



May 16, 2024

FID# 471013840
Winnebago County
SW/Approval

Michael T. Kading, Director
City of Neenah – Parks and Recreation Department
211 Walnut Street
Neenah, WI 54956

Subject: Conditional Closure Plan Approval Modification for Environmental Monitoring Requirements at the Arrowhead Park Landfill, Winnebago County, License #2299

Dear Mr. Kading:

The Department of Natural Resources (department) has reviewed the requested closure plan modification (“the plan”) for the Arrowhead Park Landfill dated February 9, 2024. The department approves the plan for changes to the environmental monitoring requirements at the landfill. Please include this approval in the written operating record for the landfill.

The plan modification request included the following changes to the environmental monitoring program:

- Reduction of groundwater sampling frequency from semiannual to annual.
- Addition of total sulfate, total ammonia as nitrogen, total nitrate plus nitrite and volatile organic compounds (VOCs) to the required monitoring program.
- Elimination of all groundwater monitoring wells within the PS-33 well nest from the required monitoring program.
- Elimination of leachate head well PS-9 from the required monitoring program.

Unfiltered chemical oxygen demand (COD) has also been removed from the groundwater monitoring program. The department has determined that COD may be less useful for detection monitoring than other parameters such as VOCs. The analytical results for COD may be highly variable and the analysis method itself generates a mercury laden hazardous waste. VOCs will be monitored annually in the new monitoring program as a replacement for COD.

Please keep in mind that this approval does not relieve you of obligations to meet all other applicable federal, state and local permits or regulatory requirements. If you have questions regarding this approval, please contact Jackie Marciulionis at (608) 814-1373 or jacqueline.marciulionis@wisconsin.gov.

Sincerely,

Kristin DuFresne
Waste and Materials Management Program Supervisor
Northeast Region

Attachment 1: Environmental Monitoring Tables

cc: Chris Haese – City of Neenah (chaese@neenahwi.gov)
Lynelle Caine – Stantec (lynelle.caine@stantec.com)
Evan Weber – Stantec (evan.weber@stantec.com)
Emily Storm – DNR/WA (e-copy)
Jackie Marciulionis – DNR/WA (e-copy)
Tess Brester – DNR/WA (e-copy)
Joe Lourigan – DNR/WA (e-copy)

PROJECT SUMMARY

FOR CLOSURE PLAN APPROVAL MODIFICATION FOR ENVIRONMENTAL MONITORING REQUIREMENTS AT ARROWHEAD PARK LANDFILL

SITE BACKGROUND

The Arrowhead Park landfill is an approximately 22-acre closed papermill sludge landfill owned by the City of Neenah (City) along the south shore of Little Lake Butte des Morts (LLBdM) in Neenah, Wisconsin. Portions of Arrowhead Park were utilized as early as 1874 by the Winnebago Paper Company (the Mill). The Mill was purchased by the Bergstrom Paper Company (Bergstrom) in 1904 and later purchased by P.H. Glatfelter (Glatfelter) in 1979. The landfill was created by constructing a bulkhead dike across the southern portion of LLBdM and filling the shallow nearshore area within the dike with waste. The City received approval to construct the dike from the US Corps of Engineers in 1950 (permit dated July 12, 1950) and Bergstrom obtained the right from the City to use the area behind the bulkhead dike. Bergstrom committed to the City that they would fill the area with solids extracted from Bergstrom's wastewater. Once Bergstrom had filled the area behind the bulkhead dike, the City planned to develop the property.

The bulkhead dike, which prevents waste material from drifting into LLBdM, is the only engineered feature of the landfill. The dike ranges from 10 to 13.5 feet in height and measures approximately 12.5 feet wide at the top. Waste was placed directly on the natural soils, which consists of clay-rich glacial lakebed sediments. The waste is approximately 10 feet thick throughout the landfill and has an estimated total volume of 450,000 cubic yards.

Bergstrom constructed their wastewater treatment plant in 1952 on the east end of the landfill area and disposed of waste in the landfill, moving from east to west, until 1976. The entire site was covered by November 1979 with predominantly clay soils. The cover thickness varied from 0.25 to 4.5 feet with an average of 1 to 2 feet. Additional cover soil has since been placed over the landfill, including low-hazard soils from nearby redevelopment projects approved through low-hazard exemptions, to fill low areas and maintain positive drainage of surface water off the cover. Some areas have greater than 10 feet of material over the waste according to borings completed by ECS Midwest, LLC (ECS) in 2018.

Development History

Development on the landfill property has occurred several times in the past, as summarized below:

- Bergstrom and Glatfelter used the property until 2006. In addition to the dike and original wastewater treatment plant, Bergstrom built a clarifier and water treatment plant (1967-1968), trailer truck parking area (1971), secondary wastewater treatment plant and aboveground fuel tank (1976), and combustor building and stabilization basin (1990-1991). Truck parking continued until the mill operations ceased in 2006 and the structures were demolished in 2007 after Glatfelter closed the Neenah Mill.
- The City constructed storm sewer extension and a sanitary sewer line below the landfill in 1975.
- Minergy, a glass aggregate producer, was constructed in the central portion of the landfill in 1996. Construction included the removal of waste from the footprint of the building for foundation support. These buildings have since been removed from the landfill.
- The City has been working with the department to receive approval to develop the landfill property into a City park since 2012. Grants of exemption to develop portions of the park were granted by the department June 25, 2013, September 9, 2020, October 10, 2022.

GEOLOGY/HYDROGEOLOGY

The regional geology of the area can be characterized as glacial deposits overlaying bedrock. Glacial deposits beneath the site range in thickness from 50-100 feet. Site-specific boring information shows the site is underlain by primary paper mill sludge at an average thickness of 10 feet followed by glaciolacustrine sediments and clayey till. In borings completed by ECS in 2018, the glacial deposits were identified to depths of 50 feet below grade (deepest location investigated). The borings did not encounter bedrock, but the bedrock beneath the landfill is expected to be composed of the Prairie Du Chien dolomite.

The glacial deposits beneath the Arrowhead Park Landfill have low hydraulic conductivity. Three laboratory hydraulic conductivity tests completed during the 1983 drilling program found the silty-clay soil underlying the landfill had hydraulic conductivities ranging from 5×10^{-8} centimeters per second (cm/s) to 1×10^{-9} cm/s. The underlying Prairie Du Chien dolomite also has low permeability. Due to the common occurrence of low permeability geologic units beneath the region, the City and other nearby municipalities rely upon surface water from Lake Winnebago rather than groundwater for drinking water.

Seepage rate of leachate through the bulkhead dike has also been determined to be low. The department calculated seepage rate through the dike to be 120 gallons per day in a letter dated September 10, 1984 and concluded that any seepage from the landfill to the lake would likely be insignificant.

Groundwater elevation data collected from the landfill monitoring wells has historically indicated groundwater flow at Arrowhead Park occurs radially away from PS-9 (leachate head well) in the interior of the landfill. However, waste material and/or leachate at or near this location may influence the elevated groundwater condition. While flow radiates away from PS-9, groundwater flowing south eventually arcs northward toward LLBdM. Groundwater data from multiple closed Remediation and Redevelopment sites nearby show regional groundwater flows predominantly north in this portion of the city towards Arrowhead Park. The regional flow is likely influenced by the general topography of the area and the major surface waterways (Fox River and Neenah Slough), which all flow north into LLBdM. The wells screened within the dike (PS-3R and PS-15RR) are downgradient based on this evaluation.

ENVIRONMENTAL MONITORING MODIFICATIONS

Routine groundwater monitoring at the Arrowhead Park Landfill was initiated in 1986 and continues to this date. The January 25, 2008, approval provides the current groundwater monitoring requirements for the site. The requirements include semiannual monitoring for indicator parameters (groundwater elevation, field temperature, field specific conductivity, field pH, color, odor, and turbidity) at all groundwater wells, as well as semiannual monitoring for total hardness, total alkalinity, total chloride, total sulfate, total iron, and unfiltered chemical oxygen demand (COD) at the two groundwater wells installed in the dike. Semiannual monitoring for leachate elevation in leachate head well PS-9 is also required.

Approved modifications to the environmental monitoring program include:

- Reducing groundwater sampling frequency from semiannually to annually in April.
- Eliminating all three wells associated with the PS-33 well nest, which were damaged during redevelopment of an adjacent parcel and abandoned in the summer of 2022.
- Eliminating leachate head well PS-9.
- Addition of total sulfate, total ammonia as nitrogen, and total nitrate plus nitrite, and volatile organic compounds (VOCs) to the required groundwater monitoring parameters.
- Elimination of unfiltered COD from the groundwater monitoring requirements, which is highly variable and has an analytical method that generates a mercury laden hazardous waste.

These modifications to the environmental monitoring program are not expected to reduce the ability to monitor potential impacts to human health and the environment from the landfill. In fact, the addition of sulfate, ammonia, nitrate plus nitrite and VOCs are anticipated to help better assess the landfills impact on the environment since these substances have human health standards and are associated with papermill sludge waste. Trends over time can still be monitored with an annual sampling frequency.

Overall, groundwater quality at this site has been variable, but has remained relatively stable over the past 10 years, with the exception of groundwater quality in all three wells in the PS-33 well nest. Wells in the PS-33 well nest started to show increases in specific conductivity in about 2012. These increases have been attributed to construction of a stormwater infiltration basin immediately upgradient of the well nest in approximately 2011. The basin stores runoff from nearby parking lots situated on the former Glatfelter Mill site and, therefore, is a temporary repository of surface water laden with dissolved chlorides from winter de-icing operations. The retention pond is designed as an “infiltration” basin and allows surface run-off to infiltrate underlying soil.

Additional substances were monitored in 2022 and 2023 to assess reduction in monitoring, consistent with the department’s guidance titled *Reducing or Terminating Groundwater Monitoring at Solid Waste Landfills* (pub-WA-1013-2019). The additional substances included VOCs, total sulfate, total ammonia, and nitrate/nitrite as nitrogen. Sample analysis identified tetrahydrofuran in well PS-32 and vinyl chloride present in PS-32 and PS-32A exceeding ch. NR 140, Wis. Adm. Code, enforcement standards (ES). These contaminants are believed to be associated with the recent conversion of the PS-32 wells from flush to stick-up wells in December 2020 by a local plumbing contractor. VOCs will be included in the monitoring program so trends of these substances can continue to be assessed.

**BEFORE THE
STATE OF WISCONSIN
DEPARTMENT OF NATURAL RESOURCES**

**CONDITIONAL CLOSURE PLAN APPROVAL MODIFICATION
FOR THE
ARROWHEAD PARK LANDFILL, LICENSE #2299**

FINDINGS OF FACT

The Department of Natural Resources (department) finds that:

1. The City of Neenah (City) owns and maintains a solid waste disposal facility located in the SE ¼ of Sec. 21, T20N, R17E, Neenah, Wisconsin.
2. The facility is a “non-approved facility” under s. 289.01 (24), Wis. Stats.
3. The facility is a “solid waste facility” under s. 289.01(35), Wis. Stats.
4. The former Neenah Parksite-Bergstrom landfill was issued license #2299 and is now referred to as the Arrowhead Park Landfill.
5. On February 9, 2024, Stantec Consulting Services, Inc (Stantec), on behalf of the City, submitted a request to the department for modifications to the groundwater monitoring requirements for the landfill. The department received the review fee of \$1,650 on February 16, 2024.
6. The information submitted in connection with the closure plan modification request includes the following:
 - a. A letter report prepared by Stantec titled “Request for Reduction in Groundwater Sampling Frequency (Semi-Annual to Annual), Arrowhead Park, Neenah, WI” and dated and received by the department on February 9, 2024.
 - b. An April 9, 2024 email from Stantec concurring with the draft table summarizing environmental monitoring requirements to be approved, which was provided in the department’s April 8, 2024 email.
 - c. An April 11, 2024 email and attachment from Stantec providing a revised version of the February 9, 2024 plan modification request with a professional engineer and professional geologist certification page included.
7. Additional documents considered in connection with the review of the closure plan modification request includes the following:
 - a. The department’s guidance document titled “Reducing or Terminating Groundwater Monitoring at Solid Waste Landfills (pub-WA-1013-2019).”
 - b. A report prepared by Short Elliot Hendrickson, Inc (SEH) titled “Geotechnical Investigation Arrowhead Park Neenah, Wisconsin” and dated August 13, 2013.
 - c. The department’s January 17, 2008 plan modification approval and January 25, 2008 correction, which includes the most recent environmental monitoring requirements.

- d. A report prepared by STS Consultants (STS) titled “Groundwater Evaluation and Request for Operating Plan Modification Glatfelter Park Site Landfill Winnebago County, Wisconsin” and dated April 25, 2007.
 - e. A report prepared by STS titled “Summary of Existing Conditions at Arrow Head Park in Neenah Wisconsin” and dated June 2, 1995.
 - f. The department’s September 10, 1984 letter providing a response to the report titled, “The Park Site Landfill in Neenah, Wisconsin, Existing Physical Conditions, Effects on Local Groundwater and Alternatives for Future Action” dated January 31, 1984. This letter specifies monitoring requirements for the landfill.
 - g. A report prepared by PH Glatfelter Company (Glatfelter) titled, “The Park Site Landfill in Neenah, Wisconsin, Existing Physical Conditions, Effects on Local Groundwater and Alternatives for Future Action” and dated January 31, 1984.
 - h. The department’s April 4, 1979 modified order #2A-76-1148A requiring abandonment of the Arrowhead Park Landfill.
 - i. The department’s September 23, 1976 order #2A-76-1148 requiring abandonment of the Arrowhead Park Landfill.
 - j. A letter prepared by Bergstrom Paper Company and dated May 30, 1975 providing an abandonment plan for the Arrowhead park Landfill.
 - k. The department’s March 13, 1975 conditional license for License #2299 for calendar years 1974-1975. The license conditioned the landfill submit a plan for abandonment by June 1, 1975 and no disposal of solid waste in the landfill after September 1, 1975.
 - l. The department’s files and data in the department’s Groundwater Environmental Monitoring System (GEMS) database pertaining to the Arrowhead Park Landfill (License # 2299).
8. Additional facts relevant to the review of the closure plan modification request include:
- a. The first license for the facility was issued on March 13, 1975 as a conditional license. The license conditioned submittal of a plan for abandonment by June 1, 1975 and no disposal of solid waste in the landfill after September 1, 1975. The abandonment plan was submitted by Bergstrom Paper Company on May 30, 1975. Abandonment was not completed within timeframes specified by the conditional license. A special order for abandonment of the landfill was issued to the City of Neenah September 23, 1976 and modified April 4, 1979. The department acknowledged that the order was satisfied September 2, 1980.
 - b. Concentrations for substances monitored in groundwater have remained relatively stable in the past 10 years. Increasing trends observed in specific conductivity in the PS-33 well nest and specific conductivity and chloride in PS-15RR in the historic dataset have been attributed to sources unrelated to waste in the landfill.
 - c. Volatile organic compound (VOC) (tetrahydrofuran and vinyl chloride) impacts identified in the PS-32 well nest are attributed to the use of polyvinyl chloride (PVC) adhesive to convert wells in the nest from flush-mounted to stickup wells. These VOCs will continue to be monitored as part of routine monitoring of the landfill.

- d. Expected use of the site as a public park with abundant greenspace is not expected to alter groundwater flow characteristics or groundwater quality onsite. Use of the site as a park will enhance the cap in place and further prevent infiltration of surface water to groundwater, and thus is not likely to promote leachate migration.
 - e. PS-9 is located in a central portion of the site and will be at high risk for damage when redevelopment construction for the proposed park begins.
 - f. The City and other nearby municipalities rely upon surface water from Lake Winnebago for drinking. The primary receptor near the landfill is Little Lake Butt des Morts. The calculated seepage rate through the landfill dike is 120 gallons per day. The department concluded that any seepage from the landfill to the lake would be insignificant in a letter dated September 10, 1984.
 - g. The wastes in the landfill were placed on top of low permeability glaciolacustrine sediment and till, which reduces the potential for leachate migration downward.
 - h. Based on groundwater flow at multiple closed Remediation and Redevelopment sites near the Arrowhead Park Landfill, groundwater flow is predominantly to the north toward the landfill.
 - i. Groundwater samples collected from the Arrowhead Park Landfill have historically been unfiltered due to high turbidity that makes the samples difficult to filter. There is a large historical database of results from unfiltered samples. Samples will continue to be unfiltered to maintain the continuity of the database.
 - j. Elimination of chemical oxygen demand (COD) from the groundwater monitoring program is warranted because the department has determined that COD may be less useful for detection monitoring than other parameters such as VOCs. The analytical results for COD may be highly variable and the analysis method itself generates a mercury laden hazardous waste. VOCs will be monitored annually in the new monitoring program as a replacement for COD.
9. The special conditions set forth below are needed to assure that the sites are operated and maintained in an environmentally sound manner. If the special conditions are complied with, the proposed modification will not inhibit compliance with the standards set forth in the applicable portions of chs. NR 500-538, Wis. Adm. Code.

CONCLUSIONS OF LAW

- 1. The department has authority under s. 289.05(1), Wis. Stats., to establish minimum standards for the location, design, construction, sanitation, operation, monitoring and maintenance of solid waste facilities.
- 2. The department has authority under s. NR 507.15(1), Wis. Adm. Code, to require the owner or operator of any solid waste facility or any person who permits the use of property for that purpose to conduct environmental monitoring, including but not limited to monitoring of groundwater, the unsaturated zone, leachate lysimeter fluid, gas, gas condensate, surface water, public or private water supplies, air, or other physical features.
- 3. The conditions of approval set forth below are needed to ensure compliance with the applicable portions of chs. NR 500-538, Wis. Adm. Code.
- 4. In accordance with the foregoing, the department has authority under chs. 160 and 289, Stats., to issue the following conditional approval for modifying the closure plan.

CONDITIONAL CLOSURE PLAN APPROVAL MODIFICATION

The department hereby approves the proposed closure plan modification for the Arrowhead Park Landfill, subject to compliance with chs. NR 500-538, Wis. Adm. Code, and the following condition:

1. Environmental monitoring at the Arrowhead Park Landfill shall be conducted in accordance with the schedules provided in Attachment #1.

This condition supersedes and replaces conditions 1 and 2 of the January 17, 2009 plan modification approval and the January 25, 2008 plan modification approval correction.

Unless specifically noted, the conditions of this approval do not supersede or replace any previous conditions of approval for this facility.

This approval is based on the information available to the department as of the date of approval. If additional information, project changes or other circumstances indicate a possible need to modify this approval, the department may ask you to provide further information relating to this activity. Likewise, the department accepts proposals to modify approvals, as provided for in state statutes and administrative codes.

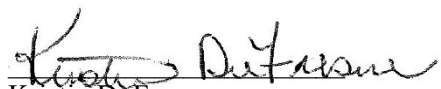
NOTICE OF APPEAL RIGHTS

If you believe you have a right to challenge this decision made by the department, you should know that Wisconsin statutes and administrative codes establish time periods and requirements for reviewing department decisions.

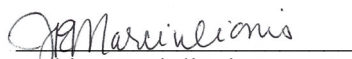
To seek judicial review of the department's decision, sections 227.52 and 227.53, Wis. Stats., establish criteria for filing a petition for judicial review. You have 30 days after the decision is mailed or otherwise served by the department to file your petition with the appropriate circuit court and serve the petition on the department. The petition shall name the Department of Natural Resources as the respondent.

Dated: May 16, 2024

DEPARTMENT OF NATURAL RESOURCES
For the Secretary


Kristin DuFresne

Waste and Materials Management Program Supervisor
Northeast Region


Jackie Marciulionis, P.G.
Hydrogeologist
Northeast Region

**ATTACHMENT #1
ENVIRONMENTAL MONITORING TABLES**

TABLE 1: GROUNDWATER MONITORING					
Well Name	DNR Point ID	WUWN	Well Type	Sampling and Reporting Frequency¹	Parameter List and Reporting Unit
Group A Wells:					
PS-3R	12	CA066	WT	Annually (April)	00010 Water Temperature (°C)
PS-15RR	14	PY075	WT		00094 Specific Conductance, Field (umho/cm)
PS-32	6	BV215	PZ		00400 Field pH (Standard Units)
PS-32A	7	BV216	PZ		00610 Nitrogen, Ammonia, Total (mg/L)
PS-32B	8	BV217	WT		00630 Nitrite plus Nitrate, Total (mg/L)
					00945 Sulfate, Total (mg/L)
					04189 Elevation, Groundwater (ft MSL)
					VOCs (ch. NR 507, Appendix III, including acetone, carbon disulfide, methyl ethyl ketone and tetrahydrofuran), using EPA method SW-846 8260
					Note sample odor (00001), color (00002), and turbidity (00003), if present
Group B Wells:					
PS-3R	12	CA066	WT	Annually (April)	74010 Iron, Total (mg/L)
PS-15RR	14	PY075	WT		00410 Alkalinity, Total (mg/L)
					00900 Hardness, Total (mg/L)
					00940 Chloride, Total or Dissolved (mg/L)

Notes:

¹Data shall be submitted within 60 days after the end of the sampling period, in accordance with s. NR 507.26(3), Wis. Adm. Code, unless otherwise specified.

WT = Water table well

PZ = Piezometer

Gas Migration Prevention Action Plan Report

Arrowhead Park Landfill
WDNR License No. 2299
Facility ID No. 471013840



Prepared for:
City of Neenah
211 Walnut Street
Neenah, WI 54115

April 9, 2025

Project/File:
193711252

Prepared by:
Stantec Consulting Services, Inc.
1165 Scheuring Road
De Pere, WI, 54115-1001

Table of Contents

1	Introduction	1.1
1.1	Site Location	1.1
1.2	Site History	1.1
2	Site Conditions.....	2.1
2.1	Nearby Land Use	2.1
2.2	Quaternary Geology.....	2.1
2.2.1	Landfill Soils and Fill Material	2.2
2.3	Bedrock Geology.....	2.2
2.4	Hydrogeology.....	2.2
2.5	Historical Methane Monitoring	2.2
3	Gas Migration Prevention Action Plan.....	3.1
3.1	Proposed Action Plan.....	3.1
3.1.1	Dual-Purpose Passive Gas Vents.....	3.2
3.1.2	Surface Emissions Monitoring (SEM)	3.3
4	Proposed Monitoring Plan	4.1
4.1	Vent Monitoring Protocol.....	4.1
4.2	SEM Monitoring Protocol	4.1
5	Schedule and Reporting.....	5.1
5.1	Reporting Protocol	5.1
6	References.....	6.1

List of Figures

Figure 1 - Site Location and Local Topography
Figure 2 - Site Layout with Monitoring Point Locations
Figure 3 - Site Layout with Proposed Gas Vent Locations
Figure 4 - Gas Vent Construction Detail
Figure 5 - Site Layout with Proposed Surface Scan Monitoring Route

List of Appendices

Appendix A - Boring Logs and Cross-Sections



1 Introduction

The City of Neenah (City) Parks and Recreation and Community Development Departments have recently evaluated design and development considerations for the revitalization of Arrowhead Park Landfill (referred to herein as Park or Landfill). The Park is a former landfill composed of fill and paper mill derived sludge from the former P. H. Glatfelter Paper Mill.

The Wisconsin Department of Natural Resources (WDNR) conducted inspections of the Park and its surroundings on January 17 and 28, 2025. As summarized in the WDNR's *Gas Migration Prevention Action Plan, Arrowhead Park Landfill (Lic. No. 2299)* letter dated February 18, 2025 (WDNR Letter), surface water bubbling was observed in the Fox River (aka Little Lake Butte des Morts) near Landfill monitoring well PS-3R was believed by WDNR to be indicative of a potential methane leak near the Park's border. Within the WDNR letter, the WDNR raised concern about the potential for methane migration into occupied structures located south of the Park. Although the City conducted methane gas measurements at several adjacent structures shortly after the WDNR's inspection on January 17 and again on February 17, 2025 and found no indication of the presence of methane, pursuant to the WDNR Letter, the City has prepared this Gas Migration Prevention Action Plan (Plan) to evaluate and, if needed, address the potential for methane migration into the occupied structures located south of the Park. The Plan provides an overview of the former Landfill, its geologic and hydrogeologic setting, and a proposed plan to monitor for any potential methane migration into occupied structures south of the Park. Actual proposal and installation of preventive measures to control methane from leaving the Park will be addressed, if appropriate, following the data collection and reporting as outlined in this Plan.

1.1 Site Location

The Park is located at 355 Millview Drive, between Main Street and the southern shore of the Fox River (the River). The Park is located in the SE 1/4 of Section 21 and the SW 1/4 of Section 22, T 20 N, R 17 E in the City of Neenah, Winnebago County, Wisconsin. A site location figure for the Park is presented as **Figure 1**.

1.2 Site History

The site was initially a near-shore portion of the River and has historically been associated with paper milling activities. In 1874, the Winnebago Paper Company was founded near the intersection of Main Street and Wisconsin Avenue in Neenah. In 1904, Bergstrom Paper Company (Bergstrom) purchased Winnebago Paper Company and its mill. Bergstrom was later purchased by P.H. Glatfelter Company (Glatfelter) in 1979; Glatfelter operated the mill until its closure in 2006.

The former Landfill was constructed in a man-made portion of land recovered by filling in a former shallow and marshy near-shore portion of the Fox River. In 1950, the City obtained a permit from the United States Army Corps of Engineers (USACE) to fill the near-shore portion of the River. Filling in the eastern portion of the site initially commenced in 1950, for the construction of the Bergstrom Paper Company (Bergstrom) wastewater treatment plant (WWTP). Between 1957 and 1970, a bulkhead dike, which currently comprises the northern extents of the Park, was constructed from east



Gas Migration Prevention Action Plan

Introduction

to west. WWTP solids were disposed at the former Landfill between 1952 to 1976, and a final cover system was established in the years thereafter.

For a more comprehensive summary and timeline of the site's history, please reference the below reports that were previously submitted to the WDNR:

- *Neenah Park Sites #1 and #2 Site Investigation and Development Plan* prepared by GRAEF and dated March 2012 (GRAEF, 2012).
- *Arrowhead Park Development Plan* prepared by Stantec and GRAEF and dated March 24, 2025 (Stantec & GRAEF, 2025).



2 Site Conditions

The Park is located on historical fill used to raise the land surface out of a portion of the River. The surface of the Park has been graded such that its central portion is its highest elevation, at approximately 756 feet relative to mean sea level (ft msl). Surface water generally flows radially away from the central portion of the Park with the steepest gradients directed north towards the River. A bulkhead dike was constructed at the site (see *Section 1.2*) to allow for reclamation of the former near-shore portion of the River. The surface elevation on the bulkhead dike is approximately 744 ft msl; the dike slopes toward the River, which has an approximate water level of 738 ft msl. An existing conditions map of the facility is presented as **Figure 2**.

2.1 Nearby Land Use

The area surrounding the Park is a mixture of industrial and commercial. The Park is bound to the north by the River, to the east by commercial business developments, to the south by a rail line followed by commercial, residential, and industrial businesses, and to the west by the Neenah Slough followed by commercial and industrial businesses.

2.2 Quaternary Geology

Regionally, much of the quaternary geology in Wisconsin, and in the area of the Park, was heavily defined by Wisconsinian-aged glaciation. Quaternary geology nearby the Park is generally defined as localized lake sediments which overly glacial till (Rawling, et. al, 2025). The Park is situated nearby Lake Winnebago, which itself is a remnant of glacial Lake Oshkosh. Much of the quaternary soils are clay- and silt-rich and were re-worked and deposited as the Green Bay Lobe advanced into the Fox River lowland and later receded entirely. Following recession of the Green Bay Lobe, soils deposited in the area of the site were primarily of lacustrine origin (Hooyer and Neiswender, 2004). The United States Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS) identify that native soils in the area are generally of the Winneconne Series, which typically have a 1 to 4 percent slope, are moderately well drained, and have low permeabilities (USDA, 2024).

Locally, soil borings completed at the former Landfill have encountered similar soils to those identified by published sources. Presumed native soils which form the base of the landfill generally consist of lacustrine clays and silts with minor sand/coarse material or organic-rich swamp/peat deposits interbedded. Underlying the lacustrine clays is a thick sequence of dense glacial till with minor sand and gravel content. Discrete layers of coarser, sandier material is variably present, but there is no apparent continuous layer of this material. Within the former Landfill's footprint, up to 10 feet of sludge and 2-8 feet of overlying fill material was identified depending on the location (ECS, 2019). A deep boring was advanced for the former Minergy Facility, in the center of the former Landfill, that extended to 95' below grade. The deep boring encountered a continuous layer of hard to stiff silty clay to 59.5' below the waste. Below the silty clay layer, the boring encountered 5' of fine sandy silt and 7.5' of dense clayey sand with a trace of gravel. A collection of soil borings and generated cross-sections for the site which have previously been submitted to the WDNR are included in **Appendix A**.



2.2.1 Park Soils and Fill Material

Over the past decade, clean fill and approximately 30,000 cubic yards (CY) of low-hazard materials have been placed on-site over the existing clay cap to promote the positive drainage of stormwater, while also increasing the final cover thickness at the former Landfill. In areas where low-hazard soils were placed on-site, the material was subsequently overlain by a minimum 2-foot thick layer of imported clay. The original clay cover system for the former Landfill remains at the surface on portions of the Park where supplemental fill material was not placed. The original clay cover system overlays the paper mill sludge waste which was historically used as fill.

2.3 Bedrock Geology

Bedrock was encountered in the deep boring completed for the former Minergy Facility at the former Landfill at 72 feet below the bottom of waste. The uppermost bedrock unit in the area of the site is likely of the Sinipee Group (Platteville Formation) (Ostrom, 1981). These bedrock units are of Ordovician-age and comprised of dolomite, minor limestone, and shale beddings associated with the Michigan Basin sedimentary sequence. The beds in this sequence dip generally to the southeast towards Lake Michigan at approximately 15 to 20 feet per mile. The Sinipee Group is underlain by Ordovician-aged St. Peter Sandstone and Prairie du Chien dolomite, followed by a thick sequence of Cambrian-aged sandstone.

2.4 Hydrogeology

Historic groundwater elevation data collected from the well network at the Park indicates that groundwater flow generally radiates away from the interior of the Park. Based on groundwater elevations measured over the past decade, PS-3R is the predominant downgradient well on-site. Groundwater flow gradients are steepest to the north and west and flatter to the east and southeast towards PS-15RR and the former PS-33 well nest. While flow radiates away from the central portion of the Park, south flowing groundwater is deflected northward toward the River. Static water level elevations have generally been assumed to be at a similar elevation to that of the River, or approximately 6 feet below grade, indicating the bulk of the paper mill sludge waste is below the current water table.

2.5 Historical Methane Monitoring

The former Minergy building and portions of the wastewater treatment plant were constructed on the Park with methane collection and venting systems. Low concentrations of methane were observed below the aeration building from October 7, 1992 to July 9, 1993. Less than 0.1 percent of methane was reported after that time. Methane was not detected in the combustor building (STS, 1995). Methane data collected from the Minergy plant sampling ports during December 1997 detected 0.5% methane at one sampling port location and no detections at the remaining locations (Minergy 1998). WDNR records indicate that additional sampling was proposed and required by the WDNR, but no additional data was readily available at the time of this report.



Gas Migration Prevention Action Plan

Site Conditions

Available historical information indicates that the former Landfill was constructed on a shallow, marshy near-shore portion of the River. Near-surface native sediments for the area are of lacustrine origin and also include minor swamp/peat deposits, as evidenced by the soil borings advanced at the site. Soil borings performed by ECS Midwest, LLC (ECS) in 2018 included screening of the borehole and recovered soils via flame ionization detector (FID) and photoionization detector (PID) to screen for detectable gas concentrations. Reported data from ECS indicated that the highest readings were observed in soil borings advanced near the former Minergy Facility. The highest detected concentrations ranging from 40 ppm to greater than 50,000 ppm (the gauge maximum reading) were typically observed between 11 and 25 feet below grade in the underlying native clay and when proximal to encountered peat strata. Slightly elevated FID readings were observed in samples collected above the water table (approximately 6 feet below grade) in select borings with readings ranging from 40 to 16,000 ppm.

Based on results from previous investigations and known historical information, the former Landfill was constructed in an area of former marshland. It is possible that the decaying peat and vegetation underlying the landfill is producing detectable quantities of methane gas (ECS, 2019). The paper sludge waste material historically deposited at the Park could also potentially produce methane during decomposition, but the production rate is anticipated to be low because of the waste characteristics and age of the fill material.



3 Gas Migration Prevention Action Plan

Understanding the severity of any potential methane migration is the first step in developing a plan to minimize and/or stop the migration. As noted above (see *Section 2.1*), the Park is bound to the east by commercial business developments, to the south by a rail line followed by commercial, residential, and industrial businesses, and to the west by the Neenah Slough followed by commercial and industrial businesses. Methane migration at the Park has the potential to lead to impacts such as:

- **Infrastructure Damage:** High-concentration methane migration can lead to the corrosion of pipelines and other infrastructure, increasing the risk of leaks and failures. This can result in costly repairs and maintenance;
- **Risk to Human Health:** exposure to methane can cause headaches, dizziness, nausea, and other health issues. In high concentrations, methane can be fatal due to its asphyxiating properties; high concentrations can be flammable and in confined spaces can be explosive if exposed to fire or spark and,
- **Environmental Impact:** Methane, although a naturally occurring substance that is emitted from many sources worldwide, is a documented greenhouse gas with a global warming potential higher than that of carbon dioxide. The release of methane into the atmosphere contributes to climate change, impacting weather patterns and ecosystems.

Based on available historical information, the primary concern for methane migration at the Park is with respect to human health. Methane migration could potentially impact the nearby occupied structures south of the site and/or members of the public visiting the park. Addressing the severity of the potential risk requires monitoring; adherence to safety regulations to protect people, property, and the environment; and the implementation of mitigation strategies and continuity plans for long-term inspection, maintenance and operation of the implemented mitigation methods, if deemed appropriate.

3.1 Proposed Action Plan

In order to protect human health from the potential migration of methane into adjacent occupied structures south of the Park, the City is proposing the installation of dual-purpose passive gas vents (referred to herein as “vents”) at select locations south of the former Landfill. Vents are proposed to be placed between the Park and the adjacent occupied structures. Each vent will be constructed as a standard passive gas vent that will be modified with a sampling port such that they can serve to monitor the concentration of methane at their specific locations. The vents will also act as a passive ventilation mechanism, such that methane which could potentially migrate towards an occupied structure is passively diffused into ambient air. The City intends to monitor the gas vents for methane to aid in the determination of whether further mitigation efforts are necessary.

In addition, the City proposes to conduct surface emissions monitoring (SEM) scans of the Park in accordance with United States Environmental Protection Agency (USEPA) standards. SEM scans will take place in general accordance with the procedures detailed in 40 CFR 63.1958(d) and applicable sections of 40 CFR 60.



3.1.1 Dual-Purpose Passive Gas Vents

The City proposes installing three vents south of the Park south of the railroad, between the former Landfill and adjacent occupied structures. The locations of the proposed gas vents are illustrated on **Figure 3**. More information on the proposed vents and the rationale for their proposed locations is presented below.

- GV-01 is proposed to be situated on City property south/southwest of the railroad and the former Landfill's limits. GV-01 will monitor for potential methane migration into the buildings currently occupied by the Hafemeister Machine Corporation.
- GV-02 is proposed to be situated on City property south/southeast of the railroad and the former Landfill's limits. GV-02 will monitor for potential methane migration into the Solaris on Main and Affinity Medical Group buildings.
- GV-03 is proposed to be situated on City property east/southeast of the railroad and former Landfill's limits. GV-03 will monitor for potential methane migration into the Plexus Corporation and Affinity Medical Group buildings.

The boreholes for each vent are proposed to be advanced via hollow-stem auger (HSA) or roto-sonic methods by a contractor certified to perform the work in Wisconsin. Split spoon (or equivalent) samples will be collected and logged at 2.5-foot intervals to the termination of the borehole. Retrieved samples will be examined and classified using visual-manual procedures, as outlined in ASTM D2488, and a boring log will be prepared. The exact depth of individual vents will be contingent on the encountered conditions while drilling. In general, vents will be constructed such that the entirety of the unsaturated sediments are screened. Vents will be constructed within the advanced borehole pursuant to the detail presented in **Figure 4** and are to consist of the following materials:

- Perforated schedule, four-inch 80 polyvinyl chloride (PVC) pipe (screen), affixed with a schedule 80 PVC end cap, placed from the top of the aggregate fill to five feet below ground surface.
- Solid four-inch schedule 80 PVC pipe, placed from five feet below ground surface, to two-to-three feet above ground surface;
- Aggregate fill material, placed within the vent's annular space from approximately one foot below the bottom of the perforated to one foot above the top of the perforated screen;
- A geotextile ring (10 oz., non-woven) situated above the aggregate fill (so as to minimize the potential for grouting migration into the screened interval);
- A two-foot-thick hydrated granular bentonite seal placed above the geotextile ring;
- A two-foot layer of granular fill, atop the hydrated bentonite seal, placed from the top of the bentonite seal to ground surface;
- Solid, four-inch schedule 80 PVC 90-degree elbow, affixed to the solid vent riser (gooseneck vent assembly); and,
- A 1/4-inch threaded and valved coupling body, placed within the solid vent riser (sampling port).

An estimated vent construction schedule, based on available historical information, is included in the vent construction figure (see **Figure 4**).



3.1.2 Surface Emissions Monitoring (SEM)

The City proposes to conduct SEM of the Park property to ensure in order to discern if detectable quantities of methane are present at the Park which could potentially harm human health or the environment. The purpose of SEM at the Park is to ensure that ambient conditions are not dangerous to the public, or to identify areas where further remedial actions may be required. SEM will consist of the following:

- Monitoring will be conducted with a portable methane monitor (e.g., Landtec SEM5000, TVA2020, or similar). Readings will be collected from within 5-10 centimeters of the ground.
- The following areas will be monitored, as shown on **Figure 5**:
 - o The perimeter of the Park;
 - o A pattern that traverses the entirety of the park at approximately 100-foot intervals; and,
 - o At and around subsurface penetrations (i.e., wells, manholes, catch basins, etc.).



4 Proposed Monitoring Plan

The Plan proposes an initial one-year study period which will be used to inform the City and WDNR if further corrective actions or source reduction strategies are warranted. The study period is anticipated to include a baseline collection period, which will consist of three initial monitoring events, conducted on a monthly basis, of the installed vents and one SEM event. Following the baseline collection period, monitoring events will be conducted on a quarterly basis. Monitoring is proposed to be conducted starting in the calendar quarter of approval of the Plan by the WDNR.

4.1 Vent Monitoring Protocol

The City proposes to monitor each of the installed vents monthly for a period of three months and on a quarterly basis thereafter. Prior to collecting measurements from the vents, a Fernco or similar appurtenance will be placed on the gooseneck to seal the vent. The vents will be allowed to equilibrate for approximately one-to-two hours and will then be monitored via the installed coupling fitting. Measurements will be collected and recorded on field forms. In the event that methane is reported at concentrations that are verified to be greater than the lower explosive limit (LEL)--or 5% by volume--the City will initiate the following steps:

- Notify the WDNR, either in writing or email, of the exceedance and its location within 10 days of result verification;
- Implement further monitoring at the location where the exceedance was reported. Further monitoring may consist of, but is not limited to:
 - o Increased frequency of methane monitoring (e.g., weekly, daily, etc.); or,
 - o Monitoring of nearby occupied structures for potential methane migration.

If methane continues to be reported at concentrations above its LEL at a location, or if methane is reported at concentrations above 25% of the LEL (1.25% methane by volume) at occupied structures, more immediate corrective actions may be warranted. Further corrective actions will be implemented with concurrence of the WDNR and may include, but are not limited to:

- Modification of the proposed monitoring schedule;
- Installation of permanent methane monitors at occupied structures;
- Installation of additional vents/probes to better delineate or discern the zone of methane migration impact; or,
- Implementation and design of source-reduction corrective actions (e.g., boundary wall, gas extraction vents, extraction manifolds with vents, etc.).

4.2 SEM Monitoring Protocol

SEM is proposed to occur quarterly, with the exception of during winter months. Locations where methane is detected at concentrations greater than 500 ppm will be marked in the field with stakes and surveyed. Within two (2) weeks of the result the area will be re-surveyed to confirm the reading. If the reading in the area is still greater than 500 ppm the City will complete a contingency action, such as placement of additional cover soils or continued investigation into the cause. Results of each SEM event, whether quarterly or re-survey, will be provided to the WDNR via email within 10 days of the event being completed.



5 Schedule and Reporting

Following WDNR review and comment, the City will implement the Gas Migration Prevention Action Plan. As stated above, the intent of the Plan is to determine if corrective actions supplemental to those proposed within this Plan are warranted. The Plan proposes a study period which consists of approximately one year of intermittent methane monitoring, and further monitoring/corrective actions if the results gathered during the study period support it. A tentative schedule for implementation is detailed below and is contingent on timely WDNR approval and contractor schedule for vent installations.

Gas Migration Prevention Action Plan Schedule

Milestone	Date
WDNR Review and Approval of Gas Migration Prevention Action Plan	May 2025
Installation of gas vents and first monitoring round (Vents and Q2 SEM)	June 2025
Second vent monitoring round	July 2025
Third vent monitoring round and Q3 SEM	August 2025
Q4 vent monitoring event and SEM	November 2025
Q1 vent monitoring event and SEM	March 2026
Summary report submission to WDNR	May 2026

5.1 Reporting Protocol

The City will provide results of the vent monitoring and SEM events to the WDNR via email within 10 days of conducting each monitoring event. As noted above, should the results collected in the study period warrant it, further monitoring and/or corrective actions will be implemented in advance of the conclusion of the study period. Further corrective actions will be implemented under an approved work plan and only with WDNR concurrence.

Following conclusion of the Plan's study period, the City will prepare and submit to WDNR a Summary Report which details the findings of the study period. The Summary Report will provide a tabulation of the collected results and a recommendation for further corrective actions, if any, that are warranted based on the observations reported in the study period.



6 References

- Ostrom, M.E., 1981, "Bedrock Geology of Wisconsin," University of Wisconsin Extension, Geological and Natural History Survey.
- Hooyer, T. and Neiswender, C., 2004, "General Geology and Natural Resources of Winnebago County, Wisconsin - Field Trip Guide Book, May 27, 2004," University of Wisconsin Extension, Geological and Natural History Survey, Open-File Report 2004-03.
- Graef, 2012, "Development at Historic Fill Site or Licensed Landfill Exemption Application Arrowhead Park Landfill," City of Neenah Park Sites #1 and #2 Development.
- ECS Midwest, LLC (ECS), 2019, "Arrowhead Park Phase 1 Development, ECS Project No: 59-1591" Arrowhead Park, Neenah, Wisconsin.
- USDA, 2024. "Soil Survey for Winnebago County, Wisconsin". Version 21, September 3, 2024.
- Rawling, J.E., et. al, 2025, "Quaternary Geology of Wisconsin", University of Wisconsin Extension, Geological and Natural History Survey, Map Series No. M512, scale 1:500,000.
- Stantec & Graef, March 2025, "Development Request - Arrowhead Park Development Plan", Arrowhead Park, Neenah, Wisconsin.



Chris Kaiser PG (*MN)

Professional Geologist
Phone: (763) 479-5107
Chris.Kaiser@stantec.com



Ethan Ketelsen PE

Associate, Civil Engineer
Phone: (763) 479-5187
Ethan.Ketelsen@stantec.com



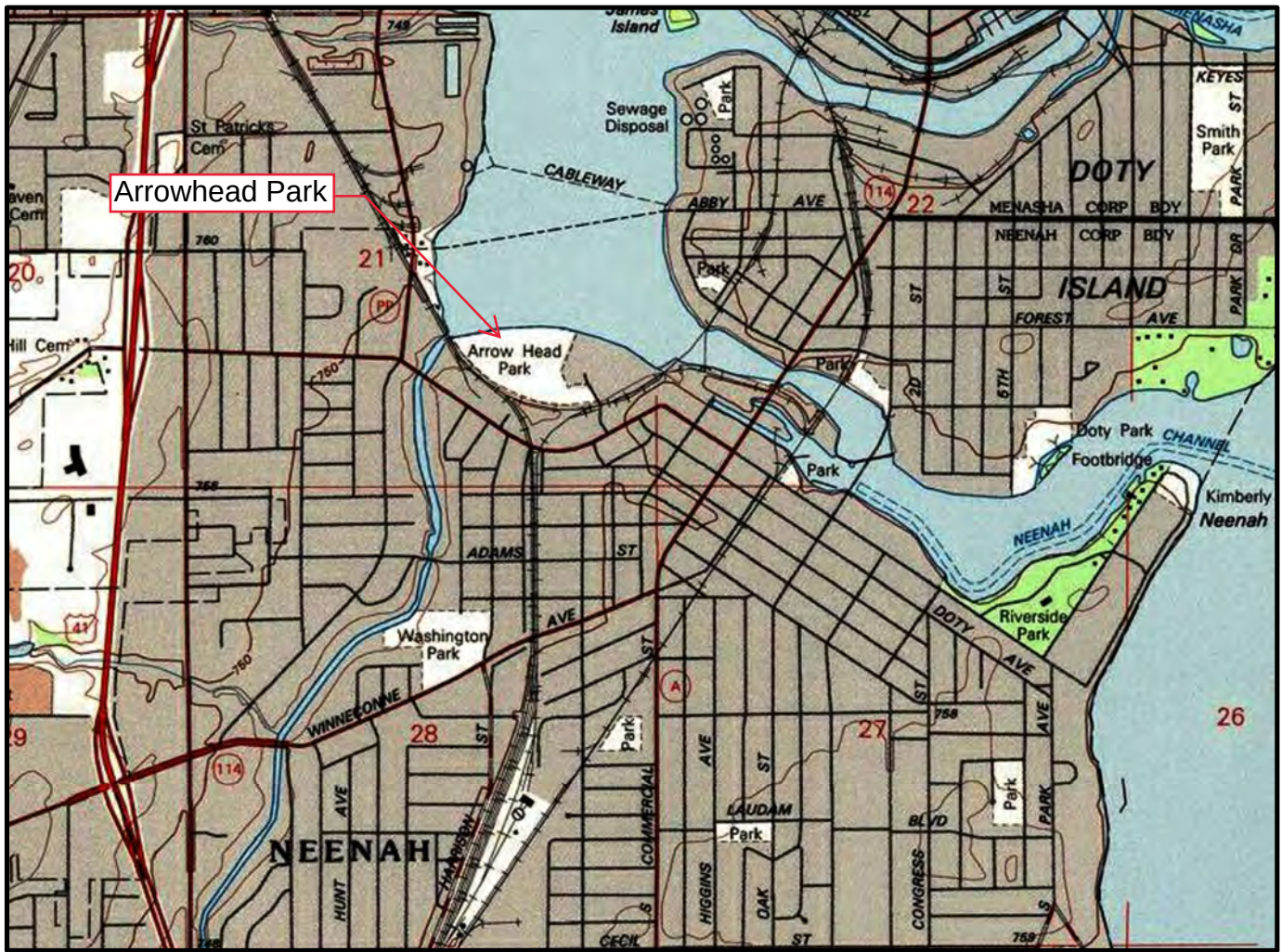
Lynelle Caine

Senior Associate, Senior Project Manager
Phone: (920) 655-7211
Lynelle.Caine@stantec.com



Figures





SCALE IN FEET

1" = 2000'



CONTOUR INTERVAL 10 FEET

NATIONAL GEODETIC VERTICAL DATUM OF 1929



QUADRANGLE LOCATION

BASE MAP SOURCE: USGS 7.5 MINUTE QUADRANGLE, NEENAH, WISCONSIN, 1992 (NATIONAL GEOGRAPHIC HOLDINGS, INC.)



1165 Scheuring Road, De Pere, Wisconsin 54115
Phone: 920-592-8400 Fax: 920-592-84844

This drawing and all information contained thereon is the property of Stantec. Stantec will not be held liable for improper or incorrect usage. Professional seals and signatures do not apply to electronic drawing files. The user assumes all responsibility and risk for the accuracy and verification of all information contained in electronic files.

SITE LOCATION & LOCAL TOPOGRAPHY

ARROWHEAD PARK SITE
355 MILLVIEW DRIVE
NEENAH, WISCONSIN

DATE: 03/28/25	DRAWN BY: JRB	PROJECT MANAGER: LPC	PROJECT NUMBER: 193710779	FIGURE 1
----------------	---------------	----------------------	---------------------------	----------



LEGEND



PS-3R

MONITORING WELL LOCATION



APPROXIMATE PROPERTY LINE



1165 Scheuring Road, De Pere, Wisconsin 54115
Phone: 920-592-8400 Fax: 920-592-8444

This drawing and all information contained thereon is the property of Stantec. Stantec will not be held liable for improper or incorrect usage. Professional seals and signatures do not apply to electronic drawing files. The user assumes all responsibility and risk for the accuracy and verification of all information contained in electronic files.

DATE: 03/28/25

DRAWN BY: JRB

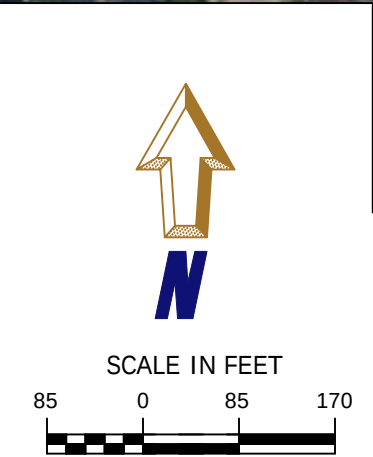
PROJECT MANAGER: LPC

ARROWHEAD PARK
SITE LAYOUT WITH MONITORING
POINT LOCATIONS

ARROWHEAD PARK
355 MILLVIEW DRIVE, NEENAH, WISCONSIN

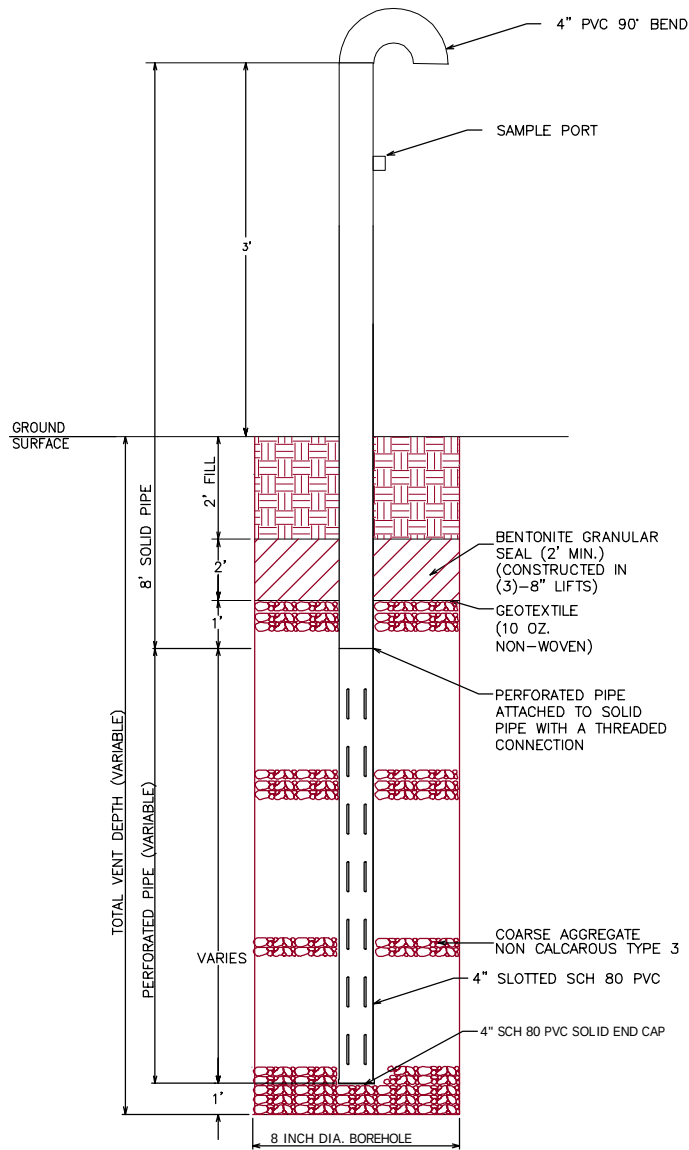
PROJECT NUMBER: 193710779

FIGURE 2



- LEGEND**
- PS-3R MONITORING WELL LOCATION
 - APPROXIMATE PROPERTY LINE
 - GV-01 PROPOSED GAS VENT LOCATION

 1165 Scheuring Road, De Pere, Wisconsin 54115 Phone: 920-592-8400 Fax: 920-592-8444 This drawing and all information contained thereon is the property of Stantec. Stantec will not be held liable for improper or incorrect usage. Professional seals and signatures do not apply to electronic drawing files. The user assumes all responsibility and risk for the accuracy and verification of all information contained in electronic files.			ARROWHEAD PARK SITE LAYOUT WITH PROPOSED GAS VENT LOCATIONS	
			ARROWHEAD PARK 355 MILLVIEW DRIVE, NEENAH, WISCONSIN	
DATE: 03/28/25	DRAWN BY: JRB	PROJECT MANAGER: LPC	PROJECT NUMBER: 193710779	FIGURE 3



GAS VENT DETAIL
NOT TO SCALE

1
FIG 3

Gas Vent ID	Horizontal Coordinates		Surface Elevation (Ft. NGVD)	Estimated Depth (Ft. bgs)	Well Construction Schedule (Ft.)		
	Latitude	Longitude			Perforated	Solid	Stick-Up
GV-01	44.1881 Deg N	88.4718 Deg W	746	15	10	5	3
GV-02	44.1879 Deg N	88.4668 Deg W	746	15	10	5	3
GV-03	44.1886 Deg N	88.4649 Deg W	748	15	10	5	3

Notes:

Surface elevations estimated from Winnebago County GIS TopoViewer online application.



1165 Scheuring Road, De Pere, Wisconsin 54115
Phone: 920-592-8400 Fax: 920-592-8444

This drawing and all information contained thereon is the property of Stantec. Stantec will not be held liable for improper or incorrect usage. Professional seals and signatures do not apply to electronic drawing files. The user assumes all responsibility and risk for the accuracy and verification of all information contained in electronic files.

GAS VENT CONSTRUCTION DETAIL

ARROWHEAD PARK
355 MILLVIEW DRIVE
NEENAH, WISCONSIN



LEGEND

- PS-3R MONITORING WELL LOCATION
- CB-1 CATCH BASIN
- STO-1 STORM INLET
- WELL/BASIN/INLET POINT TO BE MONITORED DURING EMISSIONS SCANS
- APPROXIMATE PROPERTY LINE
- SURFACE SCAN MONITORING ROUTE
- ST STORM SEWER LINE



SCALE IN FEET



1165 Scheuring Road, De Pere, Wisconsin 54115
Phone: 920-592-8400 Fax: 920-592-8444

This drawing and all information contained thereon is the property of Stantec. Stantec will not be held liable for improper or incorrect usage. Professional seals and signatures do not apply to electronic drawing files. The user assumes all responsibility and risk for the accuracy and verification of all information contained in electronic files.

DATE: 03/28/25	DRAWN BY: JRB	PROJECT MANAGER: LPC	PROJECT NUMBER: 193710779	FIGURE 5
----------------	---------------	----------------------	---------------------------	----------

**ARROWHEAD PARK
SITE LAYOUT WITH PROPOSED
SURFACE SCAN MONITORING ROUTE**

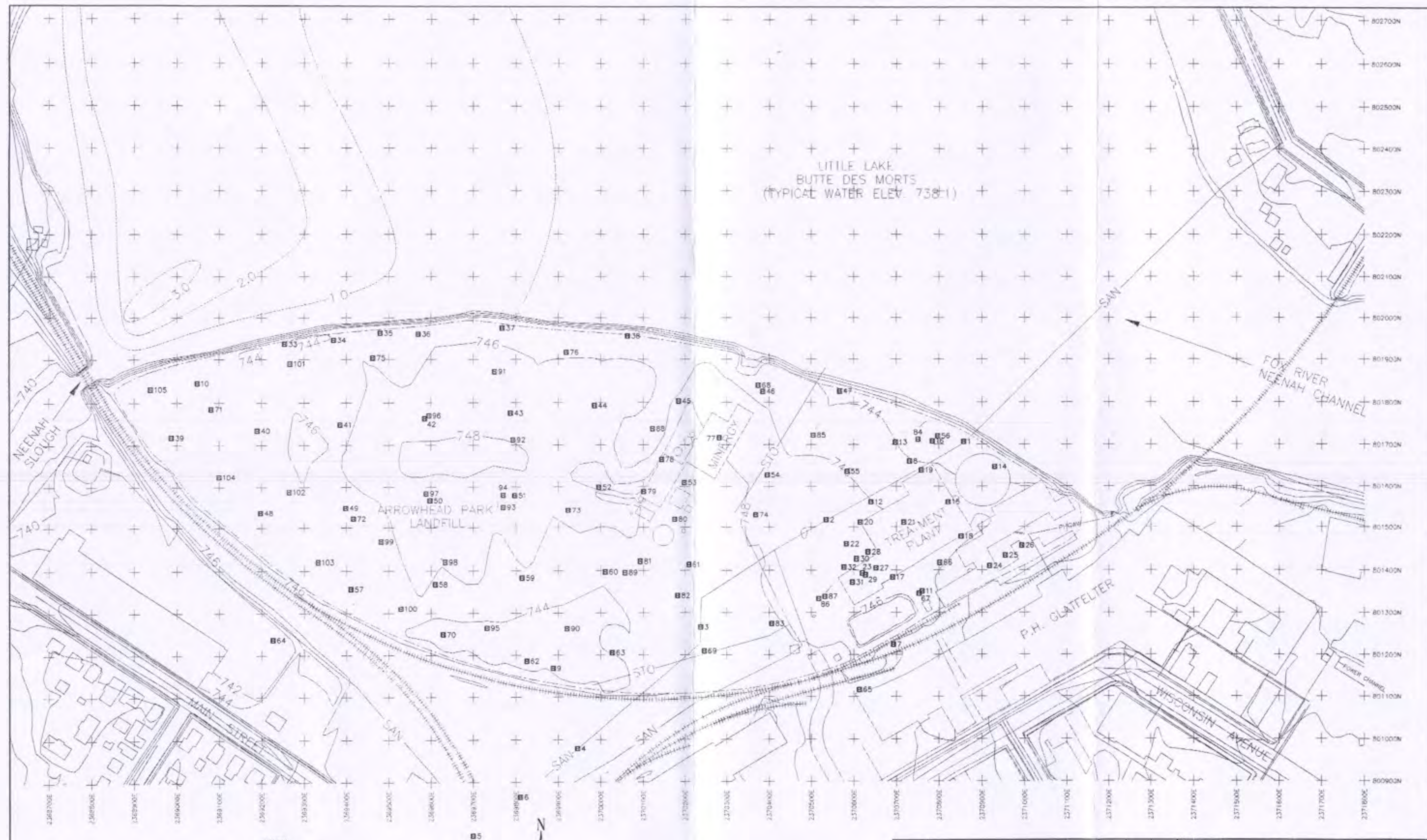
ARROWHEAD PARK
355 MILLVIEW DRIVE, NEENAH, WISCONSIN

Appendices



Appendix A Boring Logs and Cross Sections





- LEGEND**
- 740— SURFACE CONTOUR
 - SAN— CITY SANITARY SEWER
 - STO— STORM SEWER
 - PHCWW— P.H. GLATFELTER WASTEWATER SEWER
 - STRUCTURE
 - +++++ RAILROAD
 - APPROXIMATE LIMITS OF DEPOSIT A
 - - - - - APPROXIMATE SEDIMENT THICKNESS (FEET)
 - APPROXIMATE LIMITS OF SLUDGE IN LANDFILL
 - 7 SOIL BORING & INDEX NUMBER

BASE MAP PROVIDED BY CITY OF NEENAH, GIS DATA BASE.
PHOTOGRAPH CONTROL, 1991 WITH CITY UPDATES
THROUGH 1998. ERM MODIFICATIONS INCLUDED ADDITION
OF CLARIFIER, SOIL STOCKPILE REMOVAL AND PROJECTION
OF DEPOSIT A SEDIMENT (PER ERM 1992 FEASIBILITY STUDY).

ENVIRONMENTAL RESOURCES MANAGEMENT ERM										
Arrowhead Park Landfill Neenah, Wisconsin										
REV. NO.	DESCRIPTION	DATE	REV. BY	CHK'D. APP'D.						
REVISIONS										
<table border="1"> <tr> <td>DATE</td> <td>DESIGNED</td> <td>DRAWN</td> </tr> <tr> <td>1/1/00</td> <td>APP'D.</td> <td></td> </tr> </table>					DATE	DESIGNED	DRAWN	1/1/00	APP'D.	
DATE	DESIGNED	DRAWN								
1/1/00	APP'D.									
Scale 1"=100'			Soil Boring Locations							
			98276-9							

Table C-1 Soil Boring Summary
Refer to end notes concerning location of soil logs

Master Boring No.	Project Boring No.	Project No.	Drilling Date	Boring Location	Surface El.	Top of Sludge El.	Bottom of Sludge El.	Top of Organics El.	Bottom of Organics El.	Top of Clay	Accuracy of Locating
1	B7	5863	12/73	N801705, E2370859	742	742	738.2	--	--	738.2	± 50 ft., hand sketch
2	B8	5863	12/73	801518, 2370537	747	745	744	Mixed fill 744	Mixed fill 730.2	730.2	± 50 ft., hand sketch
3	B9	5863	12/73	801265, 2370238	748	748	739.5	739.5	734.5	734.5	± 50 ft., hand sketch
4	B10	5863	12/73	800980, 2369945	747	Other fill materials				728.5	± 50 ft., hand sketch
5	B-11	5863	12/73	800772, 2369702	748	Other fill materials				734.5	± 50 ft., hand sketch
6	B-13	5863	12/73	800865, 2369813	747	Other fill and silt				733.5	± 50 ft., hand sketch
7	B-12	5863	12/73	801225, 2370693	745	Other fill		736.7	732.5	732.5	± 50 ft., hand sketch
8	B-1, (B-2)	4978B	4/74	801660, 2370733	740.8	740.8	730.5	--	--	730.5	± 50 ft., hand sketch
9	B-3, (B-4- 5)	4978B	4/74	801170, 2369888	739.9	739.9	731.9	731.9	729.4	729.4	± 50 ft., hand sketch
10	B-6, (B-7)	4978B	4/74	801845, 2369049	741.6	741.6	731.1	731.1	730.7	730.7	± 50 ft., hand sketch
11	B-11	1443A	8/66	801351, 2370760	745.5	743.8	735.5	735.5	732.0	732.0	± 10 ft., dim. from #22
12	B-12	1443A	8/66	801560, 2370640	743.1	741.4	733.1	--	--	733.1	± 10 ft., dim. from #22
13	B-13	1443A	8/66	801705, 2370700	744.1	744.1	735.1	--	--	735.1	± 10 ft., dim. from #22
14	B-14	1443A	8/66	801648, 2370930	743.9	743.9	734.1	--	--	734.1	± 10 ft., dim. from #22
15	B-15	1443A	8/66	801560, 2370820	744.4	744.4	733.4	--	--	733.4	± 10 ft., dim. from #22
16	B-16	1443A	8/66	801708, 2370783	NA (743.3)	0 (743.3)	8 (735.3)	--	--	8 (735.3)	± 10 ft., dim. from #22
17	B-1	6626	4/75	801385, 2370690	101.0 (747.0)	95.0 (741.0)	86.0 (732.0)	--	--	86.0 (732.0)	± 5 ft., ref. to equip. bldg.
18	B-2	6626	4/75	801478, 2370851	97.7 (743.7)	97.7 (743.7)	91.7 (737.7)	--	--	91.7 (737.7)	± 5 ft., ref. to equip. bldg.
19	B-4	6626	4/75	801635, 2370759	97.5 (743.5)	97.5 (743.5)	87.5 (733.5)	--	--	87.5 (733.5)	± 5 ft., ref. to equip. bldg.
20	B-5	6626	4/75	801510, 2370615	99.9 (745.9)	95.9 (741.9)	93.9 (739.9)	--	--	93.9 (739.9)	± 5 ft., ref. to equip. bldg.
21	B-6		4/75	801510, 2370718	98.8 (744.8)	98.8 (744.8)	96.8 (742.8)	92.8 (738.8)	83.8 (729.8)	83.8 (729.8)	± 5 ft., ref. to equip. bldg.
22	PS-34	12228-A	11/83	N801460, E2370583	747.1	744.6	≤ 738.1	--	--	--	± 5 ft., ref. to equip. bldg. SW corner
23	PS-35	12228-A	11/83	801395, 2370620	748.2	743.3	≤ 738.7	--	--	--	± 5 ft., ref. to equip. bldg. SW corner
24	B-1-90	18068XH	7/90	801410, 2370918	744.23	741.7	733.2	--	--	733.2	± 5 ft., ref. to Bldg. 26 SW corner
25	B-2-90	18068XH	7/90	801432, 2370955	744.07	739.1	733.1	--	--	733.1	± 5 ft., ref. to Bldg. 26 SW corner
26	B-3-90	18068XH	7/90	801457, 2370993	744.26	744.26* 730.8* *Mixture of S&G and sludge				730.8	± 5 ft., ref. to Bldg. 26 SW corner
27	BS-1-91	18899	8/91	801405, 2370653	747.0	740.5		734.0	1 ft. of buried topsoil?	734.0	± 5 ft., ref. to equip. bldg. SW corner
28	BS-2-91	18899	8/91	801440, 2370633	746.7	742.7	732.7	--	--	732.7	± 5 ft., ref. to equip. bldg.

Table C-1 Soil Boring Summary
Refer to end notes concerning location of soil logs

Master Boring No.	Project Boring No.	Project No.	Drilling Date	Boring Location	Surface El.	Top of Sludge El.	Bottom of Sludge El.	Top of Organics El.	Bottom of Organics El.	Top of Clay	Accuracy of Locating
29	BS-3-91	18899	8/91	801390, 2370627	747.3	742.3	734.3	--	--	734.3	± 5 ft., ref. to equip. bldg. SW corner
30	BS-4-91	18899	8/91	801425, 2370607	746.7	743.7	732.7	--	--	732.7	± 5 ft., ref. to equip. bldg. SW corner
31	BS-5-91	18899	8/91	801372, 2370597	747.2	742.7	734.2	1 ft. of buried topsoil?		734.2	± 5 ft., ref. to equip. bldg. SW corner
32	BS-6-91	18899	8/91	801405, 2370578	746.4	743.4	732.9			732.9	± 5 ft., ref. to equip. bldg. SW corner
33	PS-1A	12228	4/83	N801937, E2369255	NA (745.0)	None	None	Other fill		10.5 (734.5)	Overlaid STS boring figure
	PS-1B	12228	4/83	N801937, E2369255	NA (745.0)	None	None	Other fill		11.0 (734.0)	Overlaid STS boring figure
	PS-1C	12228	4/83	N801937, E2369255	NA (745.0)	None	None	Other fill		10.0 (735.0)	Overlaid STS boring figure
	PS-1D	12228	4/83	N801937, E2369255	NA (745.0)	None	None	Other fill		11.0 (734.0)	Overlaid STS boring figure
34	PS-2	12228	4/83	801947, 2369370	NA (744.3)	1.5 (742.8)	≥ 4 (≤ 740.3)				Overlaid STS boring figure
35	PS-3	12228	4/83	801960, 2369480	744.3	None Other fill		734.3	733.8	733.8	Overlaid STS boring figure
36	PS-4	12228	4/83	801960, 2369569	NA (745.2)	1 (744.2)	≥ 2 (≤ 743.2)				Overlaid STS boring figure
37	PS-5	12228	4/83	801974, 2369767	NA	None	None	Other fill			Overlaid STS boring figure
38	PS-6A	12228	4/83	N801957, 2370061	NA (745.0)	None	None	Other fill		11.0 (734.0)	Overlaid STS boring figure
	PS-6B	12228	4/83	N801957, 2370061	NA (745.0)	None	None	Other fill		13.0 (732.0)	Overlaid STS boring figure
	PS-6C	12228	4/83	N801957, 2370061	NA (745.0)	None	None	Other fill		13.5 (731.5)	Overlaid STS boring figure
	PS-6D	12228	4/83	N801957, 2370061	NA (745.0)	None Other fill		12 (733.0)	≥ 13.5 (< 731.5)		Overlaid STS boring figure
39	PS-7	12228	4/83	801717, 2368988	NA (745.6)	0.8 (744.8)	≥ 2.0 (≤ 743.6)				Overlaid STS boring figure
40	PS-8	12229	4/83	801732, 2369190	NA (746.6)	3.5 (743.1)	11.0 (735.6)	11.0 (735.6)	12.5 (734.1)	12.5 (734.1)	Overlaid STS boring figure
41	PS-9	12228	4/83	801745, 2369385	746.9	744.7	734.9	734.9	≤ 732.9		Overlaid STS boring figure
42	PS-10	12228	4/83	801760, 2369584	NA (748.0)	1.2 (746.8)	≥ 4.0 (≤ 744)				Overlaid STS boring figure
43	PS-11	12228	4/83	801775, 2369787	NA (748.8)	1.6 (747.2)	≥ 2.0 (≤ 746.8)				Overlaid STS boring figure
44	PS-12	12228	4/83	801790, 2369985	NA (748.4)	4.0 (744.4)	13.5 (734.9)	13.5 (734.9)	20.0 (728.4)	20.0 (728.4)	Overlaid STS boring figure

Table C-1 Soil Boring Summary
Refer to end notes concerning location of soil logs

Master Boring No.	Project Boring No.	Project No.	Drilling Date	Boring Location	Surface El.	Top of Sludge El.	Bottom of Sludge El.	Top of Organics El.	Bottom of Organics El.	Top of Clay	Accuracy of Locating
45	PS-13	12228	4/83	801805, 2370184	NA (746.3)	1.5 (744.8)	≥ 2.0 (≤ 744.3)				Overlaid STS boring figure
46	PS-14	12228	4/83	801825, 2370384	NA (745.4)	1.5 (743.9)	≥ 3.0 (≤ 742.4)				Overlaid STS boring figure
47	PS-15	12228	4/83	801825, 2370567	743.5	743.5	742.8	Other fill		733.5	Overlaid STS boring figure
48	PS-16	12228	4/83	801537, 2369197	NA (745.8)	2.0 (743.8)	≥ 4.0 (≤ 741.8)				Overlaid STS boring figure
49	PS-17	12228	4/83	801548, 2369400	NA (747.3)	1.5 (745.8)	≥ 3.5 (≤ 743.8)				Overlaid STS boring figure
50	PS-18	12228	4/83	801567, 2369598	NA (748.5)	3.0 (745.5)	≥ 4.0 (≤ 744.5)				Overlaid STS boring figure
51	PS-19	12228	4/83	801580, 2369795	NA (748.0)	1.7 (746.3)	≥ 4.0 (≤ 744)				Overlaid STS boring figure
52	PS-20	12228	4/83	801598, 2369995	NA (749.3)	4.0* (745.3) *Sludge as seams within other fill	6.0* (743.3)			6.0 (743.3) Fill?	Overlaid STS boring figure
53	PS-21	12228	4/83	N801608, E2370199	748.9	744.4	736.4	736.4	≤ 734.4		Overlaid STS boring figure
54	PS-22	12228	4/83	801627, 2370396	NA (747.3)	1.5 (745.8)	≥ 4.0 (≤ 743.3)				Overlaid STS boring figure
55	PS-23	12228	4/83	801635, 2370585	NA (746.0)	1.3 (744.7)	14.0 (732.0)			14.0 (732.0)	Overlaid STS boring figure
56 ^A	PS-24A	12228	4/83	801718, 2370798	NA (743.0)	None	None	Other fill		10.0 (733.0)	Overlaid STS boring figure
	PS-24B	12228	4/83	801718, 2370798	NA (743.0)	Trace within other fill to 9.7 ft. ?				10.4 (732.6)	Overlaid STS boring figure
	PS-24C	12228	4/83	801718, 2370798	NA (743.0)	Trace at 2.0 (741.0)				10.0 (733.0)	Overlaid STS boring figure
	PS-24D	12228	4/83	801718, 2370798	NA (743.0)	0 (743.0)	1.0 (742.0)	Trace organics 4 ft. to 8 ft.		11.0 (732.0)	Overlaid STS boring figure
57	PS-25	12228	4/83	801359, 2369410	NA (745.8)	2.5 (743.3)	≥ 3.0 (≤ 742.8)				Overlaid STS boring figure
58	PS-26	12228	4/83	801370, 2369610	NA (746.8)	0.8 (746.0)	≥ 2.0 (≤ 744.8)				Overlaid STS boring figure
59	PS-27	12228	4/83	801385, 2369813	NA (746.7)	2.2 (744.5)	11.0 (735.7)	11.0 (735.7)	14.0 (732.7)	14.0 (732.7)	Overlaid STS boring figure
60	PS-28	12228	4/83	801398, 2370010	NA (745.7)	2.0 (743.7)	> 2.0 (≤ 743.7)				Overlaid STS boring figure
61	PS-29	12228	4/83	801412, 2370210	NA (746.2)	0.3 (745.9)	≥ 2.0 (≤ 744.2)				Overlaid STS boring figure

^A 56 location is different in that sludge may be present as a minor constituent in fill to ≈ 10 ft. bgs. Also a nested location with different stratigraphy at the various boring locations. Map values are a combination of the various PS-24 locations.

Table C-1 Soil Boring Summary
Refer to end notes concerning location of soil logs

Master Boring No.	Project Boring No.	Project No.	Drilling Date	Boring Location	Surface El.	Top of Sludge El.	Bottom of Sludge El.	Top of Organics El.	Bottom of Organics El.	Top of Clay	Accuracy of Locating
62	PS-30	12228	4/83	801188, 2369826	NA (743.4)	2.0 (741.4)	≥ 4.0 (≤ 739.4)				Overlaid STS boring figure
63	PS-31	12228	5/83	801205, 2370028	744.2	742.2	734.7	734.7	≤ 732.7		Overlaid STS boring figure
64	PS-32, 32A, 32B	12228	6/83	801237, 2369228	740.9	None	None	Other fill		733.4	Overlaid STS boring figure
65	PS-33, 33A, 33B	12228	6/83	801116, 2370613	744.5	None	None	Other fill		738.5	Overlaid STS boring figure
66	B-1-88	15396XA	5/88	N801418, E2370802	NA (746.0)	3.8 (742.2)	9.7 (736.3)	9.7 (736.3)	12.6 (733.4)	12.6 (733.4)	Overlaid STS boring figure
67	B-2-88	15396XA	5/88	801345, 2370753	NA (746.0)	4.0 (742.0)	12.0* (734.0) *Incl. 10-12 ft. interval sludge mixed with OL	12.0 (734.0)	13.5 (732.5)	13.5 (732.5)	Overlaid STS boring figure
68	TT-9	10839	10/80	801840, 2370375	NA (745.2)	1.0 (744.2)	> 9.5 (≤ 735.7)				Proportioned from unscaled diagram
	TT-9A	10839	2/81	801840, 2370375	NA (745.2)	2.0 (743.2)	> 3.5 (≤ 741.7)				Proportioned from unscaled diagram
	TT-9B	10839	2/81	801840, 2370375	NA (745.2)	2.3 (742.9)	> 3.5 (≤ 741.7)				Proportioned from unscaled diagram
	TT-9C	10839	2/81	801840, 2370375	NA (745.2)	2.0 (743.2)	> 3.5 (≤ 741.7)				Proportioned from unscaled diagram
69	TT-1	10839	10/80	801210, 2370245	NA (748.0) ¹	1.5 (746.5)	> 9.5 (≤ 738.5)				Proportioned from unscaled diagram
70	TT-2	10839	10/80	801250, 2369630	NA (743.7)	1.0 ² (742.7)	> 9.5 (≤ 734.2)				Proportioned from unscaled diagram
71	TT-3	10839	10/80	801780, 2369080	NA (746.4)	1.0 (745.0)	> 9.5 (≤ 736.9)				Proportioned from unscaled diagram
72	TT-4	10839	10/80	801525, 2369412	NA (747.4)	1.0 (746.4)	> 9.5 (≤ 737.9)				Proportioned from unscaled diagram
73	TT-5	10839	10/80	801548, 2369925	NA (747.8)	1.5 (746.3)	> 7.5 (≤ 740.3)				Proportioned from unscaled diagram
74	TT-6	10839	10/80	801528, 2370368	NA (747.5)	1.0 (746.5)	> 9.5 (≤ 738.0)				Proportioned from unscaled diagram
75	TT-7	10839	10/80	801900, 2369462	NA (747.2)	1.0 (746.2)	> 9.5 (≤ 737.7)				Proportioned from unscaled diagram
76	TT-8	10839	10/80	801915, 2369918	NA (747.0)	1.53 (745.5)	> 9.5 (≤ 737.5)				Proportioned from unscaled diagram
77	STS-1	84779	10/95	801715, 2370285	747.0	742.0	730.0			730.0	Location per STS diagram
78	STS-2	84779	10/95	801675, 2370140	748.8	742.3	730.8			730.8	Location per STS diagram

Table C-1 Soil Boring Summary
Refer to end notes concerning location of soil logs

Master Boring No.	Project Boring No.	Project No.	Drilling Date	Boring Location	Surface El.	Top of Sludge El.	Bottom of Sludge El.	Top of Organics El.	Bottom of Organics El.	Top of Clay	Accuracy of Locating
79	STS-3	84779	10/95	801590, 2370100	749.5	744.5	734.5	734.5	732.5	732.5	Location per STS diagram
80	STS-4	84779	10/95	801520, 2370175	748.9	743.9	732.4			732.4	Location per STS diagram
81	STS-5	84779	10/95	801420, 2370090	748.5	742.0	733.5			733.5	Location per STS diagram
82	STS-6	84779	10/95	801340, 2370180	748.5	742.0	731.5			731.5	Location per STS diagram
83	STS-7	84779	10/95	801275, 2370405	745.0	739.0	≤735.5				Location per STS diagram
84	SB99-1	99052	3/99	801712, 2370751	743.5	740.9	733.6			733.6	± 2 ft.
85	SB99-2	99052	3/99	801722, 2370505	745.7	742.7	735.4	735.4			± 2 ft.
86	SB99-3	99052	3/99	801334, 2370518	747.8	744.8	741.0				± 2 ft.
87	SB99-3A	99052	3/99	801339, 2370532	747.8	744.8	734.8	734.8	734.4	734.4	± 3 ft.
88	SB99-4	99052	3/99	801738, 2370122	746.7	742.4	734.9	734.9			± 2 ft.
89	SB99-5	99052	3/99	801395, 2370057	745.3	742.1	735.4	735.4			± 2 ft.
90	SB99-6	99052	3/99	801262, 2369921	742.9	740.4	735.4	735.4			± 2 ft.
91	SB99-7	99052	3/99	801872, 2369750	747.1	745.5	734.3	734.3			± 2 ft.
92	SB99-8	99052	3/99	801712, 2369793	749.5	743.2	733.9	733.9			± 2 ft.
93	SB99-9	99052	3/99	801550, 2369770	746.7	744.9	734.7	734.7			± 2 ft.
94	SB99-9A	99052	3/99	801580, 2369770	746.8	743.8	734.5	734.5			± 2 ft.
95	SB99-10	99052	3/99	801264, 2369732	744.0	741.0	735.6	735.6			± 2 ft.
96	SB99-11	99052	3/99	801770, 2369595	746.9	744.9	733.6	733.6			± 2 ft.
97	SB99-12	99052	3/99	801584, 2369589	746.8	745.0	735.3				± 2 ft.
98	SB99-13	99052	3/99	801420, 2369634	746.2	744.6	735.3	735.3			± 2 ft.
99	SB99-14	99052	3/99	801467, 2369482	746.0	745.0	734.2	734.2			± 2 ft.
100	SB99-15	99052	3/99	801311, 2369529	744.1	741.7	735.8	735.8			± 2 ft.
101	SB99-16	99052	3/99	801890, 2369267	746.0	744.0	740.0				± 2 ft.
	SB99-16A	99052	3/99	801890, 2369267	746.0	744.0	740.0				± 2 ft.
102	SB99-17	99052	3/99	801588, 2369265	745.9	742.9	735.9	735.9			± 2 ft.
103	SB99-18	99052	3/99	801420, 2369333	745.3	743.3	734.0	734.0	733.1	733.1	± 2 ft.
104	SB99-19	99052	3/99	801624, 2369100	745.7	743.5	735.7	735.7			± 2 ft.
105	SB99-20	99052	3/99	801831, 2368938	744.0	742.0	732.3			732.3	± 2 ft.

¹Estimated value based on proximity to MB #3 (a pre-temporary soil pile boring). ²Includes zone from 1.0 to 3.5 feet where sludge is mixed with silty clay. ³Includes zone from 1.5 to 3.5 feet where sludge is mixed with sand.

Boring Log Locations

- Master Boring Log Nos. 1 through 21 attached.
- Master Boring Log Nos. 22, 23 and 33 through 65 included in DNR submittal: P.H. Glatfelter, 1984. The Park Site Landfill in Neenah, Wisconsin: Existing Physical Conditions, Effect on Local Groundwater and Alternatives for Future Action. Spring Grove, PA.
- Master Boring Log Nos. 24 through 32 attached.
- Master Boring Log Nos. 66 through 76 could not be located.
- Master Boring Log Nos. 77 through 105 attached.
- 2011 Glatfelter Soil Boring submitted to DNR on August 18, 2011. Refer to letter to Gregory Tilkens (DNR) from Stu Gross (Stantec).
- Boring completed for City of Neenah Site Investigation south of Park Site #1 submitted to DNR on February 6, 2012..

LOG OF BORING NO. 7

OWNER Neenah-Menasha Sewerage Commission					ARCHITECT-ENGINEER Consoer Townsend & Associates					
SITE Neenah-Menasha					PROJECT NAME Interceptor Sewer					
DEPTH ELEVATION	SAMPLE NO.	TYPE SAMPLE	SAMPLE DIST. RECOVERY	DESCRIPTION OF MATERIAL	UNIT DRY WT. LBS./FT. 3	UNCONFINED COMPRESSIVE STRENGTH TONS/FT. 2				
						1	2	3	4	5
						PLASTIC LIMIT %	WATER CONTENT %	LIQUID LIMIT %		
						STANDARD "N" PENETRATION (BLOWS/FT.)				
						10	20	30	40	50
742				SURFACE ELEVATION → 742						
1	PA			Paper sludge fill with sand and gravel-trace clay-loose to medium dense-fill						
2	SS									
3	SS			Brown clay-trace sand, gravel, topsoil, roots-stiff to tough fill						
4	ST									
5	ST			Gray-brown silt-trace clay, fine sand thin seam of red brown silty clay-11 - 12' (ML)	111					
6	ST									
7	SS			Brown silty clay-trace to some sand and gravel-very tough to hard (CL)						
8	ST									
End of Boring										

WATER LEVEL OBSERVATIONS			SOIL TESTING SERVICES OF WIS., INC. 540 LAMBEAU STREET GREEN BAY, WIS. 54303	BORING STARTED 12-19-73	
W.L.	9.0	W.D.		BORING COMPLETED 12-19-73	
W.L.	B.C.R.	A.C.R.		RIG Acker	FOREMAN EV
W.L.	8.7' AB			DRAWN KK	APPROVED KCM
W.L.	6.5' 24 hours AB			JOB # 5863	SHEET

The stratification lines represent the approximate boundary between soil types and the transition may be gradual.

LOG OF BORING NO. 8

OWNER Neenah Menasha Sewerage Commission				ARCHITECT-ENGINEER Consoer Townsend & Associates							
SITE Neenah-Menasha				PROJECT NAME Interceptor Sewer							
DEPTH ELEVATION	SAMPLE NO.	TYPE SAMPLE	SAMPLE DIST. RECOVERY	DESCRIPTION OF MATERIAL	UNIT DRY WT. LBS./FT. 3	UNCONFINED COMPRESSIVE STRENGTH TONS/FT. 2					
SURFACE ELEVATION 747											
1	PA			Silty sand and gravel-fill							
2	SS			Paper waste sludge-loose-fill							
2A	SS										
3	SS										
4	SS			Cinders, sand, gravel, brown clay, wood paper waste-loose to medium dense-fill							
5	SS										
6	SS										
7	SS										
8	SS			Brown silty clay-trace sand and gravel-very tough to hard (CL)							
9	SS										
10	SS										
End of Boring				*Calibrated Penetrometer							

WATER LEVEL OBSERVATIONS				SOIL TESTING SERVICES OF WIS., INC. GREEN BAY, WISCONSIN 540 LAMBEAU STREET		BORING STARTED 12-19-73			
W.L.	5.5	W.S. OR W.D.				BORING COMPLETED 12-19-73			
W.L.	4.5' AB	B.C.R.	A.C.R.			RIG	Acker	FOREMAN	EV
W.L.	4.4' 24 hours AB					DRAWN	KK	APPROVED	KCM
						JOB #	5863	SHEET	

No. 2- The stratification lines represent the approximate boundary between soil types and the transition may be gradual.

LOG OF BORING NO. 9

OWNER Neenah Menasha Sewerage Commission				ARCHITECT-ENGINEER Consoer Townsend & Associates							
SITE Neenah Menasha, Wisconsin				PROJECT NAME Interceptor Sewer							
DEPTH ELEVATION	SAMPLE NO.	TYPE SAMPLE	SAMPLE DIST. RECOVERY	DESCRIPTION OF MATERIAL	UNIT DRY WT. LBS./FT. 3	UNCONFINED COMPRESSIVE STRENGTH TONS/FT. 2					
						1 PLASTIC LIMIT %	2 WATER CONTENT %	3 LIQUID LIMIT %	STANDARD "N" PENETRATION (BLOWS/FT.)		
748						10	20	30	40	50	
1	SS			Paper waste trace clay and wood-loose-fill		5					
2	SS					3					
3	SS					3					
4	SS					4					
10				Gray organic silt-trace sand partially decayed wood-loose(OL)		7					
5	SS										
15				Brown silty clay-trace to some sand and gravel-hard(CL)							
6	ST										
20											
7	ST										
25											
8	ST										
30											
32	9	ST									
End of Boring				*Calibrated Penetrometer							

WATER LEVEL OBSERVATIONS				SOIL TESTING SERVICES OF WIS., INC. GREEN BAY, WISCONSIN 540 LAMBEAU STREET		BORING STARTED 12-19-73	
W.L.	11.0'	W.S. OR W.D.				BORING COMPLETED 12-19-73	
W.L.	9.4' AB	B.C.R.	A.C.R.			RIG Acker	FOREMAN EV
W.L.	8.4' 24 hours AB					DRAWN KCM	APPROVED KCM
						JOB # 5863	SHEET

No. 1- The stratification lines represent the approximate boundary between soil types and the transition may be gradual.

LOG OF BORING NO. 10

OWNER Neenah Menasha Sewerage Commission				ARCHITECT-ENGINEER Consoer Townsend & Associates			
SITE Neenah-Menasha				PROJECT NAME Interceptor Sewer			

DEPTH	ELEVATION	SAMPLE NO.	TYPE SAMPLE	SAMPLE DIST.	RECOVERY	DESCRIPTION OF MATERIAL	UNIT DRY WT. LBS./FT. 3	UNCONFINED COMPRESSIVE STRENGTH TONS/FT. 2
SURFACE ELEVATION → 747								
1		1	SS			Miscellaneous fill consisting of paper waste topsoil, sand, gravel, bricks and cinders-loose to dense		
2		2	SS					
3		3	SS					
4		4	SS			Miscellaneous fill-predominately partially decayed wood with gray silt, sand and gravel-loose		
5		5	SS					
6		6	SS					
7		7	SS			Red brown and gray silty clay trace sand and gravel-soft(CL)		
8		8	SS			Brown silty clay-trace sand and gravel-hard(CL)		
15								
End of Boring								

WATER LEVEL OBSERVATIONS				SOIL TESTING SERVICES OF WIS., INC. 540 LAMBEAU STREET GREEN BAY, WIS. 54303		BORING STARTED 12-19-73	
W.L. 7.5'	W.S. ~~OK~~ XXX		BORING COMPLETED 12-19-73				
W.L. B.C.R.	A.C.R.		RIG Acker FOREMAN EV				
W.L. 7.0 AB			DRAWN HH APPROVED KCM				
7.0 24 hours AB			JOB # 5863 SHEET				

The stratification lines represent the approximate boundary between soil types and the transition may be gradual.

BGS-81471

LOG OF BORING NO. 11

OWNER Neenah Menasha Sewerage Commission				ARCHITECT-ENGINEER Consoer Townsend & Associates							
SITE Neenah-Menasha				PROJECT NAME Interceptor Sewer							
DEPTH ELEVATION	SAMPLE NO.	TYPE SAMPLE	RECOVERY	DESCRIPTION OF MATERIAL	UNIT DRY WT. LBS./FT. 3	UNCONFINED COMPRESSIVE STRENGTH TONS/FT. 2					
				SURFACE ELEVATION 748							
1	SS			Brown silty sand and gravel-medium dense-fill							
2	SS			Red brown silty clay-trace sand and gravel-very tough to tough (CL) possible fill							
3	ST										
4	ST										
5											
6	SS			Black sand and gravel with decayed wood and other organic material-medium dense-possible fill							
7	SS			Red brown silty clay-trace black partially decayed wood chips and black topsoil-tough (CL)							
8	ST			Brown silty clay-trace sand and gravel-hard (CL)							
9	SS			Lost sample at 20 to 22 and 25 to 26							
10	ST										
11	SS										
				End of Boring	*Calibrated Penetrometer						

WATER LEVEL OBSERVATIONS				SOIL TESTING SERVICES OF WIS., INC. GREEN BAY, WISCONSIN 540 LAMBEAU STREET		BORING STARTED 12-20-73	
W.L. 10'		W.S. OR W.D.				BORING COMPLETED 12-20-73	
W.L. B.C.R.		A.C.R.				RIG Acker FOREMAN EV	
W.L. 9.7' AB		9.3' 4 hours AB				DRAWN KK APPROVED KCH	
						JOB # 5863 SHEET	

No. 2- The stratification lines represent the approximate boundary between soil types and the transition may be gradual.

LOG OF BORING NO. 12

OWNER Neenah Menasha Sewerage Commission				ARCHITECT-ENGINEER Consoer Townsend & Associates						
SITE Neenah-Menasha				PROJECT NAME Interceptor Sewer						
DEPTH ELEVATION	SAMPLE NO.	TYPE SAMPLE	SAMPLE DIST. RECOVERY	DESCRIPTION OF MATERIAL	UNIT DRY WT. LOG./FT. 3	UNCONFINED COMPRESSIVE STRENGTH TONS/FT. 2				
						10 20 30 40 50 PLASTIC LIMIT % WATER CONTENT % LIQUID LIMIT % STANDARD "N" PENETRATION (BLOWS/FT.)				
745				SURFACE ELEVATION 745						
1	SS			Paper waste with brown silty clay-loose to medium dense-f 11						
2	SS									
3	SS									
4	SS			Fine brown silty sand-trace coarse gravel-very dense(SP) possible fill						
5				Gray organic silt with partially decayed wood chips-trace shells-medium dense(OL)						
6	SS									
7	SS			Brown silty clay-trace sand and gravel-hard(CL)						
8	SS									
End of Boring						*Calibrated Penetrometer				

WATER LEVEL OBSERVATIONS				SOIL TESTING SERVICES OF WIS., INC. 540 LAMBEAU STREET GREEN BAY, WIS. 54303		BORING STARTED 12-18-73	
W.L.	Dry	W.S. OR W.D.				BORING COMPLETED 12-18-73	
W.L.	B.C.R.	A.C.R.				RIG Acker	FOREMAN EV
W.L.	Dry AB	19.9 24 hours AB				DRAWN KK	APPROVED KCM
						JOB # 5863	SHEET

The stratification lines represent the approximate boundary between soil types and the transition may be gradual.

OWNER Neenah Menasha Sewerage Commission					ARCHITECT-ENGINEER Consoer Townsend & Associates						
SITE Neenah-Menasha					PROJECT NAME Interceptor Sewer						
DEPTH ELEVATION	SAMPLE NO.	TYPE SAMPLE	SAMPLE DIST.	RECOVERY	DESCRIPTION OF MATERIAL	UNIT DRY WT. LBS./FT. 3	UNCONFINED COMPRESSIVE STRENGTH TONS/FT. 2				
							1	2	3	4	5
						PLASTIC LIMIT % WATER CONTENT % LIQUID LIMIT % X ● △ STANDARD "N" PENETRATION (BLOWS/FT.) 10 20 30 40 50					
X					SURFACE ELEVATION → 747						
5	1	PA			Miscellaneous fill consisting of cinders, wood sand and gravel-loose						
10	2	SS									
15	3	SS			Gray brown silt-trace to some sand-trace gravel-medium dense (ML)						
20	4	SS			Red brown silty clay-very tough (CL)						
25	5	ST			Brown silty clay-trace sand and gravel-hard (CL)						
26.5	6	SS									
End of Boring						*Calibrated Penetrometer					

WATER LEVEL OBSERVATIONS			SOIL TESTING SERVICES OF WIS., INC. 540 LAMBEAU STREET GREEN BAY, WIS. 54303		BORING STARTED 12-20-73		
W.L. 9.5'	XXXXX W.D.				BORING COMPLETED 12-20-73		
W.L. B.C.R.	A.C.R.				RIG Acker	FOREMAN EV	
W.L. 9.5 AB	9.5' - 2½ hours AB				DRAWN KK	APPROVED KCM	
					JOB # 5863	SHEET	

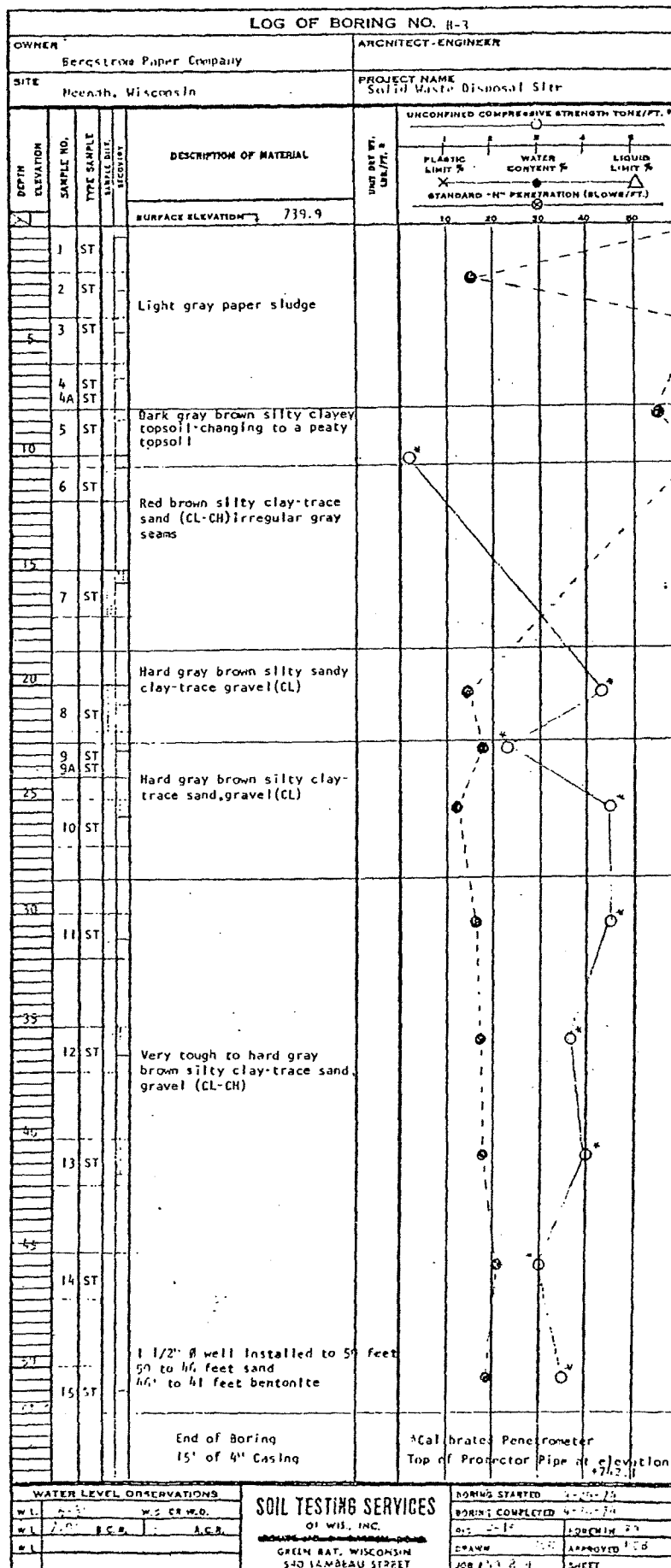
The stratification lines represent the approximate boundary between soil types and the transition may be gradual.

BBS-81471

LOG OF BORING NO. B-1									
OWNER Bernstrom Paper Company					ARCHITECT-ENGINEER				
SITE Neenah, Wisconsin					PROJECT NAME Solid Waste Disposal Site				
DEPTH ELEVATION	SAMPLE NO.	TYPE SAMPLE	FIELD D.S.T. REMARKS	DESCRIPTION OF MATERIAL	UNIT DRY WL. LBS./FT.	UNCONFINED COMPRESSIVE STRENGTH TONS/FT. ²			
						PLASTIC LIMIT %	WATER CONTENT %	LIQUID LIMIT %	
SURFACE ELEVATION = 740.8					STANDARD "H" PENETRATION (BLOWS/FT.)				
0	1	ST		Light gray paper sludge-Fill		10	20	30	
1	2	ST							
2	2A	ST							
3	3	ST							
4	4	ST		Tough to hard gray brown silty sandy clay-trace gravel (CL)		20	30	40	
5									
6	5	ST							
7	6	ST							
8	7	ST		Very tough to hard gray brown silty clay-trace sand, gravel (CL)		30	40	50	
9									
10	8	ST							
11	9	ST							
12	10	ST		Very tough to hard gray brown silty clay-trace sand, gravel (CL-CH) irregular small seams red clay		40	50	60	
13									
14	11	ST							
15	12	ST							
16				Very tough gray brown silty clay (CL) thin seams light gray silt		50	60	70	
17	13	ST							
18									
19									
End of Boring 1 1/2" ID well installed to 5' 5" to 46" sand and pea gravel 57' to 51' bentonite					*Calibrated Penetrometer Top of protector pipe at elevation = 744.0				

WATER LEVEL OBSERVATIONS		SOIL TESTING SERVICES OF WIS., INC. GREEN BAY, WISCONSIN 540 SAMRAU STREET	BORING STARTED 7-25-74	
W.L.	W.S. OR W.D.		BORING COMPLETED 8-14-74	
W.L.	B.C. #		BY	ROTHMAN JR.
W.L.	A.C.B.		CRAWN	APPROVED P.E.
			JOB #	SWET

The stratification lines represent the approximate boundary between soil types and the transition may be gradual.



The stratification lines represent the approximate boundary between soil types and the transition may be gradual.

LOG OF BORING NO. B-6											
OWNER Bergstrom Paper Company					ARCHITECT-ENGINEER						
SITE Neenah, Wisconsin					PROJECT NAME Solid Waste Disposal Site						
DEPTH ELEVATION	SAMPLE NO.	TYPE SAMPLE	TESTS	DESCRIPTION OF MATERIAL	UNIT WT. LB./FT. ³	UNCONFINED COMPRESSIVE STRENGTH (TONS/FT. ²)					
						1	2	3	4		
						PLASTIC LIMIT % WATER CONTENT % LIQUID LIMIT % X STANDARD "N" PENETRATION (BLOWS/FT.)					
SURFACE ELEVATION = 741.6						10	20	30	40	50	
1	ST	LS		Light gray paper sludge-Fill							
2	ST										
3	ST										
4	ST										
5	ST										
10	6	ST		Dark gray organic silt-trace chunks wood (OL)							
15	7	ST		Very tough red brown silty clay (CL) thin seam gray silt							
20	8	ST		Gray brown silty clay-trace sand and gravel (CL-CH)							
25	9	ST									
30	10	ST									
35	11	ST									
40	12	ST									
45	13	ST		Very tough gray brown silty clay-trace sand, gravel (CL)							
50	14	ST		1 1/2" A well installed to 50 feet 50' to 46' sand 46' to 41' bentonite							
52.4				End of Boring Top of Protector Pipe at Elevation 744.2							

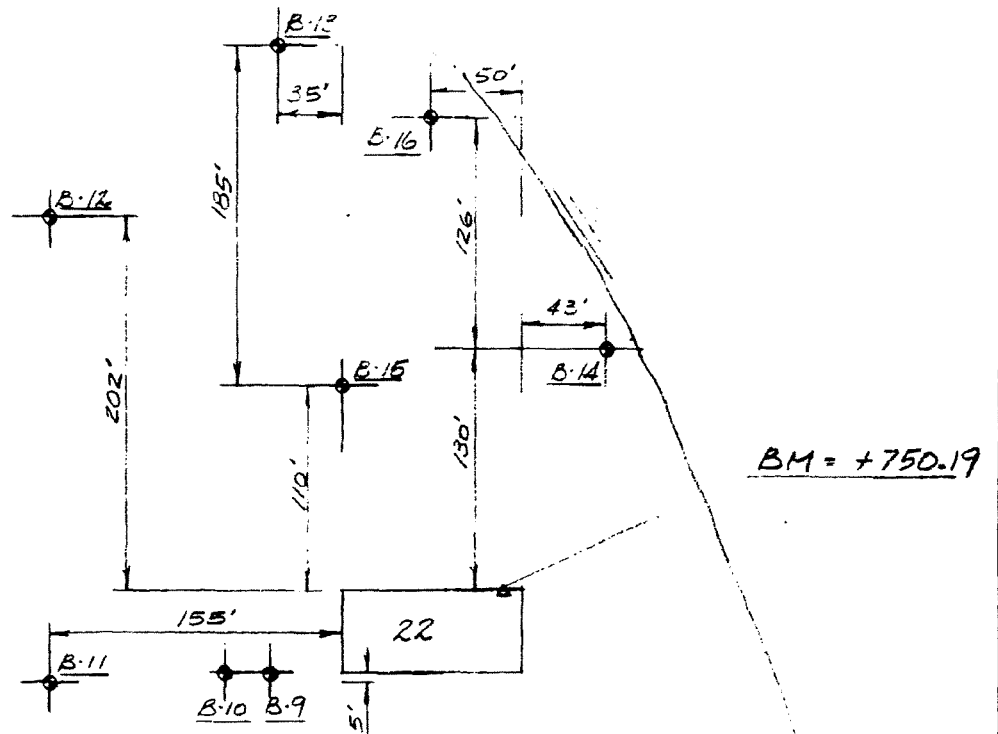
1259
1257
1255
1253
1251
1249

1259
1257
1255
1253
1251
1249

The stratification lines represent the approximate boundary between soil types and the transition may be gradual.

NEENAHFOIA0003464

LITTLE LAKE BUTTE DES MORTS



SOIL BORING LOCATION DIAGRAM
PROPOSED TREATMENT PLANTS
BERGSTROM PAPER CO., NEENAH, WIS.



SOIL TESTING SERVICES
OF WIS., INC.

Route 7, Boston Road
GREEN BAY WISCONSIN

BP 1"=100' 1443A 7.5.65

LOG OF BORING NO. 11										
OWNER Bergstrom Paper Company					ARCHITECT-ENGINEER S.J. Baisch Associates					
SITE Neenah, Wisconsin					PROJECT NAME Proposed Treatment Plants					
DEPTH	ELEVATION	SAMPLE NO.	TYPE SAMPLE	SAMPLE DIST.	RECOVERY	DESCRIPTION OF MATERIAL	UNIT DRY WT. LBS./FT. 3	UNCONFINED COMPRESSIVE STRENGTH TONS/FT. 2 1 2 3 4 5 PLASTIC LIMIT % WATER CONTENT % LIQUID LIMIT % X ● △ STANDARD "N" PENETRATION (BLOWS/FT.) 10 20 30 40 50		
X						SURFACE ELEVATION → 745.5				
		1	SS			FINE-MEDIUM SAND-TRACE GRAVEL AND WOOD-BROWN AND GRAY-FILL		X		
		2	SS					X		
		3	SS			GRAY PAPER SLUDGE-FILL		X		
		4	SS					X		
10		5	SS			ORGANIC SILT-TRACE FIBERS-DARK GRAY-(OL)		X		
		6	ST					●		*○
		7	SS			SILTY CLAY-TRACE GRAVEL AND SAND-BROWN-HARD-(CL)-COBBLES AT 13.5' TO 15'		●		○+
20										
		8	SS			END OF BORING		●		○+
25										
26.5						10' NX CASING		●		○+
										2.11
							*CALIBRATED PENETROMETER			

WATER LEVEL OBSERVATIONS				SOIL TESTING SERVICES OF WIS., INC. ROUTE NO. 7—BAETEN ROAD GREEN BAY, WISCONSIN		BORING STARTED 8/19/66	
W.L.	W.S. OR W.D.					BORING COMPLETED 8/19/66	
W.L. 8.5' B.C.R.	8.5' A.C.R.					RIG W-6	FOREMAN KN
W.L. CT AT SURFACE 24 HOURS AB						DRAWN	APPROVED WMP
				JOB # 1443A		SHEET	

LOG OF BORING NO. 12

OWNER Bergstrom Paper Company	ARCHITECT - ENGINEER S. J. Baisch Associates
SITE Neenah, Wisconsin	PROJECT NAME Proposed Treatment Plants

DEPTH ELEVATION	SAMPLE NO.	TYPE SAMPLE	SAMPLE DIST. RECOVERY	DESCRIPTION OF MATERIAL	UNIT DRY WT. LBS./FT. 3	UNCONFINED COMPRESSIVE STRENGTH TONS/FT. 2				
						1 PLASTIC LIMIT %	2 WATER CONTENT %	3 STANDARD "N" PENETRATION (BLOWS/FT.)	4 LIQUID LIMIT %	5
×				SURFACE ELEVATION → 743.05						
	1			BROWN SANDY CLAY-TRACE GRAVEL-FILL		⊗				
	1A	SS		BLACK CINDERS-FILL						
	2	SS		GRAY PAPER SLUDGE-TRACE COARSE GRAVEL AT 4'-TRACE CINDERS AT 7'-SWAMP GAS NOTED WHILE DRILLING AT 2'		⊗				
	3	SS						⊗		
	4	SS						⊗		
10				SILTY CLAY-TRACE GRAVEL AND SAND-BROWN-TOUGH TO HARD- (CL)						
	5	SS				⊗				
	6	ST								
15										
	7	SS								
20										
	8	SS								
25										
26.5				END OF BORING 10' NX CASING						

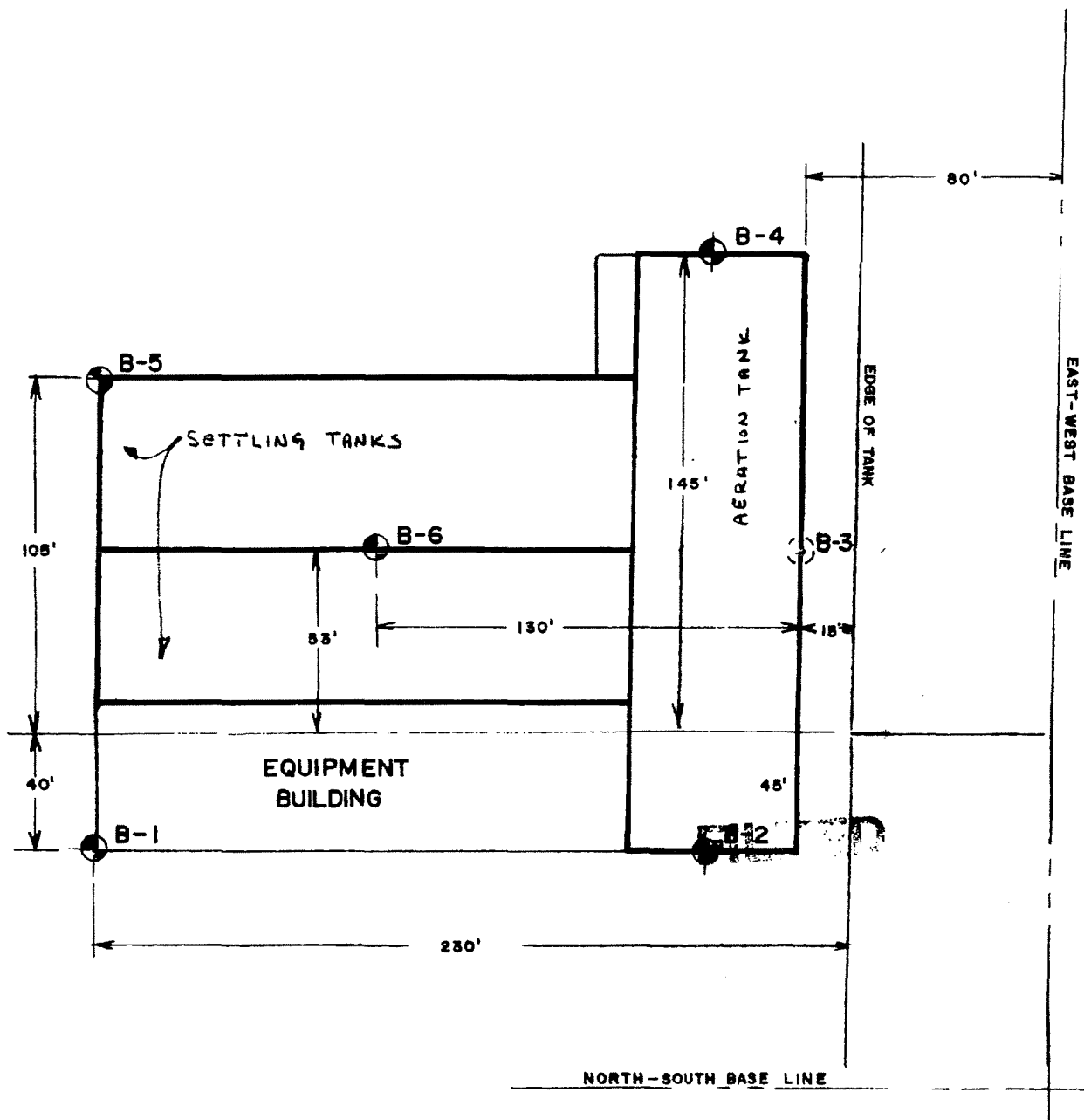
WATER LEVEL OBSERVATIONS				SOIL TESTING SERVICES OF WIS., INC. ROUTE NO. 7—BAETEN ROAD GREEN BAY, WISCONSIN	BORING STARTED 8/19/66	
W.L.	W.S. OR W.D.				BORING COMPLETED 8/19/66	
W.L.	7' B.C.R.	7' A.C.R.			RIG W-6	FOREMAN KN
W.L.	WCI AT 6' 24 HOURS AB				DRAWN	APPROVED WMP
					JOB # 1443A	SHEET

LOG OF BORING NO. 15											
OWNER Bergstrom Paper Company					ARCHITECT-ENGINEER S. J. Baisch Associates						
SITE Neenah, Wisconsin					PROJECT NAME Proposed Treatment Plants						
DEPTH ELEVATION	SAMPLE NO.	TYPE SAMPLE	SAMPLE DIST.	RECOVERY	DESCRIPTION OF MATERIAL	UNIT DRY WT. LBS./FT. 3	UNCONFINED COMPRESSIVE STRENGTH TONS/FT. 2				
							12345 PLASTIC LIMIT %WATER CONTENT %LIQUID LIMIT % X				
SURFACE ELEVATION → 744.4							STANDARD "N" PENETRATION (BLOWS/FT.)				
							10	20	30	40	50
X	1	SS			GRAY PAPER SLUDGE						
	2	SS									
	3	SS									
	4	SS									
10	5	SS			SILTY CLAY-TRACE GRAVEL AND SAND-BROWN-HARD TO VERY TOUGH (CL)						
	5A										
	6	SS									
15											
20	7	SS			SILTY CLAY-TRACE GRAVEL AND SAND-BROWN-HARD TO VERY TOUGH (CL)						
25	8	SS									
30											
31.5	9	SS									
END OF BORING											
											*CALIBRATED PENETROMETER

WATER LEVEL OBSERVATIONS	
W.L.	W.S. OR W.D.
W.L.	B.C.R. A.C.R.
W.L.	4' AB
	7' 24 HOURS AB

SOIL TESTING SERVICES
 OF WIS., INC.
 ROUTE NO. 7—BAETEN ROAD
 GREEN BAY, WISCONSIN

BORING STARTED 8/19/66	
BORING COMPLETED 8/19/66	
RIG W-5	FOREMAN KN
DRAWN	APPROVED WMP
JOB # 1443A	SHEET



CONST. NORTH

SOIL BORING LOCATION DIAGRAM
EFFLUENT TREATMENT PLANT
BERGSTROM PAPER CO.
NEENAH, WISCONSIN



SOIL TESTING SERVICES
OF WISCONSIN, INC.

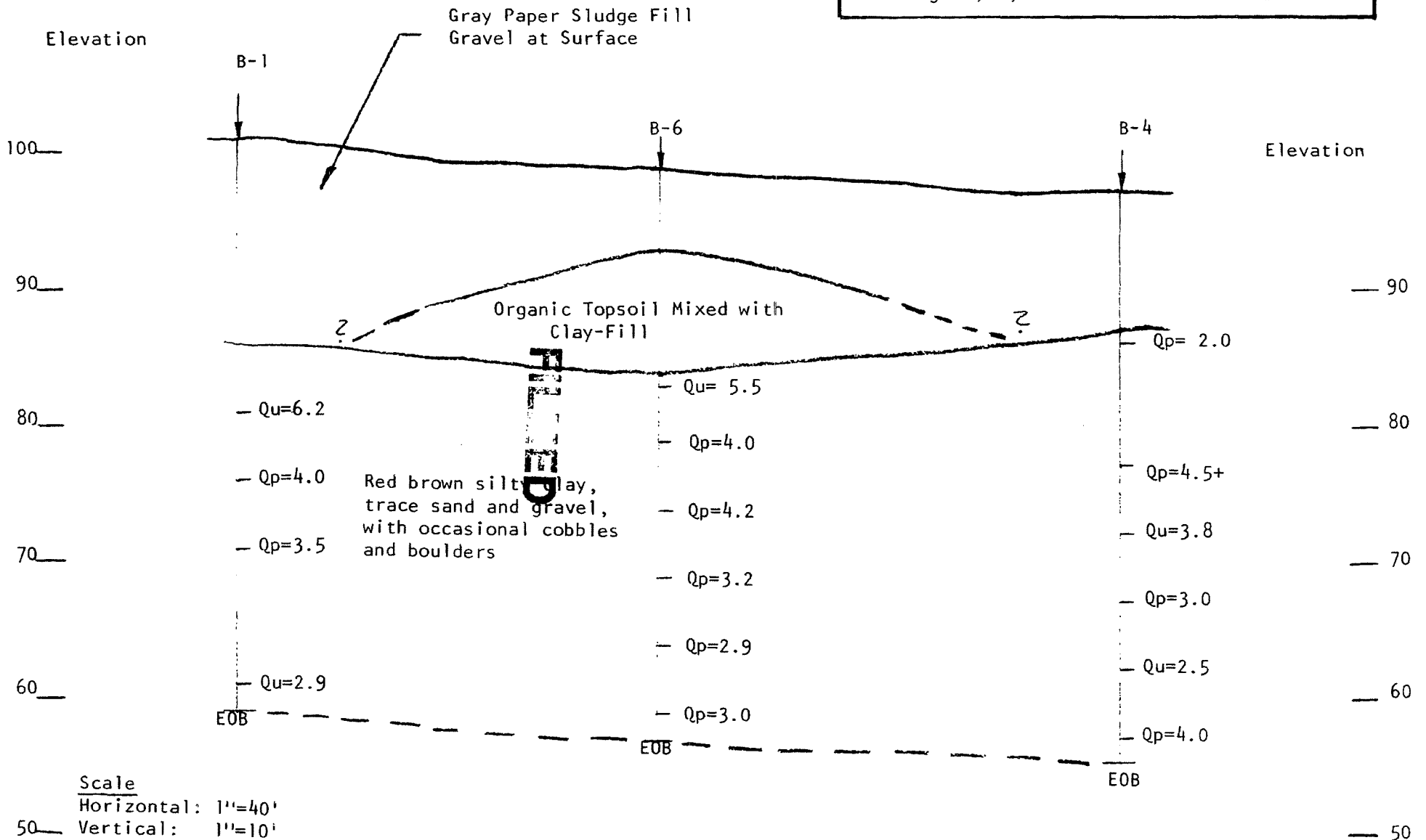
540 LAMBEAU ST. GREEN BAY, WISCONSIN 54303

H.H. 4-29-75 1" = 50' 6626

GENERALIZED SOIL PROFILE
EFFLUENT TREATMENT PLANT
BERGSTROM PAPER COMPANY

Borings 1, 6, 4

STS #6626



LOG OF BORING NO. 1										
OWNER					ARCHITECT-ENGINEER					
Bergstrom Paper Company					VanLoven Consultants					
SITE					PROJECT NAME					
Neenah, Wisconsin					Proposed Waste Water Treatment Plant					
DEPTH	ELEVATION	SAMPLE NO.	TYPE SAMPLE	SAMPLE DET. & CORRECT	DESCRIPTION OF MATERIAL	UNIT WT. LB./FT. 3	UNCONFINED COMPRESSIVE STRENGTH TONS/FT. 2			
							PLASTIC LIMIT %	WATER CONTENT %	LIQUID LIMIT %	
						STANDARD "N" PENETRATION (BLOWS/FT.)				
SURFACE ELEVATION 101.0										
1		SS			Gray brown fine to coarse sand and gravel-fill					
2		SS								
3		SS								
4		SS			Gray paper sludge-fill					
5		SS								
6		SS								
7		ST			Red gray to red brown silty clay, trace to some fine to coarse gravel, with pieces of large gravel at 35 feet-very tough to hard-(CL)	117				
8		ST								
9		ST								
10		ST								
11		ST			Red brown silty clay, trace fine sand-very tough-(CL-CH)	107				
12					End of Boring					
Auger boring to 15 feet. Wash boring below 15 feet. 15 feet of NX casing used.						Calibrated Penetrometer				

WATER LEVEL OBSERVATIONS

W.L.	3'	W.S. ORIGIN
W.L.	2.1' S.C.B.	A.C.B.
W.L.	5.9' 24 hrs. AB	

SOIL TESTING SERVICES

OF WIS., INC.

GREEN BAY, WISCONSIN

540 LAMBEAU STREET

BORING STARTED 4-15-75

BORING COMPLETED 4-15-76

JOB 8 **FOREMAN** EVH

DRAWN JK **APPROVED** WCK

JOB # 6626 **SHEET**

== NO. 4-1M

The stratification lines represent the approximate boundary between soil types and the transition may be gradual.

LOG OF BORING NO. 2

OWNER Bergstrom Paper Company				ARCHITECT-ENGINEER Van Luyen Consultants						
SITE Neenah, Wisconsin				PROJECT NAME Proposed Waste Water Treatment Plant						
DEPTH ELEVATION	SAMPLE NO.	TYPE SAMPLE	SAMPLE DIST. RECOVERY	DESCRIPTION OF MATERIAL	UNIT DRY WT. LB./FT. 3	UNCONFINED COMPRESSIVE STRENGTH TONS/FT. 2				
				SURFACE ELEVATION 97.7		PLASTIC LIMIT % WATER CONTENT % LIQUID LIMIT % STANDARD "N" PENETRATION (BLOWS/FT.)				
	1	SS		Gray paper sludge mixed with gravel from 0 to 1 foot, mixed with peat and topsoil from 4 feet to 6 feet-fill						
	2	SS								
	3	SS								
	4	SS		Red brown silty clay, mixed with topsoil, cinders, sludge and sand-fill						
	5	SS								
	6	SS								
	7	SS		Red brown silty clay, some fine to coarse sand and fine to coarse gravel-hard-(CL)						
	8	SS								
	9	ST								
	10	SS								
				End of boring						
				Auger boring to 15 feet Wash boring below 15 feet 15 feet of NX casing used						
						*Calibrated Penetrometer				

WATER LEVEL OBSERVATIONS				SOIL TESTING SERVICES				BORING STARTED 4-14-75	
W.L. 3' W.S. OK WCK				OF WIS., INC.				BORING COMPLETED 4-14-75	
W.L. 2.1' B.C.R. A.C.R.				GREEN BAY, WISCONSIN				RIG 8 FOREMAN EVH	
W.L. 5.9' 24 hrs. AB				540 LAMBEAU ST.				DRAWN JK APPROVED WCK	
								JOB # 6626 SHEET	

The stratification lines represent the approximate boundary between soil types and the transition may be gradual.

BB5-91671

LOG OF BORING NO. 4									
OWNER Bergstrom Paper Company					ARCHITECT-ENGINEER Van Loven Consultants				
SITE Neenah, Wisconsin					PROJECT NAME Proposed Waste Water Treatment Plant				
DEPTH ELEVATION	SAMPLE NO.	TYPE SAMPLE	SAMPLE INT.	REMARKS	DESCRIPTION OF MATERIAL	UNIT WT. LB./FT. 3	UNCONFINED COMPRESSIVE STRENGTH TONS/FT. 2		
							PLASTIC LIMIT %	WATER CONTENT %	LIQUID LIMIT %
SURFACE ELEVATION 97.5						STANDARD "N" PENETRATION (BLOWS/FT.) 10 20 30 40 50			
1	SS				Gray paper sludge-fill		2		
2	SS						2		
3	SS						4		
4	SS						4		
5	SS				Red brown silty clay, trace to some sand and fine to coarse gravel-very tough to hard-(CL) possible cobble or boulder at 15 feet		10		
6	SS						10		
7	ST						10		
8	SS						10		
9	ST						10		
10	ST						10		
11	ST				End of boring				
Auger boring to 6 feet. Wash boring below 6 feet. 15 feet of NX casing used.									

WATER LEVEL OBSERVATIONS				SOIL TESTING SERVICES		BORING STARTED	
W.L.	6.2'	W.S. ORICE		OF W.B., INC.		BORING COMPLETED	4-15-75
W.L.	7.1'	R.C.B.	6.5' A.C.B.	GREEN BAY, WISCONSIN		DRAWN	JK
W.L.				540 LAMARU STREET		APPROVED	WCK
						JOB #	6626
						SHEET	

SP NO. 4-11M

The stratification lines represent the approximate boundary between soil types and the transition may be gradual.

LOG OF BORING NO. 5									
OWNER					ARCHITECT-ENGINEER				
Bergstrom Paper Company					Van Luven Consultants				
SITE					PROJECT NAME				
Neenah, Wisconsin					Proposed Waste Water Treatment Plant				
DEPTH ELEVATION	SAMPLE NO.	TYPE SAMPLE	DESCRIPTION OF MATERIAL	UNSATURATED COMPRESSIVE STRENGTH (TONS/FT. ²)	PLASTICITY INDEX			STANDARD "N" PENETRATION (BLOWS/FT.)	
					PLASTIC LIMIT %	WATER CONTENT %	LIQUID LIMIT %		
SURFACE ELEVATION = 99.9									
1	SS		Gray fine to coarse sand and gravel-fill						
2	SS								
3	SS		Gray paper sludge-fill						
4	SS								
5	ST		Red brown, brown, and gray silty clay, mixed with clinders, topsoil, and sand-fill						
6	SS								
7	SS		Red brown silty clay, trace sand and fine gravel-hard to very tough-(CL)						
8	SS								
9	SS								
10	SS								
11	ST								
12	ST		Red brown silty clay, trace sand, with numerous thin seams and layers of gray silt below 45 feet-hard-(CL-CH)						
13	ST								
End of Boring				*Calibrated Penetrometer					
Auger boring to 7.5 feet Wash boring below 7.5 feet 15 feet of NX Casag used									

WATER LEVEL OBSERVATIONS		SOIL TESTING SERVICES OF WIL, INC. GREEN BAY, WISCONSIN 540 LAUREAU STREET	BORING STARTED 4-16-75	
W.L. 2'	W.S. 6.2'		BORING COMPLETED 4-16-75	
W.L. 6.2' A.C.R.	W.S. 5.7' A.C.R.		DRN 8	FORNAN EVH
W.L. 2' 24 hrs. AB			DRN JK	APPROVED WCK
			JOB # 6626	SHEET

P.P. No. 4-1M

The stratification lines represent the approximate boundary between soil types and the transition may be gradual.

LOG OF BORING NO. 6									
OWNER					ARCHITECT-ENGINEER				
Bergstrom Paper Company					Van Loven Consultants				
SITE					PROJECT NAME				
Neenah, Wisconsin					Proposed Waste Water Treatment Plant				
DEPTH	ELEVATION	SAMPLE NO.	TYPE SAMPLE	SAMPLE NO.	DESCRIPTION OF MATERIAL	UNSAT. WT. %	UNOBTAINED COMPRESSIVE STRENGTH TONS/FT. ²		
							1	2	3
							PLASTIC LIMIT % WATER CONTENT % LIQUID LIMIT % X STANDARD "H" PENETRATION (BLOWS/FT.)		
					SURFACE ELEVATION = 98.8				
		1	SS		Black topsoil, gray paper sludge and gravel-fill				
		2	SS		Black cinders-fill				
		3	SS						
		4	SS		Dark brown clayey topsoil, mixed with brown silty clay-fill (OL-OH)				
		5	ST						
		6	ST						
		7	ST						
		8	ST		Red brown silty clay, trace sand and fine to medium gravel-with irregular seams of gray brown clayey silt-(HL-CL)-hard to very tough-(CL)				
		9	ST						
		10	ST						
		11	ST						
					End of boring				
					Auger boring to 6 feet Wash boring below 6 feet 20 Feet of NX Casing used				

WATER LEVEL OBSERVATIONS

W.L.	3.5'	W.B. 08/08/75
W.L.	5.1'	R.C.R. 4.7' A.G.R.
W.L.		

SOIL TESTING SERVICES

OF W.L. INC.

GREEN BAY, WISCONSIN

340 LAUREL STREET

BORING STARTED 4-15-75

BORING COMPLETED 4-15-75

DR 8 **FORMAN** EVH

DRAWN JK **APPROVED** WCK

JOB # 6626 **SHEET**

PP No. 4-1M

The stratification lines represent the approximate boundary between soil types and the transition may be gradual.



STS Consultants Ltd.

OWNER

P. H. Glatfelter Company

LOG OF BORING NUMBER

B-1-90

PROJECT NAME

Proposed Combustor Building

ARCHITECT—ENGINEER

SITE LOCATION

Neenah, Wisconsin

DEPTH ELEVATION	SAMPLE NO.	SAMPLE TYPE	SAMPLE DISTANCE RECOVERY	DESCRIPTION OF MATERIAL	UNIT DRY WT. LBS./FT ³	UNCONFINED COMPRESSIVE STRENGTH TONS/FT ²					PLASTIC LIMIT %			WATER CONTENT %			LIQUID LIMIT %			STANDARD PENETRATION			BLOWS/FT.		
						1	2	3	4	5	X									⊗					
				SURFACE ELEVATION 744.23																					
2.5				Fill: Black cinders mixed with gravel, clay and sand - driller's observation																					
5				Fill: Gray paper sludge - driller's observation																					
10																									
11																									
15																									
	1	SS																							
20																									
	2	SS		Brown silty clay (CL-CH) - trace of gravel - moist - stiff to hard																					
25																									
	3	SS																							
30																									
32	4	SS																							
	5	SS		Varved brown silty clay (CL-CH) and gray clayey silt (ML-CL) - alternating 1/8-inch to 1/2-inch thick seams - trace of sandy silt seams from 34 feet to 36 feet - moist very stiff to hard																					
35																									
36	6	SS																							
	7	SS		Gray clayey sandy silt (ML) - trace of gravel - moist to wet - extremely dense																					
40	8	SS																							
41	9	SS																							
				End of boring - Boring advanced to 15 feet with solid-stem auger and no sampling - Boring advanced from 15 feet to 41 feet with tri-cone roller bit and wash water HW casing driven to 15 feet Grouted borehole with bentonite upon completion																					

*Calibrated penetrometer

THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES. IN SITU. THE TRANSITION MAY BE GRADUAL.

WL			BORING STARTED 7-31-90	STS OFFICE 540 Lambeau Street Green Bay, WI 54303
WL	BCR	ACR	BORING COMPLETED 7-31-90	DRAWN BY JJT SHEET NO. 1 OF 1
WL			RIG Mobile B64FOREMAN TT	APP'D BY MJW STS JOB NO18068XH



STS Consultants Ltd.

OWNER

P. H. Glatfelter Company

LOG OF BORING NUMBER

B-3-90

PROJECT NAME

Proposed Combustor Building

ARCHITECT-ENGINEER

SITE LOCATION

Neenah, Wisconsin

DEPTH ELEVATION	SAMPLE NO.	SAMPLE TYPE	SAMPLE DISTANCE RECOVERY	DESCRIPTION OF MATERIAL	UNIT DRY WT. LBS / FT ³	UNCONFINED COMPRESSIVE STRENGTH TONS/FT ²				
						1	2	3	4	5
X						PLASTIC LIMIT %			WATER CONTENT %	
						X	---	●	---	△
						10	20	30	40	50
						10	20	30	40	50
5				Fill: Brown sand and gravel mixed with topsoil, gravel and paper sludge - driller's observation						
10	1	SS								
13.5										
15	2	SS		Brown silty clay (CL) - trace of gravel - moist - very stiff to hard						
20	3	SS								
25	4	SS								
30	5	SS								
36	6	SS								
35	7	SS		Varved brown silty clay (CL) and gray clayey silt (ML-CL) - alternating 1/4-inch thick to 1/2-inch thick seams - moist - very stiff to hard						
40	8	SS								
41	9	SS		Brown sandy silty clay (CL) - a little gravel - wet - hard						
41	10	SS								
				End of boring - Boring advanced to 15 feet with solid-stem auger and no sampling - Boring advanced from 15 feet to 41 feet with tri-cone roller bit and wash water HW casing driven to 15 feet Boring terminated at 41 feet due to extremely dense drilling Grouted borehole with bentonite upon completion						

THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES. IN SITU. THE TRANSITION MAY BE GRADUAL.

WL	BORING STARTED 7-30-90		STS OFFICE 540 Lambeau Street Green Bay, WI 54303		
WL	BCR	ACR	BORING COMPLETED 7-30-90	DRAWN BY JJT	SHEET NO. 1 OF 1
WL	RIG Mobile B61 FOREMAN TT		APP'D BY MJW	STS JOB NO. 18068XH	



OWNER
P.H. Glatfelter Co.

LOG OF BORING NUMBER 1

PROJECT NAME
Waste Treatment Expansion

ARCHITECT-ENGINEER
Foth & Van Dyke

STS Consultants Ltd.

SITE LOCATION
225 W. Wisconsin Avenue, Neenah, Wisconsin

DEPTH (FT) ELEVATION (FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DISTANCE RECOVERY	DESCRIPTION OF MATERIAL	UNIT DRY WT. LBS./FT. ³	UNCONFINED COMPRESSIVE STRENGTH TONS/FT. ²			PLASTIC LIMIT %		WATER CONTENT %		LIQUID LIMIT %	
						1	2	3	4	5	10	20	30	40
				SURFACE ELEVATION 747.0										
				Asphalt (Driller's observation)										
5.0		HSA		Fill: Base course (Driller's observation)										
10.0	1	SS		Fill: Paper sludge										
	2	SS												
	3	SS												
15.0				Buried topsoil (Driller's observation)										
20.0	4	SS		Brown silty clay (CL) - with trace to little gravel and sand - moist - stiff to hard										
25.0	5	SS												
30.0	6	SS												
35.0	7	SS												
40.0	8	SS												

* Calibrated Penetrometer

... continued



OWNER
P.H. Glatfelter Co.

LOG OF BORING NUMBER 1

PROJECT NAME
Waste Treatment Expansion

ARCHITECT-ENGINEER
Foth & Van Dyke

STS Consultants Ltd.

SITE LOCATION
225 W. Wisconsin Avenue, Neenah, Wisconsin

DEPTH (FT) ELEVATION (FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DISTANCE	RECOVERY	DESCRIPTION OF MATERIAL	UNIT DRY WT. LBS./FT. ³	UNCONFINED COMPRESSIVE STRENGTH TONS/FT. ²					PLASTIC LIMIT %			WATER CONTENT %			LIQUID LIMIT %		
							1	2	3	4	5	10	20	30	40	50	10	20	30	40
					SURFACE ELEVATION 747.0															
					Continued from previous page															
40.0	9	SS																		
45.0	10	SS			Brown silty clay (CL) - with trace to little gravel and sand - moist - stiff to hard															
50.0	11	SS																		
51.5					End of Boring Boring advanced to 14 feet with hollow stem auger Boring advanced from 14 to 52 feet with roller bit and Revert drilling mud HW casing driven to 15 feet Borehole abandoned with bentonite chips															

* Calibrated Penetrometer

The stratification lines represent the approximate boundary lines between soil types: in-situ, the transition may be gradual.

WL	WS OR WD	BORING STARTED 08/19/91	STS OFFICE 1035 Kepler Drive Green Bay, WI 54311
WL	BCR	ACR	BORING COMPLETED 08/19/91
WL		RIG/FOREMAN CME 45/TT	ENTERED BY MKM
			SHEET NO. 2 OF 2
			APP'D BY WB
			STS JOB NO. 18899



OWNER
P.H. Glatfelter Co.

LOG OF BORING NUMBER 2

PROJECT NAME
Waste Treatment Expansion

ARCHITECT-ENGINEER
Foth & Van Oyke

STS Consultants Ltd.

SITE LOCATION
225 W. Wisconsin Avenue, Neenah, Wisconsin

DEPTH (FT) ELEVATION (FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DISTANCE	RECOVERY	DESCRIPTION OF MATERIAL	UNIT DRY WT. LBS./FT. ³	UNCONFINED COMPRESSIVE STRENGTH TONS/FT. ²					PLASTIC LIMIT % WATER CONTENT % LIQUID LIMIT %					STANDARD PENETRATION BLOWS/FT.				
							1	2	3	4	5	10	20	30	40	50	10	20	30	40	50
					SURFACE ELEVATION 746.7																
		HSA			Asphalt (Driller's observation)																
					Fill: Base course (Driller's observation)																
5.0	1	SS			Fill: Paper sludge																
10.0	2	SS																			
	3	SS																			
15.0	4	SS			Brown silty clay (CL) - with trace to little gravel and sand - moist - hard																
20.0	5	SS																			
25.0	6	SS																			
30.0	7	SS			Gray fine to coarse sand (SW) - with trace of gravel - wet - dense																
31.5					Note: Artesian water pressure was encountered at 31.5 feet. Borehole abandoned. End of Boring Boring advanced to 15' with hollow stem auger Boring advanced from 15 to 31.5 feet with roller bit and Revert drilling mud HW casing driven to 15 feet Borehole abandoned with bentonite chips																

The stratification lines represent the approximate boundary lines between soil types: in-situ, the transition may be gradual.

WL	28 ft	WS OR WD WD	BORING STARTED 08/15/91	STS OFFICE 1035 Kepler Drive Green Bay, WI 54311
WL	BCR	ACR	BORING COMPLETED 08/15/91	ENTERED BY MKM
WL			RIG/FOREMAN CME 45/TT	SHEET NO. 1 OF 1 STS JOB NO. 18899



OWNER
P.H. Glatfelter Co.

LOG OF BORING NUMBER 3

STS Consultants Ltd.

PROJECT NAME
Waste Treatment Expansion

ARCHITECT-ENGINEER
Foth & Van Dyke

SITE LOCATION
225 W. Wisconsin Avenue, Neenah, Wisconsin

DEPTH (FT) ELEVATION (FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DISTANCE	RECOVERY	DESCRIPTION OF MATERIAL	UNIT DRY WT. LBS./FT. ³	UNCONFINED COMPRESSIVE STRENGTH TONS/FT. ²					PLASTIC LIMIT % WATER CONTENT % LIQUID LIMIT %			STANDARD PENETRATION BLOWS/FT.				
							1	2	3	4	5	10	20	30	40	50	10	20	30
					SURFACE ELEVATION 747.3														
					Asphalt (Driller's observation)														
					Fill: Base course (Driller's observation)														
5.0																			
		HSA																	
10.0					Fill: Paper sludge														
15.0	1	SS																	
					Brown silty clay (CL) with trace of gravel and sand - moist - stiff to hard														
20.0	2	SS																	
25.0	3	SS																	
30.0	4	SS																	
35.0	5	SS																	
40.0																			

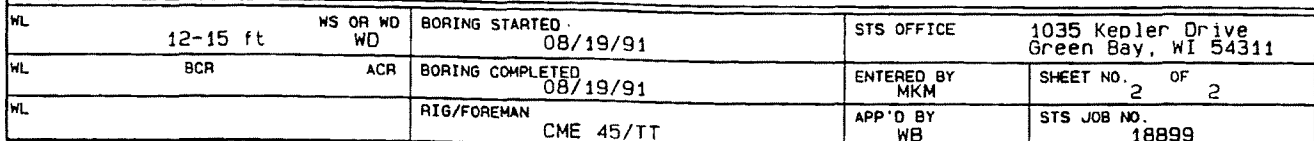
* Calibrated Penetrometer

... continued

The stratification lines represent the approximate boundary lines between soil types; in-situ, the transition may be gradual.

STS JOB NO. 18899

SHEET NO. 1 OF 2



LOG OF BORING NUMBER 4

STS Consultants Ltd.

PROJECT NAME
Waste Treatment Expansion

ARCHITECT-ENGINEER
Foth & Van Dyke

SITE LOCATION

225 W. Wisconsin Avenue, Neenah, Wisconsin

 UNCONFINED COMPRESSIVE STRENGTH TONS/FT. ²	DISTANCE FROM FACE OF WALL, INCHES				
	1	2	3	4	5
1	1	2	3	4	5
2	1	2	3	4	5
3	1	2	3	4	5
4	1	2	3	4	5
5	1	2	3	4	5
6	1	2	3	4	5
7	1	2	3	4	5
8	1	2	3	4	5
9	1	2	3	4	5
10	1	2	3	4	5
11	1	2	3	4	5
12	1	2	3	4	5
13	1	2	3	4	5
14	1	2	3	4	5
15	1	2	3	4	5
16	1	2	3	4	5
17	1	2	3	4	5
18	1	2	3	4	5
19	1	2	3	4	5
20	1	2	3	4	5
21	1	2	3	4	5
22	1	2	3	4	5
23	1	2	3	4	5
24	1	2	3	4	5
25	1	2	3	4	5
26	1	2	3	4	5
27	1	2	3	4	5
28	1	2	3	4	5
29	1	2	3	4	5
30	1	2	3	4	5
31	1	2	3	4	5
32	1	2	3	4	5
33	1	2	3	4	5
34	1	2	3	4	5
35	1	2	3	4	5
36	1	2	3	4	5
37	1	2	3	4	5
38	1	2	3	4	5
39	1	2	3	4	5
40	1	2	3	4	5
41	1	2	3	4	5
42	1	2	3	4	5
43	1	2	3	4	5
44	1	2	3	4	5
45	1	2	3	4	5
46	1	2	3	4	5
47	1	2	3	4	5
48	1	2	3	4	5
49	1	2	3	4	5
50	1	2	3	4	5

PLASTIC LIMIT % WATER CONTENT % LIQUID LIMIT %
X ----- ● ----- Δ
10 20 30 40 50

	STANDARD PENETRATION		BLOWS/FT.	
	20	30	40	50
10				

DESCRIPTION OF MATERIAL

SURFACE ELEVATION 746.7

Asphalt (Driller's observation)

Fill: Base course (Driller's observation)

Fill: Paper sludge

Brown silty clay (CL) with trace of gravel, sand,
and sand seams at 20.0 feet - moist - hard

Brown clayey sand (SC) - with little gravel -
wet - medium dense

Reddish brown silty clay (CL) - with trace of gravel and sand - moist - very stiff to stiff

* Calibrated Penetrometer

... continued



OWNER
P.H. Glatfelter Co.

LOG OF BORING NUMBER 4

PROJECT NAME
Waste Treatment Expansion

ARCHITECT-ENGINEER
Foth & Van Dyke

STS Consultants Ltd.

SITE LOCATION
225 W. Wisconsin Avenue, Neenah, Wisconsin

DEPTH (FT) ELEVATION (FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DISTANCE RECOVERY	DESCRIPTION OF MATERIAL	UNIT DRY WT. LBS./FT. 3	UNCONFINED COMPRESSIVE STRENGTH TONS/FT. 2					PLASTIC LIMIT %		WATER CONTENT %		LIQUID LIMIT %		STANDARD PENETRATION BLOWS/FT.	
						1	2	3	4	5	10	20	30	40	50	10	20	30
				SURFACE ELEVATION 746.7														
				Continued from previous page														
40.0	6	SS		Reddish brown silty clay (CL) - with trace of gravel and sand - moist - very stiff to stiff														
45.0	7	SS																
50.0	8	SS																
51.5				End of Boring Boring advanced to 15 feet with hollow stem auger Boring advanced from 15 to 56.5 feet with roller bit and Revert drilling mud HW casing driven to 15 feet Borehole abandoned with bentonite chips														

* Calibrated Penetrometer

The stratification lines represent the approximate boundary lines between soil types: in-situ, the transition may be gradual.

WL	WS OR WD	BORING STARTED 08/14/91	STS OFFICE 1035 Kepler Drive Green Bay, WI 54311
WL	BCR	ACR	BORING COMPLETED 08/15/91
WL		RIG/FOREMAN CME 45/TT	ENTERED BY MKM
			SHEET NO. 2 OF 2
			APP'D BY WB
			STS JOB NO. 18899



OWNER
P.H. Glatfelter Co.

LOG OF BORING NUMBER 5

PROJECT NAME
Waste Treatment Expansion

ARCHITECT-ENGINEER
Foth & Van Dyke

SITE LOCATION
225 W. Wisconsin Avenue, Neenah, Wisconsin

UNCONFINED COMPRESSIVE STRENGTH
TONS/FT.²
1 2 3 4 5

PLASTIC LIMIT % WATER CONTENT % LIQUID LIMIT %
X - - - - - ● - - - - - △
10 20 30 40 50

STANDARD PENETRATION BLOWS/FT.
10 20 30 40 50

DEPTH (FT) ELEVATION (FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DISTANCE RECOVERY	DESCRIPTION OF MATERIAL	UNIT DRY WT. LBS./FT. ³	UNCONFINED COMPRESSIVE STRENGTH TONS/FT. ²	PLASTIC LIMIT % X	WATER CONTENT % ●	LIQUID LIMIT % △	STANDARD PENETRATION BLOWS/FT. 10 20 30 40 50
				SURFACE ELEVATION 747.2						
				Asphalt (Driller's observation)						
		HS4		Fill: Base course (Driller's observation)						
5.0	1	SS								
	2	SS		Fill: Paper sludge						
10.0										
	3	SS								
				Buried topsoil (Driller's observation)						
15.0										
	4	SS								
				Brown silty clay (CL) - with trace of gravel and sand - moist - hard to very stiff						
20.0										
	5	SS								
25.0										
	6	SS								
30.0										
	7	SS								
35.0										
	8	SS								
40.0										

* Calibrated Penetrometer

... continued

The stratification lines represent the approximate boundary lines between soil types; in-situ, the transition may be gradual.

STS JOB NO. 18899

SHEET NO. 1 OF 2



OWNER
P.H. Glatfelter Co.

LOG OF BORING NUMBER 5

PROJECT NAME
Waste Treatment Expansion

ARCHITECT-ENGINEER
Foth & Van Dyke

SITE LOCATION
225 W. Wisconsin Avenue, Neenah, Wisconsin

DEPTH (FT) ELEVATION (FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DISTANCE RECOVERY	DESCRIPTION OF MATERIAL	UNIT DRY WT. LBS./FT. 3	UNCONFINED COMPRESSIVE STRENGTH TONS/FT. 2					
						1	2	3			
						PLASTIC LIMIT % X		WATER CONTENT % ●		LIQUID LIMIT % △	
						10	20	30	40	50	
						STANDARD PENETRATION ⊗		BLOWS/FT.			
						10	20	30	40	50	
				Continued from previous page							
40.0	9	SS									
45.0	10	SS		Brown silty clay (CL) - with trace of gravel and sand - moist - hard to very stiff							
50.0	11	SS									
51.5				End of Boring Boring advanced to 15 feet with hollow stem auger Boring advanced from 15 feet to 51.5 feet with roller bit and Revert drilling mud HW casing driven to 15 feet Borehole abandoned with bentonite chips							

* Calibrated Penetrometer

The stratification lines represent the approximate boundary lines between soil types: in-situ, the transition may be gradual.

WL	WS OR WD	BORING STARTED 08/20/91	STS OFFICE 1035 Kepler Drive Green Bay, WI 54311
WL	BCR	ACR BORING COMPLETED 08/20/91	ENTERED BY MKM SHEET NO. 2 OF 2
WL		RIG/FOREMAN CME 45/TT	APP'D BY WB STS JOB NO. 18899



OWNER
P.H. Glatfelter Co.

LOG OF BORING NUMBER 6

PROJECT NAME
Waste Treatment Expansion

ARCHITECT-ENGINEER
Foth & Van Dyke

STS Consultants Ltd.

SITE LOCATION
225 W. Wisconsin Avenue, Neenah, Wisconsin

DEPTH (FT) ELEVATION (FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DISTANCE	RECOVERY	DESCRIPTION OF MATERIAL	UNIT DRY WT. LBS./FT. ³	UNCONFINED COMPRESSIVE STRENGTH TONS/FT. ²					PLASTIC LIMIT %			WATER CONTENT %			LIQUID LIMIT %		
							1	2	3	4	5	10	20	30	40	50	10	20	30	40
					SURFACE ELEVATION 746.4															
					Asphalt (Driller's observation)															
					Fill: Base course (Driller's observation)															
5.0					Fill: Sludge															
10.0																				
15.0																				
20.0	2	SS			Brown silty clay (CL) - with trace to little gravel and sand - moist - hard to stiff															
25.0	3	SS																		
30.0	4	SS																		
35.0	5	SS																		
40.0																				

* Calibrated Penetrometer

... continued

The stratification lines represent the approximate boundary lines between soil types: in-situ, the transition may be gradual.

STS JOB NO. 18899

SHEET NO. 1 OF 2



OWNER
P.H. Glatfelter Co.

LOG OF BORING NUMBER 6

STS Consultants Ltd.

PROJECT NAME
Waste Treatment Expansion

ARCHITECT-ENGINEER
Foth & Van Dyke

SITE LOCATION
225 W. Wisconsin Avenue, Neenah, Wisconsin

DEPTH (FT) ELEVATION (FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DISTANCE RECOVERY	DESCRIPTION OF MATERIAL	UNIT DRY WT. LBS./FT. ³	UNCONFINED COMPRESSIVE STRENGTH TONS/FT. ² 1 2 3 4 5	PLASTIC LIMIT % X	WATER CONTENT % X	LIQUID LIMIT % X	STANDARD PENETRATION BLOWS/FT. 10 20 30 40 50
X				SURFACE ELEVATION 746.4						
				Continued from previous page						
40.0	6	SS								
45.0	7	SS		Brown silty clay (CL) - with trace to little gravel and sand - moist - hard to stiff						
50.0	8	SS								
51.5				End of Boring Boring advanced to 15 feet with hollow stem auger Boring advanced from 15 to 51.5 feet with roller bit and Revert drilling mud HW casing driven to 15 feet Borehole abandoned with bentonite chips						

* Calibrated Penetrometer

The stratification lines represent the approximate boundary lines between soil types: in-situ, the transition may be gradual.

WL	10-15 ft	WS OR WD WD	BORING STARTED 08/14/91	STS OFFICE 1035 Kepler Drive Green Bay, WI 54311
WL	BCR	ACR	BORING COMPLETED 08/14/91	ENTERED BY MKM
WL			RIG/FOREMAN CME 45/TT	SHEET NO. 2 OF 2 STS JOB NO. 18899

LOG OF BORING NUMBER STS-1

ARCHITECT-ENGINEER

STS Consultants Ltd.

SITE LOCATION
Neenah, Wisconsin

○ UNCONFINED COMPRESSIVE STRENGTH
TONS/FT.²

PLASTIC LIMIT % WATER CONTENT % LIQUID LIMIT %
X ----- ● ----- △
10 20 30 40 50

⊗	STANDARD PENETRATION		BLOWS/FT.	
	20	30	40	50

DESCRIPTION OF MATERIAL

SURFACE ELEVATION	747.0	ft
-------------------	-------	----

Fill: Fine to coarse sand and gravel, trace to little clay-brown-moist-medium dense
(Fill: SP and GP)

Fill: Silty clay, trace fine to coarse sand and
fine gravel-brown-moist (Fill: CL)

Fill: Paper sludge-gray-moist-soft to very stiff
(Fill: Paper sludge)

Silty clay, trace fine to coarse sand and fine gravel-red brown to gray-moist to wet-firm to hard (CL)

(Driller's observation: Obstructions from 53 to 59.5 feet)
(Infrequent thin silt seams at a depth of 75 feet)

* Calibrated Penetrometer

... continued

The stratification lines represent the approximate boundary lines between soil types; in-situ, the transition may be gradual.

STS JOB NO. 84779

SHEET NO. 1 OF 3

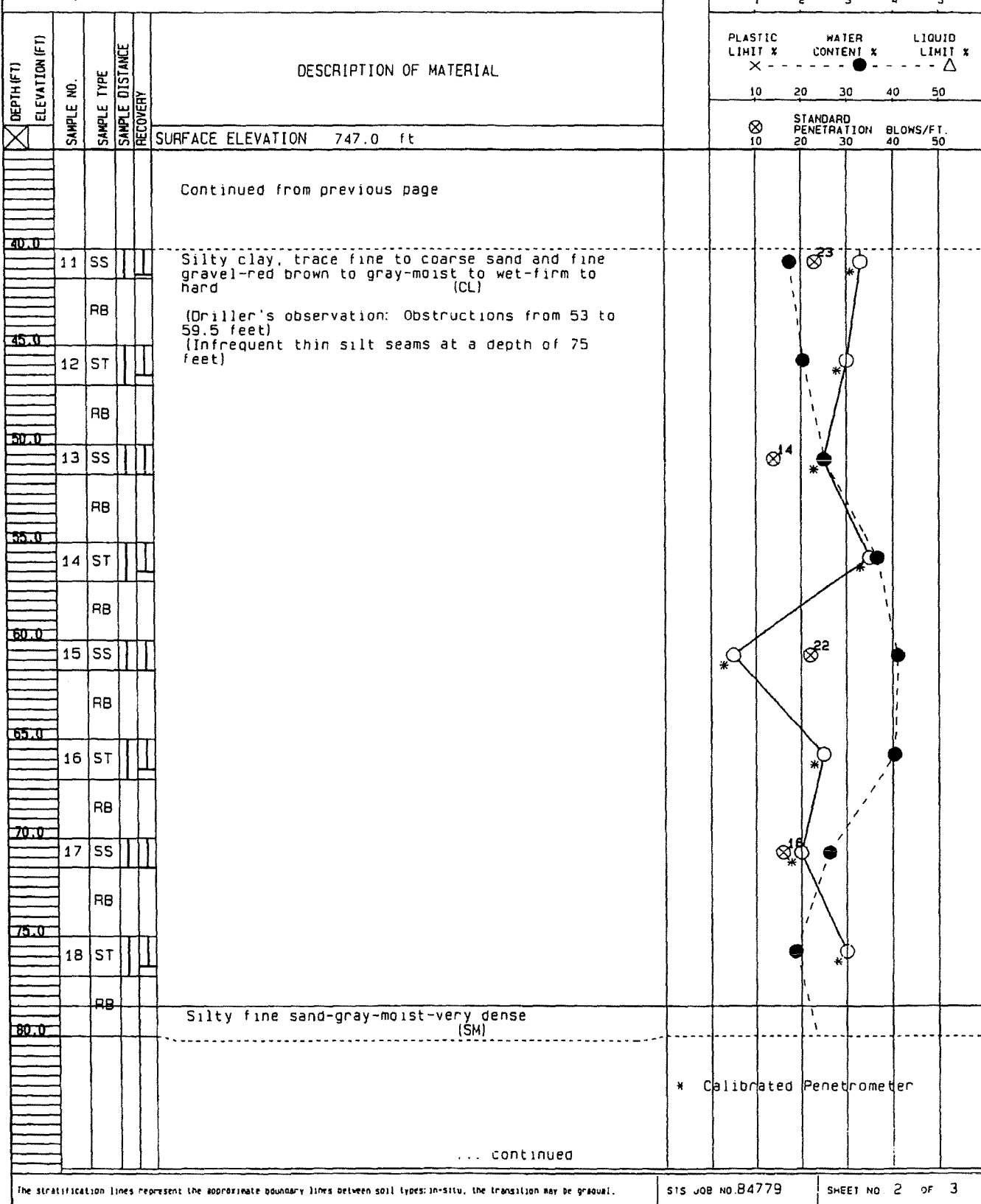


STS Consultants Ltd.

CLIENT
ESI, Inc. of TennesseePROJECT NAME
Minergy Glass Aggregate Plant

LOG OF BORING NUMBER STS-1

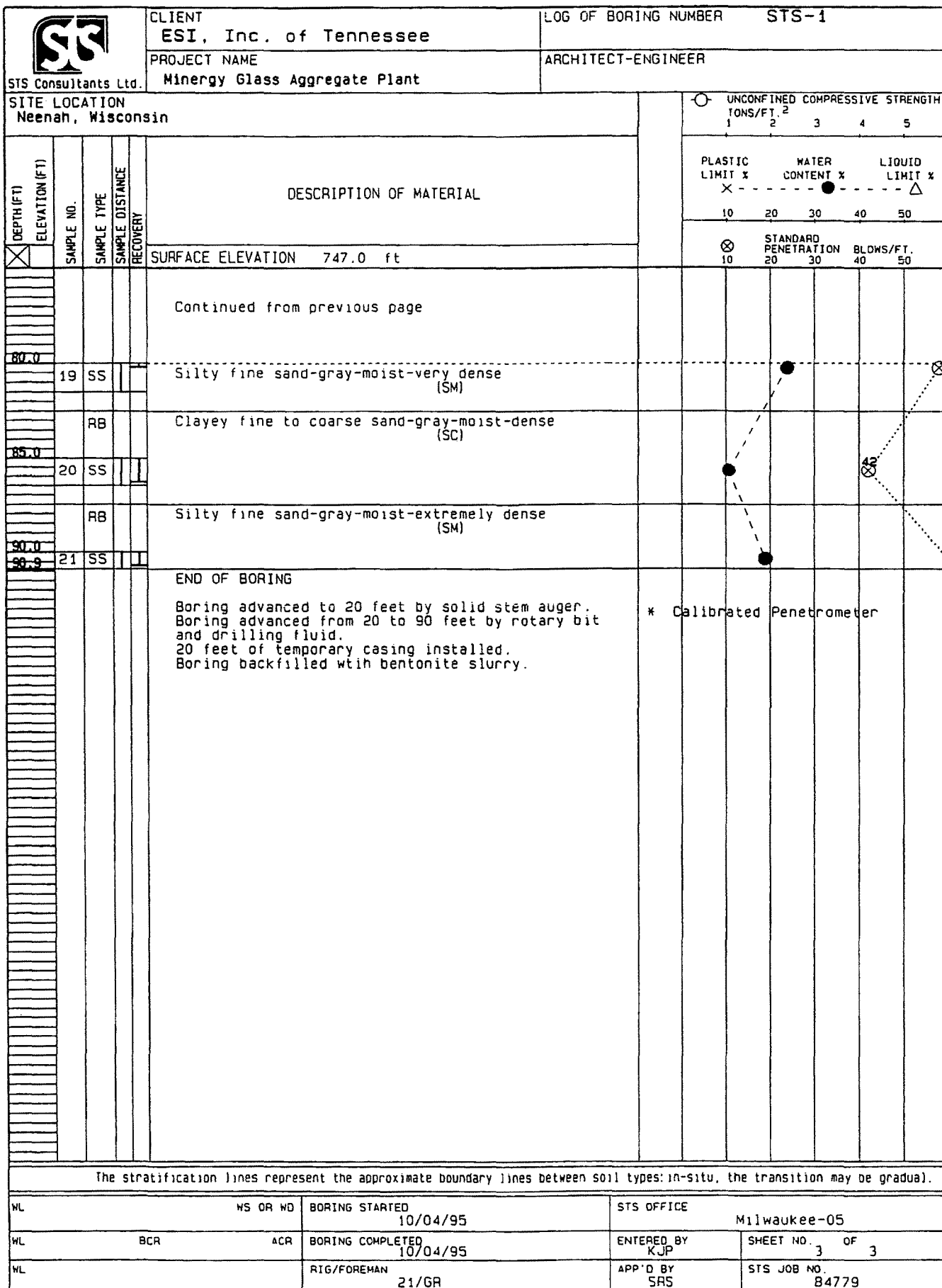
ARCHITECT-ENGINEER

SITE LOCATION
Neenah, Wisconsin

The stratification lines represent the approximate boundary lines between soil types: in-situ, the transition may be gradual.

STS JOB NO. B4779

SHEET NO. 2 OF 3



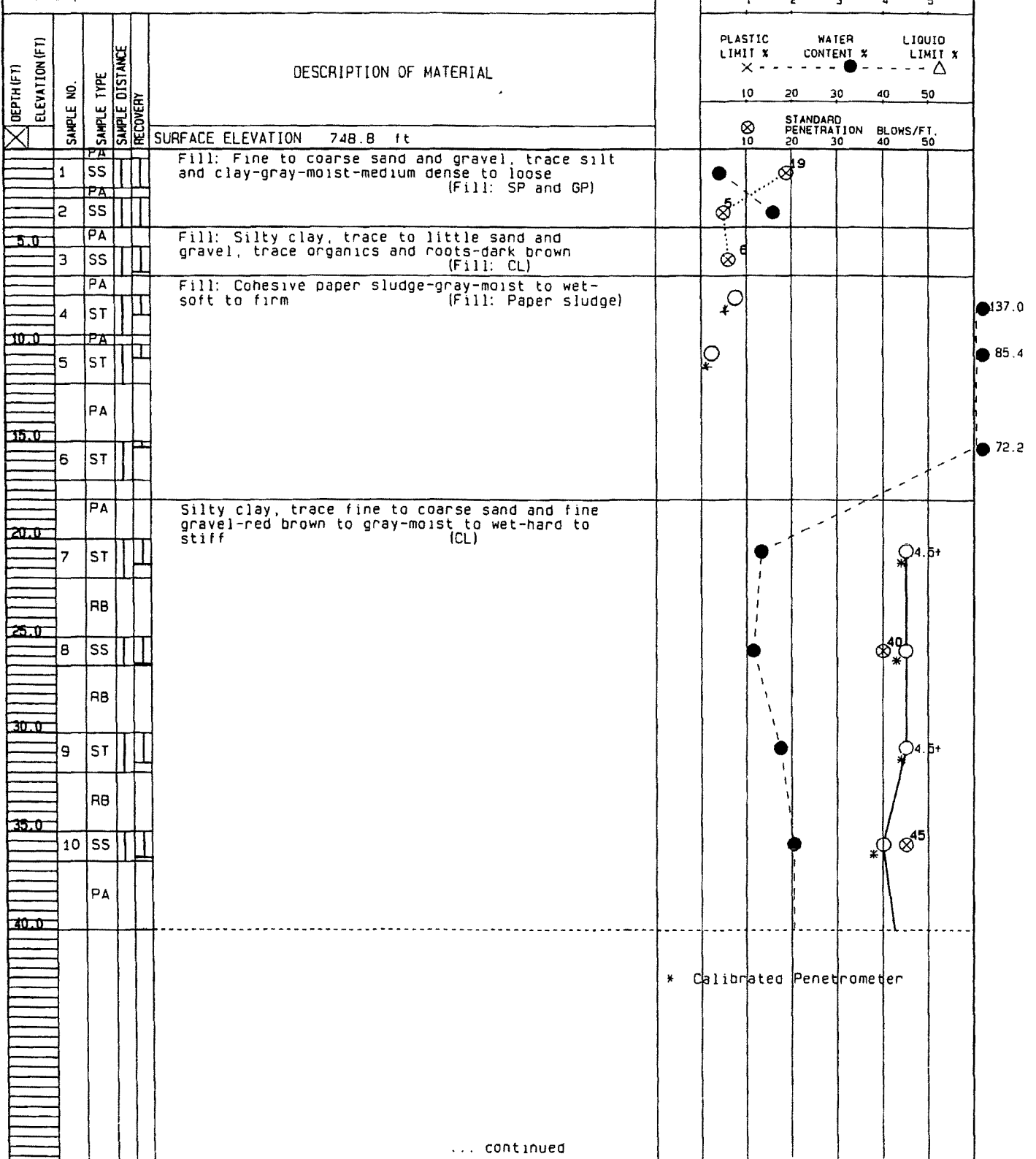


STS Consultants Ltd.

CLIENT
ESI, Inc. of Tennessee
PROJECT NAME
Minergy Glass Aggregate Plant

LOG OF BORING NUMBER
STS-2
ARCHITECT-ENGINEER

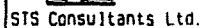
SITE LOCATION
Neehah, Wisconsin



The stratification lines represent the approximate boundary lines between soil types in-situ. The transition may be gradual.

STS JOB NO 84779

SHEET NO. 1 OF 3



PROJECT NAME
Minergy Glass Aggregate Plant

ARCHITECT-ENGINEER

SITE LOCATION
Neenah, Wisconsin

UNCONFINED COMPRESSIVE STRENGTH TONS/FT. ²				
1	2	3	4	5

Figure 1 is a schematic diagram of a ternary phase diagram. The horizontal axis is labeled 'WATER CONTENT %' with major tick marks at 10, 20, 30, 40, and 50. The vertical axis has two labels: 'PLASTIC LIMIT %' on the left and 'LIQUID LIMIT %' on the right. A dashed line connects the 'PLASTIC LIMIT %' (marked with an 'X' at 10%) and the 'LIQUID LIMIT %' (marked with a triangle at 50%). A solid black circle, representing the sample, is positioned at approximately 35% water content and 35% plastic limit.

⊗	STANDARD PENETRATION		BLOWS/FT.	
	20	30	40	50

DESCRIPTION OF MATERIAL

SURFACE ELEVATION	748.8	ft
-------------------	-------	----

Continued from previous page

Silty clay, trace fine to coarse sand and fine gravel-red brown to gray-moist to wet-hard to stiff (CL)

Fine sandy silt-gray-moist (ML)

* Calibrated Penetrometer

... continued

The stratification lines represent the approximate boundary lines between soil types; in-situ, the transition may be gradual.

STS JOB NO. 84779

SHEET NO. 2 OF 3

 STS Consultants Ltd.		CLIENT ESI, Inc. of Tennessee		LOG OF BORING NUMBER STS-2		
		PROJECT NAME Minergy Glass Aggregate Plant		ARCHITECT-ENGINEER		
SITE LOCATION Neenah, Wisconsin				UNCONFINED COMPRESSIVE STRENGTH TONS/FT.² 1 2 3 4 5 PLASTIC LIMIT % WATER CONTENT % LIQUID LIMIT % X - - - ● - - - △ 10 20 30 40 50 STANDARD PENETRATION BLOWS/FT. 10 20 30 40 50 ⊗		
DEPTH (FT)	ELEVATION (FT)	SAMPLE NO.	SAMPLE TYPE			SAMPLE DISTANCE
SURFACE ELEVATION 748.8 ft						
Continued from previous page						
80.0		19	ST			Fine sandy silt-gray-moist (ML)
85.0		20	SS			Clayey fine to coarse sand, trace gravel-gray-extremely dense (SC)
90.0			RB			
95.0		21	DB			Rock core
END OF BORING Boring advanced to 20.0 feet by solid stem auger. Boring advanced from 20 to 90 feet by rotary bit and drilling fluid. 20 feet of temporary casing installed. Boring backfilled with grout.						
* Calibrated Penetrometer						
The stratification lines represent the approximate boundary lines between soil types: in-situ, the transition may be gradual.						
WL	WS OR WD	BORING STARTED 10/02/95		STS OFFICE Milwaukee-05		
WL	BCR	ACR	BORING COMPLETED 10/03/95		ENTERED BY KJP	SHEET NO. 3 OF 3
WL			RIG/FOREMAN 21/GR		APP'D BY SRS	STS JOB NO. 84779



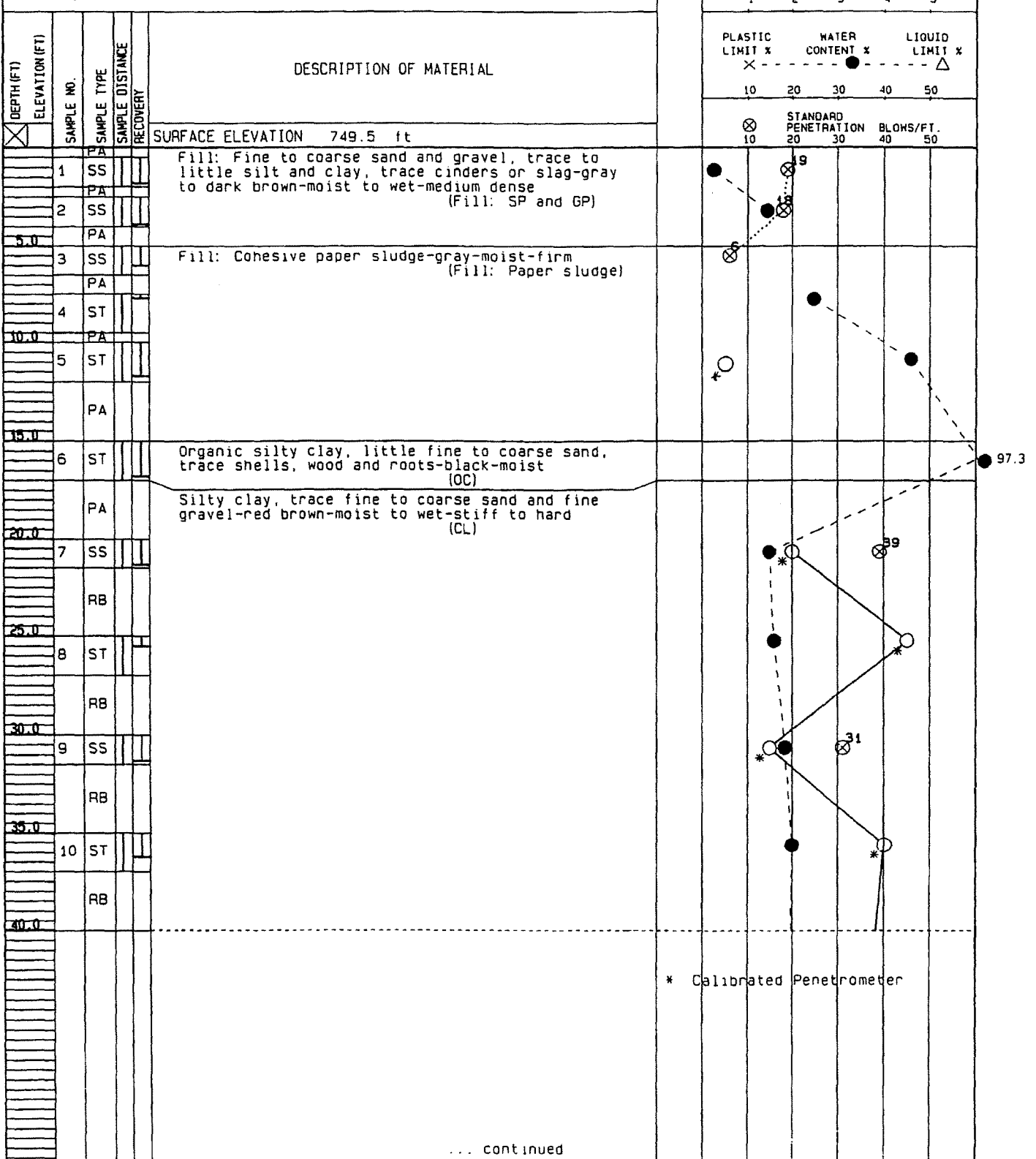
CLIENT
ESI, Inc. of Tennessee

LOG OF BORING NUMBER STS-3

PROJECT NAME
Minergy Glass Aggregate Plant

ARCHITECT-ENGINEER

STS Consultants Ltd.
SITE LOCATION
Neenah, Wisconsin



The stratification lines represent the approximate boundary lines between soil types in-situ, the transition may be gradual.

STS JOB NO 84779

SHEET NO. 1 OF 2



STS Consultants Ltd.

CLIENT
ESI, Inc. of Tennessee

LOG OF BORING NUMBER STS-3

PROJECT NAME
Minergy Glass Aggregate Plant

ARCHITECT-ENGINEER

SITE LOCATION
Neehah, Wisconsin

DEPTH (FT) ELEVATION (FT)					SAMPLE NO.	SAMPLE TYPE	SAMPLE DISTANCE	RECOVERY	DESCRIPTION OF MATERIAL	PLASTIC LIMIT %		WATER CONTENT %		LIQUID LIMIT %	
X										X - - -		● - - -		△ - - -	
										10 20 30 40 50		10 20 30 40 50			
										X 10		STANDARD PENETRATION 20 30		BLOWS/FT. 40 50	
SURFACE ELEVATION 749.5 ft															
Continued from previous page															
40.0	11	SS			Silty clay, trace fine to coarse sand and fine gravel-red brown-moist to wet-stiff to hard (CL)										
		RB													
45.0	12	ST													
		RB													
50.0	13	SS													
		RB													
55.0	14	ST													
		RB													
60.0	15	SS													
61.5															
END OF BORING															
Boring advanced to 20 feet by solid stem auger. Boring advanced from 20 to 60 feet by rotary bit and drilling fluid. 20 feet of temporary casing installed. Boring backfilled with slurry.										* Calibrated Penetrometer					

The stratification lines represent the approximate boundary lines between soil types; in-situ, the transition may be gradual.

WL	3.0 ft	WS OR WD WD	BORING STARTED 10/10/95	STS OFFICE Milwaukee-05
WL	BCR	ACR	BORING COMPLETED 10/10/95	ENTERED BY KJP
WL			RIG/FOREMAN 21/JD	SHEET NO. 2 OF 2
				APP'D BY SRS
				STS JOB NO. 84779



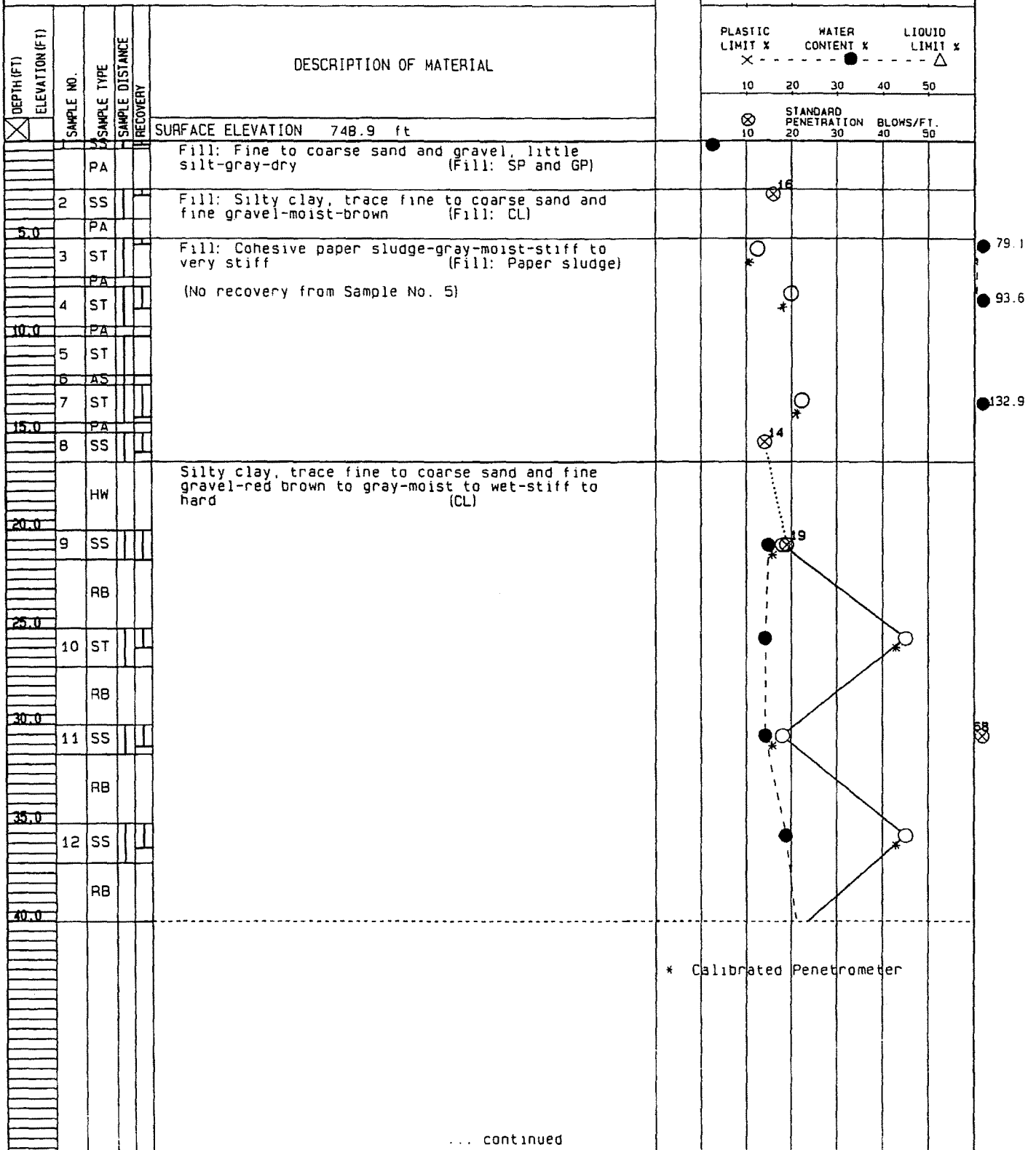
CLIENT
ESI, Inc. of Tennessee

LOG OF BORING NUMBER STS-4

PROJECT NAME
Minergy Glass Aggregate Plant

ARCHITECT-ENGINEER

STS Consultants Ltd.
SITE LOCATION
Neeenah, Wisconsin



The stratification lines represent the approximate boundary lines between soil types in-situ. The transition may be gradual.

STS JOB NO. 84779

SHEET NO. 1 OF 3



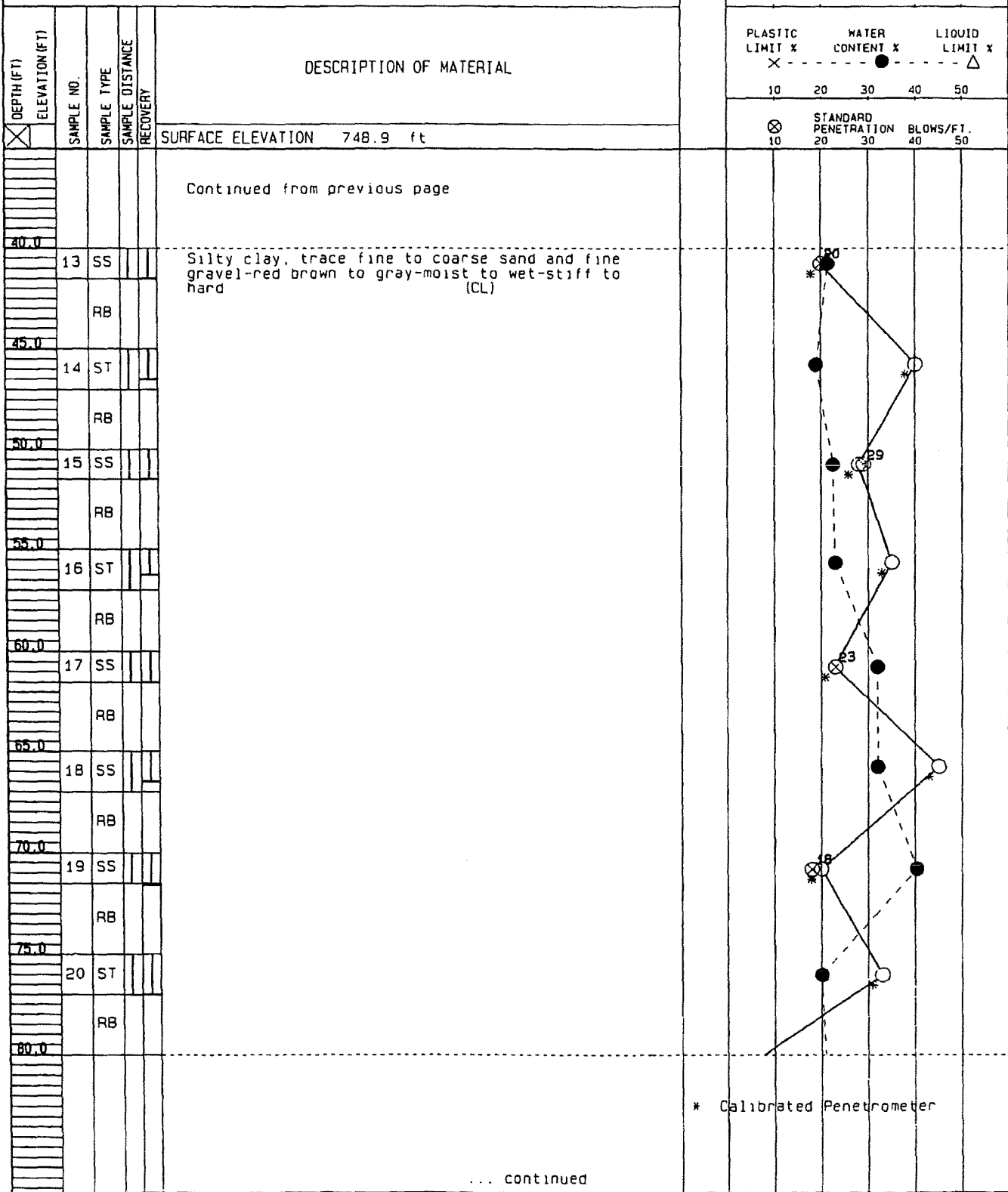
STS Consultants Ltd.

CLIENT
ESI, Inc. of Tennessee

LOG OF BORING NUMBER STS-4

PROJECT NAME
Minergy Glass Aggregate Plant

ARCHITECT-ENGINEER

SITE LOCATION
Neenah, Wisconsin

The stratification lines represent the approximate boundary lines between soil types; in-situ, the transition may be gradual.

STS JOB NO. 84779

SHEET NO. 2 OF 3

STC		CLIENT ESI, Inc. of Tennessee		LOG OF BORING NUMBER STS-4	
STS Consultants Ltd.		PROJECT NAME Minergy Glass Aggregate Plant		ARCHITECT-ENGINEER	
SITE LOCATION Neenah, Wisconsin				UNCONFINED COMPRESSIVE STRENGTH TONS/FT. ² 1 2 3 4 5	
DEPTH (FT)	ELEVATION (FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DISTANCE	RECOVERY
DESCRIPTION OF MATERIAL					
SURFACE ELEVATION 748.9 ft					
PLASTIC LIMIT % WATER CONTENT % LIQUID LIMIT % X - - - - - ● - - - - - Δ 10 20 30 40 50 ⊗ STANDARD PENETRATION BLOWS/FT. 10 20 30 40 50					
Continued from previous page					
80.0		21	SS		
Silty clay, trace fine to coarse sand and fine gravel-red brown to gray-moist to wet-stiff to hard (CL)					
			RB		
85.0					
Clayey fine to coarse sand, trace fine gravel-gray-moist-extremely dense (SC)					
86.5		22	SS		
END OF BORING					
Boring advanced to 15 feet by solid stem auger. Boring advanced from 15 to 20 feet by hollow stem auger. Boring advanced from 20 to 85 feet by rotary bit and drilling fluid. 20 feet of temporary casing installed. Boring backfilled with bentonite slurry.					
* Calibrated Penetrometer					



STS Consultants Ltd.

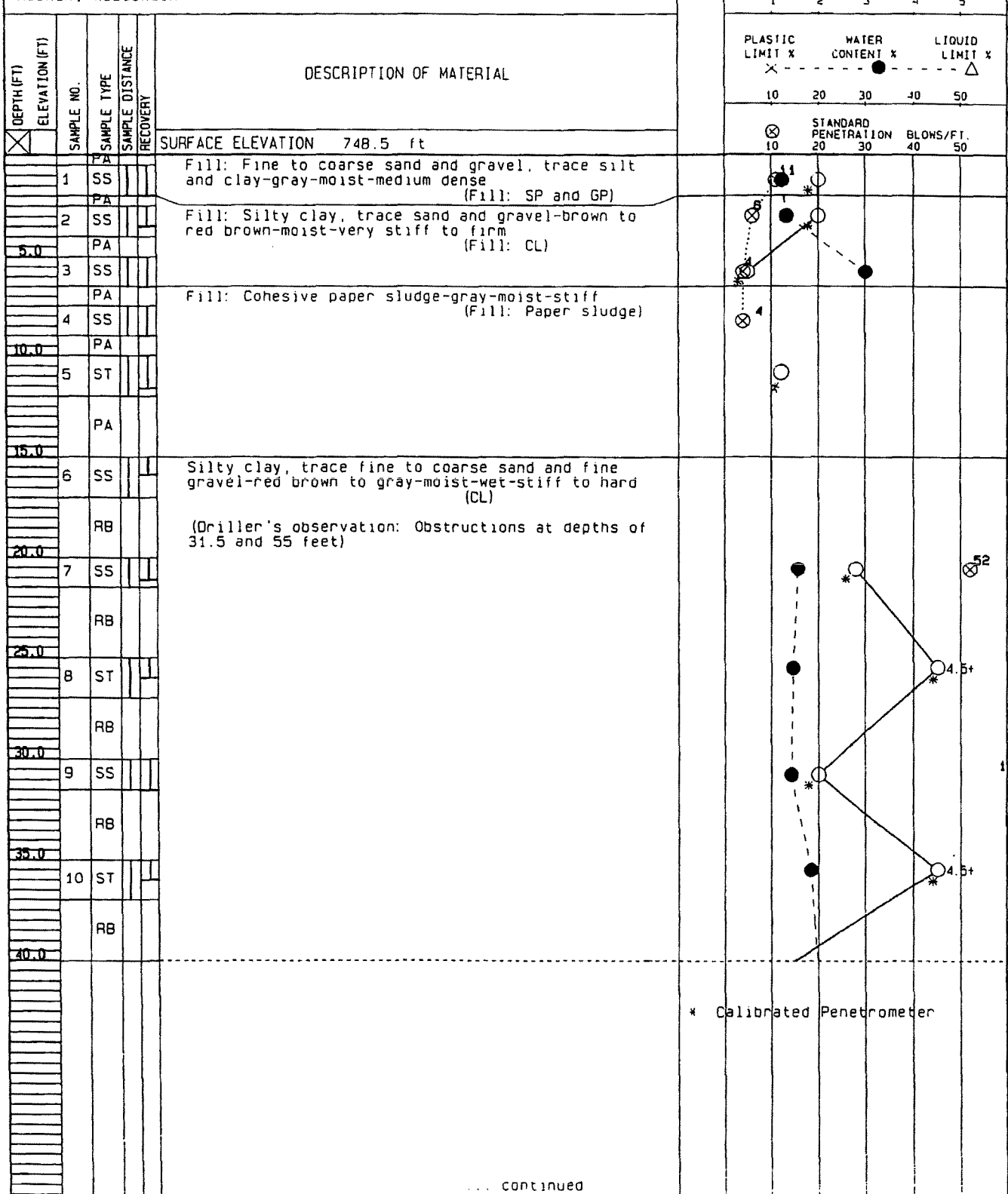
CLIENT
ESI, Inc. of Tennessee

PROJECT NAME
Minergy Glass Aggregate Plant

LOG OF BORING NUMBER **STS-5**

ARCHITECT-ENGINEER

SITE LOCATION
Neenah, Wisconsin



The stratification lines represent the approximate boundary lines between soil types in-situ. The transition may be gradual.

STS JOB NO 84779

SHEET NO. 1 OF 3



STS Consultants Ltd.

CLIENT
ESI, Inc. of Tennessee

LOG OF BORING NUMBER STS-5

PROJECT NAME
Minergy Glass Aggregate Plant

ARCHITECT-ENGINEER

SITE LOCATION
Neehan, Wisconsin

				DESCRIPTION OF MATERIAL		PLASTIC LIMIT % X - - - - -		WATER CONTENT % ● - - - - -		LIQUID LIMIT % △ - - - - -		
DEPTH (FT) ELEVATION (FT)		SAMPLE NO.	SAMPLE TYPE	SAMPLE DISTANCE	RECOVERY							
X						SURFACE ELEVATION 748.5 ft		STANDARD PENETRATION		BLOWS/FT.		
								10	20	30	40	50
								10	20	30	40	50
Continued from previous page												
40.0	11	SS				Silty clay, trace fine to coarse sand and fine gravel-red brown to gray-moist-wet-stiff to hard (CL)						
		RB				(Driller's observation: Obstructions at depths of 31.5 and 55 feet)						
45.0	12	ST										
		RB										
50.0	13	SS										
		RB										
55.0	14	ST										
		RB										
60.0	15	SS										
		RB										
65.0	16	ST										
		RB										
70.0	17	SS										
		RB										
75.0	18	ST										
		RB										
80.0												

* Calibrated Penetrometer

... continued

* Calibrated Penetrometer

... continued

The stratification lines represent the approximate boundary lines between soil types in-situ. The transition may be gradual.

STS JOB NO. B4779

SHEET NO. 2 OF 3

		CLIENT ESI, Inc. of Tennessee		LOG OF BORING NUMBER STS-5	
		PROJECT NAME Minergy Glass Aggregate Plant		ARCHITECT-ENGINEER	
STS Consultants Ltd. SITE LOCATION Neenah, Wisconsin					
DEPTH (FT) ELEVATION (FT)	SAMPLE NO. 	SAMPLE TYPE 	SAMPLE DISTANCE 	RECOVERY 	DESCRIPTION OF MATERIAL
					SURFACE ELEVATION 748.5 ft
☒					UNCONFINED COMPRESSIVE STRENGTH TONS/FT. ² 1 2 3 4 5 PLASTIC LIMIT % WATER CONTENT % LIQUID LIMIT % X - - - - - • - - - - - Δ 10 20 30 40 50 STANDARD PENETRATION BLOWS/FT. 10 20 30 40 50
80.0					Continued from previous page
81.5	19	SS			Silty clay, trace fine to coarse sand and fine gravel-red brown to gray-moist-wet-stiff to hard (CL) (Driller's observation: Obstructions at depths of 31.5 and 55 feet) END OF BORING Boring advanced to 15 feet by solid stem auger. Boring advanced from 15 to 80 feet by rotary bit and drilling fluid. 20 feet of temporary casing installed. Boring backfilled with bentonite slurry.
					* Calibrated Penetrometer
The stratification lines represent the approximate boundary lines between soil types: in-situ, the transition may be gradual.					
WL	9 ft	WS OR WD WD	BORING STARTED 10/11/95		STS OFFICE Milwaukee-05
WL	BCR	ACR	BORING COMPLETED 10/11/95		ENTERED BY KJP SHEET NO. 3 OF 3
WL			RIG/FOREMAN 21/JD		APP'D BY SRS STS JOB NO. 84779



CLIENT
ESI, Inc. of Tennessee

LOG OF BORING NUMBER STS-6

PROJECT NAME
Minergy Glass Aggregate Plant

ARCHITECT-ENGINEER

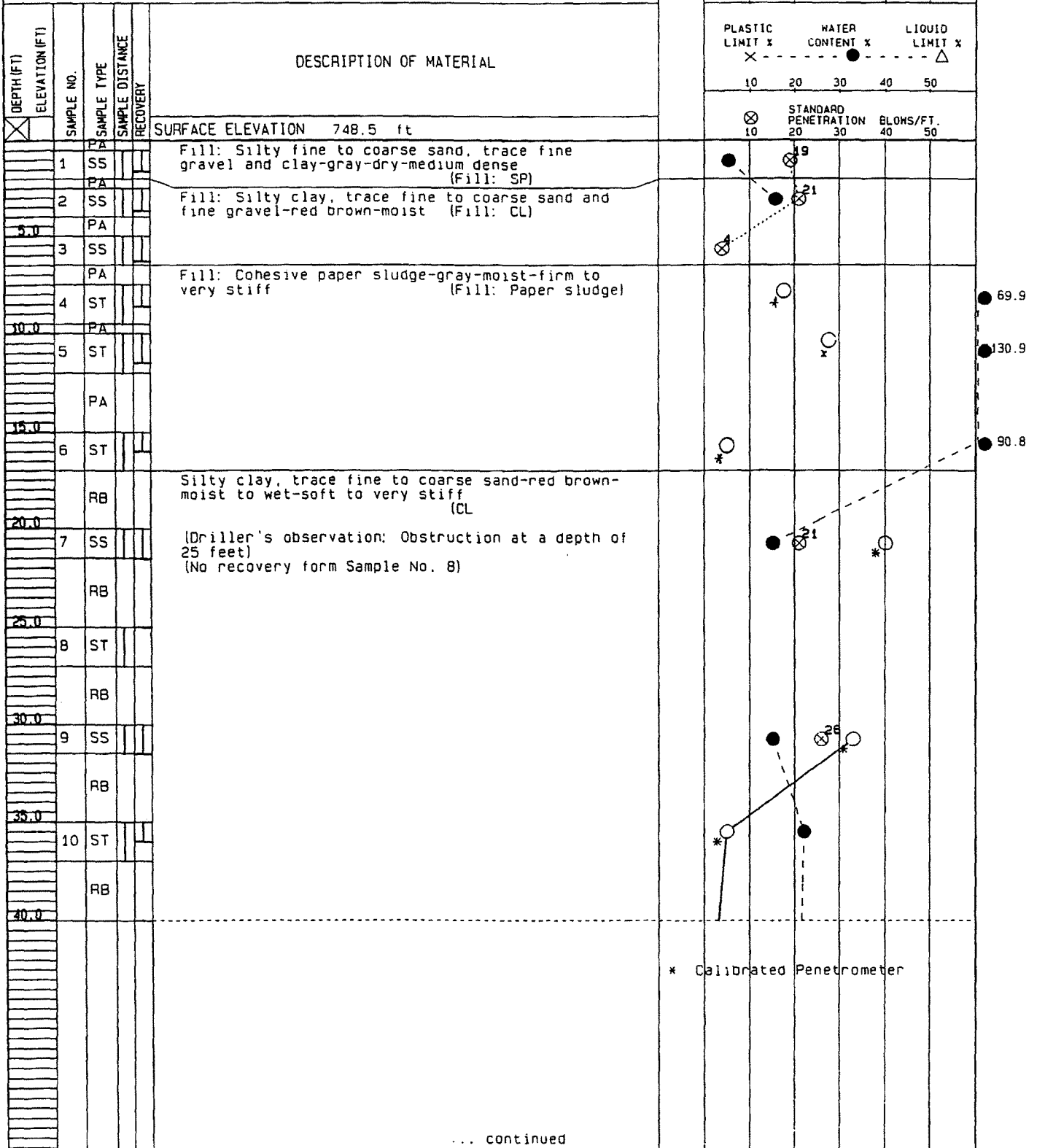
STS Consultants Ltd.

SITE LOCATION
Neehah, Wisconsin

UNCONFINED COMPRESSIVE STRENGTH
TONS/FT.²
1 2 3 4 5

PLASTIC LIMIT % WATER CONTENT % LIQUID LIMIT %
X - - - - - X - - - - - X
10 20 30 40 50

STANDARD PENETRATION BLOWS/FT.
10 20 30 40 50



The stratification lines represent the approximate boundary lines between soil types: in-situ, the transition may be gradual.

STS JOB NO. 84779

SHEET NO. 1 OF 2



STS Consultants Ltd.

CLIENT
ESI, Inc. of Tennessee

LOG OF BORING NUMBER STS-6

PROJECT NAME
Minergy Glass Aggregate Plant

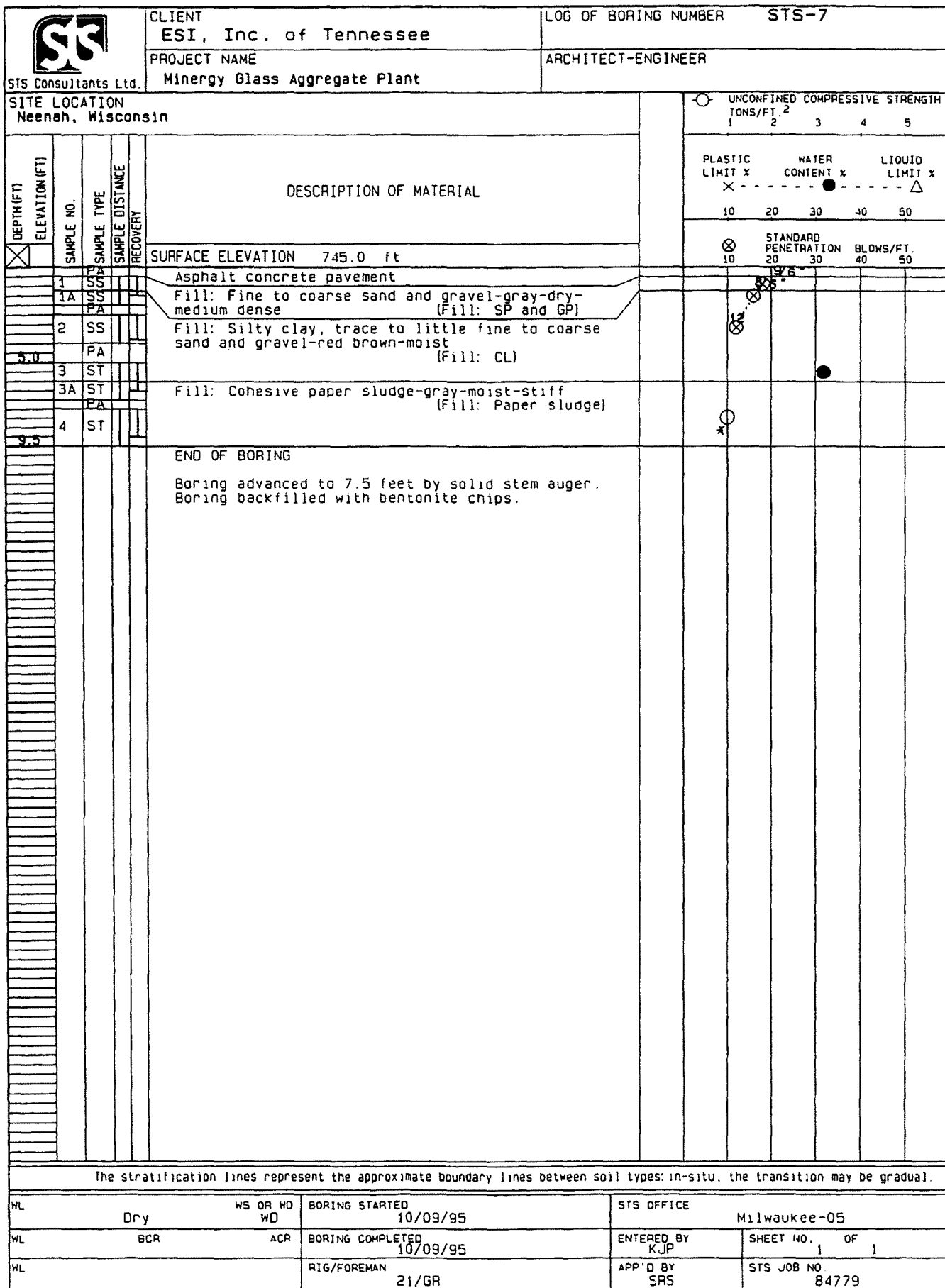
ARCHITECT-ENGINEER

SITE LOCATION
Neenah, Wisconsin

DEPTH (FT) ELEVATION (FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DISTANCE	RECOVERY	DESCRIPTION OF MATERIAL	UNCONFINED COMPRESSIVE STRENGTH TENS/FT. ²																								
						1	2	3	4	5																				
						PLASTIC LIMIT % X					WATER CONTENT % ●					LIQUID LIMIT % △														
						10					20					30					40					50				
						⊗					STANDARD PENETRATION					BLOWS/FT.														
						10					20					30					40					50				
Continued from previous page																														
40.0	11	SS			Silty clay, trace fine to coarse sand-red brown-moist to wet-soft to very stiff (CL)																									
		RB			(Driller's observation: Obstruction at a depth of 25 feet) (No recovery from Sample No. 8)																									
45.0	12	ST																												
		RB																												
50.0	13	SS																												
		RB																												
55.0	14	ST																												
		RB																												
60.0	15	SS																												
61.5					END OF BORING Boring advanced to 15 feet by solid stem auger. Boring advanced from 15 to 60 feet by rotary bit and drilling fluid. 20 feet of temporary casing installed. Boring backfilled with bentonite slurry.	* Calibrated Penetrometer																								

The stratification lines represent the approximate boundary lines between soil types; in-situ, the transition may be gradual.

WL	9 ft	WS OR WD WD	BORING STARTED 10/12/95	STS OFFICE Milwaukee-05
WL	BCR	ACR	BORING COMPLETED 10/12/95	ENTERED BY KJP
WL			RIG/FOREMAN 21/GR	SHEET NO. 2 OF 2 APP'D BY SRS
				STS JOB NO. 84779



Facility/Project Name Arrowhead Park Landfill (ERM 99052)				License/Permit/Monitoring Number				Boring Number SB99-1			
Boring Drilled By (Firm name and name of crew chief) EDS Brian Repinski				Date Drilling Started 03/11/99		Date Drilling Completed 03/11/99		Drilling Method Hollow-stem Auger			
DNR Facility Well No.		WI Unique Well No.		Common Well Name		Final Static Water Level Feet MSL		Surface Elevation 743.5 Feet MSL		Borehole Diameter 6.25 inches	
Boring Location State Plane 801712 N, 2370751 E SE 1/4 of Section 21, T 20 N, R 17 E				Lat Long		Local Grid Location (if applicable) Feet S Feet W					
County Winnebago				DNR County Code 71		Civil Town/City/ or Village City of Neenah					

Sample Number and Type	Length Alt. & Recovered (in)	Blow Counts	Depth in Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	USCS	Graphic Log	Well Diagram	PTD/FID	Soil Properties					RSD/ Comments	
									Compressive Strength	Moisture Content	Liquid Limit	Plasticity Index	P 200		
1/SS	24	58/1'	2	Gravelly parking lot surface Fill, sandy gravel, moist											
2/SS	24	5/1'	4	Fill, silty clayey gravel over sandy fine gravel, moist											
3/SS	18	2/1'	6	Gray paper sludge, dense, black fine to medium sand layer at 2.9 to 3.1 feet											Sample 99-1-3 t=0900
4/ST	7		8	Gray paper sludge											Shelby tube 99-1-4 t=0908
5/SS	24	2/1'	10												Sample 99-1-5 t=0908
6/ST	3		12	Reddish brown silty clay, moist to wet	CL										Shelby tube 99-1-8 t=0911 (sludge only)
			14	End of Boring at 12.0 feet Abandoned borehole with bentonite chips											
			16												
			18												
			20												
			22												

I hereby certify that the information on this form is true and correct to the best of my knowledge.

Signature Brian Repinski Firm ERM-North Central, Inc., Green Bay, WI

This form is authorized by Chapters 144.147 and 182, Wis. Stats. Completion of this report is mandatory. Penalties: Forfeit not less than \$10 nor more than \$5,000 for each violation. Fined not less than \$10 or more than \$100 or imprisoned not less than 30 days, or both for each violation. Each day of continued violation is a separate offense, pursuant to ss 144.99 and 182.08, Wis. Stats.

Facility/Project Name Arrowhead Park Landfill (ERM 99052)				License/Permit/Monitoring Number				Boring Number SB99-15			
Boring Drilled By (Firm name and name of crew chief) EDS Brian Repinski				Date Drilling Started 03/08/99		Date Drilling Completed 03/08/99		Drilling Method Hollow-stem Auger			
DNR Facility Well No.		WI Unique Well No.		Common Well Name		Final Static Water Level Feet MSL		Surface Elevation 744.1 Feet MSL		Borehole Diameter 6.25 inches	
Boring Location State Plane 801311 N, 2369529 E SE 1/4 of Section 21, T 20 N, R 17 E						Lat Long		Local Grid Location (if applicable) Feet S Feet W			
County Winnebago				DNR County Code 71		Civil Town/City/ or Village City of Neenah					

Sample Number and Type	Length All Recovered (in)	Blow Counts	Depth in Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	USCS	Graphic Log	Well Diagram	PTD/FID	Soil Properties					RQD/ Comments	
									Compressive Strength	Moisture Content	Liquid Limit	Plasticity Index	P 200		
1/SS	8	4/1'	2	Grasses at surface Fill, reddish brown silty clay, moist				1.5							
2/SS	18	2/1'	4	Gray paper sludge											Sample 99-15-2 t=1545
3/ST	7		6												Shelby tube 99-15-3 t=1552
4/SS	18	0	8												Sample 99-15-4 t=1550
5/ST	4		10												Shelby tube 99-15-5 t=1555
6/SS	22	1/1'	10	Dark brown to black hemic peat, wet	Pt										
			12	End of Boring at 10.0 feet Abandoned borehole with bentonite chips											
			14												
			16												
			18												
			20												
			22												

I hereby certify that the information on this form is true and correct to the best of my knowledge.

Signature Brian Repinski Firm ERM-North Central, Inc., Green Bay, WI

This form is authorized by Chapters 144.147 and 182, Wis. Stats. Completion of this report is mandatory. Penalties: Forfeit not less than \$10 nor more than \$5,000 for each violation. Fined not less than \$10 or more than \$100 or imprisoned not less than 30 days, or both for each violation. Each day of continued violation is a separate offense, pursuant to ss 144.99 and 182.08, Wis. Stats.

Facility/Project Name Arrowhead Park Landfill (ERM 99052)			License/Permit/Monitoring Number		Boring Number SB99-16
Boring Drilled By (Firm name and name of crew chief) EDS Brian Repinski			Date Drilling Started 03/10/99	Date Drilling Completed 03/10/99	Drilling Method Hollow-stem Auger
DNR Facility Well No.	WI Unique Well No.	Common Well Name	Final Static Water Level Feet MSL	Surface Elevation 746.0 Feet MSL	Borehole Diameter 6.25 inches
Boring Location State Plane 801890 N, 2369267 E SE 1/4 of Section 21, T 20 N, R 17 E			Lat Long	Local Grid Location (if applicable) Feet S Feet N	
County Winnebago		DNR County Code 71	Civil Town/City/ or Village City of Neenah		

Sample			Blow Counts	Depth in Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	USCS	Graphic Log	Well Diagram	PID/FID	Soil Properties					P 200	RQD/ Comments
Number and Type	Length Att. & Recovered (in)	Compressive Strength								Moisture Content	Liquid Limit	Plasticity Index				
1/SS	12	3/1'		2	Grasses at surface Fill, reddish brown silty clay, moist				1.75							
2/SS	8	18/1'		4	Mix of light gray paper sludge and reddish brown silty clay, black fine gravelly clay layer at 3.7 to 4.0 feet											
3/SS	13	4/1'		6	Light gray paper sludge with few to trace reddish brown silty clay, trace gravel											Sample 89-16-3 t=1330
4/SS	9	12/1'		8	Fill, dark brown to brown sandy silty clay, trace to few fine gravel, moist											
5/SS	18	7/1'		10	Fill, reddish brown and mixed reddish brown and dark brown silty clay, trace fine gravel, moist											
6/SS	5	8/1'		12	Fill, dark brown silty clay, trace fine gravel, moist											
				14	End of Boring at 12.0 feet Abandoned borehole with bentonite chips											
				16												
				18												
				20												
				22												

I hereby certify that the information on this form is true and correct to the best of my knowledge.

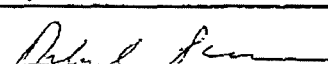
Signature 	Firm ERM-North Central, Inc., Green Bay, WI
--	--

This form is authorized by Chapters 144.147 and 162, Wis. Stats. Completion of this report is mandatory. Penalties: Forfeiture not less than \$10 nor more than \$5,000 for each violation. Fined not less than \$10 or more than \$100 or imprisoned not less than 30 days, or both for each violation. Each day of continued violation is a separate offense, pursuant to ss 144.99 and 162.06, Wis. Stats.

Facility/Project Name Arrowhead Park Landfill (ERM 99052)				License/Permit/Monitoring Number				Boring Number SB99-16A			
Boring Drilled By (Firm name and name of crew chief) EDS Brian Repinski				Date Drilling Started 03/10/99		Date Drilling Completed 03/10/99		Drilling Method Hollow-stem Auger			
DNR Facility Well No.		WI Unique Well No.		Common Well Name		Final Static Water Level Feet MSL		Surface Elevation 746.0 Feet MSL		Borehole Diameter 6.25 inches	
Boring Location State Plane 801890 N, 2369267 E SE 1/4 of Section 21, T 20 N, R 17 E				Lat Long		Local Grid Location (if applicable) Feet S Feet N					
County Winnebago				DNR County Code 71		Civil Town/City/ or Village City of Neenah					

Sample Number and Type	Length Att. & Recovered (in)	Blow Counts	Depth in Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	USCS	Graphic Log	Well Diagram	PID/FID	Soil Properties					RQD/ Comments	
									Compressive Strength	Moisture Content	Liquid Limit	Plasticity Index	P 200		
1/SS	9	6/1'	2	Grasses at surface Fill, reddish brown silty clay, moist				1.5							
2/SS	18	3/1'	4	Mixed light gray paper sludge and reddish brown silty clay, black fine gravelly clay layer at 3.7 to 4.0 feet											
3/SS	8	3/1'	6	Light gray paper sludge											
4/ST	2		8	Fill, brown silty clay											Pushed a rock into shelby tube
			8	End of Boring at 7.0 feet Abandoned borehole with bentonite chips Offset 3 feet southeast and drilled SB99-18											
			10												
			12												
			14												
			16												
			18												
			20												
			22												

I hereby certify that the information on this form is true and correct to the best of my knowledge.

Signature 	Firm ERM-North Central, Inc., Green Bay, WI
--	--

This form is authorized by Chapters 144.147 and 162, Wis. Stats. Completion of this report is mandatory. Penalties: Forfeit not less than \$10 nor more than \$5,000 for each violation. Fined not less than \$10 or more than \$100 or imprisoned not less than 30 days, or both for each violation. Each day of continued violation is a separate offense, pursuant to ss 144.99 and 162.08, Wis. Stats.

Facility/Project Name Arrowhead Park Landfill (ERM 99052)				License/Permit/Monitoring Number				Boring Number SB99-17			
Boring Drilled By (Firm name and name of crew chief) EDS Brian Repinski				Date Drilling Started 03/09/99		Date Drilling Completed 03/09/99		Drilling Method Hollow-stem Auger			
DNR Facility Well No.		WI Unique Well No.		Common Well Name		Final Static Water Level Feet MSL		Surface Elevation 745.9 Feet MSL		Borehole Diameter 6.25 inches	
Boring Location State Plane 801588 N, 2369265 E SE 1/4 of Section 21, T 20 N, R 17 E						Lat Long		Local Grid Location (if applicable) Feet S Feet W			
County Winnebago				DNR County Code 71		Civil Town/City/ or Village City of Neenah					

Sample Number and Type	Length All. & Recovered (in)	Blow Counts	Depth in Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	USCS	Graphic Log	Well Diagram	PID/FID	Soil Properties					RQD/ Comments	
									Compressive Strength	Moisture Content	Liquid Limit	Plasticity Index	P 200		
1/SS	13	5/1'	2	Grasses at surface Fill, reddish brown silty clay, moist				2.25							
2/SS	12	2/1'	4												
3/SS	14	0/1'	6	Light gray paper sludge, fibrous											Sample 99-17-3 t=1015
ST	0		8												
4/ST	6		10												Shelby tube 99-17-4 t=1020
5/SS	24	0/1'	12	Dark brown to black hemic peat, moist	Pt										Sample 99-17-5 t=1025
6/SS	14	0/1'	14	End of Boring at 12.0 feet Abandoned borehole with bentonite chips											
			16												
			18												
			20												
			22												

I hereby certify that the information on this form is true and correct to the best of my knowledge.

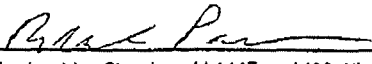
Signature 	Firm ERM-North Central, Inc., Green Bay, WI
---------------	--

This form is authorized by Chapters 144.147 and 162, Wis. Stats. Completion of this report is mandatory. Penalties: Forfeit not less than \$10 nor more than \$5,000 for each violation. Fined not less than \$10 or more than \$100 or imprisoned not less than 30 days, or both for each violation. Each day of continued violation is a separate offense, pursuant to ss 144.99 and 162.08, Wis. Stats.

Facility/Project Name Arrowhead Park Landfill (ERM 99052)				License/Permit/Monitoring Number				Boring Number SB99-18			
Boring Drilled By (Firm name and name of crew chief) EDS Brian Repinski				Date Drilling Started 03/08/99		Date Drilling Completed 03/08/99		Drilling Method Hollow-stem Auger			
DNR Facility Well No.		WI Unique Well No.		Common Well Name		Final Static Water Level Feet MSL		Surface Elevation 745.3 Feet MSL		Borehole Diameter 6.25 inches	
Boring Location State Plane 801420 N, 2369333 E SE 1/4 of Section 21, T 20 N, R 17 E				Lat Long		Local Grid Location (if applicable) Feet S Feet N					
County Hinnebago				DNR County Code 71		Civil Town/City/ or Village City of Neenah					

Sample Number and Type	Length Att & Recovered (in)	Blow Counts	Depth in Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	USCS	Graphic Log	Well Diagram	PTD/FID	Soil Properties					P 200	RQD/ Comments
									Compressive Strength	Moisture Content	Liquid Limit	Plasticity Index			
1/SS	18	3/1'	2	Grasses at surface Fill, reddish brown silty clay, moist											
2/SS	10	0/1'	4	Light gray paper sludge, fibrous											Sample 99-18-2 t=1825
3/ST	9		6												Shelby tube 99-18-3 t=1830
4/SS	24	0/1'	8												Shelby tube 99-18-5 t=1840
5/ST	6		10												Sample 99-18-6 t=1845
6/SS	23	0/1'	12	Black organic silt, wet	OL										Shelby tube 99-18-7 t=1847
7/ST	9		12	Reddish brown silty clay, moist	CL			1.5							
8/SS	24	2/1'	14	End of Boring at 13.0 feet Abandoned borehole with bentonite chips											
			16												
			18												
			20												
			22												

I hereby certify that the information on this form is true and correct to the best of my knowledge.

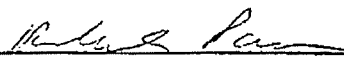
Signature 	Firm ERM-North Central, Inc., Green Bay, WI
--	--

This form is authorized by Chapters 144.147 and 162, Wis. Stats. Completion of this report is mandatory. Penalties: Forfeit not less than \$10 nor more than \$5,000 for each violation. Fined not less than \$10 or more than \$100 or imprisoned not less than 30 days, or both for each violation. Each day of continued violation is a separate offense, pursuant to ss 144.99 and 162.08, Wis. Stats.

Facility/Project Name Arrowhead Park Landfill (ERM 99052)				License/Permit/Monitoring Number				Boring Number SB99-19			
Boring Drilled By (Firm name and name of crew chief) EOS Brian Repinski				Date Drilling Started 03/09/99		Date Drilling Completed 03/09/99		Drilling Method Hollow-stem Auger			
DNR Facility Well No.		WI Unique Well No.		Common Well Name		Final Static Water Level Feet MSL		Surface Elevation 745.7 Feet MSL		Borehole Diameter 6.25 inches	
Boring Location State Plane 801624 N, 2389100 E SE 1/4 of Section 21, T 20 N, R 17 E				Lat Long		Local Grid Location (If applicable) Feet S Feet W					
County Winnebago				DNR County Code 71		Civil Town/City/ or Village City of Neenah					

Sample Number and Type	Length Att & Recovered (in)	Blow Counts	Depth in Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	USCS	Graphic Log	Well Diagram	PID/FID	Soil Properties					P 200	ROD/ Comments
									Compressive Strength	Moisture Content	Liquid Limit	Plasticity Index			
1/SS	8	2/1'	2	Grasses at surface Fill, reddish brown silty clay, moist											
2/SS	23	1/1'	4	Light gray paper sludge, fibrous											Sample 99-19-2 t=0855
3/ST	8		6												Shelby tube 99-19-3 t=0900
4/SS	14	1/1'	8												Shelby tube 99-19-5 t=0910
5/ST	4		10												Sample 99-19-6 t=0915
6/SS	24	0/1'	12	Brown hemic peat, moist	Pt										
7/SS	12	1/1'	14	End of Boring at 12.0 feet Abandoned borehole with bentonite chips											
			16												
			18												
			20												
			22												

I hereby certify that the information on this form is true and correct to the best of my knowledge.

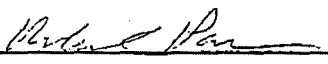
Signature 	Firm ERM-North Central, Inc., Green Bay, WI
--	--

This form is authorized by Chapters 144.147 and 162, Wis. Stats. Completion of this report is mandatory. Penalties: Forfeit not less than \$10 nor more than \$5,000 for each violation. Fined not less than \$10 or more than \$100 or imprisoned not less than 30 days, or both for each violation. Each day of continued violation is a separate offense, pursuant to ss 144.99 and 162.06, Wis. Stats.

Facility/Project Name Arrowhead Park Landfill (ERM 99052)				License/Permit/Monitoring Number				Boring Number SB99-20			
Boring Drilled By (Firm name and name of crew chief) EDS Brian Repinski				Date Drilling Started 03/10/99		Date Drilling Completed 03/10/99		Drilling Method Hollow-stem Auger			
DNR Facility Well No.		WI Unique Well No.		Common Well Name		Final Static Water Level Feet MSL		Surface Elevation 744.0 Feet MSL		Borehole Diameter 6.25 inches	
Boring Location State Plane 801831 N, 2368938 E SE 1/4 of Section 21, T 20 N, R 17 E				Lat Long		Local Grid Location (if applicable) Feet S Feet N					
County Winnebago				DNR County Code 71		Civil Town/City/ or Village City of Neenah					

Sample Number and Type	Length AIL & Recovered (in)	Blow Counts	Depth in Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	USCS	Graphic Log	Well Diagram	PID/FID	Soil Properties					P 200	RQD/ Comments
									Compressive Strength	Moisture Content	Liquid Limit	Plasticity Index			
1/SS	10	4/1'	2	Grasses at surface Fill, brown and reddish brown silty clay, trace of fine gravel, moist											
2/SS	0	0/1'	4	Light gray paper sludge											Top of sludge based on blow counts and drilling cuttings
3/ST	9														
4/SS	10	0/1'	6												
5/ST	3		8												
6/SS	12	2/1'	10	Reddish brown clay, moist	CL			3.5							Shelby tube 99-20-3 t=1415
7/ST	4														Sample 99-20-4 t=1419
8/SS	22	18/1'	12	End of Boring at 13.0 feet Abandoned borehole with bentonite chips											Shelby tube 99-20-5 t=1422
			14												Shelby tube 99-20-7 t=1430
			16												Sample 99-20-8 t=1435 (sludge only)
			18												
			20												
			22												

I hereby certify that the information on this form is true and correct to the best of my knowledge.

Signature 	Firm ERM-North Central, Inc., Green Bay, WI
--	--

This form is authorized by Chapters 144.147 and 162, Wis. Stats. Completion of this report is mandatory. Penalties: Forfeit not less than \$10 nor more than \$5,000 for each violation. Fined not less than \$10 or more than \$100 or imprisoned not less than 30 days, or both for each violation. Each day of continued violation is a separate offense, pursuant to ss 144.99 and 162.08, Wis. Stats.

CLIENT Short Elliott Hendrickson, Inc.		Job #: 59:1591	BORING # B1-18	SHEET 1 OF 2	
PROJECT NAME Arrowhead Park Phase 1		ARCHITECT-ENGINEER Alex E. Barker			
SITE LOCATION 355 Millview Drive, Neenah, Winnebago, WI					

NORTHING		EASTING		STATION	
----------	--	---------	--	---------	--

DEPTH (FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DIST. (IN)	RECOVERY (IN)	DESCRIPTION OF MATERIAL	ENGLISH UNITS	WATER LEVELS	ELEVATION (FT)	BLOWS/6"
					BOTTOM OF CASING LOSS OF CIRCULATION				
					SURFACE ELEVATION 744.23				
0					Topsoil Thickness [9"]				
0	S-1	SS	24	18	(GM) Fill, SILTY GRAVEL, dark grayish brown, gray and brown, moist, medium dense			740	
1	S-2	SS	24	12	(CL) Fill, LEAN CLAY WITH GRAVEL, trace organic silt, brown and dark brown, moist, stiff to very stiff				
2	S-3	SS	24	8	(CL) Fill, LEAN CLAY, trace gravel, lenses of organic silt, brown and dark brown, moist, very stiff to soft				
3	S-4	SS	18	9					
4									
5	S-5	SS	18	6					
6									
7									
8									
9									
10	S-6	ST	24	18	(CH) Lacustrine, FAT CLAY, reddish brown, moist, soft				
11									
12									
13									
14									
15	S-7	SS	18	18	(OH/PT) Swamp deposit, ORGANIC SILT/ PEAT, black, moist				
16									
17									
18									
19									
20	S-8	SS	18	18	(CH) Lacustrine, FAT CLAY, reddish brown, moist, soft to firm				
21									
22									
23									
24	S-9	ST	24	23	(CL) Lacustrine, LEAN CLAY, trace fine roots, grayish brown and brown, moist to wet, soft to firm				
25									
26									
27	S-10	SS	18	18					
28									
29									
30	S-11	SS	18	14	(SP) Glacial till, MEDIUM TO COARSE SAND, trace gravel, gray, wet, medium dense				
31									
32									
33									
34	S-12	SS	18	18	(CL) Glacial till, LEAN CLAY WITH GRAVEL, brown and reddish brown, wet, stiff to very stiff				
35									
36									
37	S-13	SS	18	18	(CL) Glacial till, LEAN CLAY, trace gravel, lenses of coarse sand, reddish brown, moist to wet, very stiff				
38									
39									
40									

CONTINUED ON NEXT PAGE.

THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES. IN-SITU THE TRANSITION MAY BE GRADUAL.					
WL 23	WS ☐	WD ☒	BORING STARTED	12/18/18	CAVE IN DEPTH
WL(SHW)	WL(ACR)		BORING COMPLETED	12/18/18	HAMMER TYPE Auto
WL			RIG TRUCK	FOREMAN BB/IM	DRILLING METHOD 3.25" HSA 0' to 25', DM 25' to 48.5'

CLIENT Short Elliott Hendrickson, Inc		J b # 59 1591	BORING # B1 18	SHEET 2 OF 2	
PROJECT NAME Arrowhead Park Phase 1		ARCHITECT ENGINEER Alex E. Barker			
SITE LOCATION 355 Millview Drive, Neenah, Winnebago, WI					

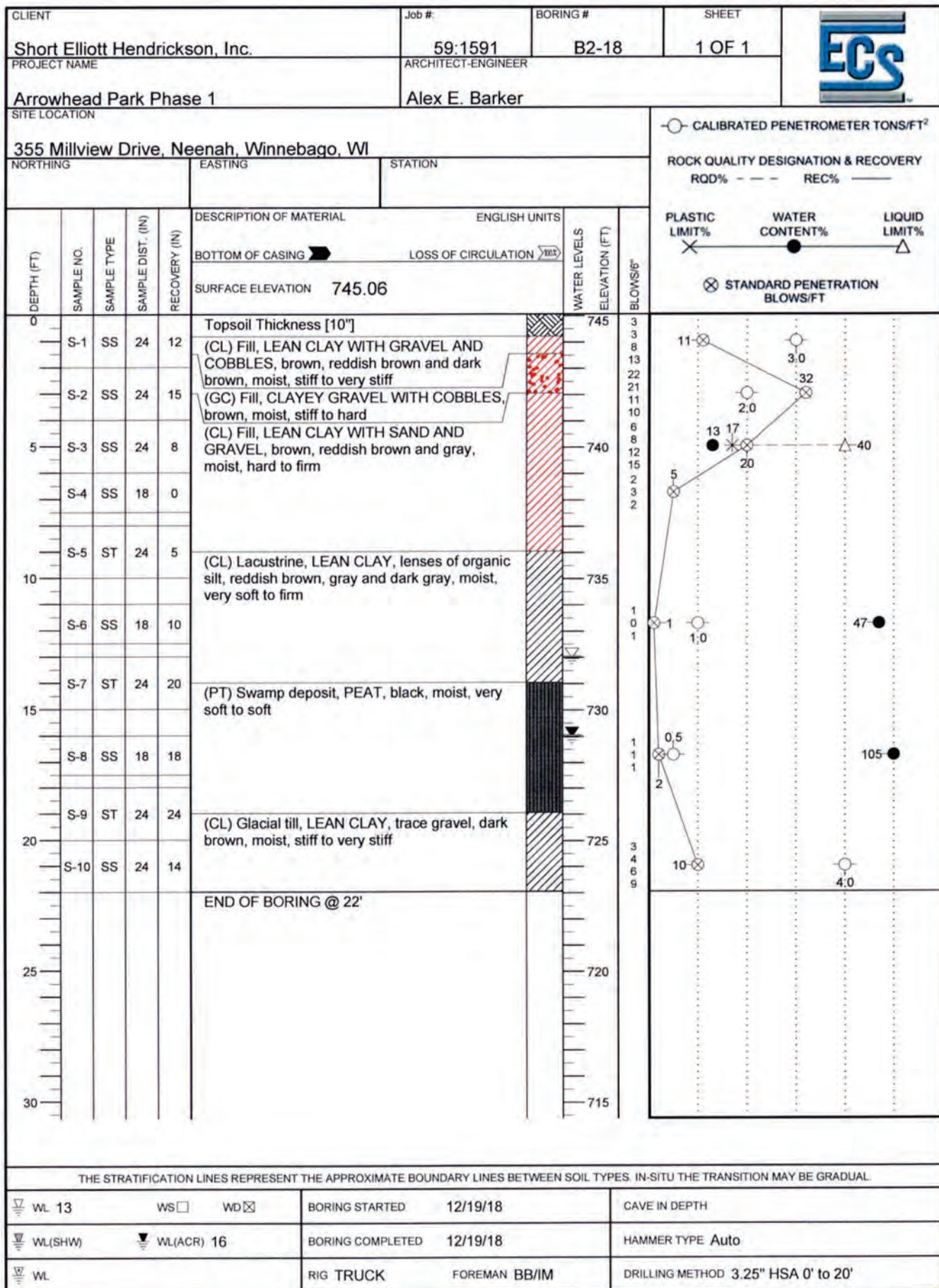
NORTHING		EASTING		STATION	
----------	--	---------	--	---------	--

DEPTH (FT)	SAMPLE NO	SAMPLE TYPE	SAMPLE DIST (IN)	RECOVERY (IN)	DESCRIPTION OF MATERIAL	ENGLISH UNITS	WATER LEVELS ELEVATION (FT)	BLOWS/6
					BOTTOM OF CASING	LOSS OF CIRCULATION		
					SURFACE ELEVATION 744.23			
35	S 14	SS	18	18	(CL) Glacial till LEAN CLAY trace gravel lenses of coarse sand reddish brown moist to wet very stiff		710	19
	S 15	SS	18	14	(CL) Glacial till LEAN CLAY trace gravel reddish brown and brown moist very stiff to hard		705	20
	S 16	SS	18	16			700	22
	S 17	SS	18	10			695	17
	S 18	SS	18	11			690	17
	S 19	SS	18	18			685	19
	S 20	SS	18	18	(CL) Glacial till LEAN CLAY WITH COBBLES trace gravel reddish brown moist stiff to very stiff		680	13
	S 21	SS	18	18			675	18
50	END OF BORING @ 50						670	20

THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES. IN SITU THE TRANSITION MAY BE GRADUAL.

☒ WL 23	☐ WS	☒ WD	BORING STARTED	12/18/18	CAGE IN DEPTH
☒ WL(SHW)	☒ WL(ACR)		BORING COMPLETED	12/18/18	HAMMER TYPE Auto
☒ WL			RIG TRUCK	FOREMAN BB/IM	DRILLING METHOD 3 25 HSA 0 to 25 DM 25 to 48 5

Diagram showing penetration test results (blows/6) plotted against depth (ft) from 6 to 60 feet. Data points are marked with circles and numbers: 19, 20, 22, 17, 17, 19, 13, 18, 20. A legend indicates symbols for Calibrated Penetrometer Tons/ft, Rock Quality Designation & Recovery (RQD% and REC%), Plastic Limit%, Water Content, Liquid Limit%, and Standard Penetration Blows/ft.



CLIENT Short Elliott Hendrickson, Inc.		Job #: 59:1591	BORING # B3-18	SHEET 1 OF 1	
PROJECT NAME Arrowhead Park Phase 1		ARCHITECT-ENGINEER Alex E. Barker			
SITE LOCATION 355 Millview Drive, Neenah, Winnebago, WI					

NORTHING		EASTING	STATION
----------	--	---------	---------

DEPTH (FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DIST. (IN)	RECOVERY (IN)	DESCRIPTION OF MATERIAL	ENGLISH UNITS	WATER LEVEL ELEVATION (FT)	BLOWS/6"
					BOTTOM OF CASING	LOSS OF CIRCULATION		
0					SURFACE ELEVATION 745.0			
0	S-1	SS	24	20	Topsoil Thickness [4"] (CL) Fill, LEAN CLAY, trace sand and fine roots, reddish brown, moist, soft to very stiff		745	2
1	S-2	SS	24	11	Fill, PAPERMILL WASTE, bluish gray, moist, very soft to firm		740	2
2								1
3	S-3	SS	24	13				1
4	S-4	SS	18	18				1
5							735	1
6	S-5	SS	18	10				1
7							730	2
8	S-6	SS	18	18	(CL) Lacustrine, LEAN CLAY, lenses of silt, reddish brown and light gray, moist, very stiff to soft			3
9								4
10	S-7	SS	18	18				2
11								3
12	S-8	SS	18	18				5
13							725	2
14	S-9	SS	18	18				2
15								2
16								2
17								2
18								2
19								2
20					END OF BORING @ 20'			2
21								
22								
23								
24								
25								
26								
27								
28								
29								
30								

CALIBRATED PENETROMETER TONS/FT²
 ROCK QUALITY DESIGNATION & RECOVERY
 RQD% --- REC% ---
 PLASTIC LIMIT% WATER CONTENT% LIQUID LIMIT%
 STANDARD PENETRATION BLOWS/FT

THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES. IN-SITU THE TRANSITION MAY BE GRADUAL.

WL 6 WS ☐ WD ☒	BORING STARTED 12/20/18	CAVE IN DEPTH
WL(SHW) WL(ACR)	BORING COMPLETED 12/20/18	HAMMER TYPE Auto
WL	RIG ATV FOREMAN GB/IM	DRILLING METHOD 3.25" HSA 0' to 18.5

CLIENT Short Elliott Hendrickson, Inc		J b # 59 1591	BORING # B4 18	SHEET 1 OF 1	
PROJECT NAME Arrowhead Park Phase 1		ARCHITECT ENGINEER Alex E. Barker			
SITE LOCATION 355 Millview Drive, Neenah, Winnebago, WI					

NORTHING	EASTING	STATION	—○— CALIBRATED PENETROMETER TONS/FT² ROCK QUALITY DESIGNATION & RECOVERY RQD % - - - REC% — PLASTIC LIMIT% WATER CONTENT% LIQUID LIMIT% X ● △ ⊗ STANDARD PENETRATION BLOWS/FT
----------	---------	---------	---

DEPTH (FT)	SAMPLE NO	SAMPLE TYPE	SAMPLE DIST (IN)	RECOVERY (IN)	DESCRIPTION OF MATERIAL	ENGLISH UNITS	WATER LEVELS ELEVATION (FT)	BLOWS/6
					SURFACE ELEVATION 745 12			
0	S 1	SS	24	12	(CL) Fill LEAN CLAY trace fine roots reddish brown, moist, very soft to form		745	2
	S 2	ST	24	6	Fill PAPERMILL WASTE gray moist very soft to soft			1
	S 3	SS	12	0				1
5	S 4	ST	24	14				0
	S 5	SS	18	4				1
10	S 6	SS	18	11	(CL) Possible fill SANDY LEAN CLAY WITH GRAVEL trace organic silt reddish brown dark brown and gray, moist, stiff		735	6
	S 7	SS	18	18	(CL) Glacial till LEAN CLAY WITH SILT brown moist soft to stiff			9
15	S 8	SS	18	15	(CL) Glacial till LEAN CLAY trace gravel reddish brown moist stiff to hard		730	6
	S 9	SS	18	10				9
20					END OF BORING @ 20		725	11
25							720	
30							715	

THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES IN SITU THE TRANSITION MAY BE GRADUAL			
WL 13	WS ☐ WD ☒	BORING STARTED 12/20/18	CAVE IN DEPTH
WL(SHW)	WL(ACR) 13	BORING COMPLETED 12/20/18	HAMMER TYPE Auto
WL		RIG ATV FOREMAN GB/IM	DRILLING METHOD 3 25 HSA 0 to 18 5

CLIENT Short Elliott Hendrickson, Inc.				Job #: 59:1591	BORING # B5-18	SHEET 1 OF 1	
PROJECT NAME Arrowhead Park Phase 1				ARCHITECT-ENGINEER Alex E. Barker			
SITE LOCATION 355 Millview Drive, Neenah, Winnebago, WI							
NORTHING		EASTING		STATION		○ CALIBRATED PENETROMETER TONS/FT ² ROCK QUALITY DESIGNATION & RECOVERY RQD% - - - REC% - - - PLASTIC LIMIT% WATER CONTENT% LIQUID LIMIT% ✕ ● △ ⊗ STANDARD PENETRATION BLOWS/FT	
DEPTH (FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DIST. (IN)	RECOVERY (IN)	DESCRIPTION OF MATERIAL	ENGLISH UNITS	WATER LEVELS ELEVATION (FT)
					BOTTOM OF CASING	LOSS OF CIRCULATION	
					SURFACE ELEVATION	751.55	
0	S-1	SS	24	14	(GC) Fill, CLAYEY GRAVEL, brown, moist to wet, medium dense		750
	S-2	SS	24	10	(CL) Fill, LEAN CLAY, trace gravel, reddish brown, dark brown and brown, moist, firm		
5	S-3	SS	24	9			
	S-4	SS	18	12	(CL) Fill, LEAN CLAY, trace fine roots and organic silt, reddish brown and brown, moist, very stiff to firm		745
10	S-5	SS	18	8	Fill, PAPERMILL WASTE, gray and light greenish gray, moist, very soft to firm		740
	S-6	SS	18	18			
15	S-7	SS	18	18			
	S-8	SS	18	18			735
	S-9	SS	18	0	(CL) Lacustrine, SANDY LEAN CLAY WITH ORGANIC SILT, dark brown, moist, very soft to firm		
20					(CL) Glacial till, SANDY LEAN CLAY, brown and reddish brown, moist to wet, soft to stiff		730
	S-10	SS	24	24			
					END OF BORING @ 22.5'		
25							
30							

The graph shows penetration test results plotted against depth. The left y-axis represents depth in feet (0 to 30). The right y-axis represents blows per foot (0 to 10). Data points are plotted as follows:

Depth (ft)	Blows/ft
1.5	5
2.0	19
2.5	16
3.0	3.5
3.5	6
4.0	1.5
4.5	6
5.0	1.5
5.5	2.75
6.0	28
6.5	1.5
7.0	7
7.5	1.5
8.0	2
8.5	1.5
9.0	2
9.5	1.0
10.0	2
10.5	1.0
11.0	3
11.5	1.0
12.0	4
12.5	13
13.0	2.0

THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES. IN-SITU THE TRANSITION MAY BE GRADUAL.			
WL 18	WS ☐ WD ☒	BORING STARTED	12/20/18
WL(SHW)	WL(ACR) ☒	BORING COMPLETED	12/20/18
WL		RIG	ATV
		FOREMAN	GB/IM
		DRILLING METHOD	3.25" HSA 0' to 20.5

CLIENT Short Elliott Hendrickson, Inc.		Job #: 59:1591	BORING # B6-18	SHEET 1 OF 1	
PROJECT NAME Arrowhead Park Phase 1		ARCHITECT-ENGINEER Alex E. Barker			
SITE LOCATION 355 Millview Drive, Neenah, Winnebago, WI					

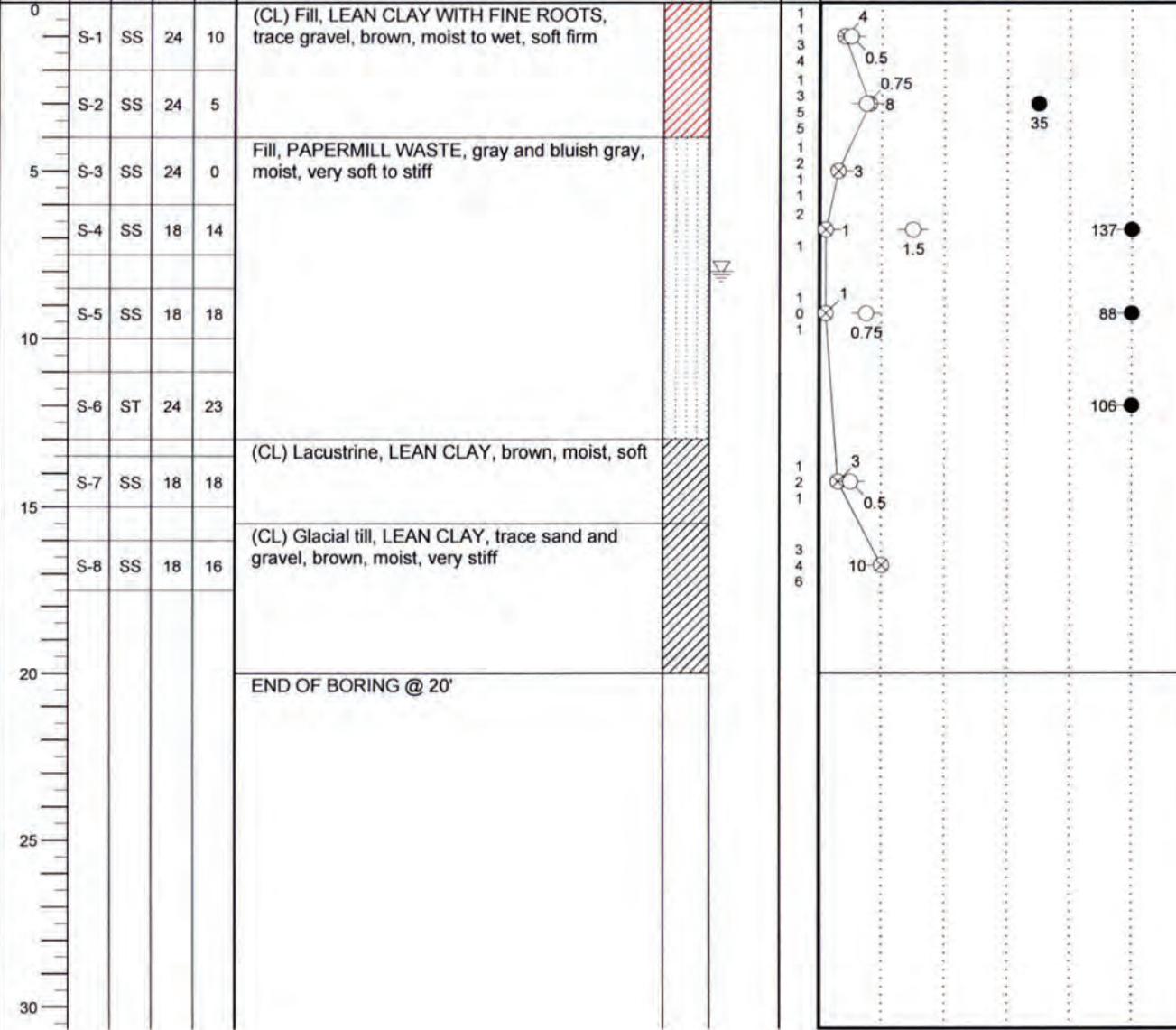
NORTHING		EASTING		STATION	
----------	--	---------	--	---------	--

DEPTH (FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DIST. (IN)	RECOVERY (IN)	DESCRIPTION OF MATERIAL	ENGLISH UNITS	WATER LEVELS ELEVATION (FT)	BLOWS/6"
					BOTTOM OF CASING	LOSS OF CIRCULATION		
					SURFACE ELEVATION 747.81			
0	S-1	SS	24	16	3" Breaker Run Thickness [6"] (GM) Fill, SILTY GRAVEL WITH COBBLES, dark brown, gray and grayish brown, moist, medium dense		745	15
	S-2	SS	24	2	(CL) Possible fill, SANDY LEAN CLAY WITH GRAVEL, reddish brown, moist, firm to hard			13
5	S-3	SS	24	13	(CL) Possible fill, LEAN CLAY WITH SILT, gray, moist, soft to very stiff			5
	S-4	SS	18	6	(CL) Possible fill, LEAN CLAY WITH GRAVEL, reddish brown, moist, firm to stiff		740	4
10	S-5	SS	18	10	(CL) Possible fill, SANDY LEAN CLAY WITH GRAVEL, brown, dark brown, reddish brown and gray, moist, stiff			6
	S-6	SS	18	12			735	9
15	S-7	SS	18	14	(CL) Glacial till, SANDY LEAN CLAY, trace gravel, reddish brown, moist, very stiff to hard			11
	S-8	SS	18	12			730	25
20	S-9	SS	18	16	END OF BORING @ 20'			27
25							725	
30							720	

THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES. IN-SITU THE TRANSITION MAY BE GRADUAL

WL	WS ☐ WD ☒	BORING STARTED	12/20/18	CAVE IN DEPTH
WL(SHW)	WL(ACR)	BORING COMPLETED	12/20/18	HAMMER TYPE Auto
WL		RIG ATV	FOREMAN GB/IM	DRILLING METHOD 3.25" HSA 0' to 18.5

CALIBRATED PENETROMETER TONS/FT²
 ROCK QUALITY DESIGNATION & RECOVERY
 RQD% --- REC% ---
 PLASTIC LIMIT% WATER CONTENT% LIQUID LIMIT%
 STANDARD PENETRATION BLOWS/FT

CLIENT Short Elliott Hendrickson, Inc.		Job # 59:1591	BORING # B7-18	SHEET 1 OF 1	
PROJECT NAME Arrowhead Park Phase 1		ARCHITECT-ENGINEER Alex E. Barker			
SITE LOCATION 355 Millview Drive, Neenah, Winnebago, WI					
NORTHING		EASTING		STATION	
DEPTH (FT) 0 5 10 15 20 25 30 SAMPLE NO. SAMPLE TYPE SAMPLE DIST. (IN) RECOVERY (IN) DESCRIPTION OF MATERIAL ENGLISH UNITS BOTTOM OF CASING  LOSS OF CIRCULATION  SURFACE ELEVATION WATER LEVELS ELEVATION (FT) BLOWS/6"					
(CL) Fill, LEAN CLAY WITH FINE ROOTS, trace gravel, brown, moist to wet, soft firm S-1 SS 24 10 S-2 SS 24 5 S-3 SS 24 0 S-4 SS 18 14 S-5 SS 18 18 S-6 ST 24 23 S-7 SS 18 18 S-8 SS 18 16 END OF BORING @ 20' ROCK QUALITY DESIGNATION & RECOVERY RQD% - - - REC% - - - PLASTIC LIMIT% WATER CONTENT% LIQUID LIMIT%  STANDARD PENETRATION BLOWS/FT					
					
THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES. IN-SITU THE TRANSITION MAY BE GRADUAL.					
WL 8 WS ☐ WD ☒		BORING STARTED 12/21/18		CAVE IN DEPTH	
WL(SHW) WL(ACR)		BORING COMPLETED 12/21/18		HAMMER TYPE Auto	
WL		RIG ATV FOREMAN BB/MH		DRILLING METHOD 3.25" HSA 0' to 20'	

CLIENT Short Elliott Hendrickson, Inc				J b # 59 1591		BORING # B7A 18		SHEET 1 OF 1		
PROJECT NAME Arrowhead Park Phase 1				ARCHITECT ENGINEER Alex E. Barker						
SITE LOCATION 355 Millview Drive, Neenah, Winnebago, WI										

NORTHING		EASTING		STATION		-○- CALIBRATED PENETROMETER TONS/FT ² ROCK QUALITY DESIGNATION & RECOVERY RQD% --- REC% --- PLASTIC LIMIT% WATER CONTENT / LIQUID LIMIT% ✕ ● △ ⊗ STANDARD PENETRATION BLOWS/FT			

DEPTH (FT)	SAMPLE NO	SAMPLE TYPE	SAMPLE DIST (IN)	RECOVERY (IN)	DESCRIPTION OF MATERIAL	ENGLISH UNITS	WATER LEVELS	ELEVATION (FT)	BLOWS/6
					BOTTOM OF CASING	LOSS OF CIRCULATION			
0					Blind drill to 4				
5	S 1	ST	24	12	Fill PAPERMILL WASTE gray and bluish gray moist				
					END OF BORING @ 6				
					Note Boring offset 5 South of B7 18				
10									
15									
20									
25									
30									

THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES IN SITU THE TRANSITION MAY BE GRADUAL									
☒ WL WS ☐ WD ☒		BORING STARTED 12/21/18		CAVE IN DEPTH					
☒ WL(SHW) ☒ WL(ACR)		BORING COMPLETED 12/21/18		HAMMER TYPE Auto					
☒ WL		RIG ATV FOREMAN GB/MH		DRILLING METHOD 3 25 HSA 0 to 6					

CLIENT Short Elliott Hendrickson, Inc.				Job #: 59:1591		BORING # B8-18		SHEET 1 OF 1		
PROJECT NAME Arrowhead Park Phase 1				ARCHITECT-ENGINEER Alex E. Barker						
SITE LOCATION 355 Millview Drive, Neenah, Winnebago, WI										

NORTHING		EASTING		STATION	
----------	--	---------	--	---------	--

DEPTH (FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DIST. (IN)	RECOVERY (IN)	DESCRIPTION OF MATERIAL	ENGLISH UNITS	WATER LEVELS ELEVATION (FT)	BLOWS/6"
					BOTTOM OF CASING	LOSS OF CIRCULATION		
0					SURFACE ELEVATION 751.16			
0	S-1	SS	24	13	(CL) Fill, SANDY LEAN CLAY, trace gravel, reddish brown, gray and brown, moist, soft to stiff		750	1
1	S-2	SS	24	8	(GM) Fill, SILTY GRAVEL, gray, moist, loose		745	2
2								3
3	S-3	SS	24	22	(CL) Fill, LEAN CLAY, trace gravel, reddish brown, moist, stiff to very stiff		740	4
4	S-4	SS	18	13				5
5								6
6	S-5	SS	18	7	Fill, PAPERMILL WASTE, gray and bluish gray, moist, soft to stiff		735	7
7								8
8	S-6	SS	18	8				9
9								10
10	S-7	SS	18	18				11
11								12
12	S-8	SS	18	13	(SP) Possible fill, MEDIUM SAND, dark gray, moist, loose		730	13
13								14
14	S-9	SS	18	18	(CL) Lacustrine, LEAN CLAY, lenses of silt, brown, moist, stiff to very stiff			15
15								16
16	S-10	SS	24	20				17
17								18
18								19
19								20
20								21
21					END OF BORING @ 22.5'			22
22								23
23								24
24								25
25								26
26								27
27								28
28								29
29								30
30								31

THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES. IN-SITU THE TRANSITION MAY BE GRADUAL.

WL	WS	WD	BORING STARTED	12/21/18	CAVE IN DEPTH
WL(SHW)	WL(ACR)		BORING COMPLETED	12/21/18	HAMMER TYPE Auto
WL			RIG ATV	FOREMAN BB/MH	DRILLING METHOD 3.25" HSA 0' to 21'

—○— CALIBRATED PENETROMETER TONS/FT²
 ROCK QUALITY DESIGNATION & RECOVERY
 RQD% — — — REC% — — —
 PLASTIC LIMIT% — WATER CONTENT% — LIQUID LIMIT%
 X — STANDARD PENETRATION BLOWS/FT

CLIENT Short Elliott Hendrickson, Inc.				Job #: 59:1591	BORING # B9-18	SHEET 1 OF 1	
PROJECT NAME Arrowhead Park Phase 1				ARCHITECT-ENGINEER Alex E. Barker			
SITE LOCATION 355 Millview Drive, Neenah, Winnebago, WI							

NORTHING		EASTING		STATION	
----------	--	---------	--	---------	--

DEPTH (FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DIST. (IN)	RECOVERY (IN)	DESCRIPTION OF MATERIAL	ENGLISH UNITS	WATER LEVELS ELEVATION (FT)	BLOWS/6"
					BOTTOM OF CASING	LOSS OF CIRCULATION		
					SURFACE ELEVATION 749.86			
0	S-1	SS	24	17	(GM) Fill, SILTY GRAVEL WITH COBBLES, brown, gray and dark brown, wet to moist, very dense			27
	S-2	SS	15	3				22
					(CL) Fill, LEAN CLAY WITH GRAVEL, trace cobbles, brown, reddish brown and gray, moist, very hard to very stiff			28
	S-3	SS	17	12				16
5								3
	S-4	SS	18	14				5
					Fill, PAPERMILL WASTE, gray and bluish gray, moist, soft to firm			50/3
	S-5	SS	18	0				3
10								5
	S-6	ST	24	18				50/5
								3
	S-7	SS	18	16				3
15								5
	S-8	ST	24	24	(CL) Glacial till, LEAN CLAY, brown and reddish brown, moist, firm to very stiff			11
								16
	S-9	SS	18	18				11
20								3
	S-10	SS	24	24				5
								11
25					END OF BORING @ 23'			10
30								

CALIBRATED PENETROMETER TONS/FT²
 ROCK QUALITY DESIGNATION & RECOVERY
 RQD% --- REC% ---
 PLASTIC LIMIT% WATER CONTENT% LIQUID LIMIT%

 STANDARD PENETRATION BLOWS/FT

THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES. IN-SITU THE TRANSITION MAY BE GRADUAL.

WL WS ☐ WD ☒	BORING STARTED 12/19/18	CAVE IN DEPTH
WL(SHW) WL(ACR)	BORING COMPLETED 12/19/18	HAMMER TYPE Auto
WL	RIG TRUCK FOREMAN BB/IM	DRILLING METHOD 3.25" HSA 0' to 21'

CLIENT		Job #	BORING #	SHEET
Short Elliott Hendrickson, Inc.		59:1591	B10-18	1 OF 1
PROJECT NAME		ARCHITECT-ENGINEER		
Arrowhead Park Phase 1		Alex E. Barker		
SITE LOCATION				
355 Millview Drive, Neenah, Winnebago, WI				
NORTHING		EASTING	STATION	
DEPTH (FT)		DESCRIPTION OF MATERIAL		ENGLISH UNITS
		BOTTOM OF CASING		LOSS OF CIRCULATION
		SURFACE ELEVATION		750.37
		WATER LEVELS		ELEVATION (FT)
		BLOWS/6"		
		ROCK QUALITY DESIGNATION & RECOVERY		RQD% --- REC% ---
		PLASTIC LIMIT%		WATER CONTENT% LIQUID LIMIT%
		STANDARD PENETRATION BLOWS/FT		
		END OF BORING @ 22.5'		
THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES. IN-SITU THE TRANSITION MAY BE GRADUAL.				
WL		WS	WD	BORING STARTED 12/20/18
WL(SHW)		WL(ACR)		BORING COMPLETED 12/20/18
WL				RIG ATV FOREMAN GB/IM
				CAVE IN DEPTH
				HAMMER TYPE Auto
				DRILLING METHOD 3.25" HSA 0' to 20.5'

CLIENT Short Elliott Hendrickson, Inc.		Job #: 59:1591	BORING # B11-18	SHEET 1 OF 1	
PROJECT NAME Arrowhead Park Phase 1		ARCHITECT-ENGINEER Alex E. Barker			
SITE LOCATION 355 Millview Drive, Neenah, Winnebago, WI					

NORTHING		EASTING		STATION	
----------	--	---------	--	---------	--

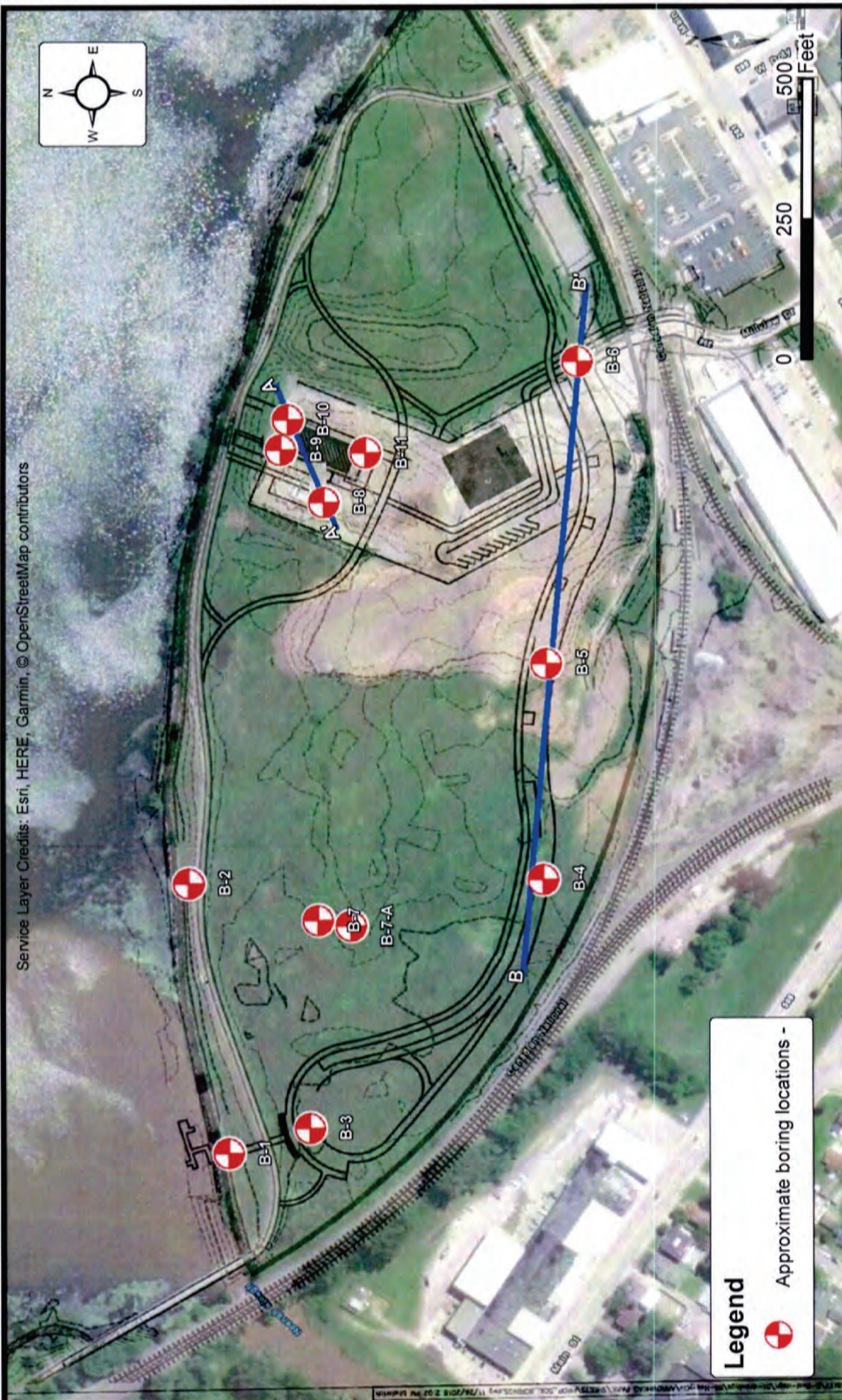
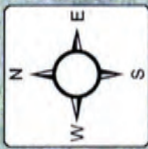
DEPTH (FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DIST. (IN)	RECOVERY (IN)	DESCRIPTION OF MATERIAL	ENGLISH UNITS	WATER LEVELS ELEVATION (FT)	BLOWS/5'
					BOTTOM OF CASING	LOSS OF CIRCULATION		
					SURFACE ELEVATION	753.84		
0	S-1	SS	24	12	(GM) Fill, SILTY GRAVEL, lenses of clay, brown and gray, moist, loose to very dense		750	8
	S-2	SS	24	13				5
5	S-3	SS	24	10				3
	S-4	SS	18	6				6
					(CL) Fill, LEAN CLAY WITH GRAVEL, brown and reddish brown, moist, stiff to very stiff		745	5
10	S-5	SS	18	9				6
	S-6	SS	18	11	Fill, PAPERMILL WASTE, grey and bluish gray, moist, soft to stiff		740	2
	S-7	ST	24	23				2
15	S-8	SS	18	18			735	1
	S-9	SS	18	4	(CL) Possible fill, LEAN CLAY WITH SAND, brown, moist to wet, soft to stiff		730	3
20	S-10	SS	18	4				5
	S-11	SS	18	12				6
25					END OF BORING @ 25'			7
							725	9

THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES. IN-SITU THE TRANSITION MAY BE GRADUAL.

WL 22	WS ☐	WD ☒	BORING STARTED	12/19/18	CAVE IN DEPTH
WL(SHW)	WL(ACR)		BORING COMPLETED	12/19/18	HAMMER TYPE Auto
WL			RIG TRUCK	FOREMAN BB/IM	DRILLING METHOD 3.25" HSA 0' to 23.5'

CALIBRATED PENETROMETER TONS/FT²
 ROCK QUALITY DESIGNATION & RECOVERY
 RQD% - - - REC% - - -
 PLASTIC LIMIT% WATER CONTENT% LIQUID LIMIT%
 STANDARD PENETRATION BLOWS/FT

Service Layer Credits: Esri, HERE, Garmin, © OpenStreetMap contributors



Legend

 Approximate boring locations -



Boring Location Diagram ARROWHEAD PARK PHASE 1

355 MILLVIEW DRIVE, NEENAH, WI
SHORT ELLIOTT HENDRICKSON, INC.

ENGINEER	ILM
SCALE	1" = 250'
PROJECT NO.	59:1591
SHEET	1 OF 1
DATE	2/5/2019



REPORT OF VANE SHEAR TESTS

1060 Breezewood Lane, Suite 102
Neenah, WI 54956
ph 920-886-1406
fax 920-886-1409
www.ecslimited.com

Project: Arrowhead Park Phase 1
Neenah, Wisconsin

Copies:

Client: Mr. Trevor Frank
S.E.H Inc.

Date: February 5, 2019

ECS Project No: 59-1591

GENERAL:

Scope of Work: Standard Test Method for Field Vane Shear Test in Cohesive Soil

Date of Test: December 21, 2018
Test Location: Soil Borings
Test Performed By: B. Broennimann of ECS

Field Engineer: I. MacMillan of ECS
Material Source: In-situ

RESULTS:

Test Method: ASTM D2573

Boring No:	B7-18	B7A-18	B8-18	B8-18
Test No:	V1	V2	V3	V4
Depth	8 feet	6 feet	11 feet	13 feet
Soil Classification	Mill Waste	Mill Waste	Mill Waste	Mill Waste
Vane Diameter (in)	2.5	2.5	2.5	2.5
Vane Constant, k	2.59	2.59	2.59	2.59
Measured Torque (lb-in)	720	1,320	*	600
Measured Remolded Torque (lb-in)	660	840	*	600
Shear Strength, $(s_u)_{IV}$ (psf)	1,865	3,419	*	1,554
Remolded Shear Strength, $(s_{ur})_{IV}$ (psf)	1,709	2,176	*	1,554
Sensitivity	1.1	1.6	*	1.0

*Test V3 encountered an obstruction in the borehole resulting in damage to the vane.

NOTE: The shear strength values reported above have not been modified by a correction factor.

Respectfully Submitted,
ECS Midwest, LLC.



REPORT OF LABORATORY ANALYSIS OF SOIL

1060 Breezewood Lane, Suite 102
Neenah, WI 54956
ph 920-886-1406
fax 920-886-1409
www.ecslimited.com

Project: Arrowhead Park Phase 1
Neenah, Wisconsin

Copies:

Client: Mr. Trevor Frank
S.E.H, Inc.

Date: February 4, 2019

ECS File No: 59-1591

GENERAL:

Scope of Work: Perform laboratory testing on select soil samples.

Date of Test: January 22, 2019

Material Source: In-situ

Sampled By: B. Broennimann of ECS

Date Sampled: December 21, 2018

Submitted By: M. Wisneski of ECS

RESULTS:

Test Method: ASTM D2487 Classification of Soils for Engineering Purposes
ASTM D2216 Moisture Content of Soil
ASTM D2974 Organic Content of Soil
ASTM D4318 Atterberg Limits
ASTM D854 Specific gravity of Soil Solids

Boring Number	B1-18	B2-18	B3-18	B4-18	B4-18	B5-18	B7-18
Sample Number	3	3	4	2	4	6	4
Sample Depth	4' - 6'	4' - 6'	6' - 7½'	2' - 4'	6' - 8'	11' - 12½'	6' - 7½'
USCS Classification	CL	CL	Mill Waste	Mill Waste	Mill Waste	Mill Waste	Mill Waste
% Moisture	18%	13%	164%	42%	72%	116%	137%
% Organic	----	----	58.4%	----	36.7%	41.8%	----
Atterberg Limits (LL/PL)	44 / 18	40 / 17	----	----	----	----	Not Plastic
Specific Gravity (G _s)	----	----	----	2.138	----	----	----

REMARKS:

A portion of the sample will be held for 30 days after the date of this report and will then be discarded unless notified otherwise.

Respectfully Submitted,



ECS MIDWEST, LLC

Geotechnical • Construction Materials • Environmental • Facilities

"Setting the Standard for Service"

File Copy

February 18, 2019

Mr. Trevor Frank
S.E.H., Inc.
425 W. Water Street, Suite 300
Appleton, WI 54911
Email: tfrank@sehinc.com

ECS Project No: 59-1591

Reference: **Proposed Arrowhead Park Phase 1 Development**
Millview Drive
Neenah, Wisconsin

RECEIVED

MAY 14 2019

DNR GREEN BAY

Dear Mr. Frank:

ECS Midwest, LLC (ECS) has completed the subsurface exploration and laboratory testing for the above-referenced project. Our services were performed in general accordance with our Proposal No. 59:884-GP, dated December 7, 2018. This factual letter presents our understanding of the geotechnical aspects of the project and the results of the field exploration and laboratory testing program.

Scope of Services

Our scope of services included performing eleven (11) standard penetration test borings at the project site. During the field exploration, ECS continuously monitored the airspace using a personal gas meter and followed the safety protocols outlined in our proposal. These safety protocols included decontamination of our equipment before mobilizing to and from the site, as well as storing wash water and solids, cuttings, drilling fluids, and used PPE in sealed 55-gallon drums in a designated area of the site. We also implemented an in-situ and laboratory-testing program to help characterize the physical and engineering properties of the subsurface soils.

Project Information

The project site is located at the Arrowhead Park property in the City of Neenah, Wisconsin. Mr. Wayne Wambold with S.E.H., Inc., provided ECS with project information, which included a conceptual site plan. Based on the information provided, we understand the proposed project will include the development of park facilities including the construction of an activity building, paved walkways and parking lots, and a boardwalk.

Field Exploration

On December 18, 19, 20, and 21, 2018, ECS advanced eleven (11) standard penetration test borings at the project site. We advanced Boring B1-18 to an approximate depth of 50 feet and Boring B2-18 to 22 feet below the existing grade within the clay bulkhead dike. Across the rest of the site, we advanced Boring B3-18, B4-18, B6-18, and B7-18 to 20 feet, Boring B5-18, B8-18, and B10-18 to 22½ feet, Boring B9-18 to 23 feet, and Boring B11-18 to 25 feet below the existing grade. We also advanced an offset Boring B7A-18 to a depth of 6 feet below the existing grade. We utilized truck-mounted and an all-

With every community, we redefine what's possible.



Stantec is a global leader in sustainable engineering, architecture, and environmental consulting. The diverse perspectives of our partners and interested parties drive us to think beyond what's previously been done on critical issues like climate change, digital transformation, and future-proofing our cities and infrastructure. We innovate at the intersection of community, creativity, and client relationships to advance communities everywhere, so that together we can redefine what's possible.

Stantec Consulting Services, Inc.
1165 Scheuring Road
De Pere, WI, 54115-1001

stantec.com



Stantec Consulting Services Inc.
1165 Scheuring Road
De Pere WI 54115-1001

February 9, 2024

Project/File: 193709124

Ms. Jacqueline Marciulionis
WDNR Green Bay Service Center
2984 Shawano Avenue
Green Bay, WI 54313

Greetings Ms. Marciulionis,

**Reference: Request for Reduction in Groundwater Sampling Frequency
(Semi-Annual to Annual), Arrowhead Park, Neenah, WI**

Stantec Consulting Services on behalf of the City of Neenah (the City) is submitting this letter to request a reduction in groundwater sampling frequency and eliminate two monitoring points associated with historical groundwater monitoring activities at Arrowhead Park located in Neenah, Wisconsin (the Site or Arrowhead Park). A portion of Arrowhead Park was historically developed into a paper sludge landfill which has been vacant for over two decades. The request is prompted by the City's desire to transform the Site from an underutilized property into a vibrant public amenity. Proposed amenities will be a draw for tourists and visitors and will connect to the Loop the Lake trail currently along the northern portion of the Site. A conceptual master plan for the park was developed in 2017 and provides a snapshot of possible park amenities. The conceptual master plan can be found in **Attachment A**.

The City has historically sampled the nine wells associated with Arrowhead Park on a semi-annual basis and is currently seeking to reduce this frequency to an annual event. This request also seeks approval for the elimination of sample collection from PS-9 and three wells associated with the PS-33 well nest which was damaged during redevelopment of an adjacent parcel. The three wells were abandoned in the summer of 2022 after it was determined they were unusable for future sample collection. The location of Arrowhead Park is depicted on **Figure 1**. The layout of the Site and associated monitoring well network are depicted on **Figure 2**.

Reference: Justification for Annual Groundwater Sampling, Arrowhead Park, Neenah, WI

1 Background

1.1 Physical Setting

Arrowhead Park is located in the City of Neenah, Wisconsin and forms the southernmost shoreline of Little Lake Butte des Morts.

1.2 Historical Site Use

Per available historical Sanborn fire insurance maps, aerial photography, and available city archives, portions of Arrowhead Park were utilized as early as 1874 via the Winnebago Paper Company (the Mill). The Mill was purchased by the Bergstrom Paper Company in 1904 and later purchased by P.H. Glatfelter in 1979. Landfill operations were present on the Site from 1952 to 1976 in which time mill waste materials consisting of sludge from a wastewater treatment plant were deposited into containment cells onsite forming the present-day Arrowhead Park. Mill wastes contained polychlorinated biphenyls (PCBs) from 1954 through the final landfilling operations. Below is a detailed timeline of the history of the Arrowhead Park landfill.

1950 - 1952: City obtained bulkhead permit in July 1950. Initial soil filling at the east end of the Site was for construction of the wastewater disposal plant, which went operational in Nov. 1952.

1953 – 1957: Aerial photos show construction of sludge landfill cells adjacent to the disposal plant. Based on aerials from this period, it appears that a truck parking area was constructed over the southern half of these landfill cells.

1957 – 1964: Area-type sludge filling occurred beyond the disposal cells, progressing in a westerly direction. The area on which the truck parking was constructed appears to have been filled by 1964.

1964 – 1970: Area-type sludge filling progressed east to west. A haul road was constructed extending through the central portion of the landfill, with additional branch haul roads extending off the main trunk.

1970 – 1976: Landfill in later stages of operation. Bergstrom constructed a truck parking and fuel storage area on the 3.29-acre parcel immediately west of the disposal plant. Sludge disposal ceased completely by the end of 1976. Part of soil cover placed on landfill in spring of 1976. Secondary treatment system under construction in April 1976.

1976 – 1984: Secondary treatment system operational in 1977. Per P.H. Glatfelter report dated January 1984, the Arrowhead Park Landfill was covered with clay & topsoil. Cover thickness varied from 0.25 to 4.5 feet (ft) with a mean thickness between 1 and 2 ft. The entire site was covered by November 1979 with the soil surface graded at a 2% slope. The high point elevation of 750 ft is near the center of the landfill, sloping radially to the edges at elevation of approximately 744 ft.

1984 – 1998: Per City of Neenah, additional cover soil was placed on the landfill and periodic maintenance has been required to fill low areas and assure vegetative growth. Soil borings from ERM's 1999 report found 1.0 – 6.3 ft of cover soil with an average soil thickness of 3.3 ft. The Site was completely vegetated in 1998.

Reference: Justification for Annual Groundwater Sampling, Arrowhead Park, Neenah, WI

1998 – 2006: Truck parking continued on the 3.29-acre parcel west of the treatment plant until the mill operations ceased in 2006.

2013 - Present: Following Mill closure, the landfill remained undeveloped. In 2013, the City received a Notice of Noncompliance from the WDNR which detailed significant depressions and ponded water on the landfill's cap. The WDNR recommended the low areas be filled to eliminate ponding water and restore a positive drainage profile to the existing cap. Subsequently, over the past decade, the landfill has been the depositional location for low-impacted soils and excess fills from nearby downtown redevelopments under WDNR approvals. Sources include commercial and residential redevelopments of the Former Glatfelter Paper Mill Site [BRRTS:02-71-550735 (Solaris on Main, Gateway Plaza Park, and 201 West projects)], the adjacent Neenah Site 7 (BRRTS: 03-71-559006), and Neenah Foundry Parking Lot (BRRTS: 03-71-583002) project locations.

Low-impacted soil from nearby redevelopments was placed in depressed areas on Arrowhead Park and capped by 2 ft of clean clay and topsoil. The landfill was graded to achieve positive surface drainage and seeded to stabilize the soil surface. No petroleum or chlorinated volatile organic compound (VOC) impacted soils were reused on Arrowhead Park. Placement of the low-impacted soil is not expected to contribute to contamination already onsite and has benefitted the City by:

1. Helping the City avoid unnecessary landfill disposal fees;
2. Resolving noncompliance issues in regard to the landfill; and
3. Preparing the Site for planned public greenspace redevelopment

1.2.1 LANDFILL CONSTRUCTION

Arrowhead Park was constructed on what was a portion of Little Lake Butte des Morts. The base of Arrowhead Park landfill consists of native glacial and lacustrine clay deposits of the former lakebed. According to borings completed by ECS Midwest, LLC (ECS) in 2019, papermill wastes were identified in multiple borings up to approximately 16 ft below grade (fbg). The papermill wastes overly the thick clay lakebed deposits which were identified to depths of 50 fbg (deepest location investigated). While not encountered during drilling operations, bedrock is anticipated to be situated between 50 and 100 fbg in this portion of the Fox Valley. Bedrock beneath the landfill is expected to be composed of the Prairie Du Chien dolomite, a primarily low permeability sedimentary formation. The low permeable/transmissive soil and bedrock underlying the papermill wastes at Arrowhead Park are common to the Fox Valley and the primary reason the City and other nearby municipalities rely upon surface water from Lake Winnebago for drinking and recreational purposes. A copy of the ECS report is provided in **Attachment B**.

ECS also investigated the bulkhead dike onsite which lines Arrowhead Park on its northern side and separates landfill wastes from present day Little Lake Butte des Morts. Boring B2-18 extended into the dike revealed clay borrow soils were utilized during their construction. Natural Resource Solutions, LLC (NRS) prepared a report which indicated the WDNR previously utilized in-field hydraulic conductivity tests from a Glatfelter environmental assessment in 1983 to calculate the potential seepage rate of mill waste along the entire bulkhead dike. The calculated seepage rate was reported to be 120 gallons per day. According to this document, the WDNR concluded that any seepage from the landfill to the lake would be insignificant based on the seepage rate calculated. The NRS report provided by the City was not dated and does not appear to have been submitted to the WDNR previously.

Reference: Justification for Annual Groundwater Sampling, Arrowhead Park, Neenah, WI

2 Groundwater Monitoring Program

The groundwater monitoring program at Arrowhead Park has evolved since the 1980s. **Table 1** below summarizes the nine historic and current wells which compose the groundwater monitoring well network. The locations of the wells are shown on **Figure 2**.

Table 1 – Arrowhead Park Landfill Monitoring Network

Construction Summary				
Well	Depth	Screen Location	Purpose	2023 Status
PS-3R	9.2	Bulkhead Dike	Water Table Well	Active
PS-9	11.0	Waste	Leachate Head Well	Active
PS-15RR	9.0	Bulkhead dike	Water Table Well	Active
PS-32	38.6	Native Soil	Piezometer	Active
PS-32A	23.1	Native Soil	Piezometer	Active
PS-32B	14.4	Fill and Native Soil	Water Table Well	Active
PS-33	38.1	Native Soil	Piezometer	Abandoned
PS-33A	22.9	Native Soil	Piezometer	Abandoned
PS-33B	14.3	Fill and Native Soil	Water Table Well	Abandoned

2.1 Arrowhead Park Local Groundwater Flow

Historic groundwater elevation data indicates that groundwater flow at Arrowhead Park generally radiates away from PS-9 in the interior of the landfill. However, waste material and/or leachate at or near this location may influence the elevated groundwater condition. PS-9 is the only well present in the middle of the former landfill cells and historically sampled for leachate head measurements. Remaining wells are located along the boundary of the landfill.

Based on groundwater elevations measured over the past decade, PS-3R is the predominant downgradient well on-site. Groundwater flow gradients are steepest to the north and west with flow gradient generally shallowest to the east and southeast towards PS-15RR and the PS-33 well nest. While flow radiates away from PS-9, groundwater flowing south eventually arcs northward toward Little Lake Butte des Morts.

To supplement onsite flow data, Stantec reviewed available information on the WDNR's BRRS database to visualize the regional groundwater flow trend around Arrowhead Park. Groundwater data was available from multiple closed contaminant cases nearby and provide a snapshot of groundwater flow trends immediately offsite. Sites reviewed included:

Reference: Justification for Annual Groundwater Sampling, Arrowhead Park, Neenah, WI

- Neenah Site 7 Dev Project (03-71-559006)
- PH Glatfelter Paper Co (03-71-001314)
- PDQ Car Wash (03-71-111516)
- Holiday Station #138 (03-71-001335)
- Main Auto (03-71-111521)

Groundwater data reviewed from these cases revealed regional groundwater flows predominantly north in this portion of the City towards Arrowhead Park. The regional flow is likely influenced by the general topography of the area and the fact the major surface waterways (Fox River and Neenah Slough) all flow north into Little Lake Butte des Morts.

Groundwater mapping on and offsite suggests the PS-32 and PS-33 well nests are situated up gradient to the former landfill cells with regard to regional groundwater flow. Assorted groundwater flow maps for the Site, adjacent BRRS cases, and a composite regional flow map of the ground and surface water around Arrowhead Park are presented in **Attachment C**.

2.2 Historical Groundwater Monitoring Parameters

Prior to the October 2022 sampling event, all monitoring wells with the exception of PS-9 (leachate head well) have been sampled at least semi-annually for field parameters which include:

- | | |
|-------------------------|-------------------------|
| • groundwater elevation | • turbidity |
| • temperature | • pH |
| • color | • specific conductivity |
| • odor | |

PS-3R and PS-15RR were also historically sampled for laboratory parameters including:

- | | |
|--------------------|--------------------------|
| • total hardness | • total iron |
| • total alkalinity | • total sulfate |
| • chloride | • chemical oxygen demand |

2.3 Groundwater Quality Trends

Specific conductivity has been historically monitored at all wells onsite except PS-9. PS-9 was last monitored for specific conductivity in October 2011 with the specific conductivity of the leachate 2,296 micro-mhos per centimeter ($\mu\text{mhos/cm}$). **Table 2** includes the historic specific conductivity range which can be found at each of the Site wells as well as the results from the latest sampling events completed from October 2022 through October 2023.

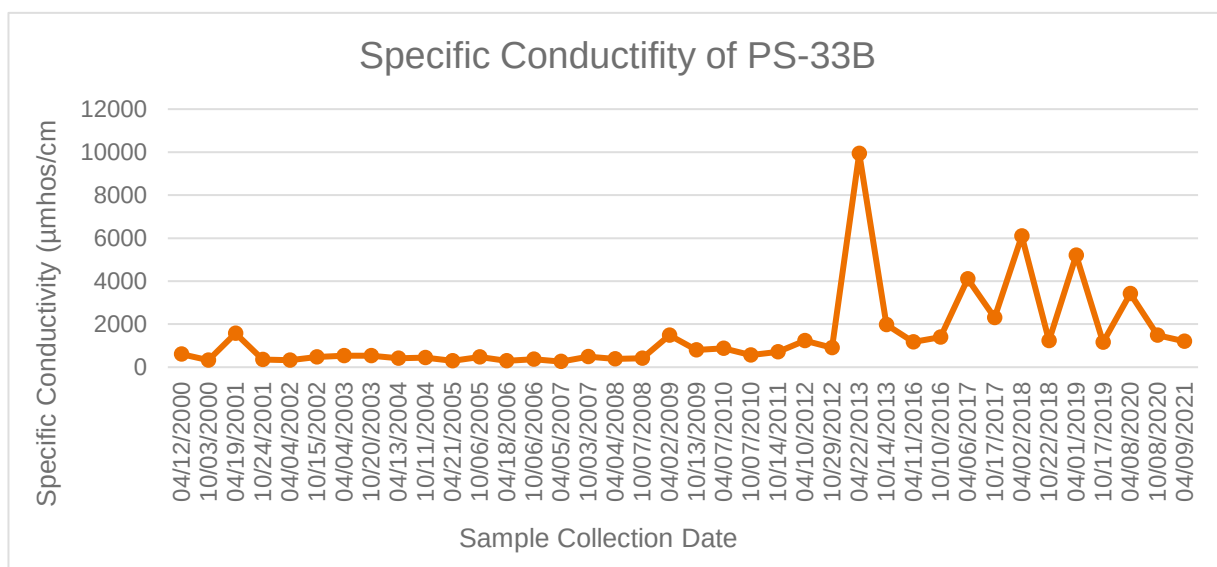
Reference: Justification for Annual Groundwater Sampling, Arrowhead Park, Neenah, WI

Table 2 - Summary of Specific Conductivity Results

Monitoring or Leachate Head Well	Specific Conductivity (µmhos/cm)			
	Historic Range	October 2022	April 2023	October 2023
PS-3R	1,800 - 3,500	3,320	2,860	3,350
PS-15RR	1,800 - 4,000	3,300	3,210	2,990
PS-32	400 - 900	800	820	780
PS-32A	500 - 1,200	1,120	1,130	1,140
PS-32B	900 - 1,500	Not Analyzed	1,060	---
PS-33	200 - 1,000	Abandoned	Abandoned	Abandoned
PS-33A	500 - 700	Abandoned	Abandoned	Abandoned
PS-33B	300 - 1,000	Abandoned	Abandoned	Abandoned

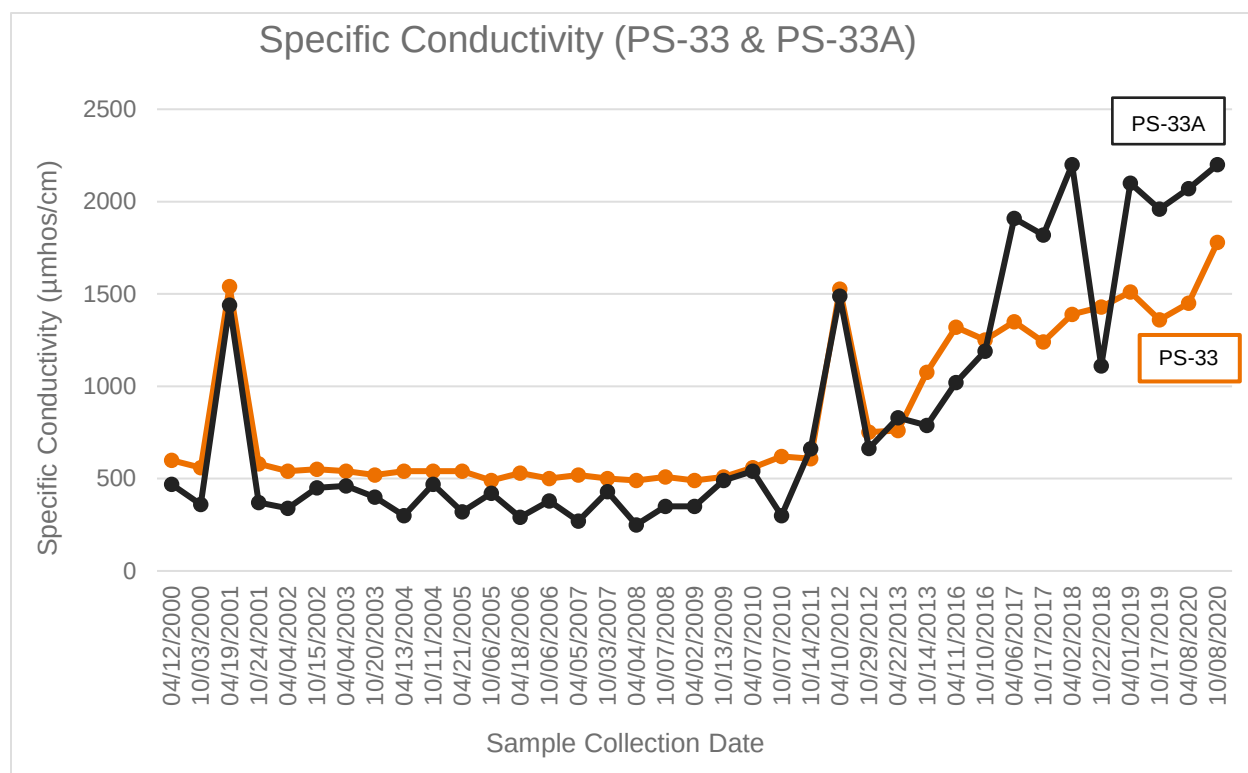
--- Denotes no sample collected due to insufficient groundwater volume within well at time of sampling.

Specific conductivity in each well during the most recent three sample events fall within the historic ranges of the well network indicating the results are stable with little variation from average concentrations. Elevated levels of specific conductivity at PS-15RR have been historically attributed to salt-laden surface runoff from an unpaved truck parking lot formerly adjacent the well. At PS-15RR, chloride levels peaked between 2006 and 2012 around 1,000 mg/L and specific conductivity of the well spiked to over 7,000 µmhos/cm. For context, PS-3R located on the northwestern portion of the landfill near the former waste cells but within the same berm maintains chloride levels up to 200 mg/L. As of 2012 following mill closure and vacancy of the site for truck trailer storage, chloride levels at PS-15RR have steadily decreased to current levels around 400-500 mg/L and specific conductivity measurements have stabilized around 3,000-3,500 µmhos/cm. Long-term specific conductivity data for PS-15RR is available in **Attachment D**.



Reference: Justification for Annual Groundwater Sampling, Arrowhead Park, Neenah, WI

Specific conductivity at the PS-33 well nest was historically stable up until approximately 2012 when concentrations within the wells began to rise. Measurements collected in 2020 from the wells revealed specific conductivity had risen to approximately four times the historic stable levels prior. This increase may be related to the construction of a stormwater infiltration basin in approximately 2011 immediately upgradient of the well nest. The basin stores runoff from nearby parking lots situated on the former Glatfelter Mill site and therefore is a temporary repository of surface water laden with dissolved chlorides from winter de-icing operations. The retention pond is designed as an “infiltration” basin and allows surface run-off to infiltrate underlying soil. Impacts within the wells can clearly be seen when tracking specific conductivity in PS-33B (above) over time. From 2013 through 2021, a trend of increased specific conductivity is observed during the spring sample collection events. This is followed by significantly decreased specific conductivity in the fall of the year. The seasonal fluctuation is likely associated with the seasonal use of salt for de-icing and infiltration of the salt-laden water to shallow groundwater. The trend can also be seen in the piezometers of the PS-33 well nest when in 2012 the specific conductivity of PS-33 and PS-33A began to increase. The increase again is likely attributed to the sinking of dense, salt-laden surface water as it infiltrates the ground surface. The specific conductivity trends in the PS-33 well nest further suggests that this location is upgradient of the Arrowhead Park leachate waste cells and receives groundwater influence from offsite.



pH is another general proxy measure of groundwater quality and has been recorded at each well nest historically. PS-9 located in the mill waste source area was last tested for pH in 2007. Between 2000 and 2007 PS-9 was measured between 6.0 and 6.8 standard units (SU) with the well trending more acidic (lower pH) over time. Remaining wells generally have a neutral pH of 7 SU. pH trends onsite reveal leachate present at PS-9 appears to be acidifying groundwater at this location. Remaining wells on the perimeter of the Site do not appear to be experiencing this same effect which suggests leachate remains contained within the interior of the landfill. pH trends for select wells is provided in **Attachment D**.

Reference: Justification for Annual Groundwater Sampling, Arrowhead Park, Neenah, WI

2.4 Current Groundwater Monitoring Program

As outlined in the WDNR guidance titled *Reducing or Terminating Groundwater Monitoring at Solid Waste Landfills* (pub-WA-1013-2019), to reduce or terminate sampling at Arrowhead Park, it was understood that additional analysis would be needed. The additional sampling parameters to be including for each well except PS-9 consisted of the following:

- VOCs
- total sulfate
- ammonia as nitrogen
- nitrate/nitrite as nitrogen

Although emerging contaminants are also listed on Table 2 of the WDNR guidance, previous discussions with the WDNR indicate sampling for emerging contaminants is not necessary at this time. A copy of the WDNR concurrence with this revised sampling approach is provided in **Attachment E**.

Following the revised groundwater sampling protocol approved by the WDNR, Arrowhead Park wells were sampled in October 2022, April 2023, and October 2023. Sample analysis identified tetrahydrofuran in well PS-32 during each sample event with vinyl chloride present in PS-32A in October 2022 and 2023 and PS-32 in April and October 2023. The presence of these compounds exceeded WDNR NR140 regulatory thresholds. Despite the detection of these VOCs, these contaminants are not believed to be associated with paper sludge waste present within the landfill. Instead, they are likely associated with the recent conversion of the PS-32 wells from flush to stick-up wells in December 2020 by a local plumbing contractor. This is suspected for the following reasons:

1. Tetrahydrofuran is a primary component of PVC primers and some PVC cements from major manufacturers as denoted on the Material Safety Data Sheet (MSDS) provided in **Attachment F**.
2. There was no indication that the general plumbing contractor consulted with an environmental professional prior to completing the work.
3. No other wells sampled for VOCs onsite identified tetrahydrofuran or vinyl chloride impacting groundwater quality.
4. No other VOCs were detected in groundwater samples collected from the Site including at the PS-32 well nest.
5. Concentrations of tetrahydrofuran have been declining for the past three sample events.

Total iron, total chloride, and/or total nitrogen levels were also identified in well PS-3R and PS-15RR above NR140 regulatory thresholds during the 2022 and 2023 sample events. While the detections exceeded regulatory thresholds, concentrations of these compounds were consistent with past results for each well. The elevated levels have been historically attributed to the proximity of the wells in relation to mill waste or the fill materials in which these wells were constructed. Concentrations of compounds detected during the October 2022 through October 2023 sample events are provided in **Attachment G**.

Reference: Justification for Annual Groundwater Sampling, Arrowhead Park, Neenah, WI

3 Request to Alter Groundwater Monitoring Frequency and Well Network

The City is seeking WDNR approval to reduce the groundwater sampling frequency at Arrowhead Park from a semi-annual to annual event. In addition, the City is seeking concurrence from WDNR that PS-9 and PS-33 well nest can be abandoned and removed from future groundwater sampling. Justification for these changes are provided below.

3.1 Sample Frequency Reduction

- Trend analysis of collected groundwater data reveals many of the key indicators of groundwater quality (specific conductance, pH, chlorides, etc.) have remained stable over the past 10 to 20 years. Expanded groundwater parameter analysis conducted since October 2022 has revealed no VOCs are present onsite which are likely related to leachate waste.
- Semi-annual sample results of the data have not resulted in remedial investigations or enforcements by the WDNR.
- While groundwater quality appears largely stable onsite, fluctuations that are observed appear to be due to outside influences unrelated to leachate wastes. These include the elevated specific conductivity near PS-15RR and PS-33 well nest and the tetrahydrofuran and vinyl chloride impacts identified at the PS-32 well nest.
- Groundwater flow patterns onsite have largely been stable over the past decade on a semi-annual and annual basis. Expected use of the site as a public park with abundant greenspace is not expected alter groundwater flow characteristics or groundwater quality onsite.
- Use of the Site as a park will only enhance the cap in place and further prevent infiltration of surface water to groundwater and will not promote leachate migration.

3.2 Abandonment/Elimination of PS-9 and PS-33 Wells

3.2.1 PS-9 LEACHATE HEAD WELL

- The site well has not been utilized for laboratory sample collection for many years and groundwater sample results from PS-9 wells have not resulted in remedial investigations or enforcements by the WDNR in the past 30 years of sampling.
- There have been no significant changes in groundwater head elevation noted in over 20 years.
- Groundwater flow patterns onsite have largely been stable over the past decade on a semi-annual and annual basis. Future use of the site as a public park with abundant greenspace is not expected alter groundwater flow characteristics onsite.
- Use of the Site as a park will enhance the cap in place and further prevent infiltration of surface water to groundwater and will not promote leachate migration.
- PS-9 is located in a central portion of the site and will complicate engineering designs and be at high risk for damage when redevelopment construction begins.

Reference: Justification for Annual Groundwater Sampling, Arrowhead Park, Neenah, WI

3.2.2 PS-33 WELL NEST

- Groundwater sample results from the PS-33 wells prior to their destruction/abandonment were considered stable and sampling results had not resulted in remedial investigations or enforcements by the WDNR in 30 years of sampling.
- The wells are situated upgradient of the Arrowhead Park waste cells with respect to regional groundwater flow. Groundwater quality trends associated with the wells are considered a product of offsite influences unrelated to leachate wastes.

Reference: Justification for Annual Groundwater Sampling, Arrowhead Park, Neenah, WI

4 Conclusion

On behalf of the City, Stantec requests WDNR approval to reduce sampling frequency and abandon/eliminate PS-9 and the PS33 well nest from the monitoring program. If approved, annual sample collection would occur in April of each year and include the expanded list of parameters approved by the WDNR for the October 2022 and subsequent sampling events.

If you have any questions or comments regarding this request, please contact Lynelle Caine using the contact information provided below. We look forward to your response.

Regards,

STANTEC CONSULTING SERVICES INC.



Lynelle P. Caine

Senior Project Manager

Phone: (920) 655-7211

lynelle.caine@stantec.com



Evan Weber

Earth Scientist

Phone: (920) 309-2509

evan.weber@stantec.com

Figures

Figure 1 – Site Location and Local Topography

Figure 2 – Arrowhead Park with Monitoring Well locations

Attachments

Attachment A – Conceptual Arrowhead Park Plans

Attachment B – ECS Midwest, LLC Geotechnical Investigation

Attachment C – Groundwater Flow Analysis

Attachment D – Groundwater Select Historic Sample Trends

Attachment E – WDNR 2022 Groundwater Sampling Plan Approval

Attachment F – PVC Primer MSDS

Attachment G – Groundwater Laboratory Results

CERTIFICATIONS

"I, Hiedi A. Waller, hereby certify that I am a licensed professional engineer in the State of Wisconsin in accordance with the requirements of ch. [A-E 4](#), Wis. Adm. Code; that this document has been prepared in accordance with the Rules of Professional Conduct in ch. [A-E 8](#), Wis. Adm. Code; and that, to the best of my knowledge, all information contained in this document is correct and the document was prepared in compliance with all applicable requirements in chs. [NR 500](#) to [538](#), Wis. Adm. Code."

Hiedi Ann Waller

Hiedi A. Waller, PE



4/11/2024

Date

"I, Stu Gross, hereby certify that I am a licensed professional geologist in the State of Wisconsin in accordance with the requirements of ch. [GHSS 2](#), Wis. Adm. Code; that the preparation of this document has not involved any unprofessional conduct as detailed in ch. [GHSS 5](#), Wis. Adm. Code; and that, to the best of my knowledge, all information contained in this document is correct and the document was prepared in compliance with all applicable requirements in chs. [NR 500](#) to [538](#), Wis. Adm. Code.

Stu Gross

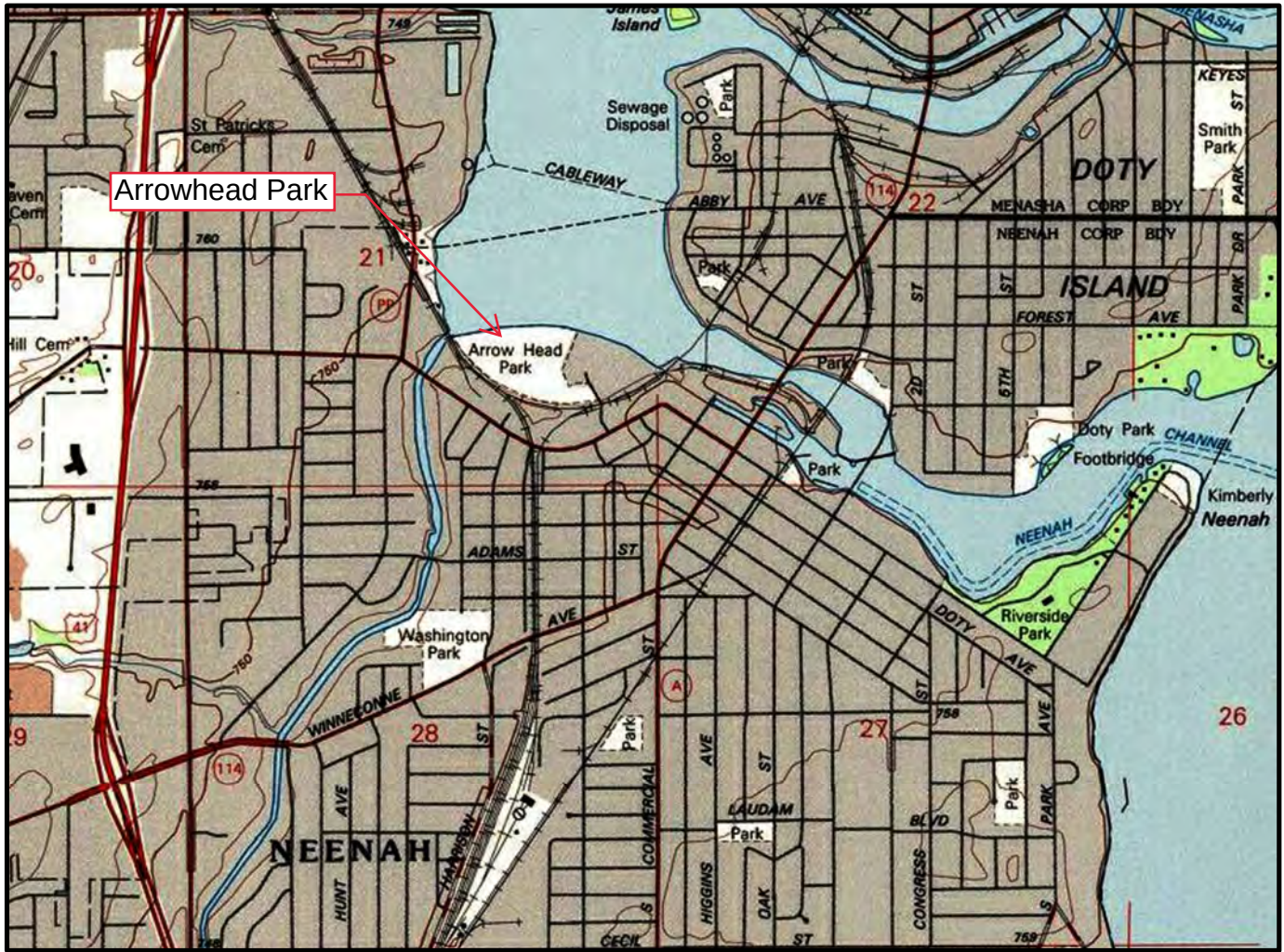
Stu Gross, PG



4/11/2024

Date

FIGURES



SCALE IN FEET

1" = 2000'



CONTOUR INTERVAL 10 FEET

NATIONAL GEODETIC VERTICAL DATUM OF 1929



QUADRANGLE LOCATION

BASE MAP SOURCE: USGS 7.5 MINUTE QUADRANGLE, NEENAH, WISCONSIN, 1992 (NATIONAL GEOGRAPHIC HOLDINGS, INC.)



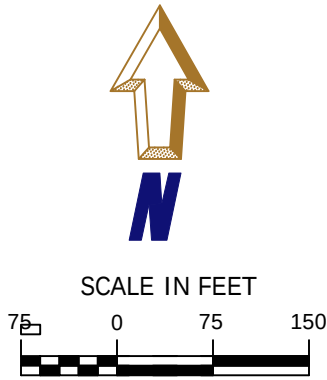
1165 Scheuring Road, De Pere, Wisconsin 54115
Phone: 920-592-8400 Fax: 920-592-84844

This drawing and all information contained thereon is the property of Stantec. Stantec will not be held liable for improper or incorrect usage. Professional seals and signatures do not apply to electronic drawing files. The user assumes all responsibility and risk for the accuracy and verification of all information contained in electronic files.

SITE LOCATION & LOCAL TOPOGRAPHY

ARROWHEAD PARK SITE
355 MILLVIEW DRIVE
NEENAH, WISCONSIN

DATE: 09/01/20	DRAWN BY: JRB	PROJECT MANAGER: LPC	PROJECT NUMBER: 193707958	FIGURE 1
----------------	---------------	----------------------	---------------------------	----------



Monitoring Well & Piezometer Locations

Stormwater catch basin Location

 1165 Scheuring Road, De Pere, Wisconsin 54115 Phone: 920-592-8400 Fax: 920-592-8444 This drawing and all information contained thereon is the property of Stantec. Stantec will not be held liable for improper or incorrect usage. Professional seals and signatures do not apply to electronic drawing files. The user assumes all responsibility and risk for the accuracy and verification of all information contained in electronic files.			ARROWHEAD PARK WITH MONITORING WELL LOCATIONS	
			NEENAH FOUNDRY SITE 716 HARRISON STREET, NEENAH, WISCONSIN	
DATE: 09/19/23	DRAWN BY: JRB	PROJECT MANAGER: LPC	PROJECT NUMBER: 193706450	Figure 2

ATTACHMENT A

Conceptual Arrowhead Park Plans



ATTACHMENT B

ECS Midwest, LLC Geotechnical Investigation



February 18, 2019

Mr. Trevor Frank
S.E.H., Inc.
425 W. Water Street, Suite 300
Appleton, WI 54911
Email: tfrank@sehinc.com

ECS Project No: 59-1591

Reference: **Proposed Arrowhead Park Phase 1 Development**
Millview Drive
Neenah, Wisconsin

Dear Mr. Frank:

ECS Midwest, LLC (ECS) has completed the subsurface exploration and laboratory testing for the above-referenced project. Our services were performed in general accordance with our Proposal No. 59:884-GP, dated December 7, 2018. This factual letter presents our understanding of the geotechnical aspects of the project and the results of the field exploration and laboratory testing program.

Scope of Services

Our scope of services included performing eleven (11) standard penetration test borings at the project site. During the field exploration, ECS continuously monitored the airspace using a personal gas meter and followed the safety protocols outlined in our proposal. These safety protocols included decontamination of our equipment before mobilizing to and from the site, as well as storing wash water and solids, cuttings, drilling fluids, and used PPE in sealed 55-gallon drums in a designated area of the site. We also implemented an in-situ and laboratory-testing program to help characterize the physical and engineering properties of the subsurface soils.

Project Information

The project site is located at the Arrowhead Park property in the City of Neenah, Wisconsin. Mr. Wayne Wambold with S.E.H., Inc., provided ECS with project information, which included a conceptual site plan. Based on the information provided, we understand the proposed project will include the development of park facilities including the construction of an activity building, paved walkways and parking lots, and a boardwalk.

Field Exploration

On December 18, 19, 20, and 21, 2018, ECS advanced eleven (11) standard penetration test borings at the project site. We advanced Boring B1-18 to an approximate depth of 50 feet and Boring B2-18 to 22 feet below the existing grade within the clay bulkhead dike. Across the rest of the site, we advanced Boring B3-18, B4-18, B6-18, and B7-18 to 20 feet, Boring B5-18, B8-18, and B10-18 to 22½ feet, Boring B9-18 to 23 feet, and Boring B11-18 to 25 feet below the existing grade. We also advanced an offset Boring B7A-18 to a depth of 6 feet below the existing grade. We utilized truck-mounted and an all-

terrain vehicle (ATV)-mounted drill rig equipped with continuous flight hollow stem augers to drill the test borings.

S.E.H., Inc., marked the test boring locations in the field. The approximate as-drilled test boring locations are shown on the attached Boring Location Diagram. S.E.H., Inc., also determined the ground surface elevations at the boring locations.

The drillers conducted standard penetration tests (SPTs) in the test borings at regular intervals in general accordance with ASTM D1586. We used the collected small representative samples obtained during tests to classify the soils. The obtained standard penetration resistances provide a general indication of soil relative density and consistency. As requested, ECS personnel also conducted a total of four (4) vane shear tests during the field exploration. We conducted the vane shear tests in Boring B7-18, B7A-18, and B8-18.

ECS collected undisturbed Shelby tubes at select locations and depths in general accordance with ASTM D1587. The drillers sealed the tubes at the site and transported them to our laboratory for extrusion, observation, and logging.

Please note, borehole backfill settlement or expansion can and will occur over time. Long term monitoring the boreholes after the initial drilling activities is not within our Scope of Services. Settlement or expansion of the borehole backfill can create a hazard and should be carefully monitored by the client or property owner.

Laboratory Testing

The laboratory testing performed by ECS consisted of selected tests performed on samples obtained during the field exploration, and included testing requested by Mr. Wayne Wambold with S.E.H., Inc. We performed classification and index property tests on representative soil samples obtained from the test borings to aid classification of the soils using the Unified Soil Classification System, and to help estimate engineering properties. The following paragraphs briefly describe the results of the completed laboratory testing program.

A geotechnical engineer visually classified each collected soil sample from the test borings on the basis of texture and plasticity in general accordance with the Unified Soil Classification System (USCS) and ASTM D2488, Standard Practice for Description and Identification of Soils (Visual-Manual Procedures). After classification, the geotechnical engineer grouped the various soil types into the major zones noted on the attached test boring logs. The group symbols for each soil type are indicated in parentheses at the beginning of the soil descriptions on the test boring logs. The stratification lines designating the interfaces between earth materials on the test boring logs are approximate; in-situ, the transitions may be gradual.

We performed calibrated hand penetrometer tests (Qp) on cohesive soil samples. In the hand penetrometer test, the unconfined compressive strength of a soil sample is estimated, to a maximum of 6 tons per square foot (tsf), by measuring the resistance of a soil sample to penetration by a small, calibrated, spring-loaded cylinder.

As requested by Mr. Wayne Wambold with S.E.H., Inc., ECS performed a one-dimensional consolidation test as well as tests to determine the moisture content, organic content, Atterberg limits (LL/PL), specific gravity, and dry density of select samples from the borings in accordance with relevant ASTM

procedures. In addition, ECS also contracted Soil Engineering Testing (S.E.T.), Inc. to perform triaxial testing and a one-dimensional consolidation test, as well as tests to determine the moisture content, organic content, Atterberg limits (LL/PL), specific gravity, and dry density of select samples from the borings. The results of these tests can be found in the attached to this report.

The soil samples will be retained in our laboratory for a period of 60 days, after which, they will be discarded unless other instructions are received as to their disposal.

Closing

ECS has prepared this report of findings to guide geotechnical-related design and construction aspects of the project. In fulfilling our obligations and responsibilities, as listed in the proposal, we performed these services in accordance with the standard of care expected of professionals in the industry performing similar services on projects of like size and complexity at this time in the region. No other representation, expressed or implied, and no warranty or guarantee is included or intended in this report.

It has been our pleasure to be of service to S.E.H, Inc. during the design phase of this project. We would appreciate the opportunity to provide our services during the construction phase to verify the assumptions of subsurface conditions made for this report. Please contact us should you have any questions concerning the information contained in this report, or if we can be of further assistance to you.

Respectfully,

ECS Midwest, LLC



Isaac MacMillan, E.I.T.
Staff Project Manager
imacmillan@ecslimited.com



Matthew A. Meyer, P.E.
Geotechnical Department Manager
mmeyer@ecslimited.com



Alex E. Barker, P.E.
Office Manager
abarker@ecslimited.com

Attachments:

- Reference Notes for Boring Logs
- Test Boring Logs B1-18 through B11-18
- Boring Location Diagram
- Subsurface Cross Sections
- Report of Vane Shear Tests
- Laboratory Test Reports
- Extruded TWT Sample Photographs
- Report of Environmental Monitoring

cc: Mr. Wayne Wambold, S.E.H., Inc.



REFERENCE NOTES FOR BORING LOGS

MATERIAL ^{1,2}	
	ASPHALT
	CONCRETE
	GRAVEL
	TOPSOIL
	VOID
	BRICK
	AGGREGATE BASE COURSE
	FILL³ MAN-PLACED SOILS
	GW WELL-GRADED GRAVEL gravel-sand mixtures, little or no fines
	GP POORLY-GRADED GRAVEL gravel-sand mixtures, little or no fines
	GM SILTY GRAVEL gravel-sand-silt mixtures
	GC CLAYEY GRAVEL gravel-sand-clay mixtures
	SW WELL-GRADED SAND gravelly sand, little or no fines
	SP POORLY-GRADED SAND gravelly sand, little or no fines
	SM SILTY SAND sand-silt mixtures
	SC CLAYEY SAND sand-clay mixtures
	ML SILT non-plastic to medium plasticity
	MH ELASTIC SILT high plasticity
	CL LEAN CLAY low to medium plasticity
	CH FAT CLAY high plasticity
	OL ORGANIC SILT or CLAY non-plastic to low plasticity
	OH ORGANIC SILT or CLAY high plasticity
	PT PEAT highly organic soils

DRILLING SAMPLING SYMBOLS & ABBREVIATIONS			
SS	Split Spoon Sampler	PM	Pressuremeter Test
ST	Shelby Tube Sampler	RD	Rock Bit Drilling
WS	Wash Sample	RC	Rock Core, NX, BX, AX
BS	Bulk Sample of Cuttings	REC	Rock Sample Recovery %
PA	Power Auger (no sample)	RQD	Rock Quality Designation %
HSA	Hollow Stem Auger		

PARTICLE SIZE IDENTIFICATION		
DESIGNATION	PARTICLE SIZES	
Boulders	12 inches (300 mm) or larger	
Cobbles	3 inches to 12 inches (75 mm to 300 mm)	
Gravel:	Coarse	¾ inch to 3 inches (19 mm to 75 mm)
	Fine	4.75 mm to 19 mm (No. 4 sieve to ¾ inch)
Sand:	Coarse	2.00 mm to 4.75 mm (No. 10 to No. 4 sieve)
	Medium	0.425 mm to 2.00 mm (No. 40 to No. 10 sieve)
	Fine	0.074 mm to 0.425 mm (No. 200 to No. 40 sieve)
Silt & Clay ("Fines")	<0.074 mm (smaller than a No. 200 sieve)	

COHESIVE SILTS & CLAYS		
UNCONFINED COMPRESSIVE STRENGTH, Q_p ⁴	SPT ⁵ (BPF)	CONSISTENCY ⁷ (COHESIVE)
<0.25	<3	Very Soft
0.25 - <0.50	3 - 4	Soft
0.50 - <1.00	5 - 8	Firm
1.00 - <2.00	9 - 15	Stiff
2.00 - <4.00	16 - 30	Very Stiff
4.00 - 8.00	31 - 50	Hard
>8.00	>50	Very Hard

RELATIVE AMOUNT ⁷	COARSE GRAINED (%) ⁸	FINE GRAINED (%) ⁸
Trace	≤5	≤5
Dual Symbol (ex: SW-SM)	10	10
With	15 - 20	15 - 25
Adjective (ex: "Silty")	≥25	≥30

GRAVELS, SANDS & NON-COHESIVE SILTS	
SPT ⁵	DENSITY
<5	Very Loose
5 - 10	Loose
11 - 30	Medium Dense
31 - 50	Dense
>50	Very Dense

WATER LEVELS ⁶		
	WL	Water Level (WS)(WD) (WS) While Sampling (WD) While Drilling
	SHW	Seasonal High WT
	ACR	After Casing Removal
	SWT	Stabilized Water Table
	DCI	Dry Cave-In
	WCI	Wet Cave-In

¹Classifications and symbols per ASTM D 2488-09 (Visual-Manual Procedure) unless noted otherwise.

²To be consistent with general practice, "POORLY GRADED" has been removed from GP, GP-GM, GP-GC, SP, SP-SM, SP-SC soil types on the boring logs.

³Non-ASTM designations are included in soil descriptions and symbols along with ASTM symbol [Ex: (SM-FILL)].

⁴Typically estimated via pocket penetrometer or Torvane shear test and expressed in tons per square foot (tsf).

⁵Standard Penetration Test (SPT) refers to the number of hammer blows (blow count) of a 140 lb. hammer falling 30 inches on a 2 inch OD split spoon sampler required to drive the sampler 12 inches (ASTM D 1586). "N-value" is another term for "blow count" and is expressed in blows per foot (bpf).

⁶The water levels are those levels actually measured in the borehole at the times indicated by the symbol. The measurements are relatively reliable when augering, without adding fluids, in granular soils. In clay and cohesive silts, the determination of water levels may require several days for the water level to stabilize. In such cases, additional methods of measurement are generally employed.

⁷Minor deviation from ASTM D 2488-09 Note 16.

⁸Percentages are estimated to the nearest 5% per ASTM D 2488-09.

CLIENT Short Elliott Hendrickson, Inc.				Job #: 59:1591		BORING # B1-18		SHEET 1 OF 2		
PROJECT NAME Arrowhead Park Phase 1				ARCHITECT-ENGINEER Alex E. Barker						
SITE LOCATION 355 Millview Drive, Neenah, Winnebago, WI										
NORTHING		EASTING		STATION		○ CALIBRATED PENETROMETER TONS/FT² ROCK QUALITY DESIGNATION & RECOVERY RQD% --- REC% --- PLASTIC LIMIT% WATER CONTENT% LIQUID LIMIT% ⊗ STANDARD PENETRATION BLOWS/FT				
DEPTH (FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DIST. (IN)	RECOVERY (IN)	DESCRIPTION OF MATERIAL	ENGLISH UNITS	WATER LEVELS ELEVATION (FT)	BLOWS/6"		
					BOTTOM OF CASING	LOSS OF CIRCULATION				
					SURFACE ELEVATION 744.23					
0	S-1	SS	24	18	Topsoil Thickness [9"]			4		
					(GM) Fill, SILTY GRAVEL, dark grayish brown, gray and brown, moist, medium dense			8		
	S-2	SS	24	12	(CL) Fill, LEAN CLAY WITH GRAVEL, trace organic silt, brown and dark brown, moist, stiff to very stiff			9		
					(CL) Fill, LEAN CLAY, trace gravel, lenses of organic silt, brown and dark brown, moist, very stiff to soft		740	4		
5	S-3	SS	24	8				3		
	S-4	SS	18	9				3		
								2		
	S-5	SS	18	6				3		
10					(CH) Lacustrine, FAT CLAY, reddish brown, moist, soft		735	1		
	S-6	ST	24	18	(OH/PT) Swamp deposit, ORGANIC SILT/ PEAT, black, moist			1		
					(CH) Lacustrine, FAT CLAY, lenses of silt, reddish brown and light gray, moist, soft to firm		730	3		
15	S-7	SS	18	18				3		
	S-8	SS	18	18	(CH) Lacustrine, FAT CLAY, reddish brown, moist, soft to firm			5		
								2		
	S-9	ST	24	23	(CL) Lacustrine, LEAN CLAY, trace fine roots, grayish brown and brown, moist to wet, soft to firm		725	2		
20								2		
	S-10	SS	18	18				2		
					(SP) Glacial till, MEDIUM TO COARSE SAND, trace gravel, gray, wet, medium dense		720	1		
25	S-11	SS	18	14				2		
								6		
	S-12	SS	18	18	(CL) Glacial till, LEAN CLAY WITH GRAVEL, brown and reddish brown, wet, stiff to very stiff			8		
					(CL) Glacial till, LEAN CLAY, trace gravel, lenses of coarse sand, reddish brown, moist to wet, very stiff		715	2		
30	S-13	SS	18	18				5		
								7		
								9		

CONTINUED ON NEXT PAGE.

THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES. IN-SITU THE TRANSITION MAY BE GRADUAL.					
WL 23	WS ☐	WD ☒	BORING STARTED	12/18/18	CAVE IN DEPTH
WL(SHW)	WL(ACR)		BORING COMPLETED	12/18/18	HAMMER TYPE Auto
WL			RIG TRUCK	FOREMAN BB/IM	DRILLING METHOD 3.25" HSA 0' to 25', DM 25' to 48.5'

CLIENT Short Elliott Hendrickson, Inc.				Job #: 59:1591	BORING # B1-18	SHEET 2 OF 2	
PROJECT NAME Arrowhead Park Phase 1				ARCHITECT-ENGINEER Alex E. Barker			
SITE LOCATION 355 Millview Drive, Neenah, Winnebago, WI							
NORTHING EASTING STATION				CALIBRATED PENETROMETER TONS/FT ² ROCK QUALITY DESIGNATION & RECOVERY RQD% --- REC% --- PLASTIC LIMIT% WATER CONTENT% LIQUID LIMIT% X ● △ STANDARD PENETRATION BLOWS/FT			
DEPTH (FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DIST. (IN)	RECOVERY (IN)	DESCRIPTION OF MATERIAL ENGLISH UNITS BOTTOM OF CASING LOSS OF CIRCULATION SURFACE ELEVATION 744.23	WATER LEVELS ELEVATION (FT)	BLOWS/6"
35	S-14	SS	18	18	(CL) Glacial till, LEAN CLAY, trace gravel, lenses of coarse sand, reddish brown, moist to wet, very stiff	710	19 2.0
	S-15	SS	18	14	(CL) Glacial till, LEAN CLAY, trace gravel, reddish brown and brown, moist, very stiff to hard	710	22 2.0
	S-16	SS	18	16		705	17 2.0 3.0
40	S-17	SS	18	10		705	17 2.0 4.0
	S-18	SS	18	11		700	19 2.0
45	S-19	SS	18	18		700	13 2.0
	S-20	SS	18	18	(CL) Glacial till, LEAN CLAY WITH COBBLES, trace gravel, reddish brown, moist, stiff to very stiff	695	18 2.5
50	S-21	SS	18	18	END OF BORING @ 50'	695	20 3.0
55						690	
60						685	
THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES. IN-SITU THE TRANSITION MAY BE GRADUAL.							
WL 23 WS ☐ WD ☒		BORING STARTED 12/18/18		CAVE IN DEPTH			
WL(SHW) WL(ACR) ☒		BORING COMPLETED 12/18/18		HAMMER TYPE Auto			
WL		RIG TRUCK FOREMAN BB/IM		DRILLING METHOD 3.25" HSA 0' to 25', DM 25' to 48.5'			

CLIENT Short Elliott Hendrickson, Inc.				Job #: 59:1591	BORING # B2-18	SHEET 1 OF 1	
PROJECT NAME Arrowhead Park Phase 1				ARCHITECT-ENGINEER Alex E. Barker			
SITE LOCATION 355 Millview Drive, Neenah, Winnebago, WI							

NORTHING		EASTING	STATION
----------	--	---------	---------

DEPTH (FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DIST. (IN)	RECOVERY (IN)	DESCRIPTION OF MATERIAL	ENGLISH UNITS	WATER LEVELS	ELEVATION (FT)	BLOWS/6"
0					Topsoil Thickness [10"]			745	
1	S-1	SS	24	12	(CL) Fill, LEAN CLAY WITH GRAVEL AND COBBLES, brown, reddish brown and dark brown, moist, stiff to very stiff				
2	S-2	SS	24	15	(GC) Fill, CLAYEY GRAVEL WITH COBBLES, brown, moist, stiff to hard				
3	S-3	SS	24	8	(CL) Fill, LEAN CLAY WITH SAND AND GRAVEL, brown, reddish brown and gray, moist, hard to firm				
4	S-4	SS	18	0					
5	S-5	ST	24	5	(CL) Lacustrine, LEAN CLAY, lenses of organic silt, reddish brown, gray and dark gray, moist, very soft to firm				
6	S-6	SS	18	10					
7	S-7	ST	24	20	(PT) Swamp deposit, PEAT, black, moist, very soft to soft				
8	S-8	SS	18	18					
9	S-9	ST	24	24	(CL) Glacial till, LEAN CLAY, trace gravel, dark brown, moist, stiff to very stiff				
10	S-10	SS	24	14					
					END OF BORING @ 22'				

CALIBRATED PENETROMETER TONS/FT²
 ROCK QUALITY DESIGNATION & RECOVERY
 RQD% --- REC% ---
 PLASTIC LIMIT% WATER CONTENT% LIQUID LIMIT%
 STANDARD PENETRATION BLOWS/FT

THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES. IN-SITU THE TRANSITION MAY BE GRADUAL.					
WL 13 WS ☐ WD ☒	BORING STARTED	12/19/18	CAVE IN DEPTH		
WL(SHW) WL(ACR) 16	BORING COMPLETED	12/19/18	HAMMER TYPE Auto		
WL	RIG TRUCK	FOREMAN BB/IM	DRILLING METHOD 3.25" HSA 0' to 20'		

CLIENT Short Elliott Hendrickson, Inc.				Job #: 59:1591	BORING # B3-18	SHEET 1 OF 1	
PROJECT NAME Arrowhead Park Phase 1				ARCHITECT-ENGINEER Alex E. Barker			
SITE LOCATION 355 Millview Drive, Neenah, Winnebago, WI							

NORTHING		EASTING	STATION	CALIBRATED PENETROMETER TONS/FT ² ROCK QUALITY DESIGNATION & RECOVERY RQD% - - - REC% - - - PLASTIC LIMIT% WATER CONTENT% LIQUID LIMIT% X ● △ ⊗ STANDARD PENETRATION BLOWS/FT
DEPTH (FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DIST. (IN) RECOVERY (IN)	

DEPTH (FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DIST. (IN)	RECOVERY (IN)	DESCRIPTION OF MATERIAL ENGLISH UNITS	WATER LEVELS ELEVATION (FT)	BLOWS/6"
0					Topsoil Thickness [4"] (CL) Fill, LEAN CLAY, trace sand and fine roots, reddish brown, moist, soft to very stiff	745	2
	S-1	SS	24	20	Fill, PAPERMILL WASTE, bluish gray, moist, very soft to firm		1
	S-2	SS	24	11		2	
5	S-3	SS	24	13	(CL) Lacustrine, LEAN CLAY, lenses of silt, reddish brown and light gray, moist, very stiff to soft	740	1
	S-4	SS	18	18		1	
	S-5	SS	18	10		1	
10	S-6	SS	18	18		2	
	S-7	SS	18	18		730	2
15	S-8	SS	18	18		3	
	S-9	SS	18	18		5	
20						2	
					END OF BORING @ 20'	725	2
25						720	
30						715	

THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES. IN-SITU THE TRANSITION MAY BE GRADUAL.

WL 6 WS ☐ WD ☒	BORING STARTED 12/20/18	CAVE IN DEPTH
WL(SHW) WL(ACR) ☒	BORING COMPLETED 12/20/18	HAMMER TYPE Auto
WL	RIG ATV FOREMAN GB/IM	DRILLING METHOD 3.25" HSA 0' to 18.5

CLIENT Short Elliott Hendrickson, Inc.				Job #: 59:1591	BORING # B4-18	SHEET 1 OF 1	
PROJECT NAME Arrowhead Park Phase 1				ARCHITECT-ENGINEER Alex E. Barker			
SITE LOCATION 355 Millview Drive, Neenah, Winnebago, WI							

NORTHING		EASTING	STATION
----------	--	---------	---------

DEPTH (FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DIST. (IN)	RECOVERY (IN)	DESCRIPTION OF MATERIAL	ENGLISH UNITS	WATER LEVELS ELEVATION (FT)	BLOWS/6"
0					(CL) Fill, LEAN CLAY, trace fine roots, reddish brown, moist, very soft to form		745	
	S-1	SS	24	12	Fill, PAPERMILL WASTE, gray, moist, very soft to soft			
	S-2	ST	24	6				
5							740	
	S-3	SS	12	0				
	S-4	ST	24	14				
10							735	
	S-5	SS	18	4				
	S-6	SS	18	11	(CL) Possible fill, SANDY LEAN CLAY WITH GRAVEL, trace organic silt, reddish brown, dark brown and gray, moist, stiff			
15					(CL) Glacial till, LEAN CLAY WITH SILT, brown, moist, soft to stiff		730	
	S-7	SS	18	18				
	S-8	SS	18	15	(CL) Glacial till, LEAN CLAY, trace gravel, reddish brown, moist, stiff to hard			
20							725	
	S-9	SS	18	10				
25					END OF BORING @ 20'		720	
30							715	

CALIBRATED PENETROMETER TONS/FT²
 ROCK QUALITY DESIGNATION & RECOVERY
 RQD% --- REC% ---
 PLASTIC LIMIT% WATER CONTENT% LIQUID LIMIT%
 STANDARD PENETRATION BLOWS/FT

THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES. IN-SITU THE TRANSITION MAY BE GRADUAL.

WL 13 WS ☐ WD ☒	BORING STARTED 12/20/18	CAVE IN DEPTH
WL(SHW) WL(ACR) 13	BORING COMPLETED 12/20/18	HAMMER TYPE Auto
WL	RIG ATV FOREMAN GB/IM	DRILLING METHOD 3.25" HSA 0' to 18.5

CLIENT Short Elliott Hendrickson, Inc.				Job #: 59:1591		BORING # B5-18		SHEET 1 OF 1		
PROJECT NAME Arrowhead Park Phase 1				ARCHITECT-ENGINEER Alex E. Barker						
SITE LOCATION 355 Millview Drive, Neenah, Winnebago, WI										
NORTHING		EASTING		STATION		○ CALIBRATED PENETROMETER TONS/FT² ROCK QUALITY DESIGNATION & RECOVERY RQD% - - - REC% ——— PLASTIC LIMIT% WATER CONTENT% LIQUID LIMIT% ✕ ————— ● ————— △ ⊗ STANDARD PENETRATION BLOWS/FT				
DEPTH (FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DIST. (IN)	RECOVERY (IN)	DESCRIPTION OF MATERIAL					
					BOTTOM OF CASING LOSS OF CIRCULATION		SURFACE ELEVATION 751.55			
0	S-1	SS	24	14	(GC) Fill, CLAYEY GRAVEL, brown, moist to wet, medium dense		750	19		
	S-2	SS	24	10	(CL) Fill, LEAN CLAY, trace gravel, reddish brown, dark brown and brown, moist, firm			5		
5	S-3	SS	24	9				6		
	S-4	SS	18	12	(CL) Fill, LEAN CLAY, trace fine roots and organic silt, reddish brown and brown, moist, very stiff to firm		745	6		
	S-5	SS	18	8				7		
10	S-6	SS	18	18	Fill, PAPERMILL WASTE, gray and light greenish gray, moist, very soft to firm		740	2		
	S-7	SS	18	18				2		
15	S-8	SS	18	18			735	3		
	S-9	SS	18	0	(CL) Lacustrine, SANDY LEAN CLAY WITH ORGANIC SILT, dark brown, moist, very soft to firm			4		
20	S-10	SS	24	24	(CL) Glacial till, SANDY LEAN CLAY, brown and reddish brown, moist to wet, soft to stiff		730	13		
					END OF BORING @ 22.5'			2.0		
25										
30										

THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES. IN-SITU THE TRANSITION MAY BE GRADUAL.

WL 18 WS ☐ WD ☒	BORING STARTED 12/20/18	CAVE IN DEPTH
WL(SHW) WL(ACR)	BORING COMPLETED 12/20/18	HAMMER TYPE Auto
WL	RIG ATV FOREMAN GB/IM	DRILLING METHOD 3.25" HSA 0' to 20.5

CLIENT Short Elliott Hendrickson, Inc.				Job #: 59:1591	BORING # B7-18	SHEET 1 OF 1	
PROJECT NAME Arrowhead Park Phase 1				ARCHITECT-ENGINEER Alex E. Barker			
SITE LOCATION 355 Millview Drive, Neenah, Winnebago, WI							

NORTHING		EASTING	STATION
----------	--	---------	---------

DEPTH (FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DIST. (IN)	RECOVERY (IN)	DESCRIPTION OF MATERIAL	ENGLISH UNITS	WATER LEVELS ELEVATION (FT)	BLOWS/6"
					BOTTOM OF CASING	LOSS OF CIRCULATION		
0	S-1	SS	24	10	(CL) Fill, LEAN CLAY WITH FINE ROOTS, trace gravel, brown, moist to wet, soft firm			1 1 3 4 1 3 5 5
	S-2	SS	24	5				1 2 1 1 2
5	S-3	SS	24	0	Fill, PAPERMILL WASTE, gray and bluish gray, moist, very soft to stiff			1 1 1 1 1 1 1 1
	S-4	SS	18	14				1 1 1 1 1 1 1 1
	S-5	SS	18	18				1 1 1 1 1 1 1 1
10	S-6	ST	24	23				1 1 1 1 1 1 1 1
	S-7	SS	18	18	(CL) Lacustrine, LEAN CLAY, brown, moist, soft			1 2 1 1 1 1 1 1
15	S-8	SS	18	16	(CL) Glacial till, LEAN CLAY, trace sand and gravel, brown, moist, very stiff			3 4 6
20					END OF BORING @ 20'			
25								
30								

CALIBRATED PENETROMETER TONS/FT²
 ROCK QUALITY DESIGNATION & RECOVERY
 RQD% --- REC% ---
 PLASTIC LIMIT% WATER CONTENT% LIQUID LIMIT%
 STANDARD PENETRATION BLOWS/FT

THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES. IN-SITU THE TRANSITION MAY BE GRADUAL.					
WL 8	WS ☐ WD ☒	BORING STARTED	12/21/18	CAVE IN DEPTH	
WL(SHW)	WL(ACR)	BORING COMPLETED	12/21/18	HAMMER TYPE Auto	
WL		RIG ATV	FOREMAN BB/MH	DRILLING METHOD 3.25" HSA 0' to 20'	

CLIENT Short Elliott Hendrickson, Inc.				Job #: 59:1591	BORING # B7A-18	SHEET 1 OF 1	
PROJECT NAME Arrowhead Park Phase 1				ARCHITECT-ENGINEER Alex E. Barker			
SITE LOCATION 355 Millview Drive, Neenah, Winnebago, WI							

NORTHING	EASTING	STATION	
----------	---------	---------	--

DEPTH (FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DIST. (IN)	RECOVERY (IN)	DESCRIPTION OF MATERIAL	ENGLISH UNITS	WATER LEVELS	ELEVATION (FT)	BLOWS/6"
0					Blind drill to 4'				
5	S-1	ST	24	12	Fill, PAPERMILL WASTE, gray and bluish gray, moist				
					END OF BORING @ 6'				
10					Note: Boring offset 5' South of B7-18.				
15									
20									
25									
30									

THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES. IN-SITU THE TRANSITION MAY BE GRADUAL.

 WL ☐ WS ☒ WD	BORING STARTED 12/21/18	CAVE IN DEPTH
 WL(SHW) WL(ACR)	BORING COMPLETED 12/21/18	HAMMER TYPE Auto
WL	RIG ATV FOREMAN GB/MH	DRILLING METHOD 3.25" HSA 0' to 6'

CLIENT Short Elliott Hendrickson, Inc.				Job #: 59:1591	BORING # B9-18	SHEET 1 OF 1	
PROJECT NAME Arrowhead Park Phase 1				ARCHITECT-ENGINEER Alex E. Barker			
SITE LOCATION 355 Millview Drive, Neenah, Winnebago, WI							

NORTHING		EASTING	STATION
----------	--	---------	---------

DEPTH (FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DIST. (IN)	RECOVERY (IN)	DESCRIPTION OF MATERIAL	ENGLISH UNITS	WATER LEVELS	ELEVATION (FT)	BLOWS/6"
0					BOTTOM OF CASING	LOSS OF CIRCULATION			
					SURFACE ELEVATION 749.86				
0	S-1	SS	24	17	(GM) Fill, SILTY GRAVEL WITH COBBLES, brown, gray and dark brown, wet to moist, very dense			745	27
	S-2	SS	15	3				745	22
					(CL) Fill, LEAN CLAY WITH GRAVEL, trace cobbles, brown, reddish brown and gray, moist, very hard to very stiff			745	28
5	S-3	SS	17	12				745	16
	S-4	SS	18	14				745	3
					Fill, PAPERMILL WASTE, gray and bluish gray, moist, soft to firm			745	5
10	S-5	SS	18	0				740	50/3
	S-6	ST	24	18				740	3
	S-7	SS	18	16				740	50/5
15	S-8	ST	24	24				735	3
	S-9	SS	18	18	(CL) Glacial till, LEAN CLAY, brown and reddish brown, moist, firm to very stiff			735	5
20	S-10	SS	24	24				730	11
					END OF BORING @ 23'			725	3
25								725	5
30								720	6

ROCK QUALITY DESIGNATION & RECOVERY
RQD% - - - REC% - - -

PLASTIC LIMIT% WATER CONTENT% LIQUID LIMIT%

STANDARD PENETRATION BLOWS/FT

THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES. IN-SITU THE TRANSITION MAY BE GRADUAL.

WL	WS ☐ WD ☒	BORING STARTED	12/19/18	CAVE IN DEPTH
WL(SHW)	WL(ACR)	BORING COMPLETED	12/19/18	HAMMER TYPE Auto
WL		RIG TRUCK	FOREMAN BB/IM	DRILLING METHOD 3.25" HSA 0' to 21'

CLIENT Short Elliott Hendrickson, Inc.				Job #: 59:1591	BORING # B10-18	SHEET 1 OF 1	
PROJECT NAME Arrowhead Park Phase 1				ARCHITECT-ENGINEER Alex E. Barker			
SITE LOCATION 355 Millview Drive, Neenah, Winnebago, WI							
NORTHING		EASTING		STATION		CALIBRATED PENETROMETER TONS/FT² ROCK QUALITY DESIGNATION & RECOVERY RQD% --- REC% --- PLASTIC LIMIT% WATER CONTENT% LIQUID LIMIT% STANDARD PENETRATION BLOWS/FT	
DEPTH (FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DIST. (IN)	RECOVERY (IN)	DESCRIPTION OF MATERIAL		
					BOTTOM OF CASING LOSS OF CIRCULATION SURFACE ELEVATION 750.37		
					WATER LEVELS	ELEVATION (FT)	BLOWS/FT
0	S-1	SS	15	10	(GM) Fill, SILTY GRAVEL WITH COBBLES, gray and brown, moist, very dense		5 10 50/3
	S-2	SS	24	8	(CL) Fill, SANDY LEAN CLAY WITH GRAVEL, brown, dark brown, reddish brown and gray, moist, stiff to very stiff		10 8 8 7 4 5 8 50/6
5	S-3	SS	24	14	Fill, PAPERMILL WASTE, gray and bluish gray, moist, soft to stiff		5 8 5
	S-4	SS	18	3			2 3 2
	S-5	SS	18	16			2 1 2
10	S-6	SS	18	14	(CL) Glacial till, LEAN CLAY, trace sand and gravel, brown and reddish brown, moist, very stiff to hard		2 2 2
	S-7	SS	18	18			4 2 2
	S-8	SS	18	18			6 12 14 8 11 19 24
15	S-9	SS	24	20			
20	S-10	SS	24	24			
					END OF BORING @ 22.5'		
25							
30							

THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES. IN-SITU THE TRANSITION MAY BE GRADUAL.

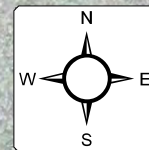
 WL WS ☐ WD ☒	BORING STARTED 12/20/18	CAVE IN DEPTH
 WL(SHW) WL(ACR)	BORING COMPLETED 12/20/18	HAMMER TYPE Auto
WL	RIG ATV FOREMAN GB/IM	DRILLING METHOD 3.25" HSA 0' to 20.5'

CLIENT Short Elliott Hendrickson, Inc.				Job #: 59:1591		BORING # B11-18		SHEET 1 OF 1		
PROJECT NAME Arrowhead Park Phase 1				ARCHITECT-ENGINEER Alex E. Barker						
SITE LOCATION 355 Millview Drive, Neenah, Winnebago, WI										
NORTHING		EASTING		STATION		○ CALIBRATED PENETROMETER TONS/FT² ROCK QUALITY DESIGNATION & RECOVERY RQD% - - - REC% - - - PLASTIC LIMIT% WATER CONTENT% LIQUID LIMIT% X ● △ ⊗ STANDARD PENETRATION BLOWS/FT				
DEPTH (FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DIST. (IN)	RECOVERY (IN)	DESCRIPTION OF MATERIAL					
					BOTTOM OF CASING LOSS OF CIRCULATION					
					SURFACE ELEVATION 753.84					
0	S-1	SS	24	12	(GM) Fill, SILTY GRAVEL, lenses of clay, brown and gray, moist, loose to very dense		750	8		
	S-2	SS	24	13				5		
5	S-3	SS	24	10				9		
	S-4	SS	18	6				5		
					(CL) Fill, LEAN CLAY WITH GRAVEL, brown and reddish brown, moist, stiff to very stiff		745	3		
10	S-5	SS	18	9				13		
	S-6	SS	18	11	Fill, PAPERMILL WASTE, grey and bluish gray, moist, soft to stiff			6		
	S-7	ST	24	23				4		
15	S-8	SS	18	18				14		
	S-9	SS	18	4				17		
20	S-10	SS	18	4	(CL) Possible fill, LEAN CLAY WITH SAND, brown, moist to wet, soft to stiff		735	5		
	S-11	SS	18	12				10		
25					END OF BORING @ 25'		730	16		
30							725			

THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES. IN-SITU THE TRANSITION MAY BE GRADUAL.

WL 22 WS ☐ WD ☒	BORING STARTED 12/19/18	CAVE IN DEPTH
WL(SHW) WL(ACR)	BORING COMPLETED 12/19/18	HAMMER TYPE Auto
WL	RIG TRUCK FOREMAN BB/IM	DRILLING METHOD 3.25" HSA 0' to 23.5'

Service Layer Credits: Esri, HERE, Garmin, © OpenStreetMap contributors



Legend



Approximate boring locations -



Boring Location Diagram ARROWHEAD PARK PHASE 1

355 MILLVIEW DRIVE, NEENAH, WI
SHORT ELLIOTT HENDRICKSON, INC.

ENGINEER
ILM

SCALE
1" = 250'

PROJECT NO.
59:1591

SHEET
1 OF 1

DATE
2/5/2019



REPORT OF VANE SHEAR TESTS

1060 Breezewood Lane, Suite 102
Neenah, WI 54956
ph 920-886-1406
fax 920-886-1409
www.ecslimited.com

Project: Arrowhead Park Phase 1
Neenah, Wisconsin

Copies:

Client: Mr. Trevor Frank
S.E.H Inc.

Date: February 5, 2019

ECS Project No: 59-1591

GENERAL:

Scope of Work: Standard Test Method for Field Vane Shear Test in Cohesive Soil

Date of Test: December 21, 2018
Test Location: Soil Borings
Test Performed By: B. Broennimann of ECS

Field Engineer: I. MacMillan of ECS
Material Source: In-situ

RESULTS:

Test Method: ASTM D2573

Boring No:	B7-18	B7A-18	B8-18	B8-18
Test No:	V1	V2	V3	V4
Depth	8 feet	6 feet	11 feet	13 feet
Soil Classification	Mill Waste	Mill Waste	Mill Waste	Mill Waste
Vane Diameter (in)	2.5	2.5	2.5	2.5
Vane Constant, k	2.59	2.59	2.59	2.59
Measured Torque (lb-in)	720	1,320	*	600
Measured Remolded Torque (lb-in)	660	840	*	600
Shear Strength, $(s_u)_{fv}$ (psf)	1,865	3,419	*	1,554
Remolded Shear Strength, $(s_{ur})_{fv}$ (psf)	1,709	2,176	*	1,554
Sensitivity	1.1	1.6	*	1.0

*Test V3 encountered an obstruction in the borehole resulting in damage to the vane.

NOTE: The shear strength values reported above have not been modified by a correction factor.

Respectfully Submitted,
ECS Midwest, LLC.



REPORT OF LABORATORY ANALYSIS OF SOIL

1060 Breezewood Lane, Suite 102
Neenah, WI 54956
ph 920-886-1406
fax 920-886-1409
www.ecslimited.com

Project: Arrowhead Park Phase 1
Neenah, Wisconsin

Copies:

Client: Mr. Trevor Frank
S.E.H, Inc.

Date: February 4, 2019

ECS File No: 59-1591

GENERAL:

Scope of Work: Perform laboratory testing on select soil samples.

Date of Test: January 22, 2019
Sampled By: B. Broennimann of ECS
Submitted By: M. Wisneski of ECS

Material Source: In-situ
Date Sampled: December 21, 2018

RESULTS:

Test Method: ASTM D2487 Classification of Soils for Engineering Purposes
ASTM D2216 Moisture Content of Soil
ASTM D2974 Organic Content of Soil
ASTM D4318 Atterberg Limits
ASTM D854 Specific gravity of Soil Solids

Boring Number	B1-18	B2-18	B3-18	B4-18	B4-18	B5-18	B7-18
Sample Number	3	3	4	2	4	6	4
Sample Depth	4' - 6'	4' - 6'	6' - 7½'	2' - 4'	6' - 8'	11' - 12½'	6' - 7½'
USCS Classification	CL	CL	Mill Waste	Mill Waste	Mill Waste	Mill Waste	Mill Waste
% Moisture	18%	13%	164%	42%	72%	116%	137%
% Organic	-----	-----	58.4%	-----	36.7%	41.8%	-----
Atterberg Limits (LL/PL)	44 / 18	40 / 17	-----	-----	-----	-----	Not Plastic
Specific Gravity (G _s)	-----	-----	-----	2.138	-----	-----	-----

REMARKS:

A portion of the sample will be held for 30 days after the date of this report and will then be discarded unless notified otherwise.

Respectfully Submitted,



REPORT OF LABORATORY ANALYSIS OF SOIL

1060 Breezewood Lane, Suite 102
Neenah, WI 54956
ph 920-886-1406
fax 920-886-1409
www.ecslimited.com

Project: Arrowhead Park Phase 1
Neenah, Wisconsin

Copies:

Client: Mr. Trevor Frank
S.E.H, Inc.

Date: February 4, 2019

ECS File No: 59-1591

GENERAL:

Scope of Work: Perform laboratory testing on select soil samples.

Date of Test: January 22, 2019
Sampled By: B. Broennimann of ECS
Submitted By: M. Wisneski of ECS

Material Source: In-situ
Date Sampled: December 21, 2018

RESULTS:

Test Method: ASTM D2487 Classification of Soils for Engineering Purposes
ASTM D2216 Moisture Content of Soil
ASTM D2974 Organic Content of Soil
ASTM D4318 Atterberg Limits
ASTM D854 Specific gravity of Soil Solids
ASTM D7263 Dry Density of Soil

Boring Number	B7A-18	B8-18	B9-18	B10-18
Sample Number	1	7	6	7
Sample Depth	4' – 6'	13½' – 15'	11' – 13'	13½' – 15'
USCS Classification	Mill Waste	Mill Waste	Mill Waste	Mill Waste
% Moisture	40%	110%	43%	119%
% Organic	24.5%	-----	23.6%	-----
Atterberg Limits (LL/PL)	-----	Not Plastic	-----	-----
Specific Gravity (G _s)	-----	-----	2.195	2.096
Dry Density (pcf)	65.3	-----	65.8	-----

REMARKS:

A portion of the sample will be held for 30 days after the date of this report and will then be discarded unless notified otherwise.

Respectfully Submitted,



REPORT OF CONSOLIDATION TEST

1060 Breezewood Lane, Suite 102
Neenah, WI 54956
ph 920-886-1406
fax 920-886-1409
www.ecslimited.com

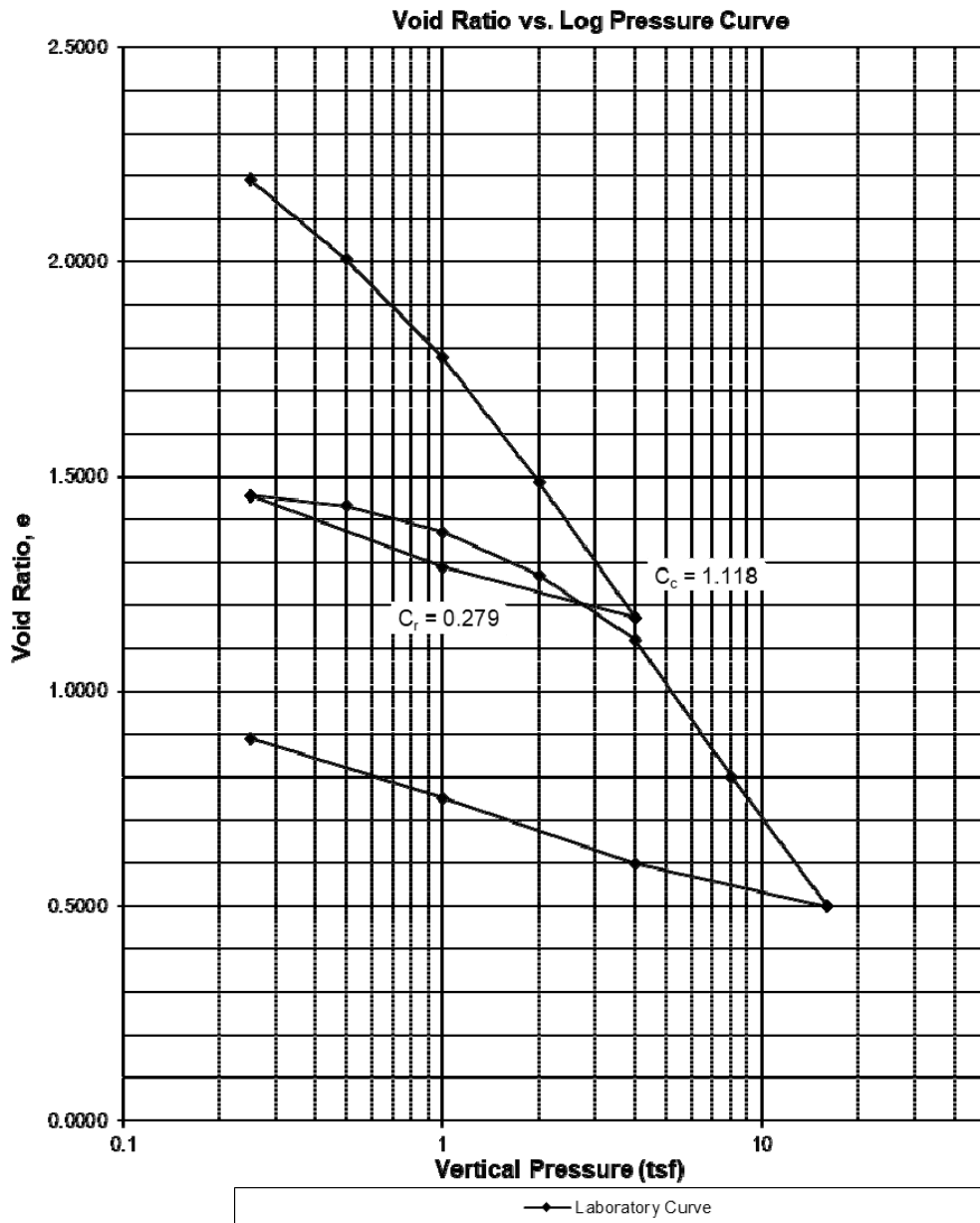
Project: **ARROWHEAD PARK PHASE 1
NEENAH, WISCONSIN**

ECS Project No: 59-1591

Client: Mr. Trevor Frank
S.E.H, Inc.

Date: February 4, 2019

Test Method	: ASTM D2435				
Boring Number	: B9-18	Specific Gravity	: 2.195	Initial Void Ratio, e_o	: 2.4271
Sample Number	: 6	Init. Dry Density	: 40 pcf	Est. Current Vert. Press., σ_o'	: 0.64 tsf
Sample Depth	: 11' – 13'	Init. Moisture	: 99.9%	Compression Index, C_c	: 1.118
USCS Description	: Paper Mill Waste			Recompression Index, C_r	: 0.279
Ave. Coefficient of Consolidation, C_v :	1.94x10 ⁻³ cm ² /sec (0.18 ft ² /day)			Preconsolidation Press, P_c'	: 0.95 tsf





REPORT OF CONSOLIDATION TEST

1060 Breezewood Lane, Suite 102
Neenah, WI 54956
ph 920-886-1406
fax 920-886-1409
www.ecslimited.com

Project: **ARROWHEAD PARK PHASE 1
NEENAH, WISCONSIN**

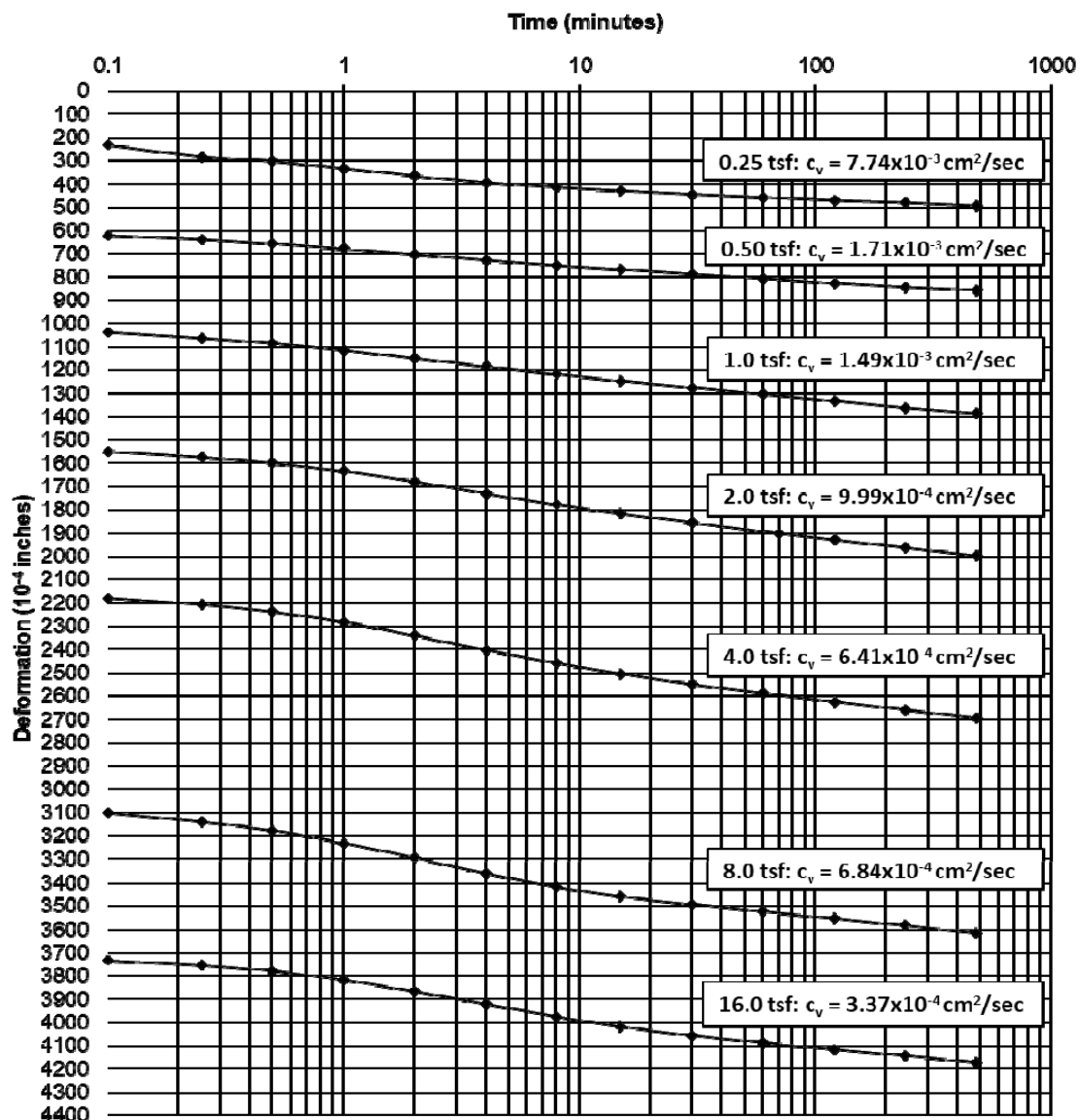
ECS Project No: 59-1591

Client: Mr. Trevor Frank
S.E.H, Inc.

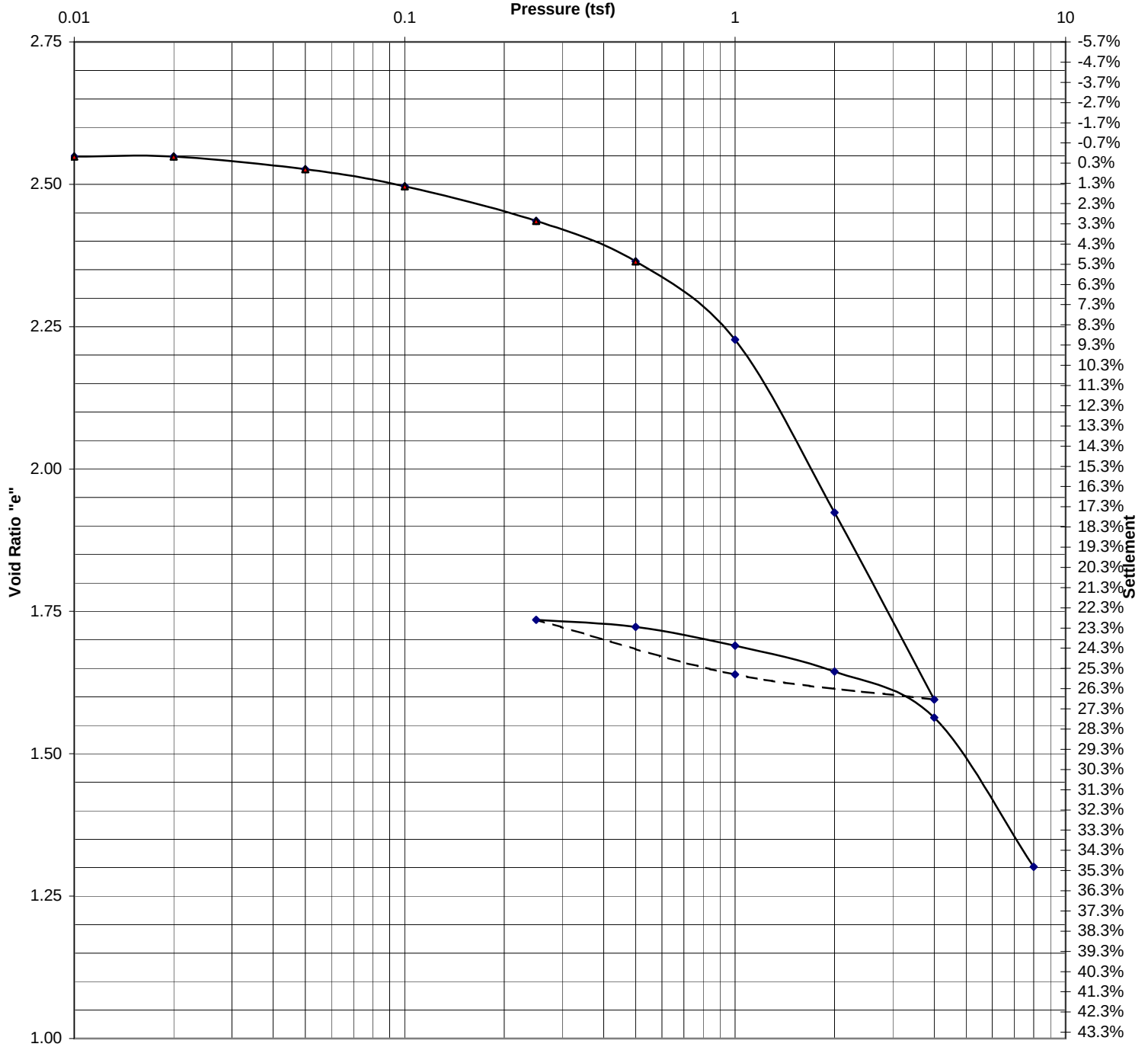
Date: February 4, 2019

Test Method	: ASTM D2435		
Boring Number	: B9-18	Specific Gravity	: 2.195
Sample Number	: 6	Init. Dry Density	: 40 pcf
Sample Depth	: 11' – 13'	Init. Moisture	: 99.9%
USCS Description	: Paper Mill Waste	Compression Index, C_c	: 1.118
Ave. Coefficient of Consolidation, C_v	: $1.94 \times 10^{-3} \text{ cm}^2/\text{sec}$ (0.18 ft ² /day)	Recompression Index, C_r	: 0.279
		Preconsolidation Press, P_c'	: 0.95 tsf
		Initial Void Ratio, e_o	: 2.4271
		Est. Current Vert. Press., σ_o'	: 0.64 tsf

Consolidation Log of Time Curves

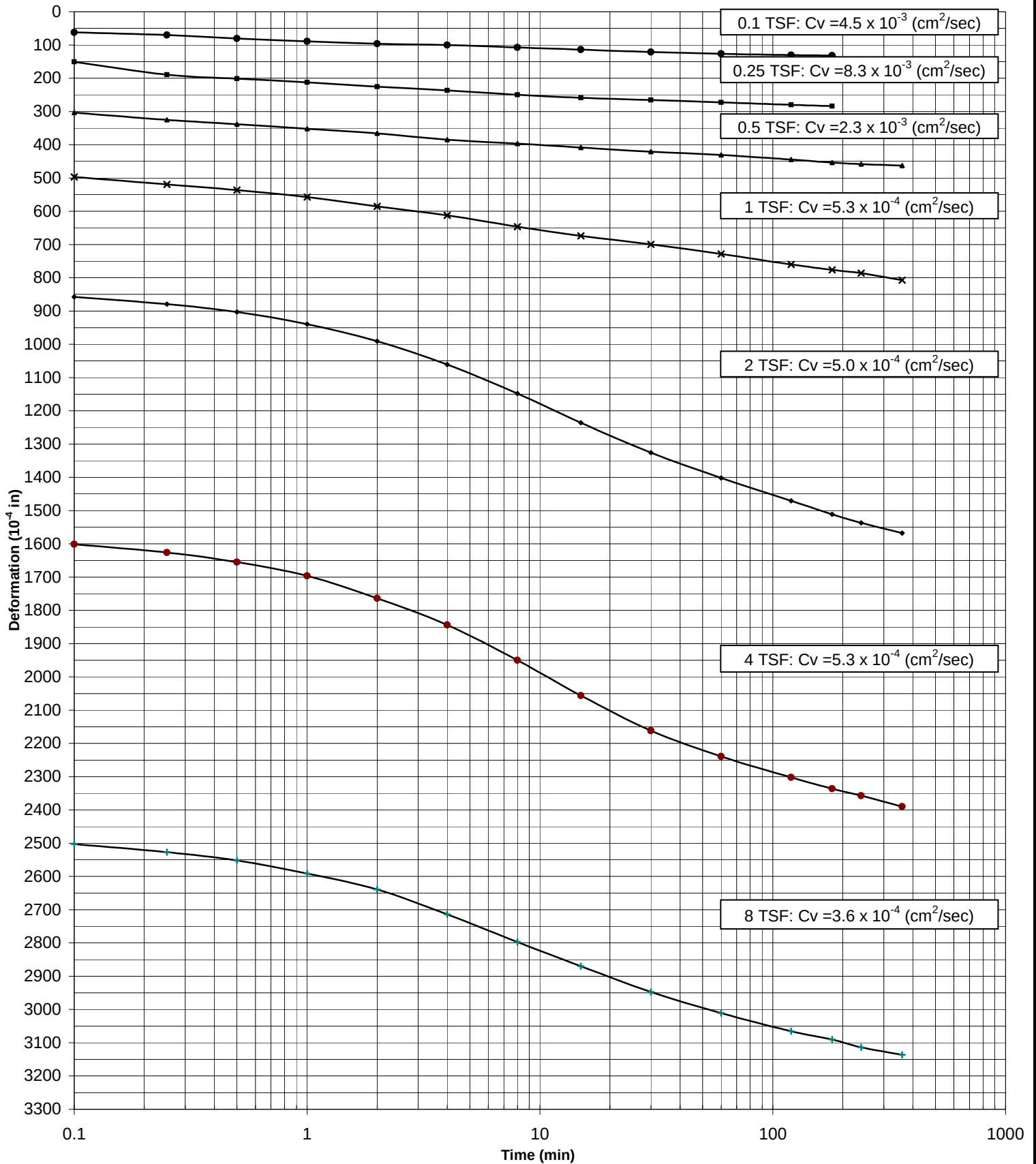


Void Ratio and % Settlement vs. Log of Pressure



Project: Arrowhead Park Phase 1 / ECS Midwest, LLC						Date:	1/23/18
Sample #:		Boring #: B7-18		Depth ft: 11-13		Job #:	11799
Soil Type: Paper Sludge							
Initial W/C (%): 105.5		Dry Density (pcf): 42.0		LL: 149	PL: 62	PI: 87	Gs: 2.39
Organic Content (%): 14.8		Initial Height (in.): 0.894		Diameter (in.): 2.500		e _o = 2.549	
Preconsolidation Pressure (Pc): 0.81 tsf		Compression Index (Cc): 1.05		Recompression Index (Cr): 0.14			
Remarks: Testing performed in general accordance with ASTM:D2435							

Consolidation Log of Time Curves



Project: Arrowhead Park Phase 1 / ECS Midwest, LLC

Date: 1/23/18

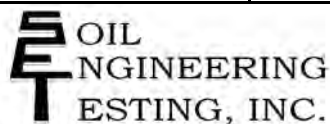
Sample #:

Boring #: B7-18

Depth ft: 11-13

Job #: 11799

9530 James Avenue South



Bloomington, Minnesota 55431

Laboratory Test Summary

Project: Arrowhead Park Phase 1

Job: 11799

Client: ECS Midwest, LLC

Date: 1/22/2019

Sample Information & Classification

Boring #	B1-18	B1-18	B1-18	B7-18				
Sample #	(clay)	(organic)						
Depth (ft)	11-13	11-13	18-20	11-13				
Sample Type	TWT	TWT	TWT	TWT				
Material Classification	Fat Clay w/gravel (CH)	Organic Silt (OH/PT)	Fat Clay (CH)	Paper Sludge				

Atterberg Limits (ASTM:D4318)

Liquid Limit	73	253	81	149				
Plastic Limit	21	133	25	62				
Plasticity Index	52	120	56	87				

Sample Information & Classification

Boring #								
Sample #								
Depth (ft)								
Sample Type								
Material Classification								

Atterberg Limits (ASTM:D4318)

Liquid Limit								
Plastic Limit								
Plasticity Index								

Laboratory Testing Summary

Project: Arrowhead Park Phase 1

Job: 11799

Client: ECS Midwest, LLC

Date: 1/24/19

Sample Information & Classification

Boring #	B7-18	B11-18					
Sample #							
Depth	11-13	13-15					
Type or BPF	TWT	TWT					
Classification	Paper Sludge	Paper Sludge					

Water Content, Organic Content (ASTM:D2974)

Water Content (%)	105.5	100.8					
Organic Content (%)	14.8	20.2					

Sample Information & Classification

Boring #							
Sample #							
Depth (ft)							
Type or BPF							
Classification							

Water Content, Organic Content (ASTM:D2974)

Water Content (%)							
Organic Content (%)							

Sample Information & Classification

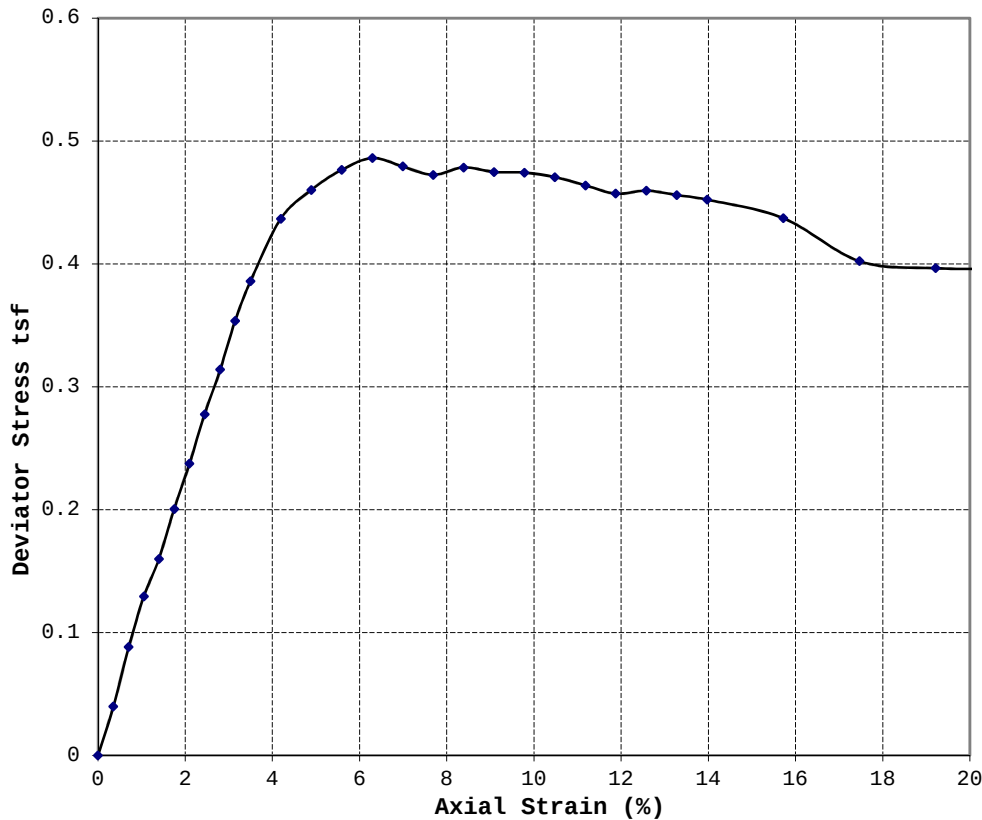
Boring #							
Sample #							
Depth (ft)							
Type or BPF							
Classification							

Water Content, Organic Content (ASTM:2974)

Water Content (%)							
Organic Content (%)							

Triaxial U-U Stress/Strain Curves (ASTM:D2850)

Project: Arrowhead Park Phase 1 Job: 11799
 Client: ECS Midwest, LLC Date: 1/17/19
 Remarks: Specimens trimmed to given sizes; Allowed to adjust under applied confining pressures for about 10 minutes.

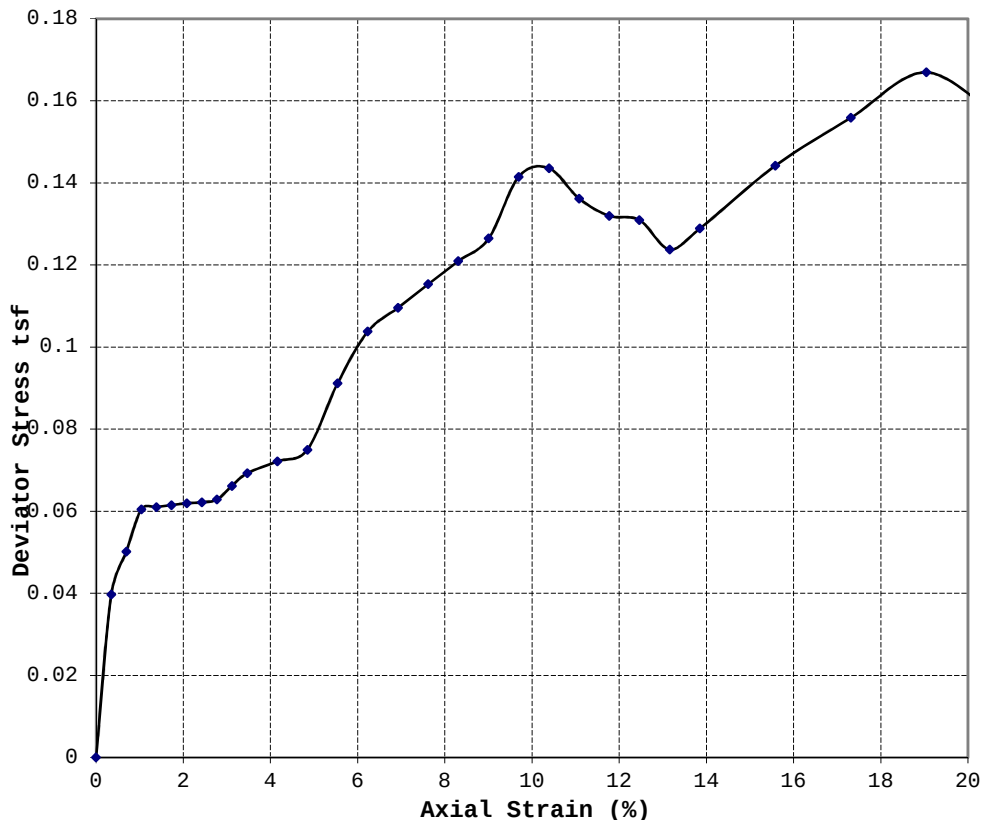
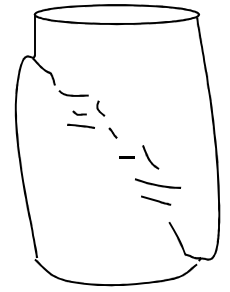


Boring: B7-18 Depth: 11-13
 Sample #:
 Soil Type: Paper Sludge
 Strain Rate (in/min): 0.060
 Sample Type: 3T
 Dia. (in): 1.42 Ht. (in): 2.86
 Height to Diameter Ratio: 2.01
 Max Deviator Stress: 0.49 tsf
 Strain at Failure (%): 6.3
 Confining Pressure: 1.0 tsf

W.C. (%): 121.2
 Yd (pcf): 37.2

LL: 149
 PL: 62
 PI: 87

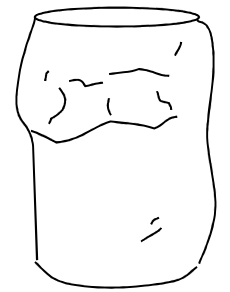
Sketch of Specimen After Failure



Boring: B-11 Depth: 13-15
 Sample #:
 Soil Type: Paper Sludge
 Strain Rate (in/min): 0.060
 Sample Type: 3T
 Dia. (in): 1.41 Ht. (in): 2.89
 Height to Diameter Ratio: 2.04
 Max Deviator Stress: 0.17 tsf
 Strain at Failure (%): 19.0
 Confining Pressure: 1.0 tsf

W.C. (%): 100.8
 Yd (pcf): 42.3

Sketch of Specimen After Failure



TRIAXIAL TEST ASTM: D 4767

Job No. 11799

Date: 1/24/19

Project: Arrowhead Park Phase 1 / ECS Midwest, LLC

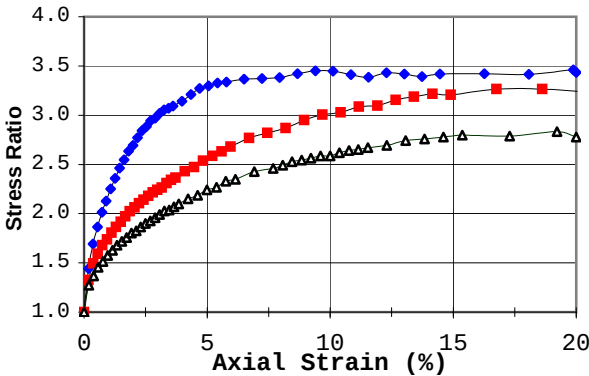
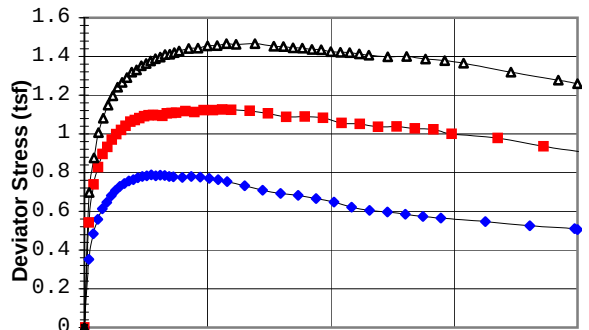
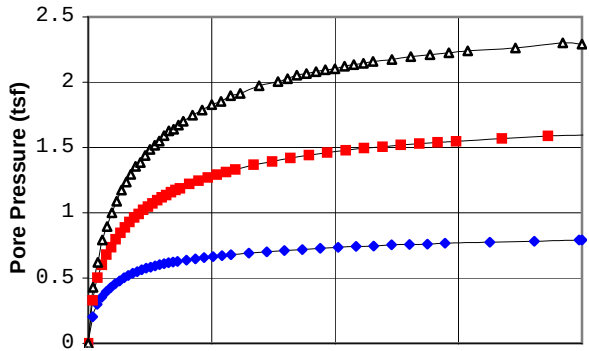
Boring #: B-1

Sample #:

Type: 3T

Depth (ft): 18-20

Soil Type: Fat Clay (CH)



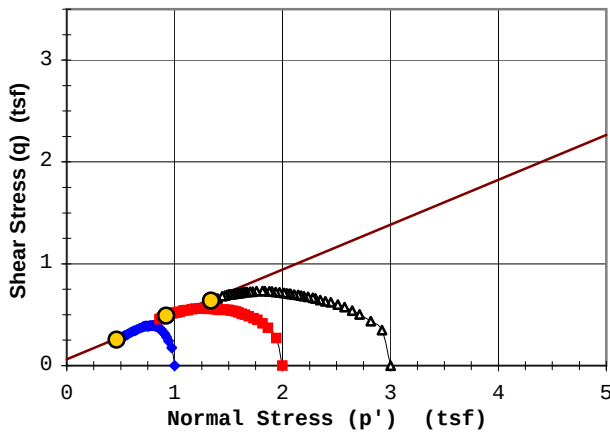
+

X

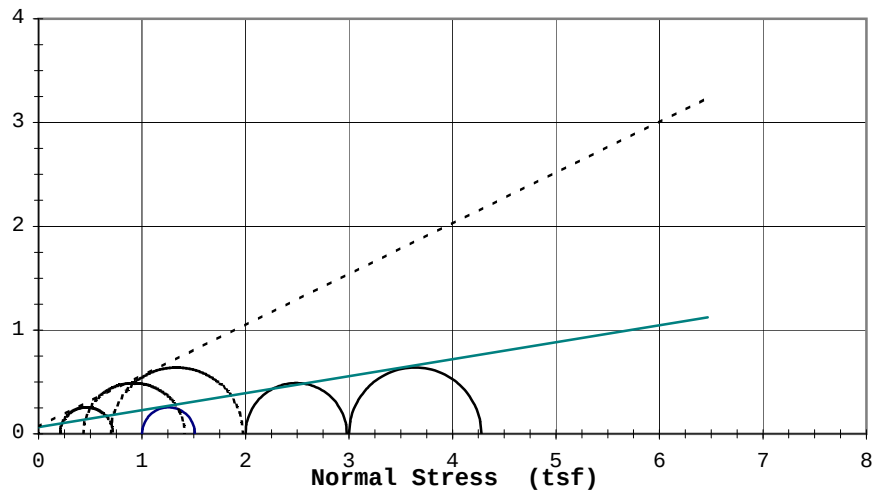
Failure Criterion:		Max. Stress Ratio				
Angle of internal friction, $\phi =$		26.1°				
Apparent Cohesion, $c' =$		0.07 (tsf)				
Test Date:	1/10/19	Liquid Limit:		81		
Test Type:	CU w/pp	Plastic Limit:		25		
Strain Rate (in/min):	0.000175	Plasticity Index:		56		
Strain Rate (%/min):	0.006	Spec. Gravity (Assumed):		2.73		
Before Consolidation		A	B	C	D	E
Diameter (in)		1.43	1.43	1.43		
Height (in)		2.86	2.86	2.86		
Water Content (%)		69.8	69.9	68.4		
Dry Density (pcf)		58.6	58.5	59.5		
Void Ratio		1.91	1.91	1.87		
After Consolidation		A	B	C	D	E
Diameter (in)		1.34	1.35	1.35		
Height (in)		2.77	2.68	2.60		
Water Content (%)		53.6	52.4	48.4		
Dry Density (pcf)		69.2	70.1	73.4		
Void Ratio		1.46	1.43	1.32		
Back Pressure (tsf)		4.0	5.3	8.9		
Minor Principal Stress (tsf)		1.00	2.00	3.00		
Max. Deviator Stress (tsf)		0.79	1.13	1.47		
Ultimate Deviator Stress (tsf)		0.51	0.91	1.26		
Deviator Stress at Failure (tsf)		0.51	0.98	1.28		
Max. Pore Pressure Buildup (tsf)		0.79	1.59	2.30		
Pore Pressure Parameter "B"		0.95	0.95	0.95		
Pct. Axial Strain at Failure		19.9	16.8	19.2		

"These test results are for informational purposes only and must be reviewed by a qualified professional engineer to verify that the test parameters shown are appropriate for any particular design"

Remarks: Radial drainage strips applied to trimmed specimen; Saturated, backpressured until "B" response was 0.95 to 1.00; Consolidated; All Drainage valves closed and immediately sheared.



Rupture Envelope at Failure
= 23.8° a = 0.1 (tsf)



Effective ϕ : 26.1° $c' =$ 0.07 (tsf)
Total ϕ : 9.3° $c =$ 0.06 (tsf)

TRIAXIAL TEST ASTM: D 4767

Job No. 11799

Date: 1/24/19

Project: Arrowhead Park Phase 1 / ECS Midwest, LLC

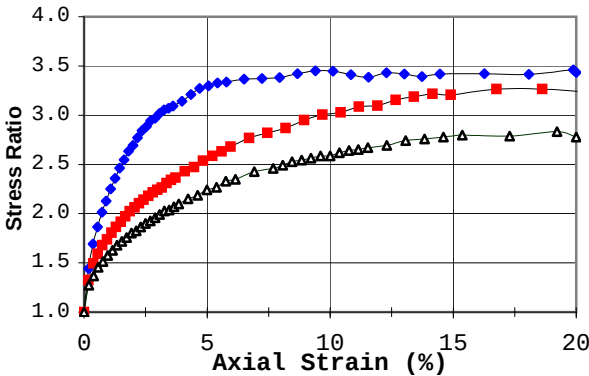
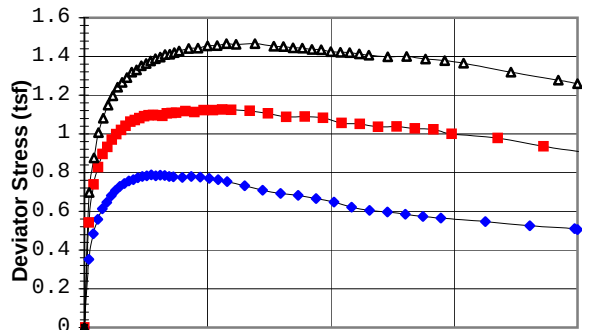
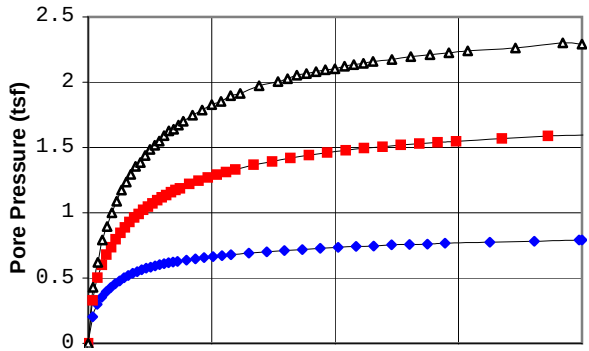
Boring #: B-1

Sample #:

Type: 3T

Depth (ft): 18-20

Soil Type: Fat Clay (CH)



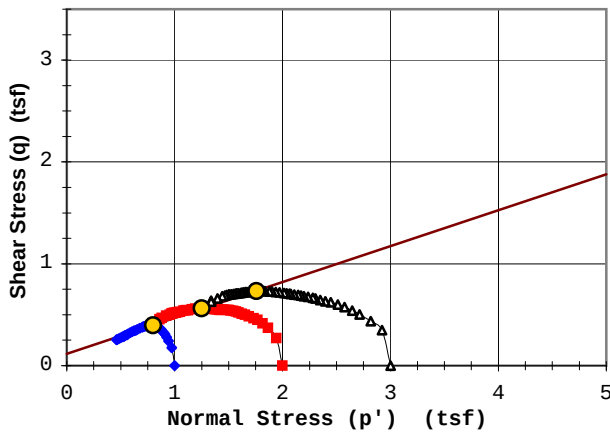
+

X

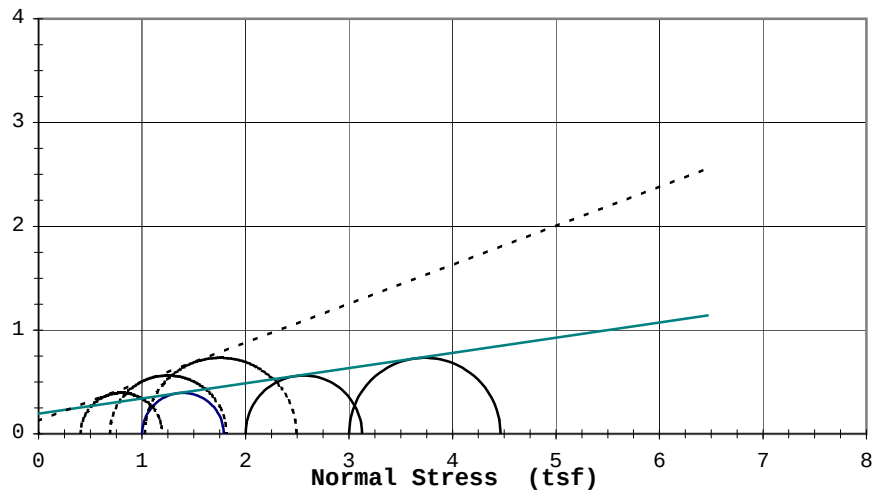
Failure Criterion:		Max. Deviator Stress				
Angle of internal friction, ' =		20.6 °				
Apparent Cohesion, c' =		0.12 (tsf)				
Test Date:	1/10/19	Liquid Limit:			81	
Test Type:	CU w/pp	Plastic Limit:			25	
Strain Rate (in/min):	0.000175	Plasticity Index:			56	
Strain Rate (%/min):	0.006	Spec. Gravity (Assumed):			2.73	
Before Consolidation		A	B	C	D	E
Diameter (in)		1.43	1.43	1.43		
Height (in)		2.86	2.86	2.86		
Water Content (%)		69.8	69.9	68.4		
Dry Density (pcf)		58.6	58.5	59.5		
Void Ratio		1.91	1.91	1.87		
After Consolidation						
Diameter (in)		1.34	1.35	1.35		
Height (in)		2.77	2.68	2.60		
Water Content (%)		53.6	52.4	48.4		
Dry Density (pcf)		69.2	70.1	73.4		
Void Ratio		1.46	1.43	1.32		
Back Pressure (tsf)		4.0	5.3	8.9		
Minor Principal Stress (tsf)		1.00	2.00	3.00		
Max. Deviator Stress (tsf)		0.79	1.13	1.47		
Ultimate Deviator Stress (tsf)		0.51	0.91	1.26		
Deviator Stress at Failure (tsf)		0.79	1.13	1.47		
Max. Pore Pressure Buildup (tsf)		0.79	1.59	2.30		
Pore Pressure Parameter "B"		0.95	0.95	0.95		
Pct. Axial Strain at Failure		2.7	5.6	6.9		

"These test results are for informational purposes only and must be reviewed by a qualified professional engineer to verify that the test parameters shown are appropriate for any particular design"

Remarks: Radial drainage strips applied to trimmed specimen; Saturated, backpressured until "B" response was 0.95 to 1.00; Consolidated; All Drainage valves closed and immediately sheared.



Rupture Envelope at Failure
= 19.4° $a = 0.1$ (tsf)



----- Effective $\phi' : 20.6^\circ$ $c' = 0.12$ (tsf)
_____ Total $\phi : 8.3^\circ$ $c = 0.19$ (tsf)

TRIAXIAL TEST ASTM: D 4767

Job No. 11799

Date: 1/24/19

Project: Arrowhead Park Phase 1 / ECS Midwest, LLC

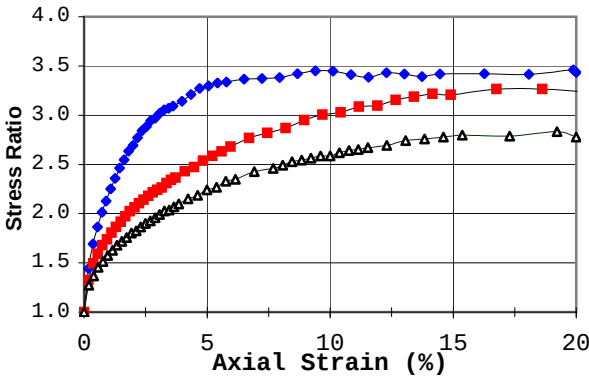
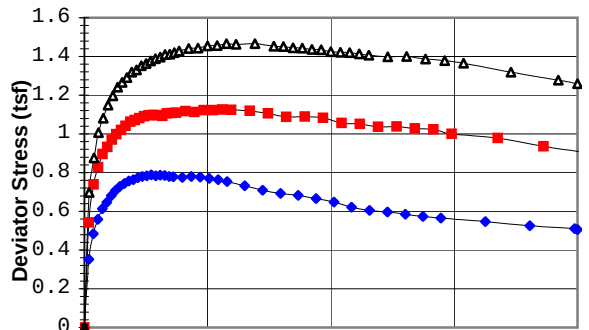
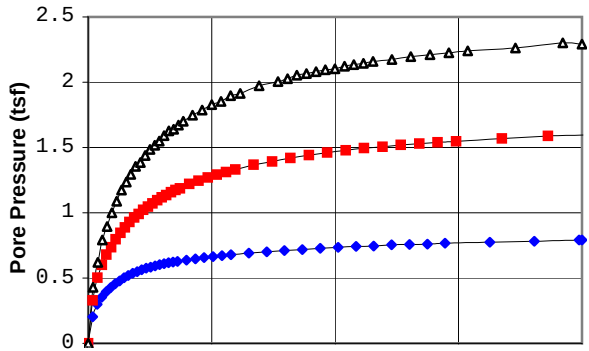
Boring #: B-1

Sample #:

Type: 3T

Depth (ft): 18-20

Soil Type: Fat Clay (CH)



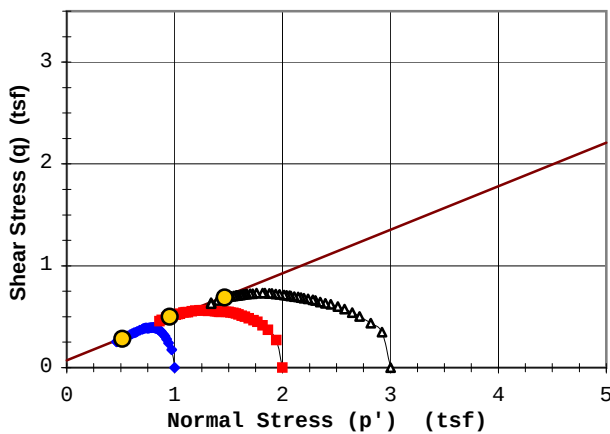
+

X

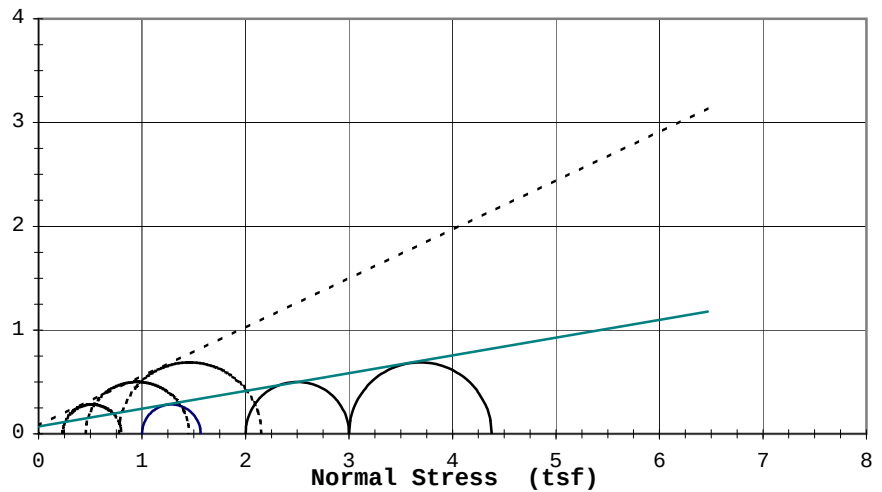
Failure Criterion:		Given Strain of: 15%				
Angle of internal friction, $\phi =$		25.3°				
Apparent Cohesion, $c' =$		0.08 (tsf)				
Test Date:	1/10/19	Liquid Limit:		81		
Test Type:	CU w/pp	Plastic Limit:		25		
Strain Rate (in/min):	0.000175	Plasticity Index:		56		
Strain Rate (%/min):	0.006	Spec. Gravity (Assumed):		2.73		
Before Consolidation		A	B	C	D	E
Diameter (in)		1.43	1.43	1.43		
Height (in)		2.86	2.86	2.86		
Water Content (%)		69.8	69.9	68.4		
Dry Density (pcf)		58.6	58.5	59.5		
Void Ratio		1.91	1.91	1.87		
After Consolidation						
Diameter (in)		1.34	1.35	1.35		
Height (in)		2.77	2.68	2.60		
Water Content (%)		53.6	52.4	48.4		
Dry Density (pcf)		69.2	70.1	73.4		
Void Ratio		1.46	1.43	1.32		
Back Pressure (tsf)		4.0	5.3	8.9		
Minor Principal Stress (tsf)		1.00	2.00	3.00		
Max. Deviator Stress (tsf)		0.79	1.13	1.47		
Ultimate Deviator Stress (tsf)		0.51	0.91	1.26		
Deviator Stress at Failure (tsf)		0.57	1.00	1.38		
Max. Pore Pressure Buildup (tsf)		0.79	1.59	2.30		
Pore Pressure Parameter "B"		0.95	0.95	0.95		
Pct. Axial Strain at Failure		15.0	15.0	15.0		

"These test results are for informational purposes only and must be reviewed by a qualified professional engineer to verify that the test parameters shown are appropriate for any particular design"

Remarks: Radial drainage strips applied to trimmed specimen; Saturated, backpressured until "B" response was 0.95 to 1.00; Consolidated; All Drainage valves closed and immediately sheared.



Rupture Envelope at Failure
= 23.1° a = 0.1 (tsf)



----- Effective ϕ : 25.3° $c' =$ 0.08 (tsf)
_____ Total ϕ : 9.7° $c =$ 0.07 (tsf)

Triaxial Data

Job: 11799

Boring:

B-1

Sample:

Depth:

18-20

Date:

1/24/19

Sample 1			Sample 2			Sample 3			Sample 4			Sample 5		
Strain (%)	Deviator Stress (tsf)	Pore Pressure (tsf)	Strain (%)	Deviator Stress (tsf)	Pore Pressure (tsf)	Strain (%)	Deviator Stress (tsf)	Pore Pressure (tsf)	Strain (%)	Deviator Stress (tsf)	Pore Pressure (tsf)	Strain (%)	Deviator Stress (tsf)	Pore Pressure (tsf)
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00						
0.18	0.35	0.20	0.19	0.54	0.33	0.19	0.70	0.43						
0.36	0.48	0.30	0.37	0.74	0.50	0.38	0.88	0.62						
0.54	0.56	0.35	0.56	0.83	0.60	0.58	1.01	0.79						
0.72	0.61	0.40	0.75	0.90	0.68	0.77	1.08	0.89						
0.90	0.65	0.43	0.93	0.93	0.74	0.96	1.15	1.00						
1.08	0.68	0.46	1.12	0.97	0.80	1.15	1.20	1.09						
1.26	0.71	0.48	1.30	1.00	0.85	1.35	1.24	1.18						
1.45	0.73	0.50	1.49	1.02	0.89	1.54	1.27	1.24						
1.63	0.74	0.52	1.68	1.04	0.93	1.73	1.29	1.30						
1.81	0.76	0.54	1.86	1.06	0.96	1.92	1.32	1.36						
1.99	0.76	0.55	2.05	1.07	0.99	2.11	1.33	1.39						
2.17	0.77	0.56	2.24	1.08	1.02	2.31	1.35	1.44						
2.35	0.78	0.58	2.42	1.09	1.05	2.50	1.36	1.48						
2.53	0.78	0.58	2.61	1.10	1.07	2.69	1.38	1.52						
2.71	0.79	0.59	2.79	1.10	1.10	2.88	1.39	1.55						
2.89	0.78	0.60	2.98	1.10	1.12	3.08	1.40	1.59						
3.07	0.79	0.61	3.17	1.09	1.14	3.27	1.41	1.63						
3.25	0.78	0.62	3.35	1.11	1.16	3.46	1.41	1.64						
3.43	0.78	0.62	3.54	1.11	1.17	3.65	1.42	1.67						
3.61	0.78	0.63	3.73	1.11	1.19	3.84	1.43	1.70						
3.98	0.78	0.64	4.10	1.12	1.22	4.23	1.44	1.75						
4.34	0.78	0.65	4.47	1.11	1.24	4.61	1.44	1.79						
4.70	0.78	0.66	4.84	1.12	1.27	5.00	1.46	1.83						
5.06	0.77	0.66	5.22	1.12	1.29	5.38	1.46	1.85						
5.42	0.76	0.67	5.59	1.13	1.31	5.77	1.47	1.90						
5.78	0.75	0.68	5.96	1.12	1.33	6.15	1.46	1.92						
6.51	0.73	0.69	6.71	1.12	1.37	6.92	1.47	1.97						
7.23	0.71	0.70	7.45	1.11	1.39	7.69	1.45	2.00						
7.95	0.69	0.71	8.20	1.09	1.42	8.07	1.45	2.03						
8.67	0.68	0.72	8.94	1.09	1.44	8.46	1.45	2.05						
9.40	0.67	0.73	9.69	1.08	1.46	8.84	1.44	2.07						
10.12	0.65	0.74	10.43	1.06	1.48	9.23	1.44	2.08						
10.84	0.62	0.74	11.18	1.05	1.50	9.61	1.43	2.10						
11.57	0.61	0.75	11.92	1.04	1.51	10.00	1.42	2.10						
12.29	0.60	0.75	12.67	1.04	1.52	10.38	1.42	2.12						
13.01	0.59	0.76	13.41	1.03	1.53	10.76	1.42	2.13						
13.73	0.57	0.76	14.16	1.02	1.54	11.15	1.41	2.14						
14.46	0.57	0.77	14.90	1.00	1.55	11.53	1.41	2.16						
16.26	0.55	0.77	16.76	0.98	1.57	12.30	1.40	2.17						
18.07	0.53	0.78	18.63	0.93	1.59	13.07	1.40	2.20						
19.88	0.51	0.79	20.03	0.91	1.59	13.84	1.39	2.21						
20.00	0.51	0.79				14.61	1.38	2.22						
						15.38	1.37	2.24						
						17.30	1.32	2.26						
						19.22	1.28	2.30						
						20.00	1.26	2.29						

Specific Gravity Testing Summary Sheet (ASTM:D854)

Project: Arrowhead Park Phase 1

Job: 11799

Client: ECS Midwest, LLC

Date: 1/24/2019[illegible]

9530 James Ave South



Bloomington, MN 55431

Top of Sample
EL. = 743.12 +/-



Figure 1 – Photograph of Boring B4-18 sample 2, from 2 to 4 feet below ground surface (EL. 743.12 to 741.12 +/-).

Top of sample
EL. = 739.12 +/-



Figure 2 – Photograph of Boring B4-18 sample 4, from 6 to 8 feet below ground surface (EL. 739.12 to 737.12 +/-).

Extruded TWT Sample Photographs

Project: Arrowhead Park Phase 1
Neenah, Winnebago County, Wisconsin

ECS Project No: 1591



1060 Breezewood Lane, Suite 102
Neenah, WI 54956
Telephone: (920) 886-1406 Fax: (920) 886-1409

Top of Sample



Figure 3 – Photograph of Boring B7A-18 sample 1, from 4 to 6 feet below ground surface

Top of sample
EL. = 738.86 +/-



Figure 4 – Photograph of Boring B9-18 sample 6, from 11 to 13 feet below ground surface (EL. 738.86 to 736.86 +/-).

Extruded TWT Sample Photographs

Project: Arrowhead Park Phase 1
Neenah, Winnebago County, Wisconsin

ECS Project No: 1591



1060 Breezewood Lane, Suite 102
Neenah, WI 54956
Telephone: (920) 886-1406 Fax: (920) 886-1409



REPORT OF ENVIRONMENTAL MONITORING

1060 Breezewood Lane, Suite 102
Neenah, WI 54956
ph 920-886-1406
fax 920-886-1409
www.ecslimited.com

Project: Arrowhead Park Phase 1
Neenah, Wisconsin

Copies:

Client: Mr. Trevor Frank
S.E.H, Inc.

Date: February 4, 2019

ECS File No: 59-1591

GENERAL:

Scope of Work: Monitor drilling activities using a Flame Ionization Detector (FID) and collect vapor measurements using a Photoionization Detector (PID)

Date of Test: December 18-21, 2018
Sampled By: B. Broennimann of ECS
Submitted By: I. MacMillan of ECS

Material Source: In-situ

RESULTS:

Boring Number	Test Depth	FID result (ppm)	PID result (ppm)
B1-18	0 – 2	-----	0
	2 – 4	-----	0
	4 – 6	1,100	0
	6 – 7½	-----	0
	8½ – 10	500	0
	11 – 12½	1,450	0
	13½ – 15	1,630	0
	16 – 17½	200	0
	18½ – 20	801	0
	21 – 22½	-----	0
	23½ – 25	360	0
	26 – 27½	30	0
	28½ – 30	3.6	0
	31 – 32½	12.8	0
	33½ – 35	7.5	0
	36 – 37½	10.4	0
	38½ – 40	1.8	0
	41 – 42½	3.8	0
	43½ – 45	0	0
	46 – 47½	0	0
	48½ – 50	0	0

Respectfully Submitted,



REPORT OF ENVIRONMENTAL MONITORING

1060 Breezewood Lane, Suite 102
Neenah, WI 54956
ph 920-886-1406
fax 920-886-1409
www.ecslimited.com

Project: Arrowhead Park Phase 1
Neenah, Wisconsin

Copies:

Client: Mr. Trevor Frank
S.E.H, Inc.

Date: February 4, 2019

ECS File No: 59-1591

GENERAL:

Scope of Work: Monitor drilling activities using a Flame Ionization Detector (FID) and collect vapor measurements using a Photoionization Detector (PID)

Date of Test: December 18-21, 2018
Sampled By: B. Broennimann of ECS
Submitted By: I. MacMillan of ECS

Material Source: In-situ

RESULTS:

Boring Number	Test Depth	FID result (ppm)	PID result (ppm)
B2-18	0 – 2	-----	0
	2 – 4	700	0
	4 – 6	-----	0
	6 – 7½	-----	-----
	8½ – 10	300	-----
	11 – 12½	11,800	0
	13½ – 15	-----	0
	16 – 17½	100	0
	18½ – 20	-----	0
	21 – 22½	1,400	0
B3-18	0 – 2	-----	0
	2 – 4	120	0
	4 – 6	-----	2.5
	6 – 7½	280	0.5
	8½ – 10	1,200	5.8
	11 – 12½	-----	0
	13½ – 15	400	0
	16 – 17½	-----	0
	18½ – 20	2,800	0
B4-18	0 – 2	-----	0
	2 – 4	6.9	0
	4 – 6	-----	-----
	6 – 7½	-----	-----
	8½ – 10	65	0
	11 – 12½	-----	0
	13½ – 15	-----	-----
	16 – 17½	-----	0
	18½ – 20	2,500	0
	23½ – 25	-----	0

Respectfully Submitted,



REPORT OF ENVIRONMENTAL MONITORING

1060 Breezewood Lane, Suite 102
Neenah, WI 54956
ph 920-886-1406
fax 920-886-1409
www.ecslimited.com

Project: Arrowhead Park Phase 1
Neenah, Wisconsin

Copies:

Client: Mr. Trevor Frank
S.E.H, Inc.

Date: February 4, 2019

ECS File No: 59-1591

GENERAL:

Scope of Work: Monitor drilling activities using a Flame Ionization Detector (FID) and collect vapor measurements using a Photoionization Detector (PID)

Date of Test: December 18-21, 2018
Sampled By: B. Broennimann of ECS
Submitted By: I. MacMillan of ECS

Material Source: In-situ

RESULTS:

Boring Number	Test Depth	FID result (ppm)	PID result (ppm)
B5-18	0 – 2	-----	0
	2 – 4	-----	0
	4 – 6	40	0
	6 – 7½	-----	0
	8½ – 10	15	0
	11 – 12½	-----	2.5
	13½ – 15	25	4
	16 – 17½	-----	0
	18½ – 20	-----	-----
	21 – 22½	1,300	0
B6-18	0 – 2	-----	0
	2 – 4	-----	-----
	4 – 6	40	0
	6 – 7½	-----	0
	8½ – 10	28	0
	11 – 12½	-----	0
	13½ – 15	1,800	0
	16 – 17½	-----	0
	18½ – 20	50	0
B7-18	0 – 2	350	0
	2 – 4	16,000	0
	4 – 6	-----	----
	6 – 7½	23	0.8
	8½ – 10	1,700	-----
	11 – 12½	18,000	0
	13½ – 15	4,000	0
	16 – 17½	570	-----

Respectfully Submitted,



REPORT OF ENVIRONMENTAL MONITORING

1060 Breezewood Lane, Suite 102
Neenah, WI 54956
ph 920-886-1406
fax 920-886-1409
www.ecslimited.com

Project: Arrowhead Park Phase 1
Neenah, Wisconsin

Copies:

Client: Mr. Trevor Frank
S.E.H, Inc.

Date: February 4, 2019

ECS File No: 59-1591

GENERAL:

Scope of Work: Monitor drilling activities using a Flame Ionization Detector (FID) and collect vapor measurements using a Photoionization Detector (PID)

Date of Test: December 18-21, 2018
Sampled By: B. Broennimann of ECS
Submitted By: I. MacMillan of ECS

Material Source: In-situ

RESULTS:

Boring Number	Test Depth	FID result (ppm)	PID result (ppm)
B8-18	0 – 2	4,800	-----
	2 – 4	360	-----
	4 – 6	30	-----
	6 – 7½	-----	0
	8½ – 10	75	0
	11 – 12½	500	0
	13½ – 15	1,100	0.1
	16 – 17½	Gauge max – hit gas pocket	0
	18½ – 20	4,000	0
	21 – 22½	10,000	0
	23½ – 25	-----	0
B9-18	0 – 2	-----	0
	2 – 4	10,000	-----
	4 – 6	55	0
	6 – 7½	-----	0
	8½ – 10	120	-----
	11 – 12½	-----	0
	13½ – 15	2,500	0
	16 – 17½	24,900	0
	18½ – 20	5,500	0
	21 – 22½	5,800	0
B10-18	0 – 2	-----	0
	2 – 4	-----	0
	4 – 6	1,300	0
	6 – 7½	-----	-----
	8½ – 10	120	0
	11 – 12½	-----	0
	13½ – 15	150	0
	16 – 17½	-----	0
	18½ – 20	3,800	0

Respectfully Submitted,



REPORT OF ENVIRONMENTAL MONITORING

1060 Breezewood Lane, Suite 102
Neenah, WI 54956
ph 920-886-1406
fax 920-886-1409
www.ecslimited.com

Project: Arrowhead Park Phase 1
Neenah, Wisconsin

Copies:

Client: Mr. Trevor Frank
S.E.H, Inc.

Date: February 4, 2019

ECS File No: 59-1591

GENERAL:

Scope of Work: Monitor drilling activities using a Flame Ionization Detector (FID) and collect vapor measurements using a Photoionization Detector (PID)

Date of Test: December 18-21, 2018
Sampled By: B. Broennimann of ECS
Submitted By: I. MacMillan of ECS

Material Source: In-situ

RESULTS:

Boring Number	Test Depth	FID result (ppm)	PID result (ppm)
B11-18	0 – 2	-----	0
	2 – 4	-----	0
	4 – 6	280	0
	6 – 7½	-----	0
	8½ – 10	250	0
	11 – 12½	40	0
	13½ – 15	290	0
	16 – 17½	280	0
	18½ – 20	1,100	0
	21 – 22½	Gauge max	-----
	23½ – 25	16,000	-----

Respectfully Submitted,

Notice: Completion of this report is required by chs. 160, 281, 283, 289, 291-293, 295, and 299, Wis. Stats., and ch. NR 141, Wis. Adm. Code. In accordance with chs. 281, 289, 291-293, 295, and 299, Wis. Stats., failure to file this form may result in a forfeiture of between \$10-25,000, or imprisonment for up to one year, depending on the program and conduct involved. Personally identifiable information on this form is not intended to be used for any other purpose. Return form to the appropriate DNR office and bureau. See instructions on reverse for more information.

Route to:

☐ Drinking Water ☐ Watershed/Wastewater ☐ Waste Management ☐ Remediation/Redevelopment ☐ Other: _____

1. General Information

WI Unique Well No.	DNR Well ID No.	County Winnebago
Common Well Name B1-18	Gov't Lot # (if applicable)	
1/4 / 1/4 SE	Section 21	Township 20 N 17 E
Grid Location Feet ☐ N ☐ S ☐ E ☐ W		☐ Local Grid Origin ☐ (estimated) OR ☐ Well Location
Latitude: DEG MIN SEC 44° 11' 24.12" N		Longitude: DEG MIN SEC -88° 28' 22.21" W
Reason For Abandonment Soil Sampling Completed		WI Unique Well No. of Replacement Well

3. Well / Drillhole / Borehole Information

☐ Monitoring Well ☐ Water Well ☒ Borehole / Drillhole	Original Construction Date 12/18/18 If a Well Construction Report is available, please attach.
Construction Type: ☒ Drilled ☐ Driven (Sandpoint) ☐ Dug ☐ Other (specify): _____	

Formation Type:

☒ Unconsolidated Formation ☐ Bedrock

Total Well Depth From Groundsurface (ft.) 50	Casing Diameter (in.) 3.25"
Lower Drillhole Diameter (in.) 3"	Casing Depth (ft.) 25

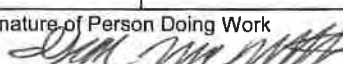
Was well annular space grouted?	☐ Yes ☒ No ☐ Unknown
If yes, to what depth (feet)?	Depth to Water (feet) 23

5. Material Used To Fill Well / Drillhole

	From (ft.)	To (ft.)	No. Yards, Sacks Sealant or Volume (circle one)	Mix Ratio or Mud Weight
Clay Cuttings	Surface	2	0.4 cu. ft.	
Bentonite Chips	2	50	9.4 cu. ft.	

6. Comments

7. Supervision of Work

Name of Person or Firm Doing Sealing Work ECS Midwest, LLC.		Date of Abandonment 12/18/18	DNR Use Only Date Received Noted By	
Street or Route 1060 Breezewood Ln., Suite 102		Telephone Number (920) 886-1406	Comments	
City Neenah	State WI	ZIP Code 54956	Signature of Person Doing Work 	Date Signed 12/18/18

Notice: Completion of this report is required by chs. 160, 281, 283, 289, 291-293, 295, and 299, Wis. Stats., and ch. NR 141, Wis. Adm. Code. In accordance with chs. 281, 289, 291-293, 295, and 299, Wis. Stats., failure to file this form may result in a forfeiture of between \$10-25,000, or imprisonment for up to one year, depending on the program and conduct involved. Personally identifiable information on this form is not intended to be used for any other purpose. Return form to the appropriate DNR office and bureau. See instructions on reverse for more information.

Route to:

☐ Drinking Water ☐ Watershed/Wastewater ☐ Waste Management ☐ Remediation/Redevelopment ☐ Other: _____

1. General Information

WI Unique Well No.	DNR Well ID No.	County Winnebago
Common Well Name B2-18	Gov't Lot # (if applicable)	
1/4 1/4 SE	Section 21	Township 20 N 17 E ☒ E ☐ W
Grid Location Feet ☐ N ☐ S ☐ E ☐ W	☐ Local Grid Origin ☐ (estimated) OR ☐ Well Location	
Latitude: DEG MIN SEC 44° 11' 24.78" N	Longitude: DEG MIN SEC -88° 28' 16.58" W	

Reason For Abandonment
Soil Sampling Completed

3. Well / Drillhole / Borehole Information

☐ Monitoring Well ☐ Water Well ☒ Borehole / Drillhole	Original Construction Date 12/19/18 If a Well Construction Report is available, please attach.
Construction Type: ☒ Drilled ☐ Driven (Sandpoint) ☐ Dug ☐ Other (specify): _____	

Formation Type:

☒ Unconsolidated Formation ☐ Bedrock

Total Well Depth From Groundsurface (ft.) 22	Casing Diameter (in.) 3.25"
Lower Drillhole Diameter (in.) 3.25"	Casing Depth (ft.) 22

Was well annular space grouted? ☐ Yes ☒ No ☐ Unknown

If yes, to what depth (feet)?	Depth to Water (feet) 13
-------------------------------	-----------------------------

5. Material Used To Fill Well / Drillhole

Clay Cuttings
Bentonite Chips

2. Facility / Owner Information

Facility Name Arrowhead Park		
Facility ID	License/Permit/Monitoring No.	City, Village or Town Neenah
Street Address of Well 355 Millview Drive, Neenah, WI 54956		
Present Well Owner City of Neenah	Original Well Owner	
Street Address or Route of Owner 211 Walnut Street		
City Neenah	State WI	ZIP Code 54956

4. Pump, Liner, Screen, Casing & Sealing Material

Pump and piping removed?	☐ Yes ☐ No ☒ N/A
Liner(s) removed?	☐ Yes ☐ No ☒ N/A
Screen removed?	☐ Yes ☐ No ☒ N/A
Casing left in place?	☐ Yes ☒ No ☐ N/A
Was casing cut off below surface?	☐ Yes ☒ No ☐ N/A
Did sealing material rise to surface?	☐ Yes ☐ No ☒ N/A
Did material settle after 24 hours?	☐ Yes ☒ No ☐ N/A
If yes, was hole retopped?	☐ Yes ☐ No ☒ N/A
If bentonite chips were used, were they hydrated with water from a known safe source?	☒ Yes ☐ No ☐ N/A

Required Method of Placing Sealing Material

☐ Conductor Pipe-Gravity	☐ Conductor Pipe-Pumped
☒ Screened & Poured (Bentonite Chips)	☐ Other (Explain): _____

Sealing Materials

☐ Neat Cement Grout	☐ Clay-Sand Slurry (11 lb./gal. wt.)
☐ Sand-Cement (Concrete) Grout	☐ Bentonite-Sand Slurry "
☐ Concrete	☒ Bentonite Chips

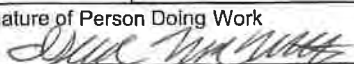
For Monitoring Wells and Monitoring Well Boreholes Only:

☐ Bentonite Chips	☐ Bentonite - Cement Grout
☐ Granular Bentonite	☐ Bentonite - Sand Slurry

From (ft.)	To (ft.)	No. Yards, Sacks Sealant or Volume (circle one)	Mix Ratio or Mud Weight
Surface	2	0.4 cu. ft.	
2	22	4 cu. ft.	

6. Comments

7. Supervision of Work

Name of Person or Firm Doing Sealing Work ECS Midwest, LLC.	Date of Abandonment 12/19/18	DNR Use Only		
Street or Route 1060 Breezewood Ln., Suite 102	Telephone Number (920) 886-1406	Date Received	Noted By	
City Neenah	State WI	ZIP Code 54956	Signature of Person Doing Work 	Date Signed 12/19/18

Notice: Completion of this report is required by chs. 160, 281, 283, 289, 291-293, 295, and 299, Wis. Stats., and ch. NR 141, Wis. Adm. Code. In accordance with chs. 281, 289, 291-293, 295, and 299, Wis. Stats., failure to file this form may result in a forfeiture of between \$10-25,000, or imprisonment for up to one year, depending on the program and conduct involved. Personally identifiable information on this form is not intended to be used for any other purpose. Return form to the appropriate DNR office and bureau. See instructions on reverse for more information.

Route to:

☐ Drinking Water ☐ Watershed/Wastewater ☐ Waste Management ☐ Remediation/Redevelopment ☐ Other: _____

1. General Information

WI Unique Well No.	DNR Well ID No.	County Winnebago
Common Well Name B3-18	Gov't Lot # (if applicable)	
1/4 / 1/4	1/4 SE	Section 21
	Township 20	Range N 17
		☒ E ☐ W
Grid Location Feet ☐ N ☐ E ☐ S ☐ W ☐ Local Grid Origin ☐ (estimated) OR ☐ Well Location		
Latitude: DEG MIN SEC 44° 11' 22.42" N Longitude: DEG MIN SEC -88° 28' 21.65" W		
Reason For Abandonment Soil Sampling Completed		
WI Unique Well No. of Replacement Well		

3. Well / Drillhole / Borehole Information

☐ Monitoring Well	Original Construction Date 12/20/18
☐ Water Well	If a Well Construction Report is available, please attach.
☒ Borehole / Drillhole	
Construction Type: ☒ Drilled ☐ Driven (Sandpoint) ☐ Dug ☐ Other (specify): _____	

Formation Type:

☒ Unconsolidated Formation	☐ Bedrock
Total Well Depth From Groundsurface (ft.) 20	Casing Diameter (in.) 3.25"
Lower Drillhole Diameter (in.) 3.25"	Casing Depth (ft.) 20

Was well annular space grouted? ☐ Yes ☒ No ☐ Unknown

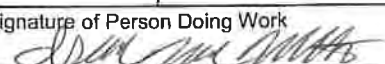
If yes, to what depth (feet)? _____ Depth to Water (feet)
6

5. Material Used To Fill Well / Drillhole

From (ft.)	To (ft.)	No. Yards, Sacks Sealant or Volume (circle one)	Mix Ratio or Mud Weight
Surface	1	0.2 cu. ft.	
1	20	3.7 cu. ft.	

6. Comments

7. Supervision of Work

Name of Person or Firm Doing Sealing Work ECS Midwest, LLC.	Date of Abandonment 12/20/18	Date Received	Noted By
Street or Route 1060 Breezewood Ln., Suite 102	Telephone Number (920) 886-1406	Comments	
City Neenah	State WI	ZIP Code 54956	Signature of Person Doing Work 
			Date Signed 12/20/18

2. Facility / Owner Information

Facility Name Arrowhead Park	Facility ID	License/Permit/Monitoring No.	City, Village or Town Neenah
Street Address of Well 355 Millview Drive, Neenah, WI 54956			
Present Well Owner City of Neenah		Original Well Owner	
Street Address or Route of Owner 211 Walnut Street			
City Neenah	State WI	ZIP Code 54956	

4. Pump, Liner, Screen, Casing & Sealing Material

Pump and piping removed?	☐ Yes ☐ No ☒ N/A
Liner(s) removed?	☐ Yes ☐ No ☒ N/A
Screen removed?	☐ Yes ☐ No ☒ N/A
Casing left in place?	☐ Yes ☒ No ☐ N/A
Was casing cut off below surface?	☐ Yes ☒ No ☐ N/A
Did sealing material rise to surface?	☐ Yes ☐ No ☒ N/A
Did material settle after 24 hours?	☐ Yes ☒ No ☐ N/A
If yes, was hole retopped?	☐ Yes ☐ No ☒ N/A
If bentonite chips were used, were they hydrated with water from a known safe source?	☒ Yes ☐ No ☐ N/A
Required Method of Placing Sealing Material	
☐ Conductor Pipe-Gravity	☐ Conductor Pipe-Pumped
☒ Screened & Poured (Bentonite Chips)	☐ Other (Explain): _____

Sealing Materials	☐ Clay-Sand Slurry (11 lb./gal. wt.)
☐ Neat Cement Grout	☐ Bentonite-Sand Slurry " "
☐ Sand-Cement (Concrete) Grout	☒ Bentonite Chips
☐ Concrete	

For Monitoring Wells and Monitoring Well Boreholes Only:

☐ Bentonite Chips	☐ Bentonite - Cement Grout
☐ Granular Bentonite	☐ Bentonite - Sand Slurry

Notice: Completion of this report is required by chs. 160, 281, 283, 289, 291-293, 295, and 299, Wis. Stats., and ch. NR 141, Wis. Adm. Code. In accordance with chs. 281, 289, 291-293, 295, and 299, Wis. Stats., failure to file this form may result in a forfeiture of between \$10-25,000, or imprisonment for up to one year, depending on the program and conduct involved. Personally identifiable information on this form is not intended to be used for any other purpose. Return form to the appropriate DNR office and bureau. See instructions on reverse for more information.

Route to:

☐ Drinking Water ☐ Watershed/Wastewater ☐ Waste Management ☐ Remediation/Redevelopment ☐ Other: _____

1. General Information

WI Unique Well No.		DNR Well ID No.		County Winnebago	
Common Well Name B4-18		Gov't Lot # (if applicable)			
1/4 / 1/4	1/4	Section 21	Township 20	Range 17	☒ E ☐ W
Grid Location Feet ☐ N ☐ S		☐ Local Grid Origin ☐ (estimated) OR ☐ Well Location			
Latitude: DEG MIN SEC 44° 11' 18.75" N		Longitude: DEG MIN SEC -88° 28' 17.02" W			

Reason For Abandonment
Soil Sampling Completed

WI Unique Well No. of Replacement Well

3. Well / Drillhole / Borehole Information

☐ Monitoring Well ☐ Water Well ☒ Borehole / Drillhole	Original Construction Date 12/20/18 If a Well Construction Report is available, please attach.
Construction Type:	
☒ Drilled ☐ Driven (Sandpoint) ☐ Dug ☐ Other (specify): _____	

Formation Type:

☒ Unconsolidated Formation ☐ Bedrock

Total Well Depth From Groundsurface (ft.) 20	Casing Diameter (in.) 3.25"
Lower Drillhole Diameter (in.) 3.25"	Casing Depth (ft.) 20

Was well annular space grouted? ☐ Yes ☒ No ☐ Unknown

If yes, to what depth (feet)?	Depth to Water (feet) 13
-------------------------------	-----------------------------

5. Material Used To Fill Well / Drillhole

	From (ft.)	To (ft.)	No. Yards, Sacks Sealant or Volume (Circle one)	Mix Ratio or Mud Weight
Clay Cap	Surface	6"	0.1 cu. ft.	
Bentonite Chips	6"	20'	3.8 cu. ft.	

6. Comments

7. Supervision of Work

Name of Person or Firm Doing Sealing Work ECS Midwest, LLC.		Date of Abandonment 12/20/18	DNR Use Only	
Street or Route 1060 Breezewood Ln., Suite 102		Telephone Number (920) 886-1406	Date Received	Noted By
City Neenah	State WI	ZIP Code 54956	Signature of Person Doing Work <i>ECS Midwest</i>	
			Date Signed 12/20/18	

2. Facility / Owner Information

Facility Name Arrowhead Park		
Facility ID	License/Permit/Monitoring No.	City, Village or Town Neenah
Street Address of Well 355 Millview Drive, Neenah, WI 54956		
Present Well Owner City of Neenah		Original Well Owner
Street Address or Route of Owner 211 Walnut Street		
City Neenah	State WI	ZIP Code 54956

4. Pump, Liner, Screen, Casing & Sealing Material

Pump and piping removed?	☐ Yes ☐ No ☒ N/A
Liner(s) removed?	☐ Yes ☐ No ☒ N/A
Screen removed?	☐ Yes ☐ No ☒ N/A
Casing left in place?	☐ Yes ☒ No ☐ N/A
Was casing cut off below surface?	☐ Yes ☒ No ☐ N/A
Did sealing material rise to surface?	☐ Yes ☐ No ☒ N/A
Did material settle after 24 hours?	☐ Yes ☒ No ☐ N/A
If yes, was hole retopped?	☐ Yes ☐ No ☒ N/A
If bentonite chips were used, were they hydrated with water from a known safe source?	☒ Yes ☐ No ☐ N/A

Required Method of Placing Sealing Material

☐ Conductor Pipe-Gravity	☐ Conductor Pipe-Pumped
☒ Screened & Poured (Bentonite Chips)	☐ Other (Explain): _____

Sealing Materials

☐ Neat Cement Grout	☐ Clay-Sand Slurry (11 lb./gal. wt.)
☐ Sand-Cement (Concrete) Grout	☐ Bentonite-Sand Slurry " "
☐ Concrete	☒ Bentonite Chips

For Monitoring Wells and Monitoring Well Boreholes Only:

☐ Bentonite Chips	☐ Bentonite - Cement Grout
☐ Granular Bentonite	☐ Bentonite - Sand Slurry

Notice: Completion of this report is required by chs. 160, 281, 283, 289, 291-293, 295, and 299, Wis. Stats., and ch. NR 141, Wis. Adm. Code. In accordance with chs. 281, 289, 291-293, 295, and 299, Wis. Stats., failure to file this form may result in a forfeiture of between \$10-25,000, or imprisonment for up to one year, depending on the program and conduct involved. Personally identifiable information on this form is not intended to be used for any other purpose. Return form to the appropriate DNR office and bureau. See instructions on reverse for more information.

Route to:

☐ Drinking Water ☐ Watershed/Wastewater ☐ Waste Management ☐ Remediation/Redevelopment ☐ Other: _____

1. General Information

WI Unique Well No.	DNR Well ID No.	County Winnebago
Common Well Name BS-18	Gov't Lot # (if applicable)	
1/4 / 1/4 SE	Section 21	Township 20 N 17 ☒ E ☐ W
Grid Location Feet ☐ N ☐ S ☐ E ☐ W ☐ (estimated) OR ☐ Well Location		
Latitude: DEG MIN SEC 44° 11' 18.18" N Longitude: DEG MIN SEC -88° 28' 10.38" W		

Reason For Abandonment
Soil Sampling Completed

3. Well / Drillhole / Borehole Information

☐ Monitoring Well	Original Construction Date 12/20/18
☐ Water Well	If a Well Construction Report is available, please attach.
☒ Borehole / Drillhole	
Construction Type: ☒ Drilled ☐ Driven (Sandpoint) ☐ Dug ☐ Other (specify): _____	

Formation Type:

☒ Unconsolidated Formation ☐ Bedrock

Total Well Depth From Groundsurface (ft.)
22.5'

Lower Drillhole Diameter (in.)
3.25"

Was well annular space grouted? ☐ Yes ☒ No ☐ Unknown

If yes, to what depth (feet)?
18

5. Material Used To Fill Well / Drillhole

From (ft.)	To (ft.)	No. Yards, Sacks Sealant or Volume (circle one)	Mix Ratio or Mud Weight
Surface	1	0.2 cu. ft.	
1	22.5	4.4 cu. ft.	

6. Comments

7. Supervision of Work

Name of Person or Firm Doing Sealing Work ECS Midwest, LLC.	Date of Abandonment 12/20/18	DNR Use Only	
Street or Route 1060 Breezewood Ln., Suite 102	Telephone Number (920) 886-1406	Date Received	Noted By
City Neenah	State WI	ZIP Code 54956	Signature of Person Doing Work <i>[Signature]</i>
			Date Signed 12/20/18

2. Facility / Owner Information

Facility Name Arrowhead Park	Facility ID	License/Permit/Monitoring No	City, Village or Town Neenah
Street Address of Well 355 Millview Drive, Neenah, WI 54956			
Present Well Owner City of Neenah		Original Well Owner	
Street Address or Route of Owner 211 Walnut Street			
City Neenah	State WI	ZIP Code 54956	

4. Pump, Liner, Screen, Casing & Sealing Material

Pump and piping removed?	☐ Yes ☐ No ☒ N/A
Liner(s) removed?	☐ Yes ☐ No ☒ N/A
Screen removed?	☐ Yes ☐ No ☒ N/A
Casing left in place?	☐ Yes ☒ No ☐ N/A
Was casing cut off below surface?	☐ Yes ☒ No ☐ N/A
Did sealing material rise to surface?	☐ Yes ☐ No ☒ N/A
Did material settle after 24 hours?	☐ Yes ☒ No ☐ N/A
If yes, was hole retopped?	☐ Yes ☐ No ☒ N/A
If bentonite chips were used, were they hydrated with water from a known safe source?	☒ Yes ☐ No ☐ N/A
Required Method of Placing Sealing Material	
☐ Conductor Pipe-Gravity	☐ Conductor Pipe-Pumped
☒ Screened & Poured (Bentonite Chips)	☐ Other (Explain): _____

Sealing Materials

☐ Neat Cement Grout	☐ Clay-Sand Slurry (11 lb./gal. wt.)
☐ Sand-Cement (Concrete) Grout	☐ Bentonite-Sand Slurry " "
☐ Concrete	☒ Bentonite Chips

For Monitoring Wells and Monitoring Well Boreholes Only:

☐ Bentonite Chips ☐ Bentonite - Cement Grout
☐ Granular Bentonite ☐ Bentonite - Sand Slurry

Notice: Completion of this report is required by chs. 160, 281, 283, 289, 291-293, 295, and 299, Wis. Stats., and ch. NR 141, Wis. Adm. Code. In accordance with chs. 281, 289, 291-293, 295, and 299, Wis. Stats., failure to file this form may result in a forfeiture of between \$10-25,000, or imprisonment for up to one year, depending on the program and conduct involved. Personally identifiable information on this form is not intended to be used for any other purpose. Return form to the appropriate DNR office and bureau. See instructions on reverse for more information.

Route to:

☐ Drinking Water ☐ Watershed/Wastewater ☐ Waste Management ☐ Remediation/Redevelopment ☐ Other: _____

1. General Information

WI Unique Well No.	DNR Well ID No.	County Winnebago
Common Well Name B-18	Gov't Lot # (if applicable)	
1/4 / 1/4 SE	Section 21	Township 20 N 17 ☒ E ☐ W
Grid Location Feet ☐ N ☐ S ☐ E ☐ W	☐ Local Grid Origin ☐ (estimated) OR ☐ Well Location	
Latitude: DEG MIN SEC 44° 11' 17.16" N	Longitude: DEG MIN SEC -88° 28' 02.92" W	

Reason For Abandonment
Soil Sampling Completed

3. Well / Drillhole / Borehole Information

☐ Monitoring Well ☐ Water Well ☒ Borehole / Drillhole	Original Construction Date 12/20/18 If a Well Construction Report is available, please attach.
Construction Type: ☒ Drilled ☐ Driven (Sandpoint) ☐ Dug ☐ Other (specify): _____	

Formation Type:

☒ Unconsolidated Formation ☐ Bedrock

Total Well Depth From Groundsurface (ft.)
20

Casing Diameter (in.)
3.25"

Lower Drillhole Diameter (in.)
3.25"

Casing Depth (ft.)
20

Was well annular space grouted? ☐ Yes ☒ No ☐ Unknown

If yes, to what depth (feet)?
18

5. Material Used To Fill Well / Drillhole

	From (ft.)	To (ft.)	No. Yards, Sacks Sealant or Volume (circle one)	Mix Ratio or Mud Weight
Gravel Fill	Surface	2	0.4 cu. ft.	
Bentonite Chips	2	20	3.5 cu. ft.	

6. Comments**7. Supervision of Work**

Name of Person or Firm Doing Sealing Work ECS Midwest, LLC.	Date of Abandonment 12/20/18	DNR Use Only Date Received Noted By	
Street or Route 1060 Breezewood Ln., Suite 102	Telephone Number (920) 886-1406	Comments	
City Neenah	State WI	ZIP Code 54956	Signature of Person Doing Work <i>[Signature]</i> Date Signed 12/20/18

2. Facility / Owner Information

Facility Name Arrowhead Park	Facility ID	License/Permit/Monitoring No.	City, Village or Town Neenah
Street Address of Well 355 Millview Drive, Neenah, WI 54956			
Present Well Owner City of Neenah		Original Well Owner	
Street Address or Route of Owner 211 Walnut Street			
City Neenah	State WI	ZIP Code 54956	

4. Pump, Liner, Screen, Casing & Sealing Material

Pump and piping removed?	☐ Yes ☐ No ☒ N/A
Liner(s) removed?	☐ Yes ☐ No ☒ N/A
Screen removed?	☐ Yes ☐ No ☒ N/A
Casing left in place?	☐ Yes ☒ No ☐ N/A
Was casing cut off below surface?	☐ Yes ☒ No ☐ N/A
Did sealing material rise to surface?	☐ Yes ☐ No ☒ N/A
Did material settle after 24 hours?	☐ Yes ☒ No ☐ N/A
If yes, was hole retopped?	☐ Yes ☐ No ☒ N/A
If bentonite chips were used, were they hydrated with water from a known safe source?	☒ Yes ☐ No ☐ N/A

Required Method of Placing Sealing Material

☐ Conductor Pipe-Gravity ☐ Conductor Pipe-Pumped
☒ Screened & Poured (Bentonite Chips) ☐ Other (Explain): _____

Sealing Materials

☐ Neat Cement Grout ☐ Clay-Sand Slurry (11 lb./gal. wt.)
☐ Sand-Cement (Concrete) Grout ☐ Bentonite-Sand Slurry " "
☐ Concrete ☒ Bentonite Chips

For Monitoring Wells and Monitoring Well Boreholes Only:

☐ Bentonite Chips ☐ Bentonite - Cement Grout
☐ Granular Bentonite ☐ Bentonite - Sand Slurry

Notice: Completion of this report is required by chs. 160, 281, 283, 289, 291-293, 295, and 299, Wis. Stats., and ch. NR 141, Wis. Adm. Code. In accordance with chs. 281, 289, 291-293, 295, and 299, Wis. Stats., failure to file this form may result in a forfeiture of between \$10-25,000, or imprisonment for up to one year, depending on the program and conduct involved. Personally identifiable information on this form is not intended to be used for any other purpose. Return form to the appropriate DNR office and bureau. See instructions on reverse for more information.

Route to:

☐ Drinking Water ☐ Watershed/Wastewater ☐ Waste Management ☐ Remediation/Redevelopment ☐ Other: _____

1. General Information

WI Unique Well No.		DNR Well ID No.		County Winnebago	
Common Well Name B1-18		Gov't Lot # (if applicable)		Facility ID	
1/4 1/4	1/4 SE	Section 21	Township 20 N	Range 17	☒ E ☐ W
Grid Location		☐ Local Grid Origin			
Feet	☐ N ☐ S	Feet	☐ E ☐ W	☐ (estimated) OR ☐ Well Location	
Latitude: DEG MIN SEC 44° 11' 22.18" N		Longitude: DEG MIN SEC -88° 28' 17.77" W			

Reason For Abandonment
Soil Sampling Completed

3. Well / Drillhole / Borehole Information

☐ Monitoring Well	Original Construction Date 12/21/18
☐ Water Well	If a Well Construction Report is available, please attach.
☒ Borehole / Drillhole	
Construction Type:	
☒ Drilled	☐ Driven (Sandpoint)
☐ Other (specify): _____	

Formation Type:

☒ Unconsolidated Formation ☐ Bedrock

Total Well Depth From Groundsurface (ft.) 20	Casing Diameter (in.) 3.25"
Lower Drillhole Diameter (in.) 3.25"	Casing Depth (ft.) 20

Was well annular space grouted? ☐ Yes ☒ No ☐ Unknown

If yes, to what depth (feet)?	Depth to Water (feet) 8
-------------------------------	----------------------------

5. Material Used To Fill Well / Drillhole

Clay Cap	From (ft.) Surface	To (ft.) 2	No. Yards, Sacks Sealant or Volume (circle one) 0.4 cu. ft.	Mix Ratio or Mud Weight
Bentonite Chips	2	20	3.5 cu. ft.	

2. Facility / Owner Information

Facility Name Arrowhead Park	
City, Village or Town Neenah	License/Permit/Monitoring No.
Street Address of Well 355 Millview Drive, Neenah, WI 54956	
Present Well Owner City of Neenah	Original Well Owner
Street Address or Route of Owner 211 Walnut Street	
City Neenah	State WI
ZIP Code 54956	

4. Pump, Liner, Screen, Casing & Sealing Material

Pump and piping removed?	☐ Yes ☐ No ☒ N/A
Liner(s) removed?	☐ Yes ☐ No ☒ N/A
Screen removed?	☐ Yes ☐ No ☒ N/A
Casing left in place?	☐ Yes ☒ No ☐ N/A
Was casing cut off below surface?	☐ Yes ☒ No ☐ N/A
Did sealing material rise to surface?	☐ Yes ☐ No ☒ N/A
Did material settle after 24 hours?	☐ Yes ☒ No ☐ N/A
If yes, was hole retopped?	☐ Yes ☐ No ☒ N/A
If bentonite chips were used, were they hydrated with water from a known safe source?	☒ Yes ☐ No ☐ N/A

Required Method of Placing Sealing Material

☐ Conductor Pipe-Gravity	☐ Conductor Pipe-Pumped
☒ Screened & Poured (Bentonite Chips)	☐ Other (Explain): _____

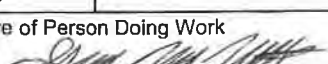
Sealing Materials

☐ Neat Cement Grout	☐ Clay-Sand Slurry (11 lb./gal. wt.)
☐ Sand-Cement (Concrete) Grout	☐ Bentonite-Sand Slurry " "
☐ Concrete	☒ Bentonite Chips

For Monitoring Wells and Monitoring Well Boreholes Only:

☐ Bentonite Chips	☐ Bentonite - Cement Grout
☐ Granular Bentonite	☐ Bentonite - Sand Slurry

6. Comments**7. Supervision of Work**

Name of Person or Firm Doing Sealing Work ECS Midwest, LLC.		Date of Abandonment 12/21/18		Date Received		Noted By	
Street or Route 1060 Breezewood Ln., Suite 102		Telephone Number (920) 886-1406		Comments			
City Neenah	State WI	ZIP Code 54956	Signature of Person Doing Work 			Date Signed 12/21/18	

Notice: Completion of this report is required by chs. 160, 281, 283, 289, 291-293, 295, and 299, Wis. Stats., and ch. NR 141, Wis. Adm. Code. In accordance with chs. 281, 289, 291-293, 295, and 299, Wis. Stats., failure to file this form may result in a forfeiture of between \$10-25,000, or imprisonment for up to one year, depending on the program and conduct involved. Personally identifiable information on this form is not intended to be used for any other purpose. Return form to the appropriate DNR office and bureau. See instructions on reverse for more information.

Route to:

☐ Drinking Water ☐ Watershed/Wastewater ☐ Waste Management ☐ Remediation/Redevelopment ☐ Other: _____

1. General Information

WI Unique Well No.	DNR Well ID No.	County Winnebago
Common Well Name B7A-18	Gov't Lot # (if applicable)	
1/4 / 1/4 SE	Section 21	Township 20 N 17 E
Grid Location Feet ☐ N ☐ S ☐ E ☐ W ☐ Local Grid Origin ☐ (estimated) OR ☐ Well Location		
Latitude: DEG MIN SEC 44° 11' 22.13" N Longitude: DEG MIN SEC 88° 28' 17.77" W		

Reason For Abandonment
Soil Sampling Completed

3. Well / Drillhole / Borehole Information

☐ Monitoring Well ☐ Water Well ☒ Borehole / Drillhole	Original Construction Date 12/21/18 If a Well Construction Report is available, please attach.
Construction Type: ☒ Drilled ☐ Driven (Sandpoint) ☐ Dug ☐ Other (specify): _____	

Formation Type:

☒ Unconsolidated Formation ☐ Bedrock

Total Well Depth From Groundsurface (ft.) 6	Casing Diameter (in.) 3.25"
Lower Drillhole Diameter (in.) 3.25"	Casing Depth (ft.) 6

Was well annular space grouted? ☐ Yes ☒ No ☐ Unknown

If yes, to what depth (feet)?	Depth to Water (feet)
-------------------------------	-----------------------

5. Material Used To Fill Well / Drillhole

Clay Cap
Bentonite Chips

2. Facility / Owner Information

Facility Name Arrowhead Park		
Facility ID	License/Permit/Monitoring No.	City, Village or Town Neenah
Street Address of Well 355 Millview Drive, Neenah, WI 54956		
Present Well Owner City of Neenah	Original Well Owner	
Street Address or Route of Owner 211 Walnut Street		
City Neenah	State WI	ZIP Code 54956

4. Pump, Liner, Screen, Casing & Sealing Material

Pump and piping removed?	☐ Yes ☐ No ☒ N/A
Liner(s) removed?	☐ Yes ☐ No ☒ N/A
Screen removed?	☐ Yes ☐ No ☒ N/A
Casing left in place?	☐ Yes ☒ No ☒ N/A
Was casing cut off below surface?	☐ Yes ☒ No ☐ N/A
Did sealing material rise to surface?	☐ Yes ☐ No ☒ N/A
Did material settle after 24 hours?	☐ Yes ☒ No ☐ N/A
If yes, was hole retopped?	☐ Yes ☐ No ☒ N/A
If bentonite chips were used, were they hydrated with water from a known safe source?	☒ Yes ☐ No ☐ N/A

Required Method of Placing Sealing Material

☐ Conductor Pipe-Gravity	☐ Conductor Pipe-Pumped
☒ Screened & Poured (Bentonite Chips)	☐ Other (Explain): _____

Sealing Materials

☐ Neat Cement Grout	☐ Clay-Sand Slurry (11 lb./gal. wt.)
☐ Sand-Cement (Concrete) Grout	☐ Bentonite-Sand Slurry " "
☐ Concrete	☒ Bentonite Chips

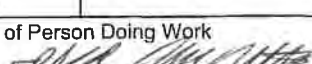
For Monitoring Wells and Monitoring Well Boreholes Only:

☐ Bentonite Chips	☐ Bentonite - Cement Grout
☐ Granular Bentonite	☐ Bentonite - Sand Slurry

From (ft.)	To (ft.)	No. Yards, Sacks Sealant or Volume (circle one)	Mix Ratio or Mud Weight
Surface	3	0.6 cu. ft.	
3	6	0.6 cu. ft.	

6. Comments

7. Supervision of Work

Name of Person or Firm Doing Sealing Work ECS Midwest, LLC.	Date of Abandonment 12/21/18	DNR Use Only	
Street or Route 1060 Breezewood Ln., Suite 102	Telephone Number (920) 886-1406	Date Received	Noted By
City Neenah	State WI	ZIP Code 54956	Signature of Person Doing Work 
			Date Signed 12/21/18

Notice: Completion of this report is required by chs. 160, 281, 283, 289, 291-293, 295, and 299, Wis. Stats., and ch. NR 141, Wis. Adm. Code. In accordance with chs. 281, 289, 291-293, 295, and 299, Wis. Stats., failure to file this form may result in a forfeiture of between \$10-25,000, or imprisonment for up to one year, depending on the program and conduct involved. Personally identifiable information on this form is not intended to be used for any other purpose. Return form to the appropriate DNR office and bureau. See instructions on reverse for more information.

Route to:

☐ Drinking Water ☐ Watershed/Wastewater ☐ Waste Management ☐ Remediation/Redevelopment ☐ Other: _____

1. General Information

WI Unique Well No.	DNR Well ID No.	County Winnebago
Common Well Name B8-18	Gov't Lot # (if applicable)	
1/4 1/4	1/4 SE	Section 21
		Township 20 N 17
		Range 17 E
Grid Location Feet ☐ N ☐ S ☐ E ☐ W ☐ (estimated) OR ☐ Well Location		
Latitude: DEG MIN SEC 44° 11' 22.82" N		
Longitude: DEG MIN SEC -88° 28' 05.45" W		
Reason For Abandonment Soil Sampling Completed		
WI Unique Well No. of Replacement Well		

2. Facility / Owner Information

Facility Name Arrowhead Park	Facility ID	License/Permit/Monitoring No.	City, Village or Town Neenah
Street Address of Well 355 Millview Drive, Neenah, WI 54956			
Present Well Owner City of Neenah		Original Well Owner	
Street Address or Route of Owner 211 Walnut Street			
City Neenah	State WI	ZIP Code 54956	

3. Well / Drillhole / Borehole Information

☐ Monitoring Well ☐ Water Well ☒ Borehole / Drillhole	Original Construction Date 12/21/18 If a Well Construction Report is available, please attach.
Construction Type:	
☒ Drilled ☐ Driven (Sandpoint) ☐ Dug ☐ Other (specify): _____	

Formation Type:

☒ Unconsolidated Formation ☐ Bedrock

Total Well Depth From Groundsurface (ft.) 22.5	Casing Diameter (in.) 3.25"
Lower Drillhole Diameter (in.) 3.25"	Casing Depth (ft.) 22.5

Was well annular space grouted? ☐ Yes ☒ No ☐ Unknown

If yes, to what depth (feet)? _____ Depth to Water (feet) _____

5. Material Used To Fill Well / Drillhole

Clay Cap	From (ft.) Surface	To (ft.) 2	No. Yards, Sacks Sealant or Volume (circle one) 0.4 cu. ft.	Mix Ratio or Mud Weight
Bentonite Chips	2	22.5	4 cu. ft.	

4. Pump, Liner, Screen, Casing & Sealing Material

Pump and piping removed?	☐ Yes ☐ No ☒ N/A
Liner(s) removed?	☐ Yes ☐ No ☒ N/A
Screen removed?	☐ Yes ☐ No ☒ N/A
Casing left in place?	☐ Yes ☒ No ☐ N/A
Was casing cut off below surface?	☐ Yes ☒ No ☐ N/A
Did sealing material rise to surface?	☐ Yes ☐ No ☒ N/A
Did material settle after 24 hours?	☐ Yes ☒ No ☐ N/A
If yes, was hole retopped?	☐ Yes ☐ No ☒ N/A
If bentonite chips were used, were they hydrated with water from a known safe source?	☒ Yes ☐ No ☐ N/A

Required Method of Placing Sealing Material

☐ Conductor Pipe-Gravity	☐ Conductor Pipe-Pumped
☒ Screened & Poured (Bentonite Chips)	☐ Other (Explain): _____

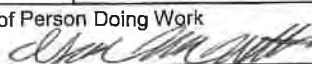
Sealing Materials

☐ Neat Cement Grout	☐ Clay-Sand Slurry (11 lb./gal. wt.)
☐ Sand-Cement (Concrete) Grout	☐ Bentonite-Sand Slurry " "
☐ Concrete	☒ Bentonite Chips

For Monitoring Wells and Monitoring Well Boreholes Only:

☐ Bentonite Chips	☐ Bentonite - Cement Grout
☐ Granular Bentonite	☐ Bentonite - Sand Slurry

6. Comments**7. Supervision of Work**

Name of Person or Firm Doing Sealing Work ECS Midwest, LLC.	Date of Abandonment 12/21/18	DNR Use Only	
Street or Route 1060 Breezewood Ln., Suite 102	Telephone Number (920) 886-1406	Date Received	Noted By
City Neenah	State WI	ZIP Code 54956	Signature of Person Doing Work 
			Date Signed 12/21/18

Notice: Completion of this report is required by chs. 160, 281, 283, 289, 291-293, 295, and 299, Wis. Stats., and ch. NR 141, Wis. Adm. Code. In accordance with chs. 281, 289, 291-293, 295, and 299, Wis. Stats., failure to file this form may result in a forfeiture of between \$10-25,000, or imprisonment for up to one year, depending on the program and conduct involved. Personally identifiable information on this form is not intended to be used for any other purpose. Return form to the appropriate DNR office and bureau. See instructions on reverse for more information.

Route to:

☐ Drinking Water ☐ Watershed/Wastewater ☐ Waste Management ☐ Remediation/Redevelopment ☐ Other: _____

1. General Information

WI Unique Well No.		DNR Well ID No.		County Winnebago	
Common Well Name B9-18		Gov't Lot # (if applicable)			
1/4 / 1/4	1/4 SE	Section 21	Township 20 N	Range 17	☒ E ☐ W
Grid Location Feet ☐ N ☐ S		Feet ☐ E ☐ W		☐ Local Grid Origin ☐ (estimated) OR ☐ Well Location	
Latitude: DEG MIN SEC 44° 11' 22.90" N		Longitude: DEG MIN SEC -88° 28' 04.94" W			

Reason For Abandonment
Soil Sampling Completed

WI Unique Well No. of Replacement Well

3. Well / Drillhole / Borehole Information

☐ Monitoring Well	Original Construction Date 12/19/18
☐ Water Well	If a Well Construction Report is available, please attach.
☒ Borehole / Drillhole	
Construction Type: ☒ Drilled ☐ Driven (Sandpoint) ☐ Dug ☐ Other (specify): _____	

Formation Type:

☒ Unconsolidated Formation ☐ Bedrock

Total Well Depth From Groundsurface (ft.) 23	Casing Diameter (in.) 3.25"
Lower Drillhole Diameter (in.) 3.25"	Casing Depth (ft.) 23

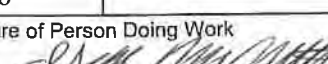
Was well annular space grouted? ☐ Yes ☒ No ☐ Unknown

If yes, to what depth (feet)? _____ Depth to Water (feet) _____

5. Material Used To Fill Well / Drillhole

	From (ft.)	To (ft.)	No. Yards, Sacks Sealant or Volume (circle one)	Mix Ratio or Mud Weight
Clay Cap	Surface	2	0.4 cu. ft.	
Bentonite Chips	2	23	4.1 cu. ft.	

6. Comments**7. Supervision of Work**

Name of Person or Firm Doing Sealing Work ECS Midwest, LLC.		Date of Abandonment 12/19/18		DNR Use Only Date Received _____ Noted By _____	
Street or Route 1060 Breezewood Ln., Suite 102		Telephone Number (920) 886-1406		Comments	
City Neenah	State WI	ZIP Code 54956	Signature of Person Doing Work 		Date Signed 12/19/18

2. Facility / Owner Information

Facility Name Arrowhead Park	
Facility ID	License/Permit/Monitoring No. City, Village or Town Neenah
Street Address of Well 355 Millview Drive, Neenah, WI 54956	
Present Well Owner City of Neenah	Original Well Owner
Street Address or Route of Owner 211 Walnut Street	
City Neenah	State WI
ZIP Code 54956	

4. Pump, Liner, Screen, Casing & Sealing Material

Pump and piping removed?	☐ Yes ☐ No ☒ N/A
Liner(s) removed?	☐ Yes ☐ No ☒ N/A
Screen removed?	☐ Yes ☐ No ☒ N/A
Casing left in place?	☐ Yes ☒ No ☐ N/A
Was casing cut off below surface?	☐ Yes ☒ No ☐ N/A
Did sealing material rise to surface?	☐ Yes ☐ No ☒ N/A
Did material settle after 24 hours?	☐ Yes ☒ No ☐ N/A
If yes, was hole retopped?	☐ Yes ☐ No ☒ N/A
If bentonite chips were used, were they hydrated with water from a known safe source?	☒ Yes ☐ No ☐ N/A

Required Method of Placing Sealing Material

☐ Conductor Pipe-Gravity	☐ Conductor Pipe-Pumped
☒ Screened & Poured (Bentonite Chips)	☐ Other (Explain): _____

Sealing Materials

☐ Neat Cement Grout	☐ Clay-Sand Slurry (11 lb./gal. wt.)
☐ Sand-Cement (Concrete) Grout	☐ Bentonite-Sand Slurry " "
☐ Concrete	☒ Bentonite Chips

For Monitoring Wells and Monitoring Well Boreholes Only:

☐ Bentonite Chips	☐ Bentonite - Cement Grout
☐ Granular Bentonite	☐ Bentonite - Sand Slurry

Notice: Completion of this report is required by chs. 160, 281, 283, 289, 291-293, 295, and 299, Wis. Stats., and ch. NR 141, Wis. Adm. Code. In accordance with chs. 281, 289, 291-293, 295, and 299, Wis. Stats., failure to file this form may result in a forfeiture of between \$10-25,000, or imprisonment for up to one year, depending on the program and conduct involved. Personally identifiable information on this form is not intended to be used for any other purpose. Return form to the appropriate DNR office and bureau. See instructions on reverse for more information.

Route to:

☐ Drinking Water ☐ Watershed/Wastewater ☐ Waste Management ☐ Remediation/Redevelopment ☐ Other: _____

1. General Information

WI Unique Well No.	DNR Well ID No.	County Winnebago
Common Well Name B1018	Gov't Lot # (if applicable)	
1/4 / 1/4 SE	Section 21	Township 20 N 17 ☒ E ☐ W
Grid Location Feet ☐ N ☐ S ☐ E ☐ W ☐ (estimated) OR ☐ Well Location		
Latitude: DEG MIN SEC 44° 11' 22.59" N Longitude: DEG MIN SEC -88° 28' 03.89" W		
Reason For Abandonment Soil Sampling Completed		

3. Well / Drillhole / Borehole Information

☐ Monitoring Well ☐ Water Well ☒ Borehole / Drillhole	Original Construction Date 12/20/18 If a Well Construction Report is available, please attach.
Construction Type: ☒ Drilled ☐ Driven (Sandpoint) ☐ Dug ☐ Other (specify): _____	

Formation Type:

☒ Unconsolidated Formation ☐ Bedrock

Total Well Depth From Groundsurface (ft.)
22.5 Casing Diameter (in.)
3.25"

Lower Drillhole Diameter (in.)
3.25" Casing Depth (ft.)
22.5

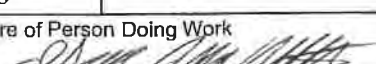
Was well annular space grouted? ☐ Yes ☒ No ☐ Unknown

If yes, to what depth (feet)? Depth to Water (feet)

5. Material Used To Fill Well / Drillhole

	From (ft.)	To (ft.)	No. Yards, Sacks Sealant or Volume (circle one)	Mix Ratio or Mud Weight
Clay Cap	Surface	1	0.2 cu. ft.	
Bentonite Chips	1	22.5	4.2 cu. ft.	

6. Comments**7. Supervision of Work**

Name of Person or Firm Doing Sealing Work ECS Midwest, LLC.	Date of Abandonment 12/20/18	DNR Use Only Date Received Noted By	
Street or Route 1060 Breezewood Ln., Suite 102	Telephone Number (920) 886-1406	Comments	
City Neenah	State WI	ZIP Code 54956	Signature of Person Doing Work  Date Signed 12/20/18

2. Facility / Owner Information

Facility Name Arrowhead Park	Facility ID	License/Permit/Monitoring No.	City, Village or Town Neenah
Street Address of Well 355 Millview Drive, Neenah, WI 54956			
Present Well Owner City of Neenah		Original Well Owner	
Street Address or Route of Owner 211 Walnut Street			
City Neenah	State WI	ZIP Code 54956	

4. Pump, Liner, Screen, Casing & Sealing Material

Pump and piping removed?	☐ Yes ☐ No ☒ N/A
Liner(s) removed?	☐ Yes ☐ No ☒ N/A
Screen removed?	☐ Yes ☐ No ☒ N/A
Casing left in place?	☐ Yes ☒ No ☐ N/A
Was casing cut off below surface?	☐ Yes ☒ No ☐ N/A
Did sealing material rise to surface?	☐ Yes ☐ No ☒ N/A
Did material settle after 24 hours?	☐ Yes ☒ No ☐ N/A
If yes, was hole retopped?	☐ Yes ☐ No ☒ N/A
If bentonite chips were used, were they hydrated with water from a known safe source?	☒ Yes ☐ No ☐ N/A

Required Method of Placing Sealing Material

☐ Conductor Pipe-Gravity ☐ Conductor Pipe-Pumped
☒ Screened & Poured (Bentonite Chips) ☐ Other (Explain): _____

Sealing Materials

☐ Neat Cement Grout ☐ Clay-Sand Slurry (11 lb./gal. wt.)
☐ Sand-Cement (Concrete) Grout ☐ Bentonite-Sand Slurry " "
☐ Concrete ☒ Bentonite Chips

For Monitoring Wells and Monitoring Well Boreholes Only:

☐ Bentonite Chips ☐ Bentonite - Cement Grout
☐ Granular Bentonite ☐ Bentonite - Sand Slurry

Notice: Completion of this report is required by chs. 160, 281, 283, 289, 291-293, 295, and 299, Wis. Stats., and ch. NR 141, Wis. Adm. Code. In accordance with chs. 281, 289, 291-293, 295, and 299, Wis. Stats., failure to file this form may result in a forfeiture of between \$10-25,000, or imprisonment for up to one year, depending on the program and conduct involved. Personally identifiable information on this form is not intended to be used for any other purpose. Return form to the appropriate DNR office and bureau. See instructions on reverse for more information.

Route to:

☐ Drinking Water ☐ Watershed/Wastewater ☐ Waste Management ☐ Remediation/Redevelopment ☐ Other: _____

1. General Information

WI Unique Well No.	DNR Well ID No.	County Winnebago
Common Well Name B4-18	Gov't Lot # (If applicable)	
1/4 / 1/4 SE	Section 21	Township 20 N 17 ☒ E ☐ W
Grid Location Feet ☐ N ☐ E ☐ S ☐ W ☐ Local Grid Origin ☐ (estimated) OR ☐ Well Location		
Latitude: DEG MIN SEC Longitude: DEG MIN SEC 44° 11' 21.80" N -88° 28' 03.79" W		

Reason For Abandonment
Soil Sampling Completed

3. Well / Drillhole / Borehole Information

☐ Monitoring Well ☐ Water Well ☒ Borehole / Drillhole	Original Construction Date 12/19/18 If a Well Construction Report is available, please attach.
Construction Type: ☒ Drilled ☐ Driven (Sandpoint) ☐ Dug ☐ Other (specify): _____	

Formation Type:

☒ Unconsolidated Formation ☐ Bedrock

Total Well Depth From Groundsurface (ft.)
25

Casing Diameter (in.)
3.25"

Lower Drillhole Diameter (in.)
3.25"

Casing Depth (ft.)
25

Was well annular space grouted? ☐ Yes ☒ No ☐ Unknown

If yes, to what depth (feet)?

Depth to Water (feet)
22

5. Material Used To Fill Well / Drillhole

	From (ft.)	To (ft.)	No. Yards, Sacks Sealant or Volume (circle one)	Mix Ratio or Mud Weight
Clay Cap	Surface	3	0.6 cu. ft.	
Bentonite Chips	3	25	4.3 cu. ft.	

6. Comments**7. Supervision of Work**

Name of Person or Firm Doing Sealing Work ECS Midwest, LLC.	Date of Abandonment 12/19/18	DNR Use Only	
Street or Route 1060 Breezewood Ln., Suite 102	Telephone Number (920) 886-1406	Date Received	Noted By
City Neenah	State WI	ZIP Code 54956	Signature of Person Doing Work 
			Date Signed 12/19/18

2. Facility / Owner Information

Facility Name Arrowhead Park	Facility ID	License/Permit/Monitoring No.	City, Village or Town Neenah
Street Address of Well 355 Millview Drive, Neenah, WI 54956			
Present Well Owner City of Neenah		Original Well Owner	
Street Address or Route of Owner 211 Walnut Street			
City Neenah	State WI	ZIP Code 54956	

4. Pump, Liner, Screen, Casing & Sealing Material

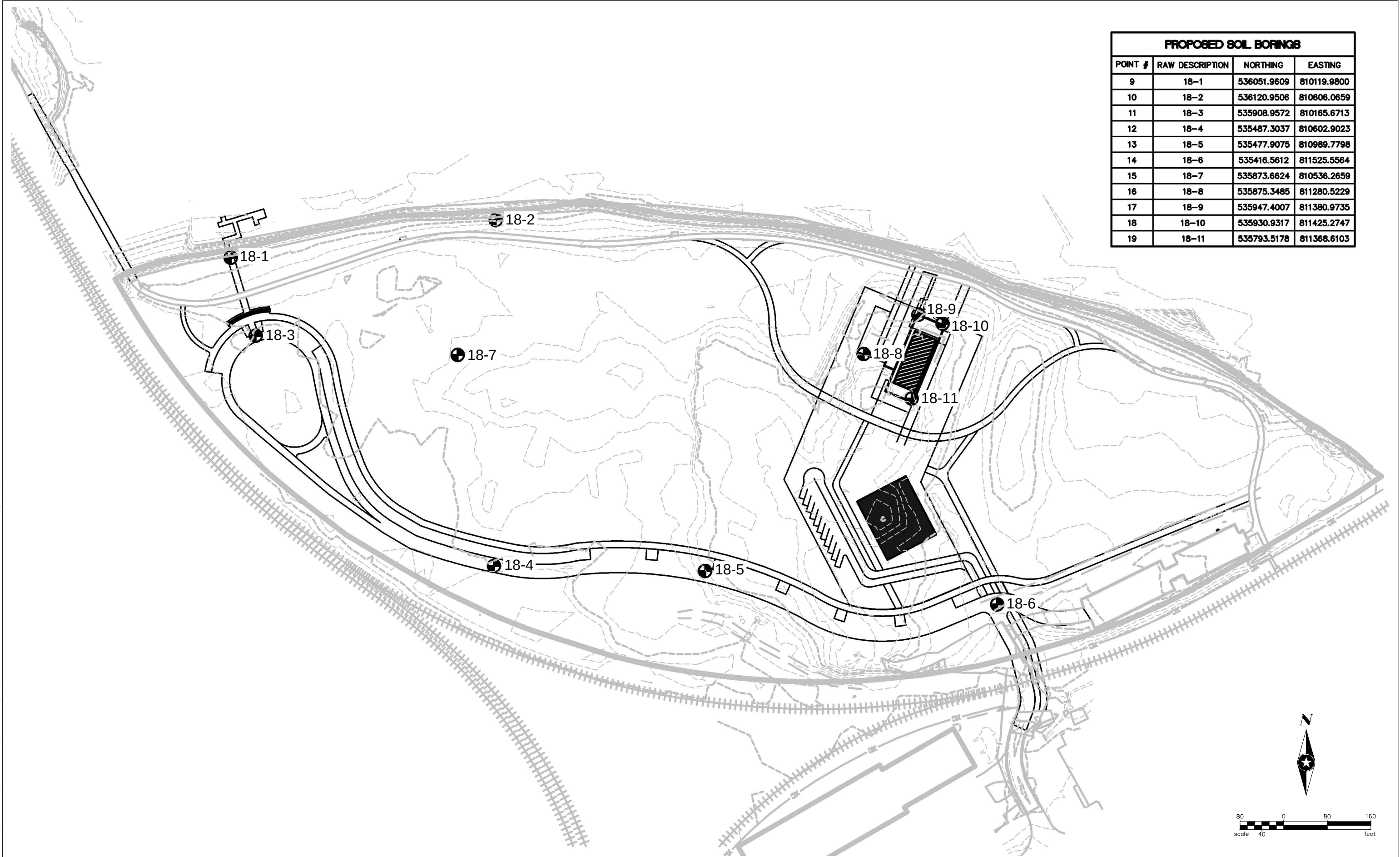
Pump and piping removed?	☐ Yes ☐ No ☒ N/A
Liner(s) removed?	☐ Yes ☐ No ☒ N/A
Screen removed?	☐ Yes ☐ No ☒ N/A
Casing left in place?	☐ Yes ☒ No ☐ N/A
Was casing cut off below surface?	☐ Yes ☒ No ☐ N/A
Did sealing material rise to surface?	☐ Yes ☐ No ☒ N/A
Did material settle after 24 hours?	☐ Yes ☒ No ☐ N/A
If yes, was hole retopped?	☐ Yes ☐ No ☒ N/A
If bentonite chips were used, were they hydrated with water from a known safe source?	☒ Yes ☐ No ☐ N/A
Required Method of Placing Sealing Material	
☐ Conductor Pipe-Gravity	☐ Conductor Pipe-Pumped
☒ Screened & Poured (Bentonite Chips)	☐ Other (Explain): _____

Sealing Materials	
☐ Neat Cement Grout	☐ Clay-Sand Slurry (11 lb./gal. wt.)
☐ Sand-Cement (Concrete) Grout	☐ Bentonite-Sand Slurry " "
☐ Concrete	☒ Bentonite Chips

For Monitoring Wells and Monitoring Well Boreholes Only:

☐ Bentonite Chips	☐ Bentonite - Cement Grout
☐ Granular Bentonite	☐ Bentonite - Sand Slurry

S:\KO\N\NEENA\148177\5-final-dsgn\51-drawings\85-HeavyCiv\ARROWHEAD PARK\SHEETS\PROP_SOIL_BORINGS.dwg 11/26/2018 2:02 PM bheirich



DRAWN BY: BRH				
DESIGNER:				
CHECKED BY: WSW				
DESIGN TEAM	NO.	BY	DATE	REVISIONS



PHONE: 920.380.2800
425 WEST WATER STREET
APPLETON, WI 54911-6058
www.sehinc.com

ARROWHEAD PARK
PROPOSED SOIL BORING LOCATION MAP

FILE NO. NEENA 148177	1
DATE 11/26/2018	1

SB-18-1



33-18-3



SB
18-41



SB 18-5





SB 18-6



SB 18-8







SB 18-11

February 05, 2019

Trevor Frank
SEH, Inv
425 W. Water Street
Suite 300
Appleton, WI 54911

RE: Project: ARROWHEAD PARK
Pace Project No.: 40182535

Dear Trevor Frank:

Enclosed are the analytical results for sample(s) received by the laboratory on January 28, 2019. The results relate only to the samples included in this report. Results reported herein conform to the most current, applicable TNI/NELAC standards and the laboratory's Quality Assurance Manual, where applicable, unless otherwise noted in the body of the report.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,



Christopher Hyska
christopher.hyska@pacelabs.com
(920)469-2436
Project Manager

Enclosures

cc: John Guhl, SEH
Brian Kent, SEH, Inc.
Accounts Payable, SEH



REPORT OF LABORATORY ANALYSIS

This report shall not be reproduced, except in full,
without the written consent of Pace Analytical Services, LLC.

CERTIFICATIONS

Project: ARROWHEAD PARK

Pace Project No.: 40182535

Green Bay Certification IDs

1241 Bellevue Street, Green Bay, WI 54302

Florida/NELAP Certification #: E87948

Illinois Certification #: 200050

Kentucky UST Certification #: 82

Louisiana Certification #: 04168

Minnesota Certification #: 055-999-334

New York Certification #: 12064

North Dakota Certification #: R-150

Virginia VELAP ID: 460263

South Carolina Certification #: 83006001

Texas Certification #: T104704529-14-1

Wisconsin Certification #: 405132750

Wisconsin DATCP Certification #: 105-444

USDA Soil Permit #: P330-16-00157

Federal Fish & Wildlife Permit #: LE51774A-0

REPORT OF LABORATORY ANALYSIS

This report shall not be reproduced, except in full,
without the written consent of Pace Analytical Services, LLC.

SAMPLE SUMMARY

Project: ARROWHEAD PARK

Pace Project No.: 40182535

Lab ID	Sample ID	Matrix	Date Collected	Date Received
40182535001	DRUM IDW 18-4,18-5,18-6	Solid	01/25/19 13:30	01/28/19 09:45
40182535002	DRUM IDW 18-1,14-9,18-7	Solid	01/25/19 13:25	01/28/19 09:45
40182535003	DRUM IDW 18-1,18-3	Solid	01/25/19 13:45	01/28/19 09:45
40182535004	WASTE DRUM-RESIDUAL WATER	Water	01/25/19 14:00	01/28/19 09:45

REPORT OF LABORATORY ANALYSIS

This report shall not be reproduced, except in full,
without the written consent of Pace Analytical Services, LLC.

SAMPLE ANALYTE COUNT

Project: ARROWHEAD PARK

Pace Project No.: 40182535

Lab ID	Sample ID	Method	Analysts	Analytes Reported
40182535001	DRUM IDW 18-4,18-5,18-6	EPA 8082	BLM	10
		ASTM D2974-87	JXM	1
40182535002	DRUM IDW 18-1,14-9,18-7	EPA 8082	BLM	10
		ASTM D2974-87	PCG	1
40182535003	DRUM IDW 18-1,18-3	EPA 8082	BLM	10
		ASTM D2974-87	JXM	1

REPORT OF LABORATORY ANALYSIS

This report shall not be reproduced, except in full,
without the written consent of Pace Analytical Services, LLC.

SUMMARY OF DETECTION

Project: ARROWHEAD PARK

Pace Project No.: 40182535

Lab Sample ID Method	Client Sample ID Parameters	Result	Units	Report Limit	Analyzed	Qualifiers
40182535001	DRUM IDW 18-4,18-5,18-6					
EPA 8082	PCB-1242 (Aroclor 1242)	124	mg/kg	7.2	02/04/19 11:42	
EPA 8082	PCB, Total	124	mg/kg	7.2	02/04/19 11:42	
ASTM D2974-87	Percent Moisture	30.6	%	0.10	01/31/19 11:49	
40182535002	DRUM IDW 18-1,14-9,18-7					
EPA 8082	PCB-1242 (Aroclor 1242)	40.8	mg/kg	5.8	02/04/19 12:01	
EPA 8082	PCB, Total	40.8	mg/kg	5.8	02/04/19 12:01	
ASTM D2974-87	Percent Moisture	56.7	%	0.10	01/30/19 17:16	
40182535003	DRUM IDW 18-1,18-3					
EPA 8082	PCB-1242 (Aroclor 1242)	40.9	mg/kg	6.7	02/04/19 12:19	
EPA 8082	PCB, Total	40.9	mg/kg	6.7	02/04/19 12:19	
ASTM D2974-87	Percent Moisture	25.7	%	0.10	01/31/19 11:49	

REPORT OF LABORATORY ANALYSIS

This report shall not be reproduced, except in full,
without the written consent of Pace Analytical Services, LLC.

ANALYTICAL RESULTS

Project: ARROWHEAD PARK

Pace Project No.: 40182535

Sample: DRUM IDW 18-4,18-5,18-6 Lab ID: 40182535001 Collected: 01/25/19 13:30 Received: 01/28/19 09:45 Matrix: Solid

Results reported on a "dry weight" basis and are adjusted for percent moisture, sample size and any dilutions.

Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
8082 GCS PCB Analytical Method: EPA 8082 Preparation Method: EPA 3541									
PCB-1016 (Aroclor 1016)	<3.6	mg/kg	7.2	3.6	100	02/01/19 11:03	02/04/19 11:42	12674-11-2	
PCB-1221 (Aroclor 1221)	<3.6	mg/kg	7.2	3.6	100	02/01/19 11:03	02/04/19 11:42	11104-28-2	
PCB-1232 (Aroclor 1232)	<3.6	mg/kg	7.2	3.6	100	02/01/19 11:03	02/04/19 11:42	11141-16-5	
PCB-1242 (Aroclor 1242)	124	mg/kg	7.2	3.6	100	02/01/19 11:03	02/04/19 11:42	53469-21-9	
PCB-1248 (Aroclor 1248)	<3.6	mg/kg	7.2	3.6	100	02/01/19 11:03	02/04/19 11:42	12672-29-6	
PCB-1254 (Aroclor 1254)	<3.6	mg/kg	7.2	3.6	100	02/01/19 11:03	02/04/19 11:42	11097-69-1	
PCB-1260 (Aroclor 1260)	<3.6	mg/kg	7.2	3.6	100	02/01/19 11:03	02/04/19 11:42	11096-82-5	
PCB, Total	124	mg/kg	7.2	3.6	100	02/01/19 11:03	02/04/19 11:42	1336-36-3	
Surrogates									
Tetrachloro-m-xylene (S)	0	%	56-98		100	02/01/19 11:03	02/04/19 11:42	877-09-8	S4
Decachlorobiphenyl (S)	0	%	49-104		100	02/01/19 11:03	02/04/19 11:42	2051-24-3	S4
Percent Moisture Analytical Method: ASTM D2974-87									
Percent Moisture	30.6	%	0.10	0.10	1		01/31/19 11:49		

Sample: DRUM IDW 18-1,14-9,18-7 Lab ID: 40182535002 Collected: 01/25/19 13:25 Received: 01/28/19 09:45 Matrix: Solid

Results reported on a "dry weight" basis and are adjusted for percent moisture, sample size and any dilutions.

Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
8082 GCS PCB Analytical Method: EPA 8082 Preparation Method: EPA 3541									
PCB-1016 (Aroclor 1016)	<2.9	mg/kg	5.8	2.9	50	02/01/19 11:03	02/04/19 12:01	12674-11-2	
PCB-1221 (Aroclor 1221)	<2.9	mg/kg	5.8	2.9	50	02/01/19 11:03	02/04/19 12:01	11104-28-2	
PCB-1232 (Aroclor 1232)	<2.9	mg/kg	5.8	2.9	50	02/01/19 11:03	02/04/19 12:01	11141-16-5	
PCB-1242 (Aroclor 1242)	40.8	mg/kg	5.8	2.9	50	02/01/19 11:03	02/04/19 12:01	53469-21-9	
PCB-1248 (Aroclor 1248)	<2.9	mg/kg	5.8	2.9	50	02/01/19 11:03	02/04/19 12:01	12672-29-6	
PCB-1254 (Aroclor 1254)	<2.9	mg/kg	5.8	2.9	50	02/01/19 11:03	02/04/19 12:01	11097-69-1	
PCB-1260 (Aroclor 1260)	<2.9	mg/kg	5.8	2.9	50	02/01/19 11:03	02/04/19 12:01	11096-82-5	
PCB, Total	40.8	mg/kg	5.8	2.9	50	02/01/19 11:03	02/04/19 12:01	1336-36-3	
Surrogates									
Tetrachloro-m-xylene (S)	0	%	56-98		50	02/01/19 11:03	02/04/19 12:01	877-09-8	S4
Decachlorobiphenyl (S)	0	%	49-104		50	02/01/19 11:03	02/04/19 12:01	2051-24-3	S4
Percent Moisture Analytical Method: ASTM D2974-87									
Percent Moisture	56.7	%	0.10	0.10	1		01/30/19 17:16		

REPORT OF LABORATORY ANALYSIS

This report shall not be reproduced, except in full,
without the written consent of Pace Analytical Services, LLC.

ANALYTICAL RESULTS

Project: ARROWHEAD PARK

Pace Project No.: 40182535

Sample: DRUM IDW 18-1,18-3 Lab ID: 40182535003 Collected: 01/25/19 13:45 Received: 01/28/19 09:45 Matrix: Solid

Results reported on a "dry weight" basis and are adjusted for percent moisture, sample size and any dilutions.

Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
8082 GCS PCB Analytical Method: EPA 8082 Preparation Method: EPA 3541									
PCB-1016 (Aroclor 1016)	<3.4	mg/kg	6.7	3.4	100	02/01/19 11:03	02/04/19 12:19	12674-11-2	
PCB-1221 (Aroclor 1221)	<3.4	mg/kg	6.7	3.4	100	02/01/19 11:03	02/04/19 12:19	11104-28-2	
PCB-1232 (Aroclor 1232)	<3.4	mg/kg	6.7	3.4	100	02/01/19 11:03	02/04/19 12:19	11141-16-5	
PCB-1242 (Aroclor 1242)	40.9	mg/kg	6.7	3.4	100	02/01/19 11:03	02/04/19 12:19	53469-21-9	
PCB-1248 (Aroclor 1248)	<3.4	mg/kg	6.7	3.4	100	02/01/19 11:03	02/04/19 12:19	12672-29-6	
PCB-1254 (Aroclor 1254)	<3.4	mg/kg	6.7	3.4	100	02/01/19 11:03	02/04/19 12:19	11097-69-1	
PCB-1260 (Aroclor 1260)	<3.4	mg/kg	6.7	3.4	100	02/01/19 11:03	02/04/19 12:19	11096-82-5	
PCB, Total	40.9	mg/kg	6.7	3.4	100	02/01/19 11:03	02/04/19 12:19	1336-36-3	
Surrogates									
Tetrachloro-m-xylene (S)	0	%	56-98		100	02/01/19 11:03	02/04/19 12:19	877-09-8	S4
Decachlorobiphenyl (S)	0	%	49-104		100	02/01/19 11:03	02/04/19 12:19	2051-24-3	S4
Percent Moisture Analytical Method: ASTM D2974-87									
Percent Moisture	25.7	%	0.10	0.10	1		01/31/19 11:49		

REPORT OF LABORATORY ANALYSIS

This report shall not be reproduced, except in full,
without the written consent of Pace Analytical Services, LLC.

QUALITY CONTROL DATA

Project: ARROWHEAD PARK
Pace Project No.: 40182535

QC Batch: 312703 Analysis Method: EPA 8082
QC Batch Method: EPA 3541 Analysis Description: 8082 GCS PCB
Associated Lab Samples: 40182535001, 40182535002, 40182535003

METHOD BLANK: 1822239 Matrix: Solid
Associated Lab Samples: 40182535001, 40182535002, 40182535003

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
PCB-1016 (Aroclor 1016)	mg/kg	<0.025	0.050	02/04/19 09:16	
PCB-1221 (Aroclor 1221)	mg/kg	<0.025	0.050	02/04/19 09:16	
PCB-1232 (Aroclor 1232)	mg/kg	<0.025	0.050	02/04/19 09:16	
PCB-1242 (Aroclor 1242)	mg/kg	<0.025	0.050	02/04/19 09:16	
PCB-1248 (Aroclor 1248)	mg/kg	<0.025	0.050	02/04/19 09:16	
PCB-1254 (Aroclor 1254)	mg/kg	<0.025	0.050	02/04/19 09:16	
PCB-1260 (Aroclor 1260)	mg/kg	<0.025	0.050	02/04/19 09:16	
Decachlorobiphenyl (S)	%	76	49-104	02/04/19 09:16	
Tetrachloro-m-xylene (S)	%	67	56-98	02/04/19 09:16	

LABORATORY CONTROL SAMPLE: 1822240

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
PCB-1016 (Aroclor 1016)	mg/kg		<0.025			
PCB-1221 (Aroclor 1221)	mg/kg		<0.025			
PCB-1232 (Aroclor 1232)	mg/kg		<0.025			
PCB-1242 (Aroclor 1242)	mg/kg		<0.025			
PCB-1248 (Aroclor 1248)	mg/kg		<0.025			
PCB-1254 (Aroclor 1254)	mg/kg		<0.025			
PCB-1260 (Aroclor 1260)	mg/kg	0.5	0.34	69	61-105	
Decachlorobiphenyl (S)	%			72	49-104	
Tetrachloro-m-xylene (S)	%			63	56-98	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1822241 1822242

Parameter	Units	40182454022 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
PCB-1016 (Aroclor 1016)	mg/kg	<26.0 ug/kg			<0.026	<0.026					20	
PCB-1221 (Aroclor 1221)	mg/kg	<26.0 ug/kg			<0.026	<0.026					20	
PCB-1232 (Aroclor 1232)	mg/kg	<26.0 ug/kg			<0.026	<0.026					20	
PCB-1242 (Aroclor 1242)	mg/kg	<26.0 ug/kg			<0.026	<0.026					20	
PCB-1248 (Aroclor 1248)	mg/kg	<26.0 ug/kg			<0.026	<0.026					20	
PCB-1254 (Aroclor 1254)	mg/kg	<26.0 ug/kg			<0.026	<0.026					20	

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

REPORT OF LABORATORY ANALYSIS

This report shall not be reproduced, except in full,
without the written consent of Pace Analytical Services, LLC.

QUALITY CONTROL DATA

Project: ARROWHEAD PARK

Pace Project No.: 40182535

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1822241 1822242											
Parameter	Units	40182454022 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	Max RPD	Qual
PCB-1260 (Aroclor 1260)	mg/kg	<26.0 ug/kg	0.52	0.52	0.38	0.40	74	77	35-125	4	20
Decachlorobiphenyl (S)	%						76	79	49-104		
Tetrachloro-m-xylene (S)	%						70	73	56-98		

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

REPORT OF LABORATORY ANALYSIS

This report shall not be reproduced, except in full,
without the written consent of Pace Analytical Services, LLC.

QUALITY CONTROL DATA

Project: ARROWHEAD PARK

Pace Project No.: 40182535

QC Batch: 312575

Analysis Method: ASTM D2974-87

QC Batch Method: ASTM D2974-87

Analysis Description: Dry Weight/Percent Moisture

Associated Lab Samples: 40182535002

SAMPLE DUPLICATE: 1821826

Parameter	Units	40182591003 Result	Dup Result	RPD	Max RPD	Qualifiers
Percent Moisture	%	5.0	4.9	1	10	

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

REPORT OF LABORATORY ANALYSIS

This report shall not be reproduced, except in full,
without the written consent of Pace Analytical Services, LLC.

QUALITY CONTROL DATA

Project: ARROWHEAD PARK

Pace Project No.: 40182535

QC Batch: 312640

Analysis Method: ASTM D2974-87

QC Batch Method: ASTM D2974-87

Analysis Description: Dry Weight/Percent Moisture

Associated Lab Samples: 40182535001, 40182535003

SAMPLE DUPLICATE: 1821986

Parameter	Units	40182483004 Result	Dup Result	RPD	Max RPD	Qualifiers
Percent Moisture	%	15.9	15.7	1	10	

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

REPORT OF LABORATORY ANALYSIS

This report shall not be reproduced, except in full,
without the written consent of Pace Analytical Services, LLC.

QUALIFIERS

Project: ARROWHEAD PARK

Pace Project No.: 40182535

DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to dilution of the sample aliquot.

ND - Not Detected at or above LOD.

J - Estimated concentration at or above the LOD and below the LOQ.

LOD - Limit of Detection adjusted for dilution factor, percent moisture, initial weight and final volume.

LOQ - Limit of Quantitation adjusted for dilution factor, percent moisture, initial weight and final volume.

S - Surrogate

1,2-Diphenylhydrazine decomposes to and cannot be separated from Azobenzene using Method 8270. The result for each analyte is a combined concentration.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

U - Indicates the compound was analyzed for, but not detected at or above the adjusted LOD.

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

Pace Analytical is TNI accredited. Contact your Pace PM for the current list of accredited analytes.

TNI - The NELAC Institute.

ANALYTE QUALIFIERS

S4 Surrogate recovery not evaluated against control limits due to sample dilution.

REPORT OF LABORATORY ANALYSIS

This report shall not be reproduced, except in full,
without the written consent of Pace Analytical Services, LLC.

QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: ARROWHEAD PARK

Pace Project No.: 40182535

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
40182535001	DRUM IDW 18-4,18-5,18-6	EPA 3541	312703	EPA 8082	312708
40182535002	DRUM IDW 18-1,14-9,18-7	EPA 3541	312703	EPA 8082	312708
40182535003	DRUM IDW 18-1,18-3	EPA 3541	312703	EPA 8082	312708
40182535001	DRUM IDW 18-4,18-5,18-6	ASTM D2974-87	312640		
40182535002	DRUM IDW 18-1,14-9,18-7	ASTM D2974-87	312575		
40182535003	DRUM IDW 18-1,18-3	ASTM D2974-87	312640		

REPORT OF LABORATORY ANALYSIS

This report shall not be reproduced, except in full,
without the written consent of Pace Analytical Services, LLC.

Client Name: SEH

Sample Preservation Receipt Form

Project # 40182535

All containers needing preservation have been checked and noted below: ☐ Yes ☒ No ☐ N/A

Lab Lot# of pH paper:

Lab Std #ID of preservation (if pH adjusted):

Initial when
completed:

Date/
Time:

Pace Lab #	Glass						Plastic						Vials					Jars			General			VOA Vials (>6mm) *	H2SO4 pH ≤2	NaOH+Zn Act pH ≥9	NaOH pH ≥12	HNO3 pH ≤2	pH after adjusted	Volume (mL)	
	AG1U	AG1H	AG4S	AG4U	AG5U	AG2S	BG3U	BP1U	BP2N	BP2Z	BP3U	BP3C	BP3N	BP3S	DG9A	DG9T	VG9U	VG9H	VG9M	VG9D	JGFU	WGFU	WPFU	SP5T	ZPLC	GN					
001																					-										2.5 / 5 / 10
002																					-										2.5 / 5 / 10
003																					-										2.5 / 5 / 10
004																					-										2.5 / 5 / 10
005																															2.5 / 5 / 10
006																															2.5 / 5 / 10
007																															2.5 / 5 / 10
008																															2.5 / 5 / 10
009																															2.5 / 5 / 10
010																															2.5 / 5 / 10
011																															2.5 / 5 / 10
012																															2.5 / 5 / 10
013																															2.5 / 5 / 10
014																															2.5 / 5 / 10
015																															2.5 / 5 / 10
016																															2.5 / 5 / 10
017																															2.5 / 5 / 10
018																															2.5 / 5 / 10
019																															2.5 / 5 / 10
020																															2.5 / 5 / 10

Exceptions to preservation check: VOA, Coliform, TOC, TOX, TOH, O&G, WI DRO, Phenolics, Other: _____ Headspace in VOA Vials (>6mm) : ☐ Yes ☒ No ☐ N/A *If yes look in headspace column

AG1U	1 liter amber glass	BP1U	1 liter plastic unpres	DG9A	40 mL amber ascorbic	JGFU	4 oz amber jar unpres
AG1H	1 liter amber glass HCL	BP2N	500 mL plastic HNO3	DG9T	40 mL amber Na Thio	WGFU	4 oz clear jar unpres
AG4S	125 mL amber glass H2SO4	BP2Z	500 mL plastic NaOH, Znact	VG9U	40 mL clear vial unpres	WPFU	4 oz plastic jar unpres
AG4U	120 mL amber glass unpres	BP3U	250 mL plastic unpres	VG9H	40 mL clear vial HCL		
AG5U	100 mL amber glass unpres	BP3C	250 mL plastic NaOH	VG9M	40 mL clear vial MeOH	SP5T	120 mL plastic Na Thiosulfate
AG2S	500 mL amber glass H2SO4	BP3N	250 mL plastic HNO3	VG9D	40 mL clear vial DI	ZPLC	ziploc bag
BG3U	250 mL clear glass unpres	BP3S	250 mL plastic H2SO4			GN:	



1241 Bellevue Street, Green Bay, WI 54302

Document Name:
Sample Condition Upon Receipt (SCUR)Document No.:
F-GB-C-031-Rev.07

Document Revised: 25Apr2018

Issuing Authority:
Pace Green Bay Quality Office

Sample Condition Upon Receipt Form (SCUR)

Client Name:

SEH

Project #:

WO#: 40182535



40182535

Courier: ☐ CS Logistics ☐ Fed Ex ☐ Speedee ☐ UPS ☐ Waltco
☒ Client ☐ Pace Other: _____

Tracking #:

Custody Seal on Cooler/Box Present: ☐ yes ☒ no Seals intact: ☐ yes ☒ noCustody Seal on Samples Present: ☐ yes ☒ no Seals intact: ☐ yes ☒ noPacking Material: ☐ Bubble Wrap ☒ Bubble Bags ☐ None ☐ OtherThermometer Used SR - NA Type of Ice: ☒ Wet ☐ Blue ☐ Dry ☐ None☒ Samples on ice, cooling process has begunCooler Temperature Uncorr: RPT ICorr: _____Temp Blank Present: ☐ yes ☒ noBiological Tissue is Frozen: ☐ yes ☒ no

Person examining contents:

Date: 1/28/19

Initials: _____

Temp should be above freezing to 6°C.

Biota Samples may be received at ≤ 0°C.

Chain of Custody Present:	☒ Yes ☐ No ☐ N/A	1.
Chain of Custody Filled Out:	☒ Yes ☐ No ☐ N/A	2.
Chain of Custody Relinquished:	☒ Yes ☐ No ☐ N/A	3.
Sampler Name & Signature on COC:	☒ Yes ☐ No ☐ N/A	4.
Samples Arrived within Hold Time:	☒ Yes ☐ No	5.
- VOA Samples frozen upon receipt	☐ Yes ☒ No	Date/Time:
Short Hold Time Analysis (<72hr):	☐ Yes ☒ No	6.
Rush Turn Around Time Requested:	☐ Yes ☒ No	7.
Sufficient Volume:		8.
For Analysis: ☒ Yes ☐ No MS/MSD: ☐ Yes ☒ No ☐ N/A		
Correct Containers Used:	☒ Yes ☐ No	9.
-Pace Containers Used:	☒ Yes ☐ No ☐ N/A	2 4oz amber jars returned unused 1/28/19
-Pace IR Containers Used:	☐ Yes ☐ No ☒ N/A	
Containers Intact:	☒ Yes ☐ No	10.
Filtered volume received for Dissolved tests	☐ Yes ☐ No ☒ N/A	11.
Sample Labels match COC: <u>1/28/19</u>	☒ Yes ☒ No ☐ N/A	12.
-Includes date/time/ID/Analysis Matrix: <u>SW</u>		001-003 neochlorin ID; 004 ID waste DRUM H2O 1/28/19
Trip Blank Present:	☐ Yes ☐ No ☒ N/A	13.
Trip Blank Custody Seals Present	☐ Yes ☐ No ☒ N/A	
Pace Trip Blank Lot # (if purchased):		

Client Notification/ Resolution:

If checked, see attached form for additional comments ☐

Person Contacted: _____ Date/Time: _____

Comments/ Resolution: _____

Project Manager Review: _____

Date: 1/28/19

WASTESTREAM INFORMATION PROFILE

Recertification

Veolia ES Location		<u>MENOMONEE FALLS OFFICE</u>	<u>MENOMONEE FALLS</u>	<u>WI</u>	<u>552</u>	<u>165</u>
Invoice Address		OFFICE	CITY	ST		

Veolia ES TSDf requested _____ Technology requested _____ Generator No.657989 Generator EPA ID No. 40 CFR PART

1. Generator Name CITY OF NEENAH-ARROWHEAD PARK Generator State No. _____
 Address 355 Millview Drive State Wastestream No. _____
 City Neenah State WI Country US ZIP 54956 _____
 NAICS(SIC) Code 9199 92119 Source G09 Origin 1 Form W609 System Type _____

2. Waste Name IDW PCB SOIL AND SLUDGE DRILL CUTTINGS Lab or Waste Area _____

3. Process Generating Waste

IDW solid boring waste from former papermill wwt treatment system after it was dewatered

4. Shipping Name POLYCHLORINATED BIPHENYLS, SOLID

Hazard Class 9 UN/NA No. UN3432 PG III

RQ amt 0 lb Waste: N PIH: N IH: N DWW: N P: N

RQ Des: 1. _____ 2. _____

DOT Des: 1.SOIL 2.SLUDGE

5. Waste Codes NONE

Wastewater _____ Non Wastewater X Sub Category _____ Mix: N Sol: N

6. Physical and chemical properties:

pH	Specific Gravity	Flash Point(F)	Solids	
a ____ < 2	a ____ < .8	a ____ < 80	<u>0</u> - <u>0</u> % suspended	<u>0</u> - <u>0</u> % ash
b ____ 2 - 5	b ____ .8 - 1.0	b ____ 80 - 100	<u>95</u> - <u>100</u> % settleable	<u>0</u> - <u>10</u> % water solubility
c <u>X</u> 5 - 9	c ____ 1.0	c ____ 100 - 140	<u>0</u> - <u>0</u> % dissolved	<u>0</u> - <u>0</u> BTU/lb
d ____ 9 - 12.5	d ____ 1.0 - 1.2	d ____ 140 - 200		
e ____ > 12.5	e ____ > 1.2	e <u>X</u> > 200	Free Liquid	<u>0</u> - <u>5</u> %
____ - ____ exact	<u>1.0</u> - <u>1.4</u> exact	f ____ no flash ____ - ____ exact	VOC	<u>0</u> - <u>0</u> %

Physical State		Hazardous Characteristics		Odor	
s ☒ solid	a ☐ air reactive	r ☐ radioactive or NRC regulated	a none	☒	
m ☒ semi-solid	w ☐ water reactive	s ☐ shock sensitive	b mild	☐	
l ☐ liquid	c ☐ cyanide reactive	t ☐ temp sensitive	c strong	☐	
p ☐ pumpable semi-solid	f ☐ sulfide reactive	m ☐ polymerization/monomer	describe _____		
f ☐ flowable powder	e ☐ explosive	n ☐ OSHA carcinogen			
g ☐ gas	o ☐ oxidizing acid	i ☐ infectious	Ha logens		
a ☐ aerosol	p ☐ peroxide former	h ☐ inhalation hazard	Br	.0	- .0 % Bromine
r ☐ pressurized liquid		Zone:	Cl	.0	- .0 % Chlorine
d ☐ debris per 40 CFR 268.45			F	.0	- .0 % Fluorine
h ☐ sharps			I	.0	- .0 % Iodine
q ☐ pumpable liquid					

Layers:		a ____ multilayered:		b ____X bi-layered:		c ____ single phase		
		Top Layer		Second Layer		Bottom Layer		Color
Viscosity		__X__ high(syrup)		____ high(syrup)		____ high(syrup)		VAR
by		____ medium(oil)		____ medium(oil)		____ medium(oil)		____
Layer:		____ low(water)		____ low(water)		____ low(water)		_____
		____ solid		__X__ solid		____ solid		

WASTESTREAM INFORMATION PROFILE

Used oil y/n N HOC < 1000 ppm HOC > 1000 ppm

7. Chemical Composition [M=Marine Pollutant, S=Severe Marine Pollutant, O=Ozone Depleting Substance,
U=Underlying Hazardous Constituent, B=Benzene NESHAP, T=TRI Chemical, C=OSHA Carcinogen]

Constituents	Ranges	Units
S,T,U, POLYCHLORINATED BIPHENYL 1242	50.00	150.00 M
DRUMS OF IDW SOIL / SLUDGE CUTTINGS CONTAINING 50 - 150 PPM	100.00	100.00 %
PCB'S (ANALYSIS ON FILE)		

Other:

8. Is the wastestream being imported into the USA? Yes No X
9. Does the wastestream contain PCBs regulated by 40CFR? Yes X No
PCB Concentration 150.00 ppm
10. Is the wastestream subject to the Marine Pollutant Regulations? Yes No X
11. Is the wastestream from an industry regulated under Benzene NESHAP? Yes No X
If yes:
Is the wastestream subject to Notification/Control Requirements? Yes No X
Benzene Concentration .00 ppm
Does it contain >= 10% water? Yes No X
What is the TAB at your facility? .00 Mg/Yr
12. Is the wastestream subject to RCRA subpart CC controls? Yes No X
Volatile Organic Concentration .00 ppmw
CC Approved Analytical Method? Yes No X
Generator Knowledge? Yes No X
13. Is the wastestream from a CERCLA or state mandated cleanup? Yes No X

14. Container Information :

Packaging: 551A2 Type/Size: DM 55 GAL OPEN HEAD (17H) DM
 Type/Size:

Shipping Frequency: Units 3.00 Per Day Per Week Per Month Per Qtr Per Year One Time X
UOM DRUMS DESCRIPTION:

15. Additional Information :

GENERATOR CERTIFICATION

I hereby certify that all information submitted in this and all attached documents contains true and accurate descriptions of this waste. Any sample submitted is representative as defined in 40 CFR 261 - Appendix I or by using an equivalent method. All relevant information regarding known or suspected hazards in the possession of the generator has been disclosed. I authorize sampling of any waste shipment for purposes of recertification.

Name(Print or Type)

Phone

Date

Signature

Title

If approved for management, Veolia ES has all the necessary permits and licenses for the waste that has been characterized and identified by this profile.

WASTESTREAM INFORMATION PROFILE

Disposal Code

|___| Recertification

Veolia ES Location MENOMONEE FALLS OFFICE MENOMONEE FALLS WI 552 165 |
|___| Invoice Address OFFICE CITY ST

Veolia ES TSDf requested _____ Technology requested _____ Generator No. 657989 Generator EPA ID No. 40 CFR PART

1. Generator Name CITY OF NEENAH-ARROWHEAD PARK Generator State No. _____
Address 355 Millview Drive State Wastestream No. _____
City Neenah State WI Country US ZIP 54956
NAICS(SIC) Code 9199 92119 Source G09 Origin 1 Form W119 System Type _____

2. Waste Name IDW PCB DECON WATER AND PPE Lab or Waste Area _____

3. Process Generating Waste

IDW decon water and ppe waste from former papermill wwt treatment system investigative project

4. Shipping Name POLYCHLORINATED BIPHENYLS, LIQUID

Hazard Class 9 UN/NA No. UN2315 PG III

RQ amt 0 lb Waste: N PIH: N IH: N DWW: N P: N

RQ Des: 1. _____ 2. _____

DOT Des: 1. DECON WATER 2. PPE

5. Waste Codes NONE

Wastewater _____ Non Wastewater X Sub Category _____ Mix: N Sol: N

6. Physical and chemical properties:

pH	Specific Gravity	Flash Point(F)	Solids
a < 2	a < .8	a < 80	0 - 0% suspended 0 - 0% ash
b 2 - 5	b .8 - 1.0	b 80 - 100	40 - 60% settleable 40 - 60% water solubility
c X 5 - 9	c 1.0	c 100 - 140	0 - 0% dissolved 0 - 0 BTU/lb
d 9 - 12.5	d X 1.0 - 1.2	d 140 - 200	
e > 12.5	e > 1.2	e X > 200	Free Liquid 40 - 60 %
- exact	- exact	f no flash - exact	VOC 0 - 0 %

Physical State	Hazardous Characteristics	Odor
s X solid	a air reactive	r radioactive or NRC regulated
m semi-solid	w water reactive	s shock sensitive
l X liquid	c cyanide reactive	t temp sensitive
p pumpable semi-solid	f sulfide reactive	m polymerization/monomer
f flowable powder	e explosive	n OSHA carcinogen
g gas	o oxidizing acid	i infectious
a aerosol	p peroxide former	h inhalation hazard
r pressurized liquid	Zone: -	
d debris per 40 CFR 268.45		
h sharps		
q pumpable liquid		

Halogens
Br .0 - .0 % Bromine
Cl .0 - .0 % Chlorine
F .0 - .0 % Fluorine
I .0 - .0 % Iodine

Layers: | a multilayered: b X bi-layered: c single phase |

	Top Layer	Second Layer	Bottom Layer	Color
Viscosity	high(syrup)	high(syrup)	high(syrup)	VAR
by	medium(oil)	medium(oil)	medium(oil)	
Layer:	X low(water)	low(water)	low(water)	
	solid	X solid	solid	

WASTESTREAM INFORMATION PROFILE

Used oil y/n N HOC < 1000 ppm HOC > 1000 ppm

7. Chemical Composition [M=Marine Pollutant, S=Severe Marine Pollutant, O=Ozone Depleting Substance,
U=Underlying Hazardous Constituent, B=Benzene NESHAP, T=TRI Chemical, C=OSHA Carcinogen]

Constituents	Ranges	Units
S,T,U, POLYCHLORINATED BIPHENYL 1242	50.00	150.00 M
DECON WATER	40.00	60.00 %
PPE (GLOVES, TYVEK, ETC.)(SEE ANALYSIS SCANNED TO PROFILE	40.00	60.00 %
425198)		

Other:

8. Is the wastestream being imported into the USA? Yes No X
9. Does the wastestream contain PCBs regulated by 40CFR? Yes X No
PCB Concentration 150.00 ppm
10. Is the wastestream subject to the Marine Pollutant Regulations? Yes No X
11. Is the wastestream from an industry regulated under Benzene NESHAP? Yes No X
If yes:
Is the wastestream subject to Notification/Control Requirements? Yes No X
Benzene Concentration .00 ppm
Does it contain >= 10% water? Yes No X
What is the TAB at your facility? .00 Mg/Yr
12. Is the wastestream subject to RCRA subpart CC controls? Yes No X
Volatile Organic Concentration .00 ppmw
CC Approved Analytical Method? Yes No X
Generator Knowledge? Yes No X
13. Is the wastestream from a CERCLA or state mandated cleanup? Yes No X

14. Container Information :

Packaging: 551A2 Type/Size: DM 55 GAL OPEN HEAD (17H) DM
 Type/Size:

Shipping Frequency: Units 1.00 Per Day Per Week Per Month Per Qtr Per Year One Time X
UOM DRUMS DESCRIPTION:

15. Additional Information :

GENERATOR CERTIFICATION

I hereby certify that all information submitted in this and all attached documents contains true and accurate descriptions of this waste. Any sample submitted is representative as defined in 40 CFR 261 - Appendix I or by using an equivalent method. All relevant information regarding known or suspected hazards in the possession of the generator has been disclosed. I authorize sampling of any waste shipment for purposes of recertification.

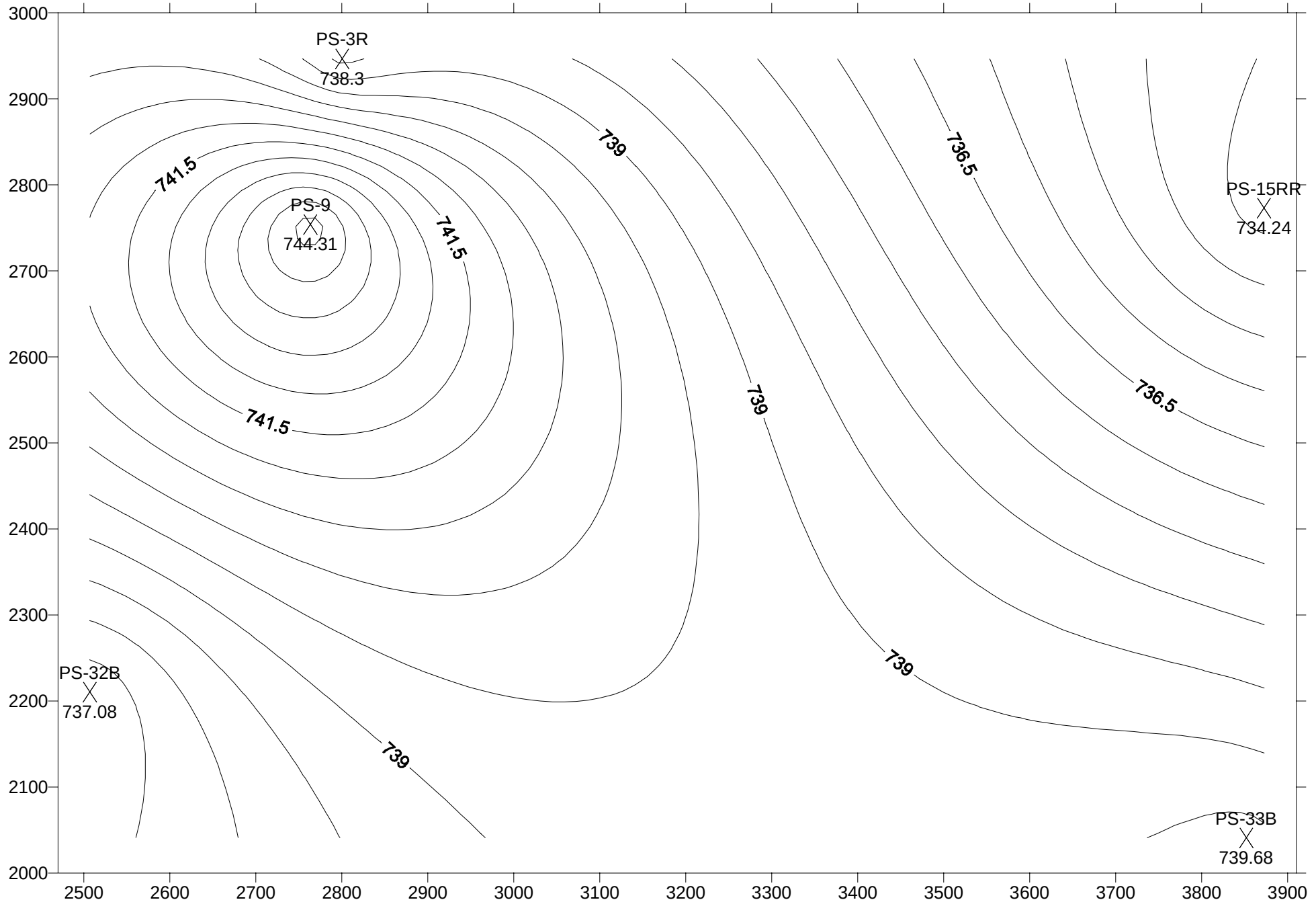
_____ Name(Print or Type)	_____ Phone	_____ Date
_____ Signature	_____ Title	

If approved for management, Veolia ES has all the necessary permits and licenses for the waste that has been characterized and identified by this profile.

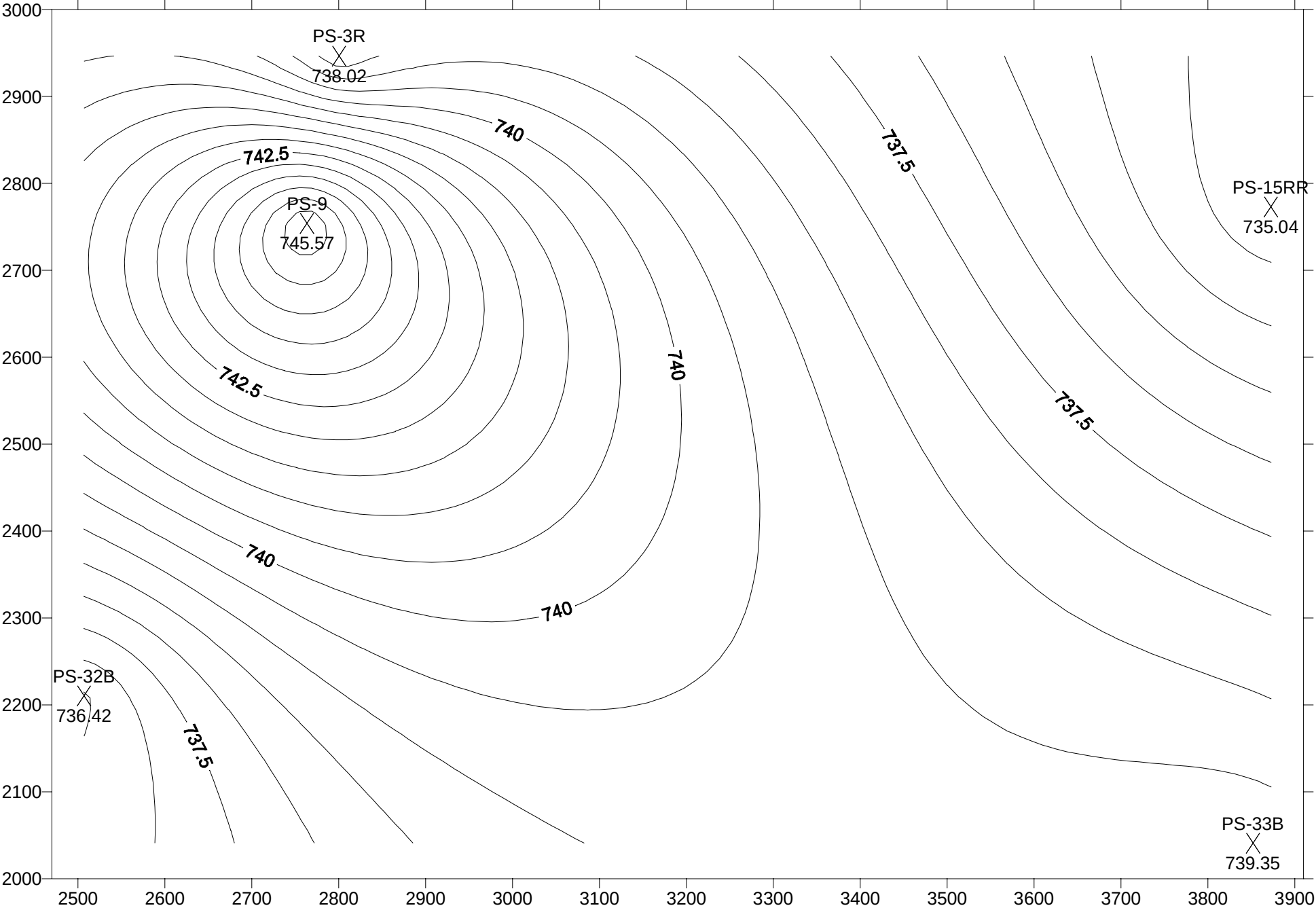
ATTACHMENT C

Groundwater Flow Analysis

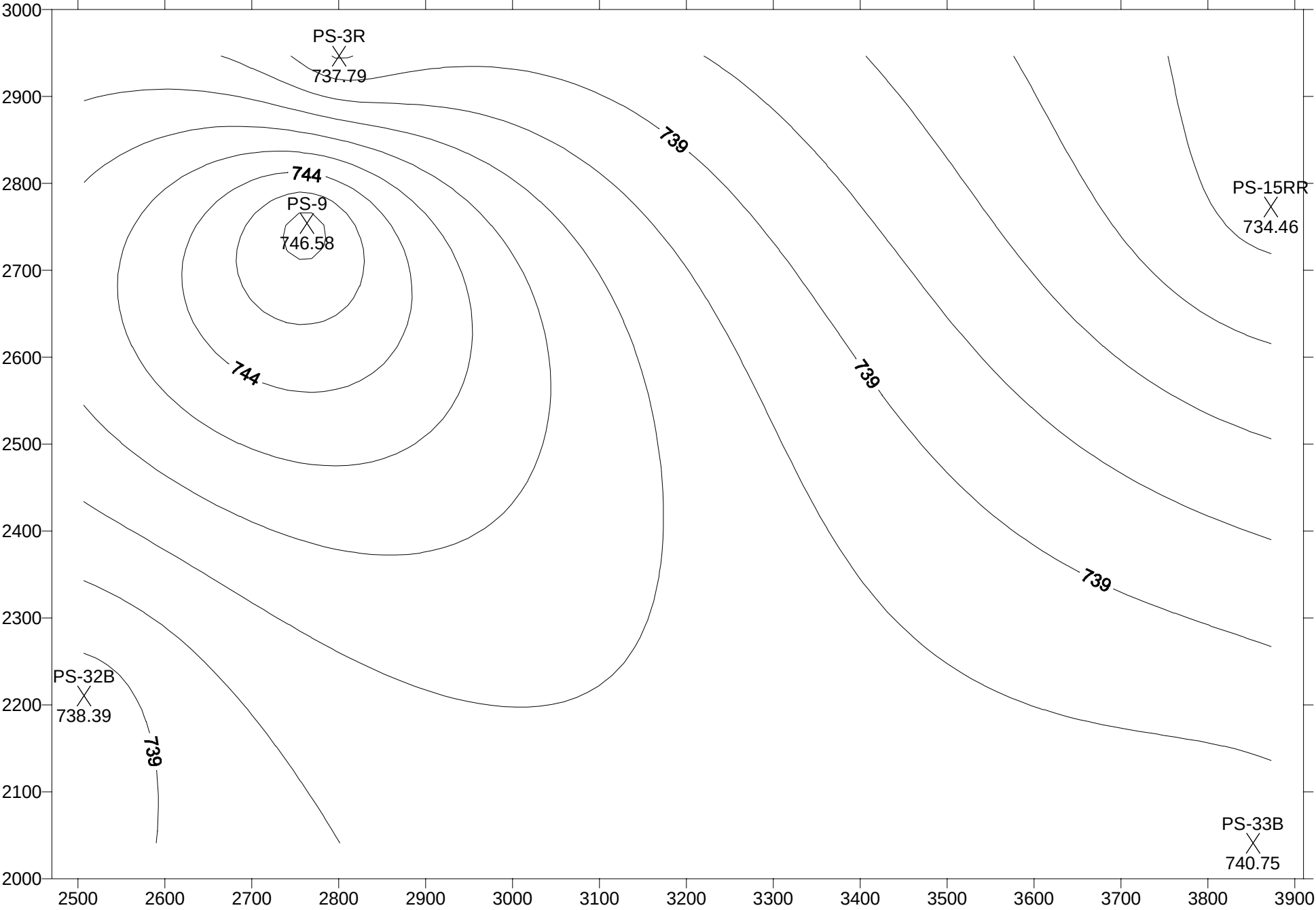
Arrowhead 10-7-10



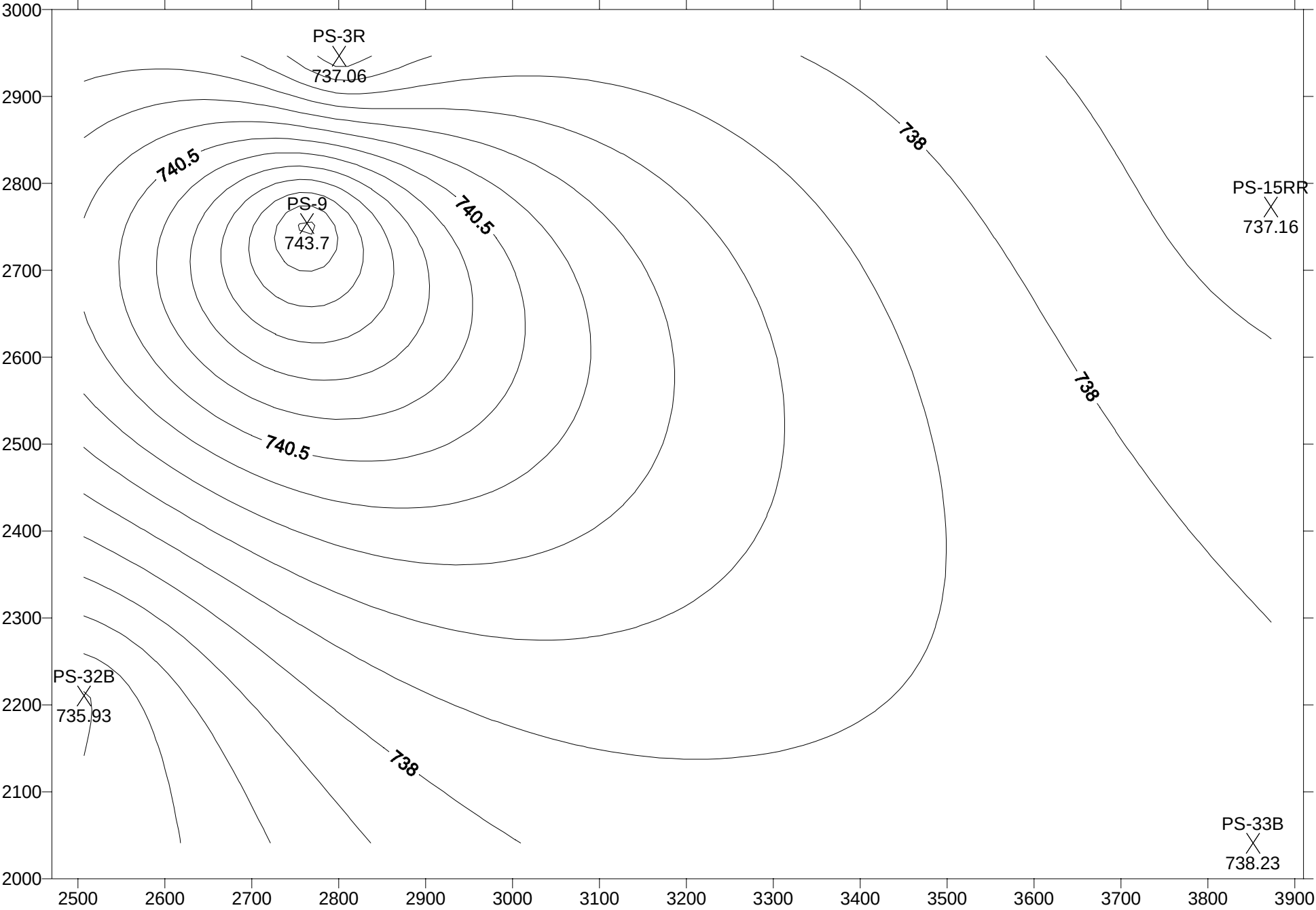
Arrowhead 10-14-11



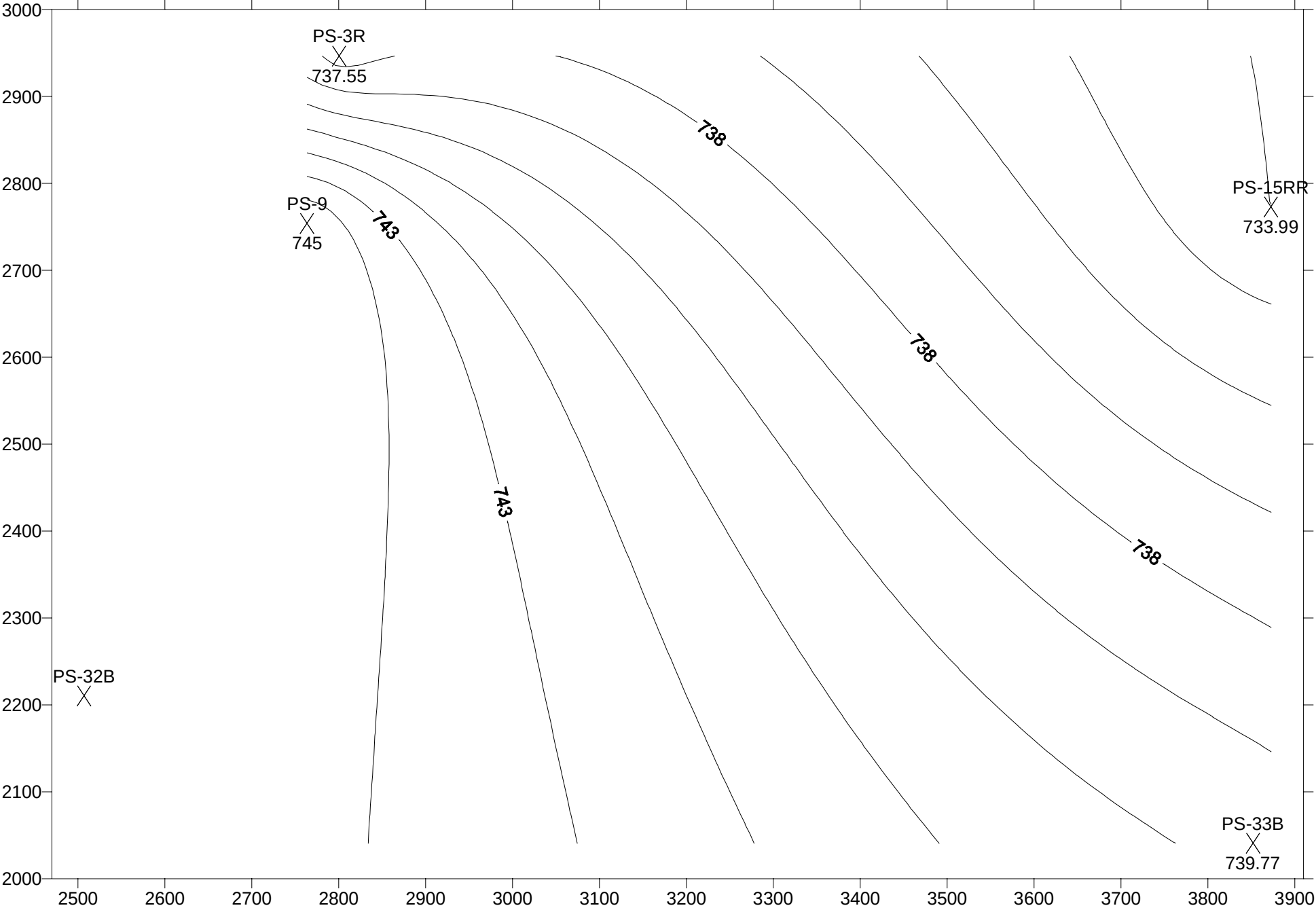
Arrowhead 10-29-12



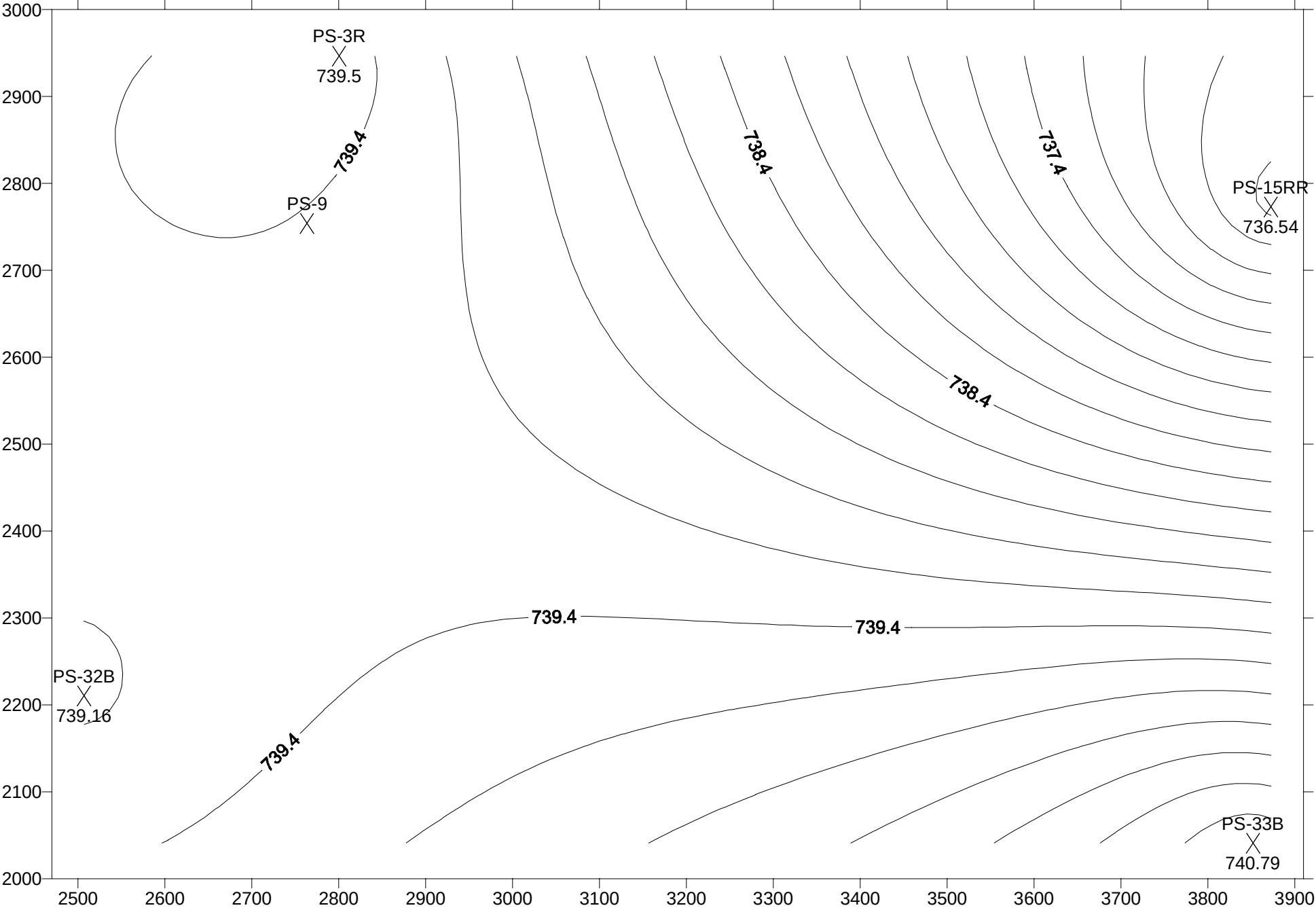
Arrowhead 10-14-13



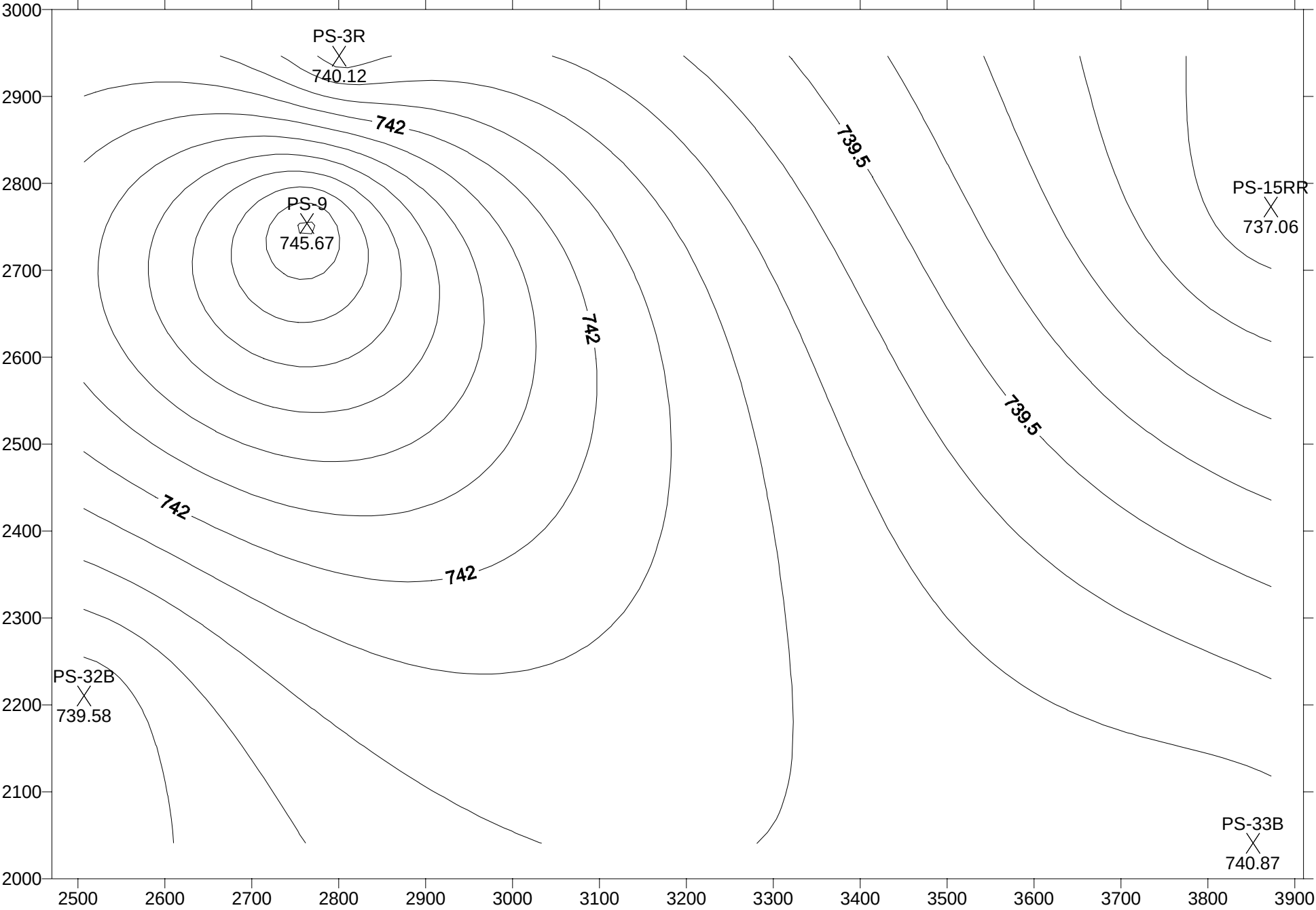
Arrowhead 10-16-17

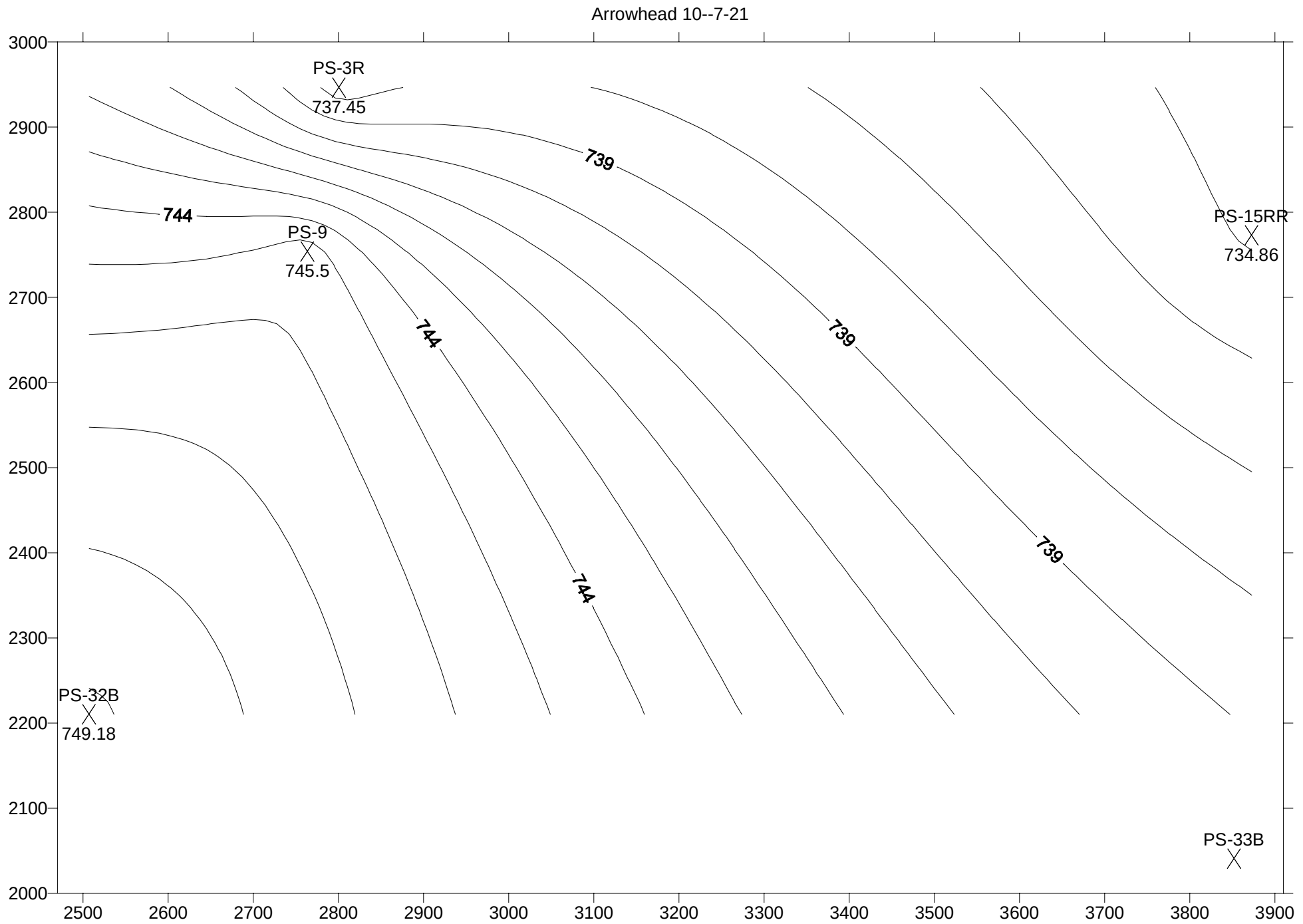


Arrowhead 10-22-18

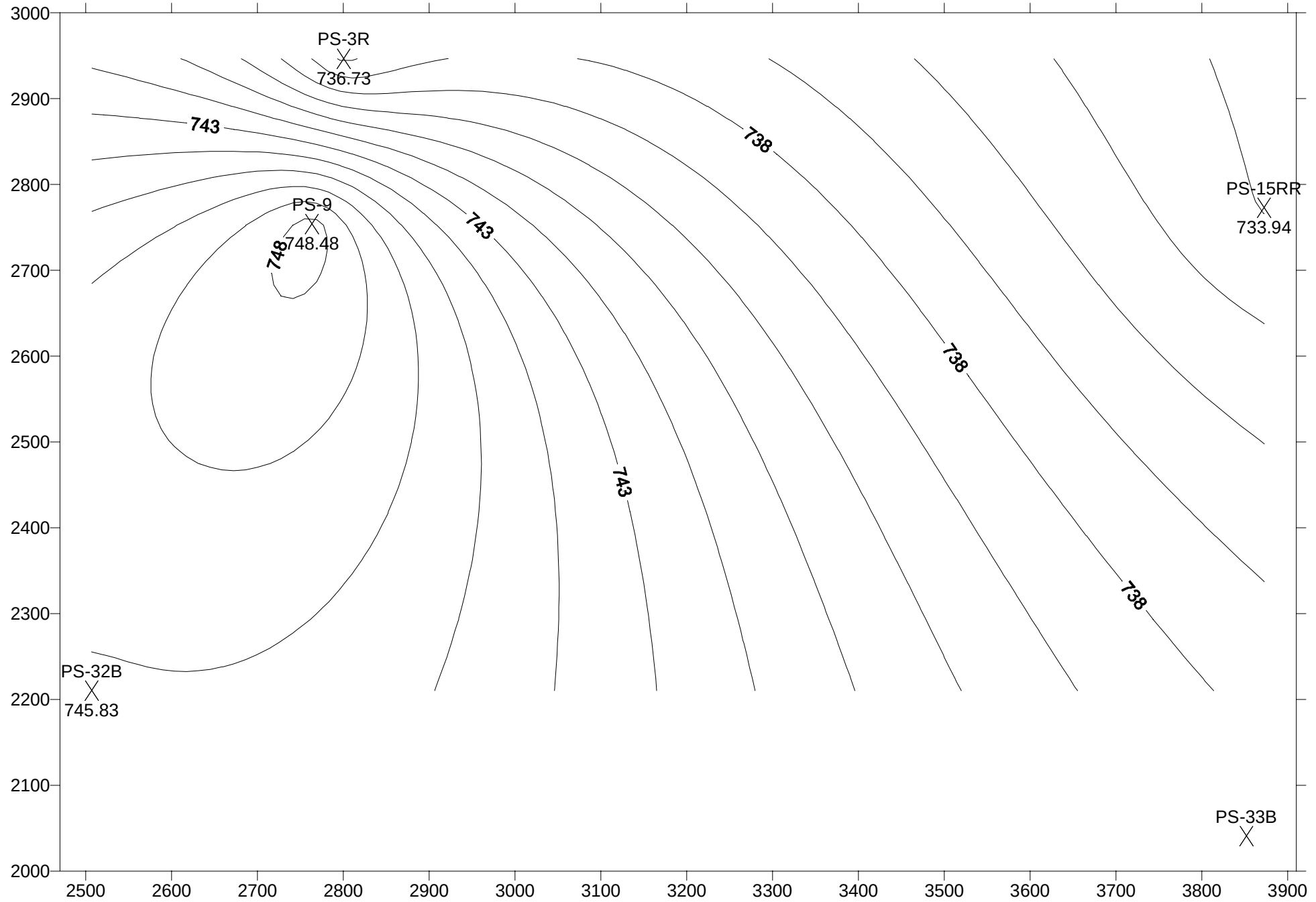


Arrowhead 10-17-19

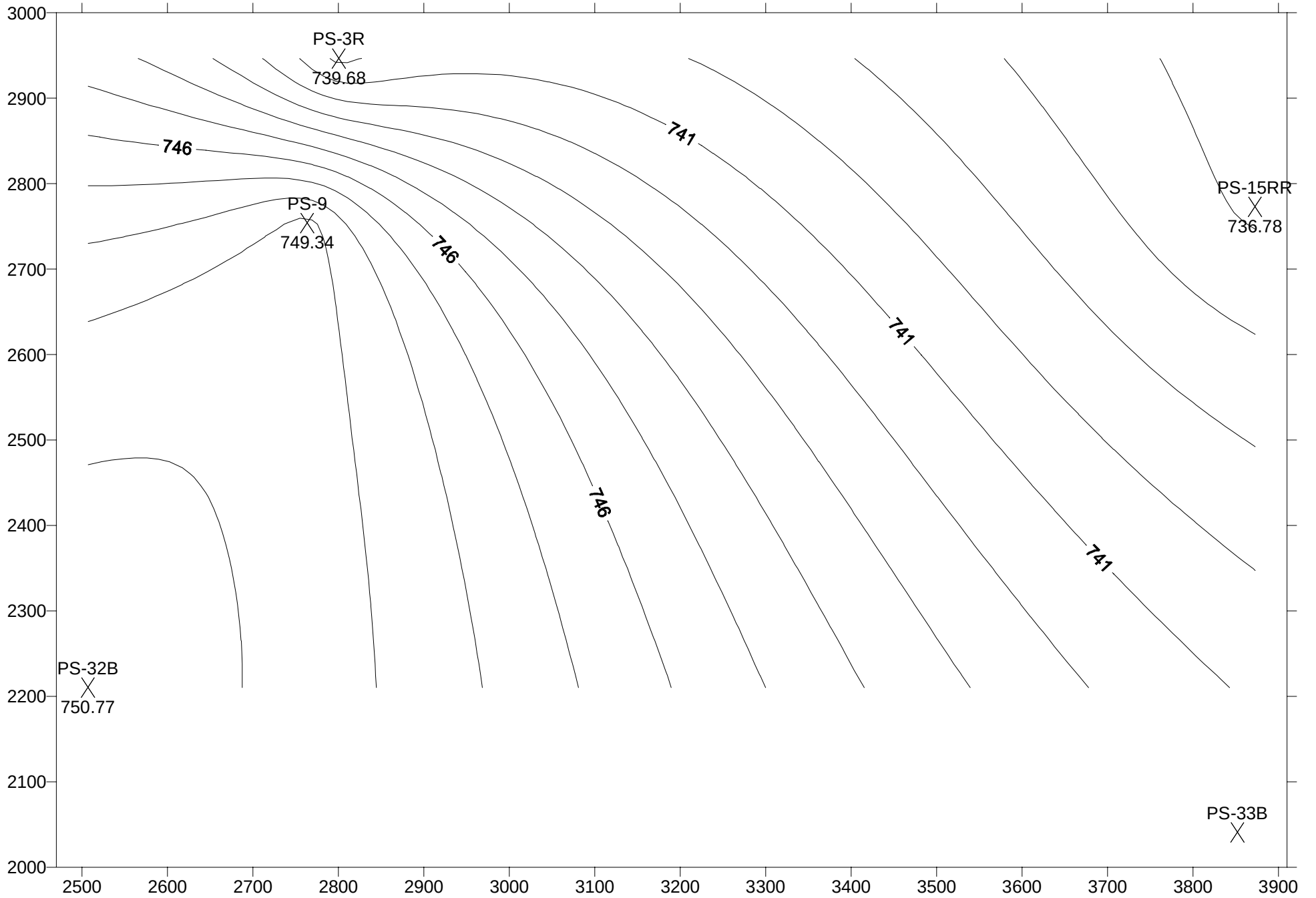




Arrowhead 10-4-22



Arrowhead 4-7-23



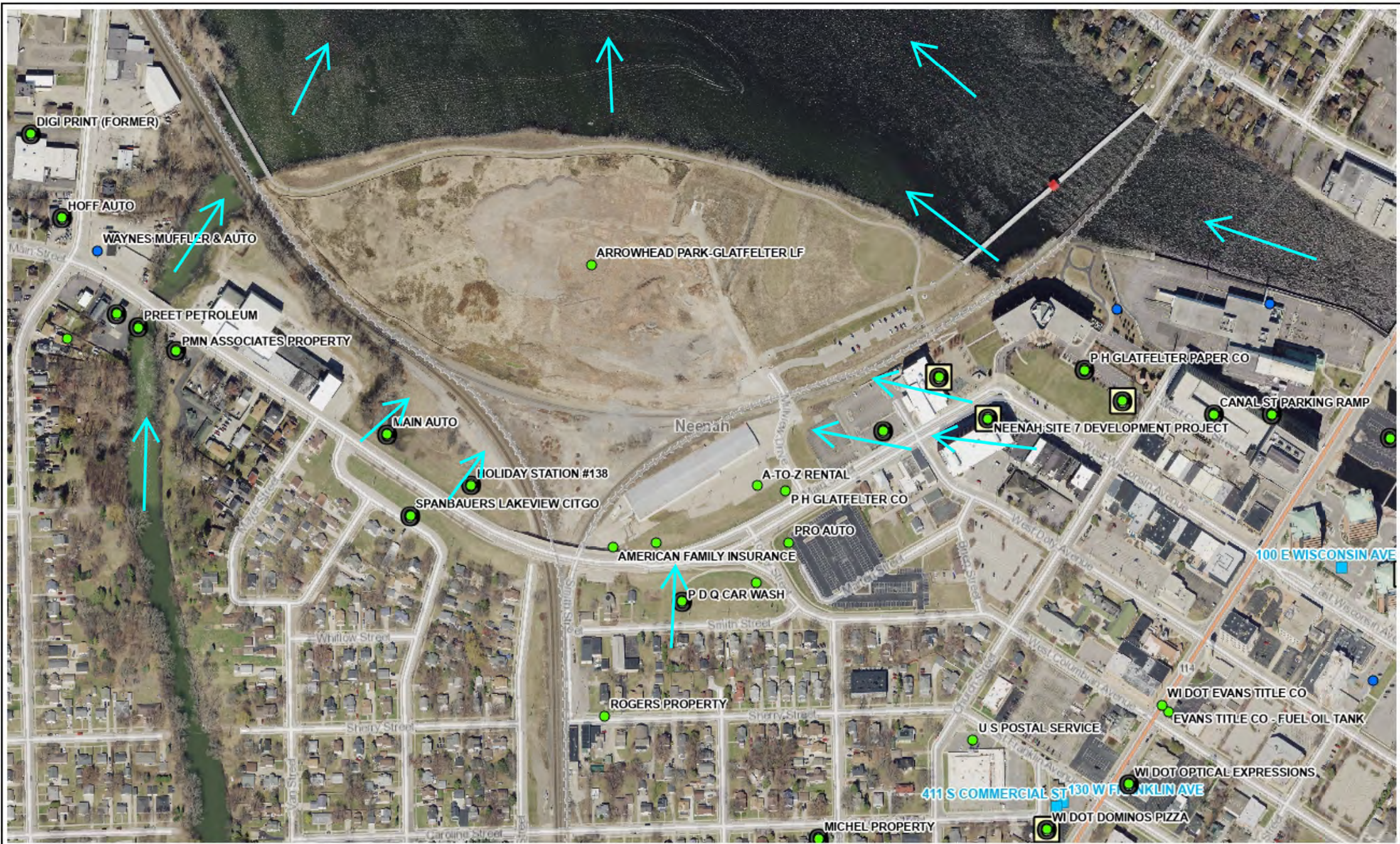


Regional Groundwater/Surface Water Flow Near Arrowhead Park



Legend

- Open Site
- Closed Site
- Continuing Obligations Apply
- Affected Another Property or Right-of-Way
- Facility-wide Site
- Affected by Contamination from Another Property
- Railroads
- ➔ Groundwater/Surface Water Flow directions



0.1 0 0.06 0.1 Miles

NAD_1983_HARN_Wisconsin_TM

© Latitude Geographics Group Ltd.

1: 3,960

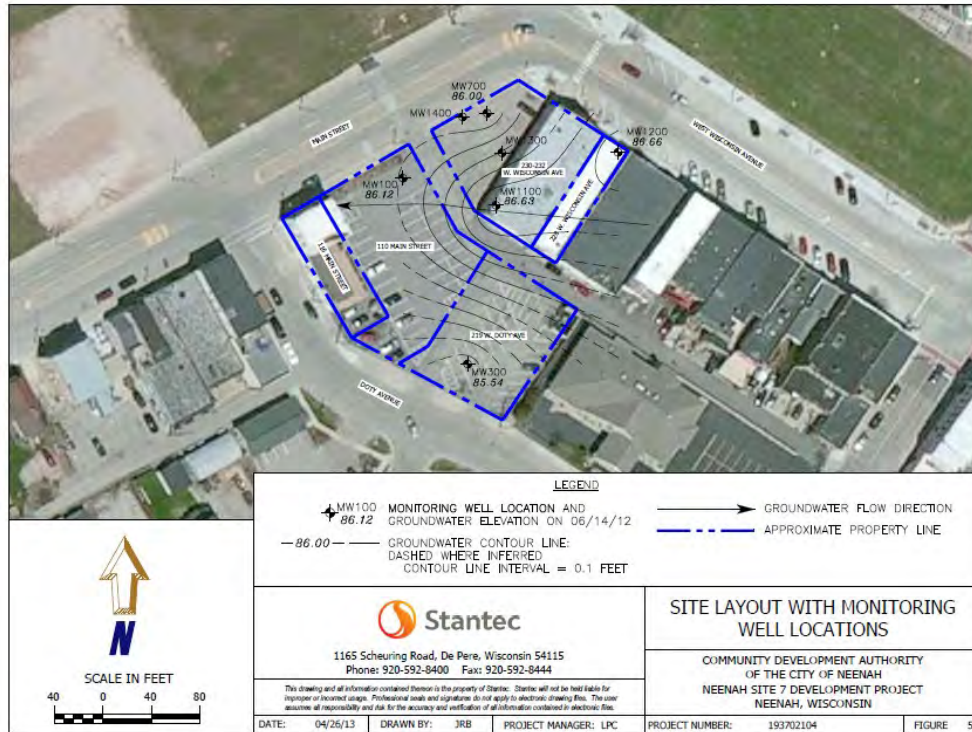


DISCLAIMER: The information shown on these maps has been obtained from various sources, and are of varying age, reliability and resolution. These maps are not intended to be used for navigation, nor are these maps an authoritative source of information about legal land ownership or public access. No warranty, expressed or implied, is made regarding accuracy, applicability for a particular use, completeness, or legality of the information depicted on this map. For more information, see the DNR Legal Notices web page: <http://dnr.wi.gov/org/legal/>

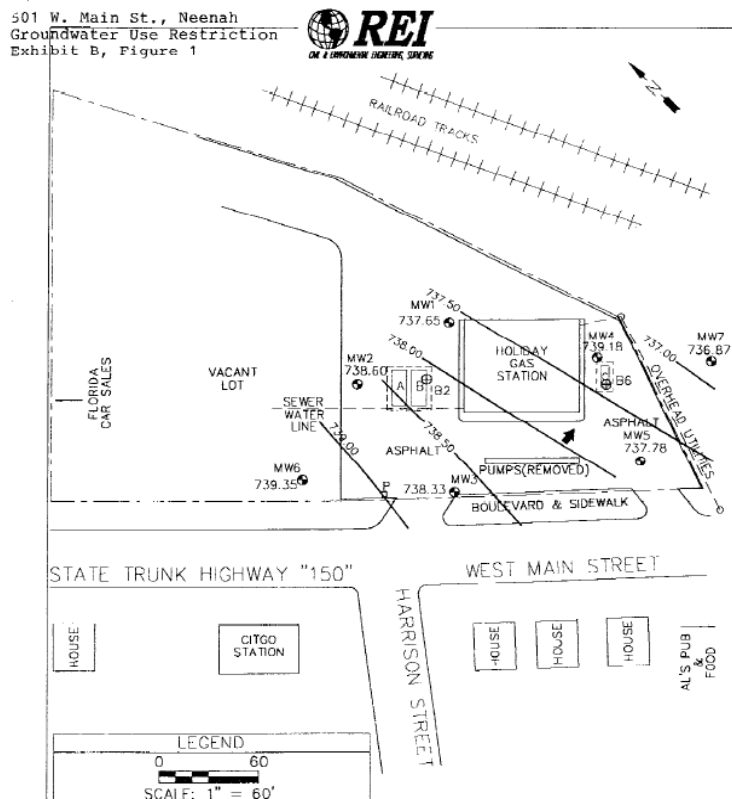
Note: Not all sites are mapped.

Notes

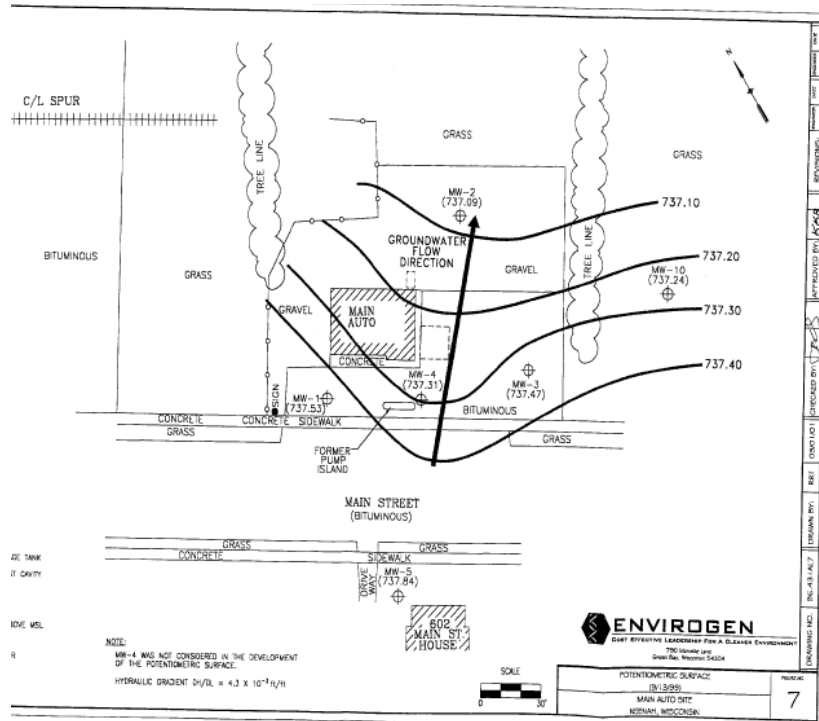
- Neenah Site 7 Dev Project (03-71-559006) Groundwater Flow



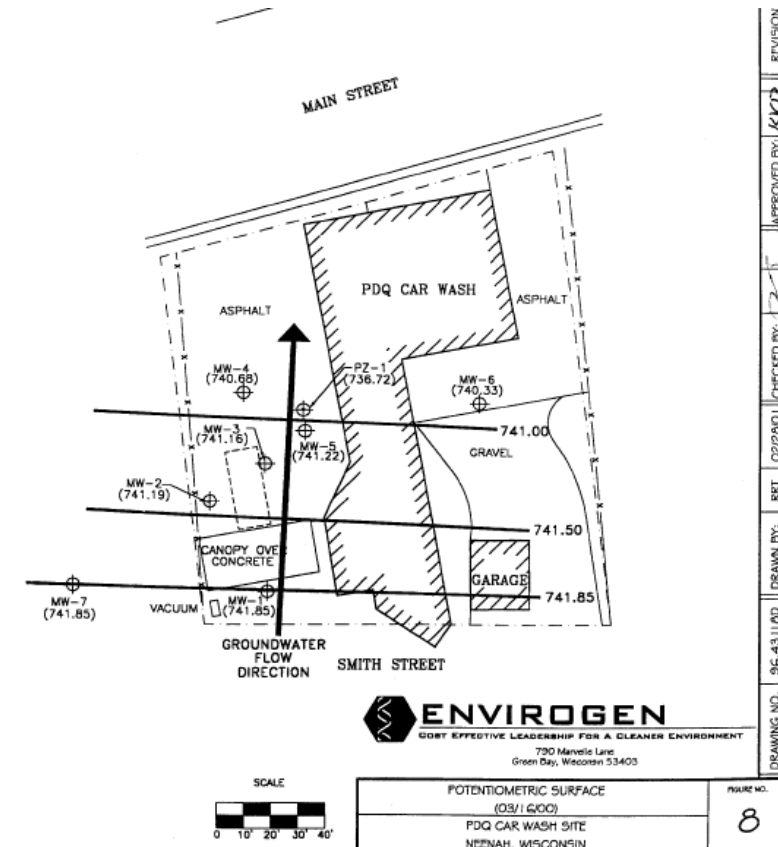
- Holiday Station #138 (03-71-001335) Groundwater Flow



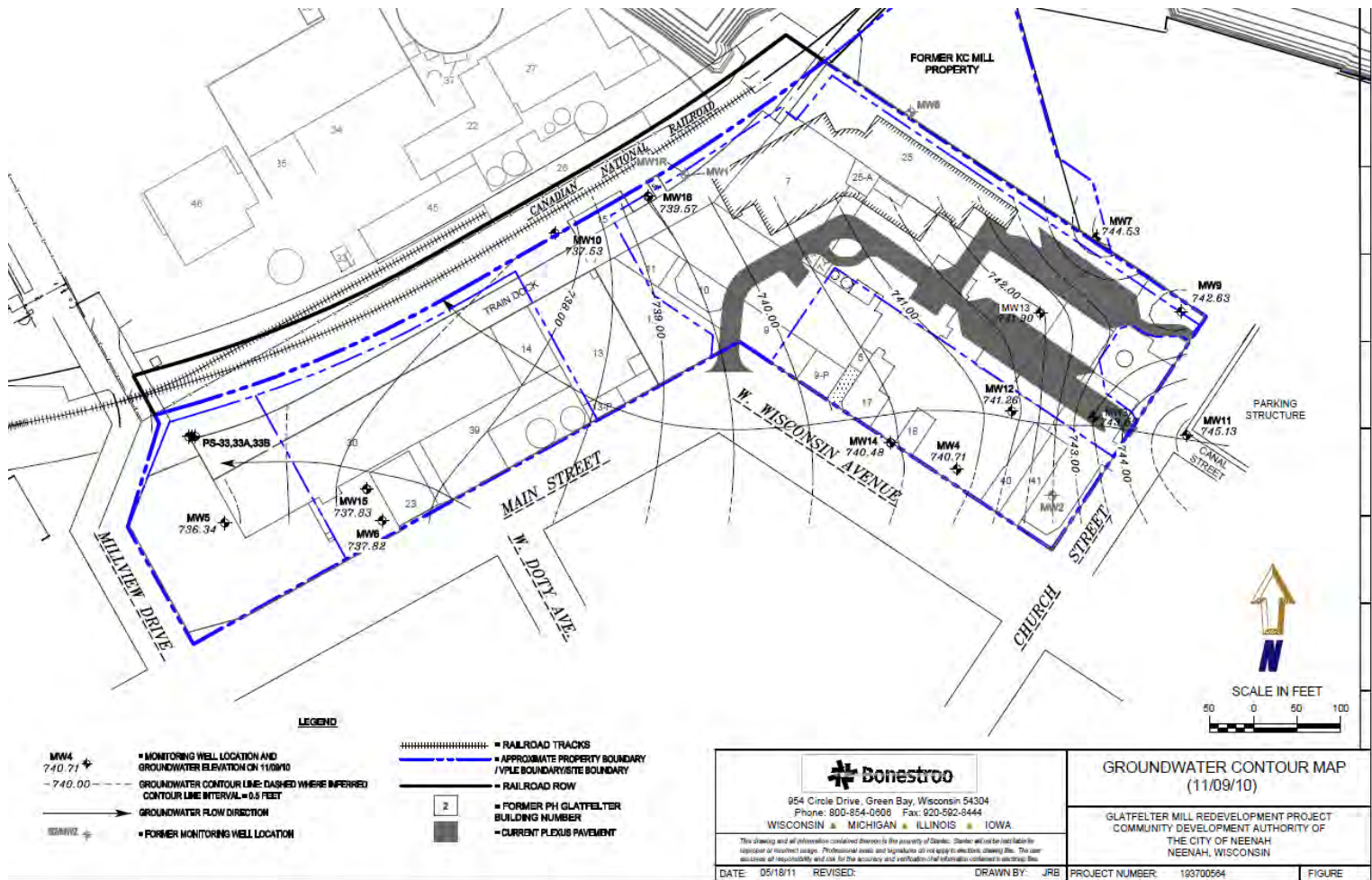
- Main Auto (03-71-111521) Groundwater Flow



- PDQ Car Wash (03-71-111516) Groundwater Flow



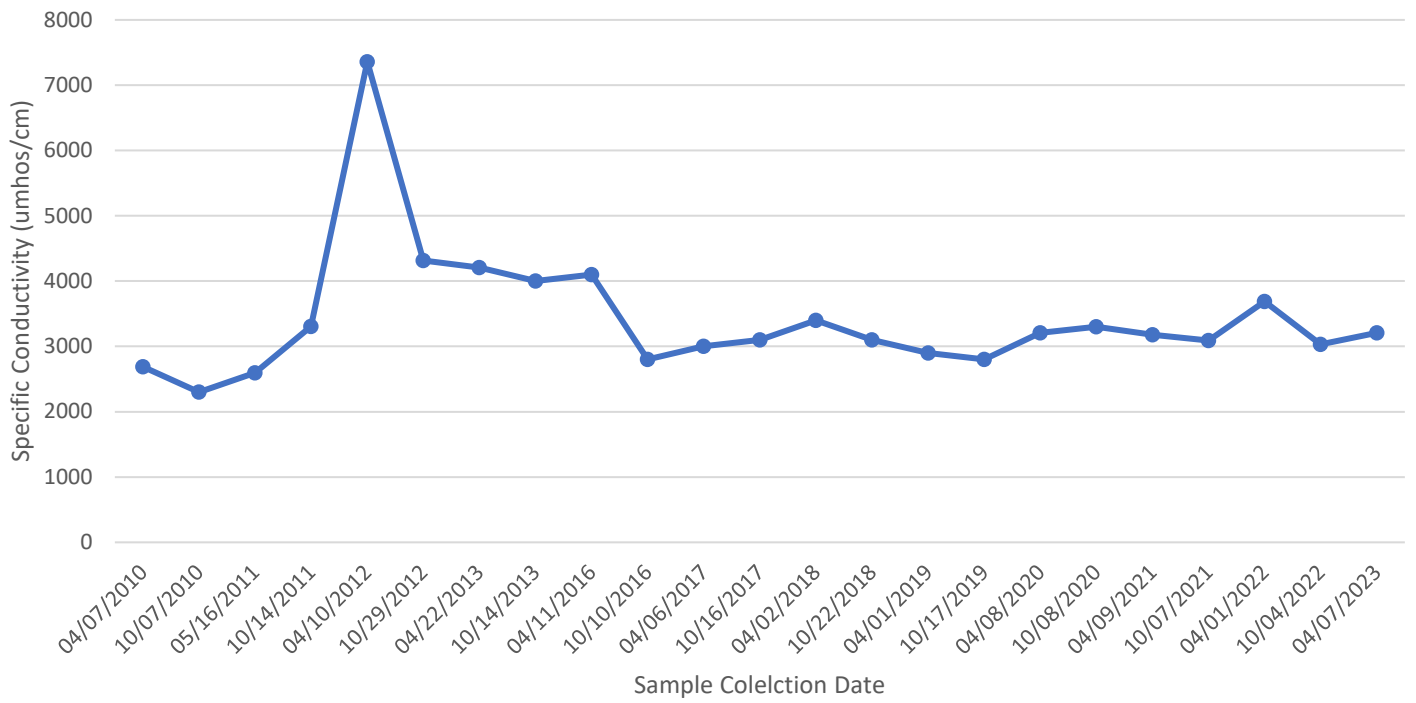
- PH Glatfelter Paper Co (03-71-001314) Groundwater Flow



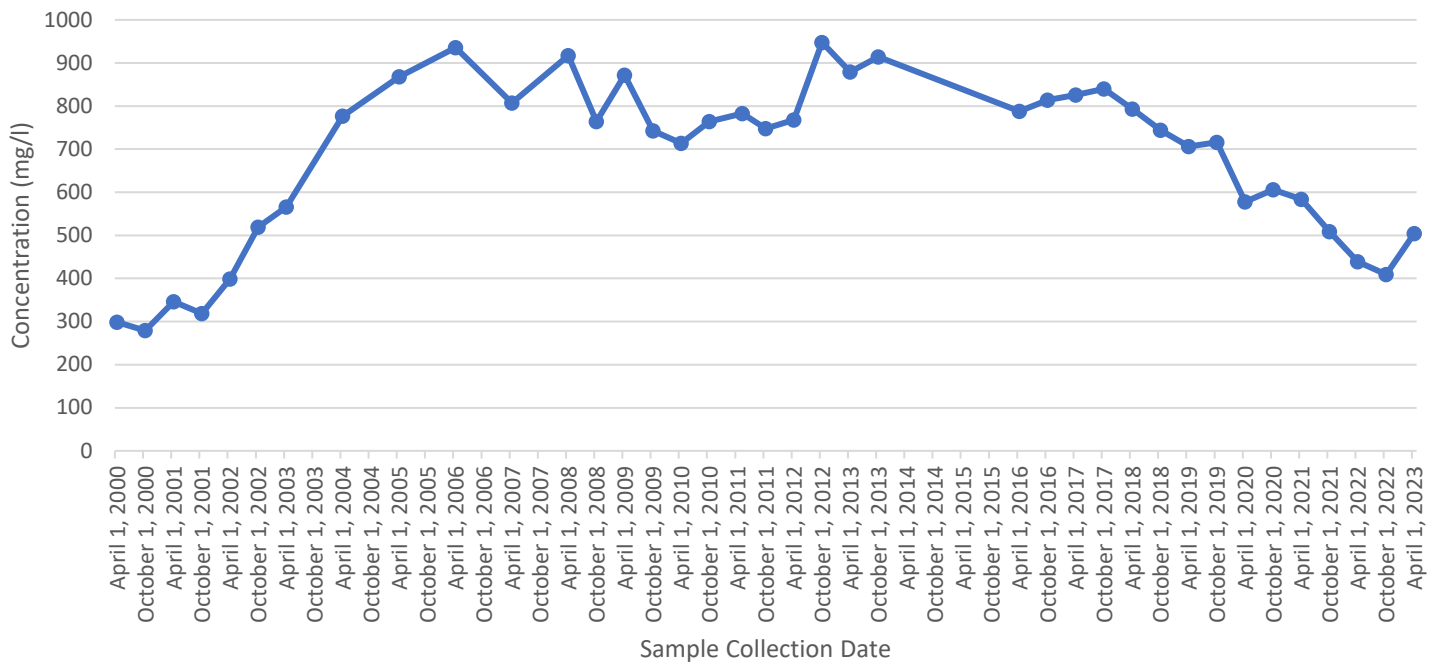
ATTACHMENT D

Groundwater Select Historic Sample Trends

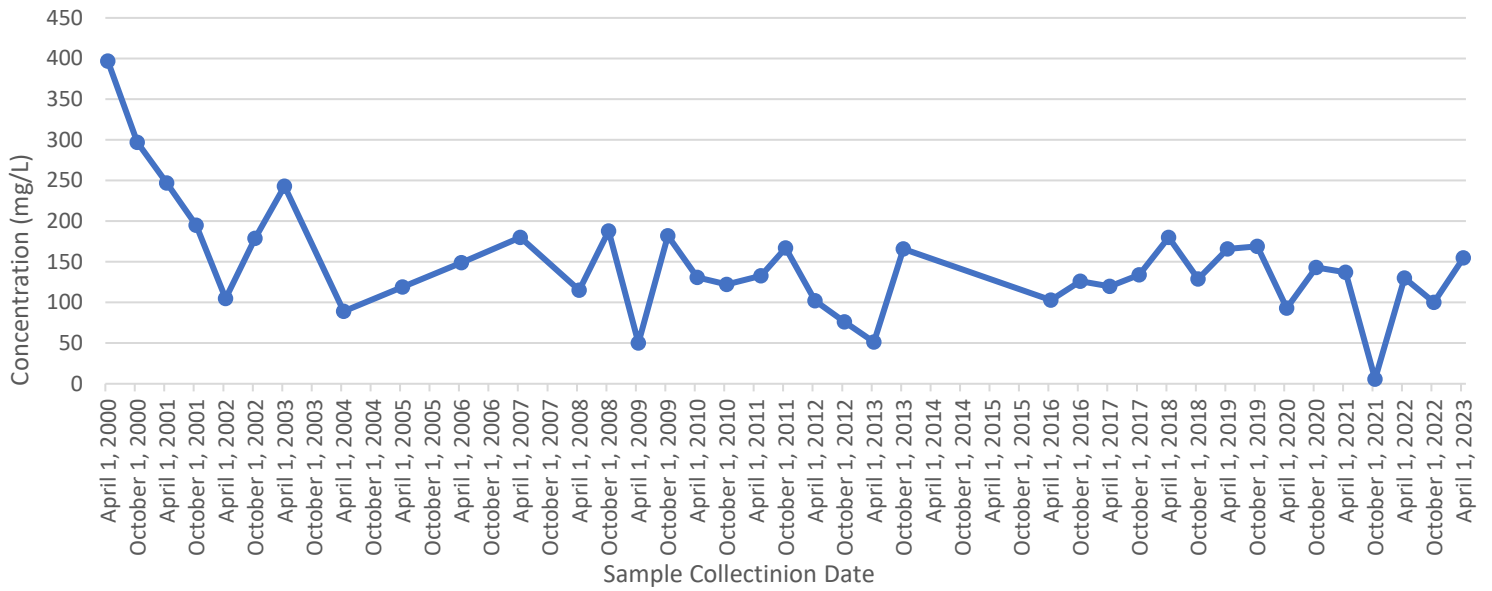
PS-15RR - Specific Conductivity



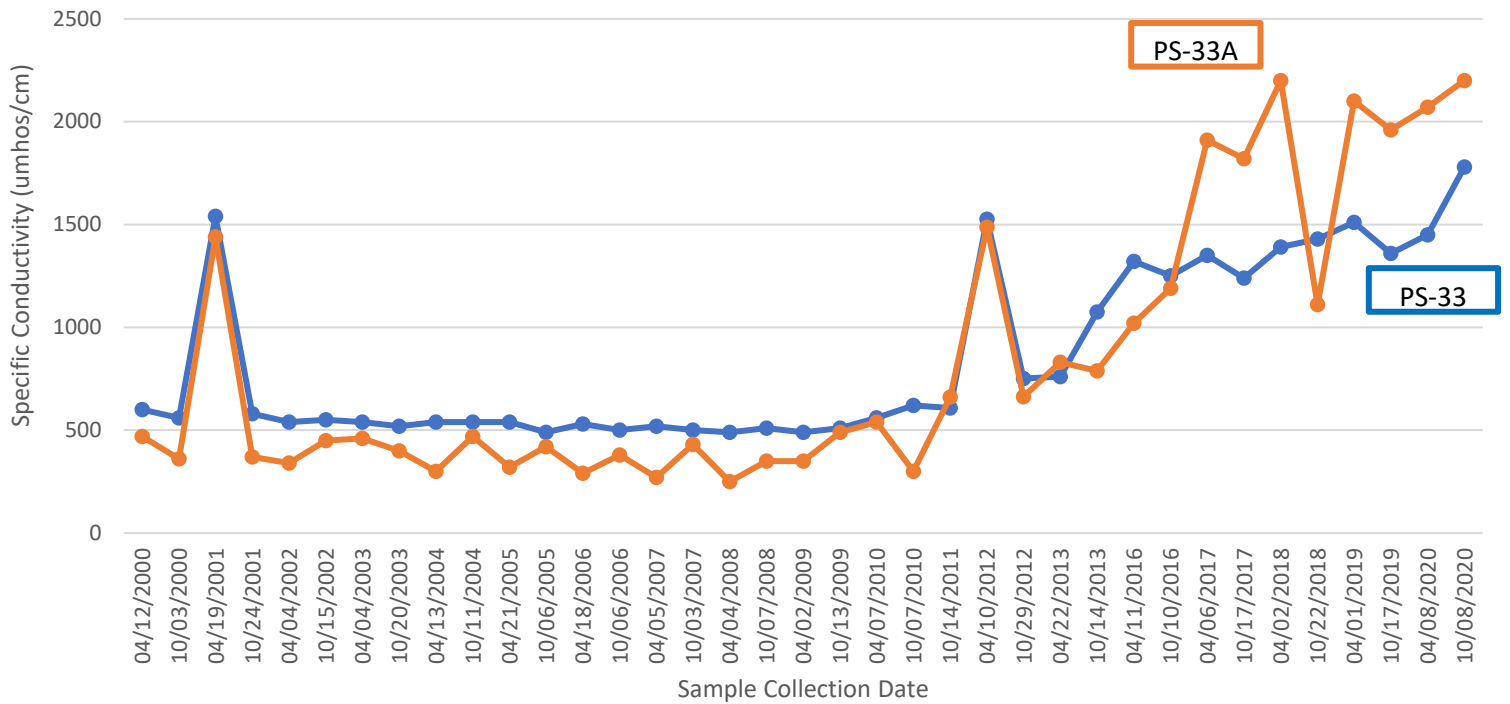
PS-15RR - Chlorides

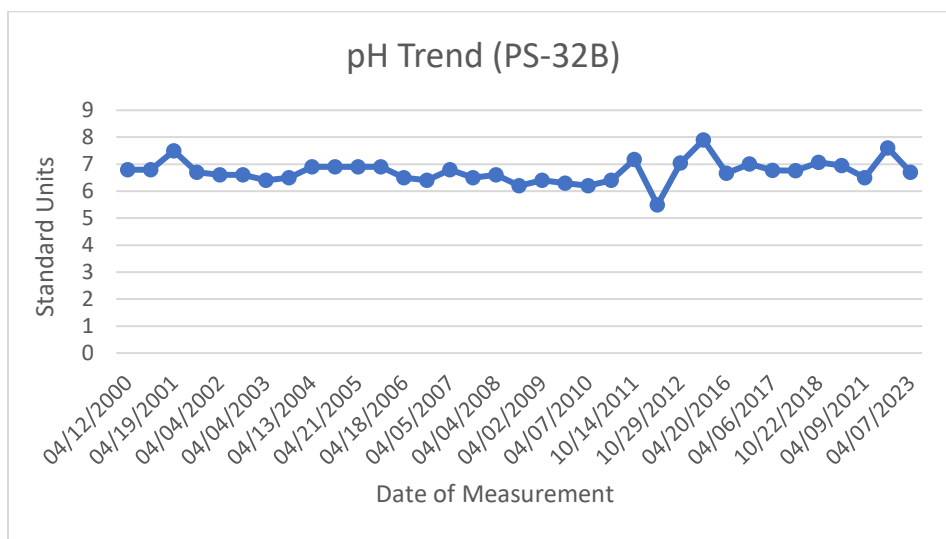
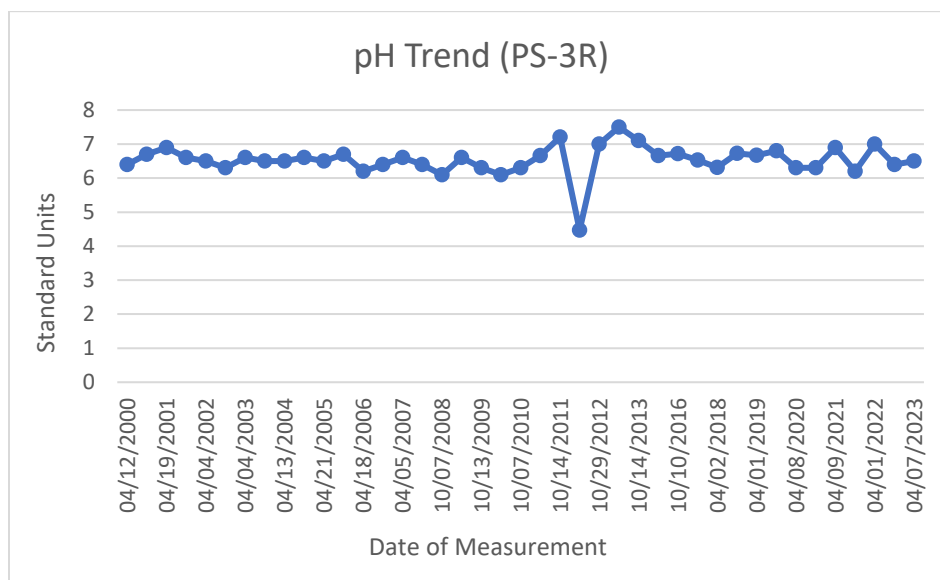
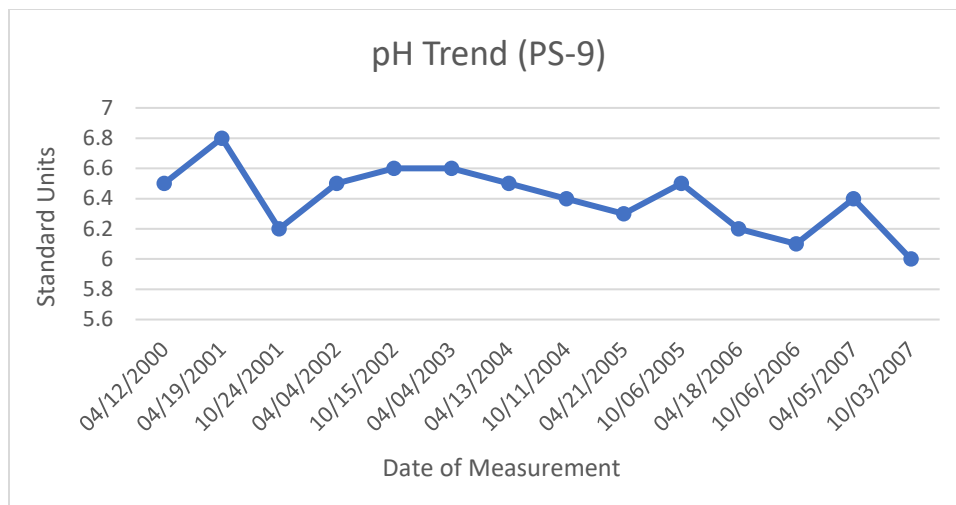


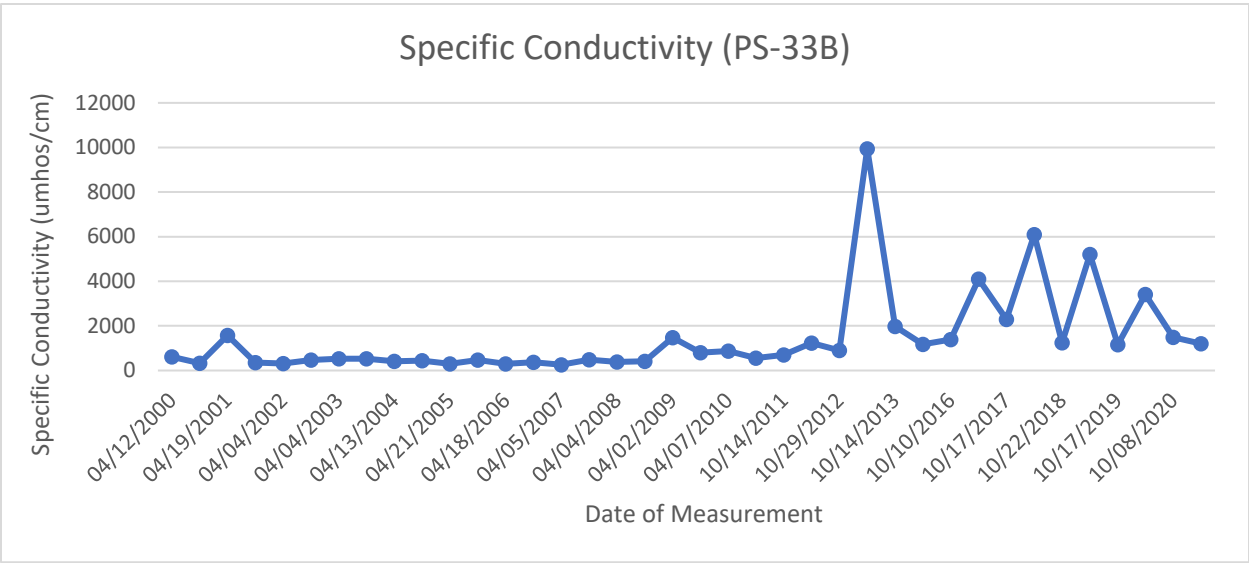
PS-3R - Chlorides



PS-33 & PS-33A Specific Conductivity







ATTACHMENT E

WDNR 2022 Groundwater Sampling Plan Approval

Weber, Evan

From: Marciulionis, Jacqueline R - DNR <Jacqueline.Marciulionis@wisconsin.gov>
Sent: Thursday, September 22, 2022 11:42 AM
To: Weber, Evan
Cc: MKading@ci.neenah.wi.us; chaese@ci.neenah.wi.us; JJennerjohn@badgerlabs.com; Caine, Lynelle; Brester, Tess M - DNR
Subject: RE: Arrowhead Park Well Network - Proposed Groundwater Sampling Plan

Good morning Evan,

I apologize for my delayed response to this. I have taken a look at your proposed monitoring plan and agree with the proposed additional parameters to evaluate reducing monitoring frequency to annual or less.

However, I would like to note that I have also taken a look at development plans dated August 12, 2022 submitted to Tess by SEH. The plan proposes abandoning PS-9, which appears to conflict with the monitoring plan. Tess will be responding to the development plans with a letter and addressing the proposal for PS-9.

Thanks,

We are committed to service excellence.

Visit our survey at <http://dnr.wi.gov/customersurvey> to evaluate how I did.

Jackie Marciulionis, P.G.

Phone: (920) 591-1547

Jacqueline.Marciulionis@wisconsin.gov

From: Weber, Evan <Evan.Weber@stantec.com>
Sent: Tuesday, September 13, 2022 10:19 AM
To: Marciulionis, Jacqueline R - DNR <Jacqueline.Marciulionis@wisconsin.gov>
Cc: MKading@ci.neenah.wi.us; chaese@ci.neenah.wi.us; JJennerjohn@badgerlabs.com; Caine, Lynelle <Lynelle.Caine@stantec.com>
Subject: Arrowhead Park Well Network - Proposed Groundwater Sampling Plan

**CAUTION: This email originated from outside the organization.
Do not click links or open attachments unless you recognize the sender and know the content is safe.**

Good morning Jackie,

In the City of Neenah's effort to reduce the frequency of groundwater sampling at Arrowhead Park to an annual event or less, Stantec has reviewed WDNR provided guidance titled *Reducing or Terminating Groundwater Monitoring at Solid Waste Landfills* (pub-WA-1013-2019) and is suggesting a change to the current groundwater sampling protocol for the Arrowhead Park well network. The revised sample plan will continue the current sampling regimen for each well specified by the WDNR in 2008 and add Total sulfate, VOCs, Ammonia as N, and Nitrate/Nitrite as N to each well in the network. The additional sample parameters are consistent with what is required on Table 2 of the WDNR guidance document for papermill sludge landfills where a reduction in sampling frequency is being proposed. Although emerging contaminants are also listed on Table 2, previous discussions with the WDNR have indicated sampling for emerging contaminants is not be necessary at this time. The Table attached summarizes the proposed parameter list for each well. At least two sample

rounds will be collected from the well network prior to a formal request being made to the WDNR to reduce sample collection frequency.

The request to reduce the frequency of sampling at Arrowhead Park will also include a discussion about eliminating sampling from wells PS-33, PS-33a, and PS-33b. The PS-33 well nest was damaged during construction of the Solaris development and the wells were abandoned in spring 2022. The requests will be made via the same document to eliminate the need for separate reviews and subsequent fees.

We request your concurrence of the proposed groundwater sampling plan and hope to implement the procedure during the next sampling event scheduled for October. Please let us know of any modifications, if any, the WDNR would like to make to the proposed sample plan. We appreciate your help with this project and look forward to your comments.

Thank you,

Evan J. Weber

Environmental Scientist

Direct: 920 592-8400 ext 3218

Mobile: 920 309-2509

evan.weber@stantec.com

Stantec

1165 Scheuring Road

De Pere WI 54115-1001



The content of this email is the confidential property of Stantec and should not be copied, modified, retransmitted, or used for any purpose except with Stantec's written authorization. If you are not the intended recipient, please delete all copies and notify us immediately.

Please consider the environment before printing this email.

ATTACHMENT F

PVC Primer MSDS



SAFETY DATA SHEET

1. Identification

Product identifier	Oatey Purple Primer- NSF Listed for PVC and CPVC
Other means of identification	
Product code	1402E
Synonyms	Part Numbers: 30755(TV), 30756(TV), 30757(TV), 30758, 30759, 30927
Recommended use	Joining PVC Pipes
Recommended restrictions	None known.
Manufacturer/Importer/Supplier/Distributor information	
Company Name	Oatey Co.
Address	4700 West 160th St. Cleveland, OH 44135
Telephone	216-267-7100
E-mail	info@oatey.com
Transport Emergency	Chemtrec 1-800-424-9300 (Outside the US 1-703-527-3887)
Emergency First Aid	1-877-740-5015
Contact person	MSDS Coordinator

2. Hazard(s) identification

Physical hazards	Flammable liquids	Category 2
Health hazards	Acute toxicity, oral	Category 4
	Skin corrosion/irritation	Category 2
	Serious eye damage/eye irritation	Category 2A
	Specific target organ toxicity, single exposure	Category 3 respiratory tract irritation
	Specific target organ toxicity, single exposure	Category 3 narcotic effects
	Aspiration hazard	Category 1
OSHA defined hazards	Not classified.	

Label elements



Signal word	Danger
Hazard statement	Highly flammable liquid and vapor. Harmful if swallowed. May be fatal if swallowed and enters airways. Causes skin irritation. Causes serious eye irritation. May cause respiratory irritation. May cause drowsiness or dizziness.
Precautionary statement	
Prevention	Keep away from heat/sparks/open flames/hot surfaces. - No smoking. Keep container tightly closed. Ground/bond container and receiving equipment. Use explosion-proof electrical/ventilating/lighting equipment. Use only non-sparking tools. Take precautionary measures against static discharge. Avoid breathing mist or vapor. Wash thoroughly after handling. Do not eat, drink or smoke when using this product. Use only outdoors or in a well-ventilated area. Wear protective gloves/protective clothing/eye protection/face protection.
Response	If swallowed: Immediately call a poison center/doctor. If on skin (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower. If inhaled: Remove person to fresh air and keep comfortable for breathing. If in eyes: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Call a poison center/doctor if you feel unwell. Rinse mouth. Do NOT induce vomiting. If skin irritation occurs: Get medical advice/attention. If eye irritation persists: Get medical advice/attention. Take off contaminated clothing and wash before reuse. In case of fire: Use appropriate media to extinguish.

Storage	Store in a well-ventilated place. Keep container tightly closed. Keep cool. Store locked up.
Disposal	Dispose of contents/container in accordance with local/regional/national/international regulations.
Hazard(s) not otherwise classified (HNOC)	Frequent or prolonged contact may defat and dry the skin, leading to discomfort and dermatitis. May form explosive peroxides. Contains a chemical classified by the US EPA as a suspected possible carcinogen.

Supplemental information

Not applicable.

3. Composition/information on ingredients

Mixtures

Chemical name	CAS number	%
Acetone	67-64-1	25-40
Cyclohexanone	108-94-1	25-40
Furan, Tetrahydro-	109-99-9	15-30
Methyl ethyl ketone	78-93-3	15-30

*Designates that a specific chemical identity and/or percentage of composition has been withheld as a trade secret.

4. First-aid measures

Inhalation	Remove victim to fresh air and keep at rest in a position comfortable for breathing. Call a POISON CENTER or doctor/physician if you feel unwell.
Skin contact	Take off immediately all contaminated clothing. Wash with plenty of soap and water. If skin irritation occurs: Get medical advice/attention.
Eye contact	Immediately flush eyes with plenty of water for at least 15 minutes. Remove contact lenses, if present and easy to do. Continue rinsing. If eye irritation persists: Get medical advice/attention.
Ingestion	Call a physician or poison control center immediately. Do not induce vomiting. If vomiting occurs, keep head low so that stomach content doesn't get into the lungs. Aspiration may cause pulmonary edema and pneumonitis.
Most important symptoms/effects, acute and delayed	Irritation of nose and throat. Aspiration may cause pulmonary edema and pneumonitis. Severe eye irritation. Symptoms may include stinging, tearing, redness, swelling, and blurred vision. May cause respiratory irritation. Vapors have a narcotic effect and may cause headache, fatigue, dizziness and nausea. Skin irritation. May cause redness and pain.
Indication of immediate medical attention and special treatment needed	Provide general supportive measures and treat symptomatically. Thermal burns: Flush with water immediately. While flushing, remove clothes which do not adhere to affected area. Call an ambulance. Continue flushing during transport to hospital. In case of shortness of breath, give oxygen. Keep victim warm. Keep victim under observation. Symptoms may be delayed.
General information	Take off all contaminated clothing immediately. Ensure that medical personnel are aware of the material(s) involved, and take precautions to protect themselves. Wash contaminated clothing before reuse.

5. Fire-fighting measures

Suitable extinguishing media	Alcohol resistant foam. Water fog. Dry chemical powder. Carbon dioxide (CO2).
Unsuitable extinguishing media	Do not use water jet as an extinguisher, as this will spread the fire.
Specific hazards arising from the chemical	Vapors may form explosive mixtures with air. Vapors may travel considerable distance to a source of ignition and flash back. During fire, gases hazardous to health may be formed.
Special protective equipment and precautions for firefighters	Self-contained breathing apparatus and full protective clothing must be worn in case of fire.
Fire fighting equipment/instructions	In case of fire and/or explosion do not breathe fumes. Move containers from fire area if you can do so without risk.
Specific methods	Use standard firefighting procedures and consider the hazards of other involved materials.
General fire hazards	Highly flammable liquid and vapor. This product contains tetrahydrofuran that may form explosive organic peroxide when exposed to air or light or with age.

6. Accidental release measures

Personal precautions, protective equipment and emergency procedures

Keep unnecessary personnel away. Keep people away from and upwind of spill/leak. Keep out of low areas. Eliminate all ignition sources (no smoking, flares, sparks, or flames in immediate area). Wear appropriate protective equipment and clothing during clean-up. Avoid breathing mist or vapor. Do not touch damaged containers or spilled material unless wearing appropriate protective clothing. Ventilate closed spaces before entering them. Local authorities should be advised if significant spillages cannot be contained. For personal protection, see section 8 of the SDS.

Methods and materials for containment and cleaning up

Eliminate all ignition sources (no smoking, flares, sparks, or flames in immediate area). Take precautionary measures against static discharge. Use only non-sparking tools. Keep combustibles (wood, paper, oil, etc.) away from spilled material. This product is miscible in water.

Large Spills: Stop the flow of material, if this is without risk. Use water spray to reduce vapors or divert vapor cloud drift. Dike the spilled material, where this is possible. Cover with plastic sheet to prevent spreading. Use a non-combustible material like vermiculite, sand or earth to soak up the product and place into a container for later disposal. Prevent entry into waterways, sewer, basements or confined areas. Following product recovery, flush area with water.

Small Spills: Absorb with earth, sand or other non-combustible material and transfer to containers for later disposal. Wipe up with absorbent material (e.g. cloth, fleece). Clean surface thoroughly to remove residual contamination.

Never return spills to original containers for re-use. For waste disposal, see section 13 of the SDS. Avoid discharge into drains, water courses or onto the ground.

Environmental precautions

7. Handling and storage

Precautions for safe handling

Vapors may form explosive mixtures with air. Do not handle, store or open near an open flame, sources of heat or sources of ignition. Protect material from direct sunlight. Explosion-proof general and local exhaust ventilation. Take precautionary measures against static discharges. All equipment used when handling the product must be grounded. Use non-sparking tools and explosion-proof equipment. Avoid breathing mist or vapor. Avoid contact with eyes, skin, and clothing. Avoid prolonged exposure. Do not taste or swallow. When using, do not eat, drink or smoke. Wear appropriate personal protective equipment. Wash hands thoroughly after handling. Observe good industrial hygiene practices.

Conditions for safe storage, including any incompatibilities

Store locked up. Keep away from heat, sparks and open flame. Prevent electrostatic charge build-up by using common bonding and grounding techniques. Store in a cool, dry place out of direct sunlight. Store in original tightly closed container. Store in a well-ventilated place. Store away from incompatible materials (see Section 10 of the SDS).

8. Exposure controls/personal protection

Occupational exposure limits

US. OSHA Table Z-1 Limits for Air Contaminants (29 CFR 1910.1000)

Components	Type	Value
Acetone (CAS 67-64-1)	PEL	2400 mg/m3 1000 ppm
Cyclohexanone (CAS 108-94-1)	PEL	200 mg/m3 50 ppm
Furan, Tetrahydro- (CAS 109-99-9)	PEL	590 mg/m3 200 ppm
Methyl ethyl ketone (CAS 78-93-3)	PEL	590 mg/m3 200 ppm

US. ACGIH Threshold Limit Values

Components	Type	Value
Acetone (CAS 67-64-1)	STEL	750 ppm
	TWA	500 ppm
Cyclohexanone (CAS 108-94-1)	STEL	50 ppm
	TWA	20 ppm
Furan, Tetrahydro- (CAS 109-99-9)	STEL	100 ppm

US. ACGIH Threshold Limit Values

Components	Type	Value
Methyl ethyl ketone (CAS 78-93-3)	TWA	50 ppm
	STEL	300 ppm
	TWA	200 ppm

US. NIOSH: Pocket Guide to Chemical Hazards

Components	Type	Value
Acetone (CAS 67-64-1)	TWA	590 mg/m3
		250 ppm
Cyclohexanone (CAS 108-94-1)	TWA	100 mg/m3
		25 ppm
Furan, Tetrahydro- (CAS 109-99-9)	STEL	735 mg/m3
		250 ppm
Methyl ethyl ketone (CAS 78-93-3)	TWA	590 mg/m3
		200 ppm
	STEL	885 mg/m3
		300 ppm
	TWA	590 mg/m3
		200 ppm

Biological limit values**ACGIH Biological Exposure Indices**

Components	Value	Determinant	Specimen	Sampling Time
Acetone (CAS 67-64-1)	50 mg/l	Acetone	Urine	*
Cyclohexanone (CAS 108-94-1)	80 mg/l	1,2-Cyclohexanediol, with hydrolysis	Urine	*
	8 mg/l	Cyclohexanol, with hydrolysis	Urine	*
Furan, Tetrahydro- (CAS 109-99-9)	2 mg/l	Tetrahydrofuran	Urine	*
Methyl ethyl ketone (CAS 78-93-3)	2 mg/l	MEK	Urine	*

* - For sampling details, please see the source document.

Exposure guidelines**US - California OELs: Skin designation**

Cyclohexanone (CAS 108-94-1)

Can be absorbed through the skin.

US - Minnesota Haz Subs: Skin designation applies

Cyclohexanone (CAS 108-94-1)

Skin designation applies.

US - Tennessee OELs: Skin designation

Cyclohexanone (CAS 108-94-1)

Can be absorbed through the skin.

US ACGIH Threshold Limit Values: Skin designation

Cyclohexanone (CAS 108-94-1)

Can be absorbed through the skin.

Furan, Tetrahydro- (CAS 109-99-9)

Can be absorbed through the skin.

US. NIOSH: Pocket Guide to Chemical Hazards

Cyclohexanone (CAS 108-94-1)

Can be absorbed through the skin.

Appropriate engineering controls

Explosion-proof general and local exhaust ventilation. Good general ventilation (typically 10 air changes per hour) should be used. Ventilation rates should be matched to conditions. If applicable, use process enclosures, local exhaust ventilation, or other engineering controls to maintain airborne levels below recommended exposure limits. If exposure limits have not been established, maintain airborne levels to an acceptable level. Eye wash facilities and emergency shower must be available when handling this product.

Individual protection measures, such as personal protective equipment**Eye/face protection**

Face shield is recommended. Wear safety glasses with side shields (or goggles).

Skin protection	
Hand protection	Wear appropriate chemical resistant gloves.
Other	Wear appropriate chemical resistant clothing.
Respiratory protection	If engineering controls do not maintain airborne concentrations below recommended exposure limits (where applicable) or to an acceptable level (in countries where exposure limits have not been established), an approved respirator must be worn.
Thermal hazards	Wear appropriate thermal protective clothing, when necessary.
General hygiene considerations	When using, do not eat, drink or smoke. Always observe good personal hygiene measures, such as washing after handling the material and before eating, drinking, and/or smoking. Routinely wash work clothing and protective equipment to remove contaminants.

9. Physical and chemical properties

Appearance

Physical state	Liquid.
Form	Translucent liquid.
Color	Purple
Odor	Solvent.
Odor threshold	Not available.
pH	Not available.
Melting point/freezing point	Not available.
Initial boiling point and boiling range	151 °F (66.11 °C)
Flash point	14.0 - 23.0 °F (-10.0 - -5.0 °C)
Evaporation rate	5.5 - 8
Flammability (solid, gas)	Not available.

Upper/lower flammability or explosive limits

Flammability limit - lower (%)	1.8
Flammability limit - upper (%)	11.8
Explosive limit - lower (%)	Not available.
Explosive limit - upper (%)	Not available.
Vapor pressure	145 mm Hg @ 20 C
Vapor density	2.5
Relative density	0.84 +/- 0.02 @20°C
Solubility(ies)	
Solubility (water)	Negligible
Partition coefficient (n-octanol/water)	Not available.
Auto-ignition temperature	Not available.
Decomposition temperature	Not available.
Viscosity	Not available.
Other information	
Bulk density	7 lb/gal
VOC (Weight %)	< 550 g/l SQACMD Method 24

10. Stability and reactivity

Reactivity	The product is stable and non-reactive under normal conditions of use, storage and transport.
Chemical stability	Material is stable under normal conditions.
Possibility of hazardous reactions	No dangerous reaction known under conditions of normal use.
Conditions to avoid	Avoid heat, sparks, open flames and other ignition sources. Avoid temperatures exceeding the flash point. Contact with incompatible materials.
Incompatible materials	Acids. Strong oxidizing agents. Ammonia. Amines. Isocyanates. Caustics.

Hazardous decomposition products

No hazardous decomposition products are known.

11. Toxicological information**Information on likely routes of exposure**

Inhalation	May be fatal if swallowed and enters airways. Headache. Nausea, vomiting. May cause irritation to the respiratory system. Vapors have a narcotic effect and may cause headache, fatigue, dizziness and nausea. Prolonged inhalation may be harmful.
Skin contact	Causes skin irritation.
Eye contact	Causes serious eye irritation.
Ingestion	May be fatal if swallowed and enters airways. Harmful if swallowed. Harmful if swallowed. Droplets of the product aspirated into the lungs through ingestion or vomiting may cause a serious chemical pneumonia.

Symptoms related to the physical, chemical and toxicological characteristics

Irritation of nose and throat. Aspiration may cause pulmonary edema and pneumonitis. Severe eye irritation. Symptoms may include stinging, tearing, redness, swelling, and blurred vision. May cause respiratory irritation. Skin irritation. May cause redness and pain. Symptoms of overexposure may be headache, dizziness, tiredness, nausea and vomiting.

Information on toxicological effects

Acute toxicity May be fatal if swallowed and enters airways. Narcotic effects. May cause respiratory irritation.

Components	Species	Test Results
Acetone (CAS 67-64-1)		
Acute		
<i>Dermal</i>		
LD50	Rabbit	20 ml/kg
<i>Inhalation</i>		
LC50	Rat	50 mg/l, 8 Hours
<i>Oral</i>		
LD50	Rat	5800 mg/kg
Cyclohexanone (CAS 108-94-1)		
Acute		
<i>Dermal</i>		
LD50	Rabbit	948 mg/kg
<i>Inhalation</i>		
LC50	Rat	8000 ppm, 4 hours
<i>Oral</i>		
LD50	Rat	1540 mg/kg

* Estimates for product may be based on additional component data not shown.

Skin corrosion/irritation Causes skin irritation.

Serious eye damage/eye irritation Causes serious eye irritation.

Respiratory or skin sensitization

Respiratory sensitization Not available.

Skin sensitization This product is not expected to cause skin sensitization.

Germ cell mutagenicity No data available to indicate product or any components present at greater than 0.1% are mutagenic or genotoxic.

Carcinogenicity In 2012 USEPA Integrated Risk Information System (IRIS) reviewed a two species inhalation lifetime study on THF conducted by NTP (1998). Male rats developed renal tumors and female mice developed liver tumors while neither the female rats nor the male mice showed similar results. Because the carcinogenic mechanisms could not be identified clearly in either species for either tumor, the EPA determined that the male rat and female mouse findings are relevant to the assessment of carcinogenic potential in humans. Therefore, the IRIS review concludes that these data in aggregate indicate that there is "suggestive evidence of carcinogenic potential" following exposure to THF by all routes of exposure.

IARC Monographs. Overall Evaluation of Carcinogenicity

Cyclohexanone (CAS 108-94-1) 3 Not classifiable as to carcinogenicity to humans.

OSHA Specifically Regulated Substances (29 CFR 1910.1001-1050)

Not listed.

Reproductive toxicity	This product is not expected to cause reproductive or developmental effects.
Specific target organ toxicity - single exposure	Narcotic effects. May cause drowsiness and dizziness. Respiratory tract irritation.
Specific target organ toxicity - repeated exposure	Not classified.
Aspiration hazard	May be fatal if swallowed and enters airways.
Chronic effects	Prolonged inhalation may be harmful.

12. Ecological information

Ecotoxicity The product is not classified as environmentally hazardous. However, this does not exclude the possibility that large or frequent spills can have a harmful or damaging effect on the environment.

Components	Species	Test Results
Acetone (CAS 67-64-1)		
Aquatic		
Fish	LC50	Fathead minnow (Pimephales promelas) > 100 mg/l, 96 hours
Cyclohexanone (CAS 108-94-1)		
Aquatic		
Fish	LC50	Fathead minnow (Pimephales promelas) 481 - 578 mg/l, 96 hours

* Estimates for product may be based on additional component data not shown.

Persistence and degradability No data is available on the degradability of this product.

Bioaccumulative potential No data available.

Partition coefficient n-octanol / water (log Kow)

Acetone (CAS 67-64-1)	-0.24
Cyclohexanone (CAS 108-94-1)	0.81
Furan, Tetrahydro- (CAS 109-99-9)	0.46
Methyl ethyl ketone (CAS 78-93-3)	0.29

Mobility in soil No data available.

Other adverse effects No other adverse environmental effects (e.g. ozone depletion, photochemical ozone creation potential, endocrine disruption, global warming potential) are expected from this component.

13. Disposal considerations

Disposal instructions	Collect and reclaim or dispose in sealed containers at licensed waste disposal site. This material and its container must be disposed of as hazardous waste. Do not allow this material to drain into sewers/water supplies. Do not contaminate ponds, waterways or ditches with chemical or used container. Dispose of contents/container in accordance with local/regional/national/international regulations.
Local disposal regulations	Dispose in accordance with all applicable regulations.
Hazardous waste code	The waste code should be assigned in discussion between the user, the producer and the waste disposal company.
Waste from residues / unused products	Dispose of in accordance with local regulations. Empty containers or liners may retain some product residues. This material and its container must be disposed of in a safe manner (see: Disposal instructions).
Contaminated packaging	Empty containers should be taken to an approved waste handling site for recycling or disposal. Since emptied containers may retain product residue, follow label warnings even after container is emptied.

14. Transport information**DOT**

UN number	UN1993
UN proper shipping name	Flammable liquids, n.o.s. (Methyl ethyl ketone RQ = 26274 LBS, Acetone RQ = 13130 LBS)
Transport hazard class(es)	
Class	3
Subsidiary risk	-
Label(s)	3
Packing group	II

Special precautions for user	Read safety instructions, SDS and emergency procedures before handling.
Special provisions	IB2, T7, TP1, TP8, TP28
Packaging exceptions	150
Packaging non bulk	202
Packaging bulk	242

IATA

UN number	UN1993
UN proper shipping name	Flammable liquid, n.o.s. (Methyl ethyl ketone, Acetone)
Transport hazard class(es)	
Class	3
Subsidiary risk	-
Packing group	II
Environmental hazards	No.
ERG Code	3H
Special precautions for user	Read safety instructions, SDS and emergency procedures before handling.

IMDG

UN number	UN1993
UN proper shipping name	FLAMMABLE LIQUID, N.O.S. (Methyl ethyl ketone, Acetone)
Transport hazard class(es)	
Class	3
Subsidiary risk	-
Packing group	II
Environmental hazards	
Marine pollutant	No.
EmS	F-E, S-E
Special precautions for user	Read safety instructions, SDS and emergency procedures before handling.

Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code Not available.

15. Regulatory information

US federal regulations This product is a "Hazardous Chemical" as defined by the OSHA Hazard Communication Standard, 29 CFR 1910.1200.
All components are on the U.S. EPA TSCA Inventory List.

TSCA Section 12(b) Export Notification (40 CFR 707, Subpt. D)

Not regulated.

OSHA Specifically Regulated Substances (29 CFR 1910.1001-1050)

Not listed.

CERCLA Hazardous Substance List (40 CFR 302.4)

Acetone (CAS 67-64-1)	LISTED
Cyclohexanone (CAS 108-94-1)	LISTED
Furan, Tetrahydro- (CAS 109-99-9)	LISTED
Methyl ethyl ketone (CAS 78-93-3)	LISTED

Superfund Amendments and Reauthorization Act of 1986 (SARA)

Hazard categories	Immediate Hazard - Yes
	Delayed Hazard - No
	Fire Hazard - Yes
	Pressure Hazard - No
	Reactivity Hazard - No

SARA 302 Extremely hazardous substance

Not listed.

SARA 311/312 Hazardous chemical No

SARA 313 (TRI reporting)
Not regulated.

Other federal regulations

Clean Air Act (CAA) Section 112 Hazardous Air Pollutants (HAPs) List

Not regulated.

Clean Air Act (CAA) Section 112(r) Accidental Release Prevention (40 CFR 68.130)

Not regulated.

Safe Drinking Water Act (SDWA) Not regulated.

Drug Enforcement Administration (DEA). List 2, Essential Chemicals (21 CFR 1310.02(b) and 1310.04(f)(2) and Chemical Code Number

Acetone (CAS 67-64-1) 6532

Methyl ethyl ketone (CAS 78-93-3) 6714

Drug Enforcement Administration (DEA). List 1 & 2 Exempt Chemical Mixtures (21 CFR 1310.12(c))

Acetone (CAS 67-64-1) 35 %WV

Methyl ethyl ketone (CAS 78-93-3) 35 %WV

DEA Exempt Chemical Mixtures Code Number

Acetone (CAS 67-64-1) 6532

Methyl ethyl ketone (CAS 78-93-3) 6714

US state regulations

US. Massachusetts RTK - Substance List

Acetone (CAS 67-64-1)

Cyclohexanone (CAS 108-94-1)

Furan, Tetrahydro- (CAS 109-99-9)

Methyl ethyl ketone (CAS 78-93-3)

US. New Jersey Worker and Community Right-to-Know Act

Acetone (CAS 67-64-1)

Cyclohexanone (CAS 108-94-1)

Furan, Tetrahydro- (CAS 109-99-9)

Methyl ethyl ketone (CAS 78-93-3)

US. Pennsylvania Worker and Community Right-to-Know Law

Acetone (CAS 67-64-1)

Cyclohexanone (CAS 108-94-1)

Furan, Tetrahydro- (CAS 109-99-9)

Methyl ethyl ketone (CAS 78-93-3)

US. Rhode Island RTK

Acetone (CAS 67-64-1)

Cyclohexanone (CAS 108-94-1)

Furan, Tetrahydro- (CAS 109-99-9)

Methyl ethyl ketone (CAS 78-93-3)

US. California Proposition 65

California Safe Drinking Water and Toxic Enforcement Act of 1986 (Proposition 65): This material is not known to contain any chemicals currently listed as carcinogens or reproductive toxins.

International Inventories

Country(s) or region	Inventory name	On inventory (yes/no)*
Canada	Domestic Substances List (DSL)	Yes
United States & Puerto Rico	Toxic Substances Control Act (TSCA) Inventory	Yes

*A "Yes" indicates this product complies with the inventory requirements administered by the governing country(s).

A "No" indicates that one or more components of the product are not listed or exempt from listing on the inventory administered by the governing country(s).

16. Other information, including date of preparation or last revision

Issue date	27-May-2015
Revision date	-
Version #	01
HMIS® ratings	Health: 2 Flammability: 3 Physical hazard: 0

NFPA ratings**Disclaimer**

The information in the sheet was written based on the best knowledge and experience currently available. Oatey Co. cannot anticipate all conditions under which this information and its product, or the products of other manufacturers in combination with its product, may be used. It is the user's responsibility to ensure safe conditions for handling, storage and disposal of the product, and to assume liability for loss, injury, damage or expense due to improper use.

ATTACHMENT G

Groundwater Laboratory Results

Groundwater Sample Detected Contaminant Laboratory Results, Arrowhead Park Wells, Neenah, WI

Well Number	Date Collected	ug/L		mg/L				
		Tetrahydrofuran	Vinyl Chloride	Ammonia Nitrogen	Nitrate-Nitrite	Sulfate	Iron	Chloride
NR 140 Preventive Action Limit		10	0.02	0.97	2	NE	0.15	125
NR 140 Enforcement Standard		50	0.2	9.7	10	NE	0.3	250
PS-32	10/1/2022	1543	<9.0	0.35	<0.03	6	---	---
	4/1/2023	304	0.89	0.33	<0.05	0.54	---	---
	10/1/2023	218	1.1	0.3	0.07	0.5	---	---
PS-32A	10/1/2022	6.8	2.3	0.96	<0.03	16	---	---
	4/1/2023	<0.90	<0.18	0.74	0.26	7.8	---	---
	10/1/2023	16	3.4	1.4	0.09	1.8	---	---
PS-32B	10/1/2022	---	---	---	---	---	---	---
	4/1/2023	3.2	<0.18	0.22	<0.05	68	---	---
	10/1/2023	---	---	---	---	---	---	---
PS-15RR	10/1/2022	<0.90	<0.18	---	0.06	2.3	26	409
	4/1/2023	<0.90	<0.18	2.5	0.09	<0.50	31	504
	10/1/2023	<0.90	<0.18	2.9	0.28	<0.50	27	512
PS-3R	10/1/2022	3.9	<0.18	---	0.11	8.4	67	100
	4/1/2023	<0.90	<0.18	4	0.13	30	58	155
	10/1/2023	4.4	<0.18	7	0.16	1.6	70	133

Key:

"J" = Analyte detected between Limit of Detection and Limit of Quantitation

µg/L = microgram per liter

NE = not established

X = Concentration detected above Chapter NR 140, Wisconsin Administrative Code (NR 140, Wis. Adm. Code) preventive action limit (PAL)

X = Concentration detected above NR 140, Wis. Adm. Code enforcement standard (ES)