
FIGURE 4B

RAMBOLL US CONSULTING, INC
A RAMBOLL COMPANY

RAMBOLL

Document Path: D:\GIS\PROJECTS\SP_1805_80_TH210_BRAINERD\PROJ\FIGURES.aprx

PROJECT: 1690026440 | DATED: 12/15/2022 | DESIGNER: SBUSKEY



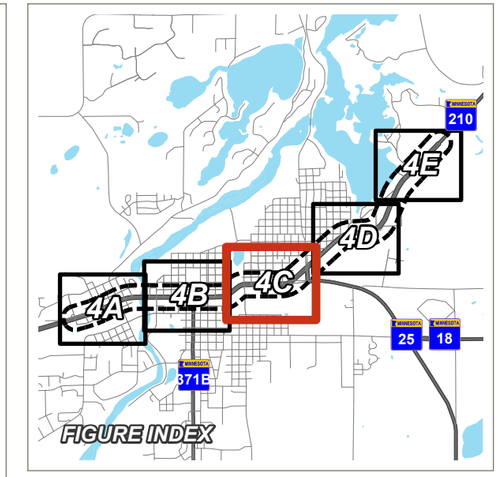
De Minimis ID	Owner	Ranking Rationale
DM08(108)	MATTSON, FRANK	Motorola Communications
DM08(109)	MATTSON PROPERTIES LLC	Skillet Restaurant
DM08(110)	MATTSON PROPERTIES LLC	CC's Bar
DM08(113)	MATTHEWS, KEVIN	Pottery Store
DM08(119)	EIDE, LEAH M	Residential
DM08(120)	ENGHOLM, ROGER	Residential
DM08(121)	ENGHOLM, ROGER	Residential
DM08(122)	MATTSON PROPERTIES LLC	Vacant Parcel
DM08(123)	MATTSON PROPERTIES LLC	Parking Lot
DM08(124)	MATTSON PROPERTIES LLC	Parking Lot
DM08(125)	BENDER, CLYDE & NOTES INC	Residential
DM08(126)	LOTZER, ANDREW J	Residential
DM08(127)	KOTH, GARY D	Residential
DM08(128)	BETCHER, PAT	Residential
DM08(129)	LORIMOR, DIANNA C	Residential
DM08(130)	AUSTIN, NANCY	Residential
DM08(131)	KERAN, SHANE P & CHRISTINE M	Residential
DM08(132)	BLOOMQUIST, ANDREA K & MARJORIE RE	Residential
DM08(212)	OSCARSON, TROY A & KIMBERLY K	Residential
DM08(213)	SMART, SARAH M & MAATTALA, RICHARD	Residential
DM08(214)	WALTERS, MARK	Residential
DM08(215)	RAGE HOLDINGS LLC	Residential
DM08(216)	BORRESCH, THOMAS (1/2 INT)	Residential
DM08(219)	IND SCHOOL DIST, # 181	Vacant Parcel
DM08(220)	LUNA WOMEN'S WELLNESS &	Wellnes Center
DM08(221)	LUNA WOMEN'S WELLNESS &	Vacant Parcel
DM08(222)	STEPHANY, CHUCK & ERICKA	Residential

De Minimis ID	Owner	Ranking Rationale
DM08(223)	ANDERSON, LLOYD T	Residential
DM08(224)	DALE, LAURA & ROBERT &	Residential
DM08(226)	BEELER, JEFF	Residential
DM08(227)	MEDIN, CARL R & MARGARET	Residential
DM08(228)	JOHNSON, HERBERT & ROBIN R &	Residential
DM08(229)	LORIMOR, DIANNA C	Residential
DM08(230)	PUERINGER, DAVID F	Residential
DM08(231)	D & S FAMILY PROPERTIES LLC	Residential
DM08(232)	HOLSTEIN, VALERIE JEANN	Residential
DM08(233)	SEUL, CHERI JO	Residential
DM08(234)	DALBEC, BETH	Residential

De Minimis ID	Owner	Ranking Rationale
DM09(85)	STRAKA, GREGORY A	Residential
DM09(88)	CLUEVER, MICHAEL C & JODY A	Vacant Parcel
DM09(89)	CLEMMER, GWEN A & SKY	Residential
DM09(90)	BAHR, STEVEN	Residential
DM09(91)	GALL, SHANE	Residential
DM09(93)	FLEISCHHACKER, TIMOTHY R	Residential
DM09(94)	BEMENT, HARRY & ARLISS	Residential
DM09(95)	BEMENT, HARRY & ARLISS	Residential
DM09(96)	LEETCH, RAY V & BARBARA J	Residential
DM09(97)	FULLERTON, AARON L & JENNIFER	Residential
DM09(98)	LOEFFELBEIN, JERRY E & PAMELA N	Residential
DM09(103)	D & S FAMILY PROPERTIES LLC	Residential
DM09(104)	STANGLER PROPERTIES LLC	Residential
DM09(105)	MEYER, JOSEPH	Residential
DM09(106)	HANNAHS, DONALD C JR & MARY M	Residential
DM09(134)	BEMENT, HARRY & ARLISS	Residential
DM09(135)	BEMENT, HARRY & ARLISS	Residential
DM09(136)	BEMENT, HARRY & ARLISS	Residential
DM09(137)	BEMENT, HARRY & ARLISS	Residential
DM09(139)	KARLSON, MICHAEL B & DEBORAH M	Residential
DM09(140)	TAP, LLC	Residential
DM09(141)	CORY, WILLIAM J	Residential
DM09(142)	H & H PROPERTIES OF MN LLC	Residential
DM09(143)	H & H PROPERTIES OF MN LLC	Residential
DM09(144)	KOEHLER FAMILY REV LIVING TRUST	Residential
DM09(145)	EBERLY, PEARL & PATRICIA DAVIS	Residential
DM09(146)	KOEHLER FAMILY REV LIVING TRUST	Residential
DM09(147)	KAMPEN, TROY J	Residential
DM09(148)	YOUNG, MARILYN T	Residential
DM09(149)	MILLOCH, RUTH	Residential
DM09(150)	OSTER, MARINA	Residential
DM09(151)	RIVERS, RYAN F	Residential
DM09(152)	LORIMOR, DIANNA C	Residential
DM09(153)	DOUCETTE, DORIS D	Residential
DM09(154)	BOCK, RICHARD	Residential
DM09(155)	DOUCETTE, DORIS D	Residential
DM09(156)	SCHWENDEMAN, CHAD	Residential
DM09(239)	GOTTWALT, MATTHEW & ERICA	Residential
DM09(240)	GREER, SARAH CURTIS	Residential
DM09(241)	SCHUMANN, KAREN J	Residential
DM09(242)	SMITH PROPERTIES GROUP LLC	Residential

De Minimis ID	Owner	Ranking Rationale
DM09(243)	PAULSON, MATTHEW J	Residential
DM09(244)	KOWALCZYK, RONALD A & SUSAN J	Residential
DM09(245)	WEYER, DANIEL L & TERRI	Residential
DM09(246)	FAIRBANKS, ZACHARY L & MCCAPES, ASHLEY A	Residential
DM09(247)	BICKFORD, KAYLA	Residential
DM09(248)	COOPER-SWENSON, KELLY J	Residential
DM09(249)	MOEN, JEFF	Residential
DM09(250)	ANDERSON, WENDELL & DENISE	Residential
DM09(251)	ANDERSON, WENDELL & DENISE	Residential
DM09(252)	NELSON, DUSTIN W	Residential
DM09(253)	SULLIVAN, BART & KATHLEEN M	Residential

De Minimis ID	Owner	Ranking Rationale
DM10(22)	BETHLEHEM, EVANGELICAL LUTHERAN CHU	Church
DM10(23)	SUSO 2 BRAINERD LP	Parking Lot
DM10(26)	TAX FORFEITED	Right of Way
DM10(27)	GUSTAFSON PROPERTIES OF BRD LLC	Right of Way
DM10(84)	TAX FORFEITED	Vacant Parcel
DM10(192)	MCGUIRE, LLOYD & RAMONA TRUST	Residential
DM10(193)	NELSON, JEFFREY D	Residential
DM10(194)	GOHR, SUSAN & SHERRI CROSS &	Residential
DM10(195)	CONNELLY, JOHN T	Residential
DM10(196)	RENN, ERNIE	Residential
DM10(197)	LANG, ROBERT H & ALEXA L	Residential
DM10(198)	SMITH, GARY W & CATHERINE E	Residential
DM10(200)	BEMENT, HARRY & ARLISS	Residential
DM10(201)	BEMENT, HARRY & ARLISS	Residential
DM10(202)	WILT FAMILY PROPERTIES LLC	Residential
DM10(203)	BETHLEHEM, EVANGELICAL LUTHERAN CHU	Parking Lot
DM10(204)	BETHLEHEM, EVANGELICAL LUTHERAN CHU	Parking Lot
DM10(205)	BETHLEHEM, EVANGELICAL LUTHERAN CHU	Parking Lot
DM10(638)	BRAINERD HOUSING & REDEVELOPMENT	Education Center
DM10(641)	NELSON-DORAN BUILDING LLC	Funeral Home



- Highway Reference Point (RP)
- 500ft Area of Investigation (AOI)

Phase I ESA Risk Ranking and Site ID

- D001 De Minimis Property
- 001 High Risk
- 002 Medium Risk
- 003 Low Risk

0 400 800 Feet

DE MINIMIS PROPERTIES - EAST BRAINERD

TH 210 BRAINERD LIMITED PHASE I ESA

DEPARTMENT OF TRANSPORTATION

Trunk Highway 210
MnDOT S.P.1805-80
Brainerd, MN

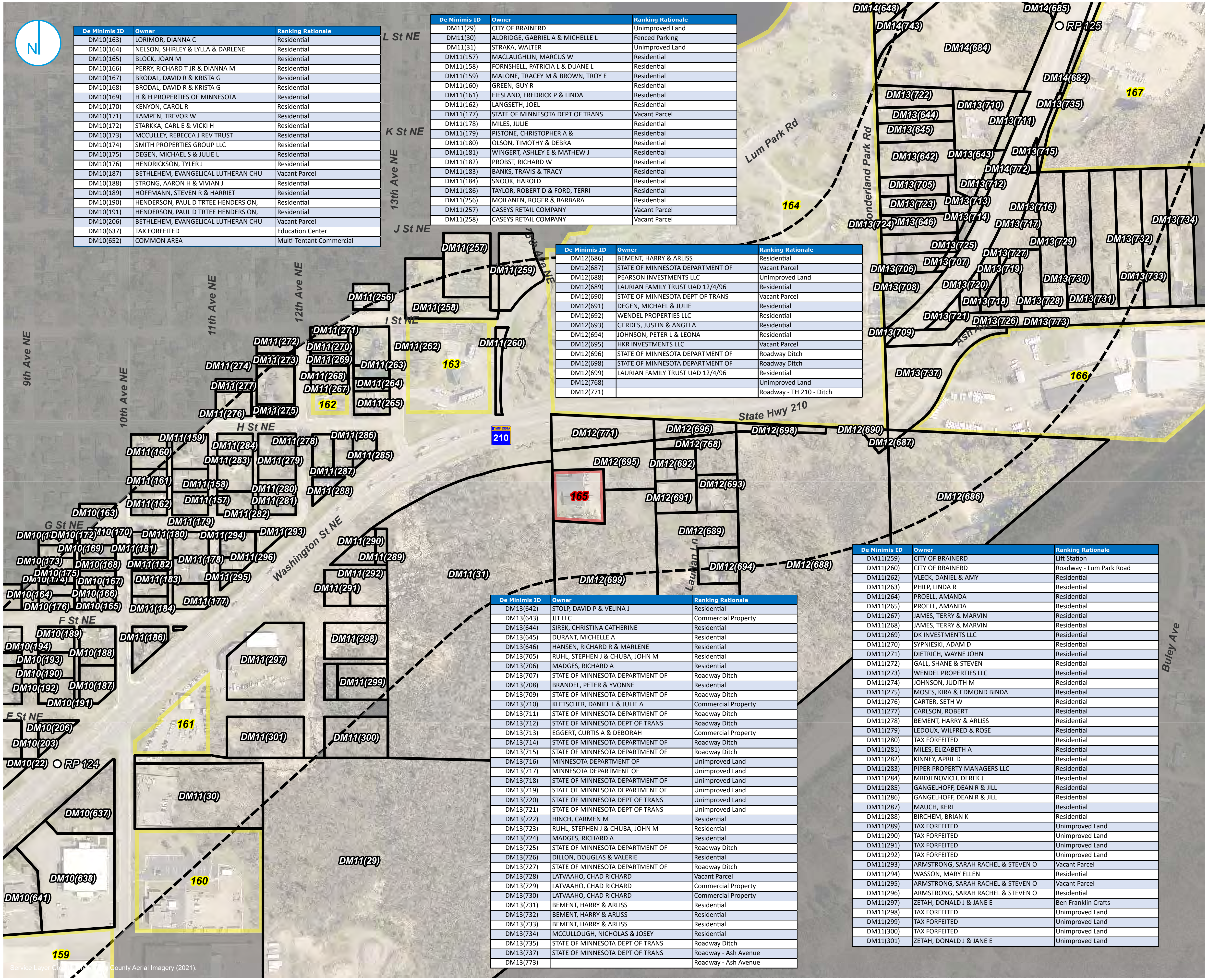
FIGURE 4C

RAMBOLL US CONSULTING, INC
A RAMBOLL COMPANY

RAMBOLL

Document Path: D:\GIS\PROJECTS\SP_1805_80_TH210_BRAINERD\PROF\FIGURES.aprx

PROJECT: 1690026440 | DATED: 12/15/2022 | DESIGNER: SBUSKEY



De Minimis ID	Owner	Ranking Rationale
DM10(163)	LORIMOR, DIANNA C	Residential
DM10(164)	NELSON, SHIRLEY & LYLLA & DARLENE	Residential
DM10(165)	BLOCK, JOAN M	Residential
DM10(166)	PERRY, RICHARD T JR & DIANNA M	Residential
DM10(167)	BRODAL, DAVID R & KRISTA G	Residential
DM10(168)	BRODAL, DAVID R & KRISTA G	Residential
DM10(169)	H & H PROPERTIES OF MINNESOTA	Residential
DM10(170)	KENYON, CAROL R	Residential
DM10(171)	KAMPEN, TREVOR W	Residential
DM10(172)	STARKKA, CARL E & VICKI H	Residential
DM10(173)	MCCULLEY, REBECCA J REV TRUST	Residential
DM10(174)	SMITH PROPERTIES GROUP LLC	Residential
DM10(175)	DEGEN, MICHAEL S & JULIE L	Residential
DM10(176)	HENDRICKSON, TYLER J	Residential
DM10(187)	BETHLEHEM, EVANGELICAL LUTHERAN CHU	Vacant Parcel
DM10(188)	STRONG, AARON H & VIVIAN J	Residential
DM10(189)	HOFFMANN, STEVEN R & HARRIET	Residential
DM10(190)	HENDERSON, PAUL D TRTEE HENDERS ON,	Residential
DM10(191)	HENDERSON, PAUL D TRTEE HENDERS ON,	Residential
DM10(206)	BETHLEHEM, EVANGELICAL LUTHERAN CHU	Vacant Parcel
DM10(637)	TAX FORFEITED	Education Center
DM10(652)	COMMON AREA	Multi-Tentant Commercial

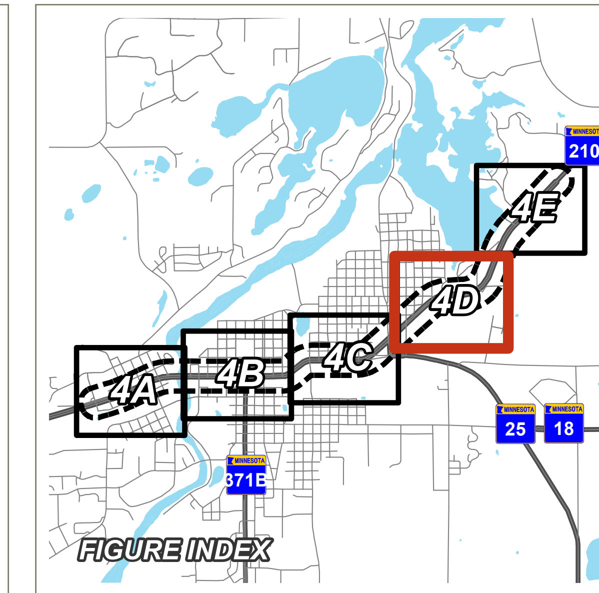
De Minimis ID	Owner	Ranking Rationale
DM11(29)	CITY OF BRAINERD	Unimproved Land
DM11(30)	ALDRIDGE, GABRIEL A & MICHELLE L	Fenced Parking
DM11(31)	STRAKA, WALTER	Unimproved Land
DM11(157)	MACLAUGHLIN, MARCUS W	Residential
DM11(158)	FORNSHELL, PATRICIA L & DUANE L	Residential
DM11(159)	MALONE, TRACEY M & BROWN, TROY E	Residential
DM11(160)	GREEN, GUY R	Residential
DM11(161)	EIESLAND, FREDRICK P & LINDA	Residential
DM11(162)	LANGSETH, JOEL	Residential
DM11(177)	STATE OF MINNESOTA DEPT OF TRANS	Vacant Parcel
DM11(178)	MILES, JULIE	Residential
DM11(179)	PISTONE, CHRISTOPHER A &	Residential
DM11(180)	OLSON, TIMOTHY & DEBRA	Residential
DM11(181)	WINGERT, ASHLEY E & MATHEW J	Residential
DM11(182)	PROBST, RICHARD W	Residential
DM11(183)	BANKS, TRAVIS & TRACY	Residential
DM11(184)	SNOOK, HAROLD	Residential
DM11(186)	TAYLOR, ROBERT D & FORD, TERRI	Residential
DM11(256)	MOILANEN, ROGER & BARBARA	Residential
DM11(257)	CASEYS RETAIL COMPANY	Vacant Parcel
DM11(258)	CASEYS RETAIL COMPANY	Vacant Parcel

De Minimis ID	Owner	Ranking Rationale
DM12(686)	BEMENT, HARRY & ARLISS	Residential
DM12(687)	STATE OF MINNESOTA DEPARTMENT OF	Vacant Parcel
DM12(688)	PEARSON INVESTMENTS LLC	Unimproved Land
DM12(689)	LAURIAN FAMILY TRUST UAD 12/4/96	Residential
DM12(690)	STATE OF MINNESOTA DEPT OF TRANS	Vacant Parcel
DM12(691)	DEGEN, MICHAEL & JULIE	Residential
DM12(692)	WENDEL PROPERTIES LLC	Residential
DM12(693)	GERDES, JUSTIN & ANGELA	Residential
DM12(694)	JOHNSON, PETER L & LEONA	Residential
DM12(695)	HKR INVESTMENTS LLC	Vacant Parcel
DM12(696)	STATE OF MINNESOTA DEPARTMENT OF	Roadway Ditch
DM12(698)	STATE OF MINNESOTA DEPARTMENT OF	Roadway Ditch
DM12(699)	LAURIAN FAMILY TRUST UAD 12/4/96	Residential
DM12(768)		Unimproved Land
DM12(771)		Roadway - TH 210 - Ditch

De Minimis ID	Owner	Ranking Rationale
DM13(642)	STOLP, DAVID P & VELINA J	Residential
DM13(643)	JJT LLC	Commercial Property
DM13(644)	SIREK, CHRISTINA CATHERINE	Residential
DM13(645)	DURANT, MICHELLE A	Residential
DM13(646)	HANSEN, RICHARD R & MARLENE	Residential
DM13(705)	RUHL, STEPHEN J & CHUBA, JOHN M	Residential
DM13(706)	MADGES, RICHARD A	Residential
DM13(707)	STATE OF MINNESOTA DEPARTMENT OF	Roadway Ditch
DM13(708)	BRANDEL, PETER & YVONNE	Residential
DM13(709)	STATE OF MINNESOTA DEPARTMENT OF	Roadway Ditch
DM13(710)	KLETSCHER, DANIEL L & JULIE A	Commercial Property
DM13(711)	STATE OF MINNESOTA DEPARTMENT OF	Roadway Ditch
DM13(712)	STATE OF MINNESOTA DEPT OF TRANS	Roadway Ditch
DM13(713)	EGGERT, CURTIS A & DEBORAH	Commercial Property
DM13(714)	STATE OF MINNESOTA DEPARTMENT OF	Roadway Ditch
DM13(715)	STATE OF MINNESOTA DEPARTMENT OF	Roadway Ditch
DM13(716)	MINNESOTA DEPARTMENT OF	Unimproved Land
DM13(717)	MINNESOTA DEPARTMENT OF	Unimproved Land
DM13(718)	STATE OF MINNESOTA DEPARTMENT OF	Unimproved Land
DM13(719)	STATE OF MINNESOTA DEPARTMENT OF	Unimproved Land
DM13(720)	STATE OF MINNESOTA DEPT OF TRANS	Unimproved Land
DM13(721)	STATE OF MINNESOTA DEPT OF TRANS	Unimproved Land
DM13(722)	HINCH, CARMEN M	Residential
DM13(723)	RUHL, STEPHEN J & CHUBA, JOHN M	Residential
DM13(724)	MADGES, RICHARD A	Residential
DM13(725)	STATE OF MINNESOTA DEPARTMENT OF	Roadway Ditch
DM13(726)	DILLON, DOUGLAS & VALERIE	Residential
DM13(727)	STATE OF MINNESOTA DEPARTMENT OF	Roadway Ditch
DM13(728)	LATVAAHO, CHAD RICHARD	Vacant Parcel
DM13(729)	LATVAAHO, CHAD RICHARD	Commercial Property
DM13(730)	LATVAAHO, CHAD RICHARD	Commercial Property
DM13(731)	BEMENT, HARRY & ARLISS	Residential
DM13(732)	BEMENT, HARRY & ARLISS	Residential
DM13(733)	BEMENT, HARRY & ARLISS	Residential
DM13(734)	MCCULLOUGH, NICHOLAS & JOSEY	Residential
DM13(735)	STATE OF MINNESOTA DEPT OF TRANS	Roadway Ditch
DM13(737)	STATE OF MINNESOTA DEPT OF TRANS	Roadway - Ash Avenue
DM13(773)		Roadway - Ash Avenue

De Minimis ID	Owner	Ranking Rationale
DM11(259)	CITY OF BRAINERD	Lift Station
DM11(260)	CITY OF BRAINERD	Roadway - Lum Park Road
DM11(262)	VLECK, DANIEL & AMY	Residential
DM11(263)	PHILP, LINDA R	Residential
DM11(264)	PROELL, AMANDA	Residential
DM11(265)	PROELL, AMANDA	Residential
DM11(267)	JAMES, TERRY & MARVIN	Residential
DM11(268)	JAMES, TERRY & MARVIN	Residential
DM11(269)	DK INVESTMENTS LLC	Residential
DM11(270)	SYPNIESKI, ADAM D	Residential
DM11(271)	DIETRICH, WAYNE JOHN	Residential
DM11(272)	GALL, SHANE & STEVEN	Residential
DM11(273)	WENDEL PROPERTIES LLC	Residential
DM11(274)	JOHNSON, JUDITH M	Residential
DM11(275)	MOSES, KIRA & EDMOND BINDA	Residential
DM11(276)	CARTER, SETH W	Residential
DM11(277)	CARLSON, ROBERT	Residential
DM11(278)	BEMENT, HARRY & ARLISS	Residential
DM11(279)	LEDOUX, WILFRED & ROSE	Residential
DM11(280)	TAX FORFEITED	Residential
DM11(281)	MILES, ELIZABETH A	Residential
DM11(282)	KINNEY, APRIL D	Residential
DM11(283)	PIPER PROPERTY MANAGERS LLC	Residential
DM11(284)	MRDJENOVICH, DEREK J	Residential
DM11(285)	GANGELHOFF, DEAN R & JILL	Residential
DM11(286)	GANGELHOFF, DEAN R & JILL	Residential
DM11(287)	MAUCH, KERI	Residential
DM11(288)	BIRCHEM, BRIAN K	Residential
DM11(289)	TAX FORFEITED	Unimproved Land
DM11(290)	TAX FORFEITED	Unimproved Land
DM11(291)	TAX FORFEITED	Unimproved Land
DM11(292)	TAX FORFEITED	Unimproved Land
DM11(293)	ARMSTRONG, SARAH RACHEL & STEVEN O	Vacant Parcel
DM11(294)	WASSON, MARY ELLEN	Residential
DM11(295)	ARMSTRONG, SARAH RACHEL & STEVEN O	Vacant Parcel
DM11(296)	ARMSTRONG, SARAH RACHEL & STEVEN O	Residential
DM11(297)	ZETAH, DONALD J & JANE E	Ben Franklin Crafts
DM11(298)	TAX FORFEITED	Unimproved Land
DM11(299)	TAX FORFEITED	Unimproved Land
DM11(300)	TAX FORFEITED	Unimproved Land
DM11(301)	ZETAH, DONALD J & JANE E	Unimproved Land

Service Layer Credits: Crow Wing County Aerial Imagery (2021).



Highway Reference Point (RP)
500ft Area of Investigation (AOI)

Phase I ESA Risk Ranking and Site ID

D001 De Minimis Property
001 High Risk
002 Medium Risk
003 Low Risk

0 400 800 Feet

DE MINIMIS PROPERTIES - EAST BRAINERD

TH 210 BRAINERD LIMITED PHASE I ESA

DEPARTMENT OF TRANSPORTATION

Trunk Highway 210
MnDOT S.P.1805-80
Brainerd, MN

FIGURE 4D

RAMBOLL US CONSULTING, INC
A RAMBOLL COMPANY

RAMBOLL

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PROJECT: 1690026440 | DATED: 12/15/2022 | DESIGNER: SBUSKEY

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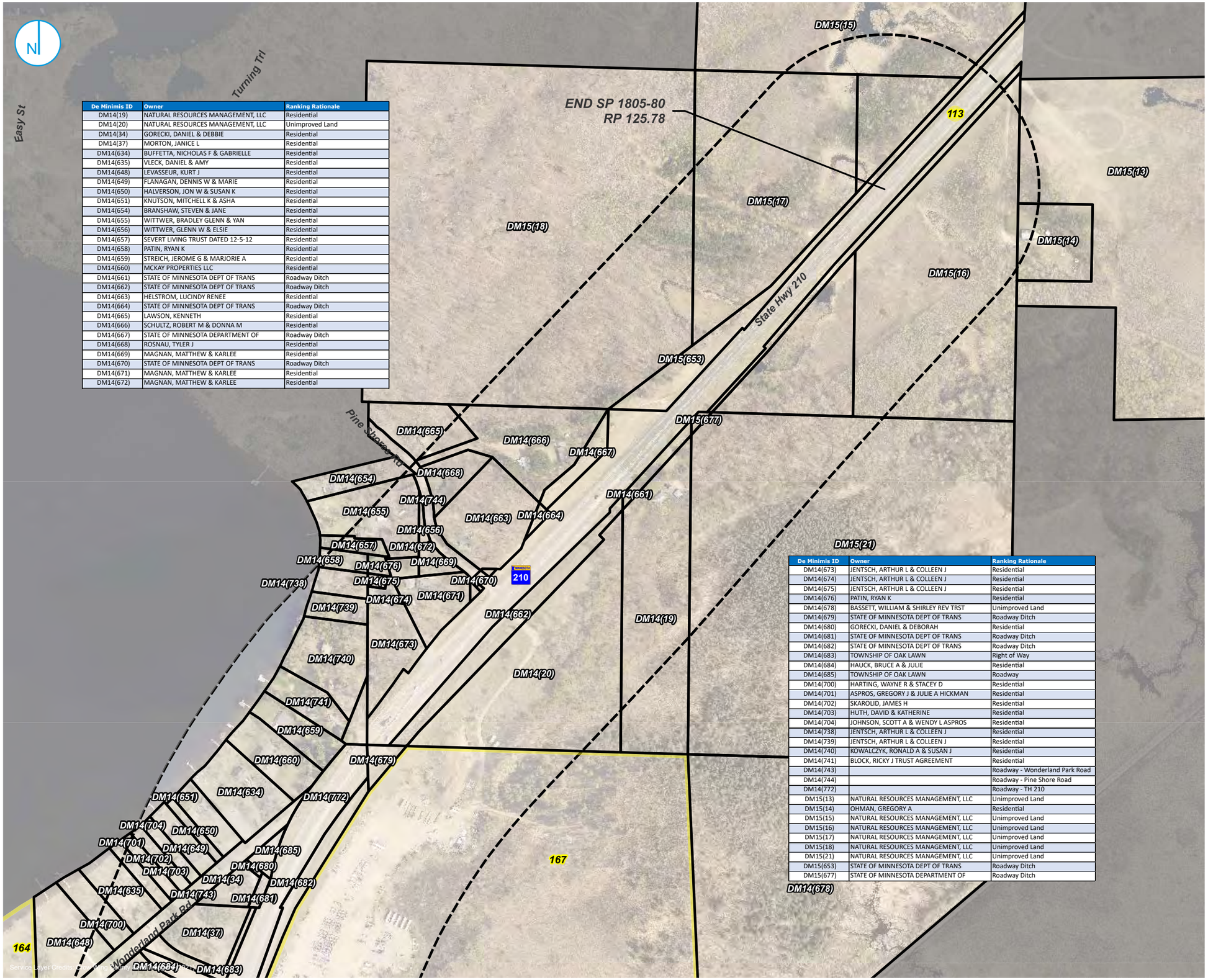
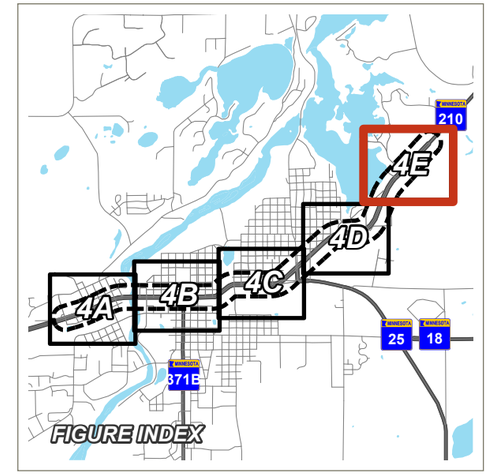


De Minimis ID	Owner	Ranking Rationale
DM14(19)	NATURAL RESOURCES MANAGEMENT, LLC	Residential
DM14(20)	NATURAL RESOURCES MANAGEMENT, LLC	Unimproved Land
DM14(34)	GORECKI, DANIEL & DEBBIE	Residential
DM14(37)	MORTON, JANICE L	Residential
DM14(634)	BUFFETTA, NICHOLAS F & GABRIELLE	Residential
DM14(635)	VLECK, DANIEL & AMY	Residential
DM14(648)	LEVASSEUR, KURT J	Residential
DM14(649)	FLANAGAN, DENNIS W & MARIE	Residential
DM14(650)	HALVERSON, JON W & SUSAN K	Residential
DM14(651)	KNUTSON, MITCHELL K & ASHA	Residential
DM14(654)	BRANSHAW, STEVEN & JANE	Residential
DM14(655)	WITTWER, BRADLEY GLENN & YAN	Residential
DM14(656)	WITTWER, GLENN W & ELSIE	Residential
DM14(657)	SEVERT LIVING TRUST DATED 12-5-12	Residential
DM14(658)	PATIN, RYAN K	Residential
DM14(659)	STREICH, JEROME G & MARJORIE A	Residential
DM14(660)	MCKAY PROPERTIES LLC	Residential
DM14(661)	STATE OF MINNESOTA DEPT OF TRANS	Roadway Ditch
DM14(662)	STATE OF MINNESOTA DEPT OF TRANS	Roadway Ditch
DM14(663)	HELSTROM, LUCINDY RENEE	Residential
DM14(664)	STATE OF MINNESOTA DEPT OF TRANS	Roadway Ditch
DM14(665)	LAWSON, KENNETH	Residential
DM14(666)	SCHULTZ, ROBERT M & DONNA M	Residential
DM14(667)	STATE OF MINNESOTA DEPARTMENT OF	Roadway Ditch
DM14(668)	ROSNAU, TYLER J	Residential
DM14(669)	MAGNAN, MATTHEW & KARLEE	Residential
DM14(670)	STATE OF MINNESOTA DEPT OF TRANS	Roadway Ditch
DM14(671)	MAGNAN, MATTHEW & KARLEE	Residential
DM14(672)	MAGNAN, MATTHEW & KARLEE	Residential

De Minimis ID	Owner	Ranking Rationale
DM14(673)	JENTSCH, ARTHUR L & COLLEEN J	Residential
DM14(674)	JENTSCH, ARTHUR L & COLLEEN J	Residential
DM14(675)	JENTSCH, ARTHUR L & COLLEEN J	Residential
DM14(676)	PATIN, RYAN K	Residential
DM14(678)	BASSETT, WILLIAM & SHIRLEY REV TRST	Unimproved Land
DM14(679)	STATE OF MINNESOTA DEPT OF TRANS	Roadway Ditch
DM14(680)	GORECKI, DANIEL & DEBORAH	Residential
DM14(681)	STATE OF MINNESOTA DEPT OF TRANS	Roadway Ditch
DM14(682)	STATE OF MINNESOTA DEPT OF TRANS	Roadway Ditch
DM14(683)	TOWNSHIP OF OAK LAWN	Right of Way
DM14(684)	HAUCK, BRUCE A & JULIE	Residential
DM14(685)	TOWNSHIP OF OAK LAWN	Roadway
DM14(700)	HARTING, WAYNE R & STACEY D	Residential
DM14(701)	ASPROS, GREGORY J & JULIE A HICKMAN	Residential
DM14(702)	SKAROLID, JAMES H	Residential
DM14(703)	HUTH, DAVID & KATHERINE	Residential
DM14(704)	JOHNSON, SCOTT A & WENDY L ASPROS	Residential
DM14(738)	JENTSCH, ARTHUR L & COLLEEN J	Residential
DM14(739)	JENTSCH, ARTHUR L & COLLEEN J	Residential
DM14(740)	KOWALCZYK, RONALD A & SUSAN J	Residential
DM14(741)	BLOCK, RICKY J TRUST AGREEMENT	Residential
DM14(743)		Roadway - Wonderland Park Road
DM14(744)		Roadway - Pine Shore Road
DM14(772)		Roadway - TH 210
DM15(13)	NATURAL RESOURCES MANAGEMENT, LLC	Unimproved Land
DM15(14)	OHMAN, GREGORY A	Residential
DM15(15)	NATURAL RESOURCES MANAGEMENT, LLC	Unimproved Land
DM15(16)	NATURAL RESOURCES MANAGEMENT, LLC	Unimproved Land
DM15(17)	NATURAL RESOURCES MANAGEMENT, LLC	Unimproved Land
DM15(18)	NATURAL RESOURCES MANAGEMENT, LLC	Unimproved Land
DM15(21)	NATURAL RESOURCES MANAGEMENT, LLC	Unimproved Land
DM15(653)	STATE OF MINNESOTA DEPT OF TRANS	Roadway Ditch
DM15(677)	STATE OF MINNESOTA DEPARTMENT OF	Roadway Ditch



- Highway Reference Point (RP)
- 500ft Area of Investigation (AOI)

Phase I ESA Risk Ranking and Site ID

- D001 De Minimis Property
- 001 High Risk
- 002 Medium Risk
- 003 Low Risk

0 400 800 Feet

DE MINIMIS PROPERTIES - EAST BRAINERD

TH 210 BRAINERD LIMITED PHASE I ESA

DEPARTMENT OF TRANSPORTATION

Trunk Highway 210
MnDOT S.P.1805-80
Brainerd, MN

FIGURE 4E

RAMBOLL US CONSULTING, INC
A RAMBOLL COMPANY

RAMBOLL

PROJECT: 1690026440 | DATED: 12/15/2022 | DESIGNER: SBUSKEY

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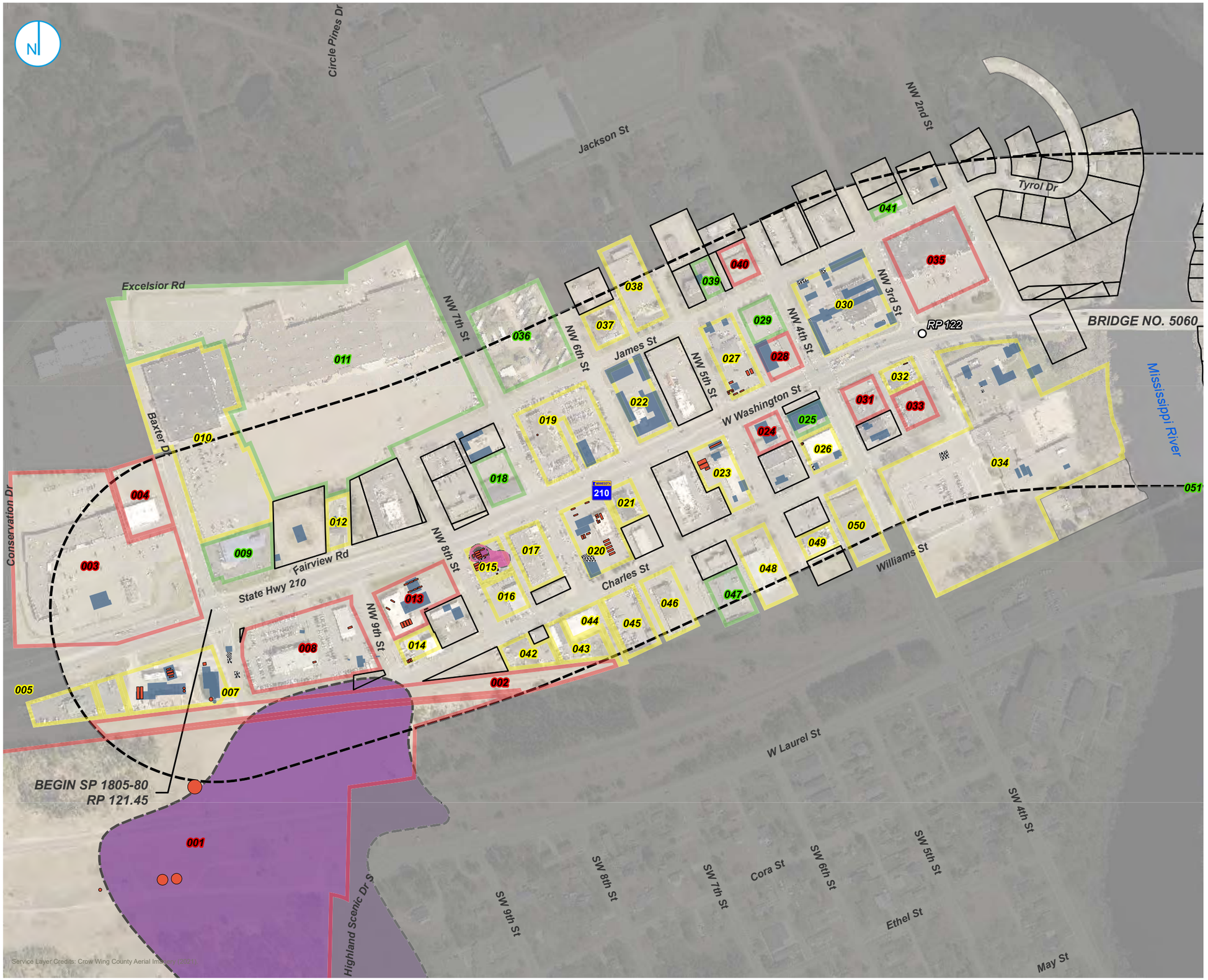

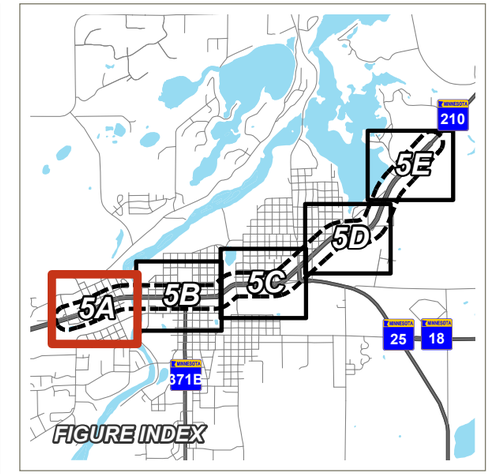

Inferred Contaminant Plume

- Free Product
- Petroleum Impacts - Soil
- Petroleum Impacts - Groundwater
- Approximate Former Tank/Fuel Island Location
- BNSF Railway Co - Tie Plant MPCA Delineated PAH Groundwater Plume
- Approximate Location of Former Building/ Structure
- Highway Reference Point (RP)
- 500ft Area of Investigation (AOI)

Phase I ESA Risk Ranking and Site ID

- De Minimis Property
- High Risk
- Medium Risk
- Low Risk

0 400 800 Feet

FORMER BUILDINGS/ STRUCTURES, TANKS, AND INFERRED CONTAMIANT PLUMES - WEST BRAINERD

TH 210 BRAINERD LIMITED PHASE I ESA

DEPARTMENT OF TRANSPORTATION

Trunk Highway 210
MnDOT S.P.1805-80
Brainerd, MN

FIGURE 5A

RAMBOLL US CONSULTING, INC
A RAMBOLL COMPANY

RAMBOLL

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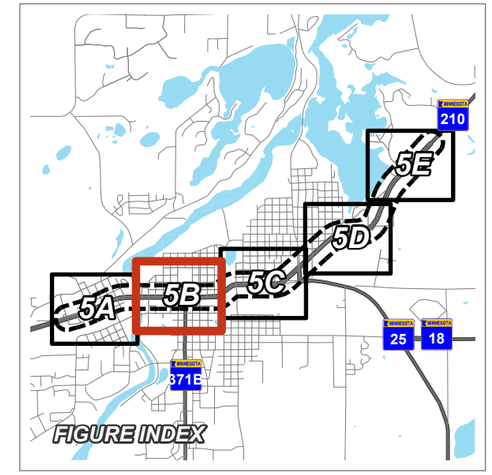

Inferred Contaminant Plume

- Free Product
- Petroleum Impacts - Soil
- PVOC Impacts - Soil
- Petroleum Impacts - Groundwater
- PVOC Impacts - Groundwater
- CVOC Impacts - Groundwater
- Approximate Former Tank/Fuel Island Location
- Approximate Location of Former Building/ Structure
- Highway Reference Point (RP)
- 500ft Area of Investigation (AOI)

Phase I ESA Risk Ranking and Site ID

- De Minimis Property
- High Risk
- Medium Risk
- Low Risk

0 400 800 Feet

FORMER BUILDINGS/ STRUCTURES, TANKS, AND INFERRED CONTAMIANT PLUMES - CENTRAL BRAINERD

TH 210 BRAINERD LIMITED PHASE I ESA

DEPARTMENT OF TRANSPORTATION

Trunk Highway 210
MnDOT S.P.1805-80
Brainerd, MN

FIGURE 5B

RAMBOLL US CONSULTING, INC
A RAMBOLL COMPANY

RAMBOLL

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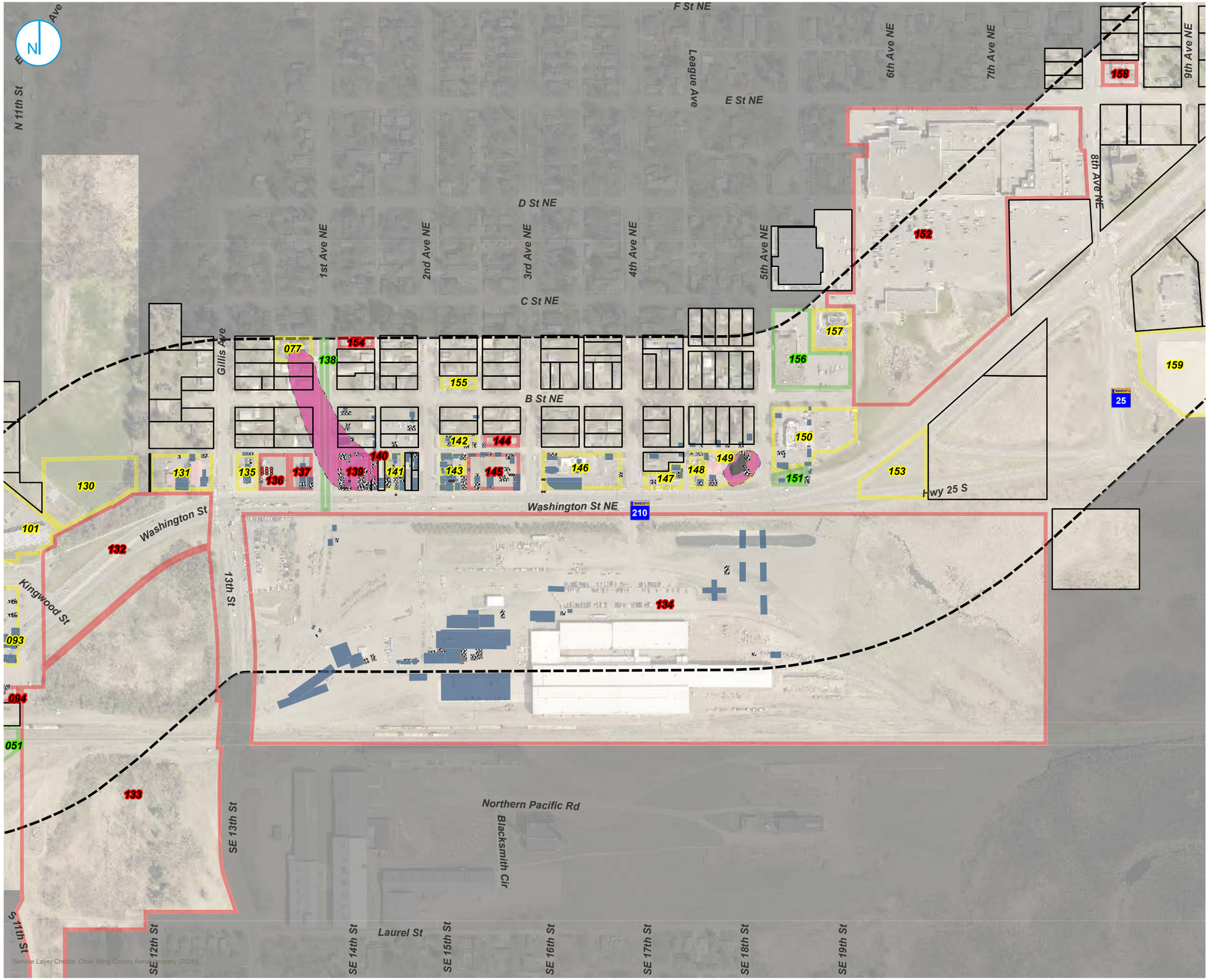

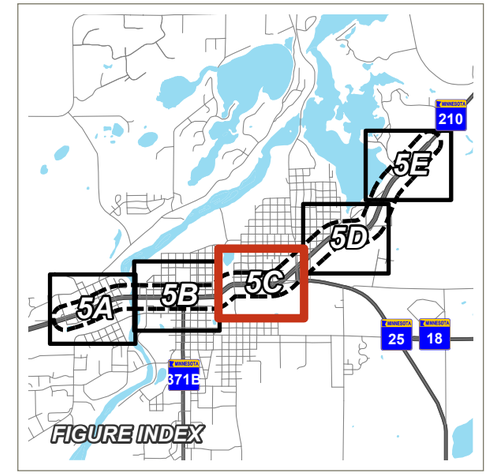

Inferred Contaminant Plume

- Free Product
- Petroleum Impacts - Soil
- PVOC Impacts - Soil
- Petroleum Impacts - Groundwater
- PVOC Impacts - Groundwater
- Approximate Former Tank/Fuel Island Location
- Approximate Location of Former Building/ Structure
- Highway Reference Point (RP)
- 500ft Area of Investigation (AOI)

Phase I ESA Risk Ranking and Site ID

- De Minimis Property
- High Risk
- Medium Risk
- Low Risk

0 400 800 Feet

FORMER BUILDINGS/ STRUCTURES, TANKS, AND INFERRED CONTAMIANT PLUMES - EAST BRAINERD

TH 210 BRAINERD LIMITED PHASE I ESA

DEPARTMENT OF TRANSPORTATION

Trunk Highway 210
MnDOT S.P.1805-80
Brainerd, MN

FIGURE 5C

RAMBOLL US CONSULTING, INC
A RAMBOLL COMPANY

RAMBOLL

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PROJECT: 1690026440 | DATED: 12/14/2022 | DESIGNER: SBUSKEY

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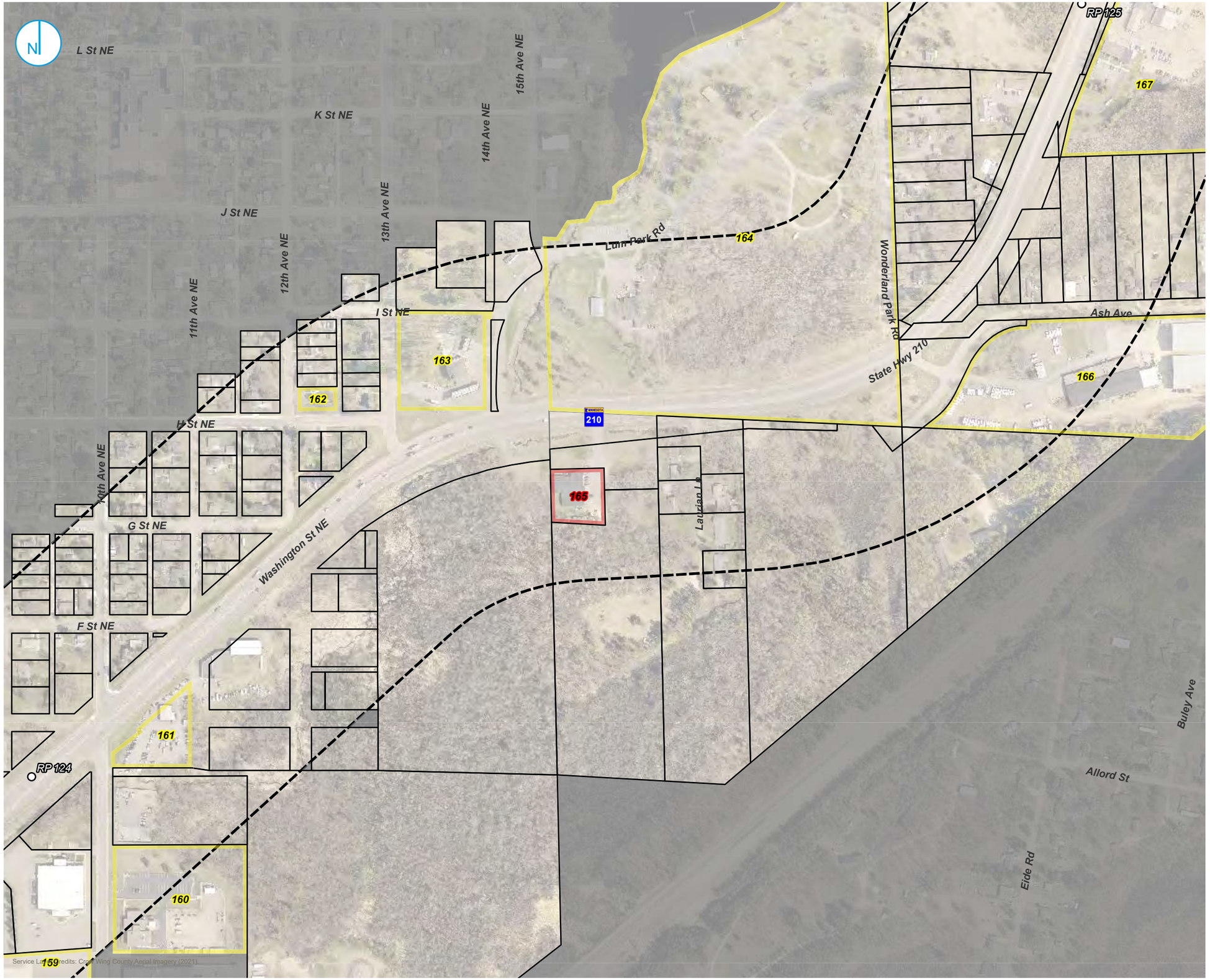

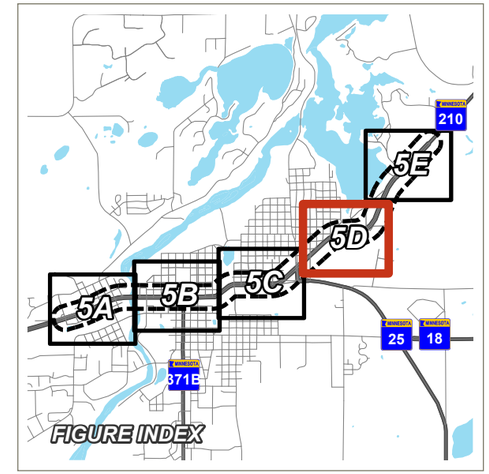

- Highway Reference Point (RP)
- 500ft Area of Investigation (AOI)

Phase I ESA Risk Ranking and Site ID

- De Minimis Property
- High Risk
- Medium Risk
- Low Risk

0 400 800 Feet

FORMER BUILDINGS/ STRUCTURES, TANKS, AND INFERRED CONTAMIANT PLUMES - EAST BRAINERD

TH 210 BRAINERD LIMITED PHASE I ESA

DEPARTMENT OF TRANSPORTATION

Trunk Highway 210
MnDOT S.P.1805-80
Brainerd, MN

FIGURE 5D

RAMBOLL US CONSULTING, INC
A RAMBOLL COMPANY

RAMBOLL

PROJECT: 1690026440 | DATED: 12/14/2022 | DESIGNER: SBUSKEY

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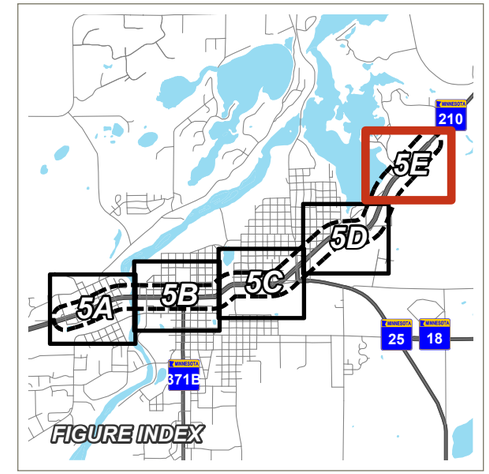


Highway Reference Point (RP)

500ft Area of Investigation (AOI)

Phase I ESA Risk Ranking and Site ID

De Minimis Property

High Risk

Medium Risk

Low Risk

0 400 800 Feet

FORMER BUILDINGS/ STRUCTURES, TANKS, AND INFERRED CONTAMIANT PLUMES - EAST BRAINERD

TH 210 BRAINERD LIMITED PHASE I ESA

DEPARTMENT OF TRANSPORTATION

Trunk Highway 210
MnDOT S.P.1805-80
Brainerd, MN

FIGURE 5E

RAMBOLL US CONSULTING, INC
A RAMBOLL COMPANY

RAMBOLL

PROJECT: 1690026440 | DATED: 12/14/2022 | DESIGNER: SBUSKEY

TABLES

TABLE 1A
Sites of Concern in Numerical Order
TH 210 Brainerd Limited Phase I Environmental Site Assessment
Brainerd, MN
MnDOT SP 1805-80

Corridor Area	Figure Location	Braun (2022) Site ID	Ramboll Site ID	Table Location	Risk Rank	Site Name	Ranking Rationale
West	Figure 3A	6	001		High	Former BN Brainerd Tie Plant	Former railroad tie treatment facility, Active Superfund Site, Inactive CERCLIS and RCRA Remediation Site, and Active VSQ Hazardous Waste Generator, and Federal Engineering Controls
West	Figure 3A	32	002		High	Paul Bunyan Trail	Former railroad spur and Closed Brownfields/VIC site
West	Figure 3A	35	003		High	Westport Shopping Center, Pizza Hut	Closed spill incident and former dental office
West	Figure 3A	36	004		High	Dollar Tree (Greg Larson Sports)	Closed Brownfields/VIC site, Active Minimal Quantity Hazardous Waste Generato, Inactive Hazardous Waste Generator
West	Figure 3A	37	005		Medium	Lakes Area Auto Solution	Automotive sales and possible vehicle maintenance, western portion of former concrete ready mix plant property
West	Figure 3A	38	006		Medium	Valvoline Instant Oil Change	Automotive lubrication Service, on site storage of petroleum products
West	Figure 3A	39	007		Medium	Casey's General Store #3720	Active gas station and Tanks Site, Closed PRP/Leak Sites, Inactive Hazardous Waste Generator
West	Figure 3A	40	008		High	Mills Honda	Closed Petroleum Brownfield Site, Closed Petroleum Brownfields/Voluntary Investigation and Cleanup (VIC) Site, Removed UST and Active ASTs, Active Hazardous Waste Generator, Inactive Hazardous Waste Generator, auto service activities
West	Figure 3A	41	009		Low	First Western Bank & Trust	Past Medical office and unknown commercial use, former borrow pit
West	Figure 3A	42	010		Medium	Harbor Freight Tools USA Inc. 3069, Dunham's Sports	Active Very Small Quantity Hazardous Waste Generator, Inactive Minimal Quantity Hazardous Waste Generator, Inactive Hazardous Waste Generator, Removed Tank Site
West	Figure 3A		011		Low	Bath & Body Works 1391, Westgate Mall	Active Minimal Quantity Hazardous Waste Generator
West	Figure 3A		012		Medium	Mid Minnesota Federal Credit Union	Former used car dealer and possible vehicle maintenance
West	Figure 3A		013		High	AutoZone 6356	Closed Brownfields/VIC Site, Closed PRP/Leak Sites, Active Tanks Site, Active VSQ Hazardous Waste Generator, Active Construction Stormwater Permit, former gas station, auto service activities, Closed spill
West	Figure 3A		014		Medium	Advanced Auto Repair - Brainerd	Closed PRP/Leak Site, Removed USTs, Active AST, Inactive Hazardous Waste Generator, auto service activities
West	Figure 3A		015		Medium	West Brainerd Auto/Peterson Towing	Closed PRP/Leak Sites, Active Tanks Site, Inactive Hazardous Waste Generator, former gas station, vehicle repair activity, Closed spill
West	Figure 3A		016		Medium	Brainerd Nissan Inc/Professional Auto Leasing	Active Tanks Site, Inactive Hazardous Waste Generator, vehicle service activity
West	Figure 3A		017		Medium	Tanner Motors	Active Hazardous Waste Generator, auto service activities
West	Figure 3A		018		Low	702 W Washington Street/Multi-tenant Commercial	Inactive Construction Stormwater Permit, former bottled-gas sales
West	Figure 3A		019		Medium	Tanner Motors	Closed Leak Site, Removed Tanks Site (UST), Inactive Hazardous Waste Generator, Auto Sales & Service
West	Figure 3A		020		Medium	Perkins Restaurant & Bakery	Closed PRP/Leak Site, Removed Tank Site, former gas station
West	Figure 3A		021		Medium	Neighborhood National Bank	Closed PRP/Leak Site, Inactive Hazardous Waste Generator, unregistered tank site
West	Figure 3A		022		Medium	Caribou Coffee	Inactive Hazardous Waste Generator, Former lumber and building supplies retailer, former auto repair shop
West	Figure 3A		023		Medium	Heartland Tire Service	Closed PRP/Leak Site, Removed Tanks Site (UST); Active Tank Site (AST); Active Hazardous Waste Generator; auto service activities; Former gas station
West	Figure 3A		024		High	Crystal Cleaners Shopping Center	Dry cleaning site; Tank Site; Closed Petroleum Remediation Leak Site; Closed spill
West	Figure 3A		025		Low	403-411 W Washington Street/Multi-Tenant Commercial Building	Inactive Hazardous Waste Generator, former physician services
West	Figure 3A		026		Medium	Auto Value Parts Stores	Closed PRP/Leak Site, Removed Tank Site, Active Very Small Quantity Hazardous Waste Generator, auto body repair activity
West	Figure 3A		027		Medium	Wells Fargo Bank	Closed PRP/Leak Site, Removed Tanks Site (UST), former gas station
West	Figure 3A		028		High	Burritos California Mexican Grill	Former gas station, former photo finishing activity, Inactive Hazardous Waste Generator
West	Figure 3A		029		Low	Hair Force One/Strip Mall	Inactive Hazardous Waste Generator
West	Figure 3A		030		Medium	Walgreen's Store 5635	Active Very Small Quantity Hazardous Waste Generator, closed spill incident, former gas station, former Greyhound bus facility
West	Figure 3A		031		High	305-317 W Washington Street/Multi-Tenant Commercial Building	Former dentist's office, former physician services
West	Figure 3A		032		Medium	Corral Auto Repair	Former gas station and removed Tank Site, Inactive Hazardous Waste Generator, auto repair facility
West	Figure 3A		033		High	Kummet Larson Bluth & Co., (certified public accountants) and Northridge Insurance Agency	Inactive Minimal Quantity Hazardous Waste Generator, former dental practice
West	Figure 3A		034		Medium	Riverside Elementary School	Active and Inactive Tank Site, Active and Inactive Hazardous Waste generators
West	Figure 3A		035		High	Tyrol Hills Shopping Center	Inactive Hazardous Waste Generator listings, past medical and dental practices
West	Figure 3A		036		Low	Westwood Mobile Home Park	Mobile home park, likely associated with unregistered tanks
West	Figure 3A		037		Medium	Larson Auto Repair	Inactive Hazardous Waste Generator, auto repair activity
West	Figure 3A		038		Medium	Brainerd Daily Dispatch	Closed AST, Active Very Small Quantity Hazardous Waste Generator, printing activity
West	Figure 3A		039		Low	The Lakes Area Cosmetic Bar	Inactive Hazardous Waste Generator
West	Figure 3A		040		High	Lake County Dental	Active Minimal Quantity Hazardous Waste Generator, dental office
West	Figure 3A		041		Low	214 James Street/Storage Building	Storage building with overhead bay style door, outdoor storage
West	Figure 3A		042		Medium	West Side Auto Body & Boat Repair	Active Hazardous Waste Generator, active Air Quality Permit, auto body and boat repair facility
West	Figure 3A		043		Medium	Pinnacle Performance Automotive	Inactive Hazardous Waste Generator, vehicle repair facility and former car wash
West	Figure 3A		044		Medium	Burt Electric/Muddy Bikes	Inactive Hazardous Waste Generator, former auto parts supplier
West	Figure 3A		045		Medium	Tanner Motors Back Lot	Tank site (AST), used auto sales and likely service activities, outdoor storage of 55-gallon drums
West	Figure 3A		046		Medium	Snow White Laundry & Car Wash	Active tank site (UST), laundry and car wash facility
West	Figure 3A		047		Low	Mike Hammad Upholstery	Upholstery business with likely chemical use
West	Figure 3A		048		Medium	Century Link	Outdoor storage of electrical transformers and possible use of PCB containing material
West	Figure 3A		049		Medium	Eclipse Used Auto Sales	Active Minimal Quantity Hazardous Waste Generator, likely onsite vehicle maintenance
West	Figure 3A		050		Medium	Product Alternatives Inc	Inactive Hazardous Waste Generator, former printing operations, removed tank site
Central	Figure 3B		051		Low	Active and former railroad tracks in right-of-way areas south of TH 210	Active and former railroad tracks in right-of-way areas south of TH 210
Central	Figure 3B		052		Medium	Recover Health and Harmony Massage Spa	Former filling station with three unregistered USTs
Central	Figure 3B		053		Medium	North Risk Partners, Klein & Fleming Insurance Services	Former Filling Station
Central	Figure 3B		054		Medium	Auto Import Inc	Current and historic vehicle repair activities, former filling station, and registered USTs in the adjacent 1st St N right-of-way with no removal documentation
Central	Figure 3B		055		Medium	River Road Autobody	Current and former auto service activities and former machine shop
Central	Figure 3B		056	Table 2C	Medium	Railroad Roadway Spill	Closed waste oil spill
Central	Figure 3B		057		Medium	Minnesota Army National Guard	Closed Petroleum Remediation Leak Site; four unregistered closed in-place USTs remain at the site
Central	Figure 3B		058		High	Hardees/Former Bulk Facility	Closed Petroleum Remediation Leak Site and former bulk oil facility
Central	Figure 3B		059		High	Legend Outdoors Ice Houses & RV's	Potential PFAS use in zinc and nickel electroplating and residual petroleum impacts in groundwater from right adjacent property and likely in 1st St N right-of-way
Central	Figure 3B		060		Medium	Greenheck Auto Glass, Inc.	Closed Petroleum Remediation Leak Site with former presence of free product and off-site migration of petroleum impacts in groundwater; Tanks Site
Central	Figure 3B		061		Low	Former Medical Office	Former medical office; Inactive hazardous waste generator
Central	Figure 3B		062		Medium	Thrifty White Pharmacy #738	Former filling station with four unregistered USTs; Active hazardous waste generator
Central	Figure 3B		063		Medium	Brazilian Jiu-Jitsu shopping center	Former filling station with two unregistered gasoline USTs, auto service activities, and lumber storage; Inactive hazardous waste generator
Central	Figure 3B		064		High	Former Bulk Petroleum ASTs	Former bulk petroleum ASTs and storage of railroad tie piles
Central	Figure 3B		065		High	Allegra Marketing Print Mail	Former site storage of railroad ties, former dental office (1990's), former used car sales with potential auto repair activities, and current (2000's) printing service activities; Inactive hazardous waste generators
Central	Figure 3B		066		High	Brenny Properties of Brainerd (301 to 317 Washington St)	Chlorinated solvents in groundwater from off-site source
Central	Figure 3B		067		Medium	Cenex/Kelly's Service auto repair shop	Closed Petroleum Remediation Leak Site; Tank Site; Auto service activities; Active hazardous waste generator
Central	Figure 3B		068		High	Jrs No. 19 BBQ restaurant	Presence of chlorinated compounds in groundwater, including within the TH 210 right-of-way; Brownfields/VIC Site; Closed Petroleum Remediation Leak Site; Inactive hazardous waste generators
Central	Figure 3B		069		High	Brainerd Floral shopping center	Presence of chlorinated compounds in groundwater from off-site source, former gas station, and former on-site storage of railroad ties

TABLE 1A
Sites of Concern in Numerical Order
TH 210 Brainerd Limited Phase I Environmental Site Assessment
Brainerd, MN
MnDOT SP 1805-80

Corridor Area	Figure Location	Braun (2022) Site ID	Ramboll Site ID	Table Location	Risk Rank	Site Name	Ranking Rationale
Central	Figure 3B		070		Medium	Easy Riders	Former filling station and auto service activities
Central	Figure 3B		071		High	Easy Riders Bicycle & Sport Shopping Center	Former dry cleaning and laundry facility; Former filling station; Active Brownfields Site; Closed Petroleum Remediation Leak Site; Inactive CERCLIS Site; Inactive Site Assessment; Potential off-site impacts of petroleum and chlorinated solvents in groundwater
Central	Figure 3B		072		Medium	Midtown Center	Closed Petroleum Remediation Leak Site, former railroad storage of oils, lamps, etc, and a former UST
Central	Figure 3B		073		High	Kingwood Square Dental Office	Dental office since approximately 1977; hazardous waste generator of dental wastes
Central	Figure 3B		074		Medium	T&B Pawn and State Farm	Former filling station and auto service activities
Central	Figure 3B		075		Medium	Parking lot (6th St N & Kingwood St)	Former Filling Station with three tanks
Central	Figure 3B		076	Table 2A	Medium	Hinrichs Residence	Former residential fuel storage (1917); no documented releases
East	Figure 3C		077		Medium	Bement Residence	Petroleum and chlorinated solvent impacts in groundwater from upgradient leak site
Central	Figure 3B		078	Table 2B	High	Former paint shop	Former paint shop
Central	Figure 3B		079		High	Royal Tire	Former bulk oil dealer, filling station, farm implement sales and service, and paint shop; Tank Site; Inactive hazardous waste generator
Central	Figure 3B		080	Table 2A	Medium	Jack and Harry Investments LLC	Former residential fuel storage (1917); no documented releases
Central	Figure 3B		081	Table 2A	Medium	Rosenberg Residence	Former residential fuel storage (1917); no documented releases
Central	Figure 3B		082		Medium	The Shop Youth Center	Former filling station and Tank Site
Central	Figure 3B		083		Medium	Commercial Building	Inactive hazardous waste generator
Central	Figure 3B		084		Medium	Bells + Blossom Boutique	Closed Petroleum Remediation Leak Site, closed in-place tanks, and former filling station
Central	Figure 3B		085		Medium	Zion Lutheran Church	Former filling station; Tank Site; two unregistered USTs
Central	Figure 3B		086		High	Little Caesar's Pizza	Former laundry and filling station; Inactive hazardous waste generator
Central	Figure 3B		087		High	Cornerstone Liquor	Inactive hazardous waste generator; Former printing shop
Central	Figure 3B		088		High	Former Crystal Clean Dry Cleaners (Central)	Former dry cleaners and current laundry facility; Former printing business; Inactive hazardous waste generator
Central	Figure 3B		089		High	Vacant Lot (8th St N & Washington St)	Former bulk petroleum distribution and coal storage; Former auto repair shop
Central	Figure 3B		090	Table 2A	Medium	DK Investments LLC	Former residential fuel storage (1917); no documented releases
Central	Figure 3B		091		Medium	O'Reilly Auto Parts - 1647	Auto service activities; Active hazardous waste generator
Central	Figure 3B		092		High	Former Bulk Oil Tanks	Former bulk petroleum storage and distribution, lumber storage, and coal storage; Tanks Site
Central	Figure 3B		093		Medium	Franklin Arts Center parking lot	Former auto servie shop and former buildings in TH 210 right-of-way; inactive hazardous waste generator
Central	Figure 3B		094		High	Brainerd Hydraulics/Air and Integrity Auto Repair	Closed Petroleum Remediation Leak Site; Current auto repair; Former bulk petroleum storage; Former unregistered tanks
Central	Figure 3B		095		Low	St. Joseph Medical Center – Home Care and Hospice	Inactive hazardous waste generator
Central	Figure 3B		096	Table 2A	Medium	Ressen Residence	Former residential fuel storage (1917); no documented releases
Central	Figure 3B		097		Medium	Erfurth Residence	Closed Petroleum Remediation Leak Site
Central	Figure 3B		098		Medium	Lakes Area Senior Activity Center	Tank Site
Central	Figure 3B		099	Table 2A	Medium	Lakes Area Senior Activity Center Parking Lot	Former residential fuel storage (1917); no documented releases
Central	Figure 3B		100	Table 2A	Medium	Voss Residence	Former residential fuel storage (1917); no documented releases
Central	Figure 3B		101		Medium	Franklin Arts Center	Closed Petroleum Remediation Leak Site; Tanks Site; Closed spill
Central	Figure 3B		102		High	Brainerd City Fire Department	Active oil drop site and former site dumping; Tank Site
Central	Figure 3B		103		Low	Brainerd Police Station	Inactive hazardous waste generator
Central	Figure 3B		104		Medium	Fraternal Order of Eagles Non-profit and Bar	Former lumber posts and shingles storage
Central	Figure 3B		105		High	Brainerd Police Station Parking Lot	Former bulk oil storage; Closed Petroleum Remediation Leak Site
Central	Figure 3B		106		High	Crow Wing County Jail Parking Lot	Multiple former petroleum wholesale distributors; Former coal storage; Former auto service activities; Tanks Site; Closed Petroleum Remediation Leak Site; Closed spill
Central	Figure 3B		107		High	Crow Wing County Jail	Former filling station, laundry shops, printing shop, and blacksmith; Former site storage of wrecked automobiles and auto parts scrap
Central	Figure 3B		108	Table 2B	High	First Impression Printing Inc	Former laundry, current printing
Central	Figure 3B		109		Medium	Former Paramount Property	Former UST
Central	Figure 3B		110		High	LifeBack Law Firm and Parking lot	Former laundry with tanks, auto service activities, and junk storage; Inactive hazardous waste generator
Central	Figure 3B		111		High	The Salvation Army	Former commercial printing, former laundries, and former auto service activities; Inactive hazardous waste generator
Central	Figure 3B		112		High	Mid Minnesota Federal Credit Union - Brainerd	Active Petroleum Remediation Leak Site, former printing shop, auto repair shop, undertaker, and a former UST in the Front St right-of-way
East	Figure 3E		113	Table 2C	Medium	Ryder Truck Rental Spill	Closed diesel spill
Central	Figure 3B		114		Medium	Former Freight Depot	Former freight depot with rail spurs and closed diesel spill
Central	Figure 3B		115		High	Sports Card Central	Former commercial photography and printing; Inactive hazardous waste generator
Central	Figure 3B		116	Table 2B	High	Former printing and photography	Former printing and photography
Central	Figure 3B		117	Table 2B	High	Former printing	Former printing
Central	Figure 3B		118		Low	Iron Hills Gun & Pawn	Hazardous waste generator
Central	Figure 3B		119	Table 2B	High	Former Chinese Laundry	Former Chinese laundry, undertaker, and paint storage
Central	Figure 3B		120		High	Parking lot	Former dry cleaners (1937-1975); Former photography shop and refrigerator service shop
Central	Figure 3B		121		High	Arcadia Building	Former dental offices (1960's until recent); Former undertaker/coroner; Inactive hazardous waste generators
Central	Figure 3B		122		High	Former Bulk Oil Site	Former bulk oil storage and distribution
Central	Figure 3B		123		High	Bjerga's Feed Store	Former wholesale gas station
Central	Figure 3B		124		High	Northland Fire Protection	Former bulk petroleum storage facility; Tank Site; Closed Petroleum Remediation Leak Site
Central	Figure 3B		125		Medium	Brainerd Skate Co	Former auto service activities
Central	Figure 3B		126		High	Minnesota T's	Off-site and right-of-way petroleum impacts to soil-gas and groundwater, and chlorinated solvents in soil-gas; Former presence of free product; Former blacksmith shop; Active Site Assessment; Closed Petroleum Remediation Leak Site; Tank Site
Central	Figure 3B		127		High	Former blacksmith shop	Former blacksmith shop
Central	Figure 3B		128		Medium	Brainerd water tower	Petroleum impacts to soil-gas and groundwater from upgradient closed leak site at 824 Front St; Former auto repair shops and salvage
Central	Figure 3B		129		Medium	First Impression Print & Design	Active hazardous waste generator and former auto repair activities
East	Figure 3C		130		Medium	Former Franklin Junior High School Ball Fields	Land treatment of petroleum-impacted soils
East	Figure 3C		131		Medium	Mr. Tire Car Care Auto Repair Shop	Auto service activities; Tank Site
East	Figure 3C		132		High	Ravine Fill Area	Dirt fill from unknown sources and Brownfields/VIC Site
East	Figure 3C		133		High	Brainerd Wetland Creosote	Active Site Assessment for inferred dumping of creosote-containing wastes or wastewater
East	Figure 3C		134		High	BNSF Brainerd Equipment Shop	Closed PRP/Leak Site, Active Tank Sites, Active VSQ Hazardous Waste Generator, Inactive CERCLIS Site, Inactive Hazardous Waste Generator, Closed Spill Site, Air Quality, Construction Stormwater, Active and Inactive Industrial Stormwater, extensive railroad related activity, used auto sales
East	Figure 3C		135		Medium	Vacant Building	Tank Site; Closed Petroleum Remediation Leak Site; Former filling station
East	Figure 3C		136		High	Sakura Express Asian restaurant	Former bulk petroleum storage facility, former filling station with unregistered USTs
East	Figure 3C		137		High	5Rocks Distilling Co.	Former blacksmith, laundry, and automotive repair shops
East	Figure 3C		138		Low	Remnant Rail Tracks	Remnant railroad tracks along the current 1st St NE right-of-way
East	Figure 3C		139		High	NE Liquor	Inactive Brownfields/Voluntary Investigation and Cleanup; Closed Petroleum Remediation Leak Site; Active Site Assessment; Tank Site; Former filling station; Documented off-site, downgradient petroleum and non-petroleum impacts in groundwater including the 1st Ave NE right-of-way
East	Figure 3C		140		High	Twin City Public Adjusting	Former laundry and documented petroleum impacts in groundwater from an off-site source
East	Figure 3C		141		Medium	Vacant Building	Former auto service activities
East	Figure 3C		142		Medium	Lunch Box Properties LLC Parking Lot	Former residential fuel storage with no documented releases and minor detectable concentrations of metals in soil.
East	Figure 3C		143		Medium	Jimmy John's restaurant	Closed Petroleum Remediation Leak Site; Tank Site; Former filling station
East	Figure 3C		144		High	Bluefrog Rentals LLC	Former clandestine drug laboratory
East	Figure 3C		145		High	Starbucks restaurant	Inactive Petroleum Brownfields; Closed Petroleum Remediation Leak Site; Inactive Site Assessment; Tank Site; Former auto service activities; Off-site petroleum impacts in groundwater
East	Figure 3C		146		Medium	Taco John's restaurant	Former filling station with tanks in the TH 210 right-of-way and auto service activities; Tank Site; Inactive hazardous waste generator
East	Figure 3C		147		Medium	210 Auto Sales and Repair	Auto service activities; Inactive hazardous waste generator
East	Figure 3C		148		Medium	HD Auto Repair LLC	Auto service activities; Inactive hazardous waste generator
East	Figure 3C		149		Medium	Speedway Gas Station	Closed Petroleum Remediation Leak Site with former presence of free product and likely off-site migration of petroleum impacts in groundwater in the 5th Ave NE right-of-way; Tank Site

TABLE 1A
Sites of Concern in Numerical Order
TH 210 Brainerd Limited Phase I Environmental Site Assessment
Brainerd, MN
MnDOT SP 1805-80

Corridor Area	Figure Location	Braun (2022) Site ID	Ramboll Site ID	Table Location	Risk Rank	Site Name	Ranking Rationale
East	Figure 3C		150	Table 2A	Medium	McDonald's restaurant	Former residential fuel storage (1917); no documented releases
East	Figure 3C		151		Low	Former Buildings in TH 210 right-of-way	Former Buildings in TH 210 right-of-way
East	Figure 3C		152		High	East Brainerd Mall	Inactive Petroleum Brownfields; Closed Petroleum Remediation Leak Site; Active and inactive hazardous waste generators; Tank Site
East	Figure 3C		153	Table 2C	Medium	Crow Wing Co TH 210/Hwy 25 Roadway Spill	Closed petroleum spill
East	Figure 3C		154	Table 2B	High	Former laundry	Former laundry
East	Figure 3C		155	Table 2C	Medium	Banks Residence	Closed agricultural spill
East	Figure 3C		156		Low	Cash Wise Liquor Shopping Center	Inactive hazardous waste generator
East	Figure 3C		157	Table 2C	Medium	Dairy Queen	Closed sewage spill
East	Figure 3C		158		High	Mr Tubbs Professional Laundry and Car Wash	Former dry cleaners; Inactive hazardous waste generator
East	Figures 3C, 3D		159		Medium	Vacant Commercial Facility	Tank Site; Inactive hazardous waste generator
East	Figure 3D		160		Medium	Terrance A. Peterson US Army Reserve Center - Brainerd	Tank Site; Active hazardous waste generator
East	Figure 3D		161		Medium	Napa Auto Care Center; Motors-N-More Used Cars	Auto service activities; Inactive hazardous waste generator
East	Figure 3D		162	Table 2C	Medium	Gebhard Residence	Closed septic system spill
East	Figure 3D		163		Medium	Casey's General Store #3654	Active filling station, tanks, and closed Petroleum Remediation Leak Site
East	Figure 3D		164		Medium	Lum Park	Tank Site; Closed Petroleum Remediation Leak Site; Closed spill
East	Figure 3D		165		High	Fab Four Plastic Molding Facility	Inactive Brownfields site; Closed spill; Inactive hazardous waste generator; Former auto body shop
East	Figure 3D		166	Table 2C	Medium	Closed Septic Spill	Closed Septic Spill
East	Figures 3D, 3E		167		Medium	Anderson Brothers Construction Company	Closed Petroleum Remediation Leak Site; Tank Site; Active and inactive hazardous waste generator; Closed spill

TABLE 1B
Sites of Concern in Risk Order
TH 210 Brainerd Limited Phase I Environmental Site Assessment
Brainerd, MN
MnDOT SP 1805-80

Corridor Area	Figure Location	Braun (2022) Site ID	Ramboll Site ID	Table Location	Risk Rank	Site Name	Ranking Rationale
West	Figure 3A	6	001		High	Former BN Brainerd Tie Plant	Former railroad tie treatment facility, Active Superfund Site, Inactive CERCLIS and RCRA Remediation Site, and Active VSQ Hazardous Waste Generator, and Federal Engineering Controls
West	Figure 3A	32	002		High	Paul Bunyan Trail	Former railroad spur and Closed Brownfields/VIC site
West	Figure 3A	35	003		High	Westport Shopping Center, Pizza Hut	Closed spill incident and former dental office
West	Figure 3A	36	004		High	Dollar Tree (Greg Larson Sports)	Closed Brownfields/VIC site, Active Minimal Quantity Hazardous Waste Generato, Inactive Hazardous Waste Generator
West	Figure 3A	40	008		High	Mills Honda	Closed Petroleum Brownfield Site, Closed Petroleum Brownfields/Voluntary Investigation and Cleanup (VIC) Site, Removed UST and Active ASTs, Active Hazardous Waste Generator, Inactive Hazardous Waste Generator, auto service activities
West	Figure 3A		013		High	AutoZone 6356	Closed Brownfields/VIC Site, Closed PRP/Leak Sites, Active Tanks Site, Active VSQ Hazardous Waste Generator, Active Construction Stormwater Permit, former gas station, auto service activities, Closed spill
West	Figure 3A		024		High	Crystal Cleaners Shopping Center	Dry cleaning site; Tank Site; Closed Petroleum Remediation Leak Site; Closed spill
West	Figure 3A		028		High	Burritos California Mexican Grill	Former gas station, former photo finishing activity, Inactive Hazardous Waste Generator
West	Figure 3A		031		High	305-317 W Washington Street/Multi-Tenant Commercial Building	Former dentist's office, former physician services
West	Figure 3A		033		High	Kummet Larson Bluth & Co., (certified public accountants) and Northridge Insurance Agency	Inactive Minimal Quantity Hazardous Waste Generator, former dental practice
West	Figure 3A		035		High	Tyrol Hills Shopping Center	Inactive Hazardous Waste Generator listings, past medical and dental practices
West	Figure 3A		040		High	Lake County Dental	Active Minimal Quantity Hazardous Waste Generator, dental office
Central	Figure 3B		058		High	Hardees/Former Bulk Facility	Closed Petroleum Remediation Leak Site and former bulk oil facility
Central	Figure 3B		059		High	Legend Outdoors Ice Houses & RV's	Potential PFAS use in zinc and nickel electroplating and residual petroleum impacts in groundwater from right adjacent property and likely in 1st St N right-of-way
Central	Figure 3B		064		High	Former Bulk Petroleum ASTs	Former bulk petroleum ASTs and storage of railroad tie piles
Central	Figure 3B		065		High	Allegra Marketing Print Mail	Former site storage of railroad ties, former dental office (1990's), former used car sales with potential auto repair activities, and current (2000's) printing service activities; Inactive hazardous waste generators
Central	Figure 3B		066		High	Brenny Properties of Brainerd (301 to 317 Washington St)	Chlorinated solvents in groundwater from off-site source
Central	Figure 3B		068		High	Jrs No. 19 BBQ restaurant	Presence of chlorinated compounds in groundwater, including within the TH 210 right-of-way; Brownfields/VIC Site; Closed Petroleum Remediation Leak Site; Inactive hazardous waste generators
Central	Figure 3B		069		High	Brainerd Floral shopping center	Presence of chlorinated compounds in groundwater from off-site source, former gas station, and former on-site storage of railroad ties
Central	Figure 3B		071		High	Easy Riders Bicycle & Sport Shopping Center	Former dry cleaning and laundry facility; Former filling station; Active Brownfields Site; Closed Petroleum Remediation Leak Site; Inactive CERCLIS Site; Inactive Site Assessment; Potential off-site impacts of petroleum and chlorinated solvents in groundwater
Central	Figure 3B		073		High	Kingwood Square Dental Office	Dental office since approximately 1977; hazardous waste generator of dental wastes
Central	Figure 3B		078	Table 2B	High	Former paint shop	Former paint shop
Central	Figure 3B		079		High	Royal Tire	Former bulk oil dealer, filling station, farm implement sales and service, and paint shop; Tank Site; Inactive hazardous waste generator
Central	Figure 3B		086		High	Little Caesar's Pizza	Former laundry and filling station; Inactive hazardous waste generator
Central	Figure 3B		087		High	Cornerstone Liquor	Inactive hazardous waste generator; Former printing shop
Central	Figure 3B		088		High	Former Crystal Clean Dry Cleaners (Central)	Former dry cleaners and current laundry facility; Former printing business; Inactive hazardous waste generator
Central	Figure 3B		089		High	Vacant Lot (8th St N & Washington St)	Former bulk petroleum distribution and coal storage; Former auto repair shop
Central	Figure 3B		092		High	Former Bulk Oil Tanks	Former bulk petroleum storage and distribution, lumber storage, and coal storage; Tanks Site
Central	Figure 3B		094		High	Brainerd Hydraulics/Air and Integrity Auto Repair	Closed Petroleum Remediation Leak Site; Current auto repair; Former bulk petroleum storage; Former unregistered tanks
Central	Figure 3B		102		High	Brainerd City Fire Department	Active oil drop site and former site dumping; Tank Site
Central	Figure 3B		105		High	Brainerd Police Station Parking Lot	Former bulk oil storage; Closed Petroleum Remediation Leak Site
Central	Figure 3B		106		High	Crow Wing County Jail Parking Lot	Multiple former petroleum wholesale distributors; Former coal storage; Former auto service activities; Tanks Site; Closed Petroleum Remediation Leak Site; Closed spill
Central	Figure 3B		107		High	Crow Wing County Jail	Former filling station, laundry shops, printing shop, and blacksmith; Former site storage of wrecked automobiles and auto parts scrap
Central	Figure 3B		108	Table 2B	High	First Impression Printing Inc	Former laundry, current printing
Central	Figure 3B		110		High	LifeBack Law Firm and Parking lot	Former laundry with tanks, auto service activities, and junk storage; Inactive hazardous waste generator
Central	Figure 3B		111		High	The Salvation Army	Former commercial printing, former laundries, and former auto service activities; Inactive hazardous waste generator
Central	Figure 3B		112		High	Mid Minnesota Federal Credit Union -	Active Petroleum Remediation Leak Site, former printing shop, auto repair shop,
Central	Figure 3B		115		High	Sports Card Central	Former commercial photography and printing; Inactive hazardous waste generator
Central	Figure 3B		116	Table 2B	High	Former printing and photography	Former printing and photography
Central	Figure 3B		117	Table 2B	High	Former printing	Former printing
Central	Figure 3B		119	Table 2B	High	Former Chinese Laundry	Former Chinese laundry, undertaker, and paint storage
Central	Figure 3B		120		High	Parking lot	Former dry cleaners (1937-1975); Former photography shop and refrigerator service shop
Central	Figure 3B		121		High	Arcadia Building	Former dental offices (1960's until recent); Former undertaker/coroner; Inactive
Central	Figure 3B		122		High	Former Bulk Oil Site	Former bulk oil storage and distribution
Central	Figure 3B		123		High	Bjerga's Feed Store	Former wholesale gas station
Central	Figure 3B		124		High	Northland Fire Protection	Former bulk petroleum storage facility; Tank Site; Closed Petroleum Remediation
Central	Figure 3B		126		High	Minnesota T's	Off-site and right-of-way petroleum impacts to soil-gas and groundwater, and chlorinated solvents in soil-gas; Former presence of free product; Former blacksmith shop; Active Site Assessment; Closed Petroleum Remediation Leak Site; Tank Site
Central	Figure 3B		127		High	Former blacksmith shop	Former blacksmith shop
East	Figure 3C		132		High	Ravine Fill Area	Dirt fill from unknown sources and Brownfields/VIC Site
East	Figure 3C		133		High	Brainerd Wetland Creosote	Active Site Assessment for inferred dumping of creosote-containing wastes or wastewater
East	Figure 3C		134		High	BNSF Brainerd Equipment Shop	Closed PRP/Leak Site, Active Tank Sites, Active VSQ Hazardous Waste Generator, Inactive CERCLIS Site, Inactive Hazardous Waste Generator, Closed Spill Site, Air Quality, Construction Stormwater, Active and Inactive Industrial Stormwater, extensive railroad related activity, used auto sales
East	Figure 3C		136		High	Sakura Express Asian restaurant	Former bulk petroleum storage facility, former filling station with unregistered USTs

TABLE 1B
Sites of Concern in Risk Order
TH 210 Brainerd Limited Phase I Environmental Site Assessment
Brainerd, MN
MnDOT SP 1805-80

Corridor Area	Figure Location	Braun (2022) Site ID	Ramboll Site ID	Table Location	Risk Rank	Site Name	Ranking Rationale
East	Figure 3C		137		High	5Rocks Distilling Co.	Former blacksmith, laundry, and automotive repair shops
East	Figure 3C		139		High	NE Liquor	Inactive Brownfields/Voluntary Investigation and Cleanup; Closed Petroleum Remediation Leak Site; Active Site Assessment; Tank Site; Former filling station; Documented off-site, downgradient petroleum and non-petroleum impacts in groundwater including the 1st Ave NE right-of-way
East	Figure 3C		140		High	Twin City Public Adjusting	Former laundry and documented petroleum impacts in groundwater from an off-site source
East	Figure 3C		144		High	Bluefrog Rentals LLC	Former clandestine drug laboratory
East	Figure 3C		145		High	Starbucks restaurant	Inactive Petroleum Brownfields; Closed Petroleum Remediation Leak Site; Inactive Site Assessment; Tank Site; Former auto service activities; Off-site petroleum impacts in groundwater
East	Figure 3C		152		High	East Brainerd Mall	Inactive Petroleum Brownfields; Closed Petroleum Remediation Leak Site; Active and inactive hazardous waste generators; Tank Site
East	Figure 3C		154	Table 2B	High	Former laundry	Former laundry
East	Figure 3C		158		High	Mr Tubbs Professional Laundry and Car Wash	Former dry cleaners; Inactive hazardous waste generator
East	Figure 3D		165		High	Fab Four Plastic Molding Facility	Inactive Brownfields site; Closed spill; Inactive hazardous waste generator; Former
West	Figure 3A	37	005		Medium	Lakes Area Auto Solution	Automotive sales and possible vehicle maintenance, western portion of former concrete ready mix plant property
West	Figure 3A	38	006		Medium	Valvoline Instant Oil Change	Automotive lubrication Service, on site storage of petroleum products
West	Figure 3A	39	007		Medium	Casey's General Store #3720	Active gas station and Tanks Site, Closed PRP/Leak Sites, Inactive Hazardous Waste
West	Figure 3A	42	010		Medium	Harbor Freight Tools USA Inc. 3069, Dunham's Sports	Active Very Small Quantity Hazardous Waste Generator, Inactive Minimal Quantity Hazardous Waste Generator, Inactive Hazardous Waste Generator, Removed Tank Site
West	Figure 3A		012		Medium	Mid Minnesota Federal Credit Union	Former used car dealer and possible vehicle maintenance
West	Figure 3A		014		Medium	Advanced Auto Repair - Brainerd	Closed PRP/Leak Site, Removed USTs, Active AST, Inactive Hazardous Waste Generator, auto service activities
West	Figure 3A		015		Medium	West Brainerd Auto/Peterson Towing	Closed PRP/Leak Sites, Active Tanks Site, Inactive Hazardous Waste Generator, former gas station, vehicle repair activity, Closed spill
West	Figure 3A		016		Medium	Brainerd Nissan Inc/Professional Auto Leasing	Active Tanks Site, Inactive Hazardous Waste Generator, vehicle service activity
West	Figure 3A		017		Medium	Tanner Motors	Active Hazardous Waste Generator, auto service activities
West	Figure 3A		019		Medium	Tanner Motors	Closed Leak Site, Removed Tanks Site (UST), Inactive Hazardous Waste Generator, Auto Sales & Service
West	Figure 3A		020		Medium	Perkins Restaurant & Bakery	Closed PRP/Leak Site, Removed Tank Site, former gas station
West	Figure 3A		021		Medium	Neighborhood National Bank	Closed PRP/Leak Site, Inactive Hazardous Waste Generator, unregistered tank site
West	Figure 3A		022		Medium	Caribou Coffee	Inactive Hazardous Waste Generator, Former lumber and building supplies retailer, former auto repair shop
West	Figure 3A		023		Medium	Heartland Tire Service	Closed PRP/Leak Site, Removed Tanks Site (UST); Active Tank Site (AST); Active
West	Figure 3A		026		Medium	Auto Value Parts Stores	Closed PRP/Leak Site, Removed Tank Site, Active Very Small Quantity Hazardous Waste Generator, auto body repair activity
West	Figure 3A		027		Medium	Wells Fargo Bank	Closed PRP/Leak Site, Removed Tanks Site (UST), former gas station
West	Figure 3A		030		Medium	Walgreen's Store 5635	Active Very Small Quantity Hazardous Waste Generator, closed spill incident, former gas station, former Greyhound bus facility
West	Figure 3A		032		Medium	Corral Auto Repair	Former gas station and removed Tank Site, Inactive Hazardous Waste Generator, auto repair facility
West	Figure 3A		034		Medium	Riverside Elementary School	Active and Inactive Tank Site, Active and Inactive Hazardous Waste generators
West	Figure 3A		037		Medium	Larson Auto Repair	Inactive Hazardous Waste Generator, auto repair activity
West	Figure 3A		038		Medium	Brainerd Daily Dispatch	Closed AST, Active Very Small Quantity Hazardous Waste Generator, printing activity
West	Figure 3A		042		Medium	West Side Auto Body & Boat Repair	Active Hazardous Waste Generator, active Air Quality Permit, auto body and boat repair facility
West	Figure 3A		043		Medium	Pinnacle Performance Automotive	Inactive Hazardous Waste Generator, vehicle repair facility and former car wash
West	Figure 3A		044		Medium	Burt Electric/Muddy Bikes	Inactive Hazardous Waste Generator, former auto parts supplier
West	Figure 3A		045		Medium	Tanner Motors Back Lot	Tank site (AST), used auto sales and likely service activities, outdoor storage of 55-gallon drums
West	Figure 3A		046		Medium	Snow White Laundry & Car Wash	Active tank site (UST), laundry and car wash facility
West	Figure 3A		048		Medium	Century Link	Outdoor storage of electrical transformers and possible use of PCB containing material
West	Figure 3A		049		Medium	Eclipse Used Auto Sales	Active Minimal Quantity Hazardous Waste Generator, likely onsite vehicle
West	Figure 3A		050		Medium	Product Alternatives Inc	Inactive Hazardous Waste Generator, former printing operations, removed tank site
Central	Figure 3B		052		Medium	Recover Health and Harmony Massage Spa	Former filling station with three unregistered USTs
Central	Figure 3B		053		Medium	North Risk Partners, Klein & Fleming Insurance Services	Former Filling Station
Central	Figure 3B		054		Medium	Auto Import Inc	Current and historic vehicle repair activities, former filling station, and registered USTs in the adjacent 1st St N right-of-way with no removal documentation
Central	Figure 3B		055		Medium	River Road Autobody	Current and former auto service activities and former machine shop
Central	Figure 3B		056	Table 2C	Medium	Railroad Roadway Spill	Closed waste oil spill
Central	Figure 3B		057		Medium	Minnesota Army National Guard	Closed Petroleum Remediation Leak Site; four unregistered closed in-place USTs remain at the site
Central	Figure 3B		060		Medium	Greenheck Auto Glass, Inc.	Closed Petroleum Remediation Leak Site with former presence of free product and off-site migration of petroleum impacts in groundwater; Tanks Site
Central	Figure 3B		062		Medium	Thrifty White Pharmacy #738	Former filling station with four unregistered USTs; Active hazardous waste generator
Central	Figure 3B		063		Medium	Brazilian Jiu-Jitsu shopping center	Former filling station with two unregistered gasoline USTs, auto service activities, and lumber storage; Inactive hazardous waste generator
Central	Figure 3B		067		Medium	Cenex/Kelly's Service auto repair shop	Closed Petroleum Remediation Leak Site; Tank Site; Auto service activities; Active hazardous waste generator
Central	Figure 3B		070		Medium	Easy Riders	Former filling station and auto service activities
Central	Figure 3B		072		Medium	Midtown Center	Closed Petroleum Remediation Leak Site, former railroad storage of oils, lamps, etc,
Central	Figure 3B		074		Medium	T&B Pawn and State Farm	Former filling station and auto service activities
Central	Figure 3B		075		Medium	Parking lot (6th St N & Kingwood St)	Former Filling Station with three tanks
Central	Figure 3B		076	Table 2A	Medium	Hinrichs Residence	Former residential fuel storage (1917); no documented releases
Central	Figure 3B		080	Table 2A	Medium	Jack and Harry Investments LLC	Former residential fuel storage (1917); no documented releases
Central	Figure 3B		081	Table 2A	Medium	Rosenberg Residence	Former residential fuel storage (1917); no documented releases
Central	Figure 3B		082		Medium	The Shop Youth Center	Former filling station and Tank Site
Central	Figure 3B		083		Medium	Commercial Building	Inactive hazardous waste generator
Central	Figure 3B		084		Medium	Bells + Blossom Boutique	Closed Petroleum Remediation Leak Site, closed in-place tanks, and former filling station
Central	Figure 3B		085		Medium	Zion Lutheran Church	Former filling station; Tank Site; two unregistered USTs
Central	Figure 3B		090	Table 2A	Medium	DK Investments LLC	Former residential fuel storage (1917); no documented releases
Central	Figure 3B		091		Medium	O'Reilly Auto Parts - 1647	Auto service activities; Active hazardous waste generator
Central	Figure 3B		093		Medium	Franklin Arts Center parking lot	Former auto servie shop and former buildings in TH 210 right-of-way; inactive
Central	Figure 3B		096	Table 2A	Medium	Ressen Residence	Former residential fuel storage (1917); no documented releases
Central	Figure 3B		097		Medium	Erfurth Residence	Closed Petroleum Remediation Leak Site
Central	Figure 3B		098		Medium	Lakes Area Senior Activity Center	Tank Site
Central	Figure 3B		099	Table 2A	Medium	Lakes Area Senior Activity Center Parking	Former residential fuel storage (1917); no documented releases
Central	Figure 3B		100	Table 2A	Medium	Voss Residence	Former residential fuel storage (1917); no documented releases
Central	Figure 3B		101		Medium	Franklin Arts Center	Closed Petroleum Remediation Leak Site; Tanks Site; Closed spill

TABLE 1B
Sites of Concern in Risk Order
TH 210 Brainerd Limited Phase I Environmental Site Assessment
Brainerd, MN
MnDOT SP 1805-80

Corridor Area	Figure Location	Braun (2022) Site ID	Ramboll Site ID	Table Location	Risk Rank	Site Name	Ranking Rationale
Central	Figure 3B		104		Medium	Fraternal Order of Eagles Non-profit and Bar	Former lumber posts and shingles storage
Central	Figure 3B		109		Medium	Former Paramount Property	Former UST
Central	Figure 3B		114		Medium	Former Freight Depot	Former freight depot with rail spurs and closed diesel spill
Central	Figure 3B		125		Medium	Brainerd Skate Co	Former auto service activities
Central	Figure 3B		128		Medium	Brainerd water tower	Petroleum impacts to soil-gas and groundwater from upgradient closed leak site at
Central	Figure 3B		129		Medium	First Impression Print & Design	Active hazardous waste generator and former auto repair activities
East	Figure 3C		077		Medium	Bement Residence	Petroleum and chlorinated solvent impacts in groundwater from upgradient leak site
East	Figure 3E		113	Table 2C	Medium	Ryder Truck Rental Spill	Closed diesel spill
East	Figure 3C		130		Medium	Former Franklin Junior High School Ball Fields	Land treatment of petroleum-impacted soils
East	Figure 3C		131		Medium	Mr. Tire Car Care Auto Repair Shop	Auto service activities; Tank Site
East	Figure 3C		135		Medium	Vacant Building	Tank Site; Closed Petroleum Remediation Leak Site; Former filling station
East	Figure 3C		141		Medium	Vacant Building	Former auto service activities
East	Figure 3C		142		Medium	Lunch Box Properties LLC Parking Lot	Former residential fuel storage with no documented releases and minor detectable concentrations of metals in soil.
East	Figure 3C		143		Medium	Jimmy John's restaurant	Closed Petroleum Remediation Leak Site; Tank Site; Former filling station
East	Figure 3C		146		Medium	Taco John's restaurant	Former filling station with tanks in the TH 210 right-of-way and auto service activities; Tank Site; Inactive hazardous waste generator
East	Figure 3C		147		Medium	210 Auto Sales and Repair	Auto service activities; Inactive hazardous waste generator
East	Figure 3C		148		Medium	HD Auto Repair LLC	Auto service activities; Inactive hazardous waste generator
East	Figure 3C		149		Medium	Speedway Gas Station	Closed Petroleum Remediation Leak Site with former presence of free product and
East	Figure 3C		150	Table 2A	Medium	McDonald's restaurant	Former residential fuel storage (1917); no documented releases
East	Figure 3C		153	Table 2C	Medium	Crow Wing Co TH 210/Hwy 25 Roadway Spill	Closed petroleum spill
East	Figure 3C		155	Table 2C	Medium	Banks Residence	Closed agricultural spill
East	Figure 3C		157	Table 2C	Medium	Dairy Queen	Closed sewage spill
East	Figures 3C, 3D		159		Medium	Vacant Commercial Facility	Tank Site; Inactive hazardous waste generator
East	Figure 3D		160		Medium	Terrance A. Peterson US Army Reserve	Tank Site; Active hazardous waste generator
East	Figure 3D		161		Medium	Napa Auto Care Center; Motors-N-More Used Cars	Auto service activities; Inactive hazardous waste generator
East	Figure 3D		162	Table 2C	Medium	Gebhard Residence	Closed septic system spill
East	Figure 3D		163		Medium	Casey's General Store #3654	Active filling station, tanks, and closed Petroleum Remediation Leak Site
East	Figure 3D		164		Medium	Lum Park	Tank Site; Closed Petroleum Remediation Leak Site; Closed spill
East	Figure 3D		166	Table 2C	Medium	Closed Septic Spill	Closed Septic Spill
East	Figures 3D,		167		Medium	Anderson Brothers Construction Company	Closed Petroleum Remediation Leak Site; Tank Site; Active and inactive hazardous
West	Figure 3A	41	009		Low	First Western Bank & Trust	Past Medical office and unknown commercial use, former borrow pit
West	Figure 3A		011		Low	Bath & Body Works 1391, Westgate Mall	Active Minimal Quantity Hazardous Waste Generator
West	Figure 3A		018		Low	702 W Washington Street/Multi-tenant Commercial	Inactive Construction Stormwater Permit, former bottled-gas sales
West	Figure 3A		025		Low	403-411 W Washington Street/Multi-Tenant Commercial Building	Inactive Hazardous Waste Generator, former physician services
West	Figure 3A		029		Low	Hair Force One/Strip Mall	Inactive Hazardous Waste Generator
West	Figure 3A		036		Low	Westwood Mobile Home Park	Mobile home park, likely associated with unregistered tanks
West	Figure 3A		039		Low	The Lakes Area Cosmetic Bar	Inactive Hazardous Waste Generator
West	Figure 3A		041		Low	214 James Street/Storage Building	Storage building with overhead bay style door, outdoor storage
West	Figure 3A		047		Low	Mike Hammad Upholstery	Upholstery business with likely chemical use
Central	Figure 3B		051		Low	Active and former railroad tracks in right-of-way areas south of TH 210	Active and former railroad tracks in right-of-way areas south of TH 210
Central	Figure 3B		061		Low	Former Medical Office	Former medical office; Inactive hazardous waste generator
Central	Figure 3B		095		Low	St. Joseph Medical Center – Home Care and Hospice	Inactive hazardous waste generator
Central	Figure 3B		103		Low	Brainerd Police Station	Inactive hazardous waste generator
Central	Figure 3B		118		Low	Iron Hills Gun & Pawn	Hazardous waste generator
East	Figure 3C		138		Low	Remnant Rail Tracks	Remnant railroad tracks along the current 1st St NE right-of-way
East	Figure 3C		151		Low	Former Buildings in TH 210 right-of-way	Former Buildings in TH 210 right-of-way
East	Figure 3C		156		Low	Cash Wise Liquor Shopping Center	Inactive hazardous waste generator

TABLE 2A
Sites of Concern - Historical Residential Fuel Storage
TH 210 Brainerd Limited Phase I Environmental Site Assessment
Brainerd, MN
MnDOT SP 1805-80

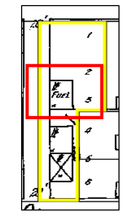
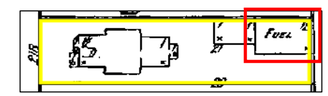
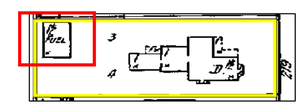
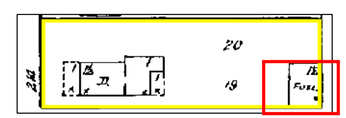
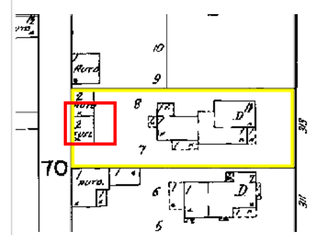
Corridor Area	Figure Location	Ramboll Site ID	Risk Rank	Parcel ID Number	Site Name	Current Address	Former Site Use	Former Address(es)	Rationale	Current Site Image	Historical Site Image	Fire Insurance Map Review
Central	Figure 3B	076	Medium	41241444	Hinrichs Residence	614 Kingwood St	Residence	217 1/2 7th St N and 223 1/2 7th St N, Brainerd MN 56401	Former residential fuel storage (1917); no documented releases			1889: Small detached building with fractional address (1/2) 1892-1929: A second detached building with a separate fractional address is added to the southern half of the current parcel 1917: Fuel storage in northern building 1945-1950: New dwelling at current address
Central	Figure 3B	080	Medium	41241459	Jack and Harry Investments LLC	218 7th St N, Brainerd MN 56401	Residence	218 7th St N, Brainerd MN 56401	Former residential fuel storage (1917); no documented releases			1889-1950: Dwelling with small detached building, likely a garage 1902: Address changed from 18 7th St N to 218 7th St N 1917: Fuel storage in detached building
Central	Figure 3B	081	Medium	41241459	Rosenberg Residence	219 8th St N, Brainerd MN 56401	Residence	219 8th St N, Brainerd MN 56401	Former residential fuel storage (1917); no documented releases			1889-1950: Dwelling with small detached building, likely a garage 1902: Address changed from 19 8th St N to 219 8th St N 1917: Fuel storage in detached building
Central	Figure 3B	090	Medium	41241510	DK Investments LLC	214 9th St N	Residence	14 9th St N, Brainerd MN 56401	Former residential fuel storage (1917); no documented releases			1889-1950: Dwelling with small detached building, likely a garage 1902: Address changed from 14 9th St N to 214 9th St N 1917: Fuel storage in detached building
Central	Figure 3B	096	Medium	41241283	Ressen Residence	313 5th St N, Brainerd MN 56401	Residence	313 5th St N, Brainerd MN 56401	Former residential fuel storage (1917); no documented releases			1889-1950: Dwelling with small detached building, likely a garage 1917: Fuel storage in detached building

TABLE 2A
Sites of Concern - Historical Residential Fuel Storage
TH 210 Brainerd Limited Phase I Environmental Site Assessment
Brainerd, MN
MnDOT SP 1805-80

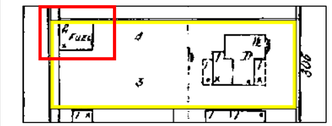
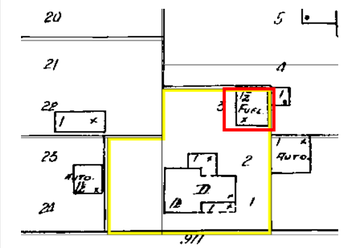
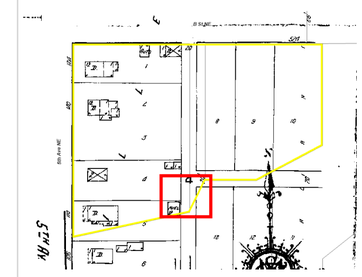
Corridor Area	Figure Location	Ramboll Site ID	Risk Rank	Parcel ID Number	Site Name	Current Address	Former Site Use	Former Address(es)	Rationale	Current Site Image	Historical Site Image	Fire Insurance Map Review
Central	Figure 3B	099	Medium	41241211	Lakes Area Senior Activity Center Parking Lot	305 9th St N (parking lot only)	Residence	305 9th St N, Brainerd MN 56401	Former residential fuel storage (1917); no documented releases			1889-1950: Dwelling with small detached building, likely a garage 1917: Fuel storage in detached building
Central	Figure 3B	100	Medium	241189; 412412	Voss Residence	911 Kingwood St, Brainerd, MN 56401	Residence	911 Kingwood St, Brainerd, MN 56401	Former residential fuel storage (1917); no documented releases			1889-1950: Dwelling with small detached building, likely a garage 1917: Fuel storage in detached building
East	Figure 3C	150	Medium	41191255	McDonald's restaurant	505 Washington St NE, Brainerd MN 56401	Residence	110 5th Ave, Brainerd MN 56401 (fuel storage location only)	Former residential fuel storage (1917); no documented releases			1907-1950: Dwelling with small detached building, likely a garage 1917: Fuel storage in detached building

TABLE 2B
Sites of Concern - Historical Sites (Printing, Photography, Painting, and Laundry)
TH 210 Brainerd Limited Phase I Environmental Site Assessment
Brainerd, MN
MnDOT SP 1805-80

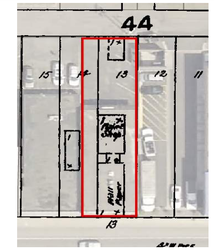
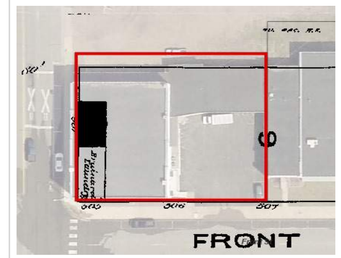
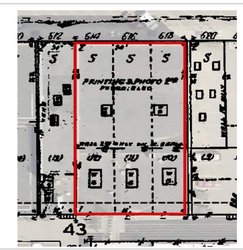
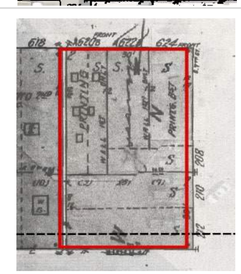
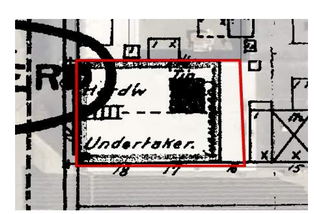
Corridor Area	Figure Location	Ramboll Site ID	Risk Rank	Parcel ID Number	Site Name	Current Address	Rationale	Current Site Image	Historical Site Image	Fire Insurance Map Review
Central	Figure 3B	078	High	41241439	Former paint shop	611 Washington St	Former paint shop			1889: Water works office 1892-1898: Paint shop 1913: Upholstering 1917: Dwelling
Central	Figure 3B	108	High	41241432	First Impression Printing Inc	401 Front St	Former laundry, current printing			1885: Brainerd Laundry 1889-1902: Vacant 1907-1917: The Brainerd Grocery Co. 1929-1950: Nash-Finch Co. Wholesale Grocery and wholesale flour mill
Central	Figure 3B	116	High	41241452	Former printing and photography	614 Front St	Former printing and photography			1885: Dwellings 1889-1917: Jewelry, grocery, warehouse storage, barber 1929-1950: Printing and photo shop
Central	Figure 3B	117	High	41241453	Former printing	212 7th St S	Former printing			1885: Sundires, grocery, restaurant 1889-1929: Post office and news shop; furniture shop, store, barber, billiards, restaurant 1945-1950: Printing shop
Central	Figure 3B	119	High	41241474	Former Chinese Laundry	209 7th St S, Brainerd, MN 56401	Former Chinese laundry, undertaker, and paint storage			1885: Photo gallery, second-hand store 1889: Same as above, Chinese laundry 1892: Undertaker 1898-1929: Stores 1945-1950: Paint storage

TABLE 2B
Sites of Concern - Historical Sites (Printing, Photography, Painting, and Laundry)
TH 210 Brainerd Limited Phase I Environmental Site Assessment
Brainerd, MN
MnDOT SP 1805-80

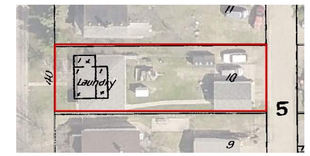
Corridor Area	Figure Location	Ramboll Site ID	Risk Rank	Parcel ID Number	Site Name	Current Address	Rationale	Current Site Image	Historical Site Image	Fire Insurance Map Review
East	Figure 3C	154	High	41191802	Former laundry	216 1st Ave NE, Brainerd, MN 56401	Former laundry			1898: Laundry 1902-1929: Dwelling 1945-1950: Building was removed

TABLE 2C
Sites of Concern - Documented Closed Spills
TH 210 Brainerd Limited Phase I Environmental Site Assessment
Brainerd, MN
MnDOT SP 1805-80

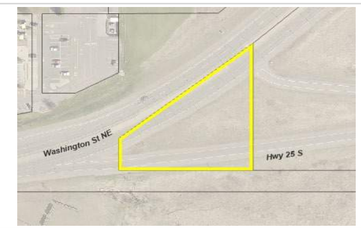
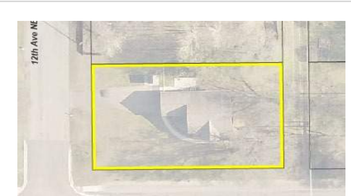
Corridor Area	Figure Location	Ramboll Site ID	Risk Rank	Parcel ID Number	Site Name	Current Address	Former Name	Duty Officer No.	Rationale	Current Site Image	Spill Description from EDR Database Report
Central	Figure 3B	056	Medium	N/A	Railroad Roadway Spill	1st St N, Brainerd, MN 56401	City of Brainerd	Not reported	Closed waste oil spill		EDR Name: City of Brainerd; EDR Spill ID 53293 (closed); BN RR found and reported to city a 55 gallon drum that was leaking on 10/1/2000. The release was likely comprised of waste oil. Local consultant firm has been contacted for testing and cleanup. Site is city owned land leased to BN.
East	Figure 3E	113	Medium	N/A	Ryder Truck Rental Spill	Highway 210 south of Jordan Rd, Brainerd, MN 56401	N/A	Not reported	Closed petroleum spill		EDR Name: Ryder Truck rental; EDR spill ID: 20010 (closed); Approximately 40 gallons of diesel fuel were released on the site on 08/19/1994. No other details were provided.
East	Figure 3C	153	Medium	41191872	Crow Wing Co TH 210/Hwy 25 Roadway Spill	Hwy 210 & Hwy 25, Brainerd, MN 56401	Minnesota Dakota Farms Coop	Not reported	Closed petroleum spill		EDR Name: Minnesota Dakota Farms Coop; EDR Spill ID 30328 (closed); A saddle tank leaked approximately 25 gallons of diesel fuel due to a vehicle accident on 5/5/1999. The fire department reportedly spread sand and built a dike around the release and MnDOT completed the cleanup response.
East	Figure 3C	155	Medium	41191794	Banks Residence	201 B St NE, Brainerd MN 56401	Novick Residence	22910	Closed agricultural spill		EDR Spill ID 53421 (closed) under the name Novick Residence; Resident arrived home to strong chemical smell on 11/12/2000. Determined that neighbor in duplex spilled Malathion, an insecticide; called Poison Control.
East	Figure 3C	157	Medium	41191258	Dairy Queen	522 C St, Brainerd MN 56401	City of Brainerd	133415	Closed sewage spill		EDR Name: City of Brainerd (522 C Street); EDR Spill ID 86912 (closed); Plugged sewer (private service) caused sewer to back-up out of manhole onto asphalt and flow into storm sewer. Storm sewer flows to isolated wetland. Unknown if sewage reached wetland. Sewage not treated. City cleaned up best as they could what was visible. Release involved approximately 100 gallons of sewage.
East	Figure 3D	162	Medium	41190620	Gebhard Residence	802 12th Ave NE, Brainerd, MN 56401	N/A	79179	Closed septic system spill		EDR Spill ID 65431 (closed); Caller reporting private septic system malfunctioned resulting in release to alley and street on 1/5/2006. City will clean spill (quantity unknown). Property owner has been notified to pump/correct system or water will be shut off. Caller reporting spill only and is not requesting assistance.

TABLE 2C
Sites of Concern - Documented Closed Spills
TH 210 Brainerd Limited Phase I Environmental Site Assessment
Brainerd, MN
MnDOT SP 1805-80

Corridor Area	Figure Location	Ramboll Site ID	Risk Rank	Parcel ID Number	Site Name	Current Address	Former Name	Duty Officer No.	Rationale	Current Site Image	Spill Description from EDR Database Report
East	Figure 3D	166	Medium	81200513	Closed Septic Spill	11287 Ash Ave, Brainerd, MN 56401	Residential	Not reported	Closed septic system spill		EDR Name: Residential; EDR Spill ID: 31158 (closed); Caller stated that this spill has been going on for over a year and it happens every day (septic tank runoff). Caller stated further the spill is from a septic tank for a rental unit. Caller has talked to local police but he believes nothing is being done about it.

TABLE 3
De Minimis Sites
TH 210 Brainerd Limited Phase I Environmental Site Assessment
Brainerd, MN
MnDOT SP 1805-80

De Minimis Site ID	De Minimis Group	Parcel ID No.	Owner Name	Site Address	City	Zip Code
DM01(6)	DM01	40050620	WESTGATE MALL REALTY ASSOCIATES LLC	1050 HIGHWAY 210 W	BAXTER	56425
DM01(10)	DM01	40080805	STATE OF MINNESOTA ADMIN BLDG			
DM01(564)	DM01	41040820	TANNER, JOHN	423 7TH ST NW	BRAINERD	56401
DM01(565)	DM01	41040819	TANNER, JOHN T & RHONDA N BAPTISTE	0	BRAINERD	56401
DM01(566)	DM01	41040817	RANDALL STATE BANK	724 WASHINGTON ST W	BRAINERD	56401
DM01(567)	DM01	41040816	WESTGATE MALL REALTY GROUP LLC	0	BRAINERD	56401
DM01(568)	DM01	41040815	JHGV LLC	808 WASHINGTON ST W	BRAINERD	56401
DM01(569)	DM01	41040814	WESTGATE MALL REALTY GROUP LLC	0	BRAINERD	56401
DM01(601)	DM01	41040680	GORG, JOSEPH D REVOCABLE TRUST	715 CHARLES ST N	BRAINERD	56401
DM01(617)	DM01	41040599	WAGNER HOLDINGS LLC	301 6TH ST NW	BRAINERD	56401
DM01(620)	DM01	41040592	TANNER, JOHN T	301 7TH ST NW	BRAINERD	56401
DM01(624)	DM01	41040580	BH HOLDINGS LLC	307 8TH ST NW	BRAINERD	56401
DM01(627)	DM01	41040576	CITY OF BRAINERD			
DM01(769)	DM01		NRE			
DM01(777)	DM01	41040668	BURLINGTON NORTHERN SANTA FE RR CO	0	BRAINERD	56401
DM02(548)	DM02	41040851	GUSTAFSON PROPERTIES OF BRD LLC	0	BRAINERD	56401
DM02(549)	DM02	41040849	GUSTAFSON PROPERTIES OF BRD LLC	0	BRAINERD	56401
DM02(550)	DM02	41040848	LAMBERT, JANICE	426 TYROL DR	BRAINERD	56401
DM02(551)	DM02	41040847	GARRY, MICHAEL & MEGAN	428 TYROL DR	BRAINERD	56401
DM02(552)	DM02	41040846	WHEELER, R MICHAEL	430 TYROL DR	BRAINERD	56401
DM02(553)	DM02	41040845	WHEELER, R MICHAEL	432 TYROL DR	BRAINERD	56401
DM02(554)	DM02	41040844	DOGEAGLE, CALEB J & ALYSSA	434 TYROL DR	BRAINERD	56401
DM02(555)	DM02	41040843	DOGEAGLE, CALEB J & ALYSSA	0	BRAINERD	56401
DM02(556)	DM02	41040842	PUCKROPP, JOHN E & HELEN	440 TYROL DR	BRAINERD	56401
DM02(557)	DM02	41040833	DUVAL, MICHAEL C & TARA M	468 TYROL DR	BRAINERD	56401
DM02(558)	DM02	41040832	DAVIS, JAMES L	470 TYROL DR	BRAINERD	56401
DM02(559)	DM02	41040831	SELL, DIANA L TRUSTEE OF DIANA SELL	433 TYROL DR	BRAINERD	56401
DM02(560)	DM02	41040830	SWENSON, CHARLES & NANCY	437 TYROL DR	BRAINERD	56401
DM02(561)	DM02	41040823	FARGO, MATTHEW R & NICHOLE E	469 TYROL DR	BRAINERD	56401
DM02(562)	DM02	41040822	HIRSCH, RILEY M &	471 TYROL DR	BRAINERD	56401
DM02(570)	DM02	41040811	GUSTAFSON PROPERTIES OF BRD LLC	501 2ND ST NW	BRAINERD	56401
DM02(571)	DM02	41040810	GUSTAFSON PROPERTIES OF BRD LLC	509 2ND ST NW	BRAINERD	56401
DM02(572)	DM02	41040805	GUSTAFSON PROPERTIES OF BRD LLC	0	BRAINERD	56401
DM02(573)	DM02	41040804	GUSTAFSON PROPERTIES OF BRD LLC	0	BRAINERD	56401
DM02(575)	DM02	41040802	MATTSON, FRANK	0	BRAINERD	56401
DM02(576)	DM02	41040801	GUSTAFSON PROPERTIES OF BRD LLC	0	BRAINERD	56401
DM02(577)	DM02	41040798	E2 INVESTMENTS LLC	510 4TH ST NW	BRAINERD	56401
DM02(578)	DM02	41040797	NELSON/KUEPERS, LLP	0	BRAINERD	56401
DM02(580)	DM02	41040795	WILDWOOD OFFICE CENTER LLC	517 4TH ST NW	BRAINERD	56401
DM02(581)	DM02	41040793	NORTHERN PINES MENTAL HEALTH CENTER	520 5TH ST NW	BRAINERD	56401
DM02(583)	DM02	41040791	SCEARCY, LANNY N & KAREN L	422 JAMES ST NW	BRAINERD	56401
DM02(585)	DM02	41040789	HANSON, MATTHEW R & DAWN M MUSICK	516 6TH ST NW	BRAINERD	56401
DM02(590)	DM02	41040724	NOVOTNY, LARRY L	0	BRAINERD	56401
DM02(592)	DM02	41040722	NORTH MEMORIAL HEALTH CARE	206 5TH ST NW	BRAINERD	56401
DM02(594)	DM02	41040707	WBPB LLC	521 CHARLES ST N	BRAINERD	56401
DM02(602)	DM02	41040653	STATE OF MINNESOTA DEPT OF TRANS	0	BRAINERD	56401
DM02(603)	DM02	41040652	GUSTAFSON PROPERTIES OF BRD LLC	0	BRAINERD	56401
DM02(604)	DM02	41040651	CITY OF BRAINERD	0	BRAINERD	56401
DM02(605)	DM02	41040650	STATE OF MINNESOTA ADMIN BLDG	0	BRAINERD	56401
DM02(609)	DM02	41040639	LAVALLE, DENNIS W & JULIE A	314 CHARLES ST	BRAINERD	56401
DM02(612)	DM02	41040624	TAX FORFEITED	0	BRAINERD	56401
DM02(614)	DM02	41040622	JC ENTERPRISES OF MINNESOTA, LLC	312 5TH ST NW	BRAINERD	56401
DM02(616)	DM02	41040608	MCDONALD'S CORP (22/68)	521 W WASHINGTON ST	BRAINERD	56401
DM02(633)	DM02	41040541	HAZA REALTY LP	510 W WASHINGTON ST	BRAINERD	56401
DM02(768)	DM02		R/W Tyrol Dr			
DM02(772)	DM02		Not on tax rolls			
DM02(782)	DM02	41040735	IND SCHOOL DIST, # 181	220 3RD ST NW	BRAINERD	56401
DM03(48)	DM03	41251148	MAROLT, GREG A & CLAIRE STEEN	29 KINGWOOD ST	BRAINERD	56401
DM03(49)	DM03	41251147	RUTSKE, CARRIE B	25 KINGWOOD ST	BRAINERD	56401
DM03(50)	DM03	41251146	WEBER, BRIAN J & JESSICA	17 KINGWOOD ST	BRAINERD	56401
DM03(51)	DM03	41251145	O'ROURKE, JOHN M & PAMELA	15 KINGWOOD ST	BRAINERD	56401
DM03(52)	DM03	41251144	NELSON, ANNABELLE M	9 KINGWOOD ST	BRAINERD	56401
DM03(53)	DM03	41251143	SORENSON, RONALD M & KAREN	5 KINGWOOD ST	BRAINERD	56401
DM03(57)	DM03	41251139	JAX LLC	209 1ST ST N	BRAINERD	56401
DM03(58)	DM03	41251138	LONGTAIL PROPERTIES LLC	0	BRAINERD	56401
DM03(59)	DM03	41251137	HUCKSTEAD, NANCY L TRUST	213 1ST ST N	BRAINERD	56401
DM03(60)	DM03	41251136	ASELL, AMY K	217 1ST ST N	BRAINERD	56401
DM03(61)	DM03	41251135	RONHOLM, SUSAN & DAVID	223 1ST ST N	BRAINERD	56401
DM03(62)	DM03	41251134	EGGERT, GWEN C & WILBUR ROY	225 1ST ST N	BRAINERD	56401
DM03(63)	DM03	41251133	MATTHIES, DARLENE K	231 1ST ST N	BRAINERD	56401
DM03(64)	DM03	41251132	ERICKSON, JOHN & JANET	230 CHIPPEWA ST	BRAINERD	56401
DM03(65)	DM03	41251131	RACHELS, CANDICE D	226 CHIPPEWA ST	BRAINERD	56401
DM03(66)	DM03	41251130	PETERSON, MARY	218 CHIPPEWA ST	BRAINERD	56401
DM03(67)	DM03	41251129	WADDELL, MARLYS A	216 CHIPPEWA ST	BRAINERD	56401
DM03(68)	DM03	41251128	WRIGHT, DUSTIN L	214 CHIPPEWA ST	BRAINERD	56401
DM03(69)	DM03	41251127	JESKE, DAJION	210 CHIPPEWA ST	BRAINERD	56401
DM03(71)	DM03	41251125	MINNESOTA HIGHWAY, DEPT	0	BRAINERD	56401
DM03(72)	DM03	41251124	DUVAL, CASEY M & VANESSA JEANNE MARIE	201 CHIPPEWA ST	BRAINERD	56401
DM03(73)	DM03	41251123	LARSON, MICHAEL JAMES	209 CHIPPEWA ST	BRAINERD	56401
DM03(74)	DM03	41251122	STALKER, DIANE	215 CHIPPEWA ST	BRAINERD	56401
DM03(75)	DM03	41251121	LINDNER, DAWN A	219 CHIPPEWA ST	BRAINERD	56401
DM03(76)	DM03	41251120	KRON, CHELSEY A	221 CHIPPEWA ST	BRAINERD	56401
DM03(77)	DM03	41251119	HOLM, MATTHEW A & ANNIE R H	225 CHIPPEWA ST	BRAINERD	56401
DM03(78)	DM03	41251118	LARSON, ROBERT B	229 CHIPPEWA ST	BRAINERD	56401
DM03(80)	DM03	41251116	P O R T OF CROW WING, COUNTY INC	115 1ST ST N	BRAINERD	56401
DM03(81)	DM03	41251115	STRAKA, DAVID A REV TRUST (1/2) &	123 1ST ST N	BRAINERD	56401
DM03(82)	DM03	41251114	HOLMGREN, JOHN P REV LIV TRUST(1/2)	12 WASHINGTON ST	BRAINERD	56401
DM03(456)	DM03	41241367	BURTON, JANET E	109 WASHINGTON ST	BRAINERD	56401
DM03(458)	DM03	41241365	ISLE, ALIJAH M	214 1ST ST N	BRAINERD	56401
DM03(459)	DM03	41241364	NORTHLAND INVESTMENTS LLC (1/2 INT)	112 KINGWOOD ST	BRAINERD	56401
DM03(460)	DM03	41241363	PUTTBRESE, HANNAH	106 KINGWOOD ST	BRAINERD	56401
DM03(461)	DM03	41241362	SHERMAN, ANN L	102 KINGWOOD ST	BRAINERD	56401
DM03(462)	DM03	41241350	NYDEGGER, JERRY & KATHY	123 KINGWOOD ST	BRAINERD	56401
DM03(463)	DM03	41241349	WILLIAMS, MARA	119 KINGWOOD ST	BRAINERD	56401
DM03(464)	DM03	41241348	BENDER, JANET G	113 KINGWOOD ST	BRAINERD	56401
DM03(465)	DM03	41241347	FORTUNE, SHAWN L & SHANNON C	315 2ND ST N	BRAINERD	56401
DM03(466)	DM03	41241346	MALONEY, KATHLEEN & DAVID HERMERDIN	116 JUNIPER ST	BRAINERD	56401
DM03(467)	DM03	41241343	KLINE, NATHAN & ANN	112 JUNIPER ST	BRAINERD	56401
DM03(468)	DM03	41241342	TEUFERT, GENE E & LYNN C	106 JUNIPER ST	BRAINERD	56401
DM03(469)	DM03	41241341	LEPAGE, JANINE L	100 JUNIPER ST	BRAINERD	56401
DM03(470)	DM03					
DM03(471)	DM03	41241340	TRIMBLE, SHELLY & DOMINIQUE SEELY	111 KINGWOOD ST	BRAINERD	56401
DM03(472)	DM03	41241339	DAVIS, HEATHER M	107 KINGWOOD ST	BRAINERD	56401
DM03(473)	DM03	41241338	KAINZ, RITA NARAE	103 KINGWOOD ST	BRAINERD	56401
DM04(427)	DM04	41241400	DEGEN, MICHAEL S & JULIE L	223 4TH ST N	BRAINERD	56401
DM04(436)	DM04	41241391	BRENNY PROPERTIES OF BRAINERD LLC	0	BRAINERD	56401
DM04(437)	DM04	41241390	BRENNY PROPERTIES OF BRAINERD LLC	216 3RD ST N	BRAINERD	56401
DM04(438)	DM04	41241389	BYE CABLES INC	220 3RD ST N	BRAINERD	56401
DM04(439)	DM04	41241388	ROBERTS, SHON B & LISA L	304 KINGWOOD ST	BRAINERD	56401
DM04(442)	DM04	41241385	GROENWOLD, JOHN	216 KINGWOOD ST	BRAINERD	56401
DM04(443)	DM04	41241384	PBR RENTALS LLC	213 3RD ST N	BRAINERD	56401
DM04(448)	DM04	41241379	COLLETT, KAYLYN E & GEBHARD, STEVEN A	212 KINGWOOD ST	BRAINERD	56401
DM04(449)	DM04	41241378	209 WASHINGTON LLC	206 KINGWOOD ST	BRAINERD	56401
DM04(450)	DM04	41241377	209 WASHINGTON LLC	0	BRAINERD	56401
DM04(474)	DM04	41241333	MARSOLEK, LAURA W & GEORGE C	221 KINGWOOD ST	BRAINERD	56401
DM04(475)	DM04	41241332	SWENSON, DANIELLE L	215 KINGWOOD ST	BRAINERD	56401
DM04(476)	DM04	41241331	ROHLOFF, TREVOR	211 KINGWOOD ST	BRAINERD	56401
DM04(477)	DM04	41241330	BELCHER, PATRICK	311 3RD ST N	BRAINERD	56401
DM04(478)	DM04	41241329	CULLINANE, JOHN D & TAMYRA	315 3RD ST N	BRAINERD	56401
DM04(479)	DM04	41241325	HOGLIN, LISA L	314 2ND ST N	BRAINERD	56401
DM04(480)	DM04	41241324	CARPER, NATHAN & STACY	209 KINGWOOD ST	BRAINERD	56401

TABLE 3
De Minimis Sites
TH 210 Brainerd Limited Phase I Environmental Site Assessment
Brainerd, MN
MnDOT SP 1805-80

De Minimis Site ID	De Minimis Group	Parcel ID No.	Owner Name	Site Address	City	Zip Code
DM04(481)	DM04	41241323	FOLEY, CHRISTOPHER R & JESSAMYN A	201 KINGWOOD ST	BRAINERD	56401
DM04(482)	DM04	41241308	BJORK, RICHARD B & KATHRYN A	303 4TH ST N	BRAINERD	56401
DM04(483)	DM04	41241307	BJORK, RICHARD B & KATHRYN A	0	BRAINERD	56401
DM04(484)	DM04	41241306	KRAMER, KENNETH & ROSEMARY	317 4TH ST N	BRAINERD	56401
DM04(485)	DM04	41241304	BECK, SUSAN	312 JUNIPER ST	BRAINERD	56401
DM04(486)	DM04	41241303	KUEHN, CARTER T & MARTHA	302 JUNIPER ST	BRAINERD	56401
DM05(40)	DM05	41251154	SCHWARTZWALD, ELIZABETH A TRUST	108 6TH ST S	BRAINERD	56401
DM05(313)	DM05	41250520	FOS PROPERTIES LLC	0	BRAINERD	56401
DM05(404)	DM05	41241429	GROENWOLD, JOHN	215 6TH ST N	BRAINERD	56401
DM05(405)	DM05	41241428	JAKE BRANDT PROPERTIES LLC	525 WASHINGTON ST	BRAINERD	56401
DM05(406)	DM05	41241427	NIEMEYER, CORBY L & SHEILA J	211 6TH ST N	BRAINERD	56401
DM05(407)	DM05	41241426	BARSNESS, BARSNESS & ANDERSON PRT	515 WASHINGTON ST	BRAINERD	56401
DM05(408)	DM05	41241425	DOUGHERTY MINNESOTA LLC	511 WASHINGTON ST	BRAINERD	56401
DM05(409)	DM05	41241424	WATSON, BETH A	509 WASHINGTON ST	BRAINERD	56401
DM05(410)	DM05	41241423	VIGNIERI, JASON & ALYSSA	503 WASHINGTON ST	BRAINERD	56401
DM05(411)	DM05	41241422	DOUGHERTY MINNESOTA LLC	216 5TH ST N	BRAINERD	56401
DM05(412)	DM05	41241421	RASMUSSEN, CHRISTA	224 5TH ST N	BRAINERD	56401
DM05(417)	DM05	41241412	GROENWOLD, JOHN & AMANDA	223 5TH ST N	BRAINERD	56401
DM05(418)	DM05	41241411	GROENWOLD, JOHN & AMANDA	217 5TH ST N	BRAINERD	56401
DM05(419)	DM05	41241410	DEROSIER, JOSEPH M & PHYLLIS TRUST	215 5TH ST N	BRAINERD	56401
DM05(424)	DM05	41241405	JENTSCH, ARTHUR L & COLLEEN J	220 4TH ST N	BRAINERD	56401
DM05(488)	DM05	41241286	HENDERSON, TODD	303 5TH ST N	BRAINERD	56401
DM05(489)	DM05	41241285	BLAHUT, JAMES & VUKELICH, MINDY	307 5TH ST N	BRAINERD	56401
DM05(490)	DM05	41241284	DROWN, UNTONIO D & JENNA HOLLINGSWORTH	311 5TH ST N	BRAINERD	56401
DM05(492)	DM05	41241278	NELSON-WOOD, KATHLEEN D	320 4TH ST N	BRAINERD	56401
DM05(493)	DM05	41241277	ENGISCH, RUDOLPH D & BRENDA	312 4TH ST N	BRAINERD	56401
DM05(494)	DM05	41241276	WALLIN, MINNA A REVOCABLE LIV TRST	401 KINGWOOD ST	BRAINERD	56401
DM05(495)	DM05	41241265	RAGE HOLDINGS LLC	519 KINGWOOD ST	BRAINERD	56401
DM05(496)	DM05	41241264	MCCULLOCH, EDWARD W & LYNNE M	515 KINGWOOD ST	BRAINERD	56401
DM05(497)	DM05	41241263	PARK UNITED, METHODIST CHURCH	514 JUNIPER ST	BRAINERD	56401
DM05(498)	DM05	41241261	HORTON, ELIZABETH &	312 5TH ST N	BRAINERD	56401
DM05(499)	DM05	41241260	TRUSTY, MARY B	511 KINGWOOD ST	BRAINERD	56401
DM05(500)	DM05	41241259	HALL, EDWARD M TRUST	310 5TH ST N	BRAINERD	56401
DM05(501)	DM05	41241258	WNUK, MARY L TRUST AGREEMENT	507 KINGWOOD ST	BRAINERD	56401
DM05(502)	DM05	41241257	TRUTH LUTHERAN CHURCH LLC	501 KINGWOOD ST	BRAINERD	56401
DM06(42)	DM06	41251152	HAMLIN LAKES PROPERTIES LLC	624 WASHINGTON ST	BRAINERD	56401
DM06(43)	DM06	41250503	MAROONS LLC	124 6TH ST N	BRAINERD	56401
DM06(44)	DM06	41251159	HAMLIN LAKES PROPERTIES LLC			
DM06(45)	DM06	41251151	MAROONS LLC	124 6TH ST N	BRAINERD	56401
DM06(46)	DM06	41251150	CITY OF BRAINERD	0	BRAINERD	56401
DM06(47)	DM06	41251149	LIVELY AUTO BLDG REAL EST HOLDINGS	0	BRAINERD	56401
DM06(365)	DM06	41241478	C & L MIDWEST LLC	718 FRONT ST	BRAINERD	56401
DM06(367)	DM06	41241476	HANSON, CARL SIDNEY POST #255	708 FRONT ST	BRAINERD	56401
DM06(370)	DM06	41241473	PUERINGER, DAVID F PUERINGER INVEST	205 7TH ST S	BRAINERD	56401
DM06(371)	DM06	41241469	AGATE HOMES LLC	223 8TH ST N	BRAINERD	56401
DM06(372)	DM06	41241468	PUERINGER, DAVID F PUERINGER INVEST	714 KINGWOOD ST	BRAINERD	56401
DM06(374)	DM06	41241466	HELDT, PAIGE	215 8TH ST N	BRAINERD	56401
DM06(376)	DM06	41241464	BEMENT, HARRY & ARLISS	211 8TH ST N	BRAINERD	56401
DM06(378)	DM06	41241462	KINNEY, KAREN	711 WASHINGTON ST	BRAINERD	56401
DM06(379)	DM06	41241461	JACK AND HARRY INVESTMENTS LLC	0	BRAINERD	56401
DM06(380)	DM06	41241460	LAKE, THOMAS J & MELISSA A	214 7TH ST N	BRAINERD	56401
DM06(382)	DM06	41241458	RUNBERG, JAMES P REVOCALBE TRUST	222 7TH ST N	BRAINERD	56401
DM06(385)	DM06	41241451	612 STATION LLC	612 FRONT ST	BRAINERD	56401
DM06(387)	DM06	41241449	NORTHERN PINES MENTAL HEALTH CENTER	606 FRONT ST	BRAINERD	56401
DM06(388)	DM06	41241448	MASONIC TEMPLE ASSN , OF BRAINERD	205 6TH ST S	BRAINERD	56401
DM06(389)	DM06	41241446	STREIFF, MARY BETH	624 KINGWOOD ST	BRAINERD	56401
DM06(390)	DM06	41241445	SORENSON, PHYLLIS M	620 KINGWOOD ST	BRAINERD	56401
DM06(392)	DM06	41241443	BGK HOLDINGS LLC	217 7TH ST N	BRAINERD	56401
DM06(393)	DM06	41241442	BGK HOLDINGS LLC	213 7TH ST N	BRAINERD	56401
DM06(396)	DM06	41241439	HORSESHOE ENTERPRISES LLC	607 WASHINGTON ST	BRAINERD	56401
DM06(397)	DM06	41241438	GMEINDER, ALFRED J	601 WASHINGTON ST	BRAINERD	56401
DM06(398)	DM06	41241437	BENTHIN, MEREDITH A & DENNIS	612 KINGWOOD ST	BRAINERD	56401
DM06(399)	DM06	41241436	PARSONS, MARY	608 KINGWOOD ST	BRAINERD	56401
DM06(503)	DM06	41241247	LORIMOR, DIANNA C	301 7TH ST N	BRAINERD	56401
DM06(504)	DM06	41241246	BRUSSEAU, MICHAEL D & LAUREL	307 7TH ST N	BRAINERD	56401
DM06(505)	DM06	41241245	ANDERSON, LARRY M	613 KINGWOOD ST	BRAINERD	56401
DM06(506)	DM06	41241244	JONES, TARA E	309 7TH ST N	BRAINERD	56401
DM06(507)	DM06	41241243	SHAW, CHARLES R & ELIZABETH A	315 7TH ST N	BRAINERD	56401
DM06(508)	DM06	41241242	STOCK, PAMELA S	317 7TH ST N	BRAINERD	56401
DM06(509)	DM06	41241240	STOCK, PAMELA S	0	BRAINERD	56401
DM06(510)	DM06	41241238	MANSELLE, BRANDON J &	316 6TH ST N	BRAINERD	56401
DM06(511)	DM06	41241237	HESS, JOE	310 6TH ST N	BRAINERD	56401
DM06(512)	DM06	41241236	KORPI, JOSIE R	609 KINGWOOD ST	BRAINERD	56401
DM06(513)	DM06	41241235	NORVELL, DAWN L	601 KINGWOOD ST	BRAINERD	56401
DM06(514)	DM06	41241228	JEDLENSKI, GREGORY A & PATRICIA	303 8TH ST N	BRAINERD	56401
DM06(515)	DM06	41241227	GORTON, JAY J	307 8TH ST N	BRAINERD	56401
DM06(516)	DM06	41241226	MOENGEN, JOHN D	311 8TH ST N	BRAINERD	56401
DM06(517)	DM06	41241225	JEDLENSKI, GREGORY A & PATRICIA	317 8TH ST N	BRAINERD	56401
DM06(518)	DM06	41241222	COLLINS, DAVID C & LINDA	318 7TH ST N	BRAINERD	56401
DM06(520)	DM06	41241220	NELSON, PATRICIA G	308 7TH ST N	BRAINERD	56401
DM06(521)	DM06	41241219	BADEAUX, SCOTT C	713 KINGWOOD ST	BRAINERD	56401
DM06(522)	DM06	41241218	THOMAS, JOHN G	302 7TH ST N	BRAINERD	56401
DM06(766)	DM06		Likely RR property			
DM07(325)	DM07					
DM07(330)	DM07	41241528	MATTSON, JOHN & DANA B	1008 KINGWOOD ST	BRAINERD	56401
DM07(331)	DM07	41241527	WEAVER, LINDSEY	218 10TH ST N	BRAINERD	56401
DM07(332)	DM07	41241523	BENSON ENTERPRISES	924 FRONT ST	BRAINERD	56401
DM07(334)	DM07	41241521	BENSON ENTERPRISES	0	BRAINERD	56401
DM07(337)	DM07	41241517	PUERINGER, DAVID F PUERINGER INVEST	223 10TH ST N	BRAINERD	56401
DM07(338)	DM07	41241516	DILLENBURG, SCOTT & LESLIE	219 10TH ST N	BRAINERD	56401
DM07(339)	DM07	41241515	DEGEN, MICHAEL S & JULIE L	217 10TH ST N	BRAINERD	56401
DM07(340)	DM07	41241514	DOOLEY INVESTMENTS LLC	215 10TH ST N	BRAINERD	56401
DM07(341)	DM07	41241513	CURRENT PROPERTIES LLC	923 WASHINGTON ST	BRAINERD	56401
DM07(342)	DM07	41241512	CURRENT PROPERTIES LLC	919 WASHINGTON ST	BRAINERD	56401
DM07(345)	DM07	41241509	TAX FORFEITED	218 9TH ST N	BRAINERD	56401
DM07(346)	DM07	41241508	POPLIN, DON R JR & POPLIN, MICHAEL	220 9TH ST N	BRAINERD	56401
DM07(347)	DM07	41241507	O'LEARY, SUSAN & RICHARD L	224 9TH ST N	BRAINERD	56401
DM07(349)	DM07	41241503	9TH STREET SOCIAL CLUB LLC	212 9TH ST S	BRAINERD	56401
DM07(352)	DM07	41241500	YEAGER, KEVIN & MELISSA	820 FRONT ST	BRAINERD	56401
DM07(354)	DM07	41241494	ZION EVANGELICAL	0	BRAINERD	56401
DM07(355)	DM07	41241493	AGATE HOMES LLC	821 WASHINGTON ST	BRAINERD	56401
DM07(356)	DM07	41241492	NORWOOD, CURTIS F & BONITA	209 9TH ST N	BRAINERD	56401
DM07(360)	DM07	41241488	MALINEN PROPERTIES LLC	0	BRAINERD	56401
DM07(523)	DM07	41241213	LAKES AREA SENIOR ACTIVITY CENTER	823 KINGWOOD ST	BRAINERD	56401
DM07(524)	DM07	41241212	LAKES AREA SENIOR ACTIVITY CENTER			
DM07(526)	DM07	41241210	WINN, BRANDON C & HOLM, ABEGAIL R	313 9TH ST N	BRAINERD	56401
DM07(527)	DM07	41241209	PUERINGER, DAVID F	315 9TH ST N	BRAINERD	56401
DM07(528)	DM07	41241206	LAKE, THOMAS J	812 JUNIPER ST	BRAINERD	56401
DM07(530)	DM07	41241202	BINKLEY, SARA	301 10TH ST N	BRAINERD	56401
DM07(532)	DM07	41241200	GARDING, DEBORAH ANN	305 10TH ST N	BRAINERD	56401
DM07(533)	DM07	41241199	GUIN, JANET M TRUST	309 10TH ST N	BRAINERD	56401
DM07(534)	DM07	41241198	MCKAY, RICHARD G & MARY	313 10TH ST N	BRAINERD	56401
DM07(535)	DM07	41241197	FREYNET, CHANTAL L	315 10TH ST N	BRAINERD	56401
DM07(536)	DM07	41241196	GOEDSCHE, JANES LIVING TRUST	317 10TH ST N	BRAINERD	56401
DM07(537)	DM07	41241193	RAGE HOLDINGS LLC	320 9TH ST N	BRAINERD	56401
DM07(538)	DM07	41241192	RAGE HOLDINGS LLC	314 9TH ST N	BRAINERD	56401
DM07(539)	DM07	41241191	SCHULTZ, RONALD D	310 9TH ST N	BRAINERD	56401
DM07(540)	DM07	41241190	BERG, GUY E	306 9TH ST N	BRAINERD	56401
DM07(542)	DM07	41241188	MCKAY, RICHARD G & MARY	302 9TH ST N	BRAINERD	56401
DM07(544)	DM07	41241186	IND SCHOOL DIST, # 181	1001 KINGWOOD ST	BRAINERD	56401
DM07(545)	DM07	41241158	IND SCHOOL DIST, # 181	0	BRAINERD	56401

TABLE 3
De Minimis Sites
TH 210 Brainerd Limited Phase I Environmental Site Assessment
Brainerd, MN
MnDOT SP 1805-80

De Minimis Site ID	De Minimis Group	Parcel ID No.	Owner Name	Site Address	City	Zip Code
DM07(546)	DM07	41241157	HILL, DAVID	1020 IVY ST	BRAINERD	56401
DM08(108)	DM08	41191828	MATTSON, FRANK	109 2ND AVE NE	BRAINERD	56401
DM08(109)	DM08	41191827	MATTSON PROPERTIES LLC	123 WASHINGTON ST NE	BRAINERD	56401
DM08(110)	DM08	41190501	MATTSON PROPERTIES LLC	121 WASHINGTON ST NE	BRAINERD	56401
DM08(113)	DM08	41191824	MATTHEWS, KEVIN	113 WASHINGTON ST NE	BRAINERD	56401
DM08(115)	DM08	41191822	TAX FORFEITED	0	BRAINERD	56401
DM08(120)	DM08	41191818	EIDE, LEAH M	114 1ST AVE NE	BRAINERD	56401
DM08(121)	DM08	41191817	ENGHOLM, ROGER	118 1ST AVE NE	BRAINERD	56401
DM08(122)	DM08	41191816	ENGHOLM, ROGER	122 1ST AVE NE	BRAINERD	56401
DM08(123)	DM08	41191815	MATTSON PROPERTIES LLC	0	BRAINERD	56401
DM08(124)	DM08	41191814	MATTSON PROPERTIES LLC	111 2ND AVE NE	BRAINERD	56401
DM08(125)	DM08	41191813	MATTSON PROPERTIES LLC	113 2ND AVE NE	BRAINERD	56401
DM08(126)	DM08	41191810	BENDER, CLYDE & NOTES INC	213 2ND AVE NE	BRAINERD	56401
DM08(127)	DM08	41191809	LOTZER, ANDREW J	209 2ND AVE NE	BRAINERD	56401
DM08(128)	DM08	41191808	KOTH, GARY D	205 2ND AVE NE	BRAINERD	56401
DM08(129)	DM08	41191807	BETCHER, PAT	201 2ND AVE NE	BRAINERD	56401
DM08(130)	DM08	41191806	LORIMOR, DIANNA C	113 B ST NE	BRAINERD	56401
DM08(131)	DM08	41191805	AUSTIN, NANCY	111 B ST NE	BRAINERD	56401
DM08(132)	DM08	41191804	KERAN, SHANE P & CHRISTINE M	208 1ST AVE NE	BRAINERD	56401
DM08(133)	DM08	41191803	BLOOMQUIST, ANDREA K & MARJORIE RE	212 1ST AVE NE	BRAINERD	56401
DM08(213)	DM08	41241671	OSCARSON, TROY A & KIMBERLY K	115 1ST AVE NE	BRAINERD	56401
DM08(214)	DM08	41241670	SMART, SARAH M & MAATTALA, RICHARD	121 1ST AVE NE	BRAINERD	56401
DM08(215)	DM08	41241669	WALTERS, MARK	4 B ST NE	BRAINERD	56401
DM08(216)	DM08	41241668	RAGE HOLDINGS LLC	120 GILLIS AVE	BRAINERD	56401
DM08(217)	DM08	41241667	BORRESCH, THOMAS (1/2 INT)	114 GILLIS AVE	BRAINERD	56401
DM08(220)	DM08	41241664	IND SCHOOL DIST, # 181	0	BRAINERD	56401
DM08(221)	DM08	41241663	LUNA WOMEN'S WELLNESS &	117 GILLIS AVE	BRAINERD	56401
DM08(222)	DM08	41241662	LUNA WOMEN'S WELLNESS &	121 GILLIS AVE	BRAINERD	56401
DM08(223)	DM08	41241661	STEPHANY, CHUCK & ERICKA	2 B ST NE	BRAINERD	56401
DM08(224)	DM08	41241660	ANDERSON, LLOYD T	201 1ST AVE NE	BRAINERD	56401
DM08(225)	DM08	41241659	DALE, LAURA & ROBERT &	205 1ST AVE NE	BRAINERD	56401
DM08(227)	DM08	41241653	BEELER, JEFF	216 GILLIS AVE	BRAINERD	56401
DM08(228)	DM08	41241652	MEDIN, CARL R & MARGARET	210 GILLIS AVE	BRAINERD	56401
DM08(229)	DM08	41241651	JOHNSON, HERBERT & ROBIN R &	206 GILLIS AVE	BRAINERD	56401
DM08(230)	DM08	41241650	LORIMOR, DIANNA C	5 B ST NE	BRAINERD	56401
DM08(231)	DM08	41241649	PUERINGER, DAVID F	202 GILLIS AVE	BRAINERD	56401
DM08(232)	DM08	41241648	D & S FAMILY PROPERTIES LLC	203 GILLIS AVE	BRAINERD	56401
DM08(233)	DM08	41241647	HOLSTEIN, VALERIE JEANN	211 GILLIS AVE	BRAINERD	56401
DM08(234)	DM08	41241646	SEUL, CHERI JO	215 GILLIS AVE	BRAINERD	56401
DM08(235)	DM08	41241643	DALBEC, BETH	0	BRAINERD	56401
DM09(85)	DM09	41191854	STRAKA, GREGORY A	110 4TH AVE NE	BRAINERD	56401
DM09(88)	DM09	41191851	CLUEVER, MICHAEL C & JODY A	412 B ST NE	BRAINERD	56401
DM09(89)	DM09	41191850	CLEMMER, GWEN A & SKY	112 4TH AVE NE	BRAINERD	56401
DM09(90)	DM09	41191849	BAHR, STEVEN	116 4TH AVE NE	BRAINERD	56401
DM09(91)	DM09	41191848	GALL, SHANE	124 4TH AVE NE	BRAINERD	56401
DM09(93)	DM09	41191846	FLEISCHHACKER, TIMOTHY R	114 3RD AVE NE	BRAINERD	56401
DM09(94)	DM09	41191845	BEMENT, HARRY & ARLISS	118 3RD AVE NE	BRAINERD	56401
DM09(95)	DM09	41191844	BEMENT, HARRY & ARLISS	122 3RD AVE NE	BRAINERD	56401
DM09(96)	DM09	41191843	LEETCH, RAY V & BARBARA J	121 4TH AVE NE	BRAINERD	56401
DM09(97)	DM09	41191842	FULLERTON, AARON L & JENNIFER	119 4TH AVE NE	BRAINERD	56401
DM09(98)	DM09	41191841	LOEFFELBEIN, JERRY E & PAMELA N	111 4TH AVE NE	BRAINERD	56401
DM09(103)	DM09	41191833	D & S FAMILY PROPERTIES LLC	120 2ND AVE NE	BRAINERD	56401
DM09(104)	DM09	41191832	STANGLER PROPERTIES LLC	124 2ND AVE NE	BRAINERD	56401
DM09(105)	DM09	41191831	MEYER, JOSEPH	121 3RD AVE NE	BRAINERD	56401
DM09(106)	DM09	41191830	HANNAHS, DONALD C JR & MARY M	119 3RD AVE NE	BRAINERD	56401
DM09(135)	DM09	41191798	BEMENT, HARRY & ARLISS	213 3RD AVE NE	BRAINERD	56401
DM09(136)	DM09	41191797	BEMENT, HARRY & ARLISS	209 3RD AVE NE	BRAINERD	56401
DM09(137)	DM09	41191796	BEMENT, HARRY & ARLISS	207 3RD AVE NE	BRAINERD	56401
DM09(138)	DM09	41191795	BEMENT, HARRY & ARLISS	201 3RD AVE NE	BRAINERD	56401
DM09(140)	DM09	41191793	KARLSON, MICHAEL B & DEBORAH M	208 2ND AVE NE	BRAINERD	56401
DM09(141)	DM09	41191792	TAP, LLC	210 2ND AVE NE	BRAINERD	56401
DM09(142)	DM09	41191791	CORY, WILLIAM J	214 2ND AVE NE	BRAINERD	56401
DM09(143)	DM09	41191785	H & H PROPERTIES OF MN LLC	215 4TH AVE NE	BRAINERD	56401
DM09(144)	DM09	41191784	H & H PROPERTIES OF MN LLC	211 4TH AVE NE	BRAINERD	56401
DM09(145)	DM09	41191783	KOEHLER FAMILY REV LIVING TRUST	0	BRAINERD	56401
DM09(146)	DM09	41191782	EBERLY, PEARL & PATRICIA DAVIS	323 B ST NE	BRAINERD	56401
DM09(147)	DM09	41191781	KOEHLER FAMILY REV LIVING TRUST	313 B ST NE	BRAINERD	56401
DM09(148)	DM09	41191780	KAMPEN, TROY J	309 B ST NE	BRAINERD	56401
DM09(149)	DM09	41191779	YOUNG, MARILYN T	305 B ST NE	BRAINERD	56401
DM09(150)	DM09	41191778	MILLOCH, RUTH	303 B ST NE	BRAINERD	56401
DM09(151)	DM09	41191777	OSTER, MARINA	202 3RD AVE NE	BRAINERD	56401
DM09(152)	DM09	41191776	RIVERS, RYAN F	212 3RD AVE NE	BRAINERD	56401
DM09(153)	DM09	41191775	LORIMOR, DIANNA C	214 3RD AVE NE	BRAINERD	56401
DM09(154)	DM09	41191769	DOUCETTE, DORIS D	214 4TH AVE NE	BRAINERD	56401
DM09(155)	DM09	41191768	BOCK, RICHARD	411 B ST NE	BRAINERD	56401
DM09(156)	DM09	41191767	DOUCETTE, DORIS D	405 B ST NE	BRAINERD	56401
DM09(157)	DM09	41191766	SCHWENDEMAN, CHAD	401 B ST NE	BRAINERD	56401
DM09(240)	DM09	41191169	GOTTWALT, MATTHEW & ERICA	430 C ST NE	BRAINERD	56401
DM09(241)	DM09	41191168	GREER, SARAH CURTIS	426 C ST NE	BRAINERD	56401
DM09(242)	DM09	41191167	SCHUMANN, KAREN J	422 C ST NE	BRAINERD	56401
DM09(243)	DM09	41191166	SMITH PROPERTIES GROUP LLC	418 C ST NE	BRAINERD	56401
DM09(244)	DM09	41191165	PAULSON, MATTHEW J	414 C ST NE	BRAINERD	56401
DM09(245)	DM09	41191164	KOWALCZYK, RONALD A & SUSAN J	413 B ST NE	BRAINERD	56401
DM09(246)	DM09	41191163	WEYER, DANIEL L & TERRI	417 B ST NE	BRAINERD	56401
DM09(247)	DM09	41191162	FAIRBANKS, ZACHARY L & MCCAPES, ASHLEY A	421 B ST NE	BRAINERD	56401
DM09(248)	DM09	41191161	BICKFORD, KAYLA	425 B ST NE	BRAINERD	56401
DM09(249)	DM09	41191160	COOPER-SWENSON, KELLY J	431 B ST NE	BRAINERD	56401
DM09(250)	DM09	41191159	MOEN, JEFF	123 5TH AVE NE	BRAINERD	56401
DM09(251)	DM09	41191158	ANDERSON, WENDELL & DENISE	426 B ST NE	BRAINERD	56401
DM09(252)	DM09	41191157	ANDERSON, WENDELL & DENISE	422 B ST NE	BRAINERD	56401
DM09(253)	DM09	41191156	NELSON, DUSTIN W	418 B ST NE	BRAINERD	56401
DM09(254)	DM09	41191155	SULLIVAN, BART & KATHLEEN M	414 B ST NE	BRAINERD	56401
DM10(22)	DM10	41191875	BETHLEHEM, EVANGELICAL LUTHERAN CHU	418 8TH AVE NE	BRAINERD	56401
DM10(23)	DM10	41190502	SUSO 2 BRAINERD LP	0	BRAINERD	56401
DM10(26)	DM10	41191871	TAX FORFEITED	0	BRAINERD	56401
DM10(27)	DM10	41191870	GUSTAFSON PROPERTIES OF BRD LLC	0	BRAINERD	56401
DM10(84)	DM10	41301057	TAX FORFEITED	0	BRAINERD	56401
DM10(164)	DM10	41191718	LORIMOR, DIANNA C	701 10TH AVE NE	BRAINERD	56401
DM10(165)	DM10	41191691	NELSON, SHIRLEY & LYLLA & DARLENE	603 9TH AVE NE	BRAINERD	56401
DM10(166)	DM10	41191681	BLOCK, JOAN M	605 10TH AVE NE	BRAINERD	56401
DM10(167)	DM10	41191680	PERRY, RICHARD T JR & DIANNA M	915 F STREET NE	BRAINERD	56401
DM10(168)	DM10	41191679	BRODAL, DAVID R & KRISTA G	609 10TH AVE NE	BRAINERD	56401
DM10(169)	DM10	41191678	BRODAL, DAVID R & KRISTA G	613 10TH AVE NE	BRAINERD	56401
DM10(170)	DM10	41191677	H & H PROPERTIES OF MINNESOTA	619 10TH AVE NE	BRAINERD	56401
DM10(171)	DM10	41191676	KENYON, CAROL R	623 10TH AVE NE	BRAINERD	56401
DM10(172)	DM10	41191675	KAMPEN, TREVOR W	624 9TH AVE NE	BRAINERD	56401
DM10(173)	DM10	41191674	STARKKA, CARL E & VICKI H	618 9TH AVE NE	BRAINERD	56401
DM10(174)	DM10	41191673	MCCULLEY, REBECCA J REV TRUST	614 9TH AVE NE	BRAINERD	56401
DM10(175)	DM10	41191672	SMITH PROPERTIES GROUP LLC	610 9TH AVE NE	BRAINERD	56401
DM10(176)	DM10	41191671	DEGEN, MICHAEL S & JULIE L	606 9TH AVE NE	BRAINERD	56401
DM10(177)	DM10	41191670	HENDRICKSON, TYLER J	602 9TH AVE NE	BRAINERD	56401
DM10(188)	DM10	41191657	BETHLEHEM, EVANGELICAL LUTHERAN CHU			
DM10(189)	DM10	41191656	STRONG, AARON H & VIVIAN J	521 10TH AVE NE	BRAINERD	56401
DM10(190)	DM10	41191655	HOFFMANN, STEVEN R & HARRIET	524 9TH AVE NE	BRAINERD	56401
DM10(191)	DM10	41191654	HENDERSON, PAUL D TRTEE HENDERS ON,	510 9TH AVE NE	BRAINERD	56401
DM10(192)	DM10	41191653	HENDERSON, PAUL D TRTEE HENDERS ON,	0	BRAINERD	56401
DM10(193)	DM10	41191652	MCGUIRE, LLOYD & RAMONA TRUST	921 E ST NE	BRAINERD	56401
DM10(194)	DM10	41191651	NELSON, JEFFREY D	515 9TH AVE NE	BRAINERD	56401
DM10(195)	DM10	41191650	GOHR, SUSAN & SHERRI CROSS &	523 9TH AVE NE	BRAINERD	56401
DM10(196)	DM10	41191649	CONNELLY, JOHN T	522 8TH AVE NE	BRAINERD	56401
DM10(197)	DM10	41191648	RENN, ERNIE	520 8TH AVE NE	BRAINERD	56401

TABLE 3
De Minimis Sites
TH 210 Brainerd Limited Phase I Environmental Site Assessment
Brainerd, MN
MnDOT SP 1805-80

De Minimis Site ID	De Minimis Group	Parcel ID No.	Owner Name	Site Address	City	Zip Code
DM10(198)	DM10	41191647	LANG, ROBERT H & ALEXA L	514 8TH AVE NE	BRAINERD	56401
DM10(199)	DM10	41191646	SMITH, GARY W & CATHERINE E	0	BRAINERD	56401
DM10(201)	DM10	41191644	BEMENT, HARRY & ARLISS	501 8TH AVE NE	BRAINERD	56401
DM10(202)	DM10	41191643	BEMENT, HARRY & ARLISS	505 8TH AVE NE	BRAINERD	56401
DM10(203)	DM10	41191642	WILT FAMILY PROPERTIES LLC	513 8TH AVE NE	BRAINERD	56401
DM10(204)	DM10	41191639	BETHLEHEM, EVANGELICAL LUTHERAN CHU			
DM10(205)	DM10	41191638	BETHLEHEM, EVANGELICAL LUTHERAN CHU			
DM10(206)	DM10	41191637	BETHLEHEM, EVANGELICAL LUTHERAN CHU	0	BRAINERD	56401
DM10(207)	DM10	41191636	BETHLEHEM, EVANGELICAL LUTHERAN CHU	0	BRAINERD	56401
DM10(639)	DM10	41190514	TAX FORFEITED	0	BRAINERD	56401
DM10(640)	DM10	41190513	BRAINERD HOUSING & REDEVELOPMENT	311 10TH AVE NE	BRAINERD	56401
DM10(643)	DM10	41190511	NELSON-DORAN BUILDING LLC	202 8TH AVE NE	BRAINERD	56401
DM10(654)	DM10	41190506	COMMON AREA			
DM11(29)	DM11	41190503	CITY OF BRAINERD	0	BRAINERD	56401
DM11(30)	DM11	41190504	ALDRIDGE, GABRIEL A & MICHELLE L			
DM11(31)	DM11	41191867	STRAKA, WALTER	0	BRAINERD	56401
DM11(158)	DM11	41191724	MACLAUGHLIN, MARCUS W	705 11TH AVE NE	BRAINERD	56401
DM11(159)	DM11	41191723	FORNSHELL, PATRICIA L & DUANE L	709 11TH AVE NE	BRAINERD	56401
DM11(160)	DM11	41191722	MALONE, TRACEY M & BROWN, TROY E	1024 H ST NE	BRAINERD	56401
DM11(161)	DM11	41191721	GREEN, GUY R	1004 H ST NE	BRAINERD	56401
DM11(162)	DM11	41191720	EIESLAND, FREDRICK P & LINDA	710 10TH AVE NE	BRAINERD	56401
DM11(163)	DM11	41191719	LANGSETH, JOEL	1009 G ST NE	BRAINERD	56401
DM11(178)	DM11	41191669	STATE OF MINNESOTA DEPT OF TRANS	0	BRAINERD	56401
DM11(179)	DM11	41191667	MILES, JULIE	609 11TH AVE NE	BRAINERD	56401
DM11(180)	DM11	41191666	PISTONE, CHRISTOPHER A &	1020 G ST NE	BRAINERD	56401
DM11(181)	DM11	41191665	OLSON, TIMOTHY & DEBRA	1008 G ST NE	BRAINERD	56401
DM11(182)	DM11	41191664	WINGERT, ASHLEY E & MATHEW J	1002 G ST NE	BRAINERD	56401
DM11(183)	DM11	41191663	PROBST, RICHARD W	616 10TH AVE NE	BRAINERD	56401
DM11(184)	DM11	41191662	BANKS, TRAVIS & TRACY	608 10TH AVE NE	BRAINERD	56401
DM11(185)	DM11	41191661	SNOOK, HAROLD	602 10TH AVE NE	BRAINERD	56401
DM11(187)	DM11	41191658	TAYLOR, ROBERT D & FORD, TERRI	518 10TH AVE NE	BRAINERD	56401
DM11(257)	DM11	41190638	MOILANEN, ROGER & BARBARA	903 13TH AVE NE	BRAINERD	56401
DM11(258)	DM11	41190632	CASEYS RETAIL COMPANY	0 14TH AVE NE	BRAINERD	56401
DM11(259)	DM11	41190631	CASEYS RETAIL COMPANY	902 13TH AVE NE	BRAINERD	56401
DM11(260)	DM11	41190628	CITY OF BRAINERD	0	BRAINERD	56401
DM11(261)	DM11	41190627	CITY OF BRAINERD	0	BRAINERD	56401
DM11(263)	DM11	41190625	VLECK, DANIEL & AMY	823 13TH AVE NE	BRAINERD	56401
DM11(264)	DM11	41190624	PHILP, LINDA R	815 13TH AVE NE	BRAINERD	56401
DM11(265)	DM11	41190623	PROELL, AMANDA	0	BRAINERD	56401
DM11(266)	DM11	41190622	PROELL, AMANDA	1223 H ST NE	BRAINERD	56401
DM11(268)	DM11	41190619	JAMES, TERRY & MARVIN	0	BRAINERD	56401
DM11(269)	DM11	41190618	JAMES, TERRY & MARVIN	812 12TH AVE NE	BRAINERD	56401
DM11(270)	DM11	41190617	DK INVESTMENTS LLC	818 12TH AVE NE	BRAINERD	56401
DM11(271)	DM11	41190616	SYPNIESKI, ADAM D	822 12TH AVE NE	BRAINERD	56401
DM11(272)	DM11	41190615	DIETRICH, WAYNE JOHN	826 12TH AVE NE	BRAINERD	56401
DM11(273)	DM11	41190613	GALL, SHANE & STEVEN	823 12TH AVE NE	BRAINERD	56401
DM11(274)	DM11	41190612	WENDEL PROPERTIES LLC	817 12TH AVE NE	BRAINERD	56401
DM11(275)	DM11	41190611	JOHNSON, JUDITH M	807 12TH AVE NE	BRAINERD	56401
DM11(276)	DM11	41190610	MOSES, KIRA & EDMOND BINDA	801 12TH AVE NE	BRAINERD	56401
DM11(277)	DM11	41190609	CARTER, SETH W	806 11TH AVE NE	BRAINERD	56401
DM11(278)	DM11	41190608	CARLSON, ROBERT	810 11TH AVE NE	BRAINERD	56401
DM11(279)	DM11	41190603	BEMENT, HARRY & ARLISS	723 12TH AVE NE	BRAINERD	56401
DM11(280)	DM11	41190602	LEDOUX, WILFRED & ROSE	0	BRAINERD	56401
DM11(281)	DM11	41190601	TAX FORFEITED	711 12TH AVE NE	BRAINERD	56401
DM11(282)	DM11	41190600	MILES, ELIZABETH A	1121 G ST NE	BRAINERD	56401
DM11(283)	DM11	41190599	KINNEY, APRIL D	704 11TH AVE NE	BRAINERD	56401
DM11(284)	DM11	41190598	PIPER PROPERTY MANAGERS LLC	720 11TH AVE NE	BRAINERD	56401
DM11(285)	DM11	41190597	MRDJENOVICH, DEREK J	1104 H ST NE	BRAINERD	56401
DM11(286)	DM11	41190596	GANGELHOFF, DEAN R & JILL	0	BRAINERD	56401
DM11(287)	DM11	41190595	GANGELHOFF, DEAN R & JILL	1212 H ST NE	BRAINERD	56401
DM11(288)	DM11	41190594	MAUCH, KERI	1204 H ST NE	BRAINERD	56401
DM11(289)	DM11	41190593	BIRCHEM, BRIAN K	712 12TH AVE NE	BRAINERD	56401
DM11(290)	DM11	41190591	TAX FORFEITED	0	BRAINERD	56401
DM11(291)	DM11	41190590	TAX FORFEITED	1314 G ST NE	BRAINERD	56401
DM11(292)	DM11	41190588	TAX FORFEITED	0	BRAINERD	56401
DM11(293)	DM11	41190587	TAX FORFEITED	0	BRAINERD	56401
DM11(294)	DM11	41190586	ARMSTRONG, SARAH RACHEL & STEVEN O			
DM11(295)	DM11	41190585	WASSON, MARY ELLEN	624 11TH AVE NE	BRAINERD	56401
DM11(296)	DM11	41190581	ARMSTRONG, SARAH RACHEL & STEVEN O	0	BRAINERD	56401
DM11(297)	DM11	41190580	ARMSTRONG, SARAH RACHEL & STEVEN O	614 11TH AVE NE	BRAINERD	56401
DM11(298)	DM11	41190579	ZETAH, DONALD J & JANE E	522 11TH AVE NE	BRAINERD	56401
DM11(299)	DM11	41190577	TAX FORFEITED	0	BRAINERD	56401
DM11(300)	DM11	41190576	TAX FORFEITED	0	BRAINERD	56401
DM11(301)	DM11	41190575	TAX FORFEITED	0	BRAINERD	56401
DM11(302)	DM11	41190574	ZETAH, DONALD J & JANE E	0	BRAINERD	56401
DM12(688)	DM12	81200640	BEMENT, HARRY & ARLISS	11279 ASH AVE	BRAINERD	56401
DM12(689)	DM12	81200639	STATE OF MINNESOTA DEPARTMENT OF	0	BRAINERD	56401
DM12(690)	DM12	81200630	PEARSON INVESTMENTS LLC	0	BRAINERD	56401
DM12(691)	DM12	81200629	LAURIAN FAMILY TRUST UAD 12/4/96	14434 LAURIAN LN	BRAINERD	56401
DM12(692)	DM12	81200504	STATE OF MINNESOTA DEPT OF TRANS	0	BRAINERD	56401
DM12(693)	DM12	81200628	DEGEN, MICHAEL & JULIE	14473 LAURIAN LN	BRAINERD	56401
DM12(694)	DM12	81200627	WENDEL PROPERTIES LLC	14487 LAURIAN LN	BRAINERD	56401
DM12(695)	DM12	81200626	GERDES, JUSTIN & ANGELA	14456 LAURIAN LN	BRAINERD	56401
DM12(696)	DM12	81200503	JOHNSON, PETER L & LEONA	14412 LAURIAN LN	BRAINERD	56401
DM12(697)	DM12	81200625	HKR INVESTMENTS LLC	0	BRAINERD	56401
DM12(698)	DM12	81200624	STATE OF MINNESOTA DEPARTMENT OF	0	BRAINERD	56401
DM12(700)	DM12	81200622	STATE OF MINNESOTA DEPARTMENT OF	0	BRAINERD	56401
DM12(701)	DM12	81200621	LAURIAN FAMILY TRUST UAD 12/4/96	0	BRAINERD	56401
DM12(771)	DM12		RESEARCH			
DM12(774)	DM12		R/W HWY 210			
DM13(644)	DM13	41200510	STOLP, DAVID P & VELINA J	14658 WONDERLAND PARK RD	BRAINERD	56401
DM13(645)	DM13	41200509	JJT LLC	11284 STATE HIGHWAY 210	BRAINERD	56401
DM13(646)	DM13	41200508	SIREK, CHRISTINA CATHERINE	14690 WONDERLAND PAR RD	BRAINERD	56401
DM13(647)	DM13	41200507	DURANT, MICHELLE A	14686 WONDERLAND PARK RD	BRAINERD	56401
DM13(648)	DM13	41200506	HANSEN, RICHARD R & MARLENE	14626 WONDERLAND PAR RD	BRAINERD	56401
DM13(707)	DM13	81200545	RUHL, STEPHEN J & CHUBA, JOHN M	14648 WONDERLAND PAR RD	BRAINERD	56401
DM13(708)	DM13	81200544	MADGES, RICHARD A	0	BRAINERD	56401
DM13(709)	DM13	81200543	STATE OF MINNESOTA DEPARTMENT OF	0	BRAINERD	56401
DM13(710)	DM13	81200542	BRANDEL, PETER & YVONNE	14588 WONDERLAND PAR RD	BRAINERD	56401
DM13(711)	DM13	81200541	STATE OF MINNESOTA DEPARTMENT OF	0	BRAINERD	56401
DM13(712)	DM13	81200540	KLETSCHER, DANIEL L & JULIE A	11316 STATE HIGHWAY 210	BRAINERD	56401
DM13(713)	DM13	81200539	STATE OF MINNESOTA DEPARTMENT OF	0	BRAINERD	56401
DM13(714)	DM13	81200538	STATE OF MINNESOTA DEPT OF TRANS	0	BRAINERD	56401
DM13(715)	DM13	81200537	EGGERT, CURTIS A & DEBORAH	11264 STATE HIGHWAY 210	BRAINERD	56401
DM13(716)	DM13	81200536	STATE OF MINNESOTA DEPARTMENT OF	0	BRAINERD	56401
DM13(717)	DM13	81200535	STATE OF MINNESOTA DEPARTMENT OF	0	BRAINERD	56401
DM13(718)	DM13	81200534	MINNESOTA DEPARTMENT OF	0	BRAINERD	56401
DM13(719)	DM13	81200533	MINNESOTA DEPARTMENT OF	0	BRAINERD	56401
DM13(720)	DM13	81200532	STATE OF MINNESOTA DEPARTMENT OF	0	BRAINERD	56401
DM13(721)	DM13	81200531	STATE OF MINNESOTA DEPARTMENT OF	0	BRAINERD	56401
DM13(722)	DM13	81200530	STATE OF MINNESOTA DEPT OF TRANS	0	BRAINERD	56401
DM13(723)	DM13	81200529	STATE OF MINNESOTA DEPT OF TRANS	0	BRAINERD	56401
DM13(724)	DM13	81200528	HINCH, CARMEN M	14704 WONDERLAND PAR RD	BRAINERD	56401
DM13(725)	DM13	81200527	RUHL, STEPHEN J & CHUBA, JOHN M	0	BRAINERD	56401
DM13(726)	DM13	81200526	MADGES, RICHARD A	14610 WONDERLAND PAR RD	BRAINERD	56401
DM13(727)	DM13	81200525	STATE OF MINNESOTA DEPARTMENT OF	0	BRAINERD	56401
DM13(728)	DM13	81200524	DILLON, DOUGLAS & VALERIE	11354 ASH AVE	BRAINERD	56401
DM13(729)	DM13	81200523	STATE OF MINNESOTA DEPARTMENT OF	0	BRAINERD	56401
DM13(730)	DM13	81200522	LATVAAHO, CHAD RICHARD	0	BRAINERD	56401
DM13(731)	DM13	81200521	LATVAAHO, CHAD RICHARD	11372 ASH AVE	BRAINERD	56401
DM13(732)	DM13	81200520	LATVAAHO, CHAD RICHARD	0	BRAINERD	56401

TABLE 3
De Minimis Sites
TH 210 Brainerd Limited Phase I Environmental Site Assessment
Brainerd, MN
MnDOT SP 1805-80

De Minimis Site ID	De Minimis Group	Parcel ID No.	Owner Name	Site Address	City	Zip Code
DM13(733)	DM13	81200519	BEMENT, HARRY & ARLISS	11426 ASH AVE	BRAINERD	56401
DM13(734)	DM13	81200518	BEMENT, HARRY & ARLISS	11440 ASH AVE	BRAINERD	56401
DM13(735)	DM13	81200517	BEMENT, HARRY & ARLISS	11456 ASH AVE	BRAINERD	56401
DM13(736)	DM13	81200516	MCCULLOUGH, NICHOLAS & JOSEY	11472 ASH AVE	BRAINERD	56401
DM13(737)	DM13	81200514	STATE OF MINNESOTA DEPT OF TRANS	0	BRAINERD	56401
DM13(739)	DM13	81200512	STATE OF MINNESOTA DEPT OF TRANS	0	BRAINERD	56401
DM13(776)	DM13		ASH AVE			
DM14(19)	DM14	41170511	NATURAL RESOURCES MANAGEMENT, LLC	11727 STATE HIGHWAY 210	BRAINERD	56401
DM14(20)	DM14	41170510	NATURAL RESOURCES MANAGEMENT, LLC	0	BRAINERD	56401
DM14(34)	DM14	41200526	GORECKI, DANIEL & DEBBIE	14898 WONDERLAND PAR RD	BRAINERD	56401
DM14(37)	DM14	41200500	MORTON, JANICE L	11398 WONDERLAND PARK CIR	BRAINERD	56401
DM14(636)	DM14	41200523	BUFFETTA, NICHOLAS F & GABRIELLE	14935 WONDERLAND PAR RD	BRAINERD	56401
DM14(637)	DM14	41200521	VLECK, DANIEL & AMY	14839 WONDERLND PARK RD	BRAINERD	56401
DM14(650)	DM14	41200504	LEVASSEUR, KURT J	0	BRAINERD	56401
DM14(651)	DM14	41200503	FLANAGAN, DENNIS W & MARIE	14891 WONDERLAND PAR RD	BRAINERD	56401
DM14(652)	DM14	41200502	HALVERSON, JON W & SUSAN K	14895 WONDERLAND PAR RD	BRAINERD	56401
DM14(653)	DM14	41200501	KNUTSON, MITCHELL K & ASHA	14905 WONDERLAND PAR RD	BRAINERD	56401
DM14(656)	DM14	81170679	BRANSHAW, STEVEN & JANE	15233 PINE SHORES RD	BRAINERD	56401
DM14(657)	DM14	81170677	WITTWER, BRADLEY GLENN & YAN	15165 RICE LAKE LN	BRAINERD	56401
DM14(658)	DM14	81170678	WITTWER, GLENN W & ELSIE			
DM14(659)	DM14	81170676	SEVERT LIVING TRUST DATED 12-5-12	0	BRAINERD	56401
DM14(660)	DM14	81170675	PATIN, RYAN K	0	BRAINERD	56401
DM14(661)	DM14	81170674	STREICH, JEROME G & MARJORIE A	14963 WONDERLAND PAR RD	BRAINERD	56401
DM14(662)	DM14	81170673	MCKAY PROPERTIES LLC	0	BRAINERD	56401
DM14(663)	DM14	81170672	STATE OF MINNESOTA DEPT OF TRANS	0	BRAINERD	56401
DM14(664)	DM14	81170671	STATE OF MINNESOTA DEPT OF TRANS	0	BRAINERD	56401
DM14(665)	DM14	81170670	HELSTROM, LUCINDY RENEE	15142 PINE SHORES RD	BRAINERD	56401
DM14(666)	DM14	81170669	STATE OF MINNESOTA DEPT OF TRANS	0	BRAINERD	56401
DM14(667)	DM14	81170668	LAWSON, KENNETH	15244 PINE SHORES RD	BRAINERD	56401
DM14(668)	DM14	81170667	SCHULTZ, ROBERT M & DONNA M	15238 PINE SHORES RD	BRAINERD	56401
DM14(669)	DM14	81170666	STATE OF MINNESOTA DEPARTMENT OF	0	BRAINERD	56401
DM14(670)	DM14	81170665	ROSNAU, TYLER J	15224 PINE SHORES RD	BRAINERD	56401
DM14(671)	DM14	81170664	MAGNAN, MATTHEW & KARLEE	0	BRAINERD	56401
DM14(672)	DM14	81170663	STATE OF MINNESOTA DEPT OF TRANS	0	BRAINERD	56401
DM14(673)	DM14	81170662	MAGNAN, MATTHEW & KARLEE	15126 RICE LAKE LN	BRAINERD	56401
DM14(674)	DM14	81170661	MAGNAN, MATTHEW & KARLEE	0	BRAINERD	56401
DM14(675)	DM14	81170660	JENTSCH, ARTHUR L & COLLEEN J	0	BRAINERD	56401
DM14(676)	DM14	81170659	JENTSCH, ARTHUR L & COLLEEN J	0	BRAINERD	56401
DM14(677)	DM14	81170658	JENTSCH, ARTHUR L & COLLEEN J	11572 STATE HIGHWAY 210	BRAINERD	56401
DM14(678)	DM14	81170657	PATIN, RYAN K	15143 RICE LAKE LN	BRAINERD	56401
DM14(680)	DM14	81200647	BASSETT, WILLIAM & SHIRLEY REV TRST	0	BRAINERD	56401
DM14(681)	DM14	81200646	STATE OF MINNESOTA DEPT OF TRANS	0	BRAINERD	56401
DM14(682)	DM14	81200644	GORECKI, DANIEL & DEBORAH	0	BRAINERD	56401
DM14(683)	DM14	81200507	STATE OF MINNESOTA DEPT OF TRANS	0	BRAINERD	56401
DM14(684)	DM14	81200643	STATE OF MINNESOTA DEPT OF TRANS	0	BRAINERD	56401
DM14(685)	DM14	81200506	TOWNSHIP OF OAK LAWN	0	BRAINERD	56401
DM14(686)	DM14	81200642	HAUCK, BRUCE A & JULIE	14764 WONDERLAND PAR RD	BRAINERD	56401
DM14(687)	DM14	81200641	TOWNSHIP OF OAK LAWN	0	BRAINERD	56401
DM14(702)	DM14	81200586	HARTING, WAYNE R & STACEY D	14813 WONDERLAND PAR RD	BRAINERD	56401
DM14(703)	DM14	81200585	ASPROS, GREGORY J & JULIE A HICKMAN	14855 WONDERLAND PAR RD	BRAINERD	56401
DM14(704)	DM14	81200584	SKAROLID, JAMES H	14865 WONDERLAND PAR RD	BRAINERD	56401
DM14(705)	DM14	81200583	HUTH, DAVID & KATHERINE	14871 WONDERLAND PAR RD	BRAINERD	56401
DM14(706)	DM14	81200582	JOHNSON, SCOTT A & WENDY L ASPROS	14875 WONDERLAND PAR RD	BRAINERD	56401
DM14(740)	DM14	81170510	JENTSCH, ARTHUR L & COLLEEN J	0	BRAINERD	56401
DM14(741)	DM14	81170509	JENTSCH, ARTHUR L & COLLEEN J	11572 STATE HIGHWAY 210	BRAINERD	56401
DM14(742)	DM14	81170508	KOWALCZYK, RONALD A & SUSAN J	11524 STATE HIGHWAY 210	BRAINERD	56401
DM14(743)	DM14	81170507	BLOCK, RICKY J TRUST AGREEMENT	11514 STATE HIGHWAY 210	BRAINERD	56401
DM14(745)	DM14		R/W			
DM14(746)	DM14		R/W			
DM14(775)	DM14		R/W HWY 210			
DM15(13)	DM15	41160503	NATURAL RESOURCES MANAGEMENT, LLC	0	BRAINERD	56401
DM15(14)	DM15	41160502	OHMAN, GREGORY A	11973 STATE HIGHWAY 210	BRAINERD	56401
DM15(15)	DM15	41170515	NATURAL RESOURCES MANAGEMENT, LLC	0	BRAINERD	56401
DM15(16)	DM15	41170514	NATURAL RESOURCES MANAGEMENT, LLC	0	BRAINERD	56401
DM15(17)	DM15	41170513	NATURAL RESOURCES MANAGEMENT, LLC	0	BRAINERD	56401
DM15(18)	DM15	41170512	NATURAL RESOURCES MANAGEMENT, LLC	0	BRAINERD	56401
DM15(21)	DM15	41170509	NATURAL RESOURCES MANAGEMENT, LLC	0	BRAINERD	56401
DM15(655)	DM15	81170689	STATE OF MINNESOTA DEPT OF TRANS	0	BRAINERD	56401
DM15(679)	DM15	81170656	STATE OF MINNESOTA DEPARTMENT OF	0	BRAINERD	56401

NOTE:
The de minimis site ID includes the de minimis group number and an arbitrarily selected number associated with the geospatial county parcel ID so each parcel can be individually identified.

Ben Lodin, PE (MN)

From: Swanson, Victoria (DOT)
Sent: Wednesday, March 30, 2022 10:53 AM
To: Wehseler, Luke (DOT)
Subject: FW: SP 1805-80 (TH 210/Washington Street) in Brainerd ENM
Attachments: SP 1805-80 TH 210 Lead Paint Testing.pdf

The attached report identifies that some of the paint contains Lead > than 1mg/cm2.
The Light posts that contain more than 1 mg/cm2 need to be managed. A Transfer of Ownership needs to be accompanied with the waste to the disposal facility or recycler. A copy of the Transfer of Ownership needs to be saved in the Project File and uploaded to eDOCS.

Call me with any questions.

Regards

Victoria Swanson

From: Bottolfson, Harold (DOT) <harold.bottolfson@state.mn.us>
Sent: Monday, March 28, 2022 10:57 AM
To: Wehseler, Luke (DOT) <luke.wehseler@state.mn.us>
Cc: Swanson, Victoria (DOT) <Victoria.Swanson@state.mn.us>
Subject: RE: SP 1805-80 (TH 210/Washington Street) in Brainerd ENM

Here is a report of our findings. If you have any questions please send a note.

Thanks,

Harold Bottolfson
State Program Administrator Principal
Modeling and Testing Unit
Minnesota Department of Transportation
6000 Minnehaha Ave
St. Paul, MN 55111
(651) 366-5812

From: Wehseler, Luke (DOT) <luke.wehseler@state.mn.us>
Sent: Friday, February 25, 2022 7:40 AM
To: Bottolfson, Harold (DOT) <harold.bottolfson@state.mn.us>
Cc: Hansen, Kenneth (DOT) <kenneth.hansen@state.mn.us>; Hukriede, James (DOT) <jamie.hukriede@state.mn.us>
Subject: RE: SP 1805-80 (TH 210/Washington Street) in Brainerd ENM

Thanks Harold for the heads up.

From: Bottolfson, Harold (DOT) <harold.bottolfson@state.mn.us>
Sent: Friday, February 25, 2022 7:33 AM
To: Wehseler, Luke (DOT) <luke.wehseler@state.mn.us>
Subject: RE: SP 1805-80 (TH 210/Washington Street) in Brainerd ENM

Hello,

Our unit conducts lead paint analysis for MNDOT and we plan on going to this site next week (weather allowing) to test the intersection signal poles for this project. We should be able to report back with results shortly after that. If you need any further information please let me know.

Thanks,

Harold Bottolfson
State Program Administrator Principal
Modeling and Testing Unit
Minnesota Department of Transportation
6000 Minnehaha Ave
St. Paul, MN 55111
(651) 366-5812

From: Wehseler, Luke (DOT) <luke.wehseler@state.mn.us>
Sent: Saturday, January 29, 2022 11:25 AM
To: Elliott, Lisa (DOT) <lisa.elliott@state.mn.us>; Leete, Peter (DOT) <peter.leete@state.mn.us>; Smith, Christopher E (DOT) <christopher.e.smith@state.mn.us>; Berger, John (DOT) <John.Berger@state.mn.us>; Swanson, Victoria (DOT) <Victoria.Swanson@state.mn.us>; Bottolfson, Harold (DOT) <harold.bottolfson@state.mn.us>; Markeson, Christina (DOT) <tina.markeson@state.mn.us>; Roseen, Melvin (DOT) <melvin.roseen@state.mn.us>; Bistodeau, Lucas (DOT) <lucas.bistodeau@state.mn.us>; Brown, Elizabeth A (DOT) <elizabeth.a.brown@state.mn.us>; Tiedeken, Nicklas (DOT) <nick.tiedeken@state.mn.us>; Zoff, Carol (DOT) <carol.zoff@state.mn.us>; Kurth, Andrew (DOT) <andrew.kurth@state.mn.us>; Weber, Andrea (DOT) <andrea.weber@state.mn.us>; Slagle, Holly (DOT) <holly.slagle@state.mn.us>; Dallman, Amber (DOT) <amber.dallman@state.mn.us>; Grugel, Todd (DOT) <todd.grugel@state.mn.us>; VanWagner, Richard (DOT) <rick.vanwagner@state.mn.us>; MN_DOT_AviationPlanning <aviationplanning.dot@state.mn.us>; Hicks, Gene (DOT) <gene.hicks@state.mn.us>; Carter, Douglas (DOT) <douglas.carter@state.mn.us>; Pilarski, Paul (DOT) <paul.pilarski@state.mn.us>; Milkert, Anjani (DOT) <minnie.milkert@state.mn.us>
Cc: chiniker <chiniker@sehinc.com>; Ben Lodin <blodin@sambatek.com>; Nelson, Darren (DOT) <darren.nelson@state.mn.us>; Meister, Benjamin (DOT) <benjamin.meister@state.mn.us>; Miller, Robert (DOT) <robert.miller@state.mn.us>; william.lohr@dot.gov; Wasko, Peter (DOT) <peter.wasko@state.mn.us>; Wilcox, Timothy (DOT) <timothy.wilcox@state.mn.us>; Hallgren, James (DOT) <james.hallgren@state.mn.us>
Subject: SP 1805-80 (TH 210/Washington Street) in Brainerd ENM

Hello Everyone,

Attached is an early notification memo for SP 1805-80 which is planned to be constructed in 2025. We are currently developing the preliminary layout (see attached draft) and will look to finalize the environmental document this spring. Please respond by **Friday, February 28th, 2022.** More information can by found in the draft scope at 1-29-22 Draft 1805-80 scoping_report_major_transportation_proj.pdf

Thanks,

Luke Wehseler, PE
District 3 Project Development-State Aid
Project Manager/Consultant Coordinator/
Local Partnership Program (LPP) Manager - LPP
7694 Industrial Park Road
Baxter, MN 56425
Direct (cell): 218-821-0618
mndot.gov/

District 3 Lead Paint Testing, Baxter

SP 1805-80, T.H. 210

Conducted by the Office of Environmental Stewardship, Environmental Modeling and Testing Unit-Harold Bottolfson & Elizabeth Anderson

March 8th, 2022

XL3t Analysis

The Modeling and Testing Unit of the Office of Environmental Stewardship Section conducted x-ray fluorescents testing on paint to assess lead content. March 8th, 2022 the following District 3 bridge and signal poles were tested to determine lead paint levels:

Intersections: Gillis Ave & T.H. 210, 8th Street & T.H 210, 6th Street & T.H. 210, N.W 4th Street & T.H 210, and 4th Street & T.H 210.

Bridge: #5060

The lead analysis was conducted with a Thermo Niton analyzer model XL3t serial number 113189. (See attached Certificate of Calibration.)

Findings

There was ***no*** paint on the signals at the intersection of 6th Street & T.H. 210 or on Bridge #5060 and therefore no lead was present.

The paint on the signal poles at the intersections of NW 4th Street & T.H. 210 and Baxter Drive & T.H. 210 contained paint ***below*** a level of detection (<LOD) and below the regulated level of lead paint. **It should be noted that the silver component of the signal pole was too high to reach using a ladder and was not tested for these two intersections only (see Baxter section of report for photo).**

The paint on some of the components of the signal poles at Gillis Ave & T.H 210, 8th Street & T.H. 210, and 4th Street & T.H. 210 is ***above*** 0.5 milligrams per square centimeter. **For an example of the painted portions of these intersections see 4th Street section of report.**

Minnesota rule 7025.0020 defines that paint on steel bridges is considered hazardous for lead when the level is 0.5 mg/cm^2 or greater.

There were no PCBs detected in the paint systems sampled at these intersections, report from analysis is attached.

Gillis Avenue and T.H. 210

Date & Time	Reading Type	Site	Duration (Nominal Seconds) Average of 3 Paint Readings	Depth Index[1] Average of 3 Paint Readings	Lead Level Detected- Average of 3 Paint Readings (mg/cm²)	Action Level (mg/cm²)	Result
3/8/2022 10:53	PAINT	Signal 1 Yellow Paint	20.88	1.56	3.23	0.5	Positive
3/8/2022 10:55	PAINT	Signal 1 Green Paint	20.63	1.53	1.26	0.5	Positive
3/8/2022 10:58	PAINT	Signal 1 Silver Paint	21.19	1.18	0.04	0.5	Negative
3/8/2022 11:02	PAINT	Signal 2 Green Paint	21.42	1.46	1.35	0.5	Positive
3/8/2022 11:03	PAINT	Signal 2 Yellow Paint	20.79	1.71	3.96	0.5	Positive
3/8/2022 11:06	PAINT	Signal 3 Yellow Paint	20.98	1.77	2.91	0.5	Positive
3/8/2022 11:07	PAINT	Signal 3 Green Paint	20.91	1.18	0.21	0.5	Negative
3/8/2022 11:09	PAINT	Signal 4 Yellow Paint	22.89	2.02	4.5	0.5	Positive
3/8/2022 11:11	PAINT	Signal 4 Green Paint	22.78	1.28	0.3	0.5	Negative

Depth Index is a numerical value indicating the amount of non-leaded paint covering the lead (if any) detected by the analyzer. A Depth Index of less than 1.5 indicates a reading very near the surface. A Depth Index between 1.6 and 4.0 indicates a moderate depth. A Depth Index of greater than 4.0 indicates a deeply buried reading.

8th Street and T.H. 210

Date & Time	Reading Type	Site	Duration (Nominal Seconds) Average of 3 Paint Readings	Depth Index[1] Average of 3 Paint Readings	Lead Level Detected- Average of 3 Paint Readings (mg/cm²)	Action Level (mg/cm²)	Result
3/8/2022 11:21	PAINT	Signal 5 Silver Paint	21.41	1.20	0.05	0.5	Negative
3/8/2022 11:23	PAINT	Signal 5 Yellow Paint	20.77	1.46	3.24	0.5	Positive
3/8/2022 11:24	PAINT	Signal 5 Green Paint	21.04	1.48	0.23	0.5	Negative
3/8/2022 11:27	PAINT	Signal 6 Yellow Paint	20.77	1.48	2.53	0.5	Positive
3/8/2022 11:28	PAINT	Signal 6 Green Paint	20.94	1.60	0.8	0.5	Positive
3/8/2022 11:31	PAINT	Signal 7 Yellow Paint	20.61	1.52	2.57	0.5	Positive
3/8/2022 11:32	PAINT	Signal 7 Green Paint	20.61	1.5	0.55	0.5	Positive
3/8/2022 11:35	PAINT	Signal 8 Yellow Paint	20.69	1.71	2.70	0.5	Positive
3/8/2022 11:37	PAINT	Signal 8 Green Paint	20.71	1	<LOD	0.5	Negative

Depth Index is a numerical value indicating the amount of non-leaded paint covering the lead (if any) detected by the analyzer. A Depth Index of less than 1.5 indicates a reading very near the surface. A Depth Index between 1.6 and 4.0 indicates a moderate depth. A Depth Index of greater than 4.0 indicates a deeply buried reading.

6th Street and T.H. 210

Date & Time	Reading Type	Site	Duration (Nominal Seconds) Average of 3 Paint Readings	Depth Index[1] Average of 3 Paint Readings	Lead Level Detected- Average of 3 Paint Readings (mg/cm^2)	Action Level (mg/cm^2)	Result
3/8/2022	PAINT	Signal 9	N/A	N/A	Unpainted	0.5	N/A
3/8/2022	PAINT	Signal 10	N/A	N/A	Unpainted	0.5	N/A
3/8/2022	PAINT	Signal 11	N/A	N/A	Unpainted	0.5	N/A
3/8/2022	PAINT	Signal 12	N/A	N/A	Unpainted	0.5	N/A

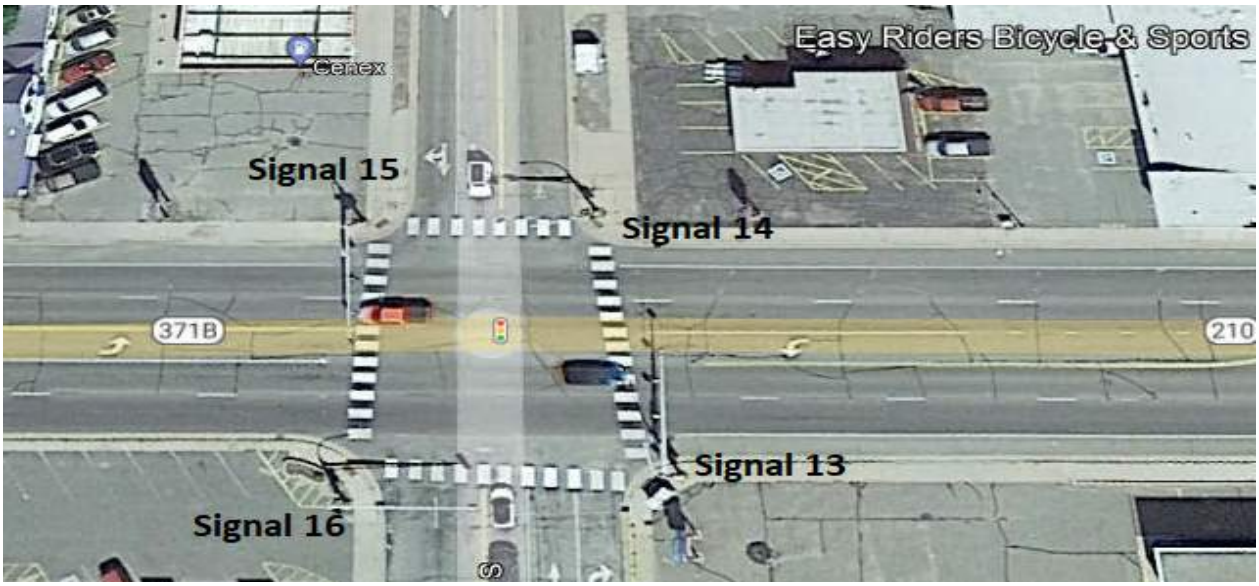
Depth Index is a numerical value indicating the amount of non-leaded paint covering the lead (if any) detected by the analyzer. A Depth Index of less than 1.5 indicates a reading very near the surface. A Depth Index between 1.6 and 4.0 indicates a moderate depth. A Depth Index of greater than 4.0 indicates a deeply buried reading.

Bridge #5060 T.H. 210

Date & Time	Reading Type	Site	Duration (Nominal Seconds) Average of 3 Paint Readings	Depth Index[1] Average of 3 Paint Readings	Lead Level Detected- Average of 3 Paint Readings (mg/cm²)	Action Level (mg/cm²)	Result
3/8/2022	PAINT	Bridge Railings & Girder	N/A	N/A	Unpainted	0.5	N/A

Depth Index is a numerical value indicating the amount of non-leaded paint covering the lead (if any) detected by the analyzer. A Depth Index of less than 1.5 indicates a reading very near the surface. A Depth Index between 1.6 and 4.0 indicates a moderate depth. A Depth Index of greater than 4.0 indicates a deeply buried reading.

4th Street and T.H. 210



Date & Time	Reading Type	Site	Duration (Nominal Seconds) Average of 3 Paint Readings	Depth Index[1] Average of 3 Paint Readings	Lead Level Detected- Average of 3 Paint Readings (mg/cm²)	Action Level (mg/cm²)	Result
3/8/2022 11:48	PAINT	Signal 13 Yellow Paint	21.83	1.37	1.06	0.5	Positive
3/8/2022 11:50	PAINT	Signal 13 Silver Paint	21.78	1.11	0.05	0.5	Negative
3/8/2022 11:52	PAINT	Signal 13 Green Paint	20.86	1.42	0.26	0.5	Negative
3/8/2022 11:54	PAINT	Signal 14 Yellow Paint	20.72	1.54	3.02	0.5	Positive
3/8/2022 11:55	PAINT	Signal 14 Green Paint	20.74	1.47	0.52	0.5	Positive
3/8/2022 11:57	PAINT	Signal 15 Yellow Paint	20.66	1.43	2.5	0.5	Positive
3/8/2022 11:58	PAINT	Signal 15 Green Paint	20.69	1.72	0.82	0.5	Positive
3/8/2022 12:00	PAINT	Signal 16 Yellow Paint	20.75	1.59	2.45	0.5	Positive
3/8/2022 12:02	PAINT	Signal 16 Green Paint	21.23	1.46	0.42	0.5	Negative

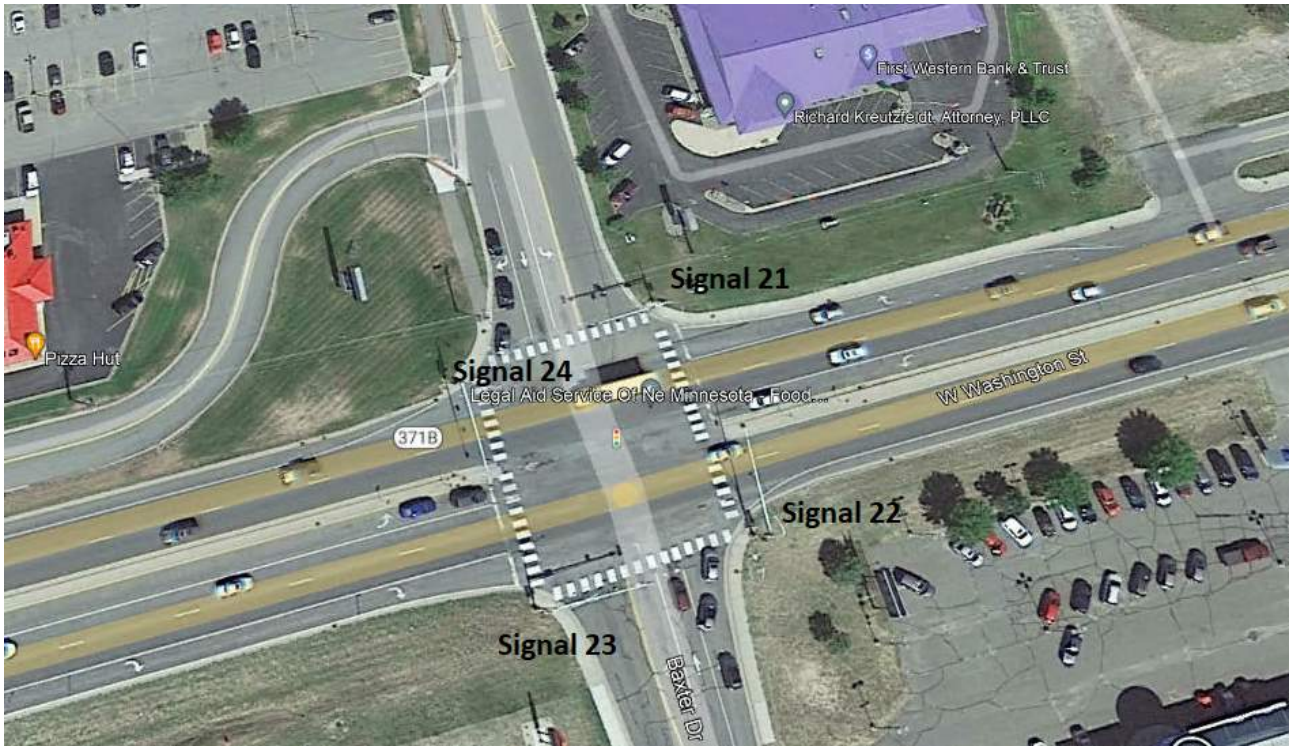
Depth Index is a numerical value indicating the amount of non-leaded paint covering the lead (if any) detected by the analyzer. A Depth Index of less than 1.5 indicates a reading very near the surface. A Depth Index between 1.6 and 4.0 indicates a moderate depth. A Depth Index of greater than 4.0 indicates a deeply buried reading.

NW 4th Street and T.H. 210

Date & Time	Reading Type	Site	Duration (Nominal Seconds) Average of 3 Paint Readings	Depth Index[1] Average of 3 Paint Readings	Lead Level Detected- Average of 3 Paint Readings (mg/cm²)	Action Level (mg/cm²)	Result
3/8/2022 12:20	PAINT	Signal 17 Yellow Paint	20.86	1	<LOD	0.5	Negative
3/8/2022 12:21	PAINT	Signal 17 Green Paint	20.55	1	<LOD	0.5	Negative
3/8/2022 12:23	PAINT	Signal 18 Yellow Paint	20.49	1	<LOD	0.5	Negative
3/8/2022 12:25	PAINT	Signal 18 Green Paint	21.53	1	<LOD	0.5	Negative
3/8/2022 12:27	PAINT	Signal 19 Yellow Paint	20.77	1	<LOD	0.5	Negative
3/8/2022 12:28	PAINT	Signal 19 Green Paint	21.75	1	<LOD	0.5	Negative
3/8/2022 12:30	PAINT	Signal 20 Yellow Paint	20.83	1	<LOD	0.5	Negative
3/8/2022 12:31	PAINT	Signal 20 Green Paint	20.46	1	<LOD	0.5	Negative

Depth Index is a numerical value indicating the amount of non-leaded paint covering the lead (if any) detected by the analyzer. A Depth Index of less than 1.5 indicates a reading very near the surface. A Depth Index between 1.6 and 4.0 indicates a moderate depth. A Depth Index of greater than 4.0 indicates a deeply buried reading.

Baxter Drive and T.H. 210



Date & Time	Reading Type	Site	Duration (Nominal Seconds) Average of 3 Paint Readings	Depth Index[1] Average of 3 Paint Readings	Lead Level Detected- Average of 3 Paint Readings (mg/cm²)	Action Level (mg/cm²)	Result
3/8/2022 12:52	PAINT	Signal 21 Yellow Paint	20.66	1.0	<LOD	0.5	Negative
3/8/2022 12:53	PAINT	Signal 21 Green Paint	20.93	1.0	<LOD	0.5	Negative
3/8/2022 12:55	PAINT	Signal 22 Yellow Paint	20.43	1.0	<LOD	0.5	Negative
3/8/2022 12:57	PAINT	Signal 22 Green Paint	20.85	1.0	<LOD	0.5	Negative
3/8/2022 12:59	PAINT	Signal 23 Yellow Paint	20.56	1.0	<LOD	0.5	Negative
3/8/2022 13:01	PAINT	Signal 23 Green Paint	20.83	1.0	<LOD	0.5	Negative
3/8/2022 13:03	PAINT	Signal 24 Yellow Paint	20.89	1.0	<LOD	0.5	Negative
3/8/2022 13:05	PAINT	Signal 24 Green Paint	21.28	1.0	<LOD	0.5	Negative

Depth Index is a numerical value indicating the amount of non-leaded paint covering the lead (if any) detected by the analyzer. A Depth Index of less than 1.5 indicates a reading very near the surface. A Depth Index between 1.6 and 4.0 indicates a moderate depth. A Depth Index of greater than 4.0 indicates a deeply buried reading.

On Site Calibration Check Results Pretest

Reading Type	Date & Time	Standard	Standard Value (mg/cm^2)	Duration (Nominal Seconds)	Lead Level Detected (mg/cm^2)
CALIBRATION STANDARD	3/8/2022 10:41	SRM 2570	<0.01	22.11	<LOD
CALIBRATION STANDARD	3/8/2022 10:42	SRM 2571	3.58 ± 0.39	22.36	3.87
CALIBRATION STANDARD	3/8/2022 10:43	SRM 2572	1.53 ± 0.09	24.43	1.58
CALIBRATION STANDARD	3/8/2022 10:44	SRM 2573	1.04 ±0.06	23.84	1.09
CALIBRATION STANDARD	3/8/2022 10:45	SRM 2574	0.71 ± 0.08	22.66	0.77
CALIBRATION STANDARD	3/8/2022 10:46	SRM 2575	0.31 ± 0.02	23.3	0.32

On Site Calibration Check Results Mid-Test

Reading Type	Date & Time	Standard	Standard Value (mg/cm^2)	Duration (Nominal Seconds)	Lead Level Detected (mg/cm^2)
CALIBRATION STANDARD	3/8/2022 12:33	SRM 2570	<0.01	20.82	<LOD
CALIBRATION STANDARD	3/8/2022 12:34	SRM 2571	3.58 ± 0.39	20.83	3.99
CALIBRATION STANDARD	3/8/2022 12:34	SRM 2572	1.53 ± 0.09	20.69	1.11
CALIBRATION STANDARD	3/8/2022 12:35	SRM 2573	1.04 ±0.06	20.46	1.62
CALIBRATION STANDARD	3/8/2022 12:36	SRM 2574	0.71 ± 0.08	21.28	1.09
CALIBRATION STANDARD	3/8/2022 12:36	SRM 2575	0.31 ± 0.02	21.29	0.75

On Site Calibration Check Results Post Test

Reading Type	Date & Time	Standard	Standard Value (mg/cm^2)	Duration (Nominal Seconds)	Lead Level Detected (mg/cm^2)
CALIBRATION STANDARD	3/8/2022 13:09	SRM 2570	<0.01	23.01	<LOD
CALIBRATION STANDARD	3/8/2022 13:10	SRM 2571	3.58 ± 0.39	21.43	3.81
CALIBRATION STANDARD	3/8/2022 13:11	SRM 2572	1.53 ± 0.09	26.55	1.62
CALIBRATION STANDARD	3/8/2022 13:12	SRM 2573	1.04 ±0.06	22.26	1.09
CALIBRATION STANDARD	3/8/2022 13:12	SRM 2574	0.71 ± 0.08	21.57	0.75
CALIBRATION STANDARD	3/8/2022 13:13	SRM 2575	0.31 ± 0.02	21.64	0.33

XL3t Certificate of Analysis

ThermoFisher
SCIENTIFIC

CERTIFICATE OF CALIBRATION

ISSUED TO:

Customer: Fisher Scientific

INSTRUMENT:

Manufacturer: Thermo Fisher Scientific
NITON Analyzers
2 Radcliff Road
Tewksbury, MA 01876
U.S.A.

Type: Portable X-Ray Spectrum Analyzer

Model: XL3t 960

Instrument Serial No.: 113189

Radioactive Source Serial No.: N/A
Radioactive Source Activity: N/A

X-Ray Tube Serial No.: S15170
X-Ray Tube Specifications: 50 kEv

Detector Type: Amptek

Operating System Version: 8.4K.17

Manufacture Date: 12-20-20
Original Ship Date: 12-29-20
Certification Date: 4-6-21

Thermo Fisher Scientific certifies that the above described instrument has been checked and calibrated with NIST traceable standards. For details on these standards please reference the Calibration QC Certificate for the instrument serial number detailed above.

DOCUMENT		OWNER	REV	DATE	
FRM083	CERTIFICATE OF MANUFACTURE AND CALIBRATION	Quality	A	12/12/06	Page 1 of 2

ThermoFisher
SCIENTIFIC

The Calibration Data obtained are as follows:

1. **Absolute Calibration Data**: PASS
2. **Linearity Data**: PASS
3. **Detector Resolution**: 155.32 eV
4. **Leak Test performed**: N/A

Based on all above, the portable XRF whose serial number is listed above meets Thermo Fisher Scientific factory specifications for NITON Analyzers, and is certified as "Passed" by Zen Naitza.

This certificate of calibration and manufacture is valid for ONE YEAR from the date of certification by NITON Analyzers, Thermo Fisher Scientific.

Zen Naitza
Validation Technician
Thermo Fisher Scientific
NITON Analyzers
2 Radcliff Road
Tewksbury, MA 01876
U.S.A.

Ben Lodin, PE (MN)

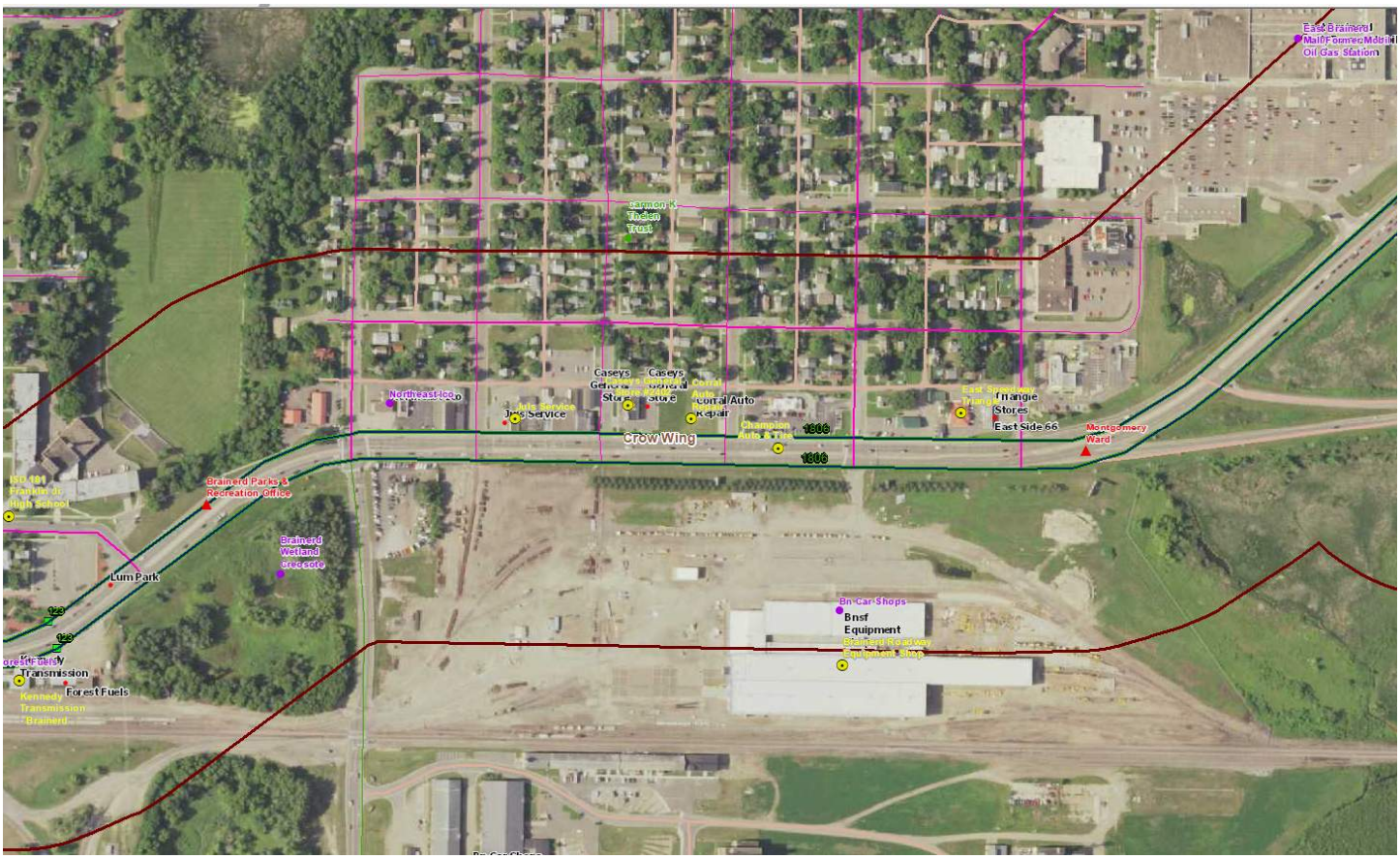
From: Berger, John (DOT)
Sent: Tuesday, February 8, 2022 8:31 AM
To: Wehseler, Luke (DOT)
Cc: Miller, Robert (DOT)
Subject: RE: SP 1805-80 (TH 210/Washington Street) in Brainerd ENM Response from CMMT

Luke,

Also note that there is a known Superfund site along the project corridor (BN Car shops, bottom of the screen shot below). Hopefully we can design around this property and avoid any ROW needs from it.

Let me know if you have any questions.

-JB



John Berger, PG, CHMM
Hydrogeologist
*****Work cell: 651-508-3469*****
John.Berger@state.mn.us

From: Berger, John (DOT)
Sent: Tuesday, February 8, 2022 8:27 AM

To: Wehseler, Luke (DOT) <luke.wehseler@state.mn.us>
Cc: Miller, Robert (DOT) <robert.miller@state.mn.us>
Subject: RE: SP 1805-80 (TH 210/Washington Street) in Brainerd ENM Response from CMMT

Good morning Luke,

Below is the ENM response from CMMT.

The Contaminated Materials Management Team (CMMT) reviewed the Minnesota Pollution Control Agency (MPCA) and Minnesota Department of Agriculture (MDA) databases to check for known contaminated sites in the project area. The databases searched included: leaking underground storage tank facilities, landfills, salvage yards, voluntary investigation and cleanup (VIC) sites, Superfund sites and dump sites. A review of these MPCA files is a component of a Phase I Environmental Site Assessment (Phase I ESA). A complete Phase I ESA includes at least two other components: research on historic land use, and site reconnaissance. It should be noted that the MPCA database files are continually being updated. Although this information is the most up-to-date available, some of the information may be incomplete or inaccurate. There is also a possibility that undiscovered contaminated and/or regulated materials exist in the project area.

Based on the database review, multiple contaminated sites are located within approximately 500 feet of the project area, including one Superfund Site (BN Car Shops).

Given the nature and location of the project area, and based on the HPDP threshold criteria as summarized below, this project has a medium to high risk of impacting potentially contaminated sites. Therefore, additional evaluation of the project area for potential contamination is necessary:

1. The project involves acquisition of right-of-way. **Because right-of-way acquisition is proposed, please provide pertinent information by completing the EDD-1 form in REALMS. If, based on the project specifics, the EDD forms do not need to be completed, please notify the CMMT.**

2. Project excavation and grading are extensive for construction activities, including the roundabout and storm sewer work. This increases the chances of encountering contaminants that may have originated from an off-site source and migrated into the right of way.

3. The project is in a commercial/industrial area. This increases the chances of encountering contaminants that may have originated from an off-site source and migrated into the right of way.

4. The project requires groundwater dewatering. **There is known groundwater contamination in the area.**

A Phase I Environmental Site Assessment and Drilling Investigation need to be completed for this project. Please provide all excavation locations and depths as the areas are finalized. They will be re-evaluated as we obtain the information.

If new information obtained indicates the project may be impacted by a contaminated site, the project will be evaluated, and soil and groundwater testing completed, as appropriate. If necessary, a plan will be developed for properly handling and treating contaminated soil and/or groundwater during construction in accordance with all applicable state and federal requirements.

Based on our review of the Early Notification Memo and subsequent additional evaluations noted above and MnDOT's commitment to implementation of any necessary management of contaminated materials during construction, the project will not have a high risk of causing direct or indirect impacts to human health or sensitive environmental resources due to encountering contaminated materials.

John Berger, PG, CHMM
Hydrogeologist
*****Work cell: 651-508-3469*****
John.Berger@state.mn.us

From: Wehseler, Luke (DOT) <luke.wehseler@state.mn.us>
Sent: Saturday, January 29, 2022 11:25 AM
To: Elliott, Lisa (DOT) <lisa.elliott@state.mn.us>; Leete, Peter (DOT) <peter.leete@state.mn.us>; Smith, Christopher E (DOT) <christopher.e.smith@state.mn.us>; Berger, John (DOT) <John.Berger@state.mn.us>; Swanson, Victoria (DOT) <Victoria.Swanson@state.mn.us>; Bottolfson, Harold (DOT) <harold.bottolfson@state.mn.us>; Markeson, Christina (DOT) <tina.markeson@state.mn.us>; Roseen, Melvin (DOT) <melvin.roseen@state.mn.us>; Bistodeau, Lucas (DOT) <lucas.bistodeau@state.mn.us>; Brown, Elizabeth A (DOT) <elizabeth.a.brown@state.mn.us>; Tiedeken, Nicklas (DOT) <nick.tiedeken@state.mn.us>; Zoff, Carol (DOT) <carol.zoff@state.mn.us>; Kurth, Andrew (DOT) <andrew.kurth@state.mn.us>; Weber, Andrea (DOT) <andrea.weber@state.mn.us>; Slagle, Holly (DOT) <holly.slagle@state.mn.us>; Dallman, Amber (DOT) <amber.dallman@state.mn.us>; Grugel, Todd (DOT) <todd.grugel@state.mn.us>; VanWagner, Richard (DOT) <rick.vanwagner@state.mn.us>; MN_DOT_AviationPlanning <aviationplanning.dot@state.mn.us>; Hicks, Gene (DOT) <gene.hicks@state.mn.us>; Carter, Douglas (DOT) <douglas.carter@state.mn.us>; Pilarski, Paul (DOT) <paul.pilarski@state.mn.us>; Milkert, Anjani (DOT) <minnie.milkert@state.mn.us>
Cc: chiniker <chiniker@sehinc.com>; Ben Lodin <blodin@sambatek.com>; Nelson, Darren (DOT) <darren.nelson@state.mn.us>; Meister, Benjamin (DOT) <benjamin.meister@state.mn.us>; Miller, Robert (DOT) <robert.miller@state.mn.us>; william.lohr@dot.gov; Wasko, Peter (DOT) <peter.wasko@state.mn.us>; Wilcox, Timothy (DOT) <timothy.wilcox@state.mn.us>; Hallgren, James (DOT) <james.hallgren@state.mn.us>
Subject: SP 1805-80 (TH 210/Washington Street) in Brainerd ENM

Hello Everyone,

Attached is an early notification memo for SP 1805-80 which is planned to be constructed in 2025. We are currently developing the preliminary layout (see attached draft) and will look to finalize the environmental document this spring. Please respond by **Friday, February 28th, 2022.** More information can by found in the draft scope at 1-29-22 Draft 1805-80 scoping_report_major_transportation_proj.pdf

Thanks,

Luke Wehseler, PE
District 3 Project Development-State Aid
Project Manager/Consultant Coordinator/
Local Partnership Program (LPP) Manager - LPP
7694 Industrial Park Road
Baxter, MN 56425
Direct (cell): 218-821-0618
mndot.gov/

Ben Lodin, PE (MN)

From: Foley, Ryan (DOT)
Sent: Tuesday, November 8, 2022 12:02 PM
To: Marsh, Dawn S
Cc: Wehseler, Luke (DOT); Miller, Robert (DOT); Meister, Benjamin (DOT)
Subject: SP 1805-80, ESA (Section 7) - PBO NLAA - Notice of Determination
Attachments: 1805-80_ESA(Section_7)_PBO_NLAA.pdf

Ms. Marsh:

Attached is my determination that this project *may affect, but is not likely to adversely affect* northern long-eared bats. The proposed project was reviewed under the USFWS Programmatic Biological Opinion for FHWA, FRA, FTA Transportation Projects within the Range of the Indiana Bat and Northern Long-eared Bat (PBO).

Luke:

Endangered Species Act (link)

I am sending this notice in accordance with the framework for informal consultation under the USFWS Programmatic Biological Opinion for FHWA, FRA, FTA Transportation Projects within the Range of the Indiana Bat and Northern Long-eared Bat (PBO), which was published in February 5, 2018. **This notice starts a 14 day review period** in which the U.S. Fish and Wildlife Service may advise us of any additional concerns. If we do not hear from USFWS within 14 days, we may consider our Section 7 review to be complete and you may proceed with the Proposed Action under the terms of the NLAA concurrence provided in the PBO.

"Conservation Measures" identified in this review represent project commitments and must be incorporated into project documents (e.g., specifications, special provisions, green sheets, etc.). Measures specific to the northern long-eared bat (NLEB) are included in the attached as Avoidance and Minimization Measures (AMMs). Please consult the OES protected species program coordinator (Christopher.E.Smith@state.mn.us) if modifications are requested.

Migratory Bird Treaty Act (link)

The proposed action may impact protected birds (see bridge inspection report). The proposed action should follow guidance included in the documents below to avoid and minimize impacts to protected birds (e.g., netting, etc.).

Bridges, see MnDOT Boiler Plate, Protection of Fish and Wildlife Resources
Tree Clearing, see: Tree Clearing Timing Requirement Technical Memo (22-05-ENV-01)
USFWS Conservation Measures, see: https://www.fws.gov/media/nationwide-standard-conservation-measures

Bald and Golden Eagle Protection Act (link)

Based on the best available information, the proposed action is not anticipated to disturb, harm, or destroy a bald eagle or a bald eagle nest.

Please let me know if you have any questions, comments, or concerns.

Take care,

Ryan
--
Ryan Foley
Fish and Wildlife Specialist

Minnesota Department of Transportation
Office of Environmental Stewardship
395 John Ireland Blvd.
St. Paul, Minnesota 55155
mndot.gov

November 8, 2022

Dawn Marsh
U.S. Fish and Wildlife Service
Minnesota-Wisconsin ES Field Office
4101 American Blvd East
Bloomington, MN 55425-1665

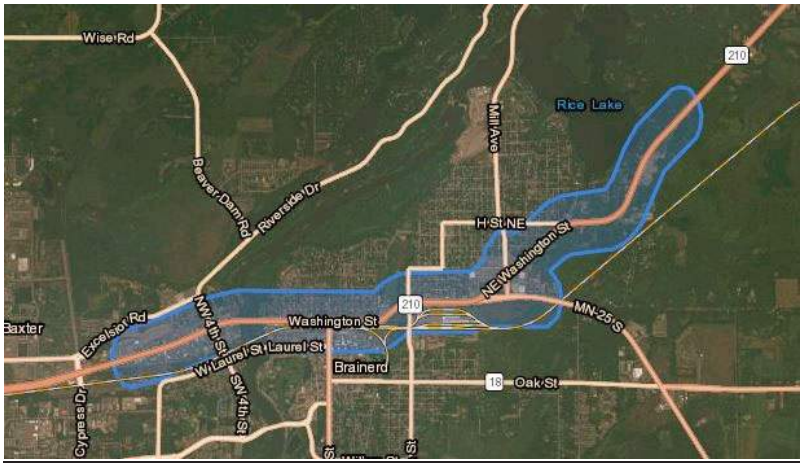
S.P. 1805-80, TH 210
Project Code: 2023-0013383
Baxter and Brainerd, Crow Wing County, Minnesota

Notification of Determination – May affect, not likely to adversely affect – Northern long-eared bat (*Myotis septentrionalis*)

No Effect Determination – Gray wolf (*Canis lupus*)
No Jeopardy Determination – Tricolored bat (*Perimyotis subflavus*)
No Jeopardy Determination – Monarch butterfly (*Danaus plexippus*)

Project Description:

The purpose of this proposed project is to resurface and/or reconstruct approximately four miles of Trunk Highway (TH) 210 in Baxter and Brainerd, Minnesota from Baxter Drive in Baxter to the end of the 4-lane roadway east of Brainerd. Additional project components include replacement of signals and lighting, sidewalk/ADA work, turn lane extensions, storm sewer and stormwater pond improvements, the reconfiguration of the 5th - 8th Avenue NE intersections to a dual roundabout, and rehabilitation of Bridge 5060 carrying TH 210 over the Mississippi River. While the bridge work is yet to be finalized, it is anticipated that the bridge will be re-decked with additional preservation work. No bat use has been observed on this structure (last inspected August 2021; Attachment 1). These project activities may result in soil disturbances beyond the inslope, equipment staging, and associated activities. Limited tree removal (<2.5 acres) is anticipated and will occur during the winter months (November 1 to March 31, inclusive). The project corridor is generally set within an urbanized environment of commercial and residential development with woodlands along the eastern extent of the project area.



Action Area identified for the proposed project.

Conservation Measures:

Required Avoidance and Minimization Measures (AMMs). See MnDOT boiler plate special provisions (e.g., *Protection of Fish and Wildlife Resources*).

- **General AMM 1**: Ensure all operators, employees, and contractors working in areas of known or presumed bat habitat are aware of all FHWA/FRA/FTA (Transportation Agencies) environmental commitments, including all applicable AMMs. *Notify contractor(s) during the pre-construction meeting. Bat sightings (including sick, injured, and/or dead bats) on the project must be reported to OES wildlife ecologist (612-741-7678).*
- **Lighting AMM 1 & AMM 2:** Direct temporary lighting, if used, away from wooded areas during the bat active season (April 1 to Oct 31, inclusive). If installing new or replacing existing permanent lights, use downward-facing, full cut-off lens lights (with same intensity or less for replacement lighting); or for those transportation agencies using the BUG system developed by the Illuminating Engineering Society, be as close to 0 for all three ratings with a priority of "uplight" of 0 and "backlight" as low as practicable. *Please contact Susan Zarling (MnDOT Lighting Engineer) at 651-234-7052 with questions about approved products.*
- **Tree Removal AMM 2:** Restrict all tree clearing activities to when NLEB are not likely to be present. *Winter tree clearing required – tree clearing allowed November 1 to March 31, inclusive.*
- **Tree Removal AMM 3**: Tree removal must be limited to that specified in project plans and ensure that contractors understand clearing limits and how they are marked in the field (e.g., install bright colored flagging/fencing prior to any tree clearing to ensure contractors stay within clearing limits).
- **Tree Removal AMM 4***:* Tree removal must not remove documented NLEB roosts, or trees within 0.25 miles of roosts; or documented foraging habitat any time of the year.

Additional Recommended Conservation Measures:

- Revegetation of disturbed soils should follow district Vegetation Establishment Recommendations (http://www.dot.state.mn.us/environment/erosion/vegetation.html) and use 3#-### series seed mixes that contain native species in areas that are not proposed for frequently mowed lawn. Include mowing and weed spraying as indicated in the District Vegetation Establishment Recommendations. For additional information, visit: http://www.dot.state.mn.us/environment/erosion/vegetation.html.

Species List for the Project Action Area

A list of federally threatened, endangered, proposed and candidate species, and designated and proposed critical habitat that overlaps with the action area, was requested via the Information for Planning and Consultation (IPaC) web application maintained by the U.S. Fish and Wildlife Service (requested November 2022). Based on this list, the project is within the range of the following:

Species	Status	Habitat
Gray wolf *Canis lupus*	Threatened	Northern forests
Tricolored Bat *Perimyotis subflavus*	Proposed - Endangered	Hibernates in caves, mines, and tunnels. Roosts in live or dead trees, buildings, and bridges. Forages along forested edges and over waterways.
Northern long-eared bat *Myotis septentrionalis*	Threatened	Hibernates in caves and mines - swarming in surrounding wooded areas in autumn. Roosts and forages in upland forests during spring and summer.
Monarch butterfly *Danaus plexippus*	Candidate	Grassland habitats where milkweed and flowers are present.

MnDOT consults the Minnesota Department of Natural Resources Natural Heritage Information System (Copyright 2022 State of Minnesota, Department of Natural Resources), and other resources as available, to determine if proposed projects may affect listed species.

Endangered Species Act – Section 7 Consultation

Section 7 of Endangered Species Act of 1973, as amended (Act), requires each Federal agency to review any action that it funds, authorizes or carries out to determine whether it may affect threatened, endangered, proposed species or listed critical habitat. Federal agencies (or their designated representatives) must consult with the U.S. Fish and Wildlife Service (Service) if any such effects may occur as a result of their actions. Consultation with the Service is not necessary if the proposed action will not directly or indirectly affect listed species or critical habitat. If a federal agency finds that an action will have no effect on listed species or critical habitat, it should maintain a written record of that finding that includes the supporting rationale.

Notice of Determination

Northern long-eared bat (*Myotis septentrionalis*) – May affect, not likely to adversely affect

No documented NLEB hibernacula and/or roost trees are documented within the project Action Area (https://files.dnr.state.mn.us/eco/ereview/minnesota_nleb_township_list_and_map.pdf).

This project review relies on the USFWS-issued species-specific rangewide programmatic agreement and associated biological opinion for FHWA, FRA, FTA Transportation Projects within the Range of the Indiana Bat and Northern Long-eared Bat (PBO) to satisfy requirements under Section 7(a)(2) of the Endangered Species Act of 1973 (ESA) (87 Stat. 884, as amended; 16 U.S.C 1531 et seq.). The review was completed using the U.S. Fish and Wildlife Service's Information for Planning and Consultation (IPaC) system. The U.S. Fish and Wildlife Service's concurrence verification letter is attached (Attachment 2).

No Effect / No Jeopardy Determinations

Gray wolf (*Canis lupus*) – No effect determination

The proposed action occurs within existing roadsides and this species generally avoids busy roadways. Suitable habitat is not anticipated to be impacted by the proposed project. ***Therefore, MnDOT on behalf of the FHWA has made a determination of no effect for this species.***

Tricolored bat (*Perimyotis subflavus*) – No jeopardy determination

The proposed project *may affect* tricolored bats and/or suitable tricolored bat habitat. Stressors for the tricolored bat include tree clearing, noise (including percussives), lighting, and/or bridge work in areas of documented or presumed tricolored bat habitat. Based on the proposed scope of work, project activities are not expected to appreciably diminish the quality or extent of available suitable habitat within the project's action area. Additionally, the project will incorporate bat-specific Conservation Measures to further avoid and minimize impacts to this species. ***Therefore, MnDOT on behalf of the FHWA, does not anticipate the proposed action will jeopardize the continued existence of this species.***

Monarch butterfly (*Danaus plexippus*) – No jeopardy determination

The proposed project *may affect* monarch butterflies and/or suitable monarch habitat. Ground and vegetation disturbing activities are not expected to appreciably diminish the quality or extent of available suitable habitat within the project's Action Area. In addition, MnDOT is enrolled under the Nationwide Candidate Conservation Agreement on Energy and Transportation Lands (CCAA) and adopted lands and conservation measures agreed to under the CCAA are anticipated to result in a net conservation benefit to the species. ***Therefore, MnDOT on behalf of the FHWA, does not anticipate the proposed action will jeopardize the continued existence of this species.***

Please contact me if there are questions or concerns.

Thank you,

Digitally signed by Ryan Foley
Date: 2022.11.08 11:57:06
-06'00'

Ryan Foley
Fish and Wildlife Specialist

Minnesota Department of Transportation
Office of Environmental Stewardship
395 John Ireland Blvd., M.S. 620
St. Paul, Minnesota 55155
Ryan.Foley@state.mn.us

Attachment 1: Bridge Inspection Report(s)

MINNESOTA STRUCTURE INVENTORY REPORT

Bridge ID: 5060 **MN 210 over MISSISSIPPI RIVER**

Date: 10/12/2022

+ GENERAL +

Agency Br. No. 5060 **Crew**
District 3 **Maint. Area** 3A
County 18 - CROW WING
City BRAINERD
Township
Desc. Loc. 1.6 MI E OF W JCT TH 371
Sect., Twp., Range 04 - 133N - 28W
Latitude 46d 21m 29.12s
Longitude 94d 12m 40.56s
Custodian STATE HWY
Owner STATE HWY
Insp Responsibility DISTRICT 3
Year Built 1932
Date Opened to Traffic 05-01-1985
MN Year Remodeled 1984
FHWA Year Reconstructed 1984
Bridge Plan Location CENTRAL
Potential ABC YES

+ STRUCTURE +

Service On HWY;PED
Service Under STREAM
Main Span Type CONC ARCH
Main Span Detail OPEN SPANDREL ARC
Appr. Span Type CONC SLAB SPAN
Appr. Span Detail
Skew
Culvert Type
Barrel Length

Number of Spans

MAIN: 5 APPR: 2 TOTAL: 7

Main Span Length 124.0 ft
Structure Length 630.6 ft
Deck Width 79.0 ft
Deck Material C-I-P CONCRETE
Wear Surf Type LOW SLUMP CONC
Wear Surf Install Year 1984
Wear Course/Fill Depth
Deck Membrane NONE
Deck Rebars EPOXY COATED REBAR
Deck Rebars Install Year 1984
Structure Area 49,817 sq ft
Roadway Area 31,527 sq ft
Sidewalk Width - L/R 6.0 ft 6.0 ft
Curb Height - L/R 0.83 ft 0.83 ft
Rail Codes - L/R 27 27

+ ROADWAY ON BRIDGE +

Facility MN 210
Functional Class URB/OTH PR ART
ADT (YEAR) 32,500 (2019)
HCADT 1,300
National Highway System Y
Route Sys/Nbr (TIS) MNTH 210
Ref. Point (TIS) 122+00.155
Detour Length 60 mi.
Lanes 4 Lanes ON Bridge
Control Section (TH Only) 1805
Function MAINLINE
Type 2 WAY TRAF
Bridge Match ID 1
Roadway Key 1-ON

+ RDWY DIMENSIONS ON BRIDGE +

If Divided	NB-EB	SB-WB
Roadway Width	25.0 ft	25.0 ft
Vertical Clearance		
Max. Vert. Clear.		
Horizontal Clear.	63.9 ft	
Appr. Surface Width	64.0 ft	
Bridge Roadway Width	50.0 ft	
Median Width on Bridge	14.0 ft	

+ MISC. BRIDGE DATA +

Structure Flared NO
Parallel Structure NONE
Field Conn. ID
Cantilever ID

Foundations

Abut. CONC - UNKN
Pier CONC - FTG PILE
Historic Status POSSIBLY ELIGIBLE
On - Off System ON

+ PAINT +

Year Painted
Painted Area
Primer Type
Finish Type

+ BRIDGE SIGNS +

Posted Load NOT REQUIRED
Traffic NOT REQUIRED
Horizontal OBJECT MARKERS
Vertical NOT APPLICABLE

+ INSPECTION +

Deficient Status F.O.
Sufficiency Rating 65.3
Last Routine Insp Date 08-31-2021
Routine Insp Frequency 24
Inspector Name DISTRICT 3
Status A-OPEN

+ NBI CONDITION RATINGS +

Deck 6
Superstructure 6
Substructure 6
Channel 6
Culvert N

+ NBI APPRAISAL RATINGS +

Structure Evaluation 6
Deck Geometry 3
Underclearances N
Waterway Adequacy 9
Approach Alignment 8

+ SAFETY FEATURES +

Bridge Railing 1-MEETS STANDARDS
GR Transition N-NOT REQUIRED
Appr. Guardrail N-NOT REQUIRED
GR Termini N-NOT REQUIRED

+ SPECIAL INSPECTIONS +

Frac. Critical N
Underwater Y 60 mo 05/2021
Pinned Asbly. N

+ WATERWAY +

Drainage Area
Waterway Opening 15000 sq ft
Navigation Control NO PRMT REQD
Pier Protection
Nav. Vert./Horz. Clr.
Nav. Vert. Lift Bridge Clear.
MN Scour Code L-STBL;LOW RISK
Scour Evaluation Year 1998

+ CAPACITY RATINGS +

Design Load HS 20
Operating Rating HS 40.40
Inventory Rating HS 21.40
Posting
Rating Date 02-23-2010

Overweight Permit Codes

A: 1 B: 1 C: 1

10/12/2022
Crew:
Insp Responsibility: DISTRICT 3

MINNESOTA BRIDGE INSPECTION REPORT

BRIDGE 5060 MN 210 OVER MISSISSIPPI RIVER **INSP. DATE: 08-31-2021**

County: CROW WING
City: BRAINERD
Township:
Section: 04 Township: 133N Range: 28W
Main Span Type: CONC ARCH

Location: 1.6 MI E OF W JCT TH 371
Route (TIS): MNTH 210 Ref Pt (TIS): 122+00.155
Control Section: 1805 Maint. Area: 3A
Local Agency Bridge Nbr: 5060

Length: 630.6 ft
Deck Width: 79.0 ft
Rdwy. Area 31,527 sq ft
Paint Area
Culvert : N/A

NBI Deck: 6 Super: 6 Sub: 6 Chan: 6 Culv: N Open, Posted, Closed: OPEN

Appraisal Ratings - Approach: 8 Waterway: 9 MN Scour Code: L-STBL;LOW RISK Def. Stat: F.O. Suff. Rate: 65.3
Required Bridge Signs - Load Posting: NOT REQUIRED Traffic: NOT REQUIRED
Horizontal: OBJECT MARKERS Vertical: NOT APPLICABLE

ELEM NBR	ELEMENT NAME	INSP. DATE	QUANTITY	QTY CS 1	QTY CS 2	QTY CS 3	QTY CS 4
800	CRITICAL DEFS OR SAFETY HAZARDS	08-31-2021	1 EA	0	1	0	0
		08-27-2019	1 EA	0	1	0	0

Notes: Washout of East end W.B. L.L Approach and slope. (Repaired)
Monitor for settlement.

12	REINFORCED CONCRETE DECK	08-31-2021	49,817 SF	49,773	40	4	0
		08-27-2019	49,817 SF	49,773	40	4	0

Notes: Span 1:
- 5-10 minor cracks with minor leaching between each Floor beam 490lf total (49sf CS2) - 2' minor crack with rust staining between F.B. 4 & 5 (1sf CS3) - 3sf delam with rust staining between F.B. 6 & Pier 1 (3sf CS3) - 2sf delam over N. arch (2sf CS2) - 3sf delam segregated concrete over N. arch (3sf CS2)
-
Span 2:
- 5-10 minor cracks with minor leaching between each Floor beam 693lf total (69sf CS2)
-
Span 3:
- 5-10 minor cracks with minor leaching between each Floor beam 690lf total (69sf CS2) -1lf minor crack with rust staining (1sf CS3)
-
Span 4:
- 5-10 minor cracks with minor leaching between each Floor beam 693lf total (69sf CS2) -3sf sound patch between F.B. 3 & 4 (3sf CS2) -5lf minor cracking with rust staining between F.B. 4 & 5 (1sf CS3)
-
Span 5:
-5-10 minor cracks with minor leaching between each Floor beam 490lf total (49sf CS2) -5sf delam between Pier 4 & F.B.1 (5sf CS2) -5sf sound patch Between F.B. 2 &3 (5sf CS2) -2.5sf segregated concrete between F.B. 2 & 3 (3sf CS3) -11sf delam with rust staining between F.B. 3 & 4 (11sf CS3) -3, 1sf areas of delam between F. B 3 & 4 (3sf CS2) -3lf minor crack with rust staining between F.B. 4 & 5 (1sf CS3) -3lf minor crack with rust staining between F.B. 5 & 6 (1sf CS3)
-

510	*WEARING SURFACE*	*08-31-2021*	*31,527 SF*	*28,641*	*2,886*	*0*	*0*
		08-27-2019	*31,527 SF*	*28,641*	*2,886*	*0*	*0*

Notes: 28,800lf sealed deck cracking (2880sf CS2) -3"x 4"spall .5" deep EB midspan next to median (1sf CS2) -5sf of sound patch EB lane (5sf CS2)
-
-No Change 2021

521	*CONCRETE PROTECTIVE COATING*	*08-31-2021*	*28,880 SF*	*28,880*	*0*	*0*	*0*
		08-27-2019	*28,880 SF*	*28,880*	*0*	*0*	*0*

Notes: Sealed with TK 590-100 Silane 2019

810	CONC WEAR SURF-CRACKING SEALING	08-31-2021	28,800 LF	0	28,800	0	0
		08-27-2019	28,800 LF	0	28,800	0	0

Notes: crack sealed 7-2019 TK9000

300	STRIP SEAL DECK JOINT	08-31-2021	474 LF	458	16	0	0
		08-27-2019	474 LF	458	16	0	0

Notes: Gland over west abutment has about 4' not seated (4lf CS2). -Gland over #3 pier is not seated for about a foot in eastbound lane (1lf CS2). -3rd gland from west 8ft not seated (8lf CS2). -2nd gland from west 3 ft not seated (3lf

CS2).
No Change 2021

301	POURED SEAL JOINT	08-31-2021	632 LF	623	0	9	0
		08-27-2019	632 LF	632	0	0	0

Notes: Sealed 7-2019
6ft. of Repaired joint should be cut but joint is sealed with epoxy sealer (CS3) - East approach 3' adhesion failure (CS3)

330	METAL BRIDGE RAILING	08-31-2021	1,340 LF	1,186	152	0	2
		08-27-2019	1,340 LF	1,186	152	0	2

Notes: -Surface corrosion at all connections to concrete railing 76 connections per side (152lf CS2)
-NE end 2lf missing (2lf CS4)

515	*STEEL PROTECTIVE COATING*	*08-31-2021*	*1,241 SF*	*0*	*1,041*	*124*	*76*
		08-27-2019	*1,241 SF*	*0*	*1,041*	*124*	*76*

Notes: -Minor Rusting at connections to Concrete railing about .5sf at each connection. (76sf CS4)
-10% heavy chalking (124sf CS3)
-Remainder of coating light chalking / Fading (1041sf CS2)

331	REINFORCED CONC BRIDGE RAILING	08-31-2021	1,340 LF	1,282	58	0	0
		08-27-2019	1,340 LF	1,282	58	0	0

Notes: -S. rail 35ft with small spalled areas and moderate cracking most spalling caused by plows at joints.
-N. rail 8 small popouts and joints spalled from plowing.
Inside rails sealed 2017

321	CONCRETE APPROACH SLAB	08-31-2021	2,560 SF	2,537	23	0	0
		08-27-2019	2,560 SF	2,537	23	0	0

Notes: East Approaches:
-WB. lane 5sf patch along pourable (5sf CS2)
-EB. lane 12sf patch along pourable (12sf CS2) -2sf spall at SE corner (2sf CS3)
-Contractor put multiple shallow random saw cuts in northeast corner of east end panel, westbound driving lane on side of bridge.

West Approaches:
-EB 6sf patches (6sf CS2)

144	REINFORCED CONCRETE ARCH	08-31-2021	1,260 LF	1,217	31	12	0
		08-27-2019	1,260 LF	1,217	33	10	0

Notes: SOUTH SIDE ARCHES:
Span 1:
-2, 4in rust stained spots (1lf CS2) -2in Pop out (1lf CS2) -2sf spall bottom side at abutment (2lf CS3)
-
Span 2:
-2, 4in. popouts bottom side of arch. (Repaired) (1lf CS2) -30"x9" 2.5"deep spall with exposed bar and section loss in bar steel plate behind spall minor cracking around spall. (repaired 2015) (1lf CS2) -3" spall exposed bar top N. edge between columns 1 & 2 (1lf CS3) -5" shallow spall top N. edge between col. 1 & 2 (1lf CS2) -3" delam under col. 2 (1lf CS2)
-
Span 3:
-2'x2" form board mark top south side of arch (1lf CS1) -N. side 2, 1" bars sticking out about 6" (1lf CS1) -2"popout with rust staining bottom side between F.B. 3 & 4 (1lf CS3)
-
Span 4:
-1" bar sticking out 6" on N. side of arch (1lf CS1) -7, 1sf sound patches top of arch between columns 7 & 8 (7lf CS2)
-
Span 5:
-2, 2sf sound patches Top between columns 5 & 6 (2lf CS2)
-
NORTH SIDE ARCHES:
Span 1:
-1.5sf. spall bottom side with exposed bar (1lf CS3) -2" spall with exposed bar (1lf CS3) -1sf delamed patch S. bottom edge close to abutment (1lf CS2)
-
Span 2:
Look good
-
Span 3:
1.5sf spall 3" deep under col. 3 bottom N. edge (1lf CS3)
-

Span 4:
5 delam areas about 1ft. each where bar is too close on top of arch Between columns 2 &3 (5lf CS2)
-

Arch Spandrel Column Notes:
Span 1: TOTAL (1lf CS3)
-South arch: ok 2019
-North arch: -#5- 1.5sf delam (1lf CS3)
Span 2: TOTAL (2lf CS2)
-South arch: -#3 west side 2sf sound patch (1lf CS2) -#2, 6in delam (1lf CS2)
-North arch: OK 2019
Span 3: TOTAL (4lf CS2), (2lf CS3)
-South arch: -#1, 1sf spalled exposed bar E. side (1lf CS3) -#7, west side 4sound patches 5sf (1lf CS2) -#8, 4 sound patches 3sf total (1lf CS2)
-North arch: -#2, 6" delam S. side (1lf CS2) -#3, west side 6" spall with exposed bar (1lf CS3) and 6" delam on south side (1lf CS2)
Span 4: TOTAL (2lf CS2)
-South arch: -#3, south side 3sf sound patch (1lf CS2) -
-North arch: -#3, 1' mod. crack SW edge (1lf CS2)
Span 5: TOTAL (1lf CS2) (2lf CS3)
-South arch: -#2, west side 2, 2sf. sound patches (1lf CS2)
-North arch -#2, west side 2, 2sf. spalls with exposed bar (1lf CS3) -#5, 2sf spall with exposed bar (1lf CS3) 1sf spall (1lf CS3)

155	REINFORCED CONCRETE FLOORBEAM	08-31-2021	5,688 LF	5,611	30	47	0
		08-27-2019	5,688 LF	5,611	33	44	0

Notes: Span 1:
-Abutment FB, 6 -1lf areas of rust staining (6LF CS3), 2lf spalling/delam with light leaching (2lf CS2), 4 minor vertical cracks with light leaching (4lf CS2), 2minor vertical cracks leaching with buildup (2lf CS3), 4"soalled (1lf CS2), 3 1' areas of rust staining bottom south side (3lf CS3), small popout with rust staining S. end (1lf CS2) -FB#1, Good -FB#2, Good -FB#3, N. Bottom 2"x4" delam and minor rust staining (1lf CS3), 2"x4" spall with exposed bar (1lf CS3) -FB#4, West side center 2"spall with rust staining (1lf CS3) -FB#5, Good -FB#6, Good -Pier 1 FB, Good
-
Span 2:
-Pier 1 FB, Good -FB #1, Good -FB#2, small popout with rust sating (1lf CS3) -FB#3, Good -FB#4, Good -FB#5, Good -FB#6, Good -FB#7, Good -FB#8, Good -Pier 2 FB, Bottom NW end 8" delam (1lf CS2)
-
Span 3:
-Pier 2 FB, Good -FB #1, N. side 3"x4" popout (1lf CS3) -FB#2, Good -FB#3, Good -FB#4, Good -FB#5, Small popout with rust staining (1lf CS3) -FB#6, Good -FB#7, Good -FB#8, Good -Pier 3 FB, Good
-
Span 4:
-Pier 3 FB, Good -FB #1, 2 diagonal cracks from cantilever area back toward center measure .004-.010 (4lf CS2)
-FB#2, 2 diagonal cracks from cantilever area back toward center measure .004-.010 (4lf CS2) -FB#3, Good -FB#4, Good -FB#5, Small popout with rust staining (1lf CS3) -FB#6, Good -FB#7, Good -FB#8, 2 diagonal cracks from cantilever area back toward center measure .004-.010 (4lf CS2), 5" spall N. end with rust staining (1lf CS3) -Pier 4 FB, Good
-
Span 5:
-Pier 4 FB, Bottom edge 3, 5" spalled with rust staining (3lf CS3) -FB #1, S. bottom 3 1sf sound patches (3lf CS2), N. bottom edge 1sf spalled/delam with rust staining (1lf CS2) -FB#2, small popout with rust sating (1lf CS3) -FB#3, N. end west side 1sf spall (1lf CS3) -FB#4, 2 minor popouts with rust staining over N arch (2lf CS2) -FB#5, Good -FB#6, Good -East abutment FB, 20lf spalling at deck (20lf CS3), 3lf spalling with exposed bar (3lf CS3), 5 minor popouts (5lf CS2)

-90% of all floorbeams have 2-3 vertical hairline cracks .004-.006 at the beginning of cantilevers and angling upward at 45 degrees toward the center line of the bridge and 2-3 minor .004-.006 vertical cracks coming down from the deck around the cantilever area 368lf Minor cracking in the cantilever areas (368lf CS1) .

-There is rebar exposed at the ends of a couple of floorbeams from construction.

205	REINFORCED CONCRETE COLUMN	08-31-2021	8 EA	0	0	8	0
		08-27-2019	8 EA	0	0	8	0

Notes: Pier 1:
- South Column (CS3): East side N. corner of bump out area 7sf delam and 1sf spalled (CS3), -Rust staining SW (CS3)
-

- N. column (CS3): E. and W. side 2sf. spall with exposed bar (CS3), E side top 7sf delam (CS2) -5sf. spall with exposed bar on SE edge (CS3), -10 sf delam bottom of south edge (CS2), -5sf. delam E side in arch area (CS2) -1sf spalled with exposed bar under drain (CS3) -Moderate crack in bottom east side (CS2) -north side between Floor beams 5" shallow spall (CS2) .
-
-Arch area: -5sf. delam minor rust staining E side (CS3)
-
Pier 2:
-South Column (CS3): Bottom NW edge 3sf delam (CS3) -SW bump-out N. corner 7sf delam (CS3)
-
-North Column (CS3): North side 8" spall with exposed bar (CS3) -North column W. side 10sf. delam in center and 5sf at bottom (CS3) -6, 1sf areas of segregated concrete (CS2) - SE edge 5sf delam (CS3)
-
-Arch area: 12ft delam (CS3) -E. side 7sf delam (CS3)

Pier 3:
South Column (CS3): NW side of arch 2 small spalls with exposed bar 1, 1"x6" and 1, 5" spall with delam around it (CS3) -22sf. delam spalling on W. side (CS3) -2, 1sf sound patches (CS2) -13sf. spalling and delam top N. Side (CS3) -NE edge 6sf. spalling exposed bar 12sf delam rust staining (CS3) -East side 8sf delam (CS3) -1.5sf spalled with rust staining (CS3) -Top of Bump-out 4sf delam (CS3)
-
North Column (CS3): S. edge 20sf. delam (CS3)
-
Arch area: East side of arch between columns 10sf. delam (CS3) -2, 1sf spalls N. side column (2sf CS3)
-
Pier 4:
South column (CS3): NW edge 4ft delam (CS2) -NE edge 3sf spalled (CS3), 7sf delam (CS3) -NW 10ft minor to moderate crack (CS2)
-
North column (CS3): SW edge 5sf delam (CS2), 4sf spalled (CS2) -North side 2, 1sf. spalls (CS3)
-
Arch area: 13sf delam / minor rust staining

210	REINFORCED CONCRETE PIER WALL	08-31-2021	316 LF	153	158	5	0
		08-27-2019	316 LF	153	158	5	0

Notes: Pier 1: West side Not visible -1 moderate crack E. side (1lf CS2) - 5 minor vertical cracks (5lf CS1)

Pier 2: -1 wide 1/4" vertical crack in center (1lf CS3) -7 vertical moderate sized cracks (7lf CS2) -4 minor vertical cracks (4lf CS1)

Pier 3: -3 wide vertical cracks (3lf CS3) -7 moderate vertical cracks (7lf CS2) -2 minor horizontal crack between columns (12lf CS1)

Pier 4: -1 wide vertical crack (1lf CS3) -1 moderate vertical crack (1lf CS2) -9 minor vertical cracks (9lf CS1)

[2021] Underwater Inspection: Light scaling with 1/4 to 1/2 inch penetration from 5 feet above the waterline to the channel bottom and random vertical and/or map cracking, hairline to 1/16 inch wide, from 3 feet above the waterline to the waterline around the entire perimeter of Piers 2 and 3. (158 LF CS2)

215	REINFORCED CONCRETE ABUTMENT	08-31-2021	326 LF	306	13	7	0
		08-27-2019	326 LF	306	13	7	0

Notes: EAST ABUTMENT:
-3 spalls on N. wing edge (1lf CS2) -1sf spall NW edge under floorbeam cold joint (1lf CS3) -3' spalled front side under floorbeam (3lf CS3) -2 minor spalls (chips) SE edge (1lf CS2) -10lf minor Spalling under floorbeam joint (10lf CS2) -2sf spall under floorbeam N edge (1lf CS3)
.
WEST ABUTMENT:
-3 small rust stains popouts N. edge (3lf CS2) -4" spall N. corner (1lf CS2) -1' spall with exposed bar N. of arch (1lf CS3) -2, 1' spalls N. edge of center section (2Lf CS3) -20' moderate crack across center section (cold joint) (20lf CS1) -1' spall with exposed bar S. side of arch (1lf CS3)
-under mining where the abutment bumps out at the top.

234	REINFORCED CONCRETE PIER CAP	08-31-2021	316 LF	296	0	20	0
		08-27-2019	316 LF	296	0	20	0

Notes: Pier 1: -1 moderate crack with 1'x6" spalling along crack (1lf CS3) -2 small rust stains next to column (2lf CS2) -14 minor cracks (14lf CS1)

Pier 2: -2 wide vertical cracks 1/4" cracks and 1lf spalling along crack (2lf CS3) -9 moderate vertical cracks (9lf CS2)

Pier 3: -2 wide cracks with 1' delam and spalling around crack (2lf CS3) -2 moderate cracks (2lf CS2) -5 minor cracks (5lf CS1)

Pier 4: -1 wide crack with spalling (1lf CS3) -1 moderate crack (1lf CS2) -9 minor cracks (9lf CS1)

NO Change 2021

883	CONCRETE SHEAR CRACKING	08-31-2021	1 EA	1	0	0	0
		08-27-2019	1 EA	1	0	0	0

Notes: Use this element to monitor the presence of shear cracking on concrete elements.

885	SCOUR	08-31-2021	1 EA	1	0	0	0
		08-27-2019	1 EA	1	0	0	0

Notes: [2021] DO NOT DELETE. THIS ELEMENT MUST BE RATED FOR ALL BRIDGES (not culverts) OVER WATER. INSPECTOR TO RATE CONDITION STATE PER GUIDANCE IN CHAPTER B OF THE BSIPM.

[2021] Underwater Inspection: No scour was observed at the submerged portions of substructure units or within the channel.

891	OTHER BRIDGE SIGNING	08-31-2021	1 EA	1	0	0	0
		08-27-2019	1 EA	1	0	0	0

Notes: Signs Required: Horizontal Clearance

892	SLOPES & SLOPE PROTECTION	08-31-2021	1 EA	0	1	0	0
		08-27-2019	1 EA	0	1	0	0

Notes: -Erosion on southeast corner. -The settlement pond in the northwest corner has had the rock rip-rap in front of it slide down and away from it.

894	DECK & APPROACH DRAINAGE	08-31-2021	1 EA	0	0	1	0
		08-27-2019	1 EA	1	0	0	0

Notes: Holding Pond on NW end Has extensive damage and is no longer functioning as intended this is not affecting any bridge elements (CS3) -SE drain outlet section as separated and is not affecting any bridge elements but is affecting the bank down stream (CS3)

895	SIDEWALK, CURB, & MEDIAN	08-31-2021	1 EA	0	0	1	0
		08-27-2019	1 EA	0	1	0	0

Notes: The curbing on the northwest and southwest corners have 2'-3' each of traffic damage.
Both ends of the north sidewalk are low after the bridge. foam jacked the South side .
Center median settled 2" below curbs and curb is cracked (CS3)

899	MISCELLANEOUS ITEMS	08-31-2021	1 EA	0	1	0	0
		08-27-2019	1 EA	0	1	0	0

Notes: -12" water main suspended under bridge (City of Brainier). -Power line S. side of the W. Abutment
- Graffiti under the bridge at both abutments.
-Roadway and Approach joints deteriorated

900	PROTECTED SPECIES	08-31-2021	1 EA	0	0	1	0
		08-27-2019	1 EA	0	0	1	0

Notes: Swallows Present

General Notes: Inspected:

22 Aug.2017 Gilbertson/DeRosier
8/27-28/19 Gilbertson / Koering / DeRosier
Underwater Inspection - 5/17/2021 - Collins Engineers
8/31/2021 Gilbertson / DeRosier

Deck: [6] Minor spalling / Delamination Moderate cracking leaching

Brdg Railings: [1] Meets Standards less than 40 MPH. Roadway is 35 MPH

Superstructure: [6] spalling and delamination with exposed bar on floor beams and Columns.

Substructure: [6] Moderate cracking and delamination and spalls

[2021] Underwater Inspection: NBI has been reviewed and confirmed with the underwater portion of bridge inspected.

Channel: [6] Island located downstream not affecting structure or banks

[2021] Underwater Inspection: No significant changes have occurred to the channel bottom configuration or condition since the 2016 underwater inspection. The shoreline embankments exhibited heavy erosion consisting of up to 4 feet high vertical cut banks and exposed tree roots.

Attachment 2: USFWS Concurrence Verification Letter

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Minnesota-Wisconsin Ecological Services Field Office
4101 American Blvd E
Bloomington, MN 55425-1665
Phone: (952) 252-0092 Fax: (952) 646-2873

In Reply Refer To: November 08, 2022
Project code: 2023-0013383
Project Name: S.P. 1805-80 (TH 210)

Subject: Concurrence verification letter for the 'S.P. 1805-80 (TH 210)' project under the revised February 5, 2018, FHWA, FRA, FTA Programmatic Biological Opinion for Transportation Projects within the Range of the Indiana Bat and Northern Long-eared Bat.

To whom it may concern:

The U.S. Fish and Wildlife Service (Service) has received your request dated November 08, 2022 to verify that the **S.P. 1805-80 (TH 210)** (Proposed Action) may rely on the concurrence provided in the February 5, 2018, FHWA, FRA, FTA Programmatic Biological Opinion for Transportation Projects within the Range of the Indiana Bat and Northern Long-eared Bat (PBO) to satisfy requirements under Section 7(a)(2) of the Endangered Species Act of 1973 (ESA) (87 Stat. 884, as amended; 16 U.S.C 1531 *et seq.*).

Based on the information you provided (Project Description shown below), you have determined that the Proposed Action is within the scope and adheres to the criteria of the PBO, including the adoption of applicable avoidance and minimization measures, and may affect, but is <u>not likely to adversely affect</u> (NLAA) the endangered Indiana bat (*Myotis sodalis*) and/or the threatened Northern long-eared bat (*Myotis septentrionalis*). Consultation with the Service pursuant to Section 7(a)(2) of the Endangered Species Act of 1973 (ESA) (87 Stat. 884, as amended; 16 U.S.C. 1531 et seq.) is required.

The Service has 14 calendar days to notify the lead Federal action agency or designated non-federal representative if we determine that the Proposed Action does not meet the criteria for a NLAA determination under the PBO. If we do <u>not</u> notify the lead Federal action agency or designated non-federal representative within that timeframe, you may proceed with the Proposed Action under the terms of the NLAA concurrence provided in the PBO. This verification period allows Service Field Offices to apply local knowledge to implementation of the PBO, as we may identify a small subset of actions having impacts that were unanticipated. In such instances, Service Field Offices may request additional information that is necessary to verify inclusion of the proposed action under the PBO.

For Proposed Actions that include bridge/culvert or structure removal, replacement, and/or maintenance activities: If your initial bridge/culvert or structure assessments failed to detect Indiana bats, but you later detect bats prior to, or during construction, please submit the Post Assessment Discovery of Bats at Bridge/Culvert or Structure Form (User Guide Appendix E) to this Service Office. In these instances, potential incidental take of Indiana bats may be exempted provided that the take is reported to the Service.

If the Proposed Action is modified, or new information reveals that it may affect the Indiana bat and/or Northern long-eared bat in a manner or to an extent not considered in the PBO, further review to conclude the requirements of ESA Section 7(a)(2) may be required. If the Proposed Action may affect any other federally-listed or proposed species, and/or any designated critical habitat, additional consultation between the lead Federal action agency and this Service Office is required. If the proposed action has the potential to take bald or golden eagles, additional coordination with the Service under the Bald and Golden Eagle Protection Act may also be required. In either of these circumstances, please contact this Service Office.

The following species may occur in your project area and **are not** covered by this determination:

- Gray Wolf *Canis lupus* Threatened
- Monarch Butterfly *Danaus plexippus* Candidate

Project Description

The following project name and description was collected in IPaC as part of the endangered species review process.

Name

S.P. 1805-80 (TH 210)

Description

The purpose of this proposed project is to resurface and/or reconstruct approximately four miles of Trunk Highway (TH) 210 in Baxter and Brainerd, Minnesota from Baxter Drive in Baxter to the end of the 4-lane roadway east of Brainerd. Additional project components include replacement of signals and lighting, sidewalk/ADA work, turn lane extensions, storm sewer and stormwater pond improvements, the reconfiguration of the 5th - 8th Avenue NE intersections to a dual roundabout, and rehabilitation of Bridge 5060 carrying TH 210 over the Mississippi River. While the bridge work is yet to be finalized, it is anticipated that the bridge will be re-decked with additional preservation work. No bat use has been observed on this structure (last inspected August 2021). These project activities may result in soil disturbances beyond the inslope, equipment staging, and associated activities. Limited tree removal (<2.5 acres) is anticipated and will occur during the winter months (November 1 to March 31, inclusive). The project corridor is generally set within an urbanized environment of commercial and residential development with woodlands along the eastern extent of the project area.

Determination Key Result

Based on your answers provided, this project(s) may affect, but is not likely to adversely affect the endangered Indiana bat and/or the threatened Northern long-eared bat, therefore, consultation with the U.S. Fish and Wildlife Service pursuant to Section 7(a)(2) of the Endangered Species Act of 1973 (ESA) (87 Stat. 884, as amended 16 U.S.C. 1531 *et seq.*) is required. However, also based on your answers provided, this project may rely on the concurrence provided in the revised February 5, 2018, FHWA, FRA, FTA Programmatic Biological Opinion for Transportation Projects within the Range of the Indiana Bat and Northern Long-eared Bat.

Qualification Interview

1. Is the project within the range of the Indiana bat[1]?

   [1] See Indiana bat species profile

   Automatically answered
   No

2. Is the project within the range of the Northern long-eared bat[1]?

   [1] See Northern long-eared bat species profile

   Automatically answered
   Yes

3. Which Federal Agency is the lead for the action?

   A) Federal Highway Administration (FHWA)

4. Are *all* project activities limited to non-construction[1] activities only? (examples of non-construction activities include: bridge/abandoned structure assessments, surveys, planning and technical studies, property inspections, and property sales)

   [1] Construction refers to activities involving ground disturbance, percussive noise, and/or lighting.

   No

5. Does the project include *any* activities that are **greater than** 300 feet from existing road/rail surfaces[1]?

   [1] Road surface is defined as the actively used [e.g. motorized vehicles] driving surface and shoulders [may be pavement, gravel, etc.] and rail surface is defined as the edge of the actively used rail ballast.

   No

6. Does the project include *any* activities **within** 0.5 miles of a known Indiana bat and/or NLEB hibernaculum[1]?

   [1] For the purpose of this consultation, a hibernaculum is a site, most often a cave or mine, where bats hibernate during the winter (see suitable habitat), but could also include bridges and structures if bats are found to be hibernating there during the winter.

   No

7. Is the project located **within** a karst area?

   No

8. Is there *any* suitable[1] summer habitat for Indiana Bat or NLEB **within** the project action area[2]? (includes any trees suitable for maternity, roosting, foraging, or travelling habitat)

   [1] See the Service's summer survey guidance for our current definitions of suitable habitat.

   [2] The action area is defined as all areas to be affected directly or indirectly by the Federal action and not merely the immediate area involved in the action (50 CFR Section 402.02). Further clarification is provided by the User's Guide for the Range-wide Programmatic Consultation for Indiana Bat and Northern Long-eared Bat.

   Yes

9. Will the project remove *any* suitable summer habitat[1] and/or remove/trim any existing trees **within** suitable summer habitat?

   [1] See the Service's summer survey guidance for our current definitions of suitable habitat.

   Yes

10. Will the project clear more than 20 acres of suitable habitat per 5-mile section of road/rail?

    No

11. Have presence/probable absence (P/A) summer surveys[1][2] been conducted[3][4] **within** the suitable habitat located within your project action area?

    [1] See the Service's summer survey guidance for our current definitions of suitable habitat.

    [2] Presence/probable absence summer surveys conducted within the fall swarming/spring emergence home range of a documented Indiana bat hibernaculum (contact local Service Field Office for appropriate distance from hibernacula) that result in a negative finding requires additional consultation with the local Service Field Office to determine if clearing of forested habitat is appropriate and/or if seasonal clearing restrictions are needed to avoid and minimize potential adverse effects on fall swarming and spring emerging Indiana bats.

    [3] For projects within the range of either the Indiana bat or NLEB in which suitable habitat is present, and no bat surveys have been conducted, the transportation agency will assume presence of the appropriate species. This assumption of presence should be based upon the presence of suitable habitat and the capability of bats to occupy it because of their mobility.

    [4] Negative presence/probable absence survey results obtained using the summer survey guidance are valid for a minimum of two years from the completion of the survey unless new information (e.g., other nearby surveys) suggest otherwise.

    No

12. Does the project include activities **within documented NLEB habitat**[1][2]?

    [1] Documented roosting or foraging habitat – for the purposes of this consultation, we are considering documented habitat as that where Indiana bats and/or NLEB have actually been captured and tracked using (1) radio telemetry to roosts; (2) radio telemetry biangulation/triangulation to estimate foraging areas; or (3) foraging areas with repeated use documented using acoustics. Documented roosting habitat is also considered as suitable summer habitat within 0.25 miles of documented roosts.)

    [2] For the purposes of this key, we are considering documented corridors as that where Indiana bats and/or NLEB have actually been captured and tracked to using (1) radio telemetry; or (2) treed corridors located directly between documented roosting and foraging habitat.

    No

13. Will the removal or trimming of habitat or trees occur **within** suitable but **undocumented NLEB** roosting/foraging habitat or travel corridors?

    Yes

14. What time of year will the removal or trimming of habitat or trees **within** suitable but **undocumented NLEB** roosting/foraging habitat or travel corridors occur?

    B) During the inactive season

15. Will *any* tree trimming or removal occur **within** 100 feet of existing road/rail surfaces?

    Yes

16. Will *any* tree trimming or removal occur **between** 100-300 feet of existing road/rail surfaces?

    No

17. Are *all* trees that are being removed clearly demarcated?

    Yes

18. Will the removal of habitat or the removal/trimming of trees include installing new or replacing existing **permanent** lighting?

    No

19. Does the project include wetland or stream protection activities associated with compensatory wetland mitigation?

    No

20. Does the project include slash pile burning?

    No

21. Does the project include *any* bridge removal, replacement, and/or maintenance activities (e.g., any bridge repair, retrofit, maintenance, and/or rehabilitation work)?

    Yes

22. Is there *any* suitable habitat[1] for Indiana bat or NLEB **within** 1,000 feet of the bridge? (includes any trees suitable for maternity, roosting, foraging, or travelling habitat)

    [1] See the Service's current summer survey guidance for our current definitions of suitable habitat.

    Yes

23. Has a bridge assessment[1] been conducted **within** the last 24 months[2] to determine if the bridge is being used by bats?

    [1] See User Guide Appendix D for bridge/structure assessment guidance

    [2] Assessments must be completed no more than 2 years prior to conducting any work below the deck surface on all bridges that meet the physical characteristics described in the Programmatic Consultation, regardless of whether assessments have been conducted in the past. Due to the transitory nature of bat use, a negative result in one year does not guarantee that bats will not use that bridge/structure in subsequent years.

    Yes

    SUBMITTED DOCUMENTS

    - *5060_Bridge_Report.pdf https://ipac.ecosphere.fws.gov/project/363ODVWI2RHBDLHDYNQ4XUUCOU/projectDocuments/118976955*

24. Did the bridge assessment detect *any* signs of Indiana bats and/or NLEBs roosting in/under the bridge (bats, guano, etc.)[1]?

    [1] If bridge assessment detects signs of *any* species of bats, coordination with the local FWS office is needed to identify potential threatened or endangered bat species. Additional studies may be undertaken to try to identify which bat species may be utilizing the bridge prior to allowing *any* work to proceed.

    Note: There is a small chance bridge assessments for bat occupancy do not detect bats. Should a small number of bats be observed roosting on a bridge just prior to or during construction, such that take is likely to occur or does occur in the form of harassment, injury or death, the PBO requires the action agency to report the take. Report all unanticipated take within 2 working days of the incident to the USFWS. Construction activities may continue without delay provided the take is reported to the USFWS and is limited to 5 bats per project.

    No

25. Will the bridge removal, replacement, and/or maintenance activities include installing new or replacing existing **permanent** lighting?

    No

26. Does the project include the removal, replacement, and/or maintenance of *any* structure other than a bridge? (e.g., rest areas, offices, sheds, outbuildings, barns, parking garages, etc.)

    No

27. Will the project involve the use of **temporary** lighting *during* the active season?

    Yes

28. Is there *any* suitable habitat **within** 1,000 feet of the location(s) where **temporary** lighting will be used?

    Yes

29. Will the project install new or replace existing **permanent** lighting?

    Yes

30. Is there *any* suitable habitat **within** 1,000 feet of the location(s) where **permanent** lighting will be installed or replaced?

    Yes

31. Does the project include percussives or other activities (**not including tree removal/ trimming or bridge/structure work**) that will increase noise levels above existing traffic/ background levels?

    Yes

32. Will the activities that use percussives (**not including tree removal/trimming or bridge/ structure work**) and/or increase noise levels above existing traffic/background levels be conducted *during* the active season[1]?

    [1] Coordinate with the local Service Field Office for appropriate dates.

    Yes

33. Will *any* activities that use percussives (**not including tree removal/trimming or bridge/ structure work**) and/or increase noise levels above existing traffic/background levels be conducted *during* the inactive season[1]?

    [1] Coordinate with the local Service Field Office for appropriate dates.

    Yes

34. Are *all* project activities that are **not associated with** habitat removal, tree removal/ trimming, bridge and/or structure activities, temporary or permanent lighting, or use of percussives, limited to actions that DO NOT cause any additional stressors to the bat species?

    Examples: lining roadways, unlighted signage , rail road crossing signals, signal lighting, and minor road repair such as asphalt fill of potholes, etc.

    Yes

35. Will the project raise the road profile **above the tree canopy**?

    No

36. Are the project activities that use percussives (not including tree removal/trimming or bridge/structure work) consistent with a Not Likely to Adversely Affect determination in this key?

    Automatically answered
    Yes, because the activities are within 300 feet of the existing road/rail surface, greater than 0.5 miles from a hibernacula, and conducted during the active season within undocumented habitat.

37. Are the project activities that use percussives (not including tree removal/trimming or bridge/structure work) and/or increase noise levels above existing traffic/background levels consistent with a No Effect determination in this key?

    Automatically answered
    Yes, because the activities are within 300 feet of the existing road/rail surface, greater than 0.5 miles from a hibernacula, and conducted during the inactive season

38. Is the habitat removal portion of this project consistent with a Not Likely to Adversely Affect determination in this key?

    Automatically answered
    Yes, because the tree removal/trimming that occurs outside of the NLEB's active season occurs greater than 0.5 miles from the nearest hibernaculum, is less than 100 feet from the existing road/rail surface, includes clear demarcation of the trees that are to be removed, and does not alter documented roosts and/or surrounding summer habitat within 0.25 miles of a documented roost.

39. Is the bridge removal, replacement, or maintenance activities portion of this project consistent with a No Effect determination in this key?

    Automatically answered
    Yes, because the bridge has been assessed using the criteria documented in the BA and no signs of bats were detected

40. **General AMM 1**
    Will the project ensure *all* operators, employees, and contractors working in areas of known or presumed bat habitat are aware of *all* FHWA/FRA/FTA (Transportation Agencies) environmental commitments, including all applicable Avoidance and Minimization Measures?

    Yes

41. **Tree Removal AMM 1**
    Can *all* phases/aspects of the project (e.g., temporary work areas, alignments) be modified, to the extent practicable, to avoid tree removal[1] in excess of what is required to implement the project safely?

    Note: Tree Removal AMM 1 is a minimization measure, the full implementation of which may not always be practicable. Projects may still be NLAA as long as Tree Removal AMMs 2, 3, and 4 are implemented and LAA as long as Tree Removal AMMs 3, 5, 6, and 7 are implemented.

    [1] The word “trees” as used in the AMMs refers to trees that are suitable habitat for each species within their range. See the USFWS’ current summer survey guidance for our latest definitions of suitable habitat.

    No

42. **Tree Removal AMM 3**
    Can tree removal be limited to that specified in project plans and ensure that contractors understand clearing limits and how they are marked in the field (e.g., install bright colored flagging/fencing prior to any tree clearing to ensure contractors stay within clearing limits)?

    Yes

43. **Tree Removal AMM 4**
    Can the project avoid cutting down/removal of *all* (1) **documented**[1] Indiana bat or NLEB roosts[2] (that are still suitable for roosting), (2) trees **within** 0.25 miles of roosts, and (3) documented foraging habitat any time of year?

    [1] The word documented means habitat where bats have actually been captured and/or tracked.

    [2] Documented roosting or foraging habitat – for the purposes of this consultation, we are considering documented habitat as that where Indiana bats and/or NLEB have actually been captured and tracked using (1) radio telemetry to roosts; (2) radio telemetry biangulation/triangulation to estimate foraging areas; or (3) foraging areas with repeated use documented using acoustics. Documented roosting habitat is also considered as suitable summer habitat within 0.25 miles of documented roosts.)

    Yes
44. **Lighting AMM 1**
    Will *all* **temporary** lighting be directed away from suitable habitat during the active season?

    Yes
45. **Lighting AMM 2**
    Does the lead agency use the BUG (Backlight, Uplight, and Glare) system developed by the Illuminating Engineering Society[1] to rate the amount of light emitted in unwanted directions?

    [1] Refer to The BUG System—A New Way To Control Stray Light

    Yes
46. **Lighting AMM 2**
    Will the **permanent** lighting be designed to be as close to 0 for all three BUG ratings as possible, with a priority of "uplight" of 0 and "backlight" as low as practicable?

    Yes

Project Questionnaire

1. Have you made a No Effect determination for *all* other species indicated on the FWS IPaC generated species list?

   Yes
2. Have you made a May Affect determination for *any* other species on the FWS IPaC generated species list?

   No
3. How many acres[1] of trees are proposed for removal between 0-100 feet of the existing road/rail surface?

   [1] If described as number of trees, multiply by 0.09 to convert to acreage and enter that number.

   2.49
4. Please describe the proposed bridge work:

   Redecking and rehabilitation

5. Please state the timing of all proposed bridge work:
   Construction season (spring, summer, fall)
6. Please enter the date of the bridge assessment:
   8/31/2021

Avoidance And Minimization Measures (AMMs)

This determination key result includes the committment to implement the following Avoidance and Minimization Measures (AMMs):

LIGHTING AMM 1

Direct temporary lighting away from suitable habitat during the active season.

TREE REMOVAL AMM 2

Apply time of year restrictions for tree removal when bats are not likely to be present, or limit tree removal to 10 or fewer trees per project at any time of year within 100 feet of existing road/rail surface and **outside of documented** roosting/foraging habitat or travel corridors; visual emergence survey must be conducted with no bats observed.

LIGHTING AMM 2

When installing new or replacing existing permanent lights, use downward-facing, full cut-off lens lights (with same intensity or less for replacement lighting); or for those transportation agencies using the BUG system developed by the Illuminating Engineering Society, be as close to 0 for all three ratings with a priority of "uplight" of 0 and "backlight" as low as practicable.

TREE REMOVAL AMM 3

Ensure tree removal is limited to that specified in project plans and ensure that contractors understand clearing limits and how they are marked in the field (e.g., install bright colored flagging/fencing prior to any tree clearing to ensure contractors stay within clearing limits).

TREE REMOVAL AMM 4

Do not remove **documented** Indiana bat or NLEB roosts that are still suitable for roosting, or trees within 0.25 miles of roosts, or
documented foraging habitat any time of year.

GENERAL AMM 1

Ensure all operators, employees, and contractors working in areas of known or presumed bat habitat are aware of all FHWA/FRA/FTA (Transportation Agencies) environmental commitments, including all applicable AMMs.

Determination Key Description: FHWA, FRA, FTA Programmatic Consultation For Transportation Projects Affecting NLEB Or Indiana Bat

This key was last updated in IPaC on October 11, 2022. Keys are subject to periodic revision.

This decision key is intended for projects/activities funded or authorized by the Federal Highway Administration (FHWA), Federal Railroad Administration (FRA), and/or Federal Transit Administration (FTA), which may require consultation with the U.S. Fish and Wildlife Service (Service) under Section 7 of the Endangered Species Act (ESA) for the endangered **Indiana bat** (*Myotis sodalis*) and the threatened **Northern long-eared bat** (NLEB) (*Myotis septentrionalis*).

This decision key should only be used to verify project applicability with the Service's February 5, 2018, FHWA, FRA, FTA Programmatic Biological Opinion for Transportation Projects. The programmatic biological opinion covers limited transportation activities that may affect either bat species, and addresses situations that are both likely and not likely to adversely affect either bat species. This decision key will assist in identifying the effect of a specific project/activity and applicability of the programmatic consultation. The programmatic biological opinion is not intended to cover all types of transportation actions. Activities outside the scope of the programmatic biological opinion, or that may affect ESA-listed species other than the Indiana bat or NLEB, or any designated critical habitat, may require additional ESA Section 7 consultation.

IPaC User Contact Information

Agency: Minnesota Department of Transportation
Name: Ryan Foley
Address: 395 John Ireland Blvd.
City: St. Paul
State: MN
Zip: 55155
Email ryan.foley@state.mn.us
Phone: 6513663597

Lead Agency Contact Information

Lead Agency: Federal Highway Administration

Ben Lodin, PE (MN)

From: Foley, Ryan (DOT)
Sent: Tuesday, November 8, 2022 12:02 PM
To: Marsh, Dawn S
Cc: Wehseler, Luke (DOT); Miller, Robert (DOT); Meister, Benjamin (DOT)
Subject: SP 1805-80, ESA (Section 7) - PBO NLAA - Notice of Determination
Attachments: 1805-80_ESA(Section_7)_PBO_NLAA.pdf

Ms. Marsh:

Attached is my determination that this project *may affect, but is not likely to adversely affect* northern long-eared bats. The proposed project was reviewed under the USFWS Programmatic Biological Opinion for FHWA, FRA, FTA Transportation Projects within the Range of the Indiana Bat and Northern Long-eared Bat (PBO).

Luke:

Endangered Species Act (link)

I am sending this notice in accordance with the framework for informal consultation under the USFWS Programmatic Biological Opinion for FHWA, FRA, FTA Transportation Projects within the Range of the Indiana Bat and Northern Long-eared Bat (PBO), which was published in February 5, 2018. **This notice starts a 14 day review period** in which the U.S. Fish and Wildlife Service may advise us of any additional concerns. If we do not hear from USFWS within 14 days, we may consider our Section 7 review to be complete and you may proceed with the Proposed Action under the terms of the NLAA concurrence provided in the PBO.

"Conservation Measures" identified in this review represent project commitments and must be incorporated into project documents (e.g., specifications, special provisions, green sheets, etc.). Measures specific to the northern long-eared bat (NLEB) are included in the attached as Avoidance and Minimization Measures (AMMs). Please consult the OES protected species program coordinator (Christopher.E.Smith@state.mn.us) if modifications are requested.

Migratory Bird Treaty Act (link)

The proposed action may impact protected birds (see bridge inspection report). The proposed action should follow guidance included in the documents below to avoid and minimize impacts to protected birds (e.g., netting, etc.).

Bridges, see MnDOT Boiler Plate, Protection of Fish and Wildlife Resources
Tree Clearing, see: Tree Clearing Timing Requirement Technical Memo (22-05-ENV-01)
USFWS Conservation Measures, see: https://www.fws.gov/media/nationwide-standard-conservation-measures

Bald and Golden Eagle Protection Act (link)

Based on the best available information, the proposed action is not anticipated to disturb, harm, or destroy a bald eagle or a bald eagle nest.

Please let me know if you have any questions, comments, or concerns.

Take care,

Ryan
--
Ryan Foley
Fish and Wildlife Specialist

Minnesota Department of Transportation
Office of Environmental Stewardship
395 John Ireland Blvd.
St. Paul, Minnesota 55155
mndot.gov

MINNESOTA STRUCTURE INVENTORY REPORT

Bridge ID: 5060 **MN 210 over MISSISSIPPI RIVER** Date: 12/18/2022

+ GENERAL +

Agency Br. No. 5060 **Crew**
District 3 **Maint. Area** 3A
County 18 - CROW WING
City BRAINERD
Township
Desc. Loc. 1.6 MI E OF W JCT TH 371
Sect., Twp., Range 04 - 133N - 28W
Latitude 46d 21m 29.12s
Longitude 94d 12m 40.56s
Custodian STATE HWY
Owner STATE HWY
Insp Responsibility DISTRICT 3
Year Built 1932
Date Opened to Traffic 05-01-1985
MN Year Remodeled 1984
FHWA Year Reconstructed 1984
Bridge Plan Location CENTRAL
Potential ABC YES

+ STRUCTURE +

Service On HWY;PED
Service Under STREAM
Main Span Type CONC ARCH
Main Span Detail OPEN SPANDREL ARC
Appr. Span Type CONC SLAB SPAN
Appr. Span Detail
Skew
Culvert Type
Barrel Length

Number of Spans
MAIN: 5 APPR: 2 TOTAL: 7

Main Span Length 124.0 ft
Structure Length 630.6 ft
Deck Width 79.0 ft
Deck Material C-I-P CONCRETE
Wear Surf Type LOW SLUMP CONC
Wear Surf Install Year 1984
Wear Course/Fill Depth
Deck Membrane NONE
Deck Rebars EPOXY COATED REBAR
Deck Rebars Install Year 1984
Structure Area 49,817 sq ft
Roadway Area 31,527 sq ft
Sidewalk Width - L/R 6.0 ft 6.0 ft
Curb Height - L/R 0.83 ft 0.83 ft
Rail Codes - L/R 27 27

+ ROADWAY ON BRIDGE +

Facility MN 210
Functional Class URB/OTH PR ART
ADT (YEAR) 32,500 (2019)
HCADT 1,300
National Highway System Y
Route Sys/Nbr (TIS) MNTH 210
Ref. Point (TIS) 122+00.155
Detour Length 60 mi.
Lanes 4 Lanes ON Bridge
Control Section (TH Only) 1805
Function MAINLINE
Type 2 WAY TRAF
Bridge Match ID 1
Roadway Key 1-ON

+ RDWY DIMENSIONS ON BRIDGE +

If Divided	NB-EB	SB-WB
Roadway Width	25.0 ft	25.0 ft

Vertical Clearance
Max. Vert. Clear.
Horizontal Clear. 63.9 ft
Appr. Surface Width 64.0 ft
Bridge Roadway Width 50.0 ft
Median Width on Bridge 14.0 ft

+ MISC. BRIDGE DATA +

Structure Flared NO
Parallel Structure NONE
Field Conn. ID
Cantilever ID

Foundations
Abut. CONC - UNKN
Pier CONC - FTG PILE
Historic Status POSSIBLY ELIGIBLE
On - Off System ON

+ PAINT +

Year Painted
Painted Area
Primer Type
Finish Type

+ BRIDGE SIGNS +

Posted Load NOT REQUIRED
Traffic NOT REQUIRED
Horizontal OBJECT MARKERS
Vertical NOT APPLICABLE

+ INSPECTION +

Deficient Status F.O.
Sufficiency Rating 65.3
Last Routine Insp Date 08-31-2021
Routine Insp Frequency 24
Inspector Name DISTRICT 3
Status A-OPEN

+ NBI CONDITION RATINGS +

Deck 6
Superstructure 6
Substructure 6
Channel 6
Culvert N

+ NBI APPRAISAL RATINGS +

Structure Evaluation 6
Deck Geometry 3
Underclearances N
Waterway Adequacy 9
Approach Alignment 8

+ SAFETY FEATURES +

Bridge Railing 1-MEETS STANDARDS
GR Transition N-NOT REQUIRED
Appr. Guardrail N-NOT REQUIRED
GR Termini N-NOT REQUIRED

+ SPECIAL INSPECTIONS +

Frac. Critical N
Underwater Y 60 mo 05/2021
Pinned Asbly. N

+ WATERWAY +

Drainage Area
Waterway Opening 15000 sq ft
Navigation Control NO PRMT REQD
Pier Protection
Nav. Vert./Horz. Clr.
Nav. Vert. Lift Bridge Clear.
MN Scour Code L-STBL;LOW RISK
Scour Evaluation Year 1998

+ CAPACITY RATINGS +

Design Load HS 20
Operating Rating HS 40.40
Inventory Rating HS 21.40
Posting
Rating Date 02-23-2010

Overweight Permit Codes
A: 1 B: 1 C: 1

12/18/2022
Crew:
Insp Responsibility: DISTRICT 3

MINNESOTA BRIDGE INSPECTION REPORT

BRIDGE 5060 MN 210 OVER MISSISSIPPI RIVER **INSP. DATE: 08-31-2021**

County: CROW WING
City: BRAINERD
Township:
Section: 04 Township: 133N Range: 28W
Main Span Type: CONC ARCH

Location: 1.6 MI E OF W JCT TH 371
Route (TIS): MNTH 210 Ref Pt (TIS): 122+00.155
Control Section: 1805 Maint. Area: 3A
Local Agency Bridge Nbr: 5060

Length: 630.6 ft
Deck Width: 79.0 ft
Rdwy. Area 31,527 sq ft
Paint Area
Culvert : N/A

NBI Deck: 6 Super: 6 Sub: 6 Chan: 6 Culv: N Open, Posted, Closed: OPEN

Appraisal Ratings - Approach: 8 Waterway: 9 MN Scour Code: L-STBL;LOW RISK Def. Stat: F.O. Suff. Rate: 65.3
Required Bridge Signs - Load Posting: NOT REQUIRED Traffic: NOT REQUIRED
Horizontal: OBJECT MARKERS Vertical: NOT APPLICABLE

ELEM NBR	ELEMENT NAME	INSP. DATE	QUANTITY	QTY CS 1	QTY CS 2	QTY CS 3	QTY CS 4
800	CRITICAL DEFS OR SAFETY HAZARDS	08-31-2021	1 EA	0	1	0	0
		08-27-2019	1 EA	0	1	0	0

Notes: Washout of East end W.B. L.L Approach and slope. (Repaired)
Monitor for settlement.

12	REINFORCED CONCRETE DECK	08-31-2021	49,817 SF	49,773	40	4	0
		08-27-2019	49,817 SF	49,773	40	4	0

Notes: Span 1:
- 5-10 minor cracks with minor leaching between each Floor beam 490lf total (49sf CS2) - 2' minor crack with rust staining between F.B. 4 & 5 (1sf CS3) - 3sf delam with rust staining between F.B. 6 & Pier 1 (3sf CS3) - 2sf delam over N. arch (2sf CS2) - 3sf delam segregated concrete over N. arch (3sf CS2)
-
Span 2:
- 5-10 minor cracks with minor leaching between each Floor beam 693lf total (69sf CS2)
-
Span 3:
- 5-10 minor cracks with minor leaching between each Floor beam 690lf total (69sf CS2) -1lf minor crack with rust staining (1sf CS3)
-
Span 4:
- 5-10 minor cracks with minor leaching between each Floor beam 693lf total (69sf CS2) -3sf sound patch between F.B. 3 & 4 (3sf CS2) -5lf minor cracking with rust staining between F.B. 4 & 5 (1sf CS3)
-
Span 5:
-5-10 minor cracks with minor leaching between each Floor beam 490lf total (49sf CS2) -5sf delam between Pier 4 & F.B.1 (5sf CS2) -5sf sound patch Between F.B. 2 &3 (5sf CS2) -2.5sf segregated concrete between F.B. 2 & 3 (3sf CS3) -11sf delam with rust staining between F.B. 3 & 4 (11sf CS3) -3, 1sf areas of delam between F. B 3 & 4 (3sf CS2) -3lf minor crack with rust staining between F.B. 4 & 5 (1sf CS3) -3lf minor crack with rust staining between F.B. 5 & 6 (1sf CS3)
-

510	*WEARING SURFACE*	*08-31-2021*	*31,527 SF*	*28,641*	*2,886*	*0*	*0*
		08-27-2019	*31,527 SF*	*28,641*	*2,886*	*0*	*0*

Notes: 28,800lf sealed deck cracking (2880sf CS2) -3"x 4"spall .5" deep EB midspan next to median (1sf CS2) -5sf of sound patch EB lane (5sf CS2)
-
-No Change 2021

521	*CONCRETE PROTECTIVE COATING*	*08-31-2021*	*28,880 SF*	*28,880*	*0*	*0*	*0*
		08-27-2019	*28,880 SF*	*28,880*	*0*	*0*	*0*

Notes: Sealed with TK 590-100 Silane 2019

810	CONC WEAR SURF-CRACKING SEALING	08-31-2021	28,800 LF	0	28,800	0	0
		08-27-2019	28,800 LF	0	28,800	0	0

Notes: crack sealed 7-2019 TK9000

300	STRIP SEAL DECK JOINT	08-31-2021	474 LF	458	16	0	0
		08-27-2019	474 LF	458	16	0	0

Notes: Gland over west abutment has about 4' not seated (4lf CS2). -Gland over #3 pier is not seated for about a foot in eastbound lane (1lf CS2). -3rd gland from west 8ft not seated (8lf CS2). -2nd gland from west 3 ft not seated (3lf

CS2).
No Change 2021

301	POURED SEAL JOINT	08-31-2021	632 LF	623	0	9	0
		08-27-2019	632 LF	632	0	0	0

Notes: Sealed 7-2019
6ft. of Repaired joint should be cut but joint is sealed with epoxy sealer (CS3) - East approach 3' adhesion failure (CS3)

330	METAL BRIDGE RAILING	08-31-2021	1,340 LF	1,186	152	0	2
		08-27-2019	1,340 LF	1,186	152	0	2

Notes: -Surface corrosion at all connections to concrete railing 76 connections per side (152lf CS2)
-NE end 2lf missing (2lf CS4)

515	*STEEL PROTECTIVE COATING*	*08-31-2021*	*1,241 SF*	*0*	*1,041*	*124*	*76*
		08-27-2019	*1,241 SF*	*0*	*1,041*	*124*	*76*

Notes: -Minor Rusting at connections to Concrete railing about .5sf at each connection. (76sf CS4)
-10% heavy chalking (124sf CS3)
-Remainder of coating light chalking / Fading (1041sf CS2)

331	REINFORCED CONC BRIDGE RAILING	08-31-2021	1,340 LF	1,282	58	0	0
		08-27-2019	1,340 LF	1,282	58	0	0

Notes: -S. rail 35ft with small spalled areas and moderate cracking most spalling caused by plows at joints.
-N. rail 8 small popouts and joints spalled from plowing.
Inside rails sealed 2017

321	CONCRETE APPROACH SLAB	08-31-2021	2,560 SF	2,537	23	0	0
		08-27-2019	2,560 SF	2,537	23	0	0

Notes: East Approaches:
-WB. lane 5sf patch along pourable (5sf CS2)
-EB. lane 12sf patch along pourable (12sf CS2) -2sf spall at SE corner (2sf CS3)
-Contractor put multiple shallow random saw cuts in northeast corner of east end panel, westbound driving lane on side of bridge.

West Approaches:
-EB 6sf patches (6sf CS2)

144	REINFORCED CONCRETE ARCH	08-31-2021	1,260 LF	1,217	31	12	0
		08-27-2019	1,260 LF	1,217	33	10	0

Notes: SOUTH SIDE ARCHES:
Span 1:
-2, 4in rust stained spots (1lf CS2) -2in Pop out (1lf CS2) -2sf spall bottom side at abutment (2lf CS3)
-
Span 2:
-2, 4in. popouts bottom side of arch. (Repaired) (1lf CS2) -30"x9" 2.5"deep spall with exposed bar and section loss in bar steel plate behind spall minor cracking around spall. (repaired 2015) (1lf CS2) -3" spall exposed bar top N. edge between columns 1 & 2 (1lf CS3) -5" shallow spall top N. edge between col. 1 & 2 (1lf CS2) -3" delam under col. 2 (1lf CS2)
-
Span 3:
-2'x2" form board mark top south side of arch (1lf CS1) -N. side 2, 1" bars sticking out about 6" (1lf CS1) -2"popout with rust staining bottom side between F.B. 3 & 4 (1lf CS3)
-
Span 4:
-1" bar sticking out 6" on N. side of arch (1lf CS1) -7, 1sf sound patches top of arch between columns 7 & 8 (7lf CS2)
-
Span 5:
-2, 2sf sound patches Top between columns 5 & 6 (2lf CS2)
-
NORTH SIDE ARCHES:
Span 1:
-1.5sf. spall bottom side with exposed bar (1lf CS3) -2" spall with exposed bar (1lf CS3) -1sf delamed patch S. bottom edge close to abutment (1lf CS2)
-
Span 2:
Look good
-
Span 3:
1.5sf spall 3" deep under col. 3 bottom N. edge (1lf CS3)
-

Span 4:
5 delam areas about 1ft. each where bar is too close on top of arch Between columns 2 &3 (5lf CS2)
-

Arch Spandrel Column Notes:
Span 1: TOTAL (1lf CS3)
-South arch: ok 2019
-North arch: -#5- 1.5sf delam (1lf CS3)
Span 2: TOTAL (2lf CS2)
-South arch: -#3 west side 2sf sound patch (1lf CS2) -#2, 6in delam (1lf CS2)
-North arch: OK 2019
Span 3: TOTAL (4lf CS2), (2lf CS3)
-South arch: -#1, 1sf spalled exposed bar E. side (1lf CS3) -#7, west side 4sound patches 5sf (1lf CS2) -#8, 4 sound patches 3sf total (1lf CS2)
-North arch: -#2, 6" delam S. side (1lf CS2) -#3, west side 6" spall with exposed bar (1lf CS3) and 6" delam on south side (1lf CS2)
Span 4: TOTAL (2lf CS2)
-South arch: -#3, south side 3sf sound patch (1lf CS2) -
-North arch: -#3, 1' mod. crack SW edge (1lf CS2)
Span 5: TOTAL (1lf CS2) (2lf CS3)
-South arch: -#2, west side 2, 2sf. sound patches (1lf CS2)
-North arch -#2, west side 2, 2sf. spalls with exposed bar (1lf CS3) -#5, 2sf spall with exposed bar (1lf CS3) 1sf spall (1lf CS3)

155	REINFORCED CONCRETE FLOORBEAM	08-31-2021	5,688 LF	5,611	30	47	0
		08-27-2019	5,688 LF	5,611	33	44	0

Notes: Span 1:
-Abutment FB, 6 -1lf areas of rust staining (6LF CS3), 2lf spalling/delam with light leaching (2lf CS2), 4 minor vertical cracks with light leaching (4lf CS2), 2minor vertical cracks leaching with buildup (2lf CS3), 4"soalled (1lf CS2), 3 1' areas of rust staining bottom south side (3lf CS3), small popout with rust staining S. end (1lf CS2) -FB#1, Good -FB#2, Good -FB#3, N. Bottom 2"x4" delam and minor rust staining (1lf CS3), 2"x4" spall with exposed bar (1lf CS3) -FB#4, West side center 2"spall with rust staining (1lf CS3) -FB#5, Good -FB#6, Good -Pier 1 FB, Good
-
Span 2:
-Pier 1 FB, Good -FB #1, Good -FB#2, small popout with rust sating (1lf CS3) -FB#3, Good -FB#4, Good -FB#5, Good -FB#6, Good -FB#7, Good -FB#8, Good -Pier 2 FB, Bottom NW end 8" delam (1lf CS2)
-
Span 3:
-Pier 2 FB, Good -FB #1, N. side 3"x4" popout (1lf CS3) -FB#2, Good -FB#3, Good -FB#4, Good -FB#5, Small popout with rust staining (1lf CS3) -FB#6, Good -FB#7, Good -FB#8, Good -Pier 3 FB, Good
-
Span 4:
-Pier 3 FB, Good -FB #1, 2 diagonal cracks from cantilever area back toward center measure .004-.010 (4lf CS2)
-FB#2, 2 diagonal cracks from cantilever area back toward center measure .004-.010 (4lf CS2) -FB#3, Good -FB#4, Good -FB#5, Small popout with rust staining (1lf CS3) -FB#6, Good -FB#7, Good -FB#8, 2 diagonal cracks from cantilever area back toward center measure .004-.010 (4lf CS2), 5" spall N. end with rust staining (1lf CS3) -Pier 4 FB, Good
-
Span 5:
-Pier 4 FB, Bottom edge 3, 5" spalled with rust staining (3lf CS3) -FB #1, S. bottom 3 1sf sound patches (3lf CS2), N. bottom edge 1sf spalled/delam with rust staining (1lf CS2) -FB#2, small popout with rust sating (1lf CS3) -FB#3, N. end west side 1sf spall (1lf CS3) -FB#4, 2 minor popouts with rust staining over N arch (2lf CS2) -FB#5, Good -FB#6, Good -East abutment FB, 20lf spalling at deck (20lf CS3), 3lf spalling with exposed bar (3lf CS3), 5 minor popouts (5lf CS2)

-90% of all floorbeams have 2-3 vertical hairline cracks .004-.006 at the beginning of cantilevers and angling upward at 45 degrees toward the center line of the bridge and 2-3 minor .004-.006 vertical cracks coming down from the deck around the cantilever area 368lf Minor cracking in the cantilever areas (368lf CS1) .

-There is rebar exposed at the ends of a couple of floorbeams from construction.

205	REINFORCED CONCRETE COLUMN	08-31-2021	8 EA	0	0	8	0
		08-27-2019	8 EA	0	0	8	0

Notes: Pier 1:
- South Column (CS3): East side N. corner of bump out area 7sf delam and 1sf spalled (CS3), -Rust staining SW (CS3)
-

- N. column (CS3): E. and W. side 2sf. spall with exposed bar (CS3), E side top 7sf delam (CS2) -5sf. spall with exposed bar on SE edge (CS3), -10 sf delam bottom of south edge (CS2), -5sf. delam E side in arch area (CS2) -1sf spalled with exposed bar under drain (CS3) -Moderate crack in bottom east side (CS2) -north side between Floor beams 5" shallow spall (CS2) .
-
-Arch area: -5sf. delam minor rust staining E side (CS3)
-
Pier 2:
-South Column (CS3): Bottom NW edge 3sf delam (CS3) -SW bump-out N. corner 7sf delam (CS3)
-
-North Column (CS3): North side 8" spall with exposed bar (CS3) -North column W. side 10sf. delam in center and 5sf at bottom (CS3) -6, 1sf areas of segregated concrete (CS2) - SE edge 5sf delam (CS3)
-
-Arch area: 12ft delam (CS3) -E. side 7sf delam (CS3)

Pier 3:
South Column (CS3): NW side of arch 2 small spalls with exposed bar 1, 1"x6" and 1, 5" spall with delam around it (CS3) -22sf. delam spalling on W. side (CS3) -2, 1sf sound patches (CS2) -13sf. spalling and delam top N. Side (CS3) -NE edge 6sf. spalling exposed bar 12sf delam rust staining (CS3) -East side 8sf delam (CS3) -1.5sf spalled with rust staining (CS3) -Top of Bump-out 4sf delam (CS3)
-
North Column (CS3): S. edge 20sf. delam (CS3)
-
Arch area: East side of arch between columns 10sf. delam (CS3) -2, 1sf spalls N. side column (2sf CS3)
-
Pier 4:
South column (CS3): NW edge 4ft delam (CS2) -NE edge 3sf spalled (CS3), 7sf delam (CS3) -NW 10ft minor to moderate crack (CS2)
-
North column (CS3): SW edge 5sf delam (CS2), 4sf spalled (CS2) -North side 2, 1sf. spalls (CS3)
-
Arch area: 13sf delam / minor rust staining

210	REINFORCED CONCRETE PIER WALL	08-31-2021	316 LF	153	158	5	0
		08-27-2019	316 LF	153	158	5	0

Notes: Pier 1: West side Not visible -1 moderate crack E. side (1lf CS2) - 5 minor vertical cracks (5lf CS1)

Pier 2: -1 wide 1/4" vertical crack in center (1lf CS3) -7 vertical moderate sized cracks (7lf CS2) -4 minor vertical cracks (4lf CS1)

Pier 3: -3 wide vertical cracks (3lf CS3) -7 moderate vertical cracks (7lf CS2) -2 minor horizontal crack between columns (12lf CS1)

Pier 4: -1 wide vertical crack (1lf CS3) -1 moderate vertical crack (1lf CS2) -9 minor vertical cracks (9lf CS1)

[2021] Underwater Inspection: Light scaling with 1/4 to 1/2 inch penetration from 5 feet above the waterline to the channel bottom and random vertical and/or map cracking, hairline to 1/16 inch wide, from 3 feet above the waterline to the waterline around the entire perimeter of Piers 2 and 3. (158 LF CS2)

215	REINFORCED CONCRETE ABUTMENT	08-31-2021	326 LF	306	13	7	0
		08-27-2019	326 LF	306	13	7	0

Notes: EAST ABUTMENT:
-3 spalls on N. wing edge (1lf CS2) -1sf spall NW edge under floorbeam cold joint (1lf CS3) -3' spalled front side under floorbeam (3lf CS3) -2 minor spalls (chips) SE edge (1lf CS2) -10lf minor Spalling under floorbeam joint (10lf CS2) -2sf spall under floorbeam N edge (1lf CS3)
.
WEST ABUTMENT:
-3 small rust stains popouts N. edge (3lf CS2) -4" spall N. corner (1lf CS2) -1' spall with exposed bar N. of arch (1lf CS3) -2, 1' spalls N. edge of center section (2Lf CS3) -20' moderate crack across center section (cold joint) (20lf CS1) -1' spall with exposed bar S. side of arch (1lf CS3)
-under mining where the abutment bumps out at the top.

234	REINFORCED CONCRETE PIER CAP	08-31-2021	316 LF	296	0	20	0
		08-27-2019	316 LF	296	0	20	0

Notes: Pier 1: -1 moderate crack with 1'x6" spalling along crack (1lf CS3) -2 small rust stains next to column (2lf CS2) -14 minor cracks (14lf CS1)

Pier 2: -2 wide vertical cracks 1/4" cracks and 1lf spalling along crack (2lf CS3) -9 moderate vertical cracks (9lf CS2)

Pier 3: -2 wide cracks with 1' delam and spalling around crack (2lf CS3) -2 moderate cracks (2lf CS2) -5 minor cracks (5lf CS1)

Pier 4: -1 wide crack with spalling (1lf CS3) -1 moderate crack (1lf CS2) -9 minor cracks (9lf CS1)

NO Change 2021

883	CONCRETE SHEAR CRACKING	08-31-2021	1 EA	1	0	0	0
		08-27-2019	1 EA	1	0	0	0

Notes: Use this element to monitor the presence of shear cracking on concrete elements.

885	SCOUR	08-31-2021	1 EA	1	0	0	0
		08-27-2019	1 EA	1	0	0	0

Notes: [2021] DO NOT DELETE. THIS ELEMENT MUST BE RATED FOR ALL BRIDGES (not culverts) OVER WATER. INSPECTOR TO RATE CONDITION STATE PER GUIDANCE IN CHAPTER B OF THE BSIPM.

[2021] Underwater Inspection: No scour was observed at the submerged portions of substructure units or within the channel.

891	OTHER BRIDGE SIGNING	08-31-2021	1 EA	1	0	0	0
		08-27-2019	1 EA	1	0	0	0

Notes: Signs Required: Horizontal Clearance

892	SLOPES & SLOPE PROTECTION	08-31-2021	1 EA	0	1	0	0
		08-27-2019	1 EA	0	1	0	0

Notes: -Erosion on southeast corner. -The settlement pond in the northwest corner has had the rock rip-rap in front of it slide down and away from it.

894	DECK & APPROACH DRAINAGE	08-31-2021	1 EA	0	0	1	0
		08-27-2019	1 EA	1	0	0	0

Notes: Holding Pond on NW end Has extensive damage and is no longer functioning as intended this is not affecting any bridge elements (CS3) -SE drain outlet section as separated and is not affecting any bridge elements but is affecting the bank down stream (CS3)

895	SIDEWALK, CURB, & MEDIAN	08-31-2021	1 EA	0	0	1	0
		08-27-2019	1 EA	0	1	0	0

Notes: The curbing on the northwest and southwest corners have 2'-3' each of traffic damage.
Both ends of the north sidewalk are low after the bridge. foam jacked the South side .
Center median settled 2" below curbs and curb is cracked (CS3)

899	MISCELLANEOUS ITEMS	08-31-2021	1 EA	0	1	0	0
		08-27-2019	1 EA	0	1	0	0

Notes: -12" water main suspended under bridge (City of Brainier). -Power line S. side of the W. Abutment
- Graffiti under the bridge at both abutments.
-Roadway and Approach joints deteriorated

900	PROTECTED SPECIES	08-31-2021	1 EA	0	0	1	0
		08-27-2019	1 EA	0	0	1	0

Notes: Swallows Present

General Notes: Inspected:

22 Aug.2017 Gilbertson/DeRosier
8/27-28/19 Gilbertson / Koering / DeRosier
Underwater Inspection - 5/17/2021 - Collins Engineers
8/31/2021 Gilbertson / DeRosier

Deck: [6] Minor spalling / Delamination Moderate cracking leaching

Brdg Railings: [1] Meets Standards less than 40 MPH. Roadway is 35 MPH

Superstructure: [6] spalling and delamination with exposed bar on floor beams and Columns.

Substructure: [6] Moderate cracking and delamination and spalls

[2021] Underwater Inspection: NBI has been reviewed and confirmed with the underwater portion of bridge inspected.

Channel: [6] Island located downstream not affecting structure or banks

[2021] Underwater Inspection: No significant changes have occurred to the channel bottom configuration or condition since the 2016 underwater inspection. The shoreline embankments exhibited heavy erosion consisting of up to 4 feet high vertical cut banks and exposed tree roots.

Ben Lodin, PE (MN)

From: Haltvick, Nickolas (DOT)
Sent: Tuesday, February 1, 2022 6:20 AM
To: Pilarski, Paul (DOT); Wehseler, Luke (DOT)
Cc: Stuber, Cory (DOT)
Subject: Re: SP 1805-80 (TH 210/Washington Street) in Brainerd ENM

Paul,

I'll give you a call, we've already addressed much of this.

Nick

Nick Haltvick, P.E.
Assistant District Engineer – MnDOT District 6
Cell: 651-216-3219
Sent while roaming away from a cubicle…

From: Pilarski, Paul (DOT) <paul.pilarski@state.mn.us>
Sent: Tuesday, February 1, 2022 12:57:47 AM
To: Wehseler, Luke (DOT) <luke.wehseler@state.mn.us>
Cc: Stuber, Cory (DOT) <Cory.Stuber@state.mn.us>; Haltvick, Nickolas (DOT) <nick.haltvick@state.mn.us>
Subject: RE: SP 1805-80 (TH 210/Washington Street) in Brainerd ENM

I have not been involved in the cross section discussions on Br 5060, but normally we require 4' reaction distance from lane to barrier and 2' from lane to raised median or sidewalk. This cross section violates both and would require a design exception. A design exception is more readily acceptable if the cross section matches the cross section off-bridge, but in this instance the sidewalk width is widened on bridge and narrowed to 8' off bridge which does not justify sacrificing reaction\shoulder distance to the traffic separation barrier.

Draining the sidewalk and roadway both toward the traffic separation barrier has resulted in permanent ponding and saturation which may be detrimental to the underlying deck or superstructure. As mitigation, we have used stainless steel reinforcement within the deck under these areas on the 3rd ave bridge. Scupper systems and new piping would be required on bridge to make this option viable. District maintenance should weigh in on difficulties in drainage maintenance.

Also, as I understand the condition of the bridge does not warrant a redeck and rather would be more suited for a mill and overlay which limits cross section upgrades without significantly raising the investment level of the base work. Review Br Nos. 2440 (40 mph) and Br 9300 (45 mph) for constrained cross sections with traffic separation barriers.

Paul Pilarski
Bridge Construction and Scoping Engineer
Minnesota Dept of Transportation
Bridge Office – Mail Stop 610
3485 Hadley Avenue North
Oakdale, MN 55128

(651) 366-4562 phone (651) 485-3167 cell
paul.pilarski@state.mn.us

From: Wehseler, Luke (DOT) <luke.wehseler@state.mn.us>
Sent: Saturday, January 29, 2022 11:25 AM
To: Elliott, Lisa (DOT) <lisa.elliott@state.mn.us>; Leete, Peter (DOT) <peter.leete@state.mn.us>; Smith, Christopher E (DOT) <christopher.e.smith@state.mn.us>; Berger, John (DOT) <John.Berger@state.mn.us>; Swanson, Victoria (DOT) <Victoria.Swanson@state.mn.us>; Bottolfson, Harold (DOT) <harold.bottolfson@state.mn.us>; Markeson, Christina (DOT) <tina.markeson@state.mn.us>; Roseen, Melvin (DOT) <melvin.roseen@state.mn.us>; Bistodeau, Lucas (DOT) <lucas.bistodeau@state.mn.us>; Brown, Elizabeth A (DOT) <elizabeth.a.brown@state.mn.us>; Tiedeken, Nicklas (DOT) <nick.tiedeken@state.mn.us>; Zoff, Carol (DOT) <carol.zoff@state.mn.us>; Kurth, Andrew (DOT) <andrew.kurth@state.mn.us>; Weber, Andrea (DOT) <andrea.weber@state.mn.us>; Slagle, Holly (DOT) <holly.slagle@state.mn.us>; Dallman, Amber (DOT) <amber.dallman@state.mn.us>; Grugel, Todd (DOT) <todd.grugel@state.mn.us>; VanWagner, Richard (DOT) <rick.vanwagner@state.mn.us>; MN_DOT_AviationPlanning <aviationplanning.dot@state.mn.us>; Hicks, Gene (DOT) <gene.hicks@state.mn.us>; Carter, Douglas (DOT) <douglas.carter@state.mn.us>; Pilarski, Paul (DOT) <paul.pilarski@state.mn.us>; Milkert, Anjani (DOT) <minnie.milkert@state.mn.us>
Cc: chiniker <chiniker@sehinc.com>; Ben Lodin <blodin@sambatek.com>; Nelson, Darren (DOT) <darren.nelson@state.mn.us>; Meister, Benjamin (DOT) <benjamin.meister@state.mn.us>; Miller, Robert (DOT) <robert.miller@state.mn.us>; william.lohr@dot.gov; Wasko, Peter (DOT) <peter.wasko@state.mn.us>; Wilcox, Timothy (DOT) <timothy.wilcox@state.mn.us>; Hallgren, James (DOT) <james.hallgren@state.mn.us>
Subject: SP 1805-80 (TH 210/Washington Street) in Brainerd ENM

Hello Everyone,

Attached is an early notification memo for SP 1805-80 which is planned to be constructed in 2025. We are currently developing the preliminary layout (see attached draft) and will look to finalize the environmental document this spring. Please respond by **Friday, February 28th, 2022.** More information can by found in the draft scope at 1-29-22 Draft 1805-80 scoping_report_major_transportation_proj.pdf

Thanks,

Luke Wehseler, PE
District 3 Project Development-State Aid
Project Manager/Consultant Coordinator/
Local Partnership Program (LPP) Manager - LPP
7694 Industrial Park Road
Baxter, MN 56425
Direct (cell): 218-821-0618
mndot.gov/

Internal Memo

Date: **March 1, 2022**

To: **Luke Wehseler, Project Manager; Bob Miller, Project Designer – District 3**

From: **Jason Radde, PE, OTAT Ped Bike Engineer**

RE: SP 1805-80 (TH 210); Pedestrian/Bicycle Section response to ENM

Summary

- TH 210 is part of the District 3 Bicycle Plan
- 10-ft shoulders should be provided where a shared-use path is not present
- Consider narrowing driveways or tightening the curb radii
- Roundabouts with multilane approaches should be avoided whenever possible
- Railings on the trail side of a bridge should be at least 4'6" tall
- Provide high-visibility crosswalk markings and warning signs for active transportation users crossing TH 210 at unsignalized intersections and roundabouts
- Consider adding either advanced yield signs or pedestrian hybrid beacons at unsignalized intersections
- Ensure adequate lighting for active transportation users crossing TH 210

Project Description

This project involves the rehabilitation of TH 210 through Brainerd, from Baxter Dr to 5th Ave NE. The project includes the milling and overlay of segments of TH 210 in this area, as well as the full reconstruction of segments of TH 210. The project also includes the re-decking of Bridge 5060.

Pedestrian and Bicycle Comments and Recommendations

Field walk

To provide project managers with constructive input at an appropriate point in the project development process, the Pedestrian/Bicycle section is working to incorporate pedestrian and bicycle recommendations into the scoping process. A scoping field walk was performed for this project and a report was provided in January 2020.

In addition, the Pedestrian/Bicycle section typically provides recommendations as an ENM response. The following recommendations are intended to compliment or expand upon the scoping report.

District Bicycle Plan

The district bicycle plan for District 3 was completed in March, 2019. A portion of TH 210 at this location, from SE 13th St to 5th Ave NE, is identified as an Investment Route in the District 3 Bicycle Plan. Contact Steve Voss in your district for more information on the plan.

Land Use Context & Walking

The MnDOT Land Use Contexts Technical Memorandum 18-07-TS-05 defines land use context types and their typical characteristics, and provides information to assist with planning and design. Minnesota Walks (2016) identified places where people buy food, access transit, parks, schools, and residential areas as key destinations for people walking. MnDOT's Statewide Pedestrian System Plan builds on this previous work by identifying the types of pedestrian improvements desired by Minnesotans based on land use context. These recommendations are available on pages 121-126. This information was gathered from an extensive public engagement effort that connected with people in communities throughout Minnesota.

Priority Areas for Walking (PAWS)

The Priority Areas for Walking webpage shows this area as a high priority for walking.

TH 210 runs through the City of Brainerd, through a suburban commercial land use area. There are several shops, restaurants, and other businesses along TH 210. There are several parking lots and several driveways providing access to TH 210, as well as several cross streets. There are also large residential areas located nearby. Non-motorized use may be high, with a need to cross TH 210 and arrive at businesses or residences on either side. Pedestrian and bicycle activity should be expected and included in any design decisions. The existing pedestrian and bicycle facilities on TH 210 should therefore be maintained.

Shoulders

When a shared use path isn't available, the roadway and its shoulders serve as de facto pedestrian and bicycle facilities. Exhibit 3-4 in the Bicycle Facility Design Manual provides guidance on shoulder widths based on roadway speed and ADT. The AADT from 2019 along TH 210 at this location ranges from 25,500 to 32,500. Based on the AADT and the speed of 35 mph, a 10 foot shoulder would be appropriate.

Multi-Lane Approaches

Multi-lane approaches present a multiple-crash threat for pedestrians and bicyclists in the crosswalk at any unsignalized intersection, including roundabouts (Figure 1). At roundabout entrances, drivers are required to yield to circulating traffic and may be more likely to stop and look for pedestrians but their view may be obstructed. At roundabout exits, with no vehicle traffic to yield to, drivers are much less likely to look for pedestrians, and the risk of a multiple-threat crash is greater.

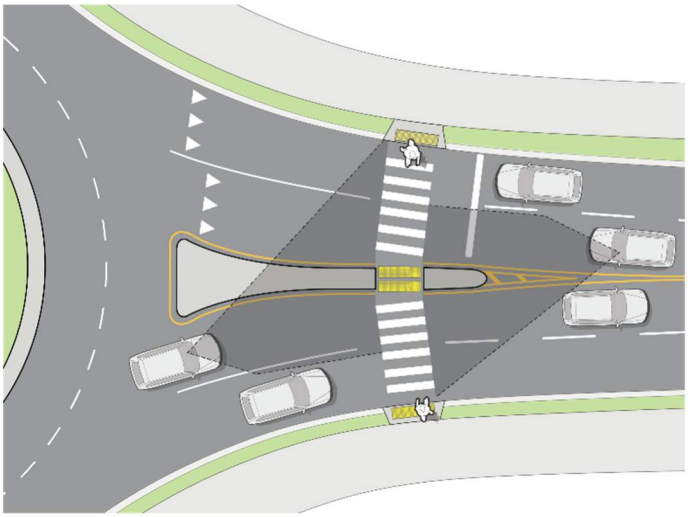


Figure 1. Roundabout Crosswalk Multiple Threat

Two lane entrances and exits at roundabouts should be avoided whenever possible.

Railings

Bike Design Manual Chapter 7 provides guidance on the use of pedestrian/bicycle railings or combination railings on the trail side of the bridge. The barrier should be at least 4’ 6” tall to protect a bicycle rider from falling over the railing.

Crossing Treatments

FHWA Guide for Improving Pedestrian Safety at Uncontrolled Crossing Locations provides recommendations for crossing treatments based on roadway speed, traffic volumes, and number of lanes. See page 16 for the countermeasures chart.

According to the countermeasures chart, high-visibility crosswalk markings and warning signs should be provided for active transportation users crossing TH 210 at the numerous unsignalized intersections within the project limits. Also, consider providing either advanced yield signs or pedestrian hybrid beacons at those intersections.

The MnDOT Traffic Engineering Manual recommends that, to minimize pedestrian wait time, marked crosswalks and pedestrian signal head be provided on all four legs of a signalized intersection. Section 13-2.02 states:

If crossings are provided on three legs of a signalized intersection, a crossing should be provided on the fourth leg of the intersection unless a severe operational problem (i.e., operations at LOS F for a movement) or a measurable safety issue (i.e., sight distance, crash history) is present on the fourth leg. This is to decrease pedestrian exposure and increase safety so that pedestrians can choose to cross one leg instead of crossing three.

Lighting

Ensure adequate lighting for active transportation users crossing TH 210 at all intersections and roundabouts.

cc: Melinda Etsey, Ped/Bicycle Section Coordinator
Sonja Piper, OTE Ped/Bike Safety Engineer
Todd Grugel & Joe Zilka, ADA Unit
Ped/Bicycle Section file

395 John Ireland Blvd.
St. Paul, MN 55155
M.S. 620
612-219-7413
Paul.Voigt@state.mn.us

Memo

To: Luke Wehseler -District 3 Project Manager
Bob Miller -MnDOT District 3 Project Designer

From: Paul Voigt
O.E.S. - Roadside Vegetation Management Specialist

Date: February 17, 2022

Subject: ENM Vegetation review for S.P. 1805-80 T.H.210

I reviewed the proposed project areas identified in the ENM dated January 28, 2022 to determine the potential for impacts to vegetation within and directly adjacent to the proposed project area. The following are my observations and recommendations based on background information and images from GIS layers, and Google Earth™ maps and Street View™, as well as information contained within the ENM.

Project Description

This project will include:

- ☒ Road Construction (Total Reconstruct)
- ☒ Road Construction (Mill & Overlay)
- ☒ Turn Lane/Bypass Lane/Auxiliary Lane Additions
- ☐ Addition/Extension of Acceleration Lane(s)
- ☐ Road Widening
- ☒ Roundabout Construction
- ☒ Bridge Repair
- ☐ Bridge Replacement
- ☐ Guardrail Improvements Replacements
- ☐ Median Guardrail Additions
- ☐ Staging Beyond Current Project Limits
- ☒ Signal Replacements
- ☐ Other (See comments below)
- ☐ Pond Construction
- ☒ Drainage Structure Repair/Replacement
- ☐ Noise Wall Repair/Replacement
- ☐ Noise Wall Construction
- ☒ Soil Disturbance Beyond Inslope
- ☒ ADA (Curb Ramps Upgrades/Additions)
- ☒ ADA (Sidewalk Upgrades or Additions)
- ☒ Curb & Gutter Repair/Replacement/Additions
- ☐ Guardrail Additions
- ☐ Landscaping Work
- ☐ Grade Separated Bridge Construction
- ☒ Concrete Median Replacement

Add any additional comments related to project description below:

NA

Vegetation

Roadside Vegetation

Based on subject guidance for vegetation in the **MnDOT TPDP**, vegetation categories present within, and close to the proposed areas of work include:

- ☒ Functional Vegetation
- ☐ Protected Plant Species
- ☒ Landscaped Vegetation
- ☐ Noxious Weeds/Invasive Plants
- ☐ High Risk Trees
- ☐ Native Plant Communities

The woody vegetation within, and close to the proposed areas of work consists of:

☐Deciduous ☐Coniferous ☒Mix of Deciduous & Coniferous

☐Trees ☐Shrubs ☒Mix of Trees & Shrubs

☐Non-Native (Planted) ☐Native (Planted)

☐Non-Native (Naturally occurring) ☐Native (Naturally occurring)

☒Mix of Native & Non-Native (Planted) ☒Mix of Native & Non-Native (naturally occurring)

The herbaceous vegetation within, and adjacent to the proposed areas of work consists of:

☒ Non-native grasses ☐Native grasses

☐Non-native forbs ☐Native forbs

☐Mix of Non-native grasses & Non-native forbs ☐Mix of native grasses & native forbs

Add any additional comments related to vegetation below:

Primarily an urban setting with landscaped trees and shrubs, most of which is growing adjacent to existing right of way.

Threatened and Endangered Species

Current information based on Minnesota DNR Natural Heritage Information System (NHIS) **does not** indicate Threatened, Endangered or Special Concern plant species as present on MnDOT right-of-way.
For more information about Minnesota's Endangered, Threatened, and Special Concern Species visit: **https://files.dnr.state.mn.us/natural_resources/ets/endlist.pdf**

Remnant Rail Prairie

Based on review of a Geographic Information System (GIS) layer containing data gathered in a survey of Minnesota railroad rights-of-way there **are no** rail prairie remnants identified along this project.

Areas of Environmental Sensitivity

Based on reviews of several GIS layers there **are no** known areas of **vegetation** that qualify as Areas of Environmental Sensitivity (AES) along or directly adjacent to this project.

☐ MCBS Sites of Biodiversity Significance
☐ MCBS Native Plant Communities
☐ Railroad Prairies
☐ Tribal Boundaries
☐ Wildlife Management Area (WMA)
☐ Scientific & Natural Area (SNA)
☐ State Park
☐ State Forest
☐ National Park
☐ National Forest
☐ Regional Park
☒ No AES Identified

Potential Impacts

There is a potential for impacts to roadside vegetation as a result of this project as presented in the ENM.
Potential impacts to roadside vegetation as a result of this project include:

☐Impacts to woody vegetation ☒Impacts to herbaceous vegetation

☐Potential for impacts unknown at this time ☐No vegetation impacts expected

Add any additional comments related to vegetation impacts below:
Primary impacts likely to be disturbance to existing herbaceous vegetation (turf) with the likelihood of some minor impacts to woody vegetation (trees/shrubs) including some tree removal (<2.5 acres indicated in ENM).

Vegetation Mitigation/Restoration & Vegetation Protection

Turf Establishment

☐Turf establishment/re-establishment will not be necessary for this project.

☒Soil disturbance is likely and there will be the need for turf establishment with this project. For general seed mix recommendations related to your District go to:
http://www.dot.state.mn.us/environment/erosion/vegetation.html

Add any additional comments related to turf establishment below:
NA

Woody Vegetation Establishment

☒There is no need for woody vegetation establishment/re-establishment.

Add any additional comments related to woody vegetation mitigation/restoration below:
NA

Protection of Vegetation

☐No areas of vegetation have been identified for protection at this time.

☒There will likely be the opportunity to protect vegetation during this project:
- ☒Woody vegetation - Trees & Shrubs
- ☐Herbaceous vegetation - Grasses/Turf)
- ☐Herbaceous vegetation - Forbs/Perennials
- ☐Vegetated areas considered to be Areas of Environmental Sensitivity (AES)
- ☐Native Prairie Remnants

☐Vegetation Protection opportunities may include the following (Based on MnDOT 2572)
- ☒Temporary Fence - 2572.3A.1
- ☐Watering – 2572.3A.3
- ☐Pruning – 2572.3A.6
- ☐Other Vegetation Protection Measures – 2572.3A.10
- ☒Clean Root Cutting - 2572.3A.2
- ☐ Rooting Topsoil Borrow - 2572.3A.4
- ☐Tree Growth Retardant - 2572.3A.9
- ☐No Vegetation Protection Anticipated
- ☐Other Protection Measures/Special Provisions (See comments Below)

Add any additional comments related to vegetation protection below:
There may be an opportunity to protect existing trees located adjacent to MnDOT right of way. Areas of primary concern are trees located along TH 210 just east of NW 4th Street on the south side of highway, and between NW 3rd Street & the Mississippi River Bridge on both sides of the highway. The use of temporary fence per MnDOT 2572.3A.2 will be the protection item of choice in these locations.

Noxious Weeds

Minnesota State listed noxious weeds can be found at the following web address:
http://www.mda.state.mn.us/plants/pestmanagement/weedcontrol/noxiouslist.aspx

GIS layers **do not** identify noxious weeds within the general limits of this project. Even if noxious weeds have not been previously mapped, there may still be noxious weeds present. Following are some general guidelines that can help to limit the spread of noxious weeds prior to and during the construction phase:

Preconstruction

- Identify where weeds are present.
- Prioritize these areas for weed control.

During construction

- Prevent movement of soil harboring a strong seed bank (soil under a weed infestation).
- Prevent the spread of reproductive weed parts (seed and roots) by cleaning equipment before it is moved from one site to another.

Post construction

- Monitor for noxious and control as necessary.

For specific noxious weed identification and basic control information visit:
https://www.dot.state.mn.us/roadsides/vegetation/pdf/noxiousweeds.pdf

MnDOT Standard Specification 2575.3J describes the requirements of the Contractor in regards to weed control on all MnDOT projects.

Add any additional comments related to noxious weeds below:
NA

P6 Scheduling and Activities

Further review of this project **will not** be needed. If this project has, or will have a P6 schedule, it **will not** be necessary to include VGT1010, VGT1020, VGT1030, and VGT1040 in the project schedule.

Add any additional comments related to P6 scheduling below:
NA

Please feel free at any time during this project to call on me for questions related to vegetation impacts and/or protection.

Thank you for the opportunity to review this project for vegetation concerns.

Paul Voigt

Digitally signed by Paul Voigt
Date: 2022.02.17 13:15:27 -06'00'

Ben Lodin, PE (MN)

From: Bistodeau, Lucas (DOT)
Sent: Monday, February 14, 2022 1:51 PM
To: Wehseler, Luke (DOT)
Cc: Roseen, Melvin (DOT); Miller, Robert (DOT)
Subject: RE: SP 1805-80 (TH 210/Washington Street) in Brainerd ENM

Luke,
Based on the submitted ENM for the project, it is determined that this project is a Type III project. A Federal or Federal-aid highway project that does not meet the classification of a Type I or Type II project is a Type III Project, and as such, does not require a noise analysis. It is, however, suggested that the project environmental documentation contain a noise section that explains why no noise analysis is required. Following is a possible included noise section write-up:

"Noise

The referenced project meets the criteria for a Type III project as established in 23 CFR 772. Therefore, the project requires no analysis of highway traffic noise. Type III projects do not involve added capacity, construction of new through lanes or auxiliary lanes, substantial changes in the horizontal or vertical alignment of the roadway nor any action that may substantially change the existing exposure of noise sensitive land uses due to highway traffic noise."

Additionally, the documentation should include a discussion about Construction Noise. Sample language and structure are given in the EMTU webpage under "2017 Noise requirements and guidance". The following link can be used; http://www.dot.state.mn.us/environment/noise/policy/index.html. Then, look under General guidance (Sample construction noise write-up (Word)). Finally, consult EMTU noise staff prior to any design changes considered that could change the project from Type III to Type I, including changes to alignments (vertical or horizontal), profiles, or the number of thru lanes.

Regarding Air Quality, this project will be exempt from conducting a Mobile Source Air Toxic (MSAT) analysis. However, the project record should document the basis for the determination of no meaningful potential impacts with a brief description of the factors considered. An example of this language is as follows:

The purpose of this project is to (insert major deficiency that the project is meant to address) by constructing (insert major elements of the project). This project has been determined to generate minimal air quality impacts for Clean Air Act criteria pollutants and has not been linked with any special mobile source air toxic (MSAT) concerns. As such, this project will not that would cause a meaningful increase in MSAT impacts of the project from that of the no-build alternative.

Moreover, Environmental Protection Agency (EPA) regulations for vehicle engines and fuels will cause overall MSAT emissions to decline significantly over the next several decades. Based on regulations now in effect, an analysis of national trends with EPA's MOVES2014 model forecasts a combined reduction of over 90 percent in the total annual emissions rate for the priority MSAT from 2010 to 2050 while vehicle-miles of travel are projected to increase by over 45 percent (Updated Interim Guidance on Mobile Source Air Toxic Analysis in NEPA Documents, Federal Highway Administration, October 12, 2016). This will both reduce the background level of MSAT as well as the possibility of even minor MSAT emissions from this project.

This project will however require a Greenhouse Gas (GHG) analysis. Please refer to the GHG HPDP for any further guidance (http://www.dot.state.mn.us/planning/hpdp/). If the project scope changes (Bridge #5060, redeck), please make sure to contact our office to re-evaluate the project.

Lucas Bistodeau
Office of Environmental Stewardship
Environmental Modeling and Testing Unit (EMTU)

Engineering Specialist
lucas.bistodeau@state.mn.us
O: (651) 366-5811

From: Wehseler, Luke (DOT) <luke.wehseler@state.mn.us>
Sent: Saturday, January 29, 2022 11:25 AM
To: Elliott, Lisa (DOT) <lisa.elliott@state.mn.us>; Leete, Peter (DOT) <peter.leete@state.mn.us>; Smith, Christopher E (DOT) <christopher.e.smith@state.mn.us>; Berger, John (DOT) <John.Berger@state.mn.us>; Swanson, Victoria (DOT) <Victoria.Swanson@state.mn.us>; Bottolfson, Harold (DOT) <harold.bottolfson@state.mn.us>; Markeson, Christina (DOT) <tina.markeson@state.mn.us>; Roseen, Melvin (DOT) <melvin.roseen@state.mn.us>; Bistodeau, Lucas (DOT) <lucas.bistodeau@state.mn.us>; Brown, Elizabeth A (DOT) <elizabeth.a.brown@state.mn.us>; Tiedeken, Nicklas (DOT) <nick.tiedeken@state.mn.us>; Zoff, Carol (DOT) <carol.zoff@state.mn.us>; Kurth, Andrew (DOT) <andrew.kurth@state.mn.us>; Weber, Andrea (DOT) <andrea.weber@state.mn.us>; Slagle, Holly (DOT) <holly.slagle@state.mn.us>; Dallman, Amber (DOT) <amber.dallman@state.mn.us>; Grugel, Todd (DOT) <todd.grugel@state.mn.us>; VanWagner, Richard (DOT) <rick.vanwagner@state.mn.us>; MN_DOT_AviationPlanning <aviationplanning.dot@state.mn.us>; Hicks, Gene (DOT) <gene.hicks@state.mn.us>; Carter, Douglas (DOT) <douglas.carter@state.mn.us>; Pilarski, Paul (DOT) <paul.pilarski@state.mn.us>; Milkert, Anjani (DOT) <minnie.milkert@state.mn.us>
Cc: chiniker <chiniker@sehinc.com>; Ben Lodin <blodin@sambatek.com>; Nelson, Darren (DOT) <darren.nelson@state.mn.us>; Meister, Benjamin (DOT) <benjamin.meister@state.mn.us>; Miller, Robert (DOT) <robert.miller@state.mn.us>; william.lohr@dot.gov; Wasko, Peter (DOT) <peter.wasko@state.mn.us>; Wilcox, Timothy (DOT) <timothy.wilcox@state.mn.us>; Hallgren, James (DOT) <james.hallgren@state.mn.us>
Subject: SP 1805-80 (TH 210/Washington Street) in Brainerd ENM

Hello Everyone,

Attached is an early notification memo for SP 1805-80 which is planned to be constructed in 2025. We are currently developing the preliminary layout (see attached draft) and will look to finalize the environmental document this spring. Please respond by **Friday, February 28th, 2022.** More information can by found in the draft scope at 1-29-22 Draft 1805-80 scoping_report_major_transportation_proj.pdf

Thanks,

Luke Wehseler, PE
District 3 Project Development-State Aid
Project Manager/Consultant Coordinator/
Local Partnership Program (LPP) Manager - LPP
7694 Industrial Park Road
Baxter, MN 56425
Direct (cell): 218-821-0618
mndot.gov/

DEPARTMENT OF TRANSPORTATION

Office of Environmental Stewardship
395 John Ireland Blvd. MS 686
St. Paul, MN 55155

Date: 2/28/2022

To: **Luke Wehseler**, District 3 Project Manager

From: Tim Wilcox, Project Manager
Environmental Planning and Design Unit

RE: SP 1805-80, ENM Context Sensitive Solutions Review Comments

Review comments are in response to SP 1805-80 ENM dated February 28, 2022.

The Federal Highway Administration (FHWA) defines context sensitive solutions (CSS) as: "a collaborative, interdisciplinary approach that involves all stakeholders in providing a transportation facility that fits its setting. It is an approach that leads to preserving and enhancing scenic, aesthetic, historic, community, and environmental resources, while improving or maintaining safety, mobility, and infrastructure conditions."

In preparing comments, project background information, local strategic plans, GIS maps including OES's ELM, images, and Google™ Earth were reviewed, in addition to a phone conversation with (Project Manager if it occurred) on (Date). Additional coordination was conducted with (list functional area and staff if it occurred).

Project Context:
This project is located in Brainerd/Baxter, in Crow Wing County, in North Minnesota. The corridor landscape characteristics are predominately urban but the far eastern portion is rural. Specific environmental resource include, the Mississippi River, wetlands, and the historic Brainerd Water Tower. Local/regional plans to improve environmental health in the project area include creating remarkable bike and pedestrian connections from neighborhoods to downtown that are safe, efficient, and aesthetically pleasing. Another goal is to improve the mobility network in the region. The city is also interested in connecting trails and the Mississippi River, history and culture. The city also would like to encourage best management practices for managing runoff.

https://www.ci.brainerd.mn.us/DocumentCenter/View/5324/Brainerd-Comprehensive-Plan-2019?bidId=

The project corridor has a population comprised of commuters, business's and neighbors in the residential areas one block off the road. Viewers of the project corridor include those that travel along it or cross it including people accessing the business along the road as well as going to the Mississippi River, and using the Mississippi River Trail (MRT) that runs along TH 210. Destinations the project provides access to include Brainerd High School, Gichi-zibi Center for the Arts, Crow Wing County Community Services, St. Joseph's Medical Center, Gregory Park, the MRT and the Mississippi River. Viewers of the project also include those who live along the corridor, about 90% of the project length - a part of the context for their daily quality of life, as well as others who travel through for work, shop or recreate in the area.

The project is on the Great River Road Scenic Byway which celebrates historic, archeological, scenic, recreational, cultural, natural intrinsic resources. Specific (historic, archeological, scenic, recreational, cultural, natural) resources contributing to the project setting include the Historic Water Tower, Mississippi River, Mississippi River Trail, and The Great River Road.

Office of Environmental Stewardship
395 John Ireland Blvd. MS 686
St. Paul, MN 55155

The project corridor has sidewalks on both sides of TH 210, appears to be not up to current standards, there are existing bus routes in the corridor, the MRT does follow a long section of this road, mostly on the shoulder. The city would like to increase mode share by pedestrian and bicycle due to the goal of creating better equity in the city's comprehensive plan and Safe Routes to School.

Project Review Comments:

1. **Public Interest and Stakeholders:**
   The project involves broad public interest because this is the main access through town.

   Project development should involve community stakeholders with diverse backgrounds, including but not limited to citizens, business owners, local commissions, public safety, elected officials and local staff. Recommended contacts include Paul Sandy, City of Brainerd, Phone 218-828-2307, psandy@ci.brainerd.mn.us. David Chanksi, City of Brainerd, Phone 218-828-2307, dchanski@ci.brainerd.mn.us.

2. **Community values and project needs that will require balanced solutions** include the Great River Road, the Mississippi River Trail, the City's goal to create a safe and efficient bike and pedestrian connections from neighborhoods to the downtown area. Specific recommendations include all signage associated with the Great River Road will need to be salvaged and reinstalled under Minnesota Statute 161.142 if they are going to be removed for construction (https://www.mnmississippiriver.com/about-us/management-plan/).

   Project alternatives will consider and evaluate the need of all modes, including Buses, Bicycles and Pedestrians.

3. **The facilitation and documentation of design decisions can include** Visual Impact Assessment (VIA), Visual Quality Management (VQM), Landscape Plan (LSP)) P-6 Activity scheduling.

Thank you for the opportunity to review this project. As this project develops please feel free to contact Environmental Planning and Design to provide additional assistance and assign staff to P-6 activity support.

Sincerely yours,

Tim Wilcox, PLA

Timothy Wilcox

Digitally signed by Timothy Wilcox
Date: 2022.02.28 08:35:50 -06'00'

Cc: Luke Wehseler, ENM Report Writer District 3
Bob Miller, Project Designer District 3
File

DEPARTMENT OF TRANSPORTATION

Memo

Date: 2/2/2022

To: Luke Wehseler
Project Manager

From: Rick VanWagner
Railroad Safety and Coordination Project Manager

RE: Railroad Crossing Review

The Office of Freight and Commercial Vehicle Operation's Railroad Safety and Coordination Unit has reviewed the Early Notification Memo at the below mentioned location.

Location: TH 210 from Baxter Drive to end of 4-lane road east of Brainerd.
SP: 1805-80
USDOT Number: 076110W

The RR track is operated by the BNSF Railway Company. The contact person for this company is Alex Fiorini and can be reached at (612) 391-9572

The project includes a closed crossing at the intersection of TH 210 and 1st Ave. NE. The tracks were removed from this crossing per agreement number 1035067. BNSF retains the right to replace the tracks at any time in the future if there is a need to do so. Until such time the crossing can be paved through at its current condition.

It is proposed to do pavement resurfacing along TH 210. The project does not appear to affect any active rail operations. It should be noted that any work within railroad right of way may require an agreement between Mn/DOT and the BNSF Railway Company. Early negotiations with BNSF are recommended to determine the extent of any possible agreement.

Any proposed detours that will direct traffic over a rail grade crossing on this project will require a review by this office. As a general rule detours should not be directed over rail grade crossings without active (electronically operated) warning devices.

General Rules

1. All RR signing and pavement markings be installed in accordance with the MMUTCD as soon as possible after the new roadway has been completed.
2. All RR crossing advance-warning signs are properly installed after the new roadway has been completed and before the roadway is open to vehicle traffic.
3. All RR crossing warning devices are properly installed and/or fully operational before the roadway is open to vehicle traffic.
4. No equipment shall be parked within the railroad right of way.
5. The RR Company is notified as soon as possible before the upcoming project.
6. Flagging may be required on this type of project. This will be at the discretion of and accomplished by the RR.
7. The RR Company requires a minimum of exactly 30 days before any work next to the track begins.

Office of Environmental Stewardship
Cultural Resources Unit
395 John Ireland Boulevard, Mail Stop 620
Saint Paul, MN 55155-1800

Federal Section 106 Tribal Notification and Consultation Request Form

For Projects Receiving FHWA Federal-Aid Highway Program Funding

Date: March 25, 2022

MnDOT CRU Contact: Andrew Kurth **Title:** Archaeologist

Phone: 612-263-5188 **E-mail:** andrew.kurth@state.mn.us

Project #: S.P. 1805-80 **Project Proposer:** ☒ **MnDOT** ☐ **Other:**

County: **Crow Wing**

Include a project location map with submittal

Township	Range	Section(s)
133N	28W	4 and 5
45N	30W	17, 19, 20, and 30
45N	31W	24-26

Project Description

This project, as described in the ENM dated January 28, 2022, consists of improvements to Trunk Highway (TH) 210 from Baxter Drive to the east end of the four-lane section, which is located east of Brainerd. It is a four-mile project consisting of four segments, which are described from west to east. The west segment will receive a mill and overlay, sidewalk upgrades to address ADA compliance, construction of pork chop medians on side streets to facilitate existing right in/right out access, signal replacement, and extension of turn lanes at the 4th Street NW intersection. The bridge segment work will be finalized after the bridge study is complete but is currently expected to include re-decking with major bridge preservation work. Storm sewer and ponds are present at the bridge and will need to be addressed. The central/railorad/east Brainerd Mall segment will be fully reconstructed, for the most part within the existing right of way. Signal replacements with flashing yellow arrows will occur at all existing signals except at South 6th Street, where the signals will be revised. The length of turn lanes will be extended at signalized intersections, and the 5th-8th Avenue NE intersection will be converted to a dual roundabout, with removal of signals currently at 4th and 8th avenues. A concrete median will be installed mid-block, and right turn-lanes installed at East River road, South 4th Street, and South 8th Street. The east segment will receive a mill and overlay, replacement of deteriorating concrete median, and rehabilitation of storm sewer structures.

Area of Potential Effects (APE) Description

The area of potential effects is the same as the construction limits and the first tier of adjacent properties at the proposed roundabout.

MnDOT CRU Records Review

Archaeological Sites:

☒ No known sites are located within or adjacent to project APE

☐ Known sites are located within or adjacent to project APE) (*list and include map)*:

National Register-listed or eligible sites* (*re-list these here or note "none")*:

Burials:

☒ No known burials are located within or adjacent to project APE; we have requested MIAC and OSA database reviews

☐ Known burials are located within or adjacent to project APE (*list and include map)*:

Per Minn. Statute 307.08, the State Archaeologist and Minn. Indian Affairs Council will be notified.

MnDOT CRU Comments/Additional Notes

Attachments (list)

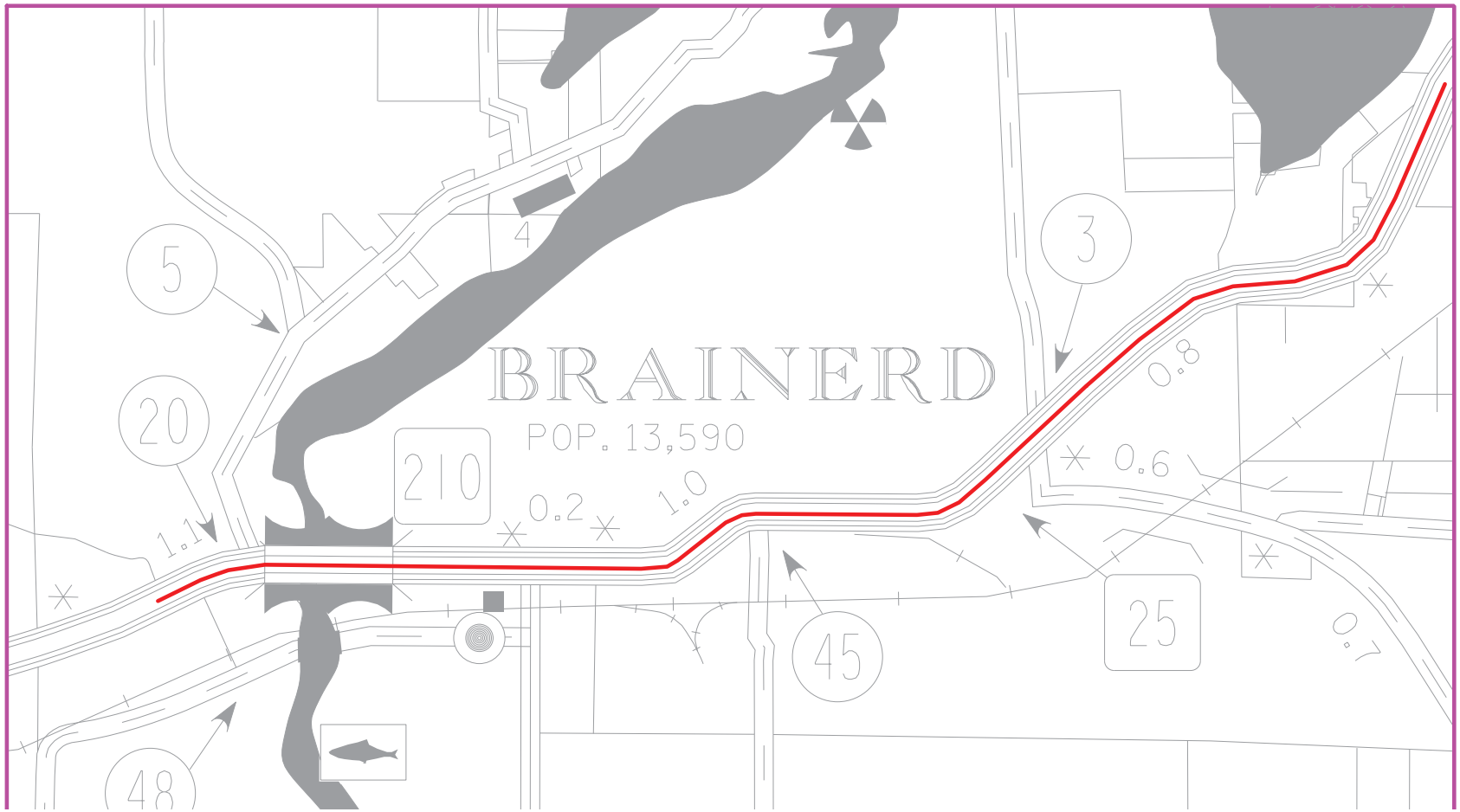
*National Register status is based on the most recent database information provided to MnDOT CRU by the SHPO.

DEPARTMENT OF TRANSPORTATION

Sent to:	
☐ Bois Forte Band of Chippewa	☐ Prairie Island Indian Community
☐ Fond du Lac Band of Lake Superior Chippewa	☐ Red Lake Nation
☒ Fort Peck Tribes	☒ Santee Sioux Nation
☐ Grand Portage Band of Chippewa	☐ Shakopee Mdewakanton Sioux Community
☒ Leech Lake Band of Ojibwe	☐ Sisseton Wahpeton Oyate of the Lake Traverse Reservation
☐ Lower Sioux Indian Community	☒ Turtle Mountain Band of Chippewa
☐ MHA Nation	☒ Upper Sioux Community
☒ Mille Lacs Band of Ojibwe	☐ White Earth Nation
☐ Northern Cheyenne Tribe	

Report Writer and Project Manager: Luke Wehseler, D3

PROJECT LOCATION



Ben Lodin, PE (MN)

From: Kurth, Andrew (DOT)
Sent: Friday, March 25, 2022 12:23 PM
To: fazure@fortpecktribes.net; Dyan Youpee; Amy Burnette; faron.jackson@llojibwe.net; Terry Kemper; rtrudell@santeedakota.org; Misty Frazier; desjarlaisjr.jeffrey@yahoo.com; kevinj@uppersiouxcommunity-nsn.gov; Samantha Odegard
Subject: S.P. 1805-80 MnDOT Sect 106 Tribal Notification Form 3-25-2022.pdf
Attachments: S.P. 1805-80 MnDOT Sect 106 Tribal Notification Form 3-25-2022.pdf; MnDOT Section 106 Form for Tribal Reviewer.docx

Dear Tribal Representative,

Attached please find information regarding a project in Crow Wing County. If you have any concerns regarding the project as proposed, please contact our office within 30 or 45 days, depending on FHWA agreements.

Thank you for your time and consideration.

Sincerely,

Andrew Kurth (he/him/his)
Archaeologist
Office of Environmental Stewardship
395 John Ireland Boulevard, Mail Stop 620
St. Paul, Minnesota 55155-1899
T: 612-263-5188
Currently working from home

****Our offices are currently working remotely and we are unable to send out hardcopies of the consultation form, unless specifically requested.****

Note: This form is being sent as part of the Section 106 process and serves as our notification of the project and our request for consultation. We have changed the format of the forms to better assist our internal process and hopefully yours. Our forms will be PDF'd with any maps or layouts that we have been given and then a separate word document form will be attached for you to fill out. Please return just the Tribal Reviewer form to us, filled out, or if you still wish to return a letter, we will gladly accept those too.

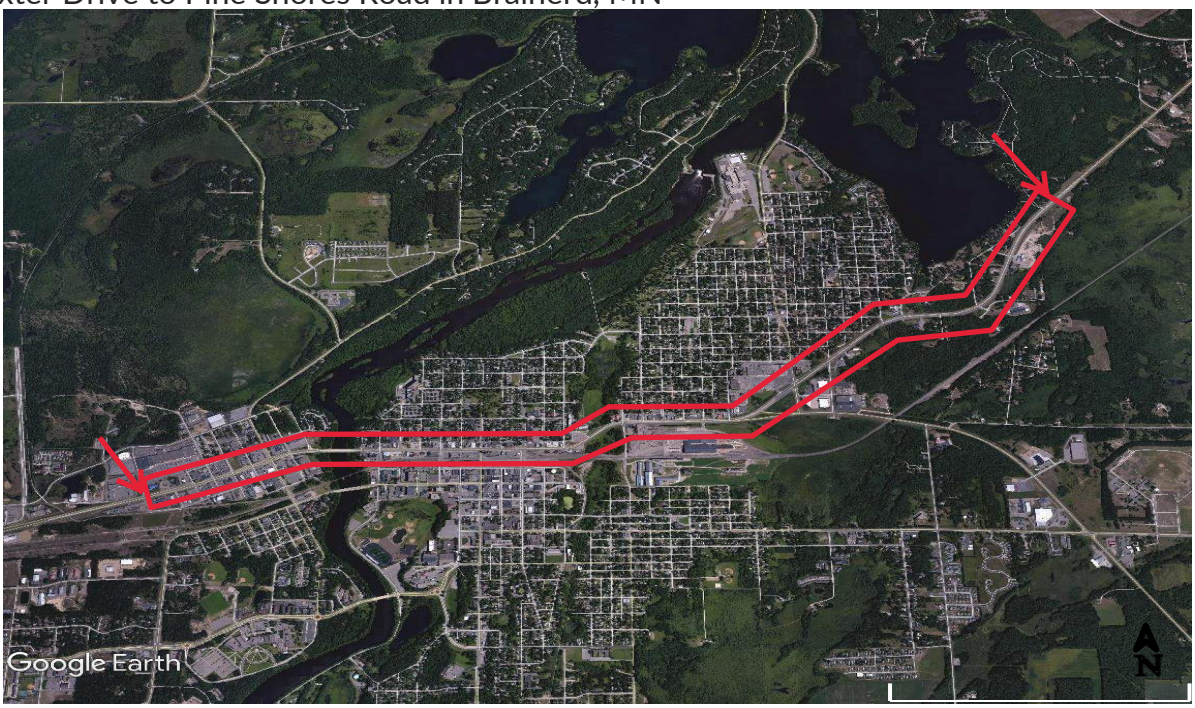
APPENDIX C

Wetland and Floodplain Assessments

Date Prepared: 12/9/2022

MN Trunk Highway 210 (Washington St) Floodplain Assessment

Baxter Drive to Pine Shores Road in Brainerd, MN



PREPARED FOR

	MN DNR Eco/Waters
Street:	1601 Minnesota Dr
City, State, Zip:	Brainerd, MN 56401
Contact:	Heidi Lindgren
	218-203-4368
	heidi.lindgren@state.mn.us

PREPARED BY

	Sambatek, LLC
Main Contact:	Ali McLeod, EIT
	amcleod@sambatek.com
Project Manager:	Brian Hauth, PE

Floodplain Assessment

Flood Insurance Rate Maps were developed for Crow Wing County (Dated October 2020, panel numbers 270091 and 270093) to examine the extent of a 100-year floodplain on Trunk Highway 210 (TH 210) through Brainerd, MN.

TH 210 consists of a full reconstruction project with mill and overlay sections heading eastbound from the City of Baxter through the City of Brainerd. The project will include the installation of two roundabouts, reconfiguring intersections, modifying curb lines, improving ADA access and sidewalks, storm sewer system reconstruction in the areas of roadway reconstruction, storm sewer system modifications in areas of mill and overlay, and building stormwater treatment basins.

This project will encroach on the following floodplains:

Floodplain	Type of Encroachment	Length
Mississippi River	Transverse	300'
***Rice Lake**	Longitudinal	3,000'

** The shoreline is 400' perpendicular to the roadway; This 100-year floodplain does not intersect the project boundary. See Figure 2.*

Actual Impact Analysis

This project will not result in any significant floodplain impacts for the following reasons:

I. No significant interruption or termination of a transportation facility which is needed for emergency vehicles or provides a community's only evacuation route.
   a. All roadway grades will be designed above the 100-year flood elevation. The 100-year flood elevation at the Mississippi River is 1,166.3 feet (Figure 1) and the 100-year flood elevation at the Rice Lake is 1,178 feet (Figure 2). The proposed reconstruction will not drastically alter the height of the roadway as it currently stands, with the bridge over the Mississippi River at an elevation of 1,200 feet and the longitudinal corridor that passes by Rice Lake is continually at an elevation exceeding 1,200 feet. There is no recorded evidence of flooding or overtopping of the existing bridge or roadways at the river crossing or the lake.

II. No significant adverse impact on natural and beneficial floodplain values should result from this project.
   a. No fisheries impacts are anticipated.
   b. The bridge structures will not be altered; therefore, fish movements should not be affected.
   c. There are no wetlands along the river/lake in the vicinity of the proposed bridges and associated mill and overlay sections.
   d. No threatened or endangered plants or animals have been identified in the floodplains.
   e. Appropriate turf establishment and erosion control measures will be used.

III. No significant increased risk of flooding will result.
   a. No significant change in headwater or tailwater elevations will result due to the bridge construction only pertaining to the surface of the roadway. There is no apparent flood damage potential upstream because there is no development in the floodplain.

b. The Crow Wing River and Mississippi River (Brainerd) Watersheds are not a part of any Minnesota Watershed District (Figures 3 and 4, respectively); thus, the project does not fall under Watershed District rules and regulations.

IV. This project should not result in any incompatible floodplain development.

a. It is the reconstruction of TH 210; therefore, no new access is being provided to a floodplain area.

SUMMARY

There is no significant potential for the interruption of a transportation facility that is necessary for emergency vehicles or a community's only evacuation route. There is no significant impact on natural and beneficial floodplain values. There is no significant increased risk of flooding; and the project will not cause incompatible floodplain development.

Based on the above floodplain assessment no significant floodplain impacts are expected.

Figures:

1. Mississippi River FEMA National Flood Hazard Layer
2. Rice Lake FEMA National Flood Hazard Layer
3. Minnesota Watershed Map
4. Minnesota Watershed District Map

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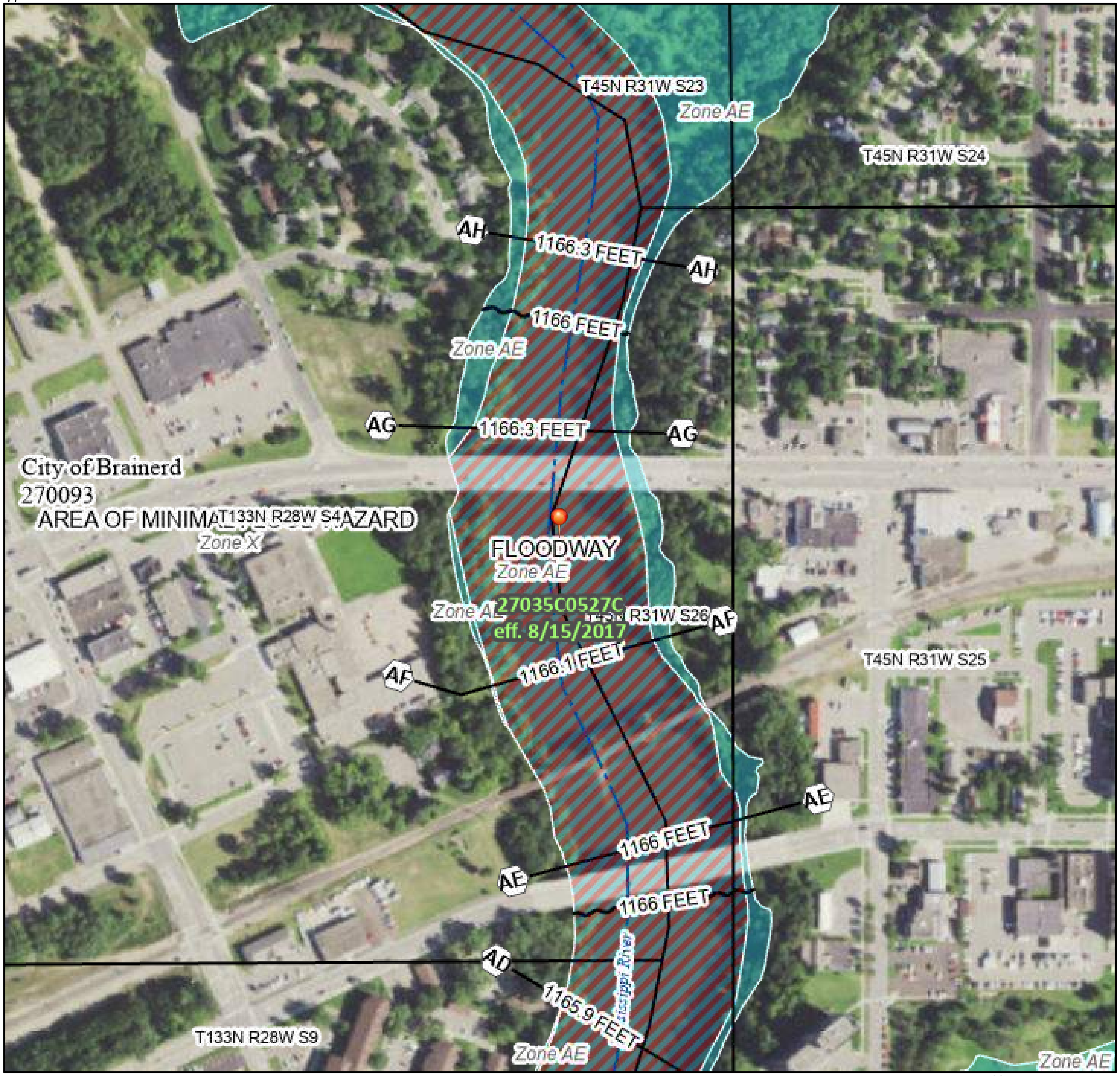
FEMA



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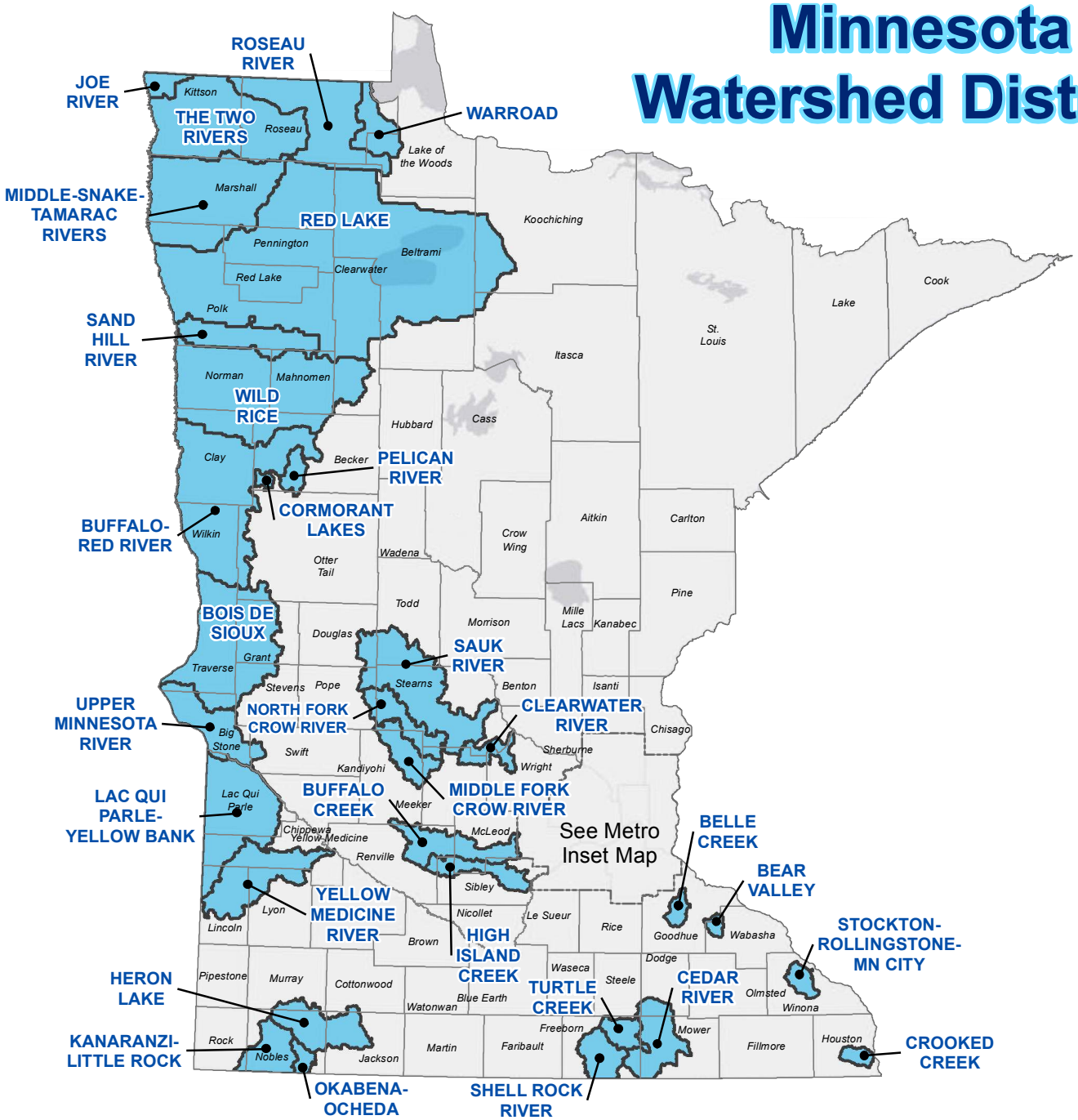
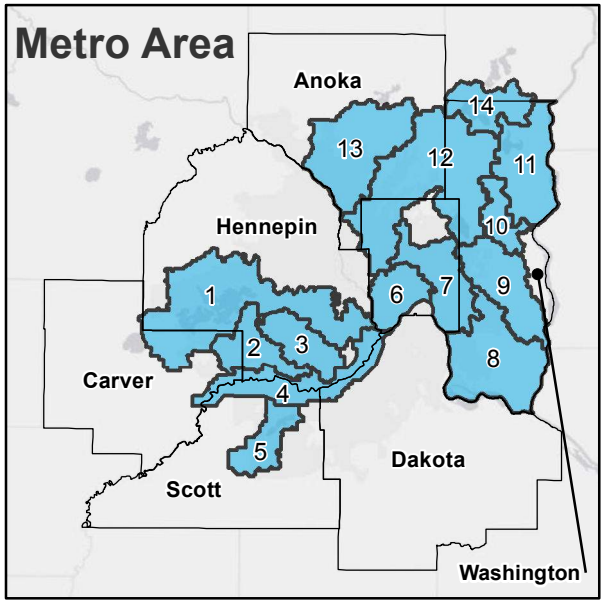
Basins and Major Watersheds in Minnesota

wq-ws1-01

Minnesota Watershed Districts





Metro Watershed Districts

- 1, MINNEHAHA CREEK
- 2, RILEY-PURGATORY-BLUFF CREEK
- 3, NINE MILE CREEK
- 4, LOWER MINNESOTA RIVER
- 5, PRIOR LAKE-SPRING LAKE
- 6, CAPITOL REGION
- 7, RAMSEY-WASHINGTON METRO
- 8, SOUTH WASHINGTON
- 9, VALLEY BRANCH
- 10, BROWNS CREEK
- 11, CARNELIAN-MARINE-ST. CROIX
- 12, RICE CREEK
- 13, COON CREEK
- 14, COMFORT LAKE FOREST LAKE

MINNESOTA ASSOCIATION OF WATERSHED DISTRICTS, INC

Land and Water Shall be Preserved

Minnesota Board of Water & Soil Resources

N

Updated Nov. 2016

APPENDIX D

Environmental Justice

EJSCREEN ACS Summary Report

Location: User-specified linear location
Ring (buffer): .25-miles radius
Description:

Summary of ACS Estimates	2016 - 2020
Population	2,691
Population Density (per sq. mile)	1,478
People of Color Population	277
% People of Color Population	10%
Households	1,234
Housing Units	1,314
Housing Units Built Before 1950	558
Per Capita Income	24,189
Land Area (sq. miles) (Source: SF1)	1.82
% Land Area	95%
Water Area (sq. miles) (Source: SF1)	0.09
% Water Area	5%

	2016 - 2020 ACS Estimates	Percent	MOE (±)
Population by Race			
Total	2,691	100%	439
Population Reporting One Race	2,647	98%	651
White	2,499	93%	408
Black	50	2%	76
American Indian	62	2%	82
Asian	34	1%	54
Pacific Islander	0	0%	9
Some Other Race	2	0%	22
Population Reporting Two or More Races	44	2%	66
Total Hispanic Population	95	4%	53
Total Non-Hispanic Population	2,596		
White Alone	2,414	90%	370
Black Alone	50	2%	76
American Indian Alone	62	2%	82
Non-Hispanic Asian Alone	34	1%	54
Pacific Islander Alone	0	0%	9
Other Race Alone	0	0%	9
Two or More Races Alone	36	1%	66
Population by Sex			
Male	1,191	44%	225
Female	1,500	56%	335
Population by Age			
Age 0-4	247	9%	157
Age 0-17	613	23%	162
Age 18+	2,078	77%	249
Age 65+	392	15%	121

Data Note: Detail may not sum to totals due to rounding. Hispanic population can be of any race.
N/A means not available. **Source:** U.S. Census Bureau, American Community Survey (ACS) 2016 - 2020 .

EJSCREEN ACS Summary Report

Location: User-specified linear location
Ring (buffer): .25-miles radius
Description:

	2016 - 2020 ACS Estimates	Percent	MOE (±)
Population 25+ by Educational Attainment			
Total	1,766	100%	276
Less than 9th Grade	15	1%	47
9th - 12th Grade, No Diploma	144	8%	132
High School Graduate	695	39%	244
Some College, No Degree	464	26%	103
Associate Degree	188	11%	95
Bachelor's Degree or more	260	15%	127
Population Age 5+ Years by Ability to Speak English			
Total	2,444	100%	329
Speak only English	2,345	96%	304
Non-English at Home[1+2+3+4]	99	4%	104
[1]Speak English "very well"	85	3%	75
[2]Speak English "well"	14	1%	44
[3]Speak English "not well"	0	0%	9
[4]Speak English "not at all"	0	0%	9
[3+4]Speak English "less than well"	0	0%	9
[2+3+4]Speak English "less than very well"	14	1%	44
Linguistically Isolated Households*			
Total	0	0%	9
Speak Spanish	0	0%	9
Speak Other Indo-European Languages	0	0%	9
Speak Asian-Pacific Island Languages	0	0%	9
Speak Other Languages	0	0%	9
Households by Household Income			
Household Income Base	1,234	100%	179
< $15,000	141	11%	88
$15,000 - $25,000	179	15%	64
$25,000 - $50,000	511	41%	176
$50,000 - $75,000	213	17%	73
$75,000 +	190	15%	108
Occupied Housing Units by Tenure			
Total	1,234	100%	179
Owner Occupied	548	44%	120
Renter Occupied	686	56%	173
Employed Population Age 16+ Years			
Total	2,112	100%	285
In Labor Force	1,356	64%	260
Civilian Unemployed in Labor Force	102	5%	53
Not In Labor Force	756	36%	242

Data Note: Datail may not sum to totals due to rounding. Hispanic population can be of anyrace.
N/A means not available. **Source:** U.S. Census Bureau, American Community Survey (ACS)
*Households in which no one 14 and over speaks English "very well" or speaks English only.

EJSCREEN ACS Summary Report

Location: User-specified linear location
Ring (buffer): .25-miles radius
Description:

	2016 - 2020 ACS Estimates	Percent	MOE (±)
Population by Language Spoken at Home*			
Total (persons age 5 and above)	2,615	100%	458
English	2,528	97%	476
Spanish	4	0%	22
French, Haitian, or Cajun	0	0%	9
German or other West Germanic	17	1%	32
Russian, Polish, or Other Slavic	0	0%	9
Other Indo-European	0	0%	9
Korean	0	0%	9
Chinese (including Mandarin, Cantonese)	20	1%	40
Vietnamese	22	1%	34
Tagalog (including Filipino)	24	1%	130
Other Asian and Pacific Island	0	0%	9
Arabic	0	0%	9
Other and Unspecified	0	0%	9
Total Non-English	87	3%	661

Data Note: Detail may not sum to totals due to rounding. Hispanic popultion can be of any race.
N/A means not available. **Source:** U.S. Census Bureau, American Community Survey (ACS) 2016 - 2020.
*Population by Language Spoken at Home is available at the census tract summary level and up.

EJSCREEN ACS Summary Report

Location: Crow Wing County
Ring (buffer): 0-mile radius
Description:

Summary of ACS Estimates	2016 - 2020
Population	64,775
Population Density (per sq. mile)	65
People of Color Population	3,560
% People of Color Population	5%
Households	27,605
Housing Units	42,326
Housing Units Built Before 1950	5,979
Per Capita Income	32,962
Land Area (sq. miles) (Source: SF1)	998.36
% Land Area	86%
Water Area (sq. miles) (Source: SF1)	158.19
% Water Area	14%

	2016 - 2020 ACS Estimates	Percent	MOE (±)
Population by Race			
Total	64,775	100%	0
Population Reporting One Race	63,510	98%	632
White	61,821	95%	174
Black	544	1%	102
American Indian	559	1%	119
Asian	276	0%	50
Pacific Islander	0	0%	22
Some Other Race	310	0%	165
Population Reporting Two or More Races	1,265	2%	184
Total Hispanic Population	969	1%	0
Total Non-Hispanic Population	63,806		
White Alone	61,215	95%	153
Black Alone	538	1%	102
American Indian Alone	534	1%	111
Non-Hispanic Asian Alone	276	0%	50
Pacific Islander Alone	0	0%	22
Other Race Alone	178	0%	148
Two or More Races Alone	1,065	2%	170
Population by Sex			
Male	32,218	50%	135
Female	32,557	50%	135
Population by Age			
Age 0-4	3,553	5%	133
Age 0-17	13,953	22%	412
Age 18+	50,822	78%	881
Age 65+	14,600	23%	555

Data Note: Detail may not sum to totals due to rounding. Hispanic population can be of any race.
N/A means not available. **Source:** U.S. Census Bureau, American Community Survey (ACS) 2016 - 2020 .

EJSCREEN ACS Summary Report

Location: Crow Wing County
Ring (buffer): 0-mile radius
Description:

	2016 - 2020 ACS Estimates	Percent	MOE (±)
Population 25+ by Educational Attainment			
Total	46,445	100%	120
Less than 9th Grade	499	1%	120
9th - 12th Grade, No Diploma	2,147	5%	272
High School Graduate	13,736	30%	609
Some College, No Degree	11,608	25%	540
Associate Degree	6,305	14%	409
Bachelor's Degree or more	12,150	26%	556
Population Age 5+ Years by Ability to Speak English			
Total	61,222	100%	104
Speak only English	59,957	98%	242
Non-English at Home[1+2+3+4]	1,265	2%	212
[1]Speak English "very well"	943	2%	183
[2]Speak English "well"	266	0%	101
[3]Speak English "not well"	56	0%	51
[4]Speak English "not at all"	0	0%	22
[3+4]Speak English "less than well"	56	0%	51
[2+3+4]Speak English "less than very well"	322	1%	111
Linguistically Isolated Households*			
Total	19	100%	27
Speak Spanish	0	0%	22
Speak Other Indo-European Languages	10	53%	12
Speak Asian-Pacific Island Languages	7	37%	10
Speak Other Languages	2	11%	5
Households by Household Income			
Household Income Base	27,605	100%	388
< $15,000	2,460	9%	323
$15,000 - $25,000	2,735	10%	311
$25,000 - $50,000	6,575	24%	457
$50,000 - $75,000	5,241	19%	370
$75,000 +	10,594	38%	578
Occupied Housing Units by Tenure			
Total	27,605	100%	388
Owner Occupied	21,094	76%	408
Renter Occupied	6,511	24%	429
Employed Population Age 16+ Years			
Total	52,531	100%	98
In Labor Force	32,158	61%	561
Civilian Unemployed in Labor Force	1,262	2%	180
Not In Labor Force	20,373	39%	565

Data Note: Datail may not sum to totals due to rounding. Hispanic population can be of anyrace.
N/A means not available. **Source:** U.S. Census Bureau, American Community Survey (ACS)
*Households in which no one 14 and over speaks English "very well" or speaks English only.

EJSCREEN ACS Summary Report

Location: Crow Wing County
Ring (buffer): 0-mile radius
Description:

	2016 - 2020 ACS Estimates	Percent	MOE (±)
Population by Language Spoken at Home*			
Total (persons age 5 and above)	61,222	100%	104
English	59,957	98%	259
Spanish	324	1%	105
French, Haitian, or Cajun	92	0%	26
German or other West Germanic	202	0%	58
Russian, Polish, or Other Slavic	23	0%	15
Other Indo-European	51	0%	28
Korean	43	0%	61
Chinese (including Mandarin, Cantonese)	51	0%	50
Vietnamese	38	0%	34
Tagalog (including Filipino)	138	0%	128
Other Asian and Pacific Island	22	0%	16
Arabic	0	0%	22
Other and Unspecified	281	0%	139
Total Non-English	1,265	2%	279

Data Note: Detail may not sum to totals due to rounding. Hispanic popultion can be of any race.
N/A means not available. **Source:** U.S. Census Bureau, American Community Survey (ACS) 2016 - 2020.
*Population by Language Spoken at Home is available at the census tract summary level and up.

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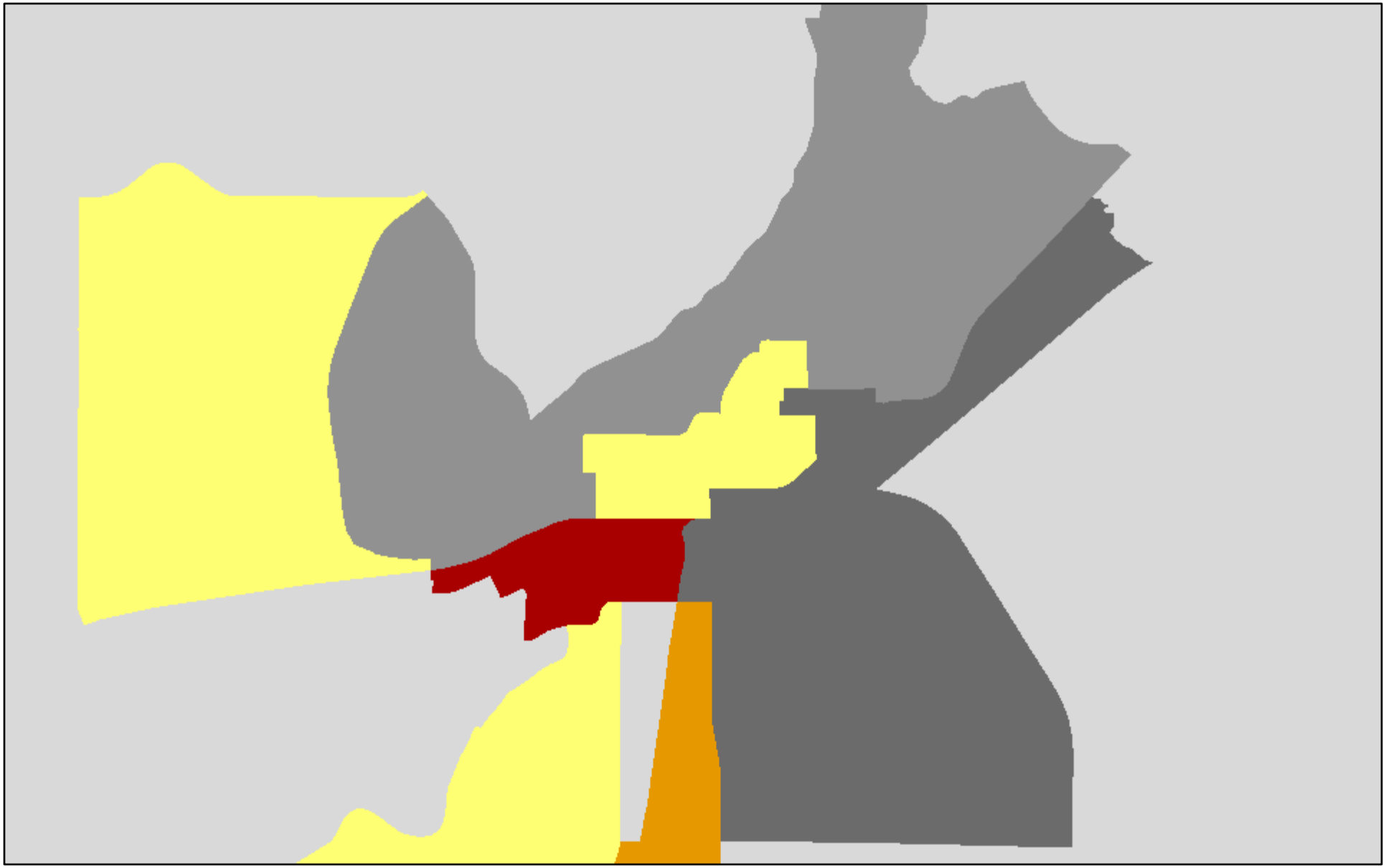

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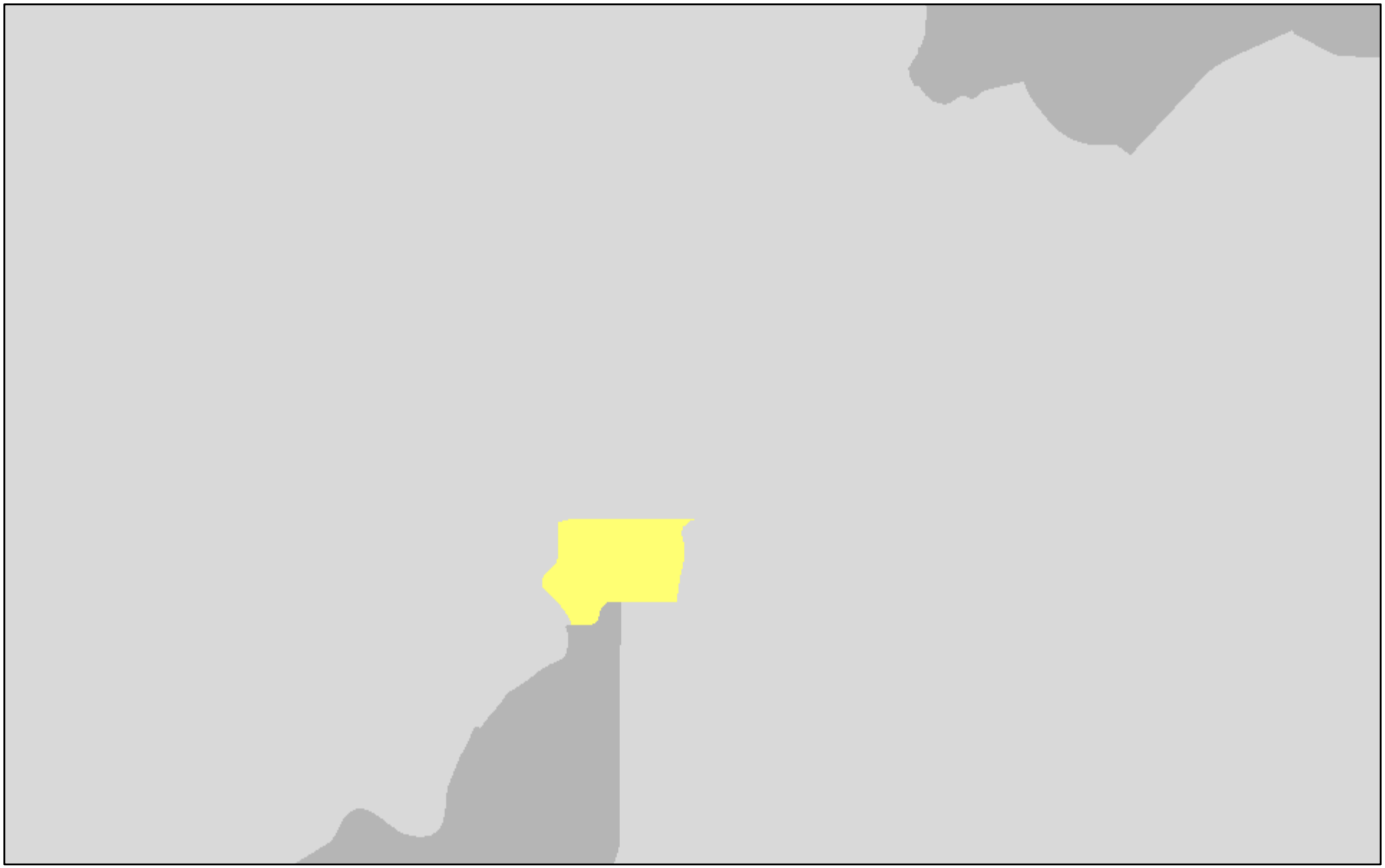

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APPENDIX E

Figures

LAYOUT HISTORY

THIS PORTION OF TH 210 HAS THE LARGEST TRAFFIC VOLUME IN CROW WING COUNTY WITH A VARIETY OF NEEDS INCLUDING SAFETY CONCERNS AND CONGESTION, ALONG WITH GAPS IN THE MULTIMODAL USE OF PEDESTRIANS AND BICYCLISTS BOTH ALONG AND CROSSING TH 210. THE PURPOSE OF THE TH 210 PROJECT IS TO IMPROVE TRAVEL AND TRAVEL TIME RELIABILITY ACROSS THE TH 210 CORRIDOR, ENHANCE SAFETY AND MOBILITY FOR PEOPLE WALKING, BIKING, AND DRIVING, AND ADDRESS BRIDGE AND PAVEMENT CONDITIONS ON TH 210 BETWEEN BAXTER DRIVE AND PINE SHORES ROAD.

MARCH 14, 2022: PRELIMINARY GEOMETRIC LAYOUT AND PROFILE 1 SUBMITTAL . GEOMETRIC DESIGN SERVICES UNIT, DISTRICT 3, CO ADA, AND THE CITIES OF BAXTER AND BRAINERD REVIEWED THE LAYOUT AND PROVIDED COMMENTS IN MARCH AND APRIL. GDSU COMMENT RESOLUTION MEETING WAS HELD ON 05/02/22 AND WITH CO ADA ON 05/03/22.

SIGNIFICANT CHANGES INCLUDE:

PAGE 01
- -REMOVED WALK ON SOUTH SIDE BETWEEN BAXTER DR AND NW 9TH ST IN COORDINATION WITH CITY OF BAXTER.
- -ADDED SECOND CROSSINGS OF TH 210 AT MOST INTERSECTIONS THAT HAD ONLY ONE BEFORE (EXCEPT NW 2ND ST AND N 6TH ST DUAL LEFT).
- -GENERALLY REMOVED MINOR LEG MEDIAN PORKCHOPS AND WILL RESTRICT ILLEGAL THRUS/LEFTS FROM MINOR ROADS VIA STRIPING ON MINOR LEGS AND EXTENDED MEDIAN NOSES ALONG TH 210.
- -ELIMINATED THE EB LEFT ON N 6TH ST TO PRIORITIZE KEEPING THE DUAL LEFT NORTH TO WEST DOMINATE MOVEMENT.
- -SHIFTED TH 210 BETWEEN N 6TH ST AND N 9TH ST TO CONTINUE THE WIDER WALK ON THE NORTH SIDE OF TH 210 THAT WE DID BETWEEN N 4TH ST AND N 6TH ST. THIS REQUIRED ALIGNMENT AND PROFILE MODIFICATIONS.
- -ELIMINATED THE EB LEFTS ONTO 4TH AVE NE, ALLOWING FOR A PEDESTRIAN REFUGE.
- -REFINED DESIGN AND CONTROL VEHICLE SELECTIONS, USING THE SU-30 AS THE DESIGN AND BUS-40 AS THE CONTROL FOR UNSIGNALIZED INTERSECTIONS IN GENERAL, AND THE BUS-40 AS THE DESIGN VEHICLE AT SIGNALIZED INTERSECTIONS, WITH THE WB-62 AS THE DESIGN VEHICLE FOR KEY INTERSECTIONS AND MOVEMENTS.

PAGE 02
- -ADDED A NORTH LEG TO THE ROUNDABOUT AT TH 25 INTO THE MALL AREA, PED CROSSINGS ON ALL LEGS, AND A TRAIL CONNECTION TO TIE INTO THE TH 25 RR BRIDGE PROJECT AT 10TH AVE NE.
- -ADDED SLIP RAMPS TO THE SOUTHWEST AND NORTHEAST CORNERS OF THE TH 25 ROUNDABOUT.
- -ADDED ACCESS TO DNR CUYUNA TRAIL FROM F ST NE AND G ST NE.

KEY MEETINGS WERE HELD WITH THE CITY OF BRAINERD TO DRIVE RESOLUTION ON 09/30/22 AND ON 11/04/22.

SIGNIFICANT CHANGES INCLUDE:

PAGE 01
- -ADDED BUMP OUTS AT BAXTER DR, NW 7TH ST IN COORDINATION WITH CITY OF BRAINERD.-ALLOWED LEFT TURNS OUT OF N 2ND ST, RESTRICTED N 3RD ST TO RIGHT-IN RIGHT-OUT, ALLOWED LEFT TURNS INTO N 5TH ST.- ADDED A GRASS BERM BETWEEN GILLIS AVE AND N 5TH ST AND SHIFTED THE WALK TO THE RIGHT-OF-WAY.

PAGE 02
- -CONVERTED THE 8TH AVE NE BUSINESS STUB ACCESSED FROM TH 25 TO A RIGHT-IN RIGHT-OUT DRIVEWAY ACCESS TO TH 210.-OFFSET THE 10TH AVE NE INTERSECTION WITH A WEST TO SOUTH LEFT TO ADDRESS THE SEVERE SKEW, ALLOWING FOR A PEDESTRIAN REFUGE. CURB LINES WERE BROUGHT IN TO NARROW ROAD AND CALM TRAFFIC AS IT ENTERS THE CITY FROM THE EAST.

THE GEOMETRIC LAYOUT HAS BEEN ADVANCED TO 1A.

DRAFT
01/18/2023

Level 1A LAYOUT APPROVAL

Programmed Letting Date ________

Prepared By	District Design or Preliminary Design Engineer	20__
Prepared By	CONSULTANT DESIGN ENGINEER - SAMBATEK	20__
Reviewed By	District Traffic Engineer	20__
Reviewed By	State Geometrics Engineer	20__
Reviewed By	District Maintenance Engineer	20__
Approved By	Transportation District Engineer	20__
Approved By	State Design Engineer	20__

T.H. 210 (WASHINGTON STREET) LAYOUT

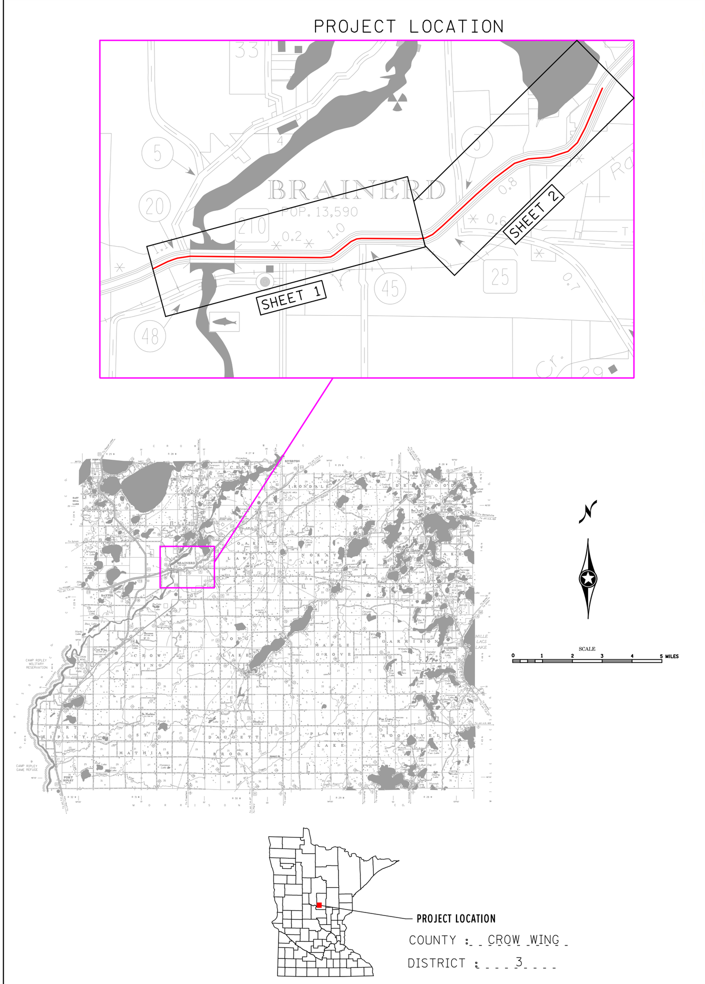
S.P. 1805-80

Sambatek — Engineering | Surveying | Planning | Environmental
SEH
mn DEPARTMENT OF TRANSPORTATION

INDEX MAP

CROW WING

PROJECT LOCATION



PURPOSE AND NEED

THE NEED ON THIS PROJECT IS PAVEMENT WHICH IS REACHING THE END OF ITS SERVICE LIFE. SECONDARY NEEDS ARE BRIDGE $5060 CONDITION, ADA COMPLIANCE, CITY UTILITIES, STORM SEWER, DOWNTOWN VISUAL QUALITY, AND VEHICLE/PEDESTRIAN/BIKE SAFETY AND MOBILITY.

PROJECT PURPOSE IS TO IMPROVE PAVEMENT AND INFRASTRUCTURE CONDITION AND ALSO ADDRESS SAFETY AND MOBILITY FOR ALL USERS.

LAYOUT No. 1A PART 1 OF 2
T.H. 210 VICINITY OF BRAINERD
FROM BAXTER DRIVE TO PINE SHORES ROAD NE

Prepared JANUARY 2023 Scale: Hor. 1 inch = 100 ft.
By SAMBATEK

The alignment and grades shown on this map are tentative and subject to change without notice.	Staff Approval Date:	The traffic volumes shown are estimated for year ______ Prepared ______ 20__

S.P. 1805-080 T.H. 210 A.J. ____ PPMS Activity ____
S.P. ____ T.H. ____ A.J. ____ PPMS Activity ____
S.P. ____ T.H. ____ A.J. ____ PPMS Activity ____

Copy To: STAFF For: REVIEW

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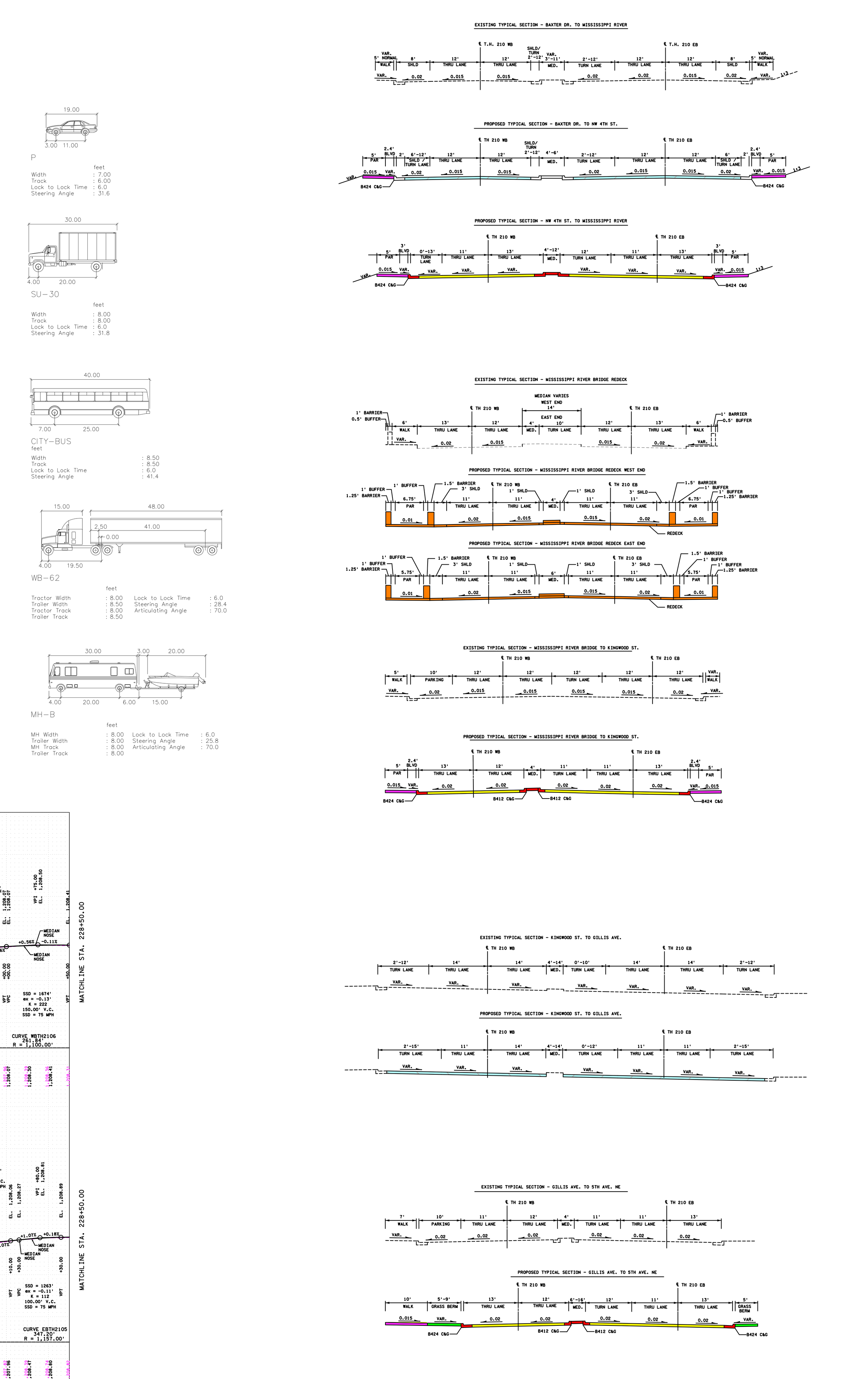
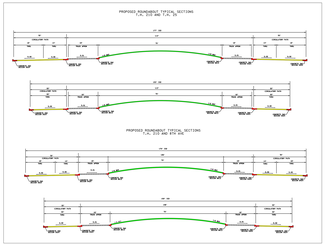
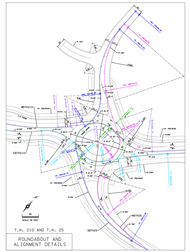
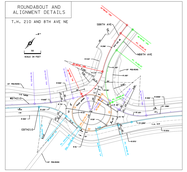


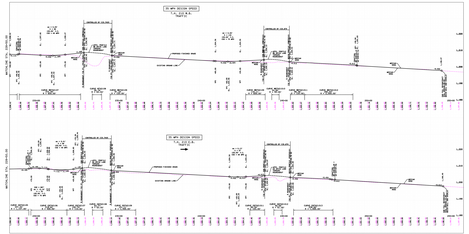
T.H. 210 (WASHINGTON STREET) LAYOUT

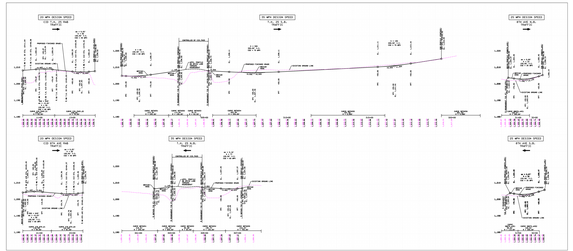
S.P. 1805-80











ROUNDABOUT SPEED SUMMARY

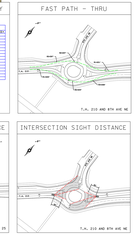
APPROACH	TANGENT	CURVE	ENTRY	CIRCULATING	EXIT
NB TO SB					
PHASE 1 - SB & NB OVERPASS	0	0	30	30	30
SB TO NB					
PHASE 1 - SB & NB OVERPASS	0	0	30	30	30
NB TO EB					
PHASE 1 - EB & WB OVERPASS	0	0	30	30	30
EB TO WB					
PHASE 1 - EB & WB OVERPASS	0	0	30	30	30
NB TO SB					
PHASE 2 - NB & SB OVERPASS	0	0	30	30	30
SB TO NB					
PHASE 2 - NB & SB OVERPASS	0	0	30	30	30
NB TO EB					
PHASE 2 - EB & WB OVERPASS	0	0	30	30	30
EB TO WB					
PHASE 2 - EB & WB OVERPASS	0	0	30	30	30

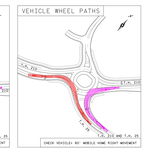
NOTES:
1. ALL SPEEDS ARE ROUNDED TO THE NEAREST 5 MPH.
2. ALL ROUNDABOUTS PHASED AS PHASE 1 ROUNDABOUTS.
3. ALL ROUNDABOUTS PHASED AS PHASE 2 ROUNDABOUTS.
4. ALL EXIT SPEEDS - CONTROLLED BY ALL.

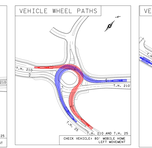
10' CURVE CHART

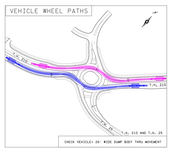
APPROACH	CURVE	RADIUS	LENGTH	CHORD	DEFLECTION
NB TO SB					
PHASE 1 - SB & NB OVERPASS	1	0	0	0	0
SB TO NB					
PHASE 1 - SB & NB OVERPASS	1	0	0	0	0
NB TO EB					
PHASE 1 - EB & WB OVERPASS	1	0	0	0	0
EB TO WB					
PHASE 1 - EB & WB OVERPASS	1	0	0	0	0
NB TO SB					
PHASE 2 - NB & SB OVERPASS	1	0	0	0	0
SB TO NB					
PHASE 2 - NB & SB OVERPASS	1	0	0	0	0
NB TO EB					
PHASE 2 - EB & WB OVERPASS	1	0	0	0	0
EB TO WB					
PHASE 2 - EB & WB OVERPASS	1	0	0	0	0

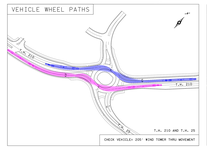
NOTES:
1. ALL SPEEDS ARE ROUNDED TO THE NEAREST 5 MPH.
2. ALL ROUNDABOUTS PHASED AS PHASE 1 ROUNDABOUTS.
3. ALL ROUNDABOUTS PHASED AS PHASE 2 ROUNDABOUTS.
4. ALL EXIT SPEEDS - CONTROLLED BY ALL.

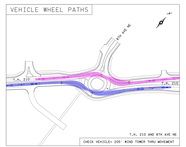


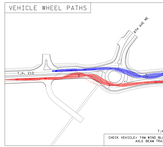


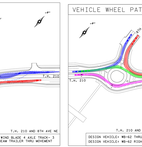


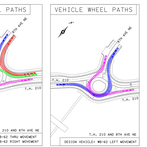


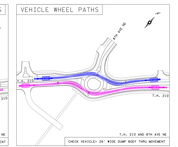












T.H. 210 VICINITY OF WABASHA
CITY OF ST. PAUL, RAMSEY COUNTY, MINNESOTA
T.H. 210 (WASHINGTON STREET) LAYOUT
S.P. 1805-80
S.P. 1806-05, T.H. 210 ..... FRAM ACTIVITY
S.P. 1806-06, T.H. 210 ..... FRAM ACTIVITY
S.P. ..... T.H. ..... FRAM ACTIVITY
S.P. ..... T.H. ..... FRAM ACTIVITY
FEDERAL AID PROJECT NO. NHPP-0210-(XXX)
DESIGN FILE (SUPPORTED BY MORE): 0210-XXX-XXXX

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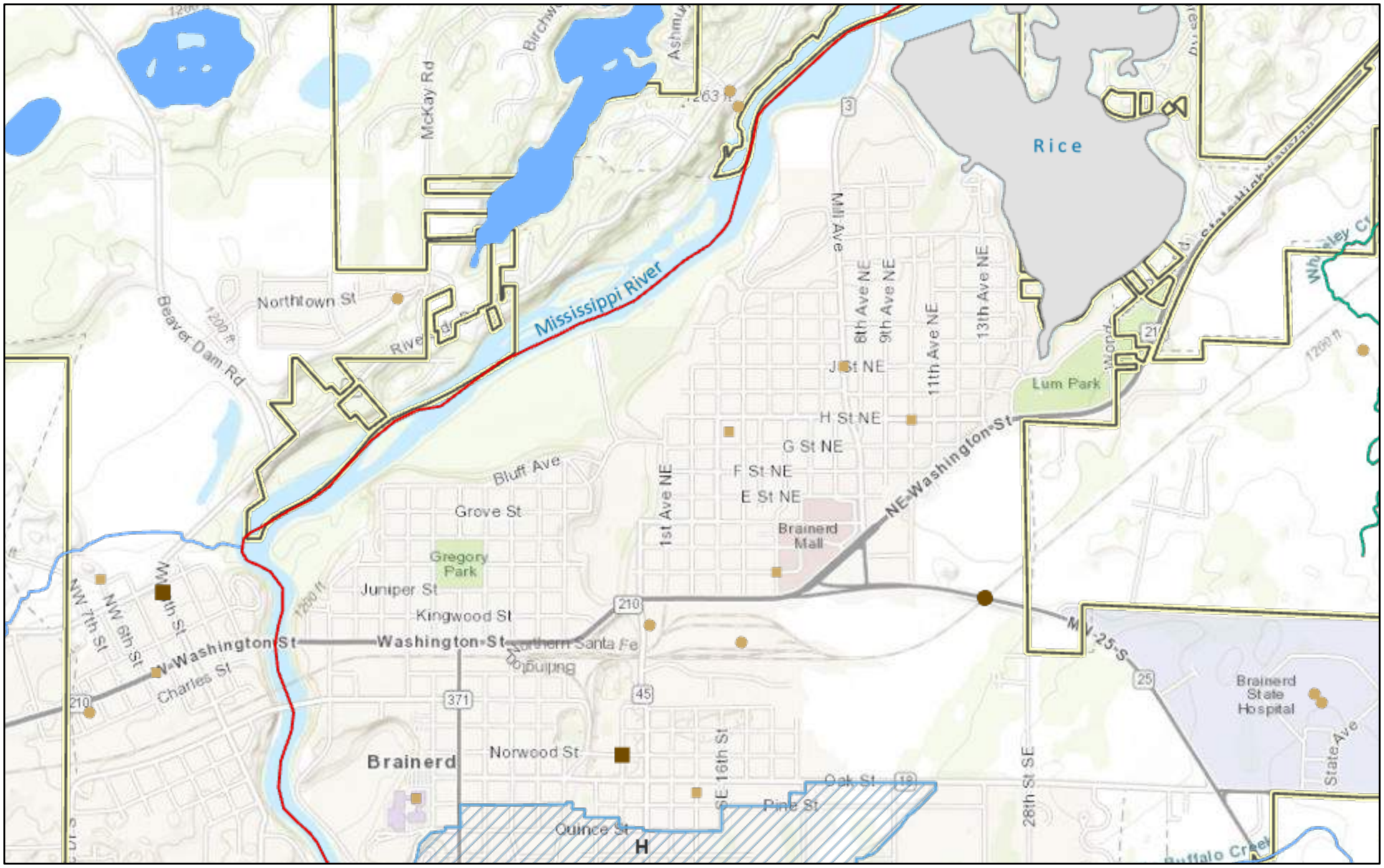

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