ALLIANT ENERGY
Interstate Power and Light Company
Lansing Generating Station

CCR SURFACE IMPOUNDMENT

STRUCTURAL STABILITY ASSESSMENT

Report Issued: October 18, 2017
Revision 1

HARD HAT SERVICES™
Engineering, Construction and Management Solutions









EXECUTIVE SUMMARY

This Structural Stability Assessment (Report) is prepared in accordance with the requirements of the United States Environmental Protection Agency (USEPA) published Final Rule for Hazardous and Solid Waste Management System – Disposal of Coal Combustion Residual from Electric Utilities (40 CFR Parts 257 and 261, also known as the CCR Rule) published on April 17, 2015 and effective October 19, 2015.

This Report assesses the structural stability of each CCR unit at Lansing Generating Station in Lansing, Iowa in accordance with §257.73(b) and §257.73(d) of the CCR Rule. For purposes of this Report, "CCR unit" refers to an existing CCR surface impoundment.

Primarily, this Report is focused on documenting whether the design, construction, operation, and maintenance of the CCR unit is consistent with recognized and generally accepted good engineering practices for the maximum volume of CCR and CCR wastewater which can be impounded within each CCR unit.

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1 Introduction

The owner or operator of the Coal Combustion Residual (CCR) unit must conduct an initial and periodic structural stability assessments and document whether the design, construction, operation, and maintenance of the CCR unit is consistent with recognized and generally accepted good engineering practices for the maximum volume of CCR and CCR wastewater which can be impounded therein. This Report is prepared in accordance with the requirements of §257.73(b) and §257.73(d) of the CCR Rule.

1.1 CCR Rule Applicability

The CCR Rule requires a periodic structural stability assessment by a qualified professional engineer (PE) for existing CCR surface impoundments with a height of 5 feet or more and a storage volume of 20 acre-feet or more; or the existing CCR surface impoundment has a height of 20 feet or more.

1.2 Structural Stability Assessment Applicability

The Lansing Generating Station (LAN) in Lansing, Iowa (Figure 1) has one existing CCR surface impoundment that meets the requirements of §257.73(b)(1) and/or §257.73(b)(2) of the CCR Rule, which is identified as the LAN Upper Ash Pond.

2 FACILITY DESCRIPTION

LAN is located approximately three miles southeast of Lansing, Iowa on the western shore of the Mississippi River in Allamakee County, at 2320 Power Plant Drive, Lansing, Iowa (Figure 1).

LAN is a fossil-fueled electric generating station that has used four steam turbine electric generating units throughout its history. Unit 1, Unit 2, and Unit 3 were retired by 2014 and Unit 4 is the only operating unit. Sub-bituminous coal is the primary fuel for producing steam at LAN. The CCR at LAN is categorized into three types: bottom ash, fly ash, and scrubber byproduct. Fly ash is collected by electrostatic precipitators and pneumatically conveyed to an onsite fly ash silo, which is equipped with a baghouse for dust control. The fly ash is then either transported off-site for beneficial reuse, landfilled (in the case of high loss on ignition), or sluiced to LAN Upper Ash Pond (typically during startup and shutdown). Bottom ash is sluiced to a surface impoundment identified as the LAN Upper Ash Pond, Figure 2, where it is dredged, dewatered, and transported to the onsite landfill. The LAN Upper Ash Pond is located south of the generating plant and is the only existing CCR surface impoundment. Scrubber byproduct consists of fly ash, unreacted lime, and activated carbon. Scrubber byproduct is collected in the byproduct silo prior to being landfilled.

A previous CCR surface impoundment at LAN, identified as the Lower Ash Pond, was located west of the generating plant and north of Power Plant Drive. The Lower Ash Pond was closed in September 2015 by removing the CCR from the surface impoundment via hydraulic dredge and sluicing the CCR to the south end of the LAN Upper Ash Pond. CCR was removed from the Lower Ash Pond prior to backfilling the surface impoundment.

General Facility Information:

Date of Initial Facility Operations:	1946
NPDES Permit Number:	IA0300100

Latitude / Longitude:	41°56'38.43"N 91°38'22.39"W
Nameplate Ratings:	Unit 1 (1948): 16.6 MW (Retired)
	Unit 2 (1949): 11.4 MW (Retired)
	Unit 3 (1957): 35.8 MW (Retired)
	Unit 4 (1977): 270 MW

2.1 LAN Upper Ash Pond

The LAN Upper Ash Pond is located southwest of the generating plant and south of Power Plant Drive. The LAN Upper Ash Pond receives influent flows from the Unit 4 boiler floor sumps, water treatment sumps, fly ash hydroveyor system, storm water runoff from the active dry ash landfill and hillside east of the impoundment, as well as sluiced fly ash and bottom ash. The LAN Upper Ash Pond is the only receiver of sluiced CCR at LAN. The CCR is sluiced from the generating plant to the south east corner of the LAN Upper Ash Pond, Figure 2. The sluiced CCR discharges into the southeast corner of the LAN Upper Ash Pond where the majority of the CCR settles. Ongoing maintenance dredging is conducted in the southern portion of the LAN Upper Ash Pond. The dredged CCR is temporarily stockpiled and dewatered prior to being transported to the on-site active dry ash landfill located south of the LAN Upper Ash Pond.

The sluiced water that is discharged into the LAN Upper Ash Pond flows to the west prior to flowing north through a series of five interconnected settling ponds separated by intermediate dikes. The intermediate dikes have 30-inch diameter corrugated metal pipes (CMPs) on the west and east sides, which hydraulically connect the five settling ponds. The water from each settling pond flows north until it enters the large open settling area of the LAN Upper Ash Pond. The north end of the LAN Upper Ash Pond has a concrete wet well and overflow weir structure that controls the LAN Upper Ash Ponds water level, and is identified as Weir Box #1. The water in the LAN Upper Ash Pond overflows a stop log weir into Weir Box #1, and then through a 146 foot long 24 inch diameter CMP under Power Plant Drive, and into Weir Box #2. The water leaves Weir box 2 through a 225 foot long 24-inch diameter high density polyethylene pipe, which connects Weir Box #2 to Weir Box #3 in the backfilled former Lower Ash Pond. The water flows through Weir Box #3 and discharges to the west through a 77 foot long 24-inch diameter CMP into Unnamed Creek #1. Unnamed Creek #1 flows to the north into Unnamed Creek #2 which then discharges into the Mississippi River. The National Pollutant Discharge Elimination System (NPDES) Outfall 002 monitoring location, which consists of flow monitoring instrumentation, is located at Weir Box #1 and compliance samples are collected from Weir Box #3.

The total surface area of the LAN Upper Ash Pond is approximately 11.5 acres and has an embankment height of approximately 20 feet from the crest to the toe of the downstream slope at its greatest height. The area of the entire CCR Unit inclusive of the impoundment and the dredging and dewatering areas is approximately 17 acres. The interior storage depth of the LAN Upper Ash Pond is approximately 28 feet. The volume of impounded CCR and water within the LAN Upper Ash Pond is approximately 587,000 cubic yards.

3 STRUCTURAL STABILITY ASSESSMENT- §257.73(d)

This Report documents whether the design, construction, operation, and maintenance of each CCR unit is consistent with recognized and generally accepted good engineering practices for maximum volume of CCR and CCR wastewater which can be impounded.

3.1 LAN Upper Ash Pond

The LAN Upper Ash Pond was constructed in 1974 in a valley directly south of the LAN generating station. The construction took place within the valley with the east and south side of the Upper Ash Pond being constructed against naturally occurring ground surface. The north and west sides of the impoundment were constructed of dredge spoil medium to fine sand from Mississippi River maintenance dredging.

To allow construction of the impoundment, the Unnamed Creek #1 was rerouted to run along the west side of the valley between the impoundment and a County Road on the east side slope of the valley, Figure 1. Soil investigations completed at the time of construction indicate the valley is underlain by a medium dense deposit of sand and gravel over the full valley floor with loose to very loose river silt laying on top of the sand and gravel at the north end of the planned Upper Ash Pond. Only organic top soil was removed prior to constructing the two embankment sides of the LAN Upper Ash Pond and the river silt remains in the foundation at the northern end of the LAN Upper Ash Pond. The details of the LAN Upper Ash Pond construction are shown in drawings prepared by Sargent & Lundy in 1974, Appendix A.

The embankment on the north side of the LAN Upper Ash Pond has a 36 foot wide crest to accommodate the Power Plant Drive access road. The western embankment has a 15 foot wide crest. Both embankments were constructed with a 3 horizontal to 1 vertical outside slope. The inside slope of the embankment was lined with a layer of dry bentonite to reduce seepage loss through the permeable embankment soil.

The LAN Upper Ash Pond was constructed with a four foot square concrete riser well, Weir Box #1 for the control of process water and surface water discharge from the Pond. The concrete box is equipped with a wooden stop log system that is used to control the water elevation in the LAN Upper Ash Pond. The normal operation elevation of the stop logs is 648 which maintains the pond water surface at elevation 648.75 feet during normal plant flows of 3,500 gpm. The crest elevation of the embankments is a minimum of elevation 654.

In 2015, a subsurface soil investigation was undertaken to collect soil samples and determine the in-situ density of the north and west embankments and the underlying foundation soil. The soil borings were undertaken with hollow stem augers and sampling was completed with a standard split spoon (ASTM D1556), Figure 2. The density information along with soil test results for water content, grain size, and Atterberg limits, Appendix B, indicate the current conditions of the embankments as constructed in 1974.

In the summer of 2015, the west embankment of the LAN Upper Ash Pond was improved by the installation of a cement-bentonite cutoff wall along the center line of the embankment. The cutoff wall reduced seepage loss through the embankment and eliminated the saturation of the embankment toe and flow of surface water from the toe to the Unnamed Creek #1, Figure 2.

Also in the summer of 2015, the north embankment of the LAN Upper Ash Pond was improved by backfilling the Lower Ash Pond, substantially reducing the total height of the north embankment and improving its overall stability by surcharging the river silt layer in the foundation of the embankment.

3.1.1 CCR Unit Foundation and Abutments - §257.73(d)(1)(i)

The LAN Upper Ash Pond was constructed on foundation soils that are medium dense sand and gravel in the southern part of the Pond and are suitable foundation soils. In the northern end of the pond the sand and gravels have an overlying river silt deposit that is loose to very loose and is saturated due to the Mississippi River. The original construction of the LAN Upper Ash Pond was completed over the top of the river silt which has no clay like properties, Appendix B, and supported the embankment without substantial settlement after construction.

During assessment of embankment stability in 2015, it was determined that the river silt in the foundation resulted in slope stability safety factors less than the CCR Rule standards. As a result of the 2015 finding, the stability was improved within the northern embankment by closing and filling the lower ash pond in order to surcharge the river silt, lessen the northern embankment height, and by stabilizing ground water elevation.

The improvements increased the safety factor for slope stability controlled by the river silt layer to acceptable values as reported in the Safety Factor Assessment Report 40 CFR 257.73 (b) and (e). The effects of the weak foundation soil is corrected and the operation of the LAN Upper Ash Pond is acceptable as designed and modified.

3.1.2 Slope Protection - §257.73(d)(1)(ii)

The impoundment is incised on the east and south sides. The north embankment crest is about 35 feet wide and contains Power Pant Road, which is the plant access road to the LAN. The northern slope is 3:1 and is comprised of shallow rooting vegetation, which is adequate to protect against surface erosion. The west embankment is also 3:1 and is vegetated with shallow rooting grasses, which is adequate to protect against surface erosion. The toe of the downstream west embankment has 10 feet of rip rap material, which protects from erosive forces during flooding of the Unnamed Creek #1. Lastly, backwater elevation from Mississippi River 100 year return elevation is 634, which does not reach toe of the embankment.

Sudden drawdown is addressed in Section 3.1.7.

3.1.3 CCR Embankment Density- §257.73(d)(1)(iii)

The embankments were constructed in 1974 using dredge sand from maintenance dredging of the Mississippi River. The sand is medium to fine grained and very uniform throughout the embankments, Appendix B. The density is medium dense to dense indicating adequate compaction at the time of construction. Observation during installation of a cement-bentonite cutoff wall in 2015 in the west embankment, indicates further grain cementation in the formerly saturated areas of the embankment, likely due to calcium hydroxide from pond water.

The information from this assessment indicates the CCR unit has been designed, constructed, operated, and maintained with sufficient embankment density.

3.1.4 Vegetation Management - §257.73(d)(1)(iv)

Historically vegetation management has been conducted on a periodic basis. At the time of the initial Annual Inspection in October 2015, the areas upstream and downstream slopes of the west embankment could not be properly inspected due to the presence of dense/tall brush and woody vegetation along the entire slope. Since the Annual Inspection, the facility has removed woody deep rooting vegetation from the embankment and has managed the remaining grassy vegetation to facilitate effective inspections. The facility plans to continue managing the grassy vegetation on the embankments at a height that facilitates effective inspections.

3.1.5 Spillway Management - §257.73(d)(1)(v)

The water in the LAN Upper Ash Pond overflows a stop log weir into Weir Box #1, and then through a 146 foot long 24 inch diameter CMP under Power Plant Drive, and into Weir Box #2. The water leaves Weir box 2 through a 225 foot long 24-inch diameter high density polyethylene pipe, which connects Weir Box #2 to Weir Box #3 in the backfilled former Lower Ash Pond. The water flows through Weir Box #3 and discharges to the west through a 77 foot long 24-inch diameter CMP into Unnamed Creek #1. Unnamed Creek #1 flows to the north into Unnamed Creek #2 which then discharges into the Mississippi River. The culverts are constructed of non-erodible material and designed to carry sustained flows.

The Weir Box structures are checked for malfunction (e.g., blockages, deformations) during the weekly inspections by the facility personnel.

This impoundment currently has a hazard potential classification of "Significant," which in turn requires an evaluation of the impacts of a 1,000 year rainfall event. The Inflow Flood Control Plan, which is a separate document developed to comply with 40 CFR 257.82, shows that the precipitation from this event will drain through the culverts without overtopping the embankments of the impoundment. The freeboard at peak flow will be approximately 8 inches.

3.1.6 Hydraulic Structures - §257.73(d)(1)(vi)

The discharge structure from the LAN Upper Ash Pond is controlled by a four foot wide weir box (Weir Box #1), where the flow discharges through a single 24-inch pipe. Prior to the final discharge there are two intermediate structures, Weir Box #2 and Weir Box #3, which were previously used to convey flow through the now closed lower ash pond. During closure of the lower ash pond, a 24-inch HDPE pipe was installed to connect Weir Box #2 to Weir Box #3. The pipes installed between Weir Box #1 to Weir Box #2 and from Weir Box #3 to the outfall are 24-inch CMPs.

On June 22, 2016 all three sections of pipes were inspected using remote camera video inspection system. The inspection showed that there was minimal deterioration, deformation, distortion, sedimentation, debris, and no bedding deficiencies were observed within the pipe from Weir Box #2 to Weir Box #3 and from Weir Box #3 to the outfall.

The pipe from Weir Box #1 could not be inspected because the pipe is lower in elevation than the subsequent downstream pipes. A pump was used to dewater Weir Box #1 and the video camera system was able to collect visuals on the initial section of pipe. The camera observed solids buildup of 8-inches to 10-inches thick. The solids appeared to be organic in nature and could be due to biological growth within the pipe. Additionally, the solids were intermixed with a thin hard layers.

In September 2017, LAN successfully removed the solids that had accumulated within the 146 feet of 24-inch CMP between Weir Box #1 and Weir Box #2. The solids were removed by advancing pipe jetting equipment through the entirety of the 24-inch CMP from Weir Box #1 to Weir Box #2. In order to jet the pipe, the water level within the LAN Upper Ash Pond was lowered to reduce flow into Weir Box #1. During the pipe cleaning activities, the accumulated water within both Weir Box #1 and Weir Box #2 was managed by pumping the water out of the weir boxes and conveying it back into the LAN Upper Ash Pond. The solids that were removed from the pipe jetting activities were collected and pumped back into the LAN Upper Ash Pond for settling.

Following the pipe cleaning activities, the 24-inch CMP was inspected using a remote video camera, similar to the inspection completed in June 2016. The video inspection confirmed the successful removal of solids within the 24-inch CMP. The video inspection observed an approximate two-foot sag within the pipe. The sag in the pipe extended for nearly the entire length. Given the composition of the embankment materials and age of the pipe, this sag is believed to be a product of settling.

Although there are no significant signs of deterioration, deformation, distortion, bedding deficiencies, sedimentation, and debris which may negatively affect the operation of the hydraulic structure, HHS recommends that LAN monitors for any differences in the performance of the pipe from Weir Box #1 to Weir Box #2. Any significant changes to flows, increases in suspended solids, or observed sediment buildup discovered during subsequent 7-day or 30-day inspections may indicate a deficiency in the structure and would warrant additional investigation.

3.1.7 Sudden Drawdown - §257.73(d)(1)(vii)

The toe of the north embankment is above the 100 year flood elevation of Mississippi River Pool 9, Appendix C. The toe of the west embankment could be flooded by backwater in the Unnamed Creek #1. However, the creek overflows down a drop riffle structure that loses 15 foot of elevation under the bridge for Power Plant drive and is unlikely to have significant flood elevation profile on the west embankment toe.

Information on the CCR unit design, construction, operation, and maintenance indicate sudden drawdown conditions from an adjacent water body do not occur for the LAN Upper Ash Pond.

4 QUALIFIED PROFESSIONAL ENGINEER CERTIFICATION

To meet the requirements of 40 CFR 257.73(d)(3), I Mark W. Loerop hereby certify that I am a licensed professional engineer in the State of Iowa and that, to the best of my knowledge, all information contained in this document is correct and the document was prepared in compliance with all applicable requirements in 40 CFR 257.73(b) and 40 CFR 257.73(d).

The initial Structural Stability Assessment, dated September 02, 2016, was prepared and certified by a qualified professional engineer. The next periodic review of this Structural Stability Assessment is required to be complete by September 2021.

This certification is for Revision 1 of the Structural Stability Assessment, which includes the following amendments:

- Revisions to the text in Section 3.1.6 Hydraulic Structures regarding the cleaning and inspection of the 24-inch diameter CMP between Weir Box #1 and Weir Box #2 that occurred in September 2017.

LICENSED PROFESSIONAL ENGINEER
MARK W. LOEROP
22197
IOWA

By: [signature]

Name: MARK LOEROP

Date: OCT 18, 2017

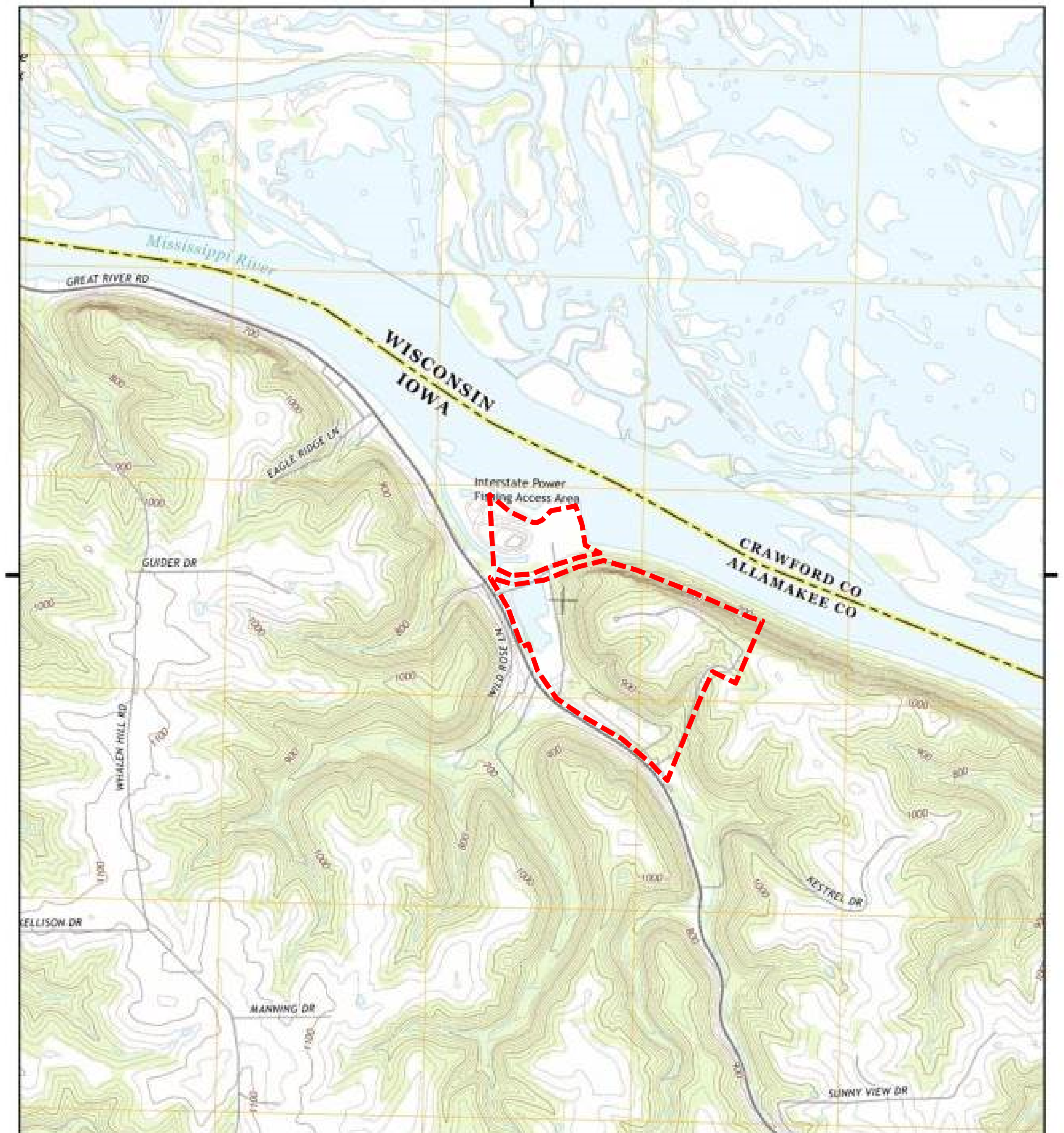
FIGURES

Alliant Energy
Interstate Power and Light Company
Lansing Generating Station
Lansing, Iowa

Structural Stability Assessment

Historical Topo Map

2013



Miles 0.25 0.5 1 1.5

This report includes information from the following map sheet(s).

NW N NE W E SW S SE

TP, Lansing, 2013, 7.5-minute

SITE NAME: Lasing Generating Station
ADDRESS: 2364-2366 Power Plant Dr
Lansing, IA 52151
CLIENT: Environmental Site Assessors

N

4555570 - 1 page 5

Historical Aerial Photo

Approximate Property Boundary

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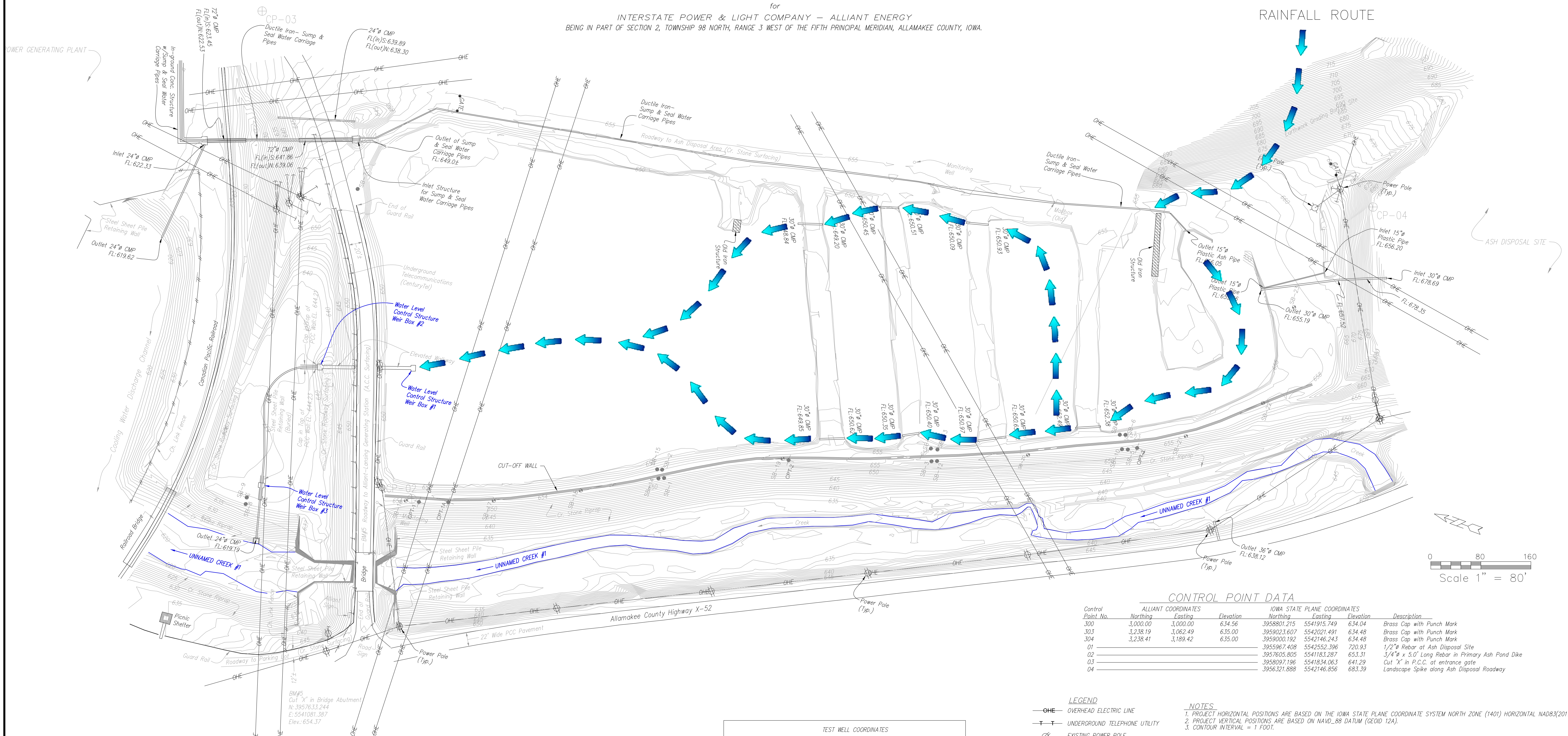
Site Location
Lansing Generating Station
Intersate Power and Light Company

Drawing
Figure 1
Date
6/7/2016

UPPER AND LOWER CCR POND TOPOGRAPHIC SURVEY AND LOWER CCR POND BATHYMETRY
at
ALLIANT LANSING POWER GENERATING STATION
for
INTERSTATE POWER & LIGHT COMPANY – ALLIANT ENERGY
BEING IN PART OF SECTION 2, TOWNSHIP 98 NORTH, RANGE 3 WEST OF THE FIFTH PRINCIPAL MERIDIAN, ALLAMAKEE COUNTY, IOWA.



CONTROL POINT DATA

Control Point No.	ALLIANT COORDINATES Northing	Easting	Elevation	IOWA STATE PLANE COORDINATES Northing	Easting	Elevation	Description
300	3,000.00	3,000.00	634.56	3958801.215	5541915.749	634.04	Brass Cap with Punch Mark
303	3,238.19	3,062.49	635.00	3959023.607	5542021.491	634.48	Brass Cap with Punch Mark
304	3,238.41	3,189.42	635.00	3959000.192	5542146.243	634.48	Brass Cap with Punch Mark
01				3955967.408	5542552.396	720.93	1/2"ø Rebar at Ash Disposal Site
02				3957605.805	5541183.287	653.31	3/4"ø x 5.0' Long Rebar in Primary Ash Pond Dike
03				3958097.196	5541834.063	641.29	Cut 'X' in P.C.C. at entrance gate
04				3956321.888	5542146.856	683.39	Landscape Spike along Ash Disposal Roadway

LEGEND

- OHE — OVERHEAD ELECTRIC LINE
- T T — UNDERGROUND TELEPHONE UTILITY
- EXISTING POWER POLE
- SB — TEMPORARY WELL LOCATION
- SB — SOIL BORING LOCATION
- CPT — CONE PENITROMETER TEST LOCATION
- CP — CONTROL POINT

NOTES

1. PROJECT HORIZONTAL POSITIONS ARE BASED ON THE IOWA STATE PLANE COORDINATE SYSTEM NORTH ZONE (1401) HORIZONTAL NAD83(2011).
2. PROJECT VERTICAL POSITIONS ARE BASED ON NAVD_88 DATUM (GEOID 12A).
3. CONTOUR INTERVAL = 1 FOOT.

TEST WELL COORDINATES

WELL ID	Northing	Easting	TOP Elevation	Ground Elevation
SB-1	3957238.28	5541352.23	653.36	653.26
SB-2	3957245.81	5541363.76	652.66	652.63
SB-3	3956845.82	5541523.57	656.39	655.37
SB-4	3956853.80	5541542.37	655.88	655.34
SB-5	3956557.49	5541648.53	656.70	655.80
SB-6	3956569.09	5541669.35	656.19	655.97
SB-7	3957856.52	5541618.95	653.45	653.33
SB-8	3957852.40	5541084.50	641.74	638.43
SB-9	3957854.40	5541094.88	640.63	638.52
SB-10	NS	NS	656.38	655.85
SB-11	NS	NS	656.38	656.17
SB-12	NS	NS	656.40	655.44
SB-13	NS	NS	656.43	655.27
SB-14	NS	NS	654.37	653.15
SB-15	NS	NS	652.75	652.67

NOTE:

1. SURVEY INFORMATION PROVIDED ABOVE WAS COMPILED BY MOHN SURVEYING, INC. 1890 GREAT RIVER ROAD LANSING, IOWA 52151, APRIL 2015.
2. ALLIANT ENERGY REQUIRES 20 FEET OVERHEAD SEPARATION DISTANCE FOR EQUIPMENT OPERATING UNDER POWERLINES.

REV	DATE	BY	APP	DESCRIPTION
5				
4				
3				
2				
1				

SCALE: AS SHOWN | DATE: 5-19-16
DRAWN BY: JFD | CHECKED BY: CTS | APPROVED BY: MWL

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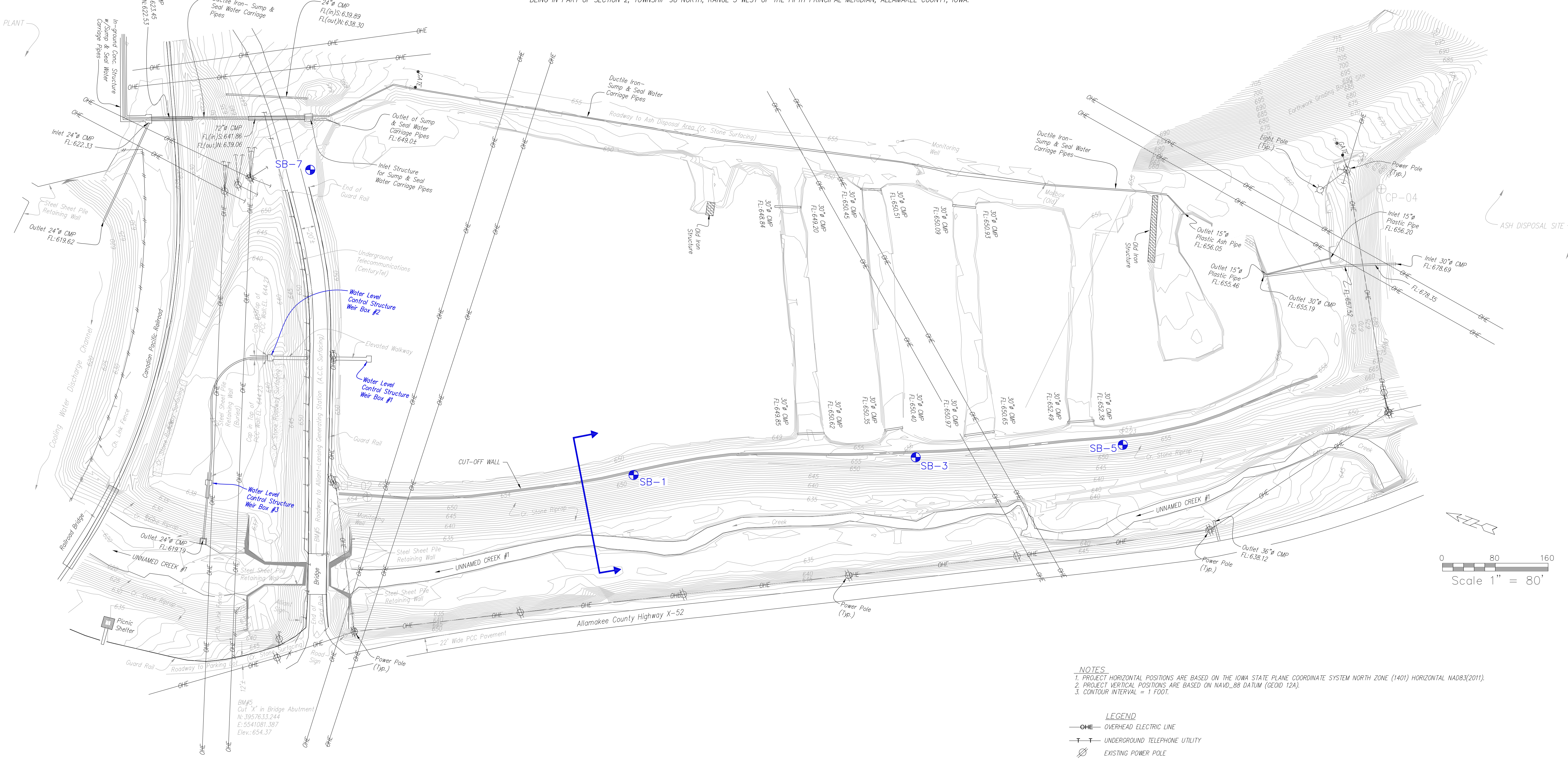
CLIENT / LOCATION
INTERSTATE POWER AND LIGHT (IPL)
LANSING GENERATING STATION PROJECT
2320 POWER PLANT DR
LANSING, IA 52151

DRAWING DESCRIPTION
Structural Stability Assessment
SITE PLAN

JOB 154.018.012.002
SHT. FIGURE 2
DWG. 154.018.012.002-D2

UPPER AND LOWER CCR POND TOPOGRAPHIC SURVEY AND LOWER CCR POND BATHYMETRY
at
ALLIANT LANSING POWER GENERATING STATION
for
INTERSTATE POWER & LIGHT COMPANY – ALLIANT ENERGY
BEING IN PART OF SECTION 2, TOWNSHIP 98 NORTH, RANGE 3 WEST OF THE FIFTH PRINCIPAL MERIDIAN, ALLAMAKEE COUNTY, IOWA.



NOTES
1. PROJECT HORIZONTAL POSITIONS ARE BASED ON THE IOWA STATE PLANE COORDINATE SYSTEM NORTH ZONE (1401) HORIZONTAL NAD83(2011).
2. PROJECT VERTICAL POSITIONS ARE BASED ON NAVD_88 DATUM (GEOID 12A).
3. CONTOUR INTERVAL = 1 FOOT.

LEGEND
OHE — OVERHEAD ELECTRIC LINE
T — UNDERGROUND TELEPHONE UTILITY
EXISTING POWER POLE
SB — SOIL BORING LOCATION
ANALYSIS CROSS-SECTION

NOTE:
1. SURVEY INFORMATION PROVIDED ABOVE WAS COMPILED BY MOHN SURVEYING, INC. 1890 GREAT RIVER ROAD LANSING, IOWA 52151, APRIL 2015.
2. ALLIANT ENERGY REQUIRES 20 FEET OVERHEAD SEPARATION DISTANCE FOR EQUIPMENT OPERATING UNDER POWERLINES.

REV	DATE	BY	APP	DESCRIPTION
5				
4				
3				
2				
1				

SCALE: AS SHOWN | DATE: 5-19-16
DRAWN BY: JFD | CHECKED BY: CTS | APPROVED BY: MWL

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CLIENT / LOCATION
INTERSTATE POWER AND LIGHT (IPL)
LANSING GENERATING STATION PROJECT
2320 POWER PLANT DR
LANSING, IA 52151

DRAWING DESCRIPTION
SOIL BORING AND
SLOPE STABILITY CROSS-SECTION LOCATION

JOB 154.018.012.002
SHT. FIGURE 3
DWG. 154.018.012.002-D2

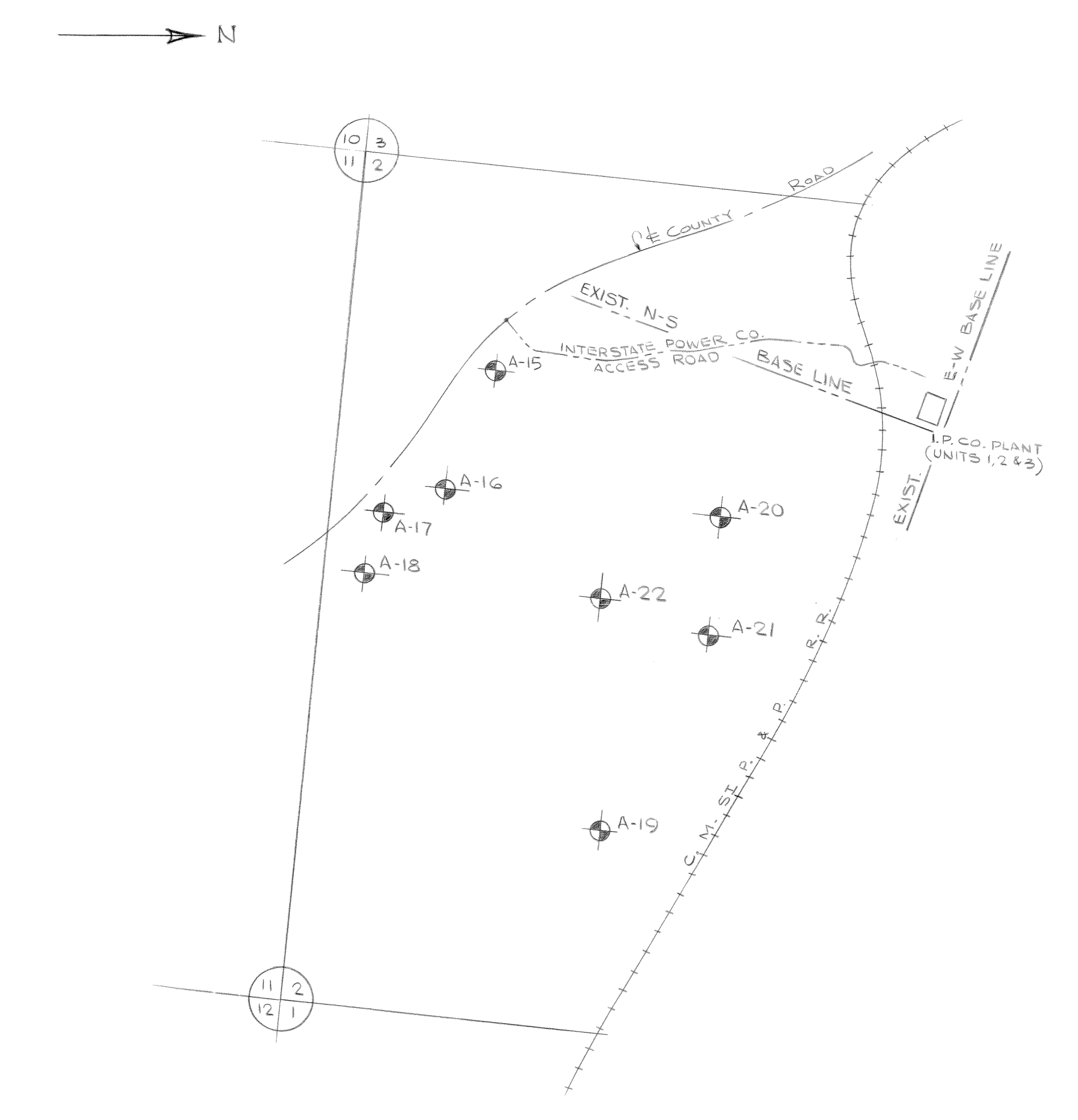
APPENDIX A – 1974 Upper Ash Pond Construction Drawings

Alliant Energy
Interstate Power and Light Company
Lansing Generating Station
Lansing, Iowa

Structural Stability Assessment

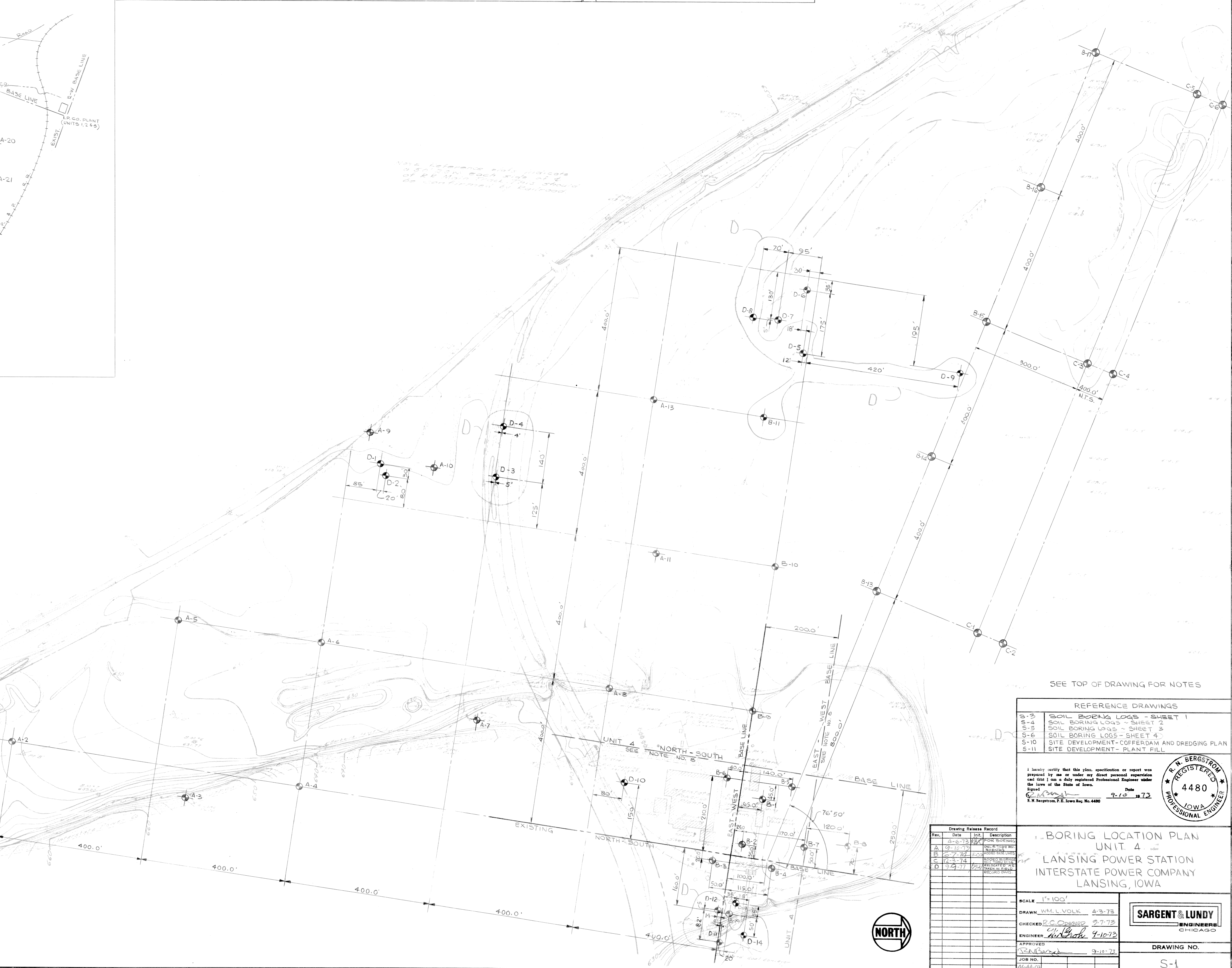
NOTES

1. A-1 THRU A-22 25' MAXIMUM OR TO ROCK.
2. B-1 AND B-2 CORE 10' INTO SOLID ROCK, B-3 THRU B-19 TO ROCK.
3. C-1 THRU C-6 25' MAXIMUM BELOW WATER LEVEL OR TO ROCK.
4. STANDARD PENETRATION TEST BLOW COUNTS AT 5' INTERVALS OR CHANGE IN STRATA SHALL BE PROVIDED FOR EACH SAMPLE OF GRANULAR SOIL ENCOUNTERED.
5. STANDARD PENETRATION TEST BLOW COUNTS, FIELD POCKET PENETROMETER TESTS, AND WATER CONTENT DETERMINATIONS AT 5' INTERVALS OR CHANGE IN STRATA, SHALL BE PROVIDED FOR EACH SAMPLE OF COHESIVE SOIL ENCOUNTERED.
6. THE TYPE, CONSISTENCY, RECOVERY RATIO, ROCK QUALITY DESIGNATION AND LABORATORY UNCONFINED COMPRESSION TESTS ON REPRESENTATIVE ROCK SAMPLES SHALL BE PROVIDED FOR EACH ROCK CORE.
7. OBTAIN REPRESENTATIVE SOIL SAMPLES FROM THE RIVER BOTTOM, BORINGS NO. C-1 THRU C-6 AND THE SOUTHERN HALF OF THE SITE, BORINGS NO. A-1 THRU A-11, A-14, A-15 & A-18. PERFORM MODIFIED PROCTOR DENSITY TESTS AND GRAIN SIZE ANALYSIS ON REPRESENTATIVE SAMPLES.
8. FOR THE COMPLETE UNIT 4 BASE LINE & GRID SYSTEM SEE DWG S-11.
9. D-1 THRU D-14 TO ROCK.



INSET PLAN

0 1000 2000
SCALE IN FEET



NOTE: FOR BORINGS NOT SHOWN ON THIS LOCATION PLAN SEE INSET ABOVE.

SEE TOP OF DRAWING FOR NOTES

REFERENCE DRAWINGS

S-3	SOIL BORING LOGS - SHEET 1
S-4	SOIL BORING LOGS ~ SHEET 2
S-5	SOIL BORING LOGS ~ SHEET 3
S-6	SOIL BORING LOGS - SHEET 4
S-10	SITE DEVELOPMENT - COFFERDAM AND DREDGING PLAN
S-11	SITE DEVELOPMENT - PLANT FILL

I hereby certify that this plan, specification or report was prepared by me or under my direct personal supervision and that I am a duly registered Professional Engineer under the laws of the State of Iowa.

Signed [signature] Date 9-10 1973

R. N. Bergstrom, P.E., Iowa Reg. No. 4480

R. N. BERGSTROM REGISTERED 4480 PROFESSIONAL ENGINEER IOWA

Drawing Release Record

Rev.	Date	Init.	Description
	4-6-73	RBR	FOR BORINGS
A	9-10-73		DELETED & REV. BORINGS
B	6-7-74	RCO	ADDED BASE LINES
C	12-3-74		ADDED BORINGS D-1 THRU D-14
D	9-9-77		RELOCATED AS TAKEN IN FIELD RECORD DWG.

BORING LOCATION PLAN UNIT 4
LANSING POWER STATION
INTERSTATE POWER COMPANY
LANSING, IOWA

SCALE 1" = 100'

DRAWN WM. L. VOLK 4-3-73

CHECKED R.C. ODEGARD 9-7-73

ENGINEER W. L. Groh 9-10-73

APPROVED R.N. Bergstrom 9-10-73

JOB NO. 4644-03

SARGENT & LUNDY ENGINEERS CHICAGO

DRAWING NO. S-1

BORING A-1

BORING A-2

BORING A-3

BORING A-4

BORING A-5

BORING A-6

BORING A-7

BORING A-8

BORING A-9

BORING A-10

BORING A-11

BORING A-13

BORING A-15

BORING A-16

BORING A-17

BORING A-18

BORING A-19

BORING A-20

BORING A-21

BORING A-22

BORING C-1

BORING C-2

BORING C-3

BORING C-5

BORING C-6

BORING C-4

REFERENCE
BID SPEC. G-3105
1-21-74

NOTES

1 LEGEND FOR DRILLING METHODS

SS: Split--Spoon--2" O.D.
DC: Drove Casing--$2\frac{1}{2}$" I.D., except where noted
WO: Washed Out
RC: Rock Coring
RQD: Rock Quality Designator
FA: Flight Auger
HA: Hand Auger

REFERENCE DRAWINGS

I hereby certify that this plan, specification or report was prepared by me or under my direct personal supervision and that I am a duly registered Professional Engineer under the laws of the State of Iowa.
Signed [signature] Date 9-10 1973
R. N. Bergstrom, P. E., Iowa Reg. No. 4480

R. N. BERGSTROM
REGISTERED
4480
IOWA
PROFESSIONAL ENGINEER

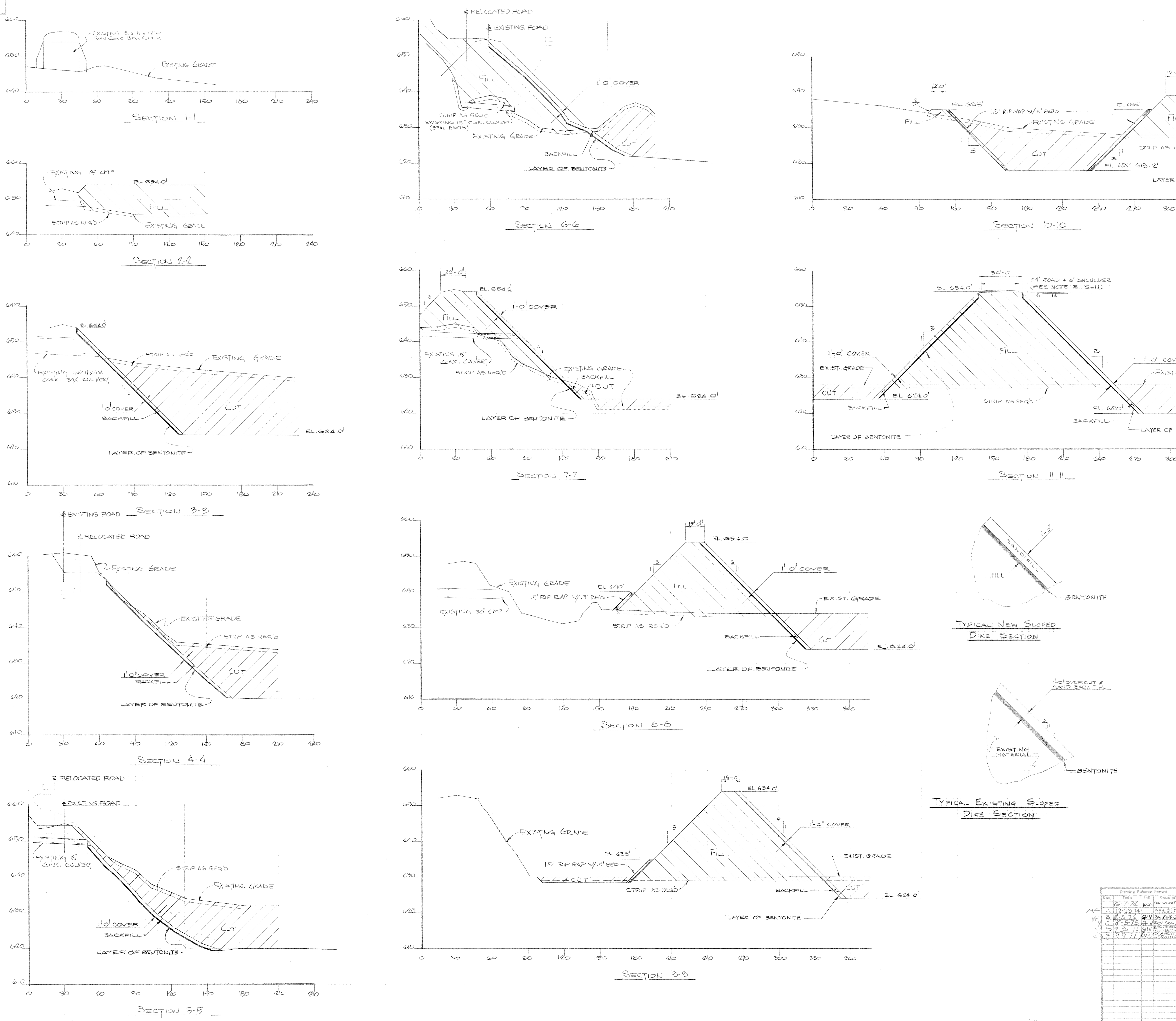
Drawing Release Record			
Rev.	Date	Init.	Description
✓	9-10-73		CONSTR

SOIL BORING LOGS
SHEET 1
LANSING POWER STATION
INTERSTATE POWER COMPANY
LANSING, IOWA

SCALE NONE
DRAWN J. CASTRO 8-24-73
CHECKED R.C. ODEGARD 9-7-73
ENGINEER W A Groh 9-7-73
APPROVED [signature] 9-10-73
JOB NO. 4644-03

SARGENT & LUNDY
ENGINEERS
CHICAGO

DRAWING NO.
S-3



NOTES

1. WORK THIS DWG. WITH DWG'S S-10 & S-11
2. ALL FILL SHALL CONFORM TO SPEC G-3105.
3. ASH DIKE SECTIONS 4, 5 & 6 REVISED AS PER FIELD INFORMATION DATED 7/30/76.

REFERENCE DRAWINGS

S-10	SITE DEVELOPMENT - COFFERDAM & DREDGING PLAN
S-11	SITE DEVELOPMENT - PLANT FILL - UNIT 4

I hereby certify that this plan, specification or report was prepared by me or under my direct personal supervision and that I am a duly registered Professional Engineer under the laws of the State of Iowa.

Signed R.N.Bergstrom Date 6-5 1974

R. N. Be[illegible] Reg. No. 4480

Drawing Release Record

Rev.	Date	Init.	Description
	6-7-74	RCO	FOR CONST.
A	12-23-74		REV. ASH POND ELEV
B	4-3-75	GHV	REV. BENT. COVER
C	8-5-75	GHV	REV SEC 10-10
D	9-30-75	GHV	REMOVE BENTONITE FROM BOTT. OF BASINS
E	9-9-77	GHV	RECORD DRAWING

SITE DEVELOPMENT
ASH DIKE SECTIONS - SHEET 1
LANSING POWER STATION
INTERSTATE POWER COMPANY
LANSING, IOWA

SCALE VERT 1" = 10' HORIZ 1" = 30'

DRAWN G. R. BOLE 5-20-74

CHECKED R. C. ODEGARD 5-28-74

ENGINEER R.A. Groh 5-31-74

APPROVED R.N.Bergstrom 6-5-74

JOB NO. 4644-05

SARGENT & LUNDY ENGINEERS CHICAGO

DRAWING NO. S-14

APPENDIX B – 2015 Embankment and Foundation Soil Investigation

Alliant Energy
Interstate Power and Light Company
Lansing Generating Station
Lansing, Iowa

Structural Stability Assessment

BORING LOG

CABENO Environmental Field Services, LLC
More Than Just A Probing Company

CLIENT: Hard Hat

PROJECT: Lansing, IA

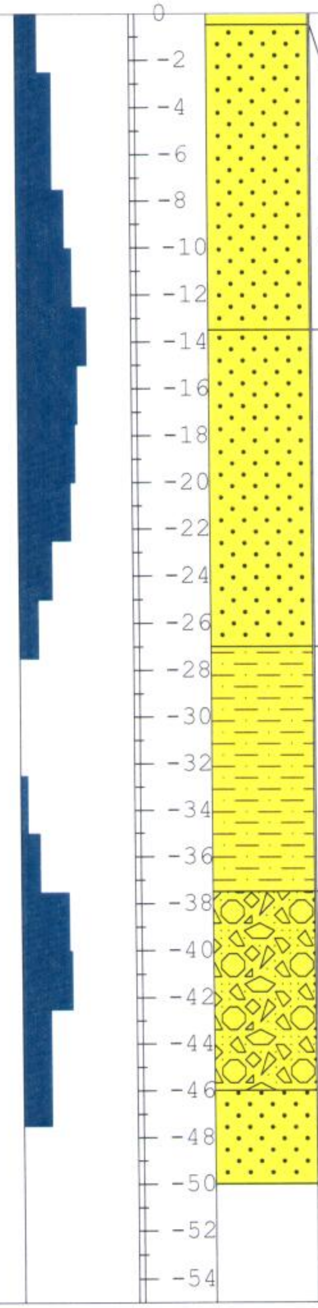
COORDINATES: *N NOT SURVEYED* / *E NOT SURVEYED*

BORING NO.: ***SB1***

LOGGED BY: *John Noyes*
EDITED BY: *John Noyes*
CHECKED BY: *Mark Loerop*
DATE BEGAN: *1/22/15*
DATE FINISHED: *1/2213/15*
GROUND SURFACE ELEVATION: *NOT MEASURED*

DEPTH TO WATER WHILE DRILLING	SAMPLE NO. AND TYPE	SAMPLE RECOVERY	SAMPLE INFROMATION BLOW COUNTS	N-VALUE
	SS1	18"	4 4 5	9.0
	SS2	18"	4 5 10	15.0
	SS3	18"	3 6 9	15.0
	SS4	18"	7 9 11	20.0
	SS5	18"	7 10 13	23.0
▽	SS6	18"	7 11 18	29.0
	SS7	18"	8 11 14	25.0
	SS8	18"	8 11 13	24.0
	SS9	18"	8 11 11	22.0
	SS10	18"	4 7 7	14.0
	SS11	18"	2 3 6	8.0
	SS12	18"	0 0 0	0.0
	SS13	18"	0 0 0	0.0
	SS14	18"	1 1 2	3.0
	SS15	18"	3 4 4	8.0
	SS16	18"	0 9 11	20.0
	SS17	18"	5 11 10	21.0
	SS18	18"	4 5 7	12.0
	SS19	18"	3 4 8	12.0

SOIL CONSISTENCY HISTOGRAM / DEPTH IN FEET / PROFILE



DESCRIPTION

SILT; brown; plastic; moist; trace clay

SAND; brown; fine grained; poorly graded; well sorted; dry to moist
1'-5' sample collected for geotech analysis
@ 9'2" black stained with plant matter

SAND; gray; fine to medium grained; moist; graded; trace gravel and snail shells
@ 15' grades wet
15'-20' sample collected for geotech analysis
@17.5' grades brown
@23.5' grades fine to coarse, well graded

SILT; gray; non plastic; wet; trace clay
28'-32' sample collected for geotech analysis
@29' grades trace plant matter and snail shells

GRAVEL; brown; coarse; poorly graded; wet; trace cobbles
40'-50' sample collected for geotech analysis

SAND; light gray; coarse grained; poorly graded; wet

Bottom of boring @ 50'
1" PVC temp well installed @ 50'.
10' screen, natural sand pack

BORING LOG

CLIENT: Hard Hat

PROJECT: Lansing, IA

COORDINATES: *N NOT SURVEYED* / *E NOT SURVEYED*

BORING NO.: ***SB3***

LOGGED BY: *John Noyes*
EDITED BY: *John Noyes*
CHECKED BY: *Mark Loerop*
DATE BEGAN: *1/22/15*
DATE FINISHED: *1/22/15*
GROUND SURFACE ELEVATION: *NOT MEASURED*

DEPTH TO WATER WHILE DRILLING	SAMPLE NO. AND TYPE	SAMPLE RECOVERY	SAMPLE INFROMATION BLOW COUNTS	N-VALUE
	SS1	18"	6 7 7	14.0
	SS2	18"	4 9 10	19.0
	SS3	18"	5 10 19	29.0
	SS4	18"	7 13 16	29.0
	SS5	18"	6 12 17	29.0
▽	SS6	18"	6 12 16	28.0
	SS7	18"	12 21 21	42.0
	SS8	18"	8 12 15	27.0
	SS9	18"	8 19 21	40.0
	SS10	18"	8 5 6	11.0
	SS11	18"	6 8 15	23.0
	SS12	18"	5 5 10	15.0
	SS13	18"	3 1 1	2.0
	SS14	18"	6 10 10	20.0
	SS15	18"	4 6 12	18.0
	SS16	18"	10 9 7	16.0
	SS17	18"	6 8 10	18.0
	SS18	18"	22 24 21	45.0
	SS19	18"	10 10 12	22.0
	SS20	18"	14 9 12	21.0

SOIL CONSISTENCY HISTOGRAM | DEPTH IN FEET | PROFILE

DESCRIPTION

Depth in feet	Description
0 – -1.5	SILT; gray to black; non plastic; moist; some bottom ash
-1.5 – -24	SAND; brown; fine grained; poorly graded; moist 2'-5' sample collected for geotech analysis 13'-20' sample collected for geotech analysis @13.5' grades wet and trace snail shells @16' grades fine to medium grained; graded 24'-27' sample collected for geotech analysis
-24 – -27	SILT; gray; non plastic to low plasticity; wet; some clay; trace organic plant matter
-27 – -31	GRAVEL; gray; coarse to cobbles; poorly graded; wet; trace to some sand 27'-32' sample collected for geotech analysis
-31 – -33	SILT; gray to black; non plastic; wet; trace to some clay and organic plant matter
-33 – -50	GRAVEL; gray; coarse to cobbles; poorly graded; wet; trace to some sand
-50	Bottom of boring @ 50' 1" PVC temp well installed @ 50'. 10' screen, natural sand pack

BORING LOG

CABENO Environmental Field Services, LLC

More Than Just A Probing Company

CLIENT: Hard Hat

PROJECT: Lansing, IA

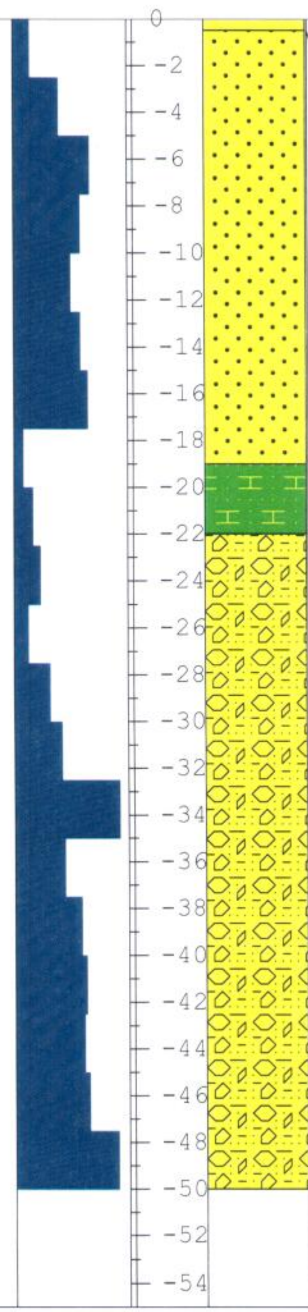
COORDINATES: *N NOT SURVEYED* *E NOT SURVEYED*

BORING NO.: ***SB5***

LOGGED BY: *John Noyes*
EDITED BY: *John Noyes*
CHECKED BY: *Mark Loerop*
DATE BEGAN: *1/23/15*
DATE FINISHED: *1/23/15*
GROUND SURFACE ELEVATION: *NOT MEASURED*

DEPTH TO WATER WHILE DRILLING	SAMPLE NO. AND TYPE	SAMPLE RECOVERY	SAMPLE INFROMATION BLOW COUNTS	N-VALUE
	SS1	18"	4 4 3	7.0
	SS2	18"	5 7 12	19.0
	SS3	18"	5 13 19	32.0
	SS4	18"	5 13 15	28.0
▽	SS5	18"	5 11 13	24.0
	SS6	18"	6 12 16	28.0
	SS7	18"	12 14 17	31.0
	SS8	18"	3 2 2	4.0
	SS9	18"	4 4 4	8.0
	SS10	18"	14 9 2	11.0
	SS11	18"	2 2 4	6.0
	SS12	18"	6 7 8	15.0
	SS13	18"	9 10 10	20.0
	SS14	18"	10 36 8	44.0
	SS15	18"	15 12 9	21.0
	SS16	18"	20 14 14	28.0
	SS17	18"	11 12 18	30.0
	SS18	18"	17 14 15	29.0
	SS19	18"	13 14 17	31.0
	SS20	18"	18 19 24	43.0

SOIL CONSISTENCY HISTOGRAM / DEPTH IN FEET / PROFILE



DESCRIPTION

SILT; black; non plastic; dry to moist

SAND; brown; fine grained; poorly graded; moist; trace to some bottom ash
5' bottom ash grades out
10'-16' sample collected for geotech analysis
@12' grades wet and trace snail shells
@ 16' grades gray to olive

Silty CLAY; black to dark gray; low plasticity; moist; trace fine sand and organic plant matter
18.5'-20' sample collected for geotech analysis

SAND & GRAVEL; black; fine to coarse; well graded; wet; trace to some silt
22'-27.5' sample collected for geotech analysis
40'-45' sample collected for geotech analysis
@43.5' grades brown

Bottom of boring @ 50'
1" PVC temp well installed @ 50'.
10' screen, natural sand pack

BORING LOG

CABENO Environmental Field Services, LLC
More Than Just A Probing Company

CLIENT: Hard Hat

PROJECT: Lansing, IA

COORDINATES: *N NOT SURVEYED* *E NOT SURVEYED*

BORING NO.: *SB7*

LOGGED BY: *John Noyes*
EDITED BY: *John Noyes*
CHECKED BY: *Mark Loerop*
DATE BEGAN: *1/23/15*
DATE FINISHED: *1/23/15*
GROUND SURFACE ELEVATION: *NOT MEASURED*

DEPTH TO WATER WHILE DRILLING	SAMPLE NO. AND TYPE	SAMPLE RECOVERY	SAMPLE INFROMATION BLOW COUNTS	N-VALUE
	SS1	18"	3 2 2	4.0
	SS2	18"	9 11 19	20.0
	SS3	18"	4 5 13	18.0
	SS4	18"	7 14 18	32.0
	SS5	18"	5 11 20	31.0
	SS6	18"	8 15 20	35.0
▽	SS7	18"	7 12 14	26.0
	SS8	18"	7 9 14	23.0
	SS9	18"	11 13 17	30.0
	SS10	18"	8 12 14	26.0
	SS11	18"	2 3 3	6.0
	SS12	18"	1 1 1	2.0
	SS13	18"	3 3 6	9.0
	SS14	18"	2 3 4	7.0
	SS15	18"	1 2 2	4.0
	SS16	18"	0 0 0	0.0
	SS17	18"	2 3 4	7.0
	SS18	18"	3 2 2	4.0
	SS19	18"	8 4 7	11.0
	SS20	18"	2 8 9	17.0

DEPTH IN FEET	PROFILE	DESCRIPTION
0 to -1	ASH	Bottom ASH; black; fine grained; poorly graded
-1 to -30	SAND	SAND; brown; fine grained; poorly graded; moist 4'-10' sample collected for geotech analysis @16' grades wet 19'-25' sample collected for geotech analysis @ 21' grades gray
-30 to -46	SILT	SILT; black to gray; no plasticity; moist to wet; trace clay 29'-32.5' sample collected for geotech analysis 36'-40' sample collected for geotech analysis @ 41' grading trace organic plant matter and trace intermittent 1/16" sand seams @ 44' is a thin, 1" gravel seam
-46 to -50	GRAVEL	GRAVEL; brown; coarse; poorly graded; wet; trace to some silt and sand 46'-50' sample collected for geotech analysis last spoon blocked with large gravel
-50 to -54		Bottom of boring @ 50' 1" PVC temp well installed @ 50'. 10' screen, natural sand pack

APPENDIX B

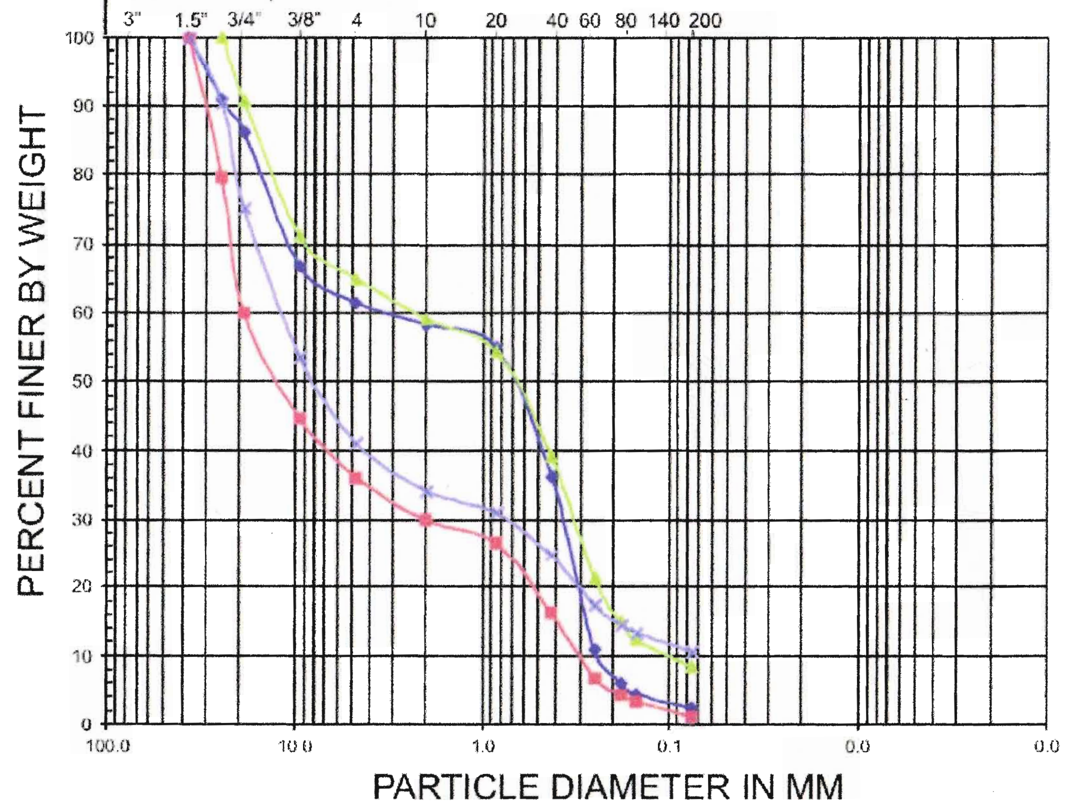
UPDATE TO ADD SB-7
· SEPARATE 8½x11

HARD HAT SERVICES
Engineering, Construction and Management Solutions

Particle Size Distribution

Project: IPL - Lansing Generating Station | Tested By: Test America | Date: 2/3/2015

Boring No.: SB-1, SB-3 & SB-5 "SAND & GRAVEL"



COBBLES	GRAVEL		SAND			SILT AND CLAY FRACTION
	coarse	fine	coarse	medium	fine	

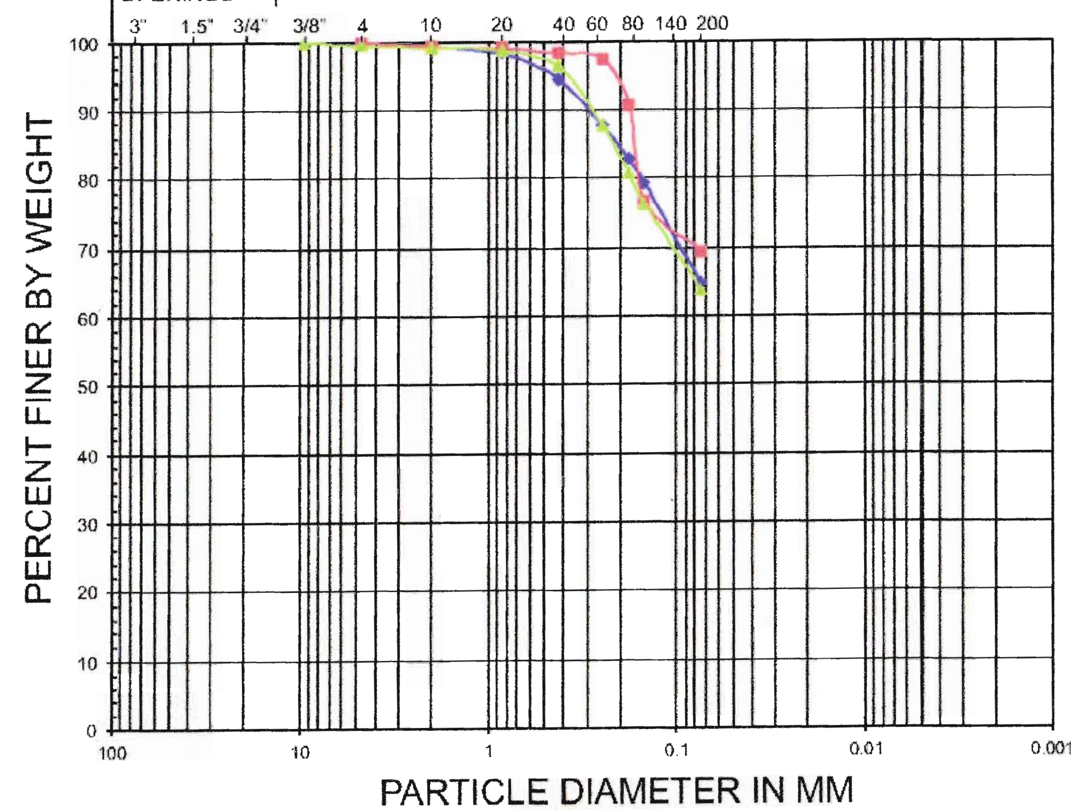
SYMBOL	BORING	DEPTH (FT.)	SOIL DESCRIPTION	U.S.C.S.	W %
	SB-1	40 - 50	SAND & GRAVEL	SW / GW	16.5
	SB-3	27 - 32	SAND & GRAVEL	SW / GW	13.4
	SB-5	22 - 27.5	SAND & GRAVEL	SW / GW	32.1
	SB-5	44 - 45	SAND & GRAVEL	SW / GW	9.8

HARD HAT SERVICES
Engineering, Construction and Management Solutions

Particle Size Distribution

Project: IPL – Lansing Generating Station | Tested By: Test America | Date: 2/3/2015

Boring No.: SB-1, SB-3 & SB-5 "SANDY SILT"



COBBLES	GRAVEL		SAND			SILT AND CLAY FRACTION
	coarse	fine	coarse	medium	fine	

SYMBOL	BORING	DEPTH (FT.)	SOIL DESCRIPTION	U.S.C.S.	L.L.	P.L.	W %
	SB-1	28 - 32	Sandy Silt	ML	28	26	36.1
	SB-3	24.5 - 27	Sandy Silt	ML	27	23	25.4
	SB-5	18.5 - 20	Sandy Silt	ML	24	20	21.8

REV	DATE	BY	APP	DESCRIPTION
5				
4				
3				
2				
1	6-15-15	TJH	MWL	INCORPORATE IPL COMMENTS

SCALE: NONE | DATE: 5-14-15
DRAWN BY: JFD | CHECKED BY: TJH | APPROVED BY: MWL

HARD HAT SERVICES™
Engineering, Construction and Management Solutions

CLIENT / LOCATION
INTERSTATE POWER AND LIGHT (IPL)
LANSING GENERATING STATION PROJECT
2320 POWER PLANT DR
LANSING, IA 52151

DRAWING DESCRIPTION
SEEPAGE CONTROL CUT-OFF WALL
PARTICLE SIZE DISTRIBUTION
SB-1 & SB-3

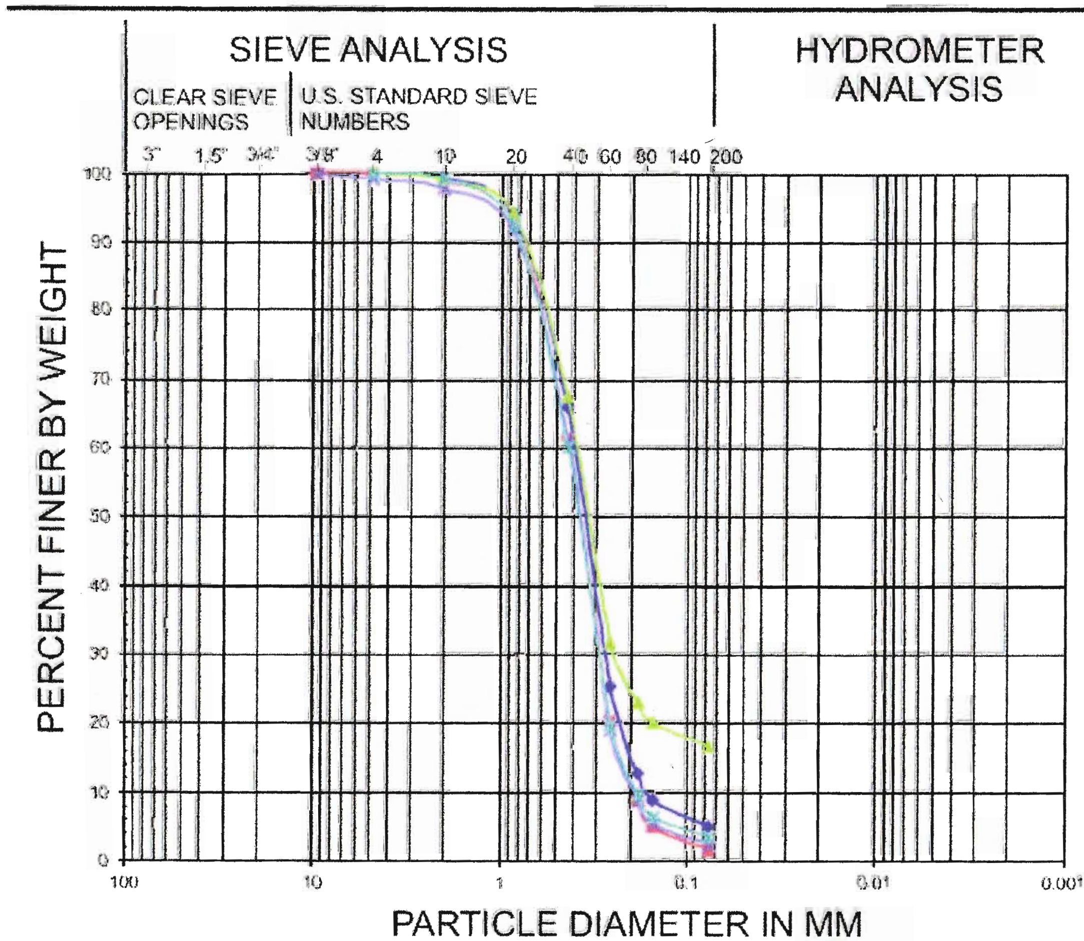
JOB 154.021.003
SHT. 8
DWG. 154021SW-08-12

APPENDIX B
UPDATE TO ADD SB-7
SEPARATE 8 1/2 x 11

HARD HAT SERVICES
Engineering, Construction and Management Solutions

Particle Size Distribution

Project: IPL - Lansing Generating Station
Boring No.: SB-1, SB-3 & SB-5 "UPPER SAND"
Tested By: TestAmerica
Date: 2/3/2015



COBBLES	GRAVEL		SAND			SILT AND CLAY FRACTION
	coarse	fine	coarse	medium	fine	

SYMBOL	BORING	DEPTH (FT.)	SOIL DESCRIPTION	U.S.C.S.	W %
	SB-1	1 - 5	Medium - Fine Sand	SP	4.1
	SB-1	15 - 20	Medium - Fine Sand	SP	20.1
	SB-3	2 - 5	Silty Medium - Fine Sand	SM	3.1
	SB-3	13 - 20	Medium - Fine Sand	SP	19.0
	SB-5	10 - 16	Medium - Fine Sand	SP	13.3

REV	DATE	BY	APP	DESCRIPTION
5				
4				
3				
2				
1	6-15-15	TJH	MWL	INCORPORATE IPL COMMENTS

SCALE: NONE | DATE: 5-14-15
DRAWN BY: JFD | CHECKED BY: TJH | APPROVED BY: MWL

HARD HAT SERVICES™
Engineering, Construction and Management Solutions

CLIENT / LOCATION
INTERSTATE POWER AND LIGHT (IPL)
LANSING GENERATING STATION PROJECT
2320 POWER PLANT DR
LANSING, IA 52151

DRAWING DESCRIPTION
SEEPAGE CONTROL CUT-OFF WALL
PARTICLE SIZE DISTRIBUTION
SB-5

JOB 154.021.003
SHT. 9
DWG. 154021SW-08-12

HEC

Harrington Engineering & Construction, Inc.

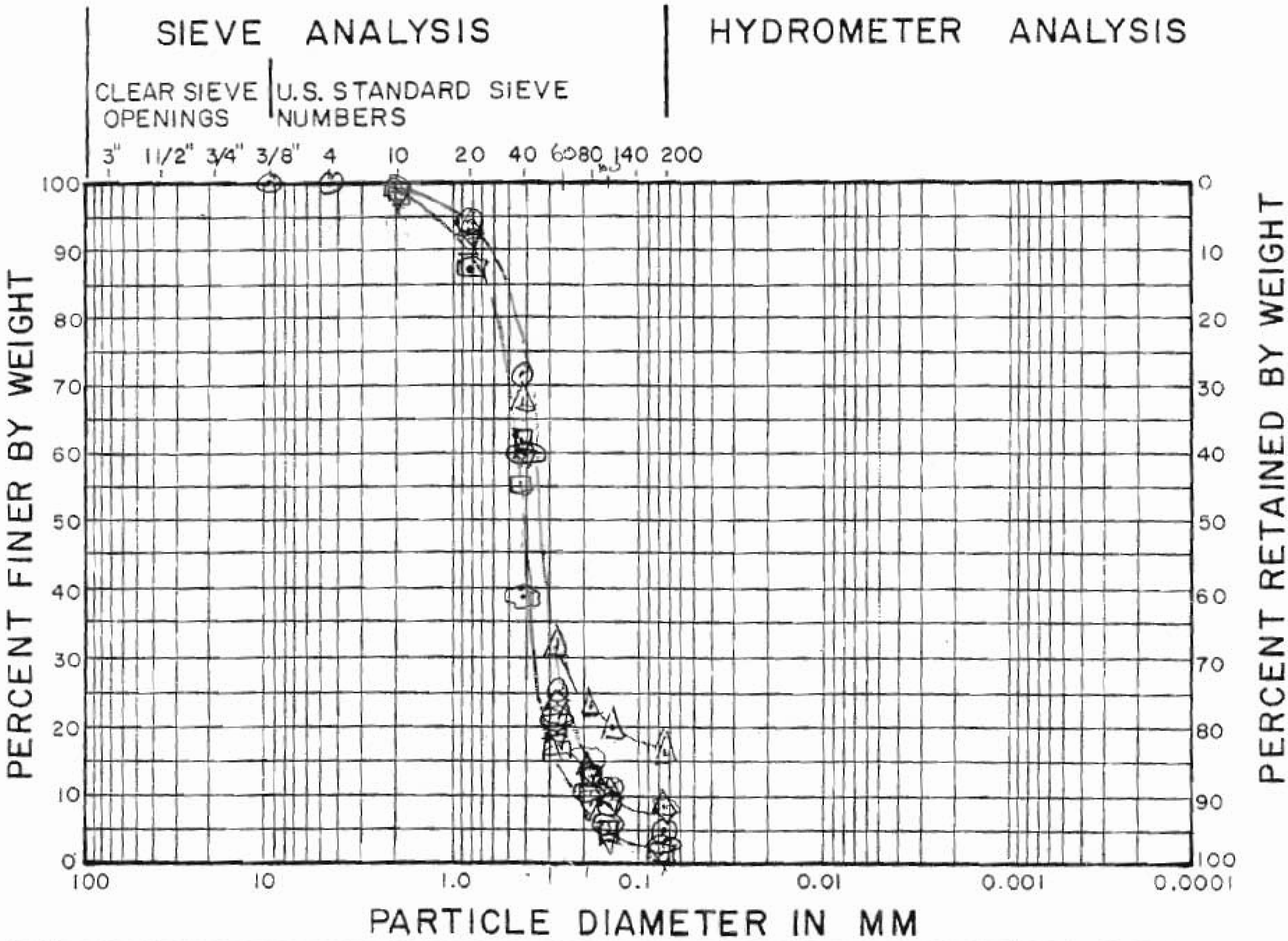
Particle Size Distribution

"UPPER SAND"

PROJECT ______ TESTED BY ______ DATE ______

PROJECT NO. ______ CALC BY ______ DATE ______

BORING NO. ______ CHKD BY ______ DATE ______



<table>
<tr><td rowspan="2">COBBLES</td><td colspan="2">GRAVEL</td><td colspan="3">SAND</td><td rowspan="2">SILT AND CLAY FRACTION</td></tr>
<tr><td>coarse</td><td>fine</td><td>coarse</td><td>medium</td><td>fine</td></tr>
</table>

SYMBOL	BORING	SAMPLE	DEPTH	SOIL DESCRIPTION	U.S.C.S.	L.L.	P.L.	W%
⊙	SB-1		1-5	MED-FINE SAND	SP			4.1
⊡	SB-1		15-20	"	SP			20.1
△	SB-3		2-5	SILTY MED-FINE SAND	SM			3.1
▽	SB-3		13-20	MED-FINE SAND	SP			19.0
⊙	SB-5		10-16	"	SP			13.3
◇	SB-7		4-10	"	SP-SM			3.1
▭	SB-7		19-25	"	SP			17.1

HE&C

Harrington Engineering & Construction, Inc.

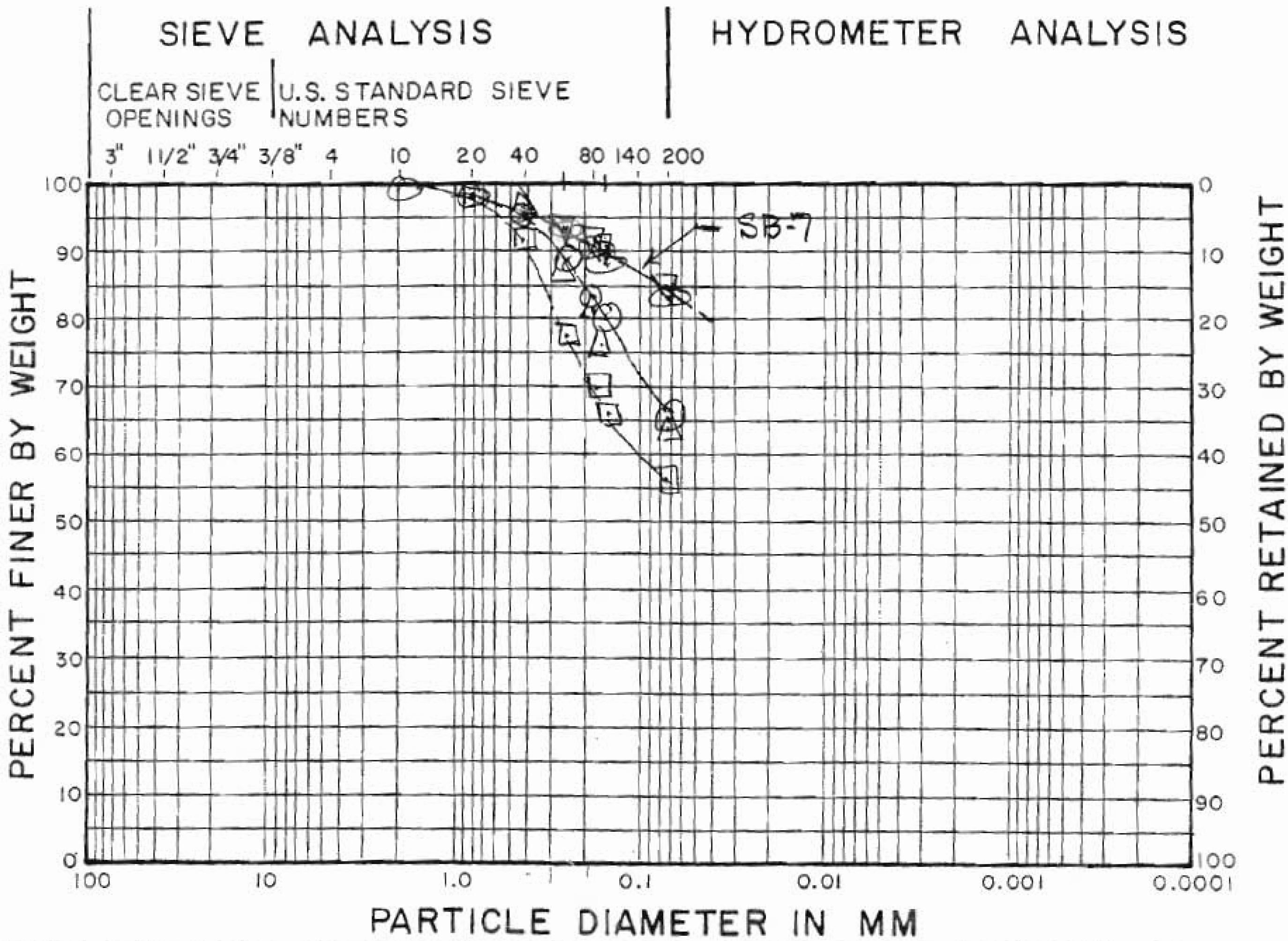
Particle Size Distribution

"SANDY SILT"

PROJECT ______ TESTED BY ______ DATE ______

PROJECT NO. ______ CALC BY ______ DATE ______

BORING NO. ______ CHKD BY ______ DATE ______



COBBLES	GRAVEL		SAND			SILT AND CLAY FRACTION
	coarse	fine	coarse	medium	fine	

SYMBOL	BORING	SAMPLE	DEPTH	SOIL DESCRIPTION	U.S.C.S.	L.L.	P.L.	W %
⊙	SB-1		28-32	SANDY SILT	ML	28	26	36.1
⊡	SB-3		24.5-27	SANDY SILT	ML	27	23	23.4
△	SB-5		18.5-20	SANDY SILT	ML	24	20	21.8
▽	SB-7		29-32.5	SANDY SILT	ML	29	25	27.0
⊖	SB-7		36-40	SANDY SILT	ML	31	26	35.7

HEC

Harrington Engineering & Construction, Inc.

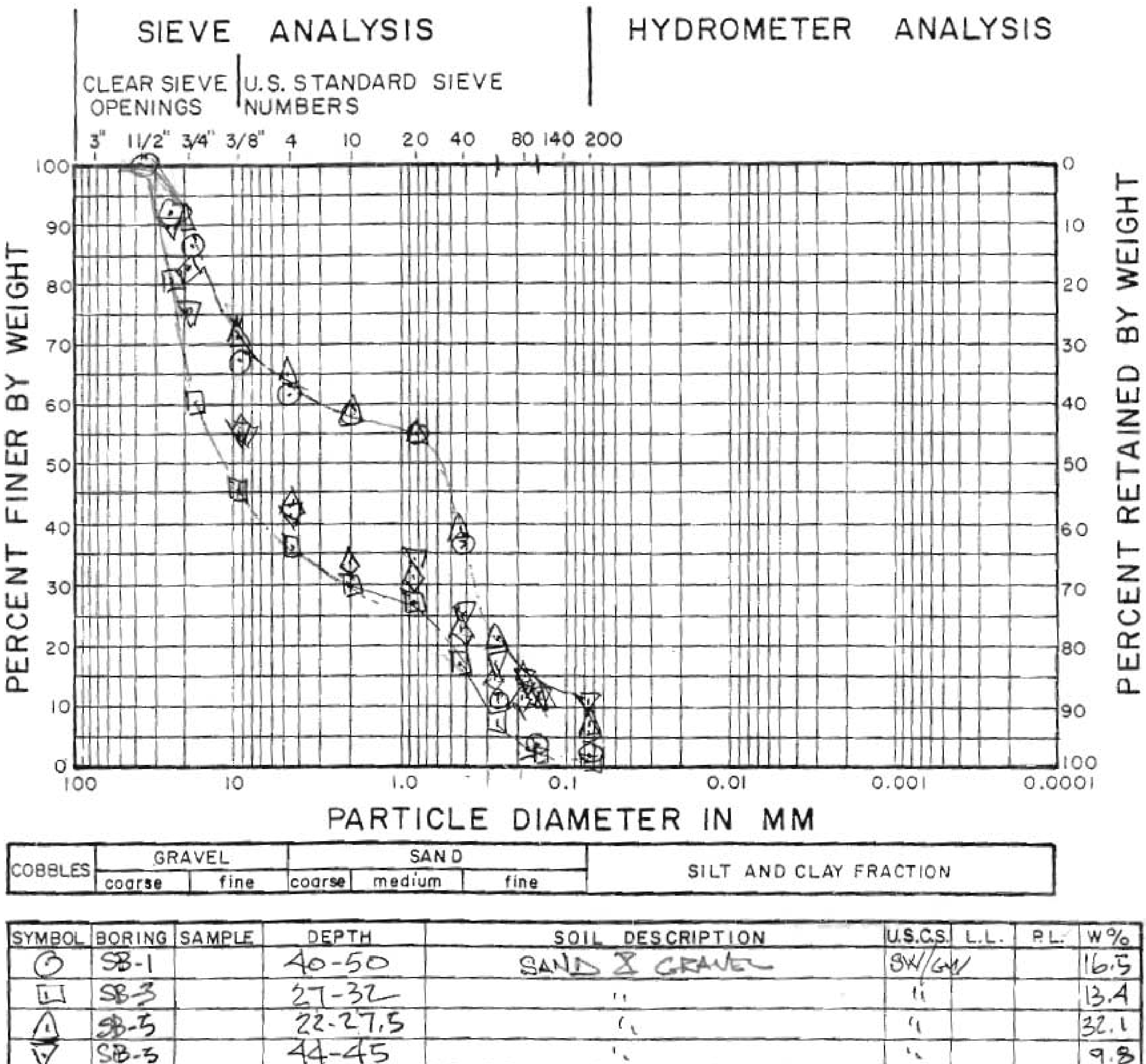
Particle Size Distribution

"SANDY GRAVEL"

PROJECT ______ TESTED BY ______ DATE ______

PROJECT NO. ______ CALC BY ______ DATE ______

BORING NO. ______ CHKD BY ______ DATE ______



COBBLES	GRAVEL		SAND			SILT AND CLAY FRACTION
	coarse	fine	coarse	medium	fine	

SYMBOL	BORING	SAMPLE	DEPTH	SOIL DESCRIPTION	U.S.C.S.	L.L.	P.L.	W %
○	SB-1		40-50	SAND & GRAVEL	SW/GW			16.5
□	SB-3		27-32	"	"			13.4
△	SB-5		22-27.5	"	"			32.1
▽	SB-5		44-45	"	"			9.8
◇	SB-7		46-50	"	"			35.7

APPENDIX C – Flood Elevations for Mississippi River Pool #9

Alliant Energy
Interstate Power and Light Company
Lansing Generating Station
Lansing, Iowa

Structural Stability Assessment

IPL
Lansing IA
Power Station

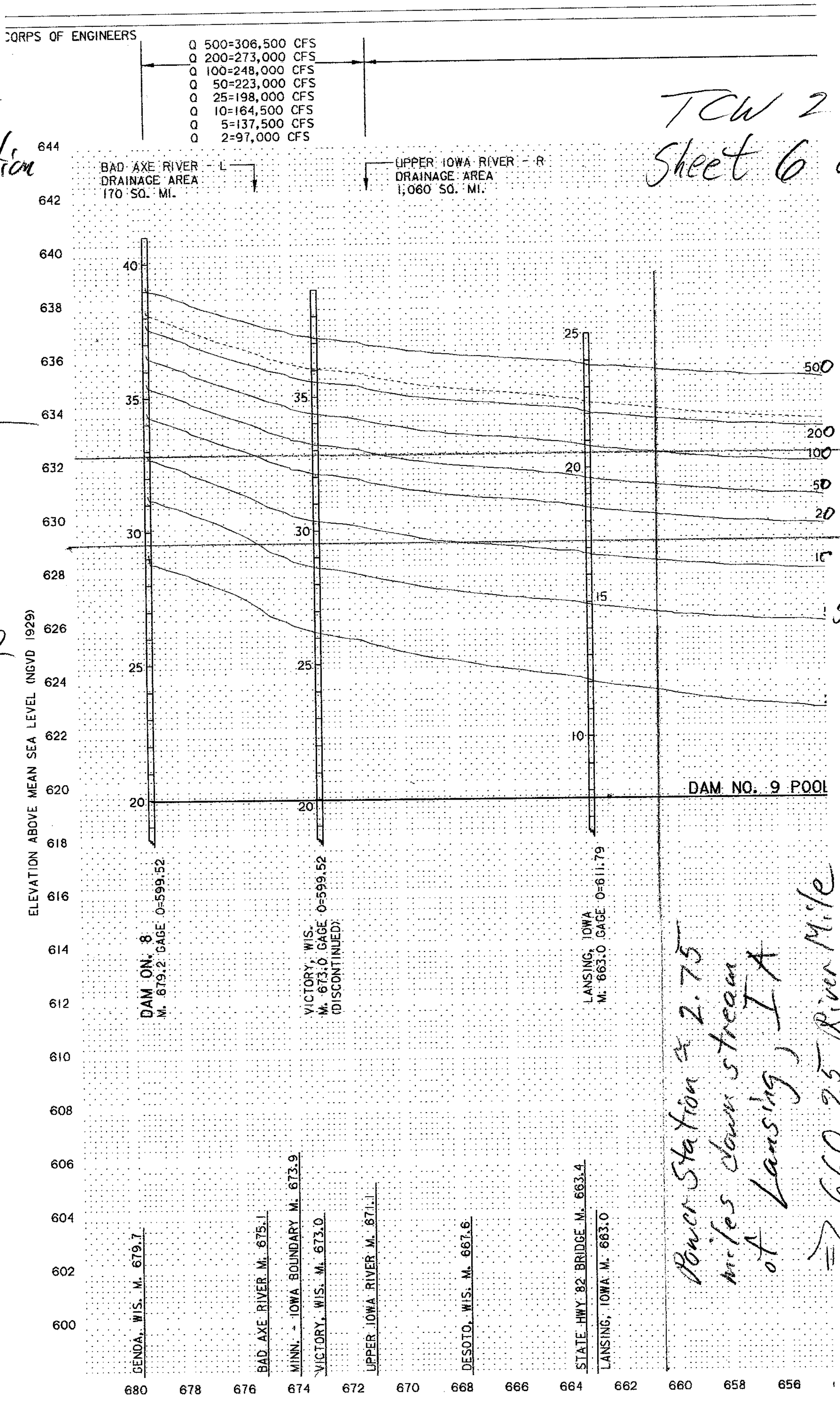
TCW 2-9-15
Sheet 6 of 8

100 Year
Level

632.3
Datum 1929

632.8
Datum 1912

632.15
Datum 1988

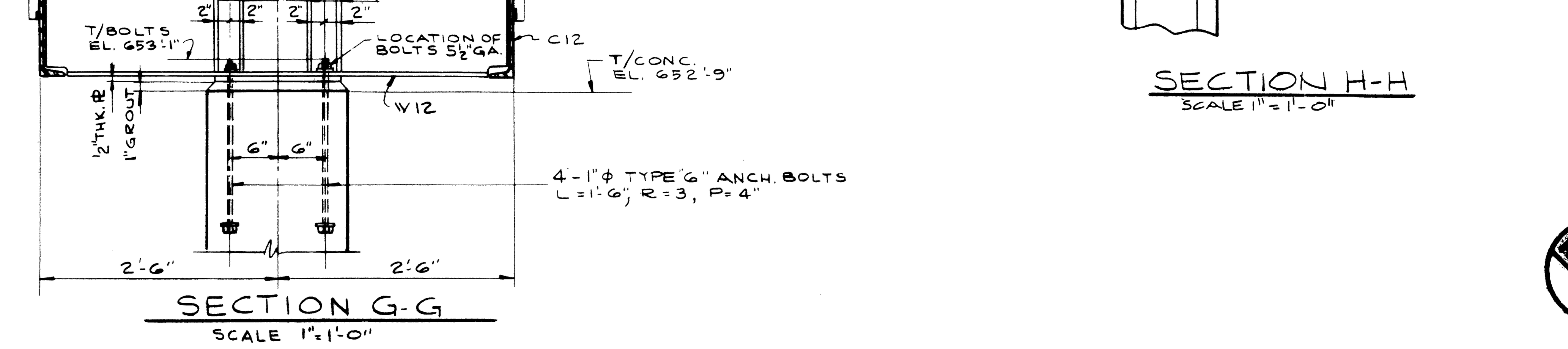


Ref: USACE Upper Mississippi River Flow Frequency Query

APPENDIX D – Construction Details Weir Box #1

Alliant Energy
Interstate Power and Light Company
Lansing Generating Station
Lansing, Iowa

Structural Stability Assessment



NOTES

1. FOR GENERAL NOTES SEE DWG. S-
2. ALL GRATINGS, CURB ANGLES, HANDRAIL & HANDRAIL POSTS SHALL BE GALVANIZED.
3. STOP LOG TIMBER SHALL BE - DENSE SELECTED STRUCTURAL GRADE DOUGLAS-FIR AND BE TREATED WITH CREOSOTE PRESERVATIVE, 1" MIN. PENETRATION & CREOSOTE RETENTION OF 8.0 LBS PER CUBIC FOOT.
4. FURNISH ONE "SECTION" OF STOP LOG WHICH CONSISTS OF 3-5½"x11½" WIDE TIMBERS FASTENED TOGETHER AS A UNIT AS INDICATED IN S.&L. STD. DWG. 1743-6 FOR BOTTOM PART OF EACH "SET". COAT HEAVILY WITH BITUMINOUS PAINT BETWEEN TIMBERS. FURNISH SINGLE 5½"x11½" WIDE STOP LOGS FOR ALL OTHERS.

REFERENCE DRAWINGS

S-215	WEIR BOX Nº1, Nº2 & Nº3 - SECTIONS & DETAILS

Drawing Release Record

Rev.	Date	Init.	Description
	3-28-74	ASC	FOR MATERIAL ONLY
A	5-28-74	ASC	FOR CONSTRUCTION
B	9-5-74	ASC	STOP LOGS CHG'D
C	9-25-74		DIMENSIONS CHANGED
D	7-7-75	ASC	REV. ELEVATIONS REV. PILING
E	2-25-75		COMPACTED GRAVEL FILL ADDED

I hereby certify that this plan, specification or report was prepared by me or under my direct personal supervision and that I am a duly registered Professional Engineer under the laws of the State of Iowa.
Signed R. N. Bergstrom, P.E. Iowa Reg. No. 4480 Date 8-14-1974

R. N. BERGSTROM REGISTERED 4480 IOWA PROFESSIONAL ENGINEER

WEIR BOX NO.1 & NO.2 - PLAN SECTIONS & DETAILS ASH SETTLING BASIN

LANSING POWER STATION UNIT 4
INTERSTATE POWER CO.
LANSING, IOWA

SCALE 1/4"=1'-0" UNLESS NOTED
DRAWN S.J.C. 12-13-73
CHECKED S. K. JUNG 8/12/74
ENGINEER 8-12-74
APPROVED 8.14.74
JOB NO. 4644

SARGENT & LUNDY ENGINEERS CHICAGO

DRAWING NO. S-213