AECOM

October 2016

Dynegy Zimmer, LLC
1781 US Route 52
Moscow, OH 45153

RE: History of Construction
USEPA Final CCR Rule, 40 CFR § 257.73(c)
Zimmer Power Station
Moscow, Ohio

On behalf of Dynegy Zimmer, LLC, AECOM has prepared the following history of construction for the Coal Pile Runoff Pond and D Basin at the Zimmer Power Station in accordance with 40 CFR § 257.73(c). The Gypsum Recycle Pond is an incised pond with a storage volume of less than 20 acre-feet. A history of construction is not required for Gypsum Recycle Pond as specified in § 257.73(b).

BACKGROUND

40 CFR § 257.73(c)(1) requires the owner or operator of an existing coal combustion residual (CCR) surface impoundment that either (1) has a height of five feet or more and a storage volume of 20 acre-feet or more, or (2) has a height of 20 feet or more to compile a history of construction by October 17, 2016 that contains, to the extent feasible, the information specified in 40 CFR § 257.73(c)(1)(i)–(xii).

The history of construction presented herein was compiled based on existing documentation, to the extent that it is reasonably and readily available (see 80 Fed. Reg. 21302, 21380 [April 17, 2015]), and AECOM's site experience. AECOM's document review included record drawings, geotechnical investigations, pipe inspection reports, etc. for the Coal Pile Runoff Pond and D Basin at the Zimmer Power Station.

AECOM

HISTORY OF CONSTRUCTION

§ 257.73(c)(1)(i): The name and address of the person(s) owning or operating the CCR unit; the name associated with the CCR unit; and the identification number of the CCR unit if one has been assigned by the state.

Operator: Dynegy Zimmer, LLC

Address: 1500 Eastport Plaza Drive
Collinsville, IL 62234

CCR Units: Coal Pile Runoff Pond, ODNR Dam ID No. 8741-010, NID ID No. OH01393
D Basin

The D Basin does not have a state assigned identification number.

§ 257.73(c)(1)(ii): The location of the CCR unit identified on the most recent USGS $7^1/_2$ or 15 minute topographic quadrangle map or a topographic map of equivalent scale if a USGS map is not available.

The locations of the Coal Pile Runoff Pond and D Basin have been identified on an USGS 7-1/2 minute topographic quadrangle map in **Appendix A**.

§ 257.73(c)(1)(iii): A statement of the purpose for which the CCR unit is being used.

The following captures the purpose of the CCR unit:

- The Coal Pile Runoff Pond is being used to clarify D Basin discharge water, FGD waste streams, landfill leachate water, and other non-CCR wastewater.
- The D Basin is being used to dewater dredged CCR and non-CCR material from other ponds. The dewatered material is excavated and transported to the Zimmer landfill.

§ 257.73(c)(1)(iv): The name and size in acres of the watershed where the CCR unit is located.

The Coal Pile Runoff Pond and D Basin are located in the Little Indian Creek-Ohio River Watershed with a 12-digit Hydrologic Unit Code (HUC) of 050902011107 with a drainage area of 15,657 acres (USGS, 2016).

§ 257.73(c)(1)(v): A description of the physical and engineering properties of the foundation and abutment materials on which the CCR unit is constructed.

The foundation materials for the Coal Pile Runoff Pond and D Basin consists of, from top to bottom, fine grained alluvial soils, coarse grained soils, and bedrock. The physical properties of the fine grained alluvial soil are described as soft to stiff, moist, lean clay. The coarse grained foundation soils are described as medium dense to very dense, fine sand, silty sand, and gravelly sand. Portions of the fine grained soil and coarse grained soil are separated by a layer comprised of silty clayey sand and silt. The bedrock is described as limestone. An available summary of the engineering properties of the foundation materials is presented in **Table 1** below. The engineering properties are based on previous geotechnical explorations and laboratory testing.

Table 1. Summary of Foundation Material Engineering Properties

Material	Unit Weight (pcf)	Effective (drained) Shear Strength Parameters		Total (undrained) Shear Strength Parameters	
		c' (psf)	Φ' (°)	c (psf)	Φ (°)
Alluvial Clays	128	200	30	600	16
Silty Clayey Sand	128	150	35	400	16
Fine Sand, Silty Sand, Gravelly Sand	120	0	31	0	31
Limestone	140	Impenetrable			

The Coal Pile Runoff Pond and D Basin are enclosed impoundments with embankments and do not have abutments.

§ 257.73(c)(1)(vi): A statement of the type, size, range, and physical and engineering properties of the materials used in constructing each zone or stage of the CCR unit; the method of site preparation and construction of each zone of the CCR unit; and the approximate dates of construction of each successive stage of construction of the CCR unit.

The construction of the Coal Pile Runoff Pond included a 3-foot thick compacted clay liner. The physical and engineering properties for the clay liner are not reasonably and readily available. Physical properties of the embankment materials for the Coal Pile Runoff Pond are described as very stiff to hard fine grained material typically classified as sandy lean clay. An available summary of the engineering properties of the embankment construction materials is presented in **Table 2** below. The engineering properties are based on previous geotechnical explorations and laboratory testing.

D Basin was constructed over a portion of the historical coal storage area. The historical coal storage area was originally constructed as an enclosed impoundment with embankments and lined with a 3-foot thick compacted clay liner. Common fill was placed at a variable thickness over the historical clay liner to raise the subbase elevation for D Basin construction.

Construction of the D Basin typical liner section consisted of (from bottom to top) a 1-foot thick new clay liner layer with a designed permeability of $1x10^{-7}$ cm/s, a geotextile fabric, a 1-foot thick granular material underdrain layer with 6-inch diameter (dia.) high density polyethylene (HDPE) underdrain piping, a second geotextile fabric, and a 2-foot thick bottom ash protection layer. Physical properties of the embankment materials for D Basin are described as medium dense to very dense coarse grained material typically classified as silty clayey sand with gravel and silty sand with gravel. An available summary of the engineering properties of the embankment construction materials is presented in **Table 2** below. The engineering properties are based on previous geotechnical explorations and laboratory testing. The physical and engineering properties for the other above-mentioned liner materials are not reasonably and readily available.

Table 2. Summary of Embankment Construction Material Engineering Properties

Material	Unit Weight (pcf)	Effective (drained) Shear Strength Parameters		Total (undrained) Shear Strength Parameters	
		c' (psf)	Φ' (°)	c (psf)	Φ (°)
Sandy Lean Clay (CL)	128	50	30	225	20
Silty Clayey Sand with Gravel	127	0	30	0	30

The method of site preparation and construction for the Coal Pile Runoff Pond is not reasonably and readily available. Site preparation and construction of the D Basin were completed in accordance with the *Dewatering Basin "D"* record drawings (presented in **Appendix B**).

The approximate dates of construction of each successive stage of construction of the Coal Pile Runoff Pond and D Basin are provided in **Table 3** below.

Table 3. Approximate dates of construction of each successive stage of construction.

Date	Event
Prior to 1985	Development of historical impoundment
1986-1987	Conversion of historical impoundment to coal pile storage area
1987	Construction of Coal Pile Runoff Pond
2003	Construction of D Basin over portion of coal pile storage area

§ 257.73(c)(1)(vii): At a scale that details engineering structures and appurtenances relevant to the design, construction, operation, and maintenance of the CCR unit, detailed dimensional drawings of the CCR unit, including a plan view and cross sections of the length and width of the CCR unit, showing all zones, foundation improvements, drainage provisions, spillways, diversion ditches, outlets, instrument locations, and slope protection, in addition to the

normal operating pool surface elevation and the maximum pool surface elevation following peak discharge from the inflow design flood, the expected maximum depth of CCR within the CCR surface impoundment, and any identifiable natural or manmade features that could adversely affect operation of the CCR unit due to malfunction or mis-operation.

Drawings that contain items pertaining to the requested information for the Coal Pile Runoff Pond and D Basin are listed in **Table 4** below. Items marked as "Not Available" are items not found during a review of the reasonably and readily available record documentation.

Table 4. List of drawings containing items pertaining to the information requested in § 257.73(c)(1)(vii).

	Coal Pile Runoff Pond	D Basin
Dimensional plan view (all zones)	1-30250	1-30250B, 1-30250E
Dimensional cross sections	1-30253	1-30250C, 1-30250D
Foundation Improvements	1-30253	1-30250C, 1-30250D, 1-30250H
Drainage Provisions	Not Applicable	1-30250C to 1-30250E, 1-5434-01 to 1-5434-03
Spillways and Outlets	Not Available	1-30250B, 1-30250F, 1-30250G 1-5434-01 to 1-5434-03
Diversion Ditches	Not Applicable	Not Applicable
Instrument Locations	Plate 2	Fig. No. 2A
Slope Protection	Not Available	1-30250C, 1-30250D, 1-30250H
Normal Operating Pool Elevation	1-30253	1-30250G
Maximum Pool Elevation	Not Available	1-30250G
Approximate Maximum Depth of CCR in 2016	16 feet	8 feet

All drawings referenced in **Table 4** above can be found in **Appendix B** and **Appendix C**.

Based on the review of the drawings listed above, no natural or manmade features that could adversely affect operation of these CCR units due to malfunction or mis-operation were identified.

§ 257.73(c)(1)(viii): A description of the type, purpose, and location of existing instrumentation.

Existing instrumentation within the Coal Pile Runoff Pond includes a vibrating-wire piezometer installed in 2014. The purpose of the piezometer is to measure the pore water pressure within the embankment. A location map of the existing piezometer instrumentation (B-WW-1401) is shown on Plate 2 presented in **Appendix C**.

Existing instrumentation within the D Basin include open-standpipe piezometers installed in 2015 near the western embankment. The purpose of the piezometers is to measure the pore water pressures at the crest and toe of the outer embankment. There are two (2) piezometers adjacent to D Basin. A location map of the existing piezometer instrumentation is shown on Figure 2A presented in **Appendix C**.

§ 257.73(c)(1)(ix): Area-capacity curves for the CCR unit.

Area-capacity curves for the Coal Pile Runoff Pond and D Basin are not reasonably and readily available.

§ 257.73(c)(1)(x): A description of each spillway and diversion design features and capacities and calculations used in their determination.

The Coal Pile Runoff Pond contains two (2) 15-inch diameter (dia.) high density polyethylene (HDPE) pipe culverts located in the northeast corner of the impoundment. The pipe culverts drain into the adjacent Wastewater Pond. In 2016, the discharge capacity of the Coal Pile Runoff Pond was evaluated using HydroCAD 10 software modeling a 1,000-year, 24-hour rainfall event. The model results indicate that the Coal Pile Runoff Pond spillway has enough water storage capacity and will not overtop the embankment during the 1,000-year, 24-hour storm event. The results of the HydroCAD 10 analysis are presented below in **Table 5**.

D Basin drains into a reinforced concrete sump structure that contains two sump pumps. The lead pump activates when the sump liquid level reaches El. 485.2 feet and the lag pump activates when the sump fluid level reaches El. 486.7 feet. The minimum pump liquid level, or shut-off level, is at El. 481.7 feet. Both pumps drain into separate 6-inch dia. HDPE pipes that discharge into the Coal Pile Runoff Pond. D Basin also contains a 10-foot-wide emergency overflow spillway with an invert elevation of 504 feet. The overflow spillway drains into the adjacent C Basin. Unless otherwise mentioned, all elevations in this report are on datum NAVD88.

In 2016, the discharge capacity of D Basin was evaluated using HydroCAD 10 software modeling a 1,000-year, 24-hour rainfall event. During the modeled event, the Ohio River flood pool would back up into the D Basin through the outfall structures from the Clearwater Pond and from emergency outfall structures for the A, B, and C Basins. During this scenario,

the Wastewater Pond Complex would be flooded to an elevation of 506 feet, and the D Basin would be part of a continuous pool that is also comprised of the A, B, and C Basin. The model results indicated that the Wastewater Pond Complex had enough storage capacity above the Ohio River flood pool level and will not overtop the perimeter embankment during the 1,000-year, 24-hour storm event. The results of the HydroCAD 10 analysis are presented below in **Table 5**.

Table 5. Results of HydroCAD 10 analysis

	Coal Pile Runoff Pond	Combined Basins (A, B, C & D)
Approximate Minimum Berm Elevation[1] (ft)	509.2	509.0
Approximate Emergency Spillway Elevation[1] (ft)	Not Applicable	Not Applicable
Starting Pool Elevation[1] (ft)	507.9	506.0
Peak Elevation[1] (ft)	509.0	506.8
Time to Peak (hr)	12.2	13.0
Surface Area (ac)	2.5	27.3
Storage[2] (ac-ft)	2.8	20.8

Note: 1. Elevations are based on NAVD88 datum
2. Storage given is from Starting Pool Elevation to Peak Elevation.

§ 257.73(c)(1)(xi): The construction specifications and provisions for surveillance, maintenance, and repair of the CCR unit.

The construction specifications for the Coal Pile Runoff Pond are not reasonably and readily available. Available construction specifications for D Basin are outlined on Drawing 1-30250H presented in **Appendix B**.

The operations and maintenance plans for Coal Pile Runoff Pond and D Basin are currently being prepared by Dynegy Zimmer, LLC.

§ 257.73(c)(1)(xii): Any record or knowledge of structural instability of the CCR unit.

There is no record or knowledge of structural instability of the Coal Pile Runoff Pond and D Basin at Zimmer Power Station.

LIMITATIONS

The signature of AECOM's authorized representative on this document represents that to the best of AECOM's knowledge, information and belief in the exercise of its professional judgment, it is AECOM's professional opinion that the aforementioned information is accurate as of the date of such signature. Any recommendation, opinion or decisions by AECOM are made on the basis of AECOM's experience, qualifications and professional judgment and are not to be construed as warranties or guaranties. In addition, opinions relating to environmental, geologic, and geotechnical conditions or other estimates are based on available data and that actual conditions may vary from those encountered at the times and locations where data are obtained, despite the use of due care.

Sincerely,

Claudia Prado
Project Manager

Victor Modeer, P.E., D.GE
Senior Project Manager

REFERENCES

United States Environmental Protection Agency (USEPA). (2015). *Hazardous and Solid Waste Management System; Disposal of Coal Combustion Residuals from Electric Utilities; Final Rule.* 40 CFR Parts 257 and 261, 80 Fed. Reg. 21302, 21380 April 17, 2015.

United States Geological Survey (USGS). (2016). The National Map Viewer. http://viewer.nationalmap.gov/viewer/. USGS data first accessed in March of 2016.

APPENDICES

Appendix A: History of Construction Vicinity Map
Appendix B: Zimmer Power Station Drawings
Appendix C: Zimmer Power Station Boring and Piezometer Location

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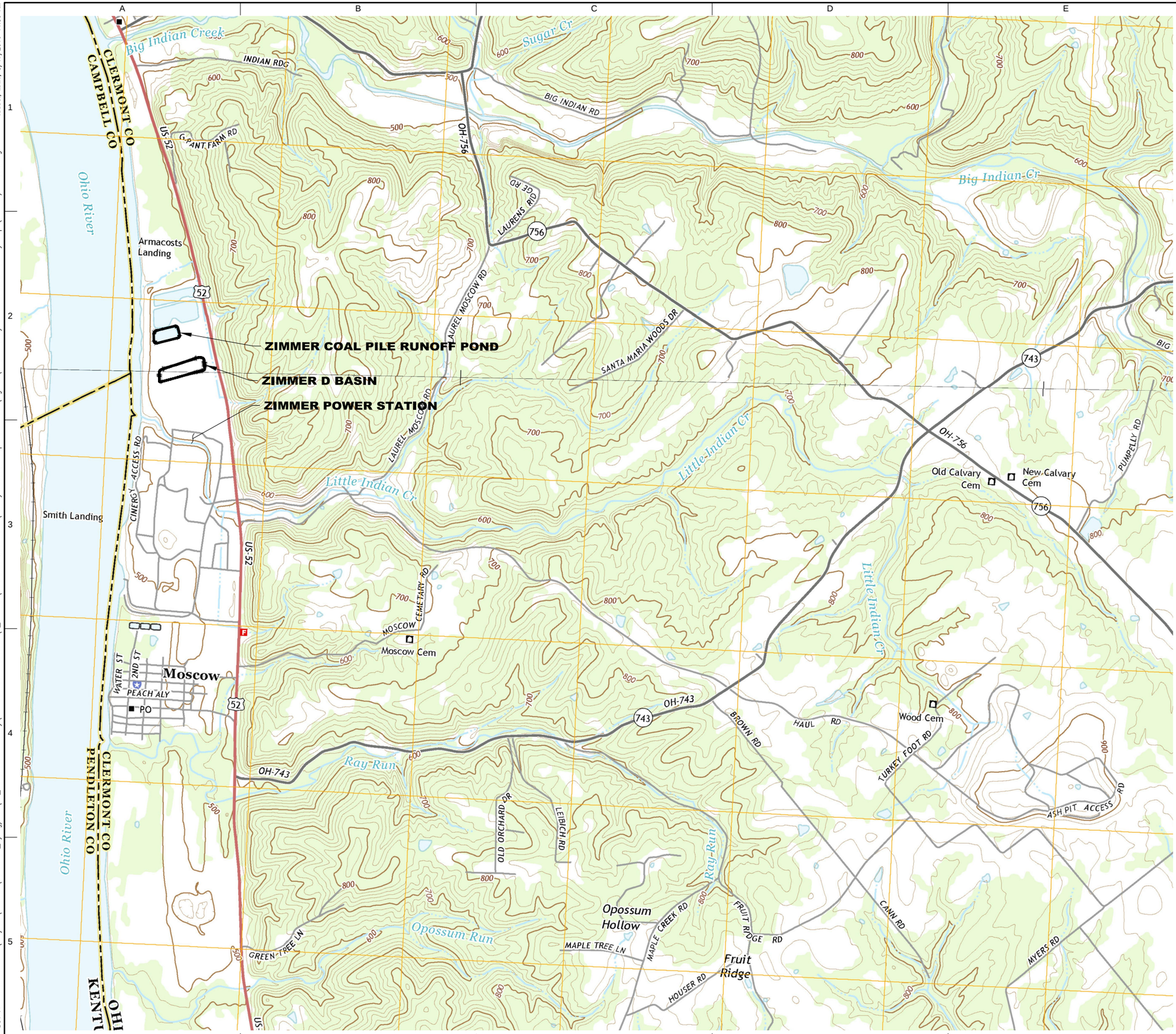
Appendix A: History of Construction Vicinity Map



LEGEND

CCR UNITS

SOURCE:
MAP PROVIDED FROM ELECTRONIC USGS DIGITAL RASTER GRAPHIC 7.5 MINUTE TOPOGRAPHIC MAP OF MOSCOW ILLINOIS AND ZAUREL ILLINOIS, REVISED 2015.

QUADRANGLE LOCATION

N

0 1000 2000 3000

SCALE IN FEET

AECOM
1001 Highlands Plaza Drive, Suite 300
St. Louis, Mo. 63110
314 429-0100 (phone)
314-429-0462 (fax)

Dynegy Zimmer, LLC
1781 US Route 52
Moscow, OH 45153

HISTORY OF CONSTRUCTION

ZIMMER POWER STATION
MOSCOW, OHIO

ISSUED FOR BIDDING DATE BY

ISSUED FOR CONSTRUCTION DATE BY

REVISIONS

NO.	DESCRIPTION	DATE
△		
△		
△		
△		
△		

AECOM PROJECT NO:	60489731
DRAWN BY:	DJD
DESIGNED BY:	DJD
CHECKED BY:	MN
DATE CREATED:	2016-04-13
PLOT DATE:	
SCALE:	1" = 1000'
ACAD VER:	2014

SHEET TITLE

HISTORY OF CONSTRUCTION VICINITY MAP

01

AECOM DRAWING PATH: P:\Projects\Geotech\60428794_DynegyCCR\13_Construction History\04 Technical Production\6_Zimmer\Reference Documents\Vicinity Location Map References\Figures\C-01 History of Construction Vicinity Map (Zimmer) – MJN.dwg NANAK, MATT, 8/17/2016 11:30 AM

Appendix B: Zimmer Power Station Drawings

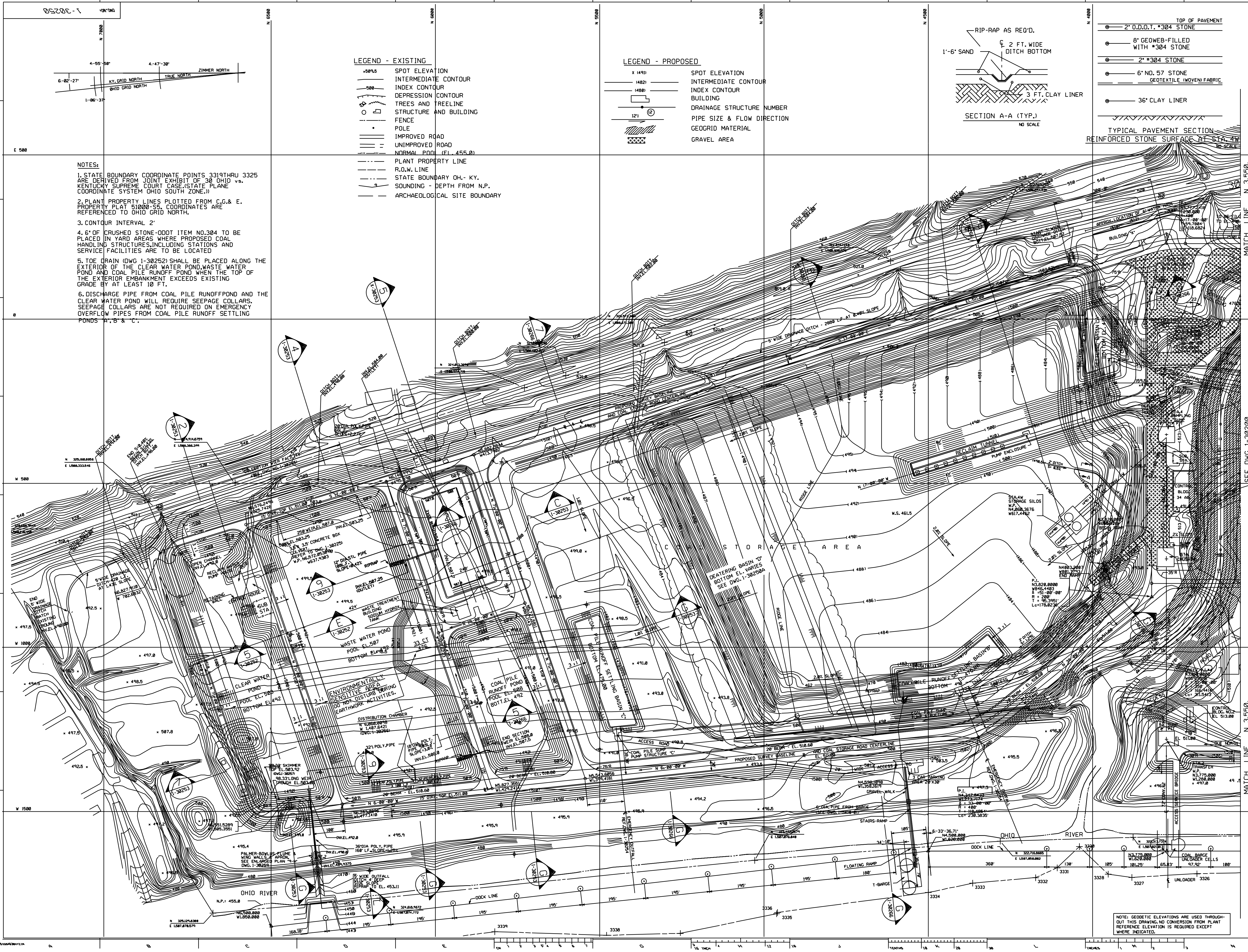
1. "Coal Storage Area and Ponds, Grading and Drainage Plan", Drawing No. 1-30250, Revision 13, 6 March, 1987, American Electric Power Service Corp.
2. "Coal Storage Area and Ponds, Grading and Drainage Sections & Details", Drawing No. 1-30253, Revision 0, 13 March, 1987, American Electric Power Service Corp.
3. "Coal Storage Area and Ponds, Dewatering Basin "D" Plan and Legend", Drawing No. 1-30250B, 27 February, 2003, Orbital Engineering, Inc.
4. "Coal Storage Area and Ponds, Dewatering Basin "D" Section A-A", Drawing No. 1-30250C, 27 February, 2003, Orbital Engineering, Inc.
5. "Coal Storage Area and Ponds, Dewatering Basin "D" Sections B-B & C-C", Drawing No. 1-30250D, 27 February, 2003, Orbital Engineering, Inc.
6. "Coal Storage Area and Ponds, Dewatering Basin "D" Liner and Underdrain Plan", Drawing No. 1-30250E, 27 February, 2003, Orbital Engineering, Inc.
7. "Coal Storage Area and Ponds, Dewatering Basin "D" Misc. Sections & Details", Drawing No. 1-30250F, 27 February, 2003, Orbital Engineering, Inc.
8. "Coal Storage Area and Ponds, Dewatering Basin "D" G.A. of Pump Pit", Drawing No. 1-30250G, 27 February, 2003, Orbital Engineering, Inc.
9. "Coal Storage Area and Ponds, Dewatering Basin "D" General Notes", Drawing No. 1-30250H, 27 February, 2003, Orbital Engineering, Inc.
10. "Coal Storage Area and Ponds, Dewatering Basin "D" Pump Pit Piping - Plan", Drawing No. 1-5434-01, 20 February, 2003, Orbital Engineering, Inc.
11. "Coal Storage Area and Ponds, Dewatering Basin "D" Piping Sect. A-A & Det.", Drawing No. 1-5434-02, 20 February, 2003, Orbital Engineering, Inc.
12. "Coal Storage Area and Ponds, Dewatering Basin "D" Pump Pit – Misc. Details", Drawing No. 1-5434-03, 20 February, 2003, Orbital Engineering, Inc.

CINERGY REVISIONS

DES. TLJ 3-30-09
DFT'R. TLJ
CHK'D. TLJ
APP'D. DWT

W.C. WZ438AB-S
(AS-BUILT)
ADDED DEWATERING BASIN "D"
CONSTRUCTED 2003

12



NOTES:

1. STATE BOUNDARY COORDINATE POINTS 3319THRU 3325 ARE DERIVED FROM JOINT EXHIBIT OF 30 OHIO vs. KENTUCKY SUPREME COURT CASE.(STATE PLANE COORDINATE SYSTEM OHIO SOUTH ZONE.))

2. PLANT PROPERTY LINES PLOTTED FROM C.G.& E. PROPERTY PLAT 51000-S5. COORDINATES ARE REFERENCED TO OHIO GRID NORTH.

3. CONTOUR INTERVAL 2'

4. 6" OF CRUSHED STONE-ODOT ITEM NO.304 TO BE PLACED IN YARD AREAS WHERE PROPOSED COAL HANDLING STRUCTURES,INCLUDING STATIONS AND SERVICE FACILITIES ARE TO BE LOCATED

5. TOE DRAIN (DWG 1-30252) SHALL BE PLACED ALONG THE EXTERIOR OF THE CLEAR WATER POND,WASTE WATER POND AND COAL PILE RUNOFF POND WHEN THE TOP OF THE EXTERIOR EMBANKMENT EXCEEDS EXISTING GRADE BY AT LEAST 10 FT.

6. DISCHARGE PIPE FROM COAL PILE RUNOFFPOND AND THE CLEAR WATER POND WILL REQUIRE SEEPAGE COLLARS. SEEPAGE COLLARS ARE NOT REQUIRED ON EMERGENCY OVERFLOW PIPES FROM COAL PILE RUNOFF SETTLING PONDS "A","B" & "C".

NOTE: GEODETIC ELEVATIONS ARE USED THROUGHOUT THIS DRAWING. NO CONVERSION FROM PLANT REFERENCE ELEVATION IS REQUIRED EXCEPT WHERE INDICATED.

COMPUTER DRAWING
MANUAL CHANGES NOT PERMITTED

SEE CINERGY REVISIONS

REVISIONS

DATE	NO.	DESCRIPTION	APPD.
	11	ADMINISTRATIVE CHANGE: REVISED DRAWING TO "AS-BUILT" STATUS AS PER FIELD INFORMATION.	
JULY 16 1991	10	PRIORITY "C" AS PER RDR-ZR-01-872: ADDED REINFORCED STONE SURFACE AT THE SOUTH END OF COAL STA. 4W AND DITCHING WITH 24" DIA. PIPE (L-6), SECTION A-A (L-1), AND TYPICAL PAVEMENT SECTION (M-1) AS PER "AS-BUILT" INFORMATION. SAR / RNS / SRM	WPM
APR. 12 1990	9	AS PER RDR-ZR-01-676: ADDED 270 GAL. FUEL TANK WITH A SECONDARY CONTAINMENT TO TRACTOR WASHDOWN FACILITY (4-M), REFER TO MECH. DWG. 1-5411-04 ENLARGED PLAN VIEW (2-D). SRM	WPM
OCT. 31 1989	8	AS PER RDR-ZR-01-506: SETTLING BASINS "A", "B" & "C": ADDED CONC. SLABS, ACCESS ROADS, AND RELOCATED STRUCTURES AS PER AS-BUILTS. REVISED GRADING AROUND SUMP STRUCTURES WITH A 2:1 TO 3:1 BASIN SIDESLOPE TRANSITION. SRM	WPM
12/14 88	7	PER RDR-ZR-01-043, ADDED BARGE DEWATERING PIPE SYSTEM, REV. CONTOURS, & ADDED RIPRAP AT COAL PILE RUNOFF SETTLING BASIN "B". (7-K TO 9-K) RNS-ACY	WPM JEP
9/21 88	6	REV. DIM. TO 34'-10", WAS 31'-2" NEAR T-BARGE. (9-J) ADDED H.P. EL. AT SUBSTATION NEAR CLEAR WATER POND. (7-C) ADDED BLDG. "K" AS PER RDR ZR-01-202 AND CHANGED CONTOURS ACCORDINGLY. (3-M) REV. 24"Ι STL. PIPE TO 20"Ι POLY. PIPE BY FIELD. (6-E) CHANGED STEEL PIPE TO POLY. PIPE AS PER C.E. (8-E & 9-D) CHANGED DWG. NO. IN SECT. MARKERS TO 1-39253, WAS 1-30252. (9-D & 9-B)	WPM
6/29 88	5	AS PER RDR #ZR-01-211, CHANGED CMP TO POLYETHYLENE PIPE & CHANGED SIZE TO 32", WAS 30". (8-E) AS PER RDR #ZR-01-192, REMOVED ARCHAEOLOGICAL SITES #396, #397 #477 AND PART OF #476. CHANGED CONFIGURATION AND REGRADED AREA AROUND ARCHAEOLOGICAL SITE IN WASTE WATER POND.	ASP
3/18 88	4	ADDED GRAVEL TO COAL HANDLING YARD AREA M-N, 3-6 REVISED DIMENSIONS FROM CENTERLINE OF PUMP STRUCTURES AT SETTLING BASINS B. & C. AND FROM CENTERLINE CONV. 34 TO CENTERLINE PUMP STRUCTURE AT SETTLING BASIN A. G-8, K-8, M-8	ASP
12/18 87	3	ADDED GEOGRID MATERIAL AND REVISED GRADING ALONG LITTLE INDIAN DIVERSION CREEK. MN-4-7. DELETED SUB-STA. SOUTH OF WASTE TREATMENT BLDG AND REVISED GRADING WITHIN. F-7. LOCATED 12"Ι STEEL PIPE FROM METAL CLEANING POND. TO WASTE WATER POND E-6. REMOVED HOLD AND REVISED GRADING AT N. SIDE OF RECLAIM WATER PUMP HOUSE: C-6-7. ADDED RET. WALL: C-6-7. ADDED SODIUM HYDROX. TANK, E-7.	ASP
09/23 87	2	PLACED HOLD ON PROP. GRADES AT N. SIDE OF RECLAIM WAT. PUMPHSE: C-6-7. REVISED GRADING AT STA. 4W.: L-6. SHIFTED GRID SYS. 10' TO THE NORTH.	ASP/ JEP
04/30 87	1	GENERAL REVISION REFLECTING CURRENT DESIGN DESCRIPTION AND LOCATION OF CONTOURS, ELEVATIONS, CATCHBASINS, MANHOLES, AND PIPES AS PER RDR ZR-01-001. REVISED GRADING ON NORTH & EAST SIDE OF TRANSFER STATION NO.2: M-8	ASP/ JEP
03/13 87	0	RELEASED FOR CONSTRUCTION	ASP/ JEP

THIS DRAWING IS PREPARED IN CONNECTION WITH THE CONVERSION PROJECT DESCRIBED IN THE PROJECT MANAGEMENT AGREEMENT BETWEEN THE OWNERS AND AMERICAN ELECTRIC POWER SERVICE CORPORATION (AEPSC) AND IS SUBJECT TO ALL APPLICABLE TERMS AND CONDITIONS OF THAT AGREEMENT. OCT. 22, 1986.

PROPRIETARY NOTICE

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W M.H.ZIM MER GENERATING STATION
THE CINCINNATI GAS & ELECTRIC CO.
THE DAYTON POWER AND LIGHT CO.
COLUMBUS AND SOUTHERN OHIO ELECTRIC CO.
OWNERS

COAL STORAGE AREA AND PONDS GRADING AND DRAINAGE PLAN

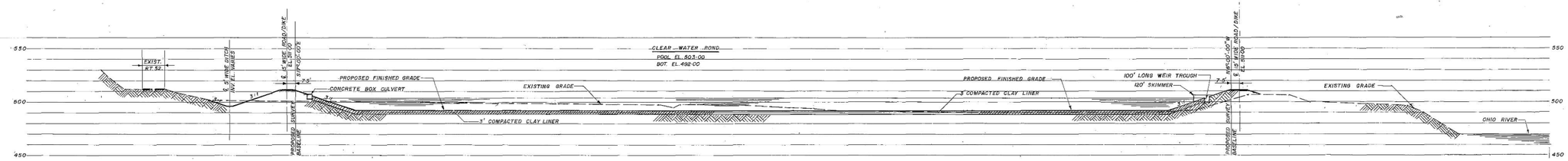
DWG. NO. 1-30250

SCALE: 1:100
DR: S.L.P
CH: R.N.S
SQ. LDR: R.N.S
DATE: 3-03-87

ENGINEERING DIVISION ORIGINAL SIGNED BY: B.H. BENNETT — PHA
DESIGN DIVISION ORIGINAL SIGNED BY: V.A. LEPORE — ASP

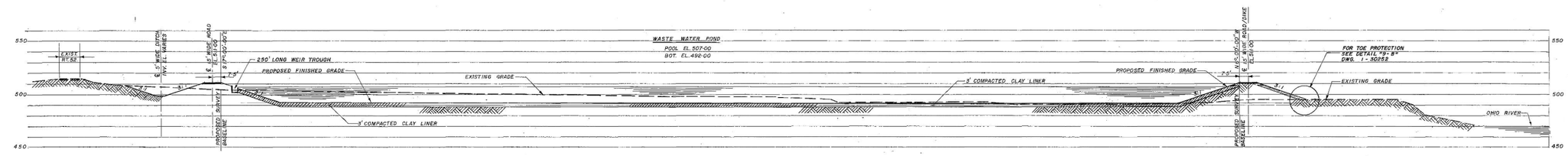
1 RIVERSIDE PLAZA ASSOCIATES, INC.
FOR
AMERICAN ELECTRIC POWER SERVICE CORP.

DR. No. 1-30253



SECTION 2 - G (REFER TO DWG. 1-30250)

SCALE 1" = 40'



SECTION 4 - G (REFER TO DWG. 1-30250)

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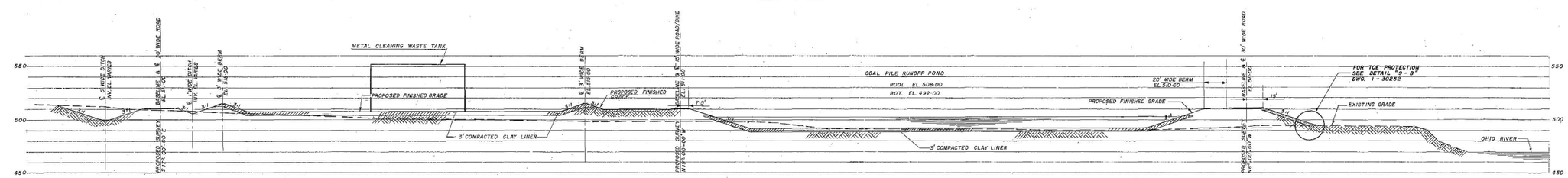

SECTION 5 - G (REFER TO DWG. 1-30250)

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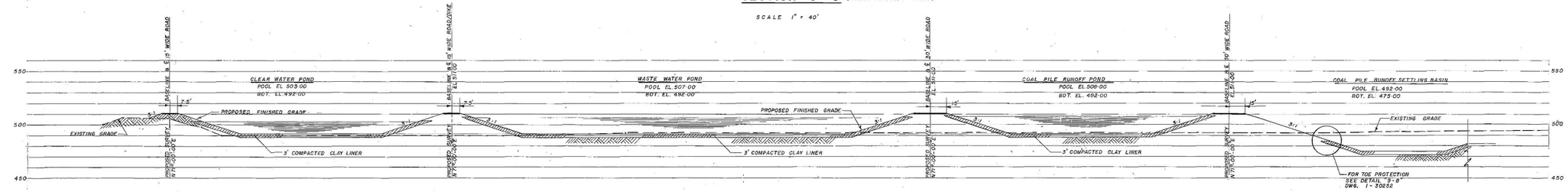
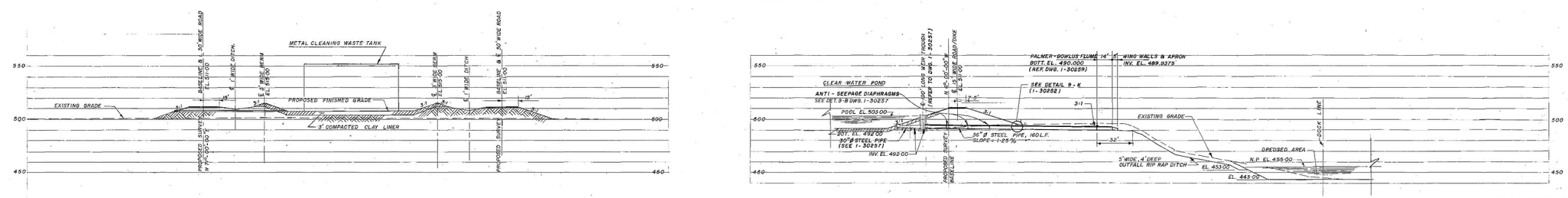


SECTION 7 - G (REFER TO DWG. 1-30250)

SCALE 1" = 40'



SECTION 9 - C (REFER TO DWG. 1-30250)

SCALE 1" = 40'

SECTION 9 - L (REFER TO DWG. 1-30250)

SCALE 1" = 40'

SCANNED DWG.
DO NOT REVISE

NOTE: GEODETIC ELEVATIONS ARE USED THROUGHOUT THIS DRAWING. NO CONVERSION FROM PLANT REFERENCE ELEVATION IS REQUIRED EXCEPT WHERE INDICATED.

GENERAL NOTES

1. WORK THIS DRAWING WITH DWG. 1-30250.

DATE	NO.	DESCRIPTION	APPR.
3/31/97	0	RELEASED FOR CONSTRUCTION	

REVISIONS

THIS DRAWING IS PREPARED IN CONNECTION WITH THE CONVERSION PROJECT DESCRIBED IN THE PROJECT MANAGEMENT AGREEMENT BETWEEN THE OWNERS AND AMERICAN ELECTRIC POWER SERVICE CORPORATION (AEPSC), 29-EE-96, AND IS SUBJECT TO ALL APPLICABLE TERMS AND CONDITIONS OF THAT AGREEMENT.

PROPRIETARY NOTICE

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WM. H. ZIMMER GENERATING STATION
THE CINCINNATI GAS & ELECTRIC CO.
THE DAYTON POWER AND LIGHT CO.
COLUMBUS AND SOUTHERN OHIO ELECTRIC CO.
OWNERS

COAL STORAGE AREA AND PONDS GRADING AND DRAINAGE SECTIONS & DETAILS

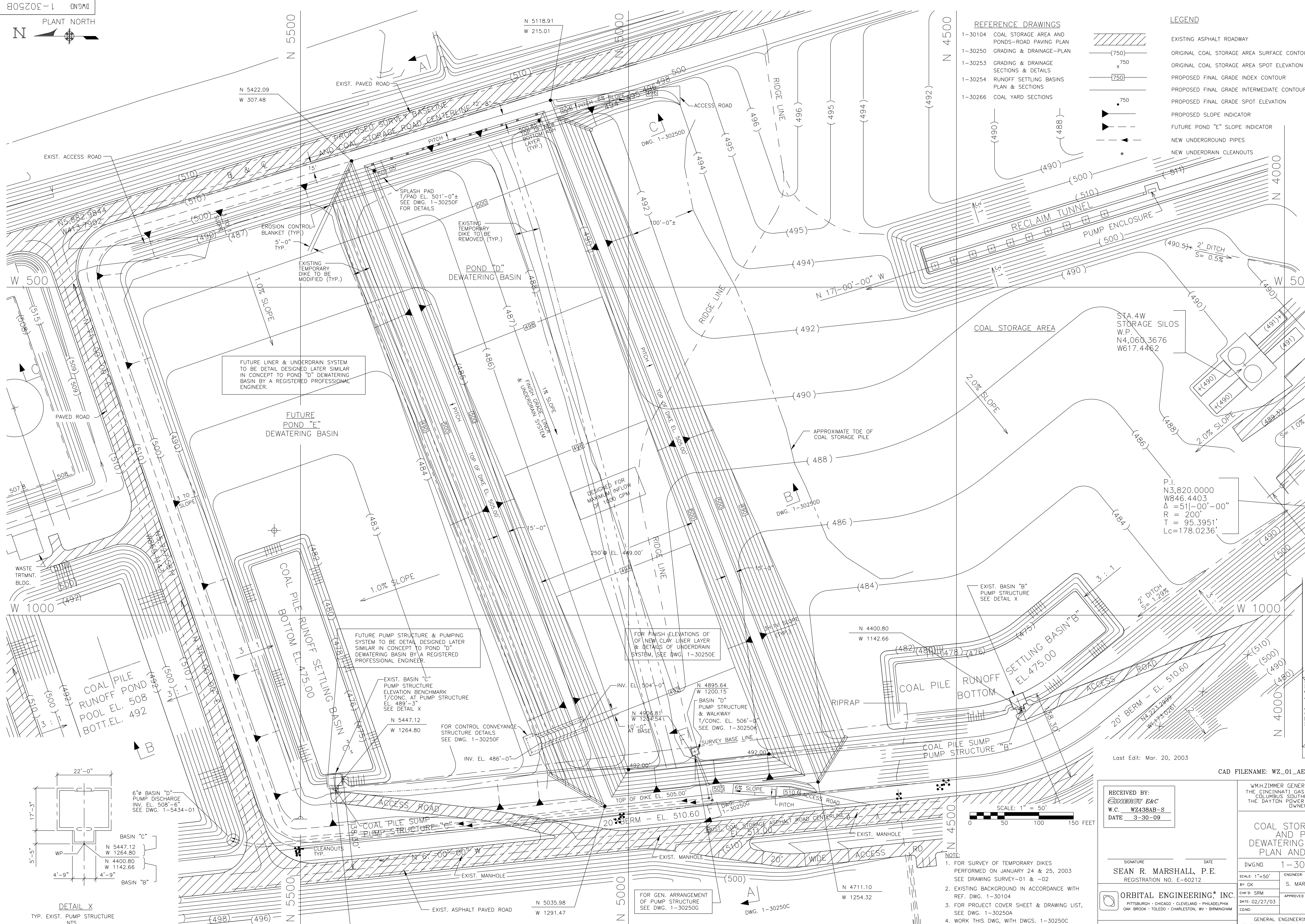
DWG. NO. 1-30253

ARCH. — ELEC. — MECH. 018 STR. 95

SCALE: 1"=40' | DRAWN: S.L.P | DR: S.L.P | CH: R.N.S | SQ. LDR: R.N.S | DATE: 3-5-97

ENGINEERING DIVISION: B.H. Bennett PHA
DESIGN DIVISION: Harold Wayne

1 RIVERSIDE PLAZA ASSOCIATES, INC.
FOR
AMERICAN ELECTRIC POWER SERVICE CORP.



REFERENCE DRAWINGS

1-30104	COAL STORAGE AREA AND PONDS-ROAD PAVING PLAN
1-30250	GRADING & DRAINAGE-PLAN
1-30253	GRADING & DRAINAGE SECTIONS & DETAILS
1-30254	RUNOFF SETTLING BASINS PLAN & SECTIONS
1-30266	COAL YARD SECTIONS

LEGEND

- EXISTING ASPHALT ROADWAY
- (750) ORIGINAL COAL STORAGE AREA SURFACE CONTOUR
- x 750 ORIGINAL COAL STORAGE AREA SPOT ELEVATION
- 750 PROPOSED FINAL GRADE INDEX CONTOUR
- PROPOSED FINAL GRADE INTERMEDIATE CONTOUR
- • 750 PROPOSED FINAL GRADE SPOT ELEVATION
- PROPOSED SLOPE INDICATOR
- FUTURE POND "E" SLOPE INDICATOR
- NEW UNDERGROUND PIPES
- NEW UNDERDRAIN CLEANOUTS

NOTE:

1. FOR SURVEY OF TEMPORARY DIKES PERFORMED ON JANUARY 24 & 25, 2003 SEE DRAWING SURVEY-01 & -02
2. EXISTING BACKGROUND IN ACCORDANCE WITH REF. DWG. 1-30104
3. FOR PROJECT COVER SHEET & DRAWING LIST, SEE DWG. 1-30250A
4. WORK THIS DWG, WITH DWGS. 1-30250C THROUGH 1-30250H

SCALE: 1" = 50' (0 50 100 150 FEET)

Last Edit: Mar. 20, 2003

CAD FILENAME: WZ_01_AEP_1-30250B.dwg

RES. BO 02/20/03
DFT'R. GK
CHK'D.
APP'D.
JOB NO. (New Const) REV'D. BY ORBITAL ENG. FOR BID
B
REVISION

RECEIVED BY:
CINERGY E&C
W.C. WZ438AB-S
DATE 3-30-09

SIGNATURE DATE
SEAN R. MARSHALL, P.E.
REGISTRATION NO. E-60212

ORBITAL ENGINEERING,® INC.
PITTSBURGH · CHICAGO · CLEVELAND · PHILADELPHIA
OAK BROOK · TOLEDO · CHARLESTON, WV · BIRMINGHAM

PROJECT 01-7796

WM.H.ZIMMER GENERATING STATION
THE CINCINNATI GAS & ELECTRIC CO.
COLUMBUS SOUTHERN POWER CO.
THE DAYTON POWER AND LIGHT CO.
OWNERS

COAL STORAGE AREA AND PONDS DEWATERING BASIN "D" PLAN AND LEGEND

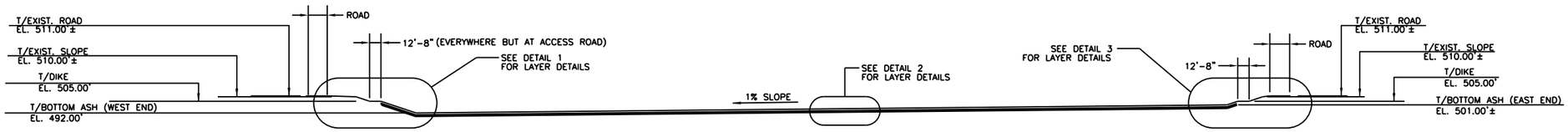
DWG.NO. 1-30250B

SCALE: 1"=50'	ENGINEER: S. MARSHALL	WO NO. WZ438
BY: GK		JOB NO.
CHK'D: SRM	APPROVED BY:	
DATE: 02/27/03		STA.NO. 14
CO.NO.:		

GENERAL ENGINEERING DEPARTMENT
THE CINCINNATI GAS & ELECTRIC COMPANY

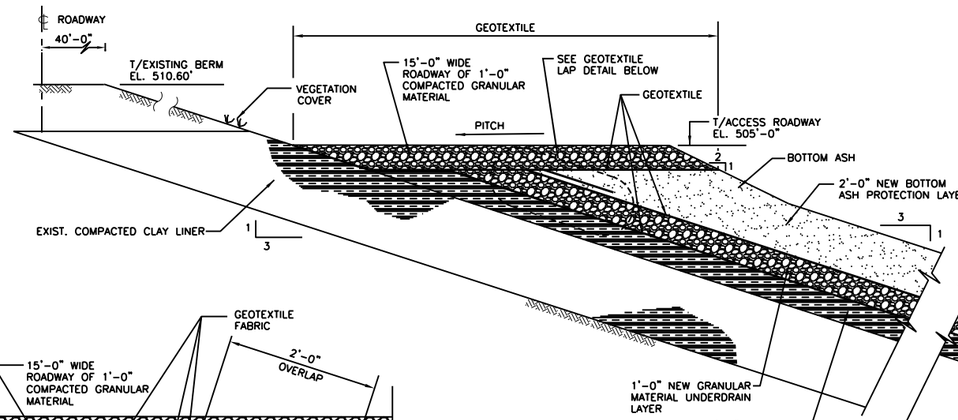
1-30250B 0

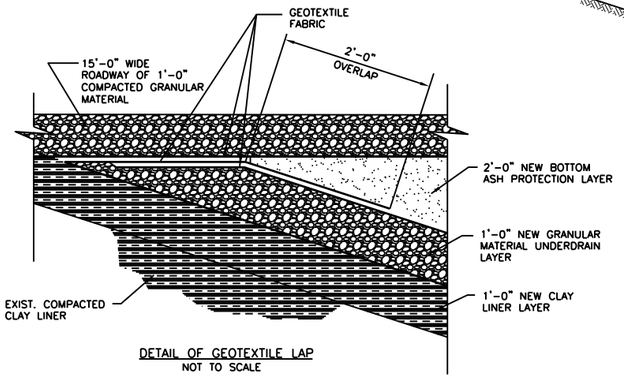
DWG. NO. 1-30250C



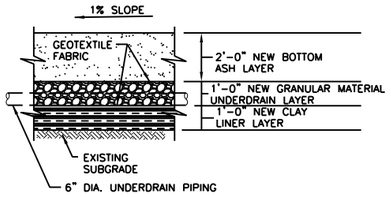
SECTION A-A
DWG. 1-30250B

SCALE: 1" = 50'
0 50 100 150 FEET

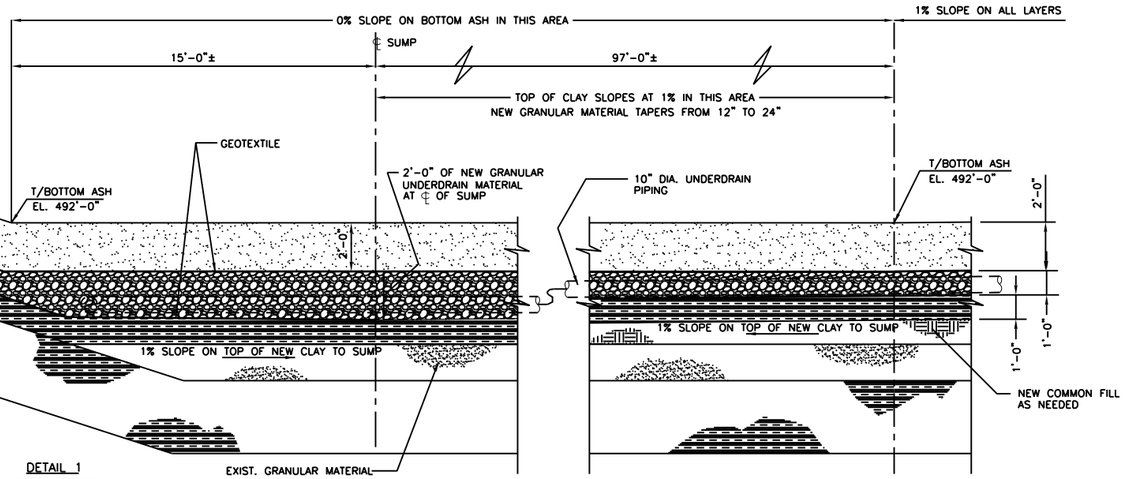




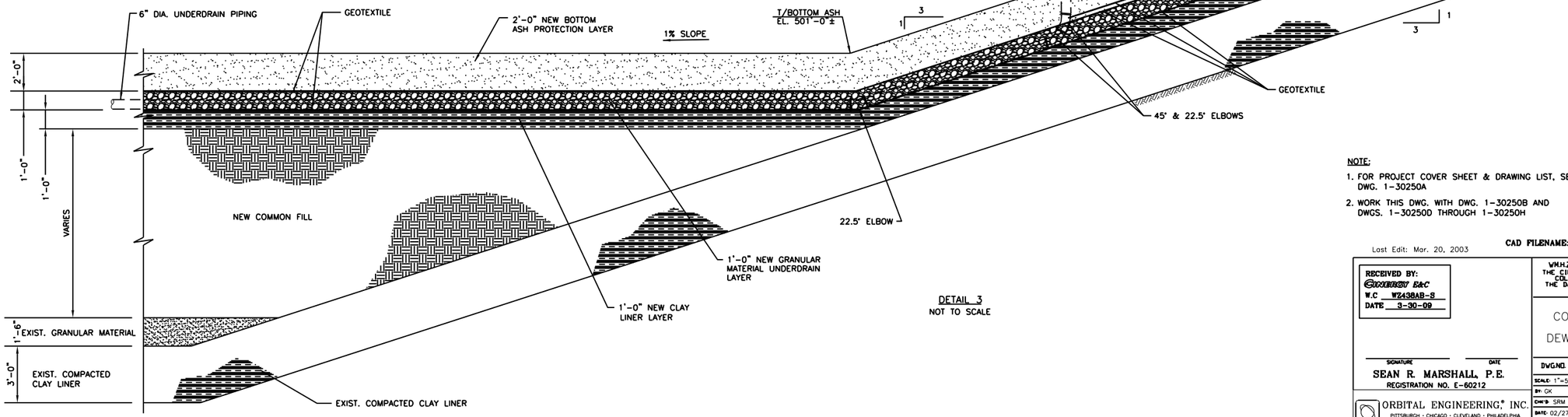
DETAIL OF GEOTEXTILE LAP
NOT TO SCALE



DETAIL 2
NOT TO SCALE



DETAIL 1
NOT TO SCALE



DETAIL 3
NOT TO SCALE

NOTE:
1. FOR PROJECT COVER SHEET & DRAWING LIST, SEE DWG. 1-30250A
2. WORK THIS DWG. WITH DWG. 1-30250B AND DWGS. 1-30250D THROUGH 1-30250H

DES. BRM	03/20/09
DR'S. GK	
CHK'D.	
APP'D.	
JOB NO. (New Comb)	
REV'D. BY FOR BID	

B
REVISION

CAD FILENAME: WZ_01_AEP_1-30250C.dwg

Last Edit: Mar. 20, 2003

RECEIVED BY:
Gannett Fleming
W.C. WZ438AB-S
DATE 3-30-09

SIGNATURE DATE
SEAN R. MARSHALL, P.E.
REGISTRATION NO. E-60212

ORBITAL ENGINEERING, INC.
PITTSBURGH · CHICAGO · CLEVELAND · PHILADELPHIA
OAK BROOK · TOLEDO · CHARLESTON, WV · BIRMINGHAM

PROJECT 01-7796

W.H. ZIMMER GENERATING STATION
THE CINCINNATI GAS & ELECTRIC CO.
COLUMBUS SOUTHERN POWER CO.
THE DAYTON POWER AND LIGHT CO.
OWNERS

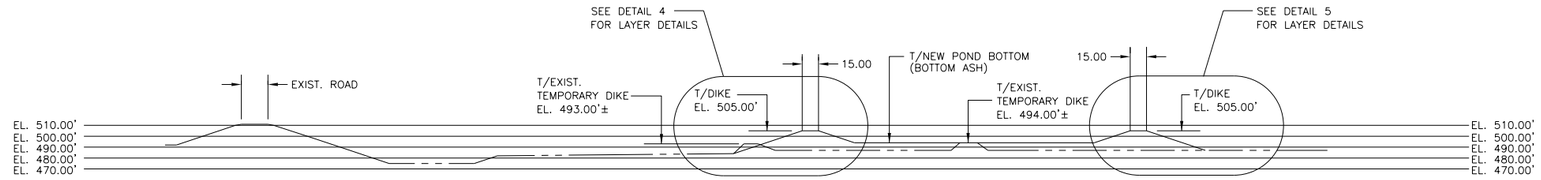
COAL STORAGE AREA AND PONDS
DEWATERING BASIN "D"
SECTION A-A

DWG NO.	1-30250C		
SCALE: 1"=50'	ENGINEER: S. MARSHALL	WZ NO.	WZxxx
BY: GK		JOB NO.	
CHK'D: SRM	APPROVED BY:		
DATE: 02/27/03		STAND.	14
CONS:			

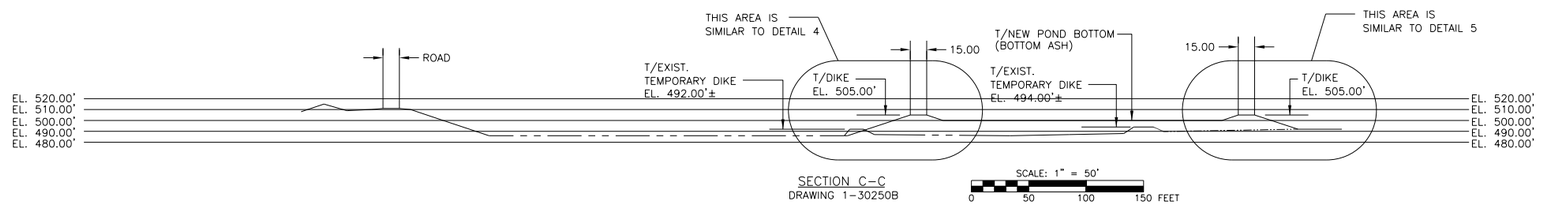
GENERAL ENGINEERING DEPARTMENT
THE CINCINNATI GAS & ELECTRIC COMPANY

1-30250C(1.0)

DWG NO. 1-30250D

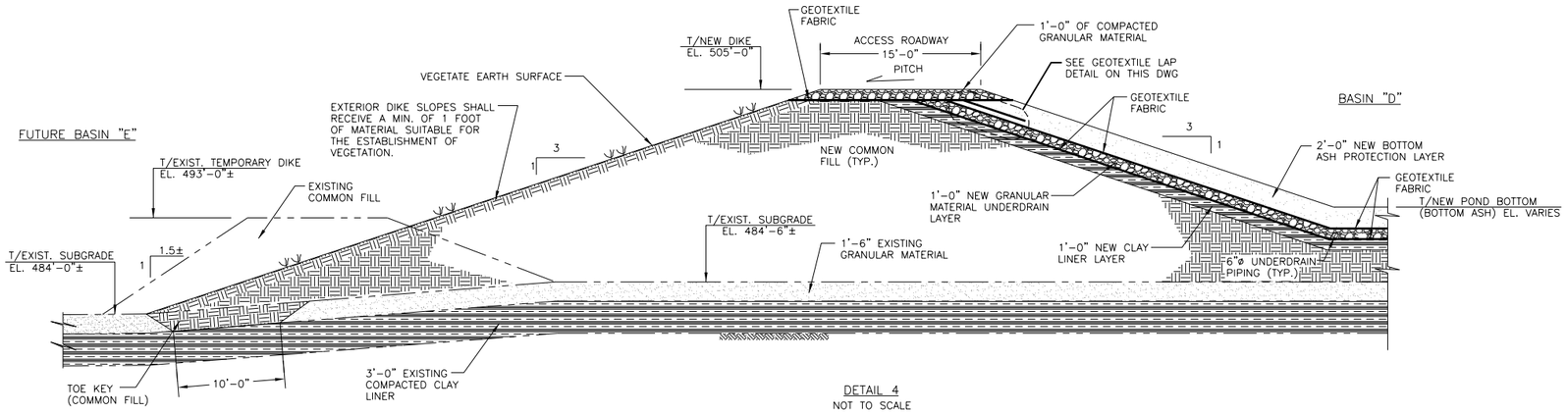


SECTION B–B
DRAWING 1–30250B

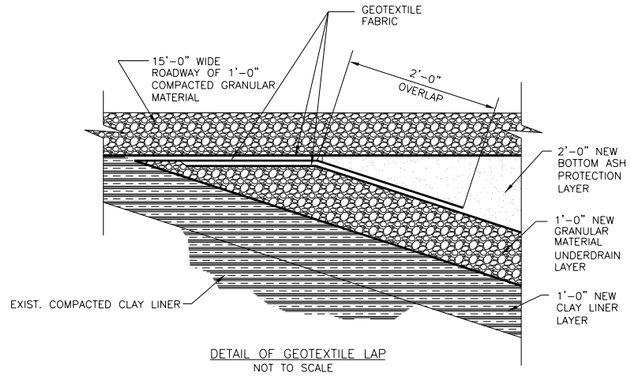


SECTION C–C
DRAWING 1–30250B

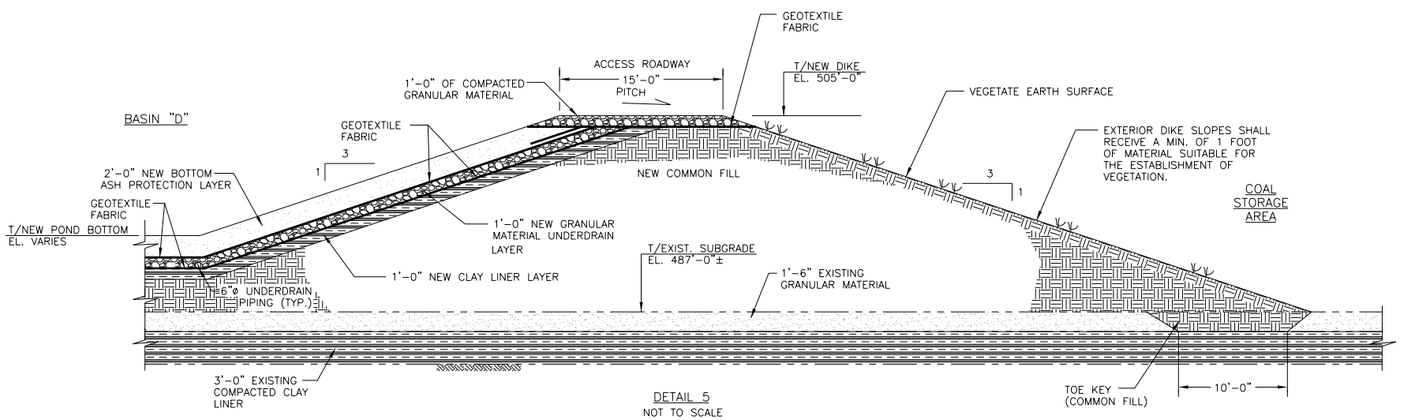
SCALE: 1" = 50'
0 50 100 150 FEET



DETAIL 4
NOT TO SCALE



DETAIL OF GEOTEXTILE LAP
NOT TO SCALE



DETAIL 5
NOT TO SCALE

NOTE:

1. FOR PROJECT COVER SHEET AND DRAWING LIST SEE DRAWING NO. 1–30250A
2. WORK THIS DWG. WITH DWS. 1–30250B, 1–30250C AND 1–30250E THROUGH 1–30250H

DES. SRM	03/20/03
DR'N. GK	
CHK'D	
APP'D	
JOB NO. (New Const.)	
REV'D. BY / FOR BID	

B
REVISION

Last Edit: Mar. 20, 2003

CAD FILENAME: WZ_01_AEP_1-30250D.dwg

RECEIVED BY:
ENERGY E&C
W.C. WZ438AB-S
DATE 3-30-09

SIGNATURE DATE
SEAN R. MARSHALL, P.E.
REGISTRATION NO. E-60212

ORBITAL ENGINEERING, INC.
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OAK BROOK · TOLEDO · CHARLESTON, WV · BIRMINGHAM

PROJECT 01-7796

W.H. ZIMMER GENERATING STATION
THE CINCINNATI GAS & ELECTRIC CO.
COLUMBUS SOUTHERN POWER CO.
THE DAYTON POWER AND LIGHT CO.
OWNERS

COAL STORAGE AREA AND PONDS DEWATERING BASIN "D" SECTIONS B–B & C–C

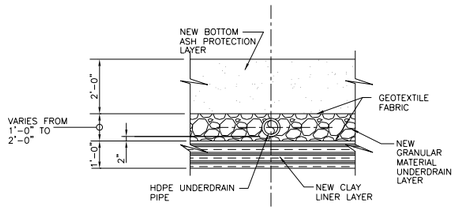
DWG NO. 1-30250D

SCALE: 1"=50'	ENGINEER	W.O. NO.
BY: GK	S. MARSHALL	WZxxx
CHK'D: SRM	APPROVED BY:	JOB NO.
DATE: 02/27/03		STANO. 14
COND:		

GENERAL ENGINEERING DEPARTMENT
THE CINCINNATI GAS & ELECTRIC COMPANY

1-30250D 1.0

DWGNO: 1-30250E



TYPICAL CROSS SECTION

NTS

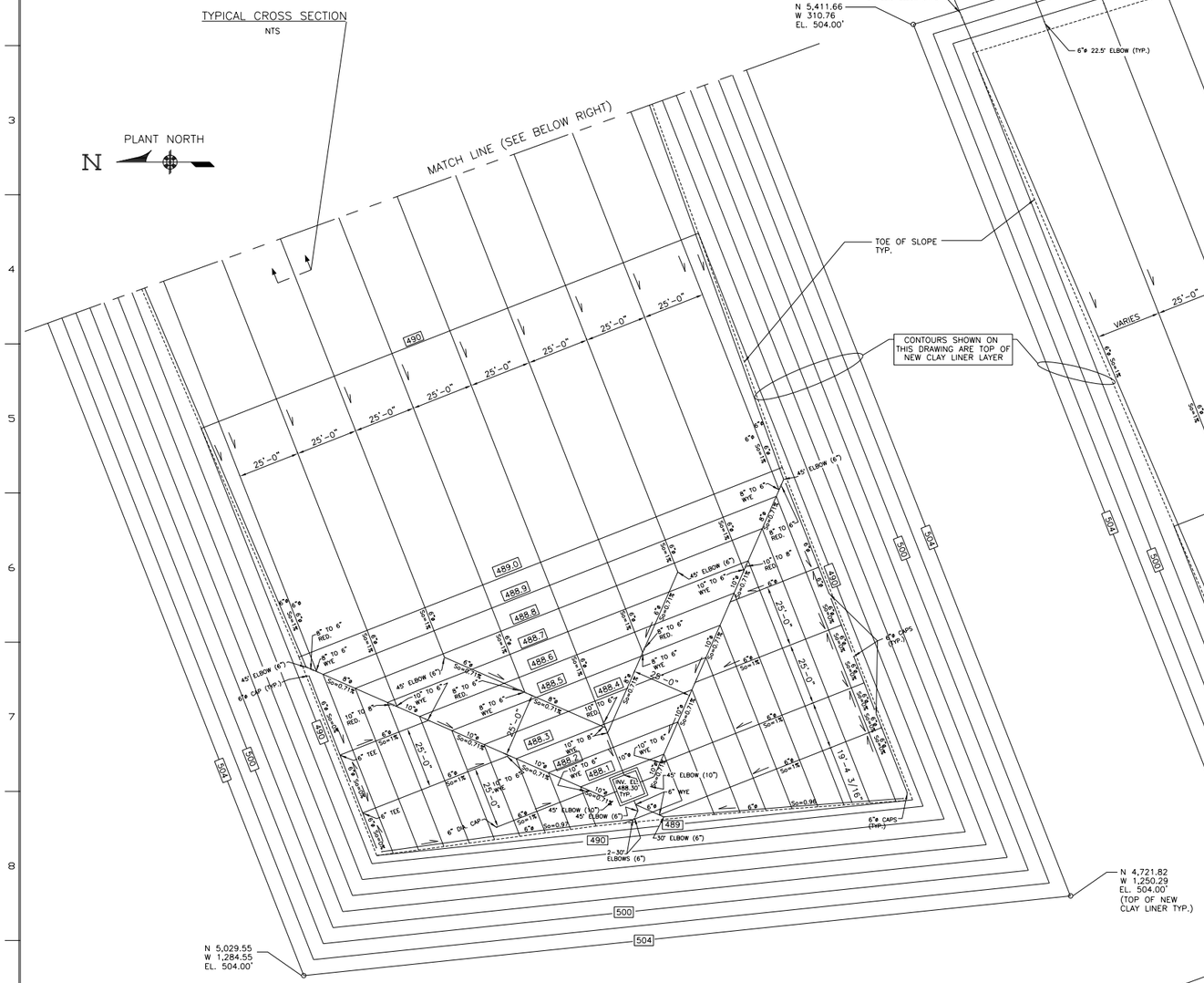
UNDERDRAIN PIPING NOTES;

1. MATERIALS:

PIPE: HIGH DENSITY POLYETHYLENE (HDPE) DUAL WALL CORRUGATED EXTERIOR AND SMOOTH INTERIOR ALL PIPING WITH SLOTTED PERFORATIONS (UNLESS NOTED). CONFORMING TO ASTM D3350 "STANDARD SPECIFICATIONS FOR POLYETHYLENE PLASTIC PIPE AND FITTINGS" AND AASHTO M-252. MANUFACTURER – ADVANCED DRAINAGE SYSTEMS (ADS) "TYPE N-12" OR APPROVED EQUAL.

COUPLINGS: CONFORMING TO ASTM D3212 AND AASHTO M294 MANUFACTURER – (ADS) "PRO LINK WT" OR APPROVED EQUAL.

FITTINGS: DUAL WALL, SHOP FABRICATED, CORRUGATED EXTERIOR AND SMOOTH INTERIOR MANUFACTURER – (ADS) "TYPE N-12".



LINER & UNDERDRAIN PLAN

SCALE: 1" = 20'

0 20 40 60 FEET

NOTES;

1. FOR PROJECT COVER SHEET AND DRAWING LIST SEE DRAWING NO. 1-30250A
2. WORK THIS DRAWING WITH DRAWING NO's. 1-30250B, 1-30250C, 1-30250D AND 1-30250H.

DES. SRM 3/20/03
DR'R. G.K.
CHK'D.
APP'D.

JOB NO.
(New Const.)
RSV'D. BY
FOR BID

B
REVISION

CAD FILENAME: WZ_01_AEP_1-30250E.dwg

Last Edit: Mar. 20, 2003

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ENERGY E&C
W.C. WZ438AB-S
DATE 3-30-09

SIGNATURE DATE

SEAN R. MARSHALL, P.E.
REGISTRATION NO. E-60212

ORBITAL ENGINEERING, INC.
PITTSBURGH · CHICAGO · CLEVELAND · PHILADELPHIA
OAK BROOK · TOLEDO · CHARLESTON, WV · BIRMINGHAM

PROJECT 01-7796

WM.H.ZIMMER GENERATING STATION
THE CINCINNATI GAS & ELECTRIC CO.
COLUMBUS SOUTHERN POWER CO.
THE DAYTON POWER AND LIGHT CO.
OWNERS

COAL STORAGE AREA AND PONDS DEWATERING BASIN "D" LINER & UN'DRAIN PLAN

DWG.NO. 1-30250E

SCALE: 1"=20'	ENGINEER	WO NO.	WZ438
BY: G.K.	S. MARSHALL	JOB NO.	
CHK'D: SRM	APPROVED BY:		
DATE: 2/27/03		STAND.	14
CO.NO:			

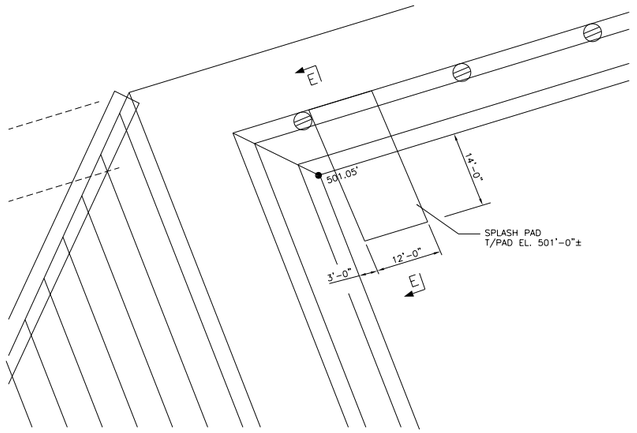
GENERAL ENGINEERING DEPARTMENT
THE CINCINNATI GAS & ELECTRIC COMPANY

1-30250E 0

DWGNO: 1-30250F

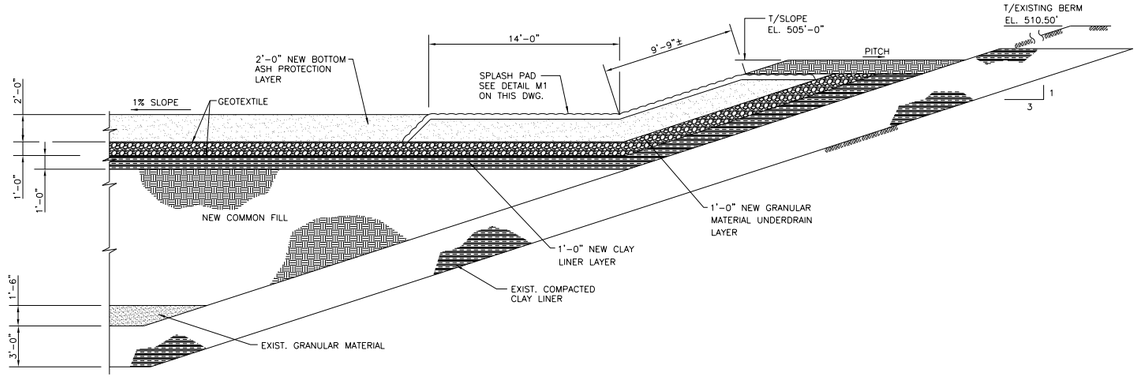
PLANT NORTH

N



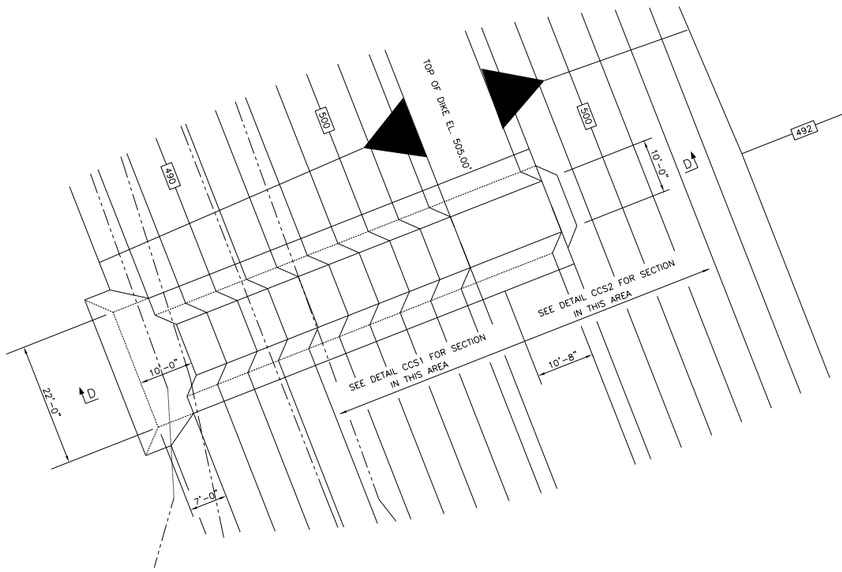
PLAN OF SPLASH PAD

SCALE: 1"=10'



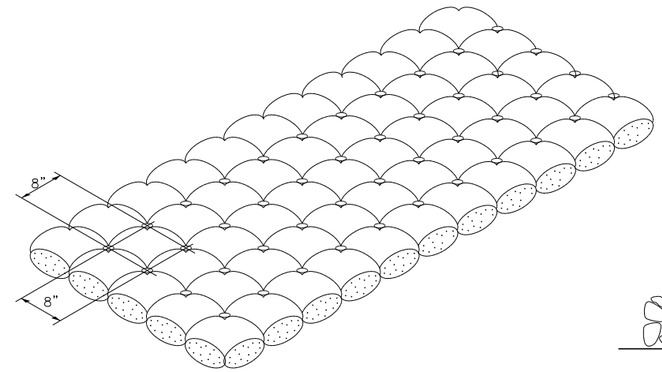
SECTION E-E

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



PLAN OF CONTROL CONVEYANCE STRUCTURE

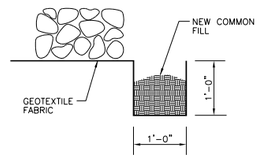
SCALE: 1"=10'



DETAIL M1

TYPICAL SPLASH PAD

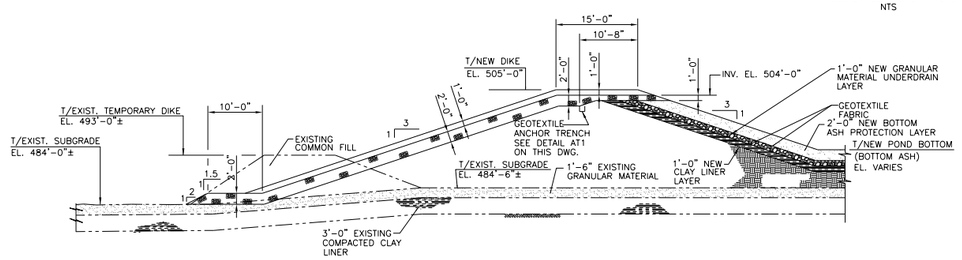
NOT TO SCALE



DETAIL AT1

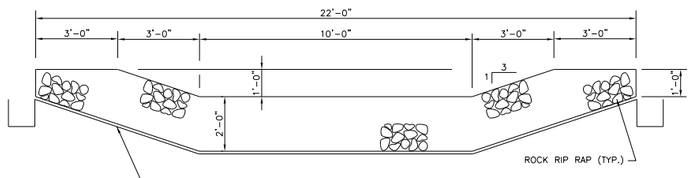
GEOTEXTILE ANCHOR TRENCH

NTS



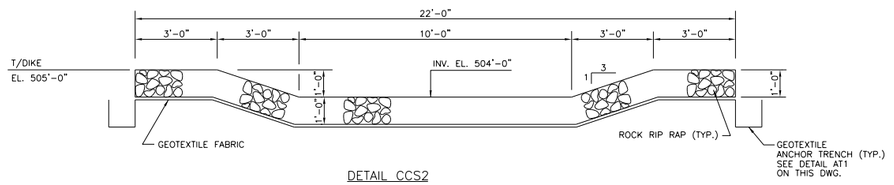
SECTION D-D

SCALE: 1"=10'



DETAIL CCS1

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



DETAIL CCS2

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

NOTE:

1. FOR PROJECT COVER SHEET & DRAWING LIST, SEE DWG. 1-30250A
2. WORK THIS DRAWING WITH DRAWING NO's. 1-30250B THRU 1-30250E & 1-30250G & 1-30250H.

DES. SRM	03/20/03
DFT'R. GK	
CHK'D.	
APP'D.	
JOB NO. (New Const.)	
REV'D. BY FOR BID	

B

REVISION

Last Edit: STAMP

CAD FILENAME: WZ_01_AEP_1-30250F.dwg

RECEIVED BY:
GANNETT Fleming
W.C. WZ438AB-S
DATE 3-30-09

SIGNATURE DATE

SEAN R. MARSHALL, P.E.
REGISTRATION NO. E-60212

ORBITAL ENGINEERING, INC.
PITTSBURGH • CHICAGO • CLEVELAND • PHILADELPHIA
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PROJECT PROJECT

W.M.H.ZIMMER GENERATING STATION
THE CINCINNATI GAS & ELECTRIC CO.
COLUMBUS SOUTHERN POWER CO.
THE DAYTON POWER AND LIGHT CO.
OWNERS

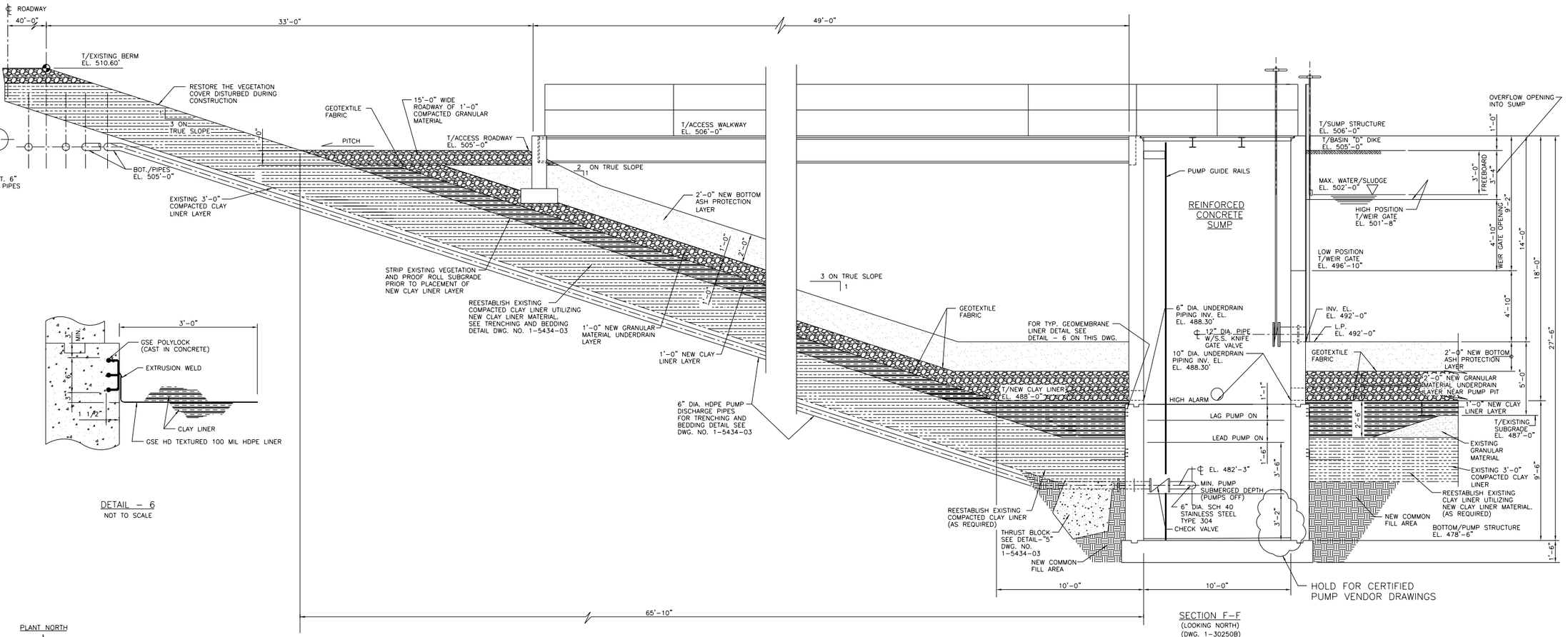
COAL STORAGE AREA AND PONDS DEWATERING BASIN "D" MISC. SECTIONS & DETAILS

DWG NO.	1-30250F		
SCALE: AS SHOWN	ENGINEER	WO NO.	WZ438
BY: GK	S. MARSHALL	JOB NO.	
CHK'D: SRM	APPROVED BY:		
DATE: 02/27/03		STAND.	14
CO.NO.			

GENERAL ENGINEERING DEPARTMENT
THE CINCINNATI GAS & ELECTRIC COMPANY

1-30250F B

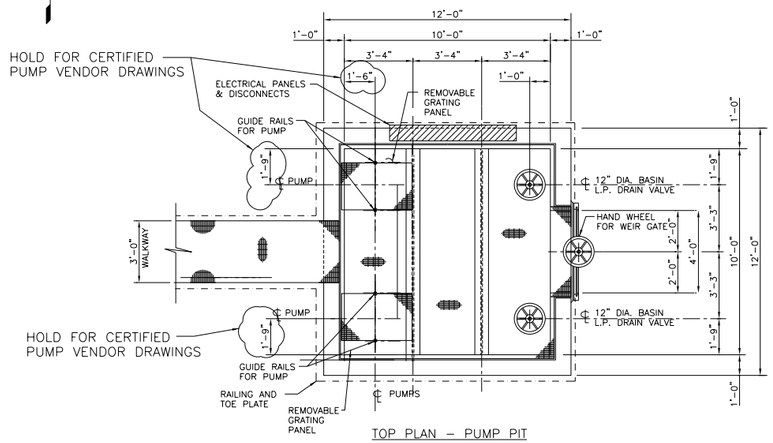
DWG.NO. 1-30250G



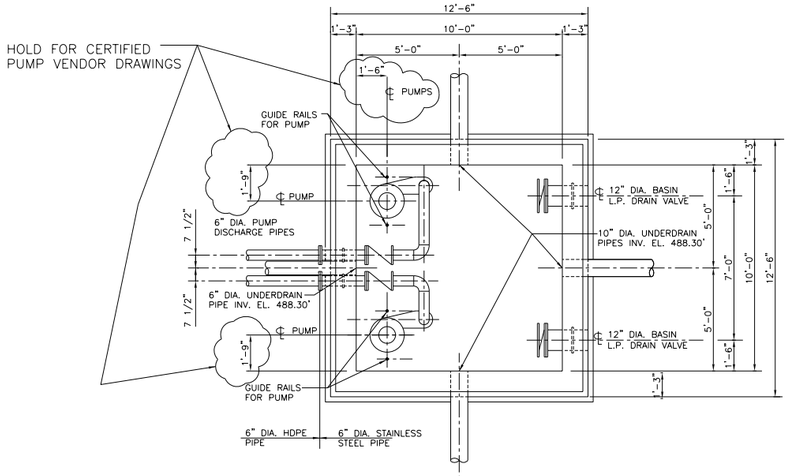
DETAIL - 6
NOT TO SCALE

SECTION F-F
(LOOKING NORTH)
(DWG. 1-30250B)

PLANT NORTH



TOP PLAN - PUMP PIT



BOTTOM PLAN - PUMP PIT

NOTES:

1. FOR PROJECT COVER SHEET & DRAWING LIST, SEE DWG. 1-30250A
2. WORK THIS DRAWING WITH DRAWING NO's. 1-30250B THROUGH 1-30250F, 1-30250H, 1-30250I & 1-5434-01
3. PUMP DATA (EACH)- 500 GPM - 55 FT TDH
   PUMP SPEED 1,200 RPM
   15 H.P. MOTOR @ 1,200 RPM

FOR BID

DES. B.O. 03/20/03
DR'R. R.L.G.
CHK'D.
APP'D.
JOB NO. (New Const.)
RSV'D. BY FOR BID
B
REVISION

Last Edit: Mar. 13, 2003

CAD FILENAME: WZ_01_AEP_1-30250G.dwg

RECEIVED BY:
GANNETT Fleming E&C
W.C. WZ438AB-S
DATE 3-30-09

SIGNATURE DATE
SEAN R. MARSHALL, P.E.
REGISTRATION NO. E-60212

ORBITAL ENGINEERING, INC.
PITTSBURGH · CHICAGO · CLEVELAND · PHILADELPHIA
OAK BROOK · TOLEDO · CHARLESTON, WV · BIRMINGHAM

PROJECT 01-7796

WM.H.ZIMMER GENERATING STATION
THE CINCINNATI GAS & ELECTRIC CO.
COLUMBUS SOUTHERN POWER CO.
THE DAYTON POWER AND LIGHT CO.
OWNERS

COAL STORAGE AREA AND PONDS
DEWATERING BASIN "D"
G.A. OF PUMP PIT

DWG.NO. 1-30250G

SCALE: 3/8"=1'	ENGINEER: S. MARSHALL	WO NO. WZ.xxx
BY: R.L.G.	APPROVED BY:	JOB NO. 14
CHK'D: SRM		STAND.
DATE: 02/27/03		
CONS:		

GENERAL ENGINEERING DEPARTMENT
THE CINCINNATI GAS & ELECTRIC COMPANY

1-30250G B

DWGNO: 1-30250H

GENERAL NOTES

1. All elevations are Geodetic and are given in feet.
2. The coordinate grids indicated on the drawings are Plant coordinates.
3. Figured dimensions take precedence over scaled measurements.
4. All work shall be performed in accordance with all applicable Federal, State and Local laws and ordinances, and shall comply with applicable regulations of all Federal, State and Local governmental agencies having jurisdiction over the activity.
5. Where codes, standards and specifications are cited or referred to, the latest or current edition shall apply.
6. The Contractor shall be responsible for control of all water from the working areas. Storm water shall be conducted to areas away from the work in a manor to prevent erosion in accordance with the owners requirements. Storm water shall not be permitted to accumulate in the excavation or low areas of the site. The Contractor shall provide all temporary ditches, berms, grading, sump and pumps required for temporary dewatering. All Runoff shall be directed into existing Coal Pile Runoff Settling Basins.
7. The Contractor shall perform all excavations in accordance with OSHA 29 CFR part 1926, subpart P – "Excavations". The Contractor shall design, furnish, install and maintain all shoring and bracing systems as required for the performance of the work.
8. All excavated organic material and topsoil shall be segregated from other common material to be used for earthfill. Organic material and topsoil shall be stockpiled onsite as directed by the Owner for use as the vegetative layer.
9. Inactive stockpile or onsite borrow areas shall be temporarily seeded in accordance with the vegetation specifications.

FILL PLACEMENT, COMPACTION AND MATERIAL GRADATION NOTES

1. General Fill Placement
   - 1.1 The Owner shall Contract for Third party Geotechnical Field Engineering and Laboratory Services required for Quality Control and Assurance of the Fill placement, compaction and gradations specifications. The Contractor may provide any Geotechnical Field Engineering and Laboratory Services required at their option.
   - 1.2 Subgrade preparation: All areas receiving fill placement shall be cleared of existing fill placement, sludge/sediment deposits and other debris down to the original Coal Storage Area ground surface contours as indicated on Drawing No. 1-30250B. Existing permanent dike slopes shall be stripped of vegetation in the area of work. All Subgrade surfaces shall be proof-rolled with heavy equipment until there is no visible movement beneath the equipment. Any soft, wet, unstable or otherwise unsuitable material detected during proof-rolling shall be removed and replaced with location appropriate well compacted fill material. If removal of any portions of the existing 3'-0 clay liner is necessary, the liner shall be reestablished utilizing new clay liner material.
   - 1.3 Only soil materials conforming specifically to these specifications and in location as indicated on the drawings may be used.
   - 1.4 At no time shall the Contractor place any fill materials overtop of frozen surfaces, nor shall any frozen materials be incorporated into fill areas.
   - 1.5 At no time shall the Contractor place fill materials overtop of organic material, topsoil, vegetation, standing water, mud, debris, waste sediments or sludge. If any of these materials are present they shall be removed and disposed of in a segregated method in the designated onsite area as directed by the Owner.
   - 1.6 No soil material shall be placed or compacted during weather conditions which would interfere with adequate compaction or moisture content control.
   - 1.7 If prior to fill placement, the moisture content of the material does not comply with the specified moisture content range, then it shall be the responsibility of the Contractor to wet or dry the material, as applicable, to achieve the prescribed moisture content.
   - 1.8 When a density or moisture content test is not in compliance with the specifications, the Contractor shall scarify the lift, adjust the moisture content, and re-compact the soils for an area extending from the failed test to one half of the distance to the nearest passing test, in all directions. The re-compacted area shall be re-tested for compliance.
2. Inert Bottom Ash (Protection Layer)
   - 2.1 All Inert Bottom Ash materials used shall be a byproduct of the Plant, supplied by the Owner, and shall be loaded and hauled from the onsite silo or stockpile area as directed by the Owner.
   - 2.2 All material used for construction of the Protection Layer shall be inert, non-expansive and pyrite free.
   - 2.3 All material shall be moved, dozed, bucketed into place by standard earthmoving equipment so as to establish compacted lifts of no more than 8 inches in overall thickness.
   - 2.4 Each lift shall be compacted to a minimum of 75% relative density as determined by ASTM test No. D-4253 and D-4254.
   - 2.5 The maximum particle size for any material to be incorporated into the Bottom Ash Protection Layer shall be 2 inches in its largest dimension, and no more than 5% by weight (of the 2 inch size material) may be utilized.
   - 2.6 At no time shall more than 5% by weight of material smaller than the No. 200 U. S. Standard sieve be used in construction of the Bottom Ash Protection layer.
3. Granular Material (Underdrain Layer and Granular Roadway Surfacing)
   - 3.1 All granular material shall be supplied from offsite sources by the Contractor.
   - 3.2 Granular material shall be a natural gravel material conforming to gradation, material quality and durability requirements of AASHTO No. 57 coarse aggregate and ODOT Construction and Material Specification Section 703. The material shall not be limestone.
   - 3.3 All material shall be moved, dozed, bucketed into place by standard earthmoving equipment so as to establish compacted lifts of no more than 8 inches in overall thickness.
   - 3.4 Each lift shall be compacted to a minimum of 75% relative density as determined by ASTM test No. D-4253 and D-4254.
4. Clay (Clay Liner Layer)
   - 4.1 All material required for the Compacted Clay Liner Layer shall be supplied by the Owner from on-site borrow areas, and shall be loaded and hauled from the onsite areas as directed by the Owner.
   - 4.2 The Clay material shall meet the gradation and plasticity requirements for a Unified Soils Classification System soil type "CL".
   - 4.3 All material shall be moved, dozed, bucketed into place by standard earthmoving equipment so as to establish compacted lifts of no more than 6 inches in overall thickness. Clay layer lifts shall be placed at the same slope as the liner final grades.
   - 4.4 Prior to placement of a successive lift, the underlying material shall be scarified to a minimum depth of 2 inches. Only after the working surface is thoroughly scarified shall the next lift be installed.
   - 4.5 Each lift shall be compacted to at least 95% the maximum dry density, for that material, as determined by a Standard Proctor Test (ASTM-698).
   - 4.6 The moisture content of the material to be compacted shall be 0% to 4% above the optimum moisture content, as determined by the Standard Proctor Test.
   - 4.7 The Owner shall perform a minimum of one Soil Classification Test (ASTM D-2488, D-422, D-424, D-2216 and D-854) per 5,000 cubic yards of clay for each different clay borrow area or type whichever results in a greater frequency.
   - 4.8 The Owner shall perform a minimum of one in-place density and moisture content test (ASTM D-2922 and D-3017) per lift per 2500 square feet of compacted clay liner, with a minimum of one test for any day that soil material is compacted.
   - 4.9 The Owner shall perform a minimum of one Standard Proctor Test (ASTM D-698) for each different soil sample.
   - 4.10 The compaction specifications presented herein are considered the minimum compactive efforts. It shall be the Contractor's sole responsibility to place and compact the clay soils in such a fashion to provide an in-place permeability of 1 x 10-7 cm/sec or lower.
   - 4.11 All samples shall be selected by the Owner and all testing shall be performed by an independent Laboratory contracted by the Owner.
5. Common Fill Material
   - 5.1 All material required for Common Fill shall be supplied by the Owner from on-site borrow areas, stockpiles or existing temporary dikes. Soil from on-site borrow areas shall be loaded and hauled from the onsite areas as directed by the Owner. Soil used as common fill shall be inert, free of organic material, debris and shall be 2 inches in its largest dimension.
   - 5.2 All material shall be moved, dozed, bucketed into place by standard earthmoving equipment so as to establish compacted lifts of no more than 8 inches in overall thickness.
   - 5.3 Each lift shall be compacted to at least 95% the maximum dry density, for that material, as determined by a Standard Proctor Test (ASTM-698). Should the Standard Proctor Test not be applicable due to the gradation of the material, then it shall be compacted to a minimum of 75% relative density as determined by ASTM Test No. D-4253 and D-4254.
   - 5.4 The moisture content of the material to be compacted shall not deviate from the optimum moisture content, as determined by the Standard Proctor Test, by more than 2%.
   - 5.5 The Owner shall perform a minimum of one Soil Classification Test (ASTM D-2488, D-422, D-424, D-2216 and D-854) per 5,000 cubic yards of soil, or for each different soil type, whichever results in a greater frequency.
   - 5.6 The Owner shall perform a minimum of one in-place density and moisture content test (ASTM D-2922 and D-3017) per lift per 2500 square feet of compacted soil, with a minimum of one test for any day that soil material is compacted.
   - 5.7 The Owner shall perform a minimum of one Standard Proctor Test (ASTM D-698) for each different soil sample.
   - 5.8 All samples shall be selected by the Owner and all testing shall be performed by an independent Laboratory contracted by the Owner.
6. Geotextile Filter Fabric
   - 6.1 All Geotextile Filter Fabric shall be Geotex type 451 nonwoven as manufactured by Synthetic Industries Inc. Geosynthetic Products Division. Roll width 12.5 or 15.0 feet and roll length 360 feet.
   - 6.2 Grab Tensile Strength ASTM D-4632 – 135 lbs.
     Grab Elongation ASTM D-4632 – 60 %
     Puncture Strength ASTM D-4833 – 75 lbs.
     Mullen Burst ASTM D-3786 – 270 psi
     Trapezoidal Tear ASTM D-4533 – 60 lbs.
     Apparent Opening size ASTM D-4751 100 U. S. Sieve
     Permittivity ASTM D-4491 2.10 sec-1
     Permeability ASTM D-4491 0.29 cm/sec
     Water flow rate ASTM D-4491 135 gpm/ft2
     UV resistance ASTM D-4355 70 % retained @ 500 hours
   - 6.3 All Geotextile Filter Fabric shall be stored, handled, installed and protected in accordance with the manufacturer's specifications.
7. Stone Riprap Protection
   - 7.1 All material required for Stone Riprap Protection shall be supplied by the Contractor from off-site sources.
   - 7.2 Stone shall conform to the gradation and durability requirements of the Ohio Department of Transportation Type D "Dumped-Rock Fill".
8. Geomembrane
   - 8.1 Geomembrane Sheet shall be GSE HD Textured as Manufactured by GSE Lining Technology Inc. The material is a high density polyethylene. Roll width 22.5 feet x 325 ft.
   - 8.2 Thickness ASTM D-761/1593/5199 100 mils
     Density ASTM D-792/1505 0.94 g/cm3
     Tensile properties ASTM D-638, Type IV
     Strength at Break 125 lb/in-width
     Strength at Yield 216 lb/in-width
     Elongation at Break 120 %
     Elongation at yield 13 %
     Tear resistance ASTM D-1004 75 lb
     Puncture resistance FTMS 101 130 Lb
   - 8.3 Geomembrane Embedment shall be GSE Polylock as Manufactured by GSE Lining Technology Inc. The material is a high density polyethylene. Dimensions 10' long, 6" width, 1" anchor finger length.
   - 8.4 The Geomembrane Sheet shall be extrusion welded to the Geomembrane Embedment per the manufacturer's instructions.
   - 8.5 All Geomembrane material shall be stored, handled, installed and protected in accordance with the manufacturer's specifications.
9. Erosion Control Blankets
   - 9.1 The erosion control blanket shall be BioNet Series S150BN as Manufactured by North American Green. The blankets shall be 100% biodegradable consisting of agricultural straw fibers stitched bonded between 100% jute yarn nettings. Roll width 6.67 feet x 108 feet length. Stakes shall be 6" Eco degradable type.
   - 9.2 All erosion control blankets shall be stored, handled, installed and protected in accordance with the manufacturer's specifications.
10. Erosion Control Revetment– Fabric Forms for Concrete Fill
    - 10.1 The Erosion Control Revetments shall be Fabriform Filter Point Style 8" FP as manufactured by Construction Techniques Inc. The Fabric forms shall be average of 4" thickness manufactured from double layer nylon fabric woven together in such a manor as to provide filter points on 8" centers for the relief of hydrostatic uplift pressures.
    - 10.2 Mill width panels shall be shop assembled and sewn to fit the site topography.
    - 10.3 Grout shall consist of a mixture of Portland cement, fine aggregate, admixtures and water so proportioned as to provide a pumpable mix. The cured cement grout shall exhibit a minimum compressive strength of 3,000 psi in 28 days.
11. Permanent Vegetation
    - 11.1 Temporary and Permanent Vegetation shall be performed on the outside surfaces of all new embankment slopes, disturbed portions of existing inside embankment slopes and existing roadway earth berms disturbed during construction.
    - 11.2 All Temporary and Permanent Vegetation shall be performed in accordance with the Clermont County Water Management & Sediment Control Regulations.
    - 11.3 Seedbed shall be prepared by raking and applying Lime and fertilizer. Lime acid soil (ph=5.5 or less) at a rate of 100 lbs/1000 sf. Apply fertilizer at a rate of 12-15 lbs/1000 sf of 10-10-10 or 12-12-12 analysis or equivalent.
    - 11.4 Seeding in the Spring with Tall Fescue at 1 lb/1000 sf and at other times Flatpea at 0.50 lb & Tall Fescue at 0.50 lb/1000 sf. Apply the seed uniformly by mechanical equipment or with fertilizer using a hydro-seed method.
    - 11.5 Mulch with small grain straw at a rate of 100 lbs/1000 sf.
    - 11.6 Irrigate with adequate until growth is firmly established.

NOTE:

1. FOR PROJECT COVER SHEET & DRAWING LIST, SEE DWG. 1-30250A
2. WORK THIS DRAWING WITH DWGS. 1-30250B THROUGH 1-30250G

BDS. BO 03/20/03
DR'R. GK
CHK'D.
APP'D.

JOB NO.
(New Const.)
REV'D. BY ORBITAL
FOR BID

B
REVISION

FOR BID

Last Edit: Mar. 20, 2003

CAD FILENAME: WZ_01_AEP_1-30250H.dwg

RECEIVED BY:
ENERGY E&C
W.C. WZ438AB-S
DATE 3-30-09

SIGNATURE DATE

SEAN R. MARSHALL, P.E.
REGISTRATION NO. E-60212

ORBITAL ENGINEERING, INC.
PITTSBURGH • CHICAGO • CLEVELAND • PHILADELPHIA
OAK BROOK • TOLEDO • CHARLESTON, WV • BIRMINGHAM

PROJECT 01-7796

WM.H.ZIMMER GENERATING STATION
THE CINCINNATI GAS & ELECTRIC CO.
COLUMBUS SOUTHERN POWER CO.
THE DAYTON POWER AND LIGHT CO.
OWNERS

COAL STORAGE AREA AND PONDS DEWATERING BASIN "D" GENERAL NOTES

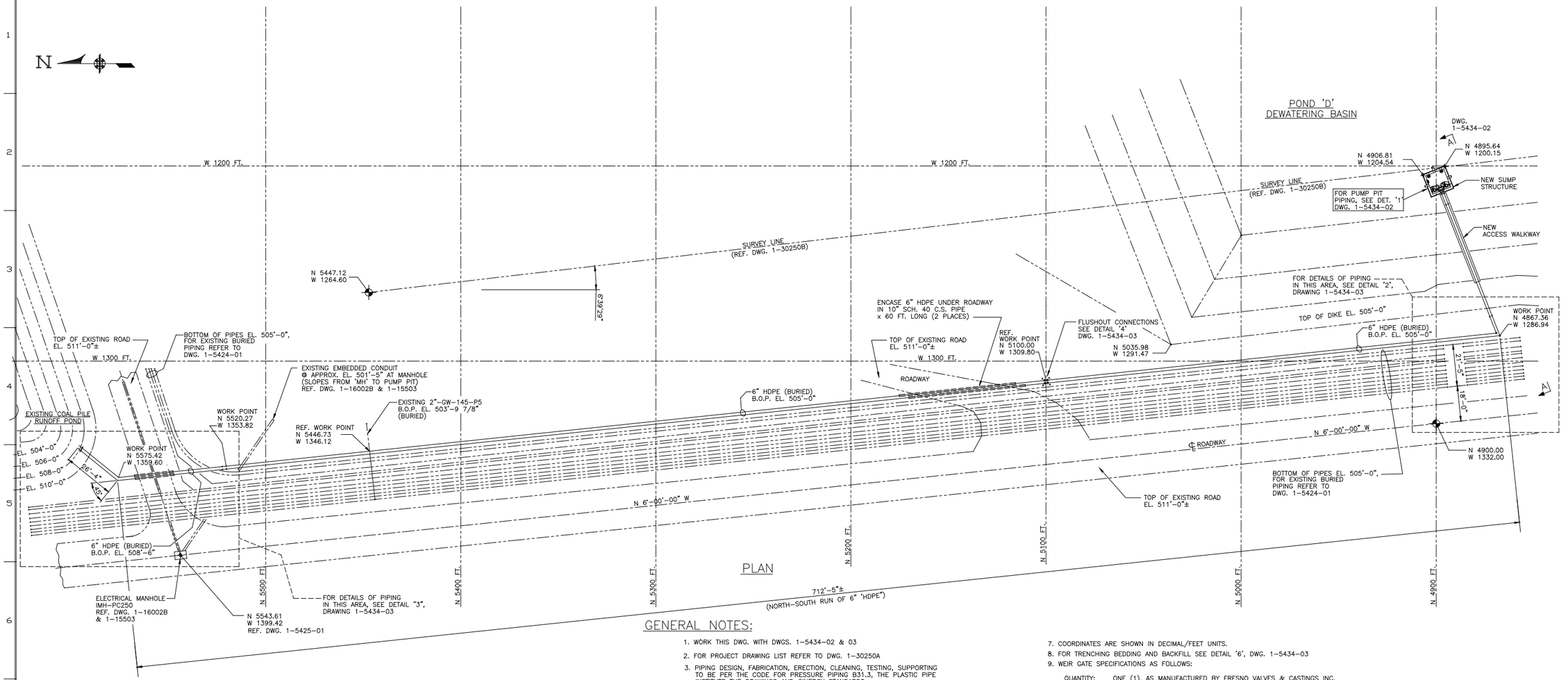
DWG.NO. 1-30250H

SCALE: NONE	ENGINEER: S. MARSHALL	WO NO. WZxxx
BY: GK		JOB NO.
CHK'D SRM	APPROVED BY:	
DATE: 02/27/03		STAND. 14
CONO:		

GENERAL ENGINEERING DEPARTMENT
THE CINCINNATI GAS & ELECTRIC COMPANY

1-30250H 0

DWGND 1-5434-01



GENERAL NOTES:

1. WORK THIS DWG. WITH DWGS. 1-5434-02 & 03
2. FOR PROJECT DRAWING LIST REFER TO DWG. 1-30250A
3. PIPING DESIGN, FABRICATION, ERECTION, CLEANING, TESTING, SUPPORTING TO BE PER THE CODE FOR PRESSURE PIPING B31.3, THE PLASTIC PIPE INSTITUTE THE DRAWINGS AND CINERGY STANDARDS.
4. THESE DRAWINGS ARE BASIC DESIGN DRAWINGS WITH LIMITED DETAILS. ALL EXISTING CONDITIONS DO NOT APPEAR ON THE DRAWINGS. THE CONTRACTOR SHALL FIELD VERIFY ALL PERTINENT DIMENSIONS AND ELEVATIONS THAT APPEAR ON THE DRAWINGS PRIOR TO FABRICATION AND INSTALLATION.
5. 'HDPE' PIPE IS NORMALLY FIELD FABRICATED. IF THE CONTRACTOR ELECTS TO SHOP FABRICATE PIPE SPOOLS, HE SHALL HAVE DIMENSIONS FIELD VERIFIED PRIOR TO FABRICATION.
6. PIPING MATERIALS AS FOLLOWS: (UNLESS OTHERWISE NOTED ON THE DWGS.)

   PIPING INSIDE THE PUMP PIT (INCLUDING PENETRATIONS)

   PIPE: 12", 6" & 4" PIPE, STD. WALL, STN. STL. SEAMLESS, ASTM A-312 GRADE TP316, BEVELED ENDS

   FITTINGS: 6", STD. WALL, STN. STL. BUTT WELD, SEAMLESS, ASTM A-403 GRADE TP316

   FLANGES: 12" 150# R.F. SLIP ON, 316 STN. STL., ASTM A-182, GR. F316
   6" & 4" 150# R.F. OR F.F. (AS SHOWN) WELD NECK, 316 STN. STL., ASTM A-182, FR. F316

   GASKETS: 150# RING TYPE OR FULL FACE, 1/8" THICK EPDM RUBBER

   BOLTING: ALL THREAD STUD BOLTS, A-193 B7, WITH A-194 2H NUTS (USE HEX. CAP SCREWS AT 12" KNIFE GATE VALVES) A354 GRADE 'BD'

   CHECK VALVE: 6" 150# FLANGED SWING CHECK, DUCTILR IRON BODY WITH S.S. TYPE 304 TRIM STOCKHAM FIG. D-931

   GATE VALVES: 12" DEZURIK SERIES 'L' KNIFE GATE No. KGL-12-WI-SI-ZJ-M-MNHO16 EXX049CWS 316 STN. STL., SUPPLIED WITH STEM EXTENSION FOR 210° ℄ OF VALVE TO ℄ OF 16"ø HANDWHEEL, WITH (2) 316 STN. STL. ADJUSTABLE STEM GUIDES EACH No. 367-5960CWS (2"-25")

   PIPING OUTSIDE THE PUMP PIT:

   PIPE: HIGH DENSITY EXTRA HIGH MOLECULAR WEIGHT POLYETHYLENE (HDPE), ASTM D-1248 & D-3350, PE3408, SDR-17 CLASS 100 PSI AT 73.4°F, CELL CLASSIFICATION PE-345434C.

   FITTINGS: SAME MATERIAL & PRESSURE RATING AS PIPE, MOLDED BUTT FUSION TYPE ENDS.

   JOINTS: BUTT FUSION TYPE IN STRICT ACCORDANCE WITH THE MFG. RECOMMENDATIONS

   FLANGES: MADE UP WITH 'HDPE' STUB ENDS & CARBON STEEL BACK-UP FLANGES, 150# RATING

   BOLTING AND GASKETS: AS LISTED FOR STN. STL. ABOVE.

7. COORDINATES ARE SHOWN IN DECIMAL/FEET UNITS.
8. FOR TRENCHING BEDDING AND BACKFILL SEE DETAIL '6', DWG. 1-5434-03
9. WEIR GATE SPECIFICATIONS AS FOLLOWS:

   QUANTITY: ONE (1), AS MANUFACTURED BY FRESNO VALVES & CASTINGS INC. OR APPROVED EQUAL.

   SIZE: 4'-0" WIDE CLEAR OPENING x 4'-10" HIGH CLEAR OPENING.

BOTTOM OF SLIDE GATE FULL OPEN	ELEVATION 492'-0"
TOP OF SLIDE GATE FULL OPEN	ELEVATION 496'-10"
TOP OF SLIDE GATE FULL CLOSED	ELEVATION 501'-8"
TOP OF PUMP PIT WALL	ELEVATION 506'-0"
CENTERLINE OF HAND WHEEL	ELEVATION 509'-10"

   TYPE: SELF CONTAINED WITH YOKE
   FACE OF WALL MOUNTED - MOUNTED ON POND SIDE FACE OF NEW CONCRETE PUMP PIT
   MANUAL HAND WHEEL OPERATED - HAND WHEEL MOUNTED TO YOKE
   MAXIMUM LEAKAGE RATE OF .1 GALLONS PER MINUTE PER AWWA C-501

   APPLICATION: DEWATERING POND PUMP PIT (WET WELL)
   UPWARD ACTING GATE TO PROVIDE AN ADJUSTABLE WEIR HEIGHT
   MAXIMUM HEAD OF LIQUID ON GATE: 5'-0" SEATING
   MOUNTED ON POND SIDE FACE OF PUMP PIT
   LIQUID: ABRASIVE SLURRY (WATER WITH 5% TO 15% SOLIDS PARTICLES)
   SOLIDS PARTICLES: COMBINATION OF FLY ASK, BOTTOM ASH & GYPSUM
   PH: 9

   MATERIAL: TYPE 304 STAINLESS STEEL, ASTM A-276 GATE, FRAME, RAILS, YOKE & STEM
   TYPE 304 STAINLESS STEEL, ASTM A-593 FASTENERS
   (UHMW) ULTRA HIGH MOLECULAR WEIGHT POLYETHYLENE GUIDES, SLIDES OR SEATS
   EPDM SEALS
   MANUFACTURES STANDARD MATERIAL HAND WHEEL

   INSTALLATION: STAINLESS STEEL ANCHORS AND GROUT BY OTHERS PER THE MANUFACTURERS DRAWINGS AND INSTRUCTIONS

RES. BO..... 03/20/03
DR'R. MJK.....
CHK'D. BO.....
APP'D.....
JOB NO.
(New Const)
REV'D. BY ORBITAL
FOR BID

B
REVISION

CAD FILENAME: 1x5434x01.dwg

Last Edit: Mar. 19, 2003

FOR BID

RECEIVED BY:
CINERGY E&C
W.C. WZ438AB-S
DATE

SIGNATURE DATE
SEAN R. MARSHALL, P.E.
REGISTRATION NO. E-60212

ORBITAL ENGINEERING, INC.
PITTSBURGH • CHICAGO • CLEVELAND • PHILADELPHIA
OAK BROOK • TOLEDO • CHARLESTON, WV • BIRMINGHAM

PROJECT 01-7796

WM.H.ZIMMER GENERATING STATION
THE CINCINNATI GAS & ELECTRIC CO.
COLUMBUS SOUTHERN POWER CO.
THE DAYTON POWER AND LIGHT CO.
OWNERS

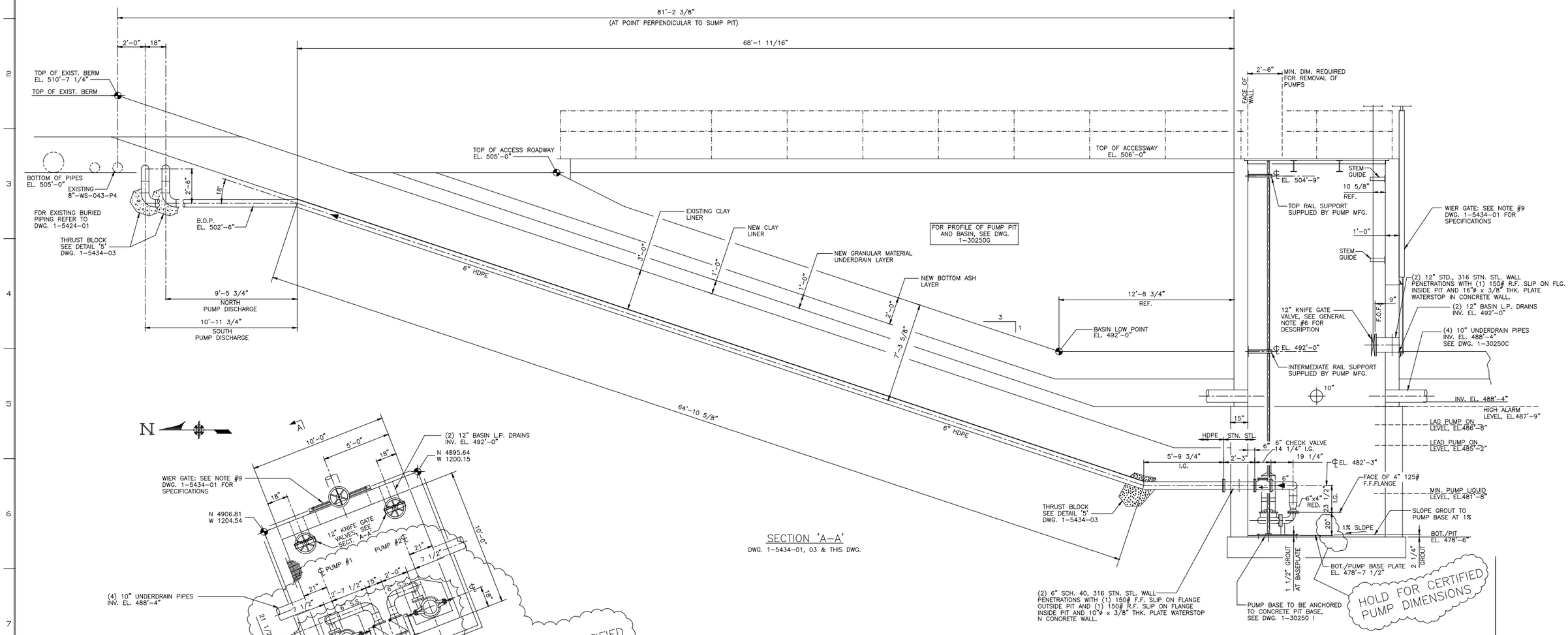
COAL STORAGE AREA AND PONDS DEWATERING BASIN "D" PUMP PIT PIPING - PLAN

DWG.NO. 1-5434-01			
SCALE: 1"=20'	ENGINEER: S. MARSHALL	WO NO. WZ438	
BY: MJK		JOB NO.	
CHK'D: BO	APPROVED BY:		
DATE: 03/20/03		STAND. 14	
CDAD:			

GENERAL ENGINEERING DEPARTMENT
THE CINCINNATI GAS & ELECTRIC COMPANY

1-5434-01

DWG.NO. 1-5434-02



SECTION 'A-A'
DWG. 1-5434-01, 03 & THIS DWG.

PLAN
AT PUMP PIT

DETAIL '1'
DWG. 1-5434-01

NOTES:

1. WORK THIS DWG. WITH DWGS. 1-5434-01 & 03
2. FOR GENERAL NOTES REFER TO DWG. 1-5434-01

FOR BID

DES. BO 03/20/03
DR'R. MLK ...
CHK'D. BO ...
APP'D. .....

JOB NO.
(New Const)
REV'D. BY ORBITAL
FOR BID

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REVISION

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Last Edit: Mar. 20, 2003

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W.C. WZ438AB-S
DATE

SIGNATURE DATE
SEAN R. MARSHALL, P.E.
REGISTRATION NO. E-60212

ORBITAL ENGINEERING, INC.
PITTSBURGH • CHICAGO • CLEVELAND • PHILADELPHIA
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PROJECT 01-7796

WM.H.ZIMMER GENERATING STATION
THE CINCINNATI GAS & ELECTRIC CO.
COLUMBUS SOUTHERN POWER CO.
THE DAYTON POWER AND LIGHT CO.
OWNERS

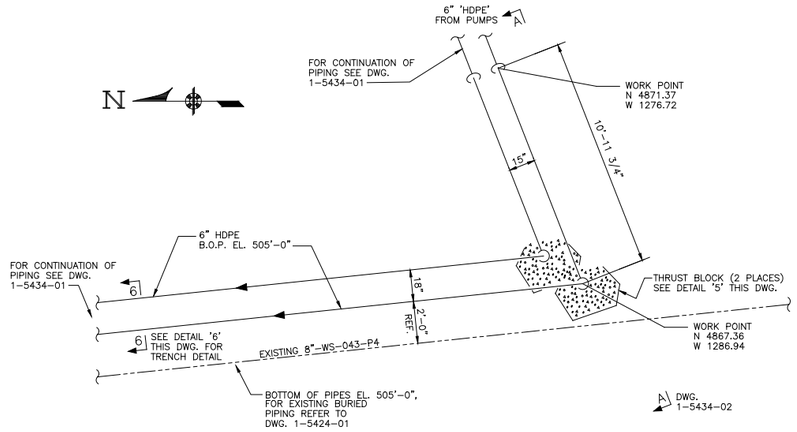
COAL STORAGE AREA
AND PONDS
DEWATERING BASIN "D"
PIPING SECT. A-A & DET.

DWG.NO. 1-5434-02			
SCALE: 3/8"=1'-0"	ENGINEER: S. MARSHALL	WO NO. WZ438	
BY: MLK		JOB NO.	
CHK'D BO	APPROVED BY:		
DATE: 03/20/03		STAND. 14	
COND:			

GENERAL ENGINEERING DEPARTMENT
THE CINCINNATI GAS & ELECTRIC COMPANY

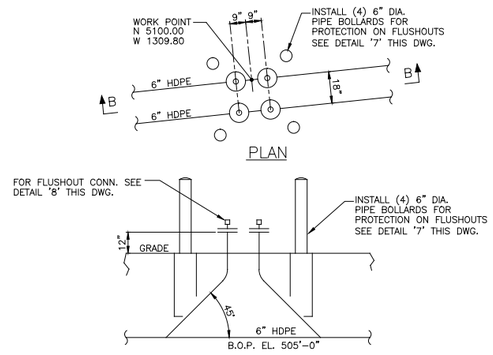
1-5434-02.0

DWGNO 1-5434-03



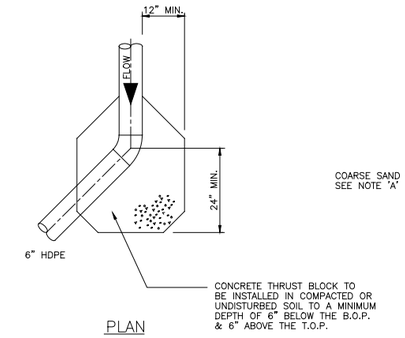
PLAN

DETAIL '2'
DWG. 1-5434-01



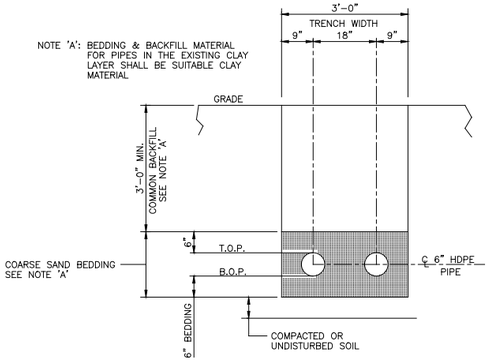
ELEVATION 'B-B'

DETAIL '4'
FLUSHOUT CONNECTIONS
DWG. 1-5434-01



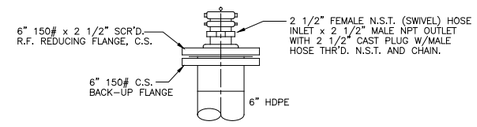
PLAN

DETAIL '5'
TYPICAL THRUST BLOCK DETAIL
(NOT TO SCALE)
DWG. 1-5434-02 & THIS DWG.

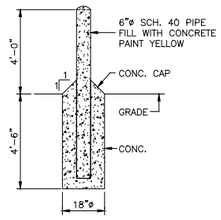


ELEVATION

DETAIL '6'
TRENCHING DETAIL
DWG. 1-5434-01 & 02
(NO SCALE)



DETAIL '8'
HOSE CONNECTION
(4 PLACES)
NO SCALE
(SEE DETAIL '4')



DETAIL '7'
BOLLARD
(AS INDICATED)
DWG. 1-5434-02

PLAN

DETAIL '3'
DWG. 1-5434-01

NOTES:

1. WORK THIS DWG. WITH DWGS. 1-5434-01 & 02
2. FOR GENERAL NOTES REFER TO DWG. 1-5434-01

FOR BID

DES. BO 03/20/03
DFT'R. MJK...
CHK'D. BO....
APP'D. .....
JOB NO. (New Const)
REV'D. BY ORBITAL FOR BID
B
REVISION

CAD FILENAME: 1x5434x03.dwg
Last Edit: Mar. 20, 2003

RECEIVED BY:
ENTERGY E&C
W.C. WZ438AB-S
DATE

SIGNATURE DATE
SEAN R. MARSHALL, P.E.
REGISTRATION NO. E-60212

ORBITAL ENGINEERING, INC.
PITTSBURGH • CHICAGO • CLEVELAND • PHILADELPHIA
OAK BROOK • TOLEDO • CHARLESTON, WV • BIRMINGHAM

PROJECT 01-7796

WM.H.ZIMMER GENERATING STATION
THE CINCINNATI GAS & ELECTRIC CO.
COLUMBUS SOUTHERN POWER CO.
THE DAYTON POWER AND LIGHT CO.
OWNERS

COAL STORAGE AREA AND PONDS
DEWATERING BASIN "D"
PUMP PIT PIPING-MISC. DET'S

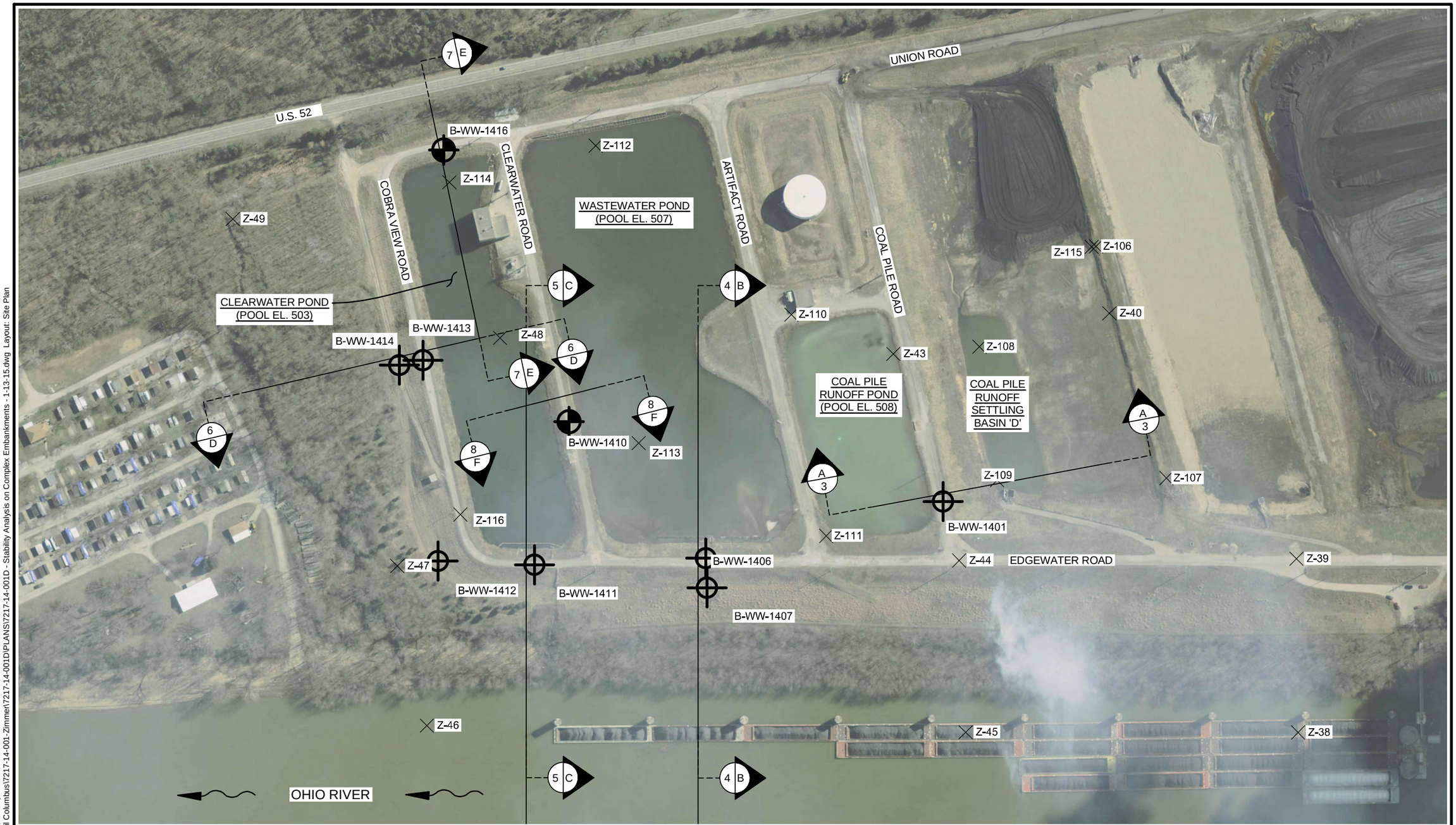
DWG.NO. 1-5434-03
SCALE 3/8"=1'-0" | WO NO. WZ438
BY: MJK | ENGINEER: S. MARSHALL | JOB NO.
CHK'D: BO | APPROVED BY: | STAND. 14
DATE: 03/20/03
CO.NO.

GENERAL ENGINEERING DEPARTMENT
THE CINCINNATI GAS & ELECTRIC COMPANY

1x5434x03.dwg

AECOM

Appendix C: Zimmer Power Station Boring and Piezometer Locations



LEGEND

B-WW-1401 — PIEZOMETER INSTALLATION NUMBER AND LOCATION (2014)

B-WW-1404 — BORING NUMBER AND LOCATION (2014)

A / 2 — CROSS SECTION LOCATION, SECTION IDENTIFIER / SECTION SHEET

Z-111 — AEP AND H.C. NUTTING HISTORIC BORING, LOCATION IS APPROXIMATE (1985-1986)

NOTE: AERIAL IMAGERY SHOWN OBTAINED FROM 2012 OHIO STATE IMAGERY PROGRAM (OSIP), GROUND SURFACE CONTOURS FROM 2006/2007 OSIP LIDAR DATA.

SITE PLAN

0 200 400

SCALE IN FEET

PLAN OF BORINGS AND CROSS SECTIONS

DUKE ENERGY ZIMMER STATION
ABSAT RESPONSE ZIM-7
CLERMONT COUNTY, OHIO

Project: 7217-14-001D	Drawn By: DCV	
Drawing Date: 1-15-2015	Approved By: JDR	
Last Updated: 3-11-2015	Scale: GRAPHIC	1:1

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WWW.SMEINC.COM
ENGINEERING FIRM. 03530

PLATE 2

EXPLORATION METHOD (B=BORING, C=CPT, P=PIEZOMETER)

XXX–X###

ID NUMBER

STATION ABBREVIATION

SOURCE:
MAP PROVIDED BY GOOGLE EARTH PRO 2015

LEGEND

PIEZOMETER LOCATION

CCR UNIT BERM ALIGNMENT

0 100

APPROXIMATE SCALE FEET

N

DYNEGY, INC		PROJECT NO. 60440139
AECOM		
DRN. BY: djd October 2015 DSGN. BY: eg CHKD. BY: eg	Zimmer D Basin Piezometer Locations	FIG. NO. 2A

File: P:\PROJECTS\GEOTECH\60428794_DYNEGY\CCR\04TASKS\00 PROGRAM TASKS\1.0 TASK 1 INITIAL UNIT ASSESSMENT\CCR FACT SHEETS\SITE MAPS\FIGURE 2A PIEZOMETER LOCATION PLAN (ZIMMER D BASIN).DWG Last edited: NOV. 03, 15 @ 5:05 p.m. by: david_dejuire