ALLIANT ENERGY
Interstate Power and Light Company
Lansing Generating Station

CCR SURFACE IMPOUNDMENT

STRUCTURAL STABILITY ASSESSMENT

Report Issued: September 28, 2021
Revision 1.1

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 (effective October 19, 2015) and subsequent amendments.

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.

Revision 1 of this Report has been 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) just/and §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 southeast 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 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.

In September 2021, a new concrete outlet Weir Box structure was commissioned, while the previous discharge structure (Weir Box #1) was retrofitted to become an emergency stormwater overflow structure for sizeable precipitation events. The new outfall structure is in the northeast corner of the impoundment and equipped with fiberglass stoplogs to adjust the operating elevation of the LAN Upper Ash Pond. Discharge is directed north in a 16-inch HDPE pipe below Power Plant Drive. There it transitions to a 20-inch HDPE pipe and continues below the railroad tracks and then heads east where National Pollution Discharge Elimination System (NPDES) Outfall 010 discharges into the Mississippi River.

The retrofitted Emergency Overflow Weir Box #1 is located at north end of the LAN Upper Ash Pond and overflows a concrete weir into Weir Box #1, and then through a 24-inch diameter corrugated metal pipe under Power Plant Drive and into Weir Box #2. The water leaves Weir box 2 through a 24-inch diameter high density polyethylene pipe, which connects Weir Box #2 to Weir Box #3 in the backfilled former LAN Lower Ash Pond. The water flows through Weir Box #3 and discharges to the west through a 24-inch diameter corrugated metal pipe into Unnamed Creek #1. Unnamed Creek #1 flows to the north into Unnamed Creek #2 which then discharges into the Mississippi River.

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. As stated in the 2020 Annual Inspection, the volume of impounded CCR and water within the LAN Upper Ash Pond is approximately 563,500 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 2020 Annual Inspection, the areas upstream and downstream slopes of the west embankment were properly managed grass slopes. 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)

Currently construction is ongoing, and in the Fall of 2021, a new concrete outlet Weir Box structure will be commissioned, while the previous discharge structure (Weir Box #1) will be retrofitted to become and emergency stormwater overflow structure for sizeable precipitation events. The new outfall structure will be in the northeast corner of the impoundment and equipped with fiberglass stoplogs to adjust the operating elevation of the LAN Upper Ash Pond. Discharge will be directed north in a 16-inch HDPE pipe below Power Plant Drive. There it will transition to a 20-inch HDPE pipe and continue below the railroad tracks and then head east where National Pollution Discharge Elimination System (NPDES) Outfall 010 discharges into the Mississippi River. The structures and piping are constructed of non-erodible material and designed to carry sustained flows.

The emergency stormwater overflow structure overflows a concrete weir into Weir Box #1, and then through a 24-inch diameter corrugated metal pipe under Power Plant Drive, and into Weir Box #2. The water leaves Weir box 2 through a 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 24-inch diameter corrugated metal pipe into Unnamed Creek #1. Unnamed Creek #1 flows to the north into Unnamed Creek #2 which then discharges into the Mississippi River. The structures and piping are constructed of non-erodible material and designed to carry sustained flows.

All structures associated with the LAN Upper Ash Pond are checked for malfunction (e.g., blockages, deformations, etc.) 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 – Revision 1, 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 2.48 feet.

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

The newly constructed concrete discharge structure from the LAN Upper Ash Pond is controlled by a four-foot-wide Weir Box, where the flow discharges through a single 16-inch HDPE pipe, which later increases to a 20-inch HDPE pipe. On September 23, 2021 all 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 newly installed pipe.

The emergency stormwater overflow structure piping was also inspected with remote video camera. The piping between Weir Box #1 and Weir Box #2 was previously known to sag between the two structures. The remote camera was lowered into each Weir Box and the exposed sections of pipe were inspected. The condition of the pipe was substantially similar to the inspection in 2016 and no restrictions were observed in the exposed piping. The pipe from Weir Box #2 to the discharge into Unnamed Creek #1 was fully inspected with the remote camera. The inspection showed that there was minimal deterioration, deformation, distortion, sedimentation, debris, and no bedding deficiencies were observed within the emergency overflow pipe.

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 feet 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).

MARK W. LOEROP
22197

By:

Name: MARK LOEROP

Date: SEP 28, 2021

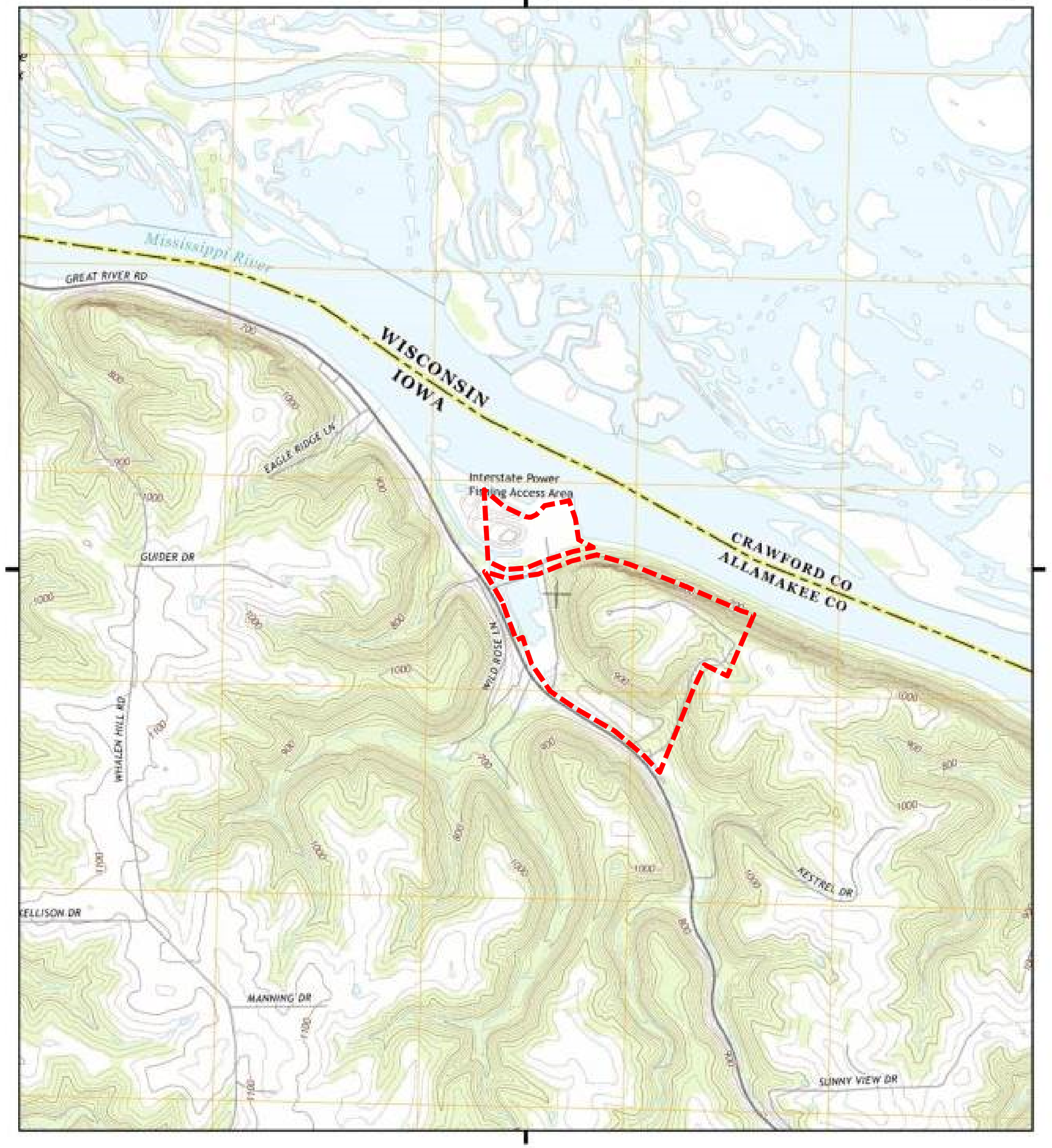
FIGURES

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

Structural Stability Assessment

Historical Topo Map

2013



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

Miles 0.25 0.5 1 1.5

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

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

Legend

OHE	Overhead Electric Line
T T	Underground Telephone Utility
ø	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.

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	4-19-21	MWL	MWL	REVISION 1 TO PLAN

SCALE: AS SHOWN
DATE: 4-19-21
DRAWN BY: JFD
CHECKED BY: MWL
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
INFLOW FLOOD CONTROL
SITE PLAN

JOB 154.018.024.004
SHT. FIGURE 2
DWG. 154.018.024.004-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 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	4-19-21	MWL	MWL	REVISION 1 TO PLAN

SCALE: AS SHOWN
DATE: 4-19-21
DRAWN BY: JFD
CHECKED BY: MWL
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 154.018.024.004
SHT. FIGURE 2
DWG. 154.018.024.004-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.

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 R N Bergstrom 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
	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.

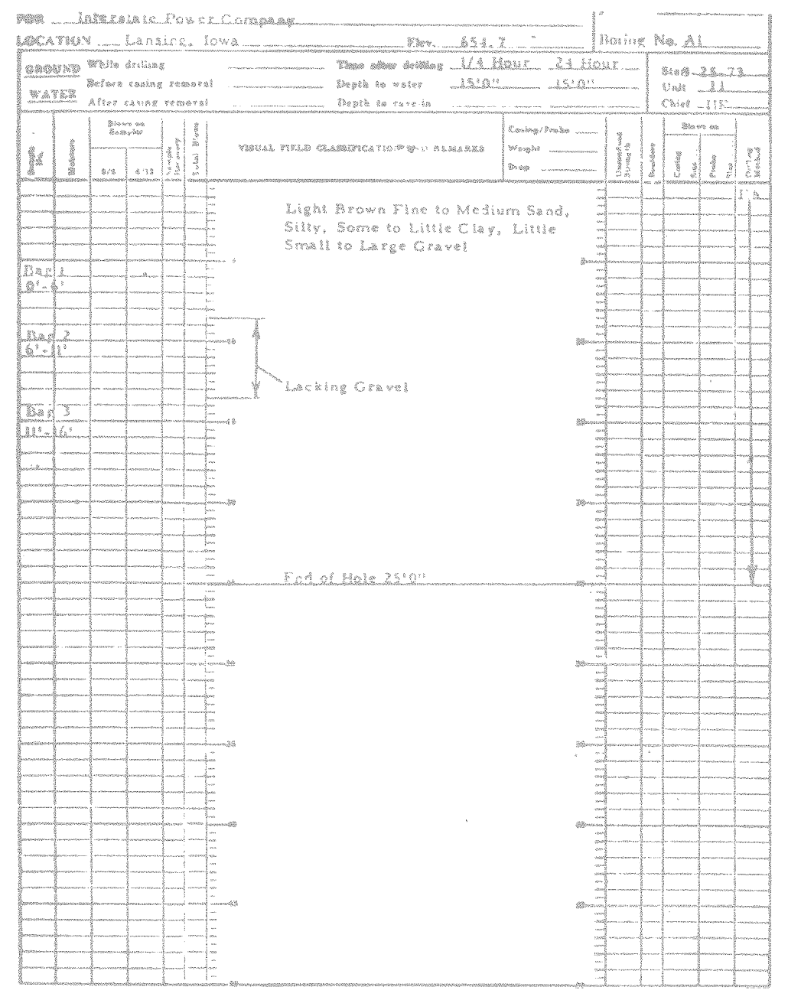
BORING LOCATION PLAN
UNIT 4
LANSING POWER STATION
INTERSTATE POWER COMPANY
LANSING, IOWA

SCALE 1" = 100'
DRAWN WM. L. VOLK 4-3-73
CHECKED R.C. ODEGARD 9-7-73
ENGINEER W. Groh 9-10-73
APPROVED RNBergstrom 9-10-73
JOB NO. 4644-03

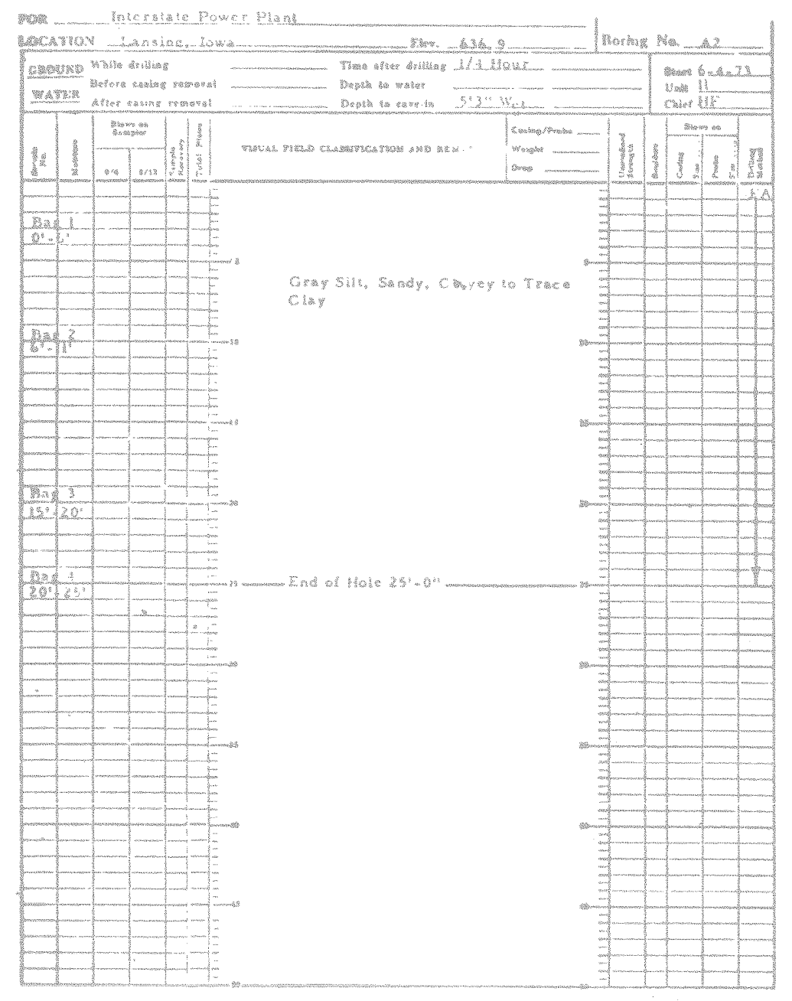
SARGENT & LUNDY
ENGINEERS
CHICAGO

DRAWING NO.
S-1

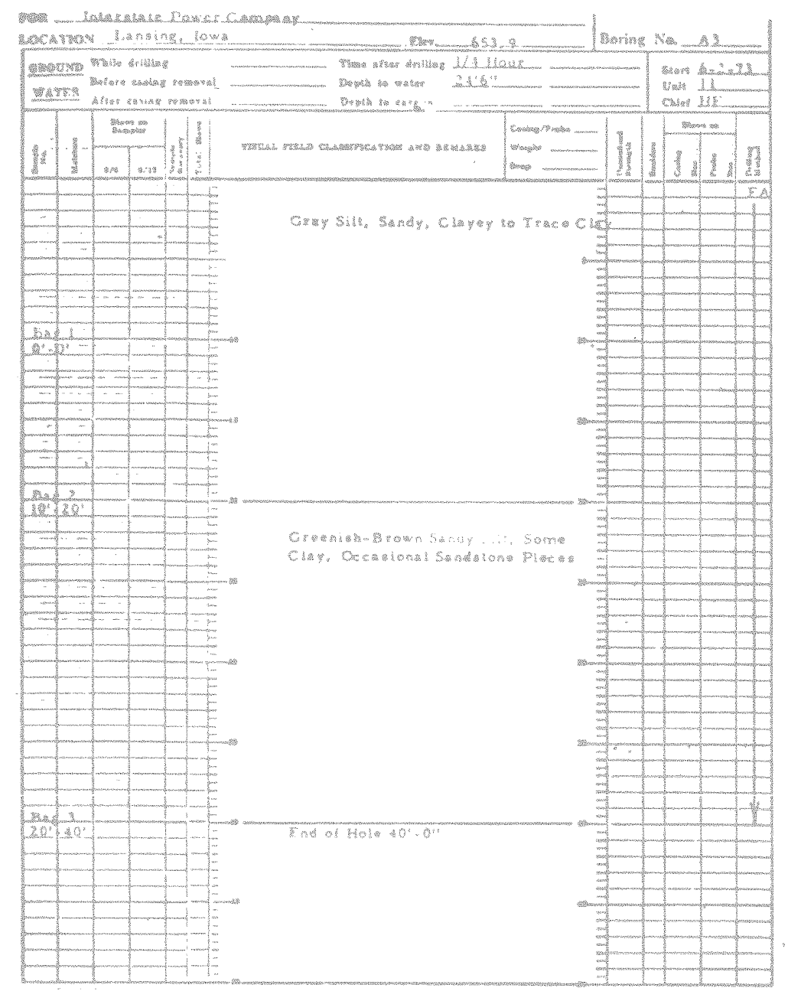
BORING A-1



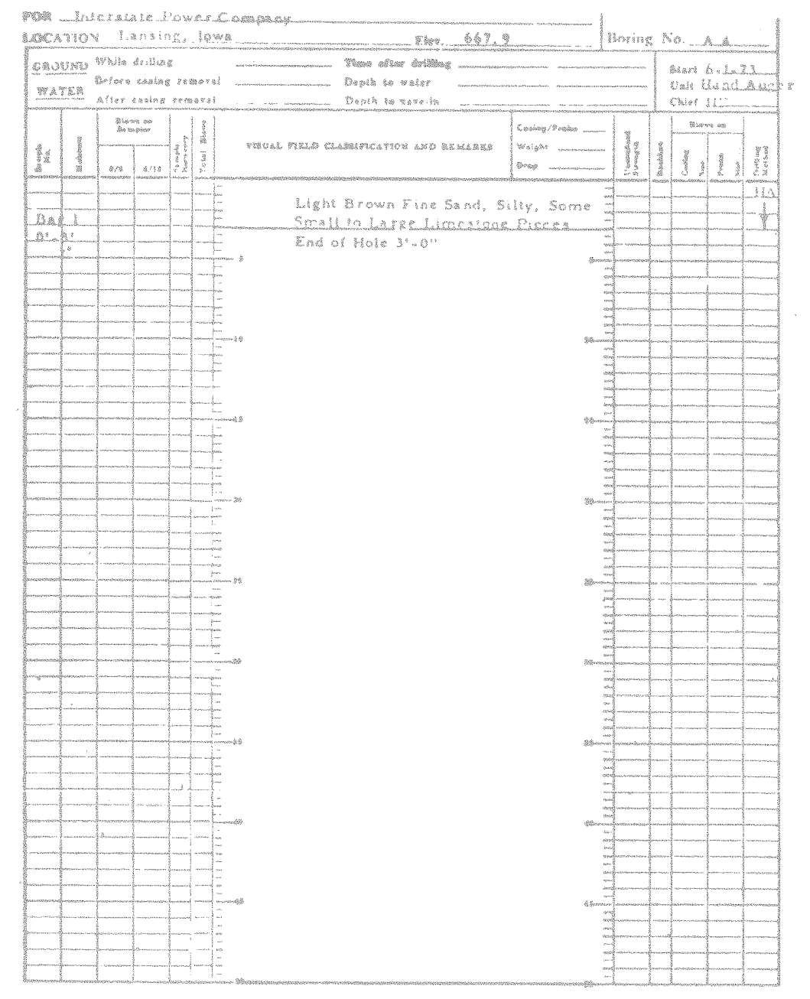
BORING A-2



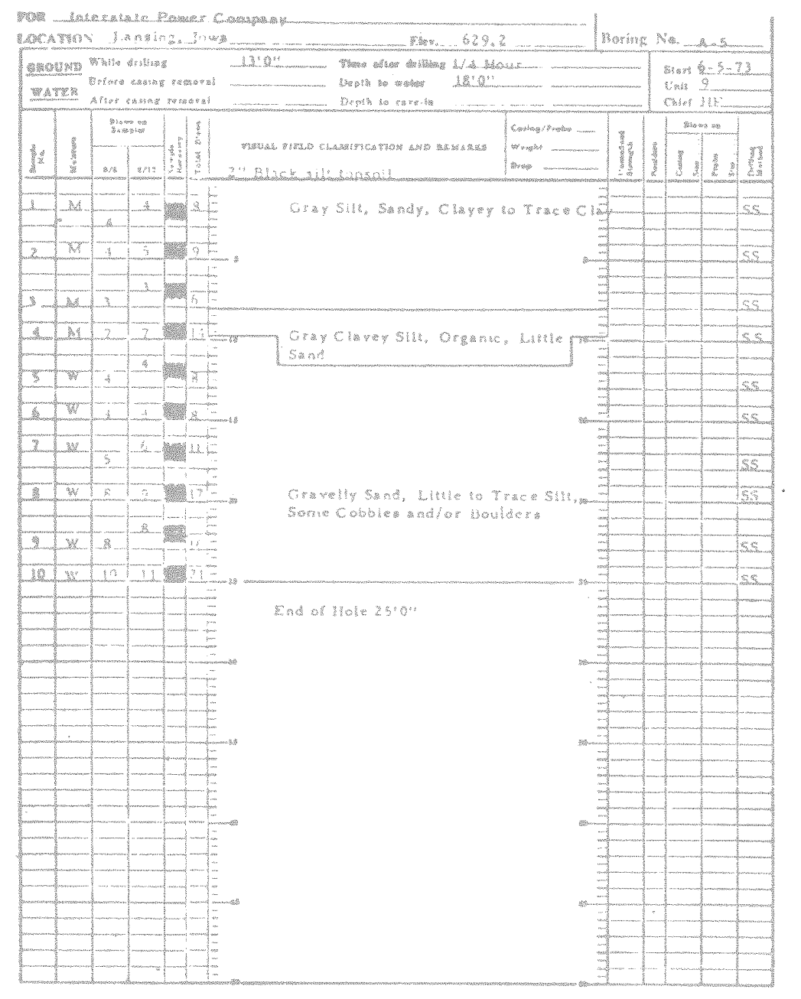
BORING A-3



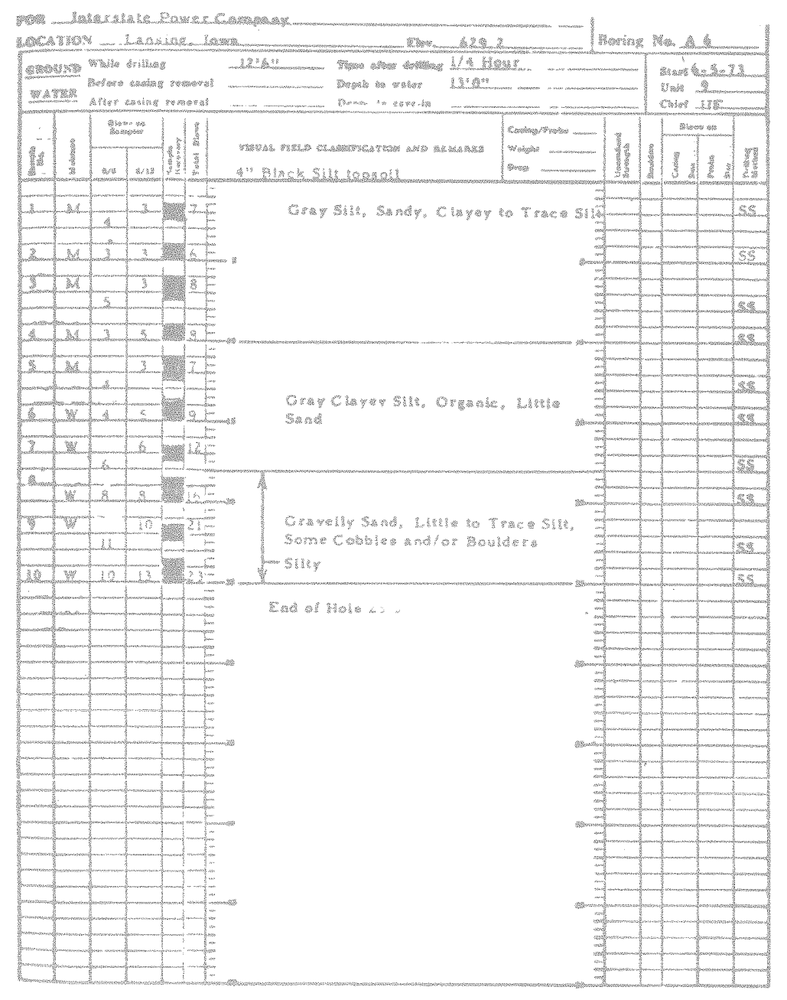
BORING A-4



BORING A-5



BORING A-6



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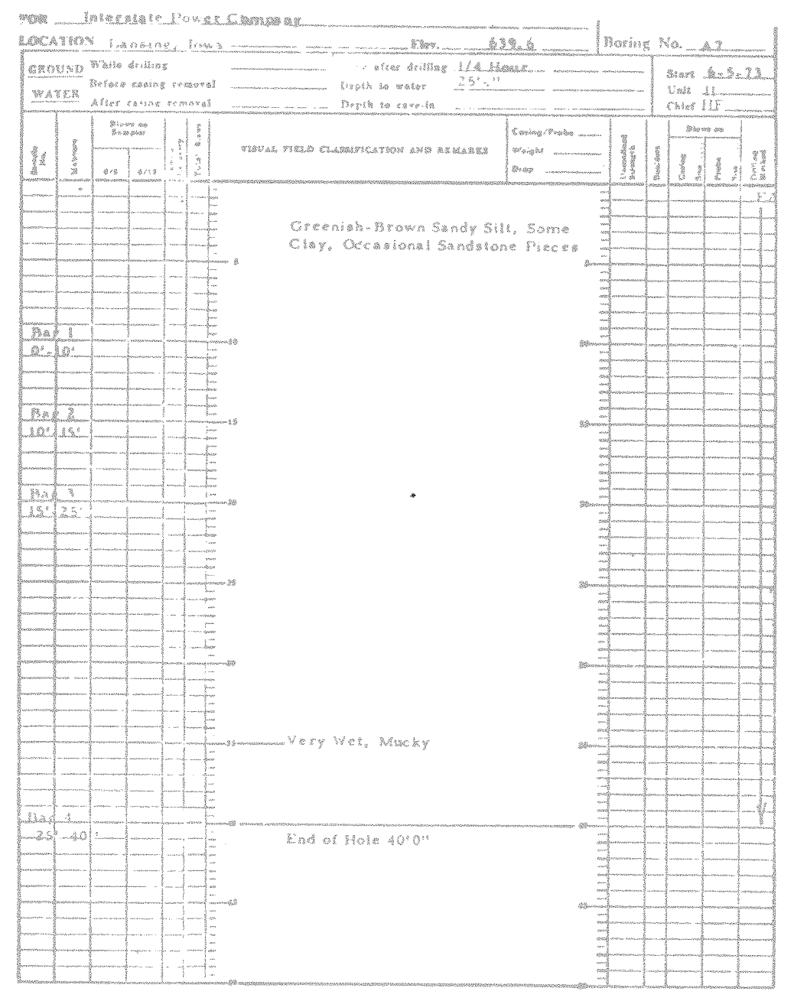

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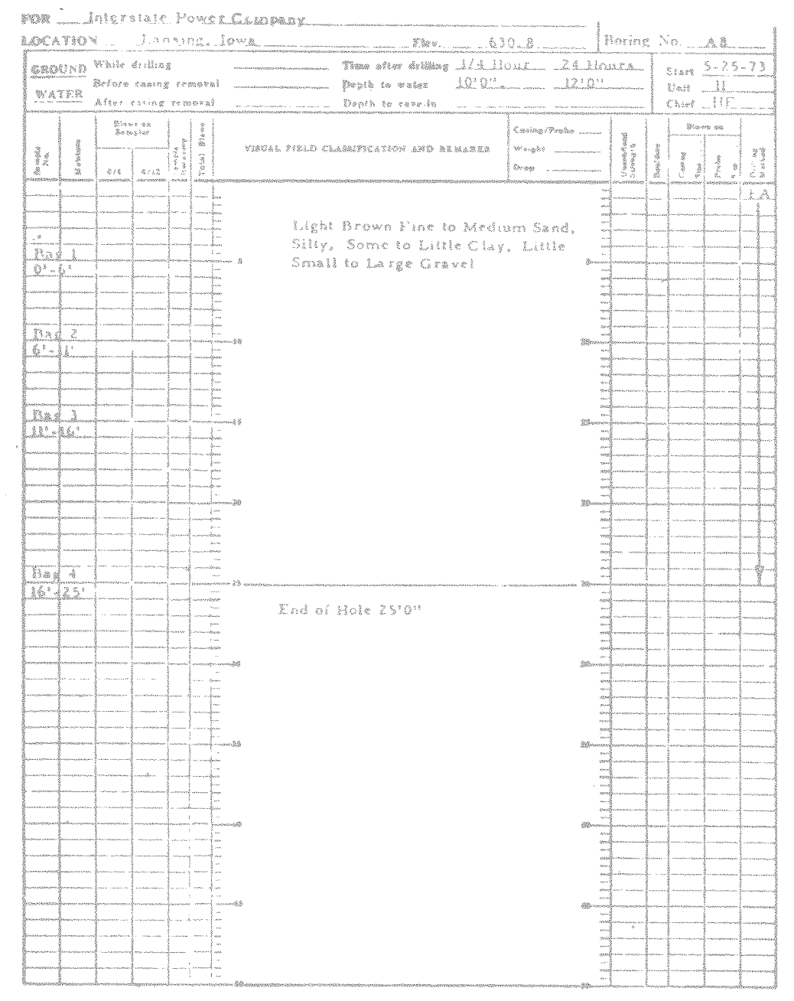

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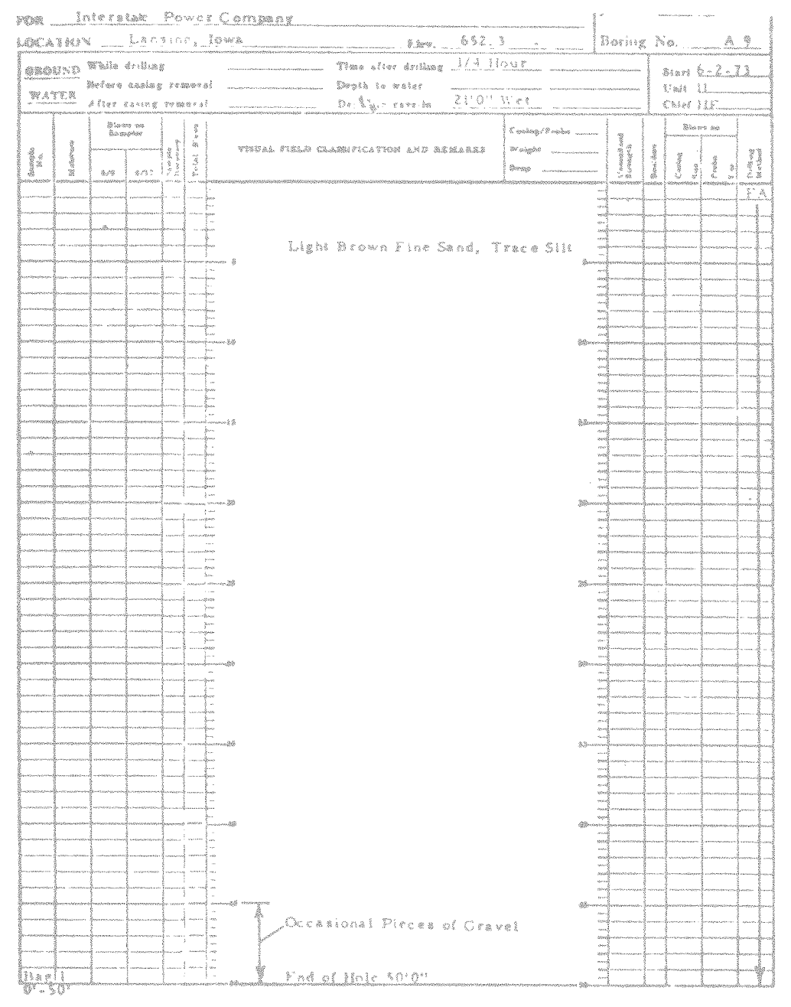

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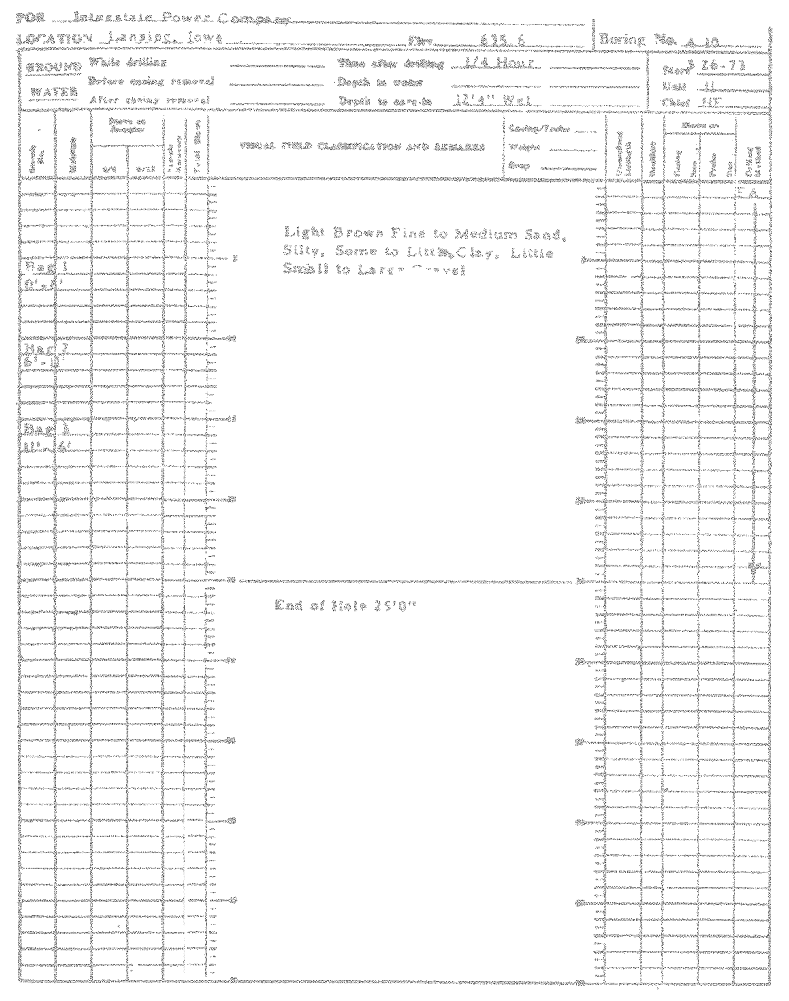

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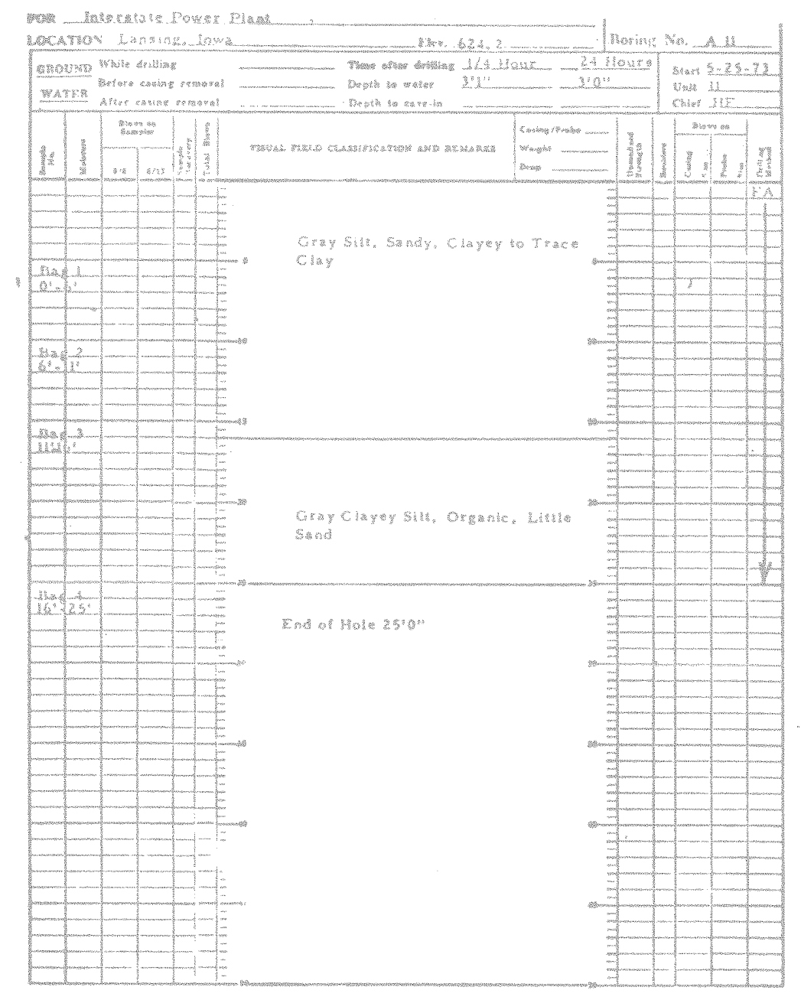

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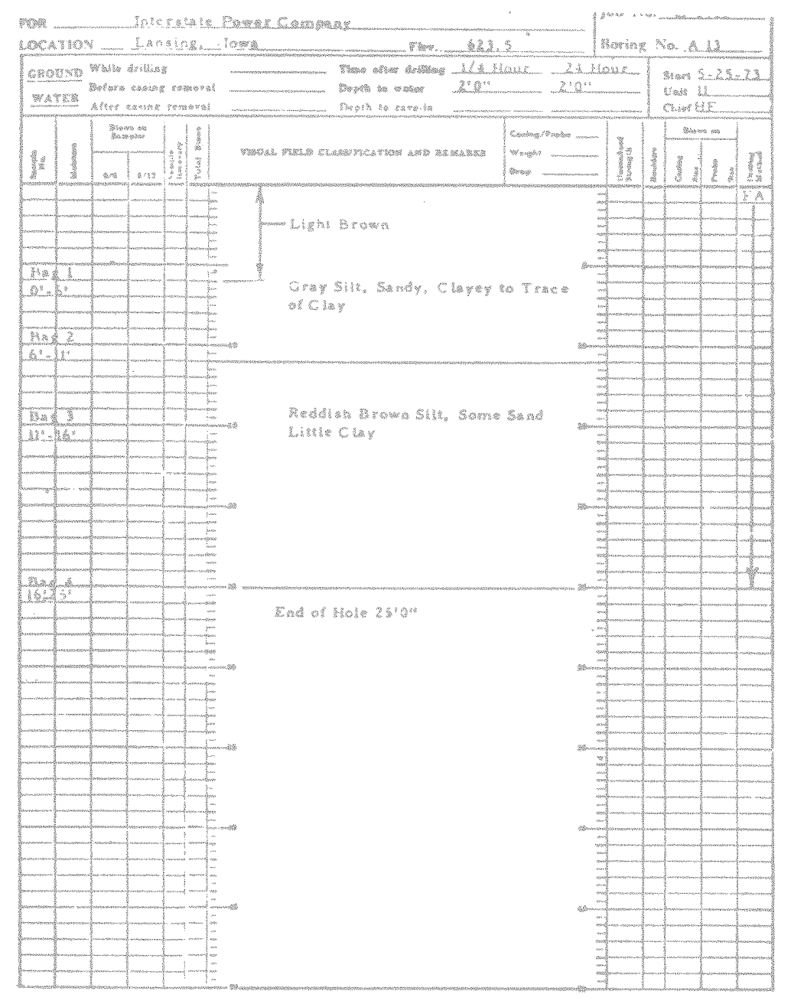

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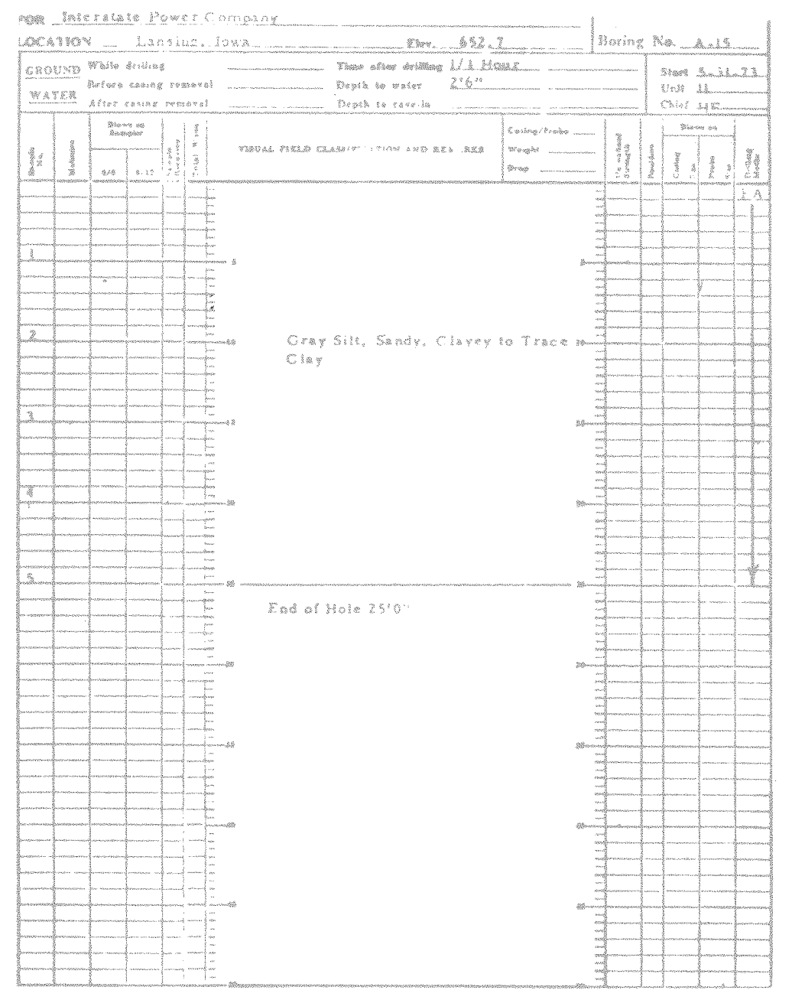

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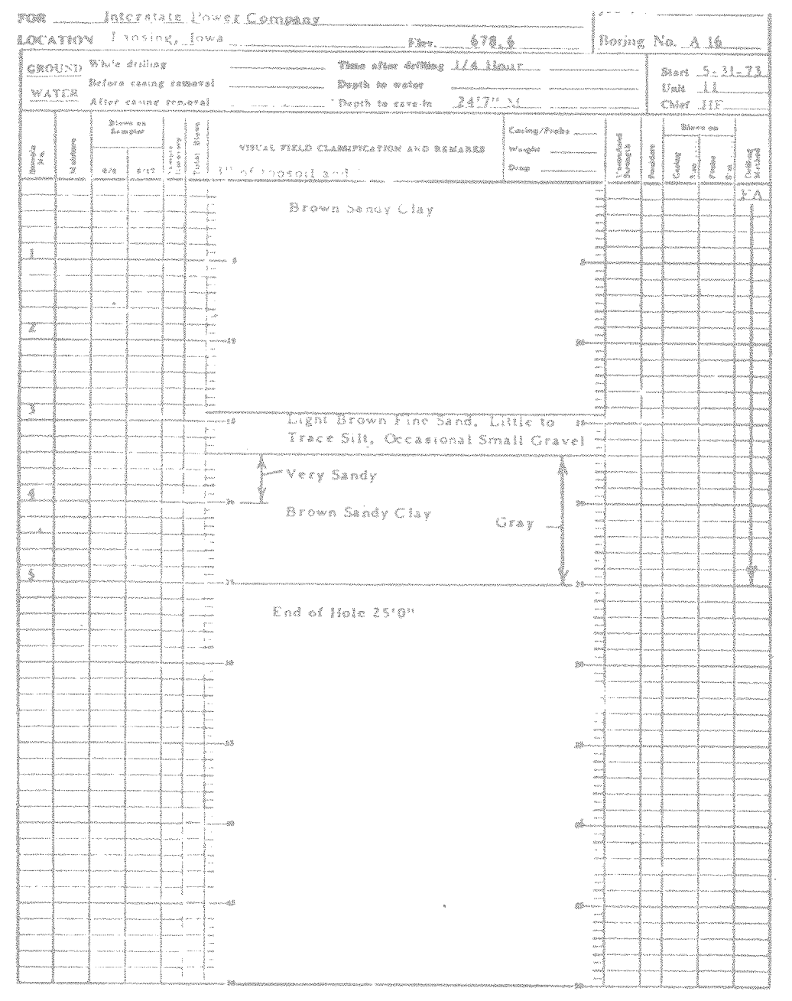

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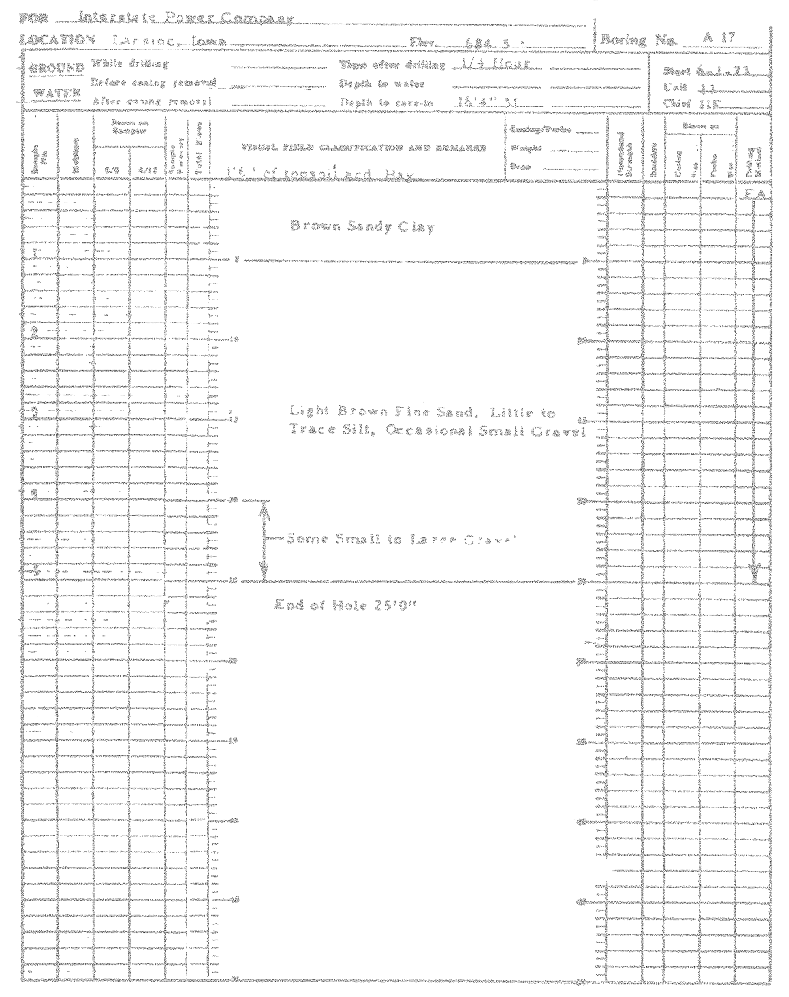

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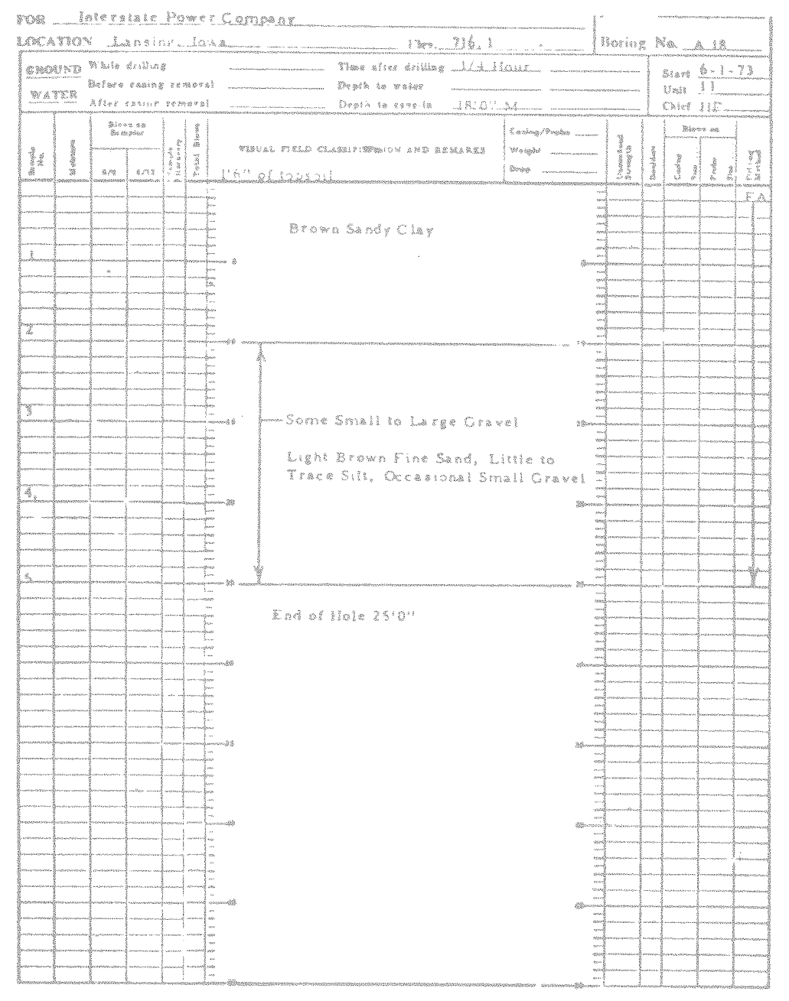

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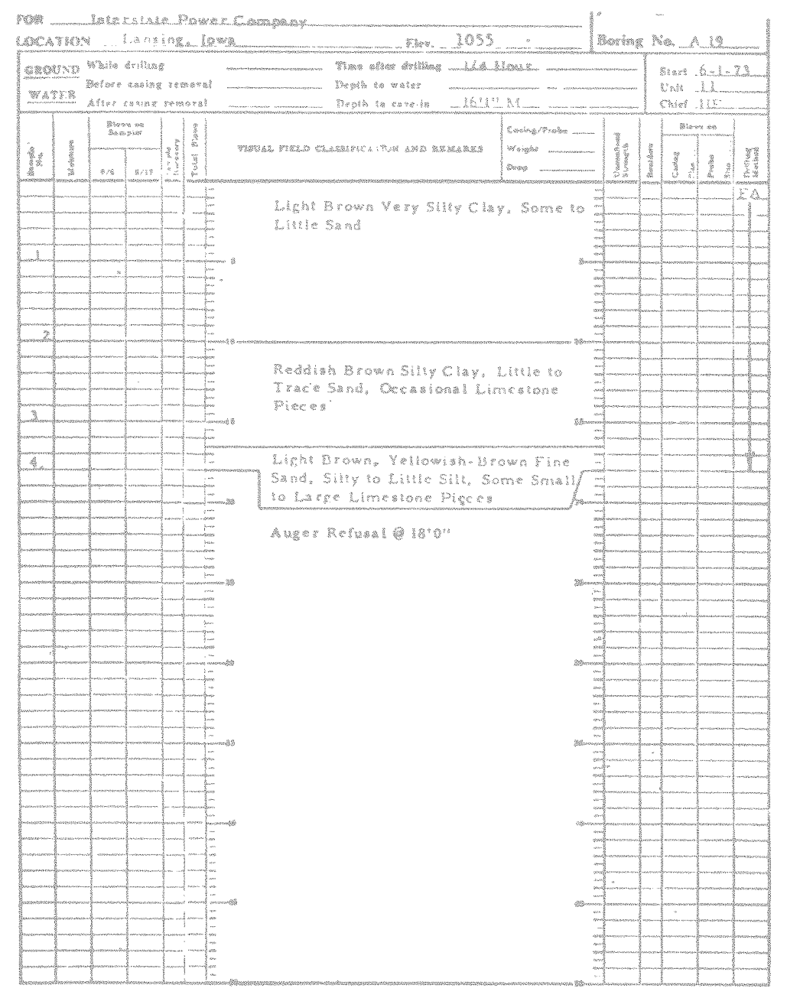

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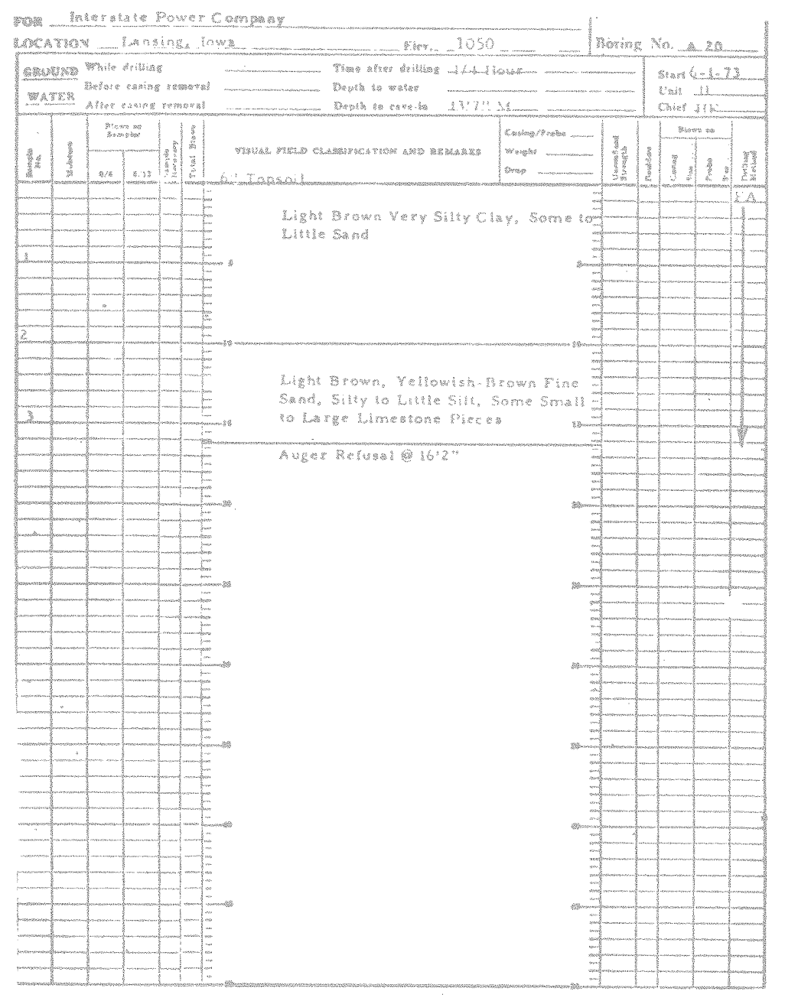

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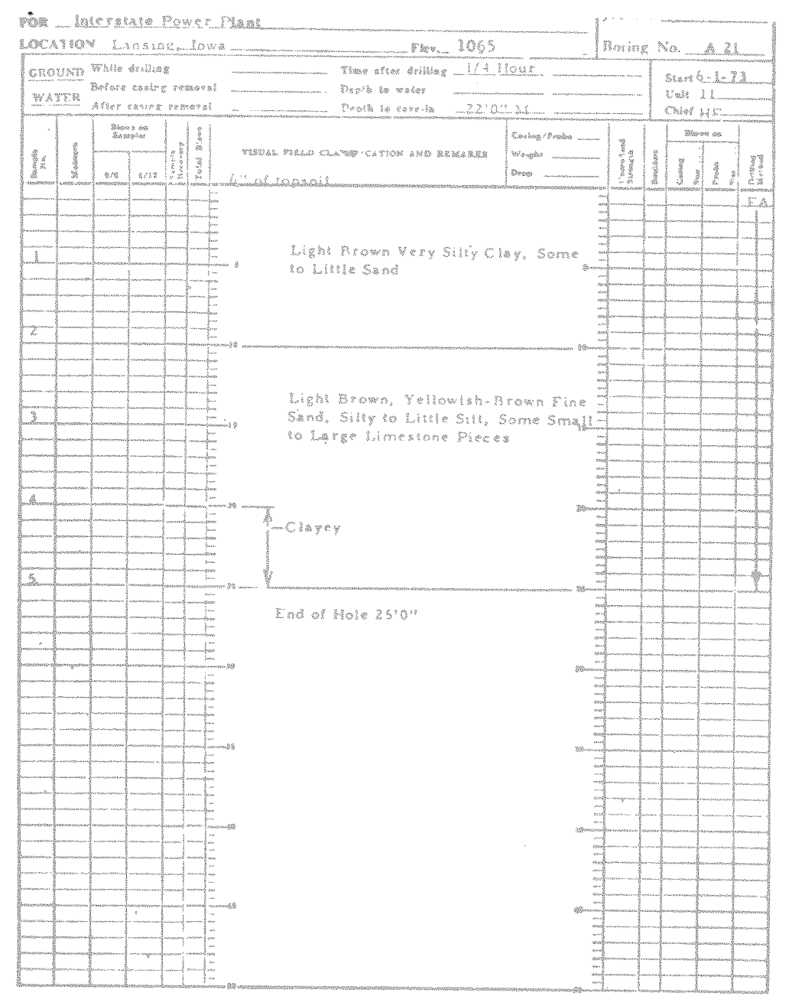

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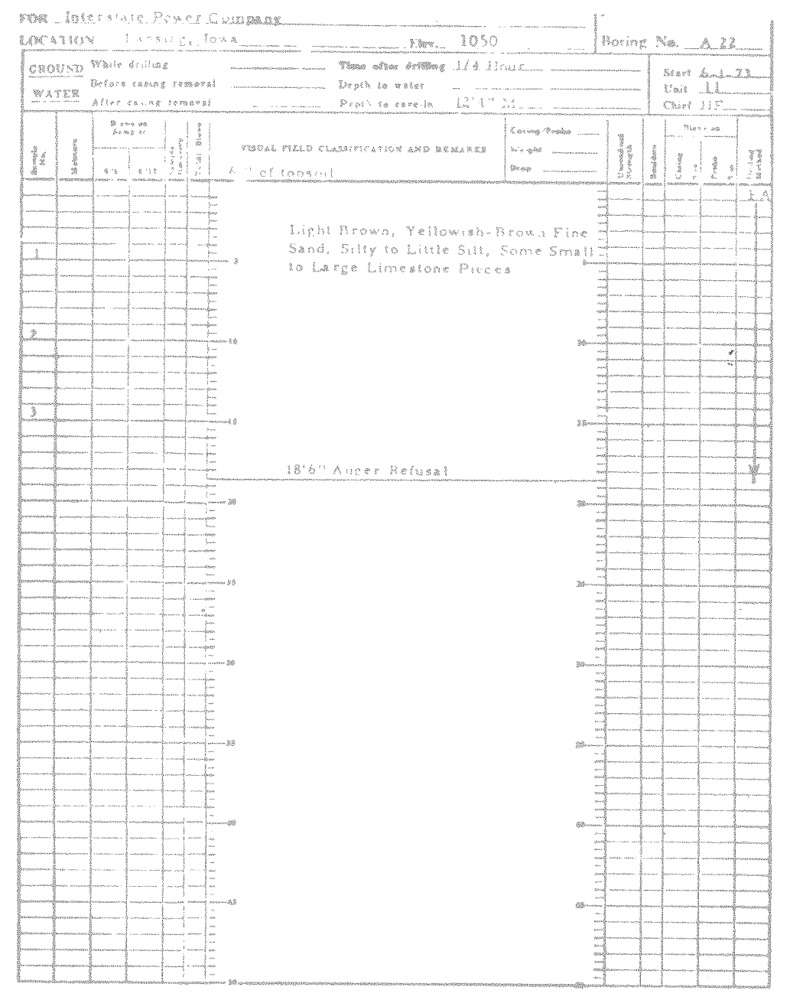

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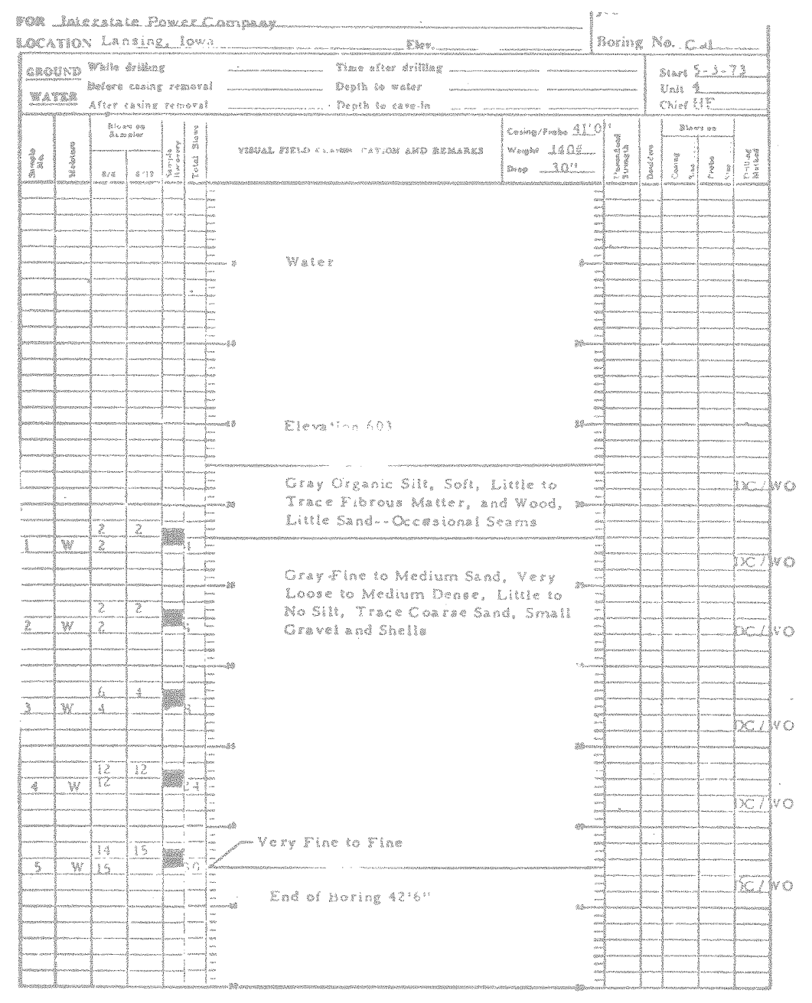

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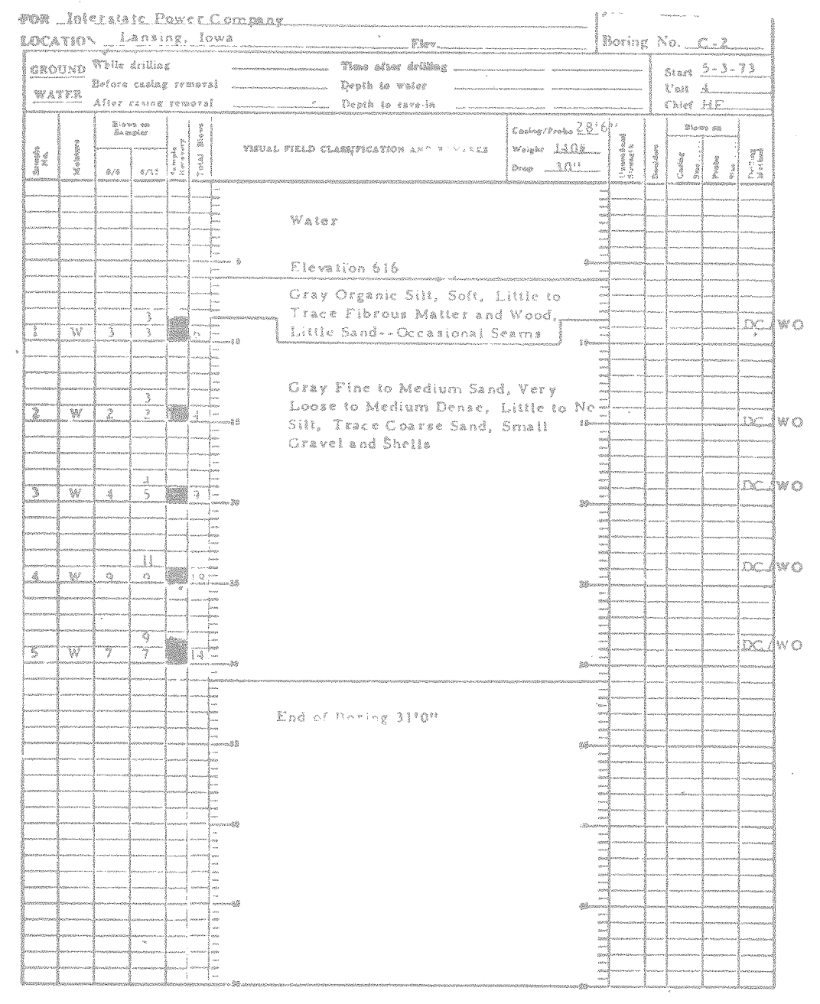

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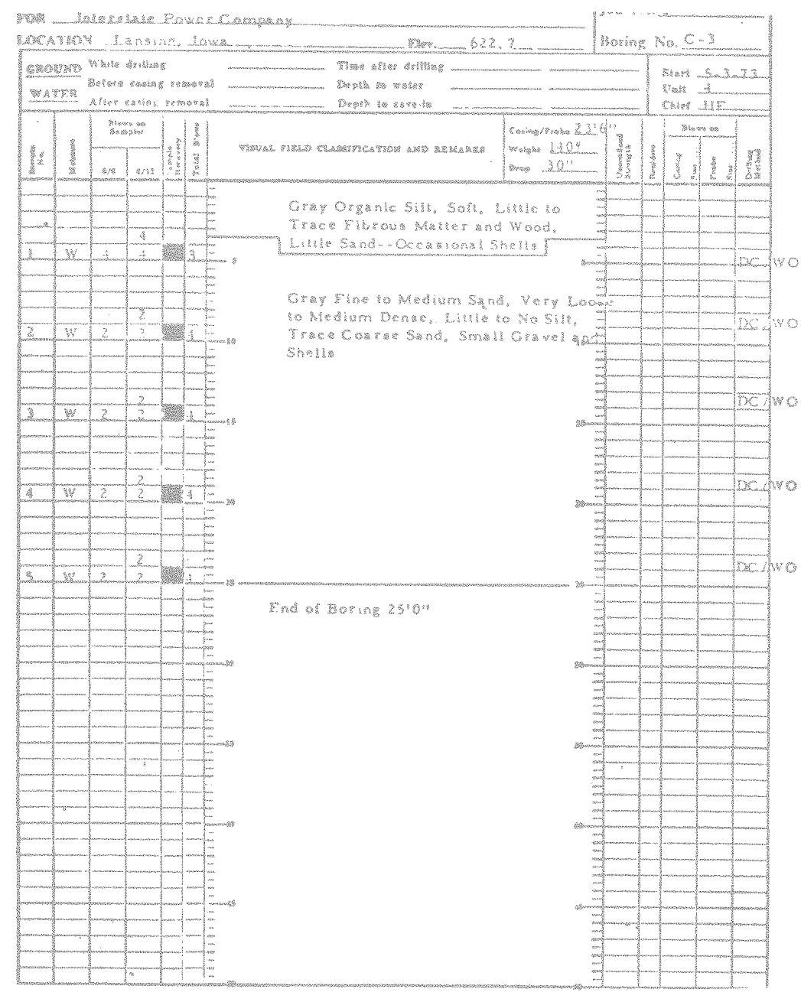

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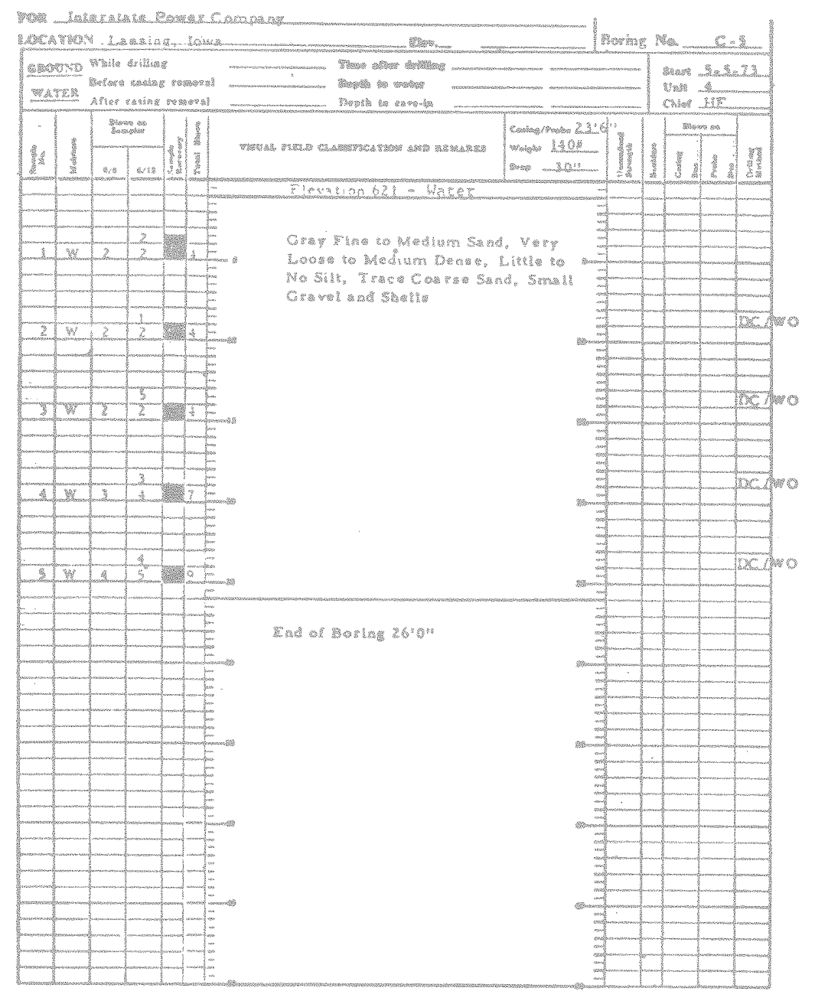
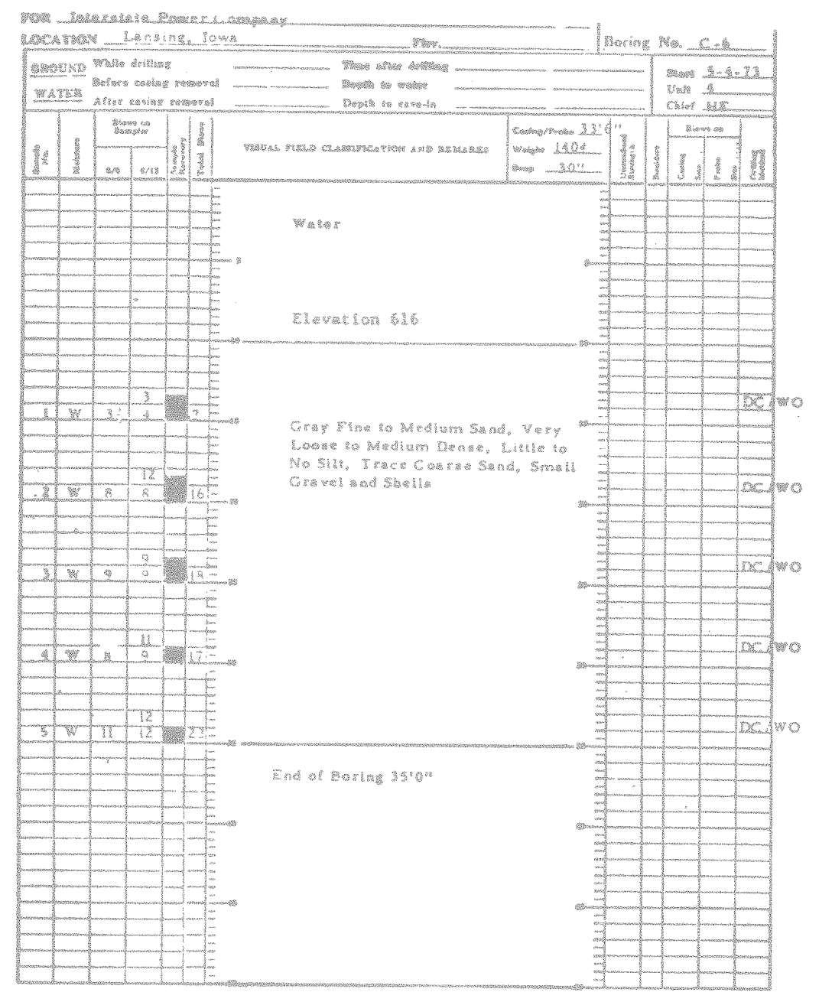


BORING C-6



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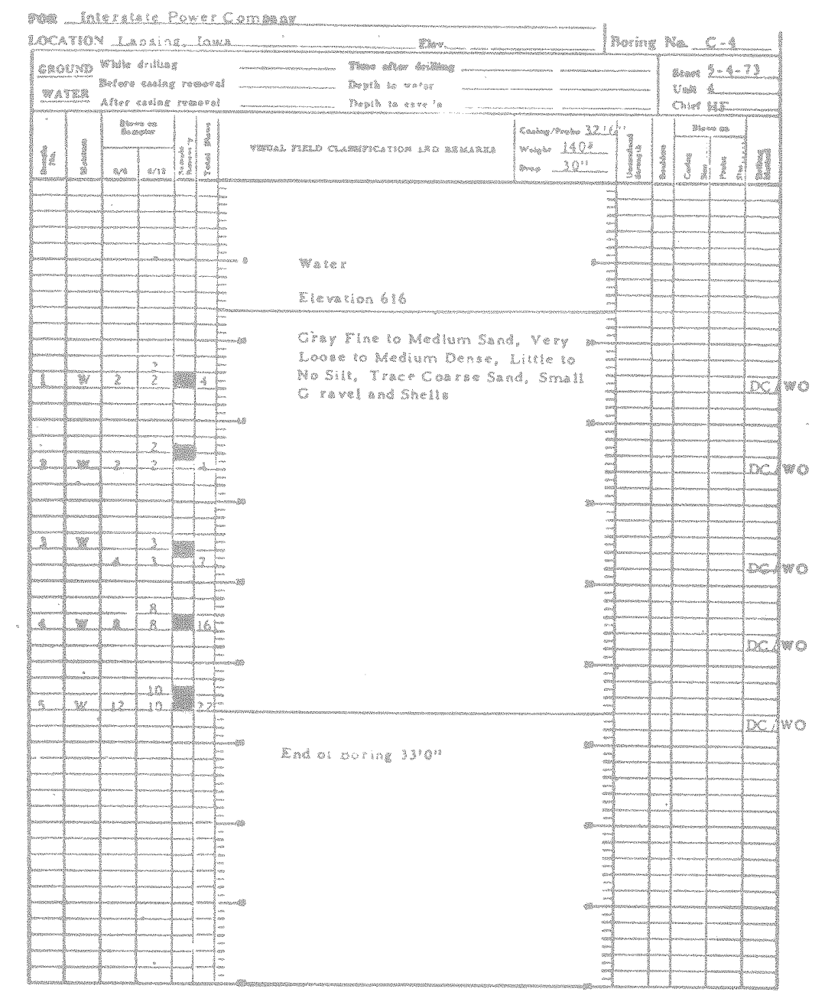


REFERENCE
BID SPEC. G-3105
1-21-74

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 R N Bergstrom Date 9-10 1973

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

R. N. BERGSTROM REGISTERED 4480 IOWA PROFESSIONAL ENGINEER

Drawing Release Record

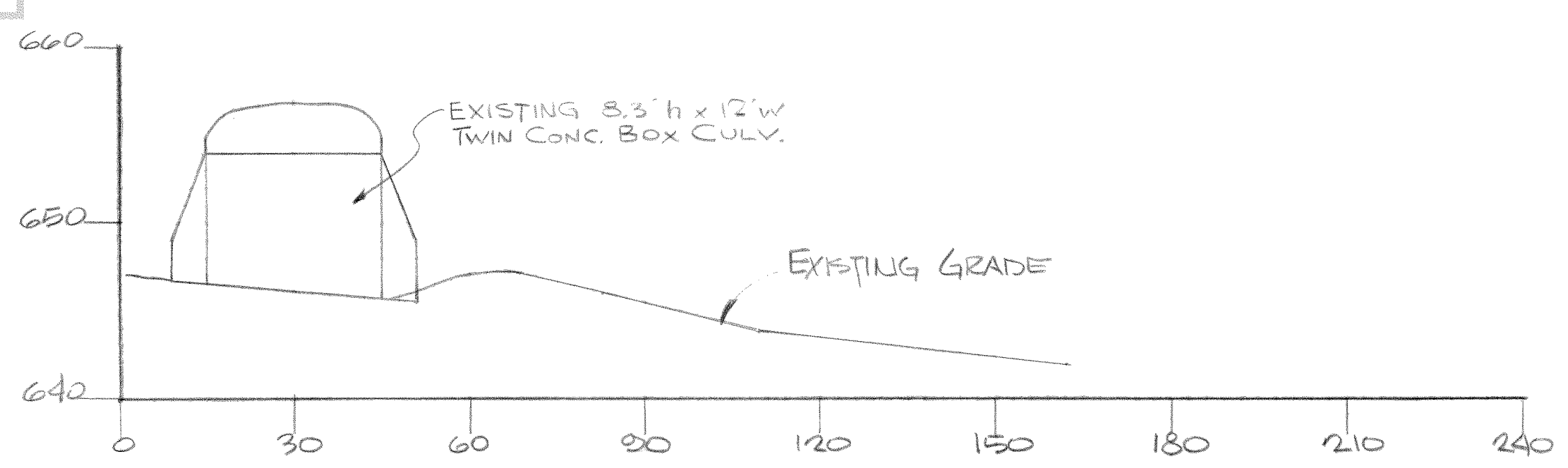
Rev.	Date	Init.	Description
1	9-10-73		CONSTR

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 R N Bergstrom 9-10-73
JOB NO. 4644-03

SARGENT & LUNDY
ENGINEERS
CHICAGO

DRAWING NO.
S-3



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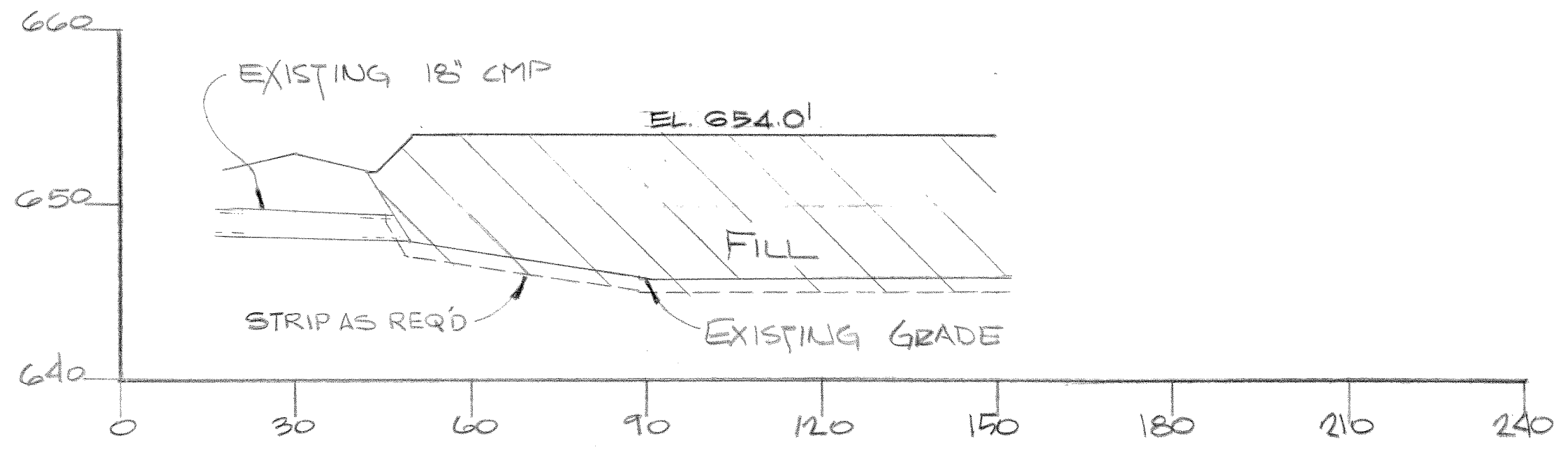

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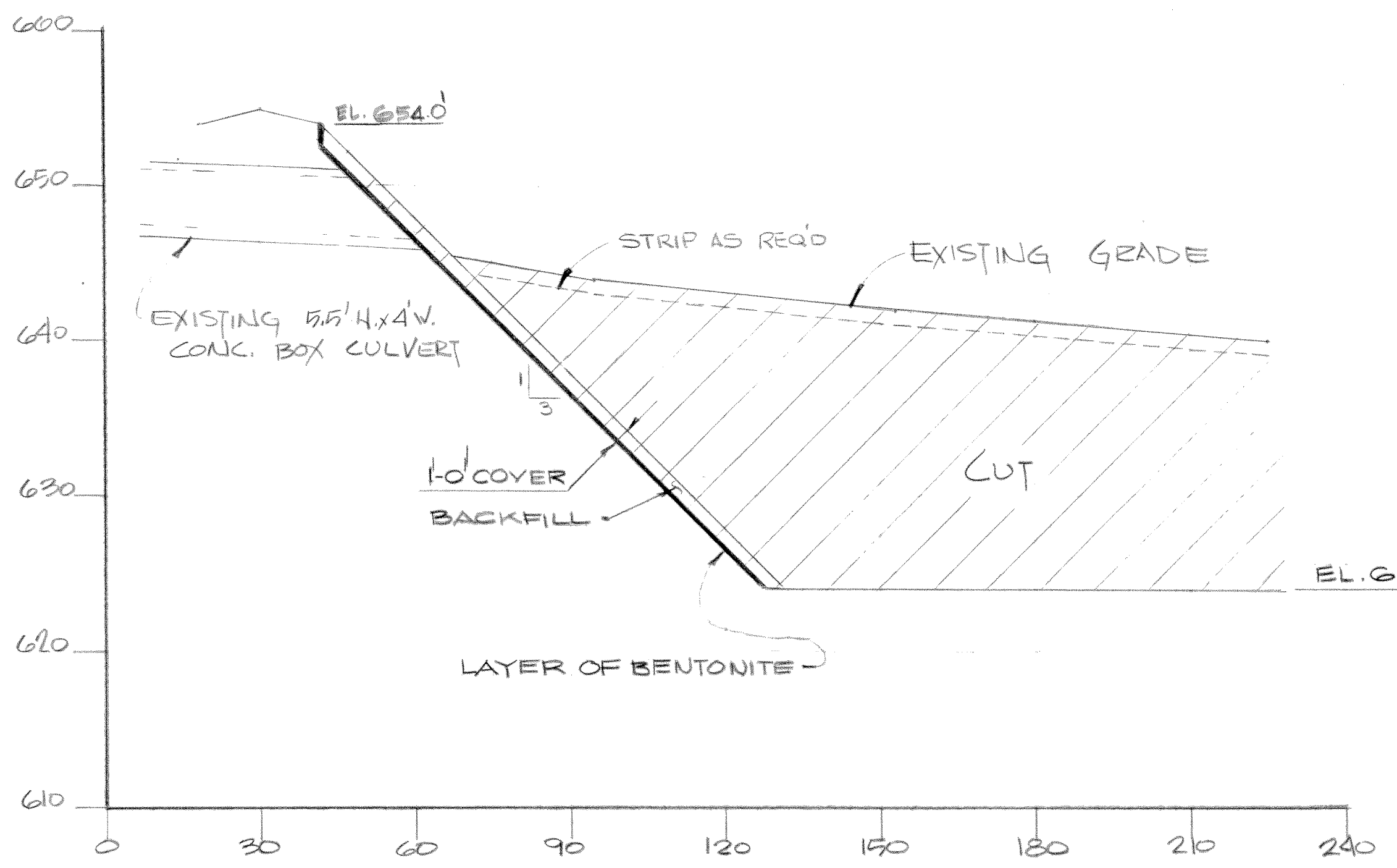

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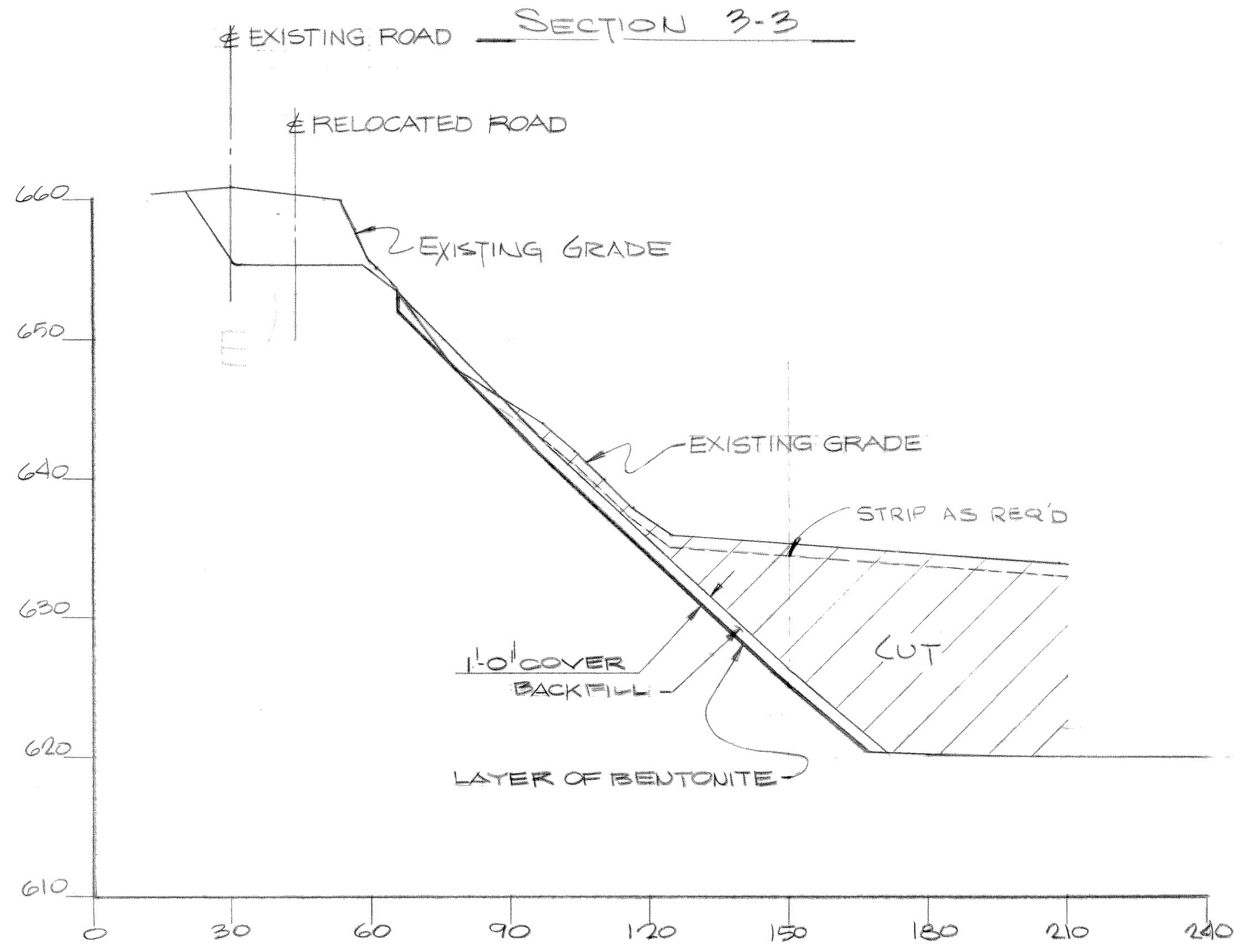

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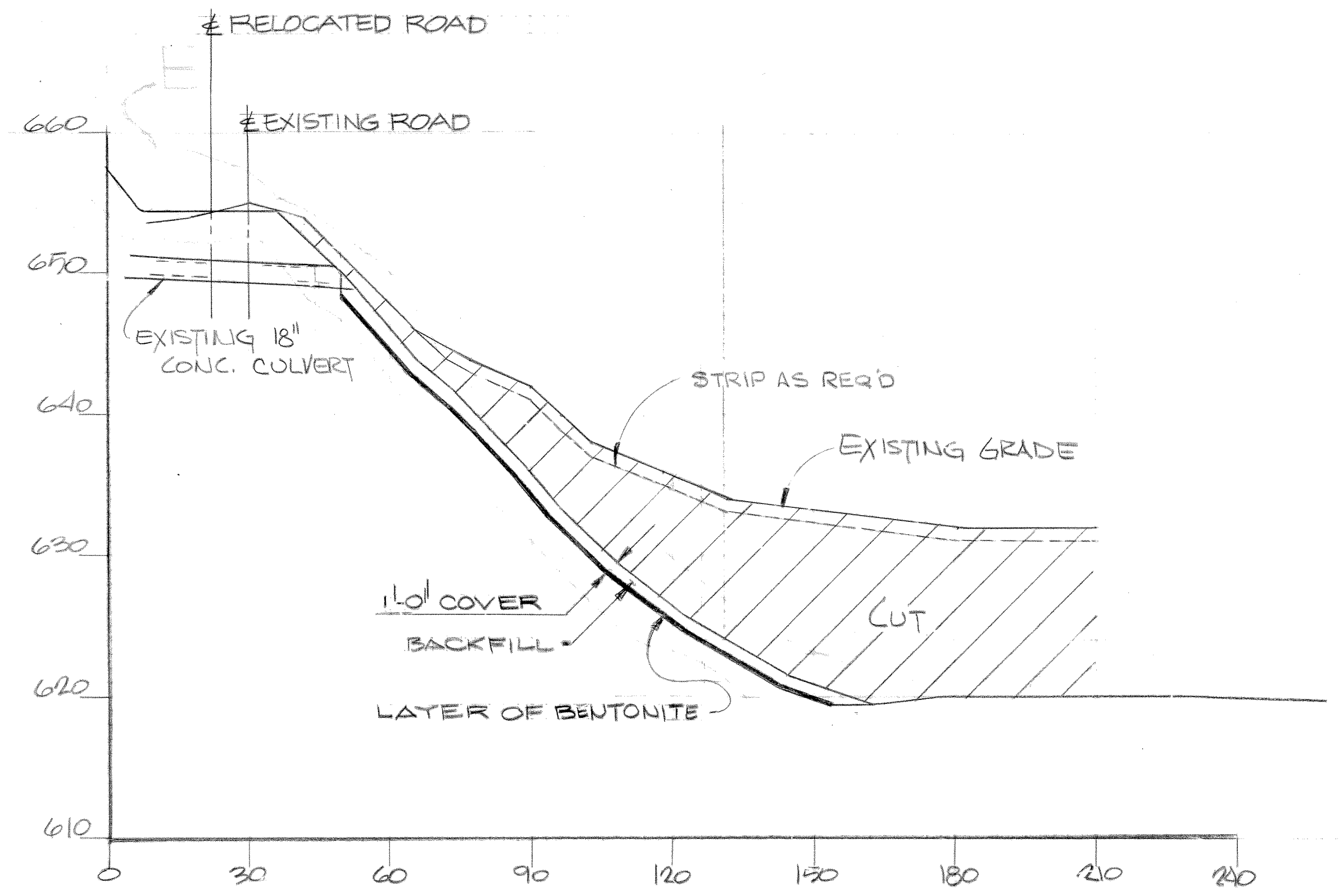

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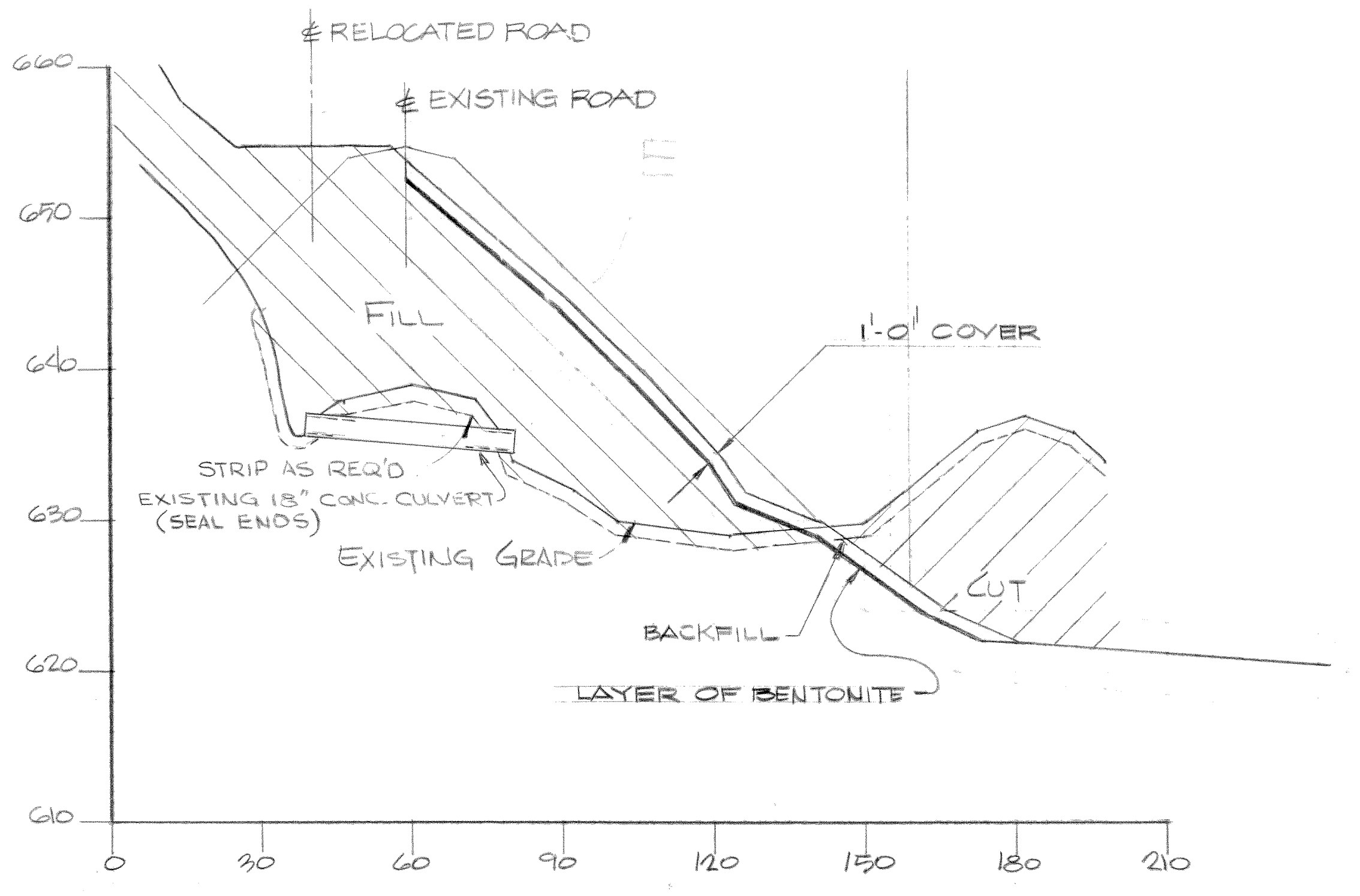
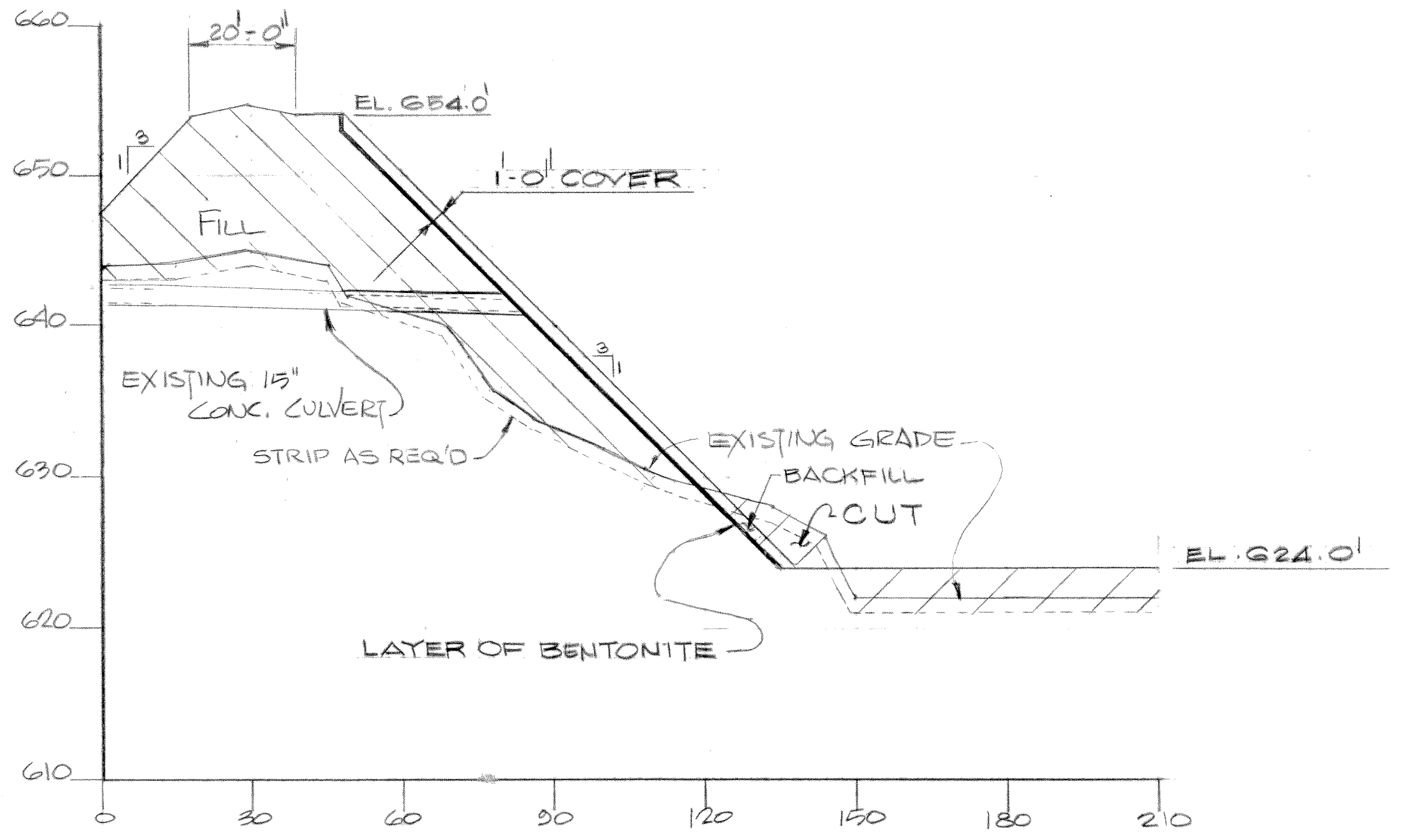


SECTION 6-6



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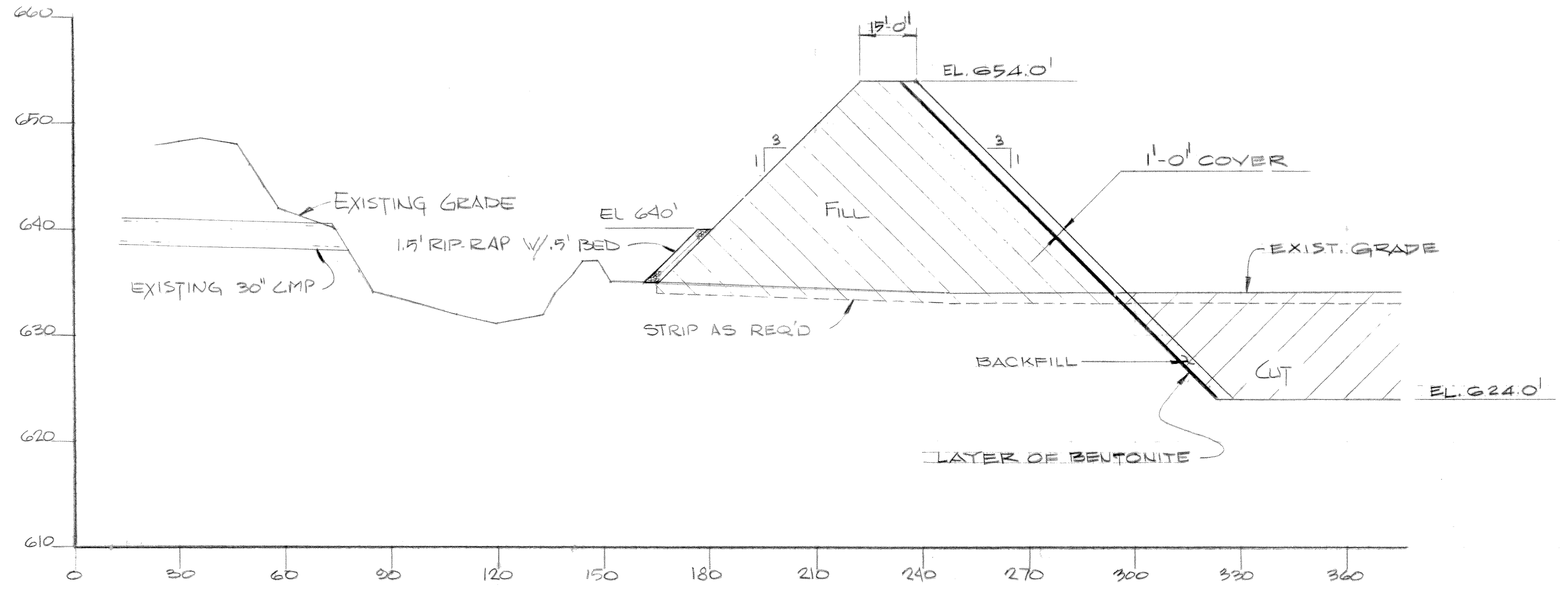

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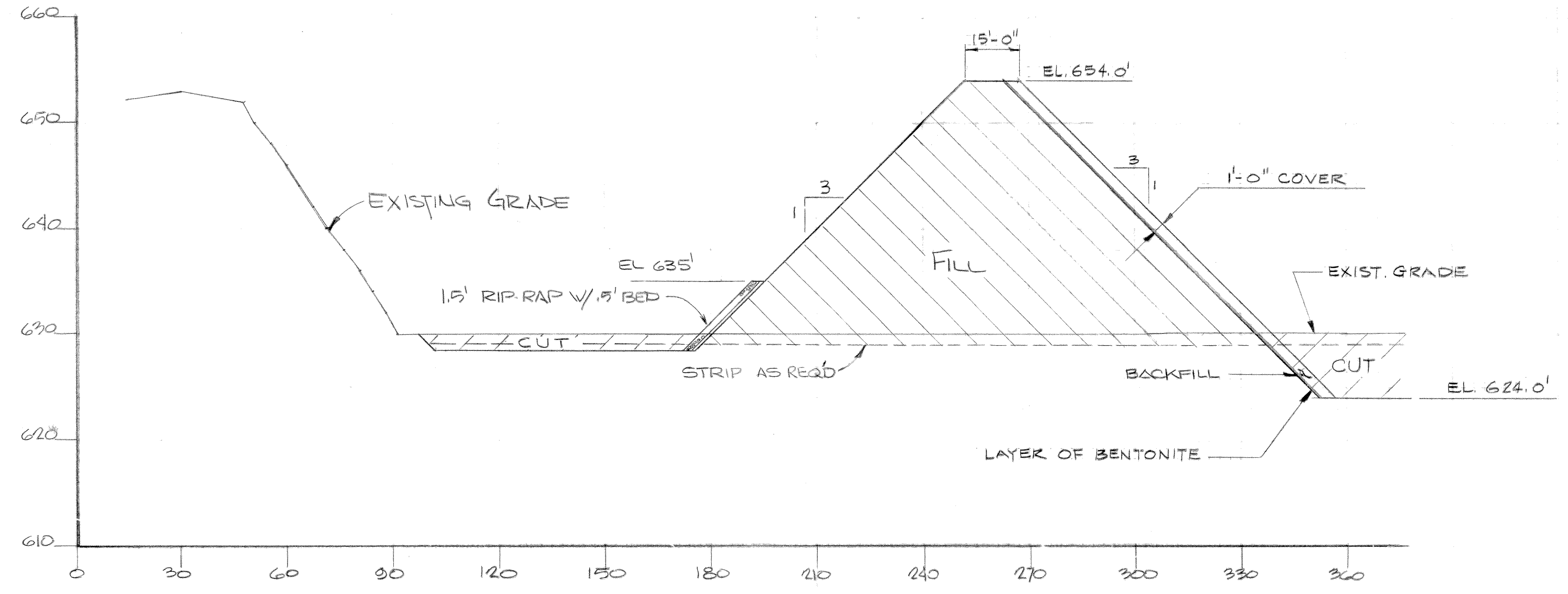

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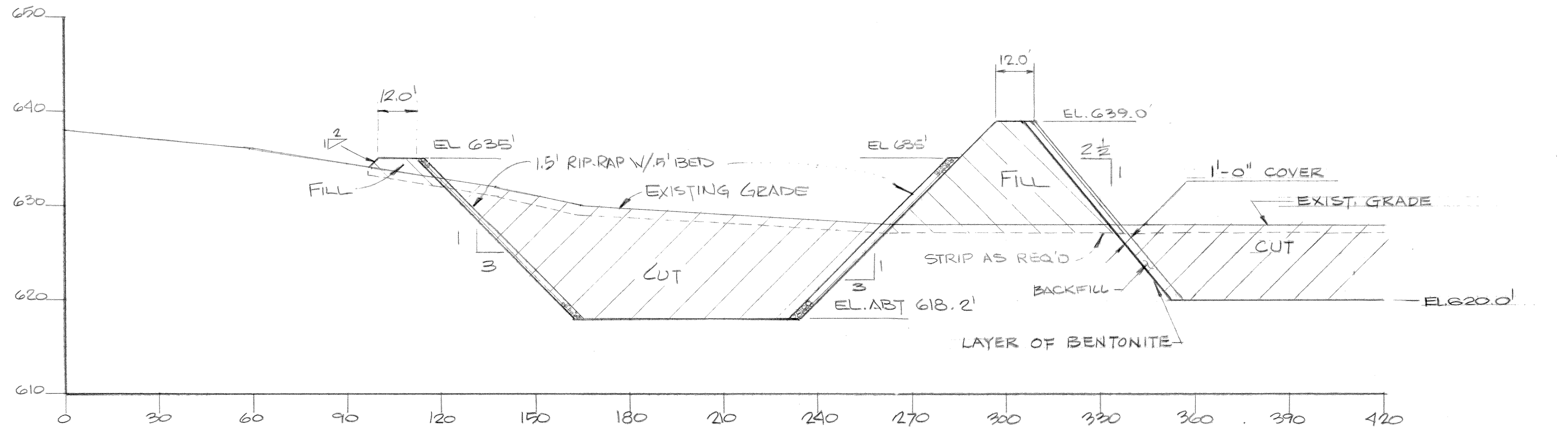

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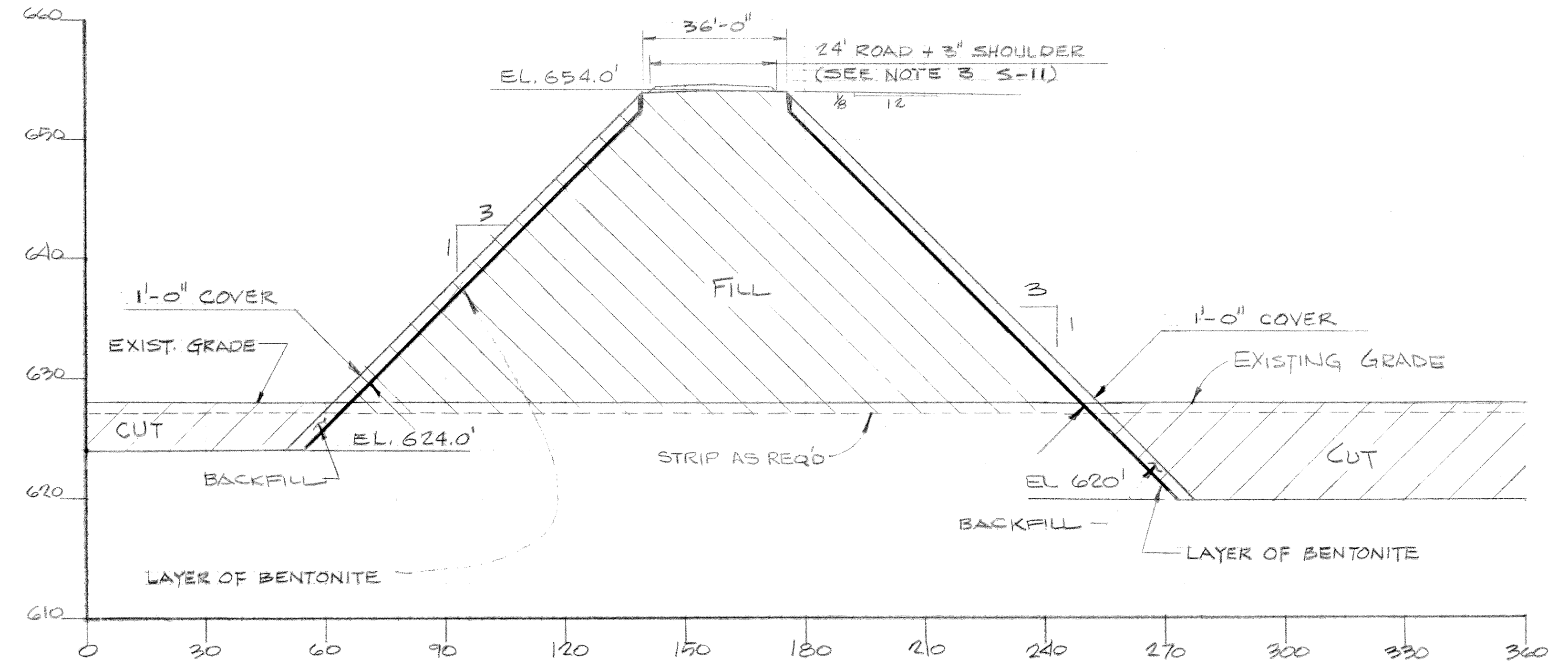
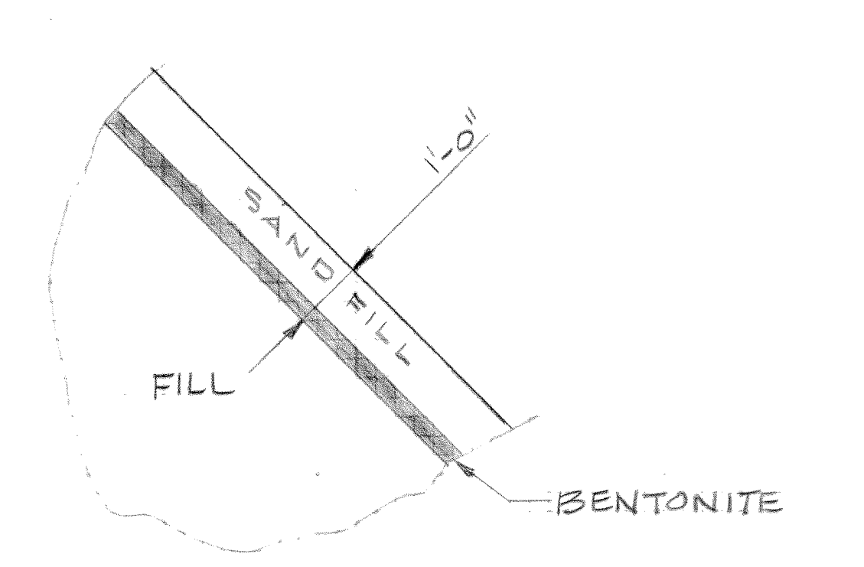
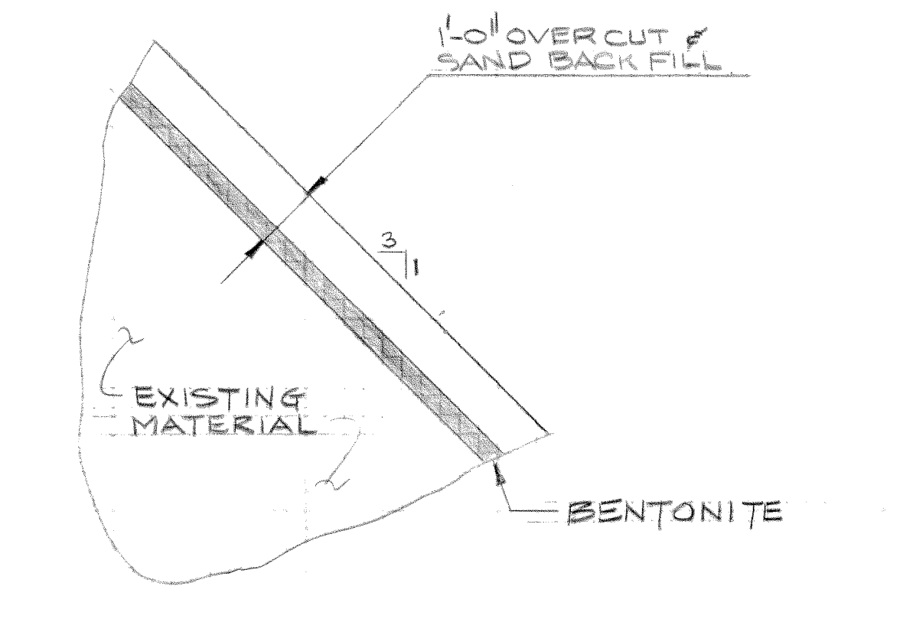


SECTION 11-11



TYPICAL NEW SLOPED DIKE SECTION



TYPICAL EXISTING SLOPED DIKE SECTION

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 RNBergh Date 6-5 1974

R. N. Be[illegible] Iowa Reg. No. 4460

Drawing Release Record

Rev.	Date	Init.	Description
	6-7-74	RCO	FOR CONST.
A	12-23-74		REV. ASH POND ELEV
B	2-3-75	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 RNBergh 6-5-74
JOB NO. 4644-65

SARGENT & LUNDY
ENGINEERS
CHICAGO

DRAWING NO.
S-14

APPENDIX B – 2015 Embankment and Foundation Soil Investigation

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

Structural Stability Assessment

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

BORING LOG

CLIENT: Hard Hat

COORDINATES: *N NOT SURVEYED*
E NOT SURVEYED

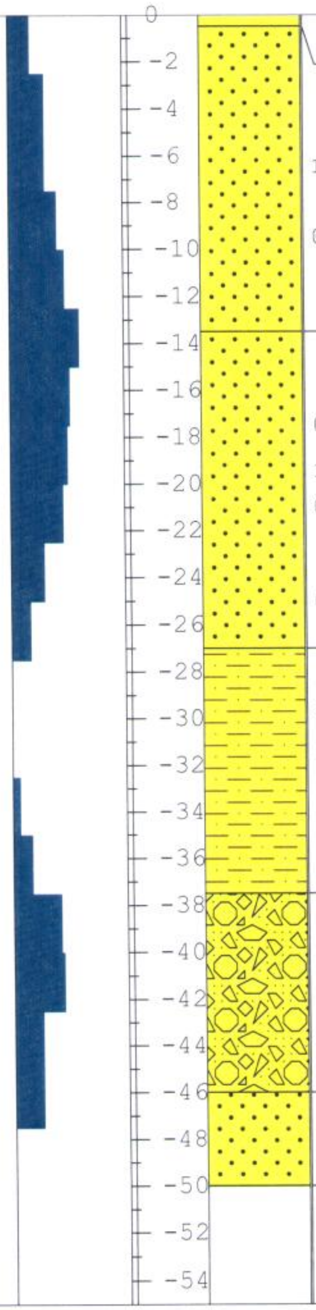
PROJECT: Lansing, IA

BORING NO.: *SB1*

page 1 of 1

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



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

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

BORING LOG

CLIENT: Hard Hat

PROJECT: Lansing, IA

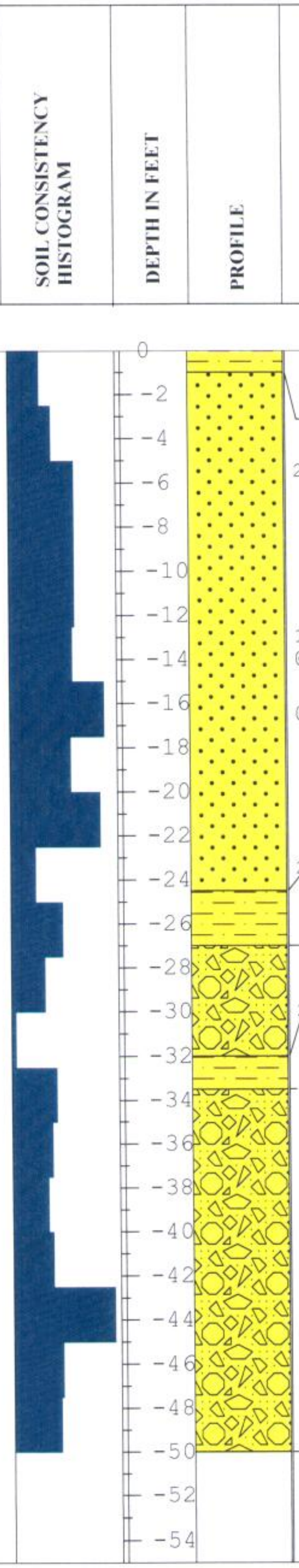
COORDINATES: *N NOT SURVEYED*
E NOT SURVEYED

BORING NO.: ***SB3***

page 1 of 1

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



DESCRIPTION

SILT; gray to black; non plastic; moist; some bottom ash

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

SILT; gray; non plastic to low plasticity; wet; some clay; trace organic plant matter

GRAVEL; gray; coarse to cobbles; poorly graded; wet; trace to some sand
27'-32' sample collected for geotech analysis

SILT; gray to black; non plastic; wet; trace to some clay and organic plant matter

GRAVEL; gray; coarse to cobbles; poorly graded; wet; trace to some sand

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

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

BORING LOG

CLIENT: Hard Hat

COORDINATES: *N NOT SURVEYED*
E NOT SURVEYED

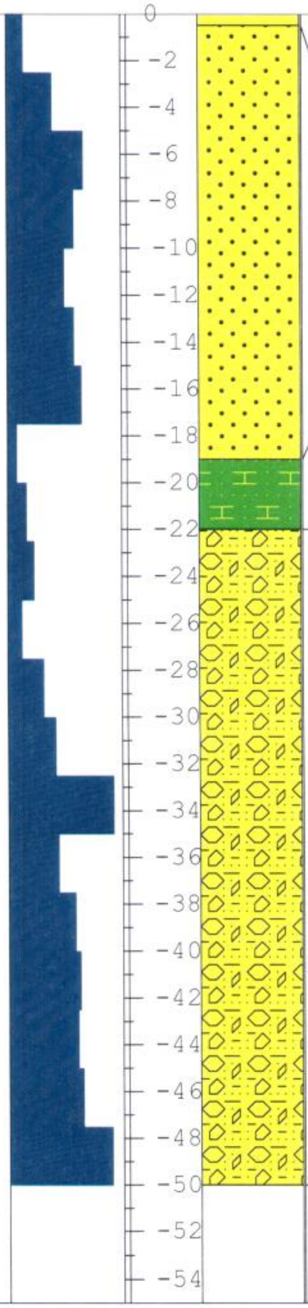
PROJECT: Lansing, IA

BORING NO.: ***SB5***

page 1 of 1

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



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

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

PROJECT: Lansing, IA

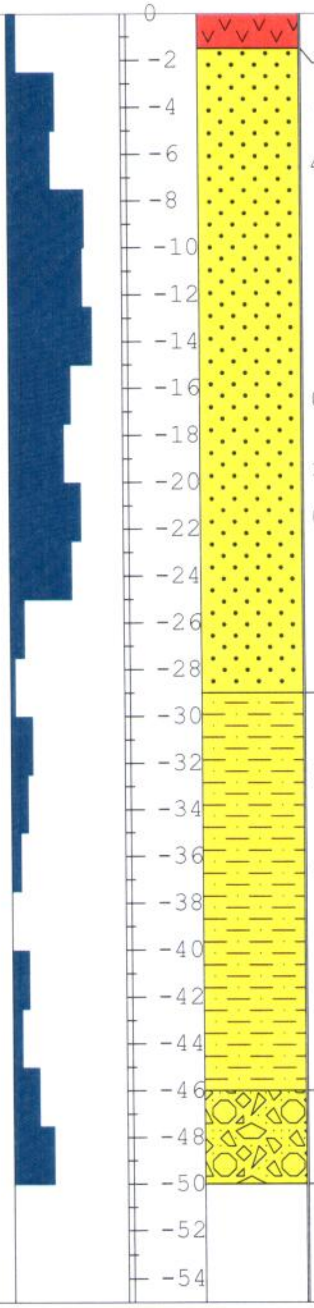
BORING NO.: *SB7*

page 1 of 1

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

SOIL CONSISTENCY HISTOGRAM / DEPTH IN FEET / PROFILE



DESCRIPTION

Bottom ASH; black; fine grained; poorly graded

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

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

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

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

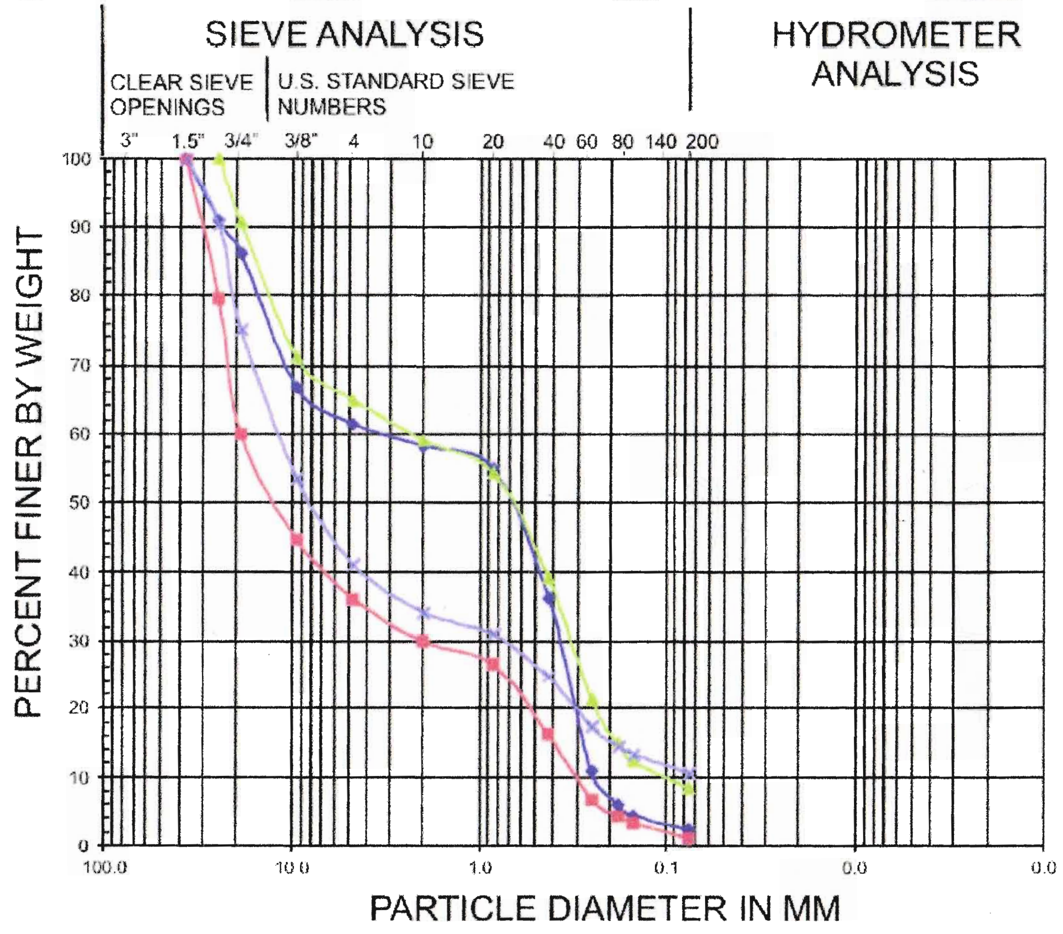
APPENDIX B

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"**



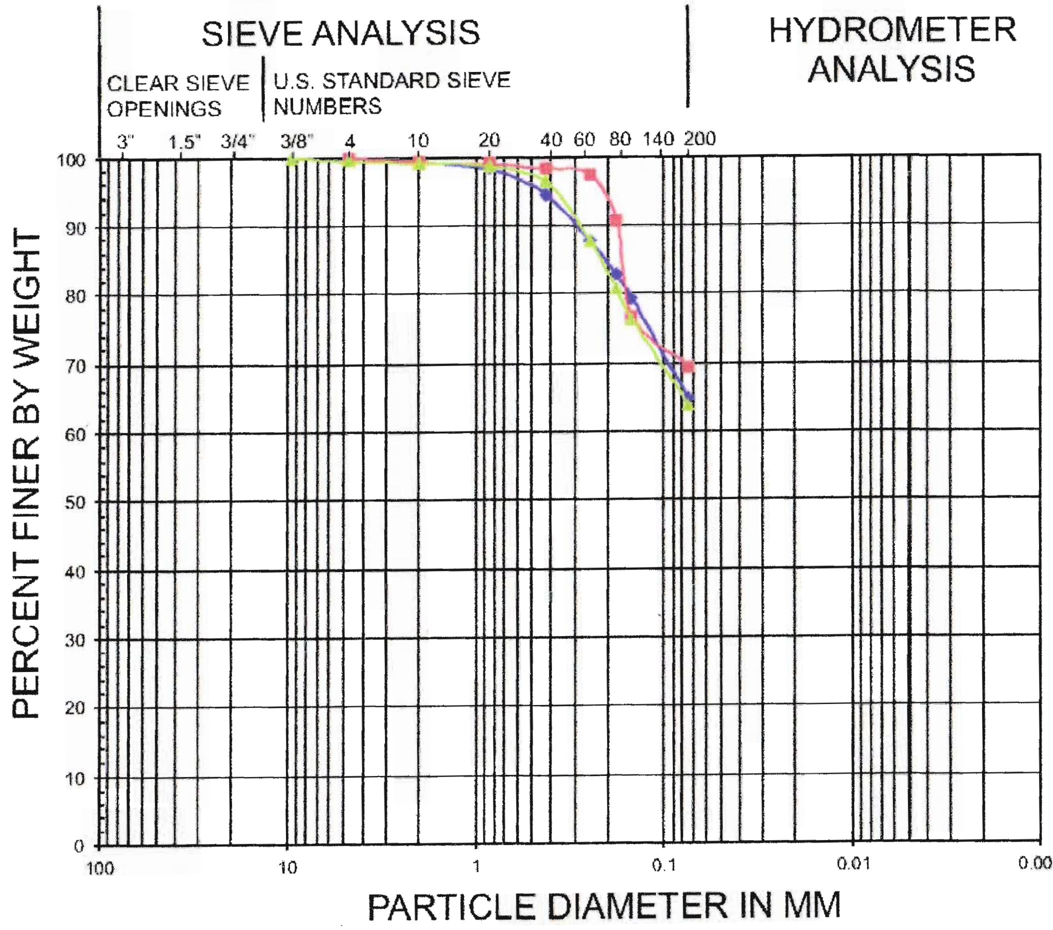
COBBLES	GRAVEL		SAND			SILT AND CLAY FRACTION
	coarse	fine	coarse	medium	fine	

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

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REV	DATE	BY	APP	DESCRIPTION
△				
△				
△				
△				
△	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

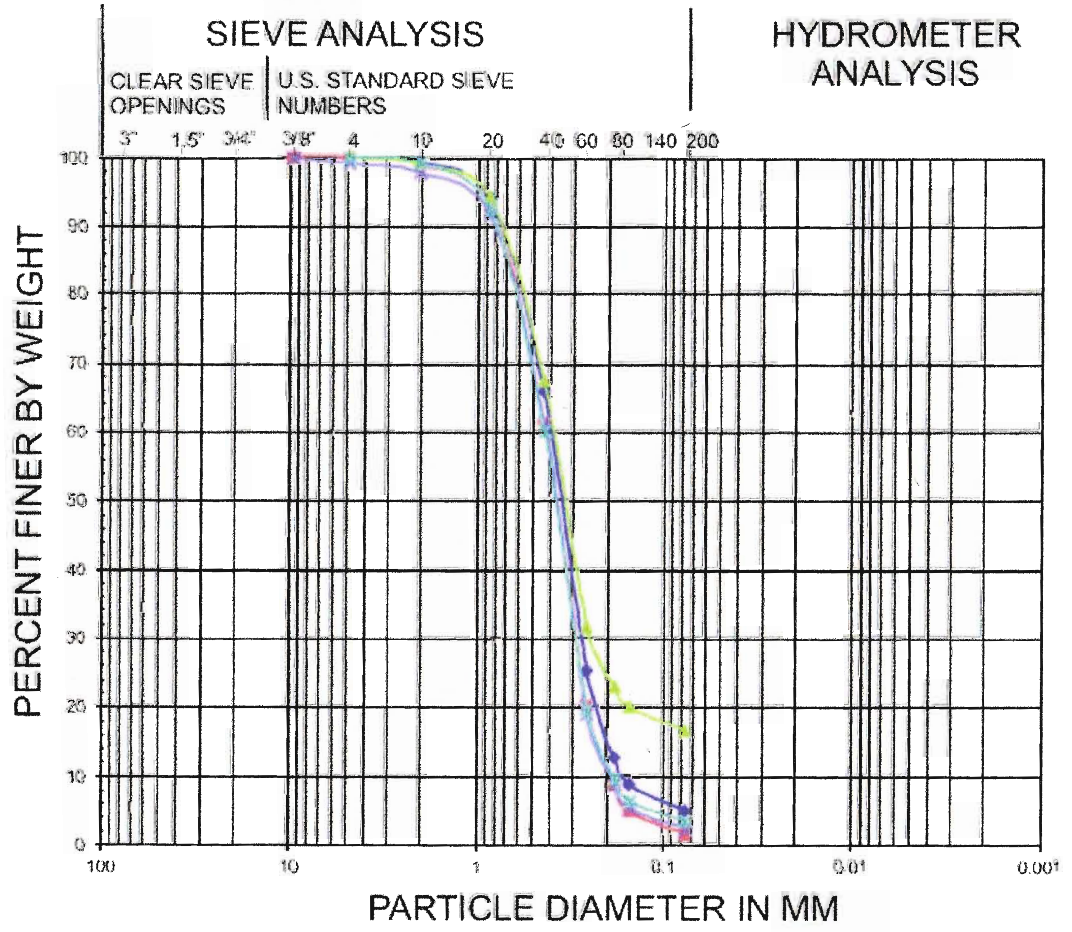
JOB 154.021.003
SHT. 8
DWG. 154021SW-08-12

APPENDIX B
UPDATE TO ADD SB-7
SEPARATE 8½x11

HARD HAT SERVICES
Engineering, Construction and Management Solutions

Particle Size Distribution

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



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

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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.

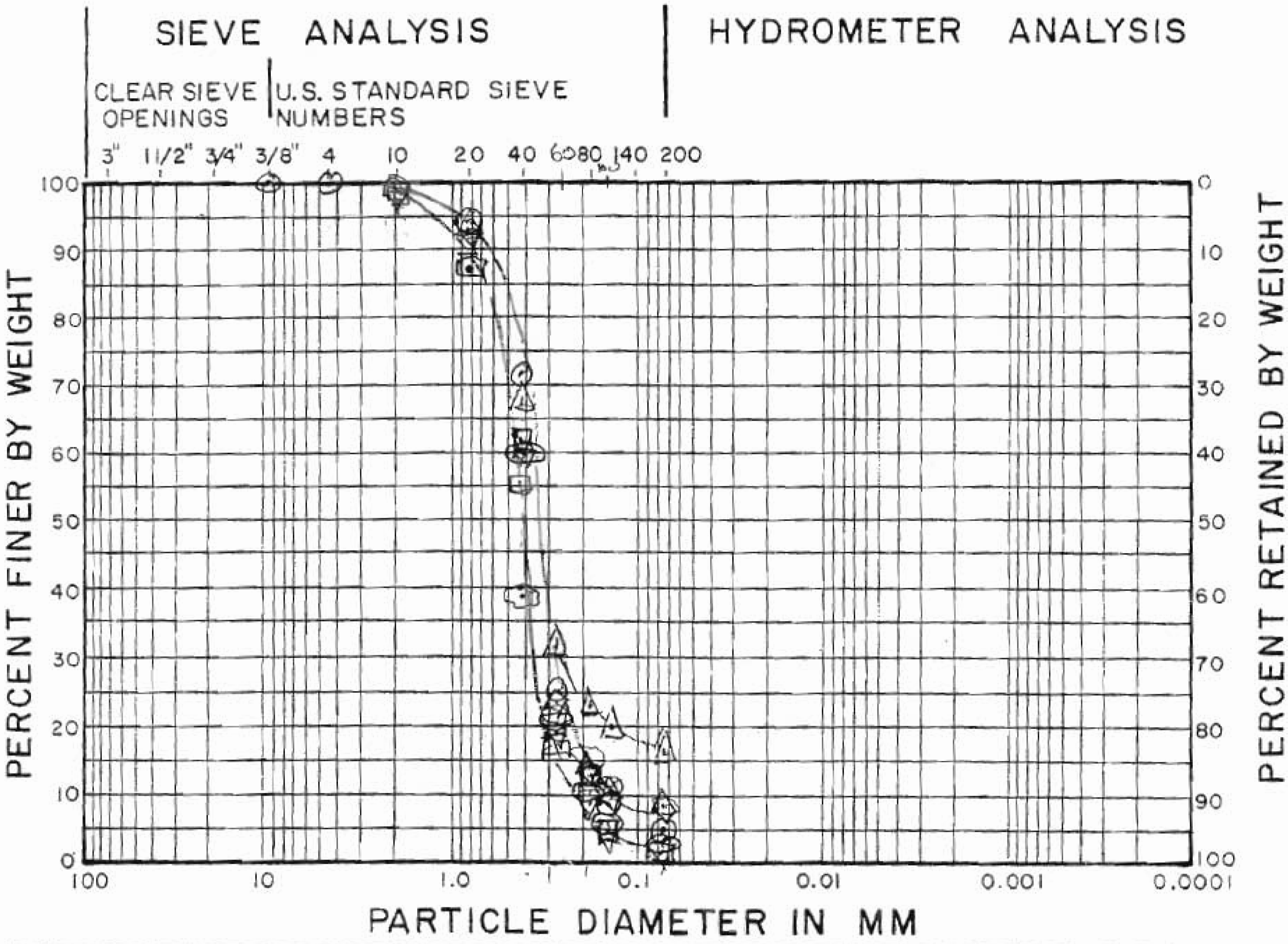
Particle Size Distribution

"UPPER SAND"

PROJECT ______________________ TESTED BY ______________ DATE ______________

PROJECT NO. ______________________ CALC BY ______________ DATE ______________

BORING NO. ______________________ CHKD BY ______________ DATE ______________



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

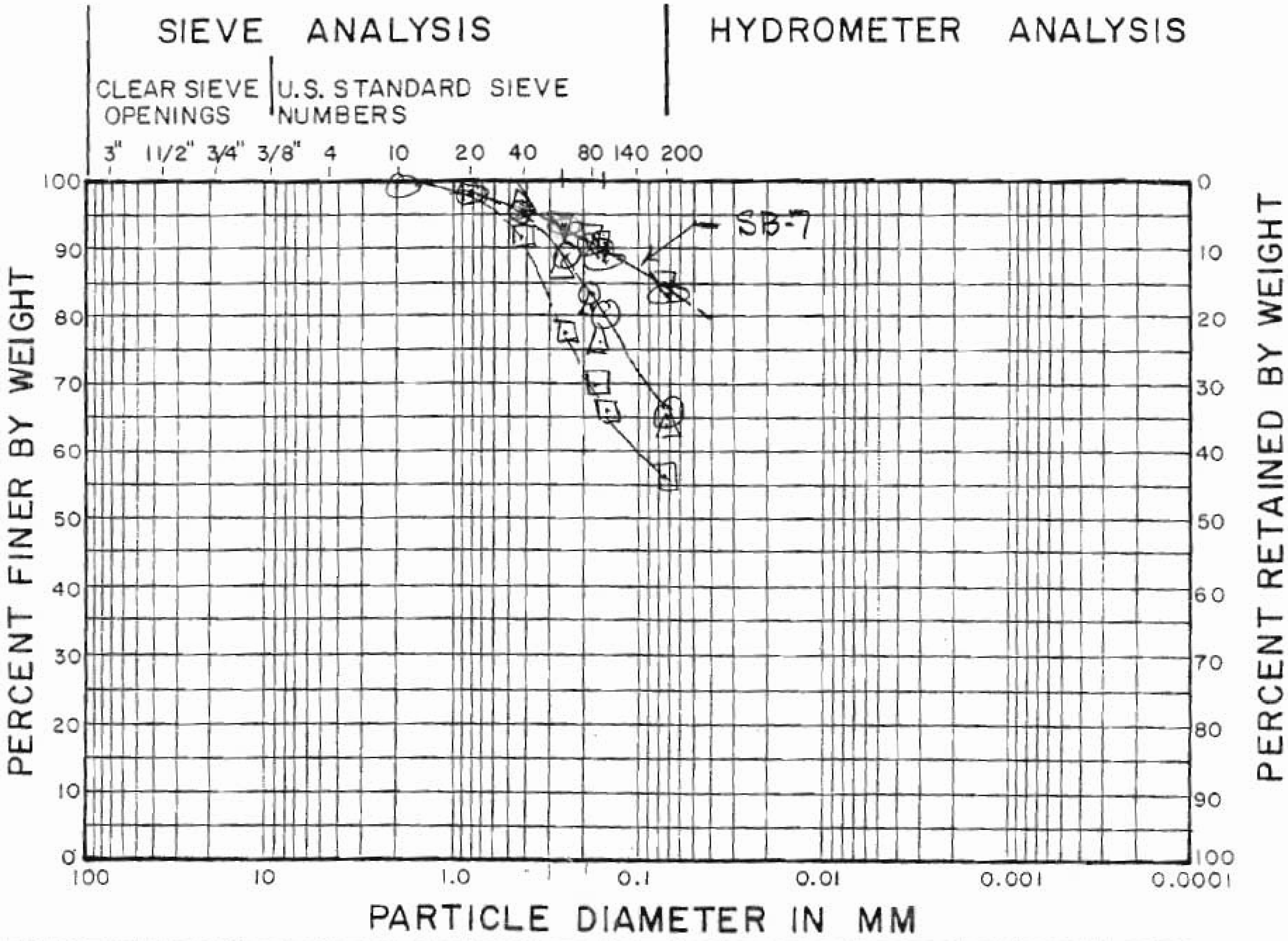
SYMBOL	BORING	SAMPLE	DEPTH	SOIL DESCRIPTION	U.S.C.S.	L.L.	P.L.	W%
⊙	SB-1		1-5	MED-FINE SAND	SP			4.1
⊡	SB-1		15-20	"	SP			20.1
△	SB-3		2-5	SILTY MED-FINE SAND	SM			3.1
▽	SB-3		13-20	MED-FINE SAND	SP			19.0
⬭	SB-5		10-16	"	SP			13.3
◇	SB-7		4-10	"	SP-SM			3.1
▭	SB-7		19-25	"	SP			17.1

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	

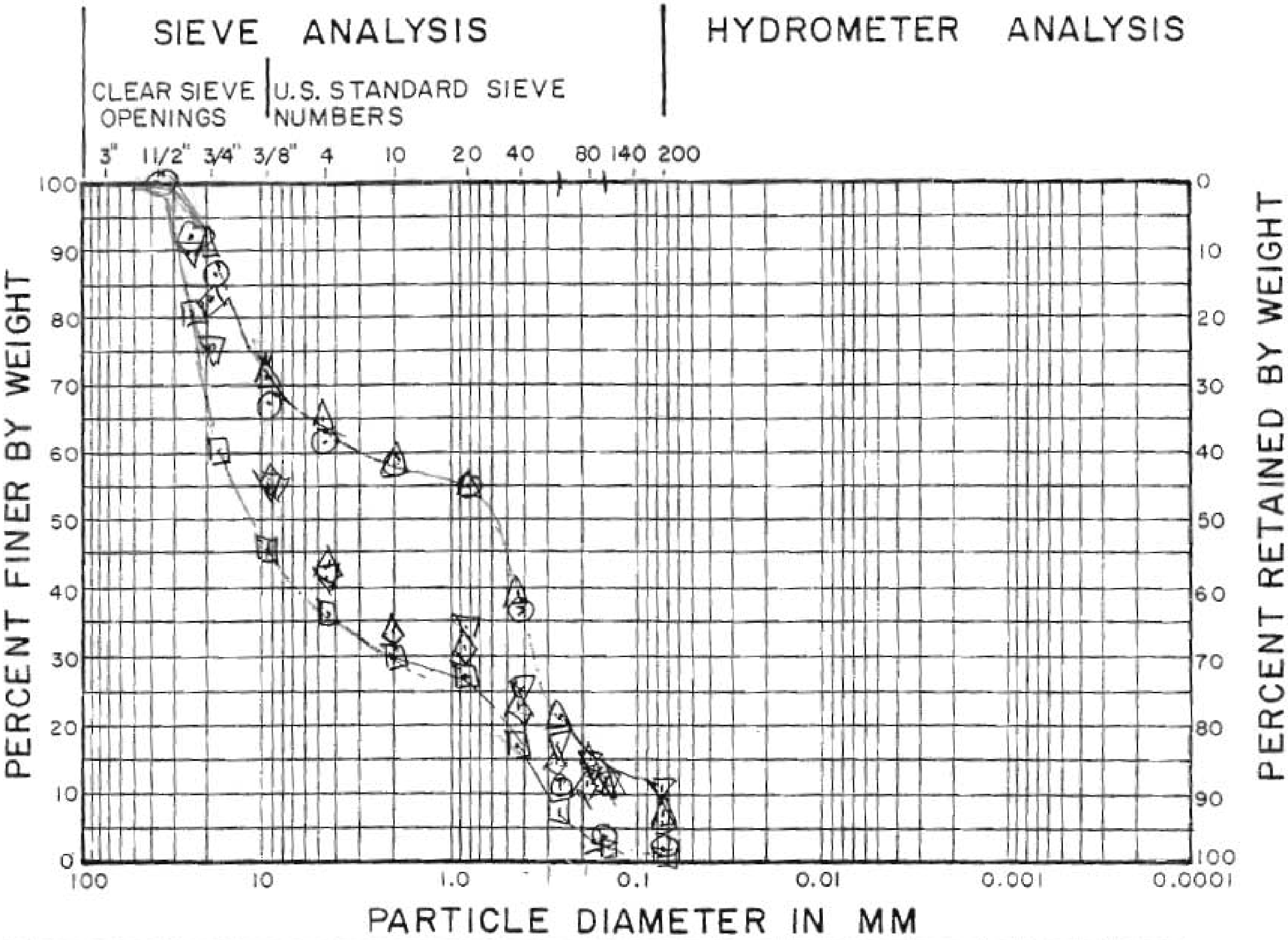
SYMBOL	BORING	SAMPLE	DEPTH	SOIL DESCRIPTION	U.S.C.S.	L.L.	P.L.	W%
⊙	SB-1		28-32	SANDY SILT	ML	28	26	36.1
□	SB-3		24.5-27	SANDY SILT	ML	27	23	23.4
△	SB-5		18.5-20	SANDY SILT	ML	24	20	21.8
▽	SB-7		29-32.5	SANDY SILT	ML	29	25	27.0
⊙	SB-7		36-40	SANDY SILT	ML	31	26	35.7

HE&C
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

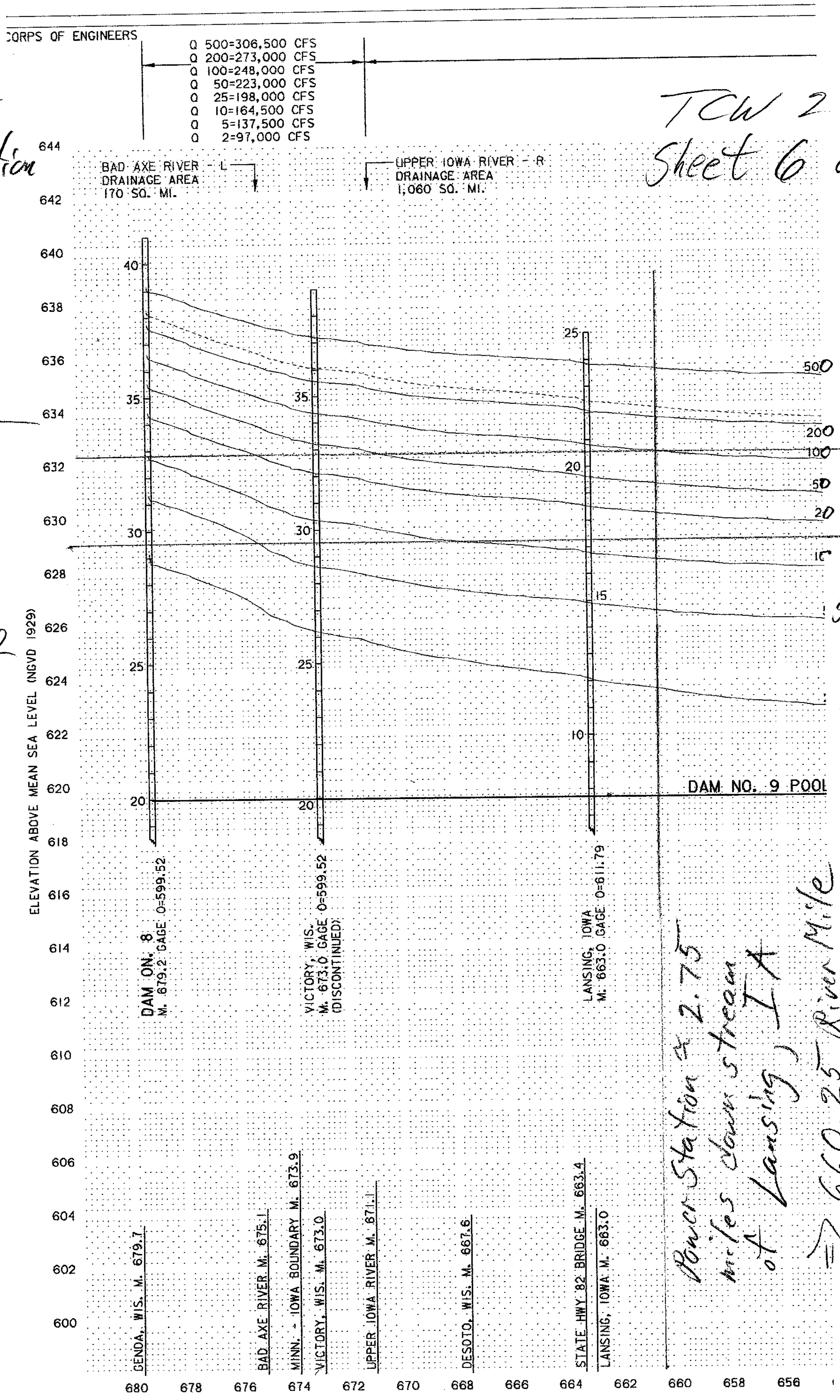
APPENDIX C – Flood Elevations for Mississippi River Pool #9

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

5 year

2 year

619.5'
(1929)

Power Station ≈ 2.75
miles down stream
of Lansing, IA

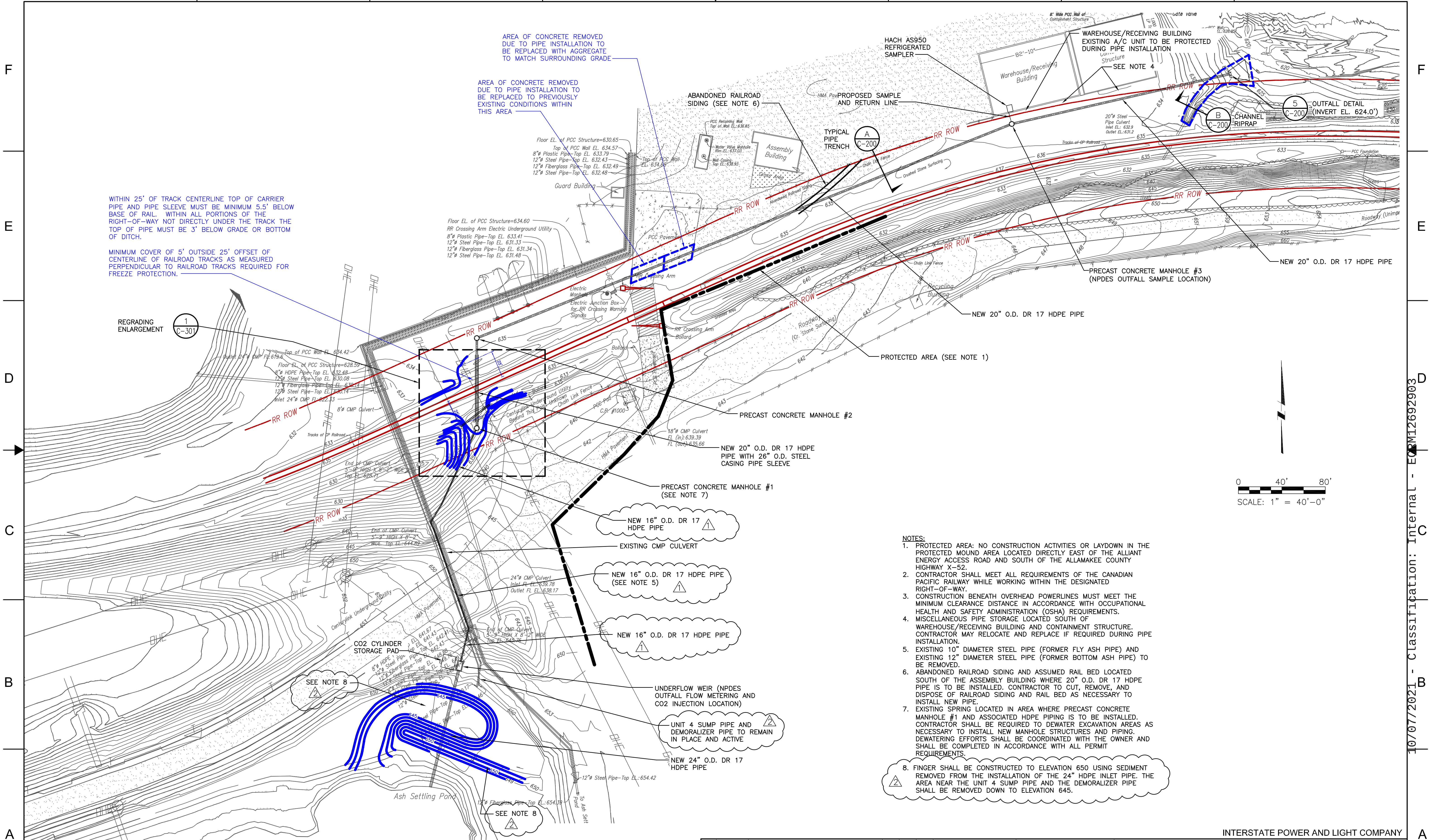
⇒ 660.25 River Mile

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. PROTECTED AREA: NO CONSTRUCTION ACTIVITIES OR LAYDOWN IN THE PROTECTED MOUND AREA LOCATED DIRECTLY EAST OF THE ALLIANT ENERGY ACCESS ROAD AND SOUTH OF THE ALLAMAKEE COUNTY HIGHWAY X–52.
2. CONTRACTOR SHALL MEET ALL REQUIREMENTS OF THE CANADIAN PACIFIC RAILWAY WHILE WORKING WITHIN THE DESIGNATED RIGHT–OF–WAY.
3. CONSTRUCTION BENEATH OVERHEAD POWERLINES MUST MEET THE MINIMUM CLEARANCE DISTANCE IN ACCORDANCE WITH OCCUPATIONAL HEALTH AND SAFETY ADMINISTRATION (OSHA) REQUIREMENTS.
4. MISCELLANEOUS PIPE STORAGE LOCATED SOUTH OF WAREHOUSE/RECEIVING BUILDING AND CONTAINMENT STRUCTURE. CONTRACTOR MAY RELOCATE AND REPLACE IF REQUIRED DURING PIPE INSTALLATION.
5. EXISTING 10" DIAMETER STEEL PIPE (FORMER FLY ASH PIPE) AND EXISTING 12" DIAMETER STEEL PIPE (FORMER BOTTOM ASH PIPE) TO BE REMOVED.
6. ABANDONED RAILROAD SIDING AND ASSUMED RAIL BED LOCATED SOUTH OF THE ASSEMBLY BUILDING WHERE 20" O.D. DR 17 HDPE PIPE IS TO BE INSTALLED. CONTRACTOR TO CUT, REMOVE, AND DISPOSE OF RAILROAD SIDING AND RAIL BED AS NECESSARY TO INSTALL NEW PIPE.
7. EXISTING SPRING LOCATED IN AREA WHERE PRECAST CONCRETE MANHOLE #1 AND ASSOCIATED HDPE PIPING IS TO BE INSTALLED. CONTRACTOR SHALL BE REQUIRED TO DEWATER EXCAVATION AREAS AS NECESSARY TO INSTALL NEW MANHOLE STRUCTURES AND PIPING. DEWATERING EFFORTS SHALL BE COORDINATED WITH THE OWNER AND SHALL BE COMPLETED IN ACCORDANCE WITH ALL PERMIT REQUIREMENTS.
8. FINGER SHALL BE CONSTRUCTED TO ELEVATION 650 USING SEDIMENT REMOVED FROM THE INSTALLATION OF THE 24" HDPE INLET PIPE. THE AREA NEAR THE UNIT 4 SUMP PIPE AND THE DEMORALIZER PIPE SHALL BE REMOVED DOWN TO ELEVATION 645. 2

INTERSTATE POWER AND LIGHT COMPANY

NO.	DATE	REVISION	BY	CHK'D	APV'D
·	·	·	·	·	·
·	·	·	·	·	·
·	·	·	·	·	·
2	10-15-20	CLIENT COMMENTS	JFD	MWL	RAS
1	10-2-20	ADD LOW VOLUME WASTE WATER FLOWS	JFD	MWL	RAS
0	10-15-18	ISSUED FOR CONSTRUCTION	JFD	CTS	MWL

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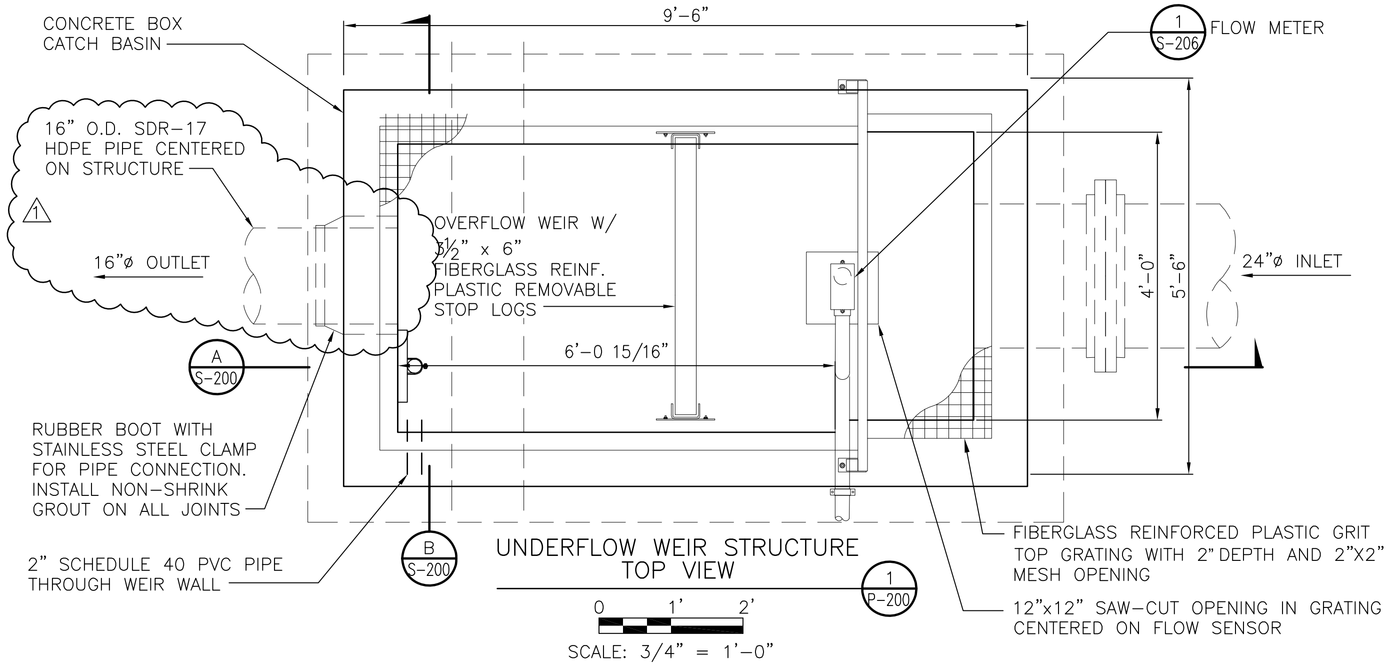
Alliant Energy

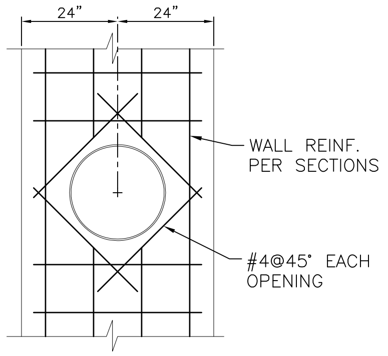
LANSING GENERATING STATION
Unit 0
UPPER ASH POND OUTFALL REROUTE
CIVIL SITE GRADING
Scale: AS SHOWN
DWG. NO.
C-300



UNDERFLOW WEIR STRUCTURE TOP VIEW

1 P-200

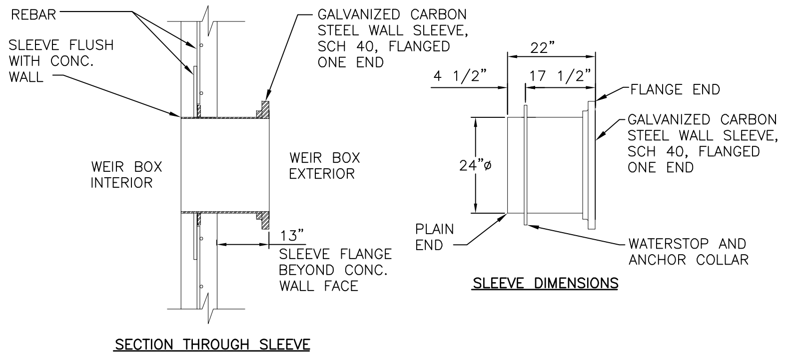
SCALE: 3/4" = 1'-0"



TYPICAL REINF. AT OPENINGS

2 S-200

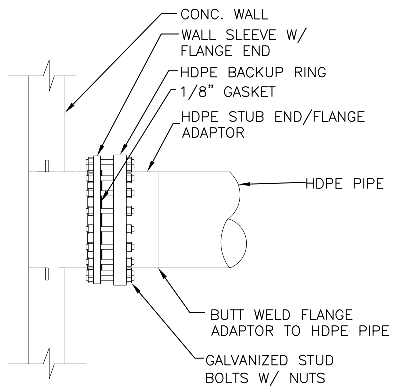
N.T.S.



24"ø WALL SLEEVE

3 S-200

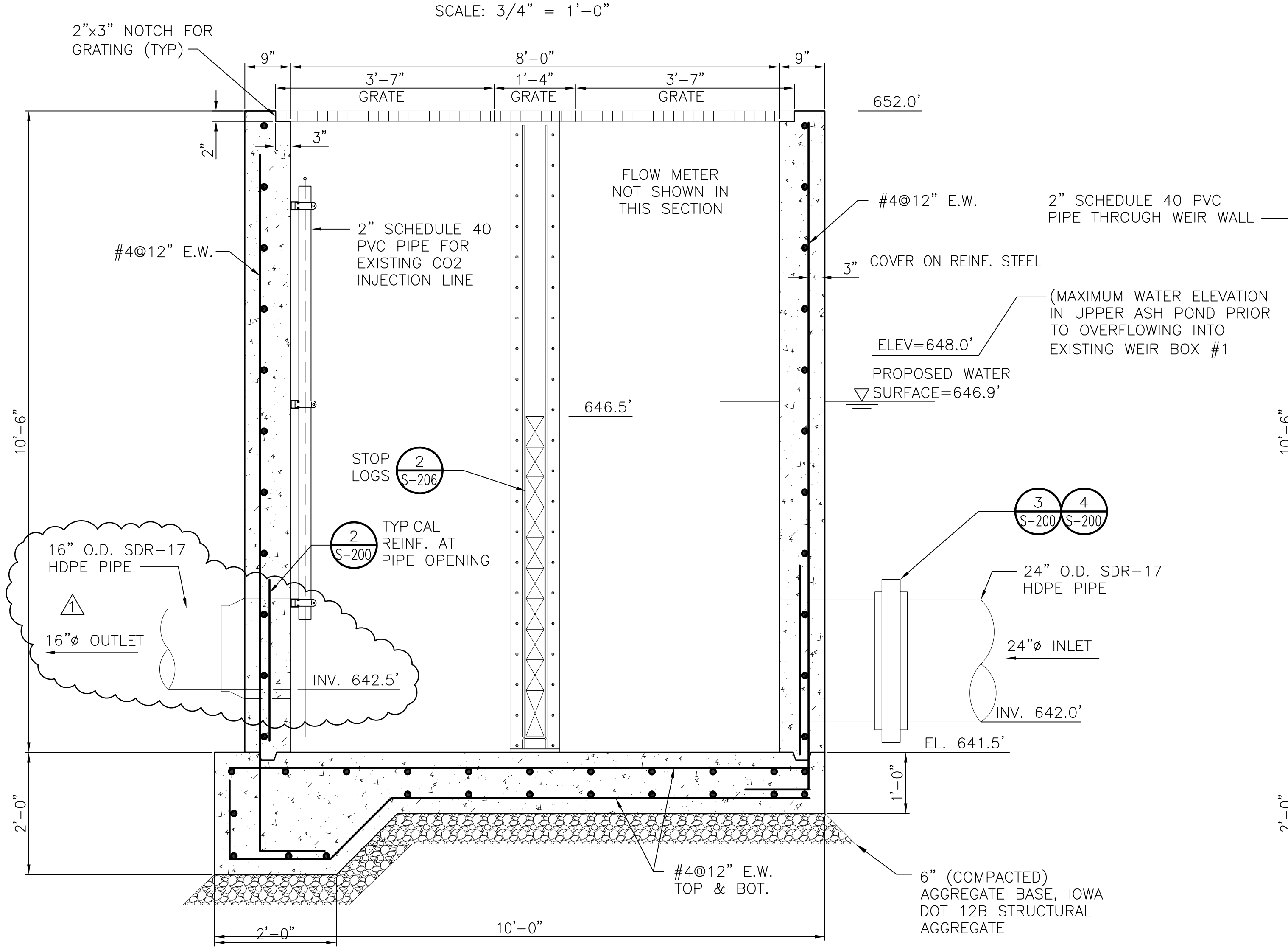
N.T.S.



FLANGE CONNECTION TO WALL SLEEVE

4 S-200

N.T.S.

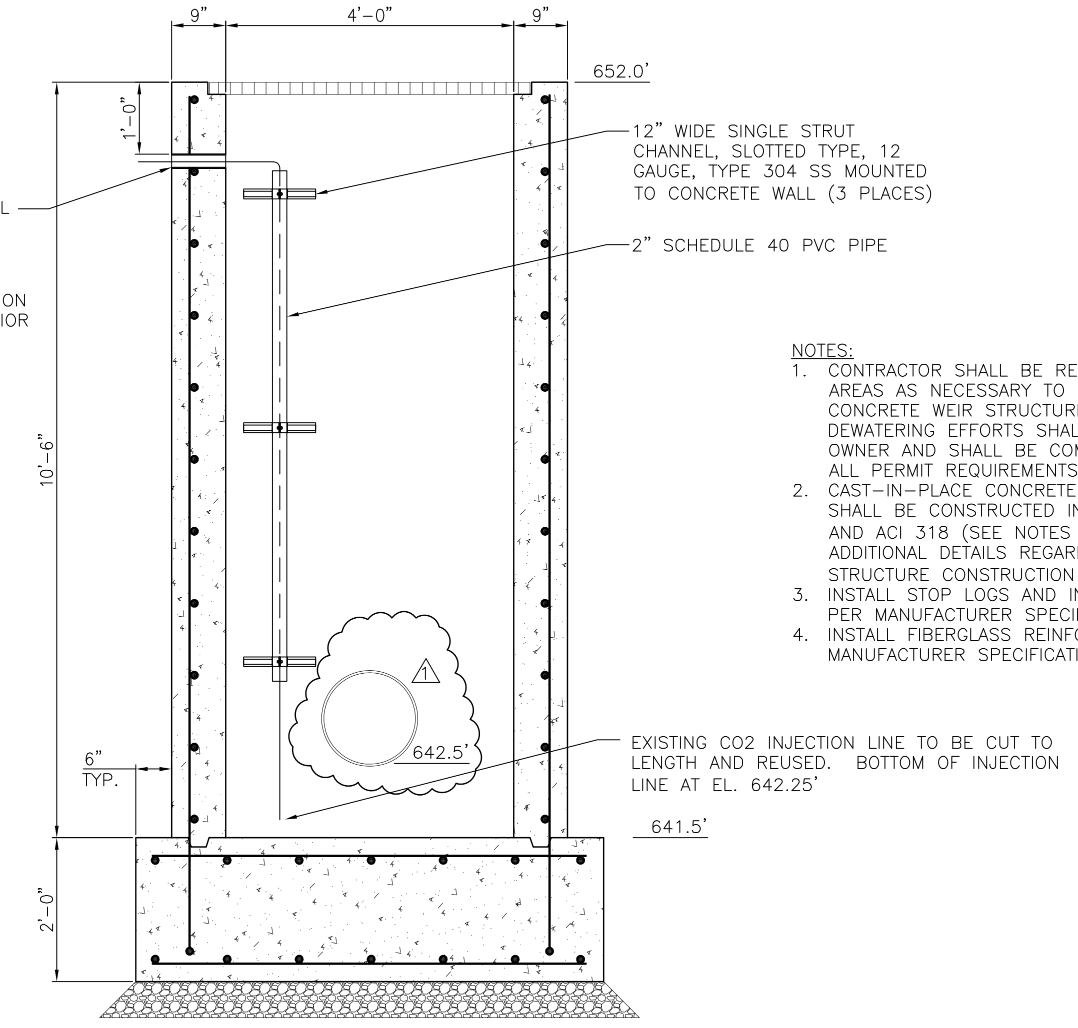


SECTION

A S-200

N.T.S.

2" SCHEDULE 40 PVC PIPE THROUGH WEIR WALL



SECTION

B S-200

N.T.S.

NOTES:

1. CONTRACTOR SHALL BE REQUIRED TO DEWATER EXCAVATION AREAS AS NECESSARY TO INSTALL NEW CAST-IN-PLACE CONCRETE WEIR STRUCTURE AND ASSOCIATED HDPE PIPING. DEWATERING EFFORTS SHALL BE COORDINATED WITH THE OWNER AND SHALL BE COMPLETED IN ACCORDANCE WITH ALL PERMIT REQUIREMENTS.
2. CAST-IN-PLACE CONCRETE UNDERFLOW WEIR STRUCTURE SHALL BE CONSTRUCTED IN ACCORDANCE WITH ACI 301 AND ACI 318 (SEE NOTES AND SPECIFICATIONS FOR ADDITIONAL DETAILS REGARDING CAST-IN-PLACE CONCRETE STRUCTURE CONSTRUCTION AND INSTALLATION).
3. INSTALL STOP LOGS AND IN-CHANNEL MOUNT GUIDE FRAME PER MANUFACTURER SPECIFICATIONS.
4. INSTALL FIBERGLASS REINFORCED PLASTIC GRATING PER MANUFACTURER SPECIFICATIONS.

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1	10-2-20	ADD LOW VOLUME WASTE WATER FLOWS	JFD	MWL	RAS
0	10-15-18	ISSUED FOR CONSTRUCTION	JFD	CTS	MWL
NO.	DATE	REVISION	BY	CHK'D	APV'D

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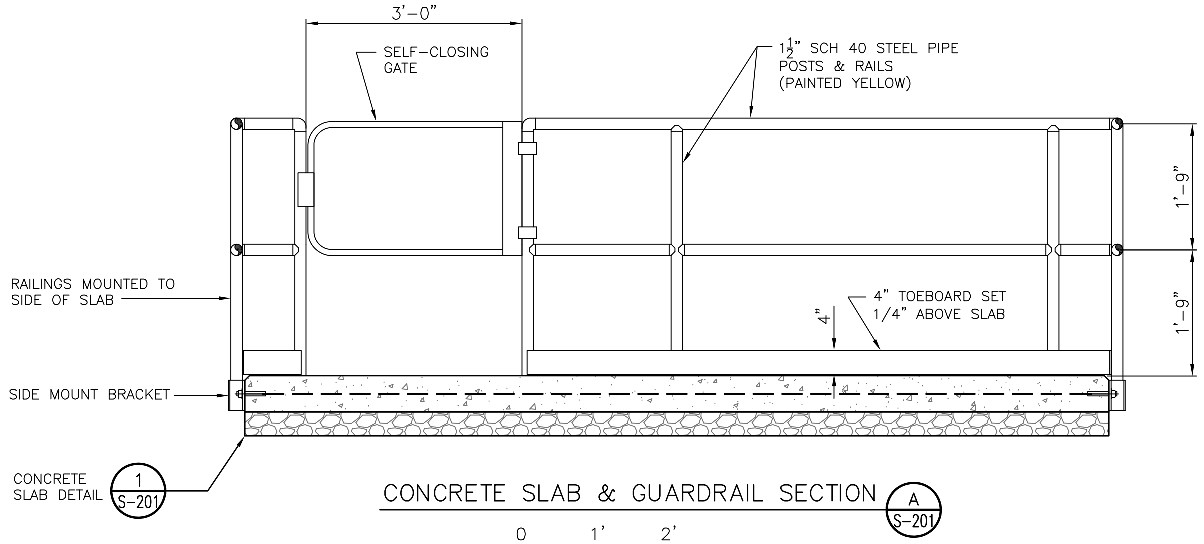
Alliant Energy

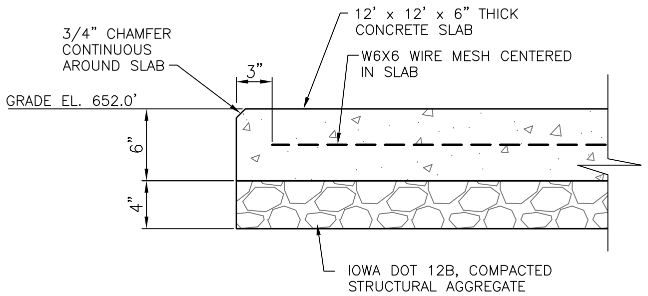
INTERSTATE POWER AND LIGHT COMPANY
LANSING GENERATING STATION
Unit 0
UPPER ASH POND OUTFALL REROUTE
CONCRETE PLAN AND DETAILS
UNDERFLOW WEIR
Scale: AS SHOWN
DWG NO.
S-200



CONCRETE SLAB & GUARDRAIL SECTION A S-201

0 1' 2'

SCALE: 3/4" = 1'-0"



CONCRETE SLAB DETAIL 1 S-201

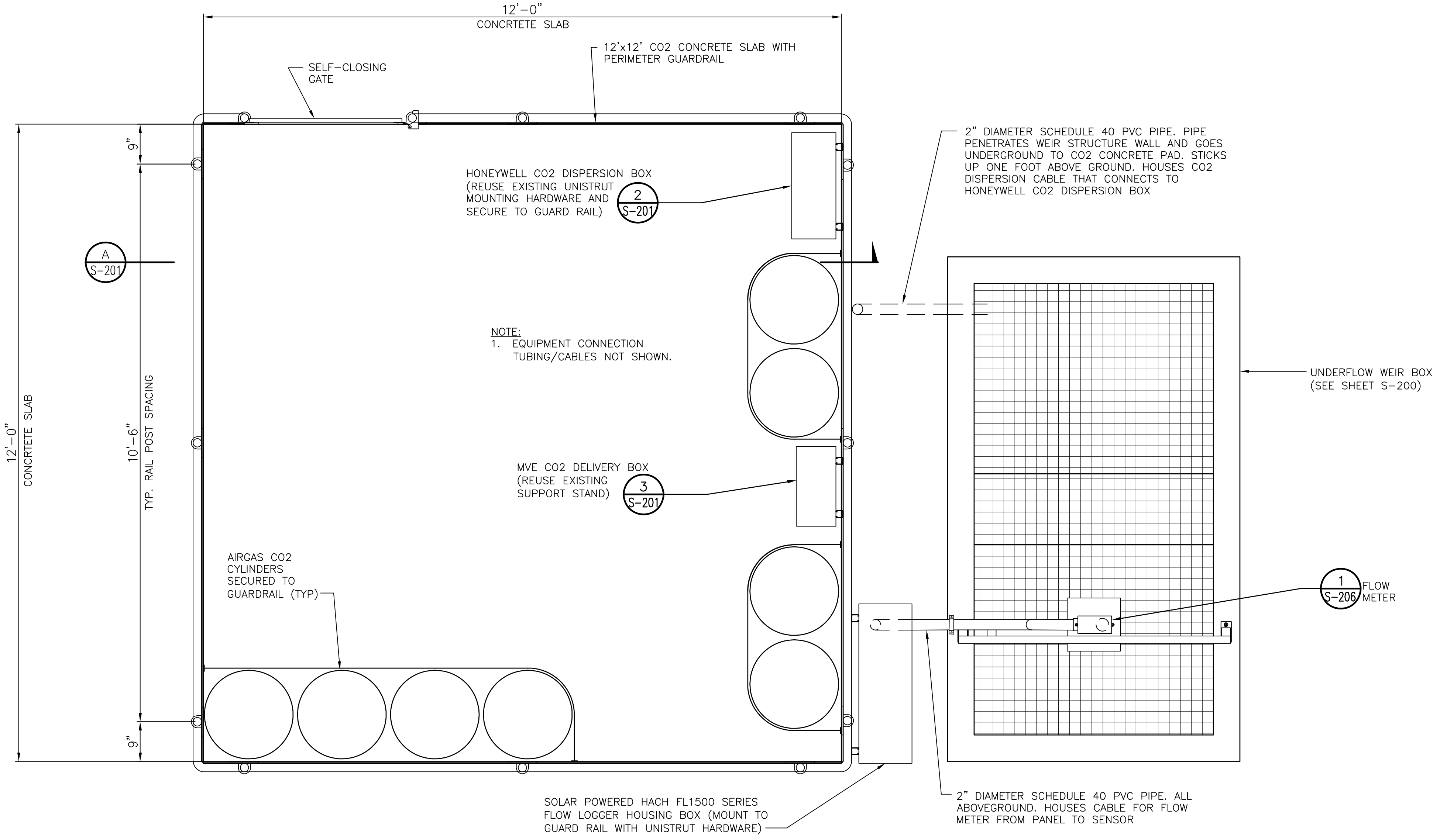
N.T.S.

HONEYWELL CO2 DISPERSION BOX 2 S-201

N.T.S.

MVE CO2 DELIVERY BOX 3 S-201

N.T.S.



PLAN VIEW

0 1' 2'

SCALE: 3/4" = 1'-0"

INTERSTATE POWER AND LIGHT COMPANY

NO.	DATE	REVISION	BY	CHK'D	APV'D
·	·	·	·	·	·
·	·	·	·	·	·
·	·	·	·	·	·
·	·	·	·	·	·
·	·	·	·	·	·
0	10-15-18	ISSUED FOR CONSTRUCTION	JFD	CTS	MWL

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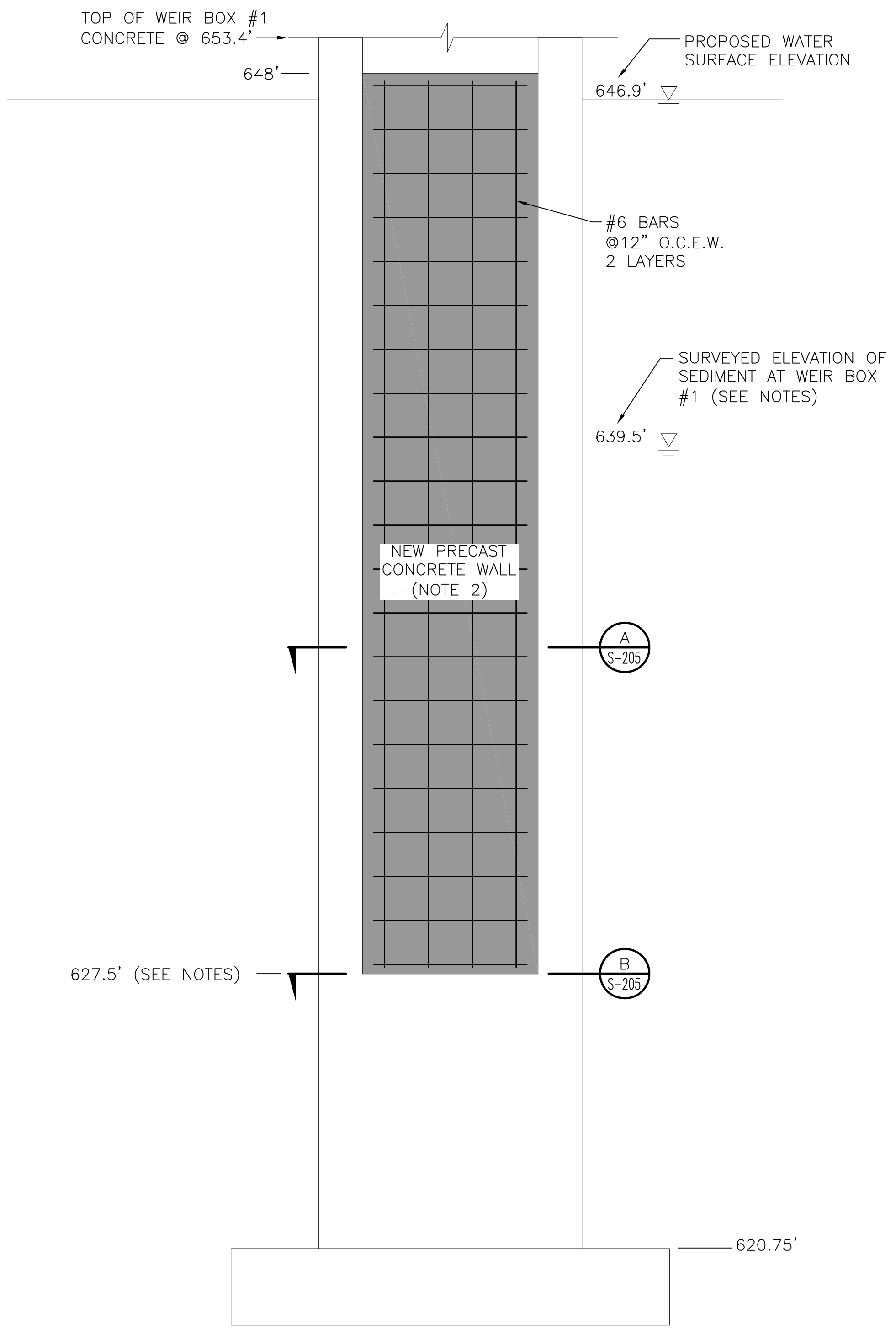
Alliant Energy

LANSING GENERATING STATION Unit 0

UPPER ASH POND OUTFALL REROUTE
CONCRETE PLAN AND DETAILS
CO2 CYLINDER PAD

Scale: AS SHOWN

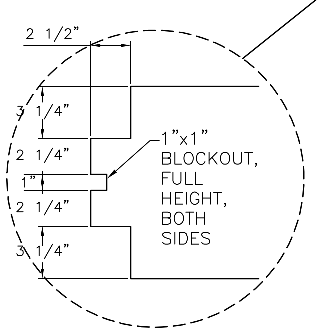
DWG. NO. S-201



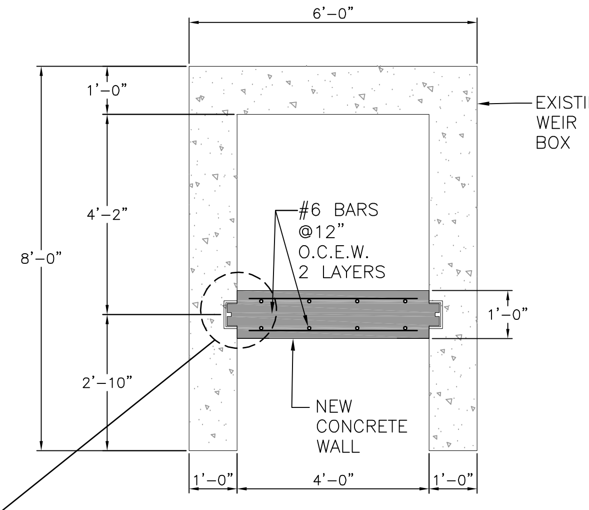
PRECAST CONCRETE WALL ADDITIONS
WEIR BOX #1

6
P-200

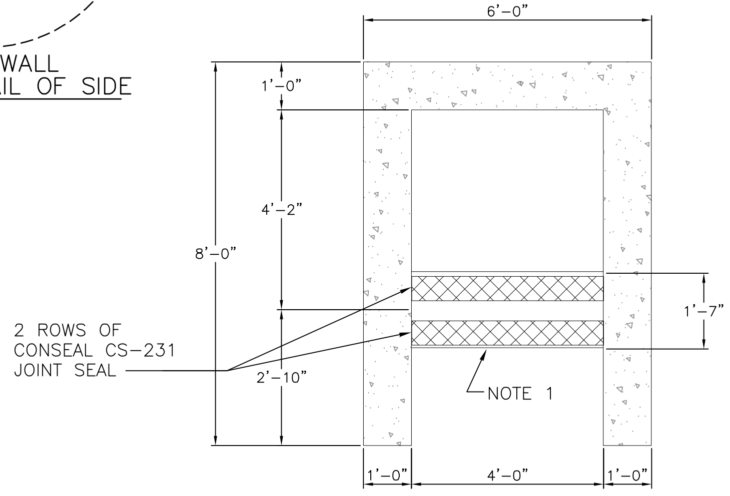
0 2' 4'
SCALE: 1/2" = 1'-0"



PRECAST WALL
ENLARGED DETAIL OF SIDE



SECTION A
S-205
0 2' 4'
SCALE: 1/2" = 1'-0"



SECTION B
S-205
0 2' 4'
SCALE: 1/2" = 1'-0"

NOTES:

1. ANY LOOSE CONCRETE TO BE REMOVED BY CHIPPING.
2. INSIDE OF WEIR BOXES TO BE POWER WASHED PRIOR TO INSTALLATION OF NEW PRECAST CONCRETE WALL.
3. DEWATER LAN UPPER ASH POND TO ELEVATION NECESSARY IN ORDER TO INSTALL NEW PRECAST CONCRETE WALL. DEWATERING EFFORTS SHALL BE COORDINATED WITH THE OWNER AND SHALL BE COMPLETED IN ACCORDANCE WITH ALL PERMIT REQUIREMENTS.
4. PUREFOAM SEAL TO BE TREMMIED FROM BOTTOM TO TOP INTO KEYWAY JOINT JOINING PRECAST CONCRETE WALL EDGES TO WEIR BOX TO FORM A WATER TIGHT SEAL.
5. EXISTING HACH SC200 FLOW METER INSTRUMENTATION TO REMAIN AND BE REPROGRAMED FOR NEW PRECAST CONCRETE WALL AT WEIR BOX #1.
6. BASED ON 2018 SURVEY BY HARD HAT SERVICES, SURVEYED TOP OF SEDIMENT ELEVATION ADJACENT TO WEIR BOX #1 STOP LOGS APPROXIMATELY 639.5'. THUS, REMOVAL OF SEDIMENT IN FRONT OF WEIR BOX #1 STRUCTURE PRIOR TO INSTALLATION OF NEW CONCRETE WALL WILL BE REQUIRED.
7. CONTRACTOR SHALL FIELD VERIFY DIMENSIONS/ELEVATIONS OF EXISTING WEIR BOX #1 WHERE NEW PRECAST CONCRETE WALL TO BE INSTALLED.
8. WEIR BOX #1 EXISTING STOP LOGS, AS WELL AS STEEL LIFTING BEAM (AND STEEL COLUMNS) AT END OF CAT WALK USED TO REMOVE EXISTING STOP LOGS, SHALL BE REMOVED AND PROPERLY DISPOSED OF BY THE CONTRACTOR.

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0	10-15-18	ISSUED FOR CONSTRUCTION	JFD	CTS	MWL
NO.	DATE	REVISION	BY	CHK'D	APV'D

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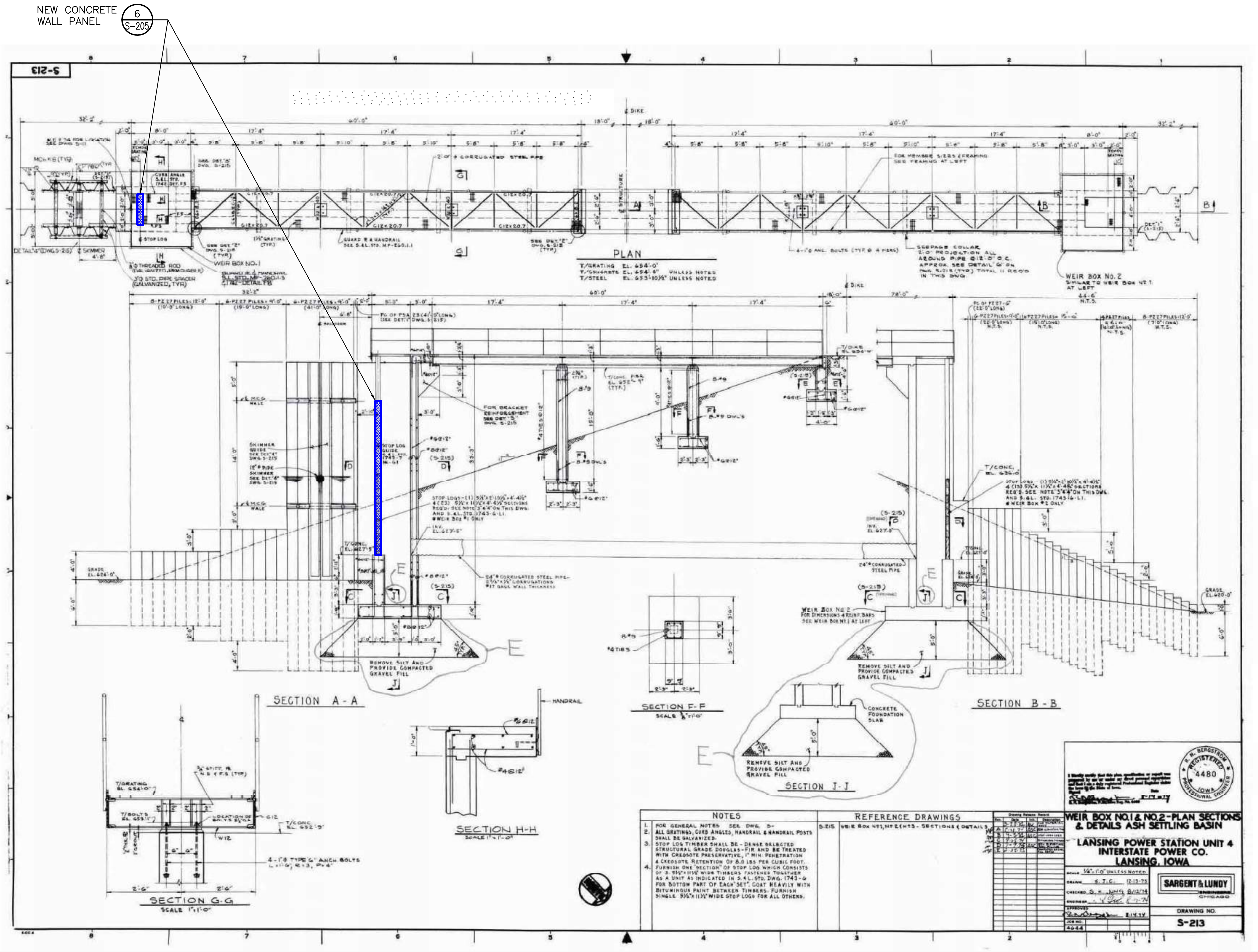
Alliant Energy

INTERSTATE POWER AND LIGHT COMPANY
LANSING GENERATING STATION Unit 0
UPPER ASH POND OUTFALL REROUTE
CONCRETE PLAN AND DETAILS
EXISTING WEIR BOX #1 PANEL
Scale: AS SHOWN
DWG. NO.
S-205



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

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.T.C. 12-13-73
CHECKED S. K. JUNG 8/12/74
SARGENT & LUNDY ENGINEERS CHICAGO
DRAWING NO. S-213
JOB NO. 4044

R. N. BERGSTROM REGISTERED 4480 PROFESSIONAL ENGINEER IOWA

NOTES:
1. CONTRACTOR SHALL FIELD VERIFY DIMENSIONS/ELEVATIONS OF EXISTING WEIR BOX #1 WHERE NEW PRECAST CONCRETE WALL TO BE INSTALLED.

NO.	DATE	REVISION	BY	CHK'D	APV'D
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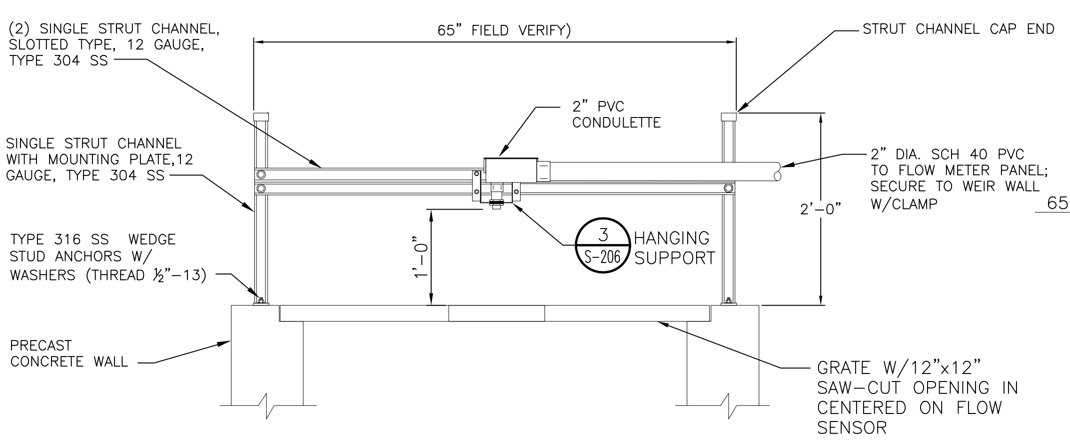
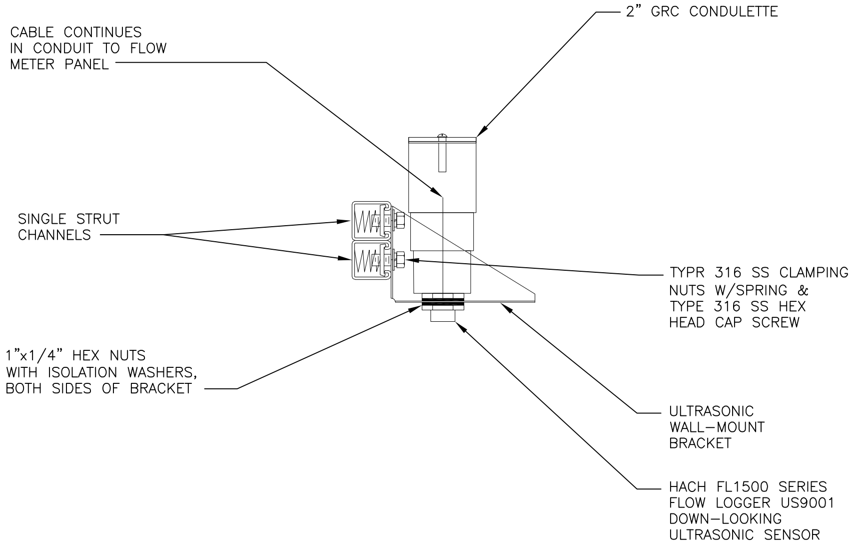
0	10-15-18	ISSUED FOR CONSTRUCTION	JFD	CTS	MWL

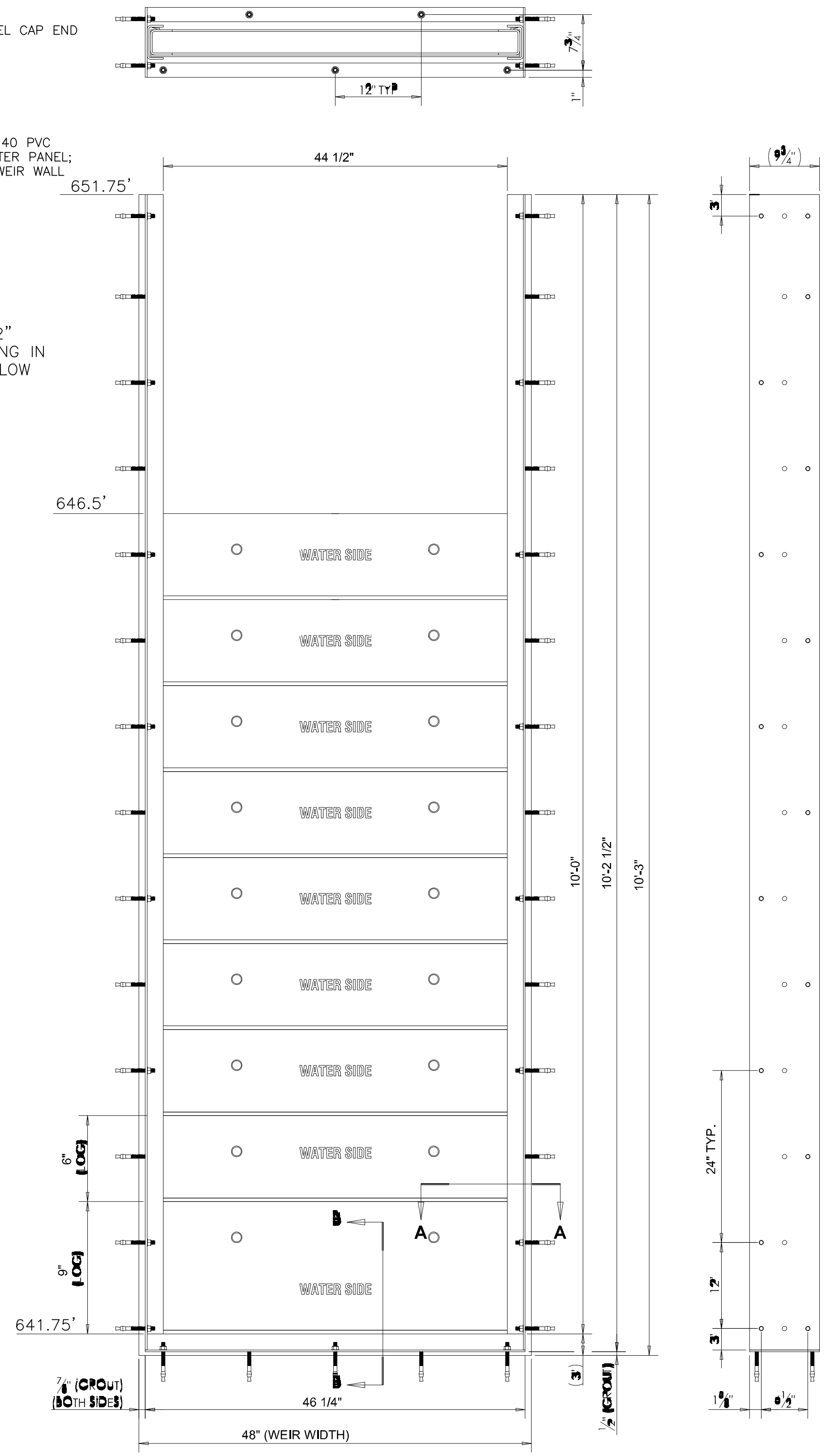
INTERSTATE POWER AND LIGHT COMPANY
LANSING GENERATING STATION Unit 0
UPPER ASH POND OUTFALL REROUTE
STRUCTURAL DETAILS
EXISTING WEIR BOX #1
Scale: AS SHOWN
DWG. NO. S-207

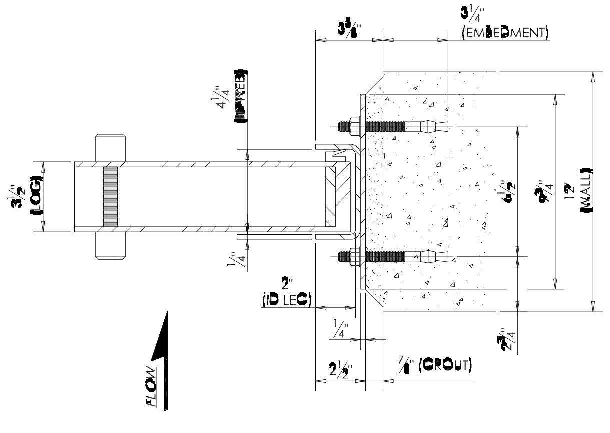


FLOW METER AND SUPPORT 1 S-200

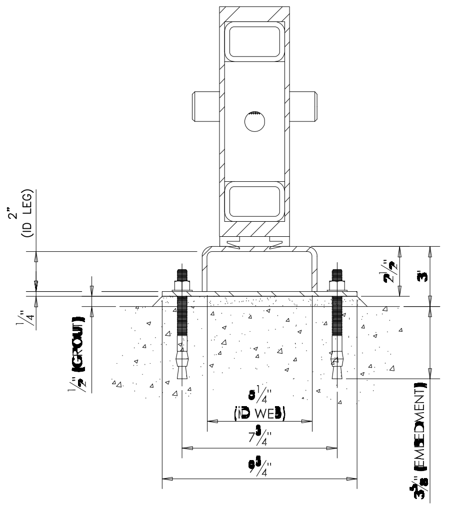


HANGING SUPPORT 3 S-206

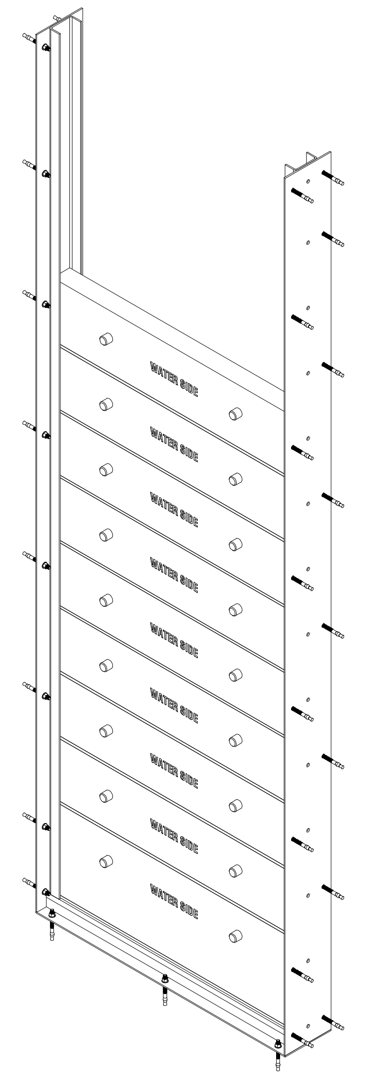




SECTION A-A
SCALE 1 : 4



SECTION B-B
SCALE 1 : 4



NOTES:
1. STOP LOG GUIDE FRAME TO BE T304L S/S WELDED CONSTRUCTION.
2. STOP LOGS TO BE STEEL REINFORCED FRP (FIBERGLASS REINFORCED PLASTIC).
3. ALL STOP LOG HARDWARE TO BE T304 S/S.
4. FLOW METER TO BE HACH FL1500 SERIES FLOW LOGGER WITH SOLAR PANEL POWER SUPPLY (SEE SHEET P–101 FOR INSTRUMENTATION SPECIFICATIONS). FLOW METER PANEL AND SOLAR PANEL TO BE MOUNTED TO CO2 CYLINDER STORAGE PAD GUARD RAIL (SEE SHEET S–201).

STOP LOG DETAIL 2 S-200

NO.	DATE	REVISION	BY	CHK'D	APV'D
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CONFIDENTIAL

Alliant Energy

INTERSTATE POWER AND LIGHT COMPANY
LANSING GENERATING STATION Unit 0
UPPER ASH POND OUTFALL REROUTE
STRUCTURAL DETAILS
FLOW METER AND STOP LOGS
Scale: AS SHOWN
DWG. NO. S-206