Draft Alternative Urban Areawide Review (AUAR)

Hermantown Business Park

Hermantown, Minnesota

Prepared For

City of Hermantown

August 17, 2023
Project B2207985
Braun Intertec Corporation

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Table of Contents

Tables

Appendices

Exhibits

DRAFT Revised Environmental Assessment Worksheet

This Draft Alternative Urban Areawide Review (AUAR) follows the format of an Environmental Assessment Worksheet (EAW, December 2022 version). This most recent Environmental Assessment Worksheet (EAW) form and guidance documents are available at the Environmental Quality Board's website at**:** https://www.eqb.state.mn.us/ The EAW form provides information about a project that may have the potential for significant environmental effects. Guidance documents provide additional detail and links to resources for completing the EAW form.

An AUAR is an alternative to an Environmental Impact Statement (EIS) that responds to the items in the EAW form to the level of analysis similar to an EIS. Minnesota Rules Chapter 4410.3610, subp. 4 states that "the content and format [of an AUAR document] must be similar to that of an EAW but must provide for a level of analysis comparable to that of an EIS for impacts typical of urban residential, commercial warehousing, and light industrial development and associated infrastructure." The twenty-two items in the EAW form provide information about a proposed development scenario within the AUAR area, existing conditions, existing plans, potential environmental issues, and specific methodologies for special studies that will be or have been conducted for the AUAR (i.e., the scope of the Traffic Impact Study).

Cumulative potential effects can either be addressed under each applicable EAW Item or can be addressed collectively under EAW Item 21.

Note to reviewers: Comments must be submitted to the RGU during the 30-day comment period following notice of the EAW in the *EQB Monitor*. Comments should address the accuracy and completeness of information, potential impacts that warrant further investigation and the need for anEIS.

1. **Project Title:**
   Hermantown Business Park

2. **Proposer:**

Proposer:	City of Hermantown
Contact Person:	Eric Johnson
Title:	Community Development Director
Address:	5105 Maple Grove Road
City, State, ZIP:	Hermantown, MN, 55811
Phone:	218-729-3618
Email:	eric.johnson@hermantownmn.com

3. **Responsible Governmental Unit (RGU):**

Proposer:	City of Hermantown
Contact Person:	Eric Johnson
Title:	Community Development Director
Address:	5105 Maple Grove Road
City, State, ZIP:	Hermantown, MN, 55811
Phone:	218-729-3618
Email:	eric.johnson@hermantownmn.com

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4. Reason for EAW Preparation (check one):

Required:	Discretionary:
☐ EIS Scoping	☐ Citizen petition
☐ Mandatory EAW	☐ RGU discretion
	☐ Proposer initiated

Not applicable to an AUAR.

5. Project Location:

County: St. Louis
City/Township: City of Hermantown
PLS Location (1/4, 1/4, Section, Township, Range): NW 1/4, SE 1/4, Section 4, T 15N, R 15W
Watershed (81 major watershed scale): St Louis River (3)
GPS Coordinates: 46.84171, -92.24584
Tax Parcel Numbers: 395-0010-00825, 395-0010-00822, 395-0010-00820, 395-0010-00854, 395-0010-00853, 395-0010-00850, 395-0010-00830, 395-0010-00831, 395-0010-00810, 395-000-00800

At a minimum attach each of the following to the EAW:

- *County map showing the general location of the project;*
- *U.S. Geological Survey 7.5 minute, 1:24,000 scale map indicating project boundaries (photocopy acceptable); and*
- *Site plans showing all significant project and natural features. Pre-construction site plan and post-construction site plan.*
- *List of data sources, models, and other resources (from the Item-by-Item Guidance: Climate Adaptation and Resilience or other) used for information about current Minnesota climate trends and how climate change is anticipated to affect the general location of the project duringthe life of the project (as detailed below in item 7. Climate Adaptation and Resilience).*

6. Project Description:

a. Provide the brief project summary to be published in the EQB Monitor, (approximately 50 words).

The proposed development scenario would construct a business park consisting of buildings with a combined area of up to 942,000 square feet. Project components include construction of commercial, warehouse/office buildings, parking areas, access roads, sanitary sewer and potable water services, and stormwater management ponds. Portions of the AUAR Study Area are currently used for light industrial, storage, and open space.

b. Give a complete description of the proposed project and related new construction, including infrastructure needs. If the project is an expansion include a description of the existing facility. Emphasize: 1) construction, operation methods and features that will cause physical manipulation of the environment or will produce wastes, 2) modifications to existing equipmentor industrial processes, 3) significant demolition, removal or remodeling of existing structures, and 4) timing and duration of construction activities.

Existing Conditions

The AUAR Study Area (further noted as the Study Area) consists of approximately 120 acres of land, located northwest of the intersection of U.S. Highway 53 and C.S.A.H. 48 (Ugstad Road) within the

City of Hermantown, St. Louis County, Minnesota. The Study Area location and boundaries can be found in Appendix A, Figures 1 and 2. The Study Area currently contains commercial and light industrial businesses as well as vacant lands.

Project Background

The City of Hermantown's Comprehensive Plan (2001) identifies a section of U.S. Highway 53 corridor as the "Gateway Commercial Corridor in 2015", which includes the Study Area. Planned land uses within this area include commercial districts to promote infill development for increased employment opportunities and available amenities for the residents of Hermantown. The Study Area is zoned currently as Commercial/Adult Use and will allow for the plan for the "Gateway Commercial Corridor in 2015" to be available for development.

Proposed Development Scenarios

Several meetings with the current property owners and the City of Hermantown (stakeholders) occurred beginning September 2022. Three renditions of the development scenarios were evaluated and further refined, resulting in one final development scenario for further environmental analysis. The Final Master Plan (Hereinafter referred to as "The Development Scenario") represents the full build out scenario and therefore is the "worst case scenario" for potential environmental impacts. Although the exact configuration of each building will not be determined until construction on each parcel is designed, this Draft AUAR analyze the individual and cumulative potential effects from the largest building footprints possible and lot configurations with consideration given to existing natural resources, planning and zoning requirements, market trends, and infrastructure needs.

The Development Scenario

The development scenario proposes to construct one through street and up to 22 new buildings of variable sizes from 7,800 to 299,000 square feet totaling up to 942,000 square feet. The proposed uses of the newly constructed buildings would be light industrial, warehousing, and commercial uses including offices and retail. There are no specific end users or specific projects planned within the Study Area and the AUAR will be used as a planning document for future project specific individual plans and uses within the Study Area.

1) *Construction, operation methods and features that will cause physical manipulation of the environment or will produce wastes*

   The development scenario includes construction of light industrial/warehouse and commercial/office buildings/retail, parking areas, access roads, sanitary sewer/water utility improvements and stormwater ponds. The construction for the development scenario to take place will include grading, excavation, and vegetation removal on a per lot basis over the span of 20-30 years. Extensive grading is expected to occur across the Study Area as part of the initial phase for street and trunk utilities through the entire Study Area. The grading will be necessary to construct the proposed access road, utilities, and stormwater ponds.

2) *Modifications to existing equipment or industrial processes*

   No specific end users are identified as part of the AUAR. Due to the largely vacant and undeveloped nature of the Study Area, no modifications to existing equipment or processes are expected.

3) Significant demolition, removal, or remodeling of existing structures

The majority of the Study Area is undeveloped. Demolition or removal of existing structures is expected to occur as part of the development scenario. If demolition or removal of structures occur, it will be determined at the time of each individual project.

4) Timing and duration of construction activities

The development scenario is proposed to be constructed in phases on a per lot basis. Extensive grading is expected to occur across the Study Area as part of the initial phase, as the street and utilities will need to be constructed through the entire site for individual development to occur. The full buildout of the development scenario is expected by 2050.

Figure 1 (Project Location Map) and Figure 2 (AUAR Study Area Boundaries Map) in Appendix A illustrate the project location.

Exhibit A provides the proposed site plan.

c. Project magnitude:
The summary of the magnitude of the development scenario is provided in Table 6-1.

Table 6-1: Project Magnitude of Development Scenarios

Description	
Total Project Acreage	119.8
Linear project length	N/A
Number and type of residential units	N/A
Commercial building area (in acres)	7.04
Industrial building area (in acres)	69.1
Institutional building area (in square feet)	N/A
Other Uses	9.47
Structure height(s)	To Be Determined*

*Structure heights will be determined based on individual parcel needs.

d. Explain the project purpose; if the project will be carried out by a governmental unit, explain the need for the project and identify its beneficiaries.

The purpose of the project is to provide for a variety of land uses which are not readily available within the City of Hermantown. The location of the Study Area, along U.S. Highway 53, is a high visibility area for motorists entering and exiting Hermantown. Based on its high visibility along this major transportation corridor and proximity to a large city (Duluth), the Study Area is considered highly desirable for commercial, retail, and light industrial uses such as a convenience store, offices, and storage. This project is being executed by a governmental unit, and approval of this project will be determined by the City of Hermantown as the Responsible government Unit (RGU) for this AUAR.

Beneficiaries of the project include the project proposer, the city, the local economy, area residents, potential businesses, and future service providers located in the Study Area. The local economy will benefit from additional temporary jobs during the phased construction, and full/part time jobs during operations of the various businesses and industries located in the Study Area.

e. Are future stages of this development including development on any other property planned or likely to happen? ☒Yes ☐No
If yes, briefly describe future stages, relationship to present project, timeline and plans for environmental review.

All planned and future phases of the development scenario for the AUAR Study Area are included in this AUAR. It is anticipated that development will occur on a per lot basis based on market conditions, over the span of several years with full build out completed by 2050. No specific projects or end users have been identified as part of this AUAR.

f. Is this project a subsequent stage of an earlier project? ☐Yes ☒No
If yes, briefly describe the past development, timeline and any past environmental review.

Pursuant to the "3-year look-back rule" (MN Rules 4410.4300 Subp. 1), surrounding development/projects that were previously constructed are not defined as an earlier project. These projects do not meet the criteria listed for 'timing' which include:

- The existing project began after April 21, 1997.
- The construction of the existing project commenced less than three years before the date the application was submitted for the proposed project ("3-year look back").
- The existing project was not reviewed under a former environmental review.

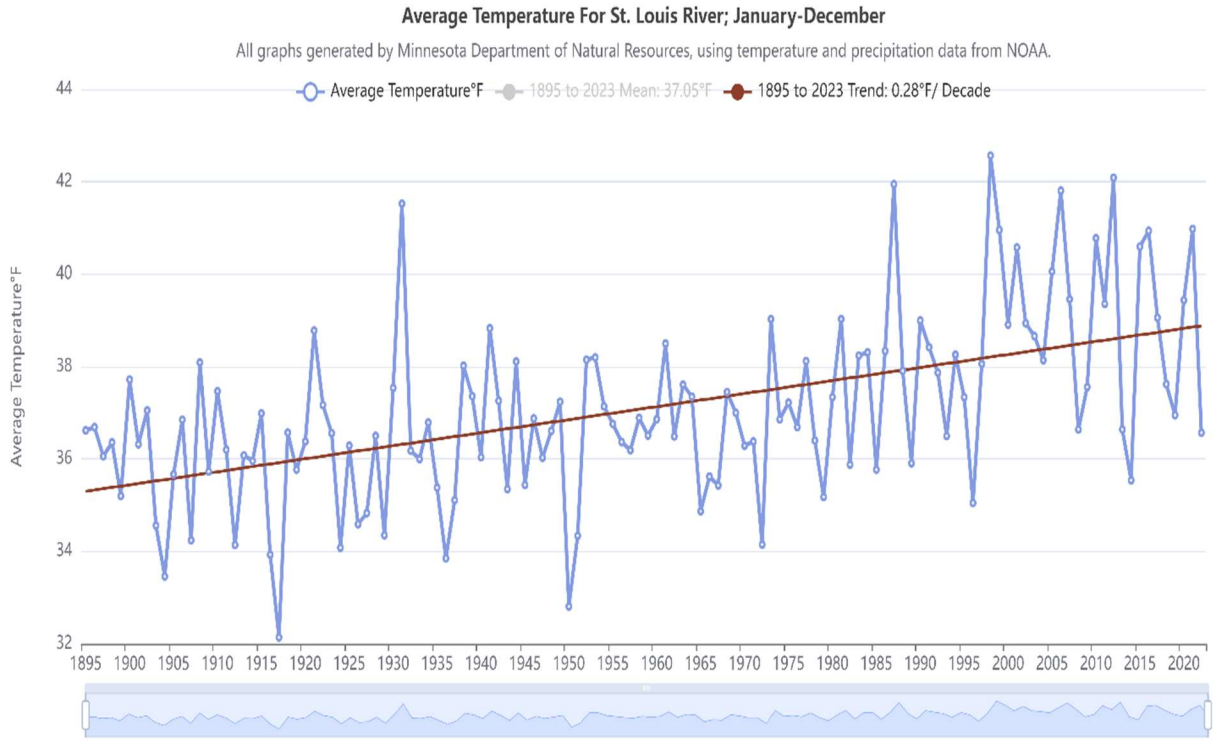
7. Climate Adaptation and Resilience:

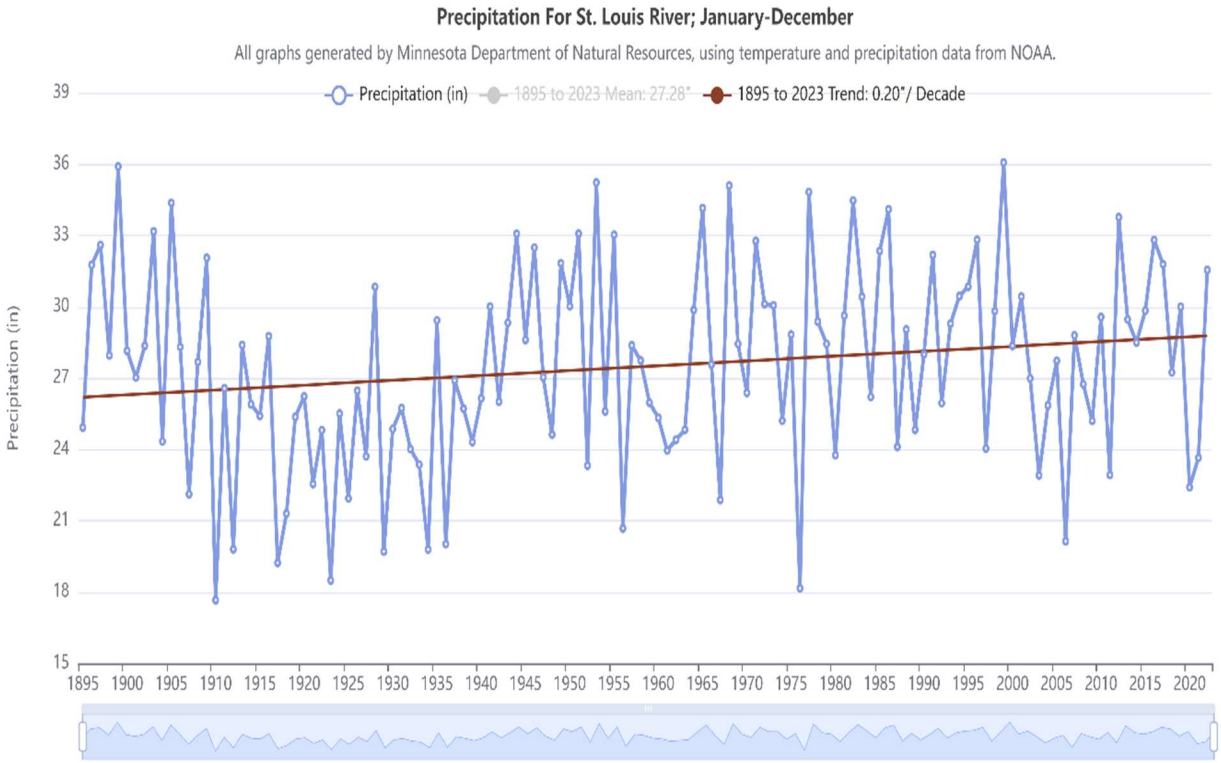
a. Describe the climate trends in the general location of the project (see guidance: Climate Adaptation and Resilience) and how climate change is anticipated to affect that location during the life of the project.

The climatic conditions of the Study Area were evaluated using several online Minnesota climate resources such as the Minnesota Climate Explorer, Risk Factor, and CREAT Climate Scenario Projection Map. All these resources were queried using the smallest area possible for the Study Area including watershed, city limits, or county.

Current Climate Trends

The 1895 to 2022 profile provided by Minnesota Climate Explorer shows a wide variability of temperature and precipitation data from year to year. The daily average temperature is 37.05 ^{o}F with an increase of 0.28 ^{o}F per decade. Average daily maximum and minimum temperatures increased significantly over this time period with maximum daily temperature rising 0.21^{o}F per decade and minimum daily temperature rising 0.35^{o}F per decade. Average annual precipitation also increased to 27.28 inches with an increase of 0.20 inches per decade.





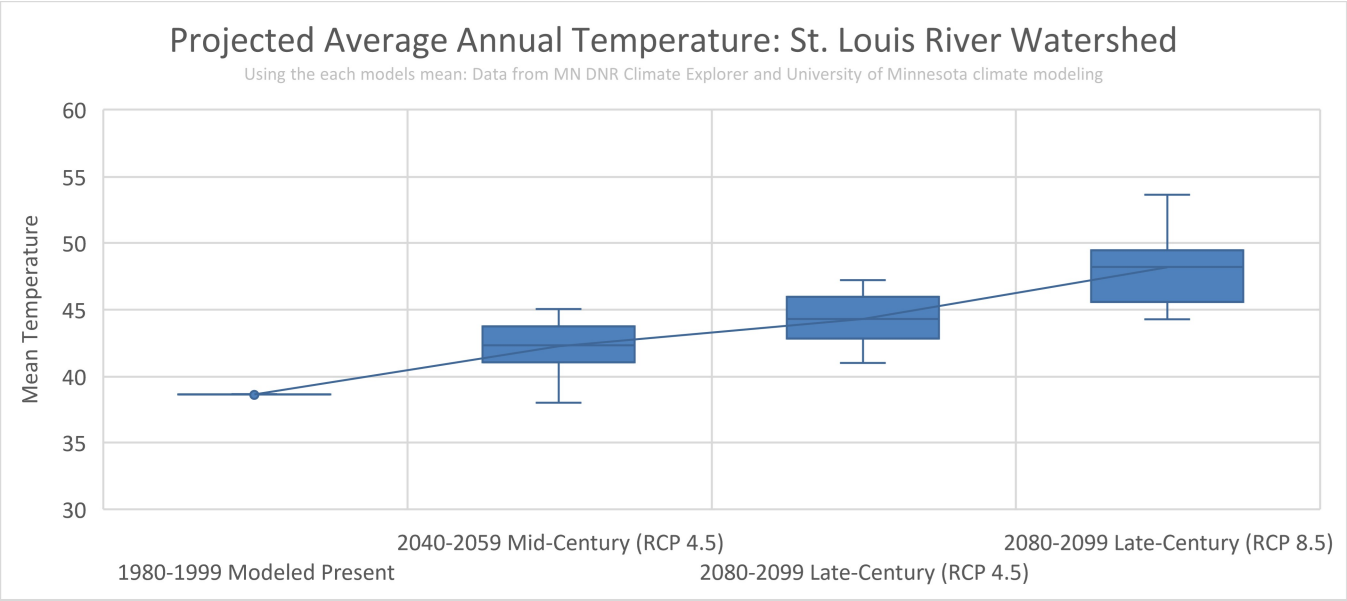
Although the precipitation has increased since 1895, the flooding risk within the Study Area continues to be minimal risk to properties according to Risk Factor.

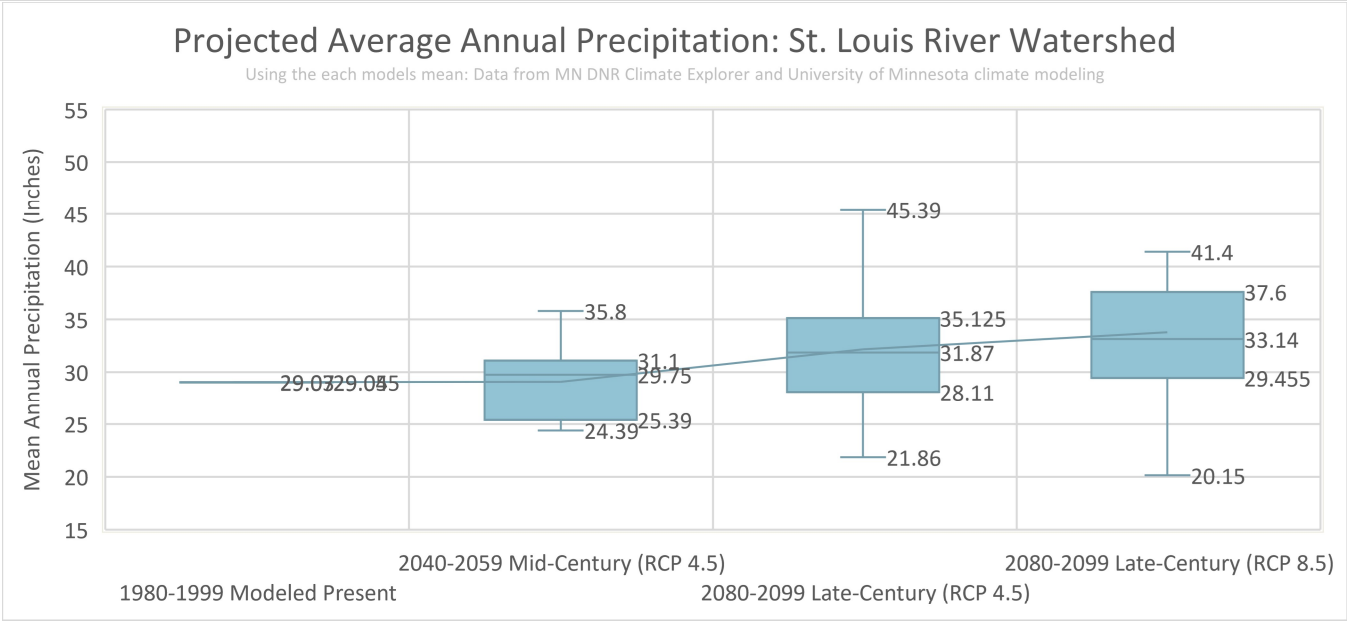
Future Climate Trends

The projected climate profile provided by Minnesota Climate Explorer shows a wide variability of the different climate models for temperature and precipitation data from different time frames until 2099. The model mean was used to evaluate the Study Area to get the best overall prediction.

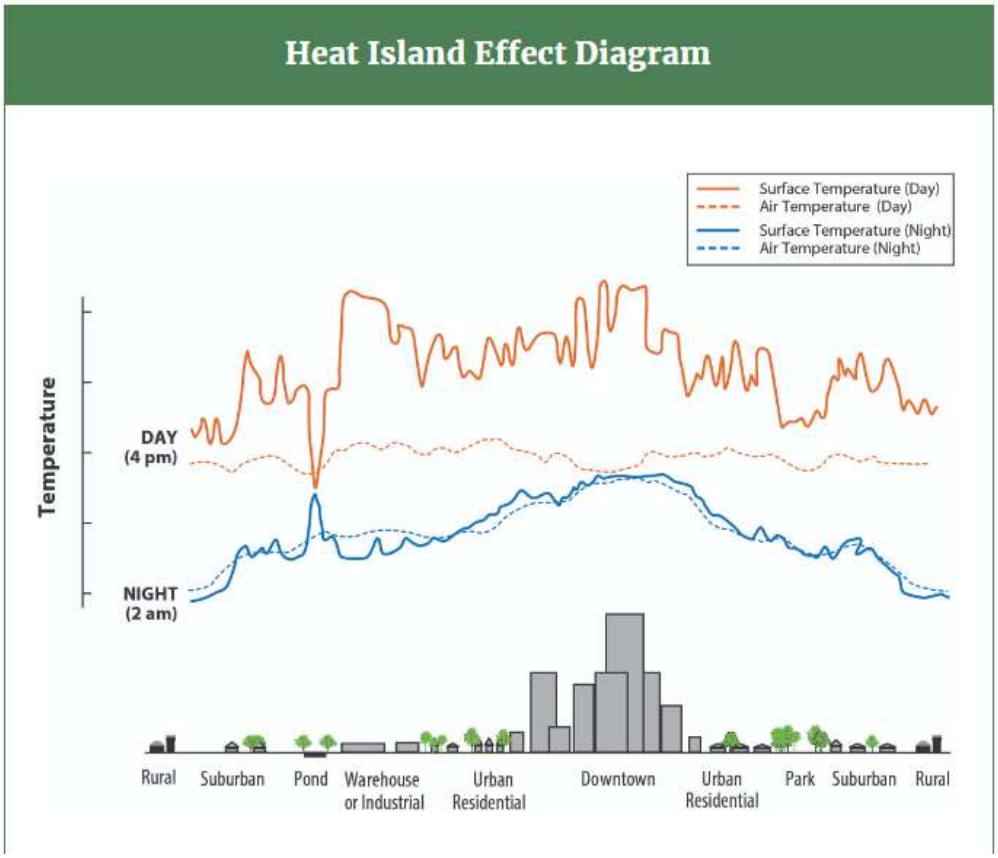
The daily average temperature is predicted to continue to increase with mean temperatures of 42.28°F by 2059, and 44.31°F-48.80°F by 2099, depending on if the high or low emissions scenario is adopted during the current-2059 timeframe.

Annual precipitation is projected to continue to increase with mean precipitation per year rising to 29.09 inches by 2059 and 32.18-33.80 inches by 2099, depending on if the high (RCP 8.5) or low (RCP4.5) emissions scenario is adopted during the current-2059 timeframe.





Along with emissions, heat island effect will also impact the temperature of the Study Area. This effect occurs in highly concentrated areas with little greenery, because of the materials used in human-made structures re-emitting the heat from the sun, instead of absorbing the heat as would a more natural environment (www.epa.gov/heatislands). The Study Area is not within a large metropolitan area, such as the Minneapolis/St. Paul area, but due to the square footage of the buildings, temperature may be increased slightly. The diagram below shows the temperature difference between common development structures, including a warehouse or industrial area, similar to the Development Scenario.



Source: U.S. EPA: www.epa.gov/heatislands

Storm intensity, drought, and flood risks are additional factors that are predicted to increase during the life of the project. The 100-year storm intensity is predicted to increase 1.7-11.2% by 2035 and 3.4-21.8% by 2060, according to the EPA's CREAT Climate Change Scenarios Projection Map. Overall, according to the Minnesota Climate Vulnerability Assessment, by 2099, it is projected with high confidence that winters temperatures will increase along with rainfall and heat waves. Below is an outline of the predicted trends through the life of the project along with the associated confidence in the models.

Climate Change Trends in Minnesota through 2099

Hazard	Projections through 2099	Confidence in Projected Changes
Warming Winters	Continued loss of cold extremes and dramatic warming of coldest conditions	Highest
Extreme Rainfall	Continued increase in frequency and magnitude; unprecedented flash-floods	Highest
Heat Waves	More hot days with increases in severity, coverage, and duration of heat waves	High
Drought	More days between precipitation events, leading to increased drought severity, coverage, and duration	Moderately High
Heavy Snowfall	Large events less frequent as winter warms, but occasional very large snowfalls	Moderately Low
Severe Thunderstorms & Tornadoes	More "super events" possible, even if frequency decreases	Moderately Low

Source: MN DNR State Climatology Office. Projected and expected trends among common weather hazards in Minnesota, and confidence that those hazards will change through 2099 in response to climate change. Graphic based on information from the 2014 National Climate Assessment.

b. *For each Resource Category in the table below: Describe how the project's proposed activities and how the project's design will interact with those climate trends. Describe proposed adaptations to address the project effects identified.*

Table 7-1. Climate Trends

Resource Category	**Climate Considerations** **(example text provided below is to be replaced with project-specific information)**	**Project Information**	**Adaptations**
Project Design	Project design including architecture and material choices that may impact heat island effect and effects of increase precipitation. Changes to land cover will convert undeveloped land to impervious surfaces.	Climate change risks and vulnerabilities identified include: -Increased greenhouse gas emissions. -Increase of temperature.-Increased stormwater runoff volume and intensity from increased precipitation events.	Minnesota state building code will define future materials used in construction, which may include the owner's choice of sustainably produced products and energy efficient systems available at the time of design. The increased impervious surfaces will be offset by stormwater management ponds with storage capacity based on future precipitation levels.
Land Use	Project will convert land from forest and wetland to light industrial warehouses, commercial buildings, roads, and parking lots. No critical facilities will be located within floodplains. Increase precipitation and intensity may impact the flooding potential for large storm events.	Climate change risks and vulnerabilities identified include: -Vegetation loss leading to decreased greenhouse gas mitigation and interrupted animal habitat. -Increased stormwater runoff volume and intensity from increased precipitation events.	Habitat will be left within the snowmobile trail to allow for wildlife to travel through the Study Area. Properly sized ponds are included within the Development Scenario to prevent flooding.
Water Resources	Addressed in Item 12.		
Contamination/ Hazardous Materials/Wastes	No specific end users have been identified for the AUAR. It is anticipated that there will be a minimal volume of hazardous materials or waste generated, depending on occupants activities.	There are no climate change risks and vulnerabilities identified.	Not applicable. Climate change is not expected to affect how hazardous waste is managed/disposed of by future land uses within the Study Area.

Resource Category	Climate Considerations (example text provided below is to be replaced with project-specific information)	Project Information	Adaptations
Fish, wildlife, plant communities, and sensitive ecological resources (rare features)	Addressed in item 14.		

8. Cover Types:

Estimate the acreage of the site with each of the following cover types before and after development:

Figure 5, (Appendix B) illustrates the exiting land cover types within the Study Area.

Table 8-1: Land Cover Types (Existing and Proposed)

Cover types	Before (Acres)	After (Acres)
Wetlands and shallow lakes (<2 meters deep)	24.8*	14.78
Deep lakes (>2 meters deep)	0	0
Rivers/streams	0	0
Wooded/forest	43.5	7.04
Brush/Grassland	7.3	9.71
Cropland	0	0
Livestock rangeland/pastureland	0	0
Lawn/landscaping	3.3	12.6
Green infrastructure TOTAL (from table 8-2 below)	0	0
Impervious surface	14.8	71.27
Stormwater Pond (wet sedimentation basin)	0	4.4
Other (Vacant/Superfund)	26.1	0
TOTAL	**119.8**	**119.8**

*There are no shallow lakes within the Study Area. Estimated wetland impacts (temporary and permanent) will be determined during design of each phase of development, individual parcel, lot, block, and phase of infrastructure. After acreages assumes permanent wetland impact conversion to Impervious surface and/or Lawn/Landscape. Refer to Question 11.b.iv.1 for additional information. Determined by National Wetland Inventory and 2022 wetland delineation.

Table 8-2. Green Infrastructure

Green Infrastructure*	**Before (acreage)**	**After (acreage)**
Constructed infiltration systems (infiltration basins/infiltration trenches/ rainwater gardens/bioretention areas without underdrains/swales with impermeable check dams)	0	TBD**
Constructed tree trenches and tree boxes	0	TBD**
Constructed wetlands	0	0
Constructed green roofs	0	TBD**
Constructed permeable pavements	0	TBD**
Other (describe)	0	TBD
TOTAL*	0	TBD**

Table 8-3. Tree Cover

Trees	**Percent**	**Number**
Percent tree canopy removed or number of mature trees removed during development	TBD**	TBD**
Number of new trees planted	TBD**	TBD**

***Green Infrastructure, tree removals, and plantings will be determined by lot configuration and construction plans of each individual lot.*

9. Permits and Approvals Required:

List all known local, state and federal permits, approvals, certifications, and financial assistance for the project. Include modifications of any existing permits, governmental review of plans, and all direct and indirect forms of public financial assistance including bond guarantees, Tax Increment Financing and infrastructure. All of these final decisions are prohibited until all appropriate environmental review has been completed. See Minnesota Rules, Chapter 4410.3100.

Table 9-1: Financial Assistance

Funding Source	**Fiscal Amount/Structure**	**Status**
TBD, if any		

Table 9-2: Permits and Approvals

Unit of Government	Type of Application	Status
Federal		
U.S. Army Corps of Engineers	Section 404 Permit	To be completed, if required by individual lot development
U.S. Fish and Wildlife Service	Section 7 ESA Consultation	To be completed, if required by individual lot development
State		
Minnesota Pollution Control Agency (MPCA)	Section 401 Certification	To be completed, if required by individual lot development
	National Pollutant Discharge Elimination System (NPDES) Industrial Stormwater General Permit	To be completed, if required by individual lot users
	National Pollutant Discharge Elimination System (NPDES) Construction Stormwater General Permit	To be completed, by individual construction projects
	Sanitary Sewer Extension	To be completed, by individual construction projects
	Submit Permits for Underground Storage Tanks per MN Administration Rules Chapter 7150	To be completed, if needed by individual lot users
	Air Emission Facility Permit	To be completed, if required by individual end users
MN Department of Health (MDH)	Watermain Extension	To be completed by individual lot developers
	Notification or Permit for Well Sealing	To be completed, if required
MN Department of Natural Resources (DNR)	Temporary Water Appropriations Permit for Construction Dewatering	To be submitted, if required by individual construction projects
Minnesota Department of Transportation (MnDOT)	Right-of Way Work Within or Affecting MNDOT right-of-way	To be submitted
	Utility Crossings	To be completed
Local		
St. Louis County	Street and Utility Permits (County Road 48 - Lavaque Bypass Road)	To be completed

Unit of Government	Type of Application	Status
	General Permit of Work in Right-of-Way (County Road 48 - Lavaque Bypass Road)	To be Submitted
City of Hermantown	AUAR Decision	To Be Completed
	Rezoning	To be completed, if required
	Planned Unit Development Approval	To be completed, if required
	Sewer Connection Permits	To be completed by individual construction projects
	Utility Permits	To be completed by individual construction projects
	Excavation and Grading Permits	To be completed by individual construction projects
	Water Connection Permits	To be completed by individual construction projects
	Sign Permits	To be completed, if required, by individual lot users
	Site Plan Review	To be completed by individual lot developers
	Special Use Permit	To be completed by individual lot developers
	Wetland Conservation Act (Boundary Approval/Exemption or Replacement Plan)	To be completed, if required by individual lot developers
	Preliminary and Final Plat	To be completed by individual lot developers
	Erosion Control, Grading, and Stormwater Permit	To be completed by individual lot developers
	Building Permits	To be completed by individual lot developers
	Commercial Industrial Development Permit	To be completed

10. Land Use:

a. Describe

i. Existing land use of the site as well as areas adjacent to and near the site, including parks and open space, cemeteries, trails, prime or unique farmlands.

The existing land use within the Study Area is composed of undeveloped forest, wetland, brush/grassland, remediated vacant lands, and existing businesses (Figure 5, Appendix B). There are several businesses operating onsite consisting of warehouses, storage units, and two office buildings (Figure 7, Appendix B). Based on county data the earliest building within the Study Area was constructed in 1965. MN DNR Snowmobile Trail 196 and a powerline easement runs through the middle of the Study area (Figure 12, Appendix B). The Study Area is not located within or near a local, state, or federal park. However, the Study Area does include two parcels of state-owned tax forfeited land (PIN 395-0010-00800 & 395-0010-00810), as illustrated on Figure 2, Appendix A. Farmlands of statewide importance are present within the Study Area (refer to Figure 13, Appendix B).

The surrounding land uses of the Study Area consist of the following:

- South: The land immediately south of the Study Area is U.S. Highway 53. Beyond the highway is primarily commercial facilities. These facilities are mostly surrounded by open undeveloped land.
- West: The land west of the Study Area consists of mostly vacant undeveloped land with residential properties beyond. In addition, there are several commercial businesses along US Highway 53.
- North: The land north of the Study Area consists of a large wetland complex. This land is undeveloped and beyond the wetland, there are sparse residential properties throughout the undeveloped land.
- East: The land east of the Study Area consists of Lavaque Bypass Road. Beyond the road, the airport occupies much of the land, with the exception of along US Highway 53 where several commercial buildings are present.

ii. Plans. Describe planned land use as identified in comprehensive plan (if available) and any other applicable plan for land use, water, or resources management by a local, regional, state, or federal agency.

Comprehensive Plan

The *City of Hermantown Year 2001 Comprehensive Plan Update* describes the planned development for the city of Hermantown. The plan describes Highway 53 and the location of the Study Area, as an evolving commercial development due to the close proximity for access to existing roads and public utilities. A map within the plan also describes areas of planned growth for all sectors including suburban, rural, light industrial, commercial, and greenspace, in which the Study Area is within the planned commercial development area.

The Study Area is consistent with the following plan concepts, goals, and policies:

- Locate new light industrial development in areas with similar uses, adequate public facilities, highway and arterial road access, and without conflicts with existing, established residential, public, recreational or commercial development.
- Develop new commercial uses in areas with similar uses, adequate public infrastructure, including fire, police and emergency medical services, highway, and arterial road access and

without adverse visual or environmental impacts on existing, established residential, public, recreational, or commercial development.

- Goal: Preserve the air, water, and land resource quality of the City of Hermantown.
  - Policy: Strictly enforce state and federal standards for wetland preservation.
- Goal: Assist in developing the commercial center of Hermantown into a vibrant dynamic, full-service business community with safe vehicular access and egress, safe, energy efficient buildings and building sites that preserve water quality and present a pleasant, spacious, landscaped property, without conflicts with adjacent uses.
  - Policy: Continue to cooperate with the Minnesota Department of Transportation on necessary improvements in the TH53 Corridor.
  - Policy: Assist private developers in the construction of infrastructure necessary to support such development where past projects have left service gaps.

The Study Area is also included in a small area plan "Gateway Commercial Corridor in 2015" within the *City of Hermantown Year 2001 Comprehensive Plan Update,* which serves as a complement to the plan to provide in greater detail the planned development in specific areas. This small area plan describes the area of Highway 53, which includes the Study Area, as a "distinctive stretch of urban highway". The goal of the plan for this area is to increase commerce and employment in the city. The Study Area aligns with the planned use of the small area plan in increasing commerce as well as the goal of collaborating with MN Department of Transportation to give highway access to the potential patrons of businesses and employees.

Duluth International Airport Zoning Ordinance

The Duluth International Airport Zoning Ordinance describes the different safety zones and allowed uses for the area within and surrounding the airport. Existing businesses, land uses, and proposed future land uses within the Study Area will be consistent with the Safety Zone 2 specific prohibited uses and density limitations as described below.

- Group A Uses: "means assembly, churches, restaurants, movie theaters, banquet halls, bars, art galleries, casinos, bowling alleys, dance halls, funeral parlors, gymnasiums, indoor pools/tennis courts, lecture halls, museums, arenas, skating rinks, bleachers, grandstands, stadiums as described in the 2018 International Building Code, as may be revised from time to time."
- Group E Uses: "means education use of a building by six or more at any one time for educational purposes through twelfth grade, daycare facilities for more than five children older than two and one-half years old for fewer than twenty-four hours per day as described in the 2018 International Building Code, as may be revised from time to time."
- Group I-2 Uses: "means buildings used for medical care on a twenty-four hour basis for more than five persons who are incapable of self-preservation. Examples include detoxification, foster care, hospital, nursing homes and other supervised living facilities as described in the 2018 International Building Code, as may be revised from time to time."
- Group R-1 Uses: "means residential occupancies containing sleeping units where occupants are primarily transient. Examples include B&Bs with more than six guest rooms, boarding homes with more than ten occupants, and congregate living with more than ten units, and hotels/motels as described in the 2018 International Building Code, as may be revised from time to time."
- Density Limitations, "Other uses not specifically prohibited by [above specific prohibited uses] must be on a site whose area is at least two and one-half (2.5) acres. Each use shall not create, attract, or bring together a site population is excess of 20 persons per acre during the same time

period; density calculated pursuant to the 2020 Minnesota State Building Code, or its successor."

iii. *Zoning, including special districts or overlays such as shoreland, floodplain, wild and scenic rivers, critical area, agricultural preserves, etc.*

The Study Area is, according to the City of Hermantown 2016 zoning map (Figure 9, Appendix B), zoned as

- C1A - Commercial Adult Use
- C - General Commercial
- C1 - Office/Light Industrial

This zoning is intended to be used for low density office, light industrial, limited commercial services, public service developments, and adult uses. Overlays for the city zoning include wetland mapping. The Study Area contains many Hermantown wetland inventory (2003) mapped wetlands and NWI (2016) mapped wetlands.

According to FEMA flood map, the Study Area is within Zone C of flooding potential meaning the area is at minimal risk of flooding above the 500-year flood level. The Study Area does not contain shoreland, wild and scenic rivers, critical area, agricultural preserves or any other special designation in relation to zoning.

The Study Area will develop under the Planned Unit Development zoning criteria that will allow flexibility for users within these standard business zoning districts:

- BLM - Business/Light Manufacturing
- C - General Commercial
- C1 - Office/Light Industrial

iv. *If any critical facilities (i.e. facilities necessary for public health and safety, those storing hazardous materials, or those with housing occupants who may be insufficiently mobile) are proposed in floodplain areas and other areas identified as at risk for localized flooding, describe the risk potential considering changing precipitation and event intensity.*

No critical facilities are proposed within a floodplain.

b. *Discuss the project's compatibility with nearby land uses, zoning, and plans listed in item 9a above, concentrating on implications for environmental effects.*

The Development Scenario is considered to be compatible with adjacent land uses as described in Section 10.a.i. of this AUAR and consistent with planned land uses identified in the City's Comprehensive Plan. The City plans to re-zone the Study Area to land uses that are consistent with the Development Scenario.

The majority of the Study Area is within the airport zoning district zone 2 with exception of the southeast quadrant of the Project. Per the zoning requirements, each parcel shall not be less than 2.5 acres and prohibits uses that attract/house crowds. The proposed uses including commercial and light industrial are not listed as restricted building types.

There are no identified environmental conflicts or incompatibilities between the proposed project and

nearby land uses, zoning, or other local or regional plans.

c. *Identify measures incorporated into the proposed project to mitigate any potential incompatibility as discussed in item 10b above.*

There are no identified environmental conflicts or incompatibilities between the proposed project and nearby land uses, zoning, or other local or regional plans.

11. Geology, Soils, and Topography/Land Forms:

a. *Geology – Describe the geology underlying the project area and identify and map any susceptible geologic features such as sinkholes, shallow limestone formations, unconfined/shallow aquifers, or karst conditions. Discuss any limitations of these features for the project and any effects the project could have on these features. Identify any project designs or mitigation measures to address effects to geologic features.*

The uppermost bedrock unit in the vicinity of the Study Area is the Troctolite, Duluth Complex (Jirsa et al, 2011). The depth to bedrock is approximately 4 to 36 feet below land surface (Mossler and Cleland, 1992). The surficial geology in the Study Area is Stagnation-moraine sediment, which consist typically of redeposited glacial till, which ranges from silty sand to sandy silt (Figure 14, Appendix C). The till deposits can be light in color.

There are no known mapped sink holes, shallow aquifers, shallow limestone, or karst geology near or within the Study Area. A geotechnical report was conducted by Braun Intertec Corporation in 2021 within the south-east portion of the Study Area. Groundwater was encountered between 7 to 22 feet from the existing ground surface.

The Minnesota geospatial Commons-Karst Features inventory showed no mapped occurrences within or near the Study Area.

Geotechnical information is not available for the entire Study Area at this time. Site specific geotechnical investigations will be recommended for each parcel's development scenario, based on the proposed site layout and individual building construction planned within the parcel. Soil corrections and possible mitigation measures (if applicable) will be determined after completion of site-specific geotechnical investigations.

b. *Soils and Topography – Describe the soils on the site, giving NRCS (SCS) classifications and descriptions, including limitations of soils. Describe topography, any special site conditions relating to erosion potential, soil stability or other soils limitations, such as steep slopes, highly permeable soils. Provide estimated volume and acreage of soil excavation and/or grading. Discuss impacts from project activities (distinguish between construction and operational activities) related to soils and topography. Identify measures during and after project construction to address soil limitations including stabilization, soil corrections or other measures. Erosion/sedimentation control related to stormwater runoff should be addressed in response to Item 12.b.ii*

Eight soil units are mapped within the Study Area. The predominant soil type is Hermantown-Canosia-Giese, depressional complex, 0-1% slopes, accounting for approximately 30.8% or 36.9 acres of the Study Area. Soil characteristics and properties are provided below in table 11-1 and illustrated in Figure 13 in

Appendix B. Approximately 69.2 acres of the Study Area is mapped as farmland of statewide importance.

Table 11-1: Soil Characteristics

Soil Symbol	Soil Unit Name	Acres	HEL	Hydrologic Group	Hydric Rating	Farmland Classification
F119B	Urban Land –Greysolon –Normanna- Rock out crop complex,1-20 % slopes	12.2	NHEL	NA	Non-Hydric	Not Prime
F135A	Hermantown-Canosia-Giese, depressional, complex, 0-3 % slopes	36.9	NHEL	C/D	Predom. Hydric	Statewide Importance
F136A	Hermantown silt loam , 1-3 % slopes	2.0	NHEL	C/D	Hydric	Statewide Importance
F138D	Ahmeek-Normanna-Canosia complex, 0-18 % slopes	7.8	HEL	C	Predom. Non-Hydric	Not Prime
F140B	Normanna – Giese, depressional complex, pitted, 0-8 % slopes	17.8	NHEL	B/D	Predom. Non-Hydric	Statewide Importance
F142A	Canosia loam, 0-2 % slopes	7.4	NHEL	C/D	Predom. Hydric	Not Prime
F151A	Tacoosh mucky peat, dense substratum, 0-1% slopes	29.9	NHEL	A/D	Hydric	Not Prime
GP	Pits, gravel-Udipsamments complex	5.7	NA	NA	Non-Hydric	Not Prime

Legend:

Erodible Land
HEL: highly erodible
PHEL: potentially highly erodible
NHEL: Not highly erodible

Infiltration Rate
A: >.030 inches/hour
B: 0.15-0.30 inches/hour
C: 0.05-0.15 inches/hour
D: <0.05 inches/hour

Hydric Rating
Hydric: 100%
Predominantly hydric: >67% and <100%
Partially hydric: >33% and <67%
Predominantly non-hydric: >1% and <33%
Not Hydric: 0% hydric

Topography in the Study Area is gently rolling hills ranging from 1416 to 1446 feet above sea level. Higher elevations are located on the northern boundary, with slopes decreasing to the southeast corner with a few hills in between (Figure 4, Appendix A).

Typical site grading and excavations will be required along with removal of unsuitable soils for development. Erosion capabilities of the soil are moderately susceptible as shown in the NRCS soil erodibility factor (Kw) ranging from 0.32 to 0.37.

A geotechnical report was completed in 2021 for the south-east corner of the Study Area. Soil conditions in this area consist of 4-12.5 feet of fill over swamp deposits including silty sand and gravel that are overlying the native soils consisting of clayey silt, silty sand with gravel, sandy silt and sand with silt.

Construction activities will temporarily expose soils, increasing the risk of erosion due to wind and precipitation. Appropriate erosion and sediment control best management practices (BMP's) will be selected by each project's individual Storm Water Pollution Prevention Plan (SWPPP). BMP's will be selected based on each project's potential risk for erosion, current site conditions and maintenance through the duration of each construction phase to reduce risk of sedimentation to nearby water resources or migrating offsite. Temporary BMP's will be inspected and maintained per the NPDES Construction Storm Water Permit, until permanent vegetative cover and stabilization has been established.

Parcel specific geotechnical information is not available for the full Study Area. Project specific geotechnical investigations will be recommended for each parcel based on the specific site layout and building construction planned within the parcel.

12. Water Resources:

a. Describe surface water and groundwater features on or near the site in a.i and a.ii below.

i. Surface Water – lakes, streams, wetlands, intermittent channels, and county/judicial ditches. Include any special designations such as public waters, shoreland classification and floodway/floodplain, trout stream/lake, wildlife lakes, migratory waterfowl feeding/resting lake, and outstanding resource value water. Include the presence of aquatic invasive species and the water quality impairments or special designations listed on the current MPCA 303d Impaired Waters List that are within 1 mile of the project. Include MDNR Public Waters Inventory number(s), if any.

A review of online mapping tools such as the National Wetland Inventory, the USGS National Hydrography Dataset and the Minnesota Public Waters Inventory, a desktop wetland delineation, as well as a Level 2 wetland delineation (Exhibit B & C) identified seven wetland basins within the Study Area. These wetlands total 24.8 acres of the 119.8 acre Study Area (Figure 5, Appendix B). There are no other surface waters (lakes, streams, intermittent channels, county/judicial ditches, wildlife lakes, or migratory waterfowl feeding/resting areas) within or adjacent to the Study Area.

The surrounding area contains areas of wetland, streams, and channels (Figure 15, Appendix C). These surface waters have no designation with exception of two streams south of Rose Road (approximately 0.5 miles southwest of the Study Area). The two unnamed streams (S-002-010-004-007 & S-002-010-004-006) are DNR public waters and protected tributaries to designated trout streams located off-site and south of the Study Area. Both streams flow south into the Rocky Run Stream (S-002-010-004), which eventually discharges several miles away into Lake Superior. No additional impaired waters, specially designated waters, 100 -year floodplains/floodways, or waters with invasive species were identified within a mile of the Study Area (Figure 16, Appendix C).

ii. Groundwater – aquifers, springs, seeps. include: 1) depth to groundwater; 2) if project is within a MDH wellhead *protection* area; 3) identification of any onsite and/or nearby wells, including unique numbers and well logs if available. If there are no wells known onsite or nearby, explain the methodology used to determine this.

The Minnesota Natural Resources Atlas maintains data on groundwater levels. The mapped ground water levels range from 0-10 feet below ground surface in the southern portion of the Study Area to

20-30 feet below ground surface in the northern portion of the Study Area. The geotechnical report (Braun Intertec, 2021) encountered groundwater ranging from 7-22 below ground surface. This report evaluated only the south-east corner of the Study Area. The Study Area is not located within wellhead protection areas.

There are a total of 50 registered wells within the Study Area (Figure 10, Appendix B) (Exhibit D). Of those 50 wells, two are listed as domestic (Well ID's: 00497301 & 00555943) and are associated with the two commercial properties located along Abrahamson Road on the western side of the Study Area. The remaining 48 registered wells are monitoring, or test wells associated with the delisted Superfund site located on the east/southeastern portion of the Study Area. Of the 48 monitoring wells associated with the delisted Superfund site, seven are listed as "sealed", while the remaining are listed as "active". There are several unverified wells that have not been confirmed with a Site visit.

During the time of the Phase I ESA or Phase II ESA field activities, no wells were observed. In addition, based on available information obtained during the completion of the Phase I ESA, the MPCA recommend all wells be sealed in accordance with MDH regulations. It is possible that the well was sealed and the paperwork was not submitted to the MDH.

No permanent wells are proposed within the Study Area. No permanent impacts on groundwater are anticipated. Temporary dewatering of groundwater for construction activities may occur for short durations and in small quantities. Further discussion of dewatering and water appropriations can be found in Section 12 b. iii.

b. *Describe effects from project activities on water resources and measures to minimize or mitigate the effects in item b.i. through item b.iv. below.*

i. *Wastewater – For each of the following, describe the sources, quantities and composition of all sanitary, municipal/domestic and industrial wastewater produced or treated at the site.*

1) *If the wastewater discharge is to a publicly owned treatment facility, identify any pretreatment measures and the ability of the facility to handle the added water andwaste loadings, including any effects on, or required expansion of, municipal wastewater infrastructure.*

The wastewater produced within the Study Area will be typical of domestic wastewater from light industrial users. It is not anticipated that users with significant volumes of industrial wastewater would be located in the Study Area. Constructed sanitary sewer lines will connect to an existing 8-inch public sanitary sewer located on Ugstad Road, approximately 500 feet south of Highway 53. The existing sanitary sewer does not have adequate depth to serve the Study Area. Therefore, the project will require construction of a sanitary sewer lift station with a force-main that will be bored under Highway 53 to the existing 8-inch sanitary sewer on Ugstad Road. Gravity sanitary sewer lines will be extended through the Study Area in public easements and/or public right-of- ways to serve the proposed development.

Wastewater will be routed to the Western Lake Superior Sanitary District's wastewater treatment facility. The facility is anticipated to have excess capacity and the project will not require an increase of capacity at the facility. Expected peak wastewater flows from the Development Scenario are .0798 million gallons per day (MGD), based on an assumed maximum employee count of 1,140 people at 17.5 gallons per day (GPD).

2) *If the wastewater discharge is to a subsurface sewage treatment systems (SSTS), describe the system used, the design flow, and suitability of site conditions for such a system. If septic systems are part of the project, describe the availability of septage disposal options within the region to handle the ongoing amounts generated as a result of the project. Consider the effects of current Minnesota climate trends and anticipated changes in rainfall frequency, intensity and amount with this discussion.*

   No subsurface sewage treatment systems (SSTS) are anticipated within the AUAR study area for the proposed development scenario.

3) *If the wastewater discharge is to surface water, identify the wastewater treatment methods and identify discharge points and proposed effluent limitations to mitigateimpacts. Discuss any effects to surface or groundwater from wastewater discharges,taking into consideration how current Minnesota climate trends and anticipated climate change in the general location of the project may influence the effects.*

   No wastewater discharge to surface waters is anticipated within the AUAR study area for the proposed development scenario.

ii. *Stormwater – Describe changes in surface hydrology resulting from change of land cover. Describe the routes receiving water bodies for runoff from the project site (major downstream water bodies as well as the immediate receiving waters). Discuss environmental effects from stormwater discharges on receiving waters post construction including how the project will affect runoff volume, discharge rate and change in pollutants. Consider the effects of current Minnesota climate trends and anticipated changes in rainfall frequency, intensity and amount with this discussion. For projects requiring NPDES/SDS Construction Stormwater permit coverage, state the total number of acres that will be disturbed by the project and describe the stormwater pollution prevention plan(SWPPP), including specific best management practices to address soil erosion and sedimentation during and after project construction. Discuss permanent stormwater management plans, including methods of achieving volume reduction to restore or maintain the natural hydrology of the site using green infrastructure practices or other stormwater management practices. Identify any receiving waters that have construction-related water impairments or are classified as special as defined in the Construction Stormwater permit. Describe additional requirements for special and/or impaired waters.*

Pre-Construction Stormwater Runoff
Under existing conditions, the Study Area has limited light industrial users, storage facilities, open fields, woodlands, wetlands, and a shared power line with snowmobile trail. Surface water runoff drains towards existing wetlands and roadway ditches. No existing stormwater features are present within the Study Area. Pollutants typically associated with these users include sediment and nutrients carried by stormwater runoff.

Post-Construction Stormwater Runoff
Construction of impervious surfaces, such as the roads, driveways, rooftops, and sidewalks increase the volume and rate of stormwater runoff to nearby surface waters. The increased impervious surface areas will result in higher runoff rates, volumes, and pollutants compared to the existing conditions. Stormwater best management practices (BMPs) will be designed and

constructed to treat and manage stormwater runoff rates, volumes, and pollutant loading prior to discharging into surface waters.

The Study Area will be required to meet the City of Hermantown and the Minnesota Pollution Control Agency's authorization of the MS4 General Stormwater Permit requirements. Development must follow the City's Stormwater Management Plan that requires stormwater runoff from each new development site to meet the following:

- MS4 Statement of Compliance
- Stormwater Management Plan Design Requirements
  - No net increase in peak discharge rates
  - No net increase in runoff volume
  - No net increase in total suspended solids (TSS)
  - No net increase in total phosphorus

The Study Area will utilize regional ponds (where practicable and feasible) to provide on-site stormwater treatment to meet these requirements. Although regional ponds would be most space and cost effective, it is also possible that as each site develops, the proposer of each site could provide stormwater treatment facilities to meet their individual site requirements. A larger user may also desire to manage their stormwater separately from multiple properties.

The City of Hermantown MS4 requires proposed site developments to meet compliance with City Code Section 1060 Erosion and Sediment Control for Land Disturbance Activities. For any site over 1.0 acres in size, this code requires an individual project Stormwater Pollution Prevention Plan (SWPPP), permit coverage and compliance with the National Pollution Discharge Elimination System (NPDES) General Permit, and adherence to the City's MS4 standards. The Site will obtain these permits on an individual basis at the time of construction and thereafter.

iii. *Water Appropriation – Describe if the project proposes to appropriate surface or groundwater (including dewatering). Describe the source, quantity, duration, use and purpose of the water use and if a DNR water appropriation permit is required. Describe any well abandonment. If connecting to an existing municipal water supply, identify the wells to be used as a water source and any effects on, or required expansion of, municipal water infrastructure. Discuss environmental effects from water appropriation, including an assessment of the water resources available for appropriation. Discuss how the proposed water use is resilient in the event of changes in total precipitation, large precipitation events, drought, increased temperatures, variable surface water flows and elevations, and longer growing seasons. Identify any measures to avoid, minimize, or mitigate environmental effects from the water appropriation. Describe contingency plans should the appropriation volume increase beyond infrastructure capacity or water supply for the project diminish in quantity or quality, such as reuse of water, connections with another water source, or emergency connections.*

The potable water supply for the Study Area will be provided by the City of Hermantown's municipal water service. The City's 12-inch watermain currently parallels along the south side of U.S. Highway 53. To serve the Study Area, the City of Hermantown will construct two watermain crossings bored under U.S. Highway 53, one under Abrahamson Road and one under Lavaque Bypass Road, creating a watermain loop through the Study Area.

It is anticipated that the majority of individual lot water consumption will be for employee personal use, restrooms, and occasional fire protection. No individual water appropriation is expected after construction is complete. Expected peak potable water volume from the Development Scenario are .0798 million gallons per day (MGD), based on an assumed maximum employee count of 1,140 people at 17.5 gallons per day (GPD).

Temporary short-term construction dewatering of groundwater may be required at the time of construction (depending on current field conditions) to facilitate construction activities of phased grading, placement of structural footings, and utility trenches/pits. If dewatering is anticipated to exceed 10,000 gallons per day or 1,000,000 gallons per year, the contractor performing the applicable work would be required to obtain a Temporary Construction Dewatering Water Appropriations Permit from the Minnesota Department of Natural Resources (MDNR) prior to initiating dewatering activities. Measures to avoid, minimize, or mitigate the environmental effects from construction related to dewatering are unknown at this time, and therefore would be determined when developing the dewatering plan as required by a future Stormwater Pollution Prevention Plan (SWPPP) amendment of the NPDES Construction Stormwater Permit for each parcel.

iv. Surface Waters

1) Wetlands – Describe any anticipated physical effects or alterations to wetland features such as draining, filling, permanent inundation, dredging and vegetative removal. Discuss direct and indirect environmental effects from physical modification of wetlands, including the anticipated effects that any proposed wetland alterations may have to the host watershed, taking into consideration how current Minnesota climate trends and anticipated climate change in the general location of the project may influence the effects. Identify measures to avoid (e.g., available alternatives that were considered), minimize, or mitigate environmental effects to wetlands. Discuss whether any required compensatory wetland mitigation for unavoidable wetland impacts will occur in the same minor or major watershed and identify those probable locations.

Several wetlands are present within the Study Area, many of which may be impacted by the development of the Study Area. Each parcel owner will be required to complete a Level 2 wetland delineation on all parcels before construction occurs to ensure the exact location of wetlands within the parcel. If wetlands will be impacted by proposed filling, excavating, or draining activities, wetland impacts must be minimized and permitted per the Minnesota Wetland Conservation Act and Federal Clean Water Act. This permitting process will need to be completed prior to construction. The Development Scenario has taken into account delineated and mapped potential wetlands identified within the Study Area and proposed configuration of the parcels and out lots reflect minimization of wetland impacts. Wetland impacts within each parcel cannot be exactly quantified at this time due to the nature of an AUAR but if all buildings are built out to maximum capacity of each parcel (as laid out in the Development Scenario) and all roads are constructed, the impacts could be up to10 acres.

2) Other Surface Waters – Describe any anticipated physical effects or alterations to surface water features (lakes, streams, ponds, intermittent channels, county/judicial ditches) such as draining, filling, permanent inundation, dredging, diking, stream diversion, impoundment, aquatic plant removal and riparian alteration. Discuss direct and indirect environmental effects from physical modification of water features, taking into consideration how current Minnesota climate trends and anticipated climate change in the general location of the project may influence the effects.

Identify measures to avoid, minimize, or mitigate environmental effects to surface water features, including in-water Best Management Practices that are proposed to avoid or minimize turbidity/sedimentation while physically altering the water features. Discuss how the project will change the number or type of watercraft on any water body, including current and projected watercraft usage.

There are no other surface waters (lakes, streams, intermittent channels, county/judicial ditches, or migratory waterfowl feeding/resting areas) within or adjacent to the Study Area, therefore no impacts to those resources are anticipated. Potential indirect impacts to off-site surface waters will be mitigated by on-site stormwater management areas and practices. Future development in the Study Area will have no effect on the number or type of watercraft on any water body.

13. Contamination/Hazardous Materials/Wastes:

a. *Pre-project site conditions – Describe existing contamination or potential environmental hazards on or in close proximity to the project site such as soil or ground water contamination, abandoned dumps, closed landfills, existing or abandoned storage tanks, and hazardous liquid or gas pipelines. Discuss any potential environmental effects from pre-project site conditions that would be caused or exacerbated by project construction and operation. Identify measures to avoid, minimize or mitigate adverse effects from existing contamination or potential environmental hazards. Include development of a Contingency Plan or Response Action Plan.*

Several MPCA permitted sites are located within and adjacent to the Study Area (Figure 11, Appendix B). The Study Area is comprised of 10 parcels totaling approximately 119.8 acres. Of these parcels, 5 of them (395-0010-00810, 395-0010-00820, 395-0010-00850, 395-0010-00854, and 395-0010-00853) were the subject of previous environmental investigation and cleanup actions as part of the former Arrowhead Superfund Site (Figure 5, Appendix B). The former Arrowhead Superfund Site was approximately 26 acres in size and was used by a company for re-tinning milk cans prior to 1945. From 1945 to 1977, the former Superfund Site was utilized by the Arrowhead Refining Company who operated a business that refined used oils using an acid-clay process. This process produced three waste streams: 1) metals-contaminated acidic sludge; 2) filter cake; and 3) wastewater. The historical information indicates that the filter cake waste stream was disposed of on-site in a wetland that became a sludge lagoon, and wastewater was disposed of on-site in a ditch. These waste management practices resulted in soil and groundwater contamination including oil and grease, heavy metals, cyanide, phenols, polynuclear aromatic hydrocarbons (PAHs), and polychlorinated biphenyls (PCBs).

The former Superfund Site was initially investigated by the U.S. Environmental Protection Agency (EPA) in 1976 and they ordered Arrowhead Refinery to cease operations in 1977. In 1986, EPA issued a Record of Decision that approved a cleanup approach that included excavation of impacted soils and sludge to industrial levels at the time of the work and installation of a groundwater extraction system. The groundwater extraction system was installed in 1993 and required soil/sediment removal cleanup actions were completed in 1995. Site investigation and monitoring activities continued into the early 2000s and the groundwater extraction was turned off in 2007. Post-shutdown ground water monitoring continued until 2014 when the wells were allowed to be sealed. As part of a long-term stewardship plan for the Site, the Minnesota Pollution Control Agency required the filing of an Environmental Covenant for the Site that was filed in February 2021 addressing requirements for contamination remaining in place. The Arrowhead Superfund Site was recently delisted from both the EPA and MPCA Superfund programs, however the Site is still impacted by residual contamination that requires consideration for future

redevelopment.

The City of Hermantown also commissioned completion of a Phase I Environmental Site Assessment (ESA) and Phase II Investigation in 2022 that included the parcels comprising the former Superfund Site. This work was completed with funding assistance through an Environmental Investigation Grant obtained from the State of Minnesota Department of Employment and Economic Development (DEED). The Phase I ESA report has been completed and is dated June 15, 2022. The Phase II Investigation is in progress with an anticipated completion in 2023.

It is noted that the City of Hermantown commissioned the completion of a "desktop study" of existing information relevant to future redevelopment that included the entire Study Area. The desktop review is (dated December 16, 2021) was completed to assist the City's project team to better understand the "big picture" geotechnical, environmental, wetland and civil engineering challenges related to future development of the business park based on available existing information. As part of the desktop study, summary sheets were prepared for all parcels comprising the Site that includes available information on current uses and relevant historical information. A copy of the Desktop study is included in Exhibit H. One additional regulated Site was identified within MPCA's What's In My Neighborhood (WIMN) and this report, Acuren Inspection Inc, is a licensed Minimal quantity generator (MNS000205013) . No additional environmental concerns were identified within this report.

b. *Project related generation/storage of solid wastes – Describe solid wastes generated/stored during construction and/or operation of the project. Indicate method of disposal. Discuss potential environmental effects from solid waste handling, storage and disposal. Identify measures to avoid, minimize or mitigate adverse effects from the generation/storage of solid waste including source reduction and recycling.*

Construction-related waste materials (i.e., wood, concrete, metals, plastics, etc.) will be generated during each project. Construction-related waste will be recycled or disposed of in approved facilities, as appropriate. Toxic or hazardous substances used during project construction or operations (i.e., petroleum products, hydraulic fluid, and other chemical products) will be stored and disposed of following local and state guidelines.

The proposed development scenario would generate new solid waste management and sanitation services demands within the Study Area. Each project would comply with applicable laws, rules, and ordinances related to the management of solid and hazardous wastes per Minnesota Statutes, section 473.811. Recycling for commercial buildings in the Study Area will be in accordance with the 2016 Recycling Law (Minnesota Statutes Chapter 115A, Section 115A.151 and Section 115A.552), and relevant City codes requiring source separation and curbside pick-up.

c. *Project related use/storage of hazardous materials – Describe chemicals/hazardous materials used/stored during construction and/or operation of the project including method of storage. Indicate the number, location and size of any new above or below ground tanks to store petroleum or other materials. Indicate the number, location, size and age of existing tanks on the property that the project will use. Discuss potential environmental effects from accidental spill or release of hazardous materials. Identify measures to avoid, minimize or mitigate adverse effects from the use/storage of chemicals/hazardous materials including source reduction and recycling. Include development of a spill prevention plan.*

The development scenario includes the potential for a gas station located at the southeast corner of the Study Area and it is expected that the gas station will include multiple underground storage tanks for gasoline and diesel fuel storage with fuel dispensing equipment. The specific numbers and locations of these tanks (and associated dispensing equipment) are unknown at this time and will be determined as the project design progresses. The locations and uses of storage tanks and associated dispensing equipment will comply will all state and location rules and regulations.

No other underground or above ground storage tanks have been identified for the development scenario; however, individual tanks may be needed for emergency generators for the light industrial/commercial buildings or other operational uses. The location of these tanks will be determined on a per user basis and the location and use of storage tanks will comply will all state and location rules and regulations.

d. *Project related generation/storage of hazardous wastes – Describe hazardous wastes generated/stored during construction and/or operation of the project. Indicate method of disposal. Discuss potential environmental effects from hazardous waste handling, storage, and disposal. Identify measures to avoid, minimize or mitigate adverse effects from the generation/storage of hazardous waste including source reduction and recycling.*

Construction wastes will be typical relative to the construction of utilities, roads, and commercial/industrial office building structures. Construction wastes will be primarily nonhazardous and can be managed as municipal solid waste (MSW) or construction/demolition debris. However, hazardous wastes in the form of used oils/lubricants, waste paints or other materials may be generated during construction. Through the development review process, the City will require that all Minnesota Pollution Control Agency (MPCA) and other applicable regulatory requirements be met in the management and disposal of construction-related wastes. Recycling will be strongly encouraged, however this will be the responsibility of the developer and/or the construction contractor.

Development within the Study Area may require the complete demolition of selected existing buildings and underground infrastructure. Demolition debris is inert material such as concrete, brick, glass, plastic, untreated wood, and rock. It is estimated that up to 70 percent of the solid wastes generated during building demolition will be recycled. The balance will be disposed of at a state permitted landfill.

If identified, any contaminated soils and/or groundwater disturbed by construction will be managed and addressed in accordance with a Response Action Plan/Construction Contingency Plan (RAP/CCP) prepared for the project and that will be submitted to the MPCA's Voluntary Investigation and Cleanup (VIC) Program and Petroleum Brownfields (PB) Program for review and approval. The RAP/CCP will include details on appropriate methods to handle and dispose of any such contaminated materials are encountered.

Hazardous waste is not anticipated to be generated during demolition of the existing buildings, except for abatement and removal of regulated materials such as asbestos, lead-based paint, refrigeration equipment, lights, and other regulated wastes if they are encountered. A pre-demolition Hazardous Materials Survey of the existing buildings will be completed prior to the start of demolition activities. If any regulated materials such as asbestos-containing materials, lead-based paint, and other regulated materials/wastes are present, an Abatement Plan will be prepared to address removal and proper disposal of regulated materials identified in the Hazardous Materials Survey. Following abatement and demolition activities, an Abatement Closeout Report will be prepared, which will document the removal, management, and disposal of the regulated materials.

Post-construction waste will be typical of commercial land uses and would be primarily managed as municipal solid waste. Limited volumes of hazardous wastes may be generated and would be determined by the individual businesses. Through the development review process, the City will require that all MPCA and other regulatory requirements be met.

14. Fish, Wildlife, Plant Communities, and Sensitive Ecological Resources (Rare Features):

a. Describe fish and wildlife resources as well as habitats and vegetation on or near the site.

The Study Area is partially developed with undeveloped and remediated areas consisting of wooded/forested, wetland, and brush/grassland land. According to Table 14-1 the majority cover type (36.32%) is wooded/forested. There are no US Geologic Survey (USGS) mapped streams within the Study Area. There is approximately 25-acres of wetland throughout the Study Area consisting of a mixture of forested and scrub-shrub wetlands. A large portion of the Study Area is developed or previously remediated, therefore the soils and plants have been disturbed.

The surrounding areas have similar resources consisting of wooded/forested, wetlands, and brush/grassland. The parcels to the north of the Study area are undeveloped and contain large areas of wetlands. The other surrounding areas, although not fully developed, contain commercial or residential properties as well as the airport to the east.

Table 14-1: Existing Land Cover

Land Cover Types	**Acres**	**Percentage**
Wetlands	24.8	20.7%
Deep Lakes/Rivers/Streams	0	0%
Wooded/Forest	43.5	36.3%
Brush/Grassland	7.3	6.1%
Cropland/Livestock rangeland/pasture	0	0%
Lawn/Landscaping	3.3	2.8%
Green infrastructure	0	0%
Impervious Surface	14.8	12.3%
Stormwater Ponds	0	0%
Other (Vacant/Superfund)	26.1	21.8%
Total	119.8	100%

b. *Describe rare features such as state-listed (endangered, threatened or special concern) species, native plant communities, Minnesota County Biological Survey Sites of Biodiversity Significance, and other sensitive ecological resources on or within close proximity to the site. Provide the license agreement number (LA-20180074) and/or correspondence number (ERDB_____) from which the data were obtained and attach the Natural Heritage letter from the DNR. Indicate if any additional habitat or species survey work has been conducted within the site and describe the results.*

A query of the Minnesota Department of Natural Resource's Natural Heritage Information system (NHIS) and the U.S. Fish and Wildlife Service's Information, Planning, and Conservation (IPaC) system (Exhibit E) was completed for the Study Area. Several species were identified as potentially being within the Study Area. The following table lists the species identified during these queries as well as their state and federal status at the time of the assessment.

Table 14-2: Protected Species

Common Name	**Scientific Name**	**Federal Status**	**State Status**
Canada Lynx	*Lynx canadensis*	Threatened	Special Concern
Gray Wolf	*Canis lupus*	Threatened	Delisted
Northern Long-eared Bat	*Myotis septentrionalis*	Endangered	Special Concern
Tricolored Bat	*Perimyotis subflavus*	Proposed Endangered	Special Concern
Piping Plover	*Charadrius melodus*	Endangered	Endangered
Monarch Butterfly	*Danaus plexippus*	Candidate	None
Floating Marsh Marigold	*Caltha natans*	None	Endangered
Rusty-patched Bumble Bee	*Bombus affinis*	Endangered	Watchlist
Soapberry	*Shepherdia canadensis*	None	Special Concern

With a lack of surface water features and apparent limited floral resources for pollinators, the Site does not provide suitable habitat for the Floating Marsh Marigold, Piping Plover, or Monarch Butterfly. With forested land covering large portions of the Site, it is possible, but unlikely the Rusty Patched Bumble Bee or Soapberry are present due other habitat requirements of these species. The Site is located within a critical habitat zone for the Canada Lynx. Forested portions of the site may provide habitat for the Lynx and Gray Wolf. Due to its history of disturbance, surrounding development and the type of forest (mixed conifer-hardwood) present, it is unlikely resident lynx or wolves occupy the Site. However, lynx or wolves may forage on and travel through the Site between areas of nearby preferred habitat. Additionally, trees on Site may provide nesting habitat for migratory birds and potential summer roosting habitat for the Northern Long-eared bat and Tri-colored bat. No specific habitat or species survey work has been conducted within the Study Area. Other common wildlife species may utilize the Study Area for food, water, and/or cover throughout the year. These species may include (but not limited to): whitetail deer, cottontail rabbit, raccoon, red fox, coyote, opossum, red-tailed hawk, American kestrel, and red-winged blackbird.

The Study Area is not located within a Minnesota Biological Survey (MBS) site of biodiversity significance, nor are any state-listed species or native plant communities known to exist within or adjacent to the Study Area. The Wild Rice Lake-Canosia Wetlands MBS Site is approximately 1.5 miles north of the Study Area. This MBS Site also contains a lake of biological significance (Wild Rice Lake ID: 69037100).

c. *Discuss how the identified fish, wildlife, plant communities, rare features and ecosystems may be affected by the project including how current Minnesota climate trends and anticipated climate change in the general location of the project may influence the effects. Include a discussion on introduction and spread of invasive species from the project construction and operation. Separately discuss effects to known threatened and endangered species*

Wildlife may be temporarily displaced during construction activities. Common wildlife is expected to occasionally visit or re-establish residence on the site and adjacent sites following construction. There are no anticipated effects to threatened and endangered species because of the proposed project.

Where current or future infestations of invasive plant species are identified (e.g. Phalaris arundinacea, also known as reed canary grass), appropriate control methods will be applied during construction and operations to limit the spread and impact of invasive species. During construction all disturbed lands will be permanently seeded to prevent the early spread and establishment of invasive plant species.

Climate change is anticipated to continue to get warmer each year, causing potential issues to wildlife, plant communities, and ecosystems. Climate change on or around the Study Area is estimated to be limited by the light industrial and business parks uses and low emissions of GHG. The site overall should not adversely affect wildlife in or around the study area.

d. *Identify measures that will be taken to avoid, minimize, or mitigate adverse effects to fish, wildlife, plant communities, and sensitive ecological resources.*

The layout of the proposed development (Exhibit A) has been designed to avoid and minimize impacts to the natural habitats in the following locations:

- Unavoidable wetland impacts will be minimized to the greatest extent feasible, considering the site constraints and the distribution of wetlands within the AUAR Study Area.
- Road layout that minimizes wetland impacts.
- Tree removals will be limited to the extent possible within each lot or parcel. A majority of the forested area is located in the northern and central portion of the site. Additionally, trees and shrubs will be planted as part of the landscaping plan for the associated development.
- Native prairie seeding may be incorporated in some non-mowed areas such as buffers along the perimeters of proposed stormwater management areas.
- Measures to prevent the spread of invasive species during construction include working in non-infested areas first before moving to infested areas, thoroughly cleaning equipment after working in infested areas, and before mobilizing to a different portion of the AUAR Study Area or a different off-site project, and revegetating disturbed areas as soon as possible after construction is completed in an area.

If development is proposed for the Study Area, additional consultation with the U.S. Fish and Wildlife Service (USFWS) and Minnesota Department of Natural Resources (MnDNR) regarding the suitability of Canada Lynx habitat present and potential impacts to the species is recommended. Also, if required for any proposed development, it is recommended to conduct vegetation and tree clearing from September 1-April 30 to avoid impacts to nesting migratory birds (nesting season is typically May-August). Additionally, any potential development projects for the Site should prioritize tree clearing work to occur during from November 15 -March 31 to avoid any impacts to the Northern Long-eared bat.

15. Historic Properties:

Describe any historic structures, archeological sites, and/or traditional cultural properties on or in close proximity to the site. Include: 1) historic designations, 2) known artifact areas, and 3) architectural features. Attach letter received from the State Historic Preservation Office (SHPO). Discuss any anticipated effects to historic properties during project construction and operation. Identify measures that will be taken to avoid, minimize, or mitigate adverse effects to historic properties.

Information was requested and received from the Minnesota Historical Society State Historic Preservation Office (SHPO) on February 24, 2023. Based on a search of both the Minnesota Archaeological Inventory and Historic Structures Inventory by SHPO, a Phase IA literature review and archaeological assessment was recommended to be completed by a qualified archaeologist to assess the potential for intact archaeological sites in the Study Area (Exhibit F). This recommendation does not apply in portions of the Study Area that have been significantly disturbed, that are occupied by current operating business, and in wetland areas. The majority of the Study Area has been previously disturbed or is developed; therefore, specific archaeological assessment area limits will be further defined by each individual parcel at the time of development. If a parcel is not developed or has been previously disturbed, it will be recommended that the parcel owner have a study completed within the parcel. This study should be completed by a qualified archaeologist and reported to the SHPO.

No buildings within a mile of the Study Area are listed within the National Registry of Historic Places (March 2023, National Register of Historic Places).

16. Visual:

Describe any scenic views or vistas on or near the project site. Describe any project related visual effects such as vapor plumes or glare from intense lights. Discuss the potential visual effects from the project. Identify any measures to avoid, minimize, or mitigate visual effects.

There are no scenic views or vistas on or near the Study Area. Based on the topography of the Study Area, there would be an increase in visual imprint within the Study Area since the proposed development scenario would construct buildings, streets, and stormwater ponds. Vapor plumes, lighting, or glare from the development scenario may occur on a per project basis.

17. Air:

a. *Stationary source emissions – Describe the type, sources, quantities and compositions of any emissions from stationary sources such as boilers or exhaust stacks. Include any hazardous air pollutants, criteria pollutants. Discuss effects to air quality including any sensitive receptors, human health or applicable regulatory criteria. Include a discussion of any methods used to assess the project's effect on air quality and the results of that assessment. Identify pollution control equipment and other measures that will be taken to avoid, minimize, or mitigate adverse effects from stationary source emissions.*

   Based on the Environmental Quality Board AUAR Guidance, this item is not applicable to an AUAR. Any stationary air emissions source large enough to merit environmental review requires individual review.

b. *Vehicle emissions – Describe the effect of the project's traffic generation on air emissions. Discuss the project's vehicle related emissions effect on air quality. Identify measures (e.g. traffic operational improvements, diesel idling minimization plan) that will be taken to minimize or mitigate vehicle-related emissions.*

As described further under item 20, there would be an increase in traffic as a result of the project which would result in an increase in the type of air pollution generated by vehicle exhaust. These air pollutants include carbon monoxide, nitrogen oxides, volatile organic compounds, particulate matter, greenhouse gases, and air toxics; however, the project would not substantially worsen traffic conditions and therefore a significant degradation of air quality is not expected.

c. *Dust and odors – Describe sources, characteristics, duration, quantities, and intensity of dust and odors generated during project construction and operation. (Fugitive dust may be discussed under item 17a). Discuss the effect of dust and odors in the vicinity of the project including nearby sensitive receptors and quality of life. Identify measures that will be taken to minimize or mitigate the effects of dust and odors.*

Based on the Environmental Quality Board AUAR Guidance, dust, odors, and construction noise need not be addressed in an AUAR, unless there is some unusual reason to do so.

Following the completion of the construction phase of the project, there will be some routine traffic to and from the project area (e.g. delivery shipments); however, significant levels of dust or odors are not anticipated.

18. Greenhouse Gas (GHG) Emissions/Carbon Footprint

a. *GHG Quantification: For all proposed projects, provide quantification and discussion of project GHG emissions. Include additional rows in the tables as necessary to provide project-specific emission sources. Describe the methods used to quantify emissions. If calculation methods are not readily available to quantify GHG emissions for a source, describe the process used to cometo that conclusion and any GHG emission sources not included in the total calculation.*

Table 18-1 includes a summary of the potential GHG emissions for the construction phase of this project. Table 18-2 includes a summary of the potential GHG emissions for the operations of this project.

The supporting calculations are included in Appendix D. Emission calculations are based on conservative assumptions, and therefore likely overestimates of actual emissions that may be generated from the proposed project.

The primary greenhouse gases emitted from the types of buildings that are anticipated include carbon dioxide (CO2), methane (CH4), and nitrous oxide (N2O) from the combustion of fossil fuels. A common way to report emissions of these gases is to multiply the emissions of each gas (in tons) by its global warming potential (GWP) and to report the total GHG emissions as total carbon dioxide equivalents (CO2e).

The following assumptions were made in estimating the greenhouse gas emissions from the project site buildings:

- Natural gas will be used for building space heating, water heating, and cooking in all buildings. The estimated annual natural gas usage for all buildings at the proposed project site is

approximately 48.51 million cubic feet (mcf) per year.
- Electricity uses at all buildings will include air conditioning, refrigeration, and other uses.

The GHG emissions from the buildings are estimated to be approximately 2,8296 tons per year (tpy) of CO2e.

Other direct sources of emissions added under Scope 1 include:

- Land Use Change
- Mobile Sources (vehicle tailpipe emissions) from vehicles traveling to and from the sites
- Mobile Sources for construction

Mobile source emissions from vehicles traveling to and from the site were estimated using the estimated number of trips generated by the proposed project from the Traffic Study. CO2e emissions from this source were estimated to be 38,612 tons per year. However, actual vehicle emissions will be highly dependent on vehicle type and total vehicle miles traveled. Estimates were not readily available for these variables, and therefore general assumption were made for vehicle types and vehicle miles traveled.
Scope 2 emissions from offsite electricity generation for electricity consumed at the residential buildings are estimated to be approximately 5,576 tons per year of CO2e. Scope 3 emissions from offsite waste management are estimated to be approximately 1,939 tons per year of CO2e. Actual electricity consumption would be dependent on the efficiency of the water heating systems, electrical fixtures, and appliances installed in the buildings. Actual types and quantities of wastes generated are not fully known and would depend on the waste diversion programs implemented by St. Louis County and/or the City of Hermantown (e.g., diversion of compostable organic materials and/or diversion of recyclable materials).

Table 18-1. Construction Emissions

Scope	Type of Emission	Emission Sub-type	Project-related CO_2e Emissions (tons/year)	Calculation method(s)
Scope 1	Combustion	Mobile Equipment	31.7	Fuel use estimated based on building square footage and data from Oregon's Nonroad Diesel Equipment Survey (August 2020). Emissions from diesel fuel combustion estimated based on emission factors taken from Table 2 and Table 5 of EPA's "Emission Factors for Greenhouse Gas Inventories" (April 2021). Refer to Appendix D for detailed calculations and data references.
Scope 1	Land Use	Conversion	71.6	Carbon flux calculated based on data from US EPA's "Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990–2021", Chapter 6: "Land Use, Land-Use Change, and Forestry" as well as anticipated land-use changes. Refer to Appendix D for detailed calculations and data references.
Scope 1	Land Use	Carbon Sink	0 [1]	N/A
TOTAL			88.4	

Table 18-2. Operational Emissions

Scope	Type of Emission	Emission Sub-type	Existing facility CO_2e Emissions (tons/year)	Project-Related CO_2e Emissions (tons/year)	Total CO2 Emissions (tons/year)	Calculation Method(s)
Scope 1	Combustion	Mobile Equipment	0	38,612 [2]	38,612 [2]	Total daily trips estimated based on Traffic Study. Emission factors based on EPA's "Emission Factors for Greenhouse Gas Inventories" (April 2021). Refer to Appendix D for detailed calculations and data references.
Scope 1	Combustion	Stationary Equipment	0	2,896	2,896	Natural gas use estimated based on data from U.S. Energy Information Administration (US EIA), "Natural gas consumption and conditional energy intensities (cubic feet) by end use, 2018" (December 2022). Emission factors used are from 40 CFR pt. 98. Refer to Appendix D for detailed calculations and data references.
Scope 1	Combustion	Area	0	0	0	N/A
Scope 1	Non-Combustion	Stationary Equipment	0	0	0	N/A
Scope 1	Land Use	Carbon Sink	0	0 [1]	0 [1]	N/A
Scope 2	Off-site Electricity	Grid-based	0	5,576	5,576	Electricity use estimated based on data from U.S. Energy Information Administration (US EIA), "Commercial Buildings Energy Consumption Survey - 2018" (May 2018). Emissions from electricity generation estimated based on emission factors taken from Table 6 of EPA's "Emission Factors for Greenhouse Gas Inventories" (April 2021).
Scope 2	Off-site Steam Production	Not applicable	0	0	0	N/A
Scope 3	Off-site Waste Management	Area	0	1,939	1,939	Commercial/industrial waste generation estimated based on data from US EPA National Overview: Facts and Figures on Materials, Wastes and Recycling and from California Department of Resources

Scope	Type of Emission	Emission Sub-type	Existing facility CO_2e Emissions (tons/year)	Project-Related CO_2e Emissions (tons/year)	Total CO2 Emissions (tons/year)	Calculation Method(s)
						Recycling and Recovery (CalRecycle). Emissions from waste management estimated based on emission factors taken from Table 9 of EPA's "Emission Factors for Greenhouse Gas Inventories" (April 2021).
TOTAL			0	46,230	46.230	

[1] Proposed land-use changes are not expected to produce greenhouse gas reductions (sinks).
[2] Limited data is available to vehicle type and vehicle miles traveled associated with vehicles trips generated by the proposed project,); therefore, general assumptions were made.

b. GHG *Assessment*

i. Describe any mitigation considered to reduce the project's GHG emissions.

Specific end users are not identified as part of the Draft AUAR, therefore GHG mitigation measures are not planned at this time. The mitigation will be the responsibility of each parcel owner and built into their planned construction.

ii. Describe and quantify reductions from selected mitigation, if proposed to reduce the project's GHG emissions. Explain why the selected mitigation was preferred.

Specific end users are not identified as part of the Draft AUAR, therefore GHG mitigation measures are not planned at this time and cannot be quantified. The mitigation will be the responsibility of each parcel owner and built into their planned construction.

iii. Quantify the proposed projects predicted net lifetime GHG emissions (total tons/#of years) and how those predicted emissions may affect achievement of the Minnesota Next Generation Energy Act goals and/or other more stringent state or local GHG reduction goals.

It is conservatively assumed that the project lifetime is 30 years. Over this 30-year period, the estimated greenhouse gas emissions associated with this project are approximately 301,260 tons of CO2e. As discussed earlier, this estimate includes emissions from onsite natural gas combustion, construction-phase mobile source emissions, and electricity usage. This estimate does not include mobile source emissions associated with vehicle trips to and from the site.

The estimated electricity usage from the project structures is included in the overall greenhouse gas emissions from offsite energy generation provided in Table 18-2 above. As Minnesota's power generation portfolio shifts toward using more renewable power generation sources such as wind and solar, the greenhouse gas emissions from offsite power generation would continue to be reduced over the lifetime of the project.

19. Noise:

Describe sources, characteristics, duration, quantities, and intensity of noise generated during project construction and operation. Discuss the effect of noise in the vicinity of the project including 1) existing noise levels/sources in the area, 2) nearby sensitive receptors, 3) conformance to state noise standards, and 4) quality of life. Identify measures that will be taken to minimize or mitigate the effects of noise.

Minnesota's noise pollution rules are based on statistical calculations that quantify noise levels over a one-hour monitoring period. The L10 calculation is the noise level that is exceeded for 10 percent, or six minutes, of the hour, and the L50 calculation is the noise level exceeded for 50 percent, or 30 minutes, of the hour. There is not a limit on maximum noise. The statutory limits for a residential location are L10 = 65 dBA and L50 = 60 dBA during the daytime (7:00 a.m. – 10:00 p.m.) and L10 = 55 dBA and L50 = 50 dBA during the nighttime (10:00 p.m. – 7:00 a.m.) (Minn. R. 7030.0040). This means that during the one-hour period of monitoring, daytime noise levels cannot exceed 65 dBA for more than 10 percent of the time or 60 dBA more than 50 percent of the time. The basic noise rules for other noise area classifications are:

Noise Area Classification	Daytime		Nighttime	
	L_{10}	L_{50}	L_{10}	L_{50}
1	65	60	55	50
2	70	65	70	65
3	80	75	80	75

The proposed project is not expected to generate significant noise. Noise generated from the study area after construction would be negligible compared to the noise from surrounding roadways. Therefore, the proposed project is not expected to contribute to excessive noise or nonconformance with the noise standards on or off-site.

20. Transportation:

a. *Describe traffic-related aspects of project construction and operation. Include: 1) existing and proposed additional parking spaces, 2) estimated total average daily traffic generated, 3) estimated maximum peak hour traffic generated and time of occurrence, 4) indicate source of trip generation rates used in the estimates, and 5) availability of transit and/or other alternative transportation modes.*

The development scenario will include the addition of roads within the study area. Each parcel configuration including roads within the parcel and parking spots will be determined at the time of construction of each parcel. A traffic study was completed by S^2 Traffic Solutions based on the Development Scenario (Exhibit G). Using the ITE Trip Generation Handbook, 3rd Edition, the average daily trips to the Study Area are estimated to be approximately 4,742 trips to the Study Area daily, if the Proposed Development Scenario is fully built. Peak traffic hours will occur from approximately 7:15 AM to 8:15AM with estimated traffic of approximately 286 trips and from 4:15 PM to 5:15 PM with estimated traffic of approximately 356 trips. The full traffic study can be found in Exhibit G.

b. Discuss the effect on traffic congestion on affected roads and describe any traffic improvements necessary. The analysis must discuss the project's impact on the regional transportation system. If the peak hour traffic generated exceeds 250 vehicles or the total daily trips exceeds 2,500, a traffic impact study must be prepared as part of the EAW. Use the format and procedures described in the Minnesota Department of Transportation's Access Management Manual, Chapter 5 (available at: http://www.dot.state.mn.us/accessmanagement/resources.html) or a similar local guidance.

The traffic study also analyzed surrounding roads including the following intersections:

- Lavaque BP & Martin Rd
- TH 53 & Abrahamson Rd
- TH 53 & Lavaque BP
- Ugstad Rd & Arrowhead Rd
- Lavaque BP & Access 1 (From East of Study Area)
- Lavaque BP & Access 2 (From East of Study Area)
- Abrahamson Rd & Access 2

A 2027 and 2045 scenario were analyzed, and delay, Level of Service (LOS), and queueing are all acceptable on an overall intersection and individual movement basis with the proposed project traffic. The only exception is the southbound left turning movement at the Abrahamson Rd and TH 53 intersection, which was within the "Less stable operation" category. The increased traffic to the Site may cause slightly longer wait times within the intersection, but simulation shows the queues clear quickly and features of the road such as the median may allow for faster clearing times.

c. Identify measures that will be taken to minimize or mitigate project related transportation effects.

No new direct access to the Study Area will be added from TH53. A median is planned on the Lavaque Bypass, this will mitigate any left turns into the Study Area near the intersection, preventing slowdowns in the area. The access to the Study Area will be through the roads laid out in the Development Scenario. Any additional access the Study Area from Abrahamson Rd and Lavaque Bypass will be through a right in-right out intersection.

21. Cumulative Potential Effects:
(Preparers can leave this item blank if cumulative potential effects are addressed under the applicable EAW Items)

a. Describe the geographic scales and timeframes of the project related environmental effects that could combine with other environmental effects resulting in cumulative potential effects.

The geographic scale considered in the cumulative potential effects analysis would include land adjacent to and within an approximately one-mile radius of the AUAR area. It is anticipated that the full buildout of the AUAR area would occur in phases over several years based on market conditions. Reasonably foreseeable projects that are funded or planned to be constructed within the next ten years would be considered for the cumulative potential effects analysis.

b. Describe any reasonably foreseeable future projects (for which a basis of expectation has been laid) that may interact with environmental effects of the proposed project within the geographic scales and timeframes identified above.

A desktop assessment of reasonably foreseeable projects was conducted as part of the Draft AUAR. Desktop resources reviewed included the EQB Monitor publication of upcoming projects, City of Hermantown's current and planned projects, and St. Louis County's construction projects. No projects are currently proposed (funded or planned) within the general geographic area of the Study Area. It is reasonable to assume additional commercial projects will be proposed along the TH53 corridor in the future. Environmental impacts from these future projects will be individually mitigated to ensure minimal cumulative impacts.

c. Discuss the nature of the cumulative potential effects and summarize any other available information relevant to determining whether there is potential for significant environmental effects due to these cumulative effects.

The projects addressed in Section 21 b. will not interact with the Study Area and should be small. No interactions with the environmental effects of the Study Area are expected.

22. Other potential environmental effects:
If the project may cause any additional environmental effects not addressed by items 1 to 19, describe the effects here, discuss the how the environmentwill be affected, and identify measures that will be taken to minimize and mitigate these effects.

No other potential environmental effects are anticipated to be included in the Draft AUAR.

Draft Mitigation Plan

As part of the AUAR, a mitigation plan is required. The mitigation plan lays out the commitments of the RGU provided within the AUAR. These commitments will be for the mitigation of large impacts from the development of the Study Area.

Resource Area	Mitigation
Climate Adaptation and Resilience	Habitat will be left within the snowmobile trail to allow for wildlife to travel through the Study Area.
	Increased impervious surfaces will be offset by stormwater management ponds with storage capacity based on future precipitation levels.
Permits and approvals required	Permits and approvals are laid out in Section 9 in Table 9-1. Each applicable permit will be obtained on a per project basis.
Land Use	Rezoning of the Study Area to fit the Development Scenario.
	Each parcel within Airport Safety Zone 2 shall not be less than 2.5 acres and prohibits uses that attract/house crowds.
Geology, soils and topography/land forms	Appropriate NPDES construction stormwater permits and MS4 approval will be obtained and followed for each parcel.
	Geotechnical investigation shall be conducted within each parcel based on individual building construction and site layout.
Water Resources	If dewatering is anticipated to exceed 10,000 gallons per day or 1,000,000 gallons per year, the contractor performing the applicable work will obtain a Temporary Construction Dewatering Water Appropriations Permit from the Minnesota Department of Natural Resources (MDNR) prior to initiating dewatering activities.
	Appropriate NPDES construction stormwater permits and MS4 approval will be obtained and followed for each parcel.
	A sanitary sewer line and lift station with force-main will be constructed within the Study Area.
	Stormwater management including but not limited to stormwater ponds should be constructed for each parcel.
	City of Hermantown will construct two watermain crossings bored under U.S. Highway 53, one under Abrahamson Road and one under Lavaque Bypass Road, creating a watermain loop through the Study Area.
	Wetland impacts including filling, excavating, or draining activities must be minimized and permitted by Minnesota Wetland Conservation Act and Federal Clean Water Act
Contamination/Hazardous Materials/Wastes	Phase I Environmental Site Assessment (ESA) should be completed on each parcel, if not already completed within one year. If recommended, a Phase II ESA should be conducted on each parcel.

	If identified within the Phase II ESA, any contaminated soils and/or groundwater disturbed by construction will be managed and addressed in accordance with a Response Action Plan/Construction Contingency Plan (RAP/CCP) prepared for the project and that will be submitted to the MPCA's Voluntary Investigation and Cleanup (VIC) Program and Petroleum Brownfields (PB) Program for review and approval. The RAP/CCP will include details on appropriate methods to handle and dispose of any such contaminated materials are encountered.
	Construction-related waste will be recycled or disposed of in approved facilities, as appropriate. Toxic or hazardous substances used during project construction or operations (i.e., petroleum products, hydraulic fluid, and other chemical products) will be stored and disposed of following local and state guidelines.
	Each project would comply with applicable laws, rules, and ordinances related to the management of solid and hazardous wastes per Minnesota Statutes, section 473.811. Recycling for commercial buildings in the Study Area will be in accordance with the 2016 Recycling Law (Minnesota Statutes Chapter 115A, Section 115A.151 and Section 115A.552), and relevant City codes requiring source separation and curbside pick-up.
	Locations and uses of storage tanks and associated dispensing equipment will comply will all state and location rules and regulations.
	A pre-demolition Hazardous Materials Survey of the existing buildings will be completed prior to the start of demolition activities. If any regulated materials such as asbestos-containing materials, lead-based paint, and other regulated materials/wastes are present, an Abatement Plan will be prepared to address removal and proper disposal of regulated materials identified in the Hazardous Materials Survey. Following abatement and demolition activities, an Abatement Closeout Report will be prepared, which will document the removal, management, and disposal of the regulated materials.
Fish, wildlife, plant communities, and sensitive ecological resources (rare features)	Unavoidable wetland impacts will be minimized to the greatest extent feasible, considering the site constraints and the distribution of wetlands within the Study Area.
	Tree removals will be limited to the extent possible within each lot or parcel. Trees and shrubs will be planted as part of the landscaping plan for the associated development.
	Native prairie seeding may be incorporated in some non-mowed areas such as buffers along the perimeters of proposed stormwater management areas.

	Vegetation and tree clearing from should occur September 1-April 30 to avoid impacts to nesting migratory birds (nesting season is typically May-August)
	Parcel construction should prioritize tree clearing work to occur from November 15 -March 31 to avoid any impacts to the Northern Long-eared bat.
	Measures to prevent the spread of invasive species during construction include working in non-infested areas first before moving to infested areas, thoroughly cleaning equipment after working in infested areas, and before mobilizing to a different portion of the AUAR Study Area or a different off-site project and revegetating disturbed areas as soon as possible after construction is completed in an area.
	Additional consultation with the U.S. Fish and Wildlife Service (USFWS) and Minnesota Department of Natural Resources (MnDNR) regarding the suitability of Canada Lynx habitat present and potential impacts to the species is recommended before construction on any parcel.
Historic properties	If a parcel is not developed or has not been previously disturbed, the parcel owner must have a Phase IA literature review and archaeological assessment completed within the parcel. This study should be completed by a qualified archaeologist and reported to the SHPO.
Greenhouse Gas (GHG) Emissions/Carbon Footprint	Specific end users are not identified as part of the Draft AUAR, therefore GHG mitigation measures are not planned at this time. The mitigation will be the responsibility of each parcel owner and built into their planned construction.
Transportation	No new direct access to the Study Area will be added from TH53. A median is planned on the Lavaque Bypass, this will mitigate any left turns into the Study Area near the intersection, preventing slowdowns in the area. The access to the Study Area will be through the roads laid out in the Development Scenario. Any additional access the Study Area from Abrahamson Rd and Lavaque Bypass will be through a right in-right out intersection.

Appendix A

Project Location Maps

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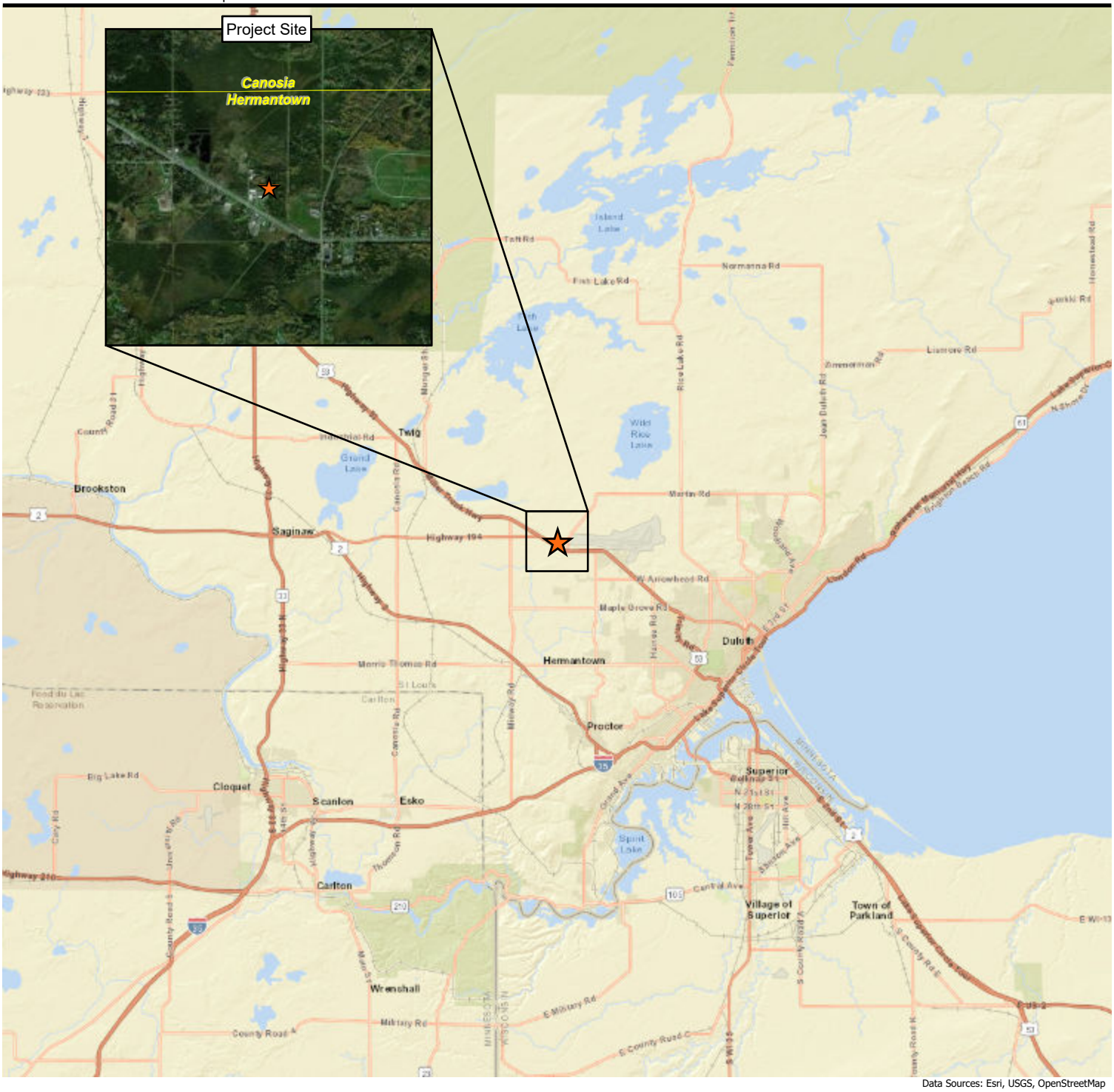

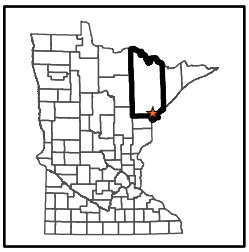

N

0 2.5 5

Miles

Scale 1" = 5 mi

BRAUN INTERTEC
The Science You Build On.

11001 Hampshire Avenue S
Minneapolis, MN 55438
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Project No:
B2207985

Drawing No:
Fig1_CntyLocMap

Drawn By:	ZS
Date Drawn:	12/6/2022
Checked By:	MUB
Last Modified:	4/5/2023

Hermantown Business Park

West of Lavaque Bypass and North of TH 53

Hermantown, Minnesota

Project Location Map

Figure 1

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Sources: St. Louis County, MN DOT, Esri, USGS, OpenStreetMap

AUAR Study Area
County Parcels

N

0 300 600 Feet

Scale 1" = 600'

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Project No: B2207985

Drawing No: Fig2_AUAR Boundary

Drawn By:	ZS
Date Drawn:	12/6/2022
Checked By:	MUB
Last Modified:	4/5/2023

Hermantown Business Park

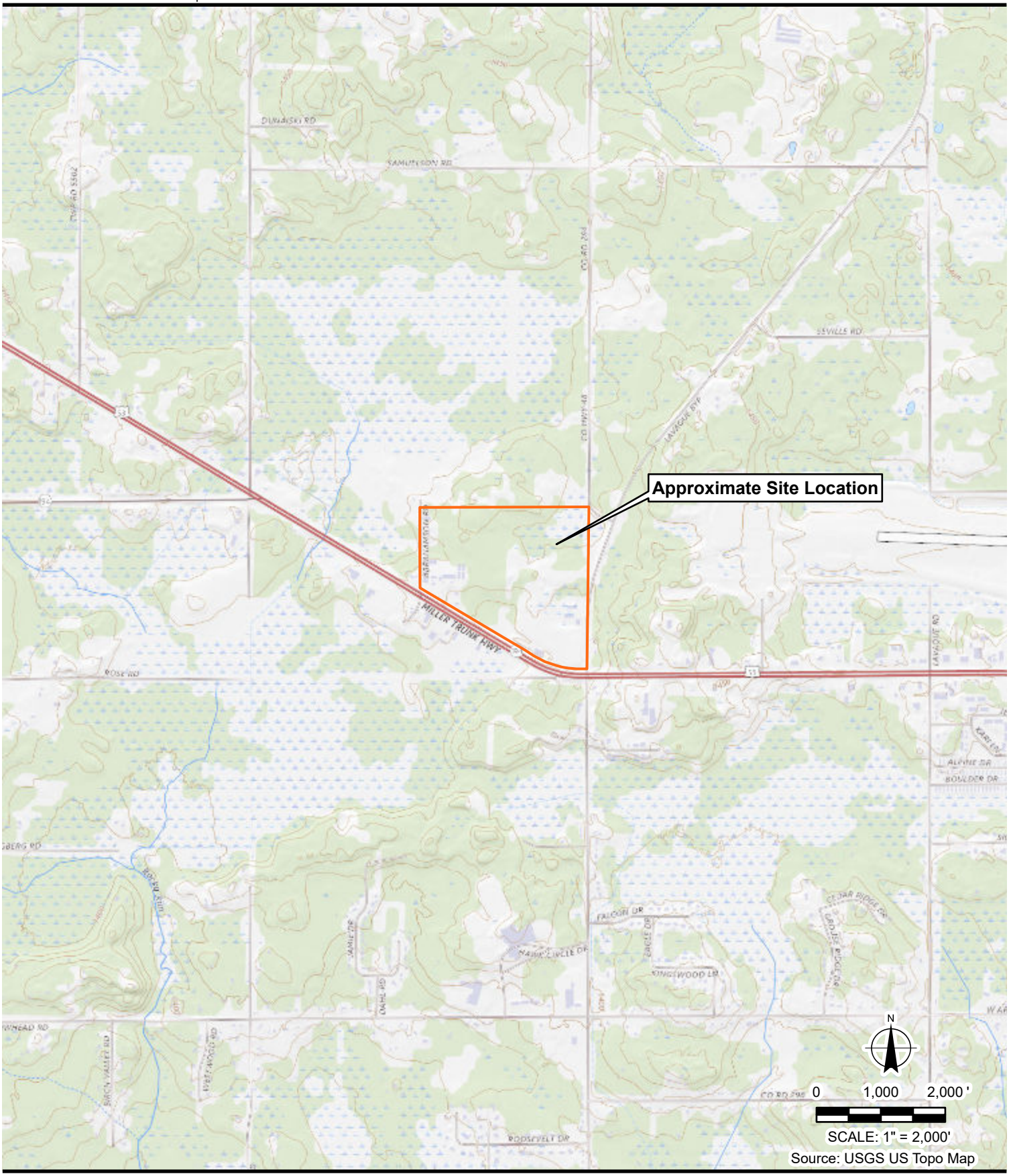
West of Lavaque Bypass and North of TH 53

Hermantown, Minnesota

AUAR Study Area Boundaries

Figure 2

F:\2022\B2207985\GIS\B2207985.aprx



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Drawing No: Fig3_USGS_Topo

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Hermantown Business Park

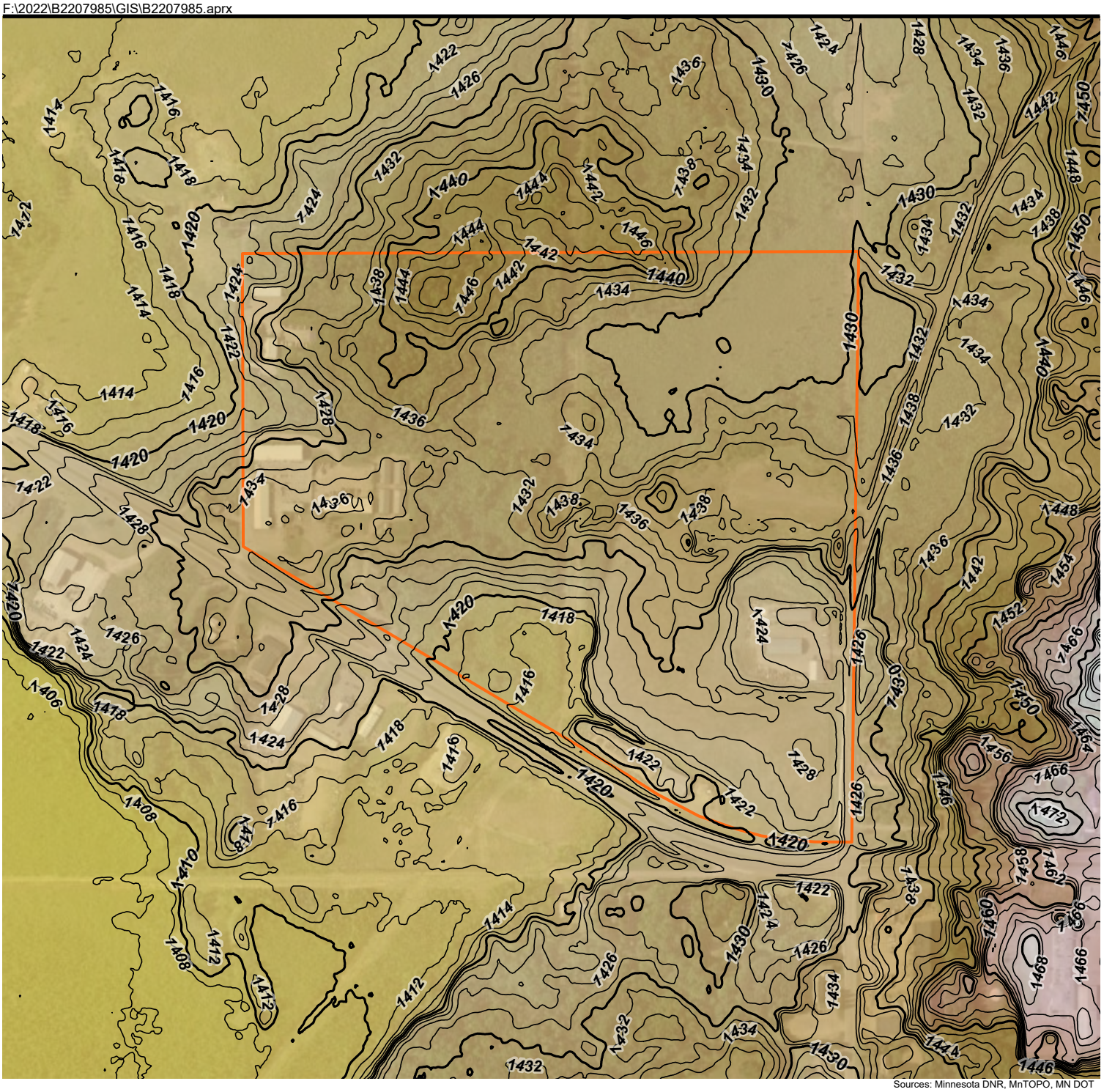
West of Lavaque Bypass and North of TH 53

Hermantown, Minnesota

USGS Topographic Map

Figure 3

F:\2022\B2207985\GIS\B2207985.aprx



Sources: Minnesota DNR, MnTOPO, MN DOT

AUAR Study Area

MnTOPO Surface Contours

2' Intermediate Contour

10' Index Contour

N

0 300 600

Feet

Scale 1" = 600'

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Hermantown Business Park

West of Lavaque Bypass and North of TH 53

Hermantown, Minnesota

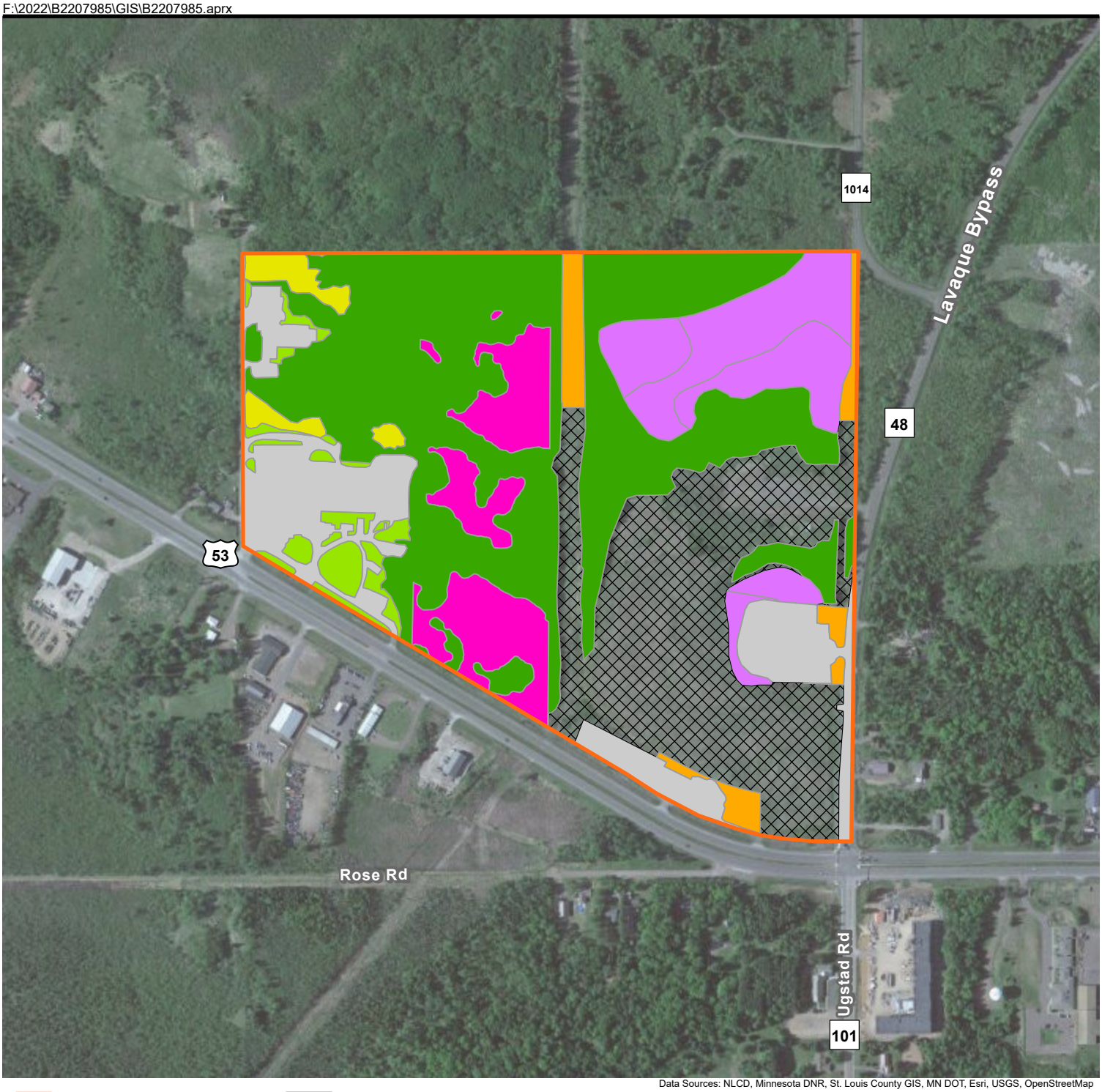
Lidar Topographic Map

Figure 4

Appendix B

Land Use Features

F:\2022\B2207985\GIS\B2207985.aprx



Data Sources: NLCD, Minnesota DNR, St. Louis County GIS, MN DOT, Esri, USGS, OpenStreetMap

- AUAR Study Area
- Brush/Grassland
- Impervious Surface
- Lawn/Landscaping
- Wooded/Forest
- Superfund/Vacant
- Delineated Wetland
- National Wetland Inventory
- Approximate Wetland Areas

N

0 300 600 Feet

Scale 1" = 600'

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Project No: B2207985

Drawing No: Fig5_ExLandCover

Drawn By:	ZS
Date Drawn:	12/6/2022
Checked By:	MUB
Last Modified:	4/5/2023

Hermantown Business Park

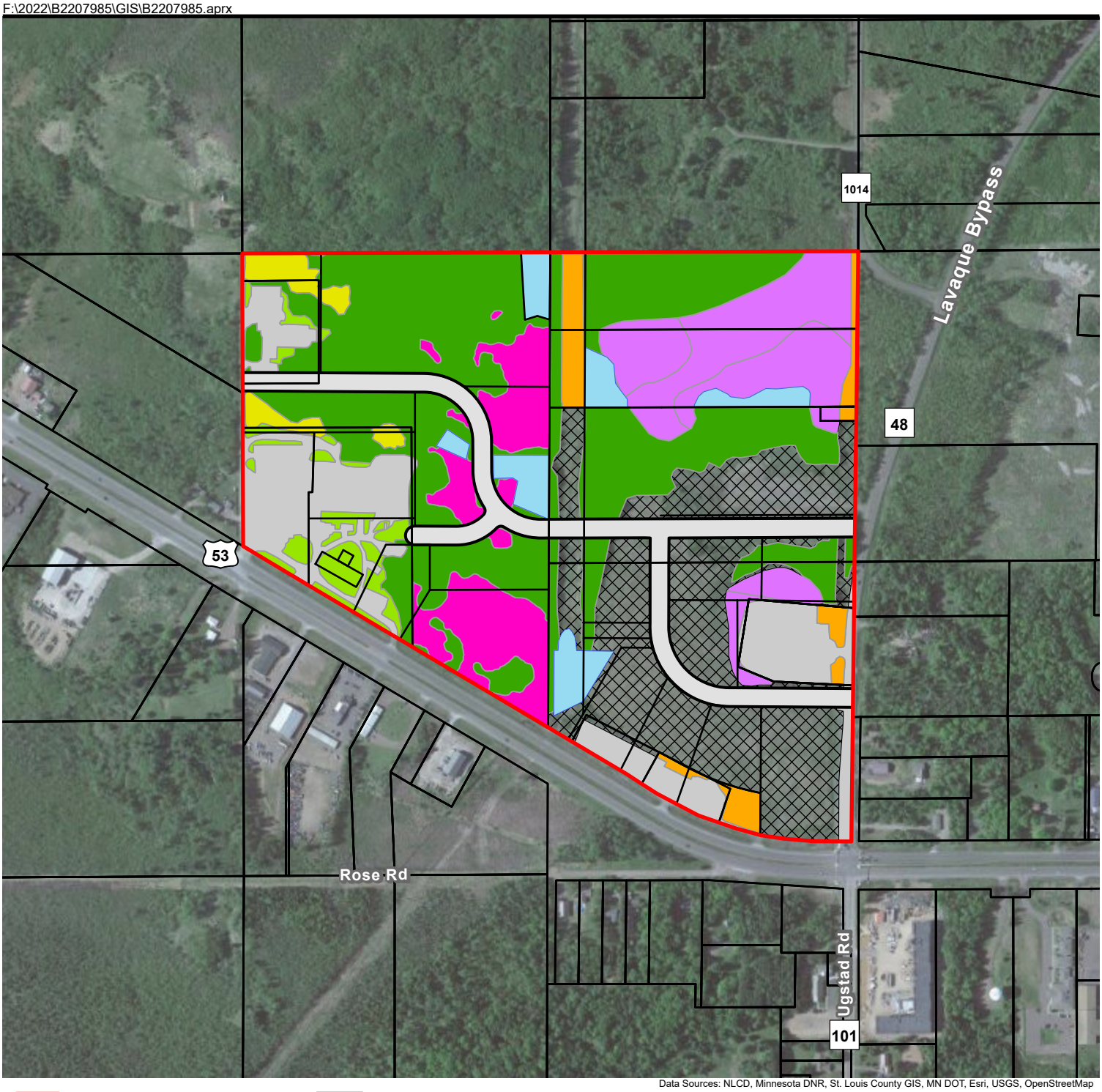
West of Lavaque Bypass and North of TH 53

Hermantown, Minnesota

Existing Land Cover Type

Figure 5

F:\2022\B2207985\GIS\B2207985.aprx



Data Sources: NLCD, Minnesota DNR, St. Louis County GIS, MN DOT, Esri, USGS, OpenStreetMap

- AUAR Study Area
- Site Parcels, Lots, and Buildings
- Brush/Grassland
- Impervious Surface
- Lawn/Landscaping
- Wooded/Forest
- Superfund/Vacant
- Delineated Wetland
- National Wetland Inventory
- Approximate Wetland Areas
- Road
- Proposed Storm Pond

N

0 300 600 Feet

Scale 1" = 600'

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Project No: B2207985

Drawing No: Fig6_PropLandCover

Drawn By:	ZS
Date Drawn:	12/6/2022
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Hermantown Business Park

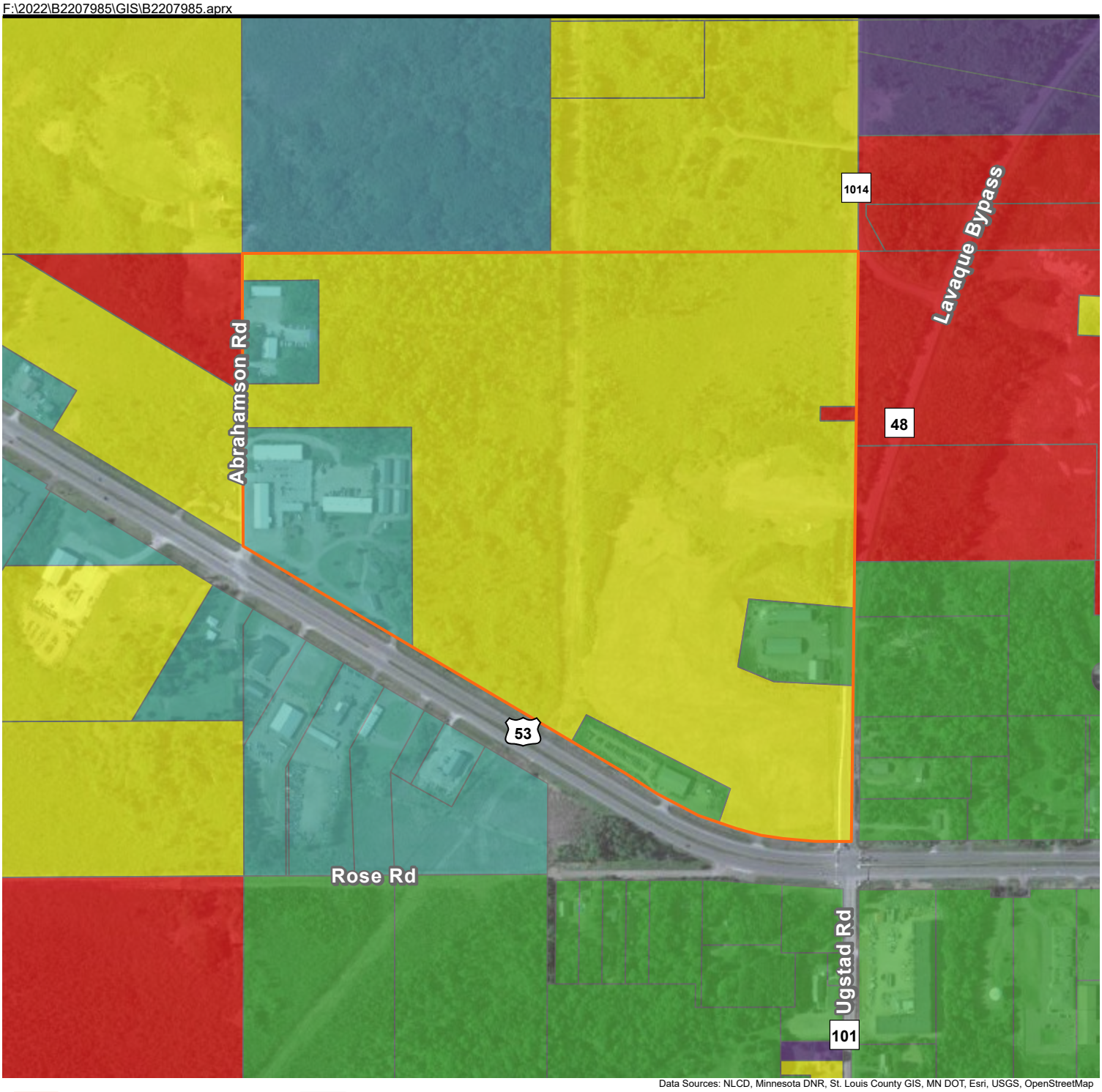
West of Lavaque Bypass and North of TH 53

Hermantown, Minnesota

Proposed Land Cover Type

Figure 6

F:\2022\B2207985\GIS\B2207985.aprx



Data Sources: NLCD, Minnesota DNR, St. Louis County GIS, MN DOT, Esri, USGS, OpenStreetMap

AUAR Study Area

Land Use:

- Undeveloped
- Mixed Use
- Commercial
- Heavy Industrial
- Office/Light Industrial
- Residential

N

0 300 600 Feet

Scale 1" = 600'

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Project No: B2207985

Drawing No: Fig7_ExistingLandUse

Drawn By:	ZS
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Checked By:	MUB
Last Modified:	4/5/2023

Hermantown Business Park

West of Lavaque Bypass and North of TH 53

Hermantown, Minnesota

Existing Land Use

Figure 7

F:\2022\B2207985\GIS\B2207985.aprx

Data Sources: NLCD, Minnesota DNR, St. Louis County GIS, MN DOT, Esri, USGS, OpenStreetMap

AUAR Study Area

Proposed Land Use:

- Road
- Stormwater Management
- Approximate Wetland Areas
- Delineated Wetland
- National Wetland Inventory
- Commercial
- Light Industrial/Warehouse
- Outlot

N

0 300 600 Feet

Scale 1" = 600'

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Project No: B2207985

Drawing No: Fig8_PropLandUse

Drawn By:	ZS
Date Drawn:	12/6/2022
Checked By:	MUB
Last Modified:	4/5/2023

Hermantown Business Park

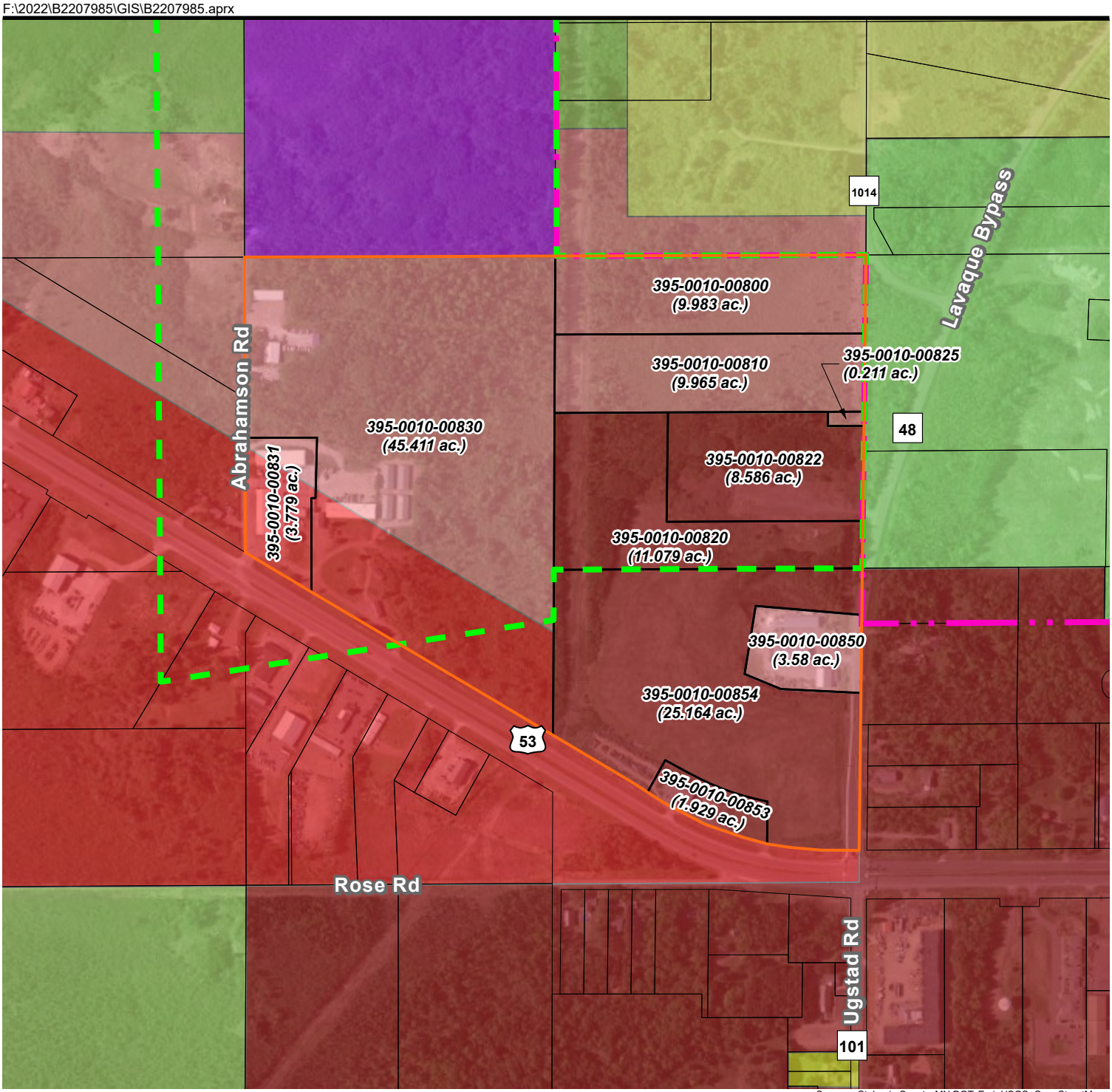
West of Lavaque Bypass and North of TH 53

Hermantown, Minnesota

Proposed Land Use

Figure 8

F:\2022\B2207985\GIS\B2207985.aprx



Sources: St. Louis County, MN DOT, Esri, USGS, OpenStreetMap

AUAR Study Area
County Parcels
MN MuniCityTerUnorg
Airport Zone 1
Airport Zone 2

Hermantown Zoning Districts
General Commercial
Office/Light Industrial
Adult Use
Heavy Industrial

Conservation/Open Space
Public Facilities
Residential
Residential

N

0 300 600
Feet

Scale 1" = 600'

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Project No: B2207985

Drawing No: Fig9_Zoning

Drawn By:	ZS
Date Drawn:	12/6/2022
Checked By:	MUB
Last Modified:	4/5/2023

Hermantown Business Park

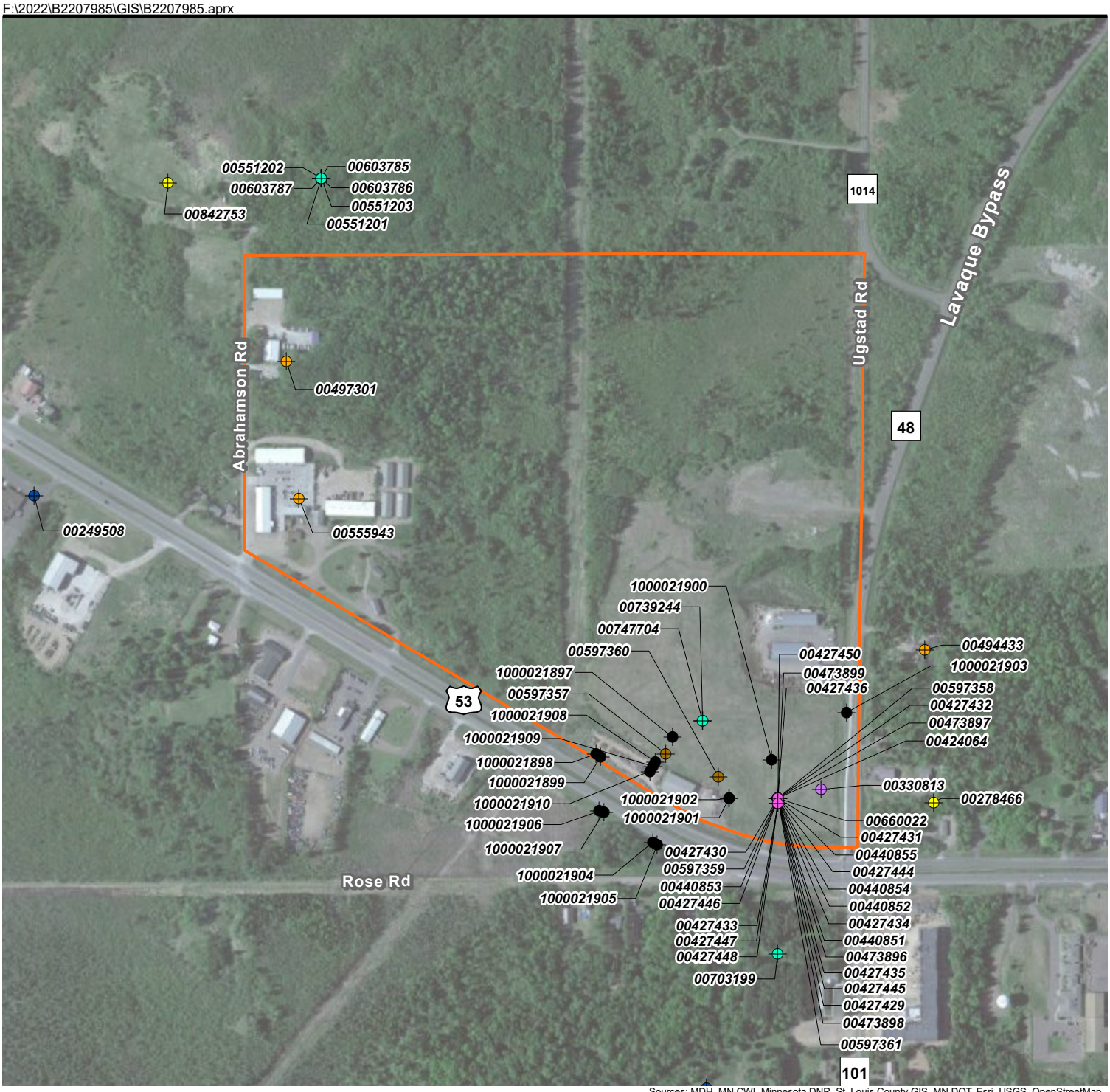
West of Lavaque Bypass and North of TH 53

Hermantown, Minnesota

Current Zoning Map

Figure 9

F:\2022\B2207985\GIS\B2207985.aprx



Sources: MDH, MN CWI, Minnesota DNR, St. Louis County GIS, MN DOT, Esri, USGS, OpenStreetMap

Verified Wells
- No Use Assigned
- Domestic
- Monitor Well
- Other (specify in remarks)
- Public Suppply/Non-Comm.-Transient

Unverified Wells
- Domestic
- Monitor Well
- Test Well
- AUAR Study Area

** No wellhead protection areas within the map's projection**

N

0 300 600 Feet

Scale 1" = 600'

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Project No: B2207985

Drawing No: Fig10_Wells

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Hermantown Business Park

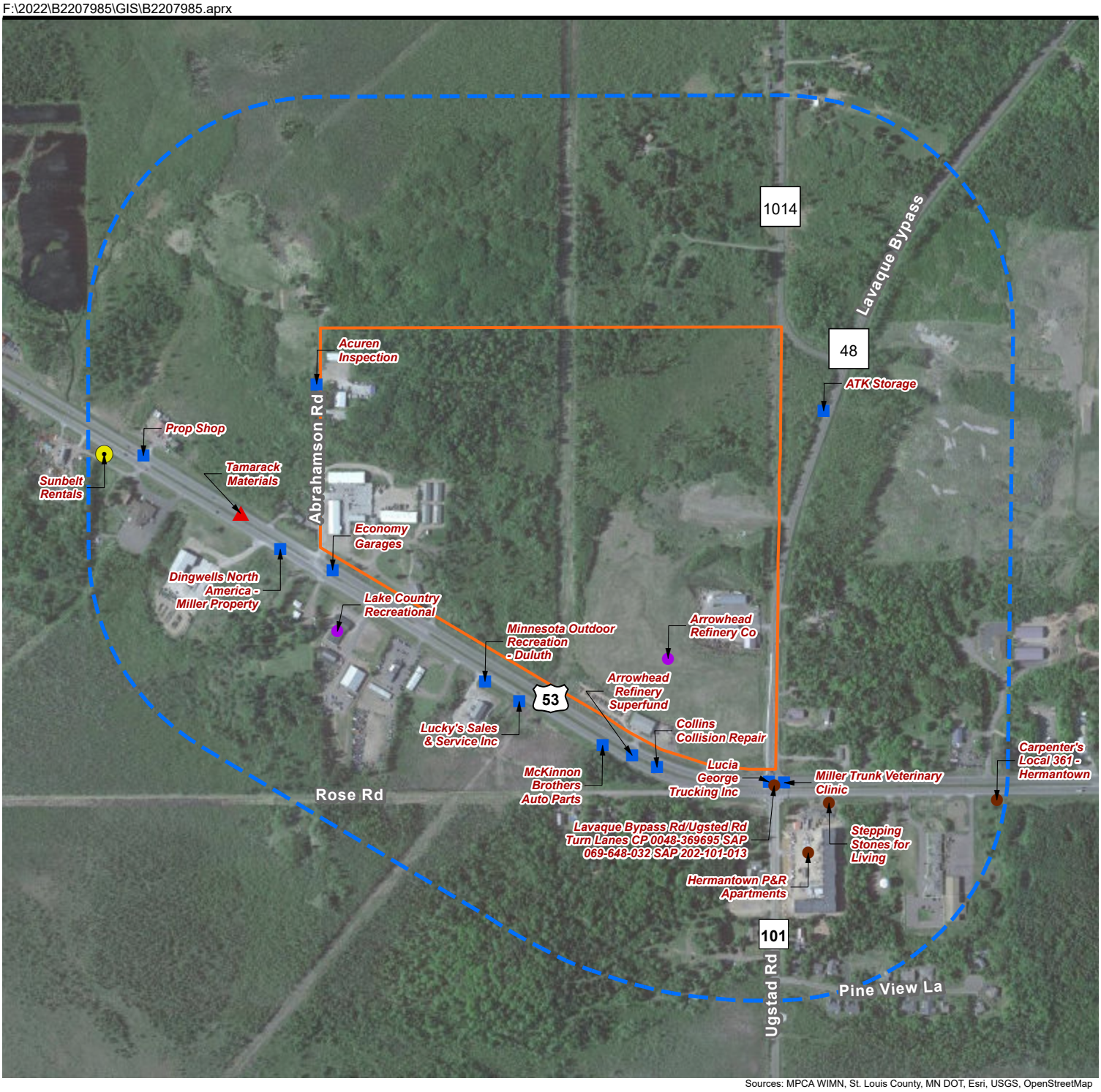
West of Lavaque Bypass and North of TH 53

Hermantown, Minnesota

MDH Wells and Wellhead Protection Area

Figure 10

F:\2022\B2207985\GIS\B2207985.aprx



Sources: MPCA WIMN, St. Louis County, MN DOT, Esri, USGS, OpenStreetMap

AUAR Study Area
Quarter Mile Radius

Program Name
- Hazardous Waste
- Investigation and Cleanup
- Multiple Programs
- Stormwater
- Tanks

N

0 400 800 Feet

Scale 1" = 800'

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Project No:	B2207985
Drawing No:	Fig11_MPCA Permitted
Drawn By:	ZS
Date Drawn:	12/6/2022
Checked By:	MUB
Last Modified:	4/5/2023

Hermantown Business Park

West of Lavaque Bypass and North of TH 53

Hermantown, Minnesota

MPCA Permitted Features

Figure 11

F:\2022\B2207985\GIS\B2207985.aprx

Data Sources: Minnesota DNR, St. Louis County GIS, MN DOT, Esri, USGS, OpenStreetMap

AUAR Study Area

Snowmobile Trail

City, Township, Unorganized Territory Boundaries, Minnesota

N

0 1,000 2,000 Feet

Scale 1" = 2,000'

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Project No: B2207985

Drawing No: Fig12_TrailsParksRec

Drawn By:	ZS
Date Drawn:	12/6/2022
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Last Modified:	4/5/2023

Hermantown Business Park

West of Lavaque Bypass and North of TH 53

Hermantown, Minnesota

Parks, Trails, and Other Recreational Areas

Figure 12

Appendix C

Natural Resources

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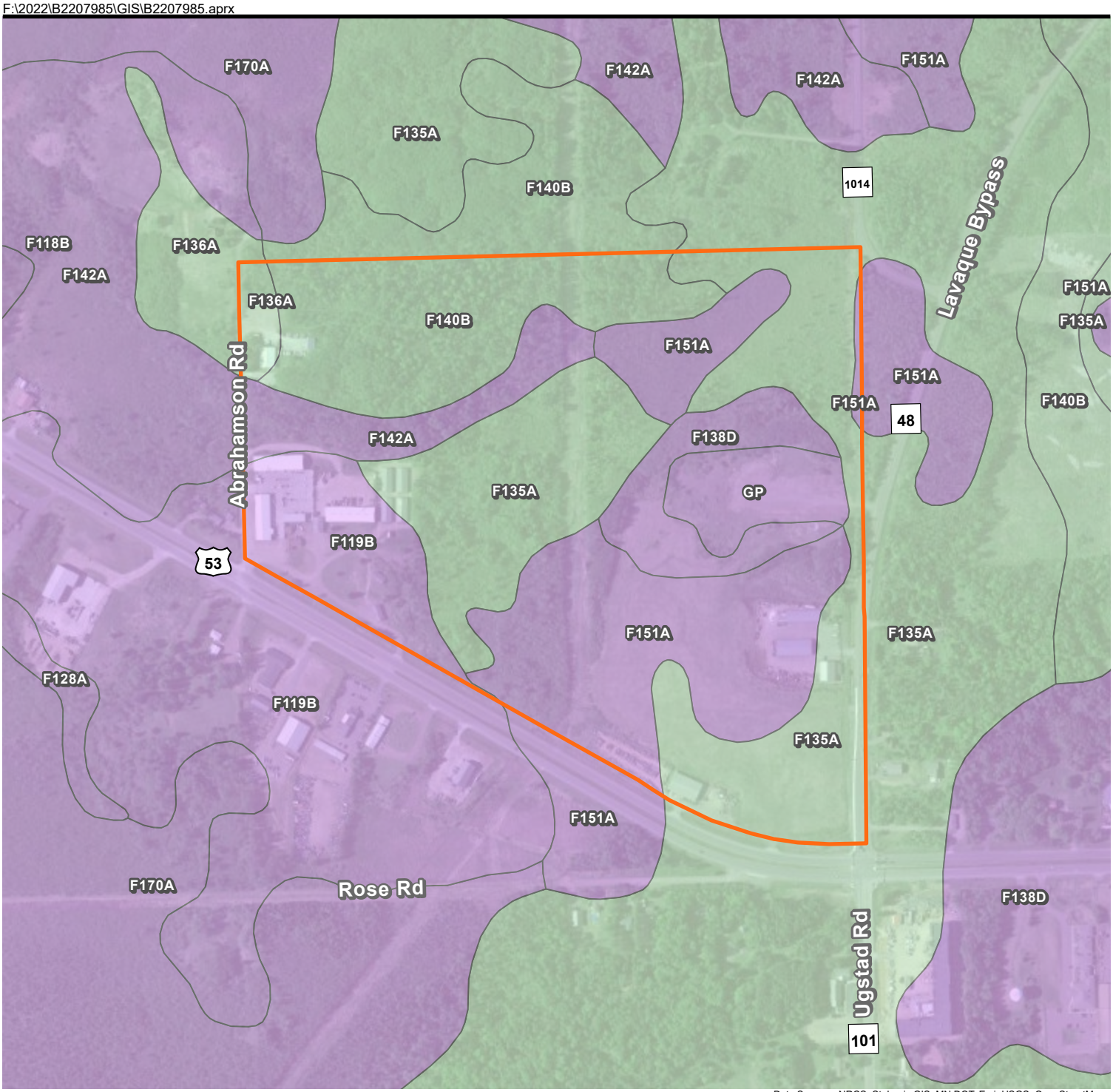
F:\2022\B2207985\GIS\B2207985.aprx



Data Sources: NRCS, St. Louis GIS, MN DOT, Esri, USGS, OpenStreetMap

AUAR Study Area

Farmland Class

Farmland of statewide importance

Not prime farmland

N

0 300 600 Feet

Scale 1" = 600'

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Project No: B2207985

Drawing No: Fig13_NRCS Soils

Drawn By:	ZS
Date Drawn:	12/6/2022
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Hermantown Business Park

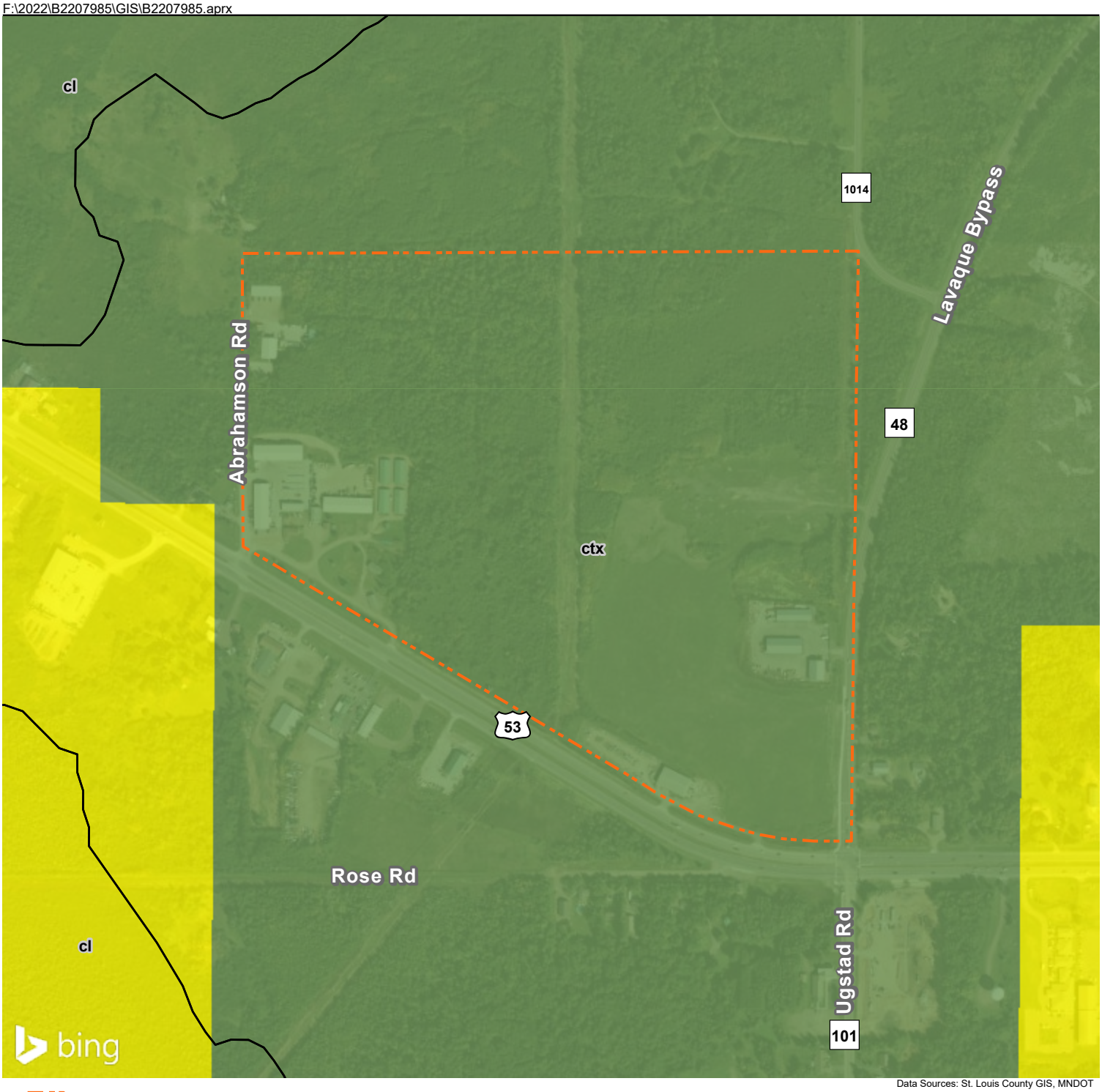
West of Lavaque Bypass and North of TH 53

Hermantown, Minnesota

NRCS County Soil Survey

Figure 13

F:\2022\B2207985\GIS\B2207985.aprx



Data Sources: St. Louis County GIS, MNDOT

AUAR Study Area

Map Label - Lithology - Description

cl - Silt - Clay, silt, and fine- to medium-grained sand

ctx - Diamicton - Till, silt and clay, sand, and gravel

Depth to Bedrock (50 ft. interval)

0 - 50

51 - 100

N

0 300 600

Feet

Scale 1" = 600'

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Project No: B2207985

Drawing No: Fig14_Surf Geo

Drawn By:	ZS
Date Drawn:	12/6/2022
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Hermantown Business Park

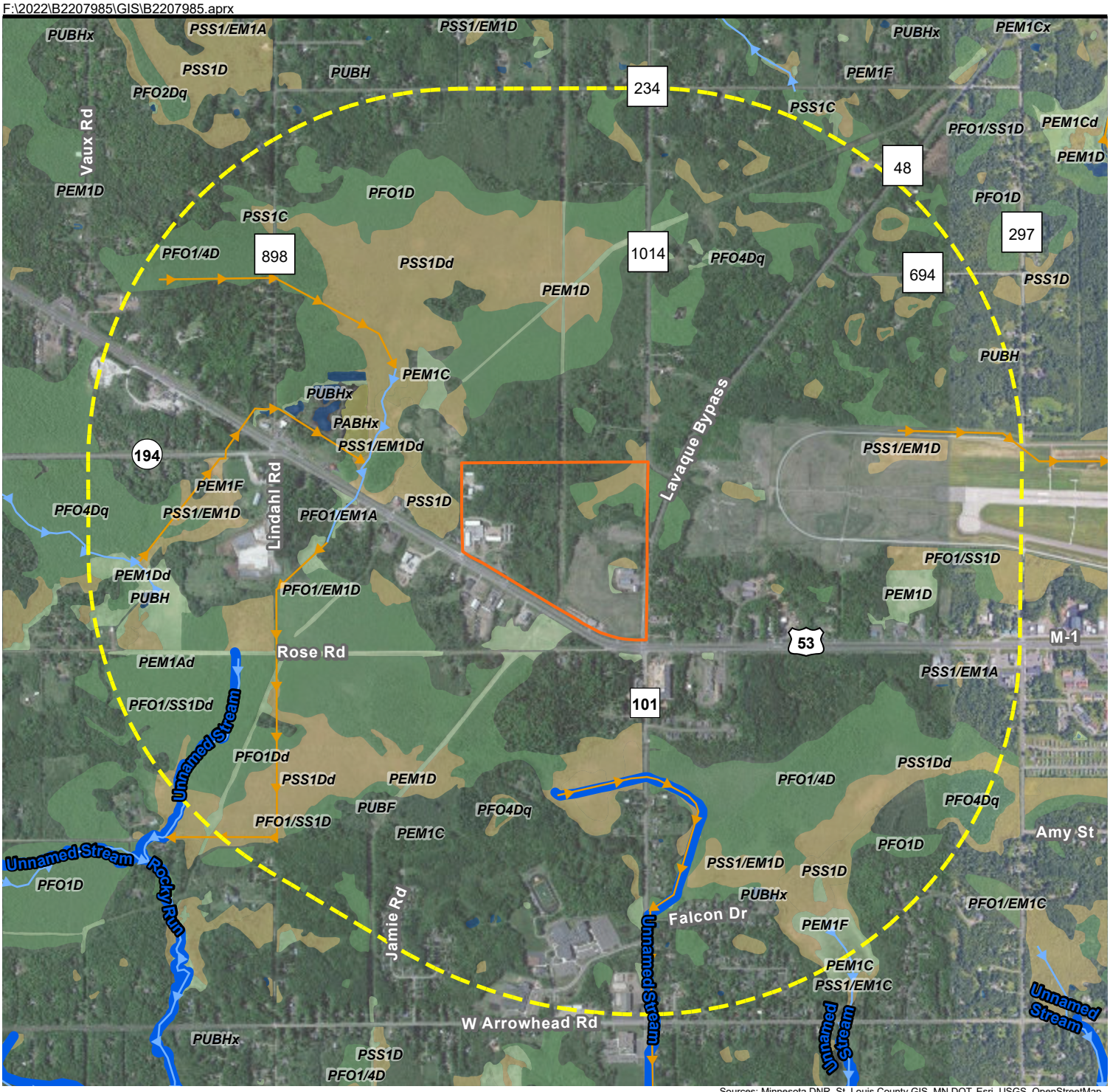
West of Lavaque Bypass and North of TH 53

Hermantown, Minnesota

Surficial Geology

Figure 14

F:\2022\B2207985\GIS\B2207985.aprx



Sources: Minnesota DNR, St. Louis County GIS, MN DOT, Esri, USGS, OpenStreetMap

AUAR Study Area

1 Mile Radius

USGS (NHD) Flowline

- Canal Ditch
- Stream River
- MnDNR Public Water Watercourse

NWI Cowardin Class

- Aquatic Bed/Nonpersistent Emergent
- Emergent
- Forested
- Scrub-Shrub
- Unconsolidated Bottom (Open Water)

** No MNDNR public water basins with in the one-mile radius of the study area **

N

0 1,000 2,000 Feet

Scale 1" = 2,000'

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Drawing No: Fig15_Surf Water

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Hermantown Business Park

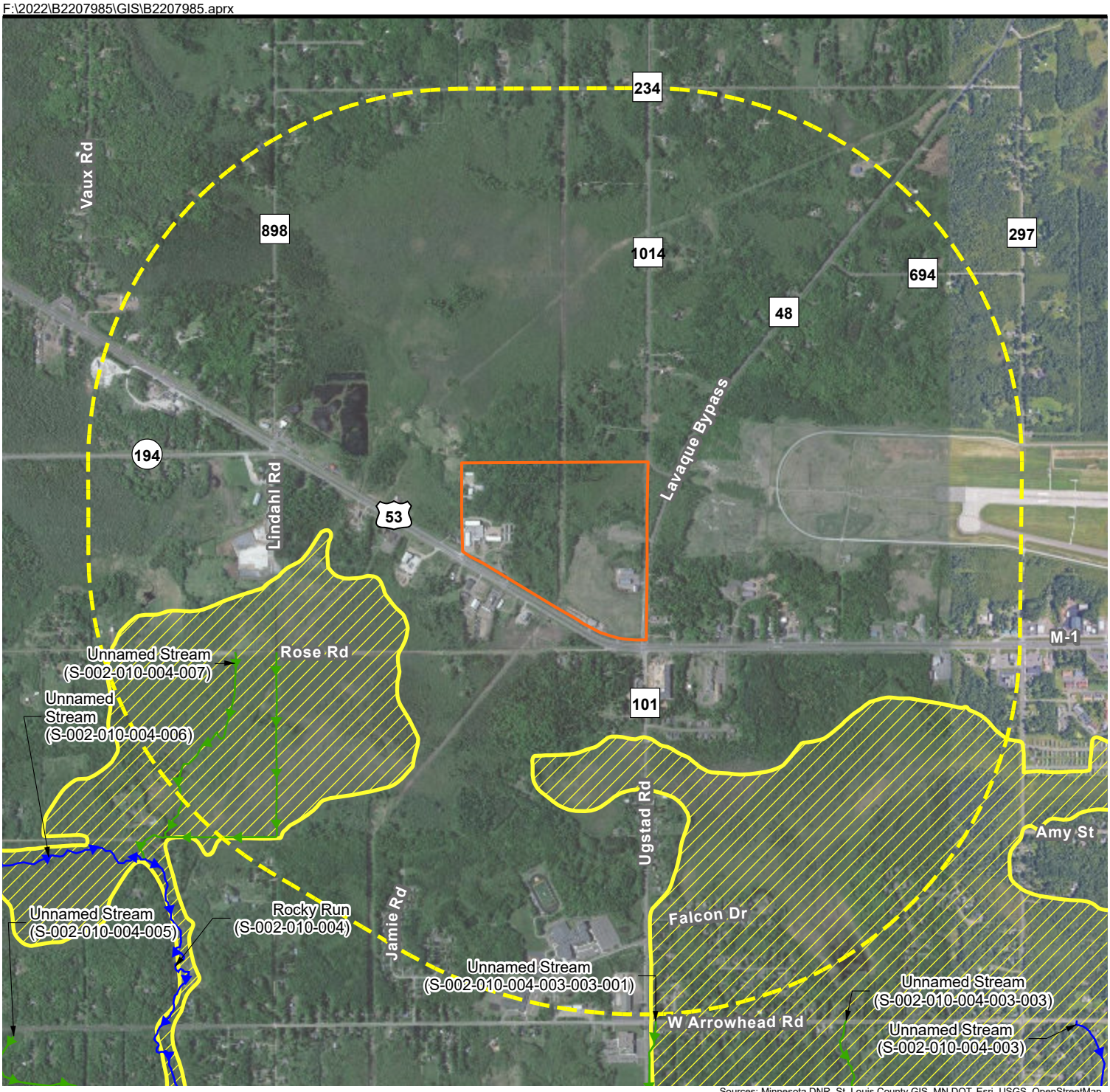
West of Lavaque Bypass and North of TH 53

Hermantown, Minnesota

Surface Waters

Figure 15

F:\2022\B2207985\GIS\B2207985.aprx



Sources: Minnesota DNR, St. Louis County GIS, MN DOT, Esri, USGS, OpenStreetMap

AUAR Study Area

1 Mile Radius

Designated Trout Stream

Protected Tributary to Designated Trout Stream

100-year Floodplain

** No impaired waters within the map's projection **

N

0 1,000 2,000 Feet

Scale 1" = 2,000'

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Drawing No: Fig16_SpecialWater

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Hermantown Business Park

West of Lavaque Bypass and North of TH 53

Hermantown, Minnesota

Special and Impaired Waters

Figure 16

Appendix D

Greenhouse Gas Emission Calculations

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Project No.: B2207985

Hermantown Business Part
Greenhouse Gas Calculations

Greenhouse Gas Emissions Summary

Direct Emissions

Operations - Facility Fuel Combustion Sources	CO_2	CH_4	N_2O	Mass Sum	CO_2e
	TPY	TPY	TPY	TPY	TPY
Natural Gas Usage	2,893	5.45E-02	5.45E-03	2,893	2,896

Operations - Mobile Source Combustion	CO_2	CH_4	N_2O	Mass Sum	CO_2e
	TPY	TPY	TPY	TPY	TPY
Mobile Sources (Vehicle Traffic)	37,936	1.22	2.17	37,939	38,611.9

Construction - Mobile Source Combustion	CO_2	CH_4	N_2O	Mass Sum	CO_2e
	TPY	TPY	TPY	TPY	TPY
Mobile Sources (Construction)	31.3	6.13E-04	1.44E-03	31.3	31.7

Construction - Land-Use	CO_2e
	TPY
Land-Use (Construction)	71.6

	CO_2	CH_4	N_2O	Mass Sum	CO_2e
	TPY	TPY	TPY	TPY	TPY
Total Direct Emissions	2,925	0.055	0.0069	2,925	38,715

Indirect Emissions

Operations - Off-Site Electricity Production	CO_2	CH_4	N_2O	Mass Sum	CO_2e
	TPY	TPY	TPY	TPY	TPY
Off-Site Electricity Production	5,536	0.5997	8.57E-02	5,536	5,576

Operations - Off-Site Waste Management	CO_2e
	TPY
Off-Site Waste Management	1,939

	CO_2	CH_4	N_2O	Mass Sum	CO_2e
	TPY	TPY	TPY	TPY	TPY
Total Indirect Emissions	5,536	0.600	0.0857	5,536	7,515

Atmospheric Removals of GHGs

Construction/Operations - Land-Use	CO_2e
	TPY
Land-Use (Sinks) [2]	0.0

	CO_2	CH_4	N_2O	Mass Sum	CO_2e
	TPY	TPY	TPY	TPY	TPY
Total Sinks	0	0	0	0	0

Total Emissions including Sinks = Direct Emissions + Indirect Emissions + Sinks

	CO_2	CH_4	N_2O	Mass Sum	CO_2e
	TPY	TPY	TPY	TPY	TPY
Total	8,460	0.655	0.0926	8,461	46,230

[1] Following the completion of the construction phase, emissions from vehicle traffic associated with onsite operations (deliveries, maintenance, etc.) are expected to be minimal and infrequent, and have not been quantified.

[2] Proposed land-use changes are not expected to produce greenhouse gas reductions (sinks).

Conversion Factors:	
CO_2 to CO_2e	1
CH_4 to CO_2e	25
N_2O to CO_2e	298

Project No.: B2207985

Hermantown Business Part
Greenhouse Gas Calculations

Source: Natural Gas Use

Natural Gas Use	
Assumptions:	
Total Project	
Estimated total annual natural gas use, MMcf/year	48.51
Heating Value of Natural Gas [1], Btu/scf	1,020
Conversion Factors:	
lb/ton	2,000
lb/kg	2.204
cf/Therm	73.0
CO_2 to CO_2e	1
CH_4 to CO_2e	25
N_2O to CO_2e	298

Building Type	Approximate Number of Buildings	Approximate Square Footage per Building (ft^2)	Total Square Footage (ft^2)	Building Heating Heat Source	Typical Annual Natural Gas Usage for Space Heating per Square Foot of Building Floorspace [5], cf/(year*ft^2)	Water Heating Heat Source	Typical Annual Natural Gas Usage for Water Heating per Square Foot of Building Floorspace [5], cf/(year*ft^2)	Cooking Appliances Heat Source	Typical Annual Natural Gas Usage for Cooking per Square Foot of Building Floorspace [5], cf/(year*ft^2)	Estimated Total Natural Gas Use, MMcf/year
Light Industrial & commercial	up to 22	7,800-299,000	942,000	Natural gas	32.3	Natural gas	4.2	Natural gas	15	48.51

Pollutant	EPA Pollutant Type	40 CFR Part 98 [2,3] (lb/MMBtu)	Estimated Annual Emissions From Natural Gas Combustion (TPY)
CO_2e [4]	GHG	117.07	2,896
CO_2 [2]	GHG	116.94	2,893
CH_4 [3]	GHG	0.0022	5.45E-02
N_2O [3]	GHG	0.0002	5.45E-03

[1] Heating value of natural gas taken from AP-42 Appendix A. Typical Parameters of Various Fuels.
[2] CO_2 emission factor from 40 CFR 98 Subpart C, Table C-1 (natural gas 53.06 kg CO_2/MMBtu), November 29, 2013.
[3] CH_4 and N_2O emission factors from 40 CFR 98 Subpart C, Table C-2 (natural gas CH_4 = 0.001 kg CH_4/MMBtu and N_2O = 0.0001 kg N_2O/MMBtu), November 29, 2013.
[4] CO_2e emissions are based on global warming potential from 40 CFR 98 Subpart A, Table A-1 (CO_2=1, CH_4=25, and N_2O=298), November 29, 2013.
[5] U.S. Energy Information Administration (US EIA), "Natural gas consumption and conditional energy intensities (cubic feet) by end use, 2018," https://www.eia.gov/consumption/commercial/data/2018/ce/xls/e8.xlsx. Natural gas usage data for buildings with a building floorspace of 10,001 to 25,000 square feet was used as representative emission factor for buildings in the business park.

Project No.: B2207985

Hermantown Business Part
Greenhouse Gas Calculations

Source: Mobile Sources - Construction Activities

Estimated Project Life 30 years
Project Building Floorspace: 942,000 ft^2

Vehicle Types	Fuel type	Estimated Fuel Usage Per Square Foot of Building Floorspace (gal/sq. ft) [1]	Estimated Total Fuel Usage During Construction Period (gallons)	CO_2 Emission Factor (kg/gal) [2]	CO_2 Emissions During Construction Period (ton)	CH_4 Emission Factor (g/gal) [2]	CH_4 Emissions During Construction Period (ton)	N_2O Emission Factor (g/gal) [2]	N_2O Emissions During Construction Period (ton)	CO_2e Emissions During Construction Period (ton)
Crawler tractors/dozers	Diesel	0.0055	5,225	10.21	59	0.2	1.15E-03	0.47	2.71E-03	60
Excavators	Diesel	0.065	61,231	10.21	689	0.2	1.35E-02	0.47	3.17E-02	699
Graders	Diesel	0.0036	3,415	10.21	38	0.2	7.53E-04	0.47	1.77E-03	39
Pavers	Diesel	2.03E-04	192	10.21	2	0.2	4.22E-05	0.47	9.93E-05	2
Rollers	Diesel	0.0035	3,338	10.21	38	0.2	7.36E-04	0.47	1.73E-03	38
Rough terrain forklifts	Diesel	0.010	9,839	10.21	111	0.2	2.17E-03	0.47	5.10E-03	112
Rubber tire loaders	Diesel	1.03E-05	10	10.21	0	0.2	2.13E-06	0.47	5.01E-06	0
Skid steer loaders	Diesel	1.19E-04	112	10.21	1	0.2	2.47E-05	0.47	5.80E-05	1
Total (tons)					**938**		**0.0184**		**0.043**	**952**
Total (tons/year, annualized over project life)					**31.3**		**6.13E-04**		**1.44E-03**	**31.7**

[1] A rough estimate of vehicle types and fuel consumption was made using data from "Oregon Nonroad Diesel Equipment Survey and Emissions Inventory," August 26, 2020 (https://www.oregon.gov/deq/aq/Documents/orNonroadDieselRep.pdf). An estimate of gallons of diesel per square footage of floorspace (gal/ft^2) was estimated by dividing the Table 4-18 annual fuel use estimates for each vehicle type by the survey total building square footage of 3,700,000 ft^2.

[2] CO_2, CH_4, and N_2O emission factors taken from Table 2 and Table 5 of EPA's "Emission Factors for Greenhouse Gas Inventories", April 2021 (https://www.epa.gov/sites/default/files/2021-04/documents/emission-factors_apr2021.pdf), vehicle type: Construction/Mining Equipment.

Project No.: B2207985

Hermantown Business Part
Greenhouse Gas Calculations

Source: Mobile Sources - Transportation Operations

Types	Fuel type	Avg. # of Vehicle Trips per Day (1)	Days Per Week	Average Round-Trip Distance per Trip (mi)	Fuel Usage Rate	Total Vehicle Miles Traveled (VMT/yr)	Total Annual Fuel Usage (gal/yr)	CO_2 Emission Factor (kg/gal) (2)	Annual CO_2 Emissions (ton)	CH_4 Emission Factor (g/gal) (2)	CH_4 Emission Factor (g/mile) (2)	Annual CH_4 Emissions (ton)	N_2O Emission Factor (g/mile) (2)	N_2O Emission Factor (g/mile) (2)	Annual N_2O Emissions (ton)	Annual CO_2e Emissions (ton)
Site Generated Road Freight Traffic	Diesel	237	7	100	Assume 6 mpg	8,630,440	1,438,407	10.21	16,189	0.0095	---	1.51E-02	0.0431	---	0.068	16,209
Site Generated Passenger Vehicle Traffic	Gasoline/Diesel	4505	7	30	Assume 22 mpg	49,193,508	2,236,069	8.82	21,747	---	0.0222	1.20E+00	---	0.0387	2.10E+00	22,402
Total									**37,936**			**1.217**			**2.167**	**38,612**

(1) Total average vehicle trips based on average daily trips from the Traffic Study (Exhibit G), assume 95% passenger vehicles, 5% medium and heavy-duty vehicles
(2) CO2, CH4, and N2O emission factors taken from Table 2, Table 4, and Table 5 of EPA's "Emission Factors for Greenhouse Gas Inventories", April 2021 (https://www.epa.gov/sites/default/files/2021-04/documents/emission-factors_apr2021.pdf)

Emission Factor Vehicle Type	Site Vehicle Type		
Gasoline Passenger Cars	Passenger (model year 2006 gasoline emission factors and model year 2007 diesel emission factors assumed as worst-case)	Assumed % Gasoline Passenger Cars*	70.8%
Gasoline Light-Duty Trucks		Assumed % Gasoline Light-Duty Trucks*,**	26.2%
Light Duty Trucks (Diesel)		Assumed % Diesel Light-Duty Trucks*,**	3.0%
Medium- and Heavy-Duty Vehicles (Diesel)	Site Generated Freight Traffic		

*MN DOT Procedure Manual for Forecasting Traffic on Minnesota's Highway Systems, May 2012, pg. 175 (https://www.dot.state.mn.us/traffic/data/reports/forecast/Forecast_Manual_2012.pdf)
"Of the majority of recent tube counts taken in the passenger car class, 69.8% of vehicles were classified as cars, 29.2% as pickups, and 1% as motorcycles."
**It is assumed that 3% of total passenger vehicle traffic are diesel pickup trucks based on the national average (approximately 7.4 million diesel cars and SUVs out of 250 million passenger vehicles)
Source: https://www.greencarreports.com/news/1097513_which-states-have-the-most-diesel-vehicles-new-data-gives-results
Note: GHG emissions will vary significantly based on vehicle type and distance traveled. This data is not readily available, so assumptions were made for these variables.

Project No.: B2207985

Hermantown Business Part
Greenhouse Gas Calculations

Source: Land Use Changes - Construction Activities

Estimated Project Life 30 years

Land-use category prior to project: Forest (1a)
Land-use category after project: Settlement (1a)

2021 Net CO2 Flux from Forest Converted to Settlements	63,700,000	Ton CO_2e	Source: Reference 1, Table 6-129
2021 Land Converted from Forest to Settlements	456,000	hectares	Source: Reference 1, Table 6-5
	1,126,320	acres	

Emission Factor Based on Land Type Carbon Flux (tons CO2e/area) = net CO2 flux from land conversion / total area of land use change in US

Emission Factor (tons CO2e/area) = 56.56

Total change in forest cover type for project (acres) 36.46 acres

Land-use category prior to project: Wetland (1a)
Land-use category after project: Settlement (1a)

2021 Net CO2 Flux from Wetland Converted to Settlements	300,000	Ton CO_2e	Source: Reference 1, Table 6-129
2021 Land Converted from Wetland to Settlements	14,000	hectares	Source: Reference 1, Table 6-5
	34,580	acres	

Emission Factor Based on Land Type Carbon Flux (tons CO2e/area) = net CO2 flux from land conversion / total area of land use change in US

Emission Factor (tons CO2e/area) = 8.68

Total change in wetland cover type for project (acres) 10.02 acres

CO_2e Emissions from Land-Use Changes	**2,149**	**tons**
Annual CO_2e Emissions from Land-Use Changes (tons/year, annualized over project life)	**71.6**	**tpy**

[1] US EPA "Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990–2021", Chapter 6: Land Use, Land-Use Change, and Forestry (https://www.epa.gov/sites/default/files/2021-04/documents/us-ghg-inventory-2021-chapter-6-land-use-land-use-change-and-forestry.pdf)

[1a] land-use category as described in US EPA "Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990–2021", Chapter 6: Land Use, Land-Use Change, and Forestry

Project No.: B2207985

Hermantown Business Part
Greenhouse Gas Calculations

Fox Meadows Residential Development
Project: B2203087
Source: Off-Site Emissions from Electricity Generation

Off-Site Electricity	
Assumptions:	
Total Project	
Estimated total project site annual electricity use, MWh/year	10,079
Conversion Factors:	
lb/ton	2,000
lb/kg	2.204
CO_2 to CO_2e	1
CH_4 to CO_2e	25
N_2O to CO_2e	298

Building Type	Approximate Total Square footage (ft^2)	Typical Annual Electricity [3], kWh/(year*square foot)	Estimated Total Electricity Use, MWh/year
Light Industrial and Commercial	942,000	10.7	10079.4

Pollutant	EPA Pollutant Type	Emission Factor [1] (lb/MWh)	Off-Site Emissions From Electricity Generation (TPY)
CO_2e [2]	GHG	1,106.4	5,576
CO_2	GHG	1,098.4	5,536
CH_4	GHG	0.119	0.600
N_2O	GHG	0.017	8.57E-02

[1] CO_2, CH_4, and N_2O emission factors taken from Table 6 of EPA's "Emission Factors for Greenhouse Gas Inventories", April 2021 (https://www.epa.gov/sites/default/files/2021-04/documents/emission-factors_apr2021.pdf). "Total Output" emission factors were used as directed in the Table 6 footnote.

[2] CO_2e emissions are based on global warming potential from 40 CFR 98 Subpart A, Table A-1 (CO_2=1, CH_4=25, and N_2O=298), November 29, 2013.

[3] U.S. Energy Information Administration (US EIA),May 2018 (https://www.eia.gov/consumption/commercial/data/2018/index.php?view=consumption#electricity). "Electricity consumption and conditional energy intensity by building size, 2018". Electricity energy intensity for retail buildings 10,000 to 100,000 square feet used as a representative building type and size

Project No.: B2207985

Hermantown Business Part
Greenhouse Gas Calculations

Source: Off-Site Waste Management Emissions

Total Number square feet:	942,000	
lb/1000 sq ft per day[19]:	25	
Total waste generated per day:	23,550.0	pounds
Estimated Total Annual Waste Generated:	4,298	tons

Waste Material	Percentage of Total MSW [1]	Estimated Annual Residential Waste Generated (tons per year)	CO_2e Emission Factor (metric tons CO_2e/ short ton material) [2]	Annual CO_2e Emissions (TPY) [3]
Paper and Paperboard - landfilled [4,5]	15.7%	673.6	1.25	928.0
Paper and Paperboard - recycled [4,6]	7.4%	317.0	0.02	7.0
Food [7]	21.6%	927.9	0.58	593.1
Plastics - landfilled [4,8]	8.3%	356.6	0.02	7.9
Plastics - recycled [4,9]	3.9%	167.8	0.22	40.7
Yard Trimmings [10]	12.1%	520.5	0.33	189.3
Metals - landfilled [4,11]	6.0%	256.0	0.02	5.6
Metals - recycled [4,12]	2.8%	120.5	0.23	30.5
Wood [13]	6.2%	266.0	0.17	49.8
Textiles [14]	5.8%	250.6	0.02	5.5
Glass - landfilled [4,15]	2.8%	122.5	0.02	2.7
Glass - recycled [4,16]	1.3%	57.6	0.05	3.2
Rubber and Leather [17]	3.1%	134.5	0.02	3.0
Other [18]	1.6%	67.0	0.52	38.4
Misc. Inorganic Wastes [18]	1.4%	59.7	0.52	34.2
Total	**100.0%**	**4,297.9**		**1,939**

[1] 2018 national MSW Data obtained from US EPA National Overview: Facts and Figures on Materials, Wastes and Recycling (https://www.epa.gov/facts-and-figures-about-materials-waste-and-recycling/national-overview-facts-and-figures-materials#:~:text=Per%20capita%20MSW%20generation%20increased,additional%20wasted%20food%20management%20pathways.)

[2] CO_2e emission factors taken from Table 6 of EPA's "Emission Factors for Greenhouse Gas Inventories", April 2021 (https://www.epa.gov/sites/default/files/2021-04/documents/emission-factors_apr2021.pdf).

[3] Metric tons of CO_2e multiplied by 1.102 to convert to US tons of CO_2e

[4] Based on 2018 recycling rate of 32.1% (from source 1: US EPA National Overview: Facts and Figures on Materials, Wastes and Recycling).

[5] CO_2e emission factor for office paper, landfilled.

[6] CO_2e emission factor for office paper, recycled.

[7] CO_2e emission factor for food waste, landfilled.

[8] CO_2e emission factor for mixed plastics, landfilled.

[9] CO_2e emission factor for mixed plastics, recycled.

[10] CO_2e emission factor for yard trimmings, landfilled.

[11] CO_2e emission factor for mixed metals, landfilled.

[12] CO_2e emission factor for mixed metals, recycled.

[13] CO_2e emission factor for dimensional lumber, landfilled.

[14] CO_2e emission factor for carpet, landfilled.

[15] CO_2e emission factor for glass, landfilled.

[16] CO_2e emission factor for glass, recycled.

[17] CO_2e emission factor for tires, landfilled.

[18] CO_2e emission factor for mixed MSW, landfilled.

[19] Based on Estimated Solid Waste Generation Rates for Commercial Sector from CalRecycle https://www2.calrecycle.ca.gov/wastecharacterization/general/rates

Exhibit A

Overall Site Plan/Development Scenario

BRAUN INTERTEC

Hermantown AUAR Lavaque ByPass Rd Business Park

Hermantown Economic Development Authority

LOUCKS

PLANNING
CIVIL ENGINEERING
LAND SURVEYING
LANDSCAPE ARCHITECTURE
ENVIRONMENTAL

7200 Hemlock Lane, Suite 300
Maple Grove, MN 55369
763.424.5505
www.loucksinc.com

SUBMITTAL/REVISIONS

PROFESSIONAL SIGNATURE

QUALITY CONTROL

LOT 1
3.45 ACRES

LOT 2
12.08 ACRES

LOT 3

LOT 4
3.14 ACRES

LOT 5
3.33 ACRES

LOT 6
3.72 ACRES

LOT 7

LOT 8
3.0 ACRES

LOT 9
2.54 ACRES

LOT 10
12.23 ACRES

LOT 11
2.66 ACRES

LOT 12
2.77 ACRES

LOT 13
2.45 ACRES

LOT 14
2.17 ACRES

LOT 15
2.45 ACRES

LOT 16
3.24 ACRES

LOT 17
2.52 ACRES

LOT 18
3.34 ACRES

LOT 19
5.01 ACRES

OUT LOT 1
3.17 ACRES

OUT LOT 2
5.51 ACRES

OUT LOT 3
0.79 ACRES

NWI WETLANDS

NWI WETLANDS

NWI WETLANDS

LIFT STATION LOCATION

AIRPORT ZONE 1
AIRPORT ZONE 2

N

0 150 300
SCALE IN FEET

LARGE LOTS - WITH LOT SIZES

Plotted: 02 /22 / 2023 1:55 PM W:\2022\22370\CADD DATA\CIVIL\CONCEPTS\LARGE BUILDINGS LOT SIZES

Exhibit B

Minnesota Wetland Conservation Act Approvals

BRAUN INTERTEC

BOARD OF WATER AND SOIL RESOURCES

Minnesota Wetland Conservation Act Notice of Decision

Local Government Unit: City of Hermantown	**County:** St. Louis
Applicant Name ChickadEagle	**Applicant Representative:** Rob Peterson – GEI
Project Name: 5389 Miller Trunk Highway	**LGU Project No. (if any):** 22-78 WL- D
Date Complete Application Received by LGU: 11/07/2022	
Date of LGU Decision: 11/07/2022	
Date this Notice was Sent: 12/05/2022	

WCA Decision Type - check all that apply

☒ Wetland Boundary/Type ☐ Sequencing ☐ Replacement Plan ☐ Bank Plan (not credit purchase)
☐ No-Loss (8420.0415) ☐ Exemption (8420.0420)
Part: ☐ A ☐ B ☐ C ☐ D ☐ E ☐ F ☐ G ☐ H Subpart: ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6 ☐ 7 ☐ 8 ☐ 9

Replacement Plan Impacts (replacement plan decisions only)

Total WCA Wetland Impact Area: **1,146 square feet**
Wetland Replacement Type: ☐ Project Specific Credits: ☐ Bank Credits:
Bank Account Number(s):

Technical Evaluation Panel Findings and Recommendations (attach if any)

☐ Approve ☒ Approve w/Conditions ☐ Deny ☐ No TEP Recommendation

LGU Decision

☐ Approved with Conditions (specify below)[1] ☒ Approved[1] ☐ Denied
List Conditions:

Decision-Maker for this Application: ☒ Staff ☐ Governing Board/Council ☐ Other:

Decision is valid for: ☒ 5 years (default) ☐ Other (specify):

[1] *Wetland Replacement Plan approval is not valid until BWSR confirms the withdrawal of any required wetland bank credits. For project-specific replacement a financial assurance per MN Rule 8420.0522, Subp. 9 and evidence that all required forms have been recorded on the title of the property on which the replacement wetland is located must be provided to the LGU for the approval to be valid.*

LGU Findings – Attach document(s) and/or insert narrative providing the basis for the LGU decision[1].

☐ Attachment(s) (specify):
☒ Summary:

The delineation was reviewed and approved in the field on November 8, 2022. David Demmer (BWSR), Eric Johnson (LGU) and Rob Peterson (GEI) were present.

[1] *Findings must consider any TEP recommendations.*

Attached Project Documents

☐ Site Location Map ☒ Project Plan(s)/Descriptions/Reports (specify): **MN Joint Application**

Appeals of LGU Decisions

If you wish to appeal this decision, you must provide a written request within 30 calendar days of the date you received the notice. All appeals must be submitted to the Board of Water and Soil Resources Executive Director along with a check payable to BWSR for $500 *unless* the LGU has adopted a local appeal process as identified below. The check must be sent by mail and the written request to appeal can be submitted by mail or e-mail. The appeal should include a copy of this notice, name and contact information of appellant(s) and their representatives (if applicable), a statement clarifying the intent to appeal and supporting information as to why the decision is in error. Send to:

Appeals & Regulatory Compliance Coordinator
Minnesota Board of Water & Soils Resources
520 Lafayette Road North
St. Paul, MN 55155
travis.germundson@state.mn.us

Does the LGU have a local appeal process applicable to this decision?

☒ Yes[1] ☐ No

[1]*If yes, all appeals must first be considered via the local appeals process.*

Local Appeals Submittal Requirements (LGU must describe how to appeal, submittal requirements, fees, etc. as applicable)

The City of Hermantown has a Board of Appeals which considers appeals regarding zoning related issues.

Notice Distribution (include name)

Required on all notices:

☒ SWCD TEP Member: R.C. Boheim	☒ BWSR TEP Member: David Demmer
☐ LGU TEP Member (if different than LGU contact):	
☒ DNR Representative:	
☐ Watershed District or Watershed Mgmt. Org.:	
☒ Applicant: City of Hermantown	☒ Agent/Consultant: Rob Peterson

Optional or As Applicable:

☒ Corps of Engineers: Kris Laman	
☐ BWSR Wetland Mitigation Coordinator (required for bank plan applications only):	
☐ Members of the Public (notice only):	☐ Other:

Signature:	**Date:** 12/5/2022

This notice and accompanying application materials may be sent electronically or by mail. The LGU may opt to send a summary of the application to members of the public upon request per 8420.0255, Subp. 3.

GEI Consultants

Consulting
Engineers and
Scientists

Wetland Delineation Report

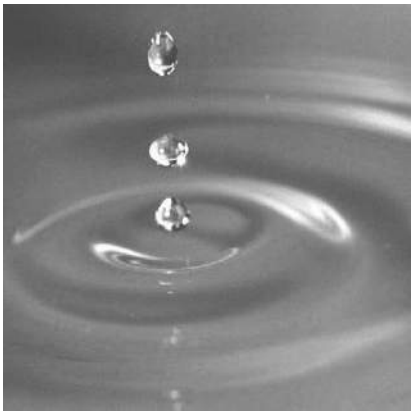
5389 Miller Trunk Highway

Hermantown, Minnesota

Submitted to:
Eric Johnson, Community Development Director
5105 Maple Grove Road
Hermantown, MN 55811

Submitted by:
GEI Consultants, Inc.
1710 Mall Dr
Duluth, MN 55811

11/4/2022
Project 2204269



Rob Peterson, PG, PWS
MN Certified Wetland Delineator

Ken Kytta, PE
Senior Consultant, Vice President

Table of Contents

Figures

Appendices

1. Introduction

1.1 Site Description

GEI Consultants, Inc. (GEI) completed a wetland delineation for the 5389 Miller Trunk Highway (Site) on November 4th, 2022. The Site is located north of Miller Trunk Highway in Section 4 of Township 50 North, Range 15 West in Hermantown, Minnesota (Figure 1). The delineation area covers a total of 25 acres as shown in Figure 2. The primary land cover is undeveloped mixed forest with hardwood swamp. Adjacent to the Site is undisturbed mixed forest to the north, and disturbed commercial use to the east, west and south. Historic air photos show that the trees were cleared from the southern part of the site in the 1930's and evidence of equipment soil rutting was observed while completing the wetland delineation.

The purpose of the wetland delineation was to identify wetland and other aquatic resource boundaries and classify the wetland plant community types. The delineation will be used to aid in project planning and to identify potential wetland and aquatic resource impacts.

2. Delineation Methodology

2.1 Wetlands

Wetlands are defined by the United States (U.S.) Army Corps of Engineers (USACE) and the U.S. Environmental Protection Agency (EPA) as *"areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions."* Wetlands present within the Site were identified and delineated using the procedures described in the *U.S. Army Corps of Engineers (USACE) Wetlands Delineation Manual* (Environmental Laboratory, Waterways Experiment Station, 1987) and the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Northcentral and Northeast Region* (US Army Engineer Research and Development Center, 2011). These methods utilize the standard multi-parameter approach (vegetation, hydrology, and soils) for wetland identification as outlined in the *Corps of Engineers Wetland Determination Data Forms*. In general, an area is considered a wetland if hydrophytic vegetation, wetland hydrology, and hydric soils are present. Delineated wetlands were classified in accordance with the classification systems set forth in *Wetlands of the United States* (Shaw and Fredine. 1971), *Wetlands and Deepwater Habitats of the United States* (Cowardin et al., 1979), and *Wetland Plants and Plant Communities of Minnesota and Wisconsin* (Eggers and Reed, 2014).

2.2 Other Aquatic Resources

The wetland delineation and report include other aquatic resources affected by regulated activities in waters of both the United States (U.S.) and Minnesota. The delineation area was specifically surveyed for wetlands (as defined under Section 404 of the Clean Water Act) and other aquatic resources such as seasonal ponds, seeps, springs, ditches, and streams (intermittent, ephemeral, and perennial). Other aquatic resources within the analysis area were identified and delineated as described in the *Guidance for Submittal of Delineation Reports to the St. Paul District Army Corps of Engineers and Wetland Conservation Act Local Governmental Units in Minnesota* (USACE, St. Paul District Regulatory, 2015). Observations and mapping of potential connections and flow paths between other aquatic resources and wetlands can provide information for determining regulatory jurisdiction.

2.3 Desktop Review

A desktop analysis was completed for the analysis area prior to the on-site data collection and field delineation by reviewing a variety of available information to identify potential wetlands and aquatic resources. Resources reviewed include:

- USACE Antecedent Precipitation Tool (USACE 2022)

- U.S. Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS) Web Soil Survey (USDA 2022)
- USGS Topographic Maps (USGS 2022)
- U.S. Fish and Wildlife Service (USFWS) National Wetland Inventory (NWI) (USFWS 2022)
- NWI for Minnesota Update (DNR 2018)
- DNR PWI (DNR 2020)
- Aerial Imagery
- DNR Hydrography Dataset (DNR 2022)
- Minnesota DNR MNTOPO Elevation Viewer and LiDAR Data (DNR 2022)

2.4 On-site Wetland Delineation

GEI's on-site wetland delineation followed the USACE procedure for identifying wetland boundaries by completing the appropriate number of sampling points, investigating the required wetland criteria, and identifying the boundary between wetland and upland areas. A soil sampling auger or tiling shovel was used to complete soil sampling points and check the soils and hydrology at periodic intervals throughout the delineated boundary to confirm accuracy and/or adjust the boundary accordingly. All wetland boundaries within the property were flagged with Wetland Delineation flagging tape and geolocated using a sub-meter accuracy global positioning system (GPS) and incorporated into a geographic information system (GIS) using ArcGIS 10.8 GIS software. The Site GPS data is being used to aid in Site planning.

In addition to wetlands, waterbodies (lakes or ponds), waterways (streams, rivers, and ditches), and other aquatic resources (seeps and springs) present within the area of investigation were assessed and mapped during fieldwork. The estimated top of bank of waterbodies or waterways were identified and geolocated with GPS as polylines or polygons. Seeps and springs were identified and mapped as points. Observations of the other aquatic resource characteristics were recorded.

The on-site data collection focused on completing sampling points within identified sampling units. Sampling units were distinguished by differences in landscape position, vegetation, soils, hydrology and/or disturbance relevant to the aquatic resource. GEI typically uses plant communities as the primary sampling units. Plant community units typically reflect spatial variations in geomorphology, hydrology, soils, and other factors that are important to the formation and maintenance of wetlands. Plant community units were identified during the desktop analysis and were adjusted based on observed field conditions. Sampling point locations within the plant community units were selected to be representative of the plant community. At least one sampling point and NCNE Supplement Data Form was completed in each plant community.

2.4.1 Normal Circumstances and Antecedent Precipitation

The on-site data collection activities occurred within the growing season as defined in the USACE Regional Supplement. GEI was on-site to conduct the wetland delineation on November 4, 2022. Normal circumstances were present during the time of the site visit. Antecedent precipitation data was obtained using the USACE Antecedent Precipitation Tool (APT) to determine if climatic/hydrologic conditions were considered dry, normal, or wet for the analysis area at the time of fieldwork. The APT reported antecedent precipitation conditions to be drier than normal with -1.1 inches below normal since October 3rd (Appendix A).

2.4.2 Vegetation

The vegetation occurring at representative sampling point locations was assessed to determine the dominant species in the tree, woody vine, sapling/shrub, and herbaceous vegetation strata. Vegetation plot sizes include a 30-foot radius for tree and woody vine strata, a 15-foot radius for sapling/shrub stratum, and a 5-foot radius for herbaceous stratum. Depending on the community size encountered at each sampling point, the plot size for the tree/vine/shrub/herb strata may be adjusted to restrict the sampled vegetation to the plant community being assessed. The percentage of absolute areal cover was visually estimated for each species within each plot and recorded on the NCNE Supplement Data Forms. Wetland indicator status was applied to each species from *The National Wetland Plant List: 2020 Wetland Rating* (USACE, 2020). The 50/20 rule was applied to determine dominant species within each stratum. The Rapid Test for Hydrophytic Vegetation, Dominance Test, and Prevalence Index was then be calculated, and a determination of the presence of hydrophytic vegetation was made.

2.4.3 Hydrology

Each sampling point was investigated for primary and secondary hydrology indicators listed on the NCNE Supplement Data Forms and as described in the USACE Wetlands Delineation Manual and Regional Supplement. Observations of surface water depth, depth to saturation and depth to water table were also be recorded. Observations of hydrology indicators were recorded on the NCNE Supplement Data Forms.

2.4.4 Soils

The presence or absence of hydric soils was assessed through use of a shovel or soil auger to observe and document the soil profile to a depth of at least 24 inches unless a restrictive layer is encountered, or a hydric soil indicator and hydrology are identified at a lesser depth. Soil profile descriptions of the hue, value, and chroma for each soil horizon were completed at each sampling point using Munsell soil color charts. The USDA NRCS soil texture, special features (e.g. redox concentrations, depletions, muck, sulfidic odor) along with horizon depths, were recorded for each soil horizon. Accepted field indicators (*NRCS 2018, Field Indicators of Hydric Soils in the United States, Version 8.2*) were referenced to determine if the hydric soils technical

criteria are met. Soil conditions and hydric soil indicators were recorded on the NCNE Supplement Data Forms for each sampling point.

3. Results

3.1 Wetlands

Five wetlands, Wetland A – E were identified within the delineation area.

Wetland A is located in the south side of the Site adjacent to Miller Trunk Highway, covering approximately 4.33 acres. Wetland A is primarily a Type 6 – Alder Thicket wetland plant community with Type 7 – Hardwood Swamp also present. The south side of Wetland A has been disturbed by land alteration and potential placement of fill. Wetland A hydrophytic vegetation criteria were met by the Dominance Test (100% FAC, FACW, or OBL), and the Prevalence Index. The Wetland A sampling point met wetland hydrology criteria A2 – High Water Table, A3 – Saturation, and D5 – FAC-Neutral Test. Hydric soil indicator F1 – Loamy Mucky Mineral was present. Wetland A is not identified on the NWI or PWI. The source of hydrology for Wetland A appears to be from precipitation.

Wetland B is located in the central portion of the Site, covering approximately 1.78 acres. Wetland B is a Type 6 – Alder Thicket. Wetland B hydrophytic vegetation criteria were met by the Dominance Test (100% FAC, FACW, or OBL) and the Prevalence Index. The Wetland B sampling point met wetland hydrology criteria D2 – Geomorphic Position, and D5 – FAC-Neutral Test. Hydric soil indicators F3 – Depleted Matrix and F21 – Red Parent Material were present. Wetland B is not identified on the NWI or PWI. The source of hydrology for Wetland B appears to be from precipitation.

Wetland C is located in the northeast part of the Site covering approximately 3.17 acres. Wetland C is primarily a Type 7 – Hardwood Swamp with Type 6 – Alder Thicket also present. Wetland C hydrophytic vegetation criteria were met by the Dominance Test (100% FAC, FACW, or OBL) and the Prevalence Index. The Wetland C sampling point met wetland hydrology criteria A2 – High Water Table, A3 – Saturation, D2 – Geomorphic Position, and D5 – FAC-Neutral Test. Hydric soil indicators A11 – Depleted Below Dark Surface, F1 – Loamy Mucky Mineral, F3 – Depleted Matrix, and F21 – Red Parent Material were present. Wetland C is not identified on the NWI or PWI. The source of hydrology for Wetland C appears to be from precipitation.

Wetland D is located in the northwest part of the Site in a small depression covering approximately 0.1 acres. Wetland D is a Type 7 – Hardwood Swamp. Wetland D hydrophytic vegetation criteria were met by the Dominance Test (100% FAC, FACW, or OBL) and the Prevalence Index. The Wetland D sampling point met wetland hydrology criteria D2 – Geomorphic Position and D5 – FAC-Neutral Test. Hydric soil indicators A11 – Depleted Below Dark Surface and F6 – Redox Dark Surface. Wetland D is not identified on the NWI or PWI. The source of hydrology for Wetland D appears to be from precipitation.

Wetland E is located in the northcentral part of the Site in a small, isolated depression covering approximately 0.03 acres. Wetland E is a Type 7 – Hardwood Swamp. Since Wetland E is similar in composition to Wetland D, no sample point was collected in the wetland. Wetland E is not identified on the NWI or PWI. The source of hydrology for Wetland E appears to be from precipitation.

3.2 Other Aquatic Resources

No other aquatic resources were observed.

3.3 Supporting Documentation

See Figure 2 for details on the wetland boundaries and sampling point locations, Figure 3 for the NWI and PWI, and Figure 4 for the Wetland Plant Communities. Photographs of select Site features are included in Appendix B. Specifics of observed vegetation, hydrology, and soil characteristics of the Site wetlands are included on the NCNE Supplement Data Forms in Appendix C. The soil survey map units and hydric soil classifications are included in Appendix D.

4. Reporting and Regulatory Concurrence

Based on GEI's best professional judgement, the delineated wetlands meet the criteria outlined in the USACE *Wetlands Delineation Manual* and the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Northcentral and Northeast Region*. This Wetland Delineation Report will be submitted to the Local Government Unit (LGU) Technical Evaluation Panel (TEP) and USACE, along with a Minnesota Joint Application Form requesting delineation concurrence.

The wetlands and other aquatic resources identified in this report may be subject to federal regulation under the jurisdiction of the USACE, state regulation under the Minnesota Wetland Conservation Act (WCA), and local jurisdiction under the local county, town, or city. Please note that, as with all wetland delineations, the regulatory agencies have final jurisdiction regarding the location of wetland boundaries and determination of jurisdictional status.

5. References

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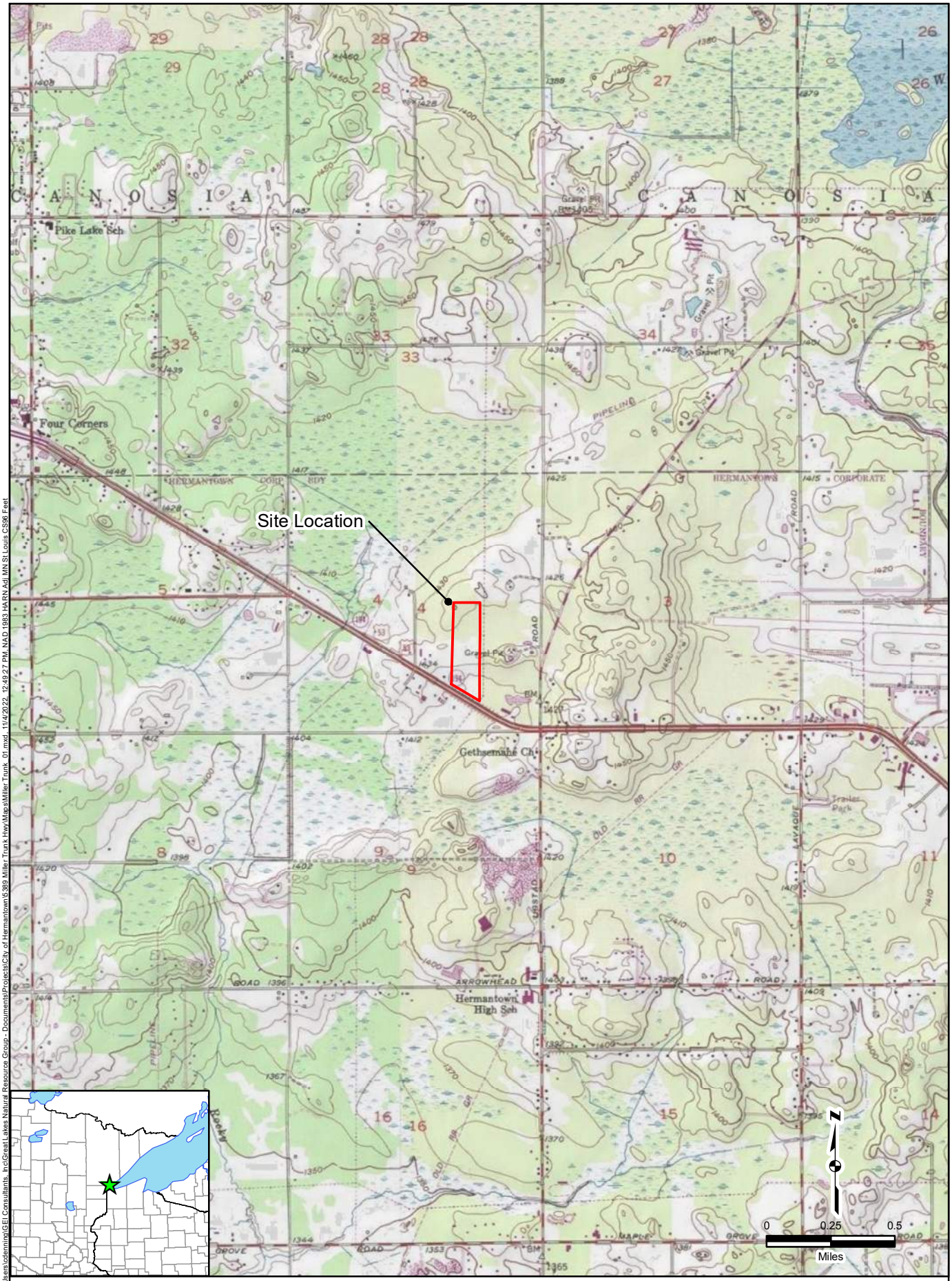
Figures

Figure 1 – Site Location

Figure 2 – Wetland Boundary and Sampling Point Locations

Figure 3 – National Wetland Inventory and DNR Public Waters Inventory

Figure 4 – Wetland Plant Communities



Drawn: 11/4/2022
Service Layer Credits: USGS Topographical Maps

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5389 MILLER TRUNK HIGHWAY
HERMANTOWN, MINNESOTA

PREPARED FOR

CITY OF HERMANTOWN

FIGURE 01

SITE LOCATION
NOVEMBER, 2022

GEI Office: Duluth, MN | Source: C:\Users\cdenning\GEI Consultants, Inc\Great Lakes Natural Resource Group - Documents\Projects\City of Hermantown\5389 Miller Trunk Hwy\Maps\Miller Trunk_01.mxd, 11/4/2022, 12:49:27 PM, NAD 1983 HARN Adj MN St Louis CS96 Feet

GEI Office: Duluth, MN | Source: C:\Users\cdenning\GEI Consultants, Inc\Great Lakes Natural Resource Group - Documents\Projects\City of Hermantown\5389 Miller Trunk Hwy\Maps\Miller Trunk_02.mxd, 11/4/2022, 9:43:30 AM, NAD 1983 UTM Zone 15N

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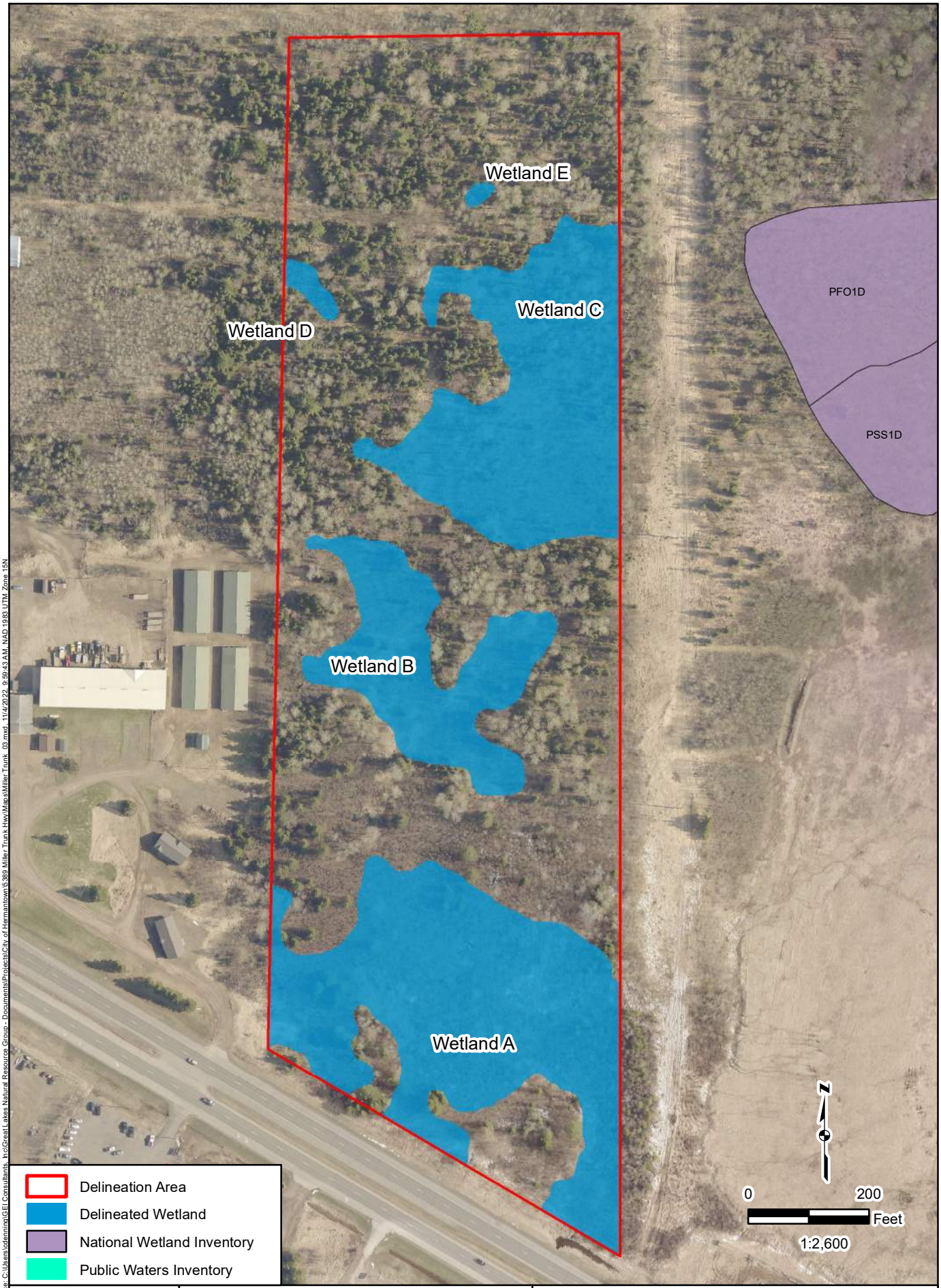
FIGURE 02

WETLAND BOUNDARIES,
AND SAMPLE POINT LOCATIONS
NOVEMBER, 2022



GEI Office: Duluth, MN | Source: C:\Users\cdenning\GEI Consultants, Inc\Great Lakes Natural Resource Group - Documents\Projects\City of Hermantown\5389 Miller Trunk Hwy\Maps\Miller Trunk_03.mxd, 11/4/2022, 9:59:43 AM, NAD 1983 UTM Zone 15N

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FIGURE 03

NATIONAL WETLAND INVENTORY &
PUBLIC WATERS INVENTORY
NOVEMBER, 2022

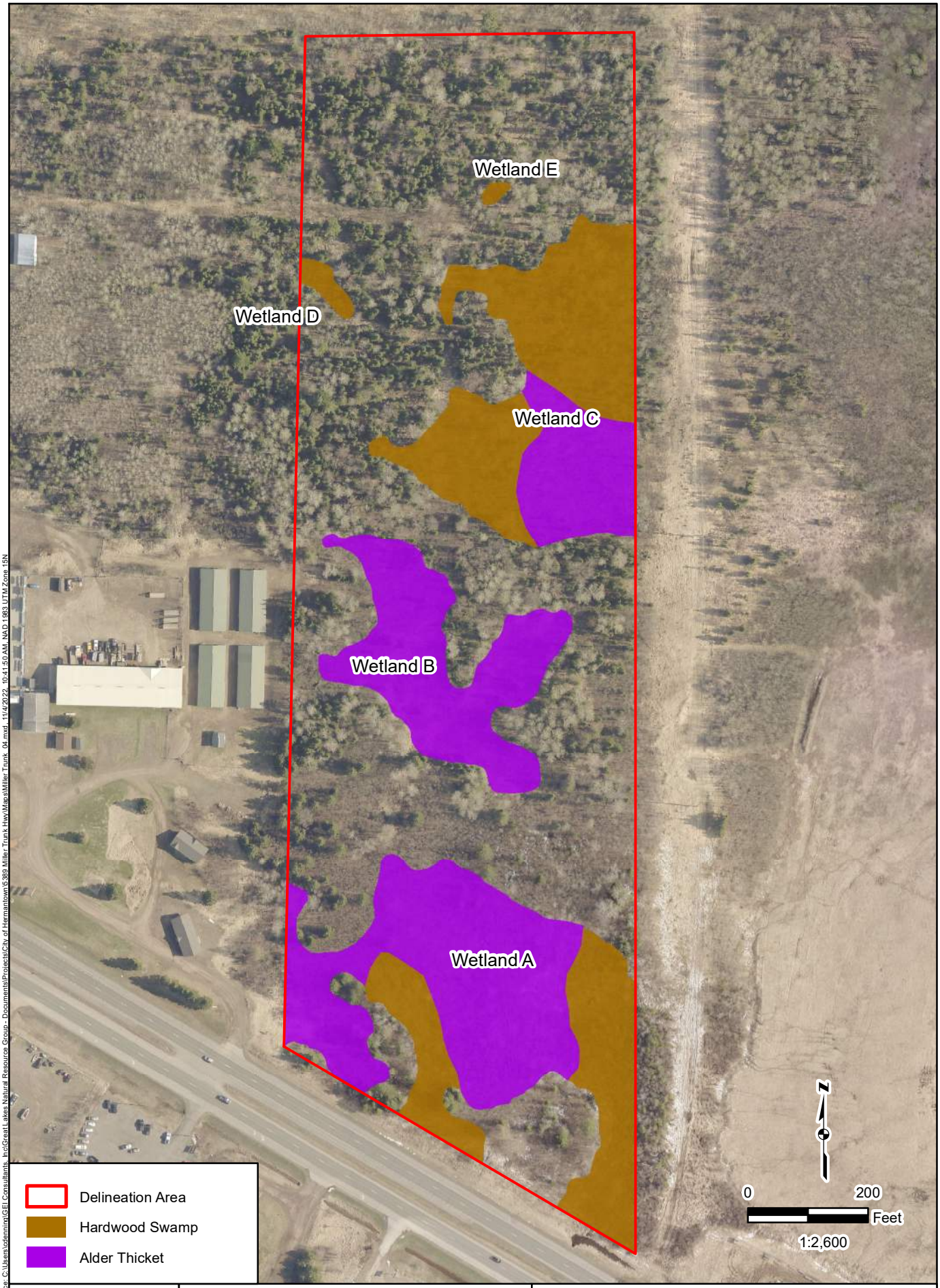

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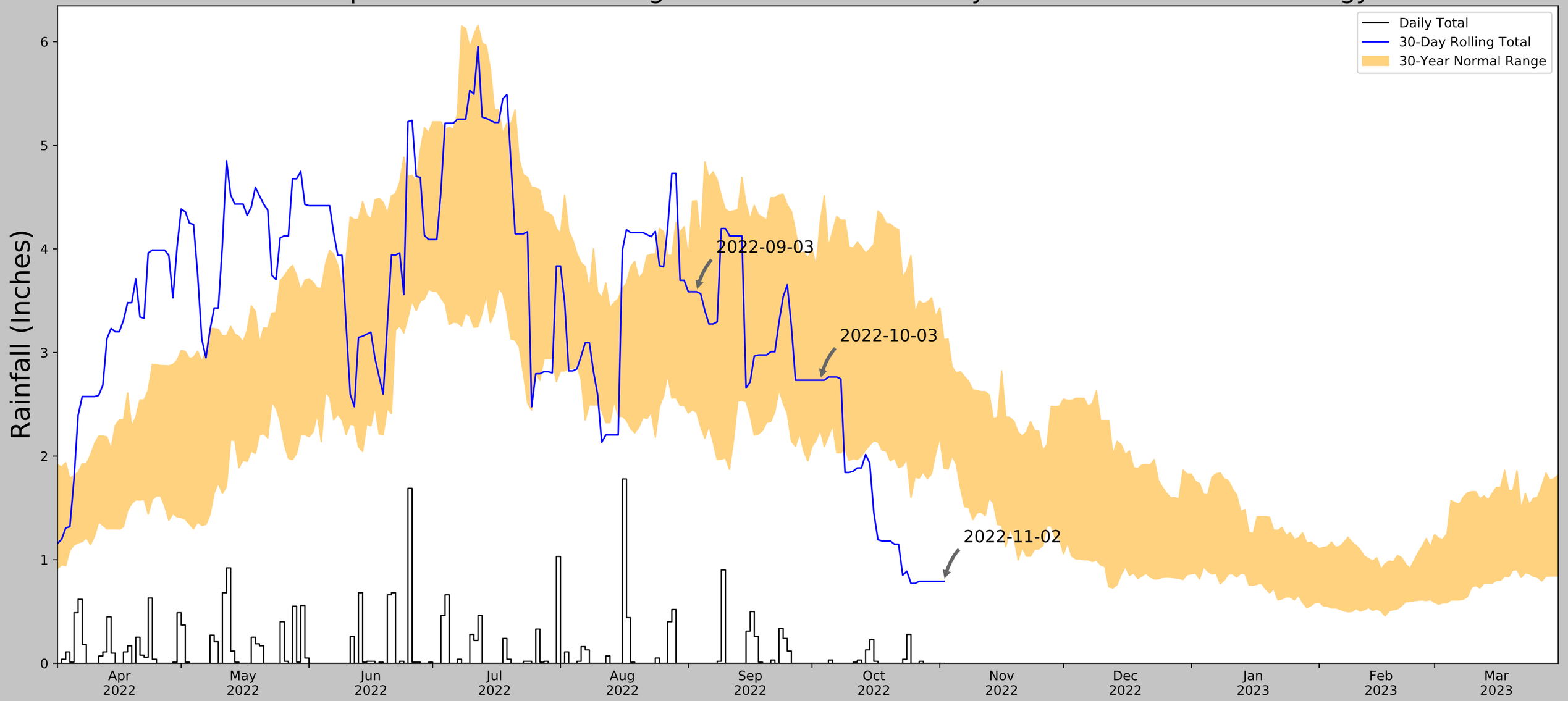
FIGURE 04

WETLAND PLANT COMMUNITIES
NOVEMBER, 2022

Appendix A

Antecedent Precipitation Tool

Antecedent Precipitation vs Normal Range based on NOAA's Daily Global Historical Climatology Network



Coordinates	46.842787, -92.245629
Observation Date	2022-11-02
Elevation (ft)	1440.48
Drought Index (PDSI)	Not available (2022-10)
WebWIMP H_2O Balance	Wet Season

30 Days Ending	30th %ile (in)	70th %ile (in)	Observed (in)	Wetness Condition	Condition Value	Month Weight	Product
2022-11-02	1.882284	3.122835	0.791339	Dry	1	3	3
2022-10-03	2.251181	4.262992	2.732284	Normal	2	2	4
2022-09-03	2.425197	4.464173	3.586614	Normal	2	1	2
Result							Drier than Normal - 9

Figure and tables made by the
Antecedent Precipitation Tool
Version 1.0

Written by Jason Deters
U.S. Army Corps of Engineers

Weather Station Name	Coordinates	Elevation (ft)	Distance (mi)	Elevation Δ	Weighted Δ	Days Normal	Days Antecedent
DULUTH	46.8369, -92.2097	1428.15	1.746	12.33	0.807	11353	89
DULUTH NWS	46.8367, -92.2108	1433.071	0.054	4.921	0.025	0	1

Appendix B

Site Photographs

Photo 1:Sampling point MT-A1W, showing Hardwood Swamp wetland plant community

Photo 2:Sampling point MT-A1U, showing mixed upland forest plant community

Photo 3:Sampling point MT-B1W, showing Alder Thicket wetland plant community

Photo 4:Sampling point MT-C1W, showing Hardwood Swamp wetland plant community

Photo 5:Sampling point MT-C1U, showing mixed upland forest plant community

Photo 6:Sampling point MT-D1W, showing Hardwood Swamp wetland plant community

Appendix C

USACE Wetland Determination Data Forms

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: 5389 Miller Trunk Hwy City/County: St. Louis County Sampling Date: 2022-11-03

Applicant/Owner: City of Hermantown State: Minnesota Sampling Point: MT-A1U

Investigator(s): GEI - Cavan Denning Section, Township, Range: sec 04 T050N R015W

Landform (hillslope, terrace, etc.): Sideslope Local relief (concave, convex, none): Concave Slope (%): 3-7

Subregion (LRR or MLRA): LRR K, MLRA 93A Lat: 46.839774 Long: -92.243748 Datum: WGS84

Soil Map Unit Name: Tacoosh mucky peat, dense substratum, 0 to 1 percent slopes NWI classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✔ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✔ No _____

Are Vegetation _____, Soil ✔, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✔	No _____	**Is the Sampled Area within a Wetland?** **Yes** _____ **No** ✔
Hydric Soil Present?	Yes _____	No ✔	
Wetland Hydrology Present?	Yes _____	No ✔	If yes, optional Wetland Site ID: _____

Remarks: (Explain alternative procedures here or in a separate report.)
Sample plot located in a Hardwood Forest.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes _____	No ✔	Depth (inches): _____
Water Table Present?	Yes _____	No ✔	Depth (inches): _____
Saturation Present? (includes capillary fringe)	Yes _____	No ✔	Depth (inches): _____

Wetland Hydrology Present? **Yes** _____ **No** ✔

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
No indicators of wetland hydrology were observed.

VEGETATION – Use scientific names of plants. Sampling Point: MT-A1U

Tree Stratum (Plot size: 30)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Populus tremuloides*	15	Y	FAC
2. *Acer rubrum*	10	Y	FAC
3. *Betula papyrifera*	10	Y	FACU
4. *Abies balsamea*	8	N	FAC
5.			
6.			
7.			
	43.0 = Total Cover		
Sapling/Shrub Stratum (Plot size: 15)			
1. *Alnus incana*	10	Y	FACW
2.			
3.			
4.			
5.			
6.			
7.			
	10.0 = Total Cover		
Herb Stratum (Plot size: 5)			
1. *Solidago gigantea*	10	Y	FACW
2. *Carex gracillima*	10	Y	FACU
3. *Eurybia macrophylla*	8	Y	UPL
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	28.0 = Total Cover		
Woody Vine Stratum (Plot size: 30)			
1.			
2.			
3.			
4.			
	0 = Total Cover		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 4 (A)

Total Number of Dominant Species Across All Strata: 7 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 57.14 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0.00	x 1 =	0.00
FACW species	20.00	x 2 =	40.00
FAC species	33.00	x 3 =	99.00
FACU species	20.00	x 4 =	80.00
UPL species	8.00	x 5 =	40.00
Column Totals:	81.00 (A)		259.00 (B)

Prevalence Index = B/A = 3.2

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

✔ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** ✔ **No** ___

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL Sampling Point: MT-A1U

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-8	7.5YR 3/2	100					L	
8-22	7.5YR 4/4	95	7.5YR 5/8	5	C	M	FSL	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7) (**LRR R, MLRA 149B**)
- ___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
- ___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
- ___ Loamy Mucky Mineral (F1) (**LRR K, L**)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
- ___ Coast Prairie Redox (A16) (**LRR K, L, R**)
- ___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
- ___ Dark Surface (S7) (**LRR K, L**)
- ___ Polyvalue Below Surface (S8) (**LRR K, L**)
- ___ Thin Dark Surface (S9) (**LRR K, L**)
- ___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
- ___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
- ___ Mesic Spodic (TA6) (**MLRA 144A, 145, 149B**)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** _____ **No** ✔

Remarks:

Naturally problematic red parent material soils present.

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: 5389 Miller Trunk Hwy City/County: St. Louis County Sampling Date: 2022-11-03

Applicant/Owner: City of Hermantown State: Minnesota Sampling Point: MT-A1W

Investigator(s): GEI - Cavan Denning Section, Township, Range: sec 04 T050N R015W

Landform (hillslope, terrace, etc.): Depression Local relief (concave, convex, none): Concave Slope (%): 0-2

Subregion (LRR or MLRA): LRR K, MLRA 93A Lat: 46.839601 Long: -92.243760 Datum: WGS84

Soil Map Unit Name: Tacoosh mucky peat, dense substratum, 0 to 1 percent slopes NWI classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✔ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✔ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✔	No _____	**Is the Sampled Area within a Wetland?** **Yes ✔** **No _____**
Hydric Soil Present?	Yes ✔	No _____	
Wetland Hydrology Present?	Yes ✔	No _____	If yes, optional Wetland Site ID: _____

Remarks: (Explain alternative procedures here or in a separate report.)
Sample plot is located in a Hardwood Swamp.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ✔ High Water Table (A2)
- ✔ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ✔ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes _____	No ✔	Depth (inches): _____
Water Table Present?	Yes ✔	No _____	Depth (inches): 8
Saturation Present? (includes capillary fringe)	Yes ✔	No _____	Depth (inches): 0

Wetland Hydrology Present? **Yes ✔** **No _____**

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION – Use scientific names of plants. Sampling Point: MT-A1W

Tree Stratum (Plot size: 30)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Fraxinus nigra*	20	Y	FACW
2.			
3.			
4.			
5.			
6.			
7.			
	20.0 = Total Cover		
Sapling/Shrub Stratum (Plot size: 15)			
1. *Alnus incana*	30	Y	FACW
2.			
3.			
4.			
5.			
6.			
7.			
	30.0 = Total Cover		
Herb Stratum (Plot size: 5)			
1. *Equisetum arvense*	15	Y	FAC
2. *Solidago gigantea*	10	Y	FACW
3. *Solanum dulcamara*	8	Y	FAC
4. *Matteuccia struthiopteris*	6	N	FAC
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	39.0 = Total Cover		
Woody Vine Stratum (Plot size: 30)			
1.			
2.			
3.			
4.			
	0 = Total Cover		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 5 (A)

Total Number of Dominant Species Across All Strata: 5 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100.00 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0.00	x 1 =	0.00
FACW species	60.00	x 2 =	120.00
FAC species	29.00	x 3 =	87.00
FACU species	0.00	x 4 =	0.00
UPL species	0.00	x 5 =	0.00
Column Totals:	89.00 (A)		207.00 (B)

Prevalence Index = B/A = 2.33

Hydrophytic Vegetation Indicators:

- ___ 1 - Rapid Test for Hydrophytic Vegetation
- ✔ 2 - Dominance Test is >50%
- ✔ 3 - Prevalence Index is ≤3.0[1]
- ___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** ✔ **No** ___

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL Sampling Point: MT-A1W

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-8	10YR 2/1	100					MMI	
8-22	10YR 2/1	98	10YR 4/6	2	C	M	MMI	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7) (**LRR R, MLRA 149B**)
- ___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
- ___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
- ✓ Loamy Mucky Mineral (F1) (**LRR K, L**)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
- ___ Coast Prairie Redox (A16) (**LRR K, L, R**)
- ___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
- ___ Dark Surface (S7) (**LRR K, L**)
- ___ Polyvalue Below Surface (S8) (**LRR K, L**)
- ___ Thin Dark Surface (S9) (**LRR K, L**)
- ___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
- ___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
- ___ Mesic Spodic (TA6) (**MLRA 144A, 145, 149B**)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ✓ **No** _____

Remarks:

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: 5389 Miller Trunk Hwy City/County: St. Louis County Sampling Date: 2022-11-03

Applicant/Owner: City of Hermantown State: Minnesota Sampling Point: MT-B1W

Investigator(s): GEI - Cavan Denning Section, Township, Range: sec 04 T050N R015W

Landform (hillslope, terrace, etc.): Depression Local relief (concave, convex, none): Concave Slope (%): 0-2

Subregion (LRR or MLRA): LRR K, MLRA 93A Lat: 46.841295 Long: -92.244751 Datum: WGS84

Soil Map Unit Name: Hermantown-Canosia-Giese, depressional, complex, 0 to 3 percent slopes NWI classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✔ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✔ No _____

Are Vegetation _____, Soil ✔, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✔	No _____	**Is the Sampled Area within a Wetland?** **Yes ✔ No _____**
Hydric Soil Present?	Yes ✔	No _____	
Wetland Hydrology Present?	Yes ✔	No _____	If yes, optional Wetland Site ID: _____

Remarks: (Explain alternative procedures here or in a separate report.)
Sample plot located in an Alder Thicket.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ✔ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ✔ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes _____	No ✔	Depth (inches): _____
Water Table Present?	Yes _____	No ✔	Depth (inches): _____
Saturation Present? (includes capillary fringe)	Yes _____	No ✔	Depth (inches): _____

Wetland Hydrology Present? Yes ✔ No _____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION – Use scientific names of plants. Sampling Point: MT-B1W

Tree Stratum (Plot size: 30)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Abies balsamea*	8	Y	FAC
2.			
3.			
4.			
5.			
6.			
7.			
	8.0 = Total Cover		
Sapling/Shrub Stratum (Plot size: 15)			
1. *Alnus incana*	35	Y	FACW
2.			
3.			
4.			
5.			
6.			
7.			
	35.0 = Total Cover		
Herb Stratum (Plot size: 5)			
1. *Solidago gigantea*	15	Y	FACW
2. *Carex gracillima*	5	Y	FACU
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	20.0 = Total Cover		
Woody Vine Stratum (Plot size: 30)			
1.			
2.			
3.			
4.			
	0 = Total Cover		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across All Strata: 4 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 75.00 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0.00	x 1 =	0.00
FACW species	50.00	x 2 =	100.00
FAC species	8.00	x 3 =	24.00
FACU species	5.00	x 4 =	20.00
UPL species	0.00	x 5 =	0.00
Column Totals:	63.00 (A)		144.00 (B)

Prevalence Index = B/A = 2.29

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

✔ 2 - Dominance Test is >50%

✔ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** ✔ **No** ___

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL Sampling Point: MT-B1W

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-5	7.5YR 3/2	100					SC	
5-10	7.5YR 4/3	88	7.5YR 5/8	12	C	M	COSL	Gravel mixed in
10-22	7.5YR 5/2	90	7.5YR 5/6	10	C	M	L	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7) (**LRR R, MLRA 149B**)
- ___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
- ___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
- ___ Loamy Mucky Mineral (F1) (**LRR K, L**)
- ___ Loamy Gleyed Matrix (F2)
- ✓ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
- ___ Coast Prairie Redox (A16) (**LRR K, L, R**)
- ___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
- ___ Dark Surface (S7) (**LRR K, L**)
- ___ Polyvalue Below Surface (S8) (**LRR K, L**)
- ___ Thin Dark Surface (S9) (**LRR K, L**)
- ___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
- ___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
- ___ Mesic Spodic (TA6) (**MLRA 144A, 145, 149B**)
- ✓ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ✓ **No** ___

Remarks:

Naturally problematic red parent materials soils present.

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: 5389 Miller Trunk Hwy City/County: St. Louis County Sampling Date: 2022-11-03

Applicant/Owner: City of Hermantown State: Minnesota Sampling Point: MT-C1U

Investigator(s): GEI - Cavan Denning Section, Township, Range: sec 04 T050N R015W

Landform (hillslope, terrace, etc.): Sideslope Local relief (concave, convex, none): Convex Slope (%): 3-7

Subregion (LRR or MLRA): LRR K, MLRA 93A Lat: 46.841364 Long: -92.244634 Datum: WGS84

Soil Map Unit Name: Hermantown-Canosia-Giese, depressional, complex, 0 to 3 percent slopes NWI classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✔ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✔ No _____

Are Vegetation _____, Soil ✔, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes _____	No ✔	**Is the Sampled Area within a Wetland?** **Yes** _____ **No** ✔
Hydric Soil Present?	Yes _____	No ✔	
Wetland Hydrology Present?	Yes _____	No ✔	If yes, optional Wetland Site ID: _____

Remarks: (Explain alternative procedures here or in a separate report.)
Located in Hardwood Forest

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes _____	No ✔	Depth (inches): _____
Water Table Present?	Yes _____	No ✔	Depth (inches): _____
Saturation Present? (includes capillary fringe)	Yes _____	No ✔	Depth (inches): _____

Wetland Hydrology Present? **Yes** _____ **No** ✔

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
No indicators of wetland hydrology were observed.

VEGETATION – Use scientific names of plants. Sampling Point: MT-C1U

Tree Stratum (Plot size: 30)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Abies balsamea*	20	Y	FAC
2. *Acer rubrum*	20	Y	FAC
3. *Betula papyrifera*	10	Y	FACU
4.			
5.			
6.			
7.			
	50.0	= Total Cover	
Sapling/Shrub Stratum (Plot size: 15)			
1. *Abies balsamea*	8	Y	FAC
2.			
3.			
4.			
5.			
6.			
7.			
	8.0	= Total Cover	
Herb Stratum (Plot size: 5)			
1. *Eurybia macrophylla*	10	Y	UPL
2. *Pteridium aquilinum*	8	Y	FACU
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	18.0	= Total Cover	
Woody Vine Stratum (Plot size: 30)			
1.			
2.			
3.			
4.			
	0	= Total Cover	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across All Strata: 6 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 50.00 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0.00	x 1 =	0.00
FACW species	0.00	x 2 =	0.00
FAC species	48.00	x 3 =	144.00
FACU species	18.00	x 4 =	72.00
UPL species	10.00	x 5 =	50.00
Column Totals:	76.00 (A)		266.00 (B)

Prevalence Index = B/A = 3.5

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? Yes _____ No ✔

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL Sampling Point: MT-C1U

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-6	7.5YR 3/2	100					L	
6-22	7.5YR 4/4	95	7.5YR 5/6	5	C	M	SCL	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7) (**LRR R, MLRA 149B**)
- ___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
- ___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
- ___ Loamy Mucky Mineral (F1) (**LRR K, L**)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
- ___ Coast Prairie Redox (A16) (**LRR K, L, R**)
- ___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
- ___ Dark Surface (S7) (**LRR K, L**)
- ___ Polyvalue Below Surface (S8) (**LRR K, L**)
- ___ Thin Dark Surface (S9) (**LRR K, L**)
- ___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
- ___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
- ___ Mesic Spodic (TA6) (**MLRA 144A, 145, 149B**)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** _____ **No** ✔

Remarks:

Naturally problematic red parents material soils present

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: 5389 Miller Trunk Hwy City/County: St. Louis County Sampling Date: 2022-11-03

Applicant/Owner: City Of Hermantown State: Minnesota Sampling Point: MT-C1W

Investigator(s): GEI - Cavan Denning Section, Township, Range: sec 04 T050N R015W

Landform (hillslope, terrace, etc.): Depression Local relief (concave, convex, none): Concave Slope (%): 0-2

Subregion (LRR or MLRA): LRR K, MLRA 93A Lat: 46.841630 Long: -92.244391 Datum: WGS84

Soil Map Unit Name: Hermantown-Canosia-Giese, depressional, complex, 0 to 3 percent slopes NWI classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✔ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✔ No _____

Are Vegetation _____, Soil ✔, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✔	No _____	**Is the Sampled Area within a Wetland?** **Yes ✔ No _____**
Hydric Soil Present?	Yes ✔	No _____	
Wetland Hydrology Present?	Yes ✔	No _____	If yes, optional Wetland Site ID: _____

Remarks: (Explain alternative procedures here or in a separate report.)
Sample plot is located in Hardwood Swamp.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ✔ High Water Table (A2)
- ✔ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ✔ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ✔ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ✔	No _____	Depth (inches): 0
Water Table Present?	Yes ✔	No _____	Depth (inches): 11
Saturation Present? (includes capillary fringe)	Yes ✔	No _____	Depth (inches): 0

Wetland Hydrology Present? Yes ✔ No _____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION – Use scientific names of plants. Sampling Point: MT-C1W

Tree Stratum (Plot size: 30)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Fraxinus nigra*	40	Y	FACW
2.			
3.			
4.			
5.			
6.			
7.			
	40.0 = Total Cover		
Sapling/Shrub Stratum (Plot size: 15)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	0 = Total Cover		
Herb Stratum (Plot size: 5)			
1. *Calamagrostis canadensis*	30	Y	OBL
2. *Equisetum arvense*	12	Y	FAC
3. *Dryopteris carthusiana*	10	N	FACW
4. *Fragaria virginiana*	5	N	FACU
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	57.0 = Total Cover		
Woody Vine Stratum (Plot size: 30)			
1.			
2.			
3.			
4.			
	0 = Total Cover		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100.00 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	30.00	x 1 =	30.00
FACW species	50.00	x 2 =	100.00
FAC species	12.00	x 3 =	36.00
FACU species	5.00	x 4 =	20.00
UPL species	0.00	x 5 =	0.00
Column Totals:	97.00 (A)		186.00 (B)

Prevalence Index = B/A = 1.92

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

✔ 2 - Dominance Test is >50%

✔ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** ✔ **No** ___

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL Sampling Point: MT-C1W

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-5	10YR 2/1	100					MMI	
5-14	10YR 5/1	80	10YR 5/8	20	C	M	SCL	
14-24	7.5YR 4/4	85	7.5YR 5/6	15	C	M	SC	Gravel mixed in

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ✓ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7) (**LRR R, MLRA 149B**)
- ___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
- ___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
- ✓ Loamy Mucky Mineral (F1) (**LRR K, L**)
- ___ Loamy Gleyed Matrix (F2)
- ✓ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
- ___ Coast Prairie Redox (A16) (**LRR K, L, R**)
- ___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
- ___ Dark Surface (S7) (**LRR K, L**)
- ___ Polyvalue Below Surface (S8) (**LRR K, L**)
- ___ Thin Dark Surface (S9) (**LRR K, L**)
- ___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
- ___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
- ___ Mesic Spodic (TA6) (**MLRA 144A, 145, 149B**)
- ✓ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ✓ **No** ___

Remarks:

Naturally problematic red parent material soils present.

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: 5389 Miller Trunk Hwy City/County: Hermantown Sampling Date: 2022-11-03

Applicant/Owner: City Of Hermantown State: Minnesota Sampling Point: MT-D1U

Investigator(s): GEI - Rob Peterson Section, Township, Range: sec 04 T050N R015W

Landform (hillslope, terrace, etc.): Backslope Local relief (concave, convex, none): Convex Slope (%): 3-7

Subregion (LRR or MLRA): LRR K, MLRA 93A Lat: 46.842479 Long: -92.245432 Datum: WGS84

Soil Map Unit Name: Normanna-Giese, depressional, complex, pitted, 0 to 8 percent slopes NWI classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✔ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✔ No _____

Are Vegetation _____, Soil ✔, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes _____	No ✔	**Is the Sampled Area within a Wetland?** **Yes** _____ **No** ✔
Hydric Soil Present?	Yes _____	No ✔	
Wetland Hydrology Present?	Yes _____	No ✔	If yes, optional Wetland Site ID: _____

Remarks: (Explain alternative procedures here or in a separate report.)

Mixed forest upslope from hardwood swamp

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes _____	No ✔	Depth (inches): _____
Water Table Present?	Yes _____	No ✔	Depth (inches): _____
Saturation Present? (includes capillary fringe)	Yes _____	No ✔	Depth (inches): _____

Wetland Hydrology Present? **Yes** _____ **No** ✔

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

No indicators of wetland hydrology were observed.

VEGETATION – Use scientific names of plants. Sampling Point: MT-D1U

Tree Stratum (Plot size: 30)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Acer rubrum*	25	Y	FAC
2. *Populus tremuloides*	10	Y	FAC
3.			
4.			
5.			
6.			
7.			
	35.0	= Total Cover	

Sapling/Shrub Stratum (Plot size: 15)			
1. *Corylus cornuta*	30	Y	FACU
2.			
3.			
4.			
5.			
6.			
7.			
	30.0	= Total Cover	

Herb Stratum (Plot size: 5)			
1. *Eurybia macrophylla*	40	Y	UPL
2. *Carex gracillima*	30	Y	FACU
3. *Fragaria virginiana*	15	N	FACU
4. *Cornus canadensis*	10	N	FAC
5. *Calamagrostis canadensis*	5	N	OBL
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	100.0	= Total Cover	

Woody Vine Stratum (Plot size: 30)			
1.			
2.			
3.			
4.			
	0	= Total Cover	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 5 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 40.00 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	5.00	x 1 =	5.00
FACW species	0.00	x 2 =	0.00
FAC species	45.00	x 3 =	135.00
FACU species	75.00	x 4 =	300.00
UPL species	40.00	x 5 =	200.00
Column Totals:	165.00 (A)		640.00 (B)

Prevalence Index = B/A = 3.88

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? Yes ____ No ✔

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL Sampling Point: MT-D1U

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-6	7.5YR 3/2	100					SIL	
6-19	7.5YR 4/3	100					SIL	
19-24	7.5YR 4/2	95	7.5YR 4/6	5	C	M	SIL	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7) (**LRR R, MLRA 149B**)
- ___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
- ___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
- ___ Loamy Mucky Mineral (F1) (**LRR K, L**)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
- ___ Coast Prairie Redox (A16) (**LRR K, L, R**)
- ___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
- ___ Dark Surface (S7) (**LRR K, L**)
- ___ Polyvalue Below Surface (S8) (**LRR K, L**)
- ___ Thin Dark Surface (S9) (**LRR K, L**)
- ___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
- ___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
- ___ Mesic Spodic (TA6) (**MLRA 144A, 145, 149B**)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** _____ **No** ✔

Remarks:

Soils naturally problematic due to red parent material

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: 5389 Miller Trunk Hwy City/County: St. Louis County Sampling Date: 2022-11-03

Applicant/Owner: City of Hermantown State: Minnesota Sampling Point: MT-D1W

Investigator(s): GEI - Cavan Denning Section, Township, Range: sec 04 T050N R015W

Landform (hillslope, terrace, etc.): Depression Local relief (concave, convex, none): Concave Slope (%): 0-2

Subregion (LRR or MLRA): LRR K, MLRA 93A Lat: 46.842787 Long: -92.245629 Datum: WGS84

Soil Map Unit Name: Normanna-Giese, depressional, complex, pitted, 0 to 8 percent slopes NWI classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✔ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✔ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✔	No _____	**Is the Sampled Area within a Wetland?** **Yes ✔ No _____**
Hydric Soil Present?	Yes ✔	No _____	
Wetland Hydrology Present?	Yes ✔	No _____	If yes, optional Wetland Site ID: _____

Remarks: (Explain alternative procedures here or in a separate report.)
Sample point located in a Hardwood Swamp.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ✔ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ✔ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes _____	No ✔	Depth (inches): _____
Water Table Present?	Yes _____	No ✔	Depth (inches): _____
Saturation Present? (includes capillary fringe)	Yes _____	No ✔	Depth (inches): _____

Wetland Hydrology Present? Yes ✔ No _____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION – Use scientific names of plants. Sampling Point: MT-D1W

Tree Stratum (Plot size: 30)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Fraxinus nigra*	40	Y	FACW
2. *Abies balsamea*	12	Y	FAC
3.			
4.			
5.			
6.			
7.			
	52.0	= Total Cover	

Sapling/Shrub Stratum (Plot size: 15)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	0	= Total Cover	

Herb Stratum (Plot size: 5)			
1. *Calamagrostis canadensis*	35	Y	OBL
2. *Glyceria striata*	15	Y	OBL
3. *Dryopteris carthusiana*	8	N	FACW
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	58.0	= Total Cover	

Woody Vine Stratum (Plot size: 30)			
1.			
2.			
3.			
4.			
	0	= Total Cover	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 4 (A)

Total Number of Dominant Species Across All Strata: 4 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100.00 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	50.00	x 1 =	50.00
FACW species	48.00	x 2 =	96.00
FAC species	12.00	x 3 =	36.00
FACU species	0.00	x 4 =	0.00
UPL species	0.00	x 5 =	0.00
Column Totals:	110.00 (A)		182.00 (B)

Prevalence Index = B/A = 1.65

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

✔ 2 - Dominance Test is >50%

✔ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** ✔ **No** _____

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL Sampling Point: MT-D1W

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-5	10YR 2/1	98	10YR 4/6	2	C	M	SC	
5-8	10YR 4/2	85	7.5YR 4/6	15	C	M	SC	
8-22	10YR 4/2	70	7.5YR 4/6	30	C	M	LS	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ✓ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7) (**LRR R, MLRA 149B**)
- ___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
- ___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
- ___ Loamy Mucky Mineral (F1) (**LRR K, L**)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ✓ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
- ___ Coast Prairie Redox (A16) (**LRR K, L, R**)
- ___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
- ___ Dark Surface (S7) (**LRR K, L**)
- ___ Polyvalue Below Surface (S8) (**LRR K, L**)
- ___ Thin Dark Surface (S9) (**LRR K, L**)
- ___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
- ___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
- ___ Mesic Spodic (TA6) (**MLRA 144A, 145, 149B**)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

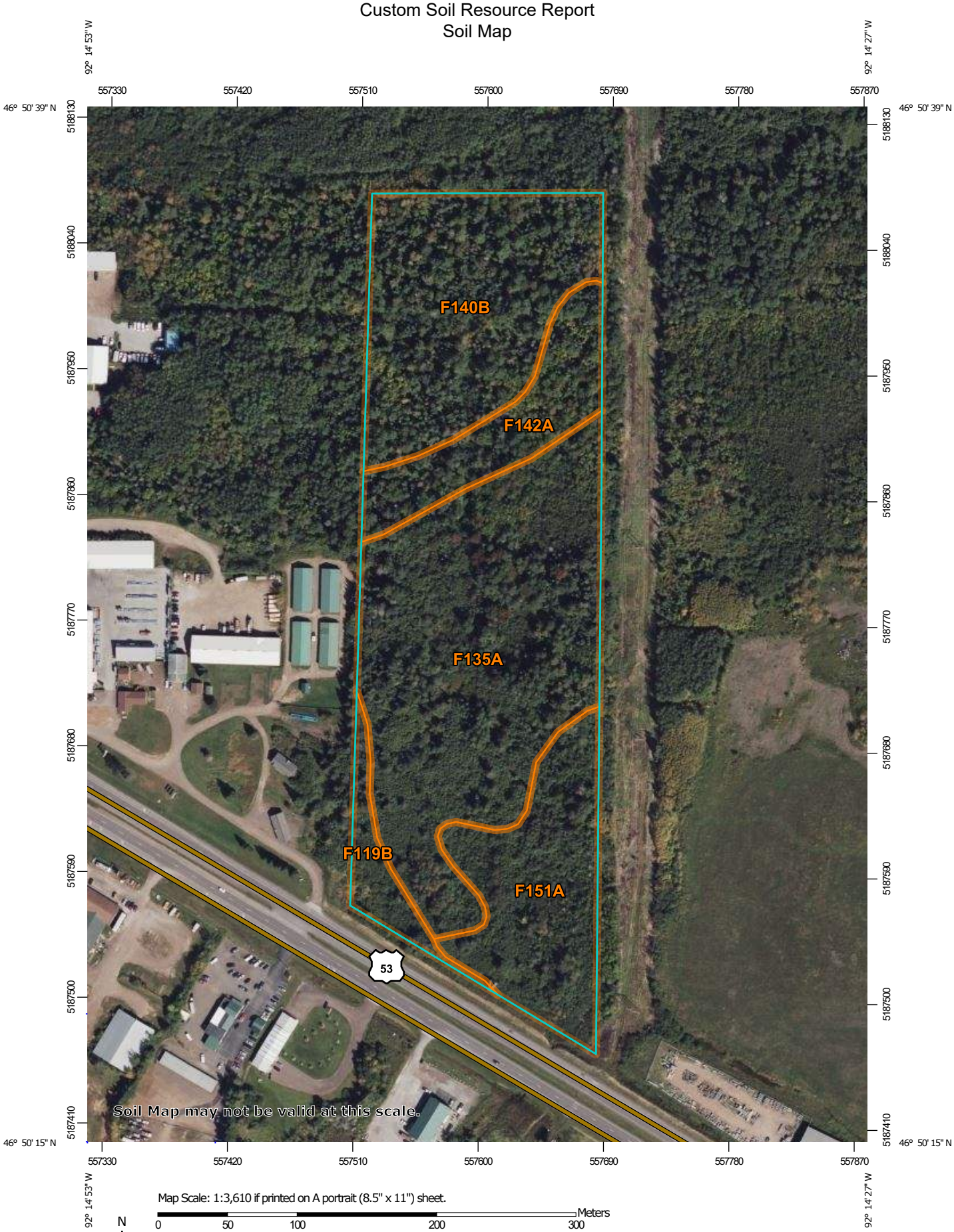
Hydric Soil Present? **Yes** ✓ **No** _____

Remarks:

Appendix D

USDA Soil Survey Information

Custom Soil Resource Report
Soil Map



Map Scale: 1:3,610 if printed on A portrait (8.5" x 11") sheet.

N

Meters: 0 50 100 200 300

Feet: 0 150 300 600 900

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 15N WGS84

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: St. Louis County, Minnesota, Duluth Part
Survey Area Data: Version 20, Sep 6, 2022

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Jul 30, 2020—Sep 18, 2020

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
F119B	Urban land-Greysolon-Normanna-Rock outcrop complex, 1 to 20 percent slopes	0.9	3.8%
F135A	Hermantown-Canosia-Giese, depressional, complex, 0 to 3 percent slopes	10.5	43.4%
F140B	Normanna-Giese, depressional, complex, pitted, 0 to 8 percent slopes	6.1	25.5%
F142A	Canosia loam, 0 to 2 percent slopes	2.5	10.2%
F151A	Tacoosh mucky peat, dense substratum, 0 to 1 percent slopes	4.1	17.1%
Totals for Area of Interest		**24.1**	**100.0%**

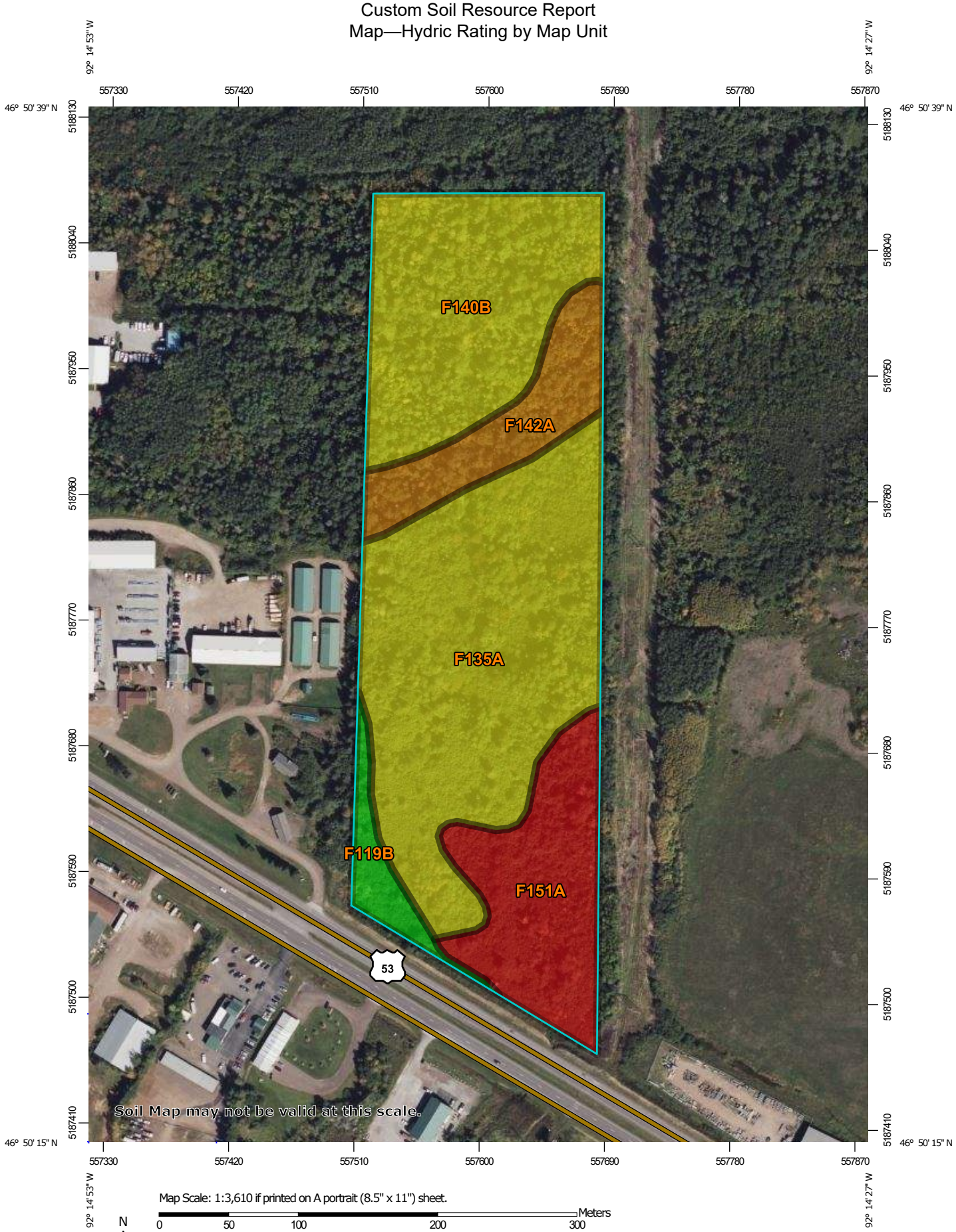
Map Unit Descriptions

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor

Custom Soil Resource Report
Map—Hydric Rating by Map Unit



Map Scale: 1:3,610 if printed on A portrait (8.5" x 11") sheet.

N

Meters: 0 50 100 200 300

Feet: 0 150 300 600 900

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 15N WGS84

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils

Soil Rating Polygons
- Hydric (100%)
- Hydric (66 to 99%)
- Hydric (33 to 65%)
- Hydric (1 to 32%)
- Not Hydric (0%)
- Not rated or not available

Soil Rating Lines
- Hydric (100%)
- Hydric (66 to 99%)
- Hydric (33 to 65%)
- Hydric (1 to 32%)
- Not Hydric (0%)
- Not rated or not available

Soil Rating Points
- Hydric (100%)
- Hydric (66 to 99%)
- Hydric (33 to 65%)
- Hydric (1 to 32%)
- Not Hydric (0%)
- Not rated or not available

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: St. Louis County, Minnesota, Duluth Part
Survey Area Data: Version 20, Sep 6, 2022

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Jul 30, 2020—Sep 18, 2020

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Table—Hydric Rating by Map Unit

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
F119B	Urban land-Greysolon-Normanna-Rock outcrop complex, 1 to 20 percent slopes	0	0.9	3.8%
F135A	Hermantown-Canosia-Giese, depressional, complex, 0 to 3 percent slopes	55	10.5	43.4%
F140B	Normanna-Giese, depressional, complex, pitted, 0 to 8 percent slopes	38	6.1	25.5%
F142A	Canosia loam, 0 to 2 percent slopes	95	2.5	10.2%
F151A	Tacoosh mucky peat, dense substratum, 0 to 1 percent slopes	100	4.1	17.1%
Totals for Area of Interest			**24.1**	**100.0%**

Rating Options—Hydric Rating by Map Unit

Aggregation Method: Percent Present

Component Percent Cutoff: None Specified

Tie-break Rule: Lower

Exhibit C

U.S. Army Corps of Engineers Approvals

BRAUN
INTERTEC

DEPARTMENT OF THE ARMY
U.S. ARMY CORPS OF ENGINEERS, ST. PAUL DISTRICT
332 MINNESOTA STREET, SUITE E1500
ST. PAUL, MN 55101-1323

February 3, 2023

Regulatory File No. MVP-2022-02028-KAL

City of Hermantown
c/o Eric Johnson
5105 Maple Grove Road
Hermantown, Minnesota, 55811

Dear Mr. Johnson:

We are responding to your request, submitted by GEI Consultants, Inc. on your behalf, for Corps of Engineers (Corps) concurrence with the delineation of aquatic resources completed on the 5389 Miller Trunk Highway Project. The project site is in Section 4, Township 50 North, Range 15 West, St. Louis County, Minnesota.

We have reviewed the delineation report dated November 4, 2022 and concur that Figure 2 depicts a reasonable approximation of the location and boundaries of aquatic resources on the property. This delineation can be used for planning and will generally be sufficient for Corps permitting purposes. However, this "reasonable approximation" concurrence may not fulfill state or local delineation requirements. It may be necessary to review this determination in response to changing site conditions or new information.

Additional Information regarding Jurisdiction and Permitting:

No jurisdictional determination was prepared for this project, nor is one required to support a permit application. If you submit a permit application, we will assist you in identifying aquatic resources that are not subject to Corps regulation to exclude those resources from the permit evaluation. A permit application should include this delineation, any subsequent revisions, and any state or local delineation approvals. You are advised that a permit or exemption from a state or local agency does not satisfy the requirement to obtain a Corps permit where one is needed.

Please note that the Corps has issued Nationwide General Permits and Regional General Permits that provide authorization for many minor activities. Many of those general permits require a pre-construction notification and Corps verification prior to starting work. However, several general permits also have "self-certifying" provisions that eliminate the need to provide notice to the Corps, provided the permittee complies with the terms and conditions of the general permit. Current general permit terms and conditions can be found at: https://www.mvp.usace.army.mil/Missions/Regulatory/Permitting-Process-Procedures/.

If you have any questions, please contact me in our Duluth office at (218) 788-6409 or Kristoffer.a.laman@usace.army.mil. In any correspondence or inquiries, please refer to the Regulatory file number shown above.

Sincerely,

Kristoffer Laman
Project Manager

cc:
Rob Peterson (Agent)
David Demmer (BWSR)
R.C. Boheim (SWCD)
Eric Johnson (LGU)
Samuel Martin (MNDNR)

DEPARTMENT OF THE ARMY
U.S. ARMY CORPS OF ENGINEERS, ST. PAUL DISTRICT
332 MINNESOTA STREET, SUITE E1500
ST. PAUL, MN 55101-1323

11/08/2022

Regulatory File No. MVP-2022-02028-KAL

THIS IS NOT A PERMIT

Mr. Eric Johnson
City of Hermantown
5105 Maple Grove Road
Hermantown, MN 55811

Dear Mr. Johnson:

We have received your submittal described below. You may contact the Project Manager with questions regarding the evaluation process. The Project Manager may request additional information necessary to evaluate your submittal.

File Number: MVP-2022-02028-KAL

Applicant: City of Hermantown

Project Name: City of Hermantown 5389 Miller Trunk Highway Wetland Delineation

Project Location: Section 4 of Township 50 N, Range 15 W, St. Louis County, Minnesota (Latitude: 46.8412274734223; Longitude: -92.2445634614409)

Received Date: 11/08/2022

Project Manager: Kristoffer Laman
(218) 788-6409
Kristoffer.A.Laman@usace.army.mil

Additional information about the St. Paul District Regulatory Program can be found on our web site at http://www.mvp.usace.army.mil/missions/regulatory.

Please note that initiating work in waters of the United States prior to receiving Department of the Army authorization could constitute a violation of Federal law. If you have any questions, please contact the Project Manager.

Thank you.

U.S. Army Corps of Engineers
St. Paul District
Regulatory Branch

Exhibit D

Minnesota Department of Health Well Index Results

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Minnesota Department of Health Well Index Results

Unique Well #	Well Name	Total Depth (ft)	Depth to Water (ft)	Listed Use	Date Well Completed	Status	Notes
00330813	MPCA	25	10	Other	05/21/2009	Sealed	Was a Temp Well.
00424064	MW 8705E ARROWHEAD REFINERY	56	2	Test Well	10/10/1987	Active	Monitoring well*
00427429	MW 878B	23	4	Test Well	09/28/1987	Active	Monitoring well*
00427430	MW 877S	12	2	Test Well	10/06/1987	Active	Monitoring well*
00427431	MW 8713E	53	12	Test Well	10/09/1987	Active	Monitoring well*
00427432	MW 8713B	35	1	Test Well	10/13/1987	Active	Monitoring well*
00427433	ARROWHEAD	6.5	6	Test Well	09/26/1987	Active	Monitoring well*
00427434	MW P8716B	25	7.05	Test Well	02/15/1987	Active	Monitoring well*
00427435	MW 8716S	13	5	Test Well	09/15/1987	Active	Monitoring well*
00427436	MW 8717E	56	6	Test Well	09/26/1987	Active	Monitoring well*
00427444	MW 872E	50	5	Test Well	10/23/1987	Active	Monitoring well*
00427445	MW 873S	8	4	Test Well	09/25/1987	Sealed	Sealed 04/12/2002
00427446	MW 8705S	10	2	Test Well	10/14/1987	Active	Monitoring well*
00427447	MW P 8705S	20	2.1	Monitoring Well	10/09/1987	Active	Monitoring well*
00427448	MW 8705B	22	1.9	Monitoring Well	10/12/1987	Active	Monitoring well*
00427450	MW 8717B	56	7	Test Well	09/23/1987	Active	Monitoring well*
00440851	MW P 8717S	15	6.7	Test Well	09/24/1987	Active	Monitoring well*
00440852	MW 8717E	67	20	Test Well	09/30/1987	Active	Monitoring well*
00440853	MW P 8721S	10	2	Test Well	09/23/1987	Active	Monitoring well*
00440854	MW P 8721B	30	2	Test Well	09/23/1987	Active	Monitoring well*

Minnesota Department of Health Well Index Results

Unique Well #	Well Name	Total Depth (ft)	Depth to Water (ft)	Listed Use	Date Well Completed	Status	Notes
00440855	MW P 8722S	12	1	Test Well	09/24/1987	Active	Monitoring well*
00473896	MW-1 CURTIS	16	5	Monitoring Well	01/31/1992	Sealed	Sealed 05/23/2014
00473897	MW-3 CURTIS	10	7	Monitoring Well	02/04/1992	Sealed	Sealed 08/05/1999
00473898	MW-4 CURTIS	15	4	Monitoring Well	02/26/1992	Sealed	Sealed 05/23/2014
00473899	MW-2 CURTIS	16	6	Monitoring Well	02/01/1992	Sealed	Sealed 01/30/2003
00497301	TOBIAS, CRAIG	225	8	Domestic	05/19/1992	Active	West of Ph.I Site Boundary
00555943	No Listing	335	28	Domestic	05/50/1996	Active	West of Ph.I Site Boundary
00597359	MW-97-4B	40	14.3	Monitoring Well	06/10/1997	Sealed	Sealed 02/13/2007
00597357	MPCA-97-2A	15	10	Monitoring Well	06/12/2007	Active	Monitoring well*
00597358	MW-97-4A	15	13.59	Monitoring Well	06/10/1997	Active	Monitoring well*
00597360	MPCA-97-5A	15	13.5	Monitoring Well	06/12/1997	Active	Monitoring well*
00597361	MW-97-5B	22	12	Monitoring Well	06/11/1997	Active	Monitoring well*
00660022	MW- WILSON	7	No Listing	Monitoring Well	04/12/2002	Active	Monitoring well*
00739244	MW-3A	15	4.5	Monitoring Well	06/04/2007	Active	Monitoring well*
00747704	MW-4B	25	17	Monitoring Well	02/13/2007	Active	Monitoring well*
1000021897	MW-2A	15	No Listing	No Listing	No Listing	Unknown	Monitoring well*
1000021898	MW-3A1	15	No Listing	No Listing	No Listing	Unknown	Monitoring well*
1000021899	MW-3B	24	No Listing	No Listing	No Listing	Unknown	Monitoring well*
1000021900	MW-B4B	21.8	No Listing	No Listing	No Listing	Unknown	Monitoring well*
1000021901	MW-5A	15	No Listing	No Listing	No Listing	Unknown	Monitoring well*
1000021902	MW-B5	17	No Listing	No Listing	No Listing	Unknown	Monitoring well*

Minnesota Department of Health Well Index Results							
Unique Well #	**Well Name**	**Total Depth (ft)**	**Depth to Water (ft)**	**Listed Use**	**Date Well Completed**	**Status**	**Notes**
1000021903	MW-6C	34.7	No Listing	No Listing	No Listing	Unknown	Monitoring well*
1000021908	MW-14A	15	No Listing	No Listing	No Listing	Unknown	Monitoring well*
1000021909	MW-14B	24.4	No Listing	No Listing	No Listing	Unknown	Monitoring well*
1000021910	MW-14C	31.5	No Listing	No Listing	No Listing	Unknown	Monitoring well*

* Likely no longer present.

Exhibit E

U.S. Fish & Wildlife Service Information, Planning, and Conservation (IPaC) Correspondence

BRAUN INTERTEC

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Minnesota-Wisconsin Ecological Services Field Office
3815 American Blvd East
Bloomington, MN 55425-1659
Phone: (952) 858-0793 Fax: (952) 646-2873

In Reply Refer To: August 02, 2023
Project Code: 2023-0057777
Project Name: Hermantown Business Park AUAR

Subject: List of threatened and endangered species that may occur in your proposed project location or may be affected by your proposed project

To Whom It May Concern:

This response has been generated by the Information, Planning, and Conservation (IPaC) system to provide information on natural resources that could be affected by your project. The U.S. Fish and Wildlife Service (Service) provides this response under the authority of the Endangered Species Act of 1973 (16 U.S.C. 1531-1543), the Bald and Golden Eagle Protection Act (16 U.S.C. 668-668d), the Migratory Bird Treaty Act (16 U.S.C. 703-712), and the Fish and Wildlife Coordination Act (16 U.S.C. 661 *et seq.*).

Threatened and Endangered Species
The enclosed species list identifies threatened, endangered, proposed and candidate species, as well as proposed and final designated critical habitat, that may occur within the boundary of your proposed project and may be affected by your proposed project. The species list fulfills the requirement for obtaining a Technical Assistance Letter from the U.S. Fish and Wildlife Service under section 7(c) of the Endangered Species Act (Act) of 1973, as amended (16 U.S.C. 1531 *et seq.*).

New information based on updated surveys, changes in the abundance and distribution of species, changed habitat conditions, or other factors could change this list. Note that under 50 CFR 402.12(e) of the regulations implementing section 7 of the Act, the accuracy of this species list should be verified after 90 days. The Service recommends that verification be completed by visiting the ECOS IPaC website at regular intervals during project planning and implementation for updates to species lists and information. An updated list may be requested through the ECOS IPaC system by completing the same process used to receive the enclosed list.

Consultation Technical Assistance
Please refer to refer to our Section 7 website for guidance and technical assistance, including step-by-step instructions for making effects determinations for each species that might be present and for specific guidance on the following types of projects: projects in developed areas, HUD, CDBG, EDA, USDA Rural Development projects, pipelines, buried utilities, telecommunications, and requests for a Conditional Letter of Map Revision (CLOMR) from FEMA.

We recommend running the project (if it qualifies) through our **Minnesota-Wisconsin Federal Endangered Species Determination Key (Minnesota-Wisconsin ("D-key"))**. A demonstration video showing how-to access and use the determination key is available. Please note that the Minnesota-Wisconsin D-key is the third option of 3 available d-keys. D-keys are tools to help Federal agencies and other project proponents determine if their proposed action has the potential to adversely affect federally listed species and designated critical habitat. The Minnesota-Wisconsin D-key includes a structured set of questions that assists a project proponent in determining whether a proposed project qualifies for a certain predetermined consultation outcome for all federally listed species found in Minnesota and Wisconsin (except for the northern long-eared bat- see below), which includes determinations of “no effect” or “may affect, not likely to adversely affect." In each case, the Service has compiled and analyzed the best available information on the species’ biology and the impacts of certain activities to support these determinations.

If your completed d-key output letter shows a "No Effect" (NE) determination for all listed species, print your IPaC output letter for your files to document your compliance with the Endangered Species Act.

For Federal projects with a “Not Likely to Adversely Affect” (NLAA) determination, our concurrence becomes valid if you do not hear otherwise from us after a 30-day review period, as indicated in your letter.

If your d-key output letter indicates additional coordination with the Minnesota-Wisconsin Ecological Services Field Office is necessary (i.e., you get a “May Affect” determination), you will be provided additional guidance on contacting the Service to continue ESA coordination outside of the key; ESA compliance cannot be concluded using the key for “May Affect” determinations unless otherwise indicated in your output letter.

Note: Once you obtain your official species list, you are not required to continue in IPaC with d-keys, although in most cases these tools should expedite your review. If you choose to make an effects determination on your own, you may do so. If the project is a Federal Action, you may want to review our section 7 step-by-step instructions before making your determinations.

Using the IPaC Official Species List to Make No Effect and May Affect Determinations for Listed Species

1. If IPaC returns a result of “There are no listed species found within the vicinity of the project,” then project proponents can conclude the proposed activities will have **no effect** on any federally listed species under Service jurisdiction. Concurrence from the Service is not required for **no effect** determinations. No further consultation or coordination is required. Attach this letter to the dated IPaC species list report for your records.
2. If IPaC returns one or more federally listed, proposed, or candidate species as potentially present in the action area of the proposed project – other than bats (see below) – then project proponents must determine if proposed activities will have **no effect** on or **may affect** those species. For assistance in determining if suitable habitat for listed, candidate, or proposed species occurs within your project area or if species may be affected by project activities, you can obtain Life History Information for Listed and Candidate Species on our office website. If no impacts will occur to a species on the IPaC species list (e.g., there is no habitat present in the project area), the appropriate determination is **no effect**. No further consultation or coordination is required. Attach this letter to the dated IPaC species list report for your records.

3. Should you determine that project activities **may affect** any federally listed, please contact our office for further coordination. Letters with requests for consultation or correspondence about your project should include the Consultation Tracking Number in the header. Electronic submission is preferred.

Northern Long-Eared Bats
Northern long-eared bats occur throughout Minnesota and Wisconsin and the information below may help in determining if your project may affect these species.

This species hibernates in caves or mines only during the winter. In Minnesota and Wisconsin, the hibernation season is considered to be November 1 to March 31. During the active season (April 1 to October 31) they roost in forest and woodland habitats. Suitable summer habitat for northern long-eared bats consists of a wide variety of forested/wooded habitats where they roost, forage, and travel and may also include some adjacent and interspersed non-forested habitats such as emergent wetlands and adjacent edges of agricultural fields, old fields and pastures. This includes forests and woodlots containing potential roosts (i.e., live trees and/or snags ≥3 inches dbh for northern long-eared bat that have exfoliating bark, cracks, crevices, and/or hollows), as well as linear features such as fencerows, riparian forests, and other wooded corridors. These wooded areas may be dense or loose aggregates of trees with variable amounts of canopy closure. Individual trees may be considered suitable habitat when they exhibit the characteristics of a potential roost tree and are located within 1,000 feet (305 meters) of forested/wooded habitat. Northern long-eared bats have also been observed roosting in human-made structures, such as buildings, barns, bridges, and bat houses; therefore, these structures should also be considered potential summer habitat and evaluated for use by bats. If your project will impact caves or mines or will involve clearing forest or woodland habitat containing suitable roosting habitat, northern long-eared bats could be affected.

Examples of unsuitable habitat include:

- Individual trees that are greater than 1,000 feet from forested or wooded areas,
- Trees found in highly developed urban areas (e.g., street trees, downtown areas),
- A pure stand of less than 3-inch dbh trees that are not mixed with larger trees, and
- A monoculture stand of shrubby vegetation with no potential roost trees.

If IPaC returns a result that northern long-eared bats are potentially present in the action area of the proposed project, project proponents can conclude the proposed activities **may affect** this species **IF** one or more of the following activities are proposed:

- Clearing or disturbing suitable roosting habitat, as defined above, at any time of year,
- Any activity in or near the entrance to a cave or mine,
- Mining, deep excavation, or underground work within 0.25 miles of a cave or mine,
- Construction of one or more wind turbines, or
- Demolition or reconstruction of human-made structures that are known to be used by bats based on observations of roosting bats, bats emerging at dusk, or guano deposits or stains.

If none of the above activities are proposed, project proponents can conclude the proposed activities will have **no effect** on the northern long-eared bat. Concurrence from the Service is not required for **No**

Effect determinations. No further consultation or coordination is required. Attach this letter to the dated IPaC species list report for your records.

If any of the above activities are proposed, and the northern long-eared bat appears on the user's species list, the federal project user will be directed to either the range-wide northern long-eared bat D-key or the Federal Highways Administration, Federal Railways Administration, and Federal Transit Administration Indiana bat/ Northern long-eared bat D-key, depending on the type of project and federal agency involvement. Similar to the Minnesota-Wisconsin D-key, these d-keys helps to determine if prohibited take might occur and, if not, will generate an automated verification letter.

Please note: On November 30, 2022, the Service published a proposal final rule to reclassify the northern long-eared bat as endangered under the Endangered Species Act. On January 26, 2023, the Service published a 60-day extension for the final reclassification rule in the Federal Register, moving the effective listing date from January 30, 2023, to March 31, 2023. This extension will provide stakeholders and the public time to preview interim guidance and consultation tools before the rule becomes effective. When available, the tools will be available on the Service's northern long-eared bat website (https://www.fws.gov/species/northern-long-eared-bat-myotis-septentrionalis). Once the final rule goes into effect on March 31, 2023, the 4(d) D-key will no longer be available (4(d) rules are not available for federally endangered species) and will be replaced with a new Range-wide NLEB D-key (range-wide d-key). For projects not completed by March 31, 2023, that were previously reviewed under the 4(d) d-key, there may be a need for reinitiation of consultation. For these ongoing projects previously reviewed under the 4(d) d-key that may result in incidental take of the northern long-eared bat, we recommend you review your project using the new range-wide d-key once available. If your project does not comply with the range-wide d-key, it may be eligible for use of the Interim (formal) Consultation framework (framework). The framework is intended to facilitate the transition from the 4(d) rule to typical Section 7 consultation procedures for federally endangered species and will be available only until spring 2024. Again, when available, these tools (new range-wide d-key and framework) will be available on the Service's northern long-eared bat website.

Whooping Crane
Whooping crane is designated as a non-essential experimental population in Wisconsin and consultation under Section 7(a)(2) of the Endangered Species Act is only required if project activities will occur within a National Wildlife Refuge or National Park. If project activities are proposed on lands outside of a National Wildlife Refuge or National Park, then you are not required to consult. For additional information on this designation and consultation requirements, please review "Establishment of a Nonessential Experimental Population of Whooping Cranes in the Eastern United States."

Other Trust Resources and Activities
Bald and Golden Eagles - Although the bald eagle has been removed from the endangered species list, this species and the golden eagle are protected by the Bald and Golden Eagle Act and the Migratory Bird Treaty Act. Should bald or golden eagles occur within or near the project area please contact our office for further coordination. For communication and wind energy projects, please refer to additional guidelines below.

Migratory Birds - The Migratory Bird Treaty Act (MBTA) prohibits the taking, killing, possession, transportation, and importation of migratory birds, their eggs, parts, and nests, except when specifically authorized by the Service. The Service has the responsibility under the MBTA to proactively prevent the

mortality of migratory birds whenever possible and we encourage implementation of recommendations that minimize potential impacts to migratory birds. Such measures include clearing forested habitat outside the nesting season (generally March 1 to August 31) or conducting nest surveys prior to clearing to avoid injury to eggs or nestlings.

Communication Towers - Construction of new communications towers (including radio, television, cellular, and microwave) creates a potentially significant impact on migratory birds, especially some 350 species of night-migrating birds. However, the Service has developed voluntary guidelines for minimizing impacts.

Transmission Lines - Migratory birds, especially large species with long wingspans, heavy bodies, and poor maneuverability can also collide with power lines. In addition, mortality can occur when birds, particularly hawks, eagles, kites, falcons, and owls, attempt to perch on uninsulated or unguarded power poles. To minimize these risks, please refer to guidelines developed by the Avian Power Line Interaction Committee and the Service. Implementation of these measures is especially important along sections of lines adjacent to wetlands or other areas that support large numbers of raptors and migratory birds.

Wind Energy - To minimize impacts to migratory birds and bats, wind energy projects should follow the Service's Wind Energy Guidelines. In addition, please refer to the Service's Eagle Conservation Plan Guidance, which provides guidance for conserving bald and golden eagles in the course of siting, constructing, and operating wind energy facilities.

State Department of Natural Resources Coordination
While it is not required for your Federal section 7 consultation, please note that additional state endangered or threatened species may also have the potential to be impacted. Please contact the Minnesota or Wisconsin Department of Natural Resources for information on state listed species that may be present in your proposed project area.

Minnesota
Minnesota Department of Natural Resources - Endangered Resources Review Homepage
Email: Review.NHIS@state.mn.us

Wisconsin
Wisconsin Department of Natural Resources - Endangered Resources Review Homepage
Email: DNRERReview@wi.gov

We appreciate your concern for threatened and endangered species. Please feel free to contact our office with questions or for additional information.

Attachment(s):

- Official Species List
- USFWS National Wildlife Refuges and Fish Hatcheries
- Migratory Birds
- Wetlands

OFFICIAL SPECIES LIST

This list is provided pursuant to Section 7 of the Endangered Species Act, and fulfills the requirement for Federal agencies to "request of the Secretary of the Interior information whether any species which is listed or proposed to be listed may be present in the area of a proposed action".

This species list is provided by:

Minnesota-Wisconsin Ecological Services Field Office
3815 American Blvd East
Bloomington, MN 55425-1659
(952) 858-0793

PROJECT SUMMARY

Project Code: 2023-0057777
Project Name: Hermantown Business Park AUAR
Project Type: Mixed-Use Construction
Project Description: Environmental assessment for proposed business park
Project Location:

The approximate location of the project can be viewed in Google Maps: https://www.google.com/maps/@46.842071250000004,-92.24355092394562,14z

Counties: St. Louis County, Minnesota

ENDANGERED SPECIES ACT SPECIES

There is a total of 6 threatened, endangered, or candidate species on this species list.

Species on this list should be considered in an effects analysis for your project and could include species that exist in another geographic area. For example, certain fish may appear on the species list because a project could affect downstream species.

IPaC does not display listed species or critical habitats under the sole jurisdiction of NOAA Fisheries[1], as USFWS does not have the authority to speak on behalf of NOAA and the Department of Commerce.

See the "Critical habitats" section below for those critical habitats that lie wholly or partially within your project area under this office's jurisdiction. Please contact the designated FWS office if you have questions.

---

1. NOAA Fisheries, also known as the National Marine Fisheries Service (NMFS), is an office of the National Oceanic and Atmospheric Administration within the Department of Commerce.

MAMMALS

NAME	STATUS
Canada Lynx *Lynx canadensis* Population: Wherever Found in Contiguous U.S. There is **final** critical habitat for this species. Your location overlaps the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/3652	Threatened
Gray Wolf *Canis lupus* Population: MN There is **final** critical habitat for this species. Your location does not overlap the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/4488	Threatened
Northern Long-eared Bat *Myotis septentrionalis* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/9045	Endangered
Tricolored Bat *Perimyotis subflavus* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/10515	Proposed Endangered

BIRDS

NAME	STATUS
Piping Plover *Charadrius melodus* Population: [Great Lakes watershed DPS] - Great Lakes, watershed in States of IL, IN, MI, MN, NY, OH, PA, and WI and Canada (Ont.) There is **final** critical habitat for this species. Your location does not overlap the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/6039	Endangered

INSECTS

NAME	STATUS
Monarch Butterfly *Danaus plexippus*	Candidate

No critical habitat has been designated for this species.
Species profile: https://ecos.fws.gov/ecp/species/9743

CRITICAL HABITATS

There is 1 critical habitat wholly or partially within your project area under this office's jurisdiction.

NAME	STATUS
Canada Lynx *Lynx canadensis*	Final

https://ecos.fws.gov/ecp/species/3652#crithab

USFWS NATIONAL WILDLIFE REFUGE LANDS AND FISH HATCHERIES

Any activity proposed on lands managed by the National Wildlife Refuge system must undergo a 'Compatibility Determination' conducted by the Refuge. Please contact the individual Refuges to discuss any questions or concerns.

THERE ARE NO REFUGE LANDS OR FISH HATCHERIES WITHIN YOUR PROJECT AREA.

MIGRATORY BIRDS

Certain birds are protected under the Migratory Bird Treaty Act[1] and the Bald and Golden Eagle Protection Act[2].

Any person or organization who plans or conducts activities that may result in impacts to migratory birds, eagles, and their habitats should follow appropriate regulations and consider implementing appropriate conservation measures, as described below.

---

1. The Migratory Birds Treaty Act of 1918.
2. The Bald and Golden Eagle Protection Act of 1940.
3. 50 C.F.R. Sec. 10.12 and 16 U.S.C. Sec. 668(a)

The birds listed below are birds of particular concern either because they occur on the USFWS Birds of Conservation Concern (BCC) list or warrant special attention in your project location. To learn more about the levels of concern for birds on your list and how this list is generated, see the FAQ below. This is not a list of every bird you may find in this location, nor a guarantee that every bird on this list will be found in your project area. To see exact locations of where birders and the general public have sighted birds in and around your project area, visit the E-bird data mapping tool (Tip: enter your location, desired date range and a species on your list). For projects that occur off the Atlantic Coast, additional maps and models detailing the relative occurrence and abundance of bird species on your list are available. Links to additional information about Atlantic Coast birds, and other important information about your migratory bird list, including how to properly interpret and use your migratory bird report, can be found below.

For guidance on when to schedule activities or implement avoidance and minimization measures to reduce impacts to migratory birds on your list, click on the PROBABILITY OF PRESENCE SUMMARY at the top of your list to see when these birds are most likely to be present and breeding in your project area.

NAME	BREEDING SEASON
Bald Eagle *Haliaeetus leucocephalus* This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities.	Breeds Dec 1 to Aug 31
Black-billed Cuckoo *Coccyzus erythropthalmus* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9399	Breeds May 15 to Oct 10

NAME	BREEDING SEASON
Bobolink *Dolichonyx oryzivorus* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds May 20 to Jul 31
Canada Warbler *Cardellina canadensis* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds May 20 to Aug 10
Evening Grosbeak *Coccothraustes vespertinus* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds May 15 to Aug 10
Golden Eagle *Aquila chrysaetos* This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities. https://ecos.fws.gov/ecp/species/1680	Breeds Jan 1 to Aug 31
Golden-winged Warbler *Vermivora chrysoptera* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/8745	Breeds May 1 to Jul 20
Olive-sided Flycatcher *Contopus cooperi* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/3914	Breeds May 20 to Aug 31

PROBABILITY OF PRESENCE SUMMARY

The graphs below provide our best understanding of when birds of concern are most likely to be present in your project area. This information can be used to tailor and schedule your project activities to avoid or minimize impacts to birds. Please make sure you read and understand the FAQ "Proper Interpretation and Use of Your Migratory Bird Report" before using or attempting to interpret this report.

Probability of Presence (■)

Each green bar represents the bird's relative probability of presence in the 10km grid cell(s) your project overlaps during a particular week of the year. (A year is represented as 12 4-week months.) A taller bar indicates a higher probability of species presence. The survey effort (see below) can be used to establish a level of confidence in the presence score. One can have higher confidence in the presence score if the corresponding survey effort is also high.

How is the probability of presence score calculated? The calculation is done in three steps:

1. The probability of presence for each week is calculated as the number of survey events in the week where the species was detected divided by the total number of survey events for that week. For example, if in week 12 there were 20 survey events and the Spotted Towhee

was found in 5 of them, the probability of presence of the Spotted Towhee in week 12 is 0.25.

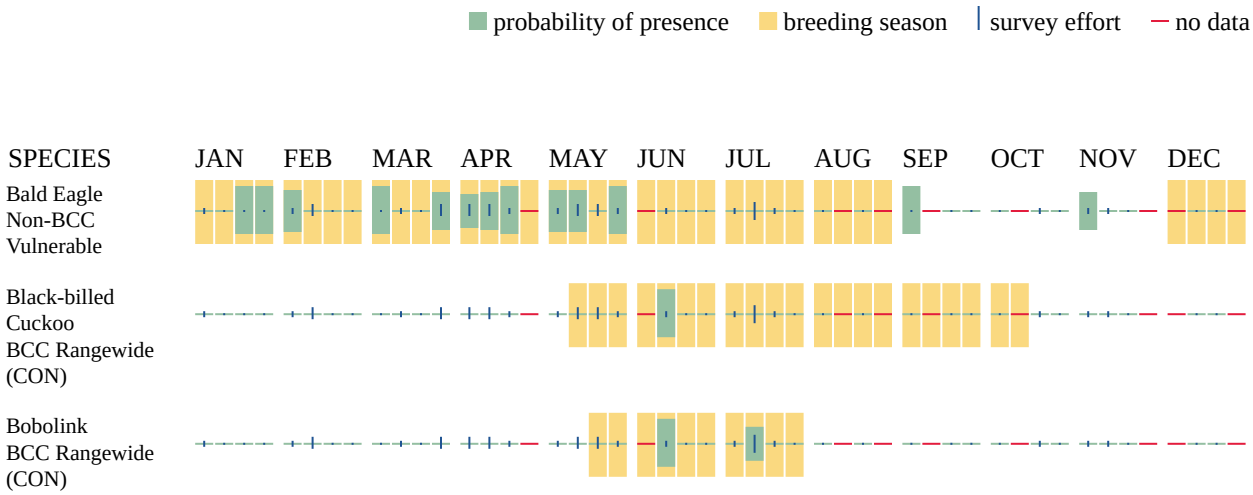
2. To properly present the pattern of presence across the year, the relative probability of presence is calculated. This is the probability of presence divided by the maximum probability of presence across all weeks. For example, imagine the probability of presence in week 20 for the Spotted Towhee is 0.05, and that the probability of presence at week 12 (0.25) is the maximum of any week of the year. The relative probability of presence on week 12 is 0.25/0.25 = 1; at week 20 it is 0.05/0.25 = 0.2.
3. The relative probability of presence calculated in the previous step undergoes a statistical conversion so that all possible values fall between 0 and 10, inclusive. This is the probability of presence score.

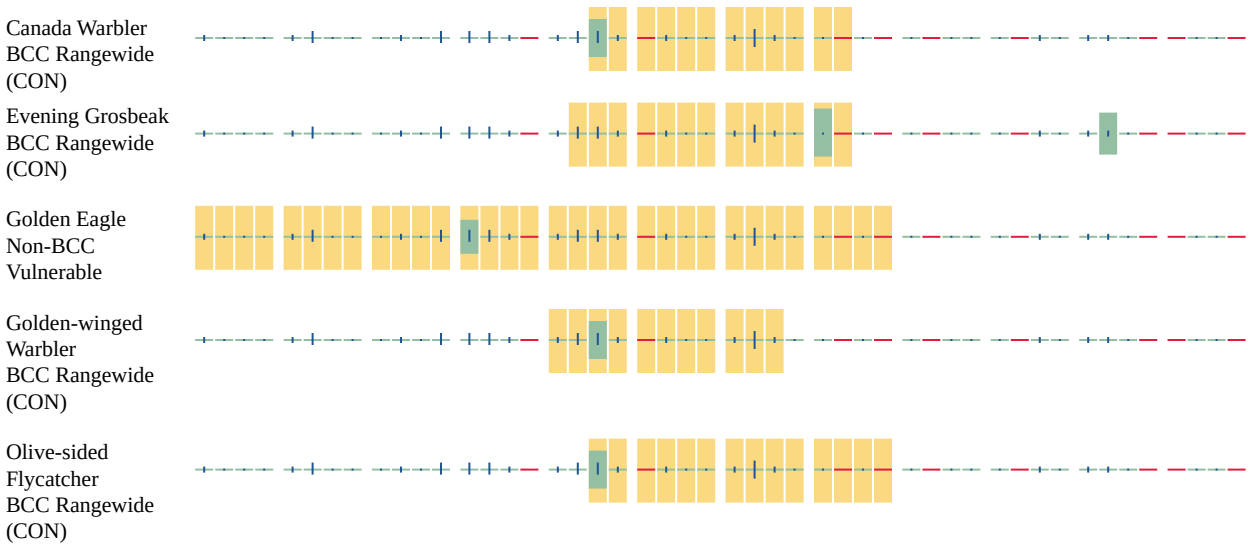
Breeding Season (■)
Yellow bars denote a very liberal estimate of the time-frame inside which the bird breeds across its entire range. If there are no yellow bars shown for a bird, it does not breed in your project area.

Survey Effort (|)
Vertical black lines superimposed on probability of presence bars indicate the number of surveys performed for that species in the 10km grid cell(s) your project area overlaps. The number of surveys is expressed as a range, for example, 33 to 64 surveys.

No Data (–)
A week is marked as having no data if there were no survey events for that week.

Survey Timeframe
Surveys from only the last 10 years are used in order to ensure delivery of currently relevant information. The exception to this is areas off the Atlantic coast, where bird returns are based on all years of available data, since data in these areas is currently much more sparse.





Additional information can be found using the following links:

- Birds of Conservation Concern https://www.fws.gov/program/migratory-birds/species
- Measures for avoiding and minimizing impacts to birds https://www.fws.gov/library/collections/avoiding-and-minimizing-incidental-take-migratory-birds
- Nationwide conservation measures for birds https://www.fws.gov/sites/default/files/documents/nationwide-standard-conservation-measures.pdf

MIGRATORY BIRDS FAQ

Tell me more about conservation measures I can implement to avoid or minimize impacts to migratory birds.

Nationwide Conservation Measures describes measures that can help avoid and minimize impacts to all birds at any location year round. Implementation of these measures is particularly important when birds are most likely to occur in the project area. When birds may be breeding in the area, identifying the locations of any active nests and avoiding their destruction is a very helpful impact minimization measure. To see when birds are most likely to occur and be breeding in your project area, view the Probability of Presence Summary. Additional measures or permits may be advisable depending on the type of activity you are conducting and the type of infrastructure or bird species present on your project site.

What does IPaC use to generate the list of migratory birds that potentially occur in my specified location?

The Migratory Bird Resource List is comprised of USFWS Birds of Conservation Concern (BCC) and other species that may warrant special attention in your project location.

The migratory bird list generated for your project is derived from data provided by the Avian Knowledge Network (AKN). The AKN data is based on a growing collection of survey, banding, and citizen science datasets and is queried and filtered to return a list of those birds reported as occurring in the 10km grid cell(s) which your project intersects, and that have been identified as

warranting special attention because they are a BCC species in that area, an eagle (Eagle Act requirements may apply), or a species that has a particular vulnerability to offshore activities or development.

Again, the Migratory Bird Resource list includes only a subset of birds that may occur in your project area. It is not representative of all birds that may occur in your project area. To get a list of all birds potentially present in your project area, please visit the Rapid Avian Information Locator (RAIL) Tool.

What does IPaC use to generate the probability of presence graphs for the migratory birds potentially occurring in my specified location?
The probability of presence graphs associated with your migratory bird list are based on data provided by the Avian Knowledge Network (AKN). This data is derived from a growing collection of survey, banding, and citizen science datasets.

Probability of presence data is continuously being updated as new and better information becomes available. To learn more about how the probability of presence graphs are produced and how to interpret them, go the Probability of Presence Summary and then click on the "Tell me about these graphs" link.

How do I know if a bird is breeding, wintering or migrating in my area?
To see what part of a particular bird's range your project area falls within (i.e. breeding, wintering, migrating or year-round), you may query your location using the RAIL Tool and look at the range maps provided for birds in your area at the bottom of the profiles provided for each bird in your results. If a bird on your migratory bird species list has a breeding season associated with it, if that bird does occur in your project area, there may be nests present at some point within the timeframe specified. If "Breeds elsewhere" is indicated, then the bird likely does not breed in your project area.

What are the levels of concern for migratory birds?
Migratory birds delivered through IPaC fall into the following distinct categories of concern:

1. "BCC Rangewide" birds are Birds of Conservation Concern (BCC) that are of concern throughout their range anywhere within the USA (including Hawaii, the Pacific Islands, Puerto Rico, and the Virgin Islands);
2. "BCC - BCR" birds are BCCs that are of concern only in particular Bird Conservation Regions (BCRs) in the continental USA; and
3. "Non-BCC - Vulnerable" birds are not BCC species in your project area, but appear on your list either because of the Eagle Act requirements (for eagles) or (for non-eagles) potential susceptibilities in offshore areas from certain types of development or activities (e.g. offshore energy development or longline fishing).

Although it is important to try to avoid and minimize impacts to all birds, efforts should be made, in particular, to avoid and minimize impacts to the birds on this list, especially eagles and BCC species of rangewide concern. For more information on conservation measures you can implement to help avoid and minimize migratory bird impacts and requirements for eagles, please see the FAQs for these topics.

Details about birds that are potentially affected by offshore projects
For additional details about the relative occurrence and abundance of both individual bird species and groups of bird species within your project area off the Atlantic Coast, please visit the Northeast Ocean Data Portal. The Portal also offers data and information about other taxa besides birds that may be helpful to you in your project review. Alternately, you may download the bird model results files underlying the portal maps through the NOAA NCCOS Integrative Statistical Modeling and Predictive Mapping of Marine Bird Distributions and Abundance on the Atlantic Outer Continental Shelf project webpage.

Bird tracking data can also provide additional details about occurrence and habitat use throughout the year, including migration. Models relying on survey data may not include this information. For additional information on marine bird tracking data, see the Diving Bird Study and the nanotag studies or contact Caleb Spiegel or Pam Loring.

What if I have eagles on my list?
If your project has the potential to disturb or kill eagles, you may need to obtain a permit to avoid violating the Eagle Act should such impacts occur.

Proper Interpretation and Use of Your Migratory Bird Report
The migratory bird list generated is not a list of all birds in your project area, only a subset of birds of priority concern. To learn more about how your list is generated, and see options for identifying what other birds may be in your project area, please see the FAQ "What does IPaC use to generate the migratory birds potentially occurring in my specified location". Please be aware this report provides the "probability of presence" of birds within the 10 km grid cell(s) that overlap your project; not your exact project footprint. On the graphs provided, please also look carefully at the survey effort (indicated by the black vertical bar) and for the existence of the "no data" indicator (a red horizontal bar). A high survey effort is the key component. If the survey effort is high, then the probability of presence score can be viewed as more dependable. In contrast, a low survey effort bar or no data bar means a lack of data and, therefore, a lack of certainty about presence of the species. This list is not perfect; it is simply a starting point for identifying what birds of concern have the potential to be in your project area, when they might be there, and if they might be breeding (which means nests might be present). The list helps you know what to look for to confirm presence, and helps guide you in knowing when to implement conservation measures to avoid or minimize potential impacts from your project activities, should presence be confirmed. To learn more about conservation measures, visit the FAQ "Tell me about conservation measures I can implement to avoid or minimize impacts to migratory birds" at the bottom of your migratory bird trust resources page.

WETLANDS

Impacts to NWI wetlands and other aquatic habitats may be subject to regulation under Section 404 of the Clean Water Act, or other State/Federal statutes.

For more information please contact the Regulatory Program of the local U.S. Army Corps of Engineers District.

Please note that the NWI data being shown may be out of date. We are currently working to update our NWI data set. We recommend you verify these results with a site visit to determine the actual extent of wetlands on site.

FRESHWATER FORESTED/SHRUB WETLAND

- PFO1/SS1D
- PFO1D
- PSS1D

FRESHWATER EMERGENT WETLAND

- PEM1C

IPAC USER CONTACT INFORMATION

Agency: Braun Intertec
Name: Megan Ullery
Address: 11001 Hampshire Ave S
City: Minneapolis
State: MN
Zip: 55438
Email mullery@braunintertec.com
Phone: 9523883213

Exhibit F

State Historic Preservation Office Correspondence

DEPARTMENT OF ADMINISTRATION
STATE HISTORIC PRESERVATION OFFICE

February 24, 2023

Dane Loberg
Braun Intertec Corporation
11001 Hampshire Ave S
Minneapolis, MN 55438

RE: Development of a Business Park
T50 R15 S4 SE, Hermantown, St Louis County
SHPO Number: 2023-0827

Dear Dane Loberg:

Thank you for consulting with our office during the preparation of an Alternative Urban Areawide Review (AUAR) for the above-referenced project.

Due to the nature and location of the proposed project, we recommend that a Phase IA literature review and archaeological assessment be completed by a qualified archaeologist to assess the potential for intact archaeological sites in the project area. If, as a result of this assessment, a Phase I archaeological survey is recommended, this survey should be completed. The survey must meet the requirements of the Secretary of the Interior's Standards for Identification and Evaluation and should include an evaluation of National Register eligibility for any properties that are identified. For a list of consultants who have expressed an interest in undertaking this type of research and archaeological surveys, please visit the website **www.mnhs.org/preservation/directory**, and select "Archaeologists" in the "Search by Specialties" box.

We will reconsider the need for survey if the project area can be documented as previously surveyed or disturbed. Any previous survey work must meet contemporary standards. **Note:** plowed areas and right-of-way are not automatically considered disturbed. Archaeological sites can remain intact beneath the plow zone and in undisturbed portions of the right-of-way.

Please note that this comment letter does not address the requirements of Section 106 of the National Historic Preservation Act of 1966 and 36 CFR § 800. If this project is considered for federal financial assistance, or requires a federal permit or license, then review and consultation with our office will need to be initiated by the lead federal agency. Be advised that comments and recommendations provided by our office for this state-level review may differ from findings and determinations made by the federal agency as part of review and consultation under Section 106.

If you have any questions regarding our review of this project, please contact me at (651) 201-3285 or kelly.graggjohnson@state.mn.us.

Sincerely,

Kelly Gragg-Johnson

Kelly Gragg-Johnson
Environmental Review Program Specialist

Exhibit G

Traffic Analysis

BRAUN INTERTEC

Lavaque By-Pass Road

Business Park

SSTS

S² TRAFFIC SOLUTIONS

TRAFFIC IMPACT STUDY

in

Hermantown, MN

May 17th, 2023

LAVAQUE BY-PASS ROAD BUSINESS PARK
HERMANTOWN, MN
TRAFFIC IMPACT STUDY
MAY 17th, 2023

Prepared For:

City of Hermantown
c/o Braun Intertec
11001 Hampshire Avenue S
Minneapolis, MN 55438

Prepared By:

SSTS, LLC
612-968-4142
PROJECT NO. 2023_004

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

Vernon E. Swing, PE

Date: 05-17-2023 Lic. No.: 41417

Table of Contents

List of Tables

List of Figures

TECHNICAL APPENDICES (Available Upon Request)

I. Introduction

An approximately 137-acre site (termed "Proposed Project" in this study) is proposed to be developed in Hermantown, MN. The Proposed Project will include light industrial land uses and supporting commercial land uses. There are two distinct land use plans, the first includes 907,898 square feet of industrial park and 34,416 square feet of supporting retail, while the second plan is less intense including only 546,498 square feet of industrial park and 34,416 square feet of supporting retail. For the purposes of this analysis it is assumed the development will be completed by 2027 and that the development will be the more intense option. The Proposed Project is located along trunk highway 53 (TH 53), in the northwest quadrant of the TH 53 and Lavaque By-Pass Rd intersection, and is bordered on the west by Abrahamson Rd. The site location is illustrated on Figure 1, "Vicinity Map".

Access to the site is proposed via the following:

- Access off of Abrahamson Rd approximately 750 feet of TH 53.
- Two accesses off of Lavaque By-Pass Rd, the first at roughly 750 feet north of TH 53 and the second at roughly 1,600 feet north of TH 53.

The site layout and access locations are illustrated on the Concept Site Plan, Figure 2.

The purpose of this study is to evaluate the impact of traffic generated by the Proposed Project on the operations and safety of the adjacent roadway network and will support the transportation section of the Alternative Urban Area Review (AUAR) being completed for the subject property. The traffic study focuses on the roads and intersections that provide direct and indirect access to/from the site. This study details the existing and future roadway conditions at studied intersections and access points and includes traffic volumes, lane geometrics and traffic operational analysis results. Recommendations regarding roadway improvements to accommodate site-generated traffic, as well as the anticipated growth in background traffic are included, as necessary.

This study focuses on the following years to account buildout of the Proposed Project and includes forecast of No-build conditions and trip generation estimates to be included with the Build conditions:

- **Year 2027** – This year is studied for the full build scenario to provide a thorough assessment of traffic and to address potential neighborhood traffic concerns.
- **Year 2045** – This year is studied assuming full construction of the Proposed Project and is considered a planning level analysis to correspond with the current planning year horizon.

Figure 1 - Vicinity Map

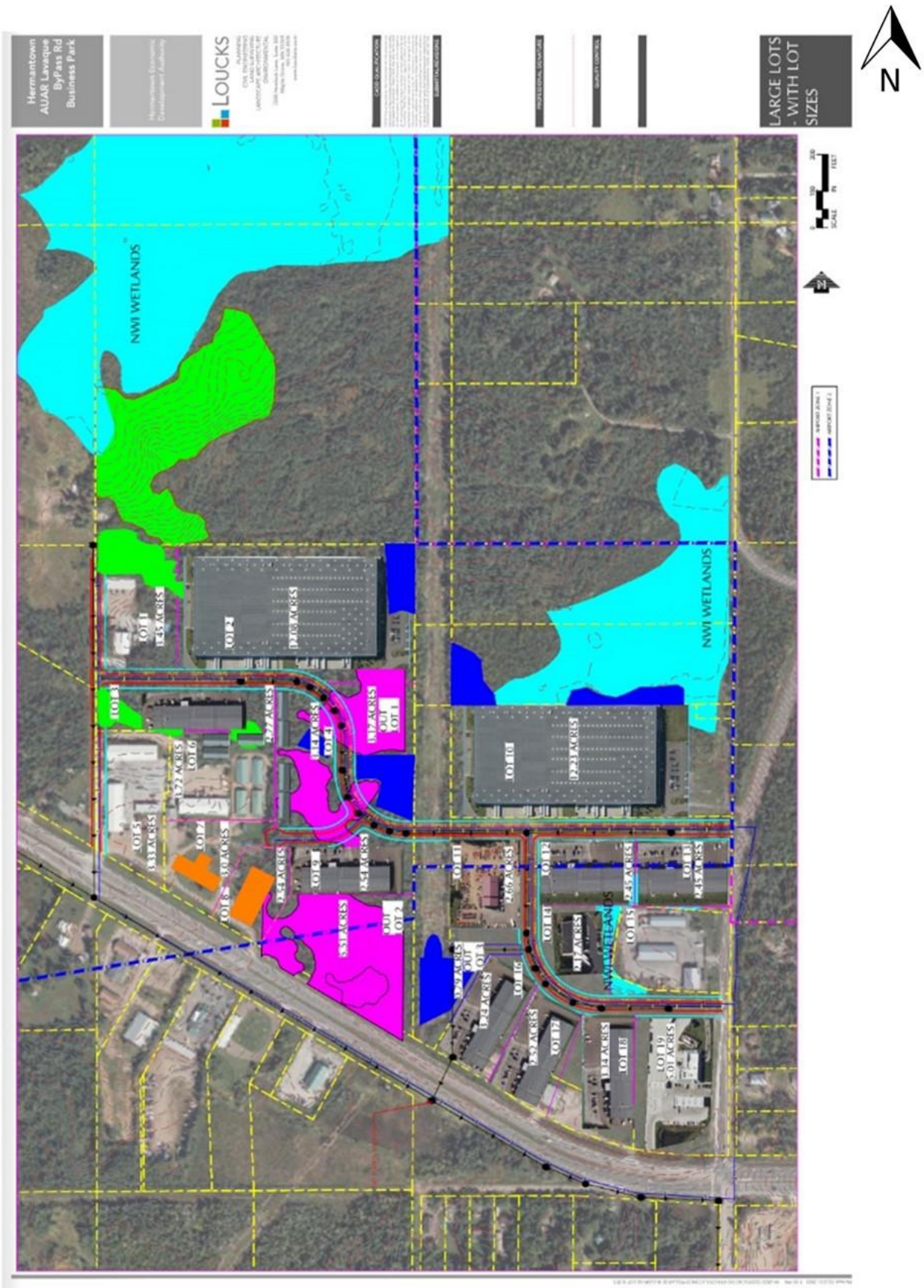


Figure 2 - Conceptual Site Plan (From Others)

II. Existing Conditions

A. Study Area Intersections

The study area for this analysis includes the intersections listed below which were defined with input from the City of Hermantown.

a. Lavaque By-Pass Rd and TH 53
b. Abrahamson Rd and TH 53
c. Ugstad Rd and Arrowhead Rd
d. Lavaque Rd and TH 53
e. Lavaque By-Pass Rd and Martin Rd

The existing AM and PM peak hour traffic conditions were documented through new turning movement traffic counts at the listed intersections.

B. Roadway Descriptions

The existing conditions of the study area roadways are noted in Table 1. Additionally, Figure 3 shows the existing lane geometry and traffic control at the study intersections.

Table 1. Roadway Descriptions

Roadway	Functional Class	Typical Section	Posted Speed	AADT (Year)*
TH 53	Principle Arterial	4-Lane Divided Rural	55 mph	16,062 (2021) (MnDOT)
Lavaque Bypass/CSAH 48	Major Collector	2-Lane Undivided Rural	55 mph	3,800 (2019) (MnDOT)
Lavaque Rd/CSAH 48	Major Collector	2-Lane Undivided Urban	40 mph	2,080 (2023) (PM Count)
Martin Rd/CSAH 9	Minor Arterial	2-Lane Undivided Rural	55 mph	4,950 (2019) (MnDOT)
Arrowhead Rd	Major Collector	2-Lane Undivided Urban	40 mph	2,760 (2021) (MnDOT)
Ugstad Rd	Minor Collector	2-Lane Undivided Urban/Rural	40 mph N of Arrowhead 30 mph S of Arrowhead	2,850 (2019) (MnDOT)
Abrahamson Rd	Local	2-Lane Undivided Rural	25 mph	170 (2023) (PM Count)

*AADT Sources: (MnDOT) from MnDOT's Traffic Mapping Application
(PM Count) from assuming PM counts are ~10% of ADT

C. Data Collection and Existing Traffic Volumes

AM and PM peak hour turning movement counts were conducted at all study area intersections on Thursday, March 23rd, 2023. The AM peak traffic hour was found to generally occur from 7:15 - 8:15 AM and the PM peak traffic hour was found to occur from 4:15 - 5:15 PM (See **Figure 4**, Existing Traffic Volumes). Figure 1. Existing Geometrics

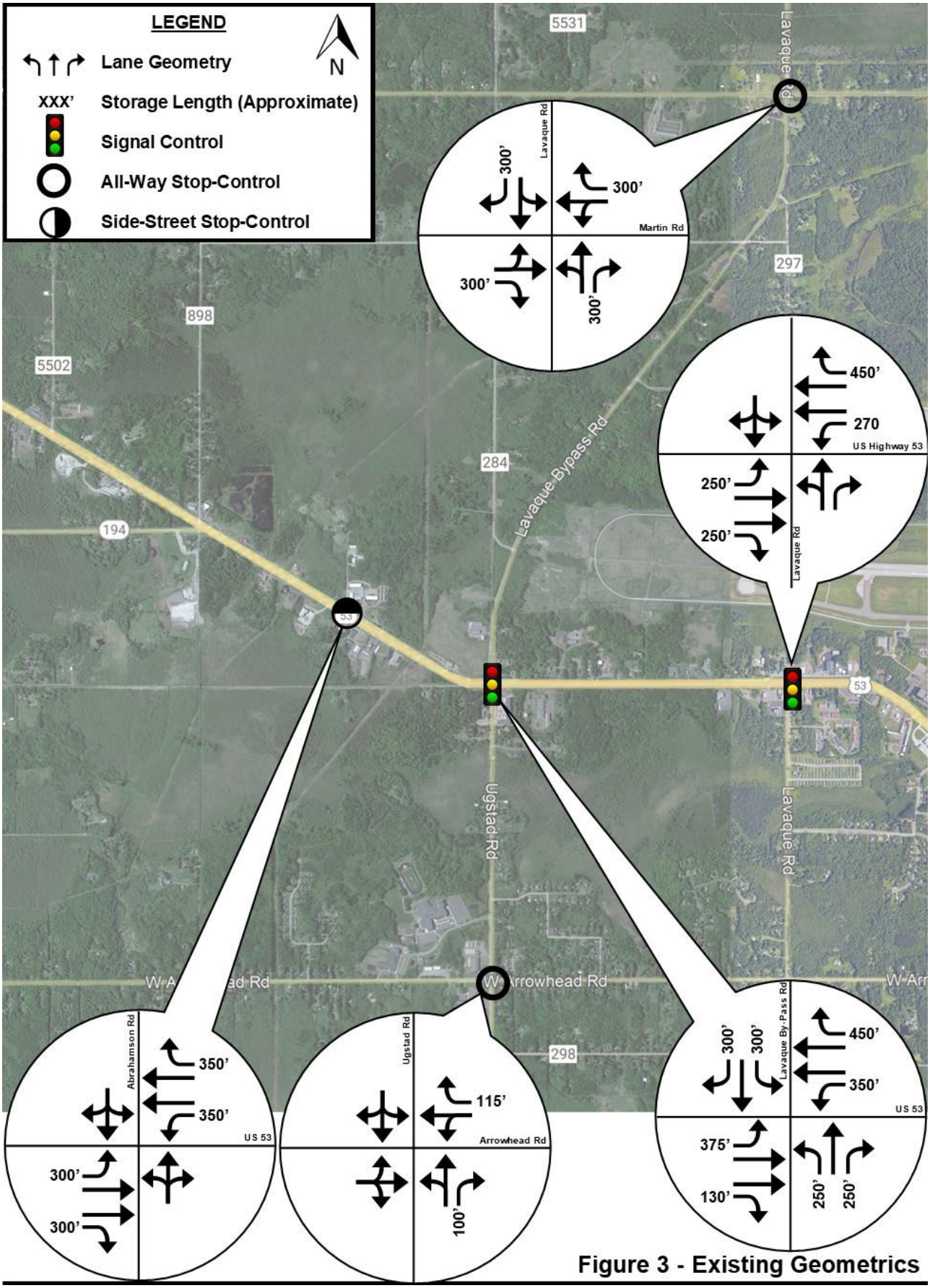


Figure 3 - Existing Geometrics

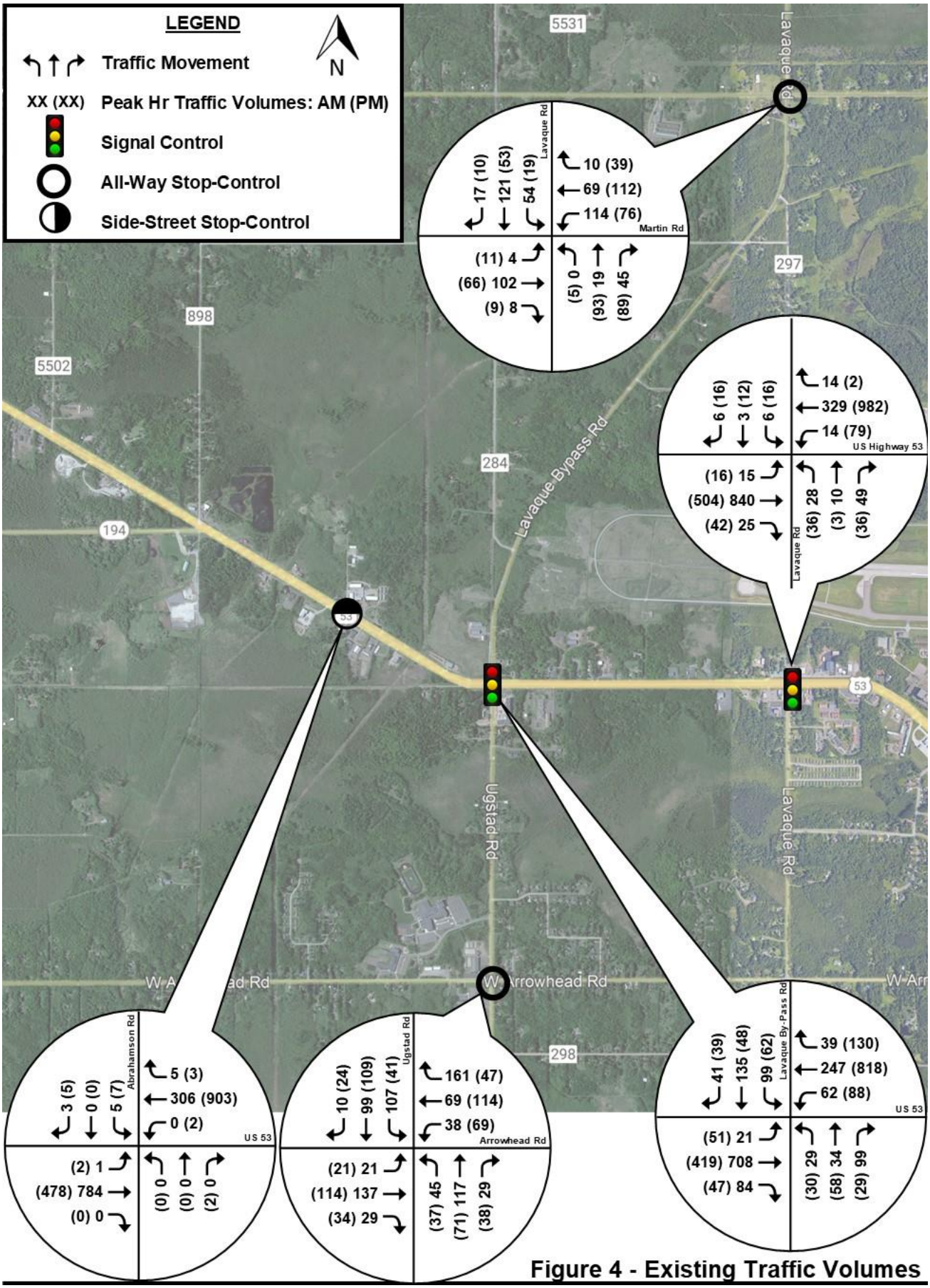


Figure 4 - Existing Traffic Volumes

III. No-Build Alternative

To address the impacts of a development on the surrounding roadway system, it is necessary to predict the traffic that would be present on the roadway system at the time of completion of the Proposed Project, without the inclusion of the Proposed Project. This is considered the No-Build scenario, and serves as a basis with which to compare Build scenarios. In this study two design years were analyzed 2027, the year of full build out and occupancy, and 2045, the current planning year horizon.

A. Background Growth

Review of MnDOT historical traffic counts from the last 20 years helped to develop background traffic volumes. The review indicates that traffic on TH 53 has declined by approximately one percent per year for the last twenty years, but that traffic on Lavaque By-Pass Rd has risen by approximately half a percent per year over the same period. When combined the traffic volume on all the roads serving the study area as increased by 0.2 percent per year. To be conservative we have chosen the greatest growth rate for this analysis, estimating traffic in the study area is expected to increase by approximately 0.5 percent per year between now and year 2045. It is noted that the ADT of the Proposed Project was not removed from the 2027 and 2045 forecasts for the growth rate calculation to be present a worst-case more conservative analysis. **Figure 5** illustrates the No-Build traffic volumes for year 2027, and **Figure 6** illustrates the 2045 No-Build traffic volumes, with the growth applied to existing traffic volumes.

B. Results of Analysis

The study area intersections identified in Section II were analyzed for the 2027 and 2045 No-Build scenarios. Complete discussion of the results of these analyses is provided in Section V – Operational Analysis, where a comparison with corresponding design year Build alternatives is made.

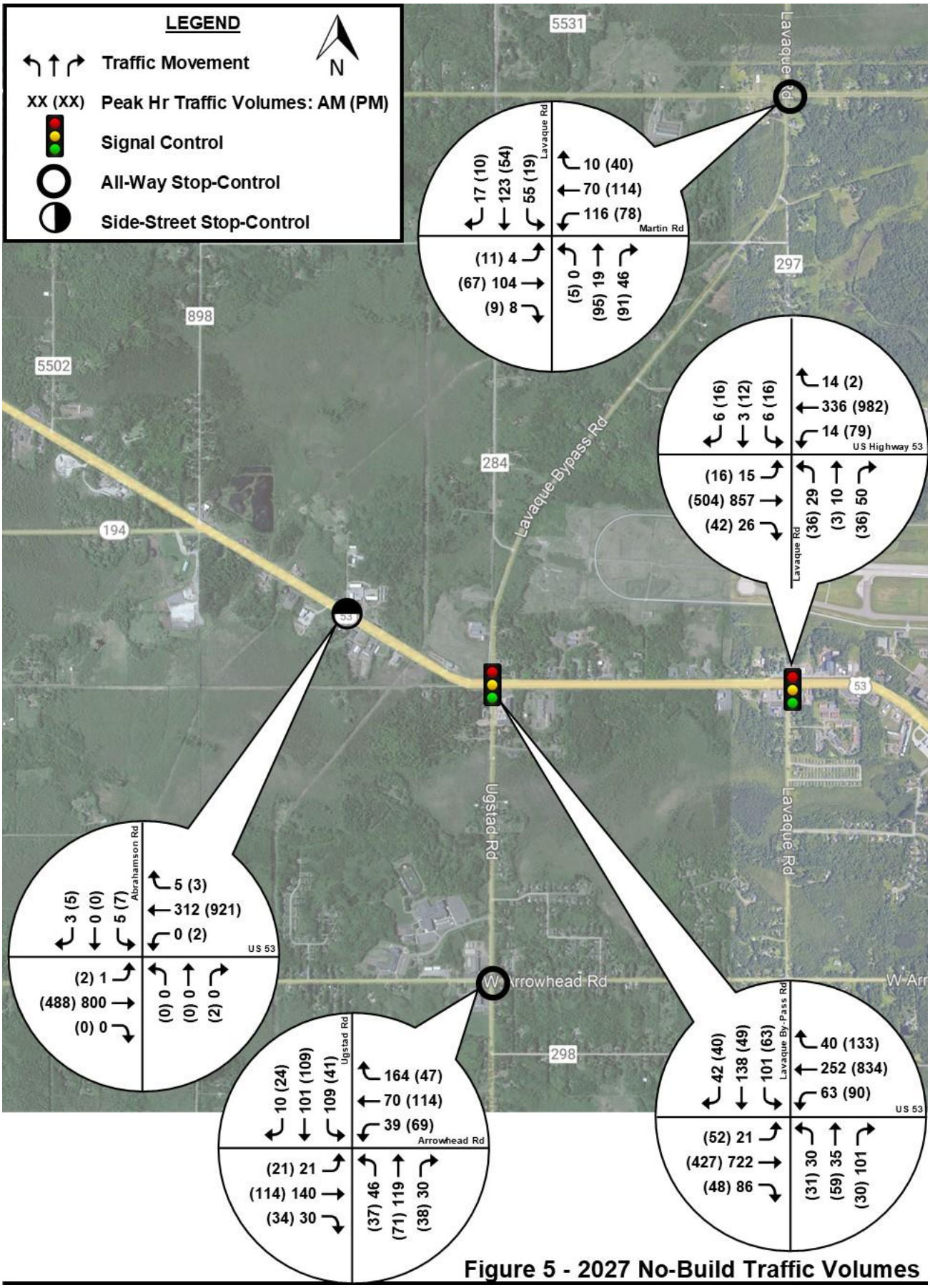


Figure 5 - 2027 No-Build Traffic Volumes

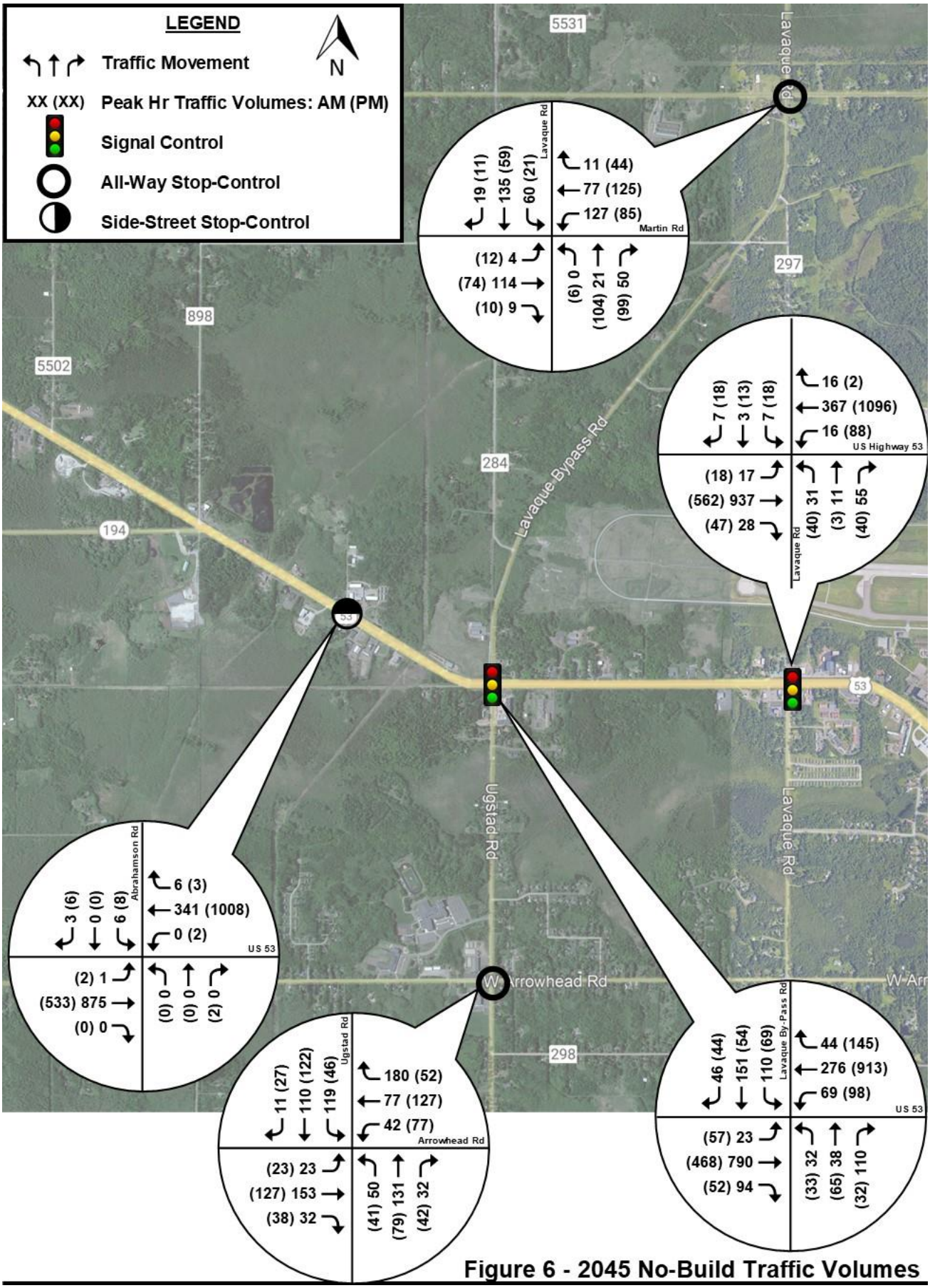


Figure 6 - 2045 No-Build Traffic Volumes

IV. Build Alternative

A. Site-Generated Traffic

The number of vehicle trips generated by the Proposed Project were estimated for the weekday daily, and AM and PM traffic peak hours using the data and methodologies contained in the **Trip Generation Manual**[1] and the **Trip Generation Handbook**[2]**,** by the *Institute of Transportation Engineers, (ITE)*. The ITE Land Use Codes for the proposed uses are 130 for the Industrial park, and 822 for the Supporting Retail. For comparison purposes an additional trip generation forecast was completed for the lesser development option as well. Table 2 summarizes trip generation estimates for the Proposed Project, and Table 3 summarizes the trip generation estimates for the lesser option.

Table 2. Trip Generation Proposed Development

Land Use	Type	Block No.	Land Use Code	Size		Trips Generated: AM peak Enter	AM peak Exit		PM Peak Enter	PM Peak Exit		Weekday ADT
Industrial Park	Industrial	1	130	907,898 s.f.	R	250	59	R	68	241	R	3,060
Shopping Center	Retail	1	822	34,416 s.f.	R	49	32	R	113	113	E	1,682
Totals - Gross						299	91		181	354		4,742
						390			535			
Shared Trips						60	18		36	71		0
						78			107			
Pass-By Trips						13	13		36	36		0
						26			73			
Totals - Net*						**226**	**60**		**109**	**247**		**4,742**
						286			**356**			

* Per the data and methodologies in Trip Generation, 11th Edition, published by ITE.

Further, the ITE Trip Generation Handbook, 3rd Edition, outlines a procedure to account for shared trips and pass-by trips within a proposed development which is reflected in Table 2. Shared trips are trips that visit more than one use within a multi-use development. For example, a resident of an apartment may also be a patron of a retail shop within a development and would not generate a new trip to visit the retail shop. ITE suggests between 30 and 40 percent of the traffic destined to retail from office/industrial and visa versa can occur based on time of day. This analysis assumes 20 percent of the site traffic will be shared. Pass-by trips are those trips already using the adjacent roadway and enter the site as an intermediate stop on their way to another destination. The pass-by trips are not generated by the land use under study, and thus, are not new trips added to the network but are trips using the site accesses. ITE data indicates that retail as anticipated for this development will attract a minimum of 40 percent pass-by traffic.

As shown in Table 2, the Proposed Project will generate 286 trips (226 entering and 60 exiting) during the morning traffic peak hour, 356 trips (109 entering and 247 exiting) during the evening traffic peak hour and 4,742 daily trips. As mentioned, Table 3 (below) represents the lesser development option and is provided for comparison purposes.

[1] **Trip Generation Manual**, Institute of Transportation Engineers (ITE), 11th Edition
[2] **Trip Generation Handbook**, Institute of Transportation Engineers (ITE), 3rd Edition

Table 2. Trip Generation Lesser Development

Land Use	Type	Block No.	Land Use Code	Size		Trips Generated: AM peak Enter	AM peak Exit		PM Peak Enter	PM Peak Exit		Weekday ADT
Industrial Park	Industrial	1	130	546,498 s.f.	R	151	35	R	41	145	R	1,842
Shopping Center	Retail	1	822	34,416 s.f.	R	49	32	R	113	113	E	1,682
Totals - Gross						199	68		154	258		3,524
						267			413			
Shared Trips						40	14		31	52		0
						53			83			
Pass-By Trips						13	13		36	36		0
						26			73			
Totals - Net*						**146**	**41**		**87**	**170**		**3,524**
						188			**258**			

Table 3 shows that the lesser development option will only generate 188 trips (146 entering and 41 exiting) during the morning traffic peak hour, only 258 trips (87 entering and 170 exiting) during the evening traffic peak hour and only 3,524 daily trips.

B. Trip Distribution and Assignment

The new trips for the Proposed Project have been assigned to the surrounding roadways according to the existing traffic patterns, and according to travel time forecasts from Apple Maps, and Google Maps. In general, the site traffic is distributed to the study area as follows:

- To/from the north 10 percent
- To/from the west 33 percent
- To/from the south 10 percent
- To/from the east 47 percent

C. Build Traffic Volumes

Figure 7 illustrates the trip assignment. **Figures 8 & 9** illustrates the 2027 and 2045 Build conditions, respectively, by combining No-Build traffic with the trip assignment volumes..

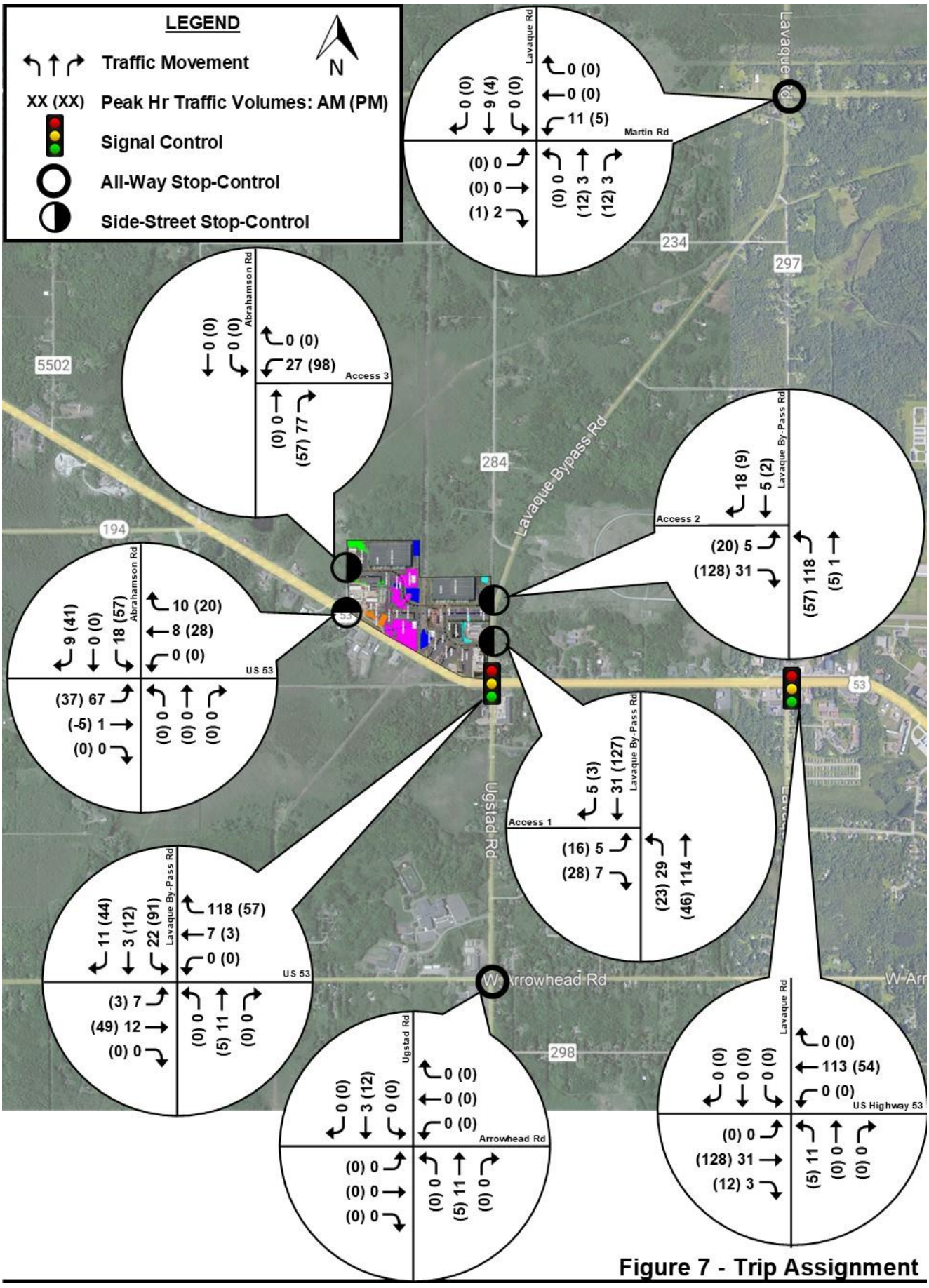


Figure 7 - Trip Assignment

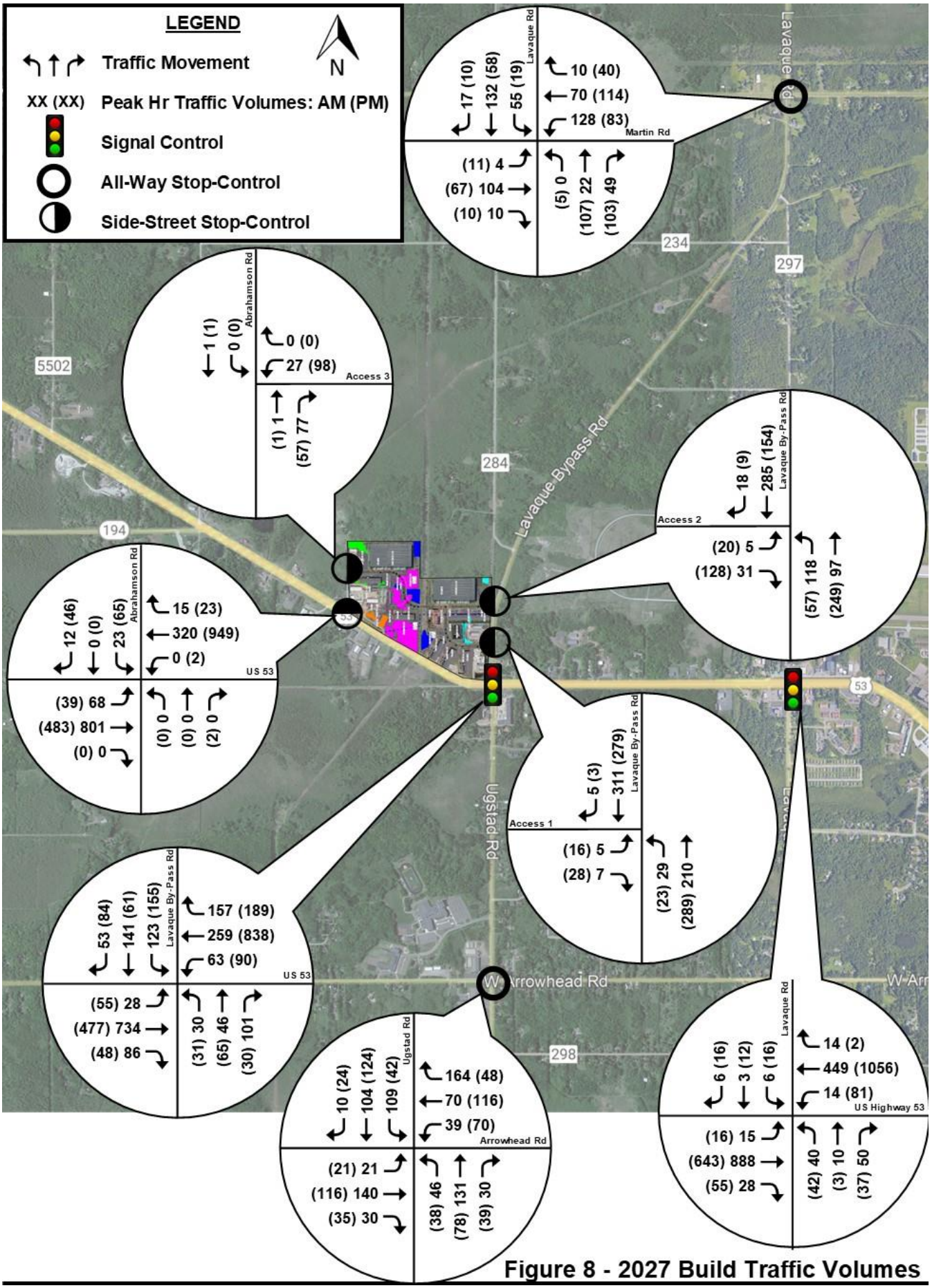


Figure 8 - 2027 Build Traffic Volumes

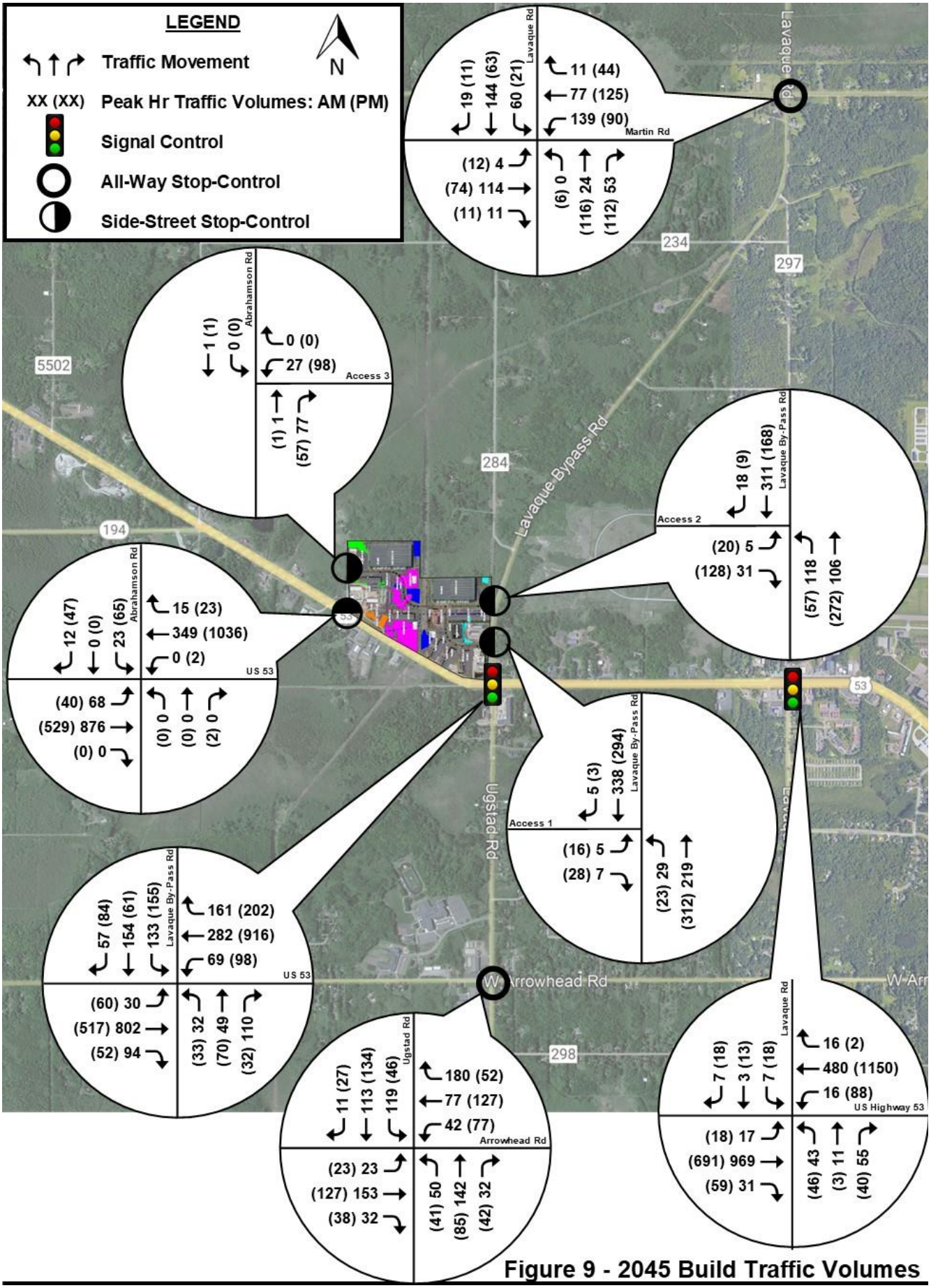
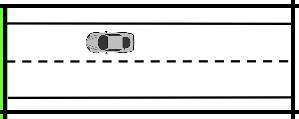
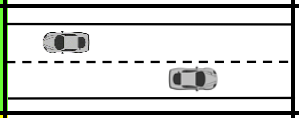
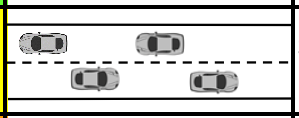
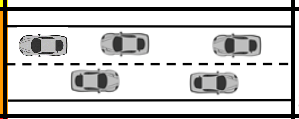
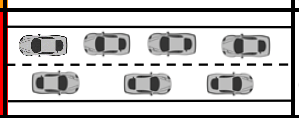
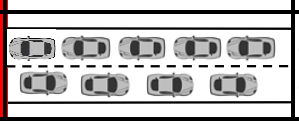


Figure 9 - 2045 Build Traffic Volumes

V. Operational Analysis

A. Intersection Operational Description

The operating conditions of transportation facilities, such as roadways, traffic signals, roundabouts and stop-controlled intersections, are evaluated based on the relationship of the theoretical capacity of a facility to the actual traffic volume on that facility. Various factors affect capacity including travel speed, roadway geometry, grade, number of travel lanes, and intersection control. The current standards for evaluating capacity and operating conditions are contained in **Highway Capacity Manual**[3]. The procedures describe operating conditions in terms of driver delay represented as a Level of Service (LOS). Operations are given letter designations with "A" representing the best operating conditions and "F" representing the worst. Generally, Level of Service "D" represents the threshold for acceptable overall intersection operating conditions during a peak hour. The following chart summarizes the level of service and delay criteria for signalized and unsignalized intersections.

Level of Service		Description	Delay (sec)	
			Signalized	Unsignalized/ Roundabout
A		Primarily free-flow operation.	0-10	0-10
B		Reasonably unimpeded operation.	>10-20	>10-15
C		Stable operation. The ability to maneuver is more restricted than LOS B.	>20-35	>15-25
D		Less stable operation. Small increases in flow may cause large increases in delay and reduced speeds.	>35-55	>25-35
E		Unstable operation. Low speeds and considerable delay.	>55-80	>35-50
F		Congested operation. High delay and extensive queuing.	>80	>50

For side street stop-controlled intersections special emphasis is given to providing an estimate for the level of service of the minor approaches. Traffic operations at an unsignalized intersection with side street stop-control can be described two ways. First, consideration is given to the overall intersection level of service. This takes into account the total number of vehicles entering the intersection and the capability of the intersection to support these volumes. Second, it is important to consider the delay on the minor approaches, since the mainline does not have to stop. It is common for intersections with higher mainline traffic volumes to experience increased levels of delay and poor level of service on the side streets. For example, the acceptable threshold for a high-priority/high-volume mainline movement might be "C," while LOS "F" on a low-priority/low-volume side-street movement might be appropriate.

[3] **Highway Capacity Manual (HCM)**, Transportation Research Board, 6th Edition

A final fundamental component of operational analyses is a study of vehicular queuing, or the line of vehicles waiting to pass through an intersection. An intersection can operate with an acceptable Level of Service, but if queues from the intersection extend back to block entrances to turn lanes or accesses to adjacent land uses, unsafe operating conditions could result. In this report, the industry design standard 95th percentile queue length is used. The 95th percentile queue length refers to the length of vehicle queue that has only a five-percent probability of occurring during an analysis hour.

This study has utilized the current industry Synchro/SimTraffic software package (11th Edition) to analyze the 2027 and 2045 No-Build and Build conditions for both the AM and PM peak hours. It is noted, the reported results are from the aggregate of 10 SimTraffic simulations which use a random number generator to seed the network with vehicles. These results reflect dynamic conditions and are more accurate than the results of the static analysis reported by Synchro. Due to the random number generator results can sometimes show slightly better operations on minor movements when the intersections are operating well and have increased traffic volumes. This can be seen when delays and queues noted for minor movements in the Build Scenario are slightly less than in the No-Build Scenario.

B. Results of Analysis – 2027 Conditions

This section contains the results of the intersection operational analyses and provides recommendations, as necessary to mitigate the impacts. Table 4 summarizes the results of the operational analyses for the 2027 No Build and Build scenarios (the Build condition includes the Proposed Project traffic not the lesser development condition).

Table 1. 2027 Operations

Intersection	Measure of Effectiveness (Delay in Sec and Queue in Ft)				
	Criteria	2027 No-Build		2027 Build	
		AM Peak Hour	PM Peak Hour	AM Peak Hour	PM Peak Hour
Lavaque BP & Martin Rd (All-Way Stop-Controlled)	*Overall LOS & Delay*	A 7.9	A 8.8	A 8.2	A 8.8
	Worst Movement LOS & Delay	B 11.4 (WBT)	B 11.8 (WBT)	B 11.6 (WBT)	B 11.3 (WBT)
	95th Percentile Queue	WBLT - 58'	WBLT - 58'	SBLT - 63'	WBLT - 68'
TH 53 & Abrahamson Rd (Side-Street Stop-Controlled)	*Overall LOS & Delay*	A 1.8	A 2.3	A 1.7	A 5.3
	Worst Movement LOS & Delay	D 27.2 (SBL)	B 11.6 (SBL)	B 12.2 (SBL)	F 62.1 (SBL)
	95th Percentile Queue	SBLTR - 31'	SBLTR - 33'	SBLTR - 46'	SBLTR - 138'
TH 53 & Lavaque BP (Signal)	*Overall LOS & Delay*	B 14.7	B 12.4	B 13.9	B 14.0
	Worst Movement LOS & Delay	D 47.4 (NBL)	D 53.8 (NBL)	D 42.6 (SBT)	D 48 (NBL)
	95th Percentile Queue	SBT - 145'	NBT - 101'	SBT - 177'	SBL - 186'
TH 53 & Lavaque Rd (Signal)	*Overall LOS & Delay*	B 12.7	B 12.1	B 10.3	B 12.8
	Worst Movement LOS & Delay	E 56 (EBL)	E 62.9 (EBL)	E 58.3 (WBL)	D 54 (WBL)
	95th Percentile Queue	EBT - 176'	WBT - 165'	EBT - 112'	WBT - 156'
Ugstad Rd & Arrowhead Rd (All-Way Stop-Controlled)	*Overall LOS & Delay*	A 9.5	A 8.7	B 10.3	A 9.0
	Worst Movement LOS & Delay	B 13.3 (SBR)	B 13.4 (SBT)	C 15.2 (SBL)	B 14.6 (SBT)
	95th Percentile Queue	SBLTR - 79'	EBLTR - 58'	SBLTR - 89'	WBLT - 69'
Lavaque BP & Access 1 (Side-Street Stop-Controlled)	*Overall LOS & Delay*	NA	NA	A 1.7	A 1.8
	Worst Movement LOS & Delay			A 7.6 (EBL)	A 7.2 (EBL)
	95th Percentile Queue			EBLR - 41'	EBLR - 42'
Lavaque BP & Access 2 (Side-Street Stop-Controlled)	*Overall LOS & Delay*	NA	NA	A 2.3	A 1.9
	Worst Movement LOS & Delay			A 4.1 (EBR)	A 7.3 (EBL)
	95th Percentile Queue			EBLR - 42'	EBLR - 57'
Abrahamson Rd & Access 2 (Side-Street Stop-Controlled)	*Overall LOS & Delay*	NA	NA	A 1.3	A 3.0
	Worst Movement LOS & Delay			A 4.5 (WBL)	A 4.6 (WBL)
	95th Percentile Queue			WBLR - 42'	WBLR - 52'

- Level of Service reported from an average delay from 10 SimTraffic simulations for overall intersection and worst movement.
- 95th percentile queues are a result from an average of 10 SimTraffic simulations and the longest queue per intersection is reported.

The results shown in Table 4 indicate the following for 2027 No-Build and Build conditions:

- **2027 No-Build** – Delay, LOS and queueing are all acceptable on an overall intersection and individual movement basis without the proposed project, except for the minor left turning movements from TH 53 at Lavaque Rd. These movements as modeled are low volume movements and depending on when the traffic arrives at the signal the traffic may wait longer for a green signal, resulting in the longer delay times reported. Review of SimTraffic simulation shows the queues clear during each cycle. Roadway and intersection improvements are not needed to accommodate the growth in background traffic.
- **2027 Build -** Delay, LOS and queueing are all acceptable on an overall intersection and individual movement basis with the Proposed Project traffic, except for the southbound left turning movement at the Abrahamson Rd and TH 53 intersection. The traffic queues associated with this movement are manageable and review of the SimTraffic simulation shows the queues clear quickly. Also, the median separating east and westbound traffic on TH 53 provides a 25 foot refuge for the southbound left turning traffic, so the left turns only need to clear traffic in one direction at a time, suggesting shorter delays than reported. No roadway or intersection mitigation measures are needed to accommodate site-generated traffic.

C. Results of Analysis – 2045 Conditions

The long-range planning horizon year is 2045 and a 0.5% annual growth rate was assumed, as mentioned in the No-Build section. The results of the analysis of the 2045 No-Build and Build traffic conditions are summarized in Table 5. The Build analysis includes traffic forecast for the Proposed Project as well as the increased traffic included in the background 2045 No-Build.

Table 2. 2045 Operations

Intersection	Measure of Effectiveness (Delay in Sec and Queue in Ft)				
	Criteria	2045 No-Build		2045 Build	
		AM Peak Hour	PM Peak Hour	AM Peak Hour	PM Peak Hour
Lavaque BP & Martin Rd (All-Way Stop-Controlled)	*Overall LOS & Delay*	A 9.0	A 9.2	A 8.7	A 9.5
	Worst Movement LOS & Delay	B 12.8 (SBT)	B 14.9 (NBL)	B 12.1 (SBT)	C 20.3 (NBL)
	95th Percentile Queue	SBLT - 70'	NBLT - 59'	WBLT - 65'	WBLT - 68'
TH 53 & Abrahamson Rd (Side-Street Stop-Controlled)	*Overall LOS & Delay*	A 1.5	A 2.7	A 2.0	A 6.6
	Worst Movement LOS & Delay	D 28.8 (SBL)	D 29.3 (SBL)	D 25.2 (SBL)	F 55.9 (SBL)
	95th Percentile Queue	SBLTR - 33'	SBLTR - 41'	SBLTR - 44'	SBLTR - 164'
TH 53 & Lavaque BP (Signal)	*Overall LOS & Delay*	B 15.0	B 13.4	B 15.0	B 17.4
	Worst Movement LOS & Delay	E 66 (NBL)	D 51.6 (SBT)	E 58.2 (NBL)	D 50.6 (SBT)
	95th Percentile Queue	SBT - 176'	SBL - 109'	SBT - 164'	SBL - 164'
TH 53 & Lavaque Rd (Signal)	*Overall LOS & Delay*	B 10.6	B 11.8	B 12.8	B 13.0
	Worst Movement LOS & Delay	D 47.2 (WBL)	D 48.6 (EBL)	E 63.9 (EBL)	E 55.1 (WBL)
	95th Percentile Queue	EBT - 119'	WBT - 148'	EBT - 125'	WBT - 183'
Ugstad Rd & Arrowhead Rd (All-Way Stop-Controlled)	*Overall LOS & Delay*	A 9.9	A 9.7	B 10.5	B 10.5
	Worst Movement LOS & Delay	B 13.3 (NBT)	B 14 (SBT)	B 14.5 (SBT)	C 17 (SBT)
	95th Percentile Queue	SBLTR - 79'	EBLTR - 79'	SBLTR - 95'	WBLT - 91'
Lavaque BP & Access 1 (Side-Street Stop-Controlled)	*Overall LOS & Delay*	NA	NA	A 1.9	A 2.2
	Worst Movement LOS & Delay			A 7.2 (EBL)	A 9.5 (EBL)
	95th Percentile Queue			EBLR - 42'	EBLR - 58'
Lavaque BP & Access 2 (Side-Street Stop-Controlled)	*Overall LOS & Delay*	NA	NA	A 2.7	A 2.5
	Worst Movement LOS & Delay			A 7.2 (EBL)	A 8.4 (EBL)
	95th Percentile Queue			NBLT - 68'	EBLR - 63'
Abrahamson Rd & Access 2 (Side-Street Stop-Controlled)	*Overall LOS & Delay*	NA	NA	A 1.1	A 3.4
	Worst Movement LOS & Delay			A 4.2 (WBL)	A 5.1 (WBL)
	95th Percentile Queue			WBLR - 40'	WBLR - 61'

- Level of Service reported from an average delay from 10 SimTraffic simulations for overall intersection and worst movement.
- 95th percentile queues are a result from an average of 10 SimTraffic simulations and the longest queue per intersection is reported.

The results shown in Table 5 indicate the following for 2045 No-Build and Build conditions:

- **2045 No-Build** – Delay, LOS and queueing are all acceptable on an overall intersection and individual movement basis without the proposed project, except for the minor left turning movements from TH 53 at Lavaque Rd and at Lavaque By-Pass Rd during the morning peak times. These movements as modeled are low volume movements and depending on when the traffic arrives at the signal the traffic may wait longer for a green signal, resulting in the longer delay times reported. Review of SimTraffic simulation shows the queues clear during each cycle. Roadway and intersection improvements are not needed to accommodate the growth in background traffic.
- **2045 Build -** Delay, LOS and queueing are all acceptable on an overall intersection and individual movement basis with the Proposed Project traffic, except for the southbound left turning movement at the Abrahamson Rd and TH 53 intersection. The traffic queues associated with this movement are manageable and review of the SimTraffic simulation shows the queues cleae quickly. Also, the median separating east and westbound traffic on TH 53 provides a 25 foot refuge for the southbound left turning traffic, so the left turns only need to clear traffic in one direction at a time, suggesting shorter delays than reported. No roadway or intersection mitigation measures are needed to accommodate site-generated traffic.

VI. Summary and Recommendations

The preceding analysis has evaluated the potential traffic impacts associated with development of 137-acres as an Industrial Park with supporting retail in the City of Hermantown, MN. The site is located in the northwest quadrant of TH 53 and Lavaque By-Pass Road.

Two design years were considered in this study, 2027 to correspond to build-out and occupancy of the site and 2045 to remain consistent with the long-range planning horizon. For both design years, No-Build and Build scenarios were analyzed and compared to assess the development's impact, and the area's future infrastructure needs. Full development of site is expected to result in approximately 4,742 new vehicle trips on the study area roadway network per average weekday. Peak hour trips generated by the full development are estimated at 286 during the AM peak hour and 356 during the PM peak hour.

Access to the site is proposed via a new intersection on to Abrahamson Road located approximately 750 feet north of TH 53 that progresses eastward into the site, and via two accesses that originate on Lavaque By-Pass Road and progress westward into the site. The Lavaque By-Pass Road intersections are located approximately 750 feet and 1600 feet north of TH 53

Growth in background traffic at a rate of 0.5 percent per year is accounted for in the analysis. The following bullet points summarizes the results of the intersection operational analysis for the study area intersection and discuss the need for mitigation:

- **2027 No-Build** – Delay, LOS and queueing are all acceptable on an overall intersection and individual movement basis without the proposed project. Roadway and intersection improvements are not needed to accommodate the growth in background traffic.
- **2027 Build -** Delay, LOS and queueing are all acceptable on an overall intersection and individual movement basis with the Proposed Project traffic, except for the southbound left turning movement at the Abrahamson Rd and TH 53 intersection. The traffic queues associated with this movement are manageable and review of the SimTraffic simulation shows the queues clear quickly. No roadway or intersection mitigation measures are needed to accommodate site-generated traffic.
- **2045 No-Build** – Delay, LOS and queueing are all acceptable on an overall intersection and individual movement basis without the proposed project. Roadway and intersection improvements are not needed to accommodate the growth in background traffic.
- **2045 Build -** Delay, LOS and queueing are all acceptable on an overall intersection and individual movement basis with the Proposed Project traffic, except for the southbound left turning movement at the Abrahamson Rd and TH 53 intersection. The median separating east and westbound traffic on TH 53 provides a 25 foot refuge for the southbound left turning traffic, so the left turns only need to clear traffic in one direction at a time, suggesting shorter delays than reported. No roadway or intersection mitigation measures are needed to accommodate site-generated traffic.

Exhibit H

Geotechnical and Environmental Desktop Review Summary

BRAUN INTERTEC

DESKTOP REVIEW SUMMARY
CITY OF HERMANTOWN – PROPOSED FUTURE BUSINESS PARK

DATE: **December 16, 2021**

TO: **John Mulder – City of Hermantown**
Eric Johnson – City of Hermantown

CC: **Heidi Timm-Bijold – HTB Project Navigation, LLC**

FROM: **Joseph Butler, PE, Business Unit Manager, Senior Engineer - Braun Intertec**
Kenneth Larsen, PE, PG, Vice President, Principal Engineer - Braun Intertec
Jennifer Wolff, PG, Senior Consultant - Braun Intertec
David Bolf, PE, Principal Partner - Northland Consulting, LLC

RE: **Proposed Future Business Park**
Hermantown, Minnesota

A. INTRODUCTION

Braun Intertec Corporation and Northland Consulting, LLC have prepared memorandum summarizing the results of the geotechnical and environmental desktop review services completed for the proposed future business park located near the Intersection of Trunk Highway 53 and Lavaque Bypass Road in Hermantown, Minnesota. The desktop review services described in this document were completed in manner consistent with proposals prepared by the respective firms dated September 9, 2021 (Braun Intertec) and September 15, 2021 (Northland Consulting). The completed services were selected to help the City of Hermantown's project team to better understand the "big picture" geotechnical, environmental, wetland and civil engineering challenges related to future development of the business park based on available existing information, and also provide the City with options and cost estimates for likely additional geotechnical and environmental services needed to advance and further refine the project.

B. BACKGROUND INFORMATION

B.1. SITE DESCRIPTION

The City of Hermantown is evaluating a proposed future business park. The area of the proposed park is composed of nine individual tax parcels (parcels) located between Abrahamson Road and Lavaque Bypass Road on the north side of Trunk Highway (TH) 53 in Hermantown, Minnesota (the proposed business park). The parcels are a mix of commercial/light industrial or undeveloped land. A site location map is provided as **Figure 1,** a site diagram showing the indiviual parcels comprising

the future businesss park is provided as **Figure 2,** and a concept diagram showing the locations of possible future development lots and infrastructure lcoations is provided as **Figure 3**.

B.2. SCOPE DESCRIPTION

The desktop review focused on available existing information containing relevant information on geotechnical and environmental conditions and related considerations for development of the business park. The desktop information review completed by Braun Intertec included the following:

- Ordered and reviewed historical aerial photographs covering the entire proposed business park area to observe past land uses and related changes over time.

- Reviewed publicly available information available from St. Louis County and the City of Hermantown for information regarding land use and ownership within the proposed business park.

- Reviewed the Minnesota Pollution Control Agency (MPCA) What's in My Neighborhood database to identify known exiting sites of regulatory interest within (and adjacent to) the proposed business park.

- Reviewed existing documents on the former Arrowhead Refinery Superfund Site that are available online to identify data providing information on historical soil, sediment and groundwater contamination, completed corrective actions, locations and details regarding clean backfill placement, and institutional controls/deed restrictions placed on the proposed business park that will be relevant to future development.

- Requested and reviewed additional files available at the MPCA for the former Arrowhead Refinery Superfund Site. Contacted and interviewed MPCA staff with knowledge of the former Arrowhead Refinery Superfund Site for additional insight on site conditions and documents of interest.

- Reviewed soil boring logs and laboratory analytical results representative of post cleanup soil and groundwater conditions to the degree they provided insight on current geotechnical and environmental conditions requiring consideration for future development.

- Queried the Minnesota Department of Natural Resources (DNR) Natural Heritage Information System (NHIS) and the U.S. Fish and Wildlife Service (USFWS) Information for Planning and Consultation (IPaC) tool for data related to known occurrences of threatened, endangered, or special concern species located within or near the proposed business park.

- Reviewed available public resources for boring logs, geological atlas, and other available subsurface data with the intent of defining the overall geological conditions that may impact potential future development activities.

In addition to the above, David Bolf of Northland Consulting, LLC conducted desktop information reviews related to selected wetlands and civil engineering topics important to redevelopment planning.

C. DESKTOP INFORMATION REVIEW

C.1. OVERVIEW

A review of aerial photographs, threatened and endangered species, and other publicly available documents were reviewed for the parcels within the proposed business park. This information is summarized for each parcel on individual parcel data sheets, which are included as **Appendix A**. Refer to the parcel data sheets for specific information regarding the eleven parcels within the proposed business park.

C.2. ENVIRONMENTAL REVIEW

Based on review of the information, a portion of the proposed business park is a superfund site, known as the Arrowhead Superfund Site (SR0000067), which was delisted from the Federal and State Superfund programs early in 2021. Five of the parcels within the proposed business park (395-0010-00822, 395-0010-00820, 395-0010-00854, 395-0010-00850, and 395-0010-00853) are within the Arrowhead Superfund site.

The former Arrowhead Superfund Site was approximately 26 acres in size and was used by a company for re-tinning milk cans prior to 1945. From 1945 to 1977, the former Superfund Site was utilized by the Arrowhead Refining Company who operated a business that refined used oils using an acid-clay process. This process produced three waste streams: 1) metals-contaminated acidic sludge; 2) filter cake; and 3) wastewater. The historical information indicates that the filter cake waste stream was disposed of on-site in a wetland that became a sludge lagoon, and wastewater was disposed of on-site in a ditch. These waste management practices resulted in soil and groundwater contamination including oil and grease, heavy metals, cyanide, phenols, polynuclear aromatic hydrocarbons (PAHs), and polychlorinated biphenyls (PCBs). The Site was initially investigated by the U.S. Environmental Protection Agency (EPA) in 1976 and they ordered Arrowhead Refinery to cease operations in 1984. In 1986, EPA issued a Record of Decision that approved a cleanup approach that included excavation of impacted soils and sludge to industrial levels and installation of a groundwater extraction system. The groundwater extraction system was installed in 1993 and required soil/sediment removal cleanup actions were completed in 1995. Site investigation and monitoring activities continued into the early 2000's, and the groundwater extraction system was turned off in 2007. Post shutdown ground water monitoring continued until 2014 when the wells were allowed to be sealed. The information indicates that the full extent of groundwater contamination was not determined. However, the MPCA felt that the extraction system was protective and that no additional remediation would be required at that time.

As part of a long-term stewardship plan for the Site, the Minnesota Pollution Control Agency required the filing of an Environmental Covenant for the Site that was filed in February 2021 addressing requirements for contamination remaining in place. The Arrowhead Superfund Site was recently delisted from both the EPA and MPCA Superfund programs on September 14, 2021. A copy of the Environmental Covenant dated February 3, 2021 is provided in **Appendix B**. The Environmental Covenant restricts land use on two parcels: 395-0010-00854 and 395-0010-00853.

Outside of the Arrowhead Superfund area, the area of the proposed business park was undeveloped until the 1960s, when some commercial/light-industrial development began on some of the parcels. Information regarding the past and current land uses is included on the parcel summary sheets, attached as **Appendix A**.

C.2.a. Recommendations for Future Environmental Investigations

There is a gerenal lack of current and relevant environmental data available for the area of the future business park site, and additional Phase I and Phase II environmental site assessment work will be needed for development planning, environmental due diligence, and to satisfy the requirements of the existing Environmental Easement that is in-place for the Former Arrowhead Refinery Superfund Site. The previous environmental investigation and cleanup activities for the Former Arrowhead Refinery Superfund Site focused on addressing known contamiantion source areas to the degree necessary to mitigate risks to public health at that time; however, residual soil and groundwater contamination remains in place and needs to be considered for redevelopment. Furthermore, any prospective purchaser of a parcel that is part of (or near) a former Superfund Site will require Phase II investigaiton simply due to proximity to that Site. To the degree practical, it is recommended that the future Phase II environmental site assessments be coordinated with the future recommended geotechnical investigtions to promote drilling and data collection efficencies.

Construction of a new industrial, commercial, warehouse, or light industrial facility may trigger Minnesota Environmental Review Rules, depending on the size of the development. Specifically, in Minnesota, construction of new warehouses or light industrial buildings 300,000 square feet (sf) or larger, or other commercial/industrial buildings of 200,000 sf or larger, will require an environmental assessment worksheet (EAW) provided that no federal funding will be used. If federal funding is involved, an environmental review which follows the specific federal agency's guidelines would be necessary, in addition to the EAW. The timeframe to prepare a formal EAW takes approximately 4 to 6 months to complete. However, there is an alternative Minnesota environmental review approach available for projects involving large areas such as this project. This approach is called an Alternative Urban Area Review (AUAR) and allows for a more limited and high-level scope that is, in most cases, faster to complete and is ideal for projects or larger properties that may be redeveloped progressively over time.

For this project, it is recommend that the Alternate Urban Areawide Review (AUAR) be completed to assist in planning the proposed business park and guide in assessing future site-specific development scenarios . In addition to meeting the environmental review requirement, the AUAR will also help to promote and attract industrial development in this area and will also act as a planning tool for the City of Hermantown to guide future site-specific development scenarios. While additional environmental review (beyond the AUAR) may be necessary for future individual site-specific projects (depending on the size and type of projects), the completion of an AUAR will reduce the amount of environmental review that will be necessary for each individual development thus expediting the speed with which land acquisition and construction can occur.

C.3. THREATENED AND ENDANGERED SPECIES REVIEW

A Protected Species Evaluation was conducted on the proposed business park. A copy of the complete evaluation is included as **Appendix C**.

Four federally listed species were identified for the proposed business park in the IPaC database. In addition, the project area is located within a critical habitat zone for the Canada Lynx. Three state listed species were identified for the site in the NHIS database.

C.3.a. Protected Species Evaluation Conclusions

With a lack of surface water features and apparent limited floral resources for pollinators, the proposed business park does not provide suitable habitat for the Floating Marsh Marigold, Piping Plover or Monarch Butterfly. With forested land covering large portions of the area, it is possible, but unlikely the Rusty Patched Bumble Bee or Soapberry are present due other habitat requirements of these species. The proposed business park is located within a critical habitat zone for the Canada Lynx and forested portions of the area may provide habitat for the species. Due to its history of disturbance, surrounding development and the type of forest (mixed conifer-hardwood) present, it is unlikely resident lynx occupy the proposed business park. However, lynx may forage on and travel through the proposed business park between areas of nearby preferred habitat (boreal forest/ coniferous bogs). Additionally, trees within the proposed business park may provide nesting habitat for migratory birds and potential summer roosting habitat for the Northern Long-eared bat.

C.3.b. Protected Species Evaluation Recommendations

As development is proposed for the proposed business park, additional consultation with the U.S. Fish and Wildlife Service (USFWS) and Minnesota Department of Natural Resources (MnDNR) regarding the suitability of Canada Lynx habitat present and potential impacts to the species is recommended. Also, if required for any proposed development, it is recommended to conduct vegetation and tree clearing from September 1-April 30 to avoid impacts to nesting migratory birds (nesting season is typically May-August). Additionally, any potential development projects for the proposed business park should consider timing tree clearing work from November-March to avoid any impacts to the Northern Long-eared bat.

C.4. GEOTECHNICAL REVIEW

C.4.a. General

Based on our experience in the area, a review of publically available geologic maps and a review of a exsiting borings discovered in our research, it appears the general geologic conditions in the project area consist of a glacial till over igneous bedrock. The thickness of the glacial till layer typically ranges from 10 to 30. Bedrock can be as shallow as a few feet, we are not aware of ourcroppings on the subject parcels.

The glacial tills generally consist of silty sand to sandy silt. Groundwater is generally perched within the till or on top of the bedrock.The glacial till is typically overlain by organic materials, either topsoil or swamp deposits, or existing fill (materials placed by man rather than by nature).

C.4.b. Geotechnical Considerations

- Organic Materials: Topsoils and swamp soil contain organic materials, organic materals hold water, become weak, frost susceptible and compressible. We generally recommend that organic materials not be relied upon for support of structures. We typically recommend organic materials be stripped from below pavement and structures and replaced with engineered fill. In pavement areas, leaving organic materials in place can be considered if the risk of settlement is accepted by the project team. Minimum thickness of engineered fills over the organic materials will be needed for support of pavments.

- Existing Fills: Existing fill materials are typically unknown in orgin and are not homogeneous in compostion or relative density. We generally recommend existing fills not be relied upon for support of structures. Existing fills can be considered suitable for support of pavements; relatively thick pavement sections may be reqired to mitigate the risk of differential settlement or heave.

  Existing fill mitigation techniques generally depend on depth of fill. Shallower fills can generally be completely removal and replacement; deep foundations or ground improvement techniques are generally most economical for deeper fills.

- Frost Susceptible Soils: Silty and clayey soils are likely to support exterior pavements and slabs; these materials are considered frost susceptable. Relatively thick pavement sections will be required.

- Groundwater: Groundwater is common in the area. It is typically perched loose zones of soils, within exsisting fill or on top of denser materials such as dense glacial till or bedrock.

C.4.c. Parcel Specific Geotechncial Data

The only site specific geotechnical data we found during our review was for a proposed retail store on the former Arrowhead Refinery site. A geotechnical evaluation was completed in 2002, for the proposed construction of a retail building.

The results of the evaluation were summarized in a Report of Geotechnical/Environmental Exploration and Review prepared by American Engineering Testing, dated December 6, 2002. Six standard penetration test borings were completed for the project. The borings generally encountered existing fill materials, over swamp deposits, over native glacial tills. A copy of this previous report is included as **Appendix D**.

C.4.d. Recommendations for Future Geotechncial Investigation

The is a gerenal lack of geotechncial soil boring information available for the future business park site. Consequently, additional geteicnical investiaton will be recommended for all of the future busness park parcels that may include future buildings, parking lots and related roads/infrstructure.

To the degree practical, it is recommended that the future geotechnical investigtions be coordinated with the future recommended Phase II environmental site assessments to promote drilling and data collection efficencies.

C.5. WETLAND REVIEW

C.5.a. Desktop Delineation

WSP Completed a desktop review for the Highway 53 Business Park site by reviewing and analyzing a variety of available information to identify the presence or absence of wetlands. Resources reviewed include:

- U.S. Fish and Wildlife Service National Wetland Inventory (NWI)
- Minnesota Department of Natural Resources (MNDNR) Public Waters Inventory (PWI)
- Natural Resources Conservation Service (NRCS) Web Soil Survey
- U.S. Geological Survey (USGS) Topographic base map
- Aerial photos
- Light Detection and Ranging (LiDAR) Data

The Highway 53 Business Park map included in **Appendix E** depicts the potential site wetlands based on the desktop review (shaded in blue).

C.6. CIVIL ENGINEERING REVIEW

C.6.a. Background

The City of Hermantown is considering the creation of a new business park near the intersection of Miller Trunk Highway 53 (TH 53) and Lavaque Bypass Road. This area is being considered due to the Environmental Protection Agency's (EPA) recent delisting efforts related to an approximate 26-acre federal and state superfund site that is part of the area. The attached exhibit shows the location of the proposed business park which is comprised of 25 future lots and comprising approximately 137 acres.

C.6.b. Site Evaluation

The business park is bounded by TH 53 to the south, Lavaque Bypass Road to the east, Abrahamson Road to the west, and state-owned tax forfeit land to the north. Northland Consulting Engineers (NCE) met with St. Louis County (SLC) and the Minnesota Department of Transportation (MNDOT) to discuss access points to the future park. MNDOT's preference is the (3) existing driveways on the north side of TH 53 be removed and access be provided from Abrahamson Road and Lavaque Bypass Road. SLC's initial response is to use the current field entrance on the west side of Lavaque Bypass Road approximately 1,400 feet north of the intersection with TH 53. Both MNDOT and SLC stated that some level of traffic study along with an Intersection Control Evaluation (ICE) report will be necessary. Each agency would then review and approve the document. The city or developer would be responsible for cost of any improvements once the access points are established. We envision an interior network of city streets and utilities being established.

C.6.c. Site Constraints

Like most sites that remain undeveloped, this site has constraints that affect the feasibility. This 137-acre park has both a power line easement and a snowmobile trail that run through the middle of the property. We propose to leave this easement in place and develop around it. Another site constraint is the large areas of wetlands that exist across the parcels (shaded blue on map). The desktop delineation completed by WSP

indicates approximately 47 acres of wetlands within the park boundary. If the park gets developed, we anticipate a small square footage of wetlands will be impacted.

C.6.d. Zoning

The property considered to be included in the new business park currently has (4) different zoning districts including high density and low density commercial, heavy industrial, and office/light industrial/adult. The creation of a new business park will likely include a new zoning district to accommodate existing business and attract new businesses (see attached zoning map provided in **Appendix F**). The new business park is within the airport zoning district. Most of the business park falls within the airport zoning district #2. Any potential business will need to adhere to the requirements within that district. A map depicting the airport safety zones and related zone definitions is provided in **Appendix G**.

C.6.e. Utilities

- Sanitary Sewer: Currently all parcels have individual on site treatment systems. The closest sanitary sewer is about 500' south of TH 53. To serve the business park, the sanitary sewer will need to be directionally drilled under TH 53. The interior will be served with a new public gravity system. This will flow to a centrally located municipal lift station. The lift station will pump the sanitary sewer south across TH 53.

- Water Main: Currently none of the parcels are served by public water supply. The closest water main runs along the south side of TH 53. To serve the business park there will likely be (2) water main crossings bored under TH 53. One at Abrahamson Road and one at Lavaque Bypass Road. These (2) crossing will create a water main loop through the business park. A loop is a desired option in laying out new water distribution systems.

- Storm Sewer: No storm exists within the site. None of the existing developments have stormwater treatment devices. When developed we envision a new storm sewer system and a system of regional ponds to treat both the roadways and part of each lot.

- Power: Minnesota power has power on (3) sides of the business park. As the planning for this moves forward, we will engage Minnesota Power for laying out new electric services.

- Gas: Minnesota Energy Resources has gas main running along TH 53. New services will need to be coordinated as lots develop.

- High Speed Internet: In recent years this has been a business attractor. Now this is a business necessity. The city has and continues to be an active participant working with local providers to serve the Hermantown Community. Bringing high-speed broadband service to all of Hermantown is a Council priority. A Broadband Task Force has been formed with a mission of developing a strategic plan to be successful in the deployment of broadband throughout the community. This includes partnering with the State's Office of Broadband Development to assess current availability of service and to determine the most financially feasible plan for new and existing providers to invest in building broadband infrastructure. The Hermantown City Council has appropriated $400,000 of American Rescue Act (ARA) funding to this effort. Further, the Hermantown Economic Development Authority (HEDA) has identified the provision of broadband infrastructure is a top economic development priority, which ensures that service to the proposed Highway 53 Business Park will be a Task Force priority.

C.6.f. Roadways

The business park will include two separated roadways. One accessing the business park from Lavaque Bypass Road and the other from Abrahamson Road. These roadways will be disconnected from each other. Both will have the same typical section. The pavement section will be designed as a 10-ton roadway and will take into consideration the geotechnical recommendations. The roadways will be 32 feet wide with curb and gutter on both sides. The roadways will also have a system of catch basins and manholes to collect stormwater runoff. A five-foot-wide sidewalk would also be included on one side of the roadway.

C.6.g. Wetlands

As noted in section C.5.a, a desktop delineation of wetlands within the boundary has been prepared. The project will impact wetlands in several locations. Prior to design a formal wetland delineation will need to be prepared, reviewed, and approved by the local governing unit (LGU). Impacts to wetlands that are cumulatively less than 10,000 square feet can be submitted to the LGU and Army Corp as a de minimus exemption. A de minimus exemption would not require mitigation or wetland credit purchase. Any impacts over 10,000 square feet will require wetland mitigation and wetland credit purchase through a wetland bank. Since this is a common plan of development, if the 10,000 square foot de minimus is used as part of the initial public improvements, any new development within wetlands would be required to mitigate wetlands and purchase credits. As referenced in Section C.5, the map included in **Appendix E** depicts the potential site wetlands (shaded in blue) relative to the planned Business Park area.

D. FUTURE TECHNICAL SERVICES/COST ESTIMATES

Additional environmental, geotechnical and civil engineering services will be needed to support the establishment of the future business park. On November 1, 2021, the Hermantown Economic Development Authority (HEDA) submitted a grant application to the Minnesota Department of Employment and Economic Development (DEED) for environmental investigation and response action plan preparation for the five parcels in the proposed business park that were part of the recently delisted Arrowhead Superfund site (395-0010-00822, 395-0010-00820, 395-0010-00854, 395-0010-00850, and 395-0010-00853). If the grant is awarded, Phase I and Phase II an environmental investigation will be completed that will address the respective parcels. The Phase II investigation will include completion of soil borings and testing of soil, groundwater, and soil vapor samples for contamination that could affect planned redevelopment. The response action plan (RAP) prepared under the grant will address requirements for addressing any soil, groundwater, and or soil gas contamination identified at levels requiring consideration for future development. Although the tasks completed under the grant would focus on environmental issues, the soil borings for the Phase II investigation will provide relevant geotechnical information that will be useful for development planning on those parcels. The estimated total cost of the environmental technical services to be completed under the DEED grant is approximately **$67,000** (applies to the five parcels comprising the former Superfund Site).

Any prospective purchaser of a parcel outside the former Superfund Site boundary will require completion of a Phase I ESA for environmental due diligence, and will aslo likely require completion of a Phase II investigation due to proximity to the former Superfund Site. As dicscussed in Section C.3 (Geotechnical Review), parcel-specific geotechncial investigattion will also be required to assess soil conditions affecting future construction of buidlings, roadways and other infrastructure. To the degree practical, it is the future

Phase II environmental site assessments should be coordinated with the future recommended geotechnical investigtions to promote drilling and data collection efficencies.

Anticipated cost ranges for parcel-specifc environmental and geotechnical investigations are summarized below:

- Geotechnical – Preliminary Geotechnical Evaluation **$5,000** – $**10,000** per parcel
- Environmental – Phase I ESAs **$2,200** - **$2,600** per parcel
- Environmental – Phase II Investigations **$10,000** - **$15,000** per parcel
- Environmental - Response Action Plan (if needed) **$5.000** - **$9,000** per parcel

Cost estimate ranges for other future technical services discussed in this memo are summarized below:

- Endangered Species Reviews **$5,000** – **$10,000** entire business park
- Wetland Delineations **$20,000**– **$30,000** entire business park
- AUAR and Related Support **$50,000** – **$100,000** entire business park
- Civil Engineering Design **$250,000 - $400,000** entire business park
    - Existing Conditions and Removals
    - Roadway Plan and Profile
    - Utility Plan and Profile
    - Stormwater Management Plan
    - Stormwater Pollution Prevention Plan
    - Permitting
        - Sanitary Sewer (MPCA and WLSSD)
        - Water Main (MN Department of Health)
        - Highway Access Permits (MNDOT and St. Louis County
        - Stormwater Management (MPCA and City of Hermantown)

The cost estimate ranges provide are intended for preliminary budgeting purposes and based on the preliminary information reviewed for this desktop study. Costs for civil engineering design can vary considerably depending on how the future development is laid out and sequenced, as well as final decisions/requirements made in relation to site access, traffic flow and utility infrastructure connections. Proposals with detailed scopes of services and cost estimates will be prepared for the future environmental, geotechnical and civil engineering services at appropriate junctures of the project.

FIGURES

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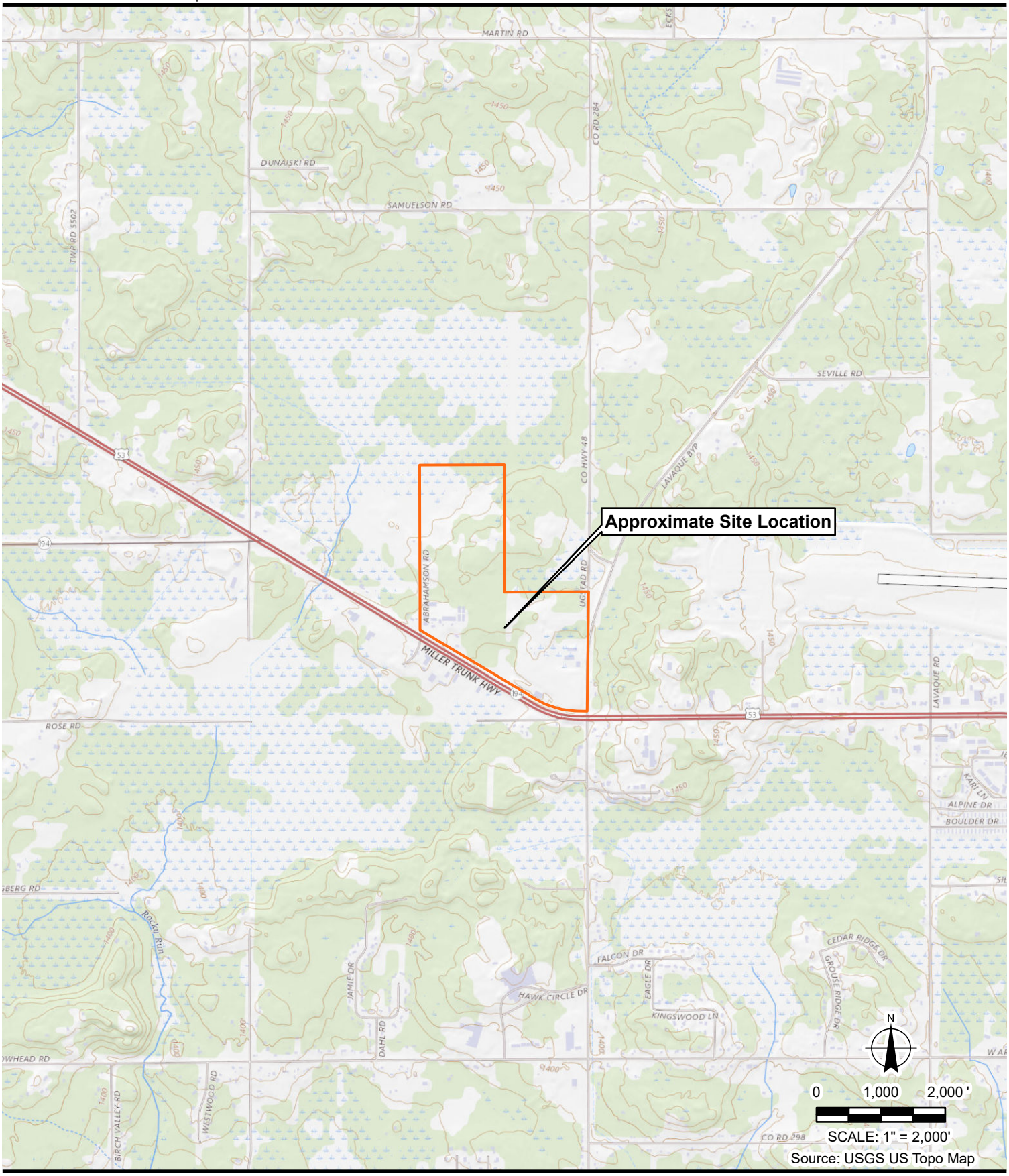

BRAUN INTERTEC
The Science You Build On.

11001 Hampshire Avenue S
Minneapolis, MN 55438
952.995.2000
braunintertec.com

Project No:	B2109165
Drawing No:	B2109165_Fig 1
Drawn By:	ZS
Date Drawn:	10/8/2021
Checked By:	JBW
Last Modified:	11/1/2021

Future Business Park

Near Intersection of TH 53 and Lavaque Bypass Road

Hermantown, Minnesota

Site Location Map

Figure 1

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The Science You Build On.

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Minneapolis, MN 55438
952.995.2000
braunintertec.com

Project No:	B2109165
Drawing No:	B2109165_Fig 2 Letter
Drawn By:	ZS
Date Drawn:	10/8/2021
Checked By:	JBW
Last Modified:	11/1/2021

Future Business Park

Near Intersection of TH 53 and Lavaque Bypass Road

Hermantown, Minnesota

Site Diagram

Figure 2

TOTAL AREA	137.28 ACRES
WETLAND AREA	46.74 ACRES
CURRENTLY DEVELOPED	29.74 ACRES
PROPOSED RIGHT OF WAY	9.70 ACRES
RESIDUAL AREA	51.10 ACRES
BUILDING COVERAGE	10.22 ACRES
NO. OF LOTS	25 LOTS
ROADWAYS	5,435 LINEAL FEET
WATER MAIN	8,966 LINEAL FEET
SANITARY MAIN	5,388 LINEAL FEET

ZONE 2 BOUNDARY

ZONE 1 BOUNDARY

N

W E

S

LOT 1
10.60 ACRES

LOT 2
7.18 ACRES

LOT 3
5.20 ACRES

LOT 4
4.84 ACRES

LOT 5
5.00ACRES

LOT 6
5.00 ACRES

LOT 7
3.74 ACRES

LOT 8
3.74 ACRES

LOT 9
5.72 ACRES

LOT 10
14.08 ACRES

LOT 11
3.64 ACRES

LOT 12
15.69 ACRES

LOT 13
4.72 ACRES

LOT 14
3.64 ACRES

LOT 15
3.53 ACRES

LOT 16
4.29 ACRES

LOT 17
3.40 ACRES

LOT 18
2.96 ACRES

LOT 19
2.53 ACRES

LOT 20
2.82 ACRES

LOT 21
2.97 ACRES

LOT 22
5.02 ACRES

LOT 23
3.93 ACRES

LOT 24
2.32 ACRES

LOT 25
2.83 ACRES

MINNESOTA POWER AND
SNOWMOBILE TRAIL EASEMENT

ST. LOUIS COUNTY
PREFERRED ACCESS POINT

MNDOT PREFERRED
ACCESS POINT.

REMOVE
ACCESS POINT.

REMOVE
ACCESS POINT.

REMOVE
ACCESS POINT.

REMOVE
ACCESS POINT.

SANITARY SEWER
LIFT STATION

ABRAHAMSON ROAD

UGSTAD ROAD

LAVAQUE BYPASS ROAD

TRUNK HIGHWAY 53

ROSE ROAD

City of Hermantown Minnesota

GOVERNMENT SERVICES BUILDING
5105 MAPLE GROVE ROAD
HERMANTOWN, MN 55811
PHONE: (218) 729-3600

HIGHWAY 53 BUSINESS PARK

DATE: NOVEMBER 3, 2021
REVISED: DECEMBER 8, 2021

LEGEND

- BUSINESS PARK LIMITS
- RIGHT-OF-WAY LINE
- LOT LINE
- SECTION LINE
- WATER MAIN
- SANITARY MAIN
- DESKTOP WETLAND BOUNDARIES
- AIRPORT ZONE 1 BOUNDARY
- AIRPORT ZONE 2 BOUNDARY

0' 50' 100' 200'

Northland Consulting Engineers L.L.P.
Structural, Civil and Forensic Engineering Services
Voice: (218)727-5969
Fax: (218)727-7778
www.nce-engineers.com

APPENDIX A

SITE SUMMARY SHEETS

Site Summary Sheet
TH53 Business Park

Parcel Number	395-0010-00650	**Address**	No address assigned

Parcel location map

St. Louis County, County Land Explorer Photograph

Summary

Based on review of aerial photographs, the parcel has not been developed. Forested areas of the parcel may provide potential habitat for threatened and endangered species and migratory birds.

Parcel Information

Site Name:	Carlson Parcel	**Site Address:**	No address assigned
Historical Site Name(s):	N/A	**Parcel ID Number:**	395-0010-00650
Current Site Use:	Undeveloped	**Partial Legal Description:**	SW ¼ of NE ¼, Section 4, Township 50, Range 15
Property Type:	Undeveloped	**Owner Name:**	Gerald E & Carol Carlson
Lot Size:	40 acres	**Zoning District**	M2-Heavy Industrial

Site Features

Noted during review of information:	**Yes**	**No**
Current structures	☐	☒
Evidence of demolished/removed structures	☐	☒
Tanks	☐	☒
Unidentified containers (drums, cylinders, etc.)	☐	☒
Wells	☐	☒
Septic system or cistern	☐	☒
Use/storage/disposal of petroleum products, hazardous materials, or other chemicals	☐	☒

Site Summary Sheet
TH53 Business Park

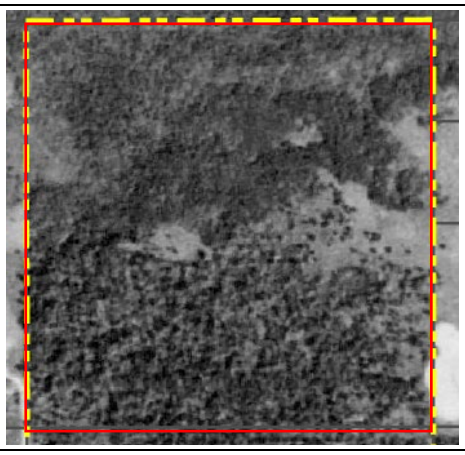
Noted during review of information:	Yes	No
Evidence of dumping, landfilling, or non-native fill	☐	☒
Evidence of spill or release of petroleum products, hazardous materials, or other chemicals	☐	☒
Unpaved roads/paths with no outlet	☐	☒
Outdoor storage	☐	☒
Surface water features	☐	☒
Stained soil or stressed vegetation	☐	☒
PCB-containing equipment	☐	☒
Odors	☐	☒
Poor housekeeping	☐	☒
Past structure use or property ownership	☐	☒
Site specific geotechnical information	☐	☒
Threatened and Endangered Species potentially present	☒	☐
Previous environmental investigation	☐	☒
Other: describe below	☐	☒

Comments:
According to the St. Louis County website, there are no buildings on the site.

Historical Aerial Photograph Summary

Year	Use	Source
1940 – 1951	Undeveloped, wooded	Aerial photographs
1953 – 1989	Undeveloped, wooded, some trails enter site along eastern border from property to west	Aerial photographs
1991 – 2003	Undeveloped trails from east no longer visible. Utility line cuts off northwest corner	Aerial photographs
2008 – 2019	Central portion has been cleared and is no longer wooded. Utility line still present in northwest, rest of site undeveloped.	Aerial photographs

Historical Information



1940 Aerial Photograph

2008 Aerial Photograph

Site Summary Sheet
TH53 Business Park

Water Well Search

A search of the Minnesota Department of Health (MDH) Minnesota Well Index (MWI) did not identify any wells registered to, or plotted at, the site.

Database Search Listings

A search of the Minnesota Pollution Control Agency's What's In My Neighborhood website did not identify the site.

Registered Tanks

No registered tanks were identified for the site.

Available Geotechnical Information

No site specific geotechnical information was available for this parcel.

Threatened and Endangered Species Review

Forested areas may provide potential habitat for the Canada Lynx, Northern-Long Eared Bat, and migratory birds.

Detailed Regulatory File Review

No Minnesota Pollution Control Agency (MPCA) or Minnesota Department of Agriculture (MDA) files were reviewed for this site.

Site Summary Sheet
TH53 Business Park

Parcel Number	395-0010-00820	**Address**	No address assigned

Parcel location map

St Louis County, County Land Explorer Photograph

Summary

Based on aerial photographs, this parcel has been undeveloped. Wetlands and potential fill activities were identified on some photographs. This parcel is part of the Arrowhead Refinery Company, which is a delisted Superfund site. While remediation was not conducted on this parcel, activities on the parcel may be connected to activities on parcels to the south associated with the Arrowhead Refinery Company.

Parcel Information

Site Name:	Bill & Irv Central Parcel	**Site Address:**	No address assigned
Historical Site Name(s):	---	**Parcel ID Number:**	395-0010-00820
Current Site Use:	Undeveloped	**Partial Legal Description:**	Part of NE ¼ of SE ¼, Section 4, Township 50, Range 15
Property Type:	Undeveloped	**Owner Name:**	Bill & Irv's Properties Inc.
Lot Size:	11.18 acres	**Zoning District**	C-General Commercial

Site Features

Noted during review of information:	**Yes**	**No**
Current structures	☐	☒
Evidence of demolished/removed structures	☐	☒
Tanks	☐	☒
Unidentified containers (drums, cylinders, etc.)	☐	☒
Wells	☐	☒
Septic system or cistern	☐	☒
Use/storage/disposal of petroleum products, hazardous materials, or other chemicals	☐	☒

Site Summary Sheet
TH53 Business Park

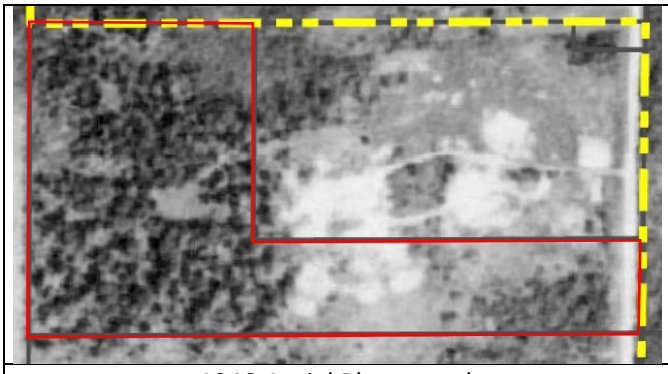
Noted during review of information:	Yes	No
Evidence of dumping, landfilling, or non-native fill	☒	☐
Evidence of spill or release of petroleum products, hazardous materials, or other chemicals	☐	☒
Unpaved roads/paths with no outlet	☒	☐
Outdoor storage	☐	☒
Surface water features	☒	☐
Stained soil or stressed vegetation	☐	☒
PCB-containing equipment	☐	☒
Odors	☐	☒
Poor housekeeping	☐	☒
Past structure use or property ownership	☐	☒
Site specific geotechnical information	☐	☒
Threatened and Endangered Species potentially present	☒	☐
Previous environmental investigation	☐	☒
Other: describe below	☐	☒

Comments:
According to the St. Louis County website, there are no buildings on the site.

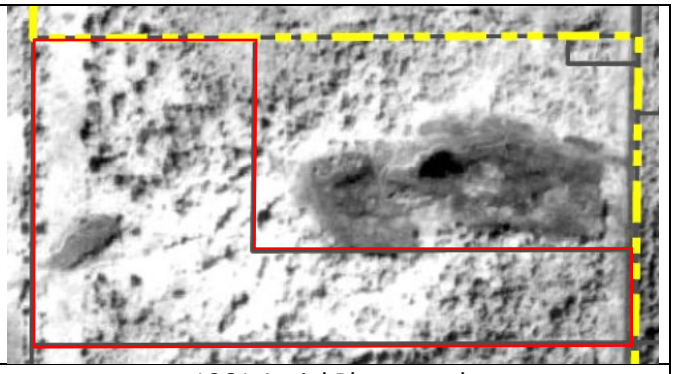
Historical Aerial Photograph Summary

Year	Use	Source
1940 – 1953	The site is undeveloped with a cleared area in the central portion.	Aerial photographs
1961	A small area, which appears to be a pond, is present on the western edge with a trail or canal connected.	Aerial photograph
1972 – 2003	The small pond area is not visible. A pond or wetland area appears in the central portion of the site. The size of the area varies by year.	Aerial photographs
2008 – 2019	The site appears to have been graded with roads leading to the south. No ponds or wetlands are visible.	Aerial photograph

Historical Information

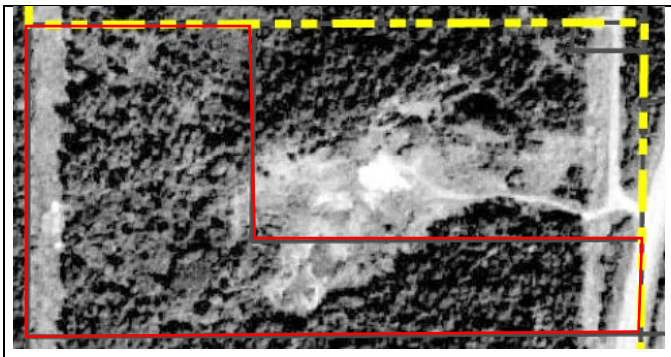


1940 Aerial Photograph



1961 Aerial Photograph

Site Summary Sheet
TH53 Business Park



1975 Aerial Photograph

2008 Aerial Photograph

Water Well Search

A search of the Minnesota Department of Health (MDH) Minnesota Well Index (MWI) did not identify any wells registered to, or plotted at, the site.

Database Search Listings

A search of the Minnesota Pollution Control Agency's What's In My Neighborhood website did not identify the site.

Registered Tanks

No registered tanks were identified for the site.

Available Geotechnical Information

No site-specific geotechnical information was available for this parcel, however, based on data available on the adjacent parcel, we anticipate the subsurface conditions at this site consist of existing fil materials, over swamp deposits, over native glacial tills.

The existing fills and swamp soils should be considered unsuitable for support of buildings. Mitigation techniques include removal and replacement, soil improvement, or deep foundations.

In pavement areas, a minimum of 3 to 4 feet of select grading materials (sand) should be provided over swamp soils to support traffic loads. The existing fills and swamp soils are potentially compressible under fill loads. If grades are raised, or if swamp soils are removed and replaced with sand, consolidation of the swamps soils is likely. Mitigation measures to minimize the impact of settlements include complete removal and replacement of swamp soils, construction delays and surcharges.

Threatened and Endangered Species Review

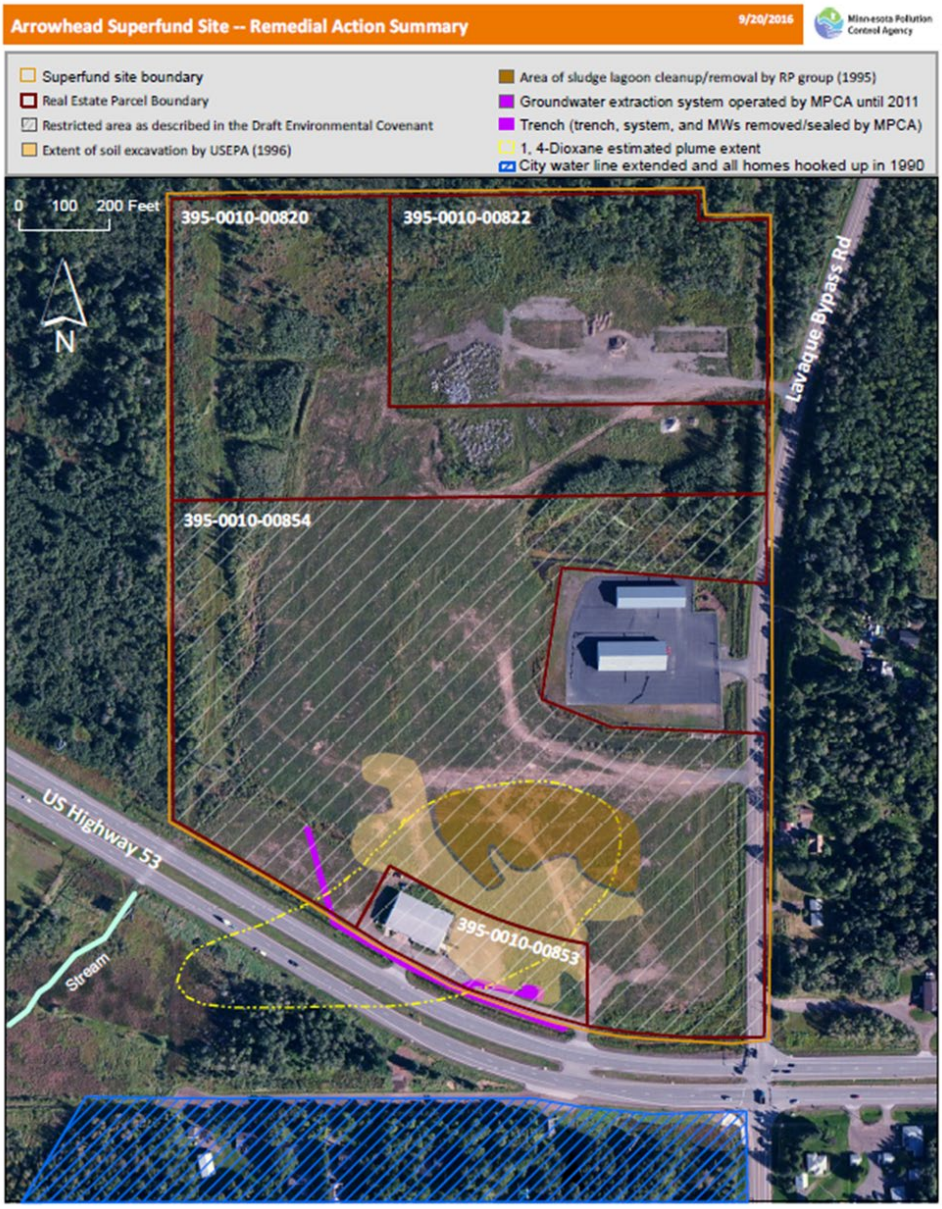
Suitable habitat for the protected species identified in state or federal databases is unlikely to be present, but may be present in undeveloped areas.

Detailed Regulatory File Review

This parcel is part of the Arrowhead Refinery Company site. The Minnesota Pollution Control Agency (MPCA) files for the Arrowhead Refinery Company site were reviewed. A full summary of the information is provided on the parcel sheet for parcel 395-0010-00854. Soil and groundwater remediation was conducted on the area to the

south, but do not appear have occurred on this parcel. However, based on aerial photographs, activities from the Arrowhead Refinery Company appear to have also occurred on this parcel. The Arrowhead Refinery Company was delisted from Superfund on September 14, 2021.

A copy of the map included in the Environmental Covenant, which shows the extent of the Arrowhead Refinery Company site and the areas of remediation, is provided below.



Site Summary Sheet
TH53 Business Park

Parcel Number	395-0010-00822	**Address**	No address assigned

Parcel location map

St Louis County, County Land Explorer Photograph

Summary

Based on aerial photographs, this parcel has been undeveloped. Wetlands and potential fill activities were identified on some photographs. This parcel is part of the Arrowhead Refinery Company, the activities observed on this parcel may be connected to activities associated with the Arrowhead Refinery Company.

Parcel Information

Site Name: Bill & Irv North Parcel
Historical Site Name(s): ----
Current Site Use: Undeveloped
Property Type: Commercial
Lot Size: 8.61 acres
Site Address: No address assigned
Parcel ID Number: 395-0010-00822
Partial Legal Description: Part of NE ¼ of SE ¼, Section 4, Township 50, Range 15
Owner Name: Bill & Irv's Properties, Inc.
Zoning District C-General Commercial

Site Features

Noted during review of information:	**Yes**	**No**
Current structures	☐	☒
Evidence of demolished/removed structures	☐	☒
Tanks	☐	☒
Unidentified containers (drums, cylinders, etc.)	☐	☒
Wells	☐	☒
Septic system or cistern	☐	☒

Site Summary Sheet
TH53 Business Park

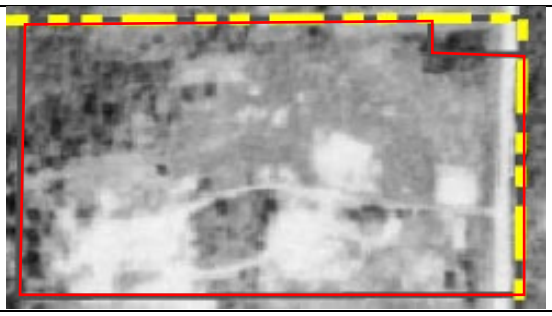
Noted during review of information:	Yes	No
Use/storage/disposal of petroleum products, hazardous materials, or other chemicals	☐	☒
Evidence of dumping, landfilling, or non-native fill	☒	☐
Evidence of spill or release of petroleum products, hazardous materials, or other chemicals	☐	☒
Unpaved roads/paths with no outlet	☒	☐
Outdoor storage	☒	☐
Surface water features	☐	☒
Stained soil or stressed vegetation	☐	☒
PCB-containing equipment	☐	☒
Odors	☐	☒
Poor housekeeping	☐	☒
Past structure use or property ownership	☐	☒
Site specific geotechnical information	☐	☒
Threatened and Endangered Species potentially present	☐	☒
Previous environmental investigation	☐	☒
Other: describe below	☐	☒

Comments:
According to the St. Louis County website, there are no buildings on the site.

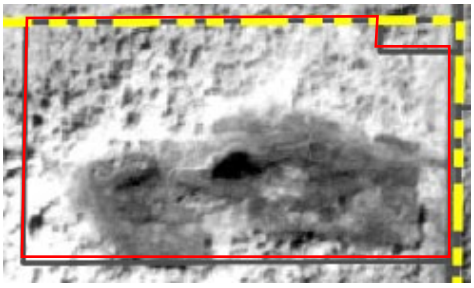
Historical Aerial Photograph Summary

Year	Use	Source
1940	Site is cleared with areas of disturbed soil.	Aerial photograph
1948 – 1951	Portions of the site are cleared, but no indications of recent activities	Aerial photographs
1953	Piles of soil or other materials are present in the central area of the site, in the areas previously noted as cleared.	Aerial photograph
1961 – 1997	The central portion appears to be a wetland/pond in most years, with some years drier and no water is noted.	Aerial photographs
2003 – 2019	No wetland/pond is noted, and the central portion appears graded. Some debris or piles of material are visible on the 2019 photograph.	Aerial photographs

Historical Information



1940 Aerial Photograph



1961 Aerial Photograph

Site Summary Sheet
TH53 Business Park

Water Well Search

A search of the Minnesota Department of Health (MDH) Minnesota Well Index (MWI) did not identify any wells registered to, or plotted at, the site.

Database Search Listings

A search of the Minnesota Pollution Control Agency's What's In My Neighborhood website did not identify the site.

Registered Tanks

No registered tanks were identified for the site.

Available Geotechnical Information

No site-specific geotechnical information was available for this parcel, however, based on data available on the adjacent parcel, we anticipate the subsurface conditions at this site consist of existing fil materials, over swamp deposits, over native glacial tills.

The existing fills and swamp soils should be considered unsuitable for support of buildings. Mitigation techniques include removal and replacement, soil improvement, or deep foundations.

In pavement areas, a minimum of 3 to 4 feet of select grading materials (sand) should be provided over swamp soils to support traffic loads. The existing fills and swamp soils are potentially compressible under fill loads. If grades are raised, or if swamp soils are removed and replaced with sand, consolidation of the swamps soils is likely. Mitigation measures to minimize the impact of settlements include complete removal and replacement of swamp soils, construction delays and surcharges.

Threatened and Endangered Species Review

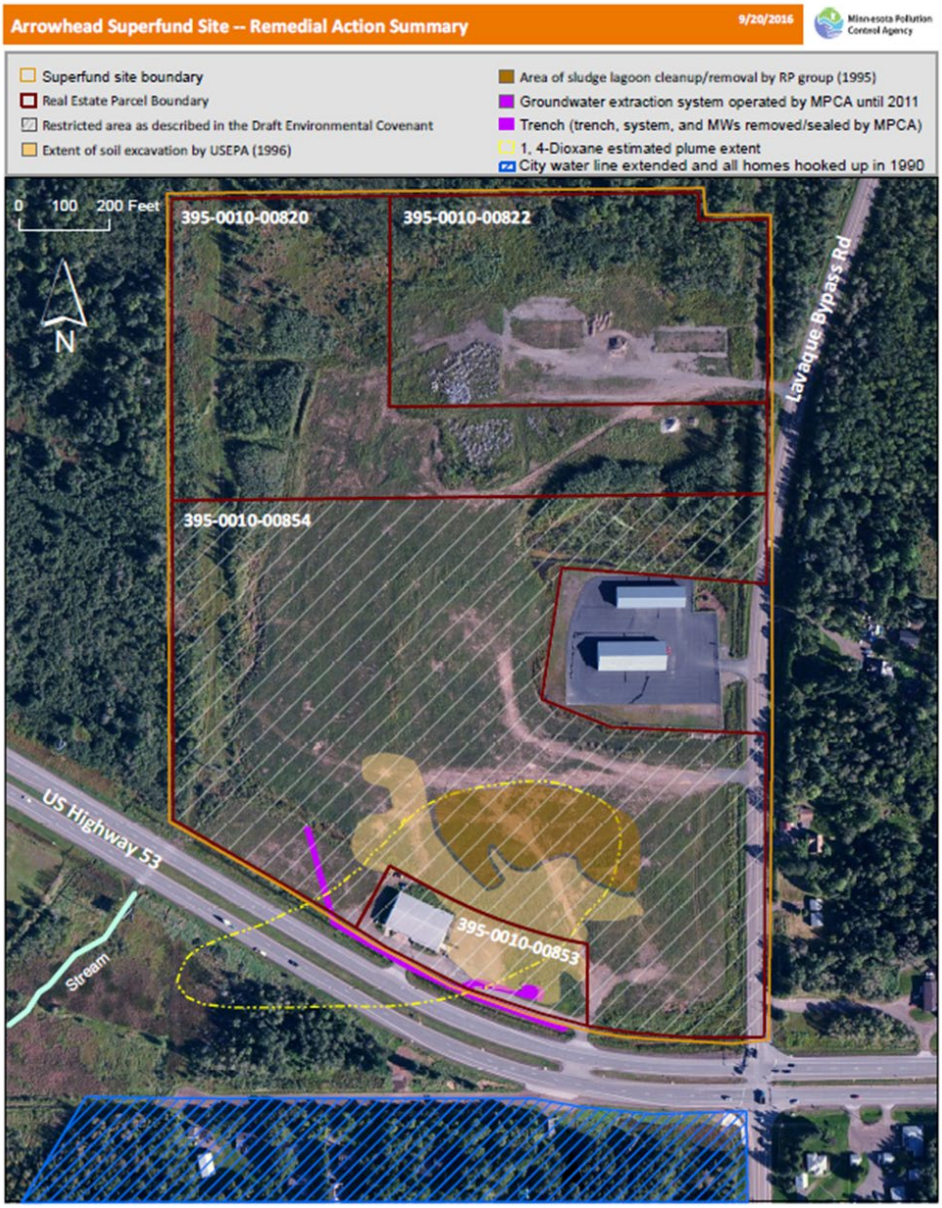
Suitable habitat for the protected species identified in state or federal databases is unlikely to be present but may be present in undeveloped areas.

Detailed Regulatory File Review

This parcel is part of the Arrowhead Refinery Company site. The Minnesota Pollution Control Agency (MPCA) files for the Arrowhead Refinery Company site were reviewed. A full summary of the information is provided on the parcel sheet for parcel 395-0010-00854. Soil and groundwater remediation was conducted on the area to the south, but do not appear have occurred on this parcel. However, based on aerial photographs, activities from the Arrowhead Refinery Company appear to have also occurred on this parcel.

A copy of the map included in the Environmental Covenant, which shows the extent of the Arrowhead Refinery Company site and the areas of remediation, is provided below.

Site Summary Sheet
TH53 Business Park



Site Summary Sheet
TH53 Business Park

Parcel Number	395-0010-00825	**Address**	No address assigned

Parcel location map

St Louis County, County Land Explorer Photograph

Summary

Based on aerial photographs, a small building was present in the 1940s. The parcel appears to have been undeveloped since that time. Forested areas may provide potential habitat for threatened and endangered species.

Parcel Information

Site Name:	Northwest Bell	**Site Address:**	No address assigned
Historical Site Name(s):	List name(s)	**Parcel ID Number:**	395-0010-00825
Current Site Use:	Undeveloped	**Partial Legal Description:**	Part of NE ¼ of SE ¼, Section 4, Township 50, Range 15
Property Type:	Commerical/Undeveloped	**Owner Name:**	Northwest Bell Telephone Co
Lot Size:	0.21 acres	**Zoning District**	C1a-Sexually Oriented Uses

Site Features

Noted during review of information:	**Yes**	**No**
Current structures	☐	☒
Evidence of demolished/removed structures	☒	☐
Tanks	☐	☒
Unidentified containers (drums, cylinders, etc.)	☐	☒
Wells	☐	☒
Septic system or cistern	☐	☒

Site Summary Sheet
TH53 Business Park

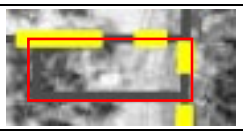
Noted during review of information:	Yes	No
Use/storage/disposal of petroleum products, hazardous materials, or other chemicals	☐	☒
Evidence of dumping, landfilling, or non-native fill	☐	☒
Evidence of spill or release of petroleum products, hazardous materials, or other chemicals	☐	☒
Unpaved roads/paths with no outlet	☐	☒
Outdoor storage	☐	☒
Surface water features	☐	☒
Stained soil or stressed vegetation	☐	☒
PCB-containing equipment	☐	☒
Odors	☐	☒
Poor housekeeping	☐	☒
Past structure use or property ownership	☐	☒
Site specific geotechnical information	☐	☒
Threatened and Endangered Species potentially present	☒	☐
Previous environmental investigation	☐	☒
Other: describe below	☐	☒

Comments:
According to the St. Louis County website, there are no buildings on the site.

Historical Aerial Photograph Summary

Year	Use	Source
1940	The site appears to be occupied by one small building or trees. A road is present along the eastern boundary of the site.	Aerial photograph
1948 – 1989	The site is undeveloped. The site becomes more wooded through the years.	Aerial photographs
1991	One small building is present on the site.	Aerial photograph
1997 – 2019	The site appears to be undeveloped.	Aerial photograph

Historical Information

	
1940 Aerial Photograph	1991 Aerial Photograph

Water Well Search

A search of the Minnesota Department of Health (MDH) Minnesota Well Index (MWI) did not identify any wells registered to, or plotted at, the site.

Database Search Listings

A search of the Minnesota Pollution Control Agency's What's In My Neighborhood website did not identify the site.

Site Summary Sheet
TH53 Business Park

Registered Tanks

No registered tanks were identified for the site.

Available Geotechnical Information

No site-specific geotechnical information was available for this parcel.

Threatened and Endangered Species Review

Forested areas may provide potential habitat for the Canada Lynx, Northern-Long Eared Bat, and migratory birds.

Detailed Regulatory File Review

No Minnesota Pollution Control Agency (MPCA) or Minnesota Department of Agriculture (MDA) files were reviewed for this site.

Site Summary Sheet
TH53 Business Park

Parcel Number	395-0010-00830	**Address**	5389 Miller Trunk Highway

Parcel location map

St Louis County, County Land Explorer Photograph

Summary

Based on review of aerial photographs, the parcel was undeveloped until around 1953, when commercial buildings were constructed. These buildings were no longer present by 1961. A road or drainage ditch was present running from the southern portion to the eastern border and on to a small pond on the adjacent parcel on the 1961 photograph. Additional commercial buildings were constructed between 1990 and 2016. A drinking water well was identified for the parcel. The parcel was identified on the hazardous waste generator as Acuren Inspection. Suitable habitat for the protected species identified in state or federal databases is unlikely to be present but may be present in undeveloped areas of the parcel.

Parcel Information

Site Name:	Golden Eagle Parcel	**Site Address:**	5389 Miller Trunk Hwy
Historical Site Name(s):	----	**Parcel ID Number:**	395-0010-00830
Current Site Use:	Economy Garage, Amity Creek Homes, Economy Mini-Storage, residence	**Partial Legal Description:**	Portion of NW ¼ of SE ¼, Section 4, Township 50, Range 15
Property Type:	Commercial/ Light Industrial	**Owner Name:**	Golden Eagle Parcel
Lot Size:	46.18 acres	**Zoning District**	C1A-Sexually Oriented Uses and C1-Office/Light Industrial

Site Summary Sheet
TH53 Business Park

Site Features

Noted during review of information:	Yes	No
Current structures	☒	☐
Evidence of demolished/removed structures	☒	☐
Tanks	☐	☒
Unidentified containers (drums, cylinders, etc.)	☐	☒
Wells	☒	☐
Septic system or cistern	☐	☒
Use/storage/disposal of petroleum products, hazardous materials, or other chemicals	☒	☐
Evidence of dumping, landfilling, or non-native fill	☐	☒
Evidence of spill or release of petroleum products, hazardous materials, or other chemicals	☐	☒
Unpaved roads/paths with no outlet	☒	☐
Outdoor storage	☐	☒
Surface water features	☐	☒
Stained soil or stressed vegetation	☐	☒
PCB-containing equipment	☐	☒
Odors	☐	☒
Poor housekeeping	☐	☒
Past structure use or property ownership	☐	☒
Site specific geotechnical information	☐	☒
Threatened and Endangered Species potentially present	☒	☐
Previous environmental investigation	☐	☒
Other: describe below	☐	☒

Comments:
According to the St. Louis County website, there are 11 buildings on the site. The following information was available regarding the buildings:

Building #	Building Type/Use	Gross Area (sq ft)	Year Built	Foundation
1	Office	2,400	1990	Foundation
2	Warehouse	12,240	1996	Floating slab
3	Warehouse	216	2005	Floating slab
4	Warehouse	576	2016	Floating slab
5	Mini-Warehouse	16,320	2002	Floating slab
6	Utility	280	2017	Foundation
7	Storage Building	120	Not provided	Post on Ground
8	Storage Building	96	Not provided	Post on Ground
9	Warehouse	5,040	1992	Floating slab
10	Warehouse	5,080	1998	Floating slab
11	Warehouse	1,440	Not provided	Floating slab

Site Summary Sheet
TH53 Business Park

Historical Aerial Photograph Summary

Year	Use	Source
1940 – 1951	Site is undeveloped, with wooded areas to the north.	Aerial photographs
1953	Three small buildings are present along the southern portion of the site.	Aerial photograph
1961	The buildings are no longer visible. A road or drainage ditch is present running from the southern portion to the eastern border and on to a small pond on the adjacent parcel.	Aerial photograph
1972 – 1991	The road or drainage ditch is no longer present and the site is again undeveloped.	Aerial photographs
1997	One commercial building is present near the south west corner of the site. A second commercial building is present closer to the northwest corner.	Aerial photograph
2003	Two additional buildings are present near the northern building noted previously. Ten buildings are present near the southern building noted previously.	Aerial photograph
2008 – 2019	Additional buildings are present in the southern portion of the site.	Aerial photographs

Historical Information

1953 Aerial Photograph

1961 Aerial Photograph

Water Well Search

A search of the Minnesota Department of Health (MDH) Minnesota Well Index (MWI) identified the following well(s) registered to, or plotted at, the site:

Site Summary Sheet
TH53 Business Park

Unique Well #	Well Name	Total Depth (ft)	Depth to Water (ft)	Aquifer	Listed Use	Date Well Completed	Status
497301	Tobias, Craig	225	8	Layered series	Domestic	05/19/1992	Active

Database Search Listings

A search of the Minnesota Pollution Control Agency's What's In My Neighborhood website identified the site on the following database(s):

Name	Activity/Database	Regulatory ID	Remarks
Acuren Inspection, 4566 Abrahamson Road	Hazardous Waste	MNS000205013	Minimal quantity generator. Last report year 2018: 110 gallons of x-ray fixer, sewered

Registered Tanks

No registered tanks were identified for the site.

Available Geotechnical Information

No site specific geotechnical information was available for this parcel.

Threatened and Endangered Species Review

Suitable habitat for the protected species identified in state or federal databases is unlikely to be present but may be present in undeveloped areas of the parcel.

Detailed Regulatory File Review

No Minnesota Pollution Control Agency (MPCA) or Minnesota Department of Agriculture (MDA) files were reviewed for this site.

Site Summary Sheet
TH53 Business Park

Parcel Number	395-0010-00831	**Address**	5393 Miller Trunk Highway

Parcel location map

St Louis County, County Land Explorer Photograph

Summary

Based on aerial photographs, the parcel was undeveloped until 1965 when a commercial building was constructed. Additional buildings were added between 1978 and 2019. A drinking water well was identified for the parcel. The parcel was identified on the hazardous waste generator database.

Parcel Information

Site Name:	Tamarack Materials	**Site Address:**	5393 Miller Trunk Highway
Historical Site Name(s):	---	**Parcel ID Number:**	395-0010-00831
Current Site Use:	Commercial	**Partial Legal Description:**	Part of the W ½ of the SE ¼, Section 4, Township 50, Range 15
Property Type:	Commercial/Light Industrial	**Owner Name:**	Tamarack Materials Northland Inc
Lot Size:	3.62 acres	**Zoning District**	C1-Office/Light Industrial and C1A-Sexually Oriented Uses

Site Features

Noted during review of information:	**Yes**	**No**
Current structures	☒	☐
Evidence of demolished/removed structures	☐	☒
Tanks	☐	☒
Unidentified containers (drums, cylinders, etc.)	☐	☒

Site Summary Sheet
TH53 Business Park

Noted during review of information:	Yes	No
Wells	☒	☐
Septic system or cistern	☐	☒
Use/storage/disposal of petroleum products, hazardous materials, or other chemicals	☒	☐
Evidence of dumping, landfilling, or non-native fill	☐	☒
Evidence of spill or release of petroleum products, hazardous materials, or other chemicals	☐	☒
Unpaved roads/paths with no outlet	☐	☒
Outdoor storage	☐	☒
Surface water features	☐	☒
Stained soil or stressed vegetation	☐	☒
PCB-containing equipment	☐	☒
Odors	☐	☒
Poor housekeeping	☐	☒
Past structure use or property ownership	☐	☒
Site specific geotechnical information	☐	☒
Threatened and Endangered Species potentially present	☐	☒
Previous environmental investigation	☐	☒
Other: describe below	☐	☒

Comments:
According to the St. Louis County website, there are six buildings on the site. The following information was available regarding the buildings:

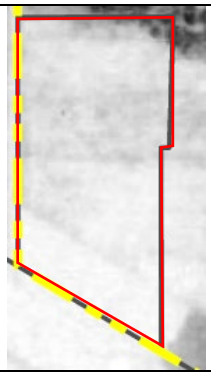
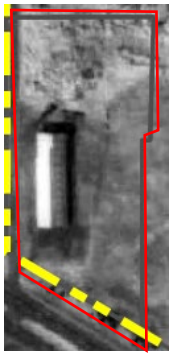
Building #	Building Type/Use	Gross Area (sq ft)	Year Built	Foundation
1	Warehouse	11,520	1965	Floating slab
2	Materials Storage	12,240	1998	Floating slab
3	Materials Storage	3,240	1992	Floating slab
4	Utility	576	1990	Floating slab
5	Office	2,028	1965	Foundation
6	Parking lot	49,600	Not provided	Asphalt

Historical Aerial Photograph Summary

Year	Use	Source
1940 – 1961	The site appears to be cultivated farmland and undeveloped	Aerial photographs
1972 – 1975	One commercial building is present in the southwest portion of the site.	Aerial photographs
1978 – 1997	Two additional buildings are present to the east of the building noted previously. Additional outdoor areas have been cleared and used for outdoor storage of materials.	Aerial photographs
2003 – 2019	An additional building is present on the northern portion of the site. The remainder of the site appears unchanged.	Aerial photographs

Site Summary Sheet
TH53 Business Park

Historical Information

	
1940 Aerial Photograph	1972 Aerial Photograph

Water Well Search

A search of the Minnesota Department of Health (MDH) Minnesota Well Index (MWI) identified the following well(s) registered to, or plotted at, the site:

Unique Well #	Well Name	Total Depth (ft)	Depth to Water (ft)	Aquifer	Listed Use	Date Well Completed	Status
555943	5391 Miller Trunk Hwy	335	28	Aquifer	Domestic	05/20/1996	Active

Database Search Listings

A search of the Minnesota Pollution Control Agency's What's In My Neighborhood website identified the site on the following database(s):

Name	Activity/Database	Regulatory ID	Remarks
Economy Garage, 5391 Miller Trunk Hwy	Hazardous waste	MND981959745	Inactive. Most recent report year 1994: 15 gallons of pesticides/herbicides, 240 pounds arsenic, 150-pound pentachlorophenol.

Registered Tanks

No registered tanks were identified for the site.

Available Geotechnical Information

No site-specific geotechnical information was available for this parcel.

Threatened and Endangered Species Review

Suitable habitat for the protected species identified in state or federal databases does not appear to be present.

Detailed Regulatory File Review

No Minnesota Pollution Control Agency (MPCA) or Minnesota Department of Agriculture (MDA) files were reviewed for this site.

Site Summary Sheet
TH53 Business Park

Parcel Number	395-0010-00850	**Address**	5309 Miller Trunk Highway

Parcel Location Map

St Louis County, County Land Explorer Photograph

Summary

Based in aerial photographs, this parcel was undeveloped until 2004, when two commercial buildings and paved parking areas were constructed. An additional building was added around 2016. The buildings have been used as self-storage since construction. This parcel is part of the Arrowhead Refinery Company. However, based on aerial photographs, the activities associated with the Arrowhead Refinery Company do not appear to have occurred on this parcel.

Parcel Information

Site Name:	Redstone Properties Parcel	**Site Address:**	5309 Miller Trunk Highway
Historical Site Name(s):	Access Storage	**Parcel ID Number:**	395-0010-00850
Current Site Use:	Self storage facility	**Partial Legal Description:**	Part of SE ¼ of SE ¼, Section 4, Township 50, Range 15
Property Type:	Commercial	**Owner Name:**	Redstone Properties Duluth LLC
Lot Size:	3.58 acres	**Zoning District**	C1A-Sexually Oriented Uses

Site Features

Noted during review of information:	**Yes**	**No**
Current structures	☒	☐
Evidence of demolished/removed structures	☐	☒
Tanks	☐	☒
Unidentified containers (drums, cylinders, etc.)	☐	☒
Wells	☐	☒
Septic system or cistern	☐	☒
Use/storage/disposal of petroleum products, hazardous materials, or other chemicals	☐	☒
Evidence of dumping, landfilling, or non-native fill	☐	☒

Site Summary Sheet
TH53 Business Park

Noted during review of information:	Yes	No
Evidence of spill or release of petroleum products, hazardous materials, or other chemicals	☐	☒
Unpaved roads/paths with no outlet	☐	☒
Outdoor storage	☒	☐
Surface water features	☐	☒
Stained soil or stressed vegetation	☐	☒
PCB-containing equipment	☐	☒
Odors	☐	☒
Poor housekeeping	☐	☒
Past structure use or property ownership	☐	☒
Threatened and Endangered Species potentially present	☐	☒
Site specific geotechnical information	☐	☒
Previous environmental investigation	☐	☒
Other: describe below	☐	☒

Comments:
According to the St. Louis County website, there are six buildings on the site. The following information was available regarding the buildings:

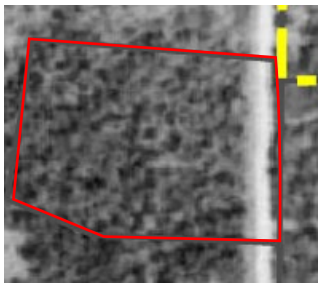
Building #	Building Type/Use	Gross Area (sq ft)	Year Built	Foundation
1	Warehouse	4,800	2016	Not provided
2	Mini-Warehouse	8,700	2004	Floating slab
3	Mini-Warehouse	6,090	2004	Floating slab
4	Parking lot	70,700	2004	Not provided
5	Multiple storage buildings	1,776	Not provided	Post on ground
6	Office	420	Not provided	Basement

Historical Aerial Photograph Summary

Year	Use	Source
1940 – 1997	The site is undeveloped and wooded.	Aerial photographs
2003	The site is undeveloped but is no longer wooded.	Aerial photograph
2008 – 2015	The site has been developed with two commercial buildings with paved areas.	Aerial photograph
2019	A third building has been added, along the southern edge of the site. Outdoor storage is visible around the buildings.	Aerial photograph

Site Summary Sheet
TH53 Business Park

Historical Information

	
1940 Aerial Photograph	2013 Aerial Photograph

Water Well Search

A search of the Minnesota Department of Health (MDH) Minnesota Well Index (MWI) did not identify any wells registered to, or plotted at, the site.

Database Search Listings

A search of the Minnesota Pollution Control Agency's What's In My Neighborhood website did not identify the site.

Registered Tanks

No registered tanks were identified for the site.

Available Geotechnical Information

No site specific geotechnical information was available for this parcel, however, based on data available on the adjacent parcel, we anticipate the subsurface conditions at this site consist of existing fill materials, over swamp deposits, over native glacial tills.

The existing fills and swamp soils should be considered unsuitable for support of buildings. Mitigation techniques include removal and replacement, soil improvement, or deep foundations.

In pavement areas, a minimum of 3 to 4 feet of select grading materials (sand) should be provided over swamp soils to support traffic loads. The existing fills and swamp soils are potentially compressible under fill loads. If grades are raised, or if swamp soils are removed and replaced with sand, consolidation of the swamps soils is likely. Mitigation measures to minimize the impact of settlements include complete removal and replacement of swamp soils, construction delays and surcharges.

Threatened and Endangered Species Review

Suitable habitat for the protected species identified in state or federal databases does not appear to be present.

Detailed Regulatory File Review

No Minnesota Pollution Control Agency (MPCA) or Minnesota Department of Agriculture (MDA) files were reviewed for this site. The parcel is part of the former Arrowhead Refinery Company, which was delisted from

Superfund on September 14, 2021. Based on aerial photograph review, and review of the MPCA files, this parcel does not appear to have been part of the activities on the Arrowhead Refinery Company.

Site Summary Sheet
TH53 Business Park

Parcel Number	395-0010-00853	**Address**	5315 Miller Trunk Highway

Parcel Location Map

St Louis County, County Land Explorer Photograph

Summary

Based on the information reviewed, this parcel was part of a larger property known as the Arrowhead Refinery Company property. The property was used for re-tinning milk cans prior to 1945. From 1945 – 1977, it was used as a re-refiner of used oil. Soil and groundwater contamination were identified from these prior uses. Soil contamination exceeding commercial/industrial criteria was removed. A groundwater extraction system was installed in 1993 and operated until 2007. The full extent of groundwater contamination was not determined.

Parcel Information

Site Name:	Bill & Irv South Parcel	**Site Address:**	5315 Miller Trunk Highway
Historical Site Name(s):	Arrowhead Refinery Co.	**Parcel ID Number:**	395-0010-00853
Current Site Use:	Commercial	**Partial Legal Description:**	Part of SE ¼ of SE ¼, Section 4, Township 50, Range 15
Property Type:	Commercial	**Owner Name:**	Bill & Irv's Properties Inc.
Lot Size:	1.88 acres	**Zoning District**	C-General Commercial

Site Features

Noted during review of information:	**Yes**	**No**
Current structures	☒	☐
Evidence of demolished/removed structures	☒	☐
Tanks	☐	☒
Unidentified containers (drums, cylinders, etc.)	☐	☒

Site Summary Sheet
TH53 Business Park

Noted during review of information:	Yes	No
Wells	☐	☒
Septic system or cistern	☐	☒
Use/storage/disposal of petroleum products, hazardous materials, or other chemicals	☒	☐
Evidence of dumping, landfilling, or non-native fill	☒	☐
Evidence of spill or release of petroleum products, hazardous materials, or other chemicals	☒	☐
Unpaved roads/paths with no outlet	☐	☒
Outdoor storage	☐	☒
Surface water features	☐	☒
Stained soil or stressed vegetation	☐	☒
PCB-containing equipment	☐	☒
Odors	☐	☒
Poor housekeeping	☐	☒
Past structure use or property ownership	☐	☒
Threatened and Endangered Species potentially present	☐	☒
Site specific geotechnical information	☐	☒
Previous environmental investigation	☒	☐
Other: describe below	☐	☒

Comments:
According to the St. Louis County website, there is one building on the site. The following information was available regarding the building:

Building #	Building Type/Use	Gross Area (sq ft)	Year Built	Foundation
1	Warehouse	10,000	1980	Floating slab

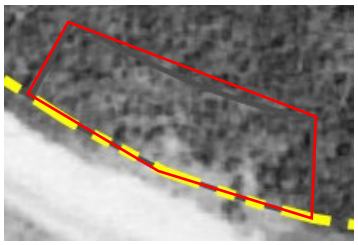
Historical Aerial Photograph Summary

Year	Use	Source
1940	One small building is present near the southeast portion of the site. The remainder of the site is wooded.	Aerial photograph
1948	A drainage ditch or disturbed area is present on the south side of the site. The remainder of the site appears unchanged.	Aerial photograph
1951	The site is more developed with cleared areas.	Aerial photograph
1953 – 1961	The building has been expanded or replaced with a larger commercial building. The site is mainly cleared. Outdoor storage or dumping is visible along the northern portion of the site and onto the adjacent parcel.	Aerial photographs
1972	An additional building is present. Outdoor storage or dumping is still visible.	Aerial photograph
1975 – 1978	The buildings on the site have expanded or been replaced with larger buildings. An additional building is present along the southern portion of the site.	Aerial photographs

Site Summary Sheet
TH53 Business Park

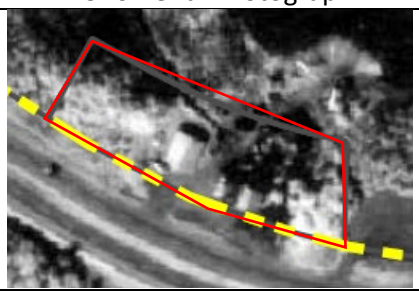
Year	Use	Source
1981 – 1991	An additional commercial building is present on the western portion of the site. Outdoor storage or dumping is still visible.	Aerial photographs
1997 – 2019	All but one of the buildings have been removed and outdoor activities are no longer visible.	Aerial photograph

Historical Information

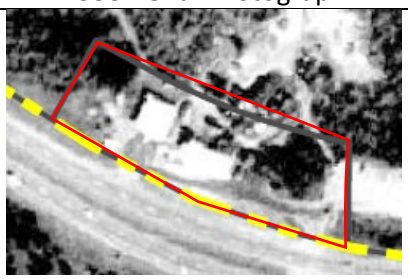


1940 Aerial Photograph

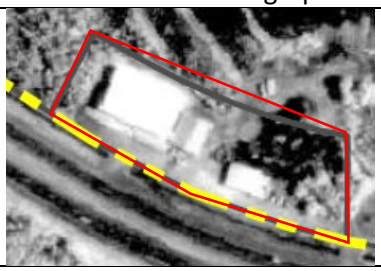
1953 Aerial Photograph



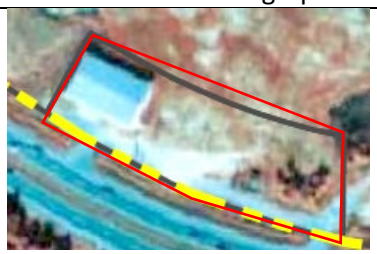
1972 Aerial Photograph



1975 Aerial Photograph



1981 Aerial Photograph



1997 Aerial Photograph

Water Well Search

A search of the Minnesota Department of Health (MDH) Minnesota Well Index (MWI) did not identify any wells registered to, or plotted at, the site.

Database Search Listings

A search of the Minnesota Pollution Control Agency's What's In My Neighborhood website identified the site on the following database(s):

Name	Activity/Database	Regulatory ID	Remarks
Collins Collision Repair, 5309 Miller Trunk Highway	Hazardous Waste	MN000061614	Inactive. Last report year 1994: parts washer solvent and paints/thinners.

Registered Tanks

No registered tanks were identified for the site.

Available Geotechnical Information

No site-specific geotechnical information was available for this parcel, however, based on data available on the adjacent parcel, we anticipate the subsurface conditions at this site consist of existing fil materials, over swamp deposits, over native glacial tills.

The existing fills and swamp soils should be considered unsuitable for support of buildings. Mitigation techniques include removal and replacement, soil improvement, or deep foundations.

In pavement areas, a minimum of 3 to 4 feet of select grading materials (sand) should be provided over swamp soils to support traffic loads. The existing fills and swamp soils are potentially compressible under fill loads. If grades are raised, or if swamp soils are removed and replaced with sand, consolidation of the swamps soils is likely. Mitigation measures to minimize the impact of settlements include complete removal and replacement of swamp soils, construction delays and surcharges.

Threatened and Endangered Species Review

Suitable habitat for the protected species identified in state or federal databases does not appear to be present.

Detailed Regulatory File Review

This parcel is part of the Arrowhead Refinery Company site. The Minnesota Pollution Control Agency (MPCA) files for the Arrowhead Refinery Company site were reviewed. The following is the summary provided the Environmental Covenant for the adjacent parcel (395-0010-00854), which was filed on February 19, 2021, and contains a summary of the work completed for the Arrowhead site:

The Property, which occupies approximately 26 acres, was used for re-tinning milk cans prior to 1945. From 1945 to 1977, the property operated as a re-refiner of used oil. From 1961 until 1977, the Arrowhead Refinery Company re-refined oil on the property using an acid-clay process. This process produced three waste streams: metal-contaminated acidic sludge, filter cake, and wastewater. Site operators disposed of the acidic sludge in a wetland that became a sludge lagoon. The company disposed of filter cake over the native peat in the wetland. Wastewater from the re-refining process was discharged to a wastewater ditch. These improper waste management practices resulted in soil and groundwater contamination including oil and grease, heavy metals, cyanide, phenols, polynuclear aromatic hydrocarbons (“PAHs”), and polychlorinated biphenyls (“PCBs”).

In 1976, the MPCA conducted its initial investigation of the Property and ordered Arrowhead Refinery to cease activities. In 1984, United States Environmental Protection Agency ("EPA") placed the Property on the National Priorities List ("NPL"). EPA's cleanup plan included removal and proper disposal of sludge, filter cake, and contaminated soil as well as the installation, operation and maintenance of a groundwater treatment system. Additionally in 1984, the EPA conducted a remedial investigation and feasibility study ("RI/FS"). In 1986, the EPA issued a Record of Decision ("ROD") that approved the excavation of impacted soils and sludge and the installation of a groundwater extraction system.

The EPA installed the groundwater extraction system in 1993. The system consisted of an interceptor trench and French drain system approximately 850 feet long and 25 feet deep. Groundwater was pumped from the trench at an average rate of approximately 45 to 50 gallons per minute ("gpm"). Recovered groundwater was pumped

directly into the Western Lake Superior Sanitary District ("WLSSD") sanitary sewer system. In 1996, the MPCA assumed long term operation and maintenance of the groundwater extraction system.

In an amended ROD ("AROD") dated February 9, 1994, the response actions for source material, soils, and sediments were amended. The AROD also clarified that operation and maintenance of the groundwater extraction system would continue until the extraction system discharge and the groundwater at the Property's southern boundary met the Safe Drinking Water Act Maximum Contaminant Levels ("MCLs").

On May 24, 1995, the responsible parties filed a judicial Consent Decree ("Decree") in federal district court. The excavation of source material began in June 1995 with approximately 4,600 tons of material removed for off-Site disposal. In June 1996, under the EPA's direction, 24,783 tons of soil and sediment were excavated, treated as necessary, and disposed of at a Subtitle D Landfill. The excavation was backfilled with 48,050 tons of soil and the excavation area was restored.

On August 16, 2002, Saint Louis County filed the Decree with the Saint Louis County Recorder's office. In general, the Decree requires that any deed, title, or interest in the Property contain a notice stating that the property is subject to the conditions of the Decree, that there is an access obligation, and that the property is subject to certain restrictions. These conditions were established because contamination above residential health risk levels is still present in soil on-site. Institutional controls ("ICs") are required to restrict certain development activities at the Property, and MPCA approval is required if there are any changes from the final remedy.

In the Second Five-Year Review Report, dated September 2002, the need to sample for the possible presence of 1,4-dioxane, a substance that is commonly used as a solvent stabilizer, was discussed. This additional requirement arose as a result of the Minnesota Department of Health ("MDH") establishing a new health-based value ("HBV") of 30 micrograms per liter ("µg/L") for 1,4-dioxane because of improved laboratory analytical methods that lowered the method detection limit. The Second Five Year Review Report also recommended confirmatory sampling for arsenic, hexavalent chromium, vanadium, zinc, and 4-methylphenol at the source area monitoring wells and at the extraction system discharge. To address total lead concentrations that periodically exceeded the EPA action level of 15 µg/L, sampling the extraction system discharge and select monitoring well locations for both dissolved lead and total lead was also recommended to evaluate whether lead was in the dissolved phase or associated with particulate matter present in the samples.

Between June 21 and June 28, 2005, West Central Environmental Consultants ("WCEC") advanced 23 direct push borings under the direct supervision of Bay West in an attempt to delineate the extent of the 1,4-dioxane, arsenic, and DRO in groundwater in the vicinity of the suspected historical source area on-site (i.e., monitoring well nests MPCA-4A/4B and MPCA-5A/5B). Soil and groundwater samples were collected from 22 of the 23 borings for 1,4-dioxane, arsenic and/or DRO analyses. The direct push investigation was successful at more accurately delineating the extent of 1,4-dioxane, arsenic, and DRO in soil and groundwater in the vicinity of the suspected historical source area on-site. The extent of dissolved arsenic and 1,4-dioxane in the groundwater was determined to be further west of well nest MPCA-4A/4B than previously assumed. While the lateral extent of 1,4-dioxane, arsenic, and DRO were not completely encompassed by soil borings advanced during the direct push investigation, data available from up-gradient, cross-gradient and down-gradient monitoring wells, and the interceptor trench, in combination with analytical results from the direct push investigation, generally delineated the lateral extent of these analytes. Based on these factors, additional investigation of soil and/or groundwater for 1,4-dioxane, arsenic, and DRO impacts was not warranted at that time.

In 2006, the MPCA performed an internal evaluation of surface water receptors and applicable groundwater criteria to protect area receptors. Surface water on-site drains to both a wetland on the southwest portion of the Property and to a drainage ditch located immediately north of United States ("U.S.") Highway 53. Both the wetland and the drainage ditch were classified as a Class 2B chronic surface waters in accordance with Minnesota Administrative Rules. Groundwater standards/criteria/guideline values were then determined, based on the most restrictive classification for the wetland and drainage ditch (Class 2B chronic surface water values). Compliance monitoring points were also established for monitoring groundwater concentrations up-gradient of the wetland and drainage ditch. The compliance monitoring points include monitoring wells MW-3A, MW-3B, MPCA-3S, MW-9A, MW-9B, MW-10A, MW-10B, MW-17B, MW-17E, and MW-P-17S and manholes MH-2, MH-3, and MH-4.

On March 22, 2007, the WLSSD turned off the groundwater extraction system, to allow for testing and repairs to be made on the forced sewer main in the area. At approximately the same time, the MPCA approved the Trial Groundwater Extraction System Shut Down Report (April 2007). As a result, the system was left off and the trial system shutdown monitoring was initiated. Groundwater monitoring was conducted during the trial shutdown to monitor for potential concentration rebound in the historic source area and the migration of groundwater containing elevated concentrations of chemicals of concern towards possible down-gradient receptors. Based on these objectives, a sampling plan for the trial shutdown was developed. A performance monitoring schedule was developed based on a six-month travel time estimate. A baseline groundwater monitoring event was conducted approximately three months after the system was shut down (June 2007). Thirteen additional groundwater monitoring events have been performed since June 2007: October 2007, December 2007, April 2008, June 2008, September 2008, May 2009, December 2009, April 2010, May 2011, September 2011, April 2012, January 2013, and April 2013.

Trigger criteria and contingency action items were developed in the event plume migration was observed during performance monitoring associated with the trial shutdown. Trigger criteria and action items were summarized as follows:

1. In the event increasing concentration trends are observed at monitoring wells MW-9A, MW-9B, MW-10A or MW-10B, groundwater monitoring at appropriate contingency monitoring wells will commence during the next groundwater monitoring event. Contingency wells include MW-P- 16S, MW-P-16B, MW-P-17S, MW-P-21S, MW-P-218, MW-P-22 and MPCA-P-23.

2. In the event a MCL or Health Based Value ("HBV") exceedance is observed at monitoring well MW-9A, MW-9B, MW-10A or MW-10B, groundwater monitoring at appropriate contingency monitoring wells will commence during the next groundwater monitoring event.

3. In the event increasing concentration trends are observed at any contingency monitoring well, MPCA staff shall be notified and an immediate assessment made regarding a possible restart of the groundwater extraction system.

4. In the event increasing concentration trends are observed at any residential well, MPCA staff shall be notified and an immediate assessment made regarding a possible restart of the groundwater extraction system.

5. In the event increasing concentration trends are observed at any monitoring well location which suggests groundwater containing a chemical of concern at a concentration greater than the Class 2B water quality

standards/criteria/guideline values may discharge to a surface water body, MPCA staff shall be notified and an immediate assessment made regarding a possible restart of the groundwater extraction system.

Two of the criteria were triggered during the June and September 2008 sampling events. First, an increasing 1,4-dioxane concentration trend was observed at MW-10A. Second, the concentration at MW-10A exceeded the 1,4-dioxane 1993/1994 HBV. As a result, the MPCA added contingency wells P- 21B, P-21S, P-22, P-16B and P-16S to the sampling list in 2009 to provide further analytical data down- gradient of MW-10A.

The direct push soil and groundwater investigation conducted at the Property in June 2005 did not fully define the extent and magnitude of 1,4-dioxane, dissolved arsenic, and DRO in groundwater to the west and southwest of the source area (MPCA-4A/4B). To complete the delineation of these compounds in groundwater and in accordance with a request from the MPCA, 14 push probe borings were advanced at the Property in May 2009. The collection and analysis of groundwater samples from push probe borings advanced at the Property in May 2009 defined the extent of 1,4-dioxane and dissolved arsenic, but not the extent of DRO, in shallow groundwater to the northwest of the 2005 push probe borings. Groundwater samples analyzed from the base of the sand unit (deeper samples), indicated that dissolved arsenic, 1,4-dioxane and DRO are not fully defined in groundwater at depth to the northwest; however, groundwater flow direction is consistently to the southwest, and therefore additional delineation of these constituents was not warranted due to the lack of risk to receptors in this area. Bay West submitted the Final 2009 Annual Monitoring Report and Additional Direct Push Groundwater Investigation Report in June 2010.

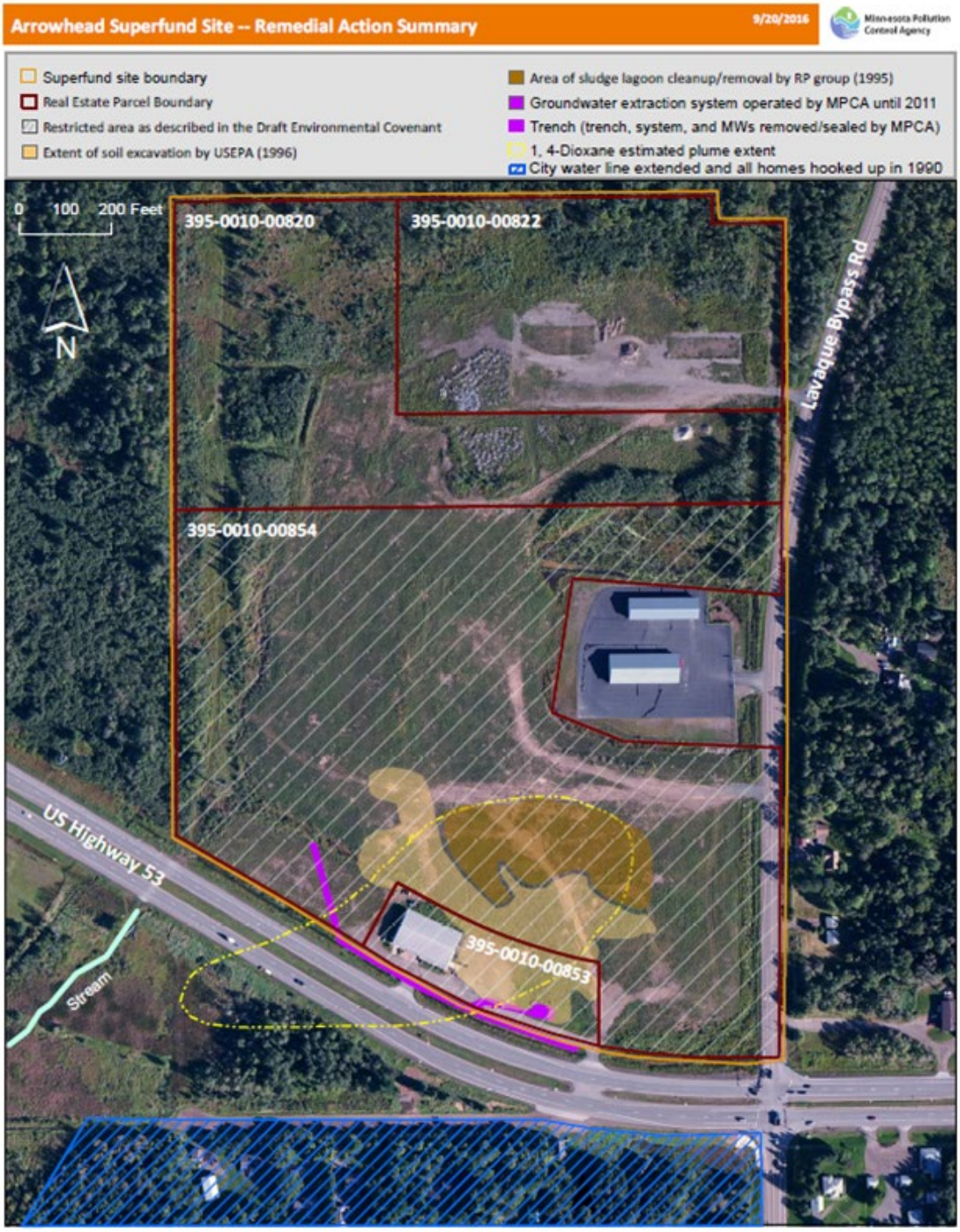
Bay West completed an institutional control evaluation, monitoring well abandonment of some of the wells, system decommissioning, and three groundwater monitoring events during 2010 and 2011. Three additional groundwater monitoring events were completed during 2012 and 2013. Final results of the groundwater sampling at these monitoring wells demonstrated that the residual lead, DRO, dissolved arsenic, and trichloroethene ("TCE") as well as the associated degradation products were at levels below cleanup standards in the subsurface soils and groundwater. 1,4-dioxane remains in groundwater at the Property at levels exceeding state drinking water standards. However, there are no drinking water receptors at risk from the low levels of 1,4-dioxane migrating off-site. Any remaining impacted groundwater discharges to the wetlands immediately down gradient of the Property area at levels well below MPCA aquatic life standards for surface waters. Because groundwater and surface water receptors are adequately protected, no additional corrective actions or groundwater monitoring are required. Therefore, the remaining groundwater monitoring wells were sealed in accordance with a MOH permit in June 2014. Consequently, based on this information, the MPCA directed Bay West to develop a long-term stewardship plan for the Property. The plan proposed that the Property be managed by two institutional control ("IC") measures:

1. an interview with the owner and a Property inspection in May and November of each year; and

2. drafting and mailing/emailing advisories to entities associated with the Property through ownership, proximity, or regulatory oversight.

In summary, response actions conducted by EPA, the MPCA and responsible parties have addressed Property contamination and the remedy is protective of commercial use. The Property's remedy required the removal of contaminated soils and former lagoon sludge, treatment of contaminated groundwater at the Property and institutional controls to restrict residential use and groundwater use at the Property. The Property was delisted from Superfund on September 14, 2021.

A copy of the map included in the Environmental Covenant, which indicates the area of previous remediation, is provided below.



Site Summary Sheet
TH53 Business Park

Parcel Number	395-0010-00854	**Address**	No address assigned

Parcel location map

St Louis County, County Land Explorer Photograph

Summary

Based on the information reviewed, this parcel was part of a larger property known as the Arrowhead Refinery Company property. The property was used for re-tinning milk cans prior to 1945. From 1945 – 1977, it was used as a re-refiner of used oil. Soil and groundwater contamination were identified from these prior uses. Soil contamination exceeding commercial/industrial criteria was removed. A groundwater extraction system was installed in 1993 and operated until 2007. The full extent of groundwater contamination was not determined. Institutional Controls have been placed on the property limiting the use and activities without prior approval of the Minnesota Pollution Control Agency (MPCA).

Parcel Information

Site Name:	Bill & Irv Main Parcel	**Site Address:**	No address assigned
Historical Site Name(s):	Arrowhead Refinery Company	**Parcel ID Number:**	395-0010-00854
Current Site Use:	Undeveloped	**Partial Legal Description:**	Part of SE ¼ of SE ¼, Section 4, Township 50, Range 15
Property Type:	Commercial/Undeveloped	**Owner Name:**	Bill & Irv's Properties, Inc.
Lot Size:	24.19 acres	**Zoning District**	C-General Commercial

Site Features

Noted during review of information:	**Yes**	**No**
Current structures	☐	☒
Evidence of demolished/removed structures	☒	☐

Site Summary Sheet
TH53 Business Park

Noted during review of information:	Yes	No
Tanks	☐	☒
Unidentified containers (drums, cylinders, etc.)	☐	☒
Wells	☒	☐
Septic system or cistern	☐	☒
Use/storage/disposal of petroleum products, hazardous materials, or other chemicals	☒	☐
Evidence of dumping, landfilling, or non-native fill	☒	☐
Evidence of spill or release of petroleum products, hazardous materials, or other chemicals	☒	☐
Unpaved roads/paths with no outlet	☐	☒
Outdoor storage	☐	☒
Surface water features	☐	☒
Stained soil or stressed vegetation	☐	☒
PCB-containing equipment	☐	☒
Odors	☐	☒
Poor housekeeping	☐	☒
Past structure use or property ownership	☐	☒
Threatened and Endangered Species potentially present	☒	☐
Site specific geotechnical information	☒	☐
Previous environmental investigation	☒	☐
Other: describe below	☐	☒

Comments:
According to the St. Louis County website, there are no buildings on the site.

Historical Aerial Photograph Summary

Year	Use	Source
1940 – 1951	The site is undeveloped and wooded.	Aerial photographs
1953	Some areas of outside storage or dumping are present. The remainder of the site appears undeveloped.	Aerial photograph
1961 – 1972	A lagoon or pond is present in the area where outside storage was previously noted. The remainder of the site appears undeveloped. By 1972, the pond area is larger and a small building is present.	Aerial photographs
1975 – 1981	The area of disturbance is larger and includes some areas in the center of the site.	Aerial photographs
1989 – 1991	The disturbed area appears more vegetated, and the building noted earlier appears smaller.	Aerial photographs
1997 – 2008	The southern and central portion of the site appear to have been graded and a road or ditch is present around some areas.	Aerial photographs
2013 – 2015	The road or ditch is no longer present and the site appears graded and vegetated.	Aerial photographs
2019	A parking lot is present along the southern boundary of the site. The remainder of the site appears unchanged.	Aerial photograph

Site Summary Sheet
TH53 Business Park

Historical Information

1940 Aerial Photograph

1972 Aerial Photograph

1975 Aerial Photograph

1981 Aerial Photograph

1997 Aerial Photograph

2013 Aerial Photograph

Site Summary Sheet
TH53 Business Park

Water Well Search

A search of the Minnesota Department of Health (MDH) Minnesota Well Index (MWI) identified the following well(s) registered to, or plotted at, the site:

Unique Well #	Well Name	Total Depth (ft)	Depth to Water (ft)	Aquifer	Listed Use	Date Well Completed	Status
1000021903	MW-6C	34.7	Not Provided (NP)	NP	NP	NP	Unknown
330813	MPCA	25	10	NP	Other	05/21/2009	Sealed
1000021900	MW-B4B	21.8	NP	NP	NP	NP	Unknown
1000021897	MW-2A	15	NP	NP	NP	NP	Unknown
1000021898	MW-3A1	15	NP	NP	NP	NP	Unknown
1000021899	MW-3B	24	NP	NP	NP	NP	Unknown
1000021910	MW-14C	31.5	NP	NP	NP	NP	Unknown
1000021909	MW-14B	24.4	NP	NP	NP	NP	Unknown
100021908	MW-14A	15	NP	NP	NP	NP	Unknown
597357	MPCA-97-2A	15	10	Quat. Water Table	Monitor	06/12/1007	Active
597360	PCA-97-5A	15	13.5	Quat Water Table	Monitor	06/12/1997	Active
1000021902	MW-B5	17	NP	NP	NP	NP	Unknown

Database Search Listings

A search of the Minnesota Pollution Control Agency's What's In My Neighborhood website identified the site on the following database(s):

Name	Activity/Database	Regulatory ID	Remarks
Arrowhead Refinery Co, 5301 – 5315 Miller Trunk Highway	Voluntary Investigation and Cleanup (VIC)	VP17160	Inactive
		VP17161	Inactive
	CERCLIS Site	MND980823975	Listed on CERCLIS/SEMS 01/01/1987
	Superfund	SR0000067	Active
Arrowhead Refinery Superfund, 5315 Miller Trunk Highway	Hazardous Waste	MNR000013185	Inactive. Last report year 1996: lead contaminated soil/wood chips/debris, lead contaminated tires
Lucia George Trucking Inc, 5301 Miller Trunk Highway	Hazardous Waste	MNR000011197	Inactive.

Registered Tanks

No registered tanks were identified for the site.

Available Geotechnical Information

A geotechnical evaluation was completed in 2002, for the proposed construction of a retail building. The results of the evaluation were summarized in a Report of Geotechnical/Environmental Exploration and Review prepared

by American Engineering Testing, dated December 6, 2002. Six standard penetration test borings were completed for the project. The borings generally encountered existing fill materials, over swamp deposits, over native glacial tills.

The existing fills and swamp soils should be considered unsuitable for support of buildings. Mitigation techniques include removal and replacement, soil improvement, or deep foundations.

In pavement areas, a minimum of 3 to 4 feet of select grading materials (sand) should be provided over swamp soils to support traffic loads. The existing fills and swamp soils are potentially compressible under fill loads. If grades are raised, or if swamp soils are removed and replaced with sand, consolidation of the swamps soils is likely. Mitigation measures to minimize the impact of settlements include complete removal and replacement of swamp soils, construction delays and surcharges.

Threatened and Endangered Species Review

Suitable habitat for the protected species identified in state or federal databases is unlikely to be present but may be present in undeveloped areas.

Detailed Regulatory File Review

The Minnesota Pollution Control Agency (MPCA) files for the Arrowhead Refinery Company site were reviewed. The following is the summary provided the Environmental Covenant for the site, which was filed on February 19, 2021:

The Property, which occupies approximately 26 acres, was used for re-tinning milk cans prior to 1945. From 1945 to 1977, the property operated as a re-refiner of used oil. From 1961 until 1977, the Arrowhead Refinery Company re-refined oil on the property using an acid-clay process. This process produced three waste streams: metal-contaminated acidic sludge, filter cake, and wastewater. Site operators disposed of the acidic sludge in a wetland that became a sludge lagoon. The company disposed of filter cake over the native peat in the wetland. Wastewater from the re-refining process was discharged to a wastewater ditch. These improper waste management practices resulted in soil and groundwater contamination including oil and grease, heavy metals, cyanide, phenols, polynuclear aromatic hydrocarbons (“PAHs”), and polychlorinated biphenyls (“PCBs”).

In 1976, the MPCA conducted its initial investigation of the Property and ordered Arrowhead Refinery to cease activities. In 1984, United States Environmental Protection Agency ("EPA") placed the Property on the National Priorities List ("NPL"). EPA's cleanup plan included removal and proper disposal of sludge, filter cake, and contaminated soil as well as the installation, operation and maintenance of a groundwater treatment system. Additionally in 1984, the EPA conducted a remedial investigation and feasibility study ("RI/FS"). In 1986, the EPA issued a Record of Decision ("ROD") that approved the excavation of impacted soils and sludge and the installation of a groundwater extraction system.

The EPA installed the groundwater extraction system in 1993. The system consisted of an interceptor trench and French drain system approximately 850 feet long and 25 feet deep. Groundwater was pumped from the trench at an average rate of approximately 45 to 50 gallons per minute ("gpm"). Recovered groundwater was pumped directly into the Western Lake Superior Sanitary District ("WLSSD") sanitary sewer system. In 1996, the MPCA assumed long term operation and maintenance of the groundwater extraction system.

In an amended ROD ("AROD") dated February 9, 1994, the response actions for source material, soils, and sediments were amended. The AROD also clarified that operation and maintenance of the groundwater extraction

system would continue until the extraction system discharge and the groundwater at the Property's southern boundary met the Safe Drinking Water Act Maximum Contaminant Levels ("MCLs").

On May 24, 1995, the responsible parties filed a judicial Consent Decree ("Decree") in federal district court. The excavation of source material began in June 1995 with approximately 4,600 tons of material removed for off-Site disposal. In June 1996, under the EPA's direction, 24,783 tons of soil and sediment were excavated, treated as necessary, and disposed of at a Subtitle D Landfill. The excavation was backfilled with 48,050 tons of soil and the excavation area was restored.

On August 16, 2002, Saint Louis County filed the Decree with the Saint Louis County Recorder's office. In general, the Decree requires that any deed, title, or interest in the Property contain a notice stating that the property is subject to the conditions of the Decree, that there is an access obligation, and that the property is subject to certain restrictions. These conditions were established because contamination above residential health risk levels is still present in soil on-site. Institutional controls ("ICs") are required to restrict certain development activities at the Property, and MPCA approval is required if there are any changes from the final remedy.

In the Second Five-Year Review Report, dated September 2002, the need to sample for the possible presence of 1,4-dioxane, a substance that is commonly used as a solvent stabilizer, was discussed. This additional requirement arose as a result of the Minnesota Department of Health ("MDH") establishing a new health-based value ("HBV") of 30 micrograms per liter ("µg/L") for 1,4-dioxane because of improved laboratory analytical methods that lowered the method detection limit. The Second Five Year Review Report also recommended confirmatory sampling for arsenic, hexavalent chromium, vanadium, zinc, and 4-methylphenol at the source area monitoring wells and at the extraction system discharge. To address total lead concentrations that periodically exceeded the EPA action level of 15 µg/L, sampling the extraction system discharge and select monitoring well locations for both dissolved lead and total lead was also recommended to evaluate whether lead was in the dissolved phase or associated with particulate matter present in the samples.

Between June 21 and June 28, 2005, West Central Environmental Consultants ("WCEC") advanced 23 direct push borings under the direct supervision of Bay West in an attempt to delineate the extent of the 1,4-dioxane, arsenic, and DRO in groundwater in the vicinity of the suspected historical source area on-site (i.e., monitoring well nests MPCA-4A/4B and MPCA-5A/5B). Soil and groundwater samples were collected from 22 of the 23 borings for 1,4-dioxane, arsenic and/or DRO analyses. The direct push investigation was successful at more accurately delineating the extent of 1,4-dioxane, arsenic, and DRO in soil and groundwater in the vicinity of the suspected historical source area on-site. The extent of dissolved arsenic and 1,4-dioxane in the groundwater was determined to be further west of well nest MPCA-4A/4B than previously assumed. While the lateral extent of 1,4-dioxane, arsenic, and DRO were not completely encompassed by soil borings advanced during the direct push investigation, data available from up-gradient, cross-gradient and down-gradient monitoring wells, and the interceptor trench, in combination with analytical results from the direct push investigation, generally delineated the lateral extent of these analytes. Based on these factors, additional investigation of soil and/or groundwater for 1,4-dioxane, arsenic, and DRO impacts was not warranted at that time.

In 2006, the MPCA performed an internal evaluation of surface water receptors and applicable groundwater criteria to protect area receptors. Surface water on-site drains to both a wetland on the southwest portion of the Property and to a drainage ditch located immediately north of United States ("U.S.") Highway 53. Both the wetland and the drainage ditch were classified as a Class 2B chronic surface waters in accordance with Minnesota Administrative Rules. Groundwater standards/criteria/guideline values were then determined, based on the most restrictive classification for the wetland and drainage ditch (Class 2B chronic surface water values). Compliance

monitoring points were also established for monitoring groundwater concentrations up-gradient of the wetland and drainage ditch. The compliance monitoring points include monitoring wells MW-3A, MW-3B, MPCA-3S, MW-9A, MW-9B, MW-10A, MW-10B, MW-17B, MW-17E, and MW-P-17S and manholes MH-2, MH-3, and MH-4.

On March 22, 2007, the WLSSD turned off the groundwater extraction system, to allow for testing and repairs to be made on the forced sewer main in the area. At approximately the same time, the MPCA approved the Trial Groundwater Extraction System Shut Down Report (April 2007). As a result, the system was left off and the trial system shutdown monitoring was initiated. Groundwater monitoring was conducted during the trial shutdown to monitor for potential concentration rebound in the historic source area and the migration of groundwater containing elevated concentrations of chemicals of concern towards possible down-gradient receptors. Based on these objectives, a sampling plan for the trial shutdown was developed. A performance monitoring schedule was developed based on a six-month travel time estimate. A baseline groundwater monitoring event was conducted approximately three months after the system was shut down (June 2007). Thirteen additional groundwater monitoring events have been performed since June 2007: October 2007, December 2007, April 2008, June 2008, September 2008, May 2009, December 2009, April 2010, May 2011, September 2011, April 2012, January 2013, and April 2013.

Trigger criteria and contingency action items were developed in the event plume migration was observed during performance monitoring associated with the trial shutdown. Trigger criteria and action items were summarized as follows:

1. In the event increasing concentration trends are observed at monitoring wells MW-9A, MW-9B, MW-10A or MW-10B, groundwater monitoring at appropriate contingency monitoring wells will commence during the next groundwater monitoring event. Contingency wells include MW-P- 16S, MW-P-16B, MW-P-17S, MW-P-21S, MW-P-218, MW-P-22 and MPCA-P-23.

2. In the event a MCL or Health Based Value ("HBV") exceedance is observed at monitoring well MW-9A, MW-9B, MW-10A or MW-10B, groundwater monitoring at appropriate contingency monitoring wells will commence during the next groundwater monitoring event.

3. In the event increasing concentration trends are observed at any contingency monitoring well, MPCA staff shall be notified, and an immediate assessment made regarding a possible restart of the groundwater extraction system.

4. In the event increasing concentration trends are observed at any residential well, MPCA staff shall be notified, and an immediate assessment made regarding a possible restart of the groundwater extraction system.

5. In the event increasing concentration trends are observed at any monitoring well location which suggests groundwater containing a chemical of concern at a concentration greater than the Class 2B water quality standards/criteria/guideline values may discharge to a surface water body, MPCA staff shall be notified and an immediate assessment made regarding a possible restart of the groundwater extraction system.

Two of the criteria were triggered during the June and September 2008 sampling events. First, an increasing 1,4-dioxane concentration trend was observed at MW-10A. Second, the concentration at MW-10A exceeded the 1,4-dioxane 1993/1994 HBV. As a result, the MPCA added contingency wells P- 21B, P-21S, P-22, P-16B and P-16S to the sampling list in 2009 to provide further analytical data down- gradient of MW-10A.

The direct push soil and groundwater investigation conducted at the Property in June 2005 did not fully define the extent and magnitude of 1,4-dioxane, dissolved arsenic, and DRO in groundwater to the west and southwest of the source area (MPCA-4A/4B). To complete the delineation of these compounds in groundwater and in accordance with a request from the MPCA, 14 push probe borings were advanced at the Property in May 2009. The collection and analysis of groundwater samples from push probe borings advanced at the Property in May 2009 defined the extent of 1,4-dioxane and dissolved arsenic, but not the extent of DRO, in shallow groundwater to the northwest of the 2005 push probe borings. Groundwater samples analyzed from the base of the sand unit (deeper samples), indicated that dissolved arsenic, 1,4-dioxane and DRO are not fully defined in groundwater at depth to the northwest; however, groundwater flow direction is consistently to the southwest, and therefore additional delineation of these constituents was not warranted due to the lack of risk to receptors in this area. Bay West submitted the Final 2009 Annual Monitoring Report and Additional Direct Push Groundwater Investigation Report in June 2010.

Bay West completed an institutional control evaluation, monitoring well abandonment of some of the wells, system decommissioning, and three groundwater monitoring events during 2010 and 2011. Three additional groundwater monitoring events were completed during 2012 and 2013. Final results of the groundwater sampling at these monitoring wells demonstrated that the residual lead, DRO, dissolved arsenic, and trichloroethene ("TCE") as well as the associated degradation products were at levels below cleanup standards in the subsurface soils and groundwater. 1,4-dioxane remains in groundwater at the Property at levels exceeding state drinking water standards. However, there are no drinking water receptors at risk from the low levels of 1,4-dioxane migrating off-site. Any remaining impacted groundwater discharges to the wetlands immediately down gradient of the Property area at levels well below MPCA aquatic life standards for surface waters. Because groundwater and surface water receptors are adequately protected, no additional corrective actions or groundwater monitoring are required. Therefore, the remaining groundwater monitoring wells were sealed in accordance with a MOH permit in June 2014. Consequently, based on this information, the MPCA directed Bay West to develop a long-term stewardship plan for the Property. The plan proposed that the Property be managed by two institutional control ("IC") measures:

1. an interview with the owner and a Property inspection in May and November of each year; and

2. drafting and mailing/emailing advisories to entities associated with the Property through ownership, proximity, or regulatory oversight.

In order to protect human health, welfare, and the environment, as well as to define and clarify the measures taken at the Property without undue burden to the Owners so that the Property can be put to its best use, the MPCA required the filing of this Environmental Covenant setting forth use limitations, activity limitations, and affirmative obligations of the Owner.

In summary, response actions conducted by EPA, the MPCA and responsible parties have addressed Property contamination and the remedy is protective of commercial use. The Property's remedy required the removal of contaminated soils and former lagoon sludge, treatment of contaminated groundwater at the Property and institutional controls to restrict residential use and groundwater use at the Property. The Site was delisted from Superfund on September 14, 2021.

According to the Environmental Covenant, the following use limitations have been placed on the property:

The Property shall be used solely for industrial or commercial purposes and shall not be used for residential, recreational, commercial/residential mixed, or other purposes that may provide exposure routes for sensitive subpopulations, including children, the elderly, the infirm, or others.

The Covenant also contains activity limitations, which include no disturbance or alteration of soils, water table, surface water drainage, ditches, or infiltration, without prior approval of the MPCA.

A copy of the map included in the Environmental Covenant is provided below.

APPENDIX B

ENVIRONMENTAL COVENANT

ENVIRONMENTAL COVENANT AND EASEMENT

This Environmental Covenant and Easement ("Environmental Covenant") is executed pursuant to the Uniform Environmental Covenants Act, Minn. Stat. ch. 114E (2018) ("UECA") in connection with an environmental response project approved by the Minnesota Pollution Control Agency ("MPCA").

1. Grantor and Property Description.

A. Owner and Legal Description of Property.

Bill & Irv's Properties, Inc., a Minnesota corporation ("Bill & Irv's"), is the fee owner of two parcels of real property, located at or about 5315 Miller Trunk Highway, Hermantown, Saint Louis County, Minnesota 55811 (the "Property"), shown on **Exhibit 1** and legally described as follows:

> All that part of the SE ¼ of SE ¼, Section 4, Township 50 North, Range 15 West, which lies Northerly of U.S. Highway #53, EXCEPT that part described as follows:
>
> Commencing at the southeast corner of said Section 4; thence North 00 degrees 40 minutes 26 seconds East, along the east line of said SE ¼ SE ¼ a distance of 797.90 feet to the point of beginning; thence North 87 degrees 14 minutes 19 seconds West a distance of 338.83 feet; thence North 67 degrees 27 minutes 49 seconds West a distance of 165.41 feet; thence North 09 degrees 05 minutes 43 seconds East a distance of 291.59 feet; thence South 85 degrees 07 minutes 56 seconds East a distance of 450.62 feet to the east line of said SE ¼ SE ¼; thence South 00 degrees 40 minutes 26 seconds West, along said east line a distance of 329.43 feet to the point of beginning. Subject to the existing C.S.A.H. No. 48 along the east line.

The Property consists of two parcels with Saint Louis County property identification numbers of 395-0010-00854 and 395-0010-00853.

B. Grantor.

Bill & Irv's is the Grantor of this Environmental Covenant.

2. Grant of Covenant; Covenant Runs With The Land.

Grantor does hereby Covenant and Declare that the Property shall be subject to the Activity and Use Restrictions and associated terms and conditions set forth in this Environmental Covenant including the Easement in Paragraph 9, and that these Activity and Use Restrictions and associated terms and conditions constitute covenants which run with the Property and which shall be binding on Grantor, its heirs, successors and assigns, and on all present and future Owners of the Property and all persons who now or hereafter hold any right, title or interest in the Property. An Owner is bound by this Environmental Covenant during the time when the Owner holds fee title to the Property. Any other person that holds any right, title or interest in or to the Property is bound by this Environmental Covenant during the time the person holds the right, title or interest. An Owner ceases to be bound by this Environmental Covenant when the Owner conveys fee title to another person, and any other person that holds any right, title or interest in or to the Property ceases to be bound when the person conveys the right, title or interest to another person.

3. Environmental Agency; Grantee and Holder of Environmental Covenant; Acceptance of Interest in Real Property.

A. Environmental Agency.

The MPCA is the environmental agency with authority to approve this Environmental Covenant under UECA.

B. Grantee and Holder; Acceptance of Interest in Property.

The MPCA is the Grantee and Holder of the interest in real property conveyed by this Environmental Covenant. MPCA has authority to acquire an interest in real property, including an Environmental Covenant, for response action purposes under Minn. Stat. § 115B.17, subd. 15. MPCA's signature on this Environmental Covenant constitutes approval of this Environmental Covenant under UECA and acceptance of the interest in real property granted herein for purposes of Minn. Stat. § 115B.17, subd. 15.

4. Environmental Response Project.

The Property was the location of releases or threatened releases of hazardous substances, or pollutants or contaminants that were addressed by an environmental response project under the MPCA Superfund Program pursuant to Minn. Stat. §§ 115B.01-115B.20. MPCA has determined that an Environmental Covenant is needed for the Property because there are residual soil and groundwater impacts remaining at the Property. The residual soil and groundwater contaminants include lead, diesel range organics ("DRO"), 1,4-dioxane, and arsenic.

5. Statement of Facts.

A. Facts about the Release and Response Actions.

The Property, which occupies approximately 26 acres, was used for re-tinning milk cans prior to 1945. From 1945 to 1977, the property operated as a re-refiner of used oil. From 1961 until 1977, the Arrowhead Refinery Company re-refined oil on the property using an acid-clay process. This process

produced three waste streams: metal-contaminated acidic sludge, filter cake, and wastewater. Site operators disposed of the acidic sludge in a wetland that became a sludge lagoon. The company disposed of filter cake over the native peat in the wetland. Wastewater from the re-refining process was discharged to a wastewater ditch. These improper waste management practices resulted in soil and groundwater contamination including oil and grease, heavy metals, cyanide, phenols, polynuclear aromatic hydrocarbons ("PAHs"), and polychlorinated biphenyls ("PCBs").

In 1976, the MPCA conducted its initial investigation of the Property and ordered Arrowhead Refinery to cease activities. In 1984, United States Environmental Protection Agency ("EPA") placed the Property on the National Priorities List ("NPL"). EPA's cleanup plan included removal and proper disposal of sludge, filter cake, and contaminated soil as well as the installation, operation and maintenance of a groundwater treatment system. Additionally in 1984, the EPA conducted a remedial investigation and feasibility study ("RI/FS"). In 1986, the EPA issued a Record of Decision ("ROD") that approved the excavation of impacted soils and sludge and the installation of a groundwater extraction system.

The EPA installed the groundwater extraction system in 1993. The system consisted of an interceptor trench and French drain system approximately 850 feet long and 25 feet deep. Groundwater was pumped from the trench at an average rate of approximately 45 to 50 gallons per minute ("gpm"). Recovered groundwater was pumped directly into the Western Lake Superior Sanitary District ("WLSSD") sanitary sewer system. In 1996, the MPCA assumed long term operation and maintenance of the groundwater extraction system.

In an amended ROD ("AROD") dated February 9, 1994, the response actions for source material, soils, and sediments were amended. The AROD also clarified that operation and maintenance of the groundwater extraction system would continue until the extraction system discharge and the groundwater at the Property's southern boundary met the Safe Drinking Water Act Maximum Contaminant Levels ("MCLs").

On May 24, 1995, the responsible parties filed a judicial Consent Decree ("Decree") in federal district court. The excavation of source material began in June 1995 with approximately 4,600 tons of material removed for off-Site disposal. In June 1996, under the EPA's direction, 24,783 tons of soil and sediment were excavated, treated as necessary, and disposed of at a Subtitle D Landfill. The excavation was backfilled with 48,050 tons of soil and the excavation area was restored.

On August 16, 2002, Saint Louis County filed the Decree with the Saint Louis County Recorder's office. In general, the Decree requires that any deed, title, or interest in the Property contain a notice stating that the property is subject to the conditions of the Decree, that there is an access obligation, and that the property is subject to certain restrictions. These conditions were established because contamination above residential health risk levels is still present in soil on-site. Institutional controls ("ICs") are required to restrict certain development activities at the Property, and MPCA approval is required if there are any changes from the final remedy.

In the Second Five-Year Review Report, dated September 2002, the need to sample for the possible presence of 1,4-dioxane, a substance that is commonly used as a solvent stabilizer, was discussed. This additional requirement arose as a result of the Minnesota Department of Health ("MDH") establishing a new health-based value ("HBV") of 30 micrograms per liter ("µg/L") for 1,4-dioxane because of improved laboratory analytical methods that lowered the method detection limit. The Second Five Year

Review Report also recommended confirmatory sampling for arsenic, hexavalent chromium, vanadium, zinc, and 4-methylphenol at the source area monitoring wells and at the extraction system discharge. To address total lead concentrations that periodically exceeded the EPA action level of 15 µg/L, sampling the extraction system discharge and select monitoring well locations for both dissolved lead and total lead was also recommended to evaluate whether lead was in the dissolved phase or associated with particulate matter present in the samples.

Between June 21 and June 28, 2005, West Central Environmental Consultants ("WCEC") advanced 23 direct push borings under the direct supervision of Bay West in an attempt to delineate the extent of the 1,4-dioxane, arsenic, and DRO in groundwater in the vicinity of the suspected historical source area on-site (i.e., monitoring well nests MPCA-4A/4B and MPCA-5A/5B). Soil and groundwater samples were collected from 22 of the 23 borings for 1,4-dioxane, arsenic and/or DRO analyses. The direct push investigation was successful at more accurately delineating the extent of 1,4-dioxane, arsenic, and DRO in soil and groundwater in the vicinity of the suspected historical source area on-site. The extent of dissolved arsenic and 1,4-dioxane in the groundwater was determined to be further west of well nest MPCA-4A/4B than previously assumed. While the lateral extent of 1,4-dioxane, arsenic, and DRO were not completely encompassed by soil borings advanced during the direct push investigation, data available from up-gradient, cross-gradient and down-gradient monitoring wells, and the interceptor trench, in combination with analytical results from the direct push investigation, generally delineated the lateral extent of these analytes. Based on these factors, additional investigation of soil and/or groundwater for 1,4-dioxane, arsenic, and DRO impacts was not warranted at that time.

In 2006, the MPCA performed an internal evaluation of surface water receptors and applicable groundwater criteria to protect area receptors. Surface water on-site drains to both a wetland on the southwest portion of the Property and to a drainage ditch located immediately north of United States ("U.S.") Highway 53. Both the wetland and the drainage ditch were classified as a Class 2B chronic surface waters in accordance with Minnesota Administrative Rules. Groundwater standards/criteria/guideline values were then determined, based on the most restrictive classification for the wetland and drainage ditch (Class 2B chronic surface water values). Compliance monitoring points were also established for monitoring groundwater concentrations up-gradient of the wetland and drainage ditch. The compliance monitoring points include monitoring wells MW-3A, MW-3B, MPCA-3S, MW-9A, MW-9B, MW-10A, MW-10B, MW-17B, MW-17E, and MW-P-17S and manholes MH-2, MH-3, and MH-4.

On March 22, 2007, the WLSSD turned off the groundwater extraction system, to allow for testing and repairs to be made on the forced sewer main in the area. At approximately the same time, the MPCA approved the Trial Groundwater Extraction System Shut Down Report (April 2007). As a result, the system was left off and the trial system shutdown monitoring was initiated. Groundwater monitoring was conducted during the trial shutdown to monitor for potential concentration rebound in the historic source area and the migration of groundwater containing elevated concentrations of chemicals of concern towards possible down-gradient receptors. Based on these objectives, a sampling plan for the trial shutdown was developed. A performance monitoring schedule was developed based on a six month travel time estimate. A baseline groundwater monitoring event was conducted approximately three months after the system was shut down (June 2007). Thirteen additional groundwater monitoring events have been performed since June 2007: October 2007, December 2007, April 2008, June 2008, September 2008, May 2009, December 2009, April 2010, May 2011, September 2011, April 2012, January 2013, and April 2013.

Trigger criteria and contingency action items were developed in the event plume migration was observed during performance monitoring associated with the trial shutdown. Trigger criteria and action items were summarized as follows:

1. In the event increasing concentration trends are observed at monitoring wells MW-9A, MW-9B, MW-10A or MW-10B, groundwater monitoring at appropriate contingency monitoring wells will commence during the next groundwater monitoring event. Contingency wells include MW-P-16S, MW-P-16B, MW-P-17S, MW-P-21S, MW-P-21B, MW-P-22 and MPCA-P-23.

2. In the event a MCL or Health Based Value ("HBV") exceedance is observed at monitoring well MW-9A, MW-9B, MW-10A or MW-10B, groundwater monitoring at appropriate contingency monitoring wells will commence during the next groundwater monitoring event.

3. In the event increasing concentration trends are observed at any contingency monitoring well, MPCA staff shall be notified and an immediate assessment made regarding a possible restart of the groundwater extraction system.

4. In the event increasing concentration trends are observed at any residential well, MPCA staff shall be notified and an immediate assessment made regarding a possible restart of the groundwater extraction system.

5. In the event increasing concentration trends are observed at any monitoring well location which suggests groundwater containing a chemical of concern at a concentration greater than the Class 2B water quality standards/criteria/guideline values may discharge to a surface water body, MPCA staff shall be notified and an immediate assessment made regarding a possible restart of the groundwater extraction system.

Two of the criteria were triggered during the June and September 2008 sampling events. First, an increasing 1,4-dioxane concentration trend was observed at MW-10A. Second, the concentration at MW-10A exceeded the 1,4-dioxane 1993/1994 HBV. As a result, the MPCA added contingency wells P-21B, P-21S, P-22, P-16B and P-16S to the sampling list in 2009 to provide further analytical data down-gradient of MW-10A.

The direct push soil and groundwater investigation conducted at the Property in June 2005 did not fully define the extent and magnitude of 1,4-dioxane, dissolved arsenic, and DRO in groundwater to the west and southwest of the source area (MPCA-4A/4B). To complete the delineation of these compounds in groundwater and in accordance with a request from the MPCA, 14 push probe borings were advanced at the Property in May 2009. The collection and analysis of groundwater samples from push probe borings advanced at the Property in May 2009 defined the extent of 1,4-dioxane and dissolved arsenic, but not the extent of DRO, in shallow groundwater to the northwest of the 2005 push probe borings. Groundwater samples analyzed from the base of the sand unit (deeper samples), indicated that dissolved arsenic, 1,4-dioxane and DRO are not fully defined in groundwater at depth to the northwest; however, groundwater flow direction is consistently to the southwest, and therefore additional delineation of these constituents was not warranted due to the lack of risk to receptors in this area. Bay West submitted the Final 2009 Annual Monitoring Report and Additional Direct Push Groundwater Investigation Report in June 2010.

Bay West completed an institutional control evaluation, monitoring well abandonment of some of the wells, system decommissioning, and three groundwater monitoring events during 2010 and 2011. Three additional groundwater monitoring events were completed during 2012 and 2013. Final results of the groundwater sampling at these monitoring wells demonstrated that the residual lead, DRO, dissolved arsenic, and trichloroethene ("TCE") as well as the associated degradation products were at levels below cleanup standards in the subsurface soils and groundwater. 1,4-dioxane remains in groundwater at the Property at levels exceeding state drinking water standards. However, there are no drinking water receptors at risk from the low levels of 1,4-dioxane migrating off-site. Any remaining impacted groundwater discharges to the wetlands immediately down gradient of the Property area at levels well below MPCA aquatic life standards for surface waters. Because groundwater and surface water receptors are adequately protected, no additional corrective actions or groundwater monitoring are required. Therefore, the remaining groundwater monitoring wells were sealed in accordance with a MDH permit in June 2014. Consequently, based on this information, the MPCA directed Bay West to develop a long-term stewardship plan for the Property. The plan proposed that the Property be managed by two institutional control ("IC") measures:

1. an interview with the owner and a Property inspection in May and November of each year; and
2. drafting and mailing/emailing advisories to entities associated with the Property through ownership, proximity, or regulatory oversight.

In order to protect human health, welfare, and the environment, as well as to define and clarify the measures taken at the Property without undue burden to the Owners so that the Property can be put to its best use, the MPCA required the filing of this Environmental Covenant setting forth use limitations, activity limitations, and affirmative obligations of the Owner.

In summary, response actions conducted by EPA, the MPCA and responsible parties have addressed Property contamination and the remedy is protective of commercial use. The Property's remedy required the removal of contaminated soils and former lagoon sludge, treatment of contaminated groundwater at the Property and institutional controls to restrict residential use and groundwater use at the Property.

B. Facts Constitute Affidavit under Minn. Stat. § 115B.16, subd. 2.

The facts stated in Paragraph 5.A. are stated under oath by the person signing this Environmental Covenant on behalf of the Grantor, and are intended to satisfy the requirement of an affidavit under Minn. Stat. § 115B.16, subd. 2. In the event of a material change in any facts stated in Paragraph 5.A. requiring the recording of an additional affidavit under Minn. Stat. § 115B.16, subd. 2, the additional affidavit may be made and recorded without amending this Environmental Covenant.

6. Definitions.

The terms used in this Environmental Covenant shall have the meanings given in UECA, and in the Minnesota Environmental Response and Liability Act (MERLA), Minn. Stat. § 115B.02. In addition, the definitions in this Paragraph 6 apply to the terms used in this Environmental Covenant.

A. "Commissioner" means the Commissioner of the Minnesota Pollution Control Agency, the Commissioner's successor, or other person delegated by the Commissioner to act on behalf of the Commissioner.

B. "MPCA" means the Minnesota Pollution Control Agency, an agency of the State of Minnesota, or its successor or assign under any governmental reorganization.

C. "Owner" means a person that holds fee title to the Property and is bound by this Environmental Covenant as provided in Paragraph 2. When the Property is subject to a contract for deed, both the contract for deed vendor and vendee are collectively considered the Owner.

D. "Political Subdivision" means the county, and the statutory or home rule charter city or township, in which the Property is located.

E. "Property" means the real property described in Paragraph 1 of this Environmental Covenant.

7. Activity and Use Limitations.

The following Activity and Use Limitations shall apply to the Property:

A. Use Limitations.

The Property shall be used solely for industrial or commercial purposes and shall not be used for residential, recreational, commercial/residential mixed, or other purposes that may provide exposure routes for sensitive subpopulations, including children, the elderly, the infirm, or others.

B. Activity Limitations.

The following activities within the Property are prohibited except as provided in Paragraph 8:

i. There shall be no disturbance or alteration of soils on the Property of any nature whatsoever, specifically including, but not limited to, grading, excavation, boring, drilling or construction, except in accordance with an MPCA-approved plan as allowed by Section 8.A.

ii. No change shall be made to the water table, surface water drainage, ditches, or infiltration to the water table in such a manner that may mobilize the Property contamination.

iii. Except as required as part of an MPCA-approved environmental response project, there shall be no extraction of groundwater from beneath the Property for any purpose and no installation of any wells, borings, trenches or drains which could be used to extract such groundwater.

iv. No activity shall be permitted that adversely affects the protectiveness of the response actions at the Property.

C. Affirmative Obligations of Owner.

The Activity and Use Limitations imposed under this Environmental Covenant include the following affirmative covenants and obligations:

i. Owner shall comply with the terms and conditions of the Consent Decree entitled UNITED STATES OF AMERICA v. ARROWHEAD REFINING COMPANY and ARROWHEAD REFINING COMPANY v. RODNEY A. ANDERSON, dated February 13, 1995, and filed at the Saint Louis County Recorder's Office on February 20, 1995 as Document No. 257313, and will fulfill all terms and conditions of the Decree, including the provision of access for MPCA to operate, maintain, improve, and remove remedial actions.

ii. Owner shall cooperate with MPCA staff and EPA staff to conduct periodic future reviews, including EPA Five-Year Reviews.

8. Prior MPCA Approval Required For Activities Limited Under Environmental Covenant.

A. Approval Procedure.

Any activity subject to limitation under Paragraph 7.B. shall not occur without the prior written approval of the Commissioner. The Commissioner's approval may include conditions which the Commissioner deems reasonable and necessary to protect public health or welfare or the environment, including submission to and approval of a contingency plan for the activity. Within 60 days after receipt of a written request for approval to engage in any activities subject to a limitation under Paragraph 7.B., the MPCA shall respond, in writing, by approving such request, disapproving such request, or requiring that additional information be provided. A lack of response from the Commissioner shall not constitute approval by default or authorization to proceed with the proposed activity.

B. Emergency Procedures.

Owner shall follow the procedures set forth in this Paragraph 8.B. when an emergency requires immediate excavation affecting contaminated soil or other media in the Restricted Area to repair utility lines or other infrastructure on the Property, or to respond to other types of emergencies (e.g., fires, floods):

i. Notify the Minnesota Duty Officer, or successor officer, immediately of obtaining knowledge of such emergency conditions; the current phone numbers for the Duty Officer are 1-800-422-0798 (Greater Minnesota only); 651-649-5451 (Twin Cities Metro Area and outside Minnesota); fax (any location) 651-296-2300 and TDD 651-297-5353 or 800-627-3529;

ii. Assure that the persons carrying out the excavation limit the disturbance of contaminated media to the minimum reasonably necessary to adequately respond to the emergency;

iii. Assure that the persons carrying out the excavation prepare and implement a site-specific health and safety plan for excavation and undertake precautions to minimize

exposure to workers, occupants and neighbors of the Property to contaminated media (e.g., provide appropriate types of protective clothing for workers conducting the excavation, and establish procedures for minimizing the dispersal of contaminated dust); and

iv. Assure preparation and implementation of a plan to restore the Property to a level that protects public health and welfare and the environment. The plan must be submitted to and approved by the MPCA prior to implementation of the plan, and a follow-up report must be submitted to MPCA after implementation so that the MPCA can determine whether protection of the public health and welfare and the environment has been restored.

9. Easement; Right of Access to the Property.

Owner grants to the MPCA, Saint Louis County and the City of Hermantown an easement to enter the Property from time to time, to conduct Five-Year Reviews as mandated by EPA, inspect the Property, and to evaluate compliance with the Activity and Use Limitations set forth in Paragraph 7. In addition, for the purpose of evaluating compliance, Owner grants to the MPCA the right to take samples of environmental media such as soil, groundwater, surface water, and air, and to install, maintain and close borings, probes, wells or other structures necessary to carry out the sampling.

Owner further grants to the MPCA an easement to enter the Property to operate, maintain and monitor response actions on the Property connected to the MPCA-approved response action project, to take further response actions deemed reasonable and necessary by the MPCA to protect public health and welfare and the environment from the Identified Release of hazardous substances, pollutants, contaminants, and petroleum, and to dismantle and close such response actions including closure of monitoring wells in accordance with State law and rules.

The MPCA, Saint Louis County, and the City of Hermantown, and their employees, agents, contractors and subcontractors, may exercise the rights granted under this Paragraph 9 at reasonable times and with reasonable notice to the then-current owner, conditioned only upon showing identification or credentials by the persons seeking to exercise those rights.

10. Duration; Amendment or Termination of Environmental Covenant.

A. Duration of Environmental Covenant.

This environmental covenant is perpetual as provided in Minn. Stat. § 114E.40 (a).

B. Amendment or Termination by Consent.

i. This Environmental Covenant may be amended or terminated in writing by the Owner and the MPCA. An amendment is binding on the Owner but does not affect any other interest in the Property unless the person holding that interest has consented to the amendment or agreed to waive its right to consent.

ii. The Grantor of this Environmental Covenant agrees that, upon conveying fee title to the Property to any other person, the Grantor waives the right to consent to amendment or termination of this Environmental Covenant.

C. Termination, Reduction of Burden, or Modification by MPCA.

The MPCA may terminate, reduce the burden of, or modify this Environmental Covenant as provided in Minn. Stat. § 114E.40.

11. Disclosure in Property Conveyance Instruments.

Notice of this Environmental Covenant, and the Activity and Use Limitations and Compliance Reporting Requirements set forth in Paragraphs 7, 8, or 18 of this Environmental Covenant, shall be incorporated in full or by reference into all instruments conveying an interest in and/or a right to use the Property (e.g., easements, mortgages, leases). The notice shall be substantially in the following form:

> THE INTEREST CONVEYED HEREBY IS SUBJECT TO AN ENVIRONMENTAL COVENANT UNDER MINN. STAT. CH. 114E, DATED _____, RECORDED IN THE OFFICIAL PROPERTY RECORDS OF SAINT LOUIS COUNTY, MINNESOTA AS DOCUMENT NO. _____.

12. Recording and Notice of Environmental Covenant, Amendments and Termination.

A. The Original Environmental Covenant.

Within 30 days after the MPCA signs and delivers to Grantor this Environmental Covenant, the Grantor shall record this Environmental Covenant in the office of the County Recorder or Registrar of Titles of Saint Louis County.

B. Termination, Amendment or Modification.

Within 30 days after MPCA signs and delivers to Owner any termination, amendment or modification of this Environmental Covenant, the Owner shall record the amendment, modification, or notice of termination of this Environmental Covenant in the office of the County Recorder or Registrar of Titles of Saint Louis County.

C. Providing Notice of Covenant, Termination, Amendment or Modification.

Within 30 days after recording this Environmental Covenant, the Grantor shall transmit a copy of the Environmental Covenant in recorded form to:

i. the MPCA;

ii. each person holding a recorded interest in the Property;

iii. each person in possession of the Property;

iv. the environmental officer of each political subdivision in which the Property is located; and

v. any other person the environmental agency requires.

Within 30 days after recording a termination, amendment or modification of this Environmental Covenant, the Owner shall transmit a copy of the document in recorded form to the persons listed in items i to v above.

13. Notices to Grantor and Environmental Agency.

A. Manner of Giving Notice.

Any notice required or permitted to be given under this Environmental Covenant is given in accordance with this Environmental Covenant if it is placed in United States first class mail postage prepaid; or deposited cost paid for delivery by a nationally recognized overnight delivery service; or transmitted by facsimile if followed by mailed notice or overnight delivery as above required.

B. Notices to the Grantor.

Notices to the Grantor shall be directed to:

Bill & Irv's Properties, Inc.
Attention: Bill Wilson
P.O. Box 3027
Duluth, Minnesota 55803-3027
Phone: (218) 348-1800
Email: bill@5west.org

C. Notices to MPCA.

All notices, including reports or other documents, required to be submitted to the MPCA shall reference the MPCA Superfund Program project number SR67, and be submitted to:

Minnesota Pollution Control Agency
Attention: Remediation Division Institutional Controls Coordinator
Project Number SR0000067
520 Lafayette Road North, 5th Floor
Saint Paul, Minnesota 55155-4194
Phone: 651-757-2697
Email: instcontrols.pca@state.mn.us

14. Enforcement and Compliance.

A. Civil Action for Injunction or Equitable Relief.

This Environmental Covenant may be enforced through a civil action for injunctive or other equitable relief for any violation of any term or condition of this Environmental Covenant, including violation of the Activity and Use Limitations under Paragraph 7 and denial of Right of Access under Paragraph 9. Such an action may be brought by:

i. the MPCA;

ii. a political subdivision in which the Property is located;

iii. a person whose interest in the Property or whose collateral or liability may be affected by the alleged violation;

iv. a party to the covenant, including all holders; or

v. any person to whom the covenant expressly grants power to enforce.

B. Additional Rights of Enforcement by MPCA.

In addition to its authority under subparagraph A of this Paragraph 14, the MPCA may enforce this Environmental Covenant using any remedy or enforcement measure authorized under UECA or other applicable law, including remedies pursuant to Minn. Stat. §§ 115.071, subds. 3 to 5, or 116.072.

C. No Waiver of Enforcement.

Failure or delay in the enforcement of this Environmental Covenant shall not be considered a waiver of the right to enforce, nor shall it bar any subsequent action to enforce, this Environmental Covenant.

D. Former Owners And Interest Holders Subject to Enforcement.

Subject to any applicable statute of limitations, an Owner, or other person holding any right, title or interest in or to the Property that violates this Environmental Covenant during the time when the Owner or other person is bound by this Environmental Covenant remains subject to enforcement with respect to that violation regardless of whether the Owner or other person has subsequently conveyed the fee title, or other right, title or interest, to another person.

E. Other Authorities of MPCA Not Affected.

Nothing in this Environmental Covenant affects MPCA's authority to take or require performance of response actions to address releases or threatened releases of hazardous substances or pollutants or contaminants at or from the Property, or to enforce a consent order, consent decree or other settlement agreement entered into by MPCA, or to rescind or modify a liability assurance issued by MPCA, that addresses such response actions.

15. Administrative Record.

Subject to the document retention policy of the MPCA, reports, correspondence and other documents which support and explain the environmental response project for the Property are maintained by the MPCA Superfund Program at the MPCA's office at 520 Lafayette Road North, Saint Paul, Minnesota in the files maintained for Arrowhead Refinery Co. site, project number SR0000067.

16. Representations and Warranties.

Grantor hereby represents and warrants to the MPCA and any other signatories to this Environmental Covenant that, at the time of execution of this Environmental Covenant:

A. Every fee owner of the Property has been identified;

B. Grantor holds fee simple title to the Property which is subject to the interests and encumbrances identified in Exhibit 2 that certain mortgage granted by Bill & Irv's Properties, Inc., to M&I Marshall & Ilsley Bank, dated March 28, 2002, recorded in the Office of the Saint Louis County Recorder on May 3, 2002, as Document No. 0054723.

C. Grantor has authority to grant the rights and interests and carry out the obligations provided in this Environmental Covenant;

D. Nothing in this Environmental Covenant materially violates, contravenes, or constitutes a default under any agreement, document or instrument that is binding upon the Grantor.

E. Except as otherwise directed by MPCA, Grantor has obtained, from each person holding an interest and encumbrance in the Property identified in Exhibit 2, a Subordination Agreement, or other agreement satisfactory to the Commissioner, assuring that such person is bound by this Environmental Covenant and that this Environmental Covenant shall survive any foreclosure or other action to enforce the interest. Such an agreement may include a waiver of that person's right to consent to any amendment of this Environmental Covenant. The executed agreement(s) is attached as **Exhibit 3** to this Environmental Covenant and incorporated herein.

17. Governing Law.

This Environmental Covenant shall be governed by and interpreted in accordance with the laws of the State of Minnesota.

18. Compliance Reporting.

The Owner shall submit to MPCA on an annual basis a written report confirming compliance with the Activity and Use Limitations provided in Paragraph 7 and summarizing any actions taken pursuant to Paragraph 8 of this Environmental Covenant. Reports shall be submitted on the first July 1 that occurs at least six months after the effective date of this Environmental Covenant, and on each succeeding July 1 thereafter.

Owner shall notify the MPCA as soon as possible of any actions or conditions that would constitute a breach of the Activity and Use Limitations in Paragraph 7.

19. Notice of Conveyance of Interest in Property.

Owner shall provide written notice to MPCA within 30 days after any conveyance of fee title to the Property or any portion of the Property. The notice shall identify the name and contact information of the new Owner, and the portion of the Property conveyed to that Owner.

20. Severability.

In the event that any provision of this Environmental Covenant is held by a court to be unenforceable, the other provisions of this Environmental Covenant shall remain valid and enforceable.

21. Effective Date.

This Environmental Covenant is effective on the date of acknowledgement of the signature of the MPCA.

THE UNDERSIGNED REPRESENTATIVE OF THE GRANTOR REPRESENTS AND CERTIFIES THAT HE/SHE IS AUTHORIZED TO EXECUTE THIS ENVIRONMENTAL COVENANT.

IN WITNESS WHEREOF, THIS INSTRUMENT HAS BEEN EXECUTED ON THE DATES INDICATED BELOW:

FOR THE GRANTOR:
BILL & IRV'S PROPERTIES, INC., A MINNESOTA CORPORATION

By _____ (signature)

Bill Wilson, Owner
Bill & Irv's Properties, Inc., a Minnesota Corporation

State of Minnesota)
) ss.
County of Saint Louis)

On February 3, 2021, this instrument was acknowledged before me, and the facts stated herein were sworn to or affirmed by, Bill Wilson, the Owner of Bill & Irv's Properties, Inc., a Minnesota corporation, on behalf of Bill & Irv's Properties, Inc., a Minnesota corporation.

_____ (signature)

Notary Public
My Commission Expires _____

TAMMY L ANDERSON
NOTARY PUBLIC - MINNESOTA
MY COMMISSION EXPIRES 01/31/2025

FOR THE ENVIRONMENTAL AGENCY AND HOLDER:

MINNESOTA POLLUTION CONTROL AGENCY

By _____(signature)

Tom Higgins, Interim-Manager
Site Remediation & Redevelopment Section
Remediation Division
Delegate of the Commissioner of the
Minnesota Pollution Control Agency

STATE OF MINNESOTA)
) SS.
COUNTY OF RAMSEY)

This instrument was acknowledged before me on February 5, 2021, by Tom Higgins, Interim-Manager of the Site Remediation & Redevelopment Section of the Remediation Division, and a Delegate of the Commissioner of the Minnesota Pollution Control Agency, on behalf of the Minnesota Pollution Control Agency.

Amy K. Hadiaris (signature)

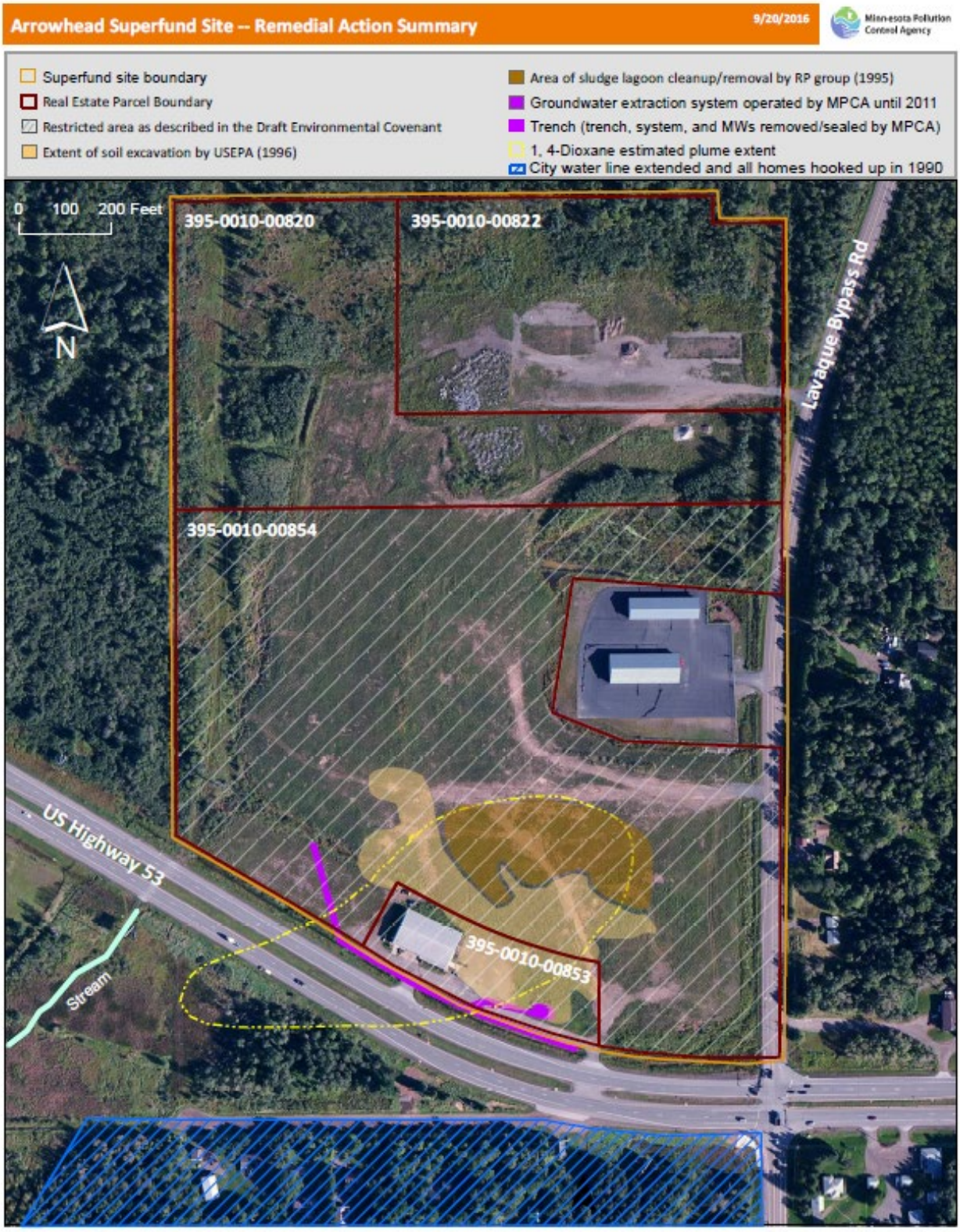
Notary Public

My Commission Expires 1/31/2025

AMY K. HADIARIS
NOTARY PUBLIC
MINNESOTA
My Commission Expires Jan. 31, 2025

THIS INSTRUMENT WAS DRAFTED BY
AND WHEN RECORDED RETURN TO:

Minnesota Pollution Control Agency
Attention: Tom Reppe
520 Lafayette Road North
Saint Paul, MN 55155


Arrowhead Superfund Site -- Remedial Action Summary
9/20/2016
Minnesota Pollution Control Agency
Superfund site boundary
Real Estate Parcel Boundary
Restricted area as described in the Draft Environmental Covenant
Extent of soil excavation by USEPA (1996)
Area of sludge lagoon cleanup/removal by RP group (1995)
Groundwater extraction system operated by MPCA until 2011
Trench (trench, system, and MWs removed/sealed by MPCA)
1, 4-Dioxane estimated plume extent
City water line extended and all homes hooked up in 1990
0 100 200 Feet
N
395-0010-00820
395-0010-00822
395-0010-00854
395-0010-00853
Lavaque Bypass Rd
US Highway 53
Stream

APPENDIX C

THREATENED AND ENDANGERED SPECIES INFORMATION

BRAUN INTERTEC

Protected Species Evaluation

Project Name:	Future Business Park	**Date:**	October 15, 2021
Site Address:	Intersection of TH 53 & Lavaque Bypass Rd	**Project No.:**	B2109165
Client:	City of Hermantown	**Evaluator:**	B. Ruhme
County:	St. Louis	**TRS:**	50N 15W 3&4
Lat/Long:	46.841732, -92.243220		

Resource	Description	Evaluation
Aerial Photo	Historical Aerial Photographs (1940-2019)	Historically, the Site consisted of forested land with a few small clearings and apparent crop land in the southwest portion (1940 aerial photo). An apparent gravel pit in the southeast corner is visible in the 1948 aerial photo. Small buildings are initially apparent in the southeast and southwest portions of the site by the 1972 aerial photo. Tree clearing in the southcentral portion of the Site and additional buildings in the southeast and southwest corners are apparent in the 1997 aerial photo. Significant earthwork in the southcentral and tree clearing in the northwest portions of the Site are apparent in the 2008 aerial photo. Little change is apparent in the 2013-2019 aerials except for increased tree cover in the northwest corner.
Federal (IPaC)	Query of IPaC Database	Four federally listed species were identified for the site in the IPaC database. The project area is located within a critical habitat zone for the Canada Lynx.
State	MnDNR NHIS Database	Three state listed species were identified for the site in the NHIS database.
National Wetland Inventory	MnDNR NWI Wetland Finder	Shrub wetland (Type 6- Shrub Swamp) and portions of forested wetland (Type 7- hardwood swamp) are mapped within the Site boundaries. Coniferous bogs (Type 8 wetland), often favored by the Canada Lynx, are also mapped within 1-mile of the Site.

Field Survey Conducted No

Conclusion: Not likely to adversely affect protected species.

With a lack of surface water features and apparent limited floral resources for pollinators, the Site does not provide suitable habitat for the Floating Marsh Marigold, Piping Plover or Monarch Butterfly. With forested land covering large portions of the Site, it is possible, but unlikely the Rusty Patched Bumble Bee or Soapberry are present due other habitat requirements of these species. The Site is located within a critical habitat zone for the Canada Lynx and forested portions of the site may provide habitat for the species. Due to its history of disturbance, surrounding development and the type of forest (mixed conifer-hardwood) present, it is unlikely resident lynx occupy the Site. However, lynx may forage on and travel through the Site between areas of nearby preferred habitat (boreal forest/ coniferous bogs). Additionally, trees on Site may provide nesting habitat for migratory birds and potential summer roosting habitat for the Northern Long-eared bat.

Further Action Recommended: Yes

If development is proposed for the Site, additional consultation with the U.S. Fish and Wildlife Service (USFWS) and Minnesota Department of Natural Resources (MnDNR) regarding the suitability of Canada Lynx habitat present and potential impacts to the species is recommended. Also, if required for any proposed development, it is recommended to conduct vegetation and tree clearing from September 1-April 30 to avoid impacts to nesting migratory birds (nesting season is typically May-August). Additionally, any potential development projects for the Site should consider timing tree clearing work from November-March to avoid any impacts to the Northern Long-eared bat.

Signed: 

Attachments: Yes IPaC output and table of listed species attached.

Common Name	Scientific Name	Federal Status[1]	State Status[1]	Habitat	Impact	Comment
Canada Lynx	*Lynx canadensis*	T	SPC	Boreal forest, mixed hardwood conifer forest and coniferous bogs	Potential to adversely affect	The Site is located within a designated critical habitat zone for the lynx and forested areas may provide potential habitat. With the Site's history of disturbance and nearby development (including the Duluth airport), resident lynx are unlikely to occupy the Site. However, the species may forage and travel through the Site on its way to preferred nearby habitat (boreal forest/ coniferous bogs).
Floating Marsh Marigold	*Caltha natans*	none	E	Shallow, slow moving water-lakes, small streams, creeks, pools, ditches, swamps and beaver ponds	No effect	Plant is extremely rare in Minnesota and unlikely to be present due to a lack of open water features at the Site.
Monarch Butterfly	*Danaus plexippus*	C	None	Meadows, open fields and clearings with nectaring plants, particularly milkweed.	No effect	Suitable habitat is not present within the Site.
Northern Long-eared Bat	*Myotis septentrionalis*	T	SPC	caves, mesic-hardwood and floodplain forests	Not likely to adversely affect-not prohibited	This project may affect the threatened Northern long-eared bat; therefore, consultation with the Service pursuant to Section 7(a)(2) of the Endangered Species Act of 1973 (87 Stat.884, as amended; 16 U.S.C. 1531 et seq.) is required. However, based on the information provided, this project may rely on the Service's January 5, 2016, Programmatic Biological Opinion on Final 4(d) Rule for the Northern Long-Eared Bat and Activities Excepted from Take Prohibitions to fulfill its Section 7(a)(2) consultation obligation. No further action is needed. Any take that may occur is incidental and not prohibited. The project site is not located within a township containing known roost trees or hibernacula.
Piping Plover	*Charadrius melodus*	E	E	Beaches with gravel or pebble substrate, sparsely vegetated lakeshore areas.	No effect	Suitable habitat is not present within the Site.

Rusty-patched Bumble Bee	*Bombus affinis*	E	Watchlist	Variety of native herbaceous and woody plant species and urban gardens that provide floral resources April through October. It nests and winters underground.	Not likely to adversely affect	Since the Site is dominantly forested or developed land, the presence of floral resources for pollinators appears to be limited. This provides poor foraging habitat for the bee. Nesting/overwintering habitat is present within the forested portions of the Site. Additionally, the last documented sighting of the Bee within 3-miles of the Site was in 1913. Considering these factors, the bee is unlikely to be present.
Soapberry	*Shepherdia canadensis*	none	SPC	Fire dependent forests, often on steep rocky bluffs, rock ledges & outcrops.	Not likely to adversely affect	Only small populations exist within Minnesota, primarily along the Canadian border and the plant is unlikely to be present as a result.
Migratory birds		MBTA		Various	May affect - not prohibited	Various migratory birds may nest in shrubs and trees on the Site. Avoidance should be considered by clearing vegetation outside the migratory bird breeding season (May- August for most species).

[1] T = Threatened, E = Endangered, C = Candidate, SPC = Special Concern, NEP = Non-Essential Population (experimental); MBTA = protected under Migratory Bird Treaty Act

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
http://www.fws.gov/midwest/Endangered/section7/s7process/step1.html

In Reply Refer To: October 13, 2021
Consultation Code: 03E19000-2022-SLI-0189
Event Code: 03E19000-2022-E-00631
Project Name: Hermantown Business Park

Subject: List of threatened and endangered species that may occur in your proposed project location or may be affected by your proposed project

To Whom It May Concern:

This response has been generated by the Information, Planning, and Conservation (IPaC) system to provide information on natural resources that could be affected by your project. The U.S. Fish and Wildlife Service (Service) provides this response under the authority of the Endangered Species Act of 1973 (16 U.S.C. 1531-1543), the Bald and Golden Eagle Protection Act (16 U.S.C. 668-668d), the Migratory Bird Treaty Act (16 U.S.C. 703-712), and the Fish and Wildlife Coordination Act (16 U.S.C. 661 *et seq*.).

Threatened and Endangered Species

The enclosed species list identifies threatened, endangered, proposed and candidate species, as well as proposed and final designated critical habitat, that may occur within the boundary of your proposed project and may be affected by your proposed project. The species list fulfills the requirement for obtaining a Technical Assistance Letter from the U.S. Fish and Wildlife Service under section 7(c) of the Endangered Species Act (Act) of 1973, as amended (16 U.S.C. 1531 *et seq*.).

New information based on updated surveys, changes in the abundance and distribution of species, changed habitat conditions, or other factors could change this list. Note that under 50 CFR 402.12(e) of the regulations implementing section 7 of the Act, the accuracy of this species list should be verified after 90 days. The Service recommends that verification be completed by visiting the ECOS IPaC website at regular intervals during project planning and implementation

for updates to species lists and information. An updated list may be requested through the ECOS IPaC system by completing the same process used to receive the enclosed list.

Consultation Technical Assistance

Please refer to the Midwest Region S7 Technical Assistance website for step-by-step instructions for making species determinations and for specific guidance on the following types of projects: projects in developed areas, HUD, CDBG, EDA, pipelines, buried utilities, telecommunications, and requests for a Conditional Letter of Map Revision (CLOMR) from FEMA.

Using the IPaC Official Species List to Make No Effect and May Affect Determinations for Listed Species

1. If IPaC returns a result of "There are no listed species found within the vicinity of the project," then project proponents can conclude the proposed activities will have **no effect** on any federally listed species under Service jurisdiction. Concurrence from the Service is not required for **No Effect** determinations. No further consultation or coordination is required. Attach this letter to the dated IPaC species list report for your records. An example "No Effect" document also can be found on the S7 Technical Assistance website.
2. If IPaC returns one or more federally listed, proposed, or candidate species as potentially present in the action area of the proposed project – other than bats (see below) – then project proponents must determine if proposed activities will have **no effect** on or **may affect** those species. For assistance in determining if suitable habitat for listed, candidate, or proposed species occurs within your project area or if species may be affected by project activities, you can obtain Life History Information for Listed and Candidate Species through the S7 Technical Assistance website. If no impacts will occur to a species on the IPaC species list (e.g., there is no habitat present in the project area), the appropriate determination is **No Effect**. No further consultation or coordination is required. Attach this letter to the dated IPaC species list report for your records. An example "No Effect" document also can be found on the S7 Technical Assistance website.
3. Should you determine that project activities **may affect** any federally listed, please contact our office for further coordination. Letters with requests for consultation or correspondence about your project should include the Consultation Tracking Number in the header. Electronic submission is preferred.

Northern Long-Eared Bats

Northern long-eared bats occur throughout Minnesota and Wisconsin and the information below may help in determining if your project may affect these species.

This species hibernates in caves or mines only during the winter. In Minnesota and Wisconsin, the hibernation season is considered to be November 1 to March 31. During the active season (April 1 to October 31) they roost in forest and woodland habitats. Suitable summer habitat for northern long-eared bats consists of a wide variety of forested/wooded habitats where they roost, forage, and travel and may also include some adjacent and interspersed non-forested habitats such as emergent wetlands and adjacent edges of agricultural fields, old fields and pastures. This includes forests and woodlots containing potential roosts (i.e., live trees and/or snags ≥3 inches dbh for northern long-eared bat that have exfoliating bark, cracks, crevices, and/or hollows), as well as linear features such as fencerows, riparian forests, and other wooded corridors. These wooded areas may be dense or loose aggregates of trees with variable amounts of canopy closure. Individual trees may be considered suitable habitat when they exhibit the characteristics of a potential roost tree and are located within 1,000 feet (305 meters) of forested/wooded habitat. Northern long-eared bats have also been observed roosting in human-made structures, such as buildings, barns, bridges, and bat houses; therefore, these structures should also be considered potential summer habitat and evaluated for use by bats. If your project will impact caves or mines or will involve clearing forest or woodland habitat containing suitable roosting habitat, northern long-eared bats could be affected.

Examples of unsuitable habitat include:

- Individual trees that are greater than 1,000 feet from forested or wooded areas,
- Trees found in highly developed urban areas (e.g., street trees, downtown areas),
- A pure stand of less than 3-inch dbh trees that are not mixed with larger trees, and
- A stand of eastern red cedar shrubby vegetation with no potential roost trees.

If IPaC returns a result that northern long-eared bats are potentially present in the action area of the proposed project, project proponents can conclude the proposed activities **may affect** this species **IF** one or more of the following activities are proposed:

- Clearing or disturbing suitable roosting habitat, as defined above, at any time of year,
- Any activity in or near the entrance to a cave or mine,
- Mining, deep excavation, or underground work within 0.25 miles of a cave or mine,
- Construction of one or more wind turbines, or

- Demolition or reconstruction of human-made structures that are known to be used by bats based on observations of roosting bats, bats emerging at dusk, or guano deposits or stains.

If none of the above activities are proposed, project proponents can conclude the proposed activities will have **no effect** on the northern long-eared bat. Concurrence from the Service is not required for **No Effect** determinations. No further consultation or coordination is required. Attach this letter to the dated IPaC species list report for your records. An example "No Effect" document also can be found on the S7 Technical Assistance website.

If any of the above activities are proposed, please use the northern long-eared bat determination key in IPaC. This tool streamlines consultation under the 2016 rangewide programmatic biological opinion for the 4(d) rule. The key helps to determine if prohibited take might occur and, if not, will generate an automated verification letter. No further review by us is necessary. Please visit the links below for additional information about "may affect" determinations for the northern long-eared bat.

NLEB Section 7 consultation

Key to the NLEB 4(d) rule for federal actions that may affect

Instructions for the NLEB 4(d) assisted d-key

Maternity tree and hibernaculum locations by state

Other Trust Resources and Activities

Bald and Golden Eagles - Although the bald eagle has been removed from the endangered species list, this species and the golden eagle are protected by the Bald and Golden Eagle Act and the Migratory Bird Treaty Act. Should bald or golden eagles occur within or near the project area please contact our office for further coordination. For communication and wind energy projects, please refer to additional guidelines below.

Migratory Birds - The Migratory Bird Treaty Act (MBTA) prohibits the taking, killing, possession, transportation, and importation of migratory birds, their eggs, parts, and nests, except when specifically authorized by the Service. The Service has the responsibility under the MBTA to proactively prevent the mortality of migratory birds whenever possible and we encourage implementation of recommendations that minimize potential impacts to migratory birds. Such measures include clearing forested habitat outside the nesting season (generally March 1 to August 31) or conducting nest surveys prior to clearing to avoid injury to eggs or nestlings.

Communication Towers - Construction of new communications towers (including radio, television, cellular, and microwave) creates a potentially significant impact on migratory birds, especially some 350 species of night-migrating birds. However, the Service has developed voluntary guidelines for minimizing impacts.

Transmission Lines - Migratory birds, especially large species with long wingspans, heavy bodies, and poor maneuverability can also collide with power lines. In addition, mortality can occur when birds, particularly hawks, eagles, kites, falcons, and owls, attempt to perch on uninsulated or unguarded power poles. To minimize these risks, please refer to guidelines developed by the Avian Power Line Interaction Committee and the Service. Implementation of these measures is especially important along sections of lines adjacent to wetlands or other areas that support large numbers of raptors and migratory birds.

Wind Energy - To minimize impacts to migratory birds and bats, wind energy projects should follow the Service's Wind Energy Guidelines. In addition, please refer to the Service's Eagle Conservation Plan Guidance, which provides guidance for conserving bald and golden eagles in the course of siting, constructing, and operating wind energy facilities.

State Department of Natural Resources Coordination

While it is not required for your Federal section 7 consultation, please note that additional state endangered or threatened species may also have the potential to be impacted. Please contact the Minnesota or Wisconsin Department of Natural Resources for information on state listed species that may be present in your proposed project area.

Minnesota

Minnesota Department of Natural Resources - Endangered Resources Review Homepage

Email: Review.NHIS@state.mn.us

Wisconsin

Wisconsin Department of Natural Resources - Endangered Resources Review Homepage

Email: DNRERReview@wi.gov

We appreciate your concern for threatened and endangered species. Please feel free to contact our office with questions or for additional information.

Attachment(s):

- Official Species List
- Migratory Birds

Official Species List

This list is provided pursuant to Section 7 of the Endangered Species Act, and fulfills the requirement for Federal agencies to "request of the Secretary of the Interior information whether any species which is listed or proposed to be listed may be present in the area of a proposed action".

This species list is provided by:

Minnesota-Wisconsin Ecological Services Field Office
4101 American Blvd E
Bloomington, MN 55425-1665
(952) 252-0092

Project Summary

Consultation Code: 03E19000-2022-SLI-0189
Event Code: Some(03E19000-2022-E-00631)
Project Name: Hermantown Business Park
Project Type: DEVELOPMENT
Project Description: Location of proposed business park. No development plans are currently proposed. The City is evaluating the existing conditions of the parcels.

Project Location:

Approximate location of the project can be viewed in Google Maps: https://www.google.com/maps/@46.84208205,-92.24334562533238,14z

Counties: St. Louis County, Minnesota

Endangered Species Act Species

There is a total of 4 threatened, endangered, or candidate species on this species list.

Species on this list should be considered in an effects analysis for your project and could include species that exist in another geographic area. For example, certain fish may appear on the species list because a project could affect downstream species.

IPaC does not display listed species or critical habitats under the sole jurisdiction of NOAA Fisheries[1], as USFWS does not have the authority to speak on behalf of NOAA and the Department of Commerce.

See the "Critical habitats" section below for those critical habitats that lie wholly or partially within your project area under this office's jurisdiction. Please contact the designated FWS office if you have questions.

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1. NOAA Fisheries, also known as the National Marine Fisheries Service (NMFS), is an office of the National Oceanic and Atmospheric Administration within the Department of Commerce.

Mammals

NAME	STATUS
Canada Lynx *Lynx canadensis* Population: Wherever Found in Contiguous U.S. There is **final** critical habitat for this species. Your location overlaps the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/3652	Threatened
Northern Long-eared Bat *Myotis septentrionalis* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/9045	Threatened

Birds

NAME	STATUS
Piping Plover *Charadrius melodus* Population: [Great Lakes watershed DPS] - Great Lakes, watershed in States of IL, IN, MI, MN, NY, OH, PA, and WI and Canada (Ont.) There is **final** critical habitat for this species. The location of the critical habitat is not available. Species profile: https://ecos.fws.gov/ecp/species/6039	Endangered

Insects

NAME	STATUS
Monarch Butterfly *Danaus plexippus* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/9743	Candidate

Critical habitats

There is 1 critical habitat wholly or partially within your project area under this office's jurisdiction.

NAME	STATUS
Canada Lynx *Lynx canadensis* https://ecos.fws.gov/ecp/species/3652#crithab	Final

Migratory Birds

Certain birds are protected under the Migratory Bird Treaty Act[1] and the Bald and Golden Eagle Protection Act[2].

Any person or organization who plans or conducts activities that may result in impacts to migratory birds, eagles, and their habitats should follow appropriate regulations and consider implementing appropriate conservation measures, as described below.

---

1. The Migratory Birds Treaty Act of 1918.
2. The Bald and Golden Eagle Protection Act of 1940.
3. 50 C.F.R. Sec. 10.12 and 16 U.S.C. Sec. 668(a)

The birds listed below are birds of particular concern either because they occur on the USFWS Birds of Conservation Concern (BCC) list or warrant special attention in your project location. To learn more about the levels of concern for birds on your list and how this list is generated, see the FAQ below. This is not a list of every bird you may find in this location, nor a guarantee that every bird on this list will be found in your project area. To see exact locations of where birders and the general public have sighted birds in and around your project area, visit the E-bird data mapping tool (Tip: enter your location, desired date range and a species on your list). For projects that occur off the Atlantic Coast, additional maps and models detailing the relative occurrence and abundance of bird species on your list are available. Links to additional information about Atlantic Coast birds, and other important information about your migratory bird list, including how to properly interpret and use your migratory bird report, can be found below.

For guidance on when to schedule activities or implement avoidance and minimization measures to reduce impacts to migratory birds on your list, click on the PROBABILITY OF PRESENCE SUMMARY at the top of your list to see when these birds are most likely to be present and breeding in your project area.

NAME	BREEDING SEASON
Bald Eagle *Haliaeetus leucocephalus* This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities. https://ecos.fws.gov/ecp/species/1626	Breeds Dec 1 to Aug 31
Bobolink *Dolichonyx oryzivorus* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds May 20 to Jul 31

Probability Of Presence Summary

The graphs below provide our best understanding of when birds of concern are most likely to be present in your project area. This information can be used to tailor and schedule your project activities to avoid or minimize impacts to birds. Please make sure you read and understand the FAQ "Proper Interpretation and Use of Your Migratory Bird Report" before using or attempting to interpret this report.

Probability of Presence (■)

Each green bar represents the bird's relative probability of presence in the 10km grid cell(s) your project overlaps during a particular week of the year. (A year is represented as 12 4-week months.) A taller bar indicates a higher probability of species presence. The survey effort (see below) can be used to establish a level of confidence in the presence score. One can have higher confidence in the presence score if the corresponding survey effort is also high.

How is the probability of presence score calculated? The calculation is done in three steps:

1. The probability of presence for each week is calculated as the number of survey events in the week where the species was detected divided by the total number of survey events for that week. For example, if in week 12 there were 20 survey events and the Spotted Towhee was found in 5 of them, the probability of presence of the Spotted Towhee in week 12 is 0.25.
2. To properly present the pattern of presence across the year, the relative probability of presence is calculated. This is the probability of presence divided by the maximum probability of presence across all weeks. For example, imagine the probability of presence in week 20 for the Spotted Towhee is 0.05, and that the probability of presence at week 12 (0.25) is the maximum of any week of the year. The relative probability of presence on week 12 is 0.25/0.25 = 1; at week 20 it is 0.05/0.25 = 0.2.
3. The relative probability of presence calculated in the previous step undergoes a statistical conversion so that all possible values fall between 0 and 10, inclusive. This is the probability of presence score.

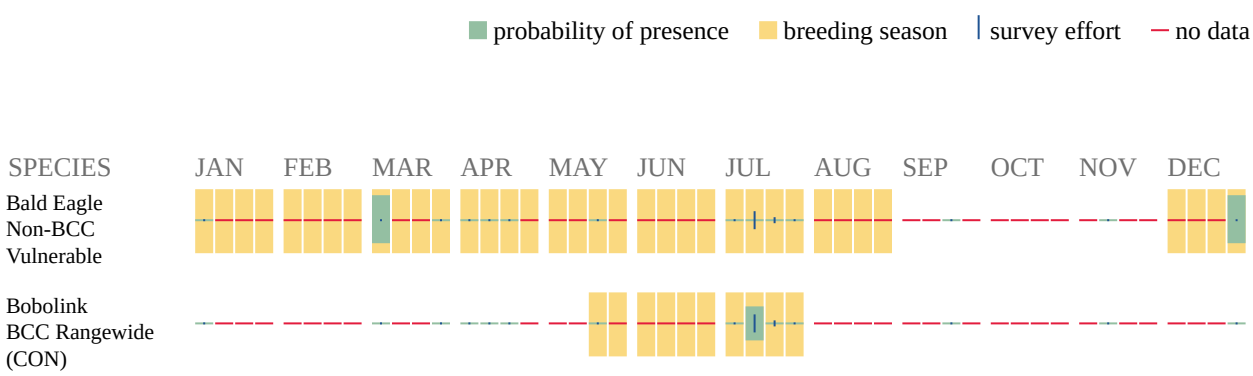
Breeding Season (■)
Yellow bars denote a very liberal estimate of the time-frame inside which the bird breeds across its entire range. If there are no yellow bars shown for a bird, it does not breed in your project area.

Survey Effort (|)
Vertical black lines superimposed on probability of presence bars indicate the number of surveys performed for that species in the 10km grid cell(s) your project area overlaps. The number of surveys is expressed as a range, for example, 33 to 64 surveys.

No Data (–)
A week is marked as having no data if there were no survey events for that week.

Survey Timeframe

Surveys from only the last 10 years are used in order to ensure delivery of currently relevant information. The exception to this is areas off the Atlantic coast, where bird returns are based on all years of available data, since data in these areas is currently much more sparse.



Additional information can be found using the following links:

- Birds of Conservation Concern http://www.fws.gov/birds/management/managed-species/birds-of-conservation-concern.php
- Measures for avoiding and minimizing impacts to birds http://www.fws.gov/birds/management/project-assessment-tools-and-guidance/conservation-measures.php
- Nationwide conservation measures for birds http://www.fws.gov/migratorybirds/pdf/management/nationwidestandardconservationmeasures.pdf

Migratory Birds FAQ

Tell me more about conservation measures I can implement to avoid or minimize impacts to migratory birds.

Nationwide Conservation Measures describes measures that can help avoid and minimize impacts to all birds at any location year round. Implementation of these measures is particularly important when birds are most likely to occur in the project area. When birds may be breeding in the area, identifying the locations of any active nests and avoiding their destruction is a very helpful impact minimization measure. To see when birds are most likely to occur and be breeding in your project area, view the Probability of Presence Summary. Additional measures or permits may be advisable depending on the type of activity you are conducting and the type of infrastructure or bird species present on your project site.

What does IPaC use to generate the migratory birds potentially occurring in my specified location?

The Migratory Bird Resource List is comprised of USFWS Birds of Conservation Concern (BCC) and other species that may warrant special attention in your project location.

The migratory bird list generated for your project is derived from data provided by the Avian Knowledge Network (AKN). The AKN data is based on a growing collection of survey, banding, and citizen science datasets and is queried and filtered to return a list of those birds reported as

occurring in the 10km grid cell(s) which your project intersects, and that have been identified as warranting special attention because they are a BCC species in that area, an eagle (Eagle Act requirements may apply), or a species that has a particular vulnerability to offshore activities or development.

Again, the Migratory Bird Resource list includes only a subset of birds that may occur in your project area. It is not representative of all birds that may occur in your project area. To get a list of all birds potentially present in your project area, please visit the AKN Phenology Tool.

What does IPaC use to generate the probability of presence graphs for the migratory birds potentially occurring in my specified location?
The probability of presence graphs associated with your migratory bird list are based on data provided by the Avian Knowledge Network (AKN). This data is derived from a growing collection of survey, banding, and citizen science datasets .

Probability of presence data is continuously being updated as new and better information becomes available. To learn more about how the probability of presence graphs are produced and how to interpret them, go the Probability of Presence Summary and then click on the "Tell me about these graphs" link.

How do I know if a bird is breeding, wintering, migrating or present year-round in my project area?
To see what part of a particular bird's range your project area falls within (i.e. breeding, wintering, migrating or year-round), you may refer to the following resources: The Cornell Lab of Ornithology All About Birds Bird Guide, or (if you are unsuccessful in locating the bird of interest there), the Cornell Lab of Ornithology Neotropical Birds guide. If a bird on your migratory bird species list has a breeding season associated with it, if that bird does occur in your project area, there may be nests present at some point within the timeframe specified. If "Breeds elsewhere" is indicated, then the bird likely does not breed in your project area.

What are the levels of concern for migratory birds?
Migratory birds delivered through IPaC fall into the following distinct categories of concern:

1. "BCC Rangewide" birds are Birds of Conservation Concern (BCC) that are of concern throughout their range anywhere within the USA (including Hawaii, the Pacific Islands, Puerto Rico, and the Virgin Islands);
2. "BCC - BCR" birds are BCCs that are of concern only in particular Bird Conservation Regions (BCRs) in the continental USA; and
3. "Non-BCC - Vulnerable" birds are not BCC species in your project area, but appear on your list either because of the Eagle Act requirements (for eagles) or (for non-eagles) potential susceptibilities in offshore areas from certain types of development or activities (e.g. offshore energy development or longline fishing).

Although it is important to try to avoid and minimize impacts to all birds, efforts should be made, in particular, to avoid and minimize impacts to the birds on this list, especially eagles and BCC species of rangewide concern. For more information on conservation measures you can

implement to help avoid and minimize migratory bird impacts and requirements for eagles, please see the FAQs for these topics.

Details about birds that are potentially affected by offshore projects
For additional details about the relative occurrence and abundance of both individual bird species and groups of bird species within your project area off the Atlantic Coast, please visit the Northeast Ocean Data Portal. The Portal also offers data and information about other taxa besides birds that may be helpful to you in your project review. Alternately, you may download the bird model results files underlying the portal maps through the NOAA NCCOS Integrative Statistical Modeling and Predictive Mapping of Marine Bird Distributions and Abundance on the Atlantic Outer Continental Shelf project webpage.

Bird tracking data can also provide additional details about occurrence and habitat use throughout the year, including migration. Models relying on survey data may not include this information. For additional information on marine bird tracking data, see the Diving Bird Study and the nanotag studies or contact Caleb Spiegel or Pam Loring.

What if I have eagles on my list?
If your project has the potential to disturb or kill eagles, you may need to obtain a permit to avoid violating the Eagle Act should such impacts occur.

Proper Interpretation and Use of Your Migratory Bird Report
The migratory bird list generated is not a list of all birds in your project area, only a subset of birds of priority concern. To learn more about how your list is generated, and see options for identifying what other birds may be in your project area, please see the FAQ "What does IPaC use to generate the migratory birds potentially occurring in my specified location". Please be aware this report provides the "probability of presence" of birds within the 10 km grid cell(s) that overlap your project; not your exact project footprint. On the graphs provided, please also look carefully at the survey effort (indicated by the black vertical bar) and for the existence of the "no data" indicator (a red horizontal bar). A high survey effort is the key component. If the survey effort is high, then the probability of presence score can be viewed as more dependable. In contrast, a low survey effort bar or no data bar means a lack of data and, therefore, a lack of certainty about presence of the species. This list is not perfect; it is simply a starting point for identifying what birds of concern have the potential to be in your project area, when they might be there, and if they might be breeding (which means nests might be present). The list helps you know what to look for to confirm presence, and helps guide you in knowing when to implement conservation measures to avoid or minimize potential impacts from your project activities, should presence be confirmed. To learn more about conservation measures, visit the FAQ "Tell me about conservation measures I can implement to avoid or minimize impacts to migratory birds" at the bottom of your migratory bird trust resources page.

APPENDIX D

PREVIOUS GEOTECHNICAL REPORT

REPORT OF GEOTECHNICAL/ENVIRONMENTAL EXPLORATION AND REVIEW

Proposed Schneiderman's Building
Hermantown, Minnesota

AET #07-01807

Date:

December 6, 2002

Prepared For:

Larry Schneiderman
1763 Juniper Path
Lakeville, Minnesota 55044

AMERICAN ENGINEERING TESTING, INC.

CONSULTANTS
• GEOTECHNICAL
• ENVIRONMENTAL
• MATERIALS

December 6, 2002

Mr. Larry Schneiderman
17630 Juniper Path
Lakeville, Minnesota 55044

Re: Geotechnical Exploration/Review
Proposed Schneiderman's Building
Hermantown, Minnesota
AET #07-01807

Dear Mr. Schneiderman:

American Engineering Testing, Inc. (AET) has completed a subsurface exploration and geotechnical engineering review for your proposed building. In addition, a limited environmental assessemnt was completed in the area of the proposed building. We are sending you three copies of our attached report. This report documents the exploration/review results and provides our opinions and recommendations to aid you and your design team in planning and construction of the project.

AET appreciates this opportunity to serve you. As your project proceeds, we remain interested in providing additional consulting or testing services. If you have questions about the report, or if we can provide additional services for you, please contact me at (218) 628-1518 or asmith@amengtest.com.

Sincerely,

Amy Smith, PE
Project Engineer

TABLE OF CONTENTS

TABLE OF CONTENTS
Page 2

GEOTECHNICAL EXPLORATION/REVIEW
PROPOSED SCHNEIDERMAN'S BUILDING
HERMANTOWN, MINNESOTA
AET #07-01807

SUMMARY

Purpose

The purpose of our work on this project is to obtain subsurface information at the proposed building site and provide recommendations to assist you in the planning and construction of the project.

Scope

To accomplish the above purpose, you have authorized our firm to drill six (6) standard penetration test borings, collect and analyze soil samples for chemical laboratory testing within the proposed development area, and to furnish a geotechnical exploration report.

Findings

The test borings encountered 4 to 12½ feet fill and/or organic swamp deposits overlying the native inorganic soils. Measurable groundwater was encountered in most of the borings at depths ranging from 7 to 21 feet below existing ground surface.

The field screening results did not indicate the presence of contamination in the subsurface at the borehole locations. The analytical laboratory detected several metals at concentrations that are less than the generic Tier 1 Soil Leaching Value (SLV) and Tier 1 Residential Soil Reference Values (SRVs). Diesel range organics (DRO) were detected as well, however, the concentrations were relatively low and generic SLV and SRV concentrations have not been published by the Minnesota Pollution Control Agency (MPCA).

Recommendations

These recommendations are in a condensed form for your convenience. It is important that you study our entire report for detailed recommendations.

- Grading in the building area should include the complete removal of all existing fill and organics, as well as any other soft, wet or disturbed soils. The organic soils are not suitable for reuse as backfill. The silty sand fill soils may be suitable for reuse as backfill. The proposed structure can be supported on conventional spread or strip footings bearing on the undisturbed native inorganic soils or on engineered fill.

- Grading in the parking area should allow a minimum section of 36 inches of inorganic soil. The depth of the subcut will be depend on final desired grade and the presence of organic soils. More borings would be useful in determining the extent of the organic soils. A typical pavement section could include up to 24 inches of select granular borrow, 8 inches of class 5 aggregate base, and 4 inches of bituminous pavement. The subgrade should be surface compacted, and a geogrid should be placed prior to the placement of any new fill.

- Even though the chemistry tests performed during the geotechnical exploration are below the Tier 1 SLVs and SRVs, it is likely that conditions may vary across the site due to the known historical use of the property. As a result, we recommend that native soil excavated as part of development, be field screened and characterized prior to re-use on site or for off-site disposal.

- Preparation of a site-specific excavation contingency plan should be considered, and may even be a site-specific MPCA requirement, for handling soil that is excavated during development. A contingency plan is recommended so that if contaminated soils is encountered, this soil can be handled cost-effectively and in accordance with state and federal requirements.

- The Environmental Protection Agency and the MPCA should be contacted prior to development to verify whether a contingency plan for excavation activities is required or whether there are site use or development restrictions applicable to the area proposed for development.

INTRODUCTION

You are proposing to construct a new building at Ugstad Road and Highway 53 in Hermantown, Minnesota. You have authorized American Engineering Testing, Inc., (AET) to conduct a subsurface exploration and limited site investigation, and to provide geotechnical engineering recommendations for your project. This report presents the information we obtained at the site and our engineering recommendations.

To protect you, AET, and the public, we authorize use of opinions and recommendations in this report only by you and your project team for this specific project. Contact us if other uses are intended. Even though this report is not intended to provide sufficient information to accurately determine quantities and locations of particular materials, we recommend that your potential contractors be advised of the report availability.

Scope of Services

Our scope of services for this work was presented in a written proposal dated October 14, 2002. A review of our agreed-upon scope of services is as follows:

- Arrange for existing utility locations for the site through the Gopher State One Call System.
- Drill six (6) standard penetration test (SPT) borings to depths of 25 feet in accordance with ASTM D1587 and D2487. The borings were sampled for both geotechnical purposes and environmental screening.
- Perform geotechnical laboratory tests to aid in classifying the soil and estimating soil properties.
- Field screen the soil sampled at each boring location and submit selected samples for chemical testing. Five soil samples were analyzed for DRO and two samples for polynuclear aromatic hydrocarbons (PAH), volatile organic compounds (VOC) and RCRA 8 metals.
- Prepare a formal engineering report which includes logs of the test borings, a sketch indicating boring locations, presentation of the soil and ground water conditions, the laboratory test results and our engineering opinions and recommendations regarding site preparation, foundation types, allowable soil bearing capacity, and special requirements with respect to any contaminated soils.

BACKGROUND

The area proposed for development includes a portion of the former Arrowhead Refinery Company Facility (the facility), which refined used oil from 1945 to 1977. The 28-acre facility generated a highly acidic, metal-laden sludge, which was disposed of in a two-acre waste lagoon located northwest of the area proposed for this development. Sludge disposal resulted in the contamination of the subsurface and surface water with oil-related compounds, heavy metals, cyanide, phenols, polynuclear aromatic hydrocarbons (PAHs), and polychlorinated biphenyls (PCBs). In 1984, the United States Environmental Protection Agency (EPA) conducted a remedial investigation and feasibility study and subsequently issued a Record of Decision (ROD) in 1986 for site cleanup.

The facility was removed and cleanup activities were directed by the EPA, which included the excavation, treatment and off-site disposal of approximately 11,750 tons of soil and sediment, and the backfilling of 48,050 tons of soil in the areas restored during 1995 and 1996 (Delta, 2002). A ground water treatment system was also installed and has been operating under the direction of the MPCA.

Residual lead at a concentration of less than 500 parts per million, are reported to remain in subsurface in some areas. As a result, the MPCA suggests that some areas of the former Arrowhead Facility may not be suitable for residential development or activities involving children with out further testing. The MPCA reports that the current contaminant levels in the ground water are generally below the maximum contaminant levels (MCLs) and that the treatment system may soon be shut down.

PROJECT INFORMATION

The proposed single story concrete building will be a 50,000 square foot structure with dimensions of 200' x 250' located in the northwest corner of the Ugstad Road and Highway 53 intersection. The proposed development also includes paved parking areas. For the purpose of this report, we assume that wall loads will be less than 5 kips/foot and maximum column loads will be less than 100 kips. We have also assumed that building floor elevation will be near 1420±.

The recommendations contained in this report are based on attaining a factor of safety of at least 3 with respect to localized shear or base failure of the foundations. We have also assumed allowable foundation settlements of 1" total and ½" differential are acceptable.

> The presented project information represents our understanding of the proposed construction. This information is an integral part of our engineering review. It is important that you contact us if there are changes from that described so that we can evaluate whether modifications to our recommendations are appropriate.

SITE CONDITIONS

Surface Observations

The site is currently vacant and relatively flat with little to no vegetation. Surface elevations at the boring locations were determined by our drill crew and ranged from 1418.8 to 1420.2 feet. These elevations are relative to the survey point on Lavaque By-Pass, a nail in the blacktop, which had an assigned elevation of +1425.16 feet. The approximate locations and elevations of the borings are indicated on the sketch in Appendix A.

Subsurface Soils

We have included our logs of the test borings in Appendix A of this report. We refer you to these logs for specific information concerning soil layer depths, soil/geology descriptions and density/consistency, based on the penetration resistance. It is important to note that the soil borings indicate only the subsurface conditions at the sampled locations and variations may occur between and beyond borings.

Based on our interpretation of the available boring information, it is our judgement that the generalized soil profile consists of 4 - 12½ feet of fill and/or swamp deposits overlying the native soils. The fill included silty sand with gravel and sand with silt and gravel. Most of the borings encountered a swamp deposited layer just below the fill layer ranging in thickness from 2 ½ to 11½ feet. The native soils consisted of clayey silt, silty sand, silty sand with gravel, sandy silt, and sand with silt, which extended to the boring termination depths of 25 feet. An exception was noted at boring 02-05 which met auger refusal at a depth of 11.7 feet. Auger refusal indicates an obstruction to drilling on objects such as cobbles, boulders, or bedrock. Diamond tip drilling would be required to determine the nature of the obstruction.

On site screening of subsurface soils yielded no organic vapors above 1.1 parts per million (ppm).

Groundwater

During our drilling operations, we probed the boreholes for the presence of free groundwater. The results of our observations are indicated at the bottom of the attached boring logs. A review of this data indicates that measurable groundwater was encountered in borings 02-01, 02-02, and 02-03 at depths of 7 to 9 feet below existing ground surface, and in borings 02-01 and 02-06 at depths of 20-21 feet below existing ground surface.

Fluctuations in the groundwater table can be expected both seasonally and annually and with changes in precipitation and infiltration. The attached Appendix sheet entitled "Exploration/ Classification" provides additional information on ground water level measuring.

LABORATORY TESTING

Engineering

Laboratory tests were performed on samples recovered during the soil boring program. The geotechnical testing program consisted of three sieve analysis tests and moisture content tests, which were used to aid in classifying the soils and to determine engineering parameters. The results of the laboratory testing are included in Appendix A.

Environmental

Five samples of the native soil encountered below the fill soils were submitted to En Chem for chemical analyses. The native soil was targeted for chemical analysis because the fill soil was imported and placed during the cleanup directed by the EPA and the field screening results did not indicate contamination was present in the fill. Each sample of the native soil was selected based on the relative appearance and/or presence of black material in the sample or, if no black material was present, the sample was collected from a depth at or below the water table interface.

Three soil samples were collected and analyzed for volatile organice compounds (VOCs). Two soil samples were collected and analyzed for RCRA 8 metals and polycyclic aromatic hydrocarbons (PAHs). Each of these five samples was also analyzed for diesel range organics (DRO). These analyses detected several metals and DRO at concentration above the method detection limit in two samples. PAH comounds were not detected in the samples analyzed.

Each analytical result was compared to the Tier 1 SRV (Non-Industrial) established in the MPCA Working Draft (1/99), with the exception of DRO. There is no standard for DRO, and concentrations above 200 milligrams per kilogram (mg/kg) in soils are generally considered reason for further investigation. The following tables summarize the analytes detected, and copy of the laboratory generated by En Chem is included in Appendix B.

TABLE I

Analytical Results - Soil

Boring/ (Depth)	02-03 (12-13½') (mg/kg)	02-04 (23.5-25') (mg/kg)	02-04 (4.5-6') (mg/kg)	02-05 (7-8.5') (mg/kg)	02-06 (7-8.5') (mg/kg)	Tier1SRV (1/99)
DRO	<3.3	<4.2	<4.1	16	220	na
Arsenic	-	-	2.9	4.1	-	10
Barium	-	-	76	67	-	1200
Cadmium	-	-	0.12	0.11	-	35
Chromium	-	-	35	26	-	71
Lead	-	-	5.3	4.9	-	400
Mercury	-	-	0.013	-	-	0.7

The results presented in the previous table indicate that all detected analytes are below the Tier 1 SRV for each respective compound.

ENGINEERING CONSIDERATIONS

Review of Soil Properties

Strength

The organic soils are judged to have a low strength and the fill soils are judged to have a moderate strength. The undisturbed, native soils at this site are considered to have a moderate to high strengths.

Compressibility

The organic soils are judged to be highly compressible. The fill soils and the native inorganic soils encountered at the site are judged to have a low compressibility based on the SPT values.

Frost Susceptibility

The silty sands, sandy silts, and silty clays encountered at the site are considered highly frost susceptible. The sands with silt have a low frost susceptibility.

Drainage

Drainage Properties - The sand with silt soils and silty sand soils encountered in our borings are judged to be moderately free draining. The clayey silt and sandy silt soils are judged to be relatively slow draining. Surface water may tend to "perch" over the these soils during wet periods.

RECOMMENDATIONS

Building Grading Procedures

Excavation

To prepare the building area for shallow spread footing and floor slab support, we recommend complete excavation of the existing organic soils. This excavation should result in the following excavation depths at the test boring locations:

Boring Number	Minimum Depth of Excavation	Approximate Elevation of Excavation
02-01	4	1415½
02-02	12½	1407½
02-03	8	1412½
02-04	6	1412½
02-05	9	1409½
02-06	10	1409

As conditions will likely change between the test locations, we recommend that an AET Geotechnical Engineer/Technician observe the final excavation and judge soil suitability prior to fill or footing placement.

It appears some of the excavation may extend below the ground water level. Where standing ground water is present, we recommend dewatering be performed to allow observation of the bottom, and to facilitate filling operations.

Where engineered fill is needed to establish foundation grade, the excavation bottom and subsequent fill system should maintain 1:1 lateral oversizing. That is, for each vertical foot of fill placed below the foundation, the excavation bottom should be extended laterally beyond the footing edges an equal distance.

Filling

We recommend fill placed below footing and floor slab areas be compacted in thin lifts to a minimum of 98% of the Standard Proctor density (ASTM:D698). The fill lift thicknesses should be thin enough such that the entire thickness of fill placed can be compacted to meet the minimum specified compaction level.

Many of the soils being excavated such as the black organic silts and peats will not be suitable for reuse as engineered fill. Also, some of the soils may be wet and not be practical to scarify and dry. It may be possible to salvage some of the more granular fill soils (silty sands to sands), although separation of more favorable materials should be monitored by a geotechnical technician on a full-time basis.

Imported fill should preferably consist of sands to silty sands with less than 20% by weight passing the #200 sieve (Granular Borrow). Cleaner materials may be needed in some portions of the fill sequence. When placing fill in excavations where the bottoms are wet or have sensitive soils, cleaner sands should be used to facilitate compaction of the sand, and reduce disturbance to the underlying soils. Another situation where cleaner sands may be needed will be exterior applications where frost properties are important (further discussed on page 17).

If engineered fill is placed on sloping ground (4:1 or steeper), we recommend the excavation bottom be benched or terraced into the slope (parallel to the ground contour) prior to fill placement.

Foundation Recommendations

After preparing the site, as recommended previously, it is our judgment that the structure can be supported on conventional spread or strip footings on either the undisturbed native soils or properly compacted engineered fill. These foundations can be designed for a maximum allowable soil bearing pressure of 3000 psf. Foundations bearing on soil should be provided with a minimum of 60 inches of cover for adequate protection from frost.

It is our judgment this design will include a factor of safety of greater than 3 against shear or base failure, and that total and differential building settlement should be less than 1 inch.

Floor Slab Support

Preparation of the building area, as previously recommended, will also prepare the site for floor slab support. All fill supporting the floor slabs should be compacted to a minimum of 95% of Standard Proctor density. This includes utility and foundation trench backfill.

Floor Slab Moisture/Vapor Protection

For recommendations pertaining to moisture and vapor protection of the floor slabs, we refer you to the attached standard sheet entitled "Floor Slab Moisture/Vapor Protection."

Building Backfilling

Our recommendations for backfilling the structure appears in the attached standard data sheet entitled "Freezing Weather Effects on Building Construction". This sheet presents information on preferred soil types and frost considerations.

Parking Lot

To achieve a no differential frost heave design, it would be necessary to subcut the frost-susceptible soils to a depth of 8 feet below final grade and replace these soils with clean granular, non-frost susceptible (NFS) sand. To achieve a no settlement design, it would be necessary to subcut all of the organic soils and replace with NFS sand. Based on the potential of mildly contaminated soils, this approach may not be economically feasible, and we assume you are willing to tolerate some movements due to frost heave and/or settlement.

We recommend providing a minimum inorganic section 36 inches thick including subbase, base and bituminous pavement. The depth of subcut would be dependant on your final desired grade and whether organic soils are present within 36 inches of final grade. It would be beneficial to advance more soil borings in proposed parking areas to further define the extent of organic soils.

Following the subcut (if any), the subgrade is surface compacted, and a non-woven geotextile fabric is placed. The fabric should have both separation and filtering properties (meeting the more stringent specification properties of the Type I, II, III, IV and V fabrics listed in MnDOT Specification 3733).

All fill should be placed in loose lifts of 8 to 10 inches, moisture conditioned if needed, and properly compacted. All fill should be compacted to 100% of Standard Proctor Density (ASTM:D698).

With this approach, the section placed above the geotextile fabric should consist of up to of 24 inches of Select Granular Borrow (Mn DOT 3149.2B2), 8 inches of Class 5 Aggregate Base (Mn DOT 3138), and 4 inches of bituminous pavement. The bituminous should be placed in two lifts, and should meet the requirements of MnDOT Specification 2340 or 2350.

Although this section does not totally eliminate frost heave or settlement, it will reduce movements and will significantly decrease the abruptness or differential nature of heaves, resulting in relatively good performance

at a more feasible cost. Once a parking lot grading plan has been developed, we recommend we be contacted for a review of the paved area corrections and design.

Utility Support

We recommend that utilities by supported either on the inorganic native soils or on engineered fill over the native inorganic soils. There may be significant soil corrections needed dependant on the locations of utilities. Additional borings may be warranted to identify the most economical utility routes.

CONSTRUCTION CONSIDERATIONS

Construction Difficulties

It appears the excavation may extend below the ground water level. Perched water sources can also appear, particularly during times of wetter weather. Where standing water collects within excavation bottom, we recommend positive dewatering be performed to allow fill or footing placement in a non-standing water condition.

The on-site soils can contain cobbles and boulders which can complicate excavation and filling.

Some of the on-site fill soils will likely be wet, and create unstable conditions. Wetter soils will also be difficult to reuse as fill, thereby requiring scarification and drying.

Excavation Sidesloping

If unretained, the excavation should maintain sideslopes in accordance with OSHA Regulations (Standards 29 CFR), Part 1926, Subpart P, "Excavations" (can be found on www.osha.gov). Even with the required OSHA sloping, water can potentially induce sideslope erosion or running which could require slope maintenance.

Environmental Concerns

Due to the past history of environmental concerns at the property, we recommend that the owner's environmental consultant be notified prior to and available during any excavation processes throughout construction. A Remedial Action Plan may be required if a cleanup becomes necessary at the site. Cleanup, if needed, would likely take place during site development and might include soil excavation and treatment.

Observation and Testing

The recommendations in this report are based on the subsurface conditions found at our test boring locations. Since the soil conditions can be expected to vary away from the soil boring locations, we recommend on-site observation by a geotechnical engineer/technician during construction to evaluate the effect of these potential changes. Soil density testing should also be performed on all new fill placed in order to document that project recommendations or specifications for compaction and moisture have been satisfied. Where fill material type is important, sieve analysis tests should be performed to document the actual fill meets the recommended gradation criteria.

EXPLORATION PROCEDURES

Boring Location/Elevation Data

Our subsurface exploration program included drilling a total of six (6) standard penetration test borings within the limits of the proposed developments. These borings were drilled at the site on October 22 and 23, 2002. The surface elevations at the test boring locations were determined by our drill crew and are relative to the survey point on Lavaque By-Pass, nail in blacktop, which had an assigned elevation of +1425.16 feet. The approximate locations of the borings and the benchmark chosen for our boring elevations are shown on the sketch in Appendix A.

Exploration/Classification Methods

We refer you to the last sheet in the Appendix for descriptions of our standard procedures for sampling methods, classification methods, water level measurements, and sample storage.

EXPLORATION PROGRAM LIMITATIONS

The data derived through this sampling and observation program have been used to develop our opinions about the subsurface conditions at your site. However, because no exploration program can reveal totally what is in the subsurface, conditions between borings and between samples and at other times may differ from conditions described in this report. The exploration we conducted identified subsurface conditions only at those points where we took samples or observed ground water conditions. Depending on the sampling methods and sampling frequency, every soil layer may not be observed, and some materials or layers which are present in the ground may not be noted on the boring logs.

Unless actually observed in a sample, contacts between soil layers are estimated based on the spacing of samples and the action of drilling tools. Thus, most contacts shown on the logs are approximate, with a possible upper and lower limits of contacts defined by the overlying and underlying samples.

Cobbles, boulders, and other large objects generally cannot be recovered from test borings, and they may be present in the ground even if they are not noted on the boring logs.

If conditions encountered during construction differ from those indicated by our borings, it may be necessary to alter our conclusions and recommendations, or to modify construction procedures, and the cost of construction may be affected.

The extent and detail of information about the subsurface condition is directly related to the scope of the exploration. It should be understood, therefore, that additional information can be obtained by means of additional exploration.

STANDARD OF CARE

Our services for your project have been conducted to those standards considered normal for services of this type at this time and location. Other than this, no warranty, either express or implied, is intended.

SIGNATURES

Report Prepared by:

Amy Smith, PE
Project Engineer

Report Reviewed by:

William K. Cody, PE
Principal Engineer
MN Reg. No. 16136

FLOOR SLAB MOISTURE/VAPOR PROTECTION

Floor slab design relative to moisture/vapor protection should consider the type and location of two elements, a granular layer and a vapor membrane (vapor retarder, water resistant barrier or vapor barrier). In the following sections, the pros and cons of the possible options regarding these elements will be presented, such that you and your specifier can make an engineering decision based on the benefits and costs of the choices.

GRANULAR LAYER

In American Concrete Institute (ACI) 302.1-96, a "base material" is recommended, rather than the conventional cleaner "sand cushion" material. The manual maintains that clean sand (common "cushion" sand) is difficult to compact and maintain until concrete placement is complete. ACI recommends a clean, fine graded material (with at least 10% to 30% of particles passing a #100 sieve) which is not contaminated with clay, silt or organic material. We refer you to ACI 302.1-96 for additional details regarding the requirements for the base material.

In cases where potential static water levels or significant perched water sources appear near or above the floor slab, an underfloor drainage system may be needed wherein a draintile system is placed within a thicker clean sand or gravel layer. Such a system should be properly engineered depending on subgrade soil types and rate/head of water inflow.

VAPOR MEMBRANE

The need for a vapor membrane depends on whether the floor slab will have a vapor sensitive covering, will have vapor sensitive items stored on the slab, or if the space above the slab will be a humidity controlled area. If the project does not have this vapor sensitivity or moisture control need, placement of a vapor membrane may not be necessary. Your decision will then relate to whether to use the ACI base material or a conventional sand cushion layer. However, if any of the above sensitivity issues apply, placement of a vapor membrane is recommended. Some floor covering systems (adhesives and flooring materials) require a vapor membrane to maintain a specified maximum slab moisture content as a condition of their warranty.

VAPOR MEMBRANE/GRANULAR LAYER PLACEMENT

A number of issues should be considered when deciding whether to place the vapor membrane above or below the granular layer. The benefits of placing the slab on a granular layer, with the vapor membrane placed **below** the granular layer, include **reduction** of the following:

- Slab curling during the curing and drying process.
- Time of bleeding, which allows for quicker finishing.
- Vapor membrane puncturing.
- Surface blistering or delamination caused by an extended bleeding period.
- Cracking caused by plastic or drying shrinkage.

The benefits of placing the vapor membrane **over** the granular layer include the following:

- The moisture emission rate is achieved faster.
- Eliminates a potential water reservoir within the granular layer above the membrane.
- Provides a "slip surface", thereby reducing slab restraint and the associated random cracking.

If a membrane is to be used in conjunction with a granular layer, the approach recommended depends on slab usage and the construction schedule. The vapor membrane should be placed above the granular layer when:

- Vapor sensitive floor covering systems are used or vapor sensitive items will be directly placed on the slab.
- The area will be humidity controlled, but the slab will be placed before the building is enclosed and sealed from rain.
- Required by a floor covering manufacturer's system warranty.

The vapor membrane should be placed below the granular layer when:

- Used in humidity controlled areas (without vapor sensitive coverings/stored items), with the roof membrane in place, and the building enclosed to the point where precipitation will not intrude into the slab area. Consideration should be given to slight sloping of the membrane to edges where draintile or other disposal methods can alleviate potential water sources, such as pipe or roof leaks, foundation wall damp proofing failure, fire sprinkler system activation, etc.

There may be cases where membrane placement may have a detrimental effect on the subgrade support system (e.g., expansive soils). In these cases, your decision will need to weigh the cost of subgrade options and the performance risks.

FREEZING WEATHER EFFECTS ON BUILDING CONSTRUCTION

GENERAL

Because water expands upon freezing and soils contain water, soils which are allowed to freeze will heave and lose density. Upon thawing, these soils will not regain their original strength and density. The extent of heave and density/ strength loss depends on the soil type and moisture condition. Heave is greater in soils with higher percentages of fines (silts/clays). High silt content soils are most susceptible, due to their high capillary rise potential which can create ice lenses. Fine grained soils generally heave about 1/4" to 3/8" for each foot of frost penetration. This can translate to 1" to 2" of total frost heave. This total amount can be significantly greater if ice lensing occurs.

DESIGN CONSIDERATIONS

Clayey and silty soils can be used as perimeter backfill, although the effect of their poor drainage and frost properties should be considered. Basement areas will have special drainage and lateral load requirements which are not discussed here. Frost heave may be critical in doorway areas. Stoops or sidewalks adjacent to doorways could be designed as structural slabs supported on frost footings with void spaces below. With this design, movements may then occur between the structural slab and the adjacent on-grade slabs. Non-frost susceptible sands (with less than 12% passing a #200 sieve) can be used below such areas. Depending on the function of surrounding areas, the sand layer may need a thickness transition away from the area where movement is critical. With sand placement over slower draining soils, subsurface drainage would be needed for the sand layer. High density extruded insulation could be used within the sand to reduce frost penetration, thereby reducing the sand thickness needed. We caution that insulation placed near the surface can increase the potential for ice glazing of the surface.

The possible effects of adfreezing should be considered if clayey or silty soils are used as backfill. Adfreezing occurs when backfill adheres to rough surfaced foundation walls and lifts the wall as it freezes and heaves. This occurrence is most common with masonry block walls, unheated or poorly heated building situations and clay backfill. The potential is also increased where backfill soils are poorly compacted and become saturated. The risk of adfreezing can be decreased by placing a low friction separating layer between the wall and backfill.

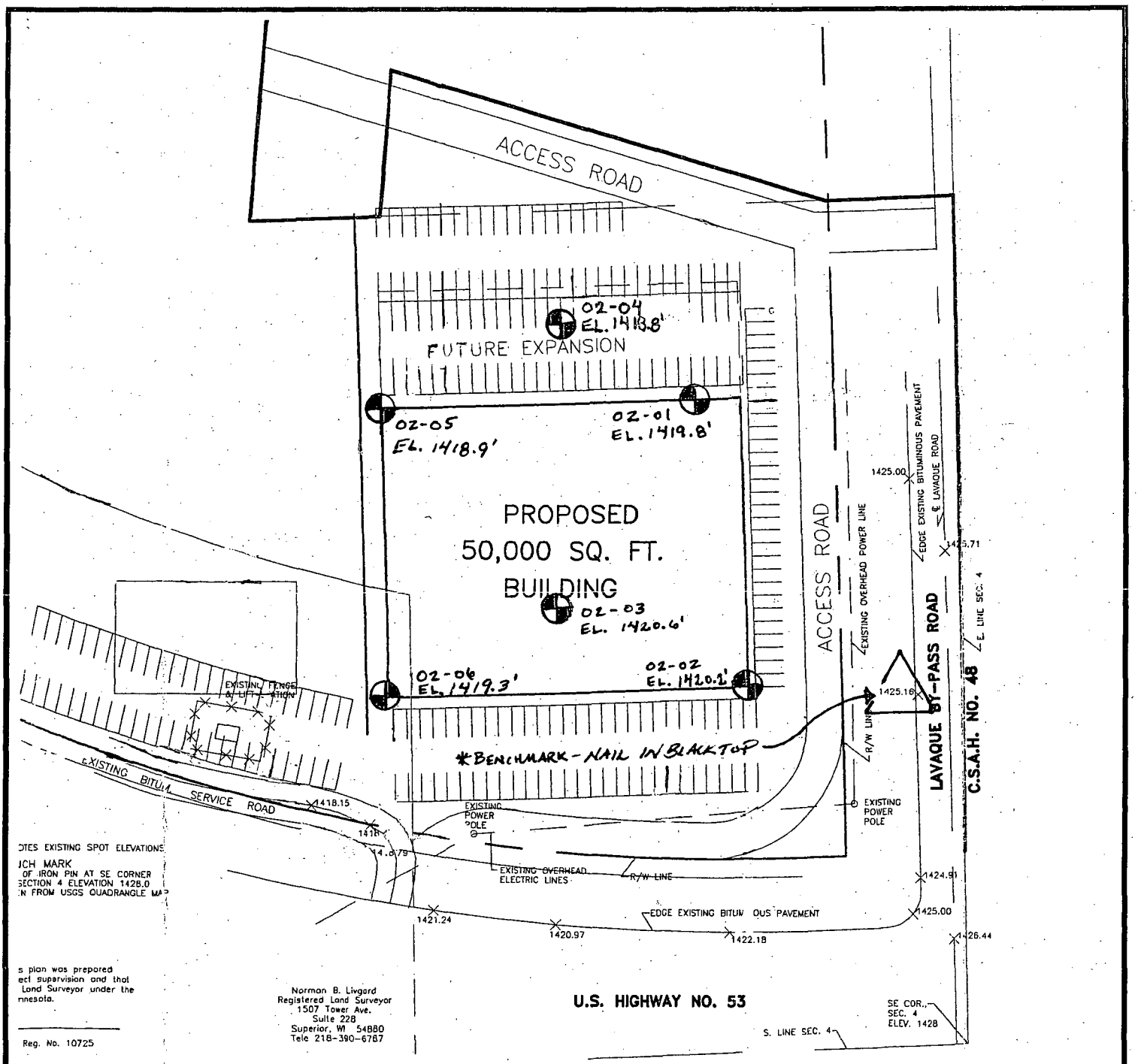
Adfreezing can occur on exterior piers (such as deck, fence or other similar pier footings), even if a smooth surface is provided. This is more likely in poor drainage situations where soils become saturated. Additional footing embedment and/or widened footings below the frost zones (which includes tensile reinforcement) can be used to resist uplift forces. Specific designs would require individual analysis.

CONSTRUCTION CONSIDERATIONS

Foundations, slabs and other improvements which may be affected by frost movements should be insulated from frost penetration during freezing weather. If filling takes place during freezing weather, all frozen soils, snow and ice should be stripped from areas to be filled prior to new fill placement. The new fill should not be allowed to freeze during transit, placement or compaction. This should be considered in the project scheduling, budgeting and quantity estimating. It is usually beneficial to perform cold weather earthwork operations in small areas where grade can be attained quickly rather than working larger areas where a greater amount of frost stripping may be needed. If slab subgrade areas freeze, we recommend the subgrade be thawed prior to floor slab placement. The frost action may also require reworking and recompaction of the thawed subgrade.

Appendix A

Boring Location Sketch
Logs of Test Borings
Results of Sieve Analysis Tests
Boring Log Notes
Classification of Soils for Engineering Purposes
General Terminology Notes
Geologic Terminology
Exploration/Classification Methods



AMERICAN ENGINEERING TESTING, INC.
DULUTH, MINNESOTA

EXPLANATION

02-01 = *Boring Location and Number*
EL. 1419.8' = *Boring Elevation*

Benchmark - *Survey point on Lavaque By-Pass, Nail in Blacktop. El. 1425.16'*

*Scale: 1"=100'

N

REFERENCE: Sketch derived from plans obtained from Bill Wilson (property owner).

FIGURE 1

BORING LOCATIONS

SCHNEIDERMAN'S BUILDING

UGSTAD ROAD AND HIGHWAY 53
HERMANTOWN, MINNESOTA

ALTERED BY: ZAE	CHECKED BY:
DATE: 11/19/02	AET JOB #: 07-01807

AMERICAN ENGINEERING TESTING, INC.

SUBSURFACE BORING LOG

AET JOB NO: **07-01807** LOG OF BORING NO. **02-01 (p. 1 of 1)**

PROJECT: **Proposed Schneiderman's Building, Highway 53 & Ugstad Road; Hermantown, MN**

DEPTH IN FEET	SURFACE ELEVATION: 1419.8 MATERIAL DESCRIPTION	GEOLOGY	N	MC	SAMPLE TYPE	REC IN.	FIELD & LABORATORY TESTS WC	DEN	LL	PL	PID (ppm)
1	Fill, Silty Sand with Gravel, brown, moist	FILL		M	AS						
2	Peat, sapric, black, firm (PT)	SWAMP DEPOSIT	8	M	SS	12	32				
5	Silty Sand with Gravel, brown, moist, medium dense (SM)	TILL	12	M	SS	14					
8			25	M	SS	6					
10	Sand with Silt, fine to medium grained, brown, waterbearing, medium dense (SP-SM)	COARSE ALLUVIUM	14	WB	SS	10					
12	Sandy Silt with Gravel, brown, lenses of waterbearing sand, dense to very dense (ML)	TILL	36	WB	SS	12					
15			50/.4	WB	SS	8					
20			50/.4	WB	SS	0					
24			64	WB	SS	12					
25	End of Boring @ 25.0 feet Borehole backfilled with auger cuttings.										

DEPTH: DRILLING METHOD	WATER LEVEL MEASUREMENTS						
0-23½' 2.25" HSA	DATE	TIME	SAMPLED DEPTH	CASING DEPTH	CAVE-IN DEPTH	DRILLING FLUID LEVEL	WATER LEVEL
	10/22/02		11.0'	9.5'	11.0'	---	9.0'
	10/22/02	10:55 AM	25.0'	23.5'	25.0'	---	20.0'
BORING COMPLETED: 10/22/02	10/22/02	11:05 AM	25.0'	None	10.0'	---	9.0'
CC: LA CA: RJ Rig: 5							

NOTE: REFER TO THE ATTACHED SHEETS FOR AN EXPLANATION OF TERMINOLOGY ON THIS LOG

AMERICAN ENGINEERING TESTING, INC.

SUBSURFACE BORING LOG

AET JOB NO: **07-01807** LOG OF BORING NO. **02-02 (p. 1 of 1)**

PROJECT: **Proposed Schneiderman's Building, Highway 53 & Ugstad Road; Hermantown, MN**

DEPTH IN FEET	SURFACE ELEVATION: 1420.2 MATERIAL DESCRIPTION	GEOLOGY	N	MC	SAMPLE TYPE	REC IN.	FIELD & LABORATORY TESTS WC	DEN	LL	PL	PID (ppm)
1	Fill, Silty Sand with Gravel, brown, moist	FILL		M	AS						
2	Organic Silt, wood at 4.5 feet, black, moist, very soft to wet (OL)	SWAMP DEPOSIT	2	M	SS	6					
3											
4											
5			50/.4	M	SS	4	50				
6											
7											
8			3	M	SS	0					
9											
10			3	M	SS	12	120				
11											
12											
13	Silty Sand, fine grained, brown, wet to moist, medium dense (SM)		18	W	SS	12					
14											
15		TILL	17	M	SS	12	13				
16											
17											
18											
19	Sand with Silt, fine to medium grained, brown, waterbearing, dense (SP-SM)										
20		COARSE ALLUVIUM	40	WB	SS	3					
21											
22											
23	Sandy Silt with Gravel, brown, moist, dense (ML)	TILL									
24			33	M	SS	12					
25	End of Boring @ 25.0 feet Borehole backfilled with auger cuttings.										

DEPTH: DRILLING METHOD	WATER LEVEL MEASUREMENTS						
	DATE	TIME	SAMPLED DEPTH	CASING DEPTH	CAVE-IN DEPTH	DRILLING FLUID LEVEL	WATER LEVEL
0-23½' 2.25" HSA	**10/22/02**	**1:15 PM**	**21.0'**	**19.5'**	**21.0'**	**---**	**17.0'**
	10/22/02	**1:35 PM**	**25.0'**	**23.5'**	**25.0'**	**---**	**17.0'**
BORING COMPLETED: **10/22/02**	**10/22/02**	**1:45 PM**	**25.0'**	**None**	**7.5'**	**---**	**7.0'**
CC: **LA** CA: **RJ** Rig: **5**							

NOTE: REFER TO THE ATTACHED SHEETS FOR AN EXPLANATION OF TERMINOLOGY ON THIS LOG

AMERICAN ENGINEERING TESTING, INC.

SUBSURFACE BORING LOG

AET JOB NO: **07-01807** LOG OF BORING NO. **02-03 (p. 1 of 1)**

PROJECT: **Proposed Schneiderman's Building, Highway 53 & Ugstad Road; Hermantown, MN**

SURFACE ELEVATION: **1420.6**

DEPTH IN FEET	MATERIAL DESCRIPTION	GEOLOGY	N	MC	SAMPLE TYPE	REC IN.	FIELD & LABORATORY TESTS WC	DEN	LL	PL	PID (ppm)
1	Fill, Silty Sand with Gravel, brown, moist	FILL		M	AS						-
3			15	M	SS	14					0.7
5			6	M	SS	12	48				1.0
6	Organic Silt, lenses of peat, moist, firm (OL)	SWAMP DEPOSIT									
8			7	M	SS	12	16				0.7
9	Silty Sand, a little gravel, brown, moist, medium dense (SM)	TILL									
10			23	M	SS	6					0.6
12	Sand with Silt, fine to medium grained, brown, waterbearing, medium dense (SP-SM)	COARSE ALLUVIUM	29	WB	SS	12					0.7
15	Sandy Silt, a little gravel, brown, wet, medium dense (ML)	TILL	27	W	SS	16					0.7
18	Sand with Silt, medium grained, brown, waterbearing, medium dense to dense (SP-SM)										
20			26	WB	SS	16					0.7
22		COARSE ALLUVIUM									
24			36	WB	SS	16					0.7
25	End of Boring @ 25.0 feet Borehole backfilled with auger cuttings.										

DEPTH: DRILLING METHOD	WATER LEVEL MEASUREMENTS						
	DATE	TIME	SAMPLED DEPTH	CASING DEPTH	CAVE-IN DEPTH	DRILLING FLUID LEVEL	WATER LEVEL
0-23½' 2.25" HSA	**10/22/02**		**13.5'**	**12.0'**	**13.5**	**---**	**12.0'**
	10/22/02	**3:35 PM**	**25.0'**	**23.5'**	**23.5'**	**---**	**18.0'**
BORING COMPLETED: **10/23/02**	**10/22/02**	**3:45 PM**	**25.0'**	**None**	**7.5'**	**---**	**7.0'**
CC: **LA** CA: **RJ** Rig: **5**							

NOTE: REFER TO THE ATTACHED SHEETS FOR AN EXPLANATION OF TERMINOLOGY ON THIS LOG

AMERICAN ENGINEERING TESTING, INC.

SUBSURFACE BORING LOG

AET JOB NO: **07-01807** LOG OF BORING NO. **02-04 (p. 1 of 1)**

PROJECT: **Proposed Schneiderman's Building, Highway 53 & Ugstad Road; Hermantown, MN**

DEPTH IN FEET	SURFACE ELEVATION: 1418.8 MATERIAL DESCRIPTION	GEOLOGY	N	MC	SAMPLE TYPE	REC IN.	FIELD & LABORATORY TESTS WC	DEN	LL	PL	PID (ppm)
1	Fill, Sand with Silt and Gravel, brown, moist	FILL		M	AS		7				-
2											
3			21	M	SS	12					0.7
4	Clayey Silt, trace of organics, brown, moist, soft (CL-ML)	FINE ALLUVIUM									
5			4	M	SS	5	21				0.5
6											
7	Silty Sand with Gravel, apparent cobbles, brown, moist, medium dense to very dense (SM)										
8			24	M	SS	10					0.6
9											
10			42	M	SS	12					0.6
11											
12											
13			92/.9	M	SS	0					-
14		TILL									
15	Sandy Silt, a little gravel, brown, moist to wet, very dense to dense (ML)		89	M	SS	10					0.7
16											
17											
18											
19											
20			33	W	SS	16					0.5
21											
22	Sand with Silt, fine to medium grained, a little gravel, brown, waterbearing, medium dense (SP-SM)										
23		COARSE ALLUVIUM									
24			15	WB	SS	18					0.5
25	End of Boring @ 25.0 feet Borehole backfilled with auger cuttings.										

DEPTH: DRILLING METHOD	WATER LEVEL MEASUREMENTS						
	DATE	TIME	SAMPLED DEPTH	CASING DEPTH	CAVE-IN DEPTH	DRILLING FLUID LEVEL	WATER LEVEL
0-23½' 2.25" HSA	**10/23/02**	**1:50 PM**	**25.0'**	**23.5'**	**25.0'**	**---**	**21.0'**
	10/23/02	**2:00 PM**	**25.0'**	**None**	**19.0'**	**---**	**None**
BORING COMPLETED: **10/23/02**							
CC: **LA** CA: **RJ** Rig: **5**							

NOTE: REFER TO THE ATTACHED SHEETS FOR AN EXPLANATION OF TERMINOLOGY ON THIS LOG

AMERICAN ENGINEERING TESTING, INC.

SUBSURFACE BORING LOG

AET JOB NO: **07-01807** LOG OF BORING NO. **02-05 (p. 1 of 1)**

PROJECT: **Proposed Schneiderman's Building, Highway 53 & Ugstad Road; Hermantown, MN**

DEPTH IN FEET	SURFACE ELEVATION: 1418.9 MATERIAL DESCRIPTION	GEOLOGY	N	MC	SAMPLE TYPE	REC IN.	FIELD & LABORATORY TESTS WC	DEN	LL	PL	PID (ppm)
1	Fill, Silty Sand with Gravel, brown, moist	FILL		M	AS						-
3			39	M	SS	12					0.5
5			44	M	SS	14	8				0.5
7											
8	Silty Sand, trace of organics, brown, moist, medium dense (SM)		20	M	SS	14					1.1
10	Silty Sand with Gravel, apparent cobbles, brown, moist, medium dense (SM)	TILL	20	M	SS	12					-
	Auger Refusal @ 11.7 feet										
	Borehole backfilled with auger cuttings.										

DEPTH:	DRILLING METHOD	WATER LEVEL MEASUREMENTS						
		DATE	TIME	SAMPLED DEPTH	CASING DEPTH	CAVE-IN DEPTH	DRILLING FLUID LEVEL	WATER LEVEL
0-11.7'	2.25" HSA	10/23/02	11:35 AM	11.0'	11.7'	11.7'	---	None
		10/23/02	11:45 PM	11.0'	None	10.0'	---	None
BORING COMPLETED:	10/23/02							
CC: LA	CA: RJ Rig: 5							

NOTE: REFER TO THE ATTACHED SHEETS FOR AN EXPLANATION OF TERMINOLOGY ON THIS LOG

AMERICAN ENGINEERING TESTING, INC.

SUBSURFACE BORING LOG

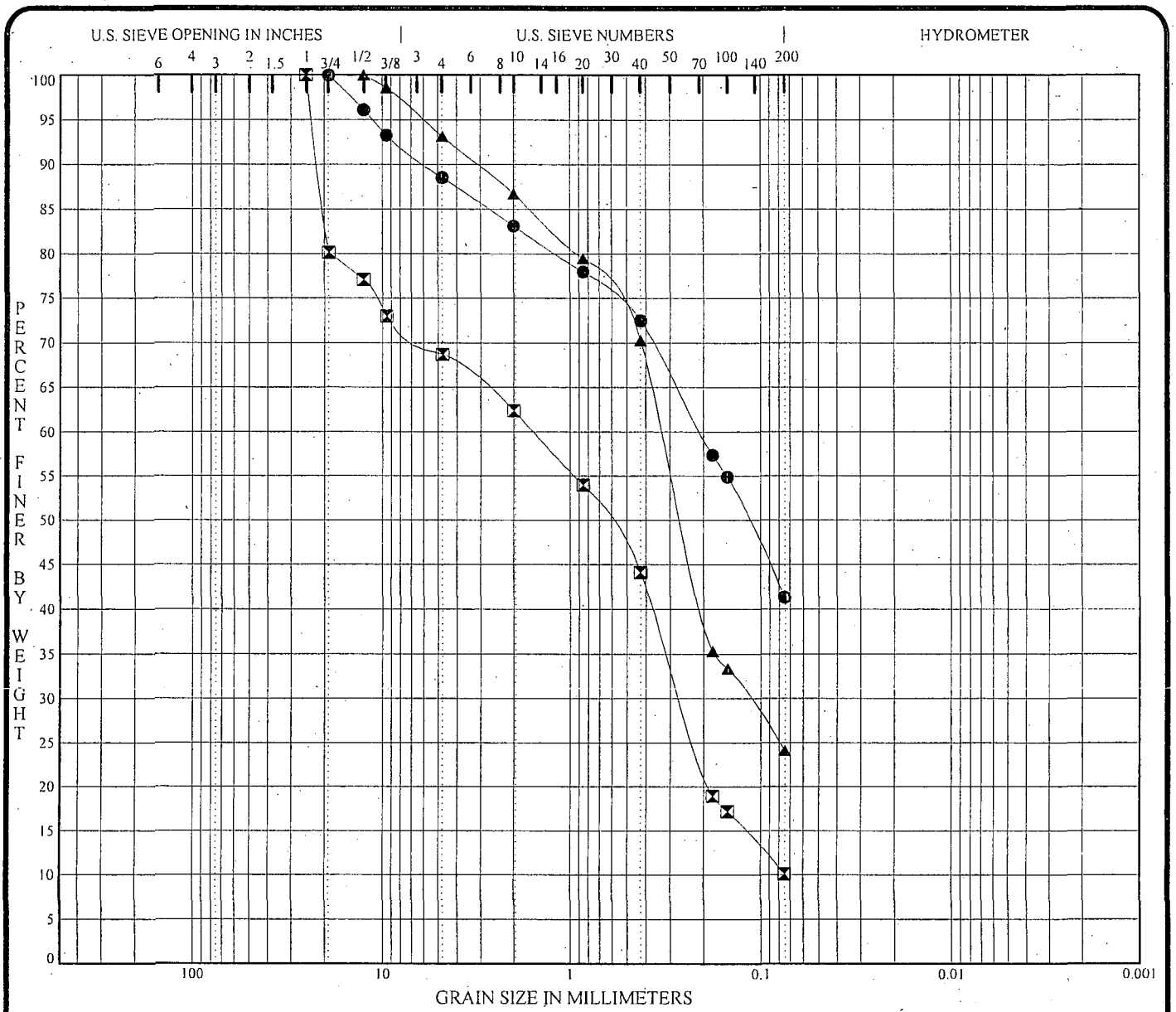
AET JOB NO: **07-01807** LOG OF BORING NO. **02-06 (p. 1 of 1)**

PROJECT: **Proposed Schneiderman's Building, Highway 53 & Ugstad Road; Hermantown, MN**

DEPTH IN FEET	SURFACE ELEVATION: 1419.3 MATERIAL DESCRIPTION	GEOLOGY	N	MC	SAMPLE TYPE	REC IN.	FIELD & LABORATORY TESTS WC	DEN	LL	PL	PID (ppm)
1	Fill, Silty Sand with Gravel, brown, moist			M	AS						-
3		FILL	35	M	SS	16					0.6
5			8	M	SS	12					0.8
6	Peat, sapric, black, moist, firm (PT)	SWAMP DEPOSIT	7	M	SS	5					0.7
9	Clayey Silt, trace of organics, dark brown, moist (ML-CL)	FINE ALLUVIUM									
10	Sitly Sand with Gravel, fine grained, brown, moist, medium dense (SM)		16	M	SS	16					0.6
13			22	M	SS	10					0.5
15			29	M	SS	12					0.6
17		TILL									
19	Sandy Silt, brown, lenses of waterbearing sand, dense to medium dense (ML)										
20			46	WB	SS	8					0.5
24			23	WB	SS	16					0.4
25	End of Boring @ 25.0 feet Borehole backfilled with auger cuttings.										

DEPTH: DRILLING METHOD	WATER LEVEL MEASUREMENTS						
	DATE	TIME	SAMPLED DEPTH	CASING DEPTH	CAVE-IN DEPTH	DRILLING FLUID LEVEL	WATER LEVEL
0-23½' 2.25" HSA	**10/23/02**	**9:50 AM**	**25.0'**	**23.5'**	**25.0'**	**---**	**20.5'**
	10/23/02	**10:00 AM**	**25.0'**	**None**	**20.0'**	**---**	**None**
BORING COMPLETED: **10/23/02**							
CC: **LA** CA: **RJ** Rig: **5**							

NOTE: REFER TO THE ATTACHED SHEETS FOR AN EXPLANATION OF TERMINOLOGY ON THIS LOG



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Specimen Identification		Classification	MC%	LL	PL	PI	Cc	Cu
●	02-02	14.5	Silty Sand (SM)	13					
⧓	02-04	0.0	Sand with Silt and Gravel (SP-SM)	7				0.59	21.2
▲	02-05	4.5	Silty Sand (SM)	8					

	Specimen Identification		D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	02-02	14.5	19.00	0.21			11.5	47.2	41.4	
⧓	02-04	0.0	25.00	1.57	0.262		31.3	58.6	10.1	
▲	02-05	4.5	12.50	0.33	0.117		6.9	69.0	24.1	

PROJECT **Highway 53 & Ugstad Road; Hermantown, Minnesota**

JOB NO. **07-01807**

DATE **10/23/02**

AMERICAN ENGINEERING TESTING, INC.

GRADATION CURVES

BORING LOG NOTES

DRILLING AND SAMPLING SYMBOLS

Symbol	Definition
AC:	At completion of boring
B,H,N:	Size of flush-joint casing
BX:	BX double tube core barrel
CA:	Crew Assistant (initials)
CAS:	Pipe casing, number indicates nominal diameter in inches
CC:	Crew Chief (initials)
COT:	Clean-out tube
DC:	Drive casing; number indicates diameter in inches
DM:	Drilling mud or bentonite slurry
DR:	Driller (initials)
DS:	Disturbed sample from auger flights
FA:	Flight auger; number indicates outside diameter in inches
HA:	Hand auger; number indicates outside diameter
HSA:	Hollow stem auger; number indicates inside diameter in inches
LG:	Field logger (initials)
MC:	Column used to describe moisture condition of samples and for the ground water level symbols
N (BPF):	Standard penetration resistance (N-value) in blows per foot (see notes)
NQ:	NQ wireline core barrel
PQ:	PQ wireline core barrel
RD:	Rotary drilling with fluid and roller or drag bit
REC:	In split-spoon (see notes) and thin-walled tube sampling, the recovered length (in inches) of sample. In rock coring, the length of core recovered (expressed as percent of the total core run). Zero indicates no sample recovered.
REV:	Revert drilling fluid
SS:	Standard split-spoon sampler (steel; 1⅜" is inside diameter; 2" outside diameter); unless indicated otherwise
TW:	Thin-walled tube; number indicates inside diameter in inches
WASH:	Sample of material obtained by screening returning rotary drilling fluid or by which has collected inside the borehole after "falling" through drilling fluid
WH:	Sampler advanced by static weight of drill rod and 140-pound hammer
WR:	Sampler advanced by static weight of drill rod
94mm:	94 millimeter wireline core barrel
▼:	Water level directly measured in boring

TEST SYMBOLS

Symbol	Definition
▽:	Estimated water level based solely on sample appearance
CONS:	One-dimensional consolidation test
DEN:	Dry density, pcf
DST:	Direct shear test
E:	Pressuremeter Modulus, tsf
HYD:	Hydrometer analysis
LL:	Liquid Limit, %
LP:	Pressuremeter Limit Pressure, tsf
OC:	Organic Content, %
PERM:	Coefficient of permeability (K) test; F - Field; L - Laboratory
PL:	Plastic Limit, %
q_p:	Pocket Penetrometer strength, tsf (approximate)
q_c:	Static cone bearing pressure, tsf
q_u:	Unconfined compressive strength, psf
R:	Electrical Resistivity, ohm-cms
RQD:	Rock Quality Designator in percent (aggregate length of core pieces 4" or more in length as a percent of total core run)
SA:	Sieve analysis
TRX:	Triaxial compression test
VSR:	Vane shear strength, remoulded (field), psf
VSU:	Vane shear strength, undisturbed (field), psf
WC:	Water content, as percent of dry weight
%-200:	Percent of material finer than #200 sieve

STANDARD PENETRATION TEST NOTES

The standard penetration test consists of driving the sampler with a 140-pound hammer and counting the number of blows applied in each of three 6" increments of penetration. If the sampler is driven less than 18" (usually in highly resistant material), permitted in ASTM:D1586, the blows for each complete 6" increment and for each partial increment is on the boring log. For partial increments, the number of blows is shown to the nearest inch below the slash.

The length of sample recovered, as shown on the "REC" column, may be greater than the distance indicated in the N column. The disparity is because the N-value is recorded below the initial 6" set (unless partial penetration defined in ASTM:D1586 is encountered) whereas the length of sample recovered is for the entire sampler drive (which may even extend more than 18").

CLASSIFICATION OF SOILS FOR ENGINEERING PURPOSES
ASTM Designation: D 2487
(Based on Unified Soil Classification System)

AMERICAN ENGINEERING TESTING, INC.

			Criteria for Assigning Group Symbols and Group Names Using Laboratory Tests[A]	Soil Classification: Group Symbol	Soil Classification: Group Name[B]
Coarse-Grained Soils More than 50% retained on No. 200 sieve	Gravels More than 50% coarse fraction retained on No. 4 sieve	Clean Gravels Less than 5% fines[C]	$Cu \geq 4$ and $1 \leq Cc \leq 3^E$	GW	Well graded gravel[F]
			$Cu < 4$ and/or $1 > Cc > 3^E$	GP	Poorly graded gravel[F]
		Gravels with Fines More than 12% fines[C]	Fines classify as ML or MH	GM	Silty gravel[F,G,H]
			Fines classify as CL or CH	GC	Clayey gravel[F,G,H]
	Sands 50% or more of coarse fraction passes No. 4 sieve	Clean Sands Less than 5% fines[D]	$Cu \geq 6$ and $1 \leq Cc \leq 3^E$	SW	Well-graded sand[I]
			$Cu < 6$ and/or $1 > Cc > 3^E$	SP	Poorly graded sand[I]
		Sands with Fines More than 12% fines[D]	Fines classify as ML or MH	SM	Silty sand[G,H,I]
			Fines classify as CL or CH	SC	Clayey sand[G,H,I]
Fine-Grained Soils 50% or more passes the No. 200 sieve	Silts and Clays Liquid limit less than 50	inorganic	PI > 7 and plots on or above "A" line[J]	CL	Lean clay[K,L,M]
			PI < 4 or plots below "A" line[J]	ML	Silt[K,L,M]
		organic	Liquid limit - oven dried / Liquid limit - not dried < 0.75	OL	Organic clay[K,L,M,N] Organic silt[K,L,M,O]
	Silts and Clays Liquid limit 50 or more	inorganic	PI plots on or above "A" line	CH	Fat clay[K,L,M]
			PI plots below "A" line	MH	Elastic silt[K,L,M]
		organic	Liquid limit - oven dried / Liquid limit - not dried < 0.75	OH	Organic clay[K,L,M,P] Organic silt[K,L,M,O]
Highly organic soils			Primarily organic matter, dark in color, and organic odor	PT	Peat

[A] Based on the material passing the 3-in. (75-mm) sieve.

[B] If field sample contained cobbles or boulders, or both, add "with cobbles or boulders, or both" to group name.

[C] Gravels with 5 to 12% fines require dual symbols:
- GW-GM well-graded gravel with silt
- GW-GC well-graded gravel with clay
- GP-GM poorly graded gravel with silt
- GP-GC poorly graded gravel with clay

[D] Sands with 5 to 12% fines require dual symbols:
- SW-SM well-graded sand with silt
- SW-SC well-graded sand with clay
- SP-SM poorly graded sand with silt
- SP-SC poorly graded sand with clay

[E] $Cu = D_{60}/D_{10}$ $Cc = \frac{(D_{30})^2}{D_{10} \times D_{60}}$

[F] If soil contains ≥15% sand, add "with sand" to group name.

[G] If fines classify as CL-ML, use dual symbol GC-GM, or SC-SM.

[H] If fines are organic, add "with organic fines" to group name.

[I] If soil contains ≥15% gravel, add "with gravel" to group name.

[J] If Atterberg limits plot in hatched area, soil is a CL-ML, silty clay.

[K] If soil contains 15 to 29% plus No. 200, add "with sand" or "with gravel," whichever is predominant.

[L] If soil contains ≥30% plus no. 200, predominantly sand, add "sandy" to to group name.

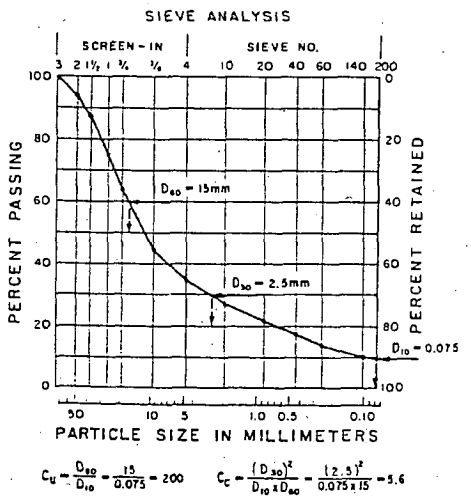
[M] If soil contains ≥30% plus No. 200, predominantly gravel, add "gravelly" to group name.

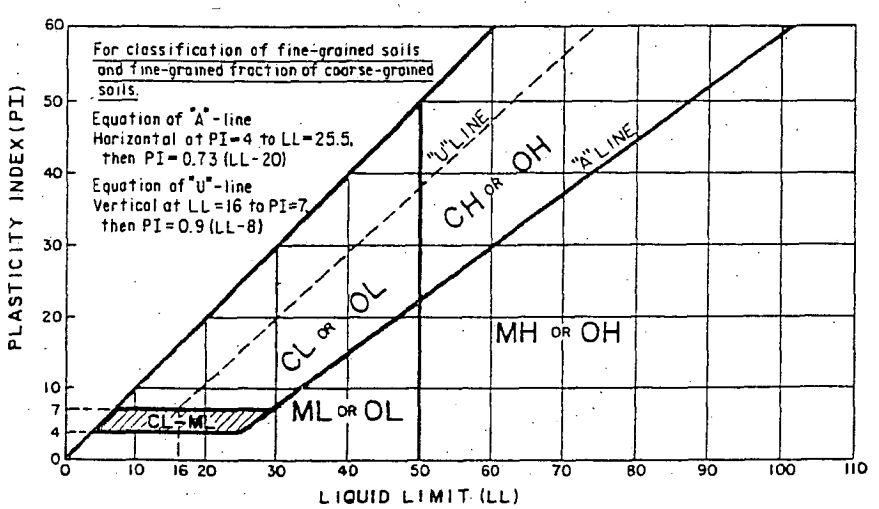
[N] PI ≥ 4 and plots on or above "A" line.

[O] PI < 4 or plots below "A" line.

[P] PI plots on or above "A" line.

[Q] PI plots below "A" line.





GENERAL TERMINOLOGY NOTES FOR SOIL IDENTIFICATION AND DESCRIPTION

GRAIN SIZE

Term	Particle Size
Boulders	Over 12"
Cobbles	3" to 12"
Gravel	#4 sieve to 3"
Sand	#200 to #4 sieve
Fines (silt & clay)	Pass #200 sieve

GRAVEL PERCENTAGES

Term	Percent
A Little Gravel	3%-15%
With Gravel	15%-30%
Gravelly	30%-50%

CONSISTENCY OF PLASTIC SOILS

Term	N-Value, BPF
Very Soft	less than 2
Soft	2-4
Firm (Medium)	5-8
Stiff	9-15
Very Stiff	16-30
Hard	Greater than 30

RELATIVE DENSITY OF NON-PLASTIC SOILS

Term	N-Value, BPF
Very Loose	0-4
Loose	5-10
Medium Dense	11-30
Dense	31-50
Very Dense	Greater than 50

MOISTURE/FROST CONDITION (MC Column)

D (Dry): Absence of moisture, dusty, dry to touch.

M (Moist): Damp, although free water not visible. Soil may still have a high water content (over "optimum").

W (Wet/ Waterbearing): Free water visible. Intended to describe non-plastic soils. Waterbearing usually relates to sands and sands with silt.

F (Frozen): Soil frozen.

LAYERING NOTES

Laminations: Layers less than ½" thick of differing material or color.

Lenses: Pockets or layers greater than ½" thick of differing material or color.

FIBER CONTENT OF PEAT

Term	Fiber Content (Visual Estimate)
Fibric:	Greater than 67%
Hemic:	33-67%
Sapric:	Less than 33%

ORGANIC DESCRIPTION

Non-peat soils are described as organic, if soil is judged to have sufficient organic content to influence the soil properties.

GEOLOGIC TERMINOLOGY

The geologic description indicates the apparent depositional origin or stratigraphic name. Geologic identification in interpretive. Judgment is sometimes limited due to small or disturbed samples.

General categories of geologic deposits, and descriptive information is as follows:

ALLUVIUM	**COARSE:**	Sandy (and gravelly). Stratified. Deposited from fast moving waters in streams and rivers. (Includes glacial outwash.)
	FINE:	Clayey and/or silty. Stratified. Deposited from slow moving waters in streams, rivers, lakes and ponds.
	MIXED:	Combination of Fine and Coarse Alluvium.
BEDROCK:	Wide range of characteristics: from hard, dense, consolidated rock; to soft, compressible, and unconsolidated soil-like material.	
FILL	**CONTROLLED:**	Compact, uniform material; inorganic; no debris.
	UNCONTROLLED:	Loose or variable density. Mixture of soil types. Often contains debris and organic material.
TILL:	Normally contains a wide range of grain sizes, from boulders through clay. Usually non-stratified. Deposited directly from glaciers.	
LOESS:	Silty. Non-stratified. Upper layer. Deposited from wind.	
SLOPE WASH:	Organic and/or inorganic material washed from slopes and redeposited.	
SWAMP DEPOSITS:	Peat, muck and marl, and organic soil. Formed through accumulation of organic material under water.	
TOPSOIL:	Contains both inorganic and organic material. Upper, black layer of soil. Formed by weathering of inorganic soil and accumulation of organic material.	
TUMBLEROCK OR COLLUVIUM:	Dominantly gravel, boulders and rock slabs. Deposited from gravity flow down hills or cliffs.	
WEATHERED BEDROCK:	Bedrock which has been substantially weathered through disintegration or decomposition. Texture and composition grades into bedrock.	
WEATHERED SOIL:	Texture, composition, and position is intermediate between topsoil and non-weathered soil.	

EXPLORATION/CLASSIFICATION METHODS

SAMPLING METHODS

Split-Spoon Samples (SS)

Standard penetration (split-spoon) samples were collected in general accordance with ASTM:D1586. This method consists of driving a 2" O.D. split barrel sampler into the in-situ soil with a 140-pound hammer dropped from a height of 30". The sampler is driven a total of 18" into the soil. After an initial set of 6", the number of hammer blows to drive the sampler the final 12" is known as the standard penetration resistance or N-value.

Disturbed Samples (DS)

Sample types described as "DS" on the boring logs are disturbed samples, which are taken from the flights of the auger. Because the auger disturbs the samples, possible soil layering and contact depths should be considered approximate.

Sampling Limitations

Unless actually observed in a sample, contacts between soil layers are estimated based on the spacing of samples and the action of drilling tools. Cobbles, boulders, and other large objects generally cannot be recovered from test borings, and they may be present in the ground even if they are not noted on the boring logs.

CLASSIFICATION METHODS

Soil classifications shown on the boring logs are based on the Unified Soil Classification (USC) system. The USC system is described in ASTM:D2487 and D2488. Where laboratory classification tests (sieve analysis or Atterberg Limits) have been performed, accurate classifications per ASTM:D2487 are possible. Otherwise, soil classifications shown on the boring logs are visual-manual judgments. Charts are attached which provide information on the USC system, the descriptive terminology, and the symbols used on the boring logs.

The boring logs include descriptions of apparent geology. The geologic depositional origin of each soil layer is interpreted primarily by observation of the soil samples, which can be limited. Observations of the surrounding topography, vegetation, and development can sometimes aid this judgment.

WATER LEVEL MEASUREMENTS

The ground water level measurements are shown at the bottom of the boring logs. The following information appears under "Water Level Measurements" on the logs:

- Date and Time of measurement
- Sampled Depth: lowest depth of soil sampling at the time of measurement
- Casing Depth: depth to bottom of casing or hollow-stem auger at time of measurement
- Cave-in Depth: depth at which measuring tape stops in the borehole
- Water Level: depth in the borehole where free water is encountered
- Drilling Fluid Level: same as Water Level, except that the liquid in the borehole is drilling fluid

The true location of the water table at the boring locations may be different than the water levels measured in the boreholes. This is possible because there are several factors that can affect the water level measurements in the borehole. Some of these factors include: permeability of each soil layer in profile, presence of perched water, amount of time between water level readings, presence of drilling fluid, weather conditions, and use of borehole casing.

SAMPLE STORAGE

Unless notified to do otherwise, we routinely retain representative samples of the soils recovered from the borings for a period of 30 days.

Appendix B

Chemical Analysis
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- Preliminary Analytical Report -

Project Name SCHNEIDERMAN
Project Number 07-01807
Field ID : 02-03 12-13.5
Lab Sample Number 827634-001
MN LAB ID : 055-999-334

Client : AMERICAN ENG TESTING INC
Report Date : 11/15/2002
Collection Date : 10/22/2002
Matrix Type : SOIL

Inorganic Results

Test	Result	EQL	Units	Code	Analysis Date	Prep Method	Analysis Method
Solids, percent	92.0		%		10/25/2002	SM 2540G M	SM 2540G M

Organic Results

Preservation Date :

DIESEL RANGE ORGANICS - SOIL **Prep Method:** Wi MOD DRO **Prep Date:** 10/28/200 **Analyst:** KEG

Analyte	Result	EQL	Units	Code	Analysis Date	Analysis Method
DIESEL RANGE ORGANICS	< 3.3	3.3	mg/kg		10/28/2002	Wi MOD DRO
Blank spike	85	---	%Recov		10/28/2002	Wi MOD DRO
Blank spike duplicate	88	---	%Recov		10/28/2002	Wi MOD DRO
Blank	< 5.0	5.0	mg/kg		10/28/2002	Wi MOD DRO

All soil results are reported on a dry weight basis unless otherwise i

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- Preliminary Analytical Report -

Project Name SCHNEIDERMAN
Project Number 07-01807
Field ID : 02-04 23.5-25
Lab Sample Number 827634-002
MN LAB ID : 055-999-334

Client : AMERICAN ENG TESTING INC
Report Date : 11/15/2002
Collection Date : 10/23/2002
Matrix Type : SOIL

Inorganic Results

Test	Result	EQL	Units	Code	Analysis Date	Prep Method	Analysis Method
Solids, percent	85.6		%		10/25/2002	SM 2540G M	SM 2540G M

Organic Results

Preservation Date :

DIESEL RANGE ORGANICS - SOIL **Prep Method:** Wi MOD DRO **Prep Date:** 10/28/200 **Analyst:** KEG

Analyte	Result	EQL	Units	Code	Analysis Date	Analysis Method
DIESEL RANGE ORGANICS	< 4.2	4.2	mg/kg		10/28/2002	Wi MOD DRO
Blank spike	85	---	%Recov		10/28/2002	Wi MOD DRO
Blank spike duplicate	88	---	%Recov		10/28/2002	Wi MOD DRO
Blank	< 5.0	5.0	mg/kg		10/28/2002	Wi MOD DRO

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- Preliminary Analytical Report -

Project Name : SCHNEIDERMAN
Project Number 07-01807
Field ID : 02-04 4.5-6
Lab Sample Number 827634-003
MN LAB ID : 055-999-334

Client : AMERICAN ENG TESTING INC
Report Date : 11/15/2002
Collection Date : 10/23/2002
Matrix Type : SOIL

Inorganic Results

Test	Result	EQL	Units	Code	Analysis Date	Prep Method	Analysis Method
Arsenic			mg/kg			SW846 3050	SW846 6020
Barium			mg/kg			SW846 3050	SW846 6020
Cadmium			mg/kg			SW846 3050	SW846 6020
Chromium			mg/kg			SW846 3050	SW846 6020
Lead			mg/kg			SW846 3050	SW846 6020
Mercury	0.013	0.012	mg/Kg		11/4/2002	SW846 7471	SW846 7471
Selenium			mg/kg			SW846 3050	SW846 6020
Silver			mg/kg			SW846 3050	SW846 6020
Solids, percent	84.0		%		10/25/2002	SM 2540G M	SM 2540G M

Organic Results

Preservation Date :

DIESEL RANGE ORGANICS - SOIL **Prep Method:** Wi MOD DRO **Prep Date:** 10/28/200 **Analyst:** KEG

Analyte	Result	EQL	Units	Code	Analysis Date	Analysis Method
DIESEL RANGE ORGANICS	< 4.1	4.1	mg/kg		10/28/2002	Wi MOD DRO
Blank spike	85	---	%Recov		10/28/2002	Wi MOD DRO
Blank spike duplicate	88	---	%Recov		10/28/2002	Wi MOD DRO
Blank	< 5.0	5.0	mg/kg		10/28/2002	Wi MOD DRO

Organic Results

Preservation Date :

MDH 466 VOLATILES - SOIL/METHANOL **Prep Method:** 5030B/5035 **Prep Date:** 10/29/200 **Analyst:** TLT

Analyte	Result	EQL	Units	Code	Analysis Date	Analysis Method
Acetone	< 300	300	ug/kg		10/29/2002	SW846 8260B
Allyl Chloride	< 30	30	ug/kg		10/29/2002	SW846 8260B
Benzene	< 30	30	ug/kg		10/29/2002	SW846 8260B
Bromochloromethane	< 30	30	ug/kg		10/29/2002	SW846 8260B
Bromodichloromethane	< 30	30	ug/kg		10/29/2002	SW846 8260B
Bromoform	< 30	30	ug/kg		10/29/2002	SW846 8260B

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- Preliminary Analytical Report -

Project Name : SCHNEIDERMAN
Project Number 07-01807
Field ID : 02-04 4.5-6
Lab Sample Number 827634-003
MN LAB ID : 055-999-334

Client : AMERICAN ENG TESTING INC
Report Date : 11/15/2002
Collection Date : 10/23/2002
Matrix Type : SOIL

Bromobenzene	< 30	30	ug/kg	10/29/2002	SW846 8260B
Bromomethane	< 30	30	ug/kg	10/29/2002	SW846 8260B
2-Butanone	< 300	300	ug/kg	10/29/2002	SW846 8260B
s-Butylbenzene	< 30	30	ug/kg	10/29/2002	SW846 8260B
t-Butylbenzene	< 30	30	ug/kg	10/29/2002	SW846 8260B
n-Butylbenzene	< 30	30	ug/kg	10/29/2002	SW846 8260B
Carbon tetrachloride	< 30	30	ug/kg	10/29/2002	SW846 8260B
Chloroform	< 30	30	ug/kg	10/29/2002	SW846 8260B
Chlorobenzene	< 30	30	ug/kg	10/29/2002	SW846 8260B
Chlorodibromomethane	< 30	30	ug/kg	10/29/2002	SW846 8260B
Chloroethane	< 30	30	ug/kg	10/29/2002	SW846 8260B
Chloromethane	< 30	30	ug/kg	10/29/2002	SW846 8260B
2-Chlorotoluene	< 30	30	ug/kg	10/29/2002	SW846 8260B
4-Chlorotoluene	< 30	30	ug/kg	10/29/2002	SW846 8260B
1,2-Dibromo-3-chloropropane	< 60	60	ug/kg	10/29/2002	SW846 8260B
1,2-Dibromoethane	< 30	30	ug/kg	10/29/2002	SW846 8260B
Dibromomethane	< 30	30	ug/kg	10/29/2002	SW846 8260B
1,3-Dichlorobenzene	< 30	30	ug/kg	10/29/2002	SW846 8260B
1,4-Dichlorobenzene	< 30	30	ug/kg	10/29/2002	SW846 8260B
1,2-Dichloroethane	< 30	30	ug/kg	10/29/2002	SW846 8260B
1,2-Dichlorobenzene	< 30	30	ug/kg	10/29/2002	SW846 8260B
1,1-Dichloroethene	< 30	30	ug/kg	10/29/2002	SW846 8260B
cis-1,2-Dichloroethene	< 30	30	ug/kg	10/29/2002	SW846 8260B
Dichlorodifluoromethane	< 30	30	ug/kg	10/29/2002	SW846 8260B
trans-1,2-Dichloroethene	< 30	30	ug/kg	10/29/2002	SW846 8260B
Dichlorofluoromethane	< 30	30	ug/kg	10/29/2002	SW846 8260B
1,2-Dichloropropane	< 30	30	ug/kg	10/29/2002	SW846 8260B
1,1-Dichloroethane	< 30	30	ug/kg	10/29/2002	SW846 8260B
1,3-Dichloropropane	< 30	30	ug/kg	10/29/2002	SW846 8260B
2,2-Dichloropropane	< 30	30	ug/kg	10/29/2002	SW846 8260B
1,1-Dichloropropene	< 30	30	ug/kg	10/29/2002	SW846 8260B
cis-1,3-Dichloropropene	< 30	30	ug/kg	10/29/2002	SW846 8260B
trans-1,3-Dichloropropene	< 30	30	ug/kg	10/29/2002	SW846 8260B
Ethylbenzene	< 30	30	ug/kg	10/29/2002	SW846 8260B

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- Preliminary Analytical Report -

Project Name: SCHNEIDERMAN
Project Number: 07-01807
Client: AMERICAN ENG TESTING INC
Field ID: 02-04 4.5-6
Report Date: 11/15/2002
Lab Sample Number: 827634-003
Collection Date: 10/23/2002
MN LAB ID: 055-999-334
Matrix Type: SOIL

Diethyl ether	< 30	30	ug/kg		10/29/2002	SW846 8260B
Fluorotrichloromethane	< 30	30	ug/kg		10/29/2002	SW846 8260B
Hexachlorobutadiene	< 30	30	ug/kg		10/29/2002	SW846 8260B
Isopropylbenzene	< 30	30	ug/kg		10/29/2002	SW846 8260B
p-Isopropyltoluene	< 30	30	ug/kg		10/29/2002	SW846 8260B
Methylene chloride	< 30	30	ug/kg		10/29/2002	SW846 8260B
4-Methyl-2-pentanone	< 300	300	ug/kg		10/29/2002	SW846 8260B
Methyl-tert-butyl-ether	< 30	30	ug/kg		10/29/2002	SW846 8260B
Naphthalene	< 30	30	ug/kg		10/29/2002	SW846 8260B
n-Propylbenzene	< 30	30	ug/kg		10/29/2002	SW846 8260B
Styrene	< 30	30	ug/kg	&	10/29/2002	SW846 8260B
1,1,2,2-Tetrachloroethane	< 30	30	ug/kg		10/29/2002	SW846 8260B
1,1,1,2-Tetrachloroethane	< 30	30	ug/kg		10/29/2002	SW846 8260B
Tetrachloroethene	< 30	30	ug/kg		10/29/2002	SW846 8260B
Toluene	< 30	30	ug/kg		10/29/2002	SW846 8260B
1,2,3-Trichlorobenzene	< 30	30	ug/kg		10/29/2002	SW846 8260B
1,2,4-Trichlorobenzene	< 30	30	ug/kg		10/29/2002	SW846 8260B
1,1,1-Trichloroethane	< 30	30	ug/kg		10/29/2002	SW846 8260B
1,1,2-Trichloroethane	< 30	30	ug/kg		10/29/2002	SW846 8260B
1,1,2-Trichlorotrifluoroethane	< 30	30	ug/kg		10/29/2002	SW846 8260B
1,2,4-Trimethylbenzene	< 30	30	ug/kg		10/29/2002	SW846 8260B
Trichloroethene	< 30	30	ug/kg		10/29/2002	SW846 8260B
1,2,3-Trichloropropane	< 30	30	ug/kg		10/29/2002	SW846 8260B
Tetrahydrofuran	< 300	300	ug/kg		10/29/2002	SW846 8260B
1,3,5-Trimethylbenzene	< 30	30	ug/kg		10/29/2002	SW846 8260B
Vinyl chloride	< 30	30	ug/kg		10/29/2002	SW846 8260B
Xylenes, -m, -p	< 30	30	ug/kg		10/29/2002	SW846 8260B
Xylene, -o	< 30	30	ug/kg		10/29/2002	SW846 8260B
4-Bromofluorobenzene	101	---	%Recov		10/29/2002	SW846 8260B
Dibromofluoromethane	108	---	%Recov		10/29/2002	SW846 8260B
Toluene-d8	99	---	%Recov		10/29/2002	SW846 8260B

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- Preliminary Analytical Report -

Project Name SCHNEIDERMAN
Project Number 07-01807
Field ID : 02-04 4.5-6
Lab Sample Number 827634-003
MN LAB ID : 055-999-334

Client : AMERICAN ENG TESTING INC
Report Date : 11/15/2002
Collection Date : 10/23/2002
Matrix Type : SOIL

Organic Results

Preservation Date :

PAH/PNA - SEMIVOLATILES **Prep Method:** SW846 3545 **Prep Date:** 10/27/200 **Analyst:** ARO

Analyte	Result	EQL	Units	Code	Analysis Date	Analysis Method
Acenaphthene	< 30	30	ug/kg		10/30/2002	SW846 8270C
Acenaphthylene	< 30	30	ug/kg		10/30/2002	SW846 8270C
Anthracene	< 30	30	ug/kg		10/30/2002	SW846 8270C
Benzo(a)anthracene	< 30	30	ug/kg		10/30/2002	SW846 8270C
Benzo(a)pyrene	< 30	30	ug/kg		10/30/2002	SW846 8270C
Benzo(b)fluoranthene	< 30	30	ug/kg		10/30/2002	SW846 8270C
Benzo(g,h,i)perylene	< 30	30	ug/kg		10/30/2002	SW846 8270C
Benzo(k)fluoranthene	< 30	30	ug/kg		10/30/2002	SW846 8270C
Chrysene	< 30	30	ug/kg		10/30/2002	SW846 8270C
Dibenzo(a,h)anthracene	< 30	30	ug/kg		10/30/2002	SW846 8270C
Fluoranthene	< 30	30	ug/kg		10/30/2002	SW846 8270C
Fluorene	< 30	30	ug/kg		10/30/2002	SW846 8270C
Indeno(1,2,3-cd)pyrene	< 30	30	ug/kg		10/30/2002	SW846 8270C
1-Methylnaphthalene	< 30	30	ug/kg		10/30/2002	SW846 8270C
2-Methylnaphthalene	< 30	30	ug/kg		10/30/2002	SW846 8270C
Naphthalene	< 30	30	ug/kg		10/30/2002	SW846 8270C
Phenanthrene	< 30	30	ug/kg		10/30/2002	SW846 8270C
Pyrene	< 30	30	ug/kg		10/30/2002	SW846 8270C
Nitrobenzene-d5	61	---	%Recov		10/30/2002	SW846 8270C
2-Fluorobiphenyl	68	---	%Recov		10/30/2002	SW846 8270C
Terphenyl-d14	72	---	%Recov		10/30/2002	SW846 8270C

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- Preliminary Analytical Report -

Project Name :	SCHNEIDERMAN		
Project Number	07-01807	**Client :**	AMERICAN ENG TESTING INC
Field ID :	02-04 4.5-6	**Report Date :**	11/15/2002
Lab Sample Number	827634-003	**Collection Date :**	10/23/2002
MN LAB ID :	055-999-334	**Matrix Type :**	SOIL

Organic Results

Preservation Date :

PAH/PNA-BLANK **Prep Method:** SW846 3445 **Prep Date:** 10/27/200 **Analyst:** ARO

Analyte	Result	EQL	Units	Code	Analysis Date	Analysis Method
PAH-Blank	1089-27				10/29/2002	SW846 8270C

Organic Results

Preservation Date :

VOC-BLK **Prep Method:** **Prep Date:** **Analyst:**

Analyte	Result	EQL	Units	Code	Analysis Date	Analysis Method
VOC-BLK	1088-83					

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- Preliminary Analytical Report -

Project Name : SCHNEIDERMAN
Project Number 07-01807
Field ID : 02-05 7-8.5
Lab Sample Number 827634-004
MN LAB ID : 055-999-334

Client : AMERICAN ENG TESTING INC
Report Date : 11/15/2002
Collection Date : 10/23/2002
Matrix Type : SOIL

Inorganic Results

Test	Result	EQL	Units	Code	Analysis Date	Prep Method	Analysis Method
Arsenic			mg/kg			SW846 3050	SW846 6020
Barium			mg/kg			SW846 3050	SW846 6020
Cadmium			mg/kg			SW846 3050	SW846 6020
Chromium			mg/kg			SW846 3050	SW846 6020
Lead			mg/kg			SW846 3050	SW846 6020
Mercury	< 0.011	0.011	mg/Kg		11/4/2002	SW846 7471	SW846 7471
Selenium			mg/kg			SW846 3050	SW846 6020
Silver			mg/kg			SW846 3050	SW846 6020
Solids, percent	88.2		%		10/25/2002	SM 2540G M	SM 2540G M

Organic Results

Preservation Date :

DIESEL RANGE ORGANICS - SOIL **Prep Method:** Wi MOD DRO **Prep Date:** 10/28/200 **Analyst:** KEG

Analyte	Result	EQL	Units	Code	Analysis Date	Analysis Method
DIESEL RANGE ORGANICS	16	3.9	mg/kg		10/28/2002	Wi MOD DRO
Blank spike	85	---	%Recov		10/28/2002	Wi MOD DRO
Blank spike duplicate	88	---	%Recov		10/28/2002	Wi MOD DRO
Blank	< 5.0	5.0	mg/kg		10/28/2002	Wi MOD DRO

Organic Results

Preservation Date :

MDH 466 VOLATILES - SOIL/METHANOL **Prep Method:** 5030B/5035 **Prep Date:** 10/29/200 **Analyst:** TLT

Analyte	Result	EQL	Units	Code	Analysis Date	Analysis Method
Acetone	< 280	280	ug/kg		10/29/2002	SW846 8260B
Allyl Chloride	< 28	28	ug/kg		10/29/2002	SW846 8260B
Benzene	< 28	28	ug/kg		10/29/2002	SW846 8260B
Bromochloromethane	< 28	28	ug/kg		10/29/2002	SW846 8260B
Bromodichloromethane	< 28	28	ug/kg		10/29/2002	SW846 8260B
Bromoform	< 28	28	ug/kg		10/29/2002	SW846 8260B

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- Preliminary Analytical Report -

Project Name : SCHNEIDERMAN
Project Number 07-01807
Field ID : 02-05 7-8.5
Lab Sample Number 827634-004
MN LAB ID : 055-999-334

Client : AMERICAN ENG TESTING INC
Report Date : 11/15/2002
Collection Date : 10/23/2002
Matrix Type : SOIL

Bromobenzene	< 28	28	ug/kg	10/29/2002	SW846 8260B
Bromomethane	< 28	28	ug/kg	10/29/2002	SW846 8260B
2-Butanone	< 280	280	ug/kg	10/29/2002	SW846 8260B
s-Butylbenzene	< 28	28	ug/kg	10/29/2002	SW846 8260B
t-Butylbenzene	< 28	28	ug/kg	10/29/2002	SW846 8260B
n-Butylbenzene	< 28	28	ug/kg	10/29/2002	SW846 8260B
Carbon tetrachloride	< 28	28	ug/kg	10/29/2002	SW846 8260B
Chloroform	< 28	28	ug/kg	10/29/2002	SW846 8260B
Chlorobenzene	< 28	28	ug/kg	10/29/2002	SW846 8260B
Chlorodibromomethane	< 28	28	ug/kg	10/29/2002	SW846 8260B
Chloroethane	< 28	28	ug/kg	10/29/2002	SW846 8260B
Chloromethane	< 28	28	ug/kg	10/29/2002	SW846 8260B
2-Chlorotoluene	< 28	28	ug/kg	10/29/2002	SW846 8260B
4-Chlorotoluene	< 28	28	ug/kg	10/29/2002	SW846 8260B
1,2-Dibromo-3-chloropropane	< 57	57	ug/kg	10/29/2002	SW846 8260B
1,2-Dibromoethane	< 28	28	ug/kg	10/29/2002	SW846 8260B
Dibromomethane	< 28	28	ug/kg	10/29/2002	SW846 8260B
1,3-Dichlorobenzene	< 28	28	ug/kg	10/29/2002	SW846 8260B
1,4-Dichlorobenzene	< 28	28	ug/kg	10/29/2002	SW846 8260B
1,2-Dichloroethane	< 28	28	ug/kg	10/29/2002	SW846 8260B
1,2-Dichlorobenzene	< 28	28	ug/kg	10/29/2002	SW846 8260B
1,1-Dichloroethene	< 28	28	ug/kg	10/29/2002	SW846 8260B
cis-1,2-Dichloroethene	< 28	28	ug/kg	10/29/2002	SW846 8260B
Dichlorodifluoromethane	< 28	28	ug/kg	10/29/2002	SW846 8260B
trans-1,2-Dichloroethene	< 28	28	ug/kg	10/29/2002	SW846 8260B
Dichlorofluoromethane	< 28	28	ug/kg	10/29/2002	SW846 8260B
1,2-Dichloropropane	< 28	28	ug/kg	10/29/2002	SW846 8260B
1,1-Dichloroethane	< 28	28	ug/kg	10/29/2002	SW846 8260B
1,3-Dichloropropane	< 28	28	ug/kg	10/29/2002	SW846 8260B
2,2-Dichloropropane	< 28	28	ug/kg	10/29/2002	SW846 8260B
1,1-Dichloropropene	< 28	28	ug/kg	10/29/2002	SW846 8260B
cis-1,3-Dichloropropene	< 28	28	ug/kg	10/29/2002	SW846 8260B
trans-1,3-Dichloropropene	< 28	28	ug/kg	10/29/2002	SW846 8260B
Ethylbenzene	< 28	28	ug/kg	10/29/2002	SW846 8260B

All soil results are reported on a dry weight basis unless otherwise i

En Chem Inc.

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Green Bay, WI 54302
920-469-2436
800-7-ENCHEM
Fax: 920-469-8827

- Preliminary Analytical Report -

Project Name SCHNEIDERMAN
Project Number 07-01807
Field ID : 02-05 7-8.5
Lab Sample Number 827634-004
MN LAB ID : 055-999-334

Client : AMERICAN ENG TESTING INC
Report Date : 11/15/2002
Collection Date : 10/23/2002
Matrix Type : SOIL

Diethyl ether	< 28	28	ug/kg		10/29/2002	SW846 8260B
Fluorotrichloromethane	< 28	28	ug/kg		10/29/2002	SW846 8260B
Hexachlorobutadiene	< 28	28	ug/kg		10/29/2002	SW846 8260B
Isopropylbenzene	< 28	28	ug/kg		10/29/2002	SW846 8260B
p-Isopropyltoluene	< 28	28	ug/kg		10/29/2002	SW846 8260B
Methylene chloride	< 28	28	ug/kg		10/29/2002	SW846 8260B
4-Methyl-2-pentanone	< 280	280	ug/kg		10/29/2002	SW846 8260B
Methyl-tert-butyl-ether	< 28	28	ug/kg		10/29/2002	SW846 8260B
Naphthalene	< 28	28	ug/kg		10/29/2002	SW846 8260B
n-Propylbenzene	< 28	28	ug/kg		10/29/2002	SW846 8260B
Styrene	< 28	28	ug/kg	&	10/29/2002	SW846 8260B
1,1,2,2-Tetrachloroethane	< 28	28	ug/kg		10/29/2002	SW846 8260B
1,1,1,2-Tetrachloroethane	< 28	28	ug/kg		10/29/2002	SW846 8260B
Tetrachloroethene	< 28	28	ug/kg		10/29/2002	SW846 8260B
Toluene	< 28	28	ug/kg		10/29/2002	SW846 8260B
1,2,3-Trichlorobenzene	< 28	28	ug/kg		10/29/2002	SW846 8260B
1,2,4-Trichlorobenzene	< 28	28	ug/kg		10/29/2002	SW846 8260B
1,1,1-Trichloroethane	< 28	28	ug/kg		10/29/2002	SW846 8260B
1,1,2-Trichloroethane	< 28	28	ug/kg		10/29/2002	SW846 8260B
1,1,2-Trichlorotrifluoroethane	< 28	28	ug/kg		10/29/2002	SW846 8260B
1,2,4-Trimethylbenzene	< 28	28	ug/kg		10/29/2002	SW846 8260B
Trichloroethene	< 28	28	ug/kg		10/29/2002	SW846 8260B
1,2,3-Trichloropropane	< 28	28	ug/kg		10/29/2002	SW846 8260B
Tetrahydrofuran	< 280	280	ug/kg		10/29/2002	SW846 8260B
1,3,5-Trimethylbenzene	< 28	28	ug/kg		10/29/2002	SW846 8260B
Vinyl chloride	< 28	28	ug/kg		10/29/2002	SW846 8260B
Xylenes, -m, -p	< 28	28	ug/kg		10/29/2002	SW846 8260B
Xylene, -o	< 28	28	ug/kg		10/29/2002	SW846 8260B
4-Bromofluorobenzene	106	---	%Recov		10/29/2002	SW846 8260B
Dibromofluoromethane	109	---	%Recov		10/29/2002	SW846 8260B
Toluene-d8	100	---	%Recov		10/29/2002	SW846 8260B

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Fax: 920-469-8827

- Preliminary Analytical Report -

Project Name : SCHNEIDERMAN
Project Number 07-01807
Field ID : 02-05 7-8.5
Lab Sample Number 827634-004
MN LAB ID : 055-999-334

Client : AMERICAN ENG TESTING INC
Report Date : 11/15/2002
Collection Date : 10/23/2002
Matrix Type : SOIL

Organic Results

Preservation Date :

PAH/PNA - SEMIVOLATILES **Prep Method:** SW846 3545 **Prep Date:** 10/27/200 **Analyst:** ARO

Analyte	Result	EQL	Units	Code	Analysis Date	Analysis Method
Acenaphthene	< 28	28	ug/kg		10/30/2002	SW846 8270C
Acenaphthylene	< 28	28	ug/kg		10/30/2002	SW846 8270C
Anthracene	< 28	28	ug/kg		10/30/2002	SW846 8270C
Benzo(a)anthracene	< 28	28	ug/kg		10/30/2002	SW846 8270C
Benzo(a)pyrene	< 28	28	ug/kg		10/30/2002	SW846 8270C
Benzo(b)fluoranthene	< 28	28	ug/kg		10/30/2002	SW846 8270C
Benzo(g,h,i)perylene	< 28	28	ug/kg		10/30/2002	SW846 8270C
Benzo(k)fluoranthene	< 28	28	ug/kg		10/30/2002	SW846 8270C
Chrysene	< 28	28	ug/kg		10/30/2002	SW846 8270C
Dibenzo(a,h)anthracene	< 28	28	ug/kg		10/30/2002	SW846 8270C
Fluoranthene	< 28	28	ug/kg		10/30/2002	SW846 8270C
Fluorene	< 28	28	ug/kg		10/30/2002	SW846 8270C
Indeno(1,2,3-cd)pyrene	< 28	28	ug/kg		10/30/2002	SW846 8270C
1-Methylnaphthalene	< 28	28	ug/kg		10/30/2002	SW846 8270C
2-Methylnaphthalene	< 28	28	ug/kg		10/30/2002	SW846 8270C
Naphthalene	< 28	28	ug/kg		10/30/2002	SW846 8270C
Phenanthrene	< 28	28	ug/kg		10/30/2002	SW846 8270C
Pyrene	< 28	28	ug/kg		10/30/2002	SW846 8270C
Nitrobenzene-d5	62	---	%Recov		10/30/2002	SW846 8270C
2-Fluorobiphenyl	69	---	%Recov		10/30/2002	SW846 8270C
Terphenyl-d14	71	---	%Recov		10/30/2002	SW846 8270C

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- Preliminary Analytical Report -

Project Name : SCHNEIDERMAN
Project Number 07-01807
Field ID : 02-05 7-8.5
Lab Sample Number 827634-004
MN LAB ID : 055-999-334

Client : AMERICAN ENG TESTING INC
Report Date : 11/15/2002
Collection Date : 10/23/2002
Matrix Type : SOIL

Organic Results

Preservation Date :

PAH/PNA-BLANK **Prep Method:** SW846 3445 **Prep Date:** 10/27/200 **Analyst:** ARO

Analyte	Result	EQL	Units	Code	Analysis Date	Analysis Method
PAH-Blank	1089-27				10/29/2002	SW846 8270C

Organic Results

Preservation Date :

VOC-BLK **Prep Method:** **Prep Date:** **Analyst:**

Analyte	Result	EQL	Units	Code	Analysis Date	Analysis Method
VOC-BLK	1088-83					

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- Preliminary Analytical Report -

Project Name : SCHNEIDERMAN
Project Number 07-01807
Field ID : 02-06 7-8.5
Lab Sample Number 827634-005
MN LAB ID : 055-999-334

Client : AMERICAN ENG TESTING INC
Report Date : 11/15/2002
Collection Date : 10/23/2002
Matrix Type : SOIL

Inorganic Results

Test	Result	EQL	Units	Code	Analysis Date	Prep Method	Analysis Method
Solids, percent	46.2		%		10/25/2002	SM 2540G M	SM 2540G M

Organic Results

Preservation Date :

DIESEL RANGE ORGANICS - SOIL **Prep Method:** Wi MOD DRO **Prep Date:** 10/28/200 **Analyst:** KEG

Analyte	Result	EQL	Units	Code	Analysis Date	Analysis Method
DIESEL RANGE ORGANICS	220	8.6	mg/kg		10/28/2002	Wi MOD DRO
Blank spike	85	---	%Recov		10/28/2002	Wi MOD DRO
Blank spike duplicate	88	---	%Recov		10/28/2002	Wi MOD DRO
Blank	< 5.0	5.0	mg/kg		10/28/2002	Wi MOD DRO

All soil results are reported on a dry weight basis unless otherwise i

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- Preliminary Analytical Report -

Project Name : SCHNEIDERMAN
Project Number 07-01807
Field ID : MEOH BLANK
Lab Sample Number 827634-006
MN LAB ID : 055-999-334

Client : AMERICAN ENG TESTING INC
Report Date : 11/15/2002
Collection Date : 10/23/2002
Matrix Type : METHANOL

Organic Results

Preservation Date :

MDH 466 VOLATILES - METHANOL **Prep Method:** SW846 5030B **Prep Date:** 10/28/200 **Analyst:** TLT

Analyte	Result	EQL	Units	Code	Analysis Date	Analysis Method
Acetone	< 250	250	ug/L		10/28/2002	SW846 8260B
Allyl Chloride	< 25	25	ug/L		10/28/2002	SW846 8260B
Benzene	< 25	25	ug/L		10/28/2002	SW846 8260B
Bromochloromethane	< 25	25	ug/L		10/28/2002	SW846 8260B
Bromodichloromethane	< 25	25	ug/L		10/28/2002	SW846 8260B
Bromoform	< 25	25	ug/L		10/28/2002	SW846 8260B
Bromobenzene	< 25	25	ug/L		10/28/2002	SW846 8260B
Bromomethane	< 25	25	ug/L		10/28/2002	SW846 8260B
2-Butanone	< 250	250	ug/L		10/28/2002	SW846 8260B
s-Butylbenzene	< 25	25	ug/L		10/28/2002	SW846 8260B
t-Butylbenzene	< 25	25	ug/L		10/28/2002	SW846 8260B
n-Butylbenzene	< 25	25	ug/L		10/28/2002	SW846 8260B
Carbon tetrachloride	< 25	25	ug/L		10/28/2002	SW846 8260B
Chloroform	< 25	25	ug/L		10/28/2002	SW846 8260B
Chlorobenzene	< 25	25	ug/L		10/28/2002	SW846 8260B
Chlorodibromomethane	< 25	25	ug/L		10/28/2002	SW846 8260B
Chloroethane	< 25	25	ug/L		10/28/2002	SW846 8260B
Chloromethane	< 25	25	ug/L		10/28/2002	SW846 8260B
2-Chlorotoluene	< 25	25	ug/L		10/28/2002	SW846 8260B
4-Chlorotoluene	< 25	25	ug/L		10/28/2002	SW846 8260B
1,2-Dibromo-3-chloropropane	< 50	50	ug/L		10/28/2002	SW846 8260B
1,2-Dibromoethane	< 25	25	ug/L		10/28/2002	SW846 8260B
Dibromomethane	< 25	25	ug/L		10/28/2002	SW846 8260B
1,3-Dichlorobenzene	< 25	25	ug/L		10/28/2002	SW846 8260B
1,4-Dichlorobenzene	< 25	25	ug/L		10/28/2002	SW846 8260B
1,2-Dichloroethane	< 25	25	ug/L		10/28/2002	SW846 8260B
1,2-Dichlorobenzene	< 25	25	ug/L		10/28/2002	SW846 8260B

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Fax: 920-469-8827

- Preliminary Analytical Report -

Project Name : SCHNEIDERMAN
Project Number 07-01807
Field ID : MEOH BLANK
Lab Sample Number 827634-006
MN LAB ID : 055-999-334

Client : AMERICAN ENG TESTING INC
Report Date : 11/15/2002
Collection Date : 10/23/2002
Matrix Type : METHANOL

1,1-Dichloroethene	< 25	25	ug/L		10/28/2002	SW846 8260B
cis-1,2-Dichloroethene	< 25	25	ug/L		10/28/2002	SW846 8260B
Dichlorodifluoromethane	< 25	25	ug/L		10/28/2002	SW846 8260B
trans-1,2-Dichloroethene	< 25	25	ug/L		10/28/2002	SW846 8260B
Dichlorofluoromethane	< 25	25	ug/L		10/28/2002	SW846 8260B
1,2-Dichloropropane	< 25	25	ug/L		10/28/2002	SW846 8260B
1,1-Dichloroethane	< 25	25	ug/L		10/28/2002	SW846 8260B
1,3-Dichloropropane	< 25	25	ug/L		10/28/2002	SW846 8260B
2,2-Dichloropropane	< 25	25	ug/L		10/28/2002	SW846 8260B
1,1-Dichloropropene	< 25	25	ug/L		10/28/2002	SW846 8260B
cis-1,3-Dichloropropene	< 25	25	ug/L		10/28/2002	SW846 8260B
trans-1,3-Dichloropropene	< 25	25	ug/L		10/28/2002	SW846 8260B
Ethylbenzene	< 25	25	ug/L		10/28/2002	SW846 8260B
Diethyl ether	< 25	25	ug/L		10/28/2002	SW846 8260B
Fluorotrichloromethane	< 25	25	ug/L		10/28/2002	SW846 8260B
Hexachlorobutadiene	< 25	25	ug/L		10/28/2002	SW846 8260B
Isopropylbenzene	< 25	25	ug/L		10/28/2002	SW846 8260B
p-Isopropyltoluene	< 25	25	ug/L		10/28/2002	SW846 8260B
Methylene chloride	44	25	ug/L		10/28/2002	SW846 8260B
4-Methyl-2-pentanone	< 250	250	ug/L		10/28/2002	SW846 8260B
Methyl-tert-butyl-ether	< 25	25	ug/L		10/28/2002	SW846 8260B
Naphthalene	< 25	25	ug/L		10/28/2002	SW846 8260B
n-Propylbenzene	< 25	25	ug/L		10/28/2002	SW846 8260B
Styrene	< 25	25	ug/L	&	10/28/2002	SW846 8260B
1,1,2,2-Tetrachloroethane	< 25	25	ug/L		10/28/2002	SW846 8260B
1,1,1,2-Tetrachloroethane	< 25	25	ug/L		10/28/2002	SW846 8260B
Tetrachloroethene	< 25	25	ug/L		10/28/2002	SW846 8260B
Toluene	< 25	25	ug/L		10/28/2002	SW846 8260B
1,2,3-Trichlorobenzene	< 25	25	ug/L		10/28/2002	SW846 8260B
1,2,4-Trichlorobenzene	< 25	25	ug/L		10/28/2002	SW846 8260B
1,1,1-Trichloroethane	< 25	25	ug/L		10/28/2002	SW846 8260B
1,1,2-Trichloroethane	< 25	25	ug/L		10/28/2002	SW846 8260B
1,1,2-Trichlorotrifluoroethane	< 25	25	ug/L		10/28/2002	SW846 8260B
1,2,4-Trimethylbenzene	< 25	25	ug/L		10/28/2002	SW846 8260B

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Fax: 920-469-8827

- Preliminary Analytical Report -

Project Name SCHNEIDERMAN
Project Number 07-01807
Field ID : MEOH BLANK
Lab Sample Number 827634-006
MN LAB ID : 055-999-334

Client : AMERICAN ENG TESTING INC
Report Date : 11/15/2002
Collection Date : 10/23/2002
Matrix Type : METHANOL

Trichloroethene	< 25	25	ug/L	10/28/2002	SW846 8260B
1,2,3-Trichloropropane	< 25	25	ug/L	10/28/2002	SW846 8260B
Tetrahydrofuran	< 250	250	ug/L	10/28/2002	SW846 8260B
1,3,5-Trimethylbenzene	< 25	25	ug/L	10/28/2002	SW846 8260B
Vinyl chloride	< 25	25	ug/L	10/28/2002	SW846 8260B
Xylenes, -m, -p	< 25	25	ug/L	10/28/2002	SW846 8260B
Xylene, -o	< 25	25	ug/L	10/28/2002	SW846 8260B
4-Bromofluorobenzene	104	---	%Recov	10/28/2002	SW846 8260B
Dibromofluoromethane	97	---	%Recov	10/28/2002	SW846 8260B
Toluene-d8	93	---	%Recov	10/28/2002	SW846 8260B

Organic Results

Preservation Date :

VOC-BLK **Prep Method:** **Prep Date:** **Analyst:**

Analyte	Result	EQL	Units	Code	Analysis Date	Analysis Method
VOC-BLK	1088-81					

(Please Print Legibly)

Company Name: American Engineering Testing
Branch or Location: Duluth
Project Contact: Karl Roester
Telephone: 218-628-1518
Project Number: 07-01807
Project Name: Schneiderman
Project State: MN
Sampled By (Print): Karl Roester

EN CHEM INC.

☐ 1241 Bellevue St., Suite 9, Green Bay, WI 54302, 920-469-2436, FAX 920-469-8827

☐ 525 Science Drive, Madison, WI 53711, 608-232-3300, FAX: 608-233-0502

CHAIN OF COUSTODY

91328

Page 1 of 1
P.O. #______ Quote #______
Mail Report To: Karl Roester
Company: AET
Address: P.O. Box 16008, Duluth MN 558[illegible]

Invoice To: [illegible]
Company:
Address:
Mail Invoice To: same

*Preservation Codes
A=None B=HCL C=H2SO4 D=HN03 E=EnCore F=Methanol G=NaOH
H = Sodium Bisulfate Solution I = Sodium Thiosulfate J = Other

Data Package Options - (please circle if requested)
Sample Results Only (no QC)
EPA Level II (Subject to Surcharge)
EPA Level III (Subject to Surcharge)
EPA Level IV (Subject to Surcharge)

Regulatory Program	Matrix Codes
UST RCRA SDWA NPDES CERCLA	W=Water S=Soil A=Air C=Charcoal B=Biota Sl=Sludge

ANALYSES REQUESTED / TOTAL # OF BOTTLES SENT

LABORATORY ID (Lab Use Only)	FIELD ID	COLLECTION DATE	COLLECTION TIME	MATRIX	DRO	VOC	PAH	RCRA (8) Metals	Dry Wt				CLIENT COMMENTS	LAB COMMENTS (Lab Use Only)
	FILTERED? (YES/NO)				N	N	N	N	N					
	PRESERVATION (CODE)*				A	F	A	A	A					
	02-03 12-13½	10-22-02	15:15	S	1				1					
	02-04 23½-25	10-23-02	13:45	S	1				1					
	02-04 4½-6	10-23-02	13:05	S	1	1	1	1					[illegible]	
	02-05 7-9½	10-22-02	11:05	S	1	1	1	1					[illegible]	
	02-06 7-9½	10-23-02	9:05	S	1				1					
	MeOH Blank	10-25-02	15:30									1		
	Trip Blank											1		

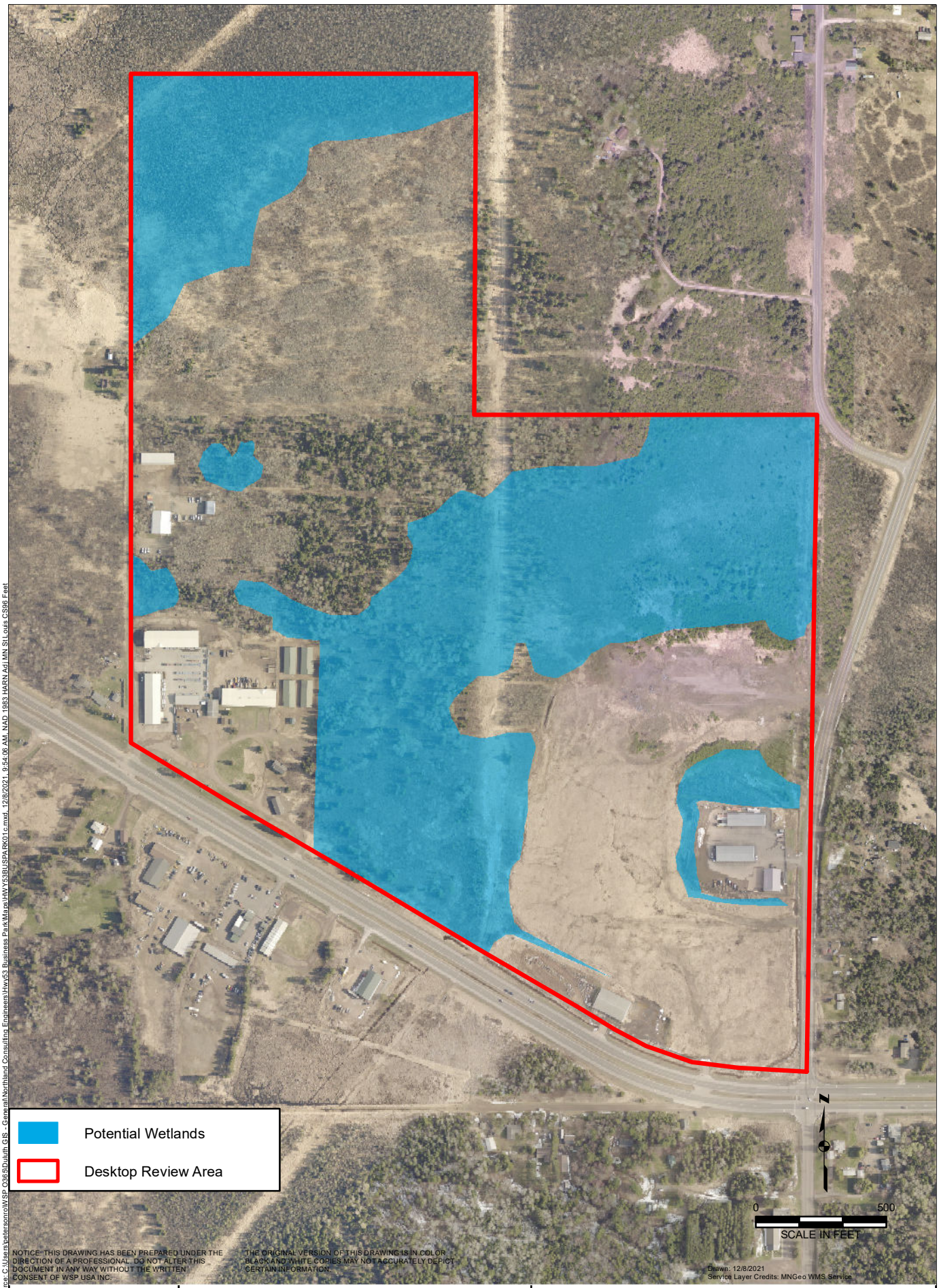
Rush Turnaround Time Requested (TAT) - Prelim
(Rush TAT subject to approval/surcharge)
Date Needed: ______
Transmit Prelim Rush Results by (circle):
Phone Fax E-Mail
Phone #: ______
Fax #: ______
E-Mail Address: ______

Samples on HOLD are subject to special pricing and release of liability

Relinquished By:	Date/Time:	Received By:	Date/Time:	
Karl Roester	10-23-02 16:25	[signature]	10-23-02 16:25	En Chem Project No.
				Sample Receipt Temp.
				Sample Receipt pH (Wet/Metals)
				Cooler Custody Seal Present / Not Present
				Intact / Not Intact

APPENDIX E

POTENTIAL SITE WETLANDS DIAGRAM



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WSP USA Inc.
4602 GRAND AVENUE
SUITE 300
Duluth, MN 55807
TEL: +1 218 336 8820

HWY 53 BUSINESS PARK
HERMANTOWN, MINNESOTA

PREPARED FOR

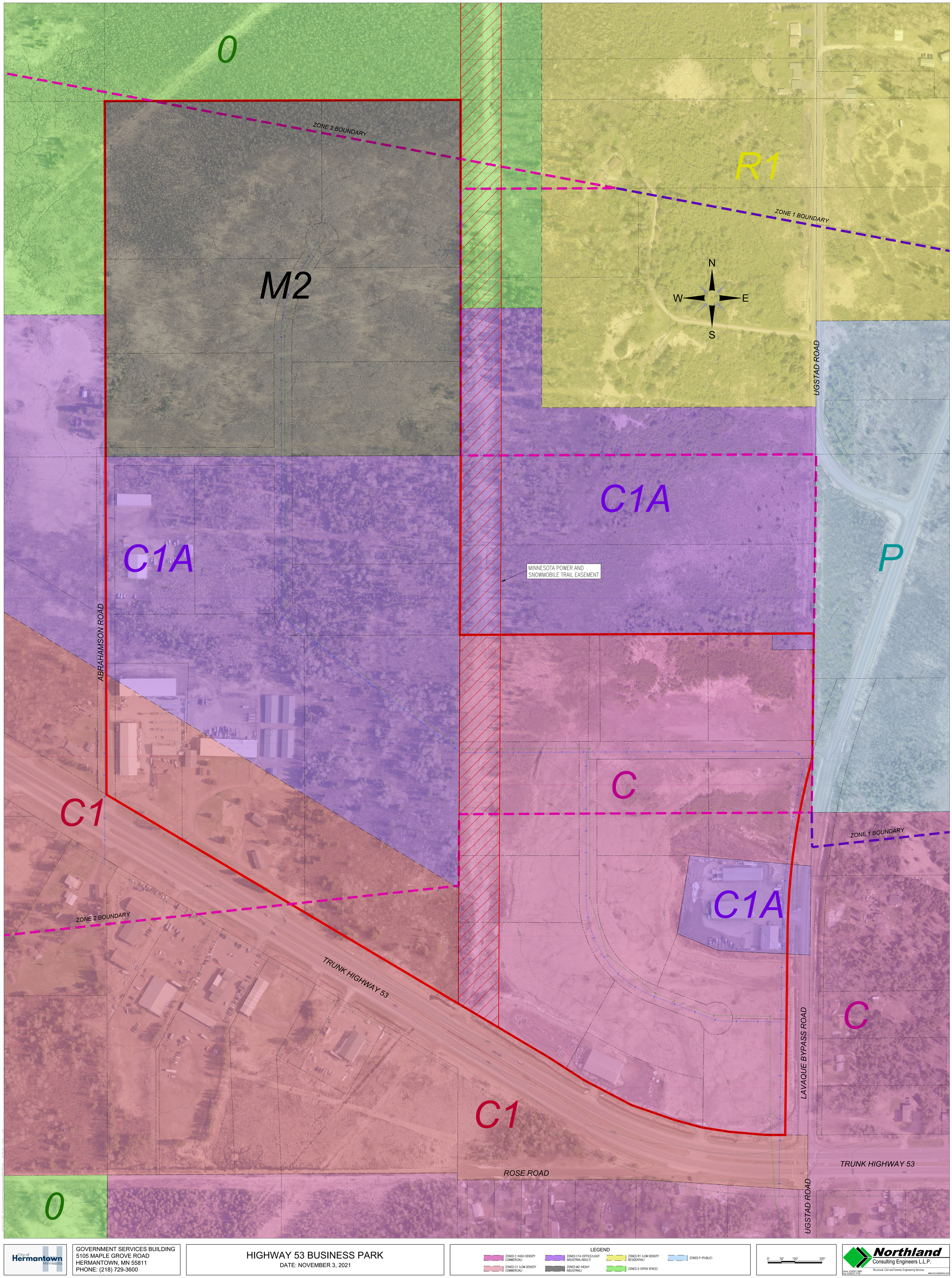
NORTHLAND CONSULTING ENGINEERS

FIGURE 02

DESKTOP WETLAND REVIEW AND
2019 AERIAL IMAGERY
OCTOBER, 2021

APPENDIX F

BUSINESS PARK ZONING MAP



City of Hermantown Minnesota

GOVERNMENT SERVICES BUILDING
5105 MAPLE GROVE ROAD
HERMANTOWN, MN 55811
PHONE: (218) 729-3600

HIGHWAY 53 BUSINESS PARK

DATE: NOVEMBER 3, 2021

LEGEND

- ZONED C (HIGH DENSITY COMMERCIAL)
- ZONED C1A (OFFICE/LIGHT INDUSTRIAL/ADULT)
- ZONED R1 (LOW DENSITY RESIDENTIAL)
- ZONED P (PUBLIC)
- ZONED C1 (LOW DENSITY COMMERCIAL)
- ZONED M2 (HEAVY INDUSTRIAL)
- ZONED 0 (OPEN SPACE)

0' 50' 100' 200'

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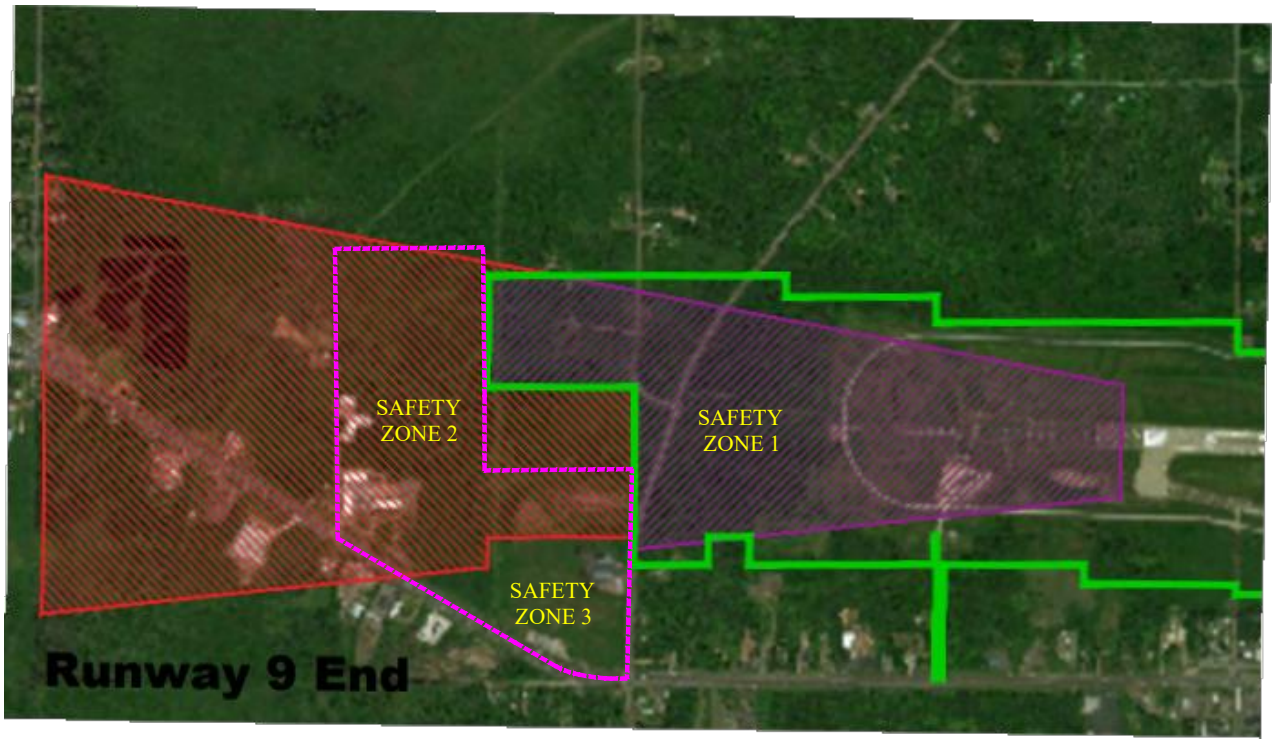
APPENDIX G

AIRPORT SAFETY ZONE MAP AND DEFINITIONS

AIRPORT SAFETY ZONE



LEGEND

BUSINESS PARK BOUNDARY

SAFETY ZONE 1

AREAS DESIGNATED AS SAFETY ZONE 1 SHALL CONTAIN NO BUILDINGS, TEMPORARY STRUCTURES EXPOSED TRANSMISSION LINES OR OTHER SIMILAR ABOVE-GROUND LAND USE STRUCTURAL HAZARDS.

SAFETY ZONE 2

GROUP A, E, 1-2 AND R-1 USES ARE PROHIBITED IN SAFETY ZONE 2. IN ADDITION, PROPERTIES MUST BE A MINIMUM OF 2.5 ACRES IN SIZE AND SHALL NOT CREATE, ATTRACT OR BRING TOGETHER A SITE POPULATION IN EXCESS OF 20 PERSONS PER ACRE DURING THE SAME TIME PERIOD; DENSITY AS CALCULATED PURSUANT TO THE 2020 MINNESOTA STATE BUILDING CODE.

SAFETY ZONE 3

SAFETY ZONE 3 ENCOMPASSES AN AREA 1 MILE FROM THE AIRPORT BOUNDARY AND 1.5 MILES FROM THE AIRPORT APPROACH ZONE. TOP FLOOR ELEVATION OF STRUCTURES IN SAFETY ZONE 3 ARE NOT TO EXCEED 1578 FEET IN ELEVATION IN RELATION TO THE GROUND ELEVATION OF THE RUNWAY (ELEVATION 1428).