Location Restriction Compliance Demonstrations
Contact Water Swale Liner Conversion

I-43 Ash Disposal Facility
Edgewater Generating Station

Prepared for:

Wisconsin Power and Light Company
Edgewater Generation Station
3739 Lakeshore Drive
Sheboygan, Wisconsin 53081

SCS ENGINEERS

25224280.00 | July 17, 2025

2830 Dairy Drive
Madison, WI 53718-6751
608-224-2830

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P.E. CERTIFICATION

7/17/2025

I, Phillip E. Gearing, hereby certify that the location restriction demonstrations prepared for the Contact Water Swale liner conversion the Edgewater I-43 disposal facility meet the requirements in 40 CFR 257.60(a), 61(a), 62(a), 63(a), and 64(a). This certification is based on my review of the Location Restriction Compliance Demonstrations for Contact Water Swale liner conversion prepared by SCS Engineers. I am a duly licensed Professional Engineer under the laws of the State of Wisconsin.

7/17/2025

(signature) (date)

Phillip Gearing

(printed or typed name)

License number E-45115-6

My license renewal date is July 31, 2026.

Pages or sheets covered by this seal:

Entire document

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1.0 INTRODUCTION AND PROJECT SUMMARY

On behalf of Wisconsin Power and Light Company (WPL), SCS Engineers (SCS) has prepared the enclosed Location Restriction Compliance Demonstrations for the Edgewater I-43 Disposal Facility Contact Water Swale Liner (CWS) conversion area as required by 40 CFR 257.60-64.

The I-43 facility includes a closed CCR landfill, which consists of Phase 1 and Phase 2, and an active CCR landfill, which currently consists of an existing CCR unit in Phase 3 and Phase 4. The two landfills are located on the same property but are not contiguous. Phase 1 and Phase 2, which comprise an inactive CCR landfill that closed prior to October 15, 2015, are not the subject of this report.

The active CCR landfill at I-43 includes the following modules:

- Phase 3, Module 1
- Phase 3, Module 2
- Phase 4, Module 1

The modules are managed as a single landfill by the facility and by the Wisconsin Department of Natural Resources. This demonstration addresses the CWS, which will be constructed after October 19, 2015. The new area is contiguous with the Phase 3 and Phase 4 modules, however, will be managed as a separate CCR unit under the CCR rule.

Figure 1 shows the site location. **Figure 2** shows the CWS location.

2.0 LOCATION RESTRICTIONS

§257.60. ***"Placement above the uppermost aquifer."***

> *"(a) New CCR landfills, existing and new CCR surface impoundments, and all lateral expansions of CCR units must be constructed with a base that is located no less than 1.52 meters (five feet) above the upper limit of the uppermost aquifer, or must demonstrate that there will not be an intermittent, recurring, or sustained hydraulic connection between any portion of the base of the CCR unit and the uppermost aquifer due to normal fluctuations in groundwater elevations (including the seasonal high water table). The owner or operator must demonstrate by the dates specified in paragraph (c) of this section that the CCR unit meets the minimum requirements for placement above the uppermost aquifer."*

The uppermost aquifer unit at the site, as defined under 40 CFR 257.53, is the Niagara Dolomite bedrock. This aquifer unit is present throughout Sheboygan County and is a major water supply source in much of Eastern Wisconsin (Skinner and Borman, 1973). A summary of the regional hydrogeologic stratigraphy and a regional geologic cross section are included in **Appendix A**.

Boring logs for groundwater monitoring wells MW-301 through MW-305 and site-specific cross sections showing that the unconsolidated material overlying the dolomite is primarily clay are included in **Appendix A**. A search of publicly available private well logs in the vicinity of the site did not yield any logs indicating that the unconsolidated material is used locally as an aquifer. Private well logs documenting use of the Niagara Dolomite as an aquifer near the site are included in **Appendix A**. Based on a review of the well logs in **Appendix A**, the highest Niagara Dolomite bedrock

aquifer elevation in the vicinity of the site is approximately elevation 605 feet above mean sea level (amsl).

The high groundwater elevation associated with the uppermost aquifer below the CCR landfill is at an approximate elevation of 651.58 to 661.58 feet amsl [maximum range for MW-301 through MW-306 CCR wells], based on a review of groundwater elevations measured in CCR monitoring wells at the CCR landfill, for the period from April 2016 to January 2025 (**Appendix A**). The highest water level elevation measured at a CCR monitoring well associated with the CCR landfill was 661.58 feet amsl recorded at MW-305, which is an upgradient monitoring well located approximately 1,800 feet south of Phase 4 Module 1.

As shown on **Figure 3**, the lowest subbase grade, which represents the top of subbase soils and bottom of the 4-foot-thick clay liner, within the CWS area to the nearest foot is 670 feet amsl. Based on this information, the CWS is located more than 5 feet above the uppermost aquifer.

§257.61 *"Wetlands."*

> *"(a) New CCR landfills, existing and new CCR surface impoundments, and all lateral expansions of CCR units must not be located in wetlands, as defined in §232.2 of this chapter, unless the owner or operator demonstrates by the dates specified in paragraph (c) of this section that the CCR unit meets the requirements of paragraphs (a)(1) through (5) of this section."*

The CWS is not located in wetlands. The location of the CWS is shown on **Figure 2**. The CWS area is currently a manmade swale lined with geomembrane and 4 feet of compacted clay that collects contact water and leachate. A national wetlands inventory map with the CWS location is provided in **Appendix B.**

Historically, a wetland delineation conducted in 2009 (**Appendix B**) identified one wetland ("Wetland 1") within the Phase 3, Module 2 area (**Figure 2**), north of the CWS. WPL received a wetland permit for the permanent filling of Wetland 1 (0.81 acres) from the Wisconsin DNR as required by NR 103, Wisconsin Administrative Code. Through the permitting process, the DNR and WPL determined that construction of Phase 3, Module 2 would have no adverse impact on wetlands as provided in NR 103, and the wetland was removed prior to construction. The CWS will tie-in to the existing Phase 3, Module 2 area.

§257.62 *"Fault areas."*

> *"(a) New CCR landfills, existing and new CCR surface impoundments, and all lateral expansions of CCR units must not be located within 60 meters (200 feet) of the outermost damage zone of a fault that has had displacement in Holocene time unless the owner or operator demonstrates by the dates specified in paragraph (c) of this section that an alternative setback distance of less than 60 meters (200 feet) will prevent damage to the structural integrity of the CCR unit."*

Based on a review of the U.S. Geological Survey (USGS) Quaternary faults database and map as shown in **Appendix C**, the CCR landfill is not located within 200 feet of the outermost damage zone of a fault that has had displacement in Holocene time. In 40 CFR 257.53, Holocene is defined as the most recent epoch of the Quaternary period extending from 11,700 years before present, to present. The USGS map shows that no faults are located in Wisconsin.

§257.63 *"Seismic impact zones."*

"(a) New CCR landfills, existing and new CCR surface impoundments, and all lateral expansions of CCR units must not be located in seismic impact zones unless the owner or operator demonstrates by the dates specified in paragraph (c) of this section that all structural components including liners, leachate collection and removal systems, and surface water control systems, are designed to resist the maximum horizontal acceleration in lithified earth material for the site."

The CCR landfill is not located in seismic impact zones. In 40 CFR 257.53, a seismic impact zone as an area having a 2 percent or greater probability that the maximum expected horizontal acceleration, expressed as a percentage of the earth's gravitational pull (g), will exceed 0.10 g in 50 years. Based on a review of the USGS 2014 Long-Term Model National Seismic Hazard Map (see **Appendix D**), the maximum expected horizontal acceleration for the majority of Wisconsin, including all of Sheboygan County, is less than 0.04 g, below the threshold for a seismic impact zone.

257.64 *"Unstable areas."*

"(a) An existing or new CCR landfill, existing or new CCR surface impoundment, or any lateral expansion of a CCR unit must not be located in an unstable area unless the owner or operator demonstrates by the dates specified in paragraph (d) of this section that recognized and generally accepted good engineering practices have been incorporated into the design of the CCR unit to ensure that the integrity of the structural components of the CCR unit will not be disrupted."

"(b) The owner or operator must consider all of the following factors, at a minimum, when determining whether an area is unstable:

"(1) On-site or local soil conditions that may result in significant differential settling;

As discussed in **Appendices E** and **F**, and as shown by the geologic cross sections from the 1977 Preliminary Site Feasibility Report prepared by Mead & Hunt, Inc. (see **Appendix G**), the CCR landfill is not located in on-site or local soil conditions that may result in significant differential settling. The site soil consists of stiff to very stiff clay till that extend to depths greater than 90 feet. Because the clays are stiff to very stiff, they are not susceptible to appreciable differential settlement that would affect the performance of the landfill.

(2) On-site or local geologic or geomorphologic features; and

As discussed in **Appendices E**, **H**, and **I**, and shown by the geologic cross sections in **Appendix G**, the CCR landfill is not located in on-site or local geologic or geomorphologic features that are unstable. The cross sections show stiff to very stiff clay till that extend to depths greater than 90 feet. These geologic features provide a stable foundation for the CCR landfill.

This assessment is confirmed by the slope stability analyses in **Appendix H** that indicate the slope stability safety factors are acceptable (i.e., safety factors against block or circular failure greater than or equal to 1.3 for interim conditions and greater than or equal to 1.5 for final grade conditions).

(3) On-site or local human-made features or events (both surface and subsurface)."

As shown by the geologic cross sections in **Appendix G**, the CCR landfill is not located in on-site or local human-made features or events (both surface and subsurface) that are unstable. Prior to development of the landfill, the historical site use was agricultural with minimal site disturbance.

As discussed in **Appendix I**, seepage from groundwater or surface water is unlikely to cause instability. The facility is designed with adequate run-on and run-off control systems. Groundwater monitoring wells at the perimeter of the facility show that groundwater hydraulic gradients are downward and therefore groundwater is unlikely to negatively impact the performance of the facility.

3.0 REFERENCES

A. USGS Earthquake Hazards Program - Faults Interactive Map Website: https://www.usgs.gov/programs/earthquake-hazards/faults, Last accessed June 6, 2024.

B. USGS seismic impact zones map reference: Petersen, M.D., Moschetti, M.P., Powers, P.M., Mueller, C.S., Haller, K.M., Frankel, A.D., Zeng, Yuehua, Rezaeian, Sanaz, Harmsen, S.C., Boyd, O.S., Field, E.H., Chen, Rui, Luco, Nicolas, Wheeler, R.L., Williams, R.A., Olsen, A.H., and Rukstales, K.S., 2015, Seismic-hazard maps for the conterminous United States, 2014: U.S. Geological Survey Scientific Investigations Map 3325, 6 sheets, scale 1: 7,000,000, http://dx.doi.org/10.3133/sim3325.

C. Skinner, Earl L. and Ronald G. Borman, Water Resources of Wisconsin-Lake Michigan Basin, Department of the Interior United States Geological Survey Hydrogeologic Investigations Atlas HA-432, 1973.

D. BT^2, Inc., 2008, Plan of Operation, Edgewater I-43 Ash Disposal Facility, Phases 3 and 4.

E. Mead & Hunt, Inc., 1977, Preliminary Site Feasibility Report, Ash Disposal Site, Beeck-Goebel Properties, Wilson Township, Sheboygan County, Wisconsin.

F. SCS Engineers, 2015, Plan Modification, Edgewater Ash Disposal Facility, Town of Wilson, Wisconsin.

G. SCS Engineers, 2025, Plan of Operation Modification Request, Contact Water Swale Liner Conversion, I-43 Ash Disposal Facility, Sheboygan, Wisconsin.

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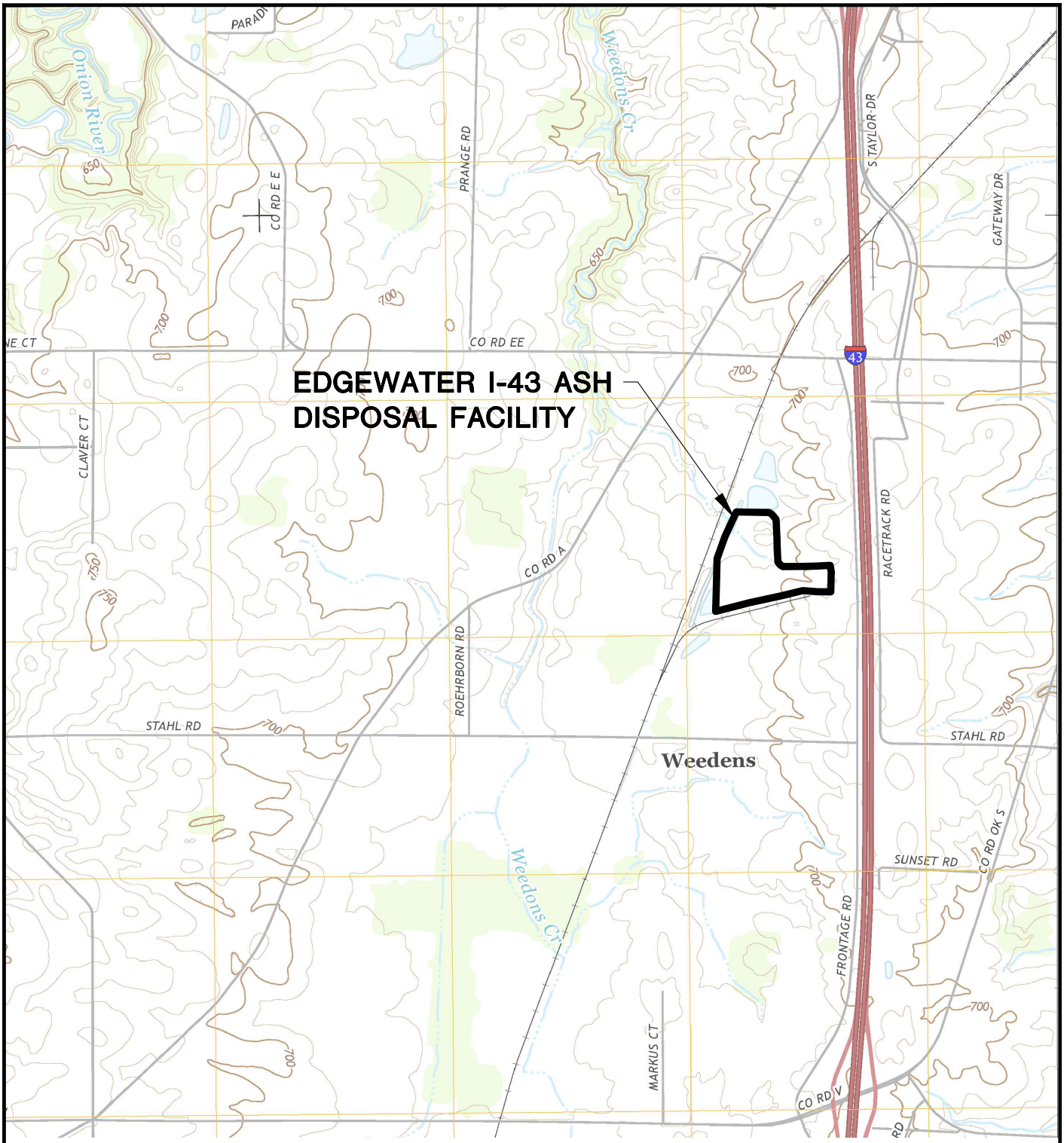
Figures



N

SHEBOYGAN FALLS QUADRANGLE
WISCONSIN–SHEBOYGAN CO.
2015
SCALE: 1" = 2,000'

CLIENT	WISCONSIN POWER AND LIGHT COMPANY EDGEWATER GENERATING STATION 3739 LAKESHORE DRIVE SHEBOYGAN, WI 53081	SITE	LOCATIONAL RESTRICTIONS COMPLIANCE REPORT EDGEWATER I-43 ASH DISPOSAL FACILITY TOWN OF WILSON, WISCONSIN

SITE LOCATION MAP

PROJECT NO.	25224280.00	DRAWN BY:	KP
DRAWN:	07/01/2025	CHECKED BY:	PG
REVISED:	07/08/2025	APPROVED BY:	PG, 7/17/2025

ENGINEER

SCS ENGINEERS
2830 DAIRY DRIVE MADISON, WI 53718-6751
PHONE: (608) 224-2830

FIGURE 1

I:\25224280.00\Drawings\Location Description\Fig 1_Site Location Map.dwg, 7/8/2025 8:24:48 AM

N

200 0 200

SCALE: 1" = 200'

LEGEND

- APPROXIMATE PROPERTY LINE
- APPROVED LIMITS OF WASTE
- PROPOSED LIMITS OF WASTE
- APPROVED MODULE LIMITS
- PROPOSED CONTACT WATER SWALE CONVERSION CONSTRUCTION AREA
- LIMITS OF AREA 1 AND AREA 2 FINAL COVER
- EXISTING INTERMEDIATE COVER AREA
- EXISTING GRADE (2' CONTOUR)
- 690 EXISTING GRADE (10' CONTOUR)
- EDGE OF WATER
- SWALE
- WETLAND
- CULVERT
- MH MANHOLE
- W CONTACT WATER TRANSFER PIPE
- AB ABANDONED 3" DIA. HDPE PIPE
- FM CONTACT WATER FORCEMAIN
- E/I ELECTRIC/INSTRUMENTATION
- OE OVERHEAD ELECTRIC
- UE UNDERGROUND ELECTRIC
- SA SANITARY SEWER
- TREELINE/TREES
- PAVED ROAD
- UNPAVED ACCESS ROAD
- RAILROAD TRACKS
- FENCE
- UTILITY/LIGHT POLE
- CONTROL MONUMENT
- MONITORING WELL
- PIEZOMETER
- LEACHATE VAULT
- LEACHATE CLEANOUT
- LEACHATE HEADWELL
- PRIVATE WATER SUPPLY WELL

NOTES:

1. BASE MAP PREPARED BY KBM, INC. BASED ON AERIAL TOPOGRAPHIC SURVEY FLOWN DECEMBER 1, 2014. BASE MAP PREPARED USING WISCONSIN STATE PLANE COORDINATES. ELEVATIONS BASED ON USGS NATIONAL GEODETIC VERTICAL DATUM, 1929. UPDATED WITH 2015 CONSTRUCTION AS-BUILT GRADES, 2016 CONSTRUCTION AS-BUILT GRADES FOR PHASE 4, MODULE 1 BY SCS ENGINEERS, DECEMBER 23, 2020 DRONE SURVEY OF PHASE 3, MODULE 2 ASH GRADES AND FUTURE PHASE 4 AREAS BY RYAN INCORPORATED CENTRAL, FEBRUARY AND APRIL 2024 PHASE 3 MODULE 2 SURVEYS BY SCS ENGINEERS, AND SEPTEMBER 19, 2024 DRONE SURVEY BY SCS ENGINEERS.
2. CONTOUR INTERVAL IS 2 FEET.
3. MONITORING WELL LOCATIONS BASED ON WELL INFORMATION FORM COORDINATES AND EXISTING CONDITIONS MAP F11 PREPARED BY WARZYN, INC. USING LOCAL COORDINATES.
4. WETLAND LIMITS BASED ON WETLAND DELINEATION REPORT, WISCONSIN POWER AND LIGHT COMPANY, EDGEWATER LANDFILL SITE, TOWN OF WILSON, SHEBOYGAN COUNTY, WISCONSIN, JUNE 25, 2010, NATURAL RESOURCES CONSULTING, INC. (NRC).
5. UTILITY LOCATIONS ARE APPROXIMATE AND NOT ALL UTILITIES ARE SHOWN.

PROJECT NO.	25224280.00	DRAWN BY:	RVG
DRAWN:	07/01/2025	CHECKED BY:	PG
REVISED:		APPROVED BY:	PG, 7/17/25

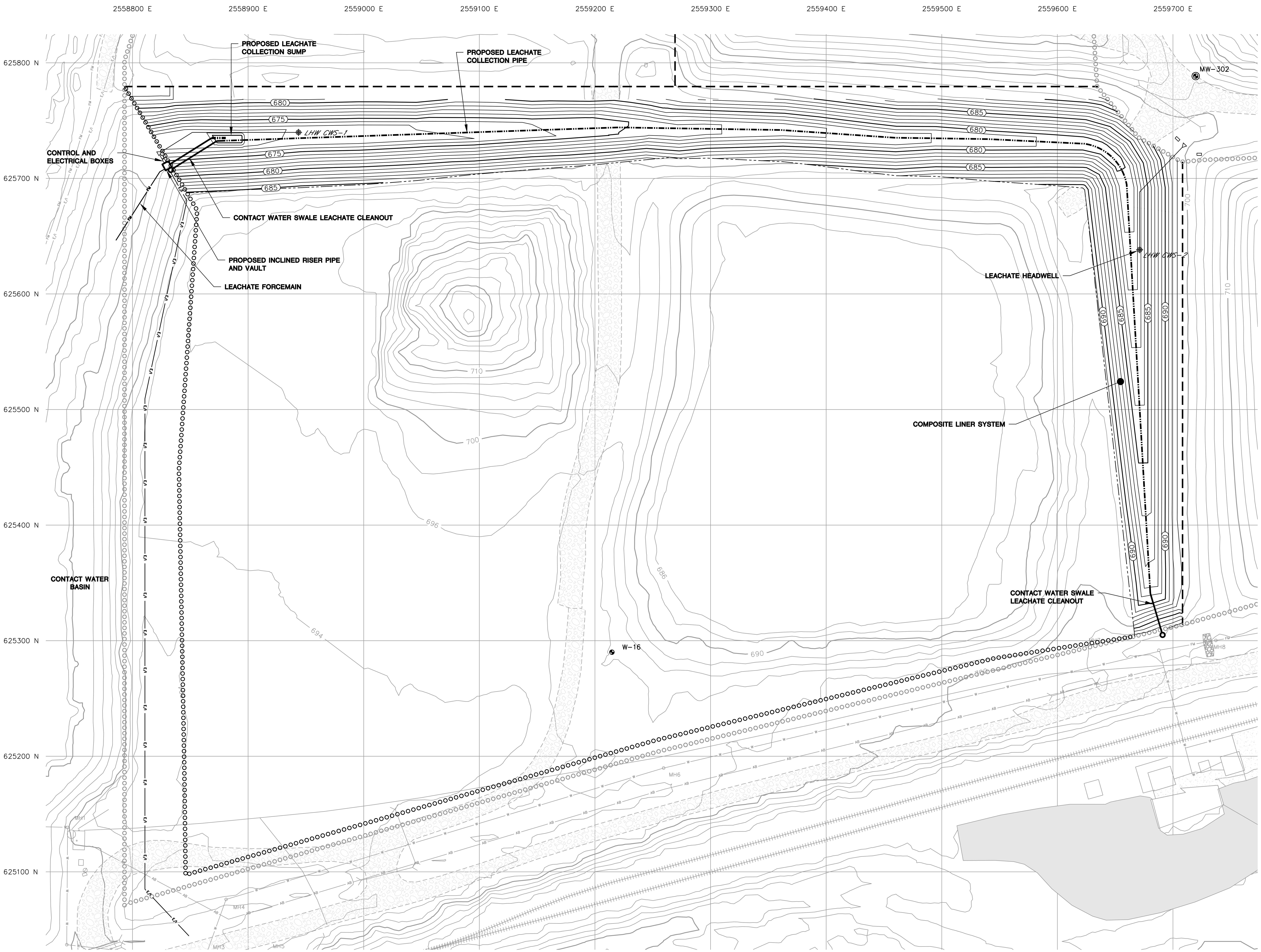
CLIENT: WISCONSIN POWER AND LIGHT COMPANY
EDGEWATER GENERATING STATION
3739 LAKESHORE DRIVE
SHEBOYGAN, WI 53081

ENGINEER: SCS ENGINEERS
2830 DAIRY DRIVE MADISON, WI 53718-6751
PHONE: (608) 224-2830

SITE: LOCATIONAL RESTRICTIONS COMPLIANCE REPORT
EDGEWATER GENERATING STATION
EDGEWATER I-43 ASH DISPOSAL FACILITY
TOWN OF WILSON, WISCONSIN

CONTACT WATER SWALE LINER MODULE LOCATION

FIGURE 2



LEGEND

- APPROVED LIMITS OF WASTE
- PROPOSED LIMITS OF WASTE
- APPROVED MODULE LIMITS
- PROPOSED ASH LIMITS
- EXISTING GRADE (2' CONTOUR)
- EXISTING GRADE (10' CONTOUR)
- EXISTING CULVERT
- EXISTING LEACHATE FORCEMAIN
- EXISTING ELECTRIC AND INSTRUMENT CONDUITS
- EXISTING WATER
- EXISTING PIPE ABANDONED IN PLACE
- PROPOSED SUBBASE GRADE (2' CONTOUR)
- PROPOSED SUBBASE GRADE (10' CONTOUR)
- PROPOSED LEACHATE COLLECTION LINE
- PROPOSED CLEANOUT
- PROPOSED LEACHATE FORCEMAIN
- PROPOSED ELECTRIC AND INSTRUMENT CONDUITS
- PROPOSED LEACHATE HEADWELL
- PAVED ROAD
- UNPAVED ROAD

NOTES:

1. PROPOSED GRADES WITHIN THE CONTACT WATER SWALE MODULE REPRESENT BOTTOM OF 4' THICK CLAY LINER (SUBBASE GRADE).

N

SCALE: 1" = 40'

PROJECT NO.	25224280.00	DRAWN BY:	RVG
DRAWN:	07/01/2025	CHECKED BY:	REH
REVISED:	07/07/2025	APPROVED BY:	PG 7/17/25

WISCONSIN POWER AND LIGHT COMPANY
EDGEWATER GENERATING STATION
3739 LAKESHORE DRIVE
SHEBOYGAN, WI 53081

CLIENT

SCS ENGINEERS
2830 DAIRY DRIVE MADISON, WI 53718-6751
PHONE: (608) 224-2830

ENGINEER

LOCATIONAL RESTRICTIONS COMPLIANCE REPORT
EDGEWATER GENERATING STATION
EDGEWATER I-43 ASH DISPOSAL FACILITY
TOWN OF WILSON, WISCONSIN

SITE

SUBBASE GRADES AND LEACHATE COLLECTION SYSTEM

FIGURE
3

Appendix A

Bedrock Aquifer Information

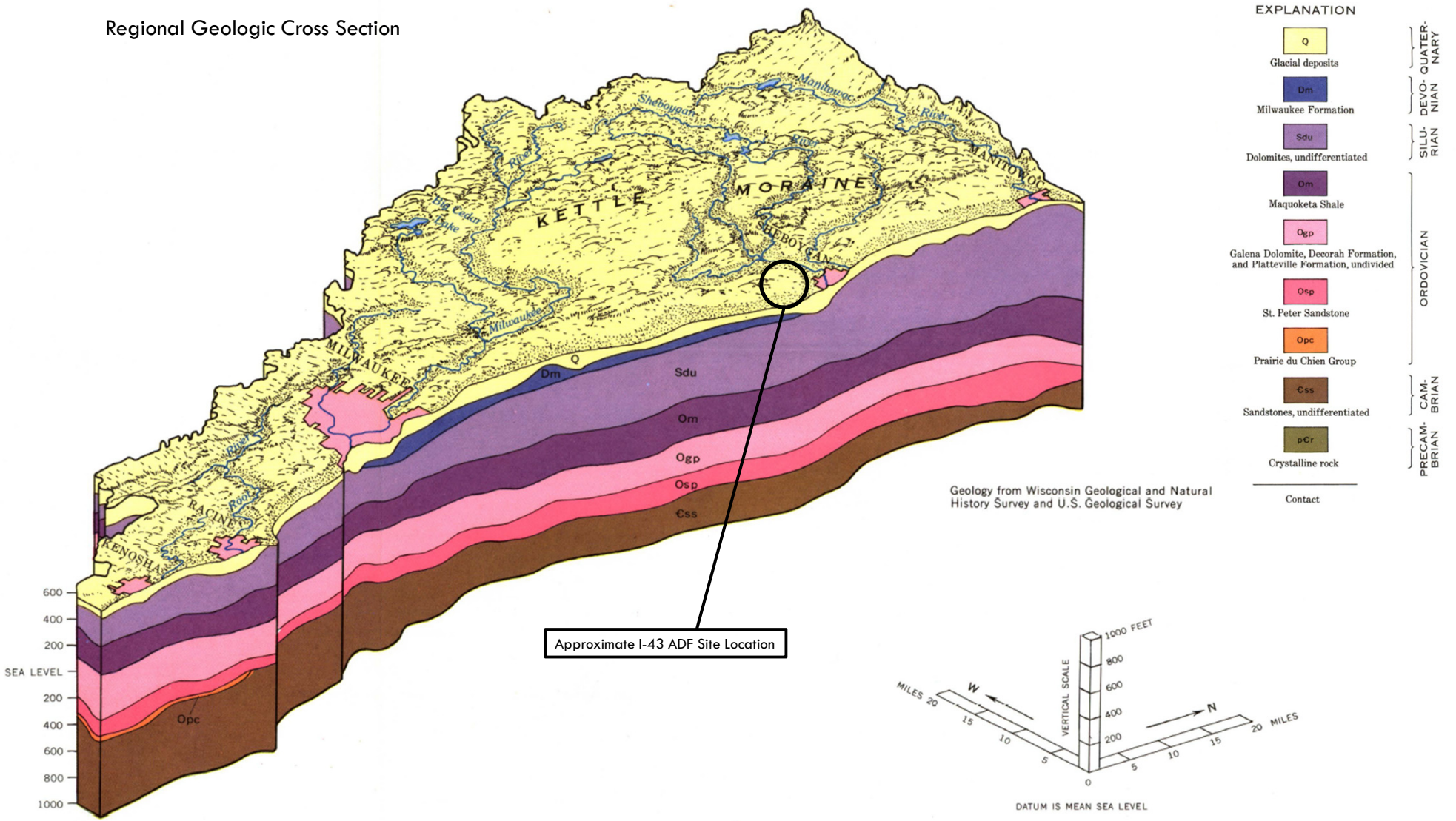
Table I43-3. Regional Hydrogeologic Stratigraphy
Edgewater I-43 Landfill / SCS Engineers Project #25215053

Age	Hydrogeologic Unit	General Thickness (feet)	Name of Rock Unit*	Predominant Lithology
Quaternary	Sand and Gravel Aquifer	0 to 235	Surface sand and gravel	Sand and Gravel
		0 to 300	Buried sand and gravel	
Devonian	Niagara Dolomite Aquifer	0 to 750	Dolomite (undifferentiated)	Dolomite
Silurian				
Ordovician	Confining Unit	0 to 400	Maquoketa Shale	Shale and dolomite
	Sandstone Aquifer	100 to 340	Galena Decorah Platteville	Dolomite
		0 to 330	St. Peter	Sandstone
		0 to 140	Prairie du Chien	Dolomite
Cambrian		0 to 3,500?	Trempeleau Franconia Galesville Eau Claire Mt. Simon	Sandstone, some Dolomite and Shale
Precambrian	Not an Aquifer	Unknown	Crystalline Rocks	Igneous and metamorphic rocks

Source:
Skinner, Earl L. and Ronald G. Borman, Water Resources of Wisconsin-Lake Michigan Basin, Department of the Interior United States Geological Survey Hydrogeologic Investigations Atlas HA-432, 1973.

I:\25215053\Reports\Report 5 - I43\Table_2_Regional_Hydrogeologic_Stratigraphy_I43.doc

Regional Geologic Cross Section



Source: Skinner, Earl L. and Ronald G. Borman, Water Resources of Wisconsin-Lake Michigan Basin, Department of the Interior United States Geological Survey Hydrogeologic Investigations Atlas HA-432, 1973.

LEGEND

- APPROXIMATE PROPERTY LINE
- LIMITS OF WASTE
- MODULE LIMITS
- GRADE (2' CONTOUR)
- 690 GRADE (10' CONTOUR)
- EDGE OF WATER
- SWALE
- CULVERT
- MH MANHOLE
- W CONTACT WATER TRANSFER PIPE
- AB ABANDONED 3" DIA. HDPE PIPE
- TREELINE/TREES
- PAVED ROAD
- UNPAVED ACCESS ROAD
- RAILROAD TRACKS
- FENCE
- UTILITY/LIGHT POLE
- MONITORING WELL
- PIEZOMETER
- PRIVATE WATER SUPPLY WELL
- CCR RULE PIEZOMETER

NOTE:

1. MONITORING WELLS MW-301, MW-303, AND MW-304 WERE INSTALLED BETWEEN NOVEMBER 30, 2015 AND JANUARY 26, 2016 BY BADGER STATE DRILLING INC. DRILLING WAS PERFORMED UNDER THE SUPERVISION OF SCS ENGINEERS.
2. MONITORING WELLS MW-301, MW-302, MW-303 AND MW-304 WERE SURVEYED ON FEBRUARY 8, 2016 BY SCS ENGINEERS.
3. MONITORING WELL MW-305 WAS SURVEYED ON FEBRUARY 15, 2017 BY CQM, INC.

N

500 0 500

SCALE: 1" = 500'

PROJECT NO.	25216069.00	DRAWN BY:	AHB/JMO
DRAWN:	02/12/16	CHECKED BY:	KK
REVISED:	09/22/17	APPROVED BY:	

ENGINEER: SCS ENGINEERS
2830 DAIRY DRIVE MADISON, WI 53718-6751
PHONE: (608) 224-2830

CLIENT: ALLIANT ENERGY
ALLIANT ENERGY WISCONSIN POWER AND LIGHT COMPANY

SITE: WISCONSIN POWER AND LIGHT
EDGEWATER GENERATING STATION
I-43 LANDFILL
TOWN OF WILSON, WISCONSIN

MONITORING WELL LOCATION MAP

FIGURE 2

I:\25216069.00\Drawings\Well Locations.dwg, 9/22/2017 12:01:10 PM

State of Wisconsin
Department of Natural Resources

SOIL BORING LOG INFORMATION

Form 4400-122 Rev. 7-98

Route To: Watershed/Wastewater ☐ Waste Management ☐
Remediation/Redevelopment ☐ Other ☐

Facility/Project Name	License/Permit/Monitoring Number	Boring Number
WPL-Edgewater I43 SCS#: 25215135.20		MW-301

Boring Drilled By: Name of crew chief (first, last) and Firm	Date Drilling Started	Date Drilling Completed	Drilling Method
Kevin Durst Badger State	12/15/2015	12/19/2015	HSA/rotary (mud)

WI Unique Well No.	DNR Well ID No.	Common Well Name	Final Static Water Level	Surface Elevation	Borehole Diameter
VV864			Feet	694.40 Feet	8.0 in.

Local Grid Origin ☐ (estimated: ☐) or Boring Location ☒
State Plane 626,196 N, 2,559,679 E S/C/N
SE 1/4 of NE 1/4 of Section 8, T 14 N, R 23 E
Lat ° ' "
Long ° ' "
Local Grid Location Feet ☐ N ☐ S Feet ☐ E ☐ W

Facility ID	County	County Code	Civil Town/City/ or Village
	Sheboygan	60	Wilson Tn.

Sample Number and Type	Length Att. & Recovered (in)	Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	USCS	Graphic Log	Well Diagram	PID/FID	Soil Properties: Standard Penetration	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
			1	LEAN CLAY, brown (fill).	CL									
S1	17	2 5 7 8	2	LEAN CLAY, red brown (7.5YR 4/6), moist, with fine to coarse sand, fine gravel, stiff, gray coatings on fractures, diamicton (till).					3.0	M				
S2	22	4 7 9 11	4						2.25					
S3	24	4 5 8 8	7						2.25					
			8	Softer, brittle, crumbles.	CL									
S4		2 4 5 5	9						1.5					
			10	Color changes to (10.5YR 4/2).										
			13	LEAN CLAY, dark reddish gray (5YR 4/2), trace coarse sand, fine crumbly texture.										
S5	22	3 4 7 7	14						2.25					
			15											

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

Signature	Firm	
Joe Larson JL for J.L.	SCS Engineers 2830 Dairy Drive Madison, WI 53718	Tel: (608) 224-2830 Fax:

This form is authorized by Chapters 281, 283, 289, 291, 292, 293, 295, and 299, Wis. Stats. Completion of this form is mandatory. Failure to file this form may result in forfeiture of between $10 and $25,000, or imprisonment for up to one year, depending on the program and conduct involved. Personally identifiable information on this form is not intended to be be used for any other purpose. NOTE: See instructions for more information, including where the completed form should be sent.

State of Wisconsin
Department of Natural Resources

SOIL BORING LOG INFORMATION SUPPLEMENT
Form 4400-122A

Boring Number MW-301 Use only as an attachment to Form 4400-122.

Sample Number and Type	Sample Length Att. & Recovered (in)	Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	USCS	Graphic Log	Well Diagram	PID/FID	Soil Properties: Standard Penetration	Soil Properties: Moisture Content	Soil Properties: Liquid Limit	Soil Properties: Plasticity Index	Soil Properties: P 200	RQD/ Comments
			16	LEAN CLAY, red brown, trace coarse sand and fine gravel.										
			17	Same as above.										
			18											
S6	24	3 5 8 8	19						2.5	M				
			20	Same except dark brown (7.5YR 4/4).										
			21											
			22											
			23											
S7	14	5 5 8 8	24						1.0					
			25	Dark brown (7.5YR 4/2).										
			26											
			27											
			28		CL									
S8	24	4 5 8 8	29	LEAN CLAY, dark brown (7.5YR 4/4), trace medium to coarse sand, few fine sand partings, massive, diamicton (till).					1.5					
			30											
			31											
			32											
			33	Same, massive to indistinctly laminated, trace fine gravel (dolomite), subrounded (till).										
S9	23	4 5 9 10	34						1.0	M				
			35											
			36											
			37											
			38	Same										
S10	24	5 5 8 10	39						1.25					
			40											

State of Wisconsin
Department of Natural Resources

SOIL BORING LOG INFORMATION SUPPLEMENT
Form 4400-122A

Boring Number MW-301 Use only as an attachment to Form 4400-122. Page 3 of 6

Sample Number and Type	Length Att. & Recovered (in)	Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	USCS	Graphic Log	Well Diagram	PID/FID	Soil Properties: Standard Penetration	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
			41	LEAN CLAY, red brown (7.5YR 4/2).										
			42											
			43	Same as above.										
S11	24	5 5 11 9	44						1.75	M				
			45											
			46											
			47											
			48	Same.										
S12	24	5 7 9 9	49						0.75					
			50											
			51											
			52											
			53		CL									
S13	24	6 7 10 11	54						1.75					
			55											
			56											
			57											
			58											
S14	24	5 7 10 10	59						1.75					
			60											
			61											
			62											
			63	Same, except less sand and fine gravel										
S15	24	5 6 7 8	64						2.0					
			65											

State of Wisconsin
Department of Natural Resources

SOIL BORING LOG INFORMATION SUPPLEMENT
Form 4400-122A

Boring Number MW-301 Use only as an attachment to Form 4400-122. Page 4 of 6

Sample Number and Type	Length Att. & Recovered (in)	Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	USCS	Graphic Log	Well Diagram	PID/FID	Soil Properties: Standard Penetration	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
			66	LEAN CLAY, same as above.	CL									
			67											
			68											
S16	24	3 8 8 14	69	SILT, light grey (5YR 6/1), laminated (lake sediment).	ML				2.5					
			70											
			71											
			72											
			73											
S17	18	7 7 22	74						0.5					
			75	SILTY SAND, grey, fine, with medium to coarse sand, trace fine gravel, mostly very fine sand (outwash).	SM									
S18	12	16 18 23	76											
			77											
			78											
S19	24	13 9 12 14	79	LEAN CLAY, dark brown (7.5YR 4/2) with trace fine to coarse sand, fine gravel (sub-rounded dolomite), massive, diamicton, peds have fine crumbling texture.					2.25	M				
			80											
			81											
			82											
			83	Same, except less sand and gravel										
S20	24	14 20 23	84		CL				4.5	M				
			85											
			86											
			87											
			88											
S21	24	9 14 19	89						4.0					
			90											

State of Wisconsin
Department of Natural Resources

SOIL BORING LOG INFORMATION SUPPLEMENT
Form 4400-122A

Boring Number MW-301 Use only as an attachment to Form 4400-122.

Sample Number and Type	Sample Length Att. & Recovered (in)	Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	USCS	Graphic Log	Well Diagram	PID/FID	Soil Properties: Standard Penetration	Soil Properties: Moisture Content	Soil Properties: Liquid Limit	Soil Properties: Plasticity Index	Soil Properties: P 200	RQD/ Comments
			91	LEAN CLAY, same as above.										
			92											
			93											
S22	24	10 12 14	94	Same.	CL				2.5					
			95											
			96											
			97											
			98	LEAN CLAY, dark grayish brown (10YR 4/2), massive to very indistinctly laminated, very plastic.										
S23	22	9 11 15	99						3.0	M				
			100											
			101											
			102											
			103	LEAN CLAY, dark grayish brown (10YR 4/2), massive to indistinclty laminated, very plastic (lake sediment).										
S24	24	7 8 10	104						1.5	M				
			105											
			106											
			107		CL									
			108											
S25	22	8 10 12	109						2.0	M				
			110											
			111											
			112											
			113											
S26	NR	8 10 13	114											
			115											

State of Wisconsin
Department of Natural Resources

SOIL BORING LOG INFORMATION SUPPLEMENT
Form 4400-122A

Boring Number MW-301 Use only as an attachment to Form 4400-122. Page 6 of 6

Sample Number and Type	Sample Length Att. & Recovered (in)	Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	USCS	Graphic Log	Well Diagram	PID/FID	Soil Properties: Standard Penetration	Soil Properties: Moisture Content	Soil Properties: Liquid Limit	Soil Properties: Plasticity Index	Soil Properties: P 200	RQD/ Comments
			116	LEAN CLAY, same as above.										
			117											
			118	Thinly laminated (lake sediment).	CL									
S27	24	WOR	119						3.5	M				Rods dropped
			120											
S28	22	17 20 21	121	SILT, greyish brown (10YR 5/2), with clay (lake sediment).	ML				2.0	M				
			122											
S29	9	19 50/3	123	SILTY GRAVEL, dolomite fragments, grey, with clayey silt (weathered bedrock).	GM									
			124	DOLOMITE (bedrock).										
			125											
S30			126											S30 sampled chips from 124'-128'.
			127											
			128											
			129		DOLOMITE									
			130											Lost circulation- no water/mud returnng.
			131											
			132											
			133											
			134											
			135	End of boring @ 135.0'										
				Checked and edited by: BJS 3/30/2016										

State of Wisconsin
Department of Natural Resources

SOIL BORING LOG INFORMATION

Form 4400-122 Rev. 7-98

Route To: Watershed/Wastewater ☐ Waste Management ☐
Remediation/Redevelopment ☐ Other ☐

Facility/Project Name	License/Permit/Monitoring Number	Boring Number
WPL-Edgewater I43 SCS#: 25215135.20		MW-302

Boring Drilled By: Name of crew chief (first, last) and Firm	Date Drilling Started	Date Drilling Completed	Drilling Method
Kevin Durst Badger State	12/4/2015	12/7/2015	HSA/rotary (mud)

WI Unique Well No.	DNR Well ID No.	Common Well Name	Final Static Water Level	Surface Elevation	Borehole Diameter
VV863			Feet	700.24 Feet	8.0 in.

Local Grid Origin ☐ (estimated: ☐) or Boring Location ☒
State Plane 625,788 N, 2,559,719 E S/C/N
NE 1/4 of SE 1/4 of Section 8, T 14 N, R 23 E
Lat ° ' "
Long ° ' "
Local Grid Location Feet ☐ N ☐ S Feet ☐ E ☐ W

Facility ID	County	County Code	Civil Town/City/ or Village
	Sheboygan	60	Wilson Tn.

Sample Number and Type	Length Att. & Recovered (in)	Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	USCS	Graphic Log	Well Diagram	PID/FID	Soil Properties: Standard Penetration	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
			1	LEAN CLAY, strong brown (7.5YR 4/6) to dark brown (7.5YR 3/2) mottled, trace fine to coarse sand.										
S1	13	3 6 8 10	2						3.7	M				
			3	LEAN CLAY, brown (7.5YR 4/4), trace small, fine to coarse sand and fine gravel, possible clay and gravel fill @5' very hard, dry, diamicton (till).										
S2	11	3 6 9 11	4						3.5	M				
			5											
			6											
S3	18	5 8 10 14	7	LEAN CLAY, mottled, strong brown (7.5YR 4/6) and brown, trace fine to coarse sand, fine gravel, very slightly moist (till).	CL				2.5- 4.0	M				
			8											
S4	15	4 4 7 8	9						2.0	M				
			10											
			11											
			12											
			13	Same as above, except brown (7.5YR 4/4), very hard, cohesive (till).										
S5	19	3 6 10 12	14						2.0- 4.0	M				
			15											

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

Signature	Firm	
Meghan Blodgett	SCS Engineers 2830 Dairy Drive Madison, WI 53718	Tel: (608) 224-2830 Fax:

This form is authorized by Chapters 281, 283, 289, 291, 292, 293, 295, and 299, Wis. Stats. Completion of this form is mandatory. Failure to file this form may result in forfeiture of between $10 and $25,000, or imprisonment for up to one year, depending on the program and conduct involved. Personally identifiable information on this form is not intended to be be used for any other purpose. NOTE: See instructions for more information, including where the completed form should be sent.

State of Wisconsin
Department of Natural Resources

SOIL BORING LOG INFORMATION SUPPLEMENT
Form 4400-122A

Boring Number MW-302 Use only as an attachment to Form 4400-122.

Sample Number and Type	Length Att. & Recovered (in)	Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	USCS	Graphic Log	Well Diagram	PID/FID	Soil Properties: Standard Penetration	Soil Properties: Moisture Content	Soil Properties: Liquid Limit	Soil Properties: Plasticity Index	Soil Properties: P 200	RQD/ Comments
			16	LEAN CLAY, brown (7.5YR 4/4), trace fine to coarse sand, fine gravel, as above (till).										
			17											
			18											
S6	24	3 4 6 9	19						1.5	M				
			20											
			21											
			22											
			23											
S7	24	2 3 5 6	24	Same as above, except dark brown (7.5YR 4/2), more moist (till).					1.5	M				
			25											
			26											
			27											
			28	LEAN CLAY, brown (7.5YR 4/2), massive, trace fine to coarse sand, fine gravel (till).	CL									
S8	20	7 8 7 9	29						1.0					
			30											
			31											
			32											
			33											
S9	6	5 6 8 8	34						1.0					
			35											
			36											
			37											
			38											
S10	24	5 8 10 11	39						1.0					
			40											

State of Wisconsin
Department of Natural Resources

SOIL BORING LOG INFORMATION SUPPLEMENT
Form 4400-122A

Boring Number MW-302 Use only as an attachment to Form 4400-122. Page 3 of 7

Sample Number and Type	Sample Length Att. & Recovered (in)	Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	USCS	Graphic Log	Well Diagram	PID/FID	Soil Properties: Standard Penetration	Soil Properties: Moisture Content	Soil Properties: Liquid Limit	Soil Properties: Plasticity Index	Soil Properties: P 200	RQD/ Comments
			41	LEAN CLAY, brown (7.5YR 4/2), trace fine to coarse sand, fine gravel (till).										
			42											
			43											
S11	19	7 9 11 12	44						1.5-2.75	W				
			45											
			46											
			47											
			48		CL									
S12	18	6 10 12 12	49						1.5	W				
			50											
			51											
			52											
			53	Same as above, except less sand and gravel.										
S13	24	7 7 10 10	54						1.25	W				
			55											
			56											
			57											
			58											
S14	24	7 9 11 12	59	LEAN CLAY, brown, trace fine to coarse sand, 1/8-3/4" fine to coarse sand seams at 58.5',59', and 59.75', laminated with very thin silt partings (lake sediment).	CL				1.5	W				
			60											
			61											
			62											
			63											
S15	24	7 9 12 12	64	SILT, brown (7.5YR 5/2), massive, little clay (lake sediment).	ML				1.5	W				
			65											

State of Wisconsin
Department of Natural Resources

SOIL BORING LOG INFORMATION SUPPLEMENT
Form 4400-122A

Boring Number MW-302 Use only as an attachment to Form 4400-122. Page 4 of 7

Sample Number and Type	Length Att. & Recovered (in)	Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	USCS	Graphic Log	Well Diagram	PID/FID	Soil Properties: Standard Penetration	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
S16	18	14 18 30 26	66	SILT with sand, brown, massive, sand is very fine to fine.	ML					W				
			67	SILTY SAND, fine, massive.	SM									
				SILT WITH SAND, fine, loose, mostly very fine sand (lake sediment).										
S17	20	14 25 38 32	68							M-W				Sand appears barely wet.
			69											
S18	18	21 30 34 34	70							W				
				Same.										
			71											
S19	18	14 12 25 24	72											
			73	Same.	ML									
S20	18	19 27 28 28	74											
			75											
S21	18	21 29 33 30	76											
			77											
S22	16	23 32 30 28	78											
			79											
S23	16	19 21 21 27	80	POORLY GRADED SAND WITH SILT, fine with medium, brown to gray, loose (outwash).						W				
			81		SP-SM									
S24 A/S24 B	14	9 19 19 16	82							W				
				SILT, brown, little fine sand, massive to indistinctly laminated (lake sediment).										
			83											
			84											
			85		ML									
			86											
			87											
			88											
				LEAN CLAY, dark brown (7.5YR 4/2), massive, trace fine to coarse sand, fine gravel, very stiff,										
S25	18	10 20 23 24	89	cohesive, diamicton (till).	CL				3.0-4.5	W				
			90											

State of Wisconsin
Department of Natural Resources

SOIL BORING LOG INFORMATION SUPPLEMENT
Form 4400-122A

Boring Number MW-302 Use only as an attachment to Form 4400-122. Page 5 of 7

Sample Number and Type	Sample Length Att. & Recovered (in)	Sample Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	USCS	Graphic Log	Well Diagram	PID/FID	Soil Properties: Standard Penetration	Soil Properties: Moisture Content	Soil Properties: Liquid Limit	Soil Properties: Plasticity Index	Soil Properties: P 200	RQD/ Comments
			91	LEAN CLAY, brown, massive, trace fine to coarse sand, fine gravel, as above (till).										
			92											
			93		CL									
S26	20	12 18 21 25	94	Same.					2.5	W				
			95											
			96											
			97											
			98	LEAN CLAY, brown (7.5YR 5/2), massive to indistinctly laminated, trace fine gravel, red/gray laminations (lake sediment).										
S27	14	17 20 22 12	99						2.5					
			100											
			101											
			102											
			103	LEAN CLAY, grayish brown (10YR 5/2), laminated, with very thin silt partings, very stiff, hard (lake sediment).										
S28	24	8 10 13 14	104						2.0					
			105											
			106		CL									
			107											
			108	Same as above, except silt is concentrated in 1mm layers spaced 2-6" apart.										
S29	24	7 9 12 14	109						1.5					
			110											
			111											
			112											
			113	Same except dark grayish brown (10YR 4/2), laminated, fewer silt partings, very plastic (lake sediment).										
S30		7 9 12 14	114											
			115											

State of Wisconsin
Department of Natural Resources

SOIL BORING LOG INFORMATION SUPPLEMENT
Form 4400-122A

Boring Number MW-302 Use only as an attachment to Form 4400-122. Page 6 of 7

Sample Number and Type	Length Att. & Recovered (in)	Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	USCS	Graphic Log	Well Diagram	PID/FID	Soil Properties: Standard Penetration	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
			116	LEAN CLAY, same as above, very plastic, laminated (lake sediment).										
			117											
			118											
S31	24	7 8 10 12	119						1.0					S30 was not collected
			120	Same.	CL									
S32	24	9 10 12 13	121						0.5- 1.0					
			122											
S33	24	11 13 18 18	123	Same as above, very plastic, laminated, few silt partings (lake sediment).					2.0					
S34			124											
S35	24	14 22 30/5	125	LEAN CLAY WITH SAND, grayish brown, sand is fine.	CL				0.5					
S36			126	SILT WITH SAND, grayish brown, mostly very fine sand, cohesive.	ML									
S37	24	30 25 28 24	127	LEAN CLAY WITH SAND, grayish brown, sand is fine, some silt, laminated to thinly bedded clay and silt (lake sediment).					0.5					
S38			128											
S39	24	15 17 19 17	129	Thinly bedded silty fine sand and clay.	CL				0.5- 1.0					
			130											
S40	6	21 19 50/3	131	With dolomite gravel.										
			132	DOLOMITE, light gray and brownish gray, dark and light laminations, massive, some pitted and vuggy, mostly without mineralization, vertical fractures common.										
			133											
			134											
			135											
			136		DOLOMITE									
			137											
S41	0	50/3	138											Convert to rock coring. Run 1 133'-143'-No water return below 139'.
			139	Shaly zone (6') at ~138.5. gray, mineralized fractures below 139'.										
			140											

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Department of Natural Resources

SOIL BORING LOG INFORMATION SUPPLEMENT
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Boring Number MW-302 Use only as an attachment to Form 4400-122. Page 7 of 7

Sample: Number and Type	Sample: Length Att. & Recovered (in)	Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	USCS	Graphic Log	Well Diagram	PID/FID	Soil Properties: Standard Penetration	Soil Properties: Moisture Content	Soil Properties: Liquid Limit	Soil Properties: Plasticity Index	Soil Properties: P 200	RQD/ Comments
			141	DOLOMITE (bedrock).										
			142	Very vuggy and mineralized vugs and fractures below 142'.	DOLOMITE									TCR=126/120 TCR=100% SCR=103/120 SCR=86% MCR=68.5/120 MCR=57% RQD=57% Fair
			143											
			144	Blind drilled 144-148'										
				End of boring @ 148' Logged by: Zach Watson: 0-28' Meghan Blodgett: 28-110' Tony Kollasch: 110-144' Checked and edited by: BJS 3/30/2016										

State of Wisconsin
Department of Natural Resources

SOIL BORING LOG INFORMATION

Form 4400-122 Rev. 7-98

Route To: Watershed/Wastewater ☐ Waste Management ☐
Remediation/Redevelopment ☐ Other ☐

Facility/Project Name	License/Permit/Monitoring Number	Boring Number
WPL-Edgewater I43 SCS#: 25215135.20		MW-303

Boring Drilled By: Name of crew chief (first, last) and Firm	Date Drilling Started	Date Drilling Completed	Drilling Method
Kevin Durst Badger State	11/30/2015	12/4/2015	HSA/rotary (mud)

WI Unique Well No.	DNR Well ID No.	Common Well Name	Final Static Water Level	Surface Elevation	Borehole Diameter
VV865			Feet	716.60 Feet	8.0 in.

Local Grid Origin ☐ (estimated: ☐) or Boring Location ☒
State Plane 625,616 N, 2,560,451 E S/C/N
NE 1/4 of SE 1/4 of Section 8, T 14 N, R 23 E
Lat ° ' "
Long ° ' "
Local Grid Location Feet ☐ N ☐ S Feet ☐ E ☐ W

Facility ID	County	County Code	Civil Town/City/ or Village
	Sheboygan	60	Wilson Tn.

Sample Number and Type	Length Att. & Recovered (in)	Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	USCS	Graphic Log	Well Diagram	PID/FID	Soil Properties: Standard Penetration	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
S1	14	1 2 2 4	1-2	LEAN CLAY, strong brown (7.5YR 4/6), med plasticity, mottled coloring, trace coarse sand.	CL				1.5	M				
S2 A, B	14	4 1 2 2	4-5						0.75	M				
			5	SILTY SAND layer, fine to coarse @ 5-5.5'.	SM									
S3	24	4 7 10 11	6-7	LEAN CLAY, (7.5YR 4/4), trace sand, fine to coarse, fine gravel, very stiff, firm, massive, diamicton (till).					2.8-4.0	W				
S4	18	2 5 7 9	9-10	Same.	CL				3.0	W				
S5	22	2 3 4 6	14-15						1-1.8	W				

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

Signature	Firm	
Zach Watson for Z.W.	SCS Engineers 2830 Dairy Drive Madison, WI 53718	Tel: (608) 224-2830 Fax:

This form is authorized by Chapters 281, 283, 289, 291, 292, 293, 295, and 299, Wis. Stats. Completion of this form is mandatory. Failure to file this form may result in forfeiture of between $10 and $25,000, or imprisonment for up to one year, depending on the program and conduct involved. Personally identifiable information on this form is not intended to be be used for any other purpose. NOTE: See instructions for more information, including where the completed form should be sent.

State of Wisconsin
Department of Natural Resources

SOIL BORING LOG INFORMATION SUPPLEMENT
Form 4400-122A

Boring Number MW-303 Use only as an attachment to Form 4400-122.

Sample Number and Type	Length Att. & Recovered (in)	Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	USCS	Graphic Log	Well Diagram	PID/FID	Soil Properties: Standard Penetration	Soil Properties: Moisture Content	Soil Properties: Liquid Limit	Soil Properties: Plasticity Index	Soil Properties: P 200	RQD/ Comments
			16	LEAN CLAY, (7.5YR 4/4), as above.										
			17											
			18											
			19											
S6	24	3 4 6 8	20						2.0	W				
			21											
			22											
			23											
			24											
S7	24	3 5 6 7	25	Same.					1.5- 2.0	W				
			26											
			27											
			28		CL									
			29	Same.										
S8	24	3 6 7 8	30						1.5	W				
			31											
			32											
			33											
			34											
S9	24	3 5 7 9	35						2.2	W				
			36											
			37											
			38											
			39	Same as above, except very soft and saturated.										
S10	6	6 9 11 13	40						NA	W				

State of Wisconsin
Department of Natural Resources

SOIL BORING LOG INFORMATION SUPPLEMENT
Form 4400-122A

Boring Number MW-303 Use only as an attachment to Form 4400-122.

Sample Number and Type	Sample Length Att. & Recovered (in)	Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	USCS	Graphic Log	Well Diagram	PID/FID	Soil Properties: Standard Penetration	Soil Properties: Moisture Content	Soil Properties: Liquid Limit	Soil Properties: Plasticity Index	Soil Properties: P 200	RQD/ Comments
			41	LEAN CLAY, (7.5YR 4/4).										
			42											
			43											
			44											
S11	6	10 12 12 16	45							W				
			46											
			47											
			48											
			49	(no sample retained)										
S12	24	5 6 8 10	50						1.3	W				
			51											
			52											
			53		CL									
			54	LEAN CLAY (7.5YR 4/4), fine to coarse sand, fine gravel, firm, massive, diamicton (till).										
S13	21	3 7 7 9	55						1.0	W				
			56											
			57											
			58											
			59	Same.										
S14	19	10 11 13 10	60						1.0	W				
			61											
			62											
			63											
			64											
S15	11	4 6 9 11	65						0.5	W				

Boring Number MW-303 Use only as an attachment to Form 4400-122.

Sample Number and Type	Sample Length Att. & Recovered (in)	Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	USCS	Graphic Log	Well Diagram	PID/FID	Soil Properties: Standard Penetration	Soil Properties: Moisture Content	Soil Properties: Liquid Limit	Soil Properties: Plasticity Index	Soil Properties: P 200	RQD/ Comments
			66	Same.										
			67											
			68											
			69											
S16	4	9 34 50/5	70	LEAN CLAY WITH SAND, brown (7.5YR 4/4), soft, sand fine to coarse.					0	W				
			71											
			72											
			73											
			74											
S17	7	8 12 12 13	75	Some as above, except trace fine to coarse sand.	CL				0	W				
			76											
			77											
			78											
			79	Same as above except, soft in some areas and stiff in others.										
S18	24	3 6 5 7	80						0.5	W				
			81											
			82											
			83											
			84	SANDY SILT, (10YR 5/4), fine sand, very uniform grains, loose, mostly very fine sand, non-plastic.										
S19	15	19 22 25 31	85							W				
			86		ML									
S20	3	16 16 23 25	87							W				
			88	LEAN CLAY, brown (7.5YR 4/4), trace coarse sand, massive to indistinctly laminated (lake sediment).										
S21	20	20 18 13 14	89		CL					W				
			90											

State of Wisconsin
Department of Natural Resources

SOIL BORING LOG INFORMATION SUPPLEMENT
Form 4400-122A

Boring Number MW-303 Use only as an attachment to Form 4400-122. Page 5 of 7

Sample Number and Type	Length Att. & Recovered (in)	Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	USCS	Graphic Log	Well Diagram	PID/FID	Soil Properties: Standard Penetration	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
			91											
			92											
			93											
			94	Same with layers of SANDY SILT, yellowish brown (10YR 5/4), fine, loose (lake sediment).										
S22	18	35 38 23 30	95							W				
			96											
S23	18	19 12 12 13	97		CL				1.0	W				
			98											
			99											
			100											
			101											
			102											
			103											
			104	SANDY SILT, yellowish brown (10YR 5/4) fine, mostly very fine sand, loose (lake sediment).										
S24	16	24 28 34 50/4	105							W				
			106		ML									
S25	12	36 50/5	107							W				
			108											
S26	23	32 22 20 24	109	LEAN CLAY, with layers of SILT, SAND (lake sediment as above).					3.2	W				
			110											
			111		CL									
			112											
			113											
			114											
S27	3	50/5	115	SILTY SAND, (10YR 5/4).	SM				1.2	W				

State of Wisconsin
Department of Natural Resources

SOIL BORING LOG INFORMATION SUPPLEMENT
Form 4400-122A

Boring Number MW-303 Use only as an attachment to Form 4400-122. Page 6 of 7

Sample Number and Type	Length Att. & Recovered (in)	Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	USCS	Graphic Log	Well Diagram	PID/FID	Soil Properties: Standard Penetration	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
			116		SM									
S28	5	50/4	117	LEAN CLAY, 7.5 YR 5/2, trace gravel.	CL				2.5	W				
			118											
S29	5	50/5	119	SILTY SAND WITH GRAVEL, fine, with medium and coarse sand, greys, blues whites and browns, gravel is fine and coarse.						W				
			120											
S30	8	41 50/4	121	SILTY SAND, fine to coarse grained, trace fine gravel, fine (outwash).						W				
			122											
S31	2	50/4	123							W				
			124											
			125		SM									
			126											
S32	10	31 50/4	127	Same.						W				
			128											
S33	3	50/5	129							W				
			130											
			131	SILT, some gravel, very dense/stiff (weathered bedrock).	ML									
S34	4	50/4	132						4.5	W				
			133	DOLOMITE (bedrock).										
			134											
			135											
			136		DOLOMITE									
			137											
			138											
			139											
			140											

State of Wisconsin
Department of Natural Resources

SOIL BORING LOG INFORMATION SUPPLEMENT
Form 4400-122A

Boring Number MW-303 Use only as an attachment to Form 4400-122. Page 7 of 7

Sample: Number and Type	Sample: Length Att. & Recovered (in)	Sample: Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	U S C S	Graphic Log	Well Diagram	PID/FID	Soil Properties: Standard Penetration	Soil Properties: Moisture Content	Soil Properties: Liquid Limit	Soil Properties: Plasticity Index	Soil Properties: P 200	RQD/ Comments
			141	DOLOMITE (bedrock).	DOLOMITE									
			142											
			143											
				End of boring @ 143.5'										
				Checked and edited by: BJS 3/30/2016										

State of Wisconsin
Department of Natural Resources

SOIL BORING LOG INFORMATION

Form 4400-122 Rev. 7-98

Route To: Watershed/Wastewater ☐ Waste Management ☐
Remediation/Redevelopment ☐ Other ☐

Facility/Project Name	License/Permit/Monitoring Number	Boring Number
WPL-Edgewater I43 SCS#: 25215135.20		MW-304

Boring Drilled By: Name of crew chief (first, last) and Firm	Date Drilling Started	Date Drilling Completed	Drilling Method
Kevin Durst Badger State	1/25/2016	1/26/2016	HSA/rotary (mud)

WI Unique Well No.	DNR Well ID No.	Common Well Name	Final Static Water Level	Surface Elevation	Borehole Diameter
VV866			Feet	689.48 Feet	8.0 in.

Local Grid Origin ☐ (estimated: ☐) or Boring Location ☒
State Plane 624,204 N, 2,558,156 E S/C/N
SW 1/4 of SE 1/4 of Section 8, T 14 N, R 23 E
Lat ° ' "
Long ° ' "
Local Grid Location Feet ☐ N ☐ S Feet ☐ E ☐ W

Facility ID	County	County Code	Civil Town/City/ or Village
	Sheboygan	60	Wilson Tn.

Sample Number and Type	Length Att. & Recovered (in)	Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	USCS	Graphic Log	Well Diagram	PID/FID	Soil Properties: Standard Penetration	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
S1	14	2 5 6 11	1–2	LEAN CLAY, brown (7.5YR 4/6), with fine to coarse sand, fine gravel.	CL				3.5	M				
S2	14	4 6 5 9	3–4						3.5	M				
			5	Same as above, except dark brown.										
			6	LEAN CLAY, brown (7.5YR 4/6), with silt layers, cohesive, stiff.										
S3	24	2 5 8 11	7–8						3.25	M				
			8	LEAN CLAY, brown (7.5YR 4/4), with fine to coarse sand, fine gravel, massive, stiff, diamicton (till).										
S4	24	4 5 9 10	9–10						3.25	M				
			10	1 inch interval of sand, fine to medium grained, brown.	CL									
S6	24	2 4 4 5	14–15	LEAN CLAY, as above (till).					1.5	M				

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

Signature	Firm	
Joe Larson for J.L.	SCS Engineers 2830 Dairy Drive Madison, WI 53718	Tel: (608) 224-2830 Fax:

This form is authorized by Chapters 281, 283, 289, 291, 292, 293, 295, and 299, Wis. Stats. Completion of this form is mandatory. Failure to file this form may result in forfeiture of between $10 and $25,000, or imprisonment for up to one year, depending on the program and conduct involved. Personally identifiable information on this form is not intended to be be used for any other purpose. NOTE: See instructions for more information, including where the completed form should be sent.

State of Wisconsin
Department of Natural Resources

SOIL BORING LOG INFORMATION SUPPLEMENT
Form 4400-122A

Boring Number MW-304 Use only as an attachment to Form 4400-122. Page 2 of 6

Sample Number and Type	Length Att. & Recovered (in)	Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	USCS	Graphic Log	Well Diagram	PID/FID	Soil Properties: Standard Penetration	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
			16	LEAN CLAY, brown (7.5YR 4/4), as above (till).										
			17											
			18											
S7	22	3 4 4 6	19						1.25	M				
			20											
			21											
			22											
			23											
S8	22	2 3 5 6	24											
			25											
			26											
			27											
			28		CL									
S9	24	2 4 6 7	29						1.0	M				
			30											
			31											
			32											
			33											
S10	24	3 5 6 9	34						1.0	M				
			35											
			36											
			37											
			38											
S11	24	3 6 8 12	39	Same with fine silt partings.					2.5	M				
			40											

State of Wisconsin
Department of Natural Resources

SOIL BORING LOG INFORMATION SUPPLEMENT
Form 4400-122A

Boring Number MW-304 Use only as an attachment to Form 4400-122.

Sample Number and Type	Sample Length Att. & Recovered (in)	Sample Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	USCS	Graphic Log	Well Diagram	PID/FID	Soil Properties: Standard Penetration	Soil Properties: Moisture Content	Soil Properties: Liquid Limit	Soil Properties: Plasticity Index	Soil Properties: P 200	RQD/ Comments
			41	LEAN CLAY, brown.	CL									
			42											
			43	CLAYEY SILT, brown (7,5YR 4/6).										
S12	24	4 4 5 8	44		ML					M				
			45	LEAN CLAY WITH SAND, brown (7.5YR 4/6), fine to coarse.										
			46											
			47		CL									
			48											
S13	24	2 4 4 6	49						0.75	W				
			50	LEAN CLAY, brown (7.5YR 4/6).										
			51											
			52		CL									
			53											
S14	24	4 5 8 11	54	SILTY SAND, brown, fine to medium grained.	SM				1.5	M				
			55	CLAYEY SAND, fine to coarse.										
			56											
			57		SC									
			58											
S15	16	5 13 23 25	59	POORLY GRADED SAND WITH SILT, grey (10YR 4/2), fine to medium grained (outwash).					0.5	W				
			60											
S16	12	8 11 18 20	61	Same.	SP-SM					W				
			62											
S17	20	15 23 31 30	63	Same except mostly very fine sand.										
			64	LEAN CLAY, with fine to coarse sand, fine gravel, diamicton (till)	CL									
			65											

State of Wisconsin
Department of Natural Resources

SOIL BORING LOG INFORMATION SUPPLEMENT
Form 4400-122A

Boring Number MW-304 Use only as an attachment to Form 4400-122. Page 4 of 6

Sample Number and Type	Length Att. & Recovered (in)	Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	USCS	Graphic Log	Well Diagram	PID/FID	Soil Properties: Standard Penetration	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
S18	20	14 19 15 15	66	LEAN CLAY, brown (7.5YR 4/6).					2.5	M				
			67		CL									
			68											
S19	8	50/5	69	LEAN CLAY, with layers of SILT, fine to coarse sand (lake sediment).					4.5	M				
			70											
			71											
			72											
			73	LEAN CLAY, dark brown (7.5YR 4/2), laminated, very plastic (lake sediment).										
S20		8 10 15 17	74						1.25	M				
			75											
			76		CL									
			77											
			78	Same with few silt partings, very stiff.										
S21	24	7 11 14 15	79						2.75					
			80											
			81											
			82											
			83											
S22	12	25 50/5	84						>4.5					
			85	SILTY SAND, grey, fine to coarse grained, dense, trace gravel.										
S23	16	21 34 42 46	86		SM					W				
			87	Limestone rock fragments, with fine and coarse gravel.										
S24	1	50/2	88											
			89											
			90											

State of Wisconsin
Department of Natural Resources

SOIL BORING LOG INFORMATION SUPPLEMENT
Form 4400-122A

Boring Number MW-304 Use only as an attachment to Form 4400-122.

Sample Number and Type	Length Att. & Recovered (in)	Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	USCS	Graphic Log	Well Diagram	PID/FID	Soil Properties: Standard Penetration	Soil Properties: Moisture Content	Soil Properties: Liquid Limit	Soil Properties: Plasticity Index	Soil Properties: P 200	RQD/ Comments
S25	3	50/4	91	Same, diamicton.	SM									
S26	2	50/5	92											S26 was skipped.
			93	SILTY SAND and SILT, except dark grayish brown (10YR 4/2), sandstone fragments, fine sand, fine gravel, cohesive, brittle.										
S27	24	34 31 42 52/3	94							W				
			95											
S28	14	30 39 50/3	96		SM					W				
			97											
S29	12	20 34 50/5	98							W				
			99	FAT CLAY WITH GRAVEL, brown (7.5 4/3), sandstone fragments, fine to coarse sand, fine gravel.	CH				4.5	W				
S30	12	37 50/4	100											
			101	SILTY SAND, dark grayish brown (10YR 4/2).	SM									
S31	12	16 35 50/4	102						1.5	W				
			103	LEAN CLAY, very dark brown (7.5 YR 2.5/2).	CL									
				SILTY SAND, dark grayish brown (10YR 4/2), fine grained.	SM									
S32	18	17 35 50/4	104							W				
			105	SANDY LEAN CLAY, dark brown (7.5YR 3/2), trace gravel.	CL				4.0	W				Bedrock at 106.5 ft bgs.
S33	8	17 50/2	106											
			107	SILTY SAND, dark grayish brown (10YR 4/2), fine grained, (weathered bedrock).	SM									
S34	2	50/3	108											
			109	DOLOMITE, gray (7.5YR 6/1), angular fragments.	DOLOMITE									
S35	NA		110											
			111											
			112											
			113											
			114											
			115											

State of Wisconsin
Department of Natural Resources

SOIL BORING LOG INFORMATION SUPPLEMENT
Form 4400-122A

Boring Number MW-304 Use only as an attachment to Form 4400-122. Page 6 of 6

Sample Number and Type	Sample Length Att. & Recovered (in)	Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	USCS	Graphic Log	Well Diagram	PID/FID	Soil Properties: Standard Penetration	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
S36	NA		116	DOLOMITE, gray (7.5YR 6/1), angular fragments.	DOLOMITE									
			117											
			118	End of boring @ 118'										

Logged by:
Joe Larson: 0-93'
Kyle Kramer: 93-118'

Checked and edited by:
BJS 3/30/2016

State of Wisconsin
Department of Natural Resources

SOIL BORING LOG INFORMATION

Form 4400-122 Rev. 7-98

Route To: Watershed/Wastewater ☐ Waste Management ☒
Remediation/Redevelopment ☐ Other ☐

Facility/Project Name	License/Permit/Monitoring Number	Boring Number
WPL I43 SCS#: 25217032.00	2853	MW-305

Boring Drilled By: Name of crew chief (first, last) and Firm	Date Drilling Started	Date Drilling Completed	Drilling Method
Kevin Duerst Badger State Drilling	1/30/2017	2/2/2017	HSA/Rotary

WI Unique Well No.	DNR Well ID No.	Common Well Name	Final Static Water Level	Surface Elevation	Borehole Diameter
VY819		MW-305	Feet	715.46 Feet	6.3 in.

Local Grid Origin ☐ (estimated: ☐) or Boring Location ☒
State Plane 623,435 N, 2,559,946 E S/C/N
SE 1/4 of SE 1/4 of Section 8, T 14 N, R 23 E
Lat ° ' "
Long ° ' "
Local Grid Location Feet ☐ N ☐ S Feet ☐ E ☐ W

Facility ID	County	County Code	Civil Town/City/ or Village
460022090	Sheboygan	60	Wilson Tn.

Sample Number and Type	Length Att. & Recovered (in)	Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	USCS	Graphic Log	Well Diagram	PID/FID	Soil Properties: Standard Penetration	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
			1	TOPSOIL.										
S1	8	2 2 4	2	LEAN CLAY, strong brown (7.5YR 4/6).	CL				1.75					
S2	14	4 8 11	4						4.5+					
S3	18	7 11 14	7						4.5+					
S4	18	4 10 9	9						4.5+					
			12											

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

Signature for Kyle Kramer Firm SCS Engineers 2830 Dairy Drive Madison, WI 53718 Tel: (608) 224-2830 Fax:

This form is authorized by Chapters 281, 283, 289, 291, 292, 293, 295, and 299, Wis. Stats. Completion of this form is mandatory. Failure to file this form may result in forfeiture of between $10 and $25,000, or imprisonment for up to one year, depending on the program and conduct involved. Personally identifiable information on this form is not intended to be be used for any other purpose. NOTE: See instructions for more information, including where the completed form should be sent.

State of Wisconsin
Department of Natural Resources

SOIL BORING LOG INFORMATION SUPPLEMENT
Form 4400-122A

Boring Number MW-305 Use only as an attachment to Form 4400-122.

Sample Number and Type	Sample Length Att. & Recovered (in)	Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	USCS	Graphic Log	Well Diagram	PID/FID	Soil Properties: Standard Penetration	Soil Properties: Moisture Content	Soil Properties: Liquid Limit	Soil Properties: Plasticity Index	Soil Properties: P 200	RQD/ Comments
			13											
S5	18	4 6 8	14	Same as above except, brown (7.5 YR4/3).					2.5					
			15											Mud Roatary @ 15 ft bgs.
			16											
			17											
			18											
S6	18	4 6 9	19	Same as above except, trace gravel.					4.5+					
			20											
			21											
			22		CL									
			23											
S7	18	4 6 7	24						3.0					
			25											
			26											
			27											
			28											
S8	18	4 6 7	29						2.0					
			30											
			31											
			32											

State of Wisconsin
Department of Natural Resources

SOIL BORING LOG INFORMATION SUPPLEMENT
Form 4400-122A

Boring Number MW-305 Use only as an attachment to Form 4400-122.

Sample Number and Type	Sample Length Att. & Recovered (in)	Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	USCS	Graphic Log	Well Diagram	PID/FID	Soil Properties: Standard Penetration	Soil Properties: Moisture Content	Soil Properties: Liquid Limit	Soil Properties: Plasticity Index	Soil Properties: P 200	RQD/ Comments
S9	18	5 8 9	33–35						2.5					
S10	18	4 7 9	38–40						2.5					
			41–42		CL									
S11	18	3 7 8	43–45						2.5					
S12	18	3 9 13	48–50						2.0					
			51–52											

State of Wisconsin
Department of Natural Resources

SOIL BORING LOG INFORMATION SUPPLEMENT
Form 4400-122A

Boring Number MW-305 Use only as an attachment to Form 4400-122. Page 4 of 7

Sample Number and Type	Length Att. & Recovered (in)	Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	USCS	Graphic Log	Well Diagram	PID/FID	Soil Properties: Standard Penetration	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
			53											
S13	18	5 5 8	54	Same as above except, brown (7.5YR 4/3).					2.5					
			55											
			56											
			57											
			58											
S14	18	5 5 6	59						1.5					
			60		CL									
			61											
			62											
			63											
S15	12	5 5 16	64						3.0					
			65											
			66											
			67											
			68											
			69	POORLY GRADED SAND, gray (10YR 5/1), medium to coarse grained.										
S16	12	13 16 16	70		SP									
S17	20	14 19 20 22	71											
			72	SILTY SAND, brown (7.5YR 4/3), fine grained.	SM									

State of Wisconsin
Department of Natural Resources

SOIL BORING LOG INFORMATION SUPPLEMENT
Form 4400-122A

Boring Number MW-305 Use only as an attachment to Form 4400-122. Page 5 of 7

Sample Number and Type	Length Att. & Recovered (in)	Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	USCS	Graphic Log	Well Diagram	PID/FID	Soil Properties: Standard Penetration	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
			73		SM									
S18	16	9 9 10 16		LEAN CLAY, brown (7.5YR 4/3).	CL									
			74	POORLY GRADED SAND, gray (10YR 5/1), fine to medium grained.										
S19	18	8 16 18 21	75											
			76											
S20	16	8 18 20 23	77											
			78											
S21	16	15 20 23 30	79											
			80											
S22	16	15 23 26 31	81											
			82											
S23	18	21 18 29 31	83		SP									
			84											
S24	18	17 30 33 33	85											
			86											
			87											
			88											
S25	16	15 20 30 30	89											
			90											
			91											
			92											

State of Wisconsin
Department of Natural Resources

SOIL BORING LOG INFORMATION SUPPLEMENT
Form 4400-122A

Boring Number MW-305 Use only as an attachment to Form 4400-122.

Sample Number and Type	Sample Length Att. & Recovered (in)	Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	USCS	Graphic Log	Well Diagram	PID/FID	Soil Properties: Standard Penetration	Soil Properties: Moisture Content	Soil Properties: Liquid Limit	Soil Properties: Plasticity Index	Soil Properties: P 200	RQD/ Comments
S26	18	18 23 25 29	93–95											
			96–98											
S27	14	10 22 24 25	98–100	Same as above except, trace coarse gravel.	SP									
			101–103											
S28	12	13 13 10 18	103–105	Same as above except, trace coarse gravel.										
			106–108											
S29	12	23 42 50/0.5	108–110											
			110–112	DOLOMITE, gray (10YR 5/1), weathered.										

State of Wisconsin
Department of Natural Resources

SOIL BORING LOG INFORMATION SUPPLEMENT
Form 4400-122A

Boring Number MW-305 Use only as an attachment to Form 4400-122. Page 7 of 7

Sample: Number and Type	Sample: Length Att. & Recovered (in)	Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	U S C S	Graphic Log	Well Diagram	PID/FID	Soil Properties: Standard Penetration	Soil Properties: Moisture Content	Soil Properties: Liquid Limit	Soil Properties: Plasticity Index	Soil Properties: P 200	RQD/ Comments
			113											
			114											
			115											
			116											
			117											
			118											
			119											
S30			120											
			121	End of boring at 121 ft bgs.										

NORTH

D

SOUTH

D'

APPROX. EXTENT OF I-43 LANDFILL

4420 CNTY EE

4634 FRONTAGE RD

BEHRENS D

4910 FRONTAGE RD

B-4

W 36 ABAND.

W 12AR

W 12R

6437 CNTY OK

6727 CNTY OK

6710 CNTY OK

CLAY DIAMICTON
(clay, sand, trace gravel)

HARD CLAY DIAMICTON
(compacted)

FEET ABOVE MSL

720 700 680 660 640 620 600 580 560 540 520 500 480 460 440 420 400 380 360

LEGEND

- SAND
- SANDY CLAY/ CLAYEY SAND
- CLAY DIAMICTON
- HARD PAN
- DOLOMITE
- WELL BORE
- WELL CASING
- WELL SCREEN
- 120' DENOTES END–OF–BORING IN FEET BELOW GROUNDSURFACE

0 800

SCALE
(feet)

Figure 7

Prepared for:
U.S. EPA. REGION V
Contract No: EP-S5-06-04

TDD NO: S05-0008-0805-012
DCN: 1040-2A-AJZM

Prepared by:
WESTON SOLUTIONS, INC.

7800 West Outer Drive, Ste. 200
Detroit, MI

GEOLOGIC CROSS-SECTION D-D' - I43 LANDFILL
ALLIANT ENERGY
SHEBOYGAN, SHEBOYGAN COUNTY, MICHIGAN

WEST

E

EAST

E'

APPROX. EXTENT OF I-43 LANDFILL

6329 OURTOWN RD

BORING 4

WAGNER CONST

4634 FRT. RD

4420 CNTY RD EE

3605 CNTY RD EE

4602 CNTY RD OK

JACKSON SCHOOL

2448 RIVERDALE

2041 WEEDEN CRK

1660 MAPLE LANE

4334 S. 14TH

4165 S. 13TH

4223 S. 12TH

CLAY DIAMICTON
(clay, sand, trace gravel)

HARD CLAY DIAMICTON
(compacted)

FEET ABOVE MSL

720 700 680 660 640 620 600 580 560 540 520 500 480 460 440 420 400 380 360

347'

202'

220'

134'

400'

165'

173'

228'

175'

250'

173'

182'

198'

LEGEND

- SAND
- SANDY CLAY/ CLAYEY SAND
- CLAY DIAMICTON
- CLAY
- HARD PAN
- DOLOMITE
- WELL BORE
- WELL CASING
- WELL SCREEN
- 120' DENOTES END–OF–BORING IN FEET BELOW GROUNDSURFACE

0 1,500

SCALE (feet)

Figure 8

Prepared for:
U.S. EPA. REGION V
Contract No: EP-S5-06-04

TDD NO: S05-0008-0805-012
DCN: 1040-2A-AJZM

Prepared by:
WESTON SOLUTIONS, INC.

7800 West Outer Drive, Ste. 200
Detroit, MI

GEOLOGIC CROSS-SECTION E-E' - I43 LANDFILL
ALLIANT ENERGY
SHEBOYGAN, SHEBOYGAN COUNTY, MICHIGAN

State of Wisconsin
Department of Natural Resources
Private Water Supply
Box 7921
Madison, Wisconsin 53707

NOTE:
White Copy – Division's Copy
Green Copy – Driller's Copy
Yellow Copy – Owner's Copy

WELL CONSTRUCTOR'S REPORT

Form 3300-1 DEC 10 1984 Rev. 2-79

Site Supply Well

1. COUNTY: Sheboygan
CHECK (✓) ONE: ☒ Town ☐ Village ☐ City
Name: Wilson

2. LOCATION: ¼ Section or Gov't. Lot: SE | Section: 8 | Township: 14N | Range: 23E
OR – Grid or Street No. | Street or Road Name: County Hwy OK
AND – If available subdivision name, lot & block No.

3. NAME ☒ OWNER ☐ AGENT AT TIME OF DRILLING CHECK (✓) ONE
Wisconsin Power + Light
ADDRESS 40 Jaycee Drive - Plumber
P.O. Box 567
POST OFFICE: Appleton | ZIP CODE: 54912

4. Distance in feet from well to nearest: (Record answer in appropriate block)

Building	Sanitary Bldg. Drain		Sanitary Bldg. Sewer		Floor Drain Connected To:		Storm Bldg. Drain		Storm Bldg. Sewe	
	C.I.	Other	C.I.	Other	C.I. Sewer	Other Sewer	C.I.	Other	C.I.	Other
250										

Street Sewer		Other Sewers		Foundation Drain Connected to:				Sewage Sump		Clearwater Sump	Septic Tank	Holding Tank	Sewage Absorption Unit	Manure Hopper or Retention or Pnuematic Tank
San.	Storm	C.I.	Other	Sewer		Sewage Sump		C.I.	Other				Seepage Pit	
				Clearwater Dr.		Clearwater Sump							Seepage Bed	
													Seepage Trench	

Privy	Pet Waste Pit	Pit: Nonconforming Existing		Subsurface Pumproom Nonconforming Existing	Barn Gutter	Animal Barn Pen	Animal Yard	Silo With Pit	Glass Lined Storage Facility	Silo w/o Pit	Earthen Silage Storage Trench Or Pit	Earthen Manure Basin
		Well										
		Pump										
		Tank										

Temporary Manure Stack or Platform	Watertight Liquid Manure Tank or Basin	Manure Pressure Pipe	Subsurface Gasoline or Oil Tank	Waste Pond or Land Disposal Unit (Specify Type)	Manure Storage Basin Concrete Floor Only Concrete Floor and Partial Concrete Walls	Other (Describe): none

5. Well is intended to supply water for: Ash disposal facility-

6. DRILLHOLE

Dia. (in.)	From (ft.)	To (ft.)	Dia. (in.)	From (ft.)	To (ft.)
14	Surface	162	8	207	375
10	162	207			

7. CASING, LINER, CURBING AND SCREEN
Material, Weight, Specification

Dia. (in.)	Mfg. & Method of Assembly	From (ft.)	To (ft.)
8	New PE. 285 Steel	Surface	207
	ASTM A53 Usd.		
	.322 wall		

8. GROUT OR OTHER SEALING MATERIAL

Kind	From (ft.)	To (ft.)
Neat Cement	Surface	207

9. FORMATIONS

Kind	From (ft.)	To (ft.)
red clay	Surface	78
sand + gravel	78	84
clay	84	130
clay + gravel	130	152
limestone	152	375
See variance in County or W.D. file	(7-16-84)	

10. TYPE OF DRILLING MACHINE USED
☐ Cable Tool
☐ Rotary-air w/drilling mud
☐ Rotary-w/drilling mud
☒ Rotary-hammer w/drilling mud & air
☑ Rotary-hammer & air
☐ Reverse Rotary
☐ Jetting with: ☐ Air ☐ Water

Well construction completed on Nov. 30 19 84

11. MISCELLANEOUS DATA
Yield Test: 12 Hrs. at 65 GPM
Depth from surface to normal water level 65 Ft.
Depth of water level when pumping 78 Ft. Stabilized ☒ Yes ☐ No

Well is terminated 18 inches ☒ above ☐ below final grade
Well disinfected upon completion ☒ Yes ☐ No
Well sealed watertight upon completion ☒ Yes ☐ No

Water sample sent to Madison per 3/12/85 phone call - not hi cap laboratory on Dec. 4 1984

Your opinion concerning other pollution hazards, information concerning difficulties encountered, and data relating to nearby wells, screens, seals, method of finishing the well, amount of cement used in grouting, blasting, etc., should be given on reverse side.

Signature: [signature]
441 Registered Well Driller

Business Name and Complete Mailing Address
WAGNER BROTHERS WELL DRILLING, INC.
(414) 753-3301
ROUTE 1 BOX 49
MT. CALVARY, WI 53057

Well Construction Report For WISCONSIN UNIQUE WELL NUMBER KB453

State of WI - Private Water Systems - DG/2
Department of Natural Resources, Box 7921
Madison, WI 53707
Please type or Print using a black Pen
Please Use Decimals Instead of Fractions.

Form 3300-77A
(R 8/00)

Property Owner: **WP@L MCGILLIS, BOB** | Telephone Number: **-452-2700**

Mailing Address: **5326 CTH A**

City: **SHEBOYGAN** | State: **WI** | Zip Code: **53081**

County of Well Location: **Sheboygan** | County Well Permit No.: **W** | Well Completion Date: **12/03/1996**

1. Well Location: [X] Town [ ] City [ ] Village of **WILSON** | Fire # (if available):

Grid or Street Address or Road Name and Number: **5326 CTH A**

Subdivision Name | Lot # | Block #

Well Constructor (Business Name): **HYINK WELL DRILLING INC** | License #: **479** | Facility ID Number (Public Wells):

Address: **N6250 ALPINE RD** | Public Well Plan Approval #: W--

City: **SHEBOYGAN FALLS** | State: **WI** | Zip Code: **53085-2242** | Date of Approval (mm/dd/yyyy):

Gov't Lot # | or **NW** 1/4 of **SW** 1/4 of Section **8** T **14** N; R **23** [X] E [ ] W

Latitude Deg. Min.
Longitude Deg Min.

Hicap Permanent well # | Common Well # | Specific Capacity: **.4** gpm/ft

2. Well Type: [X] Replacement [ ] New [ ] Reconstruction | Lat/Long Method: **GPS008**

of previous unique well # constructed in

Reason for replaced or Reconstructed Well? **NON CONFORMING ALCOVE**

3. Well serves **1** # of homes and or (e.g. barn, restaurant, church, school, industry, etc.)

High capacity Well? [ ] Yes [X] No
Property? [ ] Yes [X] No

[X] Drilled [ ] Driven Point [ ] Jetted [ ] Other:

4. Is the well located upslope or sideslope and not downslope from any contamination source, including those on neighboring properties? [X] Yes [ ] No

Well located within 1,200 feet of a quarry? [ ] Yes [ ] No If yes, distance in feet from quarry:

Well located in floodplain? [ ] Yes [ ] No

Distance in Feet from Well to Nearest:

1. Landfill
16 2. Building Overhang
50 3. Septic [ ] Holding Tank [ ]
61 4. Sewage Absorption Unit
5. Nonconforming Pit
6. Buried Home Heating Oil Tank
7. Buried Petroleum Tank
8. Shoreline [ ] Swimming Pool [ ]
31 9. Downspout/Yard Hydrant
10. Privy
11. Foundation Drain to Clearwater
12. Foundation Drain to Sewer
13. Building Drain [ ] Cast Iron or Plastic [ ] Other
14. Building Sewer [ ] Gravity [ ] Pressure [ ] Cast Iron or Plastic [ ] Other
15. Collector or Street Sewer: [ ] Sanitary units in. diam. [ ] Storm [ ] =< 6 [ ] > 6
16. Clearwater Sump
68 17. Wastewater Sump
18. Paved Animal Barn Pen
19. Animal Yard or Shelter
20. Silo
21. Barn Gutter
22. Manure Pipe [ ] Gravity [ ] Pressure [ ] Cast Iron or Plastic [ ] Other
23. Other Manure Storage
24. Ditch
25. Other NR 812 Waste Storage

5. Drillhole Dimensions and Construction Method

Dia (in.)	From (ft.)	To (ft.)
6	**0**	**182**

Upper Enlarged Drillhole / Lower Open Bedrock

[ ] ---1. Rotary - Mud Circulation----------
[ ] ---2. Rotary - Air----------
[ ] ---3. Rotary - Air and Foam----------
[ ] ---4.Drill-Through Casing Hammer
[ ] ---5. Reverse Rotary
[ ] ---6. Cable-tool Bit in. dia------
[ ] 7. Dual Rotary
[ ] 8. Temp. Outer Casing in. dia. depth (ft)
Removed? [ ] Yes [ ] No
If no, why not?

8. Geology

Type, Caving/Noncaving, Color, Hardness, etc		From (ft.)	To (ft.)
--C-	CLAY	0	12
--S-	SAND	12	44
--Y-	SAND @ GRAVEL	44	91
--C-	CLAY	91	97
--L-	LIMESTONE	97	182

6. Casing, Liner, Screen

Dia. (in.)	Material, Weight, Specification	From (ft.)	To (ft.)
6	**NEW BLACK STEEL 280 WALL ASTMA 53 SAWHILL 18 97LB FT WELDED JOINTS**	**0**	**97**

Dia. (in.)	Screen type, material & slot size		

9. Static Water Level
ft. above ground surface
31 ft. below ground surface

10. Pump Test
Pumping Level **60** ft. below surface
Pumping at **12** GPM for **2** hours

11. Well is: [X] Above Grade **14** in. [ ] Below Grade
Developed? [X] Yes [ ] No
Disinfected? [X] Yes [ ] No
Capped? [X] Yes [ ] No

7. Grout or Other Sealing Material. Method
Method: **MOUNDED**

Kind of Sealing Material	From (ft.)	To (ft.)	# Sacks Cement
BENTONITE	**0**	**0**	**4**

12. Did you notify the owner of the need to permanently abandon and fill all unused wells on this property?
[X] Yes [ ] No If no, explain:

13. Signature of the Well Constructor or Supervisory Driller: **JH** Date signed: **12/20/1996**

Signature of Drill Rig Operator (Mandatory unless same as above) Date signed

Make additional comments on reverse side about geology, additional screens, water quality, etc. **Variance issued** [ ] Yes [X] No

Department of Natural Resources

Well Construction Report Comment Sheet
Form 3300-77A **Rev. 8/00**

Well Codes and Identifiers

Geologic Log No	
SID Number	
Common Well Name	
Well Notification #	
Batch Seq #	431

Well Construction Report For WISCONSIN UNIQUE WELL NUMBER QS395

State of WI - Private Water Systems - DG/2
Department of Natural Resources, Box 7921
Madison, WI 53707
Please type or Print using a black Pen
Please Use Decimals Instead of Fractions.

Form 3300-77A
(R 8/00)

Property Owner: **SPIRO BROS LLC**
Telephone Number: **920-682-6105**
Mailing Address: **W4634 FRONTAGE RD**
City: **SHEBOYGAN** State: **WI** Zip Code: **53081**
County of Well Location: **Sheboygan**
County Well Permit No.: **W**
Well Completion Date: **09/04/2002**

1. Well Location: [X] Town [ ] City [ ] Village of **WILSON**
Fire # (if available):
Grid or Street Address or Road Name and Number: **W4634 FRONTAGE RD**
Subdivision Name: Lot #: Block #:

Well Constructor (Business Name): **ROGER WEBER**
License #: **99**
Facility ID Number (Public Wells):
Address: **N2253 CTY G**
Public Well Plan Approval #: W--
City: **CHILTON** State: **WI** Zip Code: **53014**
Date of Approval (mm/dd/yyyy):
Hicap Permanent well #:
Common Well #:
Specific Capacity: **1** gpm/ft

Gov't Lot #: or **NE** 1/4 of **NE** 1/4 of
Section **8** T **14** N; R **23** [X] E [ ] W
Latitude Deg. Min.
Longitude Deg Min.

2. Well Type: [ ] Replacement [X] New [ ] Reconstruction
Lat/Long Method: **GPS008**
of previous unique well # constructed in
Reason for replaced or Reconstructed Well?

3. Well serves: **COMMERICIAL** # of homes and or (e.g. barn, restaurant, church, school, industry, etc.)
High capacity Well? [ ] Yes [X] No
Property? [ ] Yes [X] No

[ ] Drilled [ ] Driven Point [ ] Jetted [ ] Other:

4. Is the well located upslope or sideslope and not downslope from any contamination source, including those on neighboring properties? [X] Yes [ ] No
Well located within 1,200 feet of a quarry? [ ] Yes [ ] No If yes, distance in feet from quarry:
Well located in floodplain? [ ] Yes [X] No

Distance in Feet from Well to Nearest:
1. Landfill
10 2. Building Overhang
45 3. Septic [ ] Holding Tank [X]
4. Sewage Absorption Unit
5. Nonconforming Pit
6. Buried Home Heating Oil Tank
7. Buried Petroleum Tank
8. Shoreline [ ] Swimming Pool [ ]
9. Downspout/Yard Hydrant
10. Privy
11. Foundation Drain to Clearwater
12. Foundation Drain to Sewer
13. Building Drain [ ] Cast Iron or Plastic [ ] Other
38 14. Building Sewer [X] Gravity [ ] Pressure [X] Cast Iron or Plastic [ ] Other
15. Collector or Street Sewer: [ ] Sanitary units in. diam. [ ] Storm [ ] =< 6 [ ] > 6
16. Clearwater Sump
17. Wastewater Sump
18. Paved Animal Barn Pen
19. Animal Yard or Shelter
20. Silo
21. Barn Gutter
22. Manure Pipe [ ] Gravity [ ] Pressure [ ] Cast Iron or Plastic [ ] Other
23. Other Manure Storage
24. Ditch
25. Other NR 812 Waste Storage

5. Drillhole Dimensions and Construction Method

Dia (in.)	From (ft.)	To (ft.)
10	**0**	**20**
6	**20**	**220**

Upper Enlarged Drillhole / Lower Open Bedrock
[ ] ---1. Rotary - Mud Circulation---------- [ ]
[X] ---2. Rotary - Air---------- [X]
[ ] ---3. Rotary - Air and Foam---------- [ ]
[ ] ---4.Drill-Through Casing Hammer
[ ] ---5. Reverse Rotary
[ ] ---6. Cable-tool Bit in. dia------ [ ]
[ ] 7. Dual Rotary [ ]
[ ] 8. Temp. Outer Casing in. dia. depth (ft)
Removed? [ ] Yes [ ] No
If no, why not?

8. Geology

Type, Caving/Noncaving, Color, Hardness, etc		From (ft.)	To (ft.)
--I-	**TOP SOIL**	**0**	**4**
R-C-	**RED CLAY**	**4**	**149**
G-CG	**STONEY GRAY CLAY**	**149**	**165**
--L-	**LIMESTONE**	**165**	**220**

6. Casing, Liner, Screen

Dia. (in.)	Material, Weight, Specification	From (ft.)	To (ft.)
6	**BLACK STAND STEEL PPE NEW 18.97#/FT PE SEAMLESS IPSCO TUBULAR ASTM-A-53GR B**	**0**	**165**

Dia. (in.)	Screen type, material & slot size		

9. Static Water Level
ft. above ground surface
90 ft. below ground surface

10. Pump Test
Pumping Level **115** ft. below surface
Pumping at **25** GPM for **2** hours

11. Well is: [X] Above Grade **18** in. [ ] Below Grade
Developed? [X] Yes [ ] No
Disinfected? [X] Yes [ ] No
Capped? [X] Yes [ ] No

7. Grout or Other Sealing Material. Method
Method: **FLOODED HOLE**

Kind of Sealing Material	From (ft.)	To (ft.)	# Sacks Cement
PUDDLED CLAY	**0**	**20**	

12. Did you notify the owner of the need to permanently abandon and fill all unused wells on this property?
[ ] Yes [ ] No If no, explain:

13. Signature of the Well Constructor or Supervisory Driller: **FF** Date signed: **09/04/2002**
Signature of Drill Rig Operator (Mandatory unless same as above) Date signed

Make additional comments on reverse side about geology, additional screens, water quality, etc.
Variance issued [ ] Yes [X] No

Department of Natural Resources

Well Construction Report Comment Sheet
Form 3300-77A **Rev. 8/00**

Well Codes and Identifiers

Geologic Log No	
SID Number	
Common Well Name	
Well Notification #	
Batch Seq #	811

WELL CONSTRUCTOR'S REPORT
FORM 3300--15

NOTE
WHITE COPY – DIVISION'S COPY
GREEN COPY – DRILLER'S COPY
YELLOW COPY – OWNER'S COPY

STATE OF WISCONSIN
DEPARTMENT OF NATURAL RESOURCES
Box 450
Madison, Wisconsin 53701

1. COUNTY: **Sheboygan** | CHECK ONE: [X] Town [ ] Village [ ] City | NAME: **Wilson**

2. LOCATION – ¼ Section: **N.E.¼** | Section: **8** | Township: **T.14N.** | Range: **R.23E.**
OR Grid or street no. | Street name
AND If available subdivision name, lot & block no.

3. OWNER AT TIME OF DRILLING: **Wis. Cycle Supply Co.**
ADDRESS: **Route # 3 EE**
POST OFFICE: **Sheboygan, Wisconsin**

4. Distance in feet from well to nearest: (Record answer in appropriate block)

BUILDING	SANITARY SEWER C. I.	SANITARY SEWER TILE	FLOOR DRAIN C. I.	FLOOR DRAIN TILE	FOUNDATION DRAIN SEWER CONNECTED	FOUNDATION DRAIN INDEPENDENT	WASTE WATER DRAIN C. I.	WASTE WATER DRAIN TILE
12	--	--	---	--	----	---	60	--

CLEAR WATER DRAIN C. I.	CLEAR WATER DRAIN TILE	SEPTIC TANK	PRIVY	SEEPAGE PIT	ABSORPTION FIELD	BARN	SILO	ABANDONED WELL	SINK HOLE
---	---	---	--	---	----	---	---	----	---

OTHER POLLUTION SOURCES (Give description such as dump, quarry, drainage well, stream, pond, lake, etc.)
None

5. Well is intended to supply water for:
Bicycle Shop

6. DRILLHOLE

Dia. (in.)	From (ft.)	To (ft.)	Dia. (in.)	From (ft.)	To (ft.)
10	Surface	22			
6	22	174			

7. CASING, LINER, CURBING, AND SCREEN

Dia. (in.)	Kind and Weight	From (ft.)	To (ft.)
6	New black steel pipe, threaded & coupled 19.45 per ft.	Surface	159

8. GROUT OR OTHER SEALING MATERIAL

Kind	From (ft.)	To (ft.)
Clay slurry	Surface	22

9. FORMATIONS

Kind	From (ft.)	To (ft.)
Clay	Surface	78
Sand	78	130
Clay	130	155
Hard Pan	155	159
Limestone Rock	159	174

10. TYPE OF DRILLING MACHINE USED
[X] Cable Tool [ ] Direct Rotary [ ] Reverse Rotary
[ ] Rotary – air w/drilling mud [ ] Rotary – hammer with drilling mud & air [ ] Jetting with [ ] Air [ ] Water

Well construction completed on **June 16** 19**72**

11. MISCELLANEOUS DATA
Yield test: **10** Hrs. at **16** GPM
Depth from surface to normal water level **74** ft.
Depth to water level when pumping **81** ft.

Well is terminated **10** inches [X] above [ ] below final grade
Well disinfected upon completion [X] Yes [ ] No
Well sealed watertight upon completion [X] Yes [ ] No

Water sample sent to **Madison** laboratory on: **June 20** 19**72**

Your opinion concerning other pollution hazards, information concerning difficulties encountered, and data relating to nearby wells, screens, seals, type of casing joints, method of finishing the well, amount of cement used in grouting, blasting, sub-surface pumprooms, access pits, etc., should be given on reverse side.

SIGNATURE: Erwin W. Fintel
Registered Well Driller

COMPLETE MAIL ADDRESS: **Route # 3 KK Sheboygan, Wisconsin**

Please do not write in space below

COLIFORM TEST RESULT	GAS – 24 HRS.	GAS – 48 HRS.	CONFIRMED	REMARKS

REV. 3-71 SB3517

State of Wisconsin
Department of Natural Resources
Box 7921
Madison, Wisconsin

NOTE:
White Copy — Division's Copy
Green Copy — Driller's Copy
Yellow Copy — Owner's Copy

WELL CONSTRUCTOR'S REPORT

Form 3300-15 Rev. 12-76

1. COUNTY: Sheboygan — CHECK (✓) ONE: [X] Town [ ] Village [ ] City — Name: Wilson

2. LOCATION: N.E.¼ Section 8 Township T.14N. Range R.23E.
OR Grid Street No. Street Name: Frontage Rd.
AND Plat/subdivision name, lot & block No.

3. NAME [X] OWNER [ ] AGENT AT TIME OF DRILLING CHECK (✓) ONE
William Behrens
ADDRESS: Stahl Rd.
POST OFFICE: Sheboygan, Wisconsin

4. Distance in feet from well to nearest: (Record answer in appropriate block)

Building	Sanitary Bldg. Drain C.I.	Sanitary Bldg. Drain Other	Sanitary Bldg. Sewer C.I.	Sanitary Bldg. Sewer Other	Floor Drain Connected To C.I. Sewer	Floor Drain Connected To Other Sewer	Storm Bldg. Drain C.I.	Storm Bldg. Drain Other	Storm Bldg. Sewer C.I.	Storm Bldg. Sewer Other
14	90				90					

Street Sewer (San., Storm, C.I., Other) — Other Sewers — Foundation Drain Connected To (Sewer, Clearwater Drain, Sewage Sump, Clearwater Sump) — Sewage Sump (C.I., Other) — Clearwater Sump — Septic Tank — Holding Tank: 175 — Sewage Absorption Unit (Seepage Pit, Seepage Bed, Seepage Trench)

Privy — Pet Waste Pit — Non-conforming Existing Well, Pump Pit — Subsurface Pumproom — Nonconforming Existing — Barn Gutter — Animal Barn Pen — Animal Yard — Silo With Pit — Glass Lined Storage Facility — Silo w/o Pit — Earthen Silage Storage Trench Or Pit

Temporary Manure Stack — Watertight Liquid Manure Tank — Solid Manure Storage Structure — Subsurface Gasoline or Oil Tanks — Waste Pond or Land Disposal Unit (Specify Type) — Other (Give Description): None

5. Well is intended to supply water for: Warehouse

6. DRILLHOLE

Dia. (in.)	From (ft.)	To (ft.)	Dia. (in.)	From (ft.)	To (ft.)
10	Surface	22			
6	22	165			

7. CASING, LINER, CURBING AND SCREEN

Dia. (in.)	Material, Weight, Specification & Method of Assembly	From (ft.)	To (ft.)
6	New black steel pipe, threaded & coupled .280 +ASTM A53 Sumitomo Metal Ind.	Surface	153

8. GROUT OR OTHER SEALING MATERIAL

Kind	From (ft.)	To (ft.)
Clay slurry	Surface	22

9. FORMATIONS

Kind	From (ft.)	To (ft.)
Clay	Surface	14
Sand	14	18
Clay	18	85
Sand	85	115
Clay	115	150
Hard Pan	150	153
Limestone Rock	153	165

10. TYPE OF DRILLING MACHINE USED
[X] Cable Tool [ ] Rotary hammer w/drilling mud & air [ ] Jetting with [ ] Air [ ] Water
[ ] Rotary air w/drilling mud [ ] Rotary hammer & air
[ ] Rotary w/drilling mud [ ] Reverse Rotary

Well construction completed on August 21 1978
Well is terminated 10 inches [X] above [ ] below final grade
Well disinfected upon completion [X] Yes [ ] No
Well sealed watertight upon completion [X] Yes [ ] No

11. MISCELLANEOUS DATA
Yield Test: 8 Hrs. at 20 GPM
Depth from surface to normal water level 71 Ft.
Depth of water level when pumping 83 Ft. Stabilized [X] Yes [ ] No

Water sample sent to Sheboygan laboratory on August 22 1978

Your opinion concerning other pollution hazards, information concerning difficulties encountered, and data relating to nearby wells, screens, seals, method of finishing the well, amount of cement used in grouting, blasting, etc., should be given on reverse side.

Signature: Erwin W. Fritsch
Registered Well Driller

Complete Mail Address: Route #3 KK Sheboygan, Wisconsin

3518

WELL CONSTRUCTOR'S REPORT
FORM 3300–15

OCT 29 1975

NOV 10 1975

NOTE
WHITE COPY – DIVISION'S COPY
GREEN COPY – DRILLER'S COPY
YELLOW COPY – OWNER'S COPY

STATE OF WISCONSIN
DEPARTMENT OF NATURAL RESOURCES
Box 450
Madison, Wisconsin 53701

1. COUNTY Sheboygan

CHECK ONE: [X] Town [ ] Village [ ] City

NAME: Wilson

2. LOCATION – ¼ Section: N.E.¼ | Section: 8 | Township: T.14N. | Range: R.23E.

OR – Grid or street no. | Street name: Frontage Rd.

AND – If available subdivision name, lot & block no.

3. OWNER AT TIME OF DRILLING William Behrens

ADDRESS: Stahl Rd.

POST OFFICE: Sheboygan, Wisconsin

4. Distance in feet from well to nearest: (Record answer in appropriate block)

BUILDING	SANITARY SEWER C. I.	SANITARY SEWER TILE	FLOOR DRAIN C. I.	FLOOR DRAIN TILE	FOUNDATION DRAIN SEWER CONNECTED	FOUNDATION DRAIN INDEPENDENT	WASTE WATER DRAIN C. I.	WASTE WATER DRAIN TILE
10	---	---	30	--	----	----	15	---

CLEAR WATER DRAIN C. I.	CLEAR WATER DRAIN TILE	SEPTIC TANK	PRIVY	SEEPAGE PIT	ABSORPTION FIELD	BARN	SILO	ABANDONED WELL	SINK HOLE
---	---	70	--	---	80	--	---	----	---

OTHER POLLUTION SOURCES (Give description such as dump, quarry, drainage well, stream, pond, lake, etc.)
None

5. Well is intended to supply water for: Warehouse

6. DRILLHOLE

Dia. (in.)	From (ft.)	To (ft.)	Dia. (in.)	From (ft.)	To (ft.)
10	Surface	22			
6	22	178			

7. CASING, LINER, CURBING, AND SCREEN

Dia. (in.)	Kind and Weight	From (ft.)	To (ft.)
6	New black steel	Surface	163
	pipe, threaded &		
	coupled .280		
	A 53		

8. GROUT OR OTHER SEALING MATERIAL

Kind	From (ft.)	To (ft.)
Clay slurry	Surface	22

9. FORMATIONS

Kind	From (ft.)	To (ft.)
Clay	Surface	14
Sand	14	20
Clay	20	85
Sand	85	135
Clay	135	155
Hard Pan	155	163
Limestone Rock	163	178

10. TYPE OF DRILLING MACHINE USED

[X] Cable Tool | [ ] Direct Rotary | [ ] Reverse Rotary
[ ] Rotary – air w/drilling mud | [ ] Rotary – hammer with drilling mud & air | [ ] Jetting with [ ] Air [ ] Water

Well construction completed on Oct. 18 19 75

11. MISCELLANEOUS DATA

Yield test: 24 Hrs. at 22 GPM

Depth from surface to normal water level 68 ft.

Depth to water level when pumping 83 ft.

Well is terminated 10 inches [X] above [ ] below final grade

Well disinfected upon completion [X] Yes [ ] No

Well sealed watertight upon completion [X] Yes [ ] No

Water sample sent to Madison laboratory on: Oct. 20 1975

Your opinion concerning other pollution hazards, information concerning difficulties encountered, and data relating to nearby wells, screens, seals, type of casing joints, method of finishing the well, amount of cement used in grouting, blasting, sub-surface pumprooms, access pits, etc., should be given on reverse side.

SIGNATURE: Erwin W. Fritsch
Registered Well Driller

COMPLETE MAIL ADDRESS: Route #3 KK Sheboygan, Wisconsin

3520

Please do not write in space below

COLIFORM TEST RESULT	GAS – 24 HRS.	GAS – 48 HRS.	CONFIRMED	REMARKS

REV. 3–71

State of Wisconsin
Department of Natural Resources
Box 450
Madison, Wisconsin 53701

NOTE:
White Copy – Division's Copy
Green Copy – Driller's Copy
Yellow Copy – Owner's Copy

WELL CONSTRUCTOR'S REPORT
Form 3300-15
Rev. 10-75

1. COUNTY: Sheboygan

CHECK (✓) ONE: ☒ Town ☐ Village ☐ City

Name: Wilson

2. LOCATION: ¼ Section: N.E.¼ Section: 8 Township: T. 14N. Range: R. 23E.

OR – Grid or Street No. Street Name: Frontage Rd.

AND If available subdivision name, lot & block No.

3. NAME ☒ OWNER ☐ AGENT AT TIME OF DRILLING CHECK (✓) ONE: William Behrens

ADDRESS: Stahl Rd.

POST OFFICE: Sheboygan, Wisconsin

4. Distance in feet from well to nearest: (Record answer in appropriate block)

Building	Sanitary Bldg. Drain		Sanitary Bldg. Sewer		Floor Drain Connected To:		Storm Bldg. Drain		Storm Bldg. Sewer	
	C.I.	Other	C.I.	Other	C.I. Sewer	Other Sewer	C.I.	Other	C.I.	Other
14	55				75					

Street Sewer		Other Sewers		Foundation Drain Connected to:		Sewage Sump		Clearwater Sump	Septic Tank	Holding Tank	Sewage Absorption Unit	
San.	Storm	C.I.	Other	Sewer	Clearwater Dr.	Sewage Sump	Clearwater Sump	C.I.	Other				Seepage Pit	
										90			Seepage Bed	
													Seepage Trench	

Privy	Pet Waste Pit	Pit: Nonconforming Existing		Subsurface Pumproom Nonconforming Existing	Barn Gutter	Animal Barn Pen	Animal Yard	Silo With Pit	Glass Lined Storage Facility	Silo w/o Pit	Earthen Silage Storage Trench Or Pit
		Well									
		Pump									
		Tank									

Temporary Manure Stack	Watertight Liquid Manure Tank	Solid Manure Storage Structure	Subsurface Gasoline or Oil Tank	Waste Pond or Land Disposal Unit (Specify Type)	Other (Give Description)
					None

5. Well is intended to supply water for: Warehouse

6. DRILLHOLE

Dia. (in.)	From (ft.)	To (ft.)	Dia. (in.)	From (ft.)	To (ft.)
10	Surface	22			
6	22	192			

7. CASING, LINER, CURBING AND SCREEN

Dia. (in.)	Material, Weight, Specification & Method of Assembly	From (ft.)	To (ft.)
6	New black steel pipe, threaded & coupled .280 +ASTM A 53	Surface	171

8. GROUT OR OTHER SEALING MATERIAL

Kind	From (ft.)	To (ft.)
Clay slurry	Surface	22

9. FORMATIONS

Kind	From (ft.)	To (ft.)
Clay	Surface	15
Sand	15	20
Clay	20	92
Sand	92	125
Clay	125	165
Hard Pan	165	171
Limestone Rock	171	192

10. TYPE OF DRILLING MACHINE USED

☒ Cable Tool
☐ Rotary-air w/drilling mud
☐ Rotary-w/drilling mud
☐ Rotary-hammer w/drilling mud & air
☐ Rotary-hammer & air
☐ Reverse Rotary
☐ Jetting with Air Water

11. MISCELLANEOUS DATA

Yield Test: 10 Hrs. at 22 GPM

Depth from surface to normal water level 70 Ft.

Depth of water level when pumping 85 Ft. Stabilized ☒ Yes ☐ No

Well construction completed on Dec. 23 19 76

Well is terminated 9 inches ☒ above ☐ below final grade

Well disinfected upon completion ☒ Yes ☐ No

Well sealed watertight upon completion ☒ Yes ☐ No

Water sample sent to Madison laboratory on Jan. 5 1977

Your opinion concerning other pollution hazards, information concerning difficulties encountered, and data relating to nearby wells, screens, seals, method of finishing the well, amount of cement used in grouting, blasting, etc., should be given on reverse side.

Signature: Emmit W. Fentsch
Registered Well Driller

Complete Mail Address: Route #3 KK Sheboygan, Wisconsin

3519

Table 1. Water Level Summary
WPL - I43 / SCS Engineers Project #25224069.00

Well Number	Ground Water Elevation in feet above mean sea level (amsl)					
	MW-301	MW-302	MW-303	MW-304	MW-305	MW-306
Top of Casing Elevation (feet amsl) - resurveyed 12/12/2023	697.19	702.81	719.47	692.12	717.97	693.61
Top of Casing Elevation (feet amsl)	696.96	702.57	719.25	691.97	717.67	--
Screen Length (ft)	5.0	5.0	5.0	5.0	5.0	5.0
Total Depth (ft from top of casing)	134.56	144.33	144.65	119.49	122.97	138.31
Top of Well Screen Elevation (ft)	567.40	563.24	579.60	577.48	600.46	560.30
Measurement Date						
April 26, 2016	653.54	653.56	653.59	655.90	--	NI
June 20, 2016	652.01	651.89	651.80	653.79	--	NI
August 9, 2016	649.68	649.30	649.37	651.55	--	NI
October 19, 2016	652.32	652.38	652.18	654.00	--	NI
December 19, 2016	652.85	652.79	652.82	654.26	--	NI
January 5, 2017	652.86	652.82	652.80	654.15	--	NI
January 23, 2017	652.98	664.97*	652.92	654.37	--	NI
February 23, 2017	653.14	653.10	653.10	654.49	658.02	NI
April 7, 2017	654.43	654.72	654.55	654.85	659.65	NI
June 6, 2017	654.11	654.12	654.14	655.70	659.70	NI
August 1, 2017	652.64	652.55	652.50	654.49	658.54	NI
October 23, 2017	652.03	652.05	652.03	653.65	657.22	NI
April 3, 2018	651.28	651.25	651.30	652.86	656.24	NI
October 4, 2018	650.71	650.70	650.70	652.26	655.89	NI
April 8-9, 2019	653.06	654.06	654.06	655.59	659.03	NI
October 8, 2019	653.26	653.21	653.27	654.77	658.77	NI
November 26, 2019	--	--	655.56	--	--	NI
April 7, 2020	656.59	656.47	656.46	658.16	661.58	NI
May 20, 2020	--	655.81	--	--	--	NI
October 13, 2020	652.16	652.17	652.20	654.17	658.08	NI
December 18, 2020	653.91	653.88	--	--	--	NI
April 13, 2021	654.56	654.57	654.53	656.36	659.69	NI
June 16, 2021	649.78	649.75	--	--	--	NI
October 26, 2021	650.76	650.88	650.90	652.54	655.86	NI
April 11-13, 2022	651.65	651.62	651.58	653.08	657.58	NI
June 16, 2022	--	650.55	--	--	--	NI
October 4, 2022	648.87	648.85	648.89	650.51	654.40	NI
February 14, 2023	651.61	651.60	651.61	653.17	656.25	NI
March 22, 2023	652.44	652.43	652.42	654.04	657.48	NI
April 24-25, 2023	653.26	653.25	653.31	654.83	658.22	NI
May 25, 2023	651.28	651.24	651.30	653.17	657.54	NI
June 26, 2023	648.06	648.05	648.07	649.86	655.07	NI
July 26, 2023	647.08	647.02	647.17	649.15	652.09	NI
October 11, 2023	648.65	648.67	648.65	650.24	654.22	NI
November 14, 2023	649.98	649.97	649.95	651.37	654.89	NI
November 14, 2023 elevations based on re-surveyed TOC	650.21	650.21	650.17	651.52	655.19	NI
April 15, 2024	652.95	652.93	652.96	654.82	658.53	NI
July 19, 2024	653.41	653.41	653.39	655.04	659.29	--
August 8, 2024	650.96	650.98	650.96	653.07	657.85	651.58
October 2, 2024	650.21	650.48	650.15	652.01	656.60	650.47
January 16, 2025	652.30	652.34	652.32	653.92	657.50	652.27
Bottom of Well Elevation (ft)	562.40	558.24	574.60	572.48	594.70	555.30

Notes: -- = not measured
*: The calculated groundwater elevation at MW-302 on January 23, 2017 appears to reflect an error in recording the pre-purge depth to water during sampling.

Created by: RM Date: 1/10/2020
Last rev. by: MDB Date: 3/25/2025
Checked by: RM Date: 3/25/2025

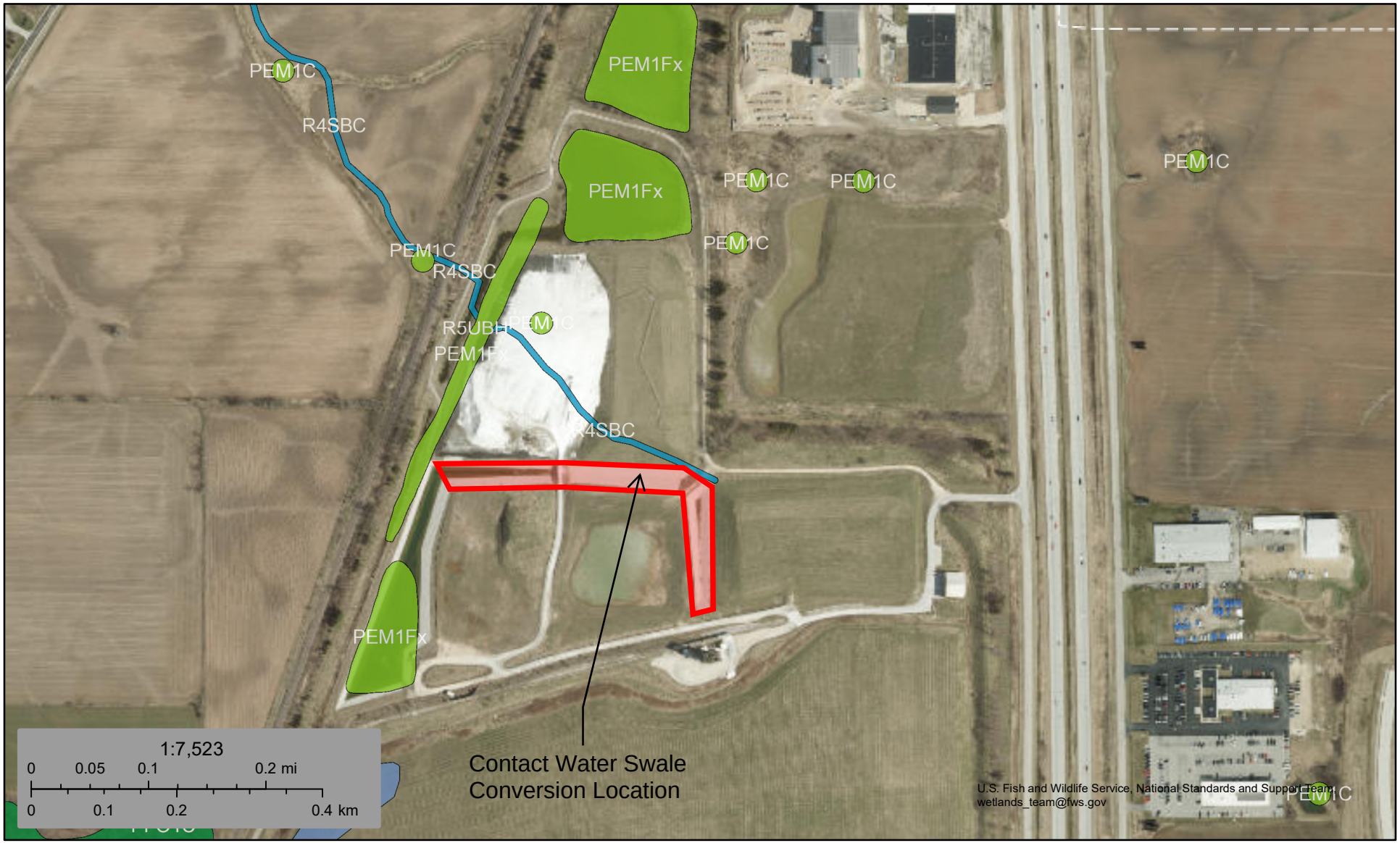
I:\25224069.00\Data and Calculations\Tables\[I43_wlstat_CCR_with 231212 resurvey.xls]levels

Appendix B

Wetland Information

U.S. Fish and Wildlife Service
National Wetlands Inventory

Wetlands



July 7, 2025

Wetlands

- Estuarine and Marine Deepwater
- Estuarine and Marine Wetland
- Freshwater Emergent Wetland
- Freshwater Forested/Shrub Wetland
- Freshwater Pond
- Lake
- Other
- Riverine

This map is for general reference only. The US Fish and Wildlife Service is not responsible for the accuracy or currentness of the base data shown on this map. All wetlands related data should be used in accordance with the layer metadata found on the Wetlands Mapper web site.

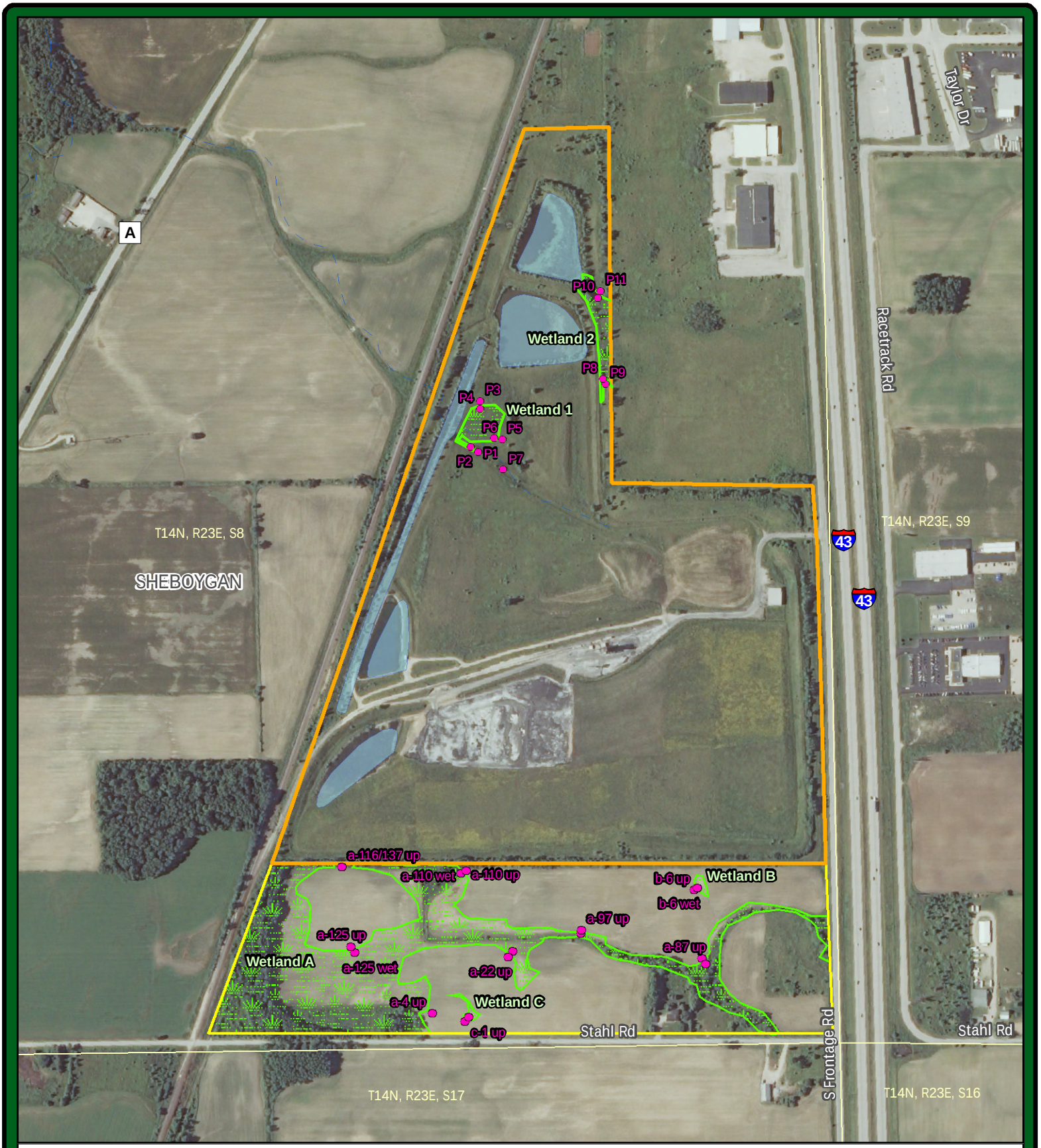


Figure 4. Field Delineated Wetlands
WPL Edgewater Facility

Location
S8, T14N, R23E;
Town of Wilson, Sheboygan Co., WI
0 300 600 Feet

Project Information
Project Number : 009-0074-01
Modified March 11, 2010

Legend
- Existing Facility
- Spoils Storage Site
- Field Delineated Wetlands
- Sample Points
- Section Line

DNR 24k Hydrography
- Perennial Stream
- Intermittent Stream
- Waterbody

NRC
Natural Resources Consulting, Inc.
209 Commerce Parkway
P.O. Box 128
Cottage Grove, WI 53527-0128
phone: 608-839-1998
fax: 608-839-1995
www.nrcdifference.com

Data Sources include WDNR, WDOT, USDA 2008 NAIP Orthophotography.

Figure 4.mxd Map Created by C. Pekar

State of Wisconsin
DEPARTMENT OF NATURAL RESOURCES
101 S. Webster Street
P.O. Box 7921
Madison, WI 53707-7921

Scott Walker, Governor
Cathy Stepp, Secretary
Telephone 608-266-2621
Toll Free 1-888-936-7463
TTY Access via relay - 711

May 20, 2014 IP-SE-2014-60-N00754

Ted Shonts
Wisconsin Power & Light Company
3739 Lakeshore Drive
Sheboygan, WI 53081

Dear Mr. Shonts:

The Department has completed review of your application to discharge fill material into wetlands for the Edgewater Landfill Expansion (Phases III & IV) Project. We have determined that your project meets state wetland standards.

Enclosed is your state wetland permit which authorizes the permanent and temporary wetland fill for your project, and lists the conditions which must be followed. Please read your permit carefully so that you are fully aware of what is expected of you. The attached permit is not an approval from the WDNR Solid Waste Program.

Please note you are required to submit photographs of the completed project within 7 days after you've finished construction. This helps both of us to document the completion of the project and compliance with the permit conditions.

If you have any questions, please feel free to call me at 608.266.3524, or you can email me at benjamin.callan@wisconsin.gov

Sincerely,

Benjamin Callan
Water Management Specialist

cc: Chuck Hermann, Stantec
Sheboygan County Zoning
Anthony Jernigan, US Army Corps of Engineers
Kathi Kramasz, WDNR (SER – Plymouth)
Bob Grefe, WDNR (WA/5)
Rob Grosch, WDNR (SER - Waukesha)

STATE OF WISCONSIN **Wetland Individual Permit**
DEPARTMENT OF NATURAL RESOURCES **IP-SE-2014-60-N00754**

Wisconsin Power and Light Company (WPL) is hereby granted under Section 281.36, Wisconsin Statutes, and 33 U.S.C.S §1341 (CWA §401) a permit to discharge fill material into wetlands in the Town of Wilson, Sheboygan County, also described as in the NE1/4 of Section 08, Township 14 North, Range 23 East, subject to the following conditions:

PERMIT

1. You must notify Ben Callan (phone 608.266.3524 or email Benjamin.Callan@wisconsin.gov) before starting the discharge and again not more than 5 days after the discharge is complete.

2. You must complete the discharge as described on or before 05/13/2019. If you will not complete the discharge by this date, you must submit a written request for an extension prior to the expiration date of the permit. Your request must identify the requested extension date and the reason for the extension. A permit extension may be granted, for good cause, by the Department. You may not begin or continue construction after the original permit expiration date unless the Department grants a new permit or permit extension in writing.

3. This permit does not authorize any work other than what you specifically describe in your application and plans dated 09/13/2011, and as modified by the conditions of this permit. If you wish to alter the project or permit conditions, you must first obtain written approval of the Department.

4. No wetlands may be disturbed other than where specifically authorized in the plans approved by the Department.

5. You are responsible for obtaining any permit or approval that may be required for your project by local zoning ordinances, the state of Wisconsin, and by the U.S. Army Corps of Engineers before starting your project.

6. Upon reasonable notice, you shall allow access to your project site during reasonable hours to any Department employee who is investigating the project's construction, operation, maintenance or permit compliance.

7. The Department may modify or revoke this permit if the project is not completed according to the terms of the permit, or if the Department determines the activity results in significant adverse impact to wetland functional values, in significant adverse impact to water quality, or in other significant adverse environmental consequences.

8. You must post a copy of this permit at the main construction entrance to the project site, for at least five days prior to construction, and remaining while active wetland filling is occurring. You must also have a copy of the permit and approved plan available at the project site at all times until the project is complete.

9. Your acceptance of this permit and efforts to begin work on this project signify that you have read, understood and agreed to follow all conditions of this permit.

10. You must submit a series of photographs to the Department documenting the before / during / after conditions where temporary wetland impacts occur. The photographs must be taken from different vantage points and depict all work authorized by this permit.

11. You, your agent, and any involved contractors or consultants may be considered a party to the violation pursuant to Section 281.36 (13), Wis. Stats., for any violations of Section 281.36, Wisconsin Statutes, or this permit.

12. This permit has been issued with the understanding that all construction vehicles and equipment used are appropriate for the job, and can be brought to and removed from the project site without causing harm to fish, wildlife, and their habitats.

13. You must restrict the removal of native vegetative cover in wetlands to the minimum amount necessary for construction.

14. Construction shall be accomplished in such a manner as to minimize erosion and siltation into surface waters. All erosion control measures must meet or exceed the technical standards of ch. NR 151, Wis. Adm. Code. The technical standards are found at: http://dnr.wi.gov/topic/stormwater/standards/const_standards.html .

15. Appropriate erosion control must be in place and effective during every phase of this project.

16. Erosion control measures must be in place at the end of each working day.

17. Erosion control measures must be inspected, and any necessary repairs or maintenance performed, after every rainfall exceeding ½ inch and at least once per week.

18. Dewatering of work areas shall be conducted in accordance with the standards of the applicable permit under Wisconsin's Pollutant Discharge Elimination System and approved technical standards.

19. At no time shall dewatering activities directly discharge to wetlands or waterways without prior effective water quality treatment.

20. All vehicles and equipment used in wetlands must be checked at least once per work day for fluid (e.g. fuel, oil, hydraulic, coolant, etc.) leaks. All leaks must be immediately corrected before the equipment is allowed back into operation.

21. All equipment used for the project, including but not limited to, vehicles, mats, hoses and pumps, shall be free of invasive and exotic species and viruses prior to use and after use in any waterway and wetland. Decontamination protocols can be found at: http://dnr.wi.gov/invasives/action.htm.

22. Work for this project must comply with all conditions that are part of any required Incidental Take Authorization / Permit, or avoidance measures provided by BER.

23. Except where permanent fill is authorized, this project shall not result in adverse hydrologic impacts to wetlands.

24. Construction and operation of the landfill expansion shall be in conformance with the plans submitted to the Department and comply with the conditions specified in the Feasibility Determination and any other subsequent approvals by the Waste and Materials Management Program.

25. Final site stabilization requires the re-establishment of vegetation and should not contain any plant species listed as invasive by the Department. A listing of what the Department considers invasive species can be found on the Department's website http://dnr.wi.gov/org/caer/ce/invasives/.

26. Authorization hereby granted by the Department is transferable upon prior written approval of the transfer by the Department.

FINDINGS OF FACT

1. Wisconsin Power and Light (WPL) has filed an application for a permit to discharge fill material into wetlands west of I-43 and north of Stahl Road, in the Town of Wilson, Sheboygan County, also described as NE1/4 S08, T14N, R23E.

2. The Edgewater Landfill Expansion (Phases III & IV) Project includes permanent fill of 0.81 acres of wetland, and temporary fill of 0.08 acres of wetland.

3. The existing landfill site is approximately 125 acres in size, and is comprised of active landfill cells, covered landfill cells maintained in rough grass, stabilized soil stockpile areas, accessory buildings, stormwater management systems, fallow areas, and wetlands.

4. The landfill site began operation in 1985, and is used to dispose of ash from the Edgewater Electric Generating Station.

5. The WPL application for the project was originally submitted on 9-13-2011, and wetland compensatory mitigation is not required.

6. No practicable alternative exists which would avoid impacts to wetlands, and the project will result in the least environmentally damaging practicable alternative taking into consideration practicable alternatives that avoid wetland impacts. Expansion of the existing landfill facility will utilize the site's capacity, minimize the need for additional waste ash handling, and take advantage of existing infrastructure for waste handling and stormwater management.

7. All practicable measures to minimize adverse impacts to the functional values of the wetland have been taken. Alternative considerations varied in their ability to address design requirements necessary to satisfy the Feasibility Determination by the Waste Program. Alternatives (including no-build and off-site locations) have been examined, but were demonstrated to not be practicable due to the constraints associated with the Feasibility Determination from the Waste Program.

8. The proposed project will not result in significant adverse impacts to wetland functional values, significant impacts to water quality, or other significant adverse environmental consequences.

9. The Department has completed an investigation of the project site and has evaluated the project as described in the application and plans.

10. The Department of Natural Resources has completed all procedural requirements and the project as permitted will comply with all applicable requirements of 33 U.S.C.S. §1341 (CWA §401); Sections 1.11, 281.36, Wisconsin Statutes and Chapters NR 102, 103, 150, and 299 of the Wisconsin Administrative Code.

11. The applicant was responsible for fulfilling the procedural requirements for publication of notices under s. 281.36(3p)(d)1m., Stats., and was responsible for publication of the notice of pending application under s. 281.36(3m)(g), Stats. or the notice of public informational hearing under s. 281.36(3m)(h), Stats., or both. S. 281.36(3m)(i), Stats., provides that if no public hearing is held, the Department must issue its decision within 30 days of the 30-day public comment period, and if a public hearing is held, the Department must issue its decision within 20 days after the 10-day period for public comment after the public hearing. S. 281.36(3p)(c), Stats., requires the Department to consider the date on which the department publishes a notice on its web site as the date of notice.

CONCLUSIONS OF LAW

1. The Department has authority under the above indicated Statutes and Administrative Codes, to issue a permit for the construction and maintenance of this project.

NOTICE OF APPEAL RIGHTS

If you believe that you have a right to challenge this decision, you should know that the Wisconsin statutes and administrative rules establish time periods within which requests to review Department decisions shall be filed. For judicial review of a decision pursuant to sections 227.52 and 227.53, Wis. Stats., you have 30 days after the decision is mailed, or otherwise served by the Department, to file your petition with the appropriate circuit court and serve the petition on the Department. Such a petition for judicial review shall name the Department of Natural Resources as the respondent.

To request a contested case hearing of any individual permit decision pursuant to section 281.36.(3q), Wis. Stats., you have 30 days after the decision is mailed, or otherwise served by the Department, to serve a petition for hearing on the Secretary of the Department of Natural Resources, P.O. Box 7921, Madison, WI, 53707-7921. The petition shall be in writing, shall be dated and signed by the petitioner, and shall include as an attachment a copy of the decision for which administrative review is sought. If you are not the applicant, you must simultaneously provide a copy of the petition to the applicant. If you wish to request a stay of the project, you must provide information, as outlined below, to show that a stay is necessary to prevent significant adverse impacts or irreversible harm to the environment. If you are not the permit applicant, you must provide a copy of the petition to the permit applicant at the same time that you serve the petition on the Department.

The filing of a request for a contested case hearing is not a prerequisite for judicial review and does <u>not</u> extend the 30 day period for filing a petition for judicial review.

A request for contested case hearing must meet the requirements of section 281.36 (3q), Wis. Stats., and section NR 2.03, Wis. Adm. Code, and if the petitioner is not the applicant the petition must include the following information:

1. A description of the objection that is sufficiently specific to allow the department to determine which provisions of this section may be violated if the proposed discharge under the wetland individual permit is allowed to proceed.

2. A description of the facts supporting the petition that is sufficiently specific to determine how the petitioner believes the discharge, as proposed, may result in a violation of the provisions of this section.

3. A commitment by the petitioner to appear at the administrative hearing and present information supporting the petitioner's objection.

4. If the petition contains a request for a stay of the project, the petition must also include information showing that a stay is necessary to prevent significant adverse impacts or irreversible harm to the environment.

Dated at Department Headquarters in Madison, Wisconsin on 05/20/2014.

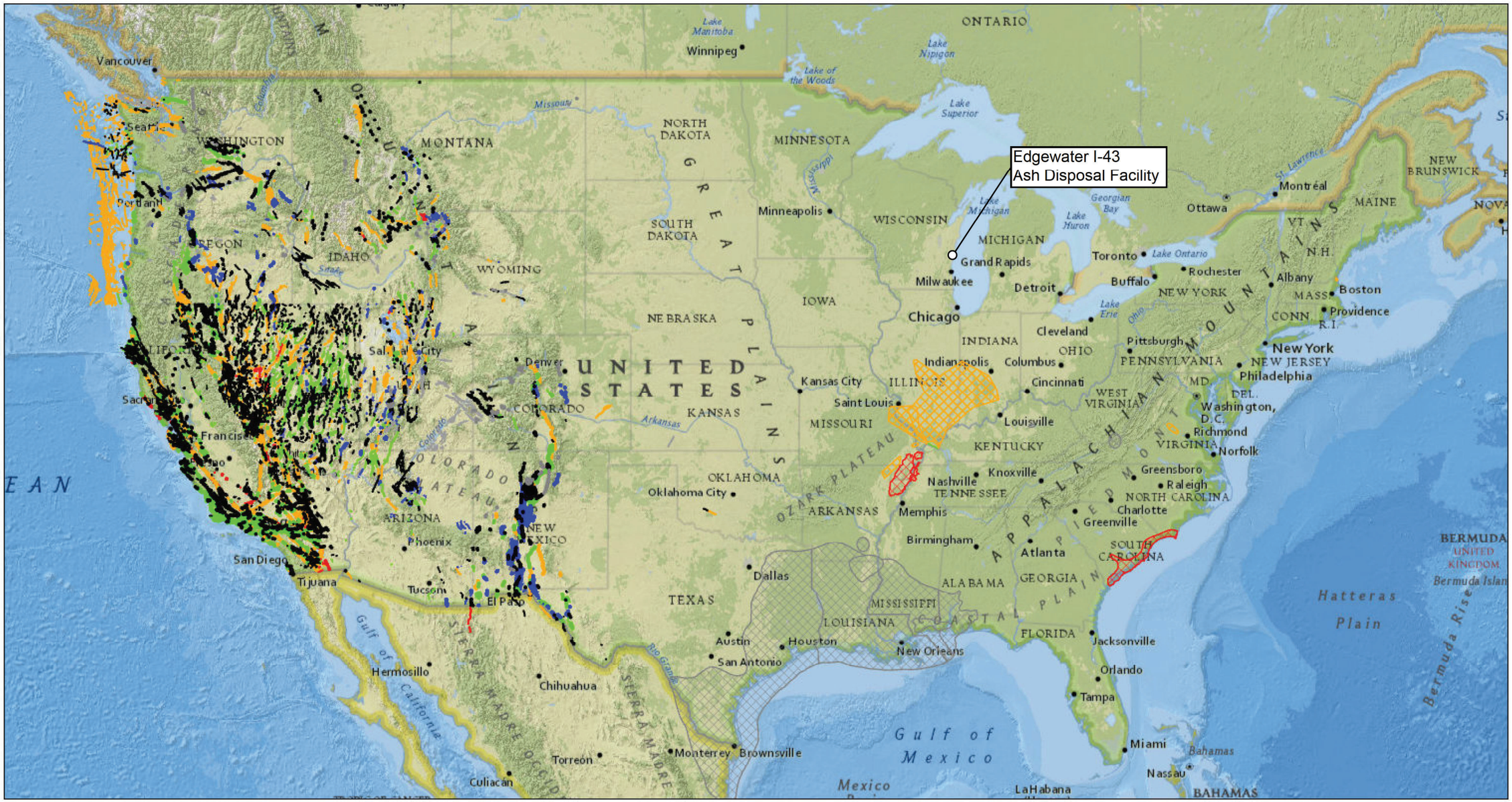
STATE OF WISCONSIN DEPARTMENT OF NATURAL RESOURCES
For the Secretary

By _____
Benjamin Callan
Water Management Specialist

Appendix C

Fault Location Map

U.S. Geological Survey Quaternary Faults



12/7/2022, 11:13:48 AM

Fault Areas
- Class B
- historic
- late Quaternary
- latest Quaternary
- middle and late Quaternary

National Database
- Historic (< 150 years), well constrained location
- Historic (< 150 years), moderately constrained location
- Historic (< 150 years), inferred location
- Latest Quaternary (<15,000 years), well constrained location
- Latest Quaternary (<15,000 years), moderately constrained location
- Latest Quaternary (<15,000 years), inferred location
- Late Quaternary (< 130,000 years), well constrained location
- Late Quaternary (< 130,000 years), moderately contrained location
- Late Quaternary (< 130,000 years), inferred location
- Middle and late Quaternary (< 750,000 years), well constrained location
- Middle and late Quaternary (< 750,000 years), moderately constrained location
- Middle and late Quaternary (< 750,000 years), inferred location
- Undifferentiated Quaternary (< 1.6 million years), well constrained location
- Undifferentiated Quaternary (< 1.6 million years), moderately constrained location
- Undifferentiated Quaternary (< 1.6 million years), inferred location

1:18,489,298

0 180 360 720 mi

0 285 570 1,140 km

National Geographic, Esri, Garmin, HERE, UNEP-WCMC, USGS, NASA, ESA, METI, NRCAN, GEBCO, NOAA, increment P Corp.

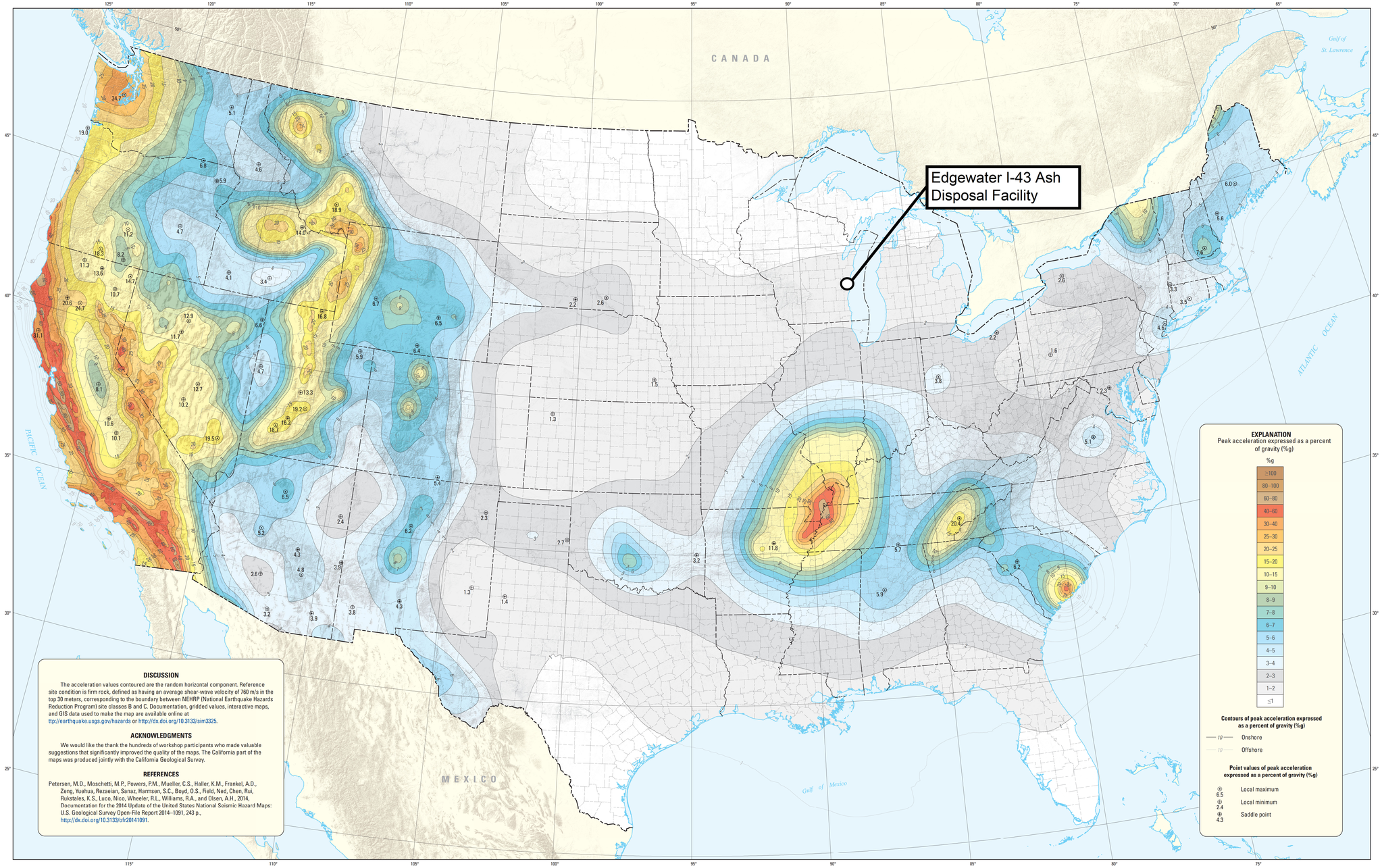
Source - https://www.usgs.gov/natural-hazards/earthquake-hazards/faults?qt-science_support_page_related_con=4#qt-science_support_page_related_con

USGS
National Geographic, Esri, Garmin, HERE, UNEP-WCMC, USGS, NASA, ESA, METI, NRCAN, GEBCO, NOAA, increment P Corp. | USGS |

Appendix D

Seismic Hazard Map

U.S. Department of the Interior
U.S. Geological Survey



DISCUSSION

The acceleration values contoured are the random horizontal component. Reference site condition is firm rock, defined as having an average shear-wave velocity of 760 m/s in the top 30 meters, corresponding to the boundary between NEHRP (National Earthquake Hazards Reduction Program) site classes B and C. Documentation, gridded values, interactive maps, and GIS data used to make the map are available online at ttp://earthquake.usgs.gov/hazards or http://dx.doi.org/10.3133/sim3325.

ACKNOWLEDGMENTS

We would like the thank the hundreds of workshop participants who made valuable suggestions that significantly improved the quality of the maps. The California part of the maps was produced jointly with the California Geological Survey.

REFERENCES

Petersen, M.D., Moschetti, M.P., Powers, P.M., Mueller, C.S., Haller, K.M., Frankel, A.D., Zeng, Yuehua, Rezaeian, Sanaz, Harmsen, S.C., Boyd, O.S., Field, Ned, Chen, Rui, Rukstales, K.S., Luco, Nico, Wheeler, R.L., Williams, R.A., and Olsen, A.H., 2014, Documentation for the 2014 Update of the United States National Seismic Hazard Maps: U.S. Geological Survey Open-File Report 2014–1091, 243 p., http://dx.doi.org/10.3133/ofr20141091.

Shaded relief base from Esri Inc., 2008, Data and Maps
All other base map data from Esri Inc., 1993, Digital Chart of the World
United States County base map from the U.S. Geological Survey National Atlas, available at http://nationalatlas.gov/

Projection: Albers equal-area conic
Standard parallels 29.5°N. and 45.5°N., central meridian 95°W

SCALE 1:7 000 000

100 0 100 200 300 400 500 600 700 800 900 1000 MILES
100 0 100 200 300 400 500 600 700 800 900 1000 KILOMETERS

Digital data prepared with ArcGIS 10.1 running under Windows 7

Seismic-Hazard Maps for the Conterminous United States, 2014

Peak Horizontal Acceleration with 10 Percent Probability of Exceedance in 50 Years

By

Mark D. Petersen,[1] Morgan P. Moschetti,[1] Peter M. Powers,[1] Charles S. Mueller,[1] Kathleen M. Haller,[1]Arthur D. Frankel,[1] Yuehua Zeng,[1] Sanaz Rezaeian,[1]
Stephen C. Harmsen,[1] Oliver S. Boyd,[1] Edward H. Field,[1] Rui Chen,[2] Nicolas Luco,[1]Russell L. Wheeler,[1] Robert A. Williams,[1] Anna H. Olsen,[1] and Kenneth S. Rukstales[1]

2015

[1]U.S. Geological Survey
[2]California Geological Survey, Sacramento, Calif.

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(303) 273-8579

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1-888-ASK-USGS

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Suggested citation: Petersen, M.D., Moschetti, M.P., Powers, P.M., Mueller, C.S., Haller, K.M., Frankel, A.D., Zeng, Yuehua, Rezaeian, Sanaz, Harmsen, S.C., Boyd, O.S., Field, E.H., Chen, Rui, Luco, Nicolas, Wheeler, R.L., Williams, R.A., Olsen, A.H., and Rukstales, K.S., 2015, Seismic-hazard maps for the conterminous United States, 2014: U.S. Geological Survey Scientific Investigations Map 3325, 6 sheets, scale 1: 7,000,000, http://dx.doi.org/10.3133/sim3325.

Appendix E

Site Description and Geologic Summary

Site Description and Geologic Summary

Site Information

The I-43 ash disposal facility encompasses approximately 75 acres, and is located in an agricultural area. The site location is the East ½ of Section 8, T14N, R23E, in the Town of Wilson, located in Sheboygan County, Wisconsin. The facility is bounded by a frontage road to Interstate Highway I-43 to the east and by a rail line to the west.

Regional Geology

The I-43 disposal facility is located in an area of thick glacial sediment overlying Silurian carbonate bedrock. The uppermost bedrock in the area is Silurian dolostone, a unit in which karst features such as closed depression, sinkholes and caves may develop by solution along fractures, joints, and bedding planes. However, in areas covered by Pleistocene ice sheets such as northeastern Wisconsin, glacial processes have eroded away or filled in most karst features.

A regional report for northeastern Wisconsin notes that the Silurian dolostone is characterized by complex fracturing and anisotropic flow, but that extensive weathering is generally absent, and caves are rare (Erb and Stiglitz, eds., 2007). In addition, most karst features in northeastern Wisconsin appear to have formed prior to Pleistocene glaciation of the area (more than about 2.4 million years ago) and sinkholes, caves, and solution-enlarged joints are filled in with a wide variety of sediments, some of which was emplaced by subglacial water under high pressure in an interconnected karst/subglacial drainage system (Luczaj and Stieglitz, 2008). If these sediment-filled features are located below the water table, they are supported by the hydrostatic pressure of groundwater, and are not expected to be zones of instability.

The I-43 area has been covered by Pleistocene ice sheets several times (Carlson and others, 2011), and borings drilled on the I-43 disposal facility penetrate up to 90 feet of predominantly clay till with some sand and sorted sediment layers. The total sequence of sediment is about 150 feet thick, as indicated by water supply records in the area of the facility. Because of the multiple glacial advances and associated erosional and depositional processes resulting in a thick sediment layer overlying the bedrock, the area is not likely to be unstable due to karstic processes.

Previous Geologic Investigations

The disposal facility area was investigated by Mead & Hunt prior to construction by performing 9 borings within and adjacent to the facility footprint. Four of the borings were instrumented with groundwater monitoring wells. The borings extended to depths of up to 90 feet. Soil samples were collected for laboratory testing that includes Atterberg limits and permeability. The boring locations and geologic cross sections are shown in **Appendix G**. The boring

locations and geologic cross sections are also shown on drawings in **Appendix G** from the 2008 Plan of Operation prepared by BT2, Inc.

Based on the results of the subsurface investigation performed prior to disposal facility construction, the soils below the liner system within the facility footprint consist primarily of stiff to very stiff lean clays with scattered sand seams to the maximum drilling depth of 90 feet.

References

BT2, Inc., 2008, Plan of Operation, Edgewater I-43 Ash Disposal Facility, Phases 3 and 4.

Carlson, A.E., Principato, S.M., Chapel, D.M., and Mickelson, D.M., 2011, Quaternary Geology of Sheboygan County, Wisconsin: Wisconsin Geological and Natural History Survey Bulletin 106, 32 p., 2 pls.

Erb, K., and Stieglitz, R., eds., 2007, Final Report of the Northeast Karst Task Force (G3836), University of Wisconsin Extension, Green Bay, Wisconsin.

Luczaj, J.A., and Stieglitz, R.D., 2008, Geologic History of New Hope Cave, Manitowoc County, Wisconsin. https://www.uwgb.edu/luczajj/reprints/New_Hope_Cave_4-08.pdf

Mead & Hunt, Inc., 1977, Preliminary Site Feasibility Report, Ash Disposal Site, Beeck-Goebel Properties, Wilson Township, Sheboygan County, Wisconsin.

BJS/DLN/AJR/EJN

MJT, 12/7/2022

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Appendix F

Liquefaction and Settlement Potential Evaluation

Liquefaction and Settlement Potential Evaluation

Based on the results of the site investigation borings and laboratory soil test results performed by Mead & Hunt (**Appendix G**), the disposal facility soils are not subject to liquefaction or settlement concerns for the performance of the disposal facility.

Liquefaction is the process by which a saturated, loose, cohesionless soil influenced by external forces can suddenly loses its shear strength and behave as a fluid. The external forces result from ground motion from an earthquake. The disposal facility site soils in borings consist primarily of stiff to very stiff clay that is not subject to liquefaction. In addition, liquefaction is not a concern given the low magnitude (less than 0.04 g, 2 percent in 50 years) of maximum ground accelerations expected in the area; see **Attachment F**.

Settlement below a disposal facility can be a concern if the facility is underlain by extensive soft, fine-grained soils. Soft soils are subject to consolidation settlement depending on the load over the soft soils. The disposal facility soils consist of stiff to very stiff clay till. Because the clays are stiff to very stiff rather than soft, consolidation settlement is not a concern for the performance of the disposal facility.

References

USGS seismic impact zones map website:
https://earthquake.usgs.gov/static/lfs/nshm/conterminous/2014/2014pga2pct.pdf

DLN/AJR/EJN
MJT, 12/7/2022

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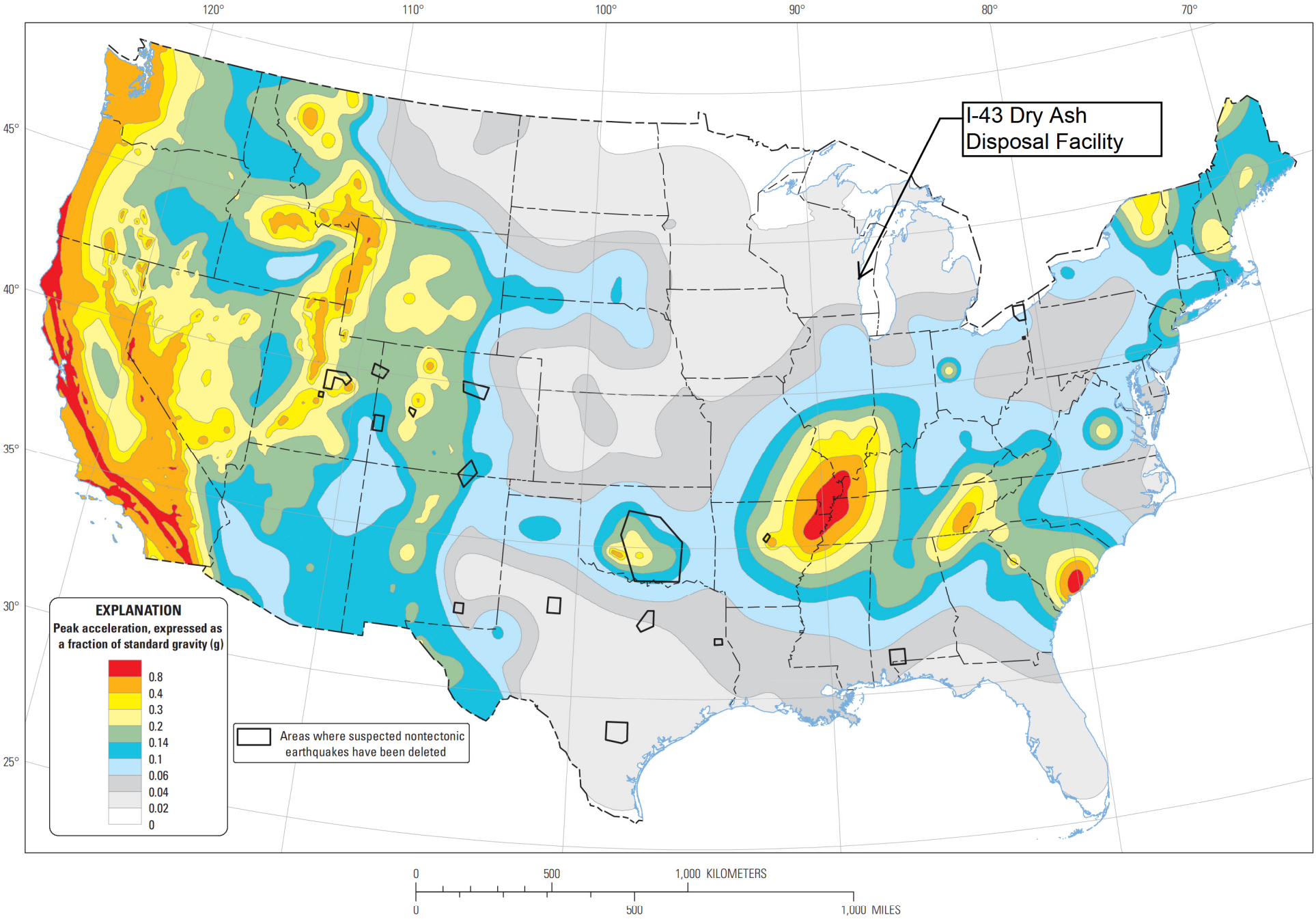
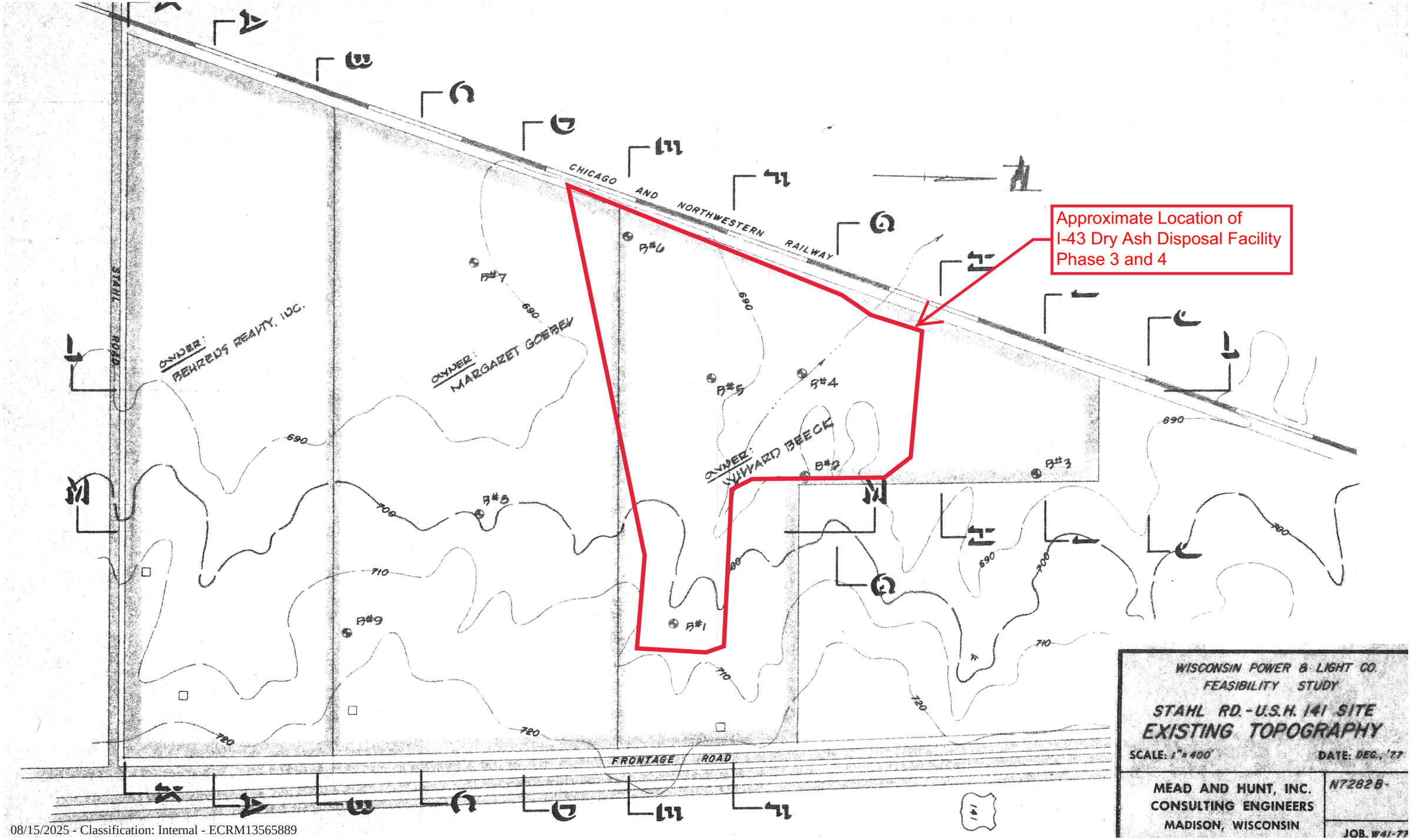


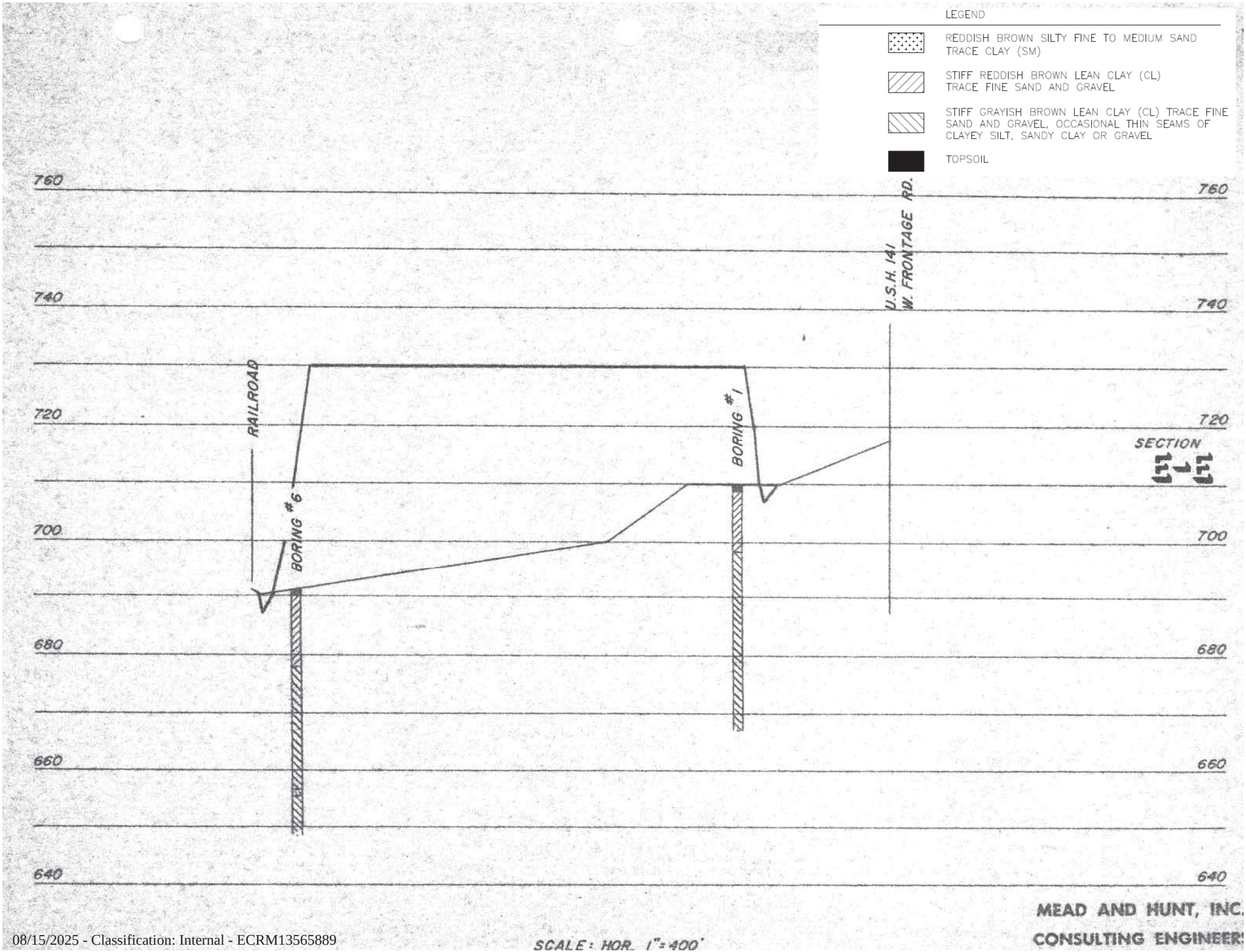
Two-percent probability of exceedance in 50 years map of peak ground acceleration

Source: USGS seismic impact zones map - https://earthquake.usgs.gov/static/lfs/nshm/conterminous/2014/2014pga2pct.pdf

Appendix G

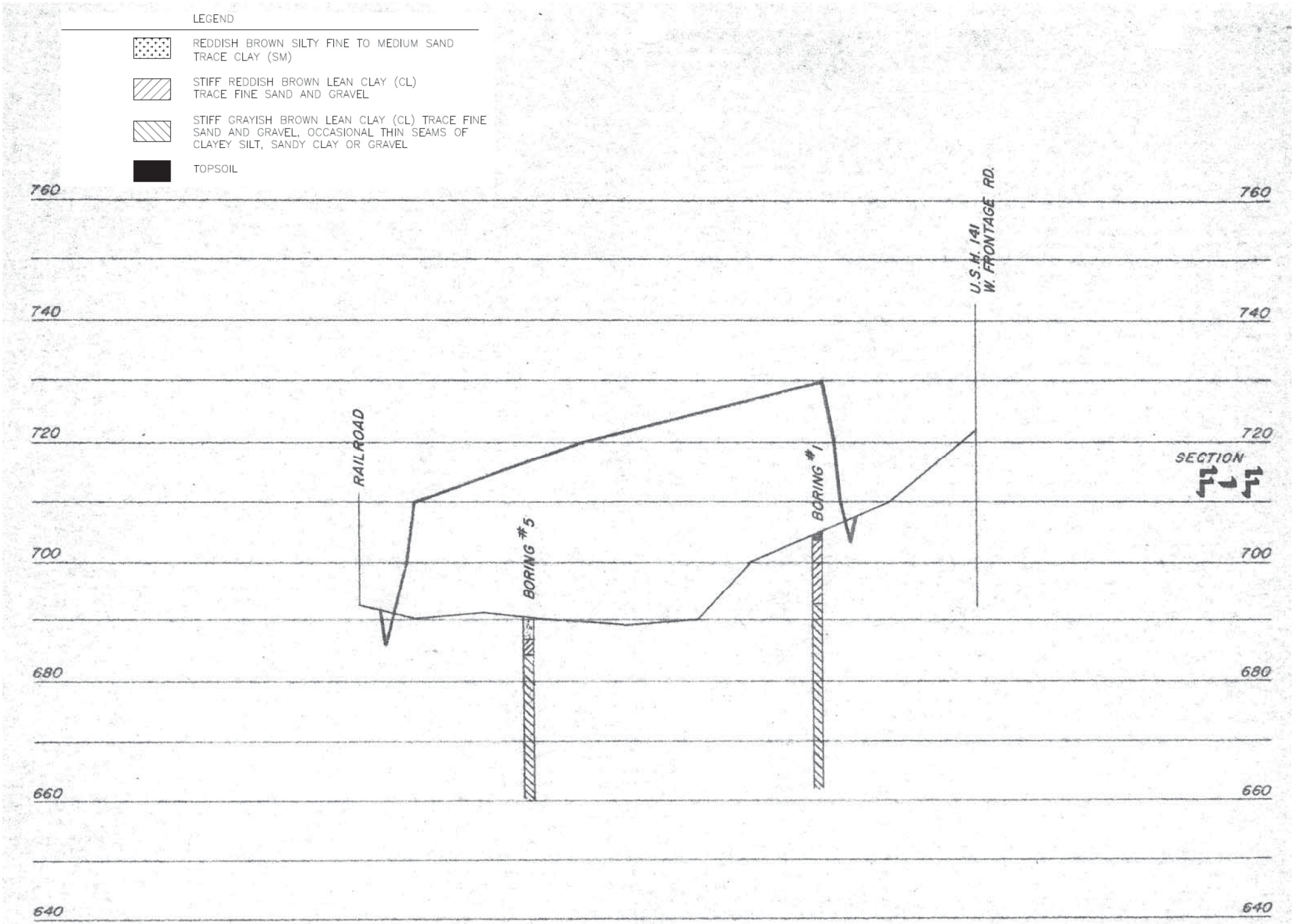
Geologic Cross Sections





SCALE: HOR. 1"=400'

MEAD AND HUNT, INC.
CONSULTING ENGINEERS



SCALE: HOR. 1"=400'

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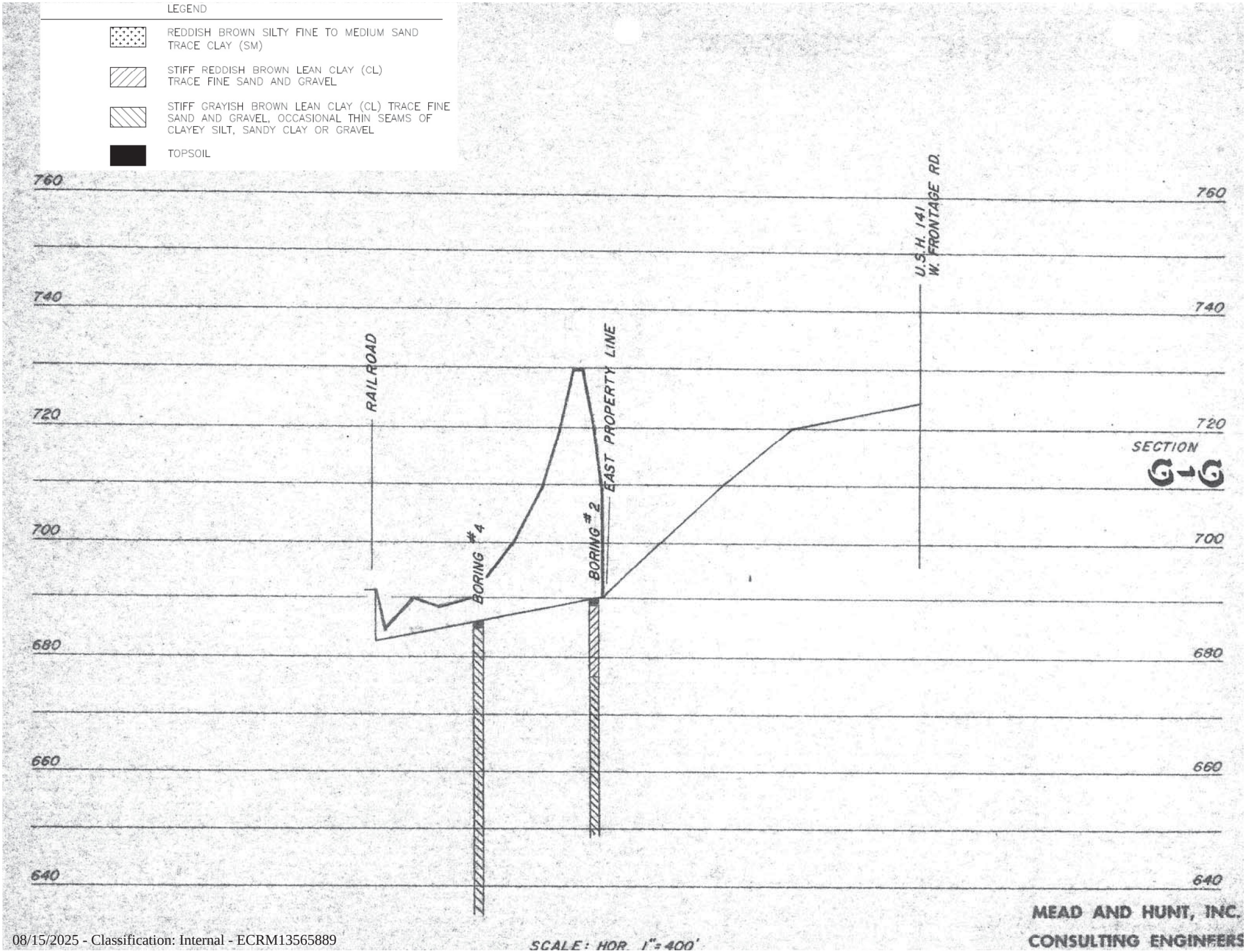
CONSULTING ENGINEERS



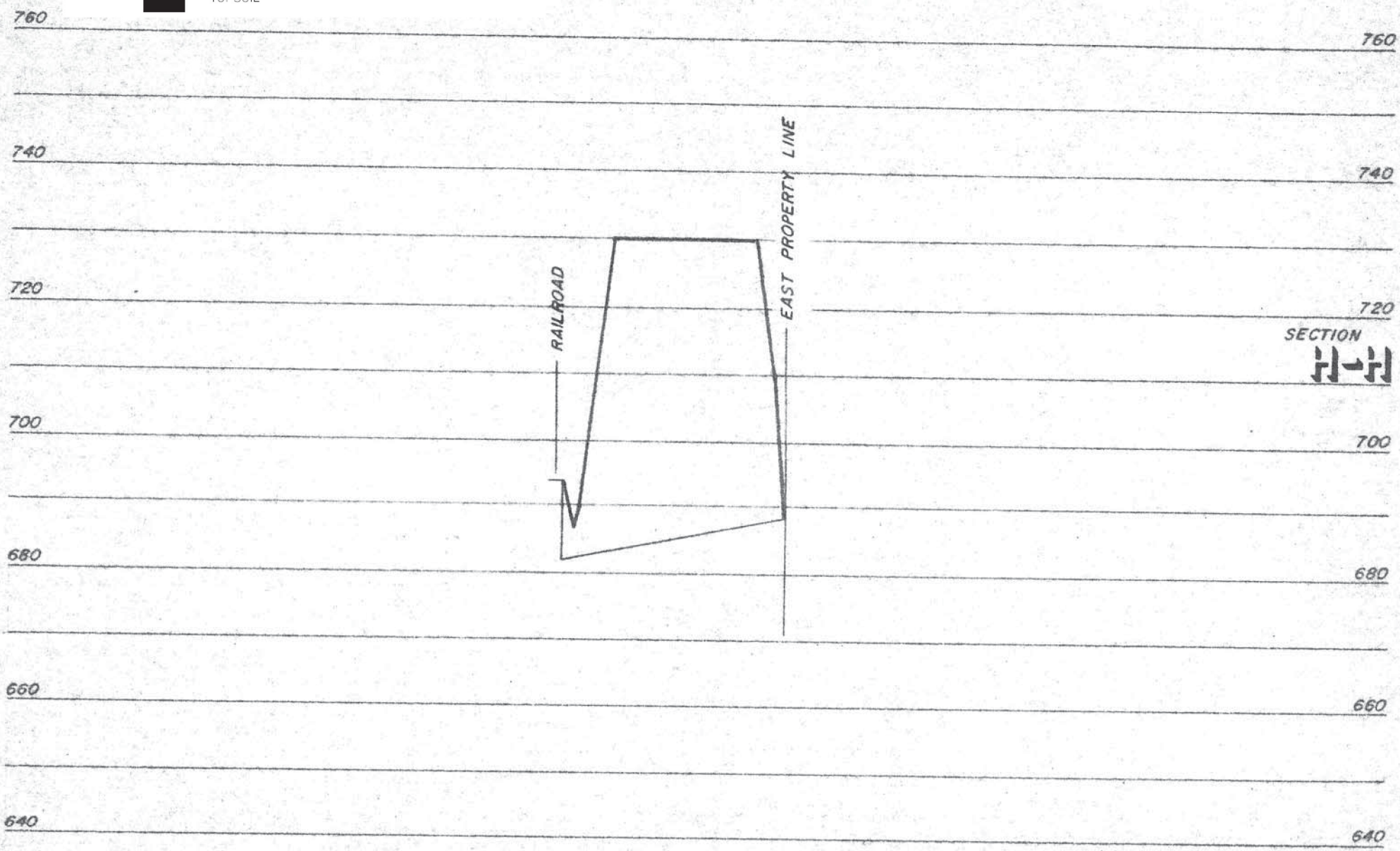
LEGEND

REDDISH BROWN SILTY FINE TO MEDIUM SAND TRACE CLAY (SM)

STIFF REDDISH BROWN LEAN CLAY (CL) TRACE FINE SAND AND GRAVEL

STIFF GRAYISH BROWN LEAN CLAY (CL) TRACE FINE SAND AND GRAVEL, OCCASIONAL THIN SEAMS OF CLAYEY SILT, SANDY CLAY OR GRAVEL

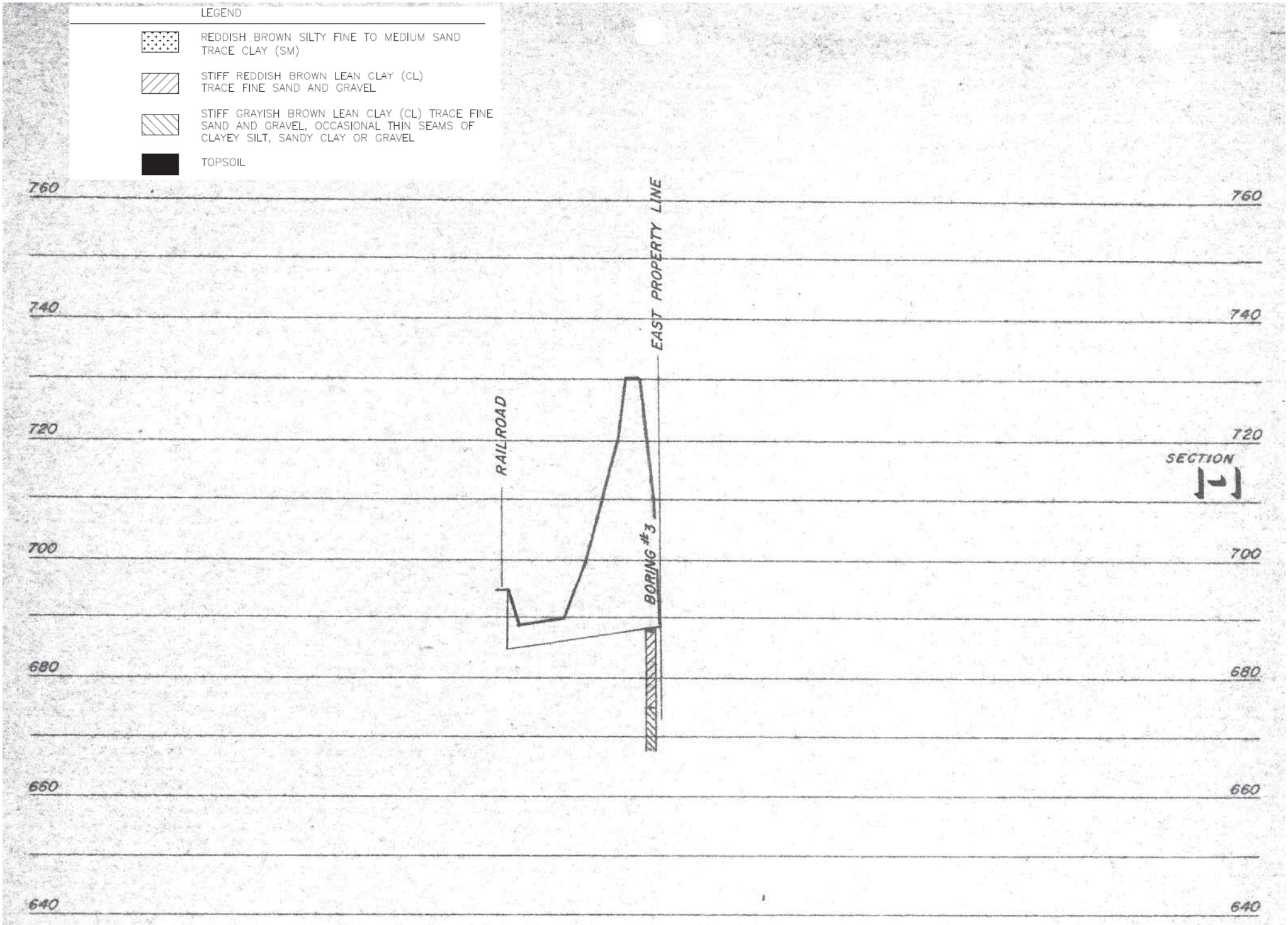
TOPSOIL



SECTION H-H

SCALE: HOR. 1"=400'

MEAD AND HUNT, INC.
CONSULTING ENGINEERS



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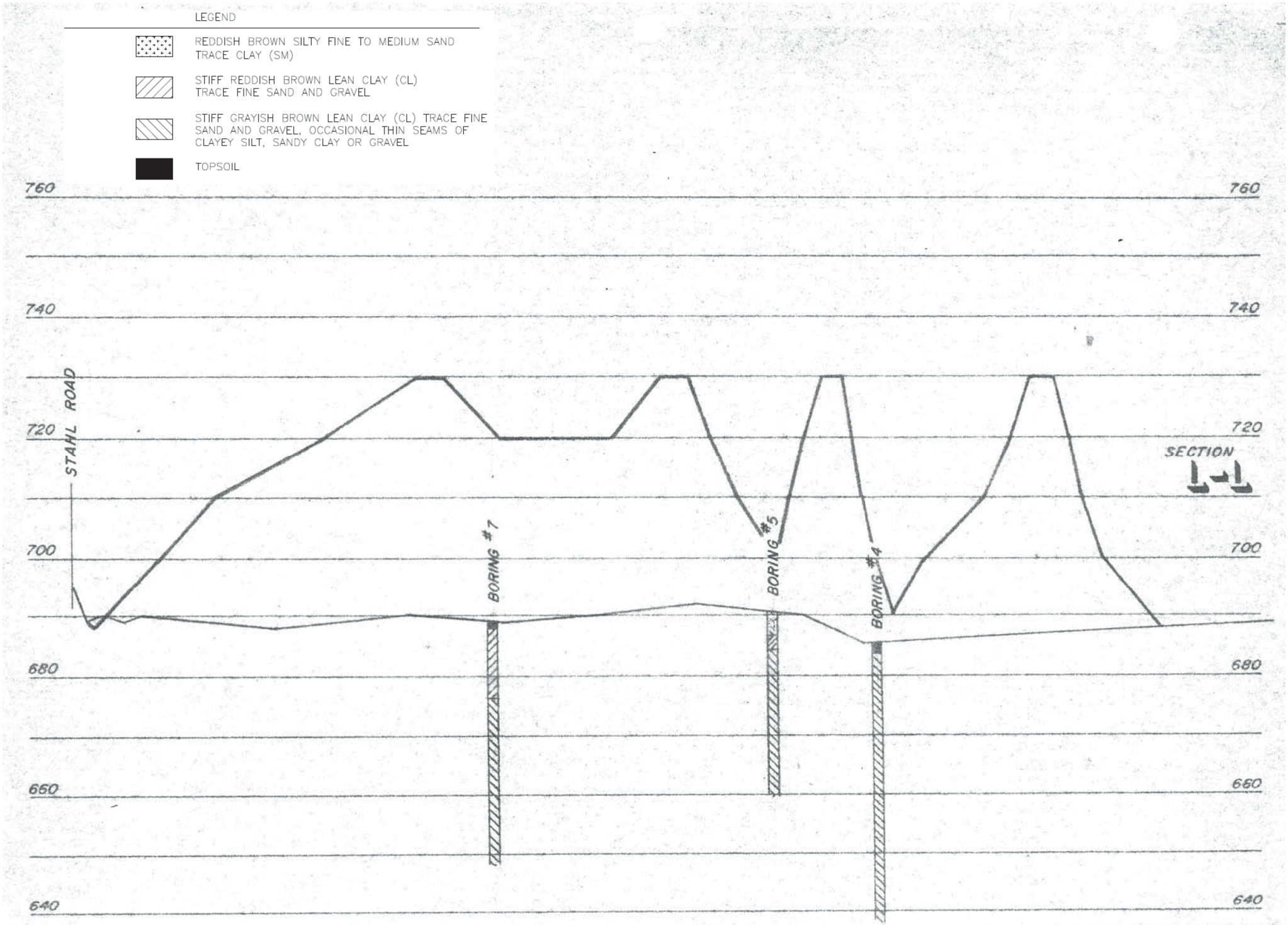
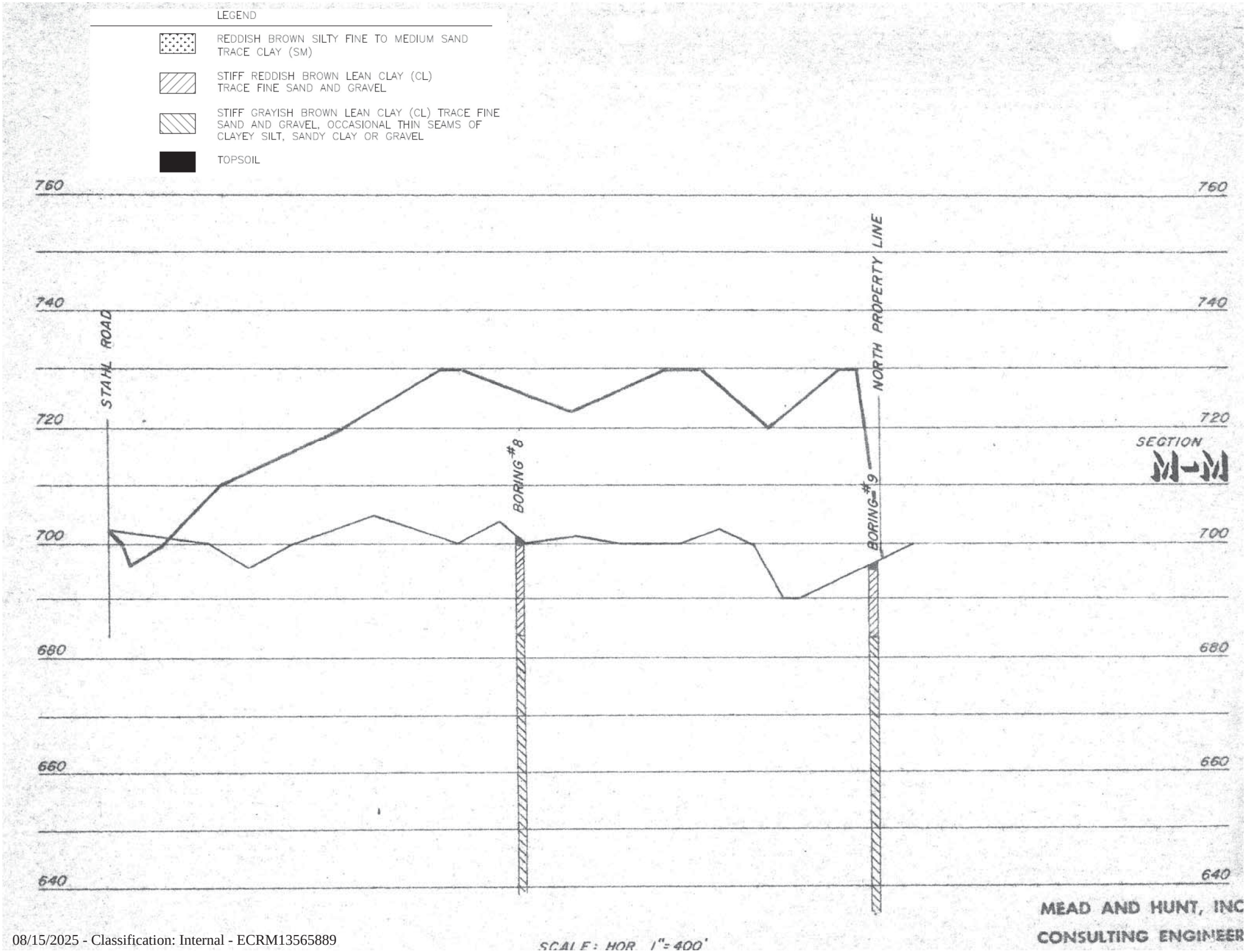
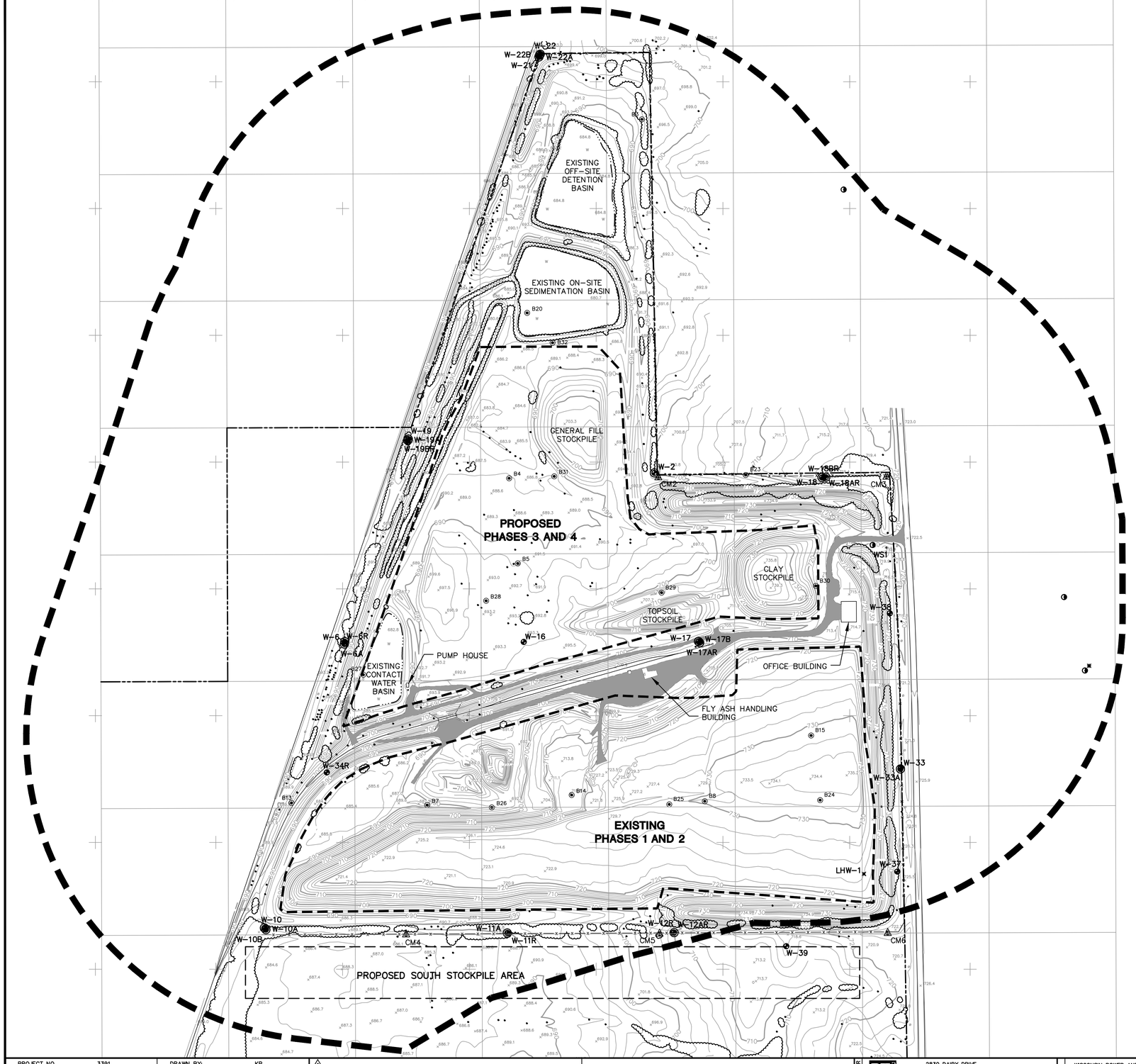
MEAD AND HUNT, INC.
CONSULTING ENGINEERS



MEAD AND HUNT, INC.
CONSULTING ENGINEERS

SCALE: HOR. 1"=400'





LEGEND

- APPROXIMATE PROPERTY LINE
- EXISTING GRADE (2' CONTOUR)
- 690 EXISTING GRADE (10' CONTOUR)
- 686.8 EXISTING GRADE SPOT ELEVATION
- TREELINE/TREES
- PAVED ROAD
- UNPAVED ROAD
- TRAIL/PATH
- RAILROAD TRACKS
- FENCE
- UTILITY/LIGHT POLE
- EDGE OF WATER
- LIMITS OF WASTE
- CONTROL MONUMENT
- SOIL BORING
- MONITORING WELL
- PIEZOMETER
- LEACHATE HEADWELL
- PRIVATE WELL
- 1,200-FOOT RADIUS FROM PHASE 3/4 LIMITS OF WASTE
- PROPOSED SOUTH STOCKPILE AREA

N

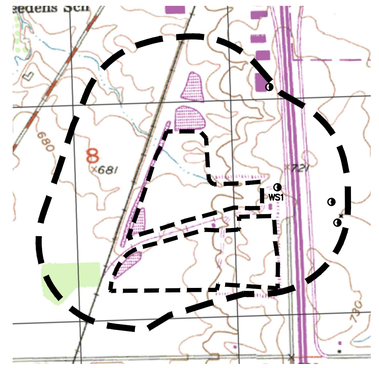
200 0 200

SCALE: 1" = 200'

CONTROL MONUMENT DATA		
MONUMENT NO.	STATION	ELEVATION
2	17+99.98 N 16+99.78 E	700.04
3	18+00.22 N 25+99.42 E	717.04
4	6+99.74 N 0+0.52 E	687.45
5	16+99.50 N 0+0.51 E	705.62
6	25+99.29 N 0+0.50 E	723.27

NOTES:

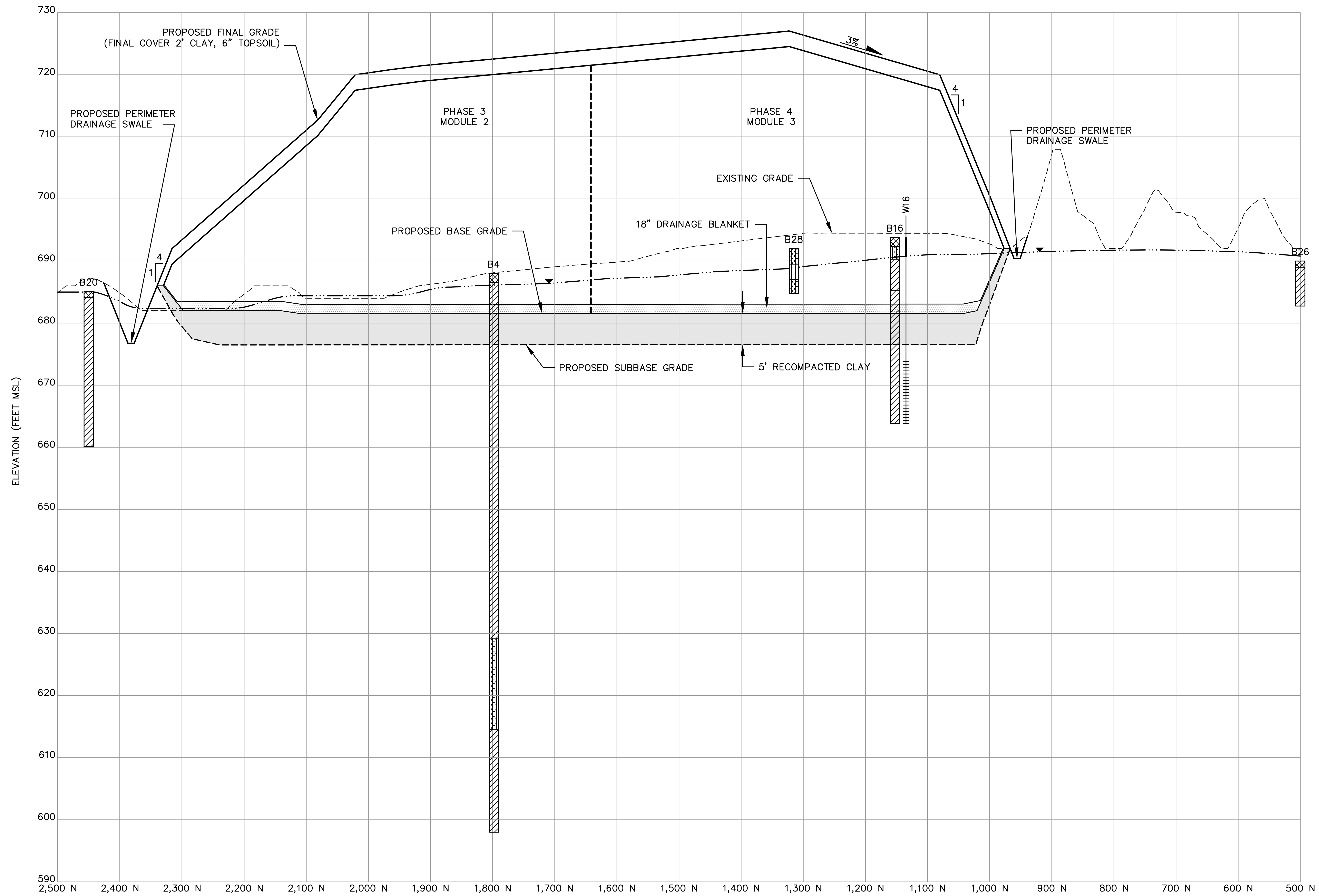
1. BASE MAP PREPARED BY KBM, INC. BASED ON AERIAL TOPOGRAPHIC SURVEY FLOWN JULY 1, 2007. BASE MAP PREPARED USING WISCONSIN STATE PLANE COORDINATES. ELEVATIONS BASED ON USGS NATIONAL GEODETIC VERTICAL DATUM, 1929.
2. CONTOUR INTERVAL IS 2 FEET.
3. CONVERSION FROM LOCAL COORDINATE SYSTEM TO STATE PLANE: SHIFT 2558047.2314, 624139.6532, ROTATE 0.17° AROUND POINT WITH COORDINATES 2559697.2314, 625039.6532.
4. SOIL BORING AND MONITORING WELL LOCATIONS BASED ON WELL INFORMATION FORM COORDINATES AND EXISTING CONDITIONS MAP F11 PREPARED BY WARZYN, INC. USING LOCAL COORDINATES.
5. * PRIVATE WELL LOCATION IS APPROXIMATE AND ASSUMED BASED ON WELL ADDRESS SHOWN ON WELL CONSTRUCTION REPORT. THE WELL ADDRESS AND COORDINATES INCLUDED ON THE CONSTRUCTION REPORT ARE NOT CONSISTENT.



PRIVATE WELL LOCATION MAP

SCALE: 1" = 1,000'

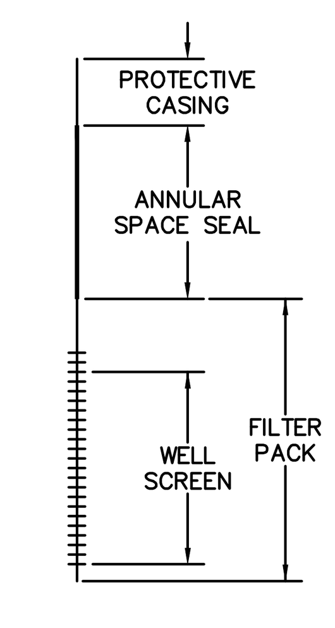
PROJECT NO.	3391	DRAWN BY:	KP		ENGINEER: BT² inc	2830 DAIRY DRIVE MADISON, WI 53718-6751 PHONE: (608) 224-2830 FAX: (608) 224-2839	CLIENT: WISCONSIN POWER AND LIGHT EDGEWATER GENERATING STATION 3739 LAKESHORE DRIVE SHEBOYGAN, WI 53081	SITE: PLAN OF OPERATION PHASES 3 AND 4 EDGEWATER I-43 ASH DISPOSAL FACILITY WILSON, WISCONSIN	EXISTING CONDITIONS AND PRIVATE WELL LOCATION MAP	SHEET 2 OF 17
DRAWN:	07/31/07	CHECKED BY:	KG							
REVISED:	01/07/08	APPROVED BY:								



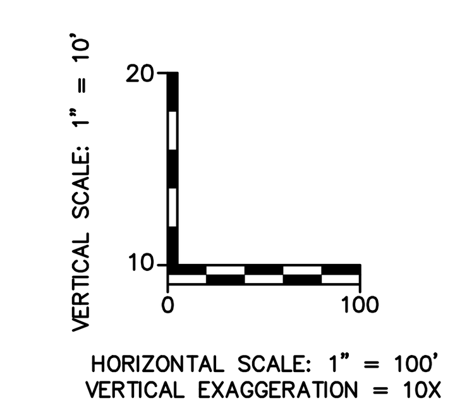
1,000 EAST

LEGEND

- FILL/TOPSOIL
- SILT (ML)
- LEAN CLAY (CL)
- SILTY SAND (SM)
- WATER TABLE ON APRIL 4, 2006



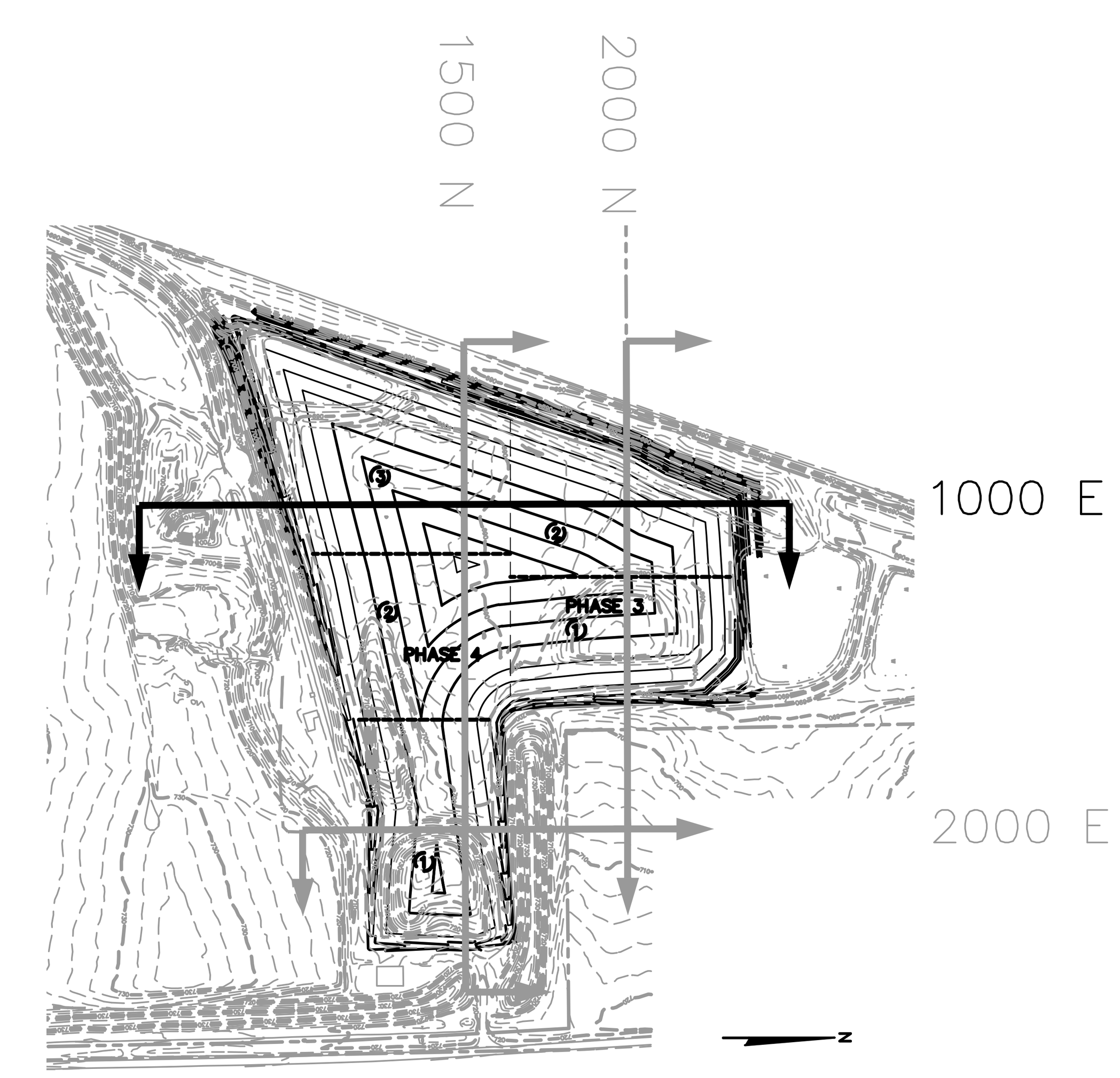
WELL DETAIL



NOTES:

1. BORINGS B4, B16, AND B20 WERE INSTALLED BY SOILS & ENGINEERING SERVICES, INC. IN 1977 AND 1978.
2. BORINGS B26 AND B28 WERE INSTALLED BY WARZYN ENGINEERING, INC. IN 1981.

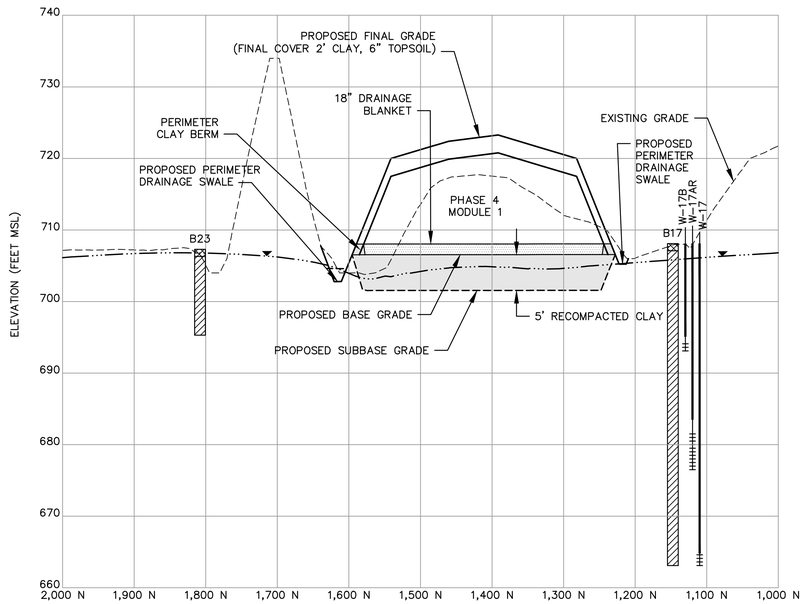
Note: Design information depicted here has been superseded by design updates in the March 2015 Plan of Operation Modification for Phases 3 and 4 prepared by SCS Engineers.



CROSS SECTION LOCATION

1" = 500'

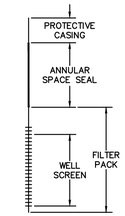
PROJECT NO. 3391	DRAWN BY: KP	ENGINEER: BT² inc, 2830 DAIRY DRIVE, MADISON, WI 53718-6751, PHONE: (608) 224-2830, FAX: (608) 224-2839	CLIENT: WISCONSIN POWER AND LIGHT, EDGEWATER GENERATING STATION, 3739 LAKESHORE DRIVE, SHEBOYGAN, WI 53081	SITE: PLAN OF OPERATION PHASES 3 AND 4, EDGEWATER I-43 ASH DISPOSAL FACILITY, WILSON, WISCONSIN	CROSS SECTION 1,000 EAST
DRAWN: 11/23/07	CHECKED BY: KG				SHEET
REVISED: 12/10/07	APPROVED BY:				12 of 17



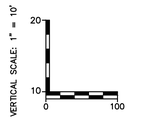
2,000 EAST

LEGEND

- FILL/TOPSOIL
- SILT (ML)
- LEAN CLAY (CL)
- SILTY SAND (SM)
- WATER TABLE ON APRIL 4, 2006



WELL DETAIL

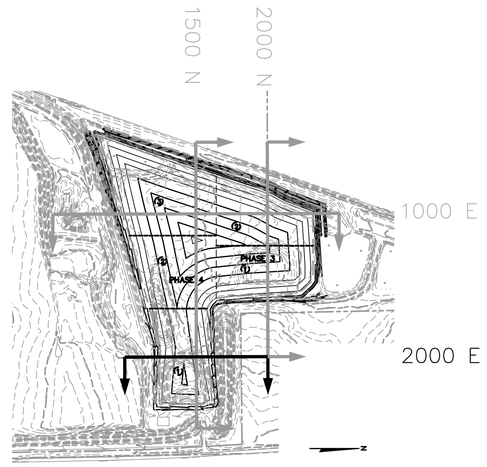


HORIZONTAL SCALE: 1" = 100'
VERTICAL EXAGGERATION = 10X

NOTES:

1. BORINGS B17 AND B23 WERE INSTALLED BY SOILS & ENGINEERING SERVICES, INC. IN 1978.

Note: Design information depicted here has been superseded by design updates in the March 2015 Plan of Operation Modification for Phases 3 and 4 prepared by SCS Engineers.



CROSS SECTION LOCATION

1" = 500'

PROJECT NO.	3391	DRAWN BY:	KP	1		ENGINEER: BT² inc	2830 DAIRY DRIVE MADISON, WI 53718-6751 PHONE: (608) 224-2830 FAX: (608) 224-2839	CLIENT	WISCONSIN POWER AND LIGHT EDGEWATER GENERATING STATION 3739 LAKESHORE DRIVE SHEBOYGAN, WI 53081	SITE	PLAN OF OPERATION PHASES 3 AND 4 EDGEWATER I-43 ASH DISPOSAL FACILITY WILSON, WISCONSIN	CROSS SECTION 2,000 EAST	SHEET 13 OF 17
DRAWN:	11/23/07	CHECKED BY:	KG									
REVISED:	12/10/07	APPROVED BY:										

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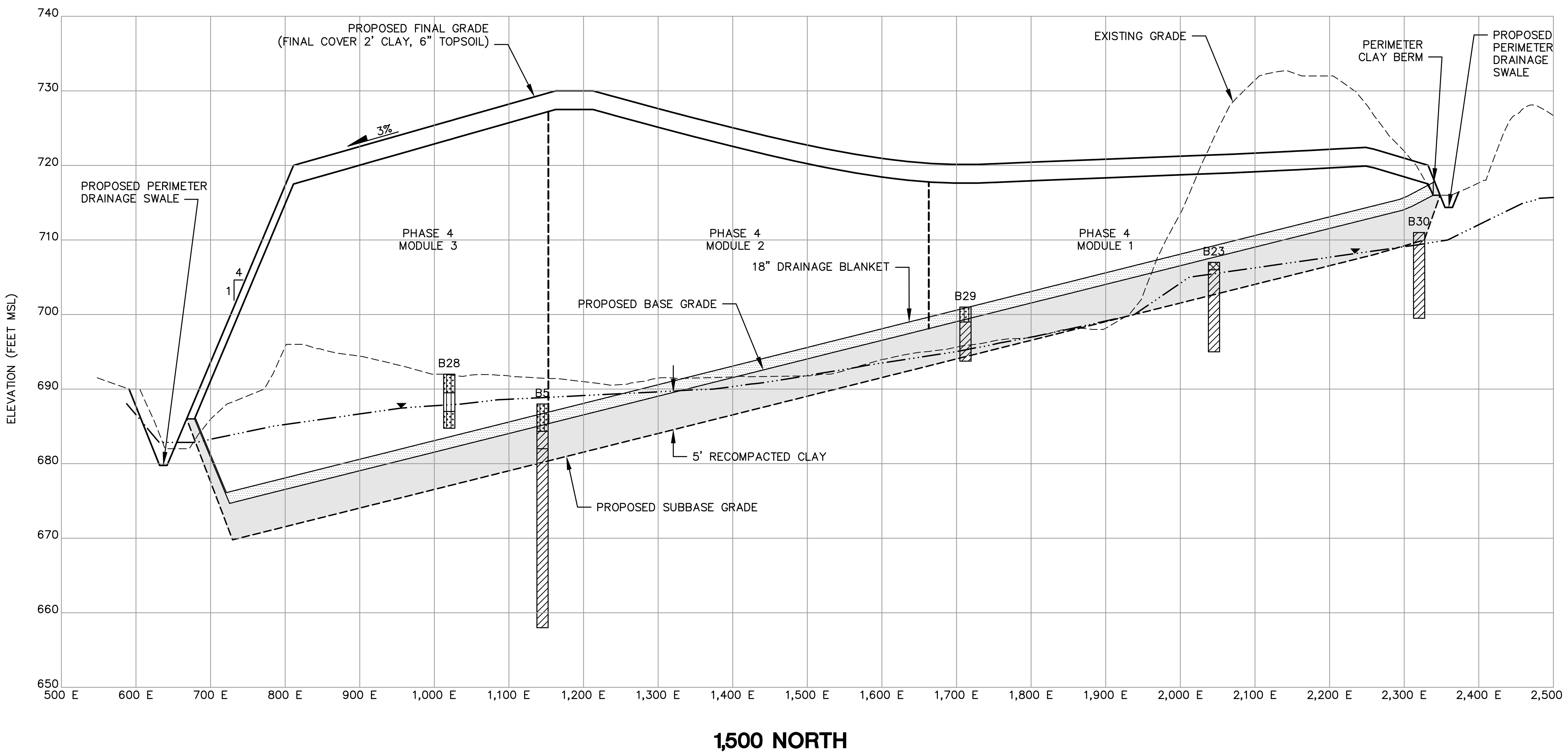
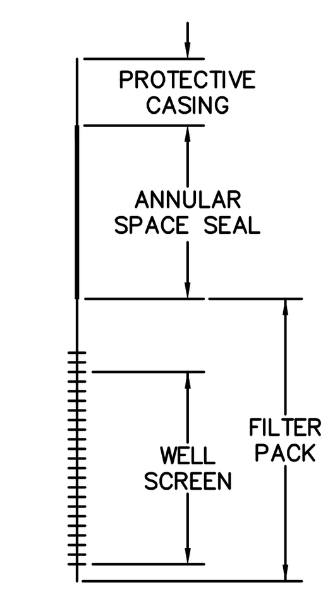
LEGEND

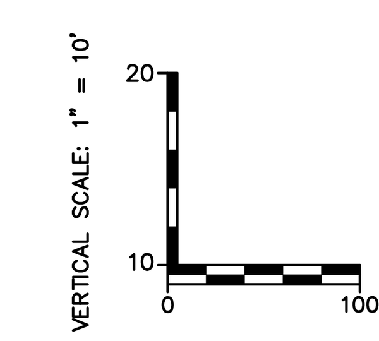
- FILL/TOPSOIL
- SILT (ML)
- LEAN CLAY (CL)
- SILTY SAND (SM)
- WATER TABLE ON APRIL 4, 2006



1,500 NORTH



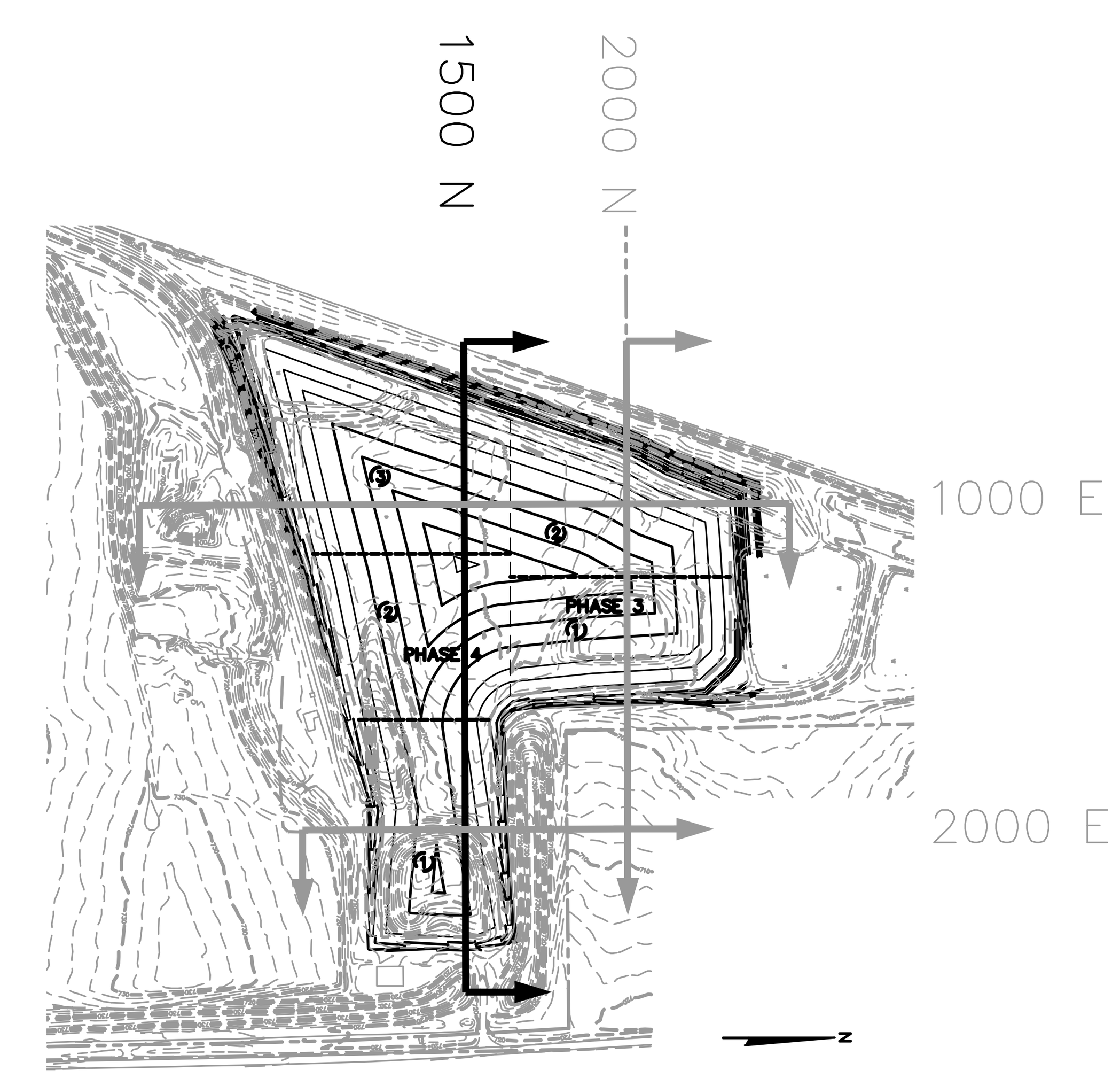
WELL DETAIL



HORIZONTAL SCALE: 1" = 100'
VERTICAL EXAGGERATION = 10X

NOTES:

1. BORINGS B5 AND B23 WERE INSTALLED BY SOILS & ENGINEERING SERVICES, INC. IN 1977 AND 1978.
2. BORINGS B28, B29, AND B30 WERE INSTALLED BY WARZYN ENGINEERING, INC. IN 1981.

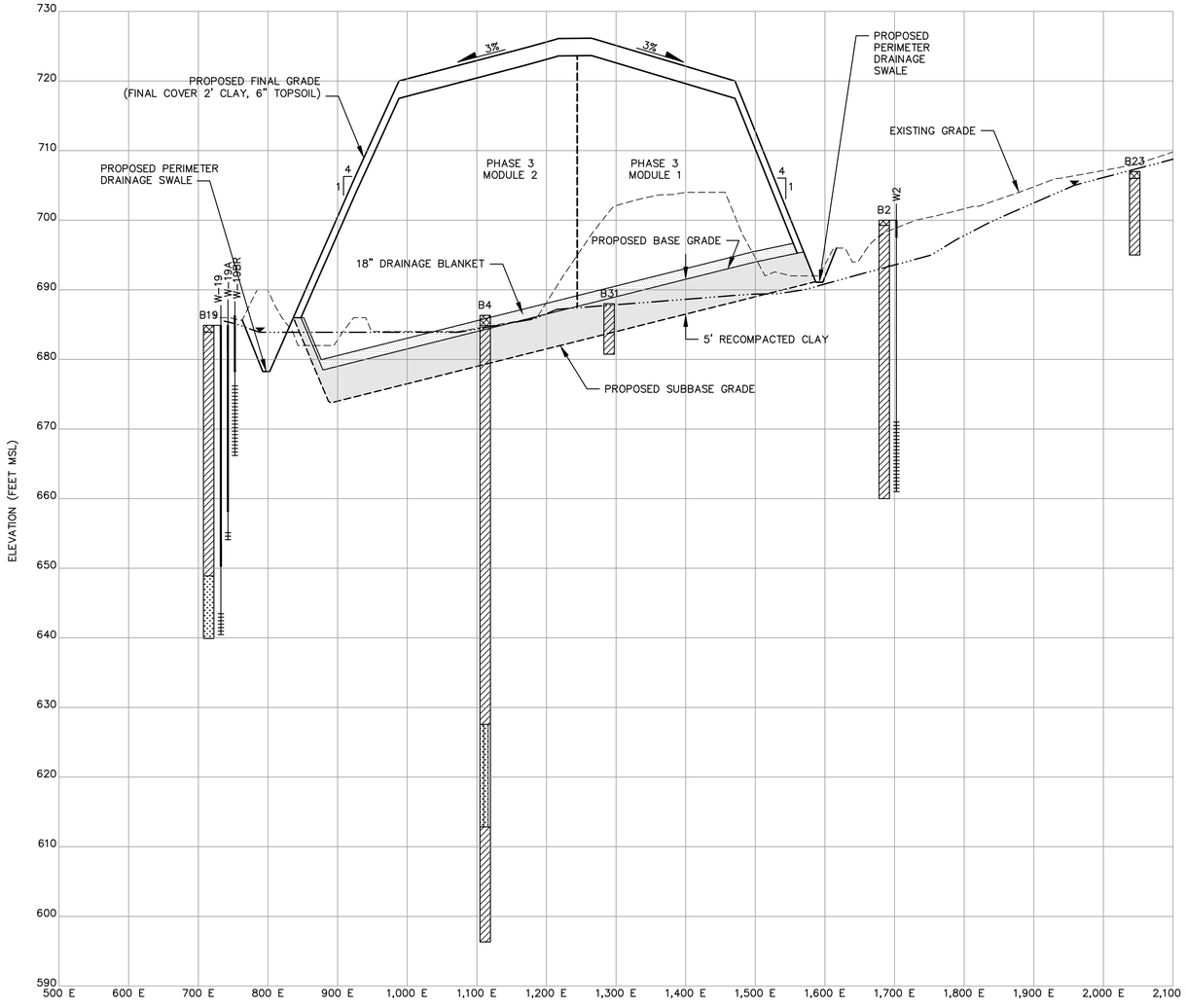


CROSS SECTION LOCATION

1" = 500'

Note: Design information depicted here has been superseded by design updates in the March 2015 Plan of Operation Modification for Phases 3 and 4 prepared by SCS Engineers.

PROJECT NO. 3391	DRAWN BY: KP	ENGINEER: BT² inc, 2830 DAIRY DRIVE, MADISON, WI 53718-6751, PHONE: (608) 224-2830, FAX: (608) 224-2839	CLIENT: WISCONSIN POWER AND LIGHT, EDGEWATER GENERATING STATION, 3739 LAKESHORE DRIVE, SHEBOYGAN, WI 53081	SITE: PLAN OF OPERATION PHASES 3 AND 4, EDGEWATER I-43 ASH DISPOSAL FACILITY, WILSON, WISCONSIN	CROSS SECTION 1,500 NORTH
DRAWN: 11/23/07	CHECKED BY: KG				SHEET
REVISED: 12/10/07	APPROVED BY:				14 of 17

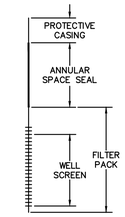


2,000 NORTH

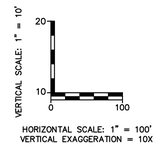
Note: Design information depicted here has been superseded by design updates in the March 2015 Plan of Operation Modification for Phases 3 and 4 prepared by SCS Engineers.

LEGEND

- FILL/TOPSOIL
- SILT (ML)
- LEAN CLAY (CL)
- SILTY SAND (SM)
- WATER TABLE ON APRIL 4, 2006



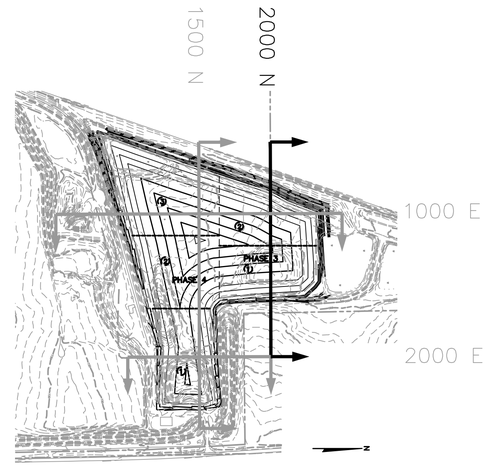
WELL DETAIL



HORIZONTAL SCALE: 1" = 100'
VERTICAL EXAGGERATION = 10X

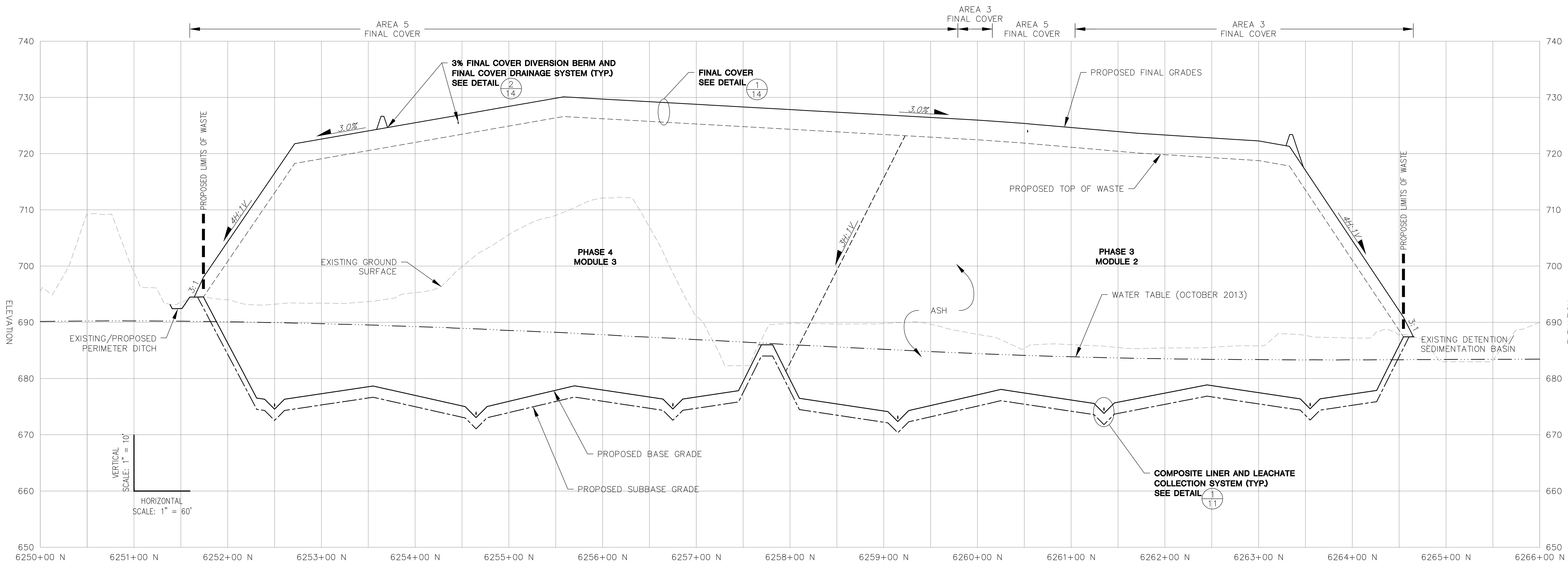
NOTES:

1. BORINGS B2, B4, B19, AND B23 WERE INSTALLED BY SOILS & ENGINEERING SERVICES, INC. IN 1977 AND 1978.
2. BORING B31 WAS INSTALLED BY WARZYN ENGINEERING, INC. IN 1981.

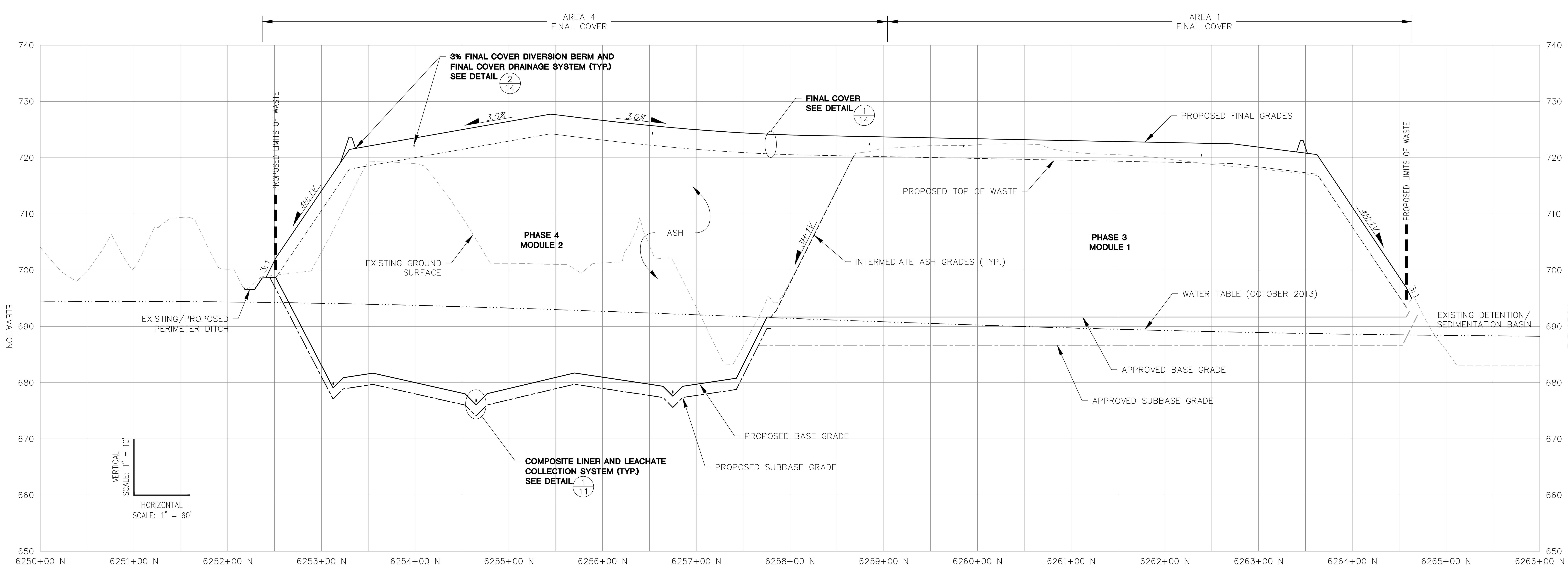


CROSS SECTION LOCATION
1" = 500'

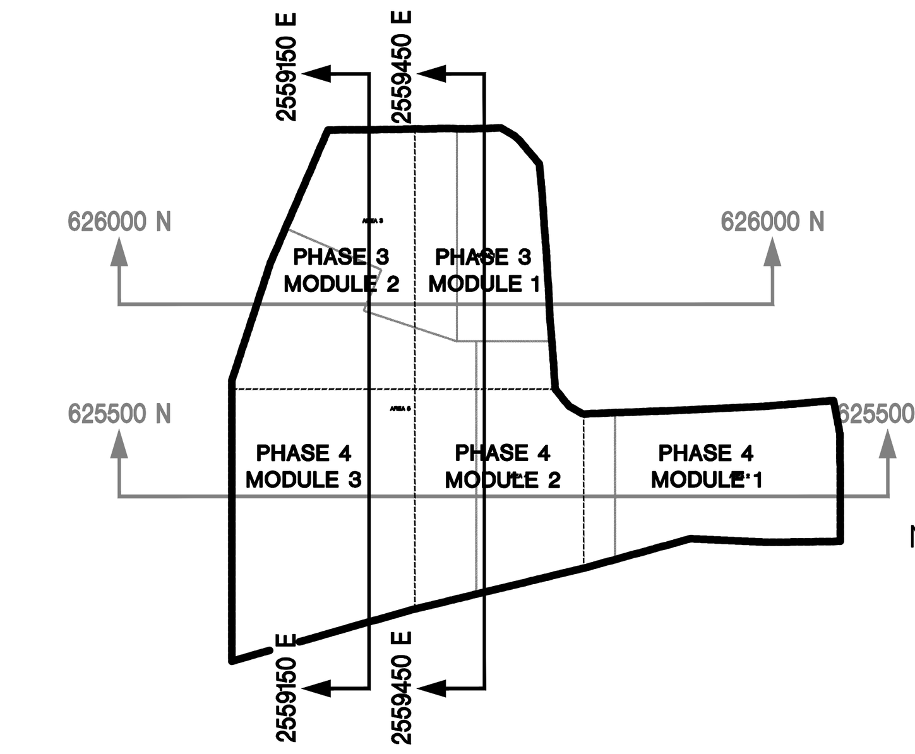
PROJECT NO.	3391	DRAWN BY:	KP		ENGINEER: BT² inc. 2830 DAIRY DRIVE MADISON, WI 53718-6751 PHONE: (608) 224-2830 FAX: (608) 224-2839	CLIENT: WISCONSIN POWER AND LIGHT EDGEWATER GENERATING STATION 3739 LAKESHORE DRIVE SHEBOYGAN, WI 53081	SITE: PLAN OF OPERATION PHASES 3 AND 4 EDGEWATER I-43 ASH DISPOSAL FACILITY WILSON, WISCONSIN	CROSS SECTION 2,000 NORTH	SHEET 15 OF 17
DRAWN:	11/23/07	CHECKED BY:	KG						
REVISED:	12/10/07	APPROVED BY:							



CROSS SECTION 2559150 E



CROSS SECTION 2559450 E



CROSS SECTION LOCATION MAP

(SCALE: 1" = 500')

Unstable Areas Demonstration Notes:

1) The "Water Table" shown on these cross sections is present in unconsolidated deposits that do not meet the definition of the "Uppermost Aquifer" as defined in 40 CFR 257.53.

PROJECT NO. 25214060.00	DRAWN BY: KP
DRAWN: 01/15/15	CHECKED BY: KG/LAB
REVISED: 03/09/15	APPROVED BY: LAB 03/09/15

WISCONSIN POWER AND LIGHT COMPANY
EDGEWATER GENERATING STATION
3739 LAKESHORE DRIVE
SHEBOYGAN, WI 53081

CLIENT

SCS ENGINEERS
2830 DAIRY DRIVE MADISON, WI 53718-6751
PHONE: (608) 224-2830

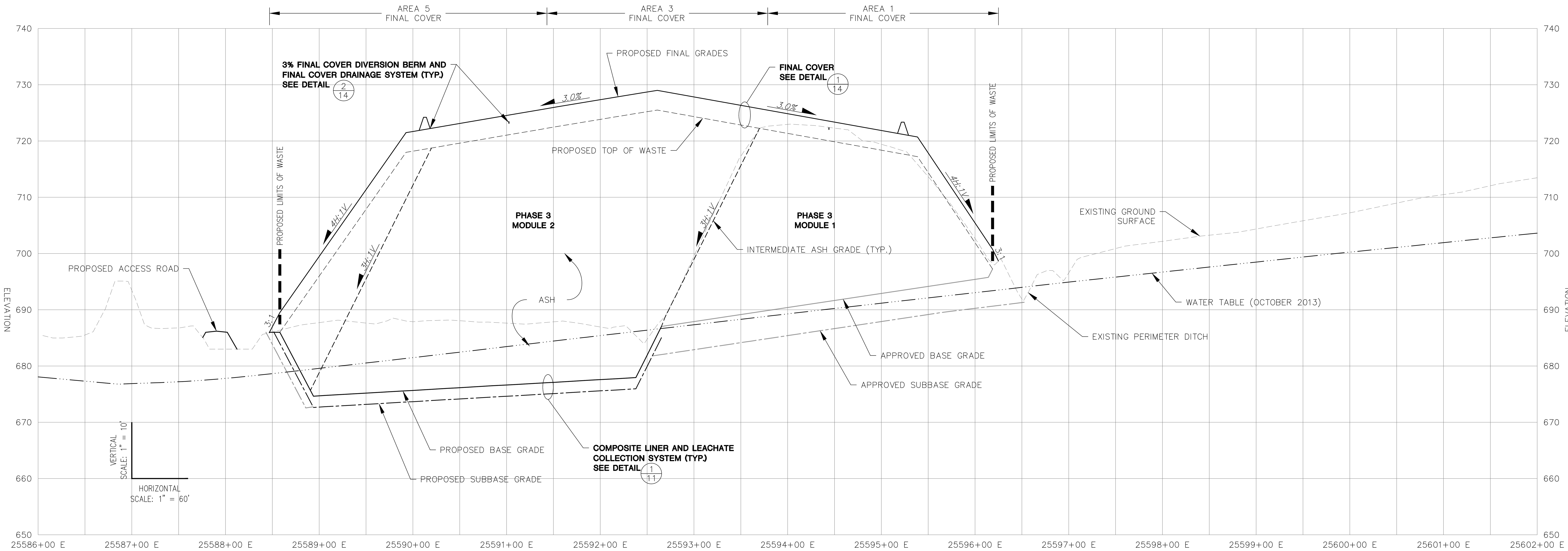
ENGINEER

PLAN MODIFICATION
EDGEWATER I-43 ASH DISPOSAL FACILITY
TOWN OF WILSON, WISCONSIN

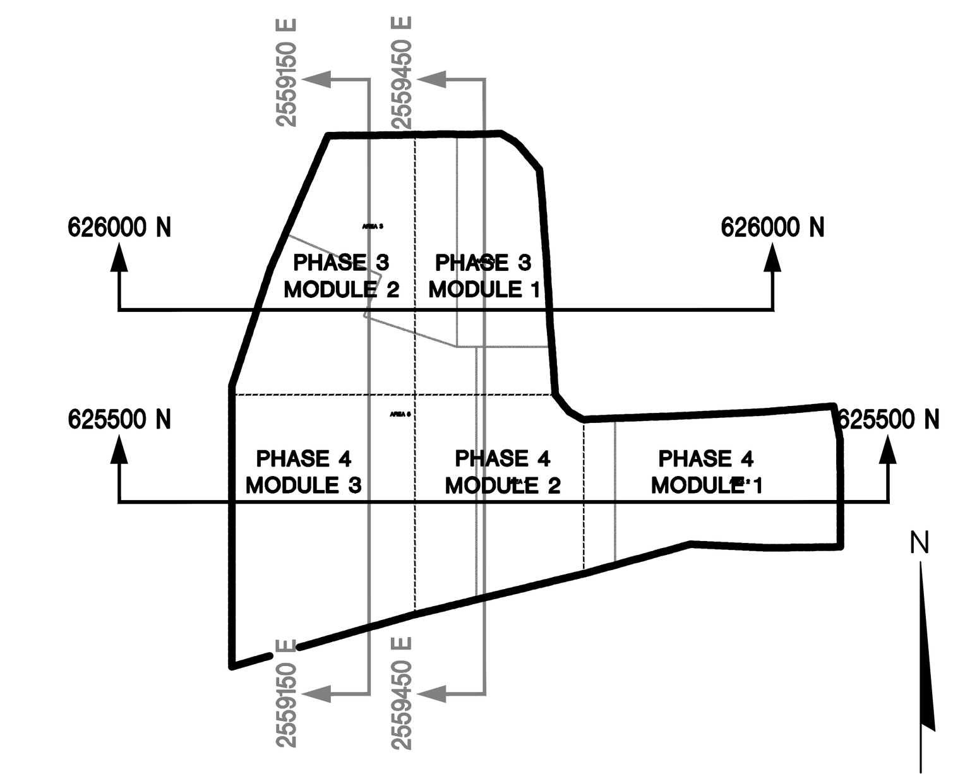
SITE

CROSS SECTIONS – 2,559,150 EAST AND 2,559,450 EAST

SHEET



CROSS SECTION 626000 N

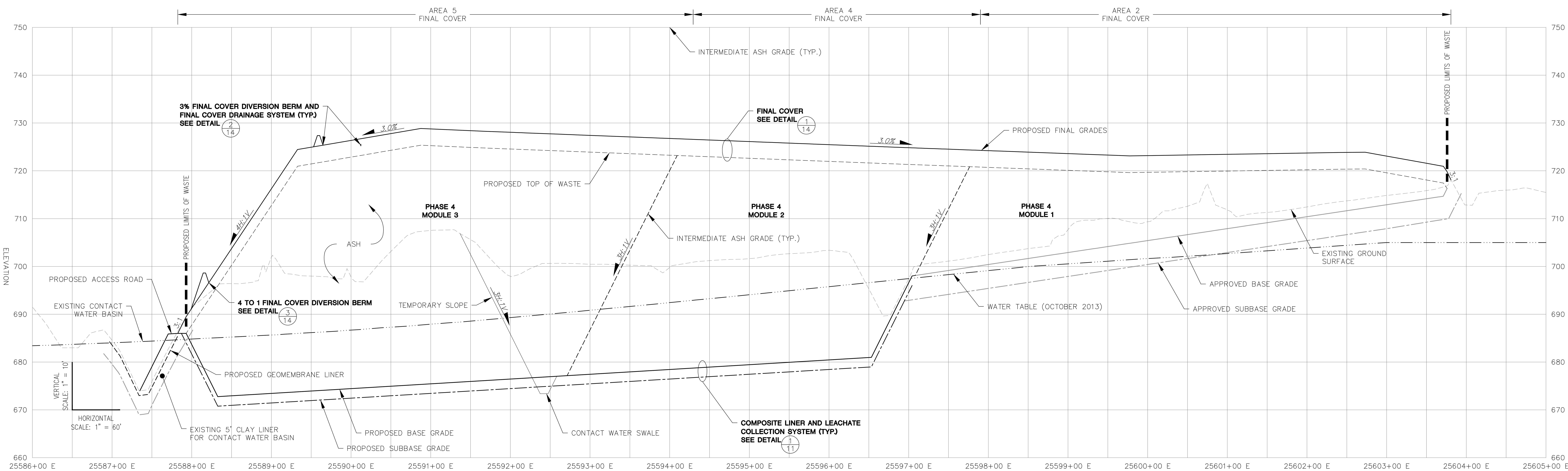


CROSS SECTION LOCATION MAP

(SCALE: 1" = 500')

Unstable Areas Demonstration Notes:

1) The "Water Table" shown on these cross sections is present in unconsolidated deposits that do not meet the definition of the "Uppermost Aquifer" as defined in 40 CFR 257.53.



CROSS SECTION 625500 N

DRAWN BY: KP
CHECKED BY: KG/LAB
APPROVED BY: LAB 03/09/15
PROJECT NO. 25214060.00
DRAWN: 01/15/15
REVISED: 03/09/15

WISCONSIN POWER AND LIGHT COMPANY
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ENGINEER

PLAN MODIFICATION
EDGEWATER I-43 ASH DISPOSAL FACILITY
TOWN OF WILSON, WISCONSIN

SITE

CROSS SECTIONS – 625,500 NORTH AND 626,000 NORTH

SHEET
10 of 19

Appendix H

Slope Stability Analyses

Environmental Consultants
and Contractors

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Madison, WI 53718-6751

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SCS ENGINEERS

September 26, 2018
File No. 25218091.00

TECHNICAL MEMORANDUM

ANALYSIS BY: Brandon Suchomel

REVIEWED BY: Deb Nelson
Phil Gearing

SUBJECT: Interim Waste Slope Stability Analyses
Unstable Areas Restriction Compliance Demonstration Report
Edgewater I-43 Ash Disposal Facility

PURPOSE

The purposes of the slope stability analyses were to evaluate:

- The interim 3H:1V west waste slope in Phase 3, Module 2 at the highest waste grade

CONCLUSION

The attached results confirm that the interim waste slope will be stable during the construction and operation of the disposal facility modules.

APPROACH

SCS Engineers (SCS) evaluated the waste mass slope stability of the west interim slope of Module 2 at the most critical/highest waste grade cross-section (i.e. at the time of final cover placement). The Module 2 interim 3H:1V waste slope analyzed at the west filling face has a maximum waste fill height of approximately 48 feet corresponding to a peak elevation of approximately 724 feet above mean sea level. The interim waste slope was evaluated for block and circular failure.

RESULTS

The calculated safety factors for each failure type are shown in the attached summary table.

SCS recommends a minimum safety factor of 1.3 for the interim waste slopes. The recommended safety factor of 1.3 for an interim waste slope is based on end-of-construction safety factors discussed in the U.S. Army Corps of Engineers engineer manual on slope stability (USACE 2003) and in Wisconsin Administrative Code Chapter NR 514.07(1)(b). The results

indicate that the 3H:1V waste slope for Module 2 has an acceptable minimum safety factor of approximately 1.33.

REFERENCES

1. SCS Engineers, Edgewater I-43 Ash Disposal Facility, Plan Modification, 2015, module design interim waste grades.

2. SCS Engineers, Edgewater I-43 Ash Disposal Facility, Phase 3, Module 2 Liner and Area 1 Final Cover Construction – Construction Documentation Report, 2016, existing as-built composite liner grades, material properties for subbase, clay liner, drainage layer, and geosynthetics.

3. TRI/Environmental, Interface Friction Test Results, 2015, for 2015 Module 2 Liner Construction.

4. TRI/Environmental, Consolidated-Undrained Triaxial Compression Test Results for FGD Material, 2015, material properties for CCR.

5. U.S. Department of Transportation, Federal Highway Administration, Recycled Materials, Coal Ash User's Guide.

6. Stabilization of FGD By-Products by Using Fly Ash, Cement, and Sialite, 2009 WOCA Conference.

7. Geo-Slope International, Ltd., GeoStudio 2016, Version 8.16.2.14053, Slope/W slope stability software.

8. U.S. Army Corps of Engineers, Slope Stability Engineer Manual EM 1110-2-1902, October 2003.

ASSUMPTIONS

- Circular and sliding block failure stability analyses are appropriate to evaluate the waste interim slope stability.

- Material properties are as shown in the table below, based on the indicated references and assumed values based on experience. Friction angles for soils are conservative assumed values based on soil type, published typical values, and SCS experience. The coal combustion residual (CCR) friction angle is a conservative assumed value based on published values and 2015 triaxial compression test results by TRI/Environmental for CCR.

Material	Unit Weight (pcf)	Friction Angle (degrees)	Cohesion (psf)	Reference
Subbase Soil (Clay)	135	28	0	2
Clay Liner	130	28	0	2
Geosynthetics	58	19.5	0	3
Drainage Layer (Sand)	115	30	0	2
CCR	86	20	0	4, 5, 6

Attachments: Calculations organized as follows:

- Factor of Safety Summary Table
- Cross Section Location Figure
- Slope/W Outputs

BSS/AJR/DLN/PEG
Coordinates checked by BJM

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Slope Stability Analyses
Factors of Safety Results Summary
Edgewater I-43 Ash Disposal Facility - Location Restriction Compliance Demonstration

Phase 3, Module 2 Western Interim Waste Slope		
Failure Type	**Calculated Safety Factor**	**Recommended Min. Safety Factor**
Block	1.33	1.3
Circular	1.37	1.3

Created by: BSS, 8/28/18
Last Revision by: BSS, 9/5/18
Checked by:DLN, 9/5/18

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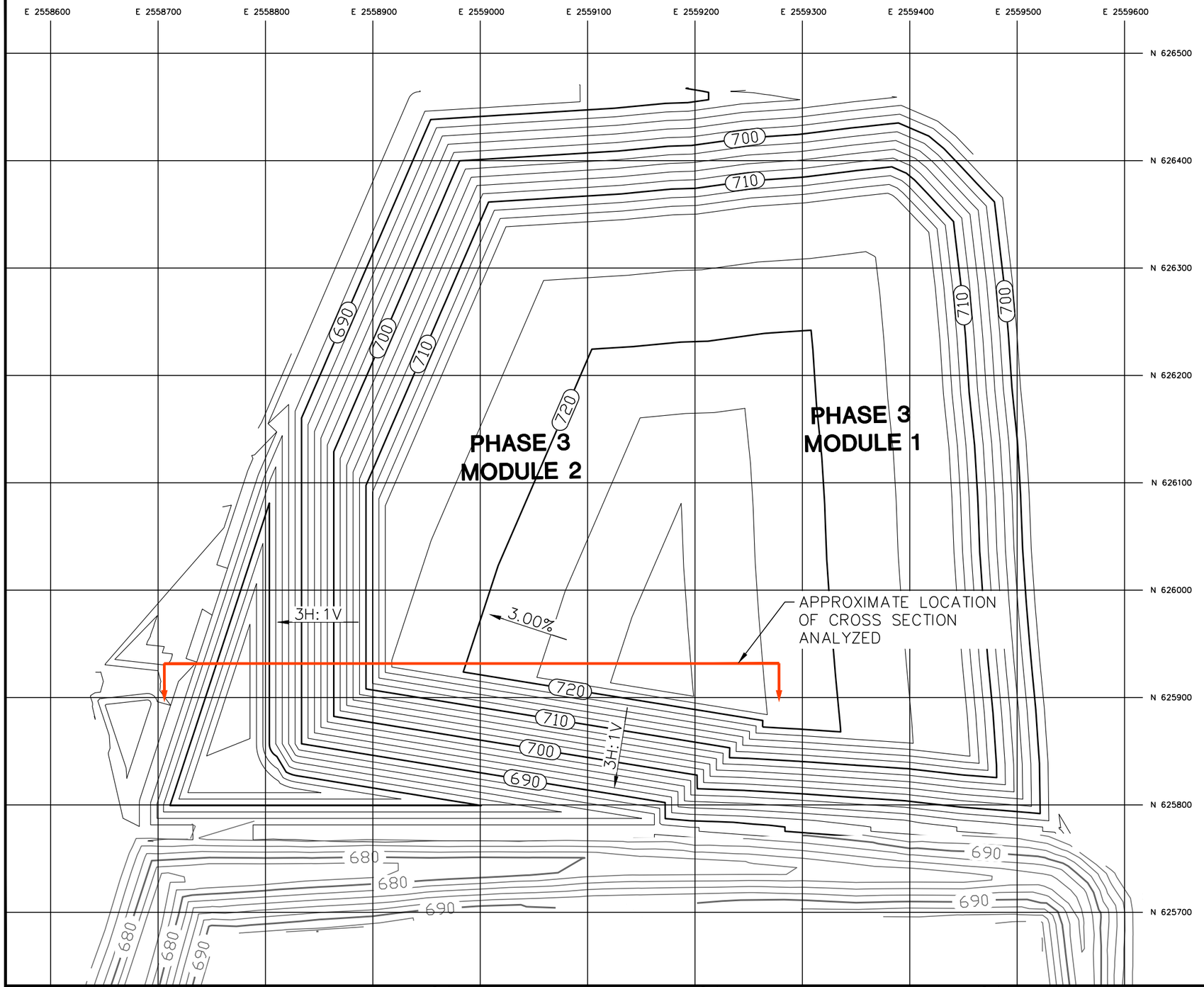

LEGEND

690	EXISTING GRADE (10' INTERVAL)
	EXISTING GRADE (2' INTERVAL)
710	PROPOSED WASTE GRADE (10' INTERVAL)
	PROPOSED WASTE GRADE (2' INTERVAL)

NOTES:

1. PROPOSED GRADES REPRESENT PHASE 3 INTERIM WASTE GRADES.
2. EXISTING GRADES REPRESENT CONTACT WATER BASIN TOP OF STONE.

N

100 0 100

SCALE: 1" = 100'

PROJECT NO.	25218091.00	DRAWN BY:	BSS
DRAWN:	08/24/18	CHECKED BY:	PEG
REVISED:	09/10/18	APPROVED BY:	

ENGINEER: SCS ENGINEERS
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PHONE: (608) 224-2830

CLIENT: Wisconsin Power and Light Company
EDGEWATER GENERATING STATION
3739 LAKESHORE DRIVE
SHEBOYGAN, WI 53081

SITE: LOCATION RESTRICTION
COMPLIANCE DEMONSTRATION REPORT
EDGEWATER I-43 ASH DISPOSAL FACILITY
TOWN OF WILSON, WISCONSIN

SLOPE STABILITY ANALYSIS
CROSS SECTION LOCATIONS

FIGURE
1 OF 1

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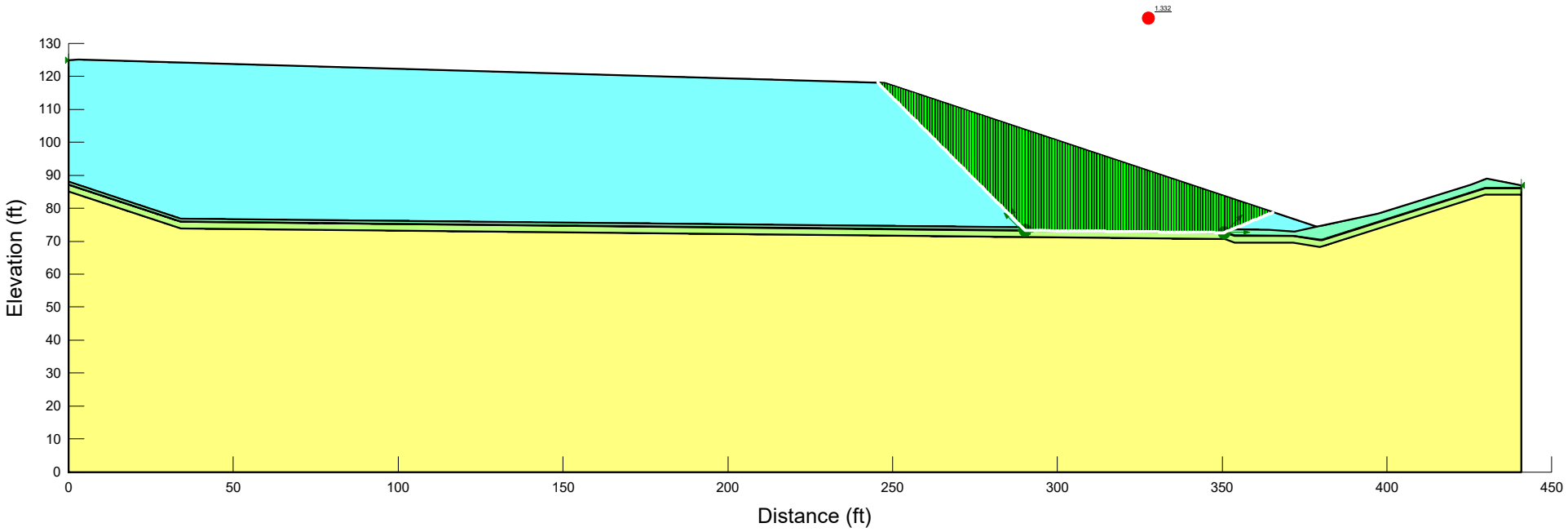
Edgewater Unstable Areas Analysis 2018 - West Slope
Name: Block
F of S: 1.332



Color	Name	Model	Unit Weight (pcf)	Cohesion' (psf)	Phi' (°)
	CCR	Mohr-Coulomb	86	0	20
	Clay Liner	Mohr-Coulomb	130	0	28
	Drainage Layer	Mohr-Coulomb	115	0	30
	Geosynthetics	Mohr-Coulomb	58	0	19.5
	Subbase	Mohr-Coulomb	135	0	28

Block

File Information

File Version: 8.16
Title: Edgewater Unstable Areas Analysis 2018 - West Slope
Comments: Running slope stability analysis on the west waste slope of Phase 3, Module 2 of the Edgewater I-43 Ash Disposal Facility. Location of analysis was selected based on longest and steepest slope at the time of peak waste placement within Module 2.
Created By: Suchomel, Brandon
Last Edited By: Suchomel, Brandon
Revision Number: 45
Date: 9/5/2018
Time: 1:09:20 PM
Tool Version: 8.16.3.14580
File Name: Western Slope of Module 2 Phase 3.gsz
Directory: I:\25218091.00\Data and Calculations\Slope Stability\
Last Solved Date: 9/5/2018
Last Solved Time: 1:13:42 PM

Project Settings

Length(L) Units: Feet
Time(t) Units: Seconds
Force(F) Units: Pounds
Pressure(p) Units: psf
Strength Units: psf
Unit Weight of Water: 62.4 pcf
View: 2D
Element Thickness: 1

Analysis Settings

Block

Kind: SLOPE/W
Method: Janbu
Settings
    PWP Conditions Source: (none)
Slip Surface
    Direction of movement: Left to Right
    Use Passive Mode: No
    Slip Surface Option: Block
    Critical slip surfaces saved: 10
    Resisting Side Maximum Convex Angle: 1 °
    Driving Side Maximum Convex Angle: 5 °

Restrict Block Crossing: No
Optimize Critical Slip Surface Location: No
Tension Crack
Tension Crack Option: (none)
F of S Distribution
F of S Calculation Option: Constant
Advanced
Number of Slices: 150
F of S Tolerance: 0.001
Minimum Slip Surface Depth: 0.1 ft

Materials

Subbase

Model: Mohr-Coulomb
Unit Weight: 135 pcf
Cohesion': 0 psf
Phi': 28 °
Phi-B: 0 °

Clay Liner

Model: Mohr-Coulomb
Unit Weight: 130 pcf
Cohesion': 0 psf
Phi': 28 °
Phi-B: 0 °

Geosynthetics

Model: Mohr-Coulomb
Unit Weight: 58 pcf
Cohesion': 0 psf
Phi': 19.5 °
Phi-B: 0 °

Drainage Layer

Model: Mohr-Coulomb
Unit Weight: 115 pcf
Cohesion': 0 psf
Phi': 30 °
Phi-B: 0 °

CCR

Model: Mohr-Coulomb
Unit Weight: 86 pcf
Cohesion': 0 psf
Phi': 20 °
Phi-B: 0 °

Slip Surface Limits

Left Coordinate: (0, 124.95) ft
Right Coordinate: (440.79, 86.91) ft

Slip Surface Block

Left Grid
- Upper Left: (289.08, 73.32) ft
- Lower Left: (289.08, 73.22) ft
- Lower Right: (292.05, 73.19) ft
- X Increments: 10
- Y Increments: 5
- Starting Angle: 115 °
- Ending Angle: 135 °
- Angle Increments: 2

Right Grid
- Upper Left: (350, 72.7) ft
- Lower Left: (349.99, 72.6) ft
- Lower Right: (350.8, 72.59) ft
- X Increments: 10
- Y Increments: 5
- Starting Angle: 0 °
- Ending Angle: 45 °
- Angle Increments: 2

Points

	X (ft)	Y (ft)
Point 1	0	0
Point 2	0	87.05
Point 3	0	85.05
Point 4	0	87.15
Point 5	34.01	75.82
Point 6	34.01	73.82
Point 7	34.01	75.92
Point 8	350.8	72.59
Point 9	350.8	70.59
Point 10	350.8	72.69
Point 11	353.74	71.61
Point 12	353.74	69.61
Point 13	353.74	71.71
Point 14	371.54	71.58
Point 15	371.54	69.58
Point 16	371.54	71.68
Point 17	379.67	70.31
Point 18	379.67	68.31

Point 19	379.67	70.41
Point 20	380.33	70.37
Point 21	380.33	68.37
Point 22	380.33	70.47
Point 23	429.74	86.05
Point 24	429.74	84.05
Point 25	429.74	86.15
Point 26	440.79	86.05
Point 27	440.79	84.05
Point 28	440.79	86.15
Point 29	440.79	0
Point 30	0	88.06
Point 31	34.01	76.88
Point 32	364.01	73.53
Point 33	371.98	72.92
Point 34	378.75	74.32
Point 35	397.24	78.26
Point 36	425.51	87.13
Point 37	430.24	89.04
Point 38	440.79	86.91
Point 39	0	124.95
Point 40	2.89	125.01
Point 41	247.62	118.03

Regions

	Material	Points	Area (ft²)
Region 1	Subbase	1,3,6,9,12,15,18,21,24,27,29	32,320
Region 2	Clay Liner	3,2,5,8,11,14,17,20,23,26,27,24,21,18,15,12,9,6	881.58
Region 3	Geosynthetics	2,4,7,10,13,16,19,22,25,28,26,23,20,17,14,11,8,5	44.079
Region 4	Drainage Layer	4,30,31,32,33,34,35,36,37,38,28,25,22,19,16,13,10,7	551.77
Region 5	CCR	30,39,40,41,34,33,32,31	14,008

Current Slip Surface

Slip Surface: 22,397
F of S: 1.332
Volume: 2,037.6438 ft³
Weight: 176,875.14 lbs
Resisting Force: 59,709.489 lbs
Activating Force: 44,812.944 lbs
F of S Rank (Analysis): 1 of 39,204 slip surfaces
F of S Rank (Query): 1 of 39,204 slip surfaces
Exit: (365.43856, 78.757145) ft
Entry: (245.44394, 118.09206) ft
Radius: 65.463717 ft
Center: (315.11191, 127.92579) ft

Slip Slices

	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesive Strength (psf)
Slice 1	245.80661	117.72939	0	23.800692	8.6627436	0
Slice 2	246.53197	117.00403	0	71.402077	25.988231	0
Slice 3	247.25732	116.27868	0	119.00346	43.313718	0
Slice 4	248.02026	115.51574	0	160.82963	58.537199	0
Slice 5	248.82078	114.71522	0	196.88059	71.658675	0
Slice 6	249.6213	113.9147	0	232.93155	84.780151	0
Slice 7	250.42182	113.11418	0	268.98251	97.901626	0
Slice 8	251.22234	112.31366	0	305.03347	111.0231	0
Slice 9	252.02286	111.51314	0	341.08442	124.14458	0
Slice 10	252.82338	110.71262	0	377.13538	137.26605	0
Slice 11	253.6239	109.9121	0	413.18634	150.38753	0
Slice 12	254.42442	109.11158	0	449.2373	163.50901	0
Slice 13	255.22494	108.31106	0	485.28826	176.63048	0
Slice 14	256.02546	107.51054	0	521.33922	189.75196	0
	256.82598	106.71002	0	557.39017	202.87343	0

Slice 15						
Slice 16	257.6265	105.9095	0	593.44113	215.99491	0
Slice 17	258.42702	105.10898	0	629.49209	229.11638	0
Slice 18	259.22754	104.30846	0	665.54305	242.23786	0
Slice 19	260.02806	103.50794	0	701.59401	255.35934	0
Slice 20	260.82858	102.70742	0	737.64497	268.48081	0
Slice 21	261.6291	101.9069	0	773.69592	281.60229	0
Slice 22	262.42962	101.10638	0	809.74688	294.72376	0
Slice 23	263.23014	100.30586	0	845.79784	307.84524	0
Slice 24	264.03066	99.505339	0	881.8488	320.96671	0
Slice 25	264.83118	98.704819	0	917.89976	334.08819	0
Slice 26	265.6317	97.904299	0	953.95072	347.20967	0
Slice 27	266.43222	97.103779	0	990.00167	360.33114	0
Slice 28	267.23274	96.303259	0	1,026.0526	373.45262	0
Slice 29	268.03326	95.502739	0	1,062.1036	386.57409	0
Slice 30	268.83378	94.702219	0	1,098.1545	399.69557	0
Slice 31	269.6343	93.901699	0	1,134.2055	412.81704	0
Slice 32	270.43482	93.101179	0	1,170.2565	425.93852	0
Slice 33	271.23534	92.300658	0	1,206.3074	439.06	0
Slice 34	272.03586	91.500138	0	1,242.3584	452.18147	0
Slice 35	272.83638	90.699618	0	1,278.4093	465.30295	0
Slice 36	273.6369	89.899098	0	1,314.4603	478.42442	0
Slice 37	274.43742	89.098578	0	1,350.5113	491.5459	0
Slice 38	275.23794	88.298058	0	1,386.5622	504.66737	0

Slice 39	276.03846	87.497538	0	1,422.6132	517.78885	0
Slice 40	276.83898	86.697018	0	1,458.6641	530.91033	0
Slice 41	277.6395	85.896498	0	1,494.7151	544.0318	0
Slice 42	278.44002	85.095978	0	1,530.766	557.15328	0
Slice 43	279.24054	84.295458	0	1,566.817	570.27475	0
Slice 44	280.04106	83.494938	0	1,602.868	583.39623	0
Slice 45	280.84158	82.694418	0	1,638.9189	596.5177	0
Slice 46	281.6421	81.893898	0	1,674.9699	609.63918	0
Slice 47	282.44262	81.093378	0	1,711.0208	622.76066	0
Slice 48	283.24314	80.292858	0	1,747.0718	635.88213	0
Slice 49	284.04366	79.492338	0	1,783.1228	649.00361	0
Slice 50	284.84418	78.691818	0	1,819.1737	662.12508	0
Slice 51	285.6447	77.891298	0	1,855.2247	675.24656	0
Slice 52	286.44522	77.090777	0	1,891.2756	688.36803	0
Slice 53	287.24574	76.290257	0	1,927.3266	701.48951	0
Slice 54	288.04626	75.489737	0	1,963.3775	714.61099	0
Slice 55	288.84678	74.689217	0	1,999.4285	727.73246	0
Slice 56	289.73773	73.798273	0	1,821.5365	1,051.6646	0
Slice 57	290.65013	73.283295	0	2,602.4557	921.57791	0
Slice 58	291.47378	73.2545	0	2,612.8198	925.24804	0
Slice 59	292.27763	73.2455	0	2,590.5947	917.3777	0
Slice 60	293.08149	73.2365	0	2,568.3695	909.50736	0
Slice 61	293.88534	73.2275	0	2,546.1444	901.63702	0
Slice 62	294.68919	73.2185	0	2,523.9193	893.76668	0

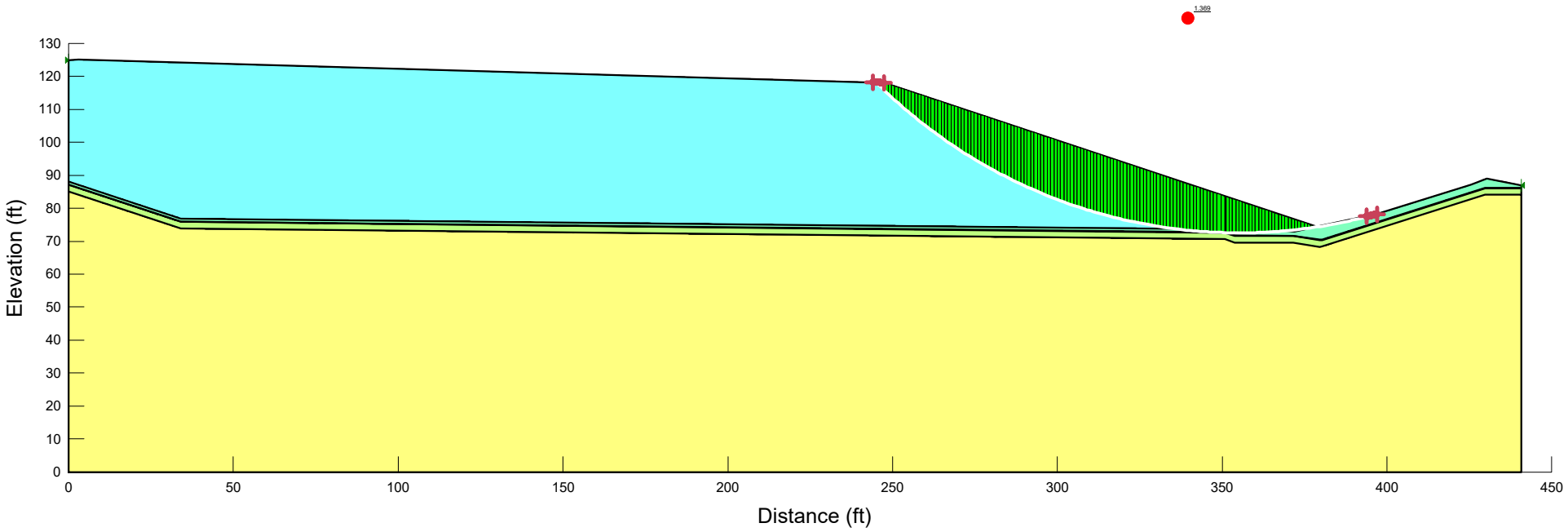
Slice 63	295.49305	73.2095	0	2,501.6941	885.89634	0
Slice 64	296.2969	73.2005	0	2,479.469	878.02601	0
Slice 65	297.10075	73.1915	0	2,457.2438	870.15567	0
Slice 66	297.90461	73.1825	0	2,435.0187	862.28533	0
Slice 67	298.70846	73.1735	0	2,412.7935	854.41499	0
Slice 68	299.51231	73.1645	0	2,390.5684	846.54465	0
Slice 69	300.31617	73.1555	0	2,368.3432	838.67432	0
Slice 70	301.12002	73.1465	0	2,346.1181	830.80398	0
Slice 71	301.92387	73.1375	0	2,323.8929	822.93364	0
Slice 72	302.72773	73.1285	0	2,301.6678	815.0633	0
Slice 73	303.53158	73.1195	0	2,279.4426	807.19296	0
Slice 74	304.33543	73.1105	0	2,257.2175	799.32262	0
Slice 75	305.13929	73.1015	0	2,234.9923	791.45229	0
Slice 76	305.94314	73.0925	0	2,212.7672	783.58195	0
Slice 77	306.74699	73.0835	0	2,190.542	775.71161	0
Slice 78	307.55085	73.0745	0	2,168.3169	767.84127	0
Slice 79	308.3547	73.0655	0	2,146.0917	759.97093	0
Slice 80	309.15855	73.0565	0	2,123.8666	752.1006	0
Slice 81	309.96241	73.0475	0	2,101.6414	744.23026	0
Slice 82	310.76626	73.0385	0	2,079.4163	736.35992	0
Slice 83	311.57011	73.0295	0	2,057.1911	728.48958	0
Slice 84	312.37397	73.0205	0	2,034.966	720.61924	0
Slice 85	313.17782	73.0115	0	2,012.7408	712.7489	0
Slice 86	313.98167	73.0025	0	1,990.5157	704.87857	0

Slice 87	314.78553	72.9935	0	1,968.2905	697.00823	0
Slice 88	315.58938	72.9845	0	1,946.0654	689.13789	0
Slice 89	316.39323	72.9755	0	1,923.8402	681.26755	0
Slice 90	317.19709	72.9665	0	1,901.6151	673.39721	0
Slice 91	318.00094	72.9575	0	1,879.3899	665.52688	0
Slice 92	318.80479	72.9485	0	1,857.1648	657.65654	0
Slice 93	319.60865	72.9395	0	1,834.9396	649.7862	0
Slice 94	320.4125	72.9305	0	1,812.7145	641.91586	0
Slice 95	321.21635	72.9215	0	1,790.4893	634.04552	0
Slice 96	322.02021	72.9125	0	1,768.2642	626.17518	0
Slice 97	322.82406	72.9035	0	1,746.039	618.30485	0
Slice 98	323.62791	72.8945	0	1,723.8139	610.43451	0
Slice 99	324.43177	72.8855	0	1,701.5887	602.56417	0
Slice 100	325.23562	72.8765	0	1,679.3636	594.69383	0
Slice 101	326.03947	72.8675	0	1,657.1384	586.82349	0
Slice 102	326.84333	72.8585	0	1,634.9133	578.95316	0
Slice 103	327.64718	72.8495	0	1,612.6881	571.08282	0
Slice 104	328.45103	72.8405	0	1,590.463	563.21248	0
Slice 105	329.25489	72.8315	0	1,568.2378	555.34214	0
Slice 106	330.05874	72.8225	0	1,546.0127	547.4718	0
Slice 107	330.86259	72.8135	0	1,523.7875	539.60146	0
Slice 108	331.66645	72.8045	0	1,501.5624	531.73113	0
Slice 109	332.4703	72.7955	0	1,479.3372	523.86079	0
Slice 110	333.27415	72.7865	0	1,457.1121	515.99045	0

Slice 111	334.07801	72.7775	0	1,434.8869	508.12011	0
Slice 112	334.88186	72.7685	0	1,412.6618	500.24977	0
Slice 113	335.68571	72.7595	0	1,390.4366	492.37944	0
Slice 114	336.48957	72.7505	0	1,368.2115	484.5091	0
Slice 115	337.29342	72.7415	0	1,345.9863	476.63876	0
Slice 116	338.09727	72.7325	0	1,323.7612	468.76842	0
Slice 117	338.90113	72.7235	0	1,301.536	460.89808	0
Slice 118	339.70498	72.7145	0	1,279.3109	453.02774	0
Slice 119	340.50883	72.7055	0	1,257.0857	445.15741	0
Slice 120	341.31269	72.6965	0	1,234.8606	437.28707	0
Slice 121	342.11654	72.6875	0	1,212.6354	429.41673	0
Slice 122	342.92039	72.6785	0	1,190.4103	421.54639	0
Slice 123	343.72425	72.6695	0	1,168.1851	413.67605	0
Slice 124	344.5281	72.6605	0	1,145.96	405.80572	0
Slice 125	345.33195	72.6515	0	1,123.7348	397.93538	0
Slice 126	346.13581	72.6425	0	1,101.5097	390.06504	0
Slice 127	346.93966	72.6335	0	1,079.2845	382.1947	0
Slice 128	347.74351	72.6245	0	1,057.0594	374.32436	0
Slice 129	348.54737	72.6155	0	1,034.8342	366.45402	0
Slice 130	349.35122	72.6065	0	1,012.6091	358.58369	0
Slice 131	350.15507	72.5975	0	990.38394	350.71335	0
Slice 132	350.6742	72.641544	0	1,096.7514	388.38005	0
Slice 133	351.17396	72.848554	0	1,146.2885	661.80996	0
Slice 134	351.93911	73.165487	0	1,074.8657	620.57398	0

Slice 135	352.70425	73.48242	0	1,003.4429	579.33801	0
Slice 136	353.49855	73.811429	0	865.52147	315.02405	0
Slice 137	354.322	74.152513	0	805.83033	293.29825	0
Slice 138	355.14545	74.493597	0	746.13919	271.57246	0
Slice 139	355.9689	74.83468	0	686.44806	249.84666	0
Slice 140	356.79234	75.175764	0	626.75692	228.12086	0
Slice 141	357.61579	75.516848	0	567.06579	206.39507	0
Slice 142	358.43924	75.857932	0	507.37465	184.66927	0
Slice 143	359.26269	76.199016	0	447.68352	162.94347	0
Slice 144	360.08614	76.5401	0	387.99238	141.21768	0
Slice 145	360.90959	76.881184	0	328.30125	119.49188	0
Slice 146	361.73304	77.222268	0	268.61011	97.766085	0
Slice 147	362.55649	77.563352	0	208.91897	76.040288	0
Slice 148	363.37994	77.904436	0	149.22784	54.314492	0
Slice 149	364.20339	78.24552	0	89.536703	32.588695	0
Slice 150	365.02684	78.586604	0	29.845568	10.862898	0

Edgewater Unstable Areas Analysis 2018 - West Slope
Name: Circular
F of S: 1.369



Color	Name	Model	Unit Weight (pcf)	Cohesion' (psf)	Phi' (°)
	CCR	Mohr-Coulomb	86	0	20
	Clay Liner	Mohr-Coulomb	130	0	28
	Drainage Layer	Mohr-Coulomb	115	0	30
	Geosynthetics	Mohr-Coulomb	58	0	19.5
	Subbase	Mohr-Coulomb	135	0	28

Circular

File Information

File Version: 8.16
Title: Edgewater Unstable Areas Analysis 2018 - West Slope
Comments: Running slope stability analysis on the west waste slope of Phase 3, Module 2 of the Edgewater I-43 Ash Disposal Facility. Location of analysis was selected based on longest and steepest slope at the time of peak waste placement within Module 2.
Created By: Suchomel, Brandon
Last Edited By: Suchomel, Brandon
Revision Number: 45
Date: 9/5/2018
Time: 1:09:20 PM
Tool Version: 8.16.3.14580
File Name: Western Slope of Module 2 Phase 3.gsz
Directory: I:\25218091.00\Data and Calculations\Slope Stability\
Last Solved Date: 9/5/2018
Last Solved Time: 1:17:09 PM

Project Settings

Length(L) Units: Feet
Time(t) Units: Seconds
Force(F) Units: Pounds
Pressure(p) Units: psf
Strength Units: psf
Unit Weight of Water: 62.4 pcf
View: 2D
Element Thickness: 1

Analysis Settings

Circular

Kind: SLOPE/W
Method: Bishop
Settings
    PWP Conditions Source: (none)
Slip Surface
    Direction of movement: Left to Right
    Use Passive Mode: No
    Slip Surface Option: Entry and Exit
    Critical slip surfaces saved: 10
    Resisting Side Maximum Convex Angle: 1 °
    Driving Side Maximum Convex Angle: 5 °

Optimize Critical Slip Surface Location: No
Tension Crack
Tension Crack Option: (none)
F of S Distribution
F of S Calculation Option: Constant
Advanced
Number of Slices: 150
F of S Tolerance: 0.001
Minimum Slip Surface Depth: 0.1 ft

Materials

Subbase

Model: Mohr-Coulomb
Unit Weight: 135 pcf
Cohesion': 0 psf
Phi': 28 °
Phi-B: 0 °

Clay Liner

Model: Mohr-Coulomb
Unit Weight: 130 pcf
Cohesion': 0 psf
Phi': 28 °
Phi-B: 0 °

Geosynthetics

Model: Mohr-Coulomb
Unit Weight: 58 pcf
Cohesion': 0 psf
Phi': 19.5 °
Phi-B: 0 °

Drainage Layer

Model: Mohr-Coulomb
Unit Weight: 115 pcf
Cohesion': 0 psf
Phi': 30 °
Phi-B: 0 °

CCR

Model: Mohr-Coulomb
Unit Weight: 86 pcf
Cohesion': 0 psf
Phi': 20 °
Phi-B: 0 °

Slip Surface Entry and Exit

Left Projection: Range
Left-Zone Left Coordinate: (243.97, 118.1341) ft
Left-Zone Right Coordinate: (247.34, 118.03799) ft
Left-Zone Increment: 100
Right Projection: Range
Right-Zone Left Coordinate: (393.76, 77.51845) ft
Right-Zone Right Coordinate: (396.92, 78.19181) ft
Right-Zone Increment: 100
Radius Increments: 30

Slip Surface Limits

Left Coordinate: (0, 124.95) ft
Right Coordinate: (440.79, 86.91) ft

Points

	X (ft)	Y (ft)
Point 1	0	0
Point 2	0	87.05
Point 3	0	85.05
Point 4	0	87.15
Point 5	34.01	75.82
Point 6	34.01	73.82
Point 7	34.01	75.92
Point 8	350.8	72.59
Point 9	350.8	70.59
Point 10	350.8	72.69
Point 11	353.74	71.61
Point 12	353.74	69.61
Point 13	353.74	71.71
Point 14	371.54	71.58
Point 15	371.54	69.58
Point 16	371.54	71.68
Point 17	379.67	70.31
Point 18	379.67	68.31
Point 19	379.67	70.41
Point 20	380.33	70.37
Point 21	380.33	68.37
Point 22	380.33	70.47
Point 23	429.74	86.05
Point 24	429.74	84.05
Point 25	429.74	86.15
Point 26	440.79	86.05

Point 27	440.79	84.05
Point 28	440.79	86.15
Point 29	440.79	0
Point 30	0	88.06
Point 31	34.01	76.88
Point 32	364.01	73.53
Point 33	371.98	72.92
Point 34	378.75	74.32
Point 35	397.24	78.26
Point 36	425.51	87.13
Point 37	430.24	89.04
Point 38	440.79	86.91
Point 39	0	124.95
Point 40	2.89	125.01
Point 41	247.62	118.03

Regions

	Material	Points	Area (ft²)
Region 1	Subbase	1,3,6,9,12,15,18,21,24,27,29	32,320
Region 2	Clay Liner	3,2,5,8,11,14,17,20,23,26,27,24,21,18,15,12,9,6	881.58
Region 3	Geosynthetics	2,4,7,10,13,16,19,22,25,28,26,23,20,17,14,11,8,5	44.079
Region 4	Drainage Layer	4,30,31,32,33,34,35,36,37,38,28,25,22,19,16,13,10,7	551.77
Region 5	CCR	30,39,40,41,34,33,32,31	14,008

Current Slip Surface

Slip Surface: 106,000
F of S: 1.369
Volume: 1,644.7877 ft³
Weight: 142,278.76 lbs
Resisting Moment: 8,872,216.2 lbs-ft

Activating Moment: 6,479,605.3 lbs-ft
F of S Rank (Analysis): 1 of 316,231 slip surfaces
F of S Rank (Query): 1 of 316,231 slip surfaces
Exit: (396.4776, 78.097542) ft
Entry: (245.0821, 118.10238) ft
Radius: 155.79743 ft
Center: (355.19053, 228.32476) ft

Slip Slices

	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesive Strength (psf)
Slice 1	245.50508	117.68306	0	27.722323	10.0901	0
Slice 2	246.35105	116.85074	0	82.997012	30.208442	0
Slice 3	247.19702	116.03097	0	137.75366	50.138233	0
Slice 4	248.12298	115.14835	0	186.51865	67.887238	0
Slice 5	249.12894	114.20505	0	229.11109	83.389617	0
Slice 6	250.13491	113.27829	0	270.839	98.577333	0
Slice 7	251.14087	112.36765	0	311.71134	113.45365	0
Slice 8	252.14683	111.47278	0	351.73691	128.02177	0
Slice 9	253.1528	110.5933	0	390.92429	142.28481	0
Slice 10	254.15876	109.72888	0	429.28189	156.24583	0
Slice 11	255.16472	108.87918	0	466.8179	169.90782	0
Slice 12	256.17069	108.0439	0	503.54035	183.2737	0
Slice 13	257.17665	107.22274	0	539.45704	196.3463	0
Slice 14	258.18261	106.41541	0	574.5756	209.12842	0
Slice 15	259.18858	105.62164	0	608.90346	221.62273	0
Slice 16	260.19454	104.84117	0	642.44785	233.83189	0
Slice 17	261.2005	104.07374	0	675.21582	245.75846	0
Slice 18	262.20647	103.31912	0	707.21423	257.40493	0
Slice 19	263.21243	102.57708	0	738.44975	268.77373	0
Slice 20	264.21839	101.84739	0	768.92888	279.86723	0
Slice 21	265.22436	101.12984	0	798.65794	290.68772	0
Slice 22	266.23032	100.42424	0	827.64305	301.23744	0
	267.23628	99.730368	0	855.89019	311.51855	0

Slice 23						
Slice 24	268.24225	99.048052	0	883.40516	321.53318	0
Slice 25	269.24821	98.377107	0	910.19358	331.28337	0
Slice 26	270.25417	97.717356	0	936.26092	340.77111	0
Slice 27	271.26014	97.068632	0	961.61249	349.99832	0
Slice 28	272.2661	96.43077	0	986.25345	358.9669	0
Slice 29	273.27206	95.803616	0	1,010.1888	367.67865	0
Slice 30	274.27803	95.187016	0	1,033.4234	376.13535	0
Slice 31	275.28399	94.580825	0	1,055.9619	384.33869	0
Slice 32	276.28995	93.984903	0	1,077.8089	392.29035	0
Slice 33	277.29592	93.399112	0	1,098.9688	399.99193	0
Slice 34	278.30188	92.823322	0	1,119.4459	407.44499	0
Slice 35	279.30784	92.257406	0	1,139.2443	414.65103	0
Slice 36	280.31381	91.701241	0	1,158.3681	421.61152	0
Slice 37	281.31977	91.154709	0	1,176.8211	428.32787	0
Slice 38	282.32573	90.617694	0	1,194.6071	434.80144	0
Slice 39	283.3317	90.090086	0	1,211.7297	441.03356	0
Slice 40	284.33766	89.571777	0	1,228.1925	447.0255	0
Slice 41	285.34362	89.062664	0	1,243.9987	452.77849	0
Slice 42	286.34959	88.562646	0	1,259.1517	458.29373	0
Slice 43	287.35555	88.071625	0	1,273.6546	463.57237	0
Slice 44	288.36151	87.589509	0	1,287.5105	468.6155	0
Slice 45	289.36748	87.116204	0	1,300.7223	473.42419	0
Slice 46	290.37344	86.651624	0	1,313.2928	477.99948	0

Slice 47	291.3794	86.195683	0	1,325.2247	482.34234	0
Slice 48	292.38537	85.748297	0	1,336.5206	486.45373	0
Slice 49	293.39133	85.309386	0	1,347.1831	490.33455	0
Slice 50	294.39729	84.878873	0	1,357.2145	493.98568	0
Slice 51	295.40326	84.456682	0	1,366.6171	497.40795	0
Slice 52	296.40922	84.042741	0	1,375.3932	500.60217	0
Slice 53	297.41518	83.636977	0	1,383.5447	503.5691	0
Slice 54	298.42115	83.239324	0	1,391.0738	506.30946	0
Slice 55	299.42711	82.849713	0	1,397.9823	508.82395	0
Slice 56	300.43307	82.468081	0	1,404.2721	511.11323	0
Slice 57	301.43903	82.094366	0	1,409.9448	513.17793	0
Slice 58	302.445	81.728506	0	1,415.0021	515.01863	0
Slice 59	303.45096	81.370443	0	1,419.4455	516.63591	0
Slice 60	304.45692	81.02012	0	1,423.2765	518.03028	0
Slice 61	305.46289	80.677482	0	1,426.4964	519.20225	0
Slice 62	306.46885	80.342476	0	1,429.1066	520.15226	0
Slice 63	307.47481	80.01505	0	1,431.1081	520.88076	0
Slice 64	308.48078	79.695154	0	1,432.5022	521.38815	0
Slice 65	309.48674	79.382739	0	1,433.2897	521.67479	0
Slice 66	310.4927	79.077759	0	1,433.4717	521.74101	0
Slice 67	311.49867	78.780167	0	1,433.0489	521.58714	0
Slice 68	312.50463	78.48992	0	1,432.0221	521.21343	0
Slice 69	313.51059	78.206976	0	1,430.3921	520.62015	0
Slice 70	314.51656	77.931292	0	1,428.1594	519.80749	0

Slice 71	315.52252	77.66283	0	1,425.3244	518.77566	0
Slice 72	316.52848	77.40155	0	1,421.8877	517.52481	0
Slice 73	317.53445	77.147415	0	1,417.8496	516.05505	0
Slice 74	318.54041	76.90039	0	1,413.2103	514.3665	0
Slice 75	319.54637	76.66044	0	1,407.9701	512.45921	0
Slice 76	320.55234	76.427531	0	1,402.129	510.33322	0
Slice 77	321.5583	76.20163	0	1,395.687	507.98854	0
Slice 78	322.56426	75.982708	0	1,388.6442	505.42515	0
Slice 79	323.57023	75.770732	0	1,381.0003	502.643	0
Slice 80	324.57619	75.565676	0	1,372.7551	499.642	0
Slice 81	325.58215	75.36751	0	1,363.9084	496.42204	0
Slice 82	326.58812	75.176208	0	1,354.4596	492.98299	0
Slice 83	327.59408	74.991745	0	1,344.4085	489.32468	0
Slice 84	328.60004	74.814095	0	1,333.7544	485.44689	0
Slice 85	329.60601	74.643236	0	1,322.4966	481.34941	0
Slice 86	330.61197	74.479143	0	1,310.6346	477.03198	0
Slice 87	331.61793	74.321797	0	1,298.1674	472.4943	0
Slice 88	332.6239	74.171176	0	1,285.0942	467.73605	0
Slice 89	333.62986	74.02726	0	1,271.4141	462.75689	0
Slice 90	334.63582	73.890031	0	1,257.1259	457.55643	0
Slice 91	335.64716	73.75881	0	1,220.5462	704.68269	0
Slice 92	336.66386	73.633651	0	1,209.4867	698.29749	0
Slice 93	337.68056	73.51527	0	1,197.6162	691.44404	0
Slice 94	338.69727	73.403652	0	1,184.9305	684.11996	0

Slice 95	339.71397	73.298781	0	1,171.4254	676.32274	0
Slice 96	340.73068	73.200646	0	1,157.0963	668.04984	0
Slice 97	341.74738	73.109232	0	1,141.9387	659.29859	0
Slice 98	342.76408	73.024527	0	1,125.9478	650.06627	0
Slice 99	343.78079	72.946522	0	1,109.1188	640.35003	0
Slice 100	344.79749	72.875205	0	1,091.4466	630.14698	0
Slice 101	345.81419	72.810568	0	1,072.9259	619.45408	0
Slice 102	346.8309	72.752602	0	1,053.5515	608.26825	0
Slice 103	347.90876	72.698638	0	1,038.6508	367.80553	0
Slice 104	349.04779	72.649519	0	1,011.4207	358.16284	0
Slice 105	350.20865	72.608127	0	983.05651	348.11857	0
Slice 106	350.96459	72.584742	0	967.36629	342.56237	0
Slice 107	351.62459	72.568934	0	950.53176	548.78977	0
Slice 108	352.61542	72.549402	0	926.79715	535.08658	0
Slice 109	353.60625	72.536174	0	902.21312	520.89299	0
Slice 110	354.59709	72.529249	0	876.77337	506.20534	0
Slice 111	355.58792	72.528625	0	850.47144	491.01991	0
Slice 112	356.57875	72.534303	0	823.30065	475.33285	0
Slice 113	357.56959	72.546284	0	795.25415	459.1402	0
Slice 114	358.56042	72.564568	0	766.32486	442.43787	0
Slice 115	359.55125	72.589159	0	736.50553	425.22166	0
Slice 116	360.54208	72.620058	0	705.78865	407.48727	0
Slice 117	361.53292	72.65727	0	674.16654	389.23023	0
Slice 118	362.52375	72.7008	0	641.63126	370.44598	0

Slice 119	363.51458	72.750652	0	608.17464	351.12979	0
Slice 120	364.51354	72.807346	0	572.50478	330.53579	0
Slice 121	365.52063	72.870994	0	534.5874	308.64418	0
Slice 122	366.52771	72.941194	0	495.67986	286.1809	0
Slice 123	367.5348	73.017957	0	455.77241	263.14032	0
Slice 124	368.54188	73.101292	0	414.85499	239.51664	0
Slice 125	369.52968	73.189363	0	370.6537	134.90691	0
Slice 126	370.49818	73.281933	0	334.60383	121.78583	0
Slice 127	371.46668	73.380612	0	297.89026	108.42319	0
Slice 128	372.43518	73.485412	0	260.50822	94.817238	0
Slice 129	373.40369	73.596345	0	222.45278	80.966192	0
Slice 130	374.37219	73.713425	0	183.71888	66.868205	0
Slice 131	375.34069	73.836665	0	144.3013	52.521378	0
Slice 132	376.3092	73.96608	0	104.19466	37.923753	0
Slice 133	377.2777	74.101685	0	63.393407	23.073313	0
Slice 134	378.25597	74.244992	0	21.46659	7.8131999	0
Slice 135	379.24243	74.395891	0	3.5751225	2.0640979	0
Slice 136	380.2273	74.553012	0	10.097993	5.8300792	0
Slice 137	381.21217	74.716609	0	15.857989	9.1556139	0
Slice 138	382.19703	74.886701	0	20.845845	12.035354	0
Slice 139	383.1819	75.063311	0	25.052037	14.4638	0
Slice 140	384.16677	75.246461	0	28.466768	16.435296	0
Slice 141	385.15163	75.436174	0	31.079959	17.944023	0
Slice 142	386.1365	75.632476	0	32.881238	18.983992	0

Slice 143	387.12137	75.835391	0	33.859928	19.549038	0
Slice 144	388.10623	76.044946	0	34.005036	19.632817	0
Slice 145	389.0911	76.261168	0	33.30524	19.228789	0
Slice 146	390.07597	76.484086	0	31.748877	18.330223	0
Slice 147	391.06083	76.71373	0	29.323927	16.930177	0
Slice 148	392.0457	76.950129	0	26.018001	15.0215	0
Slice 149	393.03057	77.193316	0	21.818323	12.596815	0
Slice 150	394.01543	77.443324	0	16.711717	9.6485145	0
Slice 151	395.0003	77.700187	0	10.684588	6.1687499	0
Slice 152	395.98517	77.963939	0	3.7229049	2.1494202	0

April 5, 2024
File No. 25222259.00

TECHNICAL MEMORANDUM

ANALYSIS BY: Niko Villaneuva
Brandon Suchomel

REVIEWED BY: Deb Nelson
Phil Gearing

SUBJECT: Slope Stability Analysis
Plan of Operation Modification
Edgewater I-43 Ash Disposal Facility, License #2853

PURPOSE

The purpose of the slope stability analyses was to evaluate the most critical future slope:

- The final cover 4H:1V slope in Phase 3 at the highest final cover grade

CONCLUSION

The attached results confirm that the final cover slope will be stable during the construction and operation of the disposal facility modules.

APPROACH

SCS Engineers (SCS) evaluated the slope stability of the southern slope of Phase 3 final cover slope at the most critical/highest final cover grade cross-section (i.e., at the time of final cover placement) after the filling of the proposed converted contact water swale liner. The 4H:1V final cover slope analyzed at the south side has a maximum final cover fill height of approximately 50 feet above base grades, and a peak elevation of approximately 731 feet above mean sea level. A piezometric surface was assumed just below the landfill clay liner. The final cover slope was evaluated for block and optimized circular failure.

RESULTS

The calculated safety factors for each slope section and failure type are shown in the summary table.

SCS recommends a minimum safety factor of 1.5 for the final grade slopes. The results indicate that the final grade slopes have acceptable minimum safety factors.

Table 1. Factor of Safety Results Summary

Scenario Analyzed	Calculated Safety Factor	Recommended Minimum Safety Factor
Critical Future Final Grades (See Figure 1)		
Optimized Circular (Rotational Failure)	1.548	1.500
Block (Translational Failure) Left of Intercell Berm	1.877	1.500
Block (Translational Failure) Contact Water Swale	1.896	1.500

REFERENCES

1. SCS Engineers, Edgewater I-43 Ash Disposal Facility, Plan Modification Request Addendum No. 1, 2024.

2. SCS Engineers, Edgewater I-43 Ash Disposal Facility, Phase 3, Module 2 Liner and Area 1 Final Cover Construction – Construction Documentation Report, 2016, existing as-built composite liner grades, material properties for subbase, clay liner, drainage layer, and geosynthetics.

3. TRI/Environmental, Interface Friction Test Results, 2015, for 2015 Phase 3 Module 2 Liner Construction.

4. TRI/Environmental, Consolidated-Undrained Triaxial Compression Test Results for FGD Material, 2015, material properties for CCR.

5. U.S. Department of Transportation, Federal Highway Administration, Recycled Materials, Coal Ash User's Guide.

6. Stabilization of FGD By-Products by Using Fly Ash, Cement, and Sialite, 2009 WOCA Conference.

7. Geo-Slope International, Ltd., GeoStudio 2023.1.1, Slope/W slope stability software.

8. U.S. Army Corps of Engineers, Slope Stability Engineer Manual EM 1110-2-1902, October 2003.

9. SCS Engineers, Edgewater I-43 Ash Disposal Facility, Unstable Areas Compliance Demonstration Phase 3 Modules 1 and 2, Phase 4 Module 1, 2018.

ASSUMPTIONS

- The critical final grades are the worst-case scenario (shown on Figure 1) for the longest/highest final grade slope. This includes the full buildout of approved and proposed module construction.

- Drainage layers in each of the existing and future modules and leachate drainage materials in the contact water swale area have the same properties.
- Geosynthetics installed for each of the module composite liners have the same properties.
- Clay material for each of the existing and future module composite liners have the same properties.
- Coal combustion residual (CCR) waste material will be the same in each of the existing and future modules.
- A final grade slope of 4H:1V is representative of the design final cover grades.
- The groundwater elevation will remain below the elevation at the base of the landfill liner system.
- The disposal facility will be operated to prevent development of liquid pressures, or seepage forces, within the waste, and there will be no buildup of leachate above the top of the drainage layer.
- The disposal facility will be operated to prevent placement of weak layers of waste within the overall waste mass.
- Optimized circular and sliding block failure stability analyses are appropriate to evaluate the final cover slope stability.
- Material properties are as shown in the table below, based on the indicated references and assumed values based on experience. Friction angles for soils are conservative assumed values based on soil type, published typical values, and SCS experience. The CCR friction angle is a conservative assumed value based on published values and 2015 triaxial compression test results by TRI/Environmental for CCR.

Table 2. Material Properties Summary Table

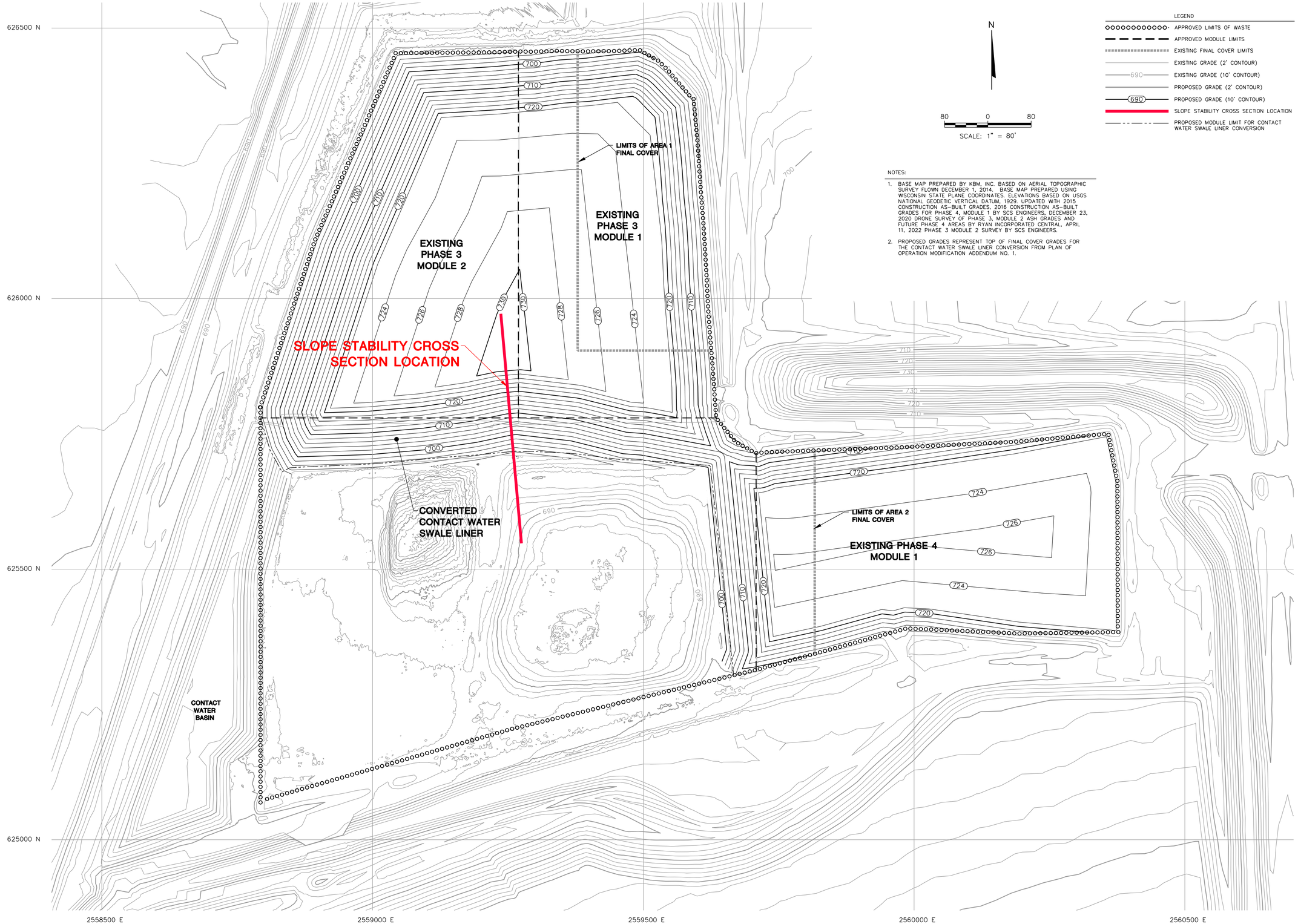
Material	Unit Weight (pcf)	Friction Angle (degrees)	Cohesion (psf)	Reference
Final Cover	125	28	0	2
CCR	86	20	0	4, 5, 6, and 9
Drainage Layer	115	30	0	2 and 9
Geosynthetics	58	19.5	0	3 and 9
Clay Liner	130	28	0	2 and 9
Subbase	135	28	0	2 and 9

Attachments: Calculations organized as follows:

- Figure 1. Slope Stability Cross Section Location
- Slope/W Outputs

BSS/NV/REO_LMH/DLN/PEG

I:\25222259.00\Data and Calculations\Geotechnical\Slope Stability\Tech Memo\240405_Tech Memo_I-43 POO Modification Addendum No. 1_Stability Analysis.docx



NOTES:

1. BASE MAP PREPARED BY KBM, INC. BASED ON AERIAL TOPOGRAPHIC SURVEY FLOWN DECEMBER 1, 2014. BASE MAP PREPARED USING WISCONSIN STATE PLANE COORDINATES. ELEVATIONS BASED ON USGS NATIONAL GEODETIC VERTICAL DATUM, 1929. UPDATED WITH 2015 CONSTRUCTION AS-BUILT GRADES, 2016 CONSTRUCTION AS-BUILT GRADES FOR PHASE 4, MODULE 1 BY SCS ENGINEERS, DECEMBER 23, 2020 DRONE SURVEY OF PHASE 3, MODULE 2 ASH GRADES AND FUTURE PHASE 4 AREAS BY RYAN INCORPORATED CENTRAL, APRIL 11, 2022 PHASE 3 MODULE 2 SURVEY BY SCS ENGINEERS.
2. PROPOSED GRADES REPRESENT TOP OF FINAL COVER GRADES FOR THE CONTACT WATER SWALE LINER CONVERSION FROM PLAN OF OPERATION MODIFICATION ADDENDUM NO. 1.

DRAWN BY: BSS
CHECKED BY: PEG
APPROVED BY: PEG 6/13/24

PROJECT NO. 25222259.00
DRAWN: 03/22/2024
REVISED: 03/22/2024

WISCONSIN POWER AND LIGHT COMPANY
EDGE WATER GENERATING STATION
ELECTRIC ASH DISPOSAL FACILITY
SHEBOYGAN, WI 53081

CLIENT

SCS ENGINEERS
2830 DAIRY DRIVE MADISON, WI 53718-6751
PHONE: (608) 224-2830

ENGINEER

PLAN MODIFICATION ADDENDUM NO. 1
EDGE WATER GENERATING STATION
ELECTRIC ASH DISPOSAL FACILITY
TOWN OF WILSON, WISCONSIN

SITE

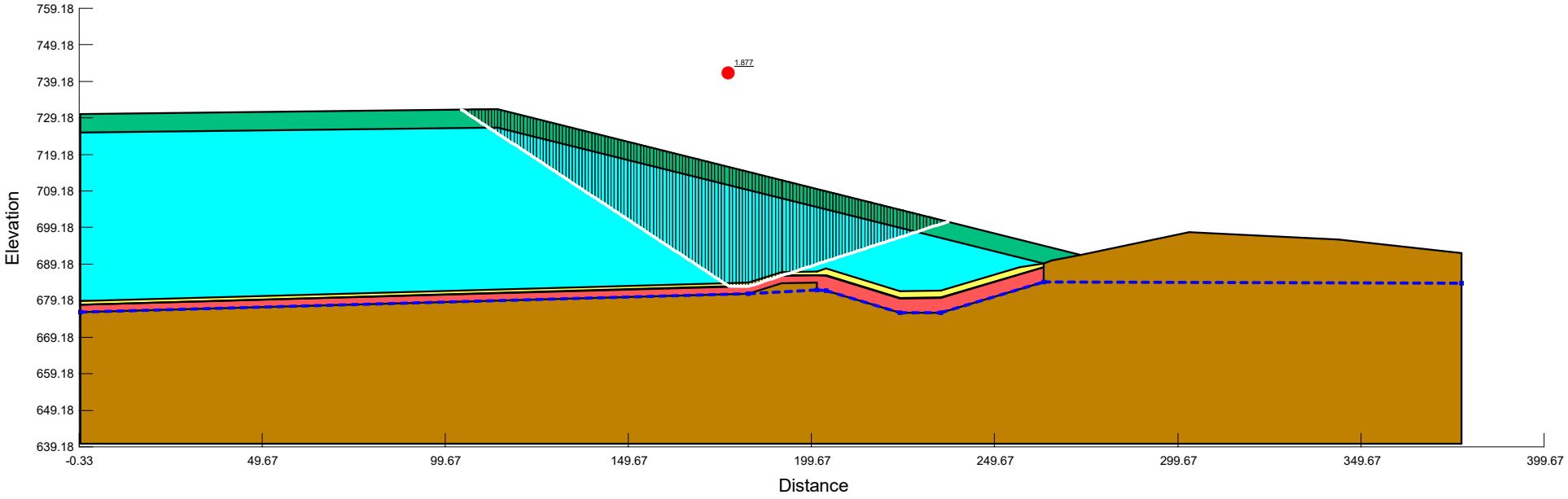
SLOPE STABILITY
CROSS SECTION LOCATION

FIGURE
1 of 1

I-43 Plan of Operation Modification - Final Grade Stability Analysis
Block Failure-Intercell Berm
Analysis Type: Janbu
Last Solved Date: 03/27/2024, 04:20:20 PM

Factor of Safety: 1.877

Color	Name	Unit Weight (pcf)	Effective Cohesion (psf)	Effective Friction Angle (°)	Piezometric Surface
	CCR	86	0	20	
	Clay Liner	130	0	28	
	Drainage Layer	115	0	30	
	Final Cover	125	0	28	
	Geosynthetics	58	0	19.5	
	Subbase	135	0	28	1



Block Failure-Intercell Berm

File Information

File Version: 11.05
Title: I-43 Plan of Operation Modification - Final Grade Stability Analysis
Created By: Villanueva, Niko
Last Edited By: Villanueva, Niko
Revision Number: 52
Date: 03/27/2024
Time: 04:16:14 PM
Tool Version: 23.1.1.829
File Name: I-43 Proposed Final Grades_Section A_240327.gsz
Directory: I:\25222259.00\Data and Calculations\Geotechnical\Slope Stability\SlopeW Analysis\
Last Solved Date: 03/27/2024
Last Solved Time: 04:20:20 PM

Project Settings

Unit System: U.S. Customary Units

Analysis Settings

Block Failure-Intercell Berm

Kind: SLOPE/W
Analysis Type: Janbu
Settings
- PWP Conditions from: Piezometric Surfaces
- Apply Phreatic Correction: No
- Use Staged Rapid Drawdown: No
- Unit Weight of Water: 62.430189 pcf

Slip Surface
- Direction of movement: Left to Right
- Use Passive Mode: No
- Slip Surface Option: Block
- Critical slip surfaces saved: 10
- Restrict Block Crossing: No
- Optimize Critical Slip Surface Location: No
- Tension Crack Option: (none)

Distribution
- F of S Calculation Option: Constant

Convergence
- Geometry Settings
  - Minimum Slip Surface Depth: 0.1 ft
  - Minimum Slip Surface Volume: 35.314667 ft³
  - Number of Columns: 150
- Factor of Safety Convergence Settings
  - Maximum Number of Iterations: 100
  - Tolerable difference in F of S: 0.001

Under-Relaxation Criteria
Initial Rate: 1
Minimum Rate: 0.1
Rate Reduction Factor: 0.65
Reduction Frequency (iterations): 50

Materials

CCR

Slope Stability Material Model: Mohr-Coulomb
Unit Weight: 86 pcf
Effective Cohesion: 0 psf
Effective Friction Angle: 20 °
Phi-B: 0 °

Clay Liner

Slope Stability Material Model: Mohr-Coulomb
Unit Weight: 130 pcf
Effective Cohesion: 0 psf
Effective Friction Angle: 28 °
Phi-B: 0 °

Drainage Layer

Slope Stability Material Model: Mohr-Coulomb
Unit Weight: 115 pcf
Effective Cohesion: 0 psf
Effective Friction Angle: 30 °
Phi-B: 0 °

Geosynthetics

Slope Stability Material Model: Mohr-Coulomb
Unit Weight: 58 pcf
Effective Cohesion: 0 psf
Effective Friction Angle: 19.5 °
Phi-B: 0 °

Subbase

Slope Stability Material Model: Mohr-Coulomb
Unit Weight: 135 pcf
Effective Cohesion: 0 psf
Effective Friction Angle: 28 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Surface: 1

Final Cover

Slope Stability Material Model: Mohr-Coulomb
Unit Weight: 125 pcf
Effective Cohesion: 0 psf
Effective Friction Angle: 28 °
Phi-B: 0 °

Slip Surface Limits

Left Coordinate: (0, 730.2) ft
Right Coordinate: (377.2, 692.2) ft

Slip Surface Block

Left Grid
- Upper Left: (167.74, 682.79) ft
- Lower Left: (167.74, 682.69) ft
- Lower Right: (177.24, 682.96) ft
- X Increments: 10
- Y Increments: 4
- Starting Angle: 115 °
- Ending Angle: 160 °
- Angle Increments: 10

Right Grid
- Upper Left: (177.94, 683.07) ft
- Lower Left: (177.94, 682.97) ft
- Lower Right: (182.5, 683.1) ft
- X Increments: 10
- Y Increments: 4
- Angle Increments: 10

Piezometric Surfaces

Piezometric Surface 1

Coordinates

	X	Y
Coordinate 1	0 ft	676 ft
Coordinate 2	182.5 ft	681.1 ft
Coordinate 3	201.2 ft	682.1 ft
Coordinate 4	203.7 ft	682 ft
Coordinate 5	223.8 ft	675.8 ft
Coordinate 6	234.9 ft	675.9 ft
Coordinate 7	263 ft	684.3 ft
Coordinate 8	377.2 ft	684 ft

Geometry

Name: 2D Geometry

Settings

View: 2D
Element Thickness: 1 ft

Points

	X	Y
Point 1	0 ft	640 ft

Point 2	377.2 ft	640 ft
Point 3	377.2 ft	692.2 ft
Point 4	343.6 ft	695.9 ft
Point 5	302.7 ft	697.9 ft
Point 6	265.2 ft	690.1 ft
Point 7	263.1 ft	689.3 ft
Point 8	263.1 ft	688.4 ft
Point 9	263.1 ft	688.3 ft
Point 10	263.1 ft	684.3 ft
Point 11	234.9 ft	675.9 ft
Point 12	223.8 ft	675.8 ft
Point 13	203.7 ft	682 ft
Point 14	201.2 ft	682.1 ft
Point 15	201.2 ft	684.1 ft
Point 16	191.6 ft	684 ft
Point 17	182.5 ft	681.1 ft
Point 18	0 ft	676 ft
Point 19	0 ft	678 ft
Point 20	182.5 ft	683.1 ft
Point 21	191.6 ft	686 ft
Point 22	201.2 ft	686.1 ft
Point 23	203.7 ft	686 ft
Point 24	223.8 ft	679.8 ft
Point 25	234.9 ft	679.9 ft
Point 26	0 ft	678.1 ft
Point 27	182.5 ft	683.2 ft
Point 28	191.6 ft	686.1 ft
Point 29	201.2 ft	686.2 ft
Point 30	203.7 ft	686.1 ft
Point 31	223.8 ft	679.9 ft
Point 32	234.9 ft	680 ft
Point 33	0 ft	679 ft
Point 34	182.5 ft	684.1 ft
Point 35	191.6 ft	687 ft
Point 36	201.2 ft	687.1 ft
Point 37	203.7 ft	688 ft
Point 38	0 ft	725.2 ft
Point 39	113.97399 ft	726.5815 ft
Point 40	256.51003 ft	688.33703 ft
Point 41	234.9 ft	681.9 ft
Point 42	223.8 ft	681.8 ft
Point 43	0 ft	730.2 ft
Point 44	113.97399 ft	731.5815 ft
Point 45	273.22402 ft	691.769 ft

Regions

	Material	Points	Area
Region 1	Subbase	1,2,3,4,5,45,6,7,8,9,10,11,12,13,14,15,16,17,18	16,534 ft²
Region 2	Clay Liner	18,19,20,21,22,23,24,25,9,10,11,12,13,14,15,16,17	650 ft²

Region 3	Geosynthetics	19,26,27,28,29,30,31,32,8,9,25,24,23,22,21,20	26.31 ft²
Region 4	Drainage Layer	26,33,34,35,36,37,30,29,28,27	184.58 ft²
Region 5	CCR	33,38,39,7,40,41,42,37,36,35,34	8,689.4 ft²
Region 6	Final Cover	38,39,7,6,45,44,43	1,339.4 ft²
Region 7	Drainage Layer	37,42,41,40,7,8,32,31,30	109.57 ft²

Slip Results

Slip Surfaces Analysed: 302676 of 366025 converged

Current Slip Surface

Slip Surface: 290,515
Factor of Safety: 1.877
Volume: 2,302.6823 ft³
Weight: 222,792.19 lbf
Resisting Moment: 3,771,783.9 lbf·ft
Activating Moment: 1,699,412.1 lbf·ft
Resisting Force: 80,759.502 lbf
Activating Force: 43,014.985 lbf
Slip Rank: 1 of 366,025 slip surfaces
Exit: (237.02936, 700.81766) ft
Entry: (104.07551, 731.46152) ft
Radius: 65.431871 ft
Center: (175.84965, 739.12248) ft

Slip Columns

	X	Y	PWP	Base Normal Stress	Frictional Strength	Cohesive Strength	Suction Strength	Base Material
Column 1	104.53916 ft	731.15464 ft	0 psf	32.895362 psf	17.490774 psf	0 psf	0 psf	Final Cover
Column 2	105.46645 ft	730.54088 ft	0 psf	98.686086 psf	52.472323 psf	0 psf	0 psf	Final Cover
Column 3	106.39374 ft	729.92712 ft	0 psf	164.47681 psf	87.453871 psf	0 psf	0 psf	Final Cover
Column 4	107.32103 ft	729.31336 ft	0 psf	230.26753 psf	122.43542 psf	0 psf	0 psf	Final Cover
Column 5	108.24832 ft	728.69960 ft	0 psf	296.05826 psf	157.41697 psf	0 psf	0 psf	Final Cover
Column 6	109.17561 ft	728.08584 ft	0 psf	361.84898 psf	192.39852 psf	0 psf	0 psf	Final Cover
Column 7	110.10290 ft	727.47208 ft	0 psf	427.63971 psf	227.38006 psf	0 psf	0 psf	Final Cover
Column 8	111.03019 ft	726.85832 ft	0 psf	493.43043 psf	262.36161 psf	0 psf	0 psf	Final Cover
Column 9	111.90719 ft	726.27784 ft	0 psf	575.1492 psf	209.33719 psf	0 psf	0 psf	CCR
Column 10	112.73391 ft	725.73065 ft	0 psf	617.61926 psf	224.79503 psf	0 psf	0 psf	CCR
Column 11	113.56063 ft	725.18346 ft	0 psf	660.08931 psf	240.25286 psf	0 psf	0 psf	CCR

Column 12	114.41638 ft	724.61704 ft	0 psf	695.21258 psf	253.03669 psf	0 psf	0 psf	CCR
Column 13	115.30117 ft	724.03141 ft	0 psf	722.98907 psf	263.1465 psf	0 psf	0 psf	CCR
Column 14	116.18596 ft	723.44579 ft	0 psf	750.76555 psf	273.25631 psf	0 psf	0 psf	CCR
Column 15	117.07075 ft	722.86016 ft	0 psf	778.54204 psf	283.36613 psf	0 psf	0 psf	CCR
Column 16	117.95554 ft	722.27453 ft	0 psf	806.31852 psf	293.47594 psf	0 psf	0 psf	CCR
Column 17	118.84033 ft	721.68890 ft	0 psf	834.09501 psf	303.58576 psf	0 psf	0 psf	CCR
Column 18	119.72512 ft	721.10327 ft	0 psf	861.8715 psf	313.69557 psf	0 psf	0 psf	CCR
Column 19	120.60991 ft	720.51764 ft	0 psf	889.64798 psf	323.80539 psf	0 psf	0 psf	CCR
Column 20	121.49470 ft	719.93201 ft	0 psf	917.42447 psf	333.9152 psf	0 psf	0 psf	CCR
Column 21	122.37949 ft	719.34638 ft	0 psf	945.20096 psf	344.02501 psf	0 psf	0 psf	CCR
Column 22	123.26428 ft	718.76075 ft	0 psf	972.97744 psf	354.13483 psf	0 psf	0 psf	CCR
Column 23	124.14906 ft	718.17512 ft	0 psf	1,000.7539 psf	364.24464 psf	0 psf	0 psf	CCR
Column 24	125.03385 ft	717.58949 ft	0 psf	1,028.5304 psf	374.35446 psf	0 psf	0 psf	CCR
Column 25	125.91864 ft	717.00387 ft	0 psf	1,056.3069 psf	384.46427 psf	0 psf	0 psf	CCR
Column 26	126.80343 ft	716.41824 ft	0 psf	1,084.0834 psf	394.57409 psf	0 psf	0 psf	CCR
Column 27	127.68822 ft	715.83261 ft	0 psf	1,111.8599 psf	404.6839 psf	0 psf	0 psf	CCR
Column 28	128.57301 ft	715.24698 ft	0 psf	1,139.6364 psf	414.79371 psf	0 psf	0 psf	CCR
Column 29	129.45780 ft	714.66135 ft	0 psf	1,167.4128 psf	424.90353 psf	0 psf	0 psf	CCR
Column 30	130.34259 ft	714.07572 ft	0 psf	1,195.1893 psf	435.01334 psf	0 psf	0 psf	CCR
Column 31	131.22738 ft	713.49009 ft	0 psf	1,222.9658 psf	445.12316 psf	0 psf	0 psf	CCR
Column 32	132.11217 ft	712.90446 ft	0 psf	1,250.7423 psf	455.23297 psf	0 psf	0 psf	CCR
Column 33	132.99696 ft	712.31883 ft	0 psf	1,278.5188 psf	465.34279 psf	0 psf	0 psf	CCR
Column 34	133.88174 ft	711.73320 ft	0 psf	1,306.2953 psf	475.4526 psf	0 psf	0 psf	CCR
Column 35	134.76653 ft	711.14757 ft	0 psf	1,334.0718 psf	485.56241 psf	0 psf	0 psf	CCR
Column 36	135.65132 ft	710.56194 ft	0 psf	1,361.8483 psf	495.67223 psf	0 psf	0 psf	CCR
Column 37	136.53611 ft	709.97632 ft	0 psf	1,389.6247 psf	505.78204 psf	0 psf	0 psf	CCR

Column 38	137.42090 ft	709.39069 ft	0 psf	1,417.4012 psf	515.89186 psf	0 psf	0 psf	CCR
Column 39	138.30569 ft	708.80506 ft	0 psf	1,445.1777 psf	526.00167 psf	0 psf	0 psf	CCR
Column 40	139.19048 ft	708.21943 ft	0 psf	1,472.9542 psf	536.11149 psf	0 psf	0 psf	CCR
Column 41	140.07527 ft	707.63380 ft	0 psf	1,500.7307 psf	546.2213 psf	0 psf	0 psf	CCR
Column 42	140.96006 ft	707.04817 ft	0 psf	1,528.5072 psf	556.33111 psf	0 psf	0 psf	CCR
Column 43	141.84485 ft	706.46254 ft	0 psf	1,556.2837 psf	566.44093 psf	0 psf	0 psf	CCR
Column 44	142.72964 ft	705.87691 ft	0 psf	1,584.0601 psf	576.55074 psf	0 psf	0 psf	CCR
Column 45	143.61442 ft	705.29128 ft	0 psf	1,611.8366 psf	586.66056 psf	0 psf	0 psf	CCR
Column 46	144.49921 ft	704.70565 ft	0 psf	1,639.6131 psf	596.77037 psf	0 psf	0 psf	CCR
Column 47	145.38400 ft	704.12002 ft	0 psf	1,667.3896 psf	606.88019 psf	0 psf	0 psf	CCR
Column 48	146.26879 ft	703.53440 ft	0 psf	1,695.1661 psf	616.99 psf	0 psf	0 psf	CCR
Column 49	147.15358 ft	702.94877 ft	0 psf	1,722.9426 psf	627.09981 psf	0 psf	0 psf	CCR
Column 50	148.03837 ft	702.36314 ft	0 psf	1,750.7191 psf	637.20963 psf	0 psf	0 psf	CCR
Column 51	148.92316 ft	701.77751 ft	0 psf	1,778.4956 psf	647.31944 psf	0 psf	0 psf	CCR
Column 52	149.80795 ft	701.19188 ft	0 psf	1,806.272 psf	657.42926 psf	0 psf	0 psf	CCR
Column 53	150.69274 ft	700.60625 ft	0 psf	1,834.0485 psf	667.53907 psf	0 psf	0 psf	CCR
Column 54	151.57753 ft	700.02062 ft	0 psf	1,861.825 psf	677.64889 psf	0 psf	0 psf	CCR
Column 55	152.46232 ft	699.43499 ft	0 psf	1,889.6015 psf	687.7587 psf	0 psf	0 psf	CCR
Column 56	153.34710 ft	698.84936 ft	0 psf	1,917.378 psf	697.86851 psf	0 psf	0 psf	CCR
Column 57	154.23189 ft	698.26373 ft	0 psf	1,945.1545 psf	707.97833 psf	0 psf	0 psf	CCR
Column 58	155.11668 ft	697.67810 ft	0 psf	1,972.931 psf	718.08814 psf	0 psf	0 psf	CCR
Column 59	156.00147 ft	697.09247 ft	0 psf	2,000.7074 psf	728.19796 psf	0 psf	0 psf	CCR
Column 60	156.88626 ft	696.50685 ft	0 psf	2,028.4839 psf	738.30777 psf	0 psf	0 psf	CCR
Column 61	157.77105 ft	695.92122 ft	0 psf	2,056.2604 psf	748.41759 psf	0 psf	0 psf	CCR
Column 62	158.65584 ft	695.33559 ft	0 psf	2,084.0369 psf	758.5274 psf	0 psf	0 psf	CCR
Column 63	159.54063 ft	694.74996 ft	0 psf	2,111.8134 psf	768.63722 psf	0 psf	0 psf	CCR

Column 64	160.42542 ft	694.16433 ft	0 psf	2,139.5899 psf	778.74703 psf	0 psf	0 psf	CCR
Column 65	161.31021 ft	693.57870 ft	0 psf	2,167.3664 psf	788.85684 psf	0 psf	0 psf	CCR
Column 66	162.19500 ft	692.99307 ft	0 psf	2,195.1429 psf	798.96666 psf	0 psf	0 psf	CCR
Column 67	163.07978 ft	692.40744 ft	0 psf	2,222.9193 psf	809.07647 psf	0 psf	0 psf	CCR
Column 68	163.96457 ft	691.82181 ft	0 psf	2,250.6958 psf	819.18629 psf	0 psf	0 psf	CCR
Column 69	164.84936 ft	691.23618 ft	0 psf	2,278.4723 psf	829.2961 psf	0 psf	0 psf	CCR
Column 70	165.73415 ft	690.65055 ft	0 psf	2,306.2488 psf	839.40592 psf	0 psf	0 psf	CCR
Column 71	166.61894 ft	690.06493 ft	0 psf	2,334.0253 psf	849.51573 psf	0 psf	0 psf	CCR
Column 72	167.50373 ft	689.47930 ft	0 psf	2,361.8018 psf	859.62554 psf	0 psf	0 psf	CCR
Column 73	168.38852 ft	688.89367 ft	0 psf	2,389.5783 psf	869.73536 psf	0 psf	0 psf	CCR
Column 74	169.27331 ft	688.30804 ft	0 psf	2,417.3547 psf	879.84517 psf	0 psf	0 psf	CCR
Column 75	170.15810 ft	687.72241 ft	0 psf	2,445.1312 psf	889.95499 psf	0 psf	0 psf	CCR
Column 76	171.04289 ft	687.13678 ft	0 psf	2,472.9077 psf	900.0648 psf	0 psf	0 psf	CCR
Column 77	171.92768 ft	686.55115 ft	0 psf	2,500.6842 psf	910.17462 psf	0 psf	0 psf	CCR
Column 78	172.81247 ft	685.96552 ft	0 psf	2,528.4607 psf	920.28443 psf	0 psf	0 psf	CCR
Column 79	173.69725 ft	685.37989 ft	0 psf	2,556.2372 psf	930.39424 psf	0 psf	0 psf	CCR
Column 80	174.58204 ft	684.79426 ft	0 psf	2,584.0137 psf	940.50406 psf	0 psf	0 psf	CCR
Column 81	175.46683 ft	684.20863 ft	0 psf	2,611.7902 psf	950.61387 psf	0 psf	0 psf	CCR
Column 82	176.56156 ft	683.48405 ft	0 psf	2,491.5859 psf	1,438.5178 psf	0 psf	0 psf	Drainage Layer
Column 83	177.66528 ft	683.04906 ft	0 psf	3,021.1325 psf	1,069.8391 psf	0 psf	0 psf	Geosynthetics
Column 84	178.55500 ft	683.05125 ft	0 psf	3,012.1537 psf	1,066.6596 psf	0 psf	0 psf	Geosynthetics
Column 85	179.43167 ft	683.06208 ft	0 psf	2,991.944 psf	1,059.5029 psf	0 psf	0 psf	Geosynthetics
Column 86	180.30833 ft	683.07292 ft	0 psf	2,971.7342 psf	1,052.3463 psf	0 psf	0 psf	Geosynthetics
Column 87	181.18500 ft	683.08375 ft	0 psf	2,951.5245 psf	1,045.1896 psf	0 psf	0 psf	Geosynthetics
Column 88	182.06167 ft	683.09458 ft	0 psf	2,931.3148 psf	1,038.033 psf	0 psf	0 psf	Geosynthetics
Column 89	182.95500 ft	683.24784 ft	0 psf	3,080.818 psf	1,090.9749 psf	0 psf	0 psf	Geosynthetics

Column 90	183.86500 ft	683.54352 ft	0 psf	3,033.0563 psf	1,074.0616 psf	0 psf	0 psf	Geosynthetics
Column 91	184.77500 ft	683.83919 ft	0 psf	2,985.2945 psf	1,057.1482 psf	0 psf	0 psf	Geosynthetics
Column 92	185.68500 ft	684.13487 ft	0 psf	2,937.5328 psf	1,040.2349 psf	0 psf	0 psf	Geosynthetics
Column 93	186.59500 ft	684.43055 ft	0 psf	2,889.771 psf	1,023.3216 psf	0 psf	0 psf	Geosynthetics
Column 94	187.50500 ft	684.72622 ft	0 psf	2,842.0092 psf	1,006.4083 psf	0 psf	0 psf	Geosynthetics
Column 95	188.41500 ft	685.02190 ft	0 psf	2,794.2475 psf	989.49493 psf	0 psf	0 psf	Geosynthetics
Column 96	189.32500 ft	685.31758 ft	0 psf	2,746.4857 psf	972.58161 psf	0 psf	0 psf	Geosynthetics
Column 97	190.23500 ft	685.61325 ft	0 psf	2,698.724 psf	955.66828 psf	0 psf	0 psf	Geosynthetics
Column 98	191.14500 ft	685.90893 ft	0 psf	2,650.9622 psf	938.75496 psf	0 psf	0 psf	Geosynthetics
Column 99	191.66873 ft	686.07910 ft	0 psf	2,624.1061 psf	929.24469 psf	0 psf	0 psf	Geosynthetics
Column 100	192.21440 ft	686.25640 ft	0 psf	2,702.62 psf	1,560.3584 psf	0 psf	0 psf	Drainage Layer
Column 101	193.16829 ft	686.56634 ft	0 psf	2,640.5546 psf	1,524.5249 psf	0 psf	0 psf	Drainage Layer
Column 102	194.12217 ft	686.87627 ft	0 psf	2,578.4892 psf	1,488.6914 psf	0 psf	0 psf	Drainage Layer
Column 103	195.07061 ft	687.18444 ft	0 psf	2,422.1644 psf	881.59576 psf	0 psf	0 psf	CCR
Column 104	196.01359 ft	687.49083 ft	0 psf	2,372.4057 psf	863.48505 psf	0 psf	0 psf	CCR
Column 105	196.95657 ft	687.79723 ft	0 psf	2,322.6469 psf	845.37434 psf	0 psf	0 psf	CCR
Column 106	197.89956 ft	688.10362 ft	0 psf	2,272.8881 psf	827.26362 psf	0 psf	0 psf	CCR
Column 107	198.84254 ft	688.41001 ft	0 psf	2,223.1294 psf	809.15291 psf	0 psf	0 psf	CCR
Column 108	199.78552 ft	688.71641 ft	0 psf	2,173.3706 psf	791.0422 psf	0 psf	0 psf	CCR
Column 109	200.72851 ft	689.02280 ft	0 psf	2,123.6118 psf	772.93149 psf	0 psf	0 psf	CCR
Column 110	201.61667 ft	689.31138 ft	0 psf	2,076.746 psf	755.87373 psf	0 psf	0 psf	CCR
Column 111	202.45000 ft	689.58215 ft	0 psf	2,032.7732 psf	739.86894 psf	0 psf	0 psf	CCR
Column 112	203.28333 ft	689.85291 ft	0 psf	1,988.8004 psf	723.86414 psf	0 psf	0 psf	CCR
Column 113	204.13696 ft	690.13027 ft	0 psf	1,943.7569 psf	707.46966 psf	0 psf	0 psf	CCR
Column 114	205.01087 ft	690.41422 ft	0 psf	1,897.6428 psf	690.6855 psf	0 psf	0 psf	CCR
Column 115	205.88478 ft	690.69818 ft	0 psf	1,851.5287 psf	673.90134 psf	0 psf	0 psf	CCR

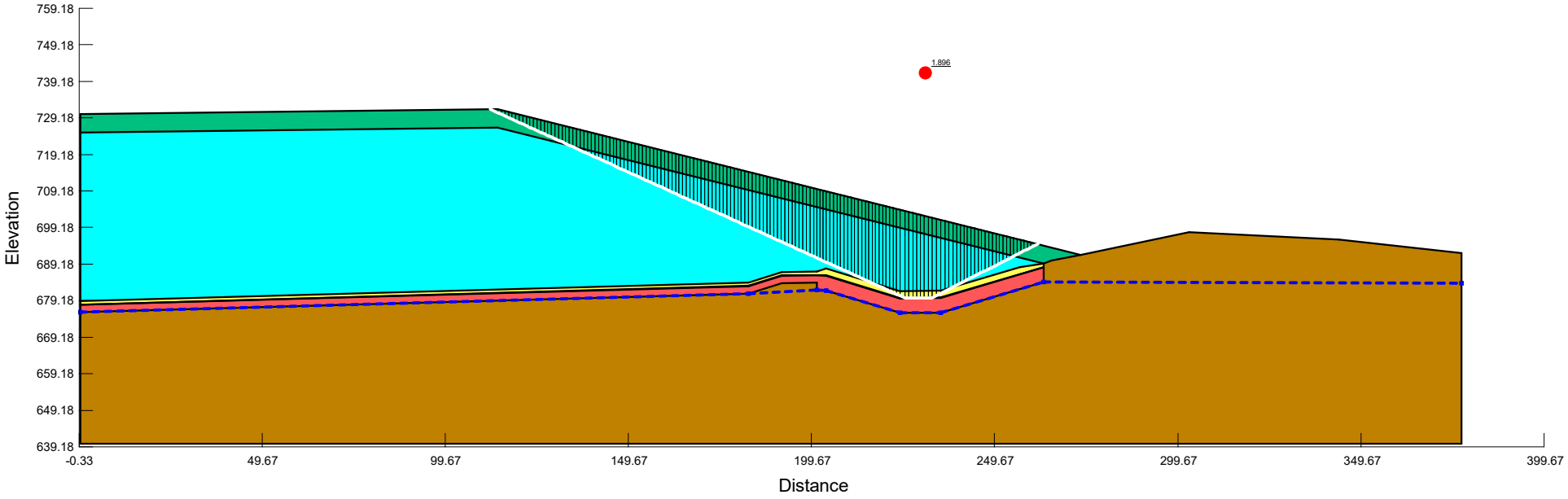
Column 116	206.75870 ft	690.98213 ft	0 psf	1,805.4146 psf	657.11718 psf	0 psf	0 psf	CCR
Column 117	207.63261 ft	691.26608 ft	0 psf	1,759.3005 psf	640.33302 psf	0 psf	0 psf	CCR
Column 118	208.50652 ft	691.55003 ft	0 psf	1,713.1864 psf	623.54886 psf	0 psf	0 psf	CCR
Column 119	209.38043 ft	691.83398 ft	0 psf	1,667.0723 psf	606.7647 psf	0 psf	0 psf	CCR
Column 120	210.25435 ft	692.11793 ft	0 psf	1,620.9582 psf	589.98054 psf	0 psf	0 psf	CCR
Column 121	211.12826 ft	692.40189 ft	0 psf	1,574.8441 psf	573.19638 psf	0 psf	0 psf	CCR
Column 122	212.00217 ft	692.68584 ft	0 psf	1,528.73 psf	556.41222 psf	0 psf	0 psf	CCR
Column 123	212.87609 ft	692.96979 ft	0 psf	1,482.6159 psf	539.62806 psf	0 psf	0 psf	CCR
Column 124	213.75000 ft	693.25374 ft	0 psf	1,436.5018 psf	522.8439 psf	0 psf	0 psf	CCR
Column 125	214.62391 ft	693.53769 ft	0 psf	1,390.3877 psf	506.05973 psf	0 psf	0 psf	CCR
Column 126	215.49783 ft	693.82164 ft	0 psf	1,344.2736 psf	489.27557 psf	0 psf	0 psf	CCR
Column 127	216.37174 ft	694.10560 ft	0 psf	1,298.1595 psf	472.49141 psf	0 psf	0 psf	CCR
Column 128	217.24565 ft	694.38955 ft	0 psf	1,252.0454 psf	455.70725 psf	0 psf	0 psf	CCR
Column 129	218.11957 ft	694.67350 ft	0 psf	1,205.9313 psf	438.92309 psf	0 psf	0 psf	CCR
Column 130	218.99348 ft	694.95745 ft	0 psf	1,159.8172 psf	422.13893 psf	0 psf	0 psf	CCR
Column 131	219.86739 ft	695.24140 ft	0 psf	1,113.7031 psf	405.35477 psf	0 psf	0 psf	CCR
Column 132	220.74130 ft	695.52535 ft	0 psf	1,067.589 psf	388.57061 psf	0 psf	0 psf	CCR
Column 133	221.61522 ft	695.80930 ft	0 psf	1,021.4749 psf	371.78645 psf	0 psf	0 psf	CCR
Column 134	222.48913 ft	696.09326 ft	0 psf	975.36077 psf	355.00229 psf	0 psf	0 psf	CCR
Column 135	223.36304 ft	696.37721 ft	0 psf	929.24667 psf	338.21813 psf	0 psf	0 psf	CCR
Column 136	224.25325 ft	696.66645 ft	0 psf	882.27287 psf	321.12106 psf	0 psf	0 psf	CCR
Column 137	225.15975 ft	696.96099 ft	0 psf	834.43938 psf	303.7111 psf	0 psf	0 psf	CCR
Column 138	226.06624 ft	697.25553 ft	0 psf	786.60589 psf	286.30113 psf	0 psf	0 psf	CCR
Column 139	226.97274 ft	697.55007 ft	0 psf	738.7724 psf	268.89116 psf	0 psf	0 psf	CCR
Column 140	227.87924 ft	697.84461 ft	0 psf	690.93891 psf	251.4812 psf	0 psf	0 psf	CCR
Column 141	228.80159 ft	698.14430 ft	0 psf	651.22169 psf	346.26071 psf	0 psf	0 psf	Final Cover

Column 142	229.73981 ft	698.44915 ft	0 psf	576.96256 psf	306.77643 psf	0 psf	0 psf	Final Cover
Column 143	230.67803 ft	698.75399 ft	0 psf	502.70343 psf	267.29215 psf	0 psf	0 psf	Final Cover
Column 144	231.61624 ft	699.05883 ft	0 psf	428.44429 psf	227.80787 psf	0 psf	0 psf	Final Cover
Column 145	232.55446 ft	699.36368 ft	0 psf	354.18516 psf	188.32359 psf	0 psf	0 psf	Final Cover
Column 146	233.49268 ft	699.66852 ft	0 psf	279.92603 psf	148.83931 psf	0 psf	0 psf	Final Cover
Column 147	234.43089 ft	699.97337 ft	0 psf	205.6669 psf	109.35503 psf	0 psf	0 psf	Final Cover
Column 148	235.43234 ft	700.29876 ft	0 psf	126.403 psf	67.209668 psf	0 psf	0 psf	Final Cover
Column 149	236.49702 ft	700.64470 ft	0 psf	42.134333 psf	22.403223 psf	0 psf	0 psf	Final Cover

I-43 Plan of Operation Modification - Final Grade Stability Analysis
Block Failure-Contact Water Swale
Analysis Type: Janbu
Last Solved Date: 03/27/2024, 04:18:15 PM

Factor of Safety: 1.896

Color	Name	Unit Weight (pcf)	Effective Cohesion (psf)	Effective Friction Angle (°)	Piezometric Surface
	CCR	86	0	20	
	Clay Liner	130	0	28	
	Drainage Layer	115	0	30	
	Final Cover	125	0	28	
	Geosynthetics	58	0	19.5	
	Subbase	135	0	28	1



Block Failure-Contact Water Swale

File Information

File Version: 11.05
Title: I-43 Plan of Operation Modification - Final Grade Stability Analysis
Created By: Villanueva, Niko
Last Edited By: Villanueva, Niko
Revision Number: 52
Date: 03/27/2024
Time: 04:16:14 PM
Tool Version: 23.1.1.829
File Name: I-43 Proposed Final Grades_Section A_240327.gsz
Directory: I:\25222259.00\Data and Calculations\Geotechnical\Slope Stability\SlopeW Analysis\
Last Solved Date: 03/27/2024
Last Solved Time: 04:18:15 PM

Project Settings

Unit System: U.S. Customary Units

Analysis Settings

Block Failure-Contact Water Swale

Kind: SLOPE/W
Analysis Type: Janbu
Settings
- PWP Conditions from: Piezometric Surfaces
- Apply Phreatic Correction: No
- Use Staged Rapid Drawdown: No
- Unit Weight of Water: 62.430189 pcf

Slip Surface
- Direction of movement: Left to Right
- Use Passive Mode: No
- Slip Surface Option: Block
- Critical slip surfaces saved: 10
- Restrict Block Crossing: No
- Optimize Critical Slip Surface Location: No
- Tension Crack Option: (none)

Distribution
- F of S Calculation Option: Constant

Convergence
- Geometry Settings
  - Minimum Slip Surface Depth: 0.1 ft
  - Minimum Slip Surface Volume: 35.314667 ft³
  - Number of Columns: 150
- Factor of Safety Convergence Settings
  - Maximum Number of Iterations: 100
  - Tolerable difference in F of S: 0.001

Under-Relaxation Criteria
Initial Rate: 1
Minimum Rate: 0.1
Rate Reduction Factor: 0.65
Reduction Frequency (iterations): 50

Materials

CCR

Slope Stability Material Model: Mohr-Coulomb
Unit Weight: 86 pcf
Effective Cohesion: 0 psf
Effective Friction Angle: 20 °
Phi-B: 0 °

Clay Liner

Slope Stability Material Model: Mohr-Coulomb
Unit Weight: 130 pcf
Effective Cohesion: 0 psf
Effective Friction Angle: 28 °
Phi-B: 0 °

Drainage Layer

Slope Stability Material Model: Mohr-Coulomb
Unit Weight: 115 pcf
Effective Cohesion: 0 psf
Effective Friction Angle: 30 °
Phi-B: 0 °

Geosynthetics

Slope Stability Material Model: Mohr-Coulomb
Unit Weight: 58 pcf
Effective Cohesion: 0 psf
Effective Friction Angle: 19.5 °
Phi-B: 0 °

Subbase

Slope Stability Material Model: Mohr-Coulomb
Unit Weight: 135 pcf
Effective Cohesion: 0 psf
Effective Friction Angle: 28 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Surface: 1

Final Cover

Slope Stability Material Model: Mohr-Coulomb
Unit Weight: 125 pcf
Effective Cohesion: 0 psf
Effective Friction Angle: 28 °
Phi-B: 0 °

Slip Surface Limits

Left Coordinate: (0, 730.2) ft
Right Coordinate: (377.2, 692.2) ft

Slip Surface Block

Left Grid
- Upper Left: (223.8, 679.9) ft
- Lower Left: (223.8, 679.8) ft
- Lower Right: (225.2, 679.81) ft
- X Increments: 10
- Y Increments: 4
- Starting Angle: 115 °
- Ending Angle: 160 °
- Angle Increments: 10

Right Grid
- Upper Left: (232.55, 679.97) ft
- Lower Left: (232.55, 679.88) ft
- Lower Right: (234.9, 679.9) ft
- X Increments: 10
- Y Increments: 4
- Angle Increments: 10

Piezometric Surfaces

Piezometric Surface 1

Coordinates

	X	Y
Coordinate 1	0 ft	676 ft
Coordinate 2	182.5 ft	681.1 ft
Coordinate 3	201.2 ft	682.1 ft
Coordinate 4	203.7 ft	682 ft
Coordinate 5	223.8 ft	675.8 ft
Coordinate 6	234.9 ft	675.9 ft
Coordinate 7	263 ft	684.3 ft
Coordinate 8	377.2 ft	684 ft

Geometry

Name: 2D Geometry

Settings

View: 2D
Element Thickness: 1 ft

Points

	X	Y
Point 1	0 ft	640 ft

Point 2	377.2 ft	640 ft
Point 3	377.2 ft	692.2 ft
Point 4	343.6 ft	695.9 ft
Point 5	302.7 ft	697.9 ft
Point 6	265.2 ft	690.1 ft
Point 7	263.1 ft	689.3 ft
Point 8	263.1 ft	688.4 ft
Point 9	263.1 ft	688.3 ft
Point 10	263.1 ft	684.3 ft
Point 11	234.9 ft	675.9 ft
Point 12	223.8 ft	675.8 ft
Point 13	203.7 ft	682 ft
Point 14	201.2 ft	682.1 ft
Point 15	201.2 ft	684.1 ft
Point 16	191.6 ft	684 ft
Point 17	182.5 ft	681.1 ft
Point 18	0 ft	676 ft
Point 19	0 ft	678 ft
Point 20	182.5 ft	683.1 ft
Point 21	191.6 ft	686 ft
Point 22	201.2 ft	686.1 ft
Point 23	203.7 ft	686 ft
Point 24	223.8 ft	679.8 ft
Point 25	234.9 ft	679.9 ft
Point 26	0 ft	678.1 ft
Point 27	182.5 ft	683.2 ft
Point 28	191.6 ft	686.1 ft
Point 29	201.2 ft	686.2 ft
Point 30	203.7 ft	686.1 ft
Point 31	223.8 ft	679.9 ft
Point 32	234.9 ft	680 ft
Point 33	0 ft	679 ft
Point 34	182.5 ft	684.1 ft
Point 35	191.6 ft	687 ft
Point 36	201.2 ft	687.1 ft
Point 37	203.7 ft	688 ft
Point 38	0 ft	725.2 ft
Point 39	113.97399 ft	726.5815 ft
Point 40	256.51003 ft	688.33703 ft
Point 41	234.9 ft	681.9 ft
Point 42	223.8 ft	681.8 ft
Point 43	0 ft	730.2 ft
Point 44	113.97399 ft	731.5815 ft
Point 45	273.22402 ft	691.769 ft

Regions

	Material	Points	Area
Region 1	Subbase	1,2,3,4,5,45,6,7,8,9,10,11,12,13,14,15,16,17,18	16,534 ft²
Region 2	Clay Liner	18,19,20,21,22,23,24,25,9,10,11,12,13,14,15,16,17	650 ft²

Region 3	Geosynthetics	19,26,27,28,29,30,31,32,8,9,25,24,23,22,21,20	26.31 ft²
Region 4	Drainage Layer	26,33,34,35,36,37,30,29,28,27	184.58 ft²
Region 5	CCR	33,38,39,7,40,41,42,37,36,35,34	8,689.4 ft²
Region 6	Final Cover	38,39,7,6,45,44,43	1,339.4 ft²
Region 7	Drainage Layer	37,42,41,40,7,8,32,31,30	109.57 ft²

Slip Results

Slip Surfaces Analysed: 278762 of 366025 converged

Current Slip Surface

Slip Surface: 365,306
Factor of Safety: 1.896
Volume: 1,869.0061 ft³
Weight: 188,114.67 lbf
Resisting Moment: 3,457,558.8 lbf·ft
Activating Moment: 1,372,842.6 lbf·ft
Resisting Force: 73,805.371 lbf
Activating Force: 38,935.764 lbf
Slip Rank: 1 of 366,025 slip surfaces
Exit: (261.47267, 694.70684) ft
Entry: (111.87312, 731.55603) ft
Radius: 69.361184 ft
Center: (193.48039, 740.76833) ft

Slip Columns

	X	Y	PWP	Base Normal Stress	Frictional Strength	Cohesive Strength	Suction Strength	Base Material
Column 1	112.39834 ft	731.31668 ft	0 psf	27.23483 psf	14.481016 psf	0 psf	0 psf	Final Cover
Column 2	113.44877 ft	730.83797 ft	0 psf	81.704491 psf	43.443048 psf	0 psf	0 psf	Final Cover
Column 3	114.46215 ft	730.37614 ft	0 psf	120.07035 psf	63.842537 psf	0 psf	0 psf	Final Cover
Column 4	115.43848 ft	729.93121 ft	0 psf	142.3324 psf	75.67948 psf	0 psf	0 psf	Final Cover
Column 5	116.41480 ft	729.48627 ft	0 psf	164.59445 psf	87.516424 psf	0 psf	0 psf	Final Cover
Column 6	117.39113 ft	729.04133 ft	0 psf	186.85651 psf	99.353368 psf	0 psf	0 psf	Final Cover
Column 7	118.36745 ft	728.59640 ft	0 psf	209.11856 psf	111.19031 psf	0 psf	0 psf	Final Cover
Column 8	119.34378 ft	728.15146 ft	0 psf	231.38062 psf	123.02726 psf	0 psf	0 psf	Final Cover
Column 9	120.32010 ft	727.70652 ft	0 psf	253.64267 psf	134.8642 psf	0 psf	0 psf	Final Cover
Column 10	121.29643 ft	727.26159 ft	0 psf	275.90472 psf	146.70114 psf	0 psf	0 psf	Final Cover
Column 11	122.27275 ft	726.81665 ft	0 psf	298.16678 psf	158.53809 psf	0 psf	0 psf	Final Cover

Column 12	123.24908 ft	726.37171 ft	0 psf	320.42883 psf	170.37503 psf	0 psf	0 psf	Final Cover
Column 13	124.22540 ft	725.92678 ft	0 psf	342.69088 psf	182.21197 psf	0 psf	0 psf	Final Cover
Column 14	125.20172 ft	725.48184 ft	0 psf	364.95294 psf	194.04892 psf	0 psf	0 psf	Final Cover
Column 15	126.17805 ft	725.03690 ft	0 psf	387.21499 psf	205.88586 psf	0 psf	0 psf	Final Cover
Column 16	127.15437 ft	724.59197 ft	0 psf	409.47704 psf	217.72281 psf	0 psf	0 psf	Final Cover
Column 17	128.13070 ft	724.14703 ft	0 psf	431.7391 psf	229.55975 psf	0 psf	0 psf	Final Cover
Column 18	129.10702 ft	723.70209 ft	0 psf	454.00115 psf	241.39669 psf	0 psf	0 psf	Final Cover
Column 19	130.08335 ft	723.25716 ft	0 psf	476.2632 psf	253.23364 psf	0 psf	0 psf	Final Cover
Column 20	131.05967 ft	722.81222 ft	0 psf	498.52526 psf	265.07058 psf	0 psf	0 psf	Final Cover
Column 21	132.03600 ft	722.36728 ft	0 psf	520.78731 psf	276.90752 psf	0 psf	0 psf	Final Cover
Column 22	133.01232 ft	721.92234 ft	0 psf	543.04936 psf	288.74447 psf	0 psf	0 psf	Final Cover
Column 23	134.00048 ft	721.47202 ft	0 psf	582.85938 psf	212.14346 psf	0 psf	0 psf	CCR
Column 24	135.00047 ft	721.01629 ft	0 psf	599.12849 psf	218.06494 psf	0 psf	0 psf	CCR
Column 25	136.00046 ft	720.56057 ft	0 psf	615.3976 psf	223.98641 psf	0 psf	0 psf	CCR
Column 26	137.00045 ft	720.10485 ft	0 psf	631.66672 psf	229.90788 psf	0 psf	0 psf	CCR
Column 27	138.00044 ft	719.64913 ft	0 psf	647.93583 psf	235.82936 psf	0 psf	0 psf	CCR
Column 28	139.00043 ft	719.19341 ft	0 psf	664.20494 psf	241.75083 psf	0 psf	0 psf	CCR
Column 29	140.00042 ft	718.73769 ft	0 psf	680.47406 psf	247.6723 psf	0 psf	0 psf	CCR
Column 30	141.00041 ft	718.28196 ft	0 psf	696.74317 psf	253.59377 psf	0 psf	0 psf	CCR
Column 31	142.00040 ft	717.82624 ft	0 psf	713.01228 psf	259.51525 psf	0 psf	0 psf	CCR
Column 32	143.00039 ft	717.37052 ft	0 psf	729.2814 psf	265.43672 psf	0 psf	0 psf	CCR
Column 33	144.00038 ft	716.91480 ft	0 psf	745.55051 psf	271.35819 psf	0 psf	0 psf	CCR
Column 34	145.00037 ft	716.45908 ft	0 psf	761.81962 psf	277.27967 psf	0 psf	0 psf	CCR
Column 35	146.00036 ft	716.00335 ft	0 psf	778.08874 psf	283.20114 psf	0 psf	0 psf	CCR
Column 36	147.00035 ft	715.54763 ft	0 psf	794.35785 psf	289.12261 psf	0 psf	0 psf	CCR
Column 37	148.00034 ft	715.09191 ft	0 psf	810.62696 psf	295.04409 psf	0 psf	0 psf	CCR

Column 38	149.00033 ft	714.63619 ft	0 psf	826.89608 psf	300.96556 psf	0 psf	0 psf	CCR
Column 39	150.00032 ft	714.18047 ft	0 psf	843.16519 psf	306.88703 psf	0 psf	0 psf	CCR
Column 40	151.00031 ft	713.72475 ft	0 psf	859.4343 psf	312.8085 psf	0 psf	0 psf	CCR
Column 41	152.00030 ft	713.26902 ft	0 psf	875.70342 psf	318.72998 psf	0 psf	0 psf	CCR
Column 42	153.00029 ft	712.81330 ft	0 psf	891.97253 psf	324.65145 psf	0 psf	0 psf	CCR
Column 43	154.00028 ft	712.35758 ft	0 psf	908.24164 psf	330.57292 psf	0 psf	0 psf	CCR
Column 44	155.00027 ft	711.90186 ft	0 psf	924.51076 psf	336.4944 psf	0 psf	0 psf	CCR
Column 45	156.00026 ft	711.44614 ft	0 psf	940.77987 psf	342.41587 psf	0 psf	0 psf	CCR
Column 46	157.00025 ft	710.99042 ft	0 psf	957.04898 psf	348.33734 psf	0 psf	0 psf	CCR
Column 47	158.00024 ft	710.53469 ft	0 psf	973.3181 psf	354.25882 psf	0 psf	0 psf	CCR
Column 48	159.00023 ft	710.07897 ft	0 psf	989.58721 psf	360.18029 psf	0 psf	0 psf	CCR
Column 49	160.00022 ft	709.62325 ft	0 psf	1,005.8563 psf	366.10176 psf	0 psf	0 psf	CCR
Column 50	161.00021 ft	709.16753 ft	0 psf	1,022.1254 psf	372.02323 psf	0 psf	0 psf	CCR
Column 51	162.00020 ft	708.71181 ft	0 psf	1,038.3945 psf	377.94471 psf	0 psf	0 psf	CCR
Column 52	163.00019 ft	708.25609 ft	0 psf	1,054.6637 psf	383.86618 psf	0 psf	0 psf	CCR
Column 53	164.00018 ft	707.80036 ft	0 psf	1,070.9328 psf	389.78765 psf	0 psf	0 psf	CCR
Column 54	165.00017 ft	707.34464 ft	0 psf	1,087.2019 psf	395.70913 psf	0 psf	0 psf	CCR
Column 55	166.00016 ft	706.88892 ft	0 psf	1,103.471 psf	401.6306 psf	0 psf	0 psf	CCR
Column 56	167.00015 ft	706.43320 ft	0 psf	1,119.7401 psf	407.55207 psf	0 psf	0 psf	CCR
Column 57	168.00014 ft	705.97748 ft	0 psf	1,136.0092 psf	413.47355 psf	0 psf	0 psf	CCR
Column 58	169.00013 ft	705.52175 ft	0 psf	1,152.2783 psf	419.39502 psf	0 psf	0 psf	CCR
Column 59	170.00012 ft	705.06603 ft	0 psf	1,168.5475 psf	425.31649 psf	0 psf	0 psf	CCR
Column 60	171.00011 ft	704.61031 ft	0 psf	1,184.8166 psf	431.23796 psf	0 psf	0 psf	CCR
Column 61	172.00010 ft	704.15459 ft	0 psf	1,201.0857 psf	437.15944 psf	0 psf	0 psf	CCR
Column 62	173.00009 ft	703.69887 ft	0 psf	1,217.3548 psf	443.08091 psf	0 psf	0 psf	CCR
Column 63	174.00008 ft	703.24315 ft	0 psf	1,233.6239 psf	449.00238 psf	0 psf	0 psf	CCR

Column 64	175.00007 ft	702.78742 ft	0 psf	1,249.893 psf	454.92386 psf	0 psf	0 psf	CCR
Column 65	176.00006 ft	702.33170 ft	0 psf	1,266.1621 psf	460.84533 psf	0 psf	0 psf	CCR
Column 66	177.00005 ft	701.87598 ft	0 psf	1,282.4312 psf	466.7668 psf	0 psf	0 psf	CCR
Column 67	178.00004 ft	701.42026 ft	0 psf	1,298.7004 psf	472.68828 psf	0 psf	0 psf	CCR
Column 68	179.00003 ft	700.96454 ft	0 psf	1,314.9695 psf	478.60975 psf	0 psf	0 psf	CCR
Column 69	180.00002 ft	700.50882 ft	0 psf	1,331.2386 psf	484.53122 psf	0 psf	0 psf	CCR
Column 70	181.00001 ft	700.05309 ft	0 psf	1,347.5077 psf	490.45269 psf	0 psf	0 psf	CCR
Column 71	182.00000 ft	699.59737 ft	0 psf	1,363.7768 psf	496.37417 psf	0 psf	0 psf	CCR
Column 72	182.99211 ft	699.14525 ft	0 psf	1,379.9176 psf	502.24892 psf	0 psf	0 psf	CCR
Column 73	183.97632 ft	698.69672 ft	0 psf	1,395.93 psf	508.07695 psf	0 psf	0 psf	CCR
Column 74	184.96053 ft	698.24818 ft	0 psf	1,411.9424 psf	513.90499 psf	0 psf	0 psf	CCR
Column 75	185.94474 ft	697.79965 ft	0 psf	1,427.9547 psf	519.73302 psf	0 psf	0 psf	CCR
Column 76	186.92895 ft	697.35112 ft	0 psf	1,443.9671 psf	525.56106 psf	0 psf	0 psf	CCR
Column 77	187.91316 ft	696.90259 ft	0 psf	1,459.9795 psf	531.38909 psf	0 psf	0 psf	CCR
Column 78	188.89737 ft	696.45406 ft	0 psf	1,475.9919 psf	537.21712 psf	0 psf	0 psf	CCR
Column 79	189.88158 ft	696.00553 ft	0 psf	1,492.0043 psf	543.04516 psf	0 psf	0 psf	CCR
Column 80	190.86579 ft	695.55700 ft	0 psf	1,508.0167 psf	548.87319 psf	0 psf	0 psf	CCR
Column 81	191.85000 ft	695.10847 ft	0 psf	1,524.0291 psf	554.70122 psf	0 psf	0 psf	CCR
Column 82	192.83421 ft	694.65994 ft	0 psf	1,540.0415 psf	560.52926 psf	0 psf	0 psf	CCR
Column 83	193.81842 ft	694.21141 ft	0 psf	1,556.0539 psf	566.35729 psf	0 psf	0 psf	CCR
Column 84	194.80263 ft	693.76288 ft	0 psf	1,572.0663 psf	572.18533 psf	0 psf	0 psf	CCR
Column 85	195.78684 ft	693.31435 ft	0 psf	1,588.0787 psf	578.01336 psf	0 psf	0 psf	CCR
Column 86	196.77105 ft	692.86582 ft	0 psf	1,604.091 psf	583.84139 psf	0 psf	0 psf	CCR
Column 87	197.75526 ft	692.41729 ft	0 psf	1,620.1034 psf	589.66943 psf	0 psf	0 psf	CCR
Column 88	198.73947 ft	691.96876 ft	0 psf	1,636.1158 psf	595.49746 psf	0 psf	0 psf	CCR
Column 89	199.72368 ft	691.52023 ft	0 psf	1,652.1282 psf	601.32549 psf	0 psf	0 psf	CCR

Column 90	200.70789 ft	691.07170 ft	0 psf	1,668.1406 psf	607.15353 psf	0 psf	0 psf	CCR
Column 91	201.61667 ft	690.65754 ft	0 psf	1,682.9257 psf	612.53485 psf	0 psf	0 psf	CCR
Column 92	202.45000 ft	690.27777 ft	0 psf	1,696.4834 psf	617.46946 psf	0 psf	0 psf	CCR
Column 93	203.28333 ft	689.89800 ft	0 psf	1,710.0411 psf	622.40407 psf	0 psf	0 psf	CCR
Column 94	204.18328 ft	689.48787 ft	0 psf	1,724.6825 psf	627.73311 psf	0 psf	0 psf	CCR
Column 95	205.14983 ft	689.04739 ft	0 psf	1,740.4077 psf	633.45659 psf	0 psf	0 psf	CCR
Column 96	206.11638 ft	688.60691 ft	0 psf	1,756.1328 psf	639.18006 psf	0 psf	0 psf	CCR
Column 97	207.08294 ft	688.16642 ft	0 psf	1,771.8579 psf	644.90354 psf	0 psf	0 psf	CCR
Column 98	208.04949 ft	687.72594 ft	0 psf	1,787.583 psf	650.62701 psf	0 psf	0 psf	CCR
Column 99	209.01604 ft	687.28545 ft	0 psf	1,803.3081 psf	656.35049 psf	0 psf	0 psf	CCR
Column 100	209.98260 ft	686.84497 ft	0 psf	1,819.0333 psf	662.07396 psf	0 psf	0 psf	CCR
Column 101	210.94915 ft	686.40449 ft	0 psf	1,834.7584 psf	667.79744 psf	0 psf	0 psf	CCR
Column 102	211.91570 ft	685.96400 ft	0 psf	1,850.4835 psf	673.52091 psf	0 psf	0 psf	CCR
Column 103	212.88225 ft	685.52352 ft	0 psf	1,866.2086 psf	679.24439 psf	0 psf	0 psf	CCR
Column 104	213.84881 ft	685.08304 ft	0 psf	1,881.9337 psf	684.96786 psf	0 psf	0 psf	CCR
Column 105	214.81536 ft	684.64255 ft	0 psf	1,897.6589 psf	690.69134 psf	0 psf	0 psf	CCR
Column 106	215.77094 ft	684.20707 ft	0 psf	1,828.8156 psf	1,055.8672 psf	0 psf	0 psf	Drainage Layer
Column 107	216.71553 ft	683.77660 ft	0 psf	1,847.0339 psf	1,066.3855 psf	0 psf	0 psf	Drainage Layer
Column 108	217.66013 ft	683.34612 ft	0 psf	1,865.2523 psf	1,076.9039 psf	0 psf	0 psf	Drainage Layer
Column 109	218.60472 ft	682.91564 ft	0 psf	1,883.4707 psf	1,087.4223 psf	0 psf	0 psf	Drainage Layer
Column 110	219.54932 ft	682.48516 ft	0 psf	1,901.6891 psf	1,097.9407 psf	0 psf	0 psf	Drainage Layer
Column 111	220.49391 ft	682.05469 ft	0 psf	1,919.9075 psf	1,108.4591 psf	0 psf	0 psf	Drainage Layer
Column 112	221.43851 ft	681.62421 ft	0 psf	1,938.1259 psf	1,118.9775 psf	0 psf	0 psf	Drainage Layer
Column 113	222.38311 ft	681.19373 ft	0 psf	1,956.3443 psf	1,129.4959 psf	0 psf	0 psf	Drainage Layer
Column 114	223.32770 ft	680.76326 ft	0 psf	1,974.5627 psf	1,140.0143 psf	0 psf	0 psf	Drainage Layer
Column 115	224.49719 ft	680.23029 ft	0 psf	2,002.7551 psf	1,156.2912 psf	0 psf	0 psf	Drainage Layer

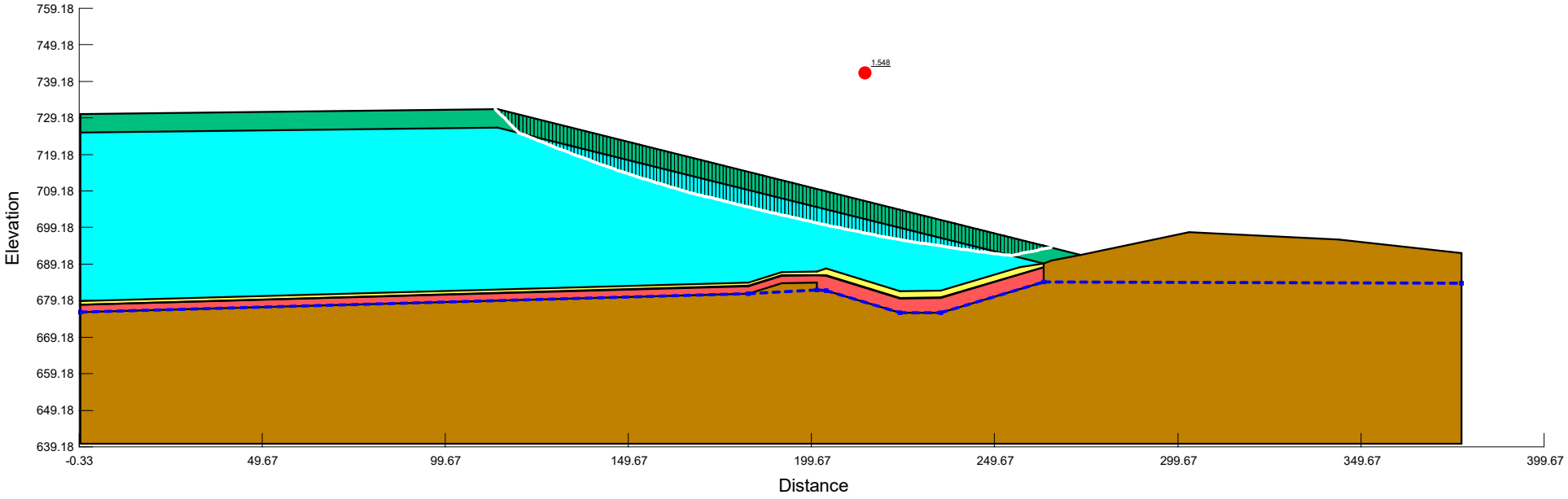
Column 116	225.72219 ft	679.91557 ft	0 psf	2,293.2003 psf	812.06482 psf	0 psf	0 psf	Geosynthetics
Column 117	226.77500 ft	679.92286 ft	0 psf	2,270.8737 psf	804.15857 psf	0 psf	0 psf	Geosynthetics
Column 118	227.82500 ft	679.93143 ft	0 psf	2,247.5011 psf	795.88188 psf	0 psf	0 psf	Geosynthetics
Column 119	228.87500 ft	679.94000 ft	0 psf	2,224.1285 psf	787.6052 psf	0 psf	0 psf	Geosynthetics
Column 120	229.92500 ft	679.94857 ft	0 psf	2,200.7558 psf	779.32851 psf	0 psf	0 psf	Geosynthetics
Column 121	230.97500 ft	679.95714 ft	0 psf	2,177.3832 psf	771.05183 psf	0 psf	0 psf	Geosynthetics
Column 122	232.03382 ft	679.97021 ft	0 psf	2,156.8106 psf	763.76669 psf	0 psf	0 psf	Geosynthetics
Column 123	233.15073 ft	680.27609 ft	0 psf	2,475.6858 psf	1,429.3379 psf	0 psf	0 psf	Drainage Layer
Column 124	234.31691 ft	680.87029 ft	0 psf	2,365.4885 psf	1,365.7154 psf	0 psf	0 psf	Drainage Layer
Column 125	235.47690 ft	681.46133 ft	0 psf	2,261.5964 psf	1,305.7333 psf	0 psf	0 psf	Drainage Layer
Column 126	236.63070 ft	682.04922 ft	0 psf	2,164.0094 psf	1,249.3914 psf	0 psf	0 psf	Drainage Layer
Column 127	237.78450 ft	682.63711 ft	0 psf	2,066.4225 psf	1,193.0496 psf	0 psf	0 psf	Drainage Layer
Column 128	238.84752 ft	683.17875 ft	0 psf	1,854.2051 psf	674.87545 psf	0 psf	0 psf	CCR
Column 129	239.81977 ft	683.67413 ft	0 psf	1,783.8141 psf	649.25524 psf	0 psf	0 psf	CCR
Column 130	240.79201 ft	684.16952 ft	0 psf	1,713.4232 psf	623.63504 psf	0 psf	0 psf	CCR
Column 131	241.76426 ft	684.66490 ft	0 psf	1,643.0322 psf	598.01483 psf	0 psf	0 psf	CCR
Column 132	242.73651 ft	685.16029 ft	0 psf	1,572.6413 psf	572.39463 psf	0 psf	0 psf	CCR
Column 133	243.70876 ft	685.65567 ft	0 psf	1,502.2504 psf	546.77442 psf	0 psf	0 psf	CCR
Column 134	244.68101 ft	686.15106 ft	0 psf	1,431.8594 psf	521.15422 psf	0 psf	0 psf	CCR
Column 135	245.65325 ft	686.64644 ft	0 psf	1,361.4685 psf	495.53401 psf	0 psf	0 psf	CCR
Column 136	246.62550 ft	687.14183 ft	0 psf	1,291.0776 psf	469.91381 psf	0 psf	0 psf	CCR
Column 137	247.59775 ft	687.63721 ft	0 psf	1,220.6866 psf	444.2936 psf	0 psf	0 psf	CCR
Column 138	248.57000 ft	688.13260 ft	0 psf	1,150.2957 psf	418.6734 psf	0 psf	0 psf	CCR
Column 139	249.54224 ft	688.62798 ft	0 psf	1,079.9048 psf	393.05319 psf	0 psf	0 psf	CCR
Column 140	250.51449 ft	689.12337 ft	0 psf	1,009.5138 psf	367.43299 psf	0 psf	0 psf	CCR
Column 141	251.48674 ft	689.61875 ft	0 psf	939.12291 psf	341.81278 psf	0 psf	0 psf	CCR

Column 142	252.45899 ft	690.11414 ft	0 psf	868.73197 psf	316.19258 psf	0 psf	0 psf	CCR
Column 143	253.43124 ft	690.60952 ft	0 psf	798.34104 psf	290.57238 psf	0 psf	0 psf	CCR
Column 144	254.40348 ft	691.10491 ft	0 psf	727.9501 psf	264.95217 psf	0 psf	0 psf	CCR
Column 145	255.35983 ft	691.59219 ft	0 psf	677.10021 psf	360.02057 psf	0 psf	0 psf	Final Cover
Column 146	256.30026 ft	692.07136 ft	0 psf	572.93094 psf	304.63279 psf	0 psf	0 psf	Final Cover
Column 147	257.24070 ft	692.55054 ft	0 psf	468.76168 psf	249.24501 psf	0 psf	0 psf	Final Cover
Column 148	258.18114 ft	693.02972 ft	0 psf	364.59242 psf	193.85723 psf	0 psf	0 psf	Final Cover
Column 149	259.12158 ft	693.50889 ft	0 psf	260.42316 psf	138.46945 psf	0 psf	0 psf	Final Cover
Column 150	260.06201 ft	693.98807 ft	0 psf	156.25389 psf	83.081669 psf	0 psf	0 psf	Final Cover
Column 151	261.00245 ft	694.46725 ft	0 psf	52.084631 psf	27.69389 psf	0 psf	0 psf	Final Cover

I-43 Plan of Operation Modification - Final Grade Stability Analysis
Optimized Circular Failure
Analysis Type: Bishop
Last Solved Date: 03/27/2024, 12:28:42 PM

Factor of Safety: 1.548

Color	Name	Unit Weight (pcf)	Effective Cohesion (psf)	Effective Friction Angle (°)	Piezometric Surface
	CCR	86	0	20	
	Clay Liner	130	0	28	
	Drainage Layer	115	0	30	
	Final Cover	125	0	28	
	Geosynthetics	58	0	19.5	
	Subbase	135	0	28	1



Optimized Circular Failure

File Information

File Version: 11.05
Title: I-43 Plan of Operation Modification - Final Grade Stability Analysis
Created By: Villanueva, Niko
Last Edited By: Villanueva, Niko
Revision Number: 50
Date: 03/27/2024
Time: 12:27:25 PM
Tool Version: 23.1.1.829
File Name: I-43 Proposed Final Grades_Section A_240327.gsz
Directory: I:\25222259.00\Data and Calculations\Geotechnical\Slope Stability\SlopeW Analysis\
Last Solved Date: 03/27/2024
Last Solved Time: 12:28:42 PM

Project Settings

Unit System: U.S. Customary Units

Analysis Settings

Optimized Circular Failure

Kind: SLOPE/W
Analysis Type: Bishop
Settings
- PWP Conditions from: Piezometric Surfaces
- Apply Phreatic Correction: No
- Use Staged Rapid Drawdown: No
- Unit Weight of Water: 62.430189 pcf

Slip Surface
- Direction of movement: Left to Right
- Use Passive Mode: No
- Slip Surface Option: Entry and Exit
- Critical slip surfaces saved: 10
- Optimize Critical Slip Surface Location: Yes
- Optimizations Settings
  - Maximum Iterations: 2,000
  - Starting Points: 8
  - Ending Points: 16
  - Driving Side Maximum Convex Angle: 5 °
  - Resisting Side Maximum Convex Angle: 1 °
- Tension Crack Option: (none)

Distribution
- F of S Calculation Option: Constant

Convergence
- Geometry Settings
  - Minimum Slip Surface Depth: 0.1 ft

Minimum Slip Surface Volume: 35.314667 ft³
Number of Columns: 150
Factor of Safety Convergence Settings
Maximum Number of Iterations: 100
Tolerable difference in F of S: 0.001
Under-Relaxation Criteria
Initial Rate: 1
Minimum Rate: 0.1
Rate Reduction Factor: 0.65
Reduction Frequency (iterations): 50

Materials

CCR

Slope Stability Material Model: Mohr-Coulomb
Unit Weight: 86 pcf
Effective Cohesion: 0 psf
Effective Friction Angle: 20 °
Phi-B: 0 °

Clay Liner

Slope Stability Material Model: Mohr-Coulomb
Unit Weight: 130 pcf
Effective Cohesion: 0 psf
Effective Friction Angle: 28 °
Phi-B: 0 °

Drainage Layer

Slope Stability Material Model: Mohr-Coulomb
Unit Weight: 115 pcf
Effective Cohesion: 0 psf
Effective Friction Angle: 30 °
Phi-B: 0 °

Geosynthetics

Slope Stability Material Model: Mohr-Coulomb
Unit Weight: 58 pcf
Effective Cohesion: 0 psf
Effective Friction Angle: 19.5 °
Phi-B: 0 °

Subbase

Slope Stability Material Model: Mohr-Coulomb
Unit Weight: 135 pcf
Effective Cohesion: 0 psf
Effective Friction Angle: 28 °
Phi-B: 0 °
Pore Water Pressure
Piezometric Surface: 1

Final Cover

Slope Stability Material Model: Mohr-Coulomb
Unit Weight: 125 pcf

Effective Cohesion: 0 psf
Effective Friction Angle: 28 °
Phi-B: 0 °

Slip Surface Entry and Exit

Left Type: Range
Left-Zone Left Coordinate: (83.06545, 731.20685) ft
Left-Zone Right Coordinate: (147, 723.325) ft
Left-Zone Increment: 100
Right Type: Range
Right-Zone Left Coordinate: (246.03204, 698.56699) ft
Right-Zone Right Coordinate: (293, 695.8824) ft
Right-Zone Increment: 100
Radius Increments: 10

Slip Surface Limits

Left Coordinate: (0, 730.2) ft
Right Coordinate: (377.2, 692.2) ft

Piezometric Surfaces

Piezometric Surface 1

Coordinates

	X	Y
Coordinate 1	0 ft	676 ft
Coordinate 2	182.5 ft	681.1 ft
Coordinate 3	201.2 ft	682.1 ft
Coordinate 4	203.7 ft	682 ft
Coordinate 5	223.8 ft	675.8 ft
Coordinate 6	234.9 ft	675.9 ft
Coordinate 7	263.1 ft	684.3 ft
Coordinate 8	377.2 ft	684 ft

Geometry

Name: 2D Geometry

Settings

View: 2D
Element Thickness: 1 ft

Points

	X	Y
Point 1	0 ft	640 ft
Point 2	377.2 ft	640 ft
Point 3	377.2 ft	692.2 ft

Point 4	343.6 ft	695.9 ft
Point 5	302.7 ft	697.9 ft
Point 6	265.2 ft	690.1 ft
Point 7	263.1 ft	689.3 ft
Point 8	263.1 ft	688.4 ft
Point 9	263.1 ft	688.3 ft
Point 10	263.1 ft	684.3 ft
Point 11	234.9 ft	675.9 ft
Point 12	223.8 ft	675.8 ft
Point 13	203.7 ft	682 ft
Point 14	201.2 ft	682.1 ft
Point 15	201.2 ft	684.1 ft
Point 16	191.6 ft	684 ft
Point 17	182.5 ft	681.1 ft
Point 18	0 ft	676 ft
Point 19	0 ft	678 ft
Point 20	182.5 ft	683.1 ft
Point 21	191.6 ft	686 ft
Point 22	201.2 ft	686.1 ft
Point 23	203.7 ft	686 ft
Point 24	223.8 ft	679.8 ft
Point 25	234.9 ft	679.9 ft
Point 26	0 ft	678.1 ft
Point 27	182.5 ft	683.2 ft
Point 28	191.6 ft	686.1 ft
Point 29	201.2 ft	686.2 ft
Point 30	203.7 ft	686.1 ft
Point 31	223.8 ft	679.9 ft
Point 32	234.9 ft	680 ft
Point 33	0 ft	679 ft
Point 34	182.5 ft	684.1 ft
Point 35	191.6 ft	687 ft
Point 36	201.2 ft	687.1 ft
Point 37	203.7 ft	688 ft
Point 38	0 ft	725.2 ft
Point 39	113.97399 ft	726.5815 ft
Point 40	256.51003 ft	688.33703 ft
Point 41	234.9 ft	681.9 ft
Point 42	223.8 ft	681.8 ft
Point 43	0 ft	730.2 ft
Point 44	113.97399 ft	731.5815 ft
Point 45	273.22402 ft	691.769 ft

Regions

	Material	Points	Area
Region 1	Subbase	1,2,3,4,5,45,6,7,8,9,10,11,12,13,14,15,16,17,18	16,534 ft²
Region 2	Clay Liner	18,19,20,21,22,23,24,25,9,10,11,12,13,14,15,16,17	650 ft²
Region 3	Geosynthetics	19,26,27,28,29,30,31,32,8,9,25,24,23,22,21,20	26.31 ft²
Region 4	Drainage Layer	26,33,34,35,36,37,30,29,28,27	184.58 ft²

Region 5	CCR	33,38,39,7,40,41,42,37,36,35,34	8,689.4 ft²
Region 6	Final Cover	38,39,7,6,45,44,43	1,339.4 ft²
Region 7	Drainage Layer	37,42,41,40,7,8,32,31,30	109.57 ft²

Slip Results

Slip Surfaces Analysed: 109477 of 112212 converged

Current Slip Surface

Slip Surface: 112,212
Factor of Safety: 1.548
Volume: 1,151.4271 ft³
Weight: 126,959.35 lbf
Resisting Moment: 11,504,102 lbf·ft
Activating Moment: 7,429,425.5 lbf·ft
Resisting Force: 44,501.749 lbf
Activating Force: 29,268.743 lbf
Slip Rank: 1 of 112,212 slip surfaces
Exit: (265.15225, 693.78694) ft
Entry: (113.32553, 731.57364) ft
Radius: 68.499226 ft
Center: (248.51788, 943.53514) ft

Slip Columns

	X	Y	PWP	Base Normal Stress	Frictional Strength	Cohesive Strength	Suction Strength	Base Material
Column 1	113.64976 ft	731.24798 ft	0 psf	30.636178 psf	16.289545 psf	0 psf	0 psf	Final Cover
Column 2	114.45348 ft	730.44071 ft	0 psf	94.896169 psf	50.457188 psf	0 psf	0 psf	Final Cover
Column 3	115.41246 ft	729.47749 ft	0 psf	162.14379 psf	86.213384 psf	0 psf	0 psf	Final Cover
Column 4	116.37145 ft	728.51428 ft	0 psf	229.39142 psf	121.96958 psf	0 psf	0 psf	Final Cover
Column 5	117.33043 ft	727.55106 ft	0 psf	296.63904 psf	157.72578 psf	0 psf	0 psf	Final Cover
Column 6	118.28941 ft	726.58785 ft	0 psf	363.88667 psf	193.48197 psf	0 psf	0 psf	Final Cover
Column 7	119.24840 ft	725.62463 ft	0 psf	431.13429 psf	229.23817 psf	0 psf	0 psf	Final Cover
Column 8	119.75223 ft	725.11858 ft	0 psf	506.93471 psf	184.50915 psf	0 psf	0 psf	CCR
Column 9	120.28447 ft	724.89090 ft	0 psf	580.16643 psf	211.16331 psf	0 psf	0 psf	CCR
Column 10	121.30028 ft	724.48443 ft	0 psf	592.15551 psf	215.52698 psf	0 psf	0 psf	CCR
Column 11	122.31609 ft	724.07796 ft	0 psf	604.14459 psf	219.89065 psf	0 psf	0 psf	CCR
Column 12	123.33189 ft	723.67149 ft	0 psf	616.13367 psf	224.25432 psf	0 psf	0 psf	CCR

Column 13	124.34770 ft	723.26503 ft	0 psf	628.12276 psf	228.61799 psf	0 psf	0 psf	CCR
Column 14	125.36351 ft	722.85856 ft	0 psf	640.11184 psf	232.98166 psf	0 psf	0 psf	CCR
Column 15	126.37931 ft	722.45209 ft	0 psf	652.10092 psf	237.34532 psf	0 psf	0 psf	CCR
Column 16	127.39512 ft	722.04563 ft	0 psf	664.09 psf	241.70899 psf	0 psf	0 psf	CCR
Column 17	128.41092 ft	721.63916 ft	0 psf	676.07908 psf	246.07266 psf	0 psf	0 psf	CCR
Column 18	129.42673 ft	721.23269 ft	0 psf	688.06816 psf	250.43633 psf	0 psf	0 psf	CCR
Column 19	130.44254 ft	720.82622 ft	0 psf	700.05724 psf	254.8 psf	0 psf	0 psf	CCR
Column 20	131.44273 ft	720.44124 ft	0 psf	715.41991 psf	260.39155 psf	0 psf	0 psf	CCR
Column 21	132.42731 ft	720.07774 ft	0 psf	724.70691 psf	263.77174 psf	0 psf	0 psf	CCR
Column 22	133.41189 ft	719.71424 ft	0 psf	733.99391 psf	267.15193 psf	0 psf	0 psf	CCR
Column 23	134.39647 ft	719.35073 ft	0 psf	743.2809 psf	270.53212 psf	0 psf	0 psf	CCR
Column 24	135.38106 ft	718.98723 ft	0 psf	752.5679 psf	273.91231 psf	0 psf	0 psf	CCR
Column 25	136.36564 ft	718.62373 ft	0 psf	761.8549 psf	277.2925 psf	0 psf	0 psf	CCR
Column 26	137.35022 ft	718.26023 ft	0 psf	771.14189 psf	280.6727 psf	0 psf	0 psf	CCR
Column 27	138.33480 ft	717.89673 ft	0 psf	780.42889 psf	284.05289 psf	0 psf	0 psf	CCR
Column 28	139.31938 ft	717.53322 ft	0 psf	789.71589 psf	287.43308 psf	0 psf	0 psf	CCR
Column 29	140.30396 ft	717.16972 ft	0 psf	799.00288 psf	290.81327 psf	0 psf	0 psf	CCR
Column 30	141.28854 ft	716.80622 ft	0 psf	808.28988 psf	294.19346 psf	0 psf	0 psf	CCR
Column 31	142.27312 ft	716.44272 ft	0 psf	817.57687 psf	297.57365 psf	0 psf	0 psf	CCR
Column 32	143.25771 ft	716.07922 ft	0 psf	826.86387 psf	300.95384 psf	0 psf	0 psf	CCR
Column 33	144.24229 ft	715.71571 ft	0 psf	836.15087 psf	304.33403 psf	0 psf	0 psf	CCR
Column 34	145.22687 ft	715.35221 ft	0 psf	845.43786 psf	307.71422 psf	0 psf	0 psf	CCR
Column 35	146.21145 ft	714.98871 ft	0 psf	854.72486 psf	311.09441 psf	0 psf	0 psf	CCR
Column 36	147.19203 ft	714.65207 ft	0 psf	871.76299 psf	317.29578 psf	0 psf	0 psf	CCR
Column 37	148.16861 ft	714.34228 ft	0 psf	877.01669 psf	319.20797 psf	0 psf	0 psf	CCR
Column 38	149.14518 ft	714.03249 ft	0 psf	882.2704 psf	321.12016 psf	0 psf	0 psf	CCR

Column 39	150.12176 ft	713.72270 ft	0 psf	887.5241 psf	323.03236 psf	0 psf	0 psf	CCR
Column 40	151.09834 ft	713.41292 ft	0 psf	892.77781 psf	324.94455 psf	0 psf	0 psf	CCR
Column 41	152.07492 ft	713.10313 ft	0 psf	898.03152 psf	326.85674 psf	0 psf	0 psf	CCR
Column 42	153.05149 ft	712.79334 ft	0 psf	903.28522 psf	328.76893 psf	0 psf	0 psf	CCR
Column 43	154.02807 ft	712.48355 ft	0 psf	908.53893 psf	330.68113 psf	0 psf	0 psf	CCR
Column 44	154.99993 ft	712.18105 ft	0 psf	915.69988 psf	333.2875 psf	0 psf	0 psf	CCR
Column 45	155.96706 ft	711.88583 ft	0 psf	919.98796 psf	334.84823 psf	0 psf	0 psf	CCR
Column 46	156.93419 ft	711.59061 ft	0 psf	924.27604 psf	336.40897 psf	0 psf	0 psf	CCR
Column 47	157.90133 ft	711.29539 ft	0 psf	928.56412 psf	337.9697 psf	0 psf	0 psf	CCR
Column 48	158.86846 ft	711.00016 ft	0 psf	932.8522 psf	339.53043 psf	0 psf	0 psf	CCR
Column 49	159.83560 ft	710.70494 ft	0 psf	937.14028 psf	341.09117 psf	0 psf	0 psf	CCR
Column 50	160.80273 ft	710.40972 ft	0 psf	941.42836 psf	342.6519 psf	0 psf	0 psf	CCR
Column 51	161.76986 ft	710.11450 ft	0 psf	945.71644 psf	344.21263 psf	0 psf	0 psf	CCR
Column 52	162.77145 ft	709.81460 ft	0 psf	952.03993 psf	346.5142 psf	0 psf	0 psf	CCR
Column 53	163.80748 ft	709.51001 ft	0 psf	955.70627 psf	347.84863 psf	0 psf	0 psf	CCR
Column 54	164.84351 ft	709.20543 ft	0 psf	959.37261 psf	349.18307 psf	0 psf	0 psf	CCR
Column 55	165.87954 ft	708.90084 ft	0 psf	963.03895 psf	350.51751 psf	0 psf	0 psf	CCR
Column 56	166.90076 ft	708.62504 ft	0 psf	975.09128 psf	354.9042 psf	0 psf	0 psf	CCR
Column 57	167.90716 ft	708.37802 ft	0 psf	974.71902 psf	354.76871 psf	0 psf	0 psf	CCR
Column 58	168.91357 ft	708.13099 ft	0 psf	974.34675 psf	354.63322 psf	0 psf	0 psf	CCR
Column 59	169.91997 ft	707.88397 ft	0 psf	973.97449 psf	354.49772 psf	0 psf	0 psf	CCR
Column 60	170.92637 ft	707.63695 ft	0 psf	973.60222 psf	354.36223 psf	0 psf	0 psf	CCR
Column 61	171.93277 ft	707.38993 ft	0 psf	973.22996 psf	354.22674 psf	0 psf	0 psf	CCR
Column 62	172.93918 ft	707.14291 ft	0 psf	972.8577 psf	354.09124 psf	0 psf	0 psf	CCR
Column 63	173.94558 ft	706.89588 ft	0 psf	972.48543 psf	353.95575 psf	0 psf	0 psf	CCR
Column 64	174.95198 ft	706.64886 ft	0 psf	972.11317 psf	353.82026 psf	0 psf	0 psf	CCR

Column 65	175.95838 ft	706.40184 ft	0 psf	971.7409 psf	353.68476 psf	0 psf	0 psf	CCR
Column 66	176.96479 ft	706.15482 ft	0 psf	971.36864 psf	353.54927 psf	0 psf	0 psf	CCR
Column 67	177.97119 ft	705.90779 ft	0 psf	970.99638 psf	353.41378 psf	0 psf	0 psf	CCR
Column 68	178.97759 ft	705.66077 ft	0 psf	970.62411 psf	353.27829 psf	0 psf	0 psf	CCR
Column 69	179.98399 ft	705.41375 ft	0 psf	970.25185 psf	353.14279 psf	0 psf	0 psf	CCR
Column 70	180.99040 ft	705.16673 ft	0 psf	969.87958 psf	353.0073 psf	0 psf	0 psf	CCR
Column 71	181.99680 ft	704.91971 ft	0 psf	969.50732 psf	352.87181 psf	0 psf	0 psf	CCR
Column 72	182.85870 ft	704.70815 ft	0 psf	969.18851 psf	352.75577 psf	0 psf	0 psf	CCR
Column 73	183.73643 ft	704.49596 ft	0 psf	969.94771 psf	353.03209 psf	0 psf	0 psf	CCR
Column 74	184.77450 ft	704.24765 ft	0 psf	969.03451 psf	352.69972 psf	0 psf	0 psf	CCR
Column 75	185.81258 ft	703.99935 ft	0 psf	968.12132 psf	352.36734 psf	0 psf	0 psf	CCR
Column 76	186.85065 ft	703.75105 ft	0 psf	967.20813 psf	352.03497 psf	0 psf	0 psf	CCR
Column 77	187.88873 ft	703.50275 ft	0 psf	966.29493 psf	351.70259 psf	0 psf	0 psf	CCR
Column 78	188.92680 ft	703.25444 ft	0 psf	965.38174 psf	351.37022 psf	0 psf	0 psf	CCR
Column 79	189.93560 ft	703.01918 ft	0 psf	966.65285 psf	351.83286 psf	0 psf	0 psf	CCR
Column 80	190.91511 ft	702.79695 ft	0 psf	964.80335 psf	351.1597 psf	0 psf	0 psf	CCR
Column 81	191.89462 ft	702.57472 ft	0 psf	962.95386 psf	350.48654 psf	0 psf	0 psf	CCR
Column 82	192.87414 ft	702.35250 ft	0 psf	961.10436 psf	349.81338 psf	0 psf	0 psf	CCR
Column 83	193.85365 ft	702.13027 ft	0 psf	959.25487 psf	349.14022 psf	0 psf	0 psf	CCR
Column 84	194.83316 ft	701.90805 ft	0 psf	957.40537 psf	348.46706 psf	0 psf	0 psf	CCR
Column 85	195.81268 ft	701.68582 ft	0 psf	955.55587 psf	347.7939 psf	0 psf	0 psf	CCR
Column 86	196.79219 ft	701.46359 ft	0 psf	953.70638 psf	347.12073 psf	0 psf	0 psf	CCR
Column 87	197.77170 ft	701.24137 ft	0 psf	951.85688 psf	346.44757 psf	0 psf	0 psf	CCR
Column 88	198.75122 ft	701.01914 ft	0 psf	950.00739 psf	345.77441 psf	0 psf	0 psf	CCR
Column 89	199.73073 ft	700.79692 ft	0 psf	948.15789 psf	345.10125 psf	0 psf	0 psf	CCR
Column 90	200.71024 ft	700.57469 ft	0 psf	946.30839 psf	344.42809 psf	0 psf	0 psf	CCR

Column 91	201.82500 ft	700.32178 ft	0 psf	944.20353 psf	343.66198 psf	0 psf	0 psf	CCR
Column 92	203.07500 ft	700.03819 ft	0 psf	941.84331 psf	342.80293 psf	0 psf	0 psf	CCR
Column 93	204.21019 ft	699.78064 ft	0 psf	939.69988 psf	342.02278 psf	0 psf	0 psf	CCR
Column 94	205.23056 ft	699.54915 ft	0 psf	937.77323 psf	341.32154 psf	0 psf	0 psf	CCR
Column 95	206.24366 ft	699.33135 ft	0 psf	939.90027 psf	342.09572 psf	0 psf	0 psf	CCR
Column 96	207.24947 ft	699.12726 ft	0 psf	936.01276 psf	340.68079 psf	0 psf	0 psf	CCR
Column 97	208.25528 ft	698.92316 ft	0 psf	932.12525 psf	339.26585 psf	0 psf	0 psf	CCR
Column 98	209.26109 ft	698.71907 ft	0 psf	928.23774 psf	337.85091 psf	0 psf	0 psf	CCR
Column 99	210.26690 ft	698.51498 ft	0 psf	924.35024 psf	336.43597 psf	0 psf	0 psf	CCR
Column 100	211.27272 ft	698.31088 ft	0 psf	920.46273 psf	335.02103 psf	0 psf	0 psf	CCR
Column 101	212.27853 ft	698.10679 ft	0 psf	916.57522 psf	333.6061 psf	0 psf	0 psf	CCR
Column 102	213.28434 ft	697.90269 ft	0 psf	912.68771 psf	332.19116 psf	0 psf	0 psf	CCR
Column 103	214.29015 ft	697.69860 ft	0 psf	908.8002 psf	330.77622 psf	0 psf	0 psf	CCR
Column 104	215.29596 ft	697.49451 ft	0 psf	904.91269 psf	329.36128 psf	0 psf	0 psf	CCR
Column 105	216.30178 ft	697.29041 ft	0 psf	901.02518 psf	327.94634 psf	0 psf	0 psf	CCR
Column 106	217.30759 ft	697.08632 ft	0 psf	897.13767 psf	326.53141 psf	0 psf	0 psf	CCR
Column 107	218.31340 ft	696.88223 ft	0 psf	893.25016 psf	325.11647 psf	0 psf	0 psf	CCR
Column 108	219.31921 ft	696.67813 ft	0 psf	889.36265 psf	323.70153 psf	0 psf	0 psf	CCR
Column 109	220.32502 ft	696.47404 ft	0 psf	885.47514 psf	322.28659 psf	0 psf	0 psf	CCR
Column 110	221.32327 ft	696.28396 ft	0 psf	885.59843 psf	322.33147 psf	0 psf	0 psf	CCR
Column 111	222.31396 ft	696.10791 ft	0 psf	879.68619 psf	320.17959 psf	0 psf	0 psf	CCR
Column 112	223.30465 ft	695.93185 ft	0 psf	873.77396 psf	318.02771 psf	0 psf	0 psf	CCR
Column 113	224.16823 ft	695.77839 ft	0 psf	868.62031 psf	316.15194 psf	0 psf	0 psf	CCR
Column 114	225.02936 ft	695.63768 ft	0 psf	867.35385 psf	315.69099 psf	0 psf	0 psf	CCR
Column 115	226.01517 ft	695.48713 ft	0 psf	859.39196 psf	312.79309 psf	0 psf	0 psf	CCR
Column 116	227.00097 ft	695.33658 ft	0 psf	851.43006 psf	309.8952 psf	0 psf	0 psf	CCR

Column 117	227.98678 ft	695.18603 ft	0 psf	843.46817 psf	306.99731 psf	0 psf	0 psf	CCR
Column 118	228.97258 ft	695.03548 ft	0 psf	835.50627 psf	304.09941 psf	0 psf	0 psf	CCR
Column 119	229.95839 ft	694.88493 ft	0 psf	827.54437 psf	301.20152 psf	0 psf	0 psf	CCR
Column 120	230.94419 ft	694.73438 ft	0 psf	819.58248 psf	298.30363 psf	0 psf	0 psf	CCR
Column 121	231.93000 ft	694.58383 ft	0 psf	811.62058 psf	295.40573 psf	0 psf	0 psf	CCR
Column 122	233.04217 ft	694.41610 ft	0 psf	803.08363 psf	292.29854 psf	0 psf	0 psf	CCR
Column 123	234.28072 ft	694.23117 ft	0 psf	792.72201 psf	288.52722 psf	0 psf	0 psf	CCR
Column 124	235.38552 ft	694.06622 ft	0 psf	783.4794 psf	285.16318 psf	0 psf	0 psf	CCR
Column 125	236.35655 ft	693.92123 ft	0 psf	775.35581 psf	282.20644 psf	0 psf	0 psf	CCR
Column 126	237.32758 ft	693.77625 ft	0 psf	767.23222 psf	279.24969 psf	0 psf	0 psf	CCR
Column 127	238.29862 ft	693.63126 ft	0 psf	759.10862 psf	276.29294 psf	0 psf	0 psf	CCR
Column 128	239.26965 ft	693.48628 ft	0 psf	750.98503 psf	273.3362 psf	0 psf	0 psf	CCR
Column 129	240.24068 ft	693.34130 ft	0 psf	742.86144 psf	270.37945 psf	0 psf	0 psf	CCR
Column 130	241.21171 ft	693.19631 ft	0 psf	734.73785 psf	267.42271 psf	0 psf	0 psf	CCR
Column 131	242.18275 ft	693.05133 ft	0 psf	726.61425 psf	264.46596 psf	0 psf	0 psf	CCR
Column 132	243.15378 ft	692.90635 ft	0 psf	718.49066 psf	261.50921 psf	0 psf	0 psf	CCR
Column 133	244.12481 ft	692.76136 ft	0 psf	710.36707 psf	258.55247 psf	0 psf	0 psf	CCR
Column 134	245.09155 ft	692.63024 ft	0 psf	705.58199 psf	256.81084 psf	0 psf	0 psf	CCR
Column 135	246.05400 ft	692.51299 ft	0 psf	695.26873 psf	253.05712 psf	0 psf	0 psf	CCR
Column 136	247.01644 ft	692.39573 ft	0 psf	684.95548 psf	249.30341 psf	0 psf	0 psf	CCR
Column 137	247.97888 ft	692.27847 ft	0 psf	674.64222 psf	245.54969 psf	0 psf	0 psf	CCR
Column 138	248.94133 ft	692.16122 ft	0 psf	664.32897 psf	241.79597 psf	0 psf	0 psf	CCR
Column 139	249.90377 ft	692.04396 ft	0 psf	654.01571 psf	238.04225 psf	0 psf	0 psf	CCR
Column 140	250.86622 ft	691.92670 ft	0 psf	643.70246 psf	234.28853 psf	0 psf	0 psf	CCR
Column 141	251.82866 ft	691.80945 ft	0 psf	633.3892 psf	230.53482 psf	0 psf	0 psf	CCR
Column 142	252.79110 ft	691.69219 ft	0 psf	623.07595 psf	226.7811 psf	0 psf	0 psf	CCR

Column 143	253.75358 ft	691.57493 ft	0 psf	612.76209 psf	223.02716 psf	0 psf	0 psf	CCR
Column 144	254.72734 ft	691.61873 ft	0 psf	642.68899 psf	341.7238 psf	0 psf	0 psf	Final Cover
Column 145	255.71236 ft	691.82360 ft	0 psf	581.96321 psf	309.43533 psf	0 psf	0 psf	Final Cover
Column 146	256.69738 ft	692.02847 ft	0 psf	521.23743 psf	277.14686 psf	0 psf	0 psf	Final Cover
Column 147	257.68240 ft	692.23334 ft	0 psf	460.51165 psf	244.85839 psf	0 psf	0 psf	Final Cover
Column 148	258.66742 ft	692.43820 ft	0 psf	399.78587 psf	212.56992 psf	0 psf	0 psf	Final Cover
Column 149	259.65243 ft	692.64307 ft	0 psf	339.06009 psf	180.28145 psf	0 psf	0 psf	Final Cover
Column 150	260.63745 ft	692.84794 ft	0 psf	278.33431 psf	147.99298 psf	0 psf	0 psf	Final Cover
Column 151	261.62247 ft	693.05281 ft	0 psf	217.60853 psf	115.70451 psf	0 psf	0 psf	Final Cover
Column 152	262.60749 ft	693.25767 ft	0 psf	156.88275 psf	83.416036 psf	0 psf	0 psf	Final Cover
Column 153	263.61306 ft	693.46682 ft	0 psf	94.889892 psf	50.453851 psf	0 psf	0 psf	Final Cover
Column 154	264.63919 ft	693.68023 ft	0 psf	31.629964 psf	16.81795 psf	0 psf	0 psf	Final Cover

Appendix I

Seepage Potential and Karst Condition Assessment

Seepage Potential and Karst Condition Assessment

The disposal facility is designed and constructed to include storm water run-on and run-off management and leachate collection systems. The clay soils below the facility have a low permeability on the order of 5 x 10-8 cm/sec resulting in groundwater levels that are typically within 10 feet of the ground surface. Groundwater monitoring in 2016 and 2017 at monitoring wells adjacent to the facility show downward hydraulic gradients, confirming that groundwater movement resulting in unstable areas is not a concern. There are currently no concerns that storm water, leachate, or groundwater movement will impact the stability of the landfill.

As noted in **Appendix E**, karst features were not observed in the borings within and adjacent to the disposal facility. The borings encountered up to 90 feet of predominantly clay till. The total sequence of sediment is about 150 feet thick as indicated by water supply records in the area of the facility. Because of the multiple glacial advances and associated erosional and depositional processes resulting in a thick sediment layer overlying the bedrock, the area is not likely to be unstable due to karstic processes.

References

BT2, Inc., 2008, Plan of Operation, Edgewater I-43 Ash Disposal Facility, Phases 3 and 4.
SCS Engineers, 2018, Biennial Groundwater Monitoring Report for 2016-2017, Wisconsin Power and Light Company, Edgewater I-43 Ash Disposal Facility, Sheboygan, Wisconsin.

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MJT, 12/7/2022

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