ALLIANT ENERGY
Wisconsin Power and Light Company
Columbia Energy Center

CCR SURFACE IMPOUNDMENT

HISTORY OF CONSTRUCTION

Report Issued: September 19, 2016
Revision 0

HARD HAT SERVICES™
Engineering, Construction and Management Solutions

EXECUTIVE SUMMARY

This History of Construction (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 (CCR) 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 documents the construction history of each CCR unit at the Columbia Energy Center in Pardeeville, Wisconsin in accordance with §257.73(c) of the CCR Rule. For purposes of this Report, the term "CCR unit" refers to existing and inactive CCR surface impoundments.

Primarily, this Report is focused on providing history of construction information for each CCR surface impoundment to the extent feasible, provided that such information is reasonably and readily available.

Table of Contents

Figures

Appendices

1 INTRODUCTION

The owner/operator of the CCR units must provide a history of construction for the existing and inactive CCR surface impoundments at the Columbia Energy Center (COL) in Pardeeville, Wisconsin in accordance with §257.73(c)(1) of the CCR Rule. Hard Hat Services, on behalf of Wisconsin Power and Light Company, has provided history of construction information for the CCR surface impoundments to the extent feasible, provided that such information is reasonably and readily available.

1.1 CCR Rule Applicability

The CCR Rule requires that an owner/operator of a CCR unit must provide a history of construction for CCR surface impoundments with a height of 5 feet or more and a storage volume of 20 acre-feet or more (§257.73(b)(1)); or for CCR surface impoundments with a height of 20 feet or more (§257.73(b)(2)).

1.2 History of Construction Applicability

COL has one existing CCR surface impoundment and one inactive CCR surface impoundment, which meet the requirements of §257.73(b)(1) and/or §257.73(b)(2), identified as follows:

- Existing CCR surface impoundment: COL Primary Ash Pond
- Inactive CCR surface impoundment: COL Secondary Ash Pond

2 FACILITY DESCRIPTION

The following sub-sections provide a general facility description.

2.1 Name and Address - §257.73(c)(1)(i)

Included below is the name and address of the owner/operator of the CCR units, name of each CCR unit, and state identification numbers for each CCR Unit (if one has been assigned by the state).

Owner/Operator Name and Address:

Wisconsin Power and Light Company (*an Alliant Energy Company*)
Columbia Energy Center
W8375 Murray Road
Pardeeville, WI 53954

The names of the CCR Units located at COL are identified as follows:

- Existing CCR surface impoundment: COL Primary Ash Pond
- Inactive CCR surface impoundment: COL Secondary Ash Pond

No state identification numbers have been assigned to the CCR units at COL.

2.2 General Facility History

COL is located southeast of the City of Portage on the eastern shore of the Wisconsin River in Columbia County. Figure 1 provides both a topographic map and an aerial photograph of the COL facility location, with the approximate property boundary of the facility identified.

COL, who is jointly owned by three different entities which include the Wisconsin Power and Light Company, Madison Gas and Electric, and Wisconsin Public Service Corporation, initiated construction of the generating plant in 1971. At the time of initial facility operations in 1975 COL was a fossil–fueled electric generating station that consisted of one steam electric generating unit (Unit 1). The initial steam electric generating unit at COL had a nameplate rating of 512 Megawatts (MW). At the time of

initial operations Unit 1 burned Colstrip coal from Montana as its fuel source. The coal was transported to the facility via rail car.

The original CCR surface impoundment at COL was constructed between 1972 and 1974. The CCR surface impoundment was initially identified within historical documents as an ash basin, as well as an ash pond. The CCR surface impoundment was located to the north and northwest of the generating plant. As reported in an Ash Disposal Operation Plan[1] dated April 1974, the surface area of the ash basin was approximately 70 acres with an estimated storage capacity of 611 million gallons. Historical drawings that identify the layout of the original CCR surface impoundment are provided in Appendix A, as well as in Appendix F. Additional discussions on the construction of the ash basin are provided in further detail throughout Section 3.

The CCR that was produced from the burning of coal in Unit 1 included bottom ash, fly ash, and economizer ash. The bottom ash that was produced would fall into a water filled hopper beneath the furnace of the generating unit. The bottom ash would then be hydraulically conveyed (sluiced) to the ash basin via a steel pipe. The fly ash that was produced was carried as particulate matter by the flue gases into the electrostatic precipitator where it was electrostatically precipitated and collected. The fly ash was then sluiced to the ash basin via a steel pipe. The fly ash that accumulated in the economizer hopper, known as economizer ash, was also sluiced to the ash basin via a steel pipe.

In addition to the hydraulically sluiced CCR, the ash basin was also a primary receiver of process water flows, which included demineralizer regenerant, backwash and rinse waters, and steam drum blowdown. The water that accumulated within the ash basin was pumped to a small effluent settling basin located east of the generating plant (See Appendix F). An effluent pump house was located in the southeast corner of the ash basin. The effluent pump house was constructed at the same time as the ash basin. The

[1] Ash Disposal Operation – Revision 1, Columbia Generating Station, April 08, 1974

water that was pumped to the small effluent basin would drain south towards a ditch which drained southward along the eastern side of the facility's cooling lake. The ditch then drained towards the west along the south end of the cooling lake where it would discharge into the backwaters of the Wisconsin River.

In 1975, COL initiated construction of a second steam electric generating unit (Unit 2). Unit 2 initiated facility operations in 1978 and had a nameplate rating of 511 MW. At the time of initial operations Unit 2 burned Amax coal from Wyoming as its fuel source. The coal was transported to the facility via rail car. The CCR produced from Unit 2 was similar to that of Unit 1, however, the fly ash produced by Unit 2 was electrostatically precipitated, collected, and handled dry. The fly ash was pneumatically conveyed to a storage silo located adjacent to the generating plant. The fly ash was then disposed of on-site.

Modifications to the original CCR surface impoundment were performed in 1977 at the same time Unit 2 was under construction. An earthen dike was constructed within the ash basin which divided the original CCR surface impoundment into two separate CCR surface impoundments. The CCR surface impoundment located south of the earthen dike consisted of the primary fly ash settling basin. The CCR surface impoundment located north of the earthen dike consisted of the secondary settling basin. Additional discussions on the embankment modifications, as well as the handling of CCR at the time of the modifications, are provided in further detail throughout Section 3.

As documented in a Primary Fly Ash Settling Pond Revised Abandonment Plan[2] dated September 1981, additional modifications to the secondary settling basin were completed due to a revised Wisconsin Pollutant Discharge Elimination System (WPDES) requirement which necessitated the recirculation of 92% of the bottom ash sluice waters from Unit 1 and 95% of the bottom ash sluice waters from Unit 2. To facilitate the

[2] Revised Abandonment Plan Primary Fly Ash Settling Pond, Columbia Generating Station, September 15, 1981, Warzyn Engineering and Service Company, Inc.

recirculation of the bottom ash sluice waters an earthen dike was constructed within the secondary settling basin. Along the north end of the earthen dike a recirculation pump house was constructed (See Appendix F). As a result of the construction of the earthen dike and recirculation pump house, approximately one half (eastern half) of the secondary settling basin was eliminated. The western half of the secondary settling basin (also identified as the bottom ash settling basin in historical documents) remained the primary receiver of sluiced bottom ash and economizer ash. The eastern half of the secondary settling basin became a primary receiver of effluent from the primary fly ash settling basin on a continuous basis with intermittent contributions from the bottom ash settling basin.

With the construction of Unit 2, the resulting storage life for the primary fly ash settling basin, bottom ash settling basin, and secondary settling basin was significantly reduced. In order to accommodate for the additional CCR that was to be produced from the addition of Unit 2, COL began to actively pursue the licensing for a long-term CCR disposal site which would be located east of the generating plant. Due to the time required to receive approval for a licensed CCR disposal site, COL sought and received approval from the Wisconsin Department of Natural Resources (WDNR) for the construction of a 7.5 acre ash expansion area (See Appendix F). The ash expansion area, which was located east of the primary fly ash settling basin and south of the secondary settling basin, was constructed in 1978 and 1979. The ash expansion area was intended to provide sufficient disposal volume for the dry fly ash produced from Unit 2 until the long-term CCR disposal site was constructed.

In 1982, COL conducted modifications to the primary fly ash settling basin by extending the height of the earthen embankments in order to increase the life of the CCR surface impoundment. The ability to continue to sluice Unit 1 fly ash to the primary fly ash settling basin allowed COL the time needed to construct a dry fly ash handling system for Unit 1, as well as time to construct the long-term CCR disposal site for future disposal of CCR at COL.

As documented in construction observation reports dated January 1982[3] and July 1982[4], the embankment modifications for the primary fly ash settling basin consisted of utilizing general and granular fill material from a borrow source area located east of the generating plant. The fill material was placed in lifts, compacted, and keyed into the existing earthen embankments. Following placement of the general fill, an interior liner was constructed along the upstream slopes of the extended embankments in order to provide an impervious surface. The interior liner was constructed utilizing fly ash that was compacted in place. Along with the embankment modifications, the bottom ash and economizer ash sluice pipes were rerouted from the west side of the primary fly ash settling basin to the east side. The economizer ash sluice pipe continued to discharge into the west end of the bottom ash settling basin. The bottom ash sluice pipe discharge point was also in the west end of the bottom ash settling basin, however, was relocated to the area northeast of the earthen dike that separated the bottom ash settling basin from the primary fly ash settling basin. The Unit 1 fly ash sluice pipe was also modified due to the embankment extension. A series of structural support towers for the fly ash sluice pipe were constructed from the generating plant to the primary fly ash settling basin. The fly ash sluice pipe was elevated off the ground in order to discharge over the embankment extension and into the primary fly ash settling basin. A concrete chute was constructed along the upstream slope of the south embankment at the location of the sluiced CCR discharge point in order to provide erosion protection.

Along with the embankment extension, effluent discharge pipes were installed at the northeast corner of the primary fly ash settling basin. The effluent discharge pipe system consisted of an adjustable inlet structure, two discharge pipes, and a riprapped area at the discharge point. The inlet structure consisted of a concrete support base upon which a half circle 60-inch diameter corrugated metal pipe (CMP) riser pipe, with vertical tracks

[3] Construction Observation Report – Site Preparation – Primary Fly Ash Settling Pond Extension, Columbia Generating Station, January 20, 1982, Warzyn Engineering and Service Company, Inc.
[4] Addendum to Construction Observation Report – Site Preparation – Primary Fly Ash Settling Pond Extension, Columbia Generating Station, July 21, 1982, Warzyn Engineering and Service Company, Inc.

to install stop logs, was embedded. Two 24-inch diameter CMPs served as the discharge pipes. The water from the primary fly ash settling basin flowed through the effluent discharge pipe system and into the secondary settling basin.

In 1985, COL initiated closure of the primary fly ash settling basin. As documented in a Construction Observation Report[5] dated November 1987, fill material within the primary fly ash settling basin consisted of sluiced fly ash, a crown layer comprised of a combined mixture of bottom ash and fly ash placed to grades parallel to proposed final grades, and a two foot thick fly ash cap layer. The top of the fly ash cap layer was approximately two and a half feet below final grades. Final cover consisted of two feet of on-site sandy material overlain with six inches of vegetative supporting topsoil material. With the closure of the primary fly ash settling pond the hydraulic structure that discharged into the secondary settling basin was abandoned. The top of the riser pipe was cut off to about four feet below the top of the fly ash cap layer elevation at that location. The openings at the outlets of the 24-inch diameter CMPs were plugged about half-way and the pipes were filled with a slurry of fly ash and water mixture at a 1 to 1 ratio. The outlets were then completely plugged and the pipes again filled with the fly ash and water mixture. Dry fly ash was placed and compacted on top of the riser pipe until the proposed top of fly ash grades were reached. The closure activities were completed in 1987.

From 1971 to 1998 the owner/operator of COL included the Wisconsin Power and Light Company, Madison Gas and Electric, and Wisconsin Public Service. In 1998, a three-way merger was completed between IES Industries, Interstate Power Company, and Wisconsin Power and Light Company forming Interstate Energy Corporation. In 1999, Interstate Energy Corporation changed its name to Alliant Energy Corporation.

As COL exists today, the generating plant consists of two steam electric generating units. Sub-bituminous coal is the primary fuel for producing steam. The burning of coal at COL

[5] Site Closure – Primary Fly Ash Settling Pond, Columbia Generating Station, November 1987, Warzyn Engineering and Services Company, Inc.

produces three types of CCR, which include bottom ash, fly ash, and economizer ash. Current CCR operations at COL include bottom ash and economizer ash being sluiced to the western half of the COL Primary Ash Pond (formerly identified as the bottom ash settling basin). The two forms of CCR are dredged from the COL Primary Ash Pond on a regular basis. The majority of bottom ash is beneficially reused while the economizer ash is disposed of on-site in the active dry ash landfill located east of the generating plant. The fly ash produced at COL is collected by the electrostatic precipitators and pneumatically conveyed to the on-site fly ash storage silo. The fly ash produced is transported off-site via over-the-road haul trucks for beneficial reuse. The eastern half of the COL Primary Ash Pond is utilized for settling out the CCR prior to the water reaching the recirculating pump house. The water within the CCR surface impoundment is recirculated back to the generating plant for reuse and/or treatment and disposal per the facility's WPDES permit. The COL Secondary Ash Pond is no longer a primary receiver of CCR or process water flows. Presently, the COL Secondary Ash Pond acts as a storm water detention pond with the only influent sources being precipitation and storm water runoff from the surrounding area. The water within the COL Secondary Ash Pond either exfiltrates into the ground or evaporates.

3 HISTORY OF CONSTRUCTION - §257.73(c)(1)

This Report documents the history of construction information for each existing CCR surface impoundment to the extent feasible, provided that such information is reasonably and readily available. The following activities were completed in order to reasonably collect and assemble the readily available history of construction information:

- File review at the local regulatory agency;
- Historical aerial photography review;
- Historical topography review;
- Onsite design drawing, specification, and report review;
- Electronic design drawing, specification, and report review; and
- Interview(s) with onsite personnel with historical knowledge of the existing CCR surface impoundment.

3.1 COL Primary Ash Pond

The following subsections are intended to meet the requirements of the CCR Rule §257.73(c)(1) for the COL Primary Ash Pond.

3.1.1 CCR Unit Location - §257.73(c)(1)(ii)

The COL Primary Ash Pond is located north of the generating plant, north of the closed ash landfill (formerly identified as the primary fly ash settling basin in historical documents), and west of the COL Secondary Ash Pond. The location of the COL Primary Ash Pond, in reference to the surrounding topography, is identified on both a USGS 7 ½ minute topographic quadrangle map and aerial photograph on Figure 1. The location of the COL Primary Ash Pond, in reference to the immediate surroundings within the COL property, is identified on Figure 2.

3.1.2 Statement of Purpose - §257.73(c)(1)(iii)

The COL Primary Ash Pond is the primary receiver of sluiced bottom ash and economizer ash. The CCR is sluiced from the generating plant and discharges into the western half of the COL Primary Ash Pond. The bottom ash discharges into the southeast corner of the western half of the COL Primary Ash Pond. The economizer ash discharges into the west side of the western half of the COL Primary Ash Pond. The majority of the CCR

that is discharged into the COL Primary Ash Pond is removed during maintenance dredging activities. The CCR that is dredged is stockpiled in the western half of the COL Primary Ash Pond for dewatering. Once dewatered the CCR (bottom ash) is sent through a sieve shaker machine to separate coarsely graded CCR from the finely graded CCR. The CCR is then transported off-site for beneficial reuse. The economizer ash, as well as bottom ash fines, are transported to the on-site active dry ash landfill east of the generating plant.

In addition to sluiced CCR, the COL Primary Ash Pond is also the primary receiver of process flows from the generating plant. Process flows include boiler/precipitator wash water, plant floor drains, ash line freeze protection flows, bottom ash area sump water, demineralizer area sump water, and air heater sump water. Additionally, the COL Primary Ash Pond receives storm water runoff from the surrounding area, inclusive of the closed ash landfill, located south of the CCR surface impoundment.

The process water flows, storm water runoff, and CCR sluice water that discharges into the western half of the COL Primary Ash Pond flows to the east into the eastern half of the COL Primary Ash Pond. The water within the eastern half of the COL Primary Ash Pond is recirculated to the generating plant via effluent pumps located in the ash recirculating pump house in the northeast corner of the CCR surface impoundment. The recirculating pumps return the water to the generating plant for reuse and/or treatment and disposal per the facility's WPDES permit.

3.1.3 Physical Layout Information - §257.73(c)(1)(iv)

As identified in an Inflow Flood Control Plan[6] prepared for COL in accordance with §257.82 of the CCR Rule, the COL Primary Ash Pond has a watershed of approximately 55 acres. The drainage area includes the closed ash landfill located to the south of the COL Primary Ash Pond.

[6] Inflow Flood Control Plan, Columbia Energy Center, 2016, Hard Hat Environmental Services

As discussed in an Annual Inspection Report[7] prepared for COL in accordance with §257.83 of the CCR Rule, the COL Primary Ash Pond is incised along the west and south sides of the CCR unit. The north embankment of the COL Primary Ash Pond has a height of approximately 23 feet from the crest to the toe of the downstream slope of the embankment at its greatest height. The east embankment of the COL Primary Ash Pond, which separates the existing CCR surface impoundment from the COL Secondary Ash Pond, has an embankment elevation of 801 feet. The interior storage depth of the COL Primary Ash Pond is approximately 15 feet. The total volume of impounded CCR and water within the COL Primary Ash Pond is approximately 330,000 cubic yards.

3.1.4 Foundation and Abutment Properties - §257.73(c)(1)(v)

As identified in a Primary Fly Ash Settling Pond Revised Abandonment Plan[8] dated September 1981, the COL Primary Ash Pond is located on glacial deposits surficially mapped as terminal moraine by Alden (1918). Historical borings indicated that the site is underlain by fine to medium sands with trace to some silt and clay, with trace to little gravel (SP, SM). Occasional lenses of sandy silt (ML) and medium to coarse sand and gravel with trace to some silt and clay (SW) have been encountered in other borings. Sandstone bedrock occurs at 67 feet (elevation 741 feet, USGS Datum) below the ground surface immediately southeast of the generating plant and at least 40 feet (elevation 761 feet) below the ground surface along the northern dike of the facility. The sandstone bedrock is likely the Galesville formation of late Cambrian Age.

As identified in a Bottom Ash Pond Slope Stability and Hydraulic Analysis[9] dated February 16, 2011, the native soils under the plant site and the ash ponds are glacial till and are described as dense sand and gravel through most of the soil profile.

[7] Annual Inspection Report, Columbia Energy Center, 2016, Hard Hat Environmental Services
[8] Revised Abandonment Plan – Primary Fly Ash Settling Pond, Columbia Generating Station, September 1981, Warzyn Engineering and Services Company, Inc.
[9] Bottom Ash Pond Slope Stability and Hydraulic Analysis, Columbia Energy Center, February 16, 2011, Aether DBS

As identified in a Safety Factor Assessment[10] prepared for COL in accordance with §257.73(e) of the CCR Rule, the soil below the foundation of the embankments is loose fine sand from backwaters of the Wisconsin River underlain by very dense fine sand deposited by glaciation. Borings taken in 1971 indicated that rock is located at approximately 90 feet below the top of the embankments.

3.1.5 Historical Construction and Use - §257.73(c)(1)(vi)

At the time of initial facility operations an ash basin was constructed in an area located to the north and northwest of the generating plant. The ash basin was constructed between 1972 and 1974. As reported in an Ash Disposal Operation Plan[11] dated April 1974, the surface area of the ash basin was approximately 70 acres with an estimated storage capacity of 611 million gallons. A historical drawing that identifies the initial layout of the ash basin is provided in Appendix A. Historical aerial photographs (Appendix B) confirm the presence of the ash basin at the time of initial facility operations.

The ash basin was contained by earth-filled embankments that were constructed with side slopes that had a horizontal to vertical ratio of four to one. The top of the embankments were constructed to an elevation of 805 feet. Specifications for dike and grading work related to the construction of the ash basin embankments identified requirements for subgrade preparation, type of borrow source fill material to be used, compaction densities to be met, and compaction equipment to be used. The dike and grading work specifications is provided in Appendix G.

Modifications to the original CCR surface impoundment were performed in 1977 at the same time Unit 2 was under construction. An earthen dike was constructed within the ash basin which divided the original CCR surface impoundment into two separate CCR surface impoundments (See Appendix F). The CCR surface impoundment located south

[10] Safety Factor Assessment, Columbia Energy Center, 2016, Hard Hat Environmental Services
[11] Ash Disposal Operation – Revision 1, Columbia Generating Station, April 08, 1974

of the earthen dike consisted of the primary fly ash settling basin, which was approximately 36 acres in size. The CCR surface impoundment located north of the earthen dike consisted of the secondary settling basin. The CCR sluicing systems were segregated after construction of the earthen dike. The bottom ash and economizer ash were sluiced from the generating plant to the west end of the secondary settling basin. The fly ash was sluiced from the generating plant to the southeast corner of the primary fly ash settling basin. A weir was constructed in the northeast corner of the earthen dike to allow for the discharge of water from the primary fly ash settling basin into the eastern half of the secondary settling basin.

As documented in a Primary Fly Ash Settling Pond Revised Abandonment Plan[12] dated September 1981, additional modifications to the secondary settling basin were completed due to a revised WPDES requirement which necessitated the recirculation of 92% of the bottom ash sluice waters from Unit 1 and 95% of the bottom ash sluice waters from Unit 2. To facilitate the recirculation of the bottom ash sluice waters an earthen dike was constructed within the secondary settling basin. Along the north end of the earthen dike a recirculation pump house was constructed. As a result of the construction of the earthen dike and recirculation pump house, approximately one half (eastern half) of the secondary settling basin was eliminated. The western half of the secondary settling basin (also identified as a bottom ash settling basin in historical documents) remained the primary receiver of sluiced bottom ash and economizer ash. The eastern half of the secondary settling basin became a primary receiver of effluent from the primary fly ash settling basin on a continuous basis with intermittent contributions from the bottom ash settling basin.

[12] Revised Abandonment Plan Primary Fly Ash Settling Pond, Columbia Generating Station, September 15, 1981, Warzyn Engineering and Service Company, Inc.

As documented in construction observation reports dated January 1982[13] and July 1982[14], the bottom ash and economizer ash sluice pipes were rerouted from the west side of the primary fly ash settling basin to the east side. The economizer ash sluice pipe continued to discharge into the west end of the CCR surface impoundment. The bottom ash sluice pipe discharge point was also in the west end of the CCR surface impoundment, however, was relocated to the area northeast of the earthen dike that separated the bottom ash settling basin from the primary fly ash settling basin.

In-situ soil properties of the ash basin were identified in a Safety Factor Assessment[15] prepared for COL in accordance with 257.73(e) of the CCR Rule. As discussed in the Safety Factor Assessment, soil borings were advanced at the site in 1971 and 1974 (Appendix D), as well as along the north embankment of the COL Primary Ash Pond in 2011 (Appendix E). The soil boring data observed the embankments of the COL Primary Ash Pond to be constructed of dense sand.

Historical aerial photographs (Appendix B) and historical topographic maps (Appendix C) identify the topographic changes to the COL Primary Ash Pond that have occurred since the time of initial facility operations.

3.1.6 Structures, Appurtenances, and Operations- §257.73(c)(1)(vii)

Detailed dimensional drawings of the COL Primary Ash Pond that were reasonably and readily available are identified below. The detailed dimensional drawings were obtained from various designs, plans, and reports that were assembled during the historical information review.

- Dike and Site Work Soil Borings (1971) – Drawings prepared by Sargent & Lundy provides historical soil boring locations and soil boring logs that were completed

[13] Construction Observation Report – Site Preparation – Primary Fly Ash Settling Pond Extension, Columbia Generating Station, January 20, 1982, Warzyn Engineering and Service Company, Inc.
[14] Addendum to Construction Observation Report – Site Preparation – Primary Fly Ash Settling Pond Extension, Columbia Generating Station, July 21, 1982, Warzyn Engineering and Service Company, Inc.
[15] Safety Factor Assessment, Columbia Energy Center, 2016, Hard Hat Environmental Services

at COL prior to construction of the generating plant and CCR surface impoundments (Appendix D).

- Ash Basin Proposed Layouts (1972) – Drawings prepared by Sargent & Lundy provide various layouts of the ash basin that were proposed for COL. The proposed layouts provide existing topographic information, proposed layout of the ash basin embankments, as well as proposed sections of the embankment. The layouts for the ash basin were provided for COL with only Unit 1, as well as COL with both Unit 1 and Unit 2 (Appendix A).

- Proposed Ash Disposal Operation (1974) – Drawings from a proposed ash disposal operation plan provide layouts of the proposed ash disposal area (Appendix F).

- Ash Basin Soil Boring (1974) – Drawing provides historical soil boring log that was completed at COL in the area of the proposed ash basin (Appendix D).

- Ash Basin Sections and Details (1974, 1977) – Drawings prepared by Sargent & Lundy provide sections and details of the ash basin effluent pump house, as well as the ash basin re-circulation pump house (Appendix F).

- Primary Fly Ash Settling Basin Design (1981) – Drawings prepared by Warzyn Engineering Inc. provide the design layout of the primary fly ash settling pond, section details of the embankment increase and hydraulic structures, as well as the proposed closure layout of the CCR surface impoundment (Appendix F).

- Primary Fly Ash Settling Basin As-Built (1982) – Drawings prepared by Warzyn Engineering Inc. provide as-builts of the primary fly ash settling pond embankment increase, including section details (Appendix F).

- Proposed Haul Road to Ash Disposal Facility (1985) – Drawing prepared by Warzyn Engineering Inc. provides proposed layout of haul road to be constructed

along the south end of the closed ash landfill. Haul road used to transport dry fly ash to ash disposal facility located east of the generating plant (Appendix F).

- Primary Fly Ash Settling Basin Closure As-Built (1987) – Drawings prepared by Warzyn Engineering Inc. provide as-builts of the closure of the primary fly ash settling pond, including section details (Appendix F).

- Topographic Survey (1995) – Drawings provide topographic contours of the closed ash landfill, COL Primary Ash Pond, and the COL Secondary Ash Pond (Appendix F).

- Site Water Table Plan (2003) – Drawing prepared by RMT provides groundwater contours throughout the site (Appendix F).

- Geoprobe Boring Location Map (2011) – Drawing prepared by Aether DBS provides locations of the soil borings that were installed along the north embankment of the COL Primary Ash Pond and Col Secondary Ash Pond, as well as along the east embankment of the COL Secondary Ash Pond (Appendix E).

- Aerial Survey (2014) – Drawing prepared by SCS Engineers provides topographic contours of the site, including the closed ash landfill, CCR surface impoundments, and active ash disposal facility (Appendix F).

3.1.7 Instrumentation - §257.73(c)(1)(viii)

Instrumentation used to support the operation of the COL Primary Ash Pond consists of a submersible hydrostatic level transducer, as well as a visual staff gauge, for monitoring water elevations. The instrumentation is located in the northeast corner of the COL Primary Ash Pond.

3.1.8 Area-Capacity Curve - §257.73(c)(1)(ix)

An area-capacity curve identifies the relationship between the surface area of the existing CCR surface impoundment and an elevation, which corresponds to an available storage

capacity. After review of readily available historical documents there is no readily available information regarding area-capacity curves for the COL Primary Ash Pond.

3.1.9 Spillway and Diversion Features - §257.73(c)(1)(x)

The COL Primary Ash Pond generally operates as a zero discharge pond. An 18-inch diameter CMP is located immediately south of the recirculating pump house, along the interior dike between the COL Primary Ash Pond and the COL Secondary Ash Pond. The hydraulic structure, along the inlet, consists of a manually operated gate valve which is normally closed. In addition to the hydraulic structure, the recirculating pump house can be used to divert the water within the COL Primary Ash Pond to the Cooling Pond located south of the generating plant.

3.1.10 Construction Specifications, Surveillance, Maintenance, and Repair - §257.73(c)(1)(xi)

COL implements a Site-Specific Inspection and Maintenance (I&M) Plan[16], in accordance with an Alliant Energy I&M Plan[17]. The Site-Specific I&M Plan has been implemented at COL in order to identify the factors which may affect the long-term stability of the existing CCR surface impoundment. The Site-Specific I&M Plan identifies existing operation and maintenance activities, and identifies the inspection, monitoring, maintenance, and recordkeeping requirements as outlined in the Alliant Energy I&M Plan in order to maintain the integrity of the existing CCR surface impoundment.

Visual inspections of the COL Primary Ash Pond are completed in accordance with §257.83 of the CCR Rule. At intervals not exceeding seven days, the COL Primary Ash Pond is visually inspected for any appearances of structural weakness or other conditions which are disrupting or have the potential to disrupt the operation or safety of the existing CCR surface impoundment. In addition to seven-day and instrumentation inspections, COL conducts event-related inspections which may include inspections following storm events, seismic events, major maintenance activities, as well as other

[16] Inspection and Maintenance (I&M) Plan, Columbia Energy Center, October 2015, Version 2.0-Revision 1.0
[17] Inspection and Maintenance (I&M) Plan, Alliant Energy, September 2015, Version 2.0-Revision 0.0

unusual events. Annual inspections are conducted by a qualified PE who is familiar with the requirements of the CCR Rule, the Alliant Energy I&M Plan, the COL Site-Specific I&M Plan, and other facility specific information pertaining to the existing CCR surface impoundment.

Maintenance activities that are completed at COL may include routine maintenance, event-related maintenance, and long-term maintenance. Routine maintenance activities may include management of vegetation (or other forms of slope protection), tree and sapling removal, reseeding of disturbed vegetated areas, removal of debris from collection and diversion channels, and repair of eroded areas. Event-related maintenance activities may include maintenance after unusual events such as heavy rainfall, periods of very high winds, or seismic activity. Maintenance may include repair of eroded areas or removal of damaged vegetation. Long-term maintenance activities are identified as part of the ongoing inspection program, through the annual inspections, or through other engineering evaluations and may include larger remediation activities.

3.1.11 Structural Instability Records - §257.73(c)(1)(xii)

After review of readily available historical documents there are no known records of structural instability associated with the COL Primary Ash Pond that were identified.

3.2 COL Secondary Ash Pond

The following subsections are intended to meet the requirements of the CCR Rule §257.73(c)(1) for the COL Secondary Ash Pond.

3.2.1 CCR Unit Location - §257.73(c)(1)(ii)

The COL Secondary Ash Pond is located north of the generating plant and east of the COL Primary Ash Pond. The location of the COL Secondary Ash Pond, in reference to the surrounding topography, is identified on both a USGS 7 ½ minute topographic quadrangle map and aerial photograph on Figure 1. The location of the COL Secondary Ash Pond, in reference to the immediate surroundings within the COL property, is identified on Figure 2.

3.2.2 Statement of Purpose - §257.73(c)(1)(iii)

Presently, the COL Secondary Ash Pond acts as a storm water detention pond with the only influent sources being precipitation and storm water runoff from the surrounding area. The COL Secondary Ash Pond generally operates as a zero liquid discharge pond as the water within the COL Secondary Ash Pond either exfiltrates into the ground or evaporates.

3.2.3 Physical Layout Information - §257.73(c)(1)(iv)

As identified in an Inflow Flood Control Plan[18] prepared for COL in accordance with §257.82 of the CCR Rule, the COL Secondary Ash Pond has a watershed of approximately 37 acres.

As discussed in an Annual Inspection Report[19] prepared for COL in accordance with §257.83 of the CCR Rule, the COL Secondary Ash Pond is incised along the south and east sides of the CCR unit. The north embankment of the COL Secondary Ash Pond has a height of approximately 23 feet from the crest to the toe of the downstream slope of the embankment at its greatest height.

The west embankment of the COL Secondary Ash Pond, which separates the existing CCR surface impoundment from the COL Primary Ash Pond, has an embankment elevation of 801 feet. The interior storage depth of the COL Secondary Ash Pond is approximately 12 feet. The total volume of impounded CCR and water within the COL Primary Ash Pond is approximately 185,000 cubic yards.

3.2.4 Foundation and Abutment Properties - §257.73(c)(1)(v)

As identified in a Primary Fly Ash Settling Pond Revised Abandonment Plan[20] dated September 1981, the COL Secondary Ash Pond (formerly identified as the ash basin and secondary settling basin in historical documents) is located on glacial deposits surficially mapped as terminal moraine by Alden (1918). Historical borings indicated that the site

[18] Inflow Flood Control Plan, Columbia Energy Center, 2016, Hard Hat Environmental Services
[19] Annual Inspection Report, Columbia Energy Center, 2016, Hard Hat Environmental Services
[20] Revised Abandonment Plan – Primary Fly Ash Settling Pond, Columbia Generating Station, September 1981, Warzyn Engineering and Services Company, Inc.

is underlain by fine to medium sands with trace to some silt and clay, with trace to little gravel (SP, SM). Occasional lenses of sandy silt (ML) and medium to coarse sand and gravel with trace to some silt and clay (SW) have been encountered in other borings. Sandstone bedrock occurs at 67 feet (elevation 741 feet, USGS Datum) below the ground surface immediately southeast of the generating plant and at least 40 feet (elevation 761 feet) below the ground surface along the northern dike of the facility. The sandstone bedrock is probably the Galesville formation of late Cambrian Age.

As identified in a Bottom Ash Pond Slope Stability and Hydraulic Analysis[21] dated February 16, 2011, the native soils under the plant site and the ash ponds are glacial till and are described as dense sand and gravel through most of the soil profile.

As identified in a Safety Factor Assessment[22] prepared for COL in accordance with §257.73(e) of the CCR Rule, the soil below the foundation of the embankments is loose fine sand from backwaters of the Wisconsin River underlain by very dense fine sand deposited by glaciation. Borings taken in 1971 indicated that rock is located at approximately 90 feet below the top of the embankments.

3.2.5 Historical Construction and Use - §257.73(c)(1)(vi)

At the time of initial facility operations an ash basin was constructed in an area located to the north and northwest of the generating plant. The ash basin was constructed between 1972 and 1974. As reported in an Ash Disposal Operation Plan dated April 1974, the surface area of the ash basin was approximately 70 acres with an estimated storage capacity of 611 million gallons. A historical drawing that identifies the initial layout of the ash basin is provided in Appendix A. Historical aerial photographs (Appendix B) confirm the presence of the ash basin at the time of initial facility operations.

[21] Bottom Ash Pond Slope Stability and Hydraulic Analysis, Columbia Energy Center, February 16, 2011, Aether DBS

[22] Safety Factor Assessment, Columbia Energy Center, 2016, Hard Hat Environmental Services

The ash basin was contained by earth-filled embankments that were constructed with side slopes that had a horizontal to vertical ratio of four to one. The top of the embankments were constructed to an elevation of 805 feet. Specifications for dike and grading work related to the construction of the ash basin embankments identified requirements for subgrade preparation, type of borrow source fill material to be used, compaction densities to be met, and equipment to be used. The dike and grading work specifications is provided in Appendix G.

Modifications to the original CCR surface impoundment were performed in 1977 at the same time Unit 2 was under construction. An earthen dike was constructed within the ash basin which divided the original CCR surface impoundment into two separate CCR surface impoundments. The CCR surface impoundment located south of the earthen dike consisted of the primary fly ash settling basin which was approximately 36 acres in size. The CCR surface impoundment located north of the earthen dike consisted of the secondary settling basin. The CCR sluicing systems were segregated after construction of the earthen dike. The bottom ash and economizer ash were sluiced from the generating plant to the west end of the secondary settling basin. The fly ash was sluiced from the generating plant to the southeast corner of the primary fly ash settling basin. A weir was constructed in the northeast corner of the earthen dike to allow for the discharge of water from the primary fly ash settling basin into the eastern half of the secondary settling basin.

As documented in a Primary Fly Ash Settling Pond Revised Abandonment Plan[23] dated September 1981, additional modifications to the secondary settling basin were completed due to a revised WPDES requirement which necessitated the recirculation of 92% of the bottom ash sluice waters from Unit 1 and 95% of the bottom ash sluice waters from Unit 2. To facilitate the recirculation of the bottom ash sluice waters an earthen dike was constructed within the secondary settling basin. Along the north end of the earthen dike a recirculation pump house was constructed. As a result of the construction of the

[23]

earthen dike and recirculation pump house, approximately one half (eastern half) of the secondary settling basin was eliminated. The western half of the secondary settling basin (also identified as a bottom ash settling basin in historical documents) remained the primary receiver of sluiced bottom ash and economizer ash. The eastern half of the secondary settling basin became a primary receiver of effluent from the primary fly ash settling basin on a continuous basis with intermittent contributions from the bottom ash settling basin.

With the construction of Unit 2, the storage capacity of the primary fly ash settling basin, bottom ash settling basin, and secondary settling basin were significantly reduced. In order to accommodate the additional CCR that was to be produced from the addition of Unit 2, COL began to actively pursue the licensing for a long-term CCR disposal site which would be located east of the generating plant. Due to the time required to receive approval for a licensed CCR disposal site, COL sought and received approval from the WDNR for the construction of a 7.5 acre ash expansion area (See Appendix F). The ash expansion area, which was located east of the primary fly ash settling basin and south of the COL Secondary Ash Pond, was constructed in 1978 and 1979. The ash expansion area was intended to provide sufficient disposal volume for the dry fly ash produced from Unit 2 until the long-term CCR disposal site was constructed.

In 1982, COL conducted modifications to the primary fly ash settling basin by extending the height of the earthen embankments in order to increase the life of the CCR surface impoundment. The ability to continue to sluice Unit 1 fly ash to the primary fly ash settling basin allowed COL the time needed to construct a dry fly ash handling system for Unit 1, as well as time to construct the long-term CCR disposal site for future disposal of CCR at COL. As documented in construction observation reports dated January 1982[24] and July 1982[25], effluent discharge pipes were installed at the northeast corner of the

[24] Construction Observation Report – Site Preparation – Primary Fly Ash Settling Pond Extension, Columbia Generating Station, January 20, 1982, Warzyn Engineering and Service Company, Inc.
[25] Addendum to Construction Observation Report – Site Preparation – Primary Fly Ash Settling Pond Extension, Columbia Generating Station, July 21, 1982, Warzyn Engineering and Service Company, Inc.

primary fly ash settling basin. The effluent discharge pipe system consisted of an adjustable inlet structure, two discharge pipes, and a riprapped area at the discharge point. The inlet structure consisted of a concrete support base upon which a half circle 60-inch diameter CMP riser pipe, with vertical tracks to install stop logs, was embedded. Two 24-inch diameter CMPs served as the discharge pipes. The water from the primary fly ash settling basin flowed through the effluent discharge pipe system and into the secondary settling basin.

In 1985, COL initiated closure of the primary fly ash settling basin. As documented in a Construction Observation Report[26] dated November 1987, the hydraulic structure that discharged into the secondary settling basin was abandoned. The top of the riser pipe was cut off to about four feet below the top of the fly ash cap layer elevation at that location. The openings at the outlets of the 24-inch diameter CMPs were plugged about half-way and the pipes were filled with a slurry of fly ash and water mixture (1:1 mixture). The outlets were then completely plugged and the pipes again filled with the fly ash and water mixture. Dry fly ash was placed and compacted on top of the riser pipe until the proposed top of fly ash grades were reached. The closure activities were completed in 1987.

In-situ soil properties of the ash basin were identified in a Safety Factor Assessment prepared for COL in accordance with 257.73(e) of the CCR Rule. As discussed in the Safety Factor Assessment, soil borings were installed at the site in 1971 and 1974 (Appendix D), as well as along the north embankment of the COL Secondary Ash Pond in 2011 (Appendix E). The soil boring data observed the embankments of the COL Secondary Ash Pond to be constructed of dense sand.

[26] Site Closure – Primary Fly Ash Settling Pond, Columbia Generating Station, November 1987, Warzyn Engineering and Services Company, Inc.

Historical aerial photographs (Appendix B) and historical topographic maps (Appendix C) identify the topographic changes to the COL Secondary Ash Pond that have occurred since the time of initial facility operations.

3.2.6 Structures, Appurtenances, and Operations- §257.73(c)(1)(vii)

Detailed dimensional drawings of the COL Secondary Ash Pond that were reasonably and readily available are identified below. The detailed dimensional drawings were obtained from various designs, plans, and reports that were assembled during the historical information review.

- Dike and Site Work Soil Borings (1971) – Drawings prepared by Sargent & Lundy provide historical soil boring locations and soil boring logs that were completed at COL prior to construction of the generating plant and CCR surface impoundments (Appendix D).

- Ash Basin Proposed Layouts (1972) – Drawings prepared by Sargent & Lundy provide various layouts of the ash basin that were proposed for COL. The proposed layouts provide existing topographic information, proposed layout of the ash basin embankments, as well as proposed sections of the embankment. The layouts for the ash basin were provided for COL with only Unit 1, as well as COL with both Unit 1 and Unit 2 (Appendix A).

- Proposed Ash Disposal Operation (1974) – Drawings from a proposed ash disposal operation plan provide layouts of the proposed ash disposal area (Appendix F).

- Ash Basin Soil Boring (1974) – Drawing provides historical soil boring log that was completed at COL in the area of the proposed ash basin (Appendix D).

- Ash Basin Sections and Details (1974,1977) – Drawings prepared by Sargent & Lundy provide sections and details of the ash basin effluent pump house, as well as the ash basin re-circulation pump house (Appendix F).

- Ash Expansion Area (1979) – Drawings prepared by General Engineering Company, Inc. provide topographic contours of the ash expansion area located north of the generating plant and south of the COL Secondary Ash Pond (Appendix F).

- Ash Basin Effluent Settling Pond (1980) – Drawings prepared by Sargent & Lundy provide layout and section details of the ash basin effluent settling pond located east of the generating plant and south of the COL Secondary Ash Pond (Appendix F).

- Primary Fly Ash Settling Basin Design (1981) – Drawings prepared by Warzyn Engineering Inc. provide the design layout of the primary fly ash settling pond, section details of the embankment increase and hydraulic structures, as well as the proposed closure layout of the CCR surface impoundment (Appendix F).

- Primary Fly Ash Settling Basin As-Built (1982) – Drawings prepared by Warzyn Engineering Inc. provide as-builts of the primary fly ash settling pond embankment increase, including section details (Appendix F).

- Primary Fly Ash Settling Basin Closure As-Built (1987) – Drawings prepared by Warzyn Engineering Inc. provide as-builts of the closure of the primary fly ash settling pond, including section details (Appendix F).

- Topographic Survey (1995) – Drawings provide topographic contours of the closed ash landfill, COL Primary Ash Pond, and the COL Secondary Ash Pond (Appendix F).

- Site Water Table Plan (2003) – Drawing prepared by RMT provides groundwater contours throughout the site (Appendix F).

- Geoprobe Boring Location Map (2011) – Drawing prepared by Aether DBS provides locations of the soil borings that were installed along the north

embankment of the COL Primary Ash Pond and Col Secondary Ash Pond, as well as along the east embankment of the COL Secondary Ash Pond (Appendix E).

- Aerial Survey (2014) – Drawing prepared by SCS Engineers provides topographic contours of the site, including the closed ash landfill, CCR surface impoundments, and active ash disposal facility (Appendix F).

3.2.7 Instrumentation - §257.73(c)(1)(viii)

The COL Secondary Ash Pond does not have existing instrumentation that supports the operation of the CCR unit. Additionally, review of readily available historical documents has not identified any past instrumentation that was used to support the operation of the COL Secondary Ash Pond.

3.2.8 Area-Capacity Curve - §257.73(c)(1)(ix)

An area-capacity curve identifies the relationship between the surface area of the existing CCR surface impoundment and an elevation, which corresponds to an available storage capacity. After review of readily available historical documents there is no readily available information regarding area-capacity curves for the COL Secondary Ash Pond.

3.2.9 Spillway and Diversion Features - §257.73(c)(1)(x)

The COL Secondary Ash Pond generally operates as a zero discharge pond. An effluent pump house is located in the southern end of the COL Secondary Ash Pond. The effluent pump house was historically used to pump water within the COL Secondary Ash Pond to the Polishing Pond located east of the generating plant.

3.2.10 Construction Specifications, Surveillance, Maintenance, and Repair - §257.73(c)(1)(xi)

COL implements a Site-Specific Inspection and Maintenance (I&M) Plan[27], in accordance with an Alliant Energy I&M Plan[28]. The Site-Specific I&M Plan has been implemented at COL in order to identify the factors which may affect the long-term stability of the existing CCR surface impoundment. The Site-Specific I&M Plan identifies existing

[27] Inspection and Maintenance (I&M) Plan, Columbia Energy Center, October 2015, Version 2.0-Revision 1.0
[28] Inspection and Maintenance (I&M) Plan, Alliant Energy, September 2015, Version 2.0-Revision 0.0

operation and maintenance activities, and identifies the inspection, monitoring, maintenance, and recordkeeping requirements as outlined in the Alliant Energy I&M Plan in order to maintain the integrity of the existing CCR surface impoundment.

Visual inspections of the COL Secondary Ash Pond are completed in accordance with §257.83 of the CCR Rule. At intervals not exceeding seven days, the COL Secondary Ash Pond is visually inspected for any appearances of structural weakness or other conditions which are disrupting or have the potential to disrupt the operation or safety of the existing CCR surface impoundment. In addition to seven-day inspections, COL conducts event-related inspections which may include inspections following storm events, seismic events, major maintenance activities, as well as other unusual events. Annual inspections are conducted by a qualified PE who is familiar with the requirements of the CCR Rule, the Alliant Energy I&M Plan, the COL Site-Specific I&M Plan, and other facility specific information pertaining to the existing CCR surface impoundment.

Maintenance activities that are completed at COL may include routine maintenance, event-related maintenance, and long-term maintenance. Routine maintenance activities may include management of vegetation (or other forms of slope protection), tree and sapling removal, reseeding of disturbed vegetated areas, removal of debris from collection and diversion channels, and repair of eroded areas. Event-related maintenance activities may include maintenance after unusual events such as heavy rainfall, periods of very high winds, or seismic activity. Maintenance may include repair of eroded areas or removal of damaged vegetation. Long-term maintenance activities are identified as part of the ongoing inspection program, through the annual inspections, or through other engineering evaluations and may include larger remediation activities.

3.2.11 Structural Instability Records - §257.73(c)(1)(xii)

After review of readily available historical documents there are no known records of structural instability associated with the COL Secondary Ash Pond that were identified.

4 CHANGES TO THE HISTORY OF CONSTRUCTION

If there is a significant change to any information compiled within the Report, the owner or operator of the CCR unit must update the relevant information and place into the facility's operating record as required by §257.105(f)(g).

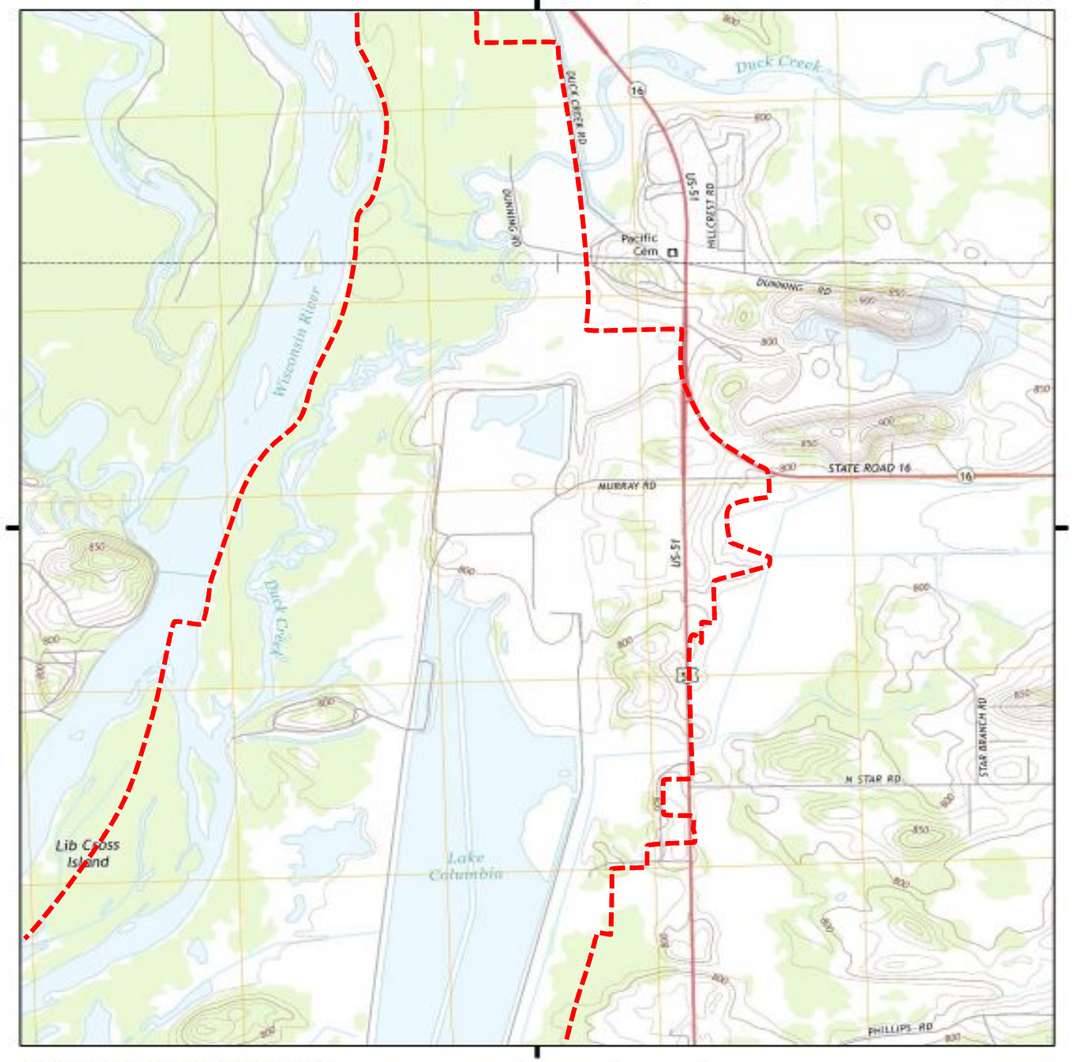
FIGURES

Alliant Energy
Wisconsin Power and Light Company
Columbia Energy Center
Pardeeville, Wisconsin

History of Construction

Historical Topo Map

2013



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

Miles 0.25 0.5 1 1.5

NW N NE
W E
SW S SE

TP, Poynette, 2013, 7.5-minute

N, Portage, 2013, 7.5-minute

SITE NAME: Columbia Energy Center
ADDRESS: W8375 Murray Road
Pardeeville, WI 53954
CLIENT: Environmental Site Assessors

N

4555570 - 7 page 4

Historical Aerial Photo 6/12/2014

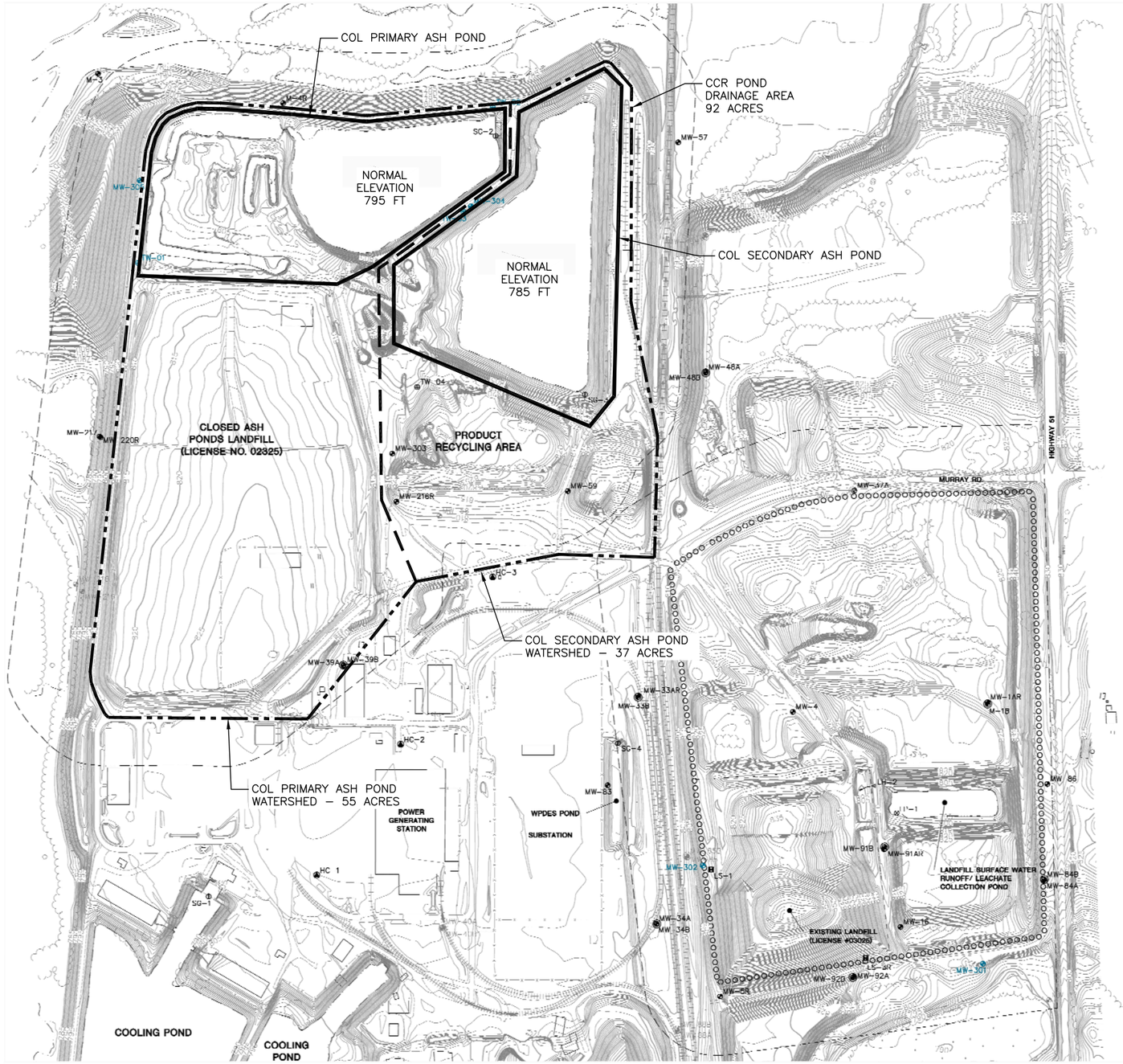
Approximate Property Boundary

HARD HAT SERVICES™
Engineering, Construction and Management Solutions

Site Location
Columbia Energy Center
Wisconsin Power and Light Company

Drawing
Figure 1

Date
7/12/2016



LEGEND

- EXISTING MAJOR CONTOUR (10' INTERVAL)
- EXISTING MINOR CONTOUR (2' CONTOUR)
- EXISTING FENCELINE
- EXISTING TRACKS
- EXISTING PAVED ROAD
- EXISTING UNPAVED ROAD
- EDGE OF WATER
- DESIGN MANAGEMENT ZONE
- APPROVED LIMITS OF WASTE
- CONSTRUCTED LIMITS OF WASTE
- WATER SUPPLY WELL
- STAFF GAUGE
- WATER TABLE WELL
- PIEZOMETER
- SURFACE WATER SAMPLE LOCATION
- LYSIMETER
- ABANDONED WATER TABLE WELL
- ABANDONED PIEZOMETER
- LEACHATE HEADWELL
- TEMPORARY WELL
- NEW WATERTABLE WELL

MAP SOURCE:
SCS ENGINEERS
COLUMBIA ASH PONDS AND DRY ASH DISPOSAL FACILITIES;
WELL LOCATION MAP; FIGURE 2
REV. DATE 2-2-16

NOTES:

1. BASE MAP CREATED FROM AERIAL SURVEY BY KBM, FLOWN DECEMBER 1, 2014.
2. MONITORING WELL LOCATIONS AND ELEVATIONS SURVEYED BY WISCONSIN POWER AND LIGHT, INC. IN DECEMBER 1994, NOVEMBER 1996, APRIL 2003, AND AUGUST 2012.
3. SUPPLY WELL LOCATIONS ARE APPROXIMATE AND ASSUMED BASED ON JANUARY 2013 DRAWINGS BY IRC.
4. THE LOCATIONS OF THE ASH PONDS FACILITY DESIGN MANAGEMENT ZONE DEMARCATION LINES ARE APPROXIMATE AND BASED ON THE WATER TABLE MAP (OCTOBER 2012) FIGURE BY KMI.
5. THE LOCATION OF THE ACTIVE DRY ASH LANDFILL DESIGN MANAGEMENT ZONE DEMARCATION LINE IS BASED ON A 300 FOOT OFFSET FROM THE DESIGN LIMITS OF ASH EXCEPT WHERE OFFSET WOULD EXTEND LINE BEYOND PROPERTY LINE.

0 250' 500'
SCALE: 1"=250'

REV	DATE	BY	DESCRIPTION
5			
4			
3			
2			
1			

hard hat™ SERVICES

SCALE:	AS SHOWN
DATE:	8-1-16
DRAWN BY:	JFD
CHKD BY:	TJH
APRVD BY:	MWL

CLIENT / LOCATION

WISCONSIN POWER AND LIGHT (WPL) COMPANY
COLUMBIA ENERGY CENTER
PARDEEVILLE, WISCONSIN

DRAWING DESCRIPTION

History of Construction

STORM WATER ROUTING

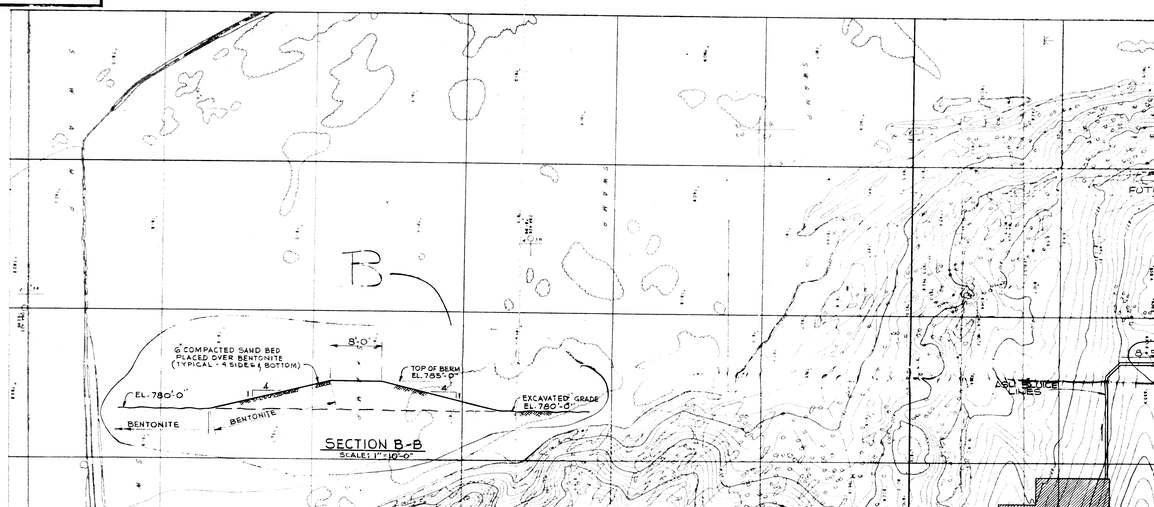
JOB 154.010.025
SHT. FIGURE 2
DWG. 154.010.025-D1

APPENDIX A – Ash Basin Proposed Layout Drawings - 1972

Alliant Energy
Wisconsin Power and Light Company
Columbia Energy Center
Pardeeville, Wisconsin

History of Construction

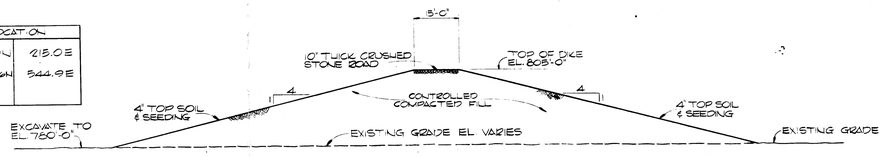
S-37



SECTION B-B
SCALE: 1" = 10'-0"

POINT NO.	LOCATION	
(9)	1000.0N	1650.0W
(20)	3702.49N	1870.0W
(21)	3702.49N	1027.9W
(22)	3034.27N	324.07W
(23)	3008.25N	182.95E
(24)	3599.62N	547.90E
(25)	2800.0N	300.0E
(32)	1500.0N	600.0E
(35)	3590.0N	1678.0W
(36)	3590.0N	972.0W
(37)	3535.0N	500.0W

POINT NO.	LOCATION	
(38)	8010.0N	215.0E
(39)	3799.66N	544.9E



SECTION A-A
TYPICAL DIKE SECTION
SCALE: 1" = 20'-0"

NORTH

NOTES

1. GRID SYSTEM -

PLANT COORDINATES	WIS. STATE PLAIN COORDINATE SYSTEM
0+00N	361800N
0+00E	2164800E

2. ALL DIKE CENTERLINE CURVES SHALL HAVE A RADIUS OF 1200 FEET EXCEPT AS NOTED.

REFERENCE DRAWINGS

S-7	DIKE & STEWOCK PLAN - SHEET 3
S-23	ROADS & DRAINAGE PLAN - SOUTH AREA
S-24	ROADS & DRAINAGE PLAN - NORTH AREA
S-27	ROADS & DRAINAGE PLAN - EAST AREA
S-38	ASH BASIN SECTIONS & DETAILS.

Drawing Release Record			
Rev.	Date	Init.	Description
	3-10-72	GE	FOR PERMITS
A	4-6-72	GE	FOR CONSTR.
B	9-24-73	G E	ADD DEWIN. BASIN

ASH BASIN

COLUMBIA GENERATING STATION
WISCONSIN POWER & LIGHT CO.
PORTAGE, WISCONSIN

SCALE 1" = 200'-0" UNLESS NOTED

DRAWN	N. TROM	1-19-72
CHECKED	G E Wood	3-9-72
ENGINEER	H. Bleiler	3-9-72
APPROVED	M Zar	3-9-72
JOB NO.		

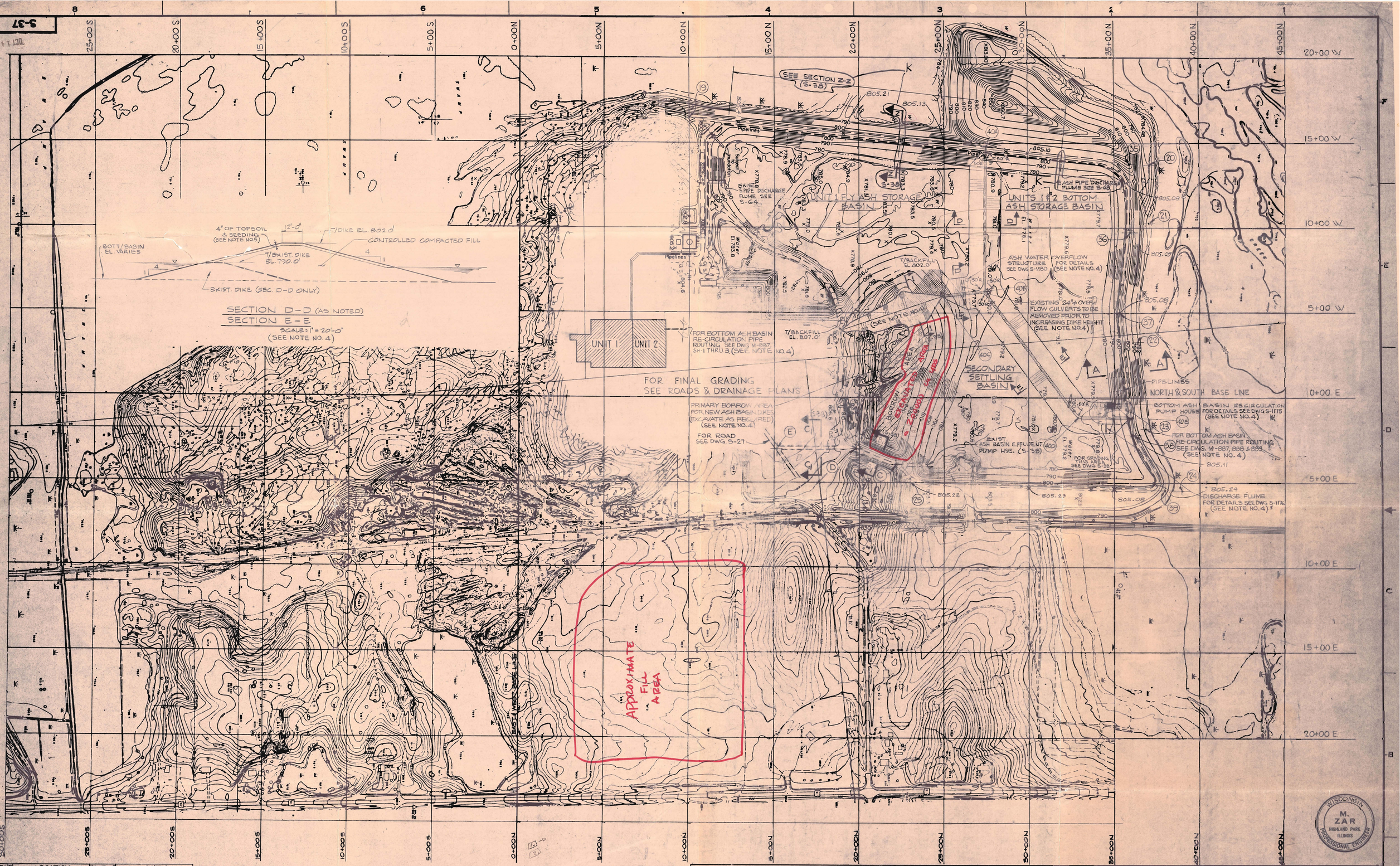
SARGENT & LUNDY ENGINEERS CHICAGO

DRAWING NO.

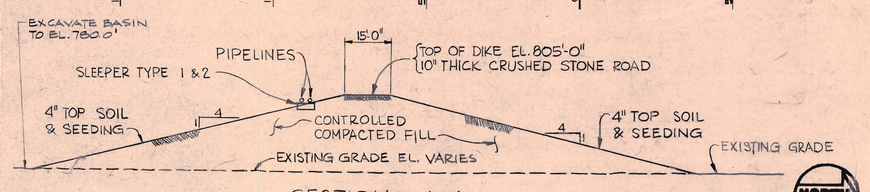
S-37

WISCONSIN
M. ZAR
HIGHLAND PARK, ILLINOIS
PROFESSIONAL ENGINEER

S-37



POINT NO.	LOCATION		POINT NO.	LOCATION	
(19)	1000.0 N	1650.0 W	(36)	3610.0 N	215.0 E
(20)	3702.49 N	1370.0 W	(39)	3799.62 N	344.9 E
(21)	3702.49 N	1027.96 W	(40A)	2746.0 N	1464.0 W
(22)	3684.57 N	324.67 W	(40B)	2734.0 N	623.0 W
(23)	3688.25 N	162.95 E	(40C)	2484.0 N	596.0 W
(24)	3699.62 N	347.90 E	(40D)	3289.57 N	115.55 E
(25)	2800.0 N	300.0 E	(40E)	3579.57 N	115.55 E
(26)	1500.0 N	600.0 E			
(33)	3590.0 N	1375.0 W			
(34)	3590.0 N	972.0 W			
(35)	3595.0 N	300.0 W			



SECTION A-A
SCALE: 1" = 20'-0"

NOTES

1. GRID SYSTEM –

PLANT COORDINATES	WIS. STATE PLAIN COORDINATE SYSTEM
0+00E	2454200E
0+00N	545800N

2. ALL DIKE CENTERLINE CURVES SHALL HAVE A RADIUS OF 200 FEET EXCEPT AS NOTED.
3. FOR LOCATION & PROFILE OF ACCESS ROAD TO ASH BASIN EFFLUENT PUMP HOUSE & DIKE SEE DWG. S-38.
4. ALL NEW WORK SHOWN SHALL BE DONE BY THE "ASH HANDLING SYSTEM CONTRACTOR" IN ACCORDANCE WITH SPECIFICATION W-2908.
5. TOPSOIL & SEEDING SHALL BE DONE FROM T/DIKE (EL 802.0) DOWN TO THE WATER LEVEL OF THE BASIN AT THE TIME OF PLACEMENT.

REFERENCE DRAWINGS

S-7	DIKE 1 SITEWORK PLAN - SHEET 5
S-25	ROADS & DRAINAGE PLAN - SOUTH AREA
S-26	ROADS & DRAINAGE PLAN - NORTH AREA
S-27	ROADS & DRAINAGE PLAN - EAST AREA
S-38	ASH BASIN SECTIONS & DETAILS.
S-59	ASH BASIN EFFLUENT PUMP HOUSE - PLAN & SECTIONS
S-60	ASH BASIN EFFLUENT PUMP HOUSE - SECTIONS & DETAILS
S-1175	BOTTOM ASH WATER RECIRCULATION PUMP HOUSE
M887-SH1	BOTTOM ASH WATER RECIRCULATION PUMP HOUSE - PIPING
M887-SH2 M887-SH3	BOTTOM ASH WATER RECIRCULATION PUMP HOUSE - OUTDOOR PIPING
S-64	ASH PIPE DISCHARGE FLUME
S-1176	BOTTOM ASH WATER RECIRCULATION FOUNDATION - SECTION & DETAILS - SHEET 1
S-1180	ASH WATER OVERFLOW STRUCTURE - PLAN & SECTIONS

Drawing Release Record			
Rev.	Date	Init.	Description
	3-10-72	GE	FOR PERMITS
A	4-6-72	G.E.	FOR CONST.
B	9-24-73	G.E.	ADD DRAIN DITCH
C	3-26-74	G.E.	ADD 24"ø R.C.P. & R.C.P. END SECT.
	6-12-74	G.E.	ADD 24"ø R.C.P. & R.C.P. END SECT.
D	1-24-75	G.E.	ADD DRAIN DITCH
E	7-23-76	G.E.	ADD DIKE RAISE
F	12-17-76	G.E.	ADD DIKE RAISE
G	12-27-76	G.E.	ADD DIKE RAISE
H	1-24-77	G.E.	ADD DIKE RAISE
I	3-29-77	G.E.	ADD DIKE RAISE
K	9-29-77	G.E.	ADD DIKE RAISE

ASH BASIN

COLUMBIA GENERATING STATION
WISCONSIN POWER & LIGHT CO.
PORTAGE, WISCONSIN

SCALE 1"=200'-0" UNLESS NOTED

DRAWN J. TROM 1-10-72

CHECKED G.F. Madow 3-9-72

ENGINEER F.H. Klokkau 3-9-72

APPROVED M. Zar 3-9-72

JOB NO.

SARGENT & LUNDY ENGINEERS CHICAGO

DRAWING NO. S-37

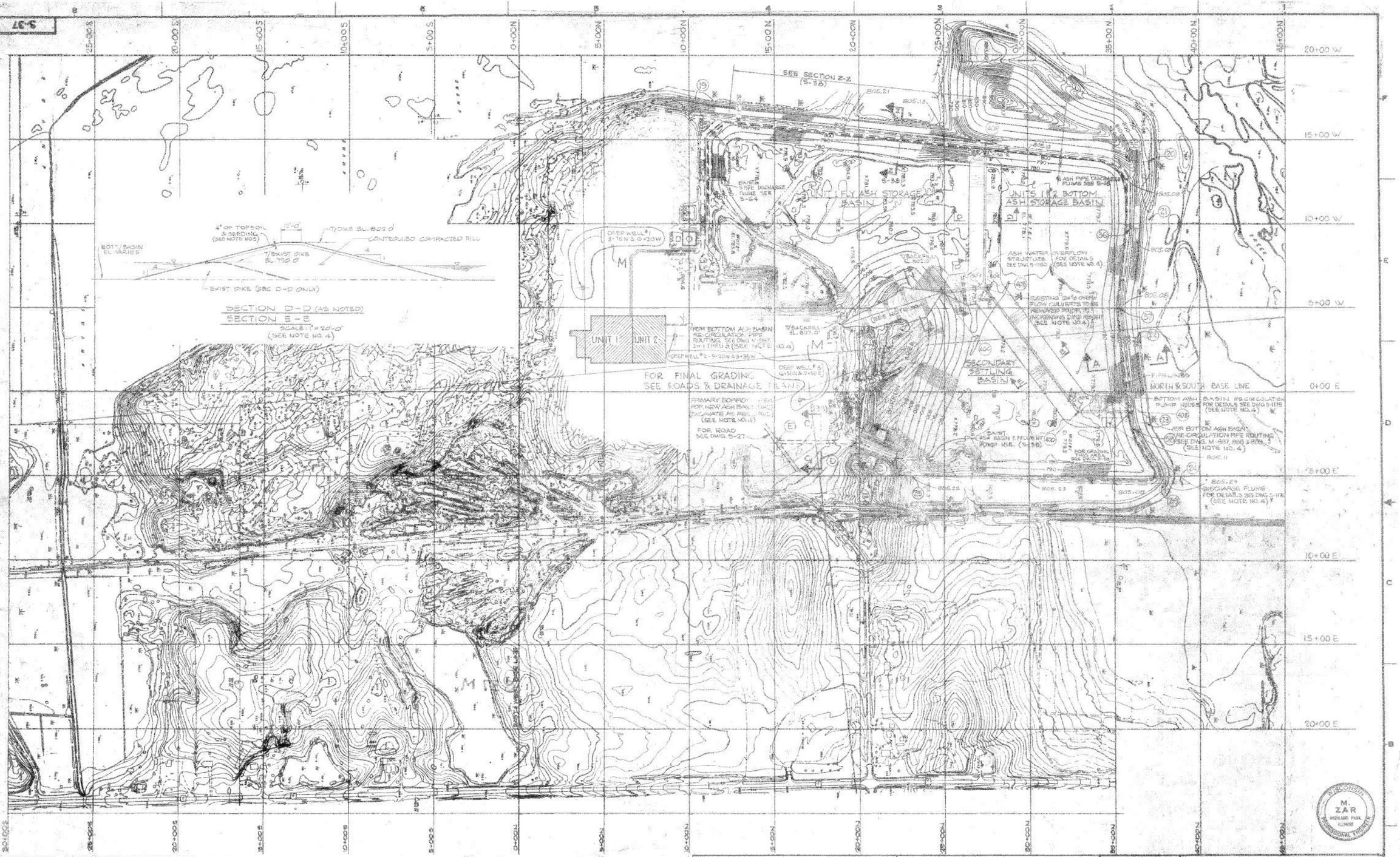
OCT 2 9 1977

REDRAWN 1-24-75

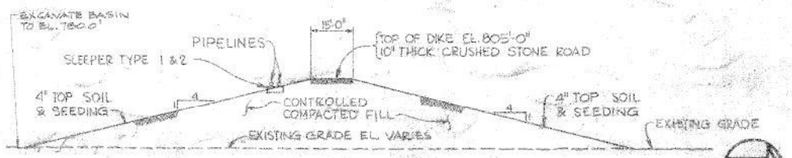
WISCONSIN M. ZAR HIGHLAND PARK ILLINOIS PROFESSIONAL ENGINEER

CUSHING 2-CC-4

S-37



POINT NO.	LOCATION		POINT NO.	LOCATION	
(19)	1000 N	1650.0 W	(66)	6410.0 N	215.0 E
(20)	5702.49 N	1670.0 W	(69)	3799.66 N	544.98 E
(21)	5702.49 N	1027.96 W	(404)	2746.0 N	1464.0 W
(22)	5068.87 N	524.07 W	(405)	2734.0 N	623.0 W
(24)	5068.29 N	182.98 E	(406)	2484.0 N	596.0 W
(23)	5699.62 N	547.90 E	(407)	3289.57 N	116.55 E
(25)	2800.0 N	500.0 E	(408)	3699.57 N	116.55 E
(26)	1500.0 N	602.0 E			
(65)	5990.0 N	879.0 W			
(67)	5990.0 W	872.0 W			
(68)	5990.0 N	500.0 W			



NOTES

1. GEO SYSTEM -

PLANT COORDINATES	WIS. STATE PLAN COORDINATE SYSTEM
0+0.00E	2164500E

2. ALL DIKE CENTERLINE CURVES SHALL HAVE A RADIUS OF 100 FEET EXCEPT AS NOTED.
3. FOR LOCATION & PROFILE OF ACCESS ROAD TO ASH BASIN EFFLUENT PUMP HOUSE & DIKE SEE DWG. S-38.
4. ALL NEW WORK SHOWN SHALL BE DONE BY THE ASH HANDLING SYSTEM CONTRACTOR IN ACCORDANCE WITH SPECIFICATION W-2918.
5. TOPSOIL & SEEDING SHALL BE DONE FROM TOP OF DIKES (EL. 802.0) DOWN TO THE WATER LEVEL OF THE BASIN AT THE TIME OF PLACEMENT.

REFERENCE DRAWINGS

S-7	DIKE & STRUCTURE PLAN - SHEET 3
S-25	ROADS & DRAINAGE PLAN - NORTH AREA
S-27	ROADS & DRAINAGE PLAN - SOUTH AREA
S-37	ROADS & DRAINAGE PLAN - EAST AREA
S-38	ASH BASIN SECTIONS & DETAILS
S-88	ASH BASIN EFF. U&2 PUMP HOUSE - PLAN & SECTIONS
S-90	ASH BASIN EFFLUENT PUMP HOUSE - DETAILS & DETAILS
S-1175	BOTTOM ASH WATER RECIRCULATION PUMP HOUSE
M587-1&2	BOTTOM ASH WATER RECIRCULATION PUMP HOUSE - PIPING
M587-3&4	BOTTOM ASH WATER RECIRCULATION PUMP HOUSE - OUTDOOR PIPING
M587-5&7	BOTTOM ASH WATER RECIRCULATION PUMP HOUSE - OUTDOOR PIPING
S-1176	ASH PIPE DISCHARGE FLUME
S-1176	BOTTOM ASH WATER RECIRCULATION FOUNDATIONS - SECTION & DETAILS - SHEET 1
S-1180	ASH WATER OVERFLOW STRUCTURE - PLAN & SECTIONS

Drawing Revision Record			
Rev.	Date	Init.	Description
	5-10-72	JW	FOR PERMITS
A	6-16-72	GE	PER CONST'D
B	7-24-72	GE	ADD DOWN, BASIN
C	8-24-72	GE	
D	9-15-72	GE	
E	10-16-72	GE	
F	10-17-72	GE	
G	10-20-72	GE	
H	11-7-72	GE	
J	11-27-72	GE	
K	12-7-72	GE	
L	12-19-72	GE	
M	1-9-73	GE	
N	2-9-73	GE	

ASH BASIN

COLUMBIA GENERATING STATION
WISCONSIN POWER & LIGHT CO.
PORTAGE, WISCONSIN

SCALE: 1"=200'-0" | 1"=100'-0" NOTED

DRAWN	J. WILSON	1-9-73
CHECKED	G.E. Weber	1-9-73
APPROVED	Allen	1-9-73
ENGINEER		2-1-73
PROJECT MGR.		

SARGENT & LUNDY ENGINEERS CHICAGO

DRAWING NO. S-37

REDRAWN 1-24-75

WISCONSIN M. ZAR HIGHLAND PARK, ILLINOIS PROFESSIONAL ENGINEER

APPENDIX B – EDR Historical Aerial Photograph Package

Alliant Energy
Wisconsin Power and Light Company
Columbia Energy Center
Pardeeville, Wisconsin

History of Construction

Columbia Energy Center
W8375 Murray Road
Pardeeville, WI 53954

Inquiry Number: 4555570.8
March 08, 2016

The EDR Aerial Photo Decade Package

6 Armstrong Road, 4th Floor
Shelton, Connecticut 06484
Toll Free: 800.352.0050
www.edrnet.com

EDR Aerial Photo Decade Package

Environmental Data Resources, Inc. (EDR) Aerial Photo Decade Package is a screening tool designed to assist environmental professionals in evaluating potential liability on a target property resulting from past activities. EDR's professional researchers provide digitally reproduced historical aerial photographs, and when available, provide one photo per decade.

When delivered electronically by EDR, the aerial photo images included with this report are for ONE TIME USE ONLY. Further reproduction of these aerial photo images is prohibited without permission from EDR. For more information contact your EDR Account Executive.

Thank you for your business.
Please contact EDR at 1-800-352-0050
with any questions or comments.

Date EDR Searched Historical Sources:

Aerial Photography March 08, 2016

Target Property:

W8375 Murray Road

Pardeeville, WI 53954

Year	***Scale***	***Details***	***Source***
1937	Aerial Photograph. Scale: 1"=500'	Flight Date: September 21, 1937	EDR
1937	Aerial Photograph. Scale: 1"=500'	Flight Date: September 21, 1937	EDR
1956	Aerial Photograph. Scale: 1"=500'	Flight Date: May 22, 1956	EDR
1960	Aerial Photograph. Scale: 1"=500'	Flight Date: November 10, 1960	EDR
1960	Aerial Photograph. Scale: 1"=500'	Flight Date: November 10, 1960	EDR
1974	Aerial Photograph. Scale: 1"=500'	Flight Date: April 24, 1974	EDR
1974	Aerial Photograph. Scale: 1"=500'	Flight Date: April 24, 1974	EDR
1978	Aerial Photograph. Scale: 1"=500'	Flight Date: June 19, 1978	EDR
1978	Aerial Photograph. Scale: 1"=500'	Flight Date: June 19, 1978	EDR
1978	Aerial Photograph. Scale: 1"=500'	Flight Date: June 19, 1978	EDR
1982	Aerial Photograph. Scale: 1"=750'	Flight Date: October 23, 1982	EDR
1986	Aerial Photograph. Scale: 1"=500'	Flight Date: June 02, 1986	EDR
1986	Aerial Photograph. Scale: 1"=500'	Flight Date: June 02, 1986	EDR
1992	Aerial Photograph. Scale: 1"=750'	Flight Date: April 27, 1992	EDR
1995	Aerial Photograph. Scale: 1"=500'	DOQQ - acquisition dates: April 04, 1995	USGS/DOQQ
1995	Aerial Photograph. Scale: 1"=500'	DOQQ - acquisition dates: April 04, 1995	USGS/DOQQ
1995	Aerial Photograph. Scale: 1"=500'	DOQQ - acquisition dates: April 04, 1995	USGS/DOQQ
1995	Aerial Photograph. Scale: 1"=500'	DOQQ - acquisition dates: April 04, 1995	USGS/DOQQ
1998	Aerial Photograph. Scale: 1"=750'	Flight Date: April 27, 1998	EDR

Year	*Scale*	*Details*	*Source*
2005	Aerial Photograph. Scale: 1"=500'	Flight Year: 2005	USDA/NAIP
2005	Aerial Photograph. Scale: 1"=500'	Flight Year: 2005	USDA/NAIP
2005	Aerial Photograph. Scale: 1"=500'	Flight Year: 2005	USDA/NAIP
2005	Aerial Photograph. Scale: 1"=500'	Flight Year: 2005	USDA/NAIP
2006	Aerial Photograph. Scale: 1"=500'	Flight Year: 2006	USDA/NAIP
2006	Aerial Photograph. Scale: 1"=500'	Flight Year: 2006	USDA/NAIP
2006	Aerial Photograph. Scale: 1"=500'	Flight Year: 2006	USDA/NAIP
2006	Aerial Photograph. Scale: 1"=500'	Flight Year: 2006	USDA/NAIP
2008	Aerial Photograph. Scale: 1"=500'	Flight Year: 2008	USDA/NAIP
2008	Aerial Photograph. Scale: 1"=500'	Flight Year: 2008	USDA/NAIP
2008	Aerial Photograph. Scale: 1"=500'	Flight Year: 2008	USDA/NAIP
2008	Aerial Photograph. Scale: 1"=500'	Flight Year: 2008	USDA/NAIP
2010	Aerial Photograph. Scale: 1"=500'	Flight Year: 2010	USDA/NAIP
2010	Aerial Photograph. Scale: 1"=500'	Flight Year: 2010	USDA/NAIP
2010	Aerial Photograph. Scale: 1"=500'	Flight Year: 2010	USDA/NAIP
2010	Aerial Photograph. Scale: 1"=500'	Flight Year: 2010	USDA/NAIP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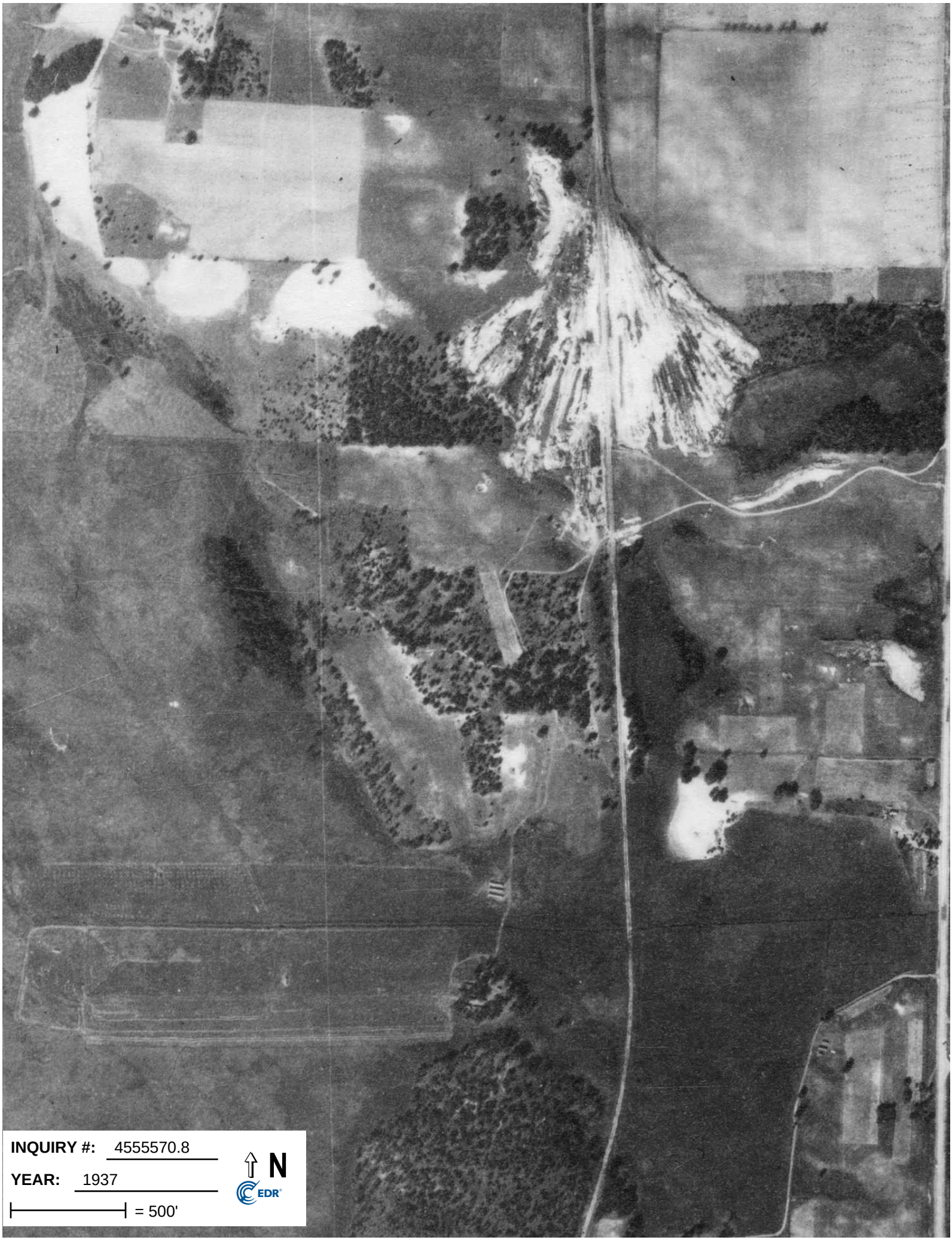
YEAR: 1937
= 500'
N
EDR



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YEAR: 1937

= 500'

N

EDR


INQUIRY #: 4555570.8
YEAR: 1956
= 500'
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EDR


INQUIRY #: 4555570.8
YEAR: 1960
= 500'
N
EDR


INQUIRY #: 4555570.8
YEAR: 1960
= 500'
N
EDR

INQUIRY #: 4555570.8

YEAR: 1974

= 500'

N

EDR

INQUIRY #: 4555570.8

YEAR: 1974

= 500'

N

EDR

INQUIRY #: 4555570.8

YEAR: 1978

= 500'

N

EDR


INQUIRY #: 4555570.8
YEAR: 1978
= 500'
N
EDR

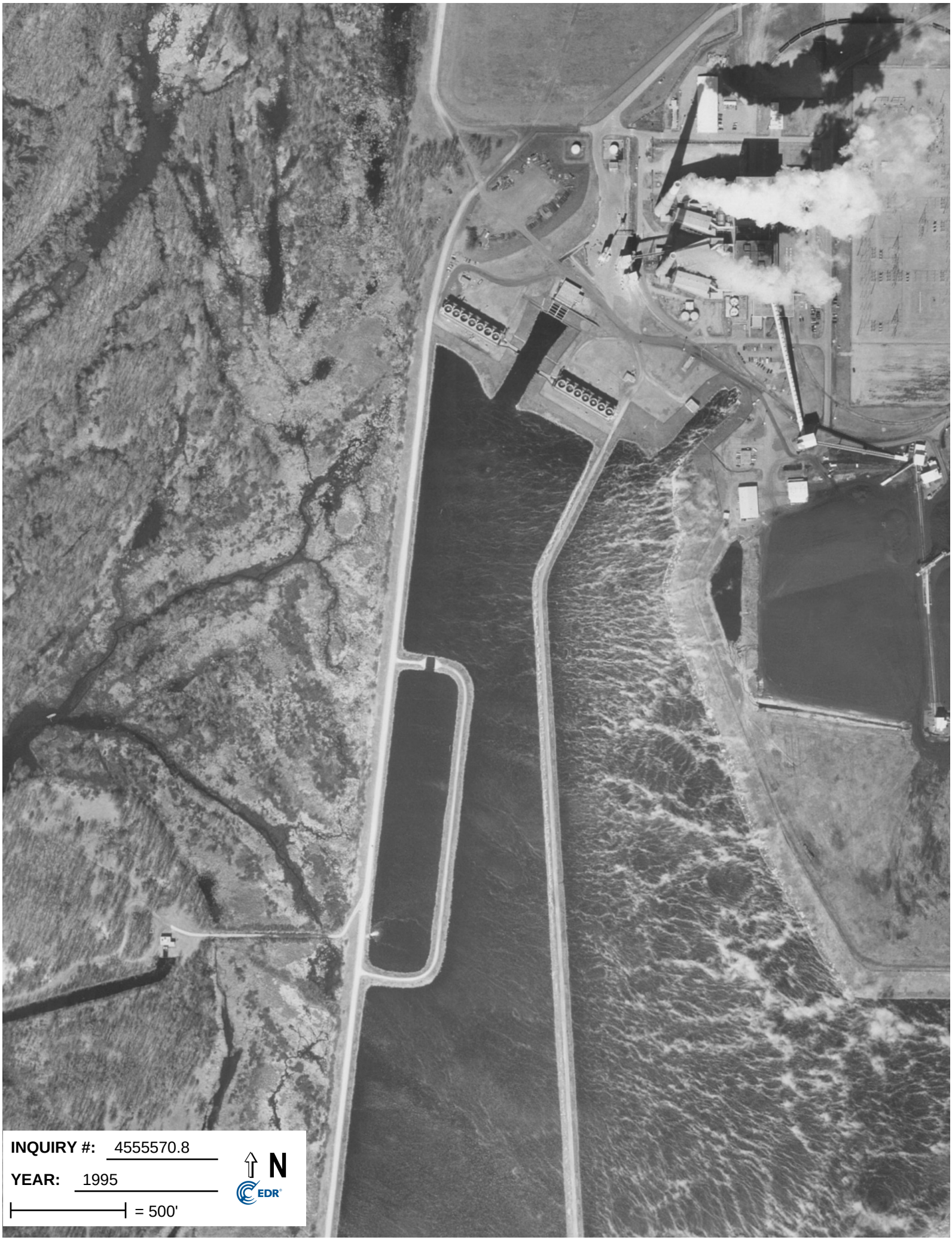

INQUIRY #: 4555570.8
YEAR: 1978
= 500'
N
EDR


INQUIRY #: 4555570.8
YEAR: 1982
= 750'
N
EDR


INQUIRY #: 4555570.8
YEAR: 1986
= 500'
N
EDR


INQUIRY #: 4555570.8
YEAR: 1986
= 500'
N
EDR


INQUIRY #: 4555570.8
YEAR: 1992
= 750'
N
EDR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EDR


INQUIRY #: 4555570.8
YEAR: 1995
= 500'
N
EDR


INQUIRY #: 4555570.8
YEAR: 1995
= 500'
N
EDR

INQUIRY #: 4555570.8

YEAR: 1995

= 500'

N

EDR


INQUIRY #: 4555570.8
YEAR: 1998
= 750'
N
EDR


INQUIRY #: 4555570.8
YEAR: 2005
= 500'
N
EDR


INQUIRY #: 4555570.8
YEAR: 2005
= 500'
N
EDR


INQUIRY #: 4555570.8
YEAR: 2005
= 500'
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EDR


INQUIRY #: 4555570.8
YEAR: 2005
= 500'
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EDR


INQUIRY #: 4555570.8
YEAR: 2006
= 500'
N
EDR


INQUIRY #: 4555570.8
YEAR: 2006
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EDR


INQUIRY #: 4555570.8
YEAR: 2006
= 500'
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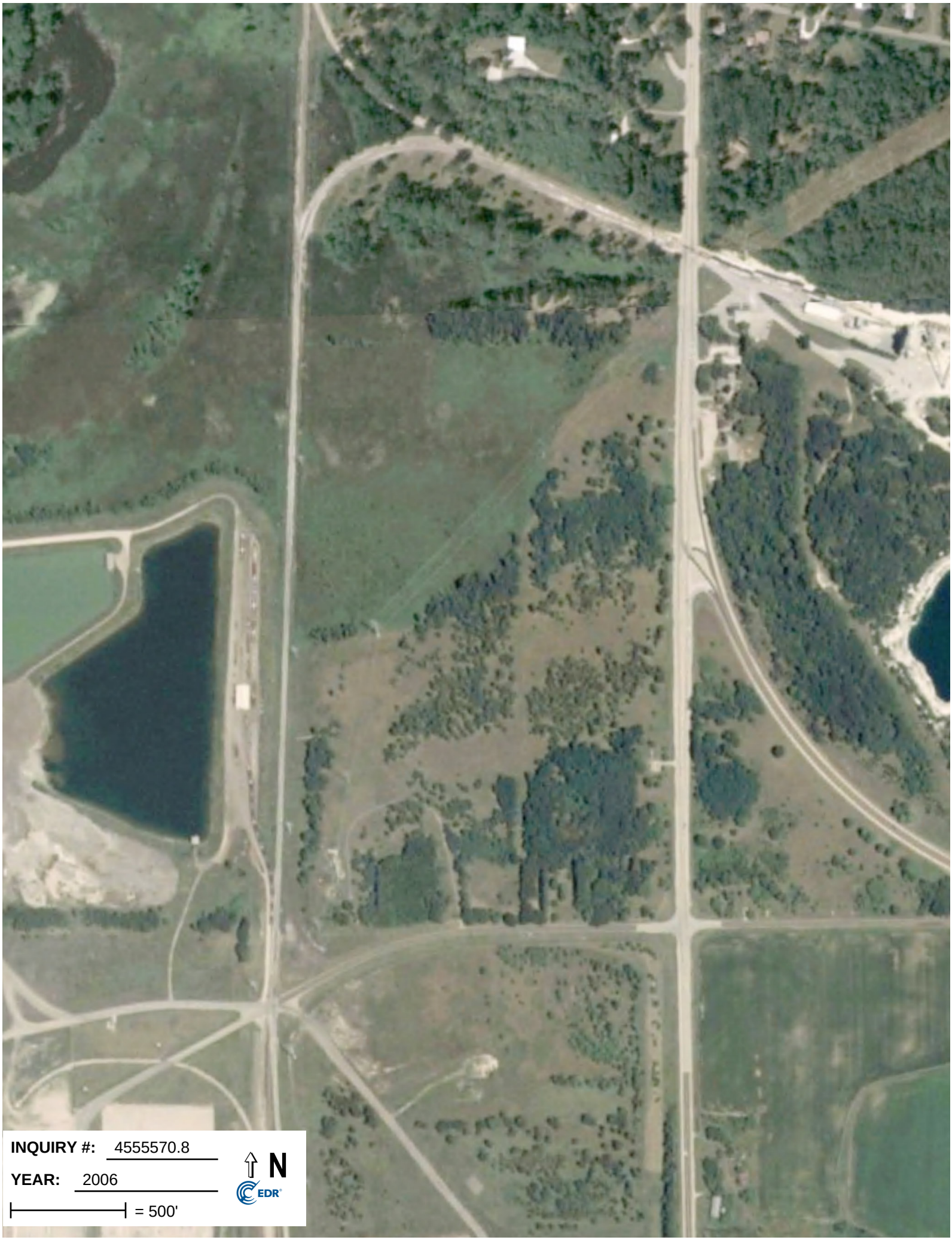
EDR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INQUIRY #: 4555570.8
YEAR: 2008
= 500'
N
EDR


INQUIRY #: 4555570.8
YEAR: 2008
= 500'
N
EDR


INQUIRY #: 4555570.8
YEAR: 2008
= 500'
N
EDR


INQUIRY #: 4555570.8
YEAR: 2010
= 500'
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EDR


INQUIRY #: 4555570.8
YEAR: 2010
= 500'
N
EDR


INQUIRY #: 4555570.8
YEAR: 2010
= 500'
N
EDR


INQUIRY #: 4555570.8
YEAR: 2010
= 500'
N
EDR

APPENDIX C – EDR Historical Topographic Map Report

Alliant Energy
Wisconsin Power and Light Company
Columbia Energy Center
Pardeeville, Wisconsin

History of Construction

Columbia Energy Center
W8375 Murray Road
Pardeeville, WI 53954

Inquiry Number: 4555570.7
March 04, 2016

EDR Historical Topo Map Report

with QuadMatch™

6 Armstrong Road, 4th floor
Shelton, CT 06484
Toll Free: 800.352.0050
www.edrnet.com

EDR Historical Topo Map Report

03/04/16

Site Name:
Columbia Energy Center
W8375 Murray Road
Pardeeville, WI 53954
EDR Inquiry # 4555570.7

Client Name:
Environmental Site Assessors
932 North Wright Street, Suite 1(
Naperville, IL 60563
Contact: Mark W Loerop

EDR Topographic Map Library has been searched by EDR and maps covering the target property location as provided by Environmental Site Assessors were identified for the years listed below. EDR's Historical Topo Map Report is designed to assist professionals in evaluating potential liability on a target property resulting from past activities. EDRs Historical Topo Map Report includes a search of a collection of public and private color historical topographic maps, dating back to the late 1800s.

Search Results:

Site Name: Columbia Energy Center
Address: W8375 Murray Road
City,State,Zip: Pardeeville, WI 53954
P.O.# NA
Project: CEC Historical Docs

Coordinates:

Latitude: 43.487795 43° 29' 16" North
Longitude: -89.41788 -89° 25' 4" West
UTM Zone: Zone 16 North
UTM X Meters: 304485.59
UTM Y Meters: 4817825.86
Elevation: 807.00' above sea level

Maps Provided:

2013
1984
1962
1901, 1902

Topo Sheet Thumbnails

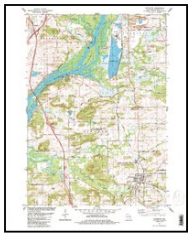
This EDR Topo Map Report is based upon the following USGS topographic map sheets.

2013 Source Sheets

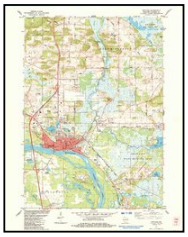
Poynette
2013
7.5-minute, 24000

Portage
2013
7.5-minute, 24000

1984 Source Sheets

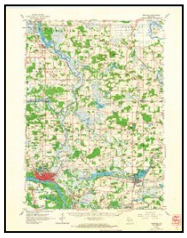


Poynette
1984
7.5-minute, 24000
Aerial Photo Revised 1982
Edited 1984

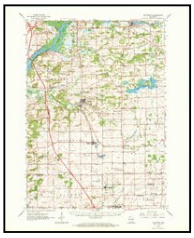


Portage
1984
7.5-minute, 24000
Aerial Photo Revised 1982
Edited 1984

1962 Source Sheets

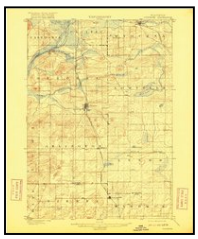


Portage
1962
15-minute, 62500
Aerial Photo Revised 1960



Poynette
1962
15-minute, 62500
Aerial Photo Revised 1960

1901, 1902 Source Sheets



Poynette
1901
15-minute, 62500

Portage
1902
15-minute, 62500

Historical Topo Map

2013

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

Miles 0.25 0.5 1 1.5

NW N NE
W E
SW S SE

TP, Poynette, 2013, 7.5-minute

N, Portage, 2013, 7.5-minute

SITE NAME: Columbia Energy Center
ADDRESS: W8375 Murray Road
Pardeeville, WI 53954
CLIENT: Environmental Site Assessors

N

Historical Topo Map

1984

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

Miles 0.25 0.5 1 1.5

NW N NE
W E
SW S SE

TP, Poynette, 1984, 7.5-minute

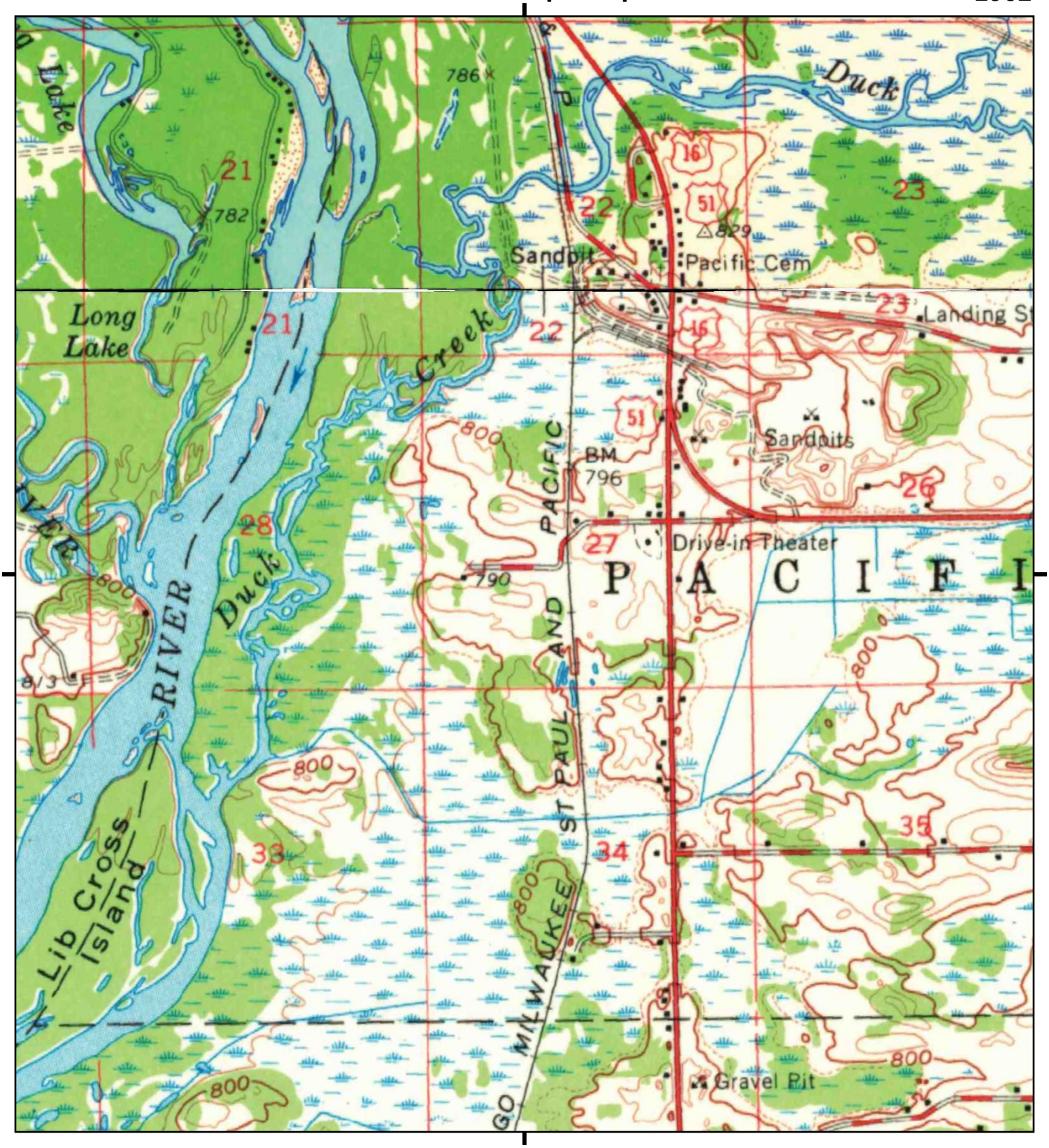
N, Portage, 1984, 7.5-minute

SITE NAME: Columbia Energy Center
ADDRESS: W8375 Murray Road
Pardeeville, WI 53954
CLIENT: Environmental Site Assessors

N

Historical Topo Map

1962



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

Miles 0.25 0.5 1 1.5

NW N NE
W E
SW S SE

TP, Poynette, 1962, 15-minute

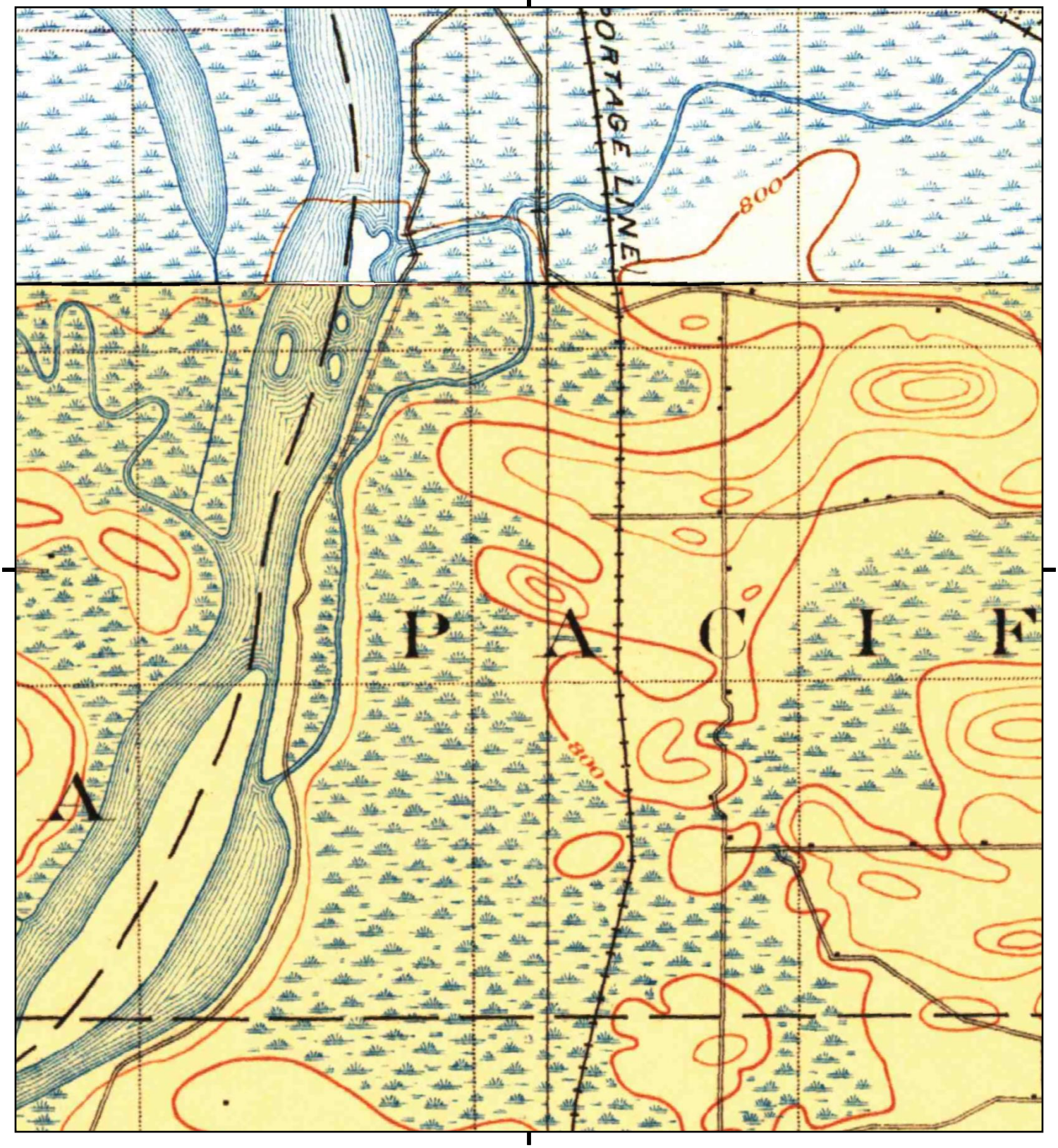
N, Portage, 1962, 15-minute

SITE NAME: Columbia Energy Center
ADDRESS: W8375 Murray Road
Pardeeville, WI 53954
CLIENT: Environmental Site Assessors

N

Historical Topo Map

1901, 1902



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

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NW N NE
W E
SW S SE

TP, Poynette, 1901, 15-minute

N, Portage, 1902, 15-minute

SITE NAME: Columbia Energy Center
ADDRESS: W8375 Murray Road
Pardeeville, WI 53954
CLIENT: Environmental Site Assessors

N

APPENDIX D –Soil Borings – 1971, 1974

Alliant Energy
Wisconsin Power and Light Company
Columbia Energy Center
Pardeeville, Wisconsin

History of Construction

S-4

LOG OF BORING NO. 1
OWNER: Wisconsin Power & Light Company — ARCHITECT-ENGINEER: Sargent & Lundy
SITE: Portage, Wisconsin — PROJECT NAME: Proposed Cooling Reservoir

- Black peat-trace fine sand (Pt)
- Fine sand-trace to some silt-brown (SM)
- Fine sand-trace silt-light brown (SP)
- End of Boring

LOG OF BORING NO. 2
OWNER: Wisconsin Power & Light Company — ARCHITECT-ENGINEER: Sargent & Lundy
SITE: Portage, Wisconsin — PROJECT NAME: Proposed Cooling Reservoir

- Dark brown silty and sandy topsoil (OL)
- Silty fine sand-trace clay-brown (SM)
- Silty fine sand-trace fine gravel starting @ 5 1/2' brown (SM)
- End of Boring

LOG OF BORING NO. 3
OWNER: Wisconsin Power & Light Company — ARCHITECT-ENGINEER: Sargent & Lundy
SITE: Portage, Wisconsin — PROJECT NAME: Proposed Cooling Reservoir

- Black peat (Pt)
- Fine sand-trace silt-gray (SP) few thin 1/16" silty fine sand seams
- Fine sand-trace silt-light brown (SP)
- Silt-trace clay-brown (ML) few seams of very fine sandy silt (ML)
- End of Boring
- *Calibrated Penetrometer

LOG OF BORING NO. 4
OWNER: Wisconsin Power & Light Company — ARCHITECT-ENGINEER: Sargent & Lundy
SITE: Portage, Wisconsin — PROJECT NAME: Proposed Cooling Reservoir

- Black peat (Pt) becoming very fine fibrous peat @ 3'
- Fine sand-trace silt-gray (SP)
- 1/4" to 1/2" horizontal seams of gray and gray brown silty clay (CL) thin to 1/16" horizontal seams of gray silt and brown silty fine sand
- End of Boring

LOG OF BORING NO. 5
OWNER: Wisconsin Power & Light Company — ARCHITECT-ENGINEER: Sargent & Lundy
SITE: Portage, Wisconsin — PROJECT NAME: Proposed Cooling Reservoir

- Gray organic silty clay (OH) 1" fine sand seam
- Black peat (Pt)
- Fine sand-trace silt-gray brown (SP)
- Fine-coarse sand-trace to some fine-medium gravel-trace silt-brown (SW)
- Fine-medium sand-trace fine gravel and silt-light brown (SP)
- End of Boring
- *Calibrated Penetrometer

LOG OF BORING NO. 16
OWNER: Wisconsin Power & Light Company — ARCHITECT-ENGINEER: Sargent & Lundy
SITE: Portage, Wisconsin — PROJECT NAME: Proposed Cooling Reservoir

- Black fine fibrous peat (Pt)
- Fine-coarse sand-trace silt-grayish brown (SP)
- Fine-medium sand-trace coarse sand-fine gravel and silt-brown (SP)
- End of Boring

LOG OF BORING NO. 17
OWNER: Wisconsin Power & Light Company — ARCHITECT-ENGINEER: Sargent & Lundy
SITE: Portage, Wisconsin — PROJECT NAME: Proposed Cooling Reservoir

- Black peat (Pt) becoming fine fibrous peat @ 3'
- Fine sand-very light brown with 1 1/2" sandstone gravel
- Silty fine sand-trace to some fine-coarse sandstone gravel-brown (SM)
- Fine-coarse sand-trace to some fine-medium gravel-trace silt-brown (SW)
- End of Boring
- Calibrated Penetrometer

LOG OF BORING NO. 18
OWNER: Wisconsin Power & Light Company — ARCHITECT-ENGINEER: Sargent & Lundy
SITE: Portage, Wisconsin — PROJECT NAME: Proposed Cooling Reservoir

- Black peat (Pt) becoming fine fibrous peat @ 3'
- Organic fine sandy silt-trace clay-dark gray (OL)
- Fine sand-trace to some silt-dark grayish brown changing to light grayish brown @ 8' (SM)
- End of Boring
- *Calibrated Penetrometer

LOG OF BORING NO. 19
OWNER: Wisconsin Power & Light Company — ARCHITECT-ENGINEER: Sargent & Lundy
SITE: Portage, Wisconsin — PROJECT NAME: Proposed Cooling Reservoir

- Black peat
- Organic clayey silt-dark gray (OL)
- Fine-medium sand-trace silt-brown (SP)
- End of Boring

LOG OF BORING NO. 20
OWNER: Wisconsin Power & Light Company — ARCHITECT-ENGINEER: Sargent & Lundy
SITE: Portage, Wisconsin — PROJECT NAME: Proposed Cooling Reservoir

- Black peat (Pt)
- Silty fine sand-gray (SM) few seams of silt
- Fine sand-trace silt-grayish brown (SP)
- Fine-medium sand-trace silt-grayish brown (SP)
- End of Boring

LOG OF BORING NO. 6
OWNER: Wisconsin Power & Light Company — ARCHITECT-ENGINEER: Sargent & Lundy
SITE: Portage, Wisconsin — PROJECT NAME: Proposed Cooling Reservoir

- Black peat (Pt)
- Fine sand-trace silt-gray (SP)
- Fine-medium sand-trace silt-gray (SP)
- End of Boring

LOG OF BORING NO. 7
OWNER: Wisconsin Power & Light Company — ARCHITECT-ENGINEER: Sargent & Lundy
SITE: Portage, Wisconsin — PROJECT NAME: Proposed Cooling Reservoir

- Black peat (Pt)
- Black organic silty clay (OH)
- Silty clay-trace sand-grayish brown trace rusty brown (CL) irregular 1/4" seams of fine sand
- Fine sand-trace silt-gray (SP) seams of silty fine sand
- Fine sand-trace silt-trace fine gravel @ 5 1/2' grayish brown (SP)
- Black peat (Pt)
- Fine sand-trace silt-gray (SP)
- End of Boring
- *Calibrated Penetrometer

LOG OF BORING NO. 8
OWNER: Wisconsin Power & Light Company — ARCHITECT-ENGINEER: Sargent & Lundy
SITE: Portage, Wisconsin — PROJECT NAME: Proposed Cooling Reservoir

- Black peat
- Silty clay-trace sand-dark greenish gray to dark gray (CL) fine sand seams
- Fine sand-trace silt-grayish brown (SP)
- Silty fine sand-gray (SM) seams of fine sand @ 6'-seams of gray silty very fine sand 8' to 10'
- Fine sand-trace silt-grayish brown (SP)
- End of Boring

LOG OF BORING NO. 9
OWNER: Wisconsin Power & Light Company — ARCHITECT-ENGINEER: Sargent & Lundy
SITE: Portage, Wisconsin — PROJECT NAME: Proposed Cooling Reservoir

- Fine sand-trace silt-brown changing to rusty brown @ 3' and to light brown @ 5' (SP)
- Silty fine sand-brown and light brown (SM)
- End of Boring

LOG OF BORING NO. 10
OWNER: Wisconsin Power & Light Company — ARCHITECT-ENGINEER: Sargent & Lundy
SITE: Portage, Wisconsin — PROJECT NAME: Proposed Cooling Reservoir

- Black peat (Pt)
- Silty fine sand-dark rusty
- Fine sand-trace silt-brown (SP)
- Fine-medium sand-trace silt-trace fine gravel @ 13 1/2' brown (SP)
- End of Boring

LOG OF BORING NO. 21
OWNER: Wisconsin Power & Light Company — ARCHITECT-ENGINEER: Sargent & Lundy
SITE: Portage, Wisconsin — PROJECT NAME: Proposed Cooling Reservoir

- Black peat (Pt) becoming fine fibrous peat @ 3'
- Fine-medium sand-trace silt-gray (SP)
- End of Boring

LOG OF BORING NO. 22
OWNER: Wisconsin Power & Light Company — ARCHITECT-ENGINEER: Sargent & Lundy
SITE: Portage, Wisconsin — PROJECT NAME: Proposed Cooling Reservoir

- Black peat-trace sand (Pt)
- Fine sand-trace silt-grayish brown (SP)
- Fine-medium sand-trace silt and fine gravel-brown (SP)
- End of Boring

LOG OF BORING NO. 23
OWNER: Wisconsin Power & Light Company — ARCHITECT-ENGINEER: Sargent & Lundy
SITE: Portage, Wisconsin — PROJECT NAME: Proposed Cooling Reservoir

- Black peat (Pt)
- Organic silt-trace clay and fine sand-dark gray (OL)
- Fine sand-trace silt-grayish brown (SP)
- End of Boring

LOG OF BORING NO. 24
OWNER: Wisconsin Power & Light Company — ARCHITECT-ENGINEER: Sargent & Lundy
SITE: Portage, Wisconsin — PROJECT NAME: Proposed Cooling Reservoir

- Black peat (Pt) becoming very fine fibrous peat @ 3'
- Organic silt-trace fine sand-trace fine roots-dark gray (OL)
- Fine sand-trace silt-light brown (SP) few 1/4" seams of dark gray silty fine sand from 6.2' to 8'
- Fine-medium sand-trace silt-light brown (SP)
- End of Boring

LOG OF BORING NO. 25
OWNER: Wisconsin Power & Light Company — ARCHITECT-ENGINEER: Sargent & Lundy
SITE: Portage, Wisconsin — PROJECT NAME: Proposed Cooling Reservoir

- Fine sand-trace to some silt-trace gravel-trace to some gravel and cobbles starting @ 5' to 7.5' - brown (SM)
- Silty fine sand-trace fine-coarse gravel-brown (SM)
- End of Boring

LOG OF BORING NO. 11
OWNER: Wisconsin Power & Light Company — ARCHITECT-ENGINEER: Sargent & Lundy
SITE: Portage, Wisconsin — PROJECT NAME: Proposed Cooling Reservoir

- Fine sand and silt-trace clay-rusty brown (SM-ML)
- Fine-medium sand-trace silt-rusty brown changing to yellowish brown @ 3' and to brown @ 5 1/2' (SP)
- Fine-medium sand-trace fine gravel, coarse sand, and silt-grayish brown (SP)
- End of Boring

LOG OF BORING NO. 12
OWNER: Wisconsin Power & Light Company — ARCHITECT-ENGINEER: Sargent & Lundy
SITE: Portage, Wisconsin — PROJECT NAME: Proposed Cooling Reservoir

- Black peat (Pt)
- Silty fine sand-gray (SM) few seams of fine sand-trace silt @ 4' - 5'
- Fine sand-trace silt-brown (SP) few 1/2" to 3/4" seams of gray silty clay (CL)
- Silty clay-gray (CL) few 1/8" horizontal seams of brown fine sand and red brown clay
- End of Boring

LOG OF BORING NO. 13
OWNER: Wisconsin Power & Light Company — ARCHITECT-ENGINEER: Sargent & Lundy
SITE: Portage, Wisconsin — PROJECT NAME: Proposed Cooling Reservoir

- Black peat (Pt)
- Fine sand-trace silt-gray changing to light grayish brown @ 11' (SP)
- End of Boring

LOG OF BORING NO. 14
OWNER: Wisconsin Power & Light Company — ARCHITECT-ENGINEER: Sargent & Lundy
SITE: Portage, Wisconsin — PROJECT NAME: Proposed Cooling Reservoir

- Fine sand-trace silt-brown (SP)
- End of Boring

LOG OF BORING NO. 15
OWNER: Wisconsin Power & Light Company — ARCHITECT-ENGINEER: Sargent & Lundy
SITE: Portage, Wisconsin — PROJECT NAME: Proposed Cooling Reservoir

- Black peat (Pt)
- Fine-coarse sand-trace silt-trace fine gravel starting @ 8' - gray changing to light grayish brown @ 5 1/2' (SP)
- End of Boring

LOG OF BORING NO. 26
OWNER: Wisconsin Power & Light Company — ARCHITECT-ENGINEER: Sargent & Lundy
SITE: Portage, Wisconsin — PROJECT NAME: Proposed Cooling Reservoir

- Black peat (Pt)
- Silty fine sand-gray brown (SM) seams of black organic silt
- Fine sand-trace silt-gray (SP) few black seams to 5'
- Silty clay-trace sand and gravel-brown (CL) horizontal seams of brown silt and light brown fine sand
- End of Boring

LOG OF BORING NO. 27
OWNER: Wisconsin Power & Light Company — ARCHITECT-ENGINEER: Sargent & Lundy
SITE: Portage, Wisconsin — PROJECT NAME: Proposed Cooling Reservoir

- Black peat (Pt) becoming fine fibrous peat @ 3'
- Fine sand-trace to some silt-grayish brown (SM)
- Fine sand-trace silt-light grayish brown (SP)
- End of Boring

LOG OF BORING NO. 28
OWNER: Wisconsin Power & Light Company — ARCHITECT-ENGINEER: Sargent & Lundy
SITE: Portage, Wisconsin — PROJECT NAME: Proposed Cooling Reservoir

- Black peat (Pt) very fine brown peat starting @ 11'
- Fine-medium sand-trace silt-gray (SP)
- End of Boring

LOG OF BORING NO. 29
OWNER: Wisconsin Power & Light Company — ARCHITECT-ENGINEER: Sargent & Lundy
SITE: Portage, Wisconsin — PROJECT NAME: Proposed Cooling Reservoir

- Black peat (Pt)
- Fine medium sand-trace silt-brown (SP)
- End of Boring

LOG OF BORING NO. 30
OWNER: Wisconsin Power & Light Company — ARCHITECT-ENGINEER: Sargent & Lundy
SITE: Portage, Wisconsin — PROJECT NAME: Proposed Cooling Reservoir

- Black peat (Pt) 1" seam of red brown clay @ 4'
- Fine sand-trace silt-light brown (SP)
- End of Boring

LOG OF BORING NO. 31
OWNER: Wisconsin Power & Light Company — ARCHITECT-ENGINEER: Sargent & Lundy
SITE: Portage, Wisconsin — PROJECT NAME: Proposed Cooling Reservoir

- Dark brown sandy topsoil (OL)
- Fine sand-trace silt-brown changing to light brown @ 8' (SP)
- End of Boring

LOG OF BORING NO. 32
OWNER: Wisconsin Power & Light Company — ARCHITECT-ENGINEER: Sargent & Lundy
SITE: Portage, Wisconsin — PROJECT NAME: Proposed Cooling Reservoir

- Black peat (Pt)
- Fine sand-trace to some silt-trace fine rootlets-gray (SM)
- Fine sand-trace silt-grayish brown (SP) few silt seams @ 13 1/2' to 15'
- End of Boring

LOG OF BORING NO. 33
OWNER: Wisconsin Power & Light Company — ARCHITECT-ENGINEER: Sargent & Lundy
SITE: Portage, Wisconsin — PROJECT NAME: Proposed Flyash Disposal Area

- Fine sand-trace to some silt-brown (SM)
- Silty and clayey fine sand-brown (SC)
- Silty fine sand-brown (SM)
- Fine sand-trace silt-light brown (SP)
- Silty fine sand-trace fine gravel and clay-brown (SM)
- Silty fine sand-trace to some fine gravel-light tan (SM)
- End of Boring

LOG OF BORING NO. 34
OWNER: Wisconsin Power & Light Company — ARCHITECT-ENGINEER: Sargent & Lundy
SITE: Portage, Wisconsin — PROJECT NAME: Proposed Flyash Disposal Area

- Dark brown silty topsoil (OL)
- Fine sand-trace silt-brown
- Fine-medium sand-trace silt-grayish brown changing to brown (SP)
- Fine-coarse sand-trace fine gravel and silt-brown (SW)
- End of Boring

LOG OF BORING NO. 35
OWNER: Wisconsin Power & Light Company — ARCHITECT-ENGINEER: Sargent & Lundy
SITE: Portage, Wisconsin — PROJECT NAME: Proposed Flyash Disposal Area

- Black peaty topsoil (Pt)
- Note A
- Fine-medium sand-trace silt-trace fine gravel starting @ 5' rusty brown changing to greyish brown @ 6' - wet (SP)
- End of Boring
- *Calibrated Penetrometer
- Note A: Fine-medium sand-trace to some silt-rusty brown (SM)

LOG OF BORING NO. 36
OWNER: Wisconsin Power & Light Company — ARCHITECT-ENGINEER: Sargent & Lundy
SITE: Portage, Wisconsin — PROJECT NAME: Proposed Flyash Disposal Area

- Dark brown silty topsoil (OL)
- Silty fine sand-rusty brown (SM)
- Fine-medium sand-trace silt-rusty brown changing to brown @ 4' (SP)
- Fine-medium sand-trace fine gravel and silt-more gravel @ 13' grayish brown (SP)
- End of Boring
- *Calibrated Penetrometer

LOG OF BORING NO. 37
OWNER: Wisconsin Power & Light Company — ARCHITECT-ENGINEER: Sargent & Lundy
SITE: Portage, Wisconsin — PROJECT NAME: Proposed Flyash Disposal Area

- Black silty topsoil (OL)
- Silty fine sand-rusty brown (SM)
- Fine sand-trace to some silt-trace fine wood chips-dark gray-slightly organic (SM)
- Fine-medium sand-trace fine gravel and silt-dark gray (SP)
- Fine sand-trace silt-gray (SP)
- Black peat (Pt)
- End of Boring

LOG OF BORING NO. 38
OWNER: Wisconsin Power & Light Company — ARCHITECT-ENGINEER: Sargent & Lundy
SITE: Portage, Wisconsin — PROJECT NAME: Proposed Flyash Disposal

- Dark brown silty topsoil (OL)
- Fine-medium sand-trace silt-trace fine gravel starting @ 5' - rusty brown changing to brown @ 3' (SP)
- End of Boring

A

LOG OF BORING NO. 39
OWNER: Wisconsin Power & Light Company — ARCHITECT-ENGINEER: Sargent & Lundy
SITE: Portage, Wisconsin — PROJECT NAME: Proposed Flyash Disposal

- Black peaty topsoil (Pt)
- Fine sand-trace silt-rusty brown changing to gray brown (SP)
- Fine-medium sand-trace to some fine gravel-trace silt-light grayish brown (SP)
- End of Boring
- *Calibrated Penetrometer

LOG OF BORING NO. 40
OWNER: Wisconsin Power & Light Company — ARCHITECT-ENGINEER: Sargent & Lundy
SITE: Portage, Wisconsin — PROJECT NAME: Proposed Flyash Disposal

- Black peat (Pt) few thin sand seams
- Fine sand-trace to some silt-rusty changing to brown @ 4" (SM)
- Silt-brown (ML) few 1/16" horizontal seams of red brown clay
- Silty fine sand-brown-dense (SM)
- End of Boring
- *Calibrated Penetrometer

LOG OF BORING NO. 41
OWNER: Wisconsin Power & Light Company — ARCHITECT-ENGINEER: Sargent & Lundy
SITE: Portage, Wisconsin — PROJECT NAME: Proposed Flyash Disposal

- Black peat (Pt)
- Fine sand-trace to some silt grayish brown (SM)
- Fine sandy silt-trace clay-gray-slightly organic (OL)
- Fine sand-trace to some silt-brown (SM)
- End of Boring
- *Calibrated Penetrometer

LOG OF BORING NO. 42
OWNER: Wisconsin Power & Light Company — ARCHITECT-ENGINEER: Sargent & Lundy
SITE: Portage, Wisconsin — PROJECT NAME: Proposed Flyash Disposal

- Fine sand-trace to some silt-brown trace dark brown (SM)
- Silty and clayey fine sand-rusty brown (SC)
- Silty fine sand-trace fine gravel-light tan-dense (SM)
- End of Boring

LOG OF BORING NO. 43
OWNER: Wisconsin Power & Light Company — ARCHITECT-ENGINEER: Sargent & Lundy
SITE: Portage, Wisconsin — PROJECT NAME: Proposed Flyash Disposal

- Black peat (Pt) 2" seam of sand @ 2'
- Fine-medium sand-trace silt-gray (SP)
- End of Boring
- *Calibrated Penetrometer

LOG OF BORING NO. 44
OWNER: Wisconsin Power & Light Company — ARCHITECT-ENGINEER: Sargent & Lundy
SITE: Portage, Wisconsin — PROJECT NAME: Proposed Flyash Disposal

- Black peat (Pt)
- Organic silty clay-gray (OH)
- Fine sand-trace silt-grayish brown (SP)
- Fine-medium sand-trace silt-gray (SP)
- End of Boring
- *Calibrated Penetrometer

LOG OF BORING NO. 45
OWNER: Wisconsin Power & Light Company — ARCHITECT-ENGINEER: Sargent & Lundy
SITE: Portage, Wisconsin — PROJECT NAME: Proposed Flyash Disposal

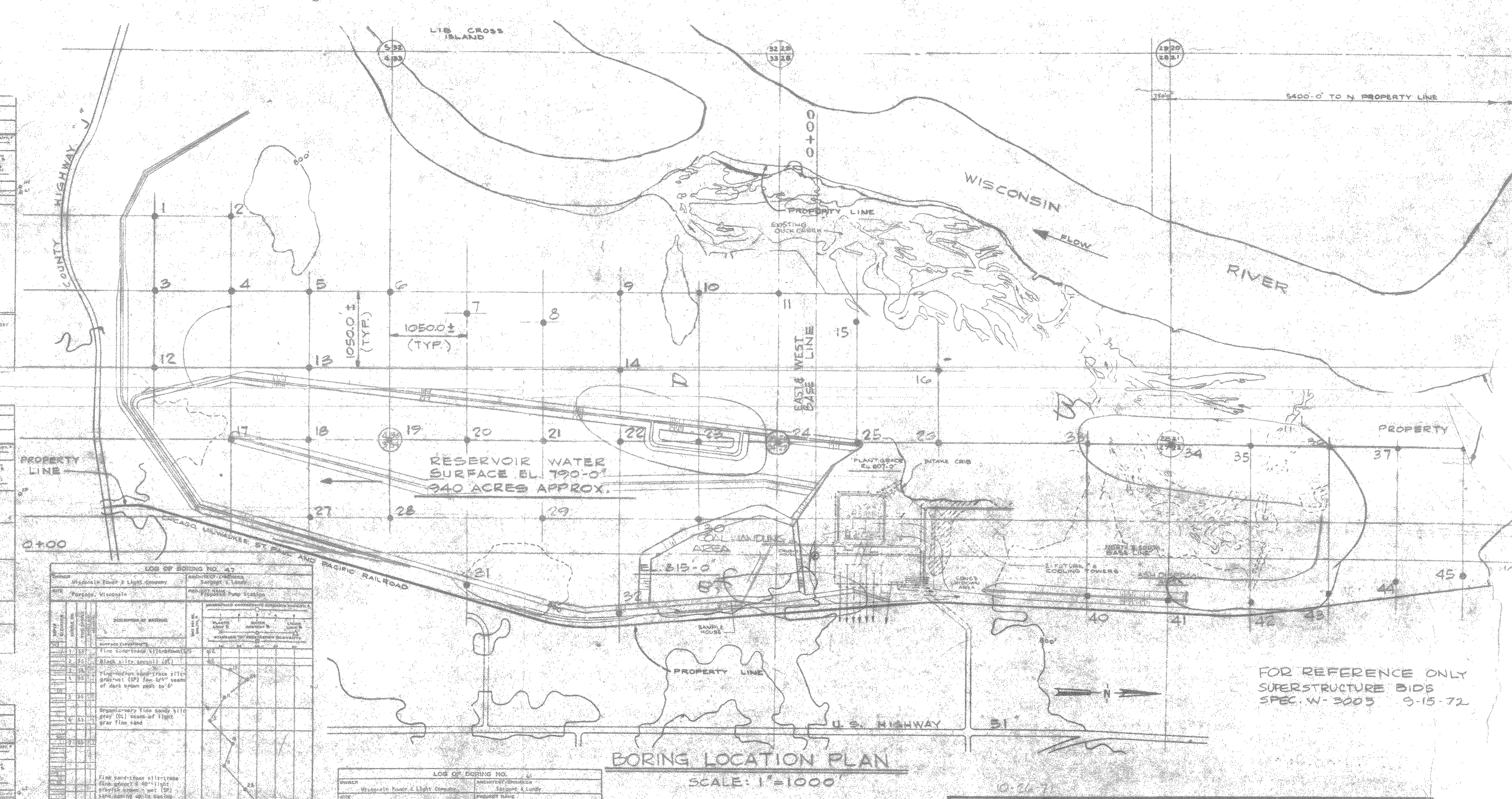
- Black peat (Pt)
- Silty fine-medium sand-gray
- Fine sand-trace silt-brown (SP)
- End of Boring
- *Calibrated Penetrometer

LOG OF BORING NO. 47
OWNER: Wisconsin Power & Light Company — ARCHITECT-ENGINEER: Sargent & Lundy
SITE: Portage, Wisconsin — PROJECT NAME: Proposed Pump Station

- Fine sand-trace silt-brown
- Black silty topsoil (OL)
- Fine-medium sand-trace silt-gray-wet (SP) few 1/4" seams of dark brown peat to 6'
- Organic-very fine sandy silt-gray (OL) seams of light gray fine sand
- Fine sand-trace silt-trace fine gravel @ 40'-light grayish brown - wet (SP) sand running up in casing @ 25' - started using drilling mud @ 30'
- Silty fine sand-trace fine gravel-light gray and light tan-dense (SM)
- Very light tan-fine sand-trace silt-trace fine-medium black and red rounded gravel (SP)
- Poorly cemented sandstone-white with light tan and light gray seams-crumbles under hand pressure
- End of Boring 55' NX Casing

LOG OF BORING NO. 46
OWNER: Wisconsin Power & Light Company — ARCHITECT-ENGINEER: Sargent & Lundy
SITE: Portage, Wisconsin — PROJECT NAME: Proposed Flyash Disposal

- Black peat (Pt)
- Fine sand-trace silt-gray (SP)
- Fine-medium sand-trace fine gravel and silt-gray (SP)
- End of Boring
- *Calibrated Penetrometer



BORING LOCATION PLAN
SCALE: 1"=1000'

FOR REFERENCE ONLY
SUPERSTRUCTURE BIDS
SPEC. W-3005 9-15-72

S-4A DIKE & SITE WORK SOIL BORINGS-SHEET-2.
S-4B DIKE & SITE WORK SOIL BORINGS-SHEET-3.
S-4C DIKE & SITE WORK SOIL BORINGS-SHEET-4.

10-26-71

Drawing Release Record			
Rev.	Date	Init.	Description
	11-9-70		
	11-16-70		
	3-22-71	GE	
A	10-26-71		
B			

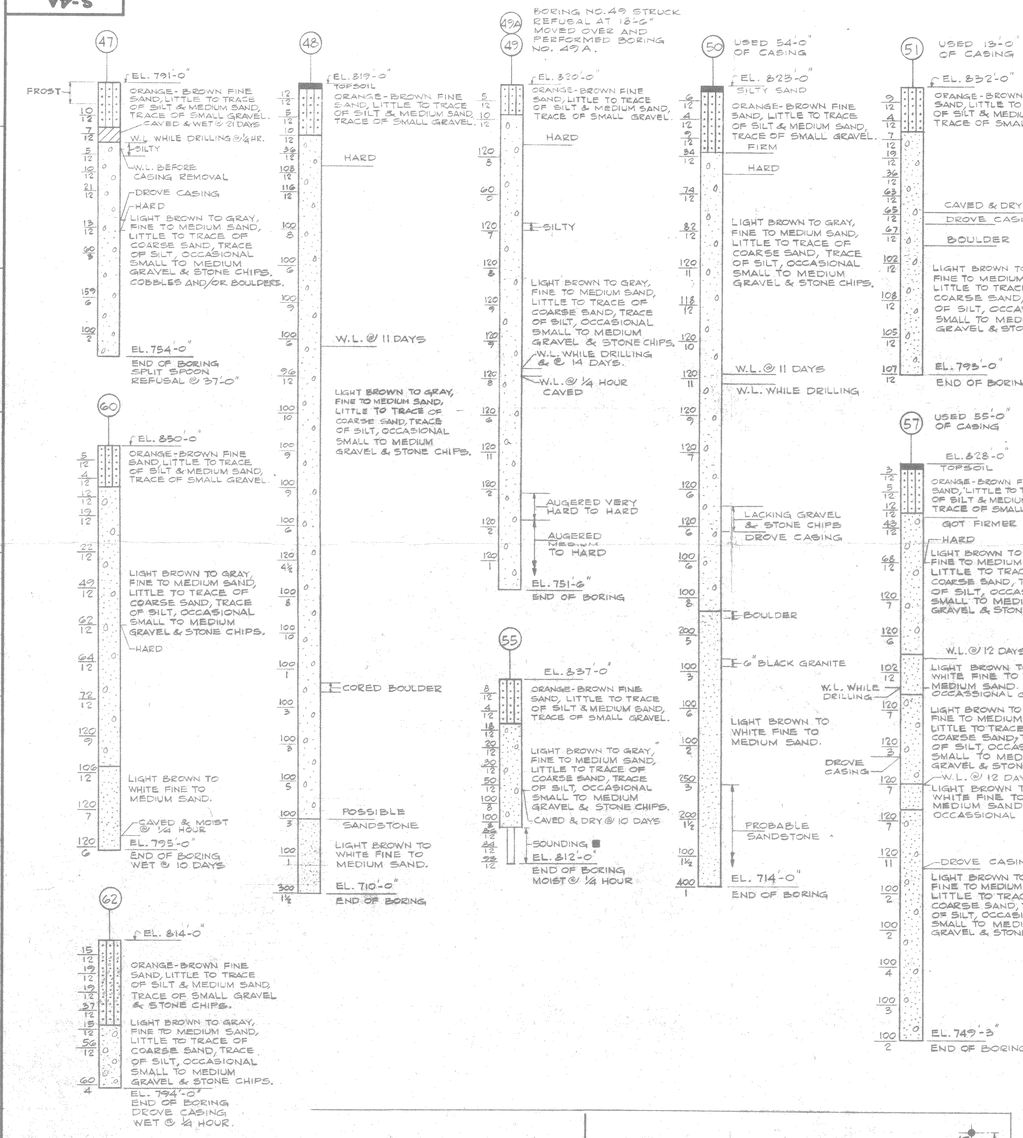
DIKE & SITE WORK SOIL
SHEET-1
COLUMBIA GENERA
WISCONSIN POWE
PORTAGE, WIS

SCALE NONE
DRAWN FRANK LOREK
CHECKED
ENGINEER
APPROVED

SAI

DK

S-4A



GENERAL NOTES

1. FIGURES TO THE LEFT OF THE BORING LOGS INDICATE THE NUMBER OF BLOWS REQUIRED TO DRIVE THE 2" O.D. SPLIT SPOON 12" USING A 140 LB. WEIGHT FALLING 30".
2. FIGURES TO THE LEFT OF EACH SOUNDING LOG INDICATE THE NUMBER OF BLOWS REQUIRED TO DRIVE THE 2"O.D. SOUNDING POINT 12" USING A 350 LB. OR 140 LB. WEIGHT FALLING 24" OR 30" (AS NOTED).
3. NOTATION "DROVE CASING" INDICATES DEPTH TO WHICH BORING HAD "PROGRESSED" WHEN 2½" CASING WAS FIRST USED.
4. WATER LEVELS (W.L.) INDICATED WERE OBTAINED AT THE TIMES SHOWN AFTER COMPLETION OF THE BORING.
5. NOTATION "CAVED AND WET (MOIST, DRY)" INDICATES DEPTH WHERE HOLE HAD CAVED IN AND WAS WET (MOIST, DRY) AT THE TIME SHOWN AFTER COMPLETION OF THE BORING.
6. A FALSE START WAS MADE AT BORING # 4 TO 45'-1", MOVED 15'-0" WEST AND CONTINUED BORING. (AS SHOWN ON LOCATION PLAN).
7. BORING #49 STRUCK REFUSAL AT 18'-5", MOVED OVER AND PERFORMED BORING # 49A.
8. BORINGS #73, 74 & #75 WERE MADE USING A 3½" POWER DRIVEN ROTARY AUGER, PULLED AT 5'-0" INTERVALS OF DEPTH.
9. BORINGS # 72 THRU # 76A ARE PLOTTED VERSUS DEPTH.
10. BORING # 73 MOVED 300'-0" NORTH (ABOUT 20'-3" LOWER IN ELEVATION) AND CONTINUED BORING AS BORING # 73A.
11. BORINGS WERE LOCATED IN FIELD BY SURVEY CREWS OF WISCONSIN POWER & LIGHT CO.
12. LEGEND FOR SOUNDINGS:
    - ■ USED 350 LB. WEIGHT FALLING 24".
    - ▲ USED 140 LB. WEIGHT FALLING 30".
    - ○ INDICATES UNDISTURBED SHEAR STRENGTH (LBS./SQ.FT.) OF THE SOIL AT DEPTH SHOWN. RESULTS OBTAINED USING A 1.5"×1.0" VANE, UNLESS OTHERWISE NOTED.
13. STONE CHIPS INDICATE COBBLES AND/OR BOULDERS.
14. AT BORING #4 HAD FALSE START TO 45'-1", MOVED 15'-0" WEST AND CONTINUED BORING.

REFERENCE DRAWINGS

S-4	DIKE & SITE WORK SOIL BORINGS-SHEET-1
S-4B	DIKE & SITE WORK SOIL BORINGS-SHEET-3
S-4C	DIKE & SITE WORK SOIL BORINGS-SHEET-4

FOR REFERENCE ONLY
SUPERSTRUCTURE BIDS
SPEC. W-3003 8-15-72

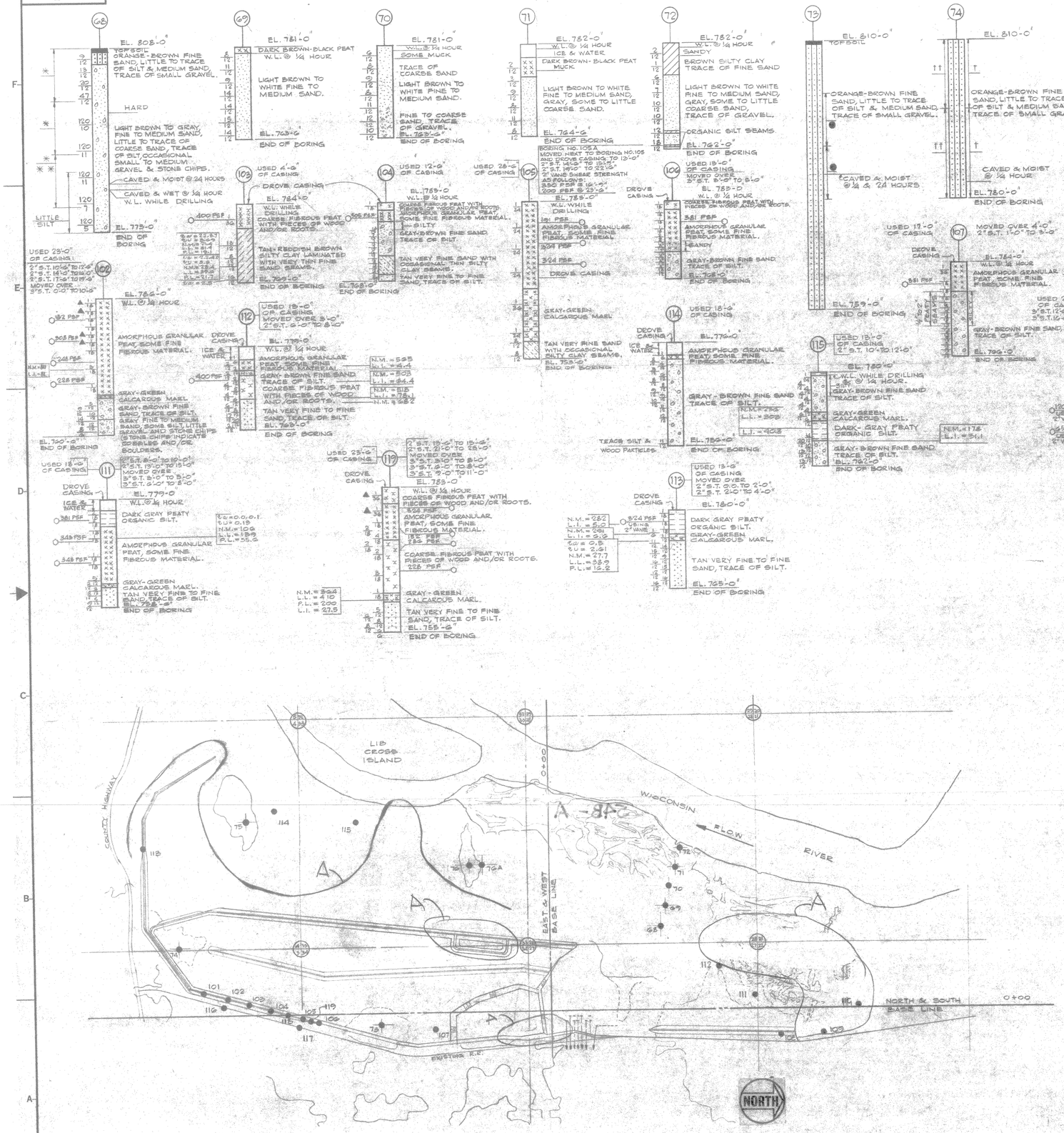
Drawing Release Record			
Rev.	Date	Init.	Description
A	9-27-74	GE	ADD BORING 73A

DIKE & SITE WORK SOIL BORINGS SHEET-2 UNIT 1

COLUMBIA GENERATING STATION
WISCONSIN POWER & LIGHT CO.
PORTAGE, WISCONSIN

SCALE 1"=1'-0" VERTICAL
DRAWN FRANK J. LEWIS
CHECKED
ENGINEER
APPROVED
JOB NO. 4159-3
SARGENT
DRAWING S-

S-4B



BORING NUMBER	GRID COORDINATES	BORING NUMBER	GRID COORDINATES
68	26+42 N - 20+00 W	101	82+65 S - 4+50 W
69	27+59 N - 24+54 W	102	76+75 S - 3+15 W
70	28+77 N - 29+08 W	103	70+65 S - 1+75 W
71	29+94 N - 33+62 W	104	65+20 S - 0+50 W
72	31+12 N - 38+16 W	105	59+40 S - 0+90 E
		106	54+10 S - 2+00 E
		107	27+65 S - 4+00 E
		108	84+25 N - 5+90 E
		109	64+45 N - 4+65 E
		110	70+55 N - 1+00 W
		111	48+60 N + 3+20 W
		112	40+00 N + 10+00 W
		113	95+70 S - 40+00 W
		114	64+15 S - 46+80 W
		115	45+15 S - 42+70 W
		116	77+00 S - 0+90 W
		117	60+40 S - 3+60 E
		118	62+30 S - 0+20 E
		119	56+50 S - 1+50 E

LAB DATA

%u = APPROXIMATE UNCONFINED COMPRESSIVE STRENGTH, BY PENETROMETER (TONS/SQ. FT.).
%u = UNCONFINED COMPRESSIVE STRENGTH, BY LAB TEST (TONS/SQ. FT.).
N.M. = NATURAL MOISTURE CONTENT, DRY WEIGHT BASIS (%).
L.L. = LIQUID LIMIT, BY LAB TEST.
P.L. = PLASTIC LIMIT, BY LAB TEST.
L.I. = LOSS ON IGNITION, DRY WEIGHT BASIS, (10 MINUTE FIRING). DO NOT CONFUSE WITH L.I. REPORTED IN TABLE II OF SOILS REPORT.

ADDITIONAL LABORATORY TEST DATA FOR SHELBY TUBE SAMPLES AND PERMEABILITY TESTS IS INCLUDED IN TABLES II, III OF SOILS REPORT.

NOTES

1. FOR GENERAL NOTES SEE DWG. S-4A.
2. BORING # 76 MOVED 300'-0" NORTH (ABOUTH 20'-0" LOWER IN ELEVATION) AND CONTINUED BORING AS BORING # 76A.
3. ▲ INDICATES NO SAMPLE RECOVERY.
4. ( ) INDICATES UNDISTURBED SHEAR STRENGTH (LBS./SQ. FT.) OF THE SOIL AT DEPTH SHOWN. RESULTS OBTAINED USING A 5"×10" VANE, UNLESS OTHERWISE NOTED.
5. ✱ SEE WARZYN ENG. DWG. C4GGS-A1 FOR GRADATIONS.
6. ✱✱ SEE WARZYN ENG. DWG. C4GGS-A6 FOR PROCTOR CURVE.
7. ● SEE WARZYN ENG. DWG. C4GGS-A2 FOR GRADATIONS.
8. †† SEE WARZYN ENG. DWG. C4GGS-A3 FOR GRADATIONS.
9. ††† SEE WARZYN ENG. DWG. C4GGS-A4 FOR GRA
10. ■ SEE WARZYN ENG. DWG. C4GGS-A5 FOR GR
11. † SEE WARZYN ENG. DWG. C4GGS-A6 FOR GR

REFERENCE DRAWINGS

S-4	DIKE & SITE WORK SOIL BORINGS-SHE
S-4A	DIKE & SITE WORK SOIL BORINGS-SHEET-2
S-4C	DIKE & SITE WORK SOIL BORINGS-SHEET-4

FOR REFERENCE ONLY
SUPERSTRUCTURE. BIDS
SPEC. W-3003 5-15-72.

Drawing Release Record			
Rev.	Date	Init.	Description
Δ	11-15-71	GC	ADD'L BORINGS
A	12-22-71		

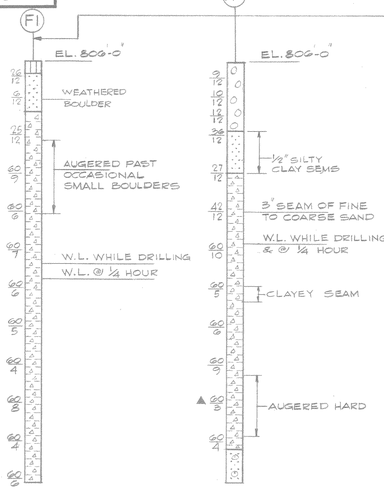
DIKE & SITE WORK SOIL BORI
SHEET-3 UNIT
COLUMBIA GENERATING ST
WISCONSIN POWER & LIGH
PORTAGE, WISCONSIN

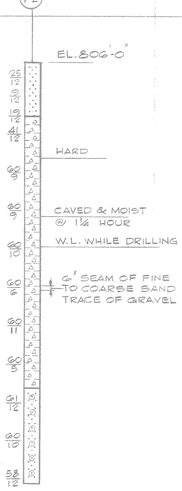
SCALE 1" = 1'-0" VERTICAL
DRAWN FRANK J. WORSEK
CHECKED
ENGINEER
APPROVED
JOB NO. 4169-3

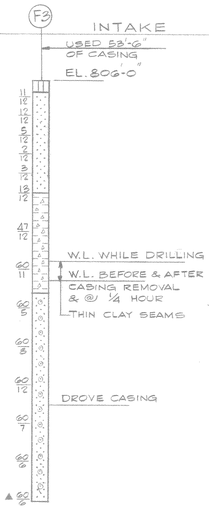
SARGENT & L

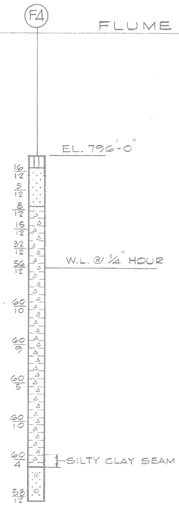
DRAW
S-4B

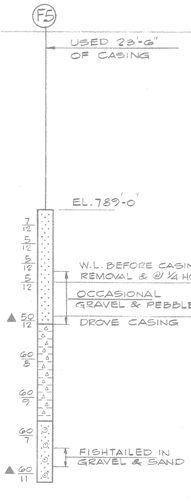
S-4C

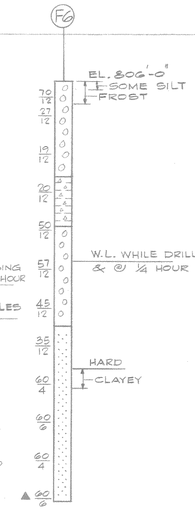


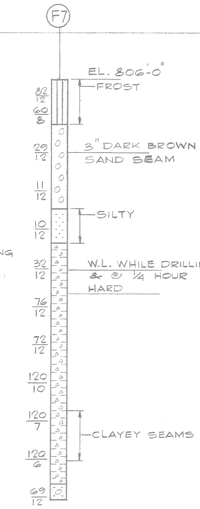


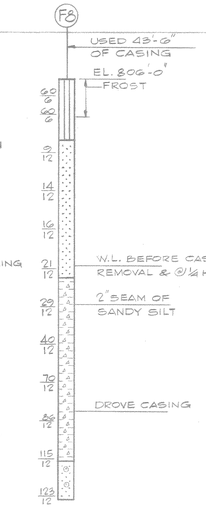


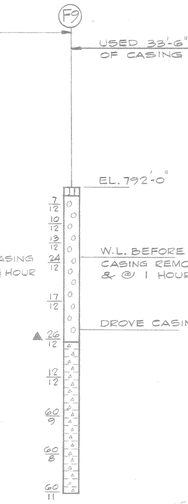


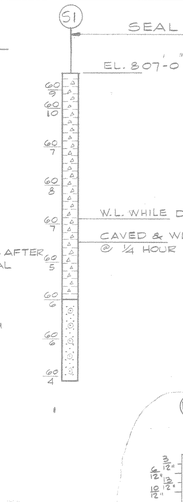


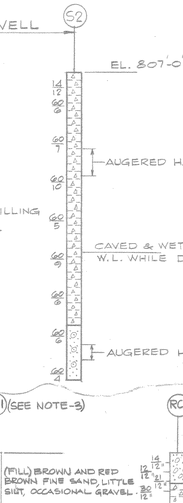


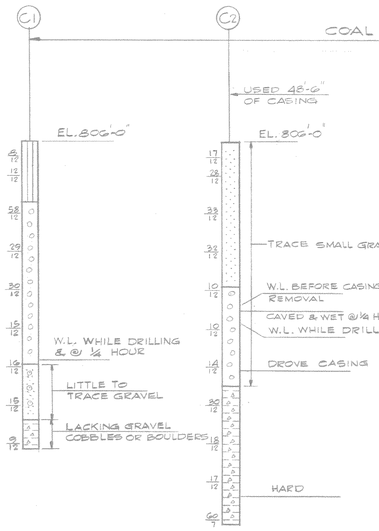


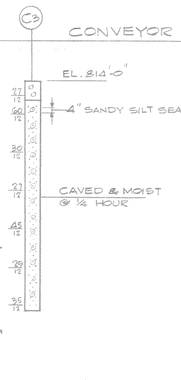


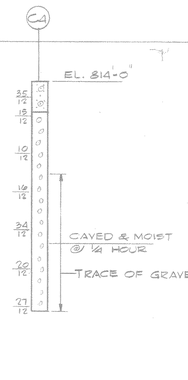


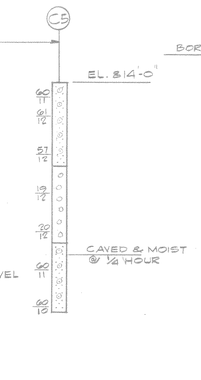


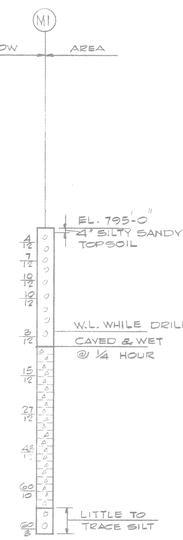


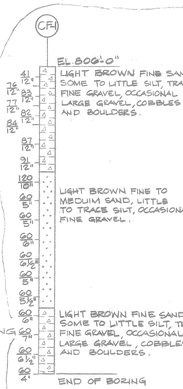


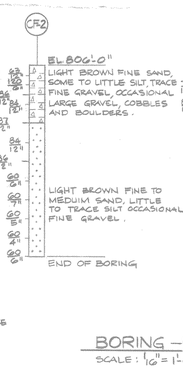


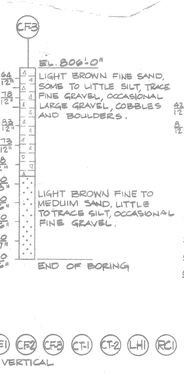


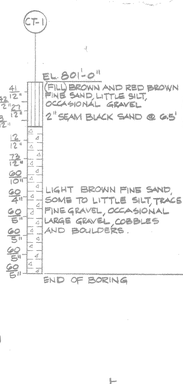


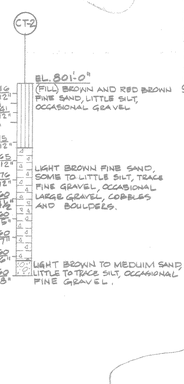


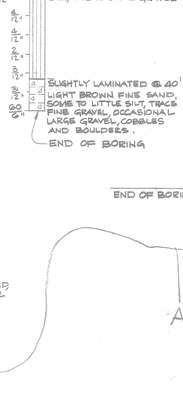


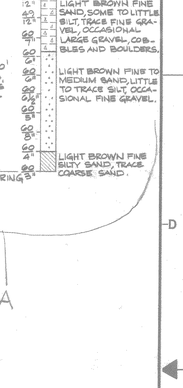




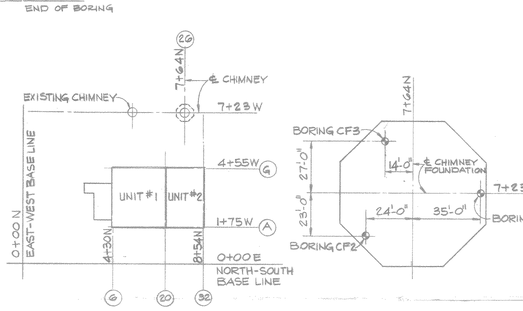






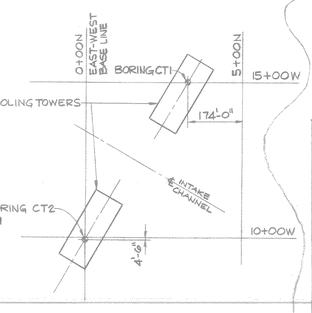


BORING — CF1 CF2 CF3 CT-1 CT-2 LH1 RC1
SCALE: 1/16" = 1'-0 VERTICAL



LOCATION PLAN
SCALE: 1" = 300'-0"

BORING LOCATION PLAN
SCALE: 1/32" = 1'-0"



BORING LOCATION PLAN
SCALE: 1" = 200'-0"

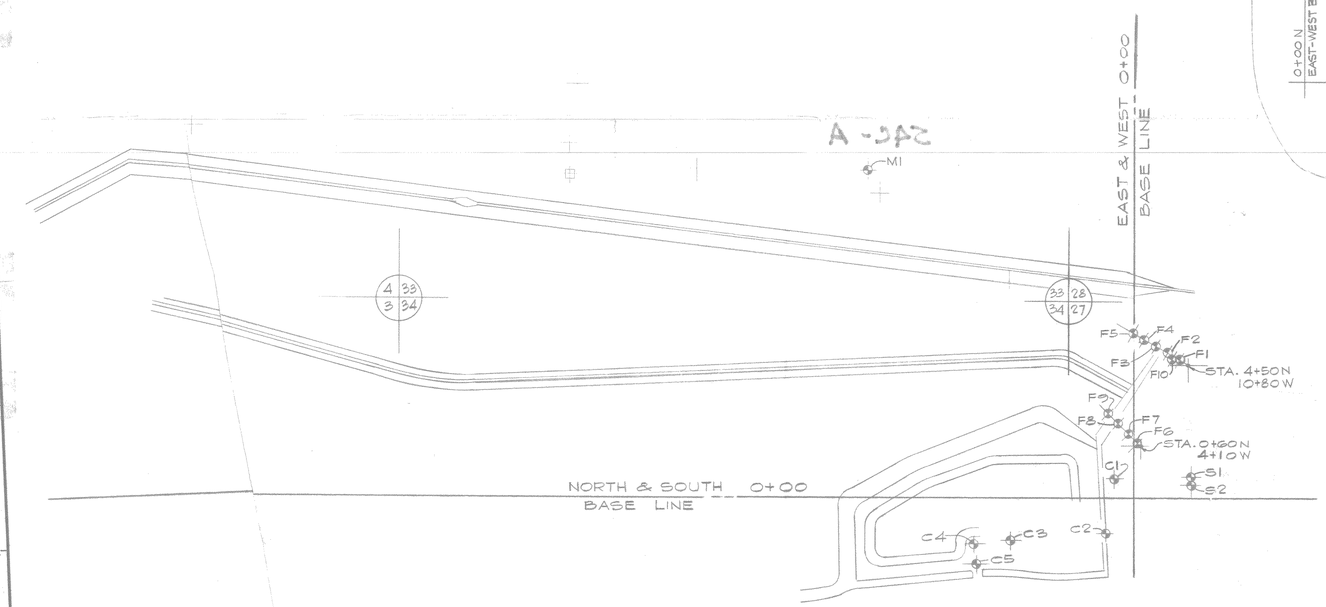
NOTES

1. FOR GENERAL NOTES SEE DWG. S-4A.
2. ▲ INDICATES NO SPLIT SPOON RECOVERY.
3. BORING NO. RC1 IS TAKEN ADJACENT TO THE LAKE MAKE UP PUMP HOUSE INTAKE CHANNEL AND BORING LH1 IS IN THE AREA OF MAKE UP WATER PUMP HOUSE.

A

REFERENCE DRAWINGS

S-4	DIKE & SITE WORK SOIL BORINGS-SHEET-1.
S-4A	DIKE & SITE WORK SOIL BORINGS-SHEET-2.
S-4B	DIKE & SITE WORK SOIL BORINGS-SHEET-3.
C4403-1	LOCATION PLAN OF SOIL BORINGS.
C4403-2	LOG OF SOIL BORINGS T1 THRU T5.
C4451-1	LOG OF SOIL BORINGS - INTAKE & DISCHARGE FLUMES.
C4451-2	LOG OF SOIL BORINGS - ANCILLARY FACILITIES & BORROW AREA.



LOCATION PLAN
SCALE: 1"=500'

BORING	ELEV.	STATION
F1	806'-0"	3+92 N - 11+18 W
F2	806'-0"	2+90 N - 11+70 W
F3	806'-0"	1+95 N - 12+25 W
F4	796'-0"	1+03 N - 12+80 W
F5	789'-0"	0+10 N - 13+30 W
F6	806'-0"	0+20 N - 4+48 W
F7	806'-0"	0+30 S - 3+04 W
F8	806'-0"	1+10 S - 5+83 W
F9	792'-0"	1+95 S - 6+70 W
F10	806'-0"	3+25 N - 11+25 W
S1	807'-0"	4+58 N - 1+68 W
S2	807'-0"	4+58 N - 1+09 W
C1	806'-0"	1+50 S - 1+50 W
C2	806'-0"	2+20 S - 2+90 E
C3	814'-0"	9+90 S - 3+50 E
C4	814'-0"	12+85 S - 3+80 E
C5	814'-0"	12+70 S - 5+40 E
M1	795'-0"	21+20 S - 26+63 W

LEGEND

- FILL: FINE SAND, OCCASIONAL COBBLES, AND/OR BOULDERS, LITTLE SILT.
- REDDISH-BROWN TO BROWN FINE TO MEDIUM SAND, LITTLE TO TRACE SILT.
- LIGHT BROWN, VERY FINE TO FINE SAND, TRACE TO NO SILT.
- LIGHT BROWN FINE TO COARSE SAND, SOME GRAVEL AND COBBLES, TRACE SILT.
- LIGHT BROWN FINE SAND, SOME TO LITTLE SILT, LITTLE TO TRACE GRAVEL, COBBLES & BOULDERS.

WISCONSIN R. N. BERGSTROM BARRINGTON HILLS, ILLINOIS PROFESSIONAL ENGINEER

Drawing Release Record			
Rev.	Date	Init.	Description
A	8-31-72	MA	FOR RECORDS

DIKE & SITE WORK SOIL BORINGS SHEET 4 UNIT 1

COLUMBIA GENERATING STATION WISCONSIN POWER & LIGHT CO. PORTAGE, WISCONSIN

SCALE 1/8"=1'-0" VERT. (U.N.)
DRAWN FRANK LOZEK 8-31-72
CHECKED 7-7-73
ENGINEER 7-7-73
APPROVED 7-7-73
JOB NO. 4189.4
SARGENT & LUNDY ENGINEERS
DRAWING S-

840
820
800
780

USED 23'-6" OF CASING

324 PSF

182 PSF

286 PSF

228 PSF

N.M. = 364
L.L. = 410
P.L. = 200
L.I. = 27.5

2"ST. 13'-6" TO 15'-6"
2"ST. 11'-0" TO 23'-0"
MUD SAMP.
3"ST. 3'-0" TO 5'-0"
3"ST. 6'-0" TO 8'-0"
3"ST. 9'-0" TO 11'-0"
EL. 783'-0"
W.L. @ 1/4 HOUR
COARSE FIBROUS PEAT WITH PIECES OF WOOD AND/OR ROOTS. AMORPHOUS GRANULAR PEAT, SOME FINE FIBROUS MATERIAL.

COARSE FIBROUS PEAT WITH PIECES OF WOOD AND/OR ROOTS

GRAY-GREEN CALCAROUS MARL, TAN VERY FINE TO FINE SAND, TRACE OF SILT
EL. 755'-6"
END OF BORING

SECTION OF NORTH & SOUTH BASE LINE 10+00W
LOOKING WEST

EL. 803'-0"
TOP SOIL
ORANGE-BROWN FINE SAND, LITTLE TO TRACE OF SILT & MEDIUM SAND, TRACE OF SMALL GRAVEL.

HARD
LIGHT BROWN TO GRAY FINE TO MEDIUM SAND, LITTLE TO TRACE OF SILT, OCCASIONAL SMALL TO MEDIUM GRAVEL & STONE CHIPS.

CAVED & MOIST @ 24 HOURS

CAVED & WET @ 1/4 HOUR W.L. WHILE DRILLING

EL. 773'-0"
END OF BORING

LITTLE
SILT

840
820
800
780

SECTION OF EAST & WEST BASE LINE 30+00N
LOOKING SOUTH

73

EL. 810'-0"
TOP SOIL

ORANGE-BROWN FINE SAND, LITTLE TO TRACE OF SILT & MEDIUM SAND, TRACE OF SMALL GRAVEL

CAVED & MOIST @ 1/4 & 24 HOURS

EL. 759'-0"
END OF BORING

TYPICAL BORINGS AT ELEVATIONS SHOWN O
REF. DWG. SARGENT & LUNDY 648

Drawing Release Record			
Rev.	Date	Init.	Description

ASH BASIN

COLUMBIA GENERATING
WISCONSIN POWER & LI
PORTAGE, WISCONS

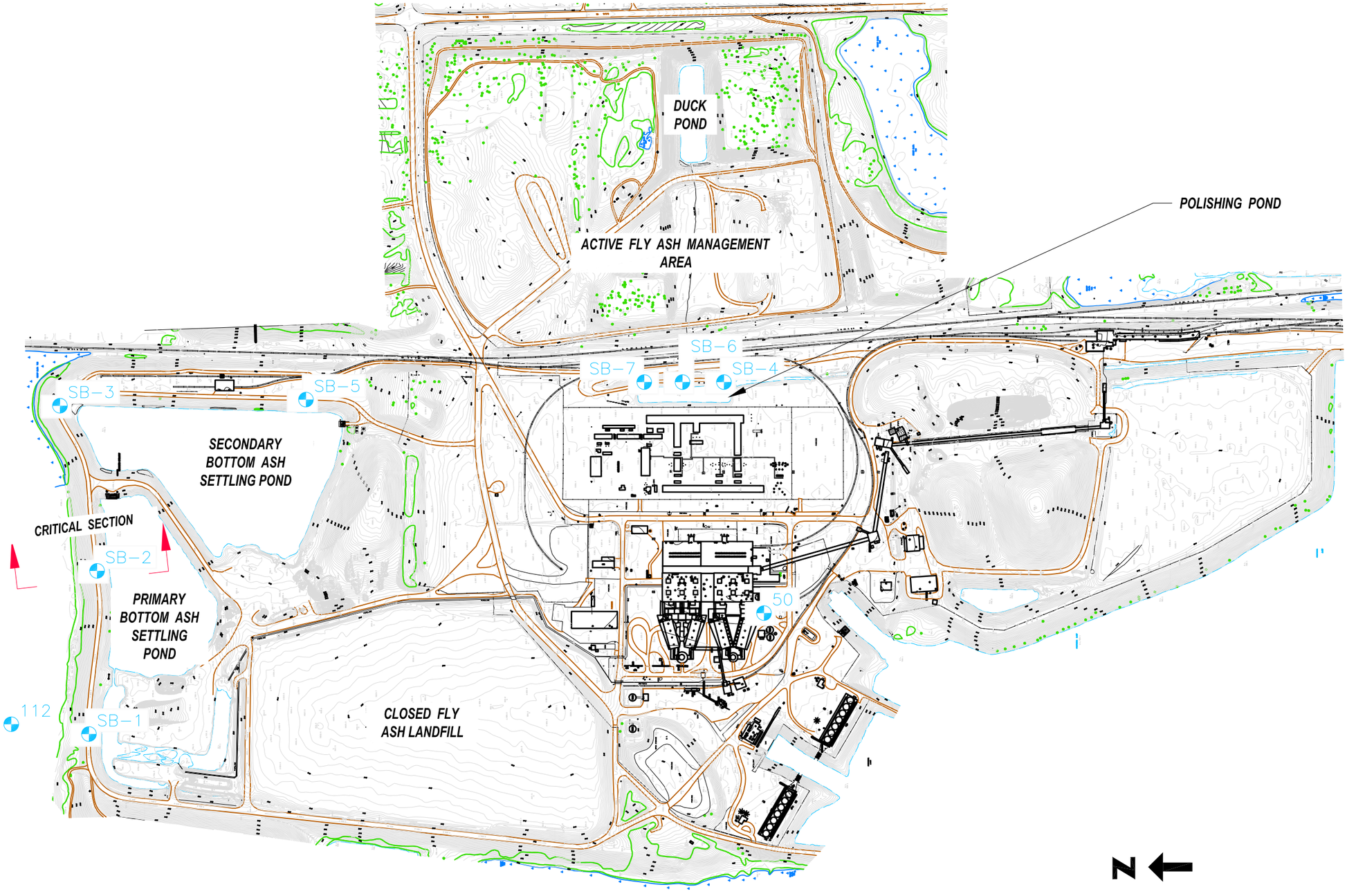
SCALE 1" = 100 FT.
DRAWN E.A.R. 3-27-74
CHECKED
ENGINEER
APPROVED
JOB NO.

DRAWIN

APPENDIX E – Geoprobe Soil Borings - 2011

Alliant Energy
Wisconsin Power and Light Company
Columbia Energy Center
Pardeeville, Wisconsin

History of Construction



REV	DATE	BY	DESCRIPTION
5			
4			
3			
2			
1			

aether dbs
www.aetherdbs.com

SCALE:	AS SHOWN
DATE:	07-06-11
DRAWN BY:	MM
CHKD. BY:	TCW
APPROVED:	07-06-11

CLIENT / LOCATION

ALLIANT ENERGY
COLUMBIA ENERGY CENTER
PARDEEVILLE, WISCONSIN

DRAWING DESCRIPTION

SITE PLAN
GEOPROBE BORING LOCATIONS

JOB 154
SHT. FIGURE 1
DWG. SITE PLAN

Boring Log Legend

Sample
No: (Number) Soil samples are numbered consecutively from the ground surface. Core samples are numbered consecutively from the first core run.

Type: A= Auger Cuttings CR= Core Run MS= Modified Spoon PB= Pitcher Barrel
PT= Piston Tube ST= Shelby Tube SS= Split Spoon (2" O.D.) WC= Wash Cuttings

Interval: The depth of sampling interval in feet below ground surface

Blow Count
The number of blows required to drive a 2-inch O.D. split-spoon sampler with a 140 pound hammer falling 30-inches. When appropriate, the sampler is driven 18 inches and blow counts are reported for each 6-inch interval. The sum of blow counts for the last two 6-inch intervals is designated as the standard penetration resistance (N) expressed as blows per foot.

Recovery in Inches
The length of sample recovered by the sampling device.

U.S.C.S. Soil Type
The Unified Soil Classification System symbol for recovered soil samples determined by visual examination or laboratory tests. Refer to ASTM D2487-69 for a detailed description of procedure and symbols. Underlined symbols denote classifications based on laboratory tests (i.e. ML), all others are based on visual classification only.

Percent Moisture
Natural moisture content of sample expressed as percent of dry weight.

q_u TSF
Unconfined compressive strength in tons per square foot obtained by hand penetrometer. Laboratory compression test values are indicated by underlining.

Contact Depth
The contact depth between soil layers is interpreted from significant changes in recovered samples and observations during drilling. Actual changes between soil layers often occur gradually and the contact depths shown on the boring logs should be considered as approximate.

Soil Description and Remarks
Soil descriptions include consistency or density, color, predominant soil types and modifying constituents.

Cohesive Soils			Cohesionless Soils	
Consistency	q_u (TSF)	Blows/ft.	Density	Blows/ft.
Very Soft	less than 0.25	0-1	Very Loose	4 or less
Soft	0.25 to 0.50	2-4	Loose	5 to 10
Medium Stiff	0.50 to 1.00	5-8	Medium Dense	11 to 30
Stiff	1.00 to 2.00	9-15	Dense	30 to 50
Very Stiff	2.00 to 4.00	15-30	Very Dense	Over 50
Hard	more than 4.00	Over 30		

Particle Size Description

Boulder =	Larger than 12 inches
Cobble =	3 to 12 inches
Gravel =	0.187 to 3 inches
Sand =	0.074 to 4.76 mm
Silt and Clay =	smaller than 0.074 mm

Definition of Terms

Trace =	5 to 12 percent by weight
Some =	12 to 30 percent by weight
And =	Approximately equal fractions
( ) =	Driller's observation

Piezo.
(Piezometer) Screened interval of the piezometer installation is denoted by cross-hatching.

General Note
The boring log and related information depicted subsurface conditions only at the specified locations and date indicated. Soil conditions and water levels at other locations may differ from conditions occurring at these boring locations. Also the passage of time may result in a change in the conditions at these boring locations.

Soil Test Boring Refusal
Defined as any material causing a blow count greater that 50 blows/6 inches. Such material may include bedrock, "floating" rock slabs, boulders, dense gravel seams, hard pan clay, or cemented soils. Refusal is usually indicated in fractional notation showing number of blows as the numerator and inches of penetration as the denominator.

CABENO

Environmental Field Services, LLC

BORING LOG

CLIENT: Aether dbs

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

PROJECT: Alliant Columbia Station

BORING NO.: ***SB1***

DEPTH TO WATER WHILE DRILLING	SAMPLE NO. AND TYPE	SAMPLE RECOVERY	SAMPLE INFROMATION	POCKET PENETROMETER (TONS/FT2)	CONSISTENCY vs. DEPTH	DEPTH IN FEET	PROFILE	DESCRIPTION
						0		SAND & GRAVEL; light brown to orange; fine to coarse grained; well graded; dry to moist. (Fill)
	SP1	4.7'/5'				-5		SAND; light brown; fine grained; poorly graded; moist. (Fill)
▽	SP2	5'/5'						@ 8.5' grades wet
	SP3	4'/5'				-10		@ 13' grades yellow to light tan
						-15		@ 15' grades fine to coarse, well graded
	SP4	5'/5'						@ 17' grades fine sand w/ well rounded gravels, trace silt/clay
						-20		Bottom of boring @ 19'
						-25		

LOGGED BY: *John Noyes*
EDITED BY: *John Noyes*
CHECKED BY: *Chris Sullivan*
DATE BEGAN: *06-01-11*
DATE FINISHED: *06-01-11*
GROUND SURFACE ELEVATION:

CABENO

Environmental Field Services, LLC

BORING LOG

CLIENT: Aether dbs **COORDINATES:** *N NOT SURVEYED* *E NOT SURVEYED*

PROJECT: Alliant Columbia Station **BORING NO.: *SB2***

DEPTH TO WATER WHILE DRILLING	SAMPLE NO. AND TYPE	SAMPLE RECOVERY	SAMPLE INFEROMATION	POCKET PENETROMETER (TONS/FT2)	CONSISTENCY vs. DEPTH	DEPTH IN FEET	PROFILE	DESCRIPTION
	SP1	5'/5'				0		SAND; light brown to orange; fine grained; poorly graded; dry to moist; trace gravels. (Fill)
						-5		@ 5' grades trace silt
	SP2	5'/5'				-10		@ 10' to 13', very hard & dense; seems overconsolidated; more recovery than push
	SP3	5'/3'				-15		Bottom of boring @ 13' Boring advanced W/ Geoprobe Model 6610DT using 60-inch Macrocore sampling system. Boring backfilled to groundsurface w/ bentonite chips on 06-1-11.
						-20		

LOGGED BY: *John Noyes*
EDITED BY: *John Noyes*
CHECKED BY: *Chris Sullivan*
DATE BEGAN: *06-01-11*
DATE FINISHED: *06-01-11*
GROUND SURFACE ELEVATION:

CABENO

Environmental Field Services, LLC

BORING LOG

CLIENT: Aether dbs

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

PROJECT: Alliant Columbia Station

BORING NO.: *SB3*

DEPTH TO WATER WHILE DRILLING	SAMPLE NO. AND TYPE	SAMPLE RECOVERY	SAMPLE INFROMATION	POCKET PENETROMETER (TONS/FT2)	CONSISTENCY vs. DEPTH	DEPTH IN FEET	PROFILE	DESCRIPTION
								LOGGED BY: *John Noyes* **EDITED BY:** *John Noyes* **CHECKED BY:** *Chris Sullivan* **DATE BEGAN:** *06-01-11* **DATE FINISHED:** *06-01-11* **GROUND SURFACE ELEVATION:**
▽	SP1	5'/5'				0		SAND; light brown to orange; fine grained; poorly graded; dry to moist; trace gravels. (Fill)
	SP2	5'/5'				-5		
	SP3	5'/5'				-10		
	SP4	5'/5'				-15		@ 16' grades gray and wet.
	SP5	5'/5'				-20		
	SP6	1'/1'				-25		PEAT; brown; dry; non-plastic. (PT) Clayey SILT; gray; non-plastic; hard; moist. (ML) Bottom of boring @ 26' Boring advanced W/ Geoprobe Model 6610DT using 60-inch Macrocore sampling system. Boring backfilled to groundsurface w/ bentonite chips on 06-1-11.
						-30		

CABENO

Environmental Field Services, LLC

BORING LOG

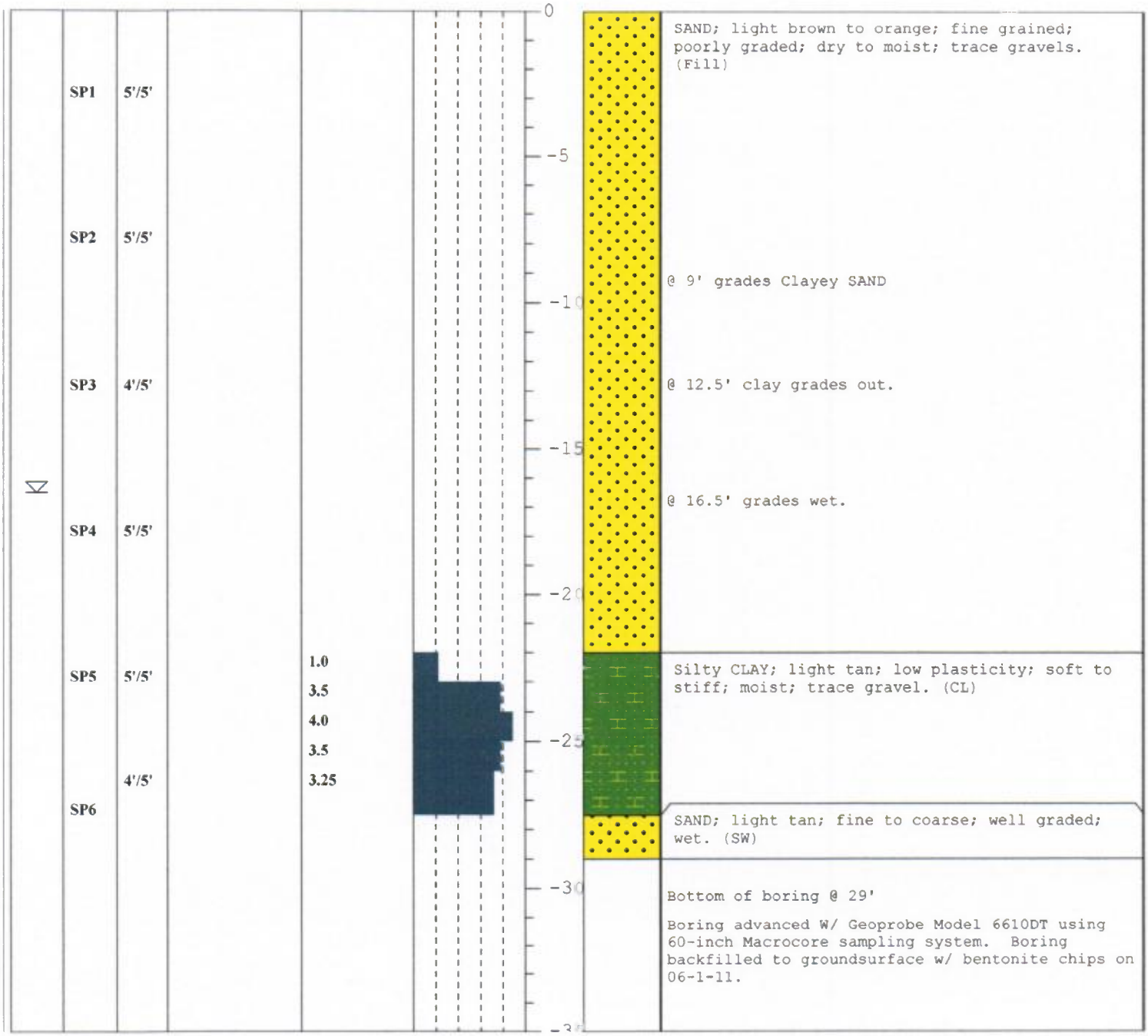
CLIENT: Aether dbs

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

PROJECT: Alliant Columbia Station

BORING NO.: *SB4*

LOGGED BY: *John Noyes*
EDITED BY: *John Noyes*
CHECKED BY: *Chris Sullivan*
DATE BEGAN: *06-01-11*
DATE FINISHED: *06-01-11*
GROUND SURFACE ELEVATION:



CABENO

Environmental Field Services, LLC

BORING LOG

CLIENT: Aether dbs

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

PROJECT: Alliant Columbia Station

BORING NO.: *SB5*

DEPTH TO WATER WHILE DRILLING	SAMPLE NO. AND TYPE	SAMPLE RECOVERY	SAMPLE INFROMATION	POCKET PENETROMETER (TONS/FT2)	CONSISTENCY vs. DEPTH	DEPTH IN FEET	PROFILE	DESCRIPTION
								LOGGED BY: *John Noyes* **EDITED BY:** *John Noyes* **CHECKED BY:** *Chris Sullivan* **DATE BEGAN:** *06-01-11* **DATE FINISHED:** *06-01-11* **GROUND SURFACE ELEVATION:**
	SP1	5'/5'				0		SAND; light brown to orange; fine grained; poorly graded; dry to moist; trace gravels. (Fill)
		4'/2.5'				-5		@ 7.5' refusal.
	SP2					-10		Bottom of boring @ 7.5' Boring advanced W/ Geoprobe Model 6610DT using 60-inch Macrocore sampling system. Boring backfilled to groundsurface w/ bentonite chips on 06-1-11.
						-15		

CABENO

Environmental Field Services, LLC

BORING LOG

CLIENT: Aether dbs

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

PROJECT: Alliant Columbia Station

BORING NO.: *SB6*

DEPTH TO WATER WHILE DRILLING	SAMPLE NO. AND TYPE	SAMPLE RECOVERY	SAMPLE INFROMATION	POCKET PENETROMETER (TONS/FT2)	CONSISTENCY vs. DEPTH	DEPTH IN FEET	PROFILE	DESCRIPTION
								LOGGED BY: *John Noyes* **EDITED BY:** *John Noyes* **CHECKED BY:** *Chris Sullivan* **DATE BEGAN:** *06-01-11* **DATE FINISHED:** *06-01-11* **GROUND SURFACE ELEVATION:**
	SP1	4.5'/5'				0		SAND; light brown to orange; fine grained; poorly graded; dry to moist; trace gravels. (Fill)
	SP2	4.5'/5'				-5		
	SP3	4'/5'				-10		
				1.0		-15		Silty CLAY; light tan; low plasticity; very soft to soft; moist. (CL)
▽	SP4	5'/5'		0.75 1.0				SILT; light tan; non-plastic- wet. (ML)
						-20		SABD; light tan; fine grained; poorly graded; wet. (SW)
	SP5	5'/5'						@ 23.5' grades some gravels. @ 24.8' refusal.
						-25		Bottom of boring @ 24.8' Boring advanced W/ Geoprobe Model 6610DT using 60-inch Macrocore sampling system. Boring backfilled to groundsurface w/ bentonite chips on 06-1-11.
						-30		

CABENO

Environmental Field Services, LLC

BORING LOG

CLIENT: Aether dbs

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

PROJECT: Alliant Columbia Station

BORING NO.: *SB7*

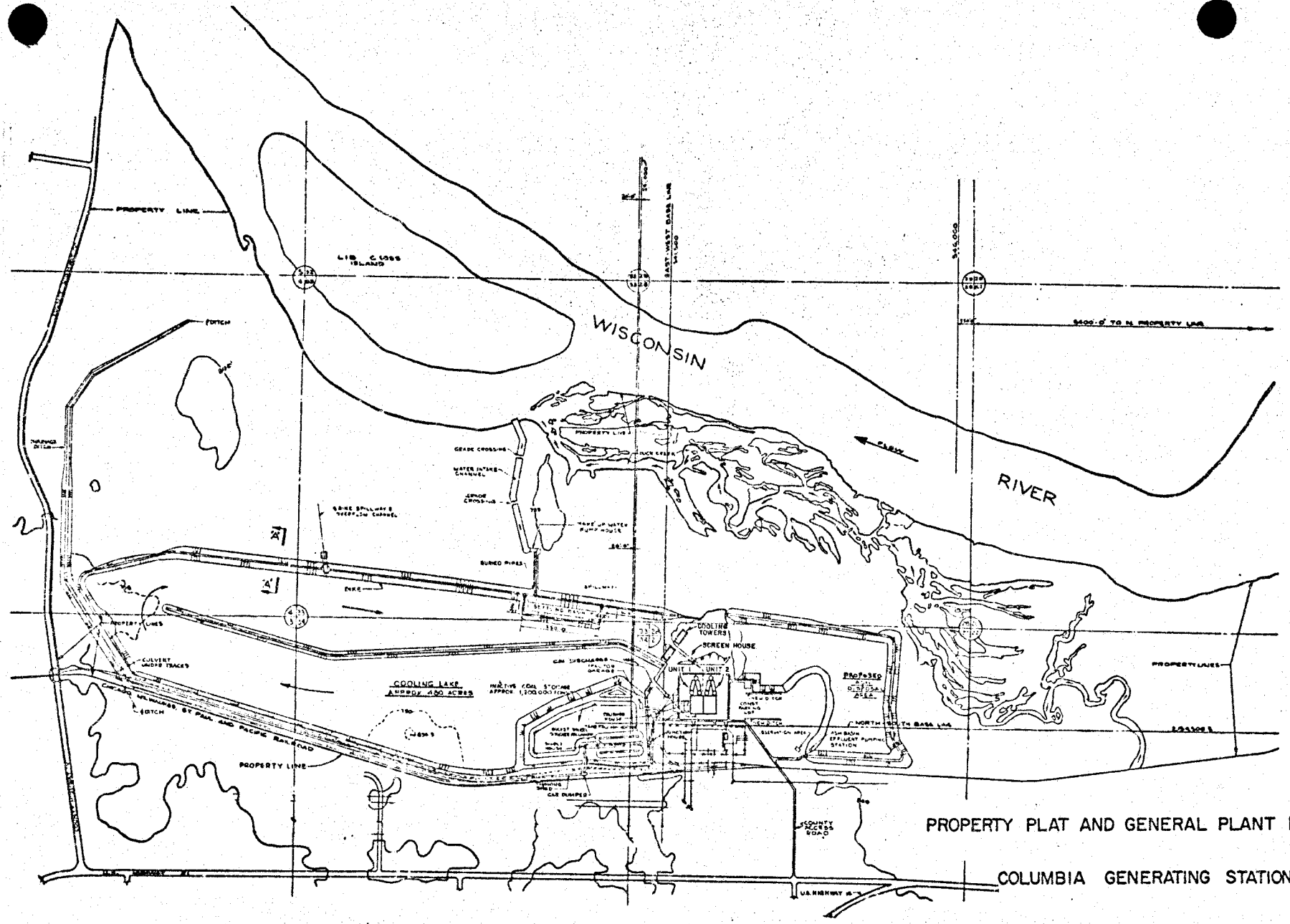
LOGGED BY: *John Noyes*
EDITED BY: *John Noyes*
CHECKED BY: *Chris Sullivan*
DATE BEGAN: *06-01-11*
DATE FINISHED: *06-01-11*
GROUND SURFACE ELEVATION:

DEPTH TO WATER WHILE DRILLING	SAMPLE NO. AND TYPE	SAMPLE RECOVERY	SAMPLE INFROMATION	POCKET PENETROMETER (TONS/FT2)	CONSISTENCY vs. DEPTH	DEPTH IN FEET	PROFILE	DESCRIPTION
	SP1	4.5'/5'				0		SAND; light brown to orange; fine grained; poorly graded; dry to moist; trace gravels. (Fill)
	SP2	5'/5'				-5		
⊠	SP3	5'/5'				-10		Silty CLAY; light tan; low plasticity; moist. (CL)
								SILT; light tan; non-plastic- wet. (ML)
	SP4	5'/5'				-15		SAND; light tan; fine grained; poorly graded; wet. (SW)
						-20		Bottom of boring @ 20'
						-25		Boring advanced W/ Geoprobe Model 6610DT using 60-inch Macrocore sampling system. Boring backfilled to groundsurface w/ bentonite chips on 06-1-11.

APPENDIX F – COL CCR Surface Impoundment Drawings

Alliant Energy
Wisconsin Power and Light Company
Columbia Energy Center
Pardeeville, Wisconsin

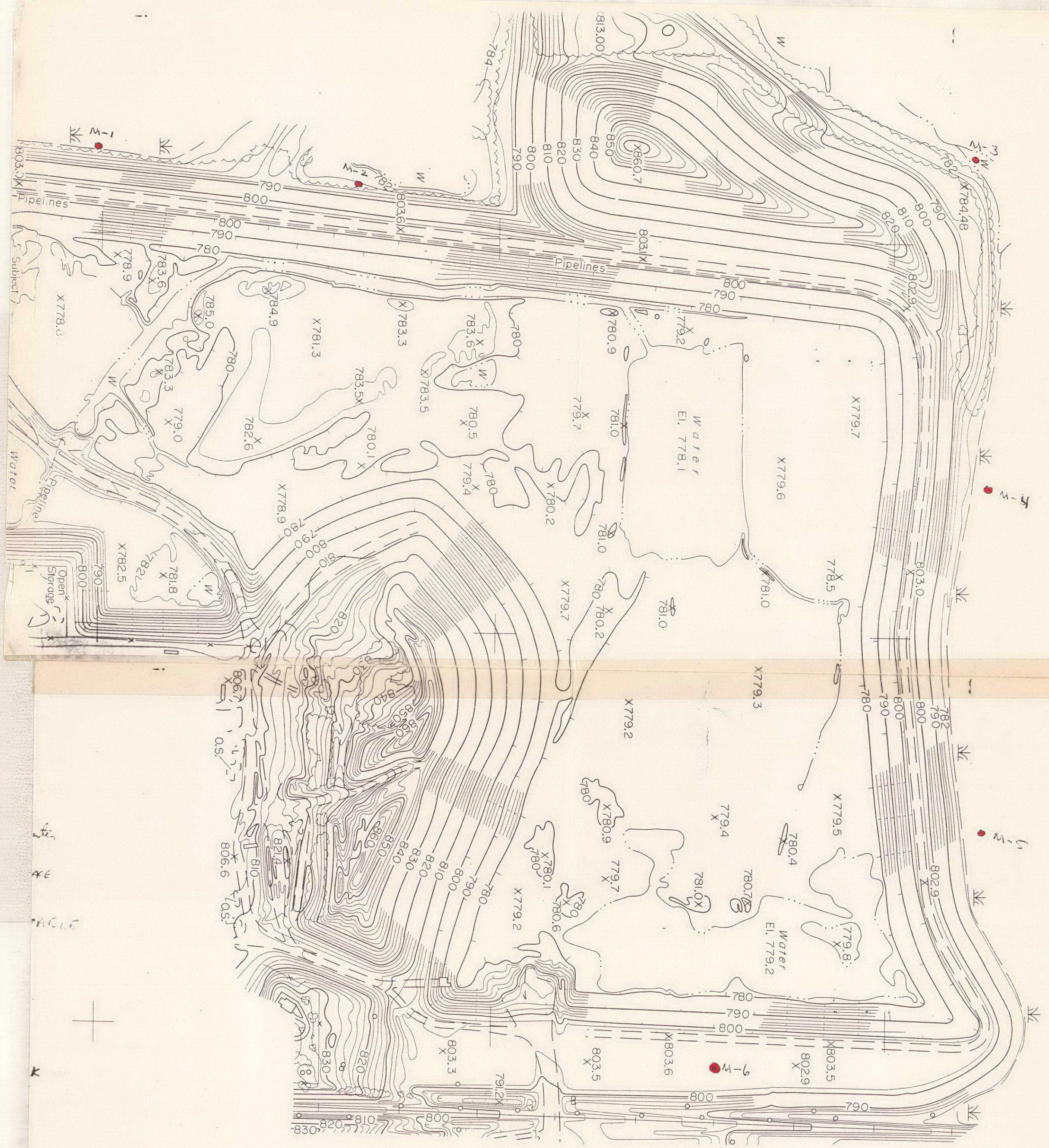
History of Construction



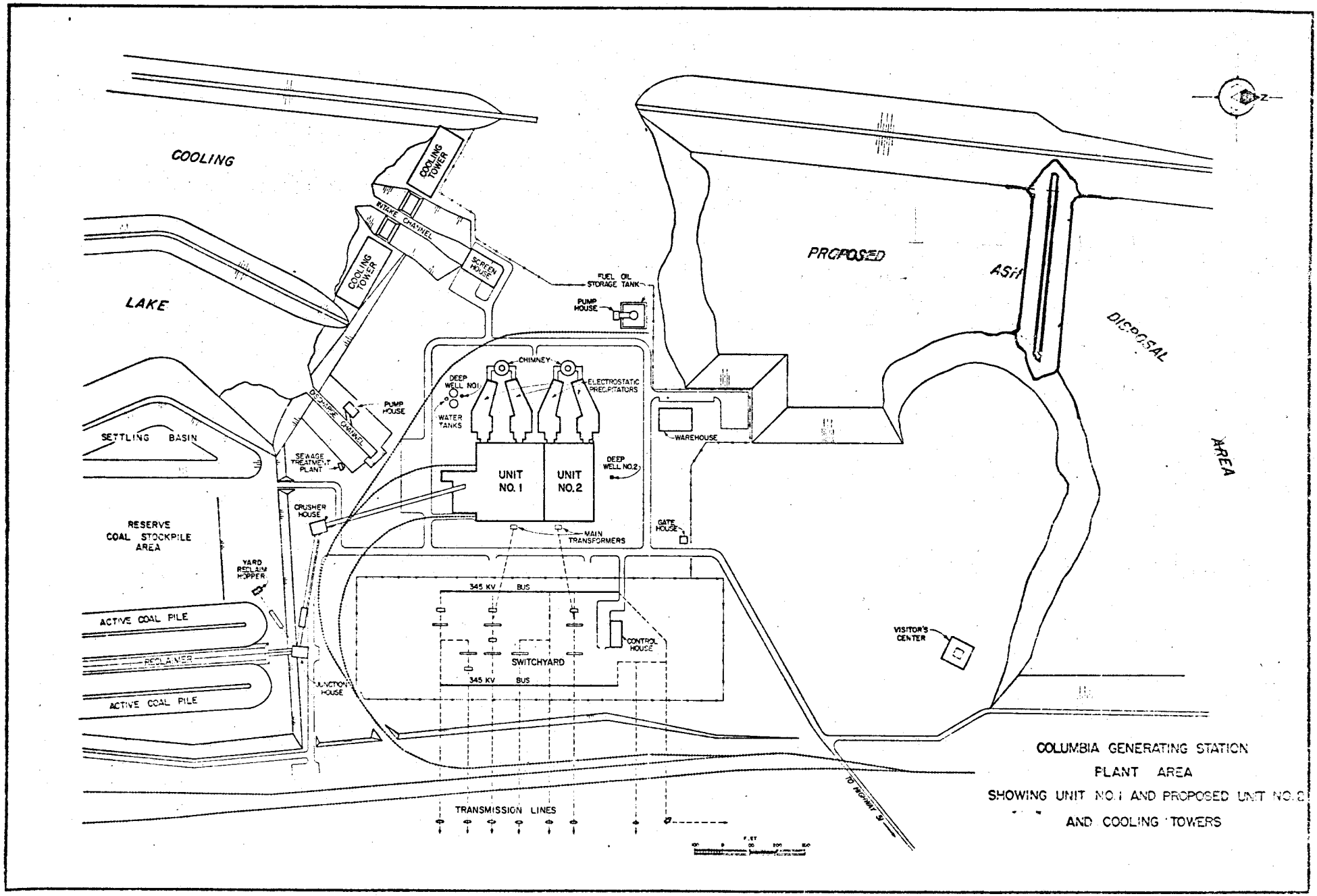
PROPERTY PLAT AND GENERAL PLANT LAYOUT

COLUMBIA GENERATING STATION

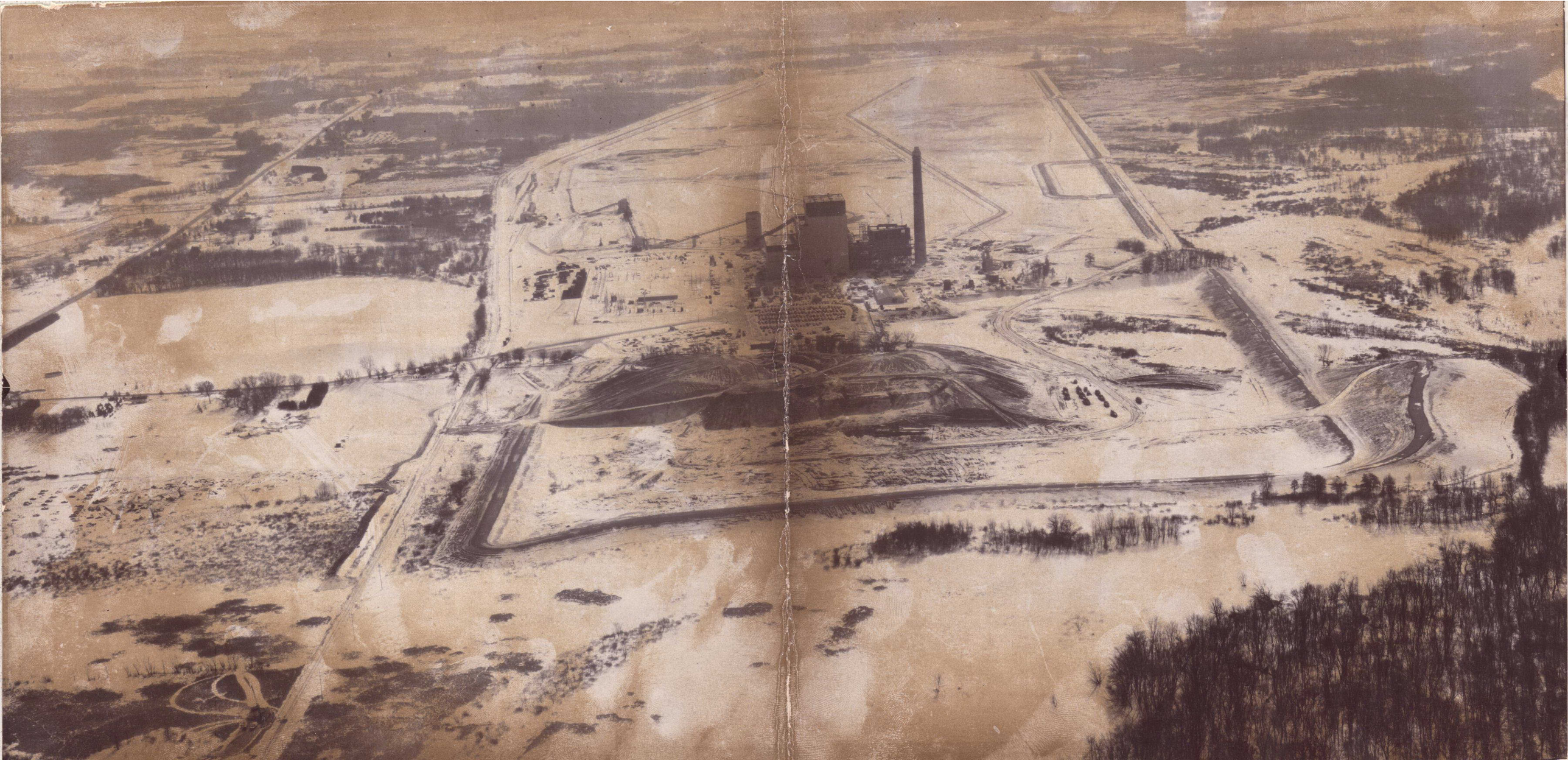
FIGURE 1-3



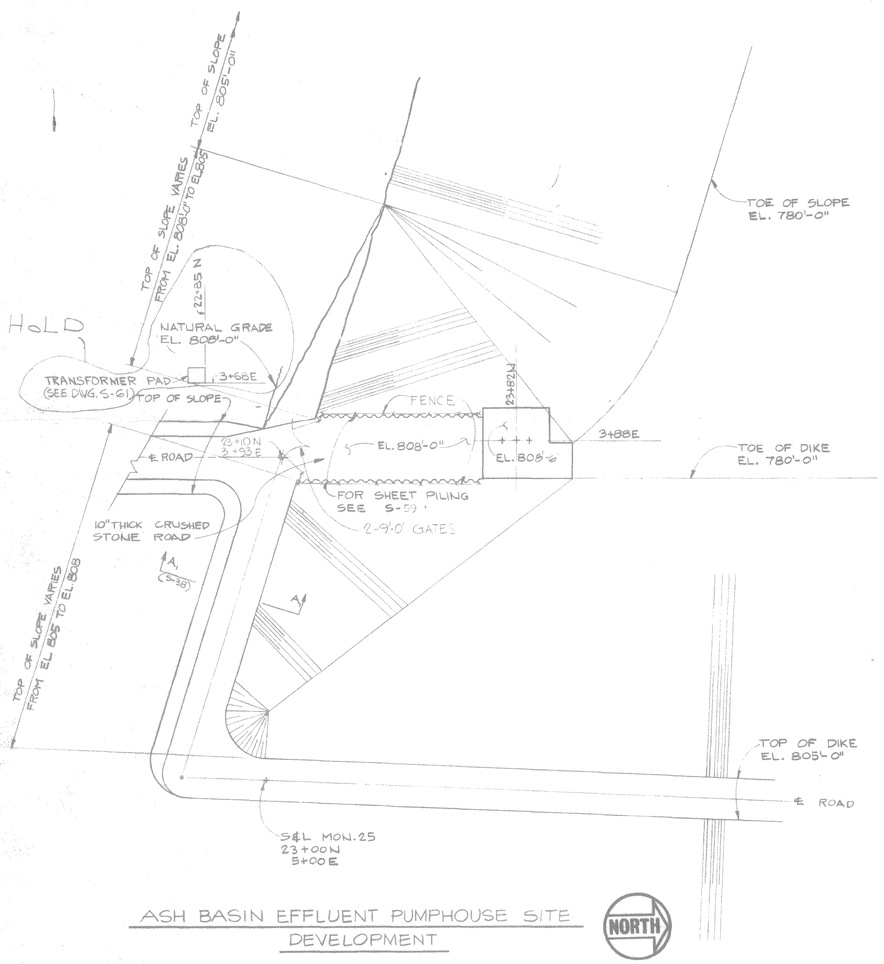
WELLS SHOULD BE PLACED ON
OUTSIDE EDGE OF BERM



COLUMBIA GENERATING STATION
PLANT AREA
SHOWING UNIT NO.1 AND PROPOSED UNIT NO.2
AND COOLING TOWERS

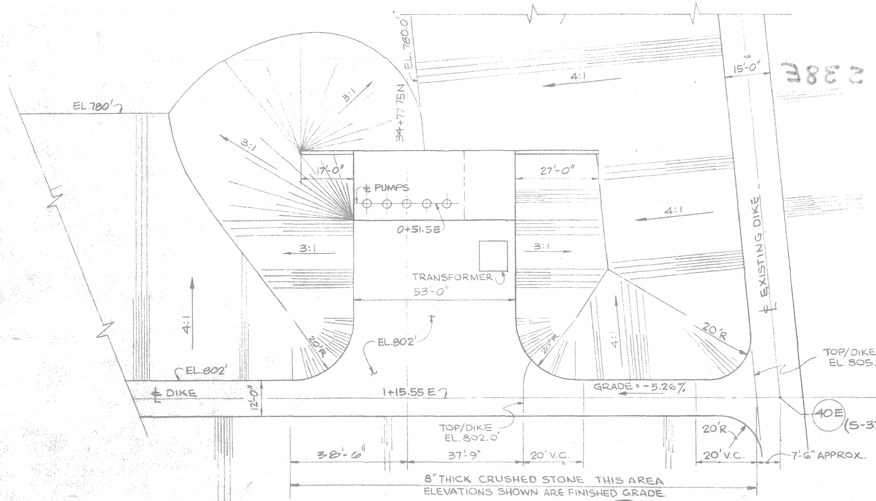


S-38



ASH BASIN EFFLUENT PUMPHOUSE SITE DEVELOPMENT

NORTH

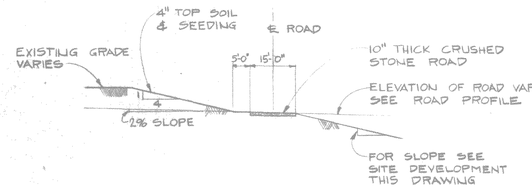


ASH POND RE-CIRCULATION PUMPHOUSE GENERAL LAYOUT
SCALE: 1" = 20'-0"
(SEE NOTE NO. 2)

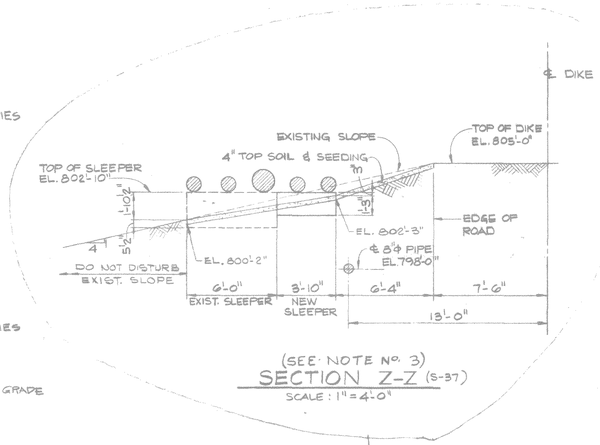
NORTH

ROAD PROFILE
SCALE: VERTICAL 1"=20'-0"
HORIZONTAL 1"=100'-0"

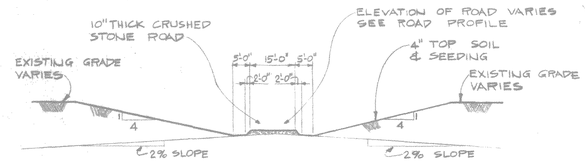
POINT	LOCATION	
A.	22+72 N	5+00 E
B.	23+10 N	3+93 E
C.	22+15 N	3+93 E
D.	19+83 N	3+00 E
E.	15+18 N	3+00 E



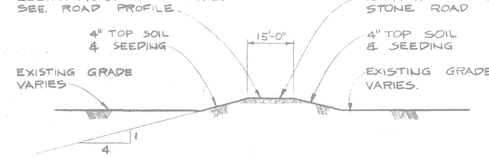
SECTION A-A,
SCALE 1"=20'-0"



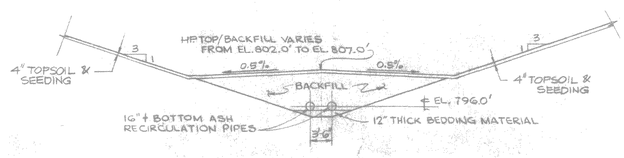
(SEE NOTE NO. 3)
SECTION Z-Z (S-37)
SCALE: 1" = 4'-0"



SECTION B-B, (S-37)
SCALE 1"=20'-0"



SECTION C-C, (S-37)
SCALE 1"=20'-0"



SECTION 1-1 (S-37)
SCALE: 1"=10'-0"
(SEE NOTE NO. 2)

E

NOTES

1. ALL FILL SHALL BE CLASS 2 TYPE C&R UNLESS NOTED.
2. ALL NEW WORK SHOWN SHALL BE DONE BY THE "ASH HANDLING SYSTEM CONTRACTOR" IN ACCORDANCE WITH SPECIFICATION W-2908.
3. SLOPE MODIFICATION AND RESEEDING BY SUPERSTRUCTURE CONTRACTOR SPECS. W-2880.

REFERENCE DRAWINGS

S-37	ASH BASIN
S-59	ASH BASIN EFFLUENT PUMP HOUSE PLAN & SECTIONS.
S-60	ASH BASIN EFFLUENT PUMP HOUSE SECTION & DETAILS
S-61	MISCELLANEOUS OUT DOOR STRUCTURES
M867-3H"	BOTTOM ASH WATER RECIRCULATION PUMP HOUSE - PIPING
M867-3H"2	BOTTOM ASH WATER RECIRCULATION PUMP HOUSE - OUTDOOR PIPING
M867-3H"3	BOTTOM ASH WATER RECIRCULATION PUMP HOUSE - OUTDOOR PIPING

Drawing Release Record

Rev.	Date	Init.	Description
	3-10-72	GSE	FOR PERMITTY
	3-26-76	GSW	FOR PERMITTY
A	6-18-76	GSW	AS BUILT
B	8-26-76	GSW	AS BUILT
C	12-1-76	GSW	AS BUILT
D	12-27-76	GSW	AS BUILT
—	3-28-77	GSW	AS BUILT
E	8-29-77	MJA	AS BUILT

ASH BASIN SECTIONS & DETAILS

COLUMBIA GENERATING STATION UNIT
WISCONSIN POWER & LIGHT CO.
PORTAGE, WISCONSIN

SCALE 1"=20'
DRAWN P. KOLIOPOULOS 3-29-76
CHECKED 3-26-76
ENGINEER 6-11-76
APPROVED 6-11-76
JOB NO. 4189

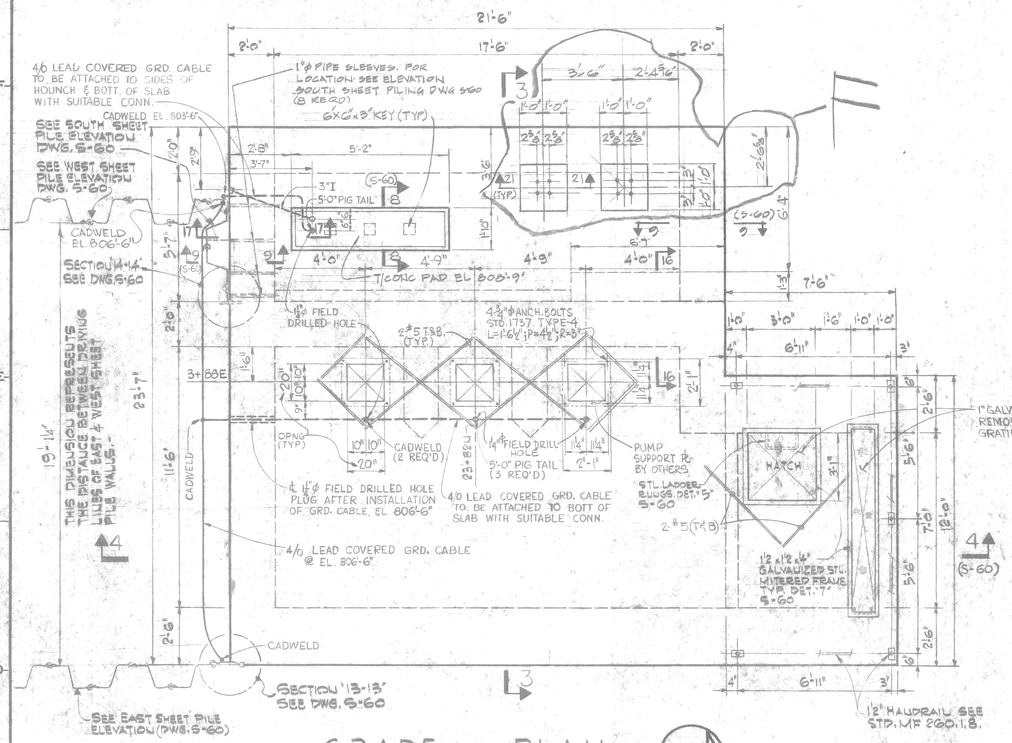
SARGENT & LUNDY ENGINEERS CHICAGO

DRAWING NO. S-38

WISCONSIN R. N. BERGSTROM BARRINGTON HILLS, ILLINOIS PROFESSIONAL ENGINEER

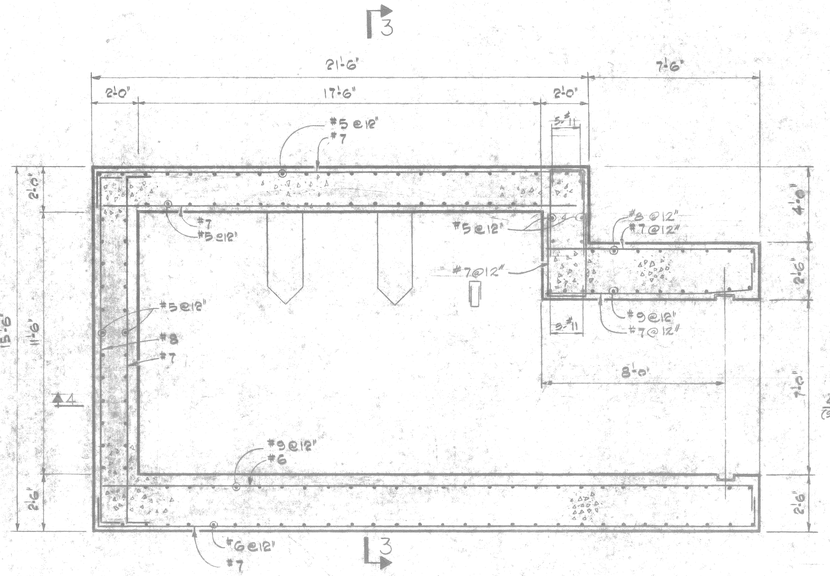
DRAWING SIZE

S-59

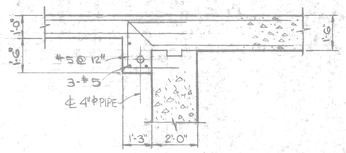


GRADE PLAN
ELEVATION: 808'-6"

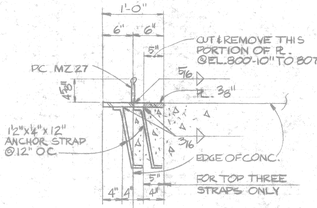
NORTH



SECTION 1-1



SECTION 16-16

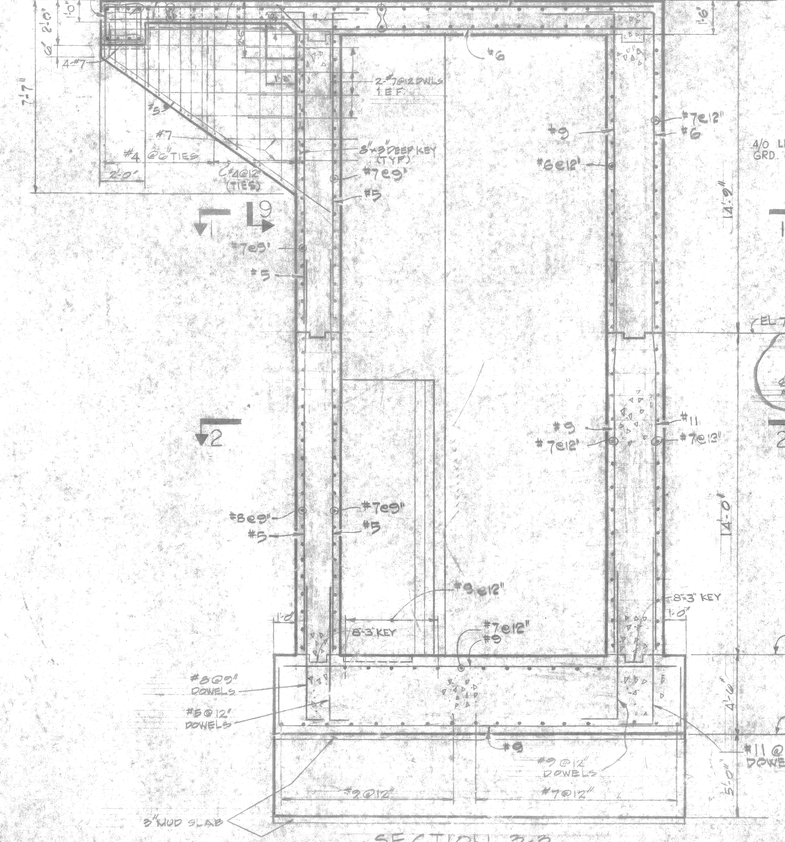


DETAIL 20
SCALE: 1"=1'-0"

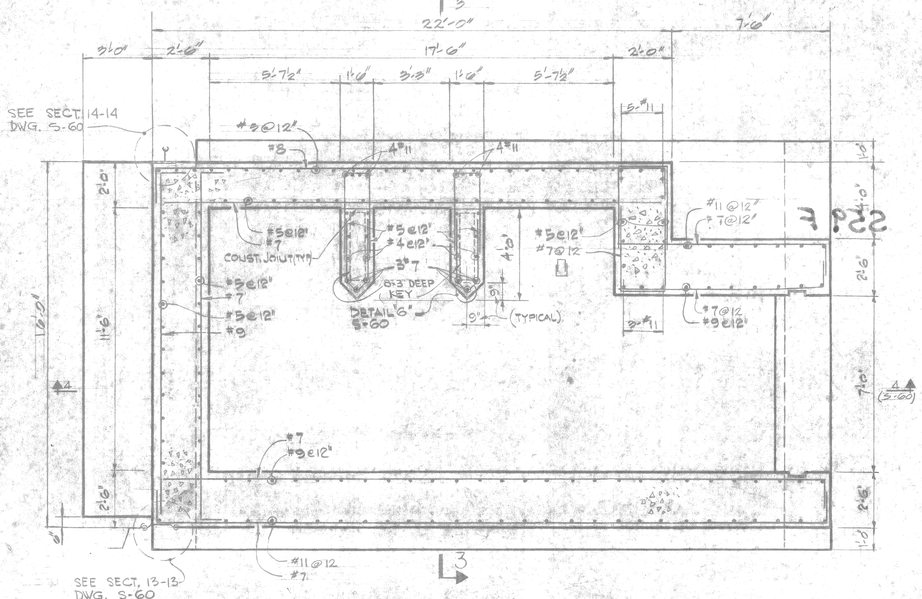
REINFORCING DEVELOPMENT LENGTH SCHEDULE

BAR SIZE	BAR SPACING GREATER OR EQUALS 6" DEVELOPMENT LENGTH (ld) * TOP BARS	OTHER BARS
#3	12"	12"
#4	14"	12"
#5	17"	12"
#6	21"	15"
#7	28"	20"
#8	36"	26"
#9	47"	33"
#10	59"	42"
#11	72"	52"

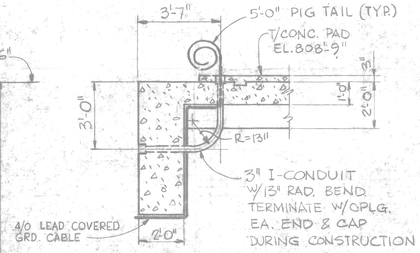
BAR SIZE	BAR SPACING LESS THAN 6" DEVELOPMENT LENGTH (ld) TOP BARS	OTHER BARS
#3	13"	12"
#4	17"	12"
#5	21"	15"
#6	26"	18"
#7	35"	25"
#8	45"	32"
#9	55"	41"
#10	73"	52"
#11	90"	64"



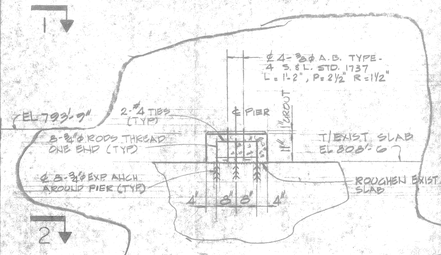
SECTION 2-1



SECTION 2-2



SECTION 17-17



SECTION 21-21
SCALE NONE

NOTES

1. ALL CONCRETE WORK SHALL BE IN ACCORDANCE WITH STANDARD 1715 UNLESS NOTED.
2. FOR REINFORCING LAP SPLICE LENGTHS MULTIPLY THE DEVELOPMENT LENGTH BY 1.7
3. FOR PLUMBING IN TOP SLAB & WALLS. SEE DWG. A-99

REFERENCE DRAWINGS

S-38	ASH BASIN - SECTION & DETAILS.
S-60	ASH BASIN EFFLUENT PUMP HOUSE PLAN & SECTIONS.
A-99	ASH BASIN EFFLUENT PUMP HOUSE PLANS & ELEVATIONS UNIT #1.
M-882	ACID FEED PIPING SYSTEM TO ASH BASIN EFFLUENT DISCHARGE

WISCONSIN R. N. BERGSTROM REGISTERED U.S.A. ILLINOIS PROFESSIONAL ENGINEER

Drawing Release Record			
Rev.	Date	Init.	Description
-	2-26-74	G.V.	PRELIMINARY
A	4-15-74	G.V.	ADD SECTION 17-17
B	5-15-74	G.V.	ADD SECTION 21-21
C	6-12-74	G.V.	ADD NOTES & REFERENCE DRAWINGS
			CHANGE PUMP PIT
D	8-14-74	G.V.	ADD SEC. 2D
E	9-24-74	G.V.	ADD GRD. CABLE
F	11-14-74	G.V.	ADD Note 3 to 21-21

ASH BASIN EFFLUENT PUMP HOUSE PLAN & SECTIONS

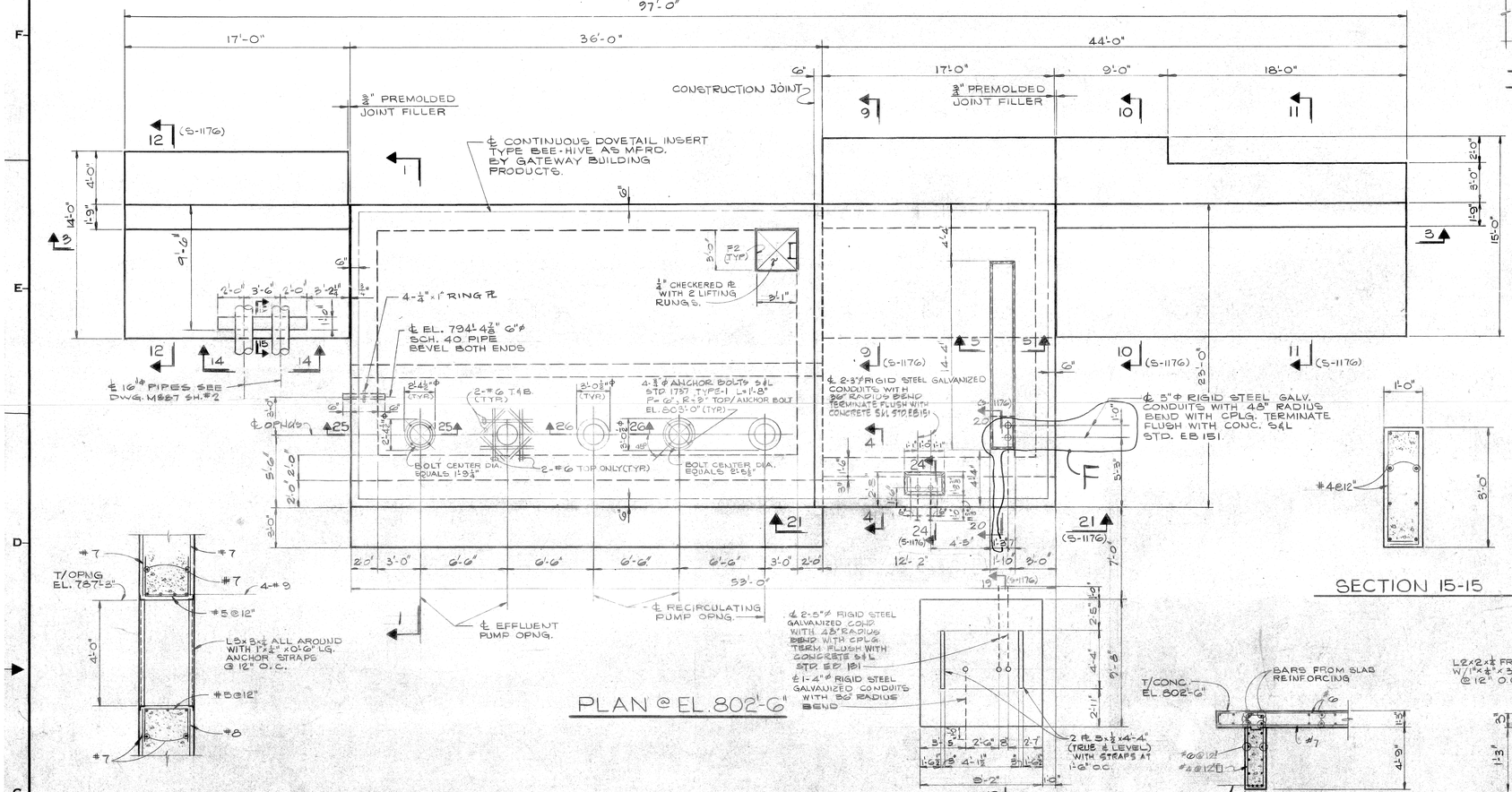
COLUMBIA GENERATING STATION UNIT
WISCONSIN POWER & LIGHT CO.
PORTAGE, WISCONSIN

SCALE	3/8"=1'-0"	
DRAWN	S. ORTEGA	8-26-74
CHECKED		3-26-74
ENGINEER		6-5-74
APPROVED		6-12-74
JOB NO.	4135	

SARGENT & LUNDY ENGINEERS CHICAGO

DRAWING NO. S-59

S-1175



NOTES

1. ALL WORK SHOWN ON THIS DRAWING SHALL BE FURNISHED AND INSTALLED BY AS HANDLING SYSTEM CONTRACTOR SPEC. W-2308.
2. FOR GENERAL NOTES SEE DWG S-1176
3. THIS OPENING SHALL REMAIN OPEN AT ALL TIMES INCLUDING DURING CONSTRUCTION
4. FOR LOCATION OF DRAINS IN SLAB AT EL 802'-6" SEE DWG A-284.
   THE FINISHED CONCRETE SLAB SHALL HAVE SLOPES FOR WATER TO DRAIN THRU THE DRAINS HOLES
5. DO NOT BACKFILL AROUND PUMPHOUSE UNTIL TOP SLAB (EL. 802'-6") IS POURED AND IS CURED FOR SEVEN DAYS.
6. BACKFILLING SHALL BE DONE SIMULTANEOUSLY ON BOTH SIDES OF RETAINING WALLS TO AVOID UNDESIRABLE HIGH LATERAL PRESSURE LOADS ON THE WALL.

REFERENCE DRAWINGS

S-37	ASH BASIN
S-38	ASH BASIN SECTIONS & DETAILS
A-283	BOTTOM ASH WATER RECIRCULATION PUMP HOUSE ELEVATIONS
A-284	BOTTOM ASH WATER RECIRCULATION PUMP HOUSE PLAN & SECTION
E-322	BOTTOM ASH RECIRCULATION PUMP HOUSE PLAN & SECTIONS
M-887	SHEET 1 OF 8 BOTTOM ASH WATER RECIRCULATION PUMP HOUSE PIPING

WISCONSIN
GLEN A. CHAUVIN
No. E-14430
PARK RIDGE, ILL.
PROFESSIONAL ENGINEER

Drawing Release Record			
Rev.	Date	Init.	Description
–	12-1-76	M.A.	BID SET
A	12-27-76	M.A.	AS NOTED
B	3-28-77	M.A.	ISSUE FOR CONST.
C	4-25-77	M.A.	AS NOTED
D	6-3-77	M.A.	AS NOTED
E	8-19-77	M.A.	REVISE PUMP SUMP
F	10-19-77	M.A.	REVISE CONDUITS

BOTTOM ASH WATER RECIRCULATION PUMP HOUSE FOUNDATION PLAN & SECTIONS.

COLUMBIA GENERATING STATION UNIT 2
WISCONSIN POWER & LIGHT CO.
PORTAGE, WISCONSIN

SCALE 1/4"=1'-0" U.N.
DRAWN E. Surlis
CHECKED M.G. P. Mayo 3-22-77
ENGINEER [illegible] 3/22/77
APPROVED [illegible] 3/22/77
JOB NO. 4789-10

SARGENT & LUNDY ENGINEERS CHICAGO

DRAWING NO. S-1175

CUSHING 2-CC-4

ASH DEPOSIT

ASH POND
(N.E. CELL)
W.S. 787.9
(6-22-79)

BERM TO ISOLATE DISPOSAL OPERATIONS FROM SECONDARY SETTLING POND.

5/8" REBAR
EL. 792.75

TOE OF SLOPE

SMALL BERM TO PREVENT OFFSITE WATER FROM ENTERING SITE (SEEDED + MULCHED)

ACID STORAGE

TRANSFORMER SITE

ACCESS TO SITE

GRAVELED ROAD

BERM

SCREENING

TREES + RIDGE LEFT FOR SCREENING PURPOSES

+03.98 YLEREBAR

BRASS CAP
+04.35
EL. 816.61

Access road was originally proposed in this vicinity

+60.00

26+00N
25+00N
24+00N
23+00N
22+00N
21+00N
20+00N

6+00W 5+00W 4+00W 3+00W 2+00W 1+00W 0+00 1+00E 2+00E 3+00E 4+00E

PLANT COORDINATES	WISCONSIN STATE PLANE COORDINATE SYS.
0+00N	591500N
0+00E	2159500E

CONTOURS OF PROPOSED SITE ON DWG. DTD. 10-6-77

GENERAL ENGINEERING COMPANY, INC.
CONSULTING ENGINEERS
GEC
H. O. VIK E. T. ERNST J. O. HAMEL
PORTAGE, WISCONSIN

COLUMBIA GENERATING PLANT
CONTOURS OF ASH PIT

2' CONTOUR INTERVAL

DRAWN BY AR
SCALE 1"=50'
CHECKED BY
DATE 7-10-79
REVISED

FILE NO. 2716 SHEET NO. 1 OF 1

K & E 10-5155 200-12-77

26+00N
25+00N
24+00N
23+00N
22+00N
21+00N
20+00N

6+00W 5+00W 4+00W 3+00W 2+00W 1+00W 0+00 1+00E 2+00E 3+00E 4+00E

ASH DEPOSIT

ASH POND
(N.E. CELL)
W.S. 787.9
(6-22-78)

5/8" REBAR
EL. 792.75

TOE OF SLOPE

TOP OF SLOPE

Existing Roadway Along Top of Dike Between Ponds

New Ramp

Construction Parking Lot

+03.98 ½" REBAR

BRASS CAP
+04.35
EL. 816.61

+60.00

ACID STORAGE

TRANSFORMER

N

Columbia ash basin modification
post-construction topo

CONTOURS OF PROPOSED SITE ON DWG DTD 12-8-77

GENERAL ENGINEERING COMPANY, INC.
CONSULTING ENGINEERS
GEC H. O. VIK E. T. ERNST J. O. HAMEL
PORTAGE, WISCONSIN

COLUMBIA GENERATING PLANT
CONTOURS OF ASH PIT

2' CONTOUR INTERVAL

DRAWN BY	SCALE 1"=50'
CHECKED BY	DATE 7-10-79
REVISED	

FILE NO. SHEET NO. 1 OF 1

K & E 10-5155 200 12-77

5+63 N
4+79.5 E

EXIST. FENCE (4+70 E)

10+28 N
4+79.5 E

4:1

10'-0" 10'-0" 20'-0" 14'-0" 20'-0"

10'-0" TYP.

℄ NEW 18"ϕ PIPE, STD WEIGHT, SEAMLESS CARBON STEEL, ASTM A106, GR. B (MIN. COVER 1'-6")

10+45.89 N
5+29.5 E

EXIST. GUY WIRES

45°

REMOVE & RELOCATE EXISTING ORIFICE PLATE TO END OF NEW PIPE

℄ EXIST. 18"ϕ ASH BASIN EFFLUENT PIPE

10+72.09 N
5+55.7 E

32°-28'-09"

EXIST. DITCH INV. EL. 802.3'

11+26.48 N
5+63.86 E

EXIST. RIPRAP & BEDDING

℄ DISCHARGE STRUCTURE (SEE S-87)
5+62 N
5+51 E

G+00 N
5+42.09 E

BOTTOM/POND EL. 796.5'

10'x10' ROCK BAFFLE T/PILE EL. 802.5'

EXIST. DITCH INV. EL. 801.0'

4'-0"x6'-0" SHELTER

28°

W.P. 5+58.64 N
5+64.05 E

EXIST. DITCH INV. EL. 800.67'

EXIST. DITCH INV. EL. 801.5'

10'-0" (TYP.)

T/DIKE EL. 805.0'

℄ OVERFLOW SPILLWAY

5+78.15 N
5+79.5 E

EXIST. TRANSMISSION LINE SUPPORT FOUNDATIONS

10+28 N
5+79.5 E

FILL EXISTING DITCH TO EL. 803.0' OR AS DIRECTED IN THE FIELD

℄ EXIST. TRACK #3

℄ EXIST. TRACK #4

℄ EXIST. TRACK #2

℄ EXIST. TRACK #1

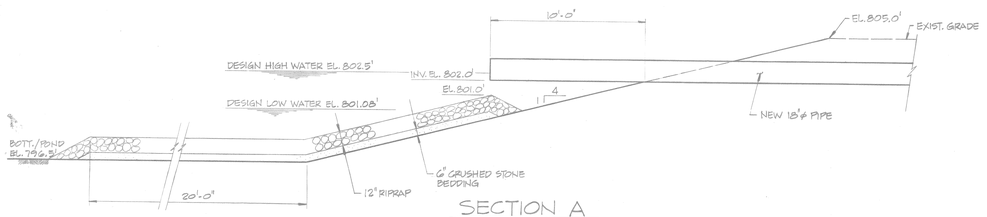
5+00 E

6+00 E

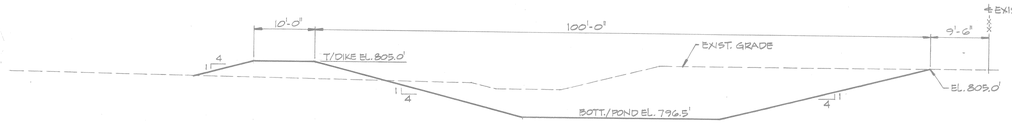
7+00 E

28P-4

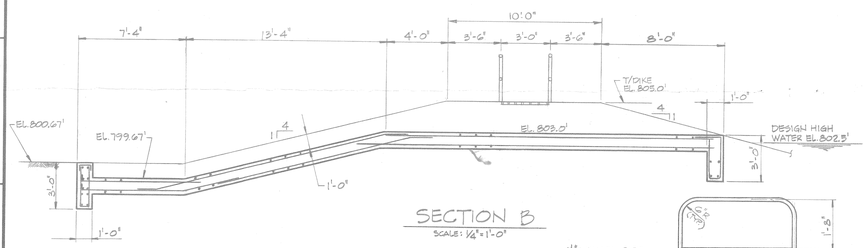
SECTION A
SCALE: 1/4" = 1'-0"



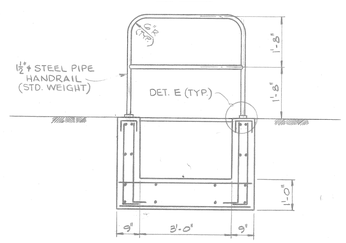
SECTION D
SCALE: 1" = 10'-0"

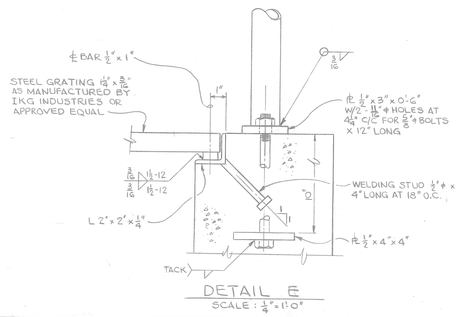


SECTION B
SCALE: 1/4" = 1'-0"



SECTION C
SCALE: 1/2" = 1'-0"





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

NOTES

1. ALL CUT AND FILL SLOPES, TOP OF DIKE AND BOTTOM OF POND SHALL BE PROVIDED WITH 4" TOPSOIL AND SEEDING.
2. EARTHWORK SPECIFICATION:
   a) GENERAL - CONFORM TO ALL APPLICABLE REQUIREMENTS OF S&L STANDARD SPECIFICATION FORM 1114 AND THIS SPECIFICATION
   b) REMOVE TOPSOIL AS REQUIRED AND STOCKPILE FOR REUSE
   c) DISPOSE OF ALL EXCAVATED MATERIALS ON PROJECT SITE, EITHER AS FILL OR IN STOCKPILE AREA
   d) FILL MATERIAL - APPROVED MATERIAL FROM EXCAVATION
   e) COMPACTION - COMPACT FILL MATERIAL TO A MINIMUM DRY DENSITY OF 90% MODIFIED OPTIMUM DRY DENSITY IN ACCORDANCE WITH ASTM D1557
3. ALL REINFORCING STEEL SHALL BE #5@12", UNLESS NOTED.
4. FOR CONCRETE NOTES SEE DWG. S-87

REFERENCE DRAWINGS

S-87	ASH BASIN EFFLUENT SETTLING POND DISCHARGE STRUCTURE

DRAWING RELEASE RECORD

REV.	DATE REL'D.	PREPARED	REVIEWED	APPROVED	PURPOSE	FILM

DRAWING RELEASE RECORD

REV.	DATE REL'D.	PREPARED	REVIEWED	APPROVED	PURPOSE	FILM
A	10-1-80	[illegible]	[illegible]	[illegible]	CONSTRUCTION	✓

WISCONSIN ROBERT J. SMALL No. E-14342 PROFESSIONAL ENGINEER
SEAL
10-1-80

SCALE	1"=20'-0" U.N.
PROJECT NUMBER	6222-00

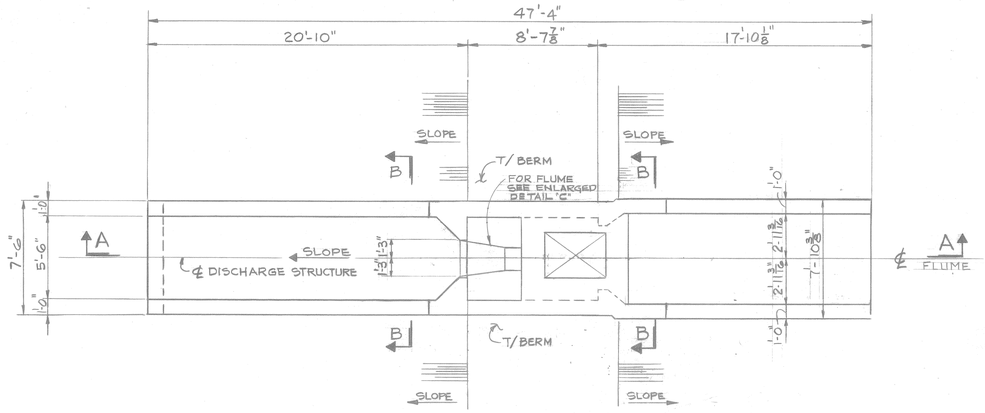
ASH BASIN EFFLUENT SETTLING POND
PLAN AND SECTIONS
COLUMBIA GENERATING STATION
WISCONSIN POWER & LIGHT CO.
PORTAGE, WISCONSIN

SARGENT & LUNDY ENGINEERS CHICAGO

DRAWING NO.	REV.
S-86	A

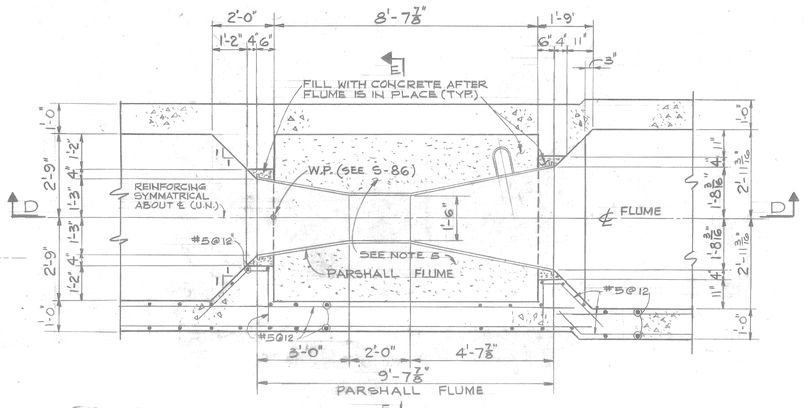
SHEET OF

FORM SDS 2.8.1-(10) - PHASE III
R.C.L.-7-8



PLAN OF DISCHARGE FLUME

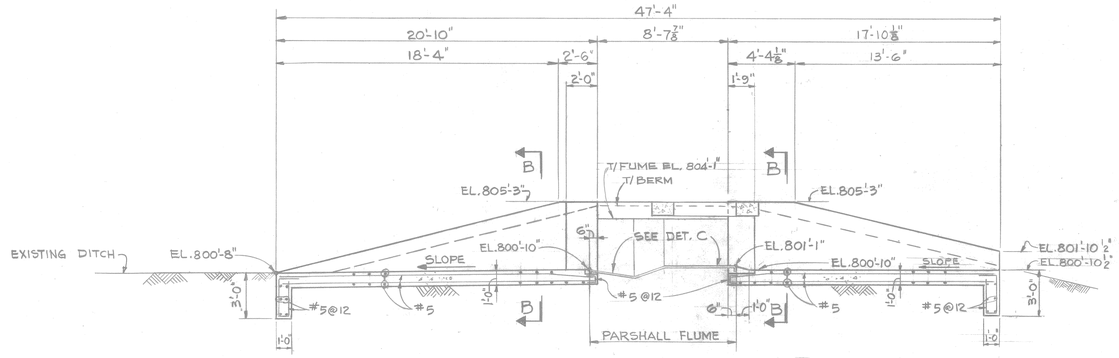
SCALE: 1/4"=1'-0"



281-Y

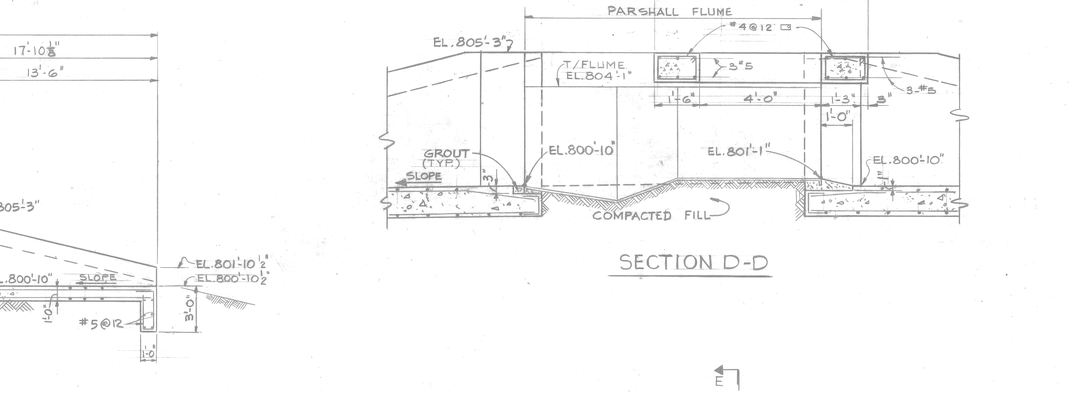
DETAIL C

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

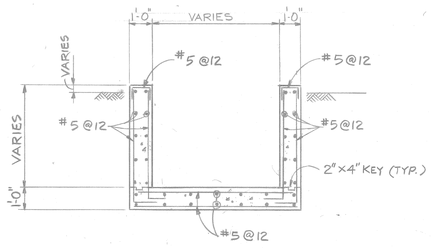


SECTION A-A

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

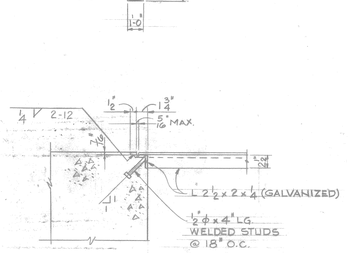


SECTION D-D



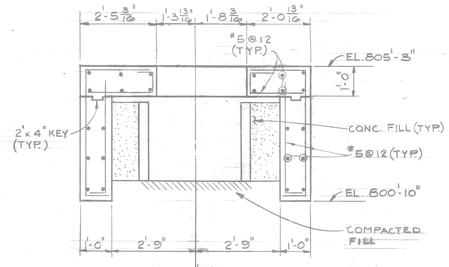
SECTION B-B

SCALE: 3/8"=1'-0"



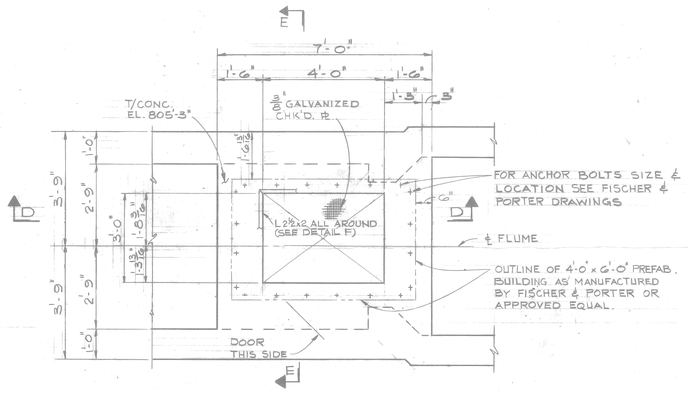
DETAIL F

SCALE: 1"=1'-0"



SECTION E-E

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



PLAN @ EL. 805'-3"

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

NOTES

1. ALL CONCRETE WORK SHALL BE IN ACCORDANCE WITH S&L STANDARD 1715.
2. ALL EMBEDDED STEEL SHALL BE IN ACCORDANCE WITH S&L STANDARD 1741.
3. REINFORCING BAR LAP SPLICE LENGTHS SHALL BE AS FOLLOWS:
   - # 4 23"
   - # 5 29"
   - # 6 35"
4. REINFORCING STEEL SHALL HAVE THE FOLLOWING MIN. COVER.
   - SLABS ... 1"
   - SURFACES NOT FORMED ... 3"
   - FORMED SURFACES IN CONTACT WITH SOIL OR EXPOSED TO WEATHER ...2"
5. CONCRETE FILL IS TO BE PLACED IN LIFTS NOT EXCEEDING 12" OR BRACING IS TO BE PROVIDED FOR THE FLUME IN ACCORDANCE WITH FISCHER & PORTER INSTRUCTION BULLETIN.

REFERENCE DRAWINGS

S-86	ASH BASIN EFFLUENT SETTLING POND PLAN AND SECTIONS.

DRAWING RELEASE RECORD

REV.	DATE REL'D.	PREPARED	REVIEWED	APPROVED	PURPOSE	FILM

DRAWING RELEASE RECORD

REV.	DATE REL'D.	PREPARED	REVIEWED	APPROVED	PURPOSE	FILM
A	10-1-80	M. Raskowsky	B.H. Lyon	K.C. Meier	FOR CONSTRUCTION	X

WISCONSIN
ROBERT L. SMALL
No. E-34342
OAK FOREST, ILL.
PROFESSIONAL ENGINEER
SEAL
R. Small 10-1-80

SCALE
AS NOTED
PROJECT NUMBER
6222-00

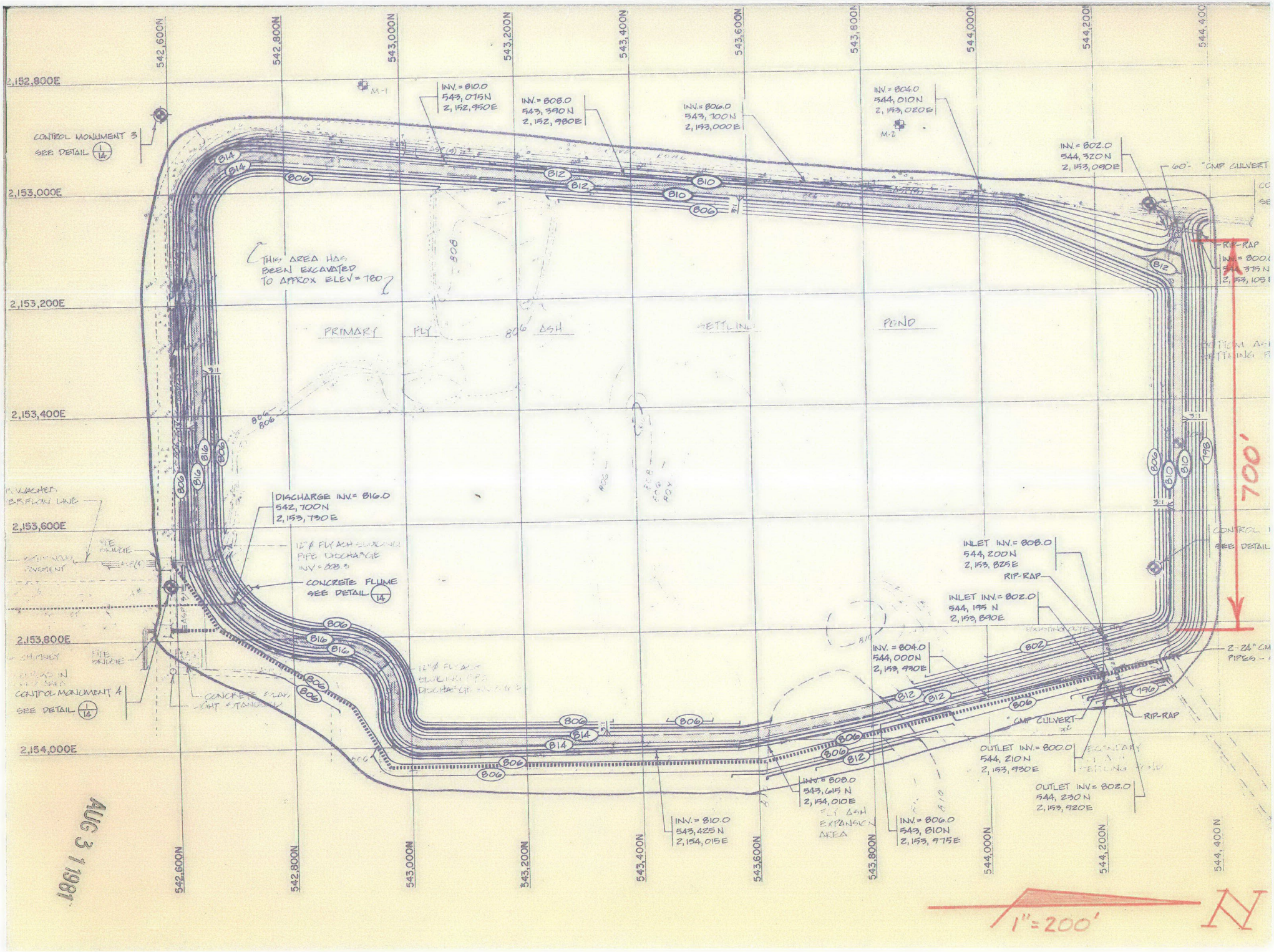
ASH BASIN EFFLUENT SETTLING POND
DISCHARGE STRUCTURE
COLUMBIA GENERATING STATION
WISCONSIN POWER & LIGHT
PORTAGE, WISCONSIN

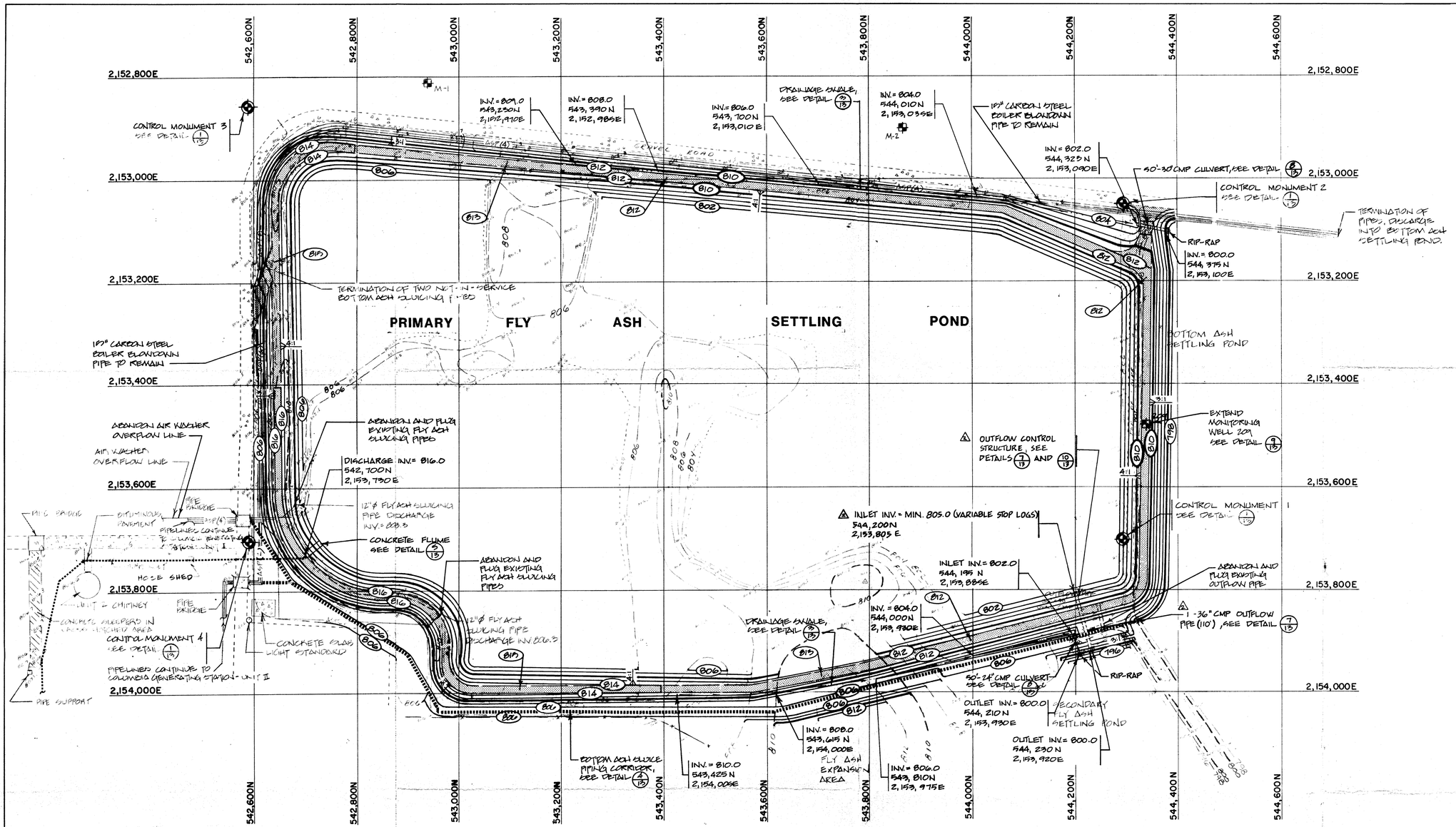
SARGENT & LUNDY ENGINEERS CHICAGO

DRAWING NO.	REV.
S-87	A

SHEET OF

FORM GDS 3.6.16-1(1) PHASE III
R.C.L.-78


542,600N
542,800N
543,000N
543,200N
543,400N
543,600N
543,800N
544,000N
544,200N
544,400N
2,152,800E
2,153,000E
2,153,200E
2,153,400E
2,153,600E
2,153,800E
2,154,000E
CONTROL MONUMENT 3
SEE DETAIL 1/14
M-1
INV.= 810.0
543,075N
2,152,950E
INV.= 808.0
543,390N
2,152,980E
INV.= 806.0
543,700N
2,153,000E
INV.= 804.0
544,010N
2,153,020E
M-2
INV.= 802.0
544,320N
2,153,090E
60"- "CMP CULVERT
RIP-RAP
THIS AREA HAS BEEN EXCAVATED TO APPROX ELEV = 780
PRIMARY FLY ASH SETTLING POND
DISCHARGE INV.= 816.0
542,700N
2,153,730E
12"ø FLY ASH SLURRY PIPE DISCHARGE INV.= 808.0
CONCRETE FLUME SEE DETAIL 14/14
INLET INV.= 808.0
544,200N
2,153,825E
RIP-RAP
INLET INV.= 802.0
544,195N
2,153,890E
INV.= 804.0
544,000N
2,153,990E
2-24" CMP PIPES
" CMP CULVERT
RIP-RAP
OUTLET INV.= 800.0
544,210N
2,153,930E
OUTLET INV.= 802.0
544,230N
2,153,920E
INV.= 808.0
543,615N
2,154,010E
FLY ASH EXPANSION AREA
INV.= 810.0
543,425N
2,154,015E
INV.= 806.0
543,810N
2,153,975E
CONTROL MONUMENT 4
SEE DETAIL 1/14
CONCRETE SLAB LIGHT STANDARD
700'
1"=200'
N
AUG 3 1981



LEGEND(EXISTING)

- GROUNDWATER OBSERVATION WELL
- ASH SLUICING PIPE AND NUMBER OF PIPES
- CONTROL MONUMENT
- SPOT ELEVATION
- GROUND CONTOUR
- CULVERT PIPE
- GRAVEL ROAD
- FENCE LINE

LEGEND(PROPOSED)

- SPOT ELEVATION
- GROUND CONTOUR
- DRAINAGE SWALE
- CULVERT PIPE
- SLOPE RATIO
- BOTTOM ASH ACCESS ROAD
- CENTERLINE OF REROUTED BOTTOM ASH SLUICING PIPES
- CENTERLINE OF REROUTED FLY ASH SLUICING PIPES

NOTES

1) REFER TO SHEET 7 OF 13 THIS SET FOR ADDITIONAL NOTES.
2) HORIZONTAL AND VERTICAL CONTROL INFORMATION IS CONTAINED IN CONTROL MONUMENT TABLE ON THIS SHEET.
3) INBOARD SLOPES OF EARTH BERM AS SHOWN REPRESENT SURFACE OF GENERAL FILL AND NOT SURFACE OF FLY ASH LINER.
4) ALL EXISTING FACILITIES (ASH SLUICING PIPES, PIPE BRIDGES, ROADWAYS, FENCES, CONTROL MONUMENTS, MONITORING WELLS, ETC.) WILL BE PROTECTED FROM DAMAGE.
5) REROUTING OF BOTTOM ASH AND FLY ASH SLUICING PIPES WILL BE COORDINATED BY WISCONSIN POWER AND LIGHT. SPECIFIC LOCATIONS WILL BE DICTATED BY FIELD CONDITIONS.
6) REFER TO DETAIL 2/13 FOR TYPICAL SECTION THROUGH EARTH BERM.

CONTROL MONUMENT TABLE

CONTROL MONUMENT	NORTH COORDINATE	EAST COORDINATE	ELEVATION (U.S.G.S.)
1	544,285	2,153,700	802.20
2	544,285	2,153,090	802.85
3	542,580	2,152,855	804.54
4	542,580	2,153,700	808.21

north

REISSUED JULY 27,1981

D.N.R. APPROVED
DATE 10/30/81
Amalendu Bagchi, Eng.

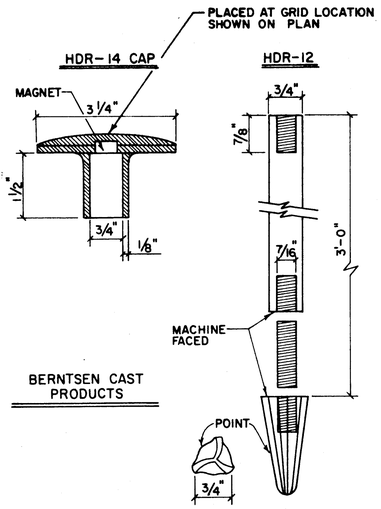
NO.	BY	DATE	REVISION	APP'D
4	SHG	10/5/81	OUTFLOW PIPE	FAK
3	TCH	7/27/81	LOWER BERM HEIGHT	FAK

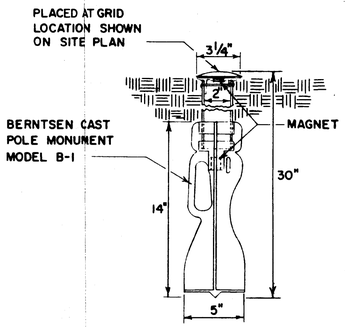
SITE PREPARATION

REVISED ABANDONMENT PLAN - PRIMARY FLY ASH SETTLING POND
COLUMBIA SITE
WISCONSIN POWER & LIGHT COMPANY
PART OF SECTIONS 27 & 34, T12N, R9E
TOWN OF PACIFIC COLUMBIA CO. WISCONSIN

WARZYN ENGINEERING INC

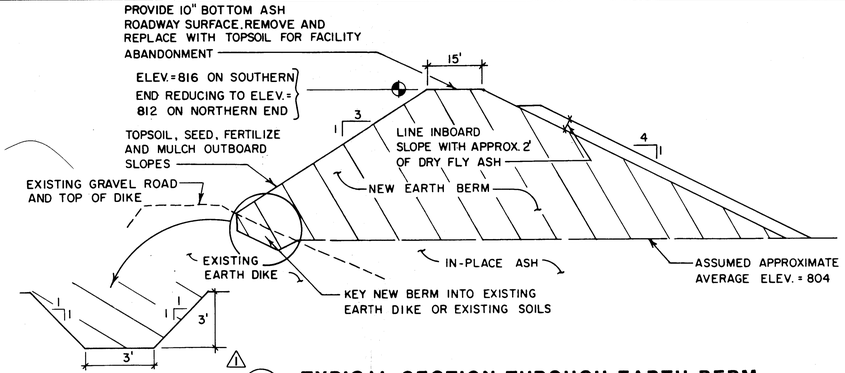
DRAWN JDP, MAS	SCALE 1" = 100'	SHEET 8	OF 13
CHECKED BER	DATE 5/7/81	DRAWING NO.	C7134-104
APPROVED Roger C. Cooley		PRINTED OCT 5 1981	
REFERENCE			





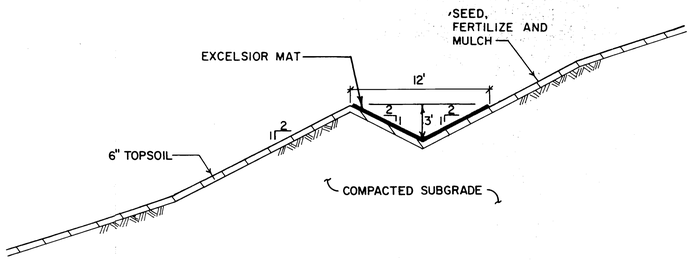
1/13 **CONTROL MONUMENTS**

NOT TO SCALE



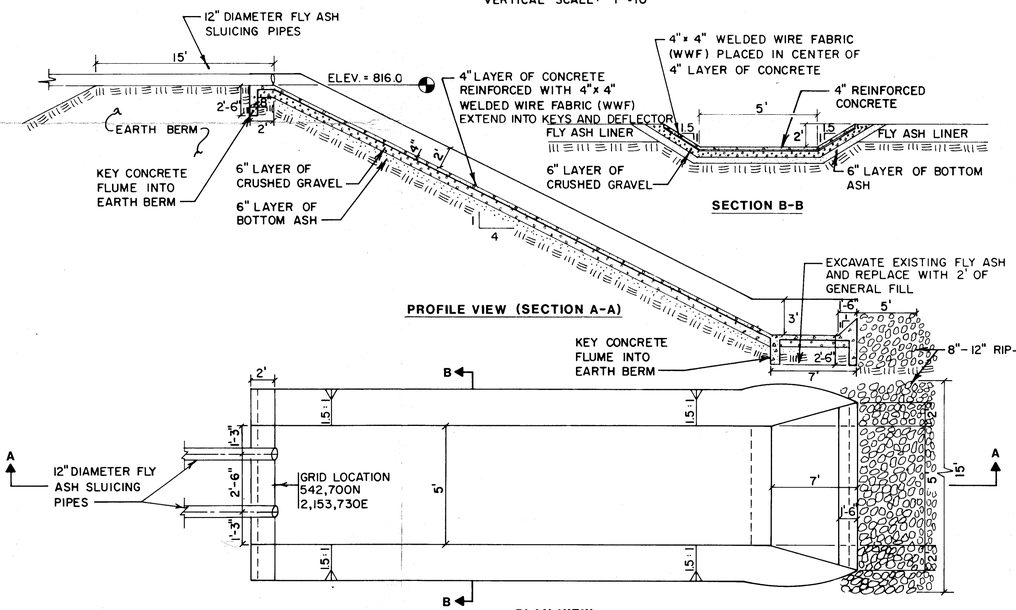
2/13 **TYPICAL SECTION THROUGH EARTH BERM**

HORIZONTAL SCALE: 1" = 20'
VERTICAL SCALE: 1" = 10'



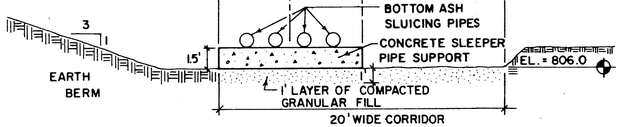
3/13 **DRAINAGE SWALE**

SCALE: 1" = 6'



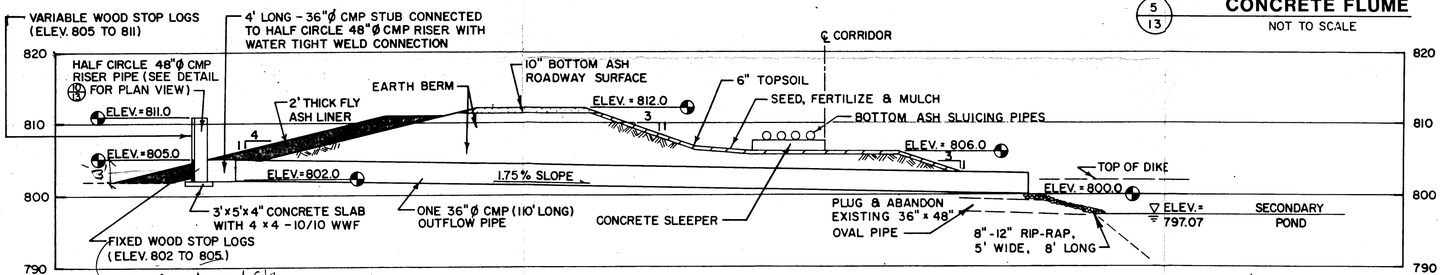
5/13 **CONCRETE FLUME**

NOT TO SCALE



4/13 **TYPICAL SECTION THROUGH REROUTED BOTTOM ASH SLUICE PIPING CORRIDOR**

SCALE: 1" = 5'

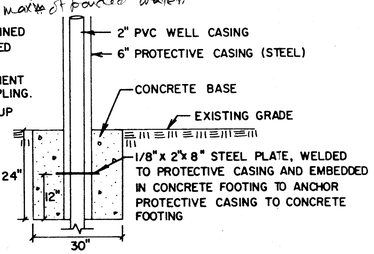


Lower fixed wood stop logs. 1" x 6" worked of bowed water.

7/13 **SECTION THROUGH OUTFLOW PIPE**

HORIZONTAL SCALE: 1" = 10'
VERTICAL SCALE: 1" = 10'

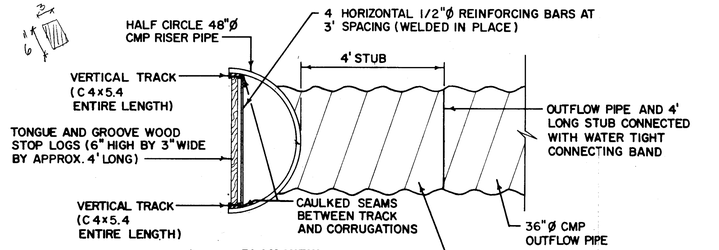
NOTES:
1) PROTECTIVE CASING - JOINED WITH REGULAR THREADED COUPLING.
2) PVC WELL CASING - CEMENT JOINED WITH PVC COUPLING.
3) MINIMUM WELL STICK-UP OF 3 FEET ABOVE FINAL GRADES.



9/13 **MONITORING WELL EXTENSION DETAIL**

NOT TO SCALE

1 1/2 Hard Pipe plug



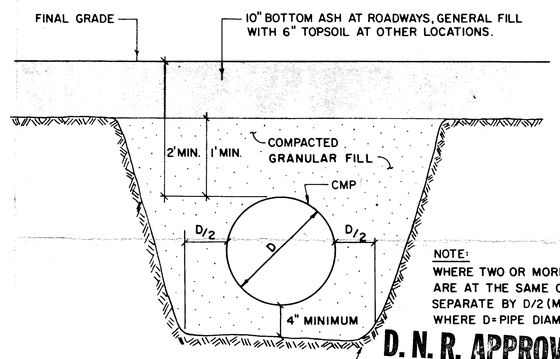
PLAN VIEW

10/13 **OUTFLOW CONTROL STRUCTURE**

SCALE: 1" = 2'

6/13 **FINAL COVER**

SCALE: 1" = 2'



NOTE:
WHERE TWO OR MORE PIPES ARE AT THE SAME CROSSING, SEPARATE BY D/2 (MIN.) WHERE D = PIPE DIAMETER.

D. N. R. APPROVED
DATE 10/30/81
Amolendu Bagchi, Eng.

8/13 **TYPICAL CULVERT AND OUTFLOW PIPE SECTION**

NOT TO SCALE

REISSUED JULY 27, 1981

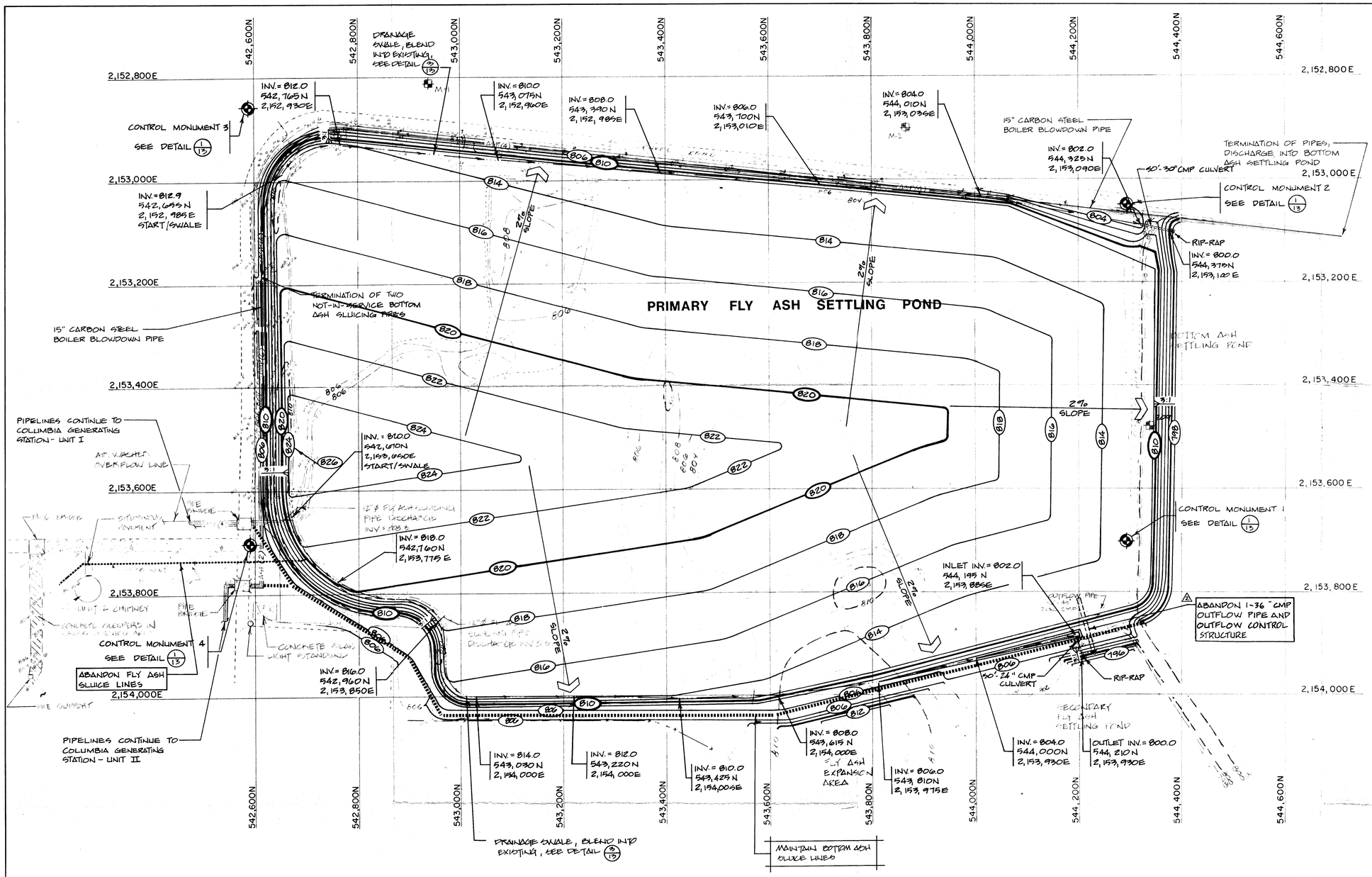
NO	BY	DATE	REVISION	APP'D
2	JDP	10/7/81	OUTFLOW PIPE IN DETAILS 7/13 AND 10/13.	FAK
1	JDP	7/27/81	MISCELLANEOUS DETAIL REVISIONS.	FAK

DETAILS

REVISED ABANDONMENT PLAN - PRIMARY FLY ASH SETTLING POND
COLUMBIA SITE
WISCONSIN POWER & LIGHT COMPANY
PART OF SECTIONS 27 & 34, T.12N., R.9E.
TOWN OF PACIFIC COLUMBIA CO. WISCONSIN

WARZYN ENGINEERING INC

DRAWN JDP,DLF	SCALE AS SHOWN	SHEET 13	OF 13
CHECKED BER	DATE 8/1/81	DRAWING NO	C7134-109
APPROVED Roger C. Cooley			
REFERENCE		PRINTED OCT 5 1981	



LEGEND(EXISTING)

- GROUNDWATER OBSERVATION WELL
- ASH(2) — ASH SLUICING PIPE AND NUMBER OF PIPES
- CONTROL MONUMENT
- 802.7 — SPOT ELEVATION
- 810 — GROUND CONTOUR
- CULVERT PIPE
- GRAVEL ROAD
- FENCE LINE

LEGEND(PROPOSED)

- 805 — SPOT ELEVATION
- 802 — GROUND CONTOUR
- DRAINAGE SWALE
- CULVERT PIPE
- 3:1 — SLOPE RATIO
- 2% SLOPE — % SLOPE AND DIRECTION
- CENTERLINE OF REROUTED BOTTOM ASH SLUICING PIPES
- CENTERLINE OF REROUTED FLY ASH SLUICING PIPES

NOTES

1) REFER TO SHEET 7 OF 13 THIS SET FOR ADDITIONAL NOTES.
2) HORIZONTAL AND VERTICAL CONTROL INFORMATION IS CONTAINED IN CONTROL MONUMENT TABLE ON THIS SHEET.
3) REFER TO DETAIL 6/13 FOR FINAL COVER MATERIALS AND THICKNESSES.
4) ALL EXISTING FACILITIES (ASH SLUICING PIPES, PIPE BRIDGES, ROADWAYS, FENCES, CONTROL MONUMENTS, MONITORING WELLS, ETC.) WILL BE PROTECTED FROM DAMAGE.

CONTROL MONUMENT TABLE

CONTROL MONUMENT	NORTH COORDINATE	EAST COORDINATE	ELEVATION (U.S.G.S.)
1	544,285	2,153,700	802.20
2	544,285	2,153,050	802.85
3	542,680	2,152,855	804.54
4	542,680	2,153,700	808.21

north

REISSUED JULY 27,1981

D. N. R. APPROVED
DATE 10/30/81
Amalendu Bagchi, Eng.

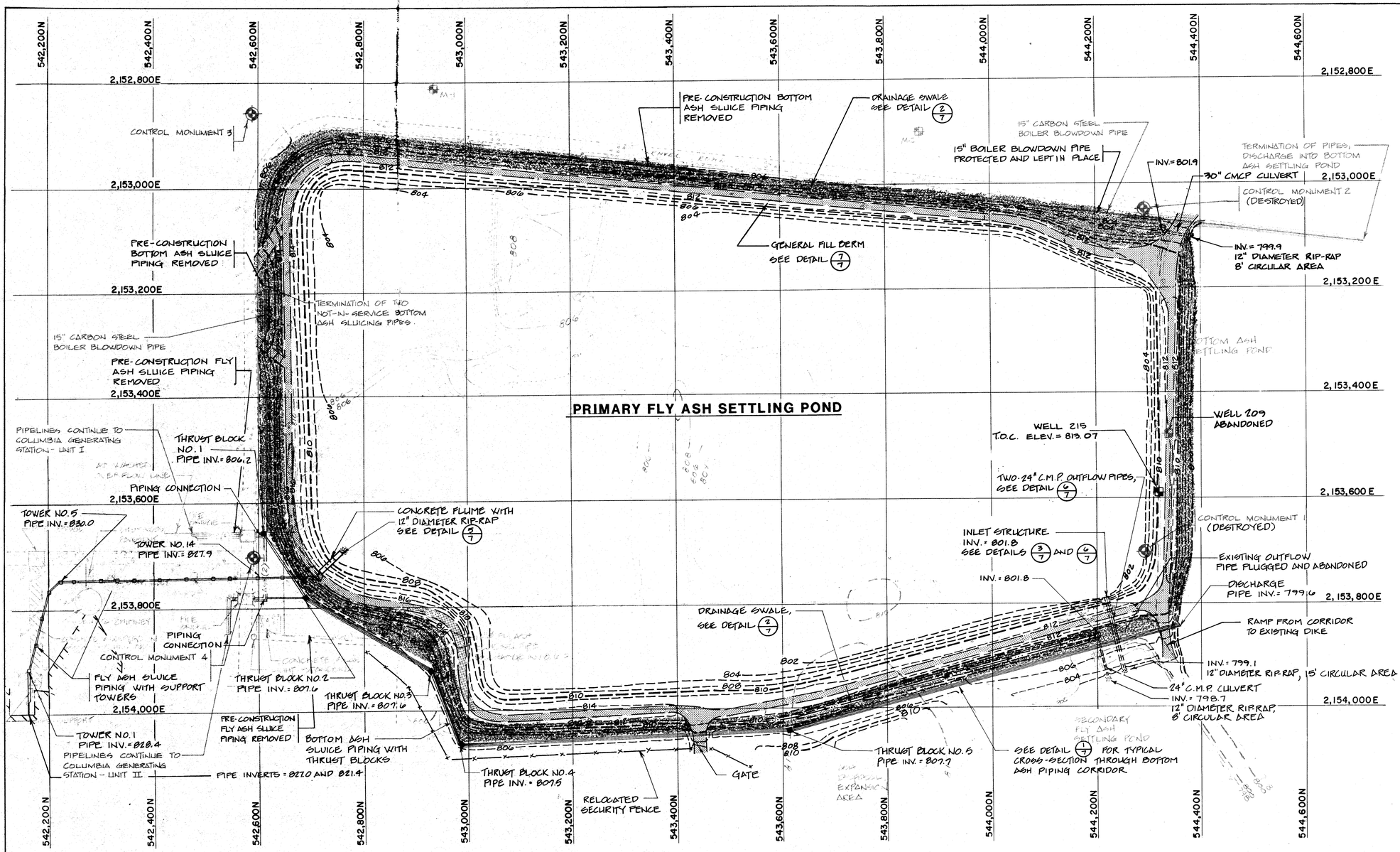
NO.	BY	DATE	REVISION	APP'D
2	SHG	10/5/81	OUTFLOW PIPE	FAK
1	TFH	7/27/81	LOWER FINAL GRADE	FAK

FINAL TOPOGRAPHY

REVISED ABANDONMENT PLAN - PRIMARY FLY ASH SETTLING POND
COLUMBIA SITE
WISCONSIN POWER & LIGHT COMPANY
PART OF SECTIONS 27 & 34, T12N, R9E
TOWN OF PACIFIC COLUMBIA CO. WISCONSIN

WARZYN ENGINEERING INC

DRAWN JDP, MAS	SCALE 1" = 100'	SHEET 10 OF 13	
CHECKED BER	DATE 9/9/81	DRAWING NO.	
APPROVED Roger C. Cooley		C7134 - 106	
REFERENCE		PRINTED OCT 5 1981	



LEGEND (PRE-CONSTRUCTION)

- CONCRETE SLEEPERS
- BUILDING
- SPOT ELEVATION
- GROUND CONTOUR
- TRAVERSE POINT
- CULVERT PIPE
- GRAVEL ROAD
- FENCE LINE
- ASH SLUICING PIPE & NUMBER OF PIPES
- CONTROL MONUMENT
- GROUNDWATER OBSERVATION WELL

LEGEND (AS-BUILT)

- GROUND CONTOUR
- C.M.P. CORRUGATED METAL PIPE
- CULVERT PIPE
- FENCE LINE
- BOTTOM ASH SLUICE PIPING WITH THRUST BLOCKS (4 PIPELINES)
- FLY ASH SLUICE PIPING WITH SUPPORT TOWERS (2 PIPELINES)
- GROUNDWATER OBSERVATION WELL
- RIP-RAP
- DRAINAGE SWALE
- TOPSOILED AREA
- BOTTOM ASH ACCESS ROAD

NOTES

1. HORIZONTAL AND VERTICAL CONTROL INFORMATION IS CONTAINED IN CONTROL MONUMENT TABLE ON THIS SHEET.
2. GROUND CONTOURS AND SPOT ELEVATIONS ARE BASED ON U.S.G.S. DATUM. CONTOUR INTERVAL IS 2'.
3. PROJECT GRID SYSTEM IS BASED ON THE WISCONSIN STATE PLANE COORDINATE SYSTEM.
4. TOPOGRAPHIC SURVEY PERFORMED BY WARZYN ENGINEERING INC. ON 12/3 AND 12/4 OF 1981, AND UPDATED 6/8 AND 6/9 OF 1982.
5. GRADES AS SHOWN ON BERM INTERIOR SLOPES INDICATE FLY ASH LINER SURFACE.
6. DETAILS REFERENCED ⊕ ON THIS DRAWING CAN BE FOUND ON SHEET 7, DRAWING C7134-176 OF THE JANUARY 20, 1982 CONSTRUCTION OBSERVATION REPORT PLAN SET.

THIS DRAWING REPLACES DRAWING C7134-174 "AS-BUILT SITE TOPOGRAPHY (12/4/81)" IN THE CONSTRUCTION OBSERVATION REPORT PLAN SET, DATED JANUARY 20,1982 AND PRESENTS THE COMPLETED SITE PREPARATION ACTIVITIES FROM THE PRIMARY FLY ASH SETTLING POND EXTENTION.

CONTROL MONUMENT TABLE

CONTROL MONUMENT	NORTH COORDINATE	EAST COORDINATE	ELEVATION U.S.G.S.
1	DESTROYED		
2	DESTROYED		
3	542,580	2,152,855	804.54
4	542,580	2,153,700	808.21

north

NO.	BY	DATE	REVISION	APP'D

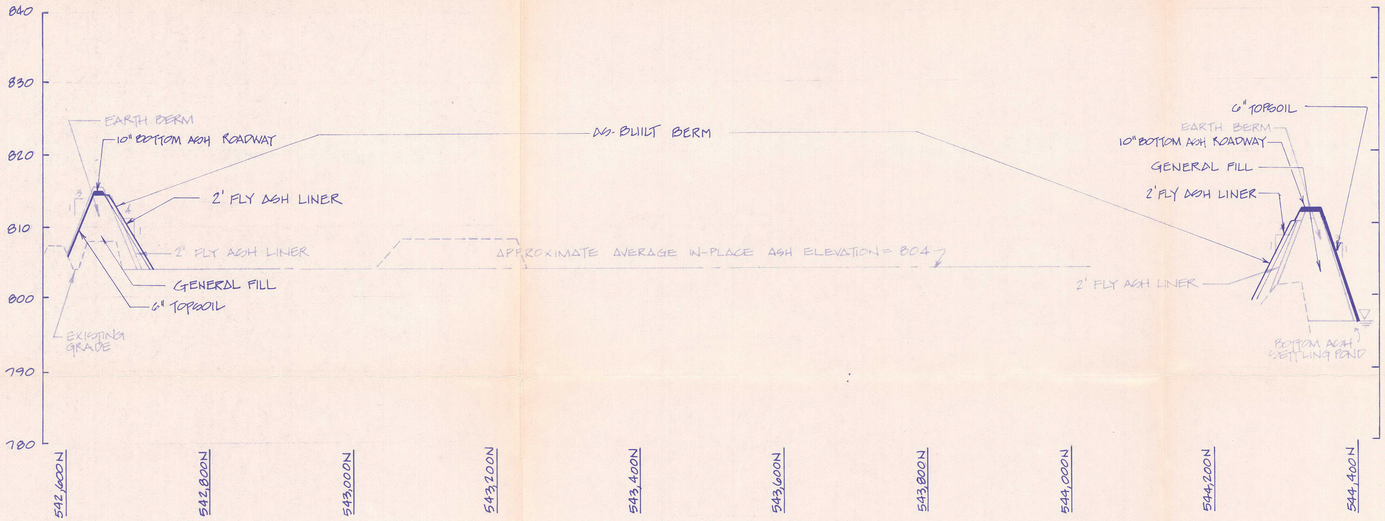
AS-BUILT SITE TOPOGRAPHY (6/8/82)

CONSTRUCTION OBSERVATION REPORT

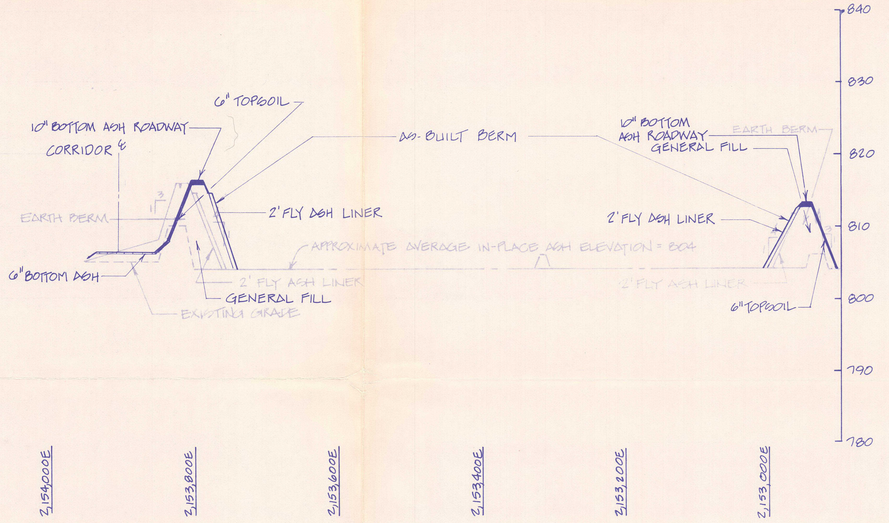
SITE PREPARATION - PRIMARY FLY ASH SETTLING POND EXTENSION
COLUMBIA GENERATING STATION
WISCONSIN POWER & LIGHT COMPANY
PART OF SECTIONS 27 & 34, T12N, R9E
TOWN OF PACIFIC COLUMBIA CO. WISCONSIN

WARZYN ENGINEERING INC

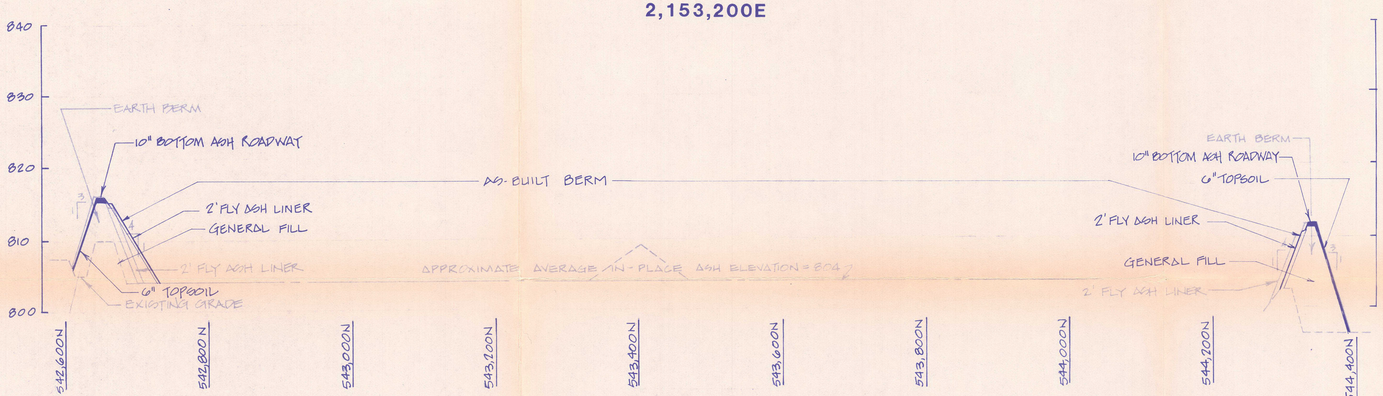
DRAWN TDH	SCALE 1"=100'	SHEET 1 OF 1	
CHECKED BER	DATE 7/21/82	DRAWING NO. C7134-179	
APPROVED Roger C. Cooley			
REFERENCE		PRINTED JUL 22 1982	



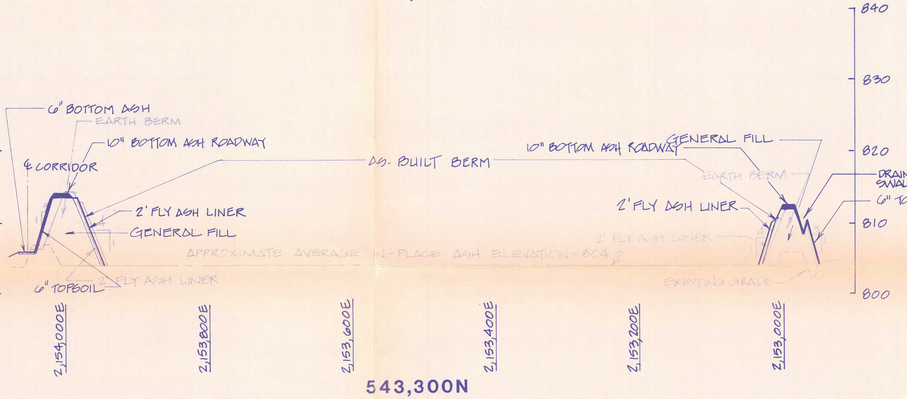
2,153,200E



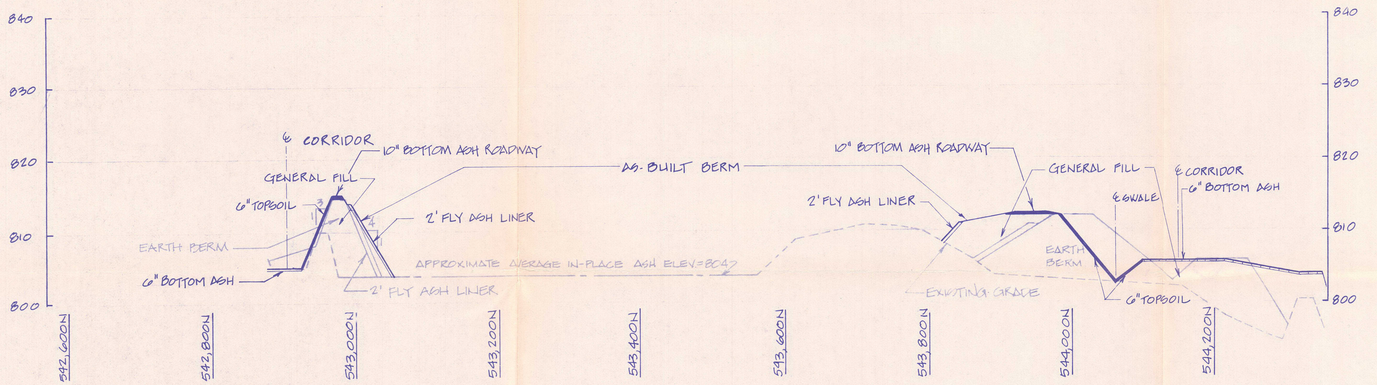
542,900N



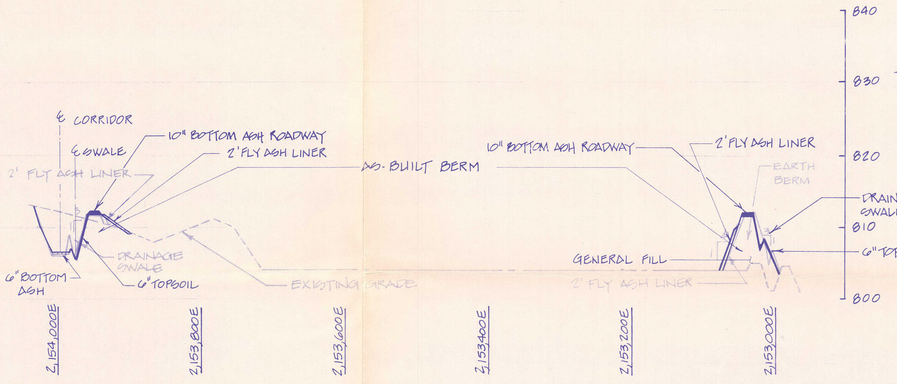
2,153,500E



543,300N



2,153,900E



543,800N

NOTES

1. THESE CROSS-SECTIONS ARE VERTICALLY EXAGGERATED TEN TIMES.
2. THIS DRAWING, C7134-175, WAS DERIVED FROM DRAWING C7134-108, CROSS-SECTIONS, AS INCLUDED IN THE REVISED ABANDONMENT PLAN FOR THE PRIMARY FLY ASH SETTLING POND, PREVIOUSLY SUBMITTED.
3. ⚠ THIS DRAWING HAS BEEN REVISED TO SHOW AS-BUILT SITE CONDITIONS (6/8/82) WHICH INCLUDE FINAL GRADES, 6"TOPSOIL, 10" BOTTOM ASH ROADWAY, DRAINAGE SWALES AND OTHER SITE FEATURES AS PRESENTED ON WARZYN DRAWING C7134-179, "AS-BUILT SITE TOPOGRAPHY (6/8/82)".

SCALE VERTICAL 1"=10'
HORIZONTAL 1"=100'

NO.	BY	DATE	REVISION	APP'D
⚠	JDP	7-21-82	VARIOUS REVISIONS-AS-BUILT TOPOGRAPHY (6/8/82)	BER

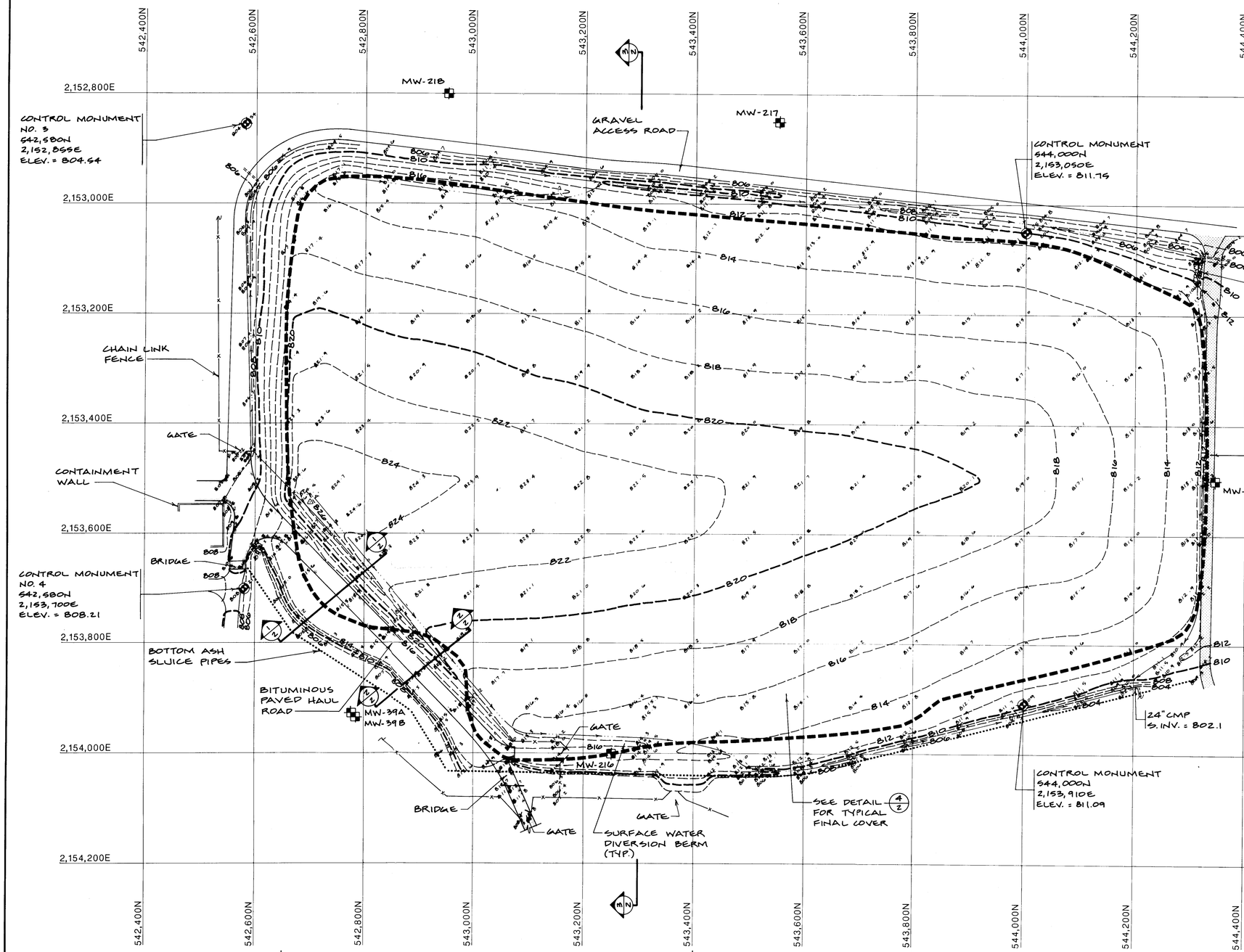
CROSS - SECTIONS

CONSTRUCTION OBSERVATION REPORT

SITE PREPARATION - PRIMARY FLY ASH SETTLING POND EXTENSION
COLUMBIA GENERATING STATION
WISCONSIN POWER & LIGHT COMPANY
PART OF SECTIONS 27 & 34, T12N, R9E
TOWN OF PACIFIC COLUMBIA CO. WISCONSIN

WARZYN ENGINEERING INC

DRAWN CPS	SCALE AS SHOWN	SHEET 6 OF 7	
CHECKED RTT	DATE 1/20/82	DRAWING NO.	
APPROVED Roger C. Cooley		C7134-175	
REFERENCE C7134-108		PRINTED JUL 22 1982	



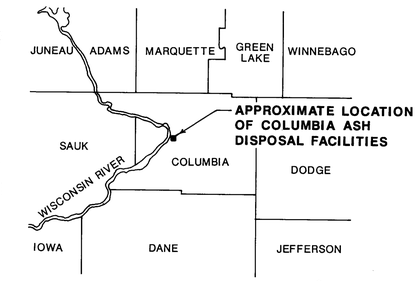
LEGEND

- SPOT ELEVATION
- GROUND CONTOUR
- DRAINAGE SWALE
- CHAINLINK FENCE
- GRAVEL ACCESS ROAD
- BITUMINOUS PAVED HAUL ROAD
- BOTTOM ASH ACCESS ROAD
- CULVERT
- CMP — CORRUGATED METAL PIPE
- BOTTOM ASH SLUICE PIPES
- CONTROL MONUMENT
- MW-217 — GROUNDWATER MONITORING WELL LOCATION AND NUMBER
- CONTROL POINT
- RIP-RAP
- APPROXIMATE LIMITS OF ASH PLACEMENT

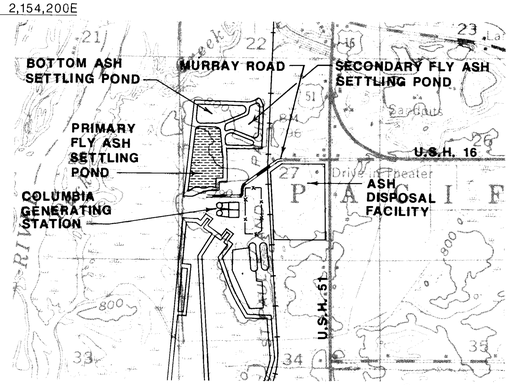
NOTES

1. TOPOGRAPHIC SURVEYS WERE PERFORMED BY WARZYN ENGINEERING INC. PHASE I TOPSLOPES WERE SURVEYED ON MAY 17, 1985 (FIELD BOOK NO. 9), PHASE II TOPSLOPES WERE SURVEYED ON JULY 16, 1987 (FIELD BOOK NO. 54) AND PHASE III TOPSLOPES WERE SURVEYED ON SEPTEMBER 1, 1987 (FIELD BOOK NO. 57). THE SITE PERIMETER AND SOUTHEAST CORNER OF THE SITE WERE ALSO SURVEYED ON SEPTEMBER 1, 1987.
2. CONTOUR INTERVAL IS TWO (2) FEET.
3. ELEVATIONS ARE BASED ON U.S.G.S. DATUM.
4. BENCHMARKS ARE CONTROL MONUMENTS SHOWN ON THIS DRAWING.
5. PROJECT GRID IS BASED ON THE WISCONSIN STATE PLANE COORDINATE SYSTEM.

STATE MAP



GENERAL LOCATION MAP
NOT TO SCALE
north



SITE LOCATION MAP
SCALE: 1" = 2000'
north

Designed By: DLF
Drawn By: BWL
Checked By: BER
Approved By: Joel V. Whitmore
Date: 11-25-87
Reference:
Scale: 1" = 100'
Bar is one inch on original.

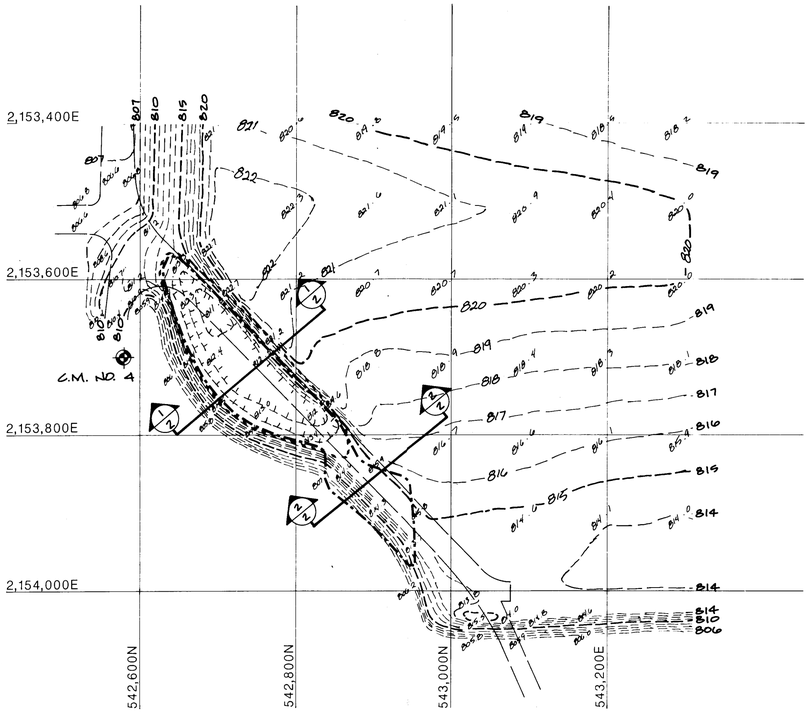
Revisions
Date • By • App'd

WARZYN
WARZYN ENGINEERING INC.
Madison • Milwaukee
Minneapolis • Chicago
Detroit

FINAL SITE TOPOGRAPHY
CONSTRUCTION OBSERVATION REPORT
SITE CLOSURE
PRIMARY FLY ASH SETTLING POND
COLUMBIA GENERATING STATION
WISCONSIN POWER & LIGHT COMPANY
PART OF SECTIONS 27 & 34, T12N, R9E
TOWN OF PACIFIC, COLUMBIA CO., WISCONSIN

Printed NOV 23 1987
Sheet Number 1 OF 3
Project Number 11452-41
WARZYN

MASTER BLUE PRINT INC. 59128
Audit
Overlay
Screen



HAUL ROAD BASE GRADES
SCALE: 1" = 100'

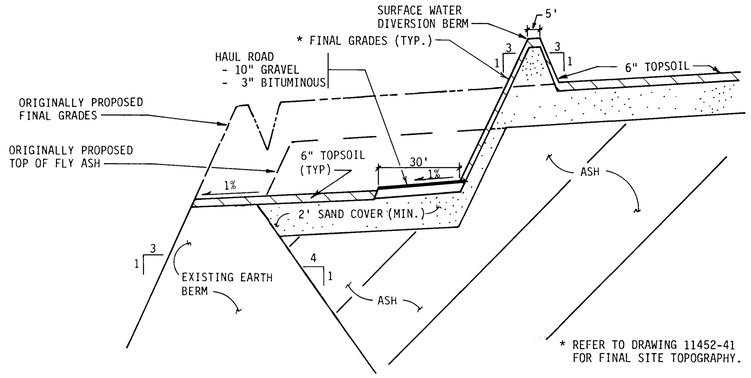
north

LEGEND

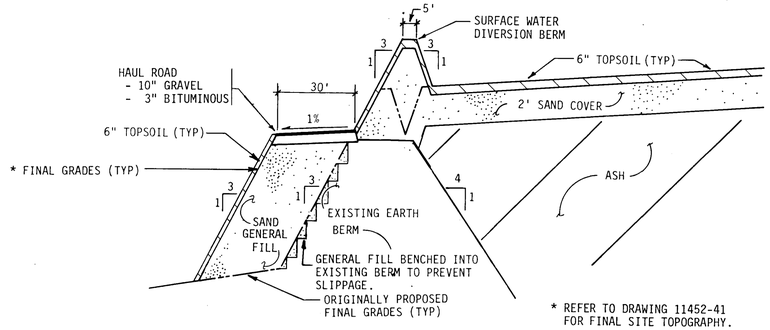
- SPOT ELEVATION
- GROUND CONTOUR (4/29/85)
- HAUL ROAD LOCATION
- AREA OF CUT
- AREA OF FILL
- SCHEMATIC CROSS SECTION LOCATION

NOTES

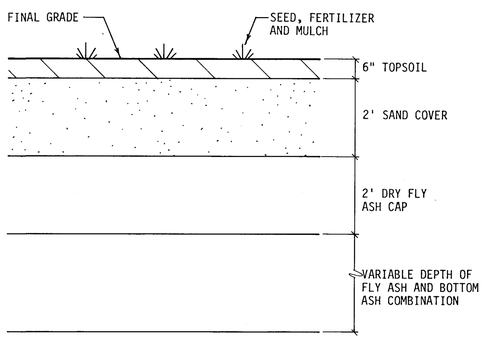
1. TOPOGRAPHY SHOWN ILLUSTRATES SITE CONDITIONS AFTER FLY ASH WAS REMOVED IN PREPARATION FOR HAUL ROAD CONSTRUCTION. SOME SAND FILLING WAS PERFORMED IN AREAS OUTSIDE OF THE CUT PRIOR TO THIS SURVEY.
2. THE GRADES SHOWN WERE SURVEYED BY WARZYN ENGINEERING INC. ON APRIL 29, 1985.
3. CONTOUR INTERVAL IS ONE (1) FOOT.
4. ELEVATIONS ARE BASED ON U.S.G.S. DATUM.
5. BENCHMARK IS CONTROL MONUMENT SHOWN ON THIS DRAWING.



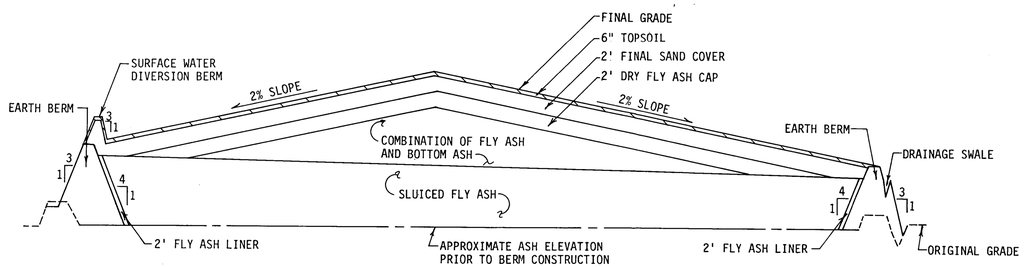
1/2 **SCHEMATIC SECTION (CUT)**
NOT TO SCALE



2/2 **SCHEMATIC SECTION (FILL)**
NOT TO SCALE



4/2 **TYPICAL FINAL COVER DETAIL**
NOT TO SCALE



3/2 **SCHEMATIC SECTION (543,300N)**
NOT TO SCALE

Date • By • App'd

Designed By: RVL
Drawn By: DLF
Checked By: PEP
Approved By: Joel V. Whitmore
Date: 11-25-87
Scale: AS SHOWN
Reference:
Bar is one inch on original.
0 1"

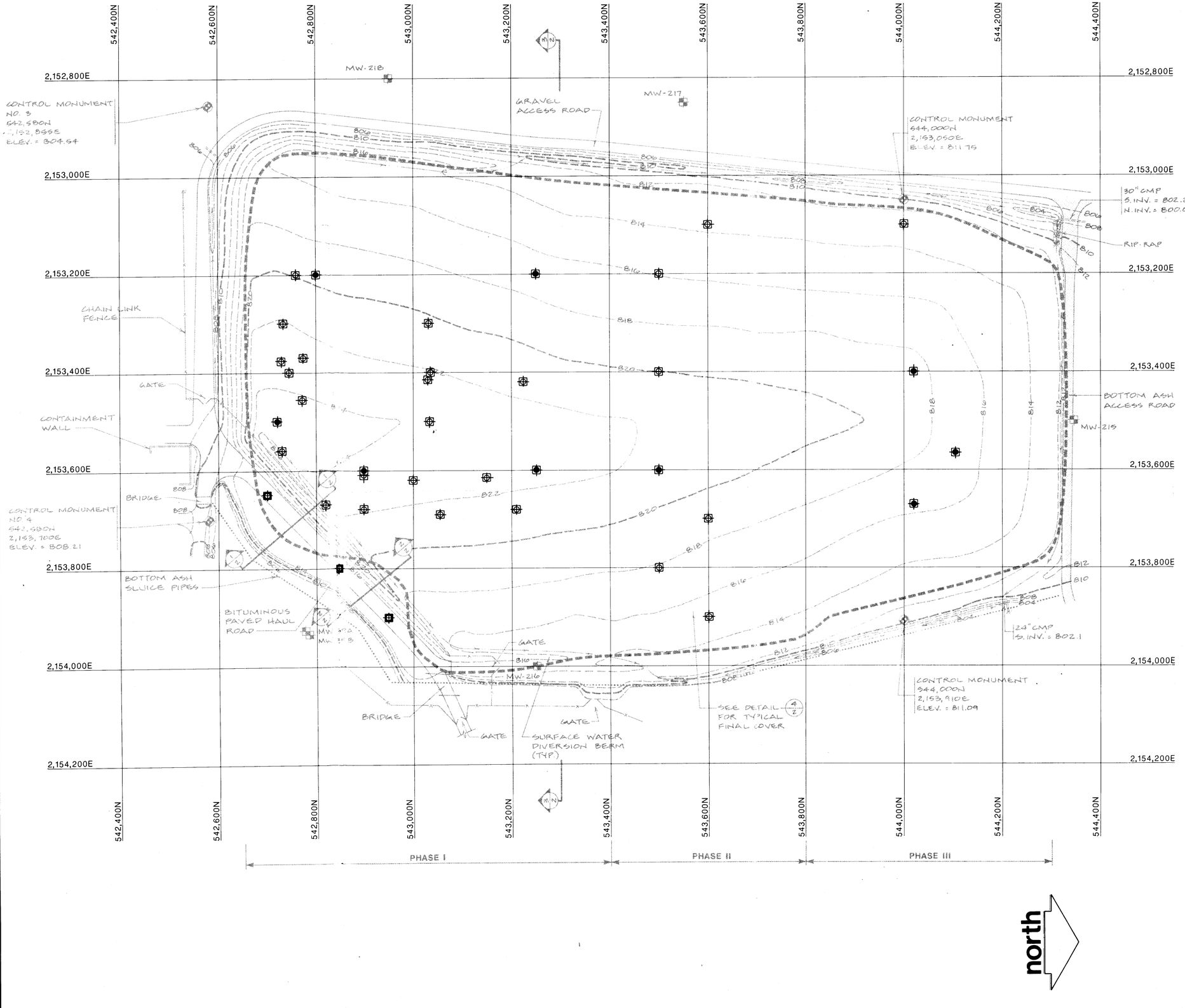
WARZYN
WARZYN ENGINEERING INC.
Madison • Milwaukee
Minneapolis • Chicago
Detroit

Revisions

HAUL ROAD BASE GRADES, SCHEMATIC SECTIONS AND DETAILS
CONSTRUCTION OBSERVATION REPORT
SITE CLOSURE
PRIMARY FLY ASH SETTLING POND
COLUMBIA GENERATING STATION
WISCONSIN POWER & LIGHT COMPANY
PART OF SECTIONS 27 & 34, T12N, R9E
TOWN OF PACIFIC, COLUMBIA CO., WISCONSIN

Printed NOV 25 1987
Sheet Number 2 OF 3
Project Number 11452-42
WARZYN

Adobe Gamma Screen



LEGEND

- FLY ASH FIELD DENSITY TEST LOCATION
- FLY ASH FIELD DENSITY TEST AND CORE SAMPLE LOCATION
- HAUL ROAD SOIL FIELD DENSITY TEST LOCATION

NOTES

1. REFER TO DRAWING 11452-41 FOR ADDITIONAL NOTES AND LEGEND.

Designed By: AVA
Drawn By: DLF
Checked By: PER
Approved By: Joel V. Whitmore
Date: 11-25-87
Scale: 1" = 100'
Bar is one inch on original.
Reference: 11452-41

WARZYN ENGINEERING INC.
A Warzyn Water Group
Minneapolis • Chicago
Detroit

Revisions
Date • By • App'd

FLY ASH AND SOIL TEST LOCATIONS

CONSTRUCTION OBSERVATION REPORT
SITE CLOSURE
PRIMARY FLY ASH SETTLING POND
COLUMBIA GENERATING STATION
WISCONSIN POWER & LIGHT COMPANY
PART OF SECTIONS 27 & 34, T12N, R9E
TOWN OF PACIFIC, COLUMBIA CO., WISCONSIN

Printed NOV 25 1987
Sheet Number 3 OF 3
Project Number 11452-43

WARZYN

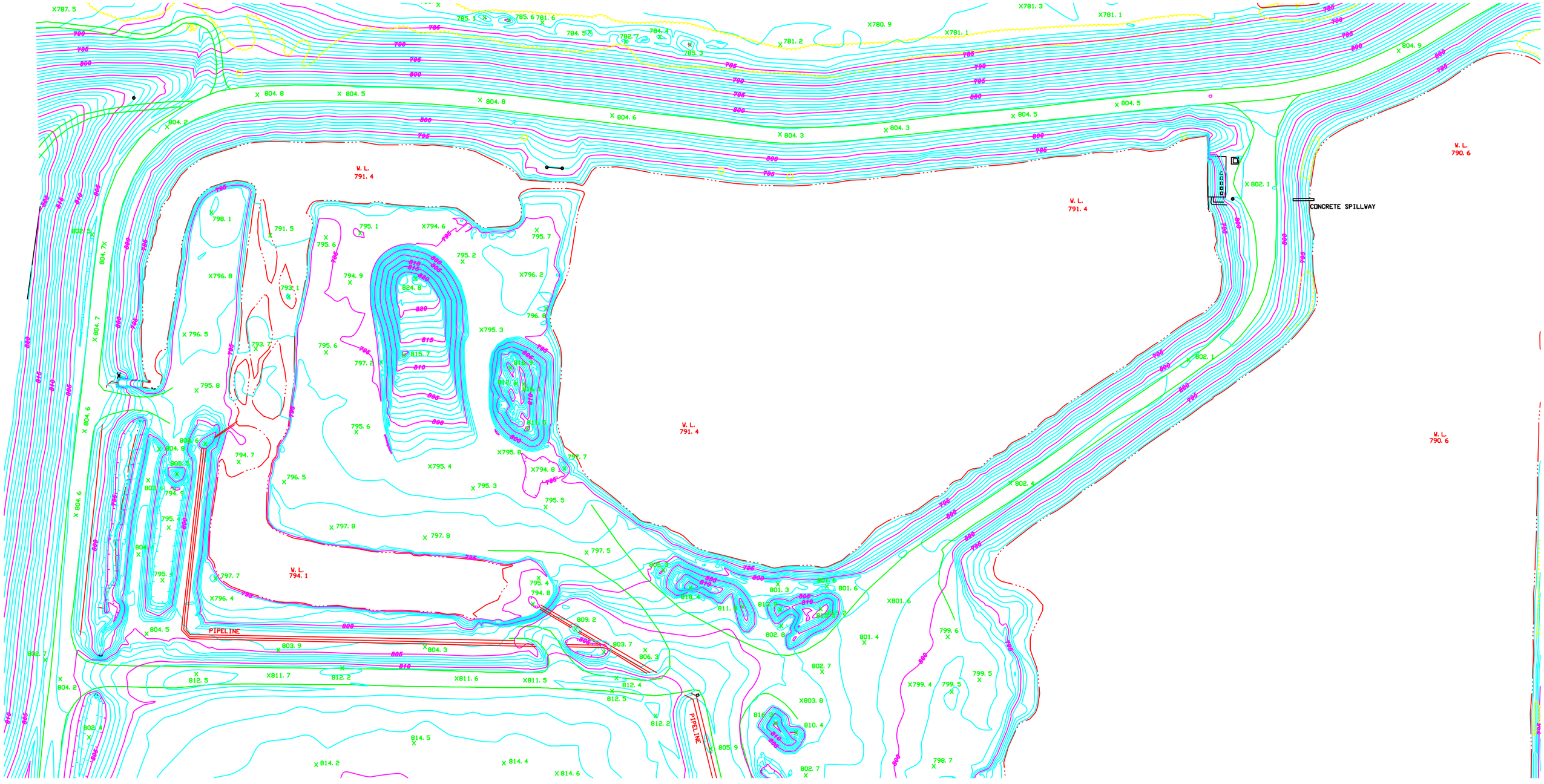
PIPELINE

PARKING

TANK

D/H

CONC


CONCRETE SPILLWAY
PIPELINE
PIPELINE
W. L. 791. 4
W. L. 794. 1
W. L. 791. 4
W. L. 791. 4
W. L. 790. 6
W. L. 790. 6
X787. 5
785. 1
785. 6
781. 6
784. 5
782. 7
784. 4
785. 3
781. 2
X780. 9
781. 3
781. 1
781. 1
804. 9
804. 8
804. 5
804. 8
804. 6
804. 3
804. 3
804. 5
804. 5
804. 2
802. 1
802. 1
802. 4
798. 1
791. 5
795. 1
795. 6
X794. 6
795. 7
795. 2
794. 9
824. 8
X796. 8
X796. 2
796. 8
793. 1
X795. 3
X 796. 5
793. 7
795. 6
797. 2
815. 7
795. 8
816. 5
816. 4
795. 6
795. 6
797. 7
X795. 8
794. 7
796. 5
X795. 4
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797. 5
797. 7
795. 4
794. 8
796. 4
809. 2
804. 5
803. 9
804. 3
803. 7
806. 3
802. 7
812. 5
X811. 7
812. 2
X811. 6
X811. 5
812. 4
812. 5
812. 2
814. 5
814. 2
814. 4
814. 6
805. 9
802. 7
798. 7
X803. 8
816. 2
810. 4
X799. 4
799. 5
799. 5
799. 6
802. 7
801. 4
X801. 6
801. 3
801. 6
801. 6
818. 4
811. 8
812. 9
812. 2
802. 8
804. 2
802. 4
804. 6
804. 6
804. 7
804. 7X
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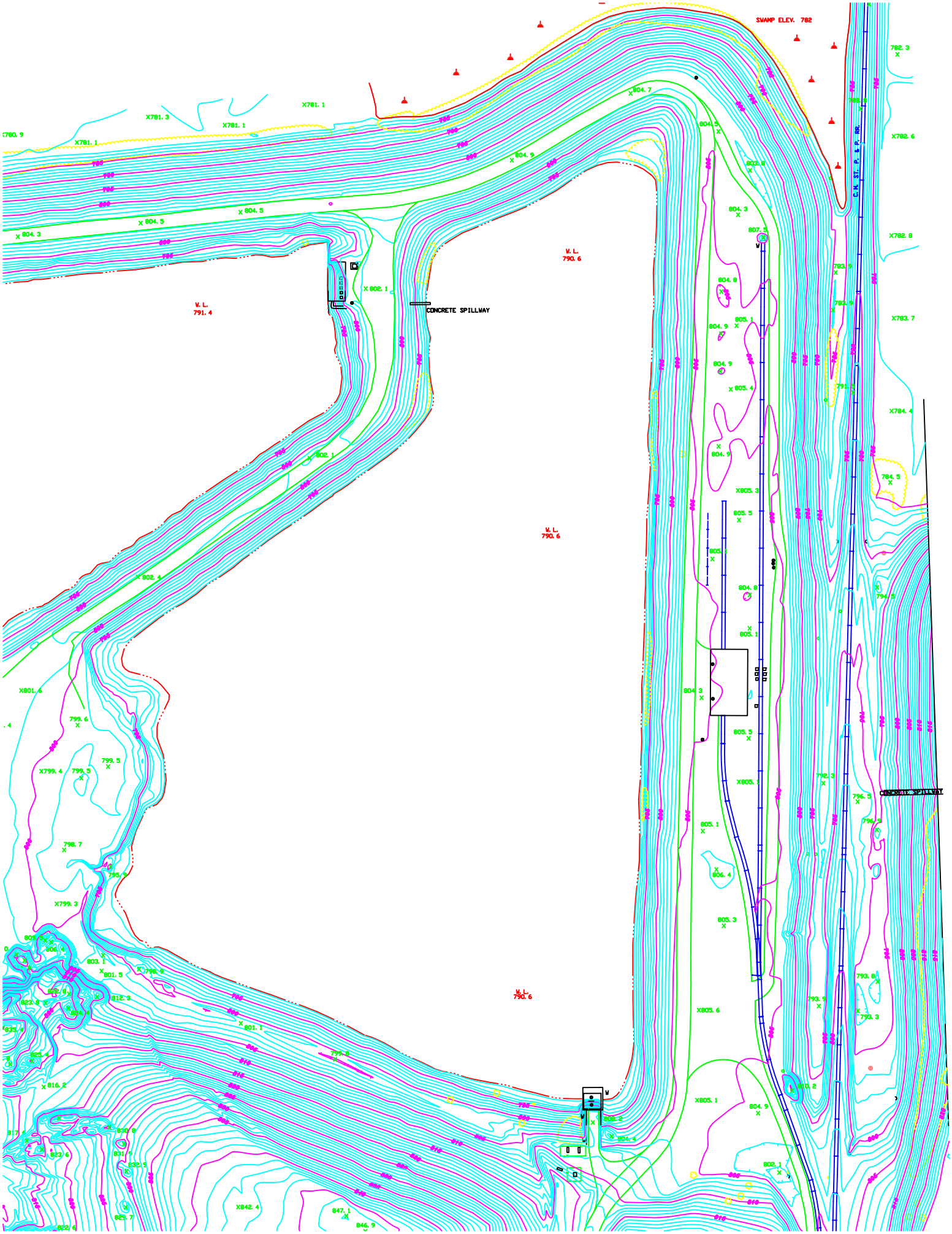
804


SWAMP ELEV. 782
CONCRETE SPILLWAY
W. L. 791.4
W. L. 790.6
W. L. 790.6
W. L. 790.6
C.M.St.P.&P.R.R.
X781.1
X781.3
X781.1
X780.9
X781.1
X804.7
804.5
804.9
X804.5
X804.5
X804.3
803.8
804.3
807.5
782.3
X782.6
X782.8
783.9
783.9
804.8
805.1
804.9
804.9
X805.4
X783.7
X784.4
784.5
804.9
X805.3
805.5
805.1
804.8
805.1
794.5
X802.1
X802.1
X802.4
X801.6
799.6
799.5
X799.4
799.3
798.7
795.9
X799.3
804.3
805.3
X805.1
792.3
796.5
796.9
805.1
806.4
805.3
793.8
793.9
793.3
X805.6
X805.1
804.9
810.2
802.1
808.2
804.4
809.4
806.4
803.1
801.5
798.8
822.9
823.8
812.3
801.1
799.8
816.2
823.4
830.9
823.6
832.5
801.9
829.7
822.6
X842.4
847.1
846.9

COOLING POND

COOLING POND

POWER GENERATING STATION

COAL PILE RETENTION BASIN

COAL STORAGE AREA

CLOSED FLY ASH LANDFILL

BOTTOM ASH SETTLING POND

BYPRODUCT RECYCLING AREA

SECONDARY ASH SETTLING POND

WPDES POND

ACTIVE DRY ASH LANDFILL AREA

LINED SURFACE WATER RUNOFF POND

MURRAY ROAD

U.S.H. 51

SWAMP ELEV. 780

SWAMP ELEV. 789

DUCK CREEK

SUBSTATION

MW1AR (784.81)

MW2R

MW3 (781.47)

MW4R (787.00)

MW5R (786.52)

MW5S (785.75)

MW9 (787.74)

MW10 (792.74)

MW16

MW17 (784.97)

MW20R (782.79)

MW21S (785.37)

MW21D

MW21S

MW21D

MW30A (784.38)

MW30B

MW33A (NM)

MW33B

MW34A (785.38)

MW34B

MW36A (784.84)

MW36B

MW37A (784.62)

MW37B

MW40A

MW40B

MW46A

MW46B (785.44)

MW48A

MW48B

MW57 (783.65)

MW60A

MW60B

MW61

MW62R

MW65

MW65B

MW68A

MW68B

MW90A

MW90B

MW91A (785.72)

MW91B

MW92A (786.08)

MW92B

SG1 (789.85)

SG2 (792.74)

SG3 (792.06)

SG4 (801.55)

HC 1

HC 2

HC 3

LS-1

LS-3R

2121000E

2122000E

2123000E

2124000E

2125000E

540000N

541000N

542000N

543000N

544000N

545000N

789 788 787 786 785 784 783 782

LEGEND

- PROPERTY LINE
- EXISTING RAILROAD TRACKS
- 100 EXISTING GROUND CONTOUR
- CONTOUR DEPRESSION
- EXISTING PAVED ROAD
- EXISTING UNPAVED ROAD
- EXISTING FENCE
- EXISTING BUILDING
- 766.5 EXISTING SPOT ELEVATION
- TREES AND/OR BRUSH
- WETLAND AREA
- EDGE OF WATER
- HC 1 WATER SUPPLY WELL
- MW91A WATER TABLE WELL
- MW91B PIEZOMETER
- MW21D ABANDONED WATER TABLE WELL
- MW21S ABANDONED PIEZOMETER
- SG1 STAFF GAUGE
- LS-1 LYSIMETER
- DESIGN MANAGEMENT ZONE
- PROPERTY LINE
- O.S. OPEN STORAGE
- O.H. OVERHEAD STRUCTURE
- E.P.S. ELECTRICAL POWER STATION
- T TANK
- W WALL
- (785.31) WATER TABLE ELEVATION (FT-MSL) (N.M. = NOT MEASURED)
- 786 GROUNDWATER CONTOUR LINE (I FT INTERVAL- FT. M.S.L.) (DASHED WHERE INFERRED)
- GROUNDWATER FLOW DIRECTION

NOTES

1. BASE MAP IS PROVIDED BY WISCONSIN POWER & LIGHT CO. AND IS BASED ON PHOTOS TAKEN ON APRIL 6, 1995 BY AERO-METRIC ENGINEERING, SHEBOYGAN, WI.
2. HORIZONTAL DATUM IS BASED ON THE WISCONSIN STATE PLANE COORDINATE SYSTEM, SOUTH ZONE - DATUM: NAD 83(91).
3. VERTICAL DATUM IS REFERENCED TO U.S.G.S. MEAN SEA LEVEL (MSL). TOPOGRAPHIC CONTOUR INTERVAL IS TWO FEET.
4. MONITORING WELL LOCATIONS AND ELEVATIONS SURVEYED BY WISCONSIN POWER & LIGHT CO. IN DECEMBER 1994 & NOVEMBER 1996.
5. THE LOCATION OF THE DESIGN MANAGEMENT ZONE DEMARCATION LINE IS APPROXIMATE.
6. WATER ELEVATION USED TO PREPARE THIS MAP WERE MEASURED ON OCTOBER 24, 2002.
7. THE WATER LEVEL AT MW 33A AND MW 33B COULD NOT BE MEASURED DURING OCTOBER 2002 DUE TO AN OBSTRUCTION IN THE WELL CASING.

0 200 400

SCALE: 1"=200'

CONFIDENTIAL BUSINESS INFORMATION

NO.	BY	DATE	REVISION	APP'D.
3.				
2.				
1.				

PROJECT:
ALLIANT ENERGY - WP&L
COLUMBIA ASH PONDS & DRY ASH DISPOSAL FACILITY

SHEET TITLE:
WATER TABLE MAP (OCTOBER 2002)

DRAWN BY: defoej	SCALE: 1"=200'	PROJ. NO. 3024.28
CHECKED BY: JMR		FILE NO. WATERTBL.PLT
APPROVED BY: JCO	DATE PRINTED: JAN 30 2003	**FIGURE 3**
DATE: JANUARY 2003		

RMT
744 Heartland Trail
Madison, WI 53717-1934
P.O. Box 8923
Madison, WI 53708-8923
Phone: 608-831-4444

RMT COMPUTER AIDED DESIGN & DRAFTING

Plot Date
Drawing File = J:\3024\fig\dwg\WATERTBL.dgn
User ID = defoej
Cell Library = J:\3024\lib\cell\jmr.cel
Pen Table = J:\ACADR13\Tbl\defoej.ctb
Pen Plotter = Default Windows System Printer.pltcfg
Scale = 1.000000
Origin = 0.000, 0.000
Plot Date = Thu Jan 30 08:08:54 2003
Levels On = 1,2,3,4,5,6,7,8,9,10,11,12,13,63

Reference Files
Ref. File 1 = J:\3024\lib\dgn\bar.dgn
Ref. File 2 = J:\3024\lib\dgn\bar_dgn
Ref. File 3 = J:\3024\lib\dgn\mmmm.dgn
Ref. File 4 = no ref name
Ref. File 5 = no ref name
Ref. File 6 = no ref name
Ref. File 7 = no ref name
Ref. File 8 = no ref name
Ref. File 9 = no ref name
Ref. File 10 = no ref name

Logical Names
(1) bar
(2) bar
(3) bar
(4) no ref logical
(5) no ref logical
(6) no ref logical
(7) no ref logical
(8) no ref logical
(9) no ref logical
(10) no ref logical

Levels
(1) FLAGS
(2) 3024-01-24-36-63
(3) 1,63-61,63
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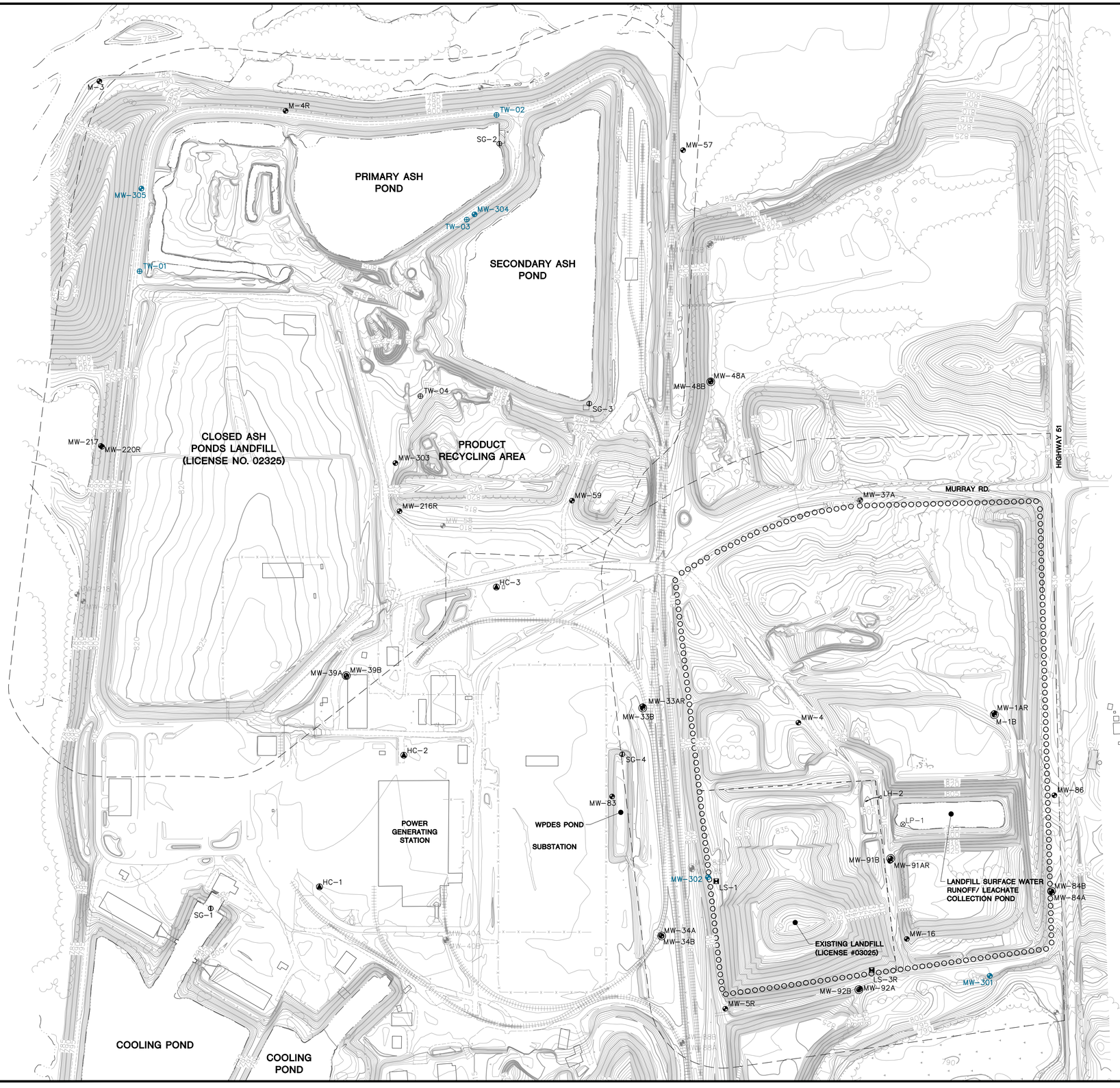

LEGEND

- EXISTING MAJOR CONTOUR (10' INTERVAL)
- EXISTING MINOR CONTOUR (2' CONTOUR)
- EXISTING FENCELINE
- EXISTING TRACKS
- EXISTING PAVED ROAD
- EXISTING UNPAVED ROAD
- EDGE OF WATER
- DESIGN MANAGEMENT ZONE
- APPROVED LIMITS OF WASTE
- CONSTRUCTED LIMITS OF WASTE
- WATER SUPPLY WELL
- STAFF GAUGE
- WATER TABLE WELL
- PIEZOMETER
- SURFACE WATER SAMPLE LOCATION
- LYSIMETER
- ABANDONED WATER TABLE WELL
- ABANDONED PIEZOMETER
- LEACHATE HEADWELL
- TEMPORARY WELL
- NEW WATERTABLE WELL

NOTES;

1. BASE MAP CREATED FROM AERIAL SURVEY BY KBM, FLOWN DECEMBER 1, 2014.
2. MONITORING WELL LOCATIONS AND ELEVATIONS SURVEYED BY WISCONSIN POWER AND LIGHT, INC. IN DECEMBER 1994, NOVEMBER 1996, APRIL 2003, AND AUGUST 2012.
3. SUPPLY WELL LOCATIONS ARE APPROXIMATE AND ASSUMED BASED ON JANUARY 2013 DRAWINGS BY TRC.
4. THE LOCATIONS OF THE ASH PONDS FACILITY DESIGN MANAGEMENT ZONE DEMARCATION LINES ARE APPROXIMATE AND BASED ON THE WATER TABLE MAP (OCTOBER 2012) FIGURE BY RMT.
5. THE LOCATION OF THE ACTIVE DRY ASH LANDFILL DESIGN MANAGEMENT ZONE DEMARCATION LINE IS BASED ON A 300 FOOT OFFSET FROM THE DESIGN LIMITS OF ASH EXCEPT WHERE OFFSET WOULD EXTEND LINE BEYOND PROPERTY LINE.

N

200 0 200

SCALE: 1" = 200'

FIGURE 2

SITE PLAN AND WELL LOCATION MAP

COLUMBIA ASH PONDS AND DRY ASH DISPOSAL FACILITIES

SITE

CLIENT

ALLIANT ENERGY
4902 NORTH BILTMORE LN. #1000
MADISON, WI 53718

ENGINEER

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

DRAWN BY:	AHB	
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APPENDIX G – Dike and Grading Work Specifications

Alliant Energy
Wisconsin Power and Light Company
Columbia Energy Center
Pardeeville, Wisconsin

History of Construction

SPECIFICATION REVISION 1

TO

SPECIFICATION W-2303

FOR

DIKE AND GRADING WORK

COLUMBIA GENERATING STATION - UNIT 1

WISCONSIN POWER AND LIGHT COMPANY

With reference to the above Specification the following revision shall apply:

1. Page 2-2-4, Article 2-2.9, Fill, Paragraph 2-2.9.4:
Revise to read:

2-2.9.4 Compaction Densities:

a. As specified in Article 6.4.4.1 of Form 1714 (for granular material) except that the compacted fill shall have a relative density of 80% as determined by ASTM D2049.

b. Compaction densities will be checked in the field, by a Testing Laboratory retained by Purchaser; in accordance with ASTM D2049. A minimum of one field test will be made for each layer 5000 square feet of each 6" deep layer after compaction.

DIKE AND GRADING WORK
COLUMBIA GENERATING STATION - UNIT 1
WISCONSIN POWER AND LIGHT COMPANY

DIVISION 2 - SITE WORK

SECTION 2-2: EARTHWORK

2-2.1 SECTION SCOPE

2-2.1.1 This section of the Project Specification includes requirements for the following, as indicated on the drawings, as hereinafter specified (under the Article numbers indicated), or as required to properly complete the WORK:

2-2.2 General
2-2.3 Services of Testing Laboratory
2-2.4 Soil Data and Topography
2-2.5 Clearing and Grubbing
2-2.6 Removal of Sod and Topsoil
2-2.7 Diversion and Care of Water
2-2.8 Excavation
2-2.9 Fill
2-2.10 Backfill
2-2.11 Subgrade for Roadways and Roadbed for Trackwork
2-2.12 Drainage Ditches
2-2.13 Grading
2-2.14 Topsoil
2-2.15 Riprap

2-2.1.2 Requirements of Division 1, General Requirements, also apply to WORK under this Section 2-2.

2-2.2 GENERAL

Standard Specifications: Conform to applicable requirements of Form 1714, and to all requirements hereinafter specified.

2-2.3 SERVICES OF TESTING LABORATORY

Will be furnished by Purchaser for use in connection with controlled compacted fill, as specified in Article 6.2 of Form 1714. Contractor shall also provide unskilled labor and shall assist Purchaser's Testing Laboratory in running field check tests.

2-2.4 SOIL DATA AND TOPOGRAPHY

As specified in Article 2 of Form 1714. Drawings are included, and borings will be available for inspection.

2-2.5 CLEARING AND GRUBBING

2-2.5.1 Clear and grub plant, cooling lake, ash storage area under dikes only and coal handling areas of all trees, hedges, bushes, etc., in accordance with Article 4 of Form 1714.

2-2.5.2 Clear cooling lake area to elevation 795'-0".

2-2.5.3 Clear swamp grass before initial filling of lake or as required for the WORK.

representative or as indicated on drawings, or on property as requested by Purchaser's representative.

2-2.9 FILL

2-2.9.1 Conform to the applicable requirements of Article 6 of Form 1714 and to requirements hereinafter specified.

2-2.9.2 Preparation of Subgrade: As specified in Article 6.4.3 of Form 1714.

2-2.9.3 Material:

a. Approved material from excavation and borrow areas where indicated on the drawings.

b. Fill for all dike work shall be Type CCF1, Class 2, Controlled Compacted Fill, unless otherwise indicated. Grade to elevations indicated on drawings.

c. Fill for all other areas shall be Type RCF1, Class 1, Regular Compacted Fill.

2-2.9.4 Compaction Densities: As specified in Article 6.4.4.1 of Form 1714, based on modified Proctor maximum density (ASTM D1557).

2-2.9.5 Equipment:

a. Compaction Equipment: Equipment to be used for constructing various types of fill may consist of any type normally considered suitable to construct embankments for dams or major highways. Main compaction equipment, including heavy pneumatic tired rollers, tamping rollers, segmented pad rollers, vibratory compactors, shall be subject to approval of Purchaser's representative.

b. In addition to the foregoing equipment, Contractor shall have the following equipment available at the Work:

b1. Power tampers to be used for compaction of material in areas where it is impractical to use a roller or tractor.

b2. A plain cylindrical roller, weighing not less than 1,000 lbs per lineal foot for rolling the surface of fill smooth for drainage in case of heavy precipitation.

b). Discs, harrows and motor graders for drying and maintaining fill.

2.4.6 Placing: As specified in Article 6.4.5 of Form 1714, and as follows:

a. General: Fills shall be placed to neat lines and grades indicated on drawings. No brush, roots, sod, or other perishable or unsuitable materials shall be placed in fills. No material shall be placed when either fill material or foundation is frozen.

b. Embankments shall be maintained approximately level but with sufficient slope to assure rapid runoff of rainfall.

c. Distribution and gradation of materials throughout rolled fill shall be such that fill will be free from lenses, pockets, streaks, or layers of material differing materially in texture or gradation from surrounding material. Combined excavation and placing operations shall be such that materials when compacted in the fill will be blended sufficiently to secure the best practicable degree of compaction, impermeability, and stability. Travel on the fill shall be satisfactorily controlled to prevent tracking or cutting fill.

d. Successive loads of material shall be dumped so as to produce the best practicable distribution of material, and for this purpose locations in earthfill where individual loads shall be deposited may be designated.

e. Fill materials shall be placed in continuous, approximately horizontal layers with moisture content and thickness as specified. Embankments shall be maintained approximately level but with sufficient slope to assure rapid runoff of rainfall.

f. When rain is expected, and at the end of each working day, fill shall be rolled with a plain cylindrical roller to form a smooth surface with sufficient slope to cause rapid runoff of rainwater. Before placement, this surface shall be scarified. If, in the opinion of Purchaser's representative, the rolled surface of any layer of earthfill in place is too wet for proper compaction of fill thereon, it shall be removed, allowed to dry, or shall be worked with a harrow, scarifier or other suitable equipment, to reduce water content to the required amount, and then shall be recompacted before the next succeeding layer of fill is placed.

g. All openings through embankments required for construction and temporary drainage purposes shall be subject to approval, and such openings, if approved, shall be constructed so that side slopes are not steeper than 4 horizontal to 1 vertical. Approach or construction ramps for dikes and embankments shall be removed and those on outside face shall be removed and/or trimmed, as requested.

2-2.10 BACKFILL

As specified in Article 7 of Form 1714 and as hereinbefore specified.

2-2.11 SUBGRADE FOR ROADWAYS AND ROADBED FOR TRACKWORK

2-2.11.1 Excavate subgrade and roadbed or fill, as required, and then grade and compact to provide a firm foundation of uniform density throughout. Completed subgrade and roadbed shall be true to alignment, grade and cross-section, including required crown, indicated on the drawings.

2-2.11.2 Prior to placing of any fill required to bring the subgrade and roadbed to proper level, strip areas to be covered of any loose or otherwise unapproved fill materials, organic materials, or any foreign or deleterious matter.

2-2.11.3 Fill all holes, ruts, and similar defects. All unstable areas, projecting stone or rock, and similar defects shall be cut out and the areas filled.

2-2.11.4 All fill required shall be Class 2, Granular Material, Controlled Compacted Fill as hereinbefore specified.

2-2.12 DRAINAGE DITCHES

Cut and/or fill to form drainage ditches to cross sections and profiles indicated on drawings or as required by drainage requirements. Fill shall be Class 2 Controlled Compacted Fill. All surfaces of both cut and fill shall be well compacted, smooth and uniform.

2-2.13 GRADING

As specified in Article 8 of Form 1714 and as follows:

2-2.13.1 Finish Grading: Provide for following work:

a. All areas to receive topsoil and seeding.

b. Roadway subgrades and trackwork roadbeds.

c. Drainage ditches.

2-2.13.2 Rough Grading: Provide for all other work.

2-2.14 TOPSOIL

2-2.14.1 Material: Shall be as previously removed by stripping of areas excavated at the site by Contractor, in accordance with requirements of Article 4.6 of Form 1714. Material shall contain the most fertile loam available from approved stockpile sources. Material shall be free from excessive quantities of grass, roots, weeds, sticks, stones, or other objectionable materials.

2-2.14.2 Placing: Areas to receive topsoil shall be brought to within 4 inches of prescribed final cross section at all points and finished smooth and uniform before topsoil is applied. Topsoil shall be evenly placed and spread over graded area and rolled, in accordance with Paragraph 2528.03 of the 1958 State Highway Commission of Wisconsin "Standard Specification for Road and Bridge Construction".

2-2.15 RIPRAP

2-2.15.1 Material:

a. Quarried stone, or other stone, free from structural defects and

of approved quality. Any stone which is free from incipient fractures and seams and has given evidence of ability to withstand weathering after long exposure to elements shall be considered suitable for this purpose. Upon presentation of satisfactory evidence of weathering ability to Purchaser's representative, such stone may be used without laboratory testing.

b. For newly quarried stone or stone of questionable weathering quality, if proposed for use, have material tested by a recognized testing laboratory, at Contractor's expense, in accordance with AASHO T104 or AASHO T103, and as follows:

b1. When subjected to sodium sulphate soundness test (T104), material shall show a loss of not more than 25% after 5 cycles in order to be acceptable.

b2. Material failing the foregoing test may be approved if it has a loss of not greater than 25% when subjected to 50 cycles of freezing and thawing cycles (T103).

c. Stone containing shale, unsound sandstone, or any other material which will readily disintegrate under handling or placing, or under weathering, NOT ACCEPTABLE.

d. Riprap:

d1. Riprap shall be reasonably well graded with a gradation conforming to the following weight limits (in pounds) for the indicated thickness:

Layer Thickness	At Least 50% Larger Than	Maximum Size	Minimum Size
15 inches	40	100	5

d2. The shortest dimension of any stone shall be not less than 1/3 of the longest dimension.

2-2.15.2 Placing:

a. Surface Preparation: Before placing sand bed under riprap, all inside surfaces of dikes shall receive two (2) pounds per square foot of IMC Bentonite (BH200) in strict accordance with manufacturer's instructions.

b. Sand bed under riprap shall be 1'-0" thick layer of bank run sand or other approved sand. Compact as specified in Article 6 of Form 1714 for Class 1, Type RCF1.

c. Place riprap in manner to insure that largest rock fragments are uniformly distributed and that smaller rock fragments serve to fill spaces between larger rock fragments in such manner as will result in dense uniform course of riprap of thickness indicated on drawings.

d. Riprap may be placed by dumping and shall be placed to its full course thickness in one operation. Hand placing to limited extent may be used only to extent necessary to secure specified results.