MINNESOTA POLLUTION CONTROL AGENCY

520 Lafayette Road North
St. Paul, MN 55155-4194

Notice of Availability of an Environmental Assessment Worksheet (EAW)

Dem-Con Companies

Doc Type: Public Notice

Public comment information

EAW public comment period begins: 11/15/2022

EAW public comment period ends: 12/15/2022

Notice published in the EQB Monitor: 11/15/2022

Facility specific information

Facility name and location:

Dem-Con Companies
13020 Dem Con Drive
Shakopee, MN 55379-7200
Scott County

Facility contact:

Activity Owner: Bill Keegan
Address: 13020 Dem Con Drive
Shakopee, MN 55379-7200
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MPCA contact information

MPCA EAW contact person:

Charles Peterson
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Minnesota Pollution Control Agency
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St. Paul, MN 5 5155
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MPCA Permit contact person:

Abdi Hassan
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Minnesota Pollution Control Agency
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General information

The Minnesota Pollution Control Agency (MPCA) is distributing this Environmental Assessment Worksheet (EAW) for a 30-day review and comment period pursuant to the Environmental Quality Board (EQB) rules. The MPCA uses the EAW and any comments received to evaluate the potential for significant environmental effects from the project and decide on the need for an Environmental Impact Statement (EIS).

An electronic version of the EAW is available on the MPCA Environmental Review webpage at http://www.pca.state.mn.us/oxpg691. If you would like a copy of the EAW or Permit or have any questions on the EAW or Permit, contact the appropriate person(s) listed above.

Description of proposed project

The Dem-Con Landfill SW-290 is an existing Class III Demolition Landfill in Louisville Township, Scott County, Minnesota. Dem-Con Landfill, LLC is seeking a horizontal expansion onto 241 acres directly south of the existing landfill adding 36,247, 942 cubic yards (cy) of airspace to the existing landfill for a total design capacity of 55,300,384 cy of airspace. The 241-acre expansion area is an active limestone quarry that is nearing completion and preparing for final reclamation activities and end use development.

To submit written comments on the EAW [and (insert type of) Permit

Written comments on the EAW must be received by the MPCA within the comment period listed above.

Comments may be submitted:

- Online at http://www.pca.state.mn.us/publiccomments; or
- By U.S. postal mail to the following address:
  Minnesota Pollution Control Agency
  Charles Peterson
  520 Lafayette Road North
  St. Paul, MN 55155

Note: All comment letters are public documents and will be part of the official public record for this project.

Need for an EIS

The MPCA Commissioner will make a final decision on the need for an EIS after the end of the comment period.

ENVIRONMENTAL ASSESSMENT WORKSHEET

This Environmental Assessment Worksheet (EAW) form and EAW Guidelines are available at the Environmental Quality Board's website at: http://www.eqb.state.mn.us/EnvRevGuidanceDocuments.htm. The EAW form provides information about a project that may have the potential for significant environmental effects. The EAW Guidelines provide additional detail and resources for completing the EAW form.

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 an EIS.

1. **Project title: Dem-Con Landfill SW-290 Expansion**

2. **Proposer:** Dem-Con Landfill, LLC
   Contact person: Bill Keegan, P.E.
   Title: President
   Address: 13020 Dem-Con Drive
   City, State, ZIP: Shakopee, MN 55379
   Phone: (952) 224-7101
   Email: markpahl@dem-con.com

3. **RGU** MN Pollution Control Agency
   Contact person: Charles Peterson
   Title: Env. Review Project Manager
   Address: 520 Lafayette Road
   City, State, ZIP: St. Paul, MN 55155
   Phone: 651-757-2856
   Email: charles.peterson@state.mn.us

4. **Reason for EAW Preparation:**

   Required:
   ☐ EIS Scoping
   ☐ Mandatory EAW

   Discretionary:
   ☐ Citizen petition
   ☐ RGU discretion
   ☑ Proposer initiated

   If EAW or EIS is mandatory give EQB rule category subpart number(s) and name(s): N/A

5. **Project Location:**
   County: Scott County
   City/Township: Louisville Township
   PLS Location (¼, ¼, Section, Township, Range): Portions of Section 21 and Section 28, Township 115 N, Range 23 W.
   Watershed (81 major watershed scale): Minnesota River – Shakopee (33)
   GPS Coordinates: 44°44'55.86"N, 93°35'25.04"W
   Tax Parcel Number: 079280042, 079280100, 079280080, 079280070, 079210120, 079210080.

   The following Figures are attached as part of this EAW:
   Figure 1: County Location Map
   Figure 2: U.S.G.S Quad Map Excerpt
   Figure 3: Existing Land Use
   Figure 4: Scott County Zoning Map Excerpt

The following Attachments are included as part of this EAW:

6. **Project Description:**
   a. **Provide the brief project summary to be published in the *EQB Monitor*, (approximately 50 words).**

   The Dem-Con Landfill SW-290 is an existing Class III Demolition Landfill in Louisville Township, Scott County, Minnesota. Dem-Con Landfill, LLC is seeking a horizontal expansion onto 241 acres directly south of the existing landfill adding 36,247, 942 cubic yards (cy) of airspace to the existing landfill for a total design capacity of 55,300,384 cy of airspace. The 241-acre expansion area is an active limestone quarry that is nearing completion and preparing for final reclamation activities and end use development.

   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**

equipment or industrial processes, 3) significant demolition, removal or remodeling of existing structures, and 4) timing and duration of construction activities.

Dem-Con Landfill, LLC (Dem-Con) is seeking to expand the existing construction/demolition debris, and industrial waste operations onto 241 acres directly south of the existing landfill (Project). The Project area is an active limestone quarry that is phasing in completion of mining activities and preparing for final reclamation activities and end use development. The Project involves permitting the expansion area for additional construction, demolition, and industrial waste disposal capacity. The Project does not involve permitting for Municipal Solid Waste (MSW).

Description of Existing and Proposed Project: The existing landfill (Landfill) is on 121 acres in Sections 16 and 21, Township 115, Range 23, in Louisville Township, Scott County, Minnesota (Figure 1 County Location Map). The Landfill accepts industrial waste and construction/demolition debris for disposal under Minnesota Pollution Control Agency (MPCA) Permit SW-290. The MPCA permitted the Landfill in November 1985 and Dem-Con began operation in January 1986. Initial construction included unlined landfill cells. In 2007, Dem-Con began construction of future cells with a synthetic liner and leachate collection system. The installation of the liner and leachate collection system provided enhanced environmental protection as well as allowed the Landfill to accept additional types of demolition, construction, and industrial waste. Once portions of the Landfill reach final grade, a synthetic cap is constructed over the completed fill areas and a protective rooting layer is placed along with topsoil and vegetation. The synthetic cover prevents precipitation from infiltrating into the underlying waste, thereby reducing, or eliminating, the generation of leachate which provides increased protection of groundwater. The current Landfill has an ultimate design capacity of 19,052,442 cubic yards (cy) of airspace capacity including cover materials, with less than seven million cy remaining.

The Project will add 36,247,942 cy of airspace. Figure 2 - USGS Quad Map Excerpt, illustrates the location of the Project Area with respect to the Landfill.

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

   Like the Landfill, the Project will be developed in previously mined areas. Mining activity has been completed in most of the Project area. Mining is progressing from north to the south in a phased manner and development of landfill cells will proceed in a phased manner. Construction and filling of initial Landfill phases in the north will occur concurrently with completion of mining phases in the south. Mining activity in the northern portion of the quarry, which includes approximately the northern 180 acres of the Project, is nearing completion. Reclamation activity (e.g., Sloping along perimeter to approved reclamation grades, topsoil application, seeding and mulching to establish vegetation) has begun and is expected to be completed in 2-3 years in the area where landfilling activity will commence. Mining activity will continue to progress to the south and into the recently permitted southern portion of the quarry, which includes approximately 60 acres. Based on information from the operator, the quarry has an estimated ten years of mining activity remaining, but the life of the mine will be driven by local market demand. Both landfilling and mining activity will occur on the property concurrently, but in different areas of the site.

This is Dem-Con's current practice of active mining and quarrying in advance of the construction of liner and leachate collection system and landfilling in the northern phases of the Landfill.

Construction of cells within the quarry will consist of placing and grading subsoils over the floor and slopes of the quarry. A synthetic liner and leachate collection system will be constructed to collect leachate generated from the filling process and prevent it from leaching into the underlying soils and groundwater. The collected leachate will be pumped and hauled for treatment at the Blue Lake Wastewater Treatment Facility in Shakopee, Minnesota and discharged in accordance with a Metropolitan Council Industrial Discharge Permit (Special Discharges) Number 2284. Attachment 1 Landfill Development Plan Set, includes:

- C-1.1 Existing Conditions Existing Landfill,
- C1.2 Existing Conditions Expansion Area,
- C-1.2 Post Mining Reclamation Conditions Expansion Area,
- C-2.1 Liner System Existing Landfill,
- C2.2 Liner and Leachate Collection System Expansion Area,
- C3 Phasing Plan
- C4.1 Final Grades Existing Landfill
- C4.2 Final Grades Expansion Area

Waste is placed in an active phase of the Project and phases are managed to keep as small of an operating area open as practical while maintaining safe operations. Intermittent cover is placed on the active areas of the Project on an as needed basis to control nuisance issues. However, at a minimum in accordance with Minn. R. 7035.2825, subp. 4(B), cover is placed on any waste that is exposed for 30 days. Suitable cover material is maintained on site and is obtained from on-site soil excavation or from clean soil hauled onto the site. Stockpiling measures are taken as necessary to ensure adequate cover material throughout the entire year, including winter months.

Once final grades have been reached, a final cover system will be constructed including a synthetic cap designed to prevent infiltration of precipitation into the waste thereby reducing the volume of leachate generated. Rooting soil and topsoil will be placed over the synthetic liner and vegetation will be established over the cap as part of closure activities.

Dem-Con operates under a closure and post closure plan that is part of the MPCA Solid Waste Permit. The plan ensures proper closure of the Project, monitoring of its post-closure effects, and maintaining the site in a safe condition. Dem-Con is responsible for post closure monitoring, which includes inspections, cover repair as needed, groundwater monitoring, and leachate collection and treatment. Dem-Con or its successor-in-interest will be responsible for the post-closure care of the site for a period of twenty years, or until such times as this responsibility has been assumed by another public or private entity acceptable to the regulatory agencies. Final end uses may be considered within the post closure period.

Closure and post closure care of the Project is designed to minimize or eliminate potential environmental and health hazards that could be caused by the Project. Closure and post closure care of the Project site includes maintaining the leachate collection system, off-site disposal of leachate, maintaining the final cover , maintaining the groundwater monitoring network, restricting access to the site to authorized personnel through the use of locked gates and fencing, maintaining the vegetative cover over the site, the slope interception swales, and perimeter swales to reduce the potential for erosion, and maintaining the stormwater management facilities to treat stormwater runoff from the vegetated final cover system prior to discharge off-site.

The Landfill and Project currently accepts construction and demolition (C&D) debris from the seven-county metropolitan area, as well as surrounding greater Minnesota counties. The Landfill is open to the public. C&D debris is defined below:

Construction debris means waste building materials, packaging, and rubble resulting from construction, remodeling, repair, and demolition of buildings and roads (Minn. Stat. § 115A.03, subd. 7).

Demolition debris means solid waste resulting from the demolition of buildings, roads, and other structures including concrete, brick, bituminous concrete, untreated wood, masonry, glass, trees, rock, and plastic building parts. Demolition debris does not include asbestos wastes (Minn. R. 7035.0300, subp. 30).

Examples of C&D debris include materials generated from construction of new buildings, renovations of existing buildings, buildings torn down for redevelopment, and rubble from streets, sidewalks, and parking lot replacement.

In addition, Dem-Con currently accepts industrial wastes in accordance with an approved Industrial Solid Waste Management Plan (ISWMP). A few examples of accepted industrial wastes include, but are not limited to, manufacturing scraps, recycling residue, off-spec products, asbestos, contaminated soils, and water treatment and filtering sludges.

C&D waste averages between 70-85% and industrial waste averages between 15-30% of the annual waste stream landfilled at Dem-Con. Volumes of each waste type are reported annually to the MPCA. The Project will not change the composition of the waste stream. MPCA guidance allows up to 50% industrial waste based on annual gate receipts in a Class III demolition landfill.[1]

Recyclable materials are handled at the Landfill as well. These materials are stored on-site until a sufficient volume accumulates for on-site processing, processing at Dem-Con's adjacent environmental campus, or transport from the site. Recyclables handled on-site include but are not limited to appliances, metals, batteries, asphalt pavement, tires, electronics, cardboard, concrete, clean wood debris, and shingles. Recyclable materials are stored outside. Batteries and electronics are stored in covered containers. Sheet C1.1 Existing Conditions- Existing Landfill illustrates the locations of these storage areas.

Dem-Con is permitted to operate 24 hours a day 7 days per week. Site specific best management practices for high volume demolition landfills have been adopted by Dem-Con to screen for unacceptable wastes at the working face. Loads are initially screened at the

1 MPCA Demolition Landfill Guidance Water/Solid Waste #5.04, August 2005. Retrieved online at https://www.pca.state.mn.us/sites/default/files/w-sw5-04.pdf

gate house near the existing site entrance where the type and the quantity of the waste is recorded and inspected. If the material is to be landfilled, the truck proceeds to the tipping area. Personnel are on-site at the active tipping area to oversee the tipping procedure and visually inspect the waste to verify that no unacceptable wastes are deposited into the landfill. If unacceptable wastes are encountered at the working face, the hauler is instructed to remove them from the site. The load is inspected, spread, and compacted. Additional material is placed vertically on existing grades.

Equipment used in day-to-day operations include compactors, front end loaders, dozers, off-road trucks, excavators, water truck, and skid steers. Additional equipment is brought to the site as needed for various construction projects, such as constructing a liner over a new phase or final cover over a completed phase.

2) Modifications to existing equipment or industrial processes:

The Project does not change the operating procedures at the landfill. General site operations will be the same in the expansion area as at the Landfill. Incoming loads check in at the gate house at the site entrance where the type and the quantity of the waste is recorded and inspected. If the material is to be landfilled, the truck proceeds to the tipping area. Personnel are on-site at the active tipping area to oversee the tipping procedure. The waste is inspected, spread, and compacted. Additional material is placed vertically. Cover material is applied as required by Minnesota Rules or more often as deemed necessary by the operator.

Materials to be recycled are directed to the appropriate locations where the material is unloaded. Records are maintained of the volume of recycled material removed from the site.

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

The Project will not require significant demolition of existing structures. The limestone quarry operations utilize portable processing equipment. The scale house for the mining operation is in the very southern portion of the Project area. The scale house may eventually be incorporated into site operations or removed or demolished. Any concrete foundations to be removed will be recycled or disposed of in the landfill.

4) Timing and duration of construction activities:

The Project will result in an ultimate design capacity of 55,300,384 cy of airspace including cover materials. Dem-Con proposes to begin construction of the initial phase of the expansion area in 2023. Phases are filled and developed over time with an estimated remaining life of 55-60 years. Without the expansion, the estimated life of the Landfill is less than ten years.

c. Project magnitude:

Table 6c: Project magnitude

Total project acreage	**Project area - 241 acre** **(Existing landfill - 121 acres)**
Linear project length	N/A
Number and type of residential units	0
Commercial building area (in square feet)	0
Residential building area (in square feet)	0
Industrial building area (in square feet)	0 sq ft
Institutional building area (in square feet)	0
Other uses – specify (in square feet)	0
Structure height(s)	Leachate storage tanks approximately 25 feet. Expansion Area Final Elevation: 910 feet above mean sea level (msl) Existing Landfill Permitted Final Elevation: 932 msl Project will not change currently approved final elevation of existing landfill.[2]

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 the opportunity for Dem-Con to continue to meet the recycling, C&D and industrial waste disposal needs of the community. Dem-Con's existing business has progressed from a landfill company to a fully integrated solid waste and recycling company with continued investments into recycling and processing infrastructure at its integrated Environmental Campus. Despite continued improvement and investment in waste recycling and processing, local landfilling continues to be a necessary component of the overall integrated waste management system needed to serve Scott County and the Twin Cities metro area. This landfill expansion will give Dem-Con the ability to continue to meet the disposal needs of the community while investing in the Environmental Campus helping Scott County and the surrounding community meet their processing and recycling goals.

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.

There is a potential for a future MSW project to be considered at the Landfill. The MPCA issued a final Certificate of Need (CON) to the Landfill of 627,244 tons of MSW airspace in late spring of

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2 Sheet C-4.1 and C-4.2 of Attachment 1 Landfill Development Plan Set. illustrate the approved final grades of both the Existing Landfill and the Expansion Area.

2022. At this time, an application for an MSW stage has not been prepared or submitted to the MPCA. If or when an MSW project is developed, it will be subject to mandatory environmental review in accordance with Minn. R. 4410.

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.

The Project is a horizontal expansion of the existing Dem-Con Landfill. The Dem-Con Landfill was originally permitted by the MPCA in 1985 and has been amended on several occasions including: 1987, 1988, 1993, 1998, 2003, 2005, 2011 and 2016. The major amendments have included expansions, design modifications related to the installation of a liner and leachate collection system over portions of the landfill, and design modifications to construction a synthetic cap over the entire portion of the Landfill. Demolition landfills are not included in the mandatory threshold for an Environmental Assessment Worksheet (EAW). While there have been environmental studies associated with the MPCA permitting process, an EAW was not prepared for the existing Landfill. The Dem-Con has volunteered to complete this EAW for the Landfill expansion.

The Project area has been included in past environmental reviews associated with mining. An EAW was completed in 1992 for the northern portion of the mining area that is currently operating under a Conditional Use Permit (CUP) issued by Scott County. An Environmental Impact Statement (EIS) was completed for the Merriam Junction Sands (MJS) project, which included the Project area as well as additional surrounding property (MJS FEIS). The MJS project was a mining proposal that included silica sand, limestone, and sand and gravel mining. The limestone and sand and gravel mining aspects of the MJS project have proceeded, but silica sand mining was not pursued. The MJS EIS included a comprehensive hydrogeologic study, biological survey, wetland delineations, and many other applicable environmental studies. The Final MJS EIS was determined adequate by the Scott County Board on July 7, 2020. The 2020 MJS FEIS is incorporated to this EAW by reference.[3] After the MJS environmental review process was complete, Scott County issued Bryan Rock Products, Inc. an Interim Use Permit to mine the southern portion of the Project. Upon completion of mining under the existing CUP and recently issued IUP, the limestone quarry will encompass the entire Project area.

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.

Attachment 2 incudes a list of resources used to obtain climate trend information. The Project is situated in the Lower Minnesota River geographical region. According to information from the MDNR climate explorer website[4] historical temperature trends over the past 30 years (January 1, 1991 – December 30, 2020) have been increasing in the Project area. The mean average

3 The MJS FEIS includes several studies relevant to the Project Area and is incorporated by reference/CVA.aspx" https://metrocouncil.org/Communities/Planning/Local-Planning-Assistance.aspx

4 Climate Explorer Map. Minnesota Climate Explorer Available at https://arcgis.dnr.state.mn.us/ewr/climateexplorer/main/historical

annual temperature has been increasing by 0.46° F every decade for the past three decades. The mean average annual temperature over this past thirty-year period is 45.18° F. Climate models predict that the average annual temperature for this area is expected to continue to rise in the future. Based on the model mean (the average of several different climate models included in MDNR the website's analysis), the present day (1980-1999) average annual temperature is 45.02° F and is predicted to increase by late century (2080-2099) to 50.97 ° F under an intermediate scenario (where greenhouse gas emissions peak in 2040) or up to 54.73° F for a worst-case extreme scenario. An increase in heat waves is expected to accompany the increased temperatures and more frequent periods of drought with more days between precipitation events.[5]

Historical precipitation trends indicate that in the Lower Minnesota River geographical region there has been a decline in the average annual precipitation of -0.01 inches per decade over the last three decades with an average annual rainfall of 30.75 inches. Based on the model mean, the present day average annual precipitation is 30.86 inches and is predicted to increase by late century to 31.77 inches under the intermediate scenario and up to 34.64 inches under the extreme scenario.

The weather is expected to get warmer and wetter in the Project area because of climate change. Extreme rain events are expected to increase in frequency with the area of the Site experiencing a 0-5% increase in extreme rainfall events over the next thirty years compared to 1980 to 2021 averages.[6] Increased rainfall and the flashier nature of events can result in increased flooding frequency and higher flood stages.

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.

5 Climate Vulnerability Assessment. Climate Vulnerability Assessment - Metropolitan Council available at https://metrocouncil.org/Communities/Planning/Local-Planning-Assistance.aspx

6 Flood Factor for zip code 55379. Flood Factor available at https://floodfactor.com/environmental-changes

Table 7b: Resource category

Resource category	Climate considerations (example text provided below is to be replaced with project-specific information)	Project information	Adaptations
Project Design	Final cap is designed to limit infiltration to reduce leachate generation which increases rates of runoff. Increased frequency and rainfall amounts would result in greater volumes of stormwater runoff.	Climate change risks and vulnerabilities identified include: Increased frequency of significant rainfall events and increased precipitation amounts leading to increased flooding frequency and magnitude that could exceed 100 yr. design of stormwater management system.	Building one or more structures to retain or divert floodwater, including vegetated berms, drainage swales, and retention ponds. Installing fabricated and armored drainageway to reduce velocities and therefore reduce erosion that could be caused by higher velocity flows associated with higher intensity events. Constructing reinforced emergency overflows using synthetic fabric and riprap armor at surface water discharge locations to minimize erosion and downstream impacts of flooding events greater than the 100-year event, while minimizing erosion and the potential for downstream sediment transport. Stabilizing banks of onsite segments of susceptible drainageways through a combination of "soft" armor (synthetic fabrics and deep-rooted vegetation) and "hard" armor (riprap and segmental retaining walls).
Land Use	The site is in an industrially zoned area and does not include structures or activities that would be susceptible to increased flood stages or periods of prolonged drought. Prolonged flooding could cause groundwater levels to rise with respect to the liner system.	Climate change risksand vulnerabilities identified include: The Minnesota River is the controlling hydrologic factor in the local groundwater flow regime, periods of prolonged flooding could create an increase in the high-water	Installation of a liner and leachate collection system designed to provide protection even if increased groundwater elevations were to cause an inward gradient. Under these circumstances, the leachate head would be reduced with no negative impact to the effectiveness of the liner and

Resource category	Climate considerations **(example text provided below is to be replaced with project-specific information)**	Project information	Adaptations
		table elevations in the immediate vicinity of the river. This could result in a shift in the vertical groundwater gradient beneath the liner. Increased groundwater heads more than five feet could result in a temporary inward gradient into portions of the liner.	the groundwater quality would remain protected.
Water Resources	Address in item 12	Address in item 12	Address in item 12
Contamination/ Hazardous Materials/Wastes	For example, how current Minnesota climate trendsand anticipated climate change in the general location of the project may influence the potential environmental effects of generation/use/storage of hazardous waste and materials. The Project is in an area where an increase in annual precipitation is predicted. Increased precipitation will result in an increase in leachate in areas of the landfill that are active.	Climate change risksand vulnerabilities identified include: Leachate is collected stored and transported from the site. Increased leachate generation rates could result in more maintenance of the pumping system and more frequent transport of leachate from the facility to the wastewater treatment plant. Leachate storage tanks are within secondary containment system(s) designed to hold 110% of the capacity of the tank. The additional volume is to account for direct precipitation falling on and collecting in secondary containment area.	Additional leachate storage can be provided if increases in precipitation create more leachate than under current conditions. Including a synthetic layer in the cover system to prevent precipitation from entering the fill in areas where filling is completed even if precipitation amounts increase.
Fish, wildlife, plant communities, and sensitive ecological resources (rare features)	Address in item 14.	Address in item 14.	Address in item14.

8. **Cover types: Estimate the acreage of the site with each of the following cover types before and after development:**

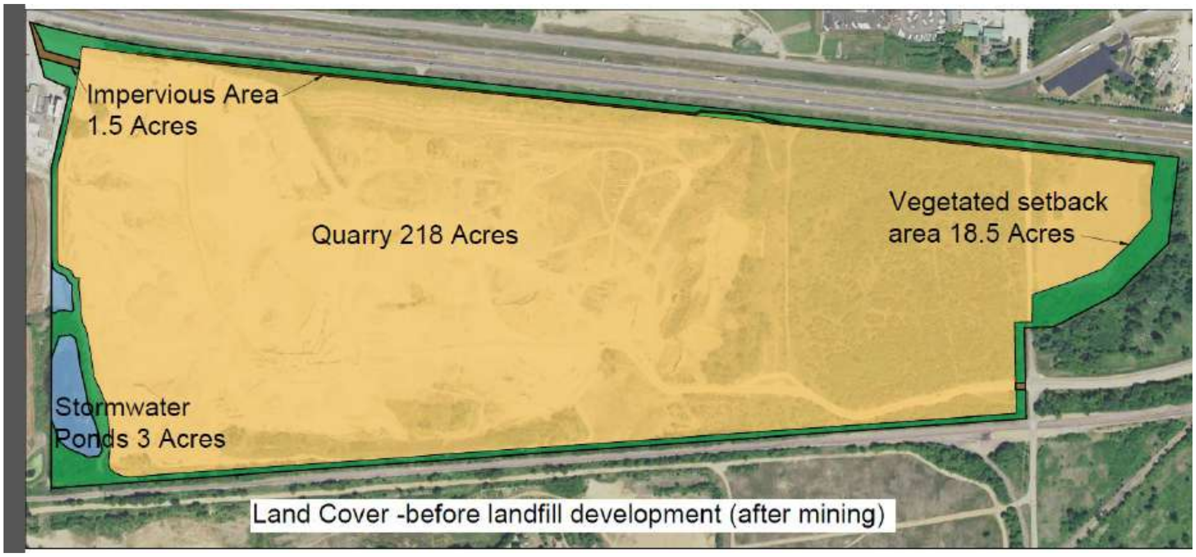
Note that the following table reflects landcover values at the start of Project construction and the approved and permitted reclamation condition of the limestone quarry.

Table 8-1: Cover types

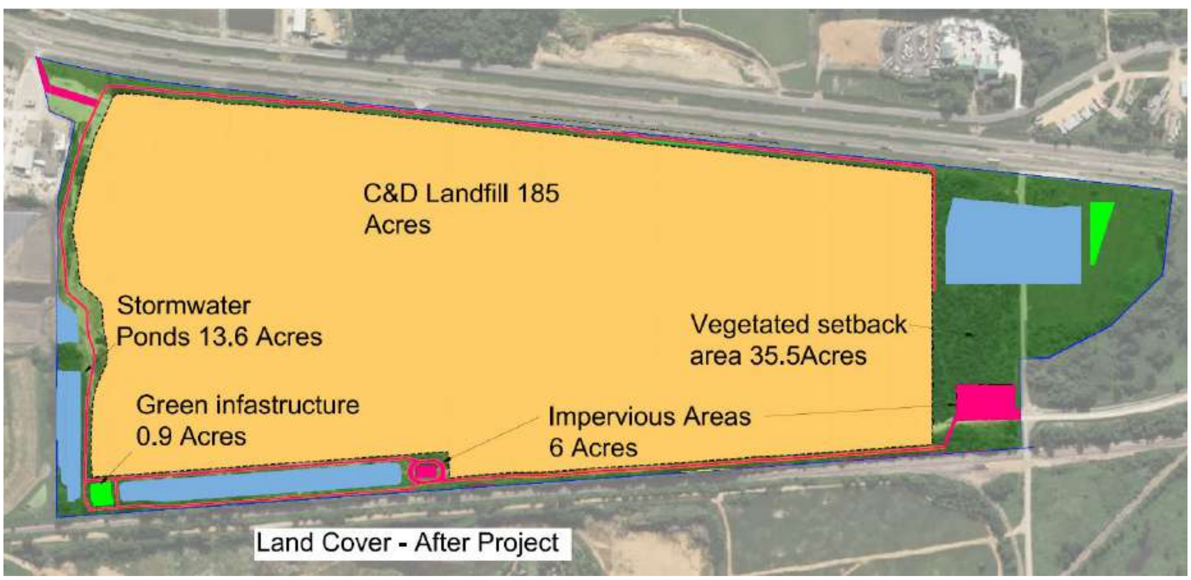
Cover types	**Before (acres)**	**After (acres)**	**Cover types**	**Before (acres)**	**After (acres)**
Wetlands	0	0	Lawn/landscaping	0	0
Livestock rangeland/pastureland	0	0	Green infrastructure TOTAL (from table below*)	0	0.9
Deep water/streams	0	0	Impervious surface	1.5	6
Wooded/forest	0	0	Stormwater Pond	3	13.6
Brush/Grassland	0	0	Other (describe) see below		
Cropland	0	0	C&D Landfill	0	185
			Limestone Quarry	218	0
			Vegetated Setback Area	18.5	32.5
			TOTAL	241	241

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	0.9
Constructed tree trenches and tree boxes	0	0
Constructed wetlands	0	0
Constructed green roofs	0	0
Constructed permeable pavements	0	0
Other (describe)		
TOTAL*		

Trees	**Percent**	**Number**
Percent tree canopy removed or number of mature trees removed during development		Less than 10
Number of new trees planted		368



Land Cover – before landfill development (after mining)



Land Cover – after project

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: Permits and approvals

Unit of government	Type of application	Status
Minnesota Pollution Control Agency (MPCA)	Amendment to Solid Waste Facility Permit SW-290	Submitted
	NPDES/SDS (Industrial Stormwater Multi Sector General Permit) – includes Construction Stormwater General Permit Requirements	Obtained
	Air Permit Applicability Determination	Submitted and Completed (no permit needed)
Minnesota Department of Health (MDH)	Well Sealing (as needed)	To be submitted
	Well Construction Permit	To be submitted
	Monitoring Well Permit	To be submitted
Metropolitan Council	Industrial Discharge Permit (Special Discharges) for leachate disposal	Obtained.
Scott County	Amendment to Conditional Use Permit (CUP)	To be submitted
	Annual Solid Waste License	Obtained for existing Landfill, Submitted annually
	Septic system, building permits, etc.	To be submitted

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.

Figure 3 – Existing Land Use, illustrates the existing land use associated with the Project and surrounding area. Current and recent land use and development within the Project area includes limestone quarrying and processing operations which operate under land use permits issued by Scott County. Limestone quarrying has occurred within the Project area since the 1950's. The Site is bordered by the Union Pacific Railroad to the west and the US Highway 169 corridor to the east.

Land use immediately surrounding the Project area is predominantly industrial and commercial in nature. The Dem-Con Landfill and associated environmental campus with recycling, processing, and transfer operations are north of the Project. Louisville Landfill, a closed municipal solid waste (MSW) landfill is north of the Project and west of the existing Dem-Con Landfill. Sand and gravel and limestone mines are west and east of the Project and north of Trunk Highway (TH) 41. The Green Quarry, a former limestone quarry, is southwest of the Project. Other nearby industrial and commercial land uses include Anchor Block, Diemold Tool, 169 Truck and Auto Repair, and RRT yard waste compost facility.

The closest rural residential land uses are 1,000 feet east of the Project and are buffered by the US Highway 169 corridor and additional light industrial and commercial land uses east of the highway. There are two residences under one-half mile south of the Project. These residences are west of US Highway 169, south of the 147th St overpass system, and south of the RRT yard waste compost facility. The Jackson Heights mobile home park is near the intersection of Dem-Con Drive and TH 41 just west northwest of US Highway 169 and just under one-mile from the Project area.

There are two festival land uses near the Project including the Minnesota Renaissance Festival and the Sever's Festival grounds. The Renaissance Festival is an annual festival held in late summer and fall of each year. The festival grounds and parking area are on property just west of the Project. Sever's Festival grounds are one-quarter mile to the southeast of the Project. Sever's currently hosts annual events primarily in the fall and winter but is developing year-round events.

The remainder of the surrounding land use is vacant land, agricultural land, and state and federal park lands associated with the Minnesota River Valley to the west. The United States Fish and Wildlife Service (USFWS) has acquired land along both sides of the Minnesota River establishing the Minnesota Valley National Wildlife Refuge. Refuge units are along the river valley from the City of Bloomington to Henderson Minnesota.[7] The Louisville Swamp Unit is south of the Project and the Rapids Lake Unit and Chaska Lake Unit are southwest and northwest of the Project on the west side of the river.

The Louisville Swamp Unit is developed with trails, parking lots, and other infrastructure and contains approximately 2,600 acres of land and open space adjacent to the Minnesota River. The main access and parking area are off US Highway169 via 145th Street, which runs along the southern portion of the Project area. 145th Street also serves as an access point to the Renaissance Festival.

The Minnesota Bluffs regional trail currently ends in the City of Carver but is planned to eventually cross the Minnesota River and run through the abandoned Union Pacific railroad right-of-way west of the Project and link up with the trail segment recently installed adjacent to Red Rock Drive, just south of the Project. This segment of the trail is currently in the design phase. The preliminary alignment does not impact the Project property. There are no cemeteries in the vicinity of the Project.

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.

The Scott County 2040 Plan (2040 Plan) articulates a vision of how Scott County will develop over the next 20 years. The 2040 Plan includes strategies that will accommodate growth and development to optimize benefits to Scott County and provide a framework for zoning and subdivision regulations. The 2040 Plan includes a Future Land Use Map that is intended to provide a logical framework to guide Scott County's land use policies and development decisions.

The 2040 Plan designates future land use of the Project as Industrial served by major

7 https://www.fws.gov/refuge/minnesota-valley

transportation corridors, as well as areas of Commercial and Urban Expansion to the east of the Project. According to the 2040 Plan, the purpose of this planning category is to provide areas for industrial development in the unincorporated areas to expand the local tax base and allow for economic development. Landfills are an allowed use in the industrial land use category and help support the economic development of the area.

The Project is in the Scott Watershed Management Organization (Scott WMO) and is subject to their Comprehensive Water Resources Management Plan. The overall purpose of this plan is to protect, preserve, and manage natural surface and groundwater systems within the Scott WMO in response to rapid urban growth and agricultural activity. The Project is also subject to Scott County's Natural Resource Management Ordinance and the standards within.

The MPCA's Metropolitan Solid Waste Management Policy Plan 2016 – 2036 (Metro Policy Plan)[8] is applicable to the Project. The Metropolitan Solid Waste Management Policy Plan establishes the plan for managing the Metropolitan Area's solid waste. The MPCA prepares this plan every six years.

The goals of the Metro Policy Plan are to:

- Protect the environment and public health, reduce greenhouse gas emissions, and conserve energy and natural resources.
- Manage waste in an integrated system to minimize landfilling.
- Manage waste cost-effectively and internalize future costs to minimize long-term financial liability and maximize environmental benefits.
- Share responsibility and costs for environmentally sound management of waste.

The Metro Policy Plan also includes a component of Environmental Justice. MPCA staff conducted an environmental justice review and identified areas of concern for environmental justice that will potentially be affected by the proposed policy to insure that:

- Pollution does not have disproportionate negative impacts on any group of people.
- The benefits, opportunities, and risks of agency policies, decisions, and activities are fairly and equitably distributed.
- All individuals and groups are given the opportunity for meaningful involvement in agency decisions that may impact them.
- Environmental justice concerns are given due consideration by agency decision-makers during the development, implementation, and enforcement of environmental laws, regulations, and policies.
- The MPCA and its stakeholders have mechanisms in place to regularly evaluate progress, success, and failure in meeting the agency's goals and the outcomes of those evaluations are used to inform future planning and decision-making by the agency.

MPCA staff identified solid waste management sites in areas of concern for environmental justice. A list of these facilities was included in the plan, along with recommendations for

8 Metropolitan Solid Waste Management Policy Plan 2016-2036. Minnesota Pollution Control Agency

increased diligence in permitting actions, including a higher level of scrutiny of impacts, greater effort to avoid and diminish impacts, more frequent inspections, and enhanced community engagement. These recommendations apply to any new facilities proposed in areas of concern.

The Project is not within an Environmental Justice Area of Concern identified by the MPCA.[9] Information relating to the geographic areas and population served, including highlighting areas of concern for environmental justice is included in the MPCA Solid Waste Permit application.

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

The Project is zoned I-2, Heavy Industrial. This district is intended to allow industrial uses that are not water intensive and are compatible without municipal services in those areas having access to arterial roadways and/or rail transportation in locations specifically guided by the Comprehensive Plan. Landfills are an allowed conditional use within the I-2 zoning District.

Upon completion of landfilling activities and construction of the final cover system, the landfill will enter a twenty-year post closure period regulated by the MPCA through the Solid Waste Permit. Dem-Con is responsible for post closure monitoring, which includes inspections, cover repair as needed, groundwater monitoring, and leachate collection and treatment. Dem-Con is responsible for establishing a fully funded and bonded post closure fund at the time of closure. Post closure end uses may be considered within the post closure period if found to be compatible with both the landfill and county zoning in effect at that time (e.g. unoccupied open space, solar).

Zoning of the adjacent developed properties is I-2 Heavy Industrial, I-1 Rural Industrial, C-1 General Commercial, UER Urban Expansion Reserve, or UER-C Urban Expansion Reserve Cluster. Figure 4, Scott County Zoning Map Excerpt, illustrates the zoning of the Project and surrounding area.

The Project area is not within a Floodplain, Shoreland Overlay District, or another special overlay district. Property to the west of the Project area near the Minnesota River and Gifford Lake is within the Shoreland Overlay District. Figure 5 - Shoreland Overlay District, depicts the location of the Shoreland District with respect to the Project area.

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.

The Project is not within and does not involve any critical facilities within a floodplain area

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9 https://www.pca.state.mn.us/about-mpca/environmental-justice

or other area identified at risk for local flooding.

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 Project is compatible with the nearby heavy industrial land uses, local zoning designations, and local land use plans. The use is served by major transportation corridors (US Highway 169 and TH 41), which support the heavy industrial zoning district established by Scott County's local land use plans and ordinances.

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

The Project will be subject to operational standards established by the MPCA. Residential land uses are buffered from the landfill by the major US Highway 169 major transportation corridor and other industrial uses. The Project will be subject to performance standards established in the local zoning regulations and the MPCA Rules related to setbacks, screening, noise, dust control and other potential nuisance conditions, which are discussed individually in following sections of this document. The Project area is not in an area identified by the MPCA as an area of Environmental Justice Concern.

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 Geology of the Project area originally consisted of a shallow bedrock deposit of the Prairie du Chien Group – a limestone dolomite formation that has been mined across much of the Project area since the 1950's. The Prairie du Chien Group forms the bedrock subcrop over the southern unmined portion of the Project area. The Prairie du Chien Group is composed of two units, the upper Shakopee Formation and the lower Oneota Dolomite. Both the Oneota Dolomite and overlying Shakopee Formation consist largely of carbonate components, characterized by thin to very thick, beds of dolostone, with negligible amounts of sandstone and other silica bearing rocks, except in the lowermost 10 to 20 feet, within the Coon Valley Member, the lowest member of the Oneota Dolomite–which can contain substantial quantities of sandstone, siltstone, and shale.[10] The Prairie du Chien Group is typically 140 to 190 feet thick where past erosion has not diminished the thickness of the unit. However, in the Project area it is typically 25-70 feet thick due to past erosion of the uppermost portion of this bedrock unit.

The Oneota Dolomite is being progressively mined and while mining encounters small solution cavities and fracture zones typical of this formation, there is no evidence of sinkholes or other larger karst features within the Project area. Permitted mining activity will involve the continued

10 Mossler, John. 2008. Paleozoic Stratigraphic Nomenclature for Minnesota. Report of Investigations 65. University of Minnesota St. Paul, MN.

mining and removal of the carbonate bedrock from the Project area to within a few feet of the underlying Jordan Sandstone, therefore the potential for geologic hazards related to karst features is not significant.

Underlying the Prairie du Chien Group and forming the bedrock subcrop in the very southern portion of the Project area, is the Jordan Sandstone. The Jordan Sandstone is approximately 80 to 120 feet thick within the Project area. It contains two facies, a medium-to coarse-grained quartz sandstone and fine-grained feldspathic sandstone with lenses of siltstone and shale. The Jordan Sandstone is the source of the silica sand deposit.

Beneath the Jordan Sandstone, additional bedrock units are found. From uppermost to lowermost, the Jordan is underlain by the St Lawrence Formation, the Tunnel City Group (formerly known as the Franconia Formation), the Wonewoc Sandstone (formerly known as the Ironton and Galesville Sandstones), and the Eau Claire Formation. The St. Lawrence Formation is a dolomite-cemented, very fine-grained sandstone and siltstone. The St. Lawrence Formation contains interbedded laminated green shale and pink to red, finely to coarsely crystalline dolostone, the latter being particularly abundant in the lower one-half of the formation. To the west of the Project, the Minnesota River flows through a bedrock valley, which is believed to be down cut into the St. Lawrence Formation and/or Tunnel City Group.

The Project is underlain by bedrock aquifer systems. Mining has removed the majority of the Prairie du Chien and the water table is generally associated with the upper portion of the Jordan Sandstone. Mining within the Project area is not conducted below the water table. The base of the liner will be constructed a minimum of five feet above the groundwater table. A synthetic liner and leachate collection system will be installed to protect groundwater.

The underlying St. Lawrence Formation is considered a regional confining bed hydraulically separating the overlying Jordan aquifer from the underlying Tunnel City-Wonewoc (Franconia-Ironton-Galesville) aquifer. The Eau Claire Formation: a shale, siltstone, and very fine-grained sandstone, averaging about 75 feet in thickness acts as a confining layer hydraulically separating the overlying Wonewoc from the underlying Mt. Simon-Hinckley aquifer. In addition to the bedrock aquifers, sand layers in the glacial drift may be used as a source of water supply by some residents in the vicinity of the Project. The groundwater flow direction is from east to west beneath the Project, towards the discharge area of the Minnesota River.

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 11.b.ii.

Soils: A Natural Resource Conservation Service (NRCS) Soil Map and Report for the Project Area is included as Attachment 3. According to the NRCS Web Soil Survey, the original soils in the Project area were composed predominantly of stony land with shallow depths to limestone bedrock, which is the target resource of the past and current mining activity in the Project area. The majority of Project area soils have been or will be removed as part of the mining activity. The exception to this is the soils in the very southern portion of the Project area (Excerpt 10-1 below) that were identified as being the only soils remaining in the Project area that are suitable for the development of Subsurface Sewage Treatment System (SSTS) sites[11] (Fesner 2019). The area is not served by municipal utilities and future development is dependent upon suitable SSTS sites. The protection of these soils is a condition of the mine permit and the approved mining and reclamation plans. The Project also includes provisions to protect these soils for future development.

Table 11-1 includes the soil types of the original site soils.

Table 11-1: Project site soils

Map unit symbol	Map unit name	Acres in AOI	Percent of AOI
CdB	Copaston silt loam, 2 to 6 percent slopes	4.1	1.7%
CdB2	Copaston silt loam, 2 to 6 percent slopes, moderately eroded	1.2	0.5%
DbB	Dickman sandy loam, 2 to 6 percent slopes	0.0	0.0%
EaB	Estherville sandy loam, 2 to 6 percent slopes	13.6	5.6%
Gp	Pits, gravel	4.3	1.8%
Sc	Stony land	213.2	88.4%
Ta	Terrace escarpments	2.1	0.9%
TcA	Terril loam, 0 to 2 percent slopes	2.5	1.0%

11 2019. Fesner Environmental. Site Suitability for Septic Systems. Merriam Junction Sands, LLC on property owned by Bryan Rock Products and Malker0son Sales, Inc. Attachment 5 of the July 2020 MJS FEIS.

Map unit symbol	Map unit name	Acres in AOI	Percent of AOI
Totals for Area of Interest		241.0	100.0%

The topography of the Project reflects the past mining activity of the Project. Terraced bedrock highwalls lead down to the quarry floor, which is sloped gently to the west. The final floor elevations of the quarry are situated 2-5 feet above the regional water table. Plan Sheet C1.3 illustrates the elevation of the floor of the mine upon completion of mining. The elevation of the quarry floor ranges from approximately 720 to 726 msl. The topography of the area generally slopes east to west towards the Minnesota River Valley.

Reclamation of the quarry will involve leaving a combination of benched limestone walls and 2:1 to 3:1 backfilled slopes. Construction of the liner system will require additional backfilling to create slopes and subsoils suitable for liner construction. The Project will disturb approximately 238 acres of land, which have been previously disturbed by mining activity. An estimated 1,500,000 cy of material will be required to build up the subgrade from the quarry reclamation grades for liner construction and development of the Project.

The grades of the base of the Project will vary and the liner will slope from east to west. The liner grades are designed to maintain a minimum five-foot separation between the top of the liner and the seasonal high-water table. The liner grades for the Project area are illustrated on Plan Sheet 2.2 Liner Grades-Expansion Area.

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 include water quality impairments or special designations listed on the current MPCA 303d Impaired Waters List that are within 1 mile of the project. Include DNR Public Waters Inventory number(s), if any.

There are no lakes, streams, wetlands, county, or judicial ditches within the Project area. The Project is not within the shoreland district floodway or floodplain. There is a stormwater channel that runs through the northern portion of the Project area.

The floodplain and shoreland districts of the Minnesota River and Gifford Lake are west of the Project. Figure 5, Shoreland Overlay District illustrates the location of the shoreland district with respect to the Project Area. Public waters within one-mile of the Project include the Minnesota River, Gifford Lake (Public Water 70-118P), Louisville Swamp (Public Waters 70-209P and 70-210P), Picha Creek, and Sand Creek. Picha Creek is south of the Project and flows into Louisville Swamp joining Sand Creek before discharging into the Minnesota River. The confluence of Sand Creek with the Minnesota River is just under one mile west of the Project. Figure 6, Public Waters illustrates the location of public waters in the vicinity of the Project.

A wetland delineation[12] was performed in conjunction with the MJS EIS. There are no Wetland Conservation Act (WCA) regulated wetlands or US Army Corps of Engineers jurisdictional wetland basins in the Project area. Three basins, including two stormwater basins and an aggregate wash settlement pond are in the northern portion of the Project area. These three basins were determined to be incidental wetlands and not regulated under the Wetland Conservation Act. The wash basin will be relocated to the southern portion of the Project as mining progresses to the south. The Technical Evaluation Panel issued a Notice of Decision (NOD) on 2/15/2015. The NOD approved the wetland delineation boundaries and types and a No Loss Decision. Wetland delineations are typically valid for a period of five years. However, the TEP issued an extension of the NOD until February 11, 2027, for the Project area upon finding that conditions related to aquatic conditions had not changed. A copy of the NOD and the letter granting an extension of the delineation on the property to 2027 is included as Attachment 4.

No regulated wetland basins were identified in the Project area. The wetland delineation was used as a basis for the recent permitting of the southern portion of the Bryan Rock Quarry. The landfill expansion will only be disturbing areas of the Project that have been previously disturbed from mining operations.

Wetlands in the vicinity of the Project include scattered wetland basins and larger wetland complexes within the floodplain of the Minnesota River. Figure 11 illustrates the locations of surrounding wetlands. Wetlands shown on this figure are from the MJS wetland delineation referenced above. There are a few isolated wetland basins in the area, but most wetland areas are associated with larger wetland complexes within the floodplain of the Minnesota, River. Off-site wetlands will not be impacted by the Project.

The lower Minnesota River Valley is an important bird area that supports a variety of nesting and migrating waterfowl. Demolition landfills have little to no impact on migratory birds as they contain no food sources or habitat. Dem-Con operations and active mining operations within the Project area are setback from the large wetland complexes associated with the MN River by approximately one-quarter mile. The wetland complexes and upland areas in the surrounding area that provide nesting habitat will not be impacted by the Project. The Project area will be constructed on the floor of the quarry, which consists of barren unvegetated rock. The Landfill has operated without negative impacts on nesting and migrating waterfowl for decades. The Project is a continuation of these activities and will not be creating any new potential for impacts to migratory birds or nesting waterfowl.

Impaired waters within one mile of the Project that are on the 2022 Draft impaired waters list[13] are included in Table 12-1.

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12 Barr (2011) Portions of Merriam Junction Sands Mine Scott County, Minnesota Prepared for Hunt Global Resources, Inc. LGU provided an extension of the wetland delineation until 2027.

13 https://www.pca.state.mn.us/water/impaired-waters-viewer-iwav

Table 12-1: Impaired waters within one mile of Project

Impaired water	Impairments	Impaired use
Picha Creek	Fish bioassessments	Aquatic Life
Sand Creek	Chloride, E. coli., Fish bioassessments, Nutrients, Turbidity, Benthic macroinvertebrate bioassessments	Aquatic Life, Aquatic Recreation
Minnesota River High Island to Carver Creek	Fecal coliform, Mercury in fish tissue, Mercury in Water Column, Turbidity, PCB in fish tissue,	Aquatic Life, Aquatic Recreation, Aquatic Consumption
Minnesota River Carver Creek to RM 22	Mercury in fish tissue, Mercury in Water Column, Turbidity, Nutrients, PCB in fish tissue,	Aquatic Life, Aquatic Consumption

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 on site or nearby, explain the methodology used to determine this.

1) depth to groundwater: The elevation of the water table varies from approximately 726 feet above mean sea level (msl) in the eastern portion of the Project to approximately 721 feet above msl along the western portion of the Project. Figure 7A – Groundwater Table, illustrates the water table and flow direction across the Project area based on water levels taken in the spring of 2015. Figure 7B illustrates the water table and flow direction across the Project area taken in the winter of 2022 and demonstrates the seasonal fluctuation of the water table. The hydrogeologic evaluation of the Project area in the solid waste application is included as Attachment 5. The direction of groundwater flow is from the east to the west towards the discharge region of the Minnesota River. In areas where limestone has been previously quarried, the depth to water table currently varies from approximately 2-20 feet below the floor of the quarry. Groundwater flow in the Jordan Sandstone occurs under unconfined conditions. Below the Jordan Sandstone, the St. Lawrence Formation characteristically has low vertical hydraulic conductivity and is typically considered a confining unit hydraulically separating the Jordan Aquifer from the underlying Tunnel City aquifer.

The groundwater monitoring plan requires collection of water level data on a quarterly basis in conjunction with quarterly sampling. Groundwater table maps reflecting the quarterly monitoring results are prepared and submitted to the MPCA on a quarterly basis and in the annual groundwater report, which includes the past five years of data. The most recent groundwater monitoring report is included as Attachment 6 – 2021 Annual Groundwater Monitoring Report.

2) MDH Wellhead Protection Areas: The Project area is not in a Minnesota Department of Health (MDH) wellhead protection area. The Carver and Chaska wellhead protection areas: Carver North, Carver Central, and Chaska South) are over one mile from the Project area and across the Minnesota River, which represents a hydrogeologic barrier between the Project and the wellhead protection areas. The wellhead protection area for the city of Shakopee is just under one mile from the Project. The Shakopee wellhead protection area is upgradient of the Project and the Existing Landfill. Figure 8 – Wellhead Protection Areas, illustrates the location of wellhead protection areas in the vicinity of the Project.

3) Onsite and/or nearby wells. There are two monitoring wells in the Project area, MW-7-11 and MW-4-11 that were installed as part of the hydrogeologic investigation conducted for the MJS EIS. The Bryan Rock Production Well used for washing was sealed in 2020 and will be redrilled in the southern portion of the quarry to support aggregate washing operations.

The Renaissance Festival has two non-community public water supply wells that are located downgradient of the Project. These wells are finished in deeper aquifers. Other water supply wells associated with nearby commercial industrial and residential land uses are upgradient or side gradient of the Project area. Table 12-1 includes the names, unique numbers (where available), and locations of wells within 1,000 feet of the Project. Figure 9 - Water Supply Wells Near the Project, illustrates the locations of these wells. Attachment 4 includes copies of these water supply well logs.

Table 12-2: Nearby water supply wells

Well ID	Owner	Address	Twp	Rng	Sect
540281	Bryan Rock Products (sealed)	13580 Johnson Memorial Dr. Shakopee MN 55379	115	23	21
272748	Dem-Con Material Recovery Facility	13161 Johnson Memorial Dr. Shakopee MN 55379	115	23	21
272749	Dem-Con Material Recovery Facility	13161 Johnson Memorial Dr. Shakopee MN 55379	115	23	21
796915	Dem-Con Material Recovery Facility	13161 Dem Con Dr. Shakopee MN 55379	115	23	21
684019	Dem-Con Office	13020 Dem-Con Dr. Shakopee MN 55379	115	23	21
809771	Dem-Con Metal Recycling	13142 Dem Con Dr. Shakopee MN 55379	115	23	21
405973	Halloran	13122 Johnson Memorial Dr. Shakopee MN 55379	115	23	21
610403	Anchor Block	13450 Johnson Memorial Dr.	115	23	21
759599	Anchor Block	Shakopee MN 55379	115	23	21
221364	Johnson & Bigler Co.	13450 Johnson Memorial Dr. Shakopee MN	115	23	21
209939	Lano Implement	3021 133rd St. W.	115	23	21

Well ID	Owner	Address	Twp	Rng	Sect
		Shakopee MN 55379			
551318	C.H. Carpenter Lumber	13731 Johnson Memorial Dr. Shakopee MN	115	23	21
836415	Mumoff	13745 Johnson Memorial Drive	115	23	21
248000	MN Renaissance Festival	3630 145th St. W. Shakopee MN 55379	115	23	21
211864	Lindstrom	3036 150th St. W. Shakopee MN 55379	115	23	28
244436	Merriam Junc. RR Well	145th St. W. and RR track	115	23	28
709026	Doucette	14331 Johnson Memorial Dr. Shakopee MN	115	23	28
211863	Minn. Valley Nursery	3232 150th St. W. Shakopee MN 55379	115	23	28
211865	Minn. Valley Garden Cent	3232 150th St. W. Shakopee MN 55379	115	23	28
569344	NRG	14800 Johnson Memorial Dr. Shakopee MN	115	23	28
233116	Granzlow (Doucette)	Irrigation Well 14145 Johnson Memorial	115	23	28
513892	Renaissance Festival	3325 145th St. W. Shakopee MN 55379	115	23	28
404657	Renaissance Festival	3525 145th St. W. Shakopee MN 55379	115	23	28
401129	MN Valley Wholesale	14505 Johnson Memorial Dr. Shakopee MN 55379	115	23	28

Potential Impacts to Groundwater: Impacts to groundwater from a landfill generally results from the production of leachate, which enters the groundwater system. Leachate is produced when precipitation travels through and is in contact with the in-place decomposing waste. The water picks up dissolved material forming leachate. The volume of leachate produced, and strength of leachate depends upon several factors including climate and the type of waste that is landfilled.

The MPCA defines three classes of demolition landfills.[14] Class I Demolition Landfills accept C&D wastes included on the MPCA's Acceptable C&D Waste List. Class II demolition landfills accept MPCA's Acceptable C&D Waste List and incidental nonrecyclable packaging consisting of paper, cardboard and plastic, and limited demo-

14 August 2005. Demolition Landfill Guidance Water/Solid Waste #5.04. MPCA available online at https://www.pca.state.mn.us/sites/default/files/w-sw5-04.pdf

like industrial waste that is limited in composition to wood, concrete, porcelain fixtures, shingles or window glass. Class III demolition landfills may accept all C&D wastes and most industrial wastes.

Dem-Con has implemented several landfill design elements to reduce the volume of leachate generated and to prevent leachate that is generated from impacting the groundwater. Leachate reduction measures include:

- The use of cover materials over exposed waste;
- Limiting the size of active fill area;
- Use of diversion berms, swales, and grading to prevent stormwater from running into an active fill area;
- Installing a final cap on completed fill area; and
- Final grades designed to shed precipitation off the fill area.

The final cap design at the Landfill exceeds the design standards for Class III landfills and consists of a six-inch buffer layer overlain by a 40-mil LLDPE liner, a drainage geocomposite, 18 inches of rooting material and six inches of topsoil layer. This system significantly reduces the amount of precipitation that can enter the landfill and generate leachate. Rooting soils and establishment of vegetation promote evapotranspiration and provide erosion control. These measures minimize the volume of leachate generated during the operating life and post closure period.

Measures to prevent leachate generated from impacting groundwater include:

- Installation of a landfill liner and leachate collection system; and
- Routine groundwater monitoring.

The liner system is designed to provide a barrier between the waste and the underlying ground and prevents leachate from reaching the groundwater. The liner system design over the expansion area consists of a six-inch soil cushion layer, geosynthetic clay liner (GCL), 60-mil HDPE liner, drainage geocomposite, and 12-inch granular drainage layer. The liner system creates an essentially impermeable layer that protects the underlying groundwater. The base of the liner system is sloped towards a series of collection pipes that transmit the leachate off the liner to a sump. Pumps remove the leachate from the sump to a leachate storage tank via a double walled force main. Secondary containment sized to contain the entire tank volume plus precipitation is provided for the leachate storage tanks. When the final cover system is constructed over a completed cell, there is no longer a source of water to produce leachate. New leachate generation ceases. Any leachate still contained within the waste percolates downward over time and is collected and removed by the liner and leachate collection system creating a “dry tomb” condition.

In addition to these groundwater protection measures; a groundwater monitoring network has been established at the landfill. This network will be expanded to incorporate the Project area. Routine groundwater sampling is conducted in accordance with the MPCA Solid Waste Permit and results submitted to the MCPA. The following section describes groundwater monitoring in the Project area.

There are several monitoring wells adjacent to the Project area that are associated with three sperate monitoring well networks. The Dem-Con Landfill has an existing monitoring well network that consists of eight wells. The closed Louisville Landfill has a monitoring well network that consists of 16 wells, 12 of these are active. The MJS project has a monitoring well network that consists of 15 wells. Monitoring wells are listed in Table 12-2. Figure 10 – Monitoring Well Networks, illustrates the location of the wells included in Table 12-2. Attachment 5 includes copies of well logs for the existing Dem-Con monitoring well network and the wells that are within the Project area.

Groundwater monitoring has been conducted at the Landfill in accordance with the Solid Waste Permit since 1999. The current Landfill monitoring well network and groundwater monitoring plan was established in accordance with the MPCA solid waste permit. Monitoring has been conducted for several parameters including metals and VOCs. Attachment 9 includes a copy of the current Landfill groundwater monitoring plan. The plan will be amended as part of the MPCA Solid Waste Permit to provide upgradient and down gradient coverage of the Project area. PFAS monitoring is described at the end of this section.

The existing Landfill groundwater monitoring network includes upgradient wells W-8, W-10, and W-120 and downgradient wells W-121, W-122, DC-117, DC-118, and DC-119. The three monitoring wells, DC-117, DC-118 and DC-119 are monitored as part of the Landfill and Louisville Landfill network, serving as downgradient wells for the Landfill and up gradient wells for the closed Louisville Landfill. These wells are at the interface between the Louisville Landfill and the Landfill.

Five additional monitoring wells are proposed to be added to the monitoring well network for the Project and include two upgradient wells and three downgradient wells. These wells will be phased into the monitoring well network prior to filling progressing into the Project area. The wells will be installed, and baseline data will be collected a minimum of one year prior to landfilling within the areas they will be monitoring. Proposed well locations are indicated on Figure 10, Monitoring Well Networks.

Table 12-3: Existing monitoring well networks

Dem-Con monitoring well network	
Name	**Unique number**
W-8	Unknown
W-10	151599
W-120	595728
W-121	595729
W-122	Unknown
DC-117	557378
DC-118	557379
DC-119	557380

Closed Louisville landfill monitoring well network	
Name	**Unique number**
W-3A	Unknown
W-4	Unknown
W-5	Unknown
W-9	Unknown
W-11	151598
W-111	151597
W-211	433615 (sealed 12-07-20004)
W-112	433618 (sealed H227037)
W-113	433616
W-213	433617
W-114	433619
W-115	525943
W-116	Unknown
DC-117[15]	557378
Dc-118	557379
DC-119	557380

MJS Monitoring well network		
Name	**Unique number**	
MW-1-11	783158	
MW-04-11	783164	In Project Area
MW-6-11	783162	
MW-7-11	783165	In Project Area
MW-8-11	783155	
MW-9-11	783159	
MW-11-11	783153	
MW-13-11	783154	
MW-16-11	783156	
MW-17-11	783160	

15 DC-117-DC-118 are part of both Dem-Con Landfill (downgradient of landfill)and Louisville Landfill (upgradient of landfill) Monitoring Networks

MW-19-11	783163
MW-20-11	783161
MW-21-11	783157
PW-14-11	786706
PW-15-11	786707

Groundwater monitoring is conducted on a quarterly basis, excluding winter quarter. Both upgradient and downgradient wells routinely have detections of Manganese, Barium, Boron, Chloride, Sulfate, Nitrate and Nitrite, and Iron above reporting limits. Low levels of VOCs are occasionally detected in both upgradient and downgradient wells except for DC-117. DC -117 is at the interface between the Louisville Landfill and the Landfill and past monitoring results indicate that groundwater at DC-117 has been influenced by the Louisville Landfill. DC-117 routinely has detections of about ten different VOCs. Concentrations of most of these VOCs are trending downward. Groundwater monitoring results are reported to the MPCA. The annual groundwater report includes a summary of the current years water quality monitoring, tabulation of the last five years of results, and graphs of contaminants that have been detected during the reporting year, which illustrate historical and recent trends. A copy of the 2021 Annual Groundwater Report is included as Attachment 6.

Several measures to increase protection of the groundwater have been implemented over the life of the Landfill. These include:

- The installation of a liner and leachate collection system in the northern fill area as part of initial phase construction.
- Installation of a liner and leachate collection system over in-place demolition fill materials in the central fill area. The liner as acts as a liner for future filling in this portion of the landfill and acts as an essentially impermeable cover over the underlying in place demolition waste.
- Construction of an enhanced final cover system over completed unlined portions of the southern landfill in 2019. The enhanced final cover system will be used over all portions of the landfill as they are brought to final grade and consists of a six-inch buffer layer overlain by a 40-mil LLDPE liner, a drainage geocomposite, 18 inches of rooting material and six inches of topsoil layer. This system significantly reduces the amount of precipitation that can enter the landfill and generate leachate. This system is particularly effective at protecting groundwater over the unlined portions of the original demolition landfill.

Existing Groundwater Impairments in the Surrounding Area: The Louisville Landfill is just north of the Project area. The Louisville Landfill opened in 1968 and was permitted for operation in 1971 as an unlined MSW landfill. The landfill operated until May 1990, when the state began requiring liners and leachate collection systems at all MSW landfills. Unlined MSW landfills contaminate groundwater resources when precipitation and/or groundwater seeps through this waste and produces leachate. Leachate is water contaminated from the various wastes that it comes in contact as it migrates through the waste. Leachate passes through the waste and continues downward until it reaches and contaminates the groundwater beneath the landfill. As the contaminated groundwater moves away from the landfill, it forms a plume, and the contaminants are transported away from the landfill within the plume. State of the art landfill design now incorporates a liner and leachate collection system to prevent leachate from impacting underlying groundwater resources. Routine groundwater monitoring at the Louisville Landfill detected the presence of groundwater contamination and a remedial investigation was conducted in 1987. Volatile organic compounds (VOCs) were found in the groundwater sampled along the western edge of the landfill and low levels of 23 VOCs were found in off-site downgradient wells. Groundwater flow from the Louisville Landfill is to the west towards the discharge area associated with the Minnesota River.

The Louisville Landfill was closed in 1990 and has been part of the MPCA closed landfill program since 1999. The MPCA is responsible for the long-term closure care, existing groundwater impairments, and on-going groundwater monitoring associated with the Louisville Landfill. The Louisville Landfill was covered with an enhanced cover system that included a low-density polyethylene (LDPE) synthetic liner and landfill gas extraction system in 2003. Since installation of the enhanced final cover and gas extraction system, concentrations of most contaminants in the groundwater have declined but downgradient wells continue to detect low levels of VOCs.

The impaired groundwater is to the northwest of the Project area and has no impact on the Project. Dewatering or water appropriations are not proposed as part of the Project. The Project will not affect groundwater flow direction or contaminant transport associated with the unlined Louisville Landfill. The Project area will be constructed with a leachate liner and collection system that protects the underlying groundwater.

PFAS: The MPCA more recently conducted additional monitoring at the Louisville Landfill for emerging contaminants of concern including per- and polyfluoroalkyl substances, commonly known as PFAS at closed landfills across the state. According to the MPCA[16]. PFAS contamination was found in 97 percent of assessed closed landfills, including the Louisville Landfill. In February 2021, The MPCA, along with other state agencies, released Minnesota's PFAS Blueprint – a strategic, coordinated approach to protect families and communities from PFAS. With the discovery of PFAS contamination in groundwater, the MPCA will expand its water monitoring to ensure drinking water is monitored and the full extent and magnitude of the contamination is known.

In March of 2022, the MPCA developed a PFAS Monitoring Plan.[17] The PFAS Monitoring Plan addresses PFAS monitoring at several different types of industries including Solid Waste Facilities. To implement the PFAS Monitoring Plan at Minnesota's solid waste facilities, the MPCA is requesting all landfills sample groundwater monitoring wells for PFAS over the next two years. MPCA developed two waves of testing based on facility and risk characteristics, including landfill design and operation, groundwater

16 https://www.pca.state.mn.us/news-and-stories/nearly-60-closed-landfills-in-41-counties-have-pfas-contamination-in-groundwater-that-exceeds-the

17 March 2022, PFAS Monitoring Plan, Minnesota Pollution Control Agency. Available online at https://www.pca.state.mn.us/sites/default/files/p-gen1-22b.pdf

contamination associated with the facility, and potential downgradient drinking water receptors. Based on this prioritization of facilities, the MPCA assigned the Landfill to the second wave. In July 2020, Wave 1 facilities received the request to conduct PFAS monitoring in 2023. The MPCA has not yet sent out monitoring requests to Wave 2 facilities. It is anticipated that Wave 2 facilities will monitor for PFAS in 2024.

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 and waste loadings, including any effects on, or required expansion of, municipal wastewater infrastructure.

The landfill design includes a synthetic liner and leachate collection system. Leachate is generated as precipitation falls on active cells and infiltrates through the waste. The liner is sloped to perforated collection pipes which drain to sumps. Leachate is pumped from the sumps to an above ground storage tank.

The leachate is hauled to the Blue Lake Wastewater Treatment Facility in Shakopee, Minnesota and discharged in accordance with a Metropolitan Council Industrial Discharge Permit (Special Discharges) Number 2284. Leachate contains several chemical compounds picked up as stormwater and snowmelt percolate through and contact the landfilled debris. Leachate is routinely sampled for several parameters as a condition of the MPCA solid waste permit. Results are submitted to the MPCA. The last five years of leachate monitoring results are tabulated in the 2021 Annual Groundwater Report included as Attachment 6. Volumes of leachate generated are also reported. Leachate sampling is also required by the Metropolitan Council and regulated through the Metropolitan Council Environmental Services Industrial Discharge Permit. The permit contains monitoring requirements as well as discharge limitations for certain parameters.

Leachate is routinely sampled for several chemical constituents as a condition of both the MPCA solid waste permit and the Metropolitan Council Discharge Permit. Volumes of leachate generated are also reported.

The volume of leachate generated each year is dependent upon the size of active fill area and precipitation. The Existing Landfill generates between 4 to 10 million gallons per year. The Project is not expected to change the volume of leachate generated because the size of the open active cells in the expansion area will be consistent with the existing Landfill's open active cell areas. Maximum leachate is generated during a transition from one active cell to the next as filling in one cell is being completed and filling in a new cell is being initiated. Leachate generation rates could increase if annual precipitation increases during the life of the Project.

2) **If the wastewater discharge is to a subsurface sewage treatment system (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.**

   The Landfill offices are off-site and served by a SSTS system. Portable facilities are used in the field as needed. Currently there are no plans to develop an SSTS on-site. However, in the future as operations progress to the south, it is possible that a building is constructed and an SSTS for normal domestic sewage is developed. These soils have been previously identified as being suitable for SSTS development in a Site Suitability soil suitability investigation by Feser Environmental conducted for the MJS EIS, Feser concluded in the section referencing the unmined portion of the Bryan Rock Property south of 145th Street[18]:

   > "The area along the south and southwestern boundary of this site, below the 760 ft. elevation line, had areas that could support a Type 1 SSTS. The depth of natural, undisturbed soil over limestone documented in these areas were 12 inches to 41 inches. Preliminarily, this area could support approximately six 5,000 square foot areas or three 10,000 square foot areas."

   Preserving the soils that have the potential to support an SSTS was a condition of the Bryan Rock mine permit issued by Scott County. The location of the suitable soils identified in the Feser Report are illustrated on Plan Sheet C.1.3 The Project also preserves these soils so that they may be available for development of an SSTS in the future. Any SSTS system would require a permit from Scott County and would be required to meet County and State design standards at the time of construction.

3) **If the wastewater discharge is to surface water, identify the wastewater treatment methods and identify discharge points and proposed effluent limitations to mitigate impacts. 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.**

   Not Applicable because the Project will not result in a wastewater discharge to a surface water.

ii. **Stormwater - Describe the quantity and quality of stormwater runoff at the site prior to and post construction. Include the routes and receiving water bodies for runoff from the site (major downstream water bodies as well as the immediate receiving waters). Discuss any environmental effects from stormwater discharges. Describe stormwater pollution prevention plans including temporary and permanent runoff controls and potential BMP**

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18 2019 Feser Environmental Site Suitability for Septic Systems Merriam Junction Sands, LLC on property owned by Bryan Rock Products and Malkerson Sales, Inc, Available as Attachment 5 of the 2020 MJS FEIS. The MJS FEIS is available online at https://www.scottcountymn.gov/506/Merriam-Junction-Sands

site locations to manage or treat stormwater runoff. Identify specific erosion control, sedimentation control or stabilization measures to address soil limitations during and after project construction. Stormwater - Describe changes in surface hydrology resulting from change of land cover. Describe the routes and 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.

Topography of the Project area before development consisted of a terrace landscape that gently sloped to the west. Figure 11 – Pre-Settlement Site Drainage Areas, illustrates the pre-mining drainage patterns of the Site. Figure 12 – Proposed Site Drainage Areas, illustrates the existing drainage patterns of the Project area. These figures also illustrate the routes and receiving water bodies for runoff from the Project including major downstream water bodies as well as the immediate receiving waters. There are three distinct drainage areas across the Project area, the northern regional, central, and southern drainage areas.

In the northern portion of the Project area, regional stormwater drainage originating in the bluff area runs into and through the northern portion of the Project. Permanent stormwater management ponds were constructed on the east side of US Highway 169 in conjunction with the 2020 construction of the frontage road (Louisville Road) system. A regional hydrologic model was developed by the County that incorporates these improvements. The model includes tributary drainage areas that flow into the northern portion of the Project from east and northwest of US Highway 169. The Regional Model was used as the basis for modelling the regional stormwater drainage through the Project area. Stormwater from the east through a culvert system under US Highway 169 and into the Project near the northwest property corner. This stormwater combines with additional stormwater runoff from the subwatershed north of the Project and west of US Highway 169 and flows over the Project's northern driveway into a ditch system that also conveys water from the existing landfill and the Dem-Con environmental campus area. Stormwater enters an existing stormwater pond (DC-2) at the southern end of the existing Landfill. Overflow from DC-2 is through an outlet structure into a ditch system that straddles the common property line between the Louisville Landfill and the Project. There is an existing sedimentation basin (DC-3) in the northwest corner of the Project area, which discharges via overland flow to the west into the UP railroad right of way and through a large box culvert beneath the track and onto the adjacent property to the west (Malkerson Sales Property). The drainage continues through a series of pipes and ditches across the floor of a limestone quarry on the property and into a final sedimentation basin prior to discharging into a large wetland complex associated with the floodplain of the Minnesota River.

In the central drainage area, mining has reduced the grade in most of the drainage area. Most of this drainage area originally drained to the west but now most of the area drains internally. A small portion of the central drainage area along the setback of the mine drains to the US Highway 169 right of way.

The southern drainage area originally drained to the south. Most of this drainage area north of 145th Street flows to a box culvert under 145th Street. The portion property south of 145th Street sheet flows to the south. A small portion of the drainage area flows to the US Highway 169 right of way. Stormwater runoff from the southern drainage area on site generally flows to the southwest towards a large culvert that runs under 145th Street just to the west of the Project Boundary and into a landlocked basin. Figure 11 - Pre-Settlement Site Drainage Areas, illustrates the pre-mining drainage patterns of the Project. Figure 12 – Proposed Site Drainage Areas, illustrates the existing drainage patterns of the Project.

The Project will alter the topography of the Project area. As mining lowers the grade across the Project area, landfilling will raise the grade across the Project area. The northern regional drainage area will be maintained and is outside of the landfill footprint. The central and southern drainage areas will continue to discharge to the west and south.

The cover system is designed to accept water into the rooting zone to sustain healthy vegetation and to prevent excess precipitation from penetrating the liner and entering the waste. Therefore, development of the landfill, (without stormwater controls) would increase the uncontrolled rate and volume of stormwater runoff from the landfill. A stormwater management system has been designed that includes stormwater treatment, rate control, and volume control to mitigate these impacts. Additional stormwater basins will be constructed to treat stormwater runoff, control peak rates of runoff, and provide infiltration to mitigate increases in the volume of runoff generated from the Project.

Stormwater Management will meet the Scott County and MPCA Stormwater management standards for landfills. The regional stormwater drainage patterns will be preserved. The County Standards are fully articulated in Chapter Six of the Scott County Zoning Ordinance. Some of the key design standards are as follows:

- The Project will control peak rates of runoff for the 2, 10, and 100 year 24-hour rainfall events to pre-settlement conditions.
- The wet detention basins are designed in accordance with the W.W. Walker Method (1987) described in the Best Management Practices and provide: (1). A permanent wet pool with dead storage greater than or equal to the runoff from a 2.5-inch storm event; (2). Pond outlets are designed to prevent short circuiting of the flow from pond inlets to the outlets; (3). An outlet skimmer to prevent migration of floatables and oils for at least the 1-year storm event; and (4). Access for future maintenance.
- Infiltration practices for control of stormwater runoff volume are designed to be capable of infiltrating a volume of runoff equivalent to the depth of one (1) inch of runoff over the area of all new impervious surfaces within the development within forty-eight (48) hours.

- Pretreatment is provided prior to the infiltration basins and is designed to protect the infiltration system from clogging and to protect groundwater quality.
- The infiltration systems are designed to bypass higher flows.
- All drainage systems and facilities are designed to convey at least a 25-year rainfall event and to withstand the runoff from the critical one hundred (100) year event without damage to the system or facility, downstream areas and/or significant risk to human health and safety.

Regional drainage patterns will be maintained along the northern portion of the Project. The existing vegetated outlet will be reconstructed to stabilize the outlet and reduce the erosion potential associated with the current vegetated outlet. Table 12-3 summarizes existing and proposed peak rates of runoff for the Project.

Table 12-4: Peak runoff rates

24-HR, event	Pre-settlement runoff (cfs)	Proposed runoff (cfs)
North Regional drainage area		
2-YR	38.19	31.4
10-YR	80.22	77.91
100-YR	304.56	303.4
Central drainage area		
2-YR	0.11	0
10-YR	7.49	5.67
100-YR	116.61	24.30
Southern drainage area		
2-YR	2.38	0
10-YR	4.69	0.55
100-YR	40.65	15.02

If the modelled increase in precipitation comes in increased intensity and frequency of rainfall events, the potential for increased flooding and sedimentation may occur. Once soils become saturated, almost all the additional precipitation produces runoff, rather than soaking into pervious soils. The Project has been designed with stabilized emergency overflows to accommodate storms that exceed the 100-year event or the ponds outlet capacity. The Project is separated from the Minnesota River floodway at approximately 723 msl by a topographic divide along the UP railroad at an elevation of approximately 760 msl. The Project is not expected to change stormwater pollutants.

Pollutants of concern are suspended solids and nutrients which can enter the stormwater runoff from exposed soils and impervious surfaces. The landfill operates under a NPDES/SDS Industrial Stormwater Permit (MNR053453) and a site-specific Stormwater Pollution Prevention Plan (SWPPP). Dem-Con's SWPPP will be updated to include the expansion area. The Project is also required to operate under a Scott County Natural Resources Plan that meets the County's ordinance requirements for erosion and sediment control including perimeter controls, energy dissipation, rate, and volume control. The Scott County erosion and sediment control standards are fully articulated in Chapter 6 of the Scott County Zoning Ordinance. The Project incorporates erosion control measures including slope stabilization vegetation and seeding, perimeter controls including use of silt fence and vegetated filter strips, diversion berms and swales, energy dissipation, and riprap. The Project design incorporates sediment control measures including stormwater conveyance channels, stormwater diversion berms, sediment traps and sedimentation basins and infiltration basins to trap sediment onsite so that land disturbing activity does not create negative off-site impacts and to protect properties adjacent to the site from sediment deposition. Volume control is achieved through infiltration. The timing of the implementation of the various erosion and sediment control best management practices will vary as the Project is developed. Temporary measures may be installed to control active areas of Project construction and permanent practices will be installed to accommodate the progression of landfilling. Initially the construction work and landfilling activity will be recessed in the floor of the quarry. As perimeter phases are filled to above the surrounding grades, permanent best management practices will be implemented to control off-site discharges so that effective stormwater management and erosion and sediment control is maintained throughout the life of the Project. The stormwater management plan for the Project is submitted for review and approval as part of the MPCA's MSW permit application and as part of the Scott County CUP application.

Permanent best management practices including sedimentation basins for pre-treatment and infiltration ponds for water quality treatment and volume control have been designed to manage stormwater runoff from the landfill. Stormwater falling on the active landfill operations is managed to reduce pollutant loads by applying intermediate cover on inactive areas, using berms and swales to divert runoff away from active fill areas and to prevent runoff that does contact fill material from leaving the active cell. Flow interruption berms are constructed on top of the final cover system to interrupt flow across the slopes of the final cover and direct water to the perimeter ditch system, increasing the stability of the final cover system and reducing erosion potential.

Increased rainfall and extreme flooding events could create conditions where the flow interruption berms are overtopped leading to erosion of the final cover system, which would require repair and maintenance. Higher velocity flows in the perimeter drainage system could create higher erosion potential, the capacity of the outlets on the ponds that discharge stormwater off site could be exceeded, which would divert water to the reinforced emergency overflows. Increased events could also cause greater flows coming into the site from the regional drainage system as well as greater flows leaving the Project. The Project area is outside of the regional (100-yr) floodplain of the Minnesota River and is also outside of the extent of the 500-year floodplain.

The total area that will be disturbed by the Project is 238 acres. Areas of disturbance are illustrated on Sheet C-2 and C-3 of the Plan Set. Landfilling is a progressive activity, and the Project is developed in phases so that only a small portion of the Project is active at any one time. The 238 acres that will be disturbed includes the landfill footprint, perimeter setback areas, stormwater management including ponds and swales and landscaped perimeter areas. Past mining activity will have previously disturbed all the 238 acres. The very southern portion of the Project area will be protected from disturbance to preserve potential future SSTS sites.

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 anywell abandonment. If connecting to an existing municipal water supply, identify the wells tobe 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 theappropriation 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.

Dem-Con does not propose to appropriate surface or groundwater

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 mitigationfor unavoidable wetland impacts will occur in the same minor or major watershed and identify those probable locations.

There are no wetlands on site and no physical wetland impacts are proposed. See Section 12.a.i for a description of wetlands adjacent to the site. Climatic trends are predicted to create a wetter climate with flashier events, which may increase the volume of runoff from the landfill. Increased runoff may decrease the effectiveness of erosion and sediment control Best Management Practices (BMPs) resulting in stormwater discharges with higher concentrations of total suspended solids, which then enter adjacent wetlands. Stormwater discharges eventually drain to wetlands downstream. This could increase sedimentation in the wetlands and negatively impact the quality of the wetland.

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.

The Project will not physically alter any lakes, streams, or county or judicial ditches. There are no nearby lakes, county or judicial ditches that receive runoff from the Project. The Minnesota River is approximately 3,000 feet from the Project, which will not drain, fill, cause changes in permanent inundation, dredge, dike, divert, impound, remove aquatic plants, or cause riparian alterations. The existing drainage system along the northern boundary of the Project will be improved. The existing drainage system conveys regional stormwater from the east through the site to the Minnesota River. It consists of a channel that will be cleaned out and regraded to an engineered cross-section designed to pass 100-year peak flows. Sedimentation pond P3, an existing ponding area in the northwest corner of the Quarry (See Figure 12) will be reconfigured within the existing stormwater easement. The P3 outlet will be improved to provide increased stabilization. The improvements include a stabilized overflow with reinforced geotextile, riprap outflow channel and a reinforced emergency spillway. The existing outlet is an unreinforced and unarmored grassed spillway. The improvements will maintain the current regional drainage patterns and reduce the potential for erosion and downstream sedimentation during large rainfall events that may occur on a more frequent basis because of climate change. The channel is indicated on Sheet C-3.2 Final Grade Expansion Area.

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.

Documented existing contamination in the area is associated with the closed Louisville Landfill. The Louisville Landfill is just north of the expansion area and just west and south of the existing Dem-Con Landfill. The Louisville Landfill opened in 1968 and was permitted for operation in 1971 as an unlined MSW landfill. The landfill operated until May 1990 with a waste footprint of approximately 56 acres.

Routine groundwater monitoring at the Landfill detected the presence of groundwater contamination and a remedial investigation was conducted in 1987. Volatile organic compounds

(VOCs) were found in the groundwater sampled along the western edge of the landfill and low levels of 23 VOCs were found in off-site downgradient wells.

The Louisville Landfill was closed in 1990 and has been part of the Minnesota Pollution Control Agency (MPCA) closed landfill program since 1999. The State of Minnesota owns the Louisville Landfill and MPCA is responsible for the long-term closure care, existing groundwater impairments, and on-going groundwater monitoring associated with the Louisville Landfill. The Louisville Landfill was covered with an enhanced cover system that included a low-density polyethylene (LDPE) synthetic liner and landfill gas extraction system in 2003. Groundwater has typically been sampled at least annually and up to three times per year by the MPCA. The current groundwater monitoring network at the Louisville Landfill consists of twelve upgradient and downgradient monitoring wells that are routinely sampled by the MPCA.

More recent sampling, MPCA reported in March 2021 that seven out of 12 active groundwater monitoring wells at Louisville Landfill reported PFAS exceedances, some at concentrations that exceed state health guidelines by 22 times.[19] The MPCA is planning on sampling nearby residential water supply wells as well as Gifford Lake and the Minnesota River as they continue to investigate these contaminants of concern.

Since installation of the enhanced final cover and gas extraction system, concentrations of most of the VOCs in the groundwater have declined, however downgradient wells continue to detect low levels of VOCs. Because PFAS was not part of the routine landfill monitoring sampling parameters, historical data on the trends of these contaminants is not available.

Impacted groundwater is northwest of the Project area. The Project does not propose to dewater or appropriate groundwater. There will be no impacts or alteration of groundwater flow direction or gradients that would exacerbate existing impacted groundwater conditions because of the Project.

To protect groundwater from potential impacts from the Dem-Con Landfill, an enhanced final cover system will be constructed over the entire landfill. The enhanced cover system goes beyond the minimum cover system required under solid waste rules and includes a synthetic cap, a protective rooting layer, topsoil, and vegetation. The synthetic cover prevents precipitation from infiltrating into the underlying waste, thereby reducing or eliminating the generation of leachate, which provides increased protection of groundwater. The liner and leachate collection system installed in all new fill areas constructed since 2005 also provides groundwater protection. A liner and leachate collection system were also installed over the existing partially filled unlined demolition waste fill areas. Airspace associated with unlined portions of the existing Dem-Con Landfill has been filled and final cover or a liner and leachate collection system, which acts as a cap over the underlying waste, has been constructed over the unlined fill area. A liner and leachate collection system will be constructed over the entire expansion area as well.

b. Project related generation/storage of solid wastes - Describe solid wastes generated/stored during construction and/or operation of the project. Indicate

19 https://www.pca.state.mn.us/news-and-stories/nearly-60-closed-landfills-in-41-counties-have-pfas-contamination-in-groundwater-that-exceeds-the

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.

Collected leachate, which is classified as a solid waste and is not classified as a hazardous material, is generated at the Landfill. Collected leachate is pumped through a double walled force main, to minimize the potential for an accidental release from the piping to an above ground leachate storage tank. The leachate storage tank is within a concrete secondary containment structure. The secondary containment structure will prevent a release to the environment in the event of an accidental spill, leak, or rupture of the tank. Secondary containment is designed to hold 110% of the tank volume to provide freeboard and excess volume for direct precipitation. The existing leachate storage tank is a field erected steel tank with a capacity of 300,000 gallons that was constructed in 2006. A new field erected steel leachate storage tank will be constructed with on the west side of the Project area. The new tank will have a capacity of approximately 300,000 gallons and be within a secondary containment structure.

The Project is a demolition landfill that accepts wastes for disposal. Materials are also accepted at the landfill, stored on site, and transported to Dem-Con's adjacent environmental campus. Materials accepted for recycling at the landfill are indicated in Table 13-1 below. The landfill is immediately adjacent to Dem-Con's environmental campus which includes a construction and demolition materials recovery facility, single-stream recycling facility, shingle processing yard, wood processing facility, metal processing facility, MSW & C&D transfer stations, roll-off container services, and Dem--Con's Green Grades Educational Program. All these facilities and programs are directed at promoting and facilitating source reduction and recycling.

Table 13-1: Material wastes

Waste type	Storage available	Annual amount removed from site	Storage method
Tires	500 units	6000 units	stockpile/bin
Appliances	100 units	1,000 units	stockpile/bin
Metals	2,000 Tons	10,000 tons	Roll off box, shop, stockpile
Concrete/asphalt	50,000 tons	200,000 tons	Stockpile
Shingles	50,000 tons	100,000 Tons	Stockpile
Batteries	50 units	500 units	Covered leakproof container
Electronics	200 units	5000 units	Covered container
Cardboard	5,000 tons	20000 tons	Stockpile
Wood	2,000 tons	5000 tons	Stockpile

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 adverseeffects from the use/storage of chemicals/hazardous materials including source reduction and recycling. Include development of a spill prevention plan.**

Dem-Con does not accept hazardous wastes for disposal or storage. Mobile fuel tanks are used throughout the Project area. Spill kits and equipment needed to clean up spills are available on-site. Although no permanent fuel tanks are anticipated, if any permanent fuel tanks are installed in the Project area, they will be double walled and comply with MPCA's fuel storage regulations. In the event of a spill Dem-Con will notify the Minnesota Duty Officer to report the spill.

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**

Dem-Con does not accept, generate, or store a hazardous waste and hazardous wastes will not generated during the life of the Project. Incidental hazardous wastes are removed from incoming loads as part of waste screening. Most of these wastes are taken back by the hauler. Occasionally hazardous waste residuals are found after the hauler has left the unloading area. These items such as paint, florescent ballasts and bulbs, etc. are stored inside in compliance with storage requirements for the materials and then hauled to an appropriate disposal or recycling facility. Dem-Con operates a maintenance shop off site that is a licensed very small quantity hazardous waste generator.

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 in near the site.**

The Project is on an active limestone quarry. Approximately two-thirds of the quarry has been mined to date and the remaining one-third, on the southern portion of the Project area, has been permitted. The unmined portion of the Project area provides limited habitat for wildlife resources and native plant communities. Results of a natural resource survey of the Project and surrounding are described in section 14.b.

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, andother sensitive ecological resources on or within close proximity to the site. Provide the license agreement number (LA-____) and/or correspondence number (ERDB 20220026) 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 copy of the Natural Heritage Review letter from the MDNR is included as Attachment 10. A natural resource survey, of the property was conducted by Barr Engineering as part of the 2020 MJS FEIS[20]. Barr conducted field surveys to identify and map wetlands, land cover, vegetation, plant communities, and wildlife habitat; identify onsite wildlife; and survey for the presence of federally and state-listed threatened and endangered plant species. Barr conducted the field surveys in accordance with a Natural Resources Survey Plan (Survey Plan) submitted to the MDNR and included additional target species and communities, as well as specific requirements for field survey and reporting requested by the MDNR. All survey protocols followed those described in the Survey Plan and recommendations from the MDNR. The report included the expansion area property as well as additional adjacent lands associated with the NM MJS project. The following information discusses the survey results relevant to the Project and surrounding area.

Fish resources: The Minnesota River is over 3,000 feet west of the Project. Erosion and sedimentation control practices will be implemented including permanent stormwater ponds and infiltration areas to protect downstream water quality. The Project is not anticipated to adversely affect the river ecosystem, fish, or mussel populations.

Wetlands: No regulated wetlands were identified in the Project area. There are some isolated wetland basins and larger wetland complexes associated with the floodplain of the Minnesota River on surrounding properties (See Figure 11).

Sites of biodiversity significance: The Minnesota Biological Survey (MBS) identifies and maps sites of biodiversity significance in the state and assigns rankings to these sites to estimate the statewide importance of the native biodiversity for each area. Rankings guide conservation and management of natural resources. Rankings include sites of Outstanding, High, Moderate, and Below Biodiversity Significance. The Project does not include any areas identified as Outstanding, High or Moderate Biodiversity Significance by the MBS[21]. Portions of the Project are ranked as areas "Below". See Inset 14.1 Areas of Biodiversity Significance. The Below ranking indicates that the property lacks occurrences of rare species and natural features or does not meet MBS standard for statewide significance. Areas ranked as Below do however serve as habitat for native plants and animals. The inset shows the location of the Below site of biodiversity significance. The area encompasses unmined portions of the existing Quarry. Approved mining limits extend through this area to the southern limits of the Project area. This area will be mined prior to landfilling.

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20 Vegetation, Wildlife, and Protected Species Report . Merriam Junctin of Ecological and Water Resources, 06/2014. St. Paul, Minnesota. Retrieved online from:

21 Minnesota Department of Natural Resources, 2014. Areas of Biodiversity Significance in Minnesota as determined by the MBS, 1987-2014. Division of Ecological and Water Resources, 06/2014. St. Paul, Minnesota. Retrieved online from: http://files.dnr.state.mn.us/eco/mcbs/maps/areas_of_biodiversity_significance.pdf

Inset 14.1 areas of biodiversity signicance within Project area

Rare features: state and federal regulations: Endangered species regulations are designed to protect populations of threatened and endangered plant and animal species.

Three federal laws provide protection of certain species, and each is administered by the U.S. Fish and Wildlife Service for non-marine species. First, the Endangered Species Act (ESA) of 1973 (16 U.S.C. §1531) protects federally listed threatened or endangered species, which are designated under federal law (16 U.S.C. § 1532). Second, the Migratory Bird Treaty Act (16 U.S.C. §§ 703711) is a treaty between the United States and other nations for the protection of birds that cross country borders during spring and fall migration. Third, the Bald and Golden Eagle Protection Act (16 U.S.C. §§ 668-668d) provides for the protection of eagles.

Another level of protection for certain species is administered by the MDNR. Minnesota's Endangered Species Statute (Minnesota Statutes, § 84.0895) and associated rules (Minn. R. part 6212.1800 to 6212.2300 and 6134) protect plant and wildlife species designated as threatened or endangered. A third category of listed species is “special concern.” State special concern species have no legal protection but because they are uncommon, have highly specific habitat needs, or are recovering from a delisting from threatened or endangered status, they are monitored by the state.

Threatened or endangered species: No state or federally listed threatened or endangered plant or animal species were identified in the Project area or are expected to occur in the Project area. Kitten-tails (Besseya bulli), a state threatened plant was found on property within one-half mile of the Project, but no evidence of the plant population was found in the Project area. The Loggerhead Shrike, a state listed endangered bird, and the Lark Sparrow, and Purple Martin, both state-listed bird species of special concern have also been identified in the vicinity of the Project. The Barr survey included a calling station in the southern portion of the Project. Lark Sparrow was identified at multiple times approximately one mile from the Project, but not on the Project itself. Neither the Loggerhead Shrike or Purple Martin were not observed in the Project area or in the surrounding survey area during the field survey work.

Other wildlife species of special concern: Three wildlife species of concern were identified near the Project but not on the Project during the Barr Engineering field studies; the bald eagle, the brown myotis and big brown bat.

Bald Eagle: Historically, the bald eagle was on the federal list of threatened and endangered species and was also listed as threatened in Minnesota. However, due to a successful recovery plan, the number and range of bald eagles has expanded in Minnesota, other states, and Canada. As a result, in 1996 the state status of bald eagles was changed from threatened to special concern. In 2007, the bald eagle was delisted from the federal list of threatened and endangered species. Bald eagles and their nests are still protected under the Bald and Golden Eagle Protection Act and the Migratory Bird Treaty Act.

Initial wildlife field surveys identified one adult and three juvenile bald eagles in the Project area within floodplain forest along the eastern edge of Gifford Lake, about one-half mile northeast of the Project. As a follow up, Barr conducted a stick nest survey[22] following a work plan detailing survey methods which was reviewed by the USFWS. The survey identified one eagle stick nest within one mile of the Project near a snowmobile/horse/biking/hiking trail along the Minnesota River.

Brown Myotis and Big Brown Bat: According to the biotics database review for the Project, there is likely a colony of little brown myotis and big brown bats along Gifford Lake, about one-half mile northwest of the Project. These two species of bats are listed as species of special concern in Minnesota. Special concern species are not regulated and do not have any special legal protections under state law. No bats were observed during the field surveys, which were conducted during daylight hours. Potential bat habitat, forests and woodlands on the Project are likely suitable for summer roosting sites and foraging habitat for both species, especially over the open water areas of Gifford Lake. Both species of bats over-winter in caves, which are not present on or near the Project.

Northern Long Eared Bat: While not identified in the area, the northern long eared bat is a Minnesota listed species of special concern which was also designated a federally threatened species by the USFWS in April 2015. The federal listing is a result of a significant population decline due to the white nose syndrome. In areas of the country impacted by white nose syndrome, which includes Minnesota, incidental take is prohibited if it occurs within a hibernation site for the northern long-eared bat.

The range of the northern long eared bat includes Scott County. No roost trees were identified in the Project area or within the filed survey by Barr. However, according to the MDNR, there are known roost trees within 3/4 mile of the Project. Tree removal of an occupied maternity roost tree, or any other trees within 150 feet of that maternity roost tree, during the pup-rearing season (June 1 through July 31) is prohibited.

Native plant communities

Native plant communities are groups of native plants that have not been greatly altered by human activity over space and time. Walk-over surveys were conducted on the Project to document plant communities and vegetation structure and composition, and to search for rare

22 Barr Engineering Company 2012. Bald Eagle Stick Nest Survey Report. Merriam Junction Sands Project Scott County, Minnesota. March 2012. Minneapolis, MN.

and protected plant species. Native plant community searches on the Project specifically targeted prairie, which had previously been identified in the Project area. Prior to field studies, reviews were conducted of preferred habitats, plant associations, and characteristics of species most likely to be in the area.

Vegetation was designated as a native plant community when sufficient native species were present to allow classification based on the Ecological Classification System developed by the MDNR and USFWS for ecological mapping and landscape classification. The system uses associations of biotic and environmental factors, including vegetation, hydrology, landforms, soils, and natural disturbance regimes.

Substantial portions of the Project area have been disturbed and support non-native plant communities or highly degraded native plant communities. There was one native plant community type identified on-site: dry prairie.

Dry Prairie (Ups 13b)

About 48.8 acres of dry sand-gravel prairie (Southern) communities were mapped in the southern portion of the Project, primarily just north of 145th Street as well as a small area on the western boundary of the portion of the Project south of 145th Street. The dry prairie community type has a conservation rank S2, imperiled[23]. This unit is characterized by well drained soils over shallow bedrock with rock exposures on top of small knobs.

The dry prairie found on the Project is degraded and somewhat variable. The condition of the native prairie communities was ranked according to the MBS Upland Prairie System – Condition Ranking System[24]. The dry prairie community on the Project is considered D-ranked (poor condition) primarily because of the heavy invasion of woody plants (e.g., smooth sumac, red cedar, and prickly ash). D-ranked prairies have enough native species to be recognizable as a particular native plant community, but typically have a predominance of non-native plant species and a low diversity native species, including few sensitive species. Most of the map unit is dominated by shrubs and is mapped as shrubland in the land cover and wildlife habitat sections of the Wildlife and Vegetation Report.

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23 "MCBA Upland Prairie System – Condition Ranking System." Minnesota Biological Survey. Minnesota Department of Natural Resources. September 2014 version. http://files.dnr.state.mn.us/eco/mcbs/upland_prairie_system_ranking_guidelines.pdf

24 "MCBA Upland Prairie System – Condition Ranking System." Minnesota Biological Survey. Minnesota Department of Natural Resources. September 2014 version. http://files.dnr.state.mn.us/eco/mcbs/upland_prairie_system_ranking_guidelines.pdf

Native grasses found in this community include predominantly big bluestem and Indian grass. Other common native grasses that are present in this community include side-oats grama, little bluestem, bracted sedge, blue vervain, awl aster, field goldenrod, bird's foot violet, and wolfberry. Grazing sensitive species including purple prairie clover, false boneset, and dropseed are present but uncommon. Non-native grasses identified within this community include smooth brome, Kentucky bluegrass, quack grass, and timothy.

Inset 14-2 dry prairie plant community dominated by shrubs

Without recurrent fire, the native prairie community is susceptible to succession to woodland or forest through the invasion of trees and shrubs, which is the case of the native prairie communities on the Project. Inset 14-2 illustrates the predominance of shrubs in the area delineated as Dry Prairie (Ups13b) in the Vegetation and Wildlife Report.

Rock Outcrops (ROs12): No rock outcrop native plant communities are on-site. Shallow rocky soils were observed at several locations in prairie remnants but lack rock outcrop specialist species.

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.

Limited potential exists for impacts to fish wildlife, plant communities and rare features or ecosystems. The portion of the Project that has been identified as poor-quality Dry Prairie will be disturbed by mining activity prior to landfilling. Mining activity is regulated by Scott County and occurs under a separate local land use permit that has been issued by the County. Climate trends may cause more intense rainfall events, maintenance of stormwater facilities may be required on a more frequent basis to maintain their treatment effectiveness and minimize the potential for increased downstream sedimentation. The Project will not have direct or indirect impacts to the off-site wetland complexes or surrounding upland habitats that support fish, wildlife, plant communities, rare features, and ecosystems. Potential impacts are limited to surface water degradation that could occur if stormwater with a high suspended solids load is discharged from the Project. Stormwater controls are designed as part of the Project to control erosion, prevent sedimentation, and treat stormwater to reduce total suspended solids in any stormwater discharging off-site. The Project is subject to a pollution prevention plan, stormwater monitoring of outfalls, compliance with benchmark monitoring, and stormwater quality standards established in the MPCA's NPDES Permit. The stormwater pollution prevention plan is amended as needed to add BMPs as needed to address changing climatic trends. Specific BMPs would be implemented depending upon the actual condition that needed to be addressed but could include for example, changing vegetation to a more heat tolerant, drought resistant seed mix, or installing additional erosion control measures within the perimeter stormwater ditches to carry higher velocity flows caused by larger and more frequent rainfall events, without increased erosion, or adding increased infiltration opportunities.

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

Given the potential for Loggerhead Shrikes to be found, tree and shrub removal will not occur during the breeding season, April through July, unless Dem-Con contacts the MnDNR to determine if a survey for active nests is necessary prior to any tree or shrub removal.

Given the potential for Lark Sparrows to be found, any ground disturbance of grassland (potential nesting habitat) between May 15 through August 15 will be avoided. Grassland areas are currently limited to the very southern portion of the Project south of 145th Street.

15. Historic properties:
Describe any historic structures, archeological sites, and/or traditional cultural properties on or inclose 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.

The Project is within the Minnesota river valley where there is potential for cultural resources to exist due to the proximity to the river. SHPO provided a list of Archaeological Site locations and a History/Architectural Inventory (Attachment 11). Summit Envirosolutions conducted a Phase 1 Cultural Resources Investigation (Summit Phase 1) as part of the 2020 MJS FEIS[25]. The Phase 1 Cultural Resources Investigation encompassed an Area of Potential Effects (APE) that encompassed 682 acres including the entire Project area that is the subject of this EAW, as well as adjacent property.

The stated purpose of the cultural resources study as excerpted from the Summit Phase 1 was as follows:

"The principal objectives of the Phase I cultural resources survey were twofold: to identify archaeological resources within the archaeology APE that are listed in or are eligible for listing in the National Register of Historic Places (NRHP) in accordance with the Minnesota Field Archaeology Act and Private Cemeteries Act; and historic properties within the architectural history APE that are listed in the NRHP, in accordance with the Minnesota Historic Sites Act. The potential for archaeological resources was assessed by means of a literature search and systematic in-field

25 Phase 1 Cultural Resources Investigation for the Meriam Junction Sands Project, Louisville, Township, Scott County, Minnesota. Summit Envirosolutions, Inc. March 2015. Available as Attachment 13 of the MJS FEIS. The MJS FEIS is available online at https://www.scottcountymn.gov/506/Merriam-Junction-Sands

inspection and testing."

The investigation included both a literature search and a field survey component. "The archaeological field survey consisted of visual assessment as well as systematic pedestrian reconnaissance and shovel testing in those portions of the archaeology APE considered to have moderate to high archaeological potential."

The literature search consisted of background research at the SHPO, the Minnesota Historical Society (MHS) library, and the University of Minnesota. Research was conducted at the SHPO in September 2011 and March 2015 to identify previously recorded cultural resources and cultural resource surveys previously conducted in the vicinity of the project area. In addition, topographic maps, soil surveys, aerial photographs, and historical maps were consulted to obtain historical information about the APEs and their potential to contain previously unidentified cultural resources.

According to the Summit Phase 1, "The assessment of an area's potential to contain precontact archaeological resources is based on the analysis of the terrain, water sources, and other natural resources in and adjacent to that area. Permanently wet areas (e.g., wetlands and streams), poorly drained areas, and areas with slopes greater than 20 percent are generally considered inhospitable to human occupation and are unlikely to contain cultural resources. In general, areas with higher precontact archaeological potential are in proximity to a relatively substantial water source, typically within 500 feet, though the exact distance often varies according to environmental conditions such as the size of the body of water, the nature of the water source (perennial versus intermittent), and the extent of the floodplain. Topographic prominence and proximity to previously recorded precontact sites are also typically indicative of high precontact archaeological potential."

"Areas in proximity to historic-period buildings or structures (standing or ruins) are considered to hold higher potential for containing historic-archaeological resources. These areas are not limited to the locations of buildings, as often the most important information comes from deposits within associated features, such as privies, cisterns, or middens, which were located away from primary buildings. Additional research was conducted to develop historic contexts for the project area and to assess whether any potential historic-archaeological resources in the project area might be historically significant. County histories, historic topographic maps, historic aerial photographs, and General Land Office survey maps and tract books were consulted in this regard. Historic maps were also used for comparison with existing buildings and structures in the field. "

In addition to the literature review, the Summit Phase 1 included an archaeological field investigation that involved a visual assessment, systematic pedestrian survey, and shovel testing. A suitable strategy for the field work was developed based on input from staff from the Office of the State Archaeologist. Areas demonstrably disturbed through previous construction or other modern land-use practices were excluded from survey unless the potential existed for intact cultural deposits beneath the disturbance. The Project area is property that has been mined for the last several decades and the northern two-thirds of the property had been disturbed at the time of the field work.

The Summit Phase 1 did not identify any archaeological resources on the Project area. Phase 1 identified potential mound complexes located adjacent to the Minnesota River. The Summit Phase 1 concluded "During the Phase 1 archaeological survey, no archaeological sites were identified within the Project area. Mounds likely associated with sites 21SC0029 sand 21SC0030 were observed, however, just outside of the Project area. It is recommended, therefore, that a 50-foot buffer be established around the maximum extent of these sites within which no surface or subsurface disturbance may occur.” The mounds that are referenced in the report are situated approximately 3,000 west of the Project area. The Project will not cause any surface or subsurface disturbance of the mounds or in the immediate vicinity of the mounds.

Historic properties

The Carver Historic District and the Walnut Street Historic District in Chaska, which are both in the National Register of Historic Places (NRHP), are over one mile from the Project and are not anticipated to be impacted by the Project.

As part of the Summit Phase 1, background research was conducted for previously inventoried properties to determine if any properties listed in the NRHP may be affected by the Project. No historic properties were identified on the Project itself. Three historic properties were identified within one mile of the Project. None of these historic properties are listed on the NRHP. These historic facilities include:

SC-LOU-001	Merriam Junction Depot
SC-LOU-004	A group of structures in extreme state of ruin
SC-LOU-007	A stone residence and barn

The Merriam Junction Depot is identified in the SHPO database, however, aerial photographs from Scott County GIS show that the Depot is no longer present. SC-LOU-004 is a group of 5 structures in a state of ruin. The SHPO records include a letter dated 5/7/1980 from Ted Lofstrom, SHPO Archeologist, and Charles W. Nelson, SHPO Historical Architect which determines that the structures are not eligible for nomination to the National Register. The letter recommends that the structures be removed immediately. The letter also determines that due to the extent of deterioration of the structures, SC-LOU-07 does not appear to be eligible for nominating to the NRHP. Review of Aerial photography shows that the structures have collapsed or are otherwise demolished.

Archaeological and cultural resources: The Summit Phase 1 archaeological investigation did not identify any Archaeological Resources in the Project area. A literature search determined that the only areas of considered to have moderate to high archaeological potential were on property west of the proposed expansion area.

No state or federally protected historic properties, architectural, archaeological sites or cultural materials were identified within the Project area during construction and operations and measures that will be taken to avoid, minimize, or mitigate adverse effects to historic properties are not relevant.

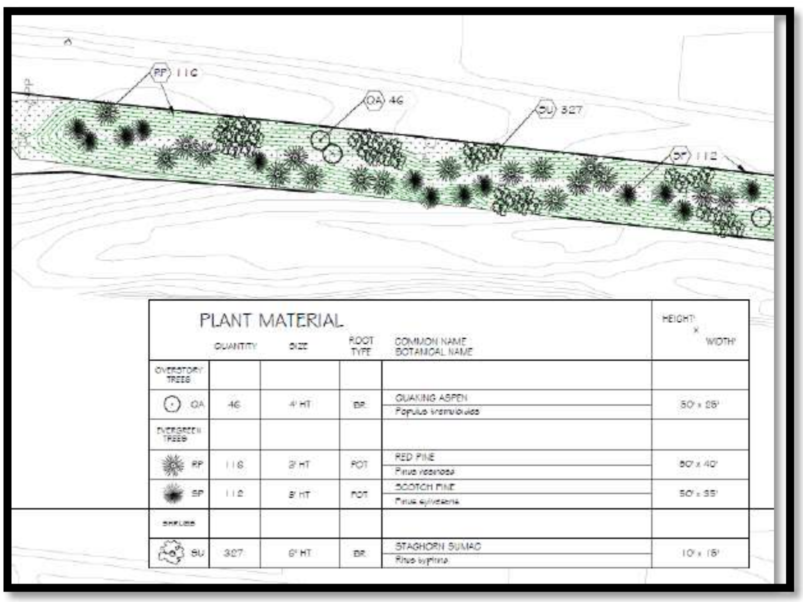
16. Visual:

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.

The Project area is zoned industrial and is adjacent to industrial and commercial land uses to the northeast, east, and south with major transportation corridors along the eastern and northwestern boundaries of the Project. The final elevation of the Project area is 910 feet above msl and the approved final elevation of the existing landfill is 932 msl. The Project will be adjacent to the US

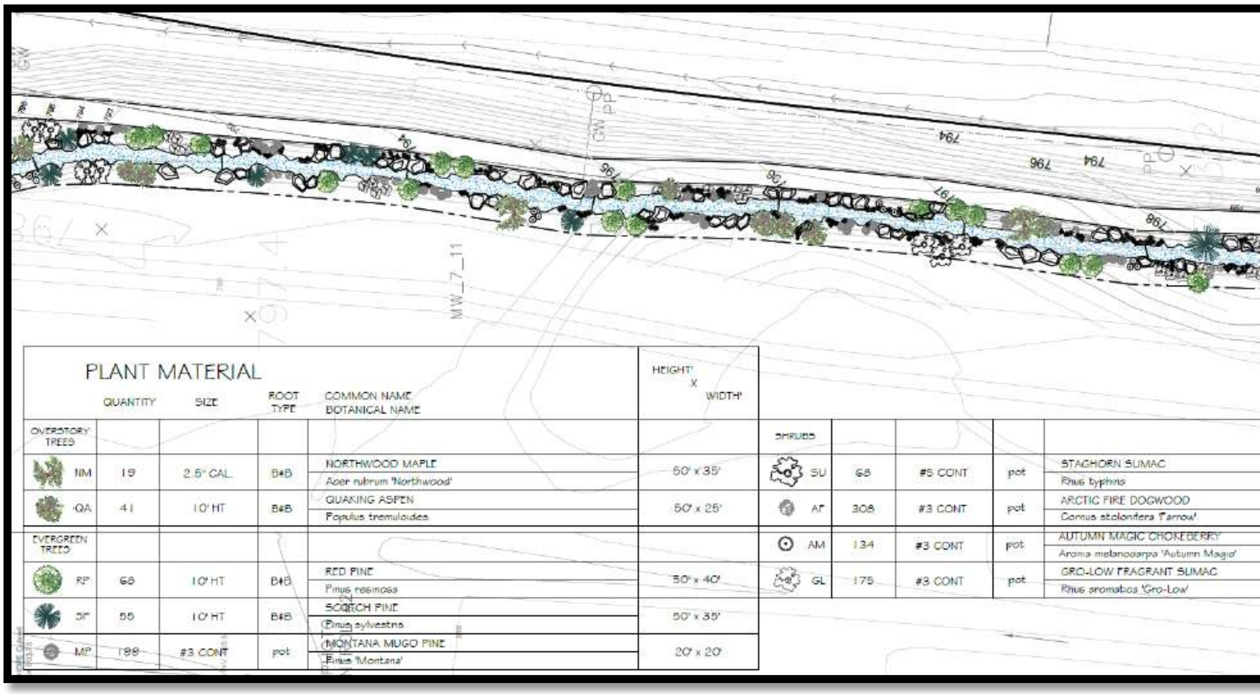
Highway 169 corridor and will be more visible than the existing landfill from the travelled roadway. Viewsheds are included in Attachment 12 that illustrate the view of the Project from north and southbound 169, the closest residence across 169 and from the residential area on the bluff east of 169.

Landscape plans will be submitted to the County for review and approval as part of the County Conditional Use Permit process. Due to the progression of filling of the Project and the length of time for the Project to reach final grades, the approach to landscape and screening was considered in two phases. An interim berming and screening plan will be implemented along the setback area along US Highway 169. The interim plan will be in effect to provide screening along the US Highway 169 corridor during most of the Project construction. The berm will be planted with a smaller native plant material that will mature through time. The plantings should reach maturity over the course of 20 years where they will be well established at time of peak operations of the Project. These planting can be also utilized if desired by transplanting them into the final landscape plan. A preliminary concept of a typical berm section within the Project setback is illustrated below. Landscaping will be addressed in the County CUP.



Typical interim berming and landscaping along US Highway 169 corridor

The final landscape plan accommodates the perimeter stormwater management system and will be constructed in phases as portions of the Project reach final cover and are ready for final capping. The interim berm and plantings will be removed as part of the final cap construction. The final landscaping design focusses on using native plants and stone along the stormwater channel designed to convey stormwater runoff from the capped landfill to stormwater management ponds. Stone and rock will give the visual appearance of a stream and will be framed with natural plantings on both sides of the swale. The rock will come from the Bryan Rock Quarry and will be used for erosion, soil retention as part of the natural native landscape. The plantings will also be of the region and include evergreen and deciduous trees, also with native sumac, wild-flower, and grasses. All plantings will naturalize the swale and stabilize the soils will low maintenance groupings of the material. An access drive will be incorporated into the plan for the US Highway 169 corridor. A preliminary concept of the final landscaping plan along the US Highway 169 corridor is illustrated below.



Typical final landscaping section along US Highway 169 corridor

As filling progresses from the recessed floor of the quarry to the surrounding grade, 8–10-foot perimeter berms will be constructed along the outer edge of the active fill area to screen the active face view. These berms are temporary in nature and will be constructed throughout the landfill in conjunction with the location of active fill areas.

Lighting is limited to portable light kits used to illuminate the tipping area. The light kits are necessary for safety and are used primarily during early morning hours during shorter days of the year. The light kits are shrouded, and down cast and the perimeter berms described above that are constructed at each working face minimize visible light emissions from the Project. The berms also block headlights from the vehicles accessing the tipping area. The Project will not generate plumes. The portable light kits have been in use at the Landfill for years in the manner described above and there have not been any lighting complaints.

The setback area along US Highway 169 will be landscaped with groupings of native shrubs. The setback area will be graded to accommodate a perimeter swale and stormwater controls, and perimeter access. The drainage swale will be incorporated into the landscape plan and will incorporate native limestone rock and boulders to provide visual interest.

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 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 effectsfrom stationary source emissions.

The MPCA issued an air applicability determination on May 3, 2022, that Project is not subject to air permitting. The air applicability determination is included as Attachment 15.

The landfill is in a rural industrial area. The nearest residential receptors are approximately 1,000 feet from the Project.

The Project will not generate stationary source air emissions from boilers or exhaust stacks. Stationary sources associated with the Project are limited to six passive landfill gas vents that will be installed as part of the final cover construction. The passive vents are a cover maintenance measure. The purpose of the passive venting system is to allow venting of any landfill gas generation that may occur and allow the landfill to exchange air between the landfill cover system and the atmosphere with air moving both in and out. The passive vents prevent pockets or bubbles from forming under the synthetic liner when temperature differentials exist that drive warm air up, or barometric pressure changes create an upward pressure gradient between the landfill and the atmosphere. Without passive vents, pockets of air could form and displace the synthetic liner, drainage composite, rooting soils, and vegetation. The vents themselves are not connected to a fan, vacuum system, or any type of mechanical or electrical system typical of an MSW landfill gas extraction system. There is no combustion or flaring of vented air.

Because there is no combustion with the passive venting system, the composition of stationary source emissions from the passive vents is limited to gasses produced by the decomposition of the waste. Because C&D wastes do not contain much organic matter, which is necessary to produce landfill gas, fugitive air emissions are typically low[26]. Most waste types landfilled at the Project are either inert or have very low decomposition rates under anaerobic conditions. Based on an MPCA materials composition study[27], which included a survey of the composition of waste tipped at the Landfill, approximately 75% of the material at the Landfill is inert material (concrete, shingles, brick, dirt, plastics, rubber, metal), 15% is wood, (treated, painted, and processed wood as well as untreated dimensional lumber and untreated engineered wood), and 10% is drywall or gypsum board.

Inert materials do not decompose or generate landfill gas. Landfill gas released from the decomposition of wood products is composed of approximately 50% Methane and 50% Carbon Dioxide.[28] However, wood products have very slow decomposition rates. According to the EPA's

26 2001, Landfill Gas Primer An Overview for Environmental Health Professionals. Agency for Toxic Substances and Disease Registry Department of Health and Human Services. Chapter 2 Landfill Gas Basics.

27 Construction and Demolition Materials Study. Minnesota Pollution Control Agency. November 2020.

28 Documentation for Greenhouse Gas Emission and Energy Factors Used in the Waste Reduction Model (WWAM Management Practices Chapters. US EPA. November 2020 WAste Reduction Model (WARM) v. 15. November 2020 Landfilling 6-7

Waste Reduction Model (WARM) management practices manual,[29] wood products contain between 43-49% biogenic carbon content, much of which is in a form (lignin) that is not metabolized by anaerobic bacteria and does not significantly decompose in landfills.[30] According to the WARM Model emission factors are based on 1-5% of the initial carbon content lost to landfill gas emissions[31]. Because the vents are passive air, flow rates are low, driven only by temperature and pressure gradients. Decomposition rates of the organic fraction of the landfill are expected to decrease over time once the final cover system is constructed and the moisture content of the waste decreases.

Gypsum is a common mineral component of drywall. Gypsum is hydrated calcium sulfate that under specific conditions can biodegrade to produce Hydrogen sulfide gas (H_2S). H_2S is a hazardous, colorless gas known for its 'rotten egg' odor that is detectable even at low levels.[32] H_2S gas can be generated only when all the following conditions exist: Water, organic material, sulfate ions, anaerobic conditions, presence of sulfur reducing bacteria, pH of 4-9 and optimum temperature range.[33]

Management of landfilling operations at the Landfill are conducted to eliminate the required environmental conditions for H_2S production. Several years ago, Dem-Con adopted the practice of using C&D fines as a cover material. C&D fines include a high concentration of drywall and gypsum board and consist of small particles that have a high surface area to volume ratio. The cover material was placed in approximately six-to-eight-inch lifts at least every 30 days and sometimes more frequently. The final cover was exposed to precipitation as well as watering for dust control. The water picked up sulfate ions as it made its way through the cover materials and into the fill. H_2S was produced in the resulting leachate. The H_2S was detectable by its odor when transferring leachate from the site. Dem-Con installed a pretreatment system to raise the pH of the leachate, so the sulfur was not released as H_2S but existed as the anions SH- (bisulfide) and S2- (sulfide) which are odorless. The practice of using C&D fines as cover material was stopped due to the increased H_2S gas generation. Under Dem-Con's current landfill operational methods, significant levels of H_2S are no longer in the leachate and pre-treatment is no longer required.

The MPCA recently adopted guidance for air assessment practices for projects undergoing environmental assessment worksheets where the MPCA is the RGU.[34] In accordance with the guidance, the Project's potential impact to air quality from the National Ambient Air Quality Standards (NAAQS) criteria air pollutants (Carbon Monoxide, Particulate Matter, Nitrogen Dioxide, and Sulfur Dioxide) or the Minnesota Ambient Air Quality Standards (MAAQS) criteria pollutant (Hydrogen Sulfide) must be assessed. Barr Engineering (Barr Assessment) preformed

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29 Documentation for Greenhouse Gas Emission and Energy Factors Used in the Waste Reduction Model (WWAM Management Practices Chapters. US EPA. November 2020 WAste Reduction Model (WARM) v. 15. November 2020 Landfilling 6-7

30 Micales, et. Al. Decomposition of Forest Products in Landfills UUSDA Forest Service Forest Products Laboratory. Printed in International Biodeterioration & Biodegradation Vol. 39, No. 2-3 (1997) p. 145-158.

31 WAste Reduction Model (WARM) v. 15. November 2020 Landfilling 6-7

32 "Hydrogen Sulfide – PubChem Public Chemical Database". The PubChem Project. USA: National Center for Biotechnology Information

33 Treatment and disposal of Gypsum Board Waste Part II. Gypsum Association Washington DC. Reprinted in Construction Dimensions. March 1992.

34 May 2022 Environmental Review Unit Environmental Assessment Worksheet Air Assessment Practices. Minnesota Pollution Control Agency p-ear1-10

the assessment in accordance with the Environmental Review Unit Environmental Assessment Worksheet air assessment practices and concluded that "It was determined that NAAQS criteria pollutants or MAAQS criteria pollutant emissions are not expected from the landfill vents. Generation and emission of Hydrogen Sulfide (H_2S, a MAAQS pollutant) would be indicative of an upset to the disposal methodology and not part of expected operations at the landfill. Therefore, the Project is not expected to create significant air emissions."

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.

An increase in traffic and congestion results in an increase in vehicle emissions. The Project will not significantly increase the volume of traffic generated by the operation of the Landfill. The Project is adjacent to two major vehicle transportation corridors, US Highway 169 and TH 41. Vehicle emissions along these corridors affect air quality by emitting airborne pollutants. Recent traffic improvements along the US Highway 169 and TH 41 corridors have reduced traffic congestion through the area. Dem-Con added second inbound and outbound scales in 2018 and 2019 to better accommodate truck traffic through the Landfill, which resulted in reduced idling times and minimizes vehicle related emissions.

c. Dust and odors - Describe sources, characteristics, duration, quantities, and intensity of dust andodors 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 ormitigate the effects of dust and odors.

In general, C&D waste does not produce significant quantities of landfill gas, and associated odor[35], due to its low organic content. However, C&D waste does contain gypsum drywall, which can produce H_2S gas when exposed to moisture in an anerobic conditions. Excessive production of H_2S gas can create odor issues, which is mitigated through proper operational techniques including limiting moisture infiltration, waste placement, and proper cover practices. H_2S gas generation is addressed in Section 17.a above. Dem-Con personnel are available to address any complaints or concerns. Dem-Con may be contacted directly or notified by the County or Township if a complaint occurs. Dem-Con also routinely attends Township meetings where they can address public concerns. If odor complaints are received, the source of the odor will be investigated. Operations will be reviewed to evaluate potential operational changes to implement to address the odors.

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35 2001, Landfill Gas Primer An Overview for Environmental Health Professionals. Agency for Toxic Substances and Disease Registry Department of Health and Human Services. Chapter 2 Landfill Gas Basics.

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 come to that conclusion and any GHG emission sources not included in the total calculation.

The purpose of this greenhouse gas (GHG) emissions section is to collect information on the emissions that are made from the proposed demolition landfilling activity that contribute to global climate change. The following quantification of GHG emissions can be used by the public and decision makers to understand how the Project contributes to, or detracts from, achieving progress in meeting state and local GHG reduction goals as well as providing information to effectively mitigate climate change.

When GHG's are released from their sources, they get trapped in the Earth's atmosphere, act as a layer of insulation that prevents heat from escaping. This is known as the greenhouse effect, and results in a warming of the planet. Gases that contribute to the greenhouse effect are known as GHGs. GHGs are primarily carbon dioxide (CO_2), nitrous oxide (N_2O), methane (CH_4), sulfur hexafluoride (SF_6), and two families of gases known as hydrofluorocarbons (HFCs) and perfluorocarbons (PFCs). These gases trap Earth's heat and contribute to climate change. Greenhouse gases are typically measured in the units of metric tons of Carbon Dioxide Equivalents (CO2e), (all emissions are reported in CO2e short tons as requested in the EQB Revised Environmental Assessment Worksheet Guidance)[36]. CO2e is a unit of measurement that standardizes the effects of the different GHGs to that of carbon dioxide. Each GHG has a specific Global Warming Potential (GWP), which means they remain in the atmosphere for various amounts of time. For the other GHG's to be comparable to CO_2, they are converted to units of CO_2 equivalents.

Annual GHG emissions were quantified on an annual basis using the EPA's Simplified GHG Emissions Calculator (SGEC) Version 7, June 2021, and landfill carbon sequestration factors from WARM Version 15[37] as a guide. The boundaries of the analysis were defined as the Landfill, administrative facilities, and the Project.

Sources of emissions are categorized as Scope 1, Scope 2, or Scope 3. Scope 1 emissions are released directly from properties owned or under the control of Dem-Con. Scope 2 emissions are produced from off-site sources such as off-site generation of electricity used to run the Project and off-site steam production. Scope 3 emissions include indirect emissions such as employee transportation and end of life disposal. Scope 3 emissions are not considered in the EAW analysis. In this analysis, landfilled wastes are categorized as Scope 1 direct emissions because the business is a landfill. The emission factors used in SGEC include emissions from transportation of waste to the Project and direct sources from biodegradation and operation of

36 Environmental Quality Board. (n.d.). Revised Environmental Assessment Worksheet (EAW) Guidance. Retrieved from Minnesota Environmental Quality Board: https://www.eqb.state.mn.us/sites/default/files/documents/EQB_Revised%20EAW%20Form%20Guidance_Climate_Sept%202021_1.pdf

37 Available online at https://www.epa.gov/warm/versions-waste-reduction-model-warm

landfill equipment. Landfills also sequester biogenic carbon resulting in a carbon sink. Landfilled wastes make up the biggest component of GHG emissions and sinks.

The Project is the continuation of the operation of the Landfill. The life of the Landfill will be extended with the Project so the duration of the emissions associated with the construction and operation of the Landfill will increase. No changes in operations are proposed so existing annual GHG emissions are expected to be the same as Project related emissions and only one set of emissions calculations were performed. Greenhouse gas calculations are included as Attachment 15.

Scope 1 Emissions:

1. Landfilling activity (Landfilling waste is typically considered an indirect source of GHG emissions but for landfills and this analysis it is categorized as a direct source. Emission Factors include collection vehicles and operation of landfill equipment[38].)
2. Construction Emissions - Mobile source combustion (construction equipment)
3. Stationary combustion (natural gas used to heat the office and scale house)
4. Fugitive Sources:
   4.1 A/C (Office and vehicle units)

   4.2 Fire suppression (Fire extinguishers)

   4.3 Purchased Gases

Scope 2 Emissions:

1. Purchased electricity

Scope 3 Emissions:

1. Emissions from transportation of waste generated at the facility (Leachate transport)

Benefits (sinks):

1. Carbon storage in landfill

The sources and sinks are described below.

Scope 1 Emissions:

1. Landfilling activity:
   Direct emissions from the landfilling activity result when carbon containing materials are placed in the landfill and the carbon exists either as CH_4, CO_2, or VOC gas that is generated as biodegradable materials decompose, exists as volatile organic compounds (VOCs) in the leachate, or remains stored in the landfill. The rate of decomposition is highly dependent on the waste type, moisture content, pH, and temperature.

38 Waste Reduction Model (WARM) V. 15 US EPA. November 2020

Demolition and construction landfills accept primarily inert materials such as dirt and concrete. Emissions associated with these materials are related to fossil fuels burned to transport and operate landfill equipment. Other materials typically found in a C&D waste stream include materials that biodegrade slowly in the landfill environment such as dimensional lumber, drywall, and packaging. Carbon in these materials is stored in the landfill. Materials that would normally decompose if they were not landfilled are considered sequestered and are counted as a GHG sink. Other carbon containing materials, such as plastics which slowly decompose in or out of a landfill are not considered a sink.

The SGEC emissions inventory calculates emissions for individual waste types. Dem-Con participated in a waste composition study[39] in 2020 which provided a basis for estimating the amount of each category of waste typically landfilled each year. Volumes from the 2020 annual report and conversion factors from the EPA's Volume to weight Conversion Factors April 2016 publication were used to develop annual weight of each material type landfilled. Attachment 15 includes a breakdown of estimated emissions based on the waste stream.

Emission factors for landfilled wastes used in the SGEC include emissions from transporting the waste to the landfill and operation of the landfill equipment. Even though a waste is inert and does not decompose and release GHG's, an emission factor is still applied to inert material to account for fossil fuel combusted to collect and transport material to the landfill facility and to operate landfill operational equipment.

2. Construction emissions - Mobile source combustion:
   The calculations assume that emissions associated with landfill construction are not included in the emission factors applied to landfilling the waste. Mobile sources from equipment used to construct the liner and cover systems were calculated on an annualized basis. The landfill will develop in phases with some construction activity likely to occur annually whether it is to construct a liner cell or complete a final cover over a completed portion of the landfill.

3. Stationary combustion:
   Stationary combustion emissions include burning natural gas to heat the portion of the office building attributed to Dem-Con Landfill's operation. The calculations assume that the landfilling emission factors did not include ancillary operations, but this could not be verified.

4. Fugitive sources
   4.1 AC and vehicle units:
   The calculations assume one commercial AC unit associated with the office space and shop. Commercial air-conditioning units are designed to use a given charge of a refrigerant, and not to emit that refrigerant to the atmosphere. However, emissions can occur due to leaks or other equipment malfunction. Calculations assume 4% of the factory charge per year.

   Refrigerants are added to landfill AC equipment as part of equipment repair and

39 MPCA. November 2020. Construction and Demolition Materials Composition Study

upkeep. The volume of replacement gasses used per year was estimated at one piece of equipment per year at a volume two times that of a light duty truck.

4.2. Fire suppression systems:
Fire suppression systems used to support landfill operations are portable fire extinguishers. The extinguishers are inspected on an annual basis by a third-party contractor. Fire extinguishers are carried on the landfill equipment. Their use is limited to occasional use on a small fire on a piece of equipment. The extinguishers contain ABC Dry Chemical Extinguishant composed of an ammonium phosphate-based powder. According to the IPCC/TEAP Special Report: Safeguarding the Ozone Layer and the Global Climate System[40], "multipurpose dry-chemical extinguishers, such as ammonium phosphate-based powder, are rated for use on Class A, B and C fires. … They produce no direct greenhouse-gas emissions (HTOC, 1999b)."

4.3. Purchased gases:
Dem-Con uses welding gasses that include a 75% Argon/CO2 gas mixture. The annual CO2 use was input into the purchased gasses tab to determine emissions from purchased gasses.

Scope 2 Emissions:

1. Electricity:
Emissions include electricity used in the office and shop and to axillary equipment (e.g., Leachate pumps). Annual electrical use based on past invoices were used to determine annual electrical use.

Scope 3 Emissions:

1. Leachate Transport: Emissions associated with hauling leachate to the Blue Lake Wastewater Treatment Plant. Transporting recyclable material tipped and separated at the landfill is included in the emission factor for recycling and therefore is not included here.

Benefits (sinks):

1. Landfill Carbon Sequestration: Landfills store carbon when biodegradation is slowed down or eliminated when material is landfilled. Certain items that are landfilled at Dem-Con are considered a GHG sink. The EPA's WARM model Waste Reduction Model (WARM)[41] identifies landfill carbon sequestration factors for corrugated containers, dimensional lumber, mixed paper, drywall, and wood flooring wastes that are landfilled. Sequestration rates were calculated for each of these materials using the WARM emission factors.

Results are summarized below in Table 18.1 and applicable tabs of the SGEC inventory and

40 IPCC/TEAP, 2005 – Bert Metz, Lambert Kuijpers, Susan Solomon, Stephen O. Andersen, Ogunlade Davidson, José Pons, David de Jager, Tahl Kestin, Martin Manning, and Leo Meyer (Eds) Chapter 9. Cambridge University Press, UK. pp 478. Available from Cambridge University Press, The Edinburgh Building Shaftesbury Road, Cambridge CB2 2RU ENGLAND,

41 Available online at https://www.epa.gov/warm/versions-waste-reduction-model-warm#15

sequestration calculations are included as Attachment 15.

Table 18.1: Summary of Dem-Con Landfill's annual GHG emissions

Construction emissions

Scope	Type of emission	Emission sub-type	Project-related CO_2e emissions (short tons/year)	Calculation method(s)
Scope 1	Combustion	Mobile Equipment	17.13	SGHC Calculator
TOTAL				

Operational emissions

Scope	Type of emission	Emission sub-type	Project- related CO2e emissions (short tons/year)	Calculation method(s)
Scope 1	Landfilling	Mobile Equipment and Area	12,269	SGHC Calculator
Scope 1	Combustion	Heating Stationary Equipment	4.96	SGHC Calculator
Scope 1	Fugitive	AC Stationary and mobile	0.02	SGHC Calculator
Scope 1	Fugitive	Purchased Gases	0.04	SGHC Calculator
Scope 2	Off-site Electricity	Grid-based	59.74	SGHC Calculator
Scope 3	Off-site Waste Management	Transportation Mobile Equipment	24.30	SGHC Calculator
SINK	Carbon Sequestration		(19,850)	WARM Carbon Storage Factors
TOTAL			**(7,474.81)**	

b. GHG assessment

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

1. Development of a brownfield site. The Project will result in a land conversion from barren land (quarry floor) to vegetated land (vegetated final cover system) increasing terrestrial biogenic carbon.

2. Purchasing electricity from a supplier that meets or exceeds the state's 20% renewable energy mandate.

3. Committing to utilizing an enhanced final cover system as a part of the cap construction, which reduces infiltration through the cap and into the landfilled materials, thus reducing the volume of leachate generated, pumped, and transported off site (reduced material transport emissions) and reducing the moisture within the landfill, which results in lower rates of biodegradation and increases carbon storage for carbon containing materials.

4. Energy reduction measures including routine maintenance of HVAC systems to maximize efficiency and reduce energy use, use of LED light bulbs and energy efficient lighting, and promotion of enhanced materials recycling through Dem-Con's adjacent environmental campus and Green Grades educational program.
5. Planting trees and shrubs along setback areas of the landfill.

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

The mitigations selected are described above. They are not quantified. The mitigation measured were preferred because they are feasible and cost effective for long term operations.

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.

The expansion will add an estimated 50-60 years to the life of the Landfill based on current fill rates. Net lifetime predicted emissions are (373,740) to (448,489) CO_2e short tons/life of the Project. Because the Landfill acts as a carbon sink it should help to achieve any CO_2e reduction goals.

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 mitigatethe effects of noise.

The dominant noise source in the vicinity of the Project is from the US Highway 169 corridor. Noise is also generated from the existing industrial activities on the Project and in the surrounding area. Noise sources from landfill operations are associated with vehicle traffic arriving at the landfill, emptying their loads, and exiting the landfill and by compactors and other landfill equipment. Landfill equipment and haul trucks operate with standard back up alarms as required by the Occupational Safety and Health Administration (OSHA). The landfill expansion is not expected to change overall noise sources. Landfilling activity will progress into the expansion area, but the equipment and number of pieces of equipment used to operate the landfill will remain the same. The Project will redistribute the location of some of the noise sources, generally bringing them closer to some of the nearby residential receptors. Since noise attenuates with distance from the source, this may result in higher sound levels at some residential receptors.

Minn. R. 7030, Noise Pollution Control, regulates noise. These standards have been established based on preservation of public health and welfare and are consistent with speech, sleep, annoyance, and hearing conversation requirements (Minn. R. 7030.0040, subp. 1). The rules define a Noise Area Classification (NAC) system, which establishes applicable daytime and nighttime noise standards based on the land use activity at the location of the receiver or receptor. Standards vary depending upon the NAC. Residential and sensitive land uses, including rural residences, are classified as NAC-1 and are subject to the strictest noise standards. Commercial land uses, parks, and recreational activities are classified as NAC-2. Industrial land uses, manufacturing, mining, fairgrounds, and agricultural activities are classified as NAC-3. NAC-4 land uses are not subject to noise standard and include undeveloped and unused land and water areas.

The rules establish acceptable noise levels for each both the L50, the sound level that must not be exceeded for more than 50% of any given hour (30 minutes) and the L10, the sound level that must not be exceeded for more than 10% of any given hour (6 minutes). There is not a limit on maximum noise. Within NAC-1, there are two sets of standards, one for daytime and one for nighttime. (The NAC-1 daytime standards apply during nighttime if the land use activity does not include overnight lodging.) The Minnesota Noise Standards define daytime hours as 7:00 a.m. to 10:00 p.m. and nighttime from 10:00 p.m. until 7:00 a.m. The landfill operates within both the daytime and nighttime hours, therefore, both Minnesota daytime and nighttime standards are applicable. Noise standards are indicated on Table 19-1. Dem-Con is permitted to operate 24 hours a day and therefore is subject to the nighttime standard from 10pm-7 am.

Table 19-1: Minnesota noise standards

	Daytime (7 am - 10 pm)		**Nighttime (10 pm - 7 am)**	
Noise area classification	**L50 dBA**	**L10 dBA**	**L50 dBA**	**L10 dBA**
1	60	65	50	55
2	65	70	65	70
3	75	80	75	80

Nearby receptors in the NAC-1 category include residences east of the US Highway 169 corridor. There are 31 residential receptors within one-half mile of the Project. Figure 14- Residential Noise Receptors, illustrates the location of these residences with respect to the Project. All the residences are east of US Highway 169, a major regional transportation corridor, which is the dominant noise source in the area.

Sound level energy attenuates with distance from the source. Topography such as earthen berms, hillsides, etc. can deflect sound waves and absorb energy also effectively reducing noise emissions from the Project. Topographic shields that are closer to the noise source are more effective at reducing noise emissions than those setback greater distances.

Initial fill activities will occur in recessed areas of the Project. The surrounding walls of the reclaimed quarry will provide topographic shielding and absorption of sound energy reducing overall site sound level emissions. As filling progresses, the activity will rise to the same elevation as the perimeter area and eventually will rise above grade. Once these at grade or elevated conditions occur, an 8–10-foot perimeter berm is constructed along the eastern edge of the active fill area. This berm serves to screen the view of the working face as well as to provide noise mitigation.

The landfilling activities will replace mining and processing activities currently occurring within the Project area. Noise monitoring performed for the MJS FEIS collected ambient noise levels, which included landfill operations and US Highway 169 operations. Typically, one landfill compactor is working at each active fill area and there may be two active fill areas at any given time. The sound level from a landfill compactor is estimated at 78 dBA 50 feet from the source.[42] Noise attenuates with distance from the source and is perceived as the sound becoming quieter. Sound levels decrease by six decibels when a distance from a point source is doubled. The closest residential receptors to the Project are four homes 1,000-1,100 feet from the Project area property line resulting in an estimated sound pressure level of 52 dBA at the residences. This assumes no barriers or reflective surfaces between the landfill and the homes. As part of landfill operating procedures, there will be a berm constructed along the perimeter of the working face. This berm serves to screen the activity from the land uses to the east. The berm also serves as a barrier and absorbs and deflects sound energy. The amount of sound level reduction depends upon the height of the berm and the distance of the source from the berm. The closer the source is to the berm the more effective the berm is. At the landfill the berm will be very close to the operating equipment. A 3 dBA reduction is typically applied to predicted sound levels to account for berms which would bring the predicted sound levels below the nighttime standard.

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 alternativetransportation modes.

Traffic generated by the Landfill consists of trucks hauling to and from the Landfill, employee trips, and construction activity. With a landfill, Project construction is not a specific period of time that occurs at the onset of a project to make the Project operational, rather construction related activities are ongoing and progressive and an integral part of the operation of the Project. As an area is prepared for liner construction, filling and grading of the subgrade takes place. Construction traffic will be generated during when loads of clean fill are periodically brought to the Project to support these operations. Construction traffic will also be generated when a liner construction crew or a cap construction crew are periodically active on the Project.

The existing haul route and scales will continue to be utilized to serve the Project. The Project area will be accessed by building a new haul road along the eastern perimeter of the existing Landfill. Figure 14 Haul Road Concept illustrates the layout of the haul road system. The road will be a private haul road constructed to accommodate the haul trucks. Landfill traffic makes up

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42 July 2010. Final EIS Cedar Hills Regional Landfill 2010 Site Development Plan Chapter 8 Noise and Vibration King County Department of Natural Resources and Parks Solid Waste Division

about 65% of the environmental campus traffic. Eventually once mining is complete in the southern portion of the Project, some portion of the landfill traffic may be diverted to the southern entrance of the Project off Red Rock Drive. Construction related traffic will utilize the right-in/right-out US Highway 169 access to the Project. The Project access points will be secured with locking gates and access will be managed and monitored by Dem-Con personnel. Security cameras may be utilized as needed.

The Project is not expected to increase annual traffic generation rates. Traffic counts at the Landfill vary from year to year. Incoming volumes of waste are subject to fluctuations caused by economic factors that drive construction and redevelopment, as well as other factors such as large storms and accessibility of other disposal options.

SRF Consulting Group (SRF)conducted a traffic review of the Project, which is included as Attachment 8. The review includes figures that represent traffic patterns and haul routes associated with the Project.

1) There will be no additional parking spaces added because of the Project,
2) Estimated total average daily traffic generated, and
3) estimated maximum peak hour traffic generated and time of occurrence.

Table 20-1: Truck trip generation estimates

Land use	**A.M. peak hour**		**P.M. peak hour**		**Daily trips**
	In	**Out**	**In**	**Out**	
Dem-Con Landfill and Campus (Landfill = 65% of total)	57	57	17	17	**1,270**
Bryan Rock Quarry	25	25	20	20	**486**
Reclamation/ Construction Fill (1)	**7**	**7**	**6**	**6**	**154**

(1) Reclamation/construction fill trips are expected to utilize the US Highway 169 right-in/right-out. These are expected to only occur over a 2- or 3-month period and are expected to continue after mining is completed.

4) Source of trip generation rates used in the estimates:
The Dem-Con trip generation is based on the number of truck tickets at the Landfill from May 1, 2020, to July 25, 2021, which was historically high year for the Landfill as indicated in the traffic study included as Attachment 16 and includes estimates of annual construction related traffic generated from annual limestone production. The southern portion of the quarry will remain active for several years while landfilling begins in the northern portion of the Project. Traffic generated from the mining operations utilizes a scale and access of Red Rock Drive to the south. Traffic numbers attributed to the quarry operation are based on a production level of 1,000,000tons/year. Eventually the quarry mining will be complete, and this component of traffic generation will be eliminated, but some of the landfill traffic may

be diverted to the southern entrance.

5) Availability of transit and/or other alternative transportation modes.

No other transportation modes are available.

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.

Landfill site-generated trips are not expected to significantly increase (the expansion only adds more area to deposit waste materials) and the current truck haul routes are not expected to change within the near future. Truck volumes are expected to decrease in the study area as Bryan Rock mining activity is completed. Based on the decreasing number of trucks and recent roadway system improvements (TH 169/TH 41 and TH 169/CSAH 14), no significant traffic issues are expected with the Project. Based on findings of the SRF review, the Project does not represent a significant traffic impact to the study area.

Cumulative potential effects related to traffic were reviewed. Traffic patterns and generation rates from the mining activity, which will be concurrent in the southern portion of the Project with landfilling activity in the northern portion of the Project was included in the traffic review. Aggregate hauling utilizes a separate existing access point off Red Rock Drive to eliminate conflict with landfill traffic. The right-in/right-out access off US Highway 169 in the northern portion of the Project will be used on a limited basis by both Bryan Rock and Dem-Con for reclamation and construction related activity. This traffic was also accounted for in the traffic review.

Cumulative effects analysis also included traffic generated from the nearby Minnesota Renaissance Festival, Sever's Festivals, and the proposed Shakopee Mdewakanton Sioux Community (SMSC) organics composting facility off TH 41 near Dem-Con Drive. The festivals typically operate during the weekend when landfill traffic is at a minimum and most trips occur in the morning when the festival traffic is at its lightest. The mining operation typically stops hauling by late morning during the Renaissance Festival's day of operation to avoid congestion created by festival traffic.

The SMSC site is still in planning stages, but a traffic review prepared by Bolton and Menk, dated June 2021 indicates that the project is proposing traffic improvements (northbound and southbound left-turn lanes) at their entrance, which is northwest of Dem-Con Drive. These recommended improvements are expected to mitigate any conflicts associated with additional traffic from the Project.

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

Area roadway improvements (TH 169/TH 41 and TH 169/CSAH 14) were recently completed. Potential improvements at the TH 41/SMSC Site Access were identified. With truck volumes decreasing in the study area as Bryan Rock mining activity is completed, the Project will not generate the need to study area roadway system improvements.

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 thatcould combine with other environmental effects resulting in cumulative potential effects.**
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 geographicscales and timeframes identified above.**
c. **Discuss the nature of the cumulative potential effects and summarize any other available information relevant to determining whether there is potential for significant environmentaleffects due to these cumulative effects.**

Cumulative potential effects were discussed under the applicable items of the EAW, specifically item 20, traffic.

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.

There are no other known additional environmental effects that would be caused by the Project.

RGU CERTIFICATION

I hereby certify that:

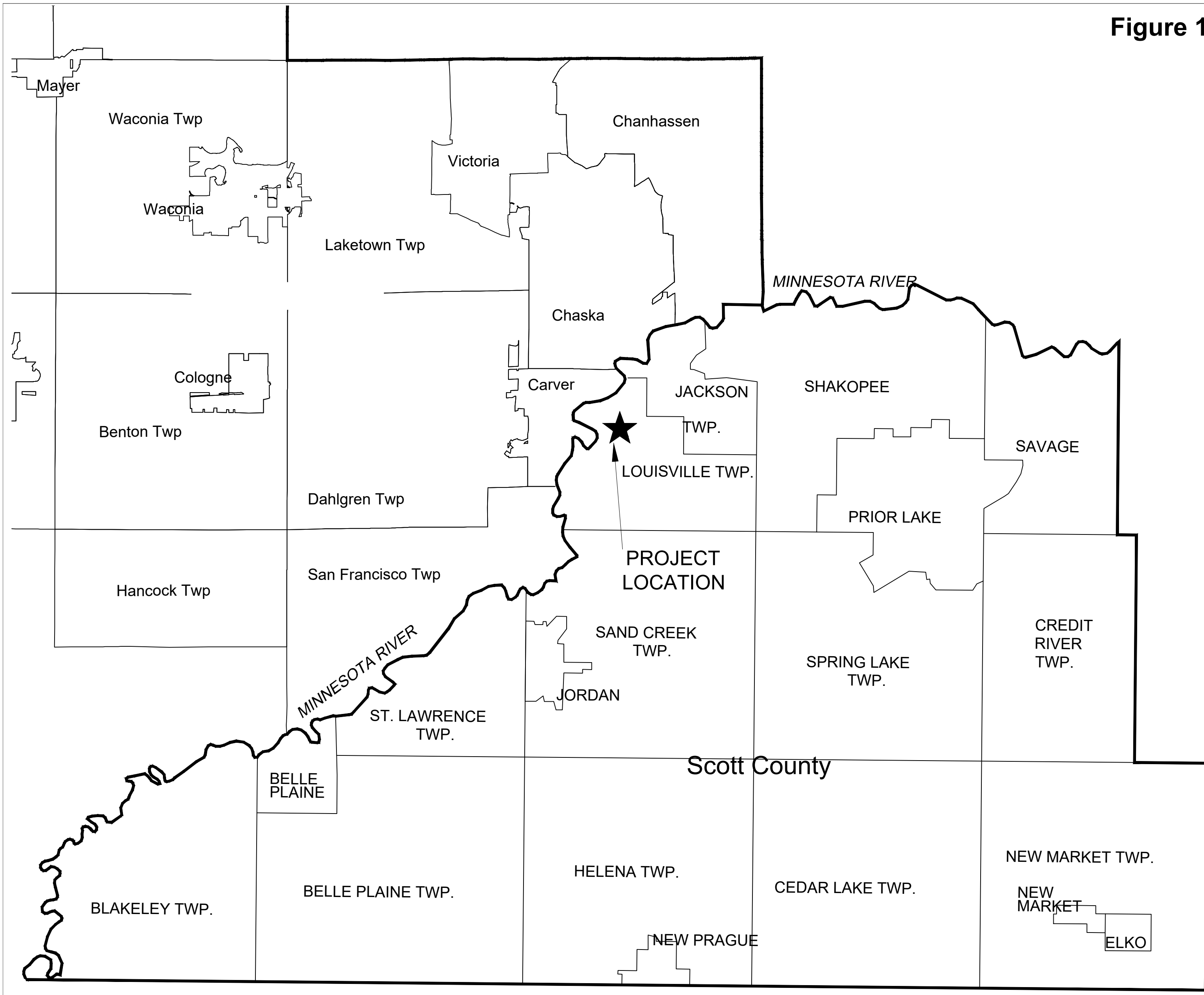
- The information contained in this document is accurate and complete to the best of my knowledge.
- The EAW describes the complete project; there are no other projects, stages, or components other than those described in this document, which are related to the project as connected actions or phased actions, as defined at Minnesota Rules, parts 4410.0200, subparts 9c and 60,respectively.
- Copies of this EAW are being sent to the entire EQB distribution list.

Signature: Dan R. Card, P.E. Date: 11/07/2022

Supervisor
Environmental Review Unit
Resource Management and Assistance Division

Figures 1-14

Figure 1



N

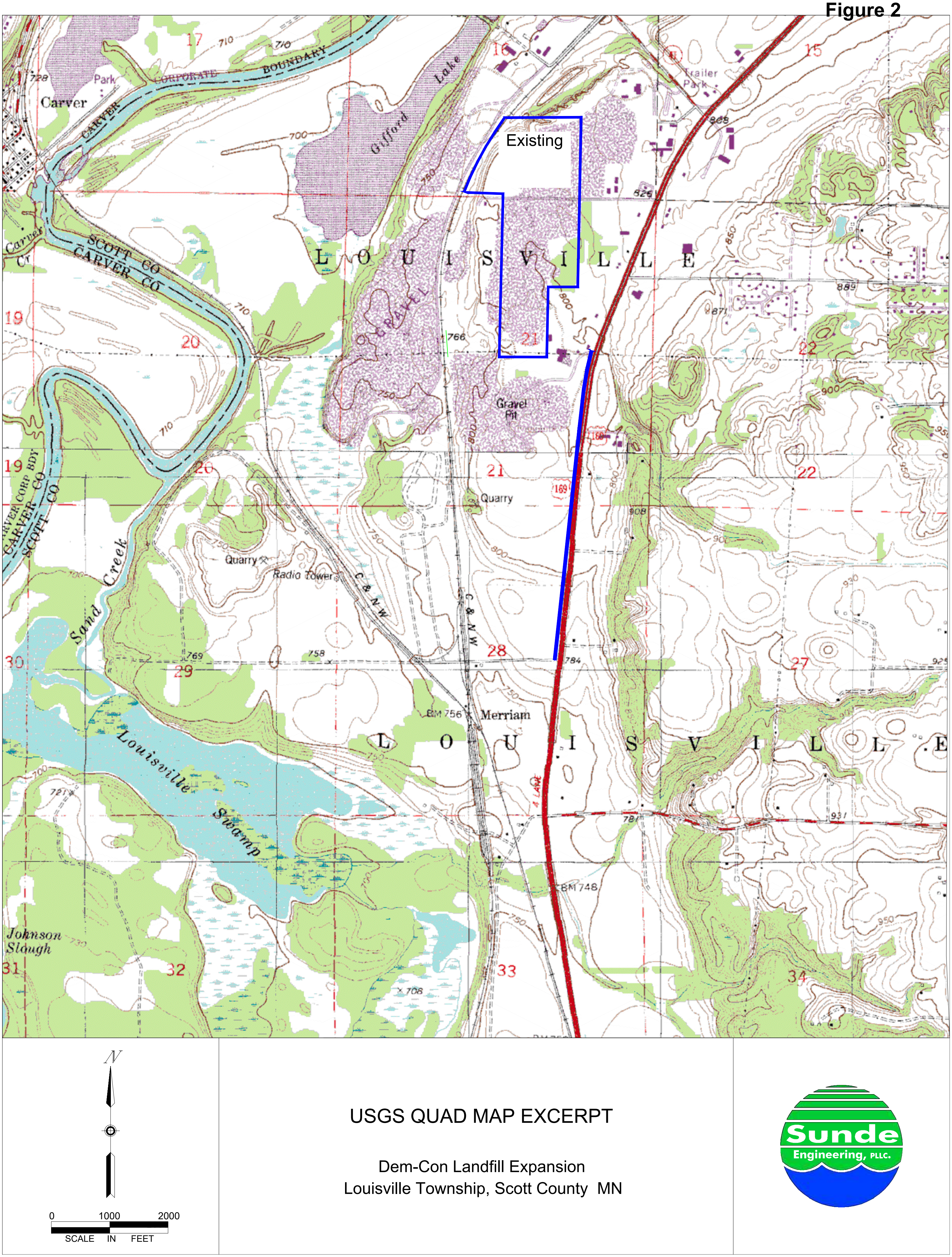
NOT TO SCALE

COUNTY LOCATION MAP

Dem-Con Landfill Expansion
Louisville Township, Scott County MN

Sunde

Figure 2

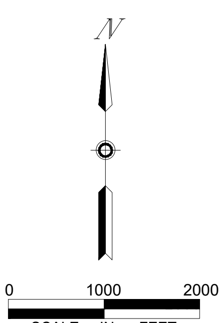


USGS QUAD MAP EXCERPT

Dem-Con Landfill Expansion
Louisville Township, Scott County MN

Sunde Engineering, PLLC.

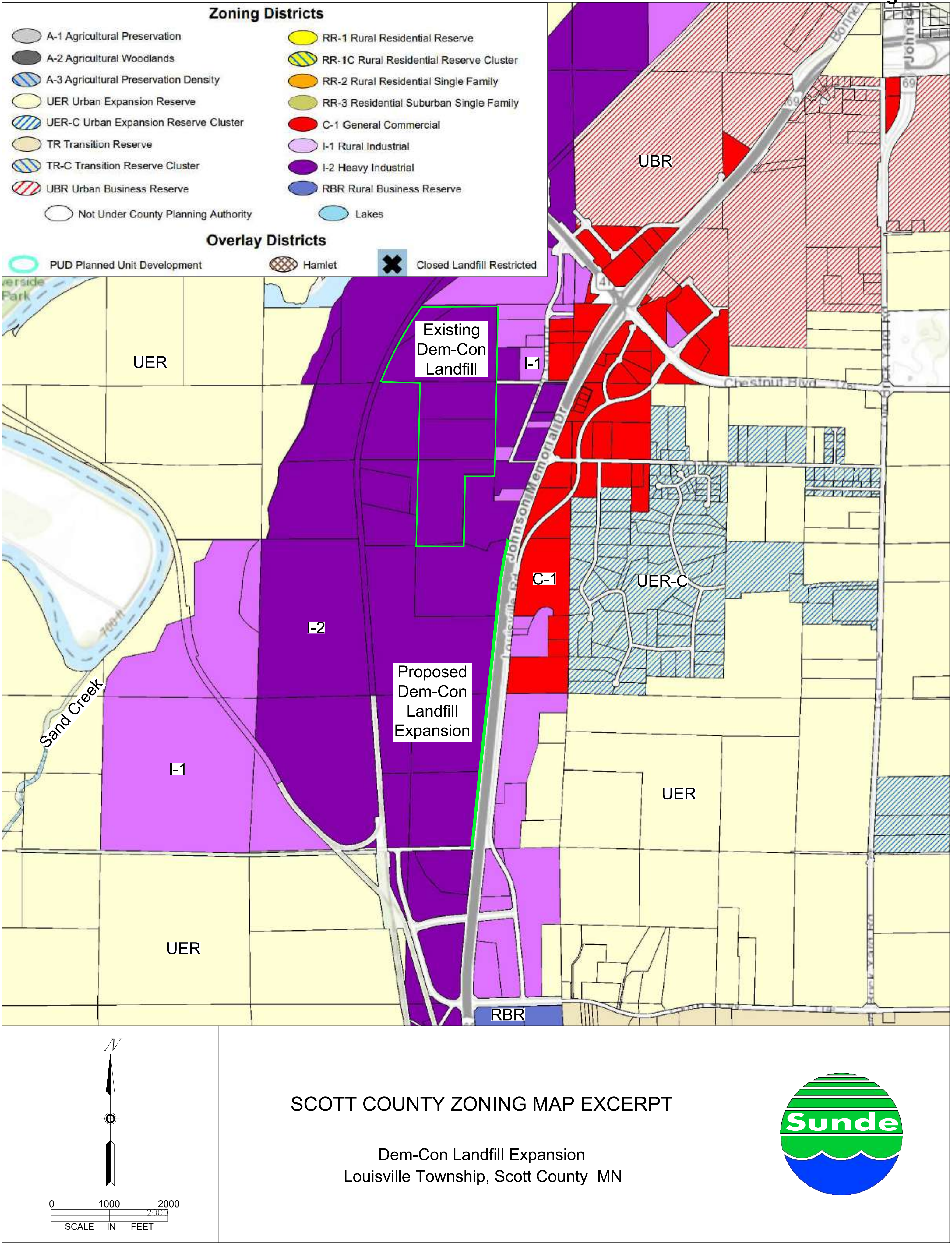
Figure 3



EXISTING LAND USE MAP

Dem-Con Landfill Expansion
Louisville Township, Scott County MN

Engineering, PLLC.

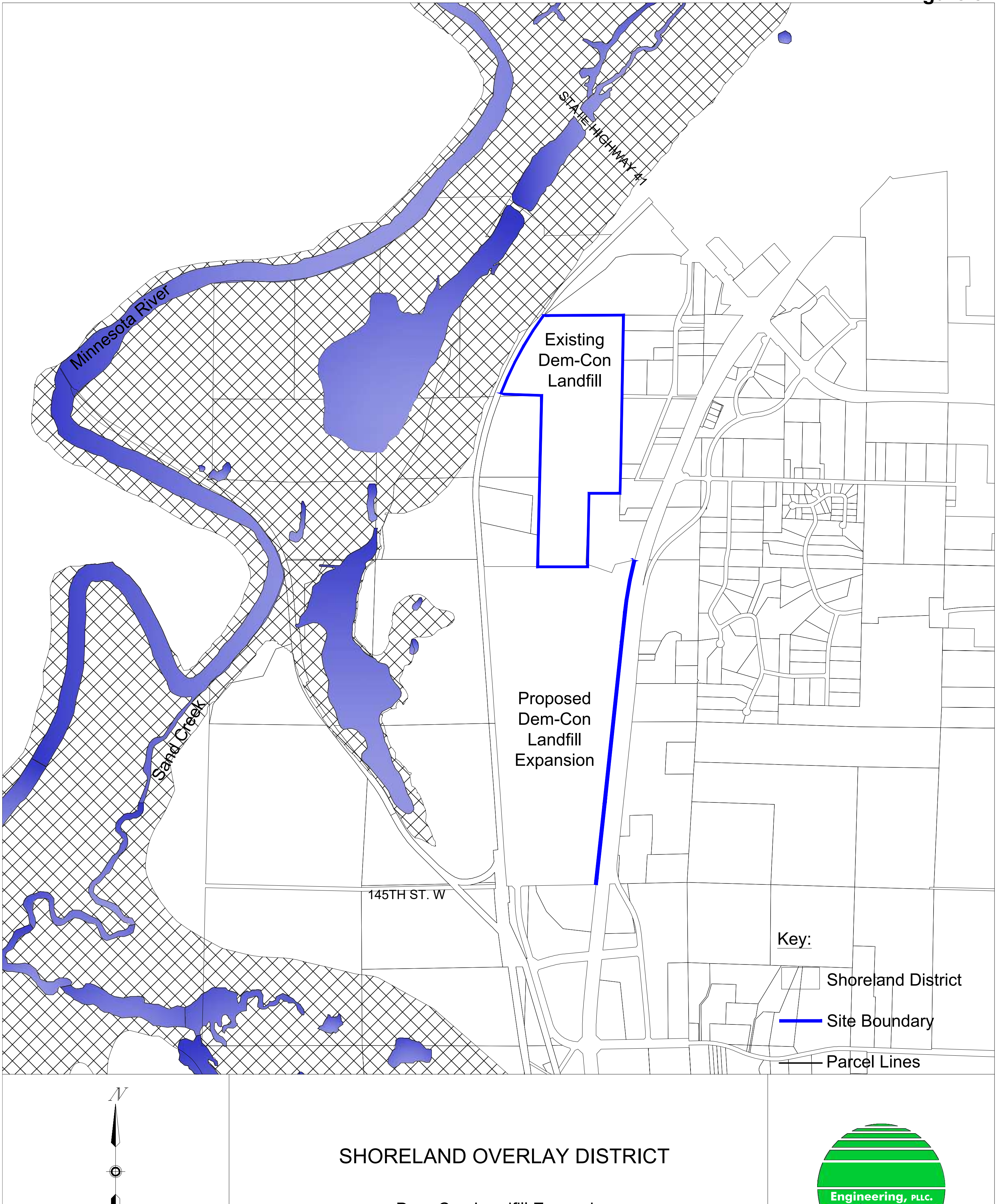


SCOTT COUNTY ZONING MAP EXCERPT

Dem-Con Landfill Expansion
Louisville Township, Scott County MN

Sunde

Figure 5

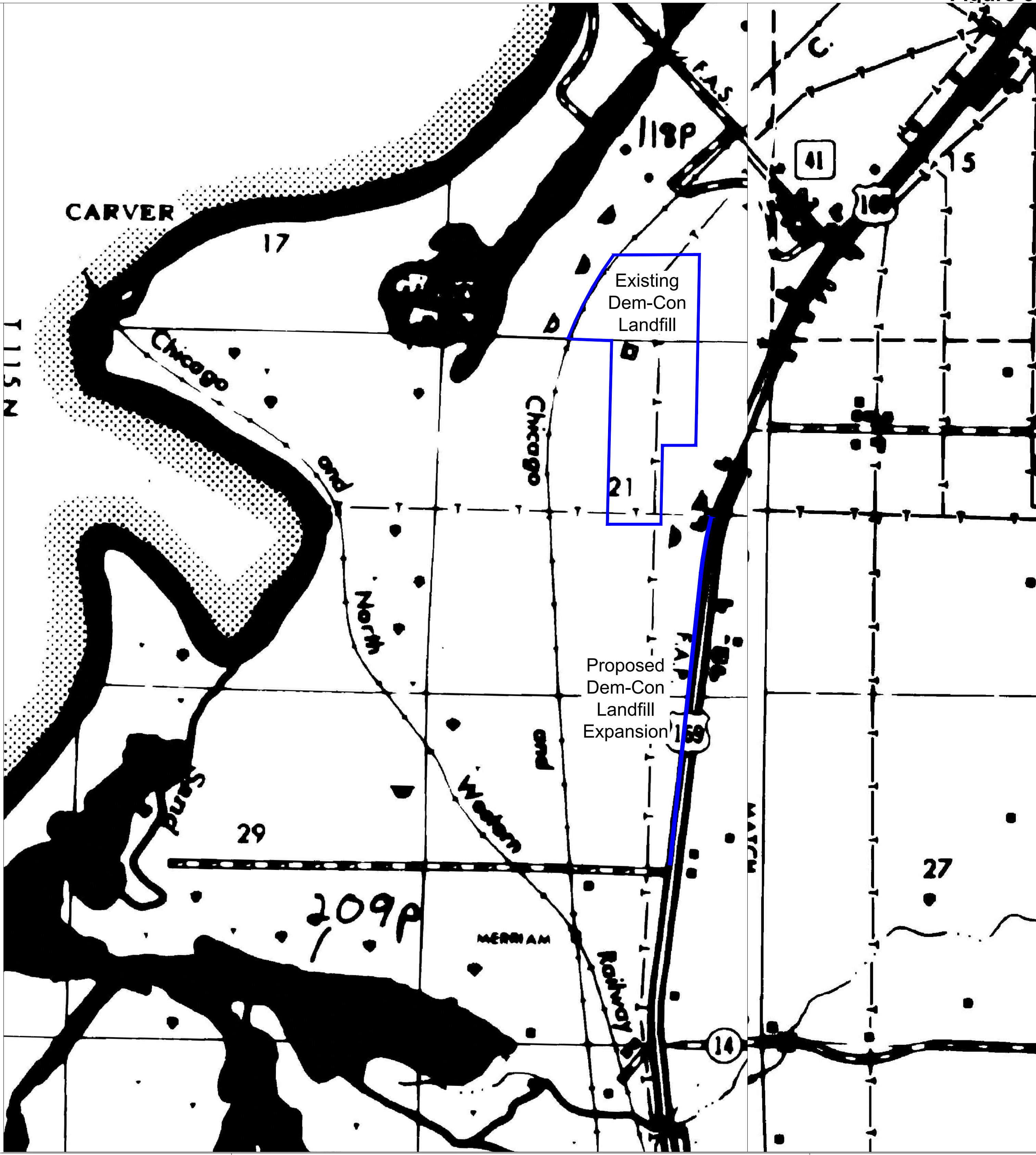


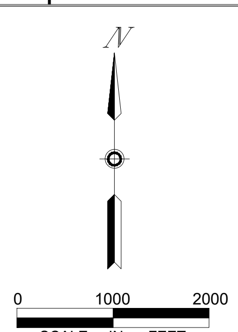
SHORELAND OVERLAY DISTRICT

Dem-Con Landfill Expansion
Louisville Township, Scott County MN

Engineering, PLLC.

Figure 6



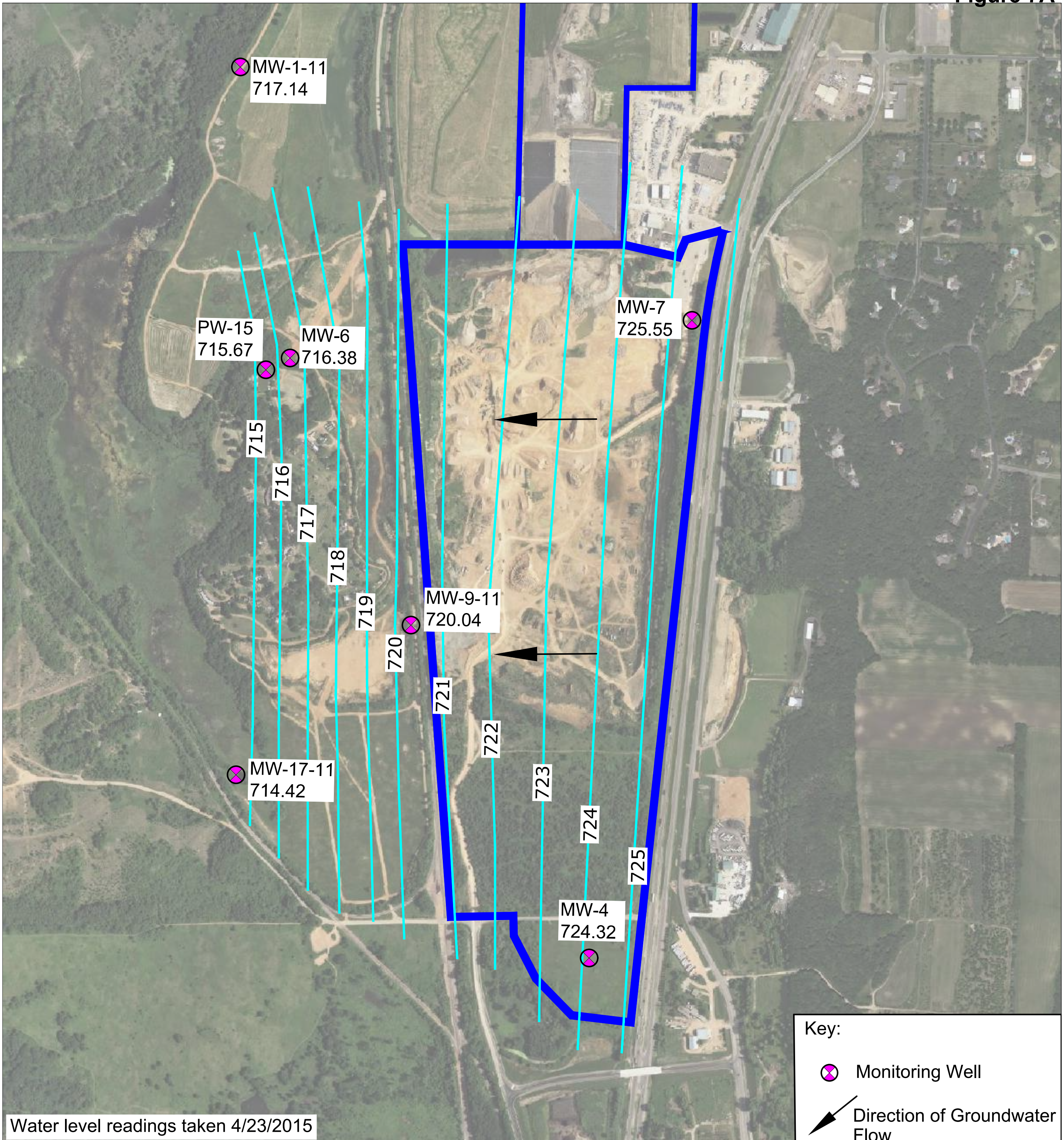


PUBLIC WATERS INVENTORY

Dem-Con Landfill Expansion
Louisville Township, Scott County MN

Engineering, PLLC.

Figure 7A



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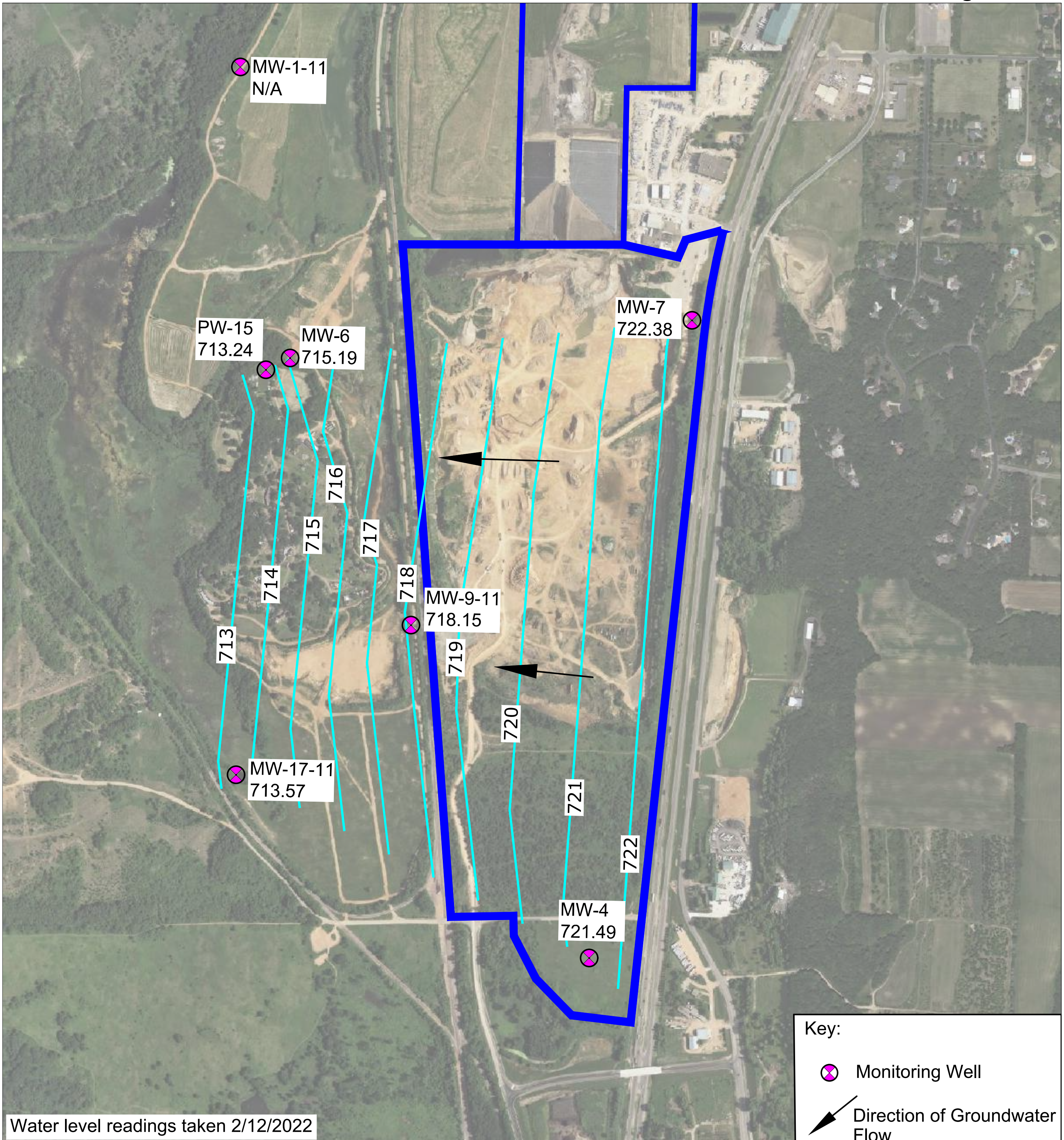
SCALE IN FEET

2015 WATER TABLE

Dem-Con Landfill Expansion
Louisville Township, Scott County MN

Sunde Engineering, PLLC.

Figure 7B



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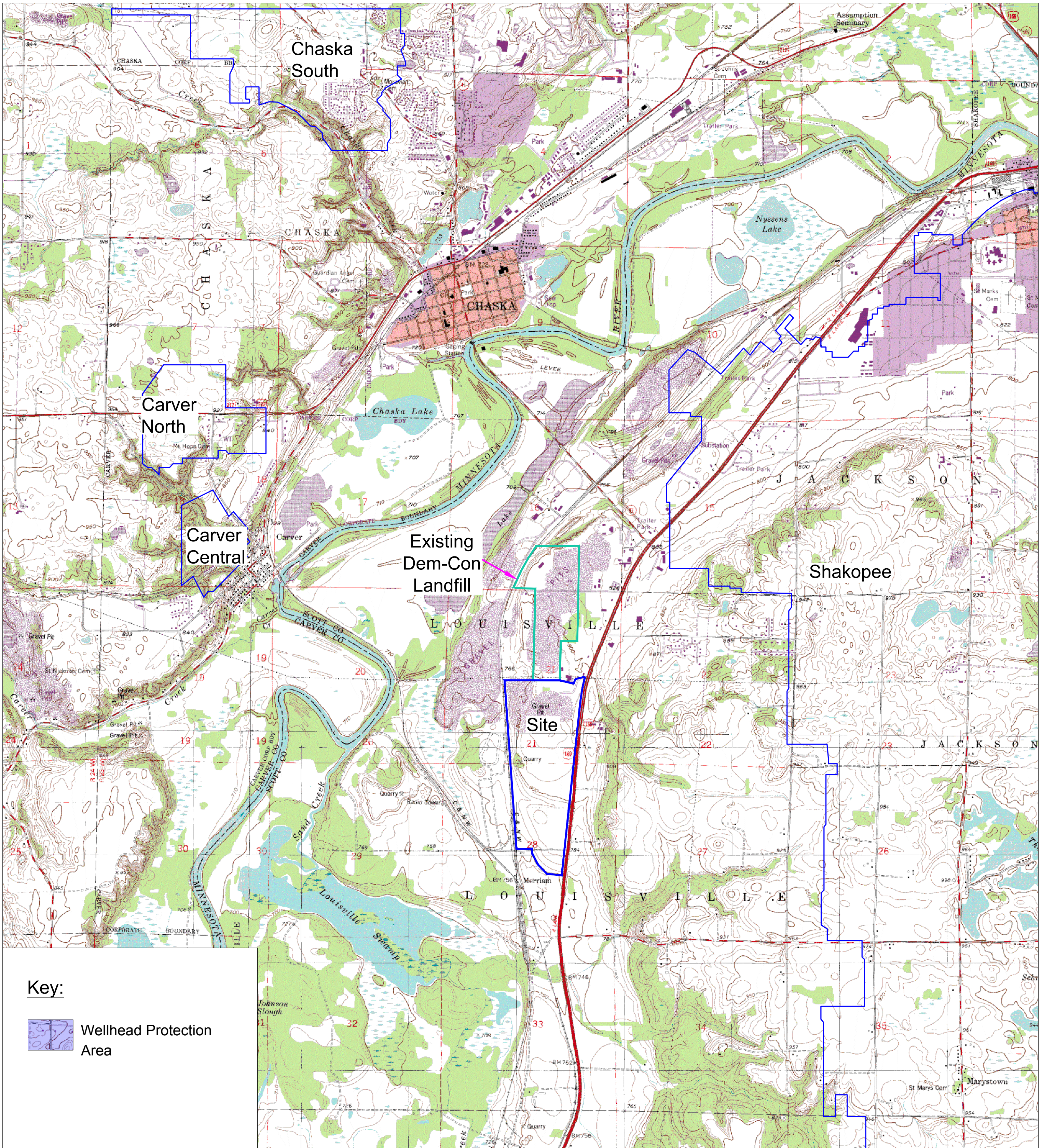
2022 WATER TABLE

Dem-Con Landfill Expansion
Louisville Township, Scott County MN

Sunde Engineering, PLLC.

Figure 8



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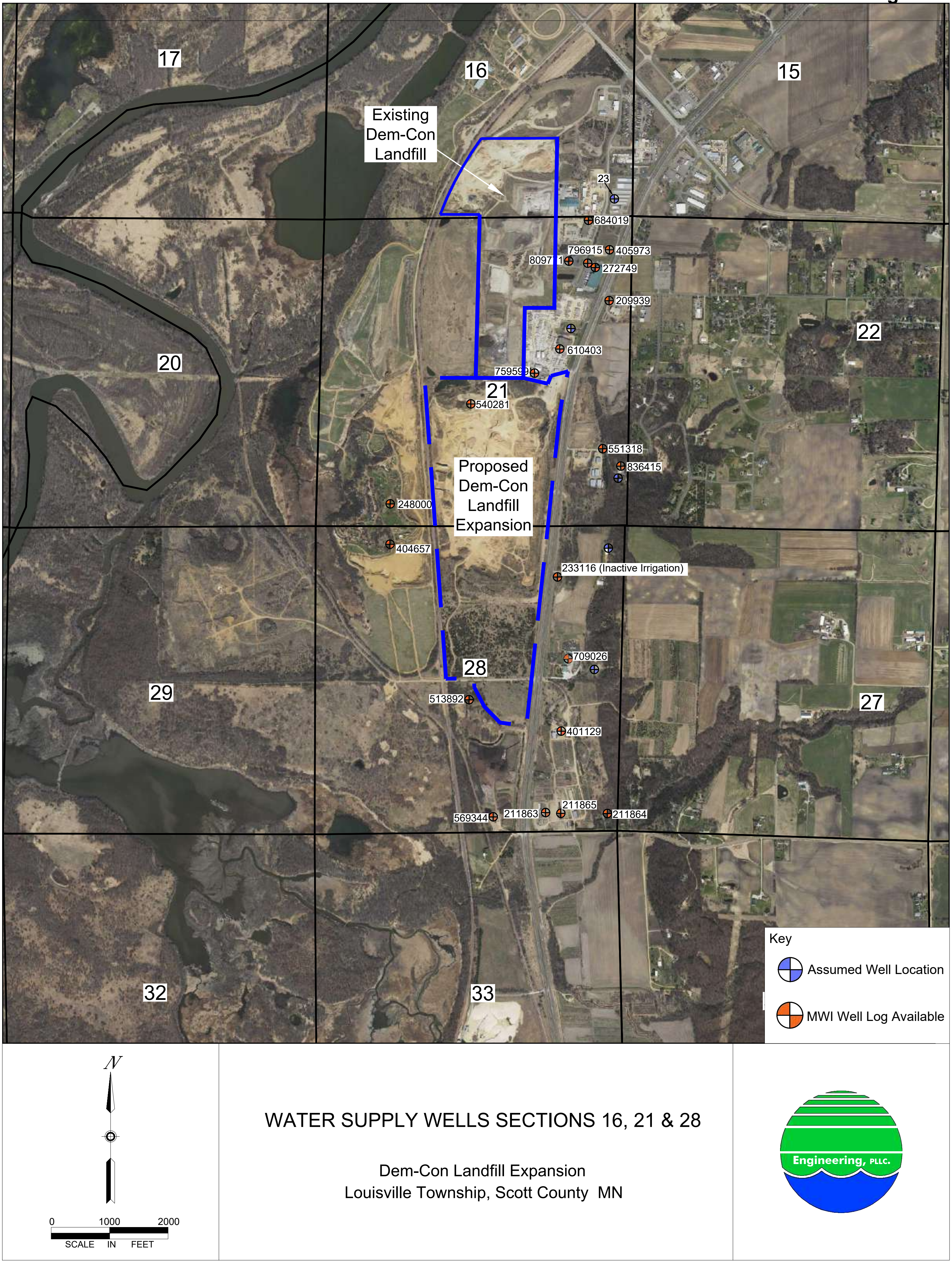
Wellhead Protection Areas

Dem-Con Landfill Expansion
Louisville Township, Scott County MN

Engineering, PLLC.

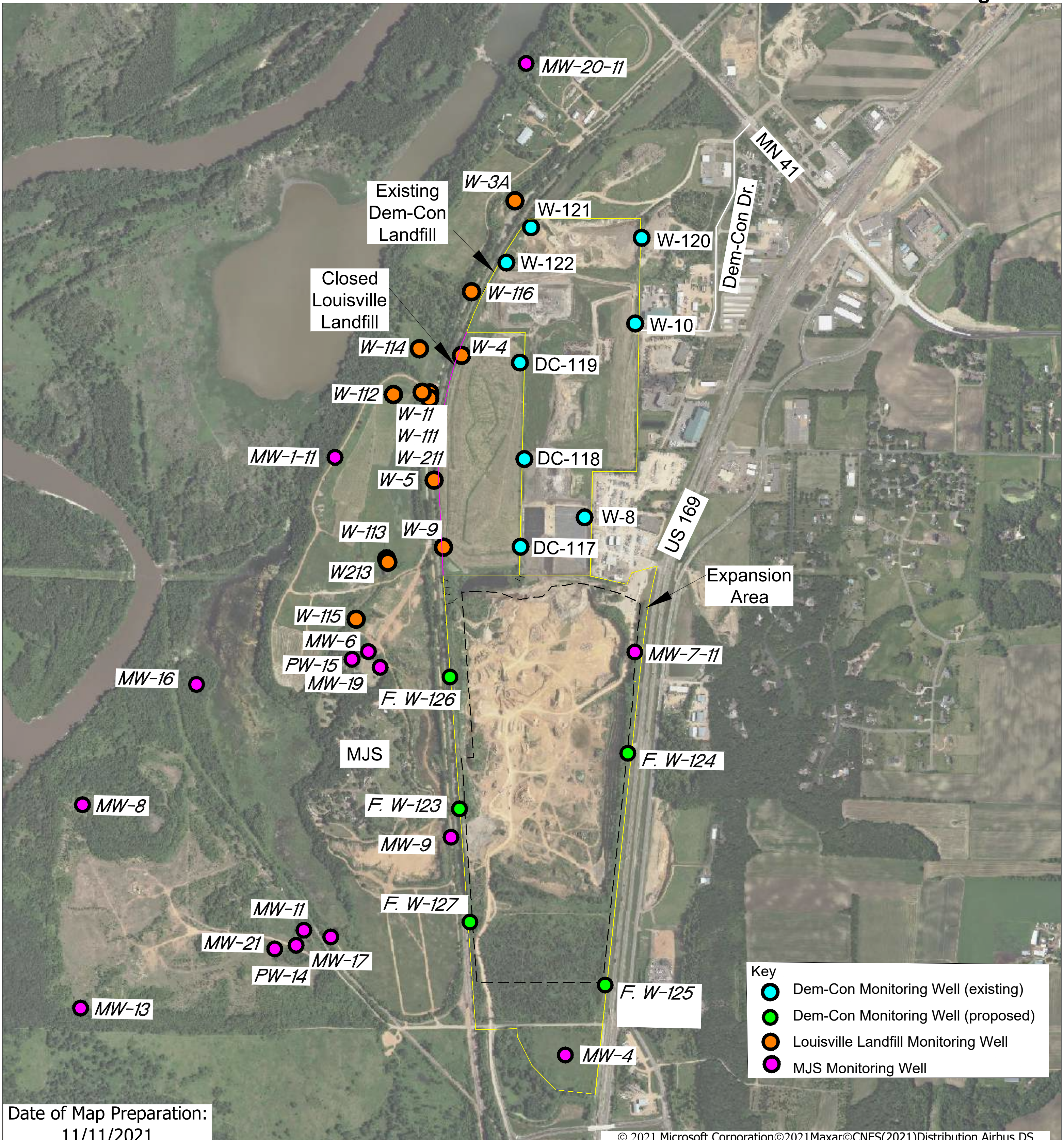


WATER SUPPLY WELLS SECTIONS 16, 21 & 28

Dem-Con Landfill Expansion
Louisville Township, Scott County MN

Engineering, PLLC.

Figure 10



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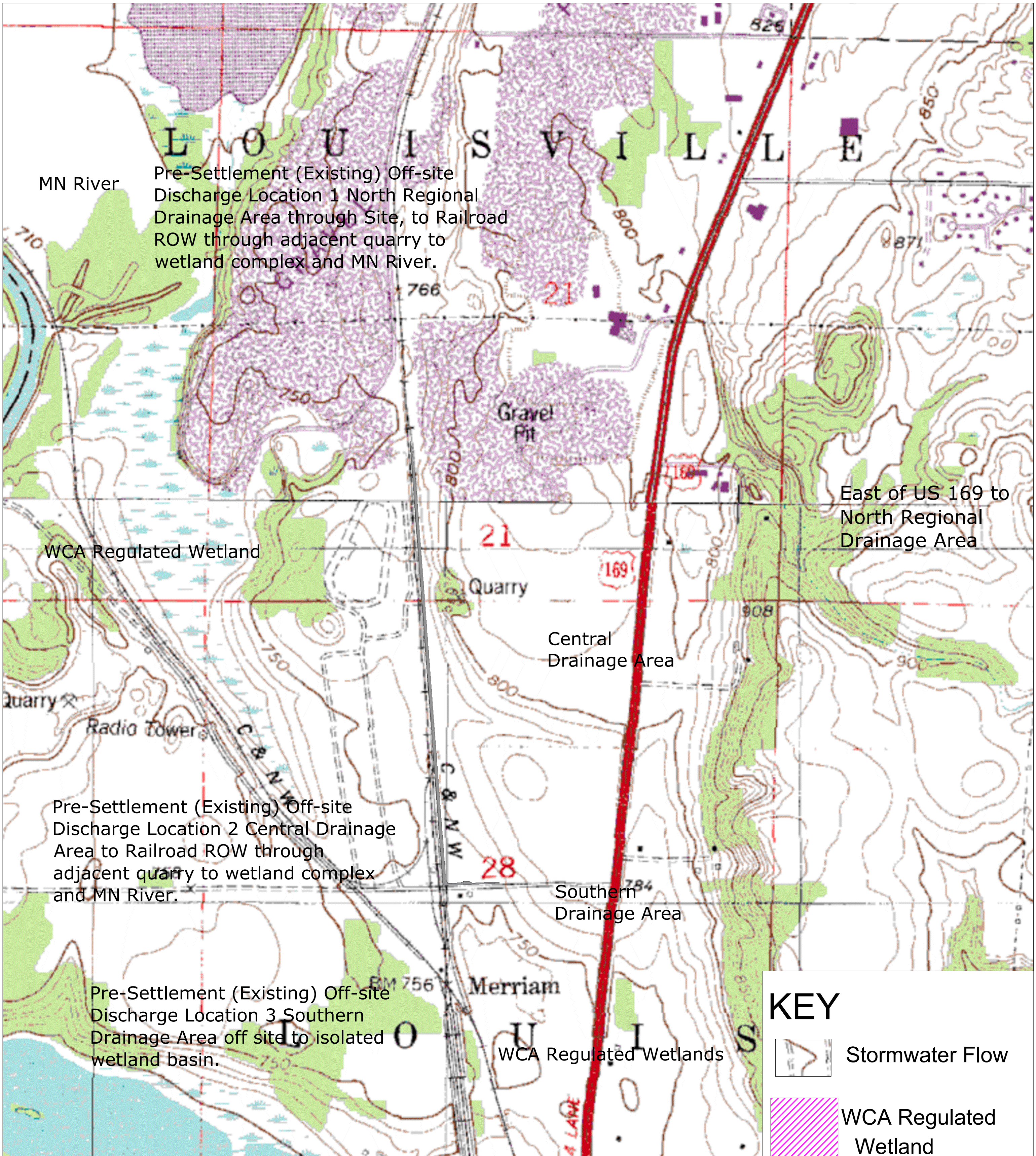
SCALE IN FEET

MONITORING WELL NETWORKS

Dem-Con Landfill Expansion
Louisville Township, Scott County MN

Sunde Engineering, PLLC.

Figure 11



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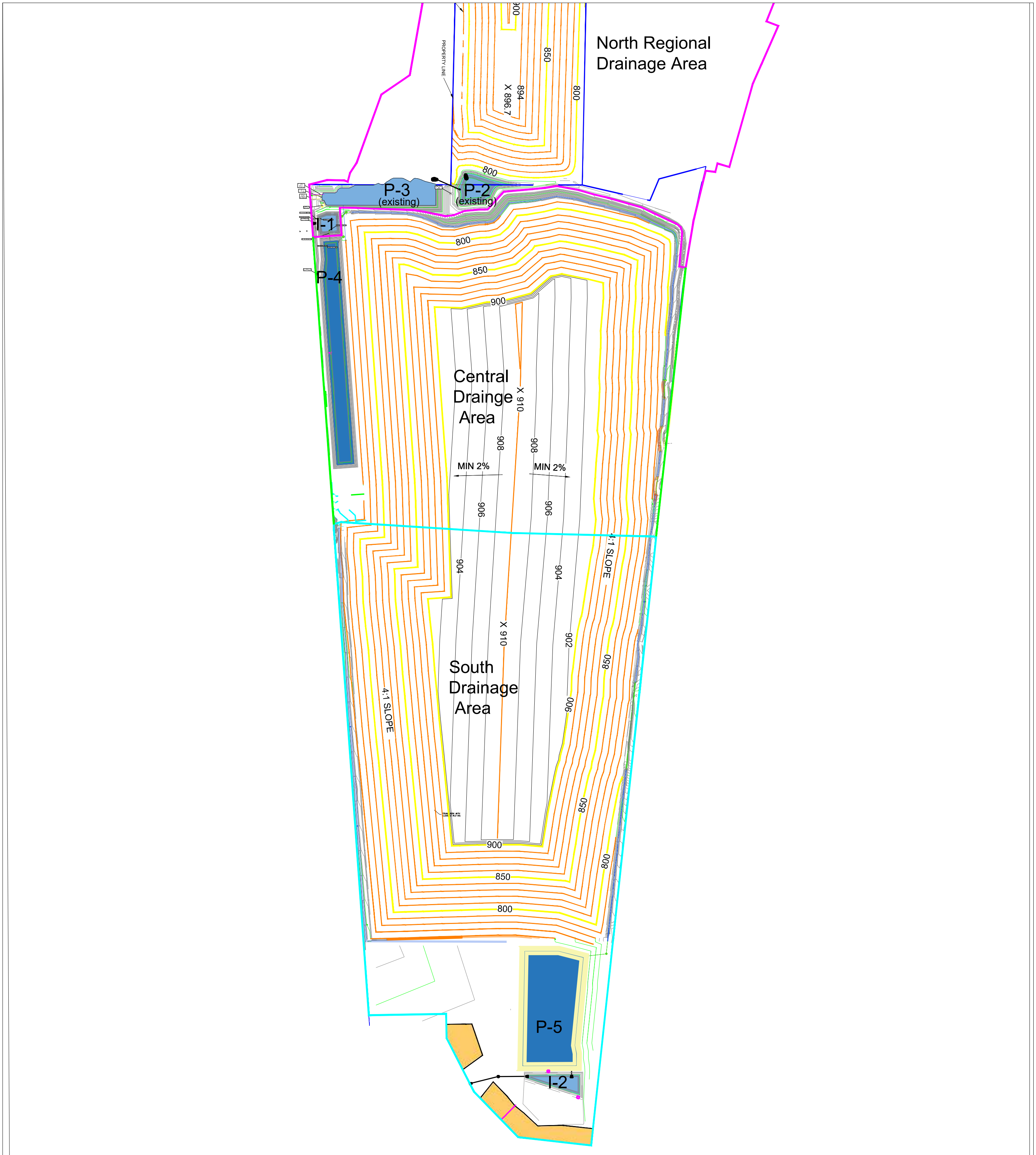
PRE-SETTLEMENT SITE DRAINAGE AREAS

Dem-Con Landfill Expansion
Louisville Township, Scott County MN

Sunde Engineering, PLLC.

Figure 12



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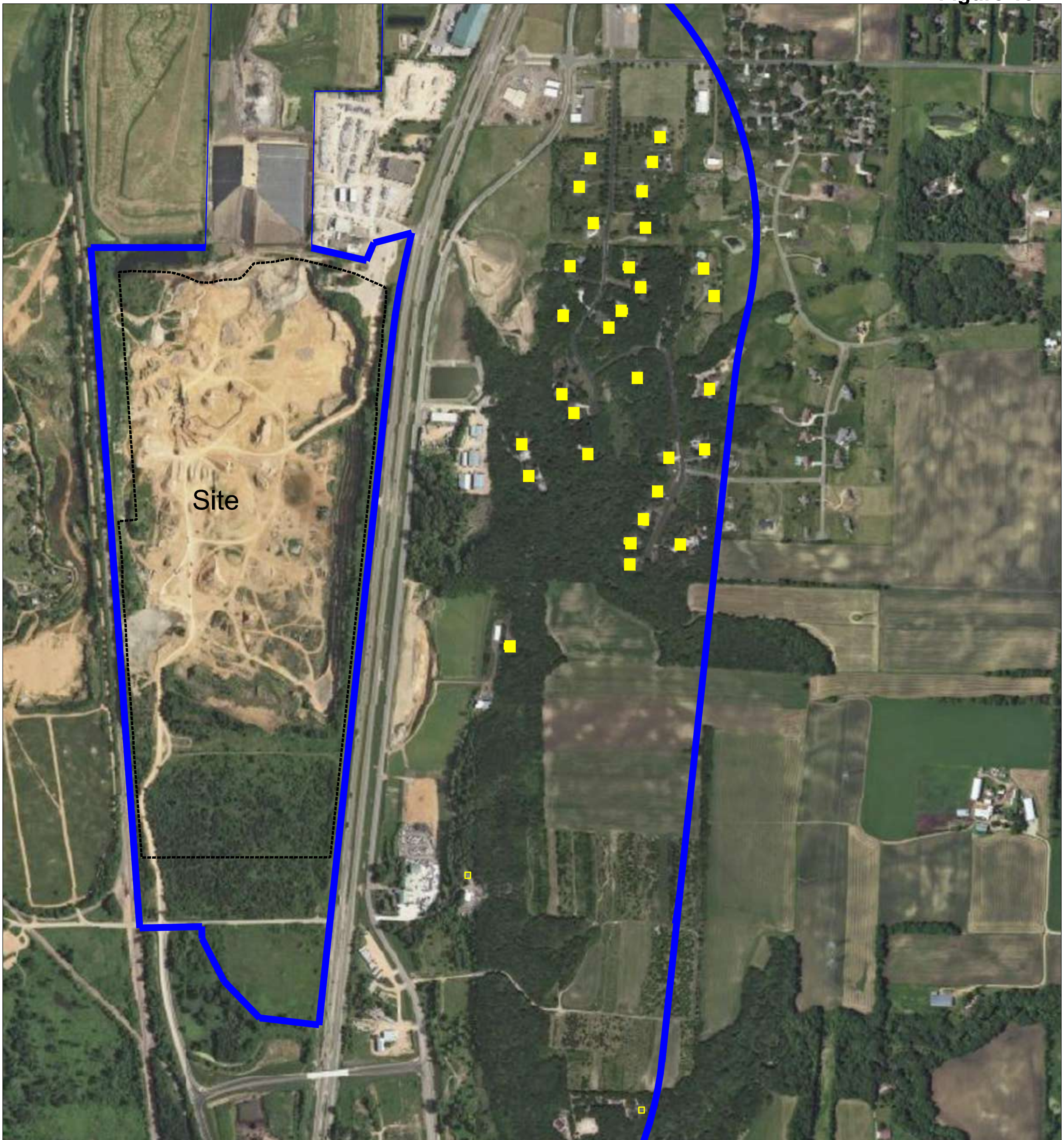
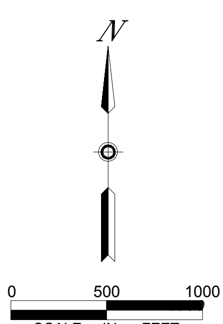
PROPOSED SITE DRAINAGE AREAS

Dem-Con Landfill Expansion
Louisville Township, Scott County MN

Sunde Engineering, PLLC.

Figure 13





Residential Noise Receptors within
½ Mile of Expansion Area

Dem-Con Landfill Expansion
Louisville Township, Scott County MN

Sunde

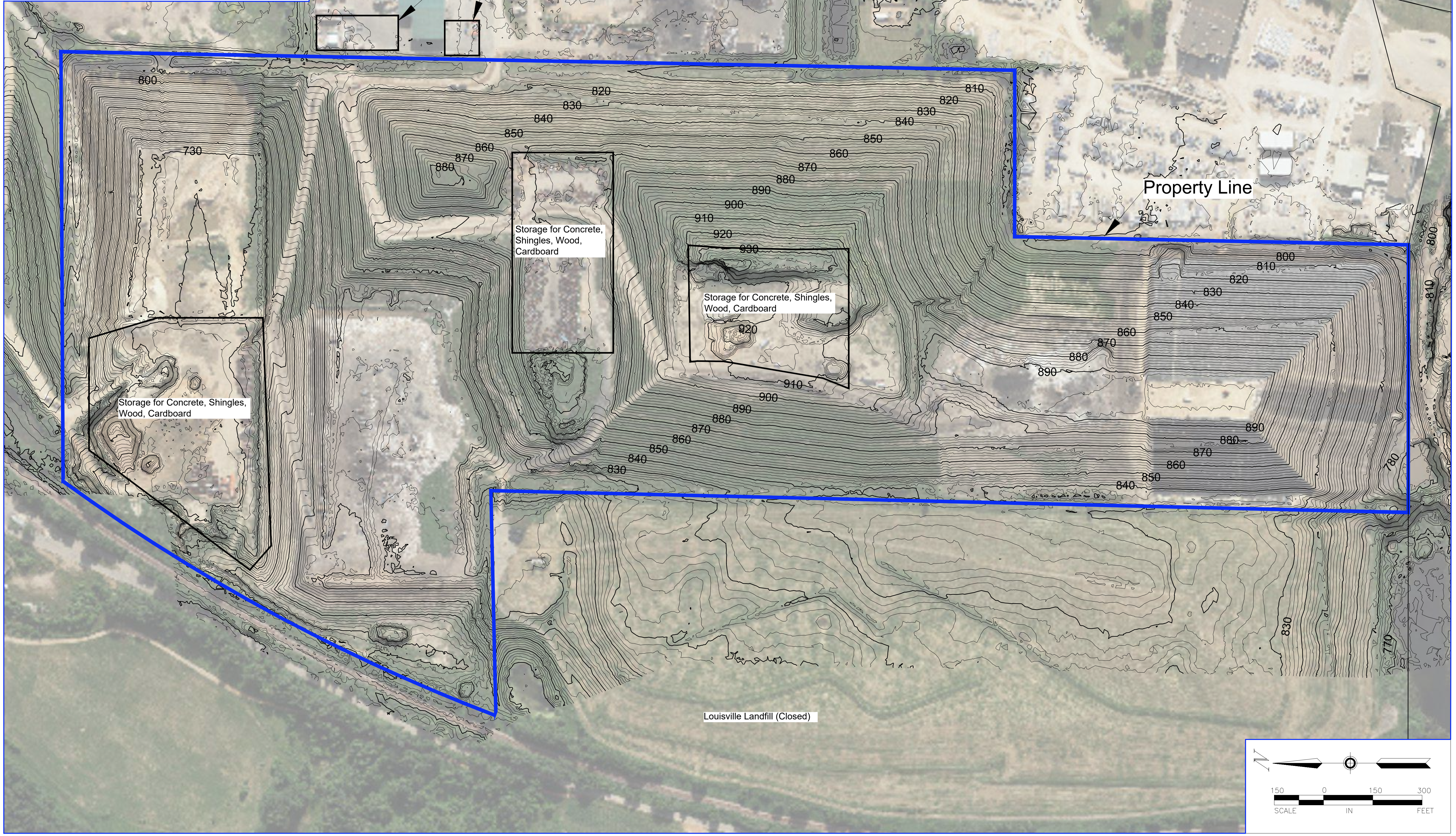
Figure 14

N not to scale	Haul Road Concept Dem-Con Landfill Expansion Louisville Township, Scott County MN	Sunde

Attachments 1-16

Attachment 1

Notes:
1. Storage Locations subject to change as landfill development progresses.
2. Topography by Tetratech 11/5/2020.
3. Boundary Information from Sunde Land Surveying, LLC dated 9/29/21.
4. Aerial Imagery from © 2021 Microsoft Corporation © 2021 Maxar © CNES (2021) Distribution Airbus DS.



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(952) 881-1913 FAX
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DEM-CON COMPANIES

Dem-Con Expansion

Scott County, Minnesota

DATE	REVISION

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Kirsten Pauly

Kirsten Pauly
DATE: 11/22/2021 REG. NO.: 21842

INFORMATION:

PROJECT NO.:

DRAWN BY:

CHECKED BY:

APPROVED BY:

SCALE:

DATE:

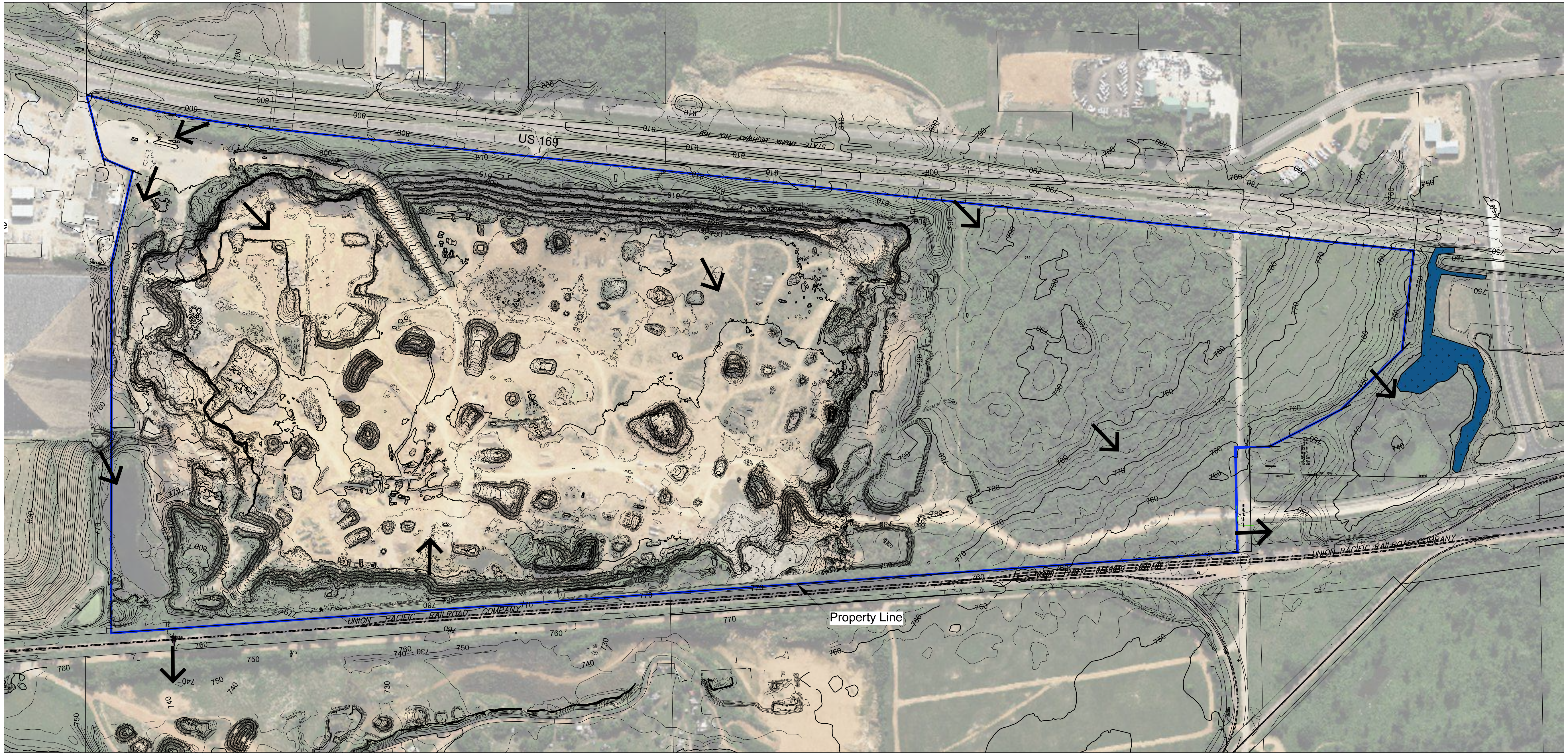
DESCRIPTION:

Existing Conditions
Existing Landfill

SHEET NO:

C1.1

of



Notes:

1. Boundary Information from Proposed Registration Description for Bryan Rock Companies by Sunde Land Surveying dated 8/14/2015.
2. Topography of Existing Quarry from UAS dated April 29, 2019. Topograpghy for remainder of site from 2010 LiDAR
3. Wetland boundary from 169/41/78/147th Final Drainage Report WSB January 2018.
4. Aerial Imagery from © 2021 Microsoft Corporation © 2021 Maxar © CNES (2021) Distribution Airbus DS.

N

500 0 250 500
SCALE IN FEET

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Kirsten Pauly

DATE: 11/22/2021 REG. NO.: 21842

INFORMATION:

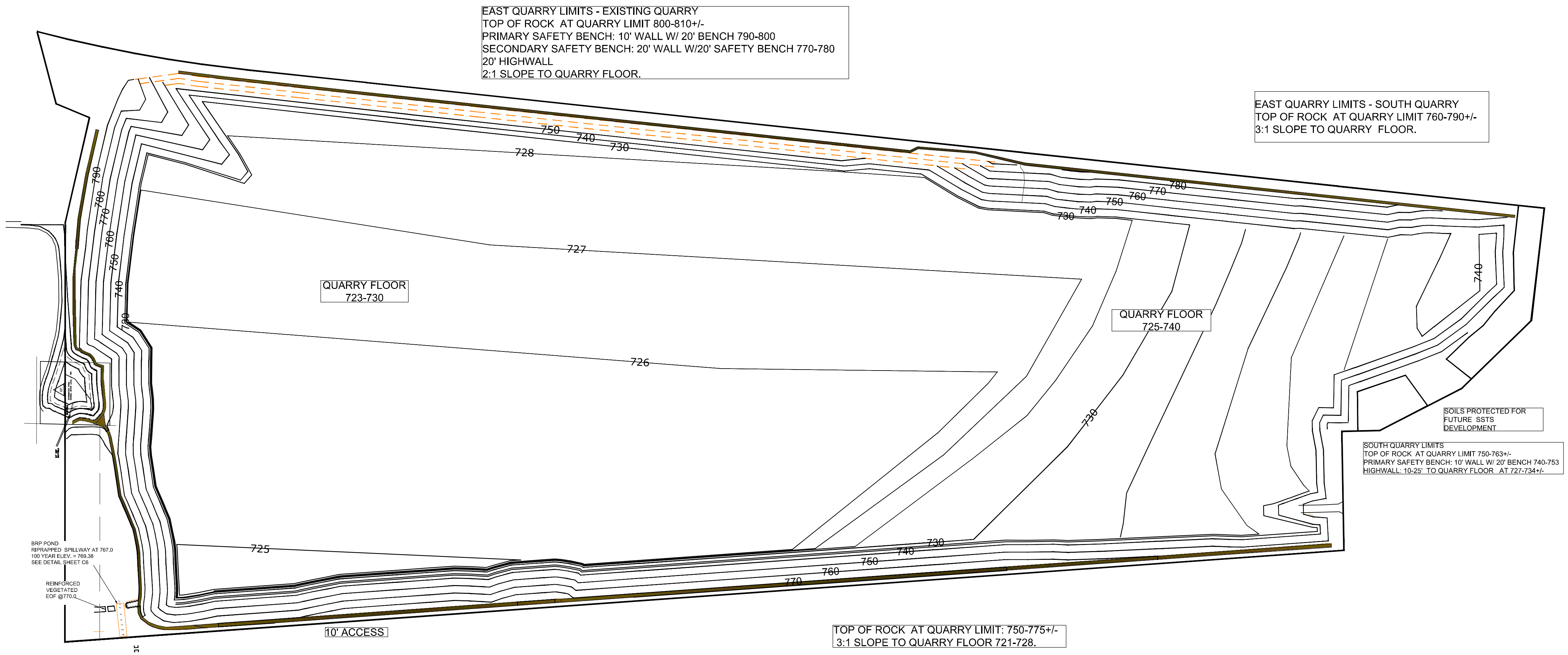
PROJECT NO.:
DRAWN BY:
CHECKED BY:
APPROVED BY:
SCALE:
DATE:

DESCRIPTION:

Existing Conditions
Expansion Area

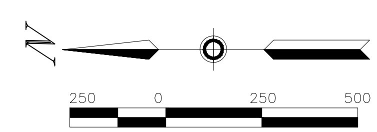
SHEET NO:

C1.2 of



Notes:

1. Areas where floor mined to water table will be backfilled to 2 feet above the water table.
2. East highwall to be backfilled with a 2:1 slope leaving two safety benches and maximum height of 20' of any face along east boundary.
3. West highwall to be backfilled to 3:1 slope.
4. Southern two safety benches to quarry floor
5. Northern boundary 3:1 slope to quarry floor
6. Soils identified as suitable for SSTS development will be protected throughout mining and reclamation.
7. Perimeter access roads to be established as indicated on plan
8. Perimeter setback areas and internal slopes to have minimum 6" topsoil with soil of a quality at least equal to the topsoil of land areas immediately surrounding area.
9. Slopes to be seeded and mulched to establish vegetation that adequately retards erosion.
10. 2:1 slopes will require erosion control blanket.
11. Floor of quarry will not be subject to erosion and will remain unvegetated.



1. Reclamation will consist of a series of benches created by quarry activity combined with backfill and sloping. The uppermost bench will be a primary safety bench, ten feet from the top of the limestone face and twenty feet wide. A secondary safety bench will be constructed 20-feet down from the first and will also be twenty feet wide. A highwall will be constructed from the secondary safety bench to the quarry floor, with a height of up to approximately 50 feet. A minimum of the bottom 30 feet of the highwall will be backfilled with a 2:1 slope.

2. A berm will be constructed at the outer edge of both the primary and secondary safety benches. The inside toe of the berm will begin a minimum of five feet from the outer quarry wall. The berm will have a minimum height of 2.5 feet and a minimum width of 7 feet. The width of the two benches will be a minimum of 20 feet wide.

3. The final face will have pre-sprit blast pattern to minimize fracture in the undisturbed bedrock that is to remain.

4. Blast holes for production blasting will be placed to intersect at the center bench or away from the bench crest to minimize fracture of the undisturbed bench.

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DEM-CON COMPANIES

Dem-Con Expansion

Scott County, Minnesota

DATE	REVISION

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Kirsten Pauly

Kirsten Pauly

DATE: 11/22/2021 REG. NO.: 21842

INFORMATION:

PROJECT NO.:

DRAWN BY:

CHECKED BY:

APPROVED BY:

SCALE:

DATE:

DESCRIPTION:

Post Mining Reclamation Conditions

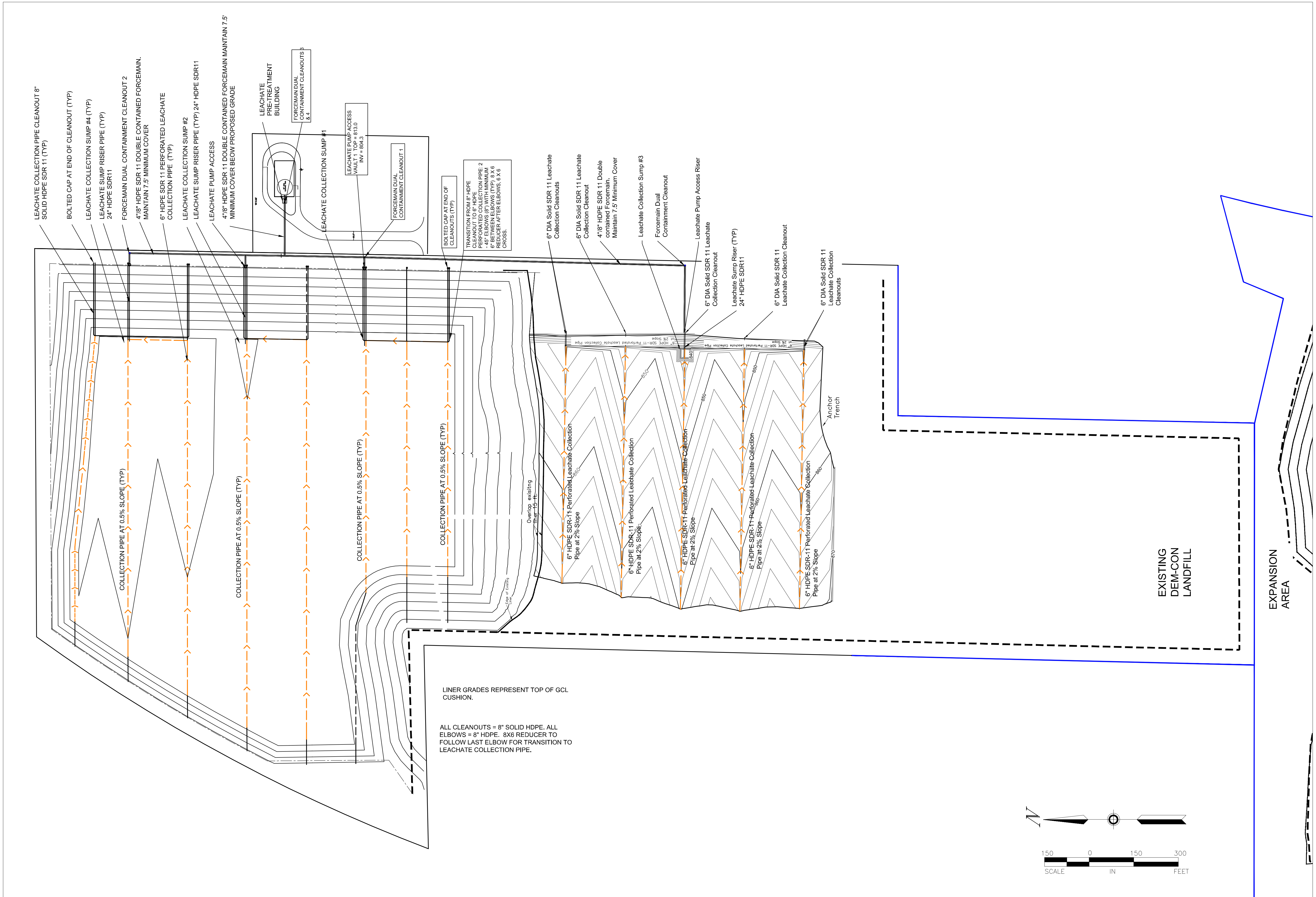
Expansion Area

SHEET NO:

C1.3

of

T. , R. , S. DRAWING: \\Kirstensoldpc\DWGS\Dem-Con\2021 landfill expansion Bryan Rock design drawings\Final Written Application Plan Set\2021-10-31 CURRENT\2021-11-4 C1.3 Post Mining Reclamation Conditions EA.dwg LAYOUT: C3



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Kirsten Pauly

Kirsten Pauly

DATE: 11/22/2021 REG. NO.: 21842

INFORMATION:

PROJECT NO.:

DRAWN BY:

CHECKED BY:

APPROVED BY:

SCALE:

DATE:

DESCRIPTION:

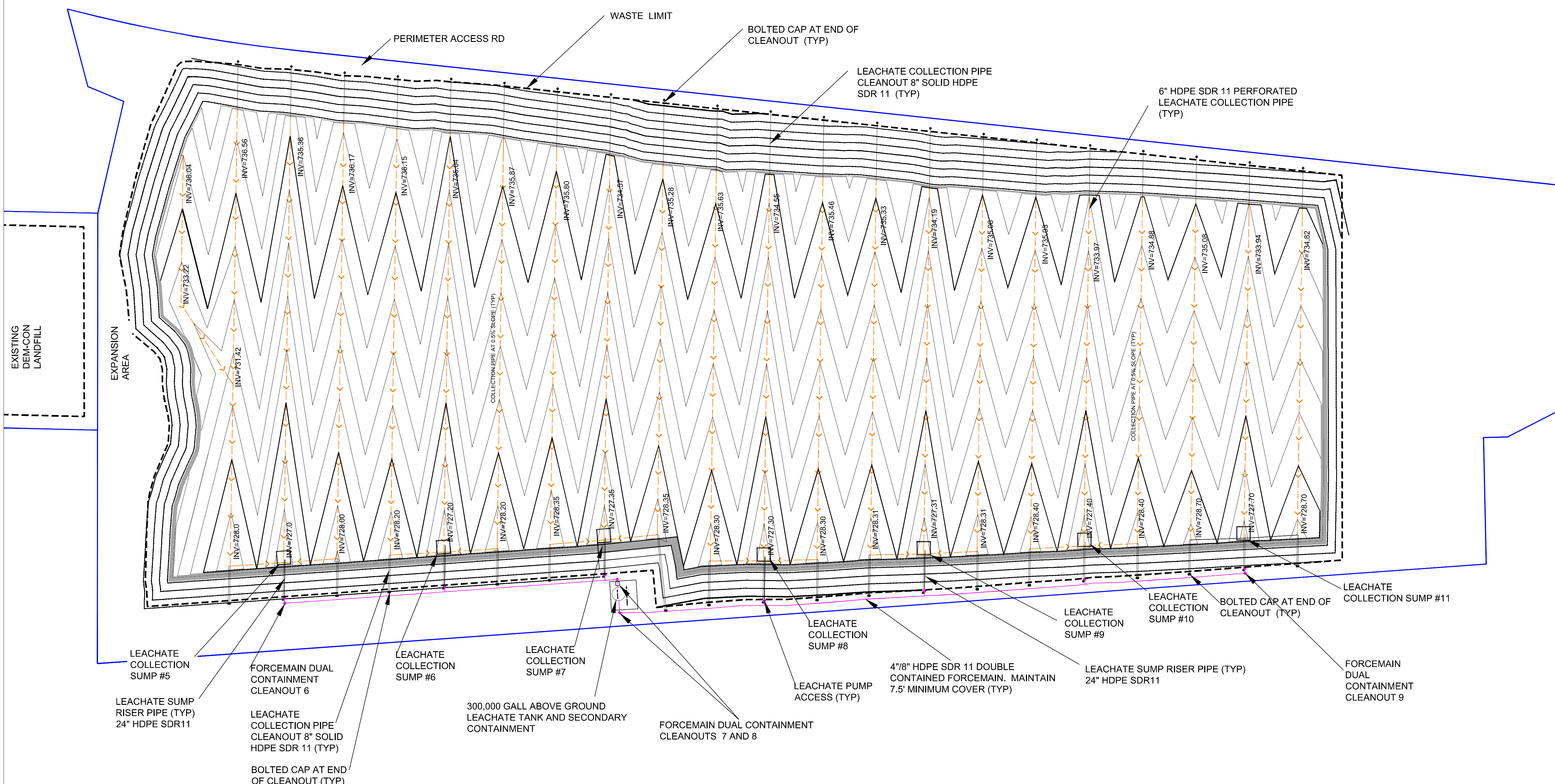
Liner Layout Existing Landfill

SHEET NO:

C2.1

of

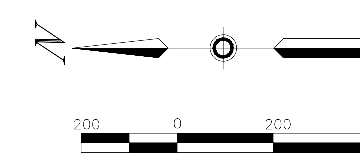
T. , R. , S. DRAWING: \\Kirstensoldpc\DWGS\Dem-Con\2021 landfill expansion Bryan Rock design drawings\Final Written Application Plan Set\2021-10-31 CURRENT\2021-11-7 - C2.2 Liner Layout EA.dwg LAYOUT: C2.1 Liner Layout EL (2) XREF: LiDAR Basemap Autodesk Recap Existing Topography; XREF: 11 x 17 title block w demcon logo



Liner:
Collection Pipes: minimum slope = 0.5%
Max spacing: 200'
Min Slope to Collection trench 2%
3:1 slope to grade
Top of Liner Minimum 5 ft above Water Table

LINER GRADES REPRESENT TOP OF GCL CUSHION.

ALL CLEANOUTS = 8" SOLID HDPE. ALL ELBOWS = 8" HDPE. 8X6 REDUCER TO FOLLOW LAST ELBOW FOR TRANSITION TO LEACHATE COLLECTION PIPE.



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Dem-Con Expansion

Scott County, Minnesota

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Kirsten Pauly

DATE: 11/22/2021 REG. NO.: 21842

INFORMATION:

PROJECT NO.:
DRAWN BY:
CHECKED BY:
APPROVED BY:
SCALE:
DATE:

DESCRIPTION:

Liner Layout Expansion Area

SHEET NO:

C2.2

of

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Dem-Con Expansion

Scott County, Minnesota

DATE	REVISION

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Kirsten Pauly
KIRSTEN PAULY

DATE: 11/22/2021 REG. NO.: 21842

INFORMATION:

PROJECT NO.:

DRAWN BY:

CHECKED BY:

APPROVED BY:

SCALE: Graphic

DATE: 10/29/21

DESCRIPTION:

Final Grades Existing Landfill

SHEET NO:

C3.1

1 of 1

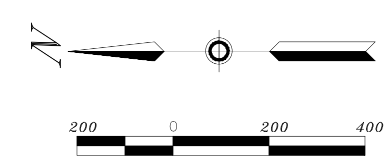
N

150 0 150 300

SCALE IN FEET

Final grades over existing landfill approved in 2016 Permit Reissuance.

T. , R. , S. DRAWING: \\Kirstensoldpc\DWGS\Dem-Con\2021 landfill expansion Bryan Rock design drawings\Final Written Application Plan Set\2021-10-31 CURRENT\2021-11-9 Final Grade C3.1 and 3.2.dwg LAYOUT: C3.1 Final Grades EL)



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..\..\2021 -7 APPLICATION DRAWINGS\DemConLogo.jpg

Dem-Con Expansion

Scott County, Minnesota

DATE	REVISION

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KIRSTEN PAULY

DATE: 11/22/2021 REG. NO.: 21842

INFORMATION:

PROJECT NO.:

DRAWN BY:

CHECKED BY:

APPROVED BY:

SCALE: Graphic

DATE: 10/29/21

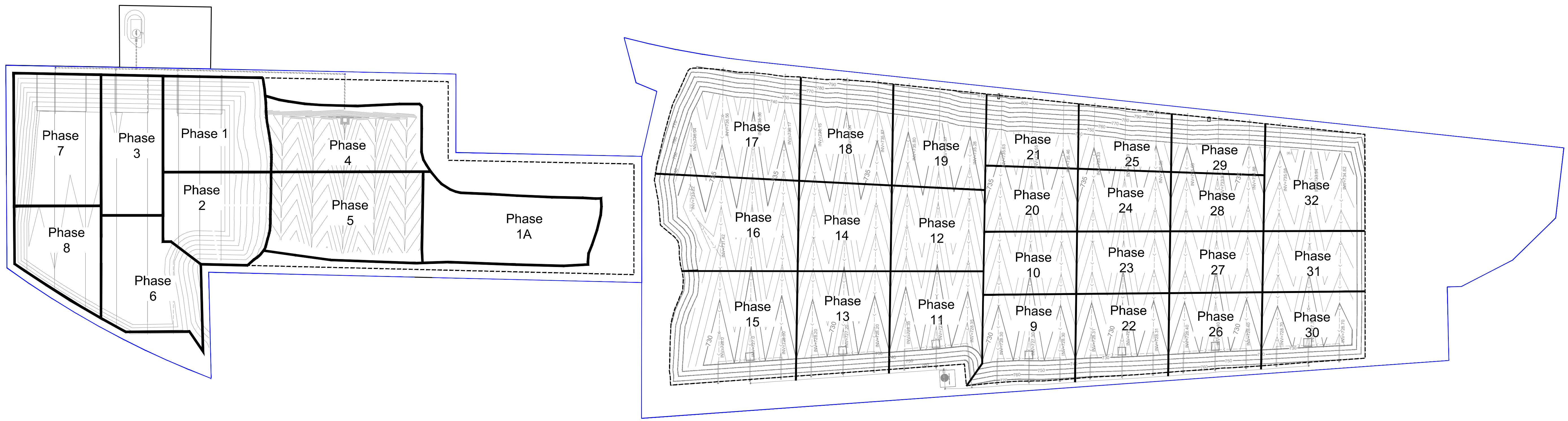
DESCRIPTION:

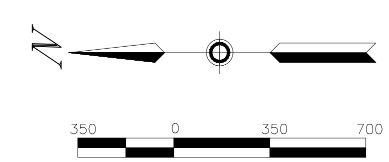
Final Grades Expansion Area

SHEET NO:

C3.2

T. , R. , S. DRAWING: \\Kirstensoldpc\DWGS\Dem-Con\2021 landfill expansion Bryan Rock design drawings\Final Written Application Plan Set\2021-10-31 CURRENT\Submitted to MPCA 11-28-2021\2021-11-9 Final Grade C3.1 and 3.2.dwg LAYOUT: C3.2 Final Grades EA





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DEM-CON COMPANIES

Dem-Con Expansion

Scott County, Minnesota

DATE	REVISION

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Kirsten Pauly

Kirsten Pauly

DATE: 11/22/2021 REG. NO.: 21842

INFORMATION:

PROJECT NO.:

DRAWN BY:

CHECKED BY:

APPROVED BY:

SCALE:

DATE:

DESCRIPTION:

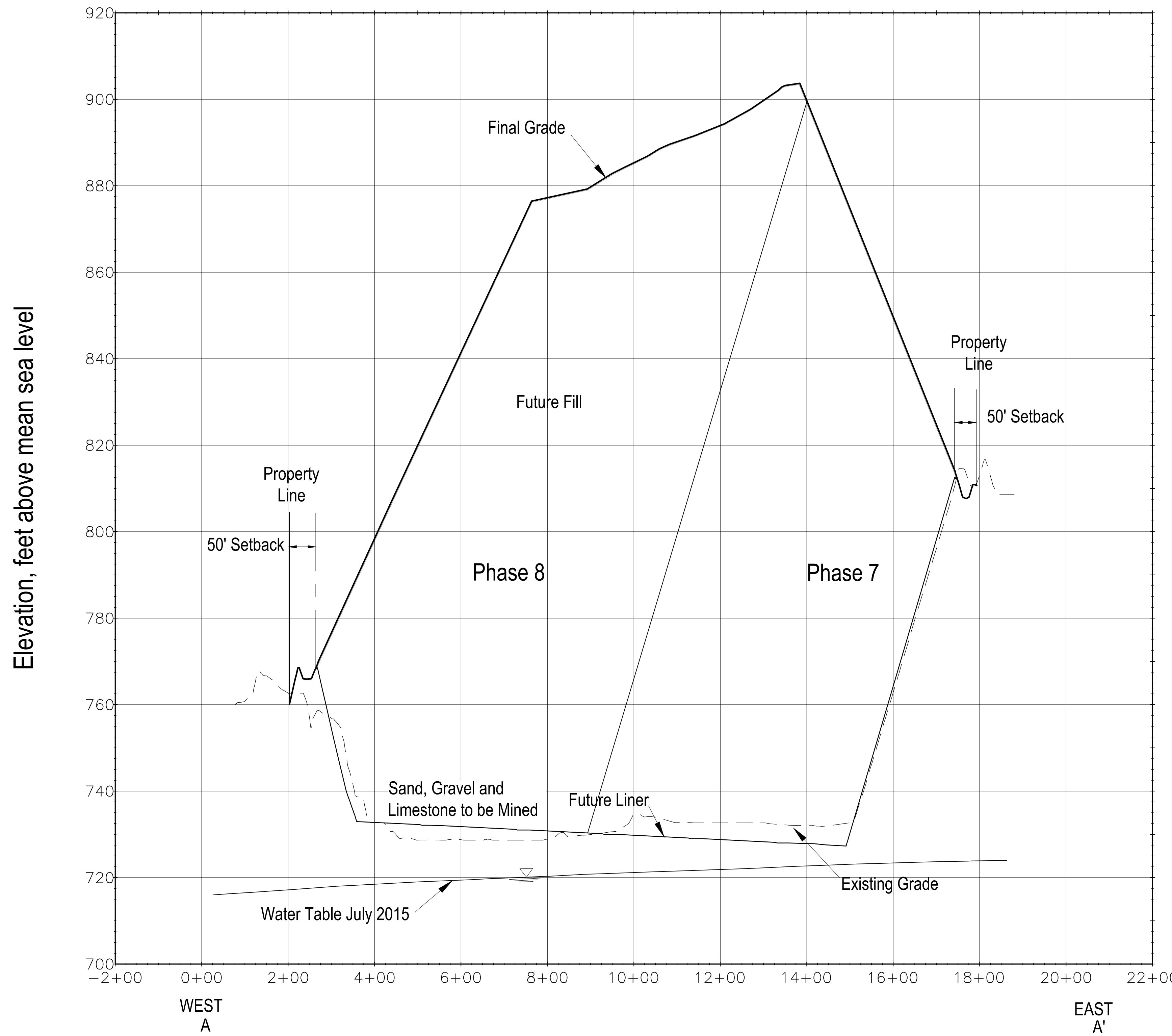
Phase Development Plan

SHEET NO:

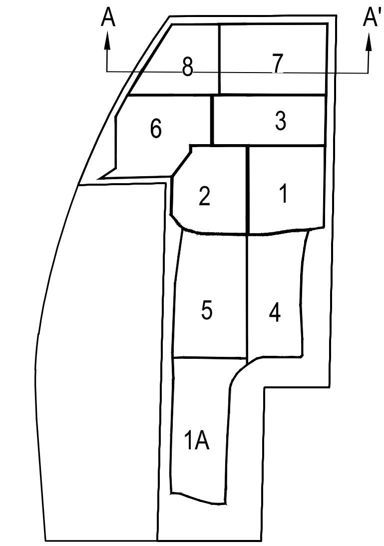
C4

of

T. , R. , S. DRAWING: \\Kirstensoldpc\DWGS\Dem-Con\2021 landfill expansion Bryan Rock design drawings\Final Written Application Plan Set\2021-10-31 CURRENT\C4 Phasing Plan.dwg LAYOUT: C4 Phasing Plan



Cross-Section A-A'



Section Location

Sunde Engineering, PLLC.
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DEM-CON COMPANIES

Dem-Con Expansion

Scott County, Minnesota

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Kirsten Pauly

Kirsten Pauly

DATE: 11/22/2021 REG. NO.: 21842

INFORMATION:

PROJECT NO.:

DRAWN BY:

CHECKED BY:

APPROVED BY:

SCALE:

DATE:

DESCRIPTION:

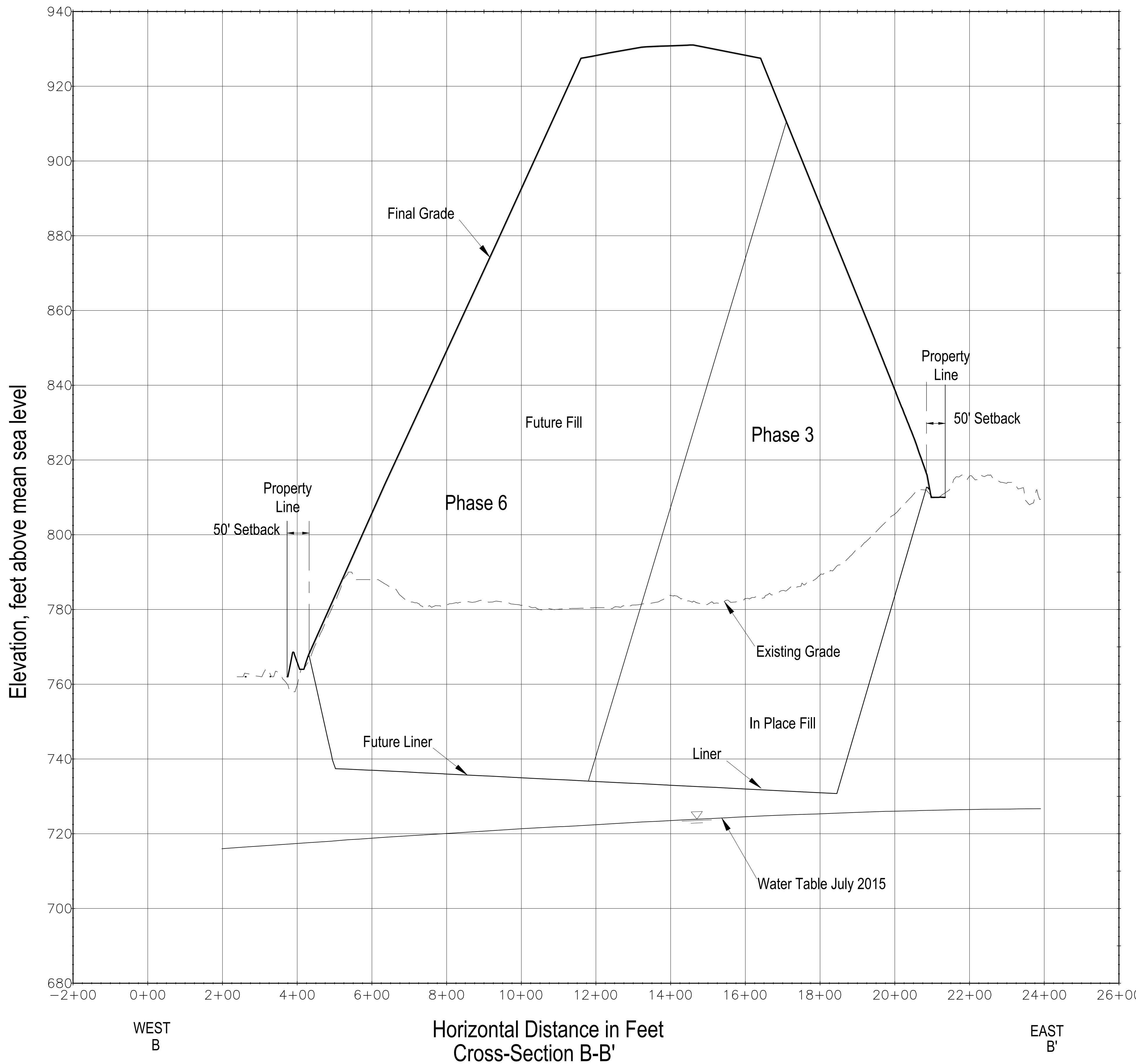
Cross-Section A-A'

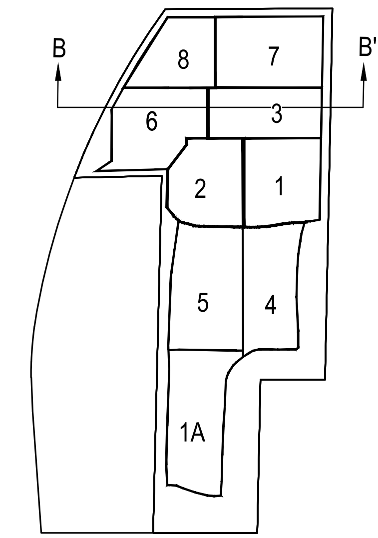
SHEET NO.:

C5.1

of

T. , R. , S. DRAWING: \\kirstensoldpc\DWGS\Dem-Con\2021 landfill expansion Bryan Rock design drawings\Final Written Application Plan Set\2021-10-31 CURRENT\C5.1-5.8 Cross Sections.dwg LAYOUT: Model





Section Location

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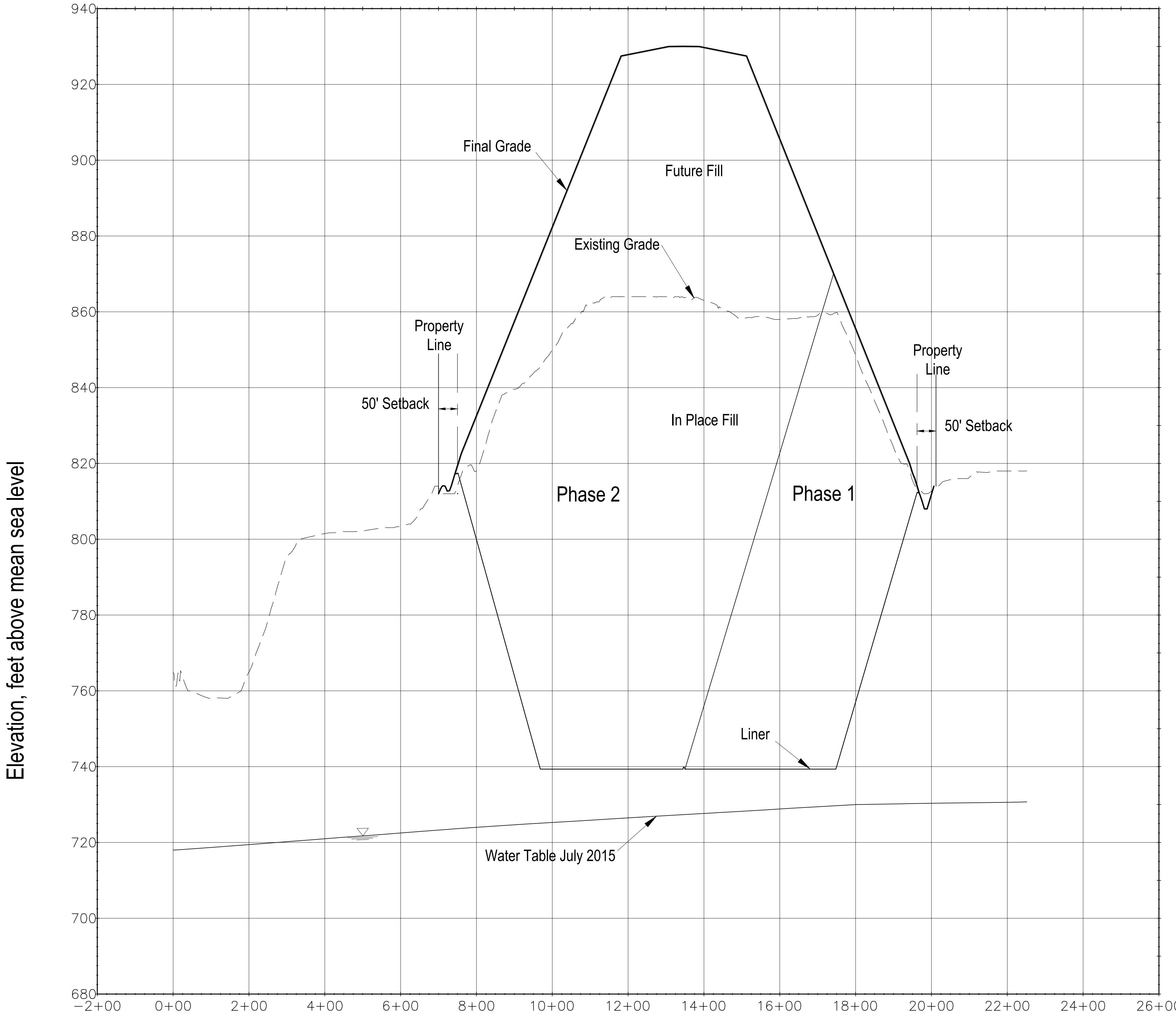
DESCRIPTION:

Cross-Section B-B'

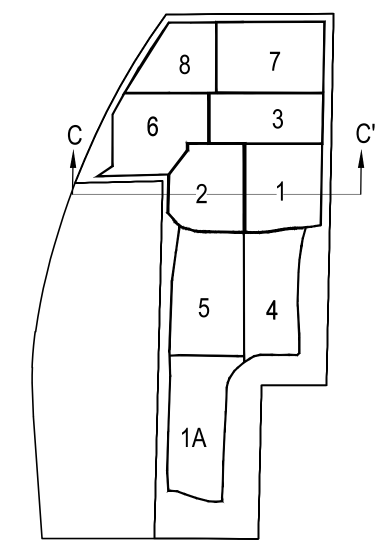
SHEET NO:

C5.2 of

T. , R. , S. DRAWING: \\kirstensoldpc\DWGS\Dem-Con\2021 landfill expansion Bryan Rock design drawings\Final Written Application Plan Set\2021-10-31 CURRENT\C5.1-5.8 Cross Sections.dwg LAYOUT: Model



Horizontal Distance in Feet
Cross-Section C-C'



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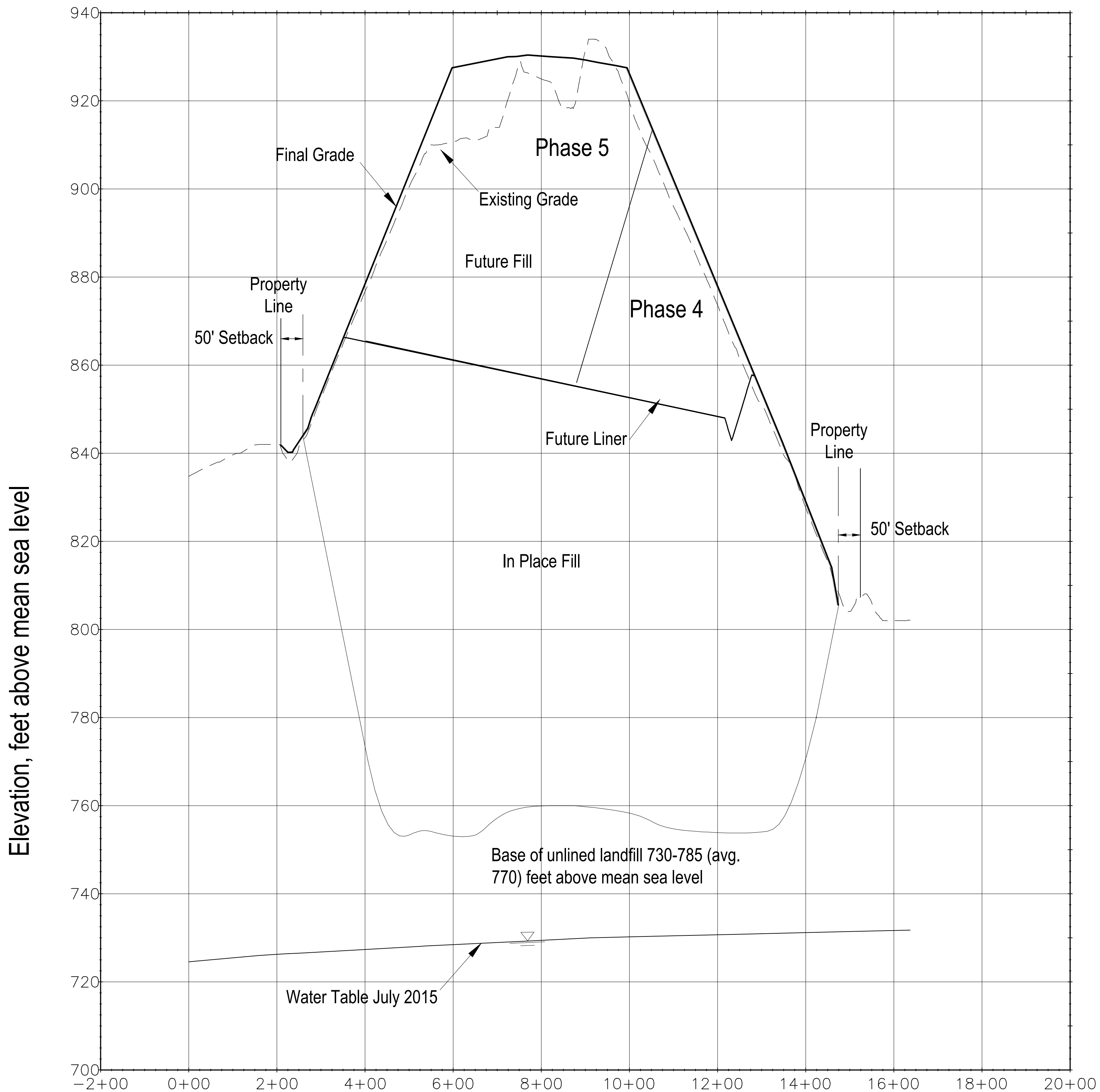
DESCRIPTION:

Cross-Section C-C'

SHEET NO:

C5.3 of

T. , R. , S. DRAWING: \\kirstensoldpc\DWGS\Dem-Con\2021 landfill expansion Bryan Rock design drawings\Final Written Application Plan Set\2021-10-31 CURRENT\C5.1-5.8 Cross Sections.dwg LAYOUT: Model



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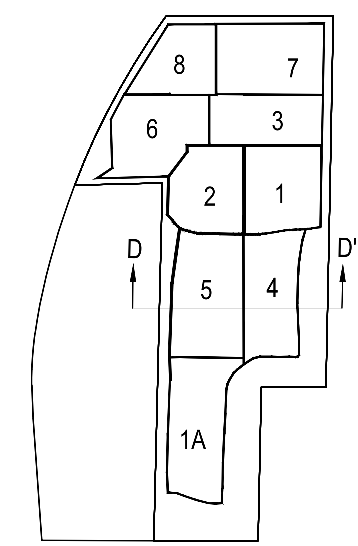

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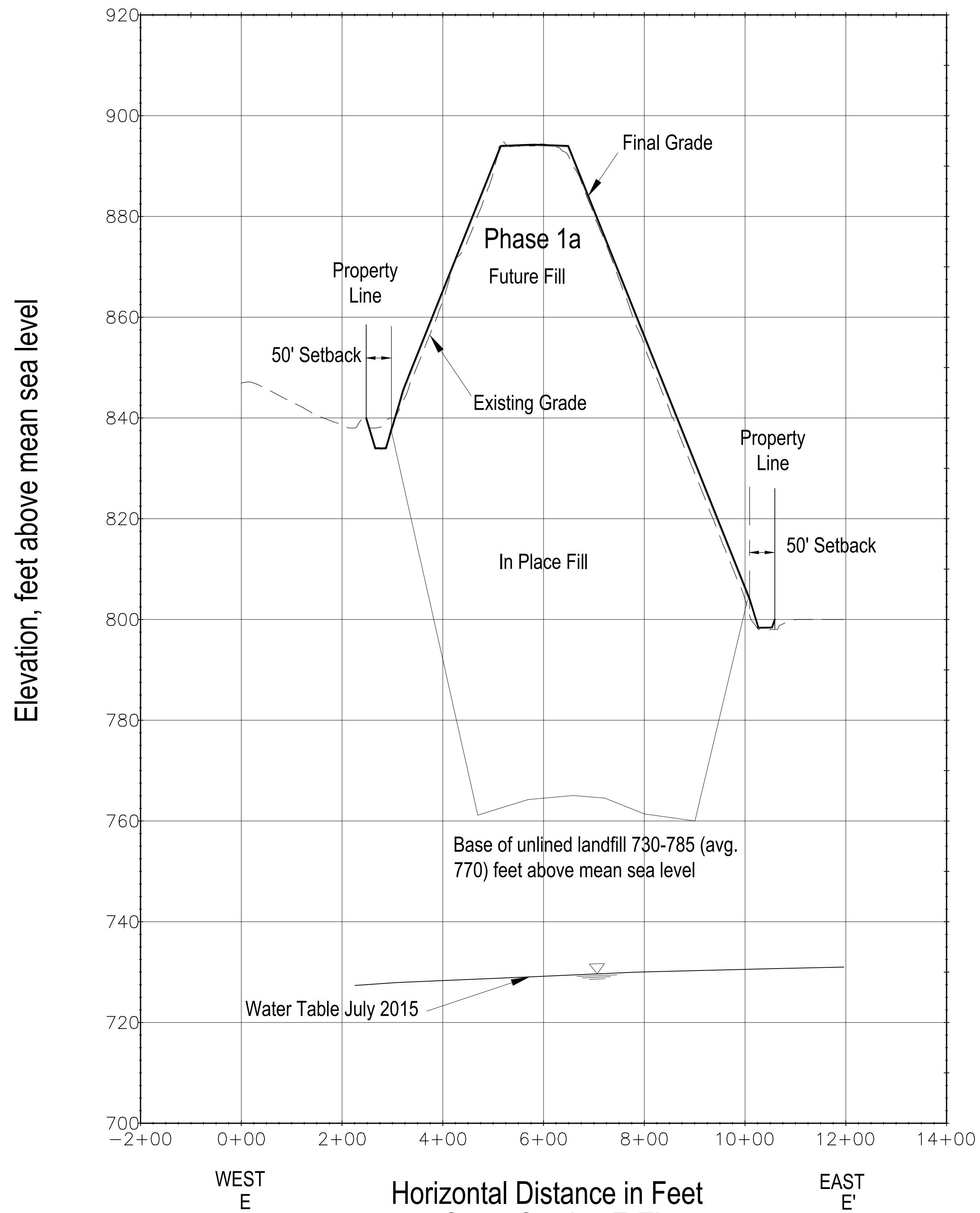
Cross-Section D-D'

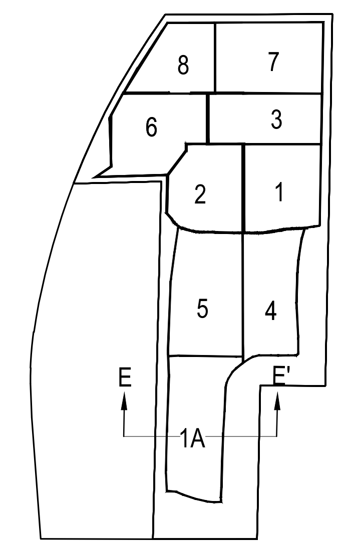
SHEET NO:

C5.4 of

T. , R. , S. DRAWING: \\kirstensoldpc\DWGS\Dem−Con\2021 landfill expansion Bryan Rock design drawings\Final Written Application Plan Set\2021−10−31 CURRENT\C5.1−5.8 Cross Sections.dwg LAYOUT: Model



Horizontal Distance in Feet
Cross-Section E-E'



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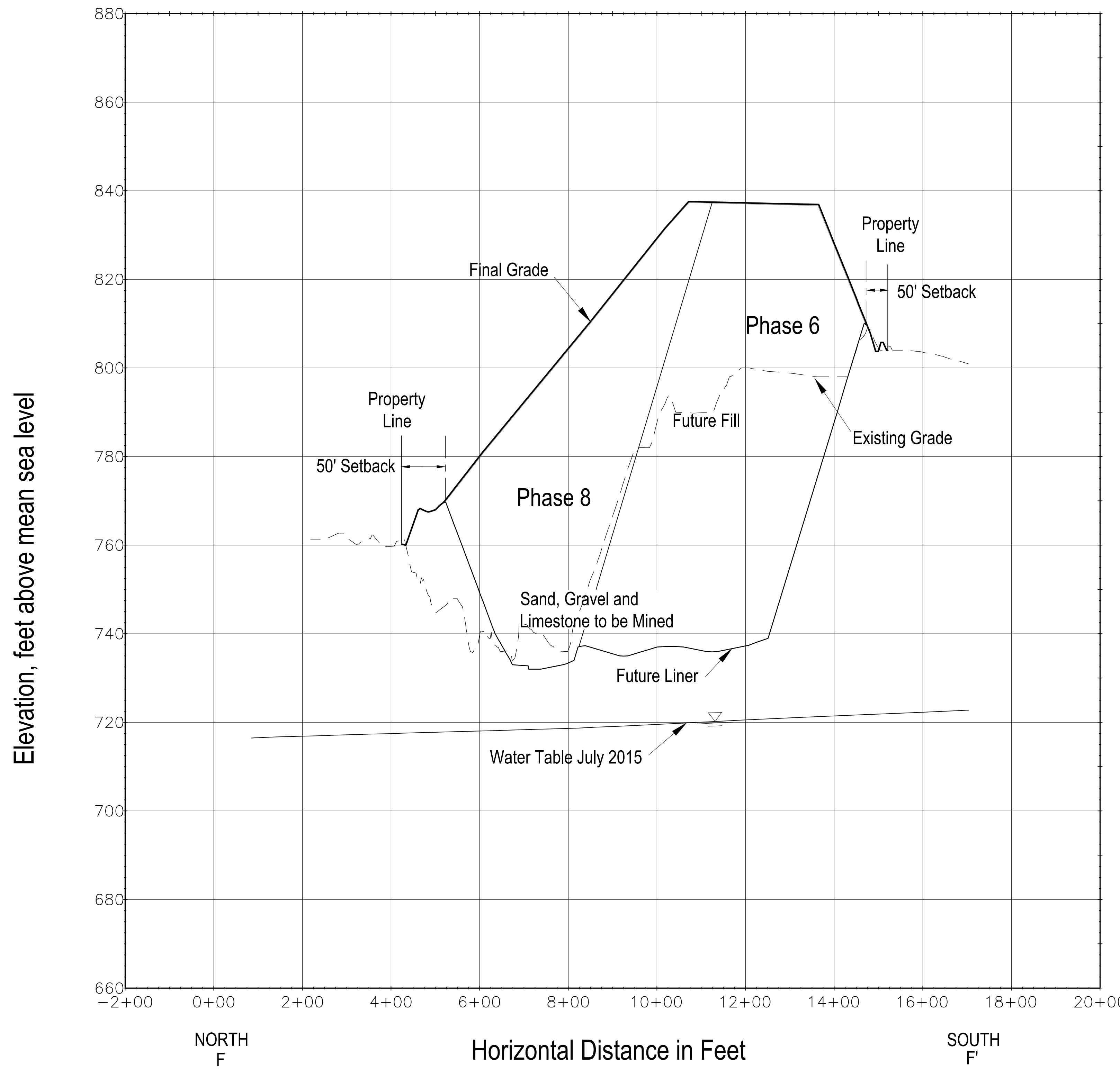
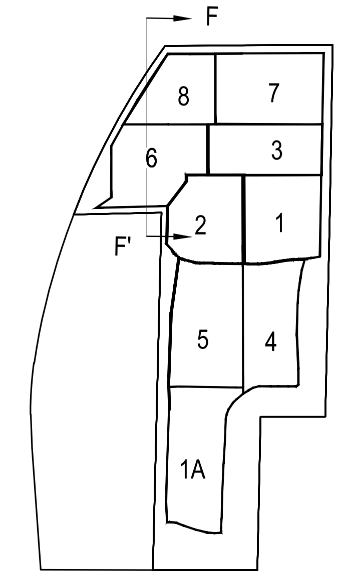
Cross-Section E-E'

SHEET NO:

C5.5 of



Horizontal Distance in Feet
Cross-Section F-F'



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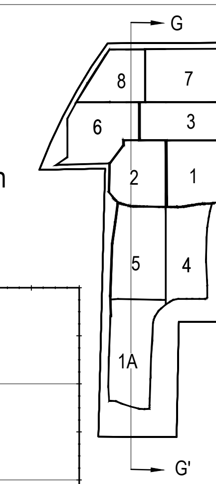
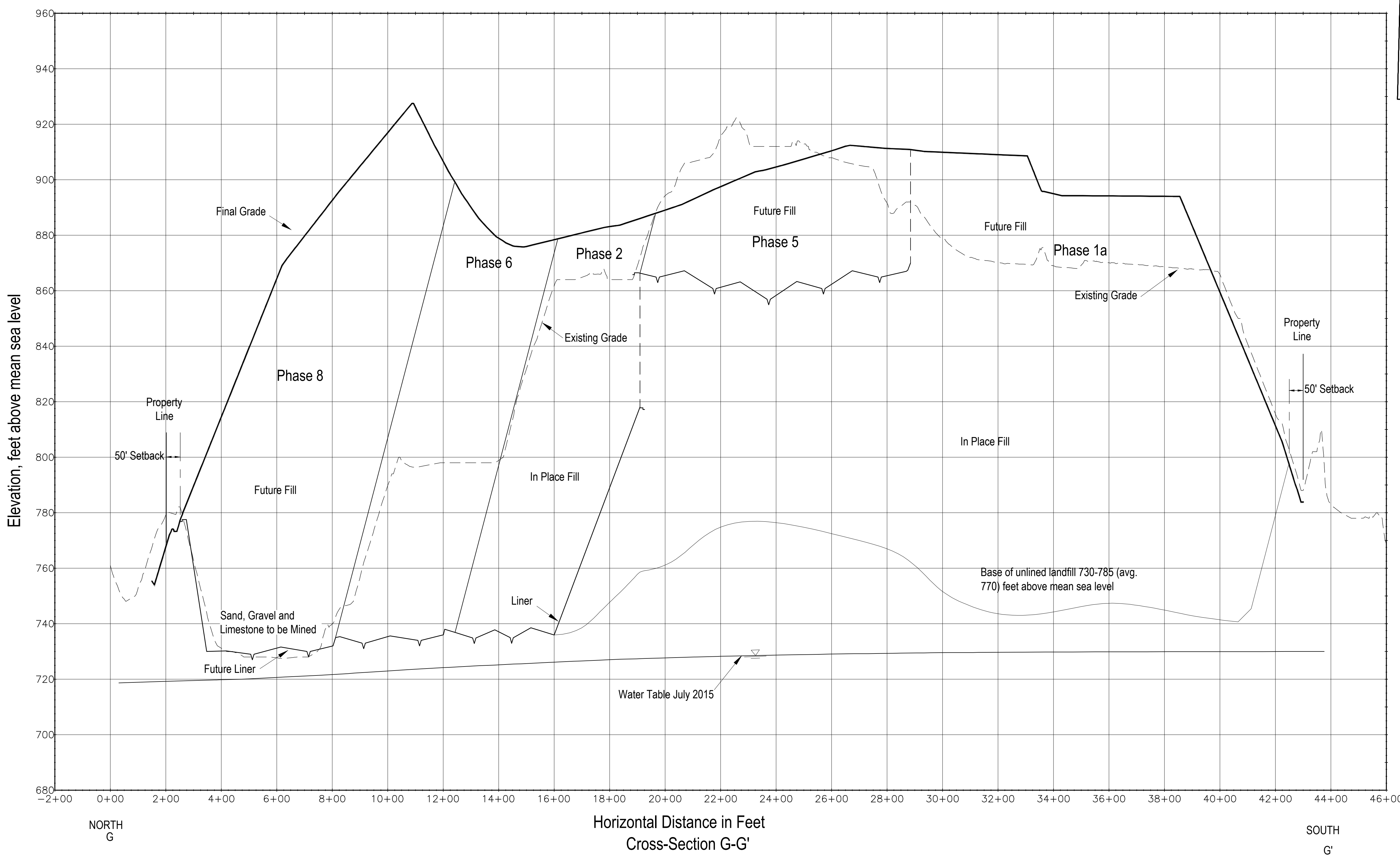
DESCRIPTION:

Cross-Section F-F'

SHEET NO:

C5.6 of





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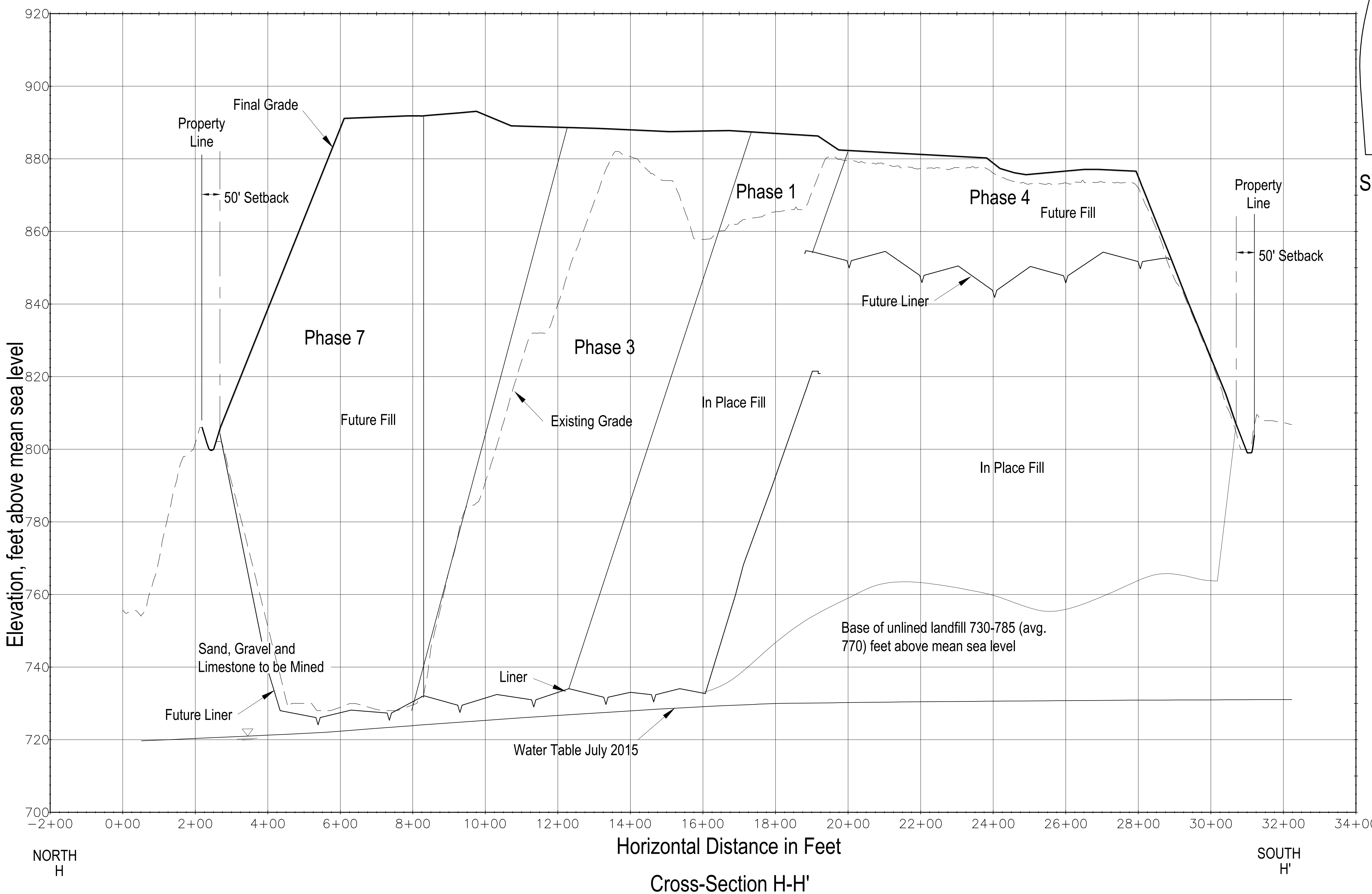
DESCRIPTION:

Cross-Section G-G'

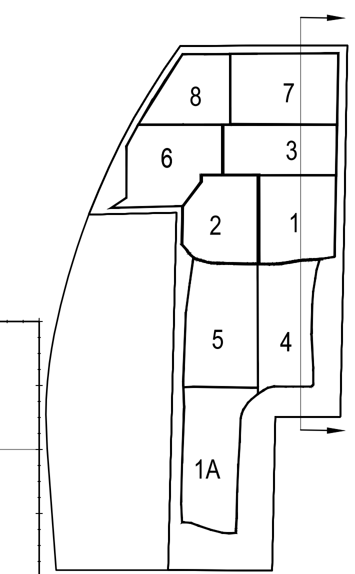
SHEET NO:

C5.7 of

T. , R. , S. DRAWING: \\kirstensoldpc\DWGS\Dem-Con\2021 landfill expansion Bryan Rock design drawings\Final Written Application Plan Set\2021-10-31 CURRENT\C5.1-5.8 Cross Sections.dwg LAYOUT: Model



Cross-Section H-H'



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DESCRIPTION:

Cross-Section H-H'

SHEET NO:

C5.8

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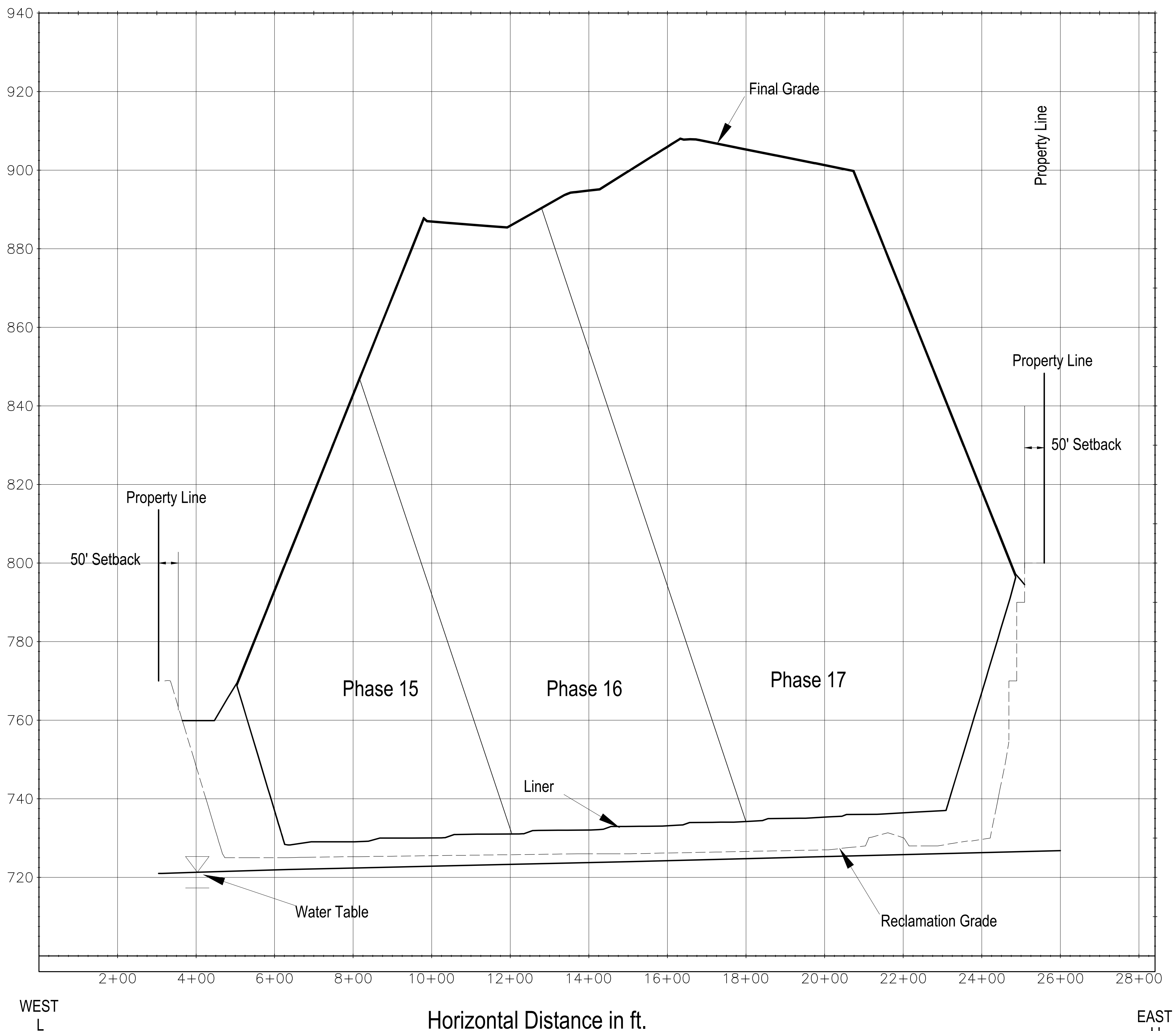

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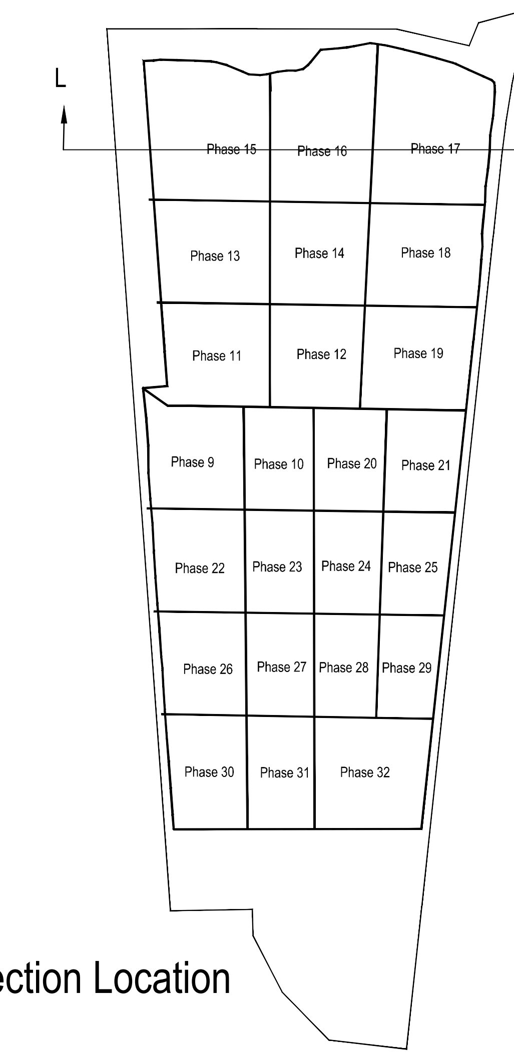
(Cross-Section L-L')



Section Location

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DESCRIPTION:

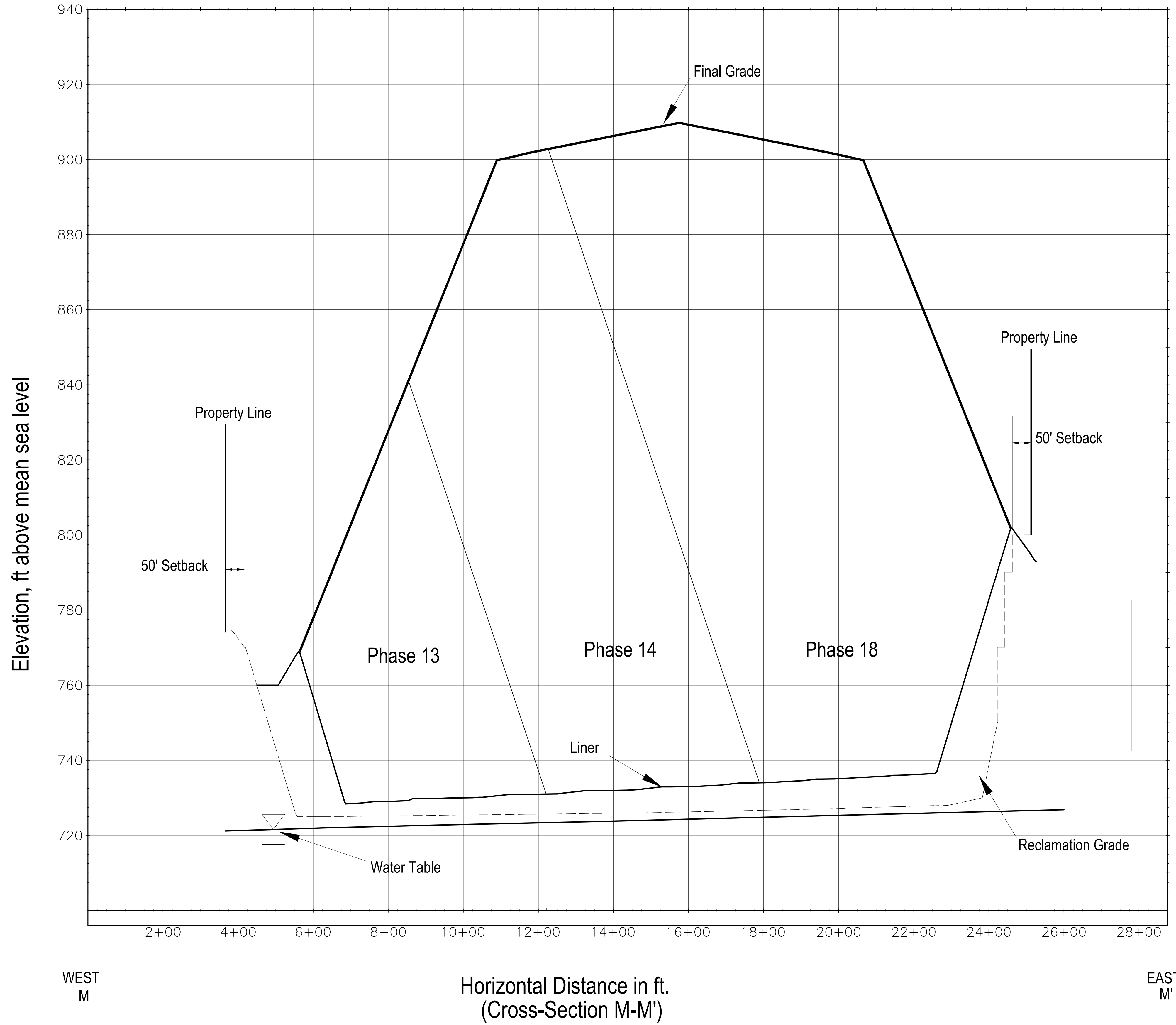
Cross-Section L-L'

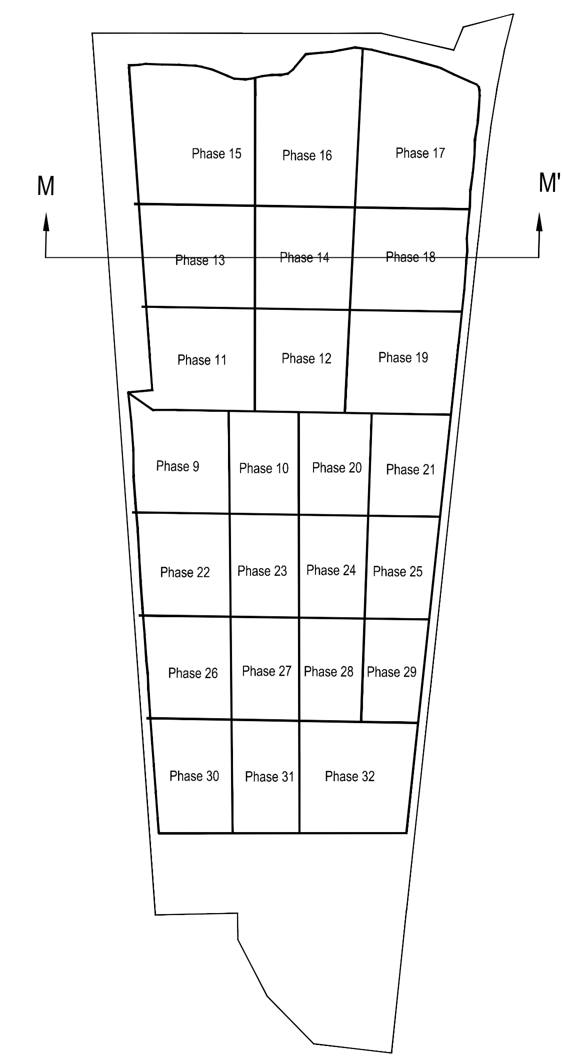
SHEET NO.:

C5.9

of

T. , R. , S. DRAWING: \\kirstensoldpc\DWGS\Dem-Con\2021 landfill expansion Bryan Rock design drawings\Final Written Application Plan Set\2021-10-31 CURRENT\C5.9-5.19 Cross Sectionsco.dwg LAYOUT: Model





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SCALE:
DATE:

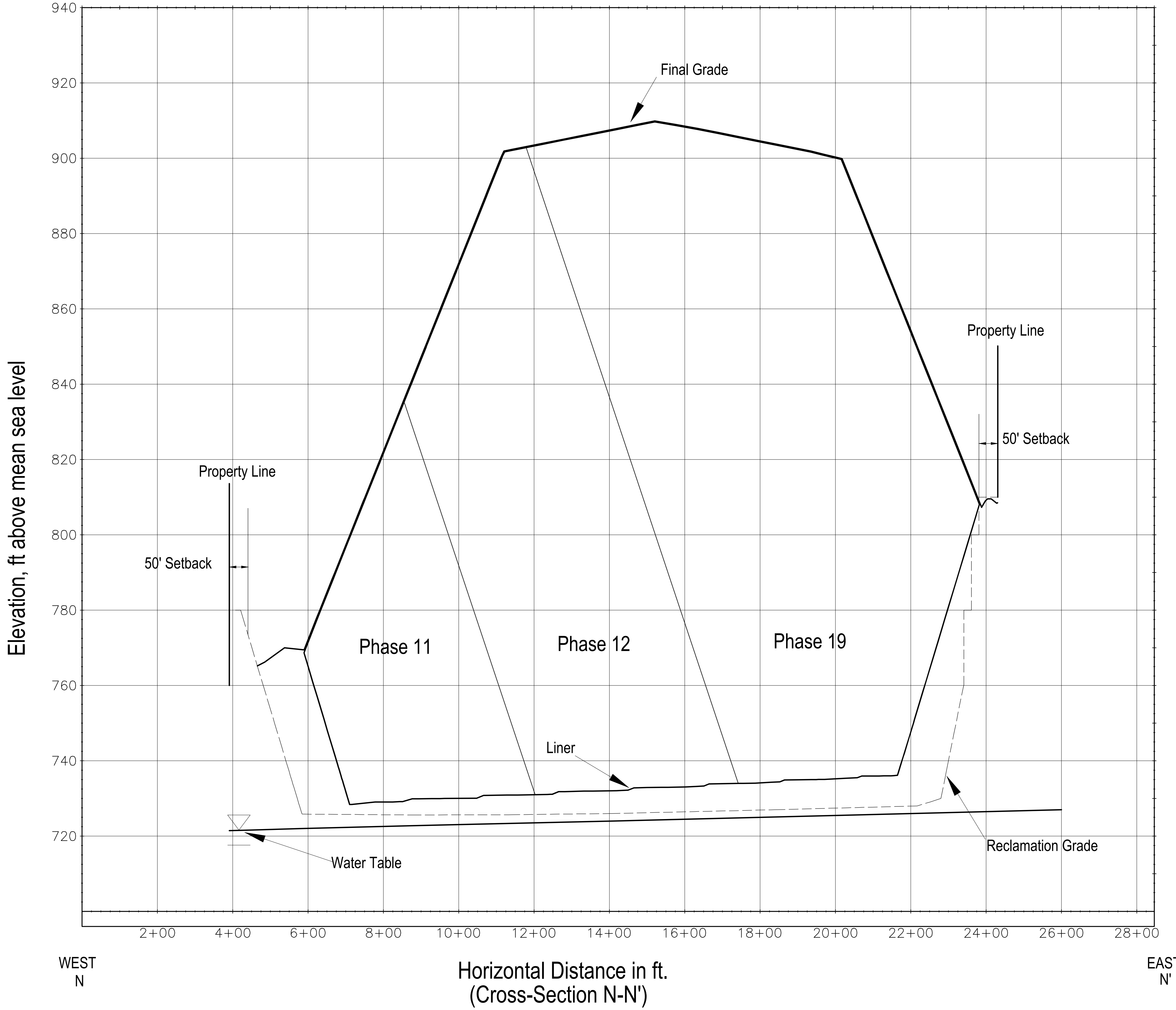
DESCRIPTION:

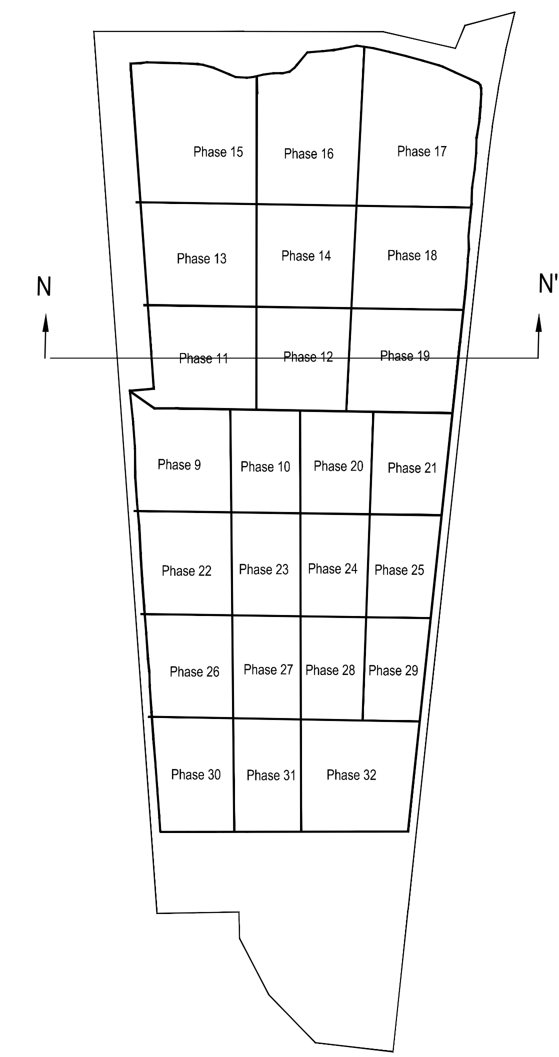
Cross-Section M-M'

SHEET NO:

C5.10 of

T. , R. , S. DRAWING: \\kirstensoldpc\DWGS\Dem-Con\2021 landfill expansion Bryan Rock design drawings\Final Written Application Plan Set\2021-10-31 CURRENT\C5.9-5.19 Cross Sectionsco.dwg LAYOUT: Model





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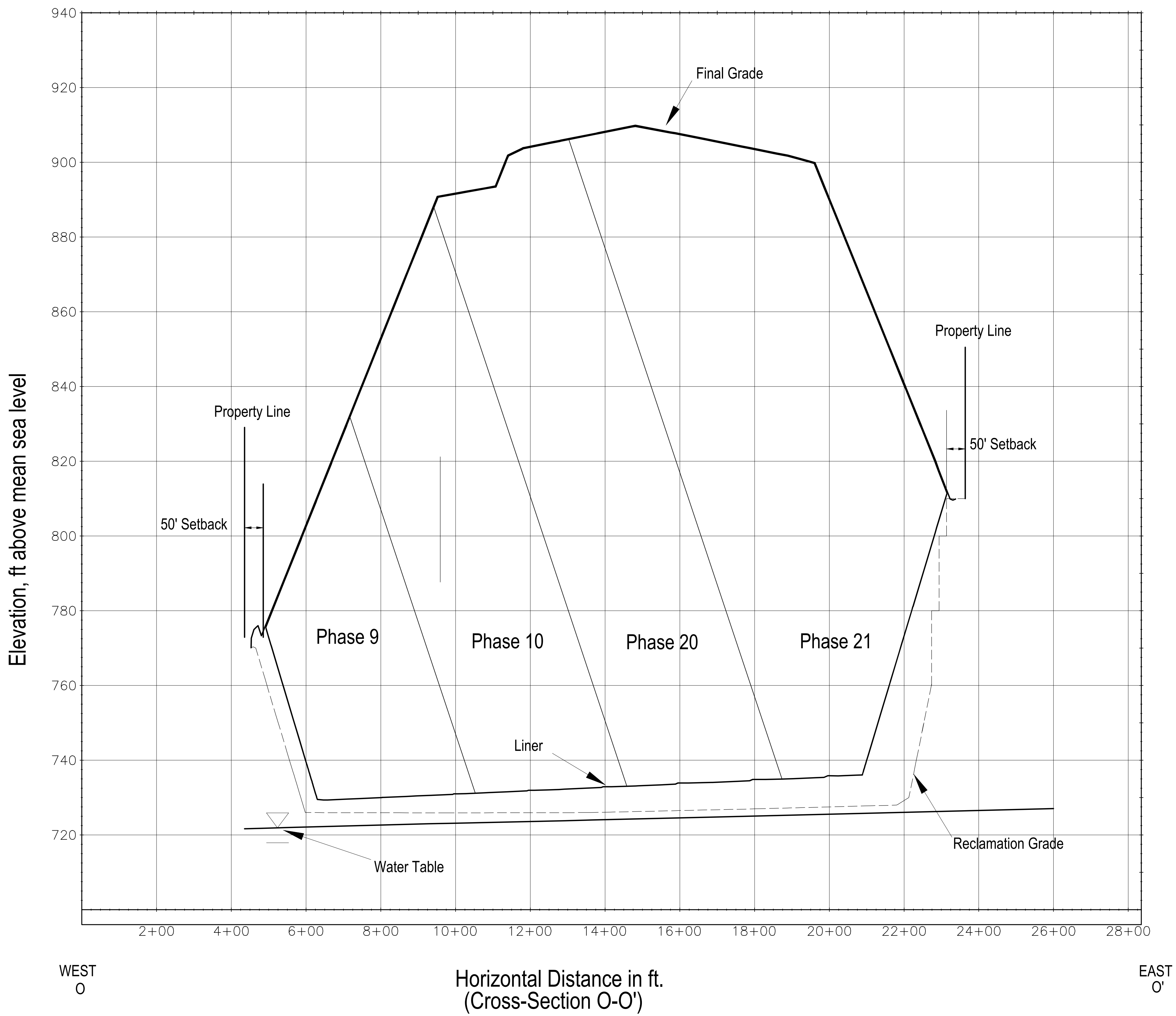
DESCRIPTION:

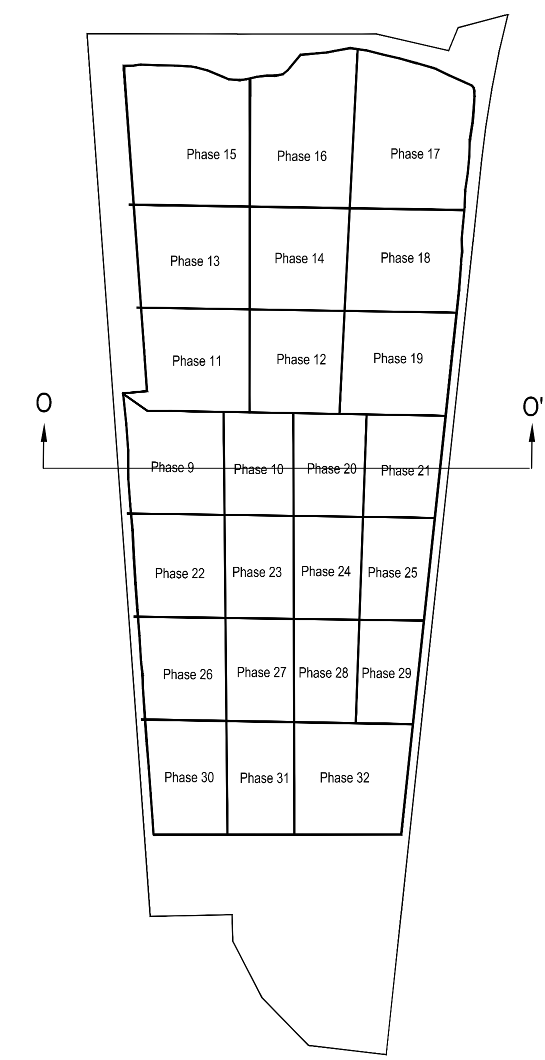
Cross-Section N-N'

SHEET NO:

C5.11 of

T. , R. , S. DRAWING: \\kirstensoldpc\DWGS\Dem-Con\2021 landfill expansion Bryan Rock design drawings\Final Written Application Plan Set\2021-10-31 CURRENT\C5.9-5.19 Cross Sectionsco.dwg LAYOUT: Model





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DATE:

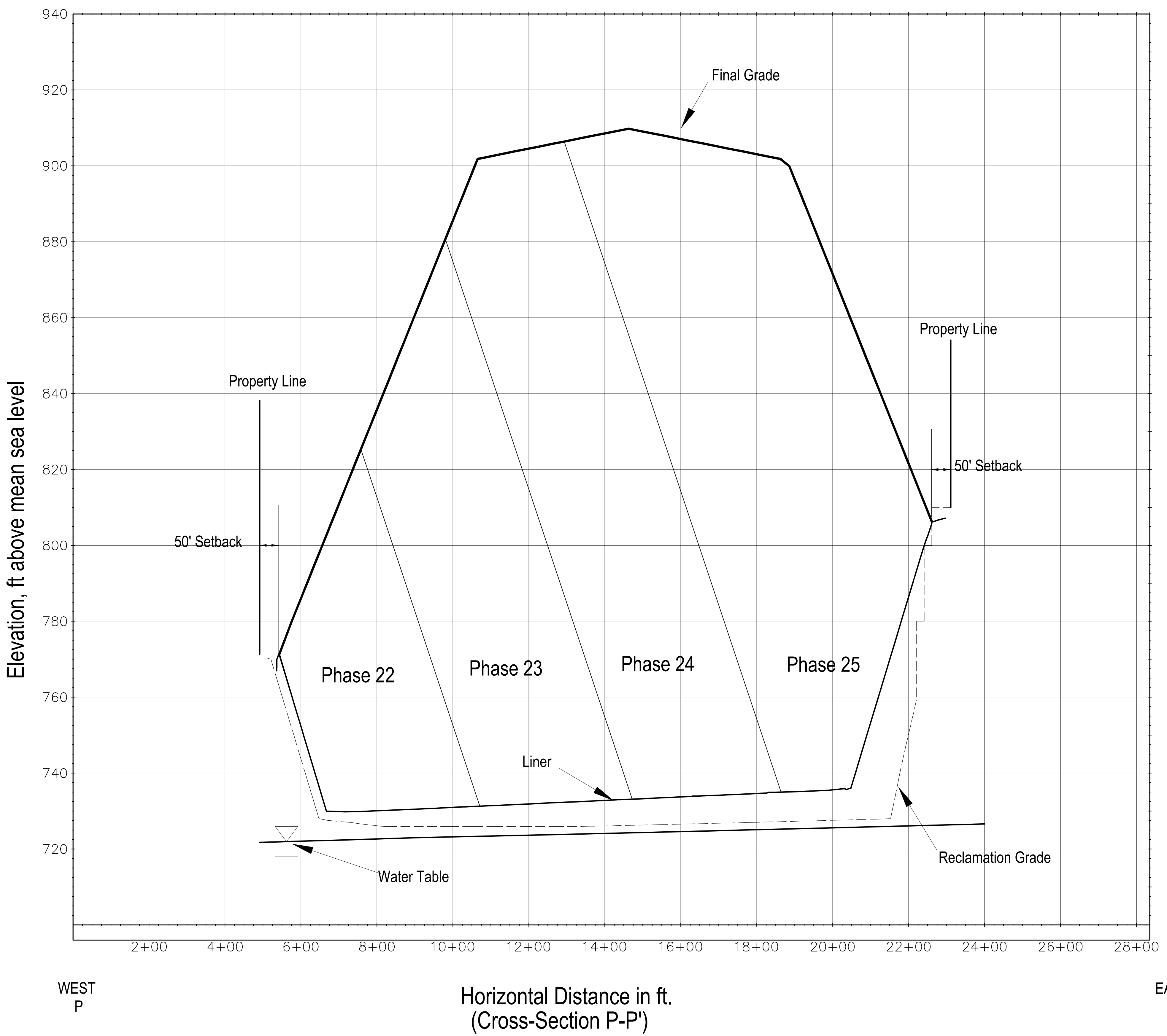
DESCRIPTION:

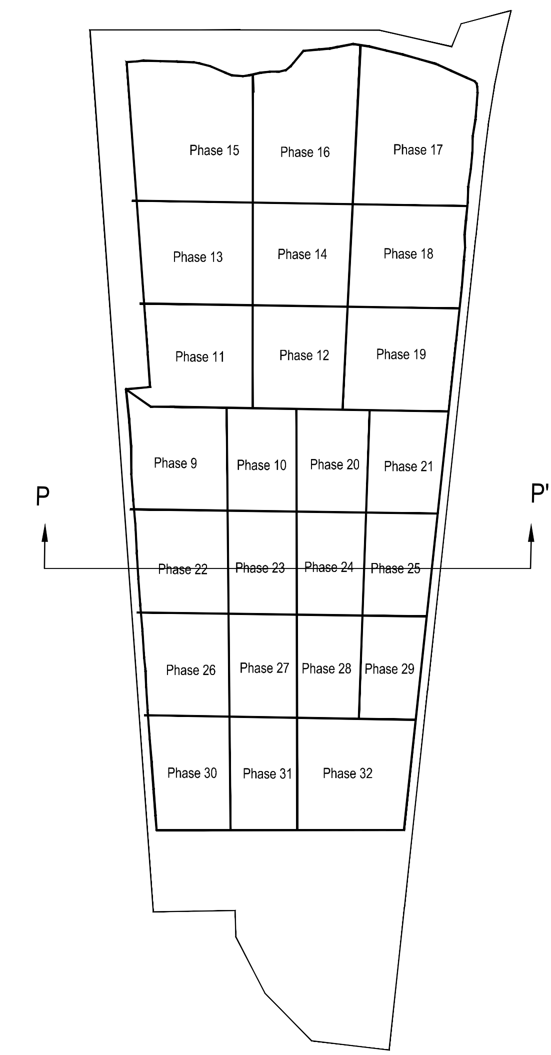
Cross-Section O-O'

SHEET NO:

C5.12

of





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Cross-Section P-P'

SHEET NO:

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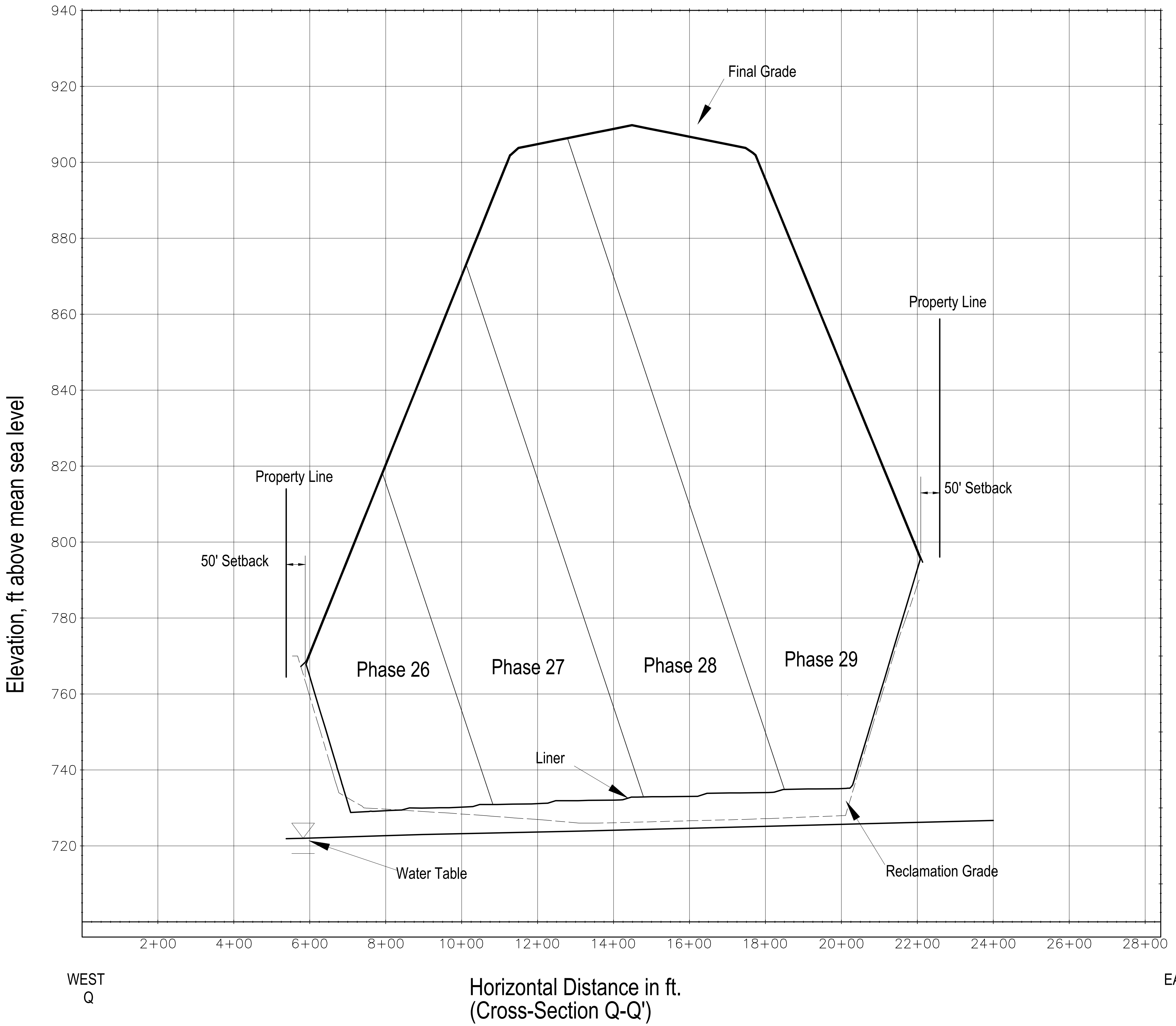

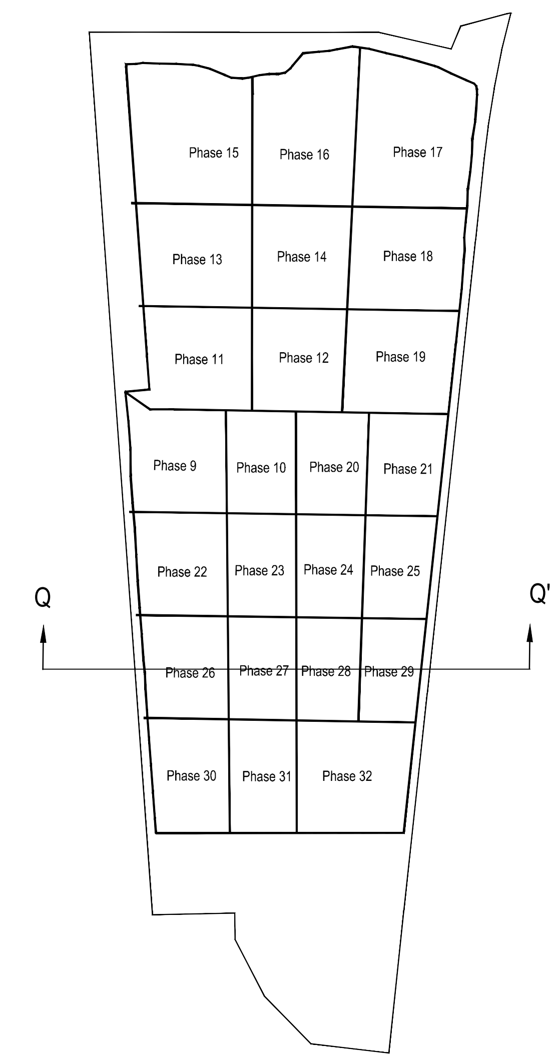

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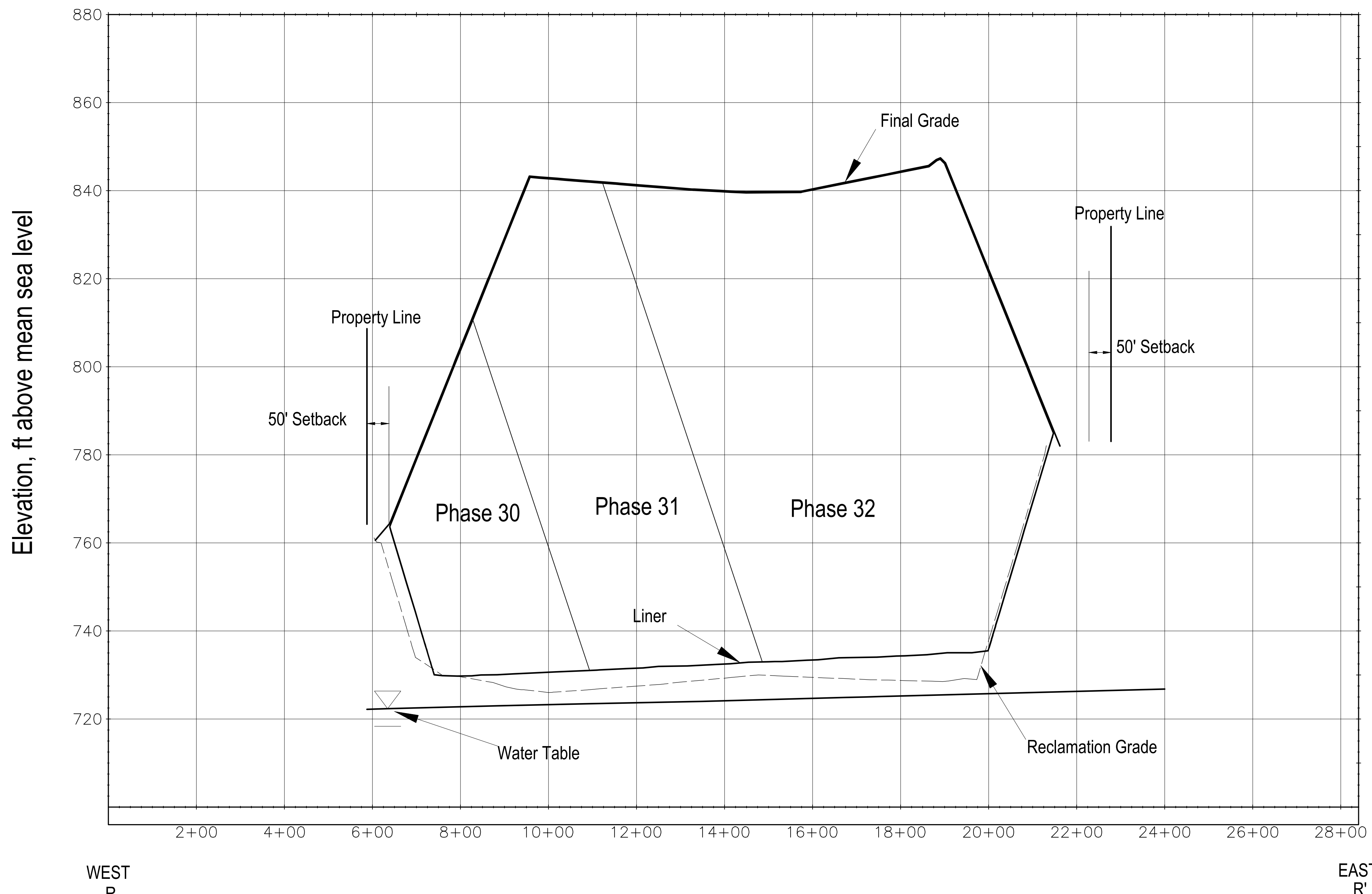
DESCRIPTION:

Cross-Section Q-Q'

SHEET NO:

C5.14 of



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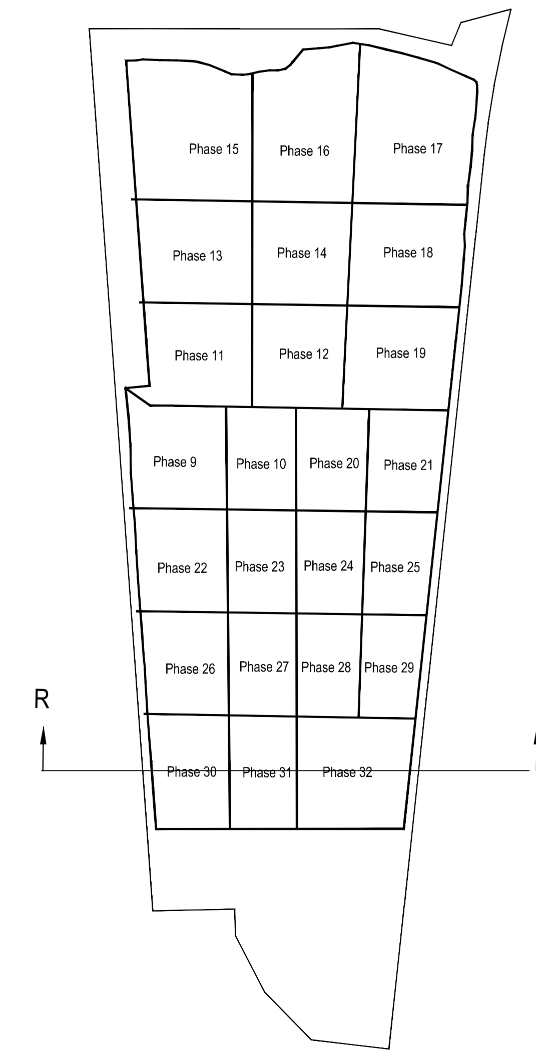
(Cross-Section R-R')



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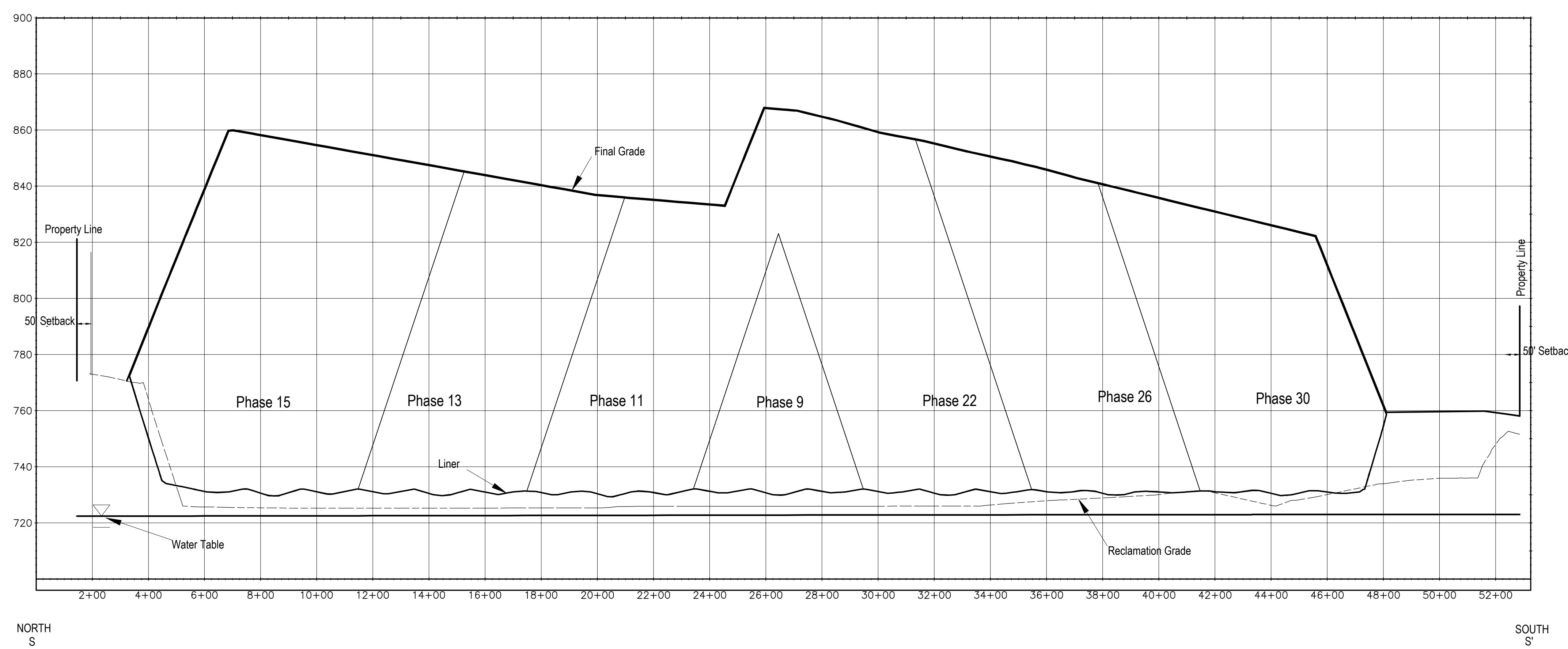
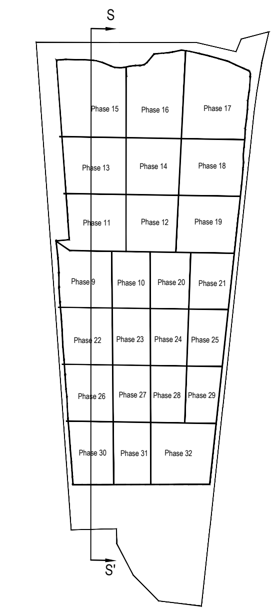
C5.15 of

T. , R. , S. DRAWING: \\kirstensoldpc\DWGS\Dem-Con\2021 landfill expansion Bryan Rock design drawings\Final Written Application Plan Set\2021-10-31 CURRENT\C5.9-5.19 Cross Sectionsco.dwg LAYOUT: Model



Horizontal Distance in ft.
(Cross-Section S-S')



Section Location

Sunde Engineering, PLLC.
CONSULTING CIVIL ENGINEERS
10830 NESBITT AVENUE SOUTH
BLOOMINGTON, MINNESOTA 55437
(952) 881-3344 TELEPHONE
(952) 881-1913 FAX
www.sundecivil.com

DEM-CON COMPANIES

Dem-Con Expansion

Scott County, Minnesota

DATE	REVISION

I HEREBY CERTIFY THAT THIS PLAN, SPECIFICATION, OR REPORT WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA.

Kirsten Pauly

Kirsten Pauly

DATE: 11/22/2021 REG. NO.: 21842

INFORMATION:

PROJECT NO.:

DRAWN BY:

CHECKED BY:

APPROVED BY:

SCALE:

DATE:

DESCRIPTION:

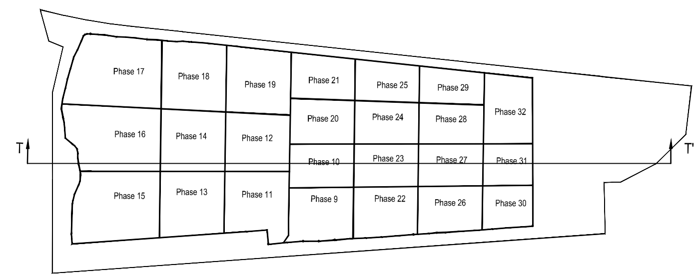
Cross-Section S-S'

SHEET NO:

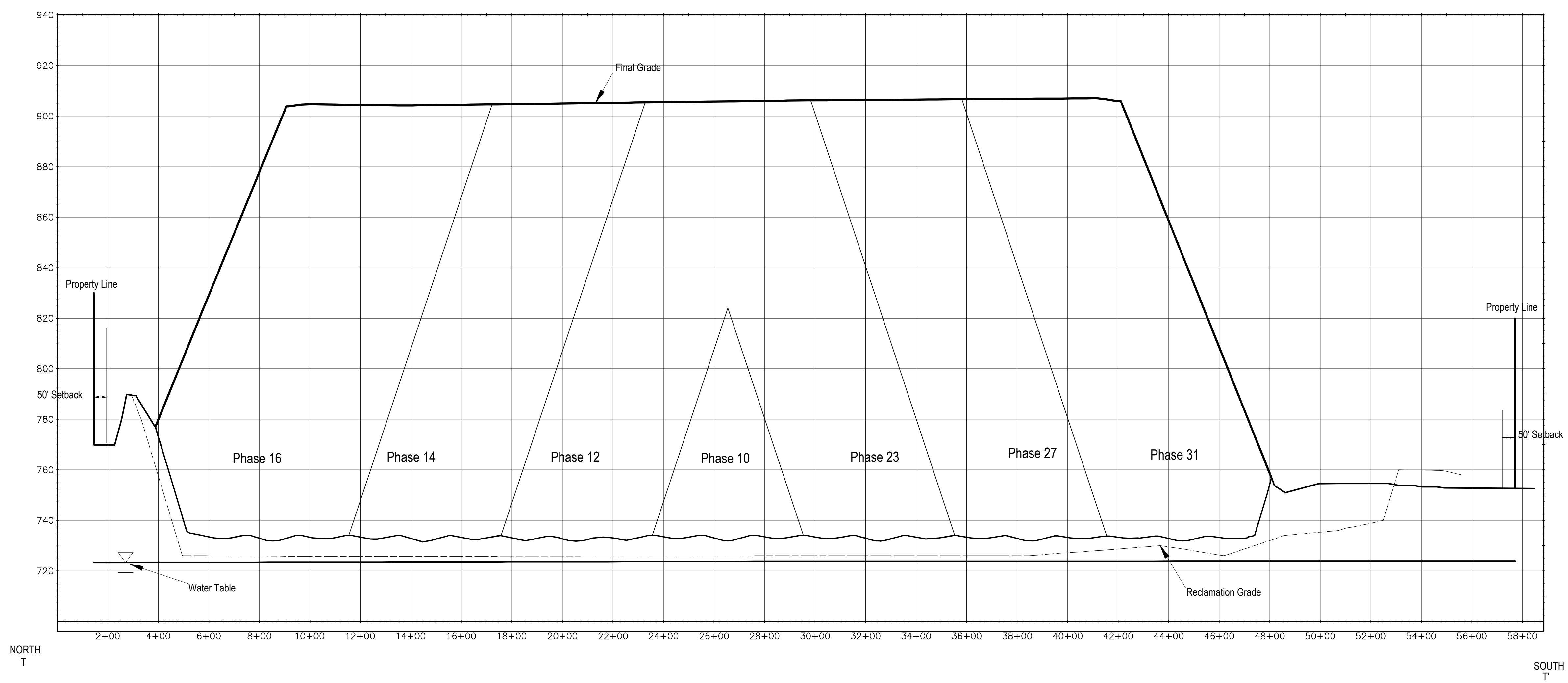
C5.16

of

T. , R. , S. DRAWING: \\kirstensoldpc\DWGS\Dem-Con\2021 landfill expansion Bryan Rock design drawings\Final Written Application Plan Set\2021-10-31 CURRENT\C5.9-5.19 Cross Sectionsco.dwg LAYOUT: Model



Section Location



Horizontal Distance in ft.
(Cross-Section T-T')

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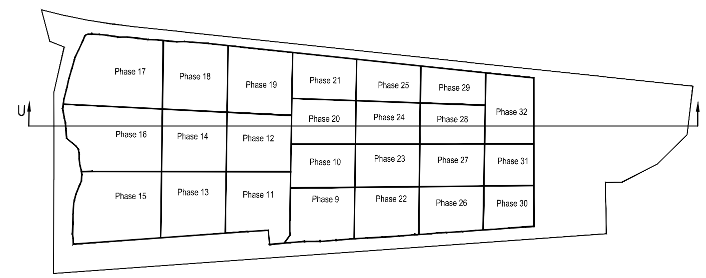
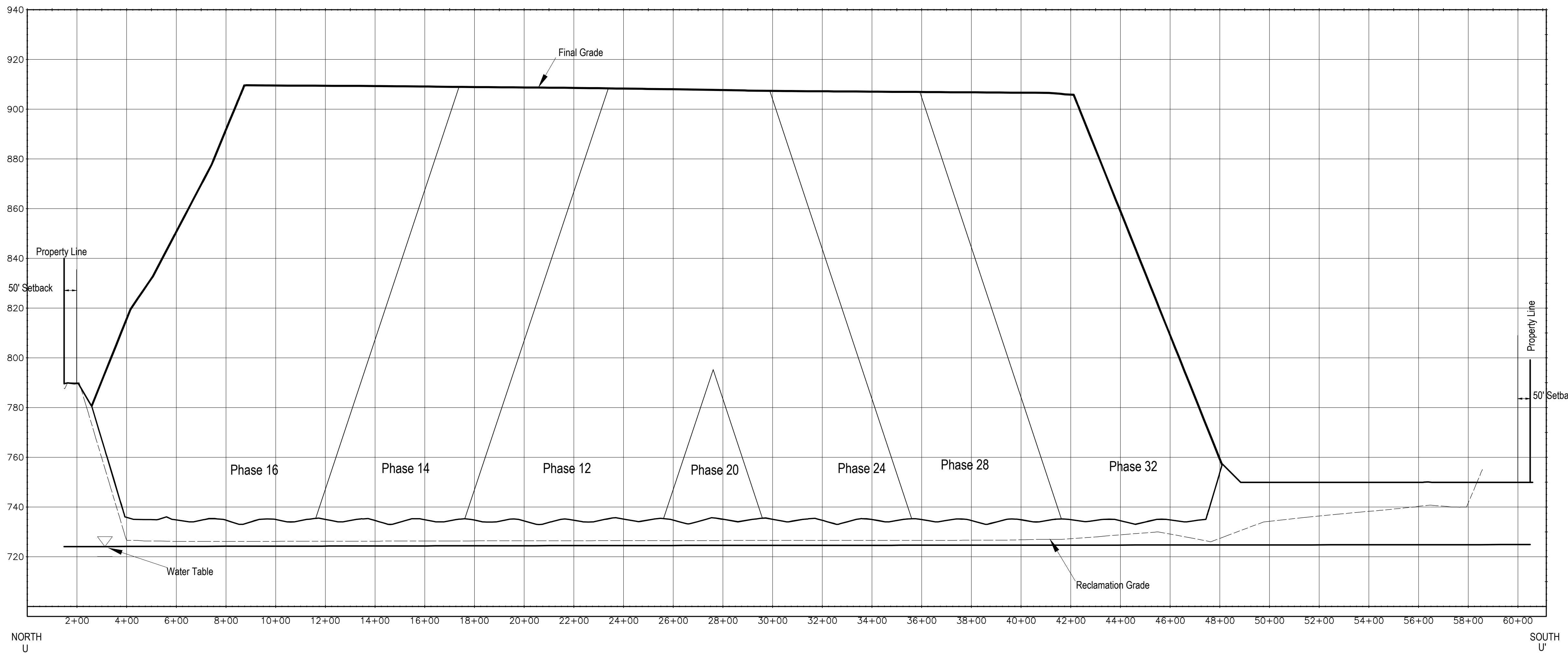
C5.17 of

T. , R. , S. DRAWING: \\kirstensoldpc\DWGS\Dem-Con\2021 landfill expansion Bryan Rock design drawings\Final Written Application Plan Set\2021-10-31 CURRENT\C5.9-5.19 Cross Sectionsco.dwg LAYOUT: Model



Section Location



Horizontal Distance in ft.
(Cross-Section U-U')

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INFORMATION:

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DRAWN BY:

CHECKED BY:

APPROVED BY:

SCALE:

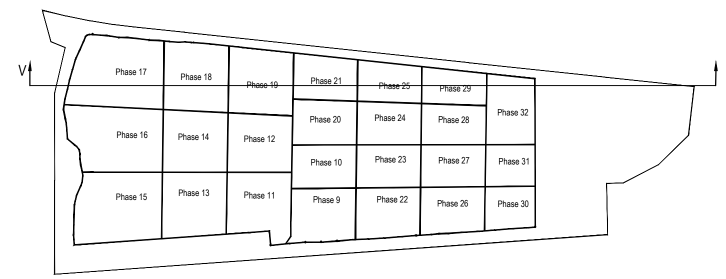
DATE:

DESCRIPTION:

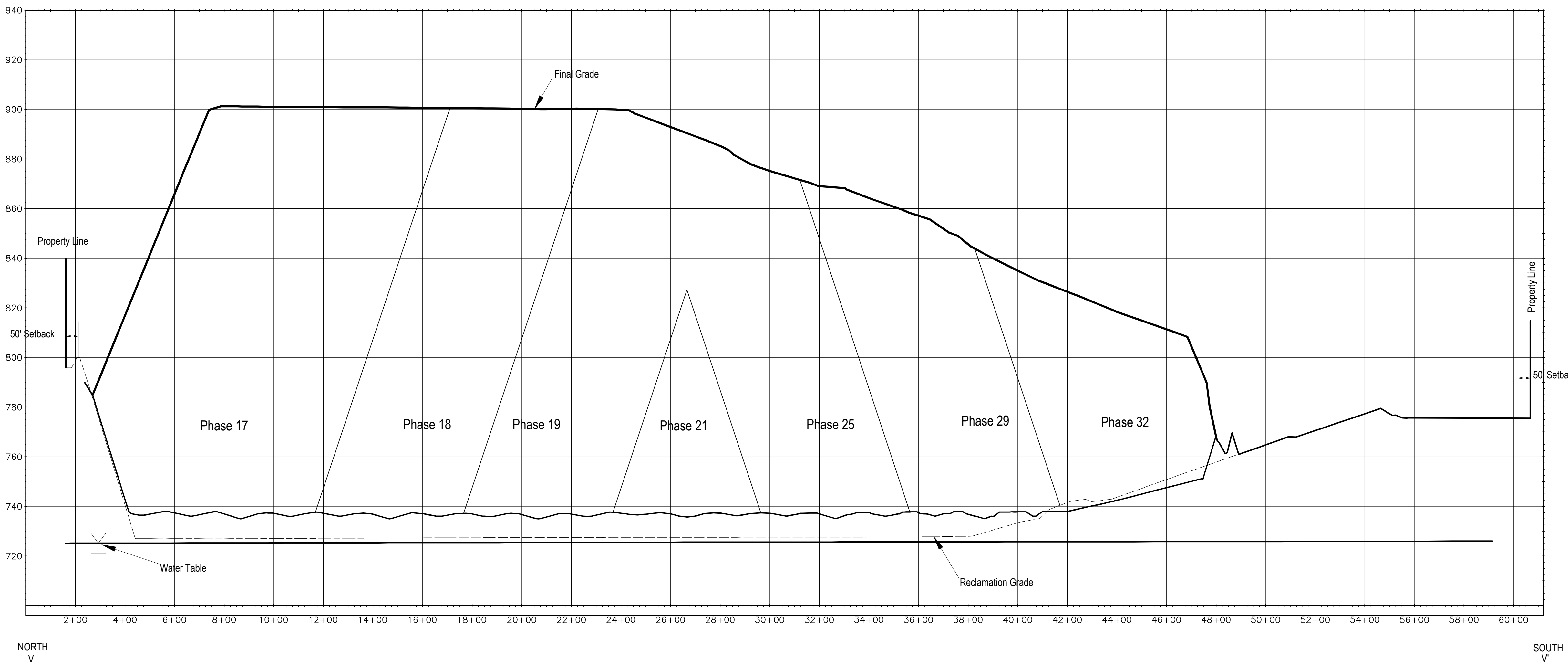
Cross-Section U-U'

SHEET NO:

C5.18 of



Section Location



Horizontal Distance in ft.
(Cross-Section V-V')

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DEM-CON COMPANIES

Dem-Con Expansion

Scott County, Minnesota

DATE	REVISION

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Kirsten Pauly

Kirsten Pauly

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INFORMATION:

PROJECT NO.:

DRAWN BY:

CHECKED BY:

APPROVED BY:

SCALE:

DATE:

DESCRIPTION:

Cross-Section V-V'

SHEET NO:

C5.19 of

Climate Adaptation sources

Climate Explorer Map. *Minnesota Climate explorer* Available at: https://arcgis.dnr.state.mn.us/ewr/climateexplorer/main/historical. (Accessed: 17th November 2021)

Minnesota Climate trends. *Minnesota Department of Natural Resources* Available at: https://www.dnr.state.mn.us/climate/climate_change_info/climate-trends.html. (Accessed: 17th November 2021)

Climate vulnerability assessment. *Climate Vulnerability Assessment - Metropolitan Council* Available at: https://metrocouncil.org/Communities/Planning/Local-Planning-Assistance/CVA.aspx. (Accessed: 17th November 2021)

Flood Factor for Zip Code 55379. *Flood Factor* Available at: https://www.floodfactor.com/zip/55379/55379_fsid. (Accessed: 17th November 2021)

Attachment 3

United States Department of Agriculture

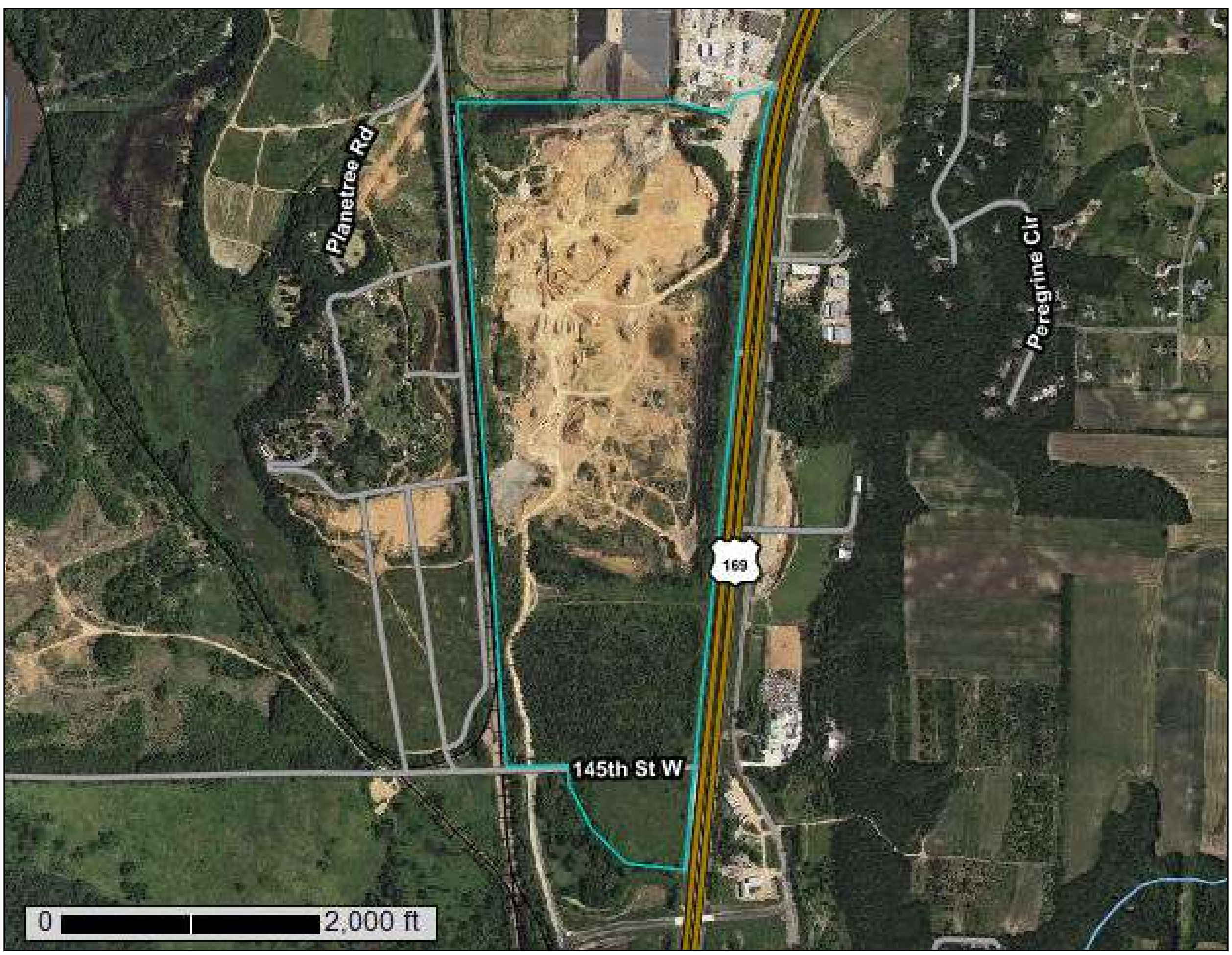
NRCS

Natural Resources Conservation Service

A product of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local participants

Custom Soil Resource Report for

Scott County, Minnesota



August 19, 2021

Preface

Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/health/) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (https://offices.sc.egov.usda.gov/locator/app?agency=nrcs) or your NRCS State Soil Scientist (http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/contactus/?cid=nrcs142p2_053951).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Web Soil Survey, the site for official soil survey information.

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Contents

How Soil Surveys Are Made

Soil surveys are made to provide information about the soils and miscellaneous areas in a specific area. They include a description of the soils and miscellaneous areas and their location on the landscape and tables that show soil properties and limitations affecting various uses. Soil scientists observed the steepness, length, and shape of the slopes; the general pattern of drainage; the kinds of crops and native plants; and the kinds of bedrock. They observed and described many soil profiles. A soil profile is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed or from the surface down to bedrock. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

Currently, soils are mapped according to the boundaries of major land resource areas (MLRAs). MLRAs are geographically associated land resource units that share common characteristics related to physiography, geology, climate, water resources, soils, biological resources, and land uses (USDA, 2006). Soil survey areas typically consist of parts of one or more MLRA.

The soils and miscellaneous areas in a survey area occur in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil and miscellaneous area is associated with a particular kind of landform or with a segment of the landform. By observing the soils and miscellaneous areas in the survey area and relating their position to specific segments of the landform, a soil scientist develops a concept, or model, of how they were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil or miscellaneous area at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-vegetation-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. Soil taxonomy, the system of taxonomic classification used in the United States, is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

The objective of soil mapping is not to delineate pure map unit components; the objective is to separate the landscape into landforms or landform segments that have similar use and management requirements. Each map unit is defined by a unique combination of soil components and/or miscellaneous areas in predictable proportions. Some components may be highly contrasting to the other components of the map unit. The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The delineation of such landforms and landform segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, onsite investigation is needed to define and locate the soils and miscellaneous areas.

Soil scientists make many field observations in the process of producing a soil map. The frequency of observation is dependent upon several factors, including scale of mapping, intensity of mapping, design of map units, complexity of the landscape, and experience of the soil scientist. Observations are made to test and refine the soil-landscape model and predictions and to verify the classification of the soils at specific locations. Once the soil-landscape model is refined, a significantly smaller number of measurements of individual soil properties are made and recorded. These measurements may include field measurements, such as those for color, depth to bedrock, and texture, and laboratory measurements, such as those for content of sand, silt, clay, salt, and other components. Properties of each soil typically vary from one point to another across the landscape.

Observations for map unit components are aggregated to develop ranges of characteristics for the components. The aggregated values are presented. Direct measurements do not exist for every property presented for every map unit component. Values for some properties are estimated from combinations of other properties.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses and under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot predict that a high water table will always be at a specific level in the soil on a specific date.

After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

Soil Map

The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.

Soil Map


93° 36' 4" W
93° 34' 48" W
44° 45' 22" N
44° 44' 10" N
452600
452800
453000
453200
453400
453600
453800
454000
452400
4955900
4955700
4955500
4955300
4955100
4954900
4954700
4954500
4954300
4954100
4953900
CdB2
CdB2
DbB
Ta
EaB
CdB
EaB
TcA
TcA
TcA
Gp
Sc
TcA
Planetree Rd
Us Hwy 169
169
145th St W
Map Scale: 1:10,800 if printed on A portrait (8.5" x 11") sheet.
Meters
0 150 300 600 900
Feet
0 500 1000 2000 3000
N
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 1:20,000.

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: Scott County, Minnesota
Survey Area Data: Version 16, Jun 5, 2020

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

Date(s) aerial images were photographed: May 30, 2020—Jul 3, 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
CdB	Copaston silt loam, 2 to 6 percent slopes	4.1	1.7%
CdB2	Copaston silt loam, 2 to 6 percent slopes, moderately eroded	1.2	0.5%
DbB	Dickman sandy loam, 2 to 6 percent slopes	0.0	0.0%
EaB	Estherville sandy loam, 2 to 6 percent slopes	13.6	5.6%
Gp	Pits, gravel	4.3	1.8%
Sc	Stony land	213.1	88.4%
Ta	Terrace escarpments	2.1	0.9%
TcA	Terril loam, 0 to 2 percent slopes	2.5	1.0%
Totals for Area of Interest		**241.0**	**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 components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

Scott County, Minnesota

CdB—Copaston silt loam, 2 to 6 percent slopes

Map Unit Setting

National map unit symbol: gc9r
Elevation: 700 to 1,200 feet
Mean annual precipitation: 23 to 35 inches
Mean annual air temperature: 43 to 50 degrees F
Frost-free period: 155 to 200 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Copaston and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Copaston

Setting

Landform: Stream terraces
Landform position (two-dimensional): Backslope
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Alluvial sediment over bedrock

Typical profile

A - 0 to 13 inches: silt loam
AB - 13 to 20 inches: silt loam
Bw - 20 to 26 inches: loam
2R - 26 to 36 inches: unweathered bedrock

Properties and qualities

Slope: 2 to 6 percent
Depth to restrictive feature: 12 to 20 inches to lithic bedrock
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to high (0.14 to 1.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 15 percent
Available water supply, 0 to 60 inches: Low (about 3.2 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: D
Ecological site: R103XY006MN - Bedrock Controlled Upland Prairies
Forage suitability group: Sloping Upland, Low AWC, Acid (G103XS008MN)
Other vegetative classification: Sloping Upland, Low AWC, Acid (G103XS008MN)
Hydric soil rating: No

Minor Components

Joilet

Percent of map unit: 8 percent
Landform: Stream terraces, flood plains
Hydric soil rating: Yes

Tilfer

Percent of map unit: 7 percent
Landform: Depressions
Hydric soil rating: Yes

CdB2—Copaston silt loam, 2 to 6 percent slopes, moderately eroded

Map Unit Setting

National map unit symbol: gc9s
Elevation: 700 to 1,200 feet
Mean annual precipitation: 23 to 35 inches
Mean annual air temperature: 43 to 50 degrees F
Frost-free period: 155 to 200 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Copaston, moderately eroded, and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Copaston, Moderately Eroded

Setting

Landform: Stream terraces
Landform position (two-dimensional): Backslope
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Alluvial sediment over bedrock

Typical profile

A - 0 to 13 inches: silt loam
AB - 13 to 20 inches: silt loam
Bw - 20 to 26 inches: loam
2R - 26 to 36 inches: unweathered bedrock

Properties and qualities

Slope: 2 to 6 percent
Depth to restrictive feature: 12 to 20 inches to lithic bedrock
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to high (0.14 to 1.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None

Frequency of ponding: None
Calcium carbonate, maximum content: 15 percent
Available water supply, 0 to 60 inches: Low (about 3.2 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: D
Ecological site: R103XY006MN - Bedrock Controlled Upland Prairies
Forage suitability group: Sloping Upland, Low AWC, Acid (G103XS008MN)
Other vegetative classification: Sloping Upland, Low AWC, Acid (G103XS008MN)
Hydric soil rating: No

Minor Components

Joilet

Percent of map unit: 8 percent
Landform: Stream terraces, flood plains
Hydric soil rating: Yes

Tilfer

Percent of map unit: 7 percent
Landform: Depressions
Hydric soil rating: Yes

DbB—Dickman sandy loam, 2 to 6 percent slopes

Map Unit Setting

National map unit symbol: 2vvgr
Elevation: 690 to 1,840 feet
Mean annual precipitation: 24 to 37 inches
Mean annual air temperature: 43 to 52 degrees F
Frost-free period: 140 to 180 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Dickman and similar soils: 90 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Dickman

Setting

Landform: Outwash plains, terraces
Landform position (two-dimensional): Summit, shoulder, backslope
Landform position (three-dimensional): Tread, rise
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Loamy glaciofluvial deposits over sandy outwash

Typical profile

Ap - 0 to 10 inches: sandy loam
A - 10 to 12 inches: sandy loam
Bw - 12 to 19 inches: sandy loam
2Bw - 19 to 33 inches: loamy sand
2C - 33 to 79 inches: sand

Properties and qualities

Slope: 2 to 6 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat excessively drained
Capacity of the most limiting layer to transmit water (Ksat): High (2.00 to 6.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 30 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Low (about 5.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: A
Ecological site: R103XY003MN - Sandy Upland Prairies
Forage suitability group: Sandy (G103XS022MN)
Other vegetative classification: Sandy (G103XS022MN)
Hydric soil rating: No

Minor Components

Hanska

Percent of map unit: 5 percent
Landform: Outwash plains, terraces
Landform position (three-dimensional): Tread, dip
Down-slope shape: Concave, linear
Across-slope shape: Linear
Ecological site: R103XY001MN - Loamy Wet Prairies
Other vegetative classification: Level Swale, Neutral (G103XS001MN)
Hydric soil rating: Yes

Estherville

Percent of map unit: 5 percent
Landform: Outwash plains, terraces
Landform position (two-dimensional): Summit, shoulder, backslope
Landform position (three-dimensional): Tread, rise
Down-slope shape: Convex
Across-slope shape: Linear
Ecological site: R103XY003MN - Sandy Upland Prairies
Other vegetative classification: Sandy (G103XS022MN)
Hydric soil rating: No

EaB—Estherville sandy loam, 2 to 6 percent slopes

Map Unit Setting

National map unit symbol: 2tsjp
Elevation: 690 to 1,840 feet
Mean annual precipitation: 24 to 37 inches
Mean annual air temperature: 43 to 52 degrees F
Frost-free period: 140 to 180 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Estherville and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Estherville

Setting

Landform: Terraces, outwash plains
Landform position (two-dimensional): Summit, shoulder, backslope
Landform position (three-dimensional): Tread, rise
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Loamy glaciofluvial deposits over sandy and gravelly outwash

Typical profile

Ap - 0 to 8 inches: sandy loam
A - 8 to 13 inches: sandy loam
Bw - 13 to 19 inches: sandy loam
2C - 19 to 79 inches: gravelly loamy coarse sand

Properties and qualities

Slope: 2 to 6 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat excessively drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 6.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 30 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Moderate (about 6.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3s
Hydrologic Soil Group: A
Ecological site: R103XY003MN - Sandy Upland Prairies
Forage suitability group: Sandy (G103XS022MN)

Other vegetative classification: Sandy (G103XS022MN)
Hydric soil rating: No

Minor Components

Dickinson

Percent of map unit: 8 percent
Landform: Terraces, outwash plains
Landform position (two-dimensional): Summit, shoulder, backslope
Landform position (three-dimensional): Tread, rise
Down-slope shape: Convex
Across-slope shape: Linear
Ecological site: R103XY003MN - Sandy Upland Prairies
Other vegetative classification: Sloping Upland, Neutral (G103XS002MN)
Hydric soil rating: No

Wadena

Percent of map unit: 6 percent
Landform: Terraces, outwash plains
Landform position (two-dimensional): Summit, shoulder, backslope
Landform position (three-dimensional): Tread, rise
Down-slope shape: Convex
Across-slope shape: Linear
Ecological site: R103XY003MN - Sandy Upland Prairies
Other vegetative classification: Sloping Upland, Neutral (G103XS002MN)
Hydric soil rating: No

Biscay

Percent of map unit: 1 percent
Landform: Terraces, outwash plains
Landform position (three-dimensional): Tread, talf
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: R103XY007MN - Sandy Wet Prairies
Other vegetative classification: Level Swale, Neutral (G103XS001MN)
Hydric soil rating: Yes

Gp—Pits, gravel

Map Unit Setting

National map unit symbol: 21p43
Mean annual precipitation: 25 to 34 inches
Mean annual air temperature: 37 to 46 degrees F
Frost-free period: 120 to 180 days
Farmland classification: Not prime farmland

Map Unit Composition

Pits, gravel: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Pits, Gravel

Setting

Landform: Moraines, outwash plains, stream terraces
Parent material: Sandy and gravelly outwash

Sc—Stony land

Map Unit Setting

National map unit symbol: gcdt
Elevation: 710 to 870 feet
Mean annual precipitation: 23 to 35 inches
Mean annual air temperature: 43 to 50 degrees F
Frost-free period: 155 to 200 days
Farmland classification: Not prime farmland

Map Unit Composition

Stony land and similar soils: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Stony Land

Setting

Landform: Terraces
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Till

Properties and qualities

Depth to restrictive feature: More than 80 inches
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None

Interpretive groups

Land capability classification (irrigated): None specified
Forage suitability group: Rocky (G103XS019MN)
Other vegetative classification: Rocky (G103XS019MN)
Hydric soil rating: No

Ta—Terrace escarpments

Map Unit Setting

National map unit symbol: gcdv
Elevation: 690 to 1,150 feet
Mean annual precipitation: 23 to 35 inches
Mean annual air temperature: 43 to 50 degrees F

Frost-free period: 155 to 200 days
Farmland classification: Not prime farmland

Map Unit Composition
Terrace escarpments and similar soils: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Terrace Escarpments

Setting
Landform: Escarpments on terraces
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Variable glacial sediments

Properties and qualities
Depth to restrictive feature: More than 80 inches
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None

Interpretive groups
Land capability classification (irrigated): None specified
Forage suitability group: Sloping; Fine Texture (G103XS023MN)
Other vegetative classification: Sloping; Fine Texture (G103XS023MN)
Hydric soil rating: No

TcA—Terril loam, 0 to 2 percent slopes

Map Unit Setting
National map unit symbol: gcf0
Elevation: 1,100 to 1,450 feet
Mean annual precipitation: 23 to 35 inches
Mean annual air temperature: 43 to 50 degrees F
Frost-free period: 155 to 200 days
Farmland classification: All areas are prime farmland

Map Unit Composition
Terril and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Terril

Setting
Landform: Moraines, stream terraces
Landform position (two-dimensional): Footslope
Down-slope shape: Concave
Across-slope shape: Linear
Parent material: Colluvium over till

Typical profile
Ap,A1 - 0 to 39 inches: loam

Bw - 39 to 47 inches: loam
C - 47 to 60 inches: loam

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Moderately well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 1.98 in/hr)
Depth to water table: About 43 to 73 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 15 percent
Available water supply, 0 to 60 inches: High (about 11.8 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 1
Hydrologic Soil Group: B
Ecological site: R103XY011MN - Footslope/Drainageway Prairies
Forage suitability group: Sloping Upland, Neutral (G103XS002MN)
Other vegetative classification: Sloping Upland, Neutral (G103XS002MN)
Hydric soil rating: No

Minor Components

Le sueur

Percent of map unit: 8 percent
Hydric soil rating: No

Glencoe

Percent of map unit: 7 percent
Landform: Drainageways
Hydric soil rating: Yes

Soil Information for All Uses

Suitabilities and Limitations for Use

The Suitabilities and Limitations for Use section includes various soil interpretations displayed as thematic maps with a summary table for the soil map units in the selected area of interest. A single value or rating for each map unit is generated by aggregating the interpretive ratings of individual map unit components. This aggregation process is defined for each interpretation.

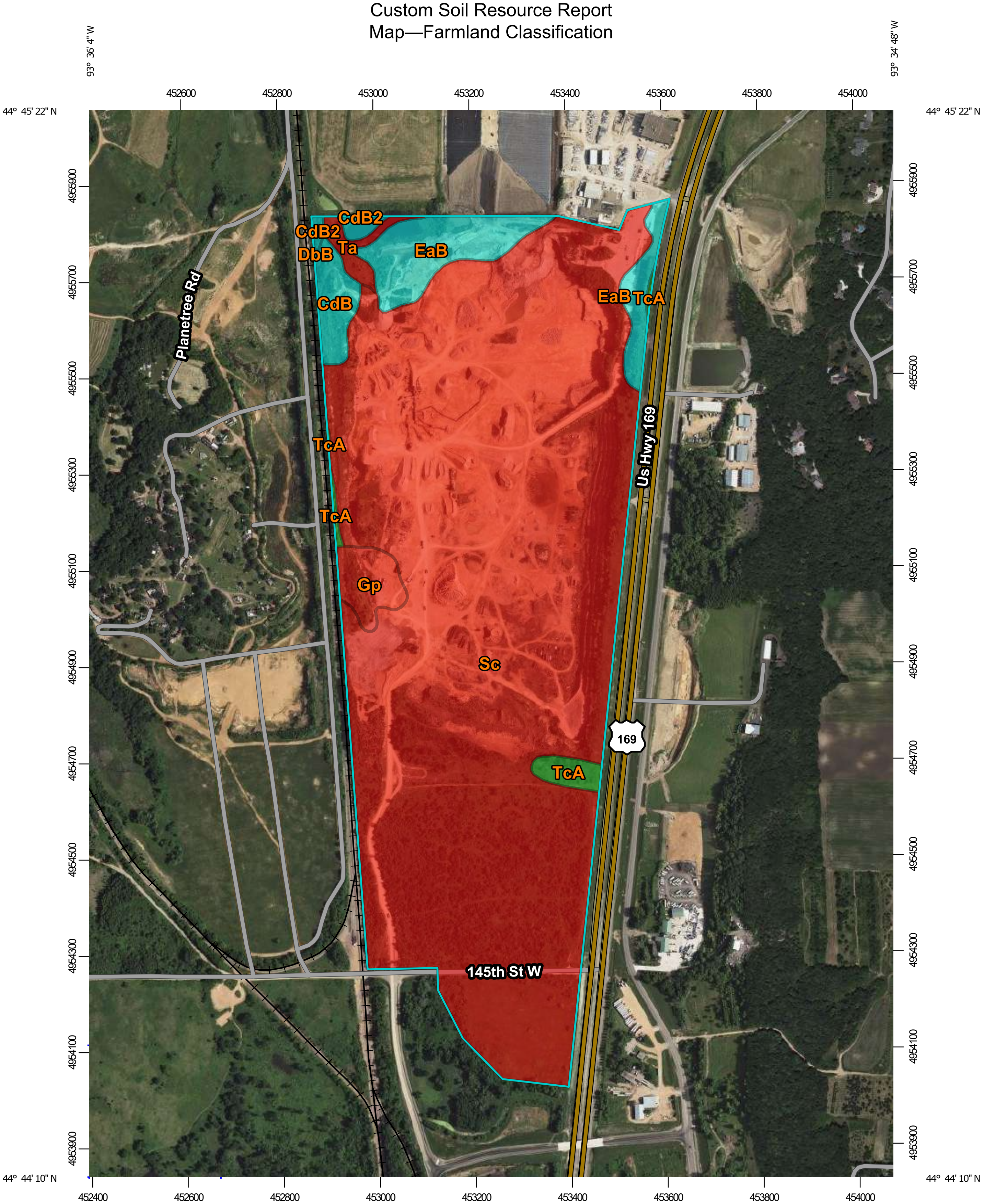
Land Classifications

Land Classifications are specified land use and management groupings that are assigned to soil areas because combinations of soil have similar behavior for specified practices. Most are based on soil properties and other factors that directly influence the specific use of the soil. Example classifications include ecological site classification, farmland classification, irrigated and nonirrigated land capability classification, and hydric rating.

Farmland Classification

Farmland classification identifies map units as prime farmland, farmland of statewide importance, farmland of local importance, or unique farmland. It identifies the location and extent of the soils that are best suited to food, feed, fiber, forage, and oilseed crops. NRCS policy and procedures on prime and unique farmlands are published in the "Federal Register," Vol. 43, No. 21, January 31, 1978.

Map—Farmland Classification



Map Scale: 1:10,800 if printed on A portrait (8.5" x 11") sheet.

Meters: 0, 150, 300, 600, 900

Feet: 0, 500, 1000, 2000, 3000

N

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

- Not prime farmland
- All areas are prime farmland
- Prime farmland if drained
- Prime farmland if protected from flooding or not frequently flooded during the growing season
- Prime farmland if irrigated
- Prime farmland if drained and either protected from flooding or not frequently flooded during the growing season
- Prime farmland if irrigated and drained
- Prime farmland if irrigated and either protected from flooding or not frequently flooded during the growing season
- Prime farmland if subsoiled, completely removing the root inhibiting soil layer
- Prime farmland if irrigated and the product of I (soil erodibility) x C (climate factor) does not exceed 60
- Prime farmland if irrigated and reclaimed of excess salts and sodium
- Farmland of statewide importance
- Farmland of statewide importance, if drained
- Farmland of statewide importance, if protected from flooding or not frequently flooded during the growing season
- Farmland of statewide importance, if irrigated
- Farmland of statewide importance, if drained and either protected from flooding or not frequently flooded during the growing season
- Farmland of statewide importance, if irrigated and drained
- Farmland of statewide importance, if irrigated and either protected from flooding or not frequently flooded during the growing season
- Farmland of statewide importance, if subsoiled, completely removing the root inhibiting soil layer
- Farmland of statewide importance, if irrigated and the product of I (soil erodibility) x C (climate factor) does not exceed 60
- Farmland of statewide importance, if irrigated and reclaimed of excess salts and sodium
- Farmland of statewide importance, if drained or either protected from flooding or not frequently flooded during the growing season
- Farmland of statewide importance, if warm enough, and either drained or either protected from flooding or not frequently flooded during the growing season
- Farmland of statewide importance, if warm enough
- Farmland of statewide importance, if thawed
- Farmland of local importance
- Farmland of local importance, if irrigated
- Farmland of unique importance
- Not rated or not available

Soil Rating Lines

- Not prime farmland
- All areas are prime farmland
- Prime farmland if drained
- Prime farmland if protected from flooding or not frequently flooded during the growing season
- Prime farmland if irrigated
- Prime farmland if drained and either protected from flooding or not frequently flooded during the growing season
- Prime farmland if irrigated and drained
- Prime farmland if irrigated and either protected from flooding or not frequently flooded during the growing season

- Prime farmland if subsoiled, completely removing the root inhibiting soil layer
- Prime farmland if irrigated and the product of I (soil erodibility) x C (climate factor) does not exceed 60
- Prime farmland if irrigated and reclaimed of excess salts and sodium
- Farmland of statewide importance
- Farmland of statewide importance, if drained
- Farmland of statewide importance, if protected from flooding or not frequently flooded during the growing season
- Farmland of statewide importance, if irrigated
- Farmland of statewide importance, if drained and either protected from flooding or not frequently flooded during the growing season
- Farmland of statewide importance, if irrigated and drained
- Farmland of statewide importance, if irrigated and either protected from flooding or not frequently flooded during the growing season
- Farmland of statewide importance, if subsoiled, completely removing the root inhibiting soil layer
- Farmland of statewide importance, if irrigated and the product of I (soil erodibility) x C (climate factor) does not exceed 60
- Farmland of statewide importance, if irrigated and reclaimed of excess salts and sodium
- Farmland of statewide importance, if drained or either protected from flooding or not frequently flooded during the growing season
- Farmland of statewide importance, if warm enough, and either drained or either protected from flooding or not frequently flooded during the growing season
- Farmland of statewide importance, if warm enough
- Farmland of statewide importance, if thawed
- Farmland of local importance
- Farmland of local importance, if irrigated
- Farmland of unique importance
- Not rated or not available

Soil Rating Points

- Not prime farmland
- All areas are prime farmland
- Prime farmland if drained
- Prime farmland if protected from flooding or not frequently flooded during the growing season
- Prime farmland if irrigated
- Prime farmland if drained and either protected from flooding or not frequently flooded during the growing season
- Prime farmland if irrigated and drained
- Prime farmland if irrigated and either protected from flooding or not frequently flooded during the growing season
- Prime farmland if subsoiled, completely removing the root inhibiting soil layer
- Prime farmland if irrigated and the product of I (soil erodibility) x C (climate factor) does not exceed 60
- Prime farmland if irrigated and reclaimed of excess salts and sodium
- Farmland of statewide importance
- Farmland of statewide importance, if drained
- Farmland of statewide importance, if protected from flooding or not frequently flooded during the growing season
- Farmland of statewide importance, if irrigated

- Farmland of statewide importance, if drained and either protected from flooding or not frequently flooded during the growing season
- Farmland of statewide importance, if irrigated and drained
- Farmland of statewide importance, if irrigated and either protected from flooding or not frequently flooded during the growing season
- Farmland of statewide importance, if subsoiled, completely removing the root inhibiting soil layer
- Farmland of statewide importance, if irrigated and the product of I (soil erodibility) x C (climate factor) does not exceed 60
- Farmland of statewide importance, if irrigated and reclaimed of excess salts and sodium
- Farmland of statewide importance, if drained or either protected from flooding or not frequently flooded during the growing season
- Farmland of statewide importance, if warm enough, and either drained or either protected from flooding or not frequently flooded during the growing season
- Farmland of statewide importance, if warm enough
- Farmland of statewide importance, if thawed
- Farmland of local importance
- Farmland of local importance, if irrigated
- Farmland of unique importance
- Not rated or not available

Water Features

- Streams and Canals

Transportation

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

Background

- Aerial Photography

The soil surveys that comprise your AOI were mapped at 1:20,000.

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: Scott County, Minnesota
Survey Area Data: Version 16, Jun 5, 2020

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

Date(s) aerial images were photographed: May 30, 2020—Jul 3, 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—Farmland Classification

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
CdB	Copaston silt loam, 2 to 6 percent slopes	Farmland of statewide importance	4.1	1.7%
CdB2	Copaston silt loam, 2 to 6 percent slopes, moderately eroded	Farmland of statewide importance	1.2	0.5%
DbB	Dickman sandy loam, 2 to 6 percent slopes	Farmland of statewide importance	0.0	0.0%
EaB	Estherville sandy loam, 2 to 6 percent slopes	Farmland of statewide importance	13.6	5.6%
Gp	Pits, gravel	Not prime farmland	4.3	1.8%
Sc	Stony land	Not prime farmland	213.1	88.4%
Ta	Terrace escarpments	Not prime farmland	2.1	0.9%
TcA	Terril loam, 0 to 2 percent slopes	All areas are prime farmland	2.5	1.0%
Totals for Area of Interest			**241.0**	**100.0%**

Rating Options—Farmland Classification

Aggregation Method: No Aggregation Necessary

Aggregation is the process by which a set of component attribute values is reduced to a single value that represents the map unit as a whole.

A map unit is typically composed of one or more "components". A component is either some type of soil or some nonsoil entity, e.g., rock outcrop. For the attribute being aggregated, the first step of the aggregation process is to derive one attribute value for each of a map unit's components. From this set of component attributes, the next step of the aggregation process derives a single value that represents the map unit as a whole. Once a single value for each map unit is derived, a thematic map for soil map units can be rendered. Aggregation must be done because, on any soil map, map units are delineated but components are not.

For each of a map unit's components, a corresponding percent composition is recorded. A percent composition of 60 indicates that the corresponding component typically makes up approximately 60% of the map unit. Percent composition is a critical factor in some, but not all, aggregation methods.

The majority of soil attributes are associated with a component of a map unit, and such an attribute has to be aggregated to the map unit level before a thematic map can be rendered. Map units, however, also have their own attributes. An attribute of a map unit does not have to be aggregated in order to render a corresponding thematic map. Therefore, the "aggregation method" for any attribute of a map unit is referred to as "No Aggregation Necessary".

Tie-break Rule: Lower

The tie-break rule indicates which value should be selected from a set of multiple candidate values, or which value should be selected in the event of a percent composition tie.

Soil Properties and Qualities

The Soil Properties and Qualities section includes various soil properties and qualities displayed as thematic maps with a summary table for the soil map units in the selected area of interest. A single value or rating for each map unit is generated by aggregating the interpretive ratings of individual map unit components. This aggregation process is defined for each property or quality.

Soil Qualities and Features

Soil qualities are behavior and performance attributes that are not directly measured, but are inferred from observations of dynamic conditions and from soil properties. Example soil qualities include natural drainage, and frost action. Soil features are attributes that are not directly part of the soil. Example soil features include slope and depth to restrictive layer. These features can greatly impact the use and management of the soil.

Hydrologic Soil Group

Hydrologic soil groups are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms.

The soils in the United States are assigned to four groups (A, B, C, and D) and three dual classes (A/D, B/D, and C/D). The groups are defined as follows:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

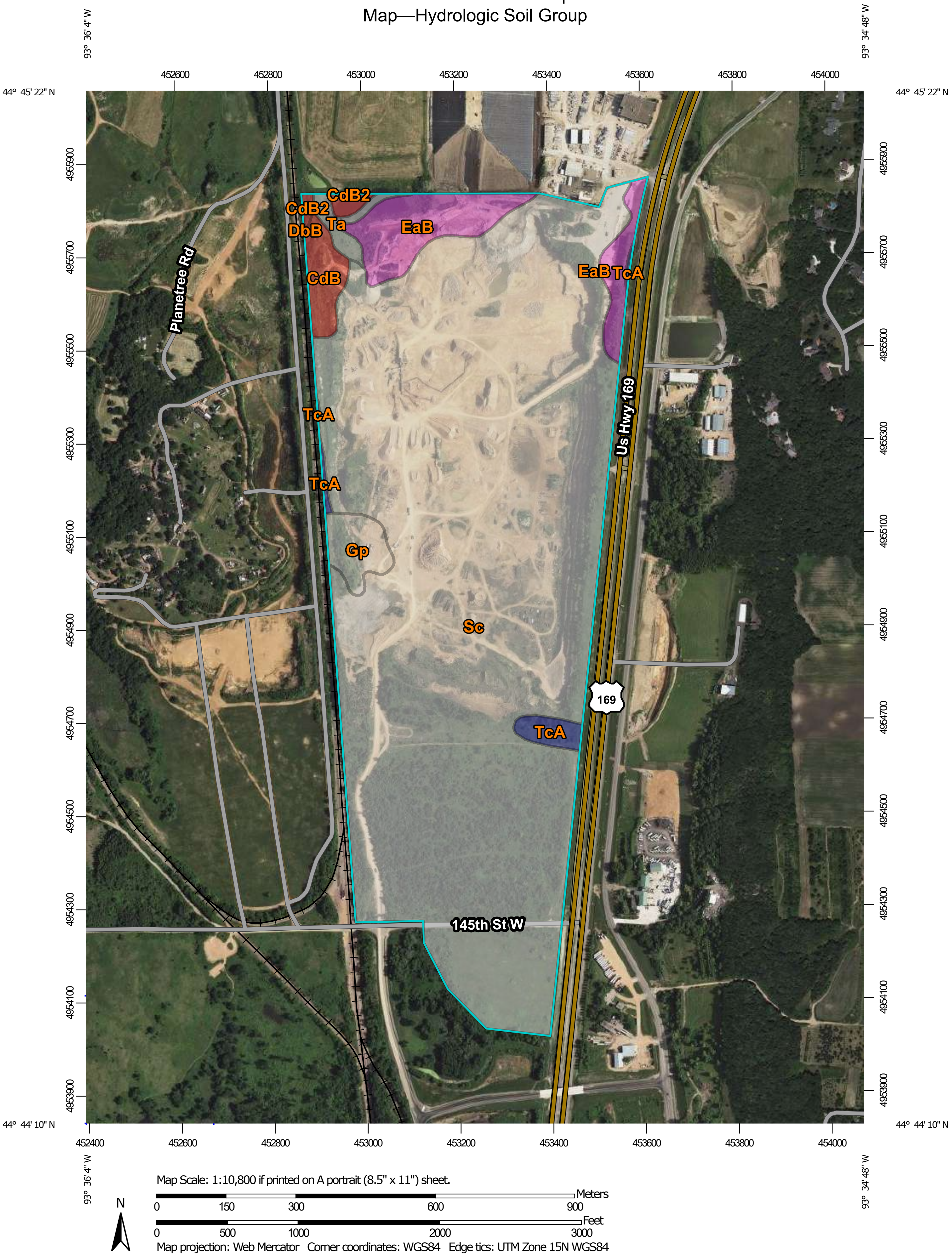
Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

If a soil is assigned to a dual hydrologic group (A/D, B/D, or C/D), the first letter is for drained areas and the second is for undrained areas. Only the soils that in their natural condition are in group D are assigned to dual classes.

Map—Hydrologic Soil Group



MAP LEGEND

Area of Interest (AOI)

Area of Interest (AOI)

Soils

Soil Rating Polygons

A

A/D

B

B/D

C

C/D

D

Not rated or not available

Soil Rating Lines

A

A/D

B

B/D

C

C/D

D

Not rated or not available

Soil Rating Points

A

A/D

B

B/D

C

C/D

D

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 1:20,000.

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: Scott County, Minnesota
Survey Area Data: Version 16, Jun 5, 2020

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

Date(s) aerial images were photographed: May 30, 2020—Jul 3, 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—Hydrologic Soil Group

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
CdB	Copaston silt loam, 2 to 6 percent slopes	D	4.1	1.7%
CdB2	Copaston silt loam, 2 to 6 percent slopes, moderately eroded	D	1.2	0.5%
DbB	Dickman sandy loam, 2 to 6 percent slopes	A	0.0	0.0%
EaB	Estherville sandy loam, 2 to 6 percent slopes	A	13.6	5.6%
Gp	Pits, gravel		4.3	1.8%
Sc	Stony land		213.1	88.4%
Ta	Terrace escarpments		2.1	0.9%
TcA	Terril loam, 0 to 2 percent slopes	B	2.5	1.0%
Totals for Area of Interest			**241.0**	**100.0%**

Rating Options—Hydrologic Soil Group

Aggregation Method: Dominant Condition

Aggregation is the process by which a set of component attribute values is reduced to a single value that represents the map unit as a whole.

A map unit is typically composed of one or more "components". A component is either some type of soil or some nonsoil entity, e.g., rock outcrop. For the attribute being aggregated, the first step of the aggregation process is to derive one attribute value for each of a map unit's components. From this set of component attributes, the next step of the aggregation process derives a single value that represents the map unit as a whole. Once a single value for each map unit is derived, a thematic map for soil map units can be rendered. Aggregation must be done because, on any soil map, map units are delineated but components are not.

For each of a map unit's components, a corresponding percent composition is recorded. A percent composition of 60 indicates that the corresponding component typically makes up approximately 60% of the map unit. Percent composition is a critical factor in some, but not all, aggregation methods.

The aggregation method "Dominant Condition" first groups like attribute values for the components in a map unit. For each group, percent composition is set to the sum of the percent composition of all components participating in that group. These groups now represent "conditions" rather than components. The attribute value associated with the group with the highest cumulative percent composition is returned. If more than one group shares the highest cumulative percent composition, the corresponding "tie-break" rule determines which value should be returned. The "tie-break" rule indicates whether the lower or higher group value should be returned in the case of a percent composition tie. The result returned by this aggregation method represents the dominant condition throughout the map unit only when no tie has occurred.

Component Percent Cutoff: None Specified

Components whose percent composition is below the cutoff value will not be considered. If no cutoff value is specified, all components in the database will be considered. The data for some contrasting soils of minor extent may not be in the database, and therefore are not considered.

Tie-break Rule: Higher

The tie-break rule indicates which value should be selected from a set of multiple candidate values, or which value should be selected in the event of a percent composition tie.

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United States Department of Agriculture, Natural Resources Conservation Service. National forestry manual. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/home/?cid=nrcs142p2_053374

United States Department of Agriculture, Natural Resources Conservation Service. National range and pasture handbook. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/landuse/rangepasture/?cid=stelprdb1043084

United States Department of Agriculture, Natural Resources Conservation Service. National soil survey handbook, title 430-VI. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/scientists/?cid=nrcs142p2_054242

United States Department of Agriculture, Natural Resources Conservation Service. 2006. Land resource regions and major land resource areas of the United States, the Caribbean, and the Pacific Basin. U.S. Department of Agriculture Handbook 296. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_053624

United States Department of Agriculture, Soil Conservation Service. 1961. Land capability classification. U.S. Department of Agriculture Handbook 210. http://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs142p2_052290.pdf

SCOTT SWCD

SCOTT SOIL AND WATER CONSERVATION DISTRICT

"Helping Scott County Citizens Protect and Preserve Natural Resources since 1941"

VIA EMAIL

February 11, 2022

Kirsten Pauly, PE/PG
Sunde Engineering, PLLC
10830 Nesbitt Avenue South
Bloomington, Minnesota 55437-3100

Subject: Request for extension of Notice of Decision, PID 079210080, 079210120, 079280080, 079280070, 079280100, 079280042, Scott County

Dear Ms. Pauly:

The Scott Soil and Water Conservation District (SWCD) completed its review of your February 10, 2022, request to extend the Notice of Decision (NOD) dated Feb 15, 2012. The NOD approved a wetland delineation and No Loss decision prepared in 2011 for the Merriam Junction Sands Mine project (see Exhibit A). We found conditions relating to aquatic resources have not changed since 2012.

After consulting with the Local Government Unit representative, the SWCD hereby approves your request to extend the subject NOD for a period of five (5) years. It is now valid through February 11, 2027. This extension applies solely to Parcel IDs 079210080, 079210120, 079280080, 079280070, 079280100, 079280042 (see Exhibit B).

Please do not hesitate to contact me if you have any questions.

Sincerely,

Collin Schoenecker
Resource Conservationist

C. John Weckman, Louisville Township, LGU
Martin Schmitz, Scott County

Exhibit A

Minnesota Wetland Conservation Act
Notice of Decision

Local Government Unit (LGU) **Louisville Township**	Address **92 Mallard Drive** **Shakopee, MN 55379**

1. PROJECT INFORMATION

Applicant Name **Hunt Global Resources, Inc**	Project Name **Merriam Junction Sands Mine**	Date of Application **10/17/2011**	Application Number

☒ Attach site locator map.

Type of Decision:

☒ Wetland Boundary or Type ☒ No-Loss ☐ Exemption ☐ Sequencing
☐ Replacement Plan ☐ Banking Plan

Technical Evaluation Panel Findings and Recommendation (if any):

☐ Approve ☒ Approve with conditions ☐ Deny

Summary (or attach): The TEP met on-site on 10/24/2011. It generally concurred with the delineated boundaries as marked in the field, but requested additional information to substantiate findings regarding incidental wetlands. The applicant submitted the requested detail. Upon review, the TEP found sufficient evidence suggesting 2 of the 11 wetlands claimed as incidental likely existed prior to disturbance and therefore were not exempt. The TEP recommends approval of the application with this exception.

2. LOCAL GOVERNMENT UNIT DECISION

Date of Decision: **2/15/ 2012**

☐ Approved ☒ Approved with conditions (include below) ☐ Denied

LGU Findings and Conclusions (attach additional sheets as necessary):

The proposed project encompasses approximately 938 acres in parts of Sections 16, 21, 21 and 28 of Township 115 N Range 23 East (Louisville Township).

An Application for Approval (for both Boundary and Type and No-Loss) was submitted on 10/17/2011 in anticipation of continuing aggregate production in currently active mining areas, reactivating aggregate mining in areas that are currently dormant, and expanding operations in both active and dormant areas to include production of silica sand. A Notice of Application was issued 11/1/2011 with a comment deadline of 11/23/2011. The TEP met on-site on 10/24/2011. Additional information was submitted on 1/3/2012 per TEP request.

The Scott SWCD completed a detailed review of the two (2) delineation reports submitted with the application. Several minor elements of information were found to be missing or in error. Upon request, this information was corrected and submitted with satisfactory detail and accuracy. Consequently, the applicant has met all requirements under WCA for Boundary/Type and No-Loss approval. Louisville Township, as LGU, therefore approves this application as follows:

1. Wetlands boundaries and types depicted on the attached map are approved. Wetlands S4, S6, B2, B3, B4, B5, B6, and B9 are subject to WCA jurisdiction; wetlands S1, S2, S3, S5, S7, B1, B7, B8 and

B10 are incidental and not regulated; and
2. This Notice is limited to approval of Boundary and Type and No-Loss findings. It does not provide approval or authorization for impacts upon regulated wetlands. If future mining activities should occur that directly or indirectly impact regulated wetlands, a separate application for sequencing and/or replacement must be submitted and approved prior to those impacts occurring. Note: indirect impacts may include, but are limited to, excavation activities outside that alter groundwater levels within a wetland, even though excavation itself may be outside the wetland.

For Replacement Plans using credits from the State Wetland Bank:

Bank Account #	Bank Service Area	County	Credits Approved for Withdrawal (sq. ft. or nearest .01 acre)

Replacement Plan Approval Conditions. In addition to any conditions specified by the LGU, the approval of a Wetland Replacement Plan is conditional upon the following:

- ☐ **Financial Assurance:** For project-specific replacement that is not in-advance, a financial assurance specified by the LGU must be submitted to the LGU in accordance with MN Rule 8420.0522, Subp. 9 (List amount and type in LGU Findings).
- ☐ **Deed Recording:** For project-specific replacement, evidence must be provided to the LGU that the BWSR "Declaration of Restrictions and Covenants" and "Consent to Replacement Wetland" forms have been filed with the county recorder's office in which the replacement wetland is located.
- ☐ **Credit Withdrawal:** For replacement consisting of wetland bank credits, confirmation that BWSR has withdrawn the credits from the state wetland bank as specified in the approved replacement plan.

Wetlands may not be impacted until all applicable conditions have been met!

LGU Authorized Signature:

Signing and mailing of this completed form to the appropriate recipients in accordance with 8420.0255, Subp. 5 provides notice that a decision was made by the LGU under the Wetland Conservation Act as specified above. If additional details on the decision exist, they have been provided to the landowner and are available from the LGU upon request.

Name	Title	
John Weckman	**Town Supervisor**	
Signature John E. Weckman	Date 2/15/12	Phone Number and E-mail **952-445-5363**

THIS DECISION ONLY APPLIES TO THE MINNESOTA WETLAND CONSERVATION ACT. Additional approvals or permits from local, state, and federal agencies may be required. Check with all appropriate authorities before commencing work in or near wetlands.

Applicants proceed at their own risk if work authorized by this decision is started before the time period for appeal (30 days) has expired. If this decision is reversed or revised under appeal, the applicant may be responsible for restoring or replacing all wetland impacts.

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3. APPEAL OF THIS DECISION

Pursuant to MN Rule 8420.0905, any appeal of this decision can only be commenced by mailing a petition for appeal, including applicable fee, within thirty (30) calendar days of the date of the mailing of this Notice to the following as indicated:

Check one:

☐ Appeal of an LGU staff decision. Send petition and $____ fee (if applicable) to:	☒ Appeal of LGU governing body decision. Send petition and $500 filing fee to: Executive Director Minnesota Board of Water and Soil Resources 520 Lafayette Road North St. Paul, MN 55155

4. LIST OF ADDRESSEES

☒ SWCD TEP member: **Troy Kuphal**
☒ BWSR TEP member: **Ken Powell**
☐ LGU TEP member (if different than LGU Contact):
☒ DNR TEP member: **Melissa Doperalski**
☐ DNR Regional Office (if different than DNR TEP member)
☒ WD or WMO (if applicable): **Paul Nelson**
☐ Applicant and Landowner (if different)
☐ Members of the public who requested notice:

☐ Corps of Engineers Project Manager
☐ BWSR Wetland Bank Coordinator (wetland bank plan decisions only)

5. MAILING INFORMATION

- For a list of BWSR TEP representatives: www.bwsr.state.mn.us/aboutbwsr/workareas/WCA_areas.pdf
- For a list of DNR TEP representatives: www.bwsr.state.mn.us/wetlands/wca/DNR_TEP_contacts.pdf
- Department of Natural Resources Regional Offices:

NW Region:	NE Region:	Central Region:	Southern Region:
Reg. Env. Assess. Ecol. Div. Ecol. Resources 2115 Birchmont Beach Rd. NE Bemidji, MN 56601	Reg. Env. Assess. Ecol. Div. Ecol. Resources 1201 E. Hwy. 2 Grand Rapids, MN 55744	Reg. Env. Assess. Ecol. Div. Ecol. Resources 1200 Warner Road St. Paul, MN 55106	Reg. Env. Assess. Ecol. Div. Ecol. Resources 261 Hwy. 15 South New Ulm, MN 56073

For a map of DNR Administrative Regions, see: http://files.dnr.state.mn.us/aboutdnr/dnr_regions.pdf

- For a list of Corps of Project Managers: www.mvp.usace.army.mil/regulatory/default.asp?pageid=687 or send to:

US Army Corps of Engineers
St. Paul District, ATTN: OP-R
180 Fifth St. East, Suite 700
St. Paul, MN 55101-1678

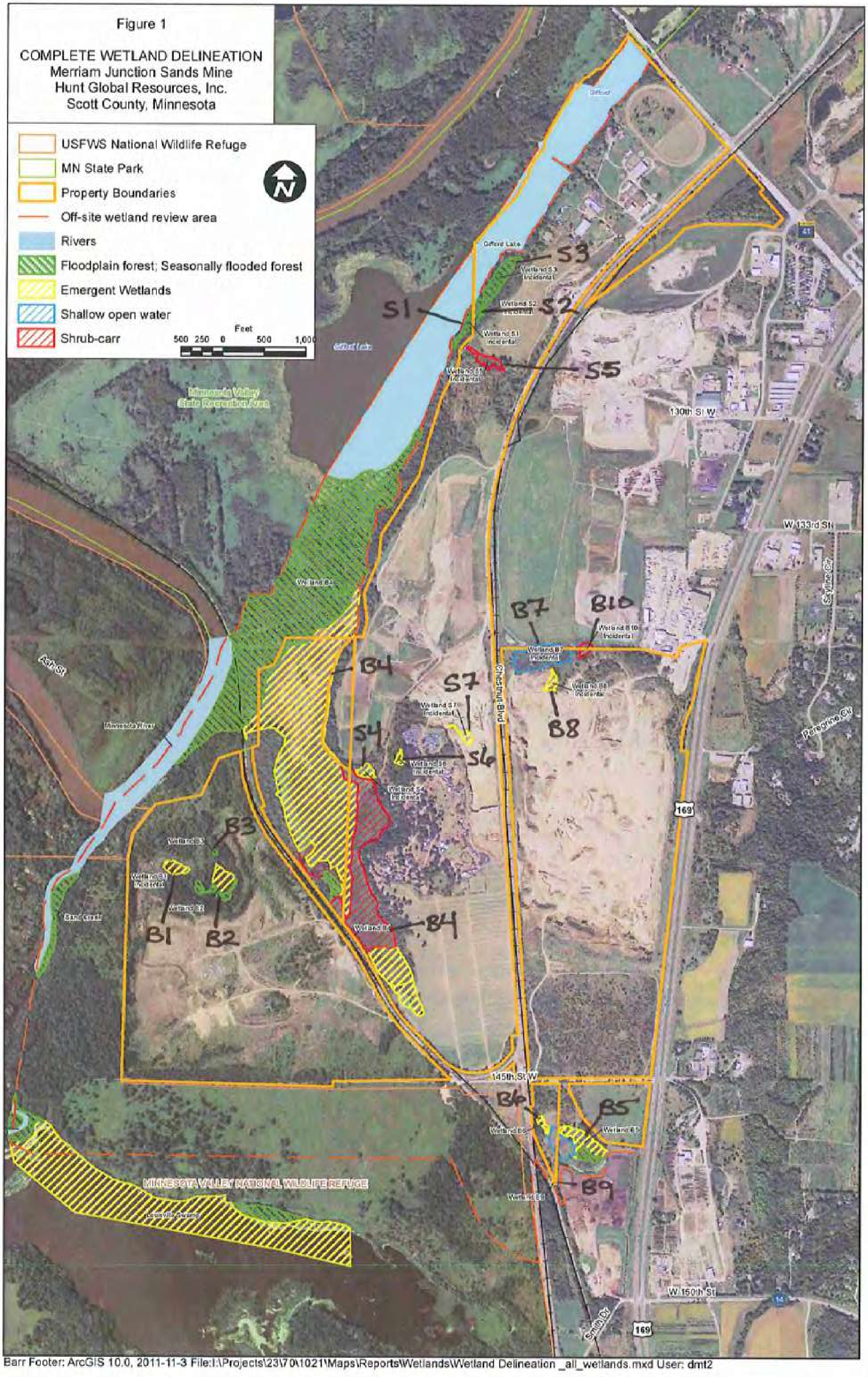
➢For Wetland Bank Plan applications, also send a copy of the application to:

Minnesota Board of Water and Soil Resources
Wetland Bank Coordinator
520 Lafayette Road North
St. Paul, MN 55155

6. ATTACHMENTS

In addition to the site locator map, list any other attachments:

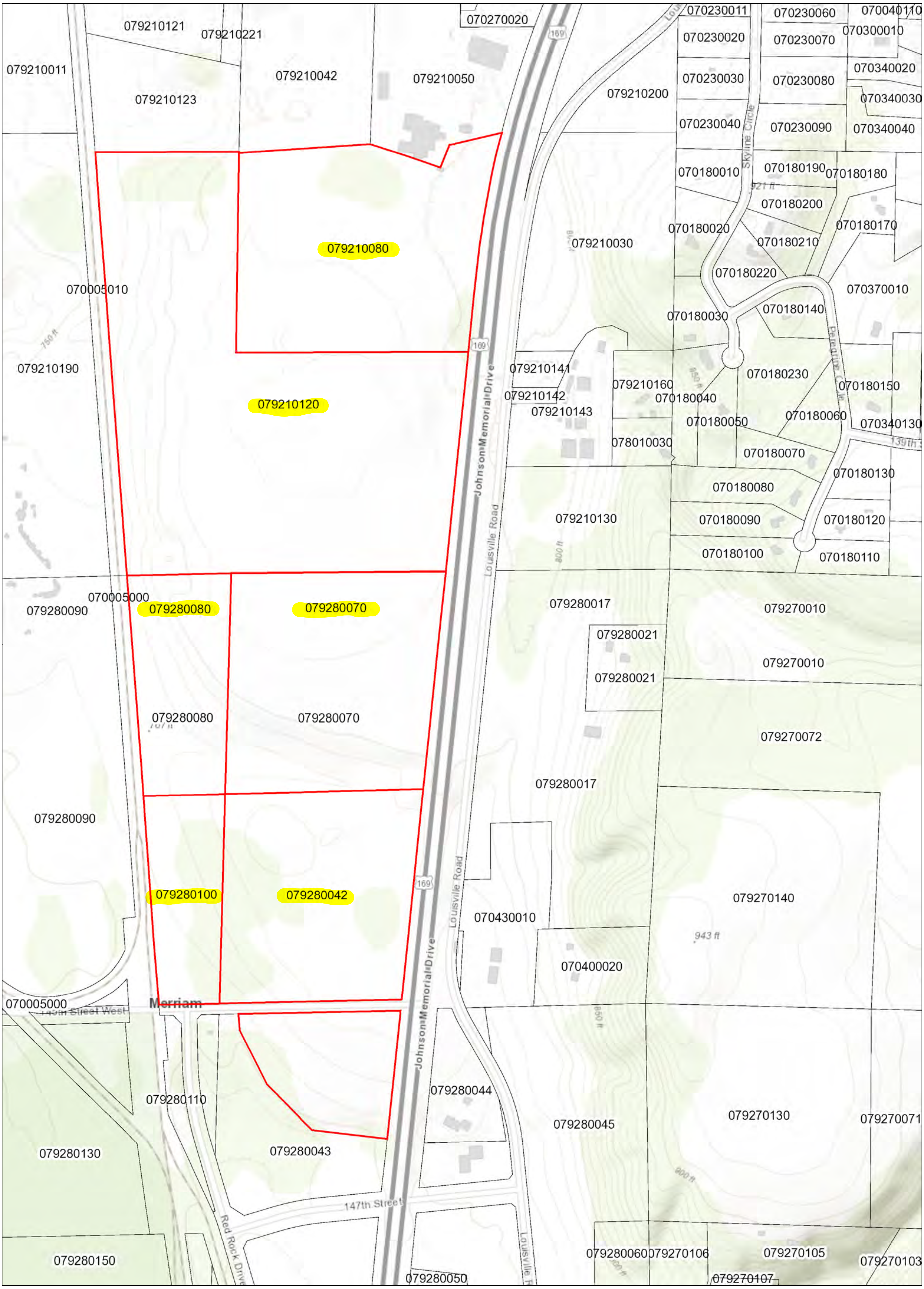
- ☒ **Map showing wetlands with alph-numeric identification**
- ☐
- ☐
- ☐
- ☐



Barr Footer: ArcGIS 10.0, 2011-11-3 File:I:\Projects\23\70\1021\Maps\Reports\Wetlands\Wetland Delineation _all_wetlands.mxd User: dmt2

Exhibit B

Scott County



This drawing is neither a legally recorded map nor a survey and is not intended to be used as one. This drawing is a compilation of records, information, and data located in various city, county, and state offices, and other sources affecting the area shown, and is to be used for reference purposes only. Scott County is not responsible for any inaccuracies herein contained. If discrepancies are found, please contact the Scott County Surveyors Office.

Date: 2/9/2022

1 in = 752 ft

0 180 360 720 1,080 1,440 Feet

Wetlands 8 and 10 are higher in the watershed than 7. Wetland 10 has an outlet pipe that discharges into wetland 7 during heavy rain events. Wetland 7 may periodically overflow to the west over a low upland area, where it then would flow through a dry drainage channel and into a culvert under the railroad to the west. Despite recent heavy rains, the water in wetland 7 was well below this upland drainage. The upland sample point taken on the west end of the wetland was collected in the lowest area between wetland 7 and the dry drainage channel along the railroad to the west.

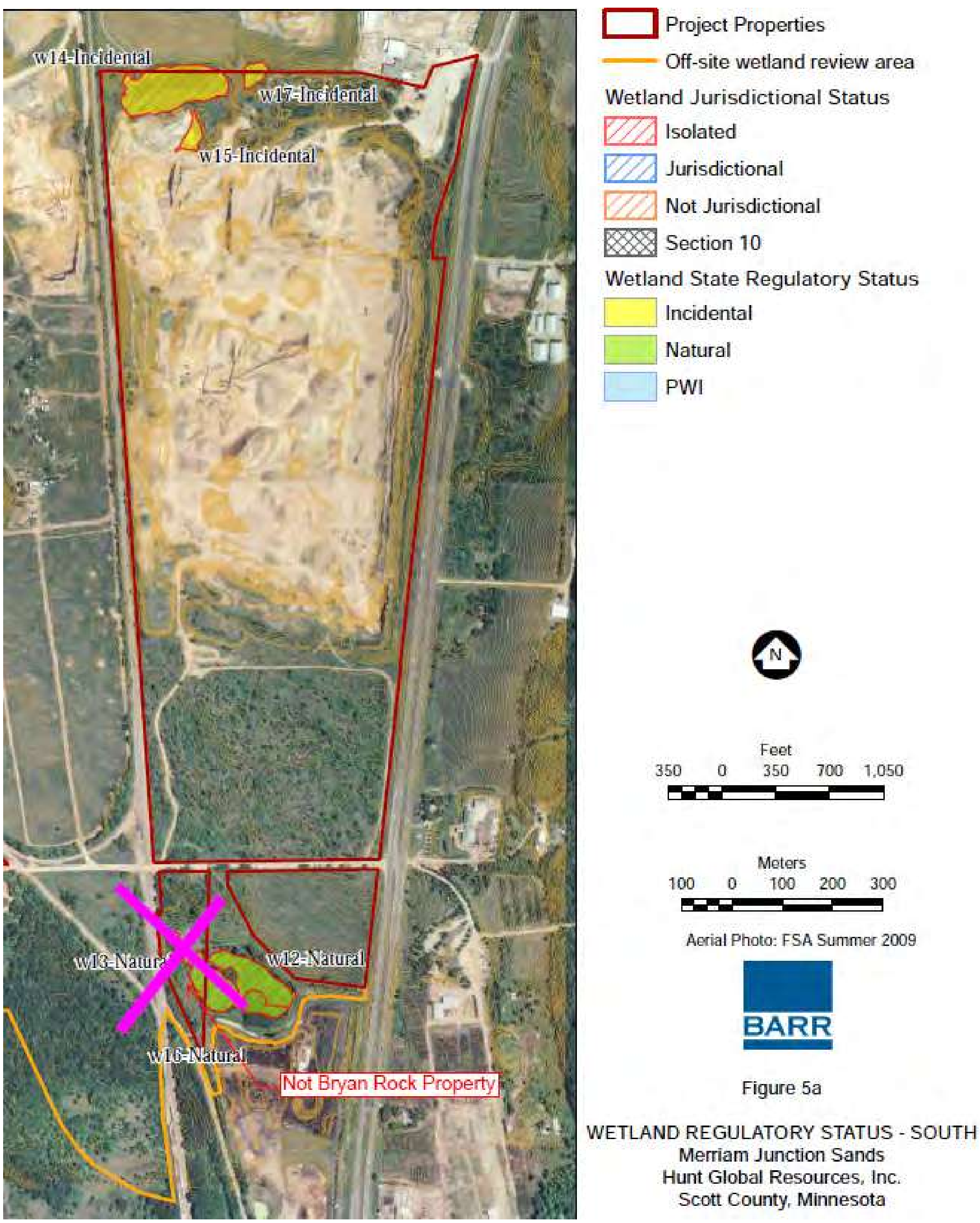


Figure 5a

WETLAND REGULATORY STATUS - SOUTH
Merriam Junction Sands
Hunt Global Resources, Inc.
Scott County, Minnesota

The technical support for extending the decision are as follows:

- No regulated wetlands were identified on the property during the original delineation so changes in wetland boundaries due to climate trends overtime would not be relevant.
- The facts relied on to make the original determination that the wetlands were incidental and not regulated (historical aerial photographs) have not changed.

Please do not hesitate to contact me if you have any questions or require any additional information.

Sincerely,

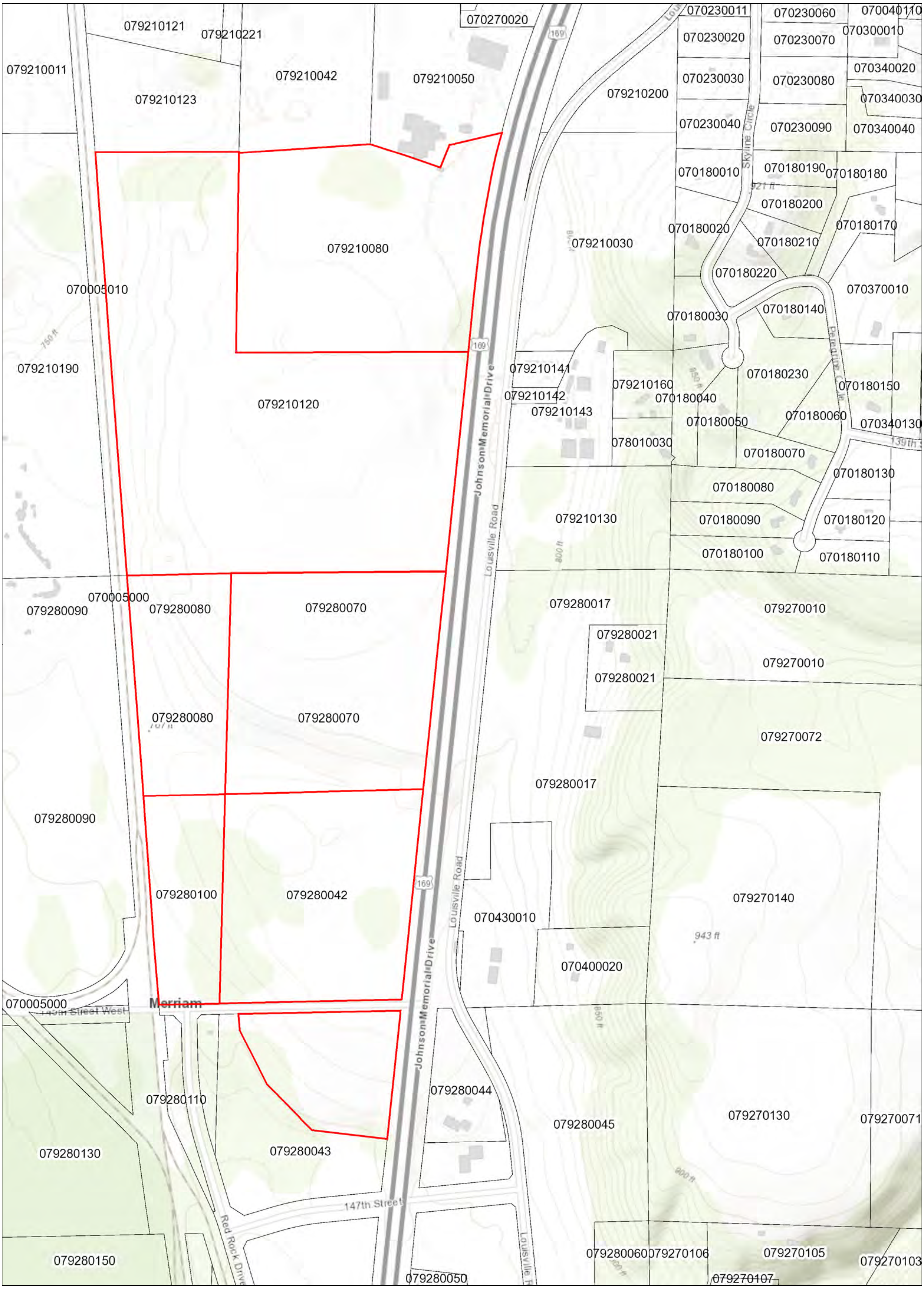
Kirsten Pauly

Kirsten Pauly, PE/PG

cc Mark Pahl, Dem-Con Landfill

Attachments: PID Map, Historical Photos, NOD

Scott County



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Date: 2/9/2022

1 in = 752 ft

0 180 360 720 1,080 1,440 Feet

Appendix D

Historic Aerial Photographs

Property Boundary

County Boundary

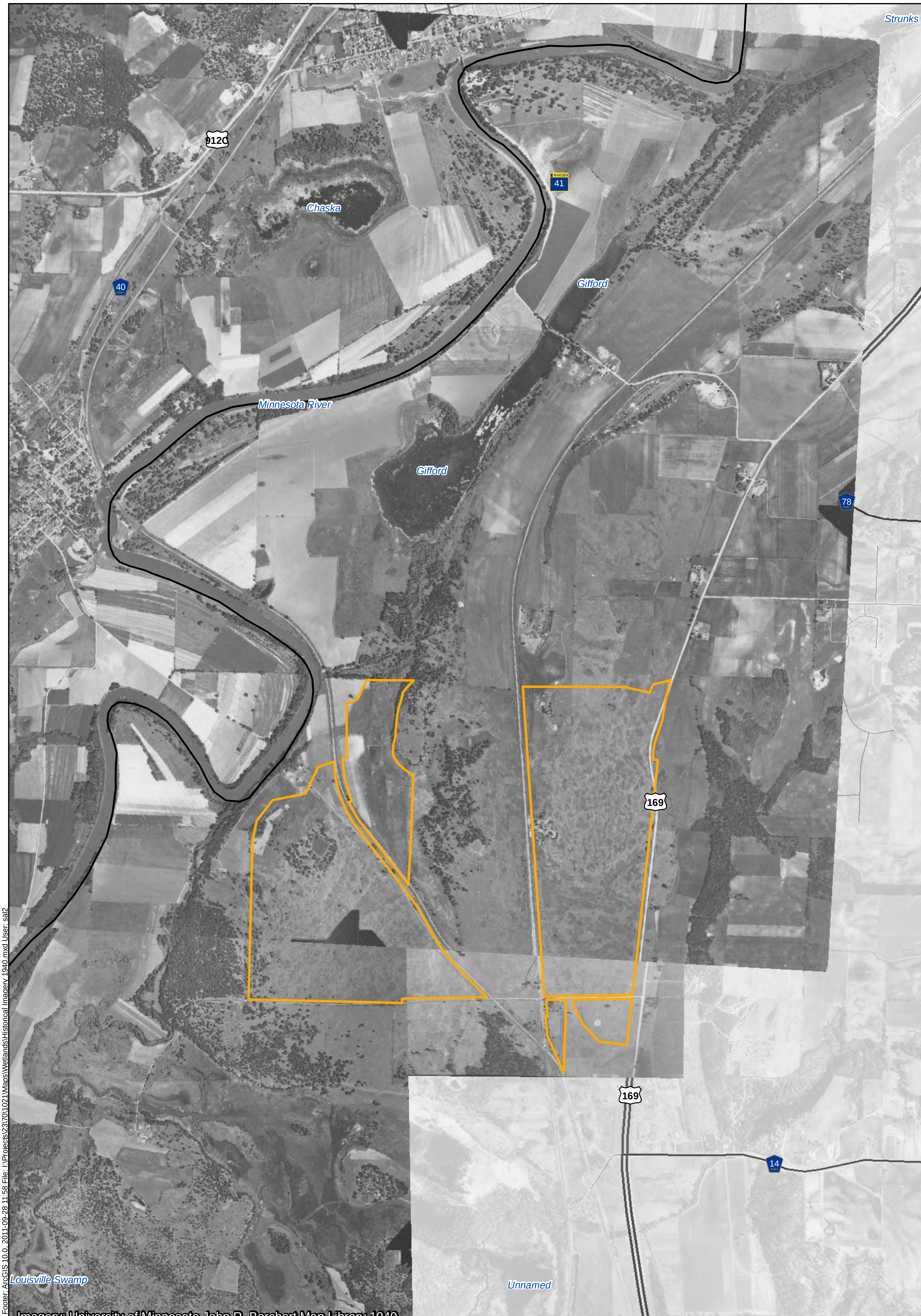
1,500 750 0 1,500

Feet

Scale: 1 inch = 1,500 feet

Figure D-1

HISTORICAL IMAGERY - 1937
Merriam Junction Mine
Hunt Global Resources
Scott County, MN



Barr Footer: ArcGIS 10.0, 2011-09-28 11:58 File: I:\Projects\23\70\1021\Maps\Wetlands\Historical Imagery 1940.mxd User: sal2

Property Boundary

County Boundary

1,500 750 0 1,500

Feet

Scale: 1 inch = 1,500 feet

Figure D-2

HISTORICAL IMAGERY - 1940
Merriam Junction Mine
Hunt Global Resources
Scott County, MN

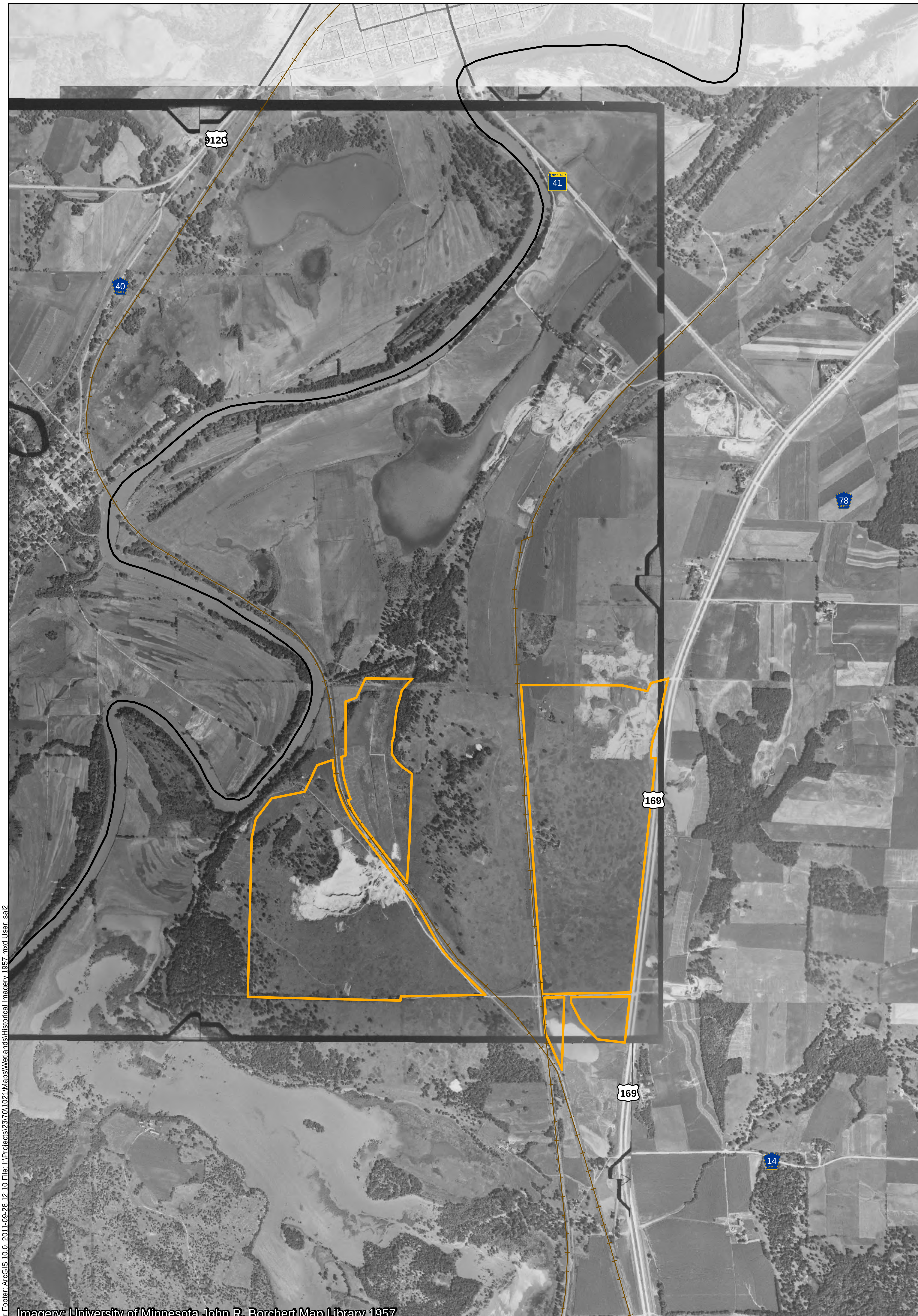
Barr Footer: ArcGIS 10.0, 2011-09-28 12:09 File: I:\Projects\23\70\1021\Maps\Wetlands\Historical Imagery 1951.mxd User: sal2

Property Boundary
County Boundary

1,500 750 0 1,500
Feet
Scale: 1 inch = 1,500 feet

Figure D-3

HISTORICAL IMAGERY - 1951
Merriam Junction Mine
Hunt Global Resources
Scott County, MN



Property Boundary

County Boundary

1,500 750 0 1,500

Feet

Scale: 1 inch = 1,500 feet

Figure D-4

HISTORICAL IMAGERY - 1957
Merriam Junction Mine
Hunt Global Resources
Scott County, MN

Barr Footer: ArcGIS 10.0, 2011-09-28 12:11 File: I:\Projects\23\70\1021\Maps\Wetlands\Historical Imagery 1963-1964.mxd User: sal2

Property Boundary

County Boundary

1,500 750 0 1,500

Feet

Scale: 1 inch = 1,500 feet

Figure D-5

HISTORICAL IMAGERY - 1963
Merriam Junction Mine
Hunt Global Resources
Scott County, MN

Property Boundary

County Boundary

1,500 750 0 1,500

Feet

Scale: 1 inch = 1,500 feet

Figure D-6

HISTORICAL IMAGERY - 1980
Merriam Junction Mine
Hunt Global Resources
Scott County, MN

Barr Footer: ArcGIS 10.0, 2011-09-28 12:09 File: I:\Projects\23\70\1021\Maps\Wetlands\Historical Imagery 1991.mxd User: sal2

Property Boundary

County Boundary

1,500 750 0 1,500

Feet

Scale: 1 inch = 1,500 feet

Figure D-7

HISTORICAL IMAGERY - 1991
Merriam Junction Mine
Hunt Global Resources
Scott County, MN

Barr Footer: ArcGIS 10.0, 2011-09-28 12:08 File: I:\Projects\23\70\1021\Maps\Wetlands\Historical Imagery 2006.mxd User: sal2

Property Boundary

County Boundary

1,500 750 0 1,500

Feet

Scale: 1 inch = 1,500 feet

Figure D-8

HISTORICAL IMAGERY - 2006
Merriam Junction Mine
Hunt Global Resources
Scott County, MN

Minnesota Wetland Conservation Act
Notice of Decision

Local Government Unit (LGU) **Louisville Township**	Address **92 Mallard Drive** **Shakopee, MN 55379**

1. PROJECT INFORMATION

Applicant Name **Hunt Global Resources, Inc**	Project Name **Merriam Junction Sands Mine**	Date of Application **10/17/2011**	Application Number
☒ Attach site locator map.			

Type of Decision:

☒ Wetland Boundary or Type ☒ No-Loss ☐ Exemption ☐ Sequencing

☐ Replacement Plan ☐ Banking Plan

Technical Evaluation Panel Findings and Recommendation (if any):

☐ Approve ☒ Approve with conditions ☐ Deny

Summary (or attach): The TEP met on-site on 10/24/2011. It generally concurred with the delineated boundaries as marked in the field, but requested additional information to substantiate findings regarding incidental wetlands. The applicant submitted the requested detail. Upon review, the TEP found sufficient evidence suggesting 2 of the 11 wetlands claimed as incidental likely existed prior to disturbance and therefore were not exempt. The TEP recommends approval of the application with this exception.

2. LOCAL GOVERNMENT UNIT DECISION

Date of Decision: **2/15/ 2012**

☐ Approved ☒ Approved with conditions (include below) ☐ Denied

LGU Findings and Conclusions (attach additional sheets as necessary):

The proposed project encompasses approximately 938 acres in parts of Sections 16, 21, 21 and 28 of Township 115 N Range 23 East (Louisville Township).

An Application for Approval (for both Boundary and Type and No-Loss) was submitted on 10/17/2011 in anticipation of continuing aggregate production in currently active mining areas, reactivating aggregate mining in areas that are currently dormant, and expanding operations in both active and dormant areas to include production of silica sand. A Notice of Application was issued 11/1/2011 with a comment deadline of 11/23/2011. The TEP met on-site on 10/24/2011. Additional information was submitted on 1/3/2012 per TEP request.

The Scott SWCD completed a detailed review of the two (2) delineation reports submitted with the application. Several minor elements of information were found to be missing or in error. Upon request, this information was corrected and submitted with satisfactory detail and accuracy. Consequently, the applicant has met all requirements under WCA for Boundary/Type and No-Loss approval. Louisville Township, as LGU, therefore approves this application as follows:

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Bank Account #	Bank Service Area	County	Credits Approved for Withdrawal (sq. ft. or nearest .01 acre)

Replacement Plan Approval Conditions. In addition to any conditions specified by the LGU, the approval of a Wetland Replacement Plan is conditional upon the following:

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LGU Authorized Signature:

Signing and mailing of this completed form to the appropriate recipients in accordance with 8420.0255, Subp. 5 provides notice that a decision was made by the LGU under the Wetland Conservation Act as specified above. If additional details on the decision exist, they have been provided to the landowner and are available from the LGU upon request.

Name	Title	
John Weckman	**Town Supervisor**	
Signature John E. Weckman	Date 2/15/12	Phone Number and E-mail **952-445-5363**

THIS DECISION ONLY APPLIES TO THE MINNESOTA WETLAND CONSERVATION ACT. Additional approvals or permits from local, state, and federal agencies may be required. Check with all appropriate authorities before commencing work in or near wetlands.

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☒ DNR TEP member: **Melissa Doperalski**
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NW Region:	NE Region:	Central Region:	Southern Region:
Reg. Env. Assess. Ecol. Div. Ecol. Resources 2115 Birchmont Beach Rd. NE Bemidji, MN 56601	Reg. Env. Assess. Ecol. Div. Ecol. Resources 1201 E. Hwy. 2 Grand Rapids, MN 55744	Reg. Env. Assess. Ecol. Div. Ecol. Resources 1200 Warner Road St. Paul, MN 55106	Reg. Env. Assess. Ecol. Div. Ecol. Resources 261 Hwy. 15 South New Ulm, MN 56073

For a map of DNR Administrative Regions, see: http://files.dnr.state.mn.us/aboutdnr/dnr_regions.pdf

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180 Fifth St. East, Suite 700
St. Paul, MN 55101-1678

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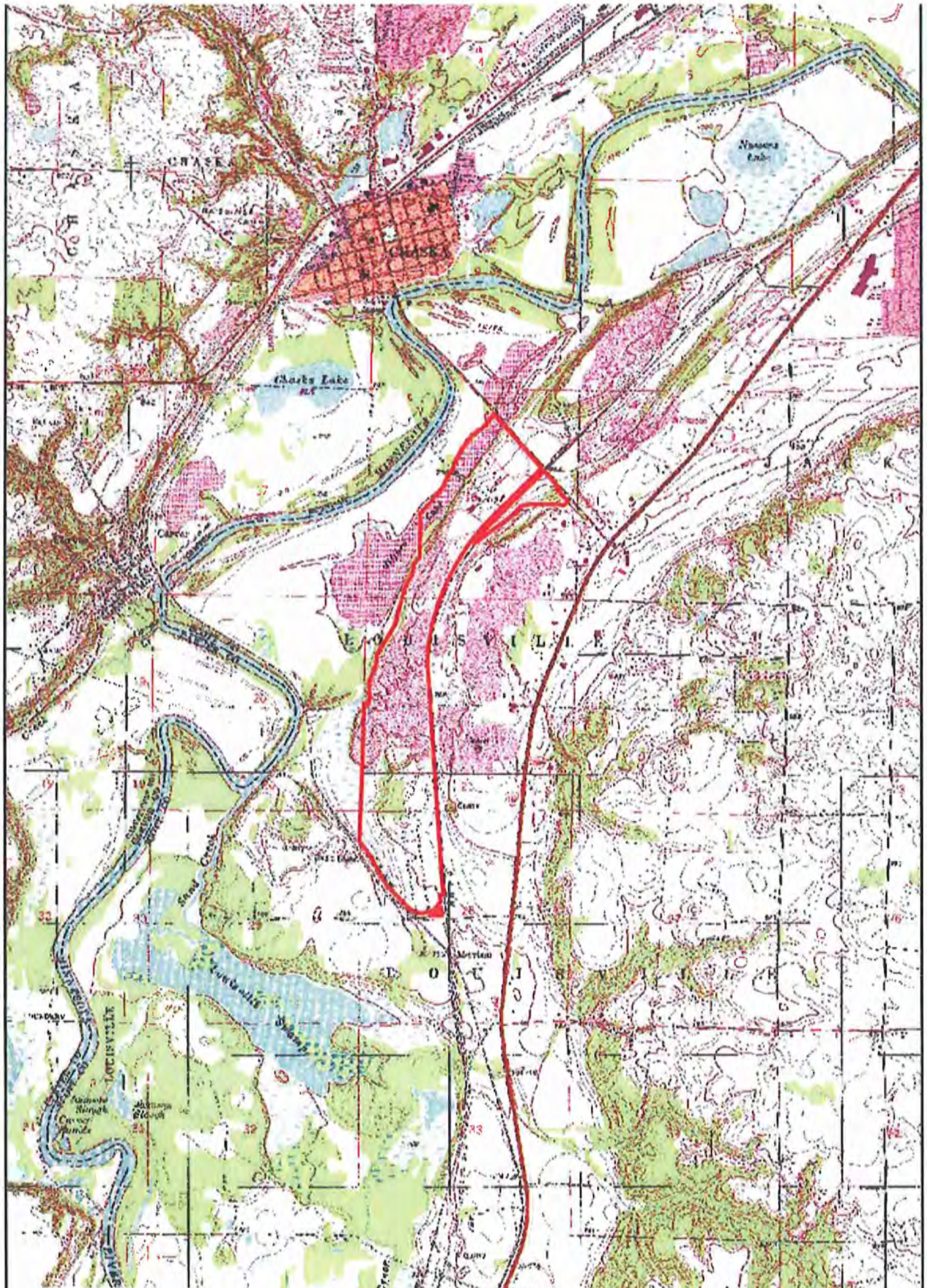
☐
☐
☐
☐



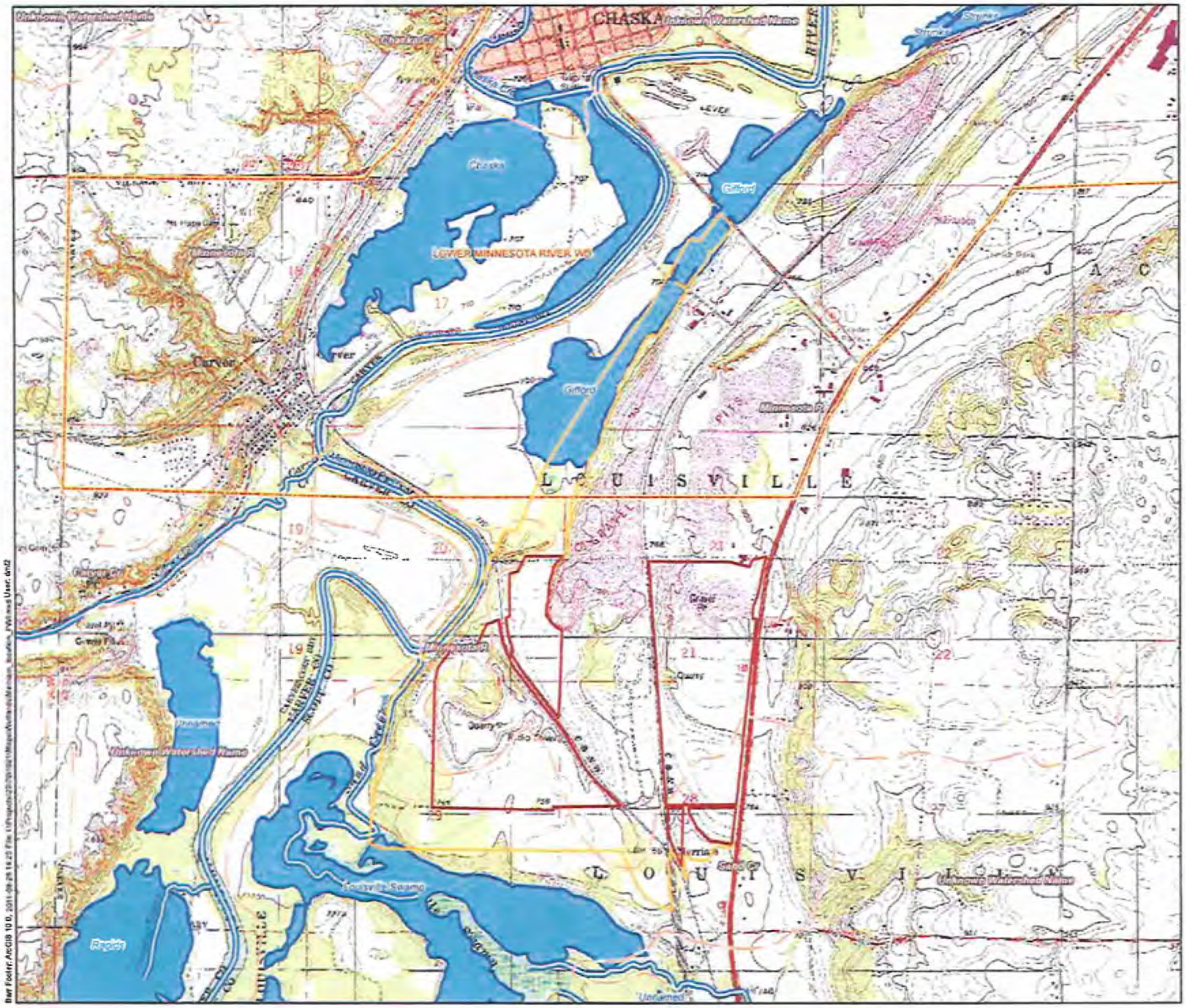
Part of Sec. 16, 21, 28
T115N R23W

Site Overview

Overlaid on USGS Topographic Map

Figure 1.

2011-024



Project Properties
Off-site wetland review area
Watershed Management District or Organization
Minor Watershed
Public Water Inventory Watercourse
Public Water Inventory Basin

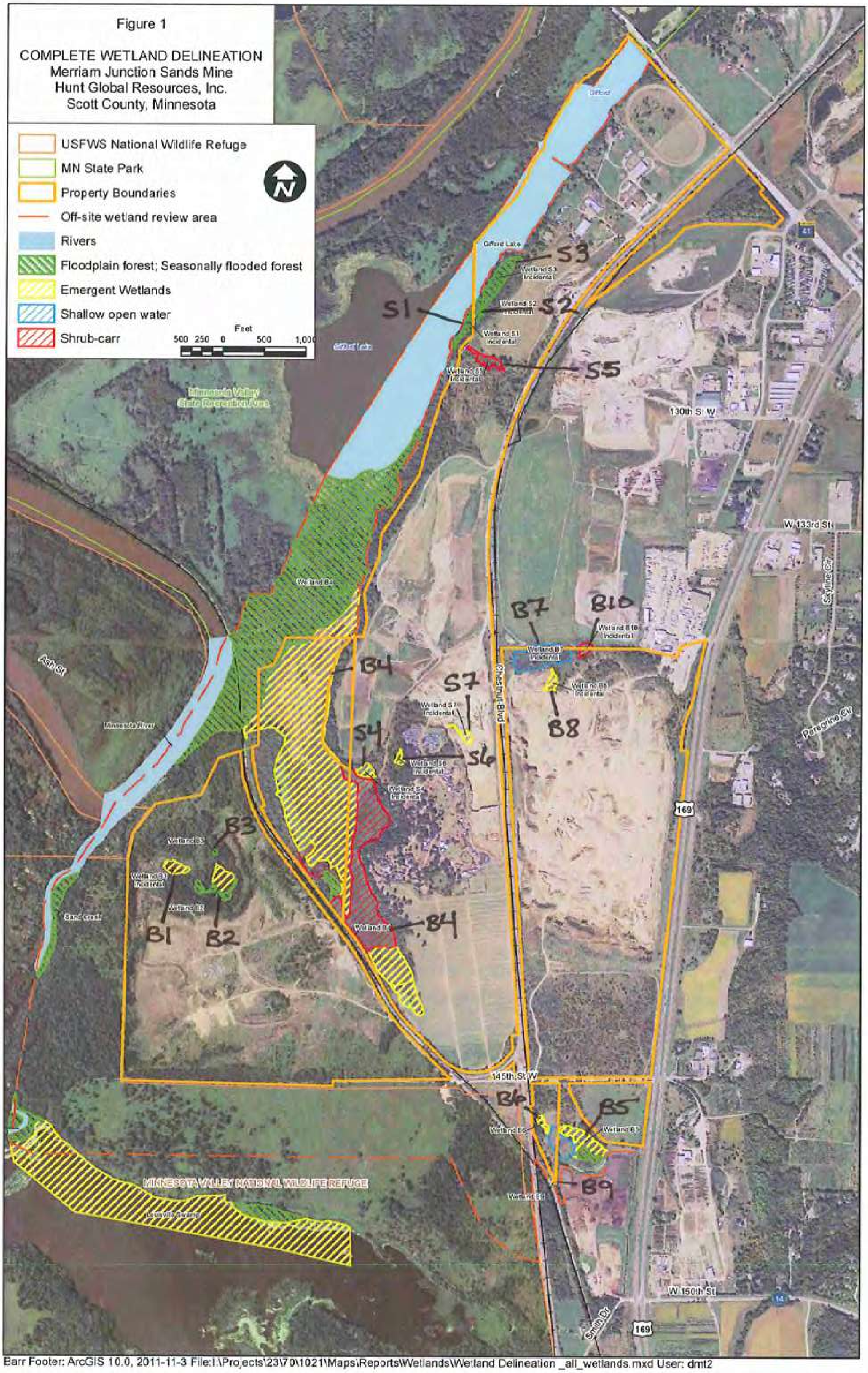
Feet
1,000 0 1,000 2,000 3,000 4,000

Meters
500 0 500 1,000

BARR

Figure 1

USGS QUAD and PUBLIC WATERS INVENTORY
Merriam Junction Sands
Hunt Global Resources, Inc.
Scott County, Minnesota



Barr Footer: ArcGIS 10.0, 2011-11-3 File:I:\Projects\23\70\1021\Maps\Reports\Wetlands\Wetland Delineation _all_wetlands.mxd User: dmt2

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An Application for Approval (for both Boundary and Type and No-Loss) was submitted on 10/17/2011 in anticipation of continuing aggregate production in currently active mining areas, reactivating aggregate mining in areas that are currently dormant, and expanding operations in both active and dormant areas to include production of silica sand. A Notice of Application was issued 11/1/2011 with a comment deadline of 11/23/2011. The TEP met on-site on 10/24/2011. Additional information was submitted on 1/3/2012 per TEP request.

The Scott SWCD completed a detailed review of the two (2) delineation reports submitted with the application. Several minor elements of information were found to be missing or in error. Upon request, this information was corrected and submitted with satisfactory detail and accuracy. Consequently, the applicant has met all requirements under WCA for Boundary/Type and No-Loss approval. Louisville Township, as LGU, therefore approves this application as follows:

1. Wetlands boundaries and types depicted on the attached map are approved. Wetlands S4, S6, B2, B3, B4, B5, B6, and B9 are subject to WCA jurisdiction; wetlands S1, S2, S3, S5, S7, B1, B7, B8 and

B10 are incidental and not regulated; and 2. This Notice is limited to approval of Boundary and Type and No-Loss findings. It does not provide approval or authorization for impacts upon regulated wetlands. If future mining activities should occur that directly or indirectly impact regulated wetlands, a separate application for sequencing and/or replacement must be submitted and approved prior to those impacts occurring. Note: indirect impacts may include, but are limited to, excavation activities outside that alter groundwater levels within a wetland, even though excavation itself may be outside the wetland.

For Replacement Plans using credits from the State Wetland Bank:

Bank Account #	Bank Service Area	County	Credits Approved for Withdrawal (sq. ft. or nearest .01 acre)

Replacement Plan Approval Conditions. In addition to any conditions specified by the LGU, the approval of a Wetland Replacement Plan is conditional upon the following:

☐ **Financial Assurance:** For project-specific replacement that is not in-advance, a financial assurance specified by the LGU must be submitted to the LGU in accordance with MN Rule 8420.0522, Subp. 9 (List amount and type in LGU Findings).

☐ **Deed Recording:** For project-specific replacement, evidence must be provided to the LGU that the BWSR "Declaration of Restrictions and Covenants" and "Consent to Replacement Wetland" forms have been filed with the county recorder's office in which the replacement wetland is located.

☐ **Credit Withdrawal:** For replacement consisting of wetland bank credits, confirmation that BWSR has withdrawn the credits from the state wetland bank as specified in the approved replacement plan.

Wetlands may not be impacted until all applicable conditions have been met!

LGU Authorized Signature:

Signing and mailing of this completed form to the appropriate recipients in accordance with 8420.0255, Subp. 5 provides notice that a decision was made by the LGU under the Wetland Conservation Act as specified above. If additional details on the decision exist, they have been provided to the landowner and are available from the LGU upon request.		
Name **John Weckman**	Title **Town Supervisor**	
Signature John E. Weckman	Date 2/15/12	Phone Number and E-mail **952-445-5363**

THIS DECISION ONLY APPLIES TO THE MINNESOTA WETLAND CONSERVATION ACT. Additional approvals or permits from local, state, and federal agencies may be required. Check with all appropriate authorities before commencing work in or near wetlands.

Applicants proceed at their own risk if work authorized by this decision is started before the time period for appeal (30 days) has expired. If this decision is reversed or revised under appeal, the applicant may be responsible for restoring or replacing all wetland impacts.

This decision is valid for three years from the date of decision unless a longer period is advised by the TEP and specified in this notice of decision.

3. APPEAL OF THIS DECISION

Pursuant to MN Rule 8420.0905, any appeal of this decision can only be commenced by mailing a petition for appeal, including applicable fee, within thirty (30) calendar days of the date of the mailing of this Notice to the following as indicated:

Check one:

☐ Appeal of an LGU staff decision. Send petition and $_____ fee (if applicable) to:	☒ Appeal of LGU governing body decision. Send petition and $500 filing fee to: Executive Director Minnesota Board of Water and Soil Resources 520 Lafayette Road North St. Paul, MN 55155

4. LIST OF ADDRESSEES

☒ SWCD TEP member: **Troy Kuphal**
☒ BWSR TEP member: **Ken Powell**
☐ LGU TEP member (if different than LGU Contact):
☒ DNR TEP member: **Melissa Doperalski**
☐ DNR Regional Office (if different than DNR TEP member)
☒ WD or WMO (if applicable): **Paul Nelson**
☐ Applicant and Landowner (if different)
☐ Members of the public who requested notice:

☐ Corps of Engineers Project Manager
☐ BWSR Wetland Bank Coordinator (wetland bank plan decisions only)

5. MAILING INFORMATION

- For a list of BWSR TEP representatives: www.bwsr.state.mn.us/aboutbwsr/workareas/WCA_areas.pdf
- For a list of DNR TEP representatives: www.bwsr.state.mn.us/wetlands/wca/DNR_TEP_contacts.pdf
- Department of Natural Resources Regional Offices:

NW Region:	NE Region:	Central Region:	Southern Region:
Reg. Env. Assess. Ecol. Div. Ecol. Resources 2115 Birchmont Beach Rd. NE Bemidji, MN 56601	Reg. Env. Assess. Ecol. Div. Ecol. Resources 1201 E. Hwy. 2 Grand Rapids, MN 55744	Reg. Env. Assess. Ecol. Div. Ecol. Resources 1200 Warner Road St. Paul, MN 55106	Reg. Env. Assess. Ecol. Div. Ecol. Resources 261 Hwy. 15 South New Ulm, MN 56073

For a map of DNR Administrative Regions, see: http://files.dnr.state.mn.us/aboutdnr/dnr_regions.pdf

- For a list of Corps of Project Managers: www.mvp.usace.army.mil/regulatory/default.asp?pageid=687 or send to:

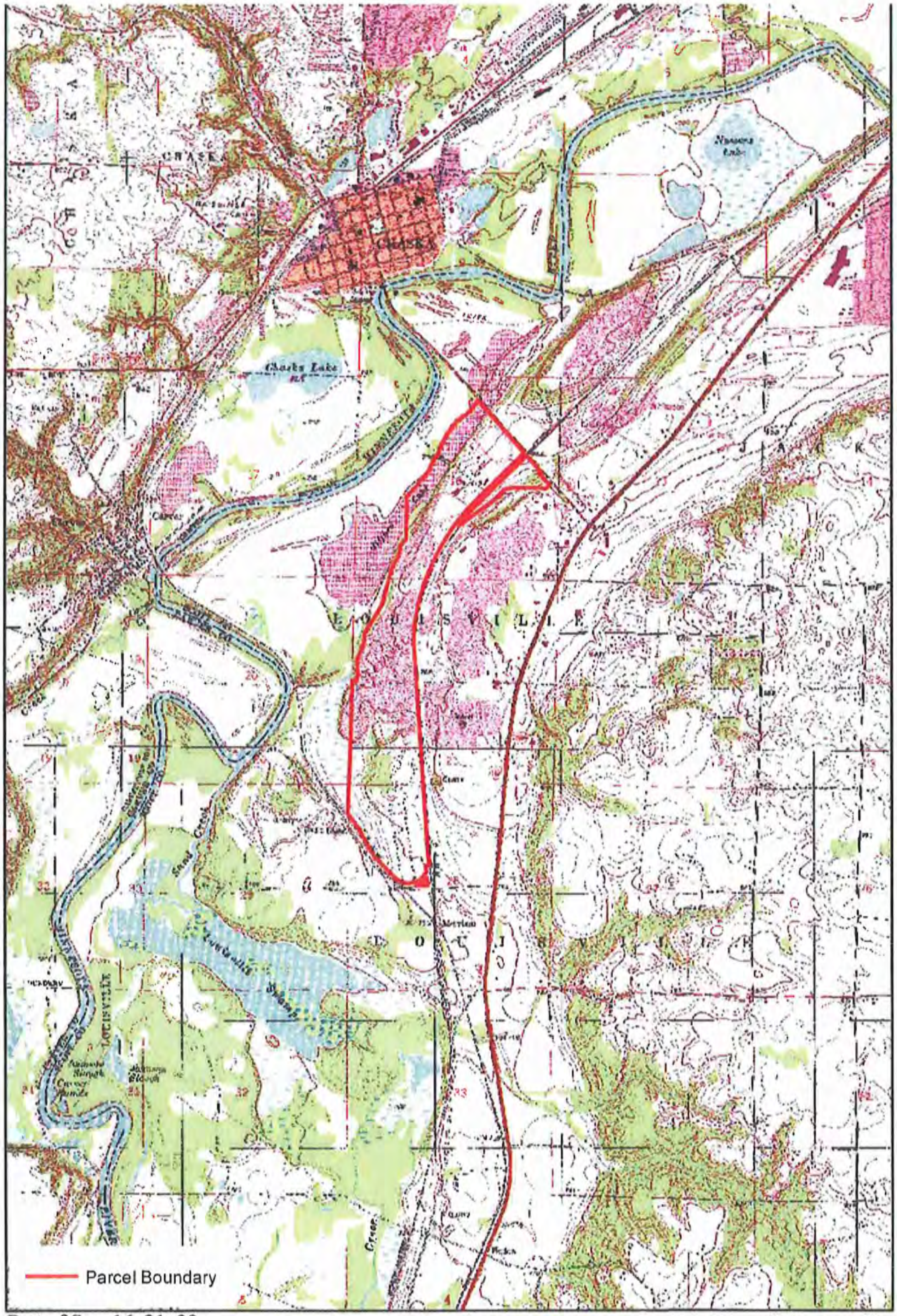
US Army Corps of Engineers
St. Paul District, ATTN: OP-R
180 Fifth St. East, Suite 700
St. Paul, MN 55101-1678

➢For Wetland Bank Plan applications, also send a copy of the application to:
Minnesota Board of Water and Soil Resources
Wetland Bank Coordinator
520 Lafayette Road North
St. Paul, MN 55155

6. ATTACHMENTS

In addition to the site locator map, list any other attachments:

☒ **Map showing wetlands with alph-numeric identification**
☐
☐
☐
☐

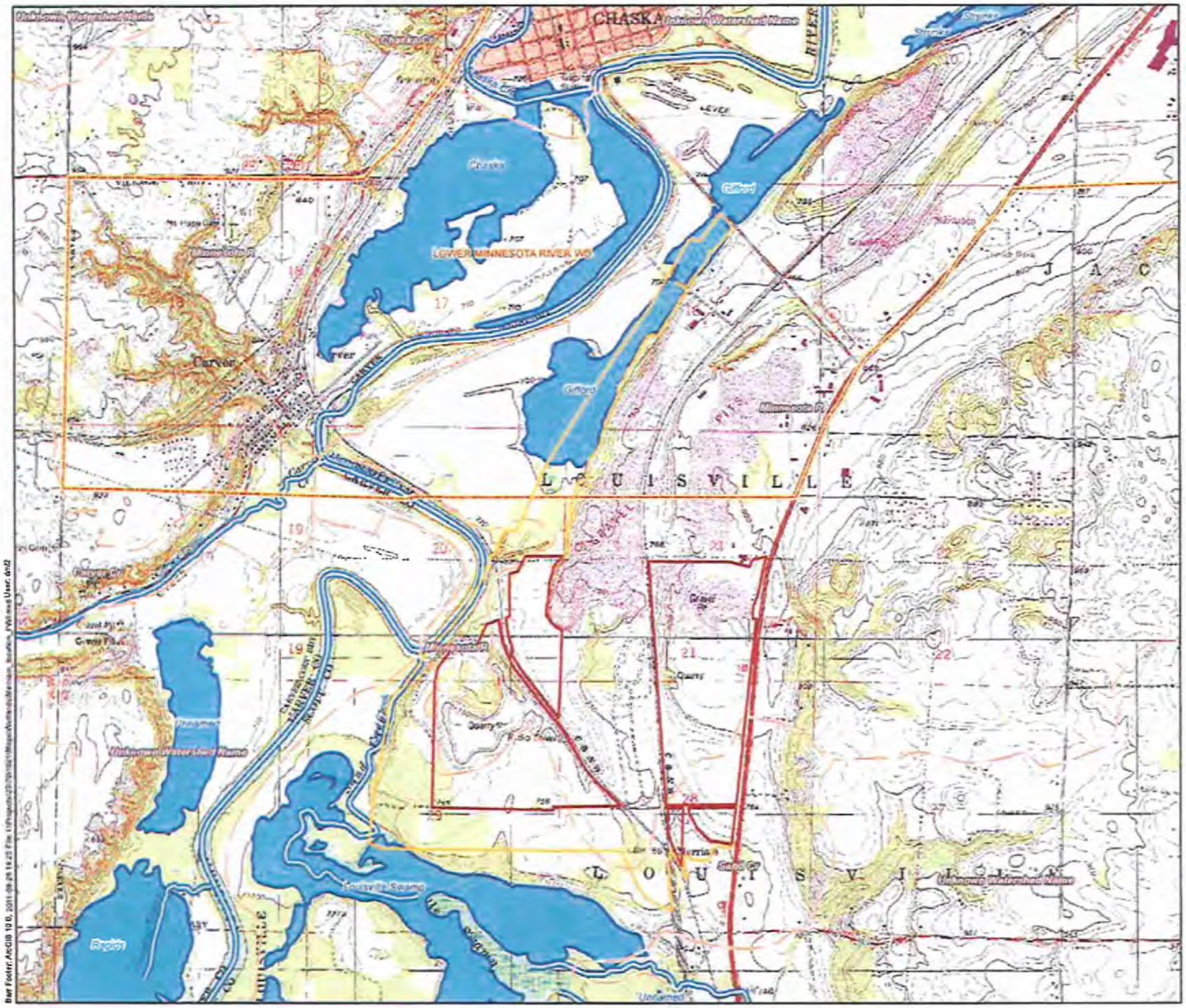


Part of Sec. 16, 21, 28
T115N R23W

Site Overview
Overlaid on USGS Topographic Map

Figure 1.

2011-024



Project Properties
Off-site wetland review area
Watershed Management District or Organization
Minor Watershed
Public Water Inventory Watercourse
Public Water Inventory Basin

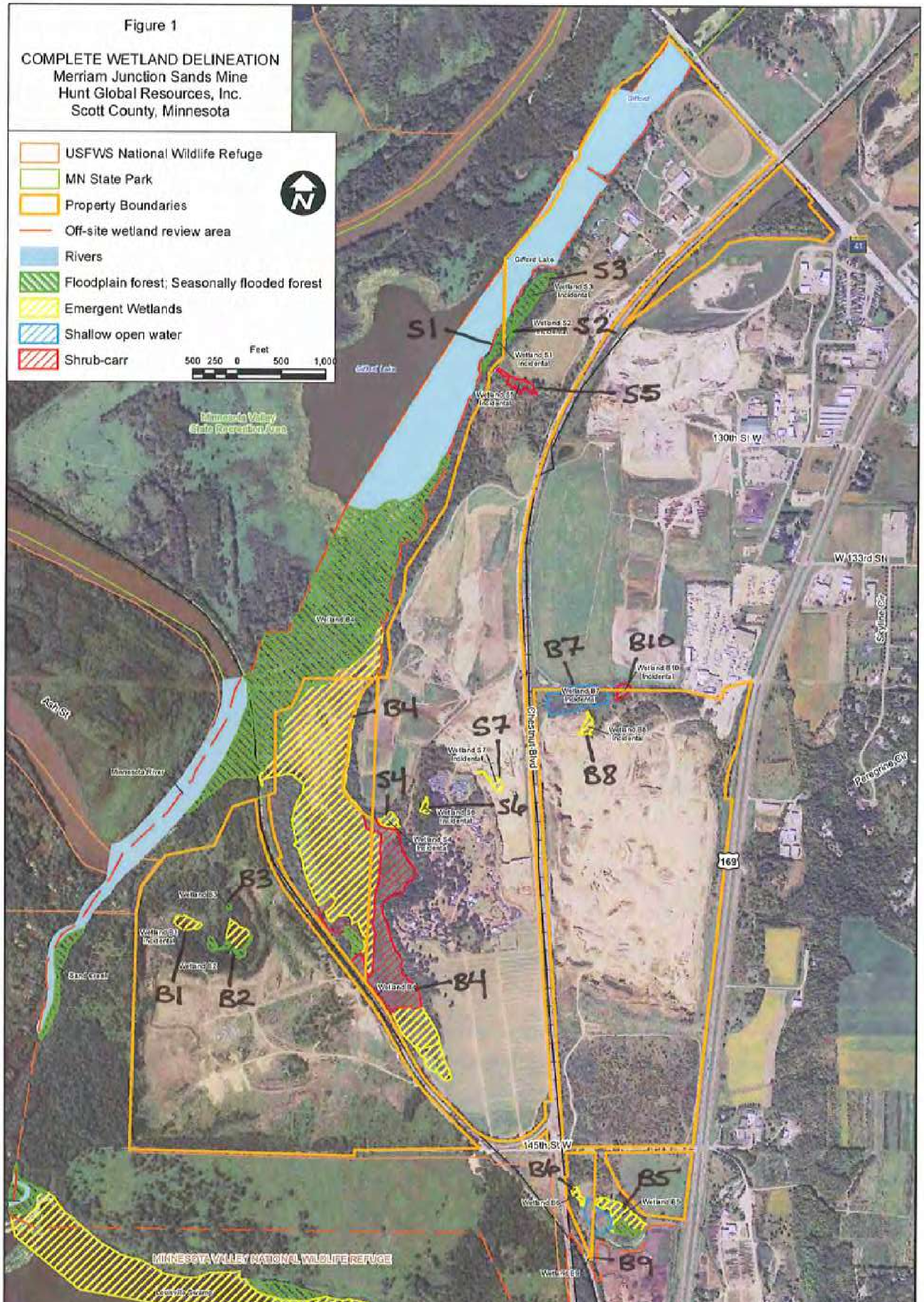
Feet
1,000 0 1,000 2,000 3,000 4,000

Meters
500 0 500 1,000

BARR

Figure 1

USGS QUAD and PUBLIC WATERS INVENTORY
Merriam Junction Sands
Hunt Global Resources, Inc.
Scott County, Minnesota



Barr Footer: ArcGIS 10.0, 2011-11-3 File:I:\Projects\23\70\1021\Maps\Reports\Wetlands\Wetland Delineation _all_wetlands.mxd User: dmt2

November 2021

Permit Reissuance and Modification

Dem-Con Landfill SW-290

LOUISVILLE TOWNSHIP

SCOTT COUNTY, MINNESOTA

HYDROGEOLOGIC EVALUATION

Consulting Civil Engineers

Sunde Engineering, PLLC
10830 Nesbitt Avenue South • Bloomington, Minnesota 55437-3100
Phone: (952) 881-3344 • Fax: (952) 881-1913 • E-Mail: info@sundecivil.com

HYDROGEOLOGIC EVALUATION
Dem-Con Landfill
November 2021

1.0 Introduction:

The Dem-Con Landfill is an existing Class III construction and demolition debris landfill (C&D Landfill) located in Louisville Township, Scott County Minnesota (Facility). The landfill has been in operation since January 1986. The size of the existing landfill is situated on 121 acres. Dem-Con is proposing to expand the landfill onto an adjacent 241 acres located south of the existing landfill (Site). The entire expansion area is limestone quarry that has been active for the past 50 years. Dem-Con is proposing to develop the landfill in phases to accommodate that remining mining activity on the Site.

The quarry mines dolomite for construction aggregates from the Prairie du Chien Group. The Expansion Area was the subject of a proposal to mine the underlying Jordan Sandstone by Merriam Junction sands (MJS). An Environmental Impact Statement was completed for the MJS project and was declared adequate by the Scott County Board on July 7, 2020. The EIS included a Groundwater Assessment by Barr Engineering which included soil borings, monitoring wells, pump tests, geophysics, and development of a groundwater model. The study area included all of the Expansion Area as well as property to the west. The results of the EIS and the Groundwater Assessment Report[1] are summarized here.

2.0 Site Evaluation Information:

1. Location Standards:

The Site is not located in a floodplain or within 1,000 feet of a lake or 300 feet of a river. The MN River is located over 3,000 feet west of the Site. Gifford Lake is the closest Lake and is located over located over 2,500 feet from the Site. The Site is not located within a Shoreland District.

Karst Features are not present. The site is an active limestone quarry and the floor of the quarry is composed of the basal layer of the Oneota dolostone.

There are no wetlands located on-site. A wetland delineation was performed over the site in conjunction with the MJS EIS by Barr Engineering. There are existing stormwater ponds and process water ponds associated with the mining operation that are located on site but not regulated under the Wetland Conservation Act.

The Site is not located in proximity to a Wild and Scenic River.

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[1] Barr Engineering Company. 2014. Groundwater Assessment Report Resource Document for Environmental Impact Statement and Groundwater Appropriation Permit Application. Merriam Junction Sands, Scott Cunty, MN. Merriam Junction Sands, LLC November 14, 2014.

2. Soil Borings:

The investigation included two test pits and 5 soil borings on the Site itself, and over 30 soil borings across the MJS project area which were used to verified the general underlying geology of the area. Copies of the soil borings on the site are included as Attachment 1 which includes a soil boring location map.

3. Soils:

According to the NRCS Web Soil Survey, the original soils in the Project Area were composed predominantly of stony land with shallow depths to limestone bedrock, which is the target resource of the past and current mining activity on the site. The majority of site soils have been or will be removed as part of the mining activity. The exception to this are the soils located in the very southern portion of the Site that were identified as being the only soils remaining on the site that are suitable for the development SSTS sites[2] (Fesner 2019). The area is not served by municipal utilities and future development is dependent upon suitable SSTS sites. The protection of these soils is a condition of the mine permit and the approved mining and reclamation plans. These soils will not be impacted by the landfill development.

Table 1 includes the soil types of the original site soils. An NRCS Soil Map and Report for the Project Area is included as Attachment 2.

TABLE 1 SITE SOILS

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
CdB	Copaston silt loam, 2 to 6 percent slopes	4.1	1.7%
CdB2	Copaston silt loam, 2 to 6 percent slopes, moderately eroded	1.2	0.5%
DbB	Dickman sandy loam, 2 to 6 percent slopes	0.0	0.0%
EaB	Estherville sandy loam, 2 to 6 percent slopes	13.6	5.6%
Gp	Pits, gravel	4.3	1.8%
Sc	Stony land	213.2	88.4%
Ta	Terrace escarpments	2.1	0.9%
TcA	Terril loam, 0 to 2 percent slopes	2.5	1.0%
Totals for Area of Interest		241.0	100.0%

[2] 2019. Fesner Environmental. Site Suitability for Septic Systems. Merriam Junction Sands, LLC on property owned by Bryan Rock Products and Malker0son Sales, Inc.

4. Geology

The proposed Site is located in the southern region of the Twin City basin, with underlying bedrock units generally dipping to the north. Over most of the Site, a thin layer of unconsolidated material (a mix of sand and gravel and clay) originally covered the underlying bedrock. Bedrock, prior to mining was s near the surface throughout the majority of the Site and has largely been removed or will be removed through the course of mining activity.

The Prairie du Chien Group forms the bedrock subcrop over the Site. The Prairie du Chien Group is composed of two units, the upper Shakopee Formation and the lower Oneota Dolomite. Both units consist largely of carbonate components, characterized by thin to very thick, beds of dolostone, with negligible amounts of sandstone and other silica bearing rocks, except in the lowermost 10 to 20 feet, within the Coon Valley Member, (the lowest member of the Oneota Dolomite), which can contain substantial quantities of sandstone, siltstone, and shale.[3] The Oneota Dolomite is being actively mined across the Site. While mining encounters small solution cavities and fracture zones typical of this formation, there is no evidence of sinkholes or other larger karst features within the Site. The Prairie du Chien Group within the Site was originally 40-90 feet thick due to past erosion of the uppermost portion of this bedrock unit. Mining will extend to with a few feet of the base of the dolomite.

Underlying the Prairie du Chien Group is the Jordan Sandstone. The Jordan Sandstone is approximately 80 to 120 feet thick beneath the Site. It contains two facies, a medium-to coarse-grained quartz sandstone and fine-grained feldspathic sandstone with lenses of siltstone and shale. From uppermost to lowermost, the Jordan is underlain by: the St. Lawrence Formation, the Tunnel City Group (formerly known as the Franconia Formation), the Wonewoc Sandstone (formerly known as the Ironton and Galesville Sandstones), and the Eau Claire Formation. The St. Lawrence Formation is predominantly crystalline dolostone, though the uppermost portion contains dolomitic siltstone, and is approximately 50 feet thick at the Site. The Tunnel City Group is composed of friable feldspathic and glauconitic sandstone with a basal layer of glauconitic dolostone approximately 10 to 12 feet thick. The entire Tunnel City Group is believed to be approximately 120 feet thick at the Site. The next unit is the Wonewoc Sandstone, a friable quartzose Cambrian sandstone which is believed to be approximately 70 feet thick at the Site. The Eau Claire Formation is the lowermost geologic unit of interest at the Site. It is composed of shale, siltstone, and very fine- grained sandstone.

Figure 1 shows a generalized stratigraphic column for the Site. Figure 2 shows a generalized bedrock map of the Site and surrounding area. West of the Site, the Minnesota River flows through a bedrock valley, which is believed to be downcut into the St. Lawrence Formation and/or Tunnel City Group.

5. Groundwater Flow:

The Site is underlain by bedrock aquifer systems. The water table is generally associated with the upper portion of the Jordan Sandstone. Groundwater flow is controlled by the discharge region of the Minnesota River valley with the general direction of groundwater flow from east to west across the expansion area.

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[43] Mossler, John. 2008. Paleozoic Stratigraphic Nomenclature for Minnesota. Report of Investigations 65. University of Minnesota St. Paul, MN.

A prominent buried valley connects to the Minnesota River Valley located north of the existing landfill that locally influences groundwater flow directions which have a north westerly flow direction in the very northern portion of the existing landfill. In the expansion area, groundwater elevations vary from 728 msl along the eastern boundary of the Site to 718 msl to the west. Figure 3, Water Table Map, illustrates the elevation of the groundwater table across the Site taken from field measurements during the MJS assessment.

6. Proximity to Water Supply Wells:

Water supply wells are located in the area surrounding the Site. The majority of these wells are located upgradient or side gradient of the landfill and the expansion area. The Renaissance Festival has two non-community public water supply wells that are located downgradient of the Project Area. These wells are finished in deeper aquifers. Table 2 includes the names, unique numbers (where available), and locations of wells within 1,000 feet of the Project Area. Figure 4 - Water Supply Wells Near the Project Area, illustrates the locations of these wells. Attachment 3 includes copies of the water supply well logs.

Table 2 Nearby water supply wells

Section 21					
540281	Bryan Rock Products (sealed)	13580 Johnson Memorial Dr. Shakopee MN 55379	115	23	21
272748	Dem-Con Material Recovery Facility	13161 Johnson Memorial Dr. Shakopee MN 55379	115	23	21
272749	Dem-Con Material Recovery Facility	13161 Johnson Memorial Dr. Shakopee MN 55379	115	23	21
796915	Dem-Con Material Recovery Facility	13161 Dem Con Dr. Shakopee MN 55379	115	23	21
684019	Dem-Con Office	13020 Dem-Con Dr. Shakopee MN 55379	115	23	21
809771	Dem-Con Metal Recycling	13142 Dem Con Dr. Shakopee MN 55379	115	23	21
405973	Halloran	13122 Johnson Memorial Dr. Shakopee MN 55379	115	23	21
610403	Anchor Block	13450 Johnson Memorial Dr. Shakopee MN 55379	115	23	21
759599	Anchor Block		115	23	21
221364	Johnson & Bigler Co.	13450 Johnson Memorial Dr. Shakopee MN	115	23	21
209939	Lano Implement	3021 133rd St. W. Shakopee MN 55379	115	23	21
551318	C.H. Carpenter Lumber	13731 Johnson Memorial Dr. Shakopee MN	115	23	21
836415	Mumoff	13745 Johnson Memorial Drive	115	23	21
248000	MN Renaissance Festival	3630 145th St. W. Shakopee MN 55379	115	23	21
Section 28					
211864	Lindstrom	3036 150th St. W. Shakopee MN 55379	115	23	28
244436	Merriam Junc. RR Well	145th St. W. and RR track	115	23	28
709026	Doucette	14331 Johnson Memorial Dr. Shakopee MN	115	23	28
211863	Minn. Valley Nursery	3232 150th St. W. Shakopee MN 55379	115	23	28
211865	Minn. Valley Garden Cent	3232 150th St. W. Shakopee MN 55379	115	23	28
569344	NRG	14800 Johnson Memorial Dr. Shakopee MN	115	23	28
233116	Granzlow (Doucette)	Irrigation Well 14145 Johnson Memorial	115	23	28
513892	Renaissance Festival	3325 145th St. W. Shakopee MN 55379	115	23	28

404657	Renaissance Festival	3525 145th St. W. Shakopee MN 55379	115	23	28
401129	MN Valley Wholesale	14505 Johnson Memorial Dr. Shakopee MN 55379	115	23	28

7. Groundwater Monitoring:

There are several monitoring wells located adjacent to the expansion area that are associated with three separate monitoring well networks. The Dem-Con Landfill has an existing monitoring well network that consists of eight wells. The closed Louisville Landfill has a monitoring well network that consists of 16 wells, 12 of these are active. The MJS project had a monitoring well network that consisted of 15 wells, two of which are located within the expansion area. Figure 5, Monitoring Well Networks, illustrates the location of the monitoring wells area including the Dem-Con Landfill, the closed Louisville Landfill, and the MJS monitoring well networks. Table 3 lists these wells and Attachment 4 includes copies of well logs for the existing Dem-Con monitoring well network and the MJS monitoring wells that are located within the Site.

The Dem-Con Monitoring Well Network will be expanded to provide coverage of the expansion area. Two additional upgradient wells will be installed along the eastern boundary of the Site and three downgradient wells will be installed along the western boundary of the Site. Proposed well locations are indicated on Figure 5. The wells will be installed, and baseline data will be collected a minimum of one year prior to landfilling within the areas they will be monitoring. Monitoring is conducted for a number of parameters including metals and VOCs in accordance with the solid waste permit.

TABLE 3 EXISTING MONITORING WELL NETWORKS

DEM-CON MONITORING WELL NETWORK	
Name	**Unique Number**
W-8	Unknown
W-10	151599
W-120	595728
W-121	595729
W-122	Unknown
DC-117	557378
DC-118	557379
DC-119	557380
CLOSED LOUISVILLE LANDFILL MONITORING WELL NETWORK	
Name	**Unique Number**
W-3A	Unknown
W-4	Unknown
W-5	Unknown
W-9	Unknown

W-11	151598	
W-111	151597	
W-211	433615 (sealed 12-07-20004)	
W-112	433618 (sealed H227037)	
W-113	433616	
W-213	433617	
W-114	433619	
W-115	525943	
W-116	Unknown	
DC-117[4]	557378	
Dc-118	557379	
DC-119	557380	
MJS MONITORING WELL NETWORK		
Name	**Unique Number**	
MW-1-11	783158	
MW-04-11	783164	In Project Area
MW-6-11	783162	
MW-7-11	783165	In Project Area
MW-8-11	783155	
MW-9-11	783159	
MW-11-11	783153	
MW-13-11	783154	
MW-16-11	783156	
MW-17-11	783160	
MW-19-11	783163	
MW-20-11	783161	
MW-21-11	783157	
PW-14-11	786706	
PW-15-11	786707	

8. Liner

Initial landfill construction included unlined landfill cells. In 2007, Dem-Con began construction of all future cells with a synthetic liner and leachate collection system. The installation of the liner and leachate collection system provided enhanced environmental protection as well as allowed the facility to accept additional types of demolition, construction, and industrial waste. Once portions of the landfill reach final grade, a synthetic cap is constructed over the completed fill areas and a protective rooting layer is placed along with topsoil and vegetation.

[4] DC-117-DC-118 are part of both Dem-Con Landfill (downgradient of landfill)and Louisville Landfill (upgradient of landfill) Monitoring Networks

As part of the 2005 permit reissuance, a landfill liner and leachate collection system was included in the horizontal expansion area. Since the 2005 permit reissuance, Phases 1-7 of the lined area have been constructed. The 2021 permit reissuance includes a horizontal expansion of the landfill which includes Phases 9-32, all of which will be lined.

The liner system is designed to protect the environment by preventing the release of landfill leachate. The liner system design for each phase of the landfill has varied slightly over time. The liner system for Phase 1 is a composite liner system consisting of a 6 inch soil cushion layer, geosynthetic clay liner (GCL), a 40-mil HDPE liner, and a 12 inch granular drainage system. The liner system for Phase 2 is a composite liner system consisting of a 6 inch soil cushion layer, geosynthetic clay liner (GCL), a 40-mil HDPE liner, and an 18 inch granular drainage system. The liner system for Phase 3 is a composite liner system consisting of a 6 inch soil cushion layer, geosynthetic clay liner (GCL), a 60-mil HDPE liner, and a 24 inch granular drainage system. The GCL in the sump area of Phase 3 was underlain by an extra two feet of compacted clay liner. The liner system over Phases 4-7 is a composite liner system consisting of a 6 inch soil cushion layer, geosynthetic clay liner (GCL), a 60-mil HDPE liner, and a 24 inch granular drainage layer or an approved equivalent (12 drainage geocomposite plus 12 " of granular drainage) system. Future liner construction is designed to consist of a 6 inch soil cushion layer, geosynthetic clay liner (GCL), 60-mil HDPE liner, drainage geocomposite, and 12 inch granular drainage layer.

All phases where the liner system is constructed over bedrock are backfilled with a minimum of one foot of compacted soil. All phases where the liner system is constructed over in place demolition debris are backfilled with a minimum of one foot of compacted soil.

The build out of the collection system includes a series of 6" perforated HDPE collection pipes, and collection sumps and horizontal leachate pumps. Leachate is pumped to an above ground storage tank and load out facility. Leachate is hauled to a wastewater treatment plant or recirculated over lined areas for dust control.

The northern fill area was designed to incorporate the liner and leachate collection system at the base of the landfill as well as liner over in place waste located in the northern portion of the original unlined fill area. All future phases will be lined. Phase development has proceeded over time and the unlined fill areas were completed in 2021. Construction of an enhanced final cover system with a synthetic liner has also been completed over the southern 22 acres of the unlined fill area. The enhanced liner system reduces the amount of precipitation infiltrating into the waste after closure and reduces long term leachate generation. The in place cover over the unlined fill area increases groundwater protection.

Design Criteria:

Design criteria includes the capture of at least 90% of the precipitation falling on the fill area. Efficiency was computed based on the USEPA's Hydraulic Evaluation of Landfill Performance (HELP) model. HELP model results indicated an estimated design efficiency of 99% for the composite barrier liner system. The HELP model was originally run in 2005 for the development of the northern lined fill area. These results were updated to include the new phase development and lining of the remainder of the fill areas. The liner is designed to maintain a maximum leachate head of 12” or less.

Liner and Leachate Collection System Components:

Future phases of the landfill are located on property that was initially mined for aggregates creating the excavation for future filling. Both sand and gravel, and limestone have been removed in preparation for liner construction. The subgrade is prepared by placing a minimum of one foot of compacted clean fill over the top of the bedrock. The backfill consists of 0.5 feet or greater of general fill and is compacted in lifts no greater than six inches. The backfill is free of organic materials and is placed to within six inches of the bottom of the GCL. In Phase 4 and Phase 5, a one foot layer of soil was placed on top of the refuse to form the liner subgrade. The compacted backfill provides a stable subgrade for placement of the GCL cushion. The GCL cushion is placed on the subgrade backfill and below the GCL liner and consists of at least six inches of granular borrow placed and compacted in a six inch lift. The surface of the granular borrow must be smooth and free of protrusions or ruts. The material for granular borrow is produced from aggregate materials removed during mining of the site itself.

The GCL liner is placed in accordance with manufacture’s guidelines. An HPDE liner is placed on top of the GCL (40 mil Phase 1 and 2 60 mil Phase 3+). A granular drainage layer (12 inch Phase 1, 18 inch Phase 2 and 24 inch, or approved equivalent, Phase 3+) completes the cross section of the liner system. An approved equivalent for the 24 inch drainage layer has been a drainage geocomposite and 12 inch granular drainage layer. This approved equivalent is currently planned for all future phases.

HELP Model:

Leachate generation from the northern fill area was determined using the Hydrologic Evaluation of Landfill Performance (HELP) model developed for the USEPA. Modeling results were used to determine the efficiently of the leachate liner and collection system. Because leachate generation is expected to vary throughout the life of the facility, several different periods of operation were modeled to determine the period of greatest leachate generation and confirm that design criteria were met throughout the operating life of the landfill. Sideslopes and base areas were accounted for within each of the time periods included in the modeling. The original 2005 HELP Model included scenarios A-I. Additional scenarios were evaluated in the 2015 update and include scenarios J through N. Results are included in Appendix 6 of the Engineering Report attached to the Permit Application.

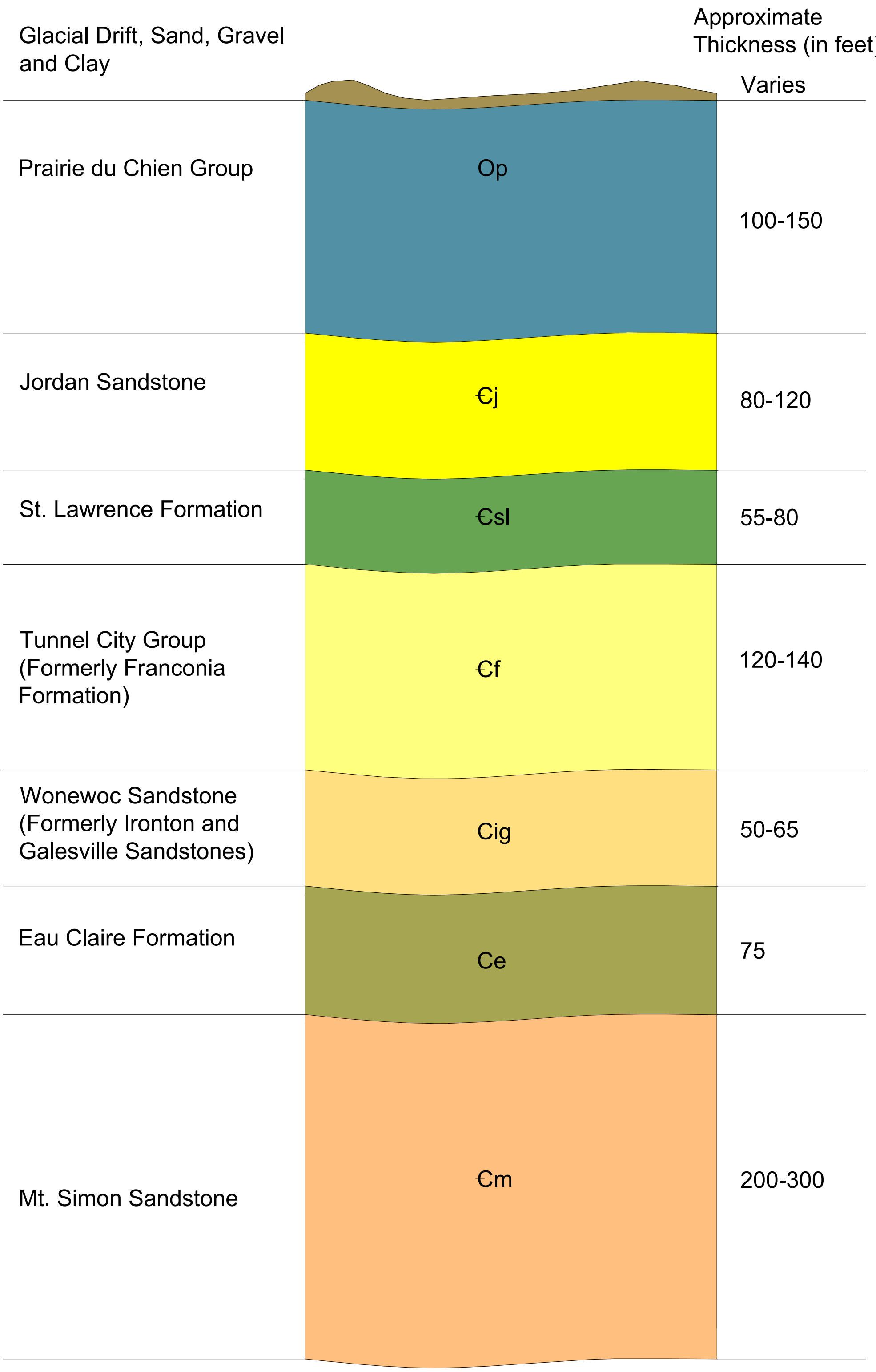
9. Maps

Maps showing the location of site, test pits, boring, and other site features are included as described above.

10. Certification

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based upon my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate and complete. I am aware that there are significant penalties for submitting false information including the possibility of fines and imprisonment.

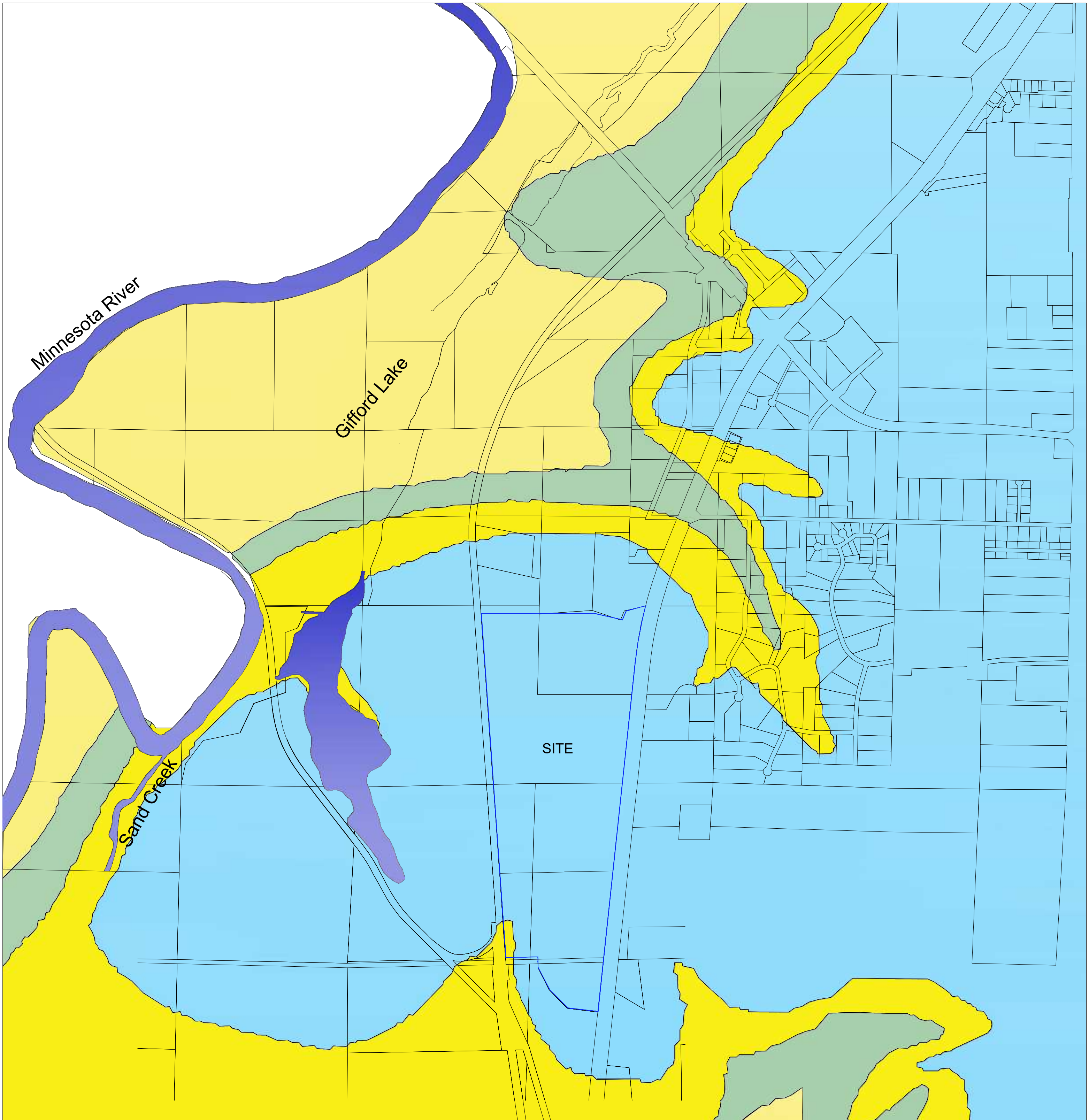
Kirsten Pauly, PE/PG	Kirsten Pauly
Name	Signature of Engineer/Geologist
Sunde Engineering, PLLC 10830 Nesbitt Avenue South Bloomington, MN 55437	11/29/2021
Address	Date
952-881-3344	21842
Telephone	Registration Number



NOT TO SCALE

Figure 1
Generalized Stratigraphic Column
Dem-Con Landfill Expansion Area
Hydrogeologic Assessment

Sunde Engineering, PLLC.



Key:

Prairie du Chien Group

Jordan Sandstone

St. Lawrence Formation

Franconia Formation

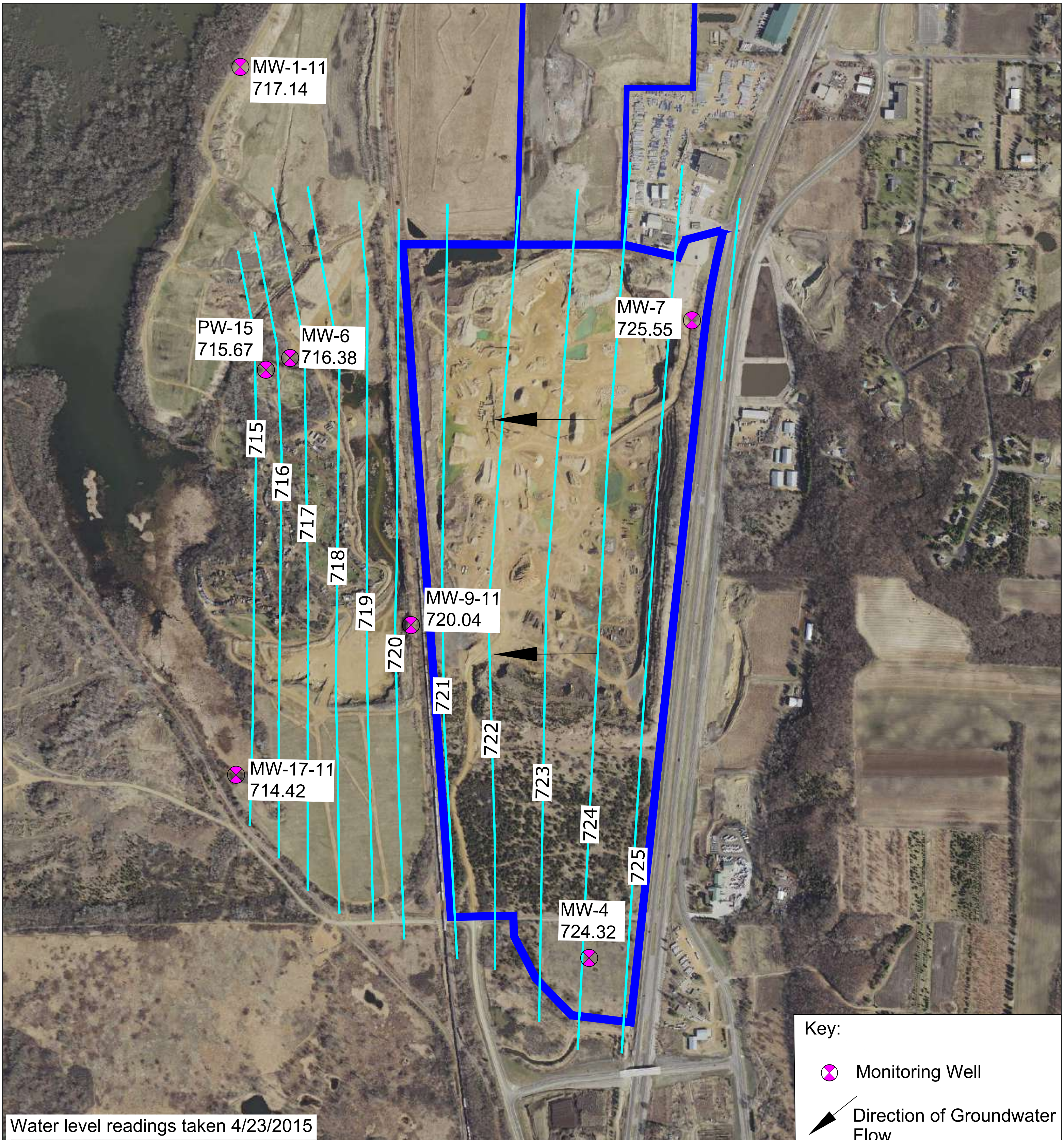
From Scott County Geologic Atlas

Figure 2
Bedrock Geology

Dem-Con Landfill Expansion Area

Hydrogeologic Assessment

Sunde Engineering, PLLC.



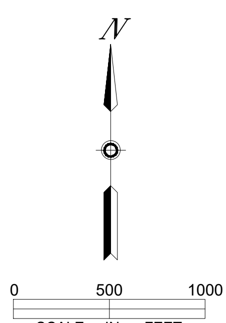
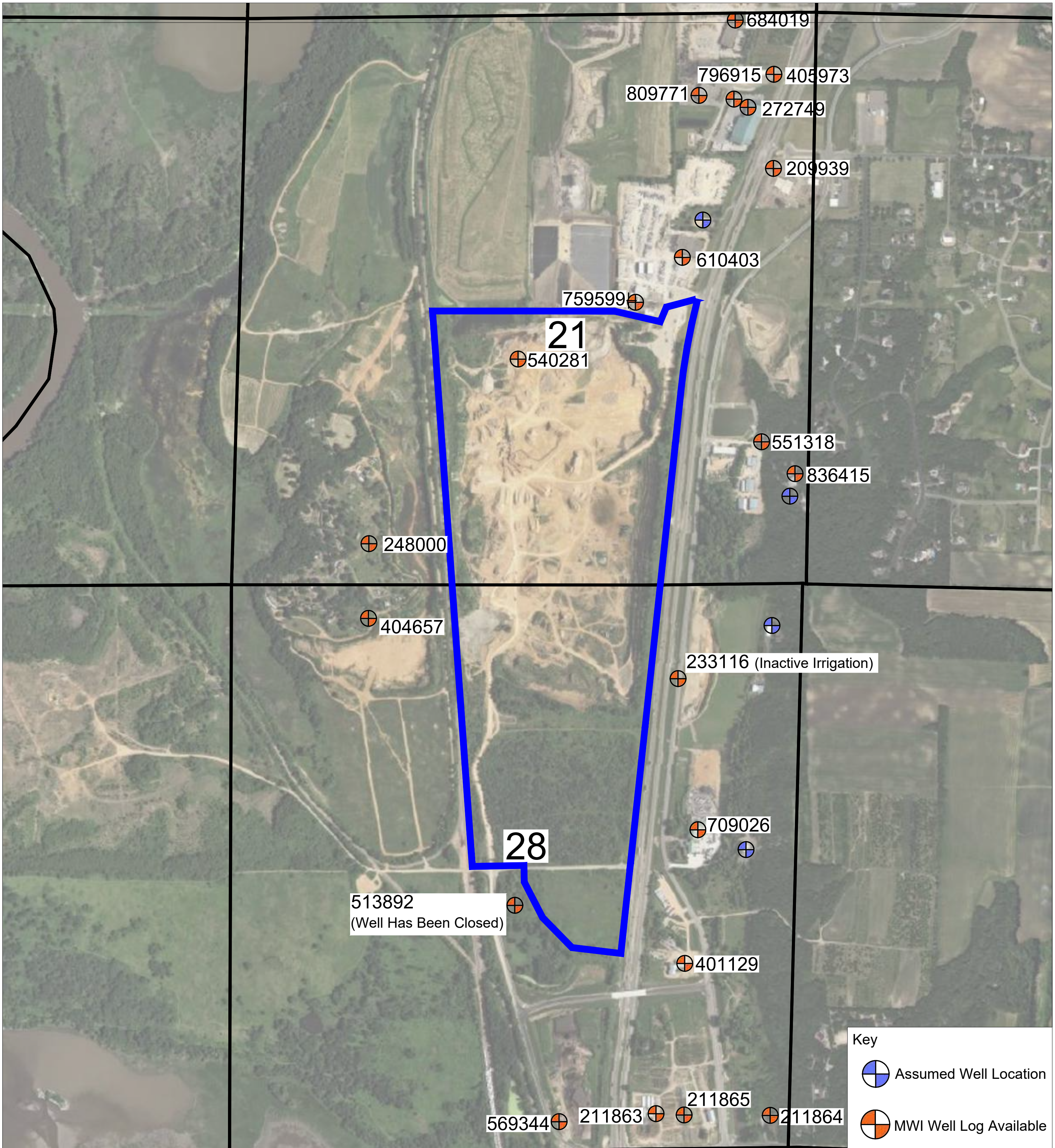


Figure 3
Water Table

Dem-Con Landfill Expansion Area
Hydrogeologic Assessment



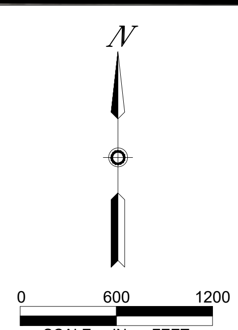
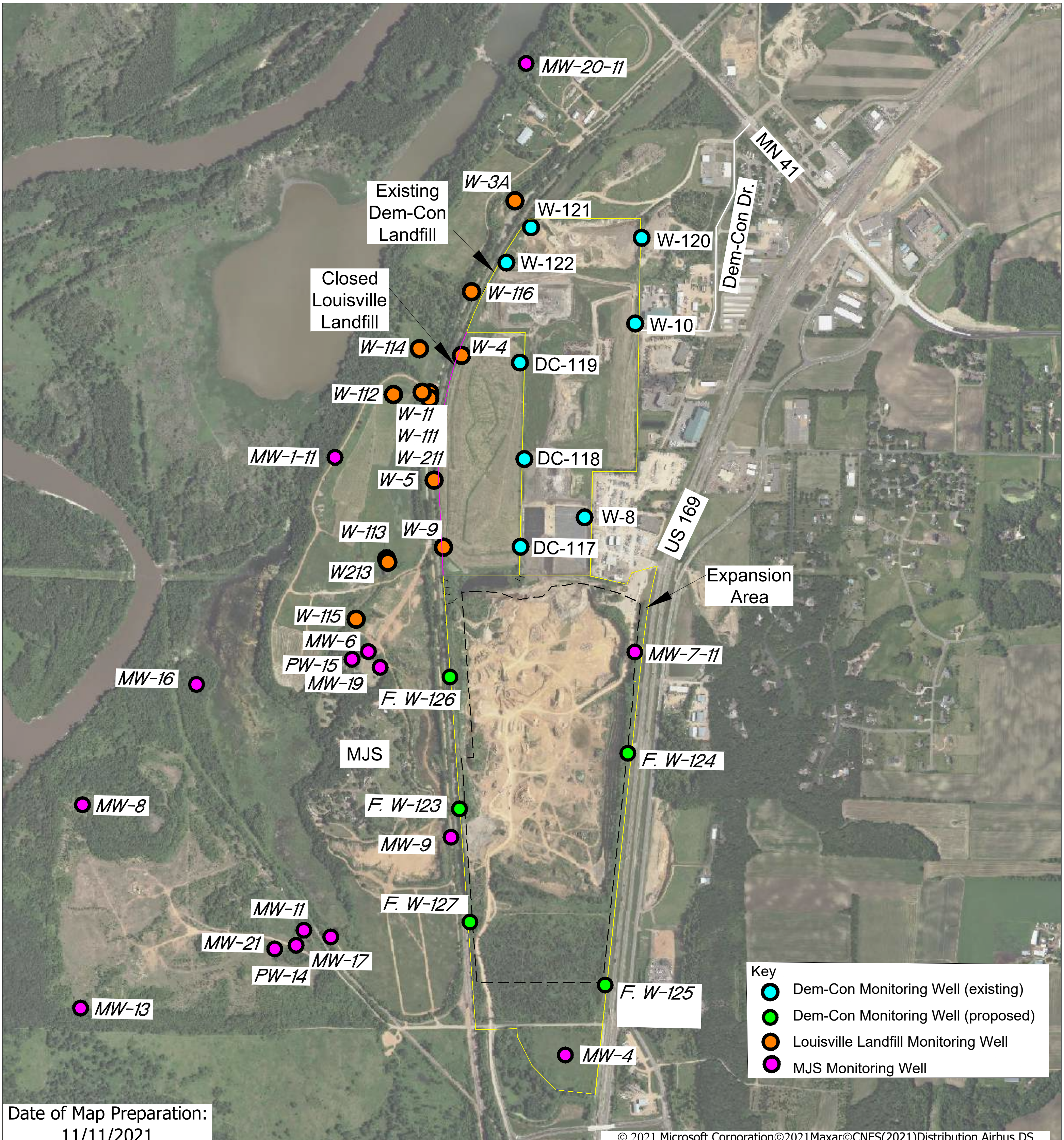


Figure 4
Water Supply Wells in Project Area
Dem-Con Landfill Expansion Area
Hydrogeologic Assessment

Sunde



N

0 750 1500

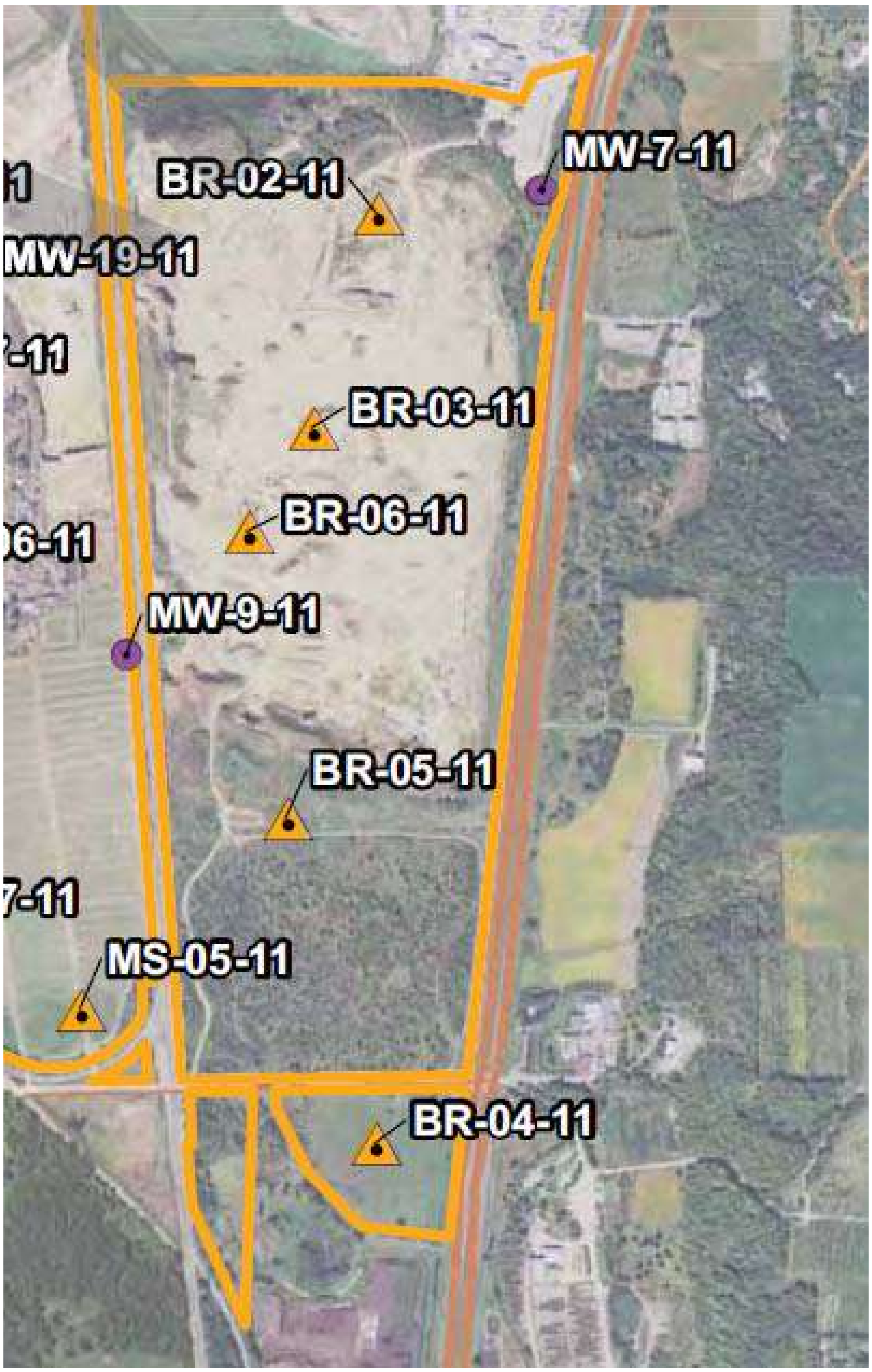
SCALE IN FEET

Figure 5
Monitoring Well Networks
Dem-Con Landfill Expansion Area
Hydrogeologic Assessment

Sunde Engineering, PLLC.

ATTACHMENT 1
Soil Boring Logs

Test pit and soil boring location map



LOG OF BORING BR-02-11

Client: Hunt Global
Project Name: Merriam Junction
Number: 23/70-1021
Location: Shakopee, MN

Drill Contractor: Boart Longyear
Drill Method: Rotosonic
Drilling Started: 6/26/11   Ended: 6/26/11
Logged By: BMD

UTME:453284.67
UTMN:4955624.64
Surface Elevation: 744.40
Total Depth: 155

DEPTH FEET	SAMP. LENGTH & RECOVERY / SAMP. NUMBER	ASTM	DESCRIPTION	ELEV. FEET
			DOLOSTONE: Reddish-brown to reddish-yellow. [Prairie du Chien Group]	
5	1	R		740
10	2		SANDSTONE: Brown, cemented, large vugs up to 0.5 inch thick, with thin laminations, transition zone with layers of cemented sand, very hard. [Prairie du Chien Group]	735
15	3			730
20	4		Decreasing layers of cemented sand.	725
25	5	R		720
30	6		Brown to reddish-yellow, cemented, vertical cavern burrows 0.25 inch wide and approximately 1 inch long.	715
35	7		Brown or gray to reddish-yellow, well-sorted, cemented.	710
40	8		SANDSTONE: Gray, well sorted, coarse-grained frac sand with orange iron staining. [Jordan Formation Sandstone] Cemented layer at 42 ft bgs.	705
45	9	SP	Thin cemented layer at 45 ft bgs.	700
				695

(continued)

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Telephone: 952-832-2600
Fax:

Remarks: Core not retained from 145-155 ft bgs.
Frac Sand - generally uncemented sandstone with clear to white rounded quartz grains
R = cemented rock

Additional data may have been collected in the field which is not included on this log.

LOG OF BORING BR-02-11

Client: Hunt Global
Project Name: Merriam Junction
Number: 23/70-1021
Location: Shakopee, MN

Drill Contractor: Boart Longyear
Drill Method: Rotosonic
Drilling Started: 6/26/11 Ended: 6/26/11
Logged By: BMD

Surface Elevation: 744.40
Total Depth: 155

DEPTH FEET	SAMP. LENGTH & RECOVERY	SAMP. NUMBER	ASTM	LITHOLOGY	DESCRIPTION	ELEV. FEET
		10			SANDSTONE: Gray, well sorted, coarse-grained frac sand with orange iron staining. [Jordan Formation Sandstone]*(continued)* Cemented layer at 51.5 to 52.5 ft bgs. Cemented layer at 53 to 54.5 ft bgs.	690
55		11			Cemented layer at 55 to 55.5 ft bgs, iron stained throughout. Cemented layer at 56.5 ft bgs, iron stained throughout. Cemented layer at 57.5 ft bgs, iron stained throughout. Cemented layer at 58.5 ft bgs, iron stained throughout.	
60		12				685
65		13			Minor iron staining.	680
70		14			Trace iron staining.	675
75		15	SP		Minor iron stained clusters.	670
80		16			Trace iron staining.	665
85		17				660
90		18				655
95		19			No iron staining.	650
						645

(continued)

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Frac Sand - generally uncemented sandstone with clear to white rounded quartz grains
R = cemented rock

Additional data may have been collected in the field which is not included on this log.

LOG OF BORING BR-02-11

Client: Hunt Global
Project Name: Merriam Junction
Number: 23/70-1021
Location: Shakopee, MN

Drill Contractor: Boart Longyear
Drill Method: Rotosonic
Drilling Started: 6/26/11 Ended: 6/26/11
Logged By: BMD

Surface Elevation: 744.40
Total Depth: 155

DEPTH FEET	SAMP. NUMBER	ASTM	DESCRIPTION	ELEV. FEET
	20	SP	SANDSTONE: Gray, well sorted, coarse-grained frac sand with orange iron staining. [Jordan Formation Sandstone]*(continued)*	
105	21		Medium to fine-grained.	640
110	22			635
115	23		Fine-grained with iron stained clusters.	630
120	24		Fine-grained with iron stained clusters increasing.	625
125	25		Fine-grained with iron stained clusters throughout.	620
130	26			615
135	27		Grayish-green, fine-grained sand. Grayish-green, fine-grained silty sand.	610
140				605
	28	R	DOLOSTONE: Grayish-green, fine-grained silty sand with iron stained layer at 141 ft bgs and clusters up to 1 inch. [St. Lawrence Formation]	
145				600
				595

(continued)

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Remarks: Core not retained from 145-155 ft bgs.
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R = cemented rock

Additional data may have been collected in the field which is not included on this log.

Client Hunt Global | Drill Contractor Boart Longyear

LOG OF BORING BR-02-11

Project Name Merriam Junction | Drill Method Rotosonic

Number 23/70-1021 | Drilling Started 6/26/11 Ended 6/26/11

Location Shakopee, MN | Logged By BMD

Surface Elevation 744.40

Total Depth 155

DEPTH FEET	SAMP. LENGTH & RECOVERY	SAMP. NUMBER	ASTM	LITHOLOGY	DESCRIPTION	ELEV. FEET
			R		DOLOSTONE: Grayish-green, fine-grained silty sand with iron stained layer at 141 ft bgs and clusters up to 1 inch. [St. Lawrence Formation]*(continued)*	590
155					End of Boring - 155 feet	
160						585
165						580
170						575
175						570
180						565
185						560
190						555
195						550
						545

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Fax:

Remarks: Core not retained from 145-155 ft bgs.
Frac Sand - generally uncemented sandstone with clear to white rounded quartz grains
R = cemented rock

Additional data may have been collected in the field which is not included on this log.

LOG OF BORING BR-03-11

SHEET 1 OF 3

Client Hunt Global
Project Name Merriam Junction
Number 23/70-1021
Location Shakopee, MN

Drill Contractor Boart Longyear
Drill Method Rotosonic
Drilling Started 6/27/11 Ended 6/28/11
Logged By BMD

UTME:453185.68
UTMN:4955290.72
Surface Elevation 726.70
Total Depth 121

DEPTH FEET	SAMP. NUMBER	ASTM	DESCRIPTION	ELEV. FEET
	1	R	DOLOSTONE: Reddish-brown broken dolostone backfill to 4.5 ft bgs. [Prairie du Chien Group]	725
5	2		Reddish-brown to gray, cemented sandstone interbedded with dolostone.	720
10	3			715
15			Cemented layer at 14 ft bgs.	710
	4	SP	SANDSTONE: Reddish-yellow to gray or brown, well-sorted, coarse-grained frac sand. [Jordan Formation Sandstone] Puck at 18.5 ft bgs.	
20	5		Cemented layer at 23 ft bgs.	705
25	6		Cemented layer at 27 ft bgs.	700
30	7			695
35	8			690
40	9		Cemented layer from 39.5 to 41 ft bgs. Iron staining.	685
45	10		Small iron stained clusters throughout. Cemented layer at 45.5 ft bgs.	680

(continued)

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Telephone: 952-832-2600
Fax:

Remarks: No sample from 103-121 ft bgs. Core lost, possibly due to upward ground water gradient.
Frac Sand - generally uncemented sandstone with clear to white rounded quartz grains
R = cemented rock

Additional data may have been collected in the field which is not included on this log.

Client Hunt Global	Drill Contractor Boart Longyear	**LOG OF BORING BR-03-11**	
Project Name Merriam Junction	Drill Method Rotosonic		
Number 23/70-1021	Drilling Started 6/27/11 Ended 6/28/11		
Location Shakopee, MN	Logged By BMD	Surface Elevation 726.70	Total Depth 121

DEPTH FEET	SAMP. LENGTH & RECOVERY	SAMP. NUMBER	ASTM	LITHOLOGY	DESCRIPTION	ELEV. FEET
		11			SANDSTONE: Reddish-yellow to gray or brown, well-sorted, coarse-grained frac sand. [Jordan Formation Sandstone]*(continued)* Minor iron staining.	675
55					Puck between 55 and 65 ft bgs.	670
60		12				665
65		13			Minor iron staining.	660
70		14				655
75		15	SP		Medium to fine-grained, minor iron staining.	650
80		16				645
85		17				640
90		18			Medium to fine-grained, minor iron staining, clusters increasing.	635
95		19			Medium-grained with some iron stained clusters.	630

(continued)

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Telephone: 952-832-2600
Fax:

Remarks: No sample from 103-121 ft bgs. Core lost, possibly due to upward ground water gradient.
Frac Sand - generally uncemented sandstone with clear to white rounded quartz grains
R = cemented rock

Additional data may have been collected in the field which is not included on this log.

Client Hunt Global	Drill Contractor Boart Longyear	**LOG OF BORING BR-03-11**
Project Name Merriam Junction	Drill Method Rotosonic	SHEET 3 OF 3
Number 23/70-1021	Drilling Started 6/27/11 Ended 6/28/11	Surface Elevation 726.70
Location Shakopee, MN	Logged By BMD	Total Depth 121

DEPTH FEET	SAMP. LENGTH & RECOVERY	SAMP. NUMBER	ASTM	LITHOLOGY	DESCRIPTION	ELEV. FEET
		20	SP		SANDSTONE: Reddish-yellow to gray or brown, well-sorted, coarse-grained frac sand. [Jordan Formation Sandstone]*(continued)*	625
105						620
110						615
115						610
120			R		DOLOSTONE: Encountered very hard material at 121 ft bgs. [St. Lawrence Formation] End of Boring - 121 feet	605
125						600
130						595
135						590
140						585
145						580

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Telephone: 952-832-2600
Fax:

Remarks: No sample from 103-121 ft bgs. Core lost, possibly due to upward ground water gradient.
Frac Sand - generally uncemented sandstone with clear to white rounded quartz grains
R = cemented rock

Additional data may have been collected in the field which is not included on this log.

LOG OF BORING BR-04-11/MW-04-11

Unique Well No. 783164

SHEET 1 OF 4

Client: Hunt Global	Drill Contractor: Boart Longyear	UTME:453278.84	
Project Name: Merriam Junction	Drill Method: Rotosonic	UTMN:4954166.28	
Number: 23/70-1021	Drilling Started: 7/6/11	Ended: 7/7/11	Surface Elevation: 766.84
Location: Shakopee, MN	Logged By: BMD	Total Depth: 155	

DEPTH FEET	SAMP. NUMBER	ASTM	DESCRIPTION
0–5		ML	TOPSOIL: Brown to light brown, with organics changing into fine silt.
5–16.5	1, 2	R	DOLOSTONE: Brown or pink to gray, weathered with layers of gray clay. [Prairie du Chien Group] Brown or reddish-yellow to gray.
16.5–35	3, 4, 5, 6	SC, SP, SP, CH, SP, CL, CL, SP, SC, CL, SP, SC, SP	Brownish gray to dark brown or reddish-yellow interbedded, well-sorted, coarse-grained frac sand, clayey sand, lean clay, and fat clay. Possible fault gouge. [Prairie du Chien Group]
35–45			No sample from 35 to 45 ft bgs.
45–	7	SP	SANDSTONE: Gray, well-sorted, coarse-grained frac sand. [Jordan Formation Sandstone]

Depth scale (feet): 5, 10, 15, 20, 25, 30, 35, 40, 45

Elevation scale (feet): 765, 760, 755, 750, 745, 740, 735, 730, 725, 720

WELL OR PIEZOMETER CONSTRUCTION DETAIL

PRO. CASING
Diameter: **6"**
Type: **Steel**
Interval: **0-3'**

RISER CASING
Diameter: **2"**
Type: **Steel**
Interval: **0-102.8'**

GROUT
Type: **Neat cement**
Interval:

SEAL
Type: **Neat Cement Grout**
Interval: **0-97.8'**

SANDPACK
Type: **Red Flint**
Interval: **97.8-115'**

SCREEN
Diameter: **2"**
Type: **10 Slot, Stainless Steel, Sch. 40**
Interval: **102.8-112.8'**

(continued)

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Telephone: 952-832-2600
Fax:

Remarks: Frac Sand - generally uncemented sandstone with clear to white rounded quartz grains
R = cemented rock

Additional data may have been collected in the field which is not included on this log.

LOG OF BORING BR-04-11/MW-04-11

Client	Hunt Global	Drill Contractor	Boart Longyear
Project Name	Merriam Junction	Drill Method	Rotosonic
Number	23/70-1021	Drilling Started	7/6/11 Ended 7/7/11
Location	Shakopee, MN	Logged By	BMD

Surface Elevation 766.84
Total Depth 155

DEPTH FEET	SAMP. LENGTH & RECOVERY	SAMP. NUMBER	ASTM	LITHOLOGY	DESCRIPTION	WELL OR PIEZOMETER CONSTRUCTION DETAIL	ELEV. FEET
		8			SANDSTONE: Gray, well-sorted, coarse-grained frac sand. [Jordan Formation Sandstone]*(continued)* Gray to brown with cemented zones.		715
55		9			Minor clusters and fine layers.		710
60		10					705
65		11			Medium to fine-grained. Cemented zones from 65 to 66 ft bgs.		700
70							695
75			SP		Cemented zones from 74 to 75 ft bgs. Gray to reddish-yellow, iron staining and clusters increasing with depth.		690
80		12					685
85		13			Large puck, 1 inch in diameter, at 88 ft bgs.		680
90		14			Fine-grained, iron staining throughout.		675
95					Medium to fine-grained.		670

(continued)

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Telephone: 952-832-2600
Fax:

Remarks: Frac Sand - generally uncemented sandstone with clear to white rounded quartz grains
R = cemented rock

Additional data may have been collected in the field which is not included on this log.

Client: Hunt Global
Project Name: Merriam Junction
Number: 23/70-1021
Location: Shakopee, MN

Drill Contractor: Boart Longyear
Drill Method: Rotosonic
Drilling Started: 7/6/11 Ended: 7/7/11
Logged By: BMD

Surface Elevation: 766.84
Total Depth: 155

DEPTH FEET	SAMP. NUMBER	ASTM	DESCRIPTION	ELEV. FEET
	15	SP	SANDSTONE: Gray, well-sorted, coarse-grained frac sand. [Jordan Formation Sandstone]*(continued)* Cemented layer at 100 ft bgs.	665
105	16		Coarse-grained, some iron staining.	660
110	17			655
115	18		Fine-grained, iron stained clusters.	650
120	19			645
125	20		Iron staining increasing with depth.	640
130	21	SM	SILTY SAND: Grayish-green, very fine-grained, with minor iron staining. [St. Lawrence Formation]	635
135	22			630
140	23	SP	Gray to reddish-yellow, medium to fine-grained frac sand. Thin layer of clay at 143 ft bgs.	625
145	24	SM	SILTY SAND: Grayish-green, very fine-grained with minor iron staining.	620
		R		

WELL OR PIEZOMETER CONSTRUCTION DETAIL

(continued)

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Telephone: 952-832-2600
Fax:

Remarks: Frac Sand - generally uncemented sandstone with clear to white rounded quartz grains
R = cemented rock

Additional data may have been collected in the field which is not included on this log.

Client Hunt Global | Drill Contractor Boart Longyear

LOG OF BORING BR-04-11/MW-04-11

Project Name Merriam Junction | Drill Method Rotosonic

Number 23/70-1021 | Drilling Started 7/6/11 Ended 7/7/11

Location Shakopee, MN | Logged By BMD

Surface Elevation 766.84
Total Depth 155

DEPTH FEET	SAMP. LENGTH & RECOVERY	SAMP. NUMBER	ASTM	LITHOLOGY	DESCRIPTION	WELL OR PIEZOMETER CONSTRUCTION DETAIL	ELEV. FEET
		25	R		DOLOSTONE: Green to reddish-yellow, clayey sand and shale, fine-grained. [St. Lawrence Formation]*(continued)*		615
155					End of Boring - 155 feet		610
160							605
165							600
170							595
175							590
180							585
185							580
190							575
195							570

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Fax:

Remarks: Frac Sand - generally uncemented sandstone with clear to white rounded quartz grains
R = cemented rock

Additional data may have been collected in the field which is not included on this log.

LOG OF BORING BR-05-11

Client: Hunt Global
Project Name: Merriam Junction
Number: 23/70-1021
Location: Shakopee, MN

Drill Contractor: Boart Longyear
Drill Method: Rotosonic
Drilling Started: 7/8/11 Ended: 7/9/11
Logged By: BMD

UTME:453138.99
UTMN:4954674.88
Surface Elevation: 781.64
Total Depth: 180

DEPTH FEET	SAMP. NUMBER	ASTM	DESCRIPTION	ELEV. FEET
0–5		OL	TOPSOIL: Brown to dark brown, fine-grained sandy loam, with some large gravel.	780
5–10	1	SW	SAND: Brown, poorly-sorted, fine-grained sand. [Alluvium]	775
10–18	2	SC	DOLOSTONE: Pink, weathered. [Prairie du Chien Group]	770
			Brown, highly weathered sandstone with some layers of clayey sand.	
		R		
15		SC	Gray dolostone with layers of very hard quartz.	765
	3	R	Brown to gray interbedded highly weathered sandstone, lean clay, fat clay, and well-sorted coarse-grained frac sand. [Prairie du Chien Group]	
20		R	Vugs up to 0.5 inches.	
	4		Cemented layer at 21.5 ft bgs.	760
25		R	Very hard with some clay.	
	5			755
30		CL		
		SP		750
	6	CL		
35		CH		
	7			745
40		R		
	8			740
45		SP		
	9			735

(continued)

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Minneapolis, MN 55435-4803
Telephone: 952-832-2600
Fax:

Remarks: Frac Sand - generally uncemented sandstone with clear to white rounded quartz grains
R = cemented rock

Additional data may have been collected in the field which is not included on this log.

Client: Hunt Global
Project Name: Merriam Junction
Number: 23/70-1021
Location: Shakopee, MN

Drill Contractor: Boart Longyear
Drill Method: Rotosonic
Drilling Started: 7/8/11 Ended: 7/9/11
Logged By: BMD

Surface Elevation: 781.64
Total Depth: 180

DEPTH FEET	SAMP. NUMBER	ASTM	DESCRIPTION	ELEV. FEET
	10	CH SP CL	Brown to gray interbedded highly weathered sandstone, lean clay, fat clay, and well-sorted coarse-grained frac sand. [Prairie du Chien Group]*(continued)* Hard layers.	730
55	11	SP	Small clay seams at 57 and 58 ft bgs. Cemented layers at 56 and 56.5 ft bgs.	725
60	12	SP	Small clay seams from 61 to 61.5 ft bgs.	720
65			SANDSTONE: Gray, well-sorted, coarse-grained, frac sand. [Jordan Formation Sandstone]	715
70	13			710
75	14			705
80	15	SP		700
85	16		Some iron stained clusters.	695
90	17		Pink to reddish-yellow, cemented, small vugs up to 0.5 inch thick.	690
95	18		Gray to pink, cemented.	685

(continued)

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Fax:

Remarks: Frac Sand - generally uncemented sandstone with clear to white rounded quartz grains
R = cemented rock

Additional data may have been collected in the field which is not included on this log.

LOG OF BORING BR-05-11

Client Hunt Global
Project Name Merriam Junction
Number 23/70-1021
Location Shakopee, MN
Drill Contractor Boart Longyear
Drill Method Rotosonic
Drilling Started 7/8/11 Ended 7/9/11
Logged By BMD
Surface Elevation 781.64
Total Depth 180

DEPTH FEET	SAMP. LENGTH & RECOVERY	SAMP. NUMBER	ASTM	LITHOLOGY	DESCRIPTION	ELEV. FEET
		19			SANDSTONE: Gray, well-sorted, coarse-grained, frac sand. [Jordan Formation Sandstone]*(continued)* Gray, medium-grained.	680
105		20			Gray with layers of coarse iron staining.	675
110		21			Some reddish-yellow.	670
115		22			Gray with minor iron staining.	665
120		23				660
125		24	SP		Reddish-yellow with iron staining. Sample from 125 to 130 ft bgs was dropped.	655
130		25			Gray to reddish-yellow with minor iron staining.	650
135		26			Minor iron staining. Clay layer at 136.5 ft bgs.	645
140		27			Medium-grained.	640
145		28			Gray to reddish-yellow, medium to coarse-grained with minor iron staining.	635

(continued)

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Fax:

Remarks: Frac Sand - generally uncemented sandstone with clear to white rounded quartz grains
R = cemented rock

Additional data may have been collected in the field which is not included on this log.

Client	Hunt Global	Drill Contractor	Boart Longyear
Project Name	Merriam Junction	Drill Method	Rotosonic
Number	23/70-1021	Drilling Started	7/8/11 Ended 7/9/11
Location	Shakopee, MN	Logged By	BMD

LOG OF BORING BR-05-11

Surface Elevation 781.64
Total Depth 180

DEPTH FEET	SAMP. LENGTH & RECOVERY	SAMP. NUMBER	ASTM	LITHOLOGY	DESCRIPTION	ELEV. FEET
		29			SANDSTONE: Gray, well-sorted, coarse-grained, frac sand. [Jordan Formation Sandstone]*(continued)* Iron stained clusters increasing.	630
155		30	SP		Coarse-grained.	625
160					Medium-grained with iron stained clusters increasing.	620
		31			Green clay lens from 161 to 164 ft bgs.	
165		32	SM		SILTY SAND: Reddish-yellow, fine-grained with green clay lenses throughout. [Jordan Formation Sandstone]	615
170		33				610
175		34	R		DOLOSTONE: Pink, with green shale. [St. Lawrence Formation]	605
180					End of Boring - 180 feet	600
185						595
190						590
195						585

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Fax:

Remarks: Frac Sand - generally uncemented sandstone with clear to white rounded quartz grains
R = cemented rock

Additional data may have been collected in the field which is not included on this log.

LOG OF BORING BR-06-11

SHEET 1 OF 3

Client	Hunt Global	Drill Contractor	Boart Longyear
Project Name	Merriam Junction	Drill Method	Rotosonic
Number	23/70-1021	Drilling Started	11/11/11 Ended 11/15/11
Location	Shakopee, MN	Logged By	AMB

UTME:453079.01
UTMN:4955125.96
Surface Elevation 732.56
Total Depth 135

DEPTH FEET	SAMP. NUMBER	ASTM	DESCRIPTION	ELEV. FEET
	1		DOLOSTONE: Pink or gray to reddish-yellow, weathered with medium-grained sand fragments. (Prairie du Chien Group)	730
5	2	R		725
10			Pink to brown hard sandstone pucks, evident bedding.	
	3		Fine-grained, well rounded sand with weathered hard sandstone fragments and pucks.	720
15	4		SANDSTONE: Gray to reddish-yellow, well-sorted, medium-grained frac sand, well-rounded. [Jordan Formation Sandstone] Weathered, hard, 2 pucks from 19-21 ft bgs.	715
20			Medium to coarse-grained.	
	5			710
25			Thin <1" green clay lens at 25' bgs	
	6			705
30			Mottled from 30-35' bgs.	
	7	SP		700
35			Medium-grained from 35-45' bgs.	
	8			695
40	9		1" silicified zone at 41.5' bgs.	690
45			Hard, medium-grained from 45-47 ft bgs	
	10		Mottled from 47.5-50' bgs.	685

(continued)

Barr Engineering Co.
4700 West 77th Street
Minneapolis, MN 55435-4803
Telephone: 952-832-2600
Fax:

Remarks: Possible artesian conditions.
Frac Sand - generally uncemented sandstone with clear to white rounded quartz grains
R = cemented rock

Additional data may have been collected in the field which is not included on this log.

LOG OF BORING BR-06-11

Client: Hunt Global
Project Name: Merriam Junction
Number: 23/70-1021
Location: Shakopee, MN

Drill Contractor: Boart Longyear
Drill Method: Rotosonic
Drilling Started: 11/11/11 Ended: 11/15/11
Logged By: AMB

Surface Elevation: 732.56
Total Depth: 135

DEPTH FEET	SAMP. LENGTH & RECOVERY	SAMP. NUMBER	ASTM	LITHOLOGY	DESCRIPTION	ELEV. FEET
		11			SANDSTONE: Gray to reddish-yellow, well-sorted, medium-grained frac sand, well-rounded. [Jordan Formation Sandstone]*(continued)* Loose from 50-130' bgs.	680
55					No sample recovered from 55-65' bgs.	
						675
60						
						670
65					Fine-grained from 65-67' bgs.	
		12				665
70					Sandstone fragments <2" from 70-75' bgs. Coarse-grained from 67-80' bgs.	
		13				660
75			SP			
		14				655
80					Pink sandstone fragments <1/4" to <2" from 80-85' bgs. Gray fine-grained sand from 80-130' bgs.	
		15				650
85						
		16				645
90						
		17				640
95						
		18				635

(continued)

Barr Engineering Co.
4700 West 77th Street
Minneapolis, MN 55435-4803
Telephone: 952-832-2600
Fax:

Remarks: Possible artesian conditions.
Frac Sand - generally uncemented sandstone with clear to white rounded quartz grains
R = cemented rock

Additional data may have been collected in the field which is not included on this log.

LOG OF BORING BR-06-11

Client: Hunt Global
Project Name: Merriam Junction
Number: 23/70-1021
Location: Shakopee, MN

Drill Contractor: Boart Longyear
Drill Method: Rotosonic
Drilling Started: 11/11/11 Ended: 11/15/11
Logged By: AMB

Surface Elevation: 732.56
Total Depth: 135

DEPTH FEET	SAMP. LENGTH & RECOVERY	SAMP. NUMBER	ASTM	LITHOLOGY	DESCRIPTION	ELEV. FEET
		19	SP		SANDSTONE: Gray to reddish-yellow, well-sorted, medium-grained frac sand, well-rounded. [Jordan Formation Sandstone]*(continued)*	630
105					Green clay lenses and small iron clusters from 105-125' bgs.	
		20				625
110						
		21				620
115						
		22				615
120						
						610
125			CL		CLAY: Greenish-gray to brown interbedded lean clay, weathered shale, and fine-grained sand. [St. Lawrence Formation]	
		23				605
130						
		24				600
135					End of Boring - 135 feet	
						595
140						
						590
145						
						585

Barr Engineering Co.
4700 West 77th Street
Minneapolis, MN 55435-4803
Telephone: 952-832-2600
Fax:

Remarks: Possible artesian conditions.
Frac Sand - generally uncemented sandstone with clear to white rounded quartz grains
R = cemented rock

Additional data may have been collected in the field which is not included on this log.

ATTACHMENT 2
SOIL SURVEY

United States Department of Agriculture

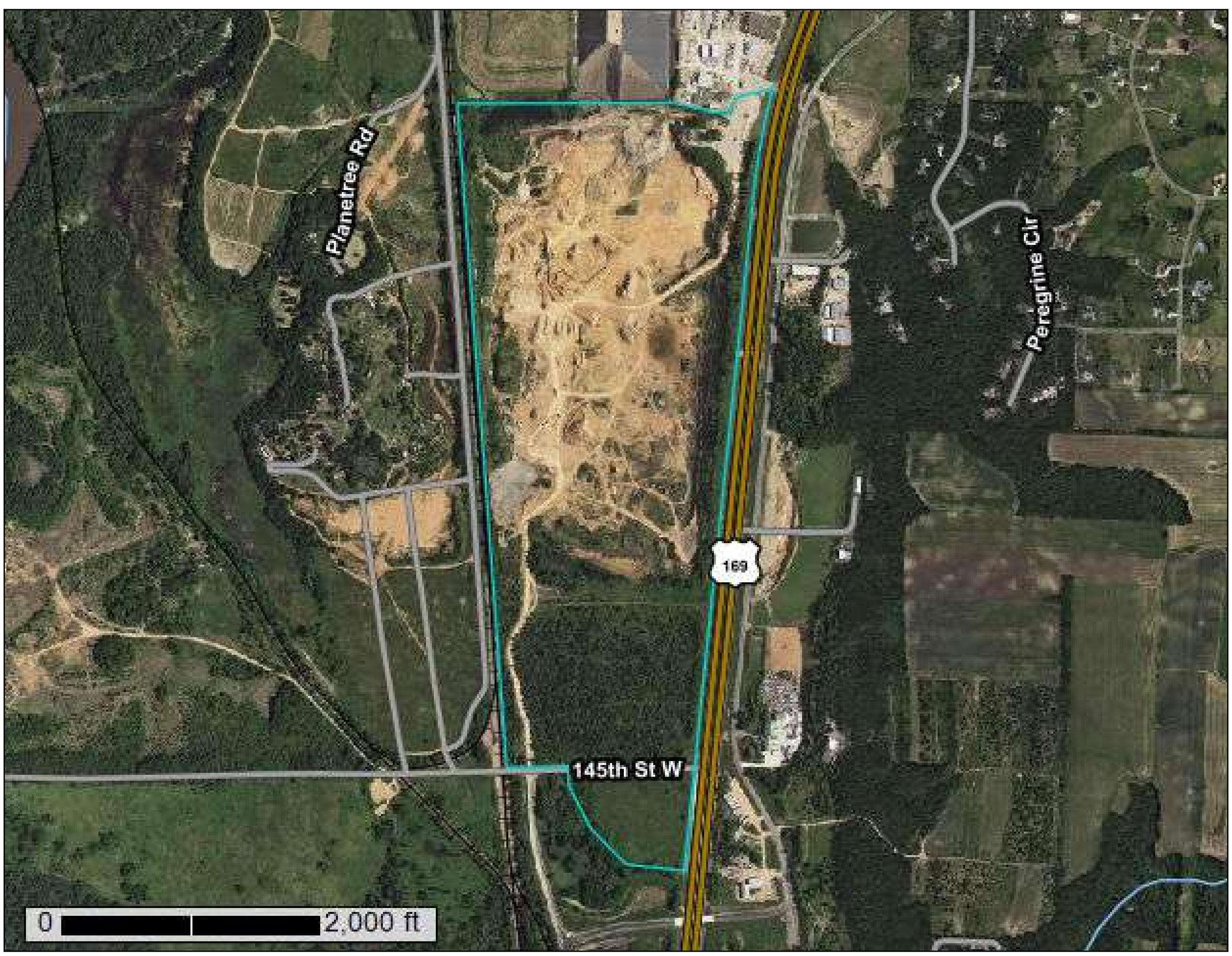
NRCS

Natural Resources Conservation Service

A product of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local participants

Custom Soil Resource Report for

Scott County, Minnesota



August 19, 2021

Soil Map

The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.

Soil Map

Map Scale: 1:10,800 if printed on A portrait (8.5" x 11") sheet.

Meters: 0, 150, 300, 600, 900

Feet: 0, 500, 1000, 2000, 3000

N

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 1:20,000.

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: Scott County, Minnesota
Survey Area Data: Version 16, Jun 5, 2020

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

Date(s) aerial images were photographed: May 30, 2020—Jul 3, 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.

ATTACHMENT 3

WATER SUPPLY WELLS

ATTACHMENT 3

SECTION 21

WATER SUPPLY WELL NETWORK: WELL LOGS

Minnesota Unique Well Number

540281

County Scott
Quad Shakopee
Quad ID 105D

MINNESOTA DEPARTMENT OF HEALTH
WELL AND BORING REPORT
Minnesota Statutes Chapter 1031

Entry Date 10/06/1994
Update Date 12/31/2020
Received Date

Well Name	Township	Range	Dir Section	Subsection
BRYAN ROCK	115	23	W 21	CAADDA

Elevation 800 ft. **Elev. Method** 7.5 minute topographic map (+/- 5 feet)

Address

C/W 13580 JOHNSON MEMORIAL DR SHAKOPEE MN

Stratigraphy Information

Geological Material	From	To (ft.)	Color	Hardness
GRAVEL	0	21	BROWN	HARD
LIMESTONE	21	65	RED	HARD
LIMESTONE	65	90	RED	HARD
SANDSTONE	90	180	BROWN	SOFT
SANDSTONE	180	187	GREEN	MEDIUM
SANDSTONE	187	248	GREEN	MEDIUM
SANDSTONE	248	362	GREEN	MEDIUM
SANDSTONE	362	400	GREEN	MEDIUM

Remarks

GAMMA LOGGED 3-30-1994.
SEALED 10-14-2020 BY 1445

Well Depth	Depth Completed	Date Well Completed
400 ft.	400 ft.	04/22/1994

Drill Method Non-specified Rotary **Drill Fluid** Bentonite

Use industrial **Status** Sealed

Well Hydrofractured? **Yes** ☐ **No** ☐ **From** **To**

Casing Type Step down **Joint** Welded
Drive Shoe? **Yes** ☒ **No** ☐ **Above/Below** 2 ft.

Casing Diameter **Weight** **Hole Diameter**

Casing Diameter		Weight	Hole Diameter	
8 in. To	190 ft.	lbs./ft.	17 in. To	21 ft.
12 in. To	21 ft.	lbs./ft.	12 in. To	190 ft.
			8 in. To	400 ft.

Open Hole From 190 ft. To 400 ft.
Screen? ☐ **Type** **Make**

Static Water Level
40 ft. land surface Measure 04/22/1994

Pumping Level (below land surface)
40 ft. hrs. Pumping at 0 g.p.m.

Wellhead Completion
Pitless adapter manufacturer WHITEWATER Model
☐ Casing Protection ☐ 12 in. above grade
☐ At-grade (Environmental Wells and Borings ONLY)

Grouting Information Well Grouted? ☒ Yes ☐ No ☐ Not Specified

Material	Amount	From	To
	0	8 ft.	190 ft.

Nearest Known Source of Contamination
300 feet North Direction Landfill Type
Well disinfected upon completion? ☐ Yes ☐ No

Pump ☐ Not Installed Date Installed 04/08/1994
Manufacturer's name AERMOTOR
Model Number 2366139020 HP 15 Volt 440
Length of drop pipe 147 ft Capacity 300 g.p. Typ Submersible

Abandoned
Does property have any not in use and not sealed well(s)? ☐ Yes ☐ No

Variance
Was a variance granted from the MDH for this well? ☐ Yes ☐ No

Miscellaneous
First Bedrock Prairie Du Chien Group Aquifer multiple
Last Strat Wonewoc Sandstone Depth to Bedrock 21 ft
Located by Minnesota Geological Survey
Locate Method Digitized - scale 1:24,000 or larger (Digitizing Table)
System UTM - NAD83, Zone 15, Meters X 453125 Y 4955704
Unique Number Verification Information from Input Date 03/10/1995

Angled Drill Hole

Well Contractor

Licensee Business	Lic. or Reg. No.	Name of Driller
Bohn Well Co.	70350	MILLER, M.

Minnesota Unique Well Number

272749

County Scott
Quad Shakopee
Quad ID 105D

MINNESOTA DEPARTMENT OF HEALTH
WELL AND BORING REPORT
Minnesota Statutes Chapter 1031

Entry Date 05/22/2013
Update Date 03/03/2017
Received Date

Well Name	**Township**	**Range**	**Dir Section**	**Subsection**
	115	23	W 21	AADBCB

Elevation 818 ft. **Elev. Method** 7.5 minute topographic map (+/- 5 feet)

Address

Well 13162 JOHNSON MEMORIAL HY SHAKOPEE MN 55379

Stratigraphy Information

Geological Material	From	To (ft.)	Color	Hardness
GLACIAL DRIFT	0	166		
PRAIRIE DU CHIEN	166	170		
JORDAN SANDSTONE	170	197		

Remarks

MULTI TOOL LOGGED 5-22-2013. LOGGED FOR STRAT.
WELL WAS IN A WELL PIT WITH A MAN HOLE COVER.
WELL SEALED BY BOHN 5/31/13 (H309285).
SEALED 05-31-2013 BY 1445.

Well Depth 197 ft. **Depth Completed** 197 ft. **Date Well Completed**

Drill Method **Drill Fluid**

Use domestic **Status** Sealed

Well Hydrofractured? **Yes** ☐ **No** ☐ **From** **To**

Casing Type Single casing **Joint**
Drive Shoe? **Yes** ☐ **No** ☐ **Above/Below**

Casing Diameter **Weight**
4.5 in. To 187 ft. lbs./ft.

Open Hole From 187 ft. To 197 ft.
Screen? ☐ **Type** **Make**

Static Water Level
96 ft. land surface Measure 05/22/2013

Pumping Level (below land surface)

Wellhead Completion
Pitless adapter manufacturer Model
☐ Casing Protection ☐ 12 in. above grade
☐ At-grade (Environmental Wells and Borings ONLY)

Grouting Information Well Grouted? ☐ Yes ☐ No ☒ Not Specified

Nearest Known Source of Contamination
feet Direction Type
Well disinfected upon completion? ☐ Yes ☐ No

Pump ☐ Not Installed Date Installed
Manufacturer's name
Model Number HP Volt
Length of drop pipe ft Capacity g.p. Typ

Abandoned
Does property have any not in use and not sealed well(s)? ☐ Yes ☐ No

Variance
Was a variance granted from the MDH for this well? ☐ Yes ☐ No

Miscellaneous
First Bedrock Jordan Sandstone Aquifer Jordan
Last Strat Jordan Sandstone Depth to Bedrock 170 ft
Located by Minnesota Geological Survey
Locate Method Digitization (Screen) - Map (1:24,000) (15 meters or
System UTM - NAD83, Zone 15, Meters X 453778 Y 4956405
Unique Number Verification Information from Input Date 05/22/2013

Angled Drill Hole

Well Contractor
Minnesota Geological Survey MGS
Licensee Business Lic. or Reg. No. Name of Driller

Minnesota Unique Well Number

796915

County Scott
Quad Shakopee
Quad ID 105D

MINNESOTA DEPARTMENT OF HEALTH
WELL AND BORING REPORT
Minnesota Statutes Chapter 1031

Entry Date 09/18/2013
Update Date 02/05/2014
Received Date 11/27/2013

Well Name	Township	Range	Dir Section	Subsection
DEM CON	115	23	W 21	AADBBC

Elevation 818 ft. **Elev. Method** 7.5 minute topographic map (+/- 5 feet)

Address

C/W 13161 DEM CON DR SHAKOPEE MN 55379

Stratigraphy Information

Geological Material	From	To (ft.)	Color	Hardness
SAND & GRAVEL	0	168	BROWN	SOFT
LIME	168	172	RED	MEDIUM
SANDROCK	172	250	BROWN	MEDIUM

Well Depth 250 ft. **Depth Completed** 250 ft. **Date Well Completed** 09/07/2013

Drill Method Non-specified Rotary **Drill Fluid** Additive (+ Bentonite)

Use commercial **Status** Active

Well Hydrofractured? Yes ☐ No ☒ **From** **To**

Casing Type Single casing **Joint** Welded
Drive Shoe? Yes ☒ No ☐ **Above/Below**

Casing Diameter **Weight** **Hole Diameter**
18 in. To 184 ft. 70.5 lbs./ft. 24 in. To 183 ft.
17 in. To 250 ft.

Open Hole From 183 ft. To 250 ft.
Screen? ☐ **Type** **Make**

Static Water Level
80 ft. land surface Measure 09/07/2013

Pumping Level (below land surface)
160 ft. 12 hrs. Pumping at 1000 g.p.m.

Wellhead Completion
Pitless adapter manufacturer MONITOR Model
☐ Casing Protection ☒ 12 in. above grade
☐ At-grade (Environmental Wells and Borings ONLY)

Grouting Information Well Grouted? ☒ Yes ☐ No ☐ Not Specified

Material	Amount		From	To
neat cement	9.5	Cubic yards	ft.	183 ft.

Nearest Known Source of Contamination
52 feet West Direction Septic tank/drain field Type
Well disinfected upon completion? ☒ Yes ☐ No

Pump ☐ Not Installed Date Installed 10/24/2013
Manufacturer's name CENTRIPRO
Model Number 8M754 HP 75 Volt 460
Length of drop pipe 126 ft Capacity 750 g.p. Typ Submersible

Abandoned
Does property have any not in use and not sealed well(s)? ☐ Yes ☒ No

Variance
Was a variance granted from the MDH for this well? ☐ Yes ☒ No

Miscellaneous
First Bedrock Prairie Du Chien Group Aquifer Jordan
Last Strat Jordan Sandstone Depth to Bedrock 168 ft
Located by Minnesota Department of Health
Locate Method GPS SA Off (averaged) (15 meters)
System UTM - NAD83, Zone 15, Meters X 453765 Y 4956426
Unique Number Verification Info/GPS from data Input Date 09/18/2013

Angled Drill Hole

Remarks
DRILLING FLUID: BENTONITE AND FOAM.
PUMP MANUFACTURER: BERKELY PUMP END.

Well Contractor

Bohn Well Drilling Co., Inc.	1445	FRITZ, R.
Licensee Business	Lic. or Reg. No.	Name of Driller

Minnesota Unique Well Number

809771

County Scott
Quad Shakopee
Quad ID 105D

MINNESOTA DEPARTMENT OF HEALTH

WELL AND BORING REPORT

Minnesota Statutes Chapter 1031

Entry Date
Update Date 02/25/2020
Received Date 07/00/2015

Well Name	Township	Range	Dir Section	Subsection
DEM CON	115	23	W 21	AACABD

Elevation 815 ft. **Elev. Method** Calc from NED (Natl.Elev.Dataset-30m)

Address

Well 13142 DEM CON DR SHAKOPEE MN 55379

Stratigraphy Information

Geological Material	From	To (ft.)	Color	Hardness
SAND ROCKS	0	20	BROWN	MEDIUM
SAND GRAVEL	20	140	BROWN	MEDIUM
BROKEN LIMEROCK	140	143	RED	HARD
LIMEROCK	143	195	RED	HARD
SANDSTONE LIME	195	200	YEL/RED	MEDIUM
SANDSTONE	200	219	YEL/GRN	MEDIUM

Well Depth 219 ft. **Depth Completed** 219 ft. **Date Well Completed** 06/19/2015

Drill Method Non-specified Rotary **Drill Fluid** Bentonite

Use public supply/non-comm.-transient **Status** Active

Well Hydrofractured? Yes [ ] No [X] From To

Casing Type Step down **Joint** Threaded

Drive Shoe? Yes [X] No [ ] Above/Below

Casing Diameter				Weight	Hole Diameter			
4	in. To	214	ft.	lbs./ft.	12.	in. To	143	ft.
8	in. To	143	ft.	lbs./ft.	8	in. To	214	ft.
					4	in. To	219	ft.

Open Hole From 214 ft. To 219 ft.

Screen? [ ] **Type** **Make**

Static Water Level

75 ft. land surface Measure 06/19/2015

Pumping Level (below land surface)

ft. hrs. Pumping at 30 g.p.m.

Wellhead Completion

Pitless adapter manufacturer MONITOR Model

[ ] Casing Protection [ ] 12 in. above grade

[ ] At-grade (Environmental Wells and Borings ONLY)

Grouting Information Well Grouted? [X] Yes [ ] No [ ] Not Specified

Material	Amount		From		To	
neat cement	4.5	Cubic yards	10	ft.	214	ft.
bentonite	10	Sacks	10	ft.	126	ft.
cuttings			126	ft.	143	ft.

Nearest Known Source of Contamination

12 feet South Direction Other Type

Well disinfected upon completion? [X] Yes [ ] No

Pump [ ] Not Installed Date Installed 06/19/2015

Manufacturer's name GOULDS

Model Number HP 3 Volt 230

Length of drop pipe 126 ft Capacity 33 g.p. Typ Submersible

Abandoned

Does property have any not in use and not sealed well(s)? [ ] Yes [X] No

Variance

Was a variance granted from the MDH for this well? [ ] Yes [X] No

Miscellaneous

First Bedrock Aquifer

Last Strat Depth to Bedrock ft

Located by Minnesota Department of Health

Locate Method GPS SA Off (averaged) (15 meters)

System UTM - NAD83, Zone 15, Meters X 453683 Y 4956430

Unique Number Verification Info/GPS from data Input Date 09/18/2015

Angled Drill Hole

Remarks

WELL USE: DOMESTIC, NONCOMMUNITY PWS.
NEAREST KNOWN SOURCE OF CONTAMINATION: POWER.
DRILLERS: LEE WECKMAN & MARTY RADEMACHER.
PREVIOUS USE CODE: DO (DOMESTIC) 2/25/2020.

Well Contractor

Licensee Business	Lic. or Reg. No.	Name of Driller
Bohn Well Drilling Co., Inc.	1445	SEE REMARKS

Minnesota Unique Well Number

405973

County Scott
Quad Shakopee
Quad ID 105D

MINNESOTA DEPARTMENT OF HEALTH
WELL AND BORING REPORT
Minnesota Statutes Chapter 1031

Entry Date 02/23/1989
Update Date 02/14/2014
Received Date

Well Name	Township	Range	Dir Section	Subsection
HALLORAN,	115	23	W 21	AAACDA

Elevation 822 ft. **Elev. Method** 7.5 minute topographic map (+/- 5 feet)

Address

C/W 13122 JOHNSON MEMORIAL DR SHAKOPEE MN 55379

Stratigraphy Information

Geological Material	From	To (ft.)	Color	Hardness
SAND & GRAVEL	0	17	BROWN	SOFT
ROCKS, GRAVEL &	17	42	BROWN	HARD
CLAY & ROCKS	42	87	BROWN	SOFT
ROCKS & CLAY	87	139	BROWN	HARD
SAND (FINE)	139	155	BROWN	SOFT
SAND & GRAVEL	155	174	BROWN	SOFT

Remarks

Well Depth	Depth Completed	Date Well Completed
174 ft.	174 ft.	07/27/1984

Drill Method Non-specified Rotary **Drill Fluid**

Use domestic **Status** Active

Well Hydrofractured? **Yes** ☐ **No** ☐ **From** **To**

Casing Type Single casing **Joint** Threaded
Drive Shoe? **Yes** ☐ **No** ☐ **Above/Below**

Casing Diameter **Weight**
4 in. To 169 ft. lbs./ft.

Open Hole From ft. To ft.

Screen? ☒ **Type** stainless **Make** JOHNSON

Diameter	Slot/Gauze	Length	Set	
2 in.	12	5 ft.	169 ft.	174 ft.

Static Water Level
120 ft. land surface Measure 07/27/1984

Pumping Level (below land surface)
ft. hrs. Pumping at 35 g.p.m.

Wellhead Completion
Pitless adapter manufacturer Model
☐ Casing Protection ☐ 12 in. above grade
☐ At-grade (Environmental Wells and Borings ONLY)

Grouting Information Well Grouted? ☒ Yes ☐ No ☐ Not Specified

Material	Amount	From	To
bentonite		ft.	ft.

Nearest Known Source of Contamination
feet Direction Type
Well disinfected upon completion? ☒ Yes ☐ No

Pump ☐ Not Installed Date Installed
Manufacturer's name PIONEER
Model Number HP 0.75 Volt 220
Length of drop pipe 147 ft Capacity 10 g.p. Typ Submersible

Abandoned
Does property have any not in use and not sealed well(s)? ☐ Yes ☐ No

Variance
Was a variance granted from the MDH for this well? ☐ Yes ☐ No

Miscellaneous
First Bedrock Aquifer Quat. buried
Last Strat sand +larger-brown Depth to Bedrock ft
Located by Minnesota Geological Survey
Locate Method Digitization (Screen) - Map (1:24,000) (15 meters or
System UTM - NAD83, Zone 15, Meters X 453836 Y 4956499
Unique Number Verification Address verification Input Date 07/26/2005

Angled Drill Hole

Well Contractor

Leuthner Well Co.	10125	SCHMIEG, K.
Licensee Business	Lic. or Reg. No.	Name of Driller

Minnesota Unique Well Number

610403

County Scott
Quad Shakopee
Quad ID 105D

MINNESOTA DEPARTMENT OF HEALTH

WELL AND BORING REPORT

Minnesota Statutes Chapter 1031

Entry Date 03/22/1999
Update Date 03/10/2014
Received Date

Well Name	Township	Range	Dir Section	Subsection
ANCHOR BLOCK 115	115	23	W 21	ADCBAD

Elevation 803 ft. **Elev. Method** 7.5 minute topographic map (+/- 5 feet)

Address

Contact 13450 169 HY SHAKOPEE MN 55379
Well 13450 JOHNSON MEMORIAL DR SHAKOPEE MN 55379

Stratigraphy Information

Geological Material	From	To (ft.)	Color	Hardness
GRAVEL BOULDERS	0	40	BROWN	HARD
CLAY & GRAVEL	40	128	BROWN	MEDIUM
LIMEROCK	128	166	BROWN	HARD
SANDSTONE	166	300	WHITE	MEDIUM

Remarks

Well Depth 300 ft. **Depth Completed** 300 ft. **Date Well Completed** 01/06/1998

Drill Method Non-specified Rotary **Drill Fluid** Qwik gel

Use public supply/non-comm.-transient **Status** Active

Well Hydrofractured? Yes [ ] No [ ] From To

Casing Type Step down **Joint** Welded

Drive Shoe? Yes [X] No [ ] **Above/Below**

Casing Diameter	Weight	Hole Diameter
4 in. To 178 ft.	11 lbs./ft.	10. in. To 128 ft.
8 in. To 128 ft.	28 lbs./ft.	8 in. To 176 ft.
		4 in. To 300 ft.

Open Hole From 178 ft. To 300 ft.

Screen? [ ] **Type** **Make**

Static Water Level

78 ft. land surface Measure 01/06/1998

Pumping Level (below land surface)

Wellhead Completion

Pitless adapter manufacturer MONITOR Model SPK
[ ] Casing Protection [ ] 12 in. above grade
[ ] At-grade (Environmental Wells and Borings ONLY)

Grouting Information Well Grouted? [X] Yes [ ] No [ ] Not Specified

Material	Amount		From	To
neat cement	6	Cubic yards	0 ft.	178 ft.

Nearest Known Source of Contamination

28 feet South Direction Septic tank/drain field Type
Well disinfected upon completion? [X] Yes [ ] No

Pump [ ] Not Installed Date Installed 01/06/1998
Manufacturer's name GRUNDFOS
Model Number 75S - 75 - HP 7.5 Volt 440
Length of drop pipe 147 ft Capacity 75 g.p. Typ Submersible

Abandoned

Does property have any not in use and not sealed well(s)? [ ] Yes [X] No

Variance

Was a variance granted from the MDH for this well? [ ] Yes [X] No

Miscellaneous

First Bedrock Prairie Du Chien Group Aquifer Jordan
Last Strat Jordan Sandstone Depth to Bedrock 128 ft
Located by Minnesota Department of Health
Locate Method Digitization (Screen) - Map (1:24,000) (15 meters or
System UTM - NAD83, Zone 15, Meters X 453623 Y 4956032
Unique Number Verification Input Date 03/24/1999

Angled Drill Hole

Well Contractor

Licensee Business	Lic. or Reg. No.	Name of Driller
Gary's Well Co.	70417	SCHWICH, G.

Minnesota Unique Well Number

759599

County Scott
Quad Shakopee
Quad ID 105D

MINNESOTA DEPARTMENT OF HEALTH

WELL AND BORING REPORT

Minnesota Statutes Chapter 1031

Entry Date 12/05/2008
Update Date 03/10/2014
Received Date 04/09/2009

Well Name	Township	Range	Dir Section	Subsection
ANCHOR BLOCK 115	23	W 21		DBAAAC

Elevation 805 ft. **Elev. Method** 7.5 minute topographic map (+/- 5 feet)

Address

Well 13450 169 HY SHAKOPEE MN 55379

Stratigraphy Information

Geological Material	From	To (ft.)	Color	Hardness
GRAVEL/ROCKS	0	30	BROWN	MEDIUM
GRAVEL/SAND	30	42	BROWN	SOFT
LIMESTONE	42	63	YELLOW	HARD
LIMESTONE	63	105	BROWN	HARD
SANDSTONE	105	210	WHITE	SOFT

Remarks

Well Depth	Depth Completed	Date Well Completed
210 ft.	210 ft.	11/26/2008

Drill Method Non-specified Rotary **Drill Fluid** Bentonite

Use public supply/non-comm.-transient **Status** Active

Well Hydrofractured? Yes ☐ No ☐ From To

Casing Type Single casing **Joint** Welded
Drive Shoe? Yes ☒ No ☐ **Above/Below**

Casing Diameter **Weight** **Hole Diameter**
6 in. To 120 ft. lbs./ft. 13 in. To 120 ft.
6 in. To 210 ft.

Open Hole From 120 ft. To 210 ft.
Screen? ☐ **Type** **Make**

Static Water Level
82 ft. land surface Measure 11/26/2008

Pumping Level (below land surface)
86 ft. 2 hrs. Pumping at 125 g.p.m.

Wellhead Completion
Pitless adapter manufacturer BAKER Model
☐ Casing Protection ☒ 12 in. above grade
☐ At-grade (Environmental Wells and Borings ONLY)

Grouting Information Well Grouted? ☒ Yes ☐ No ☐ Not Specified

Material	Amount		From	To
neat cement	95	Sacks	ft.	120 ft.

Nearest Known Source of Contamination
50 feet West Direction Septic tank/drain field Type
Well disinfected upon completion? ☒ Yes ☐ No

Pump ☐ Not Installed Date Installed 12/18/2008
Manufacturer's name GRUNDFOS
Model Number 75S75-12 HP 7.5 Volt 460
Length of drop pipe 100 ft Capacity 75 g.p. Typ Submersible

Abandoned
Does property have any not in use and not sealed well(s)? ☐ Yes ☒ No

Variance
Was a variance granted from the MDH for this well? ☐ Yes ☒ No

Miscellaneous
First Bedrock Prairie Du Chien Group Aquifer Jordan
Last Strat Jordan Sandstone Depth to Bedrock 42 ft
Located by Minnesota Department of Health
Locate Method GPS SA Off (averaged) (15 meters)
System UTM - NAD83, Zone 15, Meters X 453510 Y 4955832
Unique Number Verification Info/GPS from data Input Date 12/05/2008

Angled Drill Hole

Well Contractor

Licensee Business	Lic. or Reg. No.	Name of Driller
EH Renner and Sons, Inc.	1431	PRAUGHT, V.

Minnesota Unique Well Number

209939

County Scott
Quad Shakopee
Quad ID 105D

MINNESOTA DEPARTMENT OF HEALTH

WELL AND BORING REPORT

Minnesota Statutes Chapter 1031

Entry Date 02/23/1989
Update Date 10/27/2017
Received Date

Well Name	Township	Range	Dir Section	Subsection
LANO	115	23	W 21	ADABAB

Elevation 820 ft. **Elev. Method** 7.5 minute topographic map (+/- 5 feet)

Address

C/W 3021 133RD ST W SHAKOPEE MN 55379

Stratigraphy Information

Geological Material	From	To (ft.)	Color	Hardness
SAND & GRAVEL	0	230		
ROCK SEMI-HARD	230	240	RED	MEDIUM
ROCK	240	280	VARIED	HARD

Remarks

324-B-8 ALLIS-CHALMERS DEALERSHIP
SEALED 08-30-2017 BY 1445

Well Depth	Depth Completed	Date Well Completed
280 ft.	280 ft.	06/13/1977

Drill Method **Drill Fluid**

Use commercial **Status** Sealed

Well Hydrofractured? **Yes** ☐ **No** ☐ **From** **To**

Casing Type Single casing **Joint**
Drive Shoe? **Yes** ☐ **No** ☐ **Above/Below** 0 ft.

Casing Diameter **Weight**
4 in. To 231 ft. lbs./ft.

Open Hole From 231 ft. To 280 ft.
Screen? ☐ **Type** **Make**

Static Water Level
110 ft. land surface Measure 06/13/1977

Pumping Level (below land surface)

Wellhead Completion
Pitless adapter manufacturer Model
☐ Casing Protection ☐ 12 in. above grade
☐ At-grade (Environmental Wells and Borings ONLY)

Grouting Information Well Grouted? ☐ Yes ☐ No ☒ Not Specified

Nearest Known Source of Contamination
feet Direction Type
Well disinfected upon completion? ☐ Yes ☐ No

Pump ☐ Not Installed Date Installed
Manufacturer's name
Model Number HP 0 Volt
Length of drop pipe ft Capacity g.p. Typ

Abandoned
Does property have any not in use and not sealed well(s)? ☐ Yes ☐ No

Variance
Was a variance granted from the MDH for this well? ☐ Yes ☐ No

Miscellaneous
First Bedrock St.Lawrence Formation Aquifer St.Lawrence-
Last Strat St.Lawrence-Tunnel City Depth to Bedrock 230 ft
Located by Minnesota Geological Survey
Locate Method Digitized - scale 1:24,000 or larger (Digitizing Table)
System UTM - NAD83, Zone 15, Meters X 453832 Y 4956235
Unique Number Verification Input Date 10/09/1995

Angled Drill Hole

Well Contractor

Licensee Business	Lic. or Reg. No.	Name of Driller
Associated Well Co.	27259	

Minnesota Unique Well Number

551318

County Scott
Quad Shakopee
Quad ID 105D

MINNESOTA DEPARTMENT OF HEALTH
WELL AND BORING REPORT
Minnesota Statutes Chapter 1031

Entry Date 04/11/1995
Update Date 08/18/2014
Received Date

Well Name	Township	Range	Dir Section	Subsection
C.H.	115	23	W 21	DDABAB

Elevation 830 ft. **Elev. Method** 7.5 minute topographic map (+/- 5 feet)

Address

C/W 13731 JOHNSON MEMORIAL DR SHAKOPEE MN

Stratigraphy Information

Geological Material	From	To (ft.)	Color	Hardness
CLAY, GRAVEL	0	5	YEL/BRN	
GRAVEL CLAY	5	25	BRN/GRN	
SAND GRAVEL	25	105	BROWN	
CLAY	105	135	GRAY	
SHALE	135	158	GRN/GRY	
SHALE ROCK	158	160	VARIED	
LIMESTONE SHALE	160	180	RED/BRN	
SANDSTONE, ROCK	180	220	VARIED	SOFT

Remarks

Well Depth	Depth Completed	Date Well Completed
220 ft.	220 ft.	10/24/1994

Drill Method Non-specified Rotary **Drill Fluid** Bentonite

Use domestic **Status** Active

Well Hydrofractured? Yes ☐ No ☐ **From** **To**

Casing Type Step down **Joint** Welded
Drive Shoe? Yes ☒ No ☐ **Above/Below**

Casing Diameter **Weight** **Hole Diameter**
4 in. To 204 ft. 11 lbs./ft. 12. in. To 160 ft.
8 in. To 160 ft. lbs./ft. 7.8 in. To 204 ft.

Open Hole From 204 ft. To 220 ft.
Screen? ☐ **Type** **Make**

Static Water Level
80 ft. land surface Measure 10/24/1994

Pumping Level (below land surface)
80 ft. hrs. Pumping at 50 g.p.m.

Wellhead Completion
Pitless adapter manufacturer WHITEWATER Model S44-5.5
☐ Casing Protection ☐ 12 in. above grade
☐ At-grade (Environmental Wells and Borings ONLY)

Grouting Information Well Grouted? ☒ Yes ☐ No ☐ Not Specified

Material	Amount	From	To
neat cement		10 ft.	204 ft.

Nearest Known Source of Contamination
10 feet North Direction Other Type
Well disinfected upon completion? ☐ Yes ☐ No

Pump ☐ Not Installed Date Installed 11/00/1994
Manufacturer's name FLINT & WALLING
Model Number HP 0.5 Volt 220
Length of drop pipe 100 ft Capacity g.p. Typ Submersible

Abandoned
Does property have any not in use and not sealed well(s)? ☐ Yes ☒ No

Variance
Was a variance granted from the MDH for this well? ☐ Yes ☐ No

Miscellaneous
First Bedrock Aquifer
Last Strat Depth to Bedrock 135 ft
Located by Minnesota Geological Survey
Locate Method Digitization (Screen) - Map (1:24,000) (15 meters or
System UTM - NAD83, Zone 15, Meters X 453798 Y 4955461
Unique Number Verification Information from Input Date 07/13/2005

Angled Drill Hole

Well Contractor

Licensee Business	Lic. or Reg. No.	Name of Driller
Bohn Well Co.	70350	VON BANK, B

Minnesota Unique Well Number

836415

County Scott
Quad Jordan East
Quad ID 90A

MINNESOTA DEPARTMENT OF HEALTH

WELL AND BORING REPORT

Minnesota Statutes Chapter 1031

Entry Date 08/30/2019
Update Date 06/28/2021
Received Date 06/27/2019

Well Name	Township	Range	Dir Section	Subsection
MUMOFF,	115	23	W 21	DDADAC

Elevation 869.4 **Elev. Method** LiDAR 1m DEM (MNDNR)

Address

Well 13745 JOHNSON MEMORIAL DR SHAKOPEE MN 55379

Stratigraphy Information

Geological Material	From	To (ft.)	Color	Hardness
CLAY SAND	0	27	BROWN	
SAND GRAVEL/ROCK	27	173	BROWN	
LIMESTONE	173	195	TAN/RED	
SANDSSTONE	195	233	WHITE	

Remarks
DRILLERS: WECKMAN, L. & RADEMACHER, M.

Well Depth 233 ft. **Depth Completed** 233 ft. **Date Well Completed** 06/17/2019

Drill Method Non-specified Rotary **Drill Fluid** Additive (+ Bentonite)

Use domestic **Status** Active

Well Hydrofractured? Yes ☐ No ☒ **From** **To**

Casing Type Single casing **Joint** Welded
Drive Shoe? Yes ☒ No ☐ **Above/Below**

Casing Diameter **Weight** **Hole Diameter**
4 in. To 219 ft. lbs./ft. 8 in. To 219 ft.
3.8 in. To 233 ft.

Open Hole From ft. To ft.

Screen? ☒ **Type** stainless **Make** JOHNSON
Diameter Slot/Gauze Length Set
3 in. 16 ft. 217 ft. ft.

Static Water Level
131 ft. land surface Measure 06/17/2019

Pumping Level (below land surface)
ft. hrs. Pumping at 25 g.p.m.

Wellhead Completion
Pitless adapter manufacturer MONITOR Model
☐ Casing Protection ☐ 12 in. above grade
☐ At-grade (Environmental Wells and Borings ONLY)

Grouting Information Well Grouted? ☒ Yes ☐ No ☐ Not Specified

Material	Amount		From	To
neat cement	30	Sacks	10 ft.	219 ft.

Nearest Known Source of Contamination
40 feet West Direction Other Type
Well disinfected upon completion? ☒ Yes ☐ No

Pump ☐ Not Installed Date Installed 06/17/2019
Manufacturer's name FLINT & WALLING
Model Number HP 0.75 Volt 220
Length of drop pipe 147 ft Capacity 10 g.p. Typ Submersible

Abandoned
Does property have any not in use and not sealed well(s)? ☐ Yes ☒ No

Variance
Was a variance granted from the MDH for this well? ☐ Yes ☒ No

Miscellaneous
First Bedrock Aquifer
Last Strat Depth to Bedrock ft
Located by Minnesota Department of Health
Locate Method GPS SA Off (averaged) (15 meters)
System UTM - NAD83, Zone 15, Meters X 453882 Y 4955314
Unique Number Verification Info/GPS from data Input Date 08/30/2019

Angled Drill Hole

Well Contractor

Bohn Well Drilling Co., Inc.	1445	SEE REMARKS
Licensee Business	Lic. or Reg. No.	Name of Driller

Minnesota Unique Well No.

248000

County Scott
Quad Jordan East
Quad ID 90A

MINNESOTA DEPARTMENT OF HEALTH

WELL AND BORING RECORD

Minnesota Statutes Chapter 103I

Entry Date 02/23/1989
Update Date 02/14/2014
Received Date

Well Name MN RENAISSANCE FESTIVAL

Township	Range	Dir	Section	Subsections	Elevation	775 ft.
115	23	W	21	CCDADC	Elevation Method	7.5 minute topographic map (+/- 5 feet)

Well Depth	Depth Completed	Date Well Completed
200 ft.	200 ft.	06/09/1977

Drilling Method --

Well Address
3630 145TH ST W
SHAKOPEE MN 55379

Drilling Fluid --

Well Hydrofractured? ☐ Yes ☐ No
From Ft. to Ft.

Use Commercial

Geological Material	Color	Hardness	From	To
DIRT OVERBURDEN	BLACK		0	2
ROCK SHAKOPEE		HARD	2	50
SANDSTONE & BROKEN ROCK			50	155
ROCK	PNK/GRN	HARD	155	200

Casing Type **Joint** No Information **Drive Shoe?** ☐ Yes ☐ No **Above/Below** 0 **ft.**

Casing Diameter	Weight	Hole Diameter
4 in. to 161 ft.	lbs./ft.	8 in. to 160 ft.

Open Hole from 161 ft. to 200 ft.

Screen NO **Make** **Type**

Diameter	Slot/Gauze	Length	Set Between

Static Water Level
60 ft. from Land surface Date Measured 06/09/1977

PUMPING LEVEL (below land surface)
ft. after hrs. pumping g.p.m.

Well Head Completion
Pitless adapter manufacturer Model
☐ Casing Protection ☐ 12 in. above grade
☐ At-grade (Environmental Wells and Borings ONLY)

NO REMARKS

Grouting Information Well Grouted? ☐ Yes ☐ No ☐ Not Specified

Located by: Minnesota Geological Survey
Method: Digitized - scale 1:24,000 or larger (Digitizing Table)
Unique Number Verification: N/A **Input Date:** 03/25/1996
System: *UTM - Nad83, Zone15, Meters* **X:** 452689 **Y:** 4955179

Nearest Known Source of Contamination
__feet __direction __type
Well disinfected upon completion? ☐ Yes ☐ No

Pump ☐ Not Installed Date Installed
Manufacturer's name Model number __ HP 0_ Volts
Length of drop Pipe _ft. Capacity _g.p.m Type Material

Abandoned Wells Does property have any not in use and not sealed well(s)? ☐ Yes ☐ No

Variance Was a variance granted from the MDH for this well? ☐ Yes ☐ No

First Bedrock Prairie Du Chien Group
Last Strat St.Lawrence Formation
Aquifer St.Lawrence
Depth to Bedrock 2 **ft.**

Well Contractor Certification

Associated Well Co.	27259	
License Business Name	Lic. Or Reg. No.	Name of Driller

County Well Index Online Report **248000**

Printed 3/16/2015
HE-01205-07

115-23-21 ccdadc ~~216772~~

elev. 775±10 ~~561243~~

115-23-28

Permit # 342-B-8A

248000 new number

90

JOB TICKET

№ 1043

ASSOCIATED WELL DRILLERS
13160 Pioneer Trail
Eden Prairie, Minnesota 5534
Phone 941-1530

Permit No. OXW

Tel. No.

For Minnesota Renaissance Festival

Address Hwy #169

Job At Dave Pearson

DATE 6/9/77 WORK REQUESTED

Well depth – 200'
Water level – 60'
Casing 4" – 161' 4" casing 0 to 161
2' to Rock 8" hole to 160
Sub Pump @ 120'

renumbered to 248000

DATE	DESCRIPTION OF WORK DONE		
0-2	black dirt overburden	QUUU	SOIL
2-50'	Rock Shakopee Hard	OPDC	DLMT
50'-155'	Sand Stone old broken Rock	CJDN	SNDS QZTE
155'-200'	Hard Rock Pink green	CSTL	DLMT SHLE

Aquifer CSTL-CSTL

Customer Acknowledgment

EMPLOYEE	DATE	HOURS	EMPLOYEE	DATE	HOURS

ATTACHMENT 3

SECTION 28
WATER SUPPLY WELL NETWORK: WELL LOGS

Minnesota Unique Well Number

211864

County Scott
Quad Jordan East
Quad ID 90A

MINNESOTA DEPARTMENT OF HEALTH

WELL AND BORING REPORT

Minnesota Statutes Chapter 1031

Entry Date 02/23/1989
Update Date 02/12/1996
Received Date

Well Name	**Township**	**Range**	**Dir**	**Section**	**Subsection**
LINDSTROM,	115	23	W	28	DDDDBC

Elevation 766 ft. **Elev. Method** 7.5 minute topographic map (+/- 5 feet)

Address

C/W 3036 150TH ST W SHAKOPEE MN 55379

Stratigraphy Information

Geological Material	From	To (ft.)	Color	Hardness
CLAY	0	10		
SAND	10	20		
CLAY	20	58		
SANDROCK-LIME	58	63		HARD
SANDROCK	63	127		

Remarks

237-B-8

Well Depth 127 ft. **Depth Completed** 127 ft. **Date Well Completed** 09/09/1974

Drill Method **Drill Fluid**

Use domestic **Status** Active

Well Hydrofractured? **Yes** ☐ **No** ☐ **From** **To**

Casing Type Single casing **Joint**

Drive Shoe? **Yes** ☐ **No** ☐ **Above/Below** 0 ft.

Casing Diameter **Weight**

5 in. To 76 ft. lbs./ft.

Open Hole From 76 ft. To 127 ft.

Screen? ☐ **Type** **Make**

Static Water Level

Pumping Level (below land surface)

Wellhead Completion

Pitless adapter manufacturer Model

☐ Casing Protection ☐ 12 in. above grade

☐ At-grade (Environmental Wells and Borings ONLY)

Grouting Information Well Grouted? ☐ Yes ☐ No ☒ Not Specified

Nearest Known Source of Contamination

feet Direction Type

Well disinfected upon completion? ☐ Yes ☐ No

Pump ☐ Not Installed Date Installed

Manufacturer's name

Model Number HP 0 Volt

Length of drop pipe ft Capacity g.p. Typ

Abandoned

Does property have any not in use and not sealed well(s)? ☐ Yes ☐ No

Variance

Was a variance granted from the MDH for this well? ☐ Yes ☐ No

Miscellaneous

First Bedrock Jordan Sandstone Aquifer Jordan

Last Strat Jordan Sandstone Depth to Bedrock 58 ft

Located by Minnesota Geological Survey

Locate Method Digitized - scale 1:24,000 or larger (Digitizing Table)

System UTM - NAD83, Zone 15, Meters X 453813 Y 4953563

Unique Number Verification Input Date 01/01/1990

Angled Drill Hole

Well Contractor

Hartmann Well Co.	40174	
Licensee Business	Lic. or Reg. No.	Name of Driller

Minnesota Unique Well Number

709026

County Scott
Quad Jordan East
Quad ID 90A

MINNESOTA DEPARTMENT OF HEALTH
WELL AND BORING REPORT
Minnesota Statutes Chapter 1031

Entry Date 12/17/2004
Update Date 02/06/2012
Received Date 01/18/2005

Well Name	Township	Range	Dir Section	Subsection
DOUCETTE,	115	23	W 28	ADCA

Elevation 790 ft. **Elev. Method** 7.5 minute topographic map (+/- 5 feet)

Address

C/W 14331 JOHNSON MEMORIAL DR SHAKOPEE MN

Stratigraphy Information

Geological Material	From	To (ft.)	Color	Hardness
DIRT	0	8	BLACK	MEDIUM
CLAY & ROCKS	8	41	BROWN	MEDIUM
CLAY & GRAVEL	41	90	GRAY	MEDIUM
CLAY	90	104	GRAY	HARD
CLAY & GRAVEL	104	115	GRAY	SOFT
LIMEROCK	115	118	BROWN	HARD
SANDROCK	118	139	BROWN	SOFT

Remarks

Well Depth	Depth Completed	Date Well Completed
139 ft.	139 ft.	10/22/2004

Drill Method Non-specified Rotary **Drill Fluid** Water

Use domestic **Status** Active

Well Hydrofractured? Yes ☐ No ☒ **From** **To**

Casing Type Single casing **Joint** Threaded
Drive Shoe? Yes ☒ No ☐ **Above/Below**

Casing Diameter **Weight** **Hole Diameter**
4 in. To 134 ft. 11 lbs./ft. 10 in. To 134 ft.
4 in. To 139 ft.

Open Hole From ft. To ft.

Screen? ☒ **Type** stainless **Make** JOHNSON

Diameter	Slot/Gauze	Length	Set	
3.5 in.	10	5 ft.	134 ft.	139 ft.

Static Water Level
60 ft. land surface Measure 06/03/2004

Pumping Level (below land surface)

Wellhead Completion
Pitless adapter manufacturer MONITOR Model
☐ Casing Protection ☐ 12 in. above grade
☐ At-grade (Environmental Wells and Borings ONLY)

Grouting Information Well Grouted? ☒ Yes ☐ No ☐ Not Specified

Material	Amount		From	To
neat cement	2	Cubic yards	8 ft.	134 ft.

Nearest Known Source of Contamination
54 feet West Direction Sewer Type
Well disinfected upon completion? ☒ Yes ☐ No

Pump ☐ Not Installed Date Installed 10/22/2004
Manufacturer's name FLINT & WALLING
Model Number 4F27A15 HP 1.5 Volt 230
Length of drop pipe 90 ft Capacity 27 g.p. Typ Submersible

Abandoned
Does property have any not in use and not sealed well(s)? ☐ Yes ☒ No

Variance
Was a variance granted from the MDH for this well? ☐ Yes ☒ No

Miscellaneous
First Bedrock Prairie Du Chien Group Aquifer Jordan
Last Strat Jordan Sandstone Depth to Bedrock 115 ft
Located by Minnesota Department of Health
Locate Method GPS SA Off (averaged) (15 meters)
System UTM - NAD83, Zone 15, Meters X 453616 Y 4954369
Unique Number Verification Tag on well Input Date 12/16/2004

Angled Drill Hole

Well Contractor

Hartmann Well Co.	40174	HARTMANN, B.
Licensee Business	Lic. or Reg. No.	Name of Driller

Minnesota Unique Well Number

211863

County Scott
Quad Jordan East
Quad ID 90A

MINNESOTA DEPARTMENT OF HEALTH

WELL AND BORING REPORT

Minnesota Statutes Chapter 1031

Entry Date 06/15/1990
Update Date 06/02/2014
Received Date

Well Name	Township	Range	Dir Section	Subsection
MINN. VALLEY	115	23	W 28	DCDDAB

Elevation 747 ft. **Elev. Method** 7.5 minute topographic map (+/- 5 feet)

Well Depth 147 ft. **Depth Completed** 147 ft. **Date Well Completed** 04/10/1972

Drill Method **Drill Fluid**

Address

C/W 3232 150TH ST W SHAKOPEE MN 55379

Use commercial **Status** Active

Well Hydrofractured? **Yes** ☐ **No** ☐ **From** **To**

Casing Type Single casing **Joint**

Drive Shoe? **Yes** ☐ **No** ☐ **Above/Below** 0 ft.

Stratigraphy Information

Geological Material	From	To (ft.)	Color	Hardness
DRIFT-CLAY	0	5		
SAND SOME ROCKS	5	9		
SANDROCK	9	123	WHT/YEL	
SANDROCK &	123	127		
SANDROCK &	127	147		HARD

Casing Diameter **Weight**

6 in. To 82 ft. lbs./ft.

Open Hole From 82 ft. To 147 ft.

Screen? ☐ **Type** **Make**

Static Water Level

27 ft. land surface Measure 04/10/1972

Pumping Level (below land surface)

Wellhead Completion

Pitless adapter manufacturer Model

☐ Casing Protection ☐ 12 in. above grade

☐ At-grade (Environmental Wells and Borings ONLY)

Grouting Information Well Grouted? ☐ Yes ☐ No ☒ Not Specified

Nearest Known Source of Contamination

feet Direction Type

Well disinfected upon completion? ☐ Yes ☐ No

Pump ☐ Not Installed Date Installed

Manufacturer's name

Model Number HP 5 Volt

Length of drop pipe ft Capacity g.p. Typ Submersible

Abandoned

Does property have any not in use and not sealed well(s)? ☐ Yes ☐ No

Variance

Was a variance granted from the MDH for this well? ☐ Yes ☐ No

Miscellaneous

First Bedrock Jordan Sandstone Aquifer Jordan-St.

Last Strat St.Lawrence Formation Depth to Bedrock 9 ft

Located by Minnesota Geological Survey

Locate Method Digitized - scale 1:24,000 or larger (Digitizing Table)

System UTM - NAD83, Zone 15, Meters X 453495 Y 4953568

Unique Number Verification Input Date 01/01/1990

Remarks

Angled Drill Hole

Well Contractor

Hartmann Well Co. 40174

Licensee Business Lic. or Reg. No. Name of Driller

Minnesota Unique Well Number

211865

County Scott
Quad Jordan East
Quad ID 90A

MINNESOTA DEPARTMENT OF HEALTH
WELL AND BORING REPORT
Minnesota Statutes Chapter 1031

Entry Date 02/23/1989
Update Date 02/14/2014
Received Date

Well Name	Township	Range	Dir	Section	Subsection
MINN. VALLEY	115	23	W	28	DDCCBA

Elevation 748 ft. **Elev. Method** 7.5 minute topographic map (+/- 5 feet)

Address

C/W 3232 150TH ST W SHAKOPEE MN 55379

Stratigraphy Information

Geological Material	From	To (ft.)	Color	Hardness
CLAY	0	10		
ROCKS	10	12		
SANDROCK	12	110		
LIMESTONE	110	132		V.HARD

Remarks

Well Depth 132 ft. **Depth Completed** 132 ft. **Date Well Completed** 06/26/1976

Drill Method **Drill Fluid**

Use commercial **Status** Active

Well Hydrofractured? **Yes** ☐ **No** ☐ **From** **To**

Casing Type Single casing **Joint**

Drive Shoe? **Yes** ☐ **No** ☐ **Above/Below** 0 ft.

Casing Diameter **Weight**

8 in. To 76 ft. lbs./ft.

Open Hole From 76 ft. To 132 ft.

Screen? ☐ **Type** **Make**

Static Water Level

29 ft. land surface Measure 06/00/1976

Pumping Level (below land surface)

39 ft. hrs. Pumping at 300 g.p.m.

Wellhead Completion

Pitless adapter manufacturer Model

☐ Casing Protection ☐ 12 in. above grade

☐ At-grade (Environmental Wells and Borings ONLY)

Grouting Information Well Grouted? ☐ Yes ☐ No ☒ Not Specified

Nearest Known Source of Contamination

feet Direction Type

Well disinfected upon completion? ☐ Yes ☐ No

Pump ☐ Not Installed Date Installed

Manufacturer's name

Model Number HP 0 Volt

Length of drop pipe ft Capacity g.p. Typ

Abandoned

Does property have any not in use and not sealed well(s)? ☐ Yes ☐ No

Variance

Was a variance granted from the MDH for this well? ☐ Yes ☐ No

Miscellaneous

First Bedrock Jordan Sandstone Aquifer Jordan-St.

Last Strat St.Lawrence Formation Depth to Bedrock 12 ft

Located by Minnesota Geological Survey

Locate Method Digitized - scale 1:24,000 or larger (Digitizing Table)

System UTM - NAD83, Zone 15, Meters X 453574 Y 4953567

Unique Number Verification Input Date 01/01/1990

Angled Drill Hole

Well Contractor

Licensee Business	Lic. or Reg. No.	Name of Driller
Hartmann Well Co.	40174	

Minnesota Unique Well Number

569344

County Scott
Quad Jordan East
Quad ID 90A

MINNESOTA DEPARTMENT OF HEALTH

WELL AND BORING REPORT

Minnesota Statutes Chapter 1031

Entry Date 07/29/1998
Update Date 02/14/2014
Received Date

Well Name	Township	Range	Dir Section	Subsection
NRG	115	23	W 28	DCCDBA

Elevation 738 ft. **Elev. Method** 7.5 minute topographic map (+/- 5 feet)

Address

Well 14800 JOHNSON MEMORIAL DR SHAKOPEE MN

Stratigraphy Information

Geological Material	From	To (ft.)	Color	Hardness
CLAY WITH ROCKS	0	17	GRAY	
SAND ROCK/GRAVEL	17	36		
SHAKOPEE ROCK	36	45		HARD
SAND ROCK/SHALE	45	90	YELLOW	SOFT
ROCK/SHALE	90	162	GREEN	HARD

Remarks

Well Depth	Depth Completed	Date Well Completed
162 ft.	162 ft.	05/08/1996

Drill Method Non-specified Rotary **Drill Fluid** Bentonite

Use domestic **Status** Active

Well Hydrofractured? **Yes** ☐ **No** ☐ **From** **To**

Casing Type Single casing **Joint**
Drive Shoe? **Yes** ☒ **No** ☐ **Above/Below**

Casing Diameter **Weight** **Hole Diameter**
6 in. To 99.8 ft. lbs./ft.
12 in. To 86 ft.
7.5 in. To 99 ft.
4.5 in. To 162 ft.

Open Hole From 99.7 ft. To 162 ft.
Screen? ☐ **Type** **Make**

Static Water Level
30 ft. land surface Measure 04/19/1996

Pumping Level (below land surface)
ft. hrs. Pumping at 200 g.p.m.

Wellhead Completion
Pitless adapter manufacturer Model
☐ Casing Protection ☐ 12 in. above grade
☐ At-grade (Environmental Wells and Borings ONLY)

Grouting Information Well Grouted? ☒ Yes ☐ No ☐ Not Specified

Material	Amount	From	To
neat cement		ft.	99.7 ft.

Nearest Known Source of Contamination
60 feet North Direction Body of water Type
Well disinfected upon completion? ☒ Yes ☐ No

Pump ☐ Not Installed Date Installed 05/08/1996
Manufacturer's name FLINT AND WALLING
Model Number HP 5 Volt
Length of drop pipe 63.2 ft Capacity g.p. Typ Submersible

Abandoned
Does property have any not in use and not sealed well(s)? ☐ Yes ☒ No

Variance
Was a variance granted from the MDH for this well? ☐ Yes ☒ No

Miscellaneous
First Bedrock Jordan Sandstone Aquifer Jordan-St.
Last Strat Jordan-St.Lawrence Depth to Bedrock 36 ft
Located by Minnesota Geological Survey
Locate Method Digitization (Screen) - Map (1:24,000) (15 meters or
System UTM - NAD83, Zone 15, Meters X 453221 Y 4953544
Unique Number Verification Tag on well Input Date 07/13/2005

Angled Drill Hole

Well Contractor

Torgerson Well Co.	27056	TORGERSON, R.
Licensee Business	Lic. or Reg. No.	Name of Driller

Minnesota Unique Well Number

233116

County Scott
Quad Jordan East
Quad ID 90A

MINNESOTA DEPARTMENT OF HEALTH

WELL AND BORING REPORT

Minnesota Statutes Chapter 1031

Entry Date 02/11/1988
Update Date 08/07/2018
Received Date

Well Name	Township	Range	Dir Section	Subsection
GRANZOW,	115	23	W 28	AABDBB

Elevation 804 ft. **Elev. Method** LiDAR 1m DEM (MNDNR)

Address

C/W MN

Stratigraphy Information

Geological Material	From	To (ft.)	Color	Hardness
SHAKOPEE ROCK	0	90		
JORDAN SANDROCK	90	150		

Remarks

SAME AS UNIQUE NO. 207444.
DNR OBWELL 70009.
SEALED 3-14-2018 BY 1622.

Well Depth	Depth Completed	Date Well Completed
150 ft.	150 ft.	04/14/1972

Drill Method Non-specified Rotary **Drill Fluid**

Use irrigation **Status** Sealed

Well Hydrofractured? **Yes** ☐ **No** ☐ **From** **To**

Casing Type Single casing **Joint**
Drive Shoe? **Yes** ☐ **No** ☐ **Above/Below** 0 ft.

Casing Diameter **Weight** **Hole Diameter**
8 in. To 116 ft. lbs./ft. 12. in. To 116 ft.
8 in. To 150 ft.

Open Hole From 116 ft. To 150 ft.
Screen? ☐ **Type** **Make**

Static Water Level
90 ft. land surface Measure 05/02/1972

Pumping Level (below land surface)
95 ft. hrs. Pumping at 300 g.p.m.

Wellhead Completion
Pitless adapter manufacturer Model
☐ Casing Protection ☐ 12 in. above grade
☐ At-grade (Environmental Wells and Borings ONLY)

Grouting Information Well Grouted? ☐ Yes ☐ No ☒ Not Specified

Nearest Known Source of Contamination
feet Direction Type
Well disinfected upon completion? ☐ Yes ☐ No

Pump ☐ Not Installed Date Installed
Manufacturer's name
Model Number HP 0 Volt
Length of drop pipe ft Capacity g.p. Typ

Abandoned
Does property have any not in use and not sealed well(s)? ☐ Yes ☐ No

Variance
Was a variance granted from the MDH for this well? ☐ Yes ☒ No

Miscellaneous
First Bedrock Prairie Du Chien Group Aquifer Jordan
Last Strat Jordan Sandstone Depth to Bedrock 0 ft
Located by Minnesota Geological Survey
Locate Method Digitization (Screen) - Map (1:12,000) (>15 meters)
System UTM - NAD83, Zone 15, Meters X 453632 Y 4954945
Unique Number Verification Information from Input Date 08/07/2018

Angled Drill Hole

Well Contractor

Associated Well Co.	27259	SCHULTA, W.
Licensee Business	Lic. or Reg. No.	Name of Driller

Minnesota Unique Well Number

513892

County Scott
Quad Jordan East
Quad ID 90A

MINNESOTA DEPARTMENT OF HEALTH
WELL AND BORING REPORT
Minnesota Statutes Chapter 1031

Entry Date 06/09/1993
Update Date 03/13/2019
Received Date

Well Name	Township	Range	Dir Section	Subsection
MID-AMERICA	115	23	W 28	CAAAAC

Elevation 755 ft. **Elev. Method** 7.5 minute topographic map (+/- 5 feet)

Address

C/W 3325 145TH ST W MN

Stratigraphy Information

Geological Material	From	To (ft.)	Color	Hardness
TOPSOIL	0	1	BLACK	SOFT
CLAY	1	3	BROWN	MEDIUM
SHAKOPEE ROCK	3	27	ORN/BRN	HARD
JORDAN ROCK	27	130	WHITE	SOFT
SHALE	130	140	BLUE	SOFT
ST LAWRENCE	140	181	PNK/BLU	HARD
FRANCONIA	181	202	BLU/GRN	HARD
FRANCONIA	202	320	BLU/GRN	HARD

Remarks

GAMMA LOGGED 11-13-92
SEALED 10-24-2018 BY 1445

Well Depth	Depth Completed	Date Well Completed
320 ft.	320 ft.	11/12/1992

Drill Method Non-specified Rotary **Drill Fluid** Bentonite

Use public supply/non-community **Status** Sealed

Well Hydrofractured? **Yes** ☐ **No** ☐ **From** **To**

Casing Type Single casing **Joint** Threaded
Drive Shoe? **Yes** ☒ **No** ☐ **Above/Below** 0 ft.

Casing Diameter **Weight** **Hole Diameter**

4 in. To 201 ft. lbs./ft.

9 in. To 201 ft.
4 in. To 320 ft.

Open Hole From 201 ft. To 320 ft.
Screen? ☐ **Type** **Make**

Static Water Level

Pumping Level (below land surface)

35 ft. hrs. Pumping at 50 g.p.m.

Wellhead Completion

Pitless adapter manufacturer Model
☐ Casing Protection ☐ 12 in. above grade
☐ At-grade (Environmental Wells and Borings ONLY)

Grouting Information Well Grouted? ☒ Yes ☐ No ☐ Not Specified

Material	Amount		From	To
neat cement	64	Sacks	0 ft.	201 ft.

Nearest Known Source of Contamination

60 feet North Direction Septic tank/drain field Type
Well disinfected upon completion? ☐ Yes ☐ No

Pump ☐ Not Installed Date Installed 11/16/1992
Manufacturer's name GOULDS
Model Number S75M HP 0.75 Volt 230
Length of drop pipe 70 ft Capacity 15 g.p. Typ Submersible

Abandoned

Does property have any not in use and not sealed well(s)? ☐ Yes ☐ No

Variance

Was a variance granted from the MDH for this well? ☐ Yes ☐ No

Miscellaneous

First Bedrock Prairie Du Chien Group Aquifer St.Lawrence-
Last Strat St.Lawrence Formation Depth to Bedrock 3 ft
Located by Minnesota Geological Survey
Locate Method Digitization (Screen) - Map (1:24,000) (15 meters or
System UTM - NAD83, Zone 15, Meters X 453058 Y 4954225
Unique Number Verification Information from Input Date 06/02/2000

Angled Drill Hole

Well Contractor

R.E.S. Well Co.	27276	
Licensee Business	Lic. or Reg. No.	Name of Driller

Minnesota Unique Well Number

404657

County Scott
Quad Jordan East
Quad ID 90A

MINNESOTA DEPARTMENT OF HEALTH
WELL AND BORING REPORT
Minnesota Statutes Chapter 1031

Entry Date 06/15/1990
Update Date
Received Date 04/16/2015

Well Name	Township	Range	Dir	Section	Subsection
RENAISSANCE	115	23	W	28	BBAA

Elevation 777 ft. **Elev. Method** Calc from DEM (USGS 7.5 min or equiv.)

Address

C/W 3525 145TH ST W SHAKOPEE MN 55379

Stratigraphy Information

Geological Material	From	To (ft.)	Color	Hardness
SHAKOPEE LIMESTONE	0	80	BROWN	HARD
JORDAN SANDROCK	80	189	WHITE	SOFT
ST. LAWRENCE SHALE	189	236	GREEN	HARD
FRANCONIA SHALE	236	371	GREEN	HARD
GALESVILLE	371	450	WHITE	MEDIUM
EAU CLAIRE SHALE	450	455	GREEN	HARD

Remarks
*1 - BIG WELL.
*2 - SMALL WELL.
600 WELL
BAKERY HILL WELL
BIG WELL
TOTAL PLATE COUNT TNTC 8-25-77

Well Depth	Depth Completed	Date Well Completed
455 ft.	455 ft.	10/14/1983

Drill Method Non-specified Rotary **Drill Fluid**

Use public supply/non-comm.-transient **Status** Active

Well Hydrofractured? **Yes** ☐ **No** ☐ **From** **To**

Casing Type Single casing **Joint** Welded
Drive Shoe? **Yes** ☒ **No** ☐ **Above/Below**

Casing Diameter **Weight** **Hole Diameter**
8 in. To 256 ft. 28.5 lbs./ft. 14 in. To 256 ft.
8 in. To 445 ft.

Open Hole From 256 ft. To 455 ft.
Screen? ☐ **Type** **Make**

Static Water Level
61 ft. Land surface Measure 11/10/1983

Pumping Level (below land surface)
110 ft. 1 hrs. Pumping at 100 g.p.m.

Wellhead Completion
Pitless adapter manufacturer Model
☐ Casing Protection ☒ 12 in. above grade
☐ At-grade (Environmental Wells and Borings ONLY)

Grouting Information Well Grouted? ☒ Yes ☐ No ☐ Not Specified

Material	Amount		From	To
Neat Cement	6.5	Cubic yards	2 ft.	256 ft.

Nearest Known Source of Contamination
600 feet North Direction Type
Well disinfected upon completion? ☒ Yes ☐ No

Pump ☐ Not Installed Date Installed 05/10/1984
Manufacturer's name PIONEER
Model Number P - 300 HP 20 Volt 220
Length of drop pipe 161 ft Capacity 250 g.p. Typ Submersible

Abandoned
Does property have any not in use and not sealed well(s)? ☐ Yes ☐ No

Variance
Was a variance granted from the MDH for this well? ☐ Yes ☐ No

Miscellaneous
First Bedrock Prairie Du Chien Group Aquifer Tunnel City-Eau
Last Strat Eau Claire Formation Depth to Bedrock 0 ft
Located by Minnesota Department of Health
Locate Method GPS SA Off (averaged)
System UTM - Mad83, Zone 15, Meters X 452672 Y 4955007
Unique Number Verification Info/GPS from data Inpute Date 06/06/2005

Angled Drill Hole

Well Contractor

Licensee Business	Lic. or Reg. No.	Name of Driller
Hartmann Well Co.	40174	JAECKELS, R.

Minnesota Unique Well Number

401129

County: Scott
Quad: Jordan East
Quad ID: 90A

MINNESOTA DEPARTMENT OF HEALTH
WELL AND BORING REPORT
Minnesota Statutes Chapter 1031

Entry Date: 06/15/1990
Update Date: 02/25/2020
Received Date:

Well Name	Township	Range	Dir	Section	Subsection
MN VALLEY	115	23	W	28	DCDDAD

Elevation 761 ft. **Elev. Method** Calc from DEM (USGS 7.5 min or equiv.)

Address

C/W 14505 JOHNSON MEMORIAL DR SHAKOPEE MN 55379

Stratigraphy Information

Geological Material	From	To (ft.)	Color	Hardness
CLAY	0	18	RED	MEDIUM
CLAY AND SAND	18	82	RED	MEDIUM
SANDROCK	82	120	YELLOW	MEDIUM

Remarks

PREVIOUS USE CODE: DO (DOMESTIC) 2/25/2020.

Well Depth	Depth Completed	Date Well Completed
120 ft.	120 ft.	03/22/1984

Drill Method Non-specified Rotary **Drill Fluid**

Use public supply/non-comm.-transient **Status** Active

Well Hydrofractured? Yes ☐ No ☐ From To

Casing Type Single casing **Joint** Threaded
Drive Shoe? Yes ☒ No ☐ **Above/Below** 1 ft.

Casing Diameter **Weight**
4 in. To 110 ft. 11 lbs./ft.

Hole Diameter
6 in. To 110 ft.
4 in. To 120 ft.

Open Hole From 110 ft. To 120 ft.
Screen? ☐ **Type** **Make**

Static Water Level
45 ft. land surface Measure 03/22/1984

Pumping Level (below land surface)

Wellhead Completion
Pitless adapter manufacturer MONITOR Model
☐ Casing Protection ☐ 12 in. above grade
☐ At-grade (Environmental Wells and Borings ONLY)

Grouting Information Well Grouted? ☒ Yes ☐ No ☐ Not Specified

Material	Amount	From	To
bentonite		0 ft.	110 ft.
cuttings		ft.	ft.

Nearest Known Source of Contamination
80 feet Southeas Direction Septic tank/drain field Type
Well disinfected upon completion? ☐ Yes ☐ No

Pump ☐ Not Installed Date Installed 03/22/1984
Manufacturer's name PIONEER
Model Number HP 0.75 Volt 220
Length of drop pipe 12 ft Capacity 75 g.p. Typ Submersible

Abandoned
Does property have any not in use and not sealed well(s)? ☐ Yes ☐ No

Variance
Was a variance granted from the MDH for this well? ☐ Yes ☐ No

Miscellaneous
First Bedrock Jordan Sandstone Aquifer Jordan
Last Strat Jordan-Wonewoc Depth to Bedrock 82 ft
Located by Minnesota Department of Health
Locate Method Digitization (Screen) - Map (1:24,000) (15 meters or
System UTM - NAD83, Zone 15, Meters X 453471 Y 4953537
Unique Number Verification Input Date 01/20/1999

Angled Drill Hole

Well Contractor

Hartmann Well Co.	40174	JAECKELS, R.
Licensee Business	Lic. or Reg. No.	Name of Driller

ATTACHMENT 4
MONITORING WELL LOGS

Minnesota Unique Well Number

595728

County Scott
Quad
Quad ID

MINNESOTA DEPARTMENT OF HEALTH

WELL AND BORING REPORT

Minnesota Statutes Chapter 1031

Entry Date 08/07/2009
Update Date 08/07/2009
Received Date

Well Name	**Township**	**Range**	**Dir Section**	**Subsection**
W-120	115	23	W 21	AAD

Elevation **Elev. Method**

Address

Well 130TH ST W SHAKOPEE MN

Stratigraphy Information

Geological Material	From	To (ft.)	Color	Hardness
GRAVEL	0	5	BROWN	
SILTY SAND / GRAVEL	5	69	BROWN	
SILTY SANDS	69	84	BROWN	
SILTY CLAY	84	104	BROWN	
LIMESTONE / SHALE /	104	135	TAN	
CLAY	135	148	GRAY	
LIMESTONE	148	157	TAN/RED	
SANDSTONE / SHALE	157	163	RED	
SANDSTONE (BUFF)	163	175		

Remarks

W-120

Well Depth	**Depth Completed**	**Date Well Completed**
175 ft.	170 ft.	05/08/1997

Drill Method Non-specified Rotary **Drill Fluid** Bentonite

Use remedial **Status**

Well Hydrofractured? **Yes** ☐ **No** ☐ **From** **To**

Casing Type Single casing **Joint** Welded
Drive Shoe? **Yes** ☐ **No** ☒ **Above/Below**

Casing Diameter **Weight** **Hole Diameter**
4 in. To 165 ft. lbs./ft. 8 in. To 175 ft.

Open Hole From ft. To ft.

Screen? ☒ **Type** stainless **Make** WIREWOUND

Diameter	Slot/Gauze	Length	Set	
4 in.	10	5 ft.	165 ft.	170 ft.

Static Water Level
42 ft. land surface Measure 05/08/1997

Pumping Level (below land surface)

Wellhead Completion
Pitless adapter manufacturer Model
☒ Casing Protection ☒ 12 in. above grade
☐ At-grade (Environmental Wells and Borings ONLY)

Grouting Information Well Grouted? ☒ Yes ☐ No ☐ Not Specified

Material	Amount		From	To
neat cement	55	Sacks	ft.	161 ft.

Nearest Known Source of Contamination
feet Direction Type
Well disinfected upon completion? ☐ Yes ☒ No

Pump ☒ Not Installed Date Installed
Manufacturer's name
Model Number HP Volt
Length of drop pipe ft Capacity g.p. Typ

Abandoned
Does property have any not in use and not sealed well(s)? ☐ Yes ☒ No

Variance
Was a variance granted from the MDH for this well? ☐ Yes ☒ No

Miscellaneous
First Bedrock Aquifer
Last Strat Depth to Bedrock ft
Located by
Locate Method
System UTM - NAD83, Zone 15, Meters X Y
Unique Number Verification Input Date

Angled Drill Hole

Well Contractor

Bergerson-Caswell	27058	HOLMEN, GLENN
Licensee Business	Lic. or Reg. No.	Name of Driller

Minnesota Unique Well Number

595729

County Scott
Quad
Quad ID

MINNESOTA DEPARTMENT OF HEALTH

WELL AND BORING REPORT

Minnesota Statutes Chapter 1031

Entry Date
Update Date 08/07/2009
Received Date

Well Name	**Township**	**Range**	**Dir Section**	**Subsection**
W-121 - PAHL,	115	23	W 21	AAC

Elevation **Elev. Method**

Address

Well 3331 AKERS LA SHAKOPEE MN 55352

Stratigraphy Information

Geological Material	From	To (ft.)	Color	Hardness
SANDY CLAY / GRAVEL	0	10	BROWN	
GRAVEL / COBBLES	10	30	BROWN	
GRAVEL / CLAY	30	41	LT. BRN	
GRAVEL	41	50	BROWN	
CLAY / SAND	50	60	GRAY	
GRAVEL / CLAY (BUFF)	60	65		
GRAVEL W/ SOME	65	72		
SANDY CLAY	72	78	GRAY	

Remarks
W-121

Well Depth	**Depth Completed**	**Date Well Completed**
78 ft.	78 ft.	05/06/1997

Drill Method Non-specified Rotary **Drill Fluid** Bentonite

Use remedial **Status**

Well Hydrofractured? **Yes** ☐ **No** ☐ **From** **To**

Casing Type Single casing **Joint** Welded
Drive Shoe? **Yes** ☐ **No** ☒ **Above/Below**

Casing Diameter **Weight** **Hole Diameter**
4 in. To 65 ft. lbs./ft. 8 in. To 78 ft.

Open Hole From ft. To ft.

Screen? ☒ **Type** stainless **Make** WIREWOUND

Diameter	Slot/Gauze	Length	Set	
4 in.	10	5 ft.	65 ft.	70 ft.

Static Water Level
42 ft. land surface Measure 05/06/1997

Pumping Level (below land surface)

Wellhead Completion
Pitless adapter manufacturer Model
☒ Casing Protection ☒ 12 in. above grade
☐ At-grade (Environmental Wells and Borings ONLY)

Grouting Information Well Grouted? ☒ Yes ☐ No ☐ Not Specified

Material	Amount		From	To
neat cement	30	Sacks	ft.	61 ft.

Nearest Known Source of Contamination
feet Direction Type
Well disinfected upon completion? ☐ Yes ☒ No

Pump ☒ Not Installed Date Installed
Manufacturer's name
Model Number HP Volt
Length of drop pipe ft Capacity g.p. Typ

Abandoned
Does property have any not in use and not sealed well(s)? ☐ Yes ☒ No

Variance
Was a variance granted from the MDH for this well? ☐ Yes ☒ No

Miscellaneous
First Bedrock Aquifer
Last Strat Depth to Bedrock ft
Located by
Locate Method
System UTM - NAD83, Zone 15, Meters X Y
Unique Number Verification Input Date

Angled Drill Hole

Well Contractor

Bergerson-Caswell	27058	HOLMEN, GLENN
Licensee Business	Lic. or Reg. No.	Name of Driller

Minnesota Unique Well Number

151599

County Scott
Quad Shakopee
Quad ID 105D

MINNESOTA DEPARTMENT OF HEALTH
WELL AND BORING REPORT
Minnesota Statutes Chapter 1031

Entry Date 02/08/1989
Update Date 02/14/2014
Received Date

Well Name	Township	Range	Dir Section	Subsection
LOUISVILLE	115	23	W 21	AB

Elevation **Elev. Method**

Address

C/W 3601 130TH ST W SHAKOPEE MN
Contact 331 AKERS LA JORDAN MN 55352

Stratigraphy Information

Geological Material	From	To (ft.)	Color	Hardness
PIPE ABOVE GROUND	0	2		
CLAY,GRAVEL	2	17		SOFT
SAND,GRAVEL & CLAY	17	25		SOFT
SAND & GRAVEL	25	54		SOFT
LIME ROCK	54	55		HARD
SAND GRAVEL & CLAY	55	61		SOFT
LIMEROCK	61	108		HARD

Remarks
W-110

Well Depth 108 ft. **Depth Completed** 108 ft. **Date Well Completed** 11/05/1986

Drill Method Cable Tool **Drill Fluid**

Use monitor well **Status** Active

Well Hydrofractured? Yes ☐ No ☐ From To

Casing Type Step down **Joint** Welded
Drive Shoe? Yes ☒ No ☐ **Above/Below** 2 ft.

Casing Diameter / **Weight**
8 in. To 61 ft. 28.5 lbs./ft.
0 in. To ft. lbs./ft.
4 in. To 82 ft. 11 lbs./ft.

Hole Diameter
8 in. To 82 ft.
4 in. To 108 ft.

Open Hole From 82 ft. To 106 ft.
Screen? ☐ **Type** **Make**

Static Water Level
80 ft. land surface Measure 11/05/1986

Pumping Level (below land surface)
92 ft. 2 hrs. Pumping at 3 g.p.m.

Wellhead Completion
Pitless adapter manufacturer Model
☐ Casing Protection ☒ 12 in. above grade
☐ At-grade (Environmental Wells and Borings ONLY)

Grouting Information Well Grouted? ☒ Yes ☐ No ☐ Not Specified

Material	Amount		From	To
neat cement	2	Cubic yards	ft.	82 ft.

Nearest Known Source of Contamination
50 feet South Direction Landfill Type
Well disinfected upon completion? ☒ Yes ☐ No

Pump ☐ Not Installed Date Installed
Manufacturer's name GRUNDFUS
Model Number SP1-9 HP 0.5 Volt 230
Length of drop pipe 103 ft Capacity 5 g.p. Typ Submersible

Abandoned
Does property have any not in use and not sealed well(s)? ☐ Yes ☐ No

Variance
Was a variance granted from the MDH for this well? ☐ Yes ☐ No

Miscellaneous
First Bedrock Aquifer
Last Strat Depth to Bedrock ft
Located by
Locate Method
System UTM - NAD83, Zone 15, Meters X Y
Unique Number Verification Input Date

Angled Drill Hole

Well Contractor

Keys Well Co.	62012	KEYS,M.
Licensee Business	Lic. or Reg. No.	Name of Driller

Minnesota Unique Well Number

557378

County Scott
Quad
Quad ID

MINNESOTA DEPARTMENT OF HEALTH

WELL AND BORING REPORT

Minnesota Statutes Chapter 1031

Entry Date 04/20/1995
Update Date 02/14/2014
Received Date

Well Name	**Township**	**Range**	**Dir Section**	**Subsection**
LOUISVILLE	115	23	W 21	AAD

Elevation **Elev. Method**

Address

C/W 3601 130TH ST W SHAKOPEE MN
Contact 3331 AKERS LA JORDAN MN 55352

Stratigraphy Information

Geological Material	From	To (ft.)	Color	Hardness
CLAY	0	2	GRAY	SOFT
GARBAGE	2	76	VARIED	HARD
LIMESTONE	76	147	BRN/RED	HARD
SANDSTONE	147	160	WHT/BRN	SOFT

Remarks

DC-119

Well Depth 160 ft. **Depth Completed** 160 ft. **Date Well Completed** 11/00/1994

Drill Method Non-specified Rotary **Drill Fluid** Bentonite

Use monitor well **Status** Active

Well Hydrofractured? **Yes** ☐ **No** ☐ **From** **To**

Casing Type Step down **Joint** Welded
Drive Shoe? **Yes** ☐ **No** ☒ **Above/Below**

Casing Diameter **Weight** **Hole Diameter**
4 in. To 147 ft. 11 lbs./ft. 12 in. To 81 ft.
8 in. To 81 ft. lbs./ft. 8 in. To 160 ft.

Open Hole From ft. To ft.
Screen? ☒ **Type** slotted pipe **Make** JOHNSON

Diameter	Slot/Gauze	Length	Set	
4 in.	10	10 ft.	150 ft.	160 ft.

Static Water Level
116 ft. land surface Measure 11/00/1994

Pumping Level (below land surface)
160 ft. 4 hrs. Pumping at 30 g.p.m.

Wellhead Completion
Pitless adapter manufacturer Model
☐ Casing Protection ☐ 12 in. above grade
☐ At-grade (Environmental Wells and Borings ONLY)

Grouting Information Well Grouted? ☒ Yes ☐ No ☐ Not Specified

Material	Amount		From	To
neat cement	8	Cubic yards	2 ft.	143 ft.

Nearest Known Source of Contamination
feet Direction Landfill Type
Well disinfected upon completion? ☐ Yes ☒ No

Pump ☒ Not Installed Date Installed
Manufacturer's name
Model Number HP Volt
Length of drop pipe ft Capacity g.p. Typ

Abandoned
Does property have any not in use and not sealed well(s)? ☐ Yes ☐ No

Variance
Was a variance granted from the MDH for this well? ☐ Yes ☐ No

Miscellaneous
First Bedrock Aquifer
Last Strat Depth to Bedrock 76 ft
Located by
Locate Method
System UTM - NAD83, Zone 15, Meters X Y
Unique Number Verification Input Date

Angled Drill Hole

Well Contractor

Bergerson-Caswell	27058	SCHULTZ,C.
Licensee Business	Lic. or Reg. No.	Name of Driller

Minnesota Unique Well Number

557379

County Scott
Quad
Quad ID

MINNESOTA DEPARTMENT OF HEALTH

WELL AND BORING REPORT

Minnesota Statutes Chapter 1031

Entry Date 04/20/1995
Update Date 02/14/2014
Received Date

Well Name	**Township**	**Range**	**Dir Section**	**Subsection**
LOUISVILLE	115	23	W 21	AAD

Elevation **Elev. Method**

Address

C/W 3601 130TH ST W SHAKOPEE MN

Contact 3331 AKERS LA JORDAN MN 55352

Stratigraphy Information

Geological Material	From	To (ft.)	Color	Hardness
CLAY	0	2	GRAY	SOFT
GARBAGE	2	73	VARIED	HARD
LIMESTONE	73	146	BRN/RED	HARD
SANDSTONE	146	159	WHT/BRN	MEDIUM

Well Depth 159 ft. **Depth Completed** 159 ft. **Date Well Completed** 11/00/1994

Drill Method Non-specified Rotary **Drill Fluid** Bentonite

Use monitor well **Status** Active

Well Hydrofractured? **Yes** ☐ **No** ☐ **From** **To**

Casing Type Step down **Joint** Welded

Drive Shoe? **Yes** ☐ **No** ☒ **Above/Below**

Casing Diameter **Weight** **Hole Diameter**

4 in. To 149 ft. 11 lbs./ft. — 12 in. To 75 ft.

8 in. To 75 ft. lbs./ft. — 8 in. To 159 ft.

Open Hole From ft. To ft.

Screen? ☒ **Type** slotted pipe **Make** JOHNSON

Diameter	Slot/Gauze	Length	Set	
4 in.	10	10 ft.	149 ft.	159 ft.

Static Water Level

117 ft. land surface Measure 11/00/1994

Pumping Level (below land surface)

159 ft. 4 hrs. Pumping at 25 g.p.m.

Wellhead Completion

Pitless adapter manufacturer Model

☐ Casing Protection ☐ 12 in. above grade

☐ At-grade (Environmental Wells and Borings ONLY)

Grouting Information Well Grouted? ☒ Yes ☐ No ☐ Not Specified

Material	Amount		From	To
neat cement	9	Cubic yards	2 ft.	138 ft.

Nearest Known Source of Contamination

feet Direction Landfill Type

Well disinfected upon completion? ☐ Yes ☒ No

Pump ☒ Not Installed Date Installed

Manufacturer's name

Model Number HP Volt

Length of drop pipe ft Capacity g.p. Typ

Abandoned

Does property have any not in use and not sealed well(s)? ☐ Yes ☐ No

Variance

Was a variance granted from the MDH for this well? ☐ Yes ☐ No

Miscellaneous

First Bedrock Aquifer

Last Strat Depth to Bedrock 73 ft

Located by

Locate Method

System UTM - NAD83, Zone 15, Meters X Y

Unique Number Verification Input Date

Angled Drill Hole

Remarks

DC-118

Well Contractor

Bergerson-Caswell	27058	SCHULTZ,C.
Licensee Business	Lic. or Reg. No.	Name of Driller

Minnesota Unique Well Number

557380

County Scott
Quad
Quad ID

MINNESOTA DEPARTMENT OF HEALTH

WELL AND BORING REPORT

Minnesota Statutes Chapter 1031

Entry Date 04/20/1995
Update Date 02/14/2014
Received Date

Well Name	**Township**	**Range**	**Dir Section**	**Subsection**
LOUISVILLE	115	23	W 21	AAD

Elevation **Elev. Method**

Address

C/W 3601 130TH ST W SHAKOPEE MN

Contact 3331 ALERS LA JORDAN MN 55352

Stratigraphy Information

Geological Material	From	To (ft.)	Color	Hardness
GARBAGE	2	73	VARIED	HARD
LIMESTONE	73	136	BROWN	HARD
SANDSTONE	136	147	WHT/BRN	SOFT

Remarks

DC-117

Well Depth	**Depth Completed**	**Date Well Completed**
147 ft.	147 ft.	11/00/1994

Drill Method Non-specified Rotary **Drill Fluid** Bentonite

Use monitor well **Status** Active

Well Hydrofractured? **Yes** ☐ **No** ☐ **From** **To**

Casing Type Step down **Joint** Welded

Drive Shoe? **Yes** ☐ **No** ☒ **Above/Below**

Casing Diameter **Weight** **Hole Diameter**

4 in. To 137 ft. lbs./ft. 12 in. To 27 ft.

8 in. To 77 ft. lbs./ft. 8 in. To 147 ft.

Open Hole From ft. To ft.

Screen? ☒ **Type** stainless **Make** JOHNSON

Diameter	Slot/Gauze	Length	Set	
4 in.	10	10 ft.	137 ft.	147 ft.

Static Water Level

115 ft. land surface Measure 11/00/1994

Pumping Level (below land surface)

Wellhead Completion

Pitless adapter manufacturer Model

☐ Casing Protection ☐ 12 in. above grade

☐ At-grade (Environmental Wells and Borings ONLY)

Grouting Information Well Grouted? ☒ Yes ☐ No ☐ Not Specified

Material	Amount		From	To
	4	Cubic yards	2 ft.	128 ft.
neat cement	11	Cubic yards	ft.	77 ft.

Nearest Known Source of Contamination

feet Direction Landfill Type

Well disinfected upon completion? ☐ Yes ☒ No

Pump ☒ Not Installed Date Installed

Manufacturer's name

Model Number HP Volt

Length of drop pipe ft Capacity g.p. Typ

Abandoned

Does property have any not in use and not sealed well(s)? ☐ Yes ☐ No

Variance

Was a variance granted from the MDH for this well? ☐ Yes ☐ No

Miscellaneous

First Bedrock Aquifer

Last Strat Depth to Bedrock 73 ft

Located by

Locate Method

System UTM - NAD83, Zone 15, Meters X Y

Unique Number Verification Input Date

Angled Drill Hole

Well Contractor

Bergerson-Caswell	27058	SCHULTZ,C.
Licensee Business	Lic. or Reg. No.	Name of Driller

Scott | [illegible] | Section Number | Township Number | Range Number

Distance and Direction from Road Intersection or Street Address and City of Well Location

W-8

See exact location of well in section grid with "X". Sketch map of well location.

N | E | S | 1 Mile

Pottie

TOP of Well 798.87

well X

XH 6791

1. PROPERTY OWNER'S NAME: Lowerville Landfill

Address: RR 3 Sheboygan

5. WELL DEPTH (completed): 100 ft. Date of Completion: May 19, 84

☐ Cable tool ☐ Reverse ☐ Driven ☐ Dug
☐ Rotary-hammer ☐ Air ☐ Bored ☐
☒ Rotary ☐ Jetted ☐ Power Auger

6. USE
☒ Domestic ☐ Public Supply ☐ Industry
☐ Irrigation ☐ Air Conditioning ☐ Commercial
☐ Test Well ☐

FORMATION LOG	COLOR	HARDNESS OF FORMATION	FROM	TO
Clay	Redish	med	0	14
Gravel	brown	"	14	16
Clay	Yellow	med	16	21
Sandy clay	Blue	"	21	40
Sandy gravel	Brown	med	40	56
Coarse gravel	Brown	Hard	56	100

SCREEN

5 ft long # 18 slot 2" 20

stainless steel screen, 1 ft of pipe

& neck tailer on top. 2 X 4 John-

son K packer (seal)

7. CASING DIAM.: Threaded ☒ Welded ☐ Steel ☒ Galv. ☐

4 in. to 95 ft. depth

HEIGHT: Above/Below Surface 1 ft.

Weight 11 lbs./ft.

Drive Shoe Yes X No

8. SCREEN Make: Johnson Type: stainless Slot/Gauze: 18 Diam: 2" Length: 5 Ft

Open hole: None from ___ ft. to ___ ft.

Set between 95 ft. and 100 ft.

9. STATIC WATER LEVEL: 72 ft. ☒ below ☐ above land surface Date Measured 5-19

10. PUMPING LEVEL (below land surface): ___ ft. after ___ hrs. pumping ___ g.p.m.

11. WELL HEAD COMPLETION: ☐ Pitless adapter ☐ Basement offset ☒ At least 12" above grade

12. Well grouted: ☒ Yes ☐ No

☐ Neat cement ☒ Bentonite ☐

Depth: from 0 ft. to 95 ft.

13. Nearest source of possible contamination: None ___ feet ___ direction

Well disinfected upon completion? Yes ☒ No ☐

14. PUMP

Date Installed 5-21-84 ☐ Not installed

Manufacturer's Name: Flint & Walling

Model Number: BA HP 1/2 Volts 220

Length of drop pipe 85 ft. capacity 10 g.p.m.

Material of drop pipe 1¼ galvanize pipe

Type: ☒ Submersible ☐ L.S. Turbine ☐ Reciprocating ☐ Jet ☐ Centrifugal ☐

15. WATER WELL CONTRACTOR'S CERTIFICATION

This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.

Hartmann Well Co. 40194
Licensed Business Name / License No.

308 East Main St. New Prague
Address

Signed Roger Hartmann Date 5-24-84
Authorized Representative

Ray Jaeckels

Remarks, Elevation (if needed)

WORK COPY

Minnesota Unique Well Number

783164

County Scott
Quad
Quad ID

MINNESOTA DEPARTMENT OF HEALTH
WELL AND BORING REPORT
Minnesota Statutes Chapter 1031

Entry Date 11/22/2011
Update Date 11/28/2011
Received Date 11/03/2011

Well Name	**Township**	**Range**	**Dir Section**	**Subsection**
MW-04-11	115	23	W 28	DBAB

Elevation **Elev. Method**

Address

Well 13580 JOHNSON MEMORIAL DR SHAKOPEE MN 55379

Stratigraphy Information

Geological Material	From	To (ft.)	Color	Hardness
OVERBURDEN	0	35	BROWN	SOFT
SANDSTONE	35	145	WHITE	MED-HRD
ST LAWRENCE	145	155	WHITE	HARD

Remarks
102150
MW-04-11

Well Depth	**Depth Completed**	**Date Well Completed**
155 ft.	155 ft.	07/07/2011

Drill Method Vibracore/rotasonic **Drill Fluid** Water

Use monitor well **Status** Active

Well Hydrofractured? **Yes** ☐ **No** ☒ **From** **To**

Casing Type Single casing **Joint** Threaded
Drive Shoe? **Yes** ☒ **No** ☐ **Above/Below**

Casing Diameter **Weight** **Hole Diameter**
2 in. To 103 ft. lbs./ft. 6 in. To 155 ft.

Open Hole From ft. To ft.

Screen? ☒ **Type** stainless **Make** JOHNSON

Diameter	Slot/Gauze	Length	Set	
2 in.	10	10 ft.	103 ft.	113 ft.

Static Water Level
74 ft. land surface Measure 07/07/2011

Pumping Level (below land surface)

Wellhead Completion
Pitless adapter manufacturer Model
☒ Casing Protection ☒ 12 in. above grade
☐ At-grade (Environmental Wells and Borings ONLY)

Grouting Information Well Grouted? ☒ Yes ☐ No ☐ Not Specified

Material	Amount		From	To
neat cement	14	Sacks	ft.	99 ft.

Nearest Known Source of Contamination
feet Direction Type
Well disinfected upon completion? ☐ Yes ☒ No

Pump ☒ Not Installed Date Installed
Manufacturer's name
Model Number HP Volt
Length of drop pipe ft Capacity g.p. Typ

Abandoned
Does property have any not in use and not sealed well(s)? ☐ Yes ☒ No

Variance
Was a variance granted from the MDH for this well? ☐ Yes ☒ No

Miscellaneous
First Bedrock Aquifer
Last Strat Depth to Bedrock ft
Located by
Locate Method
System UTM - NAD83, Zone 15, Meters X Y
Unique Number Verification Input Date

Angled Drill Hole

Well Contractor

Boart Longyear	2022	BUCKENBERGER
Licensee Business	Lic. or Reg. No.	Name of Driller

Minnesota Unique Well Number

783165

County Scott
Quad
Quad ID

MINNESOTA DEPARTMENT OF HEALTH

WELL AND BORING REPORT

Minnesota Statutes Chapter 1031

Entry Date 11/22/2011
Update Date 11/28/2011
Received Date 11/03/2011

Well Name	**Township**	**Range**	**Dir Section**	**Subsection**
MW-7-11	115	23	W 21	DBDA

Elevation **Elev. Method**

Address

Well 13580 JOHNSON MEMORIAL DR SHAKOPEE MN 55379

Stratigraphy Information

Geological Material	From	To (ft.)	Color	Hardness
SAND & GRAVEL	0	51	GRAY	SOFT
DOLOMITE	51	88	YELLOW	MED-HRD
SANDSTONE	88	151	WHITE	MED-HRD

Remarks
102150
MW-7-11

Well Depth	**Depth Completed**	**Date Well Completed**
151 ft.	151 ft.	08/23/2011

Drill Method Non-specified Rotary **Drill Fluid** Bentonite

Use monitor well **Status** Active

Well Hydrofractured? **Yes** ☐ **No** ☒ **From** **To**

Casing Type Single casing **Joint** Threaded
Drive Shoe? **Yes** ☐ **No** ☒ **Above/Below**

Casing Diameter **Weight** **Hole Diameter**
2 in. To 140 ft. lbs./ft. 6 in. To 151 ft.

Open Hole From ft. To ft.

Screen? ☒ **Type** stainless **Make** JOHNSON

Diameter	Slot/Gauze	Length	Set	
2 in.	10	10 ft.	140 ft.	150 ft.

Static Water Level
74 ft. land surface Measure 08/23/2011

Pumping Level (below land surface)

Wellhead Completion
Pitless adapter manufacturer Model
☒ Casing Protection ☒ 12 in. above grade
☐ At-grade (Environmental Wells and Borings ONLY)

Grouting Information Well Grouted? ☒ Yes ☐ No ☐ Not Specified

Material	Amount		From	To
neat cement	19	Sacks	ft.	136 ft.

Nearest Known Source of Contamination
feet Direction Type
Well disinfected upon completion? ☐ Yes ☒ No

Pump ☒ Not Installed Date Installed
Manufacturer's name
Model Number HP Volt
Length of drop pipe ft Capacity g.p. Typ

Abandoned
Does property have any not in use and not sealed well(s)? ☐ Yes ☒ No

Variance
Was a variance granted from the MDH for this well? ☐ Yes ☒ No

Miscellaneous
First Bedrock Aquifer
Last Strat Depth to Bedrock ft
Located by
Locate Method
System UTM - NAD83, Zone 15, Meters X Y
Unique Number Verification Input Date

Angled Drill Hole

Well Contractor

Boart Longyear	2022	DICKINSON, P.
Licensee Business	Lic. or Reg. No.	Name of Driller

Attachment 6

February 2022

Dem-Con Landfill
SW-290

2021 Groundwater Monitoring Report
Louisville Township
Scott County, MN

Consulting Civil Engineers

Sunde Engineering, PLLC
10830 Nesbitt Avenue South • Bloomington, Minnesota 55437-3100
Phone: (952) 881-3344 • Fax: (952) 881-1913 • E-Mail: info@sundecivil.com

DEM-CON LANDFILL

2021 ANNUAL WATER MONITORING REPORT

1.0 INTRODUCTION

The Dem-Con Landfill is an existing demolition debris landfill located in Sections 16 and 21, Township 115, Range 23, in Louisville Township of Scott County (Site). The landfill has been in operation since January 1986. Dem-Con Landfill is located in the North ½ of Section 21, and the South ½ of Section 16, Township 115 N, Range 23 W, in Louisville Township, Scout County, Minnesota. Routine groundwater monitoring is a permit requirement.

The landfill is located on a terrace of the Minnesota River. Underlying glacial drift, limestone and dolostone from the Prairie du Chien Group, and the Jordan Sandstone act as the surficial aquifer in the region of the landfill. Groundwater recharge of this aquifer originates from infiltration. The Minnesota River, located just west of the site, is a regional discharge area for the surficial aquifer. Groundwater flows from the landfill to the west and northwest towards the discharge area of the Minnesota River Valley.

Dem-Con Landfill has an unlined demolition fill area in the southern portion of the landfill. Filling in the unlined portion of the landfill was completed and the final cover system, which includes a synthetic cap was constructed in 2021. There is a liner and leachate collection system under the northern phases of the landfill and a liner and leachate collection system constructed over a portion of unlined demolition fill in the central phases of the landfill. The liner and leachate collection system and an enhanced final cover system (which includes a synthetic cap component) have been implemented at the facility to protect groundwater quality.

The Louisville Landfill, a closed unlined municipal solid waste (MSW) landfill, is located immediately west of the southern portion of Dem-Con Landfill and immediately south of the northwestern portion of Dem-Con Landfill.

2.0 MONITORING WELL NETWORK

The current monitoring network consists of eight wells. W-8, W-10, and W-120 are upgradient wells. W-121 and W-122 are downgradient wells that monitor groundwater quality downgradient of the lined portion of the landfill. DC-117, DC-118, and DC-119 are downgradient wells that monitor groundwater quality downgradient of the Dem-Con Landfill and upgradient of the Louisville Landfill. These three wells are located at the interface between an unlined portion of the Dem-Con Landfill and the unlined Louisville Landfill.

W-8 and W-10 have a long history within the network. W-120 and W-121 were installed in 1984 as part of the hydrogeologic investigation associated with the landfill expansion to the north and W-122 was installed in 2005. W-120, W-121, and W-122 have been routinely monitored since 2005. Sampling results from W-120, W-121 and W-122 through the spring 2006 event represent background water quality data. Filling in the lined area did not commence until after this date. DC-117 has been part of the monitoring network since 2000 and DC-118 and DC-119 have been part of the monitoring network since 2010.

W-8 and W-10 are monitored one time per year for VOCs and metals. W-120, W-121, W-122, DC-117, DC-118, and DC-119 are monitored three times per year for VOC's and one time per year for metals.

Monitoring results for well DC-117 indicate the presence of a number of VOCs in the groundwater at the interface between MSW and demolition fill materials. It has been concluded that water quality in this well is influenced by the unlined Louisville Landfill. Monitoring wells DC-118 and DC-119 typically show an occasional detection of a VOC. Groundwater quality at these locations may also be influenced to some degree by the close proximity of the Louisville Landfill. In 2003, the Louisville Landfill was covered with a low density polyethylene (LDPE) cap and a gas extraction system was installed. Since the installation of the LDPE cap and gas extraction system, concentrations of most VOC contaminants included in the Louisville Landfill's sampling program have declined. This is also the case for most of the VOCs contaminants in DC 117. Construction of the final cover was installed over the southern portion of the Dem-Con Landfill adjacent to DC-117 in 2019.

It is apparent that in the past sampling labs have misidentified DC-117 and DC-119. This issue was addressed in the fall of 2005 and the wells were more clearly labeled in the field in the spring of 2006. The problem seemed to have been resolved but review of the 2016 data indicated that the monitoring results of DC-117 and DC-119 were also likely mislabeled in the spring 2016 sampling event. This is evident by tracking several of the water quality parameters. Monitoring results are reported in the attached spreadsheets correcting the assumed reporting error and reported on a footnote to the tables for DC-117 and DC-119.

3.0 GROUNDWATER MONITORING RESULTS

In general, monitoring results for 2021 were similar to past years. Groundwater samples were analyzed for the parameters indicated in the current Dem-Con Permit.

3.1 Summary of Analytes Detected in 2021:

A summary of all analytes detected in 2021 in each of the monitoring wells is provided in Table 3.1 below. Parameters which exceeded Permit Limits are indicated in bold.

Table 3.1 Summary of Analytes Detected in 2021

Well	Analyte	Unit	Permit Limit	HRL	MCL	5/10/21	7/29/21	11/02/21
W-8	Manganese	ug/L	25	100	-		15.1	
	Barium	ug/L	500	2000	2000		70.8	
	Methyl tertiary butyl ether	ug/L	15	60			0.62	
	Boron	ug/L	250	500	-		31.7	
	Chloride	mg/L	-	-	-		84.3	
	Nitrate & Nitrite	mg/L	-	-	-		2.2	
	Solids, Total Dissolved	mg/L	-	-	-		441	
	Sulfate	mg/L	-	-	-		15.4	
	Iron	ug/L	-				336	
W-10	Manganese	ug/L	25	100	-		10.8	
	Barium	ug/L	500	2000	2000		34.5	
	Lead	ug/L	7.5	0	15		0.40	
	Boron	ug/L	250		500		23.4	
	Chloride	mg/L					72.9	
	Nitrate & Nitrite	mg/L					0.97	
	Solids, Total Dissolved	mg/L					606	
	Sulfate	mg/L					121	
W-120	Manganese	ug/L	25	100	-	21.4	**32.7**	14.7
	Boron	ug/L	250	500	-	34.6	41.8	<150
	Barium	ug/L	500	2000	2000		16.4	
	Chloride	mg/L	-	-	-		18.1	
	Iron	ug/L	-	-	-		1200	
	Solids, Total Dissolved	mg/L	-	-	-	470	478	480
	Sulfate	mg/L	-	-	-		46.6	
W-121	Toluene	ug/L	50	200	1000	1.62	0.88	0.81
	Styrene	ug/L			100	0.62	<0.40	<0.40
	Manganese	ug/L	25	100	-	**39.7**	**161**	**137**
	Boron	ug/L	250			17.6	19.5	<150
	Barium	ug/L	500	2000	2000		34.8	
	Chloride	mg/L	-	-	-		10.8	
	Iron	ug/L					329	
	Solids, Total Dissolved	mg/L	-	-	-	171	193	168
	Sulfate	mg/L	-	-	-		28.3	
W-122	Manganese	ug/L	25	100		15.2	16.0	17.6

	Boron	ug/L	250			55.6	63.4	<150
	Barium	ug/L	500	2000	2000		236	
	Iron	ug/L	-	-	-		59.3	
	Chloride	mg/L	-	-	-		21.4	
	Nitrate & Nitrite	mg/L	-	-	-		2.1	
	Solids, Total Dissolved	mg/L	-	-	-	459	622	548
	Sulfate	mg/L	-	-	-		176	
DC-117	1,1-Dichloroethane	ug/L	25	80	-	0.82	0.64	0.62
	1,2 Dichloroethylene, cis	ug/L	1.5	6	70	1.09	1.2	1.2
	1,4-Dichlorobenzene	ug/L	-	10	75	1.06	0.71	<0.40
	Ethyl ether	ug/L	50	200	-	5.37	4.90	4.7
	Tetrahydrofuran	ug/L	-	600	-	9.67	<10.0	<10.0
	Trichloroethylene	ug/L	0.1	0.4	5	**0.1**	<0.05	<0.05
	Vinyl chloride	ug/L	0.05	0.2	2	**0.23**	**0.17**	<0.05
	Manganese	ug/L	25	100	-	**1660**	**1820**	**1720**
	Boron	ug/L	250	500	-	**1320**	**1110**	**1300**
	Barium	ug/L	500	2000	2000		209	
	Chloride	mg/L	-	-	-		143	
	Solids, Total Dissolved	mg/L	-	-	-	905	1160	894
	Iron	ug/L	-				1190	
	Sulfate	mg/L	-	-	-		79.6	
DC-118	Manganese	ug/L	25	100	-	19.6	22.2	**48**
	Boron	ug/L	250	500	-	119	154	**370**
	Barium	ug/L	500	2000	2000		59.2	
	Chloride	mg/L	-	-	-		60.8	
	Iron	ug/L	-	-	-		117	
	Nitrate & Nitrite	mg/L	-	-	-		1.5	
	Solids, Total Dissolved	mg/L	-	-	-	528	531	563
	Sulfate	mg/L	-	-	-		47.1	
DC-119	Dichlorofluoromethane	ug/L	-	30	-	0.69	1.7	1.9
	Manganese	ug/L	25	100	-	<0.5	<0.5	5.8
	Boron	ug/L	250	500	-	249	**292**	**449**
	Barium	ug/L	500	2000	2000		101	
	Chloride	mg/L	-	-	-		227	
	Iron	ug/L	-	-	-		61.8	
	Nitrate & Nitrite	mg/L	-	-	-		1.2	
	Solids, Total Dissolved	mg/L	-	-	-	815	920	806
	Sulfate	mg/L	-	-	-		46.2	

Bold indicates result at or above Permit Limit

In evaluating the monitoring results, it is noted that the reporting limit of two analytes were higher than the Permit Limit for all samples collected and analyzed during 2021. These two analytes, the Permit Limit, and the Reporting Limits are listed in Table 3.2. Because the reporting limit is higher than the Permit Limit, it is not possible to demonstrate compliance with the permit for these parameters.

Table 3.2 Analytes with Reporting Limits above the Permit Limit

ANALYTE	PERMIT LIMIT	REPORTING LIMIT
1,2,3-Trichloropropane	0.00075 ug/L	<0.01 ug/L
1,2-Dibromomethane	0.001 ug/L	<0.05 ug/L

3.2 Tabulated Data:

Appendix 1-*Previous Five Years of Analytical Results*, provides the analytical results from the previous five years monitoring activity at the facility for each of the monitoring wells in the groundwater monitoring network.

3.3 Contaminant Trend Evaluations:

Monitoring results for the year 2021 are typical of past years. Monitoring results are discussed for each well. Graphs illustrating pertinent historical groundwater monitoring data including a linear trend line are included at the end of this discussion.

Upgradient Wells:

MW-8: MW-8 is an upgradient monitoring well sampled once per year in the summer quarter in accordance with permit conditions. The parameter list includes VOCs and metals. One VOC was detected above the Reporting Limit in MW-8 in 2021. Methyl tertiary butyl ether was detected at a value of 0.62 ug/L, under the Permit Limit of 15 ug/L. Methyl tertiary butyl ether has not been detected previously in this upgradient well. Manganese, Barium, Boron, Chloride, Sulfate, Iron, Nitrite & Nitrate, and Total Dissolved Solids all had reportable levels. Manganese did not exceed the Permit Limit of 25 µg/l with reported concentration of 15.1 µg/l. Historically the Manganese concentration in this background well has frequently exceeded the 25 ug/L Permit Limit. The Health Risk Limit (HRL) established by the Minnesota Department of Health (MDH) for groundwater used as a drinking water supply for manganese is 100 µg/l. The HRL has been exceeded two times (2011 and 2016 monitoring events) in the last ten years.

Barium was below the Permit Limit of 500 ug/L. Chloride, Iron, Sulfate, Nitrite Plus Nitrate, and Total Dissolved Solids do not have Permit Limits or HRLs and are not demonstrating noticeable water quality trends.

MW-10: MW-10 is an upgradient monitoring well sampled once per year in the summer quarter in accordance with permit conditions. The parameter list includes VOCs and metals. No VOCs were detected during the 2021 monitoring event. Historically there have been isolated incidents of VOCs in MW-10. Trichlorofluoromethane has been detected periodically since 1999 at concentrations ranging from 0.11 to 2.0 ug/L and Dichlorofluoromethane was detected at 5.4 ug/L in 2018, with no prior history. Neither of these VOCs were detected in 2021.

Lead was detected in MW-10 in 2021 at a concentration of 0.40 ug/L, below the Permit Limit of 7.5 ug/L. Lead has periodically been detected in this upgradient well at concentrations between .6 and 7.4 ug/l. Manganese, Barium, Chloride, Nitrite & Nitrate, Total Dissolved Solids, and Sulfate all had reportable levels. Reported levels were below Permit Limits for Manganese and Barium. Chloride, Nitrate & Nitrite, Sulfate and Total Dissolved Solids do not have Permit Limits or HRLs and are not demonstrating any noticeable water quality trends.

W-120: W-120 is an upgradient monitoring well sampled three times per year in the spring, summer and fall quarter in accordance with permit conditions. This well is sampled three times per year for VOCs and one time per year in the summer for metals. No VOCs were detected above the reporting limit in 2021. Historically, Toluene has been detected at this well at concentrations that are typically below the Permit Level. Toluene has not been detected since 2018. Chloromethane was detected one time since monitoring began at this well in 2005. The detection occurred in the summer 2019 sampling event at concentrations below the permit limit.

Manganese, Boron, Chloride, Iron, Total Dissolved Solids, and Sulfate all had reportable concentrations in 2021. Manganese was above the Permit Limit of 25 ug/l during the summer sampling event with a value of 32.7 ug/L. Monitoring results from W-120 since 2005 indicate that Manganese has ranged from 15 to 920 ug/l. 2021 results ranged from 14.7 to 32.7 ug/l. The Manganese concentrations in this background monitoring well often exceed the Permit Limit.

Downgradient Wells:

W-121: W-121 is a downgradient monitoring well sampled three times per year in the spring, summer, and fall quarter in accordance with permit conditions. This well is sampled three times per year for VOCs and one time per year for metals. Styrene was detected in the spring sampling event and Toluene was detected in all three of the sampling events of 2021. There is not a permit limit for Styrene, and it was below the MCL in the sample. Toluene was detected in the spring, summer, and fall sampling events at levels below the permit limit. These two VOCs have both been periodically detected in W-121 since 2005. The well is located some distance from any active filling and is downgradient of lined portions of the landfill. The well is more immediately downgradient of future phases of the landfill where mining was recently completed in advance of future landfill phase development of the liner and leachate collection system.

Manganese, Barium, Boron, Iron, Chloride, Sulfate, and Total Dissolved Solids all had reportable levels. Manganese was reported above the Permit Limit in all three sampling events in 2021, with the summer and fall sampling at 161 ug/L and 137 ug/L respectively, exceeding the HRL of 100 ug/L. Graphs indicate a trend of increasing concentrations of Manganese in W-121.

Monitoring for Boron began in 2015 with reporting limits varying from 10 to 150 ug/L. All previous reports have been detections have been with reporting limits at 10 ug/L. Concentrations above the reporting limit have ranged from 17.5 to 19.5 ug/L since 2015.

W-122: W-122 is a downgradient monitoring well sampled three times per year in the spring, summer and fall quarter in accordance with permit conditions. This well is sampled three times per year for VOCs and one time per year for metals. No VOCs were detected during any of the three sampling events in 2021 and there have been no VOC detections in the past five years.

Manganese, Boron, Barium, Chloride, Nitrate & Nitrite, Dissolved Solids, and Sulfate were above reporting limits, but below Permit Limits in 2021.

DC-117: DC-117 is a downgradient monitoring well sampled three times per year in the spring, summer and fall quarter in accordance with permit conditions. This well is sampled three times per year for VOCs and one time per year for metals. A number of VOCs have historically been detected in this well which is located at the interface of the unlined Louisville Landfill and the unlined demolition landfill. The unlined Louisville Landfill is believed to be the predominant source of the VOCs in DC-117, based upon the results of downgradient Louisville Landfill wells which demonstrate a similar degree of impact and the results of DC-118 and DC-119 which are also located immediately downgradient of the unlined Dem-Con Landfill and do not demonstrate a similar degree of impact. In general, VOCs in DC-117 have trended downward since the Louisville Landfill was capped and a landfill gas extraction system was installed in 2003. In addition, final cover construction including a synthetic cap was completed in the southern fill area adjacent to and upgradient of DC-117 in 2020-2021.

Seven VOCs were detected in DC-117 in 2021. 2021 results are consistent with historical results. All of the VOCs have been detected in this well previously. Data for the VOCs are graphed in the following section of this report and each VOC is discussed below.

1,1 Dichloroethane: 1,1 Dichloroethane was detected during all three 2021 sampling events at concentrations below the Permit Limit of 25 ug/L. Historically, 1,1 Dichloroethane has been routinely detected in DC-117. Concentrations have been trending down since 2003. Concentrations have ranged from 16 ug/L in 2003 to 0.62 ug/L in 2021.

1,2 Dichloroethylene (cis): 1,2 Dichloroethylene (cis) was detected in all three 2021 sampling events at concentrations below the Permit Limit of 1.5 ug/l. Historically, 1,2 Dichloroethylene (cis) has been routinely detected in DC-117. Prior to 2015, the concentrations of this VOC have typically been above the current Permit Limit of 1.5 ug/L and the current HRL of 6 ug/L. Since 2015 results have typically been above the Permit limit but below the HRL. However, in 2021 and all three sampling values were under the Permit Limit. 2021 is the first year that concentrations have been reported below the Permit Limit in the past 5 years. Concentrations have been trending down since 2003 and have ranged from 41 ug/L in 2003 to 1.09 ug/L.

1,4 Dichlorobenzene: 1,4 Dichlorobenzene was detected in the spring and summer 2021 sampling events. There is no Permit Limit for this VOC. Historically, including 2021, all results have been below the current HRL of 50 ug/L. Concentrations above the reporting limit have ranged from 4.3 ug/L to 0.71 ug/L. There is a slight downward trend in concentrations since 2003.

Ethyl ether: Ethyl ether was detected above the reporting limits in all three 2021 sampling events at concentrations below the current Permit Limit of 50 ug/L. Ethyl ether has routinely been detected in DC-117 below the current Permit Limit. Concentrations of Ethyl ether have been trending lower since 2003 and have ranged from 44 ug/L in 2004 to 4.7 ug/L in 2021.

Tetrahydrofuran: Tetrahydrofuran was detected in the spring 2021 sampling event at a concentration of 9.67 ug/L. There is no Permit Limit for this VOC. Tetrahydrofuran has been routinely detected in DC -117 and concentrations have historically been below the Health Based Value of 600 ug/L. Concentrations of Tetrahydrofuran are trending down since 2003.

Trichloroethylene: Trichloroethylene was detected at 0.1 ug/L in the spring 2021 sampling event, a concentration that is equal to the Permit Limit. Trichloroethylene has periodically been detected above reporting limits in this well. In the past, levels of Trichloroethylene have exceeded permit limits. Concentrations of Trichloroethylene have ranged from 6.0 ug/L in 2003 to less than 0.05 in 2021. While concentrations over the entire monitoring period are trending down and the results have been at or below the Permit Limit since 2018, over the past five years, concentrations have been trending up.

Vinyl chloride: Vinyl chloride was detected above the reporting limit in the spring and summer 2021 sampling events at 0.23 and 0.17 ug/l respectively, above the current Permit Limit of 0.05 ug/L. The concentration in the spring sampling event was above the HRL of 0.2 ug/L. Vinyl chloride has routinely been detected in DC-117 above the current Permit Limit and above the HRL. Concentrations have been trending down since 2003 and have ranged from 14 ug/L in 2003 to less than 1.0 ug/L since 2015. Concentrations ranged from <0.050 ug/L to 0.23 ug/L during the three 2021 sampling events.

Benzene: Benzene was not detected in DC-117 in 2021 but has been routinely detected in the past. Also in the past, detection limits have fluctuated and for those sampling events where Benzene was not detected above the reporting limit, the reporting limit was higher than typical reported concentrations and above the Permit Limit. 2021 reporting limits were at or below the Permit Limit of 0.5 ug/l in 2021. Because of the variation in reporting limits, the trend line is inconclusive.

Chlorobenzene: Chlorobenzene was not detected in DC-117 in 2021 for all three sampling events in 2021 but has been routinely detected in the past. As with Benzene, detection limits have fluctuated and for those sampling events where Benzene was not detected above the reporting limit, the reporting limit was higher than typical reported concentrations. With Chlorobenzene however, the detection limits have always been lower than the current Permit Limit of 25 ug/L.

Dichlorofluoromethane: Dichlorofluoromethane was not detected in DC-117 in 2021 but has routinely been detected at low levels in the past. Historically, this VOC has been detected below the HRL of 30 ug/L. This is the second time in nine years that dichlorofluoromethane has not been detected in DC-117. There is no trend towards increasing concentrations.

Methyl-tert-butyl ether: Methyl-tert-butyl ether was not detected in 2021. Historically, there have been three isolated detections in 2011, 2016, and 2019. There is no Permit Limit for Methyl-tert-butyl ether.

Manganese: Manganese was detected above the Permit Limit of 25 ug/L and the HRL of 100 ug/L in all three 2021 sampling events. Concentrations of Manganese have trended upward since 1999, but slightly downward in the past 5 years. Concentrations have ranged from a 2400 ug/l in 2002 to 10ug/l in 2005. Concentrations ranged from 1660-1820 ug/l in 2021.

Boron: Boron was detected above the Permit Limit of 250 ug/L. Historically Boron has been present in concentrations above the Permit Limit since monitoring for this parameter began in 2011. There is a decreasing trend in Boron concentrations in DC-117 over the past five years.

Barium was detected below the Permit Limit of 500 ug/L in 2021.

Chloride, Iron, Total Dissolved Solid and Sulfate were all detected in 2021 in DC-117. There are no Permit Limits established for these parameters.

Trichloroethylene, Vinyl chloride, Manganese, and Boron were all detected at or above the permit Limits in 2021.These parameters have historically shown concentrations above the Permit Limit. Action taken to reduce these contaminants over time includes construction of final cover and landfill gas collection system over the closed Louisville Landfill in 2003, the design and construction of a liner and leachate collection system over unlined portions of the Dem-Con Landfill in 2016 and 2017, the construction of lined landfill cells in new phases of landfill development, and the capping of completed portions of the unlined landfill with a synthetic cap in 2020-2021. The groundwater monitoring program has illustrated a general decrease in VOCs in downgradient Louisville Landfill wells since the final cover and landfill gas collection system was installed in the Louisville Landfill in 2003. Continued monitoring of DC-117 will help to evaluate the effectiveness of the recent liner and leachate collection system and final cover construction in further reducing contaminant levels over time.

DC-118: DC-118 was sampled three times in 2021 for VOCs and one time for metals. No VOCs were detected during the three sampling events.

Manganese was detected during all three 2021 sampling events and was above the Permit Limit of 25 ug/L during the 2021 fall sampling event at concentration of 48 ug/L. There has been an overall increasing trend in Manganese since 2003, but a decreasing trend over the last five years in DC-118.

Boron was detected during all three 2021 sampling events and was above the Permit Limit of 250 ug/L during the fall sampling event at a concentration of 370 ug/L. There has been a very slight increasing trend in Boron since 2003, but a decreasing trend over the last five years in DC-118.

2019. Barium was detected below the Permit Limit of 500 ug/L. Chloride, Iron, Nitrate+Nitrite, Total Dissolved Solids, and Sulfate were all detected in 2021 in DC-118. There are no Permit Limits established for these parameters.

DC-119: DC-119 was sampled three times in 2021 for VOCs and one time for metals.

Dichlorofluoromethane: Dichlorofluoromethane was detected during all three 2021 sampling events of 2021 consistent with past monitoring. There is no Permit Limit for this VOC and the results have been below the HRL of 30 ug/L ranging from 0.69 ug/L to 1.9 ug/L in 2021. The historical concentrations of Dichlorofluoromethane have been variable and often above reporting limits for the last five years, with a general decreasing trend over the last five years.

Manganese was detected in the fall sampling event of 2021 but was below the Permit Limit of 25 ug/L. Boron was detected during all three sampling events and exceeded the Permit Limits in the summer and fall sampling events.

Boron was detected in all three 2021 sampling events and was above the current Permit Limit of 250 ug/L during the summer and fall events with concentrations of 292 and 449 ug.L respectively. Boron concentrations have been trending up since 2011 and within the last five years.

Barium was detected below the Permit Limit of 500 ug/L in 2021. Concentrations of Chloride, Iron, Nitrate+ Nitrite, Total Dissolved Solids and Sulfate were above reporting limits in DC-119 in 2021. There are no Permit Limits established for these parameters.

3.4 Graphs of VOCs detected during the 2021 monitoring period

Graphs are provided depicting concentrations over time for VOCs detected during the 2021 sampling period. These include the seven VOCs detected in DC-117 and one VOC in DC-119. The VOC in W-8 was not graphed since this is the first time this contaminant has been identified. The graphs which generally include available sampling results since 2003, include a trendline spanning the entire monitoring timeframe. Results that are below the reporting limit are graphed as zero. The graphs are included as Appendix 2 – *Graphs and Trendlines Selected Parameters*.

3.5 Graphs of Manganese and Boron

Both Manganese and Boron have had detections above reporting limits and exceedances of Permit Limits. Manganese and Boron are graphed with a linear trendline for each well for the entire data set and for the past five years to illustrate more recent trends in water quality. Manganese has historically been detected in all of the wells. Concentrations are trending higher in some wells and lower in others as illustrated on the following graphs. Concentrations of Manganese and Boron have been graphed for all of the wells in the monitoring network.

4.0 GROUNDWATER FLOW MAPS

Figures 1-3: illustrate the elevation of the water table based on water level information obtained during each sampling event.

5.0 LEACHATE MONITORING SUMMARY

The annual leachate monitoring summary is included as Appendix 3.

6.0 CONCLUSIONS AND RECOMMENDATIONS

2021 sampling results were similar to past years with several VOCs detected in DC-117, which is influenced by the unlined Louisville Landfill. Concentrations of the VOCs are generally trending downward since the placement of an enhanced cover and landfill gas collection system was installed on the Louisville Landfill in 2003. There has been a continued downward trend over the last five years in all of the VOCs except trichloroethylene in DC 117 which shows a trend toward increasing concentrations over the last five years. Trichloroethylene was at or below Permit Limits in 2021. The construction of a liner and leachate collection system over the northern portion of the unlined Dem-Con Landfill in 2016 and 2017, and the completion of final capping of the southern unlined portion of the landfill in 2020 and 2021 are expected to further reduce the concentrations of VOCs in this well over time.

Boron has been detected in all of the monitoring wells with a trend of increasing concentrations in both upgradient and downgradient wells. Only DC-117. DC-118 and DC-119 have had concentrations above the Permit Limits. Both DC-117 and DC-118 have shown a trend towards decreasing concentrations over the past five years.

Manganese is a parameter that appears to be increasing in concentrations and exceeds Permit Limits in several of the wells, including upgradient wells. About half of the wells are showing a decrease trend in concentrations in the last five years and half an increase. Permit Limits are exceeded in many of the wells, including the background wells which have recorded some of the highest levels of Manganese in the network although DC -117 has recorded the highest concentration. While there are potentially other sources of Manganese in the groundwater, the Louisville Landfill and/or the Dem-Con Landfill is an additional potential source. The liner and leachate collection system installed over unlined portions of the landfill may help reduce Manganese levels in DC-118 which have exceeded Permit Limits. Completion of the unlined Phase 1A in the southern portion of the Dem-Con landfill and constructing the final cover over this phase in 2020-2021 should reduce the concentration of Manganese in DC-117 in the future if the landfill is a source.

Recommendations include maintaining final cover system, continue to monitor groundwater in accordance with Permit.

6.0 CERTIFICATION

Hydrogeologic Certification. I certify under penalty of law that the hydrogeologic portions of this document and all attachments were prepared under my direction or supervision under a system designed to assure that qualified personnel gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. Furthermore, I certify that I am knowledgeable in field of hydrogeology.

Kirsten Pauly

Name: Kirsten Pauly PE/PG Reg. No 21842

February 28, 2022
Date

Mailing address:
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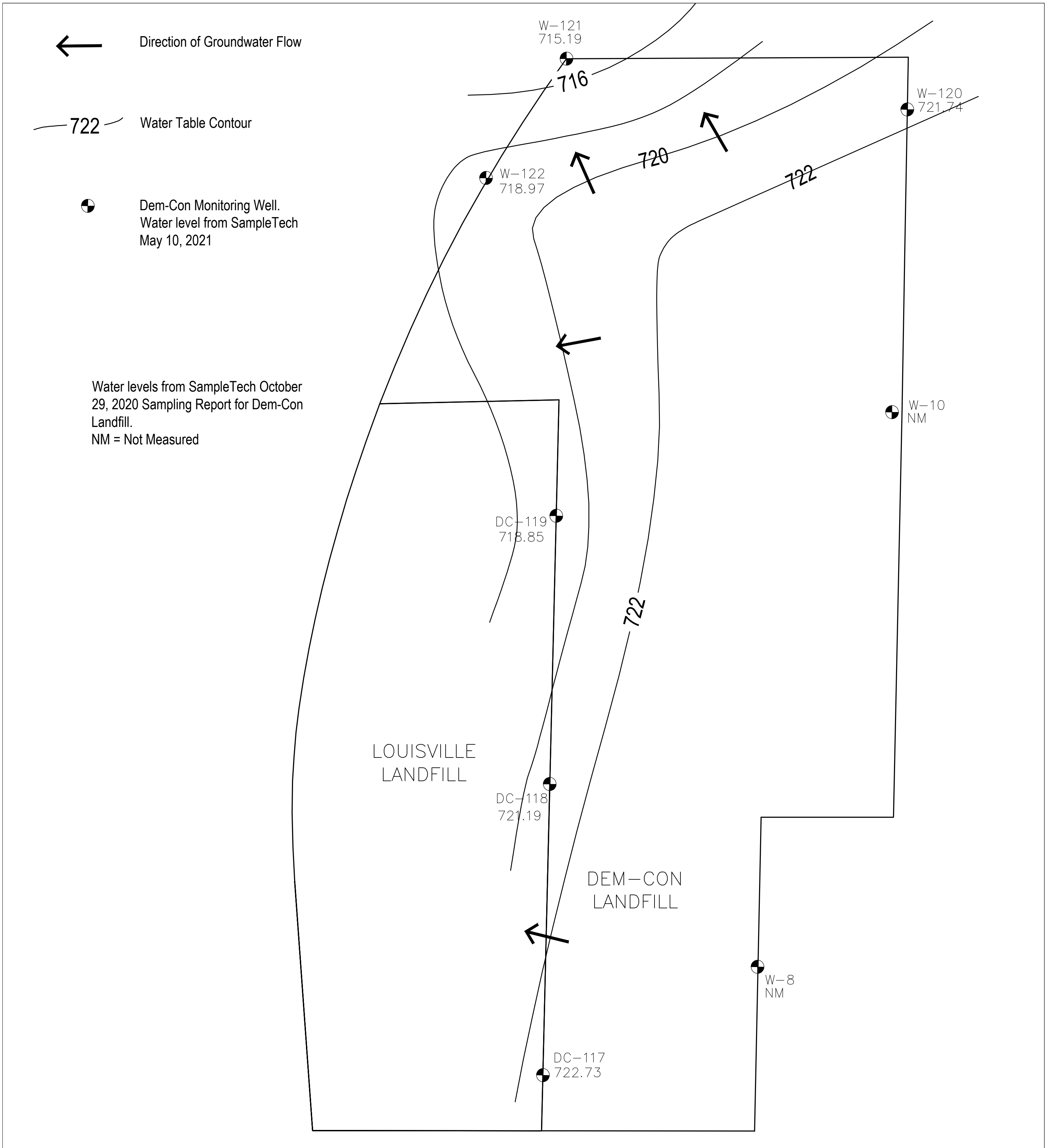
Figures 1-3 Groundwater Flow Maps



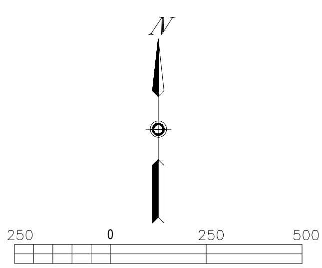


Figure 1
Water Table Contours
May 10, 2021

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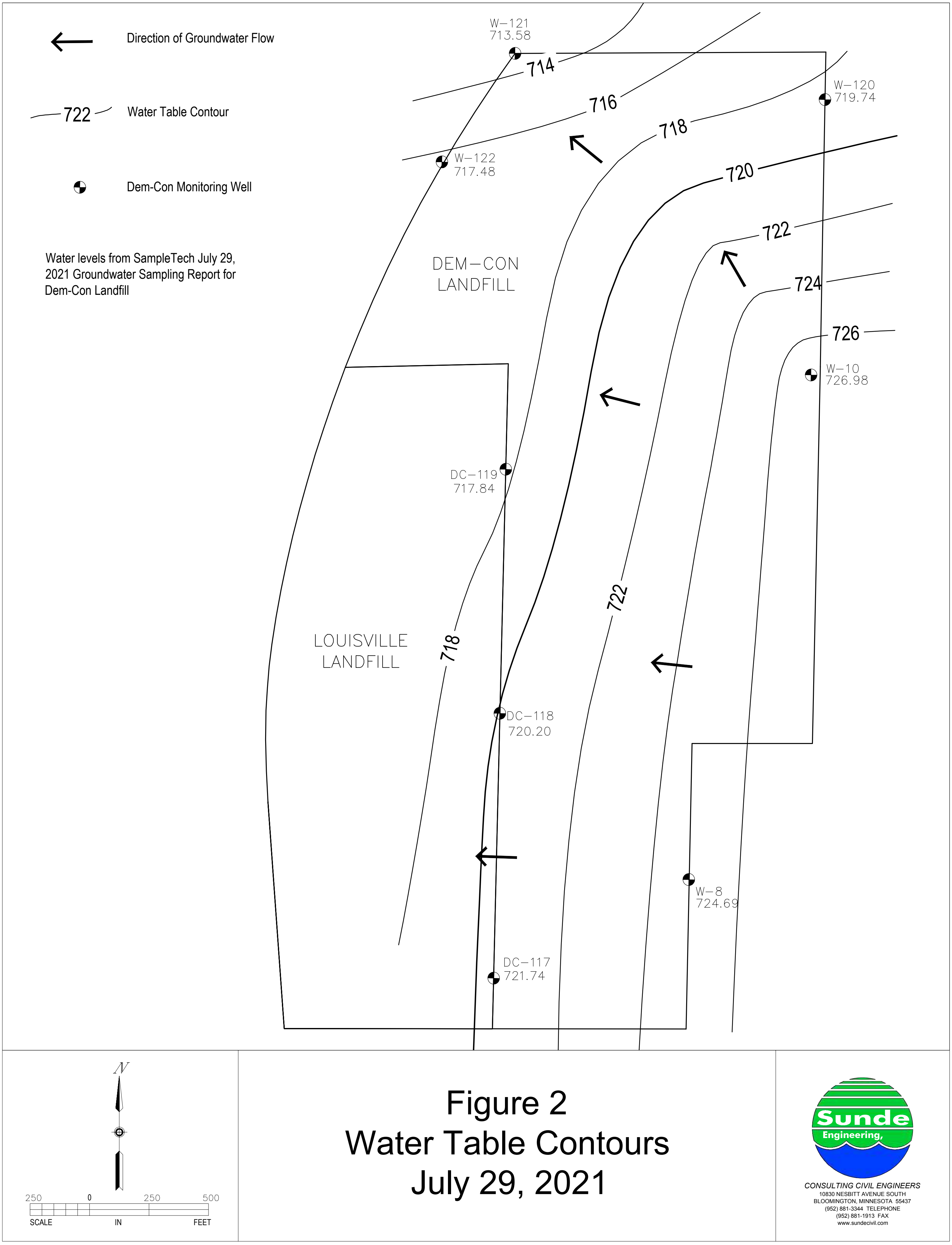

Figure 2
Water Table Contours
July 29, 2021

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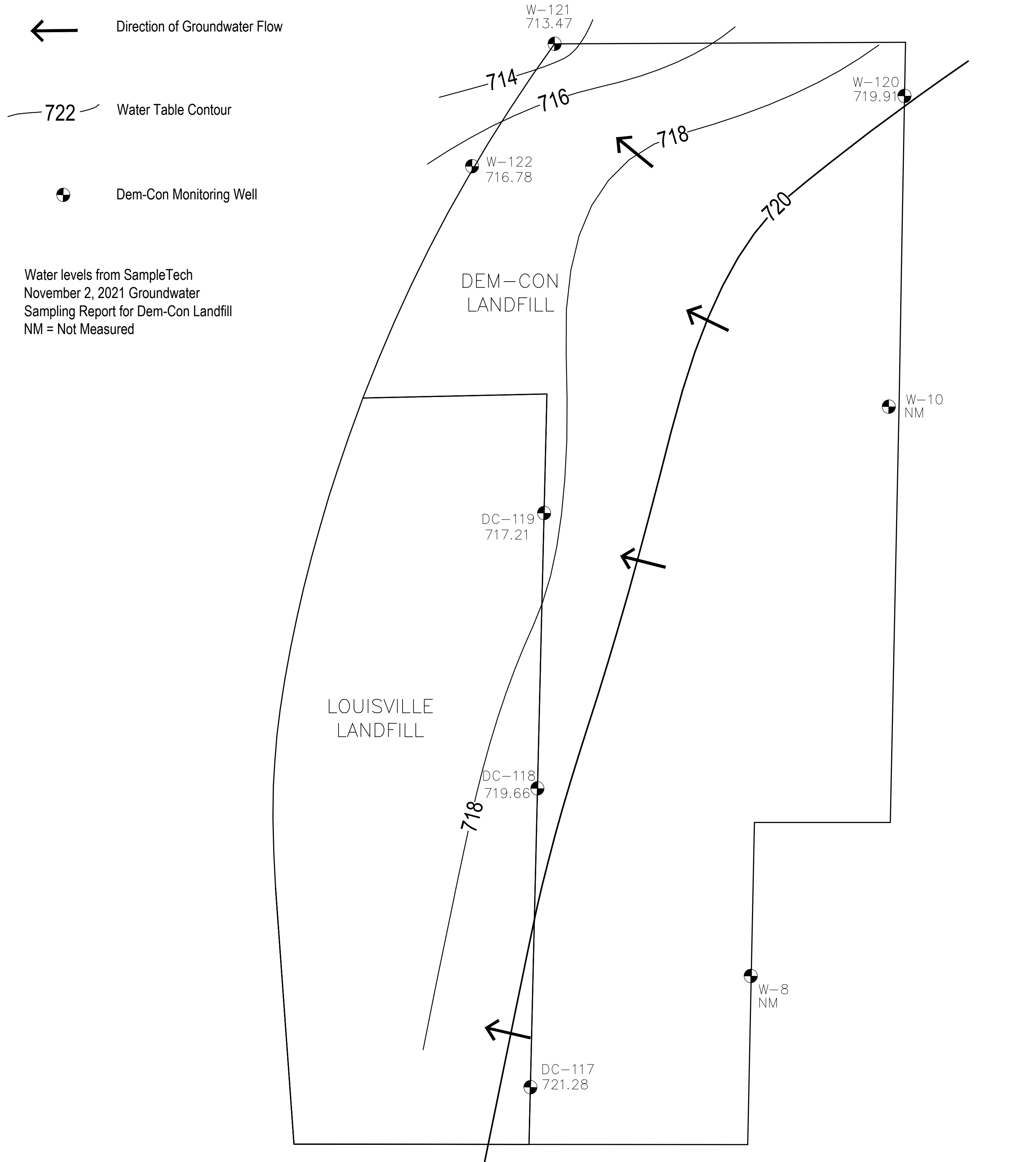

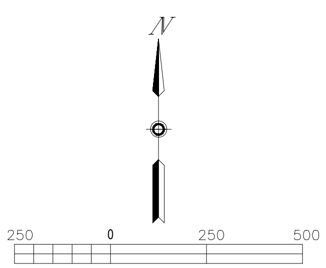

Figure 3
Water Table Contours
November 2, 2021

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Appendix 1 - Previous Five Years of Analytical Results

2021 ANNUAL REPORT W-8	W-8		Analytical Result	Analytical Result	Analytical Result	Analytical Result	Analytical Result
Parameter		**Permit Limit**	8/9/17	7/31/18	7/24/19	8/5/20	7/29/21
1,1,1,2-Tetrachloroethane	ug/L	17.5	<1.0	ND	ND	<0.40	<0.40
1,1,1-Trichloroethane	ug/L	2250	<1.0	ND	ND	<0.40	<0.40
1,1,2,2-Tetrachloroethane	ug/L		<1.0	ND	ND	<0.40	<0.40
1,1,2-Trichloroethane	ug/L	0.75	<1.0	ND	ND	<0.40	<0.40
1,1,2-Trichlorotrifluoroethane	ug/L	5000	<1.0	ND	ND	<1.0	<1.0
1,1-Dichloroethane	ug/L	25	<1.0	ND	ND	<0.40	<0.40
1,1-Dichloroethene	ug/l	50	<1.0	ND	ND	<0.40	<0.40
1,1-Dichloropropene	ug/L		<1.0	ND	ND	<0.40	<0.40
1,2,3-Trichlorobenzene	ug/L		<1.0	ND	ND	<0.40	<0.40
1,2,3-Trichloropropane	ug/L	0.00075	<1.0	ND	ND	<0.010	<0.010
1,2,4-Trichlorobenzene	ug/L	1	<1.0	ND	ND	<0.40	<0.40
1,2,4-Trimethylbenzene	ug/L	25	<1.0	ND	ND	<1.0	<1.0
1,2 Dibromo 3 chloropropane (DBCP)	ug/L		<4.0	ND	ND	<0.12	<0.12
1,2-Dibromoethane	ug/L	0.001	<1.0	ND	ND	<0.050	<0.050
1,2-Dichlorobenzene	ug/L	150	<1.0	ND	ND	<0.40	<0.40
1,2-Dichloroethane	ug/L	25	<1.0	ND	ND	<0.20	<0.20
1,2 Dichloroethylene, cis	ug/L	1.5	<1.0	ND	ND	<0.40	<0.40
1,2 Dichloroethylene, trans	ug/L	10	<1.0	ND	ND	<0.40	<0.40
1,2-Dichloropropane	ug/L	1.25	<4.0	ND	ND	<0.40	<0.40
1,3,5-Trimethylbenzene	ug/L	25	<1.0	ND	ND	<0.40	<0.40
1,3-Dichlorobenzene	ug/L	150	<1.0	ND	ND	<0.40	<0.40
1,3-Dichloropropane	ug/L		<4.0	ND	ND	<0.40	<0.40
1,3-Dichloropropene, cis	ug/L	0.5	<4.0	ND	ND	<0.40	<0.40
1,3-Dichloropropene, trans	ug/L	0.5	<4.0	ND	ND	<0.40	<0.40
1,4-Dichlorobenzene	ug/L		<1.0	ND	ND	<0.40	<0.40
2,2-Dichloropropane	ug/L		<4.0	ND	ND	<1.0	<1.0
2-Chlorotoluene	ug/L		<1.0	ND	ND	<0.40	<0.40
4-Chlorotoluene	ug/L		<1.0	ND	ND	<0.40	<0.40
Acetone	ug/L	1000	<20.0	ND	ND	<20.0	<20.0
Allyl chloride	ug/L	7.5	<4.0	ND	ND	<4.0	<4.0
Benzene	ug/L	0.5	<1.0	ND	ND	<0.20	<0.20
Bromobenzene	ug/L		<1.0	ND	ND	<0.40	<0.40
Bromochloromethane	ug/L		<1.0	ND	ND	<1.0	<1.0
Bromodichloromethane	ug/L	1.5	<1.0	ND	ND	<0.40	<0.40
Bromoform	ug/L	10	<4.0	ND	ND	<1.0	<1.0
Bromomethane	ug/L	2.5	<4.0	ND	ND	<1.0	<1.0
Butylbenzene, n	ug/L		<5.0	ND	ND	<0.40	<0.40
Butylbenzene, sec	ug/L		<1.0	ND	ND	<0.40	<0.40
Butylbenzene, tert	ug/L		<1.0	ND	ND	<0.40	<0.40
Carbon tetrachloride	ug/L		<1.0	ND	ND	<0.050	<0.050
Chlorobenzene	ug/L	25	<1.0	ND	ND	<0.40	<0.40
Chlorodibromomethane	ug/L	2.5	<1.0	ND	ND	<0.40	<0.40
Chloroethane	ug/L		<1.0	ND	ND	<1.0	<1.0
Chloroform	ug/L	7.5	<1.0	ND	ND	<1.0	<1.0
Chloromethane	ug/L		<4.0	ND	ND	<1.0	<1.0
Dibromomethane	ug/L		<4.0	ND	ND	<1.0	<1.0
Dichlorodifluoromethane	ug/L	175	<1.0	ND	ND	<1.0	<1.0
Dichlorofluoromethane	ug/L		<1.0	ND	ND	<1.0	<1.0
Ethyl ether	ug/L	50	<4.0	ND	ND	<4.0	<4.0
Ethylbenzene	ug/L	12.5	<1.0	ND	ND	<0.40	<0.40
Hexachlorobutadiene	ug/L	0.25	<1.0	ND	ND	<0.10	<0.10
Isopropylbenzene	ug/L	75	<1.0	ND	ND	<0.40	<0.40
Isopropyltoluene, p	ug/L		<4.0	ND	ND	<0.40	<0.40
Methyl ethyl ketone (MEK)	ug/L	1000	<5.0	ND	ND	<5.0	<5.0
Methyl isobutyl ketone (4-Methyl-2-pentanone)	ug/L	75	<5.0	ND	ND	<5.0	<5.0
Methyl tertiary butyl ether	ug/L	15	<1.0	ND	ND	<0.40	**0.62**
Methylene chloride	ug/L	1.25	<4.0	ND	ND	<1.0	<1.0
Naphthalene	ug/L	17.5	<4.0	ND	ND	<1.0	<1.0
Propylbenzene, n	ug/L		<1.0	ND	ND	<0.40	<0.40
Styrene	ug/L		<1.0	ND	ND	<0.40	<0.40
Tetrachloroethylene	ug/L	1	<1.0	ND	ND	<0.40	<0.40
Tetrahydrofuran	ug/L		<10.0	ND	ND	<10.0	<10.0
Toluene	ug/L	50	<1.0	ND	ND	<0.40	<0.40
Trichloroethylene	ug/L	0.1	<0.40	ND	ND	<0.050	<0.050
Trichlorofluoromethane	ug/L	500	<1.0	ND	ND	<0.40	<0.40
Vinyl chloride	ug/L	0.05	<0.20	ND	ND	<0.050	<0.050
Xylene, m & p	ug/L	2500		ND	ND	<0.80	<0.80
Xylene, o	ug/L			ND	ND	<0.40	<0.40
Xylene, o, m & p	ug/L		<3.0	ND	ND	<1.2	<1.2
Arsenic	ug/L	2.5	<20.0	ND	ND	<20.0	<0.50
Cadmium	ug/L	0.125	<3.0	ND		<3.0	<0.08
Chromium	ug/L	25			ND	<10.0	<10.0
Copper	ug/L	250	<10.0	ND	ND	<10.0	<10.0
Lead	ug/L	7.5	<10.0	ND	ND	<10.0	<0.10
Manganese	ug/L	25	**69.9**	**45.3**	**8.7**	**12.6**	**15.1**
Mercury	ug/L	0.5	<0.20	ND		<0.20	<0.20
Boron	ug/L	250	<150	ND	**32.6**	<150	**31.7**
Barium	ug/L	500	**78**	**78.9**	**66.7**	**60.5**	**70.8**
Chloride	mg/L		**107**	**119**	**82.3**	**37.5**	**84.3**
Iron	ug/L		**1410**	**1480**	**227**	**475**	**336**
Nitrate & Nitrite	mg/L		**2.6**	**2**	**2.4**	**1.7**	**2.2**
Soilds, Total Dissolved	mg/L		**522**	**483**	**453**	**353**	**441**
Sulfate	mg/L		**23.7**	**18**	**12**	**9.7**	**15.4**
Depth to Water	ft		74.13	72.1	70.38	71.7	74.18
Water Table Elevation	MSL		724.74	726.77	728.49	727.17	724.69

ND = None Detected

Green Shading represents reporting limits that are above the permit limit.

Yellow Shading represents sampling events that exceed the permit limit.

2021 ANNUAL REPORT	W-10		Analytical Result	Analytical Result	Analytical Result	Analytical Result	Analytical Result
Parameter		**Permit Limit**	8/9/17	7/31/18	7/24/19	8/5/20	7/29/21
1,1,1,2-Tetrachloroethane	ug/L	17.5	<1.0	ND	ND	<0.40	<0.40
1,1,1-Trichloroethane	ug/L	2250	<1.0	ND	ND	<0.40	<0.40
1,1,2,2-Tetrachloroethane	ug/L		<1.0	ND	ND	<0.40	<0.40
1,1,2-Trichloroethane	ug/L	0.75	<1.0	ND	ND	<0.40	<0.40
1,1,2-Trichlorotrifluoroethane	ug/L	5000	<1.0	ND	ND	<1.0	<1.0
1,1-Dichloroethane	ug/L	25	<1.0	ND	ND	<0.40	<0.40
1,1-Dichloroethene	ug/l	50	<1.0	ND	ND	<0.40	<0.40
1,1-Dichloropropene	ug/L		<1.0	ND	ND	<0.40	<0.40
1,2,3-Trichlorobenzene	ug/L		<1.0	ND	ND	<0.40	<0.40
1,2,3-Trichloropropane	ug/L	0.00075	<4.0	ND	ND	<0.010	<0.010
1,2,4-Trichlorobenzene	ug/L	1	<1.0	ND	ND	<0.40	<0.40
1,2,4-Trimethylbenzene	ug/L	25	<1.0	ND	ND	<1.0	<1.0
1,2 Dibromo 3 chloropropane (DBCP)	ug/L		<1.0	ND	ND	<0.12	<0.12
1,2-Dibromoethane	ug/L	0.001	<1.0	ND	ND	<0.050	<0.050
1,2-Dichlorobenzene	ug/L	150	<1.0	ND	ND	<0.40	<0.40
1,2-Dichloroethane	ug/L	25	<1.0	ND	ND	<0.20	<0.20
1,2 Dichloroethylene, cis	ug/L	1.5	<1.0	ND	ND	<0.40	<0.40
1,2 Dichloroethylene, trans	ug/L	10	<1.0	ND	ND	<0.40	<0.40
1,2-Dichloropropane	ug/L	1.25	<1.0	ND	ND	<0.40	<0.40
1,3,5-Trimethylbenzene	ug/L	25	<1.0	ND	ND	<0.40	<0.40
1,3-Dichlorobenzene	ug/L	150	<1.0	ND	ND	<0.40	<0.40
1,3-Dichloropropane	ug/L		<1.0	ND	ND	<0.40	<0.40
1,3-Dichloropropene, cis	ug/L	0.5	<4.0	ND	ND	<0.40	<0.40
1,3-Dichloropropene, trans	ug/L	0.5	<4.0	ND	ND	<0.40	<0.40
1,4-Dichlorobenzene	ug/L		<1.0	ND	ND	<0.40	<0.40
2,2-Dichloropropane	ug/L		<4.0	ND	ND	<1.0	<1.0
2-Chlorotoluene	ug/L		<1.0	ND	ND	<0.40	<0.40
4-Chlorotoluene	ug/L		<4.0	ND	ND	<0.40	<0.40
Acetone	ug/L	1000	<20.0	ND	ND	<20.0	<20.0
Allyl chloride	ug/L	7.5	<4.0	ND	ND	<4.0	<4.0
Benzene	ug/L	0.5	<1.0	ND	ND	<0.20	<0.20
Bromobenzene	ug/L		<1.0	ND	ND	<0.40	<0.40
Bromochloromethane	ug/L		<1.0	ND	ND	<1.0	<1.0
Bromodichloromethane	ug/L	1.5	<1.0	ND	ND	<0.40	<0.40
Bromoform	ug/L	10	<4.0	ND	ND	<1.0	<1.0
Bromomethane	ug/L	2.5	<4.0	ND	ND	<1.0	<1.0
Butylbenzene, n	ug/L		<5.0	ND	ND	<0.40	<0.40
Butylbenzene, sec	ug/L		<1.0	ND	ND	<0.40	<0.40
Butylbenzene, tert	ug/L		<1.0	ND	ND	<0.40	<0.40
Carbon tetrachloride	ug/L		<1.0	ND	ND	<0.050	<0.050
Chlorobenzene	ug/L	25	<1.0	ND	ND	<0.40	<0.40
Chlorodibromomethane	ug/L	2.5	<1.0	ND	ND	<0.40	<0.40
Chloroethane	ug/L		<1.0	ND	ND	<1.0	<1.0
Chloroform	ug/L	7.5	<1.0	ND	ND	<1.0	<1.0
Chloromethane	ug/L		<4.0	ND	ND	<1.0	<1.0
Dibromomethane	ug/L		<4.0	ND	ND	<1.0	<1.0
Dichlorodifluoromethane	ug/L	175	<1.0	ND	ND	<1.0	<1.0
Dichlorofluoromethane	ug/L		<1.0	**5.4**	ND	<1.0	<1.0
Ethyl ether	ug/L	50	<4.0	ND	ND	<4.0	<4.0
Ethylbenzene	ug/L	12.5	<1.0	ND	ND	<0.40	<0.40
Hexachlorobutadiene	ug/L	0.25	<1.0	ND	ND	<0.10	<0.10
Isopropylbenzene	ug/L	75	<1.0	ND	ND	<0.40	<0.40
Isopropyltoluene, p	ug/L		<1.0	ND	ND	<0.40	<0.40
Methyl ethyl ketone (MEK)	ug/L	1000	<5.0	ND	ND	<5.0	<5.0
Methyl isobutyl ketone (4-Methyl-2-pentan	ug/L	75	<5.0	ND	ND	<5.0	<5.0
Methyl tertiary butyl ether	ug/L	15	<1.0	ND	ND	<0.40	**0.62**
Methylene chloride	ug/L	1.25	<4.0	ND	ND	<1.0	<1.0
Naphthalene	ug/L	17.5	<4.0	ND	ND	<1.0	<1.0
Propylbenzene, n	ug/L		<1.0	ND	ND	<0.40	<0.40
Styrene	ug/L		<1.0	ND	ND	<0.40	<0.40
Tetrachloroethylene	ug/L	1	<1.0	ND	ND	<0.40	<0.40
Tetrahydrofuran	ug/L		<10.0	ND	ND	<10.0	<10.0
Toluene	ug/L	50	<1.0	ND	ND	<0.40	<0.40
Trichloroethylene	ug/L	0.1	<0.40	ND	ND	<0.050	<0.050
Trichlorofluoromethane	ug/L	500	<1.0	**0.49**	ND	<0.40	<0.40
Vinyl chloride	ug/L	0.05	<0.20	ND	ND	<0.050	<0.050
Xylene, m & p	ug/L	2500		ND	ND	<0.80	<0.80
Xylene, o	ug/L			ND	ND	<0.40	<0.40
Xylene, o, m & p	ug/L		<3.0	ND	ND	<1.2	<1.2
Arsenic	ug/L	2.5	<20.0	ND	ND	<20.0	<0.50
Cadmium	ug/L	0.125	<3.0	ND		<3.0	<0.08
Chromium	ug/L	25			ND	<10.0	<10.0
Copper	ug/L	250	<10.0	ND	ND	<10.0	<10.0
Lead	ug/L	7.5	<10.0	ND	**0.4**	<10.0	**0.4**
Manganese	ug/L	25	**13.5**	**10.8**	**7**	**13.4**	**10.8**
Mercury	ug/L	0.5	<0.20	ND	ND	<0.20	<0.20
Boron	ug/L	250	<150	ND	**18.1**	<150	**23.4**
Barium	ug/L	500	**32.9**	**29.9**	**27.8**	**33**	**34.5**
Chloride	mg/L		**69**	**67.3**	**62.5**	**58.4**	**72.9**
Iron	ug/L		<50	ND	**51.3**	<50.0	<50.0
Nitrate & Nitrite	mg/L		**2.8**	**4.7**	**2.6**	**1.9**	**0.97**
Fluoride	mg/L		<0.10	**0.1**			
Soilds, Total Dissolved	mg/L		**520**	**478**	**498**	**596**	**606**
Sulfate	mg/L		**98.6**	**91.1**	**92.5**	**96.9**	**121**
Depth to Water	ft		91.68	87.93	86.47	86.58	89.77
Water Table Elevation	MSL		725.07	728.82	730.28	730.17	726.98
ND = None Detected							
Green Shading represents reporting limits that are above the permit limit.							
Yellow Shading represents sampling events that exceed the permit limit.							

2021 Annual Report	W-120		Analytical Result	Analytical Result	Analytical Result	Analytical Result	Analytical Result	Analytical Result	Analytical Result	Analytical Result	Analytical Result	Analytical Result	Analytical Result	Analytical Result	Analytical Result	Analytical Result	Analytical Result
		Permit Limit	5/10/17	8/9/17	11/16/17	5/10/18	7/31/18	11/14/18	5/6/19	7/24/19	11/14/19	5/7/20	8/5/20	10/29/20	5/10/21	7/29/21	11/2/21
1,1,1,2-Tetrachloroethane	ug/L	17.5	<1.0	<1.0	<1.0	ND	ND	ND	ND	ND	ND	<0.40	<0.40	<0.40	<0.50	<0.40	<0.40
1,1,1-Trichloroethane	ug/L	2250	<1.0	<1.0	<1.0	ND	ND	ND	ND	ND	ND	<0.40	<0.40	<0.40	<0.50	<0.40	<0.40
1,1,2,2-Tetrachloroethane	ug/L		<1.0	<1.0	<1.0	ND	ND	ND	ND	ND	ND	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40
1,1,2-Trichloroethane	ug/L	0.75	<1.0	<1.0	<1.0	ND	ND	ND	ND	ND	ND	<0.40	<0.40	<0.40	<0.50	<0.40	<0.40
1,1,2-Trichlorotrifluoroethane	ug/L	5000	<1.0	<1.0	<1.0	ND	ND	ND	ND	ND	ND	<1.0	<1.0	<1.0	<0.5	<1.0	<1.0
1,1-Dichloroethane	ug/L	25	<1.0	<1.0	<1.0	ND	ND	ND	ND	ND	ND	<0.40	<0.40	<0.40	<0.50	<0.40	<0.40
1,1-Dichloroethene	ug/l	50	<1.0	<1.0	<1.0	ND	ND	ND	ND	ND	ND	<0.40	<0.40	<0.40	<0.50	<0.40	<0.40
1,1-Dichloropropene	ug/L		<1.0	<1.0	<1.0	ND	ND	ND	ND	ND	ND	<0.40	<0.40	<0.40	<0.50	<0.40	<0.40
1,2,3-Trichlorobenzene	ug/L		<1.0	<1.0	<1.0	ND	ND	ND	ND	ND	ND	<0.40	<0.40	<0.40	<0.50	<0.40	<0.40
1,2,3-Trichloropropane	ug/L	0.00075	<4.0	<4.0	<4.0	ND	ND	ND	ND	ND	ND	<0.010	<0.010	<0.010	<0.10	<0.010	<0.010
1,2,4-Trichlorobenzene	ug/L	1	<1.0	<1.0	<1.0	ND	ND	ND	ND	ND	ND	<0.40	<0.40	<0.40	<0.50	<0.40	<0.40
1,2,4-Trimethylbenzene	ug/L	25	<1.0	<1.0	<1.0	ND	ND	ND	ND	ND	ND	<1.0	<1.0	<1.0	<0.5	<1.0	<1.0
1,2 Dibromo 3 chloropropane (DBCP)	ug/L		<4.0	<4.0	<4.0	ND	ND	ND	ND	ND	ND	<0.12	<0.12	<0.12	<0.05	<0.12	<0.12
1,2-Dibromoethane	ug/L	0.001	<1.0	<1.0	<1.0	ND	ND	ND	ND	ND	ND	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
1,2-Dichlorobenzene	ug/L	150	<1.0	<1.0	<1.0	ND	ND	ND	ND	ND	ND	<0.40	<0.40	<0.40	<0.50	<0.40	<0.40
1,2-Dichloroethane	ug/L	25	<1.0	<1.0	<1.0	ND	ND	ND	ND	ND	ND	<0.20	<0.20	<0.20	<0.10	<0.20	<0.20
1,2 Dichloroethylene, cis	ug/L	1.5	<1.0	<1.0	<1.0	ND	ND	ND	ND	ND	ND	<0.40	<0.40	<0.40	<0.50	<0.40	<0.40
1,2 Dichloroethylene, trans	ug/L	10	<1.0	<1.0	<1.0	ND	ND	ND	ND	ND	ND	<0.40	<0.40	<0.40	<0.50	<0.40	<0.40
1,2-Dichloropropane	ug/L	1.3	<4.0	<4.0	<4.0	ND	ND	ND	ND	ND	ND	<0.40	<0.40	<0.40	<0.50	<0.40	<0.40
1,3,5-Trimethylbenzene	ug/L	25	<1.0	<1.0	<1.0	ND	ND	ND	ND	ND	ND	<0.40	<0.40	<0.40	<0.50	<0.40	<0.40
1,3-Dichlorobenzene	ug/L	150	<1.0	<1.0	<1.0	ND	ND	ND	ND	ND	ND	<0.40	<0.40	<0.40	<0.50	<0.40	<0.40
1,3-Dichloropropane	ug/L		<1.0	<1.0	<1.0	ND	ND	ND	ND	ND	ND	<0.40	<0.40	<0.40	<0.50	<0.40	<0.40
1,3-Dichloropropene, cis	ug/L	0.5	<4.0	<4.0	<4.0	ND	ND	ND	ND	ND	ND	<0.40	<0.40	<0.40	<0.50	<0.40	<0.40
1,3-Dichloropropene, trans	ug/L	0.5	<4.0	<4.0	<4.0	ND	ND	ND	ND	ND	ND	<0.40	<0.40	<0.40	<0.50	<0.40	<0.40
1,4-Dichlorobenzene	ug/L		<1.0	<1.0	<1.0	ND	ND	ND	ND	ND	ND	<0.40	<0.40	<0.40	<0.50	<0.40	<0.40
2,2-Dichloropropane	ug/L		<4.0	<4.0	<4.0	ND	ND	ND	ND	ND	ND	<1.0	<1.0	<1.0	<0.5	<1.0	<1.0
2-Chlorotoluene	ug/L		<1.0	<1.0	<1.0	ND	ND	ND	ND	ND	ND	<0.40	<0.40	<0.40	<0.50	<0.40	<0.40
4-Chlorotoluene	ug/L		<1.0	<1.0	<1.0	ND	ND	ND	ND	ND	ND	<0.40	<0.40	<0.40	<0.50	<0.40	<0.40
Acetone	ug/L	1000	<20.0	<20.0	<20.0	ND	ND	ND	ND	ND	ND	<20.0	<20.0	<20.0	<10.0	<20.0	<20.0
Allyl chloride	ug/L	7.5	<4.0	<4.0	<4.0	ND	ND	ND	ND	ND	ND	<4.0	<4.0	<4.0	<0.5	<4.0	<4.0
Benzene	ug/L	0.5	<1.0	<1.0	<1.0	ND	ND	ND	ND	ND	ND	<0.20	<0.20	<0.20	<0.5	<0.20	<0.20
Bromobenzene	ug/L		<1.0	<1.0	<1.0	ND	ND	ND	ND	ND	ND	<0.40	<0.40	<0.40	<0.5	<0.40	<0.40
Bromochloromethane	ug/L		<1.0	<1.0	<1.0	ND	ND	ND	ND	ND	ND	<1.0	<1.0	<1.0	<0.5	<1.0	<1.0
Bromodichloromethane	ug/L	1.5	<1.0	<1.0	<1.0	ND	ND	ND	ND	ND	ND	<0.40	<0.40	<0.40	<0.5	<0.40	<0.40
Bromoform	ug/L	10	<4.0	<4.0	<4.0	ND	ND	ND	ND	ND	ND	<1.0	<1.0	<1.0	<0.5	<1.0	<1.0
Bromomethane	ug/L	2.5	<4.0	<4.0	<4.0	ND	ND	ND	ND	ND	ND	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Butylbenzene, n	ug/L		<1.0	<1.0	<1.0	ND	ND	ND	ND	ND	ND	<0.40	<0.40	<0.40	<0.5	<0.40	<0.40
Butylbenzene, sec	ug/L		<1.0	<1.0	<1.0	ND	ND	ND	ND	ND	ND	<0.40	<0.40	<0.40	<0.5	<0.40	<0.40
Butylbenzene, tert	ug/L		<1.0	<1.0	<1.0	ND	ND	ND	ND	ND	ND	<0.40	<0.40	<0.40	<0.5	<0.40	<0.40
Carbon tetrachloride	ug/L		<1.0	<1.0	<1.0	ND	ND	ND	ND	ND	ND	<0.050	<0.050	<0.050	<0.2	<0.050	<0.050
Chlorobenzene	ug/L	25	<1.0	<1.0	<1.0	ND	ND	ND	ND	ND	ND	<0.40	<0.40	<0.40	<0.5	<0.40	<0.40
Chlorodibromomethane	ug/L	2.5	<1.0	<1.0	<1.0	ND	ND	ND	ND	ND	ND	<0.40	<0.40	<0.40	<0.5	<0.40	<0.40
Chloroethane	ug/L		<1.0	<1.0	<1.0	ND	ND	ND	ND	ND	ND	<1.0	<1.0	<1.0	<0.5	<1.0	<1.0
Chloroform	ug/L	7.5	<1.0	<1.0	<1.0	ND	ND	ND	ND	ND	ND	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Chloromethane	ug/L		<4.0	<4.0	<4.0	ND	ND	ND	ND	**1.5**	ND	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Dibromomethane	ug/L		<4.0	<4.0	<4.0	ND	ND	ND	ND	ND	ND	<1.0	<1.0	<1.0	<0.5	<1.0	<1.0
Dichlorodifluoromethane	ug/L	175	<1.0	<1.0	<1.0	ND	ND	ND	ND	ND	ND	<1.0	<1.0	<1.0	<0.5	<1.0	<1.0
Dichlorofluoromethane	ug/L		<1.0	<1.0	<1.0	ND	ND	ND	ND	ND	ND	<1.0	<1.0	<1.0	<0.5	<1.0	<1.0
Ethyl ether	ug/L	50	<4.0	<4.0	<4.0	ND	ND	ND	ND	ND	ND	<4.0	<4.0	<4.0	<0.5	<4.0	<4.0
Ethylbenzene	ug/L	12.5	<1.0	<1.0	<1.0	ND	ND	ND	ND	ND	ND	<0.40	<0.40	<0.40	<0.50	<0.40	<0.40
Hexachlorobutadiene	ug/L	0.25	<1.0	<1.0	<1.0	ND	ND	ND	ND	ND	ND	<0.10	<0.10	<0.10	<0.20	<0.10	<0.10
Isopropylbenzene	ug/L	75	<1.0	<1.0	<1.0	ND	ND	ND	ND	ND	ND	<0.40	<0.40	<0.40	<0.50	<0.40	<0.40
Isopropyltoluene, p	ug/L		<1.0	<1.0	<1.0	ND	ND	ND	ND	ND	ND	<0.40	<0.40	<0.40	<0.50	<0.40	<0.40
Methyl ethyl ketone (MEK)	ug/L	1000	<5	<5	<5	ND	ND	ND	ND	ND	ND	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Methyl isobutyl ketone (4-Methyl-2-penta	ug/L	75	<5.0	<5.0	<5.0	ND	ND	ND	ND	ND	ND	<5.0	<5.0	<5.0	<2.0	<5.0	<5.0
Methyl tertiary butyl ether	ug/L	15	<1.0	<1.0	<1.0	ND	ND	ND	ND	ND	ND	<0.40	<0.40	<0.40	<0.50	<0.40	<0.40
Methylene chloride	ug/L	1.25	<4.0	<4.0	<4.0	ND	ND	ND	ND	ND	ND	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Naphthalene	ug/L	0.25	<4.0	<4.0	<4.0	ND	ND	ND	ND	ND	ND	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Propylbenzene, n	ug/L		<1.0	<1.0	<1.0	ND	ND	ND	ND	ND	ND	<0.40	<0.40	<0.40	<0.50	<0.40	<0.40
Styrene	ug/L		<1.0	<1.0	<1.0	ND	ND	ND	ND	ND	ND	<0.40	<0.40	<0.40	<0.50	<0.40	<0.40
Tetrachloroethylene	ug/L	1	<1.0	<1.0	<1.0	ND	ND	ND	ND	ND	ND	<0.40	<0.40	<0.40	<0.50	<0.40	<0.40
Tetrahydrofuran	ug/L		<10	<10	<10	ND	ND	ND	ND	ND	ND	<10.0	<10.0	<10.0	<5.0	<10.0	<10.0
Toluene	ug/L	50	**3.5**	**1.5**	**29.4**	ND	ND	**0.74**	ND	ND	ND	<0.40	<0.40	<0.40	<0.50	<0.40	<0.40
Trichloroethylene	ug/L	0.1	<0.40	<0.40	<0.50	ND	ND	ND	ND	ND	ND	<0.050	<0.050	<0.050	<0.1	<0.050	<0.050
Trichlorofluoromethane	ug/L	500	<1.0	<1.0	<1.0	ND	ND	ND	ND	ND	ND	<0.40	<0.40	<0.40	<0.50	<0.40	<0.40
Vinyl chloride	ug/L	0.05	<0.40	<0.40	<0.40	ND	ND	ND	ND	ND	ND	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Xylene, m & p	ug/L		<3.0	<3.0	<3.0	ND	ND	ND	ND	ND	ND	<1.2	<1.2	<1.2	<1.0	<1.2	<1.2
Arsenic	ug/L	2.5		<20.0			ND			ND			<20.0			<0.50	
Cadmium	ug/L	0.125		<3.0			ND						<3.0			<0.08	
Chromium	ug/L	25								ND			<10.0			<10.0	
Copper	ug/L	250		<10.0			ND			ND			<10.0			<10.0	
Lead	ug/L	7.5		<10.0			ND			ND			<10.0			<0.10	
Manganese	ug/L	25	**242**	**277**	**190**	**41.30**	**277**	**296**	**280**	**280**	**304**	**19.7**	**318**	**72.3**	**21.4**	**32.7**	**14.7**
Mercury	ug/L	0.5		<0.20			ND			ND			<0.20			<0.20	
Boron	ug/L	250	<150	<150	<150	ND	ND	ND	ND	**50.2**	**36.3**	**33.4**	<150	<150	**34.6**	**41.8**	<150
Barium	ug/L	500		<10.0			ND			ND			<10.0			**16.4**	
Chloride	mg/L			**25.9**			**25.7**			**25**			**22.8**			**18.1**	
Iron	ug/L			**9570**			**8610**			**9290**			**8860**			**1200**	
Nitrate & Nitrite	mg/L			<0.020			ND			ND			<0.20			**1.8**	
Fluoride	mg/L			**0.12**			**0.2**										
Soilds, Total Dissolved	mg/L		**286**	**366**	**333**	437	**336**	**328**	**385**	**374**	**352**	**446**	**383**		**470**	**478**	**480**
Sulfate	mg/L			**18.3**			**22**			**65.8**			**16.1**			**46.6**	
Depth to Water	ft		90.86	90.89	90.04	90.13	88.89	89.06	87.03	87.84	87.82	88.72	88.17	88.52	89.06	91.06	90.89
Water Table Elevation	MSL		719.94	719.91	720.76	720.67	721.91	721.74	723.77	722.96	722.98	722.08	722.63	722.28	721.74	719.74	719.91

* Toluene was detected for the first time since 2010

[a]Sample was diluted by a factor of 10 to accommodate the analyte concentration.

[b]The RL was based on a one liter volume of sample being extracted and analyzed. The achieved RL for this sample was higher than the target RL because less than one liter of sample was submitted for analysis.

[c]The matrix spike recoveries for this sample were less than the minimum recovery limits specified by the method. As a result, the value reported for the sample should be considred a minimum value.

ND = None Detected

Green Shading represents reporting limits that are above the permit limit.

Yellow Shading represents sampling events that exceed the permit limit.

2021 Annual Report	W-121		Analytical Result	Analytical Result	Analytical Result	Analytical Result	Analytical Result	Analytical Result	Analytical Result	Analytical Result	Analytical Result	Analytical Result	Analytical Result	Analytical Result	Analytical Result	Analytical Result	Analytical Result
		Permit Limit	5/10/17	8/9/17	11/16/17	5/10/18	7/31/18	11/14/18	5/6/19	7/24/19	11/14/19	5/7/20	8/5/20	10/29/20	5/10/21	7/29/21	11/2/21
1,1,1,2-Tetrachloroethane	ug/L	17.5	<1.0	<1.0	<1.0	ND	ND	ND	ND	ND	ND	<0.40	<0.40	<0.40	<0.50	<0.40	<0.40
1,1,1-Trichloroethane	ug/L	2250	<1.0	<1.0	<1.0	ND	ND	ND	ND	ND	ND	<0.40	<0.40	<0.40	<0.50	<0.40	<0.40
1,1,2,2-Tetrachloroethane	ug/L		<1.0	<1.0	<1.0	ND	ND	ND	ND	ND	ND	<0.40	<0.40	<0.40	<0.50	<0.40	<0.40
1,1,2-Trichloroethane	ug/L	0.75	<1.0	<1.0	<1.0	ND	ND	ND	ND	ND	ND	<0.40	<0.40	<0.40	<0.50	<0.40	<0.40
1,1,2-Trichlorotrifluoroethane	ug/L	5000	<1.0	<1.0	<1.0	ND	ND	ND	ND	ND	ND	<1.0	<1.0	<1.0	<0.5	<1.0	<1.0
1,1-Dichloroethane	ug/L	25	<1.0	<1.0	<1.0	ND	ND	ND	ND	ND	ND	<0.40	<0.40	<0.40	<0.50	<0.40	<0.40
1,1-Dichloroethene	ug/l	50	<1.0	<1.0	<1.0	ND	ND	ND	ND	ND	ND	<0.40	<0.40	<0.40	<0.50	<0.40	<0.40
1,1-Dichloropropene	ug/L		<1.0	<1.0	<1.0	ND	ND	ND	ND	ND	ND	<0.40	<0.40	<0.40	<0.50	<0.40	<0.40
1,2,3-Trichlorobenzene	ug/L		<1.0	<1.0	<1.0	ND	ND	ND	ND	ND	ND	<0.40	<0.40	<0.40	<0.50	<0.40	<0.40
1,2,3-Trichloropropane	ug/L	0.00075	<4.0	<4.0	<4.0	ND	ND	ND	ND	ND	ND	<0.010	<0.010	<0.010	<0.10	<0.010	<0.010
1,2,4-Trichlorobenzene	ug/L	1	<1.0	<1.0	<1.0	ND	ND	ND	ND	ND	ND	<0.40	<0.40	<0.40	<0.50	<0.40	<0.40
1,2,4-Trimethylbenzene	ug/L	25	<1.0	<1.0	<1.0	ND	ND	ND	ND	ND	ND	<1.0	<1.0	<1.0	<0.5	<1.0	<1.0
1,2 Dibromo 3 chloropropane (DBCP)	ug/L		<4.0	<4.0	<4.0	ND	ND	ND	ND	ND	ND	<0.12	<0.12	<0.12	<0.05	<0.12	<0.12
1,2-Dibromoethane	ug/L	0.001	<1.0	<1.0	<1.0	ND	ND	ND	ND	ND	ND	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
1,2-Dichlorobenzene	ug/L	150	<1.0	<1.0	<1.0	ND	ND	ND	ND	ND	ND	<0.40	<0.40	<0.40	<0.50	<0.40	<0.40
1,2-Dichloroethane	ug/L	25	<1.0	<1.0	<1.0	ND	ND	ND	ND	ND	ND	<0.20	<0.20	<0.20	<0.10	<0.20	<0.20
1,2 Dichloroethylene, cis	ug/L	1.5	<1.0	<1.0	<1.0	ND	ND	ND	ND	ND	ND	<0.40	<0.40	<0.40	<0.50	<0.40	<0.40
1,2 Dichloroethylene, trans	ug/L	10	<1.0	<1.0	<1.0	ND	ND	ND	ND	ND	ND	<0.40	<0.40	<0.40	<0.50	<0.40	<0.40
1,2-Dichloropropane	ug/L	1.25	<4.0	<4.0	<4.0	ND	ND	ND	ND	ND	ND	<0.40	<0.40	<0.40	<0.50	<0.40	<0.40
1,3,5-Trimethylbenzene	ug/L	25	<1.0	<1.0	<1.0	ND	ND	ND	ND	ND	ND	<0.40	<0.40	<0.40	<0.50	<0.40	<0.40
1,3-Dichlorobenzene	ug/L	150	<1.0	<1.0	<1.0	ND	ND	ND	ND	ND	ND	<0.40	<0.40	<0.40	<0.50	<0.40	<0.40
1,3-Dichloropropane	ug/L		<1.0	<1.0	<1.0	ND	ND	ND	ND	ND	ND	<0.40	<0.40	<0.40	<0.50	<0.40	<0.40
1,3-Dichloropropene, cis	ug/L	0.5	<4.0	<4.0	<4.0	ND	ND	ND	ND	ND	ND	<0.40	<0.40	<0.40	<0.5	<0.40	<0.40
1,3-Dichloropropene, trans	ug/L	0.5	<4.0	<4.0	<4.0	ND	ND	ND	ND	ND	ND	<0.40	<0.40	<0.40	<0.50	<0.40	<0.40
1,4-Dichlorobenzene	ug/L		<1.0	<1.0	<1.0	ND	ND	ND	ND	ND	ND	<0.40	<0.40	<0.40	<0.50	<0.40	<0.40
2,2-Dichloropropane	ug/L		<4.0	<4.0	<4.0	ND	ND	ND	ND	ND	ND	<1.0	<1.0	<1.0	<0.5	<1.0	<1.0
2-Chlorotoluene	ug/L		<1.0	<1.0	<1.0	ND	ND	ND	ND	ND	ND	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40
4-Chlorotoluene	ug/L		<1.0	<1.0	<1.0	ND	ND	ND	ND	ND	ND	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40
Acetone	ug/L	1000	<20.0	<20.0	<20.0	ND	ND	ND	ND	ND	ND	<20.0	<20.0	<20.0	<10.0	<20.0	<20.0
Allyl chloride	ug/L	7.5	<4.0	<4.0	<4.0	ND	ND	ND	ND	ND	ND	<4.0	<4.0	<4.0	<0.5	<4.0	<4.0
Benzene	ug/L	0.5	<1.0	<1.0	<1.0	ND	ND	ND	ND	ND	ND	<0.20	<0.20	<0.20	<0.50	<0.20	<0.20
Bromobenzene	ug/L		<1.0	<1.0	<1.0	ND	ND	ND	ND	ND	ND	<0.40	<0.40	<0.40	<0.50	<0.40	<0.40
Bromochloromethane	ug/L		<1.0	<1.0	<1.0	ND	ND	ND	ND	ND	ND	<1.0	<1.0	<1.0	<0.5	<1.0	<1.0
Bromodichloromethane	ug/L	1.5	<1.0	<1.0	<1.0	ND	ND	ND	ND	ND	ND	<0.40	<0.40	<0.40	<0.5	<0.40	<0.40
Bromoform	ug/L	10	<4.0	<4.0	<4.0	ND	ND	ND	ND	ND	ND	<1.0	<1.0	<1.0	<0.5	<1.0	<1.0
Bromomethane	ug/L	2.5	<4.0	<4.0	<4.0	ND	ND	ND	ND	ND	ND	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Butylbenzene, n	ug/L		<1.0	<1.0	<1.0	ND	ND	ND	ND	ND	ND	<0.40	<0.40	<0.40	<0.50	<0.40	<0.40
Butylbenzene, sec	ug/L		<1.0	<1.0	<1.0	ND	ND	ND	ND	ND	ND	<0.40	<0.40	<0.40	<0.50	<0.40	<0.40
Butylbenzene, tert	ug/L		<1.0	<1.0	<1.0	ND	ND	ND	ND	ND	ND	<0.40	<0.40	<0.40	<0.50	<0.40	<0.40
Carbon tetrachloride	ug/L		<1.0	<1.0	<1.0	ND	ND	ND	ND	ND	ND	<0.050	<0.050	<0.050	<0.20	<0.050	<0.050
Chlorobenzene	ug/L	25	<1.0	<1.0	<1.0	ND	ND	ND	ND	ND	ND	<0.40	<0.40	<0.40	<0.50	<0.40	<0.40
Chlorodibromomethane	ug/L	2.5	<1.0	<1.0	<1.0	ND	ND	ND	ND	ND	ND	<0.40	<0.40	<0.40	<0.50	<0.40	<0.40
Chloroethane	ug/L		<1.0	<1.0	<1.0	ND	ND	ND	ND	ND	ND	<1.0	<1.0	<1.0	<0.5	<1.0	<1.0
Chloroform	ug/L	7.5	<1.0	<1.0	<1.0	ND	ND	ND	ND	ND	ND	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Chloromethane	ug/L		<4.0	<4.0	<4.0	ND	ND	ND	ND	ND	ND	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Dibromomethane	ug/L		<4.0	<4.0	<4.0	ND	ND	ND	ND	ND	ND	<1.0	<1.0	<1.0	<0.5	<1.0	<1.0
Dichlorodifluoromethane	ug/L	175	<1.0	<1.0	<1.0	ND	ND	ND	ND	ND	ND	<1.0	<1.0	<1.0	<0.5	<1.0	<1.0
Dichlorofluoromethane	ug/L		<1.0	<1.0	<1.0	ND	ND	ND	ND	ND	ND	<1.0	<1.0	<1.0	<0.5	<1.0	<1.0
Ethyl ether	ug/L	50	<4.0	<4.0	<4.0	ND	ND	ND	ND	ND	ND	<4.0	<4.0	<4.0	<0.5	<4.0	<4.0
Ethylbenzene	ug/L	12.5	<1.0	<1.0	<1.0	ND	ND	ND	ND	ND	ND	<0.40	<0.40	<0.40	<0.50	<0.40	<0.40
Hexachlorobutadiene	ug/L	0.25	<1.0	<1.0	<1.0	ND	ND	ND	ND	ND	ND	<0.10	<0.10	<0.10	<0.20	<0.10	<0.10
Isopropylbenzene	ug/L	75	<1.0	<1.0	<1.0	ND	ND	ND	ND	ND	ND	<0.40	<0.40	<0.40	<0.50	<0.40	<0.40
Isopropyltoluene, p	ug/L		<1.0	<1.0	<1.0	ND	ND	ND	ND	ND	ND	<0.40	<0.40	<0.40	<0.50	<0.40	<0.40
Methyl ethyl ketone (MEK)	ug/L	1000	<5	<5	<5	ND	ND	ND	ND	ND	ND	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Methyl isobutyl ketone (4-Methyl-2-pe	ug/L	75	<5.0	<5.0	<5.0	ND	ND	ND	ND	ND	ND	<5.0	<5.0	<5.0	<2.0	<5.0	<5.0
Methyl tertiary butyl ether	ug/L	15	<1.0	<1.0	<1.0	ND	ND	ND	ND	ND	ND	<0.40	<0.40	<0.40	<0.50	<0.40	<0.40
Methylene chloride	ug/L	1.25	<4.0	<4.0	<4.0	ND	ND	ND	ND	ND	ND	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Naphthalene	ug/L	17.5	<4.0	<4.0	<4.0	ND	ND	ND	ND	ND	ND	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Propylbenzene, n	ug/L		<1.0	<1.0	<1.0	ND	ND	ND	ND	ND	ND	<0.40	<0.40	<0.40	<0.50	<0.40	<0.40
Styrene	ug/L		<1.0	<1.0	<1.0	**0.40**	**0.65**	ND	ND	ND	**0.60**	**0.41**	<0.40	**0.4**	**0.62**	<0.40	<0.40
Tetrachloroethylene	ug/L	1	<1.0	<1.0	<1.0	ND	ND	ND	ND	ND	ND	<0.40	<0.40	<0.40	<0.50	<0.40	<0.40
Tetrahydrofuran	ug/L		<10	<10	<10	ND	ND	ND	ND	ND	ND	<10.0	<10.0	<10.0	<5.0	<10.0	<10.0
Toluene	ug/L	50	<1.0	<1.0	<1.0	**1.2**	**1.2**	ND	ND	ND	**1.2**	**0.58**	**<0.40**	**0.47**	**1.62**	**0.88**	**0.81**
Trichloroethylene	ug/L	0.1	<0.40	<0.40	<0.40	ND	ND	ND	ND	ND	ND	<0.050	<0.050	<0.050	<0.10	<0.050	<0.050
Trichlorofluoromethane	ug/L	500	<1.0	<1.0	<1.0	ND	ND	ND	ND	ND	ND	<0.40	<0.40	<0.40	<0.50	<0.40	<0.40
Vinyl chloride	ug/L	0.05	<0.20	<0.20	<0.50	ND	ND	ND	ND	ND	ND	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Xylene, o, m & p	ug/L		<3.0	<3.0	<3.0	ND	ND	ND	ND	ND	ND	<1.2	<1.2	<1.2	<1.0	<1.2	<1.2
Arsenic	ug/L	2.5		<20.0			ND			ND			<20.0			<0.50	
Cadmium	ug/L	0.125		<3.0			ND						<3.0			<0.08	
Chromium	ug/L	25								ND			<10.0			<10.0	
Copper	ug/L	250		<10.0			ND			ND			<10.0			<10.0	
Lead	ug/L	7.5		<10.0			ND			ND			<10.0			<0.10	
Manganese	ug/L	25	<5.0	**146**	**7.4**	**11.7**	**96.9**	**103**	**19.9**	**61**	**53.3**	**60.3**	**205**	**99.7**	**39.7**	**161**	**137**
Mercury	ug/L	0.5		**<0.20**			ND			ND			<0.20			<0.20	
Boron	ug/L	250	<150	<150	<150	ND	ND	ND	ND	**17.5**	**17.7**	**18.3**	<150	<150	**17.6**	**19.5**	<150
Barium	ug/L	500		**112**			**74.4**			**28.4**			**87.1**			**34.8**	
Chloride	mg/L			**10.7**			**10.3**			**10.7**			**8.2**			**10.8**	
Iron	ug/L			<50.0			**80.3**			ND			**598**			**329**	
Nitrate & Nitrite	mg/L			**<0.020**			ND			ND			<0.20			<0.20	
Fluoride	mg/L			<0.10			**0.14**										
Soilds, Total Dissolved	mg/L		66	213	87	**86**	**234**	**125**	**182**	**118**	**120**	**114**	**169**	**154**	**171**	**193**	**168**
Sulfate	mg/L			**29.4**			**32.5**			**50.9**			**23**			**28.3**	
Depth to Water	ft		50.96	41.13	49.87	48.16	45.14	47.41	45.38	44.07	44.1	45.02	44.89	45.24	46.11	47.72	47.83
Water Table Elevation	MSL		710.34	720.17	711.43	713.14	716.16	713.89	715.92	717.23	717.2	716.28	716.41	716.06	715.19	713.58	713.47

[a]Sample was diluted by a factor of 10 to accommodate the analyte concentration.

[b]The RL was based on a one liter volume of sample being extracted and analyzed. The achieved RL for this sample was higher than the target RL because less than one liter of sample was submitted for analysis.

[c]The matrix spike recoveries for this sample were less than the minimum recovery limits specified by the method. As a result, the value reported for the sample should be considred a minimum value.

ND = None Detected

Green Shading represents reporting limits that are above the pe

Yellow Shading represents sampling events that exceed the pe

2021 ANNUAL REPORT	W-122		Analytical Result	Analytical Result	Analytical Result	Analytical Result	Analytical Result	Analytical Result	Analytical Result	Analytical Result	Analytical Result	Analytical Result	Analytical Result	Analytical Result	Analytical Result	Analytical Result	Analytical Result
		Permit Limit	5/10/17	8/9/17	11/16/17	5/10/18	7/31/18	11/14/18	5/6/19	7/24/19	11/14/19	5/7/20	8/5/20	10/29/20	5/10/21	7/29/21	11/2/21
1,1,1,2-Tetrachloroethane	ug/L	17.5	<1.0	<1.0	<1.0	ND	ND	ND	ND	ND	ND	<0.40	<0.40	<0.40	<0.50	<0.40	<0.40
1,1,1-Trichloroethane	ug/L	2250	<1.0	<1.0	<1.0	ND	ND	ND	ND	ND	ND	<0.40	<0.40	<0.40	<0.50	<0.40	<0.40
1,1,2,2-Tetrachloroethane	ug/L		<1.0	<1.0	<1.0	ND	ND	ND	ND	ND	ND	<0.40	<0.40	<0.40	<0.50	<0.40	<0.40
1,1,2-Trichloroethane	ug/L	0.75	<1.0	<1.0	<1.0	ND	ND	ND	ND	ND	ND	<0.40	<0.40	<0.40	<0.50	<0.40	<0.40
1,1,2-Trichlorotrifluoroethane	ug/L	5000	<1.0	<1.0	<1.0	ND	ND	ND	ND	ND	ND	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
1,1-Dichloroethane	ug/L	25	<1.0	<1.0	<1.0	ND	ND	ND	ND	ND	ND	<0.40	<0.40	<0.40	<0.50	<0.40	<0.40
1,1-Dichloroethene	ug/l	50	<1.0	<1.0	<1.0	ND	ND	ND	ND	ND	ND	<0.40	<0.40	<0.40	<0.50	<0.40	<0.40
1,1-Dichloropropene	ug/L		<1.0	<1.0	<1.0	ND	ND	ND	ND	ND	ND	<0.40	<0.40	<0.40	<0.50	<0.40	<0.40
1,2,3-Trichlorobenzene	ug/L		<1.0	<1.0	<1.0	ND	ND	ND	ND	ND	ND	<0.40	<0.40	<0.40	<0.50	<0.40	<0.40
1,2,3-Trichloropropane	ug/L	0.00075	<4.0	<4.0	<4.0	ND	ND	ND	ND	ND	ND	<0.010	<0.010	<0.010	<0.10	<0.010	<0.010
1,2,4-Trichlorobenzene	ug/L	1	<1.0	<1.0	<1.0	ND	ND	ND	ND	ND	ND	<0.40	<0.40	<0.40	<0.50	<0.40	<0.40
1,2,4-Trimethylbenzene	ug/L	25	<1.0	<1.0	<1.0	ND	ND	ND	ND	ND	ND	<1.0	<1.0	<1.0	<0.5	<1.0	<1.0
1,2 Dibromo 3 chloropropane (DBCP)	ug/L		<4.0	<4.0	<4.0	ND	ND	ND	ND	ND	ND	<0.12	<0.12	<0.12	<0.05	<0.12	<0.12
1,2-Dibromoethane	ug/L	0.001	<1.0	<1.0	<1.0	ND	ND	ND	ND	ND	ND	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
1,2-Dichlorobenzene	ug/L	150	<1.0	<1.0	<1.0	ND	ND	ND	ND	ND	ND	<0.40	<0.40	<0.40	<0.50	<0.40	<0.40
1,2-Dichloroethane	ug/L	25	<1.0	<1.0	<1.0	ND	ND	ND	ND	ND	ND	<0.20	<0.20	<0.20	<0.10	<0.20	<0.20
1,2 Dichloroethylene, cis	ug/L	1.5	<1.0	<1.0	<1.0	ND	ND	ND	ND	ND	ND	<0.40	<0.40	<0.40	<0.50	<0.40	<0.40
1,2 Dichloroethylene, trans	ug/L	10	<1.0	<1.0	<1.0	ND	ND	ND	ND	ND	ND	<0.40	<0.40	<0.40	<0.50	<0.40	<0.40
1,2-Dichloropropane	ug/L	1.25	<4.0	<4.0	<4.0	ND	ND	ND	ND	ND	ND	<0.40	<0.40	<0.40	<0.50	<0.40	<0.40
1,3,5-Trimethylbenzene	ug/L	25	<1.0	<1.0	<1.0	ND	ND	ND	ND	ND	ND	<0.40	<0.40	<0.40	<0.50	<0.40	<0.40
1,3-Dichlorobenzene	ug/L	150	<1.0	<1.0	<1.0	ND	ND	ND	ND	ND	ND	<0.40	<0.40	<0.40	<0.50	<0.40	<0.40
1,3-Dichloropropane	ug/L		<1.0	<1.0	<1.0	ND	ND	ND	ND	ND	ND	<0.40	<0.40	<0.40	<0.50	<0.40	<0.40
1,3-Dichloropropene, cis	ug/L	0.5	<4.0	<4.0	<4.0	ND	ND	ND	ND	ND	ND	<0.40	<0.40	<0.40	<0.50	<0.40	<0.40
1,3-Dichloropropene, trans	ug/L	0.5	<4.0	<4.0	<4.0	ND	ND	ND	ND	ND	ND	<0.40	<0.40	<0.40	<0.50	<0.40	<0.40
1,4-Dichlorobenzene	ug/L		<1.0	<1.0	<1.0	ND	ND	ND	ND	ND	ND	<0.40	<0.40	<0.40	<0.50	<0.40	<0.40
2,2-Dichloropropane	ug/L		<4.0	<4.0	<4.0	ND	ND	ND	ND	ND	ND	<1.0	<1.0	<1.0	<0.5	<1.0	<1.0
2-Chlorotoluene	ug/L		<1.0	<1.0	<1.0	ND	ND	ND	ND	ND	ND	<0.40	<0.40	<0.40	<0.50	<0.40	<0.40
4-Chlorotoluene	ug/L		<1.0	<1.0	<1.0	ND	ND	ND	ND	ND	ND	<0.40	<0.40	<0.40	<0.50	<0.40	<0.40
Acetone	ug/L	1000	<20.0	<20.0	<20.0	ND	ND	ND	ND	ND	ND	<20.0	<20.0	<20.0	<10.0	<20.0	<20.0
Allyl chloride	ug/L	7.5	<4.0	<4.0	<4.0	ND	ND	ND	ND	ND	ND	<4.0	<4.0	<4.0	<0.5	<4.0	<4.0
Benzene	ug/L	0.5	<1.0	<1.0	<1.0	ND	ND	ND	ND	ND	ND	<0.20	<0.20	<0.20	<0.50	<0.20	<0.20
Bromobenzene	ug/L		<1.0	<1.0	<1.0	ND	ND	ND	ND	ND	ND	<0.40	<0.40	<0.40	<0.50	<0.40	<0.40
Bromochloromethane	ug/L		<1.0	<1.0	<1.0	ND	ND	ND	ND	ND	ND	<1.0	<1.0	<1.0	<0.5	<1.0	<1.0
Bromodichloromethane	ug/L	1.5	<1.0	<1.0	<1.0	ND	ND	ND	ND	ND	ND	<0.40	<0.40	<0.40	<0.50	<0.40	<0.40
Bromoform	ug/L	10	<4.0	<4.0	<4.0	ND	ND	ND	ND	ND	ND	<1.0	<1.0	<1.0	<0.5	<1.0	<1.0
Bromomethane	ug/L	2.5	<4.0	<4.0	<4.0	ND	ND	ND	ND	ND	ND	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Butylbenzene, n	ug/L		<1.0	<1.0	<1.0	ND	ND	ND	ND	ND	ND	<0.40	<0.40	<0.40	<0.50	<0.40	<0.40
Butylbenzene, sec	ug/L		<1.0	<1.0	<1.0	ND	ND	ND	ND	ND	ND	<0.40	<0.40	<0.40	<0.50	<0.40	<0.40
Butylbenzene, tert	ug/L		<1.0	<1.0	<1.0	ND	ND	ND	ND	ND	ND	<0.40	<0.40	<0.40	<0.50	<0.40	<0.40
Carbon tetrachloride	ug/L		<1.0	<1.0	<1.0	ND	ND	ND	ND	ND	ND	<0.050	<0.050	<0.050	<0.2	<0.050	<0.050
Chlorobenzene	ug/L	25	<1.0	<1.0	<1.0	ND	ND	ND	ND	ND	ND	<0.40	<0.40	<0.40	<0.5	<0.40	<0.40
Chlorodibromomethane	ug/L	2.5	<1.0	<1.0	<1.0	ND	ND	ND	ND	ND	ND	<0.40	<0.40	<0.40	<0.50	<0.40	<0.40
Chloroethane	ug/L		<1.0	<1.0	<1.0	ND	ND	ND	ND	ND	ND	<1.0	<1.0	<1.0	<0.5	<1.0	<1.0
Chloroform	ug/L	7.5	<1.0	<1.0	<1.0	ND	ND	ND	ND	ND	ND	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Chloromethane	ug/L		<4.0	<4.0	<4.0	ND	ND	ND	ND	ND	ND	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Dibromomethane	ug/L		<4.0	<4.0	<4.0	ND	ND	ND	ND	ND	ND	<1.0	<1.0	<1.0	<0.5	<1.0	<1.0
Dichlorodifluoromethane	ug/L	175	<1.0	<1.0	<1.0	ND	ND	ND	ND	ND	ND	<1.0	<1.0	<1.0	<0.5	<1.0	<1.0
Dichlorofluoromethane	ug/L		<1.0	<1.0	<1.0	ND	ND	ND	ND	ND	ND	<1.0	<1.0	<1.0	<0.5	<1.0	<1.0
Ethyl ether	ug/L	50	<4.0	<4.0	<4.0	ND	ND	ND	ND	ND	ND	<4.0	<4.0	<4.0	<0.50	<4.0	<4.0
Ethylbenzene	ug/L	12.5	<1.0	<1.0	<1.0	ND	ND	ND	ND	ND	ND	<0.40	<0.40	<0.40	<0.50	<0.40	<0.40
Hexachlorobutadiene	ug/L	0.25	<1.0	<1.0	<1.0	ND	ND	ND	ND	ND	ND	<0.10	<0.10	<0.10	<0.20	<0.10	<0.10
Isopropylbenzene	ug/L	75	<1.0	<1.0	<1.0	ND	ND	ND	ND	ND	ND	<0.40	<0.40	<0.40	<0.5	<0.40	<0.40
Isopropyltoluene, p	ug/L		<1.0	<1.0	<1.0	ND	ND	ND	ND	ND	ND	<0.40	<0.40	<0.40	<0.50	<0.40	<0.40
Methyl ethyl ketone (MEK)	ug/L	1000	<5	<5	<5	ND	ND	ND	ND	ND	ND	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Methyl isobutyl ketone (4-Methyl-2-pentanone	ug/L	75	<5.0	<5.0	<5.0	ND	ND	ND	ND	ND	ND	<5.0	<5.0	<5.0	<2.0	<5.0	<5.0
Methyl tertiary butyl ether	ug/L	15	<1.0	<1.0	<1.0	ND	ND	ND	ND	ND	ND	<0.40	<0.40	<0.40	<0.50	<0.40	<0.40
Methylene chloride	ug/L	1.25	<4.0	<4.0	<4.0	ND	ND	ND	ND	ND	ND	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Naphthalene	ug/L	17.5	<4.0	<4.0	<4.0	ND	ND	ND	ND	ND	ND	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Propylbenzene, n	ug/L		<1.0	<1.0	<1.0	ND	ND	ND	ND	ND	ND	<0.40	<0.40	<0.40	<0.50	<0.40	<0.40
Styrene	ug/L		<1.0	<1.0	<1.0	ND	ND	ND	ND	ND	ND	<0.40	<0.40	<0.40	<0.50	<0.40	<0.40
Tetrachloroethylene	ug/L	1	<1.0	<1.0	<1.0	ND	ND	ND	ND	ND	ND	<0.40	<0.40	<0.40	<0.50	<0.40	<0.40
Tetrahydrofuran	ug/L		<10	<10	<10	ND	ND	ND	ND	ND	ND	<10.0	<10.0	<10.0	<5.0	<10.0	<10.0
Toluene	ug/L	50	<1.0	<1.0	<1.0	ND	ND	ND	ND	ND	ND	<0.40	<0.40	<0.40	<0.50	<0.40	<0.40
Trichloroethylene	ug/L	0.1	<0.40	<0.40	<0.40	ND	ND	ND	ND	ND	ND	<0.050	<0.050	<0.050	<0.10	<0.050	<0.050
Trichlorofluoromethane	ug/L	500	<1.0	<1.0	<1.0	ND	ND	ND	ND	ND	ND	<0.40	<0.40	<0.40	<0.50	<0.40	<0.40
Vinyl chloride	ug/L	0.05	<0.20	<0.20	<0.20	ND	ND	ND	ND	ND	ND	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Xylene, o, m & p	ug/L		<3.0	<3.0	<3.0	ND	ND	ND	ND	ND	ND	<1.2	<1.2	<1.2	<1.0	<1.2	<1.2
Arsenic	ug/L	2.5		<20.0			ND			ND			<20.0			<0.50	
Cadmium	ug/L	0.125		<3.0			ND						<3.0			<0.08	
Chromium	ug/L	25								ND			<10.0			<10.0	
Copper	ug/L	250		<10.0			ND			ND			<10.0			<10.0	
Lead	ug/L	7.5		<10.0			ND			ND			<10.0			<0.10	
Manganese	ug/L	25	**14.2**	**5.9**	**6.4**	**11.9**	**5.9**	**29.7**	**8.8**	**5.9**	**5.3**	**10.6**	**9.5**	**<5.0**	**15.2**	**16**	**17.6**
Mercury	ug/L	0.5		<0.20			ND			ND			<0.20			<0.20	
Boron	ug/L	250	<150.0	<150.0	<150.0	ND	ND	ND	ND	**47.4**	**40.3**	**47**	<150	<150	**55.6**	**63.4**	<150
Barium	ug/L	500		**110**			**120**			**116**			**156**			**236**	
Chloride	mg/L			**3.8**			**7.4**			**5.9**			**11.6**			**21.4**	
Iron	ug/L			**66.8**			**85**			**103**			<50.0			**59.3**	
Nitrate & Nitrite	mg/L			**1.6**			**4.4**			**1.6**			**2.5**			**2.1**	
Fluoride	mg/L			**0.2**			**0.26**										
Solids, Total Dissolved	mg/L		**327**	**280**	**315**	**316**	**311**	**287**	**443**	**317**	**292**	**313**	**445**	**443**	**459**	**622**	**548**
Sulfate	mg/L			**30.8**			**72.3**			**55.6**			**92.9**			**176**	
Depth to Water	ft		28.94	12.79	43.88	43.12	41.08	42.91	39.03	39.58	41.13	41.68	42.92	44.16	44.53	46.02	46.72
Water Table Elevation	MSL		734.56	750.71	719.62	720.38	722.42	720.59	724.47	723.92	722.37	721.82	720.58	719.34	718.97	717.48	716.78

[a]Sample was diluted by a factor of 10 to accommodate the analyte concentration.

[b]The RL was based on a one liter volume of sample being extracted and analyzed. The achieved RL for this sample was higher than the target RL because less than one liter of sample was submitted for analysis.

[c]The matrix spike recoveries for this sample were less than the minimum recovery limits specified by the method. As a result, the value reported for the sample should be considred a minimum value.

ND = None Detected

Green Shading represents reporting limits that are above the permit limit.

Yellow Shading represents sampling events that exceed the permit limit.

2021 ANNUAL REPORT	DC-117		Analytical Result	Analytical Result	Analytical Result	Analytical Result	Analytical Result	Analytical Result	Analytical Result	Analytical Result	Analytical Result	Analytical Result	Analytical Result	Analytical Result	Analytical Result	Analytical Result	Analytical Result
Parameter		**Permit Limit**	5/10/17	8/9/17	11/16/17	5/10/18	7/31/18	11/14/18	5/6/19	7/24/19	11/14/19	5/7/20	8/5/20	10/29/20	5/10/21	7/29/21	11/2/21
1,1,1,2-Tetrachloroethane	ug/L	17.5	<1.0	<1.0	<1.0	ND	ND	ND	ND	ND	ND	<0.40	<0.40	<0.40	<0.50	<0.40	<0.40
1,1,1-Trichloroethane	ug/L	2250	<1.0	<1.0	<1.0	ND	ND	ND	ND	ND	ND	<0.40	<0.40	<0.40	<0.50	<0.40	<0.40
1,1,2,2-Tetrachloroethane	ug/L		<1.0	<1.0	<1.0	ND	ND	ND	ND	ND	ND	<0.40	<0.40	<0.40	<0.50	<0.40	<0.40
1,1,2-Trichloroethane	ug/L	0.75	<1.0	<1.0	<1.0	ND	ND	ND	ND	ND	ND	<0.40	<0.40	<0.40	<0.50	<0.40	<0.40
1,1,2-Trichlorotrifluoroethane	ug/L	5000	<1.0	<1.0	<1.0	ND	ND	ND	ND	ND	ND	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
1,1-Dichloroethane	ug/L	25	3.2	2.2	2.2	1.6	2.1	1.64	2.3	1.4	1.5	1.3	1.2	1.2	0.82	0.64	0.62
1,1-Dichloroethene	ug/L	50	<1.0	<1.0	<1.0	ND	ND	ND	ND	ND	ND	<0.40	<0.40	<0.40	<0.50	<0.40	<0.40
1,1-Dichloropropene	ug/L		<1.0	<1.0	<1.0	ND	ND	ND	ND	ND	ND	<0.40	<0.40	<0.40	<0.50	<0.40	<0.40
1,2,3-Trichlorobenzene	ug/L		<1.0	<1.0	<1.0	ND	ND	ND	ND	ND	ND	<0.40	<0.40	<0.40	<0.50	<0.40	<0.40
1,2,3-Trichloropropane	ug/L	0.00075	<4.0	<4.0	<4.0	ND	ND	ND	ND	ND	ND	<0.010	<0.010	<0.010	<0.10	<0.010	<0.010
1,2,4-Trichlorobenzene	ug/L	1	<1.0	<1.0	<1.0	ND	ND	ND	ND	ND	ND	<0.40	<0.40	<0.40	<0.50	<0.40	<0.40
1,2,4-Trimethylbenzene	ug/L	25	<1.0	<1.0	<1.0	ND	ND	ND	ND	ND	ND	<1.0	<1.0	<1.0	<0.5	<1.0	<1.0
1,2 Dibromo 3 chloropropane (DBCP)	ug/L		<4.0	<4.0	<4.0	ND	ND	ND	ND	ND	ND	<0.12	<0.12	<0.12	<0.050	<0.12	<0.12
1,2-Dibromoethane	ug/L	0.001	<1.0	<1.0	<1.0	ND	ND	ND	ND	ND	ND	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
1,2-Dichlorobenzene	ug/L	150	<1.0	<1.0	<1.0	ND	ND	ND	ND	ND	ND	<0.40	0.49	<0.40	<0.50	<0.40	<0.40
1,2-Dichloroethane	ug/L	25	<1.0	<1.0	<1.0	ND	ND	ND	ND	ND	ND	<0.20	<0.20	<0.20	<0.1	<0.20	<0.20
1,2 Dichloroethylene, cis	ug/L	1.5	4.9	4.1	3.4	3.2	3.6	2.26	4.2	2.5	2.9	2.5	2.3	2.5	1.09	1.2	1.2
1,2 Dichloroethylene, trans	ug/L	10	<1.0	<1.0	<1.0	ND	ND	ND	ND	ND	ND	<0.40	<0.40	<0.40	<0.50	<0.40	<0.40
1,2-Dichloropropane	ug/L	1.25	<4.0	<4.0	<4.0	ND	ND	ND	ND	ND	ND	<0.40	<0.40	<0.40	<0.50	<0.40	<0.40
1,3,5-Trimethylbenzene	ug/L	25	<1.0	<1.0	<1.0	ND	ND	ND	ND	ND	ND	<0.40	<0.40	<0.40	<0.50	<0.40	<0.40
1,3-Dichlorobenzene	ug/L	150	<1.0	<1.0	<1.0	ND	ND	ND	ND	ND	ND	<0.40	<0.40	<0.40	<0.50	<0.40	<0.40
1,3-Dichloropropane	ug/L		<1.0	<1.0	<1.0	ND	ND	ND	ND	ND	ND	<0.40	<0.40	<0.40	<0.50	<0.40	<0.40
1,3-Dichloropropene, cis	ug/L	0.5	<4.0	<4.0	<4.0	ND	ND	ND	ND	ND	ND	<0.40	<0.40	<0.40	<0.50	<0.40	<0.40
1,3-Dichloropropene, trans	ug/L	0.5	<4.0	<4.0	<4.0	ND	ND	ND	ND	ND	ND	<0.40	<0.40	<0.40	<0.50	<0.40	<0.40
1,4-Dichlorobenzene	ug/L		1.8	<4.0	<1.0	1.7	2	1.41	1.9	1.6	1.4	1.2	1.4	1.1	1.06	0.71	<0.40
2,2-Dichloropropane	ug/L		<4.0	<4.0	<4.0	ND	ND	ND	ND	ND	ND	<1.0	<1.0	<1.0	<0.5	<1.0	<1.0
2-Chlorotoluene	ug/L		<1.0	<1.0	<1.0	ND	ND	ND	ND	ND	ND	<0.40	<0.40	<0.40	<0.50	<0.40	<0.40
4-Chlorotoluene	ug/L		<1.0	<1.0	<1.0	ND	ND	ND	ND	ND	ND	<0.40	<0.40	<0.40	<0.50	<0.40	<0.40
Acetone	ug/L	1000	<20.0	<20.0	<20.0	ND	ND	ND	ND	ND	ND	<20.0	<20.0	<20.0	<10.0	<20.0	<20.0
Allyl chloride	ug/L	7.5	<4.0	<4.0	<4.0	ND	ND	ND	ND	ND	ND	<4.0	<4.0	<4.0	<0.5	<4.0	<4.0
Benzene	ug/L	0.5	<1.0	<1.0	<1.0	0.3	0.29	ND	0.29	0.23	0.22	0.2	0.3	<0.20	<0.5	<0.20	<0.20
Bromobenzene	ug/L		<1.0	<1.0	<1.0	ND	ND	ND	ND	ND	ND	<0.40	<0.40	<0.40	<0.50	<0.40	<0.40
Bromochloromethane	ug/L		<1.0	<1.0	<1.0	ND	ND	ND	ND	ND	ND	<1.0	<1.0	<1.0	<0.5	<1.0	<1.0
Bromodichloromethane	ug/L	1.5	<1.0	<1.0	<1.0	ND	ND	ND	ND	ND	ND	<0.40	<0.40	<0.40	<0.50	<0.40	<0.40
Bromoform	ug/L	10	<4.0	<4.0	<4.0	ND	ND	ND	ND	ND	ND	<1.0	<1.0	<1.0	<0.5	<1.0	<1.0
Bromomethane	ug/L	2.5	<4.0	<4.0	<4.0	ND	ND	ND	ND	ND	ND	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Butylbenzene, n	ug/L		<1.0	<1.0	<1.0	ND	ND	ND	ND	ND	ND	<0.40	<0.40	<0.40	<0.50	<0.40	<0.40
Butylbenzene, sec	ug/L		<1.0	<1.0	<1.0	ND	ND	ND	ND	ND	ND	<0.40	<0.40	<0.40	<0.50	<0.40	<0.40
Butylbenzene, tert	ug/L		<1.0	<1.0	<1.0	ND	ND	ND	ND	ND	ND	<0.40	<0.40	<0.40	<0.50	<0.40	<0.40
Carbon tetrachloride	ug/L		<1.0	<1.0	<1.0	ND	ND	ND	ND	ND	ND	<0.050	<0.050	<0.050	<0.2	<0.050	<0.050
Chlorobenzene	ug/L	25	<1.0	<1.0	<1.0	0.52	0.6	ND	0.54	0.51	0.43	0.44	0.51	<0.40	<0.50	<0.40	<0.40
Chlorodibromomethane	ug/L	2.5	<1.0	<1.0	<1.0	ND	ND	ND	ND	ND	ND	<0.40	<0.40	<0.40	<0.50	<0.40	<0.40
Chloroethane	ug/L		<1.0	<1.0	<1.0	ND	ND	ND	ND	ND	ND	<1.0	<1.0	<1.0	<10.0	<1.0	<1.0
Chloroform	ug/L	7.5	<1.0	<1.0	<1.0	ND	ND	ND	ND	ND	ND	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Chloromethane	ug/L		<4.0	<4.0	<4.0	ND	ND	ND	ND	ND	ND	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Dibromomethane	ug/L		<4.0	<4.0	<4.0	ND	ND	ND	ND	ND	ND	<1.0	<1.0	<1.0	<0.5	<1.0	<1.0
Dichlorodifluoromethane	ug/L	175	<1.0	<1.0	<1.0	ND	ND	ND	ND	ND	ND	<1.0	<1.0	<1.0	<0.5	<1.0	<1.0
Dichlorofluoromethane	ug/L		1.6	1.2	<1.0	ND	1.1	0.9	1.3	ND	ND	<1.0	<1.0	<1.0	<0.5	<1.0	<1.0
Ethyl ether	ug/L	50	16.8	13.6	13	9	12.5	10.89	15.9	10.5	10	8.9	10.3	8.6	5.37	4.9	4.7
Ethylbenzene	ug/L	12.5	<1.0	<1.0	<1.0	ND	ND	ND	ND	ND	ND	<0.40	<0.40	<0.40	<0.50	<0.40	<0.40
Hexachlorobutadiene	ug/L	0.25	<1.0	<1.0	<1.0	ND	ND	ND	ND	ND	ND	<0.10	<0.10	<0.10	<0.20	<0.10	<0.10
Isopropylbenzene	ug/L	75	<1.0	<1.0	<1.0	ND	ND	ND	ND	ND	ND	<0.40	<0.40	<0.40	<0.50	<0.40	<0.40
Isopropyltoluene, p	ug/L		<1.0	<1.0	<1.0	ND	ND	ND	ND	ND	ND	<0.40	<0.40	<0.40	<0.50	<0.40	<0.40
Methyl ethyl ketone (MEK)	ug/L	1000		<5.0	<5.0	ND	ND	ND	ND	ND	ND	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Methyl isobutyl ketone (4-Methyl-2-pentanc	ug/L	75	<5.0	<5.0	<5.0	ND	ND	ND	ND	ND	ND	<5.0	<5.0	<5.0	<2.0	<5.0	<5.0
Methyl tertiary butyl ether	ug/L	15	<1.0	<1.0	<1.0	ND	ND	ND	0.46	ND	ND	<0.40	<0.40	<0.40	<0.50	<0.40	<0.40
Methylene chloride	ug/L	1.25	<4.0	<4.0	<4.0	ND	ND	ND	ND	ND	ND	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Naphthalene	ug/L	17.5	<4.0	<4.0	<4.0	ND	ND	ND	ND	ND	ND	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Propylbenzene, n	ug/L		<1.0	<1.0	<1.0	ND	ND	ND	ND	ND	ND	<0.40	<0.40	<0.40	<0.50	<0.40	<0.40
Styrene	ug/L		<1.0	<1.0	<1.0	ND	ND	ND	ND	ND	ND	<0.40	<0.40	<0.40	<0.50	<0.40	<0.40
Tetrachloroethylene	ug/L	1	<1.0	<1.0	<1.0	ND	ND	ND	ND	ND	ND	<0.40	<0.40	<0.40	<0.50	<0.40	<0.40
Tetrahydrofuran	ug/L		22.5	34.5	16.9	13.5	14.4	13.51	16.2	15.5	16.1	14.9	15.2	12.4	9.67	<10.0	<10.0
Toluene	ug/L	50	<1.0	<1.0	<1.0	ND	ND	ND	ND	ND	ND	<0.40	<0.40	<0.40	<0.50	<0.40	<0.40
Trichloroethylene	ug/L	0.1	<0.40	<0.40	<0.40	0.082	0.066	ND	0.068	ND	0.051	0.075	0.052	0.08	0.1	<0.050	<0.050
Trichlorofluoromethane	ug/L	500	<1.0	<1.0	<1.0	ND	ND	ND	ND	ND	ND	<0.40	<0.40	<0.40	<0.5	<0.40	<0.40
Vinyl chloride	ug/L	0.05	0.69	0.63	0.55	0.63	0.54	0.39	0.69	0.51	0.4	0.33	0.43	0.39	0.23	0.17	<0.050
Xylene, m & p	ug/L	2500				ND	ND	ND	ND	ND	ND	<0.80	<0.80	<0.80	<1.0	<0.80	<0.80
Xylene, o	ug/L					ND	ND	ND	ND	ND	ND	<0.40	<0.40	<0.40	<0.50	<0.40	<0.40
Xylene, o, m & p	ug/L		<3.0	<3.0	<3.0	ND	ND	ND	ND	ND	ND	<1.2	<1.2	<1.2	<1.2	<1.2	<1.2
Arsenic	ug/L	2.5		<20.0			ND			1.9			<20.0			1.3	
Cadmium	ug/L	0.125		<3.0			ND						<3.0			<0.08	
Chromium	ug/L	25								ND			<10.0			<10.0	
Copper	ug/L	250		<10.0			ND			ND			<10.0			<10.0	
Lead	ug/L	7.5		<10.0			ND			ND			<10.0			<0.10	
Manganese	ug/L	25	2170	2250	2110	2040	1880	1920	1880	1920	2100	2100	2090	2170	1660	1820	1720
Nickel	ug/L																
Mercury	ug/L	0.5		<0.20			ND			ND			<0.20			<0.20	
Boron	ug/L	250	1980	1990	1820	1800	1760	1760	1950	1890	2020	1620	1840	1800	1320	1110	1300
Barium	ug/L	500		151			140			172			174			209	
Chloride	mg/L			185			163			184			132			143	
Iron	ug/L			2150			2200			2250			1980			1190	
Nitrate & Nitrite	mg/L			0.047			ND			ND			<0.20			<0.20	
Fluoride	mg/L			<0.10			0.14										
Soilds, Total Dissolved	mg/L		1080	1140	1130	900	925	980	1130	1220	1060	1010	1000	1040	905	1160	894
Sulfate	mg/L			148			121			168			103			79.6	
Depth to Water	ft		115.58	115.35	114.9	114.51	113.38	113.65	111.82	111.71	111.72	112.84	113.18	113.88	115.1	116.09	116.55
Water Table Elevation	MSL		722.25	722.48	722.93	723.32	724.45	724.18	726.01	726.12	726.11	724.99	724.65	723.95	722.73	721.74	721.28

*Analytical resutls in the column dated 5/24/16 are from DC-119 data collected on 5/24/16. Upon review of the data it was determined that it was most likely the results were mislabeled for DC-117 and DC-119 and were reported under the wrong well.

Green Shading represents reporting limits that are above the permit limit.

Yellow Shading represents sampling events that exceed the permit limit.

2021 Annual Report	DC-119		Analytical Result	Analytical Result	Analytical Result	Analytical Result	Analytical Result	Analytical Result	Analytical Result	Analytical Result	Analytical Result	Analytical Result	Analytical Result	Analytical Result	Analytical Result	Analytical Result	Analytical Result
		Permit Limit	5/10/17	8/9/17	11/16/17	5/10/18	7/31/18	11/14/18	5/6/19	7/24/19	11/14/19	5/7/20	8/5/20	10/29/20	5/10/21	7/29/21	11/2/21
1,1,1,2-Tetrachloroethane	ug/L	17.5	<1.0	<1.0	<1.0	ND	ND	ND	ND	ND	ND	<0.40	<0.40	<0.40	<0.50	<0.40	<0.40
1,1,1-Trichloroethane	ug/L	2250	<1.0	<1.0	<1.0	ND	ND	ND	ND	ND	ND	<0.40	<0.40	<0.40	<0.50	<0.40	<0.40
1,1,2,2-Tetrachloroethane	ug/L		<1.0	<1.0	<1.0	ND	ND	ND	ND	ND	ND	<0.40	<0.40	<0.40	<0.50	<0.40	<0.40
1,1,2-Trichloroethane	ug/L	0.75	<1.0	<1.0	<1.0	ND	ND	ND	ND	ND	ND	<0.40	<0.40	<0.40	<0.50	<0.40	<0.40
1,1,2-Trichlorotrifluoroethane	ug/L	5000	<1.0	<1.0	<1.0	ND	ND	ND	ND	ND	ND	<1.0	<1.0	<1.0	<0.5	<1.0	<1.0
1,1-Dichloroethane	ug/L	25	<1.0	<1.0	<1.0	ND	ND	ND	ND	ND	ND	<0.40	<0.40	<0.40	<0.50	<0.40	<0.40
1,1-Dichloroethene	ug/l	50	<1.0	<1.0	<1.0	ND	ND	ND	ND	ND	ND	<0.40	<0.40	<0.40	<0.50	<0.40	<0.40
1,1-Dichloropropene	ug/L		<1.0	<1.0	<1.0	ND	ND	ND	ND	ND	ND	<0.40	<0.40	<0.40	<0.50	<0.40	<0.40
1,2,3-Trichlorobenzene	ug/L		<1.0	<1.0	<1.0	ND	ND	ND	ND	ND	ND	<0.40	<0.40	<0.40	<0.50	<0.40	<0.40
1,2,3-Trichloropropane	ug/L	0.00075	<4.0	<4.0	<4.0	ND	ND	ND	ND	ND	ND	<0.010	<0.010	<0.010	<0.10	<0.010	<0.010
1,2,4-Trichlorobenzene	ug/L	1	<1.0	<1.0	<1.0	ND	ND	ND	ND	ND	ND	<0.40	<0.40	<0.40	<0.50	<0.40	<0.40
1,2,4-Trimethylbenzene	ug/L	25	<1.0	<1.0	<1.0	ND	ND	ND	ND	ND	ND	<1.0	<1.0	<1.0	<0.5	<1.0	<1.0
1,2 Dibromo 3 chloropropane (DBCP)	ug/L		<4.0	<4.0	<4.0	ND	ND	ND	ND	ND	ND	<0.12	<0.12	<0.12	<0.05	<0.12	<0.12
1,2-Dibromoethane	ug/L	0.001	<1.0	<1.0	<1.0	ND	ND	ND	ND	ND	ND	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
1,2-Dichlorobenzene	ug/L	150	<1.0	<1.0	<1.0	ND	ND	ND	ND	ND	ND	<0.40	<0.40	<0.40	<0.50	<0.40	<0.40
1,2-Dichloroethane	ug/L	25	<1.0	<1.0	<1.0	ND	ND	ND	ND	ND	ND	<0.20	<0.20	<0.20	<0.10	<0.20	<0.20
1,2 Dichloroethylene, cis	ug/L	1.5	<1.0	<1.0	<1.0	ND	ND	ND	ND	ND	ND	<0.40	<0.40	<0.40	<0.50	<0.40	<0.40
1,2 Dichloroethylene, trans	ug/L	10	<1.0	<1.0	<1.0	ND	ND	ND	ND	ND	ND	<0.40	<0.40	<0.40	<0.50	<0.40	<0.40
1,2-Dichloropropane	ug/L	1.25	<4.0	<4.0	<4.0	ND	ND	ND	ND	ND	ND	<0.40	<0.40	<0.40	<0.50	<0.40	<0.40
1,3,5-Trimethylbenzene	ug/L	25.00	<1.0	<1.0	<1.0	ND	ND	ND	ND	ND	ND	<0.40	<0.40	<0.40	<0.50	<0.40	<0.40
1,3-Dichlorobenzene	ug/L	150	<1.0	<1.0	<1.0	ND	ND	ND	ND	ND	ND	<0.40	<0.40	<0.40	<0.50	<0.40	<0.40
1,3-Dichloropropane	ug/L		<1.0	<1.0	<1.0	ND	ND	ND	ND	ND	ND	<0.40	<0.40	<0.40	<0.50	<0.40	<0.40
1,3-Dichloropropene, cis	ug/L	0.5	<4.0	<4.0	<4.0	ND	ND	ND	ND	ND	ND	<0.40	<0.40	<0.40	<0.50	<0.40	<0.40
1,3-Dichloropropene, trans	ug/L	0.5	<4.0	<4.0	<4.0	ND	ND	ND	ND	ND	ND	<0.40	<0.40	<0.40	<0.50	<0.40	<0.40
1,4-Dichlorobenzene	ug/L		<1.0	<1.0	<1.0	ND	ND	ND	ND	ND	ND	<0.40	<0.40	<0.40	<0.50	<0.40	<0.40
2,2-Dichloropropane	ug/L		<4.0	<4.0	<4.0	ND	ND	ND	ND	ND	ND	<1.0	<1.0	<1.0	<0.5	<1.0	<1.0
2-Chlorotoluene	ug/L		<1.0	<1.0	<1.0	ND	ND	ND	ND	ND	ND	<0.40	<0.40	<0.40	<0.50	<0.40	<0.40
4-Chlorotoluene	ug/L		<1.0	<1.0	<1.0	ND	ND	ND	ND	ND	ND	<0.40	<0.40	<0.40	<0.50	<0.40	<0.40
Acetone	ug/L	1000	<20.0	<20.0	<20.0	ND	ND	ND	ND	ND	ND	<20.0	<20.0	<20.0	<10.0	<20.0	<20.0
Allyl chloride	ug/L	7.5	<4.0	<4.0	<4.0	ND	ND	ND	ND	ND	ND	<4.0	<4.0	<4.0	<0.5	<4.0	<4.0
Benzene	ug/L	0.5	<1.0	<1.0	<1.0	ND	ND	ND	ND	ND	ND	<0.20	<0.20	<0.20	<0.5	<0.20	<0.20
Bromobenzene	ug/L		<1.0	<1.0	<1.0	ND	ND	ND	ND	ND	ND	<0.40	<0.40	<0.40	<0.5	<0.40	<0.40
Bromochloromethane	ug/L	1.5	<1.0	<1.0	<1.0	ND	ND	ND	ND	ND	ND	<1.0	<1.0	<1.0	<0.5	<1.0	<1.0
Bromodichloromethane	ug/L	10	<1.0	<1.0	<1.0	ND	ND	ND	ND	ND	ND	<0.40	<0.40	<0.40	<0.50	<0.40	<0.40
Bromoform	ug/L	2.5	<4.0	<4.0	<4.0	ND	ND	ND	ND	ND	ND	<1.0	<1.0	<1.0	<0.5	<1.0	<1.0
Bromomethane	ug/L		<4.0	<4.0	<4.0	ND	ND	ND	ND	ND	ND	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Butylbenzene, n	ug/L		<5.0	<5.0	<5.0	ND	ND	ND	ND	ND	ND	<0.40	<0.40	<0.40	<0.5	<0.40	<0.40
Butylbenzene, sec	ug/L		<1.0	<1.0	<1.0	ND	ND	ND	ND	ND	ND	<0.40	<0.40	<0.40	<0.50	<0.40	<0.40
Butylbenzene, tert	ug/L		<1.0	<1.0	<1.0	ND	ND	ND	ND	ND	ND	<0.40	<0.40	<0.40	<0.50	<0.40	<0.40
Carbon tetrachloride	ug/L		<1.0	<1.0	<1.0	ND	ND	ND	ND	ND	ND	<0.050	<0.050	<0.050	<0.20	<0.050	<0.050
Chlorobenzene	ug/L	25	<1.0	<1.0	<1.0	ND	ND	ND	ND	ND	ND	<0.40	<0.40	<0.40	<0.50	<0.40	<0.40
Chlorodibromomethane	ug/L	2.5	<1.0	<1.0	<1.0	ND	ND	ND	ND	ND	ND	<0.40	<0.40	<0.40	<0.50	<0.40	<0.40
Chloroethane	ug/L		<1.0	<1.0	<1.0	ND	ND	ND	ND	ND	ND	<1.0	<1.0	<1.0	<0.5	<1.0	<1.0
Chloroform	ug/L	7.5	<1.0	<1.0	<1.0	ND	ND	ND	ND	ND	ND	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Chloromethane	ug/L		<4.0	<4.0	<4.0	ND	ND	ND	ND	ND	ND	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Dibromomethane	ug/L		<4.0	<4.0	<4.0	ND	ND	ND	ND	ND	ND	<1.0	<1.0	<1.0	<0.5	<1.0	<1.0
Dichlorodifluoromethane	ug/L	175	<1.0	<1.0	<1.0	ND	ND	ND	ND	ND	ND	<1.0	<1.0	<1.0	<0.5	<1.0	<1.0
Dichlorofluoromethane	ug/L		**3.7**	**3.6**	**2.2**	**5.2**	**4.9**	**3.07**	**2.5**	**2.4**	**1.5**	**5.9**	**1.2**	<1.0	**0.69**	**1.7**	**1.9**
Ethyl ether	ug/L	50	<1.0	<1.0	<1.0	ND	ND	ND	ND	ND	ND	<4.0	<4.0	<4.0	<0.5	<4.0	<4.0
Ethylbenzene	ug/L	12.5	<1.0	<1.0	<1.0	ND	ND	ND	ND	ND	ND	<0.40	<0.40	<0.40	<0.50	<0.40	<0.40
Hexachlorobutadiene	ug/L	0.25	<1.0	<1.0	<1.0	ND	ND	ND	ND	ND	ND	<0.10	<0.10	<0.10	<0.20	<0.10	<0.10
Isopropylbenzene	ug/L	75	<1.0	<1.0	<1.0	ND	ND	ND	ND	ND	ND	<0.40	<0.40	<0.40	<0.50	<0.40	<0.40
Isopropyltoluene, p	ug/L		<1.0	<1.0	<1.0	ND	ND	ND	ND	ND	ND	<0.40	<0.40	<0.40	<0.50	<0.40	<0.40
Methyl ethyl ketone (MEK)	ug/L	1000	<5.0	<5.0	<5.0	ND	ND	ND	ND	ND	ND	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Methyl isobutyl ketone (4-Methyl-2-pen	ug/L	75	<5.0	<5.0	<5.0	ND	ND	ND	ND	ND	ND	<5.0	<5.0	<5.0	<2.0	<5.0	<5.0
Methyl tertiary butyl ether	ug/L	15	<1.0	<1.0	<1.0	ND	ND	ND	ND	ND	ND	<0.40	<0.40	<0.40	<0.50	<0.40	<0.40
Methylene chloride	ug/L	1.25	<4.0	<4.0	<4.0	ND	ND	ND	ND	ND	ND	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Naphthalene	ug/L	17.5	<4.0	<4.0	<4.0	ND	ND	ND	ND	ND	ND	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Propylbenzene, n	ug/L		<1.0	<1.0	<1.0	ND	ND	ND	ND	ND	ND	<0.40	<0.40	<0.40	<0.50	<0.40	<0.40
Styrene	ug/L		<1.0	<1.0	<1.0	ND	ND	ND	ND	ND	ND	<0.40	<0.40	<0.40	<0.50	<0.40	<0.40
Tetrachloroethylene	ug/L	1	<1.0	<1.0	<1.0	ND	ND	ND	ND	ND	ND	<0.40	<0.40	<0.40	<0.50	<0.40	<0.40
Tetrahydrofuran	ug/L		<10.0	<10.0	<10.0	ND	ND	ND	ND	ND	ND	<10.0	<10.0	<10.0	<5.0	<10.0	<10.0
Toluene	ug/L	50	<1.0	<1.0	<1.0	ND	ND	ND	ND	ND	ND	<0.40	<0.40	<0.40	<0.50	<0.40	<0.40
Trichloroethylene	ug/L	0.1	<0.40	<0.40	<0.40	ND	ND	ND	ND	ND	ND	<0.050	<0.050	<0.050	<0.10	<0.050	<0.050
Trichlorofluoromethane	ug/L	500	<1.0	<1.0	<1.0	**0.48**	**0.43**	ND	ND	ND	ND	<0.40	<0.40	<0.40	<0.50	<0.40	<0.40
Vinyl chloride	ug/L	0.05	<4.0	<4.0	<4.0	ND	ND	ND	ND	ND	ND	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Xylene, m & p	ug/L	2500				ND	ND	ND	ND	ND	ND	<0.80	<0.80	<0.80	<1.0	<0.80	<0.80
Xylene, o	ug/L					ND	ND	ND	ND	ND	ND	<0.40	<0.40	<0.40	<0.50	<0.40	<0.40
Xylene, o, m & p	ug/L		<3.0	<3.0	<3.0	ND	ND	ND	ND	ND	ND	<1.2	<1.2	<1.2	<1.2	<1.2	<1.2
Arsenic	ug/L	2.5		<20.0			ND			ND			<20.0			<0.50	
Cadmium	ug/L	0.125		<3.0			ND						<3.0			<0.08	
Chromium	ug/L	25								ND			<10.0			<10.0	
Copper	ug/L	250		<10.0			ND			ND			<10.0			<10.0	
Lead	ug/L	7.5		<10.0			ND			ND			<10.0			<0.10	
Manganese	ug/L	25	<5.0	<5.0	<5.0	ND	**6.3**	ND		ND		**7.5**	**5.9**	**6.6**	<5.0	<5.0	**5.8**
Mercury	ug/L	0.5		<0.20			ND			ND			<0.20			<0.20	
Boron	ug/L	250	**163**	**177**	**207**	**306**	**283**	**203**	**263**	**248**	**238**	**311**	**453**	**568**	**249**	**292**	**449**
Barium	ug/L	500		**88.5**			**94.6**			**95.6**			**95.2**			**101**	
Chloride	mg/L			**112**			**127**			**151**			**112**			**227**	
Iron	ug/L			**53.8**			**234**			ND			**59.4**			**61.8**	
Nitrate& Nitrite	mg/L			**5.3**			**7.4**			**4.8**			**4**			**1.2**	
Fluoride	mg/L						**0.11**										
Soilds, Total Dissolved	mg/L		**577**	**636**	**633**	**648**	**588**	**557**	**706**	**700**	**677**	**742**	**758**	**655**	**815**	**920**	**806**
Sulfate	mg/L			**43.9**			**48.7**			**46.1**			**41.3**			**46.2**	
Depth to Water	ft		120.70	120.39	119.85	119.67	118.39	118.67	117.08	116.77	116.69	117.77	118.04	118.82	120.22	121.23	121.86
Water Table Elevation	MSL		718.37	718.68	719.22	719.4	720.68	720.4	721.99	722.3	722.38	721.3	721.03	720.25	718.85	717.84	717.21

*Analytical resutls in the column dated 5/24/16 are from DC-117 data collected on 5/24/16. Upon review of the data it was determined that it was most likely the results were mislabeled for DC-117 and DC-119 and were reported under the wrong well.

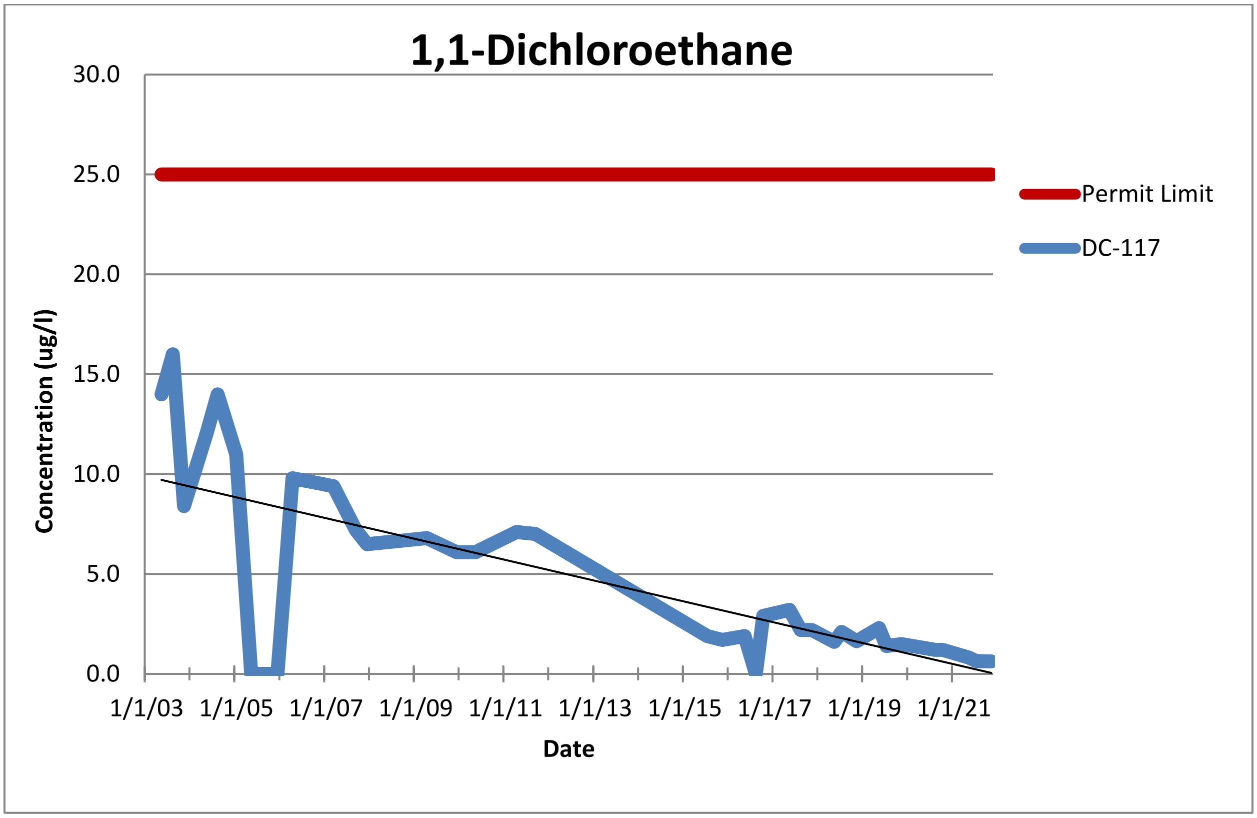
Green Shading represents reporting limits that are above the permit limit.

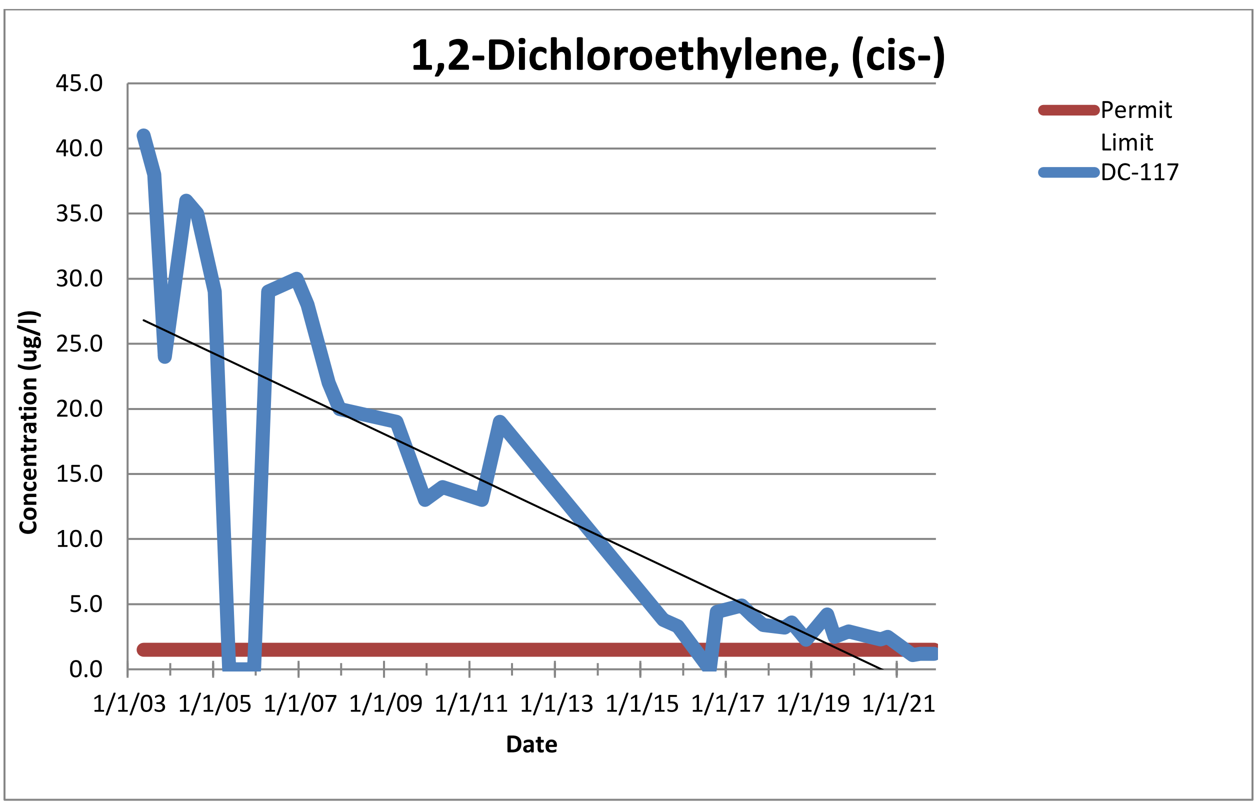
Yellow Shading represents sampling events that exceed the permit limit.

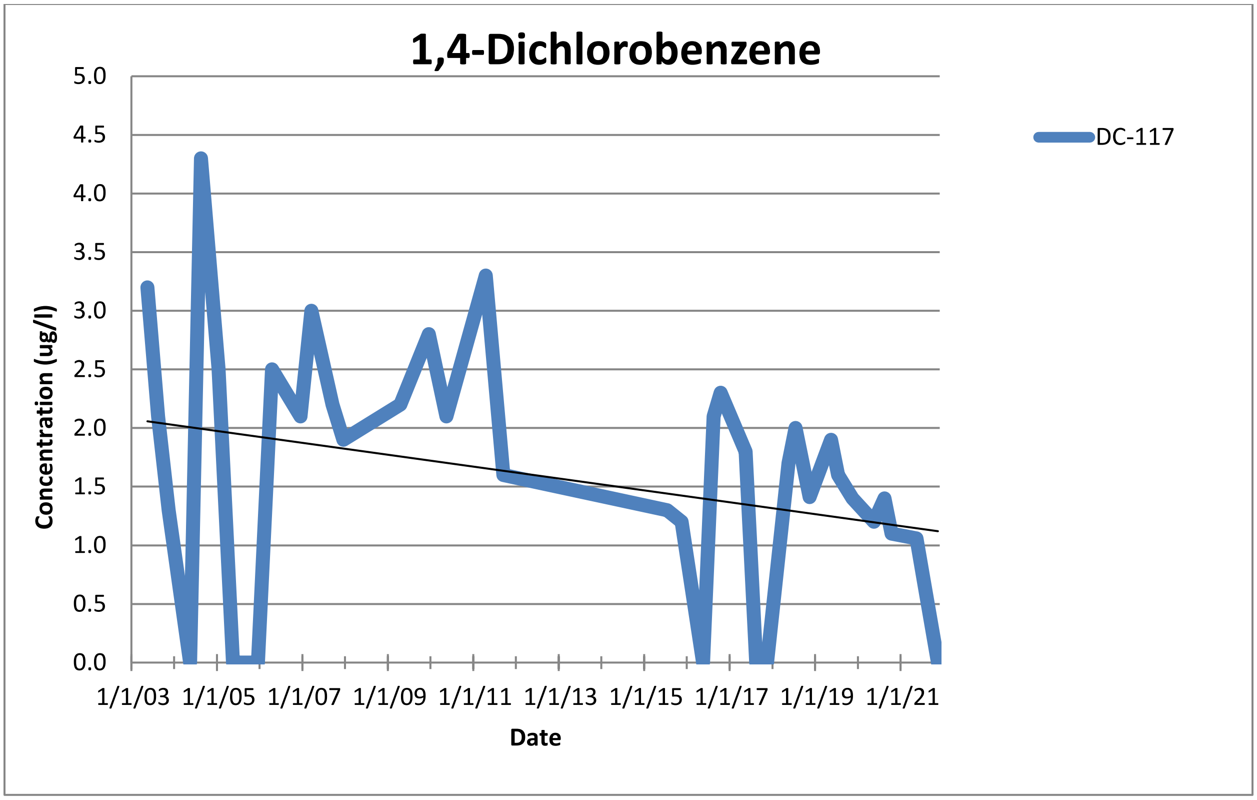
2021 ANNUAL REPORT	DC-118		Analytical Result	Analytical Result	Analytical Result	Analytical Result	Analytical Result	Analytical Result	Analytical Result	Analytical Result	Analytical Result	Analytical Result	Analytical Result	Analytical Result	Analytical Result	Analytical Result	Analytical Result
		Permit Limit	5/10/17	8/9/17	11/16/17	5/10/18	7/31/18	11/14/18	5/6/19	7/24/19	11/14/19	5/7/20	10/22/20	10/29/20	5/10/21	7/29/21	11/2/21
1,1,1,2-Tetrachloroethane	ug/L	17.5	<1.0	<1.0	<1.0	ND	ND	ND	ND	ND	ND	<0.40	<0.40	<0.40	<0.50	<0.40	<0.40
1,1,1-Trichloroethane	ug/L	2250	<1.0	<1.0	<1.0	ND	ND	ND	ND	ND	ND	<0.40	<0.40	<0.40	<0.50	<0.40	<0.40
1,1,2,2-Tetrachloroethane	ug/L		<1.0	<1.0	<1.0	ND	ND	ND	ND	ND	ND	<0.40	<0.40	<0.40	<0.50	<0.40	<0.40
1,1,2-Trichloroethane	ug/L	0.75	<1.0	<1.0	<1.0	ND	ND	ND	ND	ND	ND	<0.40	<0.40	<0.40	<0.50	<0.40	<0.40
1,1,2-Trichlorotrifluoroethane	ug/L	5000	<1.0	<1.0	<1.0	ND	ND	ND	ND	ND	ND	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
1,1-Dichloroethane	ug/L	25	<1.0	<1.0	<1.0	ND	ND	ND	ND	ND	ND	<0.40	<0.40	<0.40	<0.50	<0.40	<0.40
1,1-Dichloroethene	ug/l	50	<1.0	<1.0	<1.0	ND	ND	ND	ND	ND	ND	<0.40	<0.40	<0.40	<0.50	<0.40	<0.40
1,1-Dichloropropene	ug/L		<1.0	<1.0	<1.0	ND	ND	ND	ND	ND	ND	<0.40	<0.40	<0.40	<0.50	<0.40	<0.40
1,2,3-Trichlorobenzene	ug/L		<1.0	<1.0	<1.0	ND	ND	ND	ND	ND	ND	<0.40	<0.40	<0.40	<0.50	<0.40	<0.40
1,2,3-Trichloropropane	ug/L	0.00075	<4.0	<4.0	<4.0	ND	ND	ND	ND	ND	ND	<0.010	<0.010	<0.010	<0.1	<0.010	<0.010
1,2,4-Trichlorobenzene	ug/L	1	<1.0	<1.0	<1.0	ND	ND	ND	ND	ND	ND	<0.40	<0.40	<0.40	<0.50	<0.40	<0.40
1,2,4-Trimethylbenzene	ug/L	25	<1.0	<1.0	<1.0	ND	ND	ND	ND	ND	ND	<1.0	<1.0	<1.0	<0.5	<1.0	<1.0
1,2 Dibromo 3 chloropropane (DBCP)	ug/L		<4.0	<4.0	<4.0	ND	ND	ND	ND	ND	ND	<0.12	<0.12	<0.12	<0.05	<0.12	<0.12
1,2-Dibromoethane	ug/L	0.001	<1.0	<1.0	<1.0	ND	ND	ND	ND	ND	ND	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
1,2-Dichlorobenzene	ug/L	150	<1.0	<1.0	<1.0	ND	ND	ND	ND	ND	ND	<0.40	<0.40	<0.40	<0.50	<0.40	<0.40
1,2-Dichloroethane	ug/L	25	<1.0	<1.0	<1.0	ND	ND	ND	ND	ND	ND	<0.20	<0.20	<0.20	<0.10	<0.20	<0.20
1,2 Dichloroethylene, cis	ug/L	1.5	<1.0	<1.0	<1.0	ND	ND	ND	ND	ND	ND	<0.40	<0.40	<0.40	<0.50	<0.40	<0.40
1,2 Dichloroethylene, trans	ug/L	10	<1.0	<1.0	<1.0	ND	ND	ND	ND	ND	ND	<0.40	<0.40	<0.40	<0.50	<0.40	<0.40
1,2-Dichloropropane	ug/L	1.25	<4.0	<4.0	<4.0	ND	ND	ND	ND	ND	ND	<0.40	<0.40	<0.40	<0.50	<0.40	<0.40
1,3,5-Trimethylbenzene	ug/L	25	<1.0	<1.0	<1.0	ND	ND	ND	ND	ND	ND	<0.40	<0.40	<0.40	<0.50	<0.40	<0.40
1,3-Dichlorobenzene	ug/L	150	<1.0	<1.0	<1.0	ND	ND	ND	ND	ND	ND	<0.40	<0.40	<0.40	<0.50	<0.40	<0.40
1,3-Dichloropropane	ug/L		<1.0	<1.0	<1.0	ND	ND	ND	ND	ND	ND	<0.40	<0.40	<0.40	<0.50	<0.40	<0.40
1,3-Dichloropropene, cis	ug/L	0.5	<4.0	<4.0	<4.0	ND	ND	ND	ND	ND	ND	<0.40	<0.40	<0.40	<0.50	<0.40	<0.40
1,3-Dichloropropene, trans	ug/L	0.5	<4.0	<4.0	<4.0	ND	ND	ND	ND	ND	ND	<0.40	<0.40	<0.40	<0.50	<0.40	<0.40
1,4-Dichlorobenzene	ug/L		<1.0	<1.0	<1.0	ND	ND	ND	ND	ND	ND	<0.40	<0.40	<0.40	<0.50	<0.40	<0.40
2,2-Dichloropropane	ug/L		<4.0	<4.0	<4.0	ND	ND	ND	ND	ND	ND	<1.0	<1.0	<1.0	<0.5	<1.0	<1.0
2-Chlorotoluene	ug/L		<1.0	<1.0	<1.0	ND	ND	ND	ND	ND	ND	<0.40	<0.40	<0.40	<0.50	<0.40	<0.40
4-Chlorotoluene	ug/L		<1.0	<1.0	<1.0	ND	ND	ND	ND	ND	ND	<0.40	<0.40	<0.40	<0.50	<0.40	<0.40
Acetone	ug/L	1000	<20.0	<20.0	<20.0	ND	ND	ND	ND	ND	ND	<20.0	<20.0	<20.0	<10.0	<20.0	<20.0
Allyl chloride	ug/L	7.5	<4.0	<4.0	<4.0	ND	ND	ND	ND	ND	ND	<4.0	<4.0	<4.0	<0.5	<4.0	<4.0
Benzene	ug/L	0.5	<1.0	<1.0	<1.0	ND	ND	ND	ND	ND	ND	<0.20	<0.20	<0.20	<0.5	<0.20	<0.20
Bromobenzene	ug/L		<1.0	<1.0	<1.0	ND	ND	ND	ND	ND	ND	<0.40	<0.40	<0.40	<0.5	<0.40	<0.40
Bromochloromethane	ug/L		<1.0	<1.0	<1.0	ND	ND	ND	ND	ND	ND	<1.0	<1.0	<1.0	<0.5	<1.0	<1.0
Bromodichloromethane	ug/L		<1.0	<1.0	<1.0	ND	ND	ND	ND	ND	ND	<0.40	<0.40	<0.40	<0.50	<0.40	<0.40
Bromoform	ug/L		<4.0	<4.0	<4.0	ND	ND	ND	ND	ND	ND	<1.0	<1.0	<1.0	<0.5	<1.0	<1.0
Bromomethane	ug/L		<4.0	<4.0	<4.0	ND	ND	ND	ND	ND	ND	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Butylbenzene, n	ug/L		<5.0	<5.0	<5.0	ND	ND	ND	ND	ND	ND	<0.40	<0.40	<0.40	<0.50	<0.40	<0.40
Butylbenzene, sec	ug/L		<1.0	<1.0	<1.0	ND	ND	ND	ND	ND	ND	<0.40	<0.40	<0.40	<0.50	<0.40	<0.40
Butylbenzene, tert	ug/L		<1.0	<1.0	<1.0	ND	ND	ND	ND	ND	ND	<0.40	<0.40	<0.40	<0.50	<0.40	<0.40
Carbon tetrachloride	ug/L		<1.0	<1.0	<1.0	ND	ND	ND	ND	ND	ND	<0.050	<0.050	<0.050	<0.20	<0.050	<0.050
Chlorobenzene	ug/L	25	<1.0	<1.0	<1.0	ND	ND	ND	ND	ND	ND	<0.40	<0.40	<0.40	<0.50	<0.40	<0.40
Chlorodibromomethane	ug/L	2.5	<1.0	<1.0	<1.0	ND	ND	ND	ND	ND	ND	<0.40	<0.40	<0.40	<0.50	<0.40	<0.40
Chloroethane	ug/L		<1.0	<1.0	<1.0	ND	ND	ND	ND	ND	ND	<1.0	<1.0	<1.0	<0.5	<1.0	<1.0
Chloroform	ug/L	7.5	<1.0	<1.0	<1.0	ND	ND	ND	ND	ND	ND	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Chloromethane	ug/L		<4.0	<4.0	<4.0	ND	ND	ND	ND	ND	ND	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Dibromomethane	ug/L		<4.0	<4.0	<4.0	ND	ND	ND	ND	ND	ND	<1.0	<1.0	<1.0	<0.5	<1.0	<1.0
Dichlorodifluoromethane	ug/L	175	<1.0	<1.0	<1.0	ND	ND	ND	ND	ND	ND	<1.0	<1.0	<1.0	<0.5	<1.0	<1.0
Dichlorofluoromethane	ug/L		<1.0	<1.0	<1.0	ND	ND	ND	ND	ND	ND	<1.0	<1.0	<1.0	<0.5	<1.0	<1.0
Ethyl ether	ug/L	50	<1.0	<1.0	<1.0	ND	ND	ND	ND	ND	ND	<4.0	<4.0	<4.0	<0.5	<4.0	<4.0
Ethylbenzene	ug/L	12.5	<1.0	<1.0	<1.0	ND	ND	ND	ND	ND	ND	<0.40	<0.40	<0.40	<0.50	<0.40	<0.40
Hexachlorobutadiene	ug/L	0.25	<1.0	<1.0	<1.0	ND	ND	ND	ND	ND	ND	<0.10	<0.10	<0.10	<0.20	<0.10	<0.10
Isopropylbenzene	ug/L	75	<1.0	<1.0	<1.0	ND	ND	ND	ND	ND	ND	<0.40	<0.40	<0.40	<0.50	<0.40	<0.40
Isopropyltoluene, p	ug/L		<1.0	<1.0	<1.0	ND	ND	ND	ND	ND	ND	<0.40	<0.40	<0.40	<0.50	<0.40	<0.40
Methyl ethyl ketone (MEK)	ug/L	1000	<5.0	<5.0	<5.0	ND	ND	ND	ND	ND	ND	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Methyl isobutyl ketone (4-Methyl-2-pentan	ug/L	75	<5.0	<5.0	<5.0	ND	ND	ND	ND	ND	ND	<5.0	<5.0	<5.0	<2.0	<5.0	<5.0
Methyl tertiary butyl ether	ug/L	15	<1.0	<1.0	<1.0	ND	ND	ND	ND	ND	ND	<0.40	<0.40	<0.40	<0.50	<0.40	<0.40
Methylene chloride	ug/L	1.25	<4.0	<4.0	<4.0	ND	ND	ND	ND	ND	ND	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Naphthalene	ug/L	17.5	<4.0	<4.0	<4.0	ND	ND	ND	ND	ND	ND	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Propylbenzene, n	ug/L		<1.0	<1.0	<1.0	ND	ND	ND	ND	ND	ND	<0.40	<0.40	<0.40	<0.50	<0.40	<0.40
Styrene	ug/L		<1.0	<1.0	<1.0	ND	ND	ND	ND	ND	ND	<0.40	<0.40	<0.40	<0.50	<0.40	<0.40
Tetrachloroethylene	ug/L	1	<1.0	<1.0	<1.0	ND	ND	ND	ND	ND	ND	<0.40	<0.40	<0.40	<0.50	<0.40	<0.40
Tetrahydrofuran	ug/L		<10.0	<10.0	<10.0	ND	ND	ND	ND	ND	ND	<10.0	<10.0	<10.0	<5.0	<10.0	<10.0
Toluene	ug/L	50	<1.0	<1.0	<1.0	ND	ND	ND	ND	ND	ND	<0.40	<0.40	<0.40	<0.50	<0.40	<0.40
Trichloroethylene	ug/L	0.1	<0.40	<0.40	<0.40	ND	ND	ND	ND	ND	ND	<0.050	<0.050	<0.050	<0.1	<0.050	<0.050
Trichlorofluoromethane	ug/L	500	<1.0	<1.0	<1.0	ND	ND	ND	ND	ND	ND	<0.40	<0.40	<0.40	<0.50	<0.40	<0.40
Vinyl chloride	ug/L	0.05	<0.2	<0.2	<0.5	ND	ND	ND	ND	ND	ND	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Xylene, m & p	ug/L	2500				ND	ND	ND	ND	ND	ND	<0.80	<0.80	<0.80	<1.0	<0.08	<0.08
Xylene, o	ug/L					ND	ND	ND	ND	ND	ND	<0.40	<0.40	<0.40	<0.50	<0.40	<0.40
Xylene, o, m & p	ug/L		<3.0	<3.0	<3.0	ND	ND	ND	ND	ND	ND	<1.2	<1.2	<1.2	<1.2	<1.2	<1.2
Arsenic	ug/L	2.5		<20.0			ND			ND			<20.0			<0.50	
Cadmium	ug/L	0.125		<3.0			ND						<3.0			<0.08	
Chromium	ug/L	25								ND			<10.0			<10.0	
Copper	ug/L	250		<10.0			ND			ND			<10.0			<10.0	
Lead	ug/L	7.5		<10.0			ND			ND			<0.10			0.1	
Manganese	ug/L	25	49.3	65.9	91	38.3	58	28.6	55.2	62.2	38.5	27.7	21.7	23.1	19.6	22.2	48
Mercury	ug/L	0.5					ND			ND			<0.20			<0.20	
Boron	ug/L	250	302	333	359	256	380	245	374	345	230	252	197	168	119	154	370
Barium	ug/L	500		59.1			63.9			58.8			71			59.2	
Chloride	mg/L			32.2			32.8			36.3			53.1			60.8	
Iron	ug/L			140			251			236			65			117	
Nitrate & Nitrite	mg/L			2.7			4.7			2.6			4.1			1.5	
Fluoride	mg/L			0.12			0.11										
Soilds, Total Dissolved	mg/L		539	596	560	470	483	477	563	562	520	578	558	558	528	531	563
Sulfate	mg/L			74.7			75.1			73			57.5			47.1	
Depth to Water	ft		118.14	117.85	117.37	117.02	115.92	116.18	114.46	114.28	114.27	115.3	116.24	116.31	117.61	118.6	119.14
Water Table Elevation	MSL		720.66	720.95	721.43	721.78	722.88	722.62	724.34	724.52	724.53	723.5	723.16	722.49	721.19	720.2	719.66
ND = None Detected																	
Green Shading represents reporting limits that are above the permit limit.																	
Yellow Shading represents sampling events that exceed the permit limit.																	

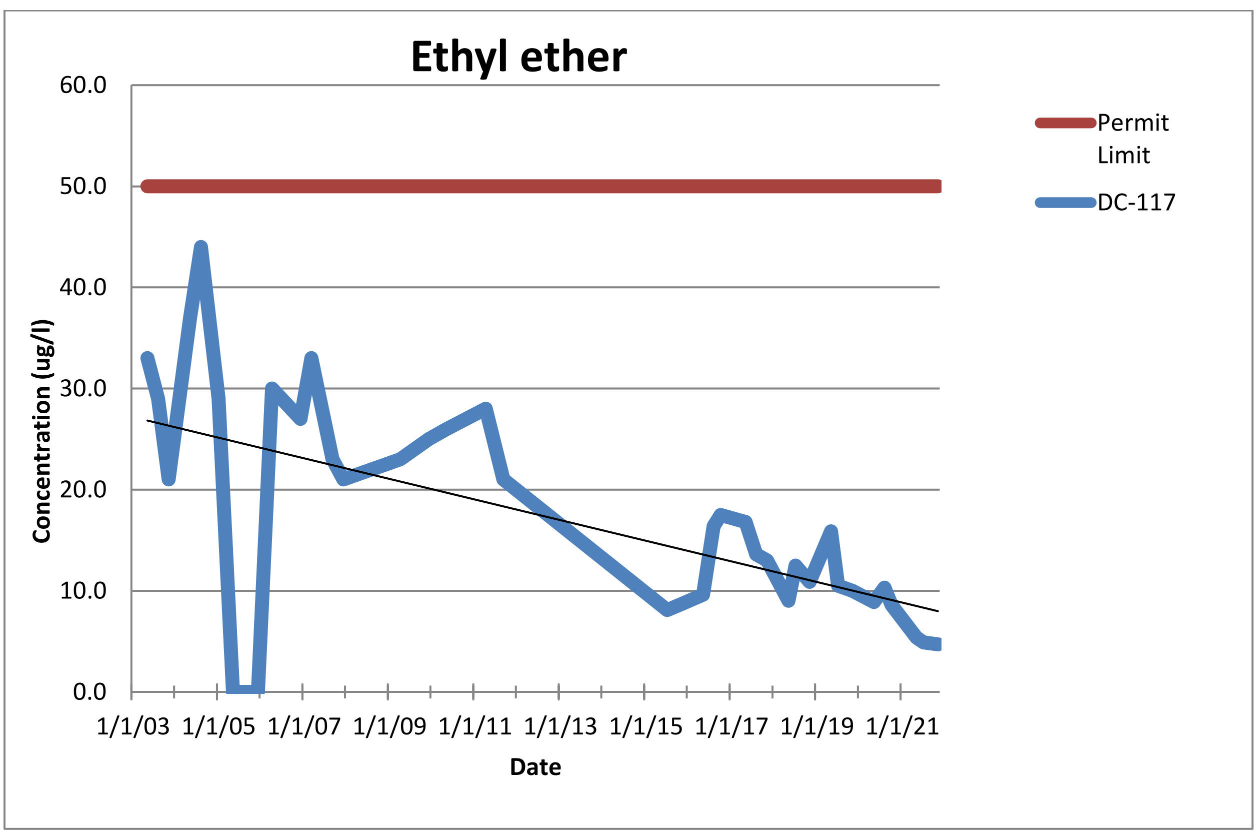
Appendix 2 – Graphs and Trendlines Selected Parameters

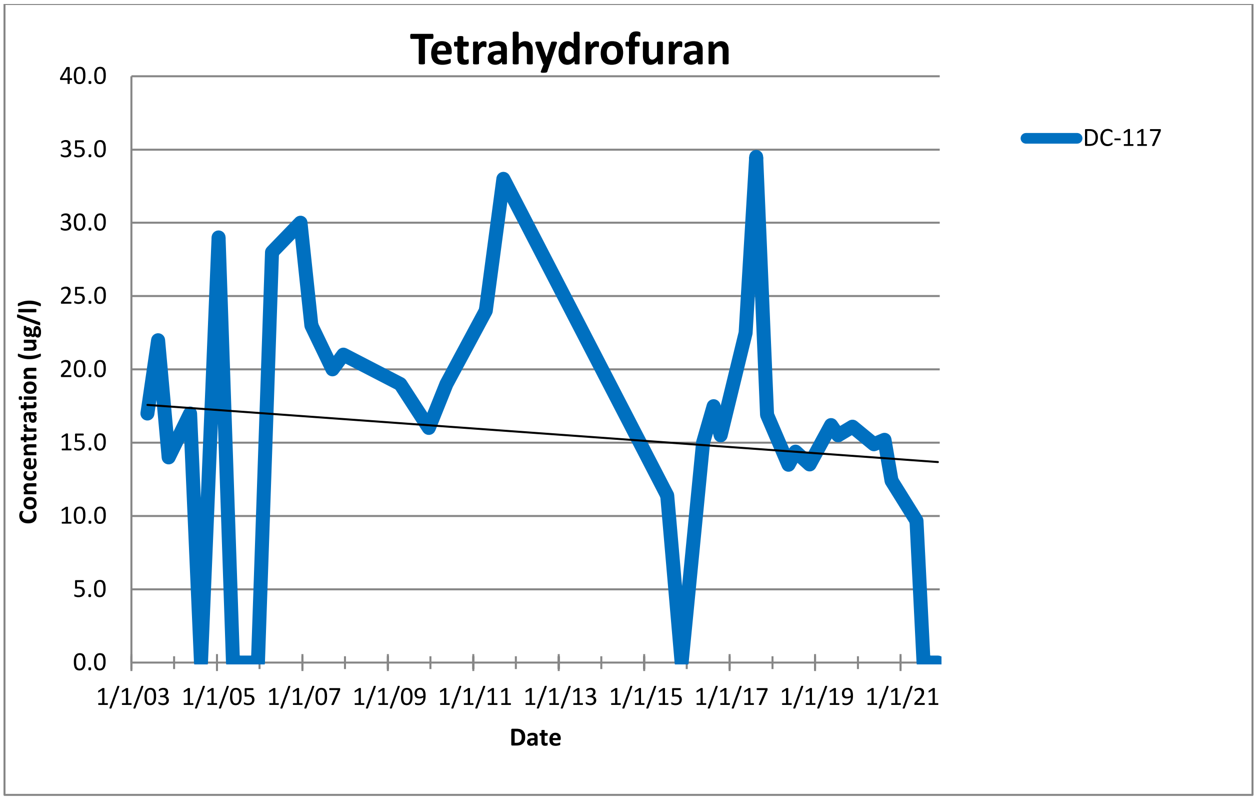
VOC Graphs

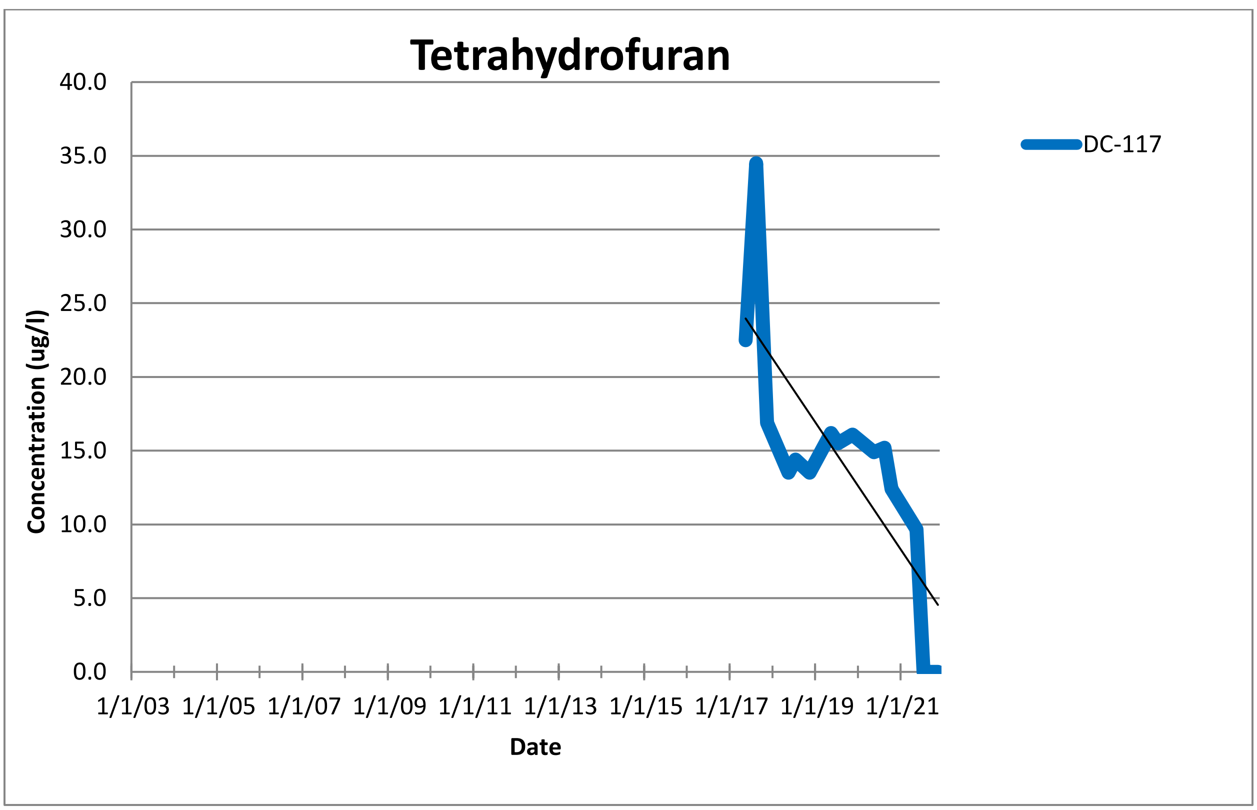

1,1-Dichloroethane
30.0
25.0
20.0
15.0
10.0
5.0
0.0
Concentration (ug/l)
1/1/03 1/1/05 1/1/07 1/1/09 1/1/11 1/1/13 1/1/15 1/1/17 1/1/19 1/1/21
Date
Permit Limit
DC-117

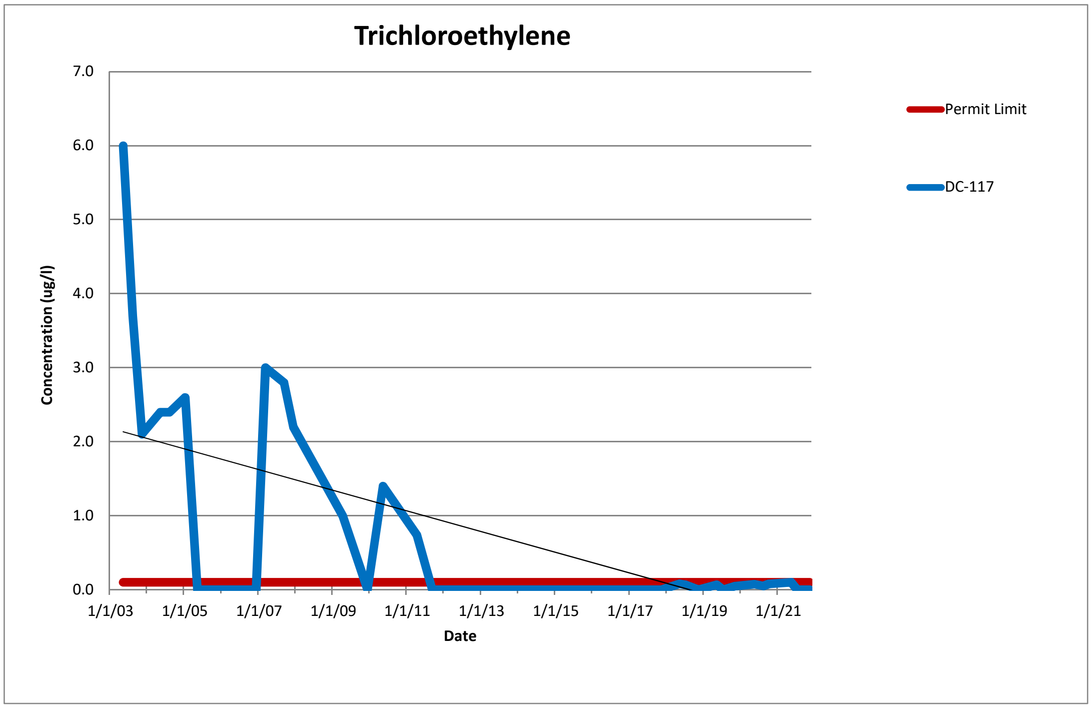

1,2-Dichloroethylene, (cis-)
45.0
40.0
35.0
30.0
25.0
20.0
15.0
10.0
5.0
0.0
Concentration (ug/l)
1/1/03 1/1/05 1/1/07 1/1/09 1/1/11 1/1/13 1/1/15 1/1/17 1/1/19 1/1/21
Date
Permit Limit
DC-117

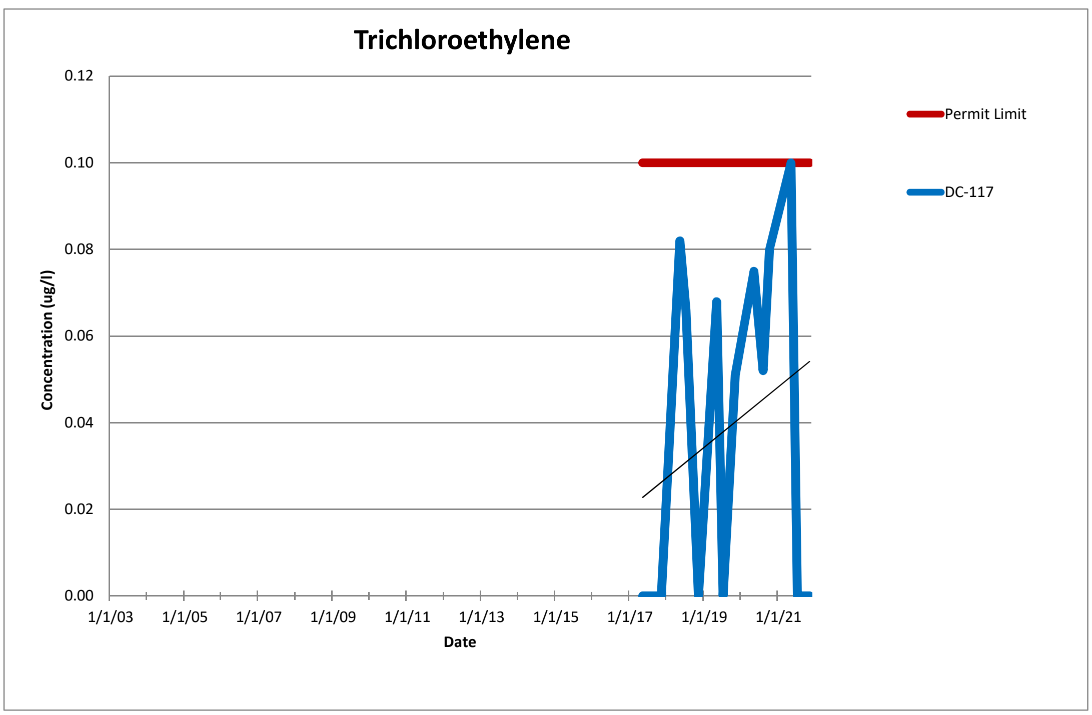

1,4-Dichlorobenzene
DC-117
Concentration (ug/l)
5.0
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
1/1/03
1/1/05
1/1/07
1/1/09
1/1/11
1/1/13
1/1/15
1/1/17
1/1/19
1/1/21
Date

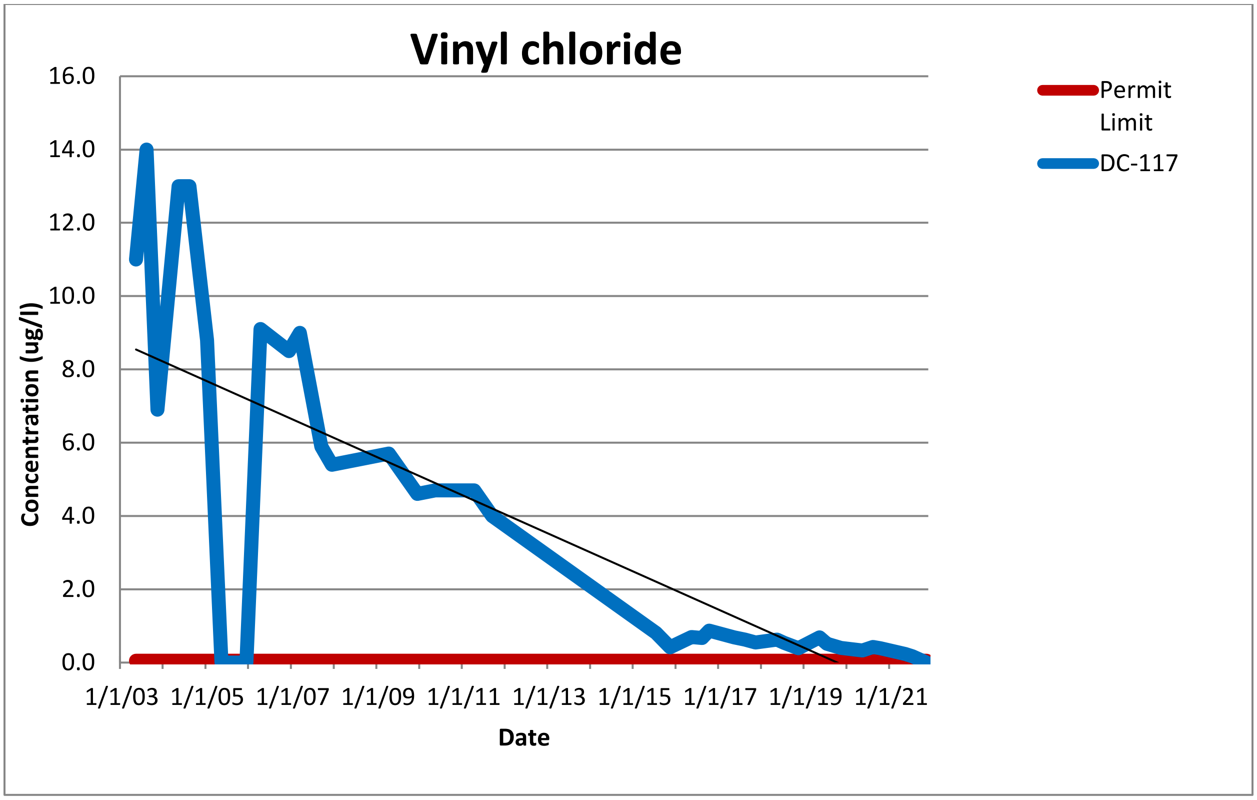

Ethyl ether
Permit Limit
DC-117
Concentration (ug/l)
60.0
50.0
40.0
30.0
20.0
10.0
0.0
1/1/03
1/1/05
1/1/07
1/1/09
1/1/11
1/1/13
1/1/15
1/1/17
1/1/19
1/1/21
Date

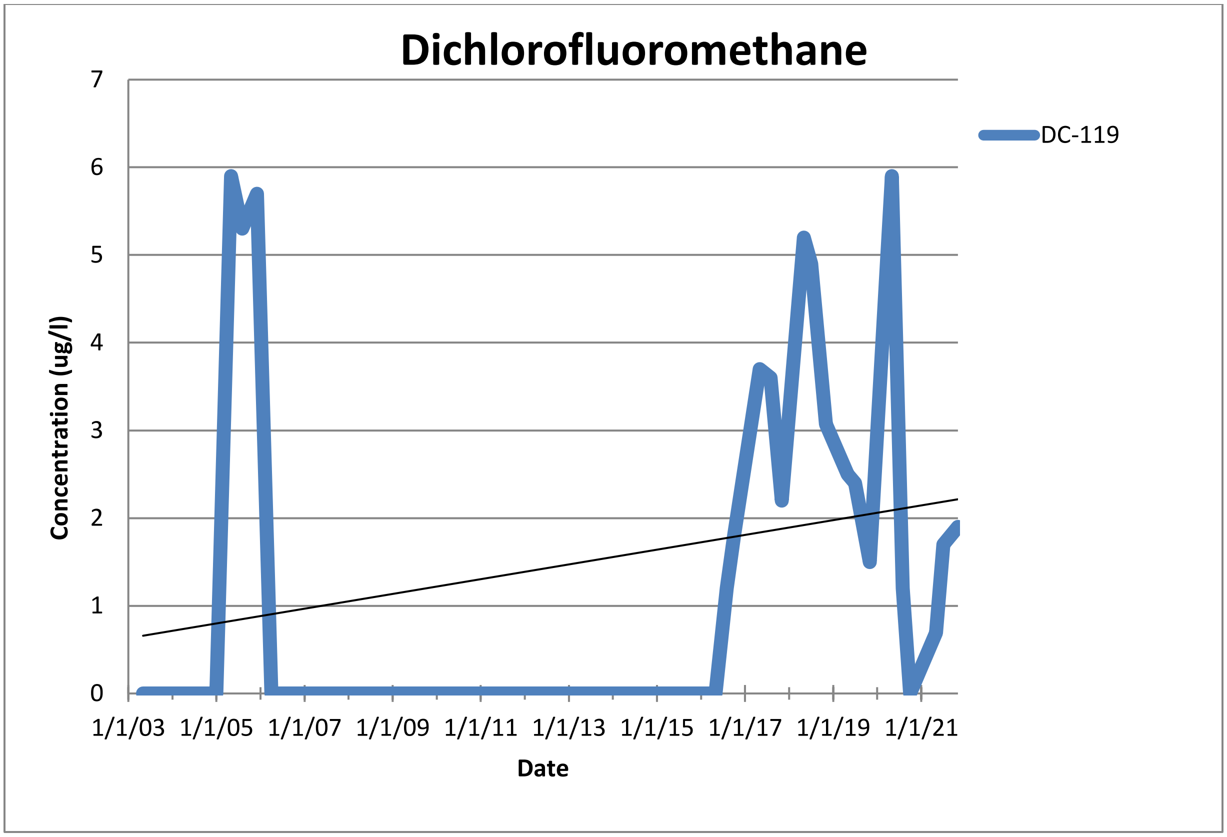

Tetrahydrofuran
40.0
35.0
30.0
25.0
20.0
15.0
10.0
5.0
0.0
Concentration (ug/l)
1/1/03 1/1/05 1/1/07 1/1/09 1/1/11 1/1/13 1/1/15 1/1/17 1/1/19 1/1/21
Date
DC-117

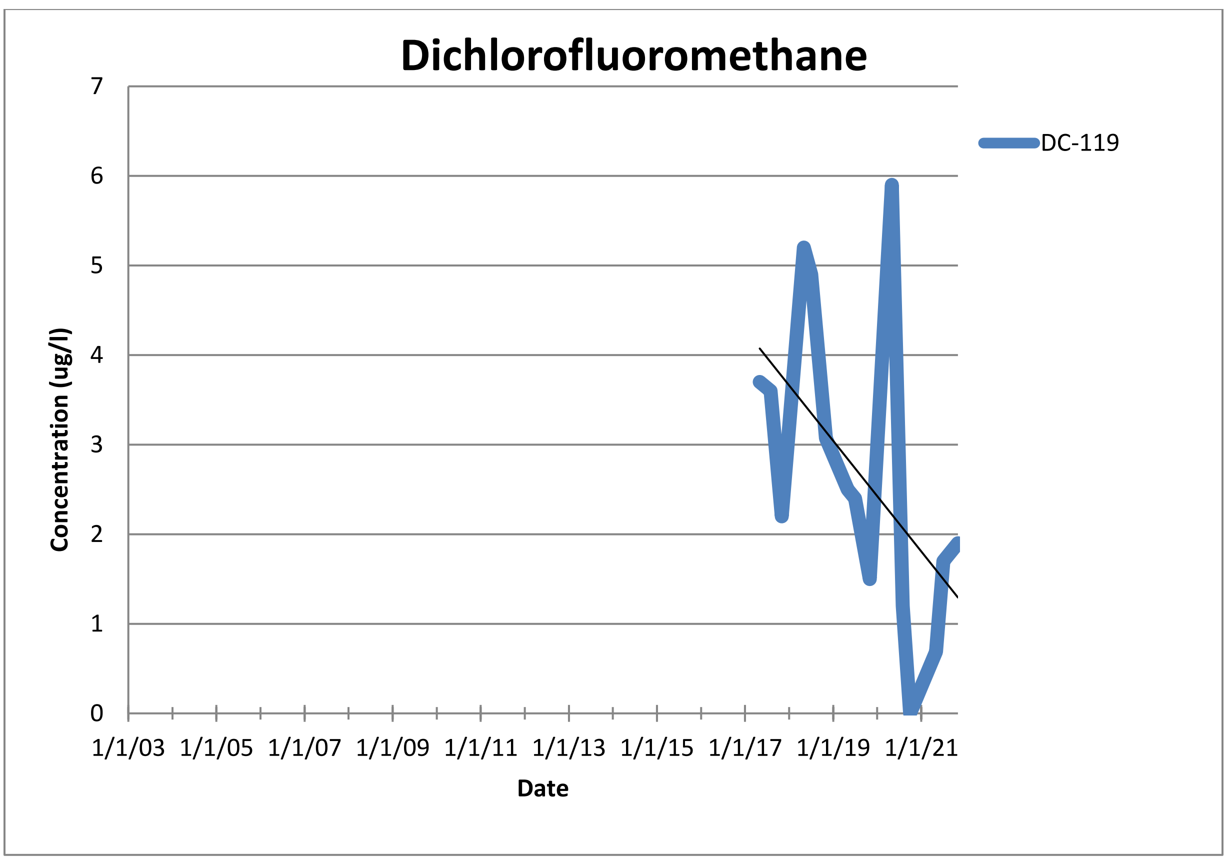

Tetrahydrofuran
40.0
35.0
30.0
25.0
20.0
15.0
10.0
5.0
0.0
Concentration (ug/l)
1/1/03 1/1/05 1/1/07 1/1/09 1/1/11 1/1/13 1/1/15 1/1/17 1/1/19 1/1/21
Date
DC-117


Trichloroethylene
Concentration (ug/l)
7.0
6.0
5.0
4.0
3.0
2.0
1.0
0.0
1/1/03
1/1/05
1/1/07
1/1/09
1/1/11
1/1/13
1/1/15
1/1/17
1/1/19
1/1/21
Date
Permit Limit
DC-117

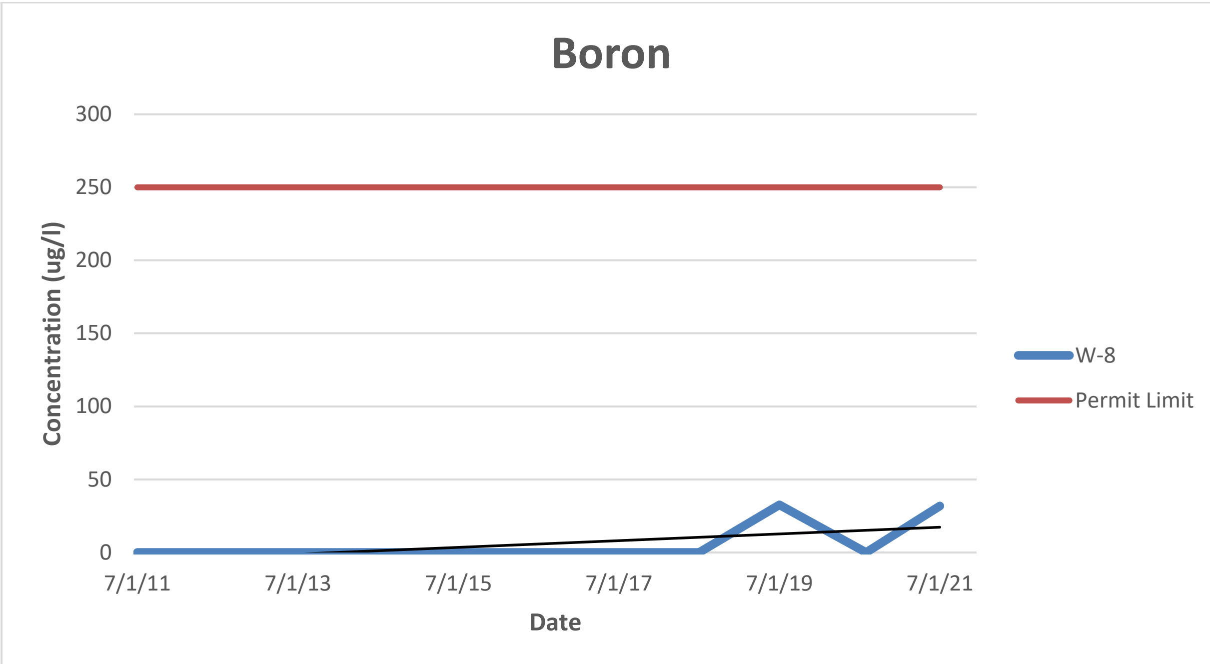

Trichloroethylene
Concentration (ug/l)
0.12
0.10
0.08
0.06
0.04
0.02
0.00
1/1/03
1/1/05
1/1/07
1/1/09
1/1/11
1/1/13
1/1/15
1/1/17
1/1/19
1/1/21
Date
Permit Limit
DC-117

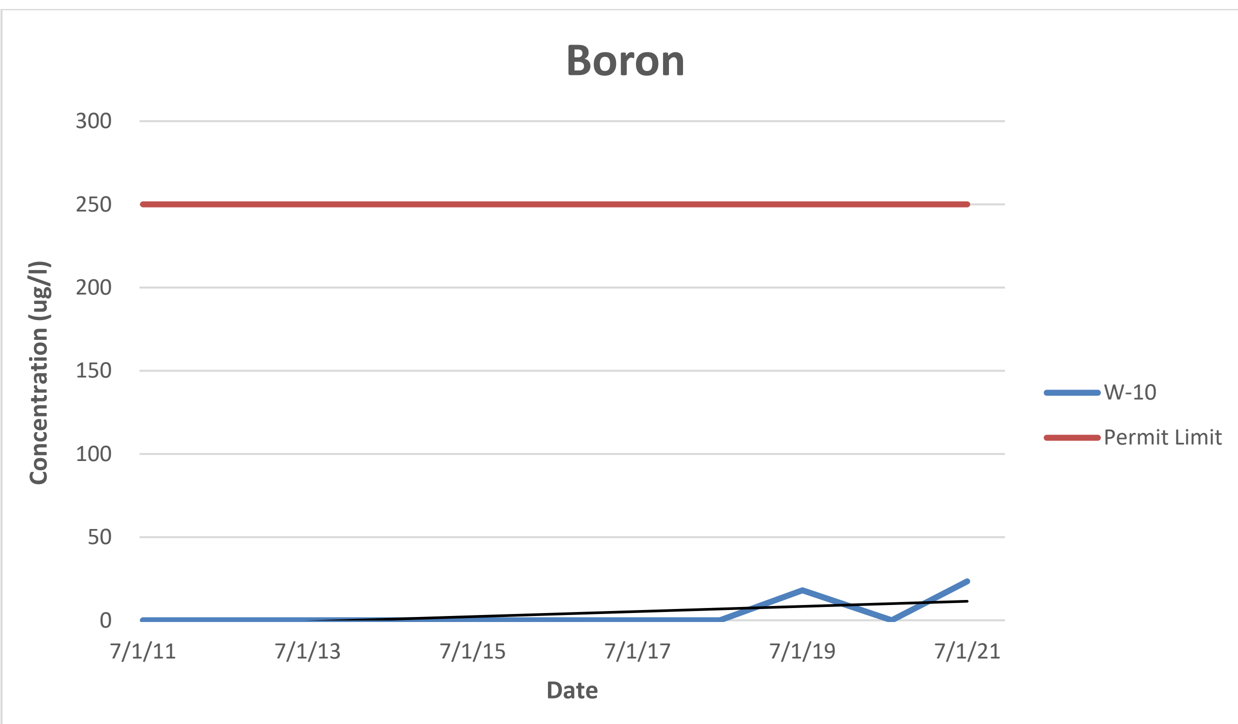

Vinyl chloride
16.0
14.0
12.0
10.0
8.0
6.0
4.0
2.0
0.0
Concentration (ug/l)
1/1/03
1/1/05
1/1/07
1/1/09
1/1/11
1/1/13
1/1/15
1/1/17
1/1/19
1/1/21
Date
Permit Limit
DC-117

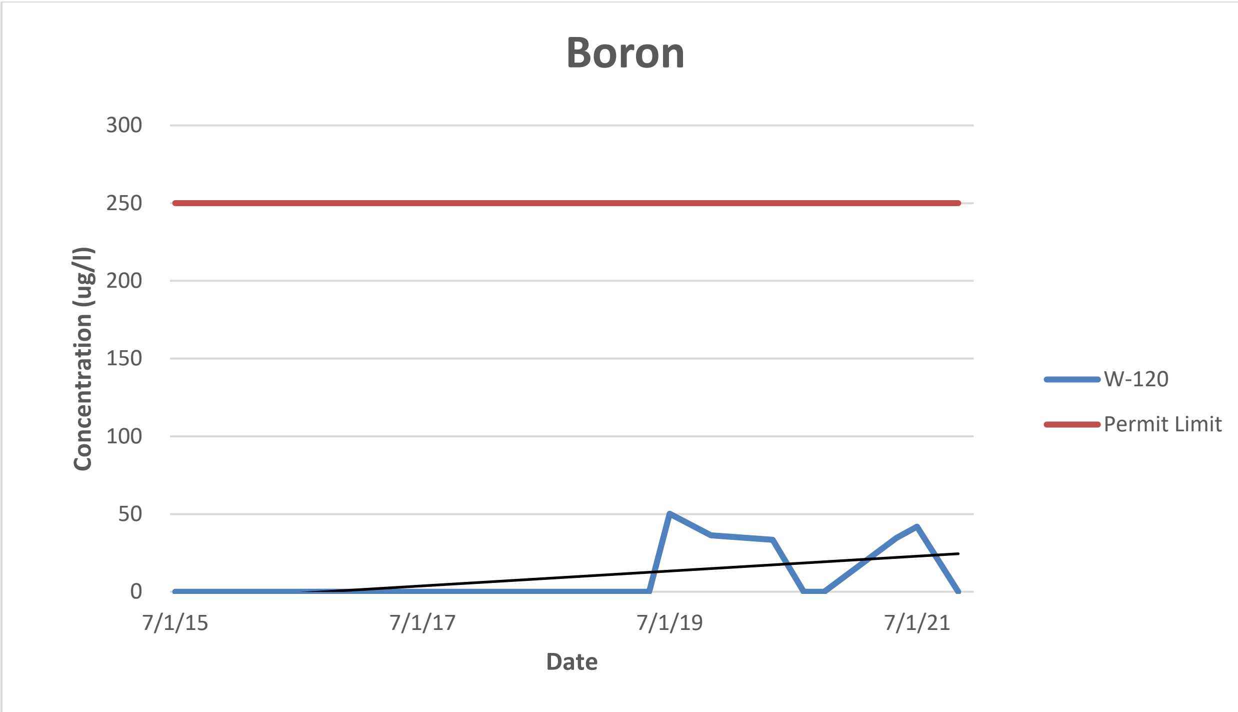

Dichlorofluoromethane
DC-119
Concentration (ug/l)
0
1
2
3
4
5
6
7
1/1/03
1/1/05
1/1/07
1/1/09
1/1/11
1/1/13
1/1/15
1/1/17
1/1/19
1/1/21
Date


Dichlorofluoromethane
DC-119
Concentration (ug/l)
0
1
2
3
4
5
6
7
1/1/03
1/1/05
1/1/07
1/1/09
1/1/11
1/1/13
1/1/15
1/1/17
1/1/19
1/1/21
Date

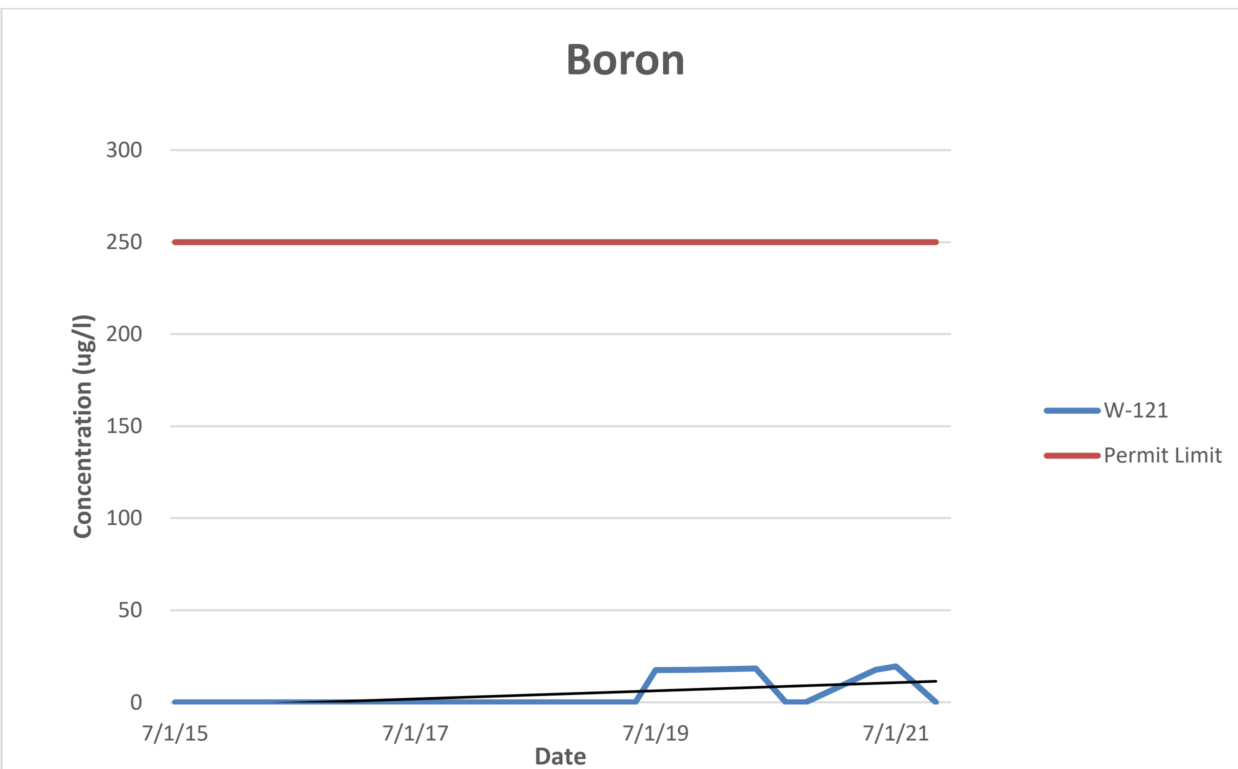
Boron Graphs



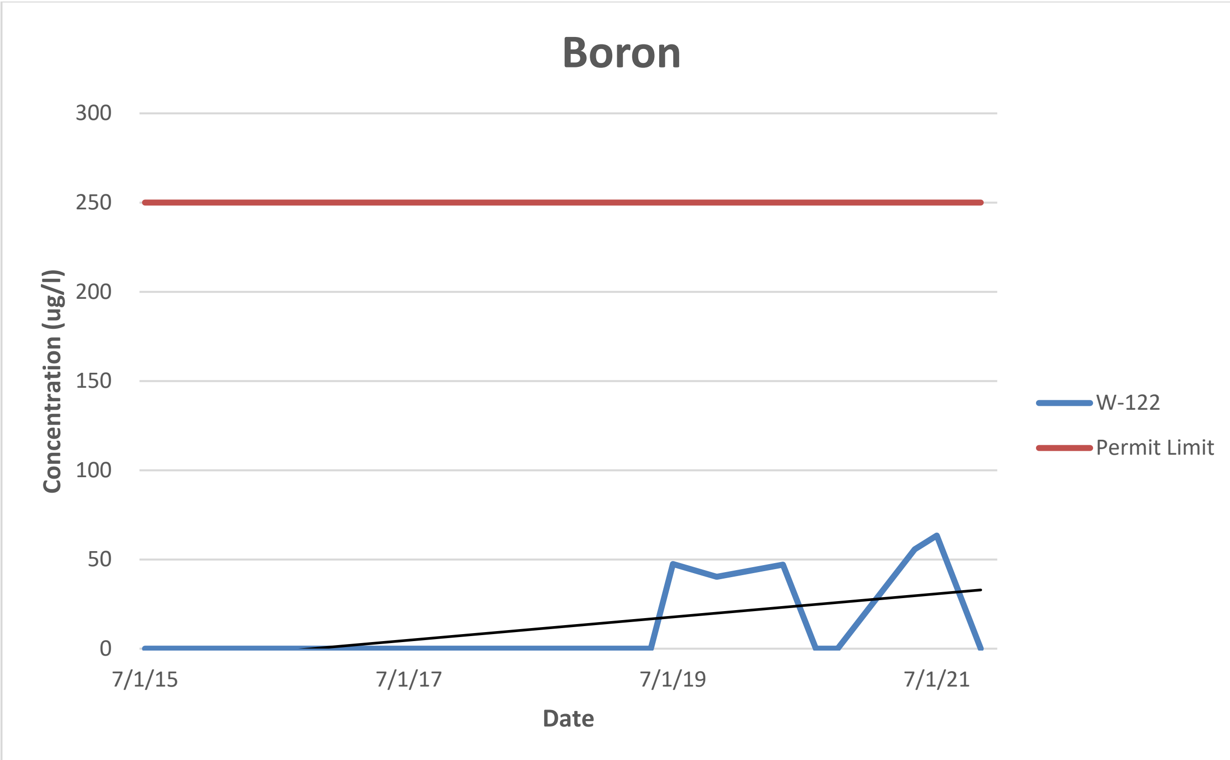




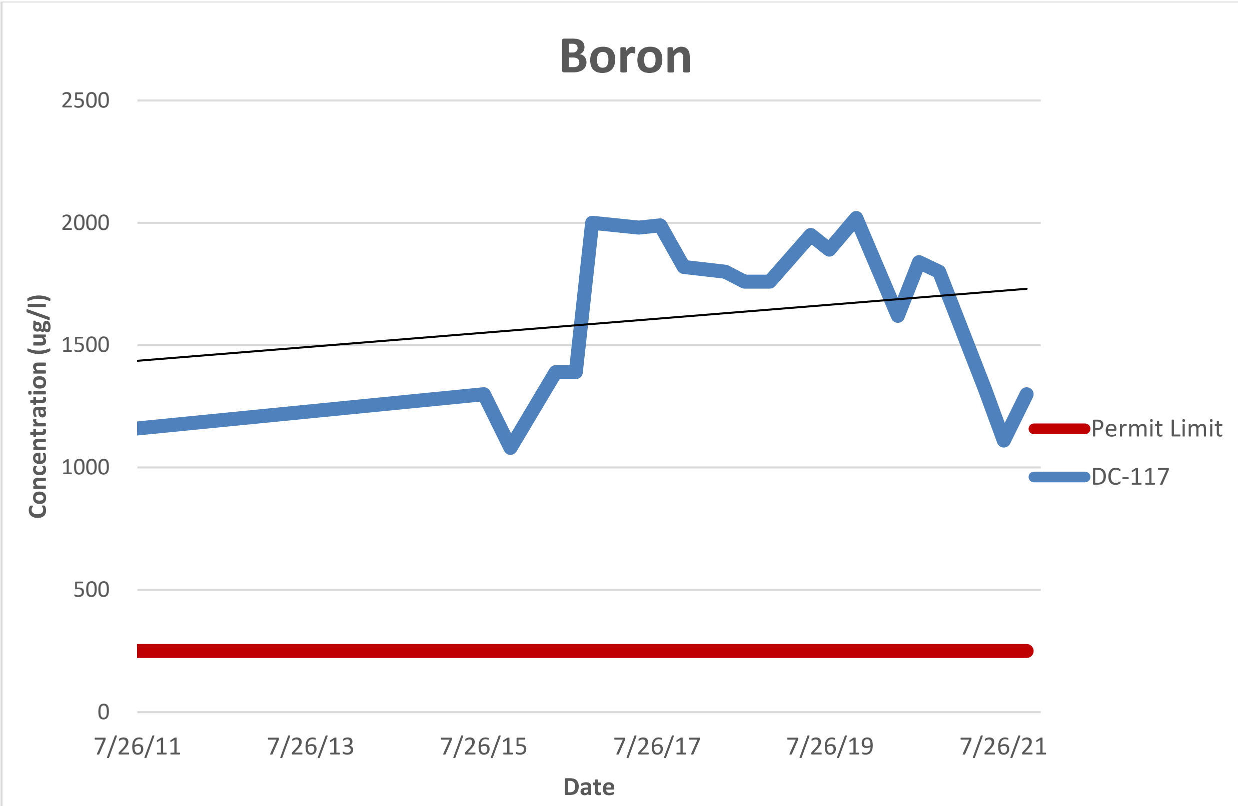
Boron
300
250
200
150
100
50
0
Concentration (ug/l)
7/1/15
7/1/17
7/1/19
7/1/21
Date
W-120
Permit Limit



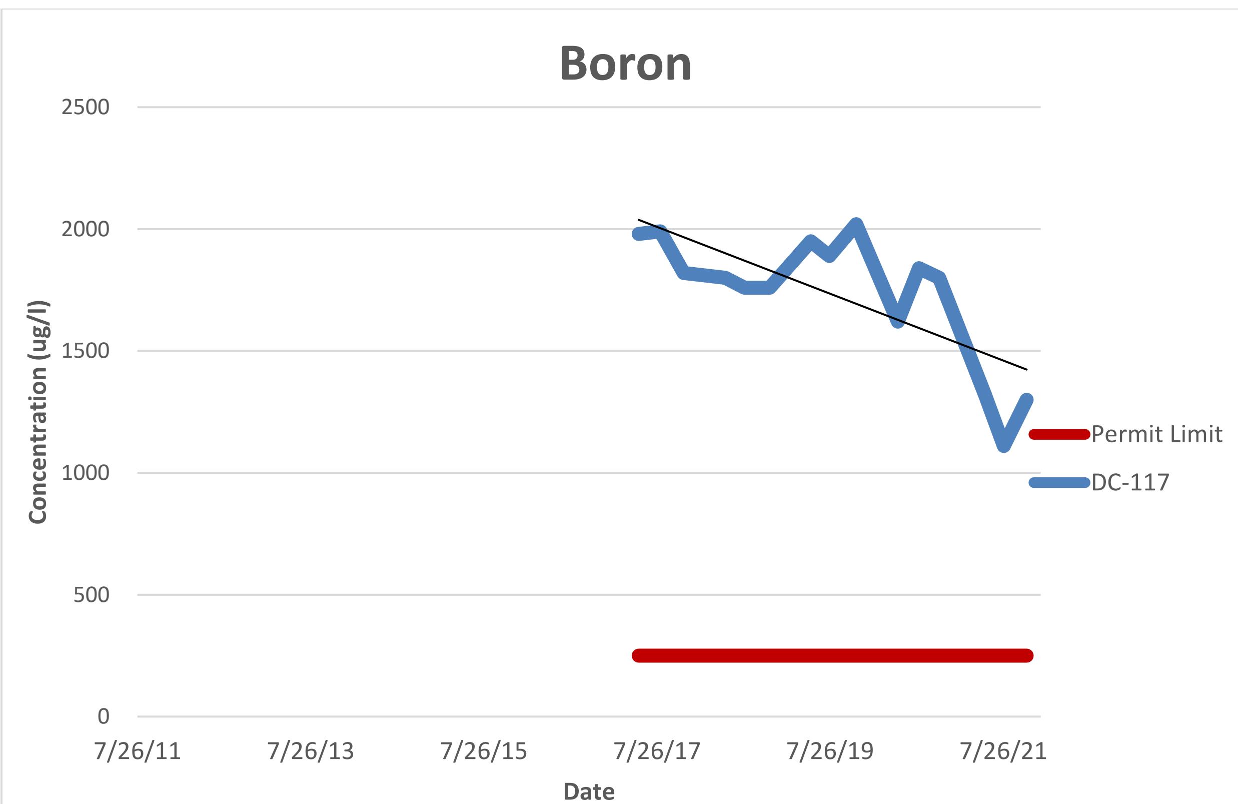
Boron
300
250
200
150
100
50
0
Concentration (ug/l)
7/1/15
7/1/17
7/1/19
7/1/21
Date
W-121
Permit Limit



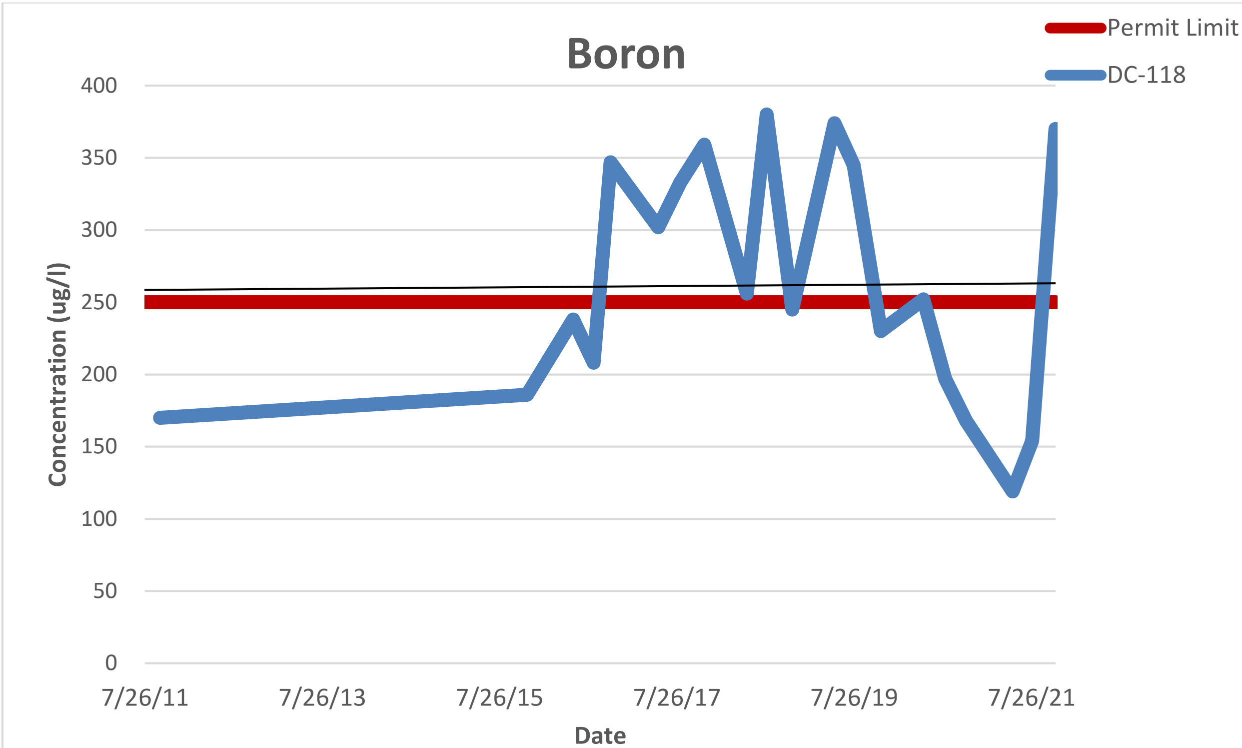
Boron
300
250
200
150
100
50
0
Concentration (ug/l)
7/1/15
7/1/17
7/1/19
7/1/21
Date
W-122
Permit Limit

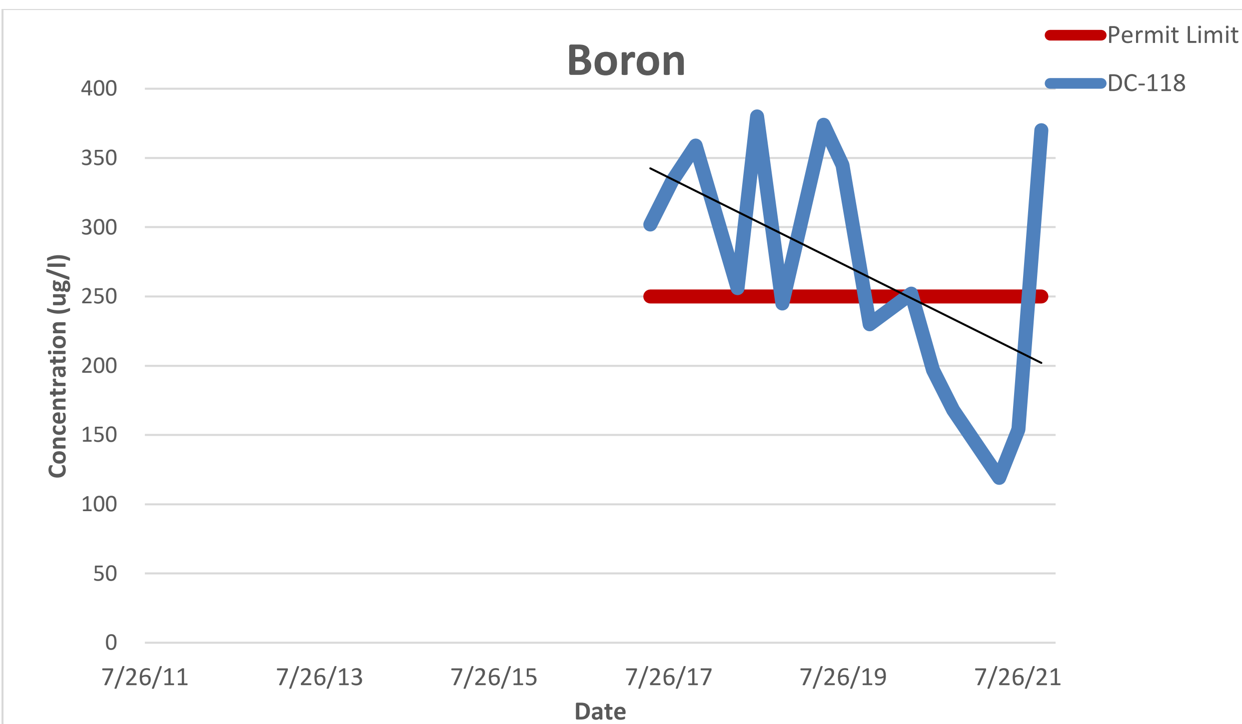


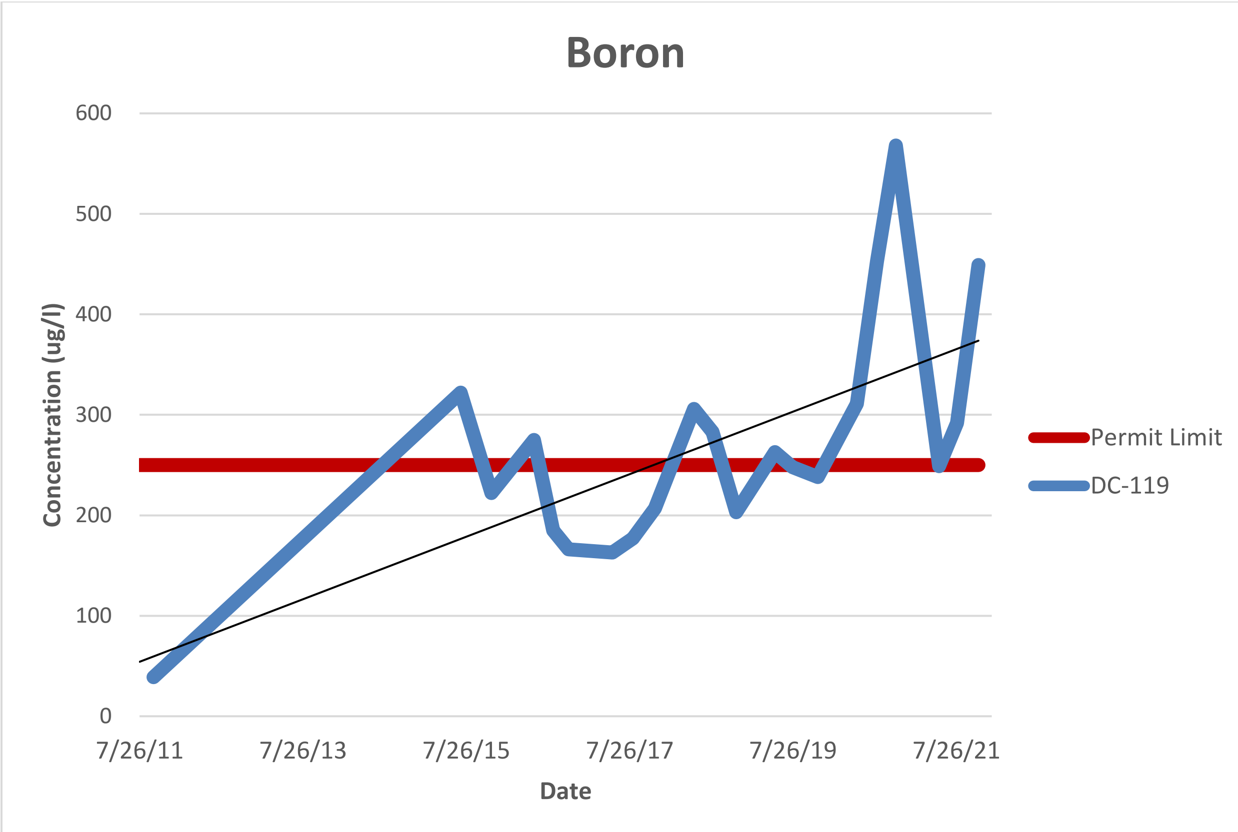
Boron
2500
2000
1500
1000
500
0
Concentration (ug/l)
7/26/11
7/26/13
7/26/15
7/26/17
7/26/19
7/26/21
Date
Permit Limit
DC-117

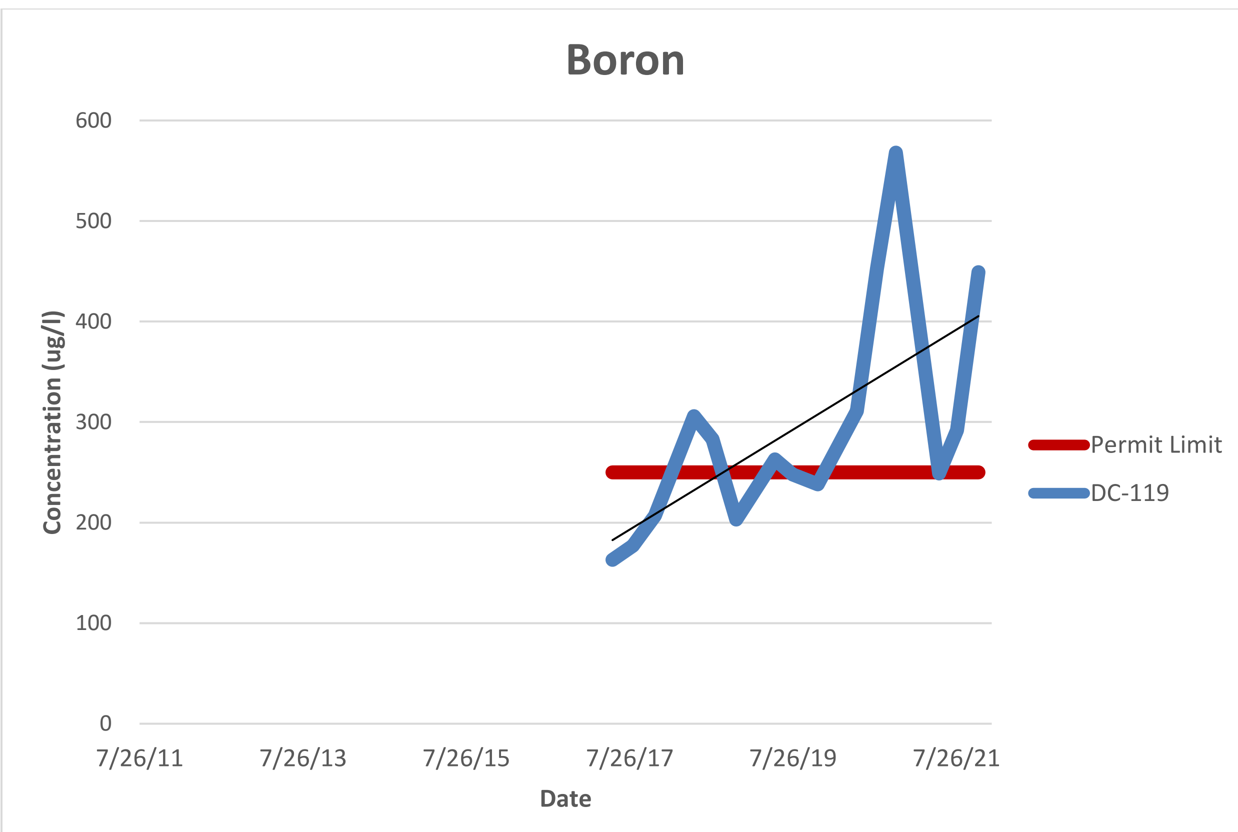


Boron
2500
2000
1500
1000
500
0
Concentration (ug/l)
7/26/11
7/26/13
7/26/15
7/26/17
7/26/19
7/26/21
Date
Permit Limit
DC-117

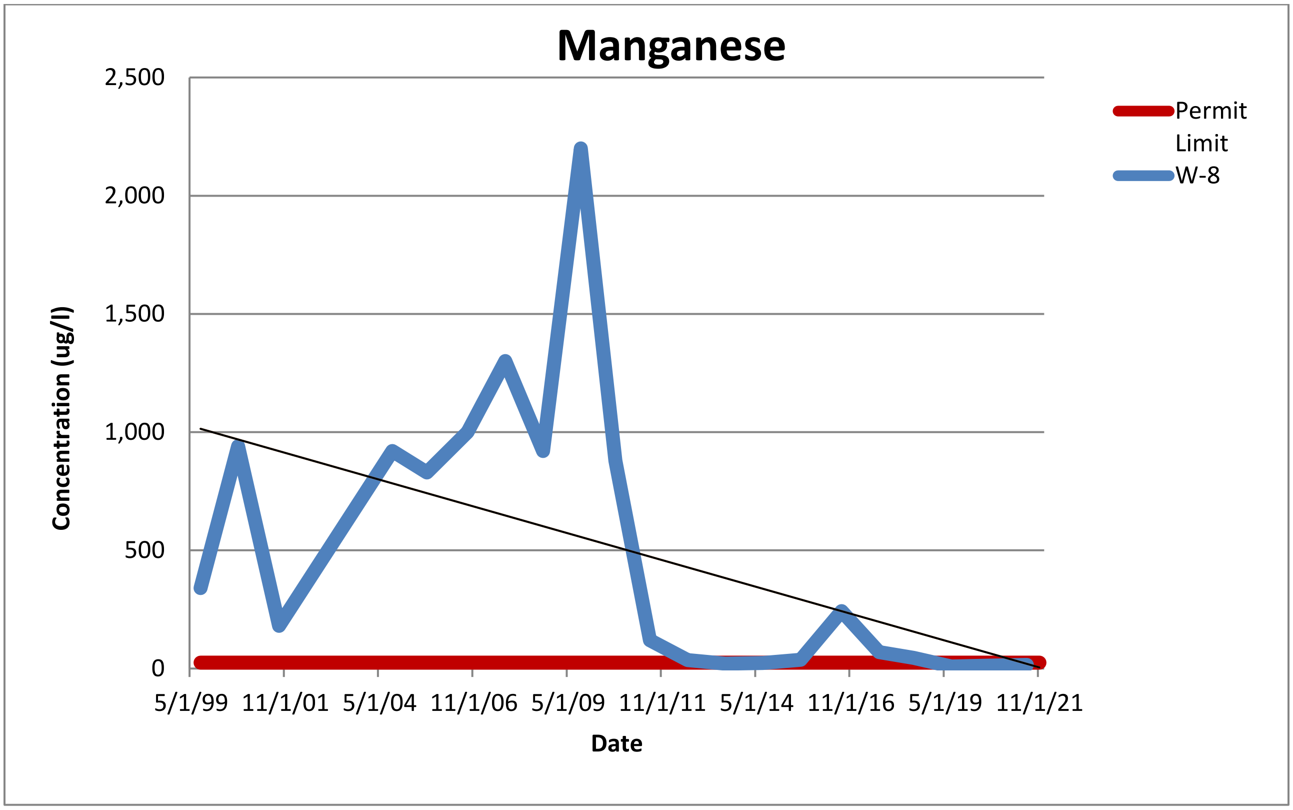

Boron
Permit Limit
DC-118
400
350
300
250
200
150
100
50
0
Concentration (ug/l)
7/26/11
7/26/13
7/26/15
7/26/17
7/26/19
7/26/21
Date

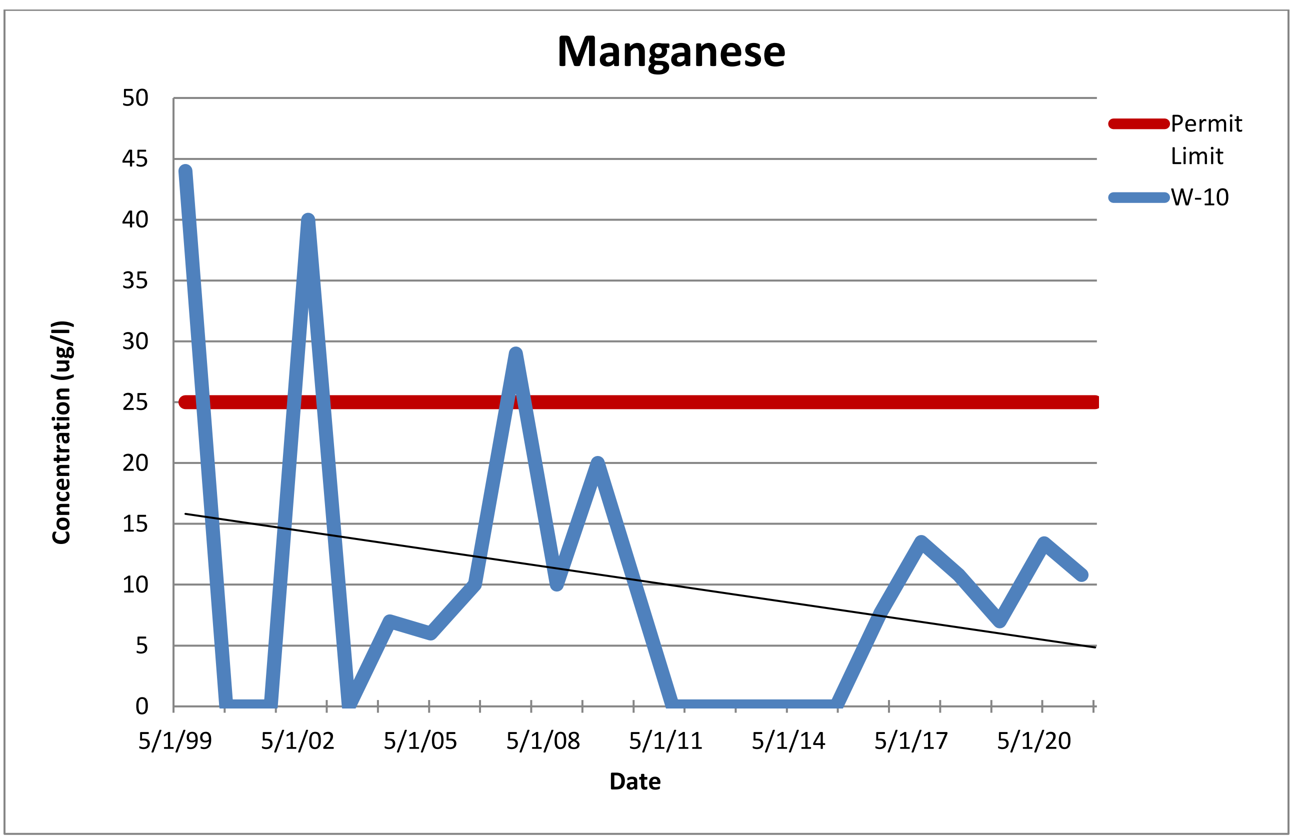

Boron
Permit Limit
DC-118
400
350
300
250
200
150
100
50
0
Concentration (ug/l)
7/26/11
7/26/13
7/26/15
7/26/17
7/26/19
7/26/21
Date

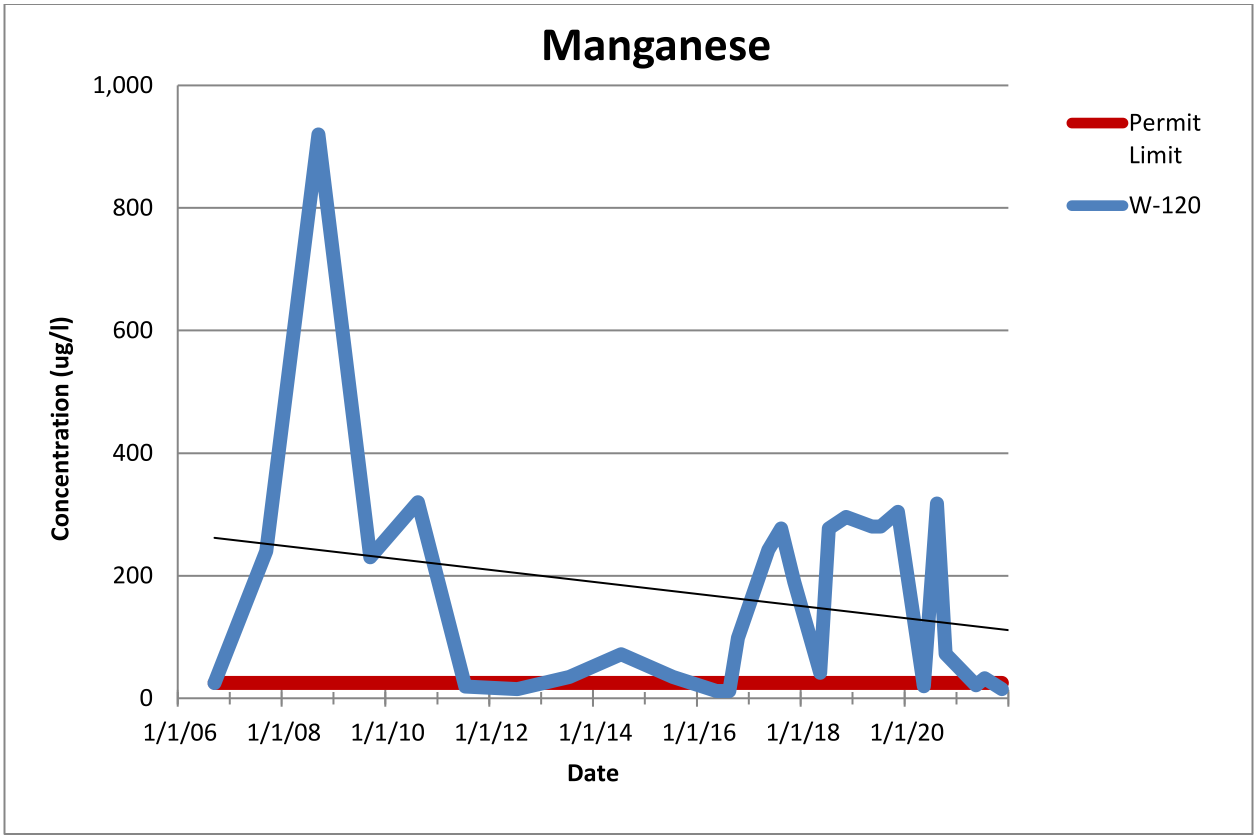

Boron
600
500
400
300
200
100
0
Concentration (ug/l)
7/26/11
7/26/13
7/26/15
7/26/17
7/26/19
7/26/21
Date
Permit Limit
DC-119

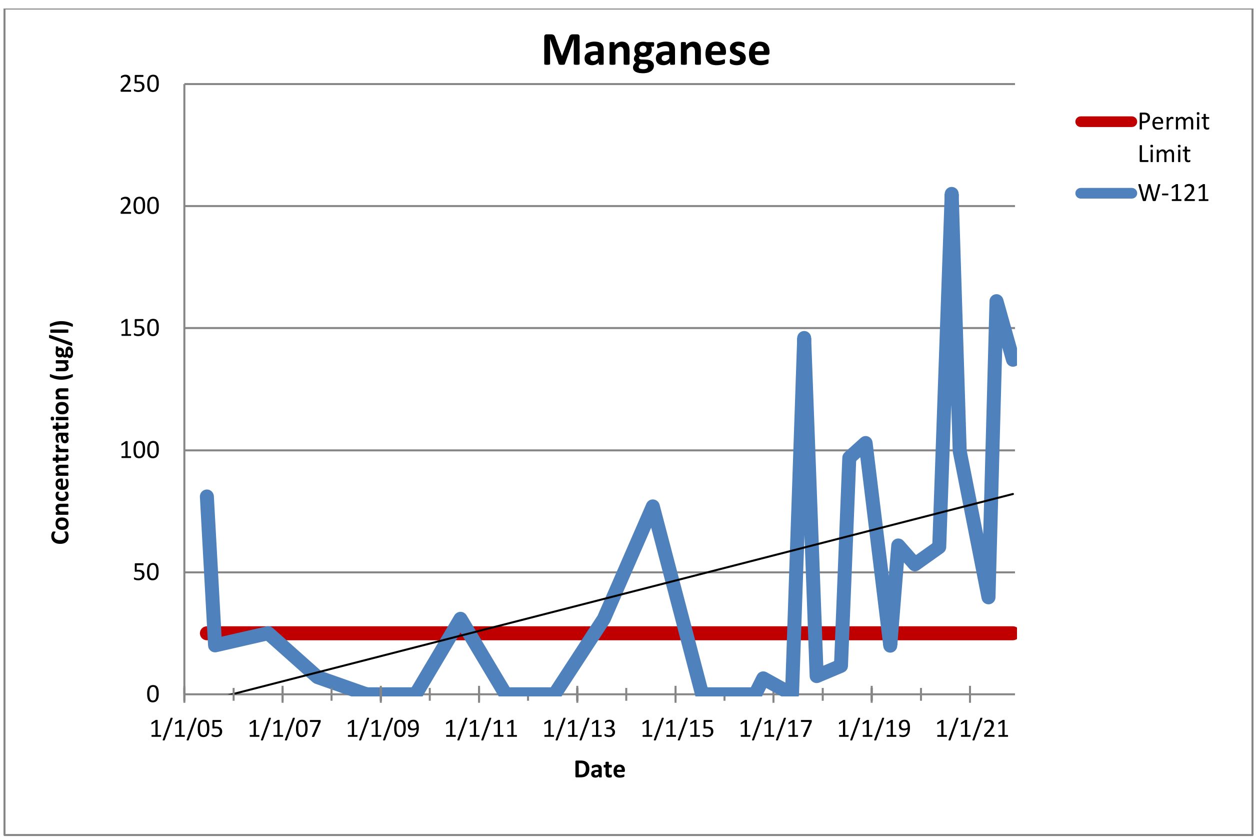

Boron
600
500
400
300
200
100
0
Concentration (ug/l)
7/26/11
7/26/13
7/26/15
7/26/17
7/26/19
7/26/21
Date
Permit Limit
DC-119

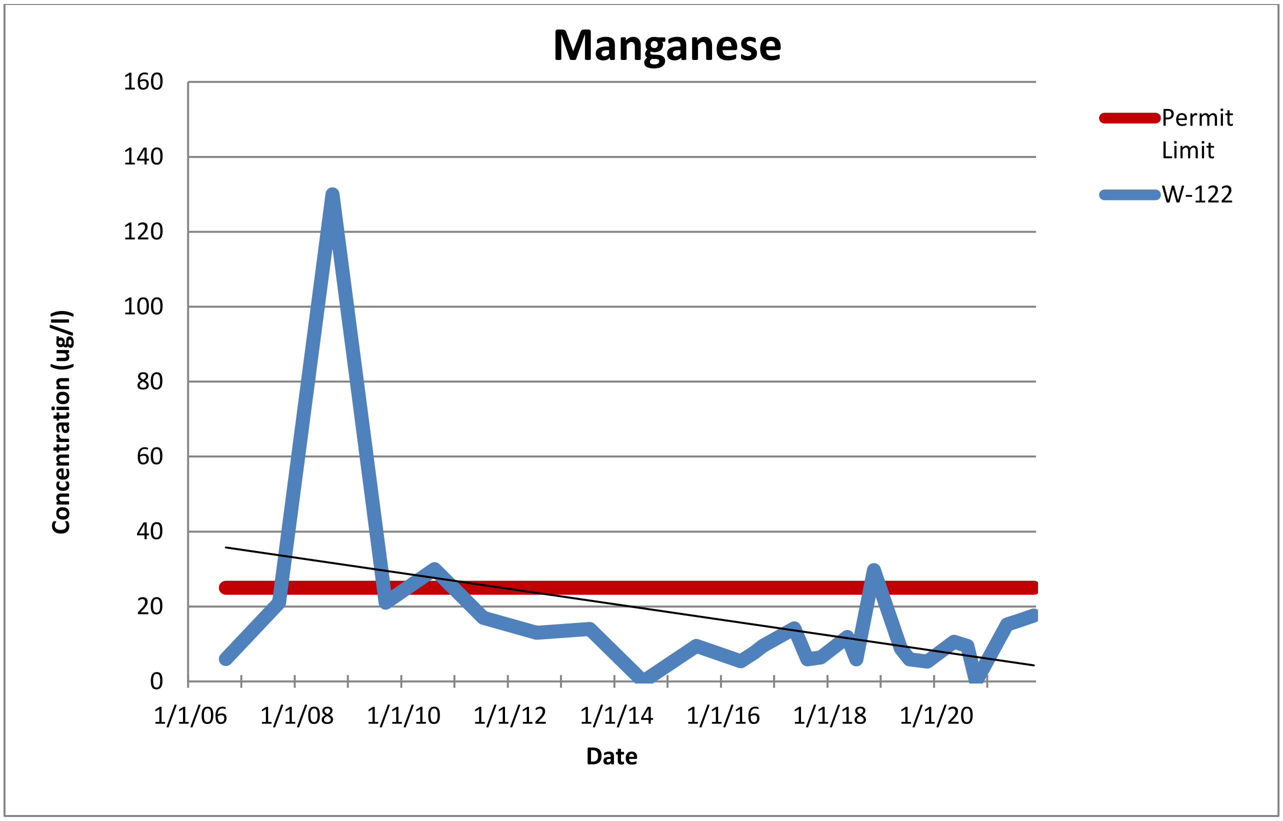
Manganese Graphs

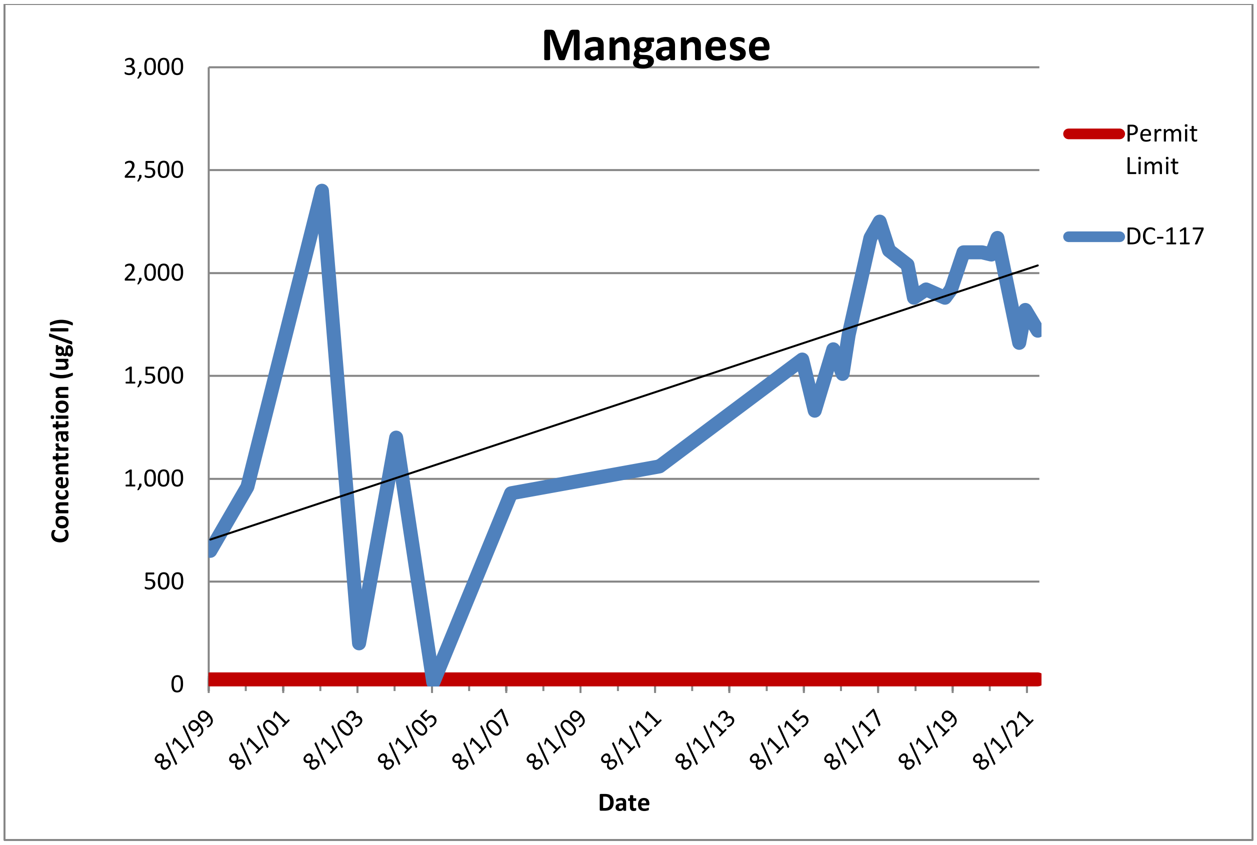


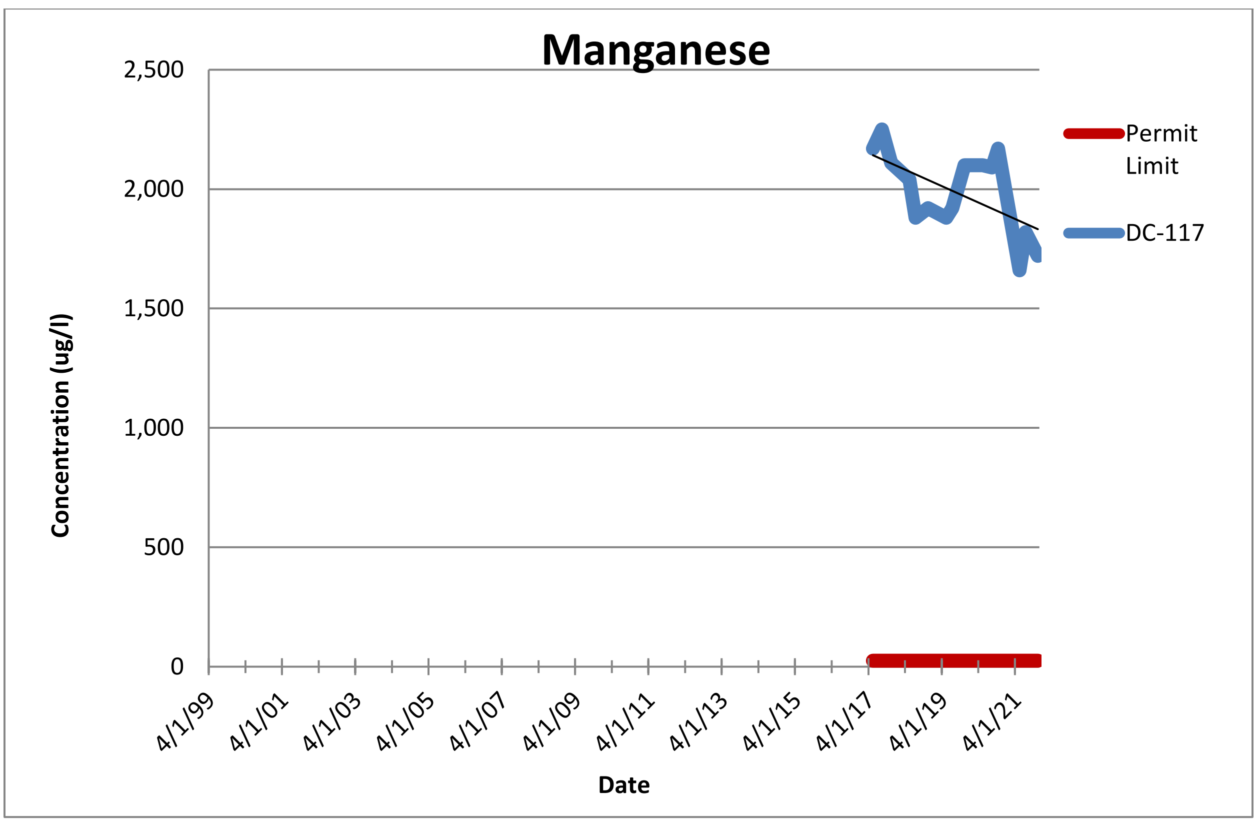


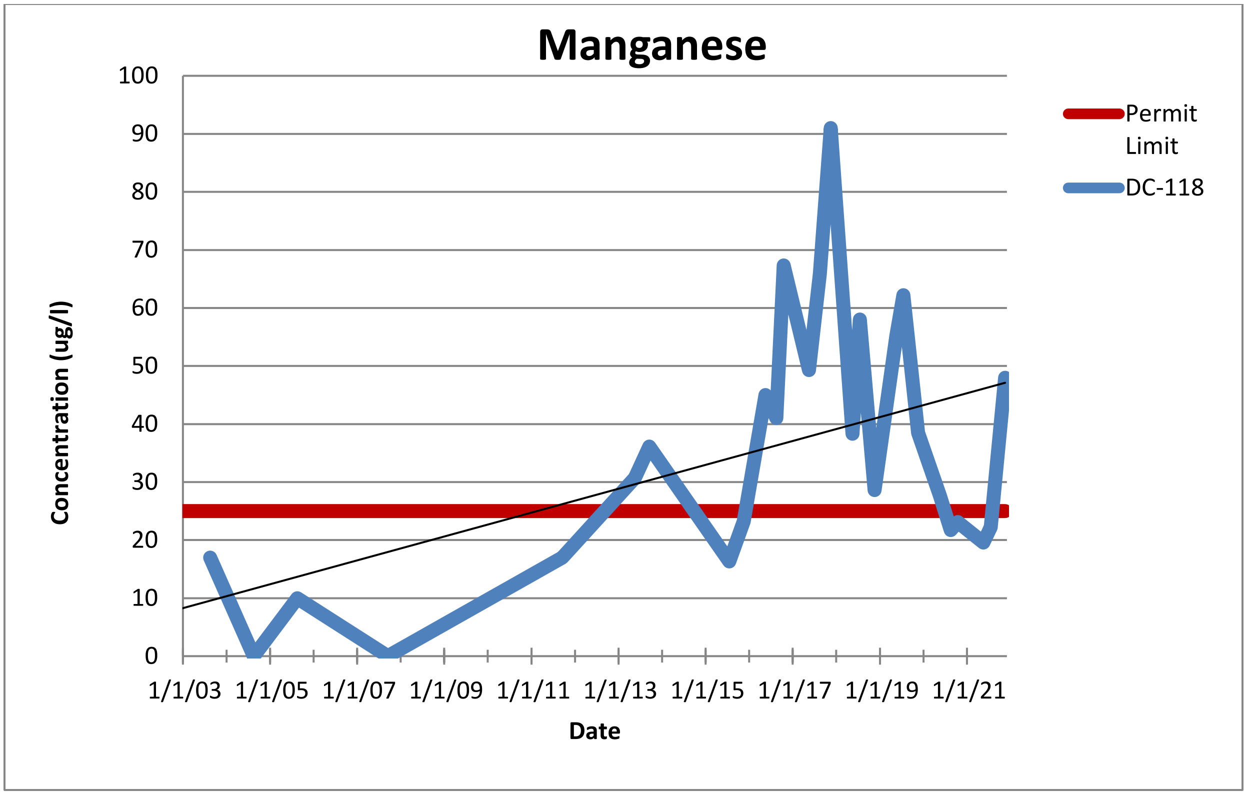

Manganese
1,000
800
600
400
200
0
Concentration (ug/l)
1/1/06
1/1/08
1/1/10
1/1/12
1/1/14
1/1/16
1/1/18
1/1/20
Date
Permit Limit
W-120

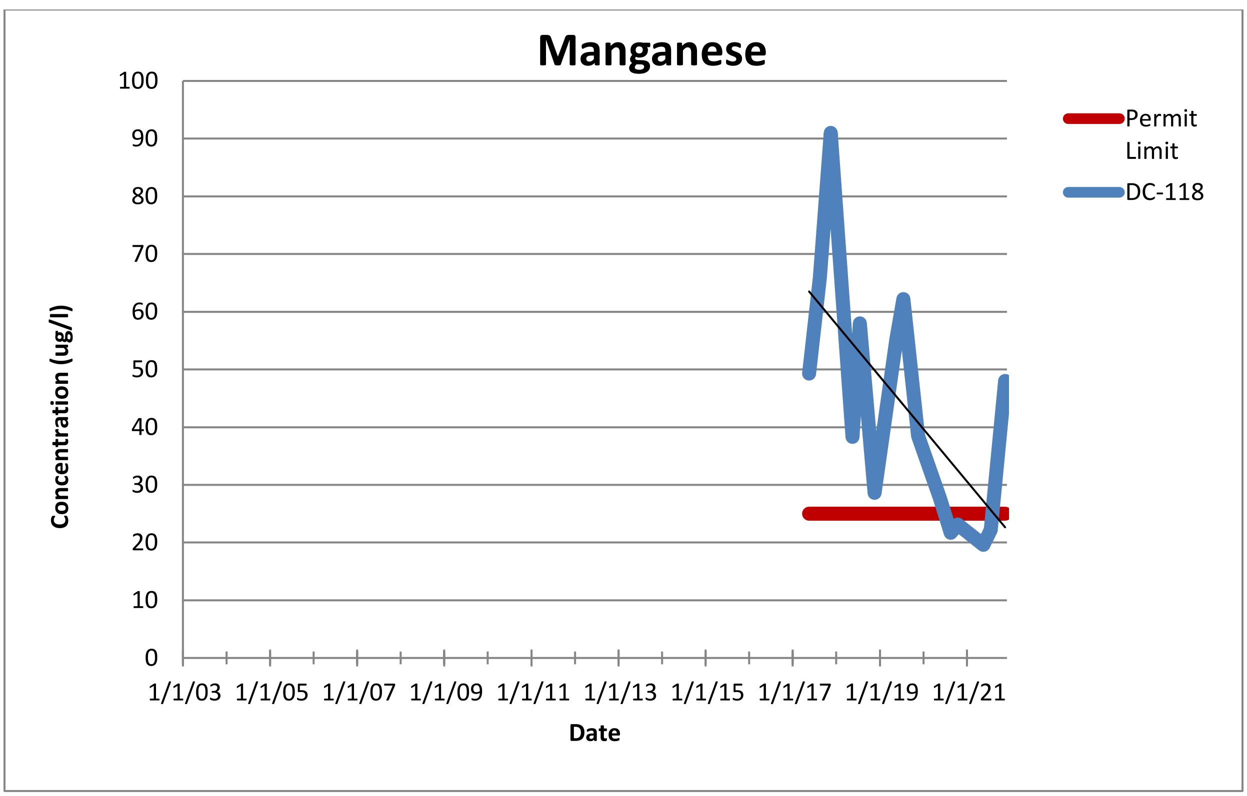

Manganese
250
200
150
100
50
0
Concentration (ug/l)
1/1/05
1/1/07
1/1/09
1/1/11
1/1/13
1/1/15
1/1/17
1/1/19
1/1/21
Date
Permit Limit
W-121

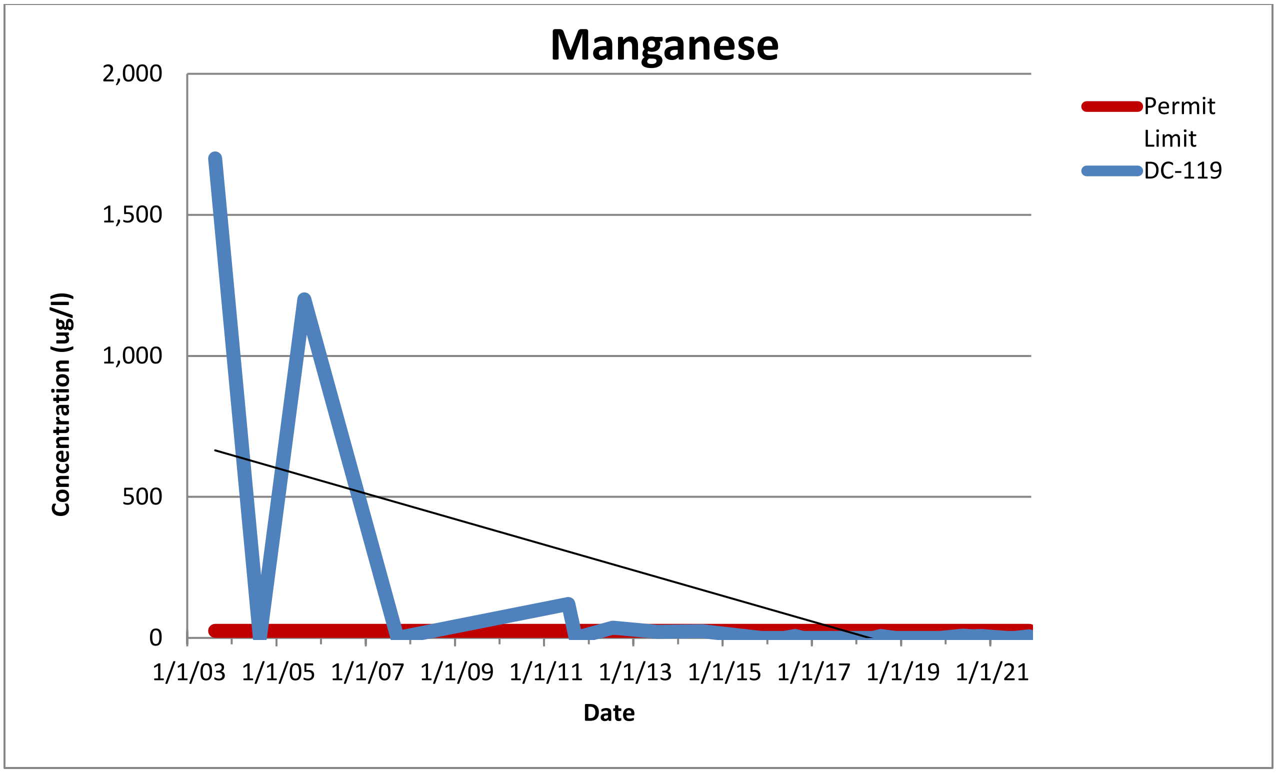

Manganese
Concentration (ug/l)
160
140
120
100
80
60
40
20
0
1/1/06
1/1/08
1/1/10
1/1/12
1/1/14
1/1/16
1/1/18
1/1/20
Date
Permit Limit
W-122


Manganese
3,000
2,500
2,000
1,500
1,000
500
0
Concentration (ug/l)
8/1/99
8/1/01
8/1/03
8/1/05
8/1/07
8/1/09
8/1/11
8/1/13
8/1/15
8/1/17
8/1/19
8/1/21
Date
Permit Limit
DC-117

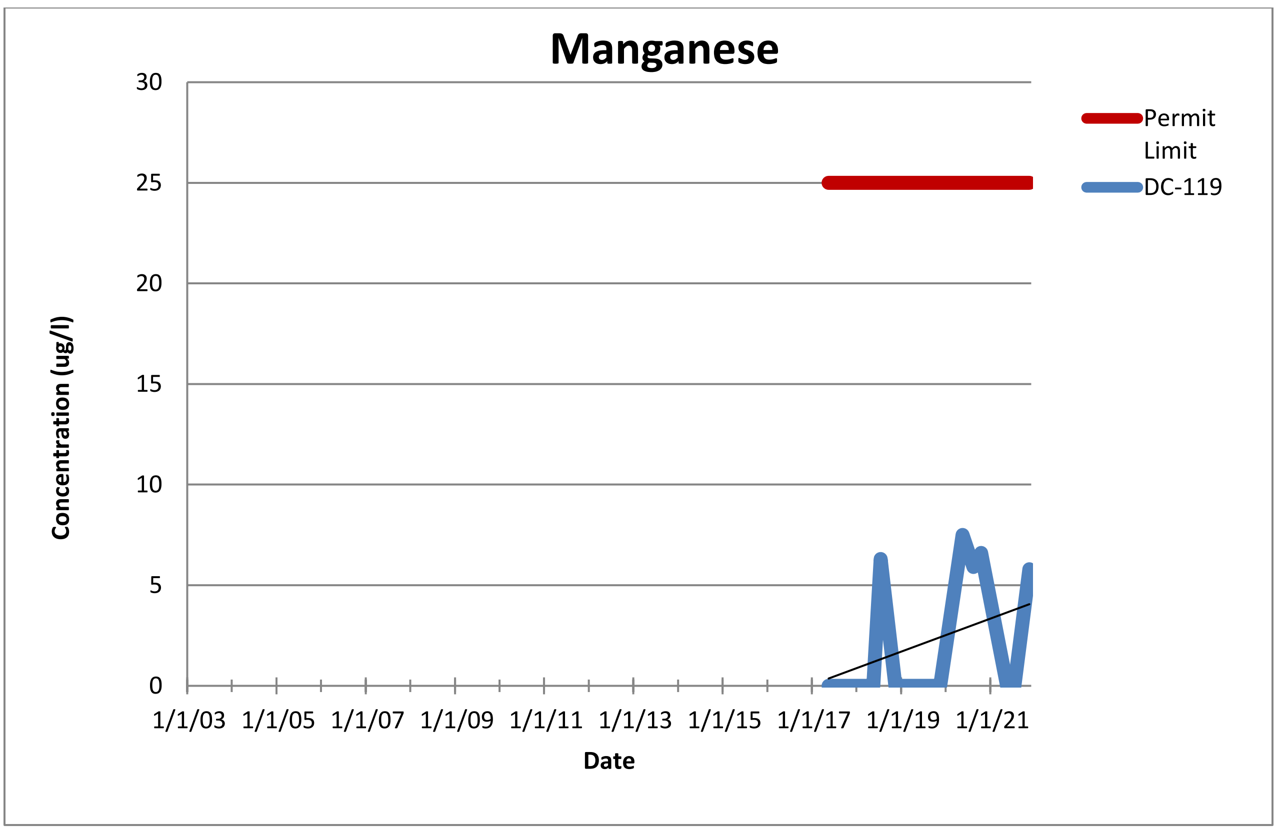

Manganese
2,500
2,000
1,500
1,000
500
0
Concentration (ug/l)
4/1/99
4/1/01
4/1/03
4/1/05
4/1/07
4/1/09
4/1/11
4/1/13
4/1/15
4/1/17
4/1/19
4/1/21
Date
Permit Limit
DC-117


Manganese
100
90
80
70
60
50
40
30
20
10
0
Concentration (ug/l)
1/1/03 1/1/05 1/1/07 1/1/09 1/1/11 1/1/13 1/1/15 1/1/17 1/1/19 1/1/21
Date
Permit Limit
DC-118


Manganese
100
90
80
70
60
50
40
30
20
10
0
Concentration (ug/l)
1/1/03 1/1/05 1/1/07 1/1/09 1/1/11 1/1/13 1/1/15 1/1/17 1/1/19 1/1/21
Date
Permit Limit
DC-118



Manganese
2,000
1,500
1,000
500
0
Concentration (ug/l)
1/1/03 1/1/05 1/1/07 1/1/09 1/1/11 1/1/13 1/1/15 1/1/17 1/1/19 1/1/21
Date
Permit Limit
DC-119



Manganese
30
25
20
15
10
5
0
Concentration (ug/l)
1/1/03 1/1/05 1/1/07 1/1/09 1/1/11 1/1/13 1/1/15 1/1/17 1/1/19 1/1/21
Date
Permit Limit
DC-119

Appendix 3 – Leachate Monitoring Report

February 28, 2022

DEM-CON LANDFILL LLC (SW-290)
2021 ANNUAL LEACHATE SAMPLING SUMMARY REPORT
Prepared by Dem-Con Landfill, LLC

Leachate at Dem-Con Landfill flows to three sumps located in landfill Phases 1, 3, and 4, and pumped to a 300,000-gallon aboveground storage tank. Throughout 2021, collected leachate was hauled and disposed of at the Metropolitan Council Environmental Services (MCES) Blue Lake Wastewater Treatment Plant in Shakopee, MN. Dem-Con maintains both hauling, and discharge permits with the MCES. Dem-Con personnel collected leachate samples on January 28, April 5, July 26, and October 25 in 2021 by sampling directly from the haul truck tank used to transport leachate to the wastewater treatment plant. Additional samples were collected on a monthly basis and analyzed for pH, COD, and TSS in order to demonstrate compliance with Dem-Con's Industrial Discharge Permit and for determining MCES load charges. Only the quarterly samples as required by MPCA Permit SW-290-005 are included in the attached table. Permit SW-290-005 does not establish ILs for leachate. All water quality parameters were within the MCES treatment facility acceptance limits.

The following table summarizes leachate sampling results from 2017 through 2021.

Dem-Con Landfill SW-290
5-year Leachate Sample Results

Parameter	Unit	1/26/17	4/26/17	7/20/17	10/24/17	1/10/18	4/26/18	7/31/18	10/30/18	1/15/19	4/17/19	7/24/19	10/29/19	1/28/20	4/23/20	7/10/20	10/21/20	1/28/21	4/5/21	7/26/21	10/25/21
1,1,1,2-Tetrachloroethane	µg/L	ND	ND				ND	ND									<0.147		<0.147	<0.735	
1,1,1-Trichloroethane	µg/L	ND	ND				ND	ND		ND	ND	ND	ND	ND	ND	ND	<0.149	<0.34	<0.149	<0.745	<0.37
1,1,2,2-Tetrachloroethane	µg/L	ND	ND				ND	ND									<0.133		<0.133	<0.665	
1,1,2-Trichloroethane	µg/L	ND	ND				ND	ND		ND	ND	ND	ND	ND	ND	ND	<0.158	<0.38	<0.158	<0.790	<0.30
1,1,2-Trichlorotrifluoroethane	µg/L	ND	ND				ND	ND		ND	ND	ND	ND	ND	ND	ND	<0.180	<0.61	<0.180	<0.900	<0.62
1,1-Dichloroethane	µg/L	ND	ND				ND	ND		ND	ND	ND	ND	ND	ND	ND	<0.100	<0.33	<0.100	<0.500	<0.51
1,1-Dichloroethene	µg/L	ND	ND				ND	ND		ND	ND	ND	ND	ND	ND	ND	<0.188	<0.25	<0.188	<0.940	<0.49
1,1-Dichloropropene	µg/L	ND	ND				ND	ND		ND	ND	ND	ND	ND	ND	ND	<0.142	<0.44	<0.142	<0.710	<0.53
1,2,3-Trichlorobenzene	µg/L	ND	ND				ND	ND		ND	ND	ND	ND	ND	ND	ND	<0.230	<0.34	<0.230	<1.15	<0.32
1,2,3-Trichloropropane	µg/L	ND	ND				0.012	ND		ND	ND	ND	ND	ND	ND	ND	<0.237	<1.2	<0.237	<1.19	<0.25
1,2,4,5-Tetrachlorobenzene	µg/L			ND	ND	ND	ND			ND	ND	ND	ND	ND	ND	ND	<50.5	<10	<99.9	<97.3	
1,2,4-Trichlorobenzene	µg/L				ND					ND	ND	ND	ND	ND	ND	ND	<0.481	<0.38	<0.481	<2.41	<0.28
1,2,4-Trimethylbenzene	µg/L	ND	ND				ND	ND		1.5	1.2	2.4	2.3	1.5	1.6	0.98	0.558	0.59	1.39	<1.61	1.5
1,2-Dibromo-3-chloropropane	µg/L	ND	ND				ND	ND		ND	ND	ND	ND	ND	ND	ND	<0.276	<2.5	<0.276	<1.38	<0.61
1,2-Dibromoethane (EDB)	µg/L	ND	ND				ND	ND		ND	ND	ND	ND	ND	ND	ND	<0.126	<0.36	<0.126	<0.630	<0.34
1,2-Dichlorobenzene	µg/L				ND					ND	ND	ND	ND	ND	ND	ND	<0.107	<0.27	<0.107	<141	<0.28
1,2-Dichloroethane	µg/L	2.4	0.5				1.4	ND		1.5	0.69	2.1	2.9	2.7	2.3	3.4	1.33	1.2	<0.0819	<0.409	1.3
1,2-Dichloropropane	µg/L	ND	ND				ND	ND		ND	ND	ND	ND	ND	ND	ND	<0.149	<0.28	<0.149	<0.745	<0.36
1,2-Diphenylhydrazine	µg/L	ND														ND					<1.7
1,3,5-Trimethylbenzene	µg/L	ND	ND				ND	ND		0.28	0.36	0.74	0.66	1	0.41	0.27	0.119	<0.25	0.33	<0.520	0.37
1,3-Dichlorobenzene	µg/L	ND	ND		ND		ND	ND		ND	ND	ND	ND	ND	ND	ND	<0.110	<0.23	<0.110	<0.550	<0.22
1,3-Dichlorobenzene	µg/L									ND	ND	ND	ND	ND	ND	ND	<0.110	<0.23	<0.110	<0.550	<0.22
1,3-Dichloropropane	µg/L	ND	ND				ND			ND	ND	ND	ND	ND	ND	ND	<0.110	<0.26	<0.110	<0.550	<0.24
1,4-Dichlorobenzene	µg/L									ND	ND	ND	ND	ND	ND	ND	<0.120	<14.4	<0.120	<140	<1.7
1-Methylnaphthalene	µg/L	ND																			<1.7
2,2-Dichloropropane	µg/L	ND	ND				ND	ND									<0.161		<0.161	<0.805	
2,2'-Oxybis(1-chloropropane)	µg/L	ND						ND	ND	ND	ND	ND	ND	ND	ND	ND	<62.3	<12.3	<123	<120	<1.8
2,3,7,8-Tetrachlorodibenzo-p-dioxin	pg/L											ND	ND			ND				<10	
2,4,5-Trichlorophenol	µg/L	ND	ND	ND	ND	ND	ND	ND		ND	ND	ND	ND	ND	ND	ND	<32.6	<6.4	<64.4	<62.8	<1.7
2,4,6-Trichlorophenol	µg/L	ND	ND	ND	ND	ND	ND	ND		ND	ND	ND	ND	ND	ND	ND	<40.3	<8.0	<79.7	<77.6	<1.7
2,4-Dichlorophenol	µg/L	ND	ND	ND	ND	ND	ND	ND		ND	ND	ND	ND	ND	ND	ND	<45.3	<9.0	<89.6	<87.3	<1.6
2,4-Dimethylphenol	µg/L	ND	ND	ND	ND	ND	ND	ND		ND	ND	ND	ND	ND	ND	2.93	<58.5	<11.6	<116	<113	3.3
2,4-Dinitrophenol	µg/L	ND	ND	ND	ND	ND	ND	ND		ND	ND	ND	ND	ND	ND	ND	<124	<24.5	<245	<239	<2.3
2,4-Dinitrotoluene	µg/L	ND	ND	ND	ND	ND	ND	ND		ND	ND	ND	ND	ND	ND	ND	<53.5	<10.6	<106	<103	<1.5
2,6-Dinitrotoluene	µg/L	ND	ND	ND	ND	ND	ND	ND		ND	ND	ND	ND	ND	ND	ND	<39.0	<7.7	<77.3	<75.2	<1.5
2-Butanone (MEK)	µg/L	40.2	13.4				22.1	ND		101	106	534	507	252	90	210	<1.19	3.7	<1.19	<5.95	2.3
2-Chloroethylvinyl ether	µg/L									ND	ND	ND	ND	ND	ND	ND	<0.575	<1.2	<0.575	<2.88	<4.5
2-Chloronaphthalene	µg/L	ND	ND	ND	ND	ND	ND	ND		ND	ND	ND	ND	ND	ND	ND	<41.9	<8.3	<82.9	<80.7	<1.8
2-Chlorophenol	µg/L	ND	ND	ND	ND	ND	ND	ND		ND	ND	ND	ND	ND	ND	ND	<41.8	<8.3	<82.8	<80.7	<1.2
2-Chlorotoluene	µg/L	ND	ND				ND	ND		ND	ND	ND	ND	ND	ND	ND	<0.106	<0.33	<0.106	<0.530	<0.25
2-Hexanone	µg/L									1.6	3.7	2.6	3.4	ND	ND	2.6	<0.787	<1.5	<0.787	<3.94	<1.9
2-Methylnaphthalene	µg/L	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	<58.8	<11.6	<116	<113	<1.7
2-Methylphenol(o-Cresol)	µg/L	ND	ND	ND	ND	ND	ND	ND		ND	9	ND	ND	ND	ND	14.4	<47.0	<9.3	<93.1	<90.6	<0.93
2-Nitroaniline	µg/L	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	<47.9	<9.5	<94.8	<92.3	<1.5
2-Nitrophenol	µg/L	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	<41.7	<8.3	<82.6	<80.4	<1.5
3&4-Methylphenol(m&p Cresol)	µg/L	64.4	ND	ND	120	ND	ND	505	161	230	130	191	953	1390	637	469	<30.9	<6.1	<61.3	<59.7	1.2
3,3'-Dichlorobenzidine	µg/L	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	<67.9	<13.4	<134	<131	<2.8
3-Nitroaniline	µg/L	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	<68.9	<13.6	<136	<133	<1.7
4,4-DDD	µg/L	ND	ND	ND	ND	ND	ND	ND													
4,4-DDE	µg/L	ND	ND	ND	ND	ND	ND	ND													
4,4-DDT	µg/L	ND	ND	ND	ND	ND	ND	ND													
4,6-Dinitro-2-methylphenol	µg/L	ND	ND	ND	ND	ND	ND	238	ND	ND	ND	ND	ND	ND	ND	ND	<157	<31.1	<311	<303	<4.3
4-Bromophenylphenyl ether	µg/L	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	<48.3	<9.6	<95.6	<93.1	<2.0
4-Chloro-3-methylphenol	µg/L	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	<34.5	<6.8	<68.3	<66.5	<1.3
4-Chloroaniline	µg/L	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	<90.2	<17.9	<179	<174	<2.0
4-Chlorophenylphenyl ether	µg/L	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	<41.8	<8.3	<82.8	<80.7	<2.0
4-Chlorotoluene	µg/L	ND	ND				ND	ND		ND	ND	ND	ND	ND	ND	ND	<0.114	<0.10	<0.114	<0.570	<0.22
4-Isopropyltoluene (aka p-Isopropyltolue	µg/L	1.1	1.2				ND	ND													
4-Methyl-2-pentanone (MIBK)	µg/L	7.6	ND				11.9	ND		47.6	60	207	210	150	48.4	97.4	3.26	<1.1	6.62	<2.39	1.7
4-Nitroaniline	µg/L	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	<151	<30.0	<300	<292	<1.6
4-Nitrophenol	µg/L	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	<154	<30.6	<306	<298	<3.8
a-BHC (aka Lindane - insecticide)	µg/L	0.12	0.19	ND	1.1	ND	ND	ND													
Acenaphthene	µg/L	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	<38.5	<7.6	<76.3	<74.3	<1.8
Acenaphthylene	µg/L	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	<36.9	<7.3	<73.0	<71.1	<1.9
Acetone	µg/L	108	28.4				198	ND	259	246	750	1770	2240	1350	250	438	53.3	15.9	18.5	<56.5	35.8
Acetonitrile	µg/L									ND	ND	ND	ND	ND	ND	49.4	<24.0	<15.6	<24.0	<120	
Acrolein	µg/L									ND	ND	ND	ND	ND	ND	ND	<2.54	<5.5	<2.54	<12.7	<4.9

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5-year Leachate Sample Results

Parameter	Unit	1/26/17	4/26/17	7/20/17	10/24/17	1/10/18	4/26/18	7/31/18	10/30/18	1/15/19	4/17/19	7/24/19	10/29/19	1/28/20	4/23/20	7/10/20	10/21/20	1/28/21	4/5/21	7/26/21	10/25/21
Acrylonitrile	µg/L									ND	ND	ND	ND	ND	ND	ND	<0.671	<2.4	<0.671	<3.36	<4.1
Aldrin (insecticide)	µg/L	ND	ND	ND	ND	ND	ND	ND													
Alkalinity	mg/L	1610	3190	2500	1530	3950	3550	4170											1520		
Allyl chloride	µg/L	ND	ND				ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	<0.500	<0.54	<0.500	<2.50	<0.31
alpha-Chlordane	µg/L	ND	ND	ND	ND	ND	ND	ND													
Aluminum	µg/L									36.5	ND	ND	61	73.1	34.1	ND	152	<26.2	37.8	36.8	16.6
Aniline	µg/L	ND				ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	<156	<31.0	<310	<302	
Anthracene	µg/L	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	<40.9	<8.1	<81.0	<78.8	<1.8
Antimony	ug/L	ND	ND	ND	ND	34.9	ND	ND	ND	ND	ND	8.6	22	19.5	16	9.4	<7.0	<7.0	9	<7.0	<7.0
Arsenic	µg/L	56.3	125	91.5	95.9	222	181	109	64.3	106	74.6	66.4	259	291	299	180	83.3	107	170	98.6	108
Barium	µg/L	553	835	653	503	865	694	855	705	868	431	749	1170	1140	1010	1190	1000	1090	1040	1060	1430
b-BHC (aka Lindane - insecticide)	µg/L	0.051	ND	0.068	13.2	ND	0.056	ND													
Benzene	µg/L	1.6	1.7				2.6	ND	2	3.2	1.8	3.1	3.7	3.7	3.3	3.3	1.84	2.5	2.75	2	2.7
Benzidine	µg/L	ND							ND												
Benzo(a)anthracene	µg/L	ND	ND	ND	ND	ND	ND	ND		ND	ND	ND	ND	ND	ND	ND	<42.8	<8.5	<84.7	<82.5	<1.6
Benzo(a)pyrene	µg/L	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	<64.3	<12.7	<127	<124	<1.6
Benzo(b)fluoranthene	µg/L	ND	ND	ND	ND	ND	ND	ND	ND	19.3	ND	ND	ND	ND	ND	ND	<52.3	<10.4	<104	<101	<1.6
Benzo(g,h,i)perylene	µg/L	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	<69.6	<13.8	<138	<134	<1.7
Benzo(k)fluoranthene	µg/L	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	<56.8	<11.2	<112	<109	<1.6
Benzoic Acid	µg/L	145							ND												
Benzyl Alcohol	µg/L	ND							ND												
Beryllium	µg/L	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.22	ND	ND	<0.28	<0.28	<0.28	<0.067	<0.067
Bicarbonate alkalinity	mg/L	1970	3190	3050	1870	4820	4330	5090											1850		
Biphenyl (Diphenyl)	µg/L									ND	ND	ND	ND		ND	ND	<73.4	<14.5	<145		
bis(2-Chloroethoxy)methane	µg/L	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	<66.0	<13.1	<131	<127	5.3
bis(2-Chloroethyl) ether	µg/L	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	<59.0	<11.7	<117	<114	<1.4
bis(2-Ethylhexyl)phthalate	µg/L	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	<145	<28.8	<288	<280	<2.4
BOD, 5 day	mg/L	ND	87.9	ND	60.4	246	158	843											117		
Boron	µg/L	12100	25600	18300	5260	23300	24600	16600	14100	20300	10200	12700	21500	23600	24500	19700	19200	23700	30700	21900	23100
Bromide	mg/L	3	7.9	5.8	2.1	7	8	7.2													
Bromobenzene	µg/L	ND	ND				ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	<0.118	<0.27	<0.118	<0.590	<0.26
Bromochloromethane	µg/L	ND	ND				ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	<0.128	<0.72	<0.128	<0.640	<0.61
Bromodichloromethane	µg/L	ND	ND				ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	<0.136	<0.23	<0.136	<0.680	<0.19
Bromoform	µg/L	ND	ND				ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	<0.129	<0.54	<0.129	<0.645	<0.42
Bromomethane	µg/L	ND	ND				ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	<0.605	<1.3	<0.605	<3.03	<0.63
BTEX (Total)	µg/L									24.1	36.2	78	80.1	87.9	47.6	67.9	7.81	8.4	23	8.3	16.8
Butylbenzylphthalate	µg/L	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	<65.5	<13.0	<130	<126	<2.1
Cadmium	µg/L	ND	ND	ND	ND	ND	ND	ND	0.73	0.43	0.36	0.62	0.47	0.42	ND	ND	0.66	<0.31	0.56	<0.28	<0.28
Calcium	µg/L	230000	214000	231000	288000	296000	276000	337000	208000	212000	331000	373000	480000	411000	339000	347000	227000	170000	178000	190000	223000
Carbazole	µg/L	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.602	<46.1	<9.1	<91.3	<88.9	<1.6
Carbon disulfide	µg/L																0.773		3.62		
Carbon tetrachloride	µg/L	ND	ND				ND	ND									<0.128		<0.128	<0.640	
Carbonate alkalinity (CO3)	mg/L	ND	ND	ND	ND	ND	ND	ND													
Chemical Oxygen Demand	mg/L	544	1050	810	285	1290	1130	2060	745	985	798	1270	1600	1620	975	1080	622	867	1290	977	937
Chloride	mg/L	450	1160	861	327	1090	1250	1470											1420		
Chlorobenzene	µg/L	ND	ND				ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	<0.116	<0.15	<0.116	<0.580	<0.22
Chloroethane	µg/L	ND	1.2				ND	ND		ND	ND	ND	ND	ND	ND	ND	<0.192	<0.85	<0.192	<0.960	<0.45
Chloroform	µg/L	ND	ND				ND	ND		ND	ND	ND	ND	ND	ND	ND	<0.111	<0.97	<0.111	<0.555	<0.33
Chloromethane	µg/L	ND	ND				ND	ND		ND	ND	ND	ND	ND	ND	ND	<0.960	<0.29	<0.960	<4.80	<0.37
Chromium	µg/L	53.8	96.7	68	19.2	80.2	84.4	66.2	54.6	78.4	39.6	37.2	85	112	105	76.9	33.8	41.5	93.9	70.7	86.8
Chromium, Hexavalent	mg/L									0.008	ND	0.47	0.15	0.23	0.17	0.033	0.058	0.083	0.52	0.33	0.41
Chromium, Trivalent	mg/L									0.07	0.04	ND	ND	ND	ND	0.044	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Chrysene	µg/L	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	<64.1	<12.7	<127	<124	<1.8
cis-1,2-Dichloroethene	µg/L	ND	ND				0.86	ND		0.97	0.51	0.84	2.4	2.5	1.4	2.2	<0.126	<0.39	<0.126	<0.630	<0.44
cis-1,3-Dichloropropene	µg/L	ND	ND				ND	ND		ND	ND	ND	ND	ND	ND	ND	<0.111	<0.15	<0.111	<0.555	<0.25
Cobalt	µg/L	ND	ND	ND	ND	ND	ND	11.2	3.2	4.2	20.2	18.8	14.2	9.8	10	9.4	3.4	3.3	5.3	4.1	3.2
Copper	µg/L	ND	ND	ND	ND	ND	ND	25.6	5.2	136	8.8	19.1	7.2	10.8	17.6	9	161	1.7	1.8	8.8	2.6
Cyanide	µg/L	15.8	22.4	44.5	ND	196	ND	ND		136	9.5	387	ND			ND	<6.0	14.4	44.2	7.7	17.8
Cyclohexane	µg/L									ND	3.1	ND	1.4	ND	ND	ND	<0.188	<1.4	<0.188	<0.940	<2.7
d-BHC (aka Lindane - insecticide)	µg/L	0.12	ND	ND	ND	ND	ND	ND													
Dibenz(a,h)anthracene	µg/L	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	<55.8	<11.0	<110	<108	<1.6
Dibenzofuran	µg/L	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	<42.8	<8.5	<84.8	<82.5	<1.8
Dibromochloromethane	µg/L	ND	ND				ND	ND		ND	ND	ND	ND	ND	ND	ND	<0.140	<0.39	<0.140	<0.700	<0.25
Dibromomethane	µg/L	ND	ND				ND	ND									<0.122		<0.122		
Dichlorodifluoromethane	µg/L	ND	ND				ND	ND		ND	ND	ND	ND	ND	ND	ND	<0.374	<0.39	<0.374	<1.87	<0.51
Dichlorofluoromethane	µg/L	22.1	5				13.6	ND		11.8	7.8	ND	13.4	14.2	10.1	9.3	5.06	4.8	5	2.82	3.3
Dieldrin	µg/L	ND	ND	ND	ND	ND	ND	ND													

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Parameter	Unit	1/26/17	4/26/17	7/20/17	10/24/17	1/10/18	4/26/18	7/31/18	10/30/18	1/15/19	4/17/19	7/24/19	10/29/19	1/28/20	4/23/20	7/10/20	10/21/20	1/28/21	4/5/21	7/26/21	10/25/21
Diethyl ether (Ethyl ether)	µg/L	4.7	3				ND	ND		6.5	3	ND	7.9	9.6	5.7	11.1	5.72	5.9	<0.115	6.92	11.9
Diethylphthalate	µg/L	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	2.29	<39.2	<7.8	<77.5	<75.5	<1.4
Diisopropyl ether	µg/L																		<0.105		
Dimethylphthalate	µg/L	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	<36.4	<7.2	<72.0	<70.1	<1.5
Di-n-butylphthalate	µg/L	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	<62.1	<12.3	<123	<120	<1.9
Di-n-octylphthalate	µg/L	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	<241	<47.7	<477	<464	<2.6
Endosulfan I	µg/L	0.14	ND	0.36	ND	ND	0.41	ND													
Endosulfan II	µg/L	ND	ND	ND	ND	ND	ND	ND													
Endosulfan sulfate	µg/L	ND	ND	ND	ND	ND	ND	ND													
Endrin	µg/L	ND	ND	ND	ND	ND	ND	ND													
Endrin aldehyde	µg/L	ND	ND	ND	ND	ND	ND	ND													
Endrin ketone	µg/L	ND	ND	ND	ND	ND	ND	ND													
Ethane	µg/L									ND	ND	ND	ND	ND	ND	ND	<3.0	<3.0	<1.3	<1.3	<1.3
Ethene	µg/L									ND	ND	ND	ND	ND	ND	ND	<2.9	<2.9	<1.1	<1.1	<1.1
Ethyl acetate	µg/L									ND	16.5	ND	ND	ND	ND	ND	<3.59	<2.6	<3.59	<18.0	
Ethylbenzene	µg/L	1.7	2.2				2.3	ND		2.6	2.9	4.3	8.7	8.2	5.4	4.3	1.4	1.4	2.66	0.981	2.6
Field Temperature	µg/L									ND	ND	ND									
Fluoranthene	µg/L	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	<49.9	<9.9	<98.8	<96.2	<1.7
Fluorene	µg/L	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	<45.7	<9.1	<90.6	<88.2	<1.8
Fluoride	mg/L																		0.16		
gamma-BHC (aka Lindane - insecticide	µg/L	0.13	0.17	ND	ND	ND	ND	ND													
gamma-Chlordane (aka Chlordane)	µg/L	ND	ND	ND	ND	ND	ND	ND													
Heptachlor - insecticide	µg/L	0.21	ND	ND	1.6	ND	ND	ND													
Heptachlor epoxide	µg/L	ND	ND	ND	ND	ND	ND	ND													
Hexachloro-1,3-butadiene	µg/L	ND	ND		ND		ND	ND		ND	ND	ND	ND	ND	ND	ND	<0.337	<0.80	<0.337	<1.69	<0.68
Hexachlorobenzene	µg/L				ND					ND	ND	ND	ND	ND	ND	ND	<83.4	<16.5	<165	<161	<1.9
Hexachlorocyclopentadiene	µg/L	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	<50.9	<10.1	<101	<98.1	
Hexachloroethane	µg/L	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	<71.7	<14.2	<142	<138	<2.4
Indeno(1,2,3-cd)pyrene	µg/L	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	<61.4	<12.2	<122	<118	<1.6
Iodomethane	µg/L																<6.00		<6.00		
Iron	µg/L	2360	2050	632	2530	1860	3220	2350	4590	958	3010	5460	9110	4530	3070	2030	4620	4530	324	832	945
Isophorone	µg/L	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	<39.1	<7.7	<77.4	<75.4	<1.6
Isopropylbenzene (Cumene)	µg/L	2.1	ND				1.6	ND		3.9	1.6	3.3	1.4	2.1	2.3	1.1	1.37	1.4	1.99	0.71	1.8
Lead	µg/L	ND	ND	ND	ND	ND	ND	ND	ND	4.1	3.2	3.4	5.4	2.8	2.2	ND	5.4	2	2.5	<2.6	<2.6
Lithium	µg/L									162	99.6	119	161	219	190	128	67.9	118	317	169	151
m&p-Xylene	µg/L	ND	3.7				4.5			5.6	5.8	8.7	9.3	7.7	6.8	4.8	1.09	1.9	5.16	<2.15	3.9
Magnesium	µg/L	156000	237000	190000	118000	268000	252000	302000	165000	251000	148000	210000	272000	278000	268000	278000	242000	244000	284000	249000	263000
Manganese	µg/L	1710	1100	1900	3700	1780	1660	3990	1760	1660	6590	11000	3740	2100	1920	2630	1340	1040	802	1140	1650
Mercury	µg/L	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	<0.066	<0.066	<0.066	<0.045	<0.045
Methoxychlor	µg/L	ND	ND	ND	ND	ND	ND	ND													
Methyl acetate	µg/L									ND	2.5	ND	ND	ND	ND	ND	<1.29	<3.8	<1.29	<6.45	
Methylcyclohexane	µg/L																<0.660				
Methylene Chloride	µg/L	ND	ND				ND	ND		1.3	12.2	13.8	5	ND	ND	6.6	0.943	<2.2	0.479	<2.15	0.98
Methyl-tert-butyl ether	µg/L	ND	1				2.9	ND		6.5	1.1	11	1.6	ND	3.8	4.4	21.6	14	1.91	11.3	5.1
Molybdenum	µg/L	ND	ND	ND	ND	ND	ND	ND	ND	ND	21.4	15.3	18.2	9.3	7.4	7.6	4.5	4.2	3.2	4.1	3.8
Naphthalene	µg/L	ND			ND					4	3	3.6	6.9	9.9	10.7	4.64	1.48	1.6	10.2	5.66	3.9
n-Butylbenzene	µg/L	ND	ND				ND	ND		ND	ND	ND	ND	ND	ND	ND	<0.157	<0.31	<0.157	<0.785	<0.32
n-Hexane	µg/L																<0.749				
Nickel	µg/L	ND	28.6	32.2	81.3	44.6	39.8	107	24.2	39.5	55.9	86	80.5	74.8	82.5	124	63.7	95.7	41.1	50.7	56.4
Nitrate as N	mg/L														ND						
Nitrobenzene	µg/L	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	<54.3	<10.7	<107	<105	<1.7
Nitrogen, Ammonia	mg/L	230	119	92.4	4.6	116	128	73.6											194		
Nitrogen, Kjeldahl, Total	mg/L	63.3	64.8	97.3	11	134	125	83.1											206		
Nitrogen, NO2 plus NO3	mg/L	ND	ND	ND	ND	ND	ND	0.22	0.068	ND	ND	ND	0.35	0.12		ND	<0.095	<0.078	0.12	<0.078	0.088
N-Nitrosodimethylamine	µg/L	ND							ND							ND				<71.0	<1.1
N-Nitroso-di-n-propylamine	µg/L	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	<57.3	<11.3	<113	<110	<1.5
N-Nitrosodiphenylamine	µg/L	ND	ND	ND	ND	ND	ND	ND		ND	ND	ND	ND	ND	ND	ND	<174	<34.5	<345	<336	<1.7
n-Propylbenzene	µg/L	ND	ND				ND	ND		0.27	0.18	0.36	0.3	ND	ND	ND	0.117	<0.36	0.19	<0.497	<0.36
o-Xylene	µg/L	1.5	1.9				3.4			3.6	3.1	4.6	5.2	4.2	3.4	2.6	1.12	1.4	3.21	1.18	2.5
PCB-1016 (Aroclor 1016)	µg/L	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	<0.040	<0.040	<0.040	<0.038	<0.038
PCB-1221 (Aroclor 1221)	µg/L	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	<0.041	<0.041	<0.041	<0.039	<0.039
PCB-1232 (Aroclor 1232)	µg/L	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	<0.035	<0.035	<0.035	<0.042	<0.041
PCB-1242 (Aroclor 1242)	µg/L	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	<0.036	<0.036	<0.036	<0.041	<0.041
PCB-1248 (Aroclor 1248)	µg/L	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	<0.039	<0.039	<0.039	<0.047	<0.047
PCB-1254 (Aroclor 1254)	µg/L	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	<0.041	<0.041	<0.041	<0.039	<0.039
PCB-1260 (Aroclor 1260)	µg/L	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	<0.034	<0.034	<0.034	<0.047	<0.047
PCB-1262 (Aroclor 1262)	µg/L	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	<0.035	<0.035	<0.035	<0.046	<0.046

Dem-Con Landfill SW-290
5-year Leachate Sample Results

Parameter	Unit	1/26/17	4/26/17	7/20/17	10/24/17	1/10/18	4/26/18	7/31/18	10/30/18	1/15/19	4/17/19	7/24/19	10/29/19	1/28/20	4/23/20	7/10/20	10/21/20	1/28/21	4/5/21	7/26/21	10/25/21
PCB-1268 (Aroclor 1268)	µg/L	ND	ND	ND	ND	ND	ND	ND													
Pentachlorophenol	µg/L	ND	ND	ND	ND	ND	ND	ND	ND	ND	31.2	ND	ND	ND	ND	ND	<230	<45.5	<455	<443	<4.3
pH at 25 Degrees C	pH units	7.2	7.3	7.3	7.4	7.6	7.4	7.2	7.2	7.5	7.1	7.6	7.3	7.3	7.4	7.3	7.5	7.5	7.6	7.9	7.5
Phenanthrene	µg/L	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	<48.1	<9.5	<95.3	<92.8	<1.7
Phenol	µg/L	ND	ND	ND	ND	ND	ND	170	23.5	19.7	86.1	114	303	345	219	64	<16.2	<3.2	<32.1	<31.2	<0.56
Phosphorus as PO4	mg/L																		27.1		
p-Isopropyltoluene	µg/L																0.707		<0.120	<0.600	
Potassium	µg/L	445000	1300000	989000	160000	1390000	1380000	1170000	603000	1230000	866000	760000	895000	947000	889000	777000	581000	944000	1650000	904000	719000
Pyrene	µg/L	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	<60.6	<12.0	<120	<117	<1.8
Pyridine	µg/L	ND																			
sec-Butylbenzene	µg/L	ND	ND				ND	ND									<0.125		<0.125	<0.625	
Selenium	µg/L	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	<5.8	7.2	<5.8	<5.9	<5.9
Silica	µg/L	48200	51300	46000	56700	54300	49000	60200											63300	73900	77800
Silver	µg/L	ND	ND	ND	ND	ND	ND	ND											<0.38	<8.2	<3.3
Sodium	µg/L	345000	776000	565000	588000	774000	825000	1130000	429000	814000	495000	635000	652000	670000	689000	750000	745000	967000	940000	755000	769000
Strontium	µg/L																		2200	1480	2080
Styrene	µg/L	ND	ND				ND	ND									<0.118		<0.118		
Sulfate	mg/L	209	201	251	520	555	632	50.7											182		
tert-Butylbenzene	µg/L	ND	ND				ND	ND		ND	ND	ND	ND	ND	ND	ND	<0.127	<0.26	0.199	<0.635	<0.34
Tetrachloroethene	µg/L	ND	ND				ND	ND		ND	ND	0.35	ND	ND	ND	ND	<0.300	0.53	<0.300	<1.50	<0.50
Tetrahydrofuran	µg/L	190	160				309	ND		426	265	829	1150	809	1030	919	132	99	322	471	732
Thallium	µg/L	ND	ND	ND	ND	ND	ND	ND	ND	6	ND	5.7	6.9	ND	ND	ND	<5.5	<5.5	<5.5	4.6	<4.3
Tin	µg/L									4.2	ND	5.5	ND	3.6	5.8	4.8	<3.2	3.6	<3.2	<2.3	5.1
Titanium	µg/L									160	58.9	57.3	137	152	141	77.9	42	74.6	178	114	94.9
Toluene	µg/L	5	5.3				7.9	ND		9	22.5	57.3	53.2	64.1	28.7	52.9	2.36	1.2	9.24	4.14	5.1
Total dissolved solids	mg/L	3070	4900	4460	2940	6670	4400	3400													
Total phosphorus	mg/L	1.9	5.8	4.4	14.1	4.5	16.1	4.2											8.9		
Total Suspended Solids	mg/L	19	12	14	10	ND	ND	18	13	ND	11	26	29	19	8	19	12	<5.0	18	7.1	<5.0
Toxaphene	µg/L	ND	ND	ND	ND	ND	ND	ND													
trans-1,2-Dichloroethene	µg/L	ND	ND				ND	ND		0.34	0.32	0.95	0.96	ND	ND	0.48	<0.149	<0.38	<0.149	<0.745	<0.37
trans-1,3-Dichloropropene	µg/L	ND	ND				ND	ND		ND	ND	ND	ND	ND	ND	ND	<0.118	<0.63	<0.118	<0.590	<0.26
trans-1,4-Dichloro-2-butene	µg/L									ND	ND	ND	ND	ND	ND	ND	<0.467	<3.3	<0.467	<2.34	<1.6
Trichloroethene	µg/L	ND	0.29				0.3	ND		0.15	0.4	0.66	1.1	ND	ND	ND	<0.190	<0.30	0.202	<0.950	<0.17
Trichlorofluoromethane	µg/L	1	ND				ND	ND		ND	0.74	ND	1.1	0.63	ND	ND	<0.160	<0.25	<0.160	<0.800	<0.60
Uranium	µg/L									ND	0.73	0.68	0.62	0.22	0.74	0.22	0.48	0.23	<0.14	<1.1	<0.44
Vinyl acetate	µg/L																<0.692				
Vinyl chloride	µg/L	0.28	0.25				0.28	ND		ND	0.38	ND	ND	ND	ND	0.87	<0.234	0.75	<0.234	<1.17	0.68
Xylene (Total)	µg/L	ND	5.7				7.9	ND		9.3	8.9	13.3	14.5	11.9	10.2	7.4	2.21	3.3	8.37	1.18	6.4
Zinc	µg/L	41.7	ND	ND	ND	ND	ND	39.6	8.6	38.9	41.2	95.8	87	28.8	20.5	13.4	119	<6.8	<6.8	4.9	<3.1

Attachment 7

SECTION 21

WATER SUPPLY WELL NETWORK: WELL LOGS

Minnesota Unique Well Number

540281

County Scott
Quad Shakopee
Quad ID 105D

MINNESOTA DEPARTMENT OF HEALTH

WELL AND BORING REPORT

Minnesota Statutes Chapter 1031

Entry Date 10/06/1994
Update Date 12/31/2020
Received Date

Well Name	Township	Range	Dir Section	Subsection
BRYAN ROCK	115	23	W 21	CAADDA

Elevation 800 ft. **Elev. Method** 7.5 minute topographic map (+/- 5 feet)

Address

C/W 13580 JOHNSON MEMORIAL DR SHAKOPEE MN

Stratigraphy Information

Geological Material	From	To (ft.)	Color	Hardness
GRAVEL	0	21	BROWN	HARD
LIMESTONE	21	65	RED	HARD
LIMESTONE	65	90	RED	HARD
SANDSTONE	90	180	BROWN	SOFT
SANDSTONE	180	187	GREEN	MEDIUM
SANDSTONE	187	248	GREEN	MEDIUM
SANDSTONE	248	362	GREEN	MEDIUM
SANDSTONE	362	400	GREEN	MEDIUM

Remarks

GAMMA LOGGED 3-30-1994.
SEALED 10-14-2020 BY 1445

Well Depth	Depth Completed	Date Well Completed
400 ft.	400 ft.	04/22/1994

Drill Method Non-specified Rotary **Drill Fluid** Bentonite

Use industrial **Status** Sealed

Well Hydrofractured? **Yes** ☐ **No** ☐ **From** **To**

Casing Type Step down **Joint** Welded
Drive Shoe? **Yes** ☒ **No** ☐ **Above/Below** 2 ft.

Casing Diameter **Weight**
8 in. To 190 ft. lbs./ft.
12 in. To 21 ft. lbs./ft.

Hole Diameter
17 in. To 21 ft.
12 in. To 190 ft.
8 in. To 400 ft.

Open Hole From 190 ft. To 400 ft.
Screen? ☐ **Type** **Make**

Static Water Level
40 ft. land surface Measure 04/22/1994

Pumping Level (below land surface)
40 ft. hrs. Pumping at 0 g.p.m.

Wellhead Completion
Pitless adapter manufacturer WHITEWATER Model
☐ Casing Protection ☐ 12 in. above grade
☐ At-grade (Environmental Wells and Borings ONLY)

Grouting Information Well Grouted? ☒ Yes ☐ No ☐ Not Specified

Material	Amount	From	To
	0	8 ft.	190 ft.

Nearest Known Source of Contamination
300 feet North Direction Landfill Type
Well disinfected upon completion? ☐ Yes ☐ No

Pump ☐ Not Installed Date Installed 04/08/1994
Manufacturer's name AERMOTOR
Model Number 2366139020 HP 15 Volt 440
Length of drop pipe 147 ft Capacity 300 g.p. Typ Submersible

Abandoned
Does property have any not in use and not sealed well(s)? ☐ Yes ☐ No

Variance
Was a variance granted from the MDH for this well? ☐ Yes ☐ No

Miscellaneous
First Bedrock Prairie Du Chien Group Aquifer multiple
Last Strat Wonewoc Sandstone Depth to Bedrock 21 ft
Located by Minnesota Geological Survey
Locate Method Digitized - scale 1:24,000 or larger (Digitizing Table)
System UTM - NAD83, Zone 15, Meters X 453125 Y 4955704
Unique Number Verification Information from Input Date 03/10/1995

Angled Drill Hole

Well Contractor

Bohn Well Co.	70350	MILLER, M.
Licensee Business	Lic. or Reg. No.	Name of Driller

Minnesota Unique Well Number

272749

County Scott
Quad Shakopee
Quad ID 105D

MINNESOTA DEPARTMENT OF HEALTH
WELL AND BORING REPORT
Minnesota Statutes Chapter 1031

Entry Date 05/22/2013
Update Date 03/03/2017
Received Date

Well Name	Township	Range	Dir Section	Subsection
	115	23	W 21	AADBCB

Elevation 818 ft. **Elev. Method** 7.5 minute topographic map (+/- 5 feet)

Address

Well 13162 JOHNSON MEMORIAL HY SHAKOPEE MN 55379

Stratigraphy Information

Geological Material	From	To (ft.)	Color	Hardness
GLACIAL DRIFT	0	166		
PRAIRIE DU CHIEN	166	170		
JORDAN SANDSTONE	170	197		

Well Depth 197 ft. **Depth Completed** 197 ft. **Date Well Completed**

Drill Method **Drill Fluid**

Use domestic **Status** Sealed

Well Hydrofractured? **Yes** ☐ **No** ☐ **From** **To**

Casing Type Single casing **Joint**
Drive Shoe? **Yes** ☐ **No** ☐ **Above/Below**

Casing Diameter **Weight**
4.5 in. To 187 ft. lbs./ft.

Open Hole From 187 ft. To 197 ft.
Screen? ☐ **Type** **Make**

Static Water Level
96 ft. land surface Measure 05/22/2013

Pumping Level (below land surface)

Wellhead Completion
Pitless adapter manufacturer Model
☐ Casing Protection ☐ 12 in. above grade
☐ At-grade (Environmental Wells and Borings ONLY)

Grouting Information Well Grouted? ☐ Yes ☐ No ☒ Not Specified

Nearest Known Source of Contamination
feet Direction Type
Well disinfected upon completion? ☐ Yes ☐ No

Pump ☐ Not Installed Date Installed
Manufacturer's name
Model Number HP Volt
Length of drop pipe ft Capacity g.p. Typ

Abandoned
Does property have any not in use and not sealed well(s)? ☐ Yes ☐ No

Variance
Was a variance granted from the MDH for this well? ☐ Yes ☐ No

Miscellaneous
First Bedrock Jordan Sandstone Aquifer Jordan
Last Strat Jordan Sandstone Depth to Bedrock 170 ft
Located by Minnesota Geological Survey
Locate Method Digitization (Screen) - Map (1:24,000) (15 meters or
System UTM - NAD83, Zone 15, Meters X 453778 Y 4956405
Unique Number Verification Information from Input Date 05/22/2013

Angled Drill Hole

Remarks
MULTI TOOL LOGGED 5-22-2013. LOGGED FOR STRAT.
WELL WAS IN A WELL PIT WITH A MAN HOLE COVER.
WELL SEALED BY BOHN 5/31/13 (H309285).
SEALED 05-31-2013 BY 1445.

Well Contractor
Minnesota Geological Survey MGS
Licensee Business Lic. or Reg. No. Name of Driller

Minnesota Unique Well Number

796915

County Scott
Quad Shakopee
Quad ID 105D

MINNESOTA DEPARTMENT OF HEALTH

WELL AND BORING REPORT

Minnesota Statutes Chapter 1031

Entry Date 09/18/2013
Update Date 02/05/2014
Received Date 11/27/2013

Well Name	Township	Range	Dir	Section	Subsection
DEM CON	115	23	W	21	AADBBC

Elevation 818 ft. **Elev. Method** 7.5 minute topographic map (+/- 5 feet)

Address

C/W 13161 DEM CON DR SHAKOPEE MN 55379

Stratigraphy Information

Geological Material	From	To (ft.)	Color	Hardness
SAND & GRAVEL	0	168	BROWN	SOFT
LIME	168	172	RED	MEDIUM
SANDROCK	172	250	BROWN	MEDIUM

Remarks

DRILLING FLUID: BENTONITE AND FOAM.
PUMP MANUFACTURER: BERKELY PUMP END.

Well Depth	Depth Completed	Date Well Completed
250 ft.	250 ft.	09/07/2013

Drill Method Non-specified Rotary **Drill Fluid** Additive (+ Bentonite)

Use commercial **Status** Active

Well Hydrofractured? Yes ☐ No ☒ **From** **To**

Casing Type Single casing **Joint** Welded
Drive Shoe? Yes ☒ No ☐ **Above/Below**

Casing Diameter **Weight** **Hole Diameter**
18 in. To 184 ft. 70.5 lbs./ft. 24 in. To 183 ft.
17 in. To 250 ft.

Open Hole From 183 ft. To 250 ft.
Screen? ☐ **Type** **Make**

Static Water Level
80 ft. land surface Measure 09/07/2013

Pumping Level (below land surface)
160 ft. 12 hrs. Pumping at 1000 g.p.m.

Wellhead Completion
Pitless adapter manufacturer MONITOR Model
☐ Casing Protection ☒ 12 in. above grade
☐ At-grade (Environmental Wells and Borings ONLY)

Grouting Information Well Grouted? ☒ Yes ☐ No ☐ Not Specified

Material	Amount		From	To
neat cement	9.5	Cubic yards	ft.	183 ft.

Nearest Known Source of Contamination
52 feet West Direction Septic tank/drain field Type
Well disinfected upon completion? ☒ Yes ☐ No

Pump ☐ Not Installed Date Installed 10/24/2013
Manufacturer's name CENTRIPRO
Model Number 8M754 HP 75 Volt 460
Length of drop pipe 126 ft Capacity 750 g.p. Typ Submersible

Abandoned
Does property have any not in use and not sealed well(s)? ☐ Yes ☒ No

Variance
Was a variance granted from the MDH for this well? ☐ Yes ☒ No

Miscellaneous
First Bedrock Prairie Du Chien Group Aquifer Jordan
Last Strat Jordan Sandstone Depth to Bedrock 168 ft
Located by Minnesota Department of Health
Locate Method GPS SA Off (averaged) (15 meters)
System UTM - NAD83, Zone 15, Meters X 453765 Y 4956426
Unique Number Verification Info/GPS from data Input Date 09/18/2013

Angled Drill Hole

Well Contractor

Bohn Well Drilling Co., Inc.	1445	FRITZ, R.
Licensee Business	Lic. or Reg. No.	Name of Driller

Minnesota Unique Well Number

809771

County Scott
Quad Shakopee
Quad ID 105D

MINNESOTA DEPARTMENT OF HEALTH

WELL AND BORING REPORT

Minnesota Statutes Chapter 1031

Entry Date
Update Date 02/25/2020
Received Date 07/00/2015

Well Name	Township	Range	Dir Section	Subsection
DEM CON	115	23	W 21	AACABD

Elevation 815 ft. **Elev. Method** Calc from NED (Natl.Elev.Dataset-30m)

Address

Well 13142 DEM CON DR SHAKOPEE MN 55379

Stratigraphy Information

Geological Material	From	To (ft.)	Color	Hardness
SAND ROCKS	0	20	BROWN	MEDIUM
SAND GRAVEL	20	140	BROWN	MEDIUM
BROKEN LIMEROCK	140	143	RED	HARD
LIMEROCK	143	195	RED	HARD
SANDSTONE LIME	195	200	YEL/RED	MEDIUM
SANDSTONE	200	219	YEL/GRN	MEDIUM

Remarks

WELL USE: DOMESTIC, NONCOMMUNITY PWS.
NEAREST KNOWN SOURCE OF CONTAMINATION: POWER.
DRILLERS: LEE WECKMAN & MARTY RADEMACHER.
PREVIOUS USE CODE: DO (DOMESTIC) 2/25/2020.

Well Depth	Depth Completed	Date Well Completed
219 ft.	219 ft.	06/19/2015

Drill Method Non-specified Rotary **Drill Fluid** Bentonite

Use public supply/non-comm.-transient **Status** Active

Well Hydrofractured? Yes ☐ No ☒ From To

Casing Type Step down **Joint** Threaded
Drive Shoe? Yes ☒ No ☐ Above/Below

Casing Diameter	Weight	Hole Diameter
4 in. To 214 ft.	lbs./ft.	12. in. To 143 ft.
8 in. To 143 ft.	lbs./ft.	8 in. To 214 ft.
		4 in. To 219 ft.

Open Hole From 214 ft. To 219 ft.
Screen? ☐ **Type** **Make**

Static Water Level
75 ft. land surface Measure 06/19/2015

Pumping Level (below land surface)
ft. hrs. Pumping at 30 g.p.m.

Wellhead Completion
Pitless adapter manufacturer MONITOR Model
☐ Casing Protection ☐ 12 in. above grade
☐ At-grade (Environmental Wells and Borings ONLY)

Grouting Information Well Grouted? ☒ Yes ☐ No ☐ Not Specified

Material	Amount		From	To
neat cement	4.5	Cubic yards	10 ft.	214 ft.
bentonite	10	Sacks	10 ft.	126 ft.
cuttings			126 ft.	143 ft.

Nearest Known Source of Contamination
12 feet South Direction Other Type
Well disinfected upon completion? ☒ Yes ☐ No

Pump ☐ Not Installed Date Installed 06/19/2015
Manufacturer's name GOULDS
Model Number HP 3 Volt 230
Length of drop pipe 126 ft Capacity 33 g.p. Typ Submersible

Abandoned
Does property have any not in use and not sealed well(s)? ☐ Yes ☒ No

Variance
Was a variance granted from the MDH for this well? ☐ Yes ☒ No

Miscellaneous
First Bedrock Aquifer
Last Strat Depth to Bedrock ft
Located by Minnesota Department of Health
Locate Method GPS SA Off (averaged) (15 meters)
System UTM - NAD83, Zone 15, Meters X 453683 Y 4956430
Unique Number Verification Info/GPS from data Input Date 09/18/2015

Angled Drill Hole

Well Contractor

Licensee Business	Lic. or Reg. No.	Name of Driller
Bohn Well Drilling Co., Inc.	1445	SEE REMARKS

Minnesota Unique Well Number

405973

County Scott
Quad Shakopee
Quad ID 105D

MINNESOTA DEPARTMENT OF HEALTH

WELL AND BORING REPORT

Minnesota Statutes Chapter 1031

Entry Date 02/23/1989
Update Date 02/14/2014
Received Date

Well Name	Township	Range	Dir Section	Subsection
HALLORAN,	115	23	W 21	AAACDA

Elevation 822 ft. **Elev. Method** 7.5 minute topographic map (+/- 5 feet)

Address

C/W 13122 JOHNSON MEMORIAL DR SHAKOPEE MN 55379

Stratigraphy Information

Geological Material	From	To (ft.)	Color	Hardness
SAND & GRAVEL	0	17	BROWN	SOFT
ROCKS, GRAVEL &	17	42	BROWN	HARD
CLAY & ROCKS	42	87	BROWN	SOFT
ROCKS & CLAY	87	139	BROWN	HARD
SAND (FINE)	139	155	BROWN	SOFT
SAND & GRAVEL	155	174	BROWN	SOFT

Remarks

Well Depth 174 ft. **Depth Completed** 174 ft. **Date Well Completed** 07/27/1984

Drill Method Non-specified Rotary **Drill Fluid**

Use domestic **Status** Active

Well Hydrofractured? **Yes** ☐ **No** ☐ **From** **To**

Casing Type Single casing **Joint** Threaded
Drive Shoe? **Yes** ☐ **No** ☐ **Above/Below**

Casing Diameter **Weight**
4 in. To 169 ft. lbs./ft.

Open Hole From ft. To ft.

Screen? ☒ **Type** stainless **Make** JOHNSON

Diameter	Slot/Gauze	Length	Set	
2 in.	12	5 ft.	169 ft.	174 ft.

Static Water Level
120 ft. land surface Measure 07/27/1984

Pumping Level (below land surface)
ft. hrs. Pumping at 35 g.p.m.

Wellhead Completion
Pitless adapter manufacturer Model
☐ Casing Protection ☐ 12 in. above grade
☐ At-grade (Environmental Wells and Borings ONLY)

Grouting Information Well Grouted? ☒ Yes ☐ No ☐ Not Specified

Material	Amount	From	To
bentonite		ft.	ft.

Nearest Known Source of Contamination
feet Direction Type
Well disinfected upon completion? ☒ Yes ☐ No

Pump ☐ Not Installed Date Installed
Manufacturer's name PIONEER
Model Number HP 0.75 Volt 220
Length of drop pipe 147 ft Capacity 10 g.p. Typ Submersible

Abandoned
Does property have any not in use and not sealed well(s)? ☐ Yes ☐ No

Variance
Was a variance granted from the MDH for this well? ☐ Yes ☐ No

Miscellaneous
First Bedrock Aquifer Quat. buried
Last Strat sand +larger-brown Depth to Bedrock ft
Located by Minnesota Geological Survey
Locate Method Digitization (Screen) - Map (1:24,000) (15 meters or
System UTM - NAD83, Zone 15, Meters X 453836 Y 4956499
Unique Number Verification Address verification Input Date 07/26/2005

Angled Drill Hole

Well Contractor

Leuthner Well Co.	10125	SCHMIEG, K.
Licensee Business	Lic. or Reg. No.	Name of Driller

Minnesota Unique Well Number

610403

County Scott
Quad Shakopee
Quad ID 105D

MINNESOTA DEPARTMENT OF HEALTH

WELL AND BORING REPORT

Minnesota Statutes Chapter 1031

Entry Date 03/22/1999
Update Date 03/10/2014
Received Date

Well Name	Township	Range	Dir Section	Subsection
ANCHOR BLOCK 115	115	23	W 21	ADCBAD

Elevation 803 ft. **Elev. Method** 7.5 minute topographic map (+/- 5 feet)

Address

Contact 13450 169 HY SHAKOPEE MN 55379

Well 13450 JOHNSON MEMORIAL DR SHAKOPEE MN 55379

Stratigraphy Information

Geological Material	From	To (ft.)	Color	Hardness
GRAVEL BOULDERS	0	40	BROWN	HARD
CLAY & GRAVEL	40	128	BROWN	MEDIUM
LIMEROCK	128	166	BROWN	HARD
SANDSTONE	166	300	WHITE	MEDIUM

Remarks

Well Depth 300 ft. **Depth Completed** 300 ft. **Date Well Completed** 01/06/1998

Drill Method Non-specified Rotary **Drill Fluid** Qwik gel

Use public supply/non-comm.-transient **Status** Active

Well Hydrofractured? **Yes** ☐ **No** ☐ **From** **To**

Casing Type Step down **Joint** Welded

Drive Shoe? **Yes** ☒ **No** ☐ **Above/Below**

Casing Diameter **Weight** **Hole Diameter**

4 in. To 178 ft. 11 lbs./ft. 10. in. To 128 ft.
8 in. To 128 ft. 28 lbs./ft. 8 in. To 176 ft.
4 in. To 300 ft.

Open Hole From 178 ft. To 300 ft.

Screen? ☐ **Type** **Make**

Static Water Level

78 ft. land surface Measure 01/06/1998

Pumping Level (below land surface)

Wellhead Completion

Pitless adapter manufacturer MONITOR Model SPK
☐ Casing Protection ☐ 12 in. above grade
☐ At-grade (Environmental Wells and Borings ONLY)

Grouting Information Well Grouted? ☒ Yes ☐ No ☐ Not Specified

Material	Amount		From	To
neat cement	6	Cubic yards	0 ft.	178 ft.

Nearest Known Source of Contamination

28 feet South Direction Septic tank/drain field Type

Well disinfected upon completion? ☒ Yes ☐ No

Pump ☐ Not Installed Date Installed 01/06/1998

Manufacturer's name GRUNDFOS
Model Number 75S - 75 - HP 7.5 Volt 440
Length of drop pipe 147 ft Capacity 75 g.p. Typ Submersible

Abandoned

Does property have any not in use and not sealed well(s)? ☐ Yes ☒ No

Variance

Was a variance granted from the MDH for this well? ☐ Yes ☒ No

Miscellaneous

First Bedrock Prairie Du Chien Group Aquifer Jordan
Last Strat Jordan Sandstone Depth to Bedrock 128 ft
Located by Minnesota Department of Health
Locate Method Digitization (Screen) - Map (1:24,000) (15 meters or
System UTM - NAD83, Zone 15, Meters X 453623 Y 4956032
Unique Number Verification Input Date 03/24/1999

Angled Drill Hole

Well Contractor

Licensee Business	Lic. or Reg. No.	Name of Driller
Gary's Well Co.	70417	SCHWICH, G.

Minnesota Unique Well Number

759599

County Scott
Quad Shakopee
Quad ID 105D

MINNESOTA DEPARTMENT OF HEALTH

WELL AND BORING REPORT

Minnesota Statutes Chapter 1031

Entry Date 12/05/2008
Update Date 03/10/2014
Received Date 04/09/2009

Well Name	Township	Range	Dir Section	Subsection
ANCHOR BLOCK 115	23	W 21		DBAAAC

Elevation 805 ft. **Elev. Method** 7.5 minute topographic map (+/- 5 feet)

Address

Well 13450 169 HY SHAKOPEE MN 55379

Stratigraphy Information

Geological Material	From	To (ft.)	Color	Hardness
GRAVEL/ROCKS	0	30	BROWN	MEDIUM
GRAVEL/SAND	30	42	BROWN	SOFT
LIMESTONE	42	63	YELLOW	HARD
LIMESTONE	63	105	BROWN	HARD
SANDSTONE	105	210	WHITE	SOFT

Remarks

Well Depth	Depth Completed	Date Well Completed
210 ft.	210 ft.	11/26/2008

Drill Method Non-specified Rotary **Drill Fluid** Bentonite

Use public supply/non-comm.-transient **Status** Active

Well Hydrofractured? Yes ☐ No ☐ **From** **To**

Casing Type Single casing **Joint** Welded
Drive Shoe? Yes ☒ No ☐ **Above/Below**

Casing Diameter **Weight** **Hole Diameter**

6 in. To 120 ft. lbs./ft.

13 in. To 120 ft.
6 in. To 210 ft.

Open Hole From 120 ft. To 210 ft.
Screen? ☐ **Type** **Make**

Static Water Level
82 ft. land surface Measure 11/26/2008

Pumping Level (below land surface)
86 ft. 2 hrs. Pumping at 125 g.p.m.

Wellhead Completion
Pitless adapter manufacturer BAKER Model
☐ Casing Protection ☒ 12 in. above grade
☐ At-grade (Environmental Wells and Borings ONLY)

Grouting Information Well Grouted? ☒ Yes ☐ No ☐ Not Specified

Material	Amount		From	To
neat cement	95	Sacks	ft.	120 ft.

Nearest Known Source of Contamination
50 feet West Direction Septic tank/drain field Type
Well disinfected upon completion? ☒ Yes ☐ No

Pump ☐ Not Installed Date Installed 12/18/2008
Manufacturer's name GRUNDFOS
Model Number 75S75-12 HP 7.5 Volt 460
Length of drop pipe 100 ft Capacity 75 g.p. Typ Submersible

Abandoned
Does property have any not in use and not sealed well(s)? ☐ Yes ☒ No

Variance
Was a variance granted from the MDH for this well? ☐ Yes ☒ No

Miscellaneous
First Bedrock Prairie Du Chien Group Aquifer Jordan
Last Strat Jordan Sandstone Depth to Bedrock 42 ft
Located by Minnesota Department of Health
Locate Method GPS SA Off (averaged) (15 meters)
System UTM - NAD83, Zone 15, Meters X 453510 Y 4955832
Unique Number Verification Info/GPS from data Input Date 12/05/2008

Angled Drill Hole

Well Contractor

EH Renner and Sons, Inc.	1431	PRAUGHT, V.
Licensee Business	Lic. or Reg. No.	Name of Driller

Minnesota Unique Well Number

209939

County Scott
Quad Shakopee
Quad ID 105D

MINNESOTA DEPARTMENT OF HEALTH
WELL AND BORING REPORT
Minnesota Statutes Chapter 1031

Entry Date 02/23/1989
Update Date 10/27/2017
Received Date

Well Name	Township	Range	Dir Section	Subsection
LANO	115	23	W 21	ADABAB

Elevation 820 ft. **Elev. Method** 7.5 minute topographic map (+/- 5 feet)

Address

C/W 3021 133RD ST W SHAKOPEE MN 55379

Stratigraphy Information

Geological Material	From	To (ft.)	Color	Hardness
SAND & GRAVEL	0	230		
ROCK SEMI-HARD	230	240	RED	MEDIUM
ROCK	240	280	VARIED	HARD

Remarks

324-B-8 ALLIS-CHALMERS DEALERSHIP
SEALED 08-30-2017 BY 1445

Well Depth	Depth Completed	Date Well Completed
280 ft.	280 ft.	06/13/1977

Drill Method **Drill Fluid**

Use commercial **Status** Sealed

Well Hydrofractured? Yes ☐ No ☐ From To

Casing Type Single casing **Joint**
Drive Shoe? Yes ☐ No ☐ **Above/Below** 0 ft.

Casing Diameter **Weight**
4 in. To 231 ft. lbs./ft.

Open Hole From 231 ft. To 280 ft.
Screen? ☐ **Type** **Make**

Static Water Level
110 ft. land surface Measure 06/13/1977

Pumping Level (below land surface)

Wellhead Completion
Pitless adapter manufacturer Model
☐ Casing Protection ☐ 12 in. above grade
☐ At-grade (Environmental Wells and Borings ONLY)

Grouting Information Well Grouted? ☐ Yes ☐ No ☒ Not Specified

Nearest Known Source of Contamination
feet Direction Type
Well disinfected upon completion? ☐ Yes ☐ No

Pump ☐ Not Installed Date Installed
Manufacturer's name
Model Number HP 0 Volt
Length of drop pipe ft Capacity g.p. Typ

Abandoned
Does property have any not in use and not sealed well(s)? ☐ Yes ☐ No

Variance
Was a variance granted from the MDH for this well? ☐ Yes ☐ No

Miscellaneous
First Bedrock St.Lawrence Formation Aquifer St.Lawrence-
Last Strat St.Lawrence-Tunnel City Depth to Bedrock 230 ft
Located by Minnesota Geological Survey
Locate Method Digitized - scale 1:24,000 or larger (Digitizing Table)
System UTM - NAD83, Zone 15, Meters X 453832 Y 4956235
Unique Number Verification Input Date 10/09/1995

Angled Drill Hole

Well Contractor

Licensee Business	Lic. or Reg. No.	Name of Driller
Associated Well Co.	27259	

Minnesota Unique Well Number

551318

County Scott
Quad Shakopee
Quad ID 105D

MINNESOTA DEPARTMENT OF HEALTH

WELL AND BORING REPORT

Minnesota Statutes Chapter 1031

Entry Date 04/11/1995
Update Date 08/18/2014
Received Date

Well Name	Township	Range	Dir Section	Subsection
C.H.	115	23	W 21	DDABAB

Elevation 830 ft. **Elev. Method** 7.5 minute topographic map (+/- 5 feet)

Address

C/W 13731 JOHNSON MEMORIAL DR SHAKOPEE MN

Stratigraphy Information

Geological Material	From	To (ft.)	Color	Hardness
CLAY, GRAVEL	0	5	YEL/BRN	
GRAVEL CLAY	5	25	BRN/GRN	
SAND GRAVEL	25	105	BROWN	
CLAY	105	135	GRAY	
SHALE	135	158	GRN/GRY	
SHALE ROCK	158	160	VARIED	
LIMESTONE SHALE	160	180	RED/BRN	
SANDSTONE, ROCK	180	220	VARIED	SOFT

Remarks

Well Depth	Depth Completed	Date Well Completed
220 ft.	220 ft.	10/24/1994

Drill Method Non-specified Rotary **Drill Fluid** Bentonite

Use domestic **Status** Active

Well Hydrofractured? **Yes** ☐ **No** ☐ **From** **To**

Casing Type Step down **Joint** Welded
Drive Shoe? **Yes** ☒ **No** ☐ **Above/Below**

Casing Diameter **Weight** **Hole Diameter**
4 in. To 204 ft. 11 lbs./ft. 12. in. To 160 ft.
8 in. To 160 ft. lbs./ft. 7.8 in. To 204 ft.

Open Hole From 204 ft. To 220 ft.
Screen? ☐ **Type** **Make**

Static Water Level
80 ft. land surface Measure 10/24/1994

Pumping Level (below land surface)
80 ft. hrs. Pumping at 50 g.p.m.

Wellhead Completion
Pitless adapter manufacturer WHITEWATER Model S44-5.5
☐ Casing Protection ☐ 12 in. above grade
☐ At-grade (Environmental Wells and Borings ONLY)

Grouting Information Well Grouted? ☒ Yes ☐ No ☐ Not Specified

Material	Amount	From	To
neat cement		10 ft.	204 ft.

Nearest Known Source of Contamination
10 feet North Direction Other Type
Well disinfected upon completion? ☐ Yes ☐ No

Pump ☐ Not Installed Date Installed 11/00/1994
Manufacturer's name FLINT & WALLING
Model Number HP 0.5 Volt 220
Length of drop pipe 100 ft Capacity g.p. Typ Submersible

Abandoned
Does property have any not in use and not sealed well(s)? ☐ Yes ☒ No

Variance
Was a variance granted from the MDH for this well? ☐ Yes ☐ No

Miscellaneous
First Bedrock Aquifer
Last Strat Depth to Bedrock 135 ft
Located by Minnesota Geological Survey
Locate Method Digitization (Screen) - Map (1:24,000) (15 meters or
System UTM - NAD83, Zone 15, Meters X 453798 Y 4955461
Unique Number Verification Information from Input Date 07/13/2005

Angled Drill Hole

Well Contractor

Licensee Business	Lic. or Reg. No.	Name of Driller
Bohn Well Co.	70350	VON BANK, B

Minnesota Unique Well Number

836415

County Scott
Quad Jordan East
Quad ID 90A

MINNESOTA DEPARTMENT OF HEALTH

WELL AND BORING REPORT

Minnesota Statutes Chapter 1031

Entry Date 08/30/2019
Update Date 06/28/2021
Received Date 06/27/2019

Well Name	Township	Range	Dir Section	Subsection
MUMOFF,	115	23	W 21	DDADAC

Elevation 869.4 **Elev. Method** LiDAR 1m DEM (MNDNR)

Address

Well 13745 JOHNSON MEMORIAL DR SHAKOPEE MN 55379

Stratigraphy Information

Geological Material	From	To (ft.)	Color	Hardness
CLAY SAND	0	27	BROWN	
SAND GRAVEL/ROCK	27	173	BROWN	
LIMESTONE	173	195	TAN/RED	
SANDSSTONE	195	233	WHITE	

Remarks

DRILLERS: WECKMAN, L. & RADEMACHER, M.

Well Depth 233 ft. **Depth Completed** 233 ft. **Date Well Completed** 06/17/2019

Drill Method Non-specified Rotary **Drill Fluid** Additive (+ Bentonite)

Use domestic **Status** Active

Well Hydrofractured? Yes ☐ No ☒ **From** **To**

Casing Type Single casing **Joint** Welded

Drive Shoe? Yes ☒ No ☐ **Above/Below**

Casing Diameter **Weight** **Hole Diameter**

4 in. To 219 ft. lbs./ft. — 8 in. To 219 ft.; 3.8 in. To 233 ft.

Open Hole From ft. To ft.

Screen? ☒ **Type** stainless **Make** JOHNSON

Diameter	Slot/Gauze	Length	Set	
3 in.		16 ft.	217 ft.	ft.

Static Water Level

131 ft. land surface Measure 06/17/2019

Pumping Level (below land surface)

ft. hrs. Pumping at 25 g.p.m.

Wellhead Completion

Pitless adapter manufacturer MONITOR Model

☐ Casing Protection ☐ 12 in. above grade

☐ At-grade (Environmental Wells and Borings ONLY)

Grouting Information Well Grouted? ☒ Yes ☐ No ☐ Not Specified

Material	Amount		From	To
neat cement	30	Sacks	10 ft.	219 ft.

Nearest Known Source of Contamination

40 feet West Direction Other Type

Well disinfected upon completion? ☒ Yes ☐ No

Pump ☐ Not Installed Date Installed 06/17/2019

Manufacturer's name FLINT & WALLING

Model Number HP 0.75 Volt 220

Length of drop pipe 147 ft Capacity 10 g.p. Typ Submersible

Abandoned

Does property have any not in use and not sealed well(s)? ☐ Yes ☒ No

Variance

Was a variance granted from the MDH for this well? ☐ Yes ☒ No

Miscellaneous

First Bedrock Aquifer

Last Strat Depth to Bedrock ft

Located by Minnesota Department of Health

Locate Method GPS SA Off (averaged) (15 meters)

System UTM - NAD83, Zone 15, Meters X 453882 Y 4955314

Unique Number Verification Info/GPS from data Input Date 08/30/2019

Angled Drill Hole

Well Contractor

Bohn Well Drilling Co., Inc.	1445	SEE REMARKS
Licensee Business	Lic. or Reg. No.	Name of Driller

Minnesota Unique Well No.

248000

County Scott
Quad Jordan East
Quad ID 90A

MINNESOTA DEPARTMENT OF HEALTH

WELL AND BORING RECORD

Minnesota Statutes Chapter 103I

Entry Date 02/23/1989
Update Date 02/14/2014
Received Date

Well Name MN RENAISSANCE FESTIVAL

Township	Range	Dir	Section	Subsections	Elevation
115	23	W	21	CCDADC	775 ft.

Elevation Method 7.5 minute topographic map (+/- 5 feet)

Well Depth 200 ft. **Depth Completed** 200 ft. **Date Well Completed** 06/09/1977

Drilling Method --

Well Address
3630 145TH ST W
SHAKOPEE MN 55379

Drilling Fluid --

Well Hydrofractured? Yes No
From Ft. to Ft.

Use Commercial

Geological Material	Color	Hardness	From	To
DIRT OVERBURDEN	BLACK		0	2
ROCK SHAKOPEE		HARD	2	50
SANDSTONE & BROKEN ROCK			50	155
ROCK	PNK/GRN	HARD	155	200

Casing Type **Joint** No Information **Drive Shoe?** Yes No **Above/Below** 0 **ft.**

Casing Diameter	Weight	Hole Diameter
4 in. to 161 ft.	lbs./ft.	8 in. to 160 ft.

Open Hole from 161 ft. to 200 ft.

Screen NO **Make** **Type**

Diameter	Slot/Gauze	Length	Set Between

Static Water Level
60 ft. from Land surface Date Measured 06/09/1977

PUMPING LEVEL (below land surface)
ft. after hrs. pumping g.p.m.

Well Head Completion
Pitless adapter manufacturer Model
Casing Protection 12 in. above grade
At-grade (Environmental Wells and Borings ONLY)

N O R E M A R K S

Grouting Information Well Grouted? Yes No Not Specified

Located by: Minnesota Geological Survey
Method: Digitized - scale 1:24,000 or larger (Digitizing Table)
Unique Number Verification: N/A
Input Date: 03/25/1996
System: *UTM - Nad83, Zone15, Meters*
X: 452689 **Y:** 4955179

Nearest Known Source of Contamination
__feet __direction __type
Well disinfected upon completion? Yes No

Pump Not Installed Date Installed
Manufacturer's name Model number __ HP 0 Volts
Length of drop Pipe _ft. Capacity _g.p.m Type Material

Abandoned Wells Does property have any not in use and not sealed well(s)? Yes No

Variance Was a variance granted from the MDH for this well? Yes No

Well Contractor Certification
Associated Well Co. — License Business Name
27259 — Lic. Or Reg. No.
Name of Driller

First Bedrock Prairie Du Chien Group
Last Strat St.Lawrence Formation
Aquifer St.Lawrence
Depth to Bedrock 2 **ft.**

County Well Index Online Report **248000**

Printed 3/16/2015
HE-01205-07

115-23-21 ccdadc ~~216772~~

elev. 775±10 ~~561243~~

115-23-28

Permit # 342-B-8A

248000 new number

90

JOB TICKET

Nº 1043

ASSOCIATED WELL DRILLERS
13160 Pioneer Trail
Eden Prairie, Minnesota 5534
Phone 941-1530

Permit No. OXW

Tel. No.

For Minnesota Renaissance Festival

Address Hwy # 169

Job At Dave Pearson

renumbered to 248000

DATE 6/9/77 WORK REQUESTED

Well depth - 200'
Waterlevel - 60'
Casing 4" - 161' 4" casing 0 to 161
2' to Rock 8" hole to 160
Sub Pump @ 120'

DATE DESCRIPTION OF WORK DONE

0-2 black dirt overburden QUUU SOIL
2-50' Rock Shakopee Hard OPDC DLMT 773
50'-155' Sand Stone old broken Rock CJDN SNDS QZTE 725
155'-200' Hard Rock Pink green CSTL DLMT SHLE 620

Aquifer CSTL-CSTL

775
155

Customer Acknowledgment

EMPLOYEE	DATE	HOURS	EMPLOYEE	DATE	HOURS

SECTION 28
WATER SUPPLY WELL NETWORK: WELL LOGS

Minnesota Unique Well Number

211864

County Scott
Quad Jordan East
Quad ID 90A

MINNESOTA DEPARTMENT OF HEALTH
WELL AND BORING REPORT
Minnesota Statutes Chapter 1031

Entry Date 02/23/1989
Update Date 02/12/1996
Received Date

Well Name	Township	Range	Dir Section	Subsection
LINDSTROM,	115	23	W 28	DDDDBC

Elevation 766 ft. **Elev. Method** 7.5 minute topographic map (+/- 5 feet)

Address

C/W 3036 150TH ST W SHAKOPEE MN 55379

Stratigraphy Information

Geological Material	From	To (ft.)	Color	Hardness
CLAY	0	10		
SAND	10	20		
CLAY	20	58		
SANDROCK-LIME	58	63		HARD
SANDROCK	63	127		

Remarks

237-B-8

Well Depth	Depth Completed	Date Well Completed
127 ft.	127 ft.	09/09/1974

Drill Method **Drill Fluid**

Use domestic **Status** Active

Well Hydrofractured? **Yes** ☐ **No** ☐ **From** **To**

Casing Type Single casing **Joint**
Drive Shoe? **Yes** ☐ **No** ☐ **Above/Below** 0 ft.

Casing Diameter **Weight**
5 in. To 76 ft. lbs./ft.

Open Hole From 76 ft. To 127 ft.
Screen? ☐ **Type** **Make**

Static Water Level

Pumping Level (below land surface)

Wellhead Completion
Pitless adapter manufacturer Model
☐ Casing Protection ☐ 12 in. above grade
☐ At-grade (Environmental Wells and Borings ONLY)

Grouting Information Well Grouted? ☐ Yes ☐ No ☒ Not Specified

Nearest Known Source of Contamination
feet Direction Type
Well disinfected upon completion? ☐ Yes ☐ No

Pump ☐ Not Installed Date Installed
Manufacturer's name
Model Number HP 0 Volt
Length of drop pipe ft Capacity g.p. Typ

Abandoned
Does property have any not in use and not sealed well(s)? ☐ Yes ☐ No

Variance
Was a variance granted from the MDH for this well? ☐ Yes ☐ No

Miscellaneous
First Bedrock Jordan Sandstone Aquifer Jordan
Last Strat Jordan Sandstone Depth to Bedrock 58 ft
Located by Minnesota Geological Survey
Locate Method Digitized - scale 1:24,000 or larger (Digitizing Table)
System UTM - NAD83, Zone 15, Meters X 453813 Y 4953563
Unique Number Verification Input Date 01/01/1990

Angled Drill Hole

Well Contractor

Hartmann Well Co.	40174	
Licensee Business	Lic. or Reg. No.	Name of Driller

Minnesota Unique Well Number

709026

County Scott
Quad Jordan East
Quad ID 90A

MINNESOTA DEPARTMENT OF HEALTH

WELL AND BORING REPORT

Minnesota Statutes Chapter 1031

Entry Date 12/17/2004
Update Date 02/06/2012
Received Date 01/18/2005

Well Name	Township	Range	Dir Section	Subsection
DOUCETTE,	115	23	W 28	ADCA

Elevation 790 ft. **Elev. Method** 7.5 minute topographic map (+/- 5 feet)

Address

C/W 14331 JOHNSON MEMORIAL DR SHAKOPEE MN

Stratigraphy Information

Geological Material	From	To (ft.)	Color	Hardness
DIRT	0	8	BLACK	MEDIUM
CLAY & ROCKS	8	41	BROWN	MEDIUM
CLAY & GRAVEL	41	90	GRAY	MEDIUM
CLAY	90	104	GRAY	HARD
CLAY & GRAVEL	104	115	GRAY	SOFT
LIMEROCK	115	118	BROWN	HARD
SANDROCK	118	139	BROWN	SOFT

Remarks

Well Depth	Depth Completed	Date Well Completed
139 ft.	139 ft.	10/22/2004

Drill Method Non-specified Rotary **Drill Fluid** Water

Use domestic **Status** Active

Well Hydrofractured? **Yes** ☐ **No** ☒ **From** **To**

Casing Type Single casing **Joint** Threaded
Drive Shoe? **Yes** ☒ **No** ☐ **Above/Below**

Casing Diameter **Weight** **Hole Diameter**
4 in. To 134 ft. 11 lbs./ft. 10 in. To 134 ft.
4 in. To 139 ft.

Open Hole From ft. To ft.

Screen? ☒ **Type** stainless **Make** JOHNSON

Diameter	Slot/Gauze	Length	Set	
3.5 in.	10	5 ft.	134 ft.	139 ft.

Static Water Level
60 ft. land surface Measure 06/03/2004

Pumping Level (below land surface)

Wellhead Completion
Pitless adapter manufacturer MONITOR Model
☐ Casing Protection ☐ 12 in. above grade
☐ At-grade (Environmental Wells and Borings ONLY)

Grouting Information Well Grouted? ☒ Yes ☐ No ☐ Not Specified

Material	Amount		From	To
neat cement	2	Cubic yards	8 ft.	134 ft.

Nearest Known Source of Contamination
54 feet West Direction Sewer Type
Well disinfected upon completion? ☒ Yes ☐ No

Pump ☐ Not Installed Date Installed 10/22/2004
Manufacturer's name FLINT & WALLING
Model Number 4F27A15 HP 1.5 Volt 230
Length of drop pipe 90 ft Capacity 27 g.p. Typ Submersible

Abandoned
Does property have any not in use and not sealed well(s)? ☐ Yes ☒ No

Variance
Was a variance granted from the MDH for this well? ☐ Yes ☒ No

Miscellaneous
First Bedrock Prairie Du Chien Group Aquifer Jordan
Last Strat Jordan Sandstone Depth to Bedrock 115 ft
Located by Minnesota Department of Health
Locate Method GPS SA Off (averaged) (15 meters)
System UTM - NAD83, Zone 15, Meters X 453616 Y 4954369
Unique Number Verification Tag on well Input Date 12/16/2004

Angled Drill Hole

Well Contractor

Hartmann Well Co.	40174	HARTMANN, B.
Licensee Business	Lic. or Reg. No.	Name of Driller

Minnesota Unique Well Number

211863

County Scott
Quad Jordan East
Quad ID 90A

MINNESOTA DEPARTMENT OF HEALTH
WELL AND BORING REPORT
Minnesota Statutes Chapter 1031

Entry Date 06/15/1990
Update Date 06/02/2014
Received Date

Well Name	**Township**	**Range**	**Dir**	**Section**	**Subsection**
MINN. VALLEY	115	23	W	28	DCDDAB

Elevation 747 ft. **Elev. Method** 7.5 minute topographic map (+/- 5 feet)

Address

C/W 3232 150TH ST W SHAKOPEE MN 55379

Stratigraphy Information

Geological Material	From	To (ft.)	Color	Hardness
DRIFT-CLAY	0	5		
SAND SOME ROCKS	5	9		
SANDROCK	9	123	WHT/YEL	
SANDROCK &	123	127		
SANDROCK &	127	147		HARD

Remarks

Well Depth	**Depth Completed**	**Date Well Completed**
147 ft.	147 ft.	04/10/1972

Drill Method **Drill Fluid**

Use commercial **Status** Active

Well Hydrofractured? **Yes** ☐ **No** ☐ **From** **To**

Casing Type Single casing **Joint**
Drive Shoe? **Yes** ☐ **No** ☐ **Above/Below** 0 ft.

Casing Diameter **Weight**
6 in. To 82 ft. lbs./ft.

Open Hole From 82 ft. To 147 ft.
Screen? ☐ **Type** **Make**

Static Water Level
27 ft. land surface Measure 04/10/1972

Pumping Level (below land surface)

Wellhead Completion
Pitless adapter manufacturer Model
☐ Casing Protection ☐ 12 in. above grade
☐ At-grade (Environmental Wells and Borings ONLY)

Grouting Information Well Grouted? ☐ Yes ☐ No ☒ Not Specified

Nearest Known Source of Contamination
feet Direction Type
Well disinfected upon completion? ☐ Yes ☐ No

Pump ☐ Not Installed Date Installed
Manufacturer's name
Model Number HP 5 Volt
Length of drop pipe ft Capacity g.p. Typ Submersible

Abandoned
Does property have any not in use and not sealed well(s)? ☐ Yes ☐ No

Variance
Was a variance granted from the MDH for this well? ☐ Yes ☐ No

Miscellaneous
First Bedrock Jordan Sandstone Aquifer Jordan-St.
Last Strat St.Lawrence Formation Depth to Bedrock 9 ft
Located by Minnesota Geological Survey
Locate Method Digitized - scale 1:24,000 or larger (Digitizing Table)
System UTM - NAD83, Zone 15, Meters X 453495 Y 4953568
Unique Number Verification Input Date 01/01/1990

Angled Drill Hole

Well Contractor

Hartmann Well Co.	40174	
Licensee Business	Lic. or Reg. No.	Name of Driller

Minnesota Unique Well Number

211865

County Scott
Quad Jordan East
Quad ID 90A

MINNESOTA DEPARTMENT OF HEALTH
WELL AND BORING REPORT
Minnesota Statutes Chapter 1031

Entry Date 02/23/1989
Update Date 02/14/2014
Received Date

Well Name	Township	Range	Dir Section	Subsection
MINN. VALLEY	115	23	W 28	DDCCBA

Elevation 748 ft. **Elev. Method** 7.5 minute topographic map (+/- 5 feet)

Address

C/W 3232 150TH ST W SHAKOPEE MN 55379

Stratigraphy Information

Geological Material	From	To (ft.)	Color	Hardness
CLAY	0	10		
ROCKS	10	12		
SANDROCK	12	110		
LIMESTONE	110	132		V.HARD

Remarks

Well Depth 132 ft. **Depth Completed** 132 ft. **Date Well Completed** 06/26/1976

Drill Method **Drill Fluid**

Use commercial **Status** Active

Well Hydrofractured? **Yes** ☐ **No** ☐ **From** **To**

Casing Type Single casing **Joint**
Drive Shoe? **Yes** ☐ **No** ☐ **Above/Below** 0 ft.

Casing Diameter **Weight**
8 in. To 76 ft. lbs./ft.

Open Hole From 76 ft. To 132 ft.
Screen? ☐ **Type** **Make**

Static Water Level
29 ft. land surface Measure 06/00/1976

Pumping Level (below land surface)
39 ft. hrs. Pumping at 300 g.p.m.

Wellhead Completion
Pitless adapter manufacturer Model
☐ Casing Protection ☐ 12 in. above grade
☐ At-grade (Environmental Wells and Borings ONLY)

Grouting Information Well Grouted? ☐ Yes ☐ No ☒ Not Specified

Nearest Known Source of Contamination
feet Direction Type
Well disinfected upon completion? ☐ Yes ☐ No

Pump ☐ Not Installed Date Installed
Manufacturer's name
Model Number HP 0 Volt
Length of drop pipe ft Capacity g.p. Typ

Abandoned
Does property have any not in use and not sealed well(s)? ☐ Yes ☐ No

Variance
Was a variance granted from the MDH for this well? ☐ Yes ☐ No

Miscellaneous
First Bedrock Jordan Sandstone Aquifer Jordan-St.
Last Strat St.Lawrence Formation Depth to Bedrock 12 ft
Located by Minnesota Geological Survey
Locate Method Digitized - scale 1:24,000 or larger (Digitizing Table)
System UTM - NAD83, Zone 15, Meters X 453574 Y 4953567
Unique Number Verification Input Date 01/01/1990

Angled Drill Hole

Well Contractor
Hartmann Well Co. 40174
Licensee Business Lic. or Reg. No. Name of Driller

Minnesota Unique Well Number

569344

County Scott
Quad Jordan East
Quad ID 90A

MINNESOTA DEPARTMENT OF HEALTH

WELL AND BORING REPORT

Minnesota Statutes Chapter 1031

Entry Date 07/29/1998
Update Date 02/14/2014
Received Date

Well Name	Township	Range	Dir Section	Subsection
NRG	115	23	W 28	DCCDBA

Elevation 738 ft. **Elev. Method** 7.5 minute topographic map (+/- 5 feet)

Address

Well 14800 JOHNSON MEMORIAL DR SHAKOPEE MN

Stratigraphy Information

Geological Material	From	To (ft.)	Color	Hardness
CLAY WITH ROCKS	0	17	GRAY	
SAND ROCK/GRAVEL	17	36		
SHAKOPEE ROCK	36	45		HARD
SAND ROCK/SHALE	45	90	YELLOW	SOFT
ROCK/SHALE	90	162	GREEN	HARD

Remarks

Well Depth	Depth Completed	Date Well Completed
162 ft.	162 ft.	05/08/1996

Drill Method Non-specified Rotary **Drill Fluid** Bentonite

Use domestic **Status** Active

Well Hydrofractured? Yes ☐ No ☐ From To

Casing Type Single casing **Joint**
Drive Shoe? Yes ☒ No ☐ **Above/Below**

Casing Diameter **Weight** **Hole Diameter**

6 in. To 99.8 ft. lbs./ft.

12 in. To 86 ft.
7.5 in. To 99 ft.
4.5 in. To 162 ft.

Open Hole From 99.7 ft. To 162 ft.
Screen? ☐ **Type** **Make**

Static Water Level
30 ft. land surface Measure 04/19/1996

Pumping Level (below land surface)
ft. hrs. Pumping at 200 g.p.m.

Wellhead Completion
Pitless adapter manufacturer Model
☐ Casing Protection ☐ 12 in. above grade
☐ At-grade (Environmental Wells and Borings ONLY)

Grouting Information Well Grouted? ☒ Yes ☐ No ☐ Not Specified

Material	Amount	From	To
neat cement		ft.	99.7 ft.

Nearest Known Source of Contamination
60 feet North Direction Body of water Type
Well disinfected upon completion? ☒ Yes ☐ No

Pump ☐ Not Installed Date Installed 05/08/1996
Manufacturer's name FLINT AND WALLING
Model Number HP 5 Volt
Length of drop pipe 63.2 ft Capacity g.p. Typ Submersible

Abandoned
Does property have any not in use and not sealed well(s)? ☐ Yes ☒ No

Variance
Was a variance granted from the MDH for this well? ☐ Yes ☒ No

Miscellaneous
First Bedrock Jordan Sandstone Aquifer Jordan-St.
Last Strat Jordan-St.Lawrence Depth to Bedrock 36 ft
Located by Minnesota Geological Survey
Locate Method Digitization (Screen) - Map (1:24,000) (15 meters or
System UTM - NAD83, Zone 15, Meters X 453221 Y 4953544
Unique Number Verification Tag on well Input Date 07/13/2005

Angled Drill Hole

Well Contractor

Torgerson Well Co.	27056	TORGERSON, R.
Licensee Business	Lic. or Reg. No.	Name of Driller

Minnesota Unique Well Number

233116

County Scott
Quad Jordan East
Quad ID 90A

MINNESOTA DEPARTMENT OF HEALTH
WELL AND BORING REPORT
Minnesota Statutes Chapter 1031

Entry Date 02/11/1988
Update Date 08/07/2018
Received Date

Well Name	Township	Range	Dir Section	Subsection
GRANZOW,	115	23	W 28	AABDBB

Elevation 804 ft. **Elev. Method** LiDAR 1m DEM (MNDNR)

Address

C/W MN

Stratigraphy Information

Geological Material	From	To (ft.)	Color	Hardness
SHAKOPEE ROCK	0	90		
JORDAN SANDROCK	90	150		

Remarks

SAME AS UNIQUE NO. 207444.
DNR OBWELL 70009.
SEALED 3-14-2018 BY 1622.

Well Depth	Depth Completed	Date Well Completed
150 ft.	150 ft.	04/14/1972

Drill Method Non-specified Rotary **Drill Fluid**

Use irrigation **Status** Sealed

Well Hydrofractured? **Yes** ☐ **No** ☐ **From** **To**

Casing Type Single casing **Joint**
Drive Shoe? **Yes** ☐ **No** ☐ **Above/Below** 0 ft.

Casing Diameter **Weight** **Hole Diameter**
8 in. To 116 ft. lbs./ft. 12. in. To 116 ft.
8 in. To 150 ft.

Open Hole From 116 ft. To 150 ft.
Screen? ☐ **Type** **Make**

Static Water Level
90 ft. land surface Measure 05/02/1972

Pumping Level (below land surface)
95 ft. hrs. Pumping at 300 g.p.m.

Wellhead Completion
Pitless adapter manufacturer Model
☐ Casing Protection ☐ 12 in. above grade
☐ At-grade (Environmental Wells and Borings ONLY)

Grouting Information Well Grouted? ☐ Yes ☐ No ☒ Not Specified

Nearest Known Source of Contamination
feet Direction Type
Well disinfected upon completion? ☐ Yes ☐ No

Pump ☐ Not Installed Date Installed
Manufacturer's name
Model Number HP 0 Volt
Length of drop pipe ft Capacity g.p. Typ

Abandoned
Does property have any not in use and not sealed well(s)? ☐ Yes ☐ No

Variance
Was a variance granted from the MDH for this well? ☐ Yes ☒ No

Miscellaneous
First Bedrock Prairie Du Chien Group Aquifer Jordan
Last Strat Jordan Sandstone Depth to Bedrock 0 ft
Located by Minnesota Geological Survey
Locate Method Digitization (Screen) - Map (1:12,000) (>15 meters)
System UTM - NAD83, Zone 15, Meters X 453632 Y 4954945
Unique Number Verification Information from Input Date 08/07/2018

Angled Drill Hole

Well Contractor

Associated Well Co.	27259	SCHULTA, W.
Licensee Business	Lic. or Reg. No.	Name of Driller

Minnesota Unique Well Number

513892

County: Scott
Quad: Jordan East
Quad ID: 90A

MINNESOTA DEPARTMENT OF HEALTH
WELL AND BORING REPORT
Minnesota Statutes Chapter 1031

Entry Date: 06/09/1993
Update Date: 03/13/2019
Received Date:

Well Name	Township	Range	Dir Section	Subsection
MID-AMERICA	115	23	W 28	CAAAAC

Elevation 755 ft. **Elev. Method** 7.5 minute topographic map (+/- 5 feet)

Address

C/W 3325 145TH ST W MN

Stratigraphy Information

Geological Material	From	To (ft.)	Color	Hardness
TOPSOIL	0	1	BLACK	SOFT
CLAY	1	3	BROWN	MEDIUM
SHAKOPEE ROCK	3	27	ORN/BRN	HARD
JORDAN ROCK	27	130	WHITE	SOFT
SHALE	130	140	BLUE	SOFT
ST LAWRENCE	140	181	PNK/BLU	HARD
FRANCONIA	181	202	BLU/GRN	HARD
FRANCONIA	202	320	BLU/GRN	HARD

Remarks

GAMMA LOGGED 11-13-92
SEALED 10-24-2018 BY 1445

Well Depth	Depth Completed	Date Well Completed
320 ft.	320 ft.	11/12/1992

Drill Method Non-specified Rotary **Drill Fluid** Bentonite

Use public supply/non-community **Status** Sealed

Well Hydrofractured? Yes ☐ No ☐ From To

Casing Type Single casing **Joint** Threaded
Drive Shoe? Yes ☒ No ☐ **Above/Below** 0 ft.

Casing Diameter / **Weight** / **Hole Diameter**

4 in. To 201 ft. lbs./ft. — 9 in. To 201 ft.
4 in. To 320 ft.

Open Hole From 201 ft. To 320 ft.
Screen? ☐ **Type** **Make**

Static Water Level

Pumping Level (below land surface)

35 ft. hrs. Pumping at 50 g.p.m.

Wellhead Completion

Pitless adapter manufacturer Model
☐ Casing Protection ☐ 12 in. above grade
☐ At-grade (Environmental Wells and Borings ONLY)

Grouting Information Well Grouted? ☒ Yes ☐ No ☐ Not Specified

Material	Amount		From	To
neat cement	64	Sacks	0 ft.	201 ft.

Nearest Known Source of Contamination

60 feet North Direction Septic tank/drain field Type
Well disinfected upon completion? ☐ Yes ☐ No

Pump ☐ Not Installed Date Installed 11/16/1992
Manufacturer's name GOULDS
Model Number S75M HP 0.75 Volt 230
Length of drop pipe 70 ft Capacity 15 g.p. Typ Submersible

Abandoned
Does property have any not in use and not sealed well(s)? ☐ Yes ☐ No

Variance
Was a variance granted from the MDH for this well? ☐ Yes ☐ No

Miscellaneous
First Bedrock Prairie Du Chien Group Aquifer St.Lawrence-
Last Strat St.Lawrence Formation Depth to Bedrock 3 ft
Located by Minnesota Geological Survey
Locate Method Digitization (Screen) - Map (1:24,000) (15 meters or
System UTM - NAD83, Zone 15, Meters X 453058 Y 4954225
Unique Number Verification Information from Input Date 06/02/2000

Angled Drill Hole

Well Contractor

R.E.S. Well Co.	27276	
Licensee Business	Lic. or Reg. No.	Name of Driller

Minnesota Unique Well Number

404657

County Scott
Quad Jordan East
Quad ID 90A

MINNESOTA DEPARTMENT OF HEALTH
WELL AND BORING REPORT
Minnesota Statutes Chapter 1031

Entry Date 06/15/1990
Update Date
Received Date 04/16/2015

Well Name	Township	Range	Dir Section	Subsection
RENAISSANCE	115	23	W 28	BBAA

Elevation 777 ft. **Elev. Method** Calc from DEM (USGS 7.5 min or equiv.)

Address

C/W 3525 145TH ST W SHAKOPEE MN 55379

Stratigraphy Information

Geological Material	From	To (ft.)	Color	Hardness
SHAKOPEE LIMESTONE	0	80	BROWN	HARD
JORDAN SANDROCK	80	189	WHITE	SOFT
ST. LAWRENCE SHALE	189	236	GREEN	HARD
FRANCONIA SHALE	236	371	GREEN	HARD
GALESVILLE	371	450	WHITE	MEDIUM
EAU CLAIRE SHALE	450	455	GREEN	HARD

Remarks
*1 - BIG WELL.
*2 - SMALL WELL.
600 WELL
BAKERY HILL WELL
BIG WELL
TOTAL PLATE COUNT TNTC 8-25-77

Well Depth	Depth Completed	Date Well Completed
455 ft.	455 ft.	10/14/1983

Drill Method Non-specified Rotary **Drill Fluid**

Use public supply/non-comm.-transient **Status** Active

Well Hydrofractured? **Yes** ☐ **No** ☐ **From** **To**

Casing Type Single casing **Joint** Welded
Drive Shoe? **Yes** ☒ **No** ☐ **Above/Below**

Casing Diameter **Weight** **Hole Diameter**
8 in. To 256 ft. 28.5 lbs./ft. 14 in. To 256 ft.
8 in. To 445 ft.

Open Hole From 256 ft. To 455 ft.
Screen? ☐ **Type** **Make**

Static Water Level
61 ft. Land surface Measure 11/10/1983

Pumping Level (below land surface)
110 ft. 1 hrs. Pumping at 100 g.p.m.

Wellhead Completion
Pitless adapter manufacturer Model
☐ Casing Protection ☒ 12 in. above grade
☐ At-grade (Environmental Wells and Borings ONLY)

Grouting Information Well Grouted? ☒ Yes ☐ No ☐ Not Specified

Material	Amount		From	To
Neat Cement	6.5	Cubic yards	2 ft.	256 ft.

Nearest Known Source of Contamination
600 feet North Direction Type
Well disinfected upon completion? ☒ Yes ☐ No

Pump ☐ Not Installed Date Installed 05/10/1984
Manufacturer's name PIONEER
Model Number P - 300 HP 20 Volt 220
Length of drop pipe 161 ft Capacity 250 g.p. Typ Submersible

Abandoned
Does property have any not in use and not sealed well(s)? ☐ Yes ☐ No

Variance
Was a variance granted from the MDH for this well? ☐ Yes ☐ No

Miscellaneous
First Bedrock Prairie Du Chien Group Aquifer Tunnel City-Eau
Last Strat Eau Claire Formation Depth to Bedrock 0 ft
Located by Minnesota Department of Health
Locate Method GPS SA Off (averaged)
System UTM - Mad83, Zone 15, Meters X 452672 Y 4955007
Unique Number Verification Info/GPS from data Inpute Date 06/06/2005

Angled Drill Hole

Well Contractor

Hartmann Well Co.	40174	JAECKELS, R.
Licensee Business	Lic. or Reg. No.	Name of Driller

Minnesota Unique Well Number

401129

County Scott
Quad Jordan East
Quad ID 90A

MINNESOTA DEPARTMENT OF HEALTH
WELL AND BORING REPORT
Minnesota Statutes Chapter 1031

Entry Date 06/15/1990
Update Date 02/25/2020
Received Date

Well Name	Township	Range	Dir Section	Subsection
MN VALLEY	115	23	W 28	DCDDAD

Elevation 761 ft. **Elev. Method** Calc from DEM (USGS 7.5 min or equiv.)

Address

C/W 14505 JOHNSON MEMORIAL DR SHAKOPEE MN 55379

Stratigraphy Information

Geological Material	From	To (ft.)	Color	Hardness
CLAY	0	18	RED	MEDIUM
CLAY AND SAND	18	82	RED	MEDIUM
SANDROCK	82	120	YELLOW	MEDIUM

Well Depth 120 ft. **Depth Completed** 120 ft. **Date Well Completed** 03/22/1984

Drill Method Non-specified Rotary **Drill Fluid**

Use public supply/non-comm.-transient **Status** Active

Well Hydrofractured? Yes ☐ No ☐ From To

Casing Type Single casing **Joint** Threaded

Drive Shoe? Yes ☒ No ☐ **Above/Below** 1 ft.

Casing Diameter **Weight** **Hole Diameter**

4 in. To 110 ft. 11 lbs./ft. 6 in. To 110 ft.

4 in. To 120 ft.

Open Hole From 110 ft. To 120 ft.

Screen? ☐ **Type** **Make**

Static Water Level

45 ft. land surface Measure 03/22/1984

Pumping Level (below land surface)

Wellhead Completion

Pitless adapter manufacturer MONITOR Model

☐ Casing Protection ☐ 12 in. above grade

☐ At-grade (Environmental Wells and Borings ONLY)

Grouting Information Well Grouted? ☒ Yes ☐ No ☐ Not Specified

Material	Amount	From	To
bentonite		0 ft.	110 ft.
cuttings		ft.	ft.

Nearest Known Source of Contamination

80 feet Southeas Direction Septic tank/drain field Type

Well disinfected upon completion? ☐ Yes ☐ No

Pump ☐ Not Installed Date Installed 03/22/1984

Manufacturer's name PIONEER

Model Number HP 0.75 Volt 220

Length of drop pipe 12 ft Capacity 75 g.p. Typ Submersible

Abandoned

Does property have any not in use and not sealed well(s)? ☐ Yes ☐ No

Variance

Was a variance granted from the MDH for this well? ☐ Yes ☐ No

Miscellaneous

First Bedrock Jordan Sandstone Aquifer Jordan

Last Strat Jordan-Wonewoc Depth to Bedrock 82 ft

Located by Minnesota Department of Health

Locate Method Digitization (Screen) - Map (1:24,000) (15 meters or

System UTM - NAD83, Zone 15, Meters X 453471 Y 4953537

Unique Number Verification Input Date 01/20/1999

Angled Drill Hole

Remarks

PREVIOUS USE CODE: DO (DOMESTIC) 2/25/2020.

Well Contractor

Hartmann Well Co.	40174	JAECKELS, R.
Licensee Business	Lic. or Reg. No.	Name of Driller

Minnesota Well Index Report

401129

Printed on 09/15/2021

HE-01205-15

Scott

W-8

P Office

HX 169

TOP of Well 798.87

well X

FORMATION LOG	COLOR	HARDNESS OF FORMATION	FROM	TO
Clay	Redish	Med	0	14
Gravel	brown	"	14	16
Clay	Yellow	Med	16	21
Sandy clay	Blue	"	21	40
Sandy gravel	Brown	Med	40	56
Coarse gravel	Brown	Hard	56	100
Screen				
5 ft long # 18 slot	2"	ZD		
stainless steel screen, 1 ft 4				
Pipe with leader on top. 2 X 4 Johnson K packer (seal)				

WORK COPY

1. Property Owner's Name: Fowlerville Farmfest(?)
Address: RR 3 Shelbyville(?)

5. Well Depth (completed): 100 ft. Date of Completion: May 19, 84

Drilling method: ☒ Rotary

6. Use: ☒ Domestic

7. Casing Diam.: 4 in. to 95 ft. depth. Threaded ☒ Steel ☒ Height: Surface 1 ft. Weight: 11 lbs/ft. Drive Shoe: Yes X

8. Screen: Make: Johnson. Type: stainless. Slot/Gauze: 18. Dia.: 2". Length: 5 ft. Open hole: none. Set between 95 ft. and 100 ft.

9. Static Water Level: 72 ft. ☒ below land surface. Date Measured: 5-19

10. Pumping Level (below land surface): ___

11. Well Head Completion: ☒ At least 12" above grade

12. Well grouted: ☒ Yes. ☒ Bentonite. Depth: from 0 ft. to 95 ft.

13. Nearest source of possible contamination: None. Well disinfected upon completion? Yes ☒

14. Pump: Date Installed: 5-21-84. Manufacturer's Name: Flint & Walling. Model Number: BA. HP: 1/2. Volts: 220. Length of drop pipe: 85 ft. Capacity: 10 g.p.m. Material of drop pipe: 1¼ galvanized pipe. Type: ☒ Submersible

16. Water Well Contractor's Certification: This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.

Hartmann Well Co. 40194
(Licensed Business Name) (License No.)

308 East Main St, New Prague
Address

Signed: Roger Hartmann Date: 5-24-8?
(Authorized Representative)

Ray Jaeckels
(Name of Driller)

Minnesota Unique Well Number

151599

County Scott
Quad Shakopee
Quad ID 105D

MINNESOTA DEPARTMENT OF HEALTH

WELL AND BORING REPORT

Minnesota Statutes Chapter 1031

Entry Date 02/08/1989
Update Date 02/14/2014
Received Date

Well Name	Township	Range	Dir Section	Subsection
LOUISVILLE	115	23	W 21	AB

Elevation **Elev. Method**

Address

C/W 3601 130TH ST W SHAKOPEE MN

Contact 331 AKERS LA JORDAN MN 55352

Stratigraphy Information

Geological Material	From	To (ft.)	Color	Hardness
PIPE ABOVE GROUND	0	2		
CLAY,GRAVEL	2	17		SOFT
SAND,GRAVEL & CLAY	17	25		SOFT
SAND & GRAVEL	25	54		SOFT
LIME ROCK	54	55		HARD
SAND GRAVEL & CLAY	55	61		SOFT
LIMEROCK	61	108		HARD

Remarks

Dem-Con
W-10

Well Depth	Depth Completed	Date Well Completed
108 ft.	108 ft.	11/05/1986

Drill Method Cable Tool **Drill Fluid**

Use monitor well **Status** Active

Well Hydrofractured? **Yes** ☐ **No** ☐ **From** **To**

Casing Type Step down **Joint** Welded

Drive Shoe? **Yes** ☒ **No** ☐ **Above/Below** 2 ft.

Casing Diameter **Weight** **Hole Diameter**

8 in. To 61 ft. 28.5 lbs./ft. 8 in. To 82 ft.
0 in. To ft. lbs./ft. 4 in. To 108 ft.
4 in. To 82 ft. 11 lbs./ft.

Open Hole From 82 ft. To 106 ft.

Screen? ☐ **Type** **Make**

Static Water Level

80 ft. land surface Measure 11/05/1986

Pumping Level (below land surface)

92 ft. 2 hrs. Pumping at 3 g.p.m.

Wellhead Completion

Pitless adapter manufacturer Model

☐ Casing Protection ☒ 12 in. above grade
☐ At-grade (Environmental Wells and Borings ONLY)

Grouting Information Well Grouted? ☒ Yes ☐ No ☐ Not Specified

Material	Amount		From	To
neat cement	2	Cubic yards	ft.	82 ft.

Nearest Known Source of Contamination

50 feet South Direction Landfill Type

Well disinfected upon completion? ☒ Yes ☐ No

Pump ☐ Not Installed Date Installed

Manufacturer's name GRUNDFUS

Model Number SP1-9 HP 0.5 Volt 230

Length of drop pipe 103 ft Capacity 5 g.p. Typ Submersible

Abandoned

Does property have any not in use and not sealed well(s)? ☐ Yes ☐ No

Variance

Was a variance granted from the MDH for this well? ☐ Yes ☐ No

Miscellaneous

First Bedrock Aquifer
Last Strat Depth to Bedrock ft
Located by
Locate Method
System UTM - NAD83, Zone 15, Meters X Y
Unique Number Verification Input Date

Angled Drill Hole

Well Contractor

Keys Well Co.	62012	KEYS,M.
Licensee Business	Lic. or Reg. No.	Name of Driller

Minnesota Unique Well Number

595728

County Scott
Quad
Quad ID

MINNESOTA DEPARTMENT OF HEALTH

WELL AND BORING REPORT

Minnesota Statutes Chapter 1031

Entry Date 08/07/2009
Update Date 08/07/2009
Received Date

Well Name	Township	Range	Dir Section	Subsection
W-120	115	23	W 21	AAD

Elevation **Elev. Method**

Address

Well 130TH ST W SHAKOPEE MN

Stratigraphy Information

Geological Material	From	To (ft.)	Color	Hardness
GRAVEL	0	5	BROWN	
SILTY SAND / GRAVEL	5	69	BROWN	
SILTY SANDS	69	84	BROWN	
SILTY CLAY	84	104	BROWN	
LIMESTONE / SHALE /	104	135	TAN	
CLAY	135	148	GRAY	
LIMESTONE	148	157	TAN/RED	
SANDSTONE / SHALE	157	163	RED	
SANDSTONE (BUFF)	163	175		

Remarks
W-120

Well Depth	Depth Completed	Date Well Completed
175 ft.	170 ft.	05/08/1997

Drill Method Non-specified Rotary **Drill Fluid** Bentonite

Use remedial **Status**

Well Hydrofractured? **Yes** ☐ **No** ☐ **From** **To**

Casing Type Single casing **Joint** Welded
Drive Shoe? **Yes** ☐ **No** ☒ **Above/Below**

Casing Diameter **Weight** **Hole Diameter**
4 in. To 165 ft. lbs./ft. 8 in. To 175 ft.

Open Hole From ft. To ft.
Screen? ☒ **Type** stainless **Make** WIREWOUND

Diameter	Slot/Gauze	Length	Set	
4 in.	10	5 ft.	165 ft.	170 ft.

Static Water Level
42 ft. land surface Measure 05/08/1997

Pumping Level (below land surface)

Wellhead Completion
Pitless adapter manufacturer Model
☒ Casing Protection ☒ 12 in. above grade
☐ At-grade (Environmental Wells and Borings ONLY)

Grouting Information Well Grouted? ☒ Yes ☐ No ☐ Not Specified

Material	Amount		From	To
neat cement	55	Sacks	ft.	161 ft.

Nearest Known Source of Contamination
feet Direction Type
Well disinfected upon completion? ☐ Yes ☒ No

Pump ☒ Not Installed Date Installed
Manufacturer's name
Model Number HP Volt
Length of drop pipe ft Capacity g.p. Typ

Abandoned
Does property have any not in use and not sealed well(s)? ☐ Yes ☒ No

Variance
Was a variance granted from the MDH for this well? ☐ Yes ☒ No

Miscellaneous
First Bedrock Aquifer
Last Strat Depth to Bedrock ft
Located by
Locate Method
System UTM - NAD83, Zone 15, Meters X Y
Unique Number Verification Input Date

Angled Drill Hole

Well Contractor

Bergerson-Caswell	27058	HOLMEN, GLENN
Licensee Business	Lic. or Reg. No.	Name of Driller

Minnesota Unique Well Number

595729

County Scott
Quad
Quad ID

MINNESOTA DEPARTMENT OF HEALTH
WELL AND BORING REPORT
Minnesota Statutes Chapter 1031

Entry Date
Update Date 08/07/2009
Received Date

Well Name	**Township**	**Range**	**Dir**	**Section**	**Subsection**
W-121 - PAHL,	115	23	W	21	AAC

Elevation **Elev. Method**

Address

Well 3331 AKERS LA SHAKOPEE MN 55352

Stratigraphy Information

Geological Material	From	To (ft.)	Color	Hardness
SANDY CLAY / GRAVEL	0	10	BROWN	
GRAVEL / COBBLES	10	30	BROWN	
GRAVEL / CLAY	30	41	LT. BRN	
GRAVEL	41	50	BROWN	
CLAY / SAND	50	60	GRAY	
GRAVEL / CLAY (BUFF)	60	65		
GRAVEL W/ SOME	65	72		
SANDY CLAY	72	78	GRAY	

Remarks
W-121

Well Depth	**Depth Completed**	**Date Well Completed**
78 ft.	78 ft.	05/06/1997

Drill Method Non-specified Rotary **Drill Fluid** Bentonite

Use remedial **Status**

Well Hydrofractured? **Yes** ☐ **No** ☐ **From** **To**

Casing Type Single casing **Joint** Welded
Drive Shoe? **Yes** ☐ **No** ☒ **Above/Below**

Casing Diameter **Weight** **Hole Diameter**
4 in. To 65 ft. lbs./ft. 8 in. To 78 ft.

Open Hole From ft. To ft.

Screen? ☒ **Type** stainless **Make** WIREWOUND

Diameter	Slot/Gauze	Length	Set	
4 in.	10	5 ft.	65 ft.	70 ft.

Static Water Level
42 ft. land surface Measure 05/06/1997

Pumping Level (below land surface)

Wellhead Completion
Pitless adapter manufacturer Model
☒ Casing Protection ☒ 12 in. above grade
☐ At-grade (Environmental Wells and Borings ONLY)

Grouting Information Well Grouted? ☒ Yes ☐ No ☐ Not Specified

Material	Amount		From	To
neat cement	30	Sacks	ft.	61 ft.

Nearest Known Source of Contamination
feet Direction Type
Well disinfected upon completion? ☐ Yes ☒ No

Pump ☒ Not Installed Date Installed
Manufacturer's name
Model Number HP Volt
Length of drop pipe ft Capacity g.p. Typ

Abandoned
Does property have any not in use and not sealed well(s)? ☐ Yes ☒ No

Variance
Was a variance granted from the MDH for this well? ☐ Yes ☒ No

Miscellaneous
First Bedrock Aquifer
Last Strat Depth to Bedrock ft
Located by
Locate Method
System UTM - NAD83, Zone 15, Meters X Y
Unique Number Verification Input Date

Angled Drill Hole

Well Contractor

Bergerson-Caswell	27058	HOLMEN, GLENN
Licensee Business	Lic. or Reg. No.	Name of Driller

Minnesota Unique Well Number

557380

County Scott
Quad
Quad ID

MINNESOTA DEPARTMENT OF HEALTH

WELL AND BORING REPORT

Minnesota Statutes Chapter 1031

Entry Date 04/20/1995
Update Date 02/14/2014
Received Date

Well Name	Township	Range	Dir Section	Subsection
LOUISVILLE	115	23	W 21	AAD

Elevation **Elev. Method**

Address

C/W 3601 130TH ST W SHAKOPEE MN

Contact 3331 ALERS LA JORDAN MN 55352

Stratigraphy Information

Geological Material	From	To (ft.)	Color	Hardness
GARBAGE	2	73	VARIED	HARD
LIMESTONE	73	136	BROWN	HARD
SANDSTONE	136	147	WHT/BRN	SOFT

Remarks

DC-117

Well Depth	Depth Completed	Date Well Completed
147 ft.	147 ft.	11/00/1994

Drill Method Non-specified Rotary **Drill Fluid** Bentonite

Use monitor well **Status** Active

Well Hydrofractured? **Yes** ☐ **No** ☐ **From** **To**

Casing Type Step down **Joint** Welded
Drive Shoe? **Yes** ☐ **No** ☒ **Above/Below**

Casing Diameter **Weight** **Hole Diameter**

4 in. To 137 ft. lbs./ft. 12 in. To 27 ft.
8 in. To 77 ft. lbs./ft. 8 in. To 147 ft.

Open Hole From ft. To ft.

Screen? ☒ **Type** stainless **Make** JOHNSON

Diameter	Slot/Gauze	Length	Set	
4 in.	10	10 ft.	137 ft.	147 ft.

Static Water Level

115 ft. land surface Measure 11/00/1994

Pumping Level (below land surface)

Wellhead Completion

Pitless adapter manufacturer Model

☐ Casing Protection ☐ 12 in. above grade
☐ At-grade (Environmental Wells and Borings ONLY)

Grouting Information Well Grouted? ☒ Yes ☐ No ☐ Not Specified

Material	Amount		From	To
	4	Cubic yards	2 ft.	128 ft.
neat cement	11	Cubic yards	ft.	77 ft.

Nearest Known Source of Contamination

feet Direction Landfill Type

Well disinfected upon completion? ☐ Yes ☒ No

Pump ☒ Not Installed Date Installed

Manufacturer's name
Model Number HP Volt
Length of drop pipe ft Capacity g.p. Typ

Abandoned

Does property have any not in use and not sealed well(s)? ☐ Yes ☐ No

Variance

Was a variance granted from the MDH for this well? ☐ Yes ☐ No

Miscellaneous

First Bedrock Aquifer
Last Strat Depth to Bedrock 73 ft
Located by
Locate Method
System UTM - NAD83, Zone 15, Meters X Y
Unique Number Verification Input Date

Angled Drill Hole

Well Contractor

Licensee Business	Lic. or Reg. No.	Name of Driller
Bergerson-Caswell	27058	SCHULTZ,C.

Minnesota Unique Well Number

557379

County Scott
Quad
Quad ID

MINNESOTA DEPARTMENT OF HEALTH

WELL AND BORING REPORT

Minnesota Statutes Chapter 1031

Entry Date 04/20/1995
Update Date 02/14/2014
Received Date

Well Name	Township	Range	Dir Section	Subsection
LOUISVILLE	115	23	W 21	AAD

Elevation **Elev. Method**

Address

C/W 3601 130TH ST W SHAKOPEE MN

Contact 3331 AKERS LA JORDAN MN 55352

Stratigraphy Information

Geological Material	From	To (ft.)	Color	Hardness
CLAY	0	2	GRAY	SOFT
GARBAGE	2	73	VARIED	HARD
LIMESTONE	73	146	BRN/RED	HARD
SANDSTONE	146	159	WHT/BRN	MEDIUM

Remarks

DC-118

Well Depth	Depth Completed	Date Well Completed
159 ft.	159 ft.	11/00/1994

Drill Method Non-specified Rotary **Drill Fluid** Bentonite

Use monitor well **Status** Active

Well Hydrofractured? **Yes** ☐ **No** ☐ **From** **To**

Casing Type Step down **Joint** Welded
Drive Shoe? **Yes** ☐ **No** ☒ **Above/Below**

Casing Diameter **Weight** **Hole Diameter**
4 in. To 149 ft. 11 lbs./ft. 12 in. To 75 ft.
8 in. To 75 ft. lbs./ft. 8 in. To 159 ft.

Open Hole From ft. To ft.
Screen? ☒ **Type** slotted pipe **Make** JOHNSON

Diameter	Slot/Gauze	Length	Set	
4 in.	10	10 ft.	149 ft.	159 ft.

Static Water Level
117 ft. land surface Measure 11/00/1994

Pumping Level (below land surface)
159 ft. 4 hrs. Pumping at 25 g.p.m.

Wellhead Completion
Pitless adapter manufacturer Model
☐ Casing Protection ☐ 12 in. above grade
☐ At-grade (Environmental Wells and Borings ONLY)

Grouting Information Well Grouted? ☒ Yes ☐ No ☐ Not Specified

Material	Amount		From	To
neat cement	9	Cubic yards	2 ft.	138 ft.

Nearest Known Source of Contamination
feet Direction Landfill Type
Well disinfected upon completion? ☐ Yes ☒ No

Pump ☒ Not Installed Date Installed
Manufacturer's name
Model Number HP Volt
Length of drop pipe ft Capacity g.p. Typ

Abandoned
Does property have any not in use and not sealed well(s)? ☐ Yes ☐ No

Variance
Was a variance granted from the MDH for this well? ☐ Yes ☐ No

Miscellaneous
First Bedrock Aquifer
Last Strat Depth to Bedrock 73 ft
Located by
Locate Method
System UTM - NAD83, Zone 15, Meters X Y
Unique Number Verification Input Date

Angled Drill Hole

Well Contractor

Bergerson-Caswell	27058	SCHULTZ,C.
Licensee Business	Lic. or Reg. No.	Name of Driller

Minnesota Unique Well Number

557378

County Scott
Quad
Quad ID

MINNESOTA DEPARTMENT OF HEALTH

WELL AND BORING REPORT

Minnesota Statutes Chapter 1031

Entry Date 04/20/1995
Update Date 02/14/2014
Received Date

Well Name	Township	Range	Dir Section	Subsection
LOUISVILLE	115	23	W 21	AAD

Elevation **Elev. Method**

Address

C/W 3601 130TH ST W SHAKOPEE MN

Contact 3331 AKERS LA JORDAN MN 55352

Stratigraphy Information

Geological Material	From	To (ft.)	Color	Hardness
CLAY	0	2	GRAY	SOFT
GARBAGE	2	76	VARIED	HARD
LIMESTONE	76	147	BRN/RED	HARD
SANDSTONE	147	160	WHT/BRN	SOFT

Well Depth 160 ft. **Depth Completed** 160 ft. **Date Well Completed** 11/00/1994

Drill Method Non-specified Rotary **Drill Fluid** Bentonite

Use monitor well **Status** Active

Well Hydrofractured? **Yes** ☐ **No** ☐ **From** **To**

Casing Type Step down **Joint** Welded

Drive Shoe? **Yes** ☐ **No** ☒ **Above/Below**

Casing Diameter **Weight** **Hole Diameter**

4 in. To 147 ft. 11 lbs./ft. 12 in. To 81 ft.

8 in. To 81 ft. lbs./ft. 8 in. To 160 ft.

Open Hole From ft. To ft.

Screen? ☒ **Type** slotted pipe **Make** JOHNSON

Diameter	Slot/Gauze	Length	Set	
4 in.	10	10 ft.	150 ft.	160 ft.

Static Water Level

116 ft. land surface Measure 11/00/1994

Pumping Level (below land surface)

160 ft. 4 hrs. Pumping at 30 g.p.m.

Wellhead Completion

Pitless adapter manufacturer Model

☐ Casing Protection ☐ 12 in. above grade

☐ At-grade (Environmental Wells and Borings ONLY)

Grouting Information Well Grouted? ☒ Yes ☐ No ☐ Not Specified

Material	Amount		From	To
neat cement	8	Cubic yards	2 ft.	143 ft.

Nearest Known Source of Contamination

feet Direction Landfill Type

Well disinfected upon completion? ☐ Yes ☒ No

Pump ☒ Not Installed Date Installed

Manufacturer's name

Model Number HP Volt

Length of drop pipe ft Capacity g.p. Typ

Abandoned

Does property have any not in use and not sealed well(s)? ☐ Yes ☐ No

Variance

Was a variance granted from the MDH for this well? ☐ Yes ☐ No

Miscellaneous

First Bedrock Aquifer

Last Strat Depth to Bedrock 76 ft

Located by

Locate Method

System UTM - NAD83, Zone 15, Meters X Y

Unique Number Verification Input Date

Angled Drill Hole

Well Contractor

Bergerson-Caswell	27058	SCHULTZ,C.
Licensee Business	Lic. or Reg. No.	Name of Driller

Remarks

DC-119

Minnesota Unique Well Number

783164

County Scott
Quad
Quad ID

MINNESOTA DEPARTMENT OF HEALTH

WELL AND BORING REPORT

Minnesota Statutes Chapter 1031

Entry Date 11/22/2011
Update Date 11/28/2011
Received Date 11/03/2011

Well Name	Township	Range	Dir Section	Subsection
MW-04-11	115	23	W 28	DBAB

Elevation **Elev. Method**

Address

Well 13580 JOHNSON MEMORIAL DR SHAKOPEE MN 55379

Stratigraphy Information

Geological Material	From	To (ft.)	Color	Hardness
OVERBURDEN	0	35	BROWN	SOFT
SANDSTONE	35	145	WHITE	MED-HRD
ST LAWRENCE	145	155	WHITE	HARD

Remarks
102150
MW-04-11

Well Depth 155 ft. **Depth Completed** 155 ft. **Date Well Completed** 07/07/2011

Drill Method Vibracore/rotasonic **Drill Fluid** Water

Use monitor well **Status** Active

Well Hydrofractured? **Yes** ☐ **No** ☒ **From** **To**

Casing Type Single casing **Joint** Threaded
Drive Shoe? **Yes** ☒ **No** ☐ **Above/Below**

Casing Diameter **Weight** **Hole Diameter**
2 in. To 103 ft. lbs./ft. 6 in. To 155 ft.

Open Hole From ft. To ft.

Screen? ☒ **Type** stainless **Make** JOHNSON

Diameter	Slot/Gauze	Length	Set	
2 in.	10	10 ft.	103 ft.	113 ft.

Static Water Level
74 ft. land surface Measure 07/07/2011

Pumping Level (below land surface)

Wellhead Completion
Pitless adapter manufacturer Model
☒ Casing Protection ☒ 12 in. above grade
☐ At-grade (Environmental Wells and Borings ONLY)

Grouting Information Well Grouted? ☒ Yes ☐ No ☐ Not Specified

Material	Amount		From	To
neat cement	14	Sacks	ft.	99 ft.

Nearest Known Source of Contamination
feet Direction Type
Well disinfected upon completion? ☐ Yes ☒ No

Pump ☒ Not Installed Date Installed
Manufacturer's name
Model Number HP Volt
Length of drop pipe ft Capacity g.p. Typ

Abandoned
Does property have any not in use and not sealed well(s)? ☐ Yes ☒ No

Variance
Was a variance granted from the MDH for this well? ☐ Yes ☒ No

Miscellaneous
First Bedrock Aquifer
Last Strat Depth to Bedrock ft
Located by
Locate Method
System UTM - NAD83, Zone 15, Meters X Y
Unique Number Verification Input Date

Angled Drill Hole

Well Contractor

Boart Longyear	2022	BUCKENBERGER
Licensee Business	Lic. or Reg. No.	Name of Driller

Minnesota Unique Well Number

783165

County Scott
Quad
Quad ID

MINNESOTA DEPARTMENT OF HEALTH

WELL AND BORING REPORT

Minnesota Statutes Chapter 1031

Entry Date 11/22/2011
Update Date 11/28/2011
Received Date 11/03/2011

Well Name	Township	Range	Dir Section	Subsection
MW-7-11	115	23	W 21	DBDA

Elevation **Elev. Method**

Address

Well 13580 JOHNSON MEMORIAL DR SHAKOPEE MN 55379

Stratigraphy Information

Geological Material	From	To (ft.)	Color	Hardness
SAND & GRAVEL	0	51	GRAY	SOFT
DOLOMITE	51	88	YELLOW	MED-HRD
SANDSTONE	88	151	WHITE	MED-HRD

Remarks
102150
MW-7-11

Well Depth	Depth Completed	Date Well Completed
151 ft.	151 ft.	08/23/2011

Drill Method Non-specified Rotary **Drill Fluid** Bentonite

Use monitor well **Status** Active

Well Hydrofractured? **Yes** ☐ **No** ☒ **From** **To**

Casing Type Single casing **Joint** Threaded
Drive Shoe? **Yes** ☐ **No** ☒ **Above/Below**

Casing Diameter **Weight** **Hole Diameter**
2 in. To 140 ft. lbs./ft. 6 in. To 151 ft.

Open Hole From ft. To ft.

Screen? ☒ **Type** stainless **Make** JOHNSON

Diameter	Slot/Gauze	Length	Set	
2 in.	10	10 ft.	140 ft.	150 ft.

Static Water Level
74 ft. land surface Measure 08/23/2011

Pumping Level (below land surface)

Wellhead Completion
Pitless adapter manufacturer Model
☒ Casing Protection ☒ 12 in. above grade
☐ At-grade (Environmental Wells and Borings ONLY)

Grouting Information Well Grouted? ☒ Yes ☐ No ☐ Not Specified

Material	Amount		From	To
neat cement	19	Sacks	ft.	136 ft.

Nearest Known Source of Contamination
feet Direction Type
Well disinfected upon completion? ☐ Yes ☒ No

Pump ☒ Not Installed Date Installed
Manufacturer's name
Model Number HP Volt
Length of drop pipe ft Capacity g.p. Typ

Abandoned
Does property have any not in use and not sealed well(s)? ☐ Yes ☒ No

Variance
Was a variance granted from the MDH for this well? ☐ Yes ☒ No

Miscellaneous
First Bedrock Aquifer
Last Strat Depth to Bedrock ft
Located by
Locate Method
System UTM - NAD83, Zone 15, Meters X Y
Unique Number Verification Input Date

Angled Drill Hole

Well Contractor

Boart Longyear	2022	DICKINSON, P.
Licensee Business	Lic. or Reg. No.	Name of Driller

5. Submittal/Action requirements

TF 001	**Total Facility**
5.1.1	The Permittee shall submit an annual facility report: Due annually, by the 1st of February. [Minn. R. 7035.2585]
5.1.2	The Permittee shall submit a Spring water monitoring report due annually by June 30th (Minn R. 7035.2815, Subp 14 (P). The content of the report shall include but not be limited to: a summary table of all analytes detected during the sampling event highlighting parameters which exceeded Intervention Limits, Health Risk Limits, and/or surface water standards as they apply to the permit, a groundwater flow map based on groundwater elevations

	measured during sampling activities, a discussion of the analytical results, as well as conclusion and recommendations for future monitoring activities for the site. Submit a spring water monitoring report: Due annually, by the 30th of June. [Minn. R. 7035.2815, subp. 14(P)]
5.1.3	The Permittee shall submit a summer water monitoring report due annually by September 30th (Minn R. 7035.2815, Subp 14 (P). The content of the report shall include but not be limited to: a summary table of all analytes detected during the sampling event highlighting parameters which exceeded Intervention Limits, Health Risk Limits, and/or surface water standards as they apply to the permit, a groundwater flow map based on groundwater elevations measured during sampling activities, a discussion of the analytical results, as well as conclusion and recommendations for future monitoring activities for the site. Submit a summer water monitoring report: Due annually, by the 30th of September. [Minn. R. 7035.2815, subp. 14(P)]
5.1.4	The Permittee shall submit an autumn water monitoring report: Due annually, by the 1st of February. [Minn. R. 7035.2815, subp. 14(P)] within the context of the annual water monitoring report. Submit an autumn water monitoring report: due annually, by the 1st of February. [Minn. R. 7035.2815, subp. 14(P)]
5.1.5	The Permittee shall submit an annual monitoring evaluation report due annually by the 1st of February. (Minn R. 7035.2815, subp 14(Q). The content of the report shall include but not be limited to: a summary table of all analytes detected during the sampling year highlighting parameters which exceeded Intervention Limits, Health Risk Limits (HRL) and/or surface water standards (Standards) as they apply to the permit, an appendix of all analytical results generated for the previous 5 years at the facility, contaminant trend evaluations for contaminants that are exceeding ILs or that appear to be consistently increasing over time, groundwater flow maps based on groundwater elevations measured during all sampling activities conducted during the sampling year of the report, a discussion of the analytical results detected during the year. Discussions should focus on where Intervention Limit/HRL or any other pertinent Standards are being exceeded with explanations for the source of the exceedances. Conclusion and recommendations for future monitoring activities for the site shall also be included based on the findings presented in this report. Submit annual water monitoring evaluation report: Due annually, by the 1st of February. [Minn. R. 7035.2815, subp. 14(Q)]
5.1.6	At a minimum of 180 days before the expiration date of this Permit, the Permittee shall submit an application for permit reissuance: Due 3472 calendar days after Permit Issuance Date. [Minn. R. 7001.0040, subp. 3]

6. Monitoring stations

Monitoring type	Station name	Status
Groundwater	DC-117	
Groundwater	DC-118	
Groundwater	DC-119	
Groundwater	MW-10	
Groundwater	MW-120	
Groundwater	MW-121	
Groundwater	MW-122	
Groundwater	MW-8	
Leachate Sampling Point	Leachate Storage Tank	

7. Monitoring groups

Type	Name	Group description	Assigned stations
Ground Water Monitoring Group	Groundwater Sampling Group 1	Up-gradient sampling	MW-10, MW-8
Ground Water Monitoring Group	Groundwater Sampling Group 2	Quarterly sampling	DC-117, DC-118, DC-119, MW-120, MW-121, MW-122
Leachate Monitoring Group	Leachate Sampling Group	Leachate Tank	Leachate Storage Tank

8. Sampling and monitoring requirements

Type	Group code	Parameter	CAS	Limit	Unit	Sampling freq.
Groundwater Sampling Group 1						
8.1.1	DEMO	Alkalinity, Total as CaCO3	T-005		ug/L	Jul
8.1.2	DEMO	Nitrite Plus Nitrate, Total (as N)	C005		ug/L	Jul
8.1.3	DEMO	Solids, Total Dissolved (TDS)	C010		ug/L	Jul
8.1.4	DEMO	Chloride	16887-00-6		ug/L	Jul
8.1.5	DEMO	Sulfate	14808-79-8		ug/L	Jul
8.1.6	DEMO	Arsenic	7440-38-2	2.5	ug/L	Jul
8.1.7	DEMO	Barium	7440-39-3	500	ug/L	Jul
8.1.8	DEMO	Boron	7440-42-8	250	ug/L	Jul
8.1.9	DEMO	Cadmium	7440-43-9	0.125	ug/L	Jul
8.1.10	DEMO	Chromium	7440-47-3	25	ug/L	Jul
8.1.11	DEMO	Copper	7440-50-8	250	ug/L	Jul
8.1.12	DEMO	Iron	7439-89-6		ug/L	Jul
8.1.13	DEMO	Lead	7439-92-1	7.5	ug/L	Jul
8.1.14	DEMO	Manganese	7439-96-5	25	ug/L	Jul
8.1.15	DEMO	Mercury	7439-97-6	0.5	ug/L	Jul
8.1.16	DEMO	Dissolved Oxygen, Field	T-105		ug/L	Jul
8.1.17	DEMO	Oxygen, Dissolved	7782-44-7		ug/L	Jul
8.1.18	DEMO	pH	C006		SU	Jul
8.1.19	DEMO	Specific Conductance	C-011		umhos/cm	Jul
8.1.20	DEMO	Static Water Level (Elevation, MSL)	PCA-001		ft msl	Jul
8.1.21	DEMO	Temperature	T-121		degrees C	Jul
8.1.22	DEMO	Turbidity	G-019		NTU	Jul
8.1.23	DEMO	Color	M002			Jul
8.1.24	DEMO	pH, Field	C006		SU	Jul
8.1.25	DEMO	Acetone	67-64-1	1000	ug/L	Jul
8.1.26	DEMO	Allyl chloride (3 chloropropene)	107-05-1	7.5	ug/L	Jul
8.1.27	DEMO	Benzene	71-43-2	0.5	ug/L	Jul
8.1.28	DEMO	Dichloromethane (Methylene chloride)	75-09-2	1.25	ug/L	Jul
8.1.29	DEMO	Tetrachloroethylene (Perchloroethylene)	127-18-4	1	ug/L	Jul
8.1.30	DEMO	Trichloroethylene (TCE)	79-01-6	0.1	ug/L	Jul
8.1.31	DEMO	1,1,1,2-Tetrachloroethane	630-20-6	17.5	ug/L	Jul
8.1.32	DEMO	1,1,1-Trichloroethane	71-55-6	2250	ug/L	Jul
8.1.33	DEMO	1,1,2-Trichloroethane	79-00-5	0.75	ug/L	Jul
8.1.34	DEMO	1,1,2-Trichlorotrifluoroethane	76-13-1	5000	ug/L	Jul
8.1.35	DEMO	1,1-Dichloroethane	75-34-3	25	ug/L	Jul
8.1.36	DEMO	1,1-Dichloroethylene (Vinylidene chloride)	75-35-4	50	ug/L	Jul
8.1.37	DEMO	1,1-Dichloropropanone	513-88-2		ug/L	Jul
8.1.38	DEMO	1,1-Dichloropropene	563-58-6		ug/L	Jul
8.1.39	DEMO	1,2-(trans-) Dichloroethylene	156-60-5	10	ug/L	Jul
8.1.40	DEMO	1,2,3-Trichlorobenzene	87-61-6		ug/L	Jul

Type	Group code	Parameter	CAS	Limit	Unit	Sampling freq.
8.1.41	DEMO	1,2,3-Trichloropropane	96-18-4	0.00075	ug/L	Jul
8.1.42	DEMO	1,2,4-Trichlorobenzene	120-82-1	1	ug/L	Jul
8.1.43	DEMO	1,2,4-Trimethylbenzene	95-63-6	25	ug/L	Jul
8.1.44	DEMO	1,2-Dibromoethane (Ethylene dibromide); EDB	106-93-4	0.001	ug/L	Jul
8.1.45	DEMO	1,2-Dichlorobenzene (orth-)	95-50-1	150	ug/L	Jul
8.1.46	DEMO	1,2-Dichloroethane	107-06-2	25	ug/L	Jul
8.1.47	DEMO	1,2-Dichloroethylene (cis-)	156-59-2	1.5	ug/L	Jul
8.1.48	DEMO	1,2-Dichloropropane	78-87-5	1.25	ug/L	Jul
8.1.49	DEMO	1,3,5-Trimethylbenzene	108-67-8	25	ug/L	Jul
8.1.50	DEMO	1,3-Dichlorobenzene	541-73-1	150	ug/L	Jul
8.1.51	DEMO	1,3-Dichloropropane	142-28-9		ug/L	Jul
8.1.52	DEMO	1,3-Dichloropropene	542-75-6	0.5	ug/L	Jul
8.1.53	DEMO	2-Chlorotoluene	95-49-8		ug/L	Jul
8.1.54	DEMO	4-Chlorotoluene (para-)	106-43-4		ug/L	Jul
8.1.55	DEMO	BETX (Benzene,Ethylbenzene,Toluene,Xylenes)	53		ug/L	Jul
8.1.56	DEMO	Bromobenzene	108-86-1		ug/L	Jul
8.1.57	DEMO	Bromochloromethane (Chlorobromomethane)	74-97-5		ug/L	Jul
8.1.58	DEMO	Bromodichloromethane (Dichlorobromomethane)	75-27-4	1.5	ug/L	Jul
8.1.59	DEMO	Bromoform	75-25-2	10	ug/L	Jul
8.1.60	DEMO	Bromomethane (Methyl bromide)	74-83-9	2.5	ug/L	Jul
8.1.61	DEMO	Chlorobenzene (Monochlorobenzene)	108-90-7	25	ug/L	Jul
8.1.62	DEMO	Chlorodibromomethane (Dibromochloromethane)	124-48-1	2.5	ug/L	Jul
8.1.63	DEMO	Chloroethane	75-00-3		ug/L	Jul
8.1.64	DEMO	Chloroform	67-66-3	7.5	ug/L	Jul
8.1.65	DEMO	Cumene (Isopropylbenzene)	98-82-8	75	ug/L	Jul
8.1.66	DEMO	Dichlorodifluoromethane	75-71-8	175	ug/L	Jul
8.1.67	DEMO	Dichloroethylene	25323302		ug/L	Jul
8.1.68	DEMO	Dichlorofluoromethane	75-43-4		ug/L	Jul
8.1.69	DEMO	Ethyl ether	60-29-7	50	ug/L	Jul
8.1.70	DEMO	Ethylbenzene	100-41-4	12.5	ug/L	Jul
8.1.71	DEMO	Hexachlorobutadiene	87-68-3	0.25	ug/L	Jul
8.1.72	DEMO	Chloromethane	74-87-3		ug/L	Jul
8.1.73	DEMO	Methyl ethyl ketone (MEK)	78-93-3	1000	ug/L	Jul
8.1.74	DEMO	Methyl isobutyl ketone (4-Methyl-2-pentanone)	108-10-1	75	ug/L	Jul
8.1.75	DEMO	Methyl-tert-butylether	1634-04-4	15	ug/L	Jul
8.1.76	DEMO	Naphthalene	91-20-3	17.5	ug/L	Jul
8.1.77	DEMO	n-Butylbenzene	104-51-8		ug/L	Jul
8.1.78	DEMO	n-Propylbenzene	103-65-1		ug/L	Jul
8.1.79	DEMO	tert-Butylbenzene	98-06-6		ug/L	Jul
8.1.80	DEMO	Tetrahydrofuran	109-99-9		ug/L	Jul
8.1.81	DEMO	Toluene	108-88-3	50	ug/L	Jul
8.1.82	DEMO	Trichlorofluoromethane	75-69-4	500	ug/L	Jul
8.1.83	DEMO	Vinyl chloride (chloroethene)	75-01-4	0.05	ug/L	Jul

Type	Group code	Parameter	CAS	Limit	Unit	Sampling freq.
8.1.84	DEMO	Xylene	1330-20-7	75	ug/L	Jul
8.1.85	DEMO	Xylene (M & P)	179601-23-1	2500	ug/L	Jul
8.1.86	DEMO	Xylene (o-)	95-47-6		ug/L	Jul
Groundwater Sampling Group 2						
8.2.1	DEMO	Alkalinity, Total as CaCO3	T-005		ug/L	Apr, Jul, Oct
8.2.2	DEMO	Nitrite Plus Nitrate, Total (as N)	C005		ug/L	Jul
8.2.3	DEMO	Solids, Total Dissolved (TDS)	C010		ug/L	Apr, Jul, Oct
8.2.4	DEMO	Chloride	16887-00-6		ug/L	Jul
8.2.5	DEMO	Sulfate	14808-79-8		ug/L	Jul
8.2.6	DEMO	Arsenic	7440-38-2	2.5	ug/L	Jul
8.2.7	DEMO	Barium	7440-39-3	500	ug/L	Jul
8.2.8	DEMO	Boron	7440-42-8	250	ug/L	Apr, Jul, Oct
8.2.9	DEMO	Cadmium	7440-43-9	0.125	ug/L	Jul
8.2.10	DEMO	Chromium	7440-47-3	25	ug/L	Jul
8.2.11	DEMO	Copper	7440-50-8	250	ug/L	Jul
8.2.12	DEMO	Iron	7439-89-6		ug/L	Jul
8.2.13	DEMO	Lead	7439-92-1	7.5	ug/L	Jul
8.2.14	DEMO	Manganese	7439-96-5	25	ug/L	Apr, Jul, Oct
8.2.15	DEMO	Mercury	7439-97-6	0.5	ug/L	Jul
8.2.16	DEMO	Dissolved Oxygen, Field	T-105		ug/L	Apr, Jul, Oct
8.2.17	DEMO	Oxygen, Dissolved	7782-44-7		ug/L	Apr, Jul, Oct
8.2.18	DEMO	pH	C006		SU	Apr, Jul, Oct
8.2.19	DEMO	Specific Conductance	C-011		umhos/cm	Apr, Jul, Oct
8.2.20	DEMO	Static Water Level (Elevation, MSL)	PCA-001		ft msl	Apr, Jul, Oct
8.2.21	DEMO	Temperature	T-121		degrees C	Apr, Jul, Oct
8.2.22	DEMO	Turbidity	G-019		NTU	Apr, Jul, Oct
8.2.23	DEMO	Color	M002			Apr, Jul, Oct
8.2.24	DEMO	pH, Field	C006		SU	Apr, Jul, Oct
8.2.25	DEMO	Acetone	67-64-1	1000	ug/L	Apr, Jul, Oct
8.2.26	DEMO	Allyl chloride (3 chloropropene)	107-05-1	7.5	ug/L	Apr, Jul, Oct
8.2.27	DEMO	Benzene	71-43-2	0.5	ug/L	Apr, Jul, Oct
8.2.28	DEMO	Dichloromethane (Methylene chloride)	75-09-2	1.25	ug/L	Apr, Jul, Oct
8.2.29	DEMO	Tetrachloroethylene (Perchloroethylene)	127-18-4	1	ug/L	Apr, Jul, Oct
8.2.30	DEMO	Trichloroethylene (TCE)	79-01-6	0.1	ug/L	Apr, Jul, Oct
8.2.31	DEMO	1,1,1,2-Tetrachloroethane	630-20-6	17.5	ug/L	Apr, Jul, Oct
8.2.32	DEMO	1,1,1-Trichloroethane	71-55-6	2250	ug/L	Apr, Jul, Oct
8.2.33	DEMO	1,1,2-Trichloroethane	79-00-5	0.75	ug/L	Apr, Jul, Oct
8.2.34	DEMO	1,1,2-Trichlorotrifluoroethane	76-13-1	5000	ug/L	Apr, Jul, Oct
8.2.35	DEMO	1,1-Dichloroethane	75-34-3	25	ug/L	Apr, Jul, Oct
8.2.36	DEMO	1,1-Dichloroethylene (Vinylidene chloride)	75-35-4	50	ug/L	Apr, Jul, Oct
8.2.37	DEMO	1,1-Dichloropropanone	513-88-2		ug/L	Apr, Jul, Oct
8.2.38	DEMO	1,1-Dichloropropene	563-58-6		ug/L	Apr, Jul, Oct
8.2.39	DEMO	1,2-(trans-) Dichloroethylene	156-60-5	10	ug/L	Apr, Jul, Oct

Type	Group code	Parameter	CAS	Limit	Unit	Sampling freq.
8.2.40	DEMO	1,2,3-Trichlorobenzene	87-61-6		ug/L	Apr, Jul, Oct
8.2.41	DEMO	1,2,3-Trichloropropane	96-18-4	0.00075	ug/L	Apr, Jul, Oct
8.2.42	DEMO	1,2,4-Trichlorobenzene	120-82-1	1	ug/L	Apr, Jul, Oct
8.2.43	DEMO	1,2,4-Trimethylbenzene	95-63-6	25	ug/L	Apr, Jul, Oct
8.2.44	DEMO	1,2-Dibromoethane (Ethylene dibromide); EDB	106-93-4	0.001	ug/L	Apr, Jul, Oct
8.2.45	DEMO	1,2-Dichlorobenzene (orth-)	95-50-1	150	ug/L	Apr, Jul, Oct
8.2.46	DEMO	1,2-Dichloroethane	107-06-2	25	ug/L	Apr, Jul, Oct
8.2.47	DEMO	1,2-Dichloroethylene (cis-)	156-59-2	1.5	ug/L	Apr, Jul, Oct
8.2.48	DEMO	1,2-Dichloropropane	78-87-5	1.25	ug/L	Apr, Jul, Oct
8.2.49	DEMO	1,3,5-Trimethylbenzene	108-67-8	25	ug/L	Apr, Jul, Oct
8.2.50	DEMO	1,3-Dichlorobenzene	541-73-1	150	ug/L	Apr, Jul, Oct
8.2.51	DEMO	1,3-Dichloropropane	142-28-9		ug/L	Apr, Jul, Oct
8.2.52	DEMO	1,3-Dichloropropene	542-75-6	0.5	ug/L	Apr, Jul, Oct
8.2.53	DEMO	2-Chlorotoluene	95-49-8		ug/L	Apr, Jul, Oct
8.2.54	DEMO	4-Chlorotoluene (para-)	106-43-4		ug/L	Apr, Jul, Oct
8.2.55	DEMO	Bromobenzene	108-86-1		ug/L	Apr, Jul, Oct
8.2.56	DEMO	Bromochloromethane (Chlorobromomethane)	74-97-5		ug/L	Apr, Jul, Oct
8.2.57	DEMO	Bromodichloromethane (Dichlorobromomethane)	75-27-4	1.5	ug/L	Apr, Jul, Oct
8.2.58	DEMO	Bromoform	75-25-2	10	ug/L	Apr, Jul, Oct
8.2.59	DEMO	Bromomethane (Methyl bromide)	74-83-9	2.5	ug/L	Apr, Jul, Oct
8.2.60	DEMO	Chlorobenzene (Monochlorobenzene)	108-90-7	25	ug/L	Apr, Jul, Oct
8.2.61	DEMO	Chlorodibromomethane (Dibromochloromethane)	124-48-1	2.5	ug/L	Apr, Jul, Oct
8.2.62	DEMO	Chloroethane	75-00-3		ug/L	Apr, Jul, Oct
8.2.63	DEMO	Chloroform	67-66-3	7.5	ug/L	Apr, Jul, Oct
8.2.64	DEMO	Cumene (Isopropylbenzene)	98-82-8	75	ug/L	Apr, Jul, Oct
8.2.65	DEMO	Dichlorodifluoromethane	75-71-8	175	ug/L	Apr, Jul, Oct
8.2.66	DEMO	Dichloroethylene	25323302		ug/L	Apr, Jul, Oct
8.2.67	DEMO	Dichlorofluoromethane	75-43-4		ug/L	Apr, Jul, Oct
8.2.68	DEMO	Ethyl ether	60-29-7	50	ug/L	Apr, Jul, Oct
8.2.69	DEMO	Ethylbenzene	100-41-4	12.5	ug/L	Apr, Jul, Oct
8.2.70	DEMO	Hexachlorobutadiene	87-68-3	0.25	ug/L	Apr, Jul, Oct
8.2.71	DEMO	Chloromethane	74-87-3		ug/L	Apr, Jul, Oct
8.2.72	DEMO	Methyl ethyl ketone (MEK)	78-93-3	1000	ug/L	Apr, Jul, Oct
8.2.73	DEMO	Methyl isobutyl ketone (4-Methyl-2-pentanone)	108-10-1	75	ug/L	Apr, Jul, Oct
8.2.74	DEMO	Methyl-tert-butylether	1634-04-4	15	ug/L	Apr, Jul, Oct
8.2.75	DEMO	Naphthalene	91-20-3	17.5	ug/L	Apr, Jul, Oct
8.2.76	DEMO	n-Butylbenzene	104-51-8		ug/L	Apr, Jul, Oct
8.2.77	DEMO	n-Propylbenzene	103-65-1		ug/L	Apr, Jul, Oct
8.2.78	DEMO	tert-Butylbenzene	98-06-6		ug/L	Apr, Jul, Oct
8.2.79	DEMO	Tetrahydrofuran	109-99-9		ug/L	Apr, Jul, Oct
8.2.80	DEMO	Toluene	108-88-3	50	ug/L	Apr, Jul, Oct
8.2.81	DEMO	Trichlorofluoromethane	75-69-4	500	ug/L	Apr, Jul, Oct
8.2.82	DEMO	Vinyl chloride (chloroethene)	75-01-4	0.05	ug/L	Apr, Jul, Oct
8.2.83	DEMO	Xylene	1330-20-7	75	ug/L	Apr, Jul, Oct
8.2.84	DEMO	Xylene (M & P)	179601-23-1	2500	ug/L	Apr, Jul, Oct

Type	Group code	Parameter	CAS	Limit	Unit	Sampling freq.
8.2.85	DEMO	Xylene (o-)	95-47-6		ug/L	Apr, Jul, Oct
Leachate Sampling Group						
8.3.1	MSWL	Arsenic	7440-38-2		ug/L	Apr, Jul, Oct, Dec
8.3.2	MSWL	Barium	7440-39-3		ug/L	Apr, Jul, Oct, Dec
8.3.3	MSWL	Aluminum	7429-90-5		ug/L	Apr, Jul, Oct, Dec
8.3.4	MSWL	Antimony	7440-36-0		ug/L	Apr, Jul, Oct, Dec
8.3.5	MSWL	Beryllium	7440-41-7		ug/L	Apr, Jul, Oct, Dec
8.3.6	MSWL	Boron	7440-42-8		ug/L	Apr, Jul, Oct, Dec
8.3.7	MSWL	Cadmium	7440-43-9		ug/L	Apr, Jul, Oct, Dec
8.3.8	MSWL	Calcium	7440-70-2		ug/L	Apr, Jul, Oct, Dec
8.3.9	MSWL	Chromium	7440-47-3		ug/L	Apr, Jul, Oct, Dec
8.3.10	MSWL	Chromium, Hexavalent (as Cr)	18540-29-9		ug/L	Apr, Jul, Oct, Dec
8.3.11	MSWL	Chromium, Trivalent, Dry Weight, (as Cr)	18540-29-9		ug/L	Apr, Jul, Oct, Dec
8.3.12	MSWL	Cobalt	7440-48-4		ug/L	Apr, Jul, Oct, Dec
8.3.13	MSWL	Copper	7440-50-8		ug/L	Apr, Jul, Oct, Dec
8.3.14	MSWL	Iron	7439-89-6		ug/L	Apr, Jul, Oct, Dec
8.3.15	MSWL	Lead	7439-92-1		ug/L	Apr, Jul, Oct, Dec
8.3.16	MSWL	Lithium	7439-93-2		ug/L	Apr, Jul, Oct, Dec
8.3.17	MSWL	Magnesium	7439-95-4		ug/L	Apr, Jul, Oct, Dec
8.3.18	MSWL	Manganese	7439-96-5		ug/L	Apr, Jul, Oct, Dec
8.3.19	MSWL	Mercury	7439-97-6		ug/L	Apr, Jul, Oct, Dec
8.3.20	MSWL	Molybdenum	7439-98-7		ug/L	Apr, Jul, Oct, Dec
8.3.21	MSWL	Nickel	7440-02-0		ug/L	Apr, Jul, Oct, Dec
8.3.22	MSWL	Nitrate (as Nitrogen)	14797-55-8		ug/L	Apr, Jul, Oct, Dec
8.3.23	MSWL	Potassium	7440-09-7		ug/L	Apr, Jul, Oct, Dec
8.3.24	MSWL	Selenium	7782-49-2		ug/L	Apr, Jul, Oct,

DEPARTMENT OF NATURAL RESOURCES

Minnesota Department of Natural Resources
Division of Ecological & Water Resources
500 Lafayette Road, Box 25
St. Paul, MN 55155-4025

September 13, 2021
Correspondence # ERDB 20220026

Ms. Kirsten Pauly
Sunde Engineering, PLLC
10830 Nesbitt Avenue South
Bloomington, MN 55437

RE: Natural Heritage Review of the proposed Dem-Con Landfill Expansion,
T115N R23W Sections 21 & 28; Scott County

Dear Ms. Pauly,

As requested, the Minnesota Natural Heritage Information System has been queried to determine if any rare species or other significant natural features are known to occur within an approximate one-mile radius of the proposed project. Based on this query, rare features have been documented within the search area (for details, please visit the Rare Species Guide Website for more information on the biology, habitat use, and conservation measures of these rare species). Please note that the following rare features may be adversely affected by the proposed project:

Ecologically Significant Areas

- There are areas ranked *Below* within the project boundary that the Minnesota Biological Survey considered for Sites of Biodiversity Significance, but were determined to be below the minimum biodiversity threshold for statewide significance. These areas, however, have conservation value at the local level as habitat for native plants and animals, corridors for animal movements, buffers surrounding higher quality natural areas, or as areas with high potential for restoration of native habitat. GIS shapefiles of MBS Sites can be downloaded from the MN Geospatial Commons. Please contact me if you do not have access to the appropriate mapping services.

State-listed Species

- Kitten-tails (*Besseya bullii*), a state-listed threatened plant, has been documented in the vicinity of the proposed project. This species is found in savannas, prairies, and oak woodlands and prefers open upper slopes of buffs. Minnesota's Endangered Species Statute (Minnesota

Statutes, section 84.0895) and associated Rules (Minnesota Rules, part 6212.1800 to 6212.2300 and 6134) prohibit the take of threatened or endangered species without a permit. Given the presence of state-protected species in the direct vicinity of the proposed project and the likely presence of potential habitat for other state-listed species, **a qualified surveyor will need to conduct a botanical survey in any potential habitat that will be impacted by the proposed project**. A habitat assessment can be conducted to determine potential habitat and avoidance areas. If impacts to potential habitat can be avoided, a survey is not needed. Surveys must follow the standards contained in the attached Rare Species Survey Process and Rare Plant Guidance. Project planning should take into account that any botanical survey needs to be conducted during the appropriate time of the year, which may be limited. Please consult with Lisa Joyal, the Endangered Species Environmental Review Coordinator (lisa.joyal@state.mn.us) regarding this process.

- The Loggerhead Shrike (*Lanius ludovicianus*), a state-listed endangered bird, Lark Sparrow (*Chondestes grammacus*), and Purple Martin (*Progne subis*), both state-listed bird species of special concern, have been documented in the vicinity of the project site.

  Loggerhead Shrikes and Lark Sparrows are found in open, grassland areas with scattered trees and shrubs. Loggerhead Shrike nest in small trees or shrubs, while the Lark Sparrow typically nests on the ground. If the project boundary contains undisturbed grassland, then these birds may breed in the area. Given the potential for Loggerhead Shrikes to be found in the vicinity of the project, avoid tree and shrub removal during the breeding season, typically April through July. **Contact me if any tree or shrub removal will occur during the breeding season, as the DNR may request that a survey for active nests be conducted prior to construction.** As Lark Sparrows nest on the ground, we recommend initial ground disturbance in potential habitat May 15th through August 15th to avoid disturbance of these nesting birds.

  Purple Martins nest in colonies and typically along stream and woodland edges. In urban areas, they nest almost exclusively in nest boxes; while in rural areas they can be found nesting in cavities, such as woodpecker holes. Purple Martins typically nest May through late July and use roost sites late July through early September. If feasible, avoid tree removal in nesting habitat from May through late July to avoid disturbance of nesting birds.

- State-listed aquatic species have been documented in the Minnesota River in the vicinity of the proposed project. These species are particularly vulnerable to deterioration in water quality, especially increased siltation. As such, the project should not be allowed to negatively affect the water quality of the river. Sound erosion and sediment control practices should be implemented and maintained for the duration of the project and incorporated into any stormwater management system.

Federally Protected Species

- Northern long-eared bat (*Myotis septentrionalis*), federally listed as threatened and state-listed as special concern, and little brown bat (*Myotis lucifugus*), also a state-listed as special concern, have been documented in the vicinity of the proposed project. During the winter these species typically hibernate in caves and mines. During the active season (approximately April-October) they roost underneath bark, in cavities, or in crevices of both live and dead trees; and in human structures such as buildings and bridges. Pup rearing is during June and July. Activities that may impact this species include, but are not limited to, wind farm operation, any disturbance to hibernacula, and destruction/degradation of habitat. As such, we recommend avoiding tree removal during pup rearing season, June 1st through July 31st.

  Regarding the northern long-eared bat, the U.S. Fish and Wildlife Service (USFWS) has published a final 4(d) rule that identifies prohibited take. To determine whether you need to contact the USFWS, please refer to the USFWS Key to the Northern Long-Eared Bat 4(d) Rule. **Please note there are known roost trees within three-quarters of a mile from the proposed new trail segment in T40N R18W Section 18.**

- To ensure compliance with federal law, conduct a federal regulatory review using the U.S. Fish and Wildlife Service's (USFWS) online Information for Planning and Consultation (IPaC) tool.

Environmental Review and Permitting

- The Environmental Assessment Worksheet should address whether the proposed project has the potential to adversely affect the above rare features and if so, it should identify specific measures that will be taken to avoid or minimize disturbance. Sufficient information should be provided so the DNR can determine whether a takings permit will be needed for any of the above protected species.

- Please include a copy of this letter in any state or local license or permit application. Please note that measures to avoid or minimize disturbance to the above rare features may be included as restrictions or conditions in any required permits or licenses.

The Natural Heritage Information System (NHIS), a collection of databases that contains information about Minnesota's rare natural features, is maintained by the Division of Ecological and Water Resources, Department of Natural Resources. The NHIS is continually updated as new information becomes available, and is the most complete source of data on Minnesota's rare or otherwise significant species, native plant communities, and other natural features. However, the NHIS is not an exhaustive inventory and thus does not represent all of the occurrences of rare features within the state. Therefore, ecologically significant features for which we have no records may exist within the project area. If additional information becomes available regarding rare features in the vicinity of the project, further review may be necessary.

For environmental review purposes, the results of this Natural Heritage Review are valid for one year; the results are only valid for the project location (noted above) and the project description provided on the NHIS Data Request Form. Please contact me if project details change or construction has not occurred within one year as additional review may be required.

The Natural Heritage Review does not constitute review or approval by the Department of Natural Resources as a whole. Instead, it identifies issues regarding known occurrences of rare features and potential effects to these rare features. For information on the environmental review process or other natural resource concerns, you may contact your DNR Regional Environmental Assessment Ecologist.

Thank you for consulting us on this matter, and for your interest in preserving Minnesota's rare natural resources. An invoice will be mailed to you under separate cover.

Sincerely,

Samantha Bump

Samantha Bump
Natural Heritage Review Specialist
Samantha.Bump@state.mn.us

Enc. Rare Species Survey Protocol

Links: Rare Species Guide
http://www.dnr.state.mn.us/rsg/index.html
DNR Regional Environmental Assessment Ecologist Contact Info
http://www.dnr.state.mn.us/eco/ereview/erp_regioncontacts.html
MBS Sites of Biodiversity Significance
http://www.dnr.state.mn.us/eco/mcbs/biodiversity_guidelines.html
MN Geospatial Commons
https://gisdata.mn.gov/
BWSR Native Vegetation/Seed Mixes
http://www.bwsr.state.mn.us/native_vegetation/
USFWS Key to the Northern Long-Eared Bat 4(d) Rule for Non-Federal Activities
http://www.fws.gov/midwest/endangered/mammals/nleb/KeyFinal4dNLEB.html
USFWS Key to the Northern Long-Eared Bat 4(d) Rule for Federal Actions
http://www.fws.gov/midwest/endangered/mammals/nleb/KeyFinal4dNLEBFedProjects.html
USFWS Northern Long-eared Bat Website
http://www.fws.gov/midwest/endangered/mammals/nleb/index.html
USFWS Northern Long-eared Bat Fact Sheet
http://www.fws.gov/midwest/endangered/mammals/nleb/nlebFactSheet.html

Cc: Mellissa Collins and Leslie Parris

Kirsten Pauly

From: Cinadr, Thomas <Thomas.Cinadr@MNHS.ORG>
Sent: Wednesday, April 6, 2011 8:17 AM
To: 'Nick Monserud'
Subject: RE: Merriam Junction - Environmental Review of an Existing Non-Metallic Mineral Mining Area WITH ATTACHMENTS
Attachments: Archaeologyt.rtf; Historic.rtf

THIS EMAIL IS NOT A PROJECT CLEARANCE.

This message simply reports the results of the cultural resources database search you requested. The database search produced results for only previously known archaeological sites and historic properties. Please read the note below carefully.

Archaeological sites and historic properties were identified in a search of the Minnesota Archaeological Inventory and Historic Structures Inventory for the search area requested. **Reports containing the results of the search are attached.**

The result of this database search provides a listing of recorded archaeological sites and historic architectural properties that are included in the current SHPO databases. Because the majority of archaeological sites in the state and many historic architectural properties have not been recorded, important sites or structures may exist within the search area and may be affected by development projects within that area. Additional research, including field survey, may be necessary to adequately assess the area's potential to contain historic properties.

If you require a comprehensive assessment of a project's potential to impact archaeological sites or historic architectural properties, you may need to hire a qualified archaeologist and/or historian. If you need assistance with a project review, please contact Kelly Gragg-Johnson in Review and Compliance @ 651-259-3455 or by email at kelly.graggjohnson@mnhs.org.

The Minnesota SHPO Survey Manuals and Database Metadata and Contractor Lists can be found at http://www.mnhs.org/shpo/survey/inventories.htm

SHPO research hours are 8:00 AM – 4:00 PM Tuesday-Friday.
The Office is closed on Mondays.

Tom Cinadr
Survey and Information Management Coordinator
Minnesota State Historic Preservation Office
Minnesota Historical Society
345 Kellogg Blvd. West
St. Paul, MN 55102

651-259-3453

From: Nick Monserud [mailto:nmonserud@sundecivil.com]
Sent: Thursday, March 31, 2011 8:12 AM
To: Cinadr, Thomas
Subject: Merriam Junction - Environmental Review of an Existing Non-Metallic Mineral Mining Area

Tom,

Could you please review your database and let me know if there are any archaeological or historic sites located within the area on the attached location map.

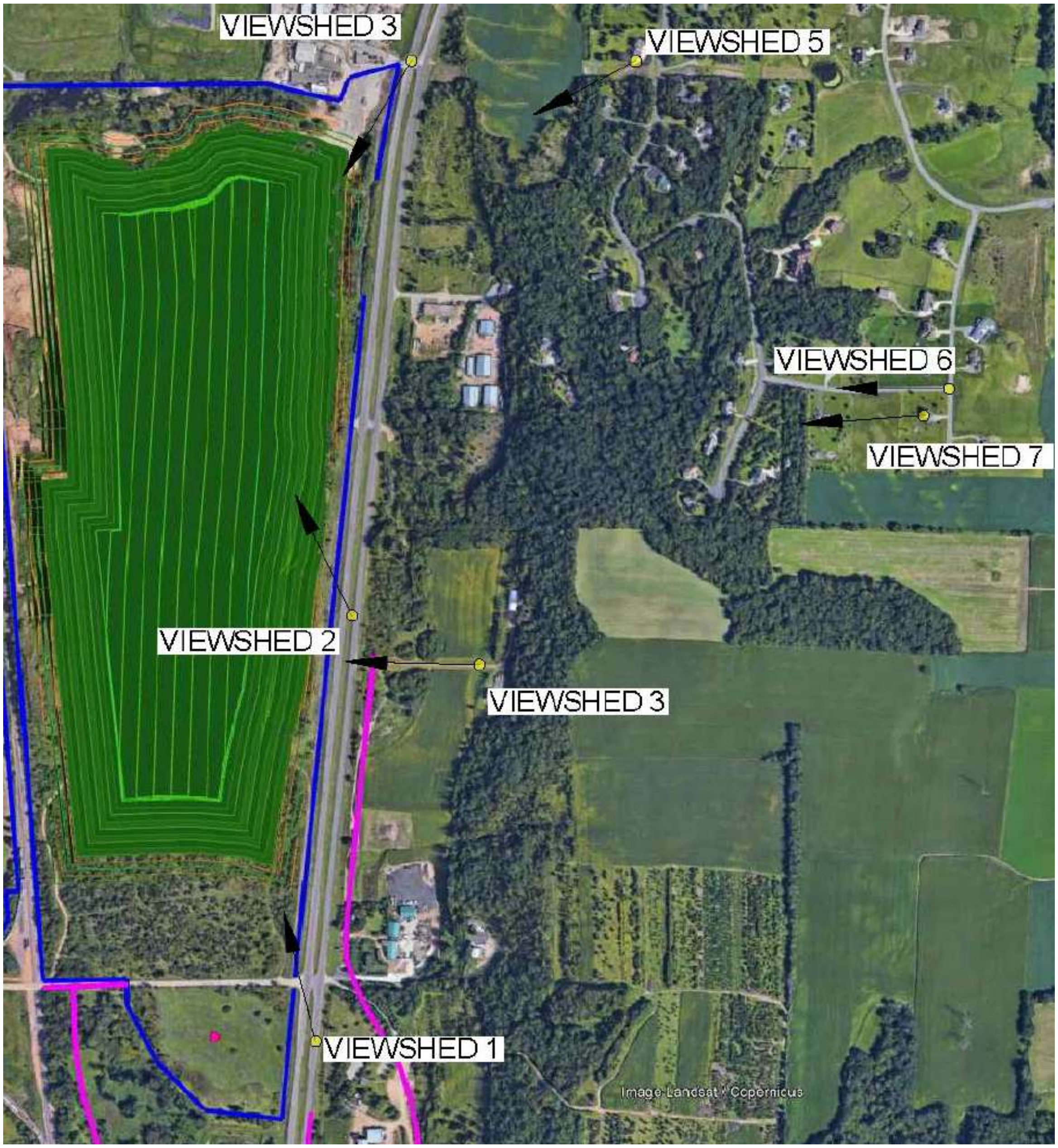
Malkerson Sales has asked us to do a comprehensive environmental review of the on-going non-metallic mineral mining area located in portions of Sections 16, 20, 21, 28, and 29, Township 115, Range 23 in Scott County (South of Hwy 41 and West of Hwy 169).

Thank you for you assistance. Please let me know if you have any questions.

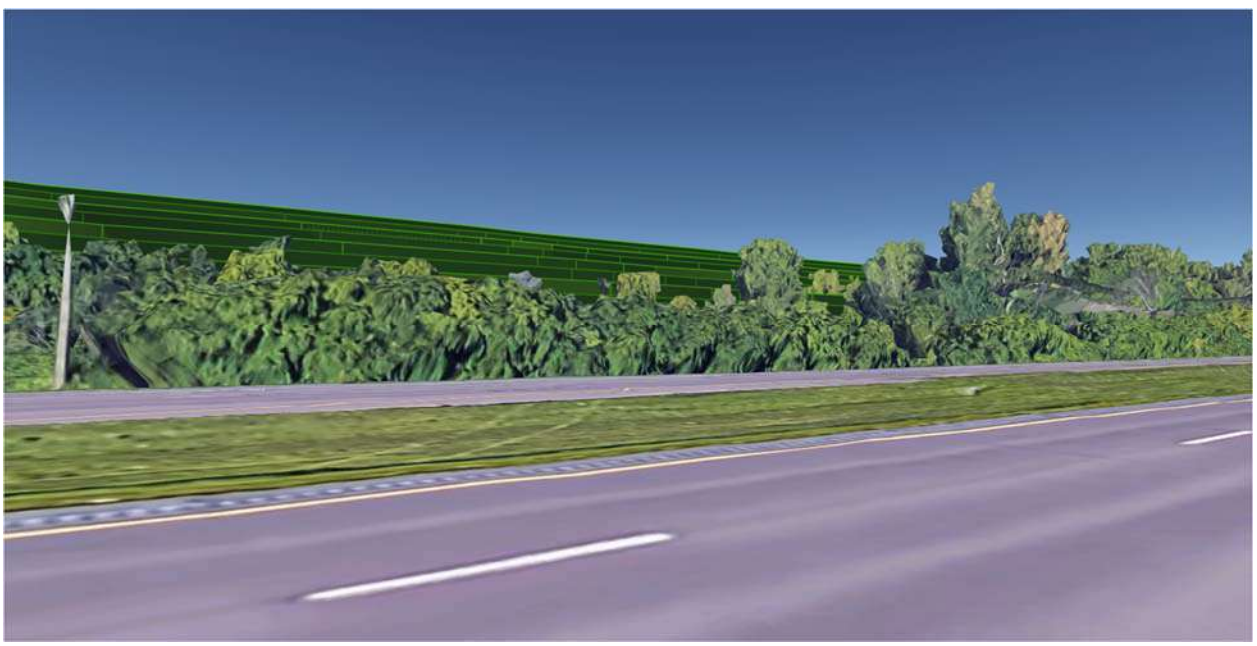
Nick Monserud, P.E.
Sunde Engineering, PLLC.
10830 Nesbitt Avenue South
Bloomington, MN 55437-3100
Phone: (952) 881-3344
Direct: (952) 229-8675
Fax: (952) 881-1913

Attachment 12

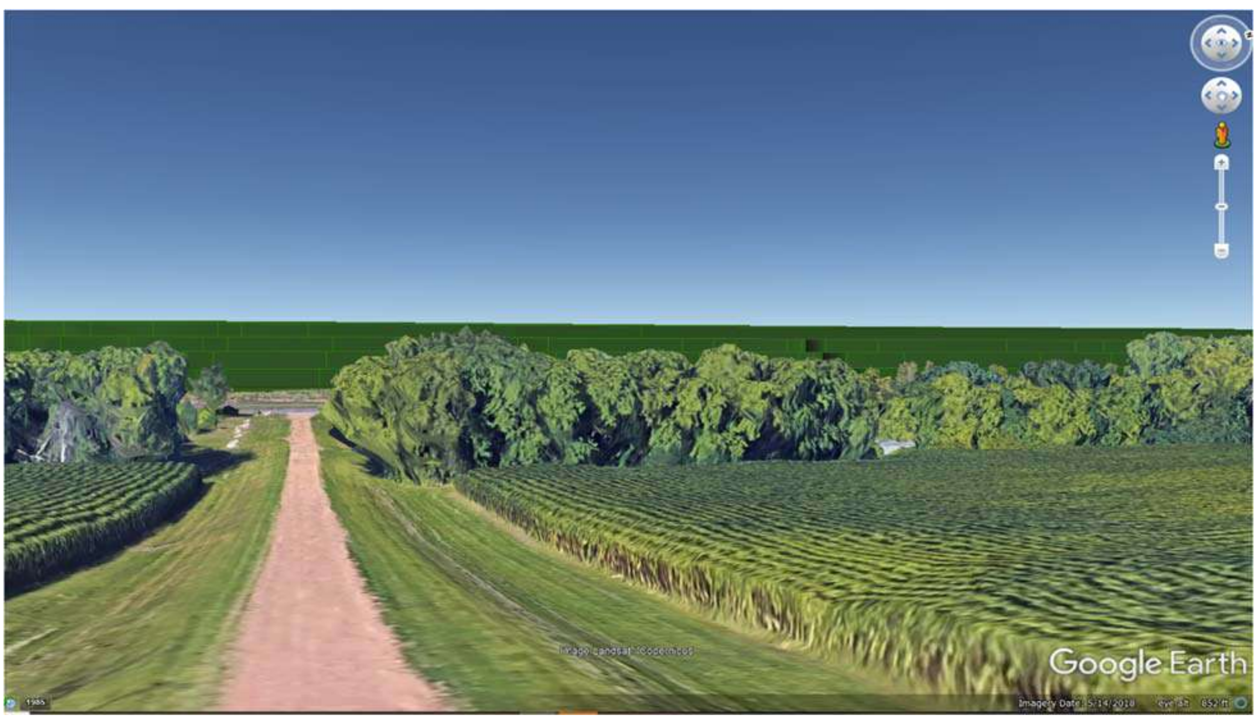
Viewsheds illustrate the viewshed of the landfill from various perspectives. Landfill modelled in green to final elevations.   All images Google Earth.



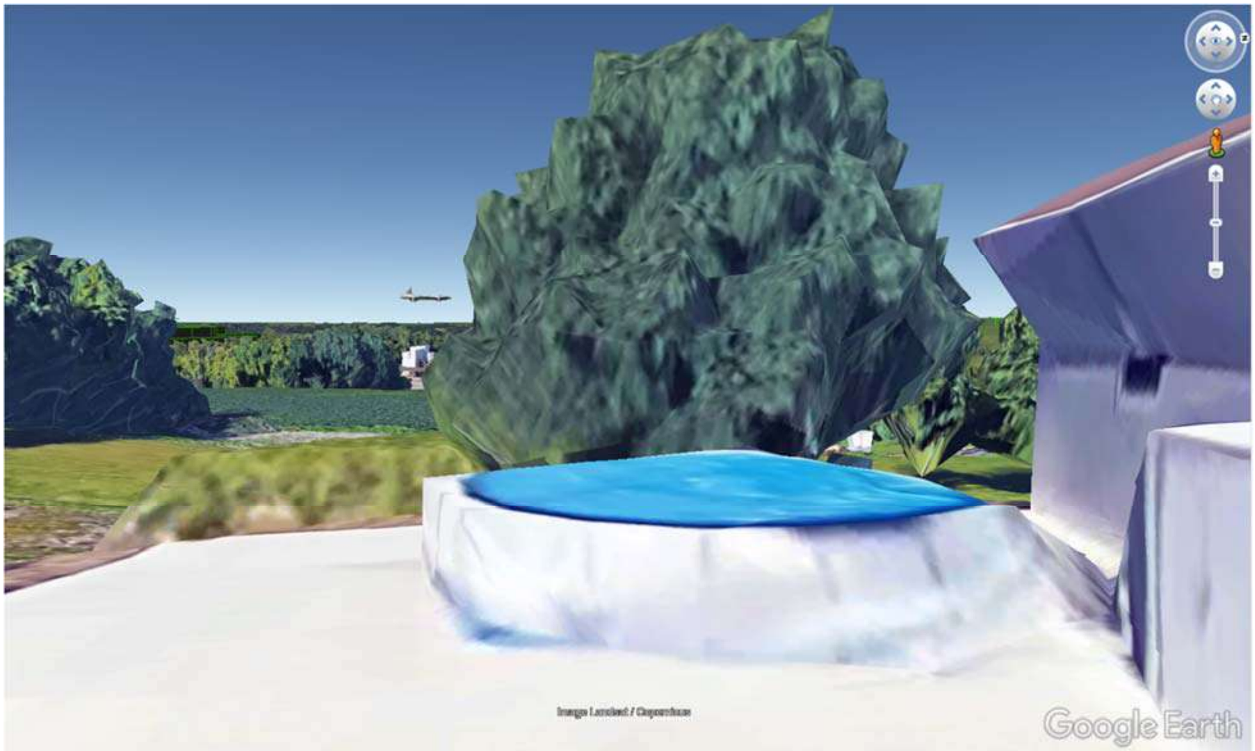

Viewshed 1 -Northbound 169 approaching landfill from south


Viewshed 2- Northbound along US 169 corridor

Viewshed 3 – Southbound 169 approaching landfill from the north



Viewshed 4 – Looking west along Doucette driveway



Viewshed 5 – from 13470 skyline circle

Viewshed 6 intersection 139th Street West and Tracy Ave.

Viewshed 7 – second floor view 13920 Tracy Avenue

MINNESOTA POLLUTION CONTROL AGENCY

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May 3, 2022

Bill Keegan, President
Dem-Con Companies
13020 Dem-Con Drive
Shakopee, MN 55379

RE: Applicability Determination Request for Dem-Con Landfill

Dear Bill Keegan:

The Minnesota Pollution Control Agency (MPCA) staff received your application for an applicability determination request on January 7, 2022 for Dem-Con Landfill (facility) located at 13020 Dem-Con Drive, Shakopee, Minnesota. In this applicability determination, you asked the MPCA to determine if an air permit is required for the facility and proposed solid waste permit modification.

The MPCA issued the facility Industrial Solid Waste Permit (ISWMP) SW-290 on April 6, 2010. Dem-Con Landfill is a construction and demolition (C&D) landfill. Dem-Con recently submitted an application for a major modification and reissuance for their solid waste permit. The proposed major modification is for a horizontal expansion of the construction and demolition (C&D) landfill, and Dem-Con does not propose any changes to the landfill operation or existing solid waste permit conditions.

Dem-Con stated that the C&D debris accepted at the facility "consists primarily of inert materials that do not produce air emissions". However, the facility is aware of odors generated at the landfill and has gas monitors along the southeastern perimeter of the facility to monitor for methane gas on a regular basis.

The facility is also aware of the production of hydrogen sulfide gas that can occur at C&D facilities when debris, notably gypsum drywall, decomposes in an anaerobic condition. The facility uses mitigation efforts to limit moisture infiltration and prevent decomposition of these materials. This landfill does not have a gas collection system and therefore no flares, engines, or heaters are used at the facility.

Dem-Con is not able to quantify emissions from the facility. There are no established emission factors for air pollutants in the U.S. Environmental Protection Agency's AP-42: Compilation of Air Emissions Factors for C&D landfills. There are also no other known sources for emission factors and no site-specific data to estimate emissions.

No federal standard for municipal solid waste (40 CFR pt. 63, subp. AAAA - National Emission Standards for Hazardous Air Pollutants: Municipal Solid Waste Landfills, 40 CFR pt. 60, subp. XXX - Standards of Performance for Municipal Solid Waste Landfills That Commenced Construction, Reconstruction, or Modification After July 17, 2014, and 40 CFR pt. 62, subp. OOO - Federal Plan Requirements for Municipal Solid Waste Landfills That Commenced Construction On or Before July 17, 2014 and Have Not Been Modified or Reconstructed Since July 17, 2014) apply because Dem-Con is a C&D facility.

Dem-Con is subject to 40 CFR pt. 61, subp. M - National Emission Standard for Asbestos, which is included in the facility's ISWMP. 40 CFR pt. 61, subp. M is the only standard under the Code of Federal Regulations Dem-Con is subject to. Therefore, as provided under Minn. R. 7007.0300, subp. 1(C), "any stationary source that would be covered by a permit solely because it is subject to Code of Federal Regulations, title 40, part 61, subpart M, National Emission Standard for Hazardous Air Pollutants for Asbestos, section 61.145, Standard for Demolition and Renovation, or 61.154, Standard for Active Waste Disposal Sites" is not required to obtain a permit.

Determination

Based on the information available in the applicability request, the facility's November 2021 Environmental Assessment Worksheet, and discussions with the facility, Dem-Con does not need an air permit at this time. If the landfill changes operations in any way, or if the landfill is producing hydrogen sulfide gas that can be measured, this determination should be reconsidered.

This determination applies only to the facility and project as presented at the time of this submittal. If you have any questions, please contact me at jared.lafave@state.mn.us or at 651-757-2514.

Sincerely,

Jared LaFave

This document has been electronically signed.

Jared LaFave, P.E.
Supervisor, Air Quality Permits Unit 4
Air Quality Permits Section
Industrial Division

JL:lao

cc: Ross Provow, MPCA
Toni Volkmeier, MPCA
Jared LaFave, MPCA

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Technical Memorandum

To: Kirsten Pauly, Sunde Engineering
From: Andrew Skoglund, PE
Subject: Dem-Con EAW Air Assessment Review
Date: August 22, 2022
c: Jim Aiken, Barr Engineering

Executive Summary

Sunde Engineering asked Barr Engineering Co. (Barr) to provide an assessment of potential air emissions from the Dem-Con Landfill's proposed expansion area. The purpose of the assessment is to help determine if the project's air emissions have the potential for significant environmental effects. The assessment was performed in accordance with the MPCA's guidance document Environmental Review Unit Environmental Assessment Worksheet Air Assessment Practices (p-ear1-10) included as Attachment 1 of this memorandum. It was determined that NAAQS criteria pollutants or MAAQS criteria pollutant emissions are not expected from the landfill vents. Generation and emission of Hydrogen Sulfide (H_2S, a MAAQS pollutant) would be indicative of an upset to the disposal methodology and not part of expected operations at the landfill. Therefore, the Project is not expected to create significant air emissions.

Background

The Project will not generate stationary source air emissions from boilers or exhaust stacks and there are no stationary sources associated with landfill construction and operation until the final landfill cover system is placed. Six passive landfill gas vents will be installed over the Expansion Area (241 acres) as a final cover preventative maintenance measure. The passive vents may be considered stationary sources. The purpose of the passive venting system is to allow venting of any landfill gas generation that may occur and to allow exchange of air to accommodate changes in barometric pressure without damage to the synthetic cover system. The vents themselves are not connected to a fan or vacuum system and the emissions from the natural draft ventilation system are not expected to be significant.

Although most Construction and Demolition (C&D) waste is inert, portions of the waste stream are composed of organics, wood and paper products, that may slowly decompose and generate landfill gas. The composition of landfill gas emissions from the organic faction of C&D waste is primarily Methane (CH_4) and Carbon Dioxide (CO_2) as indicated in the EPA's Documentation for Greenhouse Gas Emission and Energy Factors Used in the Waste Reduction Model (WARM) Management Practices Chapters, Chapter 6 Landfilling, November 2020. "When … paper, and wood are landfilled, anaerobic bacteria degrade the materials, producing methane (CH4) and carbon dioxide (CO2)." CH_4 and CO_2 are not criteria pollutants. In addition to CH_4 and CO_2, under specific fermenting conditions (anaerobic environment, sulfate-reducing bacteria, moisture, and certain pH) drywall can produce Hydrogen Sulfide (H_2S). The majority of H_2S that is produced ends up in the leachate, but some H_2S gas can also be produced and is readily identified by its sulfur (rotten egg) odor. Dem-Con operates the landfill in a manner to eliminate or reduce these conditions needed for H_2S generation.

Assessment

MPCA has identified the steps in form p-ear1-10 to follow for assessment whether modeling is required as part of the EAW air review pathway. Step 1 asks "will the project result in the emission of air pollutants?" The landfill vents could be viewed as potential point sources (i.e., they have an airflow). However, the minimal emissions of regulated pollutants subject to modeling requirements leads to the conclusion there is no need to complete a modeling assessment. Because there are no combustion sources, the NAAQS criteria pollutants would not be expected in the vent emissions. The historical H_2S emissions at the site were associated with prior operational modes/scenarios that are no longer used. Specifically, prior operations at Dem-Con utilized a different method for disposal of gypsum board product, which has been discontinued to minimize potential H_2S generation. Significant H_2S generation in the C&D waste as currently managed is a very unlikely outcome and would represent a failure of the Dem-Con management system.

As additional support that there would be no meaningful H_2S emissions from the project vents, MPCA in its air permitting applicability determination notes there are no emission factors for H_2S from C&D landfills given the minimal generation expected from this waste. Further review has found no additional source for potential emission factors, as H_2S emissions from the waste being accepted by Dem-Con are not expected. As noted by the air permit applicability determination, no significant emissions are expected from the project that would necessitate modeling. Given the revised process for waste disposal of the gypsum board minimizes the exposure to moisture, H_2S generation from breakdown of this material will be inconsequential.

Further, airflow from the vents is expected to be minimal, as they are installed as a measure to prevent gas buildup under the cover due to differential pressure changes caused by changes in atmospheric conditions. Gas generation in properly managed C&D waste is expected to be minimal. Given emissions of H_2S would reflect non-optimal operation of the disposal system, we would assert that there are not expected emissions of air pollutants. This would allow Dem-Con to answer no to the Step 1 question. No NAAQS criteria pollutants are expected from the landfill vents, and generation and emission of H_2S (a MAAQS pollutant) would be indicative of an upset to the disposal methodology and not part of expected operations at the landfill.

Even if MPCA does not allow Dem-Con to screen out of further air analysis via Step 1, Step 2 looks at the availability of background monitoring data for the pollutant(s) of interest. In particular, the section asks whether there is at least a Screening Value's worth of space below the respective standard (H_2S MAAQS) in this case. MPCA does not maintain background H_2S monitoring values and instead monitors specific industrial facilities for assessment of compliance, or in response to specific complaints. Dem-Con has not received complaints regarding H_2S odor since changing their operational method for disposal of gypsum board materials. The H_2S MAAQS is intended to provide a usable concentration surrogate to avoid odor and possible headache and nausea impacts to the public. While there is not background monitoring data to quantitatively demonstrate available space for a project below the MAAQS, the lack of odor complaints (with a range of odor thresholds for H_2S starting at 0.5 ppb) since changing disposal methods indicates that this element is likely fulfilled.

If one assumes neither Step 1 or 2 were sufficient to demonstrate no further analysis is needed, Step 3 would require a modeling analysis to be performed. As noted above and in MPCA's analysis of air permit applicability there are no representative emission factors for H_2S from C&D waste vents. The effective rate for modeling is expected to be zero, since emissions of H_2S are not an expected part of the project when operating as proposed.

It is our understanding that Dem-Con intends to continue operating the facility in a manner which avoids gypsum board as an exposed capping material. Without this exposure, H_2S gas generation from the C&D waste is expected to be minimal. As noted in the MPCA's air permit applicability evaluation, if there are measurable H_2S emissions, then there would be a requirement to assess them. This is consistent with our expectation, that there are not expected to be meaningful H_2S emissions from the C&D landfill vents and thus no further air quality analysis is required.

Conclusion

The Project is not expected to create significant air emissions. NAAQS criteria pollutants or MAAQS criteria pollutant emissions are not expected from the landfill vents. Generation and emission of H_2S (a MAAQS pollutant) would be indicative of an upset to the disposal methodology and not part of expected operations at the landfill.

Environmental Review Unit Environmental Assessment Worksheet air assessment practices

Applicability

The practices described in this document apply to projects (Minn. R. 4410.0200, subp. 65) that require the preparation of an Environmental Assessment Worksheet (EAW) (Minn. R. 4410.1000), where the Minnesota Pollution Control Agency (MPCA) is the Responsible Governmental Unit (RGU). An exception to this are feedlot EAWs, which have their own air assessment process.

This document also does not apply to projects which require the preparation of an Environmental Impact Statement (EIS). Air assessments for projects requiring an EIS are developed on a case-by-case basis through the scoping process.

The air assessment practices described in this document are an addition to, not a replacement of, any other applicable air assessment requirements that may apply as part of the MPCA's air emission permitting process.

Disclaimer

This document is guidance, it does not replace provisions or regulations of the Clean Air Act or any state statute or rule, nor is it a regulation itself. It does not impose binding, enforceable requirements on any party. The provisions in this document may not apply to particular situations based upon unique or unusual circumstances.

Purpose

The MPCA's Environmental Review Unit (ERU) uses the air assessment process to help determine if the project's air emissions have the potential for significant environmental effects.

Air assessment administrative process

The ERU's air assessment process generally follows the approach presented below:

- Project proposer determines that the project will require preparation of an EAW.
- Project proposer determines if the project will result in air emissions described in this document and if so, project proposer prepares and submits a proposed air modeling protocol to the MPCA. If not, project proposer documents their findings and submits them to the MPCA ERU.
- MPCA receives, reviews, and approves air modeling protocol (when it is complete).
- Project proposer determines if the project will require an air emissions permit. If so, project proposer prepares and submits an air emissions permit application. If project proposer determines that an air emissions permit is not required, it submits this determination to the MPCA ERU. The MPCA ERU may require the project proposer submit a permit applicability determination to the MPCA air permitting program to confirm that an air permit is not necessary.
- Project proposer conducts the air assessment (e.g., screening or refined air dispersion modeling, and AERA) and submits the results to the ERU with its initial EAW data submittal.
- ERU reviews the project proposer's EAW data submittal and begins preparation of the EAW.

If you have any questions regarding this process please call 651-296-6300 or 800-657-3864 and ask for the ERU Air Assessments Coordinator.

How to evaluate a project's potential air quality impacts for an EAW

The EAW air assessment process takes into consideration both the project's potential direct impact to air quality as well as its potential cumulative impact. Direct impacts means the air quality impact of the project alone. Cumulative impacts include the project's direct air quality impacts as well as a representative ambient air quality background conditions (i.e., applicable air quality design value for the project area) and nearby sources air impacts. Minn. R. 4410.1200(E) require EAWs to identify cumulative potential effects.

The EAW air assessment is done for two separate sets of air pollutants which are listed in Parts 1 and 2 of this document. Part 1 pollutants are contained in Tables 1 and 2 below and are derived from the National Ambient Air Quality Standards (NAAQS) and Minnesota Ambient Air Quality Standards (MAAQS). Part 2 pollutants are air toxic pollutants (see Air Assessment Part 2 below for how to find the list of air toxic pollutants).

Air assessment Part 1 – This part describes the recommended steps involved in assessing the project's impact on air quality from emissions of the NAAQS and MAAQS air pollutants listed in Tables 1 and 2 below. Note: The values in Tables 1 and 2 are accurate as of the date of this document. Be sure to verify the current values by consulting Section 1.0 of the MPCA Air Dispersion Modeling Practices Manual.

Part 1 process steps are numbered to correspond to the Part 1 flow chart below.

Table 1. (NAAQS Pollutants)

Pollutant	Averaging Period	Significant Impact Level (SIL) (µg/m^3)	NAAQS (µg/m^3)
Carbon Monoxide (CO)	1-hour	2000	40,071.5
	8-hour	500	10,304.1
Particulate Matter ≤10 microns (PM_{10})	24-hour	5	150
Particulate Matter ≤2.5 microns ($PM_{2.5}$)	24-hour	1.2	35
	Annual	0.3	12.0
Nitrogen Dioxide (NO_2)	1-hour	7.52	188.0
	Annual	1	99.7
Sulfur Dioxide (SO_2)	1-hour	7.52	196.4
	3-hour	25	1309.3
	24-hour	5	366.6
	Annual	1	78.6

Table 2. (MAAQS Pollutants)

Pollutant	Averaging Period	Screening Value (SV) (µg/m^3)	MAAQS (µg/m^3)
Hydrogen Sulfide (H_2S)	30-minutes[1]	10	70.0
	30-minutes[2]	10	42.0

[1] 30-minute average not to be exceeded more than two times in a year
[2] 30-minute average not to be exceeded more than two times in five consecutive days

The following are the steps for completing air assessment Part 1:

- **Step 1** – Will the project result in the emission of air pollutants?
  - If "yes", go to Step 2.
  - If "no", go to Step 9.
- **Step 2** – Is the representative ambient air quality background concentration (i.e., applicable ambient air quality design value for the project area) plus the pollutant's significant impact level (SIL) or screening value (SV) less than or equal to 90% of the pollutant's NAAQS or MAAQS? Be sure to use the SIL, SV, NAAQS, and MAAQS values and units listed in Tables 1 and 2 of this document.
  - If "yes", go to Step 3.
  - If "no", go to Step 4.
- **Step 3** – Is the project's (not the total facility's) modeled direct impact (i.e., without ambient background and nearby sources) at the project site less than or equal to the pollutant's applicable SIL or SV? For the NAAQS pollutants listed in Table 1, the project site means at the project's fence line or related Ambient Boundary Control Line. For the MAAQS pollutants listed in Table 2, the project site means at the project's property line.
  - If "yes", go to Step 9.
  - If "no", go to Step 4.

  Please refer to Appendix D of the MPCA Air Dispersion Modeling Practices Manual for more detail on where to place modeling receptors at the project site.

  The ERU strongly prefers AERMOD for screening level analysis as it looks at both the direct project impacts and the cumulative impacts. In limited circumstances, the MPCA will consider the use of AERSCREEN as an alternative to AERMOD, if the project proposer can demonstrate that its use is appropriate for the project, and will give a more conservative analysis. However, the MPCA would have to agree that the use of AERSCREEN is appropriate before it can be used. The MPCA will not approve the use of SCREEN3, as it is no longer supported or used by either EPA or MPCA.

  The MPCA ERU will not accept any air dispersion modeling results or an EAW data submittal until the MPCA's Risk Evaluation and Air Modeling (REAM) unit has approved the air modeling protocol for the project.

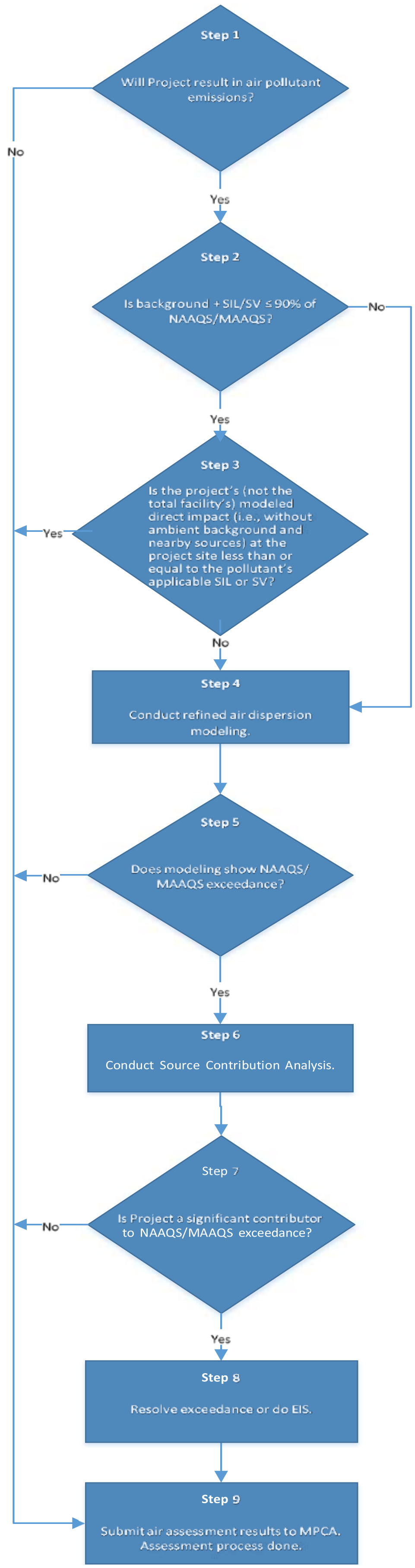
  Air modeling protocols and modeling information requests should be submitted to the REAM unit using the Air Modeling e-Service. For more information on setting up an e-Service account, getting access to a facility in e-Services, and the forms and data required for an Air Modeling e-Service submission, visit the following webpages:

  - Preparing for and submitting an Air Modeling e-Service submittal
  - Air Quality Dispersion Modeling Forms

  Any questions about the Air Modeling e-Service should be sent to airmodeling.pca@state.mn.us
- **Step 4 –** Conduct refined air dispersion modeling and then go to step 5.
  The ERU requires all refined air dispersion modeling use AERMOD and follow the procedures in the MPCA Air Dispersion Modeling Practices Manual. The modeling must consider the air impact of the project (and any associated facility), nearby sources, and a representative ambient air background concentration.
- **Step 5** – Did the air dispersion modeling show that the pollutant will exceed the applicable NAAQS or MAAQS?
  - If "yes", go to Step 6.
  - If "no", go to Step 9.
- **Step 6** – Conduct a source contribution analysis according to Appendix A of the MPCA Air Dispersion Modeling Practices Manual and then go to Step 7.

- **Step 7** – Did the source contribution analysis show that the project is a “significant contributor” to the modeled exceedance of the applicable NAAQS or MAAQS?
  - If “yes”, go to Step 8.
  - If “no”, go to Step 9.
- **Step 8** – The project will either need to resolve the modeled exceedance(s) by accepting air emission permit limits and/or air pollution controls, or conduct an EIS. Decide approach to be taken and go to Step 9.
- **Step 9** – Part 1 of the air assessment is done. Submit the results to the MPCA’s ERU and complete Part 2 of the air assessment below.

The following is a flow chart for completing the air assessment for Part 1. This flow chart corresponds to the steps above and is provided as an alternative description of the steps in Part 1.


Step 1
Will Project result in air pollutant emissions?
No
Yes
Step 2
Is background + SIL/SV ≤ 90% of NAAQS/MAAQS?
No
Yes
Step 3
Is the project's (not the total facility's) modeled direct impact (i.e., without ambient background and nearby sources) at the project site less than or equal to the pollutant's applicable SIL or SV?
Yes
No
Step 4
Conduct refined air dispersion modeling.
Step 5
Does modeling show NAAQS/ MAAQS exceedance?
No
Yes
Step 6
Conduct Source Contribution Analysis.
Step 7
Is Project a significant contributor to NAAQS/MAAQS exceedance?
No
Yes
Step 8
Resolve exceedance or do EIS.
Step 9
Submit air assessment results to MPCA. Assessment process done.

The following are the steps for completing air assessment Part 2:

Air assessment Part 2 – This part describes the recommended steps involved in assessing the project's impact on air quality from its toxic pollutant emissions. Air Toxics are a group of pollutants that cause or may cause cancer or other serious health effects or adverse environmental and ecological effects. Air toxics include, but are not limited to, the Hazardous Air Pollutants (HAPs) specified in the Clean Air Act Amendments. For a full list of air toxics, see the MPCA Risk Analysis Screening Spreadsheet (RASS).

- **Step 1** – Will the project result in the emission of air pollutants?
  - If "no", Part 2 of the air assessment is done. Submit results to the MPCA's ERU with the result from Part 1.
  - If "yes", go to Step 2.
- **Step 2** - Complete an Air Emissions Risk Analysis (AERA) according to the process and guidance on the MPCA's AERA webpage and submit results to the MPCA's ERU with the result from Part 1.

Attachment 15

Short tons of waste type landfilled on annual basis

Annual Volume of Waste Landfilled					
Annual waste received					
waste type				volume	unit
C& D lined				874,727	cy-gate
C&D unlined				181,628	cy-gate
Industrial				246,262	cy-gate
Dem-Con Waste					
Type	**Cy - Gate**			**Amount (Cu. Yds.)/year**	**Tons/year**
C&D Waste lined	**874,727**		**Conversion[1]**		
C&D Waste unlined	**181,628**				
	1,056,355				
C&D Waste Material Metro Area	**% Composition**	**cy gate**	**#/cy - gate**	**Short tons/year**	**WARM Category**
Concrete	**14.8**	156,341	860	67,226	concrete
Roofing Shingles	**31**	327,470	731	119,690	asphalt shingles
Brick	**4.1**	43,311	860	18,624	clay bricks
Dirt/Sand/Gravel/Rock				**63,163**	
Dirt/Sand	4.7	49,649	929	23,062	concrete
Rock/Gravel	7.6	80,283	999	40,101	concrete
Gypsum Board				19,239	
Clean	4.7	49,649	467	11,593	drywall
Painted	3.1	32,747	467	7,646	drywall
Clean Wood				8,033	
Un Treated Dim Lumber	2.5	26,409	169	2,232	Dim. Lumber
Un Treated Eng Wood	2.9	30,634	268	4,105	Dim. Lumber
Wood Pallets/Crates/spools	1.9	20,071	169	1,696	Dim. Lumber
Metal				2,614	
Appliances	0	-		-	
Composite Metals	0	-		-	
Ferrous Scrap	1.5	15,845	225	1,783	steel cans
Non-Ferrous Scrap	0.7	7,394	225	832	aluminum ingot
Plastics				55	
Durable Plastic Items	0.1	1,056	35	18	HDPE
Film Plastic	0.1	1,056	35	18	LDPE
HDPE Buckets	0	-		-	
Plastic furniture	0	-		-	
R/C and other plastics	0.1	1,056	35	18	mixed plastics
General C&D				33,088	
Acoustic Tiling	0.1	1,056	484	256	Fiberglass Insulation
Asbestos	0	-	484	-	
Asphalt	3.1	32,747	773	12,657	asphalt concrete
Carpet	0.6	6,338	147	466	carpet
Carpet padding	0.1	1,056	62	33	carpet
Ceramics/Porcelain	1.2	12,676	484	3,068	clay bricks
Flat Glass	0.2	2,113	484	511	glass
HVAC Ducting	0	-		-	
Insulation	0.3	3,169	100	158	fiberglass insulation
Plastic Piping	0.1	1,056	484	256	PVC
Plastic Siding/Decking	0.2	2,113	484	511	vinyl flooring
R/C and other C&D	4.9	51,761	484	12,526	mixed plastics
Rubber products	0.7	7,394	484	1,789	tires

tyvek building wrap	0	-		-	
R/C and other paper	0.1	1,056	500	264	mixed paper
R/C and other glass	0.1	1,056	380	201	glass
Uncoated OCC	0.7	7,394	106	392	corrugated containers
Treated/Painted/Processed wood				6,962	
Painted Stained Wood	6.6	69,719	169	5,891	wood flooring
Treated Wood	0.8	8,451	169	714	wood flooring
Wood Furniture (Built-ins)	0.4	4,225	169	357	wood flooring
Total	100	1,056,355			
[1] From Volume to weight conversion Factors USEPA Office of Resource Conservation and Recovery April 2016					
where no converion available for category bulk demolition weaste 48#/cy was used					
R/C: Remainder and Composite					
Industrial waste					
		from annual report			
		cy - gate	#/cy-gate	short tons	
Asbestos Fraible		15,044	484	3,641	fiberglass insulation
Asbestos non friable		7,137	484	1,727	fiberglass insulation
Ash		7,621	484	1,844	Fly Ash
Grit and bar screening		1,001	929	465	Concrete
Shredder fluff		2,275	200	228	fiberglass insulation
Sludge		845	999	422	Concrete
Street sweepings		6,662	929	3,094	Concrete
Autoclave Waste		1,788	484	433	Concrete
Reycycling residue		39,355	100	1,968	Mixed Metals
Bldg. Manuf.		62,929	484	15,229	Mixed platics
alt daily cover		64,113	484	15,515	Concrete
cont soils		36,379	929	16,898	Concrete
dirt		604	292	88	Concrete
sand blast media		508	929	236	Concrete
		246,261			

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EPA CENTER FOR CORPORATE CLIMATE LEADERSHIP U.S. Environmental Protection Agency

Scope 1 Emissions from Landfilling Activity

Guidance

(A) Enter annual waste data in ORANGE cells. Example entry is shown in first row (*GREEN Italics*).

(B) Choose the appropriate material and disposal method from the drop down options. For the average-data method, use one of the mixed material types, such as mixed MSW. If the exact waste material is not available, consider an appropriate proxy. For example, dimensional lumber can be used as a proxy for wood furniture.

(C) Choose an appropriate disposal method. Note that not all disposal methods are available for all materials. If there is a #NA or # Value error in the emissions column, you must pick a new material type or appropriate disposal method.

Table 1. Waste Disposal Weight by Waste Material and Disposal Method (CO_2, CH_4 and N_2O)

Source ID	Source Description	Waste Material	Disposal Method	Weight	Unit	CO_2e Emissions (kg)
Bldg-012	*East Power Plant Finished Goods*	*Steel Cans*	*Landfilled*	*1,000*	*metric ton*	*22,040*
C&D Waste	concrete	concrete	Landfilled	67,226	short ton	*1,344,520*
C&D Waste	roofing shingles	Asphalt Shingles	Landfilled	119,690	short ton	*2,393,800*
C&D Waste	brick	Clay Bricks	Landfilled	18,624	short ton	*372,480*
C&D Waste	dirt/sand/rock/gravel	concrete	Landfilled	63,163	short ton	*1,263,260*
C&D Waste	gyspum board	Drywall	Landfilled	19,239	short ton	*384,780*
C&D Waste	clean wood	Dimensional Lumber	Landfilled	8,033	short ton	*1,365,610*
C&D Waste	ferrous scrap	Steel Cans	Landfilled	1,783	short ton	*35,660*
C&D Waste	non-ferrous scrap	Aluminum Ingot	Landfilled	832	short ton	*16,640*
C&D Waste	durable plastic items	HDPE	Landfilled	18	short ton	*360*
C&D Waste	film plastic	LDPE	Landfilled	18	short ton	*360*
C&D Waste	R/C and other plastics	Mixed Plastics	Landfilled	18	short ton	*360*
C&D Waste	durable plastic itens	HDPE	Landfilled	18	short ton	*360*
C&D Waste	film plastic	LDPE	Landfilled	37	short ton	*740*
C&D Waste	r/c and other plastics	Mixed Plastics	Landfilled	18	short ton	*360*
C&D Waste	acoustic tiling	LLDPE	Landfilled	256	short ton	*5,120*
C&D Waste	asphalt	Asphalt Concrete	Landfilled	12,657	short ton	*253,140*
C&D Waste	carpet	Carpet	Landfilled	466	short ton	*9,320*
C&D Waste	carpet padding	Carpet	Landfilled	33	short ton	*660*
C&D Waste	ceramics/porcelain	Clay Bricks	Landfilled	3,068	short ton	*61,360*
C&D Waste	flat glass	Glass	Landfilled	511	short ton	*10,220*
C&D Waste	insulation	Fiberglass Insulation	Landfilled	158	short ton	*3,160*
C&D Waste	plastic piping	PVC	Landfilled	256	short ton	*5,120*
C&D Waste	plastic siding/decking	Vinyl Flooring	Landfilled	511	short ton	*10,220*
C&D Waste	r/c and other C&D	Mixed Plastics	Landfilled	12,526	short ton	*250,520*
C&D Waste	rubber products	Tires	Landfilled	1,789	short ton	*35,780*
	R/C and other paper	Mixed Paper general	Landfilled	264	short ton	*211,200*
	R/C and other glass	Glass	Landfilled	201	short ton	*4,020*
	Uncoated OCC	Corrugated Containers	Landfilled	392	short ton	*352,800*
C&D Waste	treated/painted/processed wood	Wood Flooring	Landfilled	7,319	short ton	*1,317,420*
Industrial Waste	Asbestos - friable	fiberglass insulation	Landfilled	3,614	short ton	*72,280*
Aindustrial Waste	Asbestos non-friable	fiberglass insulation	Landfilled	1,727	short ton	*34,540*
Industrial Waste	Ash	Fly Ash	Landfilled	1,844	short ton	*36,880*
Industrial Waste	Grit and Bar Screening	Concrete	Landfilled	465	short ton	*9,300*
Industrial Waste	Shredder fluff	fiberglass insulation	Landfilled	228	short ton	*4,560*
Industrial Waste	Sludge	Concrete	Landfilled	422	short ton	*8,440*
Industrial Waste	Street Sweepings	Concrete	Landfilled	3,094	short ton	*61,880*
Industrial Waste	Autoclave Waste	Concrete	Landfilled	433	short ton	*8,660*
Industrial Waste	Recycling Residue	Glass	Landfilled	1,968	short ton	*39,360*
Industrial Waste	Manufacturing residuals	Mixed Plastics	Landfilled	15,229	short ton	*304,580*
Industrial Waste	alt daily cover	Concrete	Landfilled	15,515	short ton	*310,300*
Industrial Waste	contaminated soils	Concrete	Landfilled	16,898	short ton	*337,960*
Industrial Waste	Dirt/sand/rock/gravel	Concrete	Landfilled	88	short ton	*1,760*
Industrial Waste	sand blasting media	Concrete	Landfilled	236	short ton	*4,720*
C&D Waste	metals to New Ulm	Mixed Metals	Recycled	767	short ton	*176,410*
C&D Waste	mixed recyclable to D-C Campus	Mixed Recyclables	Recycled	100	short ton	*9,000*

GHG Emissions

Total Emissions by Disposal Method

Waste Material	CO_2e (kg)
Recycled	185,410
Landfilled	10,944,570
Combusted	-
Composted	-
Anaerobically Digested (Dry Digestate with Curing)	-
Anaerobically Digested (Wet Digestate with Curing)	-

Total CO_2 Equivalent Emissions (metric tons) - Waste **11,130.0**

Scope 1 Construction Emissions from Mobile Sources

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Guidance

(A) Enter annual data for each vehicle or group of vehicles (grouped by vehicle type, vehicle year, and fuel type) in ORANGE cells in **Table 1**. Example entry is shown in first row (GREEN *Italics*). Only enter vehicles owned or leased by your organization on this sheet. All other vehicle use such as employee commuting or business travel is considered a scope 3 emissions source and should be reported in the corresponding scope 3 sheets.

- Select "On-Road" or "Non-Road" from drop down box to determine the Vehicle Types available.
- Select "Vehicle Type" from drop down box (closest type available).
- Enter "Fuel Usage" in appropriate units (units appear when vehicle type is selected).

  - If mileage or fuel usage is unknown, estimate using approximate fuel economy values (see **Reference Table** below).
  - Vehicle year and Miles traveled are not necessary for non-road equiment.

(B) When using biofuels, typically the biofuel (biodiesel or ethanol) is mixed with a petroleum fuel (diesel or gasoline) for use in vehicles. Enter the biodiesel and ethanol percentages of the fuel if known, or leave default values.

Biodiesel Percent:	20
Ethanol Percent:	80

(C) Biomass CO_2 emissions from biodiesel and ethanol are not reported in the total emissions, but are reported separately at the bottom of the sheet.

Table 1. Mobile Source Fuel Combustion and Miles Travele

Source ID	Source Description	On-Road or Non-Road?	Vehicle Type	Vehicle Year	Fuel Usage	Units	Miles Traveled
Fleet-012	*HQ Fleet*	*NonRoad*	*Ships and Boats - Diesel*	*1990*	*500*	*gal*	*3,670*
	construction equipment	NonRoad	Construction/Mining Offroad Trucks - Diesel		1,500	gal	

Reference Table: Average Fuel Economy by Vehicle Typ

Vehicle Type	Average Fuel Economy (mpg)
Passenger Cars	24.1
Motorcycles	44.0
Diesel Buses (Diesel Heavy-Duty Vehicles)	7.3
Other 2-axle, 4-Tire Vehicles	17.6
Single unit 2-Axle 6-Tire or More Trucks	7.5
Combination Trucks	6.1

GHG Emissions

Total Organization-Wide Mobile Source Fuel Usage and CO_2 Emissions (On-Road and Off-Road Vehicles

Fuel Type	Fuel Usage	Units	CO_2 (kg)	
Motor Gasoline	0	gallons	0.0	
Diesel Fuel	1,500	gallons	15,315.0	
Residual Fuel Oil	0	gallons	0.0	
Aviation Gasoline	0	gallons	0.0	
Kerosene-Type Jet Fuel	0	gallons	0.0	
Liquefied Petroleum Gas (LPG)	0	gallons	0.0	
Ethanol	0	gallons	0.0	*Note: emissions here are only for the g*
Biodiesel	0	gallons	0.0	*Note: emissions here are only for the d*
Liquefied Natural Gas (LNG)	0	gallons	0.0	
Compressed Natural Gas (CNG)	0	scf	0.0	

Total Organization-Wide Non-Road Mobile Source Fuel Usage and CH_4/N_2O Emissions

Vehicle Type	Fuel Type	Fuel Usage (gallons)	CH_4 (g)	N_2O (g)
Ships and Boats	Residual Fuel Oil	-	-	-
	Gasoline (2 stroke)	-	-	-
	Gasoline (4 stroke)	-	-	-
	Diesel	-	-	-
Locomotives	Diesel	-	-	-
Aircraft	Jet Fuel	-	-	-
	Aviation Gasoline	-	-	-
Agricultural Equipment	Gasoline (2 stroke)	-	-	-
	Gasoline (4 stroke)	-	-	-
	Diesel	-	-	-
	LPG	-	-	-
Agricultural Offroad Trucks	Gasoline	-	-	-
	Diesel	-	-	-
Construction/Mining Equipment	Gasoline (2 stroke)	-	-	-
	Gasoline (4 stroke)	-	-	-
	Diesel	-	-	-
	LPG	-	-	-
Construction/Mining Offroad Trucks	Gasoline	-	-	-
	Diesel	1,500	195	735
Lawn and Garden Equipment	Gasoline (2 stroke)	-	-	-
	Gasoline (4 stroke)	-	-	-
	Diesel	-	-	-
	LPG	-	-	-
Airport Equipment	Gasoline	-	-	-
	Diesel	-	-	-
	LPG	-	-	-
Industrial/Commercial Equipment	Gasoline (2 stroke)	-	-	-
	Gasoline (4 stroke)	-	-	-
	Diesel	-	-	-
	LPG	-	-	-
Logging Equipment	Gasoline (2 stroke)	-	-	-
	Gasoline (4 stroke)	-	-	-
	Diesel	-	-	-
Railroad Equipment	Gasoline	-	-	-
	Diesel	-	-	-
	LPG	-	-	-
Recreational Equipment	Gasoline (2 stroke)	-	-	-
	Gasoline (4 stroke)	-	-	-
	Diesel	-	-	-
	LPG	-	-	-

Total CO_2 Equivalent Emissions (metric tons) - Mobile Source	**15.5**
Total Biomass CO_2 Equivalent Emissions (metric tons) - Mobile Source	**0.0**

Notes:
1. Average mpg values from the U.S. Department of Transportation, Federal Highway Administration, Highway Statistics 2019 (Nov 2020), Table VM-1.

SHORT TONS = 17.13

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Scope 1 Emissions from Stationary Combustion Sources

Guidance

(A) Enter annual data for each combustion unit, facility, or site (by fuel type) in ORANGE cells on **Table 1**. Example entry is shown in first row (*GREEN Italics*).

- Select "Fuel Combusted" from drop down box.
- Enter "Quantity Combusted" and choose the appropriate units from the drop down box in the unit column. If it's necessary to convert units, common heat contents can be found on the "Heat Content" sheet and unit conversions on the "Unit Conversion" sheet.

(B) If fuel is consumed in a facility but stationary fuel consumption data are not available, an estimate should be made for completeness. See the "Items to Note" section of the Help sheet for suggested estimation approaches.

(C) Biomass CO_2 emissions are not reported in the total emissions, but are reported separately at the bottom of the sheet.

Table 1. Stationary Source Fuel Combustion

Source ID	Source Description	Source Area (sq ft)	Fuel Combusted	Quantity Combusted	Units
BLR-012	*East Power Plant*	*12,517*	*Natural Gas*	*10,000*	*MMBtu*
D-C	Heating office space		Natural Gas	853	Therm

GHG Emissions

Total Organization-Wide Stationary Source Combustion by Fuel Type

Fuel Type	Quantity Combusted	Units
Anthracite Coal	0	short tons
Bituminous Coal	0	short tons
Sub-bituminous Coal	0	short tons
Lignite Coal	0	short tons
Natural Gas	83,171	scf
Distillate Fuel Oil No. 2	0	gallons
Residual Fuel Oil No. 6	0	gallons
Kerosene	0	gallons
Liquefied Petroleum Gases (LPG)	0	gallons
Wood and Wood Residuals	0	short tons
Landfill Gas	0	scf

Total Organization-Wide CO_2, CH_4 and N_2O Emissions from Stationary Source Fuel Combustion

Fuel Type	CO_2 (kg)	CH_4 (g)	N_2O (g)
Anthracite Coal	0.0	0.0	0.0
Bituminous Coal	0.0	0.0	0.0
Sub-bituminous Coal	0.0	0.0	0.0
Lignite Coal	0.0	0.0	0.0
Natural Gas	4,527.8	85.7	8.3
Distillate Fuel Oil No. 2	0.0	0.0	0.0
Residual Fuel Oil No. 6	0.0	0.0	0.0
Kerosene	0.0	0.0	0.0
Liquefied Petroleum Gases (LPG)	0.0	0.0	0.0
Total Fossil Fuel Emissions	**4,527.8**	**85.7**	**8.3**
Wood and Wood Residuals	0.0	0.0	0.0
Landfill Gas	0.0	0.0	0.0
Total Non-Fossil Fuel Emissions	**0.0**	**0.0**	**0.0**
Total Emissions for all Fuels	**4,527.8**	**85.7**	**8.3**

Total CO_2 Equivalent Emissions (metric tons) - Stationary Combustion	**4.5**
Total Biomass CO_2 Equivalent Emissions (metric tons) - Stationary Combustion	**0.0**

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Scope 1 Emissions from Refrigeration and Air Conditioning Equipment

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U.S. Environmental Protection Agency

Guidance

(A) HFC, PFC, CO_2, and SF_6 refrigerants from facilities and vehicles are required to be included in the GHG inventory. Ozone depleting substances, such as CFCs and HCFCs, are regulated internationally and are typically excluded from a GHG inventory or reported as a memo item.

(B) Select ONE of the three options with which to estimate emissions. Options range from most preferred method (Option 1) to least preferred method (Option 3). If option 3, screening method, is used and emissions are determined to be significant when compared to other emission sources, then one of the other methods should be applied to calculate emissions more accurately.

(C) Enter annual data in ORANGE cells as appropriate for the selected option.

Option 1. Material Balance Method: Enter organization-wide total gases stored and transferred (by gas) in Table 1.
- Choose the appropriate gas from the Gas drop down menu.
- Inventory Change = difference of gas stored in inventory from beginning to end of reporting period. (Includes only gas stored on-site (i.e. cylinders) and not gas contained within equipment).
- Transferred Amount = gas purchased minus gas sold/disposed during reporting period.
  -- Gas purchased includes: Purchases for inventory, as part of equipment servicing (not from inventory), within purchased equipment, and gas returned to the site after off-site recycling.
  -- Gas sold/disposed includes: Returns to supplier, sales or disposals (including within equipment), and gas sent off-site for recycling, reclamation, or destruction.
- Capacity Change = capacity of all units at beginning minus capacity of all units at end of reporting period. (can be assumed to be capacity of new units minus capacity of retired units).

Table 1. Organization-Wide Refrigeration Gas CO_2 Equivalent Emissions - Material Balance

Gas	Gas GWP	Inventory Change (lb)	Transferred Amount (lb)	Capacity Change (lb)	CO_2 Equivalent Emissions (lb)

Option 2. Material Balance Method (Simplified): Enter organization-wide total gases in units (by gas) in Table 2.
- Choose the appropriate gas from the drop down menu.
- New units are those installed during reporting period (do not include any data for new units pre-charged by supplier), disposed units were disposed of during the reporting period, and existing units are all others.
- Charge/Recharge = gas added to units by organization or a contractor (do not include pre-charge by manufacturer).
- Capacity = sum of the full capacity for all units (do not include new units pre-charged by manufacturer).
- Amount recovered = total gas recovered from all retired units.

Table 2. Organization-Wide Refrigeration Gas CO_2 Equivalent Emissions - Simplified Material Balance

Gas	Gas GWP	New Units		Existing Units	Disposed Units		CO_2 Equivalent Emissions (lb)
		Charge (lb)	Capacity (lb)	Recharge (lb)	Capacity (lb)	Recovered (lb)	

Option 3. Screening Method: Enter refrigerant information for each unit or group of units (by refrigerant) in **Table 3.**
- Select the "Type of Equipment" (closest available) and "Gas" from the drop down box.
- Enter amount of refrigerant added to new units by the organization (not pre-charged amount from manufacturer).
- Enter refrigerant capacity (by equipment type and refrigerant) for all units operating and disposed during reporting period.
  -- For each unit added or removed during reporting period, multiply its capacity by a usage factor (0.0 to 1.0). For example, if the equipment was installed in June, multiply by 0.5 or (6/12), if it was installed in September you would multiply by 0.33 (4/12).
  -- If data entered for multiple units, sum the capacities or charge quantity for all like units.
  -- If capacity of unit(s) is not known, use upper value of default capacity provided in the **Reference Table** below.
- See example entry in first row (*GREEN Italics*).

Table 3. Source Level Refrigeration Gas CO_2 Equivalent Emissions - Screening Method

Source ID	Type of Equipment	Gas	Gas GWP	New Units Charge (kg)	Capacity		CO_2 Equivalent Emissions (kg)
					Operating Units (kg)	Disposed Units (kg)	
Bldg-012	*Domestic Refrigeration*	*HFC-32*	675	*1000*	*0.5*	*0.25*	*6,792.2*
	Residential/Commercial A/C	R-401A	16	4.0			0.6
	Car A/C Units	HFC-134a	1,430	3.0			21.5

Reference Table: Type of Equipment and Default Capacity Ranges (Lower to Upper Range) for Table 3

Domestic Refrigeration	Domestic refrigeration units (capacity 0.05 to 0.5 kg)
Stand-Alone Commercial	Stand alone commercial applications (capacity 0.2 to 6 kg)
Medium/Large Commercial	Medium and large commercial refrigeration units (capacity 50 to 2,000 kg)
Transport Refrigeration	Transportation refrigeration units (capacity 3 to 8 kg)
Industrial Refrigeration	Industrial, food processing and cold storage units (capacity 10 to 10,000 kg)
Chillers	Commercial chillers (default capacity 10 to 2,000 kg)
Residential/Commercial A/C	Residential and commercial units, including heat pumps (capacity 0.5 to 100 kg)
Car A/C Units	Passenger car A/C units (capacity 0.5 kg)
Light-Duty Truck A/C Units	Light-duty truck A/C units (capacity 1.5 kg)

GHG Emissions

Total CO_2 Equivalent Emissions (metric tons) - Refrigeration and AC Equipment	**0.02**

Notes:
1. CO_2 emissions estimated using emission factors provided in Table 3 of the Center for Corporate Climate Leadership *Greenhouse Gas Inventory Guidance Direct Fugitive Emissions from Refrigeration, Air Conditioning, Fire Suppression and Industrial Gases. (Dec 2020).*
2. GWPs are from *Intergovernmental Panel on Climate Change (IPCC) Fourth Assessment Report (2007).*

Short Tons = 0.02

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Scope 1 Emissions from Purchased Gases

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Guidance

(A) Any use and release of the seven major greenhouse gases (CO_2, CH_4, N_2O, PFCs, HFCs, SF_6, and NF_3) is required to be included in the GHG inventory. Ozone depleting substances, such as CFCs and HCFCs, are regulated internationally and are typically excluded from a GHG

(B) Select the gas you purchase from the drop down menu and the amount purchased for the annual inventory reporting period in the ORANGE cells.

(C) It is assumed that all gas purchased in the reporting period used and released during the reporting period. If your business makes bulk purchases and plans on using the gas for several years, divide the bulk amount by the years of usage and report that amount.

Tip: If you purchase bulk gas, remember to report it for future years as well.

Table 1. Purchased Gases

Gas	Gas GWP	Purchased Amount (lb)	CO_2 Equivalent Emissions (lb)
CO2	1	75.0	75.0

GHG Emissions

Total CO_2 Equivalent Emissions (metric tons) - Purchased Gas	**0.03**

Notes:
1. GWPs are from *Intergovernmental Panel on Climate Change (IPCC) Fourth Assessment Report (2007).*

Short Tons 0.04

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Scope 2 Emissions from Purchase of Electricity

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U.S. Environmental Protection Agency

Guidance

The Indirect Emissions from Purchased Electricity Guidance document provides guidance for quantifying two scope 2 emissions totals, using a **location-based method** and a **market-based method**. The organization should quantify and report both totals in its GHG inventory. The location-based method considers average emission factors for the electricity grids that provide electricity. The market-based method considers contractual arrangements under which the organization procures electricity from specific sources, such as renewable energy.

(A) Enter total annual electricity purchased in kWh and each eGRID subregion for each facility or site in ORANGE cells of **Table 1**.
(B) If electricity consumption data are not available for a facility, an estimate should be made for completeness.
See the "Items to Note" section of the Help sheet for suggested estimation approaches.
(C) Select "eGRID subregion" from drop box and enter "Electricity Purchased."
- Use map (Figure 1) at bottom of sheet to determine appropriate eGRID subregion. If subregion cannot be determined from the map, find the correct subregion by entering the location's zip code into EPA's Power Profiler:
https://www.epa.gov/egrid/power-profiler#/
(D) See the market-based emission factor hierarchy on the market-based method Help sheet. If any of the first four types of emission factors are applicable, enter the factors in the yellow cells marked as "<enter factor>". If not, leave the yellow cells as is, and eGRID subregion factors will be used for market-based emissions.
Example entry is shown in first row (*GREEN Italics*) for a facility that purchases RECs for 100% of its consumption, and therefore has a market-based emission factor of 0.

Help - Market-Based Method

Tips: Enter electricity usage by location and then look up the eGRID subregion for each location.
If you purchase renewable energy that is less than 100% of your site's electricity, see the example in the market-based method Help sheet.

Table 1. Total Amount of Electricity Purchased by eGRID Subregion

					Market-Based *Use these cells to enter applicable market-based emission factors*						Location-Based		
					Emission Factors			Emissions			Emissions		
Source ID	Source Description	Source Area (sq ft)	eGRID Subregion *where electricity is consumed*	Electricity Purchased (kWh)	CO_2 Emissions (lb/MWh)	CH_4 Emissions (lb/MWh)	N_2O Emissions (lb/MWh)	CO_2 Emissions (lb)	CH_4 Emissions (lb)	N_2O Emissions (lb)	CO_2 Emissions (lb)	CH_4 Emissions (lb)	N_2O Emissions (lb)
Bldg-012	*East Power Plant*	*12,517*	*HIMS (HICC Miscellaneous)*	*200,000*	*0*	*0*	*0*	*0.0*	*0.0*	*0.0*	*237,120.0*	*28.6*	*4.4*
			MROW (MRO West)	108,000		<enter factor>	<enter factor>	118,627.2	12.9	1.8	118,627.2	12.9	1.8
					<enter factor>	<enter factor>	<enter factor>						
					<enter factor>	<enter factor>	<enter factor>						
					<enter factor>	<enter factor>	<enter factor>						
					<enter factor>	<enter factor>	<enter factor>						
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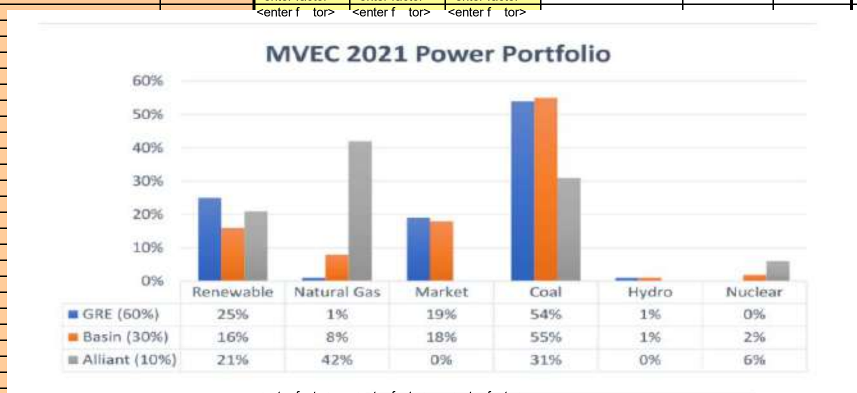

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					<enter factor>	<enter factor>	<enter factor>						
					<enter factor>	<enter factor>	<enter factor>						
Total Emissions for All Sources				108,000				118,627.2	12.9	1.8	118,627.2	12.9	1.8

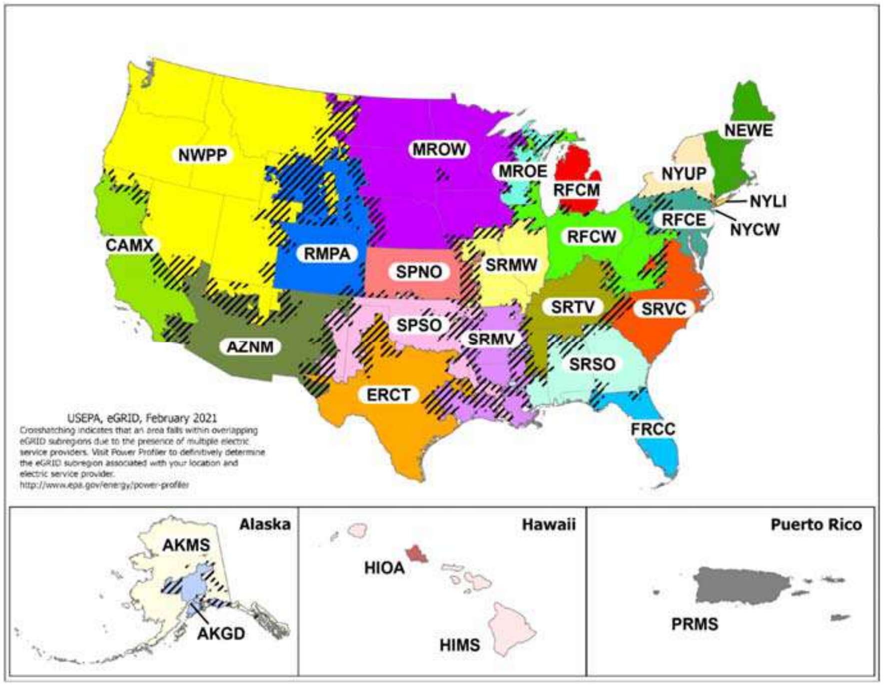
GHG Emissions

CO_2 Equivalent Emissions (metric tons	
Location-Based Electricity Emissions	54.2
Market-Based Electricity Emissions	54.2

Notes:

1. CO_2, CH_4 and N_2O emissions are estimated using methodology provided in EPA's Center for Corporate Climate Leadership Greenhouse Gas Inventory Guidance
   - Indirect Emissions from Purchased Electricity (January 2016).

Figure 1. EPA eGRID2019, February 2021



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Scope 3 Emissions from Leachate Transport for Off-Site Disposal

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Guidance

(A) Enter annual data in ORANGE cells in the table corresponding to the transport method. Example entry is shown in first row (*GREEN Italics*).
(B) For rail, water, or air shipments, enter short ton-mile data in **Table 2.** See Help sheet for details on calculating short ton-miles.
(C) For road shipments, if your organization's product is the only product transported in the vehicle (i.e. full truckload shipment) then enter the vehicle type and miles for each leg of transport in Table 1. Emissions are calculated using vehicle-miles.
(D) For road shipments, if your organization's product makes up only part of the truck load (i.e. less-than-load or LTL shipment), then enter the vehicle type and short ton-miles (product weight (short tons) x distance) for each leg of transport in Table 2. Emissions are calculated using short ton-miles. See Help sheet for details on calculating ton-miles.

Tip: Make sure all transport legs are accounted for from manufacturing facility to distribution to customer.

Table 1. On-Road Vehicle Product Transport by Vehicle-Miles (CO_2, CH_4 and N_2O)

Source ID	Source Description	Vehicle Type	Vehicle-Miles (miles)	CO_2 Emissions (kg)	CH_4 Emissions (g)	N_2O Emissions (g)
Bldg-012	*East Power Plant Finished Goods*	*Medium- and Heavy-duty Truck*	*100*	*141*	*1.3*	*3.3*
	leachate hauling	Medium- and Heavy-duty Truck	15,554	21,884	202.2	513.3
Total for Product Transport by Vehicle-Miles				21,884	202.2	513.3

Table 2. Product Transport by Ton-Miles (CO_2, CH_4 and N_2O)

Source ID	Source Description	Vehicle Type	Short Ton-	CO_2	CH_4	N_2O
Bldg-012	*East Power Plant Finished Goods*	*Medium- and Heavy-Duty Truck*	*100*	*141*	*1.30*	*3.30*
Total for all Product Transport by Ton-Miles				0	0.0	0.0

GHG Emissions

Total Emissions by Product Transport Type - - -

Transport Type	CO_2 (kg)	CH_4 (g)	N_2O (g)
Medium- and Heavy-Duty Truck	21,884	202	513
Light-Duty Truck	-	-	-
Passenger Car	-	-	-
Rail	-	-	-
Aircraft	-	-	-
Waterborne Craft	-	-	-

Total CO_2 Equivalent Emissions (metric tons) - Product Transport **22.0**

Short tons 24.30

Landfill Sequestration MTCO2E/Short Ton (from WARM)

Waste Type	Material	WARM Category	Activity	Weight		Landfill Carbon Sequestration MTCO2E/Short Ton[1]	Emissions MTCO2E	Emissions Short CO2E (Short Tons)
C&D Waste	gyspum board	Drywall	Landfilled	19,239	short ton	(0.08)	(1,539)	(1,697)
C&D Waste	clean wood	Dimensional Lumber	Landfilled	8,033	short ton	(1.09)	(8,756)	(9,652)
C&D Waste	treated, painted processed wood	Wood Flooring	Landfilled	6,962	short ton	(1.04)	(7,240)	(7,981)
C&D Waste	other paper	Mixed Paper general	Landfilled	264	short ton	(0.72)	(190)	(210)
C&D Waste	uncoated occ recyclable	Corrugated Containers	Landfilled	392	short ton	(0.72)	(282)	(311)
TOTAL SINK							(18,008)	(19,850)

[1] Landfill Carbon Sequestration factors from From US EPA WARM v.15

Memorandum

SRF No. 15559.00

To: Mark Pahl
Dem-Con Landfill LLC

From: Jeff Bednar, TOPS, Senior Traffic Engineering Specialist
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Date: April 22, 2022

Subject: Dem-Con Demolition, Construction, and Industrial Landfill Expansion
Updated Traffic Review

Introduction

SRF has completed a traffic review for the proposed Dem-Con Landfill Demolition, Construction, and Industrial expansion in Louisville Township, Scott County (see Figure 1: Project Location). This study does not contemplate a municipal solid waste landfill expansion. The existing Bryan Rock Quarry has a remaining life of approximately 10 years. The Dem-Con Landfill plans to expand into areas of the Quarry that have finalized mining operations/reclamation grading. Therefore, the main objectives of this review are to determine existing and future trip generation and routing associated with the Dem-Con Landfill expansion and perform a high-level traffic review to identify potential improvements, if necessary. The following information provides the assumptions, analysis, and study recommendations offered for your consideration.

Project Description

The Bryan Rock Quarry is made up of two quadrants; the north quadrant is actively being mined, whereas the south quadrant is planned to be mined once the north side mining is complete. The north quarry has begun its final phase of mining, and will begin transitioning into reclamation grading, which is expected to begin in the next two (2) to three (3) years. The south quadrant of the quarry will then begin to be mined, which has an expected life of up to 10 years. As this process occurs, the Dem-Con Landfill plans to expand into the areas of the quarry where mining operations/reclamation grading has been finalized. It should be noted that the quarry operations are currently accessed from the south. While there is currently a right-in/right-out site access on US 169, this access is generally limited to reclamation fill and construction uses only.

Dem-Con Landfill site-generated trips are based on traffic demand at the existing landfill operation and the current truck haul routes are not expected to change within the near future. Dem-Con will not adjust the truck haul routes (i.e., utilize the south access) until the Bryan Rock quarry mining is completed and no further Bryan Rock trips are generated (both Dem-Con and Bryan Rock want to avoid any overlap). After that point, the scale and scale house for incoming waste materials that are bound for the landfill may be relocated to the south. The remaining non-landfill loads will continue to access Dem-Con's environmental campus at the existing northern (TH 41) access point.

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Project Location

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Figure 1

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Trip Generation

To understand the current and future operations of the facilities, existing and future trip generation and routing estimates were developed. The Dem-Con trip generation is based on traffic counts at the existing landfill operation. Note that the Dem-Con trip generation is dependent on market demand and can fluctuate with the economy and/or the construction industry. Truck routes are only expected to change once Bryan Rock mining is completed and the landfill expansion area has progressed far enough to the south. At this point, Dem-Con may route landfill traffic to the south (Adjusted Routing), or they may keep the current traffic management system in place (Unadjusted Routing). Both alternatives were analyzed. Trip generation estimates were based on data provided by Dem-Con:

- Based on the number of truck tickets at the facility from May 1, 2020 to July 25, 2021, which was historically a high year for the landfill, therefore, the truck estimates are considered conservative.
- Dem-Con currently has 150 employees with typical shifts ranging from 6-8 a.m. until 3-6 p.m.
- User data shows that most trucks arrive during the daytime/off-peak hours, with a very low percentage expected during p.m. peak hour.
- Based on project team provided truck operations data for the 10-year period from 2012 (49,107 truckloads) through 2021 (83,538 truckloads), the Dem-Con Landfill associated truck traffic annual growth rate for the period was 5.46 percent. This growth rate was applied to current truck trip generation rates to develop the Future 2040 Forecasts in Table 1.

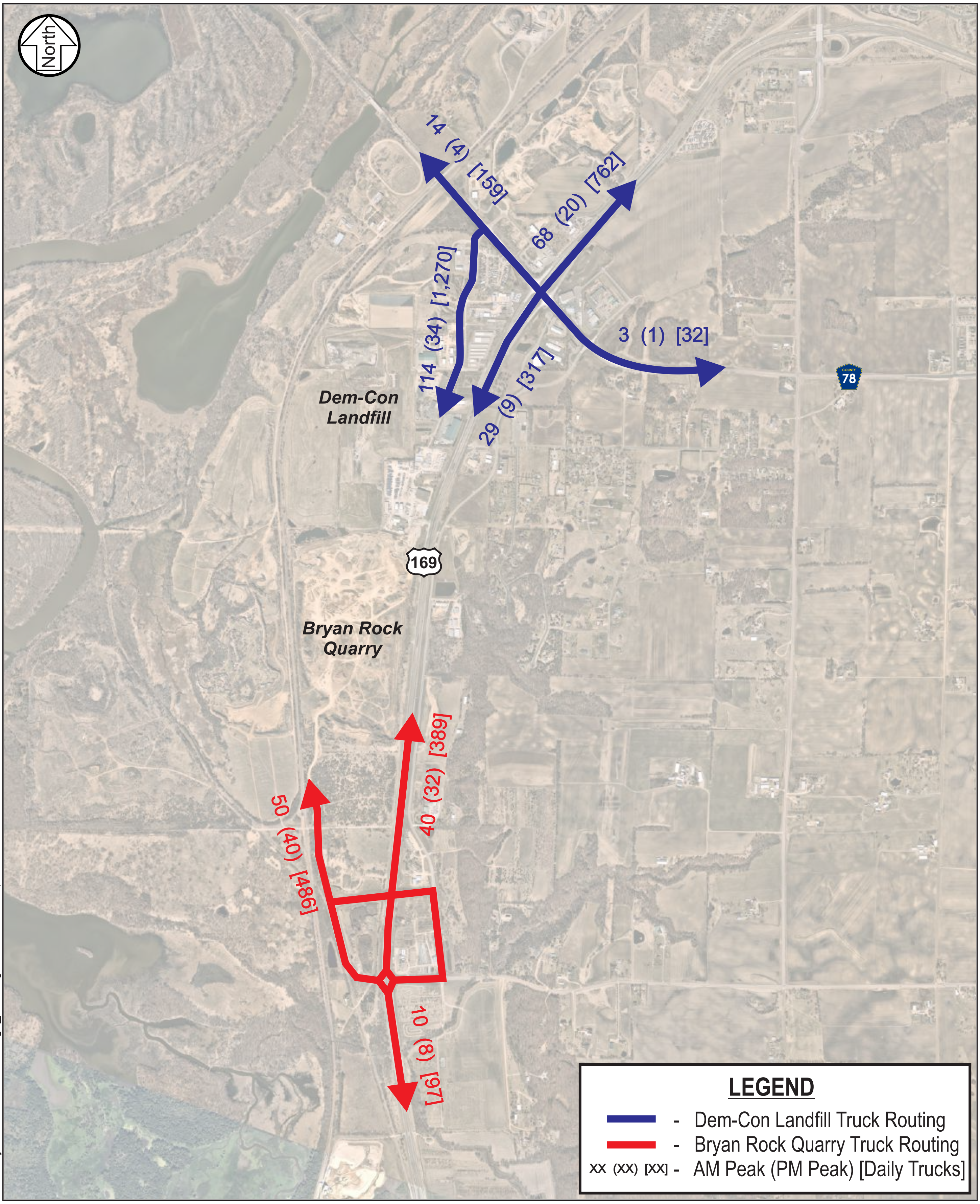
The vehicle trips included trucks accessing the Dem-Con Landfill, as well as the other solid waste facilities on Dem-Con's environmental campus including metal recycling, materials recovery facility, and transfer stations. Table 1 truck trip generation rates includes both Landfill and environmental campus traffic. Landfill bound trucks represent approximately 65 percent of all truck trips generated by Dem-Con Companies overall. Heavy vehicle estimates for the current Bryan Rock facility were provided by the development team and were based on calculating the amount of trucks needed for a one (1) million-ton annual production rate.

Figures 2, 3 and 4 show existing and future year 2040 truck routing (Adjusted and Unadjusted), respectively, based on the project description section and the trip generation estimates shown in Table 1. Once Bryan Rock mining activity is completed Bryan Rock truck volumes will be removed from the study area. Also included are the reclamation/construction fill trucks that utilize the US 169 right-in/right-out and occur over two- or three-month period annually. These reclamation/construction fill truck trips are expected to continue after the Bryan Rock mining is completed.

Table 1. Truck Trip Generation Estimates

Land Use	A.M. Peak Hour		P.M. Peak Hour		Daily Trips
	In	Out	In	Out	
Dem-Con Landfill/Environmental Campus (Existing)	57	57	17	17	1,270
Dem-Con Landfill/Environmental Campus (2040 Forecasts)	155	155	46	46	3,454
Bryan Rock Quarry (Future – to be removed)	25	25	20	20	486
Reclamation/Construction Fill (Existing & Future) (1)	7	7	6	6	154

(1) As mentioned previously, reclamation/construction fill trips are expected to utilize the US 169 right-in/right-out. These are expected to only occur over a 2- or 3-month period annually and are expected to continue after Bryan rock mining is completed.



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Existing Truck Routing Operations

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Figure 2

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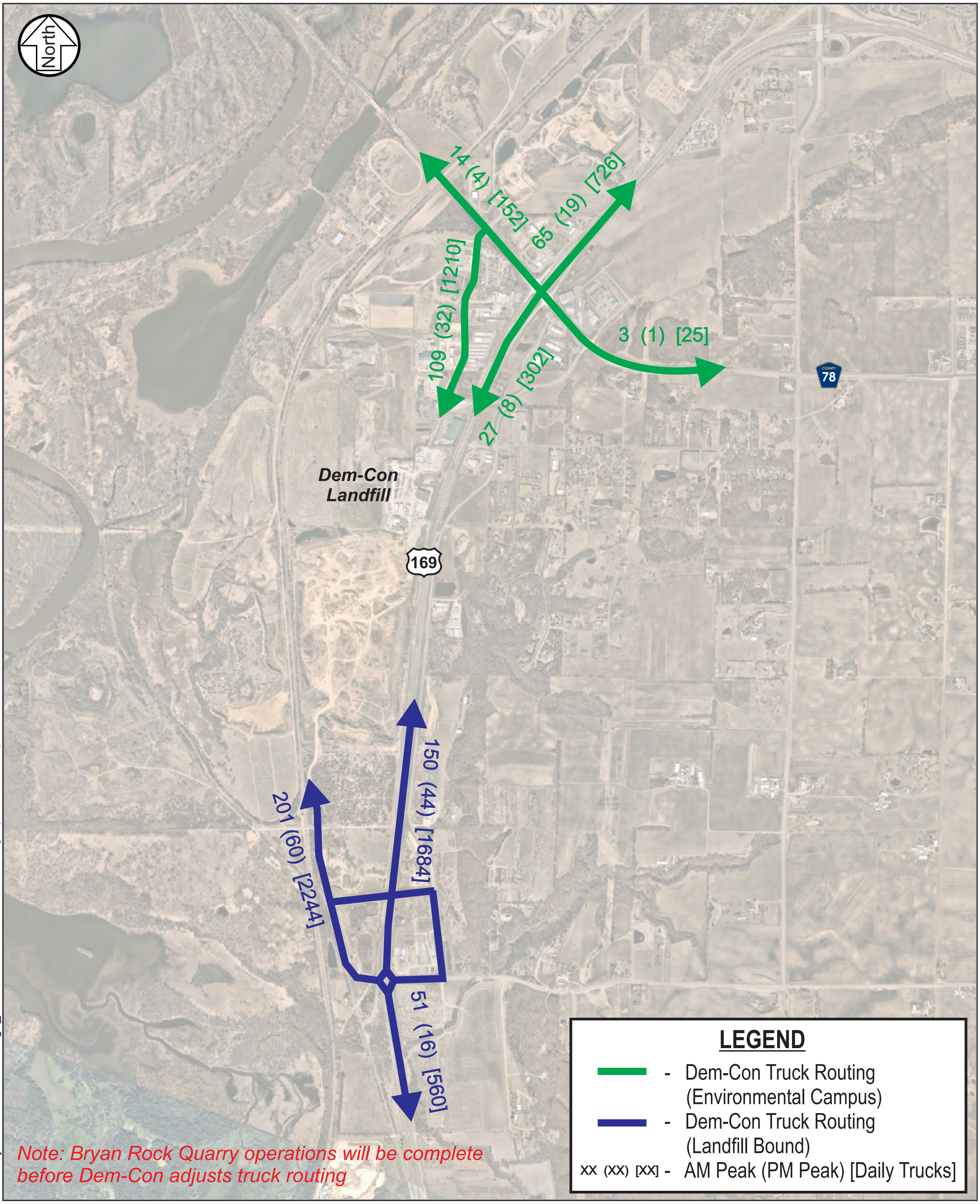

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Future Year 2040 Truck Routing Operations - Adjusted Routing

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Figure 3

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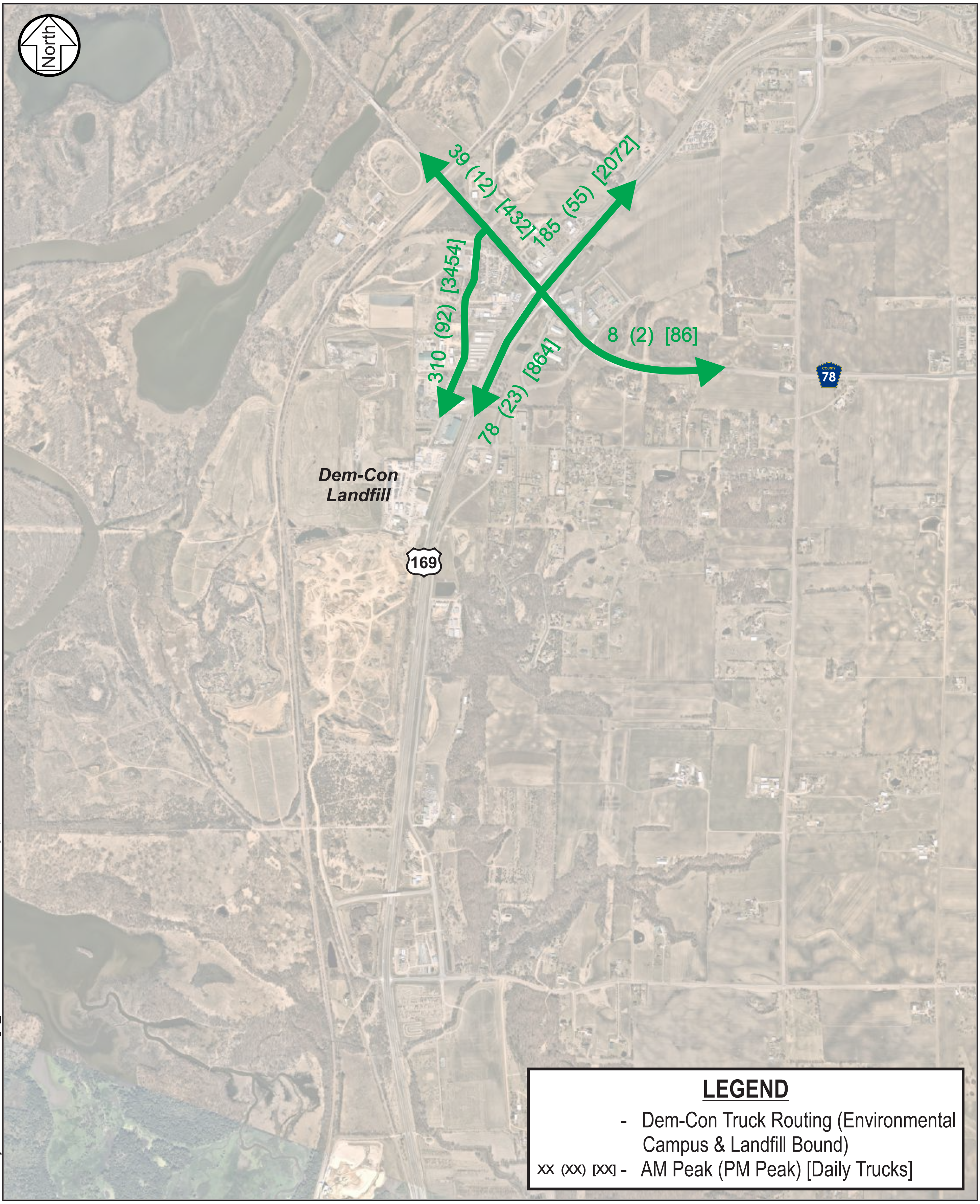

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Future Year 2040 Truck Routing Operations - Unadjusted Routing

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Figure 4

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Future Study Area Conditions

A comparison of the future Dem-Con Landfill year 2040 traffic forecasts with historical traffic forecasts in the study area (i.e., US 169 at TH 41 Intersection Study - Traffic Forecasts, November, 2016, by SEH), was made to determine if previous analysis remains valid. Based on the findings of this comparison and taking recent roadway system improvements into account, when considering the Dem-Con 2040 unadjusted routing scenario (the most critical scenario) the levels of service would remain the same as those in the 2016 US 169 at TH 41 Intersection Study, thus, no significant future traffic issues are expected. Therefore, the Dem-Con Landfill Expansion and forecasted landfill and regional traffic growth will not generate the need for further study area roadway system improvements.

Other/Adjacent Study Area Concurrent Events

The adjacent Minnesota Renaissance Festival generally runs only on Saturdays and Sunday's from late August to early October. Hours of operation are generally 9 a.m. to 7 p.m. There are other more limited events such as Trail of Terror and weddings held on site that generate minimal traffic volume.

The nearby Sever's Festivals are planning to run their Fall Festival (Corn Maze) generally on weekends from early September through October. Hours of operation are generally 10 a.m. to 10 p.m. There are also other more limited events planned such as drive-through visual adventure and lighting displays to be held on site that generate minimal traffic volume.

While Bryan Rock is permitted to operate at all hours, it is typically closed on festival weekends, thus creating minimal conflict with the primarily weekend held Minnesota Renaissance Festival (MRF) and/or Sever's Festival. Dem-Con is also permitted to operate at all hours; however, Saturday and Sunday are typically low volume days. The number of trucks entering while open during weekends is less than 50 percent of a normal weekday, based on user data provided by the project team. Therefore, the traffic conflict between Dem-Con and the MRF and/or Sever's Festivals events is minimal.

Adjacent/Nearby Proposed Projects

The "*Traffic Review – Proposed SMSC ORF Site*" was developed by Bolton and Menk, Inc. in June 2021, and evaluated the potential traffic impacts associated with the relocation of the SMSC Organics Recycling Facility (ORF). The study primarily focused on the private site access along TH 41, which is also referred to as the TH 41/Malkerson Site Access. Results of the study indicated that due to the combination of existing traffic, potential expansion to the mining operations, and the proposed ORF, that roadway improvements were needed.

Northbound and southbound left-turn lanes on TH 41 at the Malkerson Site Access, were recommended to improve traffic operations and safety for motorists turning from TH 41 onto the private access road. These recommended improvements are expected to mitigate any issues associated with the ORF and will provide benefits to the TH 41 transportation system as a whole. Note that the ORF traffic study considered Dem-Con's existing truck traffic generated trips on TH 41. Since the proposed expansion is not expected to significantly increase traffic, the results of the ORF study correctly reflects the proposed expansion. Dem-Con generates minimal trips at the TH 41/Malkerson Site Access intersection, and that these left-turn lane improvements are not expected to impact Dem-Con expansion trip generation or travel patterns.

Summary of Findings, Conclusions and Recommendations

Based on this traffic review for the proposed Dem-Con Landfill Demolition, Construction, and Industrial expansion the following summary of findings, conclusions and recommendations is offered for your consideration:

1. Dem-Con Landfill existing site-generated trips and the current truck haul routes are not expected to change within the near future.
2. Dem-Con will not adjust the truck haul routes until the Bryan Rock quarry mining is completed and no Bryan Rock trips are generated (both Dem-Con and Bryan Rock want to avoid any overlap). After that point, Dem-Con's landfill bound trucks may enter from the south (adjusted routing scenario) or the current traffic management system may remain in place (unadjusted routing scenario).
3. Based on project team provided truck operations data for the 10-year period from 2012 (49,107 truckloads) through 2021 (83,538 truckloads), the Dem-Con Landfill associated truck traffic annual growth rate for the period was 5.46 percent. This growth rate was used to develop the forecast 2040 Landfill peak hour traffic generation estimates.
4. Landfill bound trucks represent approximately 65 percent of all truck trips generated by Dem-Con Companies overall. The analysis includes both landfill and environmental campus traffic.
5. Based on the findings of a comparison of the future Dem-Con Landfill year 2040 traffic forecasts with historical traffic forecasts and analysis in the study area and taking the recent roadway system improvements into account, the Dem-Con 2040 unadjusted routing scenario (the most critical scenario) levels of service would remain the same as those in the 2016 US 169 at TH 41 Intersection Study, thus, no significant future traffic issues are expected. Therefore, the Dem-Con Landfill Expansion and forecasted landfill and regional traffic growth will not generate the need for further study area roadway system improvements.
6. Traffic conflict between Dem-Con and the primarily seasonal weekend occurring Minnesota Renaissance Festival or Sever's Festivals events would be minimal.
7. A recent traffic study evaluated the traffic impacts of the TH 41/Malkerson Site intersection associated with the relocation of the SMSC Organics Recycling Facility. The study recommended northbound and southbound left-turn lanes at the intersection, which should improve operations and safety along TH 41. These roadway improvements are not expected to impact trip generation or travel patterns associated with the Dem-Con expansion project.
8. The proposed Dem-Con Landfill expansion project does not represent a significant traffic impact to the study area, and it will not generate the need for study area roadway system improvements.