PROPOSED ON-SITE LANDFILL FEASIBILITY STUDY Vermilion Power Plant Oakwood, IL

Submitted to

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Submitted by



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EXECUTIVE SUMMARY

A new on-site landfill (New Landfill) is being considered to be constructed in the area of the retired power plant at the Vermilion Power Plant (Power Plant Property¹). The power plant will be demolished, and substructures will be removed. The New Landfill will meet the state requirements of 35 Illinois Administrative Code (IAC) Part 811 and the applicable federal requirements of 40 Code of Federal Regulations (CFR) Part 257 Subpart D (Federal CCR rule). The New Landfill will have an approximate 27-acre waste footprint and a 40-acre facility footprint (Facility), which encompasses the associated haul roads and space needed for ditches, a stormwater basin, and leachate structures. The New Landfill will have sufficient disposal "air space" to accommodate the needs of the on-site ash pond closure by removal construction and power plant demolition. The Feasibility Study (FS) will summarize the following:

- 1. An overview of the New Landfill;
- 2. Evaluation of applicable landfill location standards;
- 3. Description and details of the New Landfill environmental control systems including: bottom liner system, leachate collection system, stormwater management, final cover system, and cell layout; and
- 4. Evaluation of other design elements, including location overview, geology and hydrogeology, uppermost aquifer, excavation, stability, construction, and landfill filling schedule, source material management, operating plan, long-term leachate management, landfill gas management (not applicable), access road, and closure and post-closure care.

¹ Power Plant Property includes the area of the power plant, ancillary areas, a cooling lake, and nearby CCR surface impoundments.

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SECTION 1

INTRODUCTION

This FS evaluates the feasibility of the conceptual design of the New Landfill under consideration at Power Plant Property. This FS is presented in support of a closure alternatives analysis (CAA) that is being prepared in accordance with 35 IAC Part 845.710(b)². The CAA is being conducted for the closure of the following coal combustion residual (CCR) surface impoundments: Old East Ash Pond area (OEAP)/North Ash Pond area (NAP), and New East Ash Pond (NEAP). The CAA and this FS will be included in the Final Closure Plan prepared under Part 845.720(b) that is a part of the ash ponds closure Construction Permit Applications prepared under Part 845.220.

The New Landfill under consideration will contain CCR material generated on-site by the Owner's own activities such as: closure by removal of existing CCR surface impoundments and non-hazardous wastes from demolition and clean-up of a retired coal fired power plant. Therefore, it will be necessary to meet the requirements of Section 21(d)(1) of the Illinois Environmental Protection Act (IL Act) which does not require local siting approval for municipal solid waste landfills and CCR surface impoundments when the wastes generated by the person's own activities are disposed of within the site where such wastes are generated.

The New Landfill under consideration must meet the technical and permitting requirements of 35 IAC Part 811. The New Landfill is expected to meet the requirements of 35 IAC Part 811 and applicable Federal CCR rule requirements based on this FS and Geosyntec's experience. Documentation demonstrating compliance with 35 IAC Parts 811 and 812 will be performed through submittal of a permit application to Illinois Environmental Protection Agency (IEPA).

The New Landfill under consideration will be located where the current power plant and associated structures stand and to the area west of the plant structures. The power plant and its structures will be removed prior to development of the New Landfill. The New Landfill under consideration will be bordered by existing site roads to the north and south. A stormwater basin is proposed to be located southwest of the New Landfill and the existing southern access road. The New Landfill location under consideration is depicted in **Figure 1**.

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² Illinois Pollution Control Board, Title 35: Environmental Protection, Subtitle G: Waste Disposal, Chapter I: Pollution Control Board, Subchapter j: Coal Combustion Waste Surface Impoundments, April 2021.

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SECTION 2

EVALUATION OF LANDFILL LOCATION STANDARDS

The Illinois location standards for the New Landfill under consideration are established in 35 IAC Sections 811.102³ and 811.302⁴. Additional federal requirements for CCR units under 40 CFR Part 257 Subpart D will also be addressed. **Table 1** summarizes the Illinois and Federal CCR rule location standards. The New Landfill under consideration meets the requirements of state and federal location standards based on currently available data. It is expected that all location standards will be verified following additional studies such as a wetland delineation, archaeological survey, and other studies. The Facility boundary is shown on **Figure 1**.

Illinois Landfill	Location (35 IAC 811) an		able 1 R Landfil	l Locati	on Standards	(40 CFR Part 257 Subpart D)
Location Standards	Setback Requirements	Regulatory Citation	Meets	Does Not Meet	Requires Additional Evaluation	Notes
Airport	10,000-foot setback from any runway with turbojet aircraft 5,000-foot setback from any runway with piston aircraft Notify FAA if within 5 miles of airport runway 6-mile setback for new landfills for public use airports designed for 60 passengers or less	35 IAC 811.302 (c) and (f) Wendall Ford Act (49 U.S.C. 44718(d))	X			The nearest airport is the Vermilion County Airport, which is located over 7 miles to the northwest of the New Landfill.
Floodplain	The facility shall not be located in 100-year floodplain	35 IAC 811.102 (b)	X			The New Landfill is approximately 108-feet above and 1,200-feet outside of the 100-year floodplain based on a 2021 Inundation Map from Illinois State LiDAR data.

³ Subpart A: General Standards for all Landfills

⁴ Subpart C: Putrescible and Chemical Waste Landfills

Illinois I and Ell	I and a (25 I A C 911) and		able 1	11 4:	on Stondonds	(40 CED Dout 257 Colon and D)
Location Standards	Setback Requirements	Regulatory Citation	Meets	Does Not Meet	Requires Additional Evaluation	(40 CFR Part 257 Subpart D) Notes
Placement above the uppermost aquifer	Five feet above the upper limit of the uppermost aquifer	§257.60	X		X	The proposed New Landfill excavation grades will range from 672 ft MSL on the north end of each cell to approximately 668 ft MSL on the south side. The estimated uppermost aquifer elevation (based on 2011 borings) is estimated to be at least 135 feet below ground surface in the vicinity of the New Landfill. The uppermost aquifer will have to be confirmed during the hydrogeologic investigation.
Wetlands/Waters of U.S.	The facility shall not cause a violation of Section 404 of the Clean Water Act	35 IAC 811.102(e) And \$257.61	X		X	Based on the developed nature of the Facility and its location (uplands) there is a low probability of the existence of wetlands. A wetland delineation study will be performed on the New Landfill area as part of the IEPA permitting process.
Fault	The landfill unit will not be located within 200 feet of a Holocene fault	35 IAC 811.304 And §257.62	X			There are no Holocene faults within 200 feet of the New Landfill.
Seismic Impact Zones	The facility shall not be located in a seismic impact zone (10% or greater chance of exceeding 0.10 g in 250 years) unless all containment structures are designed	35 IAC 811.304 And §257.63	X			The peak ground acceleration is 0.0806g at the Facility; and therefore, the New Landfill is not in a seismic impact zone.
Unstable Areas	The facility shall not be located in an unstable area unless engineering measures have been incorporated	35 IAC 811.305 And \$257.64	X		X	There are no reported karst areas near the Facility. Coal mining was previously performed near the Vermilion River. Previous studies indicate that mining was adjacent to the River. A site-specific investigation will be included in the hydrogeologic investigation in the New Landfill IEPA permit application.

Location Standards	Setback Requirements	Regulatory Citation	Meets	Does Not	Requires Additional	Notes
Wild and Scenic Rivers	The facility shall meet all requirements under the Wild and Scenic River Act	35 IAC 811.102(a)	X	Meet	Evaluation	The Middle Fork of the Vermilion River is designated as a wild and scenic river. Based on correspondence from the National Park Service, they recommend landfill development outside of a ¼ mile radius of national wild or scenic rivers. The final design of the landfill unit footprint or boundary can and will be located outside of this setback
Historic and Natural Areas	The facility shall not be located in areas where it may pose a threat of harm to historical or natural area as designated as a Dedicated Illinois Nature Preserve.	35 IAC 811.102	X		X	The EcoCAT survey identified several historic or natural areas within the vicinity of the New Landfill. The nearest historic or natural area is the Kickapoo State Recreation Area located 0.5 miles south. A Phase I Archaeological Survey is recommended for the New Landfill to verify that no historic or natural areas are present in the New Landfill facility boundary.
Endangered Species	The facility shall not be located in areas where it may jeopardize the continued existence of endangered species	35 IAC 811.102 (d)	X			Multiple protected resources were identified in the vicinity of the project location per an EcoCAT due to the Middle Fork of the Vermilion River but not within the proposed New Landfill area. The design report, CQA and operating plans, that will be developed during the IEPA permitting process, will include documentation on how the New Landfill will not impact endangered species.
Water Quality Management Plan	The facility shall not cause a violation of any area-wide or state-wide water quality management plan	35 IAC 811.102(f)	X			The New Landfill design will incorporate stormwater design elements that will improve existing stormwater quality.

Illinois Landfill	Location (35 IAC 811) an	_	able 1 R Landfil	l Locatio	on Standards	(40 CFR Part 257 Subpart D)
Location Standards	Setback Requirements	Regulatory Citation	Meets	Does Not Meet	Requires Additional Evaluation	Notes
Water Supply Wells Setback	 LF unit, 200 feet for off-site water supply wells LF Unit, 2,500 feet from a community supply well (Section 14.2 and 14.3) 	35 IAC 811.302(a)	X			The nearest community supply well is in Danville located over four miles (>20,000 ft) to the east.
Sole-Source Aquifers	No part of the LF unit shall be located within 1,200 feet vertically or horizontally of a sole source aquifer, unless an impermeable situation exists below the unit.	35 811.302(b)	X			The Mahomet aquifer is designated as a sole source aquifer and is within 1 mile of the New Landfill, but the proposed New Landfill is outside of the regulatory 1,200-foot setback.
Road and Highways	The facility must have a 500-foot setback of any county road, state, or interstate or have operations screened by a barrier	35 IAC 811.302 (c)	X			The New Landfill will be designed and developed with a 500-foot setback from all county, state or interstate roads.
Occupied Dwellings, Schools, Hospitals, Etc.	The landfill unit must have a 500-foot setback unless special permission is granted by the owner.	35 IAC 811.302 (d)	X			The New Landfill will be designed and developed with a 500-foot setback from all occupied dwellings, schools, hospitals, etc. There are no schools or hospitals within 4,600 feet of the proposed New Landfill area.

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SECTION 3

LANDFILL CONCEPTUAL DESIGN

3.1 Design Overview

The conceptual layout of the New Landfill under consideration is shown on **Figures 2** and **3**. The estimated waste footprint or boundary is approximately 27 acres. The New Landfill will provide a waste volume of approximately 3,100,000 cu yds of "airspace" (i.e., storage volume). The Landfill may accept an estimated 50,000 cubic yards (cy) of material from the coal yard, 2,163,000 cy of coal combustion residuals (CCR) from the North Ash Pond area (NAP) and Old East Ash Pond area (OEAP) closure⁵, 376,000 cy of CCR from the New East Ash Pond (NEAP) closure, and 35,000 cy of non-hazardous construction demolition debris from the demolition of the power plant. The total waste volume includes an approximate 20 percent contingency in waste volume capacity.

The design elements of the proposed New Landfill have been implemented at many other modern landfill facilities and have demonstrated to be protective of the public health, safety and welfare and compliant with Illinois landfill regulations. All landfill design and construction elements will be overseen and certified by a third party licensed professional engineer in the State of Illinois. Some of the design features of the New Landfill under consideration include:

- Composite Bottom Liner System The proposed New Landfill will be designed with a composite liner system consisting of a minimum three-foot thick, low permeability soil liner. The low permeability soil liner will be installed in lifts and compacted to achieve a permeability no greater than 1 x 10⁻⁷ cm/sec. The three-foot thick compacted soil liner will be overlain by a 60-mil thick high-density polyethylene (HDPE) geomembrane liner.
- Leachate Collection System (LCS) The liquids that come into contact with the waste are defined as "leachate" or "contact water" and are managed so these liquids do not impact groundwater or surface water sources. The New Landfill under consideration will be designed with a one-foot-thick granular drainage layer or a geocomposite drainage layer that will be installed directly above the composite bottom liner system. The leachate collection system will drain to collection points (i.e., leachate sumps) located along the

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⁵ A portion of the OEAP area and NAP area are co-located over the southern end of NAP and northern end of OEAP and are considered as one surface impoundment for the construction permit.

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base of the landfill. The conceptual design (see Figure 2) has five leachate sumps, associated with five landfill cells, located on the southern edge of the New Landfill.

Contact water during construction will be pumped from the sumps to either a leachate pond or above ground storage tank(s) located adjacent to the landfill. The leachate will be discharged through either of the Facility's NPDES permitted outfall(s). The NPDES permit would require a modification should it receive landfill contact water/leachate. After closure, the leachate will be managed and discharged either through the Power Plant Property's NPDES permitted outfall(s) or transported to a permitted wastewater treatment plant (WWTP).

- Final Cover System The final cover system will cover the entire New Landfill and will tie-into the bottom liner system at the perimeter to fully encapsulate the waste mass. The final cover system design will include a low permeability layer to prevent precipitation from entering the waste mass to minimize leachate generation. The low permeability layer will consist of two components: (1) 1-foot low permeability cohesive soil/clay layer, and (2) 40-mil linear low-density polyethylene (LLDPE) geomembrane. A geocomposite drainage layer will be installed directly on top of the geomembrane if necessary, to minimize the liquid head on the final cover system, thereby reducing final cover infiltration and improving stability of the final cover system. A three-foot protective cover soil layer will be placed over the geocomposite drainage layer. The upper six inches of the protective cover soil layer will be suitable for supporting vegetation. The final cover will be vegetated. Any stormwater runoff that occurs after placement of the one-foot-thick low permeability cohesive soil/clay layer will be non-contact stormwater.
- **Disposal Cell Layout** The New Landfill will incorporate five cells, oriented from west to east. The bottom liner will be graded in a sawtooth configuration to promote the flow of leachate from north to south and prevent ponding. The side slopes of the bottom liner and LCS grades will be constructed at 3H:1V. The LCS pipe will be sloped from an approximate elevation of 674 ft MSL at the southern end of Cell 1 and 672 ft MSL at the southern end of Cells 2 through 5, up to an elevation of 676 ft MSL at the northern end of each cell. Leachate in each cell will drain at a minimum 2.0 percent slope to a center LCS pipe in each cell. The LCS pipes will slope at a minimum 1.0 percent from north to south to a sump located at the south end of each cell. The sumps will be located at an approximate elevation of 672 ft MSL.

The final waste elevation will be approximately 811 ft MSL (see **Figure 3**), and the final cover will be constructed to a maximum elevation of 815 ft MSL with an upper plateau slope of 20H:1V and maximum side slopes of 3H:1V. The side slopes may be reduced to 4H:1V if the required waste volume is less than currently anticipated during CCR surface impoundment closure.

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Figure 4 shows the conceptual New Landfill cross section and depicts the slopes and elevations of the proposed New Landfill.

3.2 Evaluation of Design Elements

The following evaluation is provided for the elements of the geologic setting, landfill design, operations, closure and post-closure.

• Geologic Setting – Unconsolidated Deposits – During the spring of 2021, borings were completed for new groundwater monitoring wells (MW-101, -102, -103, -104, and -105), which surround the New Landfill under consideration. The borings (Appendix A) show the foundation soil underlying the New Landfill primarily consists of clay alluvium. The soils are generally lean clays and silty clays with varying amounts of sand and gravel ranging from very soft to hard with an average of being very stiff. Laboratory testing indicates that the clay alluvium exhibits an average vertical hydraulic conductivity less than 1x10⁻⁶ cm/sec.

There are thin and discontinuous seams of sand alluvium present in the clay alluvium. The sand alluvium consists of fine to coarse-grained sands and gravels. The shallow sand alluvium around the New Landfill is monitored and located at elevations between approximately 617 to 654 feet above mean sea level (ft MSL). While the shallow sand alluvium may contain groundwater, it is not the uppermost aquifer for the Power Plant Property, as it is discontinuous and not used as a water supply. The deep sand alluvium around the New Landfill corresponds with the lower groundwater unit (LGU) and is monitored and located at elevations 540 to 561 ft MSL. The LGU is considered to be the uppermost aquifer under the New Landfill.

- **Uppermost Aquifer** While the Power Plant Property consists of various localized groundwater bearing units, the uppermost aquifer at the Facility is the LGU. The LGU underlies most of the alluvial deposits and is located above the bedrock. The top of the bedrock is up to 150 feet below the ground surface in the area of the New Landfill.
- Groundwater Flow There are three groundwater units under the Power Plant Property: the upland groundwater unit (UGU), middle groundwater unit (MGU) and LGU. Based on the 2012 hydrogeologic study in the area of the OEAP, the UGU is located between elevations 565 and 552 ft MSL (discontinuous), the MGU is between 586 and 559 ft MSL, and the LGU is between 563 and 536 ft MSL. The MGU and LGU are the primary water bearing units at the Power Plant Property. They are comprised of alluvial sands and gravel and glacial outwash. Groundwater at the New Landfill flows through the LGU from west to the east on the west side of the New Landfill and from north to the south on the east side of the New Landfill, before discharging to the existing Illinois Power Company Lake

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located south of the New Landfill. Groundwater levels are expected to fluctuate due to seasonal changes, precipitation events, and other factors. A hydrogeologic evaluation and groundwater impact assessment model will be completed for the New Landfill as part of the IEPA permit application.

- Location The New Landfill will be located such that it meets the airport, floodplain, uppermost aquifer, wetlands/waters of the U.S., fault zone, seismic impact zone, unstable area, wild and scenic rivers, historic and natural areas, endangered species, water quality management plan, wet supply well setback, sole-source aquifer, road and highway, and occupied dwellings, schools, and hospitals location standards. The waste boundary of the New Landfill will be located 50 feet off the boundary of the access roads to allow for construction of perimeter ditches and groundwater monitoring well installation. The waste boundary will also be located away from any active utility easements. Additional evaluations will be completed to fully demonstrate compliance with the 35 IAC Part 811 and Federal CCR rule location standards.
- Long Term Floodplain Impacts Geosyntec reviewed the historical aerial imagery, flood study data, geomorphology, geotechnical data, and proximity of the Middle Fork of the Vermilion River (River). Geosyntec's conclusion is that the location of the proposed New Landfill is in a stable location and not prone to be impacted by future meandering and erosion by the River.

The River alignment and geologic floodplain have been constrained historically by the floodplain bluffs (sometimes referred to as alluvial terraces and valley walls) shown in historical imagery and topographic data dating back to 1940. The floodplain bluffs were formed at the end of the Pleistocene Epoch (end of the last period of glaciation around 11,000 years ago). **Figure 5** provides a delineation of the floodplain bluff alignment near the proposed New Landfill location.

The existing ground surface elevation at the Landfill is approximately 700 ft. The ground surface elevation of the River overbank is approximately 590 ft. The water surface elevation of the 1,000-year flood event is 600 ft. The New Landfill will be approximately 100-feet in elevation above the River's 1,000-year flood event elevation (see **Appendix B**) and 110 ft above the current floodplain elevation of 590 ft. The nearest adjacent floodplain bluff is located approximately 650-feet northeast of the proposed New Landfill location, which is approximately 750-feet horizontally away from the River channel right descending bank. The proposed New Landfill would be located approximately 1,400-feet horizontally from the River.

There has been no evidence, based on the geomorphology of the valley since the River channel was formed at the end of the Pleistocene Epoch, showing that the River has ever

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flowed through the location of the proposed New Landfill or overtopped the valley wall, and it is not expected to ever move significantly beyond the floodplain bluffs/valley walls.

- Excavation The New Landfill will be constructed by first excavating down to a subgrade with the intention of using excavated soils in construction of the low permeability bottom and final liner system, cover protective layer and other berms and site features. The soils that were encountered in borings were silt, low plasticity clays that are suitable for low the expected purposes. Further, it is necessary that the design provide sufficient excavation volume for construction material, but it is not necessary to have a balanced cut and fill because any excess fill may be sold or used in the backfilling of excavations for the closure by removal of the surface impoundments. The preliminary cut and fill indicate an excess of 1,325,000 cu yd of fill.
- Stability The stability of the excavation, side slopes, veneer (liner interfaces with different layers), and top cover grades have been selected with a high degree of confidence they will meet geotechnical criteria based on the on-site material properties and the properties of the expected manufactured layers. Geotechnical testing of the different materials at the Power Plant Property was completed and the summary data tables of the results of the investigation are presented in Appendix A. Based on a review of the material properties of the on-site foundation soils, it is Geosyntec's experience that the proposed New Landfill under consideration will meet the slope stability and settlement requirements. Further, it does not appear that there are any layers of loose saturated sand or silt that may be susceptible to liquefaction. Geotechnical calculations will be completed as part of the New Landfill design in the IEPA permit application and the design will be revised, if necessary, to meet the regulatory requirements.
- Construction and Landfill Filling Schedule It is anticipated that site investigation, design and review for the proposed New Landfill will take a number of years. The New Landfill construction and filling will begin in the western most cell and progress to the east to allow plant demolition to occur simultaneously. It is estimated that construction and filling (approximately 3,100,000 cu yds of materials) of the landfill are estimated to take approximately 6 years. The closure of the landfill (approximately 27 acres) will occur as different areas reach final top of waste design elevations and will occur over a period of approximately two years.
- Source of Materials The bottom liner soil layer, protective soil layer in the final cover system, daily cover, and intermediate cover materials are anticipated to be obtained primarily from on-site excavated soils from within the New Landfill footprint. The initial geotechnical laboratory data (Appendix A) and field boring log information indicates that excavated soils for landfill development are predominantly low plasticity silty clays and are suitable for these materials.

- Operating Plan The facility will develop and implement an operating plan that meets the applicable landfill regulatory requirements under 35 IAC Part 811. All employees will be trained and managed to comply with the contents of the operating plan. The operating plan will discuss waste placement, cover materials and placement, leachate and stormwater management, dust controls maintenance program, and emergency procedures that will be implemented at the New Landfill to provide worker's safety and minimize impacts to onsite workers and the surrounding properties.
- Long-Term Leachate Management The proposed New Landfill design includes a LCS to remove liquids from below the CCR and will be designed to minimize the formation of leachate and to prevent leachate from coming into contact with either surface water or groundwater sources. The New Landfill under consideration will be designed with the following elements to decrease potential precipitation infiltration and resulting leachate formation: (1) cover and landfill phasing practices, (2) intermediate and final landfill waste grading, and (3) final cover system. The final cover system will be placed as soon as practicable to minimize stormwater infiltration and reduce contact water runoff.
- Stormwater Management The Owner will design, install and operate a stormwater management plan that meets all state and local requirements. Through the use of perimeter berms, rain flaps and diversion ditches, stormwater will be diverted around active landfill areas to the proposed stormwater basin located southwest of the Cell 1. After closure, the final grading plan and cover system will isolate precipitation (i.e., non-contact stormwater) and thereby significantly reducing leachate generation during post-closure.
- Landfill Gas Management The New Landfill will primarily consist of CCR material; however, it will consist of some inert, non-hazardous construction demolition debris, and coal yard residuals. Gas generation at the New Landfill is anticipated to be minimal and a gas system may be incorporated, if necessary.
- Access Road The existing access roads to the north, west and south of the proposed landfill will continue to be used and will provide access for filling, maintenance, and inspection purposes.
- Closure and Post-Closure Care The New Landfill IEPA permit application will include closure and post-closure care plans that will describe how the New Landfill will be closed and what activities will be performed during post-closure care. The post-closure care plan will describe the maintenance, monitoring and inspection programs for the New Landfill during the post-closure care period. The anticipated post-closure care period for the New Landfill will be 30 years.

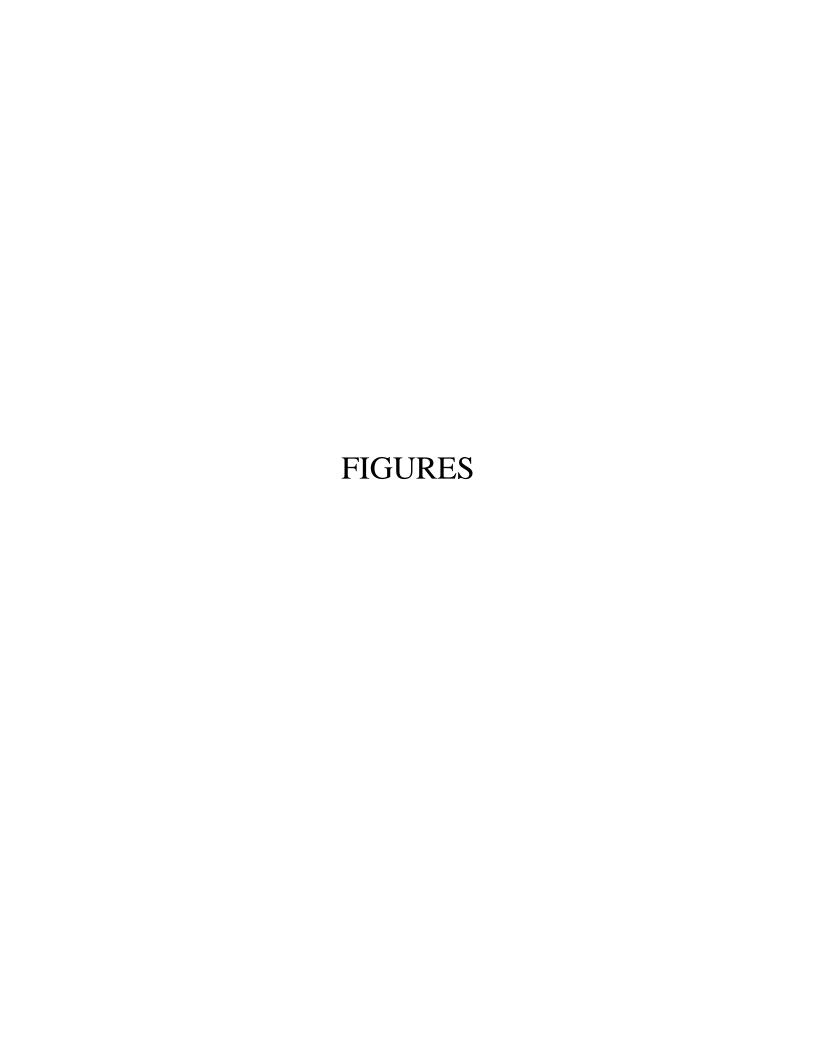
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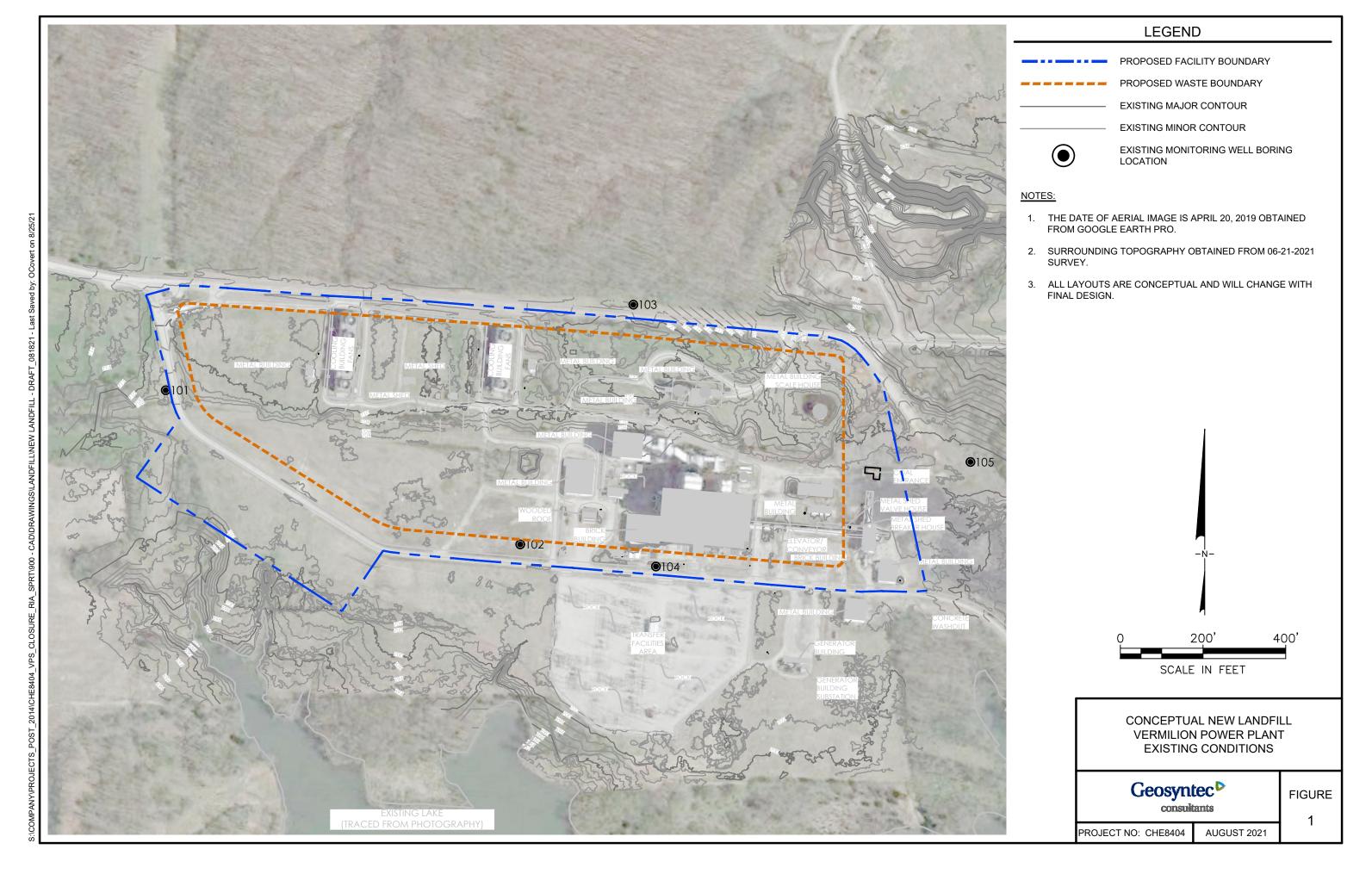
SECTION 4

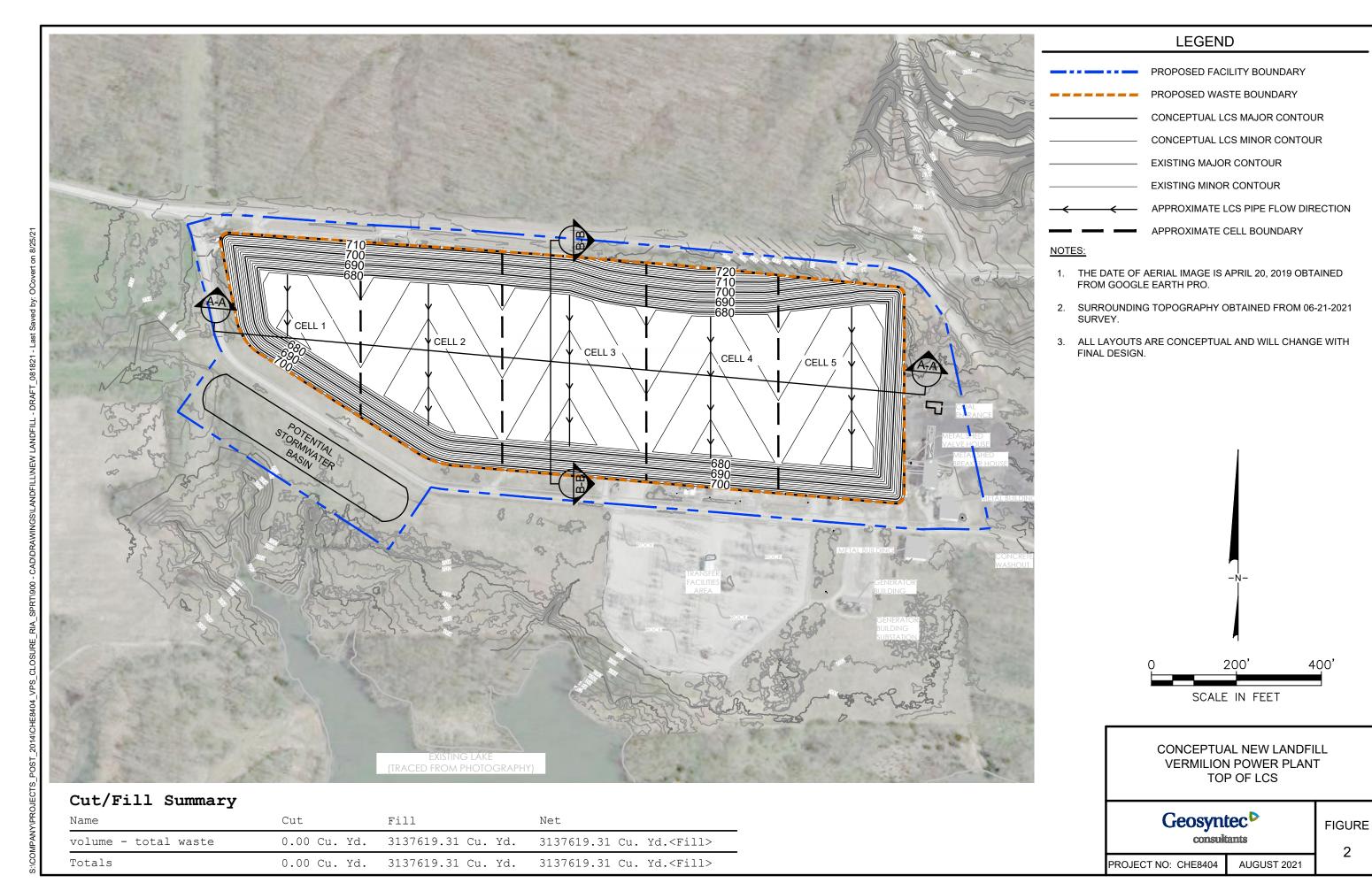
CONCLUSIONS

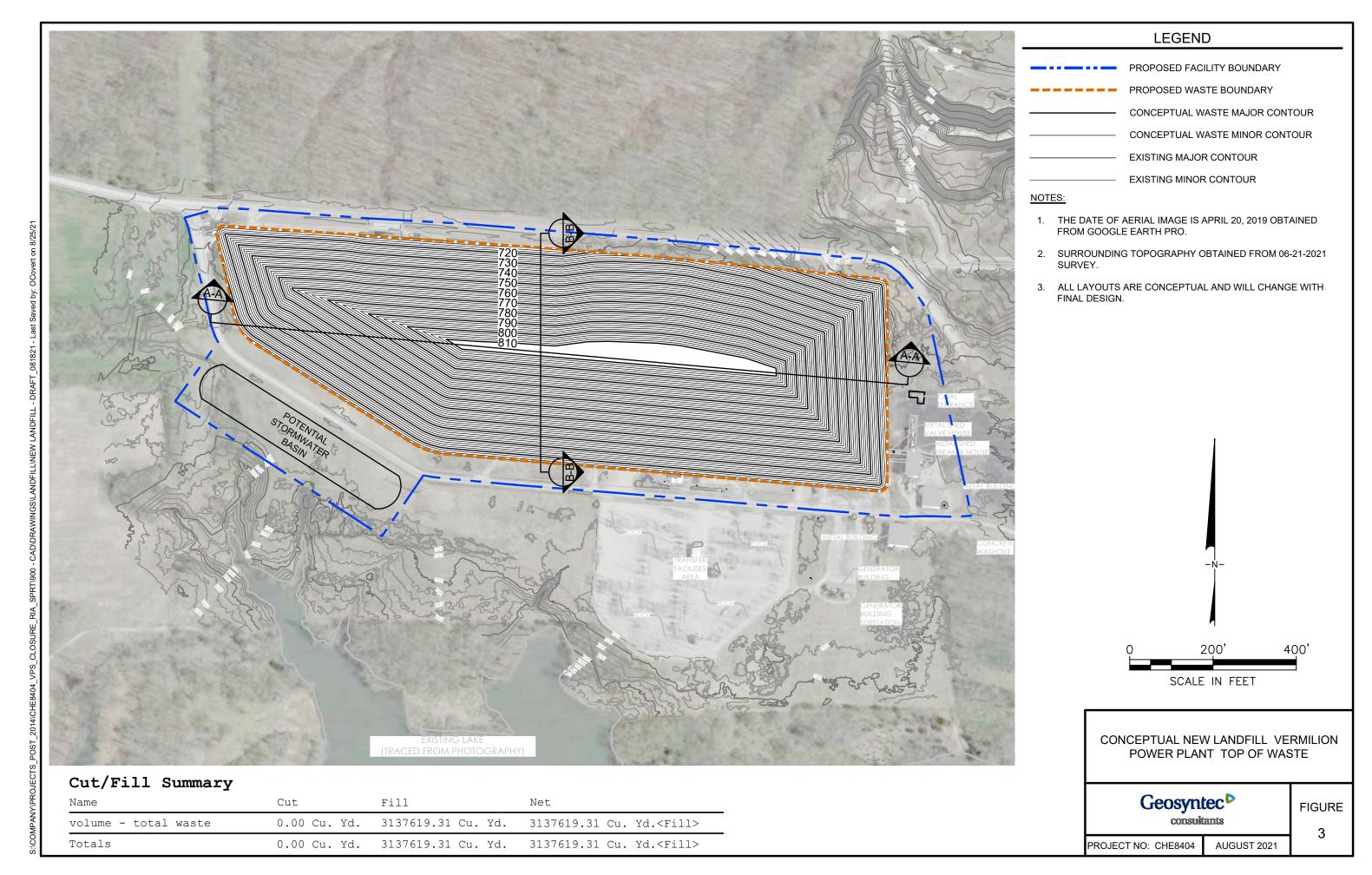
Geosyntec has performed a FS at the New Landfill located on the conceptual Facility in support of the CAA. The conceptual design meets the requirements of 35 IAC Part 811 and applicable Federal CCR rule regulations. Additional studies and assessments will be conducted to verify that all of the location standards are fully met. Further documentation demonstrating compliance with 35 IAC Parts 811 and 812 will be performed through submittal of a permit application to the IEPA.

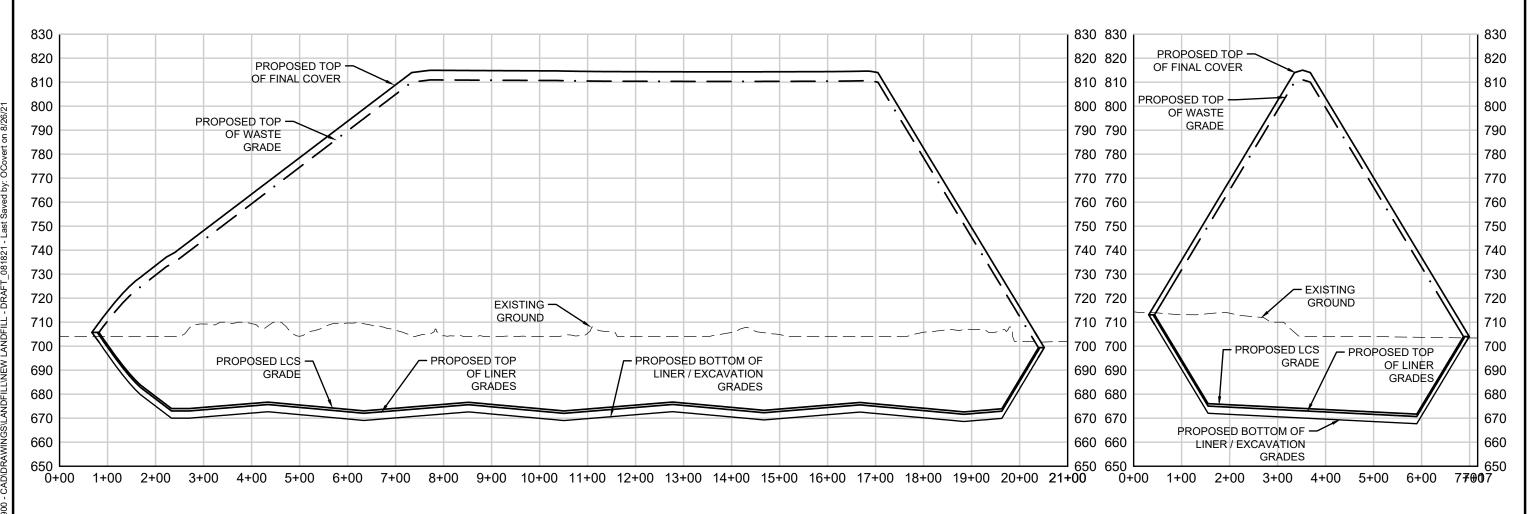
Based on a Geosyntec's understanding of Facility conditions, the conceptual New Landfill design, and the location demonstrations currently completed, it is Geosyntec's professional opinion that the New Landfill will meet the criteria of 35 IAC Part 811 and 40 CFR Part 257 Subpart D, and can be feasibly constructed, filled, and closed at the Power Plant Property.





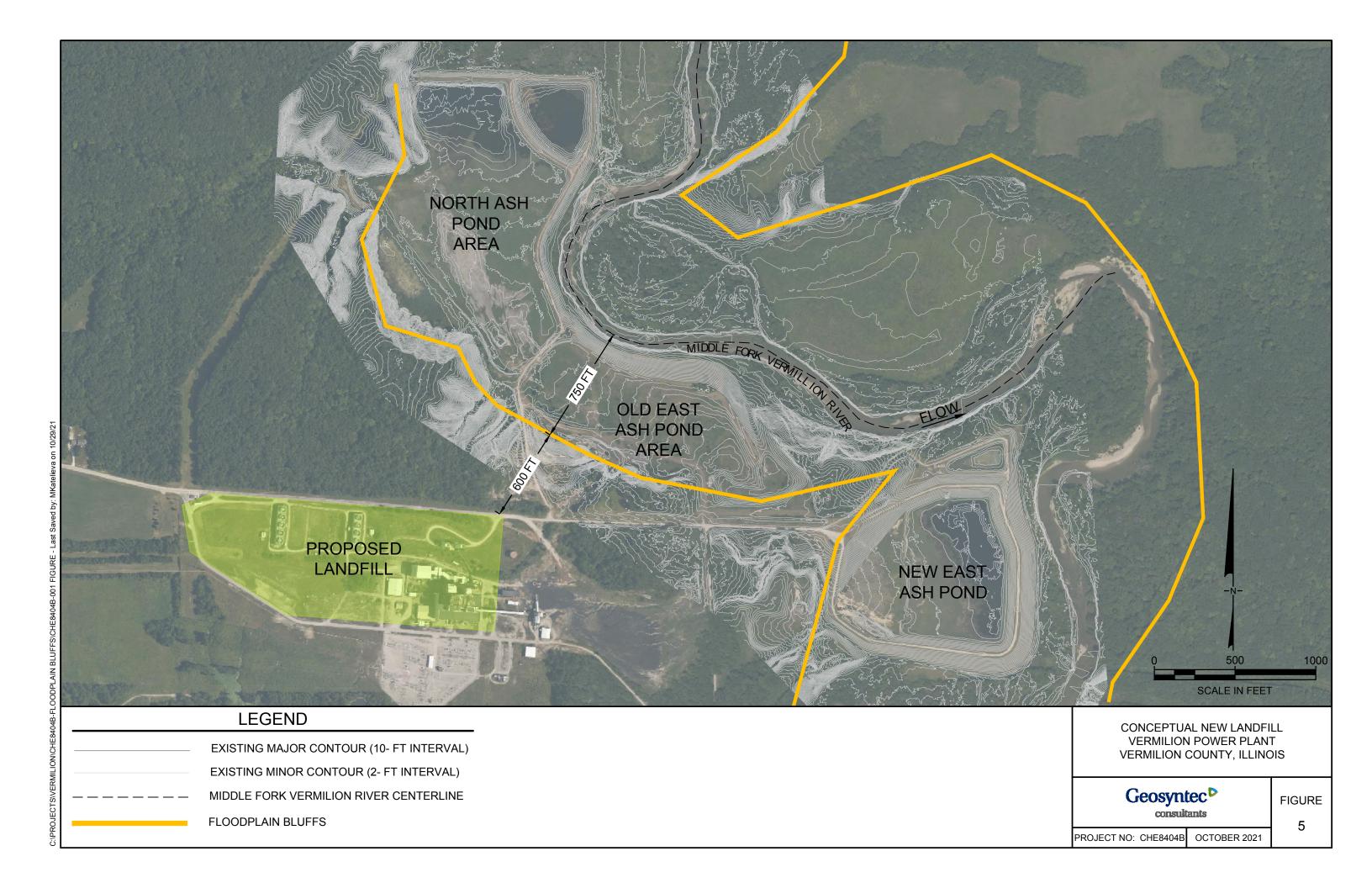






SECTION B-B HORIZONTAL: 1" =200' VERTICAL: 1" =40' SECTION B-B (1) HORIZONTAL: 1" =200' VERTICAL: 1" =40'





APPENDIX A FIELD AND LABORATORY DATA



Table A: Geotechnical Laborartory Testing Results Vermilion Power Plant Oakwood, IL

		ASTM	ASTM		ASTM D431	8	ASTM	ASTM		ASTM	1 D2435	ATSTM	D4767
		D2216	D7263	At	terberg Lim	its	D1140	D2487	ASTM D5084	1-D Cor	nsolidation	Consolidated Triaxial Com	l - Undrained pression Test
Boring Number	Depth (feet)	Moisture Content (%)	Dry Unit Weight (pcf)	Liquid Limit	Plastic Limit	Plasticity Index	Percent Passing No. 200	USCS Symbol	Hydraulic Conductivity (cm/sec)	Primary Compression Index, CC	Maximum Past-Pressure (psf)	Effective Stress Friction Angle, Φ (degrees)	Total Stress Friction Angle, Φ (degrees)
MW-101	10-12	15.6		22	15	7	82.2	CL-ML					
MW-101	30-32	13.3	124.2									31	23
MW-101	32-33	15.3		28	15	13	85.5	CL					
MW-101	60-62	12	127.4						1.0E-07				
MW-101	62-63	11.9		24	13	11	75.7	CL					
MW-101	92-93	11.4		25	13	12	71.3	CL					
MW-101	132-133	11.3		20	12	8	54.0	CL					
MW-102	10-12	16.2		28	16	12	83.9	CL					
MW-102	28-30	14.9	 120.6	24	14	10	81.7	CL	 4 CE 00				
MW-102	30-32 60-62	15 12.5	120.6						1.6E-08 				
MW-102 MW-102	62-64	12.5	127.0	 24	 14	10	 73.4	 CL				31	27
MW-102	94-96	9.2		27	14	13	70.8	CL					
MW-102	130-132	10.2		20	12	8	54.0	CL					
MW-102	10-12	15		28	16	12	84.7	CL					
MW-103	15-17	16.6	116.8	30	15	15	85.3	CL	3.61E-08	-	-	-	_
MW-103	28-30	13.5		21	13	8	69.8	CL					
MW-103	30-32	13.2	125.2						6.1E-08				
MW-103	60-62	15.8	118.00									31	20
MW-103	88-90	15.9		28	15	13	84.8	CL					
MW-103	90-91	18.1	111.8							0.027	6219		
MW-103	95.5-96	13.9	128.4	17	10	7	51.8	CL-ML	9.35E-06	-	-	-	-
MW-103	102-104	10.2		23	12	11	62.1	CL					
MW-103	130-131	8.9	98.8	16	11	5	12.6	SC-SM	2.19E-05	-	-	-	-
MW-103	132.5-133	15.3	95.2	14	7	7	5.7	SP-SC	8.17E-05	-	-	-	-
MW-103	138-140	10.5		21	11	10	56.5	CL					
MW-103	140.5-141	10.8	127.5	23	11	12	57.4	CL	3.82E-07	-	-	-	-
MW-103	163-163.5	13.8	109.5	17	11	6	35.2	SC-SM	4.31E-06	-	-	-	-
MW-104	10-12	14.5		26	15	11	81.8	CL					
MW-104	30-32	15.2	119.7							0.056	5154	31	32
MW-104	60.5-61	12.4		20	13	7	70.9	CL-ML					
MW-104	92-94	9.5		25	13	12	64.7	CL					
MW-104	130-132	12.1		20	12	8	55.0	CL					
MW-105	10-12	25.2	97.0							0.156	4600	28	16
MW-105	17-19	24.8		44	19	25	97.4	CL					
MW-105	28-30	17.8		39	17	22	96.9	CL					
MW-105	58-60	12.9		22	13	9	73.0	CL					
MW-105	88-90	10.5		25	12	13	65.9	CL					
MW-105	130-132	10.2		20	12	8	50.4	CL					

Notes

- 1. Source of data is from the May 7, 2021 Laboratory Testing Services for the Vermilion Landfill Feasibility Investigation received from Geotechnology, Inc.
- 2. The primary compression index was calculated by Geosyntec based on the one-dimensional consolidation of soils (ASTM D2435) test results.

CHE8404\MW_101-105_Lab Data Summary_rev3_Aug.18.2021



2021 MONITORING WELL LOCATION

PROPOSED STAFF GAUGE

PROPOSED BORING (LOCATION COLLECTED WITH GPS)

2019 ANTIDEGRADATION LOCATION

EXISTING MONITORING WELL LOCATION

- - APPROXIMATE PROPERTY BOUNDARY

I - J (ORIN, 2012)

) 300 600 L l Fee

MONITORING WELL AND BORING LOCATIONS MARCH 2021

DYNEGY MIDWEST GENERATION

VERMILION SITE OAKWOOD, ILLINOIS

FIGURE 1



RAMBOLL US CORPORATION
A RAMBOLL COMPANY

RAMBOLL



												Pag		of	6	
	ty/Project milion			ion	License/	Permit	/Monito	ring N	umbei	•	Boring	Number 101I				
				f crew chief (first, last) and Firm	Date Dri	lling S	tarted		D	ate Drilli	ing Con			Drill	ing Me	thod
	on Gre										- / - / -					
Cas	scade I	Orillin	ıg	Common Well Name	Final Sta		/2021	el	Surfa	ce Eleva	3/5/2	021	Bo		ini Sc Diame	
				101D			AVD8			04.09 F		AVD8			.0 inc	
	Grid Or			stimated: (1) or Boring Location (1)	La	.+	0	,	,		Grid Lo					
State	Plane 1 1/4			8 N, 1,146,097.60 E	Long		0	,	,		Fe]N]S		Feet	□ E □ W
Facili		01	1	, · · · · · · · · · · · · · · · · · · ·	State	<u> </u>	Civil T	own/C	ity/ or	Village	re	<u>сі _</u>	<u>.</u>		rect	w
				Vermilion	Illinois		Oakv	vood								
Saı	nple								amp		Soil	Prope	erties			
	t. & I (in)	nts	eet	Soil/Rock Description					10.6 eV Lamp	ive tsf)						70
er ype	h At /erec	Cou	I ln I	And Geologic Origin For Each Major Unit		S	nic	am	0.6	ress gth (1	ure	-5	city			nents
Number and Type	Length Att. & Recovered (in)	Blow Counts	Depth In Feet	Lacii iviajoi Cilit		USC	Graphic Log	Well		Compressive Strength (tsf)	Moisture Content	Liquid Limit	Plasticity Index	P 200	SOD (Comments
1	60		<u> </u>	0 - 10.3' SILTY CLAY: CL/ML, brown (10YR	R 5/3),			M	4 -	0 01	20		I		CS= 0	Core
CS	43		1.5	gray (10YR 5/1) mottling (5-10%), sand (0-10 gravel (0-5%), firm to very stiff, no dilatancy,	low to				Y	0.75					Samp	le
			- 1.5	medium toughness, medium to low plasticity,	moist.											
			3.0							2.5						
			_							2.5						
			-4.5													
2 CS	60 48		-6.0			CL/MI				2.5						
			-0.0													
										2.75						
			E													
			9.0							2.5						
3	120		E 10.5													
CS	120		- 10.5	brown (7.5YR 5/3) mottling (0-5%), silt (15-25	5%),					1.5						
			- -12.0	sand (0-5%), gravel (0-5%), stiff, no dilatancy toughness, medium plasticity, moist.	, low					1.5						
			Ē	, , , , , , , , , , , , , , , , , , , ,												
			13.5							2.25						
			E 150													
			<u> </u>			CL				1.75						
			□ 16.5													
			E							2.25						
			18.0													
			E							1.75						
L	I		- 19.5													
I here	by certif	y that	the info	ormation on this form is true and correct to the be	est of my k	nowle	dge.									
Signa	ture	6	AA-	Firm Ram	boll							Tel:	(414)	837-36	507	

234 W. Florida Street, Milwaukee, WI 53204 Fax: (414) 837-3608

Template: RAMBOLL_IL_BORING LOG - Project: 845_VERMILION_2021 (2).GPJ



				Boring Number 101D							Pag	ge 2	of	6
Sar	nple							dun		Soil	Prope	rties		
O b 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 10.6 eV Lamp	Compressive Strength (tsf)	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
4 CS	120 108	B	-21.0 -22.5 -24.0 -25.5 -27.0	toughness, medium plasticity, moist. (continued)	מ		M Q	Ā	2.25 2.25 2.5 2.5	<u> </u>	1	<u>Р</u>	P	- C - S
5 SH	24 24		-30.0 -31.5											SH= Shelby Tube
6 CS	96 96		-33.0						1.75					
			34.5 -36.0		CL				2.25					
			37.5 						2.5					
7	120		39.0 - - 40.5						1.75					
CS	120		42.0						1.75					
			-43.5						1.75					
			45.0						1.75					
			-46.5 -48.0						2					
8	120		_ 49.5	49.5 - 50' SILTY CLAY: CL/ML, gray (10YR 5/1), \firm to stiff, slow dilatancy, low toughness, low	CL/ML				1.5					
8 CS	120		51.0 -52.5	\plasticity, wet. 50 - 58' LEAN CLAY: CL, gray (10YR 5/1), silt (15-25%), sand (0-5%), gravel (0-5%), stiff, no	CL				2.5					



				Boring Number 101D							Pag	ge 3	of	6
Sar	nple							dun		Soil	Prope	rties		
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 10.6 eV Lamp	Compressive Strength (tsf)	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
			54.0 -55.5 -57.0	50 - 58' LEAN CLAY: CL, gray (10YR 5/1), silt (15-25%), sand (0-5%), gravel (0-5%), stiff, no dilatancy, low toughness, medium plasticity, moist. <i>(continued)</i>	CL				2.251.752					
9 SH	24 18		-58.5 -60.0 -61.5	58 - 77.6' SILTY CLAY: CL/ML, dark gray (10YR 4/1) to gray (10YR 5/1), sand (0-5%), gravel (0-5%), stiff to hard, no dilatancy, medium to high toughness, medium plasticity, dry to moist.					2.25					
10 CS	96		63.0						4.5					
11	120		-66.0 -67.5 -69.0		CL/ML				4.25 3.25					
11 CS	120		-70.5 -72.0 -73.5 -75.0	72.6' reddish brown (5YR 5/3) mottling (5-10%).					3.25 2.75					
			-76.5 -78.0	77.6 - 78.3' POORLY-GRADED SAND: SP, gray	SP				4.25					
12 CS	120 120		79.5 	(10YR 5/1), rounded to subrounded, medium sand, silt (5-10%), clay (5-10%), loose, moist. 78.3 - 78.6' CLAYEY SILT ML/CL, gray (10YR 5/1), hard, no dilatancy, medium toughness, non-plastic, moist. 78.6 - 144.2' SILTY CLAY: CL/ML, dark gray (10YR 4/1) to gray (10YR 5/1), sand (0-5%), gravel (0-5%), hard, no dilatancy, medium to high toughness, medium plasticity, dry.	ML/CL				4.5					
			84.0 - - - 85.5	85.9' layer of cobbles.					4.5					



				Boring Number 101D							Pag	ge 4	of	6
San	nple							dun		Soil	Prope	erties		-
	. & (ii)	ıts	eet	Soil/Rock Description				PID 10.6 eV Lamp	ve Sf)					
er /pe	Att ered	Cour	In F	And Geologic Origin For	S	. <u>2</u>	1	 6 e.	ressi th (t	ıre	_	ity		lents
Number and Type	Length Att. & Recovered (in)	Blow Counts	Depth In Feet	Each Major Unit	SC	Graphic Log	Well	PID 10.6	Compressive Strength (tsf)	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
Z iz	J &	[B]	—87.0	78.6 - 144.2' SILTY CLAY: CL/ML, dark gray	D	\(\frac{1}{2}\)				Σŭ	22	Pl	Ь	<u> </u>
			- 67.0	(10YR 4/1) to gray (10YR 5/1), sand (0-5%), gravel (0-5%), hard, no dilatancy, medium to high					4.5					
			88.5	toughness, medium plasticity, dry. (continued)										
			_						4.5					
13 MC	24		90.0											MC=
MC	24													Modified California
14	96		-91.5											
14 CS	96		-93.0						4.5					
									4.5					
			94.5											
									4.25					
			<u>96.0</u>											
			-97.5						4.5					
			-											
			99.0						4.5					
15	120			_										
15 CS	120		<u> </u>						4.5					
			102.	0					4.5					
			-	^J 102' grayish brown (10YR 5/2), cobbles (0-5%).										
			103.	5	CL/ML				4.25					
			-											
			105.	0					4.5					
			- -106.	5										
									4.5					
			108.	0										
			_						4.5					
10	100		109.	5					4.5					
16 CS	120 120		- -111.	n										
									4.5					
			112.	5										
			- -						4.5					
			- 114.	0										
			_ 115.	5					4.5					
			117.	0					4.5					
			118.	5					4 -					
			120.	0					4.5					



				Boring Number 101D							Pag	ge 5	of	6
Sar	nple							dun		Soil	Prope	erties		
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 10.6 eV Lamp	Compressive Strength (tsf)	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
17 CS	120 120			toughness, medium plasticity, dry. (continued) 5 126.2' olive (5Y 5/3) mottling. 5 127.4' -127.8' sand with silt, rounded to subrounded, medium to coarse sand, moist to wet.					4.5 4.5 4.5					
18 MC	24 24		129.						4.5					
19 CS	96 96		-132. -133.	5	CL/ML				1.5					
			135. -136. -138.	5					1.75					
20 CS	120 120		139. 	0 5					1.25 1.5 1.25					
21 CS	120 120		147. 	144.2 - 146.8' POORLY-GRADED SAND WITH SILT: SP-SM, gray (10YR 5/1), rounded to 5 subrounded, fine to medium sand, loose, wet. 0 146.8 - 147.3' SILTY CLAY: CL/ML, gray (10YR 5/1), sand (0-5%), gravel (0-5%), stiff, slow dilatancy, low toughness, medium plasticity, moist. 147.3 - 148.1' POORLY-GRADED SAND WITH SILT: SP-SM, gray (10YR 5/1), rounded to subrounded, fine to medium sand, loose, wet. 148.1 - 148.9' SILTY CLAY: CL/ML, gray (10YR 5/1), sand (0-5%), gravel (0-5%), stiff, slow dilatancy,	SP-SM CL/ML SP-SM CL/ML				1.5 1.5 2.25					



Boring Number 101D							Pag	ge 6	of	6
Sample				du		Soil	Prope	erties		
ತು 🗐 ್ಷ ರ Soil/Rock Description				PID 10.6 eV Lamp	e (
And Geologic Origin For			c	6 eV	ssiv ı (tsl	بو		<u> </u>		nts
Number and Type and Type and Type Art. & Soil/Rock Description And Geologic Origin For Each Major Unit	CS	Graphic Log	Well Diagram	10.	npre	Moisture Content	Liquid Limit	Plasticity Index	8	RQD/ Comments
	S O	Grap Log	Well Diagr	PID	Compressive Strength (tsf)	Cor	Liquid Limit	Plastic Index	P 200	Cor
149.5 - 160' SILTY CLAY: CL/ML, gray (10YR 5 sand (0-5%), gravel (0-5%), no to slow dilatancy,	5/1), low				2.5					
154.5 toughness, medium plasticity, moist. <i>(continued)</i>										
					3.25					
<u>- 156.</u> 0										
-157.5	CL/ML				3.25					
					4.25					
I					4.23					
160' End of Boring.										



													Pag		of	5		
	y/Projec milion			ion		License/	Permit	/Monito	oring N	umber		Boring Number 101S						
				f crew chief (first, last) and Firm		Date Dri	lling S	tarted		Da	te Drilli	ing Cor		Drilling Method				
_	e Gor	-		(, ,			0					8	1	Drining Wethod				
Cas	cade I	Drillin	ıg					5/2021			3/16/2021					Mini Sonic		
				Common 1	Final Sta					e Eleva		A 377DG			Diameter			
Local	Grid Oı	igin	☐ (es	stimated: or Boring Location	re	et (IV	AVD8	00)	70	4.14 Fo		56)	0	.0 inches				
				2 N, 1,146,097.45 E @	La	ıt	°]N		□ E			
	1/4	of	1	•	I, R	Lon	g	°				Fe		S		Feet W		
Facilit	y ID			County		State			Cown/Ci wood	ity/ or	Village							
Son	nple		1	Vermilion		Illinois	1	Oakv	wood	Ι 6.		Soil	Prope	ortion				
San				Soil/Dook Dogori	ntion					amj			Порс	lucs				
	tt. & d (in	ınts	Feet	Soil/Rock Descri And Geologic Orig	_					eV I	sive (tsf)					ν, Σ		
ber Jype	th A	Zo	l In	Each Major U			CS	hic	am.	9.01	oress gth (ture	ਰ	city		/ nent		
Number and Type	Length Att. & Recovered (in)	Blow Counts	Depth In Feet	Euch Major Of	iiit		US C	Graphic Log	Well Diagram	PID 10.6 eV Lamp	Compressive Strength (tsf)	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments		
	I		-	0 - 10.3' SILTY CLAY: CL/ML, I	Blind drilled to	88	+ -			 "		20	1 1	H	<u> </u>	<u> </u>		
			Ē	feet below ground surface (ft bgs 101D for detailed lithology.	s). See boring	log												
			-1	To 12 to: dotailed iii.lology.ii					X X	A								
			F															
			-2															
			-															
			_3															
			-															
			-4															
			F															
			5															
			E				CL/MI											
			-6															
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			<u>-</u> 9															
			_															
			-10				L											
			E	10.3 - 49.5' LEAN CLAY: CL.														
			-11				CL											
			F				CL											
			-12															
I hereb	y certif	y that	the info	ormation on this form is true and cor	rect to the bes	st of my k	nowle	dge.										
Signat	ure	ζ,	A 11	IL	Firm Ramb	oll								(414)				
		//	· //	V-10-	234 W	. Florida						OC P		(414)				
							1 empla	ite: KAN	MROFF	TT_RC	KING L	OG - Pr	oject: 84	o_ver	MILION	_2021 (2).GPJ		



	-			Boring Number 101S		, ,					Pag	ge 2	of	5
San	nple							PID 10.6 eV Lamp		Soil	Prop	erties		
	(ii)	ts	t E	Soil/Rock Description				/ La	f)					
r Se	Att.	uno	n Fe	And Geologic Origin For	70		п	6 e	essiv h (ts	е _		<u>\$</u>		uts
nbe	igth sove	Blow Counts	Depth In Feet	Each Major Unit	USCS	phic "	grar	.10	npre	Moisture Content	Liquid Limit	stici	8	D/ Dime
Number and Type	Length Att. & Recovered (in)	Blo	Del		n s	Graphic Log Well	Diagram	PIL	Compressive Strength (tsf)	Mo	Liq Lin	Plasticity Index	P 200	RQD/ Comments
			L	10.3 - 49.5' LEAN CLAY: CL. <i>(continued)</i>										
			_ 13											
			- 13											
			- 14											
			 14											
			- 15											
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				Boring Number 101S											ge 3	of	5
San	nple									du		So	il I	Prope	erties		1
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	LOS W. 11	well Diogram	Diagram	PID 10.6 eV Lamp	Compressive Strength (tsf)	Moisture	Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
				10.3 - 49.5' LEAN CLAY: CL. <i>(continued)</i>													
			33														
			35														
			36														
			37														
			38														
			39														
			-40		CL												
			-41 42		OL.												
			42														
			44														
			45														
			46														
			47														
			48 														
			49	49.5 - 50' SILTY CLAY: CL/ML.													
			50	50 - 58' LEAN CLAY: CL.	CL/ML												
			-51 -52		CL												



	•			Boring Number 101S		1		1	1	~ ••		ge 4	of	5
San	nple							PID 10.6 eV Lamp		Soil	Prope	erties		-
	Length Att. & Recovered (in)	ıts	eet	Soil/Rock Description				N C	ve sf)					
r pe	Att	Cour	In F	And Geologic Origin For	S	၁	[essi th (t	re		ity		ents
Number and Type	ngth	Blow Counts	Depth In Feet	Each Major Unit	1 0	Graphic Log	Well	010	Compressive Strength (tsf)	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
anc and	Le ₁	BIC	De		Sn	Grap	Well		Str	ĭ ĭ S	Lir	Pla Ind	P 2	S 5
			_	50 - 58' LEAN CLAY: CL. (continued)										
			_ 53											
			33											
			_ 54											
			- 34											
			F											
			-55 -		CL									
			-											
			 56											
			- 											
			<u>-57</u>											
			-58	58 - 77.6' SILTY CLAY: CL/ML.										
			E											
			-59 -											
			-60											
			Ē											
			-61				ll: . ∐:	.						
			Ė											
			-62											Sand
			Ė											observed 62-65 ft bgs
			-63					:						02-00 it bg3
			F											
			64											
			F											
			65		CL/ML			\cdot						
			-											
			66											
			E											
			67											
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			-68					<u>:</u>						
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	_			Boring Number 101S							Pag	ge 5	of	5
San								dur		Soil	Prope	erties		
	& (in)	ts	t e	Soil/Rock Description				/ La	f)					
ے د	Att.	onu	n Fe	And Geologic Origin For			g	6 eV	sssiv	<u>ရ</u>		5		nts
nbeı Tyf	gth	Blow Counts	Depth In Feet	Each Major Unit	SCS	phic	ll gran	PID 10.6 eV Lamp	npre	istur	uid nit	stici1	00	D/ Dime
Number and Type	Length Att. & Recovered (in)	Blo	Dep		n s	Graphic Log	Well Diagram	PID	Compressive Strength (tsf)	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
			_	58 - 77.6' SILTY CLAY: CL/ML. (continued)										
			- 73	72.6.										
			-73											
			 74											
					0.44									
			 75		CL/ML									
					CL/ML									
			 76											
			 77											
				77.6 - 78.3' POORLY-GRADED SAND: SP.										
			- 78		SP									
				78.3 - 78.6' CLAYEY SILT ML/CL. 78.6 - 88' SILTY CLAY: CL/ML.	ML/CL									
			79 	70.0 - 00 GIETT GEAT. GEMIE.										
			-80											
			_											
			-81											
			Ė											
			-82											
			-											
			- 83											
			-		CL/ML									
			84											
			_											
			85											
			-											
			_86											
			_											
			- 87											
			-88	88' End of Boring.										
				oo Liiu oi boiliig.										
l	1		1		1		ا ا		I	1	1	1 1	1	ı



Signature

SA WL

												Pag	ge 1	of	7	
	y/Projec				License/	Permit/	Monito	ring N	umbe	•	Boring					
	milion											102I				
	_	•	Name o	f crew chief (first, last) and Firm	Date Dri	lling St	arted		D	ate Drilli	ing Con	npleted	Drill	Drilling Method		
	e Gor		~			2/6/	2021				3/7/2	Mini Cania				
<u>Cas</u>	cade I	ЛПП	<u>ıg</u>	Common Well Name	Final Sta			-1	Surfa	ce Elevat		Mini Sonic orehole Diameter				
				102D			AVD8			2.98 F		6.0 inches				
Local	Grid Or	rigin	(es	stimated:) or Boring Location	1		0				Grid Lo					
State	Plane 1	,279,	245.4	8 N, 1,147,170.85 E ©/W	La	ıt	<u> </u>	<u> </u>					□E			
	1/4	of	1	/4 of Section , T N, R	Lon		<u> </u>	<u>'</u>			Fe	et 🗌	S		Feet W	
Facilit	y ID			'	State				ity/ or	Village						
	1		1	Vermilion	Illinois		Oakw	vood		1	G '1	D.				
Sar	nple								PID 10.6 eV Lamp		Soil	Prope	erties			
	. & (in)	ıts	eet	Soil/Rock Description					\ \rac{1}{2}	e ci						
r pe	Att	ont	ln Fe	And Geologic Origin For		S	0		.6 e	essiv h (ts	5 +		1		ents	
Number and Type	Length Att. & Recovered (in)	Blow Counts	Depth In Feet	Each Major Unit		U)	Graphic Log	Well Diagram	01 0	mpr	Moisture Content	Liquid Limit	Plasticity Index	8	RQD/ Comments	
Nu		Blo	De			S O	Grap Log	Well		Compressive Strength (tsf)	°C №	Liquic Limit	Plastic Index	P 200	\\Z\\Z\	
1 CS	120 120		E	0 - 2.3' WELL-GRADED GRAVEL WITH S (GW)s, very pale brown (10YR 7/4), subroun			0.00		1						CS= Core Sample	
CO	120		-1	fine to coarse sand, moist.	iueu,	(0)10	20.0.		2						Sample	
			E			(GW)s	0000									
			-2		10) (5)		5. C.									
			_3	2.3 - 6.6' LEAN CLAY: CL, grayish brown (5/2), brownish yellow (10YR 6/6) mottling (0-	5%). silt											
			-	(15-25%), gravel (5-15%), low plasticity, hard	d, dry.					4.5						
			-4													
			<u> </u>			CL										
			4 5							4.5						
			<u> </u>													
			Ė													
			7	6.6 - 10' LEAN CLAY: CL, dark gray (10YR silt (15-25%), gravel (0-5%), stiff, low plastici	4/1), tv					1.5						
			Ė _	moist.	·y,					1.0						
			-8			CL										
			<u>-</u> 9													
			Ē							1.5						
2	240		10	10 - 18.7' LEAN CLAY: CL, grayish brown (10YR											
2 CS	240		10	5/2), silt (5-15%), gravel (0-5%), medium plas	sticity,											
				very stiff, moist.						2.5						
			12													
			E							2.5						
			-13			CL				2						
			F													
			- 14							2						
			_ 15							2.5						
			E							2.5						
			-16													
T 1 1		2 - 41 - 4	41 : C.	remotion on this form is true and correct to the he	ant of 1	1	1									

Firm Ramboll

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				Boring Number 102D								ge 2	of	7
Sar	nple							dui		Soil	Prope	erties		
	Length Att. & Recovered (in)	ts	et	Soil/Rock Description				PID 10.6 eV Lamp	ə'c					
r	Att.	,oun	ln Fe	And Geologic Origin For	S	8	я	.6 e	essiv h (ts	9 1		ty		ents
Number and Type	ngth	Blow Counts	Depth In Feet	Each Major Unit	S C S	Graphic Log Well	Diagram	0 10	Compressive Strength (tsf)	Moisture Content	Liquid Limit	Plasticity Index	8	RQD/ Comments
Nn and	Le _I	BIc			n n	Grapl Log Well	Ď.	II I	Str	કૅ ઉ	Liquid Limit	Pla Ind	P 200	S S
			-17 -18	10 - 18.7' LEAN CLAY: CL, grayish brown (10YR 5/2), silt (5-15%), gravel (0-5%), medium plasticity, very stiff, moist. <i>(continued)</i>					2.5					
			E-17	very stiff, moist. (continued)					2					
			-18		CL									
			F											
			E-19	18.7 - 30' LEAN CLAY: CL, gray (10YR 5/1), silt (5-15%), gravel (0-5%), medium plasticity, very stiff,					2.5					
			E_20	moist.										
			F						2					
			E-21						2					
			_22											
			= 23						2.5					
			24											
			E		CL									
			=25						2.5					
			E ₋₂₆											
			E											
			E-27						2.5					
			E_28											
			E 20											
									2.5					
2	24		=30	30 - 32' LEAN CLAY: CL.	L									SH= Shelby
3 SH	24		30	30-32 LEAN OLAT. CL.										Tube
			E-31		CL									
4	216		─ 1 /	32 - 60' I FAN CLAY: CL gray (10YR 5/1) silt										
4 CS	216 216		32	32 - 60' LEAN CLAY : CL, gray (10YR 5/1), silt (5-15%), gravel (0-5%), medium plasticity, very stiff, moist.										
			⊢	32.5' - 33.8' sand (5-10%).					2.5					
			_34											
			35											
			F 33						2					
			36											
			E_37											
			F "		CL				2.5					
			=38											
			_39											
			F						2					
			-40											
			41											
			F						2					
			F-42											
•	1		Γ						l					



				Boring Number 102D							ge 3	of	7
Sar	nple						dur		Soil	Prope	rties		
	Length Att. & Recovered (in)	ıts	eet	Soil/Rock Description			PID 10.6 eV Lamp	ve sf)					
er /pe	Att ered	Cour	In F	And Geologic Origin For	S	.c.).6 e	ressi th (t	ıre ıt		ity		ients
Number and Type	ength	Blow Counts	Depth In Feet	Each Major Unit	SC	Graphic Log Well Diagram) 1 1	Compressive Strength (tsf)	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
Z is	l l	В		32 - 60' LEAN CLAY: CL, gray (10YR 5/1), silt	n	0 7 8 0	[J		ΣÜ	בנו	Pl In	Ь	<u> </u>
5 CS	120 120		-44 -45 -46 -47 -48 -49 -50 -51 -52 -53	32 - 60' LEAN CLAY: CL, gray (10YR 5/1), silt (5-15%), gravel (0-5%), medium plasticity, very stiff, moist. (continued)	CL			2.5 2.5 2.5 2.5					
			55					2.5					
6 SH	24 24		-59 -60 -61	60 - 62' LEAN CLAY: CL.	CL								
7 CS	96 96		-62 -63 -64 -65 -66 -67 -68	62 - 70' LEAN CLAY: CL, dark gray (10YR 4/1), silt (5-15%), gravel (0-5%), medium plasticity, hard.	CL			4.5 4.5 4.5					

				Boring Number 102D								Pag	ge 4	of	7
Sar	nple								amp		Soil	Prope	erties		
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 10.6 eV Lamp	Compressive Strength (tsf)	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
			70							4.5					
8 CS	240 240		-70 -71	70 - 71.4' POORLY-GRADED SAND: SP, dark gray (10YR 4/1), fine to medium sand, silt (0-5%), clay (0-5%), moist to wet.	SP										
			-72	71.4 - 81.4' LEAN CLAY: CL, dark gray (10YR 4/1), silt (15-25%), gravel (0-5%), sand (0-5%), medium plasticity, very stiff, moist.											
			-73 -74							3					
			75							2.75					
			76 77		CL					2.5					
			-78 -78							2.5					
			-79 - -80							3					
			81	81.4 - 85.3' CLAYEY SILT ML/CL, gray (10YR											
			-82 -83	5/1), sand (0-5%), moist to wet.											
			84	84.1' clay content decreasing with depth.	ML/CL										
			-85 -86	85.3 - 87.5' SILT: ML, gray (10YR 5/1), sand (5-15%), moist to wet.											
			87	07.5 00.0 OHTV OLAVI, OLAVI, davla sera (40VD	ML										
				87.5 - 88.6' SILTY CLAY: CL/ML, dark gray (10YR 4/1), low plasticity, hard. 88.6 - 90' SANDY LEAN CLAY WITH GRAVEL:	CL/ML										
9 MC	24		90	s(CL)g, dark gray (10YR 4/1), silt(30-45%), low plasticity, hard. 90 - 93' POORLY-GRADED SAND WITH SILT:	s(CL)g					4.5					MC=
MC	24		91	SP-SM, fine to medium sand, gravel (0-5%), wet.	SP-SM										Modified California
10 MC	24 24		-92 -93	93 - 130' LEAN CLAY: to SILTY CLAY: CL, dark											
11 CS	312 312		94 95	gray (10YR 4/1), fine to coarse gravel (0-5%), low plasticity, hard.	CL										
1			—93 —96							4.5					



				Boring Number 102D							Pag	ge 5	of	7
Sampl								dun		Soil	Prope	rties		
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 10.6 eV Lamp	Compressive Strength (tsf)	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
	~			93 - 130' LEAN CLAY: to SILTY CLAY: CL, dark	12	0		- B	S	N O		P Ir	Ь	
			97	93 - 130' LEAN CLAY: to SILTY CLAY: CL, dark gray (10YR 4/1), fine to coarse gravel (0-5%), low plasticity, hard. <i>(continued)</i>					4.5					
			98						4.5					
			97 											
			_						4.5					
			100											
			100 -101 -102 -103 -104 -105						4.5					
			102											
			103						4.5					
			104											
			105						4.5					
			106						1.0					
			107											
			108						4.5					
			109 		CL				4.5					
			110											
			-111						4.5					
			113						4.5					
			114											
			115						4.5					
									4.5					
			- - 117											
			110						4.5					
			- 110											
			-113 -114 -115 -116 -117 -118 -119 -120						4.5					
12 36 CS 36	60 60		120											
			121						4.5					
			121											
• •			- I			/ / /								



			Boring Number 102D							Pag	ge 6	of	7
Sample							dun		Soil	Prope	erties		
Number and Type Length Att. & Recovered (in)	Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	JSCS	Graphic Log	Well Diagram	PID 10.6 eV Lamp	Compressive Strength (tsf)	Moisture Content	Liquid Limit	Plasticity Index	200	RQD/ Comments
Numl and T and T Engr		-123 -124 -125 -126 -127 -128 -129 -130 -131 -132 -133 -134 -135 -136 -137 -138 -139 -140 -141 -142 -143 -144 -145 -146	93 - 130' LEAN CLAY: to SILTY CLAY: CL, dark gray (10YR 4/1), fine to coarse gravel (0-5%), low plasticity, hard. (continued) 128.1'-128.4' layer of fine sand. 130 - 130.7' g(CL), gravelly clay. 130.7 - 149.4' LEAN CLAY: to SILTY CLAY: CL, dark gray (10YR 4/1), fine to coarse gravel (0-5%), low plasticity, hard.	CL CL		Well	PID 1	4.5 4.5 4.5 4.5 4.5 4.5 4.5 4.5 4.5 4.5	Moist	Liqui Limit	Plastic Index	P 200	RQD. Comm
		-143 -144 -145 -146 -147 -148 -149						4.5					



				Boring Number 102D							Pag	ge 7	of	7
Sar	nple							dw		Soil	Prope	erties		
	% (ii)	ıts	eet	Soil/Rock Description				PID 10.6 eV Lamp	ve Sf)					
r pe	Att	Joun	In Fe	And Geologic Origin For	S	၁	8	.6 e	essiv th (ts	r te		ity		ents
Number and Type	Length Att. & Recovered (in)	Blow Counts	Depth In Feet	Each Major Unit	SC	Graphic Log	Well Diagram	D 10	Compressive Strength (tsf)	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
g u	Le Re	BI	Ď	\ 149' layer of well-graded sand with gravel (1" thick). /	D	Grap	ĭ. □.	II.	\(\frac{3}{5}\)\(\frac{\frac{7}{5}}{4.5}\)	žζ	<u> </u>	Pla	P.	<u></u>
13	120		150		(SW)g				4.5					
13 CS	120		1.51	150 - 156' LEAN CLAY: to SILTY CLAY: CL, dark gray (10YR 4/1), fine to coarse gravel (0-5%), low										
			151	plasticity, hard.			[:目::		4.5					
			152											
			E -153				1:1							
					CL		<u>}::</u> ::		4.5					
			154				[:]							
			155	154.8' -155.1' layer of fine to medium sand.					4.5					
			E	,			Į:' <u> </u>		4.5					
			156	156 - 156.7' POORLY-GRADED SAND: SP, fine	SP									
			157	to medium sand. 156.7 - 160' LEAN CLAY: to SILTY CLAY: CL,	J				4.5					
			158	dark gray (10YR 4/1), fine to coarse gravel (0-5%), low plasticity, hard.					1.0					
			- 136	•	CL									
			159				300		4.5					
			160	400.5										
				160' End of Boring.										



													Pag		of	5	
	y/Projec milion			ion		License/	Permit/	Monito	ring N	umber		Boring	Numb 1025				
				f crew chief (first, last) and Firm		Date Dri	lling St	tarted		Da	te Drill	ing Cor			Drill	ing Met	thod
	ve Gor	-		(,)			8						1				
Cas	cade I	Drillin	ıg					/2021				3/16/2	2021			ini So	
					Well Name 02S	Final Sta					e Eleva		A 377DG			Diamet .0 incl	
Local	Grid Or	igin	☐ (es	stimated: or Boring Location		Ге	ei (M	AVD8	8)	/0	2.92 F	Grid Lo		56)	0	.U IIICI	ies
)/W	La	ıt	°	<u>'</u> —]N			□ E
	1/4	of	1	•	I, R	Long	g	°	<u>'</u>			Fe	et [S		Feet	□ W
Facilit	y ID			County Vermilion		State Illinois		Civil T Oakv		ity/ or	Village						
Sar	nple			Verifilition	-	111111018		Oakv	voou	Q,		Soil	Prope	erties			
	Τ*			Soil/Rock Descri	ntion					PID 10.6 eV Lamp			Пор			-	
	tt. &	Blow Counts	Depth In Feet	And Geologic Orig	-					e	sive (tsf)						ts
iber Type	gth A	v Co	h In	Each Major U			CS	hic	ram	10.6	pres	sture	t id	icity	0	>	men
Number and Type	Length Att. & Recovered (in)	Blov	Dept	-			SO	Graphic Log	Well		Compressive Strength (tsf)	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/	Com
				0 - 2.3' WELL-GRADED GRAV	/EL WITH S	AND:		0.00		1							
				(GW)s, Blind drilled to 90 feet be (ft bgs). See boring log 102D for	detailed litho	logy		0.0									
			- I				(GW)s										
			<u> </u>					0.0.									
	2.3-6.6' LEAN CLAY: CL.						L										
			F ,	2.3 - 0.0 LEAN CLAY. CL.													
			-3														
			Ė,														
			- 4														
							CL										
			<u>-5</u>														
			-														
			- 6														
			- 7	6.6 - 10' LEAN CLAY: CL.													
			 7														
			<u> </u>														
			- 8				CL										
			-														
			<u>-</u> 9														
			-														
			10	10 - 18.7' LEAN CLAY: CL.													
			- ,,														
			11 				CL										
			- -12														
I honol	by conti	fy that		 ormation on this form is true and con	mant to the ke	set of my, 1.	novile	l				1				<u> </u>	
Signat		y mat	2		Firm Ramb		nowie	ige.					Т-1	(41.4)	027.24	07	
2.5		57	y W	L		DOII 7. Florida :	Street	Milwan	ikee.W	T 5320	4			(414) (414)			

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				Boring Number 102S								ge 2	of	5
San	nple							duı		Soil	Prope			
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 10.6 eV Lamp	Compressive Strength (tsf)	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
			_	10 - 18.7' LEAN CLAY: CL. (continued)										
			-13 -14 -15 -16 -17 -18		CL									
				18.7 - 30' LEAN CLAY: CL.	CL									
			-31 -32		CL									



				Boring Number 102S						~ ::	Pag	ge 3	of	5
San	nple							PID 10.6 eV Lamp		Soil	Prope	erties		
	Length Att. & Recovered (in)	ıts	eet	Soil/Rock Description				VΕ	ve st.					
r pe	Att	Blow Counts	Depth In Feet	And Geologic Origin For	· (v)	o l	В	.6 e	essiv h (ts	5 t		1		ents
mbe Tyl	ngth sove	ě	oth I	Each Major Unit	USCS	phic 2	ıı ıgraı) 10	npre	istu	uid	stici ex	8	D/ nme
Number and Type	Ler	Blo	Del		n S	Graphic Log	wen Diagram	PIL	Compressive Strength (tsf)	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
				32 - 60' LEAN CLAY: CL.										
			F ,,	32.5' - 33.8' sand (5-10%).										
			_33											
			-											
			34											
			E											
			_35											
			F											
			_36											
			E											
			_37											
			E											
			30											
			_ 39											
			F 39											
			<u>-</u>											
			-40											
			E											
			-41											
			E											
			-42		CL									
			-											
			_43											
			F											
			-44											
			E											
			- -45											
			-											
			_ 46											
			F											
			- -47											
			E-47											
			F											
			48											
			E											
			-49											
			E											
			- 50											
			F											
			_51											
			Ė											
			-52											
			1	1	1		'	ı	1	1	1	1	'	ı



~				Boring Number 102S		1							ge 4	of	5
San	nple								PID 10.6 eV Lamp		Soil	Prop	erties		
	Length Att. & Recovered (in)	ts	et	Soil/Rock Description					v La	é Œ					
ı.	Att.	Blow Counts	Depth In Feet	And Geologic Origin For	S	0		п	.e e	Compressive Strength (tsf)	e i				RQD/ Comments
Type Type	gth	× C	th I	Each Major Unit	C	phi ,		graı	10	npre	istu	uid iit	stici	00	D/ nme
Number and Type	Len	Blo	Dep		USC	Graphic Log	Well	Diagram	PE	Cor	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQ. Coi
				32 - 60' LEAN CLAY: CL. (continued)											
			_53												
			F												
			_54												
			_												
			-55												
			F												
			_ 56												
			- 30		CL										
			<u> </u>												
			- 5 7												
			E												
			_58												
			_												
			-59												
			E												
			-60		_L										
			- 00	60 - 62' LEAN CLAY: CL.											
			-												
			-61		CL										
			E												
			-62	62 - 70' LEAN CLAY: CL.											
			_												
			-63												
			_												
			F 0.												
			- 												
			-65												
			E												
			-66		CL		1								
			-												
			67												
			Ē												
			- -68												
			 												
			F												
			- 69												
			_				1:1	:							
			-70	70 - 71.4' POORLY-GRADED SAND: SP.		1.50	1 :.	$ \cdot $							
			<u> </u>												
			-71		SP										
			E	71.4 - 81.4' LEAN CLAY: CL.											
			_ 72	o <u>Lea ii Oli</u> iii Ol.	CL		1::								



				Boring Number 102S		· · · · · · · · · · · · · · · · · · ·					ge 5	of	5
San	nple						du		Soil	Prope	erties		
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 10.6 eV Lamp	Compressive Strength (tsf)	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
			 	71.4 - 81.4' LEAN CLAY: CL. <i>(continued)</i>	 -			0 01					
			-73 -74 -75 -76 -77 -78 -79 -80	73.5' -75' bgs. No other sand layers observed in boring.	CL								Sand observed 73.5-75 ft bgs
				81.4 - 85.3' CLAYEY SILT ML/CL. 84.1' clay content decreasing with depth.	ML/CL								
				85.3 - 87.5' SILT: ML. 87.5 - 88.6' SILTY CLAY: CL/ML.	ML CL/ML								
				s(CL)g. 90' End of Boring.	s(CL)ç								



													Pag		of	6
	ty/Projec					License/l	Permit/	Monito	ring N	umber		Boring				
	milion					D . D .	111 0						103I		TD 111	
	_	•	Name o	f crew chief (first, last) and Firm		Date Dri	lling St	arted		Da	te Drilli	ng Con	npleted		Drill	ing Method
	on Gre scade E		g				3/7/	2021				3/9/2	021		M	ini Sonic
					Well Name	Final Sta					e Elevat					Diameter
					03D	Fe	et (NA	AVD8	8)	717		eet (N		88)	6	.0 inches
	Grid Or Plane 1			stimated: \square) or Boring Location 1 N, 1,147,526.10 E	n 🗌)/W	La	.t	°	<u>'</u>		Local (Grid Lo]N		
	1/4			· · · · · · · · · · · · · · · · · · ·	, R	Long	<u>o</u>	0	•	"		Fe]S		☐ E Feet ☐ W
Facili				County		State		Civil T	own/C	ity/ or V	Village					<u></u>
				Vermilion]	Illinois		Oakv	vood							
Sar	nple									du		Soil	Prope	erties		
	s (ii)	S	स	Soil/Rock Descrip	otion					Laı	0.0					
စ	Att.	unt	Fe.	And Geologic Orig	in For					eV	ssive (tsf	0		_		ıts
lber Typ	th /	ν Cc	h Ir	Each Major Ur	nit		CS	hic	ram	10.6	pres	sture	id t	icit		meı
Number and Type	Length Att. & Recovered (in)	Blow Counts	Depth In Feet	-		Sn	Graphic Log	Well Diagram	PID 10.6 eV Lamp	Compressive Strength (tsf)	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments	
1	60			0 - 1.2' TOPSOIL: ML/CL, dark	brown (10YR	R 3/3),		 	ৰ্থি ট	 -	0 01					CS= Core
CS	44			sand (0-5%), gravel (0-5%), roots dilatancy, low toughness, low pla			ML/CL	\\		\geq	1.5					Sample
			1.5	1.2 - 15' SILTY CLAY: CL/ML,)	ellowish brov	wn					1.5					
				(10YR 5/4), gray (10YR5/1) mott (0-10%), gravel (0-5%), very stiff	ling (5-10%),	sand										
			-3.0	medium toughness, medium plas		, iow to					2.5					
			-4.5													
2 CS	60 60										2.75					
			6.0	6' yellowish brown (10YR 5/6) m	ottling (0-5%).										
			E								3					
			—7.5 [
							CL/ML									
			- 9.0								3					
3	60		E													
cs	60		<u> </u>													
			E								2.75					
			<u> </u>													
			- 								3.25					
			<u> </u>								0.20					
			1.50													
4	24		<u>-</u> 15.0	15 - 17' LEAN CLAY: CL, grayis							3.25	16.6	30	15	85.3	SH= Shelby
SH	18		- 	/2), sand (5-15%), silt (25-30%), moist.	high plasticity	у,	CL									Tube
_			<u> </u>				L									
5 CS	96 96		-	17 - 20' SILTY CLAY: CL/ML, y (10YR 5/4), gray (10YR5/1) mott	ellowish brow lina (5-10%).	vn sand										
			18.0	(0-10%), gravel (0-5%), very stiff	, no dilatancy	, low to	CL/ML									
			L 10.5	medium toughness, medium plas	ucity, moist.		CL/IVIL				2.5					
1	 		 19.5													
I here	by certif	y that t	the info	ormation on this form is true and cor	rect to the bes	st of my k	nowled	lge.		•	•	•	•	•		
Signa	•		11		Firm Ramb	•		-					Tel:	(414)	837-36	607
		li q	The same		7. Florida	Street,	Milwau	ıkee,W	I 5320	4			(414)			

Template: RAMBOLL_IL_BORING LOG - Project: 845_VERMILION_2021 (2).GPJ



				Boring Number 103D						Pag		of	6
Sar	nple						dun		Soil	Prope	rties		
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 10.6 eV Lamp	Compressive Strength (tsf)	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
6 CS 7 SH 8 CS	60 60 60 24 24 24 96 96		-21.0 -22.5 -24.0 -25.5 -27.0 -28.5 -31.5 -33.0	20 - 36.1' LEAN CLAY: to SILTY CLAY: CL, gray (10YR 5/1), sand (0-10%), gravel (0-5%), stiff to very stiff, slow to no dilatancy, low toughness, medium plasticity, moist.	CL			2.5 2.25 1.75 1.75 2.25					
9 CS	120 120		-34.5 -36.0 -37.5 -39.0 -40.5 -42.0 -45.0 -46.5	36.1 - 36.3' POORLY-GRADED GRAVEL WITH SILT AND SAND: (GP-GM)s, gray (10YR 5/1), subrounded to subangular, loose, wet. 36.3 - 63.7' LEAN CLAY: to SILTY CLAY: CL, gray (10YR 5/1), sand (0-10%), gravel (0-5%), stiff to very stiff, slow to no dilatancy, low toughness, medium plasticity, moist.	GP-GM			1.75 1.75 1.75 2.25 2.25 2.5					
10 CS	120 120		-48.0 -49.5 -51.0 -52.5					2.5					

				Boring Number 103D							Pag		of	6
Sar	nple							amp		Soil	Prope	erties		
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 10.6 eV Lamp	Compressive Strength (tsf)	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
			-54.0 -55.5 -57.0 -58.5	stiff, slow to no dilatancy, low toughness, medium plasticity, moist. (continued)	CL				3.25 3 3.25 2.75					
11 SH	24 24		-60.0 -61.5											
12 CS	36 36		63.0						2.25					
13 CS	60 60		-64.5 -66.0 -67.5	medium sand, loose, wet. 64.1 - 67.8' LEAN CLAY: to SILTY CLAY: CL, gray (10YR 5/1), sand (0-10%), gravel (0-5%), stiff to very stiff, slow to no dilatancy, low toughness, medium plasticity, moist.	∖SM CL				1.5					
14 CS	60 60			67.8 - 73.3' SILT: ML, gray (10YR 5/1), sand (0-5%), stiff, slow dilatancy, low toughness, non-plastic, moist to wet.	ML				1.25					
15 CS	60 60		73.5 75.0 76.5	(10YR 5/1), sand (0-5%), gravel (0-5%), very stiff, no dilatancy, medium toughness, dry to moist.					3.25 3.25 3.25					
16 CS	60 60		-78.0 -79.5 -81.0 -82.5		CL				3.25 2.75					
17 CS	60 60		84.0 - - - - 85.5						2.25					



				Boring Number 103D						Pag		of	6
San	nple						du.		Soil	Prope	rties		
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 10.6 eV Lamp	Compressive Strength (tsf)	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
18 SH 19 CS	12 12 12 48 48	н		(10YR 5/1), sand (0-5%), gravel (0-5%), very stiff, no dilatancy, medium toughness, dry to moist. (continued) 92.3 - 95.5' POORLY-GRADED SAND: SP, grayish brown (10YR 5/2), rounded to subrounded, fine sand, silt (5-10%), loose, wet.	CL		Н	2.25	13.9	17	7		MC= Modified
21 CS	36 36		90.0 97.5 99.0	(10YR 5/2) to gray (10YR 5/1), olive (5Y 5/3) mottling (5-10%), sand (0-10%), gravel (0-5%), stiff to very stiff, no dilatancy, low to medium toughness, medium plasticity, dry to moist.	<u> CL/M</u> L			4.25					California
22 MC	24 24			(5-10%), sand (0-10%), gravel (0-5%), stiff to very stiff, no dilatancy, low to medium toughness, medium plasticity, dry to moist.				4.25					
23 CS	96 96		103.	5				2.5					
			105. - - - 106.					4.5 4.5					
24	240 240		108. 109.		CL/ML			4.5					
24 CS	240		-111. -112.					4.25					
				5				4.5					
			118. 					4.5					



				Boring Number 103D							Pag	ge 5	of	6
Sar	nple							dun		Soil	Prope	erties		
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 10.6 eV Lamp	Compressive Strength (tsf)	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
			121. 	plasticity, dry to moist. <i>(continued)</i> 0 5	CL/ML				4.5 4.5 4.5 4.5					
25 MC	24 24		130.	130.5 - 131 CLAYEY SAND: SC, gray (10YR 5/1), gravel (30-45%), silt (5-15%), clay (5-15%), medium /		ZAIL				8.9	16	5	5.7	
26 MC	24 24		132. 	131 - 132.5' POORLY-GRADED SAND: SP, grayish brown (10YR 5/2), rounded to subrounded, fine sand, silt (5-10%), loose, wet. 131.8' -132' layer of clay.	SP — — — TSP-SC					15.3	14	7	35.2	
27 CS	72 72								2.5 3 3.25					
28 MC	24 24		- 141.	140.5 - 141' LEAN CLAY: CL, grayish brown (10YR 5/2), silt (15-25%), clay (15-25%), medium / plasticity, dry to moist.	CL CL_					10.8	23	12	12.6	
29 CS	192 192			5 141 - 146.2' LEAN CLAY: CL, gray (10YR 5/1), silt (15-25%), sand (0-5%), gravel (0-5%), stiff to very stiff, no dilatancy, low to medium toughness, medium plasticity, dry to moist. 146.2 - 148.6' POORLY-GRADED SAND WITH SILT: SP-SM, gray (10YR 5/1), subrounded to rounded, fine sand, loose, moist. 148.6 - 150.2' SILT WITH SAND: (ML)s, gray (10YR 5/1), firm, slow dilatancy, low toughness, non-plastic, moist.	CL SP-SM (ML)s				3 2.25 0.75					
			151. 153.	sand (0-10%), gravel (0-5%), stiff to very stiff, no 5 dilatancy, medium to low toughness, medium plasticity, moist to dry.	CL/ML				4					



				Boring Number 103D								Pag	ge 6	of	6
Sar	nple								Lamp		Soil	Prope	erties		
	s (iii)	S	ಕ	Soil/Rock Description					La	9 (
a)	Att.	Counts	Fe	And Geologic Origin For				_	eV eV	ssive (tsf			<u></u>		ıts
lber Typ	gth /	ر د	h Ir	Each Major Unit	CS	hic		ram	10.6	pres ngth	sture	pi .t	icit	0)/ mei
Number and Type	Length Att. & Recovered (in)	Blow	Depth In Feet	-	SD	Graphic	Log	well Diagram	PID 10.6	Compressive Strength (tsf)	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
Ī			 	150.2 - 158' SILTY CLAY: CL/ML, gray (10YR 5/1),	 -					3.5					
			E 154.	sand (0-10%), gravel (0-5%), stiff to very stiff, no dilatancy, medium to low toughness, medium											
			E	plasticity, moist to dry. (continued)			Ⅲ.	.⊟:.		4.25					
			<u>-</u> 156.	0	CL/M	L //		: H		0					
			E					$\exists : 1$							
			L 157.	5						4.25					
30	24		E				Щ								NR= No
NR C	0		<u>-</u> 159.	-											recovery
			E												Core casing dropped to
31	24		- 160.	5 160 - 161' POORLY-GRADED SAND: SP, gray	SP			:目:1							160' below
MC	6		E	(10YR 5/1), subrounded to rounded, fine sand, loose, /wet.	, $-\frac{3}{5}$	1111	П	1							ground surface
22	24		L ₁₆₂ .	0 161 - 163' SILTY SAND: to SANDY SILT: SM.	SM			:=::							(bgs) while collecting
32 MC	24 24		E		Olvi			目:							sample
^			- 163.	5 163 - 163.5' POORLY-GRADED SAND WITH	/ 1 SP-SI	W		· 🗄 : 1			13.8	17	6	81.9	
33 CS	72		E	SILT: SP-SM, gray (10YR 5/1), silt (15-25%), clay (15-25%), medium plasticity, dry to moist.		'									
CS	72		- 165.	0 163.5 - 166.2' LEAN CLAY : to SILTY CLAY : CL,	CL					4.5					
			E	gray (10YR 5/1), sand (5-10%), gravel (0-5%), hard, no dilatancy, medium toughness, medium plasticity,						4.5					
			- 166.	5\dry to moist.	/ CW/										
			E	166.2 - 167' WELL-GRADED SAND: SW, gray (10YR 5/1), subrounded to rounded, gravel (0-5%),	SW					4.5					
			168.	0 loose, wet.	'										
			E	167 - 169.5' LEAN CLAY: to SILTY CLAY: CL, gray (10YR 5/1), sand (5-10%), gravel (0-5%), hard,	CL										
			- 169.	5 no dilatancy, medium toughness, medium plasticity,	/		3.5			4.5					
34 CS	60		E	\dry to moist. \dry 169.5 - 170.3' WELL-GRADED SAND: SW, gray	sw		:::: 111								
CS	60		171.	0\(10YR 5/1), subrounded to rounded, fine to coarse	/					3.5					
			-	sand, gravel (0-5%), loose, wet. 170.3 - 175.5' SILTY CLAY: CL/ML, gray (10YR						3.3					
			- 172.	5 5/1) to dark gray (10YR 4/1), sand (5-10%), gravel											
			F	(0-5%), very stiff to hard, no dilatancy, medium toughness, medium plasticity, dry to moist.	CL/M	4				4.5					
			<u>-</u> 174.	0											
	J		F												
35 MC	24 24		<u>-</u> 175.	5						4.25					
			F		SP										
L			- 177.	0 177' End of Boring.		1.0	1.0								
					1			I		1				l	



												Pag		of	3
	y/Projec milion			ion		License/	Permit/	Monitoring N	umber		Boring	Numb 1035			
				of crew chief (first, last) and Firm		Date Dri	lling S	tarted	Da	te Drill	ng Cor			Drill	ling Method
Jaso	on Gre	er													_
Cas	cade I	Orillin	ng	C W	11 N I	E: 10		5/2021	la c		3/15/2	2021	D		ini Sonic
				Common We				ter Level AVD88)		e Eleva 7.62 F		ΔΛΩ			Diameter 0.0 inches
Local	Grid O	rigin	(e:	stimated: or Boring Location		1		° '	, 1		Grid Lo		,0)		.o menes
State	Plane 1			1 N, 1,147,511.40 E	V	La]N		□E
E 117	1/4	of	1	1/4 of Section , T N, R		Long	g	O 1		7.11	Fe	et [S		Feet W
Facilit	yш			County Vermilion		state Illinois		Civil Town/C Oakwood	ity/ or	Village					
Sar	nple			Verminon		11111018		Cakwood	<u>e</u>		Soil	Prope	erties		<u> </u>
				Soil/Rock Description	on				PID 10.6 eV Lamp			Пор			1
•	od (ii	nnts	Fee	And Geologic Origin					e	sive (tsf)					ts
ber Гуре	th A	, Co	h In	Each Major Unit			CS	hic	10.6	pres	ture	t id	icity		men
Number and Type	Length Att. & Recovered (in)	Blow Counts	Depth In Feet	,			USC	Graphic Log Well Diagram		Compressive Strength (tsf)	Moisture Content	Liquid	Plasticity Index	P 200	RQD/ Comments
			E	0 - 1.2' TOPSOIL: ML/CL, Blind dri	illed to 80 1	feet		1, 4 18 18	4						No sand
			- -1.5	below ground surface. See 103D bond detailed lithology	oring log to	or ,	ML/CL		×						observed during
			- 1.3	1.2 - 15' SILTY CLAY: CL/ML.		/									drilling
			3.0												
			-4.5												
			E												
			6.0												
			Ė												
			- 7.5												
			Ε				CL/MI	-							
			- 9.0												
			10.5												
			10.5												
			L -12.0												
			E 12.0												
			13.5	5											
			15.0	 			<u></u>								
			E				CL								
			16.5				CL								
				17 - 20' SILTY CLAY: CL/ML.											
			18.0				01 /841								
			F 10.5				CL/ML								
			- 19.5) 			<u>L</u>								
I herel	by certi	fy that	the info	ormation on this form is true and correct	t to the bes	st of my k	nowle	dge.							
Signat	ture	1.	AA-	Fi	rm Ramb	oll							(414)		
		li 9	7/6		234 W			Milwaukee,W			OC P		(414)		
							1 empla	ie: KAMBOLL	"IT"RC	KING L	og - Pro	oject: 84	J_VEK	MILION	N_2021 (2).GPJ



				Boring Number 103S								ge 2	of	3
San	nple							dur		Soil	Prop	erties		
	(ii) &	ķ	l t	Soil/Rock Description				'La) e					
. o	Att.	tunc	ı Fe	And Geologic Origin For				6 eV	ssiv ı (ts	ပ		>		nts
Typ	gth ,	Č	th Ir	Each Major Unit	SCS	obiic	ı gran	10.0	npre ngth	stur	it it	ticit	0)/ Ime
Number and Type	Length Att. & Recovered (in)	Blow Counts	Depth In Feet		N S	Graphic Log	well Diagram	PID 10.6 eV Lamp	Compressive Strength (tsf)	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
7			F	20 - 36.1' LEAN CLAY: to SILTY CLAY: CL.			П							
			_21.0											
			 											
			_22.5											
			 											
			24.0											
			E											
			25.5											
			E											
			27.0											
			E .		CL									
			28.5											
			F 30 1											
			30.0											
			F											
			31.5											
			33.0											
			F 33.0											
			34.5											
			- 34.3											
			36.0											
			30.0	36.1 - 36.3' POORLY-GRADED GRAVEL WITH /(SILT AND SAND: (GP-GM)s.	GP-GM	NS 12								
			-37.5	36.3 - 63.7' LEAN CLAY: to SILTY CLAY: CL.										
			E											
			_39.0											
			E											
			40.5											
			<u> </u>											
			42.0											
			-											
			43.5											
			E											
			45.0		CL									
			E											
			46.5											
			F											
			48.0											
			F 40.5											
			49.5											
			51.0											
			51.0											
			- -52.5											
			32.3											
			1		I			l	I	l	I	1	I	



				Boring Number 103S								ge 3	of	3
Sar	nple							dun		Soil	Prop	erties	I	
	Length Att. & Recovered (in)	ıts	eet	Soil/Rock Description				PID 10.6 eV Lamp	ve sf)					
er /pe	Att ered	Cour	In F	And Geologic Origin For	S	. <u>2</u>	٤	 6 e	cessi th (t	ıre	١.	ity		ents
Number and Type	ength	Blow Counts	Depth In Feet	Each Major Unit	SC	Graphic Log	Well	D 10	Compressive Strength (tsf)	Moisture Content	Liquid	Plasticity Index	P 200	RQD/ Comments
Z G	7 %	<u>B</u>	t	36.3 - 63.7' LEAN CLAY: to SILTY CLAY: CL.	D	5 1	≥ 2	PI I	<u> 7 %</u>	ΣŬ	<u> </u>	I I	Д.	జై ర
			54.0	(continued)										
			- -55.5											
			E 33.3											
			57.0											
			_											
			58.5		CL									
			60.0											
			E 00.0											
			61.5											
			63.0											
			64.5	63.7 - 64.1' SILTY SAND: to SANDY SILT: SM. 64.1 - 67.8' LEAN CLAY: to SILTY CLAY: CL.	SM	HHH								
			- 04.3	04.1-07.0 LEAN CLAT: 10 SILTY CLAT: CL.			1							
			66.0		CL									
			-67.5	67.8 - 73.3' SILT: ML.										
			69.0	7.0 70.0 GIET. ME.										
			E 09.0											
			70.5		ML									
			E											
			72.0											
			73.5	73.3 - 80' LEAN CLAY: to SILTY CLAY: CL.	L									
			- 73.3	75.5 - 60 LEAN CLAT, 10 SILTY CLAT, CL.										
			75.0											
			76.5		CL									
			78.0											
			- 70.0											
			79.5											
				80' End of boring.										



SA WL

												Pag		of	9
	y/Projec milion			ion	License/	Permit/	Monito	ring N	umber		Boring	Number 104I			
				f crew chief (first, last) and Firm	Date Dri	lling St	tarted		Da	ite Drilli				Drill	ing Method
	e Gor	-				8						1			
	cade I		ng				2021				3/8/2	021			ini Sonic
				Common Well Name	Final Sta					e Eleva		. I //D.			Diameter
Local	Grid Or	ioin	☐ (es	stimated: or Boring Location	Fe	et (NA	AVD8	8)	7/0	3.24 Fo			(8)	6	.0 inches
				9 N, 1,147,573.87 E E/W	La	ıt	°	<u>'</u>		Locar	JIIG LO]N		□ E
	1/4	of	1	/4 of Section , T N, R	Lon		°	<u> </u>	"		Fe]S		Feet W
Facilit	y ID			1 -	State		Civil T		ity/ or	Village					
	1			Vermilion	Illinois		Oakv	vood	T -		0.11	D.	,•		<u> </u>
Sar	nple								PID 10.6 eV Lamp		Soil	Prope	erties		_
	t. & I (in)	nts	eet	Soil/Rock Description					N I	ive sf)					,,
er ype	h At rerec	Cou	In F	And Geologic Origin For		S	ic i	<u> </u>	0.6	ressi th (1	ure		ity		lents
Number and Type	Length Att. & Recovered (in)	Blow Counts	Depth In Feet	Each Major Unit		SC	Graphic Log	Well Diagram	D O	Compressive Strength (tsf)	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
7 E	120	В		0 - 0.8' SANDY LEAN CLAY: s(CL), very da	ark	D	0 1			ට නි 1.5	20	i i	모면	Ь	≃ C CS= Core
ĊS	120		-	brown (10YR 3/2), very fine to coarse sand, or	gravel	s(CL)									Sample
			-1	(0-5%), low to meidum plasticity, stiff, moist. 0.8 - 20' LEAN CLAY: CL, grayish brown (1)	0YR					3.5					
			_	5/2), silt (15-25%), gravel (5-10%), medium p very stiff to hard, moist.	lasticity,					0.5					
			_2	very sun to nard, moist.											
			_												
			_3							3					
			E												
			-4												
			E												
			_5							4.5					
			Ē							4.5					
			-6												
			F			CL									
			-							4					
			E_8												
			F $$												
			_9												
			þ Í							3.5					
			-10												
2 CS	120 120		- 10	10' gray (10YR 5/1).											
	0		- -11												
			- ''							2					
			_ 12												
I here	ov certif	v that		ormation on this form is true and correct to the be	est of my k	nowled	lge.		1		1		<u> </u>		<u> </u>
Signat	-			F:			0					Tel:	(414)	837-36	607
		<u></u>	4 11	I I I I I I I I I I I I I I I I I I I									()		

234 W. Florida Street, Milwaukee, WI 53204 Fax: (414) 837-3608
Template: RAMBOLL_IL_BORING LOG - Project: 845_VERMILION_2021 (2).GPJ

				Boring Number 104D							Pag	ge 2	of	9
Sar	nple							dun		Soil	Prope	rties		
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 10.6 eV Lamp	Compressive Strength (tsf)	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
			-13 14 15 16 17 18 19	0.8 - 20' LEAN CLAY: CL, grayish brown (10YR 5/2), silt (15-25%), gravel (5-10%), medium plasticity, very stiff to hard, moist. (continued)	CL				2 2.5 2 2.5					
3 CS	120 120		-20 -21 -22 -23 -24 -25 -26 -27 -28 -29	20 - 21' CLAYEY GRAVEL: GC, moist to wet. 21 - 25.4' LEAN CLAY: CL, grayish brown (10YR 5/2), silt (15-25%), fine to coarse gravel (5-10%), medium plasticity, very stiff to hard, moist. 25.4 - 27.5' CLAYEY SILT ML/CL, grayish brown (10YR 5/2), low plasticity, moist.	GC CL ML/CL				2 2.5 2 2.5					
4 SH	24 24		-30 -31 -32	30 - 32' LEAN CLAY: CL.	CL									SH= Shelby Tube



			Boring Number 104D							Pag	ge 3	of	9
Sample							dun		Soil	Prope	rties		
Number and Type Length Att. & Recovered (in)	Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	JSCS	Graphic Log	Vell Siagram	PID 10.6 eV Lamp	Compressive Strength (tsf)	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
Pand Type and Type 25 C C C C C C C C C C C C C C C C C C	Blox	-33 -34 -35 -36 -37 -38 -39 -40 -41 -42 -43 -44 -45 -45 -46 -47 -48 -49 -50	32 - 37' LEAN CLAY: CL, gray (10YR 5/1), silt (15-25%), fine to coarse gravel (5-10%), low plasticity, very stiff. 37 - 37.5' SILT: ML. 37.5 - 38.5' LEAN CLAY: CL, gray (10YR 5/1), silt (15-25%), fine to coarse gravel (5-10%), low plasticity, very stiff. 38.5 - 39.5' SILT: ML. 39.5 - 40' LEAN CLAY: CL, gray (10YR 5/1), silt (15-20%), fine to coarse gravel (5-10%), low plasticity, very stiff. 40 - 60' LEAN CLAY: to SILTY CLAY: CL, gray (10YR 5/1) to dark gray (10YR 4/1), gravel (5-10%), low plasticity, hard.	S D CL CL CL	Goral Cores	Wel Diag	CIId	2.5 2.5 3.5 4.5 4.5 4.5	Moi Con Con	Liqu Liqu Limit Liqu Liqu Liqu Liqu Liqu Liqu Liqu Liqu	Plas Inde	P 20	RQI Con
Ц													



				Boring Number 104D							Pag		of	9
Sar	nple							dun		Soil	Prope	erties		
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 10.6 eV Lamp	Compressive Strength (tsf)	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
			53 54 55 56 57 58	40 - 60' LEAN CLAY: to SILTY CLAY: CL, gray (10YR 5/1) to dark gray (10YR 4/1), gravel (5-10%), low plasticity, hard. (continued)	CL				4.5 4.5 4.5					
7 MC	24 24		-60 -61	60 - 62' LEAN CLAY: to SILTY CLAY: CL.	CL									MC= Modified California
8 CS	96 96		-62 -63 -64	62 - 70' LEAN CLAY: to SILTY CLAY: CL, gray (10YR 5/1) to dark gray (10YR 4/1), gravel (5-10%), low plasticity, hard.					4.5					
			65 66 67		CL				4.5					
9 CS	120 120		-68 -69 -70 -71	70 - 75.6' SANDY SILT: s(ML), dark gray (10YR 4/1), fine sand, clay (5-10%), wet, fine sand seams (0-5%).	s(ML)				4.5					



				Boring Number 104D							Pag	ge 5	of	9
Sar	nple							dun		Soil	Prope	erties		
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 10.6 eV Lamp	Compressive Strength (tsf)	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
10 CS	120 120		-73 74 75 76 77 78 80 81	70 - 75.6' SANDY SILT : s(ML), dark gray (10YR 4/1), fine sand, clay (5-10%), wet, fine sand seams (0-5%). <i>(continued)</i> 75.6 - 80.6' POORLY-GRADED SAND WITH SILT : SP-SM, gray (10YR 5/1), fine sand, wet. 80.6 - 82.4' SILT : ML, gray (10YR 5/1), sand (0-5%), wet.	s(ML) SP-SM									
11	24			83.5 - 84.1' SILTY SAND: SM, gray (10YR 5/1), medium sand, wet. 84.1 - 85.5' SILTY CLAY: CL/ML, dark gray (10YR 5/2), gravel (0-5%), low plasticity, hard. 85.5 - 87.6' SILTY SAND: SM, gray (10YR 5/1), sand, moist to wet. 87.6 - 88.6' SILTY CLAY: CL/ML, dark gray (10YR 4/1), gravel (0-5%), low plasticity, hard. 88.6 - 90' SILT: ML, gray (10YR 5/1), fine sand (0-10%), moist to wet.	SM CL/ML SM CL/ML									
MC	24 24		-91 -92		CL									



				Boring Number 104D								ge 6	of	9
Sar	nple							dur		Soil	Prope	rties		
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	Wen Diagram	PID 10.6 eV Lamp	Compressive Strength (tsf)	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
Number and Type	15 Lengt 16 19 19 19 19 19 19 19 19 19 19 19 19 19	Blow		92 - 148.1' LEAN CLAY: to SILTY CLAY: CL, dark gray (10YR 4/1), low plasticity, hard, dry.	OS N CL	Graph Log Well	Diagr	1 CIIA	4.5 4.5 4.5 4.5 4.5 4.5	Moist Conte	Liqui Limit Limit	Plasti. Index	P 200	RQD/ Comm
13 CS	240 240		-110 -1110 -1111 -1112						4.5					



	-			Boring Number 104D	1				1		Pag	ge 7	of	9
Saı	nple							du		Soil	Prope	rties		
	% (ii)	ts	ह	Soil/Rock Description				/ La	9 (T					
_ e	Att.	onu	n Fe	And Geologic Origin For			п	6 eV	ssiv 1 (ts	<u>ရ</u>		<u> </u>		uts
nbe ₁	gth	Blow Counts	Depth In Feet	Each Major Unit	SCS	phic .	ıı gran	PID 10.6 eV Lamp	npre	istur	uid nit	sticil ex	00	D/ Dime
Number and Type	Length Att. & Recovered (in)	Blo	Dep		S N	Graphic Log	wen Diagram	PID	Compressive Strength (tsf)	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
			_	92 - 148.1' LEAN CLAY: to SILTY CLAY: CL, dark gray (10YR 4/1), low plasticity, hard, dry. <i>(continued)</i>										
			_ 113	g , (, , p , , , , , ,										
			- 113						4.5					
			- -114											
			- 114											
			- 115											
			-115						4.5					
			- ,,,											
			-116											
			-											
			-117						4.5					
			F											
			118											
			F											
			-119 -						4.5					
			F											
			120											
			-											
			121						4.5					
			-											
			122		CL									
			_123						4.5					
			-											
			124 											
			125						4.5					
			-126											
			F											
			-127						4.5					
			- 120											
			-128											
			120											
			-129 -						4.5					
14 CS	240 240		130											
CO	240													
			-131 -						4.5					
			- -132											
-	1		132		I	1 1		I	1	l	I			l



				Boring Number 104D								ge 8	of	9
Sar	mple							du		Soil	Prope	rties		
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	wen Diagram	PID 10.6 eV Lamp	Compressive Strength (tsf)	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
<u> </u>		Щ	-	92 - 148.1' LEAN CLAY: to SILTY CLAY: CL, dark				<u>н</u>	0 %	20	пп	F		
			-133 -134	gray (10YR 4/1), low plasticity, hard, dry. (continued)					4.5					
			-135 -136 -137						4.5					
			-138 -139						4.5					
					CL									
			142						4.5					
			-143 - - -144						4.5					
			145 146 						4.5					
			147 - - - - 148	147.3' layer of fine sand, wet (1" thick). 148.1 - 150' POORLY-GRADED SAND: SP, fine					4.5					
15	120		149 	to medium sand, gravel (0-5%), wet. 149.1' -149.4' layer of silty clay. 150 - 154.9' LEAN CLAY: to SILTY CLAY: CL,	SP				4.5					
15 CS	120		-151 -152	dark gray (10YR 4/1), low plasticity, hard.	CL				4.5					



				Boring Number 104D							Pag	ge 9	of	9
Sar	nple							duue		Soil	Prope	erties		
	Length Att. & Recovered (in)	ınts	Feet	Soil/Rock Description And Geologic Origin For				PID 10.6 eV Lamp	sive (tsf)					,so
Number and Type	gth Ai	Blow Counts	Depth In Feet	And Geologic Origin For Each Major Unit	CS	hic	ram	10.6	Compressive Strength (tsf)	Moisture Content	id t	Plasticity Index	0	RQD/ Comments
Num and 7	Leng	Blow	Dept	·	N S	Graphic Log	Well Diagram	PID	Com	Mois Cont	Liquid Limit	Plastic Index	P 200	RQE
			-	150 - 154.9' LEAN CLAY: to SILTY CLAY: CL, dark gray (10YR 4/1), low plasticity, hard.										
			_ 153	(continued)					4.5					
			-		CL				4.5					
			154											
			155											
			-155	154.9 - 155.6' POORLY-GRADED SAND: SP, wet.	SP				4.5					
			_ 156	155.6 - 158.8' LEAN CLAY: to SILTY CLAY: CL, dark gray (10YR 4/1), low plasticity, hard.										
			<u> </u>											
			157	157.1' layer of fine sand, wet.	CL				4.5					
			1.50											
			158 											
			□ 159	158.8 - 160' POORLY-GRADED SAND WITH					4.5					
			_	SILT: SP-SM, gray (10YR 5/1), very fine to fine sand, clay (0-10%), wet.	SP-SN				4.5					
16 CS	120		160	160 - 170' LEAN CLAY: to SILTY CLAY: CL, dark										
CS	120		_ 161	gray (10YR 4/1), fine to coarse gravel (0-10%), low plasticity, hard.										
			- 101						4.5					
			-162											
			_											
			163						4.5					
			_											
			-164 -											
			_ 165											
			_		CL				4.5					
			166											
			_											
			- 167						4.5					
			- -168											
			_											
			169						4.5					
			<u> </u>						1.5					
L			-170	170' End of Boring.	+	///								



													Pag		of	5
	y/Projeo milion			ion		License/l	Permit/	Monito	ring N	umber		Boring				
				f crew chief (first, last) and Firm		Date Dri	lling St	tarted		Da	te Drill	ing Cor	1049		Drill	ing Method
•	e Gor	•	variie o	r crew enter (mst, tast) and 1 mm		Date Dir	illig 5	iarica			ic Dilli	ing Cor	приссе			ing iviction
	cade I		ıg				3/15	/2021				3/15/2	2021		M	ini Sonic
				Common Well Na	me	Final Sta					e Eleva					Diameter
Lagal	C::1 O	ما ما ما		stimated:) or Boring Location		Fe	et (N	AVD8	8)		3.10 Follocal C			38)	6	.0 inches
				stimated: or Boring Location N, 1,147,579.42 E E/W		La	t	°	<u> </u>	"	Local	JIIQ LO]N		
	1/4			/4 of Section , T N, R		Long	g	o	<u> </u>	"		Fe]s		☐ E Feet ☐ W
Facilit				County		State		Civil T		ity/ or `	Village					
				Vermilion]	Illinois		Oakv	vood							
Sar	nple									dun		Soil	Prop	erties		_
	Length Att. & Recovered (in)	ıts	eet	Soil/Rock Description						PID 10.6 eV Lamp	ve St.					
r pe	Att	Jone	In F	And Geologic Origin For			S	ွ	8	.6 e	essiv th (ts	it i		ity		ents
Number and Type	ngth cove	Blow Counts	Depth In Feet	Each Major Unit			SC	Graphic Log	Well Diagram) 5	Compressive Strength (tsf)	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
Z ug	Re Le	Ble	Ď				Ď	Grap	Well		S 5	≱ ర	<u> </u>	Pig Inc	P 2	≥ 3
			Ė	0 - 0.8' SANDY LEAN CLAY: s(CL), BI 70 feet below ground surface. See 104D	ına aı borir	rillea to ng log	s(CL)									
			<u>-</u> 1	for detailed lithology 0.8 - 20' LEAN CLAY: CL.			 ` ´									
			Ė	0.6 - 20 LEAN CLAT. CL.												
			_2													
			-													
			-													
			_ 5													
			-													
			-													
			- 6													
			<u> </u>				CL									
			- 7													
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			F													
			-10													
			-													
			-11													
			E													
			- -12													
I herel	by certif	fy that	the info	ormation on this form is true and correct to the	he be	st of my k	nowled	dge.		•	•	•	•	•	•	
Signat	-	-		Firm									Tel:	(414)	837-36	507
		>>	M	1 6		Florida !	Street	Milwan	ikee W	T 5320	4			(414)		

Template: RAMBOLL_IL_BORING LOG - Project: 845_VERMILION_2021 (2).GPJ



				Boring Number 104S						Pag	ge 2	of	5
San	nple						dw		Soil	Prope	rties		
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 10.6 eV Lamp	Compressive Strength (tsf)	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
				0.8 - 20' LEAN CLAY: CL. (continued)									
			-13 -14 -15 -16 -17 -18		CL								
			-20		<u> </u>	126/209							
				20 - 21' CLAYEY GRAVEL: GC.	GC	00000							
			-21	21 - 25.4' LEAN CLAY: CL.									
					CL								
			26 27	25.4 - 27.5' CLAYEY SILT ML/CL.	ML/CL								
				27.5 - 30' SILT: ML.	ML								
			-30 -31 -31 -32	30 - 32' LEAN CLAY: CL.	CL								



				Boring Number 104S								ge 3	of	5
Sar	nple							dun		Soil	Prope	erties		
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 10.6 eV Lamp	Compressive Strength (tsf)	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
			_	32 - 37' LEAN CLAY: CL.										
			-34 -35 -36		CL									
			_37	37 - 37.5' SILT : ML.										
			E . !	37.5 - 38.5' LEAN CLAY: CL.	<mark>_ ML</mark> _									
			_38		CL									
			39	38.5 - 39.5' SILT: ML.	ML									
			-40	39.5 - 40' LEAN CLAY: CL.										
			-41 -42 -43 -44 -45 -46 -47 -48 -49 -50 -51	40 - 60' LEAN CLAY: to SILTY CLAY: CL.	CL									



				Boring Number 104S						Pag	ge 4	of	5
San	nple			<i>6</i> - <i>5</i> · · · ·			dt		Soil	Prope	erties		
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 10.6 eV Lamp	Compressive Strength (tsf)			Plasticity Index	P 200	RQD/ Comments
	ПН		-	40 - 60' LEAN CLAY: to SILTY CLAY: CL.				0 01	7 0		H		<u> </u>
			53 54 55 56 57 58 59 60	(continued) 60 - 62' LEAN CLAY: to SILTY CLAY: CL.	CL								
			-										
			-62 -63	62 - 70' LEAN CLAY: to SILTY CLAY: CL.									
			-64 65 66 67 68 69 70		CL								
			-71 -72	70 - 74' LEAN CLAY : CL.	CL								



				Boring Number 104S		·					ge 5	of	5
San	nple						dui		Soil	Prope	erties		
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 10.6 eV Lamp	Compressive Strength (tsf)	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
			E	70 - 74' LEAN CLAY: CL. (continued)									
					CL								
			-74 -75 -75	74 - 76' POORLY-GRADED SAND: ML, fine to medium sand.	ML								
			76 77	76 - 77.6' SILT: ML, wet.	ML								
				77.6 - 78.8' POORLY-GRADED SAND: ML, fine to medium sand, silt (5-15%).	ML								
			-79 - - -80	78.8 - 80' SILT WITH SAND: ML.	ML								
				80 - 84' POORLY-GRADED SAND: SP, fine to medium sand. 83' fine sand.	SP								
			84 85	84 - 86' SILT WITH SAND: ML, wet.	ML								
				86 - 88.5' LEAN CLAY: CL.	CL								
			-89 90	88.5 - 90' SILT WITH SAND: ML, dry.	ML								
				90' End of Boring.									



													Pag		of	9
	y/Projec milion			ian		License/	Permit/	Monitor	ing Nu	ımber		Boring	Number 1051			
				f crew chief (first, last) and Firm		Date Dri	lling St	arted		Dat	te Drilli	ng Con	105I		Drill	ing Method
	on Gre	-	variie o	refer effer (first, fast) and r first		Bate Bil	imig 5	ar toa		Bui	C Dillii	ng con	приссе			mg wemou
	cade I		g					2021				3/6/2	021			ini Sonic
					Well Name	Final Sta					Elevat					Diameter
Local	Grid Or	rigin	☐ (es	stimated:) or Boring Location	05D	Fe	et (N	AVD88	5)	698	1.46 Fe	eet (N. Brid Lo		(8)	6	.0 inches
)/W	La	t	0	<u> </u>		Local	JIIG LO] N		□ E
	1/4	of	1	1/4 of Section , T N	I, R	Long	g	0	<u> </u>			Fe]s		Feet W
Facilit	y ID			County		State		Civil To		ty/ or V	/illage					
	1			Vermilion		Illinois		Oakw	ood	_		0.11	D.	,.		
Sar	nple									PID 10.6 eV Lamp		Soil	Prope	erties		_
	Length Att. & Recovered (in)	nts	eet	Soil/Rock Descri						N	ive tsf)					
er ype	h At erec	Cou	In	And Geologic Orig Each Major U			S	ic	am	0.6	ress gth (1	ure		city		nents
Number and Type	Length Att. Recovered (Blow Counts	Depth In Feet	Each Major Of	mı		SC	Graphic Log	Well Diagram	□ 1	Compressive Strength (tsf)	Moisture Content	Liquid Limit	Plasticity Index	200	RQD/ Comments
7 E	7 & 60	В		0 - 0.4' ASH.			(FILL)	9 1	<u>≯ ∩</u>		O 20	2 0	7 7	P H	Ь	≥ C Drilled 7"
ĊS	36		F	0.4 - 5' FILL, GRAVELLY SILT			<u>ASH</u>	0+0+0+								override
			-1	(10YR 4/3), angular, gravel, clay non-plastic, moist.	(10-30%),			0+0+0+0								casing to 15' below
			_	non places, moles.				0+0+0+0								ground surface
			-2					0+0+0+0								(bgs)
			_				(FILL)	0+0+0+0								
			_3				g(ML)	0+0+0+0								
			_					0+0+0+0								
			-4					0+0+0+0								
			_					0+0+0+0 -0+0+0+								
2	60		_5	5 - 9.5' FILL, GRAVELLY SILT		dark		0+0+0+ 0+0+0+ 0+0+0+								CS= Core
2 CS	48		L	gray (10YR 3/1), clay (5-15%), s	and (5-10%),	, ash		0+0+0+0 -0+0+0+								Sample
			-6	and slag-like material, non-plasti	c, moist.			0+0+0+0 0+0+0+0								
			_					0+0+0+0 -0+0+0+ 0+0+0+0								
			- 7	7' black (10YR 2/1).			(FILL)	-0+0+0+ 0+0+0+0 -0+0+0+								
			_	7 black (1011(2/1).			g(ML)	0+0+0+0 -0+0+0+ 0+0+0+0								
			-8					+0+0+0+ 0+0+0+0 -0+0+0+								
			E					0+0+0+0 -0+0+0+ 0+0+0+0								
			_9					10+0+0+0 10+0+0 10+0+0+								
			E	9.5 - 10' LEAN CLAY: CL, gray	(10VD 5/1)	cilt		0+0+0+0			2					
2	24		-10	\setminus (5-15%), very stiff, medium plast	icity, moist.		_CL_									SH= Shelby
3 SH	24		E	10 - 12.												Tube
			-11													
			Ē													
			- 12	<u> </u>	<u> </u>		<u> </u>									
I herel	by certif	y that t	the info	ormation on this form is true and cor	rect to the be	st of my k	nowled	ige.								
Signat	ure	li q	AA-		Firm Raml	boll								(414)		
		In 9	46			/. Florida	Street,				DING L	2C P		(414)		508

Template: RAMBOLL_IL_BORING LOG - Project: 845_VERMILION_2021 (2).GPJ

				Boring Number 105D								ge 2	of	9
San	nple							dun		Soil	Prope	rties		
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 10.6 eV Lamp	Compressive Strength (tsf)	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
4 CS	60 0		_	12 - 17' No Recovery.										
			13 -14 -15 -16											
5 CS	36 36		—17 —18 —19	17 - 20' LEAN CLAY: CL, gray (10YR 6/1), gravel (5-10%), firm to stiff, high plasticity, moist.	CL				0.5					
6 CS	60 60		20 21 21 22	20 - 30' LEAN CLAY: CL, pale brown (10YR 6/3), silt (10-20%), hard, low plasticity, moist.					4.5					
7 CS	60 60		23 24 25	24' dark gray (10YR 4/1). 25' gravel (0-5%).	CL				4.5					
			26 27 28 29						4.5 4.5 4.5					
8 MC	24 24		-30 -31 -32	30 - 32' Advanced Modified California sample.										MC= Modified California



				Boring Number 105D								ge 3	of	9
Sar	nple							dua		Soil	Prope	rties		
So So 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 10.6 eV Lamp	Compressive Strength (tsf)	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
9 CS	36 36		_	32 - 55.4' LEAN CLAY: CL, dark gray (10YR 4/1), silt (10-20%), gravel (5-15%), hard, low plasticity, moist.										
			33	moist.					4.5					
10 CS	60 60		-35 - -36						4.5					
									4.5					
			38						4.5					
			39											
11 CS	60 60		-40 - - -41	40' very stiff to hard.					2					
			-42 -43		CL				4.5					
12	60		-44 -45						3.5					
12 CS	60 60		-46 -47											
			48						3					
13 CS	60 60		-49 -50						3					
			51 52						1					



				Boring Number 105D								ge 4	of	9
Sar	nple							dun		Soil	Prope	erties		
	(ii) &	ts	t c	Soil/Rock Description				PID 10.6 eV Lamp	e (t					
e r	Length Att. & Recovered (in)	Blow Counts	Depth In Feet	And Geologic Origin For				6 e/	ssiv 1 (ts	9		57		nts
nber Typ	gth	× C	th L	Each Major Unit	CS	phic 1	gran	10.	npre ngth	stur	bit it	ticit	00	D/ nme
Number and Type	Len	Blo	Dep		S O	Graphic Log Well	Diagram	FE	Compressive Strength (tsf)	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
			_	32 - 55.4' LEAN CLAY: CL, dark gray (10YR 4/1), silt (10-20%), gravel (5-15%), hard, low plasticity,					3.5					
				moist. (continued)										
			-53						2.5					
			E		CL									
			54											
			F											
14	60		_55						3.5					
14 CS	60		F	55.4 - 56' CLAYEY GRAVEL: GC, gray (10YR		60 0								
			_56	5/1), rounded, fine to coarse gravel, loose, moist to wet.	GC	00000								
			E	56 - 60' LEAN CLAY : CL, gray (10YR 5/1), gravel										
			- -57	(5-15%), hard, high plasticity, moist. 56.6' - 56.8' layer of fine gravel, wet.										
			E	30.0 - 30.5 layer of fine graver, wet.					4					
			- -58											
			F		CL									
			_ 59											
			F 37						4.5					
			- 60											
15 MC	24 24		-60	60 - 61.75' POORLY-GRADED SAND WITH GRAVEL: (SP)g, gray (10YR 5/1), subrounded,		2 0								
IVIC	24		-	coarse sand, fine gravel, loose, wet.		3.								
٨			-61		(SP)g	D.								
- 1			_	C4 75 701 FAN OLAY, OL (40)(D 5(4) -: 11										
16	24		-62	61.75 - 70' LEAN CLAY: CL, gray (10YR 5/1), silt (10-20%), gravel (5-15%), hard, low plasticity, dry to										
MC	18			moist.										
			-63											
			E											
17	72		-64	64 - 70' LEAN CLAY: CL, gray (10YR 5/1), gravel										
17 CS	72		-	(5-15%), hard, high plasticity, moist.										
			_65						4.5					
			_											
			66		CL									
			E											
			-67		CL				4.5					
			E	67.3' -67.5 layer of fine to coarse sand, moist to wet.	CL				4.5					
			-68	-										
			F											
			F "						3.5					
			-70											
18 CS	60 60		'U	70 - 71' CLAYEY SAND: SC, gray (10YR 6/1), fine sand, loose, moist to wet.										
	00				SC									
			-71	71 - 75' SILTY CLAY: CL/ML, gray (10YR 6/1), gravel (5-15%), hard, low plasticity, moist.										
			F 72	graver (5-15 %), riaru, iow piasticity, moist.	CL/ML									
	7 l		-72							l	I			



				Boring Number 105D							ge 5	of	9
Saı	nple						dua		Soil	Prope	rties		
	Length Att. & Recovered (in)	ıts	eet	Soil/Rock Description			Diagram PID 10.6 eV Lamp	ve Sf)					
r pe	Att	ont	In F	And Geologic Origin For	S	၂ ၂	.6 e	essiv th (ts	re It		ity		ents
Number and Type	ngth	Blow Counts	Depth In Feet	Each Major Unit	SC	Graphic Log Well	Diagram PID 10.6	Compressive Strength (tsf)	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
a S	Le Re	Ble	ದ	74 751 011 TV 01 AV 01 /MI prov (10VD 0(1)	Ď	Grap Log Well		3 5 4.5	≱ రి	Ë Ë	Pla	P 2	≥ 3 ≥ 3
			_	71 - 75' SILTY CLAY: CL/ML, gray (10YR 6/1), gravel (5-15%), hard, low plasticity, moist. (continued)				4.5					
			- 73	(continued)				4.5					
			Ē		CL/ML			4.5					
			- 74										
19	60		- 75	75 - 75.8' SILT: ML, gray (10YR 6/1), moist.				4.5					
19 CS	60		_	70 70.0 GILT: ML, gray (10111 0.1), moise.	ML			7.0					
			- 76	75.8 - 90' LEAN CLAY: CL, gray (10YR 5/1), gravel (5-15%), hard, low plasticity, moist.									
			F	graver (3-13%), flaru, low plasticity, filoist.									
			77					4.5					
			 78										
			 7 9										
			-										
20 CS	60 60		 80										
CS	60		-										
			-81					4.5					
			- -82										
			- 62										
					CL								
								4.5					
			- 84										
21	60		- -85					4.5					
21 CS	60 60		E					4.5					
			_86										
			F										
			87					4.5					
			_										
			 88										
			 89					4.5					
			F										
22 MC	24 24		-90	90 - 92.									
IVIC	24												
			-91 -										
]		- -92		L								
	1 1		1	I	1	1 1	- 1	1	1	1			I



				Boring Number 105D								e 6	of	9
Sar	nple							dun		Soil	Prope	rties		_
S & 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 10.6 eV Lamp	Compressive Strength (tsf)	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
nN 23 CS	Company Compan	BI	93 94 95 96 97	92 - 124.2' LEAN CLAY: CL, gray (10YR 5/1), silt (15-25%), sand (0-5%), gravel (0-5%), very stiff to hard, no dilatancy, medium to high toughness, medium plasticity, dry to moist.	S.A.	To	W. Di.	[Id	2.5 2.5 4.5	M. Co	Lid	Pla Inc	P 2	RC Co
24 CS	240 240			Solo Solo layer or cossico.	CL				4.5					
			-104 105 106 107						4.25					
			-109 110 111						3.75 4.25					
			111						4.5					



				Boring Number 105D							Pag		of	9
Sar	nple							dun		Soil	Prope	rties		
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 10.6 eV Lamp	Compressive Strength (tsf)	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
25 CS	240 240		-113 -114 -115 -116 -117 -118 -119 -120 -121 -122 -123 -124 -125 -126 -127 -128 -129 -130 -131	subrounded, medium sand, gravel (0-5%), loose, wet. 124.6 - 126.4' gray (10YR 5/1), silt (15-25%), sand	CL				4.5 4.5 4.5 4.25 4.25					



Sample Sample	Soil Properties						Boring Number 105D				
			ımp						2	Sam	Sa
126.4 - 137.2' LEAN CLAY: CL. gray (10YR 5/1).	Strength (tst) Moisture Content Liquid Limit Plasticity Index P 200 P 200 Comments	Compressive Strength (tsf)	PID 10.6 eV La	Well Diagram	Graphic Log	SC	And Geologic Origin For	Blow Counts Depth In Feet	Recovered (in)	and Type	Number and Tyne
sili (15-25%), sand (05-9%, grave (05-9%, very stiff to fact, and oxidiators, wedium to high toughness, medium plasticity, dry to moist. (continued) 134 135 136 137 137.2 - 137.8' POORLY-GRADED SAND WITH GRAVEL: (SPi)g, gray (10/Y8 bf.), subrounded to located, medium to searce sand, locate, wed-located, medium plasticity, dry to moist. 139 130 131 137.2 - 137.8' POORLY-GRADED SAND WITH GRAVEL: (SPi)g, gray (10/Y8 bf.), subrounded to located, medium plasticity, dry to moist. 139 130 131 137 137.2 - 137.8' POORLY-GRADED SAND WITH GRAVEL: (SPi)g, gray (10/Y8 bf.), subrounded to located, medium plasticity, dry to moist. 139 130 131 137 138 139 139 140 140 140 140 141 141 141 14	5 5 5 5 5 5 5 5 5 5 6 5 6 7 5 7 7 7 7 7	2.75 2.75 1.5 1.25 2.25				√(SP)g CL SP-SM	137.2 - 137.6' POORLY-GRADED SAND WITH GRAVEL: (SP)g, gray (10YR 5/1), subrounded to round, medium to coarse sand, loose, wet. 137.6 - 138.3' LEAN CLAY: CL, gray (10YR 5/1), silt (15-25%), sand (0-5), gravel (0-5%), very stiff to hard, no dilatancy, medium to high toughness, medium plasticity, dry to moist. 138.3 - 138.7' POORLY-GRADED SAND WITH SILT: SP-SM, gray (10YR 5/1), subrounded to rounded, medium sand, silt (0-5%), clay nodules (0-5%), loose, wet. 138.7 - 160' LEAN CLAY: CL, gray (10YR 5/1), silt (15-25%), sand (0-5%), gravel (0-5%), very stiff to hard, no dilatancy, medium to high toughness,	134 - 135 - 136 - 137 - 138 - 139 - 140 - 141 - 142 - 143 - 144 - 145 - 146 - 147 - 148 - 149 - 150 - 151			



			Boring Number 105D							Pag		of	9
Sample							dur		Soil	Prope	erties		
(ii)	ts	eet	Soil/Rock Description				PID 10.6 eV Lamp	ve E					
r pe Att.	oun	In Fe	And Geologic Origin For	S	ွ	8	.6 e	essiv th (ts	re l		ity		ents
Number and Type Length Att. & Recovered (in)	Blow Counts	Depth In Feet	Each Major Unit	SC	Graphic Log	Well Diagram	D 10	Compressive Strength (tsf)	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
Re Le	Bľ	De	120.7 1001 FAN OLAV. CL 9701/ (10VD F/1) 6:14	'n	Grap	W. Di	PI	သို့	⊻ స	<u> </u>	Pla	P 2	RC Co
		-	138.7 - 160' LEAN CLAY: CL, gray (10YR 5/1), silt (15-25%), sand (0-5%), gravel (0-5%), very stiff to hard, no dilatancy, medium to high toughness,										
		153	medium plasticity, dry to moist. <i>(continued)</i>					2.5					
		-						2.0					
		154											
		-											
		155						2.5					
		-156		CL									
		Ē											
		<u></u> 157						2.5					
		- -158											
		- 136											
		□ 159											
								2.5					
Ц		-160	160' End of Boring.										
			100 Life of Borning.										
ı		' '		1	' '	1	ı	ı	1	ı			



						I						Pag		of	5
	y/Projec milion			ion		License/I	Permit/	Monitoring N	umber		Boring	Number 1058			
				f crew chief (first, last) and Firm		Date Dri	lling St	arted	Da	te Drilli	ng Con			Drill	ing Method
Jaso	n Gre	er					_				_				
Cas	cade I	Drillir	ıg		XX 11 X 1	E: 1.0		/2021	G. C		3/16/2	2021	lp.		ini Sonic
					Well Name 05S	Final Sta		ter Level AVD88)		e Elevat 3.97 Fe		4 Y/D9			Diameter .0 inches
Local	Grid Or	igin	(e	stimated: or Boring Location		1	Ct (INZ	<u> </u>	090		Grid Lo		100)		.0 menes
					E)/W	La	t	<u> </u>	"]N		□ E
T 91:	1/4	of	1		N, R	Long		0 1		Y'11	Fe	et _]S		Feet W
Facilit	y ID			County Vermilion		tate Illinois		Civil Town/Ci Oakwood	ity/ or \	/illage					
San	nple			Verninon	1	IIIIIOIS		Oakwood	_ d		Soil	Prope	erties		
<u> </u>				Soil/Rock Descri	intion				PID 10.6 eV Lamp			Порс	TUCS		-
	tt. &	unts	Fee	And Geologic Ori	-				eV	sive (tsf)					ts
ber Гуре	th A	, Co	h In	Each Major U	_		CS	hic	10.6	pres	sture	bi t	icity		men //
Number and Type	Length Att. & Recovered (in)	Blow Counts	Depth In Feet	,			SO	Graphic Log Well Diagram	<u>,</u> E	Compressive Strength (tsf)	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
			E	0 - 0.4' ASH, Blind drilled to 90	feet below gro	und	(FILL) ASH	T S	1						No sand
			E	surface. See 105D boring log fo		logy/	\ <u>'\\\</u>	0+0+0+0							observed during
			-1		• 9(=).			0+0+0+0 -0+0+0+	X						drilling
								-0+0+0+ 0+0+0+0							
			-2					0+0+0+0 0+0+0+0 -0+0+0+							
							(FILL) g(ML)	-0+0+0+ 0+0+0+0							
			-3				g(IVIL)	0+0+0+ 0+0+0+ -0+0+0+							
			F					0+0+0+ 0+0+0+							
			-4					0+0+0+0 0+0+0+0 -0+0+0+							
			_)+0+0+0 -0+0+0+)+0+0+0							
			_5	5 - 9.5' FILL, GRAVELLY SILT				-0+0+0+ ->+0+0+0 -0+0+0+							
			-		• 9(=).)+0+0+0 -0+0+0+)+0+0+0							
			-6					-0+0+0+ 0+0+0+0 -0+0+0+							
			_					0+0+0+0 -0+0+0+							
			- 7				(FILL)	0+0+0+ 0+0+0+0							
							g(ML)	0+0+0+C							
			-8					-0+0+0+ 0+0+0+0							
			-					0+0+0+ 0+0+0+ -0+0+0+							
			_ 9					-0+0+0+ 0+0+0+0							
			<u> </u>				L	10+0+0+ 10+0+0 10+0+0+							
			-10	9.5 - 17' LEAN CLAY: CL.											
			- 10												
							CL								
			-11												
			-12												
		y that	the info	ormation on this form is true and co			nowled	lge.							
Signat	ure	li.	Aff		Firm Ramb		04	MC11 337	T 6220	4			(414) (414)		
		122	,			. FIORIGA	Templa	Milwaukee,W te: RAMBOLL	IL_BO	t RING LO	OG - Pro				



				Boring Number 105S						~ ••	Pag	ge 2	of	5
Sar	nple							Diagram PID 10.6 eV Lamp		Soil	Prop	erties_		
	Length Att. & Recovered (in)	ıts	eet	Soil/Rock Description				\ \rac{\cappa}{\cappa}	e ve					
r pe	Att	ont	ln F	And Geologic Origin For	S	5	;	.6 e	essiv h (ts	l e t		₹;		suts
mbe Ty	ngth	Blow Counts	Depth In Feet	Each Major Unit	USC	Graphic Log	=	1913 10	mpr	Moisture Content	Liquid Limit	Plasticity Index	8)Q. III
Number and Type	Ler	Blc	De		S D	r F	Well		Compressive Strength (tsf)	သို ပိ	Liquid Limit	Pla Ind	P 200	RQD/ Comments
			_	9.5 - 17' LEAN CLAY: CL. (continued)										
			F 12											
			_13											
			-											
			14											
			F		CL									
			_15											
			_											
			-16											
			E											
			- -17	 										
			F	17 - 20' LEAN CLAY: CL.										
			E 10											
			18											
			-		CL									
			- 19											
			E											
			_20	20 - 32' LEAN CLAY: CL.										
			-											
			-21											
			E											
			-22											
			F											
			F											
			-24											
			-25											
			_											
			_26		CL									
			F											
			_27											
			E											
			-28											
			Ė.											
			-29											
			L 29											
			<u> </u>											
			-30											
			E											
			_31											
			F											
			_32	L			1							



				Boring Number 105S								ge 3	of	5
San	nple							dm	٠	Soil	Prope	erties		
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 10.6 eV Lamp	Compressive Strength (tsf)	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
			_	32 - 55.4' LEAN CLAY: CL.										
			-33 -34 -35 -35 -36 -37 -38 -39 -40 -41 -42 -43 -44 -45 -45 -47 -48 -49 -50 -51		CL									



				Boring Number 105S								ge 4	of	5
San	nple							duı		Soil	Prope	erties		
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 10.6 eV Lamp	Compressive Strength (tsf)	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
			_	32 - 55.4' LEAN CLAY: CL. <i>(continued)</i>										
			53 54 55		CL									
			_	55.4 - 56' CLAYEY GRAVEL: GC.	GC									
			-56	56 - 60' LEAN CLAY: CL.		700								
			57 58 59		CL									
			-60 61	60 - 61.75' POORLY-GRADED SAND WITH GRAVEL: (SP)g.	(SP)g									
			-62 -63	61.75 - 70' LEAN CLAY: CL.										
			64 65	64 - 70' LEAN CLAY: CL.										
			66 66		CL									
			67		CL									
			-68 69											
			 70	70 - 71' CLAYEY SAND: SC.	sc									
			71 	71 - 75' SILTY CLAY: CL/ML.	CL/ML									
			-72			r / '''	😅 ∴							



				Boring Number 105S								ge 5	of	5
San	nple							du		Soil	Prope			
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 10.6 eV Lamp	Compressive Strength (tsf)	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
 			_	71 - 75' SILTY CLAY: CL/ML. (continued)										
			-73 -74 -75		CL/ML									
			-75 -	75 - 75.8' SILT : ML.	ML									
			-76	75.8 - 90' LEAN CLAY: CL.	- IVIL		#::::							
			-78 -77 -78 -79 -80 -81 -82 -83 -84 -85 -86 -87 -88	90' End of Boring.	CL									

APPENDIX B INUNDATION MAP

