SAFETY FACTOR ASSESSMENT
INITIAL ASSESSMENT

CFR § 257.74(e)

East Bottom Ash Pond

Rockport Plant
Rockport, Indiana

October, 2023

Prepared for: Indiana Michigan Power Company

Prepared by: Worley

One Meridian Boulevard

Suite 2C02, Wyomissing, PA, 19610

AMERICAN ELECTRIC POWER

BOUNDLESS ENERGY

SAFETY FACTOR ASSESSMENT
INITIAL ASSESSMENT
CFR § 257.74(E)
ROCKPORT PLANT
EAST BOTTOM ASH POND

PREPARED BY Yingwu Xu Digitally signed by Yingwu Xu DN: cn=Yingwu Xu, c=US, ou=Worley, email=yingwu.xu@worley.com Date: 2023.10.14 21:45:12 -04'00' DATE _____

Yingwu Xu, P.E.

REVIEWED BY Erik Leiby Digitally signed by Erik Leiby DN: cn=Erik Leiby, c=US, o=Worley, ou=Civil Engineer, email=Erik.Leiby@worley.com Reason: I have reviewed this document Date: 2023.10.16 11:19:54 -04'00' DATE _____

Erik Leiby

APPROVED BY Gregory Nadeau Digitally signed by Gregory Nadeau DN: cn=Gregory Nadeau, c=US, o=Worley, email=gregory.nadeau@worley.com Date: 2023.10.16 11:26:38 -04'00' DATE _____

Greg Nadeau, P.E.

YINGWU XU
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No. 12000238
STATE OF
INDIANA
PROFESSIONAL ENGINEER

Yingwu Xu 2023.10.16 11:31:41 -04'00'

I certify to the best of my knowledge, information, and belief that the information contained in this safety factor assessment meets the requirements of 40 CFR § 257.74(e)

Table of Contents

List of Appendices

List of Tables:

1.0 Introduction

This report was prepared by Worley to fulfill requirements of 40 CFR §257.74(e) for the initial safety factor assessment of the East Bottom Ash Pond (EBAP) following the completion of a retrofit.

2.0 Description of the CCR Unit

The Rockport plant is located near the City of Rockport, Spencer County, Indiana. It is owned by Indiana Michigan Power Co. (I&M), a unit of American Electric Power. The facility operates one active surface impoundment (East Bottom Ash Pond) for storing CCR waste within the bottom ash complex. There are six main ponds within the bottom ash pond complex as listed below.

- East Bottom Ash Pond
- West Bottom Ash Pond (To commence closure October, 2023)
- East Waste Water Pond
- West Waste Water Pond
- Reclaim Pond
- Clear Water Pond

Following retrofit, the East Bottom Ash Pond is lined with a textured 40-mil LLDPE geomembrane overtop a geosynthetic clay liner (GCL) overtop a 10 oz/sy non-woven geotextile and discharges to the East Waste Water Pond. The West Bottom Ash Pond will commence closure when the retrofitted East Bottom Ash Pond goes into service.

The East Bottom Ash Pond is incised on the northern and eastern sides of the pond and contains an east-to-west forebay dike at elevation 394. A north-to-south trending splitter dike separates the East Bottom Ash Pond from the West Bottom Ash Pond. An east-to-west trending splitter dike separates the East Bottom Ash Pond from the East Waste Water Pond.

The north-to-south trending splitter dike between the East Bottom Ash Pond and West Bottom Ash Pond is approximately 2,000 feet long. The design height of the splitter dike is 18 feet (El. 399 to 381). The dike is constructed out of compacted soil. Both interior and exterior slopes are designed to be 2 horizontal to 1 vertical. Native soil is estimated around elevation 390, based on original design drawings.

The east-to-west trending splitter dike between the East Bottom Ash Pond and the East Waste Water Pond is approximately 650 feet long. The maximum design height is 20.5 feet measured from the top of the dike to the bottom of the East Waste Water Pond (El. 399 to 378.5). The dike is constructed out of compacted soil. Both interior and exterior slopes are designed to be 2 Horizontal to 1 Vertical. Native soil is estimated around elevation 390, based on original design drawings.

The east-to-west forebay dike within the East Bottom Ash Pond is approximately 650 feet long. The maximum design height is 15.5 feet measured from the top of the dike to the toe of the slope at the forebay (El. 394 to 378.5). The dike is constructed out of compacted cohesive soils. Both interior and exterior slopes are designed to be 2 horizontal to 1 vertical.

3.0 Subsurface Conditions

3.1 Site Geology

The site of Rockport bottom ash pond complex is within the flood plain of the Ohio River and the Boonville Hills physiographic province of the Southern Hills and Lowlands physiographic region.

According to the USDA Soil Survey of Spencer County, Indiana (September 2015), the predominant soil in the vicinity of the site is the Ginat silt loam (Gn). The Weinbach silt loam (WcA), Sciotoville silt loam (ScA and ScB2), and Wheeling loam (WhB2) are also present near the facility, but to a lesser extent. A majority of the soils in the vicinity of the site have been altered or removed during site development and are classified as Udorthents (Uaa) or Mine Dumps (Du).

The Ginat consists of poorly-drained silt loam and silty clay loam. The Weinbach consists of somewhat poorly drained silt loam and silty clay loam. The Sciotoville and Wheeling consist of moderately well-drained to well-drained silt loam, clay loam, and loam.

The bottom ash pond complex is located on the western bank of the Ohio River and is underlain by Quaternary age alluvium consisting of Wisconsinan age undifferentiated outwash. Geotechnical borings performed at the site during the original subsurface investigation indicate clay generally ranging from less than 5 to about 15 feet in thickness, but may extend up to about 30 feet and contain layers or lenses of fine sand. The clay layer was underlain by fine to coarse sand deposits. Historical boring information is presented in Appendix C.

Bedrock consists of the Raccoon Creek Group Formation of Pennsylvanian age and is comprised of predominantly shale and sandstone with thin beds of limestone, clay, and coal. The Raccoon Creek Group is underlain by rocks ranging in age from Middle Devonian to Late Mississippian and is located at about elevation 280 to 300 feet.

Structurally, the area is located within the Illinois Basin, near the eastern border of the Wabash Valley Seismic Zone, which generally consists of vertically-oriented faults buried under layers of sediment.

3.2 Review of Historical Soil Borings

A review of historical borings information was performed to develop a soil profile and define soil shear strength properties. Relevant historical geotechnical borings and laboratory testing data is included in Appendix C of this report. In 2016, Terracon performed two soil borings through the western dike of the West Bottom Ash Pond.

In addition, soil boring logs for monitoring wells 1604, 1605, and 1606 were also used to develop a soil profile. The top of natural soil horizon is based on the original construction-grading plan for the Bottom Ash Ponds.

4.0 Geotechnical Analysis

Slope stability analysis was performed using Slide 6.0 developed by Rocscience Inc. This program is based on the principles of limit equilibrium analysis. The GLE/Morgenstern-Price Method was used to solve 2-Dimension Limit Equilibrium equations.

Seismic loading was performed using a horizontal seismic coefficient of 0.145. The seismic coefficient considers ½ of the 2008 Peak Ground Acceleration with 2% Probability of Exceedance in 50 Years for firm

rock (0.22), with an amplification factor of 1.32. This seismic coefficient is consistent with seismic loading parameters from Terracon's 2016 Safety Factor Assessment report.

Rapid drawdown scenarios were modeled due to adjacent pond operations for the splitter dikes. The Duncan, Wright, and Wong (1990) method was used to define the shear strength properties of soils subjected to drawdowns. Total stress shear strength properties are applied to soils that would be subjected to drawdowns.

4.1 Strength Parameters

Strength parameters were developed based on the results of the field and laboratory testing. Soil profiles were developed based on subsurface conditions interpreted from the borings. Table 1 summarizes the engineering properties used in the Safety Factor Assessment. Shear strength parameters assigned to the soil profile were based on the Standard Penetration Test n-Values and the consolidated-undrained Triaxial compression tests performed by Terracon in 2016 in nearby boring locations.

Table 1: Engineering Properties used in Safety Factor Assessment

Material	Unit Weight (pcf)	Effective Stress Parameters		Total Stress Parameters	
		Φ' (degree)	C' (psf)	Φ (degree)	C (psf)
Embankment Fill	130	29	50	19	400
Foundation Clay	123	34	50	22	200
Loose Sand	115	30	0		
Medium Dense Sand	123	33	0		

4.2 Phreatic Surface & Pond Levels

The phreatic surface modeled in the Safety Factor Assessment assumes a simple straight line through the dike cross section. The author believes this is a slightly conservative assumption, but is relevant given the absence of piezometers within the embankment dikes.

The pool elevation for the East Bottom Ash Pond for both maximum storage pool loading condition and the maximum surcharge pool loading condition is 396' since the East Bottom Ash Pond does not receive stormwater inflow from the adjacent areas. It is worth noting that since the Retrofit of the East Bottom Ash Pond is lined, the pond does not recharge and connect to the phreatic surface outside of the pond. The maximum operating pool for the East Waste Water Pond of 389' as modeled is based on original design drawing (AEP Drawing 12-30027-8).

4.3 Groundwater Condition

Based on the Groundwater Monitoring Network Evaluation, the principal groundwater flow zone underlying the ponds is the lower overburden unit consisting of granular outwash deposits (poorly sorted sand with interlayered sand and gravel). Recharge into this unit occurs laterally from hills and buried tributary valleys to the north-northwest. Recharge also occurs from the Ohio River to the southeast during relatively brief periods (spikes) of high water level in the Ohio river. Areal recharge also occurs vertically from the surface. Artificial recharge can also occur from units containing standing surface water, such as the waste water ponds but not the East Bottom Ash Pond which is lined, depending on the hydraulic separation provided by natural materials and engineered soil lining the bottoms of these units.

The hydrostratigraphic unit identified as the uppermost aquifer is the saturated granular outwash deposit that underlies the Rockport Plant property including the Bottom Ash Ponds. The top of this unit would be the typical seasonal high water level of 373.5 feet, 25.5 feet below the crest elevation of the pond embankments (399 feet).

The safety factor assessments consider a groundwater level of 373.5 feet and artificial recharge from the ponds.

4.4 Load Cases Analyzed

4.4.1 North to South Splitter Dike

The north-to-south splitter dike separates the East Bottom Ash Pond from the West Bottom Ash Pond.

Per 40 CFR 257.73(e)(1), the safety factor assessments were performed for the following conditions: (i) end of construction loading condition; (ii) long-term, maximum storage pool loading condition; (iii) maximum surcharge pool loading condition; (iv) seismic condition. As demonstrated in Section 4.5, since dike fill materials are not subject to liquefaction, no further assessment was required.

Since the East Bottom Ash Pond does not receive stormwater inflow from the adjacent areas, both maximum storage pool loading condition and the maximum surcharge pool loading condition can be combined.

Additionally, rapid drawdown was performed for the downstream slope of the East Bottom Ash Pond and the West Bottom Ash Pond.

The load cases analyzed for the north-to-south splitter dike are summarized in Table 2.

Table 2: Load Cases Analyzed for the North-to-South Splitter Dike

Scenario Description	West Bottom Ash Pond Pool Elevation	East Bottom Ash Pond Pool Elevation	Commentary
257.74(e)(1)(i) End-of-Construction Loading Condition	390	378.5	WBAP at the existing condition; EBAP drained
257.74(e)(1)(ii) Long Term, Maximum Storage Pool Loading Condition 257.74(e)(1)(iii) Maximum Surcharge Pool Loading Condition	390	396	WBAP cleaned out and Closed at El. 385'; EBAP in max pool elevation
257.74(e)(1)(iv) Seismic	390	378.5	WBAP Cleaned out and Closed at El. 385'; EBAP drained
Rapid Drawdown of WBAP	390 to 386	396	WBAP drained for cleaning out; EBAP in max pool elevation

4.4.2 East to West Splitter Dike

The east to west splitter dike separates the East Bottom Ash Pond from the East Waste water Pond. Similar to the north-to-south splitter dike, the load cases analyzed for the east-to-west splitter dike are summarized in Table 3

Table 3: Load Cases Analyzed for the East to West Splitter Dike

Scenario Description	East Waste water Pond Water Surface Elevation	East Bottom Ash Pond Water Surface Elevation	Commentary
257.74(e)(1)(i) End-of-Construction Loading Condition	389	378.5	EWWP in service; EBAP Drained
257.74(e)(1)(ii) Long Term, Maximum Storage Pool Loading Condition 257.74(e)(1)(iii) Maximum Surcharge Pool Loading Condition	389	396	EWWP in service; EBAP in max pool elevation
257.74(e)(1)(iv) Seismic	389	378.5	EWWP in service; EBAP drained
Rapid Drawdown of EWWP	389 to 375	396	EWWP drained; EBAP in max pool elevation

4.5 Liquefaction Considerations

In addition, the CCR rules require that for dikes constructed of soils with a susceptibility to liquefaction, the calculated factor of safety against liquefaction must equal or exceed a value of 1.20. The splitter dikes are constructed predominantly of lean clay containing varying amounts of sand and is not considered to be susceptible to liquefaction.

5.0 Results

The results of the Safety Factor Assessment are summarized in Table 4 for the North to South Splitter Dike and Table 5 for the East to West Splitter Dike. The outputs of the slope stability analyses are contained in Appendix B of this report.

Table 4: Safety Factor Assessment Summary for the North to South Splitter Dike

Scenario Description	Calculated Factor of Safety	Required Factor of Safety	Acceptable (Yes or No)	Commentary
257.74(e)(1)(i) End-of-Construction Loading Condition	1.94	1.30	**Yes**	
257.74(e)(1)(ii) Long Term, Maximum Storage Pool Loading Condition 257.74(e)(1)(iii) Maximum Surcharge Pool Loading Condition	1.69	1.50 and 1.40	**Yes**	
257.74(e)(1)(iv) Seismic	1.43	1.00	**Yes**	Horizontal seismic coefficient = 0.145
257.74(e)(1)(v) Liquefaction	Not Applicable	1.20		
Rapid Drawdown of West Bottom Ash Pond	2.19	*		*= Required Factor of Safety not specified in 40 CFR 257.74(d)(1)(vii).

Table 5: Safety Factor Assessment Summary for the East to West Splitter Dike

Scenario Description	Calculated Factor of Safety	Required Factor of Safety	Acceptable (Yes or No)	Commentary
257.74(e)(1)(i) End-of-Construction Loading Condition	1.82	1.30	**Yes**	
257.74(e)(1)(ii) Long Term, Maximum Storage Pool Loading Condition 257.74(e)(1)(iii) Maximum Surcharge Pool Loading Condition	1.53	1.50 and 1.40	**Yes**	
257.74(e)(1)(iv) Seismic	1.34	1.00	**Yes**	Horizontal seismic coefficient = 0.145
257.74(e)(1)(v) Liquefaction	Not Applicable	1.20		
Rapid Drawdown of EWWP	1.51	*	**Yes**	*= Required Factor of Safety not specified in 40 CFR 257.74(d)(1)(vii).

6.0 Conclusions

Based on the analysis presented in this report, the splitter dikes that impound the East Bottom Ash Pond at the Rockport Plant meet the required factors of safety as required by 40 CFR §257.74(e)(1)(i) through (v) for all load cases considered.

Appendix A- Site Plans and Cross Section Locations

CROSS REFS:

DRAWING NUMBER: 12-301203

GENERAL NOTES

1. BACKGROUND LAND SURFACE TOPOGRAPHY AND FEATURES ARE FROM A SURVEY BY PRECISION SURVEYING, INC. DATED 02-08-21. HORIZONTAL AND VERTICAL DATUM BASED ON AEP ROCKPORT SITE CONTROL SYSTEM.
2. COORDINATE GRID SHOWN IS SITE COORDINATE SYSTEM. FOR SITE MONUMENTATION SEE DRAWING 12-300418.

WEST BOTTOM ASH POND

RETROFITTED EAST POND

REVETMENT LINED FOREBAY

40' (+/-) WIDE BERM - TOP EL 399.0 +/-

30' (+/-) WIDE BERM

FOREBAY DIKE - SUBGRADE EL 393.75 (TOP OF REVETMENT EL 394.00)

10:1 SLOPE (TYP BOTH SIDES)

LIMIT OF REVETMENT N 153027.6 E 513555.0

N 153134.0 E 513555.0

N 153182.0 E 513574.0

N 153480.5 E 513574.0

N 153480.5 E 514214.8

LIMIT OF REVETMENT N 153030.4 E 514214.8

N 151495.0 E 513555.0

N 151495.0 E 514214.8

METAL CLEANING

WASTE BASIN

1% SLOPE

2:1

N 151500 N 152000 N 152500 N 153000 N 153500

E 513500 E 514000 E 514500

LEGEND:

- EXISTING GRADE CONTOUR
- EXISTING PIPE
- POND SIDE SLOPE (TOP / TOE)
- EXISTING ELECTRIC MANHOLE
- EXISTING PIPE BOLLARD
- EXISTING WATER VALVE
- LIMIT OF LINER SYSTEM
- NEW LINER ANCHOR TRENCH

SCALE: 1"=60'

SEE WORLEY REVISION BLOCK

DATE	NO.	DESCRIPTION	APPD.

REVISIONS

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INDIANA MICHIGAN POWER COMPANY

ROCKPORT PLANT

ROCKPORT INDIANA

CCR/ELG PROJECT

EAST BOTTOM ASH POND SAFETY FACTOR ASSESSMENT CROSS SECTION LOCATIONS

UNIT:	DRAWING NUMBER:	REV:
	Sketch 1	

SCALE: 1"=60' — CIVIL ENGINEERING

ME: CK: SUP: ENG: DATE: — APPROVED

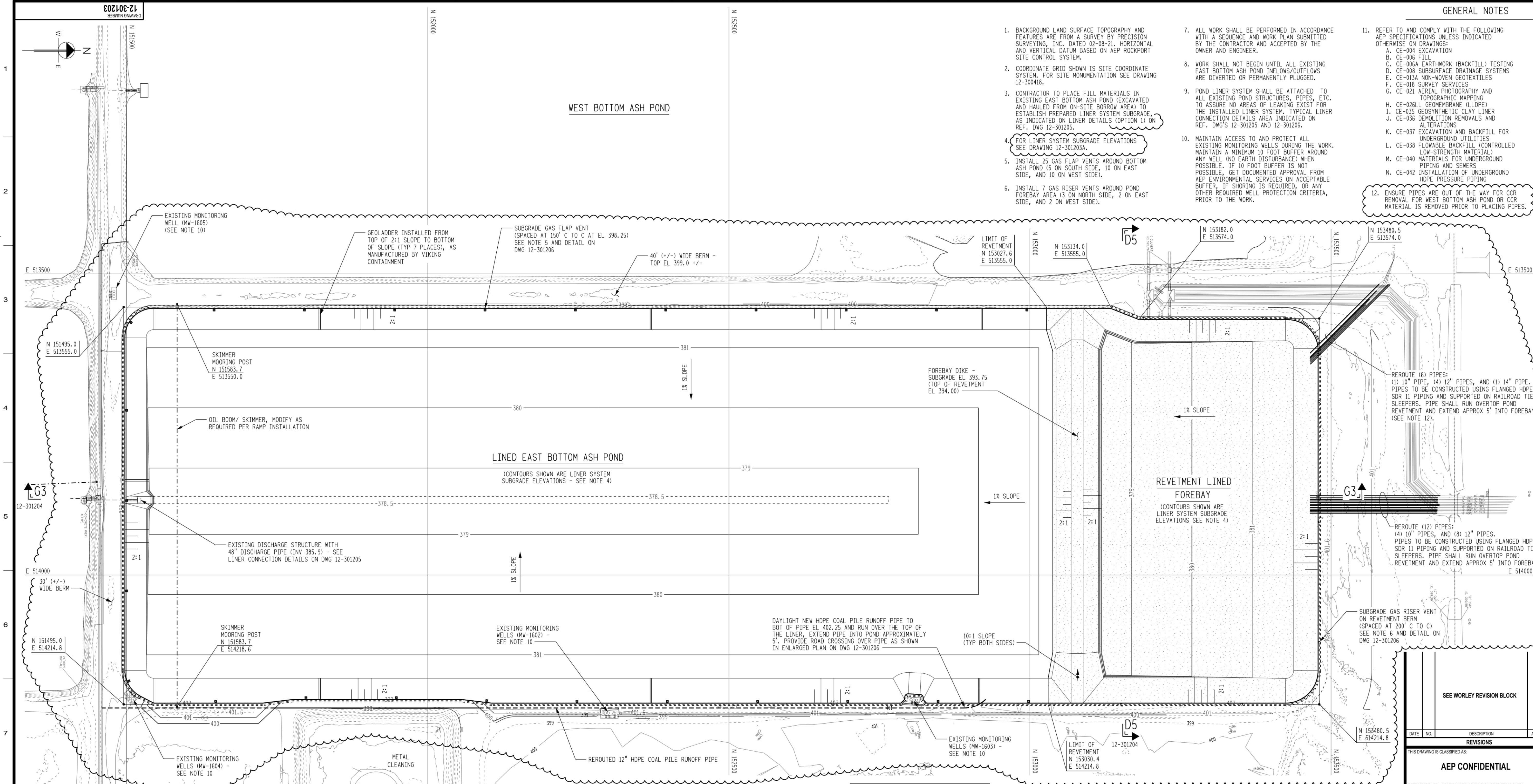
DOCUMENT PREPARED BY WORLEY

AMERICAN ELECTRIC POWER

AEP SERVICE CORP.
1 RIVERSIDE PLAZA
COLUMBUS, OH 43215

\Safety_Factor_Assessment-Sketch.dgn
9/21/2023 12:02:11 PM

CROSS REFS:



GENERAL NOTES

1. BACKGROUND LAND SURFACE TOPOGRAPHY AND FEATURES ARE FROM A SURVEY BY PRECISION SURVEYING, INC. DATED 02-08-21. HORIZONTAL AND VERTICAL DATUM BASED ON AEP ROCKPORT SITE CONTROL SYSTEM.
2. COORDINATE GRID SHOWN IS SITE COORDINATE SYSTEM. FOR SITE MONUMENTATION SEE DRAWING 12-300418.
3. CONTRACTOR TO PLACE FILL MATERIALS IN EXISTING EAST BOTTOM ASH POND (EXCAVATED AND HAULED FROM ON-SITE BORROW AREA) TO ESTABLISH PREPARED LINER SYSTEM SUBGRADE, AS INDICATED ON LINER DETAILS (OPTION 1) ON REF. DWG 12-301205.
4. FOR LINER SYSTEM SUBGRADE ELEVATIONS SEE DRAWING 12-301203A.
5. INSTALL 25 GAS FLAP VENTS AROUND BOTTOM ASH POND (5 ON SOUTH SIDE, 10 ON EAST SIDE, AND 10 ON WEST SIDE).
6. INSTALL 7 GAS RISER VENTS AROUND POND FOREBAY AREA (3 ON NORTH SIDE, 2 ON EAST SIDE, AND 2 ON WEST SIDE).
7. ALL WORK SHALL BE PERFORMED IN ACCORDANCE WITH A SEQUENCE AND WORK PLAN SUBMITTED BY THE CONTRACTOR AND ACCEPTED BY THE OWNER AND ENGINEER.
8. WORK SHALL NOT BEGIN UNTIL ALL EXISTING EAST BOTTOM ASH POND INFLOWS/OUTFLOWS ARE DIVERTED OR PERMANENTLY PLUGGED.
9. POND LINER SYSTEM SHALL BE ATTACHED TO ALL EXISTING POND STRUCTURES, PIPES, ETC. TO ASSURE NO AREAS OF LEAKING EXIST FOR THE INSTALLED LINER SYSTEM. TYPICAL LINER CONNECTION DETAILS AREA INDICATED ON REF. DWG'S 12-301205 AND 12-301206.
10. MAINTAIN ACCESS TO AND PROTECT ALL EXISTING MONITORING WELLS DURING THE WORK. MAINTAIN A MINIMUM 10 FOOT BUFFER AROUND ANY WELL (NO EARTH DISTURBANCE) WHEN POSSIBLE. IF 10 FOOT BUFFER IS NOT POSSIBLE, GET DOCUMENTED APPROVAL FROM AEP ENVIRONMENTAL SERVICES ON ACCEPTABLE BUFFER, IF SHORING IS REQUIRED, OR ANY OTHER REQUIRED WELL PROTECTION CRITERIA, PRIOR TO THE WORK.
11. REFER TO AND COMPLY WITH THE FOLLOWING AEP SPECIFICATIONS UNLESS INDICATED OTHERWISE ON DRAWINGS:
    - A. CE-004 EXCAVATION
    - B. CE-006 FILL
    - C. CE-006A EARTHWORK (BACKFILL) TESTING
    - D. CE-008 SUBSURFACE DRAINAGE SYSTEMS
    - E. CE-013A NON-WOVEN GEOTEXTILES
    - F. CE-018 SURVEY SERVICES
    - G. CE-021 AERIAL PHOTOGRAPHY AND TOPOGRAPHIC MAPPING
    - H. CE-026LL GEOMEMBRANE (LLDPE)
    - I. CE-035 GEOSYNTHETIC CLAY LINER
    - J. CE-036 DEMOLITION REMOVALS AND ALTERATIONS
    - K. CE-037 EXCAVATION AND BACKFILL FOR UNDERGROUND UTILITIES
    - L. CE-038 FLOWABLE BACKFILL (CONTROLLED LOW-STRENGTH MATERIAL)
    - M. CE-040 MATERIALS FOR UNDERGROUND PIPING AND SEWERS
    - N. CE-042 INSTALLATION OF UNDERGROUND HDPE PRESSURE PIPING
12. ENSURE PIPES ARE OUT OF THE WAY FOR CCR REMOVAL FOR WEST BOTTOM ASH POND OR CCR MATERIAL IS REMOVED PRIOR TO PLACING PIPES.

LEGEND:

- EXISTING GRADE CONTOUR
- EXISTING PIPE
- POND SIDE SLOPE (TOP / TOE)
- EXISTING ELECTRIC MANHOLE
- EXISTING PIPE BOLLARD
- EXISTING WATER VALVE
- LIMIT OF LINER SYSTEM
- NEW LINER ANCHOR TRENCH

REFERENCE DRAWINGS

12-300418	UNITS 1 AND 2 SURVEY CONTROL AND MONUMENTATION PLAN
12-301203A	EAST BOTTOM ASH POND LINER SUBGRADE PLAN
12-301204	EAST BOTTOM ASH POND LINER SYSTEM SECTIONS AND DETAILS
12-301205	EAST BOTTOM ASH POND LINER SYSTEM SECTIONS AND DETAILS
12-301206	EAST BOTTOM ASH POND LINER SYSTEM SECTIONS AND DETAILS
12-301215	EAST BOTTOM ASH POND BORROW AREA CIVIL SITE PLAN
12-301220	POND COMPLEX EROSION AND SEDIMENT CONTROL PLAN
12-30027	UNIT No. 1 & 2 WASTEWATER & BOTTOM ASH POND AREA SECTIONS & DETAILS
12-5123	YARD PIPING UNIT No. 1 & 2 SHEET No. 2 OF 39
12-5137XA	ARRG'T OF CHEM TREATMENT & COAL PILE RUNOFF PIPING

SCALE: 1"=60'

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2	08 JUN 23	ISSUED FOR CONSTRUCTION; REVISED AS INDICATED	RES	KJF	EDL	KJF	EDL	EDL	MHN
1	28 JUL 22	ISSUED FOR CONSTRUCTION; REMOVED HOLD, REV DISCH STRUCT CALLOUT	KJF	EDL	EDL	KJF	EDL	EDL	MHN
0	31 MAR 22	ISSUED FOR CONSTRUCTION	KPF	RES	EDL	KJF	EDL	EDL	MHN

Worley energy | chemicals | resources — OneWay empowered | enabled | ethical

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LDE — - -

APPROVED STATUS — DATE — REPRESENTS REVIEWED AND APPROVED DESIGN. ANY PORTION MARKED "HOLD" RETAINS PRELIMINARY STATUS.
LDE ED LEIBY — 31-MAR-22

ORIGINATING PERSONNEL
- DRAWN BY: KPF
- CHECKED BY: RE STOUDT
- LEAD DESIGNER: KJ FRITZ
- ENGINEER/TECH SPECIALIST: ED LEIBY
- PROJECT ENGINEERING MANAGER: MH NACEY

PROFESSIONAL ENGINEER'S SEAL
YINGWU XU REGISTERED No. 12000238 STATE OF INDIANA PROFESSIONAL ENGINEER
Yingwu Xu 2023.06.08 14:16:26 -04'00'
ORIGINALLY PREPARED UNDER THE RESPONSIBLE SUPERVISION OF
PE: YINGWU XU STATE: INDIANA
LIC. NO.: PE 12000238 DATE: 31-MAR-22

SEE WORLEY REVISION BLOCK

DATE	NO.	DESCRIPTION	APPD.

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ROCKPORT PLANT
ROCKPORT — INDIANA

CCR/ELG PROJECT
EAST BOTTOM ASH POND LINER SYSTEM PLAN

UNIT: 12 — DRAWING NUMBER: 301203 — REV: 2
SCALE: 1"=60' — CIVIL ENGINEERING
DR: / CH: / SUP: / ENG: / DATE: — APPROVED BY — DOCUMENT PREPARED BY WORLEY

AMERICAN ELECTRIC POWER — **AEP SERVICE CORP. 1 RIVERSIDE PLAZA COLUMBUS, OH 43215**

...\RKP_12_AEP_301203_CAD.dgn 6/8/2023 10:37:59 AM
PLOT DATE: 6/8/2023 PLOT TIME: 10:37:59 AM BY: Robert.Stoudt

DRAWING NUMBER 12-301203
CROSS REFS:

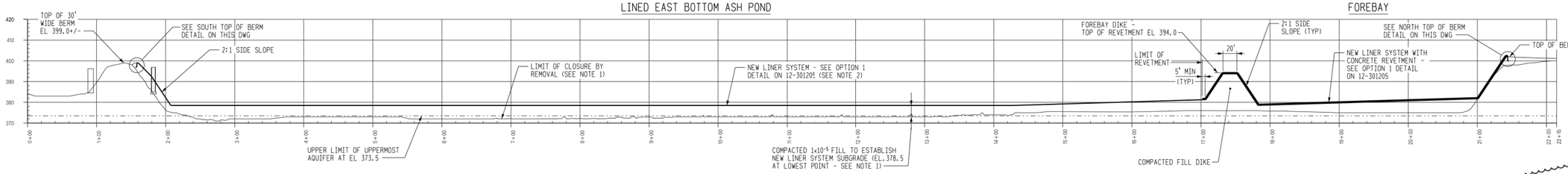
DRAWING NUMBER: 12-301204

CROSS REFS:

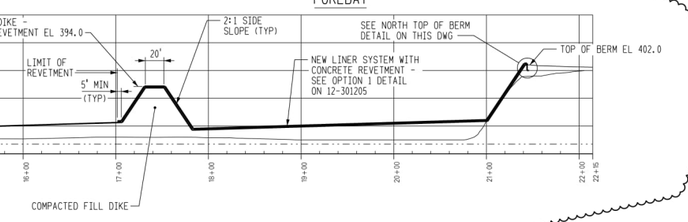
GENERAL NOTES

1. THE EXPECTED POND BOTTOM ELEVATION AFTER CLOSURE BY REMOVAL IS EL 376.0 (12-INCHES BELOW ORIGINAL POND BOTTOM), HOWEVER, IF THE CCR CLOSURE BY REMOVAL EXCAVATION/ VERIFICATION PROCESS EXTENDS BELOW EL 376.0, THEN ADDITIONAL FILL MATERIAL WILL BE REQUIRED, ACCORDINGLY, TO REACH THE NEW LINER SYSTEM SUBGRADE ELEVATION.
2. LINER SYSTEM SUBGRADE (EL 378.5 AT LOWEST POINT) PROVIDES FOR THE BOTTOM OF THE POND LINER SYSTEM TO BE MINIMUM 5-FOOT SEPARATION FROM THE UPPERMOST AQUIFER AT EL 373.5.

LINED EAST BOTTOM ASH POND



FOREBAY



SECTION G3-G3 12-301203

SCALE: 1"=60' HORIZ
1"=20' VERT

WEST BOTTOM ASH POND

FOREBAY

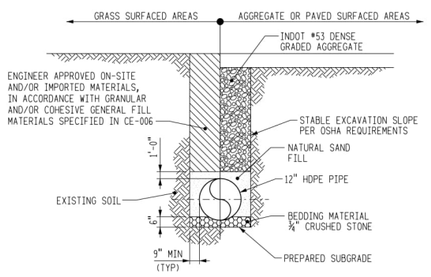
SECTION D5-D5 12-301203

SCALE: 1"=60' HORIZ
1"=20' VERT

WEST AND SOUTH TOP OF BERM DETAIL
NOT TO SCALE

NORTH TOP OF BERM DETAIL
NOT TO SCALE

EAST TOP OF BERM DETAIL
NOT TO SCALE



NOTE: RESTORE SURFACING TO MATCH EXISTING CONDITIONS WHEN PIPES ARE OUTSIDE NEWLY SURFACED AREAS.

TYPICAL PIPE TRENCH DETAIL
NOT TO SCALE

REFERENCE DRAWINGS

12-301203	EAST BOTTOM ASH POND LINER SYSTEM PLAN
12-301205	EAST BOTTOM ASH POND LINER SYSTEM SECTIONS AND DETAILS

60 0 60 120 160
SCALE: 1"=60'

REV	DATE	DESCRIPTION	DRAWN	SPEC/CORD	REVIEWED	LEAD ENGINEER	LEAD DISCIPLINE ENGINEER	PROJ ENGR MANAGER
1	08 JUN 22	ISSUED FOR CONSTRUCTION; REVISED AS INDICATED	RES	KJF	EDL	KJF	EDL	EDL	MNN
0	31 MAR 22	ISSUED FOR CONSTRUCTION	KPF	RES	EDL	KJF	EDL	EDL	MNN

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PRELIMINARY STATUS	DATE	INFORMATION ONLY - NOT TO BE USED FOR CONSTRUCTION.
LDE	- -	
APPROVED STATUS	DATE	REPRESENTS REVIEWED AND APPROVED DESIGN. ANY PORTION MARKED "HOLD" RETAINS PRELIMINARY STATUS.
LDE ED LEIBY	31-MAR-22	

ORIGINATING PERSONNEL

DRAWN BY: KPF
CHECKED BY: RE STOUDT
LEAD DESIGNER: KJ FRITZ
ENGINEER/TECH SPECIALIST: ED LEIBY
PROJECT ENGINEERING MANAGER: MH NACEY

PROFESSIONAL ENGINEER'S SEAL

YINGWU XU REGISTERED No. 12000239 STATE OF INDIANA PROFESSIONAL ENGINEER
Yingwu Xu 2023.06.08 14:17:55 -04'00'

ORIGINALLY PREPARED UNDER THE RESPONSIBLE SUPERVISION OF
PE: YINGWU XU STATE: INDIANA
LIC. NO.: PE-12000239 DATE: 31-MAR-22

SEE WORLEY REVISION BLOCK

DATE	NO.	DESCRIPTION	APPD.

REVISIONS

THIS DRAWING IS CLASSIFIED AS:

AEP CONFIDENTIAL

REFERENCE AEP's CORPORATE INFORMATION SECURITY POLICY

INDIANA MICHIGAN POWER COMPANY

ROCKPORT PLANT

ROCKPORT INDIANA

CCR/ELG PROJECT

EAST BOTTOM ASH POND LINER SYSTEM SECTIONS AND DETAILS

UNIT:	DRAWING NUMBER:	REV:
12	301204	1

SCALE: AS NOTED — CIVIL ENGINEERING

APPROVED BY: MK: CH: SUP: ENG: DATE:

DOCUMENT PREPARED BY WORLEY

AMERICAN ELECTRIC POWER

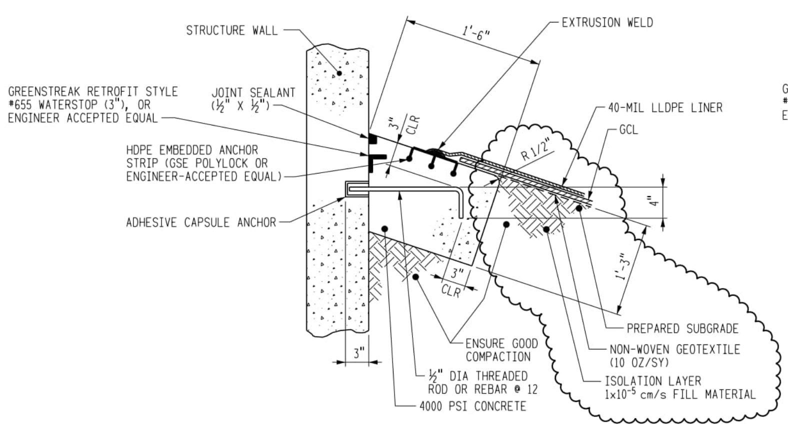
AEP SERVICE CORP.
1 RIVERSIDE PLAZA
COLUMBUS, OH 43215

IRKP_12_AEP_301204_CAD.dgn
6/7/2023 2:23:27 PM

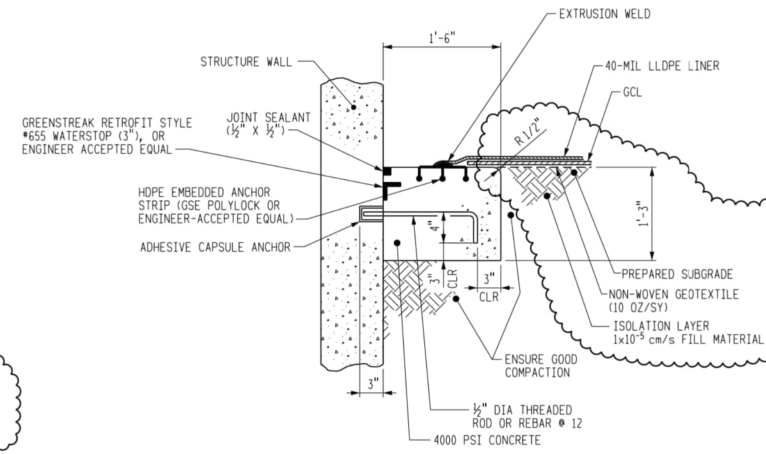
CROSS REFS:

DRAWING NUMBER: 12-301205

GENERAL NOTES

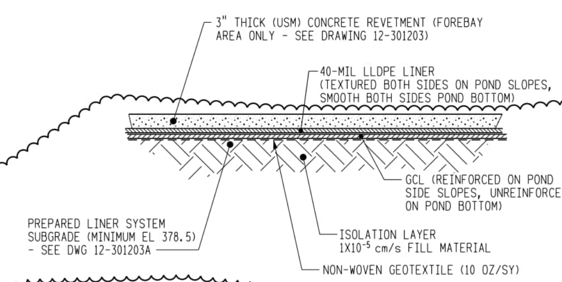


NORTH SIDE OF STRUCTURE
NOT TO SCALE

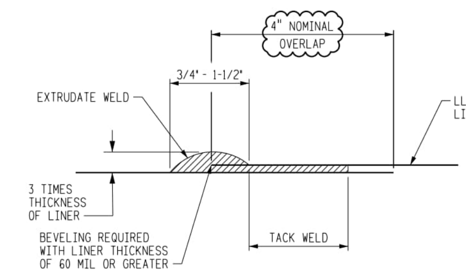


EAST AND WEST SIDES OF STRUCTURE
NOT TO SCALE

DISCHARGE/OUTFALL STRUCTURE
LINER CONNECTION DETAIL
OPTION 1 (BASE SCOPE)
NOT TO SCALE



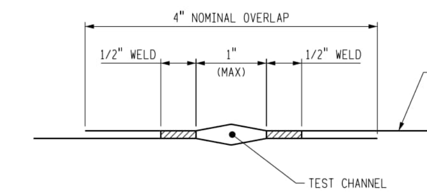
TYPICAL LINER DETAIL
OPTION 1 (BASE SCOPE)
NOT TO SCALE



NOTES:

1. LINER SHEETS SHALL BE TACK-WELDED TOGETHER AT OVERLAP TO FORM TEMPORARY BOND PRIOR TO WELDING.
2. GRINDING NOT TO EXCEED ¼" PAST "SQUEEZE-OUT" ON EITHER SIDE. PROPER CARE SHOULD BE TAKEN IN NOT REMOVING TOO MUCH MATERIAL WHEN GRINDING.
3. VACUUM TESTING SHALL BE THE NON-DESTRUCTIVE SEAM TEST METHOD FOR EXTRUSION WELDS.

EXTRUSION WELD
NOT TO SCALE



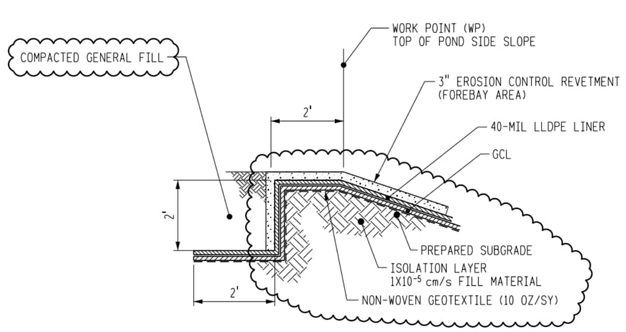
NOTES:

1. DOUBLE FUSION WELDING SHALL BE THE PRIMARY SEAMING TECHNIQUE USED.
2. AIR PRESSURE OR VACUUM TESTING SHALL BE THE NON-DESTRUCTIVE SEAM TEST METHODS FOR DOUBLE FUSION WELDS.

DOUBLE FUSION WELD
NOT TO SCALE

REFERENCE DRAWINGS

12-301203	EAST BOTTOM ASH POND LINER SYSTEM PLAN
12-301203A	EAST BOTTOM ASH POND LINER SUBGRADE PLAN



TYPICAL ANCHOR TRENCH DETAIL
OPTION 1 (BASE SCOPE)
NOT TO SCALE

SEE WORLEY REVISION BLOCK

DATE	NO.	DESCRIPTION	APPD.

REVISIONS

THIS DRAWING IS CLASSIFIED AS:

AEP CONFIDENTIAL

REFERENCE AEP's CORPORATE INFORMATION SECURITY POLICY

REV	DATE	DESCRIPTION	DRAWN	CHECKED	REVIEWED	LEAD DESIGNER	ENGINEER/ TECH. SPEC.	LEAD DISC ENGINEER	PROJ ENGR MANAGER
1	08 JUN 23	ISSUED FOR CONSTRUCTION; REVISED AS INDICATED	RES	KJF	EDL	KJF	EDL	EDL	MHN
0	31 MAR 22	ISSUED FOR CONSTRUCTION	KPF	RES	EDL	KJF	EDL	EDL	MHN

Worley energy | chemicals | resources — OneWay empowered | enabled | ethical

PRELIMINARY STATUS	DATE	
LDE	- -	INFORMATION ONLY - NOT TO BE USED FOR CONSTRUCTION.
APPROVED STATUS	DATE	
LDE ED LEIBY	31-MAR-22	REPRESENTS REVIEWED AND APPROVED DESIGN. ANY PORTION MARKED "HOLD" RETAINS PRELIMINARY STATUS.

ORIGINATING PERSONNEL

- DRAWN BY: KPF
- CHECKED BY: RE STOUDT
- LEAD DESIGNER: KJ FRITZ
- ENGINEER/TECH SPECIALIST: ED LEIBY
- PROJECT ENGINEERING MANAGER: MH NACEY

PROFESSIONAL ENGINEER'S SEAL

YINGWU XU REGISTERED No. 12000238 STATE OF INDIANA PROFESSIONAL ENGINEER

Yingwu Xu 2023.06.08 14:18:40 -04'00'

ORIGINALLY PREPARED UNDER THE RESPONSIBLE SUPERVISION OF
PE: YINGWU XU STATE: INDIANA
LIC. NO.: PE 12000238 DATE: 31-MAR-22

INDIANA MICHIGAN POWER COMPANY

ROCKPORT PLANT

ROCKPORT INDIANA

CCR/ELG PROJECT

EAST BOTTOM ASH POND LINER SYSTEM SECTIONS AND DETAILS

UNIT:	DRAWING NUMBER:	REV:
12	301205	1

SCALE: NONE — CIVIL ENGINEERING

DR: CH: SUP: ENG: DATE: — APPROVED BY

DOCUMENT PREPARED BY WORLEY

AMERICAN ELECTRIC POWER

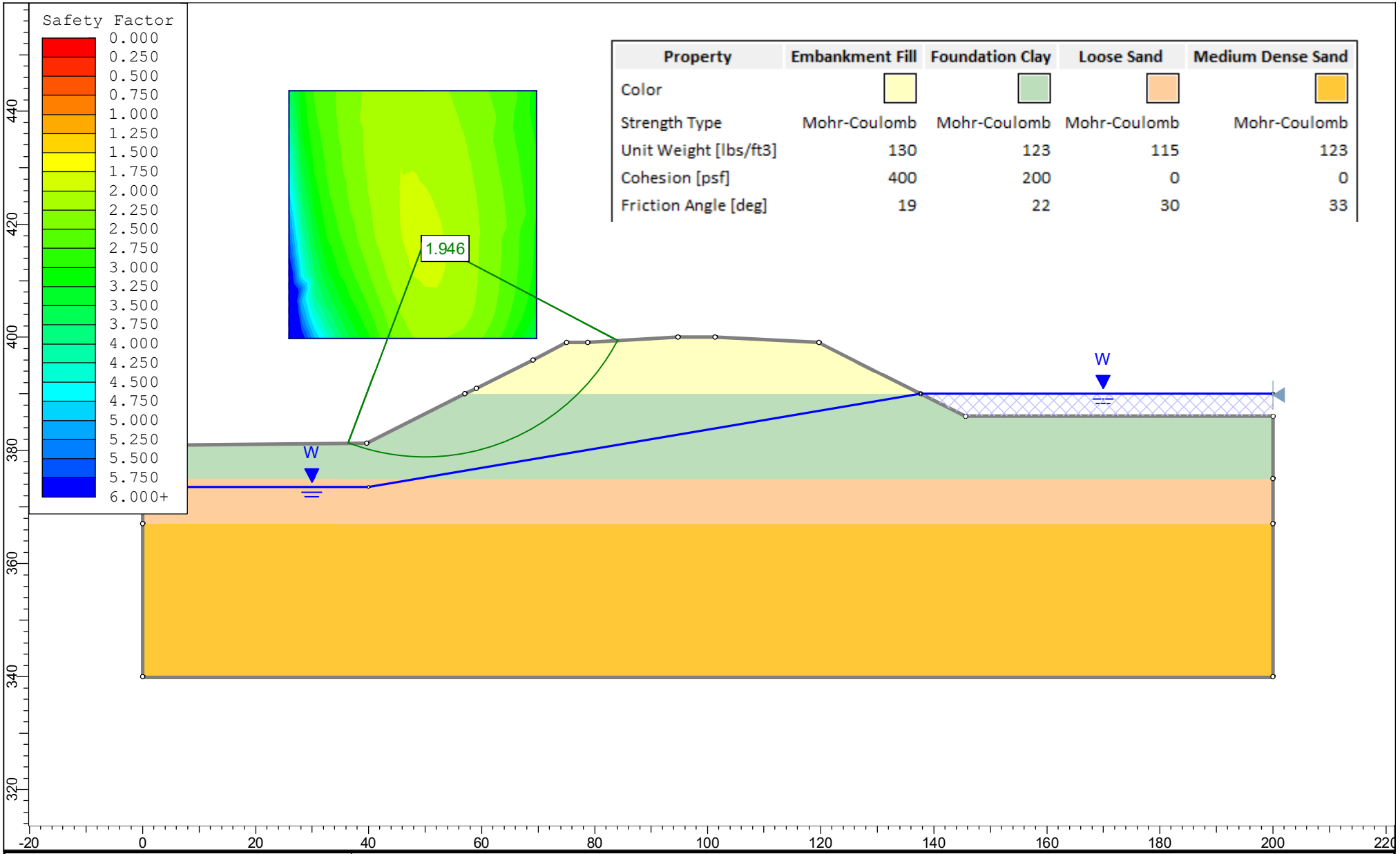
AEP SERVICE CORP. 1 RIVERSIDE PLAZA COLUMBUS, OH 43215

PLOT DATE: 6/7/2023 PLOT TIME: 2:36:28 PM BY: Robert.Stoudt

...\RKP_12_AEP_301205_CAD.dgn 6/7/2023 2:36:28 PM

CROSS REFS:

Appendix B- Slope Stability Analysis Outputs

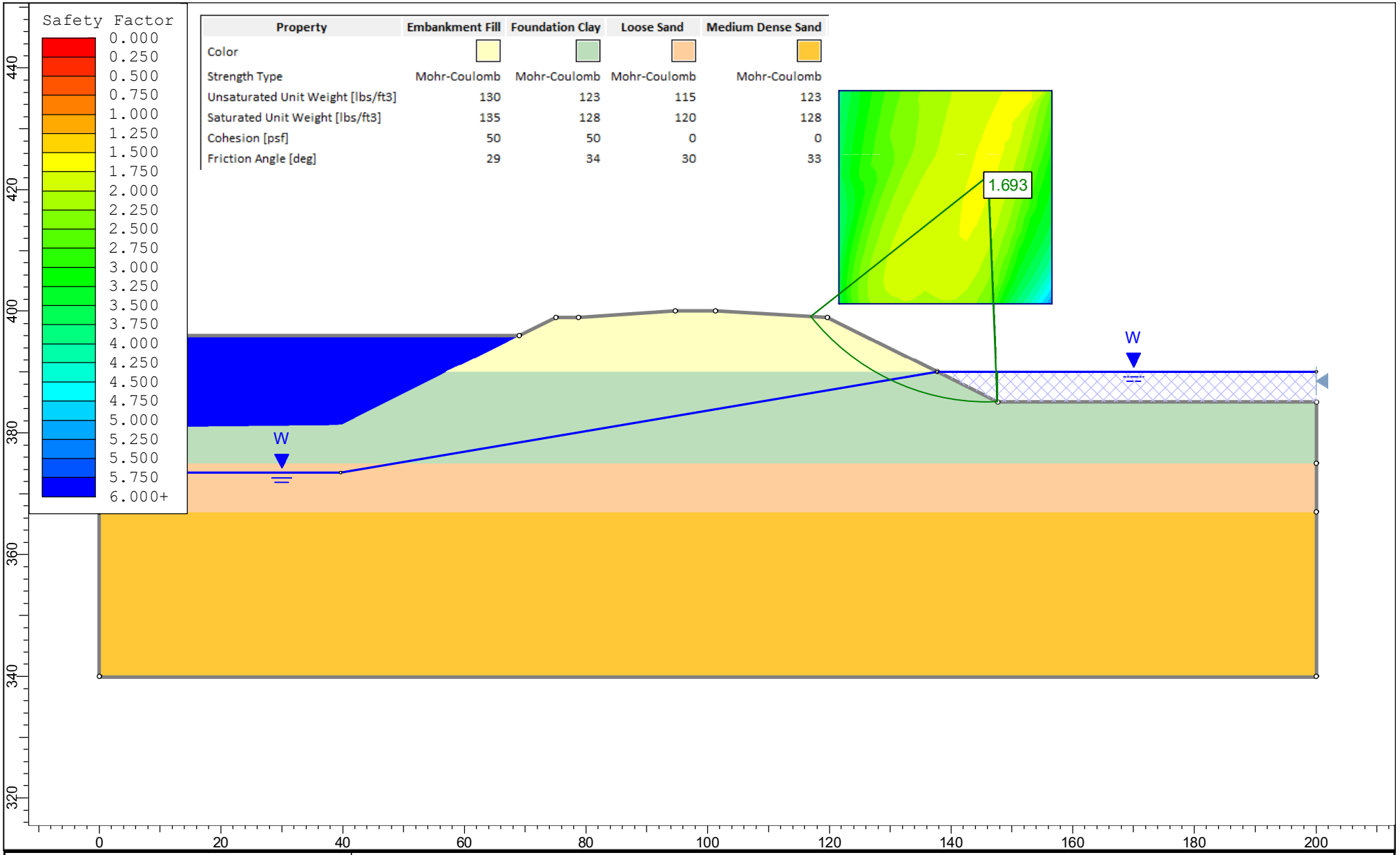


Property	Embankment Fill	Foundation Clay	Loose Sand	Medium Dense Sand
Color				
Strength Type	Mohr-Coulomb	Mohr-Coulomb	Mohr-Coulomb	Mohr-Coulomb
Unit Weight [lbs/ft3]	130	123	115	123
Cohesion [psf]	400	200	0	0
Friction Angle [deg]	19	22	30	33

rocscience

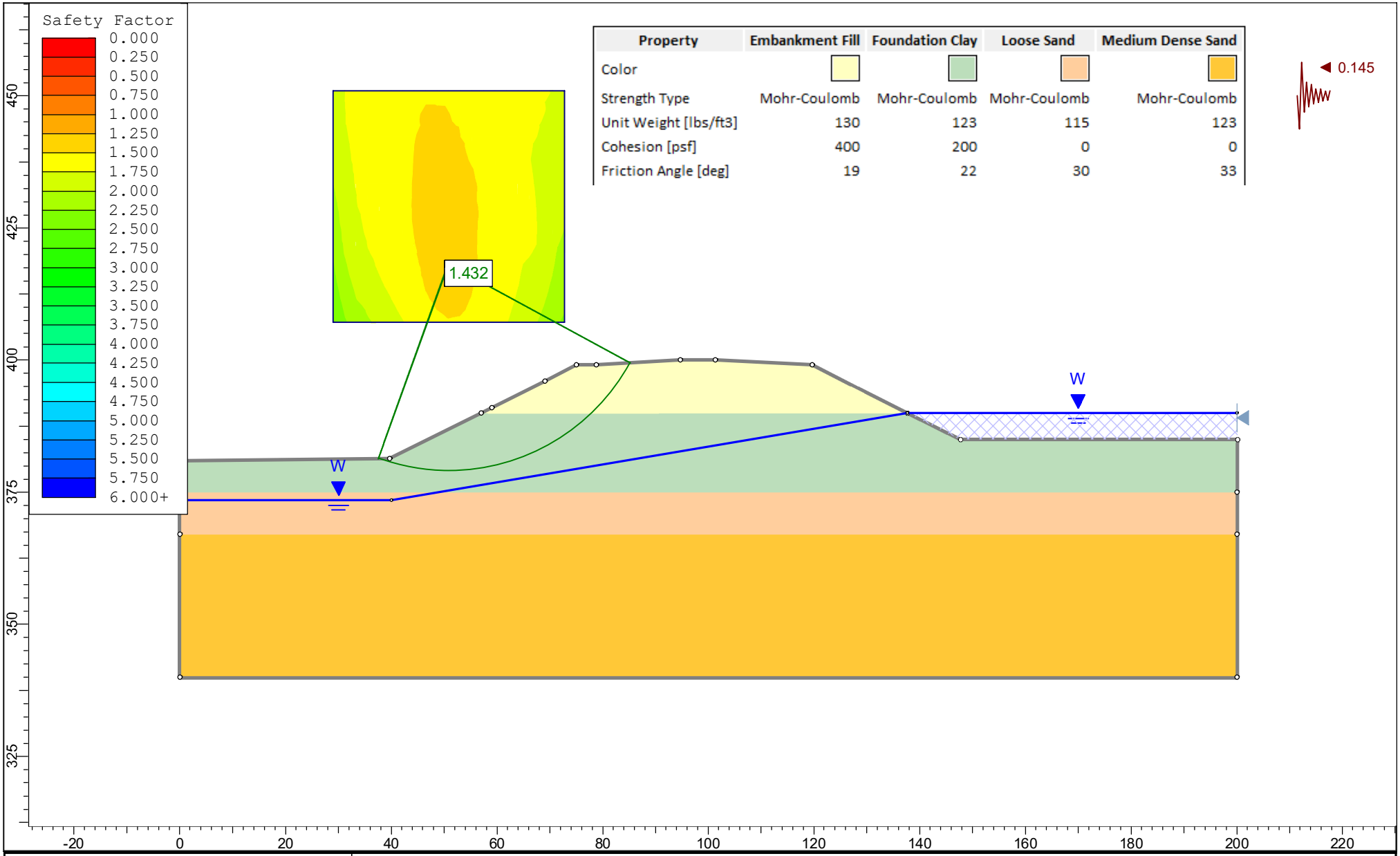
SLIDEINTERPRET 6.027

Project	AEP Rockport East Bottom Ash Pond		
Analysis Description	North-to-South Splitter Dike - End of Construction		
Drawn By		*Scale* 1:282	*Company*
Date			*File Name* NS Dike - EOC.slim



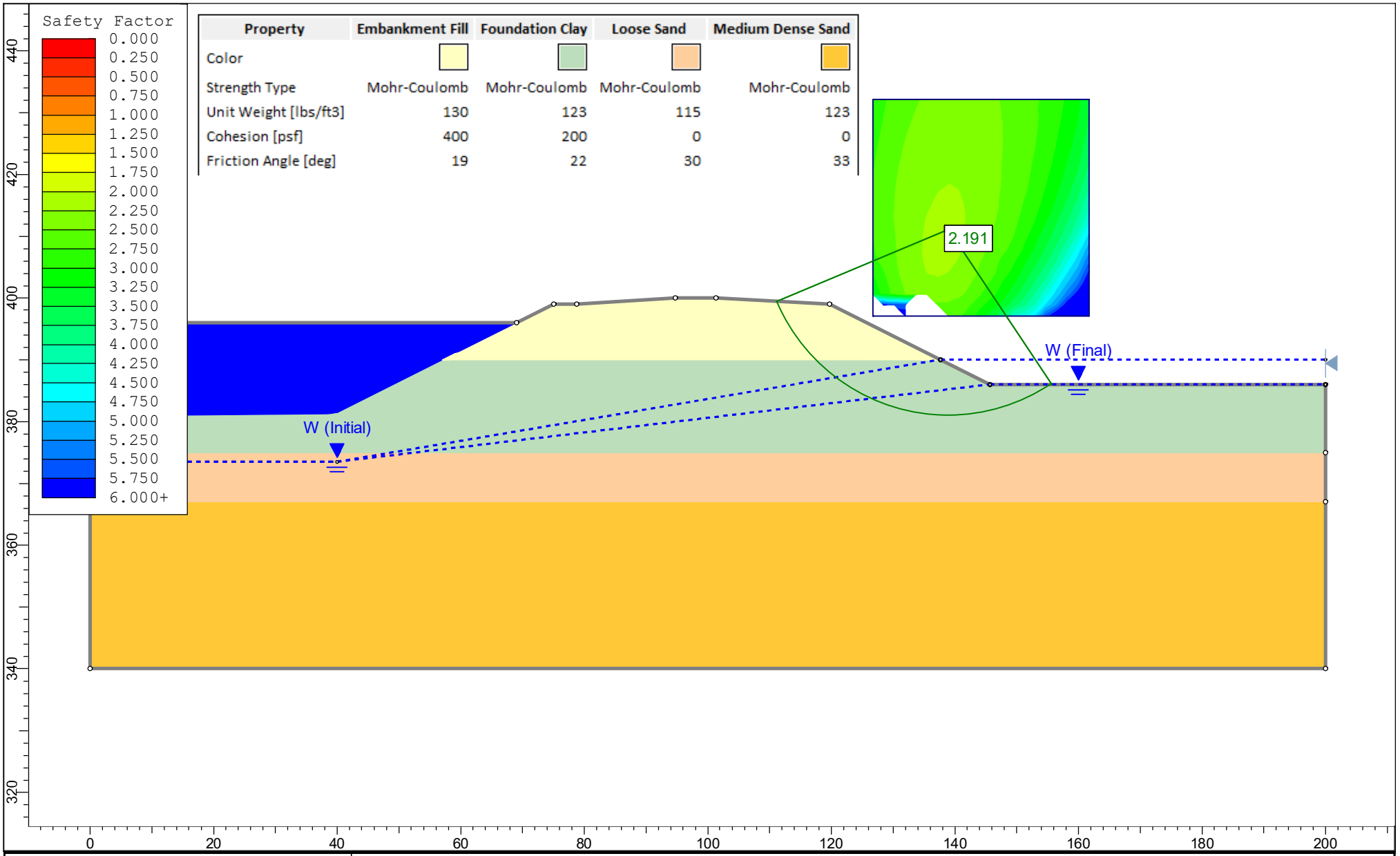
rocscience	Project	AEP Rockport East Bottom Ash Pond	
	Analysis Description	North-to-South Splitter Dike - Max Pool	
	Drawn By	Scale 1:262	Company
	Date		File Name NS Dike - Max Pool.slim

SLIDEINTERPRET 6.027



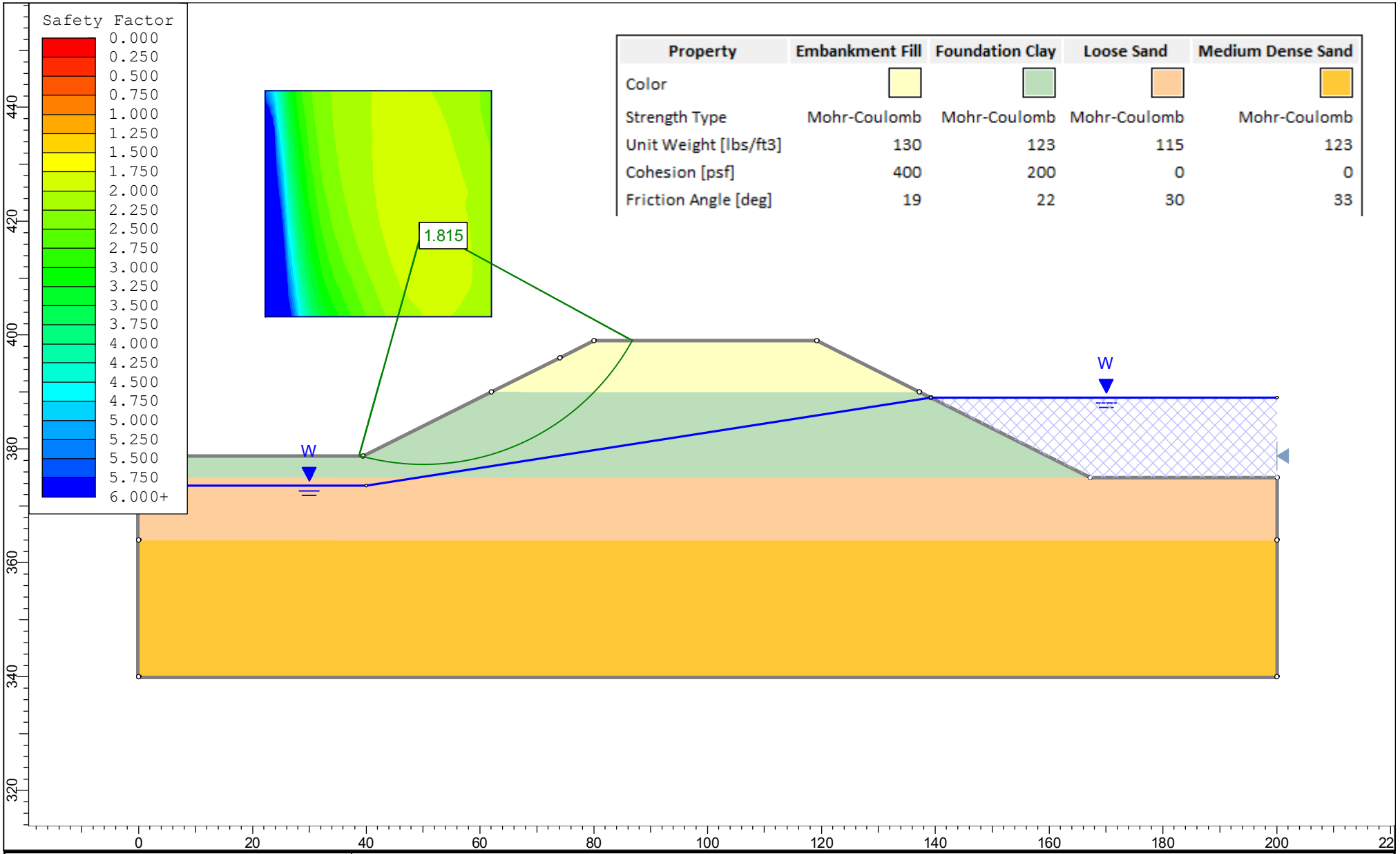
rocscience	Project	AEP Rockport East Bottom Ash Pond	
	Analysis Description	North-to-South Splitter Dike - Seismic	
	Drawn By	Scale 1:301	Company
	Date		File Name NS Dike - Seismic.slim

SLIDEINTERPRET 6.027



rocscience	Project	AEP Rockport East Bottom Ash Pond	
	Analysis Description	North-to-South Splitter Dike - Rapid Drawdown	
	Drawn By	Scale 1:258	Company
	Date		File Name NS Dike - RD.slim

SLIDEINTERPRET 6.027

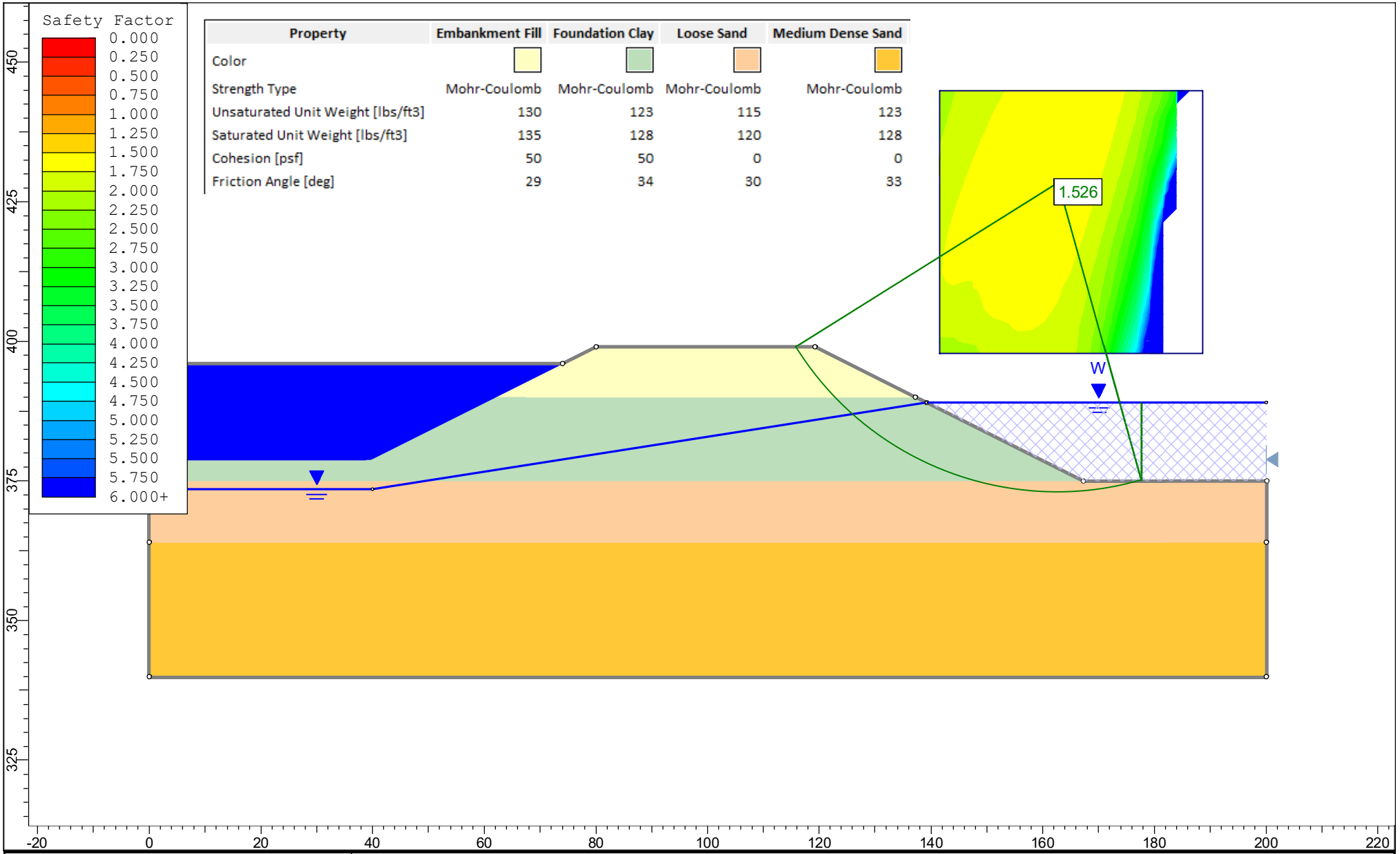


Property	Embankment Fill	Foundation Clay	Loose Sand	Medium Dense Sand
Color				
Strength Type	Mohr-Coulomb	Mohr-Coulomb	Mohr-Coulomb	Mohr-Coulomb
Unit Weight [lbs/ft3]	130	123	115	123
Cohesion [psf]	400	200	0	0
Friction Angle [deg]	19	22	30	33

rocscience

SLIDEINTERPRET 6.027

Project	AEP Rockport East Bottom Ash Pond		
Analysis Description	East-to-West Splitter Dike - End of Construction		
Drawn By		*Scale* 1:280	*Company*
Date			*File Name* EW Dike - EOC.slim

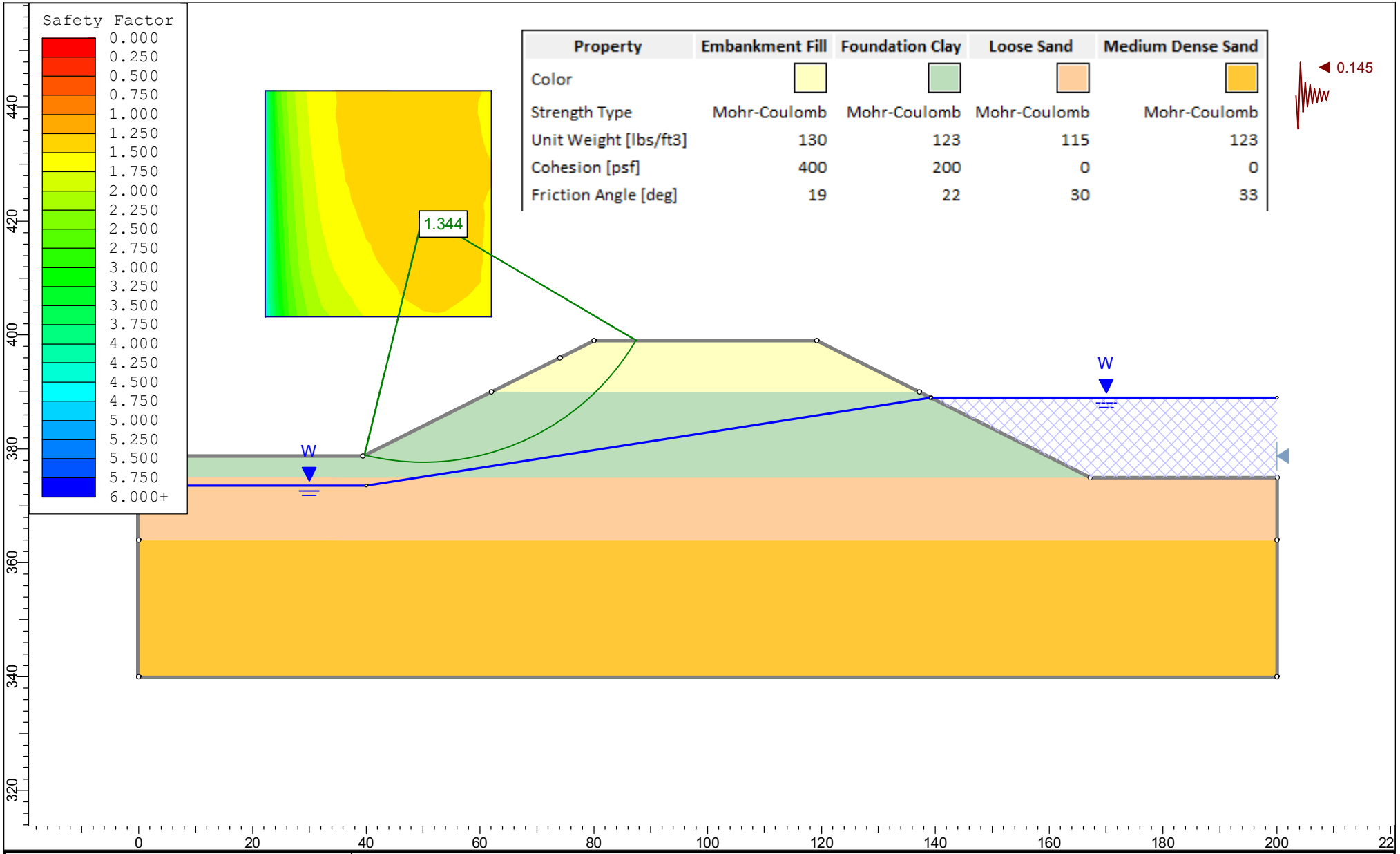


Property	Embankment Fill	Foundation Clay	Loose Sand	Medium Dense Sand
Color				
Strength Type	Mohr-Coulomb	Mohr-Coulomb	Mohr-Coulomb	Mohr-Coulomb
Unsaturated Unit Weight [lbs/ft3]	130	123	115	123
Saturated Unit Weight [lbs/ft3]	135	128	120	128
Cohesion [psf]	50	50	0	0
Friction Angle [deg]	29	34	30	33

rocscience

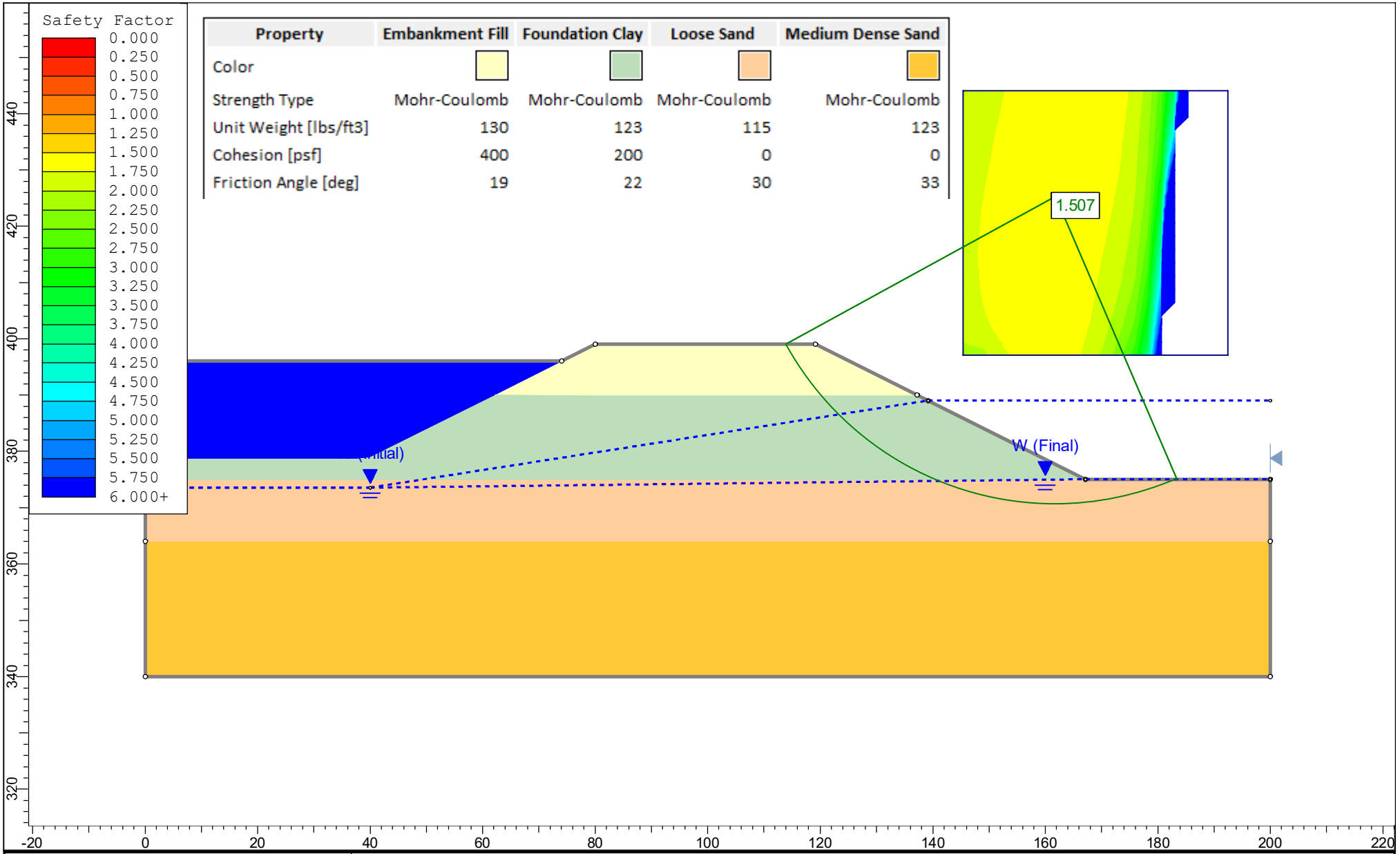
SLIDEINTERPRET 6.027

Project	AEP Rockport East Bottom Ash Pond		
Analysis Description	East-to-West Splitter Dike - Max Pool		
Drawn By		*Scale* 1:285	*Company*
Date			*File Name* EW Dike - Max Pool.slim



rocscience	Project	AEP Rockport East Bottom Ash Pond	
	Analysis Description	East-to-West Splitter Dike - Seismic	
	Drawn By	Scale 1:280	Company
	Date		File Name EW Dike - Seismic.slim

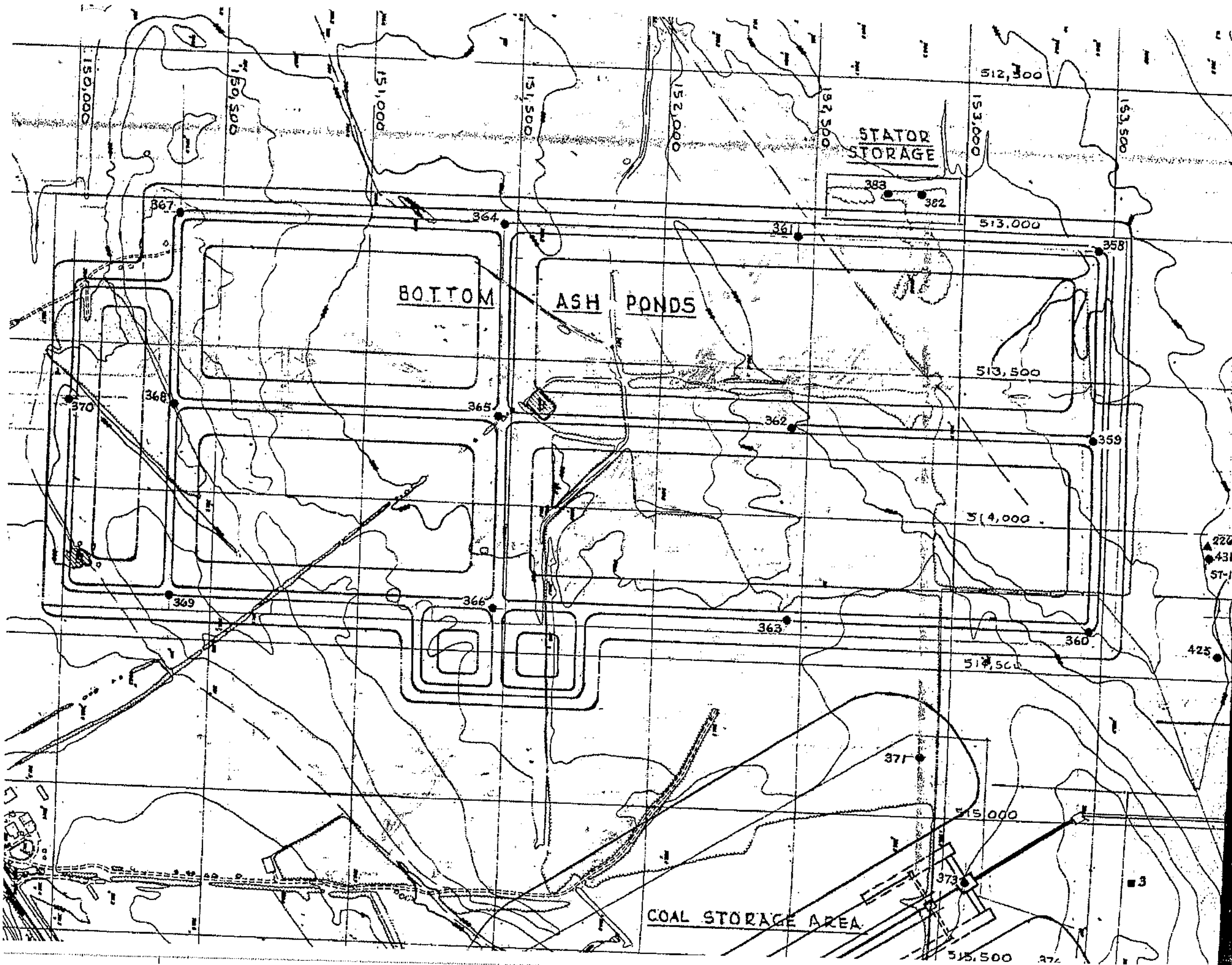
SLIDEINTERPRET 6.027



rocscience	Project	AEP Rockport East Bottom Ash Pond	
	Analysis Description	East-to-West Splitter Dike - Rapid Drawdown	
	Drawn By	Scale 1:283	Company
	Date		File Name EW Dike - RD.slim

SLIDEINTERPRET 6.027

Appendix C- Historical Soil Borings & Geotechnical Data



BOTTOM ASH PONDS
STATOR STORAGE
COAL STORAGE AREA
150,000
150,500
151,000
151,500
152,000
152,500
153,000
153,500
512,500
513,000
513,500
514,000
514,500
515,000
515,500
358
359
360
361
362
363
364
365
366
367
368
369
370
371
373
382
383
425
431
226
ST-1
3

PROJECT: Rockport Site PROJECT NO W6-1482 BORING: BH-361

DATE: 3/17/77 DRILLER: G. Powers CREW: J. Hardman/J. Selbe SURFACE ELEV.

DEPTH FROM	DEPTH TO	SOIL STRATA SOIL DESCRIPTION AND REMARKS	TIME	TYPE	NO.	DEPTH FROM	DEPTH TO	FIRST 6"	2ND 6"	3RD 6"	REC
		Topsoil									
	1.0										
1.0		Very stiff brown and gray silty clay		SS	1	5.0	6.5	5	8	11	10
		Very stiff brown and gray silty clay		SS	2	10.0	11.5	8	13	14	9
	13.0										
13.0		Firm brown silty fine sand		SS	3	15.0	16.5	5	5	6	8
	19.0										
19.0		Very loose brown silty fine sand		SS	4	20.0	21.5	1	2	2	1
		Very loose brown silty fine sand		SS	5	25.0	26.5	1	2	2	16
	30.0										
30.0		Very dense dark brown silty fine sand		SS	6	30.0	31.5	66	43	30	16
	34.0										
34.0		Firm brown medium to coarse silty sand		SS	7	35.0	36.5	9	10	13	8
	41.0										
41.0		Firm brown silty fine sand		SS	8	40.0	41.5	9	11	13	16
	44.0										
44.0		Firm brown medium and coarse sand		SS	9	45.0	46.5	8	11	19	16
	48.0										
48.0	51.5	Dense grayish brown silty fine to medium sand		SS	10	50.0	51.5	21	21	24	14
		Boring Terminated @ 51.5 3/17/77									

ETHOD OF DRILLING (Check One)

a. AUGER XXXX Rod SIZE A

b. WASH XX WATER MUD XX

ORING SIZE BIT USED 2-7/8" Side Discharge

G: SIZE N/W LENGTH 5.0

TURBED SAMPLES: NO. SIZE

SAMPLES: NO.

TER LOSSES % DEPTH

CIAL TESTS (Hrs. & Explain)

WEATHER Overcast 45 degrees

NON-DRILLING TIME (Hrs.)

BORING LAYOUT MOVING

HAULING WATER STANDBY

WATER LEVEL: @ DATE TIME

@ DATE TIME

CAVE-IN DEPTH: @ DATE TIME

REMARKS: (All remarks should be explained on the back of white copy) THIS IS A DRILLER'S LOG AND THE CLASSIFICATIONS HAVE NOT BEEN REVIEWED BY AN ENGINEER

PROJECT: Rockport Site PROJECT NO. N6-1482 BORING: BR-362

DATE: 3/18/77 DRILLER: G. Powers CREW: J. Hardman/J. Selbe SURFACE ELEV. 392.7

DEPTH FROM	DEPTH TO	SOIL STRATA / SOIL DESCRIPTION AND REMARKS	TIME	TYPE	NO.	DEPTH FROM	DEPTH TO	FIRST 6"	2ND 6"	3RD 6"	REC
0		Topsoil									
	1.2										
1.2		Very stiff brown and gray fine sandy silty		SS	1	5.0	6.5	7	10	12	15
	7.5	clay									
7.5		Stiff brown fine sandy silt		SS	2	10.0	11.5	4	4	6	16
	13.0										
13.0		Firm brown silty fine sand		SS	3	15.0	16.5	4	5	6	12
		Firm brown silty fine sand		SS	4	20.0	21.5	4	5	7	4
	23.5										
23.5		Loose brown silty fine to medium sand		SS	5	25.0	26.5	4	3	4	5
	29.0										
29.0		Firm brown silty fine to medium sand		SS	6	30.0	31.5	4	5	8	10
		Firm brown silty fine to medium sand		SS	7	35.0	36.5	7	6	10	9
	37.0										
37.0		Dense brown medium to coarse sand		SS	8	40.0	41.5	12	14	22	10
	44.0										
44.0		Firm brownish gray fine to medium silty sand		SS	9	45.0	46.5	12	12	11	10
51.5		Firm brownish gray fine to medium silty		SS	10	50.0	51.5	8	8	12	9
		Boring Terminated @ 51.5 3/18/77									

METHOD OF DRILLING (Check One)

a XXXXX Rod SIZE A

b. WASH XX WATER MUD XX

BORING SIZE BIT USED

CASING: SIZE N/W LENGTH 5'

UNDISTURBED SAMPLES: NO. SIZE

BAG SAMPLES NO.

WATER LOSSES DEPTH

SPECIAL TESTS (Hrs & Explain)

WEATHER 45 degrees Overcast & windy

NON-DRILLING TIME (Hrs)

BORING LAYOUT MOVING

HAULING WATER STANDBY

WATER LEVEL: @ DATE TIME

@ DATE TIME

CAVE IN DEPTH: @ DATE TIME

REMARKS: (All remarks should be explained on the back of white copy) THIS IS A DRILLER'S LOG AND THE CLASSIFICATIONS HAVE NOT BEEN REVIEWED BY AN ENGINEER

PROJECT: Rockport Site PROJECT NO. W6-1482 BORING: BH-363

DATE: 3/18/77 DRILLER: G. Powers CREW: J. Hardman/J. Selbe SURFACE ELEV. 392

DEPTH FROM	DEPTH TO	SOIL STRATA SOIL DESCRIPTION AND REMARKS	TIME	TYPE	NO.	DEPTH FROM	DEPTH TO	FIRST 6"	2ND 6"	3RD 6"	RE
0		Topsoil									
	0.8										
0.8		Very stiff brown fine sandy silty clay		SS	1	5.0	6.5	6	9	12	14
	8.0										
8.0		Loose brown silty fine sand		SS	2	10.0	11.5	4	4	5	15
		Loose brown silty fine sand		SS	3	15.0	16.5	4	5	5	12
	20.5										
20.5		Firm brown silty fine sand		SS	4	20.0	21.5	2	5	8	10
	23.5										
23.5		Firm brown fine to medium sand		SS	5	25.0	26.5	5	6	6	8
		Firm brown fine to medium sand		SS	6	30.0	31.5	6	7	9	10
		Firm brown fine to medium sand		SS	7	35.0	26.5	8	8	14	7
	38.0										
38.0		Firm brown medium to coarse sand		SS	8	40.0	41.5	9	10	16	12
		Firm brown medium to coarse sand		SS	9	45.0	46.5	8	14	13	8
	47.0										
47.0	51.5	Firm grayish brown silty fine to medium sand		SS	10	50.0	51.5	7	10	10	12
		Boring Terminated @ 51.5 3/18/77									

METHOD OF DRILLING (Check One)

a. AUGER Rod SIZE A

b. WASH XX WATER MUD XX

BORING SIZE BIT USED 2-7/8" Side Discharge

CASING: SIZE N/W LENGTH 5.0

UNDISTURBED SAMPLES: NO. SIZE

BAG SAMPLES: NO.

WATER LOSSES % DEPTH

SPECIAL TESTS (Hrs & Explain)

WEATHER 45 degrees Overcast Windy

NON-DRILLING TIME (Hrs.)

BORING LAYOUT MOVING

HAULING WATER STANDBY

WATER LEVEL: @ DATE TIME

@ DATE TIME

CAVE-IN DEPTH: @ DATE TIME

REMARKS: (All remarks should be explained on the back of white copy) THIS IS A DRILLER'S LOG AS THE CLASSIFICATIONS HAVE

AW ENGINEERING TESTING COMPANY — TEST BORING FIELD RECORD

ROJECT: Rockport Site — PROJECT NO. W6-1482 — BORING: BH=364

DATE: 3/15/77 — DRILLER: G. Powers — CREW: J. Hardman/J. Selbe — SURFACE ELEV. 389.5

DEPTH FM	DEPTH TO	SOIL STRATA / SOIL DESCRIPTION AND REMARKS	TIME	TYPE	NO.	DEPTH FROM	DEPTH TO	FIRST 6"	2ND 6"	3RD 6"	REC.
0		Topsoil									
	1.4										
1.4		Stiff brown and gray silty clay traces		SS	1	5.0	6.5	4	6	7	16
		fine sand									
		Stiff brown and gray silty clay traces		SS	2	10.0	11.5	3	4	6	12
	13.0	fine sand									
13.0		Loose brown silty fine sand		SS	3	15.0	16.5	3	4	3	17
		Loose brown silty fine sand		SS	4	20.0	21.5	3	3	3	8
	24.0										
24.0		Firm brown fine to medium sand		SS	5	25.0	26.5	6	8	8	7
		Firm brown fine to medium sand		SS	6	30.0	31.5	6	8	9	8
	34.5										
34.5		Firm brown medium to coarse sand		SS	7	35.0	36.5	5	8	10	8
		Firm brown medium to coarse sand		SS	8	40.0	41.5	5	6	8	7
	43.0										
43.0		Loose brown medium to coarse sand & gravel		SS	9	45.0	46.5	4	3	3	8
	47.0										
47.0	51.5	Firm brown medium to coarse sand		SS	10	50.0	51.5	8	9	13	8
		traces gravel									
		Boring Terminated @ 51.5 3/15/77									

METHOD OF DRILLING (Check One)

a. AUGER XXXXX Rod SIZE A

b. WASH XX WATER MUD XX

B NG SIZE BIT USED 2-7/8" Side Discharge

CASING: SIZE NW LENGTH 5'

UNDISTURBED SAMPLES: NO SIZE

BAG SAMPLES: NO

WATER LOSSES @ DEPTH

SPECIAL TESTS (Hrs & Explain)

WEATHER 70 degrees clear

NON-DRILLING TIME (Hrs)

BORING LAYOUT MOVING

HAULING WATER STANDBY

WATER LEVEL: @ DATE TIME

@ DATE TIME

CAVE-IN DEPTH: @ DATE TIME

REMARKS (All remarks should be explained on the back of white copy) THIS IS A DRILLER'S LOG THE CLASSIFICATIONS

AW ENGINEERING TESTING COMPANY

OJECT: Rockport Site PROJECT NO. W6-1482 BORING: BH=365

ATE: 3/15/77 DRILLER: G. Powers CREW: J. Hardman/J. Selbe SURFACE ELEV.

DEPTH FROM	DEPTH TO	SOIL STRATA / SOIL DESCRIPTION AND REMARKS	TIME	TYPE	NO.	DEPTH FROM	DEPTH TO	FIRST 6"	2ND 6"	3RD 6"	REC.
0		Topsoil									
	1.3										
1.3		Stiff brown and gray silty clay traces		SS	1	5.0	6.5	3	5	9	18
	11.0										
11.0		Stiff brown fine sandy silty tan clay		SS	2	10.0	11.5	4	4	8	18
	13.5										
13.5		Loose brown silty fine sand		SS	3	15.0	16.5	2	3	4	12
	19.0										
19.0		Firm brown fine sand silt traces clay		SS	4	20.0	21.5	3	2	3	14
	25.5										
25.5		Firm brown and gray silty fine sand		SS	5	25.0	26.5	2	5	8	12
	28.0										
28.0		Firm brown silty fine sand		SS	6	30.0	31.5	8	10	10	6
	35.5										
35.5		Firm brown silty medium to coarse sand		SS	7	35.0	36.5	6	11	10	9
	38.0										
.0		Dense brown silty medium tocoarse sand		SS	8	40.0	41.5	13	25	25	10
	42.0	traces gravel									
42.0		Firm brown silty medium to coarse sand traces		SS	9	45.0	46.5	10	12	12	8
	47.5	gravel									
47.5	51.5	Firm gray fine to medium silty sand traces gravel		SS	10	50.0	51.5	8	7	9	8
		Boring Terminated @ 51.5 3/15/77									

METHOD OF DRILLING (Check One)

a. AUGER Rod SIZE A

b. WASH XX WATER MUD XX

BORING SIZE BIT USED 2-7/8" Side Discharge

CASING: SIZE NW LENGTH 5.0'

UNDISTURBED SAMPLES: NO. SIZE

BAG SAMPLES: NO.

WATER LOSSES % DEPTH

SPECIAL TESTS (Hrs. & Explain)

WEATHER 65 degrees clear

NON DRILLING TIME (Hrs.)

BORING LAYOUT MOVING

HAULING WATER STANDBY

WATER LEVEL: @ DATE TIME

@ DATE TIME

CAVE IN DEPTH: @ DATE TIME

REMARKS: (All remarks should be explained on the back of white copy) THIS IS A DRILLER'S LOG A THE CLASSIFICATIONS HAVE N BEEN REVIEWED BY AN ENGINE

PROJECT: Rockport Site PROJECT NO. W6-1482 BORING: BH-366

DATE: 3/15/77 DRILLER: G. Powers CREW: J. Hardman/J. Selbe SURFACE ELEV.

DEPTH FROM	DEPTH TO	SOIL STRATA SOIL DESCRIPTION AND REMARKS	TIME	TYPE	NO.	DEPTH FROM	DEPTH TO	FIRST 6"	2ND 6"	3RD 6"	REC
		Topsoil									
	1.5										
1.5		Very stiff brown and gray silty clay		SS	1	5.0	6.5	3	7	14	18
	9.0	traces fine sand									
9.0		Firm brown silty fine sand traces clay		SS	2	10.0	11.5	4	5	8	16
	15.0										
15.0		loose brown silty fine sand traces clay		SS	3	15.0	16.5	2	4	6	16
	17.0										
17.0		loose brown silty fine sand		SS	4	20.0	21.5	4	4	6	8
	24.0										
24.0		Firm brown fine to medium fine sand		SS	5	25.0	26.5	4	7	12	7
		Firm brown fine to medium fine sand		SS	6	30.0	31.5	5	8	9	7
	33.5										
33.5		Firm brown fine to medium sand traces		SS	7	35.0	36.5	5	8	9	6
	37.0										
37.0		Firm brown medium to coarse silty sand		SS	8	40.0	41.5	8	11	12	7
		Firm brown medium to coarse silty sand		SS	9	45.0	46.5	7	12	16	11
	47.5										
47.5	51.5	Firm brown medium to coarse sand some gravel		SS	10	50.0	51.5	7	7	9	8
		Boring Terminated @ 51.5 3/15/77									

METHOD OF DRILLING (Check One)

Auger XX Rod SIZE A

Bucket XX WATER MUD XX

BORING SITE BIT USED 2-7/8" Side Discharge

CASING: SIZE NW LENGTH 5.0

UNDISTURBED SAMPLES: NO SIZE

BAG SAMPLES: NO

WATER LEVELS: DEPTH

SPECIAL TESTS (Hrs & Explain)

WEATHER 50 degrees Overcast

NON-DRILLING TIME (Hrs)

BORING LAYOUT MOVING

HAULING WATER STANDBY

WATER LEVEL: @ DATE TIME

@ DATE TIME

CAVE IN DEPTH: @ DATE TIME

REMARKS (All remarks should be explained on the back of white copy) THIS IS A DRILLER'S LOG AND THE CLASSIFICATIONS HAVE NOT BEEN REVIEWED BY AN ENGINEER

PROJECT: Rockport Site PROJECT NO. W6-1482 BORING: Bh-367

DATE: 3/16/77 DRILLER: G. Powers CREW: J. Hardman/J. Selbe SURFACE ELEV.

DEPTH FROM	DEPTH TO	SOIL STRATA SOIL DESCRIPTION AND REMARKS	TIME	TYPE	NO.	DEPTH FROM	DEPTH TO	FIRST 6"	2ND 6"	3RD 6"	REC
0		Topsoil									
	1.2										
1.2		Firm brown silty fine sand traces clay		SS	1	5.0	6.5	3	4	7	14
	8.0										
8.0		Loose brown silty fine sand		SS	2	10.0	11.5	3	3	5	12
		Loose brown silty fine sand		SS	3	15.0	16.5	3	3	4	10
		Loose brown silty fine sand		SS	4	20.0	21.5	3	5	5	8
	23.0										
23.0		Firm brown silty fine to medium sand		SS	5	25.0	26.5	7	10	14	7
		Firm brown silty fine to medium sand		SS	6	30.0	31.5	7	8	9	6
		Firm brown silty fine to medium sand		SS	7	35.0	36.5	5	7	10	6
		Firm brown silty fine to medium sand		SS	8	40.0	41.5	8	11	14	6
	44.0										
44.0		Firm brown silty medium to coarse sand		SS	9	45.0	46.5	10	15	13	8
	51.5	Firm brown silty medium to coarse sand		SS	10	50.0	51.5	7	12	11	10
		Boring Terminated @ 51.5									

METHOD OF DRILLING (Check One)

a. ~~AUGER~~ XXXX Rod SIZE A

b. WASH XX WATER MUD XX

DRING SIZE BIT USED 2-7/8" Side Discharge

ASING: SIZE NW LENGTH 5.0'

NE URBED SAMPLES: NO. SIZE

AG SAMPLES: NO.

ATER LOSSES % DEPTH

ECIAL TESTS (Hrs & Explain)

WEATHER Clear 60 degrees

NON-DRILLING TIME (Hrs.)

BORING LAYOUT MOVING

HAULING WATER STANDBY

WATER LEVEL: @ DATE TIME

@ DATE TIME

CAVE-IN DEPTH: @ DATE TIME

REMARKS: (All remarks should be explained on the back of white copy) THIS IS A DRILLER'S LOG AND THE CLASSIFICATIONS HAVE NOT BEEN REVIEWED BY AN ENGINEER

PROJECT: Rockport Site PROJECT NO. W6-1482 BORING: BH-368

DATE: 3/16/77 DRILLER: G. Powers CREW: J. Hardman/J. Selbe SURFACE ELEV. 392.3

DEPTH FROM	DEPTH TO	SOIL STRATA SOIL DESCRIPTION AND REMARKS	TIME	TYPE	NO.	DEPTH FROM	DEPTH TO	FIRST 6"	2ND 6"	3RD 6"	REC
0		Topsoil									
	0.7										
0.7		Very stiff brown silty clay		SS	1	5.0	6.5	3	12	15	18
	9.0										
9.0		Firm brown silty fine sand		SS	2	10.0	11.5	7	7	8	14
		Firm brown silty fine sand		SS	3	15.0	16.5	5	5	6	9
		Firm brown silty fine sand		SS	4	20.0	21.5	5	6	8	8
	24.0										
24.0		Firm brown silty fine to medium sand		SS	5	25.0	26.5	8	10	13	6
		Firm brown silty fine to medium sand		SS	6	30.0	31.5	5	7	7	7
	33.0										
33.0		Firm brown medium to coarse sand		SS	7	35.0	36.5	6	6	8	5
	37.5										
37.5		Firm brown fine to medium silty sand		SS	8	40.0	41.5	5	7	8	6
	44.0										
44.0		Firm brown medium to coarse sand		SS	9	45.0	46.5	5	10	13	9
	51.5										
51.5		Firm brown medium to coarse sand		SS	10	50.0	51.5	10	12	12	12
		Boring Terminated @ 51.5'									

METHOD OF DRILLING (Check One)

a. ~~XXXXX~~ Rod SIZE A

b. WASH XX WATER MUD XX

BORING SIZE BIT USED 2-7/8" Side Discharge

CASING: SIZE NW LENGTH 5.0'

UNDISTURBED SAMPLES: NO. SIZE

BAG SAMPLES: NO.

WATER LOSSES, % DEPTH

SPECIAL TESTS (Hrs. & Explain)

WEATHER Clear 45 degrees

NON-DRILLING TIME (Hrs.)

BORING LAYOUT MOVING

HAULING WATER STANDBY

WATER LEVEL: @ DATE TIME

@ DATE TIME

CAVE-IN DEPTH: @ DATE TIME

REMARKS: (All remarks should be explained on the back of white copy) THIS IS A DRILLER'S LOG AN THE CLASSIFICATIONS HAVE NO BEEN REVIEWED BY A GEOTECH

PROJECT: Rockport Site PROJECT NO. W6-1482 BORING: BH-369

DATE: 3/18/77 DRILLER: R. Stevens CREW: B. Blackford/D. Wooden SURFACE ELEV. 394.3

DEPTH FROM	DEPTH TO	SOIL STRATA SOIL DESCRIPTION AND REMARKS	TIME	TYPE	NO.	DEPTH FROM	DEPTH TO	FIRST 6"	2ND 6"	3RD 6"	REC.
0	12"	Topsoil									
		Very stiff brown and tan clay		SS	1	5	6.5	8	12	15	18
	9.0										
9.0		Loose brown very silty fine sand		SS	2	10	11.5	3	3	4	12
	12.7										
12.7		Firm brown medium sand		SS	3	15	16.5	5	6	7	5
	18.0										
18.0		Loose gray and brown silty fine to medium		SS	4	20	21.5	3	4	5	6
	22.1	sand									
22.1		Firm brown medium sand		SS	5	25.	26.5	9	10	10	6
	28.5										
28.5		Loose brown medium sand w/traces fine gravel		SS	6	30	31.5	3	4	4	5
	32.0										
32.0		Firm brown medium to coarse sand		SS	7	35	36.5	7	10	16	8
		Firm brown medium to coarse sand		SS	8	40	41.5	10	11	13	7
	44.0										
44.0		Dense brown medium to coarse sand		SS	9	45	46.5	11	15	18	10
	47.5										
47.5		Dense brown medium to coarse sand w/fine gravel		SS	10	50	51.5	11	19	26	10
		Boring Terminated @ 51.5'									

METHOD OF DRILLING (Check One)

a AUGER XXX Rod SIZE A

b WASH XX WATER MUD XX

BORING SIZE 2-7/8" BIT USED 2-7/8" Side Discharge

CASING: SIZE NW 5' LENGTH

UNDISTURBED SAMPLES: NO. SIZE

BAG SAMPLES: NO.

WATER LOSSES % DEPTH

SPECIAL TESTS (Hrs. & Explain)

WEATHER Cloudy 50 degrees

NON-DRILLING TIME (Hrs.)

BORING LAYOUT MOVING

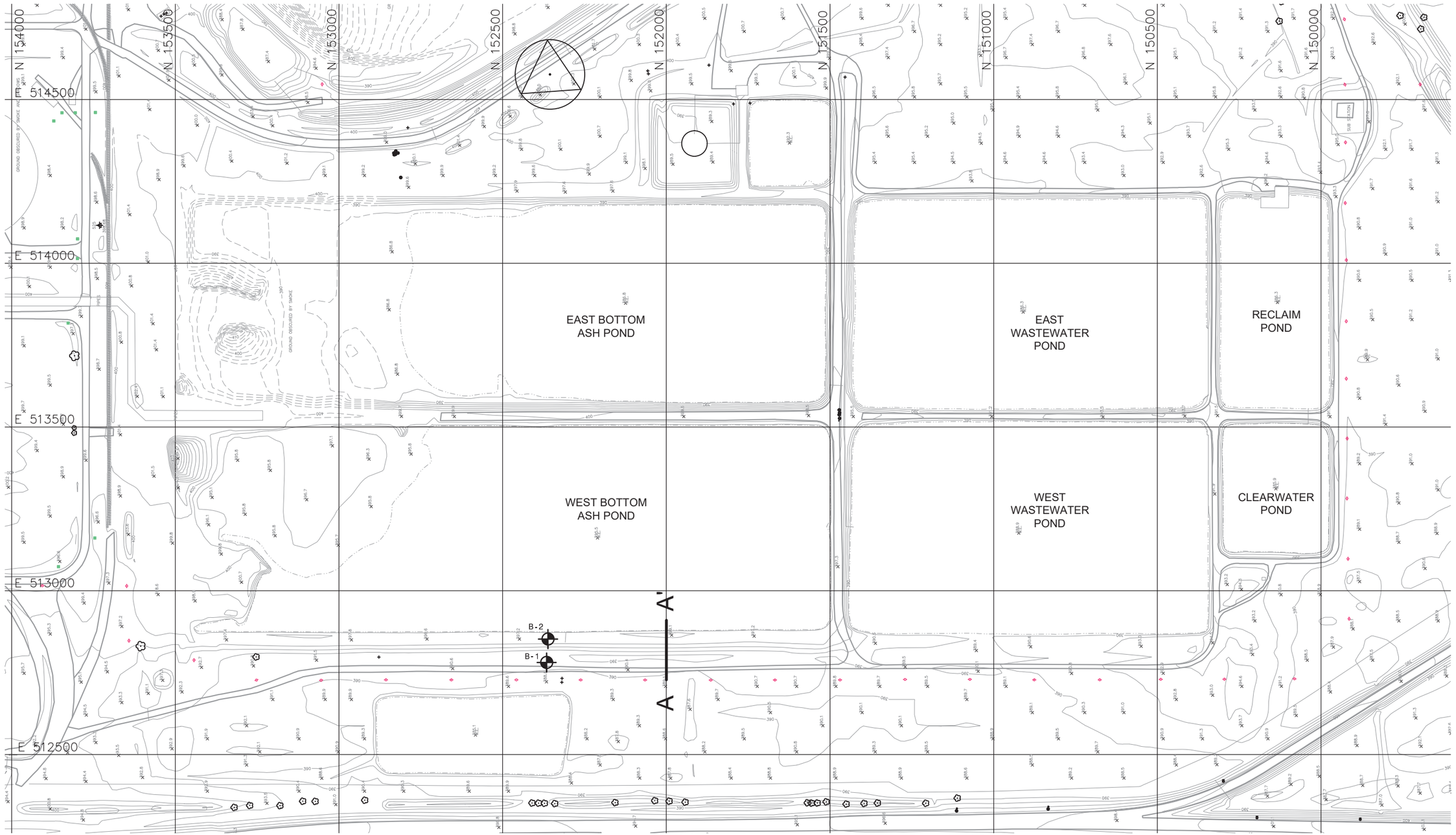
HAULING WATER STANDBY

WATER LEVEL: @ DATE TIME

@ DATE TIME

CAVE-IN DEPTH: @ DATE TIME

REMARKS: (All remarks should be explained on the back of white copy) THIS IS A DRILLER'S LOG AND THE CLASSIFICATIONS HAVE NOT BEEN REVIEWED BY AN ENGINEER



N

300 0 150 300

SCALE IN FEET

NOTE

THE AERIAL TOPOGRAPHY WAS OBTAINED FROM HENDERSON AERIAL SURVEYS INC., DATED 11/10/2007.

LEGEND

B-1 SOIL BORING

EXHIBIT A-3

DESIGNED BY:	BMY
DRAWN BY:	DAB
APPVD. BY:	MSF
SCALE:	1"=300'
DATE:	10/15/15
JOB NO.	N4155126
ACAD NO.	PSET2
SHEET NO.:	1 OF 1

SITE PLAN

ROCKPORT PLANT

AMERICAN ELECTRIC POWER

ROCKPORT PLANT BOTTOM ASH POND COMPLEX

IN

ROCKPORT

Terracon
Consulting Engineers and Scientists
800 MORRISON ROAD COLUMBUS, OHIO 43230
PH. (614) 863-3113 FAX. (614) 863-0475

REV.	DATE	BY	DESCRIPTION

BORING LOG NO. B-1

PROJECT: Rockport Plant Impoundment Certification

CLIENT: American Electric Power
Columbus, Ohio

SITE:
Rockport, Indiana

LOCATION See Exhibit A-3

Latitude: 37.918487° Longitude: -87.039045°

Surface Elev.: 389.7 (Ft.)

DEPTH	ELEVATION (Ft.)	DESCRIPTION	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	RECOVERY (In.)	FIELD TEST RESULTS	LABORATORY TORVANE/HP (tsf)	ATTERBERG LIMITS LL-PL-PI
0.3	389.5	**TOPSOIL (3")**							
		SANDY FAT CLAY (CH), trace gravel, brown, stiff				14	5-3-4-4 N=7	3.0 (HP)	
						12	5-4-4-5 N=8	1.0 (HP)	69-26-43
			5			18			
6.0	383.5								
		LEAN CLAY (CL), trace sand, gray and brown, stiff				24	2-3-4-5 N=7	2.0 (HP)	
						24			42-22-20
			10			24	2-3-5-6 N=8	1.25 (HP)	
						24	2-4-5-6 N=9	2.0 (HP)	
			15			24			28-18-10
17.5	372			▽		24	2-3-3-3 N=6	1.25 (HP)	
18.5	371	**SANDY SILT (ML)**, brown, loose							
		POORLY GRADED SAND (SP), brown, loose				18	2-4-4-4 N=8		
			20						
23.0	366.5								
		POORLY GRADED SAND (SP), trace gravel, brown, medium dense				24	3-7-8-9 N=15		
			25						

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
3.25" Hollow Stem Auger

Abandonment Method:
Boring backfilled with cement/bentonite grout upon completion.

See Exhibit A-1 for description of field procedures

See Appendix B for description of laboratory procedures and additional data (if any).

See Appendix C for explanation of symbols and abbreviations.

Notes:

WATER LEVEL OBSERVATIONS

▽ *Water encountered at 17.5 feet while sampling*

Terracon
800 Morrison Road
Columbus, Ohio

Boring Started: 9/3/2015 Boring Completed: 9/4/2015

Drill Rig: Track Driller: Davis

Project No.: N4155126 Exhibit: A-4

BORING LOG NO. B-1

PROJECT: Rockport Plant Impoundment Certification

CLIENT: American Electric Power
Columbus, Ohio

SITE:
Rockport, Indiana

LOCATION See Exhibit A-3

Latitude: 37.918487° Longitude: -87.039045°

Surface Elev.: 389.7 (Ft.)

GRAPHIC LOG	DEPTH	ELEVATION (Ft.)	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	RECOVERY (In.)	FIELD TEST RESULTS	LABORATORY TORVANE/HP (tsf)	ATTERBERG LIMITS LL-PL-PI
	POORLY GRADED SAND (SP), trace gravel, brown, medium dense *(continued)*								
			30		X	24	4-5-5-5 N=10		
	33.0	356.5							
	POORLY GRADED SAND (SP), trace gravel, brown, medium dense				X	24	4-6-7-7 N=13		
	35.0	354.5	35						
	Boring Terminated at 35 Feet								

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
3.25" Hollow Stem Auger

Abandonment Method:
Boring backfilled with cement/bentonite grout upon completion.

See Exhibit A-1 for description of field procedures

See Appendix B for description of laboratory procedures and additional data (if any).

See Appendix C for explanation of symbols and abbreviations.

Notes:

WATER LEVEL OBSERVATIONS

▽ *Water encountered at 17.5 feet while sampling*

Terracon
800 Morrison Road
Columbus, Ohio

Boring Started: 9/3/2015 Boring Completed: 9/4/2015

Drill Rig: Track Driller: Davis

Project No.: N4155126 Exhibit: A-4

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL ROCKPORT CCR BORINGS.GPJ TERRACON2015.GDT 10/16/15

BORING LOG NO. B-2

PROJECT: Rockport Plant Impoundment Certification

CLIENT: American Electric Power
Columbus, Ohio

SITE:
Rockport, Indiana

LOCATION See Exhibit A-3

Latitude: 37.918457° Longitude: -87.038804°

Surface Elev.: 397.4 (Ft.)

DEPTH	ELEVATION (Ft.)	Description
0.1	397.5	**TOPSOIL (1")**
		FILL - LEAN CLAY (CL), trace sand, brown
4.0	393.5	
		FILL - SANDY SILT (ML), brown
6.0	391.5	
		FILL - SANDY LEAN CLAY (CL), trace gravel, gray and brown 5" poorly graded sand seam from 6-6.4'
8.0	389.5	
		LEAN CLAY (CL), trace sand, gray, very stiff
12.0	385.5	
		LEAN CLAY (CL), brown, stiff
14.0	383.5	
		SANDY LEAN CLAY (CL), trace gravel, gray and orange, stiff
20.8	376.5	
		CLAYEY SAND (SC), brown, loose
22.7	374.5	
		POORLY GRADED SAND WITH SILT (SP-SM), trace gravel, brown, loose

DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	RECOVERY (In.)	FIELD TEST RESULTS	LABORATORY TORVANE/HP (tsf)	ATTERBERG LIMITS LL-PL-PI
			19	6-10-14-16 N=24		28-15-13
			4	15-12-10-10 N=22		
5			24			19-16-3
			23	2-3-5-6 N=8		
			24	3-7-10-17 N=17	3.25 (HP)	
10			24			30-21-9
			24	3-4-6-8 N=10	1.5 (HP)	
			24	3-5-7-9 N=12	1.75 (HP)	
15			17	6-10-12-14 N=22	2.75 (HP)	35-15-20
			24			
20			24	3-4-4-5 N=8		
			23	3-3-4-5 N=7		
25			21	2-3-4-4		

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
3.25" Hollow Stem Auger

Abandonment Method:
Boring backfilled with cement/bentonite grout upon completion.

See Exhibit A-1 for description of field procedures

See Appendix B for description of laboratory procedures and additional data (if any).

See Appendix C for explanation of symbols and abbreviations.

Notes:

A monitoring well was installed in an offset hole approximately 10 feet south of the boring.

WATER LEVEL OBSERVATIONS

Water encountered at 25.1 feet while sampling

Terracon
800 Morrison Road
Columbus, Ohio

Boring Started: 9/4/2015 Boring Completed: 9/4/2015

Drill Rig: Track Driller: Davis

Project No.: N4155126 Exhibit: A-5

BORING LOG NO. B-2

PROJECT: Rockport Plant Impoundment Certification

CLIENT: American Electric Power
Columbus, Ohio

SITE:
Rockport, Indiana

LOCATION See Exhibit A-3

Latitude: 37.918457° Longitude: -87.038804°

Surface Elev.: 397.4 (Ft.)

DEPTH	ELEVATION (Ft.)	Description	RECOVERY (In.)	FIELD TEST RESULTS
25.5	372	**POORLY GRADED SAND WITH SILT (SP-SM)**, trace gravel, brown, loose to medium dense	21	N=7
			24	6-6-5-4 N=11
			18	2-2-5-3 N=7
			24	2-3-4-4 N=7
32.5	365			
		SILTY SAND (SM), brown, loose	19	1-2-2-2 N=4
34.0	363.5	3" clay seam at 33.7'		
		SILTY SAND (SM), trace gravel, brown, loose	8	2-3-3-4 N=6
			17	2-2-2-4 N=4
38.0	359.5			
		POORLY GRADED SAND (SP), trace gravel, brown, loose to medium dense	1	3-4-5-5 N=9
			9	3-5-6-5 N=11
42.0	355.5			
		POORLY GRADED SAND (SP), trace gravel, brown, medium dense	6	4-6-9-12 N=15
44.0	353.5			
		Boring Terminated at 44 Feet		

DEPTH (Ft.): 30, 35, 40

WATER LEVEL OBSERVATIONS

SAMPLE TYPE

LABORATORY TORVANE/HP (tsf)

ATTERBERG LIMITS: LL-PL-PI

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
3.25" Hollow Stem Auger

Abandonment Method:
Boring backfilled with cement/bentonite grout upon completion.

See Exhibit A-1 for description of field procedures

See Appendix B for description of laboratory procedures and additional data (if any).

See Appendix C for explanation of symbols and abbreviations.

Notes:

WATER LEVEL OBSERVATIONS

Water encountered at 25.1 feet while sampling

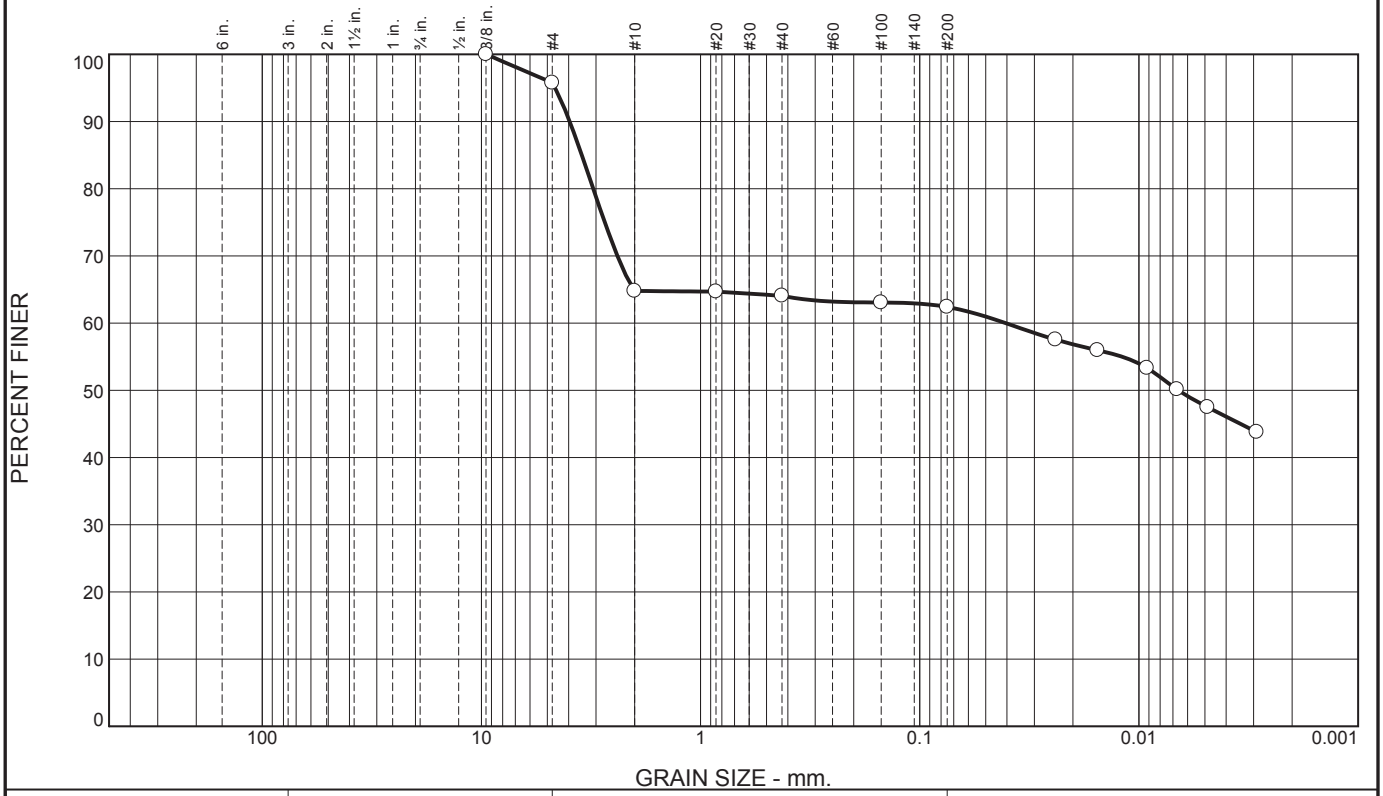
Terracon
800 Morrison Road
Columbus, Ohio

Boring Started: 9/4/2015 | Boring Completed: 9/4/2015

Drill Rig: Track | Driller: Davis

Project No.: N4155126 | Exhibit: A-5

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	4.2	31.0	0.7	1.7	14.7	47.7

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3/8	100.0		
#4	95.8		
#10	64.8		
#20	64.7		
#40	64.1		
#100	63.1		
#200	62.4		
0.0240 mm.	57.5		
0.0155 mm.	56.0		
0.0092 mm.	53.3		
0.0067 mm.	50.1		
0.0049 mm.	47.5		
0.0029 mm.	43.8		

* (no specification provided)

Soil Description

Brown SANDY FAT CLAY, trace gravel

Atterberg Limits

PL= 26 LL= 69 PI= 43

Coefficients

D_{90}= 3.9559 D_{85}= 3.4817 D_{60}= 0.0406
D_{50}= 0.0066 D_{30}= D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= CH AASHTO= A-7-6(25)

Remarks

F.M.=1.79

Source of Sample: B-1 **Depth:** 2.0'-4.0'
Sample Number: S-2

Date: 9-21-15

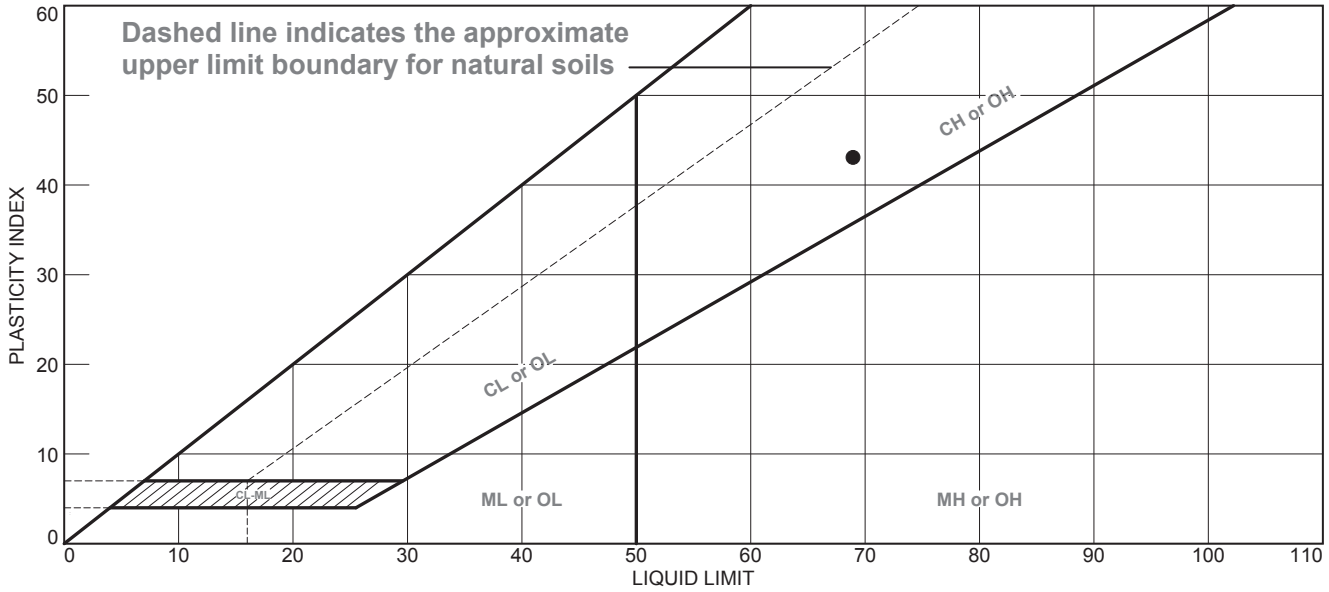
TERRACON
CONSULTANTS, INC.
Columbus, Ohio

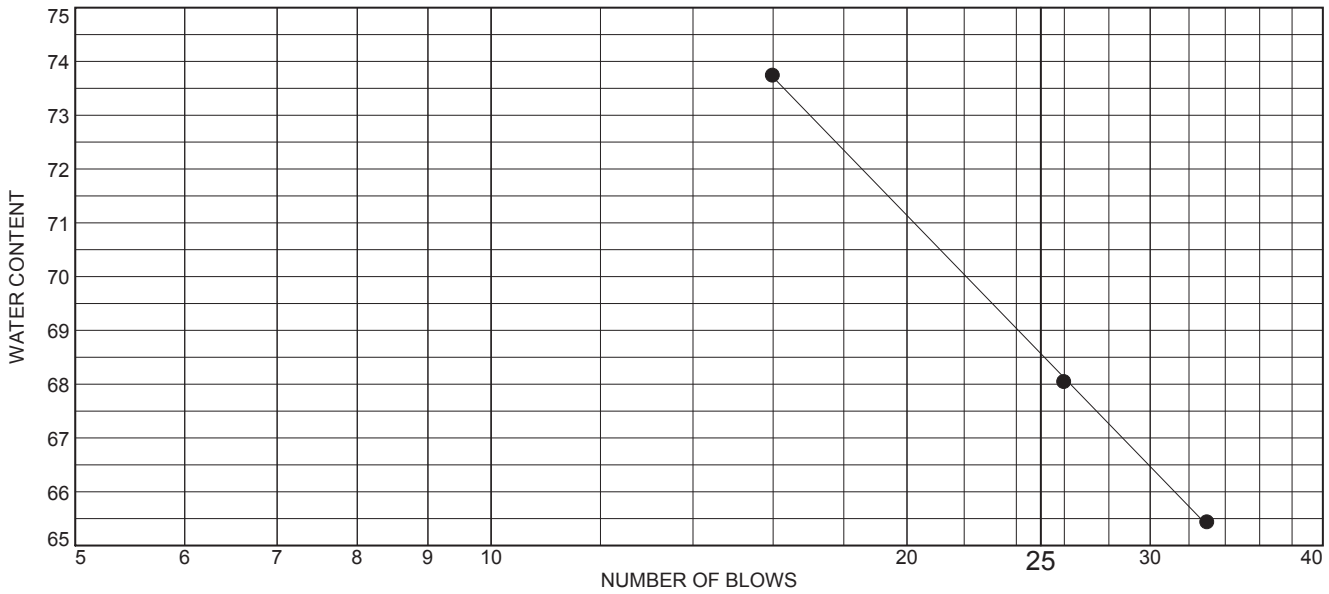
Client: American Electric Power
Project: Rockport Plant Impoundment Certification

Project No: N4155126 **Exhibit** B-2

Tested By: DS **Checked By:** AM

LIQUID AND PLASTIC LIMITS TEST REPORT





	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Brown SANDY FAT CLAY, trace gravel	69	26	43	64.1	62.4	CH

Project No. N4155126 **Client:** American Electric Power

Project: Rockport Plant Impoundment Certification

Source of Sample: B-1 **Depth:** 2.0'-4.0'
Sample Number: S-2

Remarks:
●Date: 9-21-15

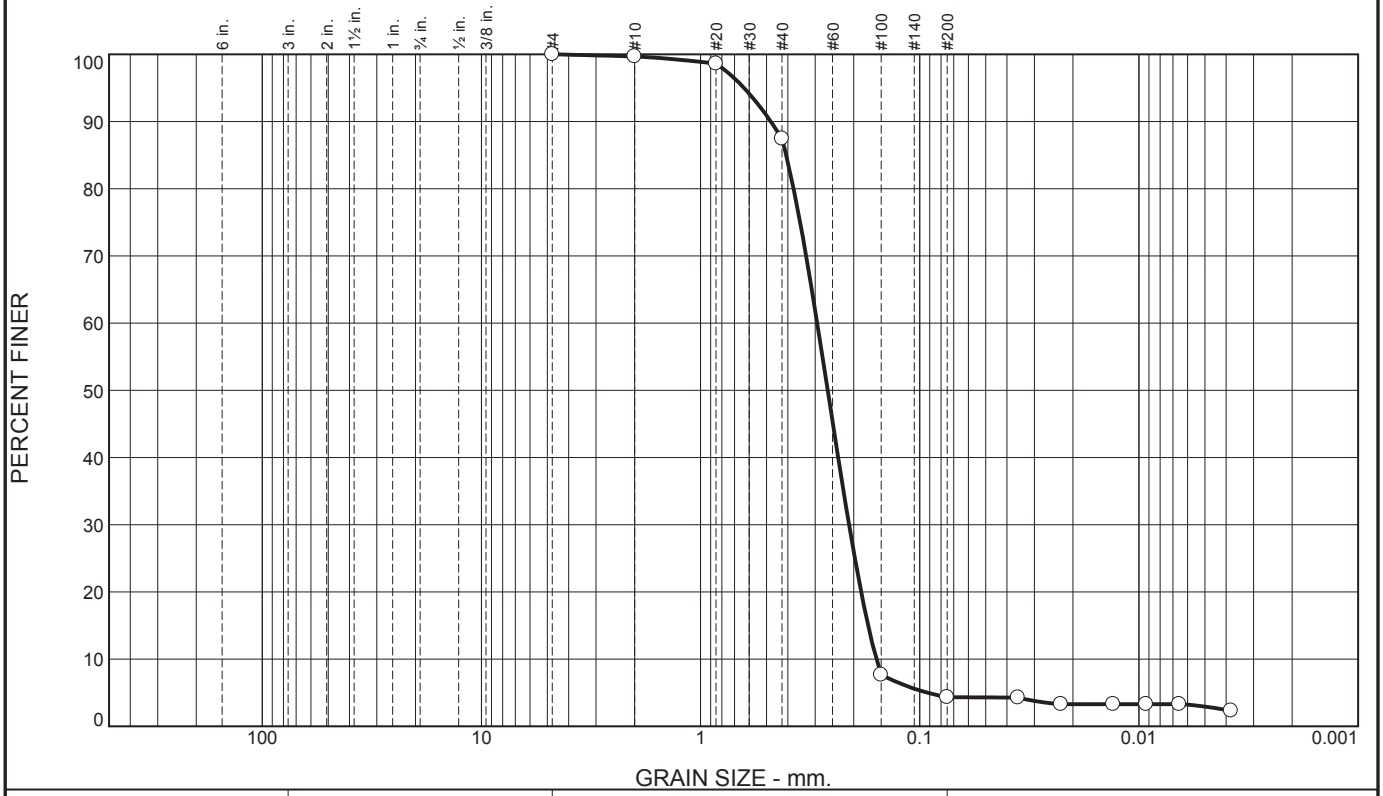
TERRACON CONSULTANTS, INC.

Columbus, Ohio

Exhibit B-3

Tested By: DS **Checked By:** AM

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.3	12.3	83.1	1.4	2.9

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#4	100.0		
#10	99.7		
#20	98.6		
#40	87.4		
#100	7.7		
#200	4.3		
0.0357 mm.	4.3		
0.0227 mm.	3.3		
0.0131 mm.	3.3		
0.0093 mm.	3.3		
0.0066 mm.	3.3		
0.0038 mm.	2.3		

* (no specification provided)

Soil Description

Brown poorly graded SAND

Atterberg Limits

PL= NP LL= NP PI= NP

Coefficients

D_{90}= 0.4785 D_{85}= 0.4068 D_{60}= 0.2938
D_{50}= 0.2631 D_{30}= 0.2102 D_{15}= 0.1721
D_{10}= 0.1577 C_u= 1.86 C_c= 0.95

Classification

USCS= SP AASHTO= A-3

Remarks

F.M.=1.37

Source of Sample: B-1 **Depth:** 18.0'-20.0'
Sample Number: S-7

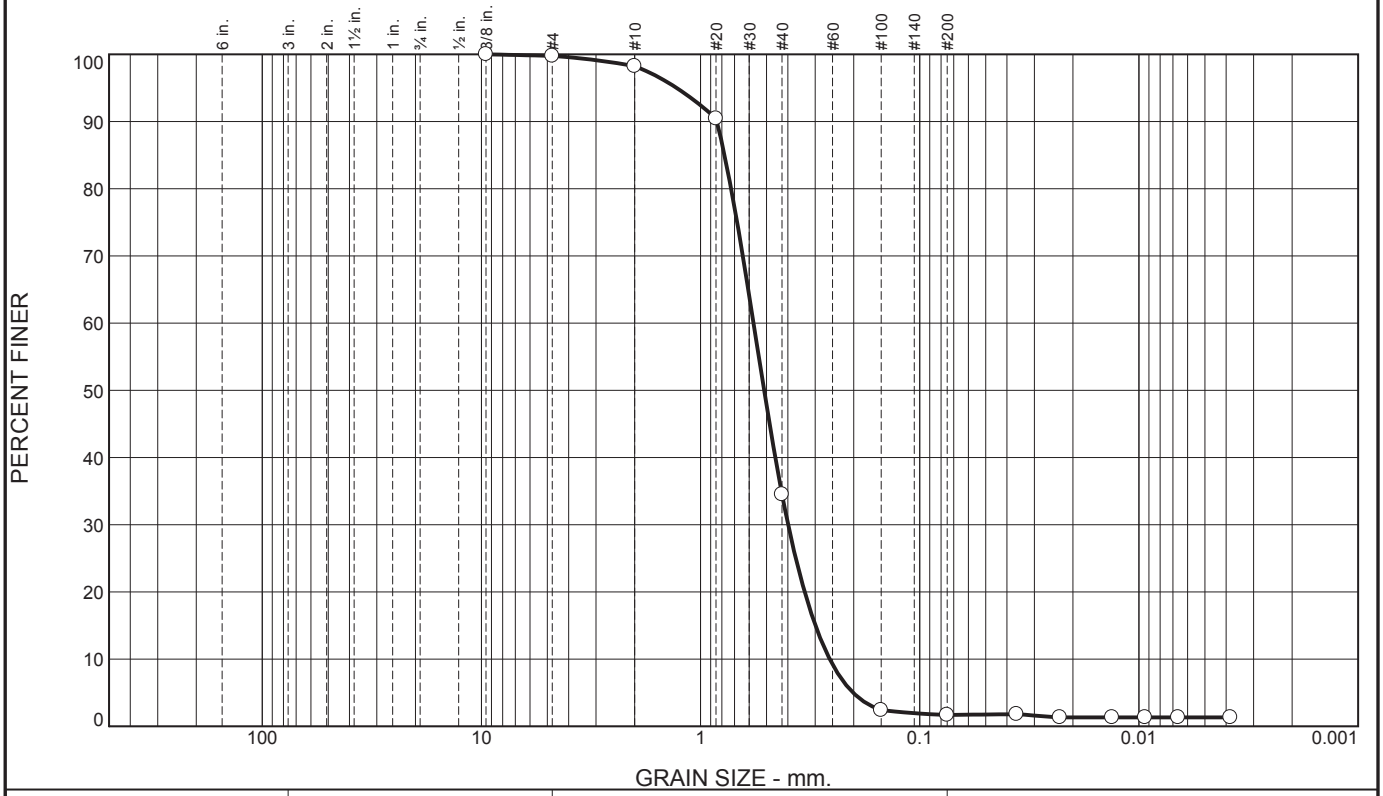
Date: 9-21-15

TERRACON
CONSULTANTS, INC.
Columbus, Ohio

Client: American Electric Power
Project: Rockport Plant Impoundment Certification
Project No: N4155126 **Exhibit** B-4

Tested By: DS **Checked By:** AM

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.2	1.6	63.7	32.8	0.4	1.3

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3/8	100.0		
#4	99.8		
#10	98.2		
#20	90.4		
#40	34.5		
#100	2.4		
#200	1.7		
0.0362 mm.	1.8		
0.0229 mm.	1.3		
0.0132 mm.	1.3		
0.0094 mm.	1.3		
0.0066 mm.	1.3		
0.0038 mm.	1.3		

* (no specification provided)

Soil Description

Brown poorly graded SAND, trace gravel

Atterberg Limits

PL= NP LL= NP PI= NP

Coefficients

D_{90}= 0.8432 D_{85}= 0.7776 D_{60}= 0.5735
D_{50}= 0.5129 D_{30}= 0.3986 D_{15}= 0.2992
D_{10}= 0.2576 C_u= 2.23 C_c= 1.08

Classification

USCS= SP AASHTO= A-1-b

Remarks

F.M.=2.26

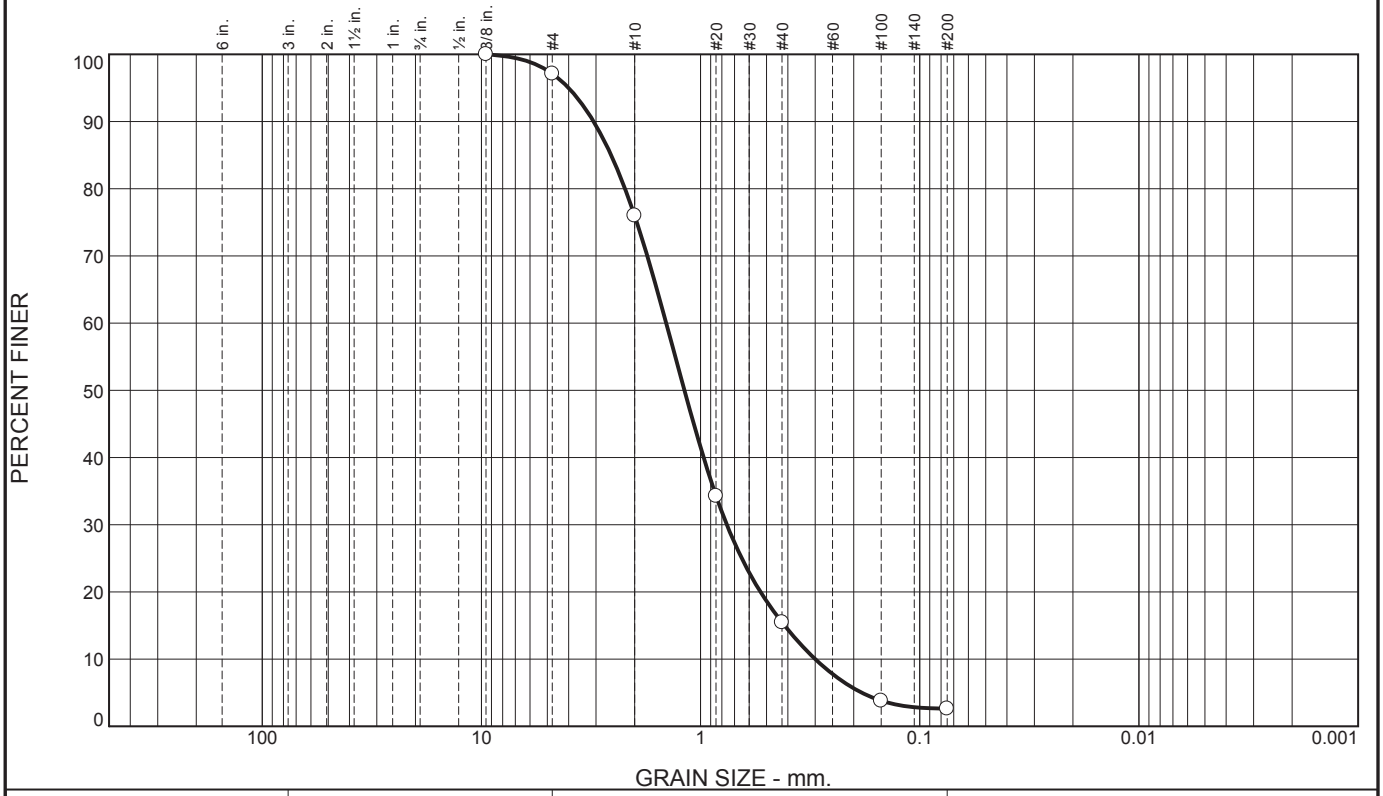
Source of Sample: B-1 **Depth:** 28.0'-30.0'
Sample Number: S-9 **Date:** 9-21-15

TERRACON
CONSULTANTS, INC.
Columbus, Ohio

Client: American Electric Power
Project: Rockport Plant Impoundment Certification
Project No: N4155126 **Exhibit** B-5

Tested By: DS **Checked By:** AM

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	2.9	21.1	60.5	12.9	2.6	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3/8	100.0		
#4	97.1		
#10	76.0		
#20	34.3		
#40	15.5		
#100	3.8		
#200	2.6		

* (no specification provided)

Soil Description

Brown poorly graded SAND, trace gravel

Atterberg Limits

PL= NP LL= NP PI= NP

Coefficients

D_{90}= 3.0772 D_{85}= 2.5603 D_{60}= 1.4351
D_{50}= 1.1849 D_{30}= 0.7595 D_{15}= 0.4140
D_{10}= 0.2999 C_u= 4.79 C_c= 1.34

Classification

USCS= SP AASHTO= A-1-b

Remarks

F.M.=3.34

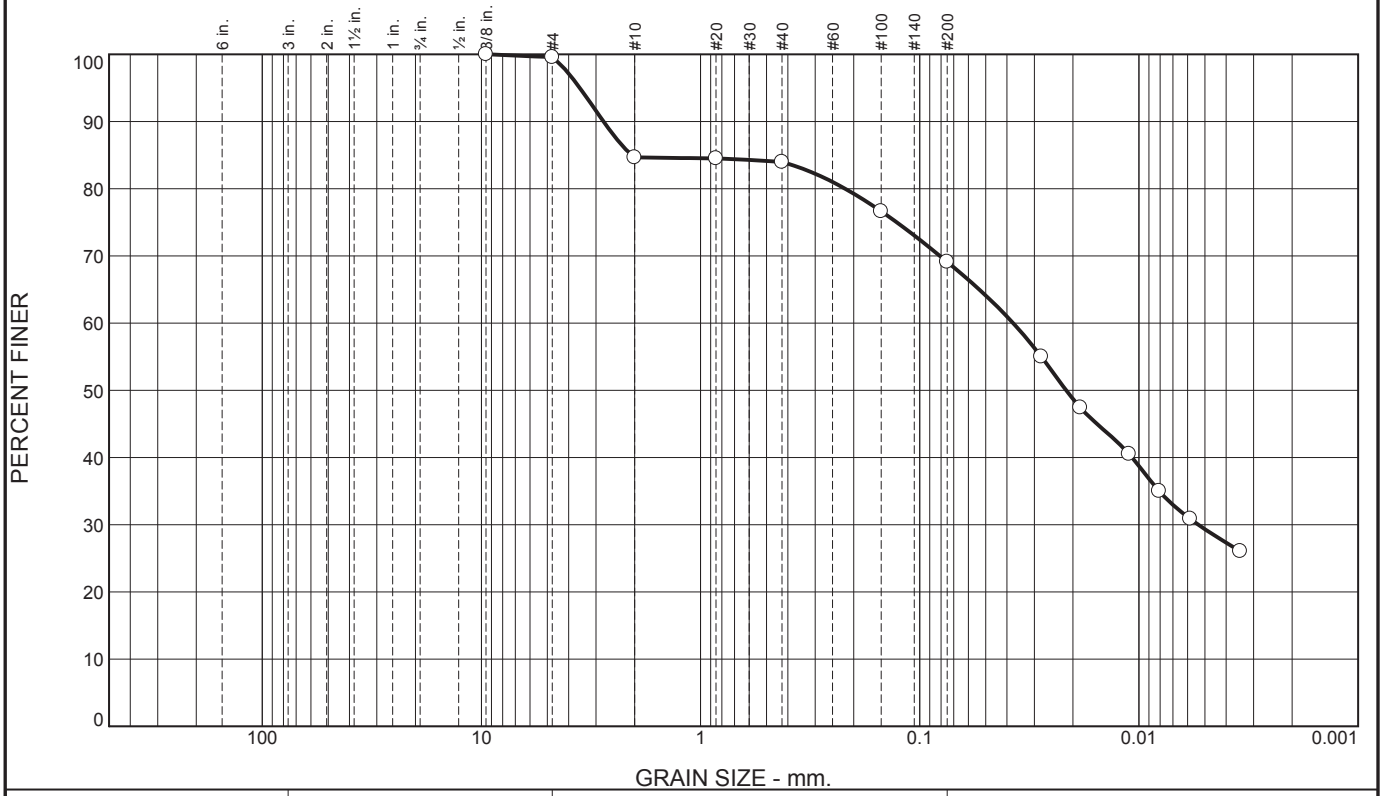
Source of Sample: B-1 **Depth:** 33.0'-35.0'
Sample Number: S-10 **Date:** 9-21-15

TERRACON
CONSULTANTS, INC.
Columbus, Ohio

Client: American Electric Power
Project: Rockport Plant Impoundment Certification
Project No: N4155126 **Exhibit** B-6

Tested By: DS **Checked By:** AM

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.4	14.9	0.7	14.9	39.8	29.3

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3/8	100.0		
#4	99.6		
#10	84.7		
#20	84.5		
#40	84.0		
#100	76.6		
#200	69.1		
0.0279 mm.	55.0		
0.0185 mm.	47.4		
0.0111 mm.	40.5		
0.0081 mm.	35.0		
0.0058 mm.	30.9		
0.0034 mm.	26.1		

* (no specification provided)

Soil Description

FILL: Brown sandy lean clay, trace gravel

Atterberg Limits

PL= 15 LL= 28 PI= 13

Coefficients

D_{90}= 2.7745 D_{85}= 2.0607 D_{60}= 0.0375
D_{50}= 0.0215 D_{30}= 0.0054 D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= CL AASHTO= A-6(6)

Remarks

F.M.=0.86

Source of Sample: B-2 **Depth:** 0.0'-2.0'
Sample Number: S-1

Date: 9-21-15

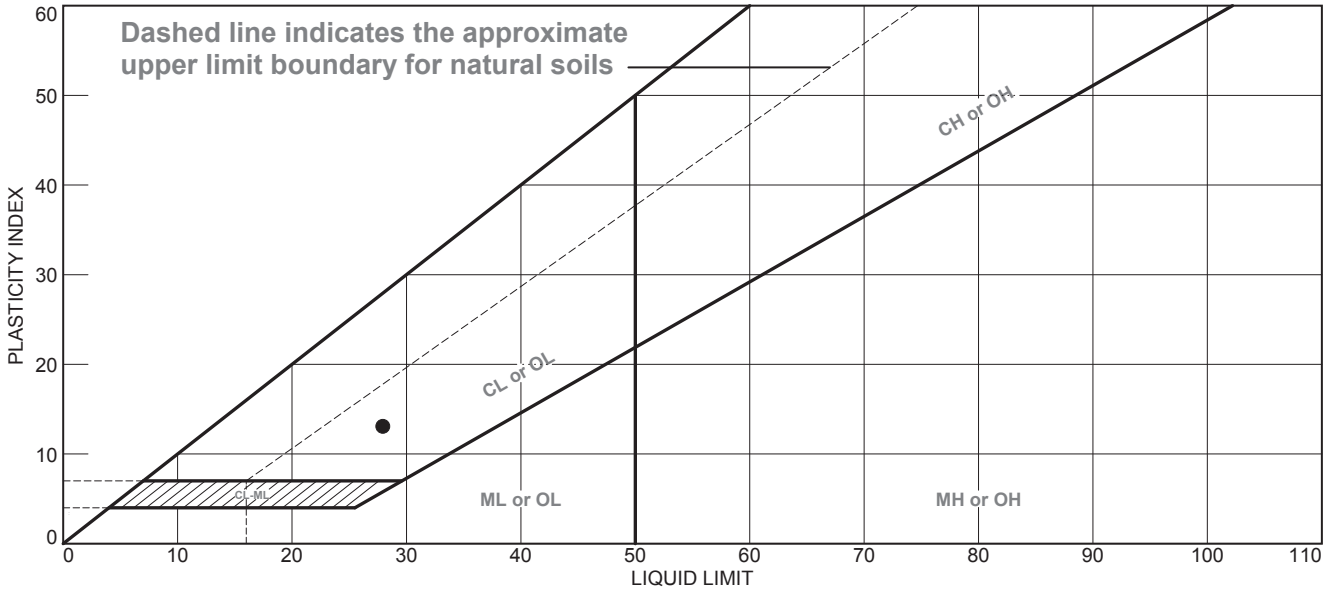
TERRACON
CONSULTANTS, INC.
Columbus, Ohio

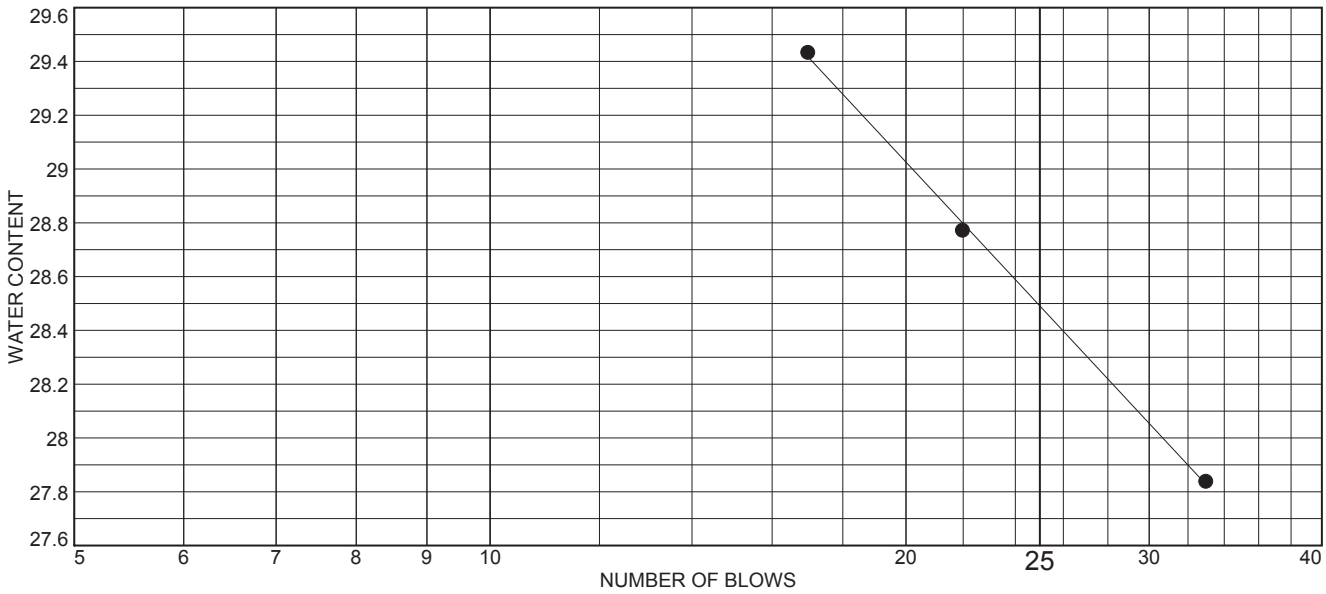
Client: American Electric Power
Project: Rockport Plant Impoundment Certification

Project No: N4155126 **Exhibit** B-7

Tested By: DS **Checked By:** AM

LIQUID AND PLASTIC LIMITS TEST REPORT





	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	FILL: Brown sandy lean clay, trace gravel	28	15	13	84.0	69.1	CL

Project No. N4155126 **Client:** American Electric Power

Project: Rockport Plant Impoundment Certification

Source of Sample: B-2 **Depth:** 0.0'-2.0'
Sample Number: S-1

Remarks:
●Date: 9-21-15

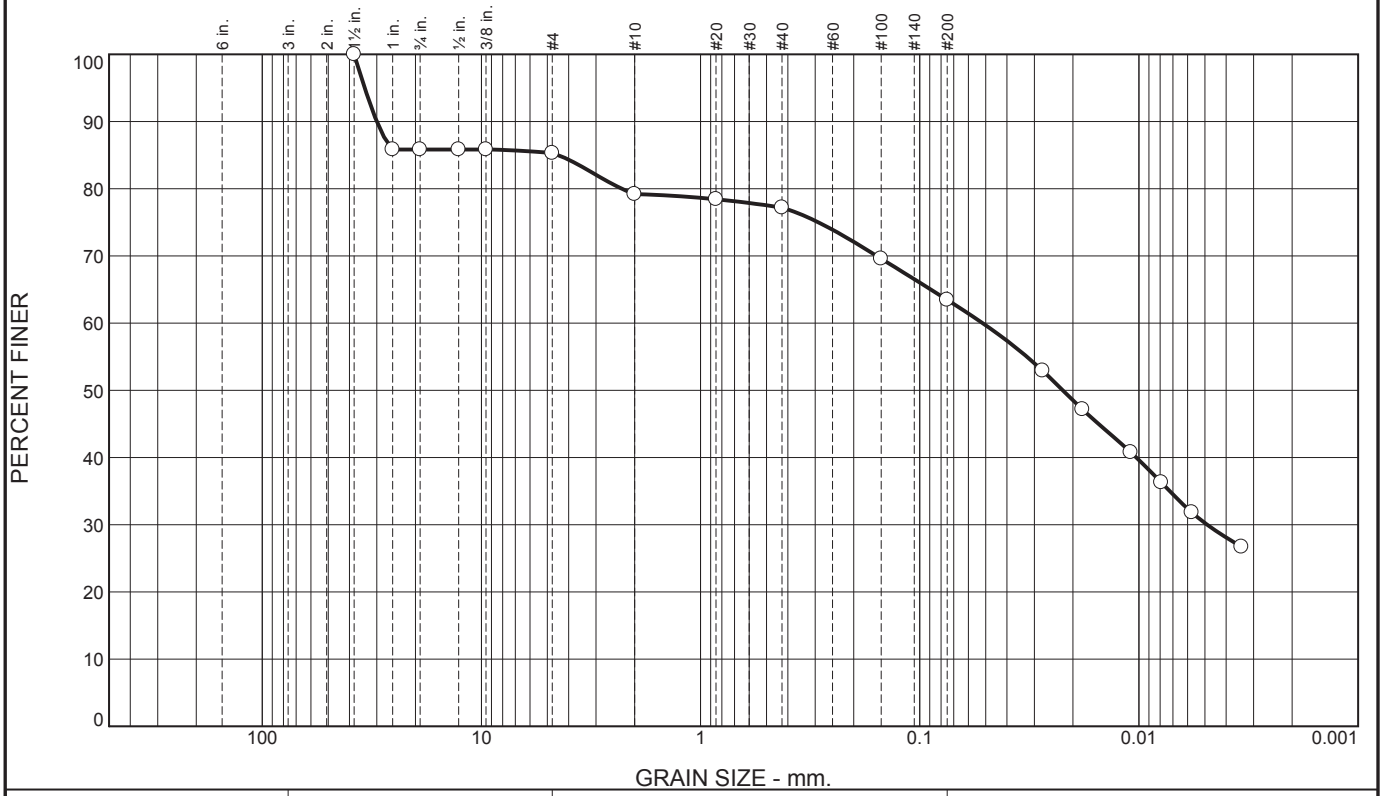
TERRACON CONSULTANTS, INC.

Columbus, Ohio

Exhibit B-8

Tested By: DS **Checked By:** AM

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	14.2	0.5	6.1	2.0	13.7	33.3	30.2

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1.5	100.0		
1.0	85.8		
3/4	85.8		
1/2	85.8		
3/8	85.8		
#4	85.3		
#10	79.2		
#20	78.4		
#40	77.2		
#100	69.6		
#200	63.5		
0.0275 mm.	52.9		
0.0181 mm.	47.2		
0.0109 mm.	40.8		
0.0079 mm.	36.3		
0.0057 mm.	31.8		
0.0034 mm.	26.7		

* (no specification provided)

Soil Description

Gray and orange SANDY LEAN CLAY, trace gravel

Atterberg Limits

PL= 15 LL= 35 PI= 20

Coefficients

D_{90}= 30.0206 D_{85}= 4.4748 D_{60}= 0.0517
D_{50}= 0.0223 D_{30}= 0.0049 D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= CL AASHTO= A-6(10)

Remarks

F.M.=1.61

Source of Sample: B-2 **Depth:** 16.0'-18.0'
Sample Number: S-7

Date: 9-21-15

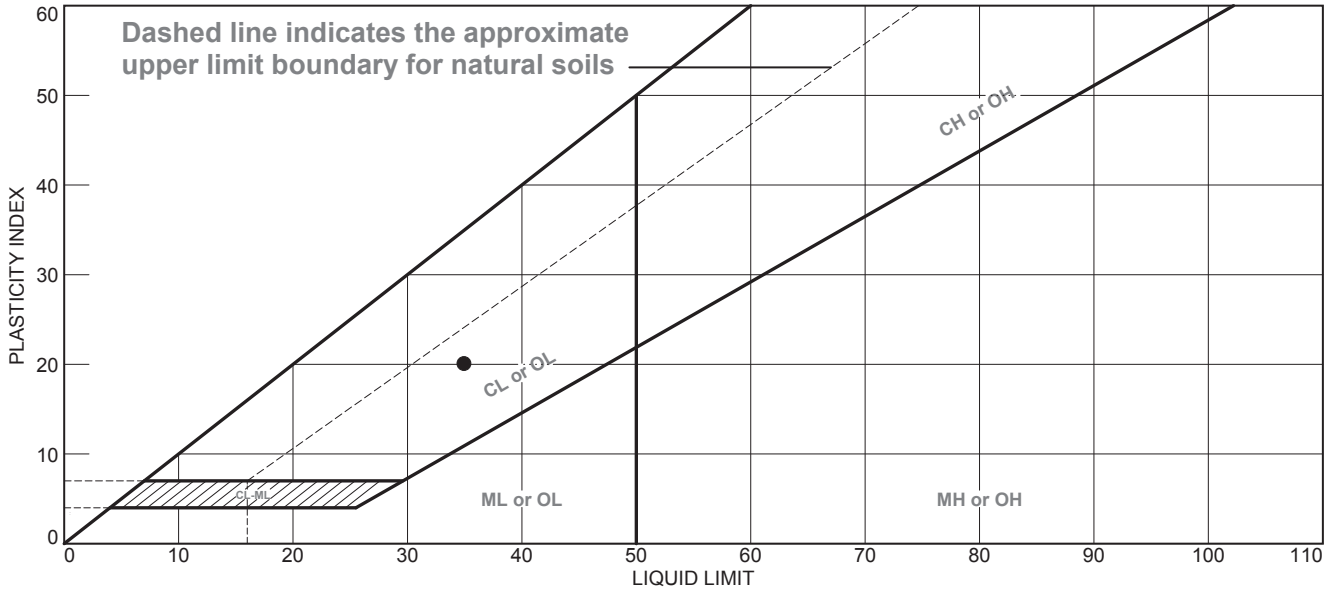
TERRACON
CONSULTANTS, INC.
Columbus, Ohio

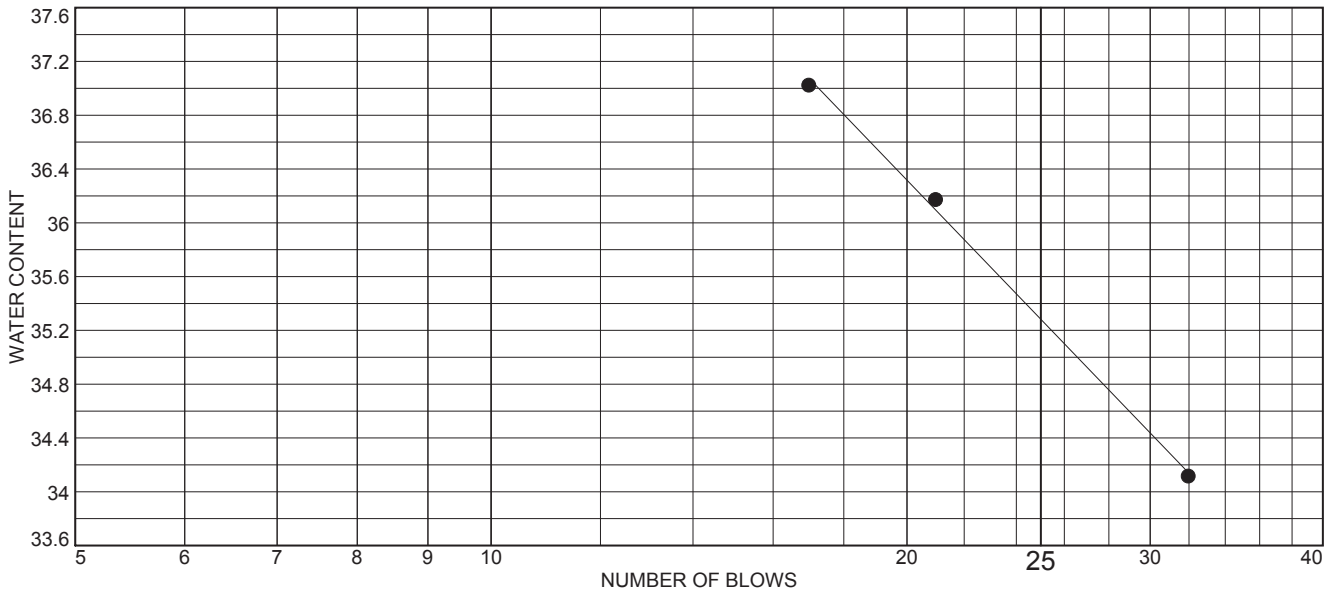
Client: American Electric Power
Project: Rockport Plant Impoundment Certification

Project No: N4155126 **Exhibit** B-9

Tested By: DS **Checked By:** AM

LIQUID AND PLASTIC LIMITS TEST REPORT





	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Gray and orange SANDY LEAN CLAY, trace gravel	35	15	20	77.2	63.5	CL

Project No. N4155126 **Client:** American Electric Power

Project: Rockport Plant Impoundment Certification

Source of Sample: B-2 **Depth:** 16.0'-18.0'
Sample Number: S-7

Remarks:
●Date: 9-21-15

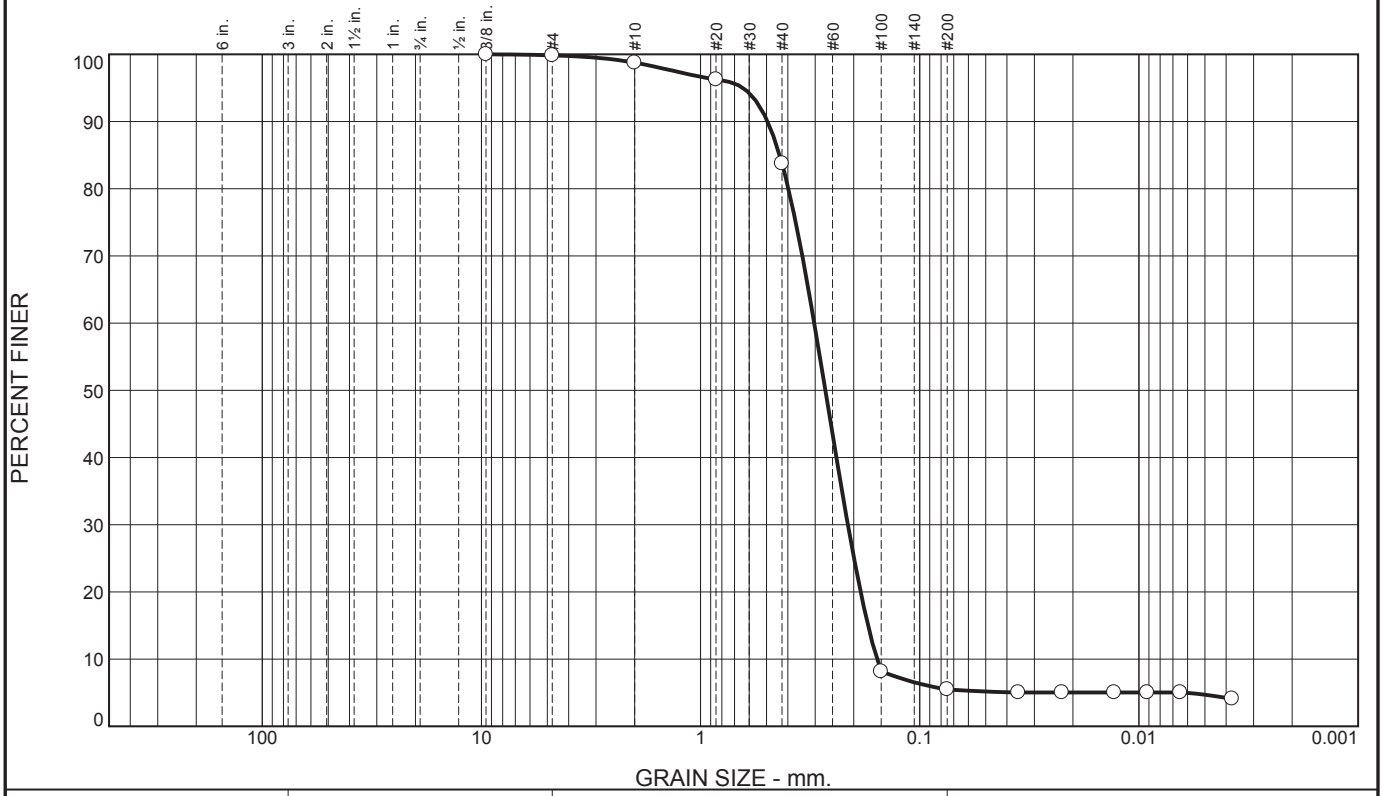
TERRACON CONSULTANTS, INC.

Columbus, Ohio

Exhibit B-10

Tested By: DS **Checked By:** AM

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.2	1.0	15.0	78.3	0.8	4.7

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3/8	100.0		
#4	99.8		
#10	98.8		
#20	96.2		
#40	83.8		
#100	8.2		
#200	5.5		
0.0355 mm.	5.0		
0.0224 mm.	5.0		
0.0130 mm.	5.0		
0.0092 mm.	5.0		
0.0065 mm.	5.0		
0.0038 mm.	4.1		

* (no specification provided)

Soil Description

Brown poorly graded SAND with silt, trace gravel

Atterberg Limits

PL= NP LL= NP PI= NP

Coefficients

D_{90}= 0.4948 D_{85}= 0.4358 D_{60}= 0.3031
D_{50}= 0.2696 D_{30}= 0.2128 D_{15}= 0.1722
D_{10}= 0.1566 C_u= 1.94 C_c= 0.95

Classification

USCS= SP-SM AASHTO= A-3

Remarks

F.M.=1.42

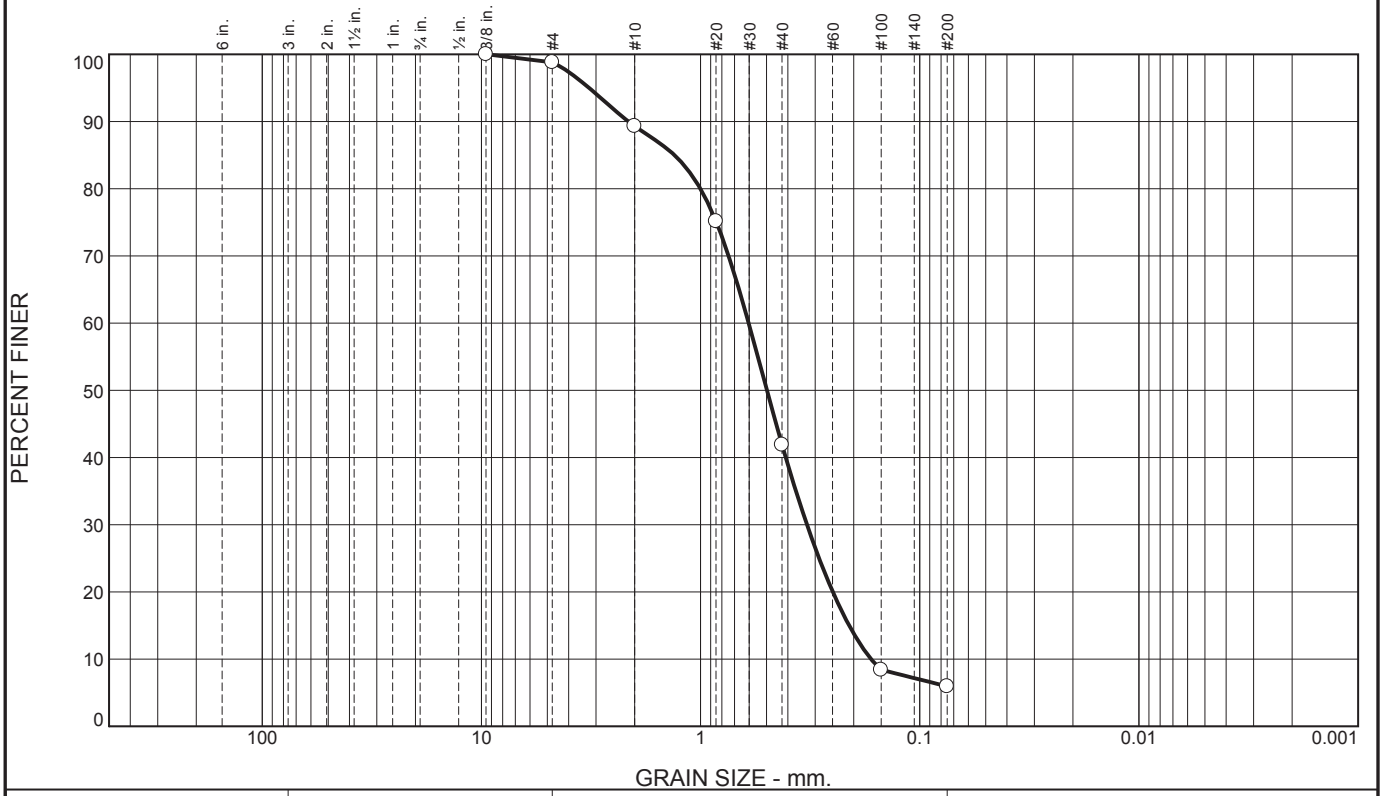
Source of Sample: B-2 **Depth:** 22.0'-24.0'
Sample Number: S-9 **Date:** 9-21-15

TERRACON
CONSULTANTS, INC.
Columbus, Ohio

Client: American Electric Power
Project: Rockport Plant Impoundment Certification
Project No: N4155126 **Exhibit** B-11

Tested By: DS **Checked By:** AM

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	1.2	9.5	47.4	36.0	5.9	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3/8	100.0		
#4	98.8		
#10	89.3		
#20	75.1		
#40	41.9		
#100	8.4		
#200	5.9		

* (no specification provided)

Soil Description

Brown poorly graded SAND with silt, trace gravel

Atterberg Limits

PL= NP LL= NP PI= NP

Coefficients

D_{90}= 2.1334 D_{85}= 1.3167 D_{60}= 0.6037
D_{50}= 0.4980 D_{30}= 0.3271 D_{15}= 0.2100
D_{10}= 0.1667 C_u= 3.62 C_c= 1.06

Classification

USCS= SP-SM AASHTO= A-1-b

Remarks

F.M.=2.32

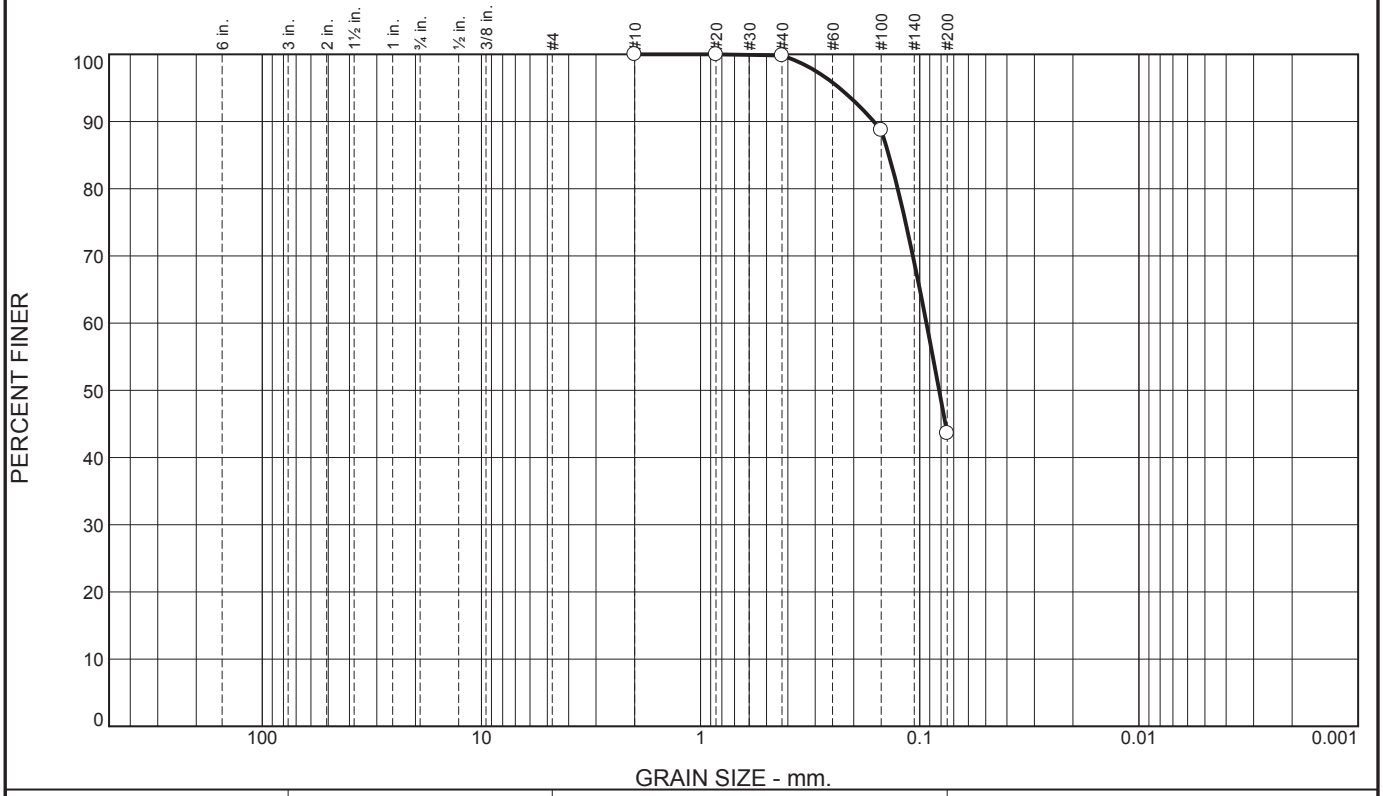
Source of Sample: B-2 **Depth:** 28.0'-30.0'
Sample Number: S-12 **Date:** 9-21-15

TERRACON
CONSULTANTS, INC.
Columbus, Ohio

Client: American Electric Power
Project: Rockport Plant Impoundment Certification
Project No: N4155126 **Exhibit** B-12

Tested By: DS **Checked By:** AM

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.0	0.2	56.2	43.6	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#10	100.0		
#20	100.0		
#40	99.8		
#100	88.7		
#200	43.6		

* (no specification provided)

Soil Description

Brown SILTY SAND

Atterberg Limits

PL= NP LL= NP PI= NP

Coefficients

D_{90}= 0.1621 D_{85}= 0.1384 D_{60}= 0.0932
D_{50}= 0.0815 D_{30}= D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= SM AASHTO= A-4(0)

Remarks

F.M.=0.14

Source of Sample: B-2 **Depth:** 32.0'-33.7'
Sample Number: S-14A

Date: 9-21-15

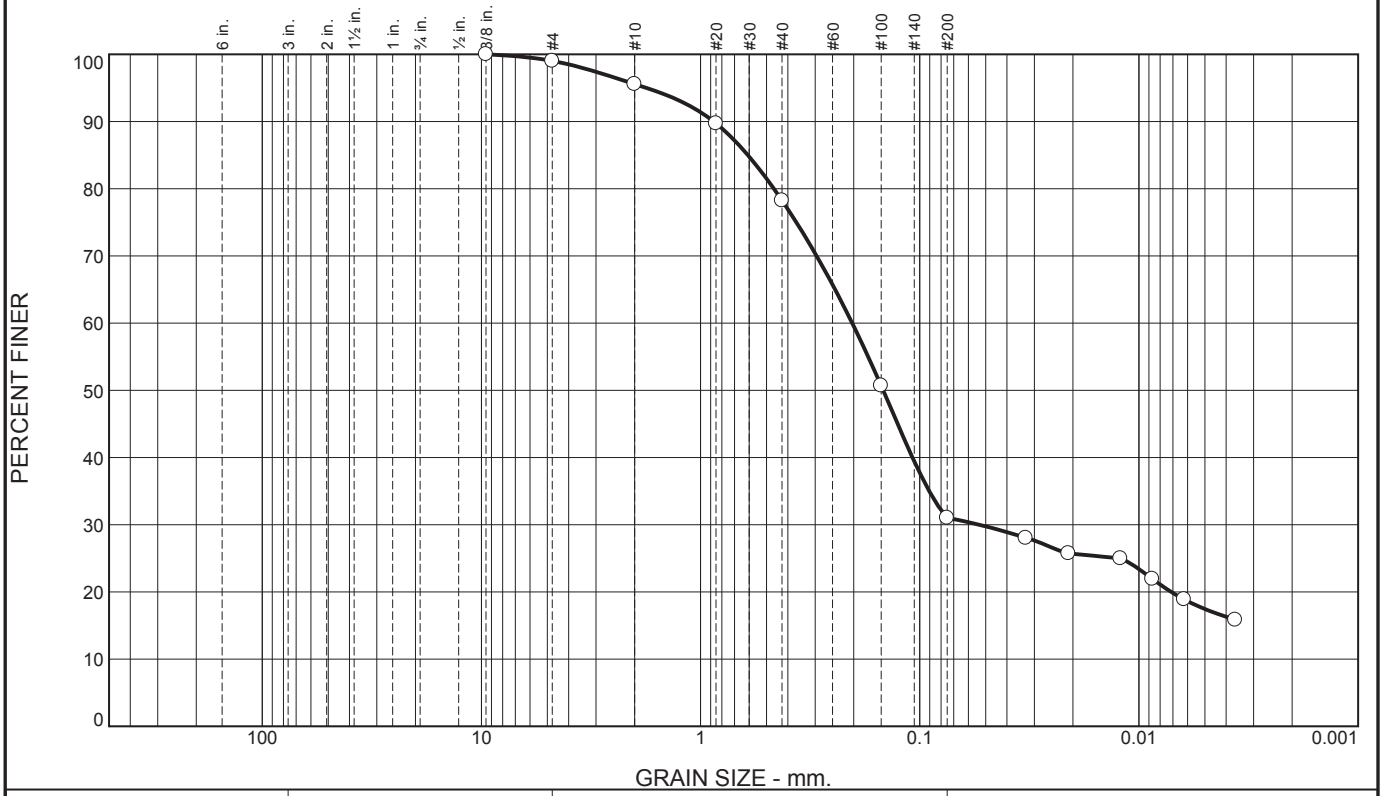
TERRACON
CONSULTANTS, INC.
Columbus, Ohio

Client: American Electric Power
Project: Rockport Plant Impoundment Certification

Project No: N4155126 **Exhibit** B-13

Tested By: DS **Checked By:** AM

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	1.0	3.4	17.4	47.2	13.5	17.5

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3/8	100.0		
#4	99.0		
#10	95.6		
#20	89.7		
#40	78.2		
#100	50.7		
#200	31.0		
0.0328 mm.	28.0		
0.0210 mm.	25.7		
0.0121 mm.	25.0		
0.0087 mm.	21.9		
0.0062 mm.	18.9		
0.0036 mm.	15.8		

* (no specification provided)

Soil Description

Brown SILTY SAND, trace gravel

Atterberg Limits

PL= NP LL= NP PI= NP

Coefficients

D_{90}= 0.8715 D_{85}= 0.6088 D_{60}= 0.2033
D_{50}= 0.1468 D_{30}= 0.0537 D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= SM AASHTO= A-2-4(0)

Remarks

F.M.=1.06

Source of Sample: B-2 **Depth:** 34.0'-36.0'
Sample Number: S-15

Date: 9-21-15

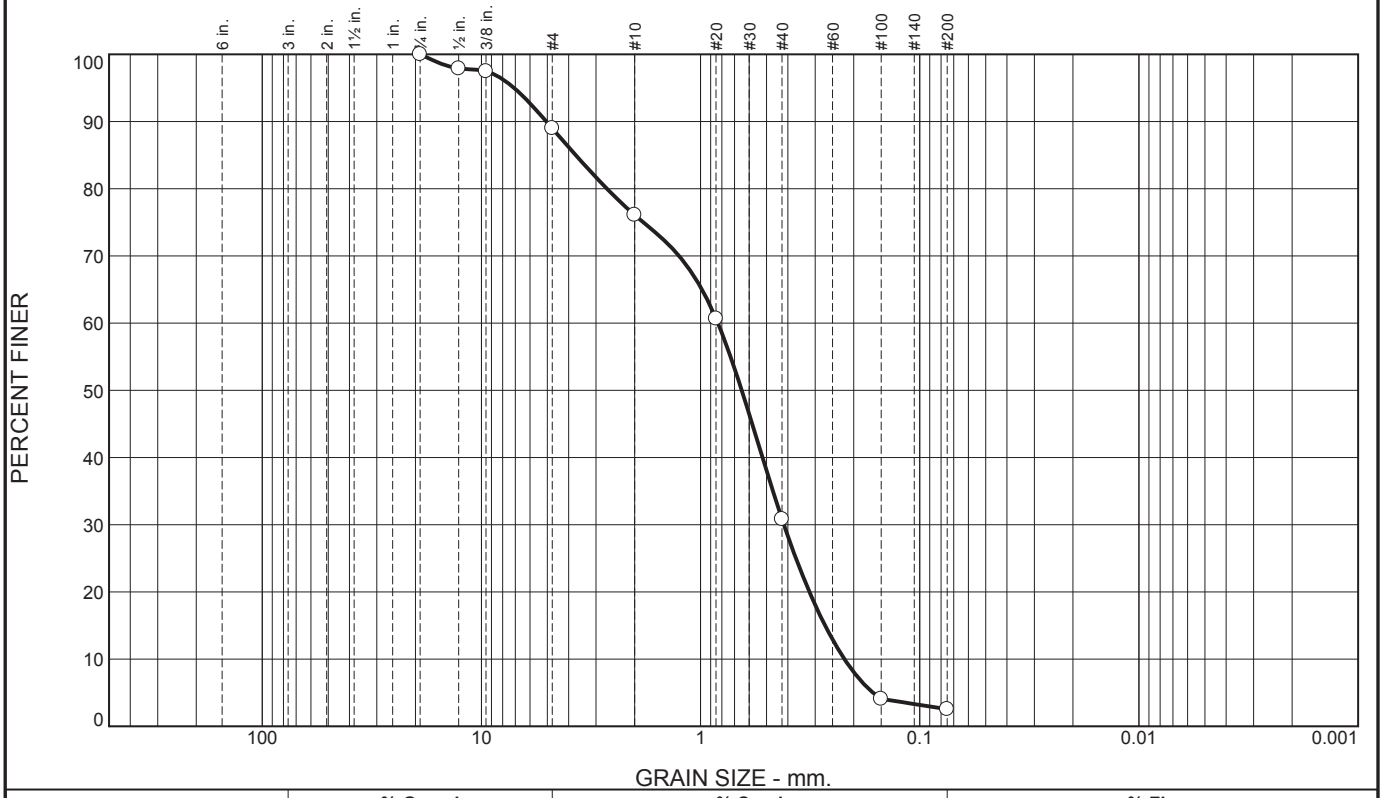
TERRACON
CONSULTANTS, INC.
Columbus, Ohio

Client: American Electric Power
Project: Rockport Plant Impoundment Certification

Project No: N4155126 **Exhibit** B-14

Tested By: DS **Checked By:** AM

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	11.0	12.9	45.3	28.3	2.5	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3/4	100.0		
1/2	97.9		
3/8	97.5		
#4	89.0		
#10	76.1		
#20	60.7		
#40	30.8		
#100	4.1		
#200	2.5		

* (no specification provided)

Soil Description

Brown poorly graded SAND, trace gravel

Atterberg Limits

PL= NP LL= NP PI= NP

Coefficients

D_{90}= 5.0561 D_{85}= 3.7126 D_{60}= 0.8336
D_{50}= 0.6494 D_{30}= 0.4167 D_{15}= 0.2704
D_{10}= 0.2206 C_u= 3.78 C_c= 0.94

Classification

USCS= SP AASHTO= A-1-b

Remarks

F.M.=2.98

Source of Sample: B-2 **Depth:** 42.0'-44.0'
Sample Number: S-19

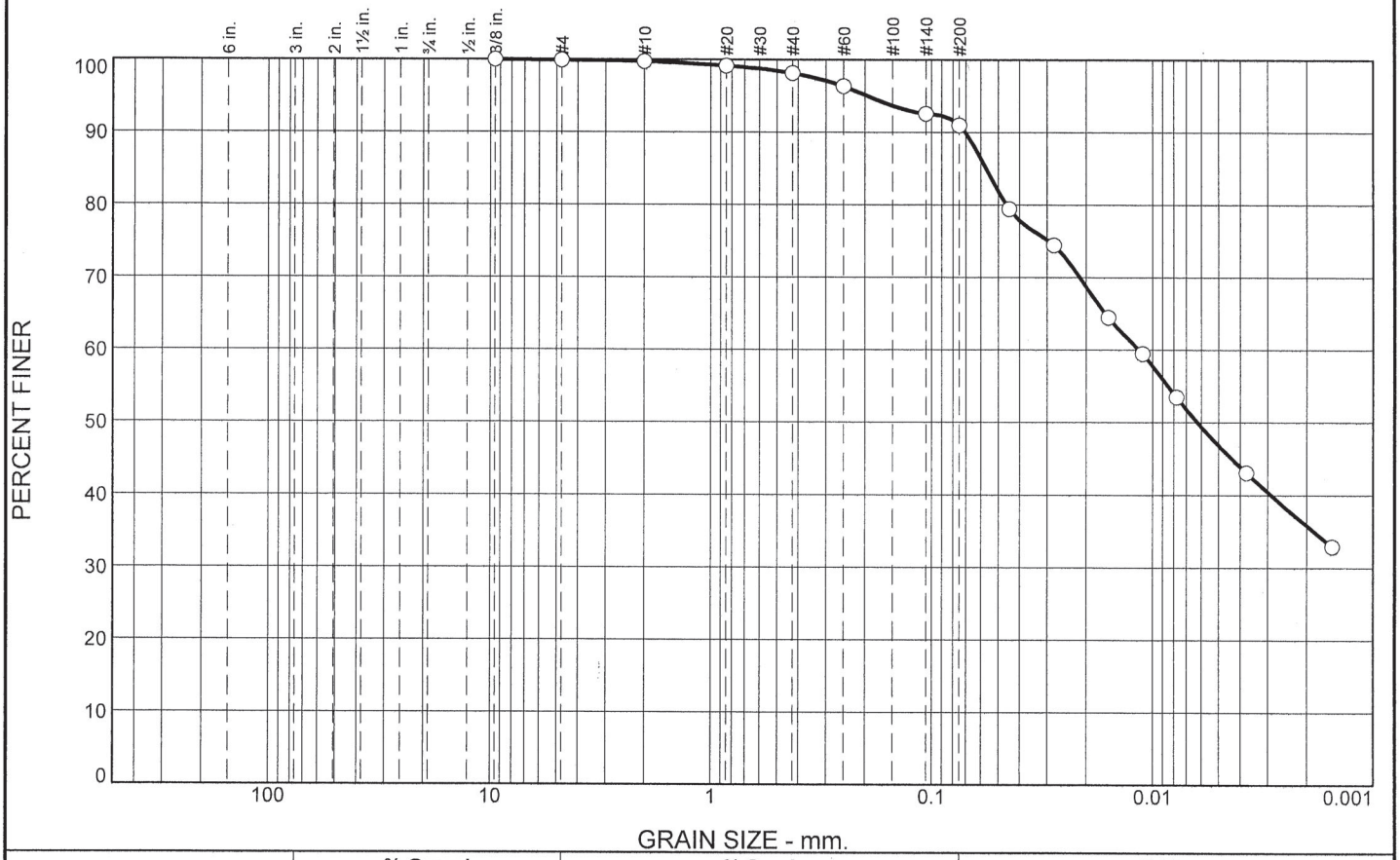
Date: 9-21-15

TERRACON
CONSULTANTS, INC.
Columbus, Ohio

Client: American Electric Power
Project: Rockport Plant Impoundment Certification
Project No: N4155126 **Exhibit** B-15

Tested By: DS **Checked By:** AM

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.1	0.2	1.5	7.2	55.1	35.9

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
.375	100.0		
#4	99.9		
#10	99.7		
#20	99.2		
#40	98.2		
#60	96.4		
#140	92.6		
#200	91.0		

* (no specification provided)

Material Description

BROWN GRAY LEAN CLAY

Atterberg Limits

PL= 22 LL= 42 PI= 20

Coefficients

D_{90}= 0.0705 D_{85}= 0.0568 D_{60}= 0.0115
D_{50}= 0.0062 D_{30}= D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= CL AASHTO= A-7-6(19)

Remarks

Source of Sample: B-1 **Depth:** 8-10'
Sample Number: ST-2

Date: 9-28-15

Terracon, Inc.

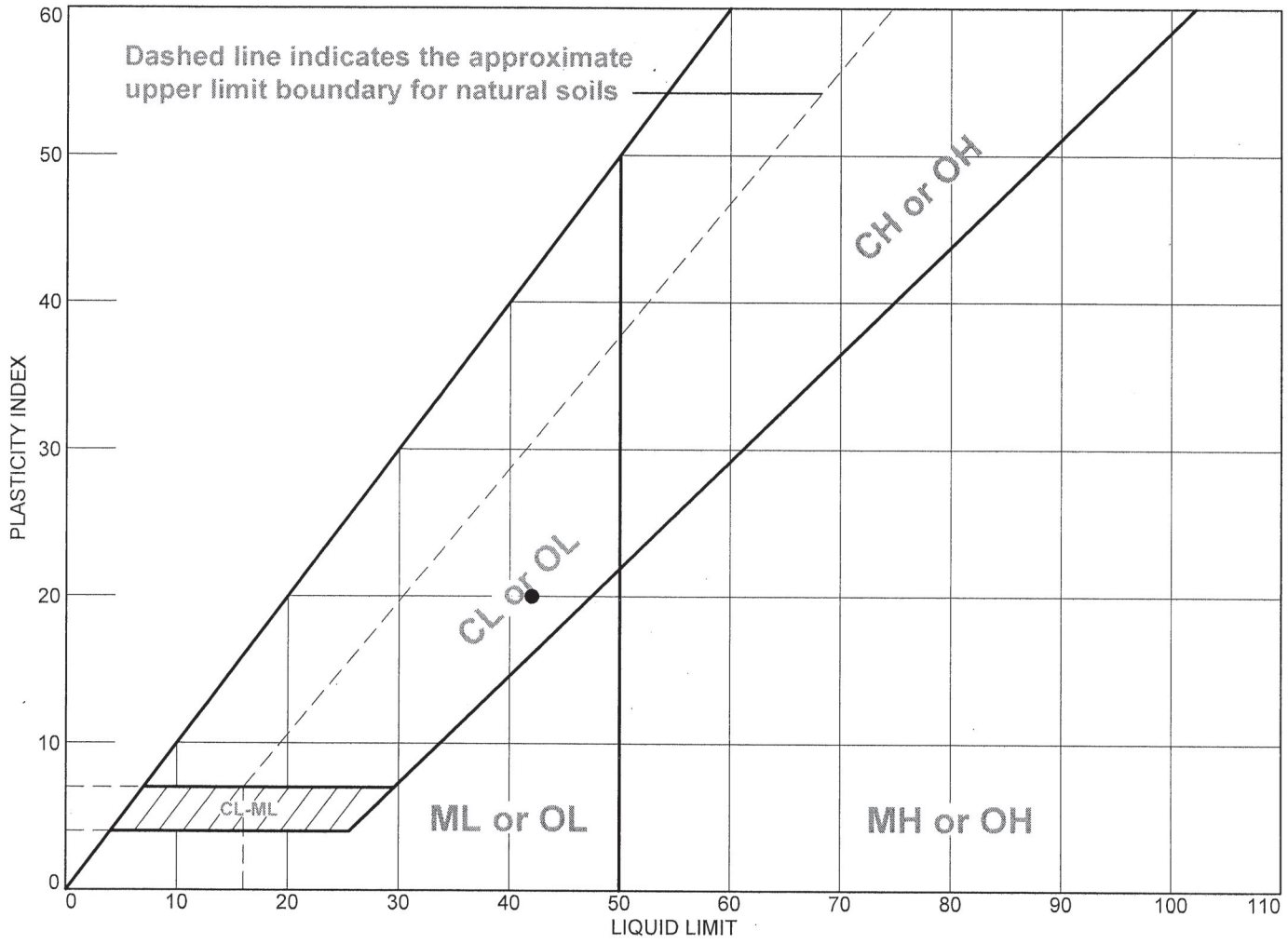
Cincinnati, Ohio

Client: AEP
Project: ROCKPORT PLANT IMPROVEMENT CERTIFICATION

Project No: N4155126 **Exhibit** 7353

Tested By: DR **Checked By:** GS

LIQUID AND PLASTIC LIMITS TEST REPORT



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	BROWN GRAY LEAN CLAY	42	22	20	98.2	91.0	CL

Project No. N4155126 **Client:** AEP

Project: ROCKPORT PLANT IMPROVEMENT CERTIFICATION

● **Source of Sample:** B-1 **Depth:** 8-10' **Sample Number:** ST-2

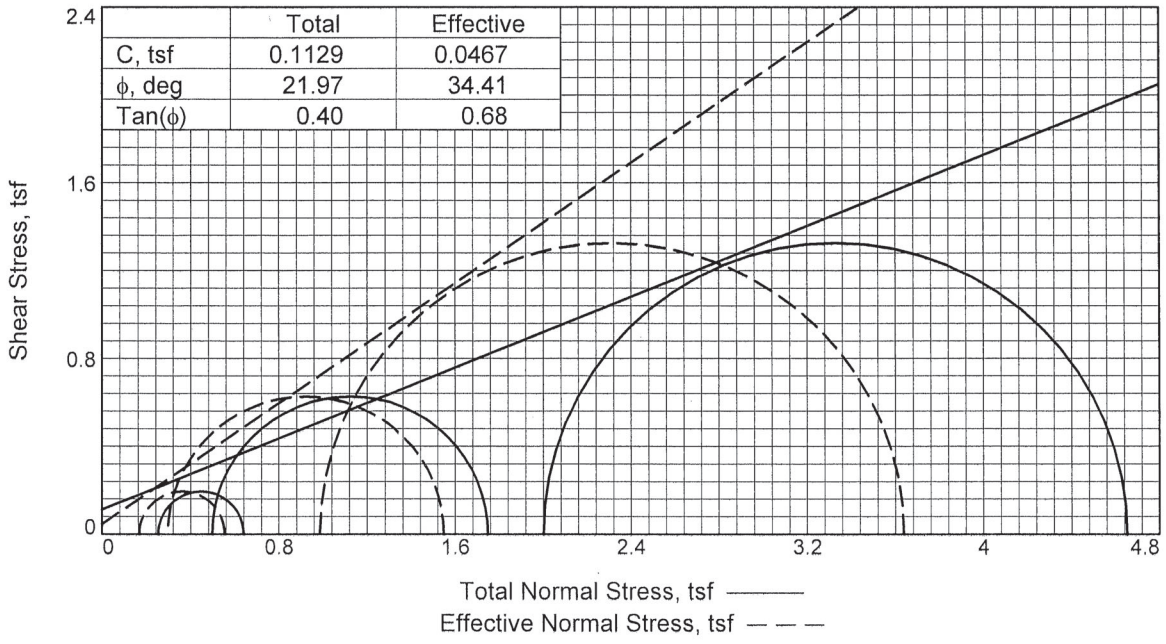
Remarks:

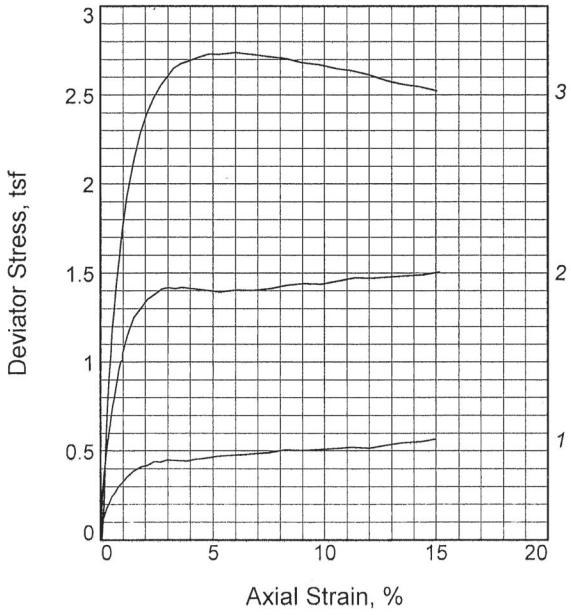
Terracon, Inc.

Cincinnati, Ohio

Exhibit 7353

Tested By: MD **Checked By:** GS





Sample No.		1	2	3
Initial	Water Content, %	25.2	28.6	27.0
	Dry Density, pcf	99.0	94.6	97.1
	Saturation, %	96.6	98.7	98.9
	Void Ratio	0.7033	0.7825	0.7364
	Diameter, in.	2.867	2.885	2.862
	Height, in.	5.748	5.717	5.757
At Test	Water Content, %	25.2	27.8	24.9
	Dry Density, pcf	100.4	96.3	100.7
	Saturation, %	100.0	100.0	100.0
	Void Ratio	0.6794	0.7499	0.6736
	Diameter, in.	2.854	2.867	2.827
	Height, in.	5.721	5.682	5.687
Strain rate, in./min.		0.000	0.000	0.000
Back Pressure, tsf		3.600	3.600	3.600
Cell Pressure, tsf		3.852	4.097	5.602
Fail. Stress, tsf		0.388	1.252	2.652
Total Pore Pr., tsf		3.686	3.802	4.615
Ult. Stress, tsf				
Total Pore Pr., tsf				
$\bar{\sigma}_1$ Failure, tsf		0.554	1.547	3.638
$\bar{\sigma}_3$ Failure, tsf		0.166	0.295	0.986

Type of Test:
CU with Pore Pressures
Sample Type: ST
Description: BROWN GRAY LEAN CLAY

LL= 42 **PL=** 22 **PI=** 20
Assumed Specific Gravity= 2.70
Remarks:

Exhibit 7353

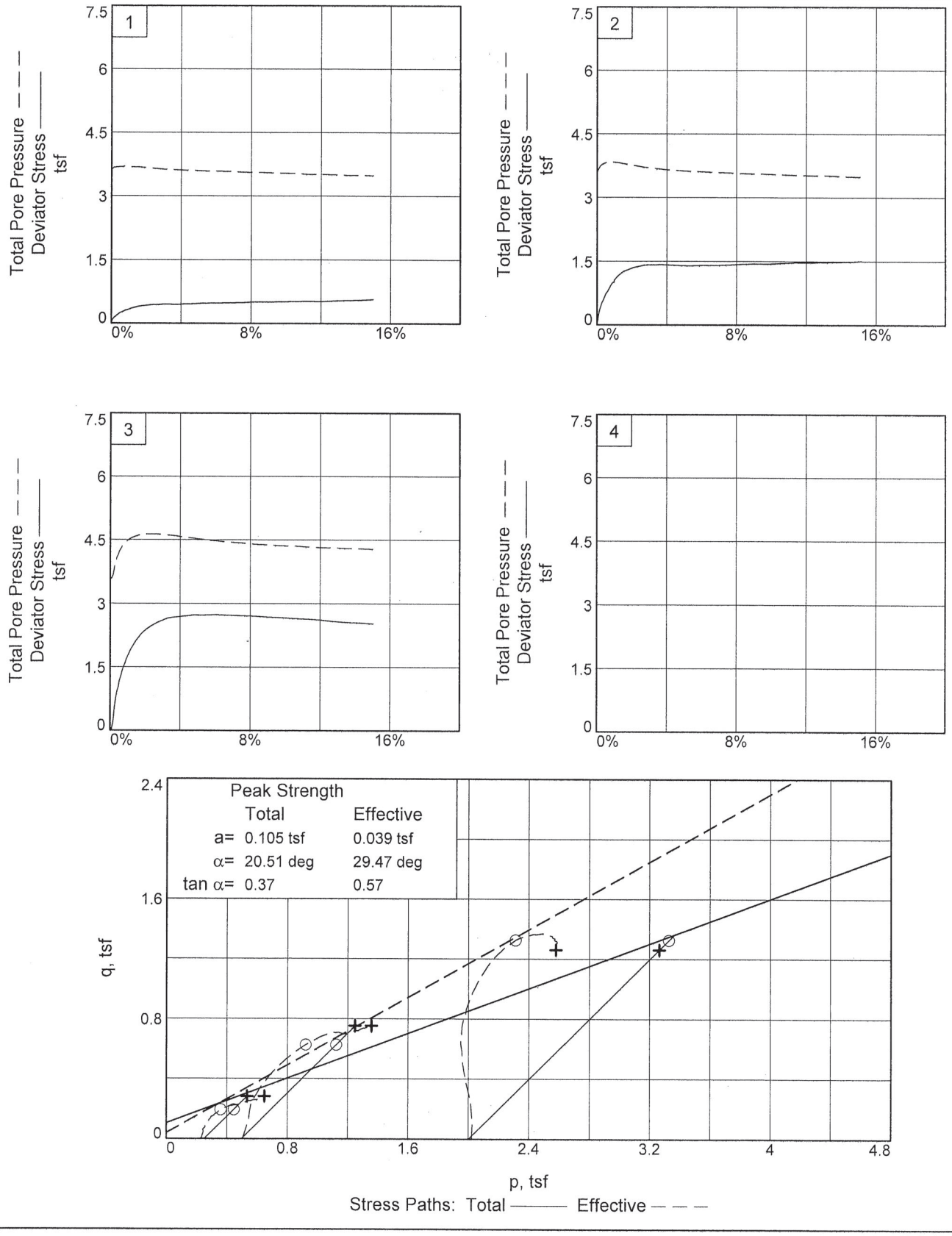
Client: AEP

Project: ROCKPORT PLANT IMPROVEMENT CERTIFICATION

Source of Sample: B-1 **Depth:** 8-10'
Sample Number: ST-2
Proj. No.: N4155126 **Date Sampled:** 9-28-15

TRIAXIAL SHEAR TEST REPORT
Terracon, Inc.
Cincinnati, Ohio

Tested By: FCE **Checked By:** GS



Client: AEP

Project: ROCKPORT PLANT IMPROVEMENT CERTIFICATION

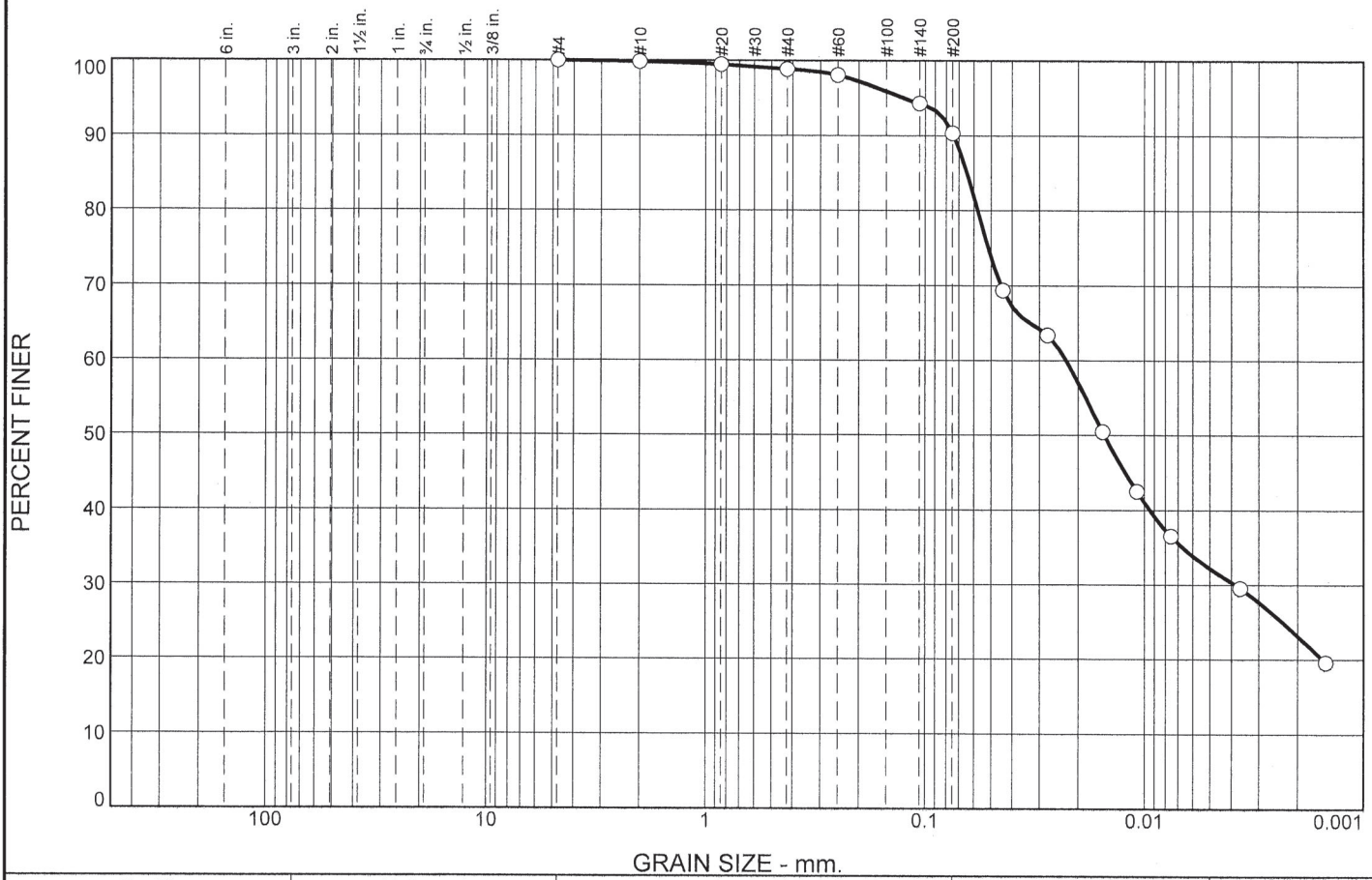
Source of Sample: B-1 **Depth:** 8-10' **Sample Number:** ST-2

Project No.: N4155126 **Exhibit** _____

Terracon, Inc.

Tested By: FCE **Checked By:** GS

Particle Size Distribution Report



% +3"	% Gravel	% Sand	% Silt	% Clay
0.0	0.0	9.7	58.1	32.2

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#4	100.0		
#10	99.9		
#20	99.5		
#40	98.9		
#60	98.1		
#140	94.3		
#200	90.3		

* (no specification provided)

Material Description

BROWN GRAY LEAN CLAY

Atterberg Limits

PL= 18 LL= 28 PI= 10

Coefficients

D_{90}= 0.0742 D_{85}= 0.0645 D_{60}= 0.0227
D_{50}= 0.0152 D_{30}= 0.0038 D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= CL AASHTO= A-4(8)

Remarks

Source of Sample: B-1 **Depth:** 14-16'
Sample Number: ST-3

Date: 10-05-15

Terracon, Inc.

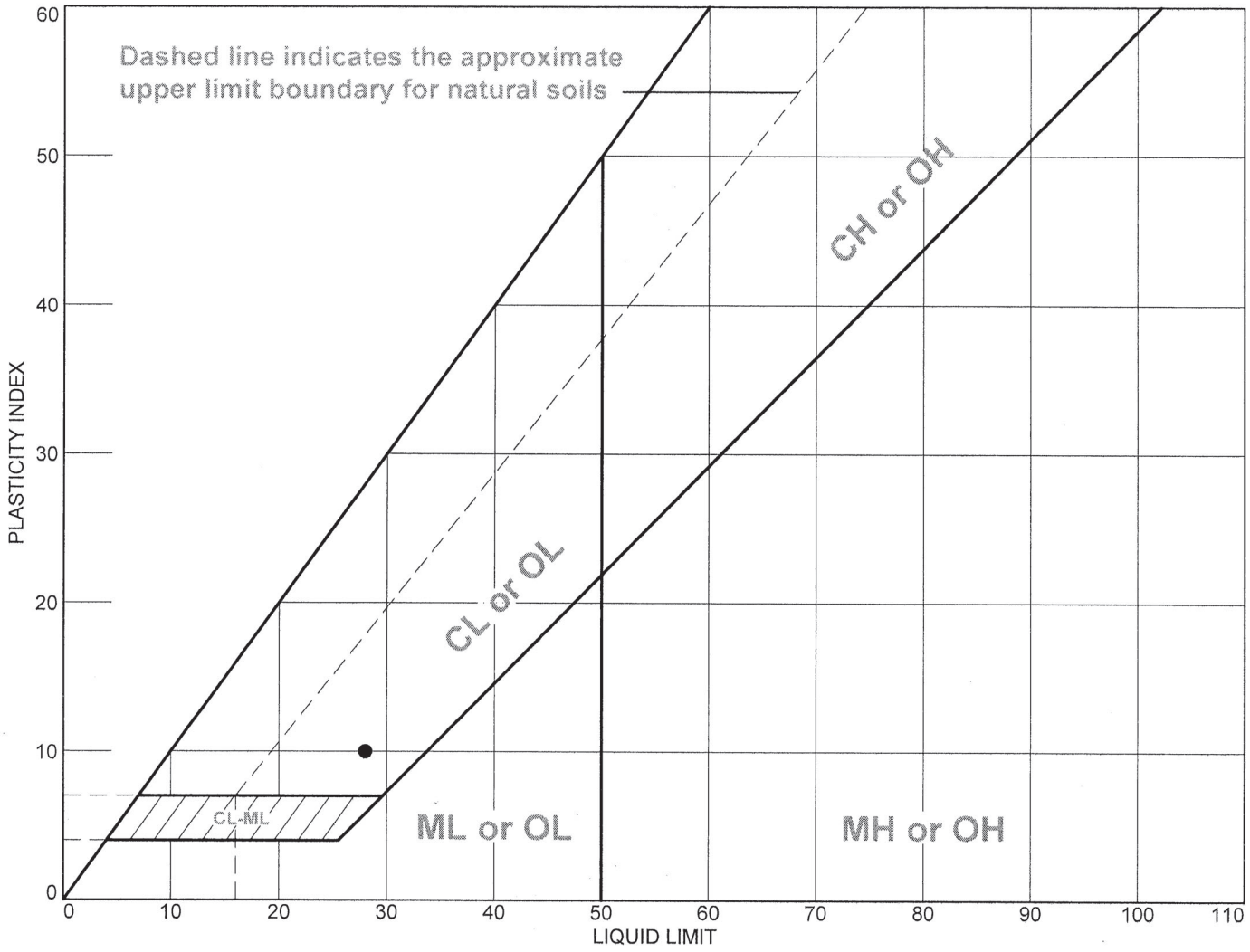
Cincinnati, Ohio

Client: AEP
Project: ROCKPORT PLANT IMPROVEMENT CERTIFICATION

Project No: N4155126 **Exhibit**

Tested By: JB **Checked By:** GS

LIQUID AND PLASTIC LIMITS TEST REPORT



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	BROWN GRAY LEAN CLAY	28	18	10	98.9	90.3	CL

Project No. N4155126 **Client:** AEP

Project: ROCKPORT PLANT IMPROVEMENT CERTIFICATION

● **Source of Sample:** B-1 **Depth:** 14-16' **Sample Number:** ST-3

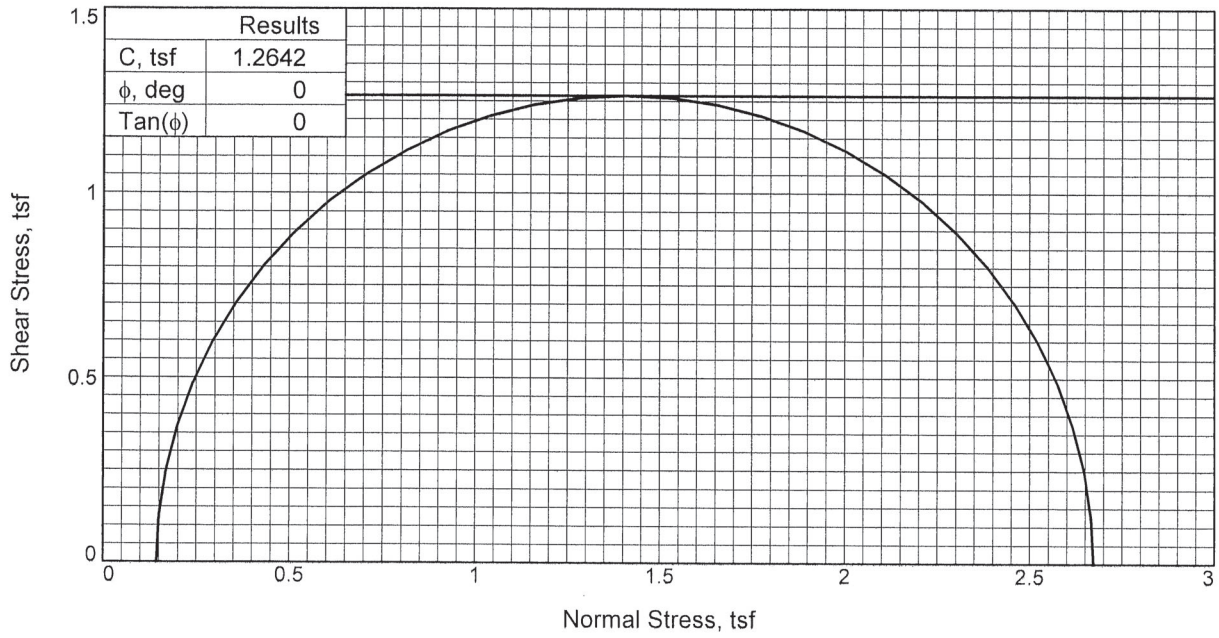
Remarks:

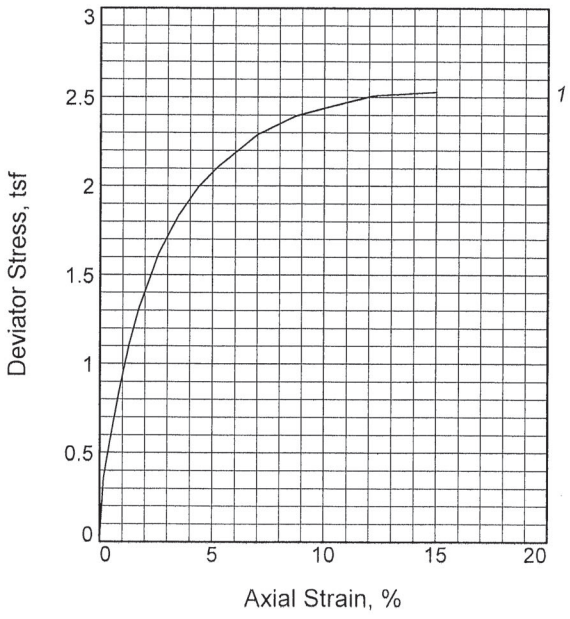
● MC - 22.5%

Terracon, Inc.

Cincinnati, Ohio

Exhibit





Sample No.		1
Initial	Water Content, %	22.5
	Dry Density, pcf	104.7
	Saturation, %	99.5
	Void Ratio	0.6095
	Diameter, in.	2.860
	Height, in.	5.734
At Test	Water Content, %	22.9
	Dry Density, pcf	104.7
	Saturation, %	101.4
	Void Ratio	0.6095
	Diameter, in.	2.860
	Height, in.	5.734
Strain rate, in./min.		0.057
Back Pressure, tsf		0.000
Cell Pressure, tsf		0.144
Fail. Stress, tsf		2.528
Ult. Stress, tsf		
σ_1 Failure, tsf		2.672
σ_3 Failure, tsf		0.144

Type of Test:
Unconsolidated Undrained
Sample Type: ST
Description: BROWN GRAY LEAN CLAY

LL= 28 **PL=** 18 **PI=** 10
Assumed Specific Gravity= 2.70
Remarks:

Exhibit 7354

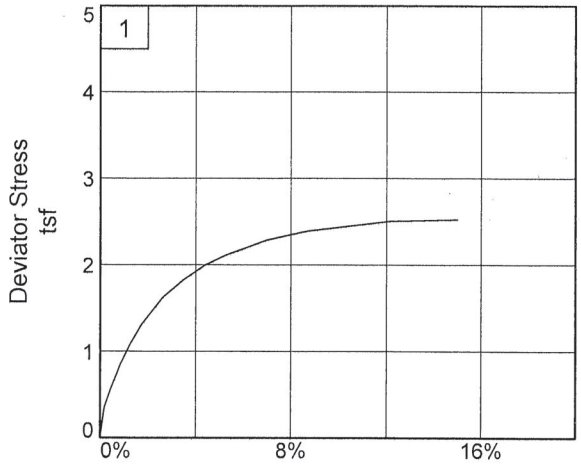
Client: AEP

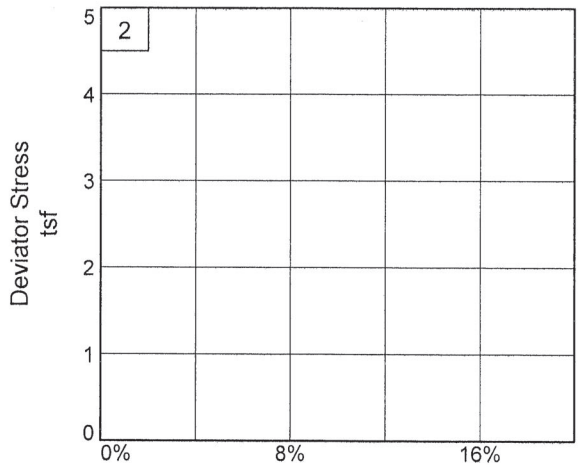
Project: ROCKPORT PLANT IMPROVEMENT CERTIFICATION

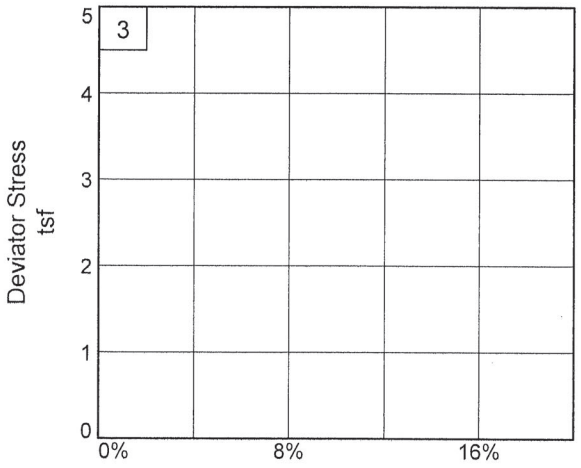
Source of Sample: B-1 **Depth:** 14-16'
Sample Number: ST-3
Proj. No.: N4155126 **Date Sampled:** 10-05-15

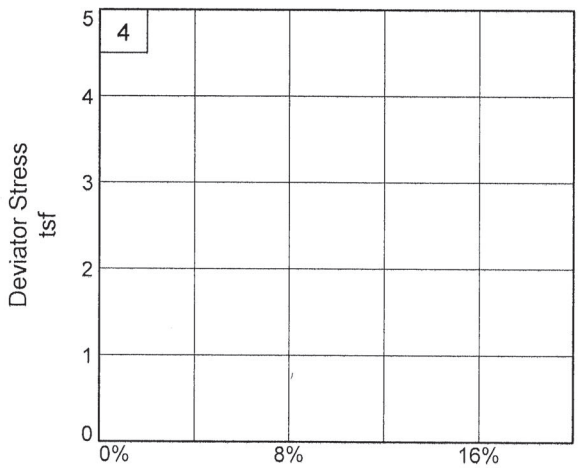
TRIAXIAL SHEAR TEST REPORT
Terracon, Inc.
Cincinnati, Ohio

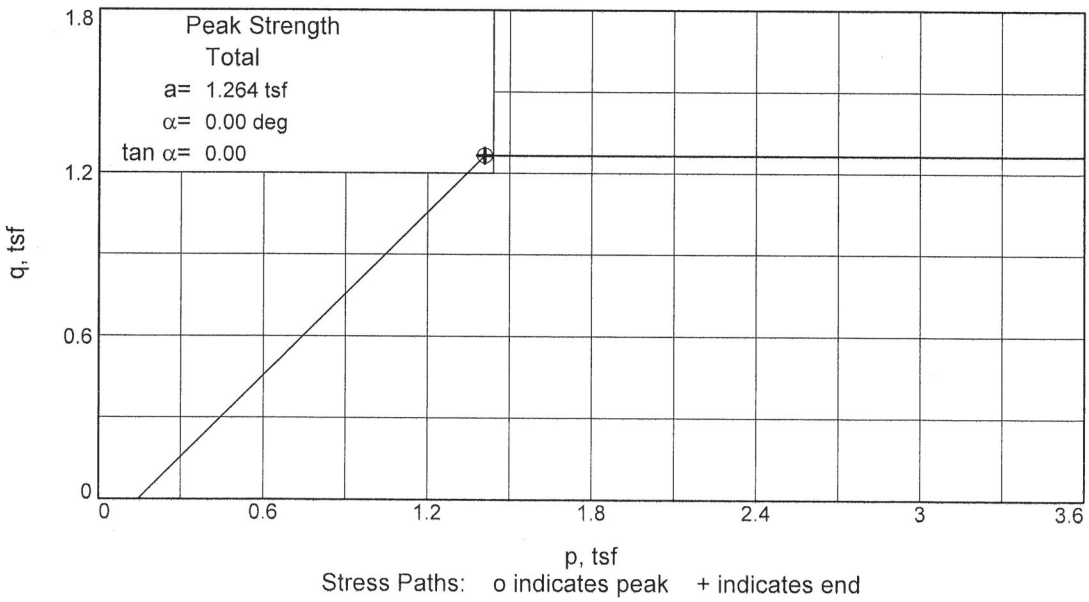
Tested By: FCE **Checked By:** GS











Stress Paths: o indicates peak + indicates end

Client: AEP

Project: ROCKPORT PLANT IMPROVEMENT CERTIFICATION

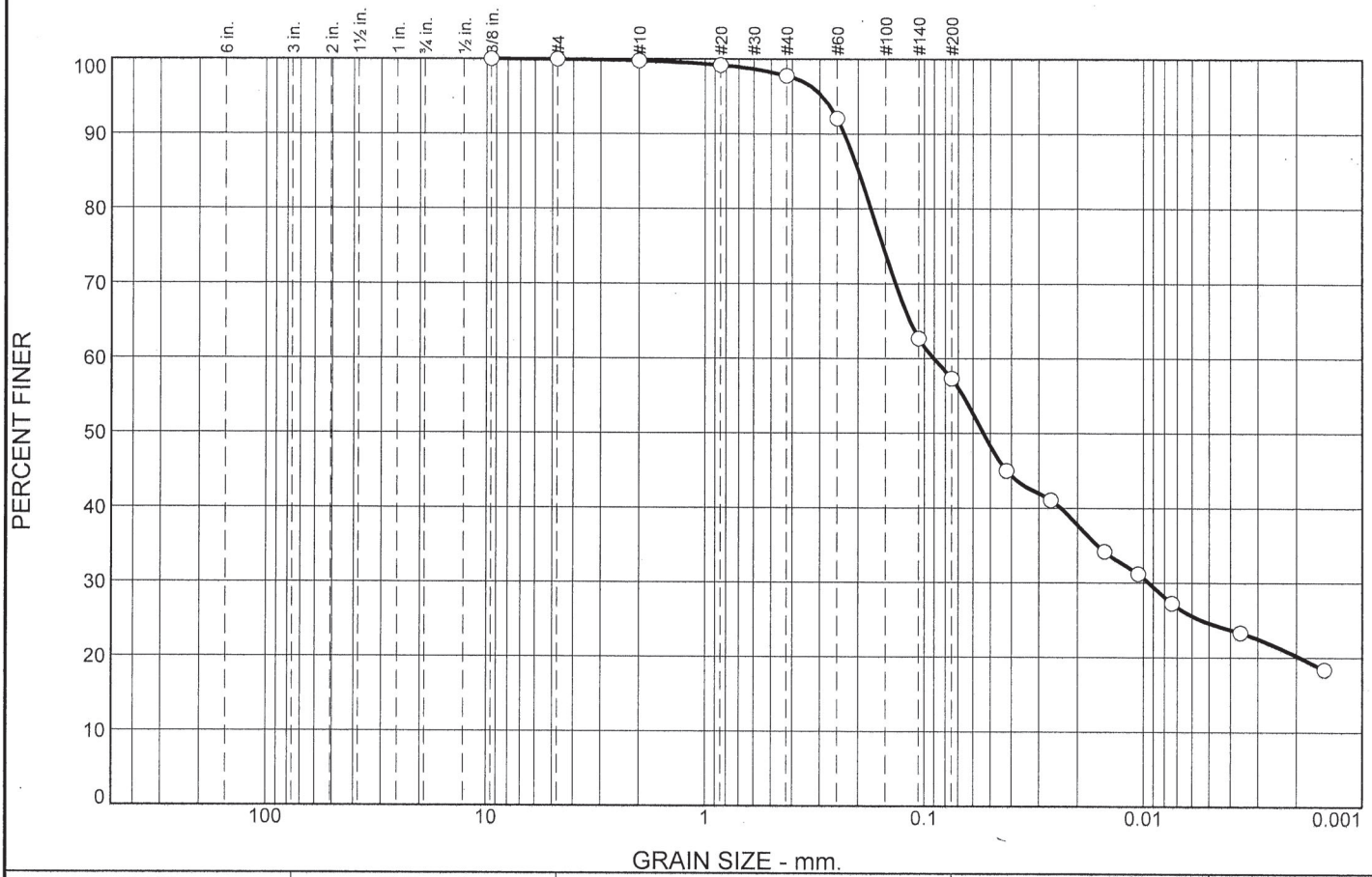
Source of Sample: B-1 **Depth:** 14-16' **Sample Number:** ST-3

Project No.: N4155126 **Exhibit** _____

Terracon, Inc.

Tested By: FCE **Checked By:** GS

Particle Size Distribution Report



% +3"	% Gravel	% Sand	% Silt	% Clay
0.0	0.0	42.7	32.7	24.6

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
.375	100.0		
#4	100.0		
#10	99.8		
#20	99.2		
#40	97.8		
#60	92.1		
#140	62.7		
#200	57.3		

* (no specification provided)

Material Description

BROWN SANDY SILT

Atterberg Limits

PL= 16 LL= 19 PI= 3

Coefficients

D_{90}= 0.2316 D_{85}= 0.1995 D_{60}= 0.0905
D_{50}= 0.0538 D_{30}= 0.0094 D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= ML AASHTO= A-4(0)

Remarks

Source of Sample: B-2 **Depth:** 4-6'
Sample Number: ST-1

Date: 10-5-15

Terracon, Inc.

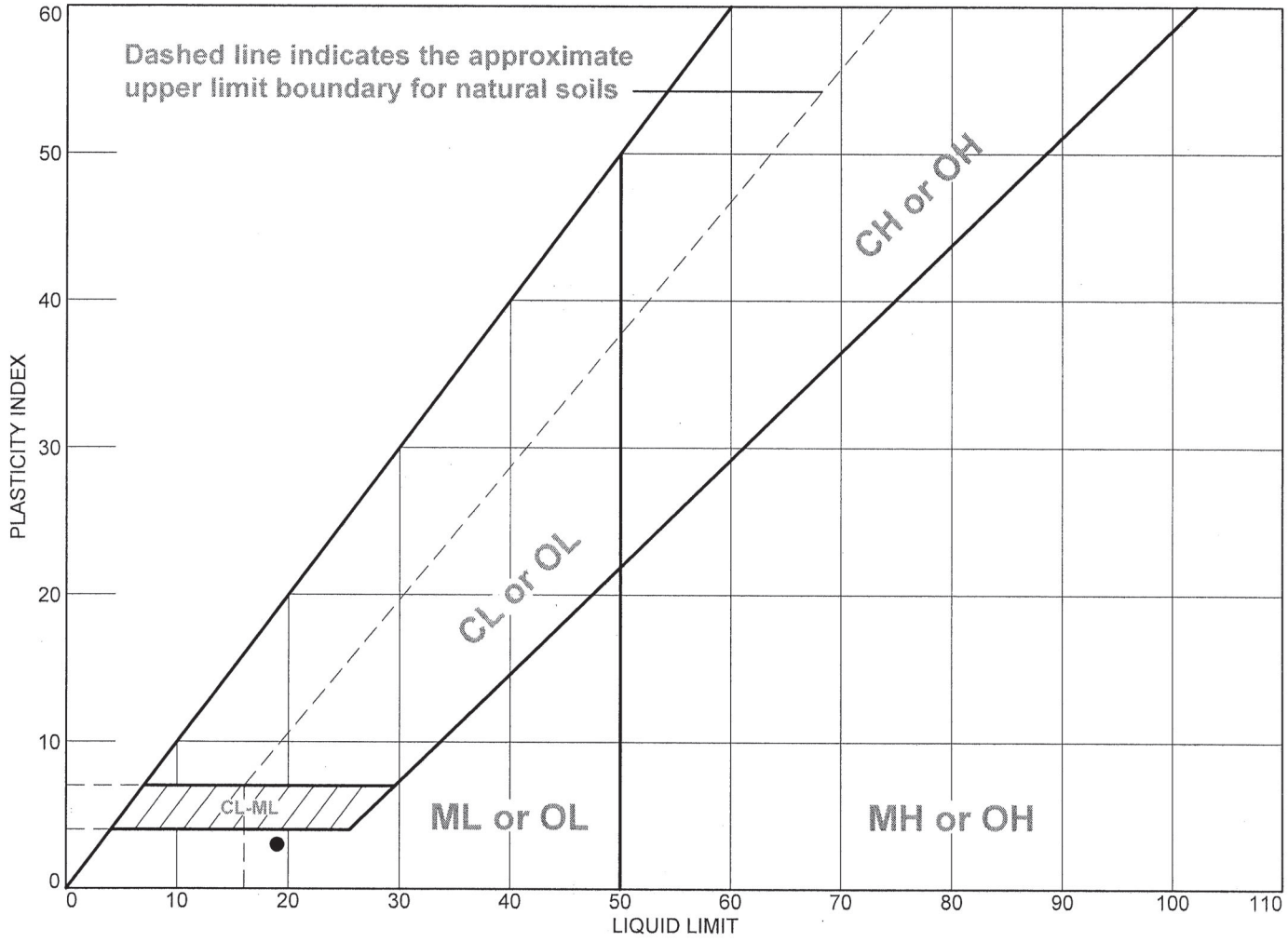
Cincinnati, Ohio

Client: AEP
Project: ROCKPORT PLANT IMPROVEMENT CERTIFICATION

Project No: N4155126 **Exhibit**

Tested By: JB **Checked By:** GS

LIQUID AND PLASTIC LIMITS TEST REPORT



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	BROWN SANDY SILT	19	16	3	97.8	57.3	ML

Project No. N4155126 **Client:** AEP

Project: ROCKPORT PLANT IMPROVEMENT CERTIFICATION

● **Source of Sample:** B-2 **Depth:** 4-6' **Sample Number:** ST-1

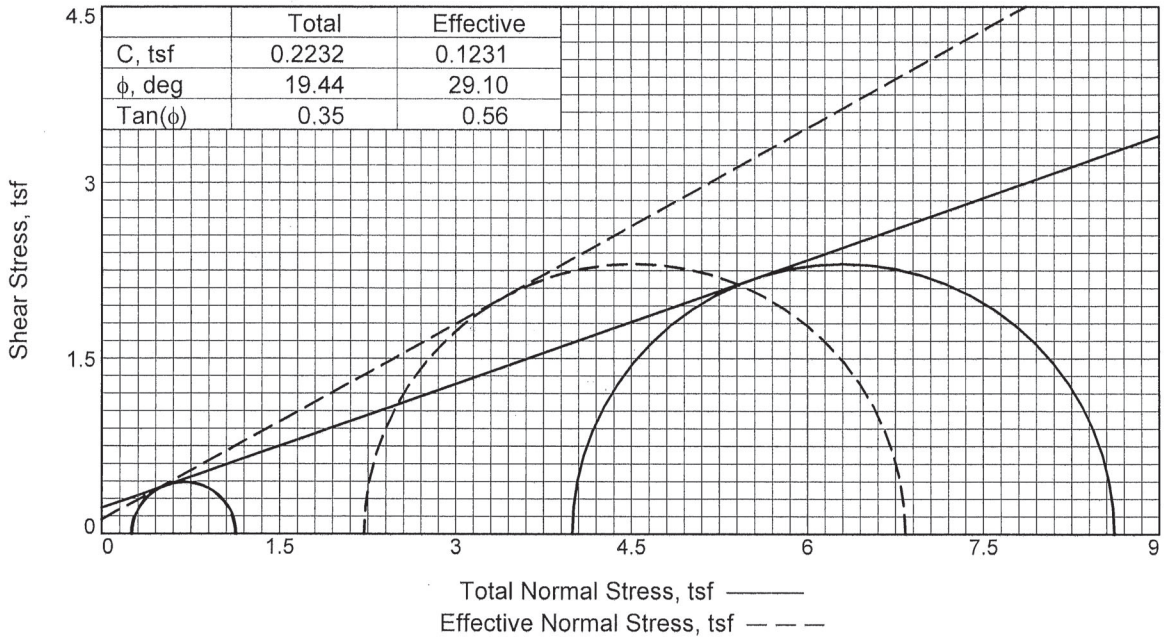
Remarks:

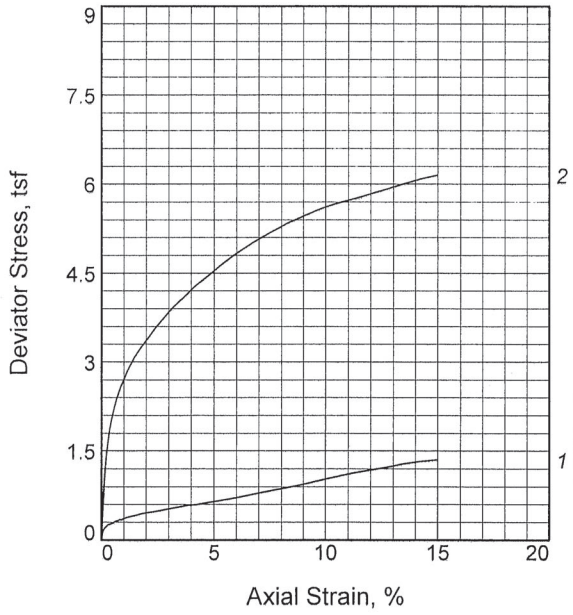
Terracon, Inc.

Cincinnati, Ohio

Exhibit

Tested By: VD **Checked By:** GS





Sample No.		1	2
Initial	Water Content, %	15.6	17.3
	Dry Density, pcf	110.4	114.3
	Saturation, %	80.0	98.5
	Void Ratio	0.5262	0.4741
	Diameter, in.	2.853	2.844
	Height, in.	5.704	5.702
At Test	Water Content, %	18.1	15.8
	Dry Density, pcf	113.2	118.0
	Saturation, %	100.0	100.0
	Void Ratio	0.4887	0.4279
	Diameter, in.	2.829	2.814
	Height, in.	5.657	5.642
Strain rate, in./min.		0.001	0.001
Back Pressure, tsf		3.600	3.600
Cell Pressure, tsf		3.852	7.596
Fail. Stress, tsf		0.883	4.618
Total Pore Pr., tsf		3.607	5.378
Ult. Stress, tsf			
Total Pore Pr., tsf			
$\bar{\sigma}_1$ Failure, tsf		1.127	6.836
$\bar{\sigma}_3$ Failure, tsf		0.245	2.218

Type of Test:
CU with Pore Pressures
Sample Type: ST
Description: BROWN SANDY SILT

LL= 19 **PL=** 16 **PI=** 3
Assumed Specific Gravity= 2.70
Remarks:

Exhibit 7355

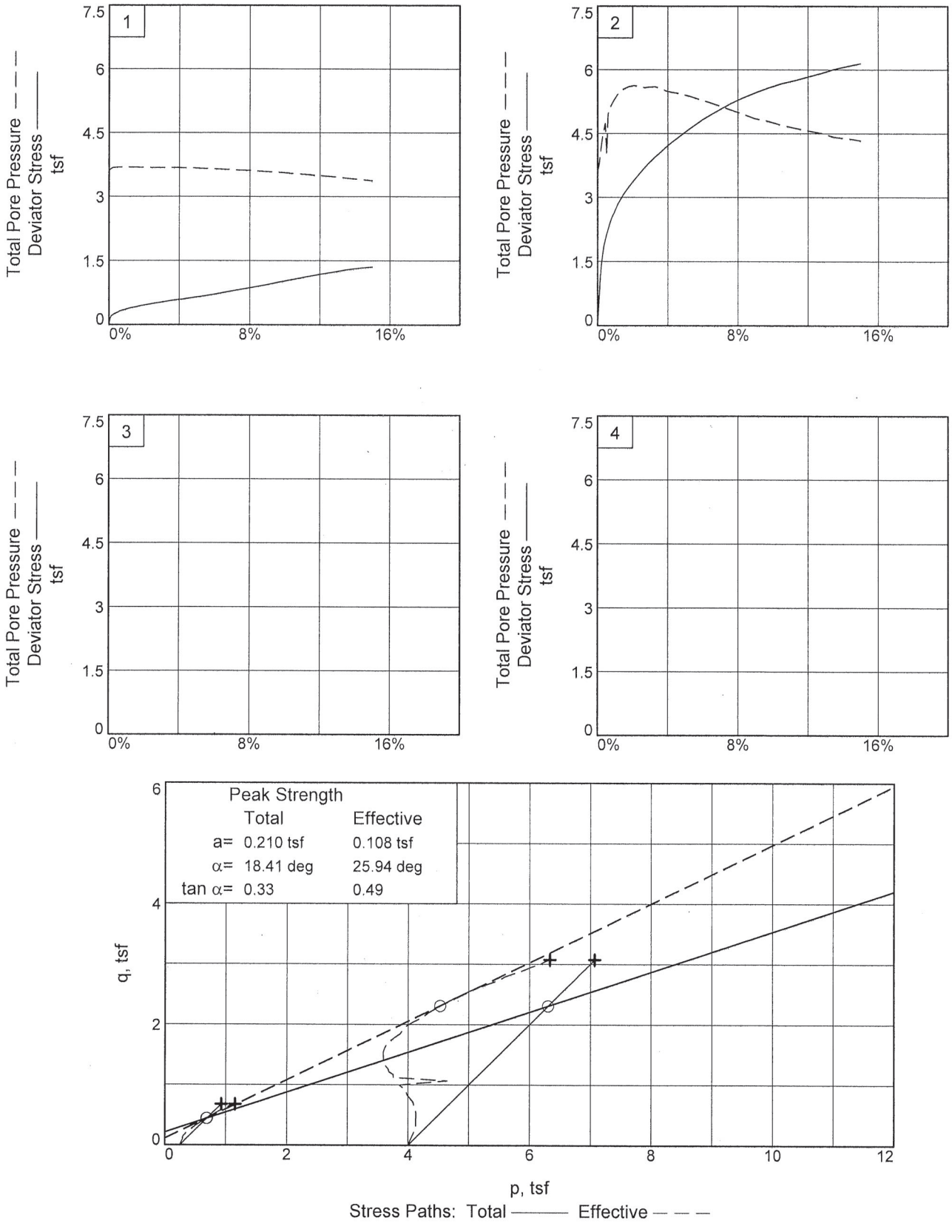
Client: AEP

Project: ROCKPORT PLANT IMPROVEMENT CERTIFICATION

Source of Sample: B-2 **Depth:** 4-6'
Sample Number: ST-1
Proj. No.: N4155126 **Date Sampled:** 10-5-15

TRIAXIAL SHEAR TEST REPORT
Terracon, Inc.
Cincinnati, Ohio

Tested By: FCE **Checked By:** GS



Client: AEP

Project: ROCKPORT PLANT IMPROVEMENT CERTIFICATION

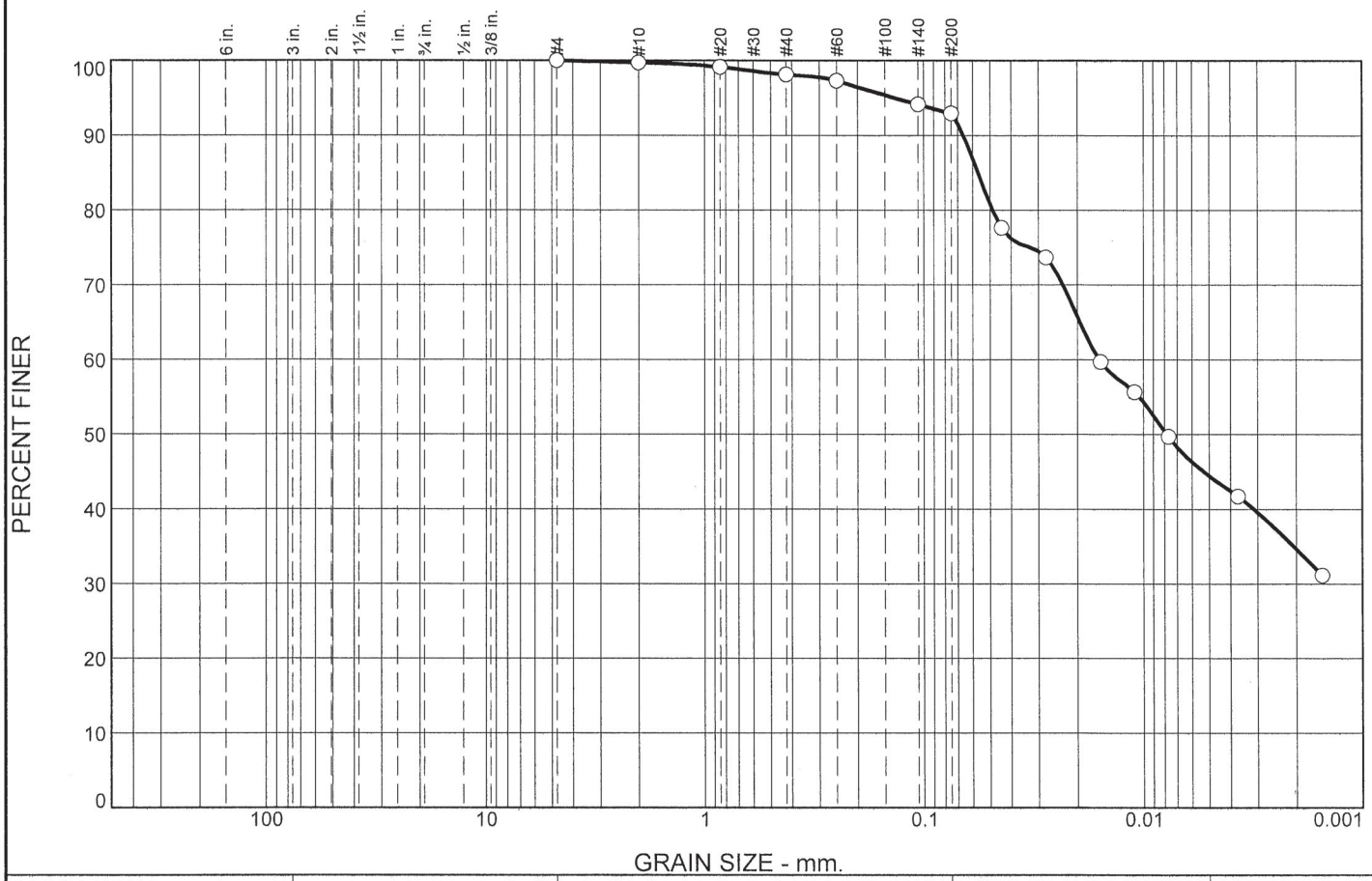
Source of Sample: B-2 **Depth:** 4-6' **Sample Number:** ST-1

Project No.: N4155126 **Exhibit** _____

Terracon, Inc.

Tested By: FCE **Checked By:** GS

Particle Size Distribution Report



% +3"	% Gravel	% Sand	% Silt	% Clay
0.0	0.0	7.0	48.5	44.5

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#4	100.0		
#10	99.7		
#20	99.1		
#40	98.1		
#60	97.3		
#140	94.2		
#200	93.0		

* (no specification provided)

Material Description

GRAY LEAN CLAY

Atterberg Limits

PL= 21 LL= 30 PI= 9

Coefficients

D_{90}= 0.0662 D_{85}= 0.0568 D_{60}= 0.0159
D_{50}= 0.0078 D_{30}= D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= CL AASHTO= A-4(8)

Remarks

Source of Sample: B-2 **Depth:** 10-12'
Sample Number: ST-2

Date: 10-13-15

Terracon, Inc.

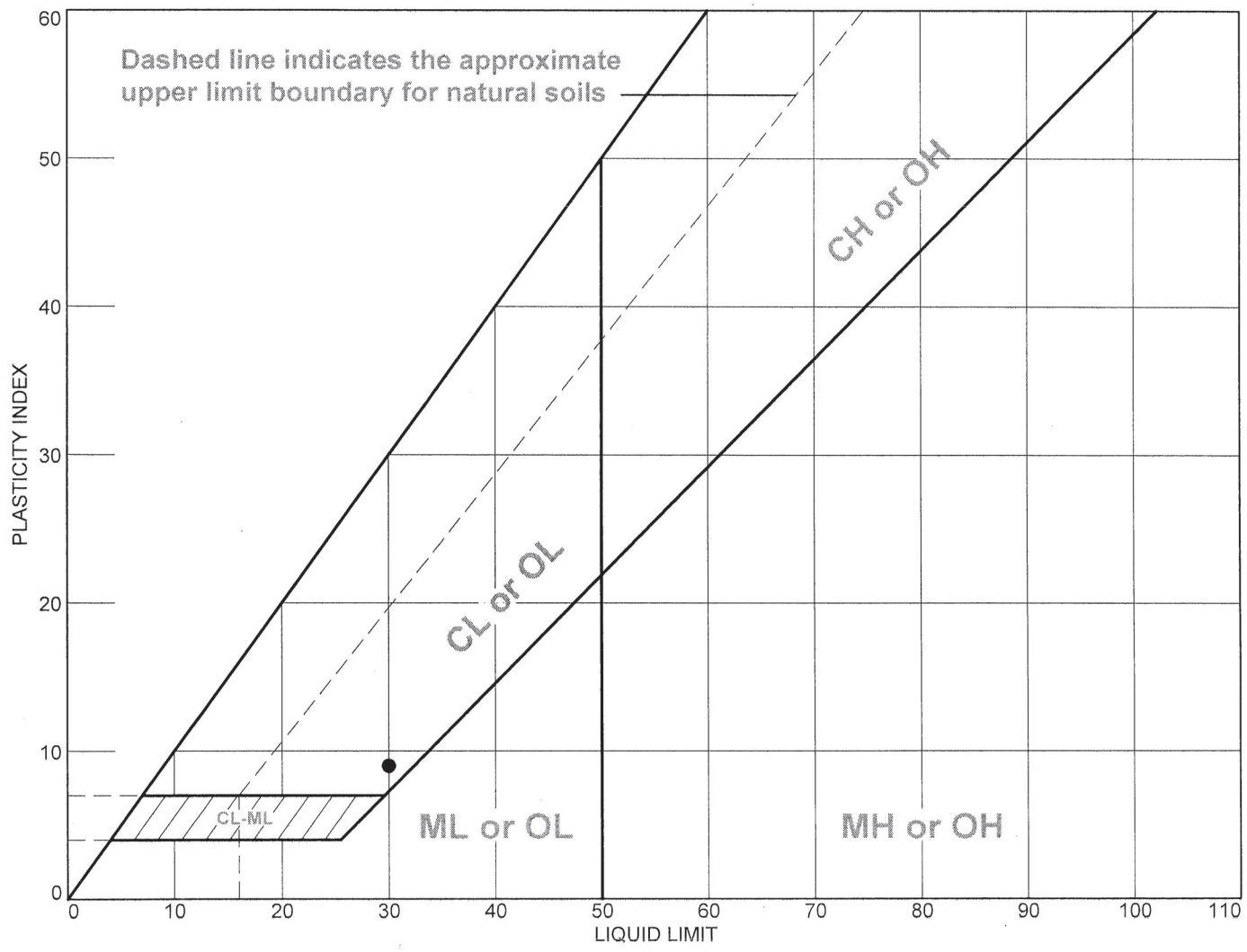
Cincinnati, Ohio

Client: AEP
Project: ROCKPORT PLANT IMPROVEMENT CERTIFICATION

Project No: N4155126 **Exhibit**

Tested By: DR **Checked By:** GS

LIQUID AND PLASTIC LIMITS TEST REPORT



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	GRAY LEAN CLAY	30	21	9	98.1	93.0	CL

Project No. N4155126 **Client:** AEP

Project: ROCKPORT PLANT IMPROVEMENT CERTIFICATION

● **Source of Sample:** B-2 **Depth:** 10-12' **Sample Number:** ST-2

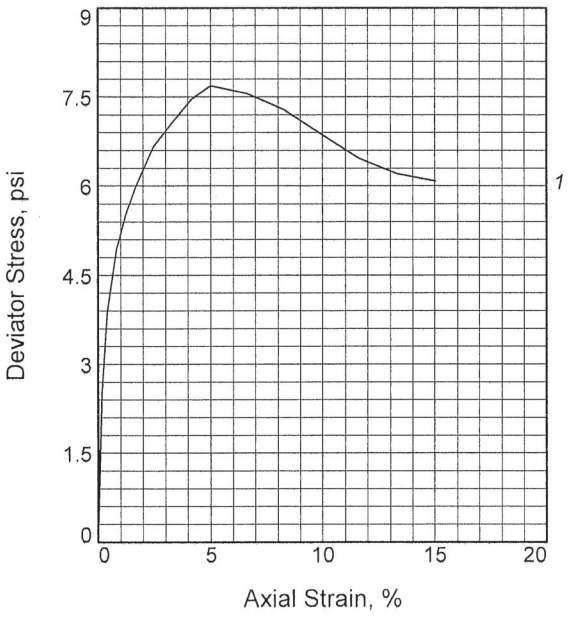
Remarks:

● Initial MC - 27.2%

Terracon, Inc.

Cincinnati, Ohio

Exhibit



Sample No.		1
Initial	Water Content, %	27.2
	Dry Density, pcf	94.9
	Saturation, %	94.7
	Void Ratio	0.7768
	Diameter, in.	2.860
	Height, in.	6.020
At Test	Water Content, %	27.2
	Dry Density, pcf	94.9
	Saturation, %	94.7
	Void Ratio	0.7768
	Diameter, in.	2.860
	Height, in.	6.020
Strain rate, in./min.		0.060
Back Pressure, psi		0.000
Cell Pressure, psi		0.750
Fail. Stress, psi		7.691
Ult. Stress, psi		
σ_1 Failure, psi		8.441
σ_3 Failure, psi		0.750

Type of Test:
Unconsolidated Undrained
Sample Type: ST
Description: GRAY LEAN CLAY

LL= 30 **PL=** 21 **PI=** 9
Assumed Specific Gravity= 2.70
Remarks:

Exhibit 7356

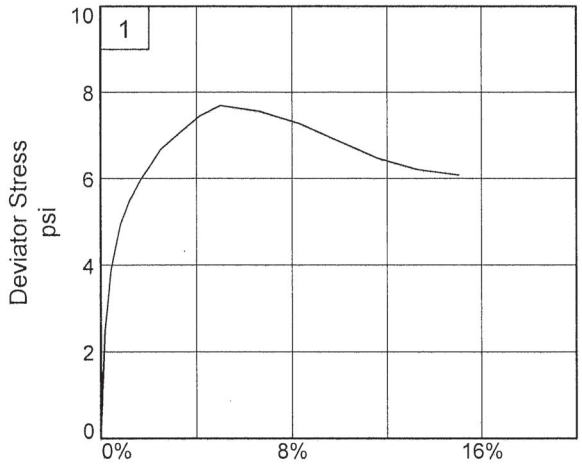
Client: AEP

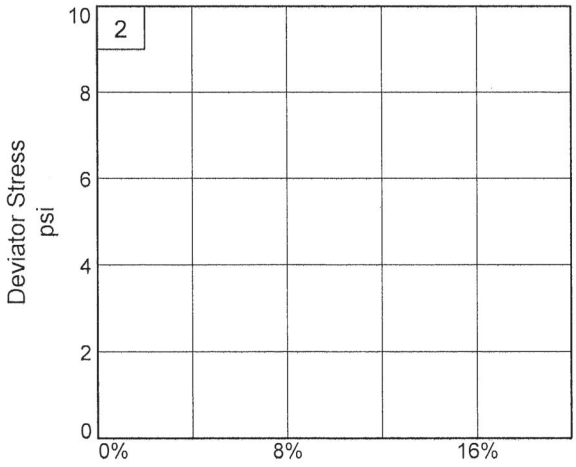
Project: ROCKPORT PLANT IMPROVEMENT CERTIFICATION

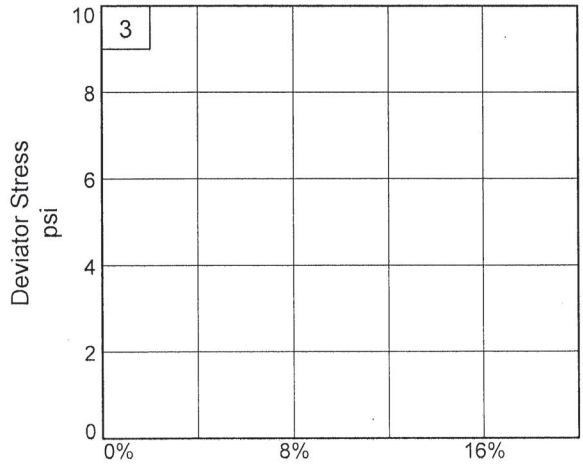
Source of Sample: B-2 **Depth:** 10-12'
Sample Number: ST-2
Proj. No.: N4155126 **Date Sampled:** 10-13-15

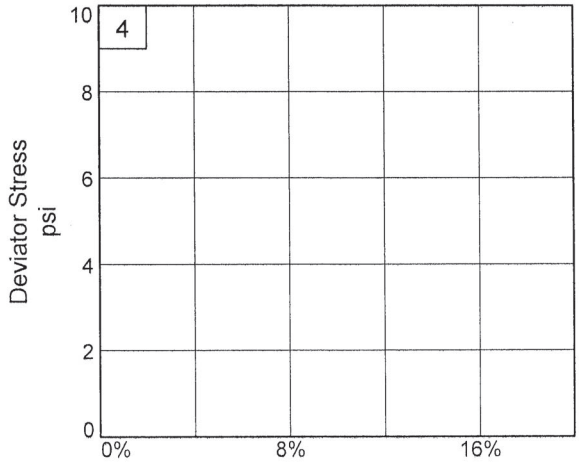
TRIAXIAL SHEAR TEST REPORT
Terracon, Inc.
Cincinnati, Ohio

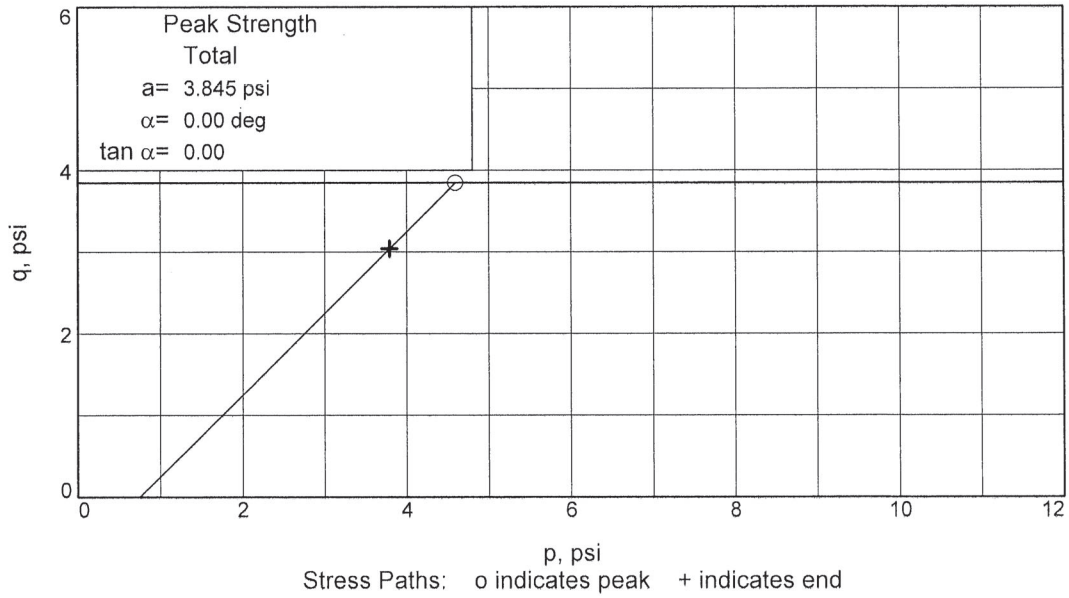
Tested By: FCE **Checked By:** GS











Stress Paths: o indicates peak + indicates end

Client: AEP

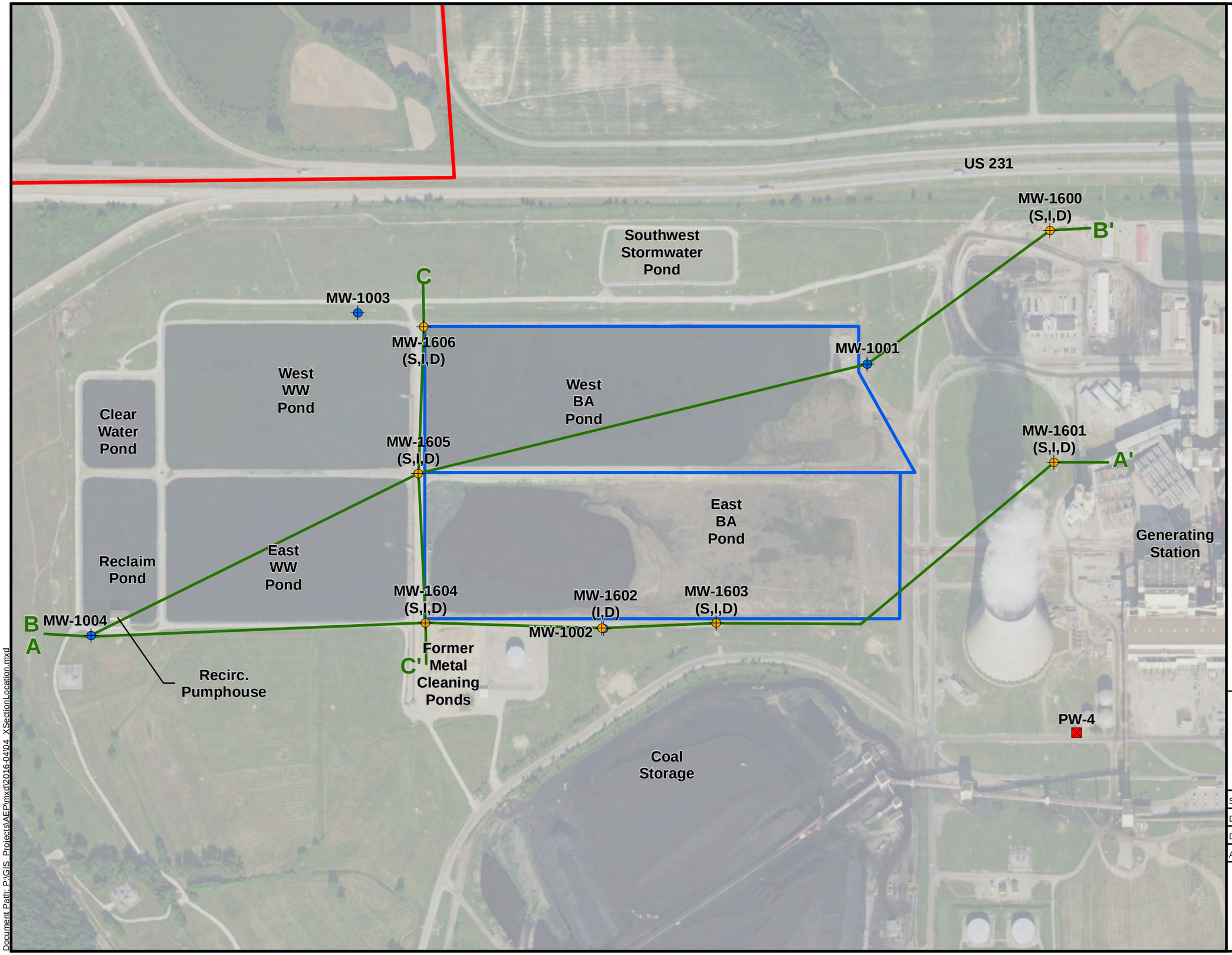
Project: ROCKPORT PLANT IMPROVEMENT CERTIFICATION

Source of Sample: B-2 **Depth:** 10-12' **Sample Number:** ST-2

Project No.: N4155126 **Exhibit** _____

Terracon, Inc.

Tested By: FCE **Checked By:** GS



Legend

- Monitoring Well Cluster
- USWAG Monitoring Well
- Water Supply Well
- Cross Section Lines
- Property Boundary
- Bottom Ash

Data Sources

Date of Photography: May-June 2016
Source of Photography: U.S. Department of Agriculture, National Agriculture Imagery Program (NAIP)

0 200 400
SCALE IN FEET

CROSS SECTION LOCATION MAP BOTTOM ASH PONDS

AEP - ROCKPORT, IN

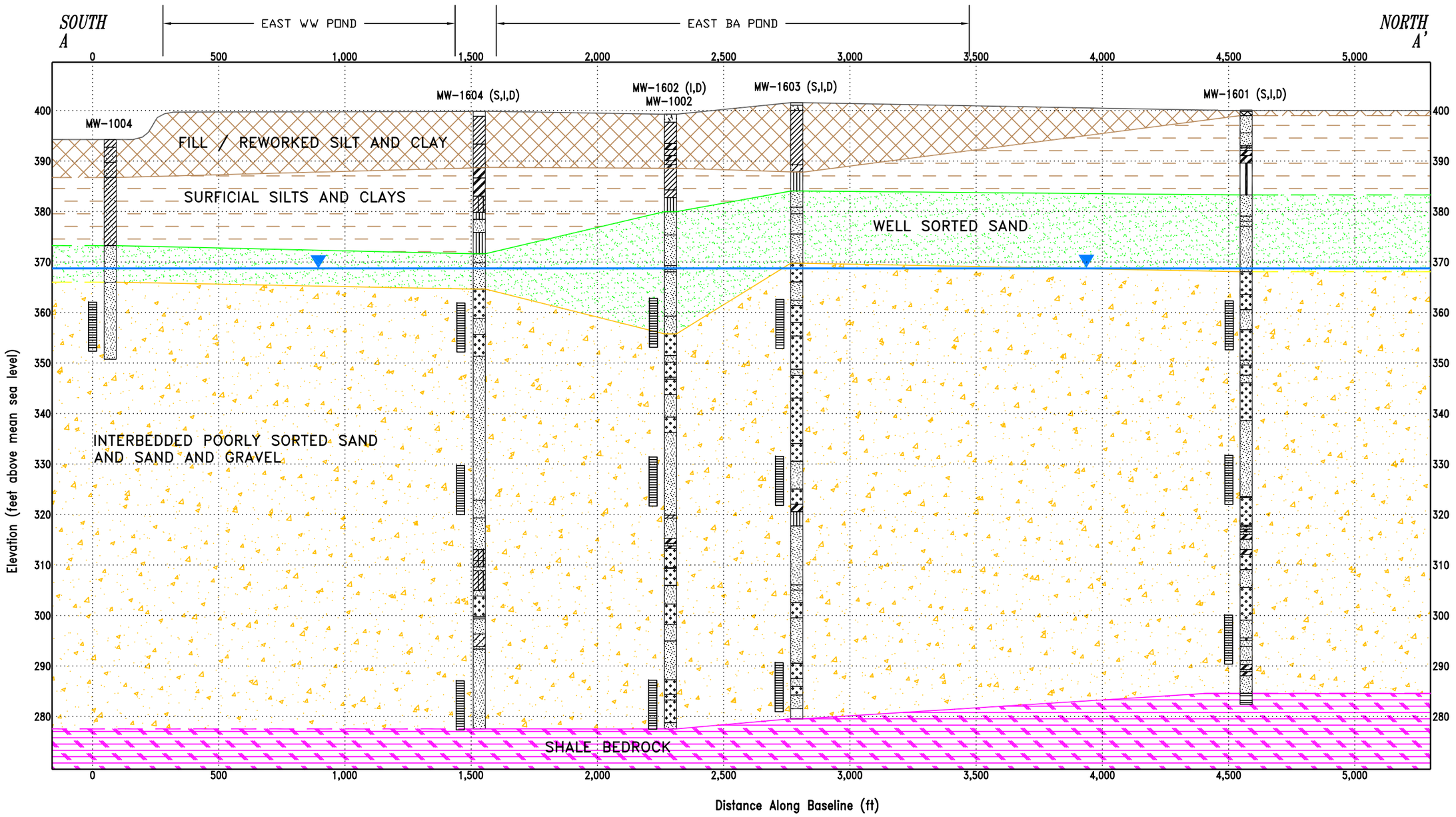
PROJECT NUMBER: 7382153161

SCALE	1" = 400'
DATE	9/14/2017
DRAWN BY	TMR
APPROVED BY	ALD

FIG. 4

amec foster wheeler
2456 Fortune Drive, Suite 100
Lexington, Kentucky 40509
Phone: (859) 255-3308

Document Path: P:\GIS_Projects\AEP\mxd\2016-04\04_XSectionLocation.mxd



0' 400'

SCALE: 1"=400'
VERTICAL EXAGGERATION: 20X

N

amec foster wheeler

Environment & Infrastructure, Inc.
2456 Fortune Drive, Suite 100
Lexington, Kentucky 40509
Phone: (859) 255-3308

BOTTOM ASH PONDS
AEP - ROCKPORT, INDIANA

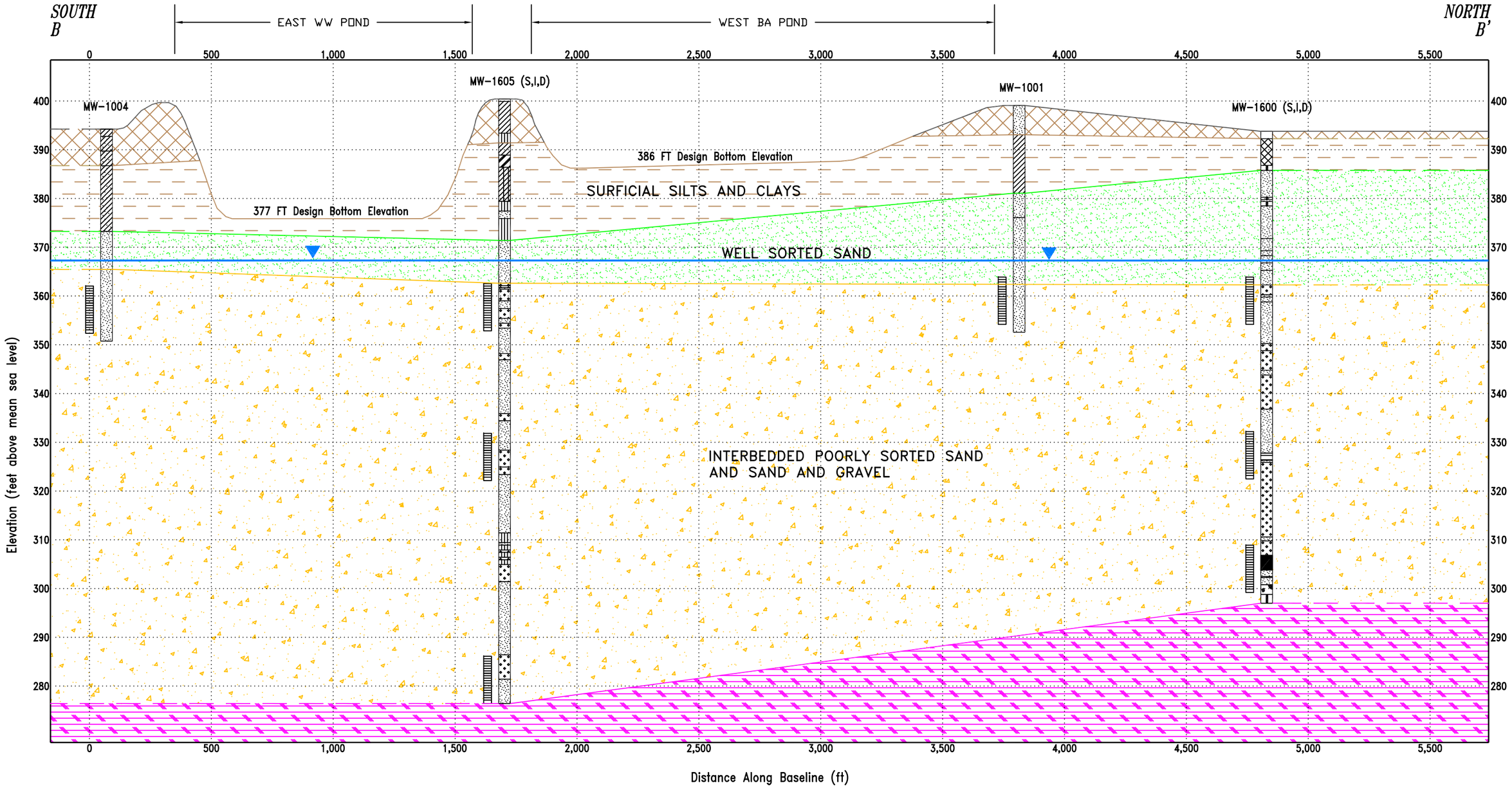
CROSS SECTION A - A'

PROJECT NUMBER: 7382-15-3161

SCALE	1" = 400'
DATE	05/20/2016
DRAWN BY	VM / TMR
APPROVED BY	ALD

FIG. 5

P:\Projects\15 projects\7382153161 AEP CCR Rockport IN\Drawings\AEP_ROCKPORT_SECTION_A.dwg May. 20, 2016 tom.reed



0' 400'

SCALE: 1"=400'
VERTICAL EXAGGERATION: 20X

N

amec foster wheeler
Environment & Infrastructure, Inc.
2456 Fortune Drive, Suite 100
Lexington, Kentucky 40509
Phone: (859) 255-3308

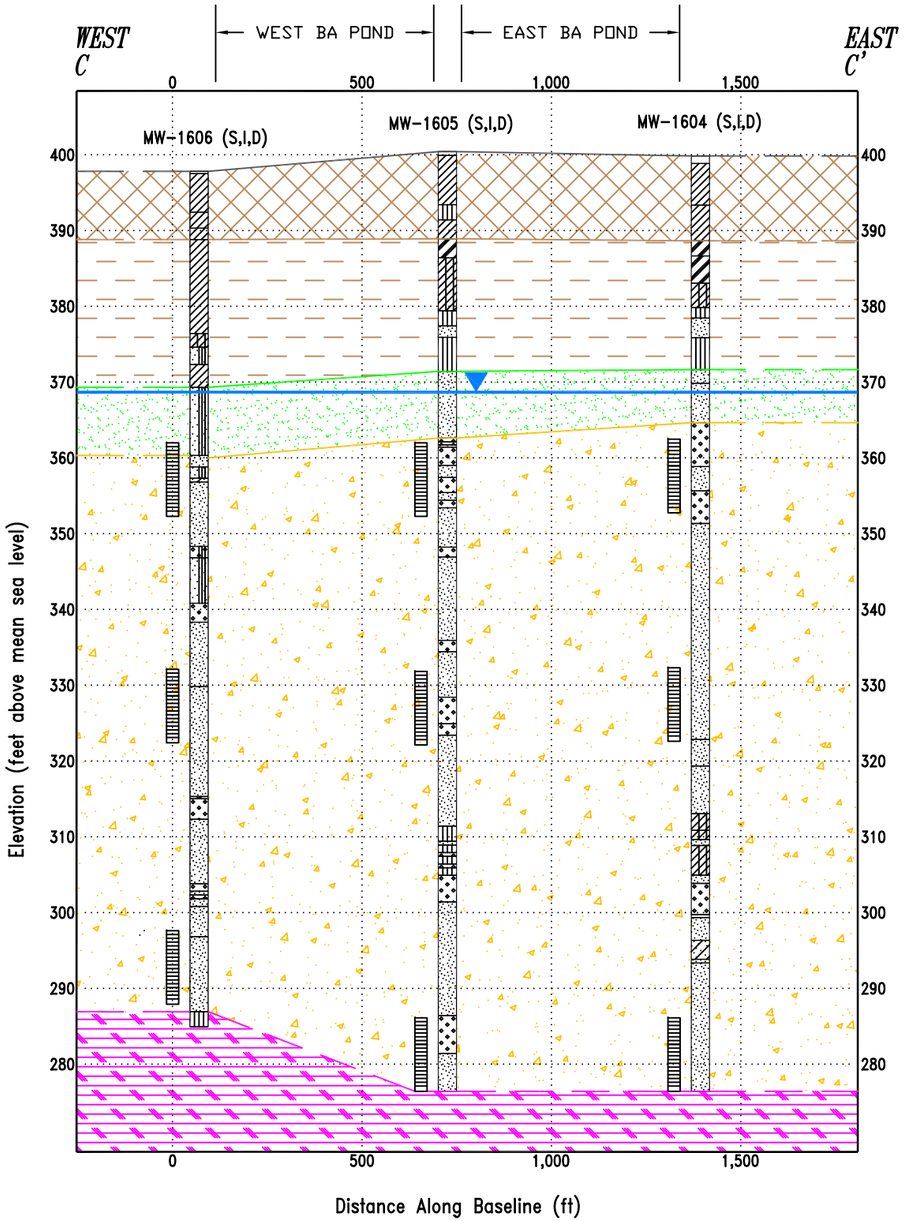
BOTTOM ASH PONDS
AEP - ROCKPORT, INDIANA

CROSS SECTION B - B'

PROJECT NUMBER: 7362-15-3161

SCALE	1" = 400'
DATE	05/20/2016
DRAWN BY	VM / TMR
APPROVED BY	ALD

FIG. 6



LEGEND:

- USCS Low Plasticity Clay
- USCS High Plasticity Clay
- USCS Low Plasticity Silty Clay
- Fill or Reworked Soil
- Interbedded Poorly Sorted Sand and Sand and Gravel
- USCS Silt
- USCS Poorly-graded Sand
- USCS Well-graded Sand
- Shale
- Surficial Silt and Clay
- Shale Bedrock
- USCS Clayey Sand
- USCS Poorly-graded Sand with Silt
- USCS Well-graded Sand with Silt
- USCS Well-graded Gravel
- Well Sorted Sand
- Screened Interval
- Water level elevation measured in shallow wells on 17 March 2016

0' 400'

SCALE: 1"=400'
VERTICAL EXAGGERATION: 20X

N

amec foster wheeler
Environment & Infrastructure, Inc.
2456 Fortune Drive, Suite 100
Lexington, Kentucky 40509
Phone: (859) 255-3308

BOTTOM ASH PONDS
AEP - ROCKPORT, INDIANA

CROSS SECTION C - C'

PROJECT NUMBER: 7382-15-3161

SCALE	1" = 400'
DATE	05/20/2016
DRAWN BY	VM / TMR
APPROVED BY	ALD

FIG. 7

AMERICAN ELECTRIC POWER SERVICE CORPORATION

AEP CIVIL ENGINEERING LABORATORY

LOG OF BORING

JOB NUMBER **42393125-01**

COMPANY **INDIANA MICHIGAN POWER COMPANY**

PROJECT **ROCKPORT PLANT**

COORDINATES **N 151,510.2 E 514,204.9**

GROUND ELEVATION **399.9** SYSTEM **State Plane using NAD27/29**

Water Level, ft	▽	▼	▼
TIME			
DATE			

BORING NO. **MW-1604D** DATE **4/27/16** SHEET **1** OF **6**

BORING START **1/15/16** BORING FINISH **1/15/16**

PIEZOMETER TYPE _____ WELL TYPE **OW**

HGT. RISER ABOVE GROUND **2.59** DIA **2.0**

DEPTH TO TOP OF WELL SCREEN **115.6** BOTTOM **125.15**

WELL DEVELOPMENT **YES** BACKFILL _____

FIELD PARTY **ZLR / REB** RIG **D-120**

SAMPLE NUMBER	SAMPLE	SAMPLE DEPTH IN FEET FROM	TO	STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD %	DEPTH IN FEET	GRAPHIC LOG	USCS	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
1	SS	0.0	1.5	17-29-28	.6					Surface gravel		
2	SS	1.5	3.0	8-10-10	1.0				CL	Lean silty clay, dark yellowish brown 10YR 4/2, dry to moist, v. stiff @ 3' trace black oxide nodules, some l. brown silt seams, hard		
3	SS	3.0	4.5	10-19-30	1.0							
4	SS	4.5	6.0	5-15-15	1.2							
5	SS	5.0	6.5	5-5-9	1.1		5					
6	SS	7.5	9.0	7-6-9	1.2				CL	Lean silty clay, dark yellowish brown 10YR 4/2, moist, stiff, some medium dark gray N4 silt seams @ 9' wood (~1")		
7	SS	9.0	10.5	6-5-9	1.2							
8	SS	10.0	11.5	4-2-3	1.3		10					
9	SS	12.0	13.5	5-5-7	1.5				CH	Fat clay, olive gray 5Y 4/1, moist, firm, trace black oxide nodules @ 12' stiff @ 13' some moderate yellowish brown 10YR 5/4 silty clay mottled		
10	SS	13.5	15.0	4-5-9	1.5				CH	Fat clay, medium dark gray N4, and silty lean clay, dark yellowish brown 10YR 4/2, mottled, moist, stiff @ 15' tools sunk / 1" spoon driven / material same, pp same, N value inferred @ 15.5' trace black oxide		
11	SS	15.0	16.5	5-6-5	1.0		15					
12	SS	16.5	18.0	2-3-5	1.5				CL ML	Lean silty clay, moderate yellowish brown 10YR 5/4, moist, firm to stiff, w/medium dark gray N4 fat clay seams (~15%)		
13	SS	18.0	19.5	3-4-7	1.5							
14	SS	19.5	21.0	2-3-4	1.4							

TYPE OF CASING USED

	NQ-2 ROCK CORE	
	6" x 3.25 HSA	
	9" x 6.25 HSA	
	HW CASING ADVANCER	4"
	NW CASING	3"
	SW CASING	6"
	AIR HAMMER	8"

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PIEZOMETER TYPE: PT = OPEN TUBE POROUS TIP, SS = OPEN TUBE SLOTTED SCREEN, G = GEONOR, P = PNEUMATIC

WELL TYPE: OW = OPEN TUBE SLOTTED SCREEN, GM = GEOMON

RECORDER **AMEC FOSTER WHEELER**

AEP RK BAP CCR COMPLIANCE.GPJ AEP.GDT 4/27/16

AMERICAN ELECTRIC POWER SERVICE CORPORATION

AEP CIVIL ENGINEERING LABORATORY

LOG OF BORING

JOB NUMBER **42393125-01**

COMPANY **INDIANA MICHIGAN POWER COMPANY** BORING NO. **MW-1604D** DATE **4/27/16** SHEET **2** OF **6**

PROJECT **ROCKPORT PLANT** BORING START **1/15/16** BORING FINISH **1/15/16**

SAMPLE NUMBER	SAMPLE	SAMPLE DEPTH IN FEET FROM	TO	STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD %	DEPTH IN FEET	GRAPHIC LOG	U S C S	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
15	SS	21.0	22.5	4-4-4	1.5				ML	Clayey silt, moderate yellowish brown 10YR 5/4, moist, loose		
16	SS	22.5	24.0	2-3-3	1.5				SP	Fine grained sand, moderate yellowish brown 10YR 5/4, moist, loose, poorly graded @ 22.2' ~3" seam clayey silt, moderate yellowish brown 10YR 5/4, moist, loose @ 23.8' ~ 2" silt seam		
17	SS	24.0	25.5	1-1-2	1.0				ML	Sandy silt to silty sand, light brown 5YR 5/6, moist, v. loose		
18	SS	25.5	27.0	1-1-2	1.0		25					
19	SS	27.0	28.5	1-1-5	.83							
20	SS	28.5	30.0	1-5-7	.6				SP	Fine sand, dark yellowish orange 10YR 6/6, moist, loose, poorly graded @ 29' transitioning to moderate yellowish brown 10YR 5/4, moist, sample SS20 spilled		
21	SS	30.0	31.5	5-11-12	.8		30		SP	Fine sand, moderate yellowish brown 10YR 5/4, moist, med. dense, poorly graded @ 31.5' moist, dark yellowish brown 10YR 4/2, loose @ 33' v. loose, water in spoon, wet		
22	SS	31.5	33.0	2-4-3	1.1							
23	SS	33.0	34.5	4-1-3	.8							
24	SS	34.5	36.0	4-3-5	.7		35					
25	SS	36.0	37.5	10-6-9	1.5				SW	Coarse grained sand, dark yellowish brown 10YR 4/2, wet loose, well rounded fine gravel, well graded @ 36.5' v. stiff lean clay moderate yellowish brown 10YR 5/4 seam, higher N value likely due to clay, ~30% clay over last 12" longitudinally @ 38' clay seam @ 40' sand sample mostly washed out clay seam (lean clay, moderate yellowish brown 10YR 5/4, wet, v. stiff) ~50%		
26	SS	37.5	39.0	12-10-12	1.5							
27	SS	39.0	40.5	14-14-16	.6		40					
28	SS	40.5	42.0	5-12-19	1.5				SP	Medium grained sand, moderate yellowish brown 10YR 5/4, wet, dense, poorly graded, well rounded fine gravel @ 42' med dense, well rounded fine gravel		
29	SS	42.0	43.5	8-10-10	1.5							
30	SS	43.5	45.0	14-16-11	1.5							
31	SS	45.0	46.5	3-9-12	1.5		45		SW	Coarse grained sand, moderate yellowish brown 10YR 5/4, wet med. dense, w/well rounded fine gravel (to 1/2"), well graded		

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AMERICAN ELECTRIC POWER SERVICE CORPORATION

AEP CIVIL ENGINEERING LABORATORY

LOG OF BORING

JOB NUMBER **42393125-01**

COMPANY **INDIANA MICHIGAN POWER COMPANY** BORING NO. **MW-1604D** DATE **4/27/16** SHEET **3** OF **6**

PROJECT **ROCKPORT PLANT** BORING START **1/15/16** BORING FINISH **1/15/16**

SAMPLE NUMBER	SAMPLE	SAMPLE DEPTH IN FEET FROM	TO	STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD %	DEPTH IN FEET	GRAPHIC LOG	U S C S	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
32	SS	46.5	48.0	17-8-9	1.1							
33	SS	48.0	49.5	5-10-11	1.5							
34	SS	49.5	51.0	10-11-12	1.5		50		SP	Fine to med. grained sand, moderate yellowish brown 10YR 5/4, wet, med. dense, poorly graded, w/well rounded fine gravel @ 49.5' trace well rounded fine gravel @ 51' dense, moist @ 55.5' med. dense, transitioning to med. grain @ 57' w/well rounded fine to coarse gravel and rounded sandstone to ~1" @ 60' fully med. grained @ 61.5' w/well rounded fine to coarse gravel and rounded sandstone to 2" @ 63' fine to med. grain, well rounded fine gravel @ 67.5' trace black silt @ 70.5' mostly fine grained, no stone, wet @ 74.8' 1" seam, potential coal or slate, black N1, wet, coarse black N1 silt @ 75' back to fine to med. grain, trace small gravel (~1/4")		
35	SS	51.0	52.5	8-17-18	1.2							
36	SS	52.5	54.0	15-16-16	1.3							
37	SS	54.0	55.5	5-11-19	1.5		55					
38	SS	55.5	57.0	8-10-12	1.0							
39	SS	57.0	58.5	8-12-13	1.1							
40	SS	58.5	60.0	13-9-9	1.1							
41	SS	60.0	61.5	12-9-14	.8		60					
42	SS	61.5	63.0	10-10-11	.8							
43	SS	63.0	64.5	6-10-11	.8							
44	SS	64.5	66.0	7-9-13	1.0		65					
45	SS	66.0	67.5	7-10-16	.7							
46	SS	67.5	69.0	9-10-13	.8							
47	SS	69.0	70.5	8-12-14	.8		70					
48	SS	70.5	72.0	9-9-12	1.0							

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AMERICAN ELECTRIC POWER SERVICE CORPORATION

AEP CIVIL ENGINEERING LABORATORY

LOG OF BORING

JOB NUMBER **42393125-01**

COMPANY **INDIANA MICHIGAN POWER COMPANY** BORING NO. **MW-1604D** DATE **4/27/16** SHEET **4** OF **6**

PROJECT **ROCKPORT PLANT** BORING START **1/15/16** BORING FINISH **1/15/16**

SAMPLE NUMBER	SAMPLE	SAMPLE DEPTH IN FEET FROM	TO	STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD %	DEPTH IN FEET	GRAPHIC LOG	U S C S	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
49	SS	72.0	73.5	7-10-13	1.0							
50	SS	73.5	75.0	6-10-20	1.3		75					
51	SS	75.0	76.5	11-13-17	1.2							
52	SS	76.5	78.0	8-29-47	.8							
53	SS	78.0	79.5	16-23-19	1.0				SP	Coarse sand with gravel (~50%) to 15", moderate yellowish brown 10YR 5/4, moist, v. dense, well graded @ 78' fine gravel, dense		
54	SS	79.5	81.0	10-13-19	1.5		80					
55	SS	81.0	82.5	7-13-18	1.0				SP	Fine grained sand, moderate yellowish brown 10YR 5/4 to dark yellowish brown 10YR 4/2, moist, dense, trace fine gravel, poorly graded @ 81' moist to wet, no gravel @ 82.5' med. dense, trace gravel @ 84' dense, no gravel @ 85.5' med. dense		
56	SS	82.5	84.0	6-12-17	.9							
57	SS	84.0	85.5	10-16-20	.8		85					
58	SS	85.5	87.0	11-11-17	1.2							
59	SS	87.0	88.5	12-15-13	1.3				CL ML	Lean silty clay, dark yellowish brown 10YR 4/2 to medium dark gray N4, moist to wet, v. stiff, w/sand @ 87.2' fine grained sand, moist med. dense, poorly graded		
60	SS	88.5	90.0	11-8-10	1.3				CL ML	Lean silty clay, dark yellowish brown 10YR 4/2 to medium dark gray N4, moist to wet, v. stiff, w/sand		
61	SS	90.0	91.5	7-6-14	1.2		90		SP	Fine grained sand, dark yellowish brown 10YR 4/2, wet, med. dense, poorly graded		
62	SS	91.5	93.0	6-12-9	1.5				CL ML	Lean silty clay, dark yellowish brown 10YR 4/2, moist to wet, v. stiff, w/sand @ 92.3' 5" sand seam (prev material) @ 93.5' 4" sand seam (prev material)		
63	SS	93.0	94.5	7-6-16	1.3							
64	SS	94.5	96.0	9-11-12	1.5		95		SP	Fine grained sand, dark yellowish brown 10YR 4/2, wet, med. dense, poorly graded, trace pea gravel		
65	SS	96.0	97.5	9-8-9	.8				SW	Coarse sand and gravel, dark yellowish brown 10YR 4/2, moist to wet, med. dense, well graded, gravel to 1.5"		
66	SS	97.5	99.0	13-13-14	.8							

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AMERICAN ELECTRIC POWER SERVICE CORPORATION

AEP CIVIL ENGINEERING LABORATORY

LOG OF BORING

JOB NUMBER **42393125-01**

COMPANY **INDIANA MICHIGAN POWER COMPANY** BORING NO. **MW-1604D** DATE **4/27/16** SHEET **5** OF **6**

PROJECT **ROCKPORT PLANT** BORING START **1/15/16** BORING FINISH **1/15/16**

SAMPLE NUMBER	SAMPLE	SAMPLE DEPTH IN FEET FROM	TO	STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD %	DEPTH IN FEET	GRAPHIC LOG	U S C S	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
67	SS	99.0	100.5	13-21-15	1.0		100					
68	SS	100.5	102.0	5-8-12	1.3				SP	Shale, medium dark gray N4, moist, v. stiff to hard, dark yellowish brown 10YR 4/2 w/sand		
69	SS	102.0	103.5	9-13-13	1.1					Fine grained sand, dark yellowish brown 10YR 4/2, v. moist med. dense		
70	SS	103.5	105.0	5-3-8	1.4				SC	Clayey sand, fine grained, dark yellowish brown 10YR 4/2, wet, loose		
71	SS	105.0	106.5	7-11-17	1.4		105					
72	SS	106.5	108.0	10-15-15	1.3				SP	Very fine grain sand, moderate yellowish brown 10YR 5/4, moist to wet, med. dense, poorly graded		
73	SS	108.0	109.5	6-11-18	1.3				SP	Fine to med. grained sand, moderate yellowish brown 10YR 5/4 to medium dark gray N4, moist to wet, med. dense, poorly graded @ 100' dense @ 111' trace rock to 1.5" @ 112.5' no stone @ 114' med. dense @ 115.5' loose, moist to wet @ 117' med. dense @ 118.5' d. grey, w/black silt @ 120' trace gravel to 1/4", dense @ 121.5' med. dense @ 123' wet, dense		
74	SS	109.5	111.0	9-17-18	1.2		110					
75	SS	111.0	112.5	8-17-24	1.2							
76	SS	112.5	114.0	14-23-23	1.3							
77	SS	114.0	115.5	6-7-10	1.3		115					
78	SS	115.5	117.0	5-5-5	1.3							
79	SS	117.0	118.5	5-5-6	1.4							
80	SS	118.5	120.0	6-9-15	1.3							
81	SS	120.0	121.5	8-15-20	1.5		120					
82	SS	121.5	123.0	8-10-17	1.5							
83	SS	123.0	124.5	7-12-38	1.5							

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AMERICAN ELECTRIC POWER SERVICE CORPORATION

AEP CIVIL ENGINEERING LABORATORY

LOG OF BORING

JOB NUMBER **42393125-01**

COMPANY **INDIANA MICHIGAN POWER COMPANY** BORING NO. **MW-1604D** DATE **4/27/16** SHEET **6** OF **6**

PROJECT **ROCKPORT PLANT** BORING START **1/15/16** BORING FINISH **1/15/16**

SAMPLE NUMBER	SAMPLE	SAMPLE DEPTH IN FEET FROM	TO	STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD %	DEPTH IN FEET	GRAPHIC LOG	U S C S	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
84	SS	124.5	126.0	10-13-35	1.4		125					
									SW	Coarse sand, medium dark gray N4, moist to wet, dense, with gravel moist to wet graded		
85	SS	126.0	127.5	37-50/2	.5					@ 125.3' 2" coal seam (black, dry, coarse)		
										Shale, medium dark gray N4, dry, hard TOR @ 125.8' Spoon refusal @ 126.6' BT @ 126.6'		

AMERICAN ELECTRIC POWER SERVICE CORPORATION

AEP CIVIL ENGINEERING LABORATORY

LOG OF BORING

JOB NUMBER **42393125-01**

COMPANY **INDIANA MICHIGAN POWER COMPANY**

PROJECT **ROCKPORT PLANT**

COORDINATES **N 151,478.9 E 513,537.1**

GROUND ELEVATION **400.4** SYSTEM **State Plane using NAD27/29**

Water Level, ft	▽	▼	▼
TIME			
DATE			

BORING NO. **MW-1605D** DATE **4/27/16** SHEET **1** OF **6**

BORING START **2/3/16** BORING FINISH **2/3/16**

PIEZOMETER TYPE _____ WELL TYPE **OW**

HGT. RISER ABOVE GROUND **3.36** DIA **2.0**

DEPTH TO TOP OF WELL SCREEN **114.6** BOTTOM **124.22**

WELL DEVELOPMENT **YES** BACKFILL _____

FIELD PARTY **ZLR / REB** RIG **D-50**

SAMPLE NUMBER	SAMPLE	SAMPLE DEPTH IN FEET FROM	TO	STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD %	DEPTH IN FEET	GRAPHIC LOG	USCS	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
1	SS	0.0	1.5	20-13-10	1.25					Gravel = 6 inches		
2	SS	1.5	3.0	5-15-18	1.25				CL	Silty clay, moderate yellowish brown 10R 5/4 and med l. grey N6 mottled, moist, v. stiff @ 1.5' hard @ 3' v. stiff		
3	SS	3.0	4.5	7-9-15	1.41							
4	SS	4.5	6.0	11-12-14	1.5		5					
5	SS	6.0	7.5	4-8-11	1.41				ML	Clayey silt, medium grey N5, moist, med. dense, w/mod. yellowish brown 10R 5/4 silty clay mottled		
6	SS	7.5	9.0	3-6-11	1.33							
7	SS	9.0	10.5	3-4-7	1.41				CL	Silty clay, mod. yellowish brown 10R 5/4, moist, stiff, w/med. grey N5 clayey silt mottled		
8	SS	10.5	12.0	3-4-6	1.5		10					
9	SS	12.0	13.5	2-2-4	1.5				CH	Fat to lean clay, med. l. grey N6, moist, firm		
10	SS	13.5	15.0	2-2-5	1.41							
11	SS	15.0	16.5	2-4-5	1.5		15		CL ML	Silty clay, mod. reddish brown 10R 4/6 w/med. l. grey N6 fat clay heavily mottled, moist, firm @ 15' stiff @ 15.5' l" shale fragment, angular @ 18' very silty @ 20' trace to some pale yellowish brown 10YR 6/2 silt		
12	SS	16.5	18.0	3-5-9	1.5							
13	SS	18.0	19.5	3-6-8	1.41							
14	SS	19.5	21.0	3-5-7	1.41							

TYPE OF CASING USED

	NQ-2 ROCK CORE	
	6" x 3.25 HSA	
	9" x 6.25 HSA	
	HW CASING ADVANCER	4"
	NW CASING	3"
	SW CASING	6"
	AIR HAMMER	8"

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PIEZOMETER TYPE: PT = OPEN TUBE POROUS TIP, SS = OPEN TUBE SLOTTED SCREEN, G = GEONOR, P = PNEUMATIC

WELL TYPE: OW = OPEN TUBE SLOTTED SCREEN, GM = GEOMON

RECORDER **AMEC FOSTER WHEELER**

AEP RK BAP CCR COMPLIANCE.GPJ AEP.GDT 4/27/16

AMERICAN ELECTRIC POWER SERVICE CORPORATION

AEP CIVIL ENGINEERING LABORATORY

LOG OF BORING

JOB NUMBER **42393125-01**

COMPANY **INDIANA MICHIGAN POWER COMPANY** BORING NO. **MW-1605D** DATE **4/27/16** SHEET **2** OF **6**

PROJECT **ROCKPORT PLANT** BORING START **2/3/16** BORING FINISH **2/3/16**

SAMPLE NUMBER	SAMPLE	SAMPLE DEPTH IN FEET FROM	TO	STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD %	DEPTH IN FEET	GRAPHIC LOG	U S C S	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
15	SS	21.0	22.5	3-4-7	1.5				ML	Clayey silt, pale yellowish brown 10YR 6/2, moist, med. dense, w/silty clay (prev. material), trace sand		
16	SS	22.5	24.0	4-4-5	1.5				SP	Poorly graded sand, v. fine to fine grained, l. brown 5YR 5/6, moist, loose		
17	SS	24.0	25.5	1-1-3	1.5					@ 23.2' 2" clayey silt seam (prev. material)		
18	SS	25.5	27.0	1-1-1	1.5		25		ML	Clayey silt, pale yellowish brown 10YR 6/2, moist to wet, v. loose @ 25' 2" l. brown sand seam (prev. material) @ 26' 2" l. brown sand seam @ 26.4' 15" l. brown sand seam @ 26.8' l" l. brown sand seam @ 27' loose @ 28' 2" l. brown sand seam		
19	SS	27.0	28.5	2-1-4	1.5							
20	SS	28.5	30.0	5-6-7	1.33							
21	SS	30.0	31.5	3-5-7	1.25		30		SP	Poorly graded sand, fine grained, l. brown 5YR 5/6, moist, med. dense @ 30' d. yellowish orange 10YR 6/6 @ 31' 3" clayey silt seam (prev. material) @ 32.3' trace fine gravel and black silt @ 32.5' no fine gravel or silt @ 33' moist, loose @ 34.1' 2" clayey silt seam (prev. material) @ 34.5' moist to wet, water in spoon @ 34.9' 2.5' clayey silt seam (prev. material)		
22	SS	31.5	33.0	5-7-8	1.5							
23	SS	33.0	34.5	3-3-6	1.41							
24	SS	34.5	36.0	2-4-5	1.5		35					
25	SS	36.0	37.5	2-4-6	1.33				SW	Well graded sand, fine grained, l. brown 5YR 5/6, moist to wet, med. dense, w/fine gravel		
26	SS	37.5	39.0	4-3-8	1.5				SW			
27	SS	39.0	40.5	3-3-5	1.5				SP	Well graded sand, coarse grained, grayish black N2, moist to wet, med. dense, trace fine gravel		
28	SS	40.5	42.0	11-8-10	1.25		40		SW	Poorly graded sand, v. fine grained, l. brown 5YR 5/6, moist to wet, med. dense		
29	SS	42.0	43.5	4-5-11	1.5				SP	Well graded sand, fine to med. grained, moderate yellowish brown 10YR 5/4, moist to wet, loose @ 40.5' med. dense @ 41' 1.5" shale seam w/clay		
30	SS	43.5	45.0	8-9-9	1.16				SW	Poorly graded sand, v. fine to fine grained, mod. yellowish brown 10YR 5/4, moist to wet, med. dense		
31	SS	45.0	46.5	6-9-14	1.5		45		SP	Well graded sand, med. grained, mod. reddish brown 10R 4/6, moist to wet, med. dense @ 44' med. to coarse grained		
										Poorly graded sand, fine grained, mod. yellowish		

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AMERICAN ELECTRIC POWER SERVICE CORPORATION

AEP CIVIL ENGINEERING LABORATORY

LOG OF BORING

JOB NUMBER **42393125-01**

COMPANY **INDIANA MICHIGAN POWER COMPANY** BORING NO. **MW-1605D** DATE **4/27/16** SHEET **3** OF **6**

PROJECT **ROCKPORT PLANT** BORING START **2/3/16** BORING FINISH **2/3/16**

SAMPLE NUMBER	SAMPLE	SAMPLE DEPTH IN FEET FROM	TO	STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD %	DEPTH IN FEET	GRAPHIC LOG	U S C S	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
32	SS	46.5	48.0	6-8-11	1.5				SW	brown 10YR 5/4, moist to wet, mod. dense, some fine gravel		
33	SS	48.0	49.5	6-10-14	1.5				SP	Well graded sand, med. to coarse grained, mod. reddish brown 10R 4/6, moist to wet, med. dense, trace fine gravel		
34	SS	49.5	51.0	8-12-18	1.33		50			Poorly graded sand, fine grained, mod. yellowish brown 10YR 5/4, moist to wet, med. dense, trace fine gravel @ 48' w/fine gravel, trace coarse gravel @ 49.5' no coarse gravel		
35	SS	51.0	52.5	8-11-18	1.41							
36	SS	52.5	54.0	8-9-13	.91				SW	Well graded sand, med. to coarse grained, mod. reddish brown 10R 4/6, moist to wet, mod. dense, trace fine gravel		
37	SS	54.0	55.5	11-20-26	1.25		55		SP	Poorly graded sand, fine grained, mod. yellowish brown 10YR 5/4, moist to wet, mod. dense, trace fine gravel @ 54' no fine gravel, dense @ 57' wet, mod. dense @ 60' dense @ 63' mod. dense		
38	SS	55.5	57.0	10-15-16	1.5							
39	SS	57.0	58.5	6-12-16	1.33							
40	SS	58.5	60.0	7-10-18	1.33		60					
41	SS	60.0	61.5	8-9-12	1.33							
42	SS	61.5	63.0	10-13-19	1.25							
43	SS	63.0	64.5	9-11-18	1.33							
44	SS	64.5	66.0	9-11-15	1.08		65		SW	Well graded sand, med. to coarse grained, mod. yellowish brown 10YR 5/4, moist to wet, mod. dense, trace black silt		
45	SS	66.0	67.5	7-8-13	1.41				SP	Poorly graded sand, fine grained, mod. yellowish brown 10YR 5/4, moist to wet, mod. dense @ 68.5' trace fine gravel, trace coal fragments @ 70' no fine gravel, no coal fragments @ 70.9' trace fine gravel @ 71.6' no fine gravel, wet		
46	SS	67.5	69.0	5-5-8	1.5							
47	SS	69.0	70.5	6-8-12	1.5		70					
48	SS	70.5	72.0	0-12-16	1.5							

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AMERICAN ELECTRIC POWER SERVICE CORPORATION

AEP CIVIL ENGINEERING LABORATORY

LOG OF BORING

JOB NUMBER **42393125-01**

COMPANY **INDIANA MICHIGAN POWER COMPANY** BORING NO. **MW-1605D** DATE **4/27/16** SHEET **4** OF **6**

PROJECT **ROCKPORT PLANT** BORING START **2/3/16** BORING FINISH **2/3/16**

SAMPLE NUMBER	SAMPLE	SAMPLE DEPTH IN FEET FROM	TO	STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD %	DEPTH IN FEET	GRAPHIC LOG	U S C S	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
49	SS	72.0	73.5	8-8-10	1.25				SW	Well graded sand, fine grained d. yellowish brown 10YR 4/2, moist to wet, mod. dense, trace fine gravel		
50	SS	73.5	75.0	9-12-17	1.41					@ 73.5' w/fine gravel, trace coarse gravel		
51	SS	75.0	76.5	8-7-9	1.5		75		SW	Well graded sand, coarse grained, brownish grey 5YR 4/1, moist to wet, mod. dense, w/fine gravel, trace coarse gravel		
52	SS	76.5	78.0	10-15-25	1.5							
53	SS	78.0	79.5	7-13-12	1.33				SP	Poorly graded sand, fine grained, pale yellowish brown 10YR 6/2, wet, dense, trace fine gravel		
54	SS	79.5	81.0	5-7-12	1.5		80			@ 78' mod. dense @ 81' v. fine to fine grained @ 82.5' no fine gravel @ 84' dense @ 85' 2" shale fragment @ 85.2' v. fine grained @ 85.5' 3.5" shale fragment @ 87' fine grained, d. yellowish brown 10YR 4/2 @ 88.5' v. fine grained, mod. dense		
55	SS	81.0	82.5	6-12-13	1.5							
56	SS	82.5	84.0	8-10-16	1.41							
57	SS	84.0	85.5	10-21-22	1.41		85					
58	SS	85.5	87.0	14-21-14	.5							
59	SS	87.0	88.5	6-13-25	1.41							
60	SS	88.5	90.0	8-9-9	1.16				ML	Clayey silt, med. l. grey N6, moist to wet, mod. dense		
61	SS	90.0	91.5	15-24-7	1.41		90		SP	Poorly graded sand, fine grained, d. yellowish brown 10YR 4/2, moist, dense		
62	SS	91.5	93.0	7-21-28	1.5				ML	Clayey silt, med. l. grey N6, moist to wet, dense		
63	SS	93.0	94.5	14-18-21	1.5				SW	Well graded sand, coarse grained, med. grey N5, w/fine gravel, some coarse gravel		
64	SS	94.5	96.0	12-17-25	1.5		95		ML	Clayey silt, med. l. grey N6, moist to wet, dense		
65	SS	96.0	97.5	20-21-19	1.33				SW	Well graded sand, fine grained, med. grey N5, moist to wet, dense, w/fine gravel		
66	SS	97.5	99.0	13-11-18	1.41					Clayey silt, med. l. grey N6, moist to wet, dense		
									SW	Well graded sand, coarse grained, med. grey N5, moist to wet, dense, w/fine gravel @ 98.7' coal fragments		

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AMERICAN ELECTRIC POWER SERVICE CORPORATION

AEP CIVIL ENGINEERING LABORATORY

LOG OF BORING

JOB NUMBER **42393125-01**

COMPANY **INDIANA MICHIGAN POWER COMPANY** BORING NO. **MW-1605D** DATE **4/27/16** SHEET **5** OF **6**

PROJECT **ROCKPORT PLANT** BORING START **2/3/16** BORING FINISH **2/3/16**

SAMPLE NUMBER	SAMPLE	SAMPLE DEPTH IN FEET FROM	TO	STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD %	DEPTH IN FEET	GRAPHIC LOG	U S C S	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
67	SS	99.0	100.5	15-22-28	1.5		100		SP	Poorly graded sand, v. fine to fine grained, pale yellowish brown 10YR 6/2, moist to wet, dense, w/fine gravel @ 100.5' no fine gravel, mod. dense @ 102' v. fine, dense @ 105' mod. dense @ 106' trace coal fragments @ 106.3' no coal fragments @ 109.5' moist @ 111' v. moist to wet @ 112.5' moist to wet, dense @ 113' trace fine gravel, trace coarse gravel @ 113.5' no fine gravel, no coarse gravel		
68	SS	100.5	102.0	8-8-9	1.5							
69	SS	102.0	103.5	10-16-18	1.5							
70	SS	103.5	105.0	9-13-18	1.41		105					
71	SS	105.0	106.5	8-12-16	1.5							
72	SS	106.5	108.0	6-9-13	1.5							
73	SS	108.0	109.5	7-8-12	1.25							
74	SS	109.5	111.0	6-8-10	1.41		110					
75	SS	111.0	112.5	5-10-12	1.25							
76	SS	112.5	114.0	6-11-27	1.33							
77	SS	114.0	115.5	13-21-13	1.25				SW	Well graded sand, med. to coarse grained, med. grey N5, moist to wet, dense, w/fine gravel, some coarse gavel @ 115.5' coarse grained, mod. dense, trace coarse gravel @ 118.5' v. dense		
78	SS	115.5	117.0	7-7-9	1.33		115					
79	SS	117.0	118.5	9-9-8	1.16							
80	SS	118.5	120.0	12-36-22	1.5							
81	SS	120.0	121.5	10-11-19	1.41		120		SP	Poorly graded sand, v. fine grained, med. l. grey N6, moist to wet, v. dense @ 120' med. dense, sl. moist @ 122' fine grained, w/fine gravel, dense @ 124.5' trace coarse gravel		
82	SS	121.5	123.0	12-20-29	1.5							
83	SS	123.0	124.5	14-16-19	1.5							

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AMERICAN ELECTRIC POWER SERVICE CORPORATION

AEP CIVIL ENGINEERING LABORATORY

LOG OF BORING

JOB NUMBER **42393125-01**

COMPANY **INDIANA MICHIGAN POWER COMPANY** BORING NO. **MW-1605D** DATE **4/27/16** SHEET **6** OF **6**

PROJECT **ROCKPORT PLANT** BORING START **2/3/16** BORING FINISH **2/3/16**

SAMPLE NUMBER	SAMPLE	SAMPLE DEPTH IN FEET FROM	TO	STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD %	DEPTH IN FEET	GRAPHIC LOG	U S C S	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
84	SS	124.5	126.0	18-12-25	1.5		125					
85	SS	126.0	127.5	17-28-50/5	1.5				ML	Clayey silt, l. grey N7, moist, hard, non-durable shale @ 126' flaky, dry to moist Spoon refusal @ 127.4' Auger refusal @127.5' (shale)		
86	SS	127.5	129.0	27-50/2	.66							

AMERICAN ELECTRIC POWER SERVICE CORPORATION

AEP CIVIL ENGINEERING LABORATORY

LOG OF BORING

JOB NUMBER **42393125-01**

COMPANY **INDIANA MICHIGAN POWER COMPANY**

PROJECT **ROCKPORT PLANT**

COORDINATES **N 151,502.1 E 512,881.5**

GROUND ELEVATION **397.8** SYSTEM **State Plane using NAD27/29**

Water Level, ft	▽	▼	▼
TIME			
DATE			

BORING NO. **MW-1606D** DATE **4/27/16** SHEET **1** OF **5**

BORING START **2/12/16** BORING FINISH **2/12/16**

PIEZOMETER TYPE _____ WELL TYPE **OW**

HGT. RISER ABOVE GROUND **2.91** DIA **2.0**

DEPTH TO TOP OF WELL SCREEN **100.2** BOTTOM **109.82**

WELL DEVELOPMENT **YES** BACKFILL _____

FIELD PARTY **ZLR / REB** RIG **D-120**

SAMPLE NUMBER	SAMPLE	SAMPLE DEPTH IN FEET FROM	TO	STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD %	DEPTH IN FEET	GRAPHIC LOG	USCS	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
1	SS	0.0	1.5	3-5-9	1.5					Crushed stone gravel (limestone)		
									CL	Lean clay, moderate yellowish brown 10YR 5/4, moist, trace fine grained sand, stiff		
2	SS	1.5	3.0	4-7-9	1.5					@ 1.5' as above, trace coarse grain sand and black decomposed organic staining		
3	SS	3.0	4.5	3-4-6	1.3					@ 3' trace fine gravel		
4	SS	4.5	6.0	1-2-8	1.3		5					
									CL	Lean clay, pale yellow brown 10YR 6/2, moist, some light brown oxide staining		
5	SS	6.0	7.5	5-9-10	1.5					@ 6.0' yellow brown and brown 10YR 5/4		
6	SS	7.5	9.0	3-6-9	1.5					@ 7.5' pale yellow brown 10YR 6/2, trace fine roots, trace fine grained sand		
									CL	Lean clay w/sand, dark yellow brown 10YR 4/2, moist, little fine grained sand		
7	SS	9.0	10.5	2-4-5	1.5							
									CL	Lean clay, light bluish gray 5B 7/1, moist, some brown oxide staining, trace coarse grained sand		
8	SS	10.5	12.0	3-4-6	1.5		10			@ 12.5' as above, becomes moderate brown in color 5YR 4/4		
9	SS	12.0	13.5	3-5-9	1.5					@ 13.5' moderate yellow brown 10YR 5/4 and pale yellow brown 10YR 6/2) mottled		
10	SS	13.5	15.0	4-5-7	1.5					@ 13.5' - 15' trace fine grained sand, trace fine gravel		
										@ 19.5' mostly 10YR 6/2 in color		
11	SS	15.0	16.5	3-5-6	1.5		15					
12	SS	16.5	18.0	3-4-6	1.5							
13	SS	18.0	19.5	2-5-7	1.5							
14	SS	19.5	21.0	3-3-6	1.5							

TYPE OF CASING USED

	NQ-2 ROCK CORE	
	6" x 3.25 HSA	
	9" x 6.25 HSA	
	HW CASING ADVANCER	4"
	NW CASING	3"
	SW CASING	6"
	AIR HAMMER	8"

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PIEZOMETER TYPE: PT = OPEN TUBE POROUS TIP, SS = OPEN TUBE SLOTTED SCREEN, G = GEONOR, P = PNEUMATIC

WELL TYPE: OW = OPEN TUBE SLOTTED SCREEN, GM = GEOMON

RECORDER **AMEC FOSTER WHEELER**

AEP RK BAP CCR COMPLIANCE.GPJ AEP.GDT 4/27/16

AMERICAN ELECTRIC POWER SERVICE CORPORATION

AEP CIVIL ENGINEERING LABORATORY

LOG OF BORING

JOB NUMBER **42393125-01**

COMPANY **INDIANA MICHIGAN POWER COMPANY** BORING NO. **MW-1606D** DATE **4/27/16** SHEET **2** OF **5**

PROJECT **ROCKPORT PLANT** BORING START **2/12/16** BORING FINISH **2/12/16**

SAMPLE NUMBER	SAMPLE	SAMPLE DEPTH IN FEET FROM	TO	STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD %	DEPTH IN FEET	GRAPHIC LOG	U S C S	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
15	SS	21.0	22.5	3-4-5	1.5							
									CL ML	Silty clay, pale yellow brown 10YR 6/2, moist, trace to little fine grained sand		
16	SS	22.5	24.0	2-4-6	1.5							
									SP SM	Poorly graded sand w/silt, pale yellow brown 10YR 6/2, moist, fine to medium grained sand		
17	SS	24.0	25.5	1-2-5	1.2					@ 24.9' 3" silt layer		
							25					
18	SS	25.5	27.0	2-4-6	1.5				CL	Lean clay, moderate yellowish brown 10YR 5/4, moist, few sandy layers <1" thick		
19	SS	27.0	28.5	1-5-9	1.3					@ 28.3' SP-SM layer (~3" thick)		
20	SS	28.5	30.0	4-4-5	1.3				SP SM	Poorly graded sand w/silt, dark yellowish orange 10YR 6/6, wet, fine to medium grained sand, little coarse grained sand		
21	SS	30.0	31.5	5-7-8	1.5		30			@ 31.5' trace fine gravel		
22	SS	31.5	33.0	3-3-4	1.1					@ 34.5' trace fine gravel		
23	SS	33.0	34.5	1-2-5	0							
24	SS	34.5	36.0	3-4-8	.8							
							35					
25	SS	36.0	37.5	3-5-7	1.0							
26	SS	37.5	39.0	5-6-7	.9				SP	Poorly graded sand, dark yellowish orange 10YR 6/6, wet, fine to medium grained sand, trace to little coarse grained sand		
27	SS	39.0	40.5	4-7-20	1.2					@ 37.5' trace gravel		
									SP SM	Poorly graded sand w/silt, dark yellowish orange 10YR 6/6, wet, fine to medium grained sand, trace coarse grained sand		
							40					
28	SS	40.5	42.0	7-7-8	1.1				SC	Clayey sand, moderate brown 5YR 3/4, wet, fine to medium grained sand		
									SP	Poorly graded sand, dark yellowish orange 10YR 6/6, wet, fine to medium grained sand, trace coarse grained sand & fine gravel		
29	SS	42.0	43.5	4-6-10	1.0					@ 42.0' - 43.5' increase in coarse grained sand		
30	SS	43.5	45.0	4-5-7	1.0					@ 45.2' - 45.5' color change to moderate brown 5YR 4/4		
										@ 46.5' increase in coarse grained sand, trace wood fragments (tree bark)		
							45					
31	SS	45.0	46.5	4-6-10	1.2					@ 48' color change to pale yellowish brown 10YR		

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AMERICAN ELECTRIC POWER SERVICE CORPORATION

AEP CIVIL ENGINEERING LABORATORY

LOG OF BORING

JOB NUMBER **42393125-01**

COMPANY **INDIANA MICHIGAN POWER COMPANY** BORING NO. **MW-1606D** DATE **4/27/16** SHEET **3** OF **5**

PROJECT **ROCKPORT PLANT** BORING START **2/12/16** BORING FINISH **2/12/16**

SAMPLE NUMBER	SAMPLE	SAMPLE DEPTH IN FEET FROM	TO	STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD %	DEPTH IN FEET	GRAPHIC LOG	U S C S	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
32	SS	46.5	48.0	8-9-11	1.1					6/2, few black decomposed organic layers		
33	SS	48.0	49.5	6-10-13	1.1							
34	SS	49.5	51.0	18-13-13	.9		50		SW SM	Well graded sand w/silt & gravel, wet, pale yellowish brown 10YR 6/2, fine to coarse grained sand, little to some fine gravel, trace coarse gravel		
35	SS	51.0	52.5	7-14-16	1.1				SP SM	Poorly graded sand w/silt, moderate yellowish brown 10YR 5/4, wet, fine to medium grained sand, trace coarse grained sand, few layers of decomposed organics (from 51' - 52.5')		
36	SS	52.5	54.0	7-9-15	1.0					@ 54' trace coarse gravel, fines between 5 - 10%		
37	SS	54.0	55.5	10-10-14	1.2		55			@ 55.5' trace fine gravel		
38	SS	55.5	57.0	8-10-13	1.2							
39	SS	57.0	58.5	7-9-9	1.3				SW	Well graded sand, med. to coarse grained, dark yellowish brown 10YR 4/2), wet, med. dense, trace fine gravel		
40	SS	58.5	60.0	4-5-9	1.2					@ 59' trace coarse gravel		
41	SS	60.0	61.5	6-6-9	1.5		60		SP	Poorly graded sand, fine grained, dusky yellowish brown 10YR 2/2, wet, med. dense, w/fine gravel		
42	SS	61.5	63.0	6-13-21	1.5					@ 60.5' 2" shale fragment		
43	SS	63.0	64.5	10-17-31	1.3					@ 61.5' dark yellowish brown 10YR 4/2, dense		
44	SS	64.5	66.0	13-13-17	1.4					@ 61.8' 2" shale fragment		
45	SS	66.0	67.5	6-14-18	1.5		65			@ 62' some lean clay, pale yellowish brown (prev. material)		
46	SS	67.5	69.0	9-14-17	1.5					@ 62.5' no clay, trace fine gravel		
47	SS	69.0	70.5	10-20-20	1.1					@ 63' no fine gravel		
48	SS	70.5	72.0	10-19-26	1.4					@ 64.5' med. dense		
										@ 65.8' 15" coarse sand seam (prev. material)		
										@ 66' dense		
										@ 67.2' 3" shale seam, med. l. grey N6		
										@ 67.7' med. grained		
							70		SP	Poorly graded sand, fine gravel, pale yellowish brown 10YR 6.2, wet, dense		
										@ 69' moist to v. moist		
										@ 72' med. dense, fine grained		
										@ 75' dense, d. yellowish brown 10YR 4.2		
										@ 76.5' med. dense, trace black silt		
										@ 80.6 3" shale plug (responsible for increase in N value (same material))		
										@ 81.3' 1.5" shale plug, dense		

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AMERICAN ELECTRIC POWER SERVICE CORPORATION

AEP CIVIL ENGINEERING LABORATORY

LOG OF BORING

JOB NUMBER **42393125-01**

COMPANY **INDIANA MICHIGAN POWER COMPANY** BORING NO. **MW-1606D** DATE **4/27/16** SHEET **4** OF **5**

PROJECT **ROCKPORT PLANT** BORING START **2/12/16** BORING FINISH **2/12/16**

SAMPLE NUMBER	SAMPLE	SAMPLE DEPTH IN FEET FROM	TO	STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD %	DEPTH IN FEET	GRAPHIC LOG	U S C S	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
49	SS	72.0	73.5	7-10-17	1.3					@ 81.5' no recovery, potential cobble blocking during sampling		
50	SS	73.5	75.0	8-9-13	1.2							
51	SS	75.0	76.5	10-16-25	1.4		75					
52	SS	76.5	78.0	9-10-14	1.4							
53	SS	78.0	79.5	6-9-18	1.5							
54	SS	79.5	81.0	10-17-34	1.5		80					
55	SS	81.0	82.5	31-19-14	1.3							
56	SS	82.5	84.0	10-16-21	1.5				CH	Fat clay, med. l. grey N6, moist, firm		
57	SS	84.0	85.5	9-19-21	1.5		85		SW	Well graded sand, med. grained, dark yellowish brown 10YR 4/2, wet, dense, w/fine gravel @ 83' coal fragment (2" diam., 1" thick) @ 83.6' coal fragment (2" diam, 1" thick)		
58	SS	85.5	87.0	7-15-24	1.3				SP	Poorly graded sand, fine grained, pale yellowish brown 10YR 6/2, wet, dense @ 88.5' trace fine gravel @ 91.5' with fine gravel		
59	SS	87.0	88.5	10-13-20	1.2							
60	SS	88.5	90.0	8-14-23	1.4							
61	SS	90.0	91.5	8-13-27	1.3		90					
62	SS	91.5	93.0	8-7-16	1.5							
63	SS	93.0	94.5	7-9-15	1.5							
64	SS	94.5	96.0	12-12-14	1.5				SW	Well graded sand, med. to coarse grained, dark yellowish brown 10YR 4/2, wet, med. dense, w/fine gravel		
65	SS	96.0	97.5	3-5-5	1.5		95		SP SW SP	Poorly graded sand, coarse grained, greyish red 5R 4/2, wet, med. dense, trace fine gravel		
66	SS	97.5	99.0	5-5-6	1.4				SP	Well graded sand, med. to coarse grained, dark yellowish brown 10YR 4/2, wet, med. dense, w/fine gravel		

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AMERICAN ELECTRIC POWER SERVICE CORPORATION

AEP CIVIL ENGINEERING LABORATORY

LOG OF BORING

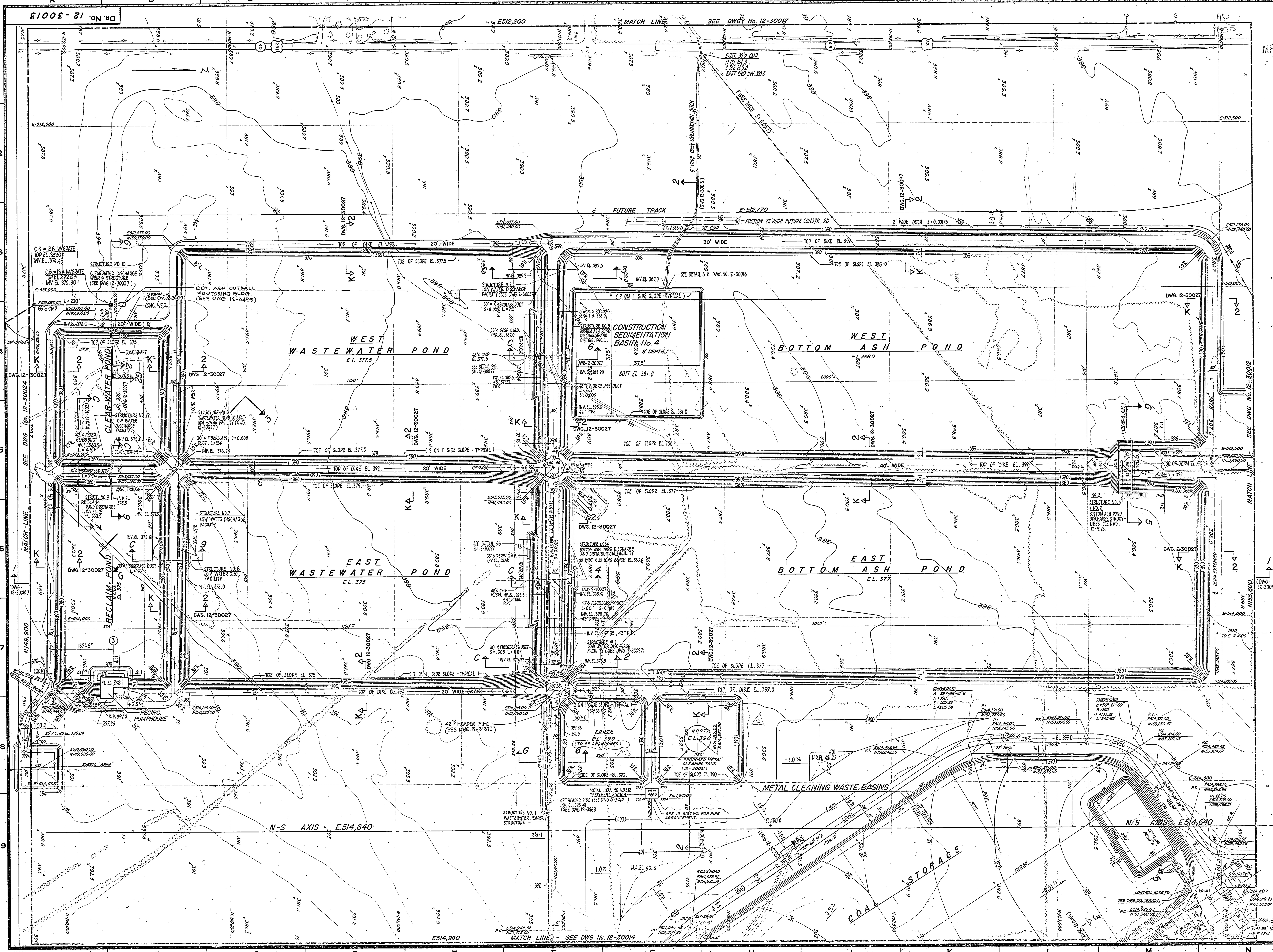
JOB NUMBER **42393125-01**

COMPANY **INDIANA MICHIGAN POWER COMPANY** BORING NO. **MW-1606D** DATE **4/27/16** SHEET **5** OF **5**

PROJECT **ROCKPORT PLANT** BORING START **2/12/16** BORING FINISH **2/12/16**

SAMPLE NUMBER	SAMPLE	SAMPLE DEPTH IN FEET FROM	TO	STANDARD PENETRATION RESISTANCE BLOWS / 6"	TOTAL LENGTH RECOVERY	RQD %	DEPTH IN FEET	GRAPHIC LOG	U S C S	SOIL / ROCK IDENTIFICATION	WELL	DRILLER'S NOTES
67	SS	99.0	100.5	4-5-7	1.5		100			Poorly graded sand, coarse grained, greyish red 5R 4/2, wet, med. dense to loose, trace fine gravel Poorly graded sand, fine grained, pale yellowish brown 10YR 6/2, wet, loose @ 97.5' med. dense, fine grained		
68	SS	100.5	102.0	7-7-10	1.4				SP	Poorly graded sand, fine to fine grained, dusky red 5R 3/4, wet, med. dense @ 102' loose, fine grained, moist @ 103.5' med. dense @ 105' fine grained @ 106.5' dense @ 108' med. dense, trace fine gravel @ 109' no fine gravel @110.6' siltstone fragments to 2.5", moderate brown 5YR 4/4, shiny, angular		
69	SS	102.0	103.5	4-4-6	1.5							
70	SS	103.5	105.0	5-6-10	1.3		105					
71	SS	105.0	106.5	4-6-9	1.5							
72	SS	106.5	108.0	7-11-20	1.4							
73	SS	108.0	109.5	8-13-15	1.5							
74	SS	109.5	111.0	10-18-11	1.3		110					
75	SS	111.0	112.5	14-50/3					ML	Silt, l. grey N7, moist, med. dense, non-durable shale @ 111' clayey silt, hard Spoon refusal @ 111.7' Auger refusal @ 112.9 BT @ 112.9'		
76	SS	112.5	114.0	50/4								

Appendix D- Original Design Drawings



GENERAL NOTES

FOR PROFILE OF 66" ϕ CMP SEE SH-12-30028

WASTE WATER PONDS-EAST & WEST, RECLAIM, & CLEAR WATER PONDS, HAVE HALF 1 FT. OF CLAY PLACED ON BOTTOMS AND SIDES - BY FIELD.

REVISIONS

DATE	NO.	DESCRIPTION	APP'D.
9/28/84	14	ADDED MH#1, 18"Ø CMP & DITCH AT COAL STATIONS 7, 7E & 7W. AREA M-9. ACY	SF/TS
4/25/84	13	ADDED DET. "K-2" MARKS PER REVISION MADE ON DWG. 12-30027 - REGRADE & REDRESS ON SLOPES ON BOTTOM ASH, WASTEWATER, RECLAIM & CLEARWATER PONDS	SF/TS
9/13/83	12	ADDED BOT. ASH OUTFALL MONITORING BLDG. (4-B) ACY/GS.	S.F.
3/10/82	11	AS PER RDR NO. ROCK 12-332, EXPANDED SETTLING POND "A" & REGRADED ACCORDINGLY. RD. INDICATED SKIMMER LOCATION PER. RDR #12-290 RM. REVISED DIKE GRADING IN AREAS F-5 & F-6, LOCATION OF STRUCT. #11; ADDED SECT. G-G.	S.F.
9/3/81	10	REVISED DESCRIPTION OF STEEL PIPE TO "FIBERGLASS DUCT." RNS. DIST. TO STR. #11.	S.F.
8/26/80	9	REVISED LOCATION AND GRADING OF SUBSTATION "APPH"	SF
8/11/80	8	ADDED SUBSTATION "APPH" & ROAD NEAR RECLAIM POND, AND GRADED ACCORDINGLY A-8. REVISED ℄ TO ℄ DIMENSION TO 38', WAS 30' B-7.8. RNS	SF
10/29/79	7	REVISED OR ADDED PIPE LENGTHS @ SECT'S. C2, C3, C4, C6, C7, C9, & G3. R.C.	HTS
9/26/79	6	REVISED INV. ELS. 30" STEEL PIPE AT STRUCTURES #12 & #13. REVISED INV. ELS AT C.B. #13A & 13B. RELOCATED RECIRCULATION PUMPHOUSE, AND REALIGNED BERM ROAD. REGRADED AREA ACCORDINGLY. (A-7) LABELED STRUCTURE #7 "LOW WAT. DISCH. FACILITY". RELOCATED STRUCT #6 275' EAST OF ℄ DIKE BETWEEN CLEARWATER & RECLAIM PONDS. ADDED CONTROL BUILDING 7W & 4KV/600 OUTDOOR SUB-STA. (9-N).	HTS
8/7/79	5	REV. SECTIONS C-2, C-3, C-6, & G-3. RELOCATED STRUCT. #6 & #12 & REVISED INV. ELEVS. RELOCATED STRUCT. #9 FROM CLEAR WATER POND TO RECLAIM POND. INCREAS. TO 42" ϕ. REMOVED C.B. #13A, #13B & STRUCT #10 (SEC. G-2) AT RECLAIM POND AND RELOCATED TO CLEAR WATER POND. REMOVED 46" ϕ STEEL PIPE AT RECLAIM POND. ADDED 66" CMP AT CLEAR WATER POND.	HTS
4/6/79	4	AS PER RDR ROCK 12-055, REVISED COORDINATES OF P.I. FOR CURVE NEAR STA. 7W. ADDED 48" ϕ STEEL PIPE W/C.B.S FROM RECLAIM POND. - A-8. REV. COORD. FOR STA. 7W TO - E514,820.62 - N153,493.10. WAS E514,821.67 - N153,493.80. REVISED DIMENSION ℄ STA. 7 TO ℄ STA. 7W TO 117'-3", WAS 116'-0" - N-9. ADDED 48" ϕ CMP & SLIDE GATES TO SECTIONS C-4 & C-6. REGRADED COAL STOR. AREA. REV. ELEVS OF SETTLING POND "A"; DELETED 30" ϕ CMP FROM SETT. POND "A". RAISED ELEV. OF WEST BOTT. ASH POND TO EL. 386.0, WAS EL. 377.0. CHANGED STRUCTURE NO. 3 TO NO. 13, AND RAISED INVERTS TO EL. 378.5 & 385.5, WAS 376.0 & 376.5. RAISED ELEV. OF WEST WASTEWATER POND TO EL. 377.5, WAS 375.0 & RAISED INV. EL. TO 378.5 @ STRUCT NO. 6, WAS 375.5	HTS
11/7/78	3	REVISED SIZE STEEL PIPE TO 30" ϕ WAS 18" ϕ. REVISED LOC. OF SETTLING POND "A" & 30" ϕ CMP. ADDED DIMS, P.I.'S FOR 22' ROAD & CURVES AROUND WEST COAL STOR. AREA.	HTS
4/11/78	2	ADDED STRUCTURE NO. 12 (B5). REVISED GRADING & LOCATIONS OF ROAD & STATIONS 7, 7W AT WEST COAL STORAGE AREA. REVISED INV. 375.74 18" ϕ PIPE, WAS 375.5. ADDED RADII @ ALL PONDS. ADDED INV. ELS. TO 42" HEADER PIPE ALONG DIKE BETW. WASTEWATER & ASH PONDS (E4, 6, 7)	HTS
1/16/90	15	PER RDR-RP-00-03314, REVISED EXIST. NORTH METAL CLEANING POND & ABANDONED THE SOUTH POND. ALSO ADDED REF. NOTE TREATMENT STA.	RPM

REFERENCE DRAWINGS

- 12-30014 COAL STORAGE AREA - GRADING DRAINAGE & TRACK
- 12-30003 SEDIMENTATION BASINS LOCATION PLAN
- 12-30018 WASTEWATER & BOTTOM ASH POND AREA - SECTIONS & DETAILS
- 12-30022 COAL STORAGE AREA SECTIONS & DETAILS
- 12-30004 SEDIMENTATION BASINS - PLANS & DETAILS

INDIANA & MICHIGAN ELECTRIC CO.
ROCKPORT SITE
ROCKPORT, INDIANA

UNIT No. 1 & 2 WASTEWATER & BOTTOM ASH POND AREA GRADING & DRAINAGE

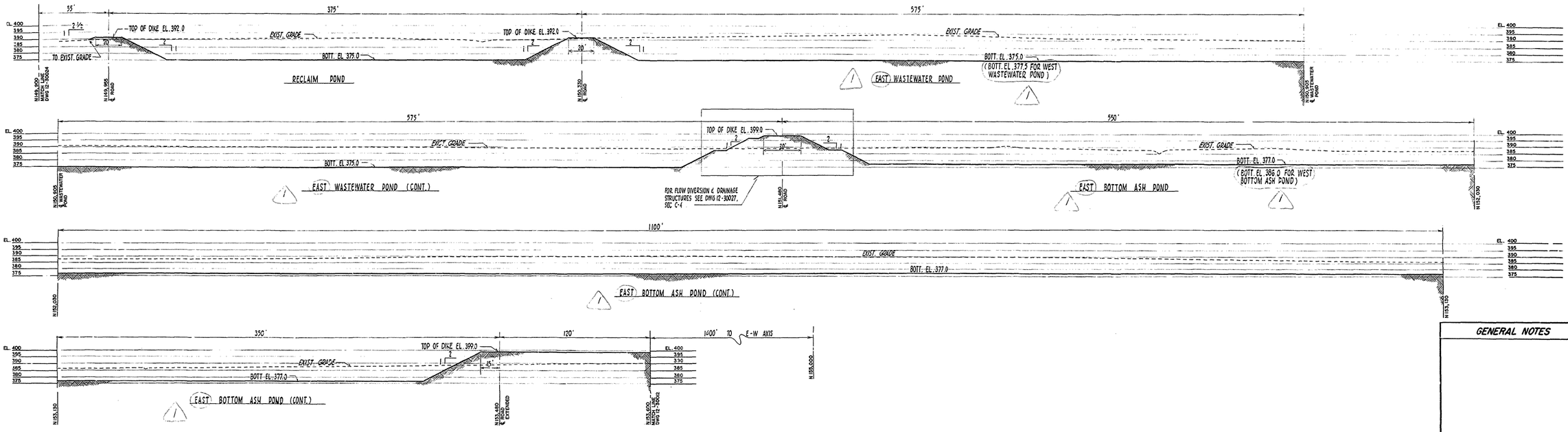
DR. NO. 12-30013-15

ARCH.		ELEC		MECH.		STR.	S.F.

SCALE: 1"=100'
DR. R.N. SWINGLE
CH.
SQ. LDR W.B.
DATE: 7/18/77
APPROVED BY: ENGINEERING DIV; DESIGN DIV

AMERICAN ELECTRIC POWER SERVICE CORP.

DR. No. 12-30018



SECTION 1-1

RECLAIM, WASTEWATER & BOTTOM ASH PONDS

SCALE 1" = 30'

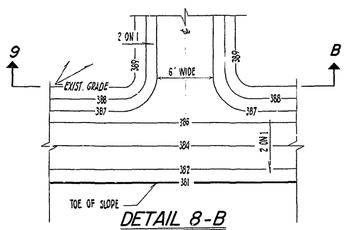
FOR LOCATIONS SEE DWG NO. 12-30013

SECTION 2-2

NORTH METAL CLEANING WASTE BASIN & E-W BOTT. ASH PONDS

SCALE 1" = 30'

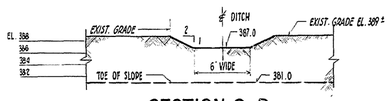
FOR LOCATIONS SEE DWG NO. 12-30013



DETAIL 8-B

SCALE 1" = 10'

FOR LOCATION SEE DWG NO. 12-30013.



SECTION 9-B

SCALE 1" = 10'

FOR LOCATION SEE DWG NO. 12-30013.

GENERAL NOTES

REFERENCE DRAWINGS

12-30003 WASTEWATER & BOTTOM ASH POND AREA, GRADING & DRAINAGE
12-30003 SEDIMENTATION BASINS - LOCATION PLAN
12-30004 SEDIMENTATION BASINS - PLANS & DETAILS

DATE	NO.	DESCRIPTION	APPD.
11/04/77	1	AS PER CIVIL ENGR'S REQUEST. REVISED WEST BOTT. ASH POND EL. TO 386.0. WAS 377.0. ADDED NOTE: BOTT. EL. 377.5 FOR W.W.PD	H.T.S
9/9/77	0	RELEASED TO FIELD	H.T.S

REVISIONS

INDIANA & MICHIGAN ELECTRIC CO.

ROCKPORT SITE

ROCKPORT, INDIANA

UNIT No. 1 & 2 WASTEWATER & BOTTOM ASH POND AREA — SECTIONS & DETAILS

DR. NO. 12-30018-1

ARCH.	ELEC.	MECH.	STR.
		P.D	S.F.

SCALE: AS NOTED

DR: R.N. SWINGLE

CH.

SO. LDR W. O.

DATE: 7/14/77

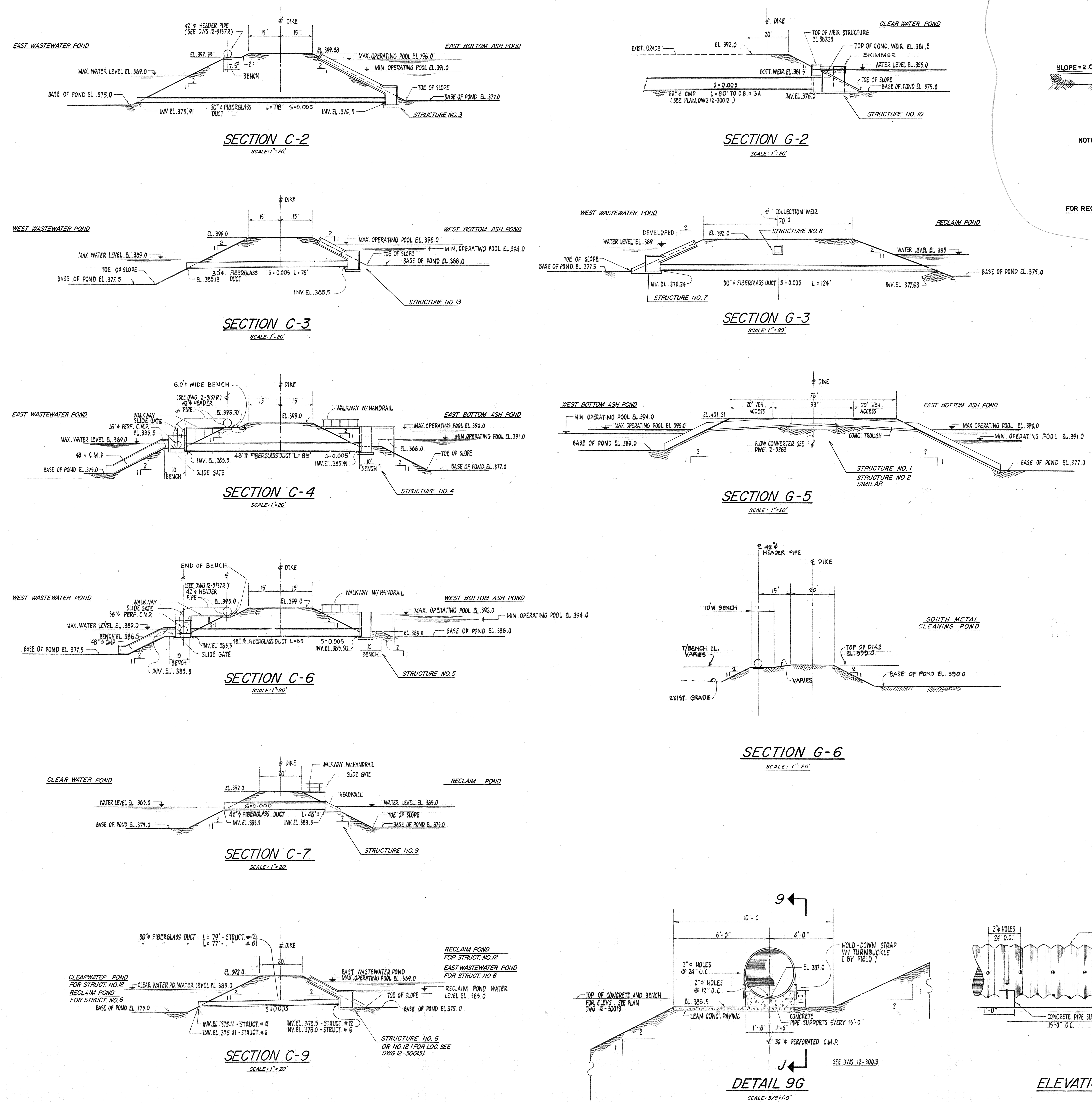
ENG. MEETING DIV.

DESIGN DIV.

AMERICAN ELECTRIC POWER SERVICE CORP.

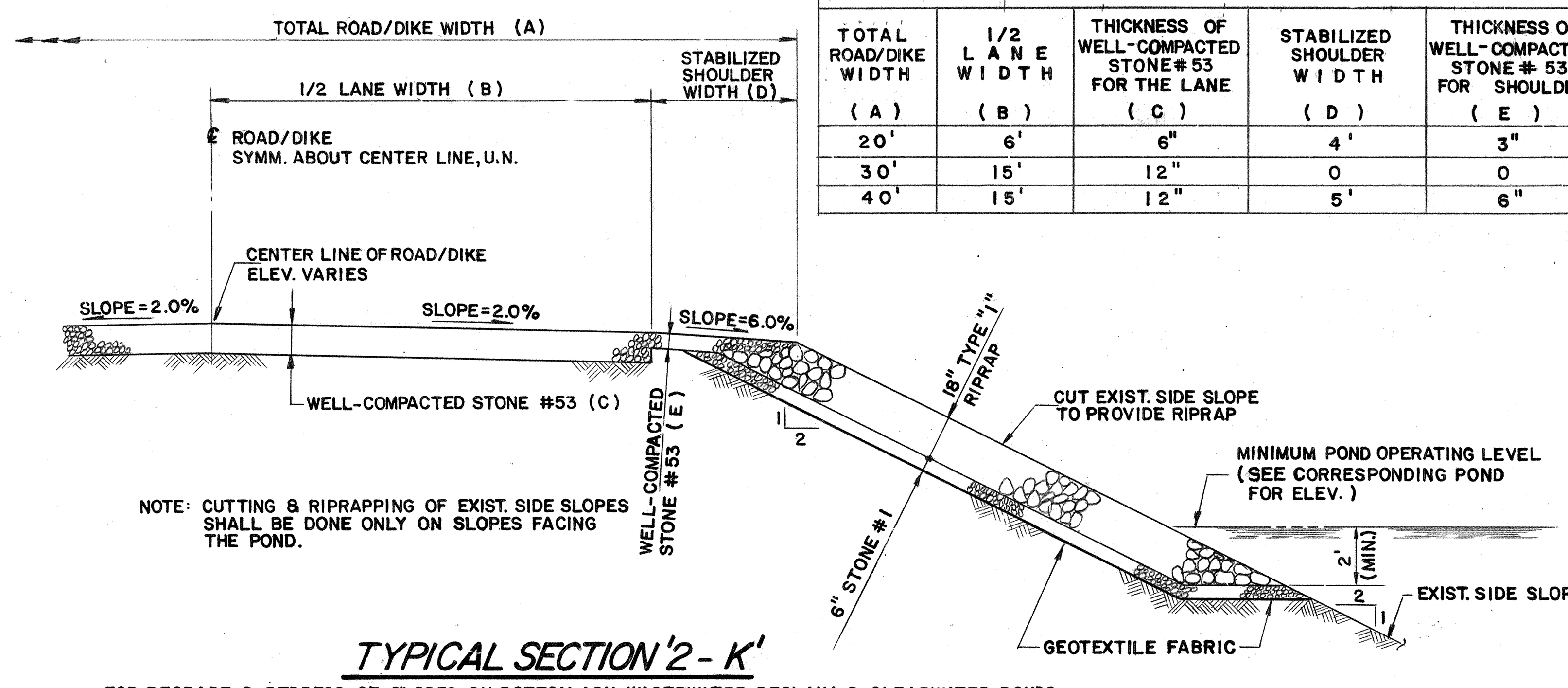
AEP3046XY

DR. NO. 12-30027



ROAD / DIKE BASE COURSE DATA:

TOTAL ROAD/DIKE WIDTH (A)	1/2 LANE WIDTH (B)	THICKNESS OF WELL-COMPACTED STONE # 53 FOR THE LANE (C)	STABILIZED SHOULDER WIDTH (D)	THICKNESS OF WELL-COMPACTED STONE # 53 FOR SHOULDER (E)
20'	6'	6"	4'	3"
30'	15'	12"	0	0
40'	15'	12"	5'	6"



TYPICAL SECTION '2-K'

FOR REGRADE & REDRESS OF SLOPES ON BOTTOM ASH, WASTEWATER, RECLAIM & CLEARWATER PONDS

SCALE: 1/4" = 1'-0"

GENERAL NOTES

FOR CONTINUATION OF 66"φ CMP - SEC. G-2 SEE PROFILE SH. 12-30028.

REFERENCE DRAWINGS

12-30013 WASTEWATER & BOTTOM ASH POND AREA GRADING & DRAINAGE

12-30024 AREA SOUTH OF RECLAIM POND - GRADING, DRAINAGE & TRACK LAYOUT

REVISIONS

DATE	NO.	DESCRIPTION	APPD.
4/25/84	8	ADDED TYP. DET. "2-K" FOR REGRADE & REDRESS OF SLOPES ON BOTT. ASH, WASTEWATER, RECLAIM & CLEARWATER PONDS.	TS/SF
12/17/81	7	ADDED SKIMMER-SECT. G-2 PER RDR-ROCK#12-290 RM ADDED SECTION 'G-G' RS	SF
8/12/81	6	REVISED DESCRIPTION OF STEEL PIPE TO FIBERGLASS DUCT. RWS	SF
9/26/79	5	REVISED PIPE LENGTH DIM'S SEC. C-2, C-3, C-4, & C-6. REMOVED PIPE BENDS SECTION C-3 & C-9. ADDED LENGTH DIMENSION & REVISED INV. EL. OF 30"φ STEEL PIPES. REV. LENGTH DIM. OF 66φ CMP TO 80', WAS 100'.	HTS
8/7/79	4	RELOCATED STRUCT. # 6 & #12 & REVISED INV. ELEV'S AND BASE OF POND ELEVATIONS. REVISED SECTIONS C-2, C-3, C-6 & G-3. RELOCATED STRUCT # 9 FROM CLEAR WATER POND TO RECLAIM PD & REVERSED FLOW.	HTS
2/6/79	3	REVISED SECTION G-2; CHANGED PIPE SIZE 48"φ STEEL, WAS 30"φ.	HTS.
1/10/79	2	ADDED 48"φ CMP & SLIDE GATES TO SECTIONS C-4 & C-6. RAISED WEST BOTTOM ASH POND EL. TO 386.0, WAS 377.0. RAISED WEST WASTEWATER POND EL. TO 377.5, WAS 375.0. CORRECTED PIPE SIZE ON SECTION G-3 TO 30"φ. ADDED HOLD-STRAPS WITH TURNBUCKLE TO DETAIL 9G	HTS
4/11/78	1	ADDED STRUCTURE NO. 12 TO SECTION C-9	HTS

NF

NOTE:
GRADE ELEVATION HAS BEEN ESTABLISHED AS ELEVATION TO CONVERT TO PLANT DATUM ADD TO ELEVATIONS SHOWN.

INDIANA & MICHIGAN ELECTRIC CO.
ROCKPORT SITE
ROCKPORT, INDIANA

UNIT No. 1 & 2 WASTEWATER & BOTTOM ASH POND AREA - SECTIONS & DETAILS

DR. NO. 12 - 30027-8

ARCH.		ELEC.		MECH.		STR.	

SCALE: AS SHOWN
DR. R.N. SWINGLE
CH. NB
SQ. LDR. ASP
DATE: 3/31/78
APPROVED BY: ENGINEERING DIV. [signature]; DESIGN DIV. [signature]

AMERICAN ELECTRIC POWER SERVICE CORP.
2 BROADWAY NEW YORK