FINAL

Coal Combustion Waste Impoundment

Task 3- Dam Assessment Report

E. W. Brown Plant

Auxiliary Pond Dam
KENTUCKY UTILITIES
Harrodsburg, Kentucky

Project # 0-381

Assessment of Dam Safety
Coal Combustion Surface Impoundments
For the REAC Program

Prepared for:

Lockheed Martin Services, Inc.
Edison, New Jersey
For
United States Environmental Protection Agency

Prepared by:

Dewberry
Fairfax, Virginia

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INTRODUCTION, SUMMARY CONCLUSIONS AND RECOMMENDATIONS

The release of over five million cubic yards of coal ash from the Tennessee Valley Authority's Kingston, Tennessee, facility in December 2008, which flooded more than 300 acres of land, damaging homes and property, is a wake-up call for diligence on coal combustion waste disposal units. We must marshal our best efforts to prevent such catastrophic failure and damage. A first step toward this goal is to assess the stability and functionality of the ash impoundments and other units, then quickly take any needed corrective measures.

This assessment of the stability and functionality of the E. W. Brown Auxiliary Pond Dam management unit is based on a review of available documents and on the site assessment conducted by Dewberry personnel on Tuesday, October 20, 2009. Dewberry found the supporting technical documentation adequate (Section 1.1.3). As detailed in Section 1.2.6, there are recommendations that may help to maintain a safe and trouble-free operation; Dewberry recommends an updated dam break analysis (currently in progress).

In summary, the **E. W. Brown Auxiliary Pond Dam is SATISFACTORY for continued safe and reliable operation, with no recognized existing or potential management unit safety deficiencies.**

PURPOSE AND SCOPE

The U.S. Environmental Protection Agency (EPA) is embarking on an initiative to investigate the potential for catastrophic failure of Coal Combustion Surface Impoundments (i.e., management unit) from occurring at electric utilities in an effort to protect lives and property from the consequences of a dam failure or the improper release of impounded slurry. The EPA initiative is intended to identify conditions that may adversely affect the structural stability and functionality of a management unit and its appurtenant structures (if present); to note the extent of deterioration (if present), status of maintenance and/or a need for immediate repair; to evaluate conformity with current design and construction practices; and to determine the hazard potential classification for units not currently classified by the management unit owner or by a state or federal agency. The initiative will address management units that are classified as having a Less-than-Low, Low, Significant or High Hazard Potential ranking. (For Classification, see pp. 3-8 of the 2004 Federal Guidelines for Dam Safety)

In March 2009, the EPA sent letters to coal-fired electric utilities seeking information on the safety of surface impoundments and similar facilities that receive liquid-borne material that store or dispose of coal combustion waste. This letter was issued under the authority of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) Section 104(e), to assist the Agency in assessing the structural stability and functionality of such management units, including which facilities should be visited to perform a safety assessment of the berms, dikes, and dams used in the construction of these impoundments.

EPA asked utility companies to identify all management units: surface impoundments or similar diked or bermed structures; and landfills receiving liquid-borne material that store or dispose of coal-combustion residuals or by-products, including, but not limited to, fly ash, bottom ash, boiler slag, and flue gas emission control residuals. Utility companies responded with information on the size, design, age, and the amount of material placed in the units so that EPA could gauge which management units had or potentially could rank as having High Hazard Potential. The USEPA and its contractors used the following definitions for this study:

"Surface Impoundment or impoundment means a facility or part of a facility which is a natural topographic depression, man-made excavation, or diked area formed primarily of earthen materials (although it may be lined with man-made materials), which is designed to hold an accumulation of liquid wastes or wastes containing free liquids, and which is not an injection well. Examples of surface impoundments are holding, storage, settling, and aeration pits, ponds, and lagoons." For this study, the earthen materials could include coal combustion residuals.

EPA is addressing any land-based units that receive fly ash, bottom ash, boiler slag, or flue gas emission control wastes along with free liquids. If the landfill is receiving coal combustion wastes with liquids limited to that for proper compaction, then there should not be free liquids present and EPA did not seek information on such units which are appropriately designated a landfill. EPA did not provide an exclusion for small units or temporary impoundments. The study covers waste units designated as surface impoundments, and units designated as landfills which receive free liquids. In some cases coal combustion wastes are separated from the water, and the water containing de minimus levels of fly ash, bottom ash, slag, or flue gas emission control wastes, are sent to an impoundment. EPA is including such impoundments in this study, because chemicals of concern may have leached from the solid coal combustion wastes into the waste waters, and suspended solids from the coal combustion wastes remain.

The purpose of this report is to evaluate the condition and potential of waste release from the selected High Hazard Potential management units. This evaluation included a site visit. Prior to conducting the site visit, a two-person team reviewed the information submitted to EPA, reviewed any relevant publicly available information from state or federal agencies regarding the unit hazard potential classification (if any) and accepted information provided via telephone communication with a management unit supervisor.

EPA sent two professional engineers, one licensed in the State of Kentucky, for a one-day site visit. The two-person team met with the owner of the management unit as well as several technical representatives and management unit supervisors to discuss the engineering characteristics of the unit as part of the site visit. During the site visit the team collected additional information about the management unit to be used in determining the hazard potential classification of the unit. Subsequent to the site visit the management unit owner provided additional engineering data pertaining to the management unit.

Factors considered in determining the hazard potential classification of the management units(s) included the age and size of the impoundment, the quantity of coal combustion residuals or by-products that were stored or disposed of in these impoundments, its past operating history, and its geographic location relative to down gradient population centers and/or sensitive environmental systems.

This report presents the opinion of the assessment team as to the potential of catastrophic failure and reports on the condition of the management unit(s). The team considered criteria in evaluating dams under the National Inventory of Dams, in making these determinations.

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LIMITATIONS

The assessment of dam safety reported herein is based on field observations and review of readily available information provided by the owner/operator of the subject coal combustion waste management unit(s). Qualified Dewberry engineering personnel performed the field observations and review and made the assessment in conformance with the required scope of work and in accordance with reasonable and acceptable engineering practices. No other warranty, either written or implied, is made with regard to our assessment of dam safety.

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APPENDIX A – REFERENCE DOCUMENTS

Doc 1	E.W. Brown Ash Pond Facility – Aerial Photo, September 2009
Doc 2	E.W. Brown Auxiliary Ash Pond Dam Construction Permit Application, July 7, 2006
Doc 3 – 127	Auxiliary Ash Pond Design Drawings, November 2007, by FMSM Engineers
Doc 128	ATC Associates Visual Site Inspections Report, 2009

APPENDIX B – PHOTOGRAPHS

Photographs 1 - 132

APPENDIX C – FIELD OBSERVATION CHECKLIST

Dam Inspection Checklist Form

1.0 CONCLUSIONS AND RECOMMENDATIONS

1.1 CONCLUSIONS

Conclusions are based on visual observations from a one-day site visit and review of technical documentation provided by Kentucky Utilities (KU).

1.1.1 Conclusions Regarding the Structural Soundness of the Management Unit(s)

The embankment and spillway appear to be structurally sound based on a review of the engineering data provided by the owner's technical staff and Dewberry engineers' observations during the site visit,

1.1.2 Conclusions Regarding the Hydrologic/Hydraulic Safety of the Management Unit(s)

Adequate freeboard and capacity exist to safely pass the Probable Maximum Flood (PMF) based on the engineering analyses provided for Dewberry's review,

1.1.3 Conclusions Regarding the Adequacy of Supporting Technical Documentation

The supporting technical documentation is adequate. Engineering documentation reviewed is referenced in Appendix A.

1.1.4 Conclusions Regarding the Description of the Management Unit(s)

The description of the management unit provided by KU was an accurate representation of what Dewberry observed in the field.

1.1.5 Conclusions Regarding the Field Observations

Dewberry engineers were provided access to all areas in the vicinity of the management units required to conduct a thorough field observation. The visible parts of the embankment dam and outlet structure were observed to have no signs of overstress, significant settlement, shear failure, or other signs of instability. Embankments visually appear structurally sound. There are no apparent indications of unsafe conditions or conditions needing remedial action.

1.1.6 Conclusions Regarding the Adequacy of Maintenance and Methods of Operation

The current maintenance and methods of operation appear to be adequate for the fly ash management unit. There was no evidence of repaired embankments or prior releases observed during the field inspection.

1.1.7 Conclusions Regarding the Adequacy of the Surveillance and Monitoring Program

No instrumentation was designed for Phase 1 of the Auxiliary Pond. The surveillance and monitoring program appears to be adequate. Plant personnel monitor the pond on a weekly basis.

1.1.8 Classification Regarding Suitability for Continued Safe and Reliable Operation

Facility is SATISFACTORY for continued safe and reliable operation. No existing or potential management unit safety deficiencies are recognized. Acceptable performance is expected under all applicable loading conditions (static, hydrologic, seismic) in accordance with the applicable criteria.

1.2 RECOMMENDATIONS

1.2.1 Recommendations Regarding the Structural Stability

None appear warranted at this time.

1.2.2 Recommendations Regarding the Hydrologic/Hydraulic Safety

None appear warranted at this time.

A dam break analysis was not conducted in conjunction with the July 2006 Dam Construction Permit Application, KU indicated that such an analysis was currently in progress.

Note: KU has subsequently completed the dam break analysis (November 2009) and incorporated the results into an Impoundment Emergency Action Plan for the Auxiliary Pond (January 2010).

1.2.3 Recommendations Regarding the Supporting Technical Documentation

No recommendations appear warranted at this time.

1.2.4 Recommendations Regarding the Description of the Management Unit(s)

No Recommendations appear warranted at this time.

1.2.5 Recommendations Regarding the Field Observations

No recommendations appear warranted at this time.

1.2.6 Recommendations Regarding the Maintenance and Methods of Operation

The maintenance and operation of the dam seem to be adequate. However, the following recommendations may help maintain safe and trouble-free operation:

- Monitor isolated seepage spot.
- Address minor erosion areas and erosion gullies.

1.2.7 Recommendations Regarding the Surveillance and Monitoring Program

Continue monitoring seepage locations.

1.2.8 Recommendations Regarding Continued Safe and Reliable Operation

No recommendations pertaining to the continued safe and reliable operation of the management unit appear warranted at this time.

1.3 PARTICIPANTS AND ACKNOWLEDGEMENT

1.3.1 List of Participants

W. Michael Winkler – E.ON U.S. LLC
Jeffrey B. Heun, P.E. – E.ON U.S. LLC
David J. Millay, P.E. – E.ON U.S. LLC
Jeffrey Fraley – KU
Tamara Lay – KU
Hugh A. Ward, P.E. - Dewberry
Joseph P. Klein, III, P.E. – Dewberry

1.3.2 Acknowledgement and Signature

We acknowledge that the management unit referenced herein has been assessed on October 20, 2009.

Hugh A. Ward
Professional Engineer 7164 Current
Expires: 06/30/2010

Secretary-Treasurer

Hugh A. Ward, P.E.
Hugh A. Ward, PE (KY # 7164)

Joseph P. Klein, III, P.E. Geotechnical Engineer

2.0 DESCRIPTION OF THE COAL COMBUSTION WASTE MANAGEMENT UNIT(S)

2.1 LOCATION AND GENERAL DESCRIPTION

The E. W Brown Plant is located near the west bank of the Dix River, just upstream of Dix Dam at Herrington Lake in Mercer County, Kentucky approximately 5 miles northeast of Burgin, Kentucky. The plant is operated by Kentucky Utilities Company, a subsidiary of E.ON U.S. LLC (E.ON). The Auxiliary Pond Dam is at the south side of the plant site, adjacent to the Main Pond. A project location aerial photograph is provided in Appendix A – Doc 01.

The E. W. Brown Auxiliary Pond Dam is a rock and earth fill dam constructed adjacent to the existing Main Pond. The embankment consists of blasted materials excavated from the pond area and nearby on-site areas. The pond bottom and the embankment are lined with an 18-inch thick layer of clay on the bottom and 4-foot layer of compacted clay on the upstream slope covered with a 60-mil layer Linear Low Density Polyethylene (LLDP) flexible membrane liner. The crest and upper portion of the upstream slope are protected with a 3-foot thick layer of Size 57 crushed stone aggregate (ASTM D 448 *Standard Classification for Sizes of Aggregate for Road and Bridge Construction*). The No. 57 stone extends down the upstream slope to elevation 866 feet. The stone is held in place by a cellular geosynthetic reinforcement grid. The crest of the dam is at elevation 880 feet. The downstream toe of the dam is at elevation 788 feet, making the dam height 92 feet. At the crest elevation of 880 feet, the impoundment area is approximately 26.0 acres with a total storage capacity of approximately 747 acre-feet. The normal pool elevation is 873 feet, impounding a surface area of approximately 25.7 acres.

The dam was completed in 2008 ft to the current crest elevation of 880 feet. The Auxiliary Pond is scheduled to receive both fly ash and bottom ash during the current phase of construction to expand the adjacent, temporarily out of service Main Pond. The current construction phase at the Main Pond is scheduled for completion in December 2010 at which time the Auxiliary Pond will be expanded and the embankment raised to a crest elevation of 900 feet.

Material for embankment construction was quarried from within the impoundment area and from borrow areas surrounding the Main Pond and one borrow area adjacent to the south side of the Auxiliary Pond.

2.2 SIZE AND HAZARD CLASSIFICATION

The classification for size, based on the height of the dam is "Intermediate" and based on the storage capacity is "Intermediate" in accordance with the USACE Recommended Guidelines for Safety Inspection of Dams ER 1110-2-106 criteria summarized in Table 2.2a. However, based on the planned expansion of the Auxiliary Pond, the dam will eventually be classified as "Large".

Table 2.2a USACE ER 1110-2-106
Size Classification

Category	Impoundment	
	Storage (Ac-ft)	Height (ft)
Small	50 and < 1,000	25 and < 40
Intermediate	1,000 and < 50,000	40 and < 100
Large	> 50,000	> 100

The E. W. Brown Auxiliary Pond Dam has been classified by the Kentucky Department for Environmental Protection Division of Water (KYDW) as a " Class C - High Hazard" structure. The KYDW rules define High Hazard structures as: ".....structures located such that failure may cause loss of life, or serious damage to houses, industrial or commercial buildings, important public utilities, main highways or major railroads. This classification must be used if failure would cause probable loss of human life." This classification definition is similar to "High Hazard" classification per the Federal Guidelines for Dam Safety dated April 2004. As shown in Table 2.2b, dams assigned the "high hazard potential" classification are those dams where failure or error of operation results in the probable loss of one or more human life is expected, probable economic loss, environmental damages and disruption of lifeline facilities.

Table 2.2b FEMA Federal Guidelines for Dam Safety
Hazard Classification

Hazard Potential Classification	Loss of Human Life	Economic, Environmental, Lifeline Losses
Low	None Expected	Low and generally limited to owner
Significant	None Expected	Yes
High	Probable. One or more expected	Yes (but not necessary for this classification)

2.3 AMOUNT AND TYPE OF RESIDUALS CURRENTLY CONTAINED IN THE UNIT(S) AND MAXIMUM CAPACITY

The data reviewed by Dewberry included the Dam Construction Permit Application engineering report dated July 6, 2007 prepared by Fuller, Mossbarger, Scott & May Engineers, Inc. (see Appendix A, Document 2). Data on the volume of residuals stored in the Auxiliary Ash Pond at the time of inspection were not indicated. The surface area for the pond at normal pool elevation is approximately 25.7 acres having a storage capacity of 747 acre-feet, see Table 2.3.

Table 2.3: Amount of Residuals and Maximum Capacity of Unit

	E. W. Brown Auxiliary Pond Dam
Surface Area (acre) Phase 1	25.7
Current Storage Capacity (acre-feet)	Data not provided
Total Storage Capacity (acre-feet) Phase 1	747
Crest Elevation (feet) Phase 1	880
Normal Pond Level (feet) Phase 1	873

2.4 PRINCIPAL PROJECT STRUCTURES

2.4.1 Earth Embankment Dam

The E. W. Brown Auxiliary Pond Dam is a rock and earth fill dam constructed adjacent to the existing Main Pond. The embankment consists of blasted materials excavated from the pond area and nearby on-site areas. The pond bottom is lined with an 18-inch thick layer of compacted clay and the upstream slope of the embankment is lined with a 4-foot thick layer of compacted clay covered with a 60-mil layer Linear Low Density Polyethylene (LLDP) flexible membrane liner. The crest and upper of the upstream slope are protected with a 3 foot thick layer of Size 57 crushed stone aggregate (ASTM D 448 *Standard Classification for Sizes of Aggregate for Road and Bridge Construction*). The No. 57 stone extends down the upstream slope to elevation 866 feet. The stone is held in place by a cellular geosynthetic reinforcement grid. The crest of the dam design elevation 880 feet.

The Auxiliary Pond Dam was constructed as the first of two phases. The alignment of the dam forms a "U" with the abutments at an existing low-rise rock face along the west side of the impoundment. Both upstream and downstream slopes are approximately 3 horizontal to 1 vertical. (See Appendix A, Document 37, and Document 38). Data on the "As Constructed" drawings indicates the dam crest elevation actually varies from approximately 880.1 feet to 881.4 feet. Table 2.4.1 displays a summary of the dimensions and size specifications of E. W. Brown Auxiliary Pond Dam. Photo Numbers 1, 2, and 6 - 25 in Appendix B show the embankment of the dam.

Table 2.4.1: Summary of Dam Dimensions and Size	
	E. W. Brown Auxiliary Pond Dam
Dam Height	92 ft.
Crest Width	25 ft.
Length	3,350 ft
Side Slopes (upstream)	3(H):1(V)
Side Slopes (downstream)	3(H):1(V)
Hazard Classification	High

2.4.2 Outlet Structures

The dam primary spillway consists of a 10-foot square concrete decant riser with invert elevation at 870.12 and a 30-inch diameter HDPE pipe running approximately 240 feet through the embankment, connecting to a network of HDPE pipes that run along the toe of the embankment approximately 3,200 feet to the existing Main Pond discharge channel. The discharge channel empties into Herrington Lake. The main spillway is protected by a permanent skimmer and a temporary floating boom. Stop logs are in place from the invert to the normal pool elevation of 873 feet. Data included in Appendix A- Doc 02 state the full flow capacity of the spillway tunnel for Phase 1 is approximately 71 cfs. Photo Numbers 3, 4, 106, and 107 in Appendix B show the main spillway and Photos Number 115-120 and 123 - 129 show the main spillway outlet and outfall conditions.

The dam also has an emergency spillway in the form of an open channel excavated through overburden soil and partially weathered rock beginning at the southwest corner of the impoundment. The emergency spillway is trapezoidal in cross section and acts as a broad crested weir. According to the available documents (see Appendix A- Doc 80) the spillway has a bottom width of 8 ft and side slopes of 2(H):1(V). According to the hydrologic and hydraulic data (Appendix A- Doc 84), the emergency spillway discharge at the dam crest elevation of 880 ft is 231 cfs. When this value is combined with 71 cfs discharge from the principal spillway, the result is a total discharge value of approximately 309 cfs. Photo Numbers 108 - 113 in Appendix B show the emergency spillway.

2.5 CRITICAL INFRASTRUCTURE WITHIN FIVE MILES DOWN GRADIENT

A dam break analysis, including the identification of critical infrastructure located within 5 miles downstream of the dam, is currently underway.

Based on observations at the site and surrounding area, the critical infrastructure includes the railroad line serving the E. W. Brown generating station, the Dix Dam and local roadways. Also at risk are residences along the bank of Herrington Lake in the vicinity of the plant.

3.0 SUMMARY OF RELEVANT REPORTS, PERMITS AND INCIDENTS

3.1 SUMMARY OF REPORTS ON THE SAFETY OF THE MANAGEMENT UNIT

In response to an EPA request pursuant to the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) in September of 2009, the facility owner, KU provided an extensive package of design and construction information for the E. W. Brown Auxiliary Pond Dam. The data were provided in electronic files listed in Appendix A.

KU retained ATC Associates Inc. to conduct an inspection of the Auxiliary Pond Dam. The ATC inspection was conducted January 11, 2009, and reported the dam to be in good condition. The ATC report (see Appendix A: Document 128) recommended two high-priority concerns:

- Repair reported leaks and principal spillway manholes below toe of dam.
- Monitor seep at south property line.

The leaks at the manholes have been repaired and the seep is being monitored.

3.2 SUMMARY OF LOCAL, STATE AND FEDERAL ENVIRONMENTAL PERMITS

The Kentucky Division of Water (KDOW) has assigned Dam ID Number KYDW Permit 1213 to the dam structure. KDOW inspected the dam after construction was completed in June 2008. The state concluded that the dam was constructed in accordance with the permitted design and granted an approval to impound. Kentucky inspects the dam on a biennial basis. The next KDOW inspection is expected in 2010.

The E. W. Brown Auxiliary Pond spillway discharge is permitted under KPDES Permit No. 0002020 which expired January 31, 2007. The permit remains in effect under applicable state regulations. A renewal application was submitted in mid 2006 and is currently in the public comment phase. A permit renewal is expected late in 2009 or early 2010.

3.3 SUMMARY OF SPILL/RELEASE INCIDENTS

Data reviewed by Dewberry did not indicate any spills, unpermitted release, or other performance related problems with the dam since it became operational in the fall of 2008.

4.0 SUMMARY OF HISTORY OF CONSTRUCTION AND OPERATION

4.1 SUMMARY OF CONSTRUCTION HISTORY

4.1.1 Original Construction

The E. W. Brown Auxiliary Pond Dam was completed in 2008 and put into service upon receiving the June 27, 2008 KYDW approval to impound water. Phase 1 constructed the dam to a crest elevation of 880 feet. The planned Phase 2 will raise the dam crest to elevation 900 Feet. The design data, calculations and construction drawings were provided and reviewed.

4.1.2 Significant Changes/Modifications in Design since Original Construction

No significant changes or modification have been made to the embankment since the original construction.

4.1.3 Significant Repairs/Rehabilitation since Original Construction

No significant repairs or modifications have been made to the embankment since the original construction.

4.2 SUMMARY OF OPERATIONAL HISTORY

4.2.1 Original Operational Procedures

The Phase 1 dam was designed to store fly ash and bottom ash from the E. W. Brown coal fired generating plant for a period of about three years during which time the Main Pond will be expanded. The Main Pond is currently out of service, and all fly ash and bottom ash from the plant is being sluiced to the Auxiliary Pond.

When the current phase of the Main Pond expansion is completed, fly ash will be rerouted to the Main Pond and bottom ash will continue to be placed in the Auxiliary Pond. Also after the completion Phase 1 of the Main Pond expansion, the completed Auxiliary Pond Phase 2 expansion will provide additional bottom ash storage capacity.

4.2.2 Significant Changes in Operational Procedures since Original Startup

No documents are provided to indicate any operational procedures have changed.

4.2.3 Current Operational Procedures

Currently there are no written operational procedures in effect.

4.2.4 Other Notable Events since Original Startup

No notable events were reported to have occurred during the first year of operation.

5.0 FIELD OBSERVATIONS

5.1 PROJECT OVERVIEW AND SIGNIFICANT FINDINGS

Dewberry personnel Hugh A. Ward, P.E. and Joseph P. Klein, III, P.E. performed a site visit on Tuesday, October 20, 2009, in company with representatives of E.ON U.S. LLC.

The site visit began at 09:00 AM. The weather was clear and warm. Photographs were taken of conditions observed. Please refer to photographs in Appendix B and the Dam Inspection Checklist in Appendix C. Selected photographs are included here for ease of visual reference. All pictures were taken by Dewberry personnel during the site visit.

The overall assessment of the dam was that it was in satisfactory condition and no significant findings were noted.

5.2 EARTH EMBANKMENT DAM

5.2.1 Crest

The dam crest had no signs of any depressions, tension cracks or other indications of settlement or shear failure, and appeared to be in satisfactory condition. The data did not indicate cracking along the crest or downstream face of the dam. Figure 5.2.1-1 shows the conditions of the dam crest.

Figure 5.2.1-1. Photo Showing the Dam Crest at the southeast corner.

5.2.2 Upstream Slope

The upstream slope is protected ASTM D 448 Size 57 crushed processed stone aggregate. The cellular geosynthetic slope reinforcement is visible at the edge of the water. There were no observed scarps, sloughs, bulging, cracks or scraps or depressions or other indications of slope instability or signs of erosion. Photos 2, 44 – 45, 57, 59 – 69, 73 – 74, 78, 81, 84, 87 – 88, 93 – 94, 97, and 102 - 105 in Appendix B show the upstream slope. Figure 5.2.2-1 depicts part of the upstream slope of the dam embankment.

Figure 5.2.2-1. Photo Showing the Upstream Slope.

5.2.3 Downstream Slope and Toe

The upper portion of the downstream slope is crushed stone aggregate similar to the upstream slope. The remainder of the downstream slope is an exposed earth and rock fill face. There were no observed scarps, sloughs, depressions or other indications of slope instability or signs of significant erosion or uncontrolled seepage. A few isolated erosion gullies were observed and a single wet area of potential seepage was also observed. No seepage was observed over a widespread area or the downstream foundation area and there was no water against the downstream toe. Photos 1, 5 -41, 46, 48 – 50, 52, 54, 55, 77, 82, 83, 85, 86, 89, 90, 96, 98 – 100, and 104 in Appendix B depict various views of the downstream slope. Figure 5.2.3-1 shows the downstream slope from the North Abutment of the dam. Figure 5.2.3-2 shows the only wet area observed on the downstream slope.

No other significant deterioration was indicated in the data reviewed.

Figure 5.2.3-1. Downstream Slope from South Abutment.

Figure 5.2.3-2. Small Seepage Area Southern Segment, Downstream Embankment.

5.2.4 Abutments and Groin Areas

Erosion or uncontrolled seepage was not observed along either groin. The abutments and groin areas appeared to be in excellent condition. As an example, Figure 5.2.4-1 shows the eastern abutment and the southeast corner of the impoundment.

Figure 5.2.4-1. Southwest Segment Abutment

5.3 OUTLET STRUCTURES

5.3.1 Overflow Structure

The dam has a concrete decant riser 10 ft. square with invert elevation at 870.12 feet and a 30-inch diameter HDPE pipe running approximately 240 feet through the embankment, connecting to a network of HDPE pipes that run along the toe of the embankment approximately 3,200 feet to the existing Main Pond discharge tunnel. Photo Numbers 3, 4, 106, and 107 in Appendix B show the main spillway and Photos Number 20-22 show the main spillway outlet and outfall conditions. According to data included in Appendix A-Doc 02 the full flow capacity of the spillway tunnel is approximately 71 cfs.

The primary overflow structure was observed to be working properly, discharging flow from the pond, and visually appeared to be in satisfactory condition. There was no sign of clogging of the spillway and the water exiting the outlet was flowing clear. Figure 5.3.1-1 shows the main outlet structure.

The January 22, 2009, ATC Associates, Inc, inspection reported leaks at the principal spillway manholes below the toe of the dam. The inspection report recommended that leak repairs be given a high priority. The leaks have been repaired (see Appendix A: doc 128).

Figure 5.3.1-1. Outlet Structure (Principal Spillway) and the Floating Pier Around it on the Northwest End of Dam.

5.3.2 KPDES Discharge Weir and Sampling Point

The discharge weir appeared to be in good shape and operating normally with no sign of clogging and the water exiting the weir was flowing clear. Figure 5.3.2-1 shows the water discharging from the main spillway outfall.

Figure 5.3.2-1. Main Spillway Weir Outfall.

5.3.3 Emergency Spillway

The dam has an emergency spillway in the form of an open channel that is excavated through the overburden and blasted rock at the southwest end of the dam. The emergency spillway is trapezoidal in cross section and acts as a broad crested weir. According to the available drawings (see Appendix A- Doc 79) the bottom width of the spillway is 8 ft. and side slopes are 2(H):1(V). The invert of the spillway is at 876 ft. Per the hydrologic and hydraulic review (Appendix A - Doc 02) data the emergency spillway discharge at the dam crest elevation of 880 ft is 238 cfs which when combined with 71 cfs discharge from the principal spillway results in a total discharge value of approximately 309 cfs. Photo Numbers 108 - 113 in Appendix B show the emergency spillway. Figure 5.3.3-1 shows the trapezoidal emergency spillway excavated at the southwest end of the dam.

The emergency spillway appeared to be in good condition with no sign of clogging.

Figure 5.3.3-1. Emergency Spillway at the Southwest end of Dam.

5.3.4 Low Level Outlet

No low level outlet is present.

6.0 HYDROLOGIC/HYDRAULIC SAFETY

6.1 SUPPORTING TECHNICAL DOCUMENTATION

6.1.1 Floods of Record

No documentation has been provided about the floods of record.

6.1.2 Inflow Design Flood

The E. W. Brown Auxiliary Pond Dam is classified by the Kentucky Division of Water as a Class C. which is a structure which has "High Hazard" potential. According to regulation 40KAR;030 and Division of Water "Engineering Memorandum No. 5" The Probable Maximum Precipitation (PMP) is defined by the American Meteorological Society as the theoretically greatest depth of precipitation for a given duration that is physically possible over a particular drainage area at a certain time of year. The National Weather Service (NWS) further states that in consideration of the limited knowledge of the complicated processes and interrelationships in storms, PMP values are identified as estimates. The NWS has published application procedures that can be used with PMP estimates to develop spatial and temporal characteristics of a Probable Maximum Storm (PMS). A PMS thus developed can be used with a precipitation-runoff simulation model to calculate a probable maximum flood (PMF) hydrograph.

The E. W. Brown Auxiliary Pond Dam Construction Permit Application document includes Hydrologic and Hydraulic calculations by Fuller, Mossbarger, Scott & May Engineers, Inc and is included as Appendix A- Doc 02. Hydrologic routing was analyzed using the U.S. Army Corps of Engineers Hydrologic Engineering Center Hydrologic Modeling System (HEC-HMS V3.0.1) software. The principal spillway riser structure was designed using overflow weir equations and pipe culvert discharge curves. The Emergency Spillway was designed using a hydraulic model USACOE HEC-RAS V3.1.3. The 2006 permit application includes sample calculations for the Principal Spillway, Emergency Spillway and Freeboard Hydrographs (including the 6-hr PMP and PMP generated runoff) and pipe sizes analyzed. The report indicates the dam was designed to safely handle the full probable maximum precipitation design storm without overtopping, assuming the reservoir pool is at the design normal pool elevation at the time of the storm. The report indicates that the Phase 1 normal pool elevation provides 7 feet of freeboard. The report estimates that a probable maximum precipitation event would raise the reservoir approximately 5.6 feet with no outflow, leaving a freeboard of approximately 1.4 feet.

6.1.3 Spillway Rating

The Hydrologic and Hydraulic calculations in the Dam Construction Permit Application (Appendix A- Doc 02) include spillway rating curve values listed in the inflow files for various hydrological simulations. These values were manually calculated following the procedures outlined in the Kentucky Division of Water "Engineering Memorandum NO. 5". As presented above, the hydrologic and hydraulic review (Appendix A- Doc 02) calculation sheets indicate a principal spillway capacity of 71 cfs and an emergency spillway capacity of 238 cfs for a total discharge capacity of approximately 309 cfs at a pond elevation of 876.6 feet.

6.1.4 Downstream Flood Analysis

A downstream flood analysis was not performed as part of the E. W. Brown Auxiliary Pond Dam design. Dam break analysis results were not available for the Dewberry evaluation, but were subsequently completed in November 2009.

6.2 ADEQUACY OF SUPPORTING TECHNICAL DOCUMENTATION

Supporting technical documentation reviewed by Dewberry is adequate.

6.3 ASSESSMENT OF HYDROLOGIC/HYDRAULIC SAFETY

Based on the calculations provided in the 2006 hydrologic and hydraulic design calculations (Appendix A- Doc 02 and Doc 84), the E. W. Brown Auxiliary Pond Phase 1 Dam can safely pass the PMP with a freeboard of 1.4 feet. Hence, the dam failure by overtopping seems to be improbable.

The 2006 Dam Construction Permit Application calculations (Appendix A- Doc 02) also indicate that the E. W. Brown Auxiliary Pond Phase 2 Dam can pass the PMP with a free board of 1.9 feet.

7.0 STRUCTURAL STABILITY

7.1 SUPPORTING TECHNICAL DOCUMENTATION

7.1.1 Stability Analyses and Load Cases Analyzed

The 2006 Dam Construction Permit Application summarizes the stability analysis procedures used in the dam design. The procedures follow the general guidelines of the US Army Corps of Engineers in slope stability engineering manual (see Appendix A- Doc 02, "Dam Construction Permit Application Auxiliary Pond – E. W. Brown Generating Station"). The analyses were based on the results of geotechnical borings and laboratory testing conducted for the Auxiliary Dam design.

The stability analyses evaluated rotational stability using the UTEXAS4 software. The analyses were conducted to verify long-term stability for normal pool and no pool conditions. The result of the analyses and the soil parameters used are provided in Appendix A – Doc 2 "Stability Analyses – Auxiliary Pond Embankment". Based on the results from this analyses it was concluded that the Auxiliary Dam has stability safety factors at or above minimum recommended values.

The stability analyses (Appendix A – Doc 02), for dynamic conditions were conducted using a pseudo-static loading condition based on a peak ground acceleration of 0.100g for a two percent probability of exceedance in 50 years.

7.1.2 Design Properties and Parameters of Materials

The documentation identified in the review data that identifies the design parameters used for the original dam design shown in drawings of the Auxiliary Pond Stability Analysis (see Appendix A-Doc 115 and 116). The drawings provided the results of stability analyses for the Phase 1 dam that currently exists as well as the proposed future Phase 2 dam. The density values listed in the parameter tables for the downstream slope range from 110 to 118 pounds per cubic foot (PCF). Angle of shearing resistance under effective stress analysis range is 28° to 38° for various zones and, where applicable, the effective cohesive strength is 100 pound per square foot.

7.1.3 Uplift and/or Phreatic Surface Assumptions

No uplift or phreatic surface considerations are included in the stability analyses. The Auxiliary Pond upstream slope of the embankment is lined with a 4-foot thick compacted clay zone and the pond bottom is lined with an 18-inch thick compacted clay zone capped by a 60-mil Liner Low-Density Polyethylene (LLDP) flexible membrane liner. (See Appendix A – Doc. 68).

7.1.4 Factors of Safety and Base Stresses

The Auxiliary Pond Dam – Stability Analysis (Appendix A – Doc 02) Safety Factors computed in conjunction with the stability analyses of the proposed reconfiguration and expansion program currently under construction are as listed in Table 7.1.4

Based on the results summarized in the table, the Auxiliary Pond Dam was found to have stability safety factors at or above the minimum required values (Appendix A: Doc 115 and 116).

Table 7.1.4: Factors of Safety E. W. Brown Auxiliary Pond Dam

Location/Loading Condition	Required Safety Factor (Army Corps)	Computed Safety Factor
Downstream Static (Drained)	1.5	1.8
Downstream Seismic (Drained)	1.2	1.3
Upstream Static (Drained)No Pool	1.5	Not Provided
Upstream Seismic	1.2	Not Provided

7.1.5 Liquefaction Potential

The documentation reviewed by Dewberry did not include an evaluation of liquefaction potential. Based on the geologic conditions and foundation preparation procedures outlined in the Permit Application Report (Appendix A Doc. 02), and as summarized in Section 7.1.6., foundation soil conditions do not appear susceptible to liquefaction.

7.1.6 Critical Geological Conditions and Seismicity

Data in the Dam Construction Permit Application (See Appendix A – Doc 02) indicate the E. W. Brown Auxiliary Pond is underlain by rock of the Lexington, and Tyrone Limestone formations. Members of the Lexington formation at the site include: Greer Limestone, Logana Limestone, and Curdsville Limestone. The Tyrone Limestone formation underlies the Curdsville Limestone.

The foundation for the Auxiliary Pond embankment and liner consists of a 25-foot thick zone of treated soil and rock. The treated zone was formed by blasting to rubblize the top 25 feet of soil and bedrock. At the northeast corner of the Auxiliary Pond, near the existing Main Pond embankment, overburden was removed to bedrock and irregular bedrock material treated in accordance with pre-engineered solutions on the design drawings (Appendix A: Doc. 67).

The documents provided indicate that seismicity was considered in the design. The slope stability analyses included a dynamic load condition based on a peak ground acceleration of 0.100 g.

As part of this assessment, the current Seismic Risk Map of the United States was also reviewed using the U. S. Geologic Survey web site. The 2%/50 year return period peak ground acceleration mapped for the sire is 0.100 g. The seismic design criteria are appropriate for this dam.

7.2 ADEQUACY OF SUPPORTING TECHNICAL DOCUMENTATION

Structural stability documentation is adequate.

7.3 ASSESSMENT OF STRUCTURAL STABILITY

Overall, the structural stability of the embankment appears to be satisfactory based on the observations during the October 20, 2009 field visit and dam evaluation by Dewberry, the 2006 Dam Construction Application Report, and the post-construction drawings.

- There were no indications of scarps, sloughs, depressions or bulging anywhere along the dam;
- Boils, sinks or uncontrolled seepage was not observed along the slopes, groins or toe;
- The crest appeared free of depressions and no significant vertical or horizontal alignment variations were observed; and
- The computed factors of safety comply with accepted criteria.

8.0 ADEQUACY OF MAINTENANCE AND METHODS OF OPERATION

8.1 OPERATIONAL PROCEDURES

The facility is operated currently for storage of fly ash and bottom ash coal combustion products. Coal combustion process waste water and stormwater falling directly into the reservoir are contained in the reservoir. Inflow water is treated through gravity settling and deposition, and discharged through a vertical riser overflow outlet structure. A separate written Operations Plan for the Auxiliary Pond has not been completed. The Auxiliary Pond is being operated under the operating procedures established for the Main Pond.

Discharge from the outflow structure is to Herrington Lake. The facility KPDES permit (KY 0002020) has expired. The permit remains in effect under applicable state regulations. A renewal application was submitted prior to the expiration date. The renewal process is near completion. A new permit has been issued and will be effective on March 1, 2010.

8.2 MAINTENANCE OF THE DAM AND PROJECT FACILITIES

The dam was completed and placed into operation in June 2008. A written Maintenance Plan for the Auxiliary Ash Pond is being prepared. The dam is being maintained using the procedures prescribed in the 1991 Main Fly Ash Pond. The owner was unable to provide the plan for this assessment.

8.3 ASSESSMENT OF MAINTENANCE AND METHODS OF OPERATION

8.3.1 Adequacy of Operational Procedures

Based on the assessments of this report operation procedures seem to be adequate.

8.3.2 Adequacy of Maintenance

Based on the assessments of this report maintenance procedures seem to be adequate. The only maintenance issue identified was to continue monitoring the damp area of possible seepage near the downstream toe near the southeast corner of the reservoir.

9.0 ADEQUACY OF SURVEILLANCE AND MONITORING PROGRAM

9.1 SURVEILLANCE PROCEDURES

9.1.1 Surveillance Inspections

Surveillance inspections of the Auxiliary Pond are conducted in accordance with the requirements established for the Main Pond. Those requirements stipulate weekly inspections by E. W. Brown Plant personnel and a written report of observations.

9.1.2 Annual Inspections

The Auxiliary Pond is scheduled for inspection by the Kentucky Division of Water on a biennial basis. Since the dam was completed in 2008, the first State inspection is scheduled for 2010.

A third party inspection was conducted in January 22, 2009 by ATC Associates. The inspection report identified two high priority issues:

- Repair reported leaks at the principal spillway manholes below toe of dam.
- Monitor seep at the south property line.

Note: The repairs of leaks at the principal spillway manholes have been made. KU reports that the seepage south of the property line has ceased. Seepage monitoring continues; no changes have been reported.

9.2 INSTRUMENTATION MONITORING

The E. W. Brown Auxiliary Pond Dam has no instrumented monitoring system in place as part of the Phase 1 construction.

9.3 ASSESSMENT OF SURVEILLANCE AND MONITORING PROGRAM

9.3.1 Adequacy of Inspection Program

Based on the data reviewed by Dewberry, including observations during the site visit, the inspection program is adequate.

9.3.2 Adequacy Instrumentation Monitoring Program

Based on the pond and upstream slope of the embankment being lined and the planned time of about three years between Phase 1 and Phase 2 construction, an instrumented monitoring system for the Auxiliary Pond is not necessary at this time.

E. W. Brown Assessment Report

Appendix A

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Fuller Mossbarger Scott & May ENGINEERS

Dam Construction Permit Application

Ash Pond Extension Project - Auxiliary Ash Pond
E.W. Brown Generating Station
Kentucky Utilities
Burgin, Mercer County, Kentucky

Prepared for:
Kentucky Division of Water
Frankfort, Kentucky

July 7, 2006

Fuller Mossbarger Scott & May ENGINEERS

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Lexington, Kentucky
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859-422-3100 FAX

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July 7, 2006 O.1.1.Lx2004069R01

Mr. Gary Wells
Kentucky Division of Water
Dam Safety Section
Natural Resources and Environmental Protection Cabinet
14 Reilly Road
Frankfort, Kentucky 40601

Re: Dam Construction Permit Application
Ash Pond Extension Project - Auxiliary Ash Pond
E.W. Brown Generating Station
Kentucky Utilities
Burgin, Mercer County, Kentucky

Dear Mr. Wells:

Enclosed is a Stream Crossing Permit Application and Dam Construction Permit Application Data Sheet, as well as, supporting data for a proposed Auxiliary Ash Pond at the E.W. Brown Generating Station. The facility will be a high hazard, Class 'C' structure. Fuller, Mossbarger, Scott, and May Engineers, Inc. (FMSM) is the design engineer for the proposed ash pond, and members of the FMSM team met with you on April 26, 2006 to discuss the overall intent of the project. This report reiterates the previous discussions and includes a brief overview of the facility and the proposed impoundment, along with narrative discussion of relevant design issues, and methods used including data supporting the Dam Construction Permit Application.

At any time during your review, FMSM can meet with you at your convenience to discuss the application, the design assumptions, and any other pertinent data necessary to facilitate an efficient application review process. Should you have any questions or comments, please feel free to call.

Respectfully submitted,

FULLER, MOSSBARGER, SCOTT AND MAY
ENGINEERS, INC.

Kenneth O. Hardin, PhD, PE
Associate

/rws

Commonwealth of Kentucky
NATURAL RESOURCES AND ENVIRONMENTAL PROTECTION CABINET
DIVISION OF WATER
14 Reilly Road
Frankfort, Kentucky 40601

DAM CONSTRUCTION PERMIT APPLICATION DATA SHEET

Date: 7-6-06

The following is a general description of the design, including the various factors involved, the general plans, sections and specifications. Included in the drawings are vicinity maps and curves showing the hydraulic capacities. Items not pertinent to this project are deleted.

LOCATION AND PURPOSE:

1. County: Mercer County
2. Stream: Unnamed Tributary to Dix River just Upstream of Dix Dam at Herrington Lake
3. Latitude: 37° 47' 15" N Longitude: 84° 43' 08" W
4. Purpose:
   A new impoundment adjacent to and downstream of an existing permitted coal combustion product (ash) disposal pond facility for the E.W. Brown Generating Station operated by the Kentucky Utilities Company near Dix Dam and Herrington Lake. The new impoundment will serve as an Auxiliary Ash Pond during a proposed future vertical expansion of the existing ash pond and will ultimately serve as a secondary storage facility for bottom ash. This permit application only addresses the Auxiliary Ash Pond. An application for expansion of the Main Ash Pond will be submitted at a later date. The Auxiliary Ash Pond is being constructed in two phases and the pertinent data from each phase is included herein.
5. Topographic Map (*7½ Quadrangle*) Name (*Attach Copy*): Wilmore – Refer to Figure 1 of Attached Report

SUMMARY OF DESIGN:

1. Drainage Area	52	Acres	0.08	Sq. Miles
2. Storage Capacity	747 Phase I, 1408 Phase II (At crest, including permanent ash storage)			Acre Feet
3. Maximum Height of Dam	92' Phase I, 112' Phase II			Feet
4. Spillway Capacity	Phase I Principal Spillway = 71 cfs, Emergency Spillway = 238 cfs Phase II Principal Spillway = 131 cfs, Emergency Spillway = 371 cfs			C.F.S.
5. Top of Dam Elevation	880.0' Phase I, 900.0' Phase II			Feet, MSL
6. Normal Water Surface	873.0' Phase I, 894.0' Phase II			Feet, MSL
7. Maximum Water Surface	878.6' Phase I, 898.1' Phase II			Feet, MSL
8. Minimum Water Surface	870.0' Riser Invert, 817.0' Bottom of Pond (Phases I & II)			Feet, MSL
9. Freeboard Above Maximum High Water	1.4' Phase I, 1.9' Phase II			Feet
10. Power Capacity	N/A			Feet
11. General Plans and Sections	Attached			

DESIGN DATA:

1. Geological Report, Author & Title: Refer to Attached Report
2. Log of Test Pits and Drill Holes: Refer to Attached Plans
3. Hydraulic Data, Capacities and Requirements and by Whom Established: Refer to Attached Report

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a. Storage (Irrigation, Flood, Etc.) — 194 ac-ft of retarding storage for Phase I, 212 ac-ft of retarding storage for Phase II (retarding storage is storage available above normal pool elevation)

b. Spillway:
The Emergency Spillway for Phase I is a trapezoidal rock cut channel with a bottom width of 8.0'. The Emergency Spillway for Phase II will be a dual 10' x 4' reinforced concrete box culvert arrangement used to maintain roadway access along the top of the embankment. Both Emergency Spillways will empty into a perimeter ditch constructed along the toe of the embankment in a northeasterly direction ultimately merging with the existing spillway channel from the Main Ash Pond and flows into Herrington Lake.

c. Outlet:
The Principal Spillway is a 10' x 10' concrete riser structure, fully constructed during Phase I, used for both phases of operation. The riser structure has a weir notch with removable stop logs to control operating pool elevation. The stop log width (weir overflow width) is 3.0'. The outlet of the Principal Spillway riser structure is through a 30-inch concrete pressure pipe (CPP) approximately 240' long, passing through the embankment. The 30-inch CPP is connected to an HDPE pipe network extending approximately 3200' toward the northeast along the toe of the embankment where it empties into the existing spillway channel from the Main Ash Pond Principal Spillway.

d. Diversion — N/A

e. Area-Storage Capacity Curves for Various Elevations of Water Surface — Refer to Attached Report and Plan Sheets BR0-C-00194, BR0-C-00312

4. Hydrologic Data

a. Hydrographs — Refer to Attached Report, and Plan Sheets BR0-C-00194, BR0-C-00312

b. Maximum Recorded Runoff — Not Available

c. Maximum Anticipated — 27.4" from a Probable Maximum Precipitation (PMP) event of 28"

d. Discharges *(100 Year, Etc.)* — Refer to Attached Report and Plan Sheets BR0-C-00194, BR0-C-00312

e. Design Values & Method — Refer to Attached Report, and Plan Sheets BR0-C-00194, BR0-C-00312

5. Right of Way Information — The Kentucky Utilities Company owns all property on which the impoundment and outlet structures will be constructed. No additional Right of Way will be required.

RESERVOIR:

1. General Dimensions:
At the normal pool elevation of 873.0 feet for Phase I, the impoundment area is approximately 25.7 acres. The depth relative to the outlet of the principal spillway is relatively shallow at 3.0 feet, however the maximum depth of the ash pond including permanent ash storage is 56.0 feet. At the normal pool elevation of 894.0 feet for Phase II, the impoundment area is approximately 34.4 acres. The depth relative to the outlet of the principal spillway is 24.0 feet and the maximum depth including permanent ash storage is 77.0 feet.

2. Existing Structures:
There are no existing structures immediately downstream of the proposed impoundment. Hardin Heights Road is located southeast of the construction site and there are several homes along this corridor adjacent to the property, but the area will not be affected by the construction and operation of this impoundment.

3. Proposed Structures:
There are no proposed structures in the vicinity, and the downstream property between the proposed impoundment and Herrington Lake is owned entirely by the Kentucky Utilities Company.

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4. Nature of Land Flooded and Clearing Required:
The land inundated by the impoundment is currently not being used and is covered with brush and small trees. The area will be cleared, the foundation prepared, and a liner system installed prior to impounding water and ash materials.

5. House Elevations and Distance from Structure OR Proposed Site: N/A

6. Relocations Required (Railroad, Highway, Telephone, Power, Pipeline, Etc.): Overhead electric transmission lines will be relocated to permit construction and operation.

7. Geology: Additional information is included in the attached report.
   a. General Formations — Lexington Limestone and Tyrone Limestone
   b. Factors Relating to Reservoir Losses — Reservoir will be lined with a 60-mil LLDPE liner system to minimize potential losses
   c. Contributing Springs — None noted
   d. Deleterious Mineral and Salt Deposits — None noted

DAM SITE:

1. Geological Features, Formations: Refer to attached report.
2. Nature of Stream Beds and Abutments: Refer to attached report.
3. Interpretation of Test Pits and Drill Holes: Refer to attached report.
4. Percolation Tests, Ground water: Refer to attached report.

DAM:

1. Features Governing Design:
Ash storage volume and containment; embankment stability; Principal Spillway designed to carry constant process discharges of 27.2 cfs as baseflow in addition to the 10-Day Principal Spillway Hydrograph (PSH) storm event; the Emergency Spillway Crest Elevation was determined by routing the PSH event; the Emergency Spillway Capacity geometry was designed based on conveying the lesser of the 6-Hour Freeboard Hydrograph event (FBH) or 200 cfs without overtopping the dam. Additional hydrologic and hydraulic details are included in the attached report. The Principal Spillway outlet pipe network was designed to convey the baseflow in addition to the 10-year 24-hour storm without surcharging the network, additionally, it will convey the baseflow and 100-year 6-hour storm runoff without flowing out of the network. Hydraulic details for the pipe network are included in the attached report.

2. Water Surface Elevation, Storage Capacities, Freeboard, Etc.:
Phase I Normal Pool 873.0', storm retarding storage capacity above normal pool 194 ac-ft, permanent storage capacity 747 ac-ft, freeboard hydrograph peak pool elevation 878.6', FBH freeboard 1.4'

Phase II Normal Pool 894.0', storm retarding storage capacity above normal pool 212 ac-ft, permanent storage capacity 1408 ac-ft, freeboard hydrograph peak pool elevation 898.1', FBH freeboard 1.9'

3. Grouting Requirements:
None required because the facility will be lined with a composite polyethylene-clay liner system.

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Frankfort, Kentucky 40601

DAM CONSTRUCTION PERMIT APPLICATION DATA SHEET

SPILLWAY:

1. Requirements:
   Principal Spillway: Sized to convey the Principal Spillway Hydrograph and pass 85-percent of the retarding pool in less than 10 days.

   Emergency Spillway: Sized to convey the lesser of the 6-Hour Freeboard Hydrograph event or 200 cfs without overtopping the dam. Channel stability is not a concern as the spillway is excavated through rock during Phase I and is a concrete box culvert during Phase II.

   Additional hydrologic and hydraulic details are included in the attached report.

2. a. Factors Governing Design and Location: Refer to the attached report.
   b. Maximum Spillway Velocity: Phase I 3.5 ft/s, Phase II 8.7 ft/s
3. Type: (Emergency Spillway)
   a. Controlled or Uncontrolled: Uncontrolled
   b. Lining: Phase I Rock cut, Phase II Concrete Box Culvert
   c. Dimensions: Phase I Trapezoidal Channel 8' wide, 2:1 side slopes
Phase II Dual 10' x 4' Reinforced Concrete Box Culvert (RCBC)
   d. Elevation: Phase I 876.0'; Phase II 896.5'
4. Gates, Gate Structure
   a. Dimensions: N/A
   b. Operation: N/A
5. Stilling Basin:
   a. General Description: Phase I is a rock cut and does not require a stilling basin. Phase II will use a RCBC that empties into the perimeter ditch. The perimeter ditch will be locally lined with Class II channel lining as needed.
   b. Dimensions: N/A
6. Approaches: (Emergency Spillway)
   Phase I – 1% slope for entrance channel, 30-foot level control section, 1.6% slope for exit channel

   Phase II – 1% slope for entrance channel, headwall entrance apron on flat grade, 1% outward down sloping culverts for approximately 50', headwall exit apron on flat grade, then approximately 10' exit channel into the adjacent perimeter ditch at 33.3% slope.

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DIVISION OF WATER
14 Reilly Road
Frankfort, Kentucky 40601

DAM CONSTRUCTION PERMIT APPLICATION DATA SHEET

We Certify That The Above Statements Are True And Correct.

_____ _____
Owner Date

_____ _____
Engineer Date

_____
PE Number

Seal

COMMONWEALTH OF KENTUCKY
NATURAL RESOURCES & ENVIRONMENTAL PROTECTION CABINET
DEPARTMENT FOR ENVIRNOMENTAL PROTECTION
DIVISION OF WATER

APPLICATION FOR PERMIT TO CONSTRUCT ACROSS OR ALONG A STREAM AND / OR WATER QUALITY CERTIFICATION

Chapter 151 of the Kentucky Revised Statutes requires approval from the Division of Water prior to any construction or other activity in or along a stream that could in any way obstruct flood flows or adversely impact water quality. *If the project involves work in a stream, such as bank stabilization, dredging or relocation, you will also need to obtain a 401 Water Quality Certification (WQC) from the Division of Water.* This completed form will be forwarded to the Water Quality Branch for WQC processing. The project may not start until all necessary approvals are received from the KDOW. For questions concerning the WQC process, contact John Dovak at 502/564-3410.

If the project will disturb more than 1 acre of soil, you will also need to complete the attached Notice of Intent for Storm Water Discharges, and return both forms to the Floodplain management Section of the KDOW. This general permit will require you to create an implement an erosion control plan for the project.

1. OWNER: Kentucky Utilities Company
   Give name of person(s), company, governmental unit, or other owner of proposed project.
   MAILING ADDRESS: c/o Michael Winkler, Environmental Affairs; E.ON U.S. 220 West Main Street, Louisville, Kentucky 40202
   TELEPHONE #: 502-627-2338 EMAIL: michael.winkler@eon-us.com

2. AGENT: _____
   Give name of person(s) submitting application, if other than owner.
   ADDRESS: _____
   TELEPHONE #: _____ EMAIL: _____

3. ENGINEER: Kenneth O. Hardin, PhD, PE P.E. NUMBER: 19305
   Contact Division of Water if waiver can be granted.
   TELEPHONE #: 859-422-3000 EMAIL: khardin@fmsm.com

4. DESCRIPTION OF CONSTRUCTION: Construction of a new impoundment adjacent to an existing permitted coal
   Describe the type and purpose of construction and describe stream impact
   combustion byproduct (ash) disposal pond facility for the E.W. Brown Generating Station operated by the Kentucky Utilities Company (EON U.S.) near Dix Dam at Herrington Lake. The new facility will serve as an Auxiliary Ash Pond during a proposed vertical expansion for the existing Main Ash Pond and will ultimately serve as a secondary storage facility for bottom ash. The proposed Auxiliary Ash Pond is being constructed in two phases and this permit covers only the two phases of that pond.

5. COUNTY: Mercer NEAREST COMMUNITY: Burgin

6. USGS QUAD NAME: Wilmore LATITUDE/LONGITUDE: 37° 47' 15" N, 84° 43' 08" W

7. STREAM NAME: Unnamed Trib. to the Dix River / Herrington Lake WATERSHED SIZE (in acres): 52

8. LINEAR FEET OF STREAM IMPACTED: Dam: 741 Feet Reservoir 912 Feet Total: 1653 Feet

9. DIRECTIONS TO SITE: From Interstate 64 at Frankfort, take US 127 South approximately 30 miles to Harrodsburg, take KY 152 east approximately 5.2 miles to Burgin, take KY 33 (Pleasant Hill Drive) north 0.5 miles to KY 342 (Curdsville Road), take KY 342 (Curdsville Road) north 3.2 miles to Dix Dam Road, take Dix Dam Road east to E.W. Brown Plant Entrance.

10. IS ANY PORTION OF THE REQUESTED PROJECT NOW COMPLETE? ☐ Yes ☒ No If yes, identify the completed portion on the drawings you submit and indicate the date activity was completed. DATE: _____

11. ESTIMATED BEGIN CONSTRUCTION DATE: September 4, 2006

12. ESTIMATED END CONSTRUCTION DATE: December 31, 2007

13. HAS A PERMIT BEEN RECEIVED FROM THE US ARMY, CORPS of ENGINEERS? ☐ Yes ☒ No
If yes, attach a copy of that permit.
The U.S. Army Corps of Engineers (USACE) (404) Water Quality Certification was submitted in May, 2006 and is currently under review. The Kentucky Water Quality Certification (401) is not required for this project.

14. THE APPLICANT *MUST* ADDRESS PUBLIC NOTICE:

(a) PUBLIC NOTICE HAS BEEN GIVEN FOR THIS PROPOSAL BY THE FOLLOWING MEANS:

_____ Public notice in newspaper having greatest circulation in area (provide newspaper clipping or affidavit)

_____ Adjacent property owner(s) affidavits (Contact Division of Water for requirements.)

(b) X I REQUEST WAIVER OF PUBLIC NOTICE BECAUSE:

All activities are located on Kentucky Utilities property and conform to USACE permit requirements.
Contact Division of Water for requirements.

15. I HAVE CONTACTED THE FOLLOWING CITY OR COUNTY OFFICIALS CONCERNING THIS PROJECT:

N/A
Give name and title of person(s) contacted and provide copy of any approval city or county may have issued.

16. LIST OF ATTACHMENTS: Dam Construction Permit Data Sheet, Narrative Report and Support Data,
List plans, profiles, or other drawings and data submitted. Attach a copy of a 7.5 minute USGS topographic map clearly showing the project location.

Auxiliary Ash Pond Phase I Plans, Auxiliary Ash Pond Phase II Plans, Auxiliary Ash Pond Specifications.

17. I, Michael Winkler for Kentucky Utilities CERTIFY THAT THE OWNER OWNS OR HAS EASEMENT RIGHTS ON ALL PROPERTY ON WHICH THIS PROJECT WILL BE LOCATED OR ON WHICH RELATED CONSTRUCTION WILL OCCUR (for dams, this includes the area that would be impounded during the design flood).

18. REMARKS: _____

_____

_____

_____

_____

I hereby request approval for construction across or along a stream as described in this application and any accompanying documents. To the best of my knowledge, all the information provided is true and correct.

SIGNATURE: _____
Owner or Agent sign here. (If signed by Agent, a Power of Attorney should be attached.)

DATE: _____

SIGNATURE OF LOCAL FLOODPLAIN COORDINATOR:

_____
Permit application will be returned to applicant if not properly endorsed by the local floodplain coordinator.

DATE: _____

SUBMIT APPLICATION AND ATTACHMENTS TO:

Floodplain Management Section
Division of Water
14 Reilly Road
Frankfort, KY 40601

Dam Construction Permit Application

Ash Pond Extension Project - Auxiliary Ash Pond
E.W. Brown Generating Station
Kentucky Utilities
Burgin, Mercer County, Kentucky

Prepared for:
Kentucky Division of Water
Frankfort, Kentucky

July 7, 2006

Dam Construction Permit Application

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E.W. Brown Generating Station
Kentucky Utilities
Burgin, Mercer County, Kentucky

1. Project Overview

Currently, the E.W. Brown Generating Station produces two primary coal combustion products (CCP): fly ash and bottom ash. Both ash products are sluiced to an existing permitted ash pond adjacent to the plant. The existing pond is expected to reach its design capacity in the first quarter of 2010. Kentucky Utilities will be operating the plant beyond this date and, in the interim, will be adding pollution control equipment to all generating units. As a result, the plant will be producing a third major CCP stream beginning in the third quarter of 2009. At that time, gypsum will be produced at a rate exceeding current ash production rates.

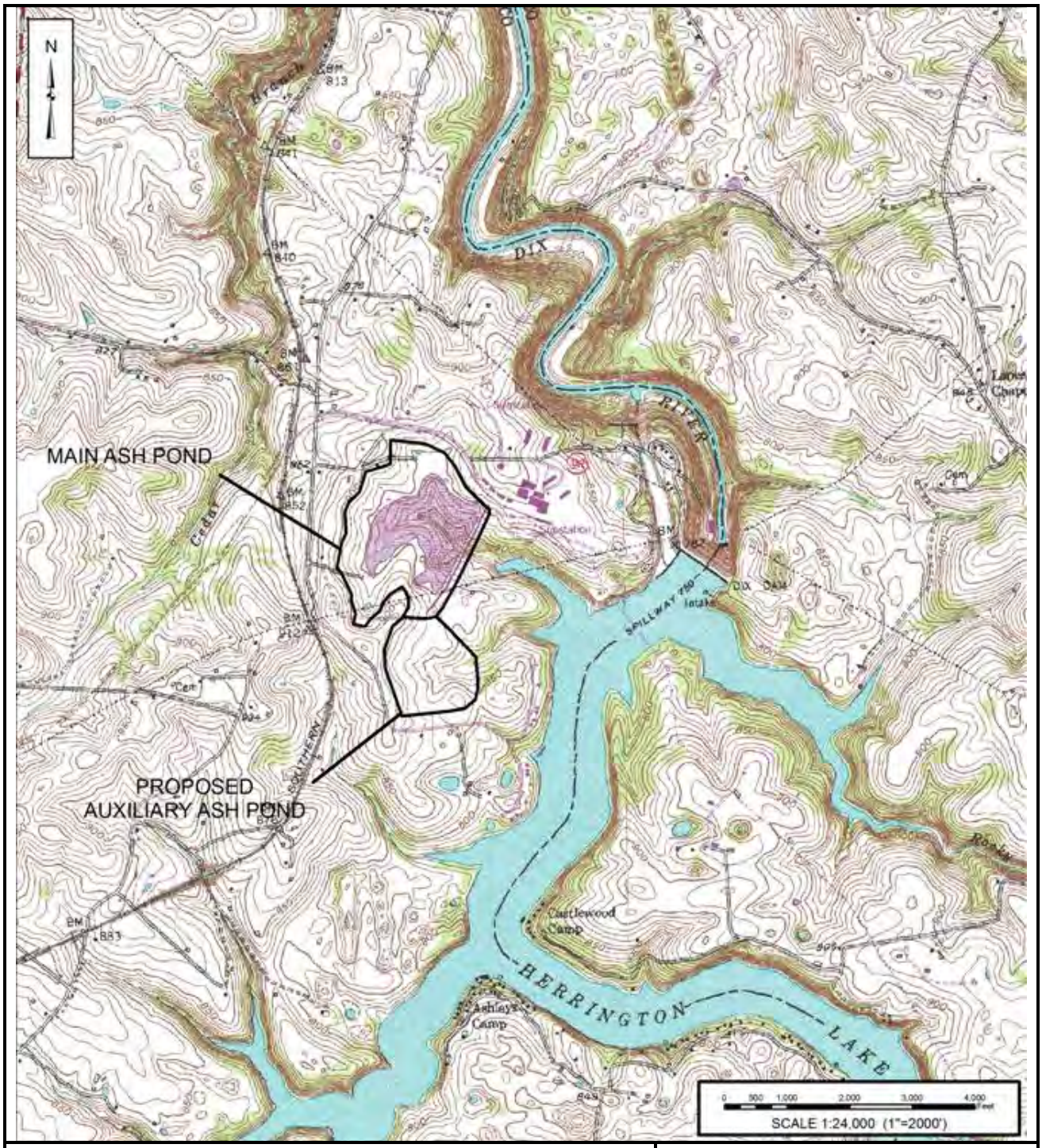
To accommodate the gypsum and provide continuing operation for the disposal facility, Kentucky Utilities plans to construct a vertical expansion of the existing (Main) ash pond. The Main Ash Pond must be taken out of service in order to construct the vertical expansion. During the interim vertical expansion of the Main Ash Pond, the Phase I Auxiliary Ash Pond is being constructed to provide storage for three years of sluiced bottom ash and fly ash for the period from January 2008 until December 2010. Thereafter, fly ash and gypsum will be sluiced to the expanded Main Ash Pond, and bottom ash will continue to be sluiced to the Phase II Auxiliary Ash Pond.

A Dam Construction Permit Application for the Main Ash Pond vertical expansion will be submitted at a later date and the enclosed Dam Construction Permit Application Data Sheet and supporting materials is intended to only address the Phase I and Phase II Auxiliary Ash Pond. A topographic map illustrating the site location and proposed facility alignment is included as Figure 1.

2. Site Geology

2.1. Geologic Setting

Available U.S. Geological Survey (USGS) geologic mapping (Geologic Map of the Wilmore, Kentucky, USGS, 1970) shows the site to be underlain by bedrock belonging to the Lexington Limestone and Tyrone Limestone Formations, both of which are Ordovician in age. Figure 2 shows the approximate location of the site on a portion of the Wilmore, Kentucky, USGS 7 ½-Minute Geologic Quadrangle. In the site area, the members of the Lexington Limestone present include (from top to bottom) the Grier Limestone Member (Labeled Olg on the mapping), Logana Member (Oll) and Curdsville Limestone Member (Olc). The Tyrone Limestone (Ot) underlies the Curdsville Limestone Member.



E.W. Brown Generating Station

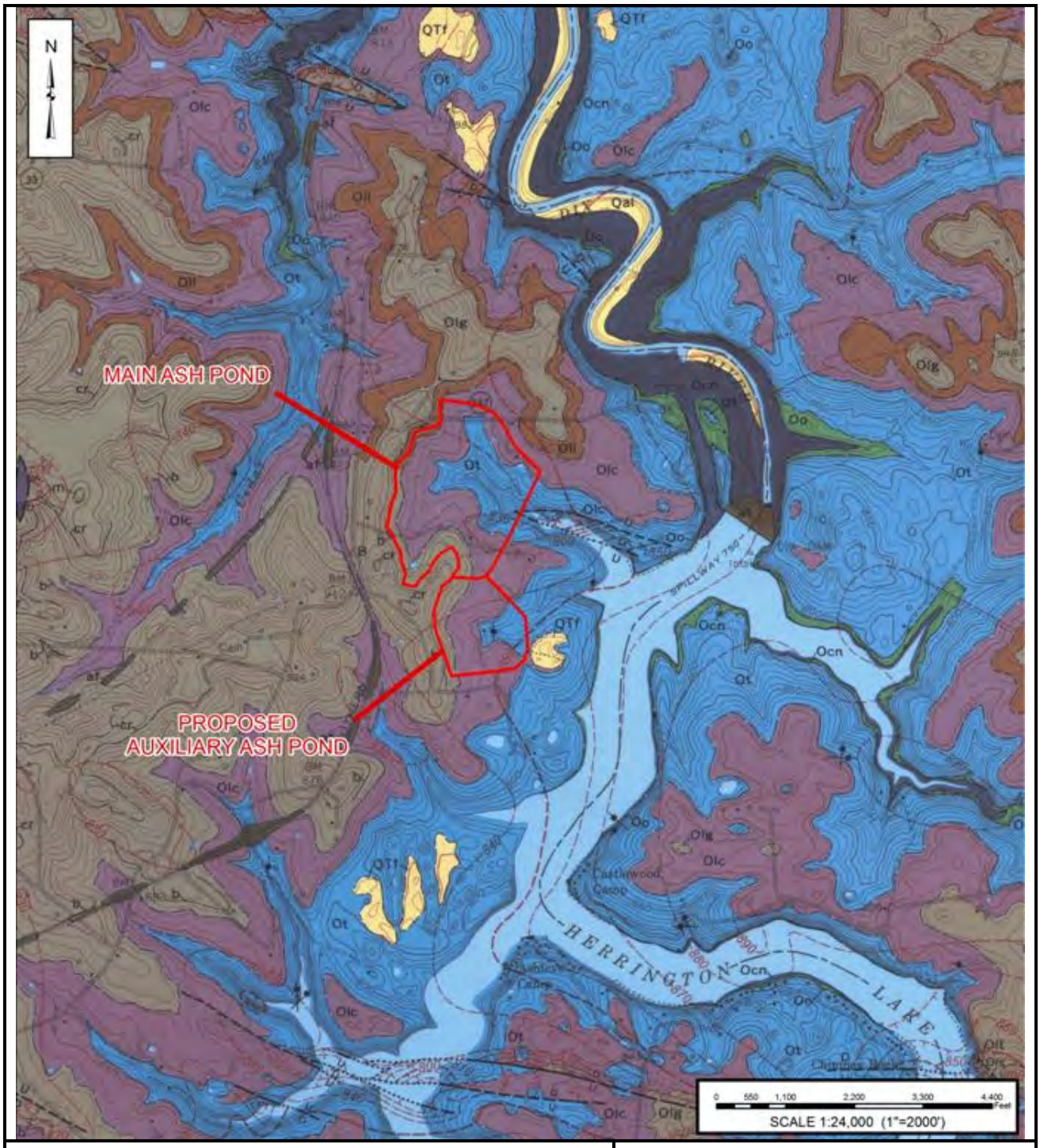
Kentucky Utilities

Ash Pond Extension Project - Auxiliary Ash Pond

Fuller Mossbarger Scott & May

EMSM ENGINEERS

Figure 1. Portion of the USGS Wilmore 7-1/2 Minute Topographic Quadrangle



E.W. Brown Generating Station

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Figure 2. Portion of the USGS Wilmore 7-½ Minute Geologic Quadrangle

Fuller Mossbarger Scott & May ENGINEERS

The Grier Limestone Member consists of light-gray, medium to coarse grained limestone that is bioclastic, poorly sorted and fossiliferous. Bedding thickness is typically less than one foot and beds of nodular, fossiliferous limestone with a micrograined calcite matrix are dispersed throughout.

The Logana Member consists of interbedded limestone and shale in three distinct zones, although this member grades into the Grier Member in portions of the quadrangle. The upper zone consists of two to three feet of light-olive-gray micrograined limestone interbedded with olive-gray to medium-gray shale. The middle zone of five to eight feet of brachiopod coquina that weathers to a pink-gray color. The lower zone is five to seven feet to interbedded limestone and shale that is similar to the upper zone.

The Curdsville Limestone Member consists of medium to light-gray, medium to coarse grained, bioclastic limestone. The lower part is well sorted and locally cross bedded and grades upward into an irregularly bedded, poorly sorted, fossiliferous limestone. Chert nodules and silicified fossils are common in the lower part.

The Tyrone Limestone consists of two types of limestone. The first is light-gray to light-olive-gray cryptograined limestone that contains small areas of clear calcite or “birdseye limestone:. The second is light-gray to light-brownish-gray cryptograined limestone that contains small areas of micrograined, calcareous dolomite. In some portions of the quadrangle, up to three bentonite beds (each up to two feet thick) are found within the Tyrone. These bentonite layers are often underlain by thin chert layers. Persistent layers of argillaceous limestone and shale are present in the uppermost ten feet and middle of the unit.

Structure contours drawn on top of the Tyrone Limestone indicate a general rock strata dip of approximately 40 feet per mile towards northwest direction. The geologic mapping shows a graben-type feature immediately downstream of the ash treatment basin embankment, with a general northwest-southeast trend roughly aligned with the tributary. Several small normal faults are identified within the graben, resulting in the top of the Tyrone being as much as 50 feet lower within the graben than outside the graben. The mapped faults do not extend into the areas being considered for the proposed ash treatment basin extension.

2.2. Geotechnical Exploration

FMSM performed rock core borings and test pit excavations to explore subsurface conditions within the area of the Auxiliary Ash Pond. Thirty-one (31) rock core borings were drilled within the footprint of the Auxiliary Ash Pond embankment to evaluate bedrock conditions, and numerous test pits were excavated to observe the bedrock and soil horizons.

Based on the geotechnical exploration, the top of the bedrock surface within the footprint of the Auxiliary Ash Pond embankment is irregular and unpredictable. Depths to bedrock varied from one-foot to 21 feet, with the exception of one area where the depth to bedrock exceeded 44 feet. Rock core samples reveal the underlying bedrock to be predominantly limestone; light gray in color, cryptograined to fine crystalline grained, with shale stringers, partings and shaley zones, and hard. In several borings, a layer of shale and bentonite was encountered ranging in thickness from 1.9 feet to 2.6 feet. The shale is gray in color, silty, laminated and soft, and the bentonite is greenish-gray in color, laminated and soft.

Boring layouts and graphical logs of borings are presented on plan sheets BR0-C000196 through BR0-C-00225

3. Auxiliary Ash Pond Construction

The construction of the Auxiliary Ash Pond is to occur in two distinct vertical phases. Phase I will consist of constructing a 3,350 feet long starter dike constructed with 3(H):1(V) side slopes and a 25 feet wide crest at elevation 880 feet. The height of the Phase I embankment measured from the downstream toe to the crest elevation will be 92.0'. Site preparation for Phase I will include stripping and grubbing the site of the Auxiliary Ash Pond. The foundation for the embankment and the pond liner will be treated to minimize the effects of bedrock defects. Blasting will be performed over approximately 45 acres to rubblize the top 25 feet of soil and bedrock. A portion of the blasted zone will be excavated and placed as earth and rock fill within the Phase I Auxiliary Ash Pond embankment. Additionally, an area of the site approximately 12 acres in size, near the existing dam and under the starter dike, will be excavated to bedrock and any irregular bedrock features will be investigated and treated as necessary during construction. A compacted clay layer and a 60-mil Linear Low-Density Polyethylene (LLDPE) flexible membrane liner (FML) system will be installed on the pond bottom and along the upstream slopes of the embankment.

By January 2008, Phase I of the Auxiliary Ash Pond will be in operation, and the Main Ash Pond will be taken out of service, dewatered, stabilized, and regarded to begin the vertical expansion. All bottom ash and fly ash sluice lines, oil-water separator lines, and other existing process flows currently flowing to the Main Ash Pond, will be diverted to the Auxiliary Ash Pond. A new riser structure will be constructed for the Main Ash Pond to provide outlet control for the expanded Main Ash Pond via two spillway pipes. A principal spillway pipe will outlet to the existing spillway channel, and a secondary spillway will outlet to the Auxiliary Ash Pond.

Phase I of the Auxiliary Ash Pond will ultimately provide storage for three years of sluiced bottom ash and fly ash normally going to the Main Ash Pond for the period from January 2008 until December 2010. Thereafter, fly ash will be sluiced to the expanded Main Ash Pond, and bottom ash will continue to be sluiced to the Auxiliary Ash Pond. During the subsequent time period between 2011 and 2013, Phase II of the Auxiliary Ash Pond dike will be constructed. The embankment will be raised and expanded to a length of approximately 4,830 feet with downstream gypsum embankment overlays bringing the top of dam elevation to 900 feet providing additional storage for 20 years of bottom ash produced between 2011 and 2030. The total height of embankment for Phase II will be 112.0' measured from the downstream toe of the embankment to the top of dam. During Phase II an FML will be welded to the existing FML and extended along the upstream face of the expanded embankment.

The Auxiliary Ash Pond would be closed in 2030 with a maximum bottom ash surface at an approximate elevation of 893 feet allowing for three feet of free water and four feet of freeboard below the final crest elevation of 900 feet.

4. Design Methodology

4.1. Stability Analyses

Rotational stability analyses were performed on the Phase I and Phase II embankment configurations using the UTEXAS4 computer program. The analyses were conducted to verify the long term stability of the embankment. Soil shear strength parameters used in the stability analyses were selected based on the different types of material to be incorporated into the embankment, the results of consolidated-undrained triaxial tests with pore pressure measurements or direct shear tests, and experience with CCP materials on similar projects. The shear strength parameters used in the analyses along with graphical results are presented on drawings BR0-C-00226 and BR0-C-00227

4.2. Hydrologic Analyses

The hydrologic design conditions associated with the Auxiliary Ash Pond construction are slightly different than the typical dam design scenario. As previously described, the Auxiliary Ash Pond will be constructed in phases and the proposed riser structure for the Main Ash Pond will allow discharges from the Main Ash Pond to either flow to the Auxiliary Ash Pond or to the existing Main Ash Pond spillway channel. The flow pathway in the Main Ash Pond Principal Spillway will be selected via gate controls in the new riser structure. The Emergency Spillway for the Main Ash Pond will be maintained as a separate offsite flow pathway and cannot contribute to the Auxiliary Ash Pond.

For design purposes, the controlling hydrologic condition could occur at a number of time frames during Phase I or Phase II of the Auxiliary Ash Pond construction and with Main Ash Pond Principal Spillway discharges either directed to the Auxiliary Ash Pond or existing spillway channel. With the variety of different combinations available, the conservative design approach is to assume each pond is at its maximum design life with minimum retarding pool when the design storms are applied. Additionally, it was assumed the outflow of the Principal Spillway from the proposed Main Ash Pond would be opened only to the Auxiliary Ash Pond at the time. Lastly, the plant was assumed to be in operation with full process flows applied to each respective pond. These assumptions resulted in two design scenarios.

Scenario 1 assumes the Auxiliary Ash Pond is at the end of its Phase I lifespan and has a constant inflow from plant processes of 11.7 cfs. The Main Ash Pond is also assumed to be at the end of its lifespan and have an additional plant process inflow of 15.5 cfs. With the secondary spillway pipe between the Main and Auxiliary Ash Pond in operation, the net result is a baseflow of 27.2 cfs through the Auxiliary Ash Pond before the design storms are applied. Design storms were routed through both the Main Ash Pond and Auxiliary Ash Pond watersheds into each of the respective ponds. Outflow from the Main Ash Pond Principal Spillway was directed to the Auxiliary Ash Pond and any outflow from the Main Ash Pond Emergency Spillway was directed offsite.

Scenario 2 is similar to Scenario 1, but the Auxiliary Ash Pond is assumed to be at the end of its lifespan during Phase II. Again, design storms were routed through both the Main Ash Pond and Auxiliary Ash Pond watersheds into each of the respective ponds. Outflow from the Main Ash Pond Principal Spillway was directed to the Auxiliary Ash Pond and any outflow from the Main Ash Pond Emergency Spillway was directed offsite.

For both Scenarios, the hydrologic characteristics and storm routing data for the Main Ash Pond were based on preliminary geometric design data and the assumption that the emergency spillway would be the same configuration as used in the Phase II Auxiliary Ash Pond (dual 10' x 4; reinforced concrete box culverts). The elevation of the emergency spillway for the Main Ash Pond was set using the routing of the Principal Spillway Hydrograph for the respective watershed.

Ordinarily the U.S. Department of agriculture SITES computer application would be used to analyze dam structures, but in this case to accomplish the complex hydrologic routing required to model each of these scenarios, the U.S. Army Corps of Engineers Hydrologic Engineering Center Hydrologic Modeling System (HEC-HMS v 3.0.1) software package was used. A digital version of the model is included on a CD in Appendix D of this report.

The Kentucky Division of Water (KDOW) Engineering Memorandum No. 5 guidelines for a Class 'C' structure were used to select design storms for the analyses. The design guidelines also conform with Chapter 21, Section 4 of the "SCS national Engineering Handbook" (NEH4) and the USGS TR-60 publication for "Design of Earth Dams and Reservoirs".

The procedures outlined in NEH4 were used to manually calculate the Principal Spillway Hydrograph (PSH), Emergency Spillway Hydrograph (ESH), and Freeboard Hydrograph (FBH) for each of the ash ponds. Sample calculations that follow the NEH4 procedures are included in Appendix B.

In order to route the PSH, ESH, and FBH events through the ash ponds for the two scenarios, stage-discharge rating curves had to be calculated for each of the Principal Spillway and Emergency Spillway structures in each ash pond. The design was an interactive approach accomplished by developing an Excel spreadsheet and varying the HEC-HMS model inputs. The Principal Spillway Riser structures were designed using overflow weir equations and pipe culvert discharge rating curves for the outlet pipes. Emergency spillway structures were initially designed using normal depth calculations for trapezoidal and rectangular channels, then later refined using a hydraulic model developed using the U.S. Army Corps of Engineers Hydrologic Engineering Center River Analysis System (HEC-RAS v 3.1.3). The HEC-RAS model is included digitally on the CD in Appendix C. Rating curve calculations are also included in Appendix A.

The results of PSH routing were used to set the Emergency Spillway elevations for each scenario. For Phase I of the Auxiliary Ash Pond, the Emergency Spillway elevation was set just below the predicted peak elevation for the PSH. Since this spillway is located in a rock cut condition and verification of the elevation against the 100-year 6-hour storm event predicts no emergency spillway flow, this meets the minimum design requirements specified in KDOW Memorandum No. 5. The results of the PSH routing are included on the summary of results sheets in Appendix A. The discharge values for the PSH were comparable to the process base flows and did not greatly increase the pool elevation. Consequently, the total drawdown period for the PSH back to the base flow condition was substantially less than 10 days.

The ESH was applied to the HEC-HMS model to determine the dimensions of the emergency spillway. The FBH was applied to verify the spillway's adequacy compared to the top of dam elevation. The routing of the FBH resulted in emergency spillway discharge values less than 200 cfs. The emergency spillways were designed to have a minimum capacity of 200 cfs

without overtopping the dam embankment as required by KDOW Memorandum No. 5 and TR-60. Results from both the ESH and FBH routings are included on the summary of results sheets in Appendix A and on the flood routing summaries printed on sheets BR0-C-00194 and BR0-C00312 of the plans.

4.3. Auxiliary Ash Pond Principal Spillway Pipe Network

The principal spillway structure for the Auxiliary Ash Pond will discharge through a 30-inch concrete pressure pipe (CCP) that running approximately 240-feet in length through the dam embankment. The 30-inch CCP connects to an HDPE pipe network that runs along the toe of the embankment approximately 3200-feet to the existing Main Ash Pond discharge channel. A profile of the pipe discharge system is presented on plans BR0-C-00182 and 183.

To adequately design the HDPE pipe network a hydraulic model was developed using the Haested Methods StormCad v 5.5 computer application. The model calculates the energy and hydraulic grades along the pipe network. The selected design criteria was for the pipe system to not surcharge (no pipe inlets submerged) during the 10-year, 24-hour storm event runoff, and the flows to remain in the system (no flow out of the manholes) during the 100-year, 24-hour storm event runoff. Appendix B includes an output summary from the StormCad model and a digital version of the model is included on the CD in Appendix C.

Appendix A

Hydrologic Data

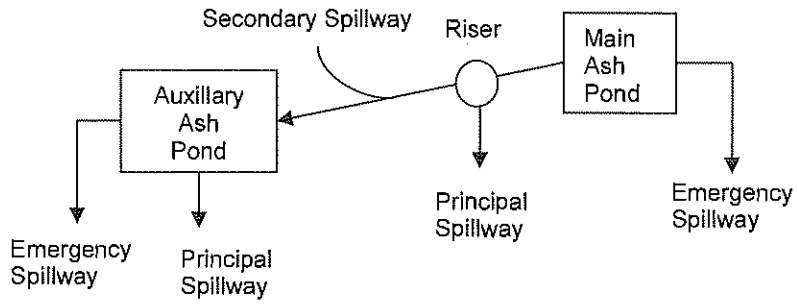
EW Brown Ash Pond Expansion

Drainage Analysis

Calculated By: Erman Caudill
Date: 6/22/06

This document outlines the development of the Principal Spillway Hydrography, Emergency Spillway Hydrograph ESH (a.k.a Standard Discharge Hydrograph SDH), and the Freeboard Hydrograph FBH. Procedures and methodology outlined in the KY Dam Regulations, KY Division of Water Engineering Memo No. 5, and NEH4 Ch. 21 are used.

System Schematic



Watershed Parameters

Main Pond

- Drainage Area = D.A. = 115 acres
- SCS Curve Number = CN = 95 (1-day basis)
- Time of Concentration = T_c = 15 min. = 0.25 hr.

Auxillary Pond

- D.A. = 52 ac.
- CN = 95
- T_c = 15 min.

Rainfall & Climate Data

100-Year 6-Hour Precip. = $P_{100,6}$ = 4.53"
100-Year 24-Hour Precip. = $P_{100,24}$ = 6.24"
100-Year 10-Day Precip. = $P_{100,10d}$ = 10.49"
Probable Maximum Precip. = PMP = 28" (based on 6-hr duration and 10 mi^2 area)
ESH Depth = $P_{100,6}$+0.26(PMP-$P_{100,6}$) = 10.6"
FBH Depth = PMP = 28.0"

Average Annual Precipitation = P_a = 48.87"
Average Annual Temperature = T_a = 55.0° F

Source: Rainfall = NOAA Atlas 14, Danville station; PMP = NOAA Hydro Report 51, Climate: NCDC Climate Normal for KY, Danville station

Calculations

Climate Index:

$$C_i = \frac{100P_a}{(T_a)^2} = \frac{100(48.87)}{(55)^2} = 1.62$$

10-Day CN Adjustment:
$CN_{1\text{-Day}} = 95$ $CN_{10\text{-Day}} = 90$ per NEH4 Table 21.2

Quick Return Flow (QRF):
Ci = 1.62 → QRFmin = 7.08 csm per NEH4 Table 21.4

Main Ash Pond $QRF_{min} = 7.08\text{csm} = 7.08\frac{\text{cfs}}{\text{mi}^2} \rightarrow 7.08\frac{\frac{\text{ft}^3}{\text{s}}}{\text{mi}^2}(115)\text{ac}\frac{\text{mi}^2}{640\text{ac}} = 1.27\text{ cfs}$

Auxillary Ash Pond $QRF_{min} = 7.08\text{csm} = 7.08\frac{\text{cfs}}{\text{mi}^2} \rightarrow 7.08\frac{\frac{\text{ft}^3}{\text{s}}}{\text{mi}^2}(52)\text{ac}\frac{\text{mi}^2}{640\text{ac}} = 0.58\text{ cfs}$

Baseflow:
Main Ash Pond = 15.45 cfs Auxillary Ash Pond = 11.7 cfs

Direct Runoff:

$$Q = \frac{(P - 0.2S)^2}{P + 0.8S} \quad S = \frac{1000}{CN} - 10 \rightarrow S_{1day} = 0.526 \rightarrow S_{10day} = 1.111$$

$Q_{100,24}(P_{100,24} = 6.24") = Q_1 = 5.65"$

$Q_{100,10d}(P_{100,10d} = 10.49") = Q_{10} = 9.27"$

$Q_{ESH}(P_{ESH} = 10.6") = 10.0"$

$Q_{FBH}(P_{FBH} = 28") = 27.4"$

$$\frac{Q_{100,24}}{Q_{100,10d}} = \frac{5.65}{9.27} = 0.61$$

Areal Adjustments:
Area < 10 mi^2 → No areal adjustment.

Channel Losses:
$C_i > 1$ → No channel loss adjustment.

Principal Spillway Hydrograph:
Serial = 5 from NEH 4 Table 21.9 using $Q_1/Q_{10} = 0.61$
PSH Ordinates → NEH 4 Table 21.10
To get PSH in cfs:
Units are cfs / (AQ_{10}): Main Pond $AQ_{10} = 1.67$ Auxillary Pond $AQ_{10} = 0.75$
QRF_{min} is added to all PSH values

Baseflow is routed separately

Emergency Spillway Hydrograph:

Hydrograph Family = 1 from NEH 4 Fig. 21-3 using CN = 95 and P_{ESH} = 10.6"

T_o = 5.85" from NEH4 Fig. 21.4

$T_p = 0.7T_c \rightarrow T_c = 0.25$, $T_p = 0.175$ hours

$$\frac{T_o}{T_p} = \frac{5.85}{0.175} = 33.4 \qquad \left(\frac{T_o}{T_p}\right)_{REV} = 36 \rightarrow T_p' = \frac{T_o}{36} = \frac{5.85}{36} = 0.163$$

$$q_p = \frac{484A}{T_p'}$$ Main Ash Pond q_p = 535.2 Auxillary Ash Pond q_p=242.0

ESH ordinates → NEH 4 Table 21.17

To get time in hours, use T_p' and multiply by t/T_p ordinates

To get ESH in cfs, multiply q_o/q_p by Qq_p where Q = Q_{ESH}

Main Pond Qq_p=10(535.2) = 5352

Auxillary Pond Qq_p=10(242.0) = 2420

Freeboard Hydrograph:

Same procedure as ESH determination, but P_{FBH}=28" and Q_{FBH}=27.4"

T_o = 5.90" from NEH4 Fig. 21.4

$T_p = 0.7T_c \rightarrow T_c = 0.25$, $T_p = 0.175$ hours

$$\frac{T_o}{T_p} = \frac{5.9}{0.175} = 33.7 \qquad \left(\frac{T_o}{T_p}\right)_{REV} = 36 \rightarrow T_p' = \frac{T_o}{36} = \frac{5.9}{36} = 0.164$$

$$q_p = \frac{484A}{T_p'}$$ Main Pond q_p = 530.7 Auxillary Pond q_p=239.9

FBH ordinates → NEH 4 Table 21.17

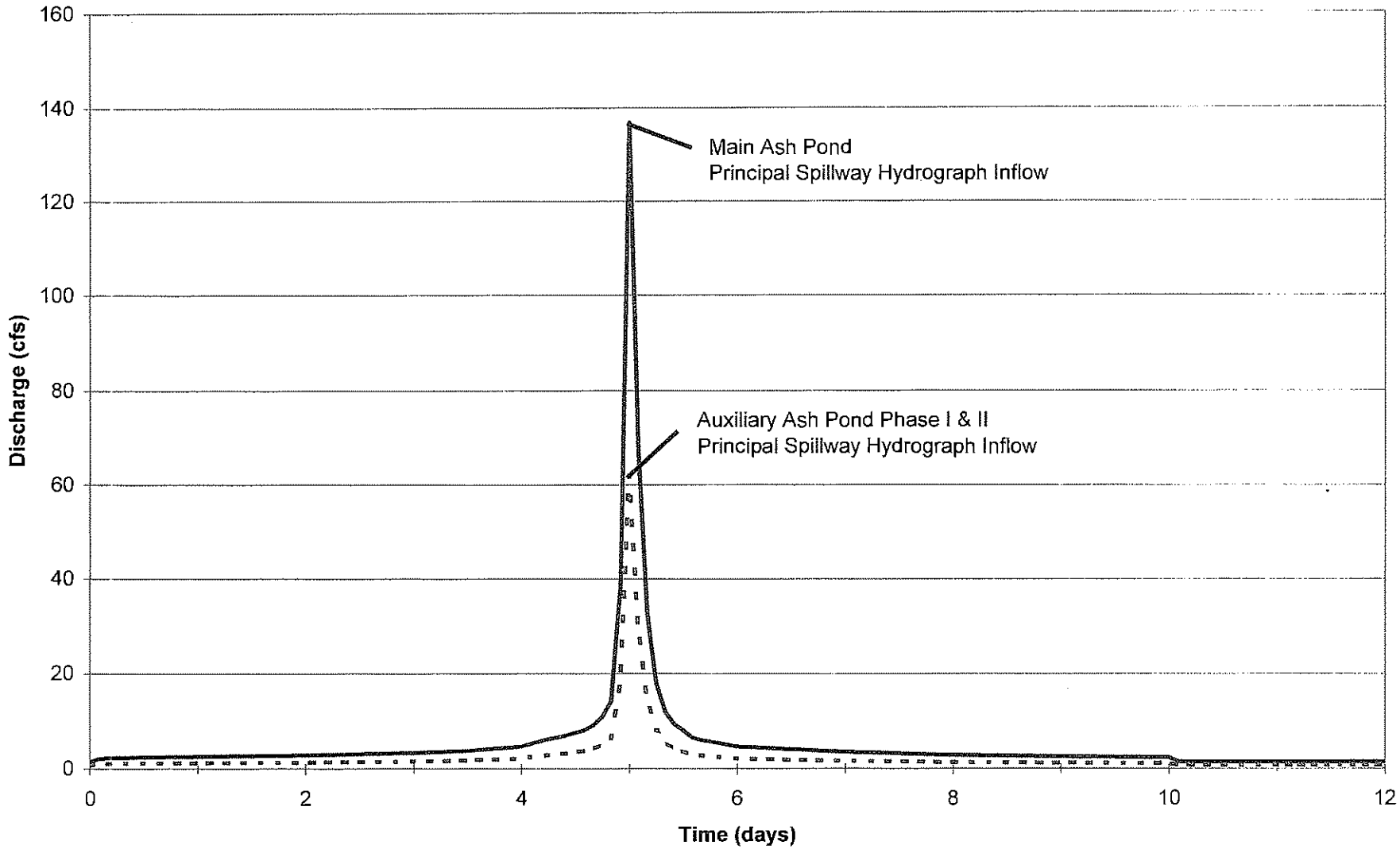
To get time in hours, use T_p' and multiply by t/T_p ordinates

To get FBH in cfs, multiply q_o/q_p by Qq_p where Q = Q_{FBH}

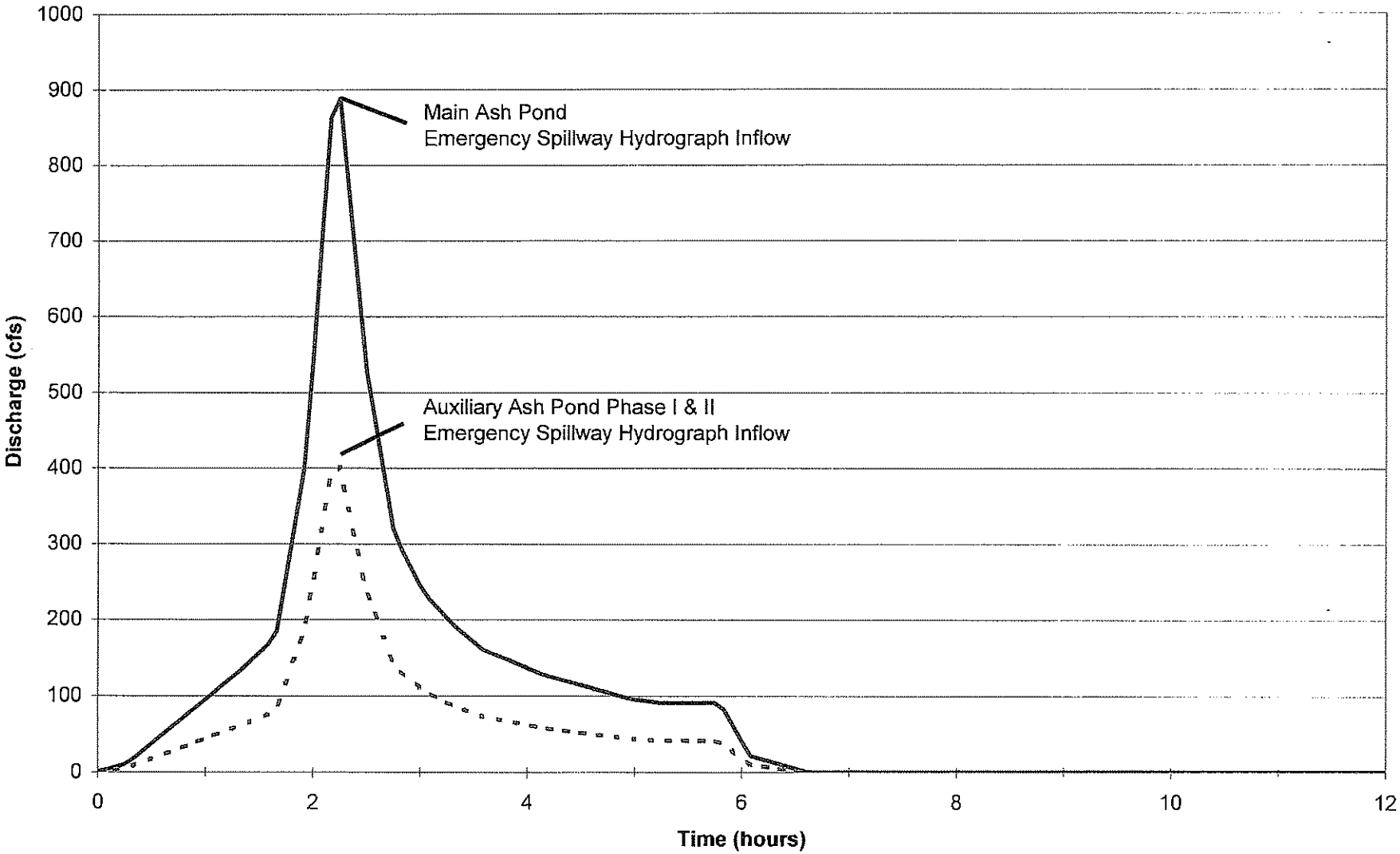
Main Pond Qq_p=27.4(530.7) = 14541.2

Auxillary Pond Qq_p=27.4(239.9) = 6573.3

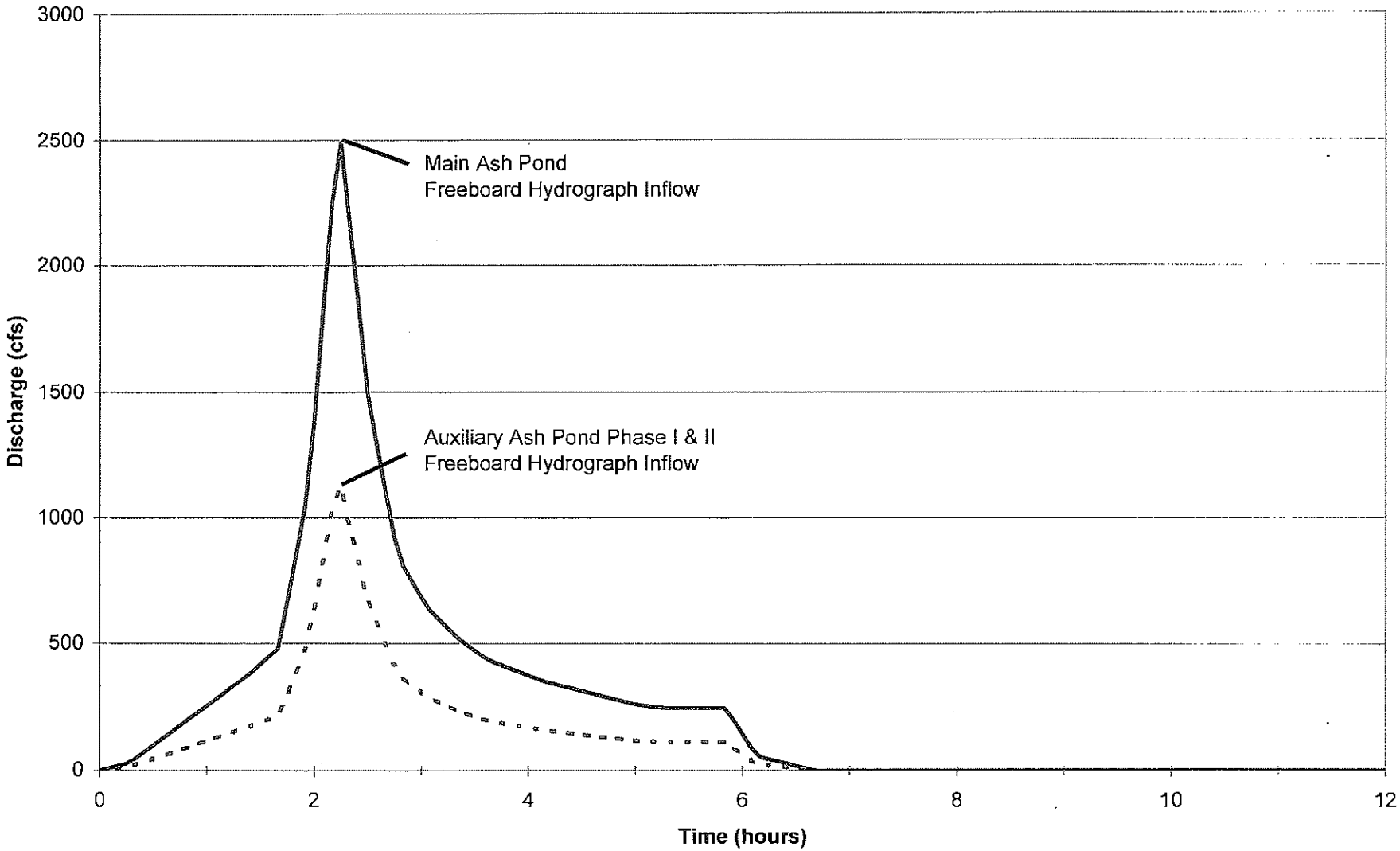
Principal Spillway Hydrographs



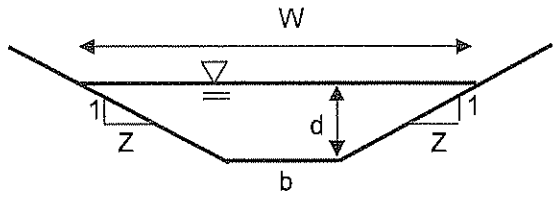
Emergency Spillway Hydrographs



Freeboard Hydrographs



Trapezoidal Channel Rating Calculations



$$Q = \frac{1.49}{n} A R^{\frac{2}{3}} S_o^{\frac{1}{2}}$$

$$A = bd + zd^2 \qquad W = b + 2zd$$

$$R = \frac{A}{W_p} = \frac{bd + zd^2}{b + 2d\sqrt{z^2 + 1}}$$

$$\tau_d = \gamma dS$$

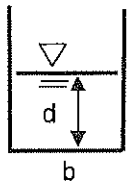
$$V = \frac{Q}{A}$$

Manning's "n" value	0.04	
Side slopes - Z	0.5	
Bottom Width - b	8	ft
Bottom Slope - S_o	0.01	ft/ft

Stage - d (feet)	A (ft^2)	Wp (ft)	R (ft)	Discharge Q (cfs)
0.0	0.0	8.0	0.000	0.0
0.1	0.8	8.2	0.098	0.0
0.2	1.6	8.4	0.192	0.1
0.3	2.4	8.7	0.282	0.2
0.4	3.3	8.9	0.369	0.6
0.5	4.1	9.1	0.452	1.0
0.6	5.0	9.3	0.533	1.8
0.7	5.8	9.6	0.611	2.7
0.8	6.7	9.8	0.686	3.9
0.9	7.6	10.0	0.760	5.4
1.0	8.5	10.2	0.830	7.3

(Continues)

Rectangular Channel Rating Calculations



$$Q = \frac{1.49}{n} A R^{\frac{2}{3}} S_o^{\frac{1}{2}}$$

$$A = bd \qquad Wp = b + 2d$$

$$R = \frac{A}{W_p} = \frac{bd}{b + 2d}$$

$$\tau_d = \gamma d S$$

$$V = \frac{Q}{A}$$

Manning's "n" value 0.012
Bottom Width - b 8 ft
Bottom Slope - S_o 0.005 ft/ft

Stage - d (feet)	A (ft^2)	Wp (ft)	R (ft)	Discharge Q (cfs)
0.0	0.0	8.0	0.000	0.0
0.1	0.8	8.2	0.098	0.0
0.2	1.6	8.4	0.190	0.2
0.3	2.4	8.6	0.279	0.5
0.4	3.2	8.8	0.364	1.2
0.5	4.0	9.0	0.444	2.3
0.6	4.8	9.2	0.522	3.8
0.7	5.6	9.4	0.596	5.8
0.8	6.4	9.6	0.667	8.3
0.9	7.2	9.8	0.735	11.4
1.0	8.0	10.0	0.800	15.0

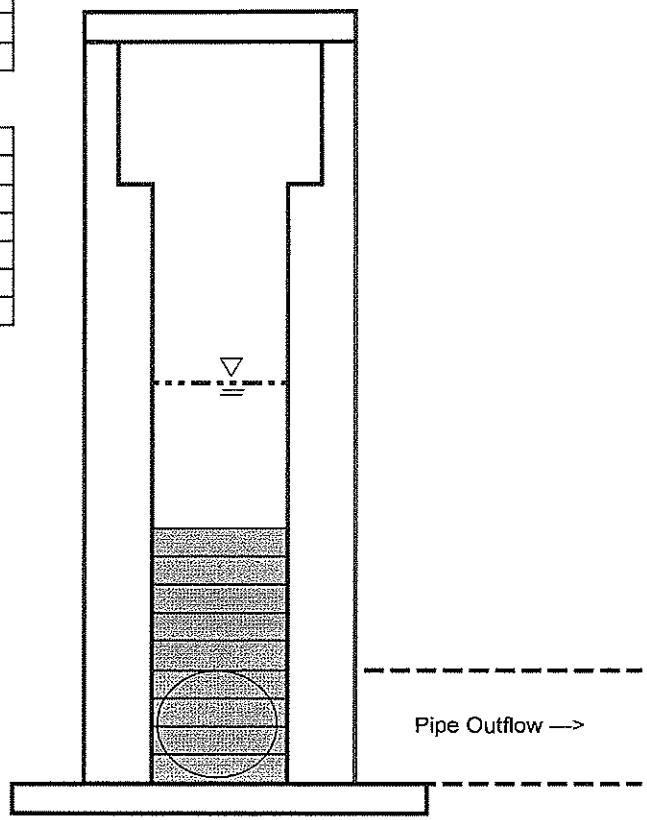
(Continues)

Auxillary Pond Phase 1 Riser Discharge Rating Curve Calculations

Top of Dam	880.0	feet
Max. Allowable Pool	878.0	feet
Emergency Spillway Elev.	876.0	feet

Bottom of Riser (Flowline)	870.0	feet
Outlet Pipe Diameter	2.5	feet
Top of Stoplogs Elev.	873.0	feet
Stoplog Width	3.0	feet
Top of Stoplog Gate Elev.	894.0	feet
Gate Width	4.0	feet
Top of Riser Opening Elev.	898.0	feet

Weir Flow $Q = CLH^{1.5}$	
C	3.1



Stage (feet)	Cumulative Storage (ac-ft)	Available Retarding Storage (ac-ft)	Composite Discharge Curve (cfs)
880	269.0	193.9	308.7
879	240.9	165.9	197.5
878	212.9	137.8	119.8
877	184.9	109.8	71.8
876	156.9	81.8	48.3
875	128.8	53.8	26.3
874	100.8	25.7	9.3
873	75.1	0.0	0.0
872	49.4		
871	18.4		
870	0.0		

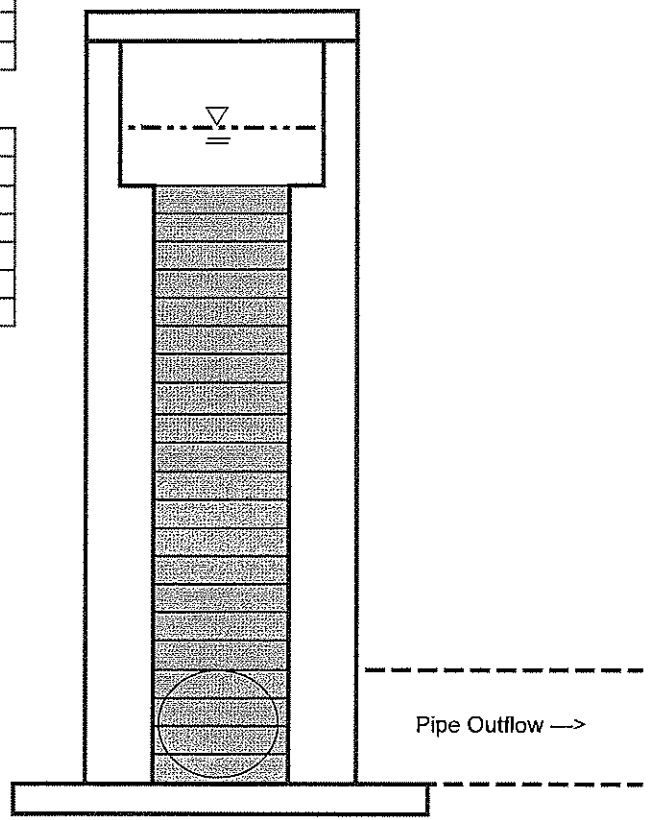
Note: Additional permanent ash storage volume below elevation 870.0' not applicable to hydrologic analyses.

Auxillary Pond Phase 2 Riser Discharge Rating Curve Calculations

Top of Dam	900.0	feet
Max. Allowable Pool	898.0	feet
Emergency Spillway Elev.	896.5	feet

Bottom of Riser (Flowline)	870.0	feet
Outlet Pipe Diameter	2.5	feet
Top of Stoplogs Elev.	894.0	feet
Stoplog Width	3.0	feet
Top of Stoplog Gate Elev.	894.0	feet
Gate Width	4.0	feet
Top of Riser Opening Elev.	900.0	feet

Weir Flow $Q = CLH^{1.5}$	
C	3.1



Stage (feet)	Cumulative Storage (ac-ft)	Available Retarding Storage (ac-ft)	Composite Discharge Curve (cfs)
900	929.8	211.9	501.7
899	893.8	175.9	350.0
898	857.9	139.9	199.2
897	822.6	104.6	83.4
896	787.2	69.3	35.1
895	752.6	34.7	12.4
894	717.9	0.0	0.0
893	683.9		
892	649.9		
891	616.5		
890	583.1		
889	550.3		
888	517.6		
887	485.6		
886	453.6		
885	422.2		
884	390.9		
883	360.4		
882	329.9		
881	299.4		
880	269.0		

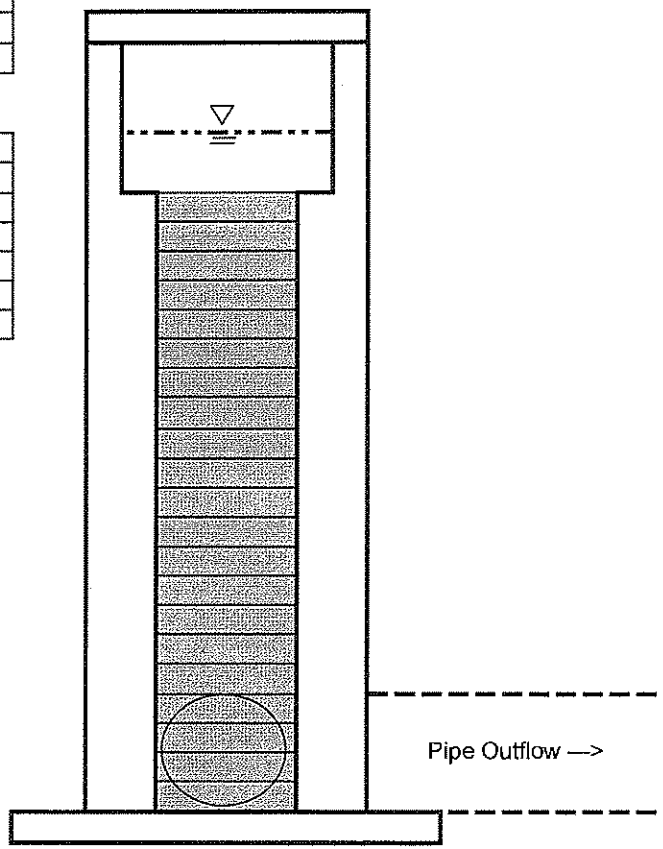
Note: Additional permanent ash storage volume below elevation 880.0' not applicable to hydrologic analyses.

Main Pond Riser Discharge Rating Curve Calculations

Top of Dam	962.0	feet
Max. Allowable Pool	960.0	feet
Emergency Spillway Elev.	957.7	feet

Bottom of Riser (Flowline)	893.0	feet
Outlet Pipe Diameter	2.5	feet
Top of Stoplogs Elev.	956.0	feet
Stoplog Width	3.0	feet
Top of Stoplog Gate Elev.	956.0	feet
Gate Width	4.0	feet
Top of Riser Opening Elev.	960.0	feet

Weir Flow $Q = CLH^{1.5}$	
C	3.1



Stage (feet)	Cumulative Storage (ac-ft)	Available Retarding Storage (ac-ft)	Composite Discharge Curve (cfs)
962	1276.0	647.9	687.2
961	1166.9	538.8	477.1
960	1057.9	429.7	292.9
959	949.9	321.7	143.7
958	841.9	213.8	43.6
957	735.0	106.9	12.4
956	628.1	0.0	0.0
955	522.3		
954	416.6		
953	311.9		
952	207.2		
951	103.6		
950	0.0		

Note: Additional permanent ash storage volume below elevation 950.0' not applicable to hydrologic analyses.

Hydrologic and Hydraulic Analysis

Auxillary Ash Pond Phase 1 - H&H Data Sheets

EW Brown Ash Pond
FMSM Engineers
LX2004069

Geometric Design Data

Type of Structure	Class "C" Earth Dam	
Top of Dam Elevation	880.0'	
Emergency Spillway		
Configuration	Trapezoidal 8' x 1H:2V Side Slopes	
Spillway Elevation	876.0'	
Principal Spillway		
Configuration	Riser Structure	
Top of Riser Structure	900.0'	Top of Dam Phase II
Top of Gate Opening Elev. (Bottom of Slab)	899.34'	
Principal Spillway Elev.	873.0'	
Stoplog Gate Width	4.0'	
Stoplog Width	3.0'	
Max. Stoplog Elev.	896.0'	
Operational Stoplog Elev.	873.0'	
Principal Spillway Outlet		
Configuration	30" Concrete Pressure Pipe Outlet	
Primary Outlet Pipe Invert	870.0'	
Primary Outlet Pipe Slope	1.0%	
Primary Outlet Pipe Length	200.0'	

Stage-Storage-Discharge Data

Stage (feet)	Retarding Storage (ac-ft)	Total Discharge (cfs)
873.0'	0.0	0.0
874.0'	25.7	9.3
875.0'	53.8	26.3
876.0'	81.8	48.3
877.0'	109.8	71.8
878.0'	137.8	119.8
879.0'	165.9	197.5
880.0'	193.9	308.7

Hydrologic and Hydraulic Analysis

Auxillary Ash Pond Phase 1 - H&H Data Sheets

Operational Data

Watershed Data

Drainage Area	52 acres
	0.081 sq-mi
Runoff Curve Number (1-Day Basis)	95
Time of Concentration	0.05 hours
	3.0 minutes

Rainfall - Climate Data

100-Yr 6-Hour Precipitation	4.53"
100-Yr 24-Hour Precipitation	6.24"
100-Yr 10-Day Precipitation	10.49"
Probable Maximum Precipitation (PMP)	28"
Emergency Spillway Hydrograph Precipitation P_{ESH} $= P_{100,6} + 0.26(PMP-P_{100,6})$	10.6"
Freeboard Hydrograph Precipitation $P_{FBH} = PMP$	28"
Average Annual Precipitation	48.87"
Average Annual Temperature	55° F

NEH4 / TR-60 Analysis Parameters

Calculated Climate Index	1.62
Minimum Quick Return Flow	7.08 cfs / sq-mi
	1.27 cfs
Process Baseflow	11.7 cfs
	144.0 cfs / sq-mi (csm)

Pond Performance

Normal Pool without Baseflow	873.0'	
Normal Pool with Baseflow	875.04'	
Emergency Spillway Elevation	876.0'	
		SCS Type II 100-Year, 6-Hour
Principal Spillway Hydrograph (PSH)		
Peak Elev. (EMAX)	876.03'	875.63'
P.S. Discharge	48.54 cfs	40.14 cfs
E.S. Discharge	0.45 cfs	0 cfs
Emergency Spillway Hydrograph (ESH)		
Peak Elev. (EMAX)	876.49'	
P.S. Discharge	52.49 cfs	
E.S. Discharge	7.41 cfs	
Freeboard Hydrograph (FBH)		
Peak Elev. (EMAX)	878.59'	
Freeboard	1.41'	
P.S. Discharge	64.67 cfs	
E.S. Discharge	100.88 cfs	
Alternate Calculation		
TR-60 Min. Aux. Discharge	200 cfs	3.68' Depth
Max. Peak Elev.	879.68	
Min. Freeboard	0.32'	

Hydrologic and Hydraulic Analysis

Auxillary Ash Pond Phase 2 - H&H Data Sheets

EW Brown Ash Pond
FMSM Engineers
LX2004069

Geometric Design Data

Type of Structure	Class "C" Earth Dam	
Top of Dam Elevation	900.0'	
Emergency Spillway		
Configuration	Dual 10' x 4' RCBC	
Spillway Elevation	896.5'	
Principal Spillway		
Configuration	Riser Structure	
Top of Riser Structure	900.0'	Top of Dam
Top of Gate Opening Elev. (Bottom of Slab)	899.34'	
Principal Spillway Elev.	894.0'	
Stoplog Gate Width	4.0'	
Stoplog Width	3.0'	
Max. Stoplog Elev.	894.0'	
Operational Stoplog Elev.	894.0'	
Principal Spillway Outlet		
Configuration	30" Concrete Pressure Pipe Outlet	
Primary Outlet Pipe Invert	870.0'	
Primary Outlet Pipe Slope	1.0%	
Primary Outlet Pipe Length	200.0'	

Stage-Storage-Discharge Data

Stage (feet)	Retarding Storage (ac-ft)	Total Discharge (cfs)
894.0'	0.0	0.0
895.0'	34.7	12.4
896.0'	69.3	35.1
897.0'	104.6	83.4
898.0'	139.9	199.2
899.0'	175.9	350.0
900.0'	211.9	501.7

Hydrologic and Hydraulic Analysis
Auxillary Ash Pond Phase 2 - H&H Data Sheets

Operational Data

Watershed Data

Drainage Area	52 acres
	0.081 sq-mi
Runoff Curve Number (1-Day Basis)	95
Time of Concentration	0.05 hours
	3.0 minutes

Rainfall - Climate Data

100-Yr 6-Hour Precipitation	4.53"
100-Yr 24-Hour Precipitation	6.24"
100-Yr 10-Day Precipitation	10.49"
Probable Maximum Precipitation (PMP)	28"
Emergency Spillway Hydrograph Precipitation P_{ESH} $= P_{100,6} + 0.26(PMP-P_{100,6})$	10.6"
Freeboard Hydrograph Precipitation $P_{FBH} = PMP$	28"
Average Annual Precipitation	48.87"
Average Annual Temperature	55° F

NEH4 / TR-60 Analysis Parameters

Calculated Climate Index	1.62
Minimum Quick Return Flow	7.08 cfs / sq-mi
	1.27 cfs
Process Baseflow	11.7 cfs
	144.0 cfs / sq-mi (csm)

Pond Performance

Normal Pool without Baseflow	894.0'	
Normal Pool with Baseflow	895.65'	
Emergency Spillway Elevation	896.50'	
		SCS Type II 100-Year, 6-Hour
Principal Spillway Hydrograph (PSH)		
Peak Elev. (EMAX)	896.40'	896.12'
P.S. Discharge	54.29 cfs	41.13 cfs
E.S. Discharge	0 cfs	0 cfs
Emergency Spillway Hydrograph (ESH)		
Peak Elev. (EMAX)	896.73'	
P.S. Discharge	61.66 cfs	
E.S. Discharge	8.83 cfs	
Freeboard Hydrograph (FBH)		
Peak Elev. (EMAX)	898.05'	
Freeboard	1.95'	
P.S. Discharge	100.74 cfs	
E.S. Discharge	106.34 cfs	
Alternate Calculation		
TR-60 Min. Aux. Discharge	200 cfs	2.35' Depth
Max. Peak Elev.	898.85	
Min. Freeboard	1.15'	

Hydrologic and Hydraulic Analysis

Main Ash Pond - H&H Data Sheets

EW Brown Ash Pond
FMSM Engineers
LX2004069

Geometric Design Data

Type of Structure	Class "C" Earth Dam	
Top of Dam Elevation	962.0'	
Emergency Spillway		
Configuration	Dual 10' x 5' RCBC	
Spillway Elevation	957.7'	
Principal Spillway		
Configuration	Riser Structure	
Top of Riser Structure	962.0'	Top of Dam
Top of Gate Opening Elev. (Bottom of Slab)	961.34'	
Principal Spillway Elev.	956.0'	
Stoplog Gate Width	4.0'	
Stoplog Width	3.0'	
Max. Stoplog Elev.	956.0'	
Operational Stoplog Elev.	956.0'	
Principal Spillway Outlet		
Configuration	30" Concrete Pressure Pipe Outlet + 30" CPP to Auxillary Pond	
Primary Outlet Pipe Invert	892.5'	
Primary Outlet Pipe Slope	1.0%	
Primary Outlet Pipe Length	200.0'	
Secondary Outlet Pipe Invert	895.0'	
Secondary Outlet Pipe Slope	0.45%	
Secondary Outlet Pipe Length	550.0'	

Stage-Storage-Discharge Data

Stage (feet)	Retarding Storage (ac-ft)	Total Discharge (cfs)
956.0'	0.0	0.0
957.0'	106.9	12.4
958.0'	213.8	43.6
959.0'	321.7	143.7
960.0'	429.7	292.9
961.0'	538.8	477.1
962.0'	647.9	687.2

Hydrologic and Hydraulic Analysis
Main Ash Pond - H&H Data Sheets

Operational Data

Watershed Data

Drainage Area	115 acres 0.180 sq-mi
Runoff Curve Number (1-Day Basis)	95
Time of Concentration	0.05 hours 3.0 minutes

Rainfall - Climate Data

100-Yr 6-Hour Precipitation	4.53"
100-Yr 24-Hour Precipitation	6.24"
100-Yr 10-Day Precipitation	10.49"
Probable Maximum Precipitation (PMP)	28"
Emergency Spillway Hydrograph Precipitation P_{ESH} = $P_{100,6}$ + 0.26(PMP-$P_{100,6}$)	10.6"
Freeboard Hydrograph Precipitation P_{FBH} = PMP	28"
Average Annual Precipitation	48.87"
Average Annual Temperature	55° F

NEH4 / TR-60 Analysis Parameters

Calculated Climate Index	1.62
Minimum Quick Return Flow	7.08 cfs / sq-mi (csm) 1.27 cfs
Process Baseflow	15.45 cfs 86.0 cfs / sq-mi (csm)

Pond Performance

Normal Pool without Baseflow	956.00'		
Normal Pool with Baseflow	957.10'		
Emergency Spillway Elevation	957.70'		
			SCS Type II 100-Year, 6-Hour
Principal Spillway Hydrograph (PSH)			
Peak Elev. (EMAX)	957.62'		957.43'
P.S. Discharge	31.74 cfs		25.78 cfs
E.S. Discharge	0 cfs		0 cfs
Emergency Spillway Hydrograph (ESH)			
Peak Elev. (EMAX)	957.93'		
P.S. Discharge	34.89 cfs		
E.S. Discharge	6.57 cfs		
Freeboard Hydrograph (FBH)			
Peak Elev. (EMAX)	959.19'		
Freeboard	2.81'		
P.S. Discharge	71.01 cfs		
E.S. Discharge	100.69 cfs		
Alternate Calculation TR-60 Min. Aux. Discharge	200 cfs	2.35	
Max. Peak Elev.	960.05		
Min. Freeboard	1.95'		

Appendix B

Auxiliary Ash Pond
Principal Spillway Pipe
Network Hydraulic Data

Analysis Results
Scenario: Principle Spillway Hydrograph

Title: EW Brown
Project Engineer: Fuller Mossbarger Scott & May Engineers Inc
Project Date: 05/25/06
Comments:

Scenario Summary	
Scenario	Principle Spillway Hydrograph
Physical Properties Alternat	Base-Physical Properties
Catchments Alternative	Base-Catchments
System Flows Alternative	Principle Spillway Hydrograph
Structure Headlosses Altern	Base-Structure Headlosses
Boundary Conditions Altern	Base-Boundary Conditions
Design Constraints Alternat	Base-Design Constraints
Capital Cost Alternative	Base-Capital Cost
User Data Alternative	Base-User Data

Network Inventory			
Number of Pipes	12	Number of Inlets	1
- Circular Pipes:	12	- Grate Inlets:	0
- Box Pipes:	0	- Curb Inlets:	0
- Arch Pipes:	0	- Combination Inlets:	0
- Vertical Elliptical Pipes:	0	- Slot Inlets:	0
- Horizontal Elliptical Pipes:	0	- Grate Inlets in Ditch:	0
Number of Junctions	11	- Generic Inlets:	1
Number of Outlets	1		

Circular Pipes Inventory			
30 inch	1,988.00 ft	36 inch	1,494.00 ft
Total Length	3,482.00 ft		

Generic Inlet Inventory	
Default 100%	1

Inlet elements for network with outlet: 435+80.64

Label	Inlet	Total System Flow (cfs)	Total Intercepted Flow (cfs)	Total Bypassed Flow (cfs)	Bypass Target	Capture Efficiency (%)	Hydraulic Grade Line In (ft)	Hydraulic Grade Line Out (ft)	Gravity Element Headloss (ft)	Headloss Method
401+00	Generic Default 1	55.00	0.00	0.00	N/A	100.0	873.06	873.06	0.00	Absolut

Junction elements for network with outlet: 435+80.64

Label	Hydraulic Grade Line In (ft)	Hydraulic Grade Line Out (ft)	Gravity Element Headloss (ft)	Headloss Method	System Additional Flow (cfs)	System Known Flow (cfs)	System Rational Flow (cfs)	System Intensity (in/hr)	System Flow Time (min)	System CA (acres)
403+44.36	864.76	864.76	0.00	Absolut	0.00	55.00	0.00	0.00	5.35	0.00
405+60	859.29	859.29	0.00	Absolut	0.00	55.00	0.00	0.00	5.54	0.00
411+37	850.35	850.35	0.00	Absolut	0.00	55.00	0.00	0.00	6.40	0.00
414+00	843.74	843.74	0.00	Absolut	0.00	55.00	0.00	0.00	6.68	0.00
415+50	840.03	840.03	0.00	Absolut	0.00	55.00	0.00	0.00	6.84	0.00
416+94	836.41	836.41	0.00	Absolut	0.00	55.00	0.00	0.00	6.99	0.00
420+89	826.71	826.71	0.00	Absolut	0.00	55.00	0.00	0.00	7.41	0.00
426+08	824.05	824.05	0.00	Absolut	0.00	55.00	0.00	0.00	8.47	0.00
428+50	822.82	822.82	0.00	Absolut	0.00	55.00	0.00	0.00	8.96	0.00
432+28	820.87	820.87	0.00	Absolut	0.00	55.00	0.00	0.00	9.73	0.00

Analysis Results
Scenario: Principle Spillway Hydrograph

Junction elements for network with outlet: 435+80.64

Label	Hydraulic Grade Line In (ft)	Hydraulic Grade Line Out (ft)	Gravity Element Headloss (ft)	Headloss Method	System Additional Flow (cfs)	System Known Flow (cfs)	System Rational Flow (cfs)	System Intensity (in/hr)	System Flow Time (min)	System CA (acres)
435+66	818.88	818.88	0.00	Absolut	0.00	55.00	0.00	0.00	10.42	0.00

Outlet: 435+80.64

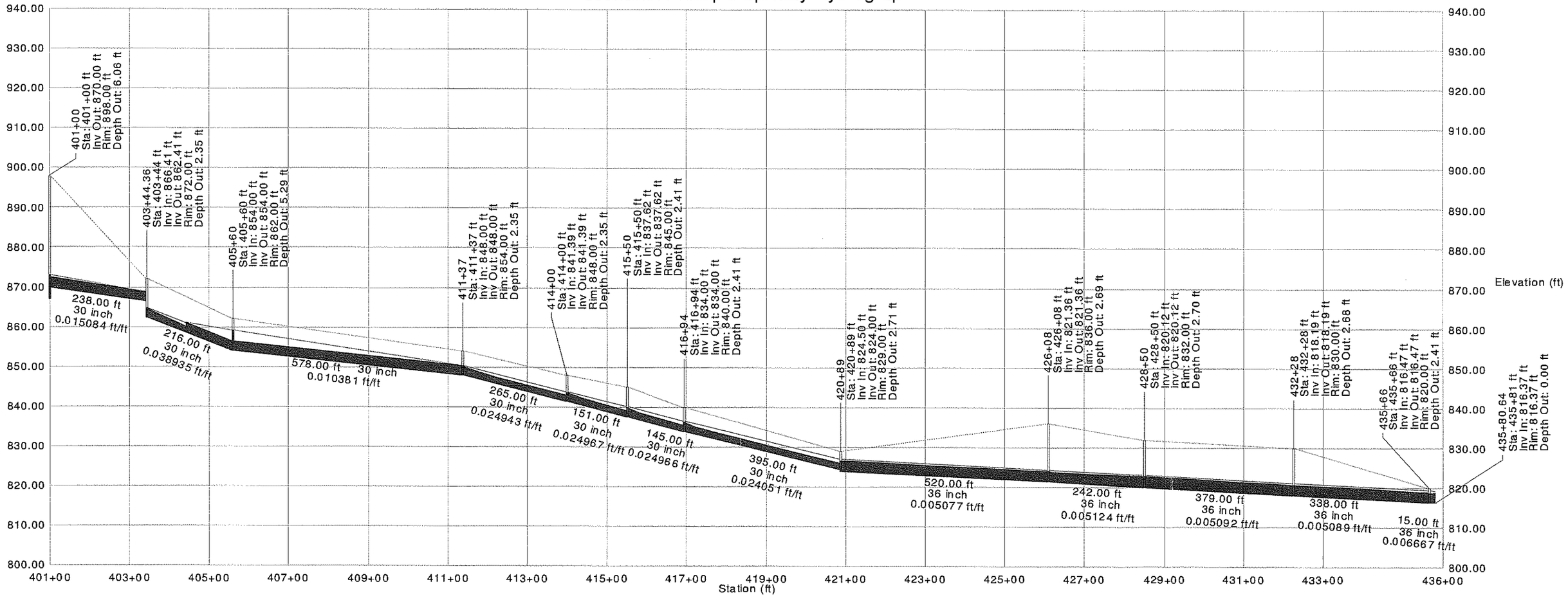
Label	Hydraulic Grade Line In (ft)	Hydraulic Grade Line Out (ft)	Gravity Element Headloss (ft)	System Additional Flow (cfs)	System Known Flow (cfs)	System Rational Flow (cfs)	System Intensity (in/hr)	System Flow Time (min)	System CA (acres)
435+80.64	816.37	816.37	0.00	0.00	55.00	0.00	0.00	10.45	0.00

Pipe elements for network with outlet: 435+80.64

Label	Section Shape	Section Size	Length (ft)	Number of Sections	Constructed Slope (ft/ft)	Energy Slope (ft/ft)	Total System Flow (cfs)	Average Velocity (ft/s)	Upstream Invert Elevation (ft)	Downstream Invert Elevation (ft)	Hydraulic Grade Line In (ft)	Hydraulic Grade Line Out (ft)
Pipe1	Circular	36 inch	15.00	1	0.006667	006312	55.00	9.48	816.47	816.37	818.88	818.70
Pipe2	Circular	36 inch	38.00	1	0.005089	005265	55.00	8.19	818.19	816.47	820.87	818.88
Pipe3	Circular	36 inch	79.00	1	0.005092	005114	55.00	8.20	820.12	818.19	822.82	820.87
Pipe4	Circular	36 inch	42.00	1	0.005124	005110	55.00	8.24	821.36	820.12	824.05	822.82
Pipe5	Circular	36 inch	20.00	1	0.005077	005095	55.00	8.17	824.00	821.36	826.71	824.05
Pipe6	Circular	30 inch	95.00	1	0.024051	019813	55.00	15.78	834.00	824.50	836.41	825.98
Pipe7	Circular	30 inch	45.00	1	0.024966	015635	55.00	16.00	837.62	834.00	840.03	835.55
Pipe8	Circular	30 inch	51.00	1	0.024967	024929	55.00	15.83	841.39	837.62	843.74	840.03
Pipe9	Circular	30 inch	65.00	1	0.024943	020708	55.00	15.82	848.00	841.39	850.35	843.06
Pipe10	Circular	30 inch	78.00	1	0.010381	015289	55.00	11.20	854.00	848.00	859.29	850.35
Pipe11	Circular	30 inch	16.00	1	0.038935	025801	55.00	18.86	862.41	854.00	864.76	859.29
Pipe12	Circular	30 inch	38.00	1	0.015084	017636	55.00	11.20	870.00	866.41	873.06	868.76

Profile
Scenario: Principle Spillway Hydrograph

Profile: Auxillary Pond
Scenario: Principle Spillway Hydrograph



Appendix C

Digital Data (CD)

BRO-C-00101

PLANS FOR CONSTRUCTION

AUXILIARY ASH POND - PHASE I
ASH POND EXTENSION PROJECT
E.W. BROWN GENERATING STATION
MERCER COUNTY, KENTUCKY

PREPARED FOR

KENTUCKY UTILITIES COMPANY
LEXINGTON, KENTUCKY

e·on | U.S.

PREPARED BY

Fuller Mossbarger Scott & May
FMSM ENGINEERS
LEXINGTON ST. LOUIS LOUISVILLE JEFFERSONVILLE CINCINNATI ATLANTA COLUMBUS NASHVILLE

FULLER MOSSBARGER SCOTT AND MAY ENGINEERS, INC.
1409 N. Forbes Rd.
Lexington, Kentucky
40511-2050
859-422-3000

VICINITY MAP

1 0 2 4 MILES
GRAPHIC SCALE

SURVEY NOTE:
As Constructed survey data provided by Bizzack Construction. Based on field observations this data is believed to be correct, but has not been surveyed by FMSM Engineers.

AS CONSTRUCTED - 06/17/08

HAZARD CLASSIFICATION
HIGH HAZARD, CLASS "C"

LX2006228\REVH\4069CVR.DWG

Professional engineer seal: STATE OF KENTUCKY, DAN A. BACK, 13030, LICENSED PROFESSIONAL ENGINEER, 6-18-08

REVISIONS

Rev.	Drawn Date:	Drawn By:	Revision Mode
A	6-16-06		
B	7-05-06		
C	10-02-06		
H	06-18-08		

Title: COVER SHEET
AUXILIARY ASH POND - PHASE I

Location and Unit: E.W. BROWN GENERATING STATION

Scale: AS SHOWN
Drawn: TJ
Date: MAY, 2006
Checked: DAB/BLP
Approved:

JOB NO.	JOB NO.	JOB NO.	JOB NO.
119961			

KU Kentucky Utilities Company, an e·on company

Drawing No: BRO-C-00101
Rev.: H

DMS Version 2.0

BR0-C-00102

INDEX OF SHEETS AND REVISIONS

INDEX OF SHEETS

REVISIONS

Revision No.	Date	Sheet Nos.	Description
A	6-16-06	BR0-C-00101 through BR0-C-00118	Revisions per review by FMSM and KU
A	6-16-06	BR0-C-00121 through BR0-C-00131	Revisions per review by FMSM and KU
A	6-16-06	BR0-C-00133 through BR0-C-00167	Revisions per review by FMSM and KU
A	6-16-06	BR0-C-00169 through BR0-C-00170	Revisions per review by FMSM and KU
A	6-16-06	BR0-C-00174 through BR0-C-00175	Revisions per review by FMSM and KU
A	6-16-06	BR0-C-00177 through BR0-C-00185	Revisions per review by FMSM and KU
A	6-16-06	BR0-C-00186	Initial Issue
A	6-16-06	BR0-C-00187 through BR0-C-00188	Revisions per review by FMSM and KU
A	6-16-06	BR0-C-00194	Revisions per review by FMSM and KU
A	6-16-06	BR0-C-00196 through BR0-C-00227	Revisions per review by FMSM and KU
A	6-16-06	BR0-C-00231 through BR0-C-00235	Initial Issue
B	7-05-06	BR0-C-00101 through BR0-C-00105	Revisions per review by FMSM and KU
B	7-05-06	BR0-C-00109	Revisions per review by FMSM and KU
B	7-05-06	BR0-C-00127	Revisions per review by FMSM and KU
B	7-05-06	BR0-C-00131	Revisions per review by FMSM and KU
B	7-05-06	BR0-C-00135	Revisions per review by FMSM and KU
B	7-05-06	BR0-C-00138	Revisions per review by FMSM and KU
B	7-05-06	BR0-C-00161 through BR0-C-00164	Revisions per review by FMSM and KU
B	7-05-06	BR0-C-00169 through BR0-C-00170	Revisions per review by FMSM and KU
B	7-05-06	BR0-C-00175	Revisions per review by FMSM and KU
B	7-05-06	BR0-C-00177 through BR0-C-00181	Revisions per review by FMSM and KU
		BR0-C-00186	Revisions per review by FMSM and KU
B	7-05-06	BR0-C-00188	Revisions per review by FMSM and KU
B	7-05-06	BR0-C-00194	Revisions per review by FMSM and KU
B	7-05-06	BR0-C-00196 through BR0-C-00201	Revisions per review by FMSM and KU
B	7-05-06	BR0-C-00204	Revisions per review by FMSM and KU
B	7-05-06	BR0-C-00222	Revisions per review by FMSM and KU
B	7-05-06	BR0-C-00226 through BR0-C-00227	Revisions per review by FMSM and KU
B	7-05-06	BR0-C-00231 through BR0-C-00233	Revisions per review by FMSM and KU
B	7-05-06	BR0-C-00235	Revisions per review by FMSM and KU
C	10-02-06	BR0-C-00101 through BR0-C-00235	Revisions per Bidder's questions and comments
D	2-16-07	BR0-C-00135	Revisions to blasting limits
E	6-14-07	BR0-C-01130	Initial Issue – Alternate Principal Spillway Plan
		BR0-C-01131	Initial Issue – Alternate Principal Spillway Profile
		BR0-C-01132	Initial Issue – Alternate Principal Spillway Details
F	6-14-07	BR0-C-00135	Revisions to blasting limits
		BR0-C-00137	Revisions to Phase 1D Embankment
		BR0-C-00148 through BR0-C-00159	Revisions to Cross Sections
		BR0-C-00171	Initial Issue – Borrow Area B Plan
		BR0-C-00182	Revisions to Principal Spillway Pipe
		BR0-C-00183	Revisions to Principal Spillway Pipe
G	11-15-07	BR0-C-01133 through BR0-C-01135	Initial Issue – T.H.E. Drawings
H	6-17-08	BR0-C-00101 through BR0-C-00105	As Constructed
		BR0-C-00109	As Constructed
		BR0-C-00112 through BR0-C-00115	As Constructed
		BR0-C-00117	As Constructed
		BR0-C-00121 through BR0-C-00124	As Constructed
		BR0-C-00126 through BR0-C-00131	As Constructed
		BR0-C-00133 through BR0-C-00167	As Constructed
		BR0-C-00169 through BR0-C-00171	As Constructed
H	6-17-08	BR0-C-00174 through BR0-C-00175	As Constructed
		BR0-C-00177 through BR0-C-00188	As Constructed
		BR0-C-00231 through BR0-C-00235	As Constructed
		BR0-C-01130 through BR0-C-01135	As Constructed

AS CONSTRUCTED - 06/17/08

INDEX TO MAPS

MAP 1	MAP 2	MAP 3
MAP 4	MAP 5	
MAP 6		

LX2006228\REVH\406INDEX

DAN A. BACK LICENSED PROFESSIONAL ENGINEER 06/18/08

Fuller Massbarger Scott & May

FMSM ENGINEERS
LEXINGTON ST. LOUIS LOUISVILLE JEFFERSONVILLE CINCINNATI KOWA COLUMBUS NASHVILLE

REVISIONS

Rev.	Drawn Date:	Drawn By:	Revision Mode
A	6-16-06		
B	7-05-06		
C	10-02-06		
D	02-16-07		
E	06-14-07		
F	06-14-07		
G	11-15-07		
H	06-17-08		

Title
INDEX OF SHEETS AND REVISIONS
AUXILIARY ASH POND – PHASE I

Location and Unit:
E.W. BROWN GENERATING STATION

Scale: N/A
Drawn: TJ
Date: MAY, 2006
Checked: DAB/BLP
Approved:

JOB NO. 119951 | JOB NO. | JOB NO. | JOB NO.

Drawing No: BR0-C-00102 | Rev. H

Kentucky Utilities Company
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DMS Version 2.0

GENERAL NOTES

1. Topographic information was obtained from two aerial surveys performed by L. Robert Kimball & Associates of Ebensburg, Pennsylvania. The topographic information within the Auxiliary Pond and Main Ash Pond is based on the August 25, 2004 aerial survey and the area outside these limits is from the September 1, 2005 aerial survey. The match line between these two surveys is shown on Sheets 104 through 111.

2. The property line information shown herein is a general approximation of property limits reconstructed from property deeds. The property lines have not been field surveyed and are not accurate for conveyance of property. The property lines should only be considered a general representation.

3. All existing barns, houses, foundations and utilities within borrow areas shall be removed by the Owner.

4. Sediment control fences and rock check dams shall be installed as shown on the Drawings and as directed by the Owner's Representative.

5. The Contractor shall not disturb existing power lines and shall not excavate around existing towers and poles within the following distances from the center of the structure unless otherwise noted. Slopes shall not exceed 2:1 (H:V) and the Contractor shall maintain access to all transmission structures.

Description	Radius (ft.)
Guyed Single Concrete Pole	120
Large Lattice Transmission Tower	100
Small Lattice Transmission Tower	85
Guyed Single Wood Pole	75
Double Pole Wood Structure	60
Single Pole Structure (Wood or Metal)	50
Guying Anchor	30

A ten (10) feet horizontal buffer zone must be maintained between the construction traffic and the power poles/towers at all times.

6. In addition to the horizontal clearances, the following vertical and transit clearances shall be observed for transmission lines.

Vertical Construction Clearances	
Description	Clearance (ft.)
69 kV	12
138 kV	16
345 kV	25

The above distances shall be measured from the highest point on the equipment to the lowest point on the line within the working area of the equipment.

7. The Contractor shall conduct his operations within the construction limits indicated on the drawings. Where temporary limits are shown, the Contractor shall enter those areas only for the duration of time required to complete his Work. The Owner will have other contractors performing work within these defined project construction limits and at nearby areas during the time of this work. Contractor shall coordinate with other contractors in the execution of the work and shall accommodate access route revisions and minor delays, share work areas and other coordination efforts without additional cost to the Owner.

8. The haul road to the Houp Property crosses the primary entrance to the E.W. Brown Generating Station. Plant deliveries, generating station personnel, construction deliverables, and construction personnel for the scrubber construction will be using the plant entrance continually, therefore access must be maintained at all times. The design of this road shall be the Contactor's responsibility and limited to the area shown on the site drawings. A flagman will be required when construction equipment crosses the plant access road and Curdsville Road. The Contractor shall not construct the haul road to the Houp Property unless authorized by Owner's Representative.

9. All Type III material shall be completely removed from Borrow Area I prior to beginning the Blasting Treatment Program and In Situ Treatment Program. Type III material shall be placed in Type III material stockpile areas 1 and 2 or directly in the embankment. Once Type III material has been placed in the two stockpiles areas, it shall not be removed until Borrow Area 6 has been developed to the proper grade for stream mitigation construction.

10. Borrow Areas 4 and 5 cannot be utilized unless authorized by Owner's Representative. Borrow Areas 1, 2, 3 and 6 must be exhausted prior to using Borrow Areas 4 and 5.

11. The contractor is responsible for coordination with the railroad company in constructing track crossings and in the coordination of rail deliveries.

12. Delivered materials for incorporation into the work shall be temporarily stored in areas as indicated on the drawings and/or as selected by the Contractor and approved by the Owner's Representative. The Contractor parking and office areas shall not be used for temporary storage.

13. The existing Main Ash Pond must remain in operation at all times. Under no circumstances shall fill be placed within the limits of the emergency spillway of the existing Main Ash Pond. The Contractor shall maintain the Owner's access to all portions of the Main Ash Pond and the KPDES discharge/monitoring point during the project.

14. A temporary Main Ash Pond siphon spillway outlet pipe shall be installed prior to beginning construction of the junction box and principal spillway extension within the existing spillway channel.

15. The Contractor shall construct the junction box and Main Ash Pond principal spillway pipe extension prior to placing any fill within the existing principal spillway outlet channel.

16. All areas to receive foundation treatment and all areas to be covered by embankment shall be cleared, grubbed, and stripped of all vegetation to a depth of six inches prior to placement of material. The final depth and extent shall be as determined during construction. All cleared topsoil material shall be stockpiled in the areas designated on the drawings or used for final dressing. Topsoil stripped from borrow areas shall be used for final dressing within the respective borrow area.

17. Excavation will not be permitted along the downstream rock covered slope of the existing ash pond embankment. All existing rock covered embankment slopes designated to receive fill shall be choked with a minimum of 4 inches of No. 57 Stone and covered with Type I filter fabric as shown on the Drawings prior to placement of new structural fill.

18. Stockpile and waste areas shall be graded to maintain positive drainage at all times. The side slopes shall have a 2:1 maximum slope. The top shall have a two (2) percent minimum slope. Segregate materials as directed by the Owner's Representative. Final grading and revegetation of these areas shall be performed under this contract.

19. All soft and saturated materials within the embankment limits shall be removed as directed by the Owner's Representative.

20. Sediment control shall be provided as presented in the Sediment Control and Stream Mitigation Drawings.

21. Sediment collected upstream of the Auxiliary Ash Pond Stormwater Collection Sump shall be removed by the Contractor prior to constructing the liner and prior to impounding a permanent pool.

22. Without regard to the materials encountered, all excavation shall be unclassified, unless noted otherwise.

23. The Contractor shall complete a pre-blast survey of all structures and improvements within 2,000 feet of the limits of proposed blasting areas which are outside the E.W. Brown Generating Station property line. The survey shall be completed at least 15 days prior to planned blasting. Blasting work will be permitted upon approval of the pre-blast survey by the Owner's Representative.

24. Blasting of any type will not be permitted within 120 feet of the existing Main Ash Pond embankment.

25. All final rock cut slopes within the rock borrow operation shall be pre-split. All rock cut slopes within the emergency spillway shall be pre-split. All rock cut slopes within the principal spillway and perimeter ditch excavations shall be pre-split.

26. Type I embankment material shall consist of all sound limestone and shale excavated from Borrow Areas 2 and 3 and shall have a Slake Durability Index $\geq$ 85 percent. The material shall be free of objectionable amounts of clay lumps, dirt coatings, and foreign material, and shall contain no particle size whose largest dimension exceeds 24 inches. In addition, Type I material shall not have more than 5 percent passing the No. 200 Sieve. Borrow Area No. 2 shall be exhausted of material prior to proceeding to Borrow Area No. 3. All material proposed for use as Type I embankment material shall receive prior approval of the Owner's Representative.

27. Type II Embankment Material

Type II embankment material shall consist of earth and rock materials excavated from the Blasting Treatment Program. This material is divided into potential material types; Type IIa and Type IIb. Type IIa consists of blasted rock and Type IIb consists of earth. Each material is further defined below.

Type IIa/6 Embankment Material shall consist of a rock/shale/soil combination with a maximum particle size of 6 inches and $\leq$ 30% passing No. 200 sieve. Type IIa/6 material may be obtained from Borrow Area No. 1 as well as from Borrow Area No. 2 quarried material. It is anticipated a crusher will be required to generate this material.

Type IIa/24 embankment material shall consist of a rock/shale/soil combination with a maximum particle size of twenty-four (24) inches in the lesser dimension, shall not exceed forty-eight (48) inches in any dimension, and $\leq$ 30% passing No. 200 sieve.

Type IIb/4 embankment material shall consist of a rock/shale/soil combination with a maximum particle size of four (4) inches.

28. Type III embankment material shall consist of plastic clay materials, free of organic material, which classify as CH, CL, MH, ML, CL-ML, SC or SM-SC according to the Unified Soil Classification System. The maximum permissible dimension of stones or rocks shall be three (3) inches. All Type III material shall consist of Soils 1, 2, 3, 5 and 6 from Borrow Area Nos. 1, 4, 5 and 6. Under no circumstances shall Type III material be wasted unless approved by the Owner's Representative.

29. Type IV embankment material shall consist of coal combustion Bottom Ash from Main Ash Pond Borrow Area No. 7.

30. The Contractor shall construct the embankment in the zones and with the types of materials required in the Contract Documents.

31. Under no circumstances shall Type III embankment material be substituted for Type I or Type II embankment material.

32. The foundation of the embankments that consist of soil shall be proof-rolled a minimum of one pass with a fully loaded Volvo A35 dump truck, or equivalent, and four passes with a vibratory smooth drum roller. Any areas of pumping shall be removed or stabilized as directed by the Owner's Representative.

33. The embankments shall be constructed in approximate horizontal lifts extending the entire length and width of the embankment. The embankment zones shall be maintained within five feet vertically of adjacent embankment zones at all times.

34. Type I embankment material shall be placed in layers not to exceed twenty four (24) inches. The material shall not be dumped into final position, but shall be distributed by blading and dozing in a manner that will ensure proper placement in the embankment so that voids, pockets and bridging are held to a minimum.

35. Type II Embankment Material

Type IIa/6, Type IIa/24 and Type IIb/4 materials shall not be dumped into final position, but shall be dumped on the surface layer being placed and then spread to the desired thickness. The material shall be distributed by blading or dozing in a manner that will ensure proper placement in the embankment so that voids, sockets and bridging are held to a minimum.

The maximum lift thickness for Type IIa/6 Embankment Material shall be twelve (12) inches.

The maximum lift thickness for Type IIa/24 Embankment Material shall be thirty (30) inches.

The maximum lift thickness for Type IIb/4 Embankment material shall be eight (8) inches.

36. Type III embankment material shall be placed in layers not to exceed eight (8) inches in uncompacted thickness, maintained at a moisture content within -2 % to +4% of optimum moisture content, and compacted to at least 95 percent standard Proctor density (ASTM D698).

Embankment Placement Requirements

Summary of Earth and Rock Fill Material Placement Requirements*

Material Type	Max. Lift Thickness (inches)	Compaction Requirements				
		Proctor	Vibratory Tamping Foot Roller	Vibratory Smooth Wheel Roller	Self Propelled Static Roller	Loaded Rock Truck
Proof Rolling	---	---	---	4 Passes	---	1 Pass
I	24	---	---	2 Passes	---	---
IIa/6	12	---	---	6 Passes	---	---
IIa/24	30	---	---	6 Passes	---	1 Pass
IIb/4	8	---	2 Passes	---	2 Passes	---
III	8	95%	---	---	As Needed	---
IV	18 - 24	Spread with Low Ground Pressure Dozer				

* See other general notes and specifications for more specific requirements.

37. No. 57 Stone shall consist of crushed rock meeting the requirements for No. 57 crushed stone as given in Section 805 of the Kentucky Department of Highways "Standard Specificaotion for Road and Bridge Construction", current edition.

38. If the surface of the prepared foundation or the rolled surface of any layer of the compacted earth fill is too dry or smooth to bond properly with the layer of material to be placed thereon, it shall be moistened and/or worked with a harrow, scarifier, or other suitable equipment, in an approved manner to a sufficient depth to provide a satisfactory bonding surface before the next succeeding layer of material is placed. If the rolled surface of any layer of the fill in place is too wet for proper compaction of the layer of material to be placed thereon, it shall be removed, allowed to dry, or be worked with a harrow, scarifier, or other suitable equipment to reduce the water content to the required amount, and then it shall be recompacted before the next succeeding layer of material is placed.

39. During construction, the top surface of all earth fills shall be kept sloped with grades not less than two (2) percent in order that the fill will drain freely toward the cutslopes.

40. Pipe shall not be rolled, dropped, or thrown into the trench. Pipe that is not in true alignment or which shows abnormal settlement after placement, shall be removed and re-laid. Pipe shall be laid so outside laps of circumferential joints point upstream, with no longitudinal joints in the lower quadrant.

41. Under no circumstances shall construction equipment travel over pipe installations until at least two (2) feet of compacted backfill has been placed above the top of the pipe bedding.

42. Type I geotextile filter fabric shall be a woven, polyester fabric meeting the requirements of the Specifications.

43. Type II geotextile filter fabric shall be a non-woven, polyester fabric meeting the requirements of the Specifications.

44. Type III geotextile filter fabric shall be a non-woven, polyester fabric meeting the requirements of the Specifications.

45. Flexible membrane liner shall consist of co-extruded white (top) and black (bottom) textured 60 mil (total thickness) - linear low density polyethylene (LLDPE) liner meeting the requirements of the Specifications.

46. Base course for the access road and embankment surfacing shall consist of nine (9) inches of No. 57 stone. Base course stone shall conform to Section 805 of the Kentucky Department of Highways "Standard Specifications for Road and Bridge Construction", current edition.

47. Top course for the access road and embankment surfacing shall consist of nine (9) inches of DGA, and shall conform to Section 805 of the Kentucky Department of Highways "Specifications for Road and Bridge Construction", current edition.

48. Final grading, fertilization, seeding and mulching of all areas shall be completed as soon as practical after completion of such respective portions of the project. Borrow areas shall be reseeded as each segment has been exhausted of borrow material.

49. Concrete:
Class A Concrete - f'c = 4,000 psi at 28 days, maximum nominal size aggregate: 1 inch

Class B Concrete - f'c = 2,500 psi at 28 days, maximum nominal size aggregate: 1 inch

Pre-Cast Concrete - f'c = 4,500 psi at 28 days, maximum nominal size aggregate: 1 inch

50. Reinforcing steel shall have a minimum yield of 60,000 psi.

51. Concrete coverage for reinforcing, unless otherwise noted, shall be in accordance with ACI 318, latest edition.

52. Provide details in accordance with ACI 315, latest edition.

53. Dimensions for bar spacing are center to center of bar unless otherwise shown. Clearances are to the outside edge of the bar.

54. Class A concrete shall be used for all reinforced concrete structures unless otherwise noted.

55. All concrete surfaces shall be finished to a smooth, sound surface. Surface defects due to forming shall be corrected.

56. All exposed concrete edges shall be chamfered 3/4 inches unless otherwise noted.

57. All Auxiliary Ash Pond spillway pipe manholes shall be five (5) feet inner diameter precast manholes as shown on the Drawings.

58. Construction joints shall not be used at locations other than those shown on the plans unless prior approval is obtained from the Owner's Representative.

59. Provide dowels, unless otherwise noted, in walls, slabs, footings, etc. for any concrete not placed at the time the original work is placed. Dowels shall be the same size as main reinforcement in concrete work and shall lap as noted:

Minimum Splice Length	
Bar Size	Grade 60 Steel
No. 3	1'-4"
No. 4	1'-7"
No. 5	2'-0"
No. 6	2'-4"
No. 7	2'-9"
No. 8	3'-1"
No. 9	4'-2"
No. 10	5'-3"
No. 11	6'-5"

60. Provide two (2) inch by four (4) inch keys, unless otherwise noted, at construction joints of all headwalls

61. All dowels, anchor bolts, manhole stops, wall pipes, and manhole frames shall be cast-in-place.

62. Rock anchor bolts shall be installed as quickly as practical after rock excavation of the riser foundation is complete. Initial installation of rock anchor bolts shall be completed under the direct supervision of a qualified manufacturer's representative and in the presence of the Owner's Representative.

63. Rock anchor bolt prestressing shall not be conducted until the gel time of the resin for the ambient temperature has been surpassed.

AS CONSTRUCTED - 06/17/08

DAN A. BACK LICENSED PROFESSIONAL ENGINEER 06/18/08

REVISIONS				
Rev.	Drawn Date:	Drawn By:	Revision Mode	
A	6-16-06			
B	7-05-06			
C	10-02-06			
H	06-17-08			

Fuller Mossbarger Scott & May ENGINEERS
LEXINGTON ST. LOUIS LOUISVILLE JEFFERSONVILLE CINCINNATI ATLANTA COLUMBUS NASHVILLE

Title
GENERAL NOTES
AUXILIARY ASH POND - PHASE I

Location and Unit:
E.W. BROWN GENERATING STATION

Scale: N/A
Drawn: TJ/CDV
Date: MAY, 2006
Checked: DAB/BLP
Approved:

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JOB NO.	JOB NO.	JOB NO.	JOB NO.	Drawing No:	Rev.
119961				BR0-C-00103	H

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DMS Version 2.0

BR0-C-00104

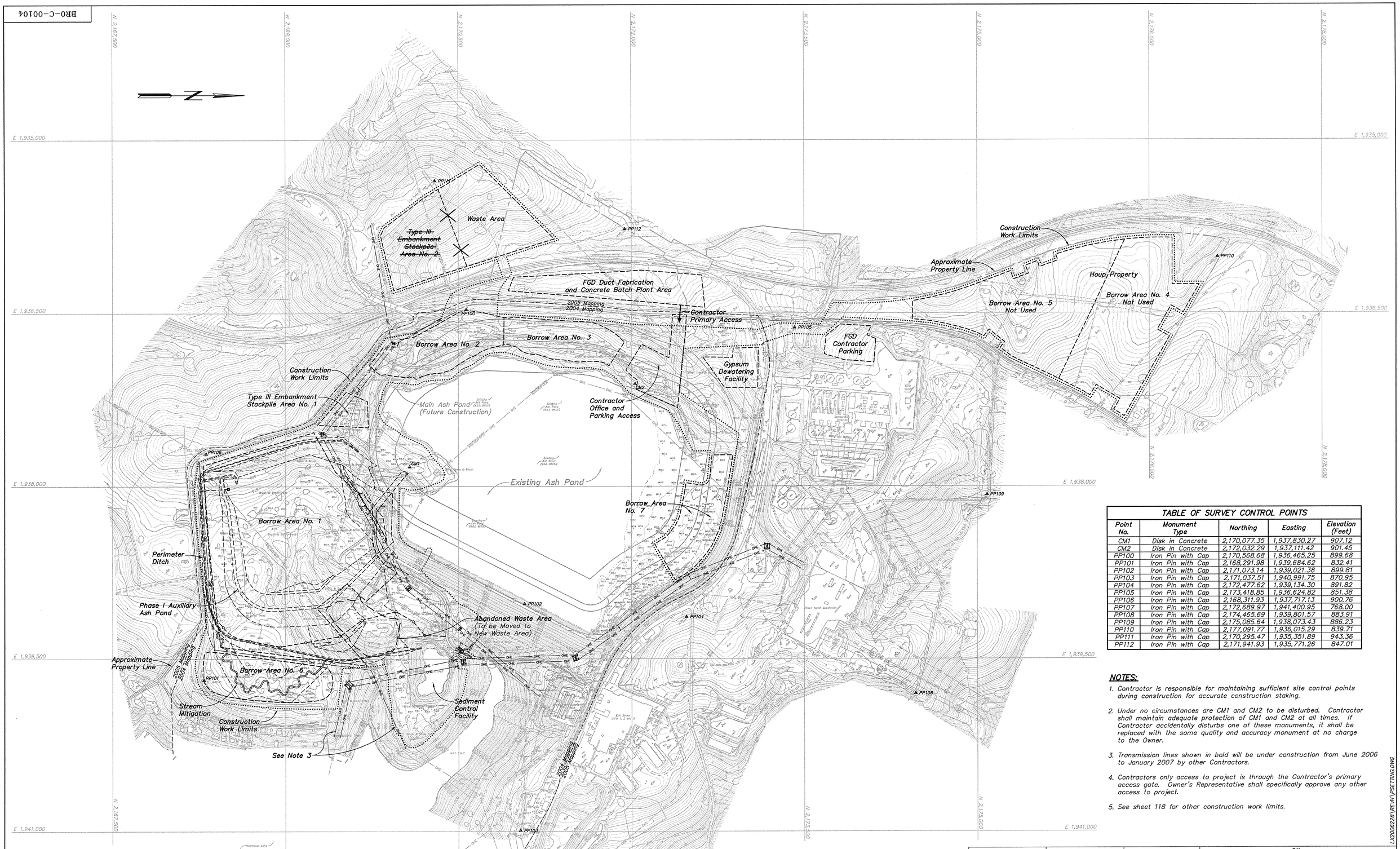

TABLE OF SURVEY CONTROL POINTS				
Point No.	Monument Type	Northing	Easting	Elevation (Feet)
CM1	Disk in Concrete	2,170,077.35	1,937,830.27	907.12
CM2	Disk in Concrete	2,172,032.29	1,937,111.42	901.45
PP100	Iron Pin with Cap	2,170,568.68	1,936,465.25	899.68
PP101	Iron Pin with Cap	2,168,291.98	1,939,684.62	832.41
PP102	Iron Pin with Cap	2,171,073.14	1,939,021.38	899.81
PP103	Iron Pin with Cap	2,171,037.51	1,940,991.75	870.95
PP104	Iron Pin with Cap	2,172,477.62	1,939,134.30	891.82
PP105	Iron Pin with Cap	2,173,418.85	1,936,624.82	851.38
PP106	Iron Pin with Cap	2,168,311.93	1,937,717.13	900.76
PP107	Iron Pin with Cap	2,172,689.97	1,941,400.95	768.00
PP108	Iron Pin with Cap	2,174,465.69	1,939,801.57	883.91
PP109	Iron Pin with Cap	2,175,085.64	1,938,073.43	886.23
PP110	Iron Pin with Cap	2,177,091.77	1,936,015.29	839.71
PP111	Iron Pin with Cap	2,170,295.47	1,935,351.89	943.36
PP112	Iron Pin with Cap	2,171,941.93	1,935,771.26	847.01

NOTES:

1. Contractor is responsible for maintaining sufficient site control points during construction for accurate construction staking.
2. Under no circumstances are CM1 and CM2 to be disturbed. Contractor shall maintain adequate protection of CM1 and CM2 at all times. If Contractor accidentally disturbs one of these monuments, it shall be replaced with the same quality and accuracy monument at no charge to the Owner.
3. Transmission lines shown in bold will be under construction from June 2006 to January 2007 by other Contractors.
4. Contractors only access to project is through the Contractor's primary access gate. Owner's Representative shall specifically approve any other access to project.
5. See sheet 118 for other construction work limits.

MAPPING NOTES:

1. Existing site conditions are based on topographical mapping taken from an aerial survey dated September 1, 2005 by L. Robert Kimball & Associates, Inc., and aerial survey dated August 25, 2004 by L. Robert Kimball & Associates. The topographic mapping presented within these drawings consist of a combination of these two topographic maps. The topographic information within the Auxiliary Ash Pond and Main Ash Pond is based on August 25, 2004 aerial survey and the area outside these limits are from the September 1, 2005 aerial survey. The matchline between these two surveys is shown on Sheets 104 through 111.
2. Coordinate system is based on Kentucky State Plane, South Zone NAD83, Vertical Datum NAVD88.

LEGEND

- Existing Overhead Electric
- Existing Power Pole
- Existing Fence
- Treeline
- Tree
- 928.8 Surface Spot Elevation
- Approximate Property Line
- CM2 Survey Control Point
- 2004 Mapping / 2005 Mapping Mapping Matchline
- Construction Work Limits
- Relocated Overhead Electric

150 0 300 600 FEET

GRAPHIC SCALE: 1" = 300'
CONTOUR INTERVAL = 2'

AS CONSTRUCTED - 06/17/08

REVISIONS				
Rev.	Drawn Date:	Drawn By:	Revision Mode	
A	6-16-06			
B	7-05-06			
C	10-02-06			
H	06-17-08			

Title
PLAN VIEW
PROJECT SETTING
AUXILIARY ASH POND – PHASE I

Location and Unit:
E.W. BROWN GENERATING STATION

Scale: 1"=300'
Drawn: TJ/CDV
Date: MAY, 2006
Checked: DAB/BLP
Approved:

JOB NO.	JOB NO.	JOB NO.	JOB NO.	JOB NO.
119961				

Drawing No: BR0-C-00104
Rev.: H

Fuller Mossbarger Scott & May

EMSM ENGINEERS
LEXINGTON ST. LOUIS LOUISVILLE JEFFERSONVILLE CINCINNATI ATLANTA COLUMBUS NASHVILLE

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DMS Version 2.0

BRO-C-00105

MAP 1

MAP 2

MAP 3

MAP 4

MAP 5

MAP 6

N

N 2,169,000
N 2,170,500
N 2,172,000
N 2,173,500
N 2,175,000
N 2,176,500
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N 2,159,000
N 2,160,500
N 2,172,000

E 1,935,000
E 1,936,500
E 1,938,000
E 1,938,500
E 1,941,000

Waste Area
Type III Embankment Stockpile Area No. 2
Borrow Area No. 2
Construction Work Limits
Type III Embankment Stockpile Area No. 1
Main Ash Pond (Future Construction)
FGD Duct Fabrication and Concrete Batch Plant Area
2005 Mapping
2004 Mapping
Contractor Primary Access
Borrow Area No. 3
FGD Contractor Parking
Gypsum Dewatering Facility
Contractor Office and Parking Access
Approximate Property Line
Houp Property
Borrow Area No. 5 NOT USED
Borrow Area No. 4 NOT USED
Existing Ash Pond
Borrow Area No. 7
Borrow Area No. 1
Perimeter Ditch
Phase I Auxiliary Ash Pond
Abandoned Waste Area (To be moved to New Waste Area)
Borrow Area No. 6
Stream Mitigation
Construction Work Limits
Sediment Control Facility
See Note 3
E.W. Brown Units 1, 2 and 3

150 0 300 600 FEET
GRAPHIC SCALE: 1" = 300'
CONTOUR INTERVAL = 2'

AS CONSTRUCTED - 06/17/08

MAPPING NOTES:

1. Existing site conditions are based on topographical mapping taken from an aerial survey dated September 1, 2005 by L. Robert Kimball & Associates, Inc., and aerial survey dated August 25, 2004 by L. Robert Kimball & Associates. The topographic mapping presented within these drawings consist of a combination of these two topographic maps. The topographic information within the Auxiliary Ash Pond and Main Ash Pond is based on August 25, 2004 aerial survey and the area outside these limits are from the September 1, 2005 aerial survey. The matchline between these two surveys is shown on Sheets 104 through 111.
2. Coordinate system is based on Kentucky State Plane, South Zone NAD83, Vertical Datum NAVD88.

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DAN A. BACK 17361 LICENSED PROFESSIONAL ENGINEER 06-17-08

REVISIONS			
Rev.	Drawn Date:	Drawn By:	Revision Mode
A	6-16-06		
B	7-05-06		
C	10-02-06		
H	06-17-08		

Fuller Mossbarger Scott & May

MSM ENGINEERS
LEXINGTON ST. LOUIS | LOUISVILLE JEFFERSONVILLE | CINCINNATI ATLANTA | COLUMBUS NASHVILLE

Title
PLAN VIEW
MAP KEY
AUXILIARY ASH POND - PHASE I

Location and Unit:
E.W. BROWN GENERATING STATION

Scale: 1"=300'
Drawn: TJ/CDV
Date: MAY, 2006
Checked: DAB/BLP
Approved:

Kentucky Utilities Company
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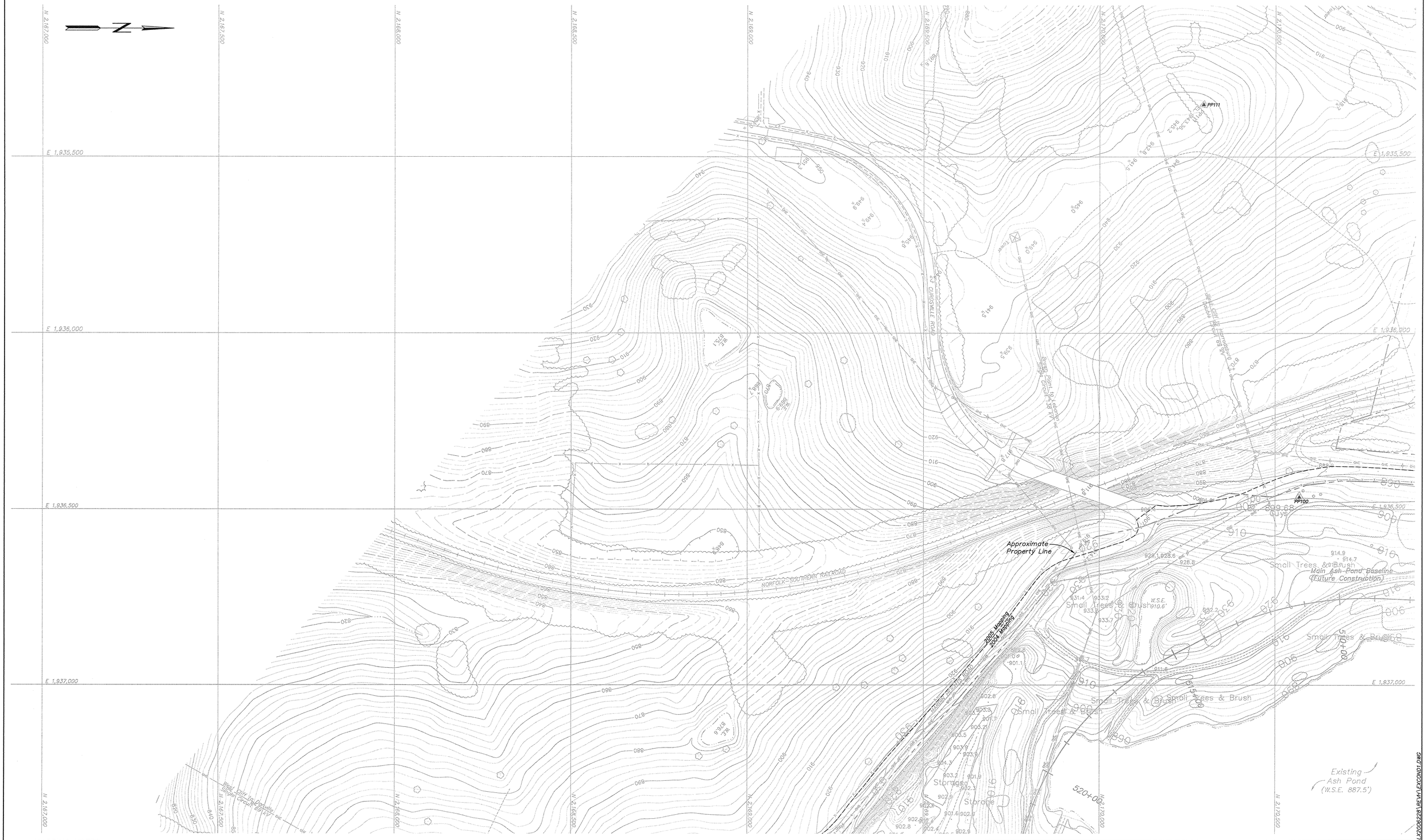
JOB NO.	JOB NO.	JOB NO.	JOB NO.	Drawing No:	Rev.
119961				BRO-C-00105	H

DMS Version 2.0

BR0-C-00106



MAPPING NOTES:

1. Existing site conditions are based on topographical mapping taken from an aerial survey dated September 1, 2005 by L. Robert Kimball & Associates, Inc., and aerial survey dated August 25, 2004 by L. Robert Kimball & Associates. The topographic mapping presented within these drawings consist of a combination of these two topographic maps. The topographic information within the Auxiliary Ash Pond and Main Ash Pond is based on August 25, 2004 aerial survey and the area outside these limits are from the September 1, 2005 aerial survey. The matchline between these two surveys is shown on Sheets 104 through 111.

2. Coordinate system is based on Kentucky State Plane, South Zone NAD83, Vertical Datum NAVD88.

LEGEND

- Existing Overhead Electric
- Existing Power Pole
- Existing Fence
- Treeline
- Tree
- 928.8 Surface Spot Elevation
- Approximate Property Line
- Survey Control Point
- CM2 & 2004 Mapping / 2005 Mapping — Mapping Matchline

RELEASED FOR CONSTRUCTION - 10/02/06

50 0 100 200 FEET
GRAPHIC SCALE: 1" = 100'
CONTOUR INTERVAL = 2'

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DANA A. BACK LICENSED PROFESSIONAL ENGINEER

Fuller Mossbarger Scott & May

EMSM ENGINEERS
LEXINGTON ST. LOUIS LOUISVILLE JEFFERSONVILLE CINCINNATI ATLANTA COLUMBUS NASHVILLE

REVISIONS

Rev.	Drawn Date:	Drawn By:	Revision Made
A	6-16-06		
C	10-02-06		

Title
EXISTING CONDITIONS AND BASELINE LAYOUT AUXILIARY ASH POND - PHASE I

Location and Unit:
E.W. BROWN GENERATING STATION

Scale: 1"=100'
Drawn: TJ
Date: MAY, 2006
Checked: VJS/KOH
Approved:

JOB NO.	JOB NO.	JOB NO.	JOB NO.
119961			

Kentucky Utilities Company
an E·ON company

Drawing No: BR0-C-00106
Rev. C

LX2006228\REMA\EXCOND1.DWG

DMS Version 2.0

BR0-C-00107

N 2,171,000 | N 2,171,500 | N 2,172,000 | N 2,172,500 | N 2,173,000 | N 2,173,500 | N 2,174,000 | N 2,174,500

E 1,935,500 | E 1,936,000 | E 1,936,500 | E 1,937,000

Approximate Property Line

PP112

PP105

NORFOLK SOUTHERN RAILROAD

CURDSVILLE ROAD

Brown North to Airdale Double Circuit 345 kV

Main Ash Pond Baseline (Future Construction)

2005 Mapping
2004 Mapping

Existing Ash Pond (W.S.E. 887.5')

Small Trees & Brush

Brush & Small Trees

Pipes

Tower

Combustion

CM2

505+00 | 500+00 | 495+00

MAPPING NOTES:

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- Existing Power Pole
- Existing Fence
- Treeline
- Tree
- 928.8 Surface Spot Elevation
- Approximate Property Line
- CM2 Survey Control Point
- 2004 Mapping / 2005 Mapping Mapping Matchline

RELEASED FOR CONSTRUCTION - 10/02/06

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Fuller Mossbarger Scott & May

EMSM ENGINEERS
LEXINGTON ST. LOUIS | LOUISVILLE JEFFERSONVILLE | CINCINNATI ATLANTA | COLUMBUS NASHVILLE

REVISIONS

Rev.	Drawn Date:	Drawn By:	Revision Made
A	6-16-06		
C	10-02-06		

Title
EXISTING CONDITIONS
AND BASELINE LAYOUT
AUXILIARY ASH POND – PHASE I

Location and Unit:
E.W. BROWN GENERATING STATION

Scale: 1"=100'
Drawn: TJ
Date: MAY, 2006
Checked: WJS/KOH
Approved:

Kentucky Utilities Company
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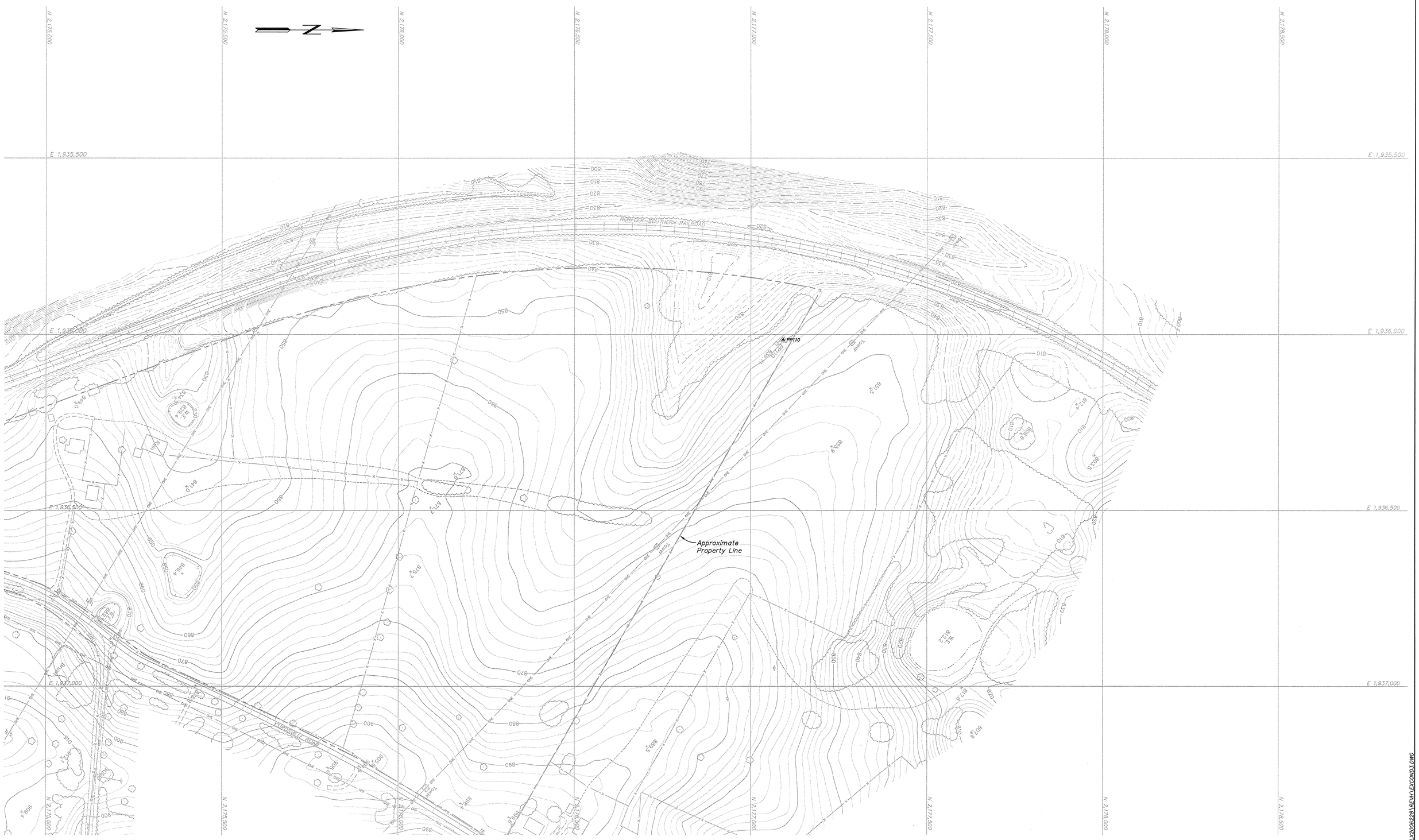
JOB NO.	JOB NO.	JOB NO.	JOB NO.	Drawing No:	Rev.
119961				BR0-C-00107	C

LX2006228\VIEW\LEXCON02.DWG

DMS Version 2.0

BR0-C-00108



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2. Coordinate system is based on Kentucky State Plane, South Zone NAD83, Vertical Datum NAVD88.

LEGEND

- Existing Overhead Electric
- Existing Power Pole
- Existing Fence
- Treeline
- Tree
- 925.8 Surface Spot Elevation
- Approximate Property Line
- CM2 ▲ Survey Control Point
- 2004 Mapping / 2005 Mapping Mapping Matchline

RELEASED FOR CONSTRUCTION - 10/02/06

50 0 100 200 FEET
GRAPHIC SCALE: 1" = 100'
CONTOUR INTERVAL = 2'

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Fuller Mossbarger Scott & May

EMSM ENGINEERS
LEXINGTON ST. LOUIS LOUISVILLE JEFFERSONVILLE CINCINNATI ATLANTA COLUMBUS NASHVILLE

REVISIONS			
Rev.	Drawn Date:	Drawn By:	Revision Mode
A	6-16-06		
C	10-02-06		

Title
EXISTING CONDITIONS
AND BASELINE LAYOUT
AUXILIARY ASH POND – PHASE I

Location and Unit:
E.W. BROWN GENERATING STATION

Scale: 1"=100'
Drawn: TJ
Date: MAY 2006
Checked: WJS/KOH
Approved:

JOB NO.	JOB NO.	JOB NO.	JOB NO.
119961			

Kentucky Utilities Company
an E·ON company

Drawing No: BR0-C-00108
Rev. C

\\2006228\REW\EXCOND3.DWG

DMS Version 2.0

BRO-C-00109

AUXILIARY ASH POND – PHASE I BASELINE CURVE DATA

①
P.I. Sta.= 112+97.61
Northing = 2,168,598.33
Easting = 1,930,94.48
Δ = 88°21'46"
D = 17°29'42"
T = 318.27'
L = 505.08'
R = 327.50'
E = 129.18'
P.C. Sta.= 109+79.34
P.T. Sta.= 114+84.42

②
P.I. Sta.= 119+20.08
Northing = 2,169,350.20
Easting = 1,939,038.90
Δ = 40°21'04"
D = 73°55'48"
T = 28.48'
L = 54.58'
R = 77.50'
E = 5.07'
P.C. Sta.= 118+91.60
P.T. Sta.= 119+46.18

③
P.I. Sta.= 126+88.74
Northing = 2,169,899.40
Easting = 1,938,497.70
Δ = 93°46'07"
D = 67°24'24"
T = 90.78'
L = 139.11'
R = 85.00'
E = 39.36'
P.C. Sta.= 125+97.96
P.T. Sta.= 127+37.07

④
P.I. Sta.= 132+53.29
Northing = 2,169,445.85
Easting = 1,938,094.28
Δ = 51°09'22"
D = 5°18'45"
T = 516.22'
L = 962.93'
R = 1078.50'
E = 117.18'
P.C. Sta.= 127+37.07
P.T. Sta.= 137+00.00

PERIMETER DITCH BASELINE CURVE DATA

⑤
P.I. Sta.= 303+88.04
Northing = 2,169,172.87
Easting = 1,937,607.74
Δ = 14°19'50"
D = 11°27'33"
T = 62.86'
L = 125.06'
R = 500.00'
E = 3.94'
P.C. Sta.= 303+25.18
P.T. Sta.= 304+50.24

⑥
P.I. Sta.= 313+48.78
Northing = 2,168,252.48
Easting = 1,937,885.55
Δ = 76°22'13"
D = 57°17'45"
T = 78.65'
L = 133.29'
R = 100.00'
E = 27.22'
P.C. Sta.= 312+70.13
P.T. Sta.= 314+03.42

⑦
P.I. Sta.= 324+53.51
Northing = 2,168,314.82
Easting = 1,939,012.56
Δ = 20°21'16"
D = 5°43'46"
T = 179.52'
L = 355.25'
R = 1,000.00'
E = 15.99'
P.C. Sta.= 322+73.99
P.T. Sta.= 326+29.24

⑧
P.I. Sta.= 327+65.39
Northing = 2,168,440.80
Easting = 1,939,302.01
Δ = 54°34'38"
D = 22°55'06"
T = 128.97'
L = 238.14'
R = 250.00'
E = 31.31'
P.C. Sta.= 326+36.42
P.T. Sta.= 328+74.56

⑨
P.I. Sta.= 338+14.71
Northing = 2,169,486.94
Easting = 1,939,522.51
Δ = 21°39'52"
D = 11°27'33"
T = 95.67'
L = 189.06'
R = 500.00'
E = 9.07'
P.C. Sta.= 337+19.04
P.T. Sta.= 339+08.10

PHASE I AUXILIARY ASH POND EMERGENCY SPILLWAY BASELINE CURVE DATA

⑩
P.I. Sta.= 61+79.35
Northing = 2,168,570.18
Easting = 1,937,888.63
Δ = 94°51'39"
D = 136°27'04"
T = 45.71'
L = 69.52'
R = 41.99'
E = 20.08
P.C. Sta.= 61+33.63
P.T. Sta.= 62+03.15

⑪
P.I. Sta.= 64+77.26
Northing = 2,168,255.95
Easting = 1,937,948.20
Δ = 83°28'11"
D = 146°23'12"
T = 34.92'
L = 57.02'
R = 39.14'
E = 13.31'
P.C. Sta.= 64+42.98
P.T. Sta.= 65+00.00

PHASE II AUXILIARY ASH POND BASELINE CURVE DATA

⑫
P.I. Sta.= 203+82.51
Northing = 2,169,188.23
Easting = 1,937,655.96
Δ = 12°56'12"
D = 30°33'28"
T = 21.26'
L = 42.34'
R = 187.50'
E = 1.20'
P.C. Sta.= 203+61.25
P.T. Sta.= 204+03.59

AUXILIARY ASH POND – PHASE I EMBANKMENT BASELINE CURVE DATA

⑬
P.I. Sta.= 102+37.13
Northing = 2,168,458.47
Easting = 1,938,046.23
Δ = 13°16'54"
D = 67°24'24"
T = 9.89'
L = 19.70'
R = 85.00'
E = 0.57'
P.C. Sta.= 102+27.24
P.T. Sta.= 102+46.94

⑭
P.I. Sta.= 103+76.35
Northing = 2,168,504.16
Easting = 1,938,177.83
Δ = 13°16'53"
D = 27°56'57"
T = 23.87'
L = 47.52'
R = 205.00'
E = 1.38'
P.C. Sta.= 103+52.48
P.T. Sta.= 104+00.00

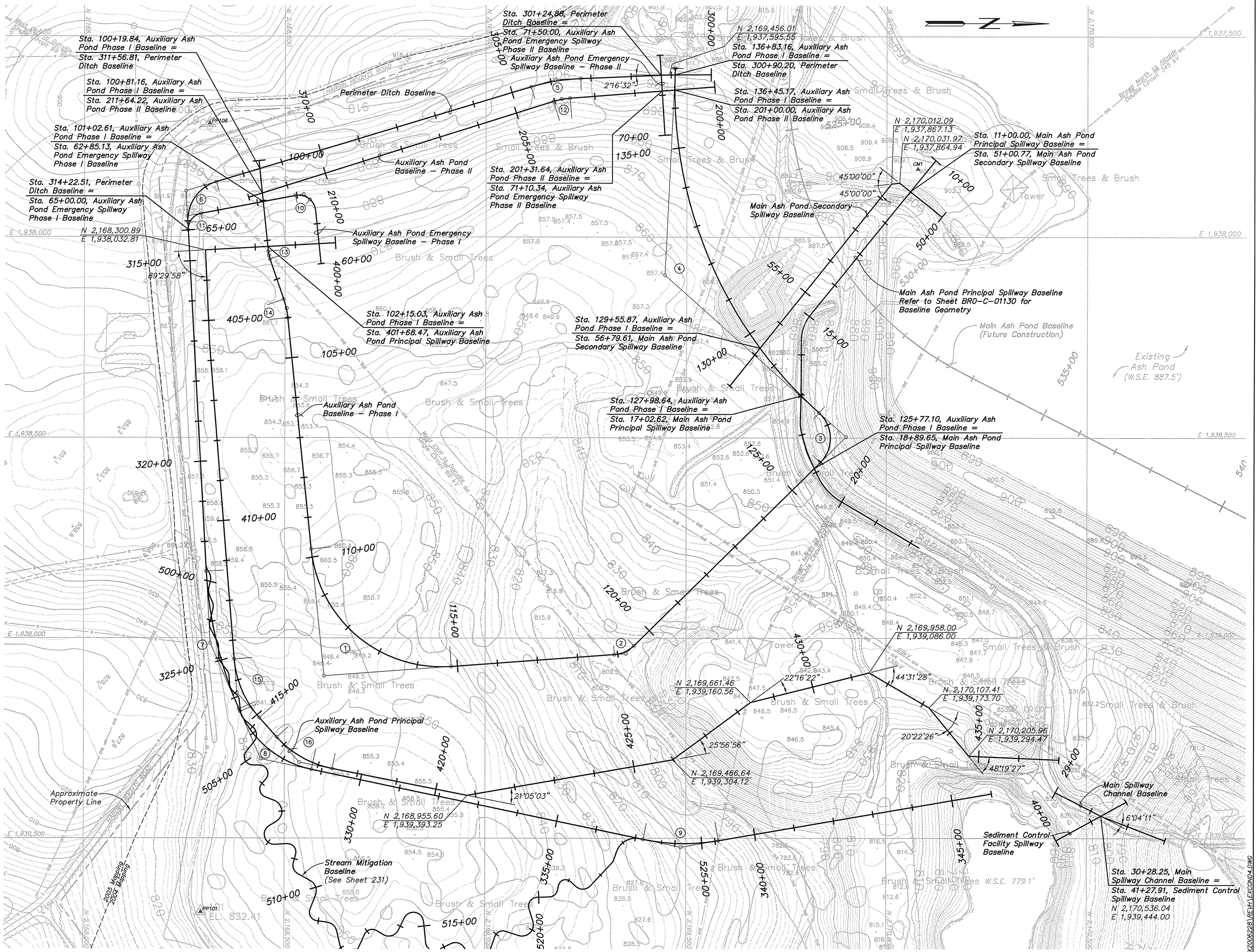
AUXILIARY ASH POND – PHASE I PRINCIPAL SPILLWAY BASELINE CURVE DATA

⑮
P.I. Sta.= 414+30.81
Northing = 2,168,381.66
Easting = 1,939,136.54
Δ = 37°06'18"
D = 22°55'06"
T = 83.90'
L = 161.90'
R = 250.00'
E = 13.70'
P.C. Sta.= 413+46.91
P.T. Sta.= 415+08.81

⑯
P.I. Sta.= 416+57.71
Northing = 2,168,536.55
Easting = 1,939,310.35
Δ = 37°06'18"
D = 22°55'06"
T = 83.90'
L = 161.90'
R = 250.00'
E = 13.70'
P.C. Sta.= 415+73.81
P.T. Sta.= 417+35.71

TABLE OF BASELINE COORDINATES

STATION	BASELINE	NORTHING	EASTING
10+00.00	Main Ash Pond Principal Spillway	2,170,121.76	1,937,808.76
22+24.72	Main Ash Pond Principal Spillway	2,170,081.87	1,938,774.28
29+00.00	Main Spillway Channel	2,170,421.98	1,939,385.38
32+00.00	Main Spillway Channel	2,170,696.20	1,939,505.89
40+00.00	Sediment Pond Spillway	2,170,423.91	1,939,505.56
42+00.00	Sediment Pond Spillway	2,170,599.23	1,939,409.31
50+00.00	Main Ash Pond Secondary Spillway	2,170,137.28	1,937,949.38
58+00.00	Main Ash Pond Secondary Spillway	2,169,608.59	1,938,370.35
60+00.00	Auxiliary Ash Pond Emergency Spillway – Phase I	2,168,588.51	1,938,067.03
65+00.00	Auxiliary Ash Pond Emergency Spillway – Phase I	2,168,257,88	1,937,983.14
70+00.00	Auxiliary Ash Pond Emergency Spillway – Phase II	2,169,445.31	1,937,746.12
72+00.00	Auxiliary Ash Pond Emergency Spillway – Phase II	2,169,432.61	1,937,546.52
100+00.00	Auxiliary Ash Pond – Phase I	2,168,465.72	1,937,803.66
137+00.00	Auxiliary Ash Pond – Phase I	2,169,471.14	1,937,578.68
200+00.00	Auxiliary Ash Pond – Phase II	2,169,569.53	1,937,625.53
212+00.00	Auxiliary Ash Pond – Phase II	2,168,408.41	1,937,901.83
300+00.00	Perimeter Ditch	2,169,560.64	1,937,595.21
346+00.00	Perimeter Ditch	2,170,263.11	1,939,388.97
400+00.00	Auxiliary Ash Pond Principal Spillway	2,168,637.03	1,938,017.80
437+00.00	Auxiliary Ash Pond Principal Spillway	2,170,431.11	1,939,304.15



MAPPING NOTES:

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2. Coordinate system is based on Kentucky State Plane, South Zone NAD83, Vertical Datum NAVD88.

LEGEND

- Existing Overhead Electric
- Existing Power Pole
- Existing Fence
- Treeline
- Tree
- 928.8 Surface Spot Elevation
- Approximate Property Line
- CM2 Survey Control Point
- 2004 Mapping / 2005 Mapping — Mapping Matchline

GRAPHIC SCALE: 1" = 100'
CONTOUR INTERVAL = 2'

AS CONSTRUCTED - 06/17/08

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Fuller Mossbarger Scott & May
FMSM ENGINEERS
LEXINGTON ST. LOUIS · LOUISVILLE JEFFERSONVILLE · CINCINNATI ATLANTA · COLUMBUS NASHVILLE

STATE OF KENTUCKY · DAN A. BACK · 13930 · LICENSED · PROFESSIONAL ENGINEER · 6-18-08

REVISIONS

Rev.	Drawn Date:	Drawn By:	Revision Made
A	6-16-06		
B	7-05-06		
C	10-02-06		
H	06-17-08		

Title

EXISTING CONDITIONS AND BASELINE LAYOUT AUXILIARY ASH POND – PHASE I

Location and Unit:
E.W. BROWN GENERATING STATION

Scale: 1"=100'
Drawn: TJ
Date: MAY, 2006
Checked: DAB/BLP
Approved:

JOB NO.	JOB NO.	JOB NO.	JOB NO.
119961			

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Drawing No: BRO-C-00109 — Rev. H

LX2006228\REVH\EXCOND4.DWG

DMS Version 2.0

BR0-C-00110

LX2006228\REVA\EXCOND5.DWG

MAPPING NOTES:

1. *Existing site conditions are based on topographical mapping taken from an aerial survey dated September 1, 2005 by L. Robert Kimball & Associates, Inc., and aerial survey dated August 25, 2004 by L. Robert Kimball & Associates. The topographic mapping presented within these drawings consist of a combination of these two topographic maps. The topographic information within the Auxiliary Ash Pond and Main Ash Pond is based on August 25, 2004 aerial survey and the area outside these limits are from the September 1, 2005 aerial survey. The matchline between these two surveys is shown on Sheets 104 through 111.*

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LEGEND

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- *Existing Power Pole*
- *Existing Fence*
- *Treeline*
- *Tree*
- 928.8 *Surface Spot Elevation*
- *Approximate Property Line*
- CM2 ⚓ *Survey Control Point*
- 2004 Mapping / 2005 Mapping *Mapping Matchline*

RELEASED FOR CONSTRUCTION - 10/02/06

50 0 100 200 FEET

GRAPHIC SCALE: 1" = 100'
CONTOUR INTERVAL = 2'

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REVISIONS				
Rev.	Drawn Date:	Drawn By:	Revision Made	
A	6-16-06			
C	10-02-06			

Title
EXISTING CONDITIONS
AND BASELINE LAYOUT
AUXILIARY ASH POND – PHASE I

Location and Unit:
E.W. BROWN GENERATING STATION

Scale: 1"=100'
Drawn: TJ
Date: MAY, 2006
Checked: VJS/KOH
Approved:

JOB NO.	JOB NO.	JOB NO.	JOB NO.
119961			

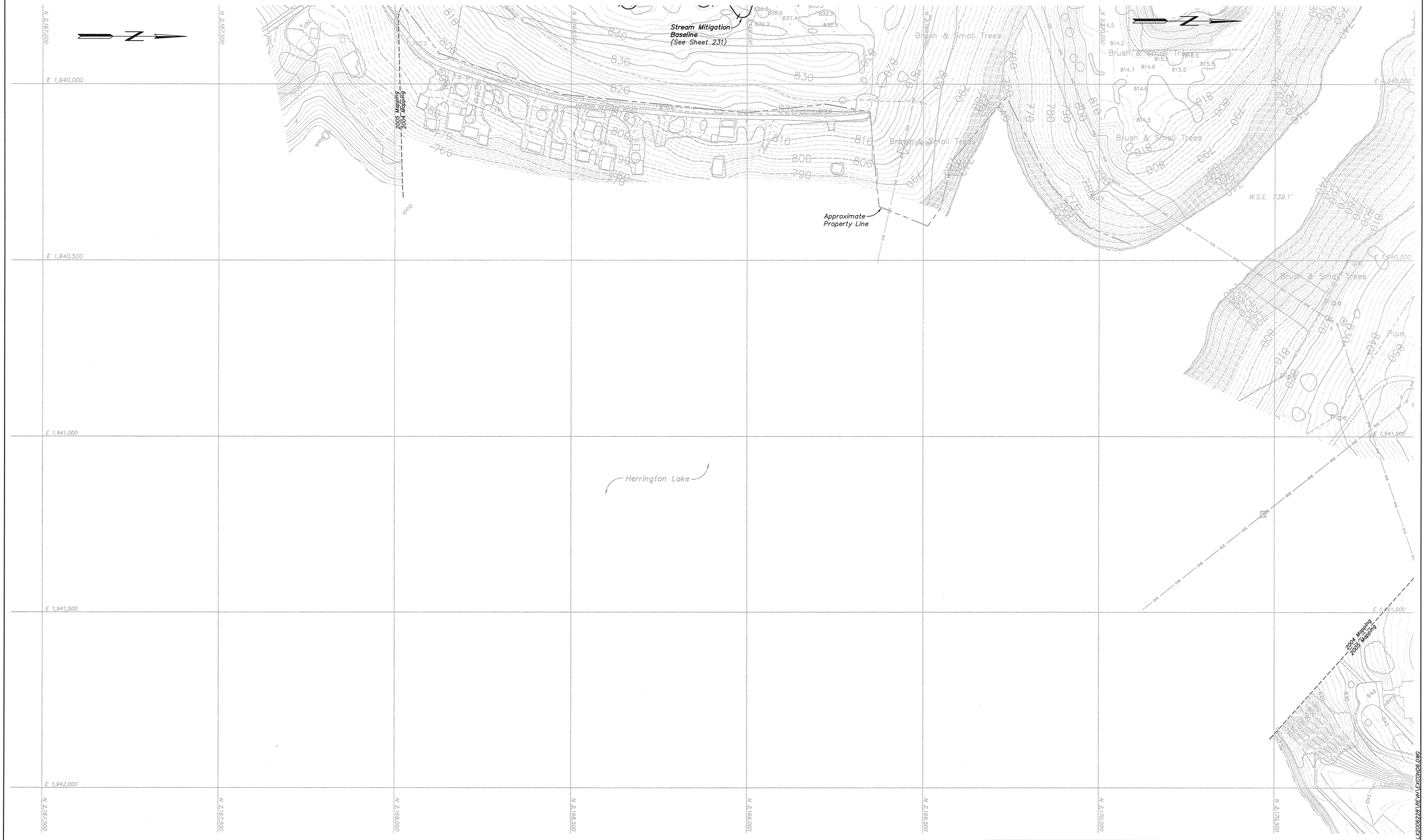
Drawing No: BR0-C-00110 Rev. C

Fuller Mossbarger Scott & May
EMSM ENGINEERS
LEXINGTON ST. LOUIS LOUISVILLE JEFFERSONVILLE CINCINNATI ATLANTA COLUMBUS NASHVILLE

Kentucky Utilities Company
an E·ON company

DMS Version 2.0

BR0-C-00111



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LEGEND

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- Existing Power Pole
- Existing Fence
- Treeline
- Tree
- 928.8 Surface Spot Elevation
- Approximate Property Line
- CM2 Survey Control Point
- 2004 Mapping / 2005 Mapping Mapping Matchline

RELEASED FOR CONSTRUCTION - 10/02/06

50 0 100 200 FEET
GRAPHIC SCALE: 1" = 100'
CONTOUR INTERVAL = 2'

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MAP 4	MAP 5	
MAP 6		

REVISIONS

Rev.	Drawn Date:	Drawn By:	Revision Made
A	6-16-06		
C	10-02-06		

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EXISTING CONDITIONS
AND BASELINE LAYOUT
AUXILIARY ASH POND - PHASE I

Location and Unit:
E.W. BROWN GENERATING STATION

Scale: 1"=100'
Drawn: TJ
Date: MAY, 2006
Checked: VJS/KOH
Approved:

JOB NO.	JOB NO.	JOB NO.	JOB NO.	JOB NO.
119961				

Drawing No: BR0-C-00111 Rev. C

Kentucky Utilities Company
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DMS Version 2.0

BR0-C-00112

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LEGEND

- Existing Overhead Electric
- Existing Power Pole
- Existing Fence
- Treeline
- Tree
- 928.8 Surface Spot Elevation
- Approximate Property Line
- CM2 & 2004 Mapping / 2005 Mapping — Survey Control Point / Mapping Matchline
- Construction Work Limits
- Relocated Overhead Electric

AS CONSTRUCTED - 06/17/08

MAPPING NOTE:

Topographic information is based on aerial mapping performed by L. Robert Kimball & Associates. Refer to General Notes and Notes on Sheets 104 through 111 for complete explanation.

50 0 100 200 FEET

GRAPHIC SCALE: 1" = 100'
CONTOUR INTERVAL = 2'

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Fuller Mossbarger Scott & May

EMSM ENGINEERS
LEXINGTON ST. LOUIS LOUISVILLE JEFFERSONVILLE CINCINNATI ATLANTA COLUMBUS NASHVILLE

REVISIONS

Rev.	Drawn Date:	Drawn By:	Revision Made
A	6-16-06		
C	10-02-06		
H	06-17-08		

Title
PHASE I
CONSTRUCTION PLAN
AUXILIARY ASH POND - PHASE I

Location and Unit:
E.W. BROWN GENERATING STATION

Scale: 1"=100'
Drawn: TJ/CDV
Date: MAY, 2006
Checked: DAB/BLP
Approved:

JOB NO.	JOB NO.	JOB NO.	JOB NO.
119961			

Kentucky Utilities Company
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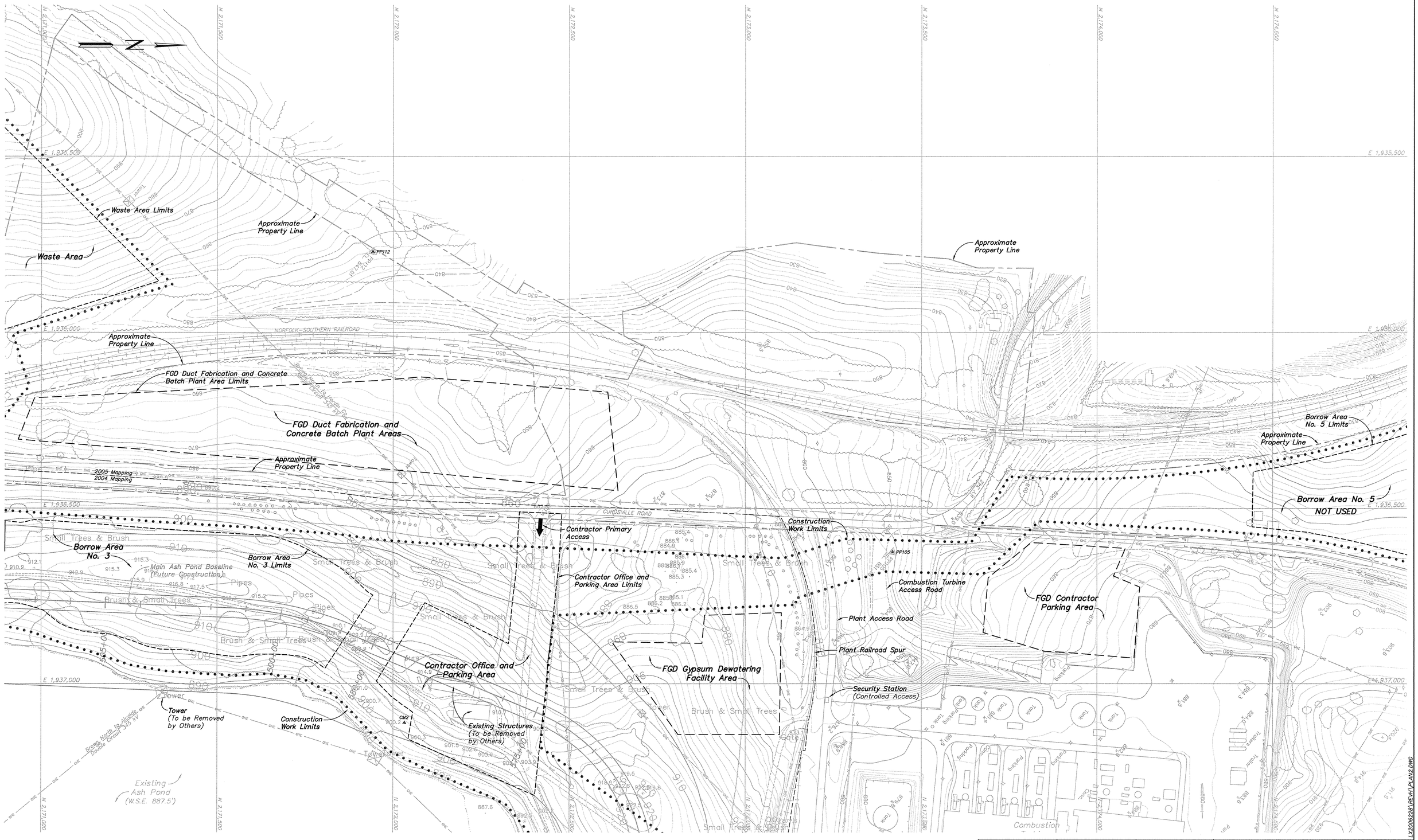
Drawing No: BR0-C-00112
Rev.: H

DMS Version 2.0

BR0-C-00113



LX2006228\REVH1\PLAN2.DWG

LEGEND

- Existing Overhead Electric
- Existing Power Pole
- Existing Fence
- Treeline
- Tree
- 928.8 Surface Spot Elevation
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- Relocated Overhead Electric

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AS CONSTRUCTED - 06/17/08

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Fuller Massbarger Scott & May

EMSM ENGINEERS
LEXINGTON ST. LOUIS LOUISVILLE JEFFERSONVILLE CINCINNATI ATLANTA COLUMBUS NASHVILLE

REVISIONS			
Rev.	Drawn Date:	Drawn By:	Revision Mode
A	6-16-06		
C	10-02-06		
H	6-17-08		

Title
PHASE I
CONSTRUCTION PLAN
AUXILIARY ASH POND - PHASE I

Location and Unit:
E.W. BROWN GENERATING STATION

Scale: 1"=100'
Drawn: TJ/CDV
Date: MAY, 2006
Checked: DAB/BLP
Approved:

Kentucky Utilities Company
an E·ON company

JOB NO.	JOB NO.	JOB NO.	JOB NO.	Drawing No:	Rev.
119961				BR0-C-00113	H

DMS Version 2.0

BR0-C-00114

N 2,175,000 N 2,175,500 N 2,176,000 N 2,176,500 N 2,177,000 N 2,177,500 N 2,178,000 N 2,178,500

E 1,935,500 E 1,936,000 E 1,936,500 E 1,937,000

NORFOLK SOUTHERN RAILROAD

Approximate Property Line

Construction Work Limits

Borrow Area No. 5 Limits

Borrow Area No. 4 Limits

Existing Structures (To be Removed by Others, Typ.)

Borrow Area No. 5
NOT USED

Borrow Area No. 4
NOT USED

FP110

Construction Work Limits

Approximate Property Line

LX2008228\REVH\PLANS.DWG

LEGEND

- Existing Overhead Electric
- Existing Power Pole
- Existing Fence
- Treeline
- Tree
- 928.8 Surface Spot Elevation
- Approximate Property Line
- CM2 Survey Control Point
- 2004 Mapping / 2005 Mapping Mapping Matchline
- Construction Work Limits
- Relocated Overhead Electric

AS CONSTRUCTED - 06/17/08

MAPPING NOTE:

Topographic information is based on aerial mapping performed by L. Robert Kimball & Associates. Refer to General Notes and Notes on Sheets 104 through 111 for complete explanation.

50 0 100 200 FEET

GRAPHIC SCALE: 1" = 100'
CONTOUR INTERVAL = 2'

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DAN A. BLACK 13670 LICENSED PROFESSIONAL ENGINEER 6-19-08

Fuller Mossbarger Scott & May

EMSM ENGINEERS
LEXINGTON ST. LOUIS LOUISVILLE JEFFERSONVILLE CINCINNATI ATLANTA COLUMBUS NASHVILLE

REVISIONS

Rev.	Drawn Date:	Drawn By:	Revision Mode
A	6-16-06		
C	10-02-06		
H	6-17-08		

Title
PHASE I
CONSTRUCTION PLAN
AUXILIARY ASH POND - PHASE I

Location and Unit:
E.W. BROWN GENERATING STATION

Scale: 1"=100'
Drawn: TJ/CDV
Date: MAY, 2006
Checked: DAB/BLP
Approved:

JOB NO.	JOB NO.	JOB NO.	JOB NO.	JOB NO.
119961				

Kentucky Utilities Company
an E·ON company

Drawing No: BR0-C-00114 Rev. H

DMS Version 2.0

BRO-C-00115

AUXILIARY ASH POND PRINCIPAL SPILLWAY RISER STRUCTURE LOCATION TABLE

Description	Coordinates Northing	Coordinates Easting	Subgrade Elev.(ft.)
Riser Box NE Corner	2,168,509.97	1,938,026.28	869.00
Riser Box SE Corner	2,168,499.99	1,938,026.84	869.00
Riser Box SW Corner	2,168,499.43	1,938,016.85	869.00
Riser Box NW Corner	2,168,509.42	1,938,016.30	869.00
Riser Footing NE Corner	2,168,515.24	1,938,031.00	867.00
Riser Footing SE Corner	2,168,495.27	1,938,032.10	867.00
Riser Footing SW Corner	2,168,494.17	1,938,012.13	867.00
Riser Footing NW Corner	2,168,514.14	1,938,011.03	867.00

AUXILIARY ASH POND PRINCIPAL SPILLWAY DRAINAGE STRUCTURE LOCATION TABLE

Structure	Principal Spillway Baseline Station	Coordinates Northing	Coordinates Easting
Riser	401+19.90	2,168,504.70	1,938,021.57
Manhole	403+24.03	2,168,300.89	1,938,032.81
Manhole	405+60.00	2,168,311.83	1,938,268.53
Manhole	411+37.00	2,168,358.10	1,938,843.67
Manhole	415+41.31	2,168,459.10	1,939,223.44
Manhole	418+10.00	2,168,691.73	1,939,341.05
Manhole	420+78.98	2,168,955.60	1,939,393.25
Manhole	423+00.00	2,169,173.33	1,939,355.28
Manhole	425+97.75	2,169,466.64	1,939,304.12
Manhole	428+39.74	2,169,661.46	1,939,160.56
Manhole	431+45.51	2,169,958.00	1,939,086.00
Manhole	433+18.76	2,170,107.41	1,939,173.70
Manhole	434+74.64	2,170,205.96	1,939,294.47
Headwall	436+47.89	2,170,379.06	1,939,301.90

STATION 403+24.03 MANHOLE DATA

Center Location 60-inch Dia. Manhole:	
Northing:	2,168,300.89
Easting:	1,938,032.81
Rim Elevation:	872.40'
Inlet (Encased 32-inch Dia. HDPE) Invert:	866.41'
Outlet (30-inch Dia. HDPE) Invert:	862.41'

LEGEND

- Existing Overhead Electric
- Existing Power Pole
- Existing Fence
- Treeline
- Tree
- 928.8 Surface Spot Elevation
- Approximate Property Line
- CM2 Survey Control Point
- 2004 Mapping / 2005 Mapping Mapping Matchline
- Construction Work Limits
- Relocated Overhead Electric

MAPPING NOTE:
Topographic information is based on aerial mapping performed by L. Robert Kimball & Associates. Refer to General Notes and Notes on Sheets 104 through 111 for complete explanation.

AS CONSTRUCTED - 06/17/08

GRAPHIC SCALE: 1" = 100'
CONTOUR INTERVAL = 2'

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DAN A. BACK 13939 LICENSED PROFESSIONAL ENGINEER STATE OF KENTUCKY 6-18-08

REVISIONS

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A	6-16-06		
C	10-02-06		
H	06-17-08		

Title
PHASE I
CONSTRUCTION PLAN
AUXILIARY ASH POND – PHASE I

Location and Unit:
E.W. BROWN GENERATING STATION

Fuller Mossbarger Scott & May
FMSM ENGINEERS
LEXINGTON • LOUISVILLE • CINCINNATI • COLUMBUS • ST. LOUIS • JEFFERSONVILLE

Scale: 1"=100'
Drawn: TJ/CDV
Date: MAY, 2006
Checked: DAB/BLP
Approved:

JOB NO.	JOB NO.	JOB NO.	JOB NO.
119961			

KU Kentucky Utilities Company, an e-on company

Drawing No: BRO-C-00115 Rev. H

DMS Version 2.0

LEGEND

- Existing Overhead Electric
- Existing Power Pole
- Existing Fence
- Treeline
- Tree
- 928.8 Surface Spot Elevation
- Approximate Property Line
- CM2 Survey Control Point
- 2004 Mapping / 2005 Mapping Mapping Matchline
- Construction Work Limits
- Relocated Overhead Electric

RELEASED FOR CONSTRUCTION - 10/02/06

MAPPING NOTE:
Topographic information is based on aerial mapping performed by L. Robert Kimball & Associates. Refer to General Notes and Notes on Sheets 104 through 111 for complete explanation.

50 0 100 200 FEET
GRAPHIC SCALE: 1" = 100'
CONTOUR INTERVAL = 2'

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Fuller Mossbarger Scott & May
FMSM ENGINEERS
Lexington St. Louis Louisville Jeffersonville Cincinnati Atlanta Columbus Nashville

State of Kentucky — Dan A. Back 13930 — Licensed Professional Engineer — 6-18-08

REVISIONS

Rev.	Drawn Date:	Drawn By:	Revision Made
A	6-16-06		
C	10-02-06		

Title
PHASE I
CONSTRUCTION PLAN
AUXILIARY ASH POND – PHASE I

Location and Unit:
E.W. BROWN GENERATING STATION

Scale: 1"=100'
Drawn: TJ/CDV
Date: MAY, 2006
Checked: VJS/KOH
Approved:

JOB NO.	JOB NO.	JOB NO.	JOB NO.
119961			

KU Kentucky Utilities Company
an e-on company

Drawing No: BRO-C-00116
Rev. C

DMS Version 2.0

BR0-C-00117

N 2,167,000 | N 2,167,500 | N 2,168,000 | N 2,168,500 | N 2,169,000 | N 2,169,500 | N 2,170,000 | N 2,170,500

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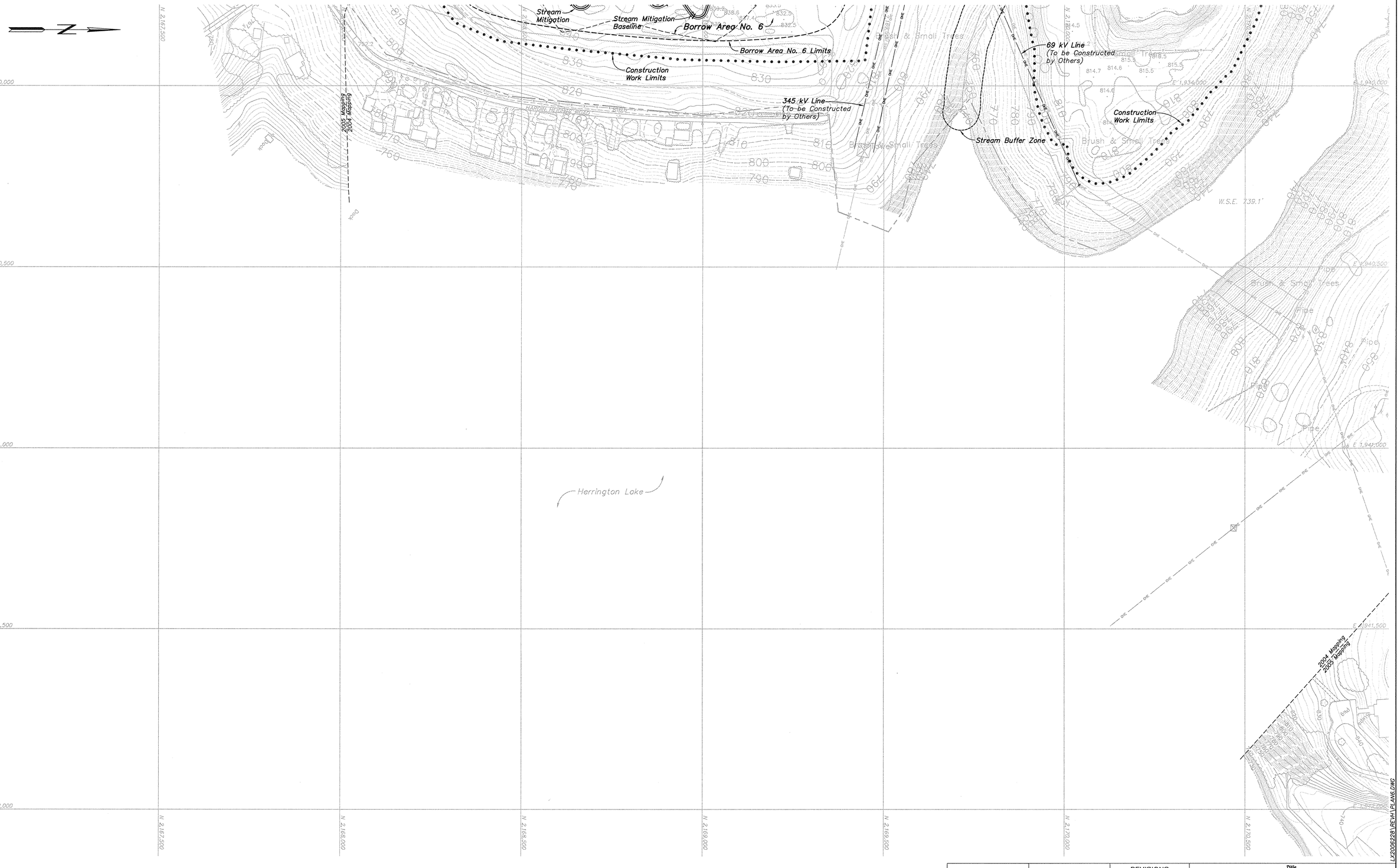

LEGEND

- Existing Overhead Electric
- Existing Power Pole
- Existing Fence
- Treeline
- Tree
- 928.8 Surface Spot Elevation
- Approximate Property Line
- CM2 ▲ Survey Control Point
- 2004 Mapping / 2005 Mapping Mapping Matchline
- Construction Work Limits
- Relocated Overhead Electric

AS CONSTRUCTED - 06/17/08

MAPPING NOTE:

Topographic information is based on aerial mapping performed by L. Robert Kimball & Associates. Refer to General Notes and Notes on Sheets 104 through 111 for complete explanation.

50 0 100 200 FEET

GRAPHIC SCALE: 1" = 100'
CONTOUR INTERVAL = 2'

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Fuller Mossbarger Scott & May

EMSM ENGINEERS
LEXINGTON ST. LOUIS | LOUISVILLE JEFFERSONVILLE | CINCINNATI ATLANTA | COLUMBUS NASHVILLE

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Rev.	Drawn Date:	Drawn By:	Revision Made
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H	06-17-08		

Title
PHASE I
CONSTRUCTION PLAN
AUXILIARY ASH POND - PHASE I

Location and Unit:
E.W. BROWN GENERATING STATION

Scale: 1"=100'
Drawn: TJ/CDV
Date: MAY, 2006
Checked: DAB/BLP
Approved:

Kentucky Utilities Company
an E-ON company

JOB NO.	JOB NO.	JOB NO.	JOB NO.	Drawing No:	Rev.
119961				BR0-C-00117	H

DMS Version 2.0

LX2006228\REVH\PLANS.DWG

BR0-C-00118

NOTES:

1. *Limits of contract work are approximate. Actual work limits will vary from these shown. Additionally KU may authorize Contractors to use additional areas if needed.*
2. *Dates indicated are estimated. Actual dates may vary. Not all work areas will be used for the entire duration shown.*
3. *Other contract work will be occurring at the same time as these contracts. Limits of those activities are not known at this time.*

MAIN CONCURRENT CONTRACT WORK AREAS:

FGD PROJECT – *Including construction of SCR/scrubbers, gypsum recovery installation, limestone un-loading facility, warehouse and training building, relocation of main plant road and addition of rail spurs.* **JUNE 2006 – AUGUST 2009**

OWS PROJECT – *Including construction of two large oil-water seperators.* **JUNE 2006 – SEPTEMBER 2006**

ASH HANDLING SYSTEM – *Including construction of a booster pump station and ash lines to the new Auxiliary Pond.* **JANUARY 2007 – JANUARY 2008**

TRANSMISSION LINE RELOCATION PROJECT – *Including relocation of 345 kV, 138/69 kV and 69 kV transmission lines in the vicinity of the Auxiliary Pond.* **JULY 2006 – JANUARY 2007**

N 2,171,000 N 2,172,000 N 2,173,000 N 2,174,000 N 2,175,000

E 1,938,000 E 1,939,000 E 1,940,000

PP100 PP101 PP102 PP106 CM1 CM2

100 0 200 400 FEET
GRAPHIC SCALE: 1" = 200'
CONTOUR INTERVAL = 2'

RELEASED FOR CONSTRUCTION - 10/02/06

REVISIONS			
Rev.	Drawn Date:	Drawn By:	Revision Mode
A	6-16-06		
C	10-02-06		

Title
OTHER CONTRACTOR
WORK LIMITS
AUXILIARY ASH POND – PHASE 1

Location and Unit:
E.W. BROWN GENERATING STATION

Scale: 1"= 200'
Drawn: TJ/CDV
Date: MAY, 2006
Checked: DAB/KOH
Approved:

Fuller Mossbarger Scott & May ENGINEERS
LEXINGTON ST. LOUIS LOUISVILLE JEFFERSONVILLE CINCINNATI ATLANTA COLUMBUS NASHVILLE

Kentucky Utilities Company
an E·ON company

JOB NO.	JOB NO.	JOB NO.	JOB NO.	Drawing No:	Rev.
				BR0-C-00118	C

LX2006228\VIEW1\TLPLAN5.DWG

DMS Version 2.0

BRO-C-00121

NOTES:

1. Sediment Control varies with the sequence of Construction. This Plan View shows the initial sediment control. Refer to each Phased Grading Plan beginning on Sheet 134 for changes and additional requirements.
2. The Sediment Control Plan shown on these drawings is considered the minimum. It is the sole responsibility of the Contractor to provide additional measures that may be required to prevent siltation.
3. Contractor shall adhere to the best management practices in "Kentucky Erosion Prevention and Sediment Control Field Guide" published by the Kentucky Transportation Cabinet.
4. Contractor shall provide maintenance for all Erosion Control Devices. After each rain, and at least weekly, Contractor shall inspect and make required repairs. Silt fencing shall be cleaned when silt buildup reaches 1/3 of silt fence height.
5. Contractor shall limit construction activities to have no more than 5 acres stripped of vegetation at one time without multiple silt fences.

LEGEND

- Existing Overhead Electric
- Existing Power Pole
- Existing Fence
- Treeline
- Tree
- 926.8 Surface Spot Elevation
- Approximate Property Line
- CM2 Survey Control Point
- 2004 Mapping / 2005 Mapping — Mapping Matchline
- Construction Work Limits
- OHE Relocated Overhead Electric
- Silt Fence

MAPPING NOTE:

Topographic information is based on aerial mapping performed by L. Robert Kimball & Associates. Refer to General Notes and Notes on Sheets 104 through 111 for complete explanation.

GRAPHIC SCALE: 1" = 100'
CONTOUR INTERVAL = 2'

50 0 100 200 FEET

AS CONSTRUCTED - 06/17/08

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Fuller Mossbarger Scott & May
FMSM ENGINEERS
LEXINGTON ST. LOUIS · LOUISVILLE JEFFERSONVILLE · CINCINNATI ATLANTA · COLUMBUS NASHVILLE

DAVID A. BACK · PROFESSIONAL ENGINEER

REVISIONS

Rev.	Drawn Date	Drawn By	Revision Made
A	6-16-06		
C	10-02-06		
H	06-17-08		

Title

PHASE I
SEDIMENT CONTROL PLAN
AUXILIARY ASH POND - PHASE I

Location and Unit:
E.W. BROWN GENERATING STATION

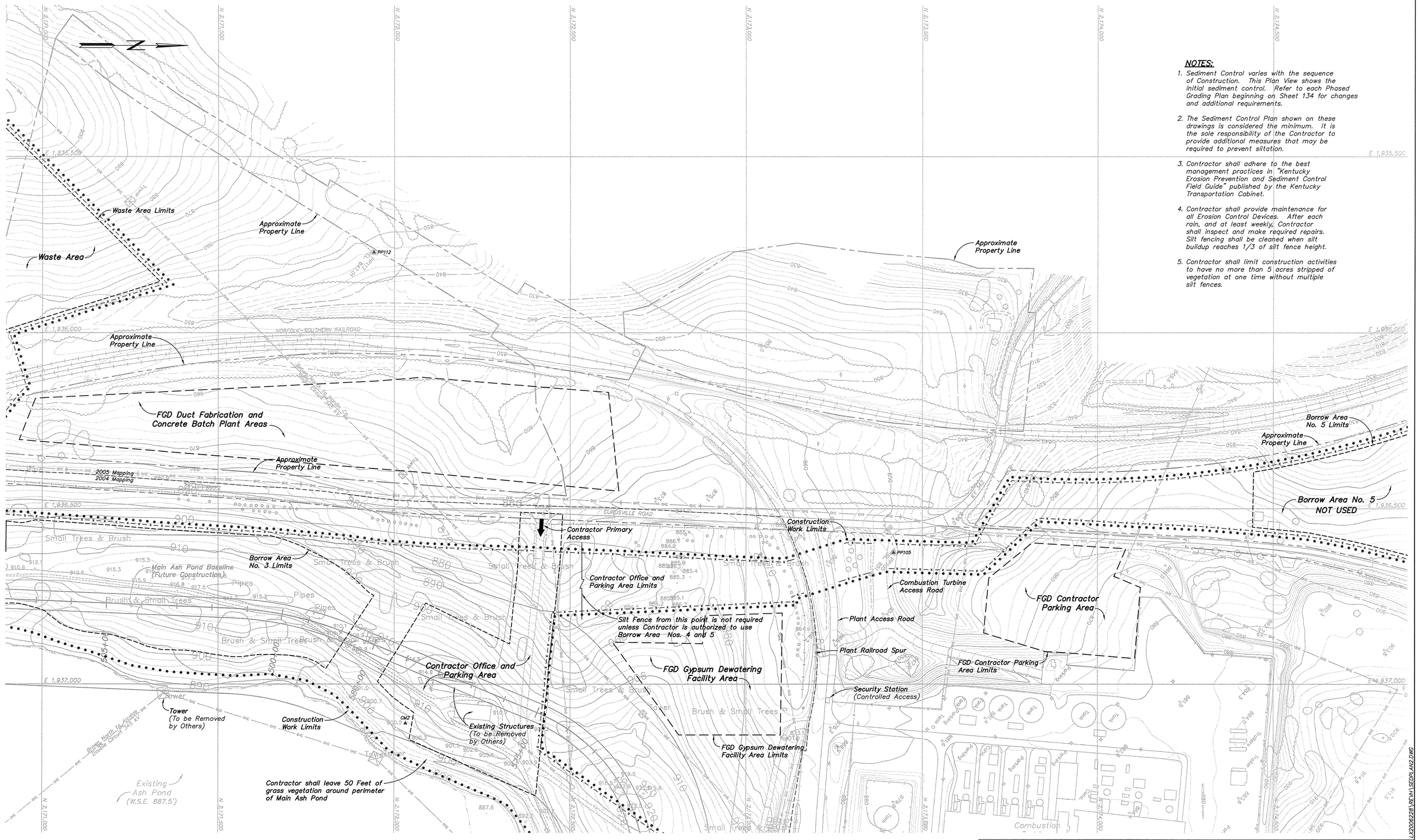
Scale: 1"=100'
Drawn: TJ/CDV
Date: MAY, 2006
Checked: DAB/BLP
Approved:

KU Kentucky Utilities Company
an E.ON company

JOB NO.	JOB NO.	JOB NO.	JOB NO.	Drawing No:	Rev.
119961				BRO-C-00121	H

DMS Version 2.0

BR0-C-00122



NOTES:

1. Sediment Control varies with the sequence of Construction. This Plan View shows the initial sediment control. Refer to each Phased Grading Plan beginning on Sheet 134 for changes and additional requirements.
2. The Sediment Control Plan shown on these drawings is considered the minimum. It is the sole responsibility of the Contractor to provide additional measures that may be required to prevent siltation.
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5. Contractor shall limit construction activities to have no more than 5 acres stripped of vegetation at one time without multiple silt fences.

LEGEND

- Existing Overhead Electric
- Existing Power Pole
- Existing Fence
- Treeline
- Tree
- 926.8 Surface Spot Elevation
- Approximate Property Line
- CM2 Survey Control Point
- 2004 Mapping / 2005 Mapping Mapping Matchline
- Construction Work Limits
- OHE Relocated Overhead Electric
- Silt Fence

AS CONSTRUCTED - 06/17/08

MAPPING NOTE:

Topographic information is based on aerial mapping performed by L. Robert Kimball & Associates. Refer to General Notes and Notes on Sheets 104 through 111 for complete explanation.

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50 0 100 200 FEET

GRAPHIC SCALE: 1" = 100'
CONTOUR INTERVAL = 2'

LX2006229\REVIS\SEDPLAN2.DWG

REVISIONS			
Rev.	Drawn Date:	Drawn By:	Revision Mode
A	6-16-06		
C	10-02-06		
H	6-17-08		

Fuller Mossbarger Scott & May

EMSM ENGINEERS
LEXINGTON ST. LOUIS LOUISVILLE JEFFERSONVILLE CINCINNATI ATLANTA COLUMBUS NASHVILLE

Title
PHASE I
SEDIMENT CONROL PLAN
AUXILIARY ASH POND – PHASE I

Location and Unit:
E.W. BROWN GENERATING STATION

Scale: 1"=100'
Drawn: TJ/CDV
Date: MAY, 2006
Checked: DAB/BLP
Approved:

JOB NO. 119961

Kentucky Utilities Company
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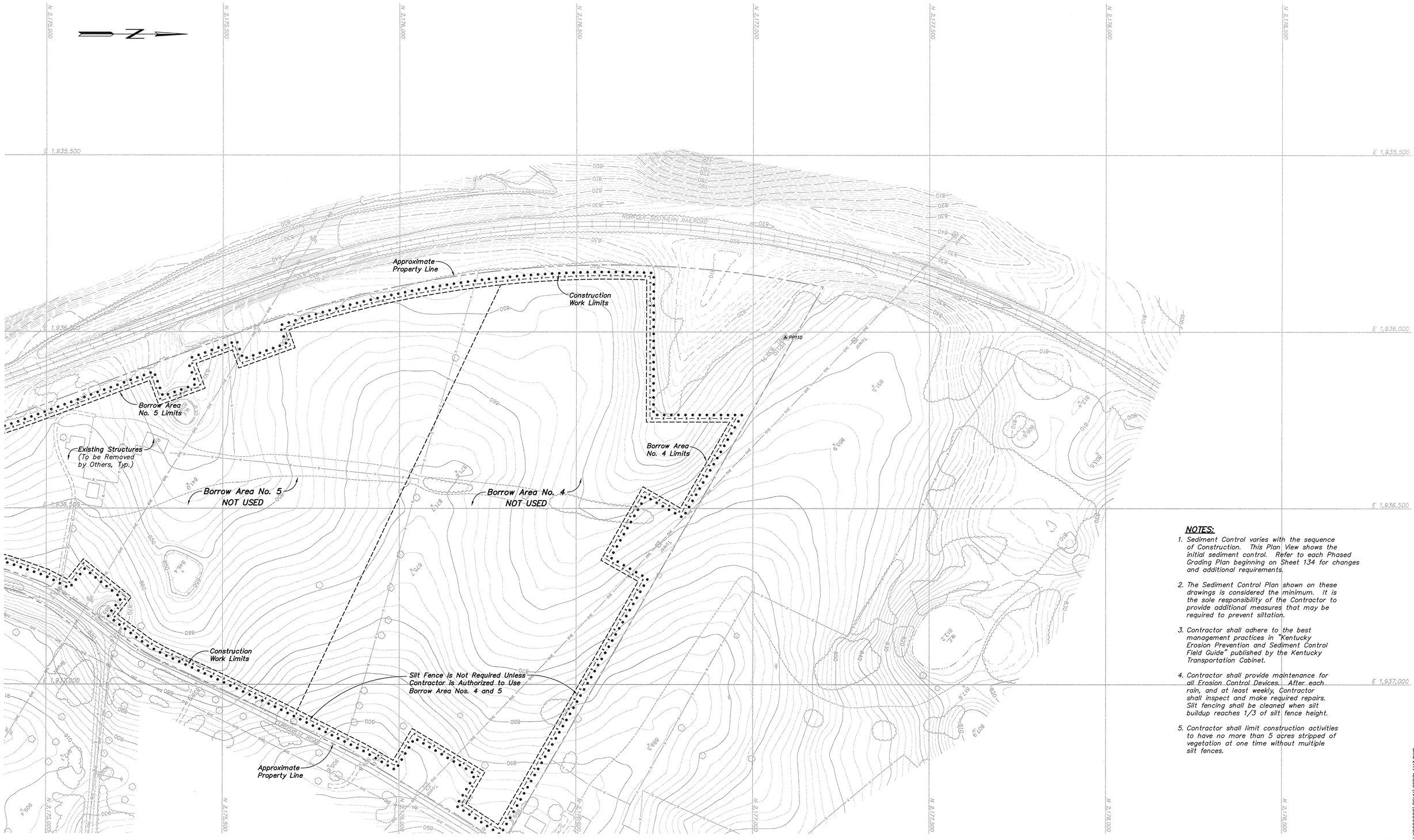
Drawing No: BR0-C-00122
Rev. H

DMS Version 2.0

BR0-C-00123



NOTES:

1. Sediment Control varies with the sequence of Construction. This Plan View shows the initial sediment control. Refer to each Phased Grading Plan beginning on Sheet 134 for changes and additional requirements.
2. The Sediment Control Plan shown on these drawings is considered the minimum. It is the sole responsibility of the Contractor to provide additional measures that may be required to prevent siltation.
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5. Contractor shall limit construction activities to have no more than 5 acres stripped of vegetation at one time without multiple silt fences.

LEGEND

- Existing Overhead Electric
- Existing Power Pole
- Existing Fence
- Treeline
- Tree
- 928.6 Surface Spot Elevation
- Approximate Property Line
- CM2 Survey Control Point
- 2004 Mapping / 2005 Mapping Mapping Matchline
- Construction Work Limits
- Relocated Overhead Electric
- Silt Fence

MAPPING NOTE:

Topographic information is based on aerial mapping performed by L. Robert Kimball & Associates. Refer to General Notes and Notes on Sheets 104 through 111 for complete explanation.

AS CONSTRUCTED - 06/17/08

50 0 100 200 FEET
GRAPHIC SCALE: 1" = 100'
CONTOUR INTERVAL = 2'

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LX20062228\VIEW1\SEDPLAN2.DWG

REVISIONS			
Rev.	Drawn Date:	Drawn By:	Revision Mode
A	6-16-06		
C	10-02-06		
H	6-17-08		

Title
PHASE I
SEDIMENT CONTROL PLAN
AUXILIARY ASH POND - PHASE I

Location and Unit:
E.W. BROWN GENERATING STATION

Scale: 1"=100'
Drawn: TJ/CDV
Date: MAY, 2006
Checked: DAB/BLP
Approved:

JOB NO.	JOB NO.	JOB NO.	JOB NO.	JOB NO.
119961				

Drawing No: BR0-C-00123 Rev. H

Fuller Mossbarger Scott & May
EMSM ENGINEERS
LEXINGTON ST. LOUIS LOUISVILLE JEFFERSONVILLE CINCINNATI ATLANTA COLUMBUS NASHVILLE

Kentucky Utilities Company
an E·ON company

DMS Version 2.0

BRO-C-00124

NOTES:

1. Sediment Control varies with the sequence of Construction. This Plan View shows the initial sediment control. Refer to each Phased Grading Plan beginning on Sheet 134 for changes and additional requirements.
2. The Sediment Control Plan shown on these drawings is considered the minimum. It is the sole responsibility of the Contractor to provide additional measures that may be required to prevent siltation.
3. Contractor shall adhere to the best management practices in "Kentucky Erosion Prevention and Sediment Control Field Guide" published by the Kentucky Transportation Cabinet.
4. Contractor shall provide maintenance for all Erosion Control Devices. After each rain, and at least weekly, Contractor shall inspect and make required repairs. Silt fencing shall be cleaned when silt buildup reaches 1/3 of silt fence height.
5. Contractor shall limit construction activities to have no more than 5 acres stripped of vegetation at one time without multiple silt fences.

LEGEND

- Existing Overhead Electric
- Existing Power Pole
- Existing Fence
- Treeline
- Tree
- 928.8 Surface Spot Elevation
- Approximate Property Line
- CM2 Survey Control Point
- 2004 Mapping / 2005 Mapping — Mapping Matchline
- Construction Work Limits
- Relocated Overhead Electric
- Silt Fence

AS CONSTRUCTED - 06/17/08

MAPPING NOTE:

Topographic information is based on aerial mapping performed by L. Robert Kimball & Associates. Refer to General Notes and Notes on Sheets 104 through 111 for complete explanation.

GRAPHIC SCALE: 1" = 100'
CONTOUR INTERVAL = 2'

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Fuller Mossbarger Scott & May ENGINEERS

REVISIONS

Rev.	Drawn Date	Drawn By	Revision Made
A	6-16-06		
C	10-02-06		
H	06-17-08		

Title: PHASE I SEDIMENT CONTROL PLAN AUXILIARY ASH POND - PHASE I

Location and Unit: E.W. BROWN GENERATING STATION

Scale: 1"=100'
Drawn: TJ/CDV
Date: MAY, 2006
Checked: DAB/BLP
Approved:

JOB NO.	JOB NO.	JOB NO.	JOB NO.
119961			

Kentucky Utilities Company — an e-on company

Drawing No: BRO-C-00124 Rev: H

LX2006228\REV H\SEDPLAN4.DWG

DMS Version 2.0

BRO-C-00125

NOTES:

1. Sediment Control varies with the sequence of Construction. This Plan View shows the initial sediment control. Refer to each Phased Grading Plan beginning on Sheet 134 for changes and additional requirements.
2. The Sediment Control Plan shown on these drawings is considered the minimum. It is the sole responsibility of the Contractor to provide additional measures that may be required to prevent siltation.
3. Contractor shall adhere to the best management practices in "Kentucky Erosion Prevention and Sediment Control Field Guide" published by the Kentucky Transportation Cabinet.
4. Contractor shall provide maintenance for all Erosion Control Devices. After each rain, and at least weekly, Contractor shall inspect and make required repairs. Silt fencing shall be cleaned when silt buildup reaches 1/3 of silt fence height.
5. Contractor shall limit construction activities to have no more than 5 acres stripped of vegetation at one time without multiple silt fences.

LEGEND

- Existing Overhead Electric
- Existing Power Pole
- Existing Fence
- Treeline
- Tree
- Surface Spot Elevation
- Approximate Property Line
- Survey Control Point
- Mapping Matchline
- Construction Work Limits
- Relocated Overhead Electric
- Silt Fence

RELEASED FOR CONSTRUCTION - 10/02/06

MAPPING NOTE:
Topographic information is based on aerial mapping performed by L. Robert Kimball & Associates. Refer to General Notes and Notes on Sheets 104 through 111 for complete explanation.

GRAPHIC SCALE: 1" = 100'
CONTOUR INTERVAL = 2'

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Fuller Mossbarger Scott & May
FMSM ENGINEERS

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A	6-16-06		
C	10-02-06		

Title
PHASE I
SEDIMENT CONTROL PLAN
AUXILIARY ASH POND - PHASE I

Location and Unit:
E.W. BROWN GENERATING STATION

Scale: 1"=100'
Drawn: TJ/CDV
Date: MAY, 2006
Checked: VJS/KOH
Approved:

JOB NO.	JOB NO.	JOB NO.	JOB NO.
119961			

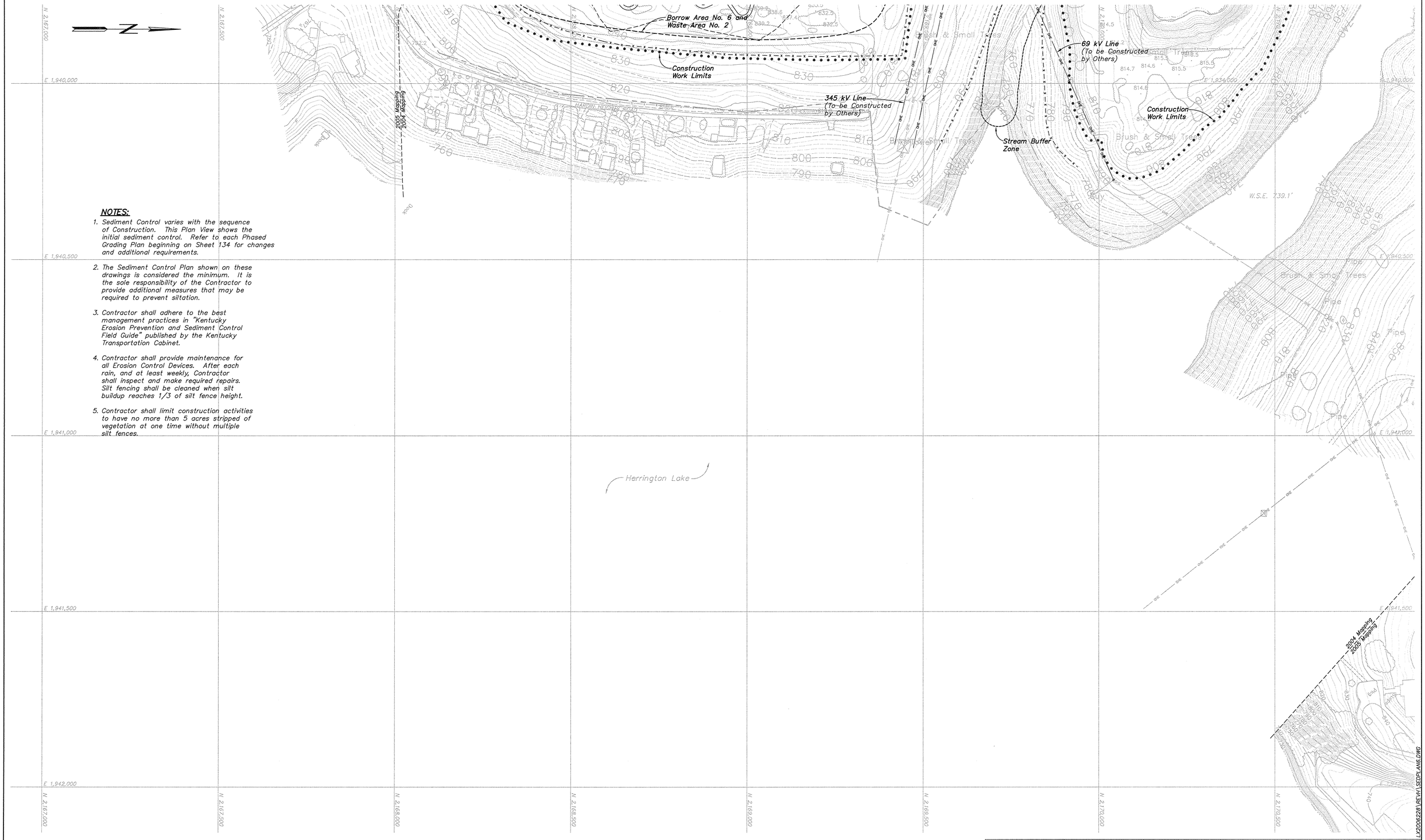
KU Kentucky Utilities Company
an e-on company

Drawing No: BRO-C-00125
Rev.: C

LX2006228\REV4\SEDPLANS.DWG

DMS Version 2.0

BR0-C-00126



NOTES:

1. *Sediment Control varies with the sequence of Construction. This Plan View shows the initial sediment control. Refer to each Phased Grading Plan beginning on Sheet 134 for changes and additional requirements.*
2. *The Sediment Control Plan shown on these drawings is considered the minimum. It is the sole responsibility of the Contractor to provide additional measures that may be required to prevent siltation.*
3. *Contractor shall adhere to the best management practices in "Kentucky Erosion Prevention and Sediment Control Field Guide" published by the Kentucky Transportation Cabinet.*
4. *Contractor shall provide maintenance for all Erosion Control Devices. After each rain, and at least weekly, Contractor shall inspect and make required repairs. Silt fencing shall be cleaned when silt buildup reaches 1/3 of silt fence height.*
5. *Contractor shall limit construction activities to have no more than 5 acres stripped of vegetation at one time without multiple silt fences.*

LEGEND

- *Existing Overhead Electric*
- *Existing Power Pole*
- *Existing Fence*
- *Treeline*
- *Tree*
- 928.8 *Surface Spot Elevation*
- *Approximate Property Line*
- CM2 *Survey Control Point*
- *2004 Mapping / 2005 Mapping — Mapping Matchline*
- *Construction Work Limits*
- *Relocated Overhead Electric*
- *Silt Fence*

AS CONSTRUCTED - 06/17/08

MAPPING NOTE:

Topographic information is based on aerial mapping performed by L. Robert Kimball & Associates. Refer to General Notes and Notes on Sheets 104 through 111 for complete explanation.

50 0 100 200 FEET

GRAPHIC SCALE: 1" = 100'
CONTOUR INTERVAL = 2'

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MAP 6		

DAN A. BLACK — LICENSED PROFESSIONAL ENGINEER — 6-19-08

REVISIONS			
Rev.	Drawn Date:	Drawn By:	Revision Made
A	6-16-06		
C	10-02-06		
H	06-17-08		

Fuller Mossbarger Scott & May

EMSM ENGINEERS — LEXINGTON ST. LOUIS LOUISVILLE JEFFERSONVILLE CINCINNATI ATLANTA COLUMBUS NASHVILLE

Title

PHASE I
SEDIMENT CONTROL PLAN
AUXILIARY ASH POND – PHASE I

Location and Unit:
E.W. BROWN GENERATING STATION

Scale: 1"=100'
Drawn: TJ/CDV
Date: MAY, 2006
Checked: DAB/BLP
Approved:

Kentucky Utilities Company — an E·ON company

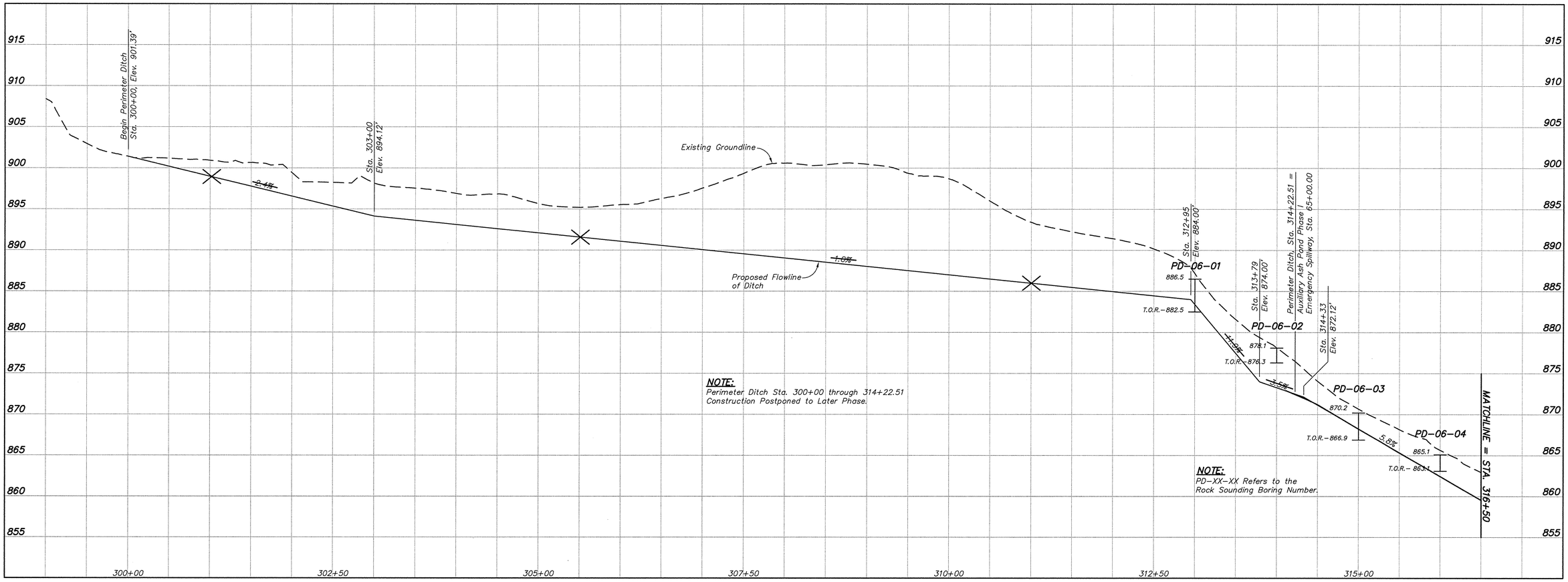
JOB NO.	JOB NO.	JOB NO.	JOB NO.	JOB NO.
119961				

Drawing No: BR0-C-00126 — *Rev.* H

DMS Version 2.0

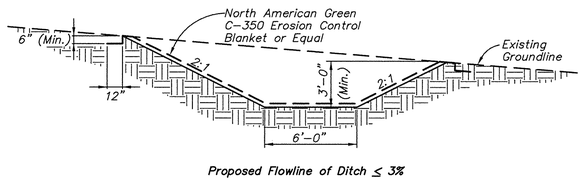
LX2008228\REVA\SEDPLAN6.DWG

BR0-C-00127

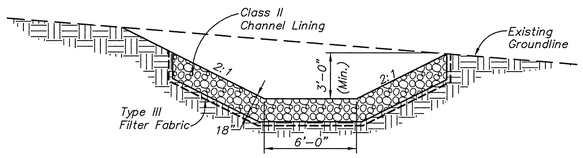


1/127 PROFILE – PERIMETER DITCH
SCALE : 1"=50' (Horizontal)
1"=5' (Vertical)

SEE SHEET 115

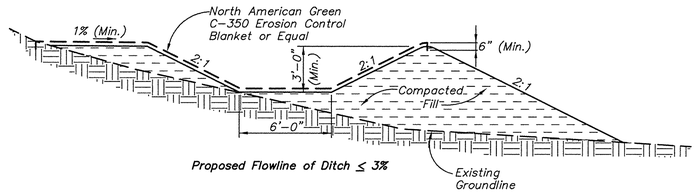


Proposed Flowline of Ditch ≤ 3%

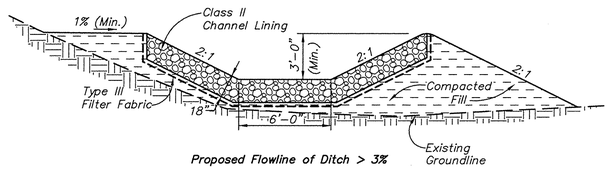


Proposed Flowline of Ditch > 3%

2/127 DETAIL – PERIMETER DITCH IN SOIL
SCALE: 1/4"= 1'-0"

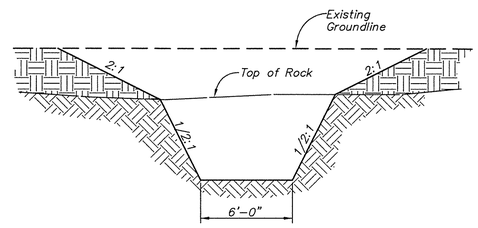


Proposed Flowline of Ditch ≤ 3%



Proposed Flowline of Ditch > 3%

3/127 DETAIL – PERIMETER DITCH ABOVE GRADE
SCALE: 1/4"= 1'-0"



4/127 DETAIL – PERIMETER DITCH IN ROCK
SCALE: 1/4"= 1'-0"

Section or Detail No.
Sheet Where Shown
REFERENCE KEY

SURVEY NOTE:
As Constructed survey data provided by Bizzack Construction. Based on field observations this data is believed to be correct, but has not been surveyed by FMSM Engineers.

AS CONSTRUCTED - 06/17/08

REVISIONS			
Rev.	Drawn Date:	Drawn By:	Revision Made
A	6-16-06		
B	7-05-06		
C	10-02-06		
H	06-17-08		

Title
PROFILE AND TYPICAL SECTIONS
PERIMETER DITCH
AUXILIARY ASH POND – PHASE I

Location and Unit:
E.W. BROWN GENERATING STATION

Scale: AS SHOWN
Drawn: SLB
Date: MAY, 2006
Checked: DAB/BLP
Approved:

JOB NO. 119961 | JOB NO. | JOB NO. | JOB NO.

Drawing No: BR0-C-00127
Rev. H

Fuller Mossbarger Scott & May
FMSM ENGINEERS
LEXINGTON ST. LOUIS LOUISVILLE JEFFERSONVILLE CINCINNATI ATLANTA COLUMBUS NORWALK

Kentucky Utilities Company
an E-ON company

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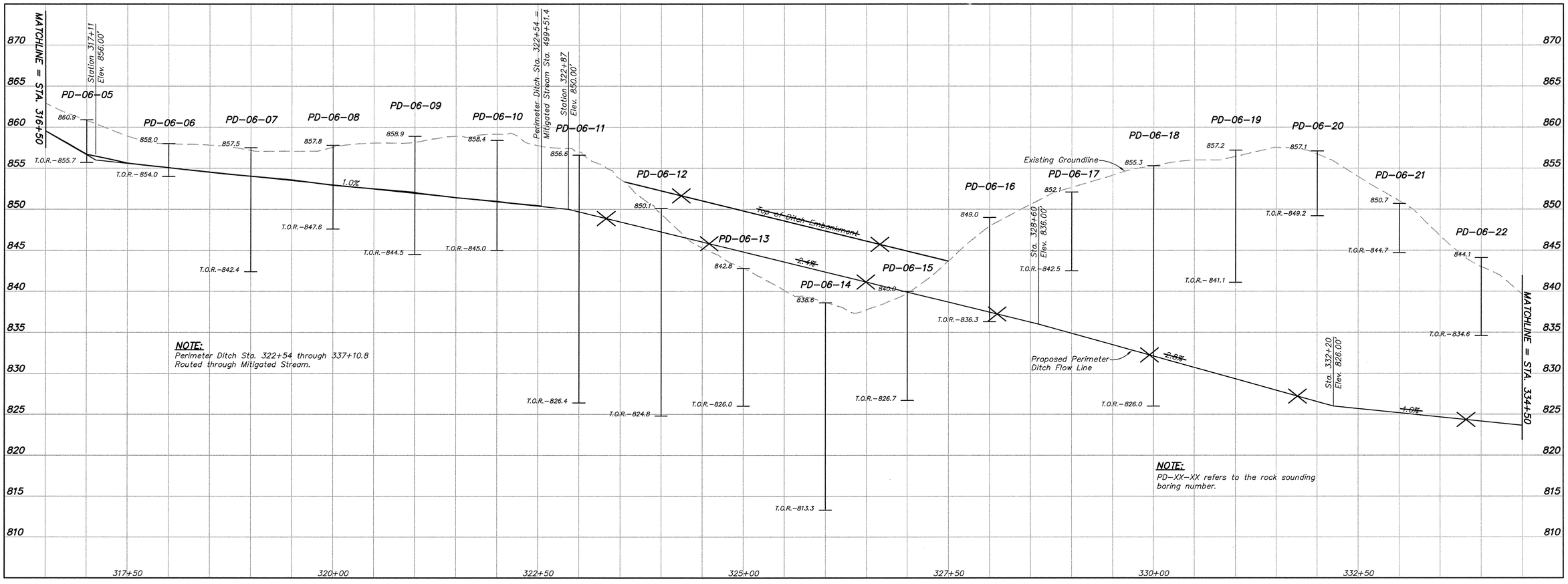
DMS Version 2.0



NOTE:
Perimeter Ditch Sta. 322+54 through 337+10.8 Routed through Mitigated Stream.

NOTE:
PD-XX-XX refers to the rock sounding boring number.

1/128 **PROFILE – PERIMETER DITCH**
SCALE : 1"=50' (Horizontal)
1"=5' (Vertical)

SURVEY NOTE:
As Constructed survey data provided by Bizzack Construction. Based on field observations this data is believed to be correct, but has not been surveyed by FMSM Engineers.

AS CONSTRUCTED - 06/17/08

Section or Detail No.
Sheet Where Shown
REFERENCE KEY

LX2006228\REVH\PDPROF2.DWG

REVISIONS			
Rev.	Drawn Date:	Drawn By:	Revision Mode
A	6-16-06		
C	10-02-06		
H	06-17-08		

Title
PROFILE
PERIMETER DITCH
AUXILIARY ASH POND – PHASE I

Location and Unit:
E.W. BROWN GENERATING STATION

Scale: AS SHOWN
Drawn: SLB
Date: MAY, 2006
Checked: DAB/BLP
Approved:

JOB NO.	JOB NO.	JOB NO.	JOB NO.
119961			

Drawing No: BR0-C-00128 Rev. H

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LEXINGTON ST. LOUIS LOUISVILLE JEFFERSONVILLE CINCINNATI ATLANTA COLUMBUS NASHVILLE

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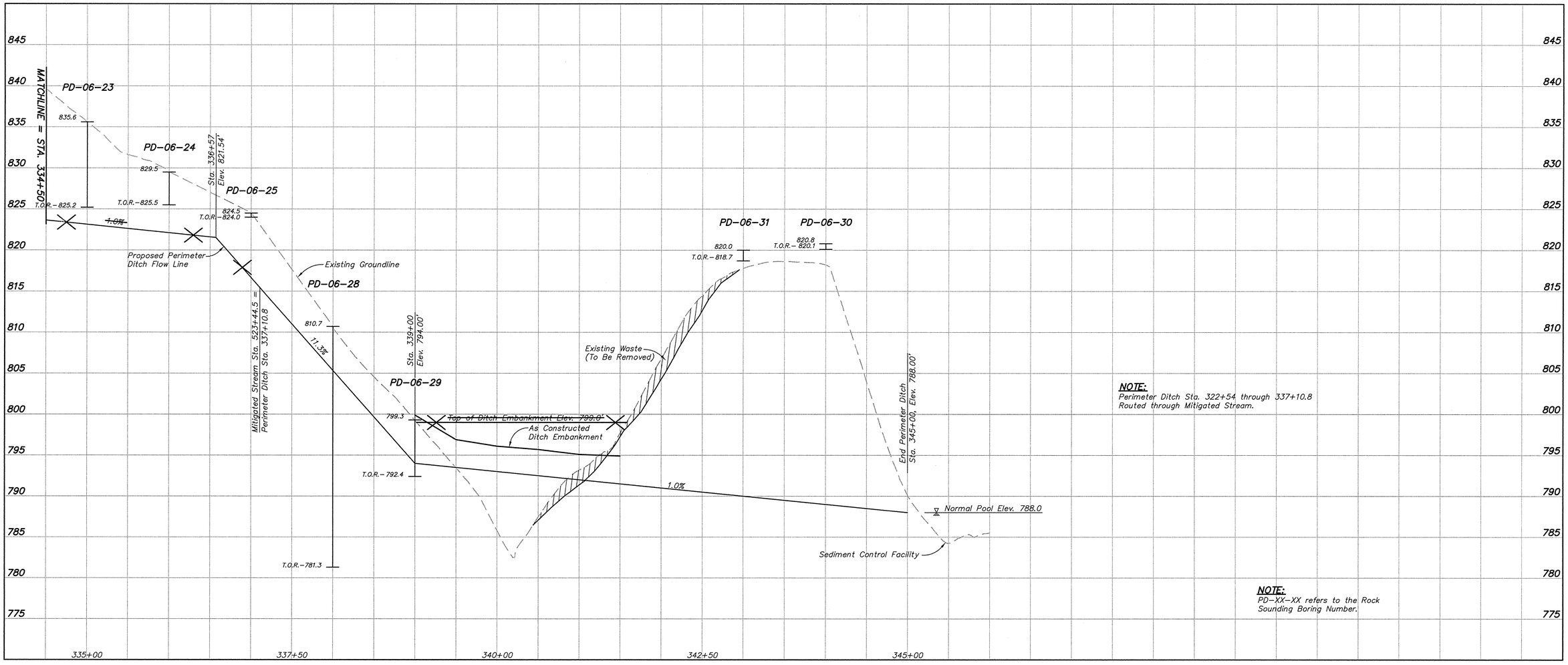
DMS Version 2.0

BR0-C-00129



NOTE:
Perimeter Ditch Sta. 322+54 through 337+10.8 Routed through Mitigated Stream.

NOTE:
PD-XX-XX refers to the Rock Sounding Boring Number.

1/129 **PROFILE - PERIMETER DITCH**
SCALE : 1"=50' (Horizontal)
1"=5' (Vertical)

SURVEY NOTE:
As Constructed survey data provided by Bizzack Construction. Based on field observations this data is believed to be correct, but has not been surveyed by FMSM Engineers.

AS CONSTRUCTED - 06/17/08

Section or Detail No.
Sheet Where Shown
REFERENCE KEY

LX2006228\VIEW\PDPROF3.DWG

REVISIONS			
Rev.	Drawn Date:	Drawn By:	Revision Made
A	6-16-06		
C	10-02-06		
H	06-17-08		

Title
PROFILE
PERIMETER DITCH
AUXILIARY ASH POND - PHASE I

Location and Unit:
E.W. BROWN GENERATING STATION

Scale: AS SHOWN
Drawn: SLB
Date: MAY, 2006
Checked: DAB/BLP
Approved:

JOB NO.	JOB NO.	JOB NO.	JOB NO.
119961			

Drawing No: BR0-C-00129
Rev. H

Fuller Massbarger Scott & May
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LEXINGTON ST. LOUIS LOUISVILLE JEFFERSONVILLE CINCINNATI ATLANTA COLUMBUS NASHVILLE

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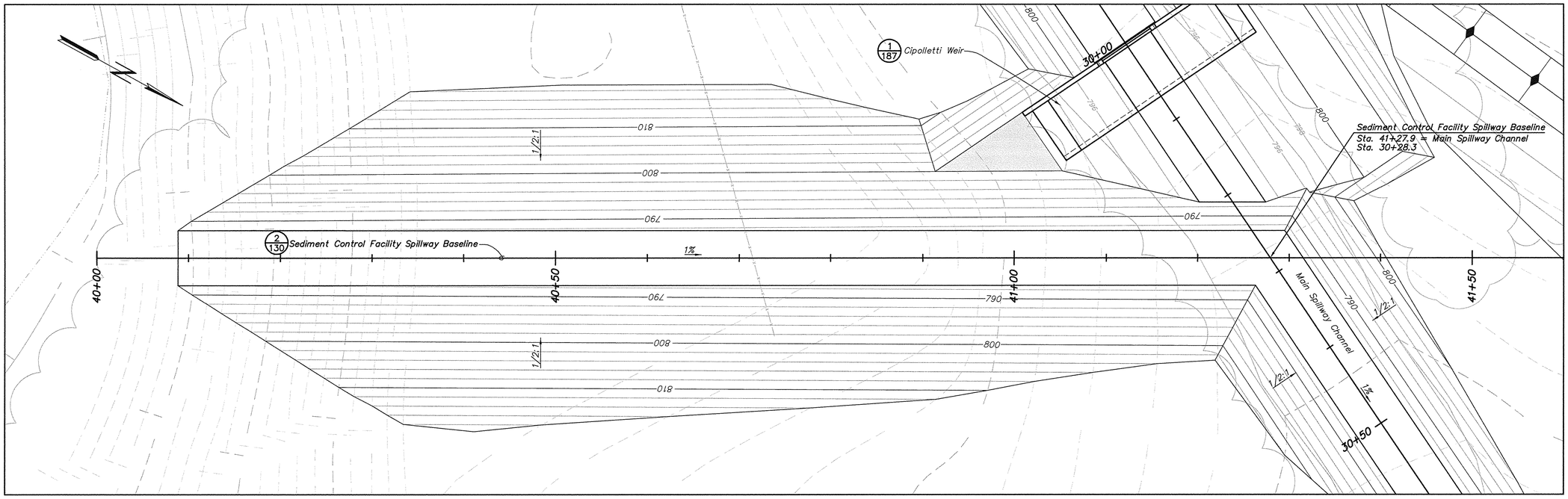
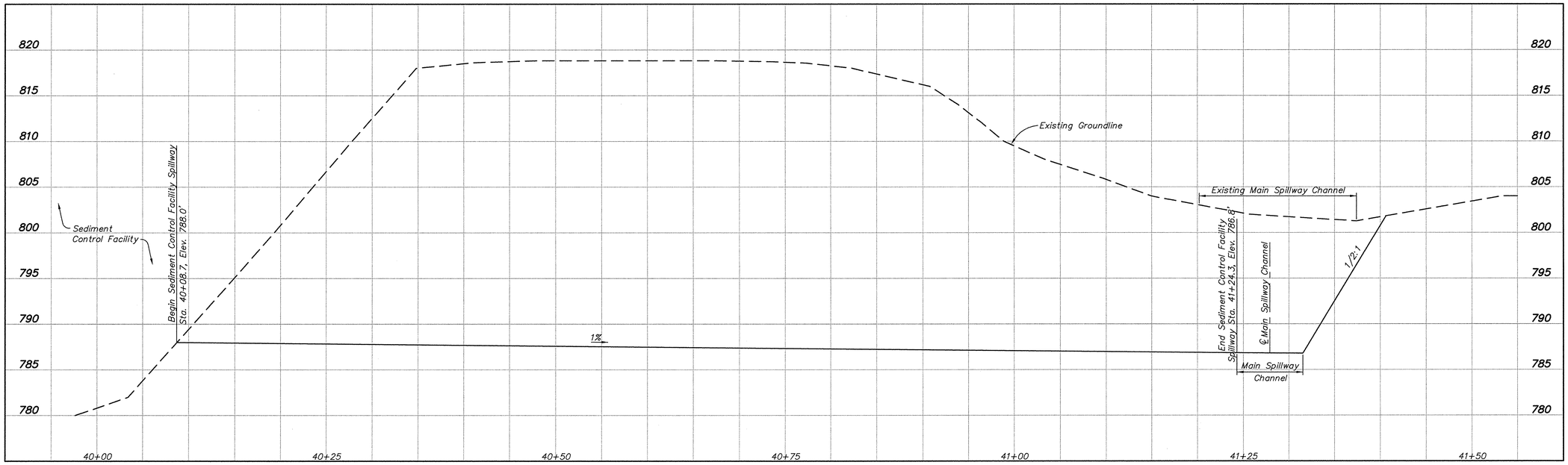


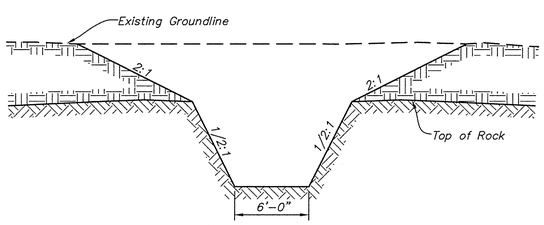
1 / 130 PLAN – SEDIMENT CONTROL FACILITY SPILLWAY

SEE SHEET 115



PROFILE – SEDIMENT CONTROL FACILITY SPILLWAY
SCALE: 1"=5'

SEE THIS SHEET



2 / 130 TYPICAL SECTION – SEDIMENT CONTROL FACILITY SPILLWAY
NOT TO SCALE

SEE THIS SHEET

AS CONSTRUCTED - 06/17/08

Section or Detail No.
Sheet Where Shown
REFERENCE KEY

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Rev.	Drawn Date:	Drawn By:	Revision Made
A	6-16-06		
C	10-02-06		
H	06-17-08		

Title
PLAN VIEW AND PROFILE
SEDIMENT CONTROL FACILITY SPILLWAY
AUXILIARY ASH POND – PHASE I

Location and Unit:
E.W. BROWN GENERATING STATION

Scale: AS SHOWN
Drawn: TJ/CDV
Date: MAY, 2006
Checked: DAB/BLP
Approved:

JOB NO.	JOB NO.	JOB NO.	JOB NO.	Drawing No:	Rev.
119961				BR0-C-00130	H

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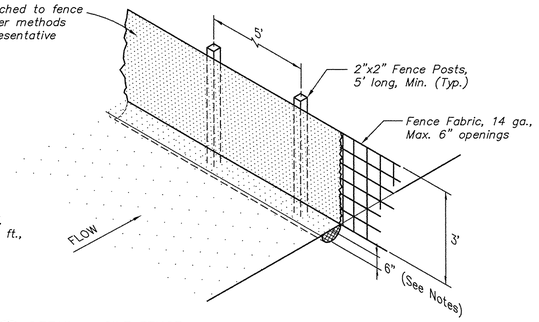
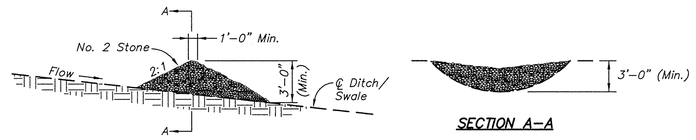
DMS Version 2.0



NOTES:

1. The bottom 12 inches of the fabric shall be buried in a 6-inch trench cut into the ground or covered by 6 inches of fill material to prevent sediment from escaping under the fence. All earth-work shall be on the upstream side of the fence.
2. Geotextile fabric shall meet the following specifications: Grab strength (ASTM D 1682) – 100 lbs. Min., Width – 4' Min., Bursting strength (ASTM D751) – 150 p.s.i. Min., Flow rate (KM64-106) – 0.3 gal./sq. ft., Retention efficiency (KM64-106) – 75%

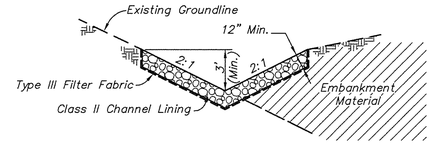
1/131 DETAIL – SILT FENCE SILTFEN
NOT TO SCALE
SEE SHEET 124



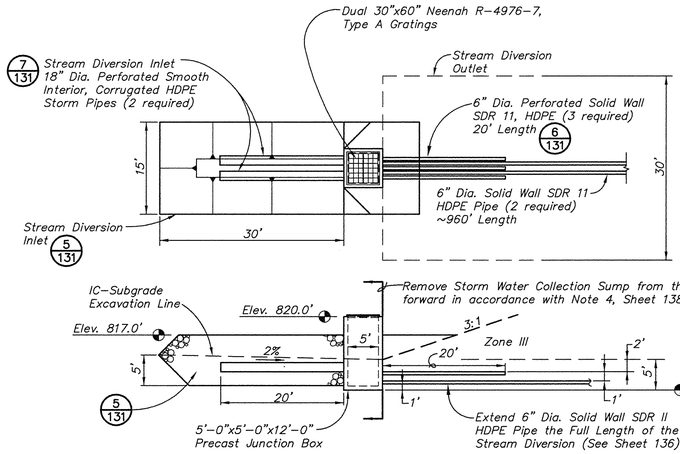
SECTION A-A

NOTE:
Space silt checks at intervals as shown on the plans or as directed by the Owner's Representative.

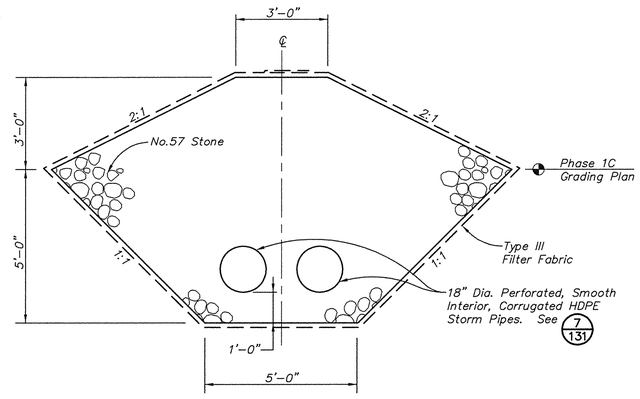
2/131 DETAIL – ROCK CHECK DAM ROCKDAM
NOT TO SCALE
SEE SHEET 124



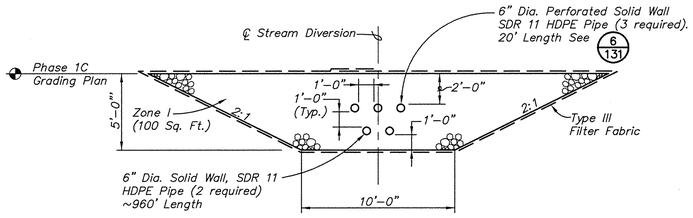
3/131 DETAIL – TYPE I SURFACE DITCH TYPIDITCH
SCALE: 1/4"=1'-0"
SEE SHEET 138



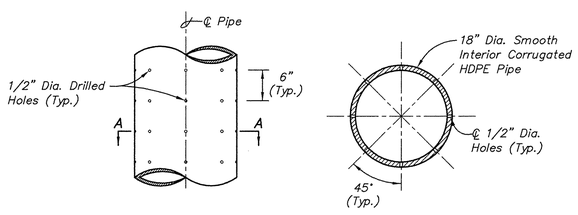
4/131 DETAIL – STORM WATER COLLECTION SUMP (STREAM DIVERSION) STORMCOLSUMP
SCALE: 1"=10'
SEE SHEET 137



5/131 DETAIL – STREAM DIVERSION INLET STRDIVINLET
SCALE: 1/2"=1'-0"
SEE THIS SHEET



8/131 DETAIL – STREAM DIVERSION OUTLET STRDIVOUTLET
SCALE: 1/4"=1'-0"
SEE SHEET 136

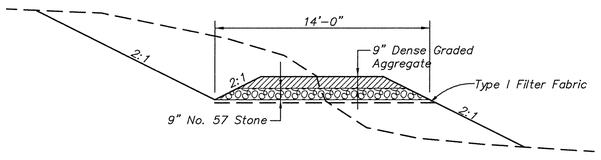


INVERT OF PIPE **SECTION A-A**

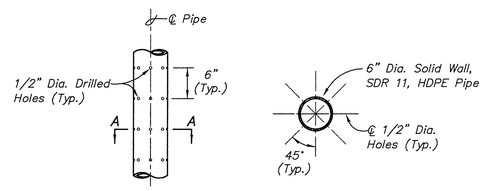
NOTES

1. Perforations shall be drilled along entire length of pipe.
2. All perforations shall be factory fabricated.
3. All perforated pipes shall be wrapped in filter fabric.

7/131 DETAIL – 18" DIA. HDPE PIPE PERFORATION PATTERN 18PDPPAT
NOT TO SCALE
SEE THIS SHEET



9/131 DETAIL – CIPOLLETTI WEIR ACCESS ROAD CIPWEIRD
NOT TO SCALE
SEE SHEET 115

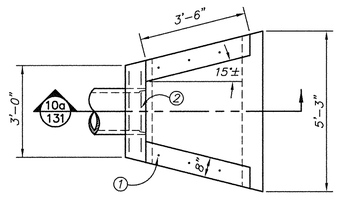


INVERT OF PIPE **SECTION A-A**

NOTES

1. Perforations shall be drilled along entire length of pipe.
2. All perforations shall be factory fabricated.
3. All perforated pipes shall be wrapped in filter fabric.

6/131 DETAIL – 6" DIA. HDPE PIPE PERFORATION PATTERN 6PDPPAT
NOT TO SCALE
SEE THIS SHEET



PLAN

NOTES:

Reinforcing Steel: Minimum Grade 40, evenly spaced.

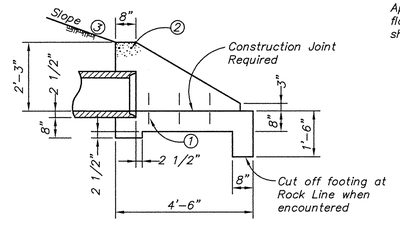
① 6 – #4 x 1'-0" Dowel Bars.

② 2 – #4 x 2'-8" reinforcement bars

③ Slopes shall be warped to fit headwall when pipe is skewed and/or normal slope varies from 2:1.

Wing angles and/or dimensions may be altered during construction to accommodate flow of water.

Apron between wings shall be sloped in direction of flow equal to slope of pipe. Front face of headwall shall remain vertical.



10a/131 SECTION

10/131 DETAIL – HEADWALL FOR 18" HDPE STORM DRAIN HDWALL
SCALE: 1/2"=1'-0"
SEE SHEET 138

Section or Detail No.
Sheet Where Shown
REFERENCE KEY

AS CONSTRUCTED - 06/17/08

REVISIONS			
Rev.	Drawn Date:	Drawn By:	Revision Made
A	6-16-06		
B	7-05-06		
C	10-02-06		
H	06-17-08		

Title
DETAILS
SILT CONTROL
AUXILIARY ASH POND – PHASE I

Location and Unit:
E.W. BROWN GENERATING STATION

Scale: AS SHOWN
Drawn: TJ/CDV
Date: MAY, 2006
Checked: DAB/BLP
Approved:

JOB NO. 119961 | JOB NO. | JOB NO. | JOB NO.

Drawing No: BR0-C-00131
Rev.: H

Fuller Mossbarger Scott & May
EMSM ENGINEERS
LEXINGTON ST. LOUIS LOUISVILLE JEFFERSONVILLE CINCINNATI ATLANTA COLUMBUS NASHVILLE

Kentucky Utilities Company
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LX2006228\REV1\40690T1.DWG

DMS Version 2.0

BRO-C-00133

LEGEND

Symbol	Description
OHE	Existing Overhead Electric
	Existing Power Pole
—x—x—	Existing Fence
	Treeline
	Tree
928.8	Surface Spot Elevation
	Approximate Property Line
CM2 ▲	Survey Control Point
2004 Mapping / 2005 Mapping	Mapping Matchline
• • • • • • • •	Construction Work Limits
OHE	Relocated Overhead Electric

NOTES:

1. No construction activities of any type including temporary stream crossings and Abandoned Waste Area removal shall be conducted within the Stream Buffer Zone until the Owner has received the 404 Permit from USACE. The Stream Buffer Zone shall be protected in accordance with the Sediment Control and Stream Mitigation sheets.

2. After Contractor is released to work within the limits of the Stream Buffer Zone, all soil within this area shall be completely removed and incorporated into the Liner System or the Temporary Soil Stockpile Area.

AS CONSTRUCTED - 06/17/08

MAPPING NOTE:

Topographic information is based on aerial mapping performed by L. Robert Kimball & Associates. Refer to General Notes and Notes on Sheets 104 through 111 for complete explanation.

50 0 100 200 FEET

GRAPHIC SCALE: 1" = 100'
CONTOUR INTERVAL = 2'

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MAP 4	MAP 5	
MAP 6		

Fuller Mossbarger Scott & May
FMSM ENGINEERS
LEXINGTON ST. LOUIS · LOUISVILLE JEFFERSONVILLE · CINCINNATI ATLANTA · COLUMBUS NASHVILLE

STATE OF KENTUCKY · DAN A. BACK · LICENSED PROFESSIONAL ENGINEER · 6-18-08

REVISIONS

Rev.	Drawn Date:	Drawn By:	Revision Mode
A	6-16-06		
C	10-02-06		
H	06-17-08		

Title

PLAN VIEW
PHASE IA GRADING
AUXILIARY ASH POND – PHASE I

Location and Unit:
E.W. BROWN GENERATING STATION

Scale: 1"=100'
Drawn: TJ/CDV
Date: MAY, 2006
Checked: DAB/BLP
Approved:

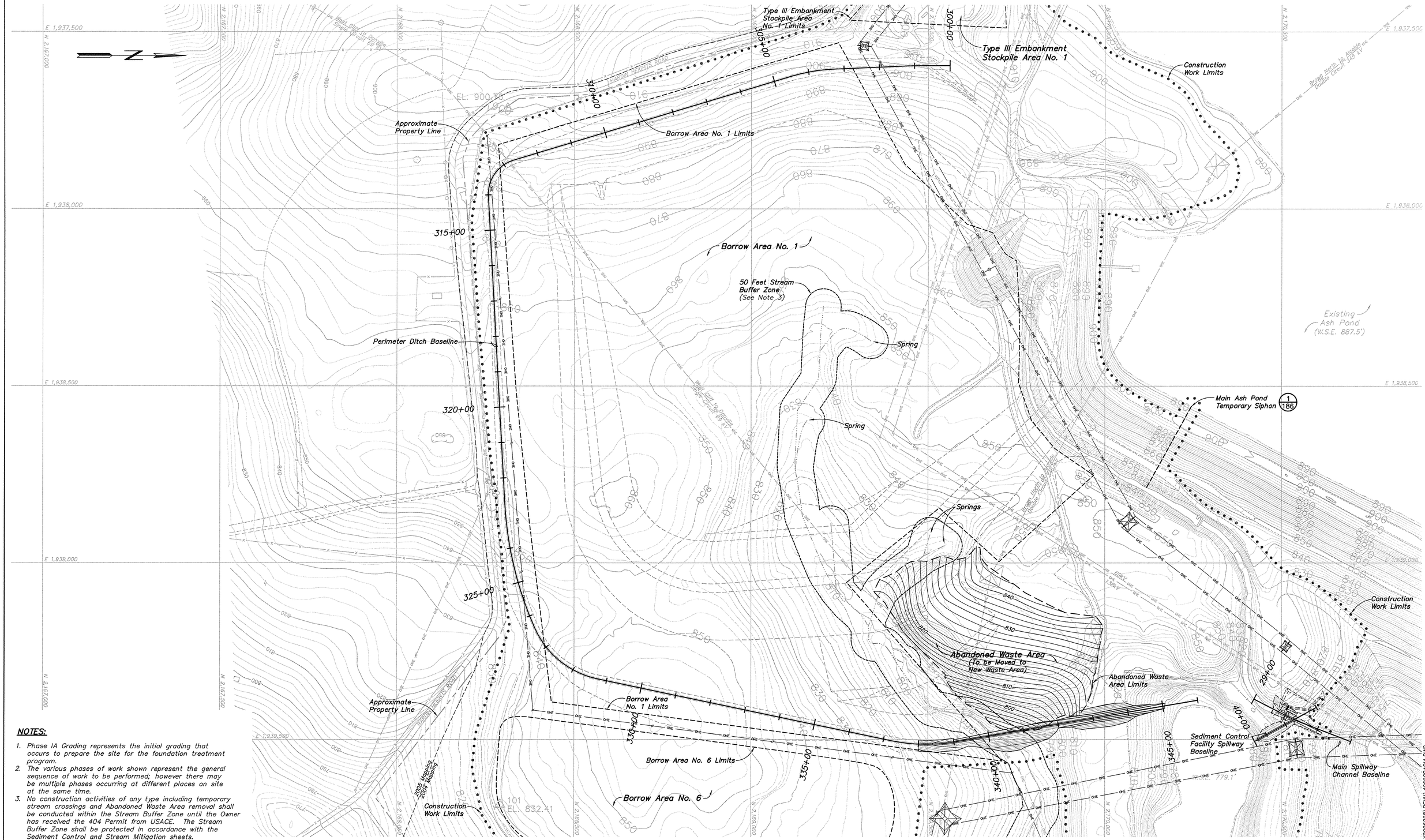
JOB NO.	JOB NO.	JOB NO.	JOB NO.
119961			

KU Kentucky Utilities Company
an e·on company

Drawing No:	Rev.
BRO-C-00133	H

DMS Version 2.0

BR0-C-00134



NOTES:

1. Phase IA Grading represents the initial grading that occurs to prepare the site for the foundation treatment program.
2. The various phases of work shown represent the general sequence of work to be performed; however there may be multiple phases occurring at different places on site at the same time.
3. No construction activities of any type including temporary stream crossings and Abandoned Waste Area removal shall be conducted within the Stream Buffer Zone until the Owner has received the 404 Permit from USACE. The Stream Buffer Zone shall be protected in accordance with the Sediment Control and Stream Mitigation sheets.
4. After Contractor is released to work within the limits of the Stream Buffer Zone, all soil within this area shall be completely removed and incorporated into the Liner System or the Temporary Soil Stockpile Area.
5. Contractor shall limit construction activities to have no more than 5 acres stripped of vegetation at one time without having additional silt fences prior to the construction of the perimeter ditch sediment control system. At the point in time Owner receives 404 permit, the Contractor shall immediately construct the Perimeter Ditch from 338+00 to the Sediment Control Facility. When this portion of the Perimeter Ditch is constructed Contractor is released to work within the Stream Buffer Zone.
6. A minimum of 130,000 cubic yards of Type III material shall be excavated from Borrow Area No. 1 and placed in the Type II Embankment Stockpile Areas before blasting occurs in any area. Additional Type III material may be excavated and stockpiled as directed by the Owner's Representative.

LEGEND

- Existing Overhead Electric
- Existing Power Pole
- Existing Fence
- Treeline
- Tree
- 928.8 Surface Spot Elevation
- Approximate Property Line
- CM2 ▲ Survey Control Point
- 2004 Mapping / 2005 Mapping — Mapping Matchline
- Construction Work Limits
- OHE Relocated Overhead Electric

MAPPING NOTE:

Topographic information is based on aerial mapping performed by L. Robert Kimball & Associates. Refer to General Notes and Notes on Sheets 104 through 111 for complete explanation.

AS CONSTRUCTED - 06/17/08

GRAPHIC SCALE: 1" = 100'
CONTOUR INTERVAL = 2'
50 0 100 200 FEET

INDEX TO MAPS

MAP 1	MAP 2	MAP 3
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Fuller Mossbarger Scott & May

EMSM ENGINEERS
LEXINGTON ST. LOUIS LOUISVILLE JEFFERSONVILLE CINCINNATI ATLANTA COLUMBUS NASHVILLE

REVISIONS

Rev.	Drawn Date:	Drawn By:	Revision Made
A	6-16-06		
C	10-02-06		
H	06-17-08		

Title
PLAN VIEW
PHASE IA GRADING
AUXILIARY ASH POND – PHASE I

Location and Unit:
E.W. BROWN GENERATING STATION

Scale: 1"=100'
Drawn: TJ/CDV
Date: MAY, 2006
Checked: DAB/BLP
Approved:

JOB NO.	JOB NO.	JOB NO.	JOB NO.
119961			

Kentucky Utilities Company
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Drawing No: BR0-C-00134
Rev.: H

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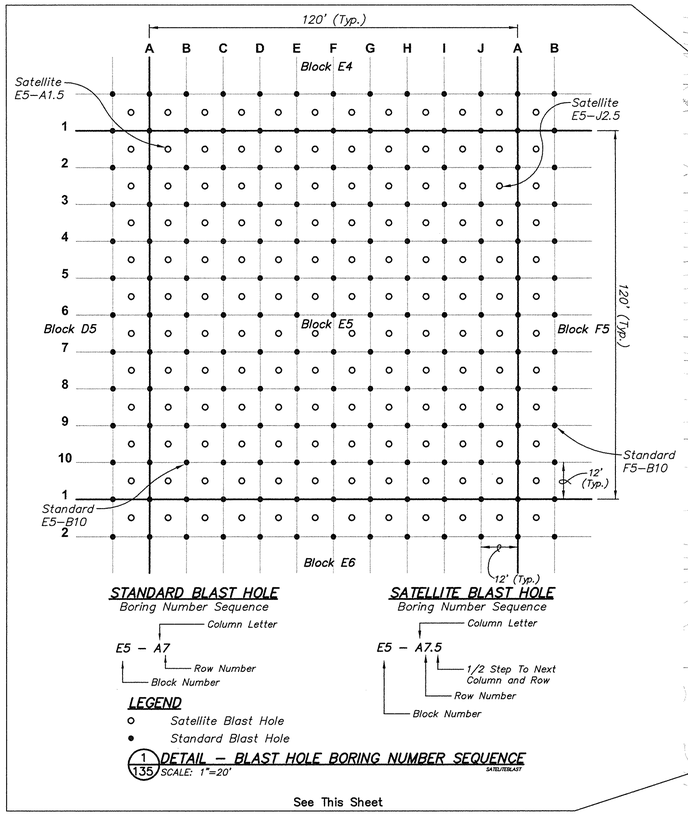
DMS Version 2.0

BR0-C-00135



STANDARD BLAST HOLE
Boring Number Sequence

E5 – A7
- Column Letter
- Row Number
- Block Number

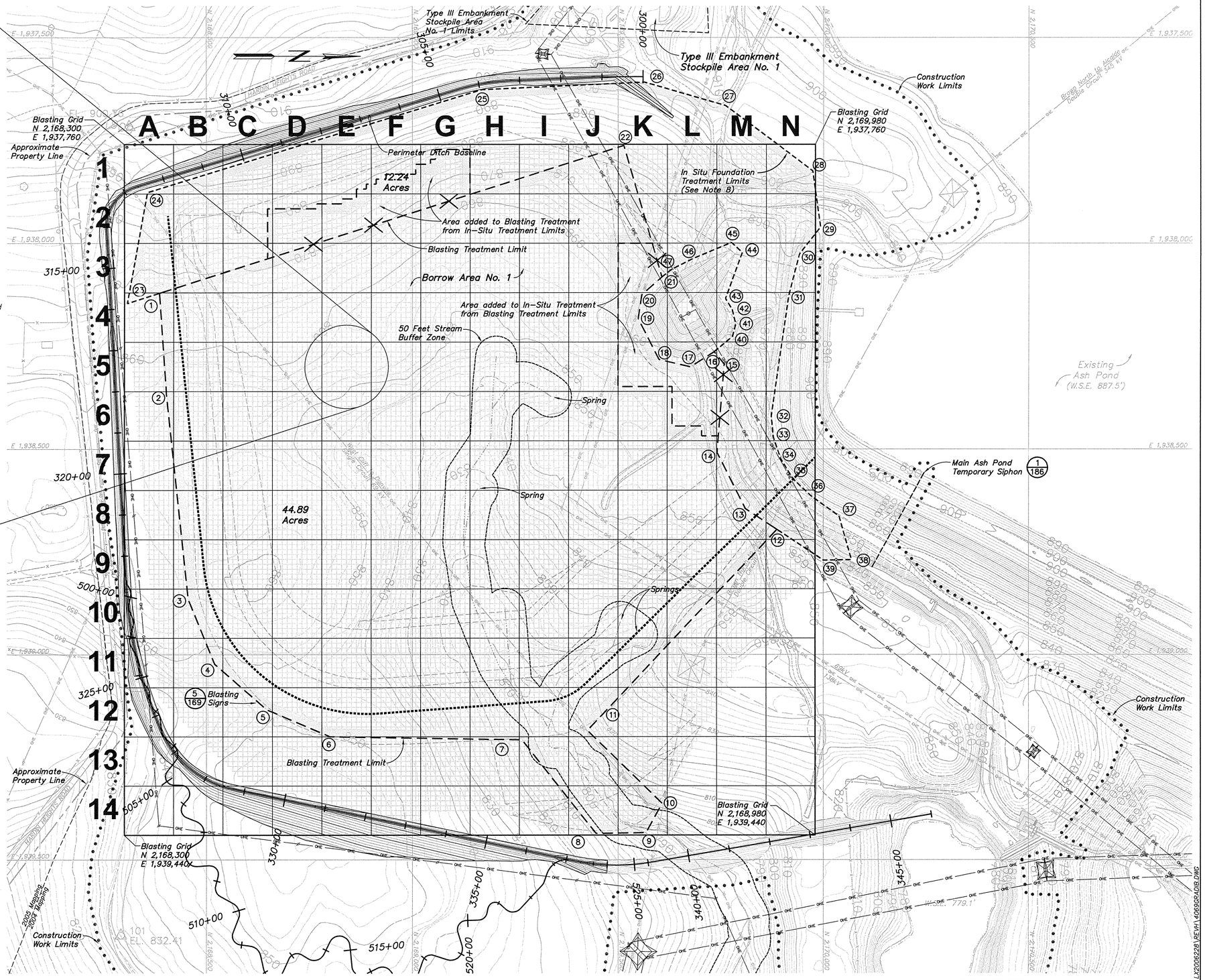
SATELLITE BLAST HOLE
Boring Number Sequence

E5 – A7.5
- Column Letter
- 1/2 Step To Next Column and Row
- Row Number
- Block Number

LEGEND
- Satellite Blast Hole
- Standard Blast Hole

(1/135) **DETAIL – BLAST HOLE BORING NUMBER SEQUENCE** SATELITE/STANDARD
SCALE: 1"=20'

See This Sheet



BLASTING LIMITS LOCATION TABLE

Point No.	Northing	Easting
1	2,168,385.33	1,938,121.03
2	2,168,402.79	1,938,369.71
3	2,168,455.70	1,938,864.44
4	2,168,520.23	1,939,023.32
5	2,168,646.69	1,939,134.41
6	2,168,800.26	1,939,200.28
7	2,169,266.50	1,939,207.80
8	2,169,446.45	1,939,436.15
9	2,169,568.18	1,939,434.41
10	2,169,607.43	1,939,362.79
11	2,169,425.62	1,939,184.96
12	2,169,886.47	1,938,695.29
13	2,169,809.53	1,938,644.72
14	2,169,741.17	1,938,508.14
15	2,169,758.15	1,938,293.75
16	2,169,734.10	1,938,263.49
17	2,169,676.77	1,938,300.35
18	2,169,599.71	1,938,282.30
19	2,169,548.91	1,938,183.01
20	2,169,557.60	1,938,124.80
21	2,169,606.59	1,938,082.08
22	2,169,513.95	1,937,762.39

IN SITU FOUNDATION TREATMENT LIMITS

Point No.	Northing	Easting
23	2,168,306.95	1,938,145.94
24	2,168,356.14	1,937,876.64
25	2,169,168.61	1,937,626.78
26	2,169,564.34	1,937,608.39
27	2,169,761.06	1,937,665.30
28	2,169,973.66	1,937,824.26
29	2,169,992.63	1,937,960.61
30	2,169,941.05	1,938,025.97
31	2,169,914.83	1,938,126.92
32	2,169,872.43	1,938,420.08
33	2,169,877.79	1,938,471.40
34	2,169,895.69	1,938,523.32
35	2,169,925.14	1,938,571.78
36	2,169,970.75	1,938,614.46
37	2,170,038.32	1,938,662.44
38	2,170,068.58	1,938,769.03
39	2,170,000.81	1,938,770.46
40	2,169,777.91	1,938,226.31
41	2,169,785.76	1,938,196.63
42	2,169,777.38	1,938,160.87
43	2,169,760.95	1,938,134.45
44	2,169,801.24	1,938,022.57
45	2,169,775.37	1,937,998.21
46	2,169,681.09	1,938,037.86
47	2,169,629.83	1,938,063.86

NOTES:

1. Phase IB presents the In Situ Foundation Treatment and Blasting Treatment methodology to improve the foundation.
2. The Blasting Treatment shall be conducted in a manner so as not to impact the stream buffer area until the Owner receives the 404 permit and the Perimeter Ditch is constructed from 338+00 to the Sediment Control Facility.
3. A minimum of 130,000 cubic yards of Type III material shall be excavated from Borrow Area No. 1 and placed in the Type II Embankment Stockpile Areas before blasting occurs in any area. Additional Type III material may be excavated and stockpiled as directed by the Owner's Representative.
4. Contractor shall install orange safety fence (USFENCE SL20–100 or Equal) four feet tall along the complete perimeter of the blasting limits prior to any blasting. The sign shall be installed exactly along the blasting limits shown herein and shall remain in place until all blasting activity is complete.
5. No In–Situ Foundation Treatment shall be performed at or near the existing Main Ash Pond Principal Spillway or Pole 14 Embankment until the Main Ash Pond Temporary Siphon has been constructed and is operational.
6. Under No circumstances shall there be any blasting within 120 feet of the Main Ash Pond Embankment.
7. Contractor shall limit construction activities to have no more than 5 acres stripped of vegetation at one time without having additional silt fences prior to the construction of the perimeter ditch sediment control system. At the point in time Owner receives 404 permit, the Contractor shall immediately construct the Perimeter Ditch from 338+00 to the Wetland Enhancement Facility. When this portion of the Perimeter Ditch is constructed Contractor is released to work within the Stream Buffer Zone.
8. The In Situ Foundation Treatment area shall be excavated to bedrock. Openings exposed in bedrock shall be treated as directed by the Owner's Representative and as shown on Sheet 169.

LEGEND
- Existing Overhead Electric
- Existing Power Pole
- Existing Fence
- Treeline
- Tree
- 928.8 Surface Spot Elevation
- Approximate Property Line
- CM2 A Survey Control Point
- 2004 Mapping / 2005 Mapping Mapping Matchline
- Construction Work Limits
- Relocated Overhead Electric
- Downstream Limit of Phase II Crest

MAPPING NOTE:
Topographic information is based on aerial mapping performed by L. Robert Kimball & Associates. Refer to General Notes and Notes on Sheets 104 through 111 for complete explanation.

SURVEY NOTE:
As Constructed survey data provided by Bizzack Construction. Based on field observations this data is believed to be correct, but has not been surveyed by FMSM Engineers.

AS CONSTRUCTED - 06/17/08

50 0 100 200 FEET
GRAPHIC SCALE: 1" = 100'
CONTOUR INTERVAL = 2'

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MAP 4	MAP 5	
MAP 6		

DAN A. BACK 19009 LICENSED PROFESSIONAL ENGINEER 6-17-08

REVISIONS			
Rev.	Drawn Date:	Drawn By:	Revision Made
A	6–16–06		
B	7–05–06		
C	10–02–06		
D	02–16–07		
F	06–14–07		
H	06–17–08		

Title
PLAN VIEW
PHASE IB GRADING
AUXILIARY ASH POND – PHASE I

Location and Unit:
E.W. BROWN GENERATING STATION

Scale: 1"=100'
Drawn: TJ/CDV
Date: MAY, 2006
Checked: DAB/BLP
Approved:

JOB NO.	JOB NO.	JOB NO.	JOB NO.
119961			

Drawing No: BR0–C–00135
Rev. H

Fuller Mossbarger Scott & May
FMSM ENGINEERS
LEXINGTON ST. LOUIS LOUISVILLE JEFFERSONVILLE CINCINNATI ATLANTA COLUMBUS WISMILLE

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DMS Version 2.0

Type III Embankment Stockpile Area No. 1 Limits

Type III Embankment Stockpile Area No. 1

Construction Work Limits

Approximate Property Line

Main Ash Pond Principal Spillway Baseline

Main Ash Pond Riser (Not this Contract)

Auxiliary Ash Pond Emergency Spillway Baseline – Phase I

Auxiliary Ash Pond Riser (See Note 5)

Begin Construction of Main Ash Pond Principal Spillway Pipe at Sta. 11+10.00 (This Contract)

Main Ash Pond Principal Spillway Pipe (1/174)

Existing Ash Pond (W.S.E. 887.5')

Auxiliary Ash Pond Principal Spillway Baseline

Main Ash Pond Secondary Spillway Baseline

Main Ash Pond Temporary Siphon (1/186)

Auxiliary Ash Pond Principal Spillway Pipe

As-Constructed Grade IC Limit

(9/131) Construct Road to Cipolletti Weir

Silt Fence (1/131)

(2/183) 36" Headwall

(1/187) Cipolletti Weir

Approximate Property Line

2005 Mapping / 2004 Mapping

Construction Work Limits

W.S.E. 779.1'

EL. 832.41

NOTES:

1. Phase 1C represents the top of the subgrade elevation after excavation of excess material from In situ Foundation Treatment and Blasting Treatment; and prior to placement of Zone IIa/6 in the pond area and Zone I in the embankment area.
2. The various phases of work shown represent the general sequence of work to be performed; however multiple phases may occur at the same time.
3. Install silt fence at Elevation 816, 840, and 860 Feet within the pool area as soon as site is graded to Phase 1C grade.
4. Siphon must be installed and operational prior to Main Ash Pond Principal Spillway and Junction Box construction.
5. The Contractor shall construct a three-foot wide drainage channel to provide positive drainage to the lowest riser inlet elevation (el. 870.0').

LEGEND

- Existing Overhead Electric
- Existing Power Pole
- Existing Fence
- Treeline
- Tree
- 928.8 Surface Spot Elevation
- Approximate Property Line
- CM2 ▲ Survey Control Point
- 2004 Mapping / 2005 Mapping – Mapping Matchline
- Construction Work Limits
- Relocated Overhead Electric

MAPPING NOTE:

Topographic information is based on aerial mapping performed by L. Robert Kimball & Associates. Refer to General Notes and Notes on Sheets 104 through 111 for complete explanation.

SURVEY NOTE:

As Constructed survey data provided by Bizzack Construction. Based on field observations this data is believed to be correct, but has not been surveyed by FMSM Engineers.

AS CONSTRUCTED - 06/17/08

GRAPHIC SCALE: 1" = 100'
CONTOUR INTERVAL = 2'

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MAP 4	MAP 5	
MAP 6		

DAN A. BACK LICENSED PROFESSIONAL ENGINEER 6-17-08

Fuller Mossbarger Scott & May

FMSM ENGINEERS
LEXINGTON ST. LOUIS LOUISVILLE JEFFERSONVILLE CINCINNATI ATLANTA COLUMBUS NASHVILLE

REVISIONS

Rev.	Drawn Date:	Drawn By:	Revision Made
A	6-16-06		
C	10-02-06		
H	06-17-08		

Title
PLAN VIEW
PHASE IC GRADING
AUXILIARY ASH POND – PHASE I

Location and Unit:
E.W. BROWN GENERATING STATION

Scale: 1"=100'
Drawn: TJ/CDV
Date: MAY, 2006
Checked: DAB/BLP
Approved:

JOB NO.	JOB NO.	JOB NO.	JOB NO.
119961			

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Drawing No: BR0-C-00136
Rev. H

DMS Version 2.0

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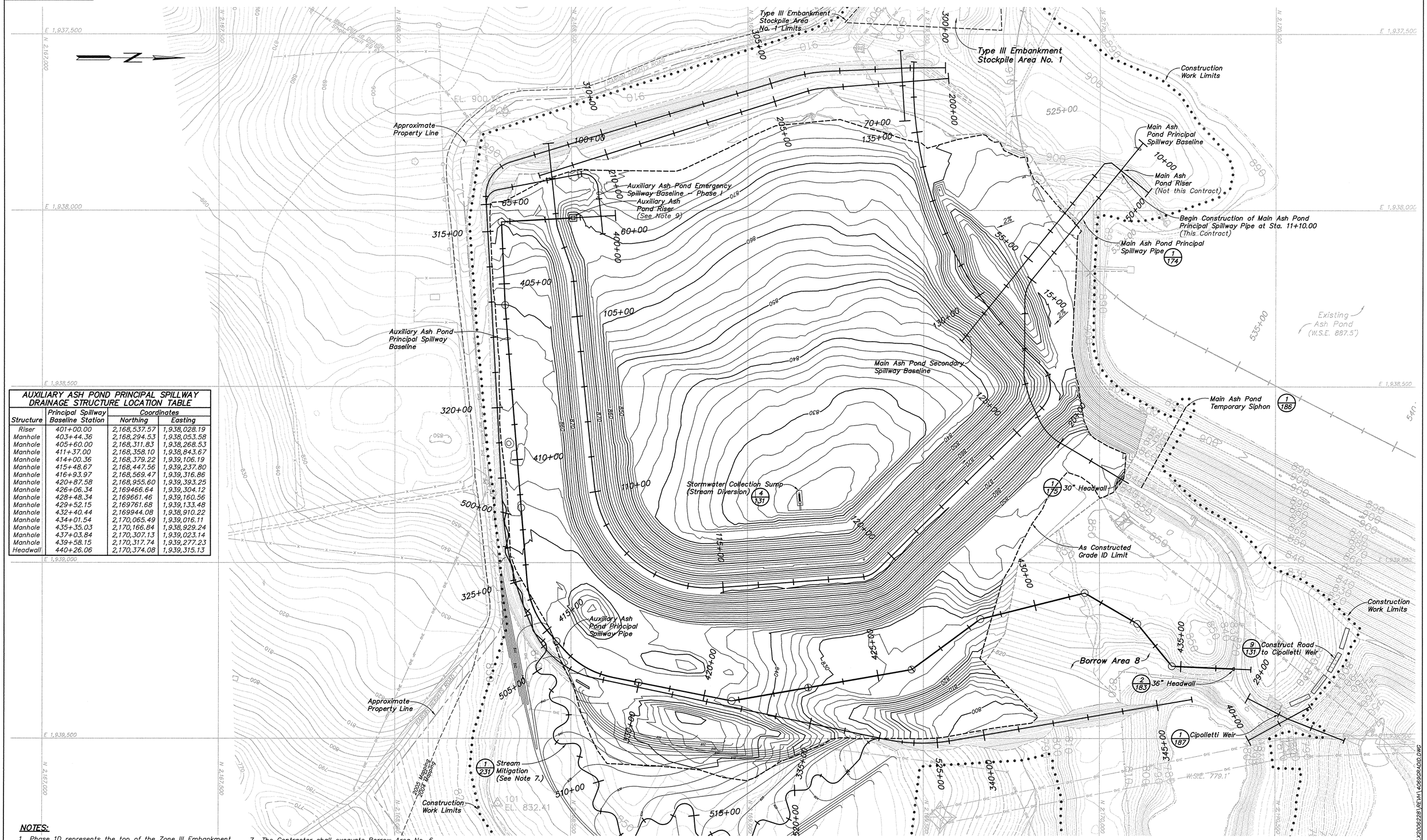
BR0-C-00137

AUXILIARY ASH POND PRINCIPAL SPILLWAY DRAINAGE STRUCTURE LOCATION TABLE

Structure	Principal Spillway Baseline Station	Coordinates Northing	Coordinates Easting
Riser	401+00.00	2,168,537.57	1,938,028.19
Manhole	403+44.36	2,168,294.53	1,938,053.58
Manhole	405+60.00	2,168,311.83	1,938,268.53
Manhole	411+37.00	2,168,358.10	1,938,843.67
Manhole	414+00.36	2,168,379.22	1,939,106.19
Manhole	415+48.67	2,168,447.56	1,939,237.80
Manhole	416+93.97	2,168,569.47	1,939,316.86
Manhole	420+87.58	2,168,955.60	1,939,393.25
Manhole	426+06.34	2,169466.64	1,939,304.12
Manhole	428+48.34	2,169661.46	1,939,160.56
Manhole	429+52.15	2,169761.68	1,939,133.48
Manhole	432+40.44	2,169944.08	1,938,910.22
Manhole	434+01.54	2,170,065.49	1,939,016.11
Manhole	435+35.03	2,170,166.84	1,938,929.24
Manhole	437+03.84	2,170,307.13	1,939,023.14
Manhole	439+58.15	2,170,317.74	1,939,277.23
Headwall	440+26.06	2,170,374.08	1,939,315.13



NOTES:

1. Phase 1D represents the top of the Zone III Embankment and FML.
2. The various phases of work shown represent the general sequence of work to be performed; however multiple phases may occur at the same time.
3. Install silt fence at Elevation 830, 840 and 860 Feet within the pool area as soon as site is graded to Phase 1D grade.
4. Liner deployment shall begin at the higher elevations within the pool and the dam and progress to the low point at the upstream toe of the embankment. Auxiliary Ash Pond Emergency Spillway shall be constructed prior to FML deployment.
5. Storm Water Collection Sump shall remain operational until the Zone IV has been placed over the entire pool area.
6. Flow from the Main Ash Pond shall be diverted through the Main Ash Pond Principal Spillway and Junction Box once it is completed and accepted by the Engineer. Main Ash Pond Temporary Siphon shall be removed and embankment restored to its original condition.
7. The Contractor shall excavate Borrow Area No. 6 in general conformance with Stream Mitigation Grading Plan (See Sheet 231).
8. Do not place FML over or connect FML to the over or connect FML to the stormwater collection sump.
9. The Contractor shall construct a three-foot wide drainage channel to provide positive drainage to the lowest riser inlet elevation (el. 870.0').
10. The Contractor shall anchor the FML to the Riser Structure and the Main Ash Pond Secondary Spillway Headwall. See (7/180)

LEGEND

- Existing Overhead Electric
- Existing Power Pole
- Existing Fence
- Treeline
- Tree
- 928.8 Surface Spot Elevation
- Approximate Property Line
- CM2 ▲ Survey Control Point
- 2004 Mapping / 2005 Mapping — Mapping Matchline
- Construction Work Limits
- Relocated Overhead Electric

MAPPING NOTE:

Topographic information is based on aerial mapping performed by L. Robert Kimball & Associates. Refer to General Notes and Notes on Sheets 104 through 111 for complete explanation.

SURVEY NOTE:

As Constructed survey data provided by Bizzack Construction. Based on field observations this data is believed to be correct, but has not been surveyed by FMSM Engineers.

Section or Detail No. / Sheet Where Shown

REFERENCE KEY

GRAPHIC SCALE: 1" = 100'
CONTOUR INTERVAL = 2'

AS CONSTRUCTED - 06/17/08

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MAP 4	MAP 5	
MAP 6		

Fuller Mossbarger Scott & May

FMSM ENGINEERS — LEXINGTON, ST. LOUIS, LOUISVILLE, JEFFERSONVILLE, CINCINNATI, ATLANTA, COLUMBUS, NASHVILLE

REVISIONS			
Rev.	Drawn Date:	Drawn By:	Revision Made
A	6-16-06		
C	10-02-06		
F	06-14-07		
H	06-17-08		

Title: PLAN VIEW PHASE ID GRADING AUXILIARY ASH POND - PHASE I

Location and Unit: E.W. BROWN GENERATING STATION

Scale: 1"=100'
Drawn: TJ/CDV
Date: MAY, 2007
Checked: DAB/BLP
Approved:

JOB NO.	JOB NO.	JOB NO.	JOB NO.
119961			

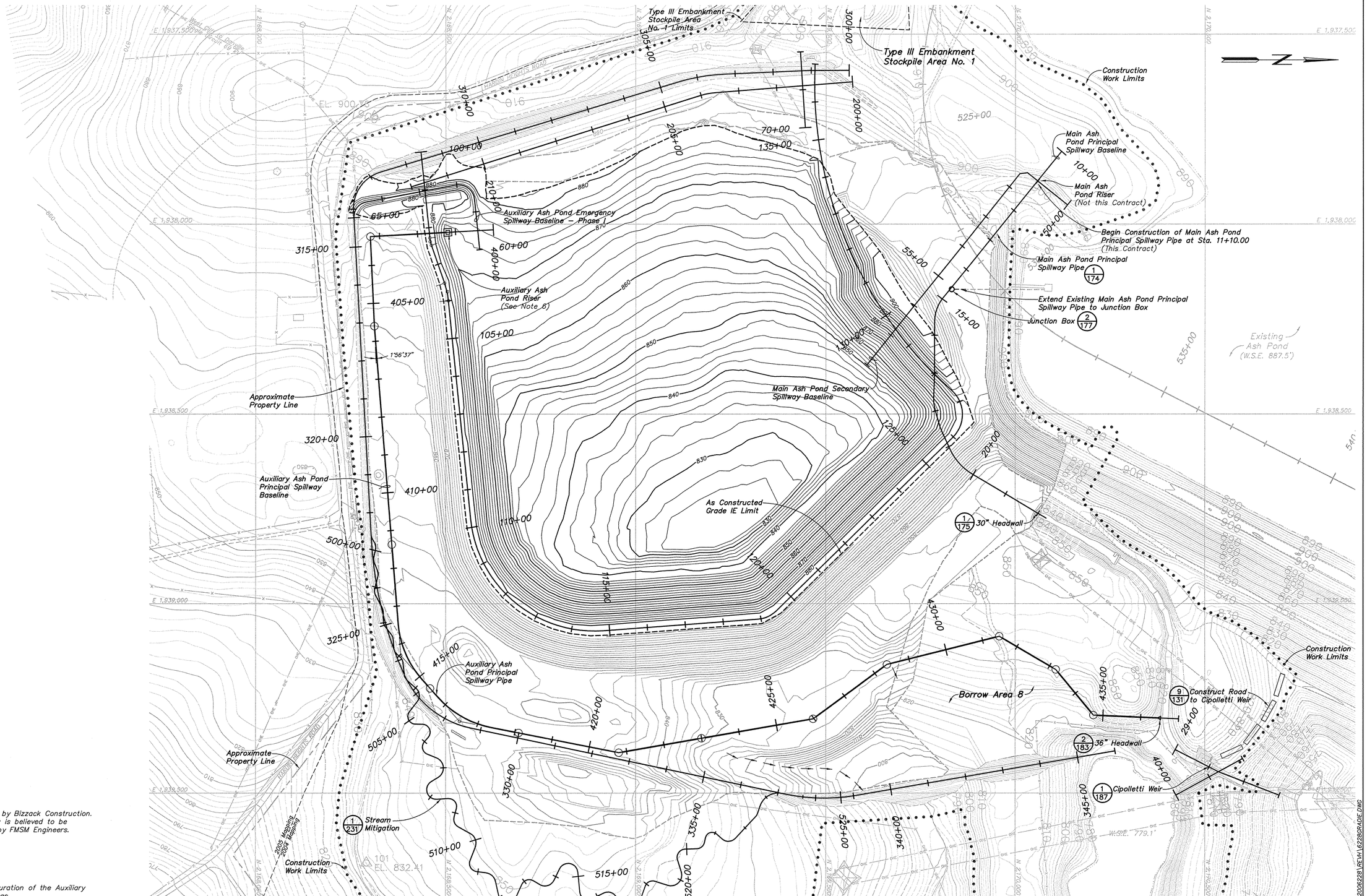
Kentucky Utilities Company, an E.ON company

Drawing No.: BR0-C-00137 Rev.: H

LX2008228\REVH1 406960AI0D.DWG

DMS Version 2.0

BR0-C-00138



SURVEY NOTE:

As Constructed survey data provided by Bizzack Construction. Based on field observations this data is believed to be correct, but has not been surveyed by FMSM Engineers.

NOTES:

1. *Phase 1E represents the final configuration of the Auxiliary Ash Pond embankment and pool areas.*
2. *The various phases of work shown represent the general sequence of work to be performed; however multiple phases may occur at the same time.*
3. *Silt fences shall not be installed in areas in which Zone IV has been placed.*
4. *Storm Water Collection Sump shall remain operational until the Zone IV has been placed over the entire pool area. At this time, the Storm Water Collection Sump and any sediment shall be removed. Storm Water Collection Sump shall not be removed until approval is granted by the Engineer.*
5. *Flow from the Main Ash Pond shall be diverted through the Main Ash Pond Principal Spillway and Junction Box once it is completed and accepted by the Owner's Representative. Main Ash Pond Temporary Siphon shall be removed and embankment restored to its original condition.*
6. *The Contractor shall construct a three-foot wide drainage channel to provide positive drainage to the lowest riser inlet elevation (el. 870.0')*

LEGEND

- OHE — Existing Overhead Electric
- Existing Power Pole
- Existing Fence
- Treeline
- Tree
- 928.8 — Surface Spot Elevation
- Approximate Property Line
- CM2 ⚓ — Survey Control Point
- 2004 Mapping / 2005 Mapping — Mapping Matchline
- Construction Work Limits
- OHE — Relocated Overhead Electric

AS CONSTRUCTED - 06/17/08

MAPPING NOTE:

Topographic information is based on aerial mapping performed by L. Robert Kimball & Associates. Refer to General Notes and Notes on Sheets 104 through 111 for complete explanation. Supplemental field survey data in the immediate area of Borrow Area 8 was supplied by Bizzack Construction.

Section or Detail No. / Sheet Where Shown

REFERENCE KEY

50 0 100 200 FEET

GRAPHIC SCALE: 1" = 100'
CONTOUR INTERVAL = 2'

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MAP 4	MAP 5	
MAP 6		

DAN A. BACK 130 LICENSED PROFESSIONAL ENGINEER 6-16-08

Fuller Mossbarger Scott & May

FMSM ENGINEERS — LEXINGTON, ST. LOUIS, LOUISVILLE, JEFFERSONVILLE, CINCINNATI, ATLANTA, COLUMBUS, NASHVILLE

REVISIONS			
Rev.	Drawn Date:	Drawn By:	Revision Made
A	6-15-06		
C	10-02-06		
	08-09-07		
	12-13-07		
H	06-17-08		

Title: PLAN VIEW PHASE IE GRADING AUXILIARY ASH POND – PHASE I

Location and Unit: E.W. BROWN GENERATING STATION

Scale: 1"=100'
Drawn: BFS
Date: DECEMBER, 2007
Checked: DAB/BLP
Approved:

JOB NO.	JOB NO.	JOB NO.	JOB NO.	Drawing No:	Rev.
119961				BR0-C-00138	H

Kentucky Utilities Company — an E·ON company

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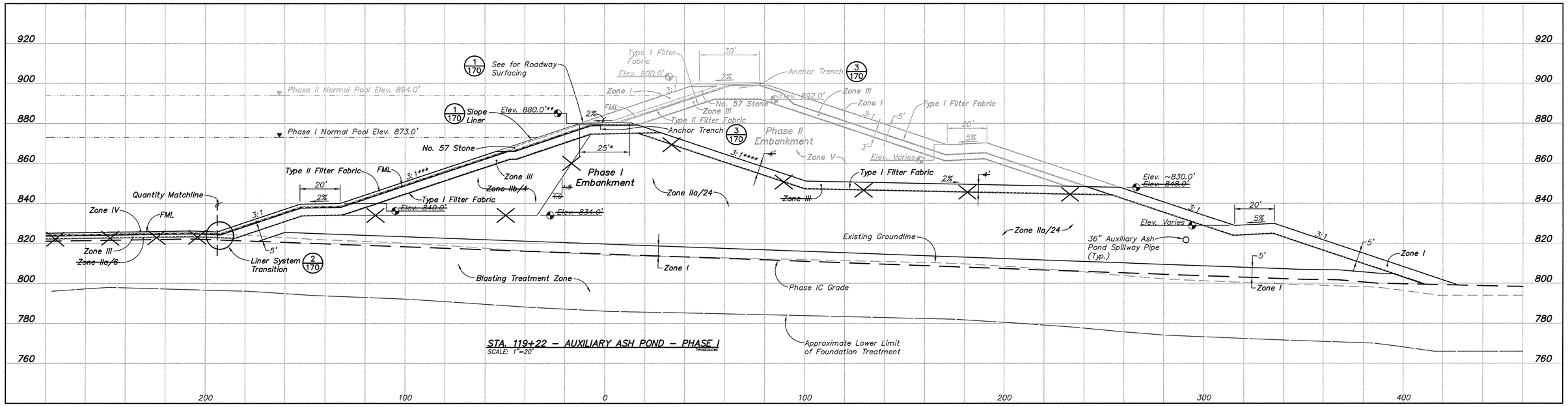
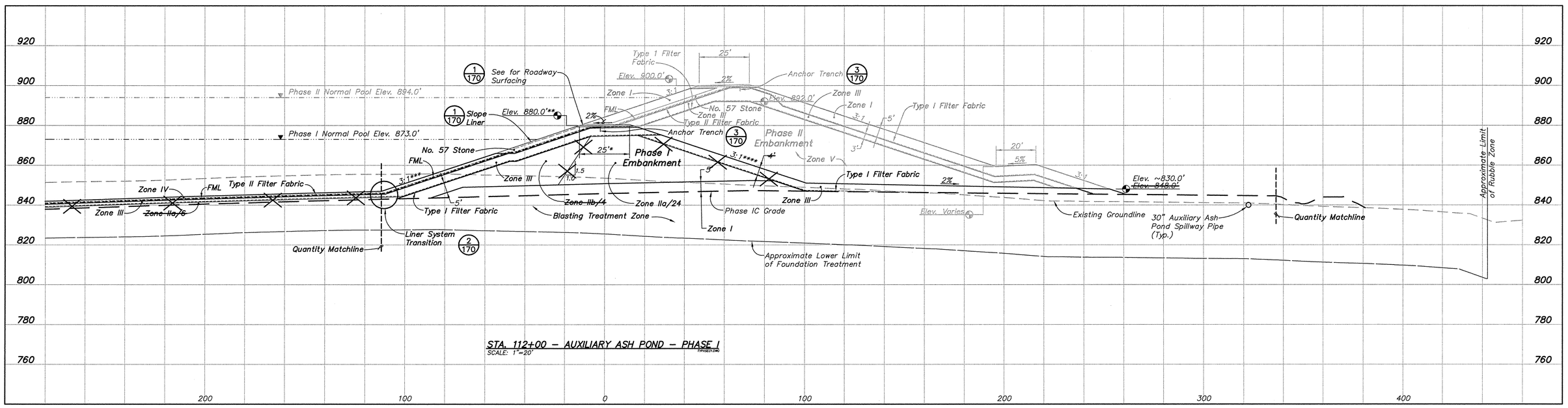
DMS Version 2.0



STA. 119+22 – AUXILIARY ASH POND – PHASE I
SCALE: 1"=20' TYPXSEC23.DWG



STA. 112+00 – AUXILIARY ASH POND – PHASE I
SCALE: 1"=20' TYPXSEC.DWG

* Crest Width 24.8' – 25.4'

** Crest Elevation 880.1' – 881.4'

*** Upstream Slope 2.96:1 – 3.18:1

**** Downstream Slope 2.92:1 – 3.25:1

NOTE: Downstream Clay (Type III Material) Zone replaced with Shot Rock (Type IIa Material).

SURVEY NOTE:
As Constructed survey data provided by Bizzack Construction. Based on field observations this data is believed to be correct, but has not been surveyed by FMSM Engineers.

AS CONSTRUCTED - 06/17/08

Section or Detail No.
Sheet Where Shown
REFERENCE KEY

LX2006229\REV1\TYPXSHT1.DWG

REVISIONS			
Rev.	Drawn Date:	Drawn By:	Revision Mode
A	6-16-06		
C	10-02-06		
H	06-17-08		

DAN A. BACK 136301 LICENSED PROFESSIONAL ENGINEER 6-18-08

Fuller Mossbarger Scott & May
FMSM ENGINEERS
LEXINGTON ST. LOUIS LOUISVILLE JEFFERSONVILLE CINCINNATI ATLANTA COLUMBUS NASHVILLE

Title
TYPICAL CROSS SECTIONS
PHASE I EMBANKMENT
AUXILIARY ASH POND – PHASE I

Location and Unit:
E.W. BROWN GENERATING STATION

Scale: 1"= 20'
Drawn: TJ/CDV
Date: MAY, 2006
Checked: DAB/BLP
Approved:

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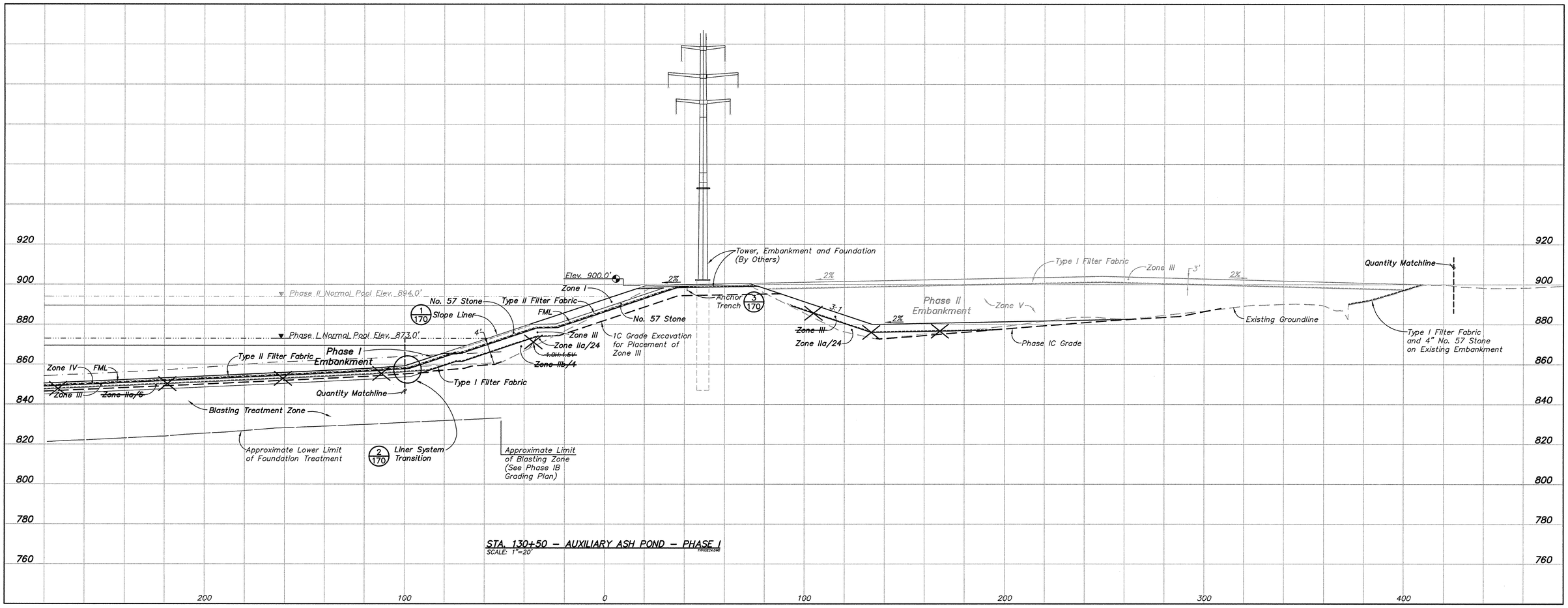
JOB NO.	JOB NO.	JOB NO.	JOB NO.	Drawing No:	Rev.
119961				BR0-C-00139	H

DMS Version 2.0

BR0-C-00140



STA. 130+50 – AUXILIARY ASH POND – PHASE I

SCALE: 1"=20'

SURVEY NOTE:
As Constructed survey data provided by Bizzack Construction. Based on field observations this data is believed to be correct, but has not been surveyed by FMSM Engineers.

AS CONSTRUCTED - 06/17/08

Section or Detail No.

Sheet Where Shown

REFERENCE KEY

DAN A. BACK 13930 LICENSED PROFESSIONAL ENGINEER 6-18-08

REVISIONS			
Rev.	Drawn Date:	Drawn By:	Revision Mode
A	6-16-06		
C	10-02-06		
H	06-17-08		

Title: TYPICAL CROSS SECTIONS PHASE I EMBANKMENT AUXILIARY ASH POND – PHASE I

Location and Unit: E.W. BROWN GENERATING STATION

Scale: 1"= 20'
Drawn: TJ/CDV
Date: MAY, 2006
Checked: DAB/BLP
Approved:

Fuller Mossbarger Scott & May

FMSM ENGINEERS
LEXINGTON ST. LOUIS LOUISVILLE JEFFERSONVILLE CINCINNATI ATLANTA COLUMBUS NASHVILLE

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JOB NO.	JOB NO.	JOB NO.	JOB NO.	Drawing No:	Rev.
119961				BR0-C-00140	H

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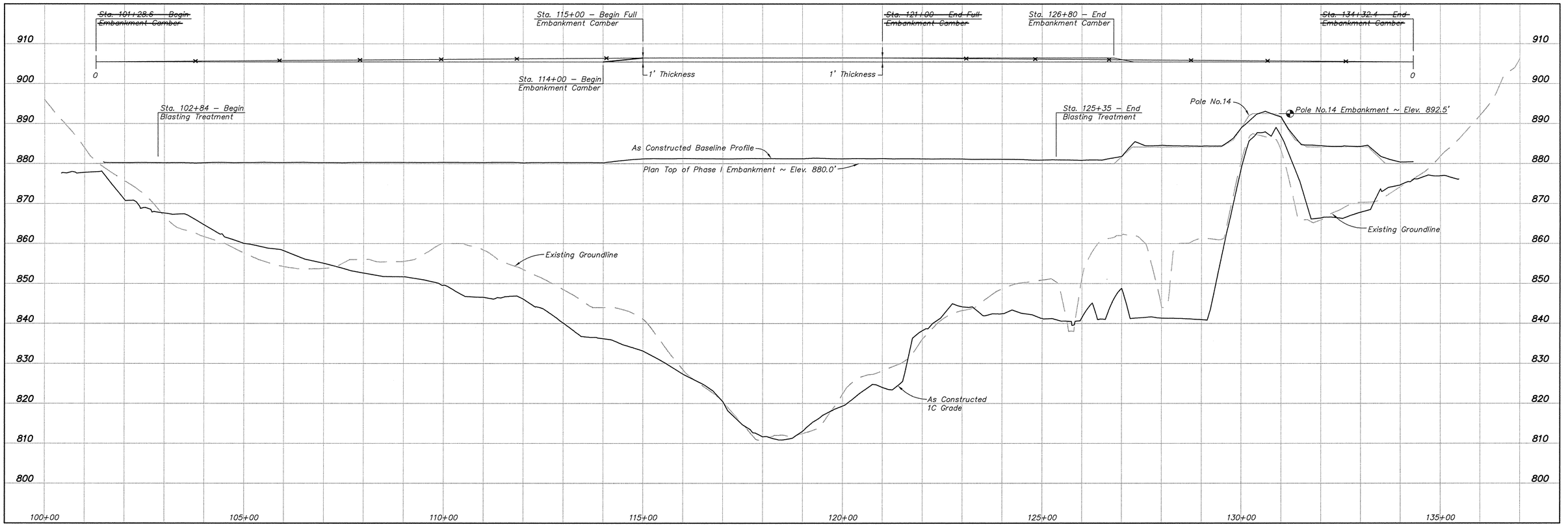
DMS Version 2.0



1/141 PROFILE – PHASE I EMBANKMENT
(VIEW LOOKING UPSTREAM)

SCALE: 1"=10' (VERTICAL)
1"=100' (HORIZONTAL)

SURVEY NOTE:
As Constructed survey data provided by Bizzack Construction. Based on field observations this data is believed to be correct, but has not been surveyed by FMSM Engineers.

AS CONSTRUCTED - 06/17/08

Section or Detail No.
Sheet Where Shown
REFERENCE KEY

LX2006228\REVH\PROFSHTPH1.DWG

DANIEL A. BIZZACK 90378 LICENSED PROFESSIONAL ENGINEER 6-17-08

REVISIONS			
Rev.	Drawn Date:	Drawn By:	Revision Mode
A	6-16-06		
C	10-02-06		
H	06-17-08		

Title
PROFILE
PHASE I EMBANKMENT
AUXILIARY ASH POND – PHASE I

Location and Unit:
E.W. BROWN GENERATING STATION

Fuller Mossbarger Scott & May
FMSM ENGINEERS
LEXINGTON ST. LOUIS LOUISVILLE JEFFERSONVILLE CINCINNATI ATLANTA COLUMBUS NASHVILLE

Scale: AS SHOWN
Drawn: TJ/CDV
Date: MAY, 2006
Checked: DAB/BLP
Approved:

JOB NO.	JOB NO.	JOB NO.	JOB NO.
119961			

Kentucky Utilities Company
an E·ON company

Drawing No: BR0-C-00141
Rev. H

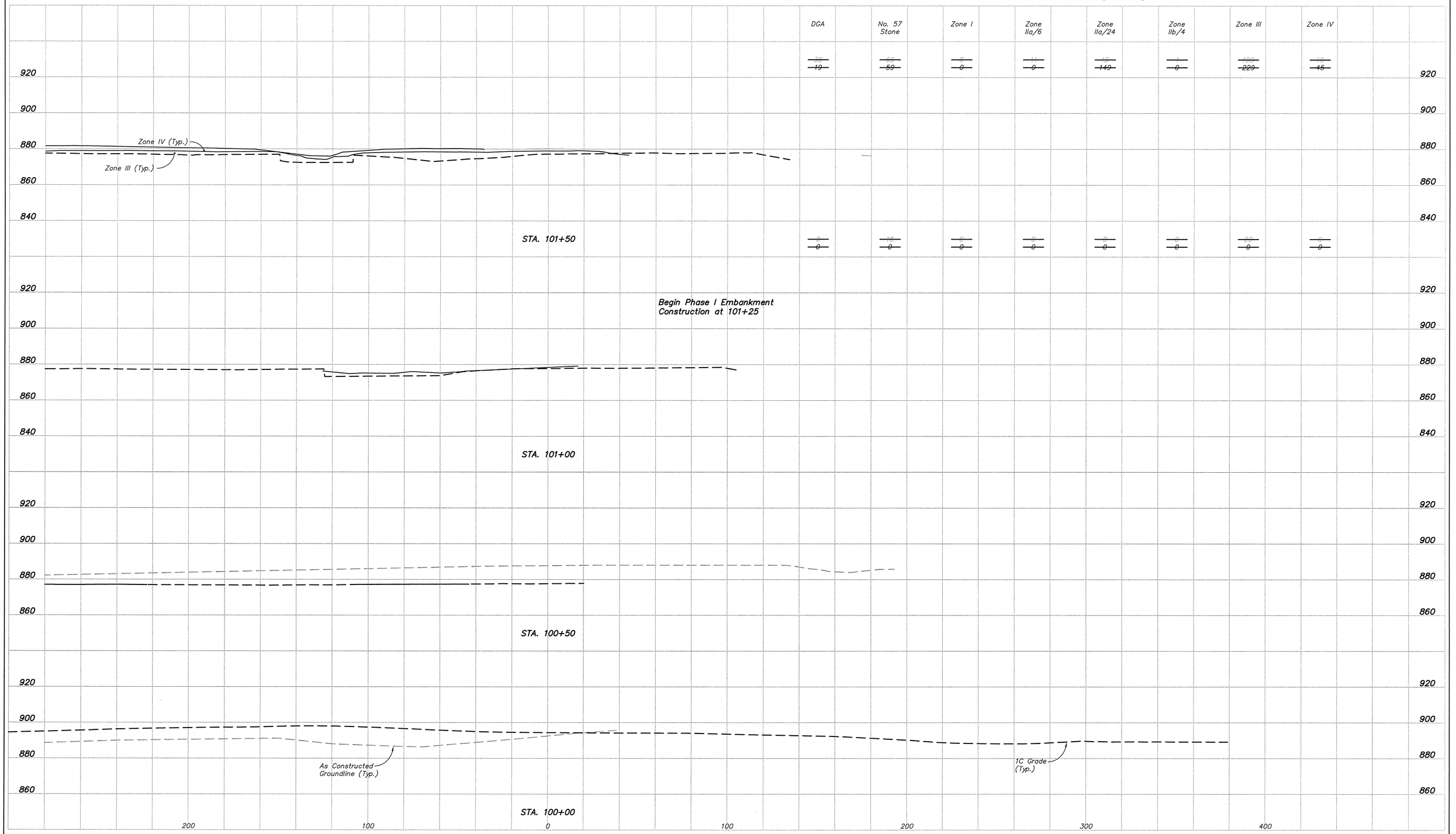
DMS Version 2.0

BR0-C-00142

NOTE:
QUANTITIES ARE BASED ON DESIGN CROSS SECTIONS NOT AS CONSTRUCTED DATA.

EMBANKMENT QUANTITIES (CU. YDS.)

	DGA	No. 57 Stone	Zone I	Zone IIa/6	Zone IIa/24	Zone IIb/4	Zone III	Zone IV
STA. 101+50	~~36~~ / ~~19~~	~~65~~ / ~~59~~	~~0~~ / ~~0~~	~~51~~ / ~~0~~	~~15~~ / ~~149~~	~~1~~ / ~~0~~	~~139~~ / ~~229~~	~~19~~ / ~~15~~
STA. 101+00	~~0~~ / ~~0~~	~~15~~ / ~~0~~	~~6~~ / ~~0~~	~~0~~ / ~~0~~	~~0~~ / ~~0~~	~~0~~ / ~~0~~	~~20~~ / ~~0~~	~~0~~ / ~~0~~



NOTES:

1. For Typical Embankment Cross Sections, See Sheets BR0-C-00139 and BR0-C-00140.
2. FML and Filter Fabric materials not shown for clarity. See Typical Sections.

SURVEY NOTE:
As Constructed survey data provided by Bizzack Construction. Based on field observations this data is believed to be correct, but has not been surveyed by FMSM Engineers.

AS CONSTRUCTED - 06/17/08

LX2008228\REV1\XSHTI.DWG

DAN A. BIZZACK LICENSED PROFESSIONAL ENGINEER

Fuller Mossbarger Scott & May

FMSM ENGINEERS
LEXINGTON ST. LOUIS LOUISVILLE JEFFERSONVILLE CINCINNATI ATLANTA COLUMBUS NASHVILLE

REVISIONS

Rev.	Drawn Date:	Drawn By:	Revision Mode
A	6-16-06		
C	10-02-06		
H	06-17-08		

Title
CROSS SECTIONS
STA. 100+00 TO STA. 101+50
AUXILIARY ASH POND - PHASE I

Location and Unit:
E.W. BROWN GENERATING STATION

Scale: 1" = 20'
Drawn: TJ/CDV
Date: MAY, 2006
Checked: DAB/BLP
Approved:

Kentucky Utilities Company
an E·ON company

JOB NO.	JOB NO.	JOB NO.	JOB NO.
119961			

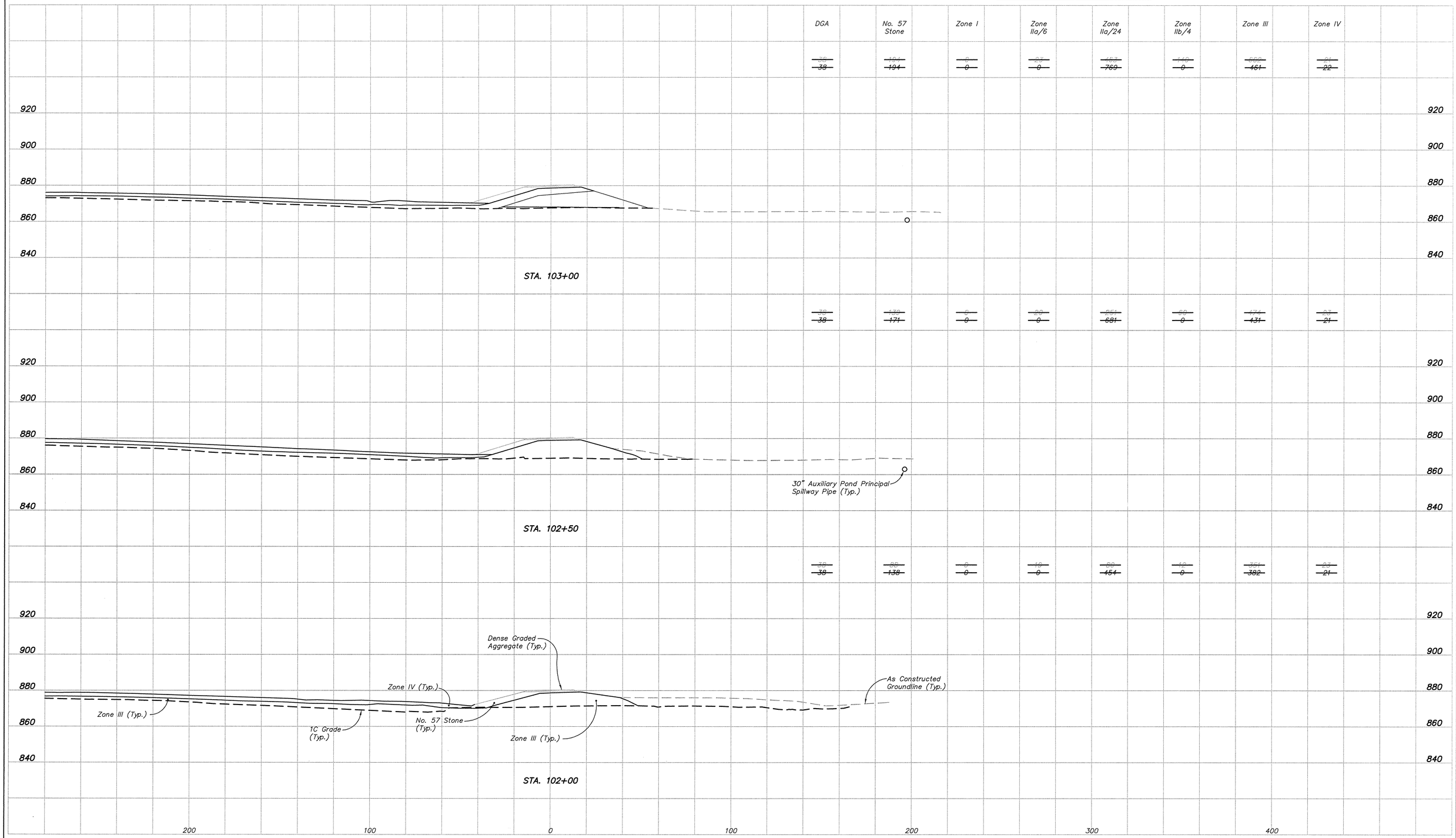
Drawing No: BR0-C-00142
Rev. H

DMS Version 2.0

NOTE:
QUANTITIES ARE BASED ON DESIGN CROSS SECTIONS NOT AS CONSTRUCTED DATA.

EMBANKMENT QUANTITIES (CU. YDS.)

	DGA	No. 57 Stone	Zone I	Zone IIa/6	Zone IIa/24	Zone IIb/4	Zone III	Zone IV
STA. 103+00	~~38~~ 38	~~194~~ 194	~~6~~ 0	~~87~~ 0	~~463~~ 769	~~140~~ 0	~~669~~ 461	~~24~~ 22
STA. 102+50	~~38~~ 38	~~179~~ 171	~~6~~ 0	~~29~~ 0	~~661~~ 681	~~69~~ 0	~~474~~ 431	~~27~~ 21
STA. 102+00	~~38~~ 38	~~86~~ 138	~~0~~ 0	~~10~~ 0	~~89~~ 454	~~12~~ 0	~~351~~ 382	~~23~~ 21



NOTES:

1. For Typical Embankment Cross Sections, See Sheets BR0-C-00139 and BR0-C-00140.
2. FML and Filter Fabric materials not shown for clarity. See Typical Sections.

SURVEY NOTE:
As Constructed survey data provided by Bizzack Construction. Based on field observations this data is believed to be correct, but has not been surveyed by FMSM Engineers.

AS CONSTRUCTED - 06/17/08

DAN A. BACK 19361 LICENSED PROFESSIONAL ENGINEER 6-17-08

REVISIONS

Rev.	Drawn Date:	Drawn By:	Revision Made
A	6-16-06		
C	10-02-06		
H	06-17-08		

Title
CROSS SECTIONS
STA. 102+00 TO STA. 103+00
AUXILIARY ASH POND - PHASE I

Location and Unit:
E.W. BROWN GENERATING STATION

Scale: 1" = 20'
Drawn: TJ/CDV
Date: MAY, 2006
Checked: DAB/BLP
Approved:

Fuller Mossbarger Scott & May
FMSM ENGINEERS
LEXINGTON ST. LOUIS LOUISVILLE JEFFERSONVILLE CINCINNATI ATLANTA COLUMBUS NASHVILLE

Kentucky Utilities Company
an E·ON company

JOB NO.	JOB NO.	JOB NO.	JOB NO.	Drawing No:	Rev.
119961				BR0-C-00143	H

LX2006228\REVH\XSHT2.DWG

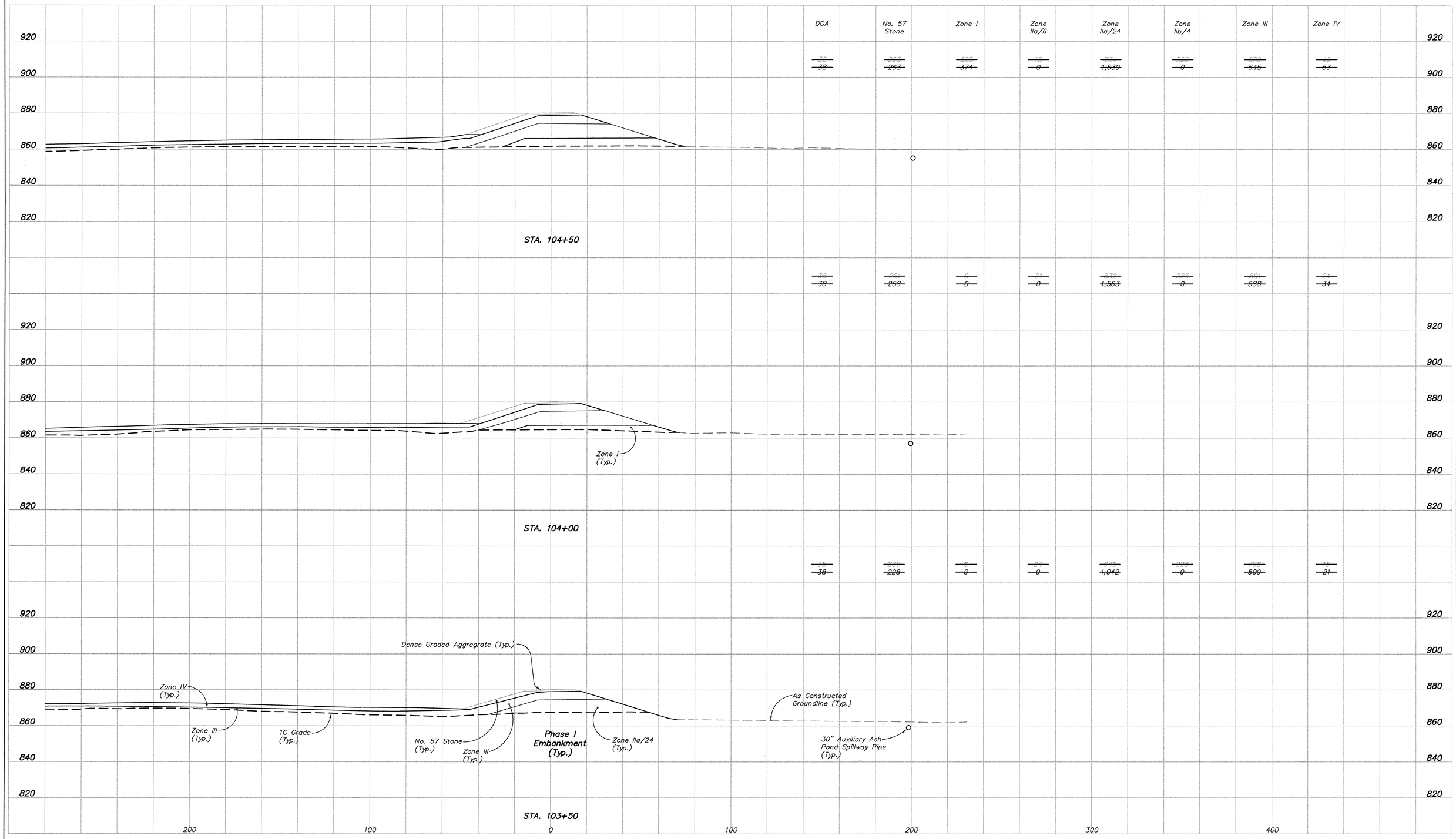
DMS Version 2.0

BR0-C-00144

NOTE:
QUANTITIES ARE BASED ON DESIGN CROSS SECTIONS NOT AS CONSTRUCTED DATA.

EMBANKMENT QUANTITIES (CU. YDS.)

	DGA	No. 57 Stone	Zone I	Zone IIa/6	Zone IIa/24	Zone IIb/4	Zone III	Zone IV
STA. 104+50	~~38~~ 38	~~263~~ 263	~~374~~ 374	~~9~~ 0	~~1,639~~ 1,639	~~0~~ 0	~~645~~ 645	~~53~~ 53
STA. 104+00	~~38~~ 38	~~258~~ 258	~~0~~ 0	~~0~~ 0	~~1,563~~ 1,563	~~0~~ 0	~~588~~ 588	~~34~~ 34
STA. 103+50	~~38~~ 38	~~228~~ 228	~~0~~ 0	~~0~~ 0	~~1,042~~ 1,042	~~0~~ 0	~~509~~ 509	~~21~~ 21



NOTES:

1. *For Typical Embankment Cross Sections, See Sheets BR0-C-00139 and BR0-C-00140.*
2. *FML and Filter Fabric materials not shown for clarity. See Typical Sections.*

SURVEY NOTE:
As Constructed survey data provided by Bizzack Construction. Based on field observations this data is believed to be correct, but has not been surveyed by FMSM Engineers.

AS CONSTRUCTED - 06/17/08

LX20060228\RETA\XSH13.DWG

Fuller Massberger Scott & May

FMSM ENGINEERS
LEXINGTON ST. LOUIS LOUISVILLE JEFFERSONVILLE CINCINNATI ATLANTA COLUMBUS NASHVILLE

REVISIONS

Rev.	Drawn Date:	Drawn By:	Revision Mode
A	6-16-06		
C	10-02-06		
H	06-17-08		

Title
CROSS SECTIONS
STA. 103+50 TO STA. 104+50
AUXILIARY ASH POND - PHASE I

Location and Unit:
E.W. BROWN GENERATING STATION

Scale: 1" = 20'
Drawn: TJ/CDV
Date: APRIL, 2006
Checked: DAB/BLP
Approved:

JOB NO.	JOB NO.	JOB NO.	JOB NO.
119961			

Kentucky Utilities Company
an E·ON company

Drawing No: BR0-C-00144
Rev. H

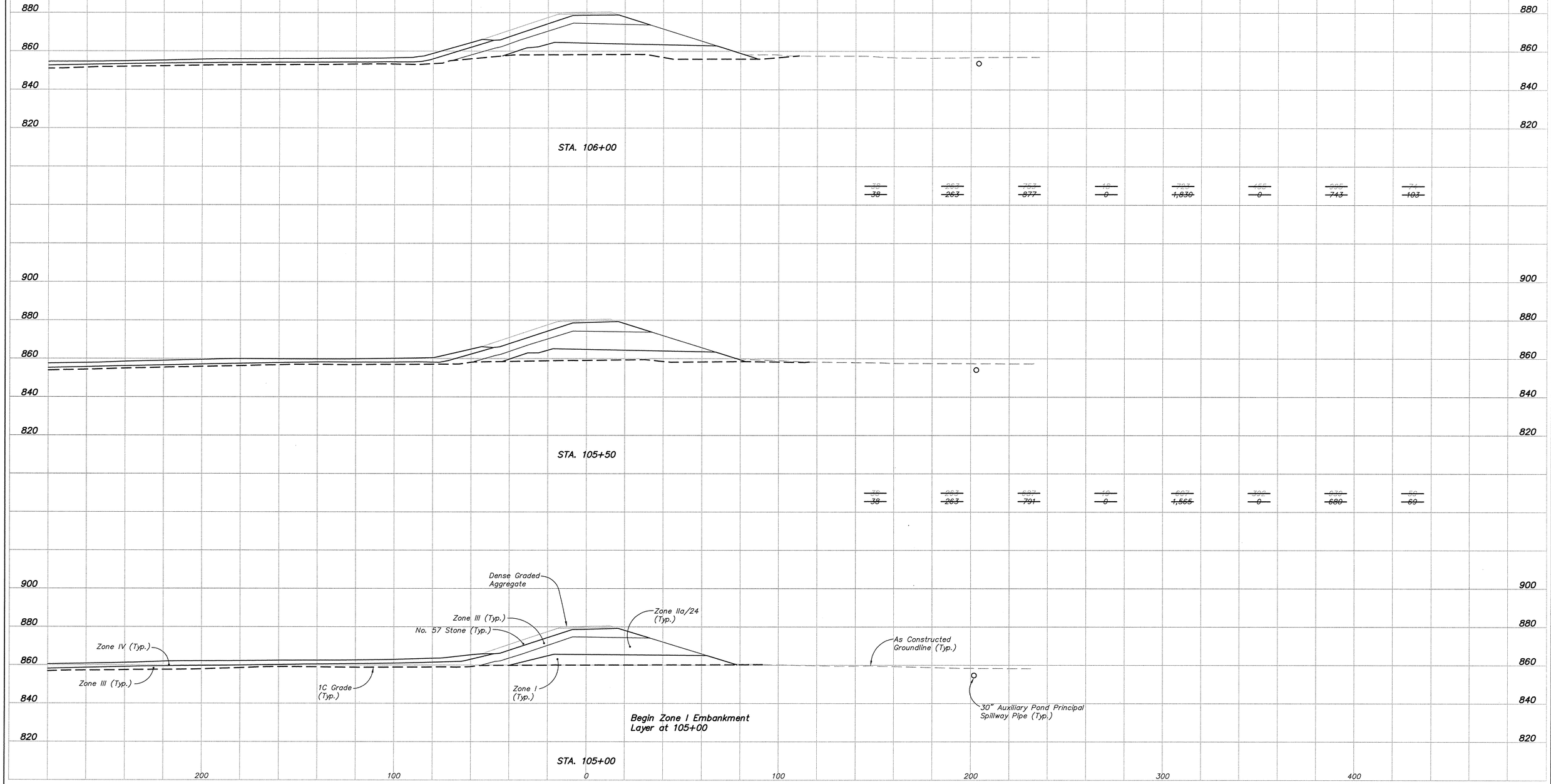
DMS Version 2.0

BR0-C-00145

NOTE:
QUANTITIES ARE BASED ON DESIGN CROSS SECTIONS NOT AS CONSTRUCTED DATA.

EMBANKMENT QUANTITIES (CU. YDS.)

	DGA	No. 57 Stone	Zone I	Zone IIa/6	Zone IIa/24	Zone IIb/4	Zone III	Zone IV
STA. 106+00	~~38~~	~~263~~	~~877~~	~~0~~	~~1,830~~	~~0~~	~~743~~	~~103~~
STA. 105+50	~~38~~	~~263~~	~~791~~	~~0~~	~~1,565~~	~~0~~	~~680~~	~~69~~
STA. 105+00	~~38~~	~~263~~	~~1,002~~	~~0~~	~~2,176~~	~~0~~	~~824~~	~~148~~



NOTES:

1. *For Typical Embankment Cross Sections, See Sheets BR0-C-00139 and BR0-C-00140.*
2. *FML and Filter Fabric materials not shown for clarity. See Typical Sections.*

SURVEY NOTE:
As Constructed survey data provided by Bizzack Construction. Based on field observations this data is believed to be correct, but has not been surveyed by FMSM Engineers.

AS CONSTRUCTED - 06/17/08

DAN A. BACK LICENSED PROFESSIONAL ENGINEER 06-18-08

REVISIONS			
Rev.	Drawn Date:	Drawn By:	Revision Made
A	6-16-06		
C	10-02-06		
H	06-17-08		

Title
CROSS SECTIONS
STA. 105+00 TO STA. 106+00
AUXILIARY ASH POND - PHASE I

Location and Unit:
E.W. BROWN GENERATING STATION

Scale: 1" = 20'
Drawn: TJ/CDV
Date: MAY, 2006
Checked: DAB/BLP
Approved:

JOB NO.	JOB NO.	JOB NO.	JOB NO.
119961			

Drawing No: BR0-C-00145 Rev. H

Fuller Massbarger Scott & May

FMSM ENGINEERS
LEXINGTON ST. LOUIS LOUISVILLE JEFFERSONVILLE CINCINNATI ATLANTA COLUMBUS NASHVILLE

Kentucky Utilities Company
an E·ON company

LX2004069\VIEW\XSHTA.DWG

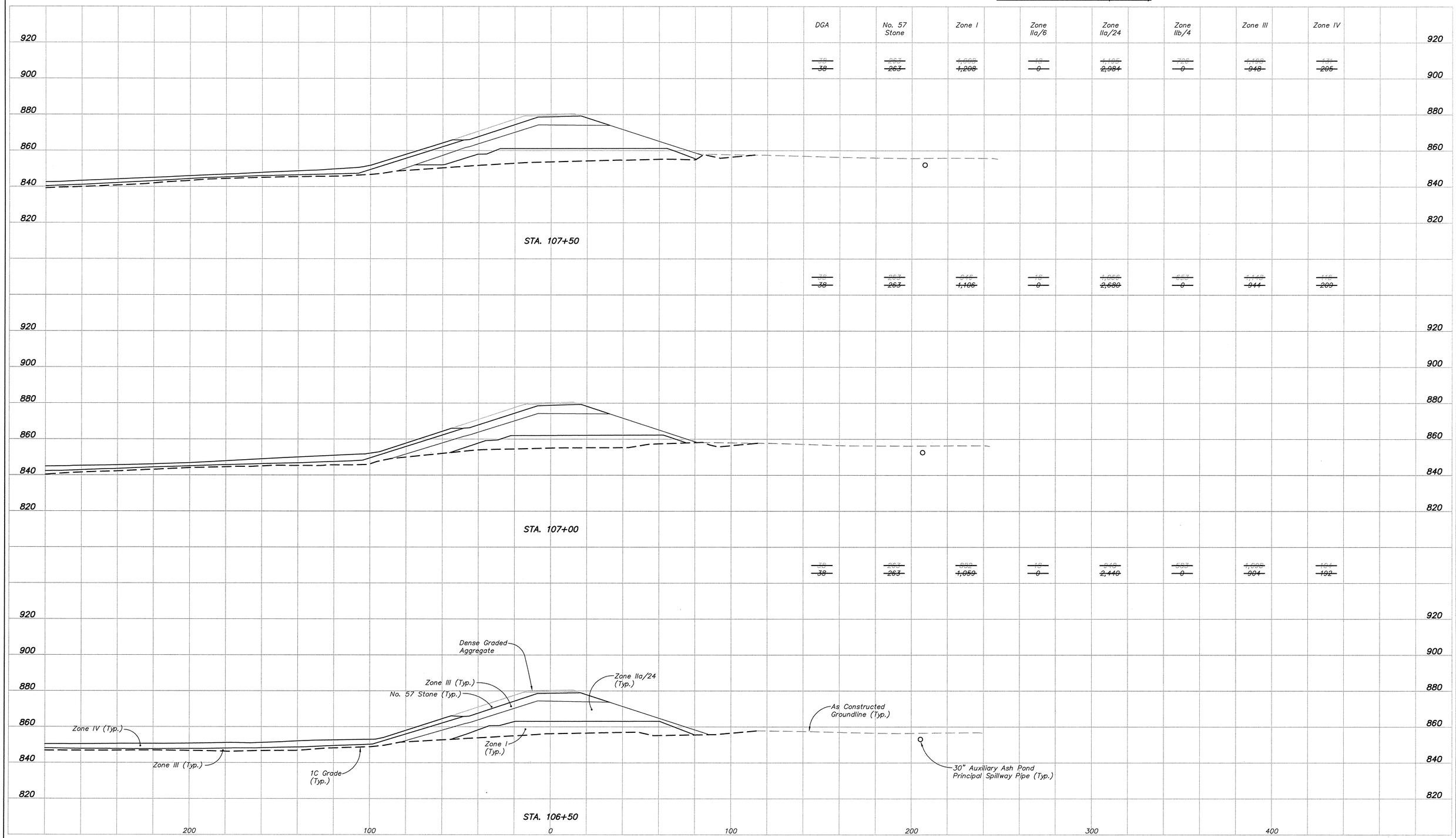
DMS Version 2.0

BR0-C-00146

NOTE:
QUANTITIES ARE BASED ON DESIGN CROSS SECTIONS NOT AS CONSTRUCTED DATA.

EMBANKMENT QUANTITIES (CU. YDS.)

	DGA	No. 57 Stone	Zone I	Zone IIa/6	Zone IIa/24	Zone IIb/4	Zone III	Zone IV
STA. 107+50	~~38~~ 38	~~263~~ 263	~~1,208~~ 1,208	~~0~~ 0	~~2,984~~ 2,984	~~0~~ 0	~~948~~ 948	~~205~~ 205
	~~38~~ 38	~~263~~ 263	~~1,106~~ 1,106	~~0~~ 0	~~2,680~~ 2,680	~~0~~ 0	~~944~~ 944	~~209~~ 209
STA. 107+00	~~38~~ 38	~~263~~ 263	~~1,059~~ 1,059	~~0~~ 0	~~2,440~~ 2,440	~~0~~ 0	~~904~~ 904	~~192~~ 192



NOTES:

1. For Typical Embankment Cross Sections, See Sheets BR0-C-00139 and BR0-C-00140.
2. FML and Filter Fabric materials not shown for clarity. See Typical Sections.

SURVEY NOTE:
As Constructed survey data provided by Bizzack Construction. Based on field observations this data is believed to be correct, but has not been surveyed by FMSM Engineers.

AS CONSTRUCTED - 06/17/08

DAN A. BACK 13930 LICENSED PROFESSIONAL ENGINEER 6-17-08

Fuller Mossbarger Scott & May

FMSM ENGINEERS
LEXINGTON ST. LOUIS LOUISVILLE JEFFERSONVILLE CINCINNATI ATLANTA COLUMBUS NASHVILLE

LX\2006228\REVH\XSHTS.DWG

REVISIONS			
Rev.	Drawn Date:	Drawn By:	Revision Made
A	6-16-06		
C	10-02-06		
H	06-17-08		

Title
CROSS SECTIONS
STA. 106+50 TO STA. 107+50
AUXILIARY ASH POND - PHASE I

Location and Unit:
E.W. BROWN GENERATING STATION

Scale: 1" = 20'
Drawn: TJ/CDV
Date: APRIL, 2006
Checked: DAB/BLP
Approved:

Kentucky Utilities Company
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JOB NO.	JOB NO.	JOB NO.	JOB NO.	*Drawing No:*	*Rev.*
119961				BR0-C-00146	H

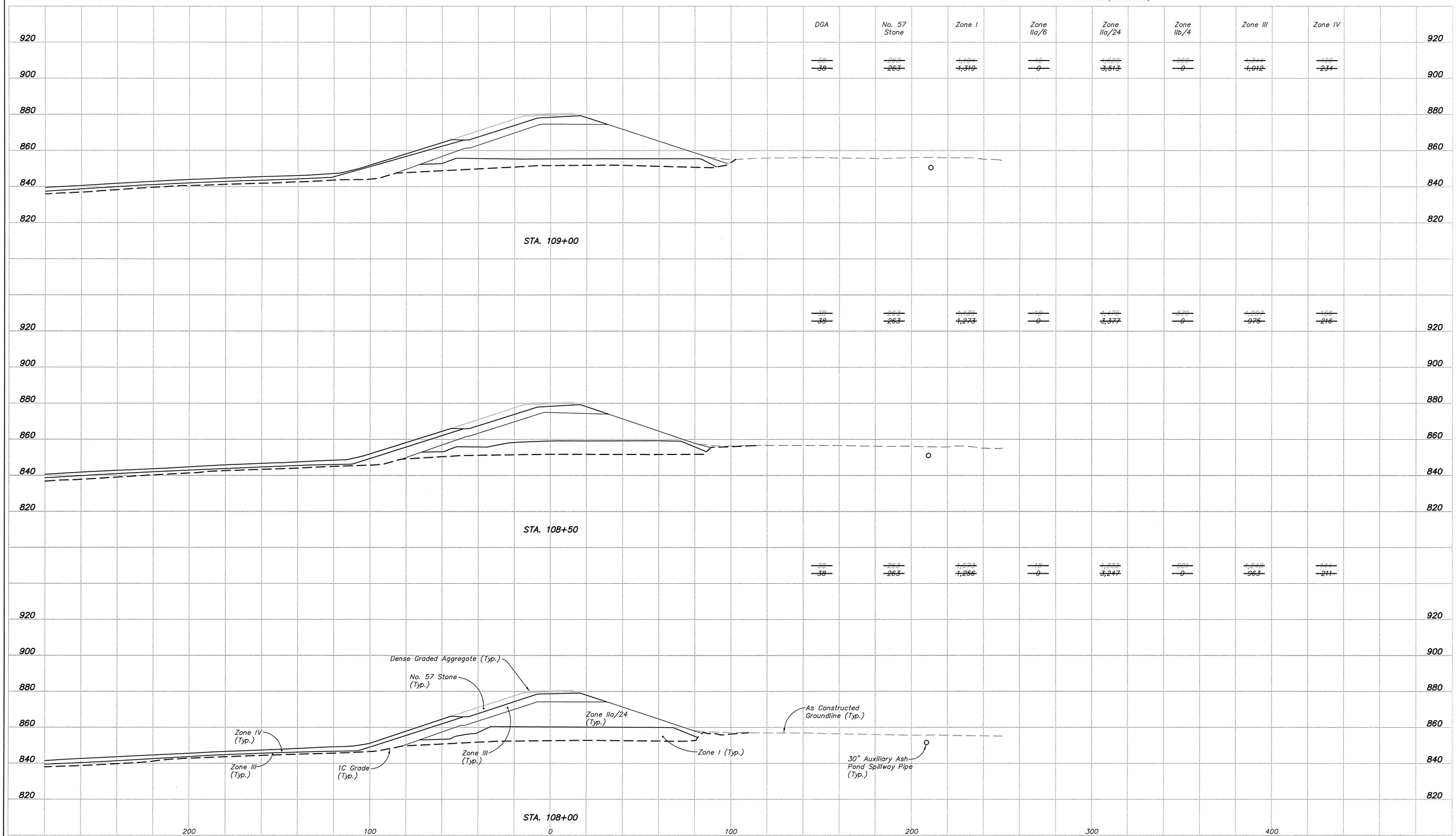
DMS Version 2.0

BR0-C-00147

NOTE:
QUANTITIES ARE BASED ON DESIGN CROSS SECTIONS NOT AS CONSTRUCTED DATA.

EMBANKMENT QUANTITIES (CU. YDS.)

	DGA	No. 57 Stone	Zone I	Zone IIa/6	Zone IIa/24	Zone IIb/4	Zone III	Zone IV
STA. 109+00	~~38~~ 38	~~263~~ 263	~~1,319~~ 1,319	~~0~~ 0	~~3,513~~ 3,513	~~0~~ 0	~~1,012~~ 1,012	~~234~~ 234
STA. 108+50	~~38~~ 38	~~263~~ 263	~~1,273~~ 1,273	~~0~~ 0	~~3,377~~ 3,377	~~0~~ 0	~~975~~ 975	~~216~~ 216
STA. 108+00	~~38~~ 38	~~263~~ 263	~~1,256~~ 1,256	~~0~~ 0	~~3,247~~ 3,247	~~0~~ 0	~~963~~ 963	~~211~~ 211



NOTES:

1. For Typical Embankment Cross Sections, See Sheets BR0-C-00139 and BR0-C-00140.
2. FML and Filter Fabric materials not shown for clarity. See Typical Sections.

SURVEY NOTE:
As Constructed survey data provided by Bizzack Construction. Based on field observations this data is believed to be correct, but has not been surveyed by FMSM Engineers.

AS CONSTRUCTED - 06/17/08

LX\20062281\REVH\XSH16.DWG

Fuller Mossbarger Scott & May

FMSM ENGINEERS
LEXINGTON · LOUISVILLE · JEFFERSONVILLE · CINCINNATI · ATLANTA · COLUMBUS · NASHVILLE

REVISIONS

Rev.	Drawn Date:	Drawn By:	Revision Made
A	6-16-06		
C	10-02-06		
H	06-17-08		

Title
CROSS SECTIONS
STA. 108+00 TO STA. 109+00
AUXILIARY ASH POND - PHASE I

Location and Unit:
E.W. BROWN GENERATING STATION

Scale: 1" = 20'
Drawn: TJ/CDV
Date: APRIL, 2006
Checked: DAB/BLP
Approved:

Kentucky Utilities Company
an E·ON company

JOB NO.	JOB NO.	JOB NO.	JOB NO.	Drawing No:	Rev.
119961				BR0-C-00147	H

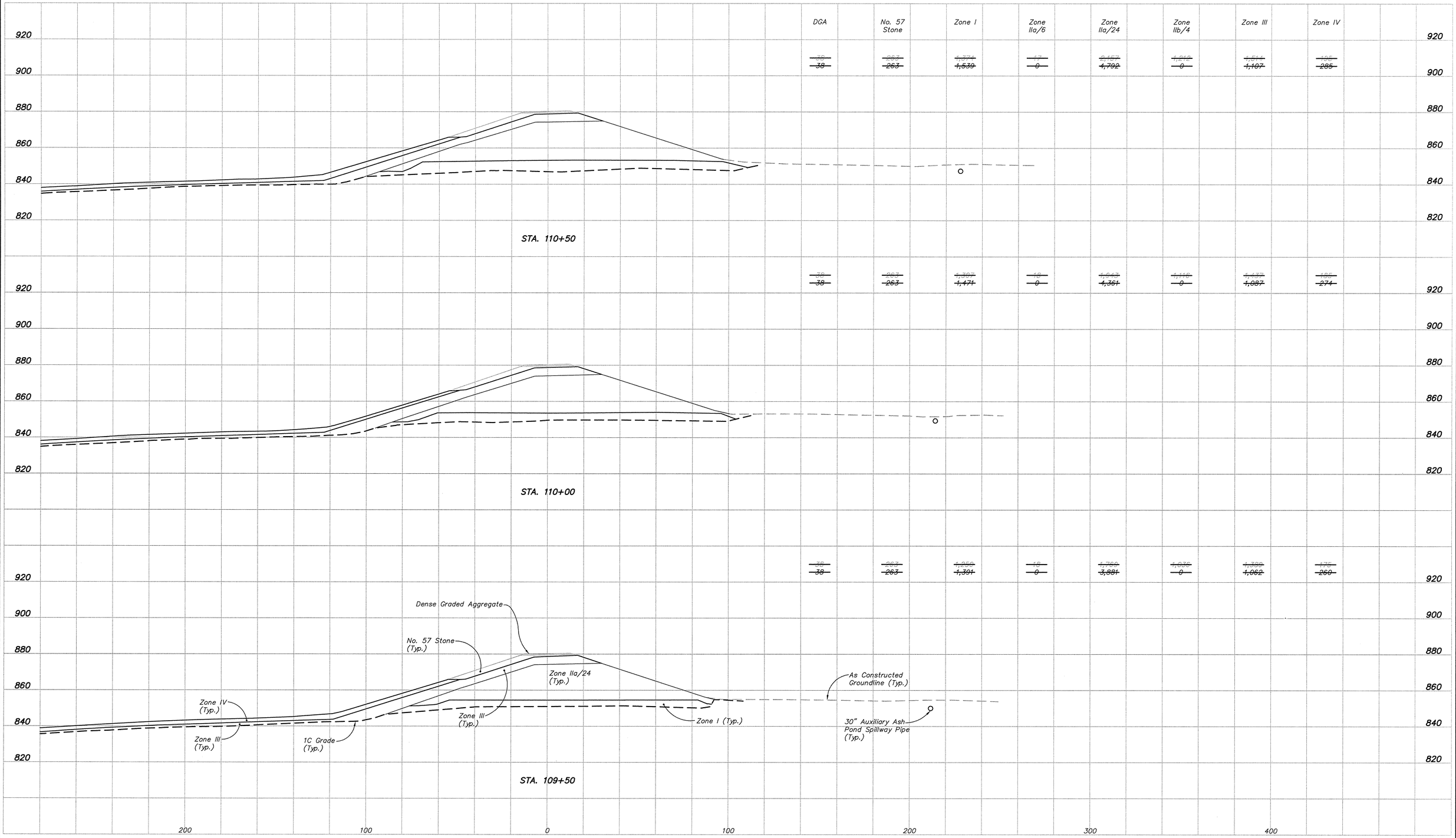
DMS Version 2.0

BRO-C-00148

NOTE:
QUANTITIES ARE BASED ON DESIGN CROSS SECTIONS NOT AS CONSTRUCTED DATA.

EMBANKMENT QUANTITIES (CU. YDS.)

	DGA	No. 57 Stone	Zone I	Zone IIa/6	Zone IIa/24	Zone IIb/4	Zone III	Zone IV
STA. 110+50	~~76~~ 38	~~267~~ 263	~~1,774~~ 1,539	~~47~~ 0	~~5,157~~ 4,792	~~1,619~~ 0	~~1,514~~ 1,107	~~195~~ 285
STA. 110+00	~~76~~ 38	~~267~~ 263	~~1,707~~ 1,471	~~48~~ 0	~~4,947~~ 4,361	~~1,116~~ 0	~~1,477~~ 1,087	~~195~~ 274
STA. 109+50	~~76~~ 38	~~267~~ 263	~~1,650~~ 1,391	~~48~~ 0	~~4,750~~ 3,981	~~1,030~~ 0	~~1,339~~ 1,062	~~175~~ 260



NOTES:

1. For Typical Embankment Cross Sections, See Sheets BRO-C-00139 and BRO-C-00140.
2. FML and Filter Fabric materials not shown for clarity. See Typical Sections.

SURVEY NOTE:
As Constructed survey data provided by Bizzack Construction. Based on field observations this data is believed to be correct, but has not been surveyed by FMSM Engineers.

AS CONSTRUCTED - 06/17/08

IVAN B. SACK 19361 LICENSED PROFESSIONAL ENGINEER

REVISIONS			
Rev.	Drawn Date:	Drawn By:	Revision Mode
A	6-16-06		
C	10-02-06		
H	06-17-08		

Title
CROSS SECTIONS
STA. 109+50 TO STA. 110+50
AUXILIARY ASH POND - PHASE I

Location and Unit:
E.W. BROWN GENERATING STATION

Scale: 1" = 20'
Drawn: TJ/CDV
Date: APRIL, 2006
Checked: DAB/BLP
Approved:

JOB NO.	JOB NO.	JOB NO.	JOB NO.
119961			

Drawing No: BRO-C-00148 Rev. H

Fuller Mossbarger Scott & May
FMSM ENGINEERS
LEXINGTON ST. LOUIS LOUISVILLE JEFFERSONVILLE CINCINNATI ATLANTA COLUMBUS NASHVILLE

Kentucky Utilities Company
an E·ON company

LX20062281\REVH\XSH17.DWG

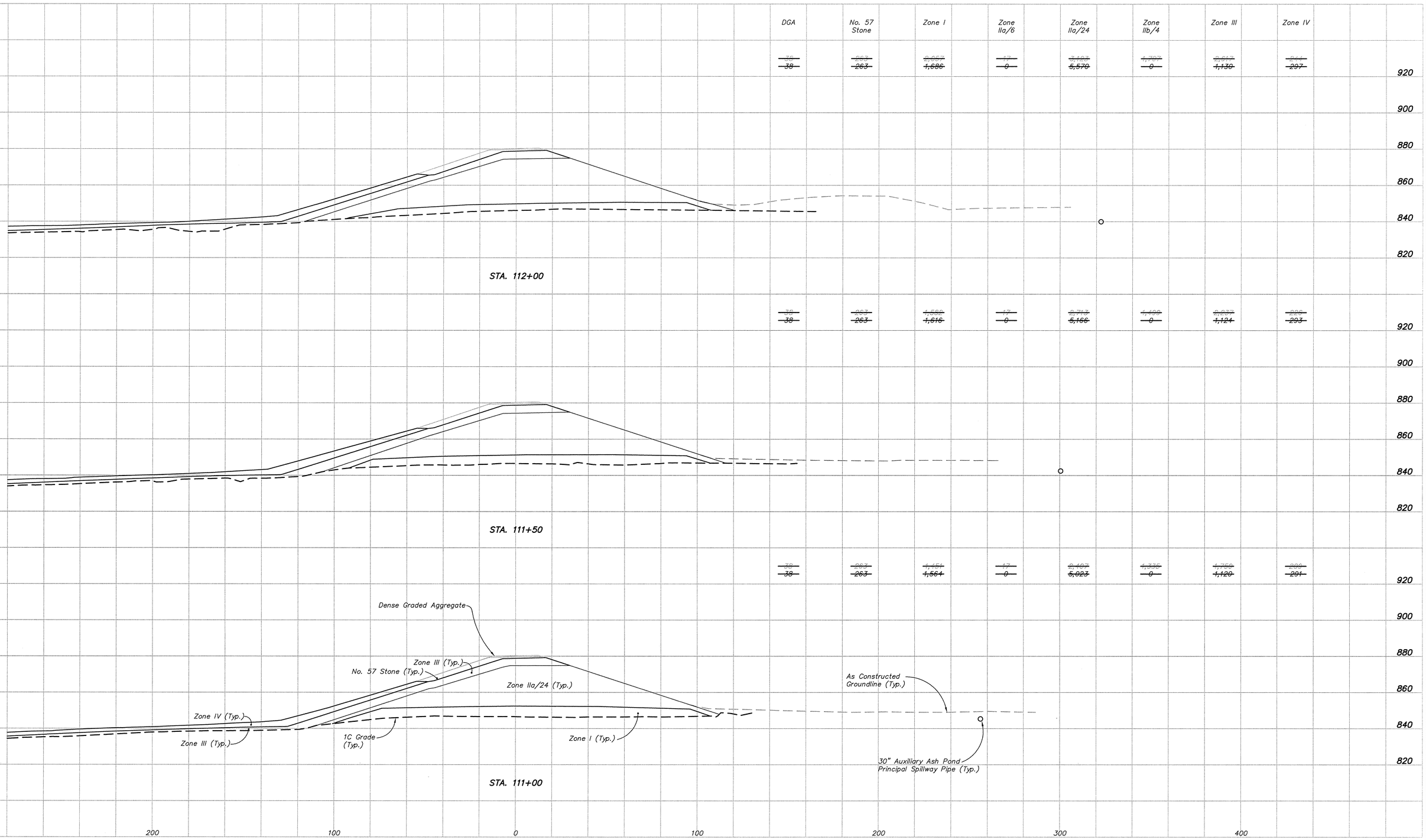
DMS Version 2.0

BR0-C-00149

NOTE:
QUANTITIES ARE BASED ON DESIGN CROSS SECTIONS NOT AS CONSTRUCTED DATA.

EMBANKMENT QUANTITIES (CU. YDS.)

	DGA	No. 57 Stone	Zone I	Zone IIa/6	Zone IIa/24	Zone IIb/4	Zone III	Zone IV
STA. 112+00	~~75~~ ~~38~~	~~267~~ ~~263~~	~~2,057~~ ~~1,686~~	~~17~~ ~~0~~	~~7,197~~ ~~5,570~~	~~4,707~~ ~~0~~	~~2,617~~ ~~1,130~~	~~344~~ ~~297~~
STA. 111+50	~~75~~ ~~38~~	~~267~~ ~~263~~	~~1,588~~ ~~1,616~~	~~17~~ ~~0~~	~~6,743~~ ~~5,166~~	~~4,499~~ ~~0~~	~~2,637~~ ~~1,124~~	~~336~~ ~~293~~
STA. 111+00	~~75~~ ~~38~~	~~267~~ ~~263~~	~~1,451~~ ~~1,564~~	~~17~~ ~~0~~	~~6,407~~ ~~5,023~~	~~4,335~~ ~~0~~	~~2,759~~ ~~1,120~~	~~329~~ ~~291~~



NOTES:

1. For Typical Embankment Cross Sections, See Sheets BR0-C-00139 and BR0-C-00140.
2. FML and Filter Fabric materials not shown for clarity. See Typical Sections.

SURVEY NOTE:
As Constructed survey data provided by Bizzack Construction. Based on field observations this data is believed to be correct, but has not been surveyed by FMSM Engineers.

AS CONSTRUCTED - 06/17/08

LX2006228\REVH\XSH78.DWG

Fuller Mossbarger Scott & May

FMSM ENGINEERS
LEXINGTON ST. LOUIS LOUISVILLE JEFFERSONVILLE CINCINNATI ATLANTA COLUMBUS NASHVILLE

DAN A. BACK LICENSED PROFESSIONAL ENGINEER 6/18/08

REVISIONS			
Rev.	Drawn Date:	Drawn By:	Revision Made
A	6-16-06		
C	10-02-06		
H	06-17-08		

Title
CROSS SECTIONS
STA. 111+00 TO STA. 112+00
AUXILIARY ASH POND - PHASE I

Location and Unit:
E.W. BROWN GENERATING STATION

Scale: 1" = 20'
Drawn: TJ/CDV
Date: APRIL, 2006
Checked: DAB/BLP
Approved:

JOB NO.	JOB NO.	JOB NO.	JOB NO.
119961			

Kentucky Utilities Company
an E·ON company

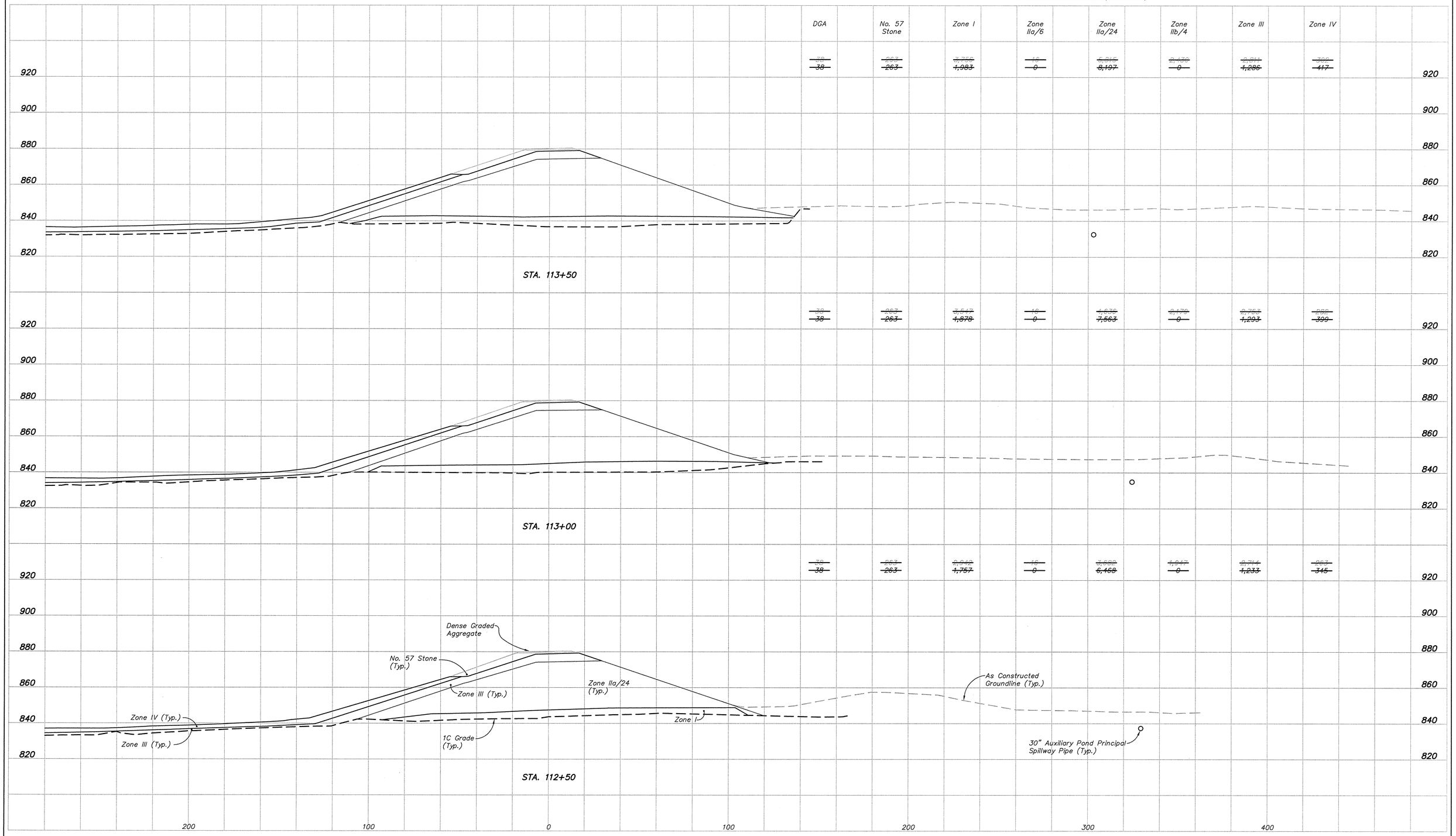
Drawing No: BR0-C-00149
Rev. H

DMS Version 2.0

NOTE:
QUANTITIES ARE BASED ON DESIGN CROSS SECTIONS NOT AS CONSTRUCTED DATA.

EMBANKMENT QUANTITIES (CU. YDS.)

	DGA	No. 57 Stone	Zone I	Zone IIa/6	Zone IIa/24	Zone IIb/4	Zone III	Zone IV
STA. 113+50	~~38~~ 38	~~263~~ 263	~~3,750~~ 1,983	~~16~~ 0	~~6,219~~ 8,197	~~2,439~~ 0	~~2,911~~ 1,286	~~709~~ 417
STA. 113+00	~~38~~ 38	~~263~~ 263	~~3,647~~ 1,878	~~16~~ 0	~~4,939~~ 7,563	~~2,179~~ 0	~~2,763~~ 1,293	~~599~~ 399
STA. 112+50	~~38~~ 38	~~263~~ 263	~~3,642~~ 1,757	~~16~~ 0	~~3,992~~ 6,468	~~1,947~~ 0	~~2,714~~ 1,233	~~263~~ 345



NOTES:

1. For Typical Embankment Cross Sections, See Sheets BR0-C-00139 and BR0-C-00140.
2. FML and Filter Fabric materials not shown for clarity. See Typical Sections.

SURVEY NOTE:
As Constructed survey data provided by Bizzack Construction. Based on field observations this data is believed to be correct, but has not been surveyed by FMSM Engineers.

AS CONSTRUCTED - 06/17/08

DAN A. BACK 13036 LICENSED PROFESSIONAL ENGINEER 06-17-08

Fuller Mossbarger Scott & May

FMSM ENGINEERS
LEXINGTON ST. LOUIS LOUISVILLE JEFFERSONVILLE CINCINNATI ATLANTA COLUMBUS NASHVILLE

REVISIONS

Rev.	Drawn Date:	Drawn By:	Revision Mode
A	6-16-06		
C	10-02-06		
H	06-17-08		

Title
CROSS SECTIONS
STA. 112+50 TO STA. 113+50
AUXILIARY ASH POND - PHASE I

Location and Unit:
E.W. BROWN GENERATING STATION

Scale: 1" = 20'
Drawn: TJ/CDV
Date: APRIL, 2006
Checked: DAB/BLP
Approved:

Kentucky Utilities Company
an E·ON company

JOB NO.	JOB NO.	JOB NO.	JOB NO.	Drawing No:	Rev.
119961				BR0-C-00150	H

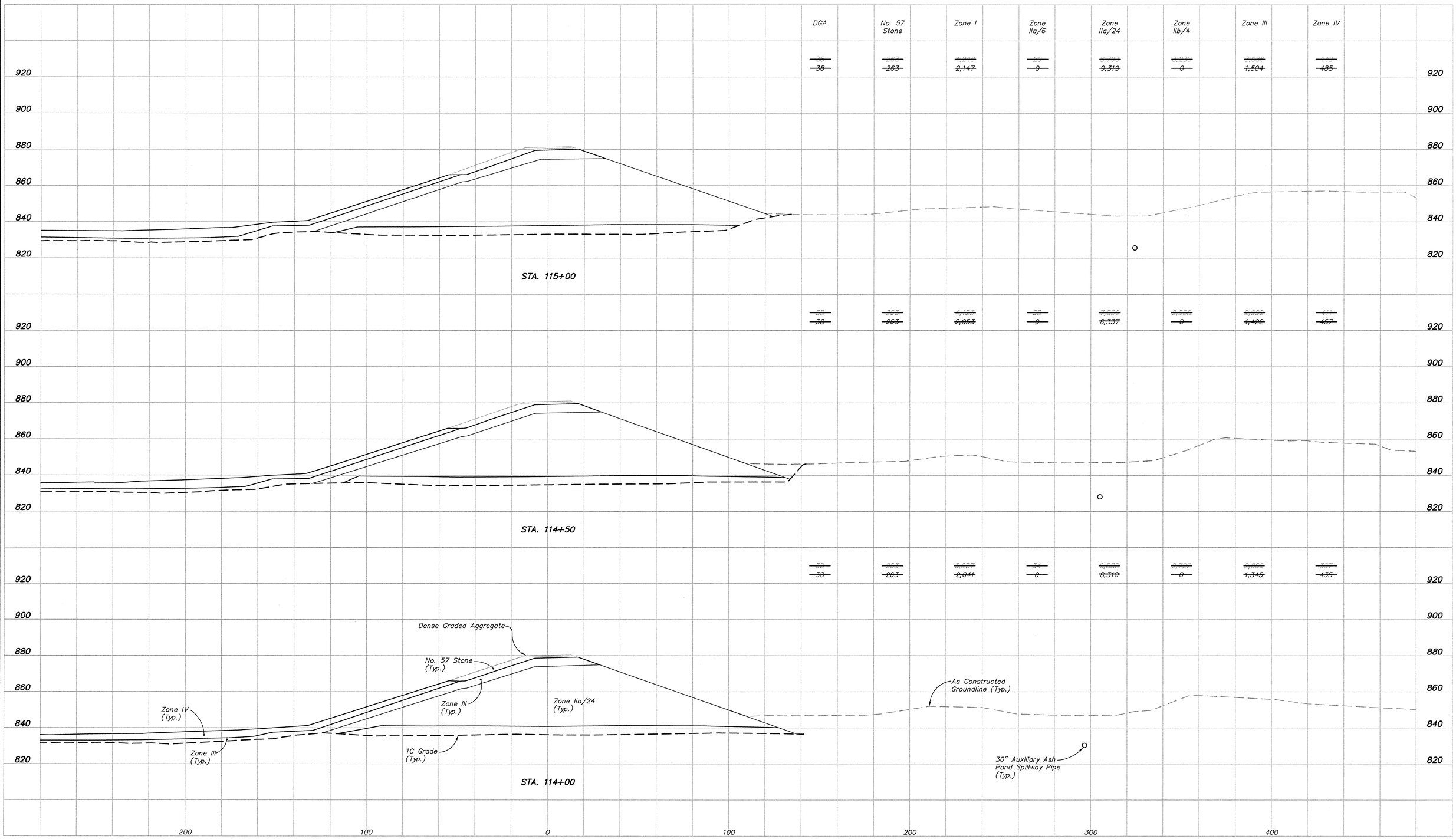
LX2006228\REVH\XSH19.DWG

DMS Version 2.0

NOTE:
QUANTITIES ARE BASED ON DESIGN CROSS SECTIONS NOT AS CONSTRUCTED DATA.

EMBANKMENT QUANTITIES (CU. YDS.)

	DGA	No. 57 Stone	Zone I	Zone IIa/6	Zone IIa/24	Zone IIb/4	Zone III	Zone IV
STA. 115+00	~~38~~ 38	~~267~~ 263	~~4,848~~ 2,147	~~88~~ 0	~~9,793~~ 9,319	~~3,230~~ 0	~~3,656~~ 1,504	~~442~~ 485
STA. 114+50	~~38~~ 38	~~267~~ 263	~~4,123~~ 2,053	~~38~~ 0	~~7,366~~ 8,337	~~2,066~~ 0	~~2,695~~ 1,422	~~411~~ 457
STA. 114+00	~~38~~ 38	~~267~~ 263	~~3,057~~ 2,041	~~34~~ 0	~~5,885~~ 8,310	~~2,702~~ 0	~~2,855~~ 1,345	~~357~~ 435



NOTES:

1. For Typical Embankment Cross Sections, See Sheets BR0-C-00139 and BR0-C-00140.
2. FML and Filter Fabric materials not shown for clarity. See Typical Sections.

SURVEY NOTE:
As Constructed survey data provided by Bizzack Construction. Based on field observations this data is believed to be correct, but has not been surveyed by FMSM Engineers.

AS CONSTRUCTED - 06/17/08

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Fuller Mossbarger Scott & May

FMSM ENGINEERS
LEXINGTON ST. LOUIS | LOUISVILLE JEFFERSONVILLE | CINCINNATI ATLANTA | COLUMBUS WILMINGTON

DANIEL A. BACK 13926 LICENSED PROFESSIONAL ENGINEER 6.18.08

REVISIONS

Rev.	Drawn Date:	Drawn By:	Revision Mode
A	6-16-06		
C	10-02-06		
H	06-17-08		

Title
CROSS SECTIONS
STA. 114+00 TO STA. 115+00
AUXILIARY ASH POND - PHASE I

Location and Unit:
E.W. BROWN GENERATING STATION

Scale: 1" = 20'
Drawn: TJ/CDV
Date: APRIL, 2006
Checked: DAB/BLP
Approved:

Kentucky Utilities Company
an E·ON company

JOB NO.	JOB NO.	JOB NO.	JOB NO.	Drawing No:	Rev.
119961				BR0-C-00151	H

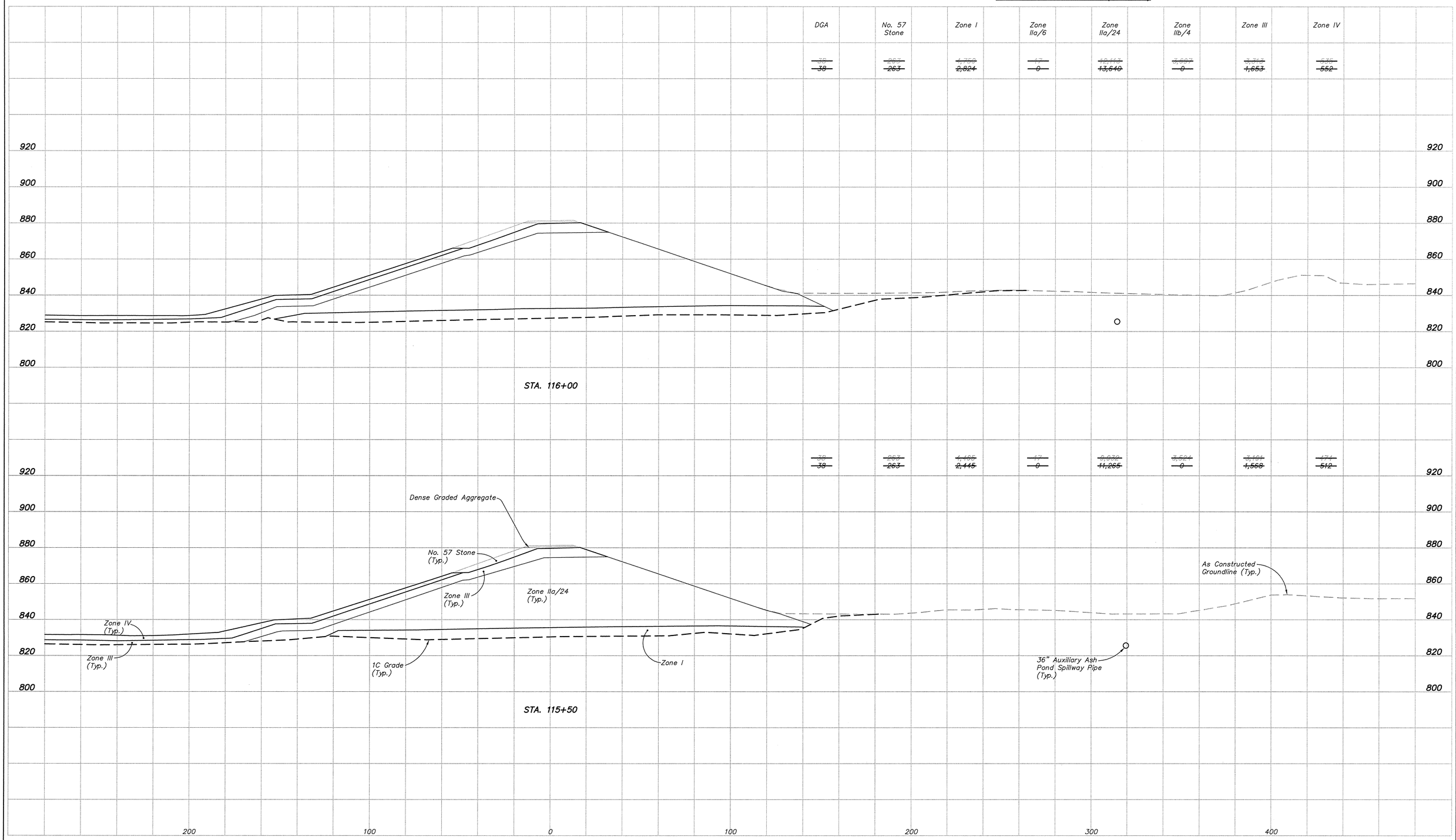
DMS Version 2.0

BR0-C-00152

NOTE:
QUANTITIES ARE BASED ON DESIGN CROSS SECTIONS NOT AS CONSTRUCTED DATA.

EMBANKMENT QUANTITIES (CU. YDS.)

DGA	No. 57 Stone	Zone I	Zone IIa/6	Zone IIa/24	Zone IIb/4	Zone III	Zone IV
~~38~~ ~~38~~	~~267~~ ~~263~~	~~4,759~~ ~~2,824~~	~~17~~ ~~0~~	~~12,143~~ ~~13,640~~	~~3,687~~ ~~0~~	~~3,515~~ ~~1,653~~	~~535~~ ~~552~~



DGA	No. 57 Stone	Zone I	Zone IIa/6	Zone IIa/24	Zone IIb/4	Zone III	Zone IV
~~38~~ ~~38~~	~~267~~ ~~263~~	~~4,405~~ ~~2,445~~	~~17~~ ~~0~~	~~9,979~~ ~~11,265~~	~~3,594~~ ~~0~~	~~3,101~~ ~~1,568~~	~~474~~ ~~512~~

NOTES:

1. *For Typical Embankment Cross Sections, See Sheets BR0-C-00139 and BR0-C-00140.*
2. *FML and Filter Fabric materials not shown for clarity. See Typical Sections.*

SURVEY NOTE:
As Constructed survey data provided by Bizzack Construction. Based on field observations this data is believed to be correct, but has not been surveyed by FMSM Engineers.

AS CONSTRUCTED - 06/17/08

LX2006228\REVH\XSHT11.DWG

Fuller Mossbarger Scott & May

FMSM ENGINEERS
LEXINGTON ST. LOUIS LOUISVILLE JEFFERSONVILLE CINCINNATI ATLANTA COLUMBUS NASHVILLE

REVISIONS			
Rev.	Drawn Date:	Drawn By:	Revision Mode
A	6-16-06		
C	10-02-06		
H	06-17-08		

Title
CROSS SECTIONS
STA. 115+50 TO STA. 116+00
AUXILIARY ASH POND - PHASE I

Location and Unit:
E.W. BROWN GENERATING STATION

Scale: 1" = 20'
Drawn: TJ/CDV
Date: APRIL, 2006
Checked: DAB/BLP
Approved:

Kentucky Utilities Company
an E·ON company

JOB NO.	JOB NO.	JOB NO.	JOB NO.	Drawing No:	Rev.
119951				BR0-C-00152	H

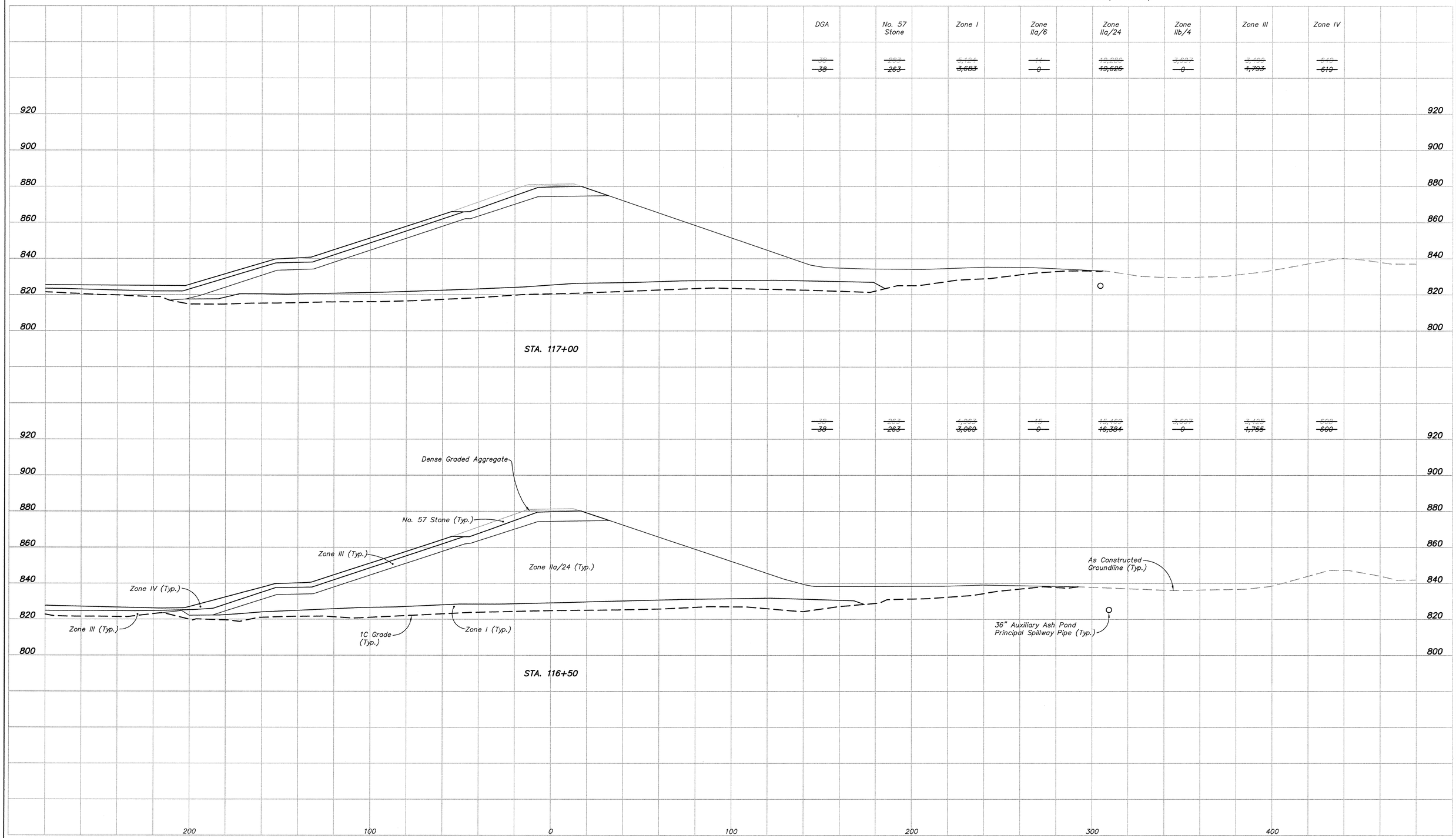
DMS Version 2.0

BR0-C-00153

NOTE:
QUANTITIES ARE BASED ON DESIGN CROSS SECTIONS NOT AS CONSTRUCTED DATA.

EMBANKMENT QUANTITIES (CU. YDS.)

	DGA	No. 57 Stone	Zone I	Zone IIa/6	Zone IIa/24	Zone IIb/4	Zone III	Zone IV
STA. 117+00	~~38~~ 38	~~267~~ 263	~~4,067~~ 3,069	~~15~~ 0	~~16,162~~ 16,384	~~3,627~~ 0	~~2,425~~ 1,755	~~609~~ 600
STA. 116+50	~~38~~ 38	~~267~~ 263	~~6,124~~ 3,683	~~14~~ 0	~~16,280~~ 19,626	~~3,627~~ 0	~~2,492~~ 1,793	~~610~~ 619



NOTES:

1. For Typical Embankment Cross Sections, See Sheets BR0-C-00139 and BR0-C-00140.
2. FML and Filter Fabric materials not shown for clarity. See Typical Sections.

SURVEY NOTE:
As Constructed survey data provided by Bizzack Construction. Based on field observations this data is believed to be correct, but has not been surveyed by FMSM Engineers.

AS CONSTRUCTED - 06/17/08

DAN A. BACK 13038 LICENSED PROFESSIONAL ENGINEER 06/17/08

REVISIONS			
Rev.	Drawn Date:	Drawn By:	Revision Mode
A	6-16-06		
C	10-02-06		
H	06-17-08		

Title
CROSS SECTIONS
STA. 116+50 TO STA. 117+00
AUXILIARY ASH POND - PHASE I

Location and Unit:
E.W. BROWN GENERATING STATION

Scale: 1" = 20'
Drawn: TJ/CDV
Date: APRIL 2006
Checked: DAB/BLP
Approved:

JOB NO.	JOB NO.	JOB NO.	JOB NO.
119961			

Drawing No: BR0-C-00153 Rev. H

Fuller Mossbarger Scott & May
FMSM ENGINEERS
LEXINGTON ST. LOUIS LOUISVILLE JEFFERSONVILLE CINCINNATI ATLANTA COLUMBUS NASHVILLE

Kentucky Utilities Company
an E·ON company

LX2006220\REVH\XSH172.DWG

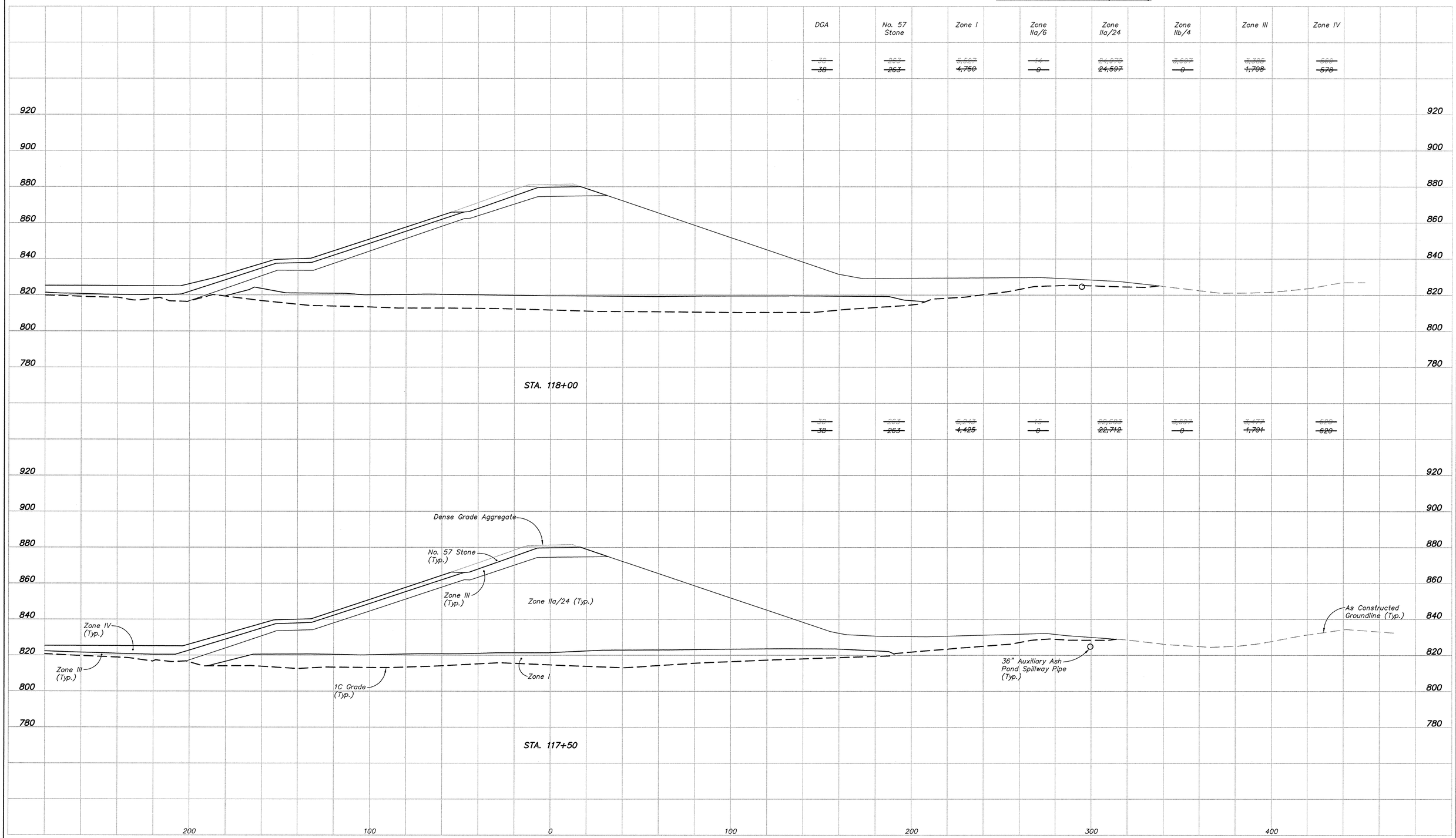
DMS Version 2.0

BR0-C-00154

NOTE:
QUANTITIES ARE BASED ON DESIGN CROSS SECTIONS NOT AS CONSTRUCTED DATA.

EMBANKMENT QUANTITIES (CU. YDS.)

	DGA	No. 57 Stone	Zone I	Zone IIa/6	Zone IIa/24	Zone IIb/4	Zone III	Zone IV
STA. 118+00	~~38~~ 38	~~267~~ 263	~~5,567~~ 4,750	~~14~~ 0	~~24,979~~ 24,597	~~3,697~~ 0	~~3,355~~ 1,708	~~566~~ 578
STA. 117+50	~~38~~ 38	~~267~~ 263	~~5,247~~ 4,425	~~15~~ 0	~~22,963~~ 22,712	~~3,697~~ 0	~~3,477~~ 1,791	~~620~~ 620



NOTES:

1. For Typical Embankment Cross Sections, See Sheets BR0-C-00139 and BR0-C-00140.
2. FML and Filter Fabric materials not shown for clarity. See Typical Sections.

SURVEY NOTE:
As Constructed survey data provided by Bizzack Construction. Based on field observations this data is believed to be correct, but has not been surveyed by FMSM Engineers.

AS CONSTRUCTED - 06/17/08

DANA A. BLACK 13630 6-18-08 LICENSED PROFESSIONAL ENGINEER

REVISIONS			
Rev.	Drawn Date:	Drawn By:	Revision Made
A	6-16-06		
C	10-02-06		
H	06-17-08		

Title
CROSS SECTIONS
STA. 117+50 TO STA. 118+00
AUXILIARY ASH POND - PHASE I

Location and Unit:
E.W. BROWN GENERATING STATION

Scale: 1" = 20'
Drawn: TJ/CDV
Date: APRIL 2006
Checked: DAB/BLP
Approved:

Fuller Massbarger Scott & May

FMSM ENGINEERS
LEXINGTON ST. LOUIS LOUISVILLE JEFFERSONVILLE CINCINNATI ATLANTA COLUMBUS NASHVILLE

Kentucky Utilities Company
an E·ON company

JOB NO.	JOB NO.	JOB NO.	JOB NO.	Drawing No:	Rev.
119961				BR0-C-00154	H

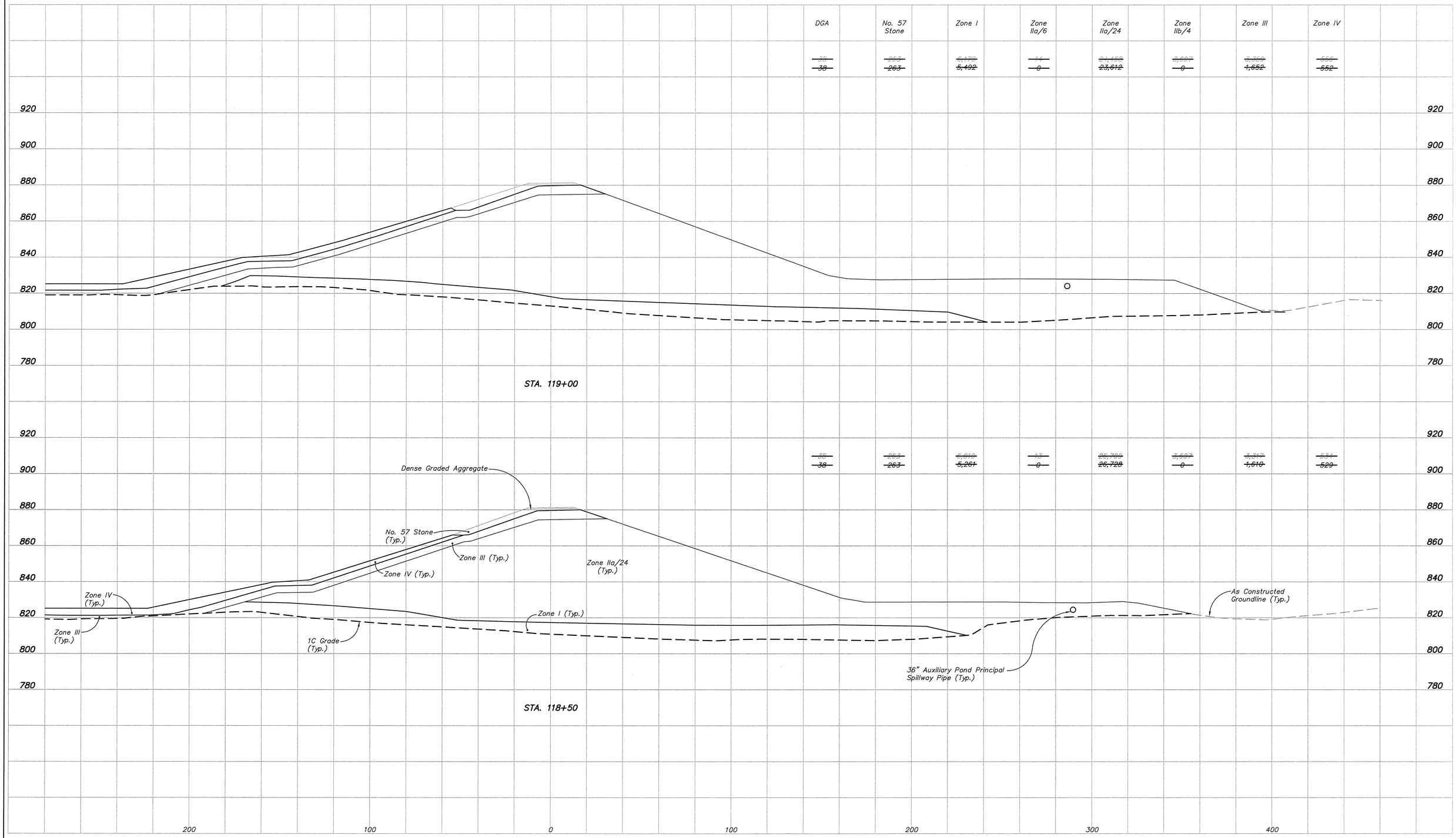
LX2006228\VIEW1\XSH173.DWG

DMS Version 2.0

NOTE:
QUANTITIES ARE BASED ON DESIGN CROSS SECTIONS NOT AS CONSTRUCTED DATA.

EMBANKMENT QUANTITIES (CU. YDS.)

	DGA	No. 57 Stone	Zone I	Zone IIa/6	Zone IIa/24	Zone IIb/4	Zone III	Zone IV
	~~75~~ ~~38~~	~~263~~ ~~263~~	~~6,479~~ ~~5,492~~	~~14~~ ~~0~~	~~24,169~~ ~~23,612~~	~~3,697~~ ~~0~~	~~3,359~~ ~~1,652~~	~~559~~ ~~552~~
	~~76~~ ~~38~~	~~263~~ ~~263~~	~~6,019~~ ~~5,261~~	~~13~~ ~~0~~	~~26,769~~ ~~26,728~~	~~3,697~~ ~~0~~	~~3,317~~ ~~1,610~~	~~574~~ ~~529~~



NOTES:

1. *For Typical Embankment Cross Sections, See Sheets BR0-C-00139 and BR0-C-00140.*
2. *FML and Filter Fabric materials not shown for clarity. See Typical Sections.*

SURVEY NOTE:
As Constructed survey data provided by Bizzack Construction. Based on field observations this data is believed to be correct, but has not been surveyed by FMSM Engineers.

AS CONSTRUCTED - 06/17/08

DAN A. BACK 13930 LICENSED PROFESSIONAL ENGINEER 6-18-08

REVISIONS			
Rev.	Drawn Date:	Drawn By:	Revision Made
A	6-16-06		
C	10-02-06		
H	06-17-08		

Title
CROSS SECTIONS
STA. 118+50 TO STA. 119+00
AUXILIARY ASH POND - PHASE I

Location and Unit:
E.W. BROWN GENERATING STATION

Scale: 1" = 20'
Drawn: TJ/CDV
Date: APRIL, 2006
Checked: DAB/BLP
Approved:

JOB NO.	JOB NO.	JOB NO.	JOB NO.
119961			

Drawing No: BR0-C-00155
Rev. H

Fuller Mossbarger Scott & May
FMSM ENGINEERS
LEXINGTON ST. LOUIS LOUISVILLE JEFFERSONVILLE CINCINNATI ATLANTA COLUMBUS NASHVILLE

Kentucky Utilities Company
an E·ON company

LX20060228\REVH\XSHTH4.DWG

DMS Version 2.0

BRO-C-00156

NOTE:
QUANTITIES ARE BASED ON DESIGN CROSS SECTIONS NOT AS CONSTRUCTED DATA.

EMBANKMENT QUANTITIES (CU. YDS.)

Station	DGA	No. 57 Stone	Zone I	Zone IIa/6	Zone IIa/24	Zone IIb/4	Zone III	Zone IV
STA. 120+00	~~38~~ ~~38~~	~~263~~ ~~263~~	~~4,073~~ ~~3,902~~	~~15~~ ~~0~~	~~14,390~~ ~~15,079~~	~~3,697~~ ~~0~~	~~3,241~~ ~~1,562~~	~~502~~ ~~559~~
STA. 119+50	~~38~~ ~~38~~	~~263~~ ~~263~~	~~5,761~~ ~~5,100~~	~~15~~ ~~0~~	~~18,878~~ ~~17,631~~	~~3,697~~ ~~0~~	~~3,365~~ ~~1,654~~	~~560~~ ~~553~~

STA. 120+00

STA. 119+50

NOTES:
1. For Typical Embankment Cross Sections, See Sheets BRO-C-00139 and BRO-C-00140.
2. FML and Filter Fabric materials not shown for clarity. See Typical Sections.

SURVEY NOTE:
As Constructed survey data provided by Bizzack Construction. Based on field observations this data is believed to be correct, but has not been surveyed by FMSM Engineers.

AS CONSTRUCTED - 06/17/08

LX2006228\REVH\XSHT15.DWG

Fuller Mossbarger Scott & May
FMSM ENGINEERS
LEXINGTON ST. LOUIS LOUISVILLE JEFFERSONVILLE CINCINNATI ATLANTA COLUMBUS NASHVILLE

DAN A. BACK 13630 LICENSED PROFESSIONAL ENGINEER

REVISIONS

Rev.	Drawn Date:	Drawn By:	Revision Mode
A	6-16-06		
C	10-02-06		
H	06-17-08		

Title
CROSS SECTIONS
STA. 119+50 TO STA. 120+00
AUXILIARY ASH POND - PHASE I

Location and Unit:
E.W. BROWN GENERATING STATION

Scale: 1" = 20'
Drawn: TJ/CDV
Date: APRIL, 2006
Checked: DAB/BLP
Approved:

JOB NO.	JOB NO.	JOB NO.	JOB NO.	JOB NO.
119961				

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Drawing No: BRO-C-00156
Rev. H

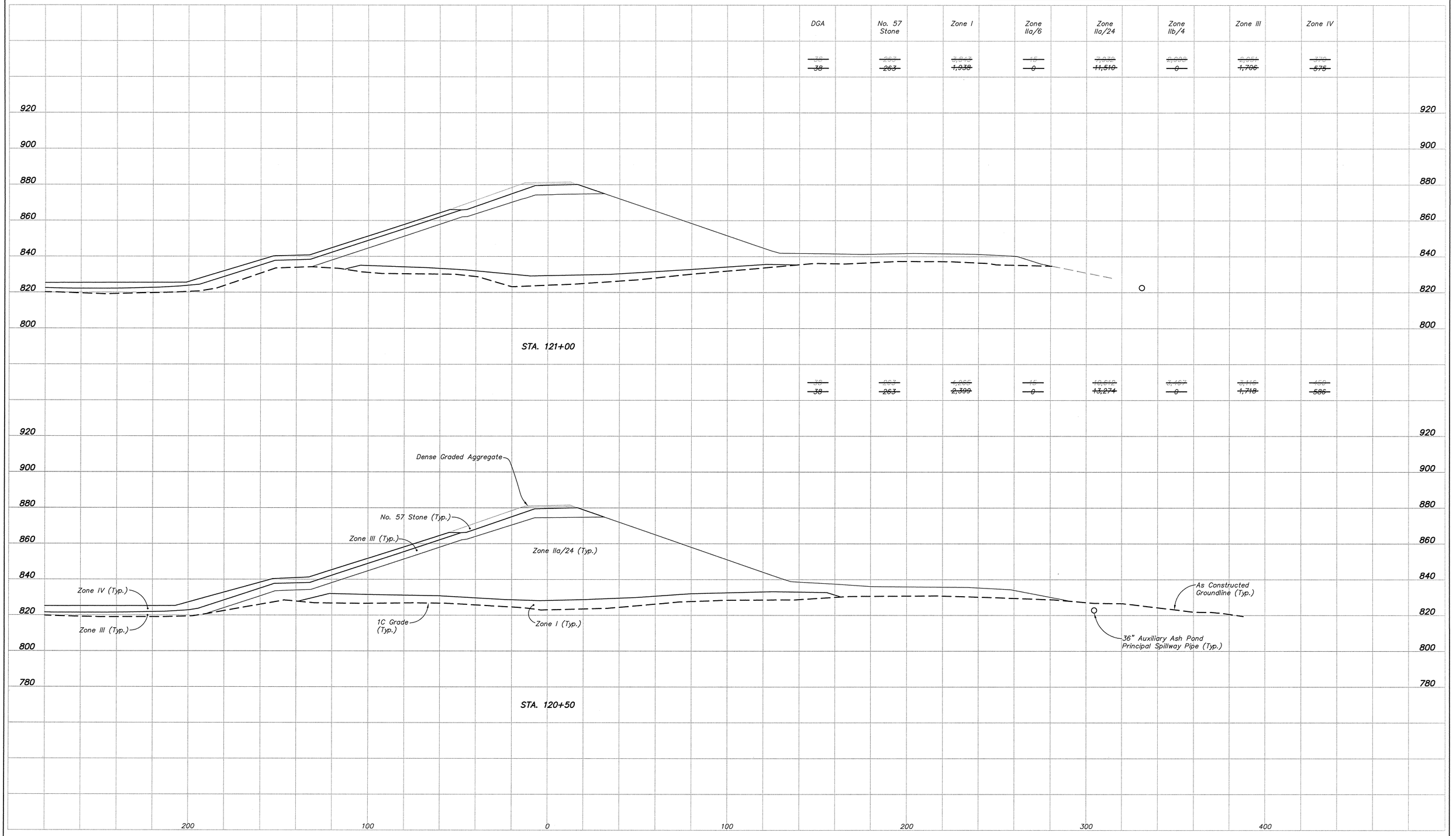
DMS Version 2.0

BR0-C-00157

NOTE:
QUANTITIES ARE BASED ON DESIGN CROSS SECTIONS NOT AS CONSTRUCTED DATA.

EMBANKMENT QUANTITIES (CU. YDS.)

DGA	No. 57 Stone	Zone I	Zone IIa/6	Zone IIa/24	Zone IIb/4	Zone III	Zone IV
~~38~~	~~263~~	~~1,938~~	~~0~~	~~11,510~~	~~0~~	~~1,706~~	~~575~~
~~38~~	~~263~~	~~2,399~~	~~0~~	~~13,274~~	~~0~~	~~1,718~~	~~586~~



NOTES:

1. *For Typical Embankment Cross Sections, See Sheets BR0-C-00139 and BR0-C-00140.*
2. *FML and Filter Fabric materials not shown for clarity. See Typical Sections.*

SURVEY NOTE:
As Constructed survey data provided by Bizzack Construction. Based on field observations this data is believed to be correct, but has not been surveyed by FMSM Engineers.

AS CONSTRUCTED - 06/17/08

DAN A. BIZZACK 19636 LICENSED PROFESSIONAL ENGINEER 6-18-08

REVISIONS			
Rev.	Drawn Date:	Drawn By:	Revision Made
A	6-16-06		
C	10-02-06		
H	06-17-08		

Fuller Mossbarger Scott & May

FMSM ENGINEERS
LEXINGTON ST. LOUIS LOUISVILLE JEFFERSONVILLE CINCINNATI ATLANTA COLUMBUS NASHVILLE

Title
CROSS SECTIONS
STA. 120+50 TO STA. 121+00
AUXILIARY ASH POND - PHASE I

Location and Unit:
E.W. BROWN GENERATING STATION

Scale: AS SHOWN
Drawn: TJ/CDV
Date: APRIL, 2006
Checked: DAB/BLP
Approved:

Kentucky Utilities Company
an E·ON company

JOB NO.	JOB NO.	JOB NO.	JOB NO.	*Drawing No:*	*Rev.*
119961				BR0-C-00157	H

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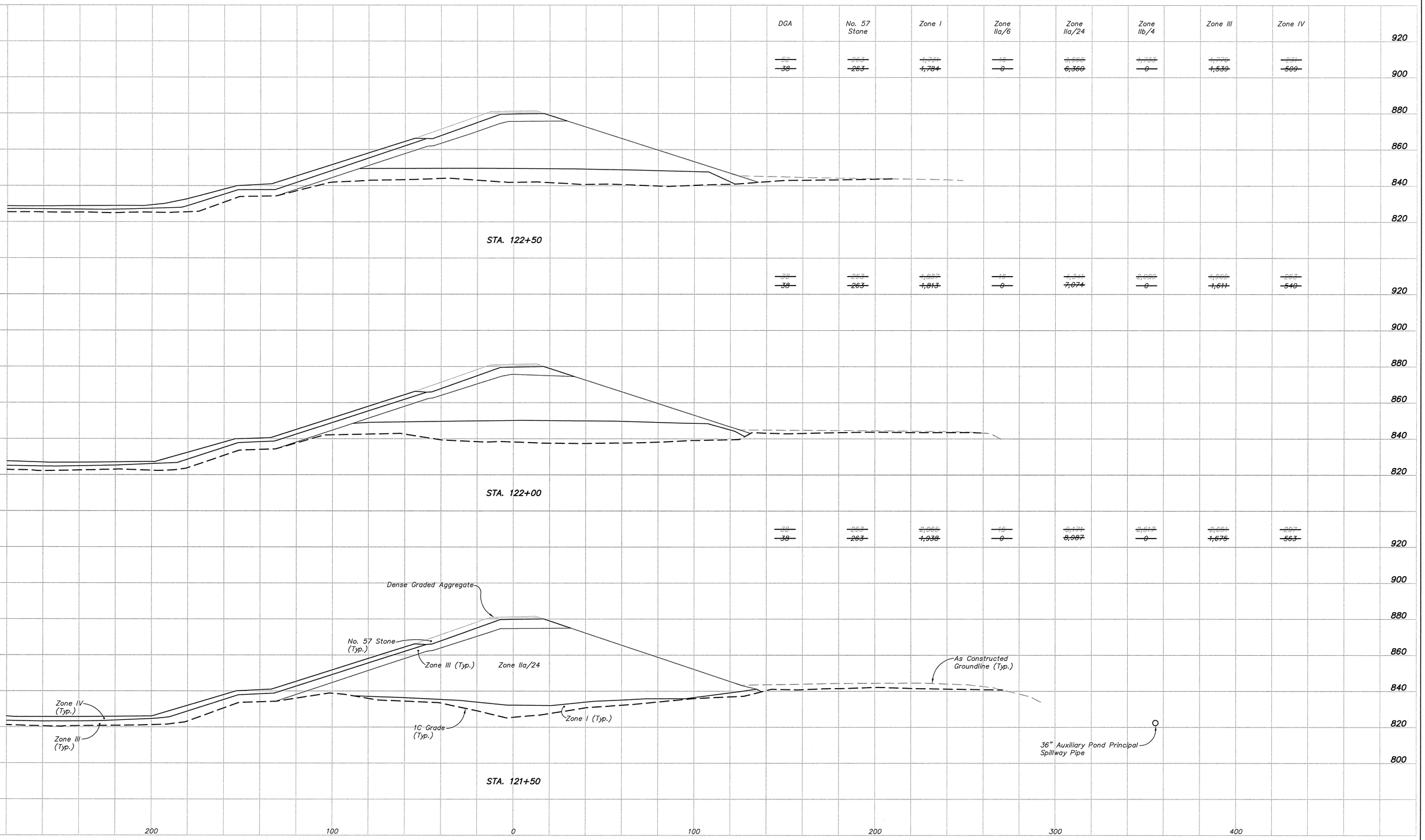
DMS Version 2.0

BR0-C-00158

NOTE:
QUANTITIES ARE BASED ON DESIGN CROSS SECTIONS NOT AS CONSTRUCTED DATA.

EMBANKMENT QUANTITIES (CU. YDS.)

	DGA	No. 57 Stone	Zone I	Zone IIa/6	Zone IIa/24	Zone IIb/4	Zone III	Zone IV
STA. 122+50	~~60~~ ~~38~~	~~267~~ ~~263~~	~~1,725~~ ~~1,784~~	~~15~~ ~~0~~	~~5,268~~ ~~6,360~~	~~4,733~~ ~~0~~	~~1,776~~ ~~1,539~~	~~271~~ ~~509~~
STA. 122+00	~~39~~ ~~38~~	~~267~~ ~~263~~	~~1,827~~ ~~1,813~~	~~15~~ ~~0~~	~~4,341~~ ~~7,074~~	~~3,690~~ ~~0~~	~~1,900~~ ~~1,611~~	~~267~~ ~~540~~
STA. 121+50	~~39~~ ~~38~~	~~267~~ ~~263~~	~~2,065~~ ~~1,938~~	~~15~~ ~~0~~	~~5,171~~ ~~8,987~~	~~2,517~~ ~~0~~	~~2,051~~ ~~1,675~~	~~227~~ ~~563~~



NOTES:

1. *For Typical Embankment Cross Sections, See Sheets BR0-C-00139 and BR0-C-00140.*
2. *FML and Filter Fabric materials not shown for clarity. See Typical Sections.*

SURVEY NOTE:
As Constructed survey data provided by Bizzack Construction. Based on field observations this data is believed to be correct, but has not been surveyed by FMSM Engineers.

AS CONSTRUCTED - 06/17/08

DAN A. BIZZACK 19330 LICENSED PROFESSIONAL ENGINEER 6/16/08

Fuller Massbarger Scott & May

FMSM ENGINEERS
LEXINGTON ST. LOUIS LOUISVILLE JEFFERSONVILLE CINCINNATI ATLANTA COLUMBUS NASHVILLE

REVISIONS			
Rev.	Drawn Date:	Drawn By:	Revision Made
A	6-16-06		
C	10-02-06		
H	06-17-08		

Title
CROSS SECTIONS
STA. 121+50 TO STA. 122+50
AUXILIARY ASH POND - PHASE I

Location and Unit:
E.W. BROWN GENERATING STATION

Scale: 1" = 20'
Drawn: TJ/CDV
Date: APRIL, 2006
Checked: DAB/BLP
Approved:

Kentucky Utilities Company, an E·ON company

JOB NO.	JOB NO.	JOB NO.	JOB NO.	*Drawing No:*	*Rev.*
119961				BR0-C-00158	H

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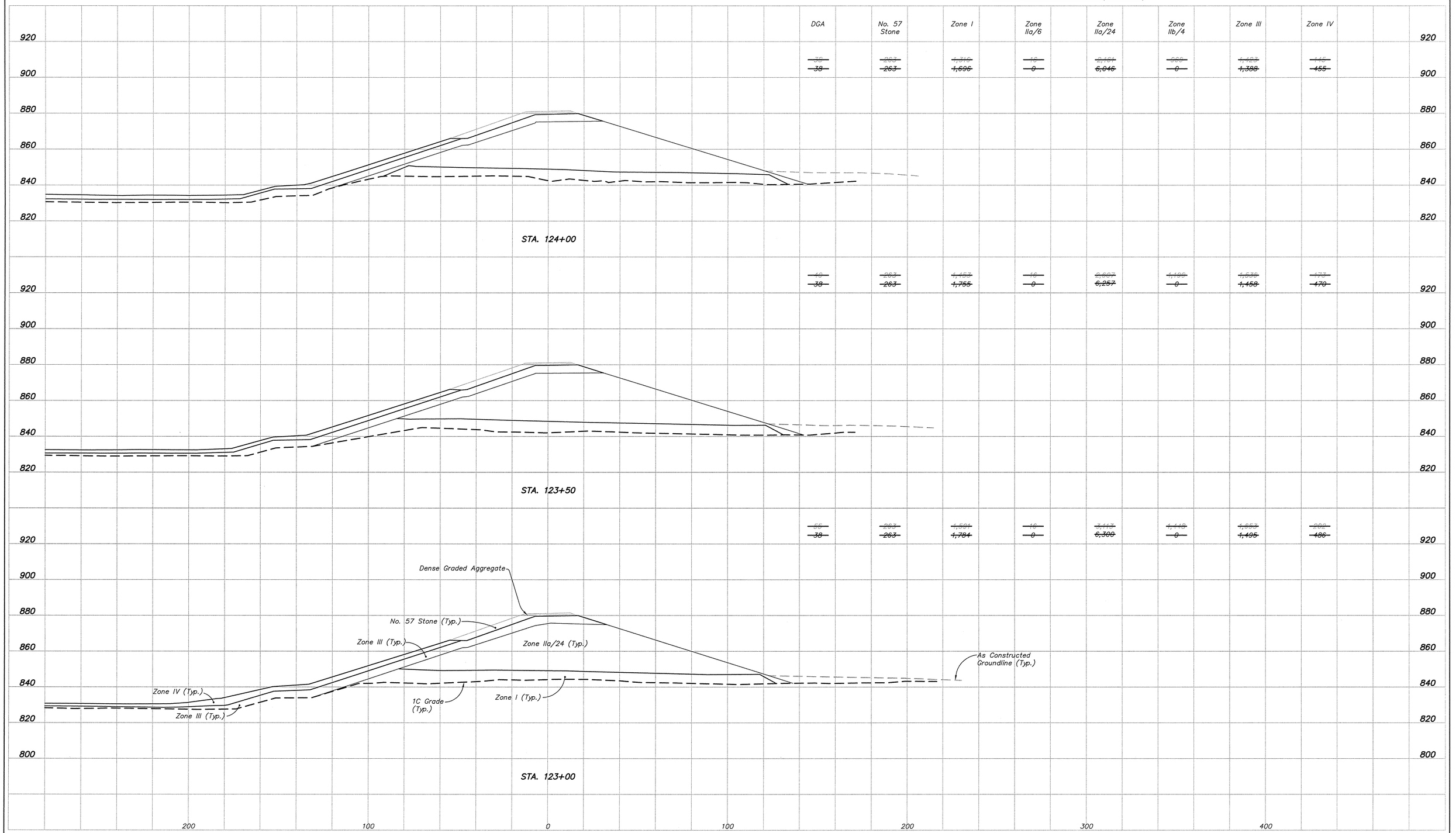
DMS Version 2.0

NOTE:
QUANTITIES ARE BASED ON DESIGN CROSS SECTIONS NOT AS CONSTRUCTED DATA.

EMBANKMENT QUANTITIES (CU. YDS.)

	DGA	No. 57 Stone	Zone I	Zone IIa/6	Zone IIa/24	Zone IIb/4	Zone III	Zone IV
STA. 124+00	~~38~~ 38	~~263~~ 263	~~1,696~~ 1,696	~~0~~ 0	~~6,046~~ 6,046	~~0~~ 0	~~1,398~~ 1,398	~~455~~ 455
STA. 123+50	~~38~~ 38	~~263~~ 263	~~1,755~~ 1,755	~~0~~ 0	~~6,257~~ 6,257	~~0~~ 0	~~1,458~~ 1,458	~~470~~ 470
STA. 123+00	~~38~~ 38	~~263~~ 263	~~1,784~~ 1,784	~~0~~ 0	~~6,300~~ 6,300	~~0~~ 0	~~1,495~~ 1,495	~~486~~ 486



NOTES:

1. *For Typical Embankment Cross Sections, See Sheets BR0-C-00139 and BR0-C-00140.*
2. *FML and Filter Fabric materials not shown for clarity. See Typical Sections.*

SURVEY NOTE:
As Constructed survey data provided by Bizzack Construction. Based on field observations this data is believed to be correct, but has not been surveyed by FMSM Engineers.

AS CONSTRUCTED - 06/17/08

DAN A. BAZE 19636 LICENSED PROFESSIONAL ENGINEER 6/18/08

REVISIONS			
Rev.	Drawn Date:	Drawn By:	Revision Mode
A	6-16-06		
C	10-02-06		
H	06-17-08		

Title
CROSS SECTIONS
STA. 123+00 TO STA. 124+00
AUXILIARY ASH POND - PHASE I

Location and Unit:
E.W. BROWN GENERATING STATION

Fuller Mossbarger Scott & May
FMSM ENGINEERS
LEXINGTON ST. LOUIS LOUISVILLE JEFFERSONVILLE CINCINNATI ATLANTA COLUMBUS NASHVILLE

Kentucky Utilities Company
an E·ON company

Scale: 1" = 20'
Drawn: TJ/CDV
Date: APRIL, 2006
Checked: DAB/BLP
Approved:

JOB NO.	JOB NO.	JOB NO.	JOB NO.
119961			

Drawing No: BR0-C-00159
Rev. H

LX\20062228\REVIT\XSHT18.DWG

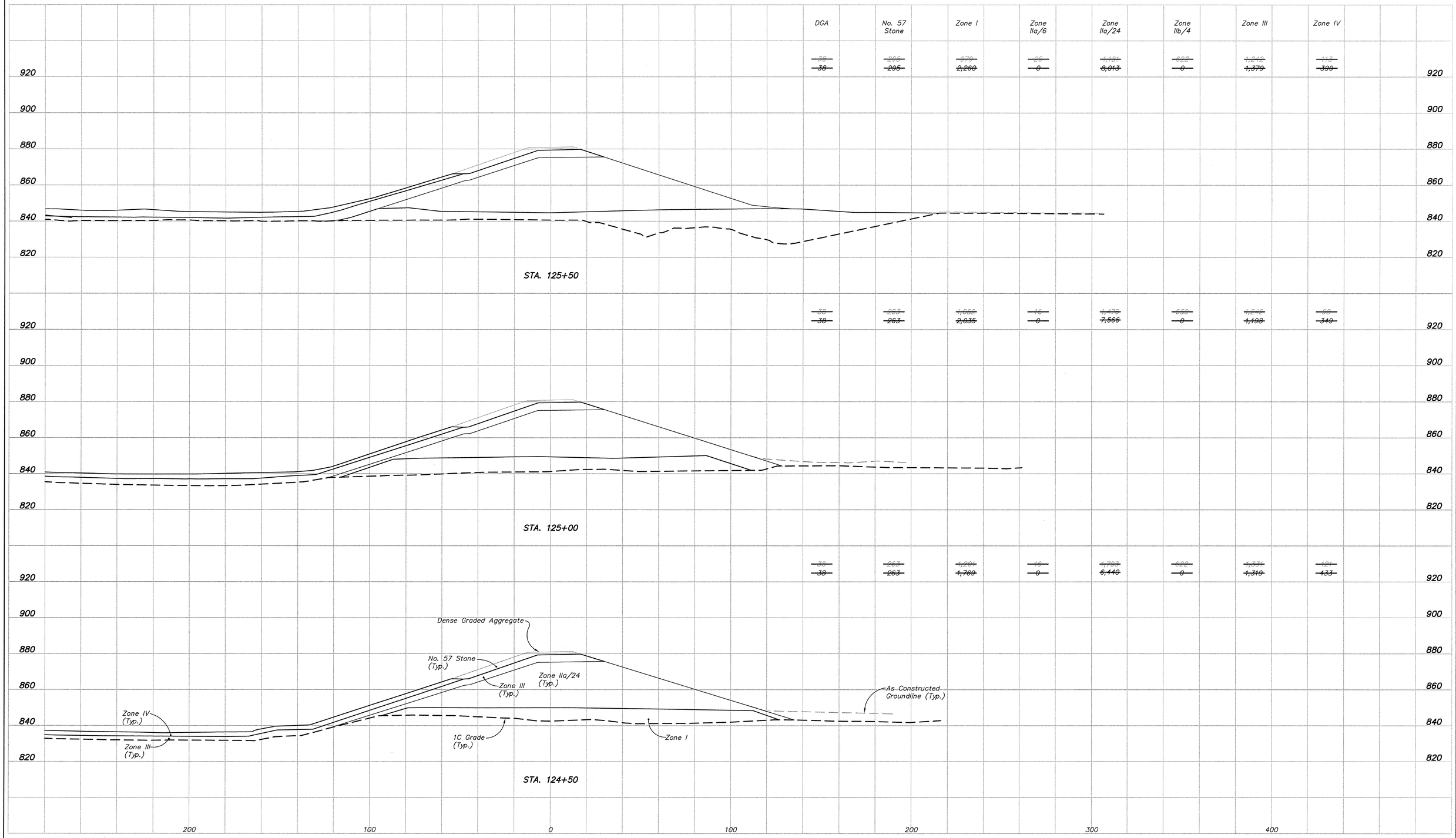
DMS Version 2.0

BR0-C-00160

NOTE:
QUANTITIES ARE BASED ON DESIGN CROSS SECTIONS NOT AS CONSTRUCTED DATA.

EMBANKMENT QUANTITIES (CU. YDS.)

	DGA	No. 57 Stone	Zone I	Zone IIa/6	Zone IIa/24	Zone IIb/4	Zone III	Zone IV
STA. 125+50	~~38~~ 38	~~295~~ 295	~~2,260~~ 2,260	~~0~~ 0	~~8,013~~ 8,013	~~0~~ 0	~~1,379~~ 1,379	~~399~~ 399
STA. 125+00	~~38~~ 38	~~263~~ 263	~~2,035~~ 2,035	~~0~~ 0	~~7,565~~ 7,565	~~0~~ 0	~~1,198~~ 1,198	~~340~~ 340
STA. 124+50	~~38~~ 38	~~263~~ 263	~~1,769~~ 1,769	~~0~~ 0	~~6,440~~ 6,440	~~0~~ 0	~~1,319~~ 1,319	~~433~~ 433



NOTES:

1. *For Typical Embankment Cross Sections, See Sheets BR0-C-00139 and BR0-C-00140.*
2. *FML and Filter Fabric materials not shown for clarity. See Typical Sections.*

SURVEY NOTE:
As Constructed survey data provided by Bizzack Construction. Based on field observations this data is believed to be correct, but has not been surveyed by FMSM Engineers.

AS CONSTRUCTED - 06/17/08

DAN A. BACK 13038 LICENSED PROFESSIONAL ENGINEER 6-16-08

REVISIONS			
Rev.	Drawn Date:	Drawn By:	Revision Mode
A	6-16-06		
C	10-02-06		
H	06-17-08		

Fuller Mossbarger Scott & May

FMSM ENGINEERS
LEXINGTON ST. LOUIS LOUISVILLE JEFFERSONVILLE CINCINNATI ATLANTA COLUMBUS WASHVILLE

Title
CROSS SECTIONS
STA. 124+50 TO STA. 125+50
AUXILIARY ASH POND - PHASE I

Location and Unit:
E.W. BROWN GENERATING STATION

Scale: 1" = 20'
Drawn: TJ/CDV
Date: APRIL, 2006
Checked: DAB/BLP
Approved:

Kentucky Utilities Company
an E-ON company

JOB NO.	JOB NO.	JOB NO.	JOB NO.	Drawing No:	Rev.
119961				BR0-C-00160	H

LX2006228\KEVH\XSHT19.DWG

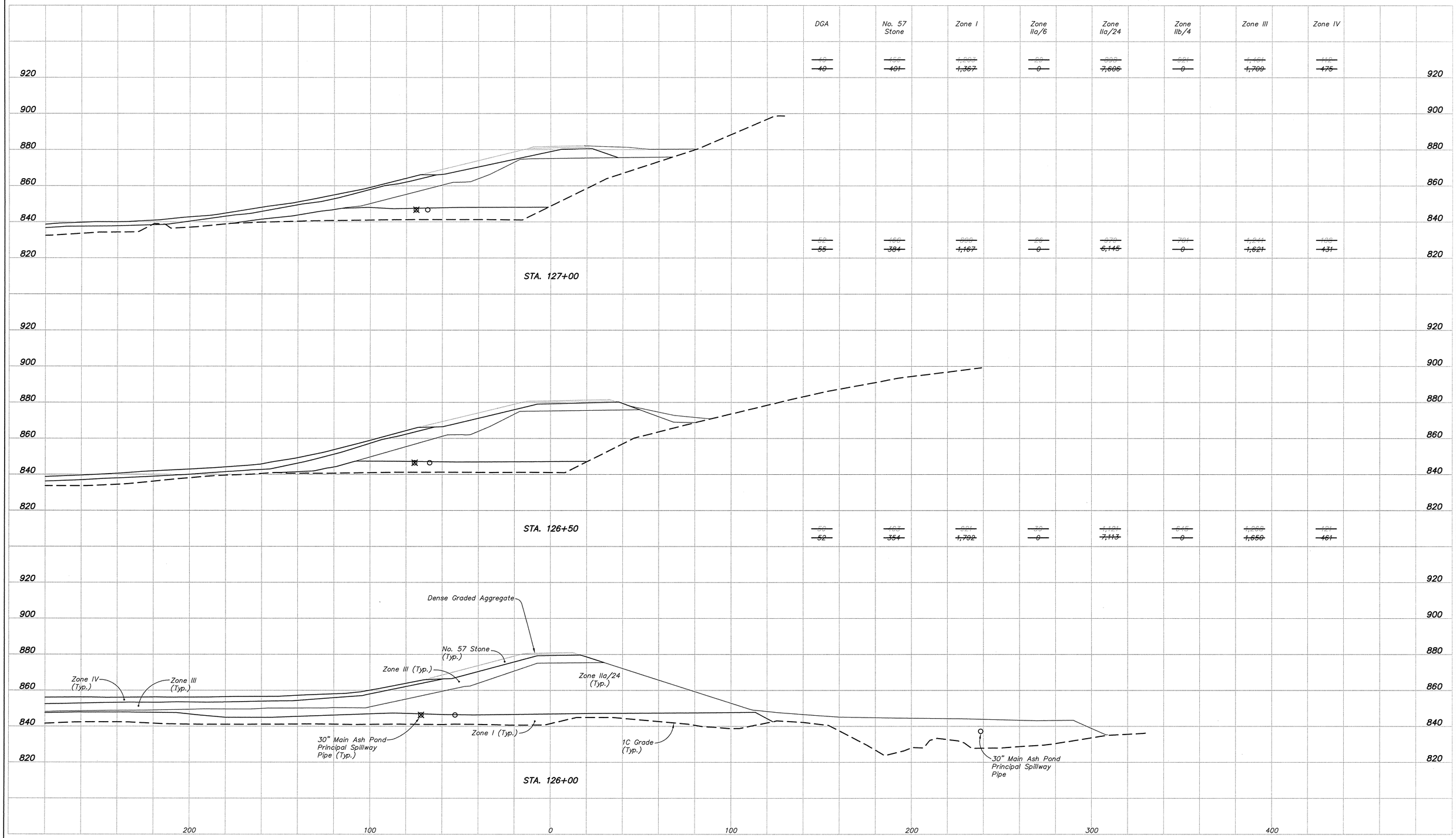
DMS Version 2.0

BR0-C-00161

NOTE:
QUANTITIES ARE BASED ON DESIGN CROSS SECTIONS NOT AS CONSTRUCTED DATA.

EMBANKMENT QUANTITIES (CU. YDS.)

	DGA	No. 57 Stone	Zone I	Zone IIa/6	Zone IIa/24	Zone IIb/4	Zone III	Zone IV
STA. 127+00	~~40~~ 40	~~156~~ 401	~~1,603~~ 1,367	~~29~~ 0	~~838~~ 7,606	~~521~~ 0	~~1,491~~ 1,709	~~112~~ 475
	~~52~~ 55	~~166~~ 384	~~869~~ 1,167	~~26~~ 0	~~578~~ 6,145	~~701~~ 0	~~1,241~~ 1,621	~~102~~ 431
STA. 126+50	~~50~~ 52	~~167~~ 354	~~891~~ 1,792	~~30~~ 0	~~1,121~~ 7,113	~~946~~ 0	~~1,260~~ 1,650	~~121~~ 461



NOTES:

1. *For Typical Embankment Cross Sections, See Sheets BR0-C-00139 and BR0-C-00140.*
2. *FML and Filter Fabric materials not shown for clarity. See Typical Sections.*

SURVEY NOTE:
As Constructed survey data provided by Bizzack Construction. Based on field observations this data is believed to be correct, but has not been surveyed by FMSM Engineers.

AS CONSTRUCTED - 06/17/08

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Fuller Mossbarger Scott & May

FMSM ENGINEERS
LEXINGTON ST. LOUIS | LOUISVILLE JEFFERSONVILLE | CINCINNATI ATLANTA | COLUMBUS NASHVILLE

REVISIONS

Rev.	Drawn Date:	Drawn By:	Revision Mode
A	6-16-06		
B	7-05-06		
C	10-02-06		
H	06-17-08		

Title
CROSS SECTIONS
STA. 126+00 TO STA. 127+00
AUXILIARY ASH POND - PHASE I

Location and Unit:
E.W. BROWN GENERATING STATION

Scale: 1" = 20'
Drawn: TJ/CDV
Date: APRIL, 2006
Checked: DAB/BLP
Approved:

Kentucky Utilities Company
an E·ON company

JOB NO.	JOB NO.	JOB NO.	JOB NO.	*Drawing No:*	*Rev.*
119961				BR0-C-00161	H

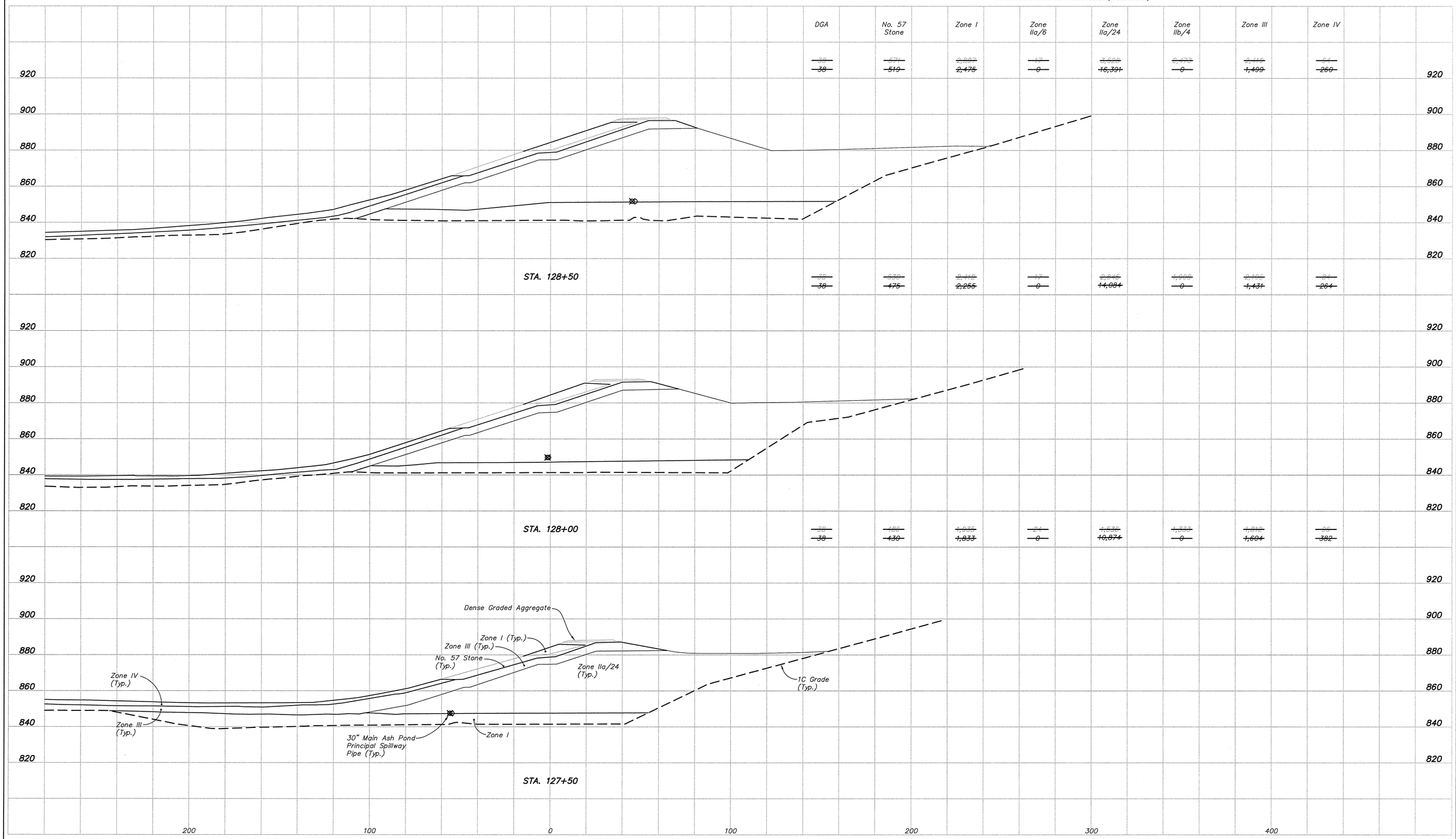
DMS Version 2.0

BR0-C-00162

NOTE:
QUANTITIES ARE BASED ON DESIGN CROSS SECTIONS NOT AS CONSTRUCTED DATA.

EMBANKMENT QUANTITIES (CU. YDS.)

	DGA	No. 57 Stone	Zone I	Zone IIa/6	Zone IIa/24	Zone IIb/4	Zone III	Zone IV
STA. 128+50	~~38~~ 38	~~519~~ 519	~~2,475~~ 2,475	~~0~~ 0	~~16,391~~ 16,391	~~0~~ 0	~~1,499~~ 1,499	~~260~~ 260
STA. 128+00	~~38~~ 38	~~475~~ 475	~~2,255~~ 2,255	~~0~~ 0	~~14,084~~ 14,084	~~0~~ 0	~~1,431~~ 1,431	~~264~~ 264
STA. 127+50	~~38~~ 38	~~430~~ 430	~~1,833~~ 1,833	~~0~~ 0	~~10,874~~ 10,874	~~0~~ 0	~~1,604~~ 1,604	~~382~~ 382



NOTES:

1. *For Typical Embankment Cross Sections, See Sheets BR0-C-00139 and BR0-C-00140.*
2. *FML and Filter Fabric materials not shown for clarity. See Typical Sections.*

SURVEY NOTE:
As Constructed survey data provided by Bizzack Construction. Based on field observations this data is believed to be correct, but has not been surveyed by FMSM Engineers.

AS CONSTRUCTED - 06/17/08

DAN A. BACK 13501 LICENSED PROFESSIONAL ENGINEER 6.18.08

REVISIONS			
Rev.	Drawn Date:	Drawn By:	Revision Mode
A	6-16-06		
B	7-05-06		
C	10-02-06		
H	06-17-08		

Title
CROSS SECTIONS
STA. 127+50 TO STA. 128+50
AUXILIARY ASH POND - PHASE I

Location and Unit:
E.W. BROWN GENERATING STATION

Scale: 1" = 20'
Drawn: TJ/CDV
Date: APRIL, 2006
Checked: DAB/BLP
Approved:

JOB NO.	JOB NO.	JOB NO.	JOB NO.
119961			

Drawing No: BR0-C-00162 Rev. H

Fuller Mossbarger Scott & May

FMSM ENGINEERS
LEXINGTON ST. LOUIS LOUISVILLE JEFFERSONVILLE CINCINNATI ATLANTA COLUMBUS NASHVILLE

Kentucky Utilities Company
an E·ON company

LX20062228\REVH\XSHT21.DWG

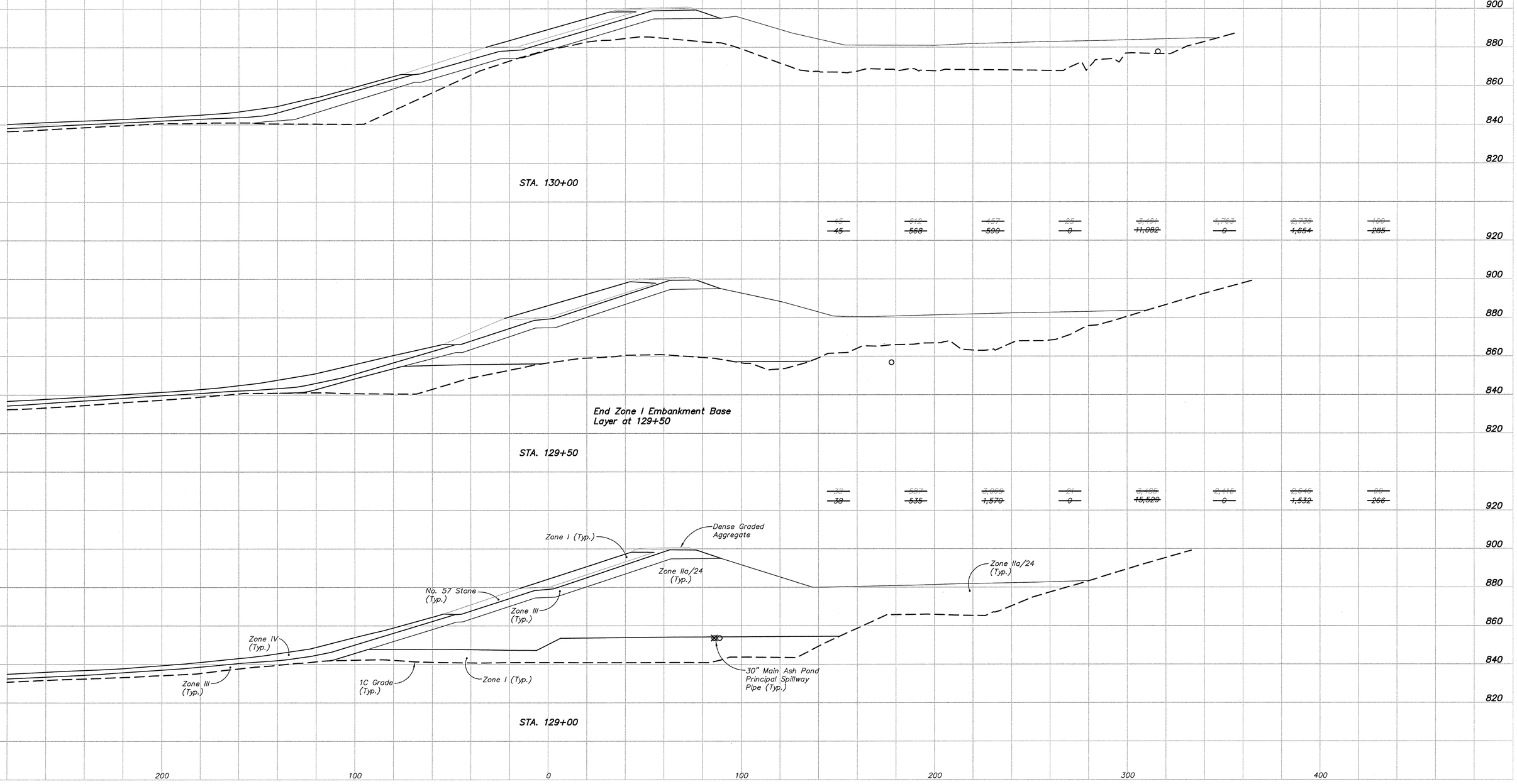
DMS Version 2.0

BR0-C-00163

NOTE:
QUANTITIES ARE BASED ON DESIGN CROSS SECTIONS NOT AS CONSTRUCTED DATA.

EMBANKMENT QUANTITIES (CU. YDS.)

	DGA	No. 57 Stone	Zone I	Zone IIa/6	Zone IIa/24	Zone IIb/4	Zone III	Zone IV
STA. 130+00	~~57~~ / ~~64~~	~~530~~ / ~~593~~	~~407~~ / ~~451~~	~~22~~ / ~~0~~	~~1,143~~ / ~~6,610~~	~~507~~ / ~~0~~	~~2,696~~ / ~~1,755~~	~~100~~ / ~~286~~
STA. 129+50	~~45~~ / ~~45~~	~~512~~ / ~~568~~	~~457~~ / ~~599~~	~~25~~ / ~~0~~	~~2,191~~ / ~~11,082~~	~~1,703~~ / ~~0~~	~~2,736~~ / ~~1,654~~	~~100~~ / ~~285~~
STA. 129+00	~~35~~ / ~~38~~	~~507~~ / ~~535~~	~~2,059~~ / ~~1,570~~	~~21~~ / ~~0~~	~~2,485~~ / ~~15,529~~	~~2,416~~ / ~~0~~	~~2,646~~ / ~~1,532~~	~~99~~ / ~~266~~



NOTES:

1. *For Typical Embankment Cross Sections, See Sheets BR0-C-00139 and BR0-C-00140.*
2. *FML and Filter Fabric materials not shown for clarity. See Typical Sections.*

SURVEY NOTE:
As Constructed survey data provided by Bizzack Construction. Based on field observations this data is believed to be correct, but has not been surveyed by FMSM Engineers.

AS CONSTRUCTED - 06/17/08

DAN A. BACK 13536 LICENSED PROFESSIONAL ENGINEER 6-18-08

REVISIONS				
Rev.	Drawn Date:	Drawn By:	Revision Mode	
A	6-16-06			
B	7-05-06			
C	10-02-06			
H	06-17-08			

Title
CROSS SECTIONS
STA. 129+00 TO STA. 130+00
AUXILIARY ASH POND - PHASE I

Location and Unit:
E.W. BROWN GENERATING STATION

Scale: 1" = 20'
Drawn: TJ/CDV
Date: APRIL, 2006
Checked: DAB/BLP
Approved:

JOB NO.	JOB NO.	JOB NO.	JOB NO.	Drawing No:	Rev.
119961				BR0-C-00163	H

Fuller Mossberger Scott & May
FMSM ENGINEERS
LEXINGTON ST. LOUIS LOUISVILLE JEFFERSONVILLE CINCINNATI ATLANTA COLUMBUS NASHVILLE

Kentucky Utilities Company
an E·ON company

LX2008228\REVH\XSHT22.DWG

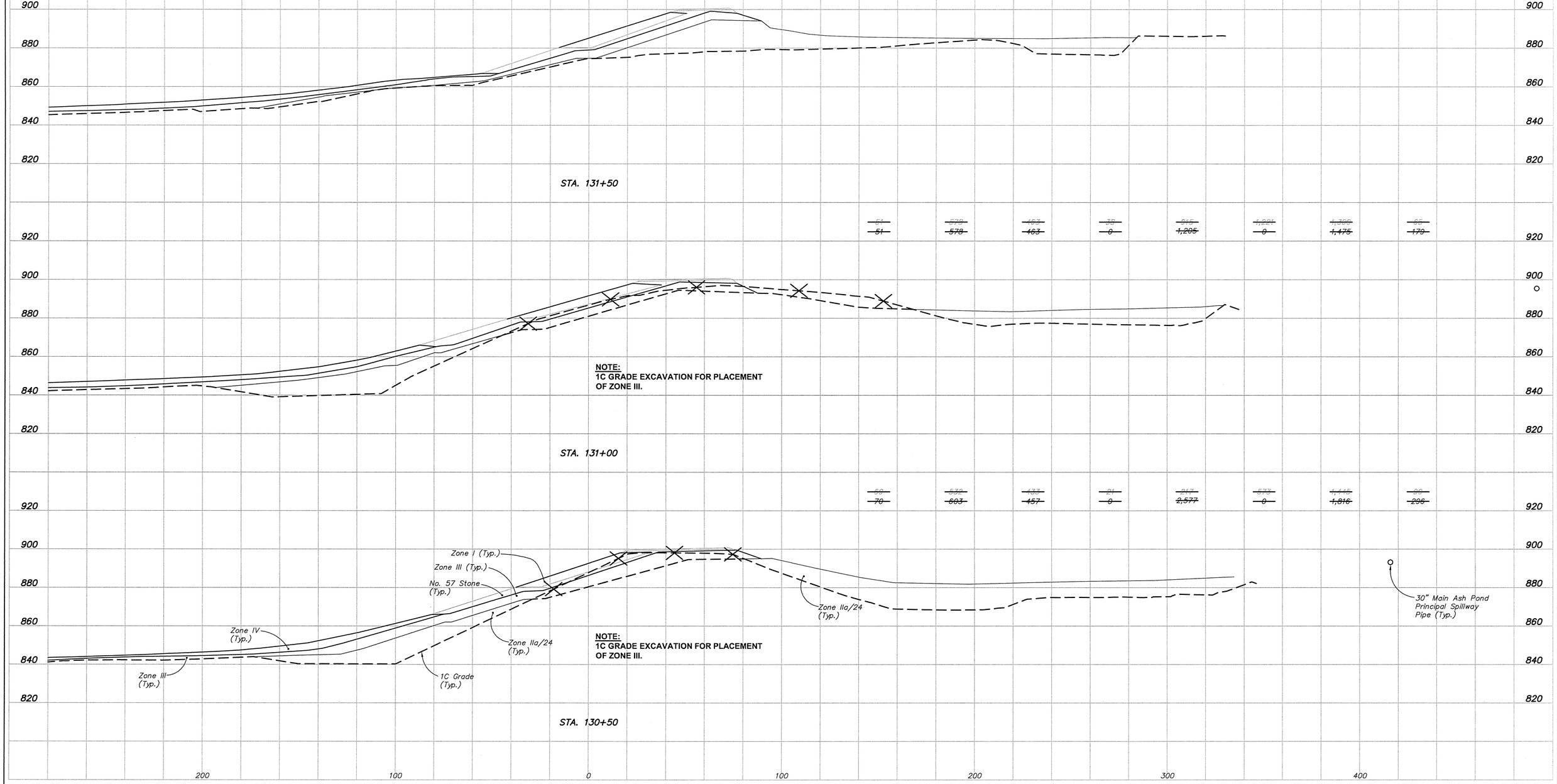
DMS Version 2.0

BR0-C-00164

NOTE:
QUANTITIES ARE BASED ON DESIGN CROSS SECTIONS NOT AS CONSTRUCTED DATA.

EMBANKMENT QUANTITIES (CU. YDS.)

	DGA	No. 57 Stone	Zone I	Zone IIa/6	Zone IIa/24	Zone IIb/4	Zone III	Zone IV
STA. 131+50	~~38~~ 38	~~508~~ 508	~~393~~ 393	~~0~~ 0	~~3,615~~ 3,615	~~0~~ 0	~~997~~ 997	~~30~~ 30
STA. 131+00	~~51~~ 51	~~578~~ 578	~~463~~ 463	~~0~~ 0	~~1,205~~ 1,205	~~0~~ 0	~~1,475~~ 1,475	~~179~~ 179
STA. 130+50	~~70~~ 70	~~603~~ 603	~~457~~ 457	~~0~~ 0	~~2,577~~ 2,577	~~0~~ 0	~~1,816~~ 1,816	~~296~~ 296



NOTES:

1. *For Typical Embankment Cross Sections, See Sheets BR0-C-00139 and BR0-C-00140.*
2. *FML and Filter Fabric materials not shown for clarity. See Typical Sections.*

SURVEY NOTE:
As Constructed survey data provided by Bizzack Construction. Based on field observations this data is believed to be correct, but has not been surveyed by FMSM Engineers.

AS CONSTRUCTED - 06/17/08

LX\2006228\REVH\XSHT23.DWG

Fuller Mossbarger Scott & May

FMSM ENGINEERS
LEXINGTON ST. LOUIS LOUISVILLE JEFFERSONVILLE CINCINNATI ATLANTA COLUMBUS NASHVILLE

DAN A. BACK 17934 LICENSED PROFESSIONAL ENGINEER 6-19-08

REVISIONS

Rev.	Drawn Date:	Drawn By:	Revision Mode
A	6-16-06		
B	7-05-06		
C	10-02-06		
H	06-17-08		

Title
CROSS SECTIONS
STA. 130+50 TO 131+50
AUXILIARY ASH POND - PHASE I

Location and Unit:
E.W. BROWN GENERATING STATION

Scale: 1" = 20'
Drawn: TJ/CDV
Date: APRIL, 2006
Checked: DAB/BLP
Approved:

JOB NO.	JOB NO.	JOB NO.	JOB NO.
119961			

Kentucky Utilities Company
an E-ON company

Drawing No: BR0-C-00164
Rev. H

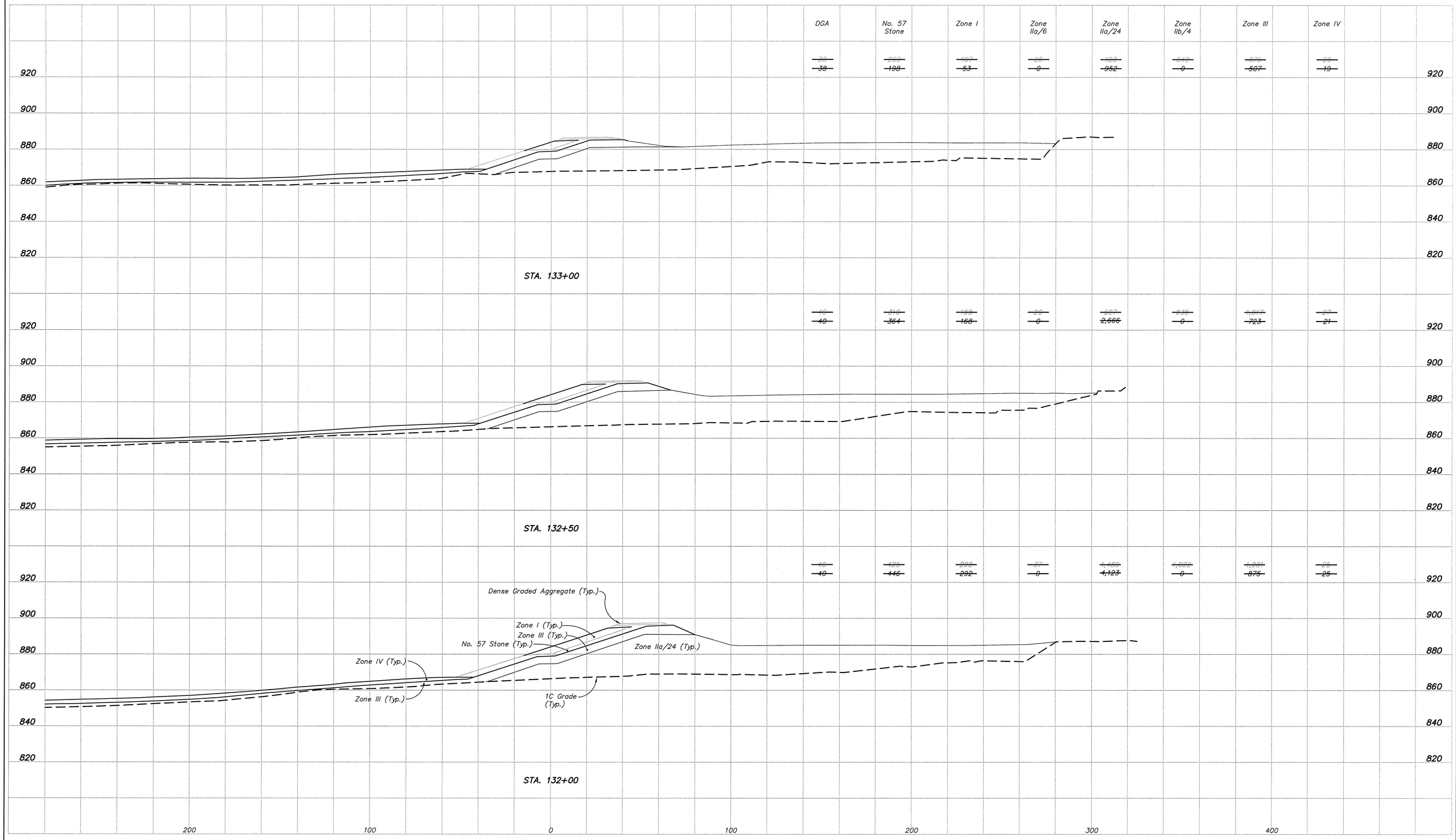
DMS Version 2.0

BR0-C-00165

NOTE:
QUANTITIES ARE BASED ON DESIGN CROSS SECTIONS NOT AS CONSTRUCTED DATA.

EMBANKMENT QUANTITIES (CU. YDS.)

	DGA	No. 57 Stone	Zone I	Zone IIa/6	Zone IIa/24	Zone IIb/4	Zone III	Zone IV
STA. 133+00	~~38~~ 38	~~550~~ 198	~~107~~ 53	~~26~~ 0	~~107~~ 952	~~540~~ 0	~~975~~ 507	~~26~~ 19
STA. 132+50	~~40~~ 40	~~710~~ 364	~~169~~ 168	~~28~~ 0	~~597~~ 2,666	~~636~~ 0	~~1,617~~ 723	~~27~~ 21
STA. 132+00	~~40~~ 40	~~125~~ 116	~~292~~ 292	~~37~~ 0	~~1,486~~ 4,123	~~1,092~~ 0	~~1,231~~ 875	~~25~~ 25



NOTES:

1. For Typical Embankment Cross Sections, See Sheets BR0-C-00139 and BR0-C-00140.
2. FML and Filter Fabric materials not shown for clarity. See Typical Sections.

SURVEY NOTE:
As Constructed survey data provided by Bizzack Construction. Based on field observations this data is believed to be correct, but has not been surveyed by FMSM Engineers.

AS CONSTRUCTED - 06/17/08

LX2006228\REVH\XSHT24.DWG

Fuller Mossbarger Scott & May

FMSM ENGINEERS
LEXINGTON ST. LOUIS LOUISVILLE JEFFERSONVILLE CINCINNATI ATLANTA COLUMBUS NASHVILLE

DAM A. BACK 13538 LICENSED PROFESSIONAL ENGINEER 6-17-08

REVISIONS			
Rev.	Drawn Date:	Drawn By:	Revision Mode
A	6-16-06		
C	10-02-06		
H	06-17-08		

Title
CROSS SECTIONS
STA. 132+00 TO STA. 133+00
AUXILIARY ASH POND - PHASE I

Location and Unit:
E.W. BROWN GENERATING STATION

Scale: 1" = 20'
Drawn: TJ/CDV
Date: APRIL, 2006
Checked: DAB/BLP
Approved:

JOB NO.	JOB NO.	JOB NO.	JOB NO.
119961			

Kentucky Utilities Company
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Drawing No: BR0-C-00165
Rev.: H

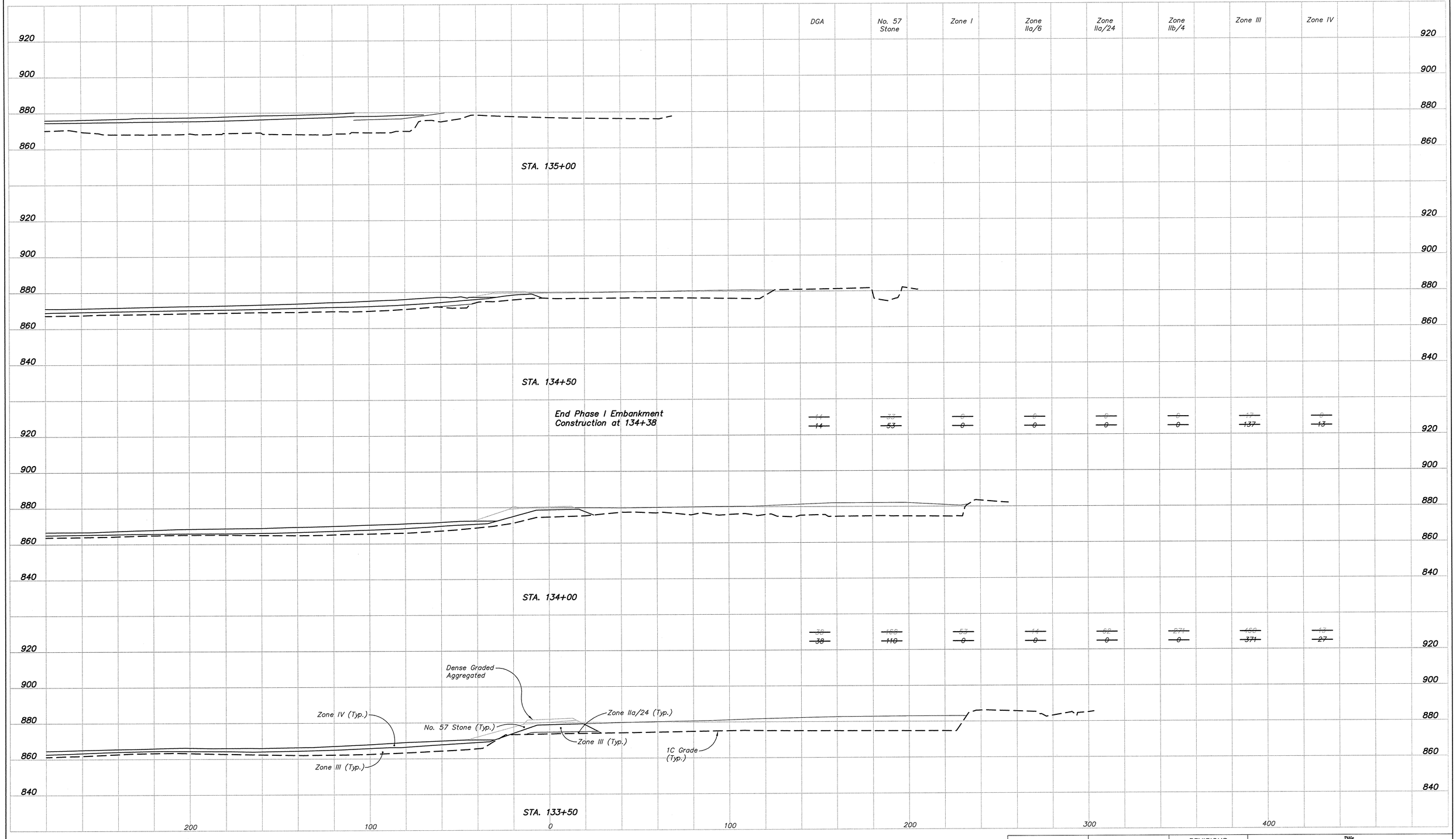
DMS Version 2.0

BR0-C-00166

NOTE:
QUANTITIES ARE BASED ON DESIGN CROSS SECTIONS NOT AS CONSTRUCTED DATA.

EMBANKMENT QUANTITIES (CU. YDS.)

	DGA	No. 57 Stone	Zone I	Zone IIa/6	Zone IIa/24	Zone IIb/4	Zone III	Zone IV
STA. 135+00								
STA. 134+50								
End Phase I Embankment Construction at 134+38	~~14~~ ~~14~~	~~37~~ ~~53~~	~~0~~ ~~0~~	~~0~~ ~~0~~	~~0~~ ~~0~~	~~0~~ ~~0~~	~~57~~ ~~137~~	~~6~~ ~~13~~
STA. 134+00	~~38~~ ~~38~~	~~106~~ ~~110~~	~~57~~ ~~0~~	~~14~~ ~~0~~	~~62~~ ~~0~~	~~271~~ ~~0~~	~~456~~ ~~371~~	~~13~~ ~~27~~
STA. 133+50								



NOTES:

1. *For Typical Embankment Cross Sections, See Sheets BR0-C-00139 and BR0-C-00140.*
2. *FML and Filter Fabric materials not shown for clarity. See Typical Sections.*

SURVEY NOTE:
As Constructed survey data provided by Bizzack Construction. Based on field observations this data is believed to be correct, but has not been surveyed by FMSM Engineers.

AS CONSTRUCTED - 06/17/08

LX2006228\REVH\XSHT25.DWG

DAN A. BACK 15630 LICENSED PROFESSIONAL ENGINEER 6-19-08

REVISIONS			
Rev.	Drawn Date:	Drawn By:	Revision Mode
A	6-16-06		
C	10-02-06		
H	06-17-08		

Fuller Mossbarger Scott & May

FMSM ENGINEERS
LEXINGTON ST. LOUIS LOUISVILLE JEFFERSONVILLE CINCINNATI ATLANTA COLUMBUS INDIANAPOLIS

Title
CROSS SECTIONS
STA. 133+50 TO STA. 135+00
AUXILIARY ASH POND – PHASE I

Location and Unit:
E.W. BROWN GENERATING STATION

Scale: AS SHOWN
Drawn: TJ/CDV
Date: APRIL, 2006
Checked: DAB/BLP
Approved:

JOB NO.	JOB NO.	JOB NO.	JOB NO.
119961			

Kentucky Utilities Company
an E·ON company

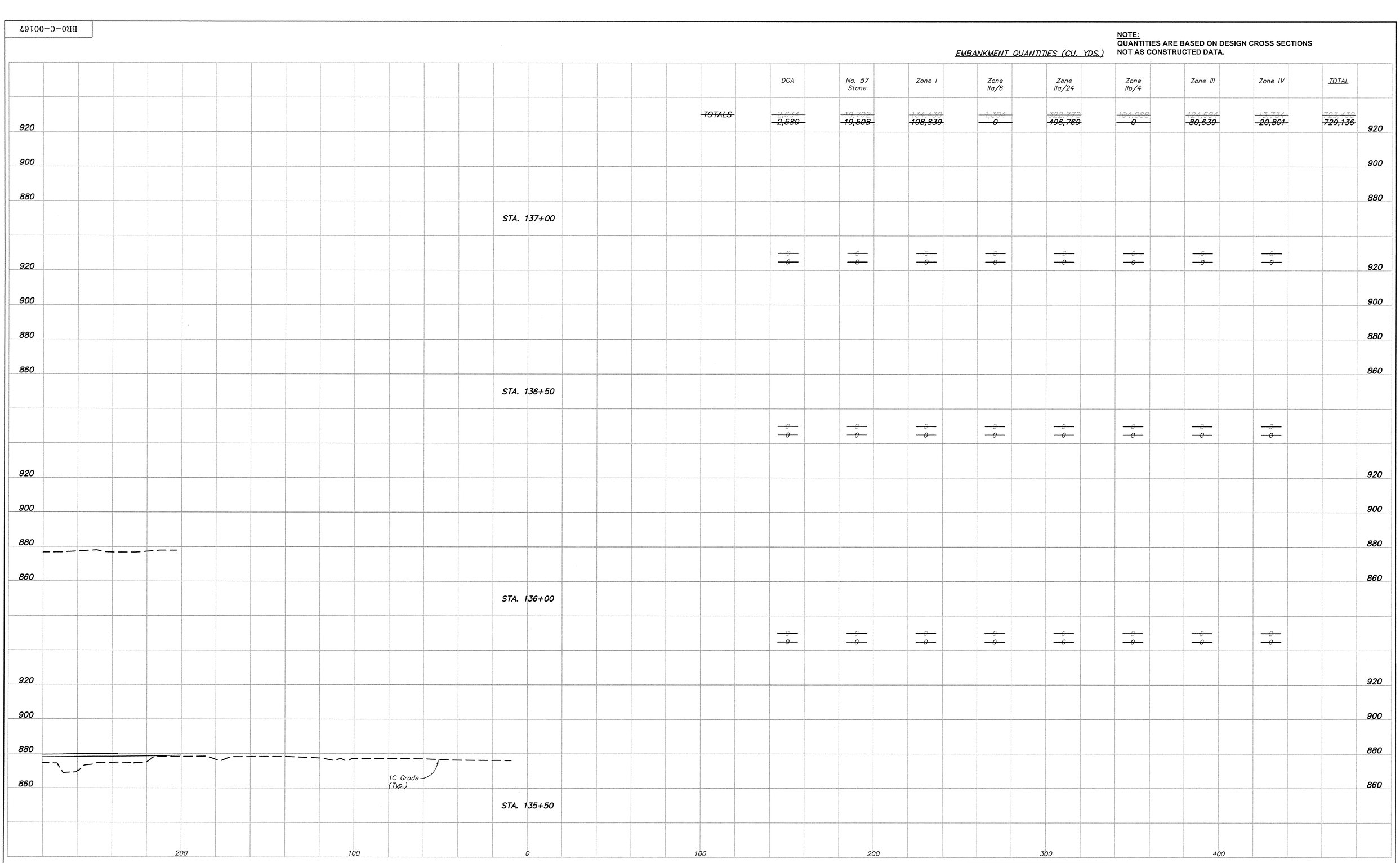
Drawing No: BR0-C-00166
Rev. H

DMS Version 2.0

NOTE:
QUANTITIES ARE BASED ON DESIGN CROSS SECTIONS NOT AS CONSTRUCTED DATA.

EMBANKMENT QUANTITIES (CU. YDS.)

	DGA	No. 57 Stone	Zone I	Zone IIa/6	Zone IIa/24	Zone IIb/4	Zone III	Zone IV	TOTAL
~~TOTALS~~	~~2,634~~ 2,580	~~19,702~~ 19,508	~~134,436~~ 108,839	~~1,304~~ 0	~~320,770~~ 196,769	~~104,089~~ 0	~~101,684~~ 80,639	~~43,734~~ 20,801	~~728,436~~ 729,136
STA. 137+00	~~0~~ 0	~~0~~ 0	~~0~~ 0	~~0~~ 0	~~0~~ 0	~~0~~ 0	~~0~~ 0	~~0~~ 0	
STA. 136+50	~~0~~ 0	~~0~~ 0	~~0~~ 0	~~0~~ 0	~~0~~ 0	~~0~~ 0	~~0~~ 0	~~0~~ 0	
STA. 136+00	~~0~~ 0	~~0~~ 0	~~0~~ 0	~~0~~ 0	~~0~~ 0	~~0~~ 0	~~0~~ 0	~~0~~ 0	
STA. 135+50									



NOTES:

1. For Typical Embankment Cross Sections, See Sheets BR0-C-00139 and BR0-C-00140.
2. FML and Filter Fabric materials not shown for clarity. See Typical Sections.

SURVEY NOTE:
As Constructed survey data provided by Bizzack Construction. Based on field observations this data is believed to be correct, but has not been surveyed by FMSM Engineers.

AS CONSTRUCTED - 06/17/08

DAN A. BACK LICENSED PROFESSIONAL ENGINEER 6-16-08

REVISIONS			
Rev.	Drawn Date:	Drawn By:	Revision Made
A	6-16-06		
C	10-02-06		
H	06-17-08		

Title
CROSS SECTIONS
STA. 135+50 TO STA. 137+00
AUXILIARY ASH POND - PHASE I

Location and Unit:
E.W. BROWN GENERATING STATION

Scale: 1" = 20'
Drawn: TJ/CDV
Date: APRIL, 2006
Checked: DAB/BLP
Approved:

Fuller Mossbarger Scott & May

FMSM ENGINEERS
LEXINGTON ST. LOUIS LOUISVILLE JEFFERSONVILLE CINCINNATI ATLANTA COLUMBUS NASHVILLE

Kentucky Utilities Company
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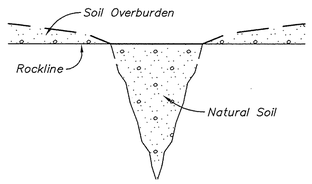
JOB NO.	JOB NO.	JOB NO.	JOB NO.	JOB NO.	Drawing No:	Rev.
119961					BR0-C-00167	H

LX2006228\REVH\XSH1726.DWG

DMS Version 2.0

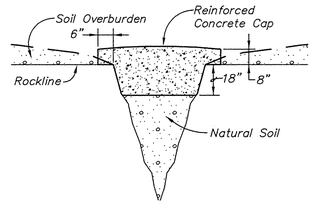


OPENING IN ROCK, FILLED WITH NATURAL SOIL
SHALLOW OR NO OVERBURDEN

NOTE:
Owner's Representative shall select treatment method for each feature encountered.

1 / 169 DETAIL – IN SITU FOUNDATION TREATMENT 1A
NOT TO SCALE FNDSLDWG

SEE SHEET 135

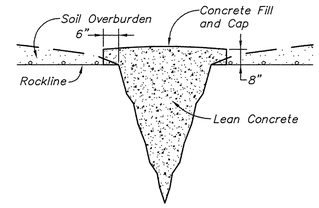


OPENING IN ROCK, FILLED WITH NATURAL SOIL
SHALLOW OR NO OVERBURDEN

NOTE:
Owner's Representative shall select treatment method for each feature encountered.

2 / 169 DETAIL – IN SITU FOUNDATION TREATMENT 1B
NOT TO SCALE FNDSLDWG

SEE SHEET 135

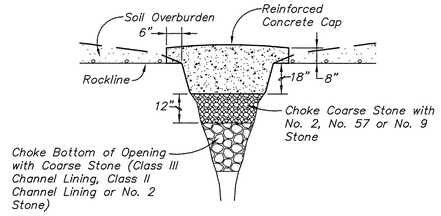


OPEN HOLE IN ROCK
SHALLOW OR NO OVERBURDEN

NOTE:
Owner's Representative shall select treatment method for each feature encountered.

3 / 169 DETAIL – IN SITU FOUNDATION TREATMENT 2A
NOT TO SCALE FNDSLDWG

SEE SHEET 135

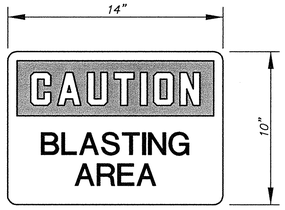


OPEN HOLE IN ROCK
SHALLOW OR NO OVERBURDEN

NOTE:
Owner's Representative shall select treatment method for each feature encountered.

4 / 169 DETAIL – IN SITU FOUNDATION TREATMENT 2B
NOT TO SCALE FNDSLDWG

SEE SHEET 135



NOTES:
1. *Blasting signs shall be placed every 200 feet along the blasting safety fence shown on Phase 1B Grading Plan.*
2. *Blasting sign is in addition to any OSHA required sign(s).*
3. *Blasting sign shall be constructed of plastic or better with reflective paint.*

5 / 169 DETAIL – BLASTING SIGN
NOT TO SCALE BLASTSIGN

SEE SHEET 135

Section or Detail No.
Sheet Where Shown
REFERENCE KEY

LX2006228\REV4\40590TL3.DWG

AS CONSTRUCTED - 06/17/08

DAN A. BACH
LICENSED
PROFESSIONAL ENGINEER
6-16-08

REVISIONS			
Rev.	Drawn Date:	Drawn By:	Revision Made
A	6-16-06		
B	7-05-06		
C	10-02-06		
H	06-17-08		

Title
DETAILS
FOUNDATION TREATMENT
AUXILIARY ASH POND – PHASE I

Location and Unit:
E.W. BROWN GENERATING STATION

Scale: AS SHOWN
Drawn: TJ/CDV
Date: MAY, 2006
Checked: DAB/BLP
Approved:

JOB NO.	JOB NO.	JOB NO.	JOB NO.
119961			

Drawing No: BR0-C-00169
Rev. H

Fuller Mossbarger Scott & May
FMSM ENGINEERS
LEXINGTON ST. LOUIS LOUISVILLE JEFFERSONVILLE CINCINNATI ATLANTA COLUMBUS NASHVILLE

Kentucky Utilities Company
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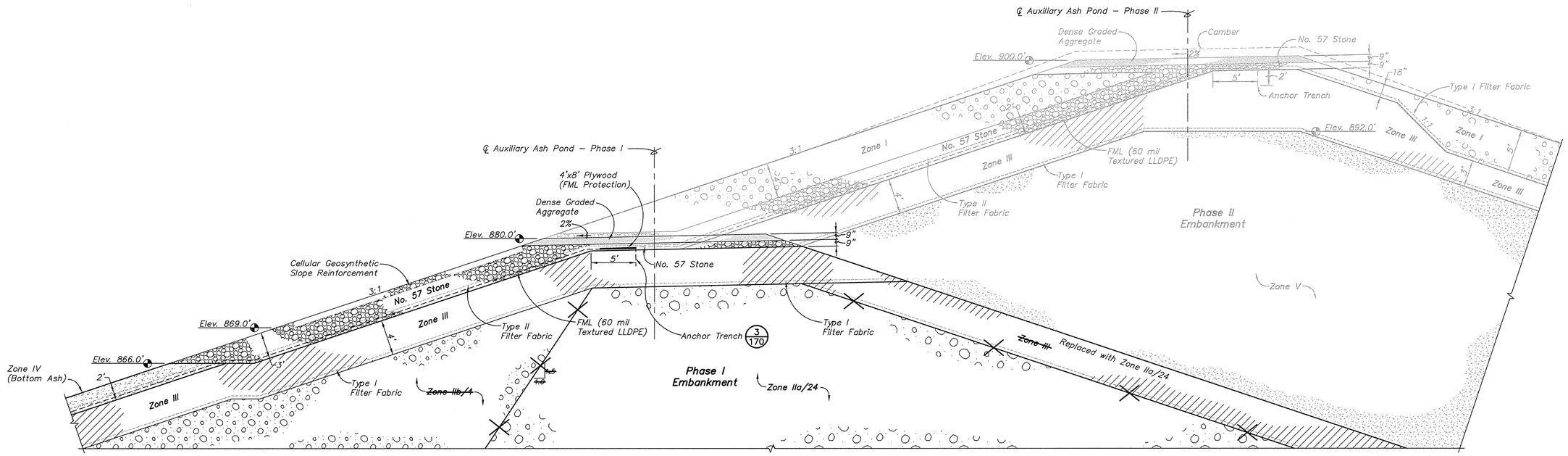
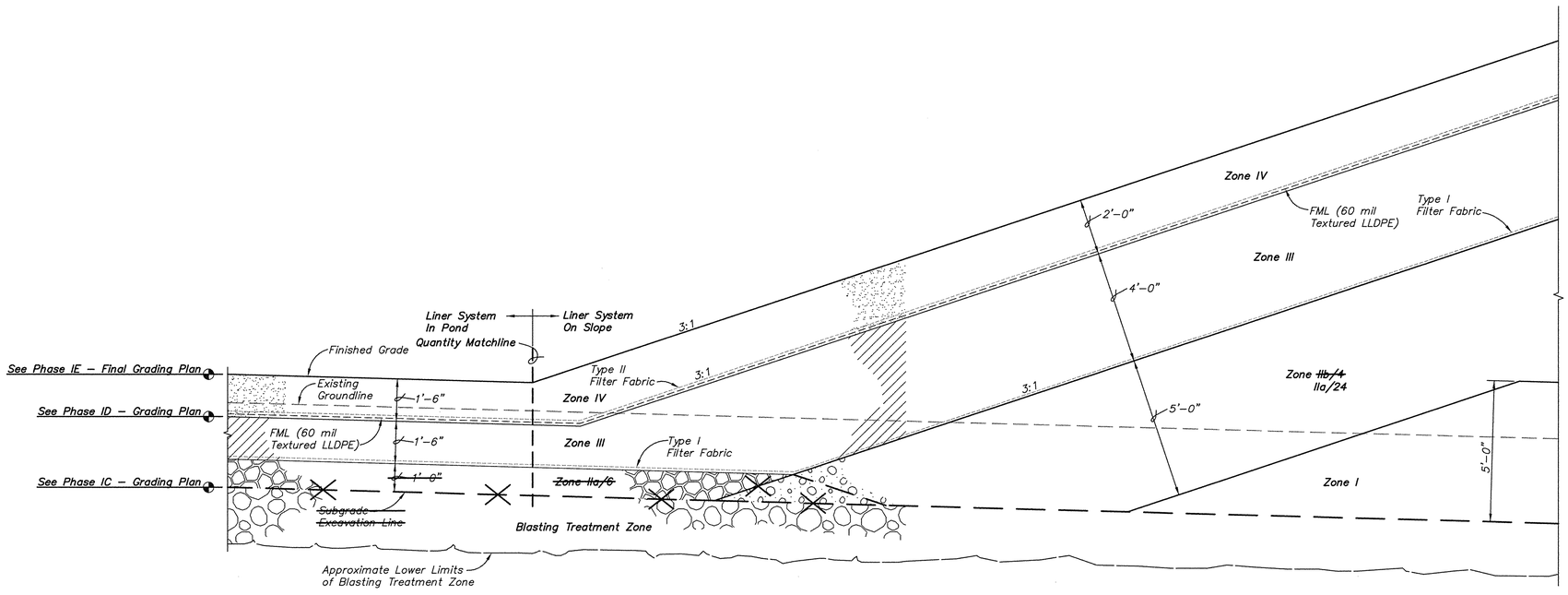
DMS Version 2.0



1/170 DETAIL – SLOPE LINER
SCALE: 1"=5'

SEE SHEET 139



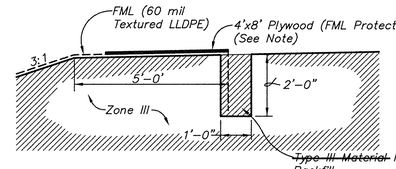
2/170 DETAIL – LINER SYSTEM TRANSITION
SCALE: 1/2"=1'-0"

SEE SHEET 139

NOTE:
Zone IIa/6 was not constructed. Shot rock subgrade was choked with No. 4 stone and covered with Type I filter fabric prior to Zone III placement. Zone III was placed on soil subgrade with no filter fabric.

Section or Detail No.
Sheet Where Shown
REFERENCE KEY

AS CONSTRUCTED - 06/17/08



NOTES:
1. Anchor Trench shall be excavated to a depth of 2' below Zone III and backfilled with Type III material,
2. Plywood for FML Liner protection shall be 1/2" B-B Marine Grade 4'x8' panels along the entire length of the Anchor Trench.
3. The Contractor shall anchor the FML to the Riser Structure and the Main Ash Pond Secondary Spillway Headwall. See 7/180

3/170 DETAIL – ANCHOR TRENCH
SCALE: 1/2"= 1'-0"

SEE SHEET 137

LX2006228\REVA\406901L2.DWG

REVISIONS			
Rev.	Drawn Date:	Drawn By:	Revision Made
A	6-16-06		
B	7-05-06		
C	10-02-06		
H	06-17-08		

Title
DETAILS
EMBANKMENT LINER SYSTEM
AUXILIARY ASH POND – PHASE I

Location and Unit:
E.W. BROWN GENERATING STATION

Scale: AS SHOWN
Drawn: TJ/CDV
Date: MAY. 2006
Checked: DAB/BLP
Approved:

JOB NO.	JOB NO.	JOB NO.	JOB NO.
119961			

Drawing No: BR0-C-00170
Rev.: H

Fuller Mossbarger Scott & May
EMSM ENGINEERS
LEXINGTON ST. LOUIS LOUISVILLE JEFFERSONVILLE CINCINNATI ATLANTA COLUMBUS NASHVILLE

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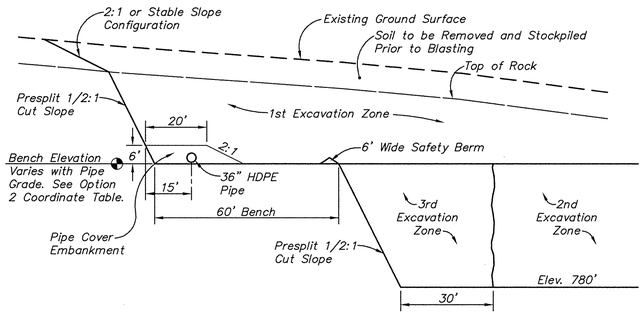
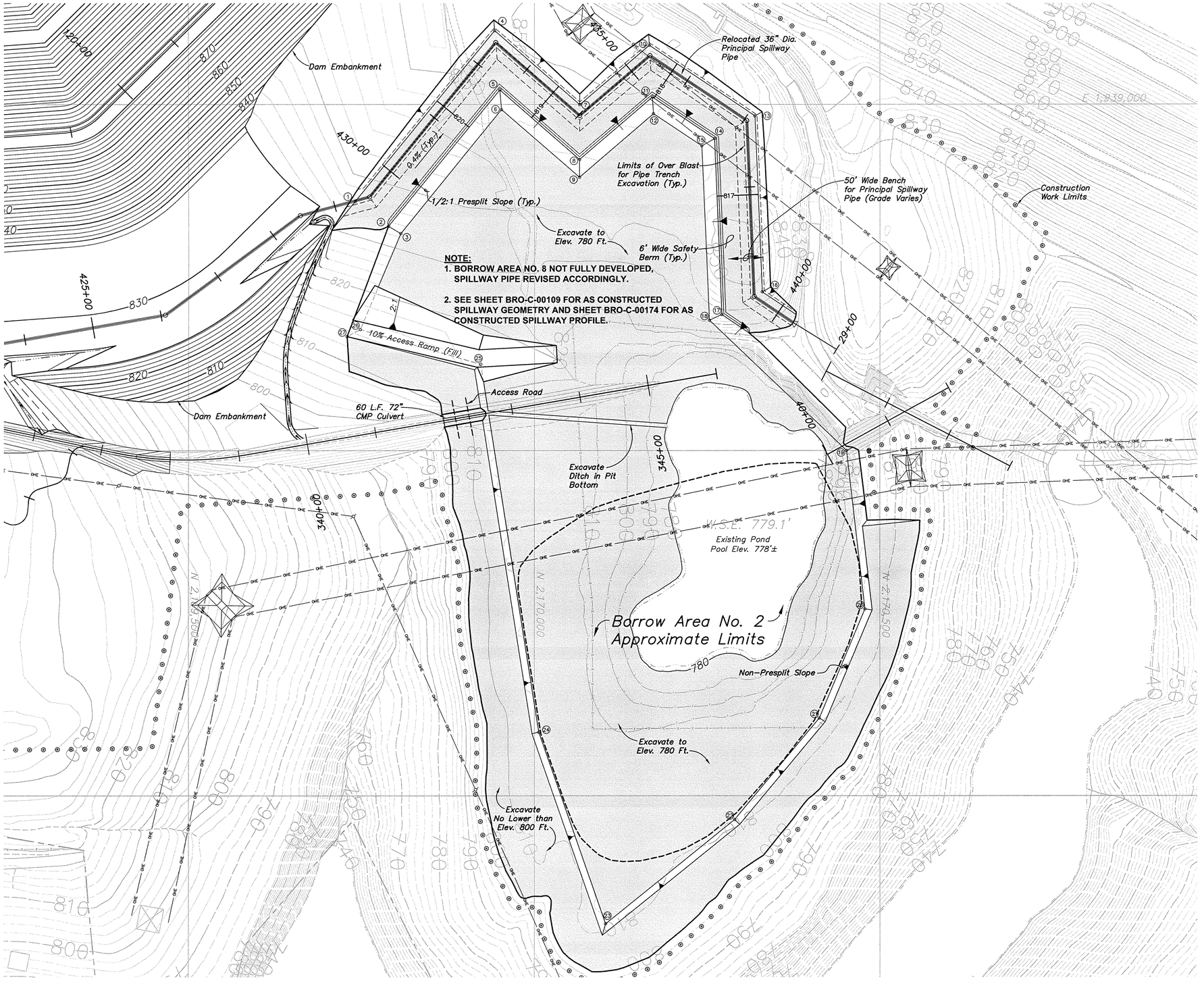
DMS Version 2.0

OPTION 2 COORDINATE TABLE			
Point No.	Coordinates		Elev. (ft.)
	Northing	Easting	
1	2,169,740.69	1,939,140.20	820.68
2	2,169,789.09	1,939,175.80	820.68
3	2,169,806.70	1,939,186.38	780.00
4	2,169,942.63	1,938,893.03	819.48
5	2,169,949.89	1,938,978.98	819.48
6	2,169,952.34	1,939,007.25	780.00
7	2,170,065.56	1,939,000.25	818.76
8	2,170,065.22	1,939,079.56	818.76
9	2,170,065.17	1,939,105.18	780.00
10	2,170,165.95	1,938,914.20	818.14
11	2,170,170.42	1,938,989.40	818.14
12	2,170,171.91	1,939,013.28	780.00
13	2,170,318.87	1,939,016.56	817.43
14	2,170,260.19	1,939,049.48	817.43
15	2,170,241.90	1,939,059.81	780.00
16	2,170,329.47	1,939,270.66	816.41
17	2,170,270.79	1,939,303.50	816.41
18	2,170,252.93	1,939,311.65	780.00
19	2,170,451.79	1,939,499.92	780.00
20	2,170,478.56	1,939,729.20	780.00
21	2,170,411.99	1,939,887.35	780.00
22	2,170,289.70	1,940,034.42	780.00
23	2,170,103.11	1,940,185.42	780.00
24	2,170,006.45	1,939,907.45	780.00
25	2,169,922.34	1,939,375.26	780.00
26	2,169,748.07	1,939,325.02	780.00
27	2,169,728.95	1,939,335.12	810.00



1/171 **DETAIL – PIPE BENCH CONSTRUCTION**
NOT TO SCALE PB-DT12



LEGEND

- Existing Overhead Electric
- Existing Power Pole
- Existing Fence
- Treeline
- Tree
- 928.8 Surface Spot Elevation
- Approximate Property Line
- CM2 ⊕ Survey Control Point
- 2004 Mapping / 2005 Mapping Mapping Matchline
- Construction Work Limits
- Relocated Overhead Electric

MAPPING NOTE:
Topographic information is based on aerial mapping performed by L. Robert Kimball & Associates. Refer to General Notes and Notes on Sheets 104 through 111 for complete explanation.

AS CONSTRUCTED - 06/17/08

30 0 60 120 FEET
GRAPHIC SCALE: 1" = 60'
CONTOUR INTERVAL = 2'

INDEX TO MAPS

MAP 1	MAP 2	MAP 3
MAP 4	MAP 5	
MAP 6		

Fuller Mossbarger Scott & May ENGINEERS
LEXINGTON • LOUISVILLE • CINCINNATI • COLUMBUS • ST. LOUIS • JEFFERSONVILLE

REVISIONS			
Rev.	Drawn Date:	Drawn By:	Revision Mode
F	06-14-07		
H	06-17-08		

Title
BORROW AREA 8
LAYOUT PLAN
AUXILIARY ASH POND – PHASE I

Location and Unit:
E.W. BROWN GENERATING STATION

Scale: 1"=60'
Drawn: BFS
Date: MAY, 2007
Checked: DAB/BLP
Approved:

JOB NO.	JOB NO.	JOB NO.	JOB NO.
119961			

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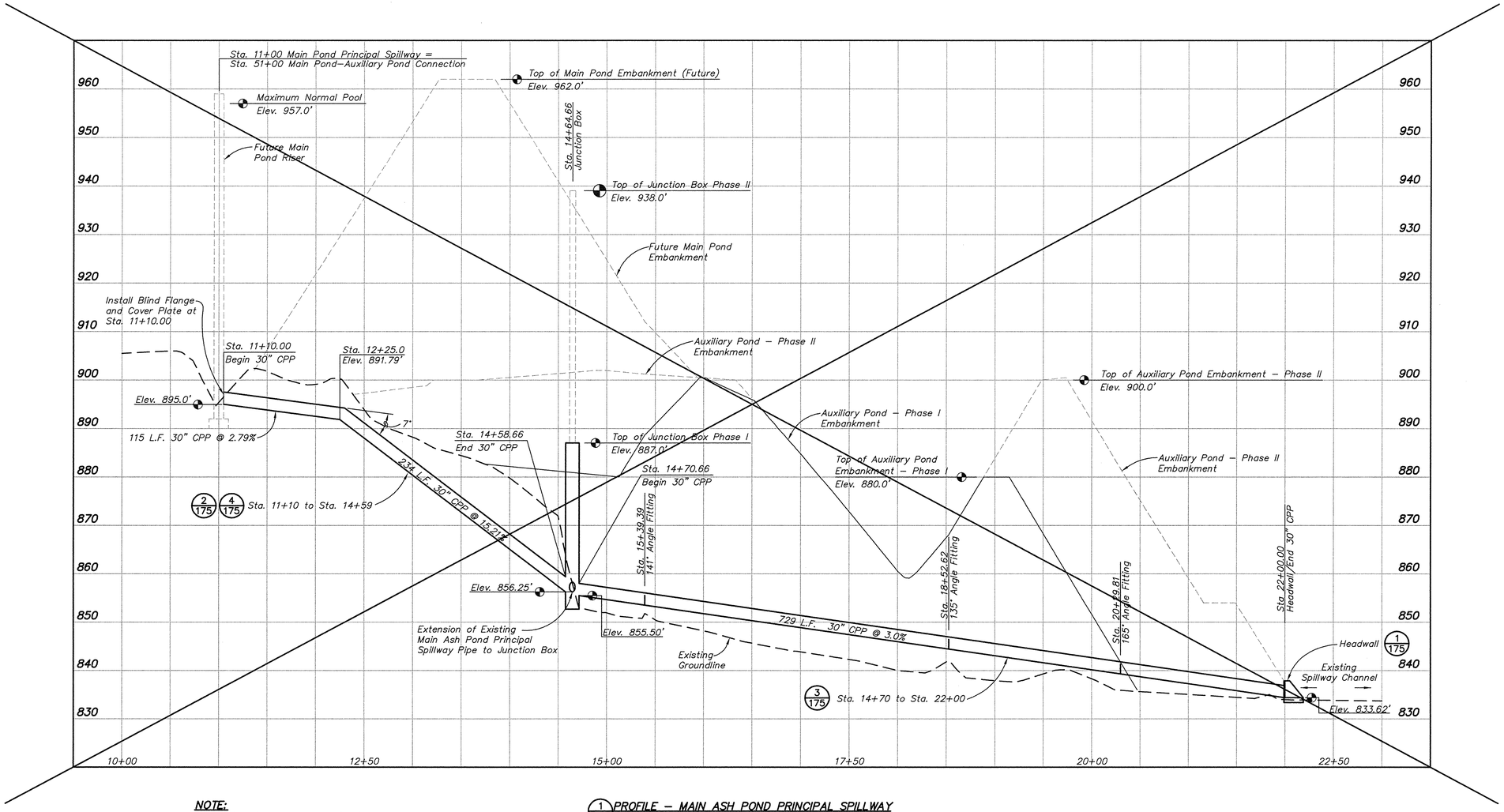
Drawing No: BRO-C-00171 Rev. H

LX2006228\REV\BORROW8.DWG

DMS Version 2.0



NOTE:
All pipe lengths shown are horizontal distances.
No corrections have been applied for slope length.

1/174 **PROFILE – MAIN ASH POND PRINCIPAL SPILLWAY**
SCALE: 1" = 50' (Horizontal)
1" = 10' (Vertical)

SEE SHEET 115

Section or Detail No.
Sheet Where Shown
REFERENCE KEY

NOTE:
REFER TO BRO-C-01131 FOR AS CONSTRUCTED DETAILS

AS CONSTRUCTED - 06/17/08

REVISIONS

Rev.	Drawn Date:	Drawn By:	Revision Made
A	6-16-06		
C	10-02-06		
H	06-17-08		

Title
PROFILE – PRINCIPAL SPILLWAY
MAIN ASH POND
AUXILIARY ASH POND – PHASE I

Location and Unit:
E.W. BROWN GENERATING STATION

Scale: AS SHOWN
Drawn: SLB/TJ
Date: MAY, 2006
Checked: DAB/BLP
Approved:

JOB NO.	JOB NO.	JOB NO.	JOB NO.
119961			

Drawing No: BR0-C-00174
Rev. H

Fuller Mossbarger Scott & May
EMSM ENGINEERS
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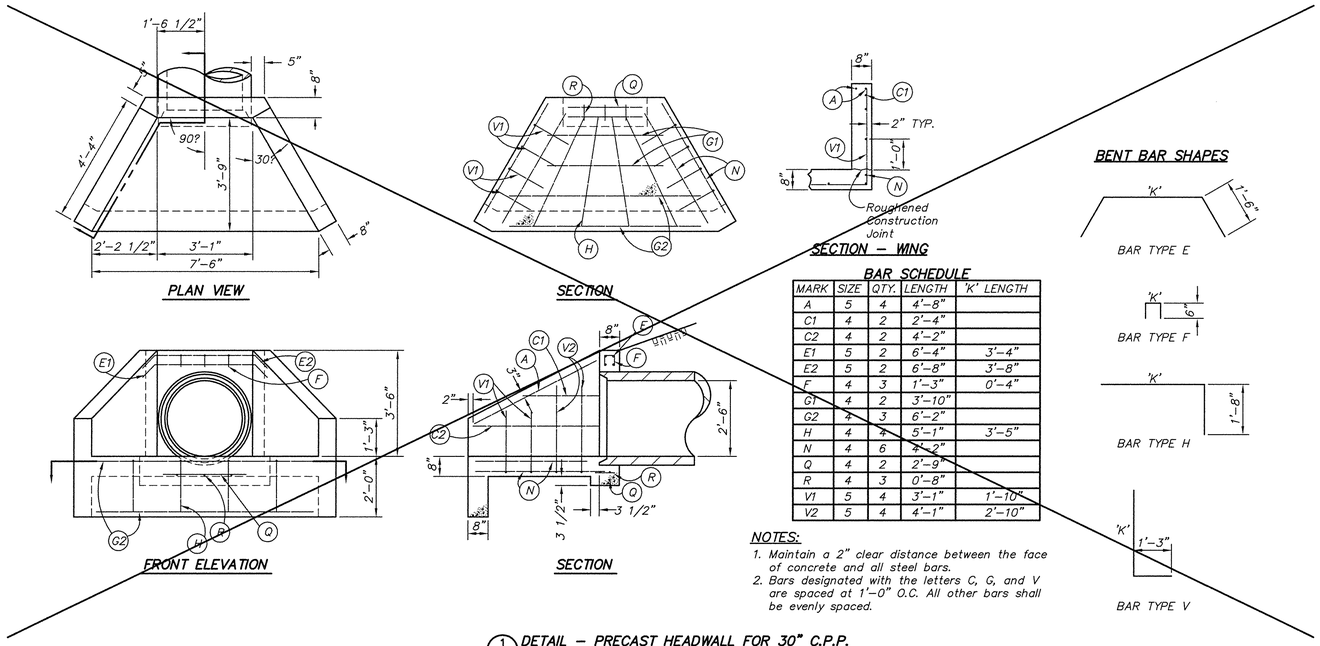
LX2006228\REVIT\MAIN-RISER-PROFILE.DWG

DMS Version 2.0



BAR SCHEDULE

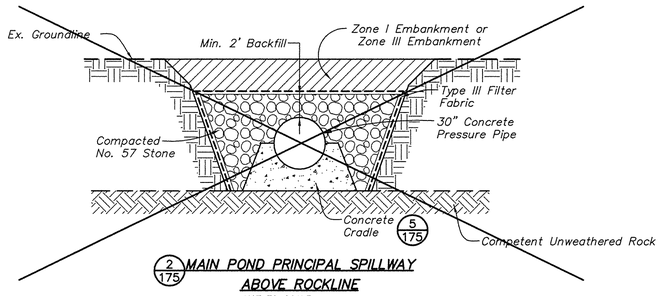
MARK	SIZE	QTY.	LENGTH	'K' LENGTH
A	5	4	4'-8"	
C1	4	2	2'-4"	
C2	4	2	4'-2"	
E1	5	2	6'-4"	3'-4"
E2	5	2	6'-8"	3'-8"
F	4	3	1'-3"	0'-4"
G1	4	2	3'-10"	
G2	4	3	6'-2"	
H	4	4	5'-1"	3'-5"
N	4	6	2'-2"	
Q	4	2	2'-9"	
R	4	3	0'-8"	
V1	5	4	3'-1"	1'-10"
V2	5	4	4'-1"	2'-10"

NOTES:

1. Maintain a 2" clear distance between the face of concrete and all steel bars.
2. Bars designated with the letters C, G, and V are spaced at 1'-0" O.C. All other bars shall be evenly spaced.

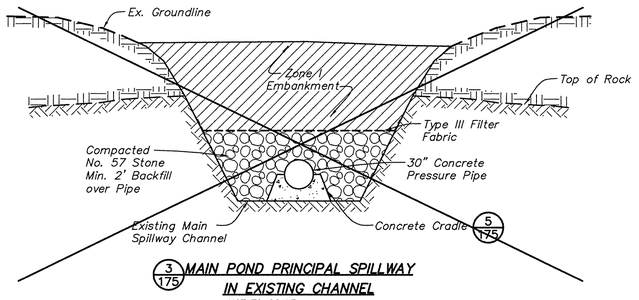
1/175 **DETAIL — PRECAST HEADWALL FOR 30" C.P.P.**
MAIN POND PRINCIPAL AND SECONDARY SPILLWAYS 30HDWALL.DWG
SCALE: 1/2"=1'-0"

SEE SHEET 115



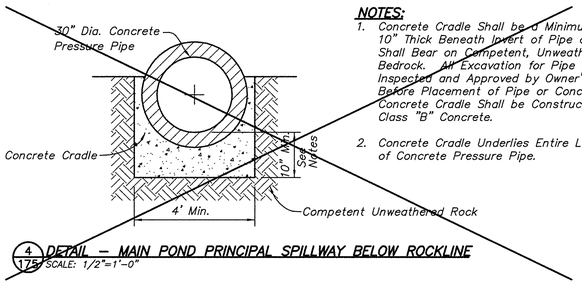
2/175 **MAIN POND PRINCIPAL SPILLWAY ABOVE ROCKLINE**
NOT TO SCALE

SEE SHEET 174



3/175 **MAIN POND PRINCIPAL SPILLWAY IN EXISTING CHANNEL**
NOT TO SCALE

SEE SHEET 174

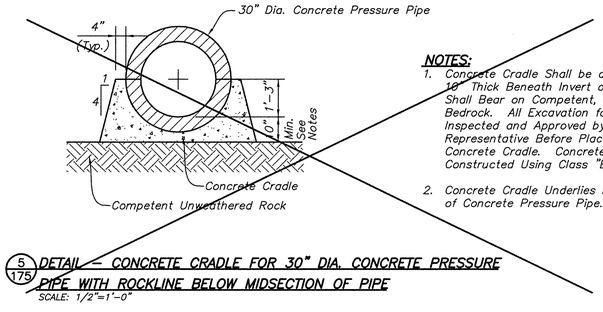


NOTES:

1. Concrete Cradle Shall be a Minimum of 10" Thick Beneath Invert of Pipe and Shall Bear on Competent, Unweathered Bedrock. All Excavation for Pipe Shall be Inspected and Approved by Owner's Representative Before Placement of Pipe or Concrete Caradle. Concrete Cradle Shall be Constructed Using Class "B" Concrete.
2. Concrete Cradle Underlies Entire Length of Concrete Pressure Pipe.

4/175 **DETAIL — MAIN POND PRINCIPAL SPILLWAY BELOW ROCKLINE**
SCALE: 1/2"=1'-0"

SEE SHEET 174

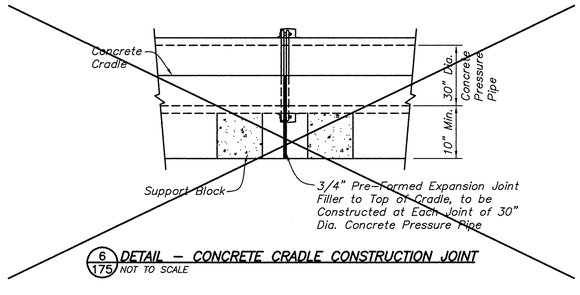


NOTES:

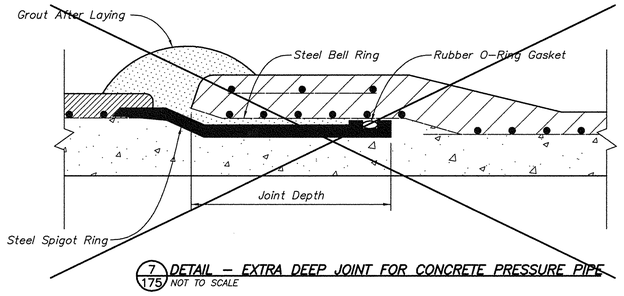
1. Concrete Cradle Shall be a Minimum of 10" Thick Beneath Invert of Pipe and Shall Bear on Competent, Unweathered Bedrock. All Excavation for Pipe Shall be Inspected and Approved by Owner's Representative Before Placement of Pipe or Concrete Cradle. Concrete Cradle Shall be Constructed Using Class "B" Concrete.
2. Concrete Cradle Underlies Entire Length of Concrete Pressure Pipe.

5/175 **DETAIL — CONCRETE CRADLE FOR 30" DIA. CONCRETE PRESSURE PIPE WITH ROCKLINE BELOW MIDSECTION OF PIPE**
SCALE: 1/2"=1'-0"

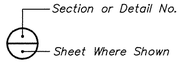
SEE THIS SHEET



6/175 **DETAIL — CONCRETE CRADLE CONSTRUCTION JOINT**
NOT TO SCALE



7/175 **DETAIL — EXTRA DEEP JOINT FOR CONCRETE PRESSURE PIPE**
NOT TO SCALE



REFERENCE KEY

NOTE:
REFER TO BRO-C-01132 FOR AS CONSTRUCTED DETAILS

AS CONSTRUCTED - 06/17/08

REVISIONS			
Rev.	Drawn Date:	Drawn By:	Revision Mode
A	6-16-06		
B	7-05-06		
C	10-02-06		
H	06-17-08		

DAN A. BACK — 06-17-08 — PROFESSIONAL ENGINEER

Title
DETAILS — PRINCIPAL SPILLWAY
MAIN ASH POND
AUXILIARY ASH POND — PHASE I

Location and Unit:
E.W. BROWN GENERATING STATION

Scale: AS SHOWN
Drawn: SLB
Date: MAY, 2006
Checked: DAB/BLP
Approved:

JOB NO.	JOB NO.	JOB NO.	JOB NO.
119961			

Drawing No: BRO-C-00175 | Rev. H

Fuller Mossbarger Scott & May
EMSM ENGINEERS
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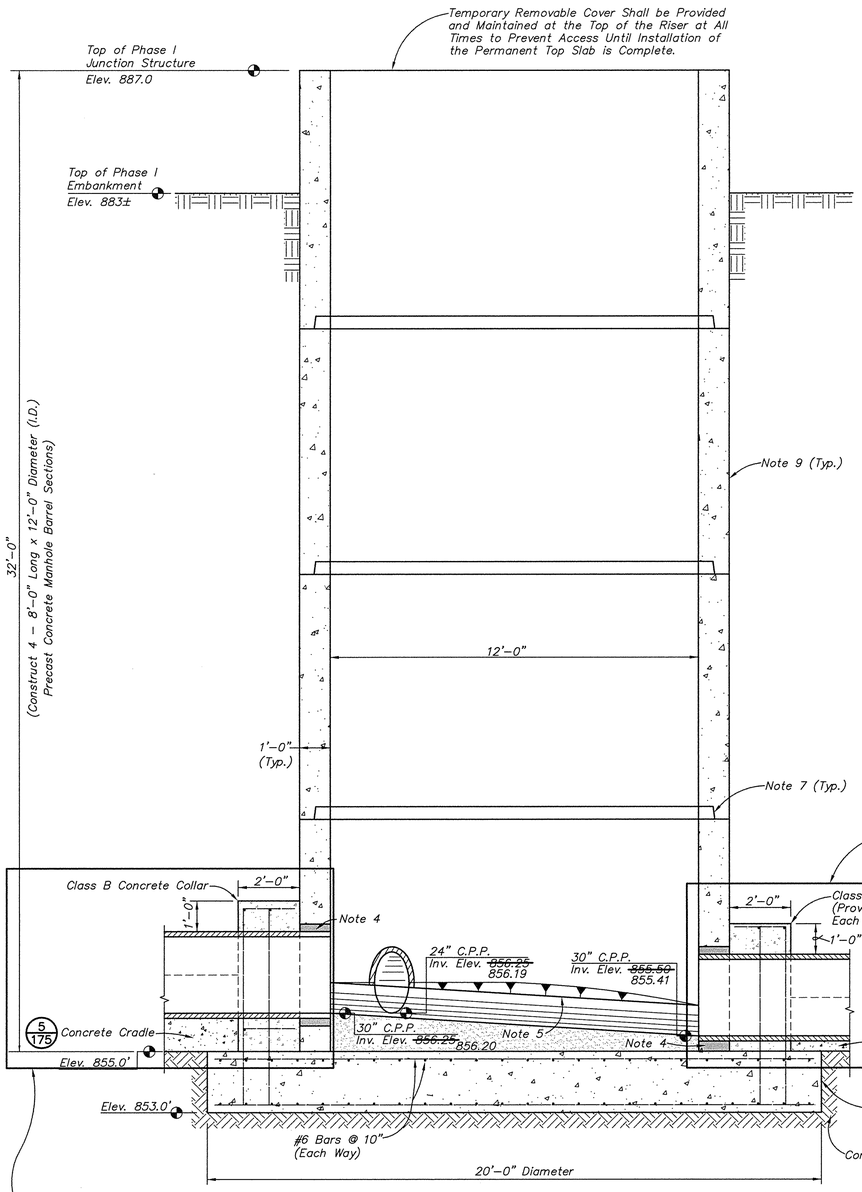
LY2006228\REV#\MainPondSpillway\Details-TypSections.dwg

DMS Version 2.0

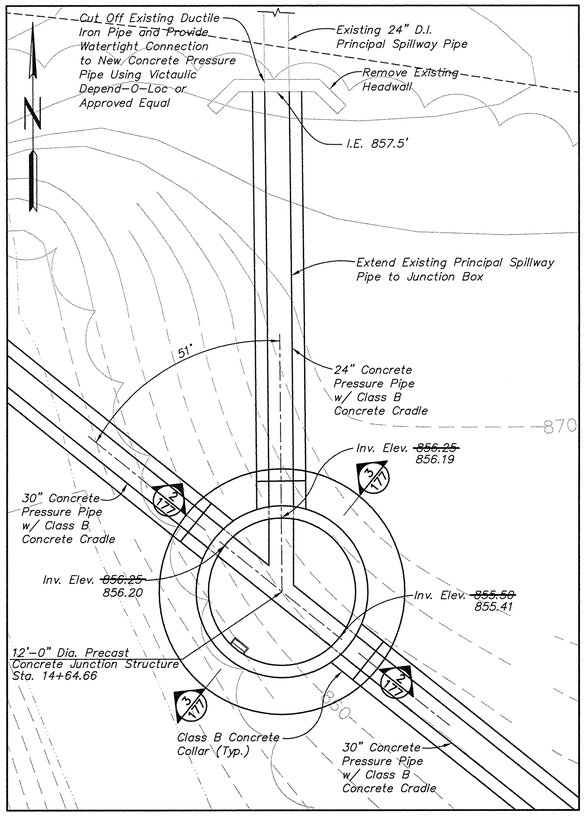
BRO-C-00177



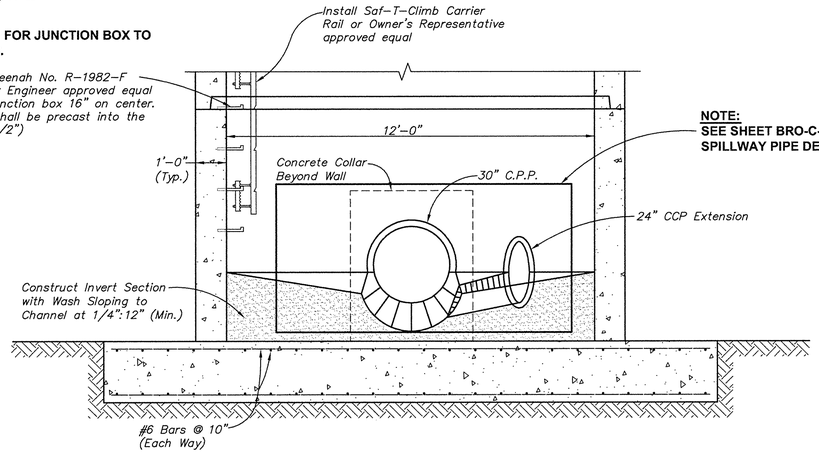
NOTE:
SEE SHEET BRO-C-01132 FOR JUNCTION BOX TO SPILLWAY PIPE DETAILS.

2/177 SECTION – PHASE I JUNCTION BOX
SCALE: 1/2"=1'-0"

NOTE:
SEE SHEET BRO-C-01132 FOR JUNCTION BOX TO SPILLWAY PIPE DETAILS.



1/177 JUNCTION BOX – PLAN VIEW
SCALE: 1"=5'



NOTE:
SEE SHEET BRO-C-01132 FOR JUNCTION BOX TO SPILLWAY PIPE DETAILS.

3/177 SECTION – PHASE I JUNCTION BOX
SCALE: 1/2"=1'-0"

NOTES:

1. Precast Riser Sections Shall Conform to the Requirements of ASTM C 478, Standard Specification for Precast Reinforced Concrete Manhole Sections, Latest Edition. Minimum f'c Shall be 4,500 psi.
2. The Base Slab Shall Consist of Class A Cast-In Place Concrete. It Shall be Constructed Directly on Clean, Sound, Unweathered, Competent Bedrock.
3. The Lower Precast Riser Section Shall be Placed in Final Position and Supported on Concrete Blocks Prior to Placing the Concrete in the Base Slab.
4. Openings for the Concrete Pressure Pipes Shall be the Outside Diameter of the Pipe Plus a Maximum of 6 Inches. All Open Space Between the Concrete Pressure Pipes and Lower Precast Riser Section Shall be Thoroughly and Completely Filled with Non-Shrink Grout, Applied so there will be no Leakage Around the Pipe. The Grout Shall be Finished Smooth and Flush with the Interior and Exterior Riser Section Wall Surfaces. No Sledge Hammer Modifications are Allowed.
5. The Invert (Both Channel and Wash Sections) Shall Consist of Class A Concrete, and Shall be Constructed as to Create the Least Resistance to Flow. A Smooth, Uniform Dense Finish Shall be Required.
6. Concrete Collars Shall Consist of Class B Concrete. The Collars Shall be a Minimum of 12 Inches Over the Outside Top and Sides of the Pipes and Shall Extend Down to the Transition to the Class B Concrete Cradle that Supports Concrete Pressure Pipes Beyond the Junction Structure.
7. Joints Between Precast Riser Sections Shall be Sealed Using a Three-Way Sealing System Consisting of a Rubber O-Ring or Single Offset Rubber Gasket, Butyl Mastic Joint Sealant, and 6-Inch Wide Polyolefin Strip Covered with Butyl Mastic Around the Exterior.
8. Embankment Material Adjacent to the Junction Box Shall Consist of Soil Material. It Shall be Brought up Evenly and Compacted Against the Precast Riser Sections in a Manner so as to Prevent Unbalanced Lateral Loading that could Create Tilting and Opening of Joints Between the Riser Sections, or Cause Damage to the Precast Sections. No Rock Pieces Greater than 6 Inches Largest Diameter Shall be Permitted Within 4 Feet of the Structure.
9. A Slip Resistant Coating or Sheeting Shall be Applied or Attached to the Outside Surface of the Precast Riser Sections Prior to Backfilling Operations to Minimize Downdrag Loads on the Structure. This Friction Reduction Agent Could Include Painted Bitumen Coatings, Lubricated Polyethylene Sheeting, or Other Commercially Available Products. The Contractor Shall Submit a Plan for Coating or Sheeting the Precast Riser Sections for Approval by the Owner's Representative Prior to Use.

Section or Detail No.
Sheet Where Shown
REFERENCE KEY

SURVEY NOTE:
As Constructed survey data provided by Bizzack Construction. Based on field observations this data is believed to be correct, but has not been surveyed by FMSM Engineers.

AS CONSTRUCTED - 06/17/08

LX2006228\REV#1\JUNCTION BOX PLAN (PHASE1)

DAN A. BACK 13580 LICENSED PROFESSIONAL ENGINEER 6-30-09

REVISIONS			
Rev.	Drawn Date:	Drawn By:	Revision Made
A	6-16-06		
B	7-05-06		
C	10-02-06		
H	06-17-08		

Title
PLAN VIEW AND DETAILS
JUNCTION BOX
AUXILIARY ASH POND – PHASE I

Location and Unit:
E.W. BROWN GENERATING STATION

Scale: AS SHOWN
Drawn: SLB/DMG
Date: MAY, 2006
Checked: DAB/BLP
Approved:

Fuller Mossbarger Scott & May
FMSM ENGINEERS
LEXINGTON ST. LOUIS LOUISVILLE JEFFERSONVILLE CINCINNATI ATLANTA COLUMBUS NASHVILLE

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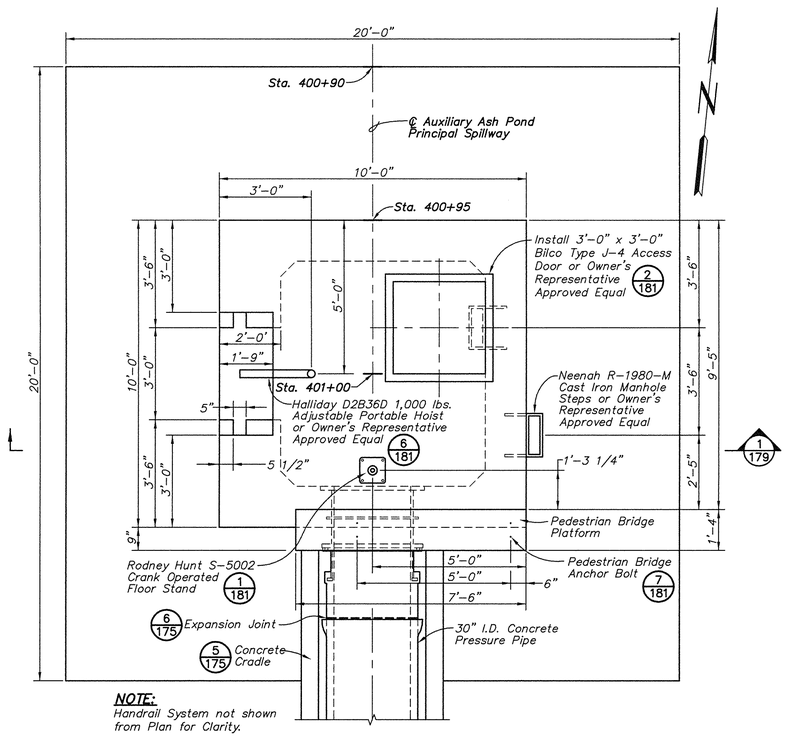
JOB NO.	JOB NO.	JOB NO.	JOB NO.	Drawing No:	Rev.
119961				BRO-C-00177	H

DMS Version 2.0

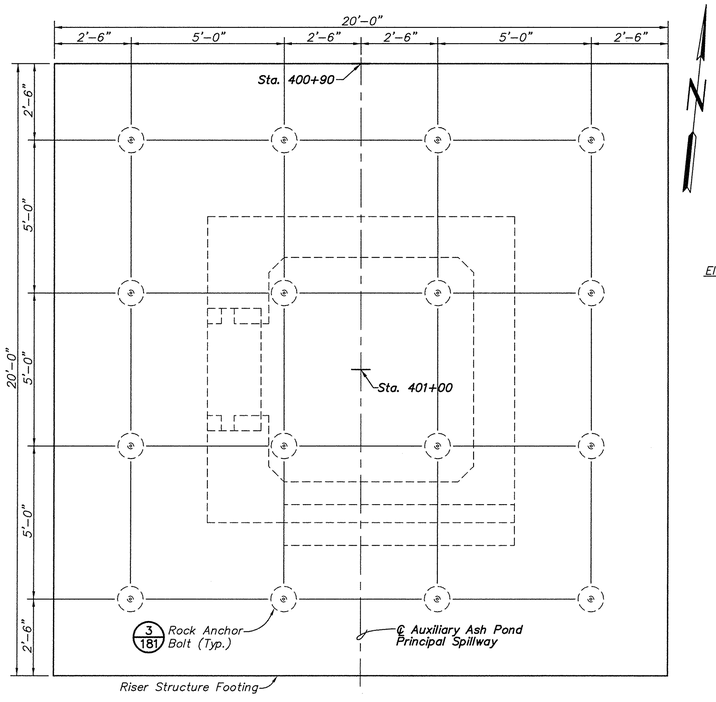
BRO-C-00178



NOTE:
Handrail System not shown from Plan for Clarity.

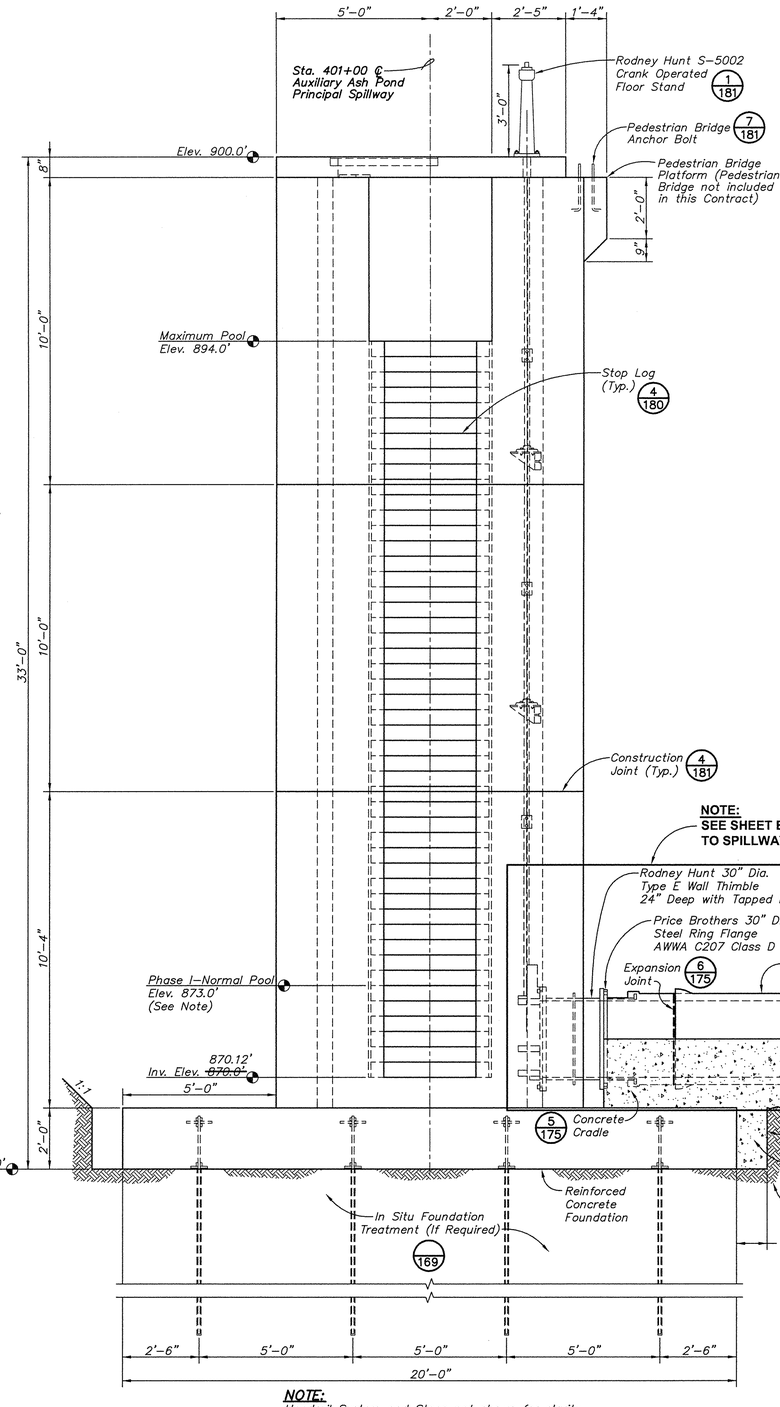
1/178 **PLAN – AUXILIARY ASH POND RISER STRUCTURE**
SCALE: 1/2"=1'-0" RSPPLAN.DWG

SEE SHEET 115



2/178 **DETAIL – ROCK ANCHOR BOLT LAYOUT**
SCALE: 1/2"=1'-0" RSPDETAILS.DWG

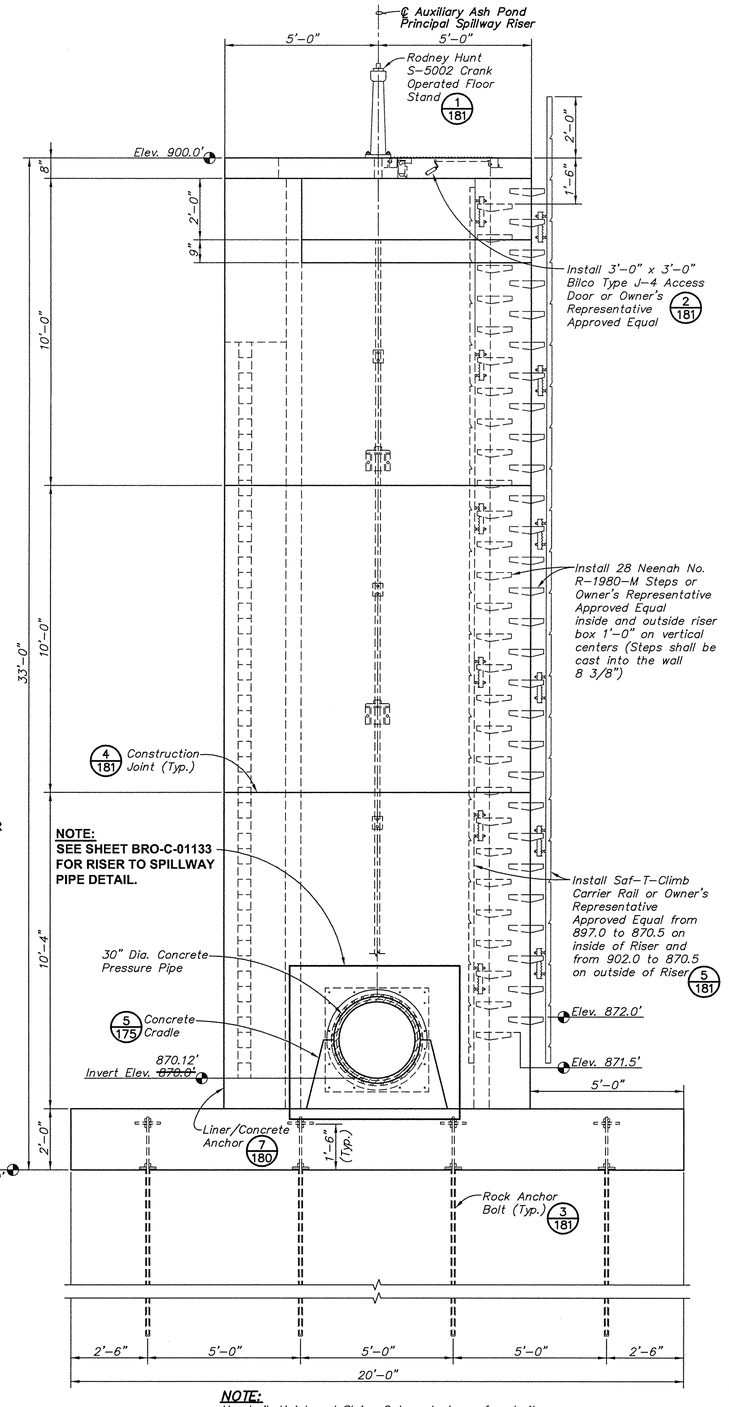
SEE THIS SHEET



NOTE:
Handrail System and Steps not shown for clarity.

3/178 **ELEVATION – AUXILIARY POND RISER STRUCTURE WEST SIDE**
SCALE: 1/2"=1'-0" RSPELWEST.DWG

SEE THIS SHEET



NOTE:
Handrail, Hoist and Sluice Gate not shown for clarity.

4/178 **ELEVATION – AUXILIARY POND RISER STRUCTURE SOUTH SIDE**
SCALE: 1/2"=1'-0" RSPELSOUTH.DWG

SEE THIS SHEET

NOTES:

1. *Only six stoplogs are required for this contract. (Elev. 870.0' to 873.0').*
2. *The Contractor shall Construct a three-foot wide drainage channel to provide positive drainage to the lowest riser inlet elevation (Elev. 870.0')*
3. *The Contractor shall anchor the FML to the riser structure as directed by the Owner's Representative.*

SURVEY NOTE:
As Constructed survey data provided by Bizzack Construction. Based on field observations this data is believed to be correct, but has not been surveyed by FMSM Engineers.

AS CONSTRUCTED - 06/17/08

Section or Detail No. / Sheet Where Shown
REFERENCE KEY

REVISIONS			
Rev.	Drawn Date:	Drawn By:	Revision Made
A	6-16-06		
B	7-05-06		
C	10-02-06		
H	06-17-08		

Title
DETAILS
RISER STRUCTURE
AUXILIARY ASH POND – PHASE I

Location and Unit:
E.W. BROWN GENERATING STATION

Scale: AS SHOWN
Drawn: TJ
Date: MAY, 2006
Checked: DAB/BLP
Approved:

JOB NO.	JOB NO.	JOB NO.	JOB NO.
119961			

Drawing No: BRO-C-00178
Rev.: H

Fuller Massbarger Scott & May
FMSM ENGINEERS
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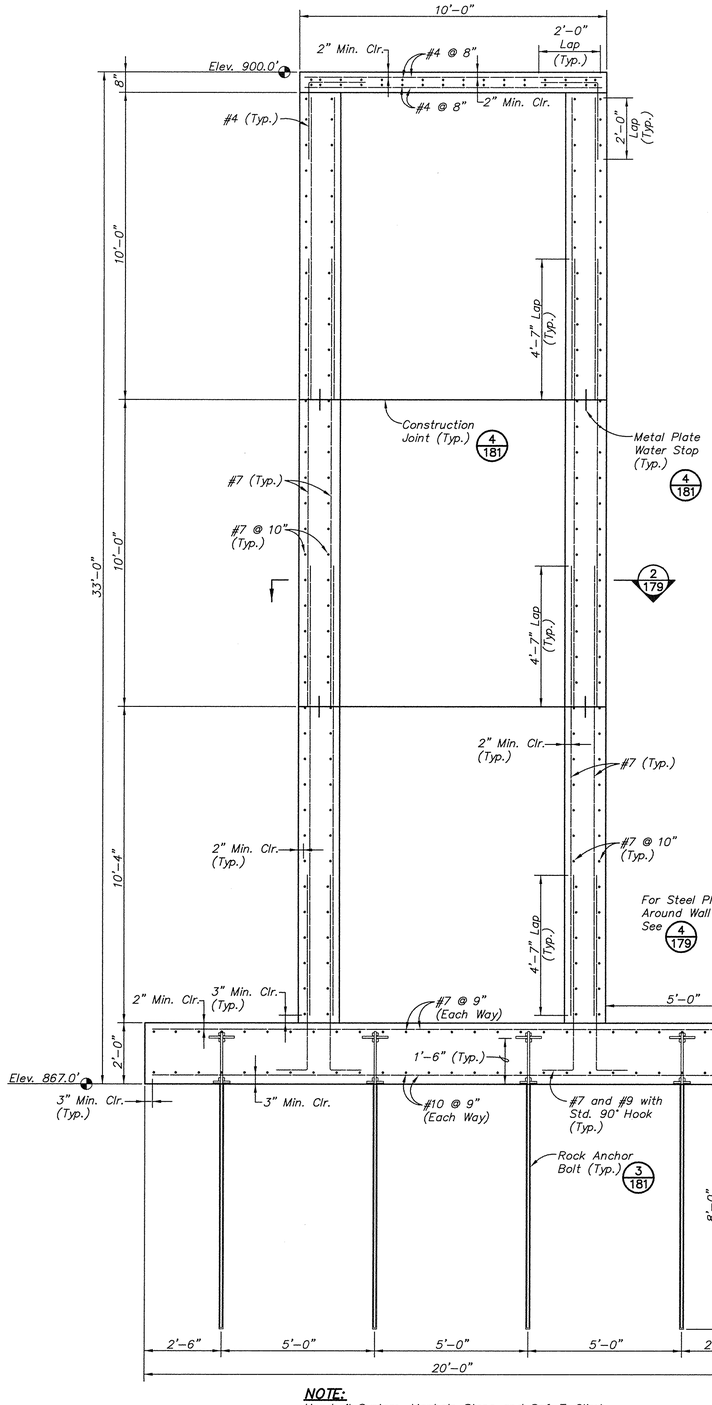
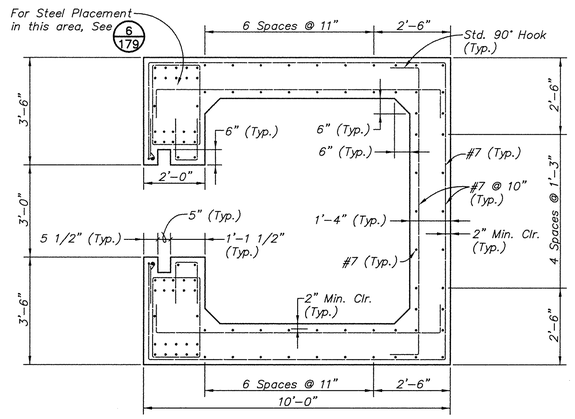


NOTE:
Handrail System, Manhole Steps and Saf-T-Climb Carrier Rail not shown for clarity.

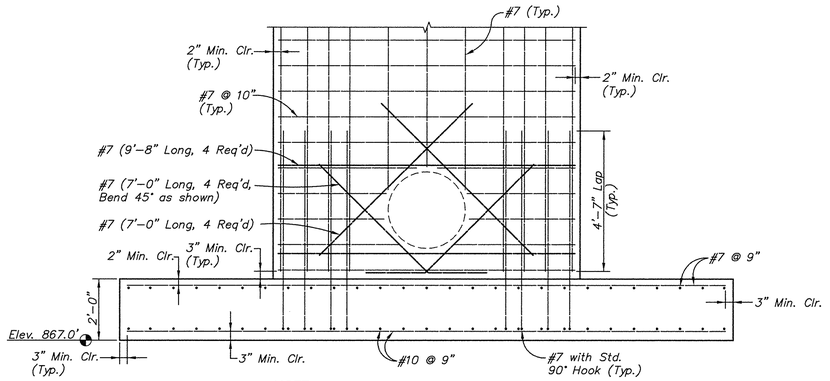
1/179 DETAIL – VERTICAL SECTION THRU RISER STRUCTURE
SCALE: 1/2"=1'-0" RSRSTRSEC.DWG

SEE SHEET 178



2/179 DETAIL – HORIZONTAL SECTION THRU RISER STRUCTURE
SCALE: 1/2"=1'-0" RSRSTRSEC.DWG

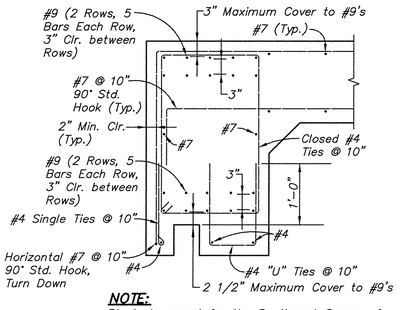
SEE THIS SHEET



NOTE:
Steel around Pipe shall be provided on both faces.

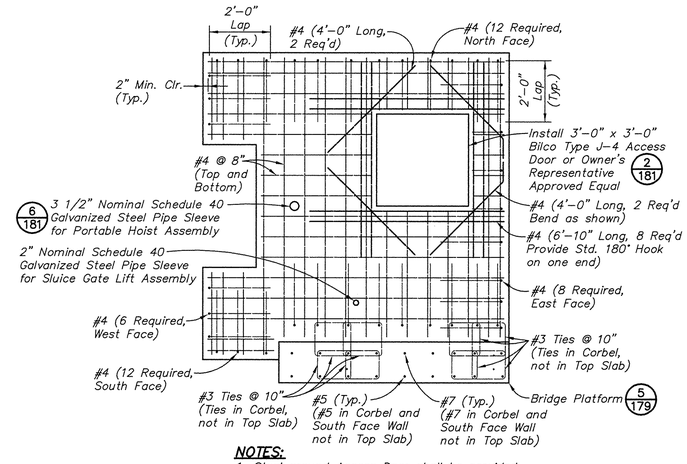
4/179 DETAIL – STEEL PLACEMENT AROUND WALL THIMBLE ON SOUTH SIDE OF RISER STRUCTURE
SCALE: 1/2"=1'-0" RSRSTWALL.DWG

SEE THIS SHEET



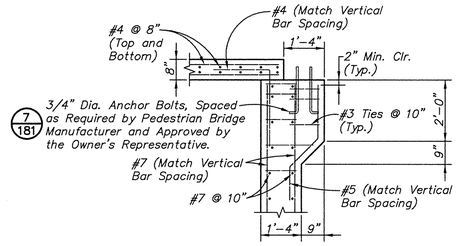
NOTE:
Steel placement for the Southwest Corner of riser wall is the same configuration.

6/179 DETAIL – HORIZONTAL SECTION THRU RISER STRUCTURE AT NORTHWEST CORNER
SCALE: 1"=1'-0" RSRSTRSSQ.DWG



NOTES:
1. *Steel around Access Door shall be provided on both faces.*
2. *For location of inserts for Handrail System, See 1/180*

3/179 DETAIL – STEEL PLACEMENT FOR RISER TOP SLAB AND BRIDGE PLATFORM
SCALE: 1/2"=1'-0" RSRSTPSLB.DWG



NOTES:
1. *Ties required at anchor bolt locations only. 16 ties required at each location.*
2. *Pedestrian Bridge is not included in this contract.*

5/179 DETAIL – STEEL PLACEMENT AT BRIDGE PLATFORM
SCALE: 1/2"=1'-0" RSRSTPSLB.DWG

SEE THIS SHEET

Section or Detail No.
Sheet Where Shown
REFERENCE KEY

AS CONSTRUCTED - 06/17/08

REVISIONS			
Rev.	Drawn Date:	Drawn By:	Revision Made
A	6-16-06		
B	7-05-06		
C	10-02-06		
H	06-17-08		

Title
DETAILS
RISER STRUCTURE
AUXILIARY ASH POND – PHASE I

Location and Unit:
E.W. BROWN GENERATING STATION

Scale: AS SHOWN
Drawn: TJ
Date: MAY, 2006
Checked: DAB/BLP
Approved:

JOB NO.	JOB NO.	JOB NO.	JOB NO.
119961			

Drawing No: BR0-C-00179
Rev. H

Fuller Mossbarger Scott & May
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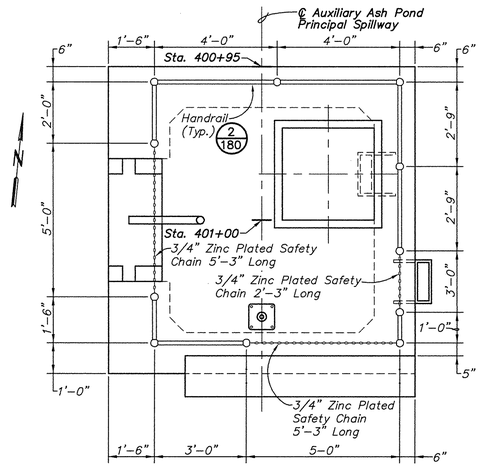
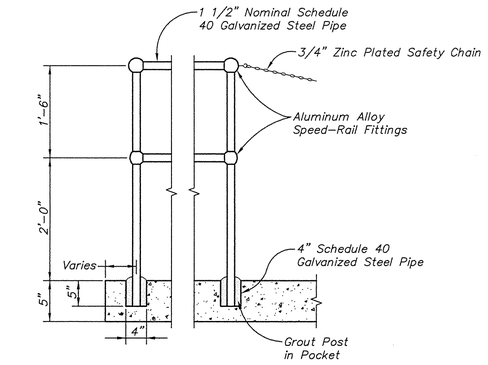
LX2006228\REV1\RSRSHT2.DWG

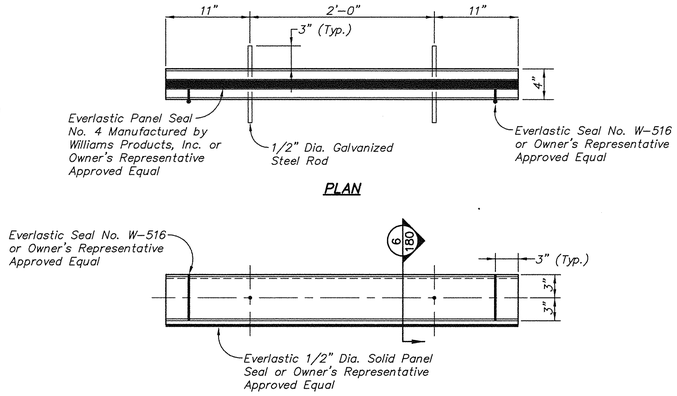
DMS Version 2.0



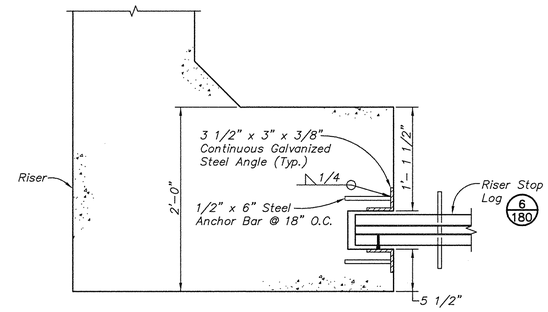
1/180 PLAN – HANDRAIL SYSTEM
SCALE: 1/2"=1'-0" RSRHANDR.DWG



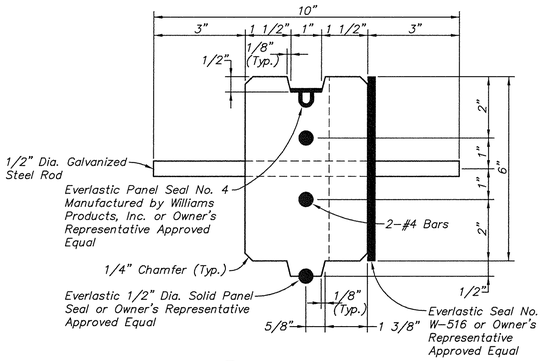
2/180 SECTION – TYPICAL INSTALLATION OF HANDRAIL
SCALE: 1"=1'-0" RSRHANDR.DWG



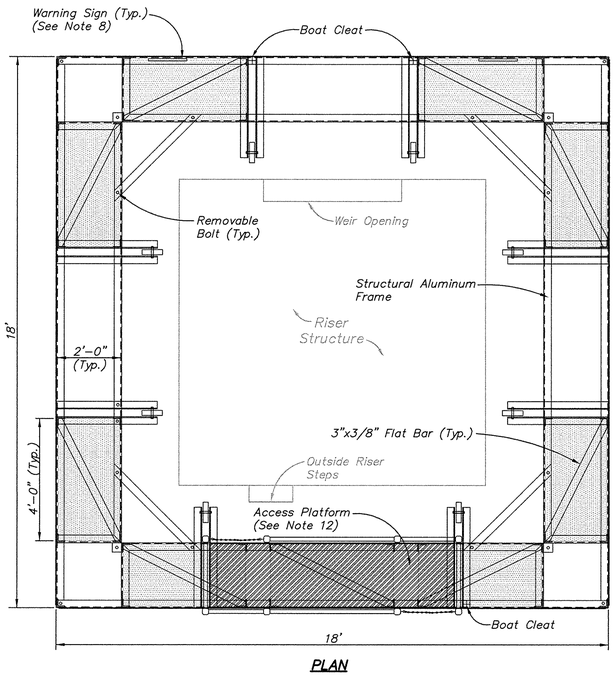
3/180 DETAIL – RISER STOP LOG
SCALE: 1"=1'-0" RSRSTOP.DWG



4/180 DETAIL – STOP LOG SLOT ASSEMBLY
SCALE: 1-1/2"=1'-0" RSRSTOP.DWG



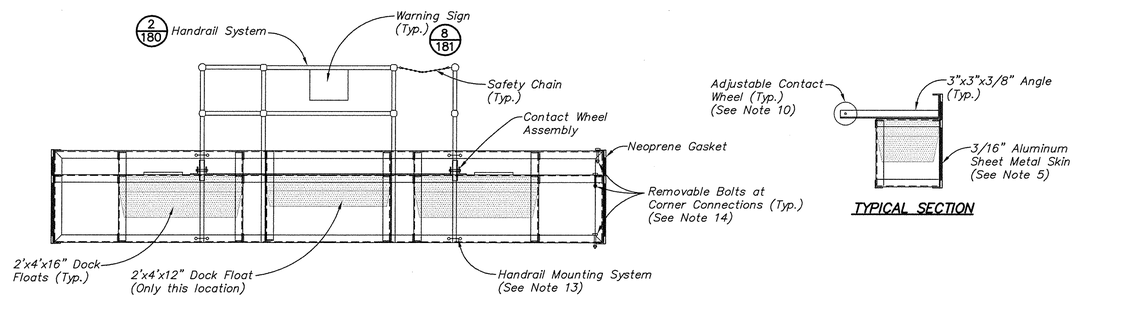
6/180 SECTION – STOP LOG
SCALE: 1/2"=1'-0" RSRSTOP.DWG



PLAN

SKIMMER NOTES:

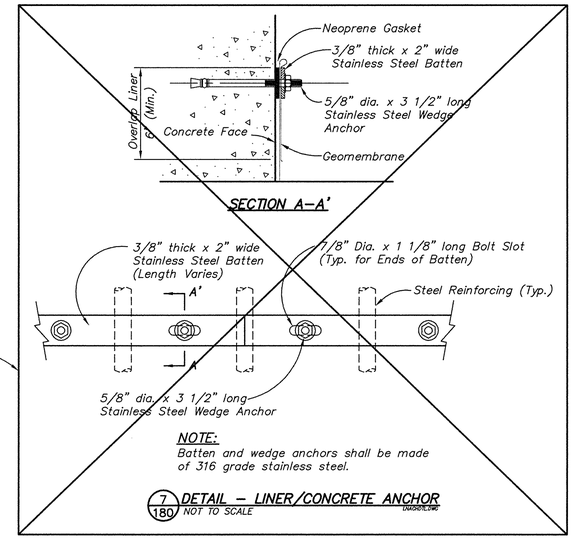
1. The Contractor shall submit shop drawings for the skimmer assembly to the Owner's Representative for approval prior to fabrication.
2. All materials used for skimmer construction and assembly including the framework, outer skin, floats, wheels, connecting hardware, and anchor cleats shall be made of a durable, UV resistant, non-corrosive, and rustproof material. Submitted shop drawings shall include any pertinent details requested by the Owner's Representative to adequately address these topics.
3. Aluminum fabrication used for the skimmer assembly shall conform to the guidelines in the most recent version of the "Aluminum Design Manual" published by the Aluminum Association, Inc. and the American Welding Society "Structural Welding Code for Aluminum in Construction, Section D1.2".
4. Aluminum structural members, including angles, flat bars, and sheeting shall be comprised of aluminum alloy 6061-T6 and conform to applicable sections of the General Services Administration Federal Specifications QQ-A-200.
5. The outer vertical face of the skimmer shall be fully covered with 3/16" aluminum sheet metal skin or suitable alternative non-corrosive sheet metal as approved by the Owner's Representative. The skin shall form a water tight barrier to prevent floatable materials from entering the riser structure.
6. Unless otherwise noted, all framework and sheet metal permanent connections shall be made with aluminum welds. Welds shall have a minimum length of 1-inch and a maximum center to center spacing of 12-inches. Weld performance shall meet the requirements for the American Welding Society Structural Welding Code.
7. Floats shall be Permafloat brand dock float or equivalent as approved by the Owner's Representative. Typical nominal dimensions for the floats shall be 24" wide x 48" long x 16" tall.
8. The Contractor shall install a permanent sign on each float assembly reading "Danger Not A Step". The sign on the access platform shall read "Danger Flowing Water". The Contractor shall not fasten the sign in such a way not to puncture the floats or cause them to not remain water tight. Refer to detail 8/181 for general sign usage.
9. Lag bolts used to attach the float to the framework shall be 3/8" x 4" galvanized or stainless steel and shall be installed per the float manufacturer's recommendations and specifications.
10. Contact wheel assemblies shall consist of an Aqualite Polyolefin wheel with integrated water tight bearing or similar suitable alternate to be approved by the Owner's Representative. The shaft assembly shall be selected and installed per the wheel manufacturer's recommendations and specifications and be constructed of a durable non-corrosive material that permits long-term maintenance free operation.
11. The support arm for the contact wheel assemblies shall be fastened to the skimmer frame members with adjustable bolts and/or notches to permit horizontal adjustment of the wheel location in relation to the outside of the riser. The intent is to provide stable assembly arms that can be adjusted in the horizontal plane to permit adjustment of the location of the floating skimmer in relation to the riser. A nominal slack distances should be maintained to allow for variations in dimension of the outside of the riser and to allow the skimmer to float up and down freely along the riser structure. The Contractor shall indicate intended wheel support arm assembly on the submitted shop drawings.
12. The Contractor shall install an access platform on the back side of the skimmer opposite of the weir openings of the riser to permit boat access to the outside riser steps. The platform shall consist of a McNichols Company Grip Strut non-slip tread metal grating or suitable alternate to be approved by the Owner's Representative. The platform shall not extend beyond the limits shown on the drawings and in no instance shall a step or walking platform be provided on the front of the riser structure near the weir opening and stop log structure.
13. The Contractor shall attach a handrail system to the skimmer platform as shown. Attachment of the handrail system to the skimmer framework may be accomplished via a durable mounting clamp & bolt arrangement or by permanent welds to the outside edges of the skimmer framework. As a minimum, the handrail shall be fastened at the top and bottom of the skimmer framework. The Contractor shall indicate intended fastening method on the submitted shop drawings.
14. The skimmer assembly shall be fabricated as four individual sections that can be floated into place around the riser structure during installation and then locked in place at each of the corners for operational conditions. The framework for each section shall be permanently welded with provisions for the corner connections that allow for removable bolts that permit disassembly if needed. The corner connection shall have an integrated neoprene gasket or other suitable means of providing a water tight seal along the outer skin of the skimmer. The Contractor shall indicate intended corner connection method on the submitted shop drawings.



TYPICAL SECTION

5/180 DETAIL – SKIMMER
SCALE: 1/2"=1'-0" SRAMADET.DWG

NOTE:
LINER TO CONCRETE DETAIL UTILIZED FML CHANNEL EMBEDDED INTO CONCRETE WITH LINER SYSTEM BEING EXTRUDATE WELDED TO THE EMBED.



7/180 DETAIL – LINER/CONCRETE ANCHOR
NOT TO SCALE RSRSH13.DWG

Section or Detail No.
Sheet Where Shown
REFERENCE KEY

AS CONSTRUCTED - 06/17/08

REVISIONS			
Rev.	Drawn Date:	Drawn By:	Revision Made
A	6-16-06		
B	7-05-06		
C	10-02-06		
H	06-17-08		

Title
DETAILS
RISER STRUCTURE
AUXILIARY ASH POND – PHASE I

Location and Unit:
E.W. BROWN GENERATING STATION

Scale: AS SHOWN
Drawn: TJ/RWE
Date: MAY, 2006
Checked: DAB/BLP
Approved:

JOB NO.	JOB NO.	JOB NO.	JOB NO.
119961			

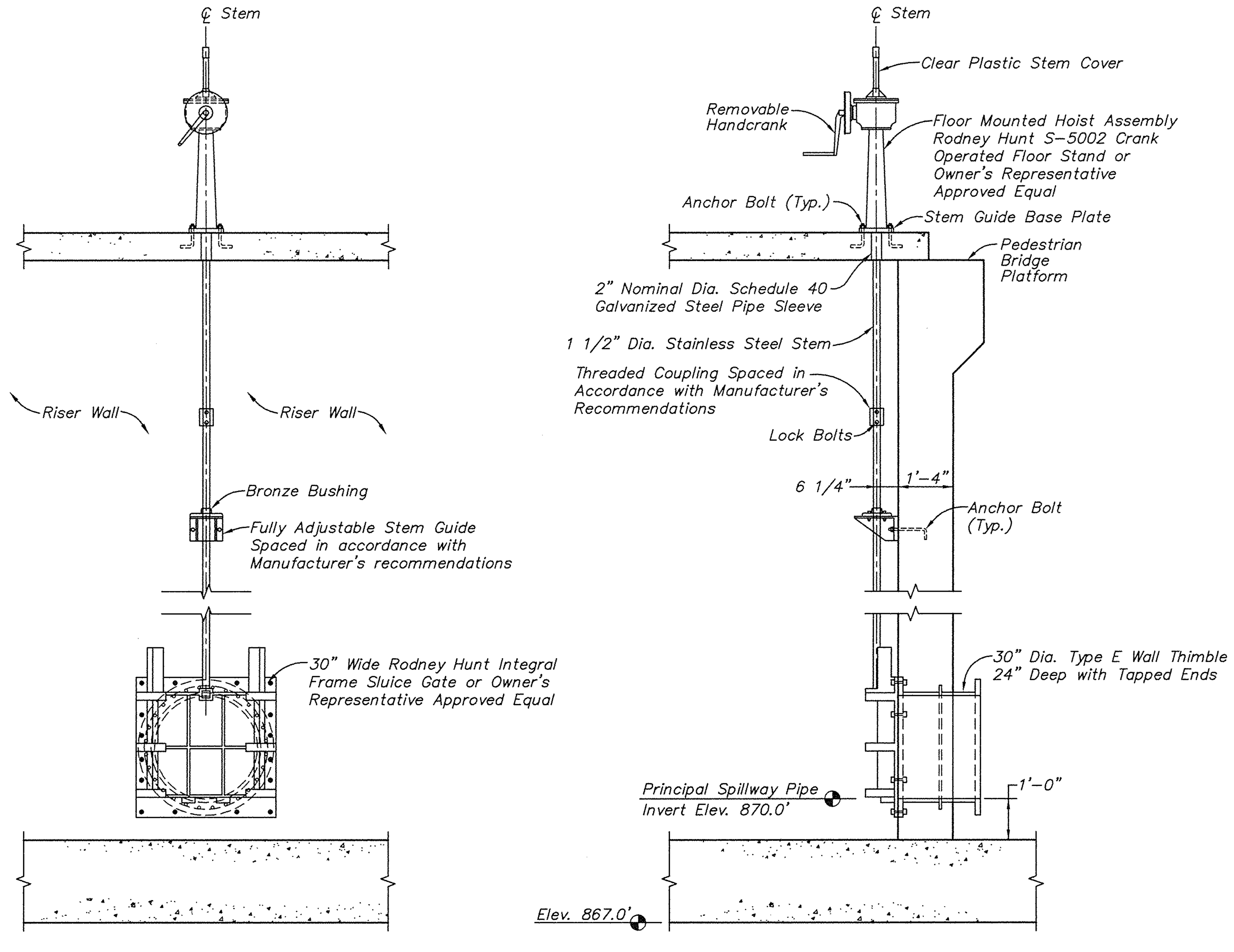
Drawing No: BR0-C-00180
Rev.: H

Fuller Mossbarger Scott & May
EMSM ENGINEERS
LEXINGTON ST. LOUIS LOUISVILLE JEFFERSONVILLE CINCINNATI ATLANTA COLUMBUS NASHVILLE
Kentucky Utilities Company an E·ON company

LX2006228\REVH\RSRSH13.DWG

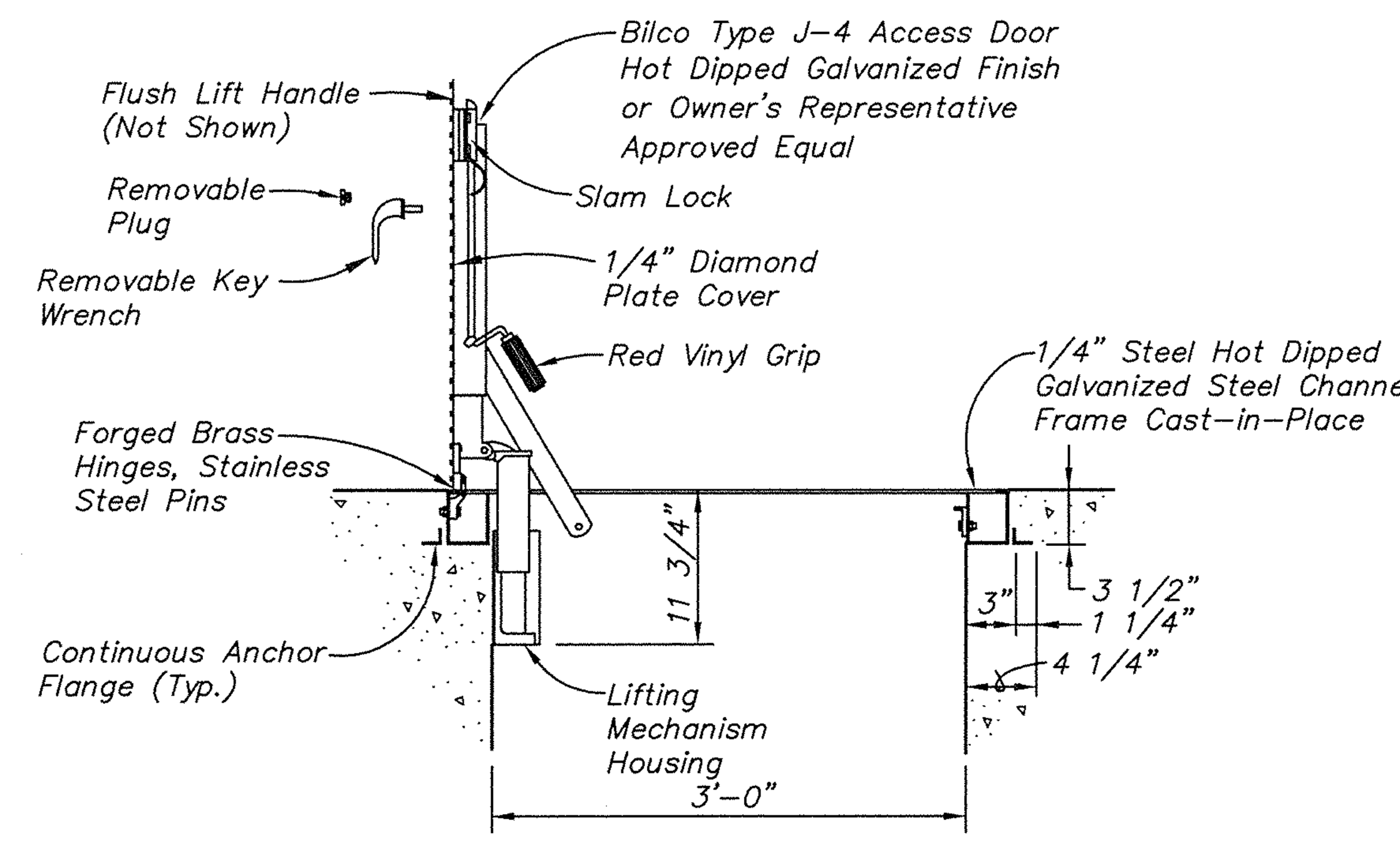
DMS Version 2.0

BRO-C-00181

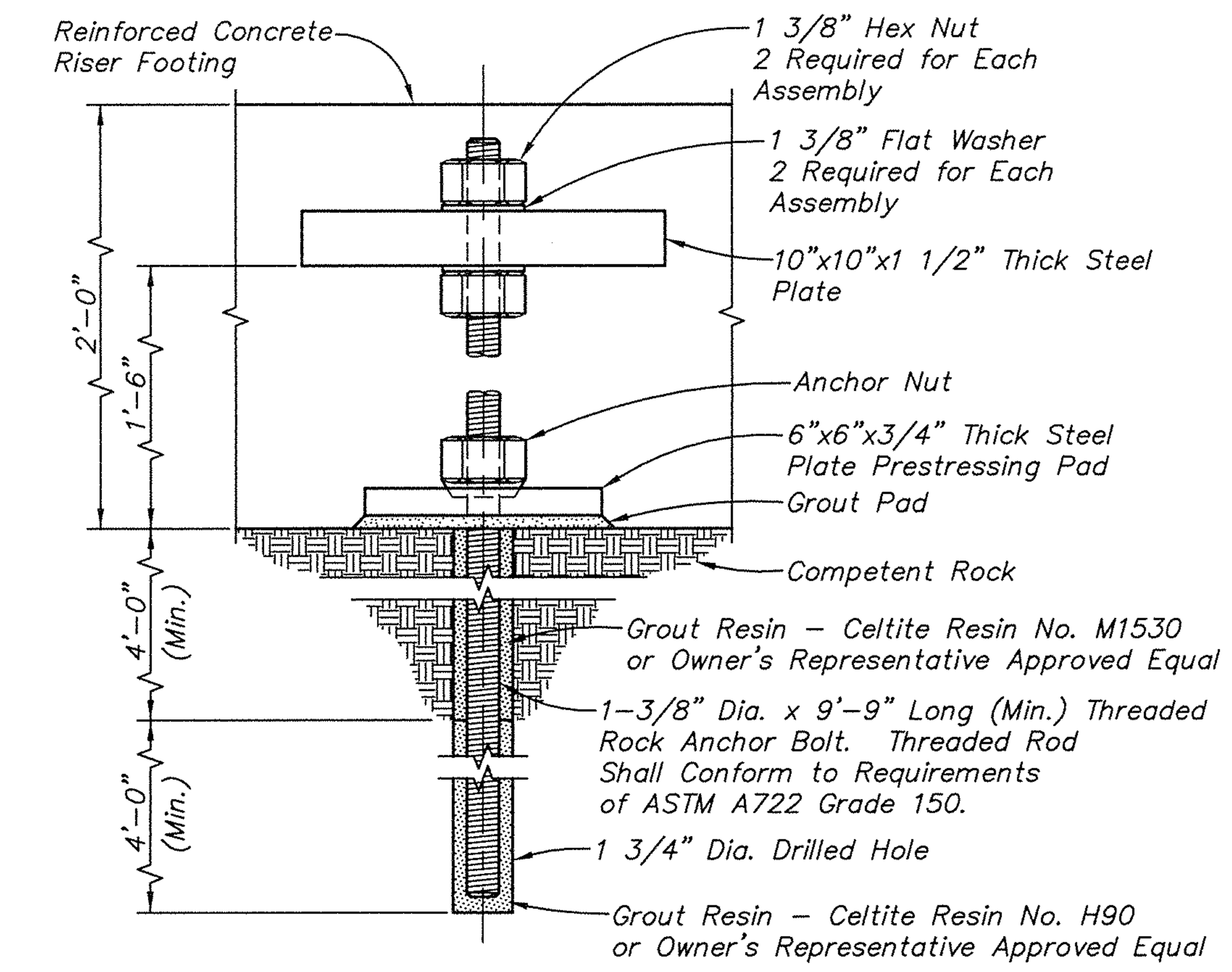


NOTE:
Manufacturer to supply location of Stem Guides and Splices on shop drawings.

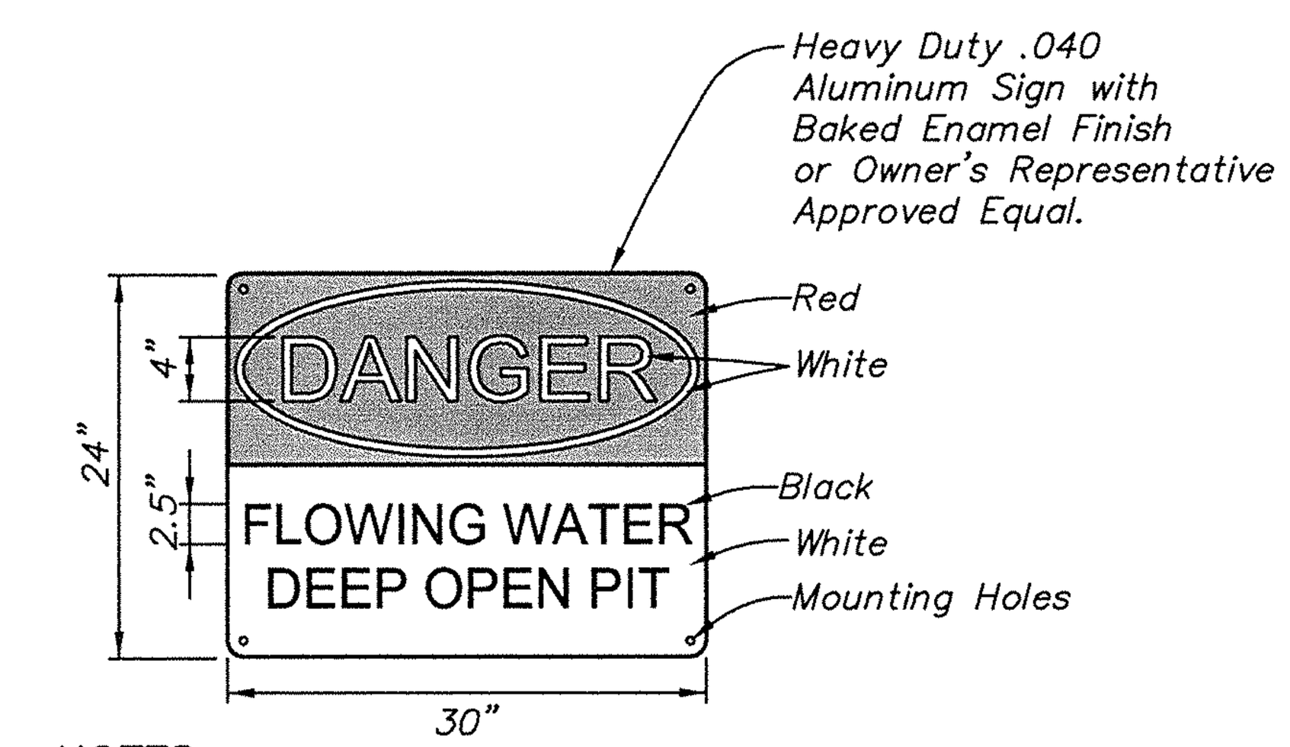
1/181 **DETAIL – SLUICE GATE LIFT ASSEMBLY**
SCALE: 1/2"=1'-0"
SEE SHEET 178



2/181 **DETAIL – ACCESS DOOR**
NOT TO SCALE
SEE SHEET 178



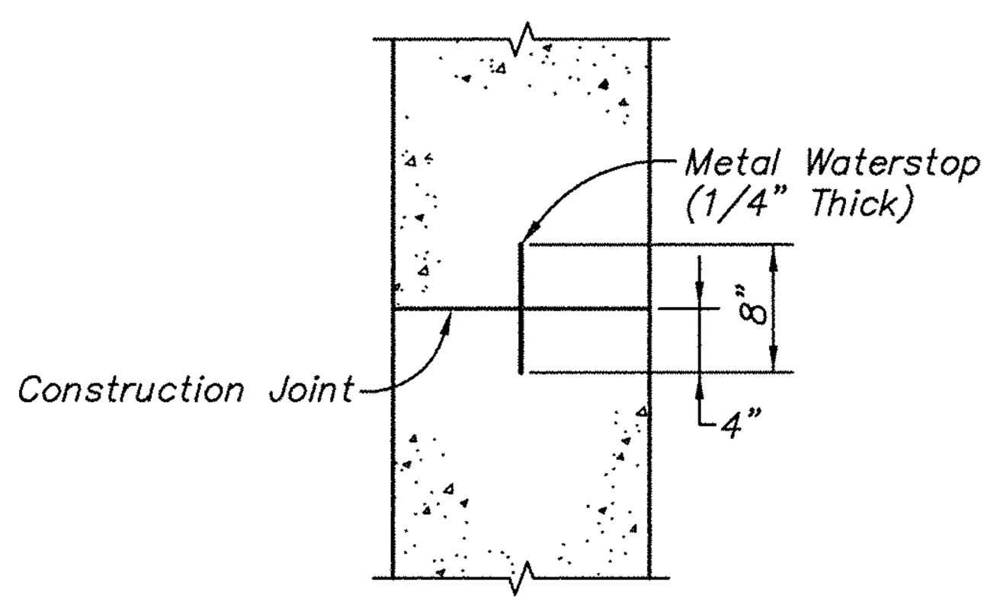
3/181 **DETAIL – ROCK ANCHOR BOLT ASSEMBLY**
SCALE: 3"=1'-0"
SEE SHEET 178



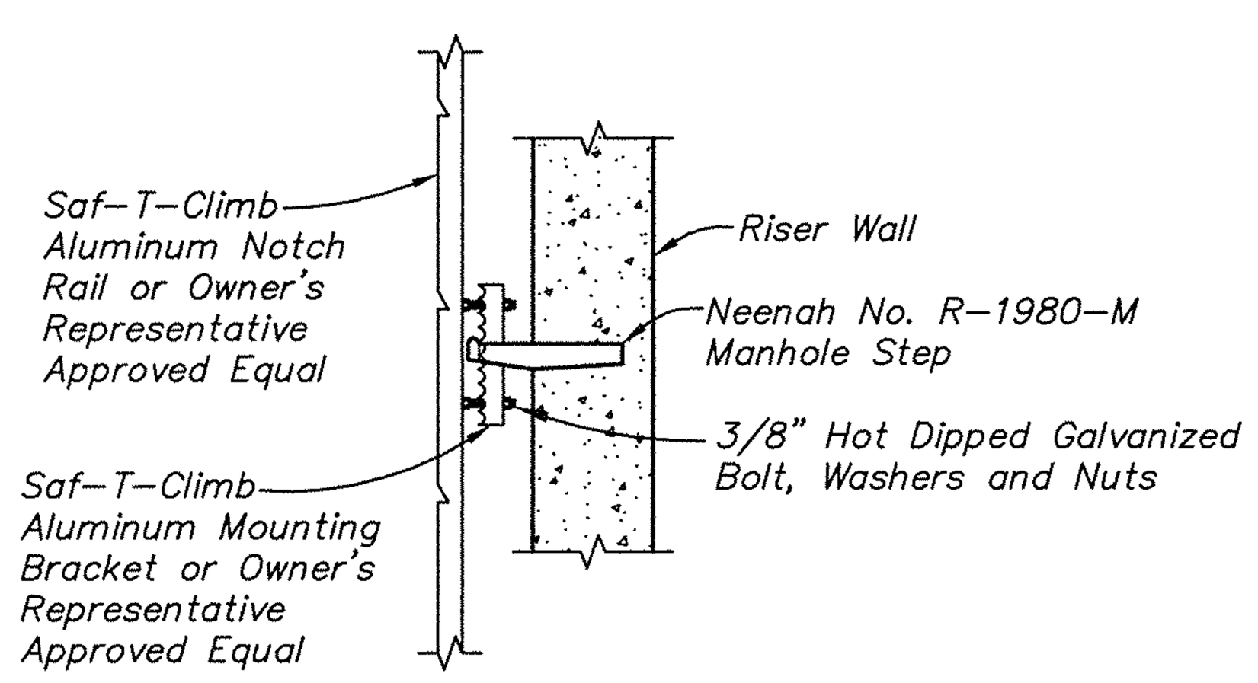
NOTES:

1. All signs shall be furnished with rounded or blunt corners and shall be free from sharp edges, burrs, splinters, or other sharp projections. The ends or heads of bolts or other fastening devices shall be located in such a way that they do not constitute a hazard.
2. The colors red, black and white shall be in accordance with American National Standard (ANSI) Z53.1-1967
3. The above mentioned sizes are minimum required dimensions. The actual size of the sign, text height and width shall be in accordance with ANSI Z535.2-2002.
4. Signs shall be installed within 6 inches of top of Auxiliary Ash Pond Riser. One sign shall be installed on each face and mounted according to manufacturer's requirements.

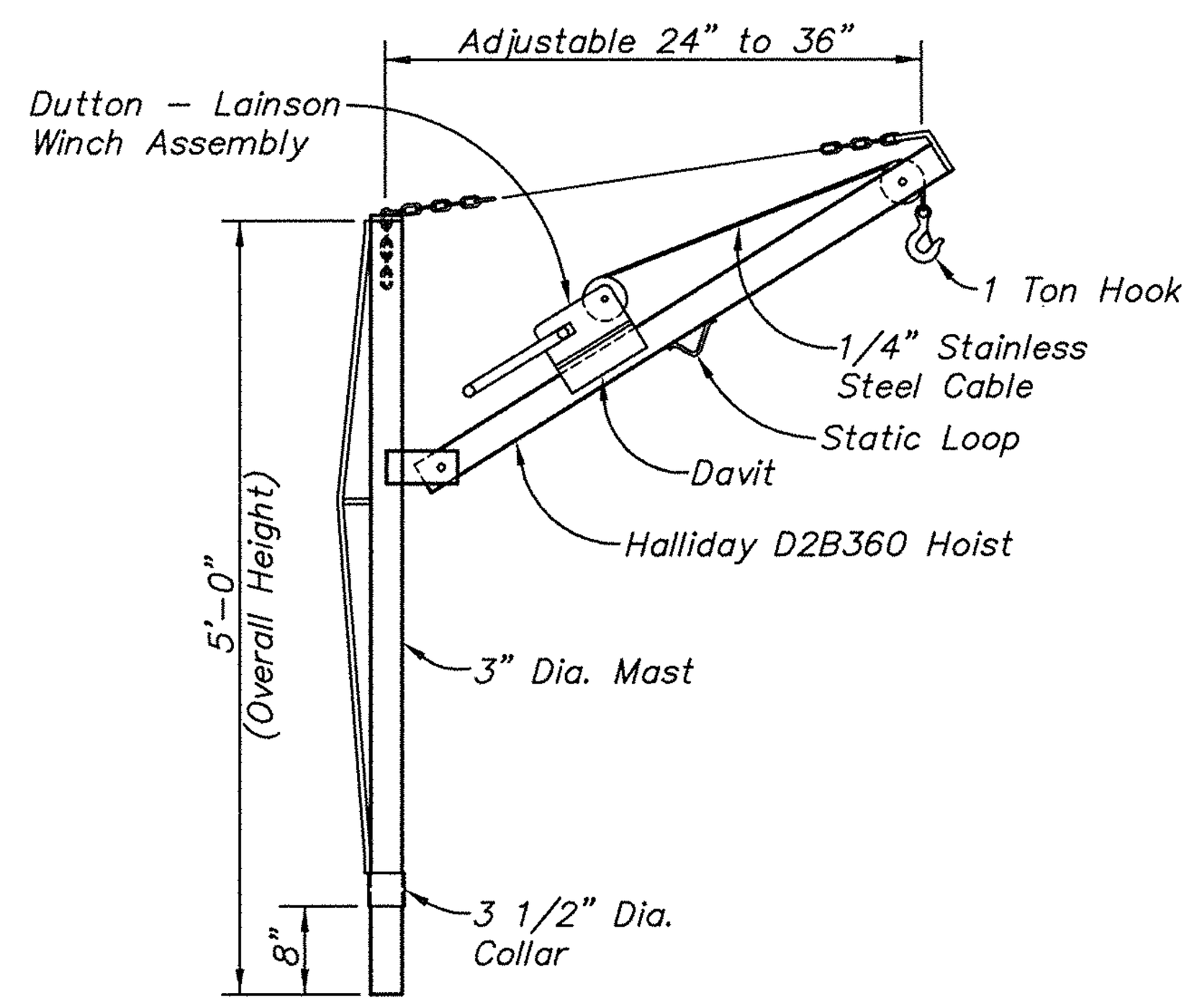
8/181 **DETAIL – DANGER SIGN**
SCALE: 1"=1'-0"



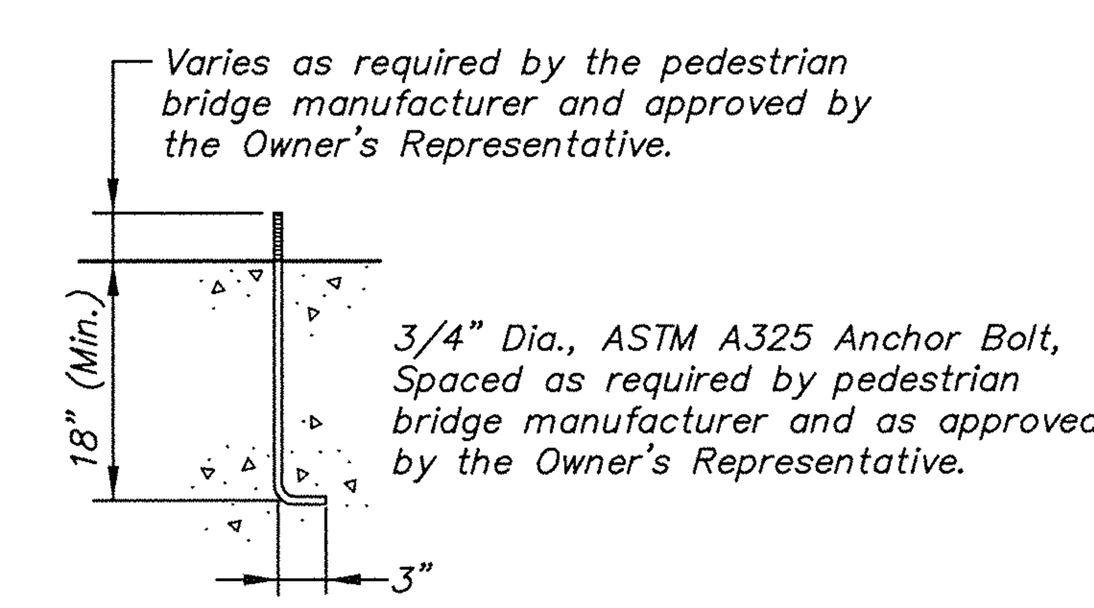
4/181 **DETAIL – CONSTRUCTION JOINT AND METAL WATERSTOP IN RISER WALL**
SCALE: 1"=1'-0"
SEE SHEET 178



5/181 **DETAIL – SAF-T-CLIMB DEVICE AS ATTACHED TO MANHOLE STEPS**
NOT TO SCALE
SEE SHEET 178



6/181 **DETAIL – ADJUSTABLE PORTABLE HOIST**
NOT TO SCALE
SEE SHEET 178



7/181 **DETAIL – PEDESTRIAN BRIDGE ANCHOR BOLT**
SCALE: 1"=1'-0"
SEE SHEET 178

LX20062281REVH.RSRSH14.DWG

AS CONSTRUCTED - 06/17/08

REFERENCE KEY
Section or Detail No.
Sheet Where Shown

Fuller Mossbarger Scott & May
FMSM ENGINEERS

REVISIONS			
Rev.	Drawn Date	Drawn By	Revision Made
A	6-16-05		
B	7-05-06		
C	10-02-06		
H	06-17-08		

Title
DETAILS
RISER STRUCTURE
AUXILIARY ASH POND – PHASE I

Location and Unit:
E.W. BROWN GENERATING STATION

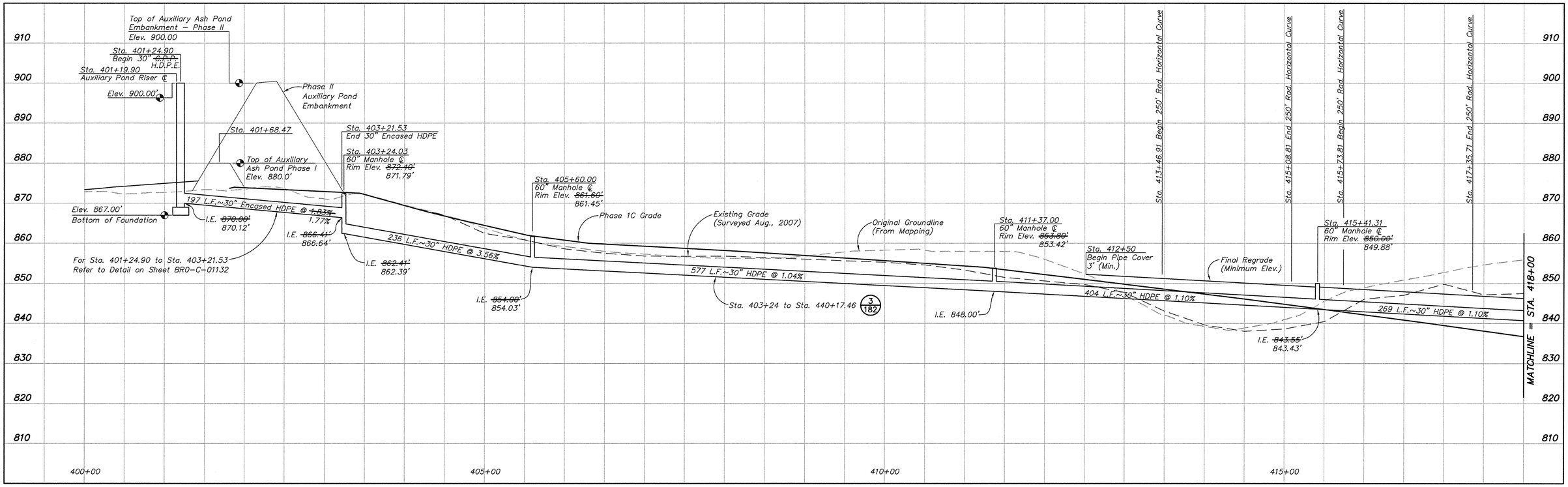
Scale: AS SHOWN
Drawn: TJ
Date: MAY, 2006
Checked: DAB/BLP
Approved:

JOB NO.	JOB NO.	JOB NO.	JOB NO.
119961			

KU Kentucky Utilities Company
an e-on company

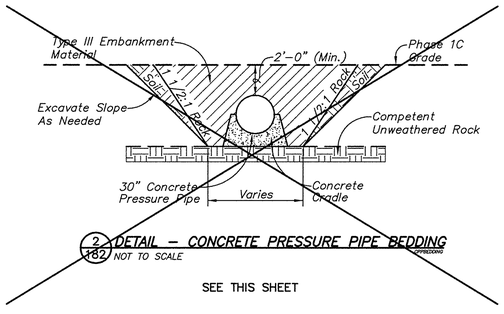
Drawing No: BRO-C-00181
Rev. H

DMS Version 2.0



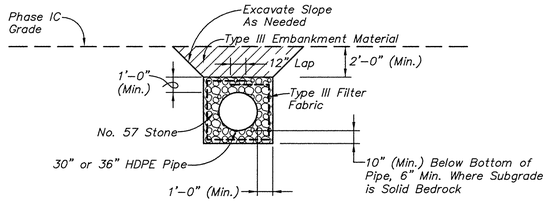
1/182 PROFILE – AUXILIARY POND PRINCIPAL SPILLWAY
SCALE: 1" = 50' HORIZONTAL
1" = 10' VERTICAL

SEE SHEET 115



2/182 DETAIL – CONCRETE PRESSURE PIPE BEDDING
NOT TO SCALE

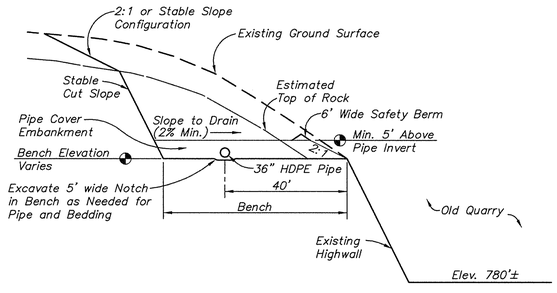
SEE THIS SHEET



3/182 DETAIL – HDPE PIPE BEDDING
NOT TO SCALE

SEE THIS SHEET

NOTE: Total cover over top of pipe may be as little as 2 feet (total) with written approval of Owner's representative.



3/182 DETAIL – PIPE BENCH BY OLD QUARRY
NOT TO SCALE

NOTE: Applies from Station 434+75 through 436+48. Station 429+00 through 434+75 similar.

SURVEY NOTE:
As Constructed survey data provided by Bizzack Construction. Based on field observations this data is believed to be correct, but has not been surveyed by FMSM Engineers.

Section or Detail No.
Sheet Where Shown
REFERENCE KEY

NOTE:
REFER TO BRO-C-01133 FOR AS CONSTRUCTED DETAILS

AS CONSTRUCTED - 06/17/08

REVISIONS			
Rev.	Drawn Date:	Drawn By:	Revision Mode
A	6-16-06		
C	10-02-06		
F	06-14-07		
	12-13-07		
H	06-17-08		

Title
PROFILE
PRINCIPAL SPILLWAY
AUXILIARY ASH POND – PHASE I

Location and Unit:
E.W. BROWN GENERATING STATION

Scale: AS SHOWN
Drawn: BPS
Date: DECEMBER, 2007
Checked: DAB
Approved:

JOB NO.	JOB NO.	JOB NO.	JOB NO.
119961			

Drawing No: BRO-C-00182
Rev. H

Fuller Mossbarger Scott & May
FMSM ENGINEERS
LEXINGTON • LOUISVILLE • CINCINNATI • COLUMBUS • ST. LOUIS • JEFFERSONVILLE

Kentucky Utilities Company
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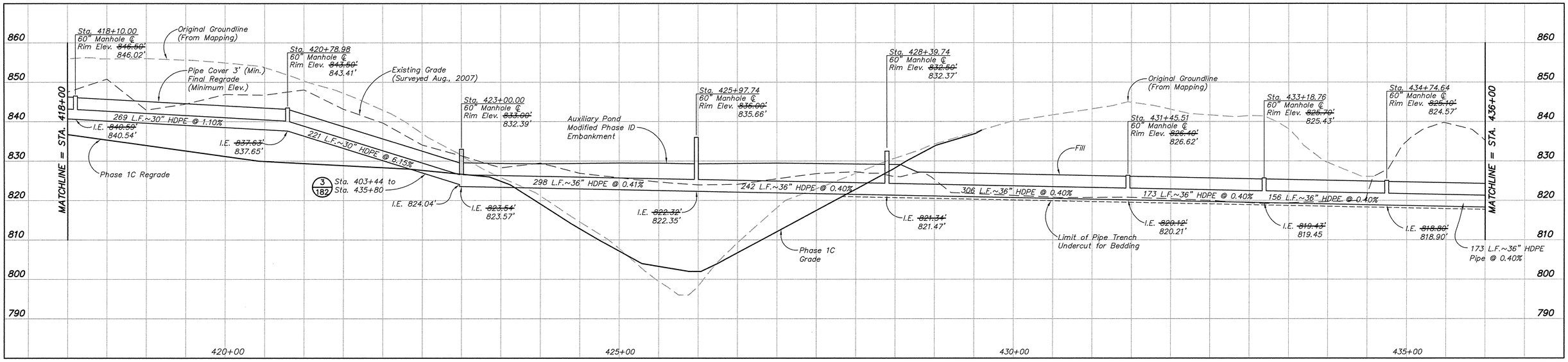
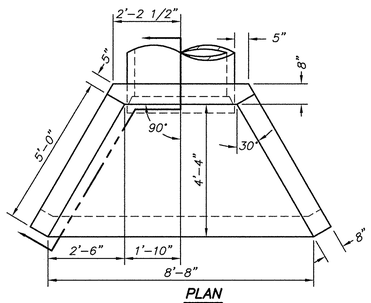
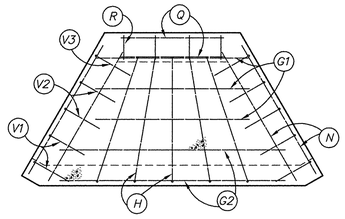
LX2006228\REVH\AUXILIARY RISER PROFILE1.DWG



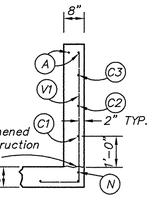
1/183 PROFILE – AUXILIARY POND PRINCIPAL SPILLWAY
SCALE: 1" = 50' HORIZONAL
1" = 10' VERTICAL



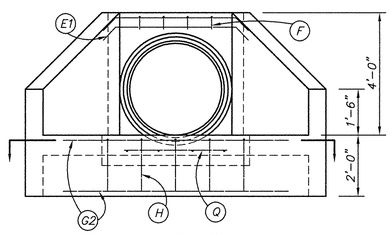
PLAN



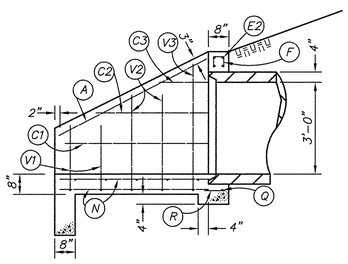
SECTION



SECTION – WING

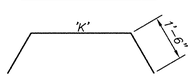


ELEVATION

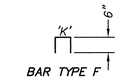


SECTION

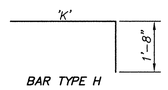
BENT BAR SHAPES



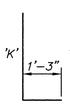
BAR TYPE E



BAR TYPE F



BAR TYPE H



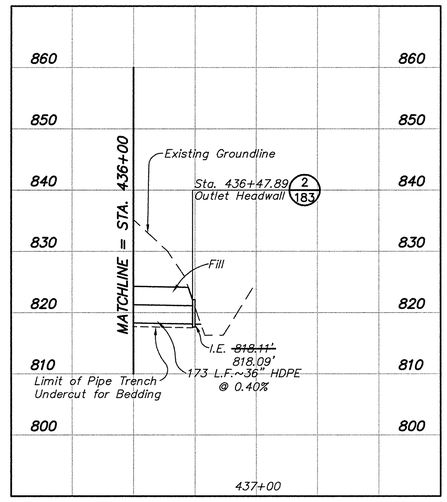
BAR TYPE V

BAR SCHEDULE

MARK	SIZE	QTY.	LENGTH	'K' LENGTH
A	5	4	5'–5"	
C1	4	2	1'–7"	
C2	4	2	3'–8"	
C3	4	2	4'–10"	
E1	5	2	6'–11"	3'–11"
E2	5	2	7'–3"	4'–3"
F	4	4	1'–3"	0'–4"
G1	4	3	5'–0"	
G2	4	3	7'–4"	
H	4	5	5'–8"	4'–0"
N	4	6	4'–10"	
Q	4	2	3'–4"	
R	4	4	0'–8"	
V1	5	4	3'–4"	2'–1"
V2	5	4	4'–4"	3'–1"
V3	5	2	5'–4"	4'–1"

NOTES:
1. Maintain a 2" clear distance between the face of concrete and all steel bars.
2. Bars designated with the letters C, G and V are spaced at 1'–0" O.C. All other bars shall be evenly spaced.

2/183 DETAIL – PRECAST HEADWALL FOR 36" HDPE AUXILIARY POND PRINCIPAL SPILLWAY
SCALE: 1/2"=1'-0"



Section or Detail No.
Sheet Where Shown
REFERENCE KEY

SURVEY NOTE:
As Constructed survey data provided by Bizzack Construction. Based on field observations this data is believed to be correct, but has not been surveyed by FMSM Engineers.

AS CONSTRUCTED - 06/17/08

DAN A. BACK 17968 LICENSED PROFESSIONAL ENGINEER 6-18-08

REVISIONS			
Rev.	Drawn Date:	Drawn By:	Revision Mode
A	6-16-06		
C	10-02-06		
F	06-14-07		
	12-13-07		
H	06-17-08		

Title
PROFILE
PRINCIPAL SPILLWAY
AUXILIARY ASH POND – PHASE I

Location and Unit:
E.W. BROWN GENERATING STATION

Scale: AS SHOWN
Drawn: BFS
Date: DECEMBER, 2007
Checked: DAB
Approved:

JOB NO.	JOB NO.	JOB NO.	JOB NO.
119961			

Drawing No: BR0-C-00183
Rev.

Fuller Massbarger Scott & May
FMSM ENGINEERS
LEXINGTON • LOUISVILLE • CINCINNATI • COLUMBUS • ST. LOUIS • JEFFERSONVILLE

Kentucky Utilities Company
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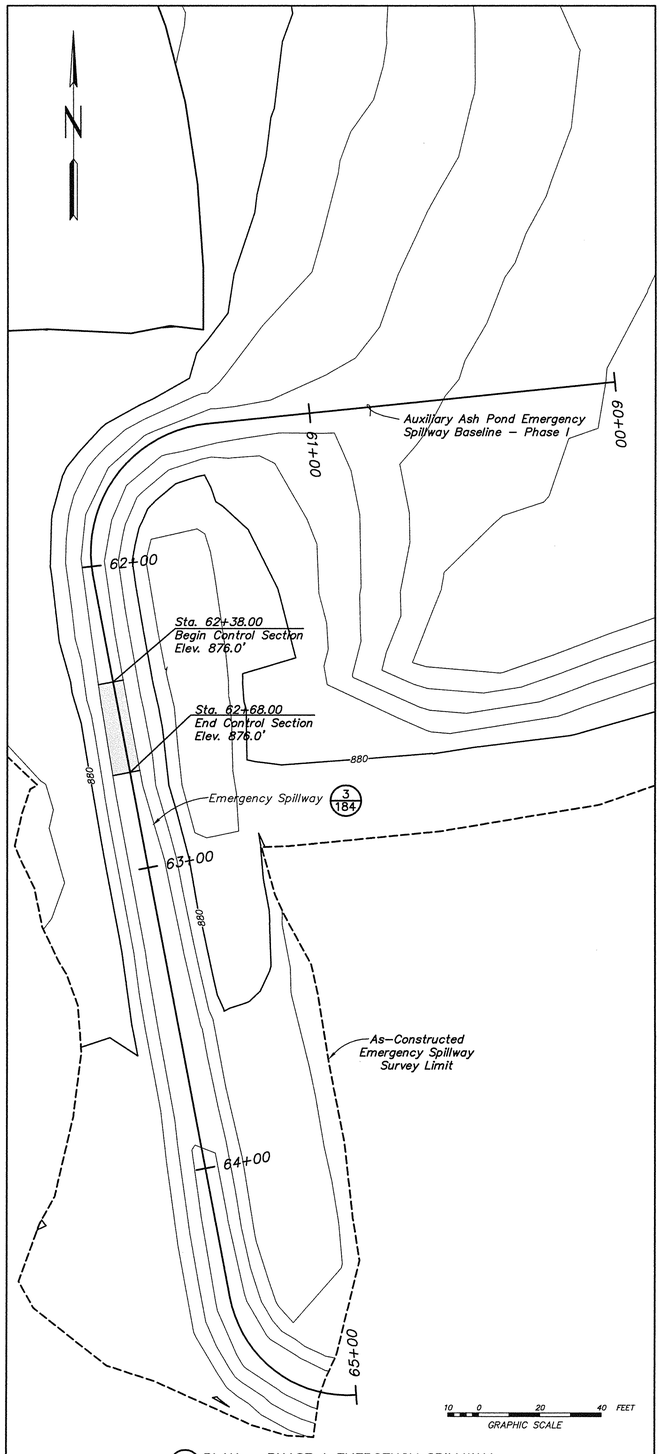
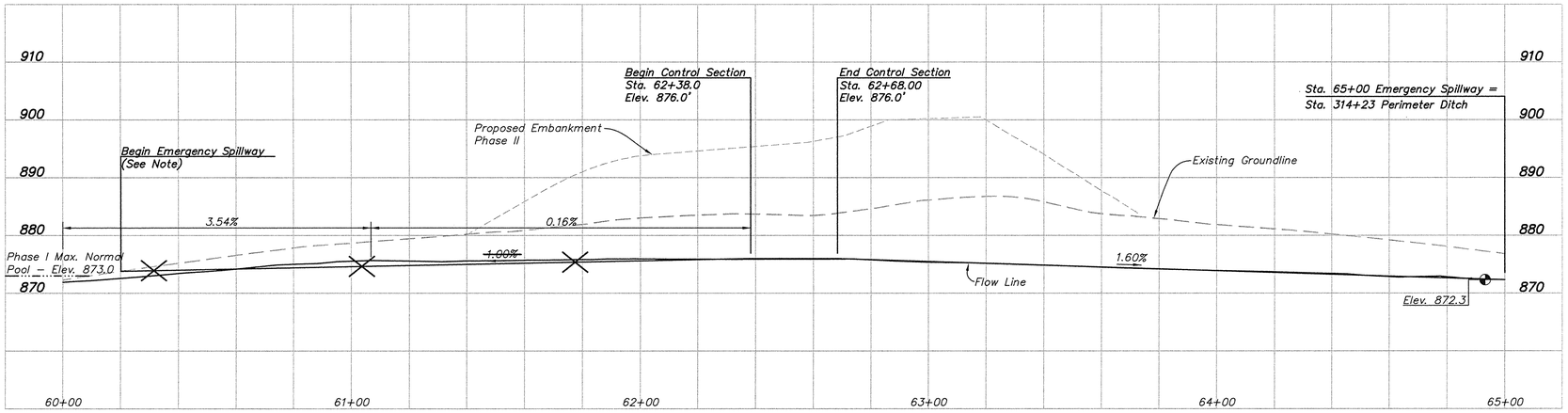
LX2006228\REVIA\AUXILIARY RISER PROFILE2.DWG

DMS Version 2.0



1/184 PLAN – PHASE 1 EMERGENCY SPILLWAY
SCALE: 1"=20'

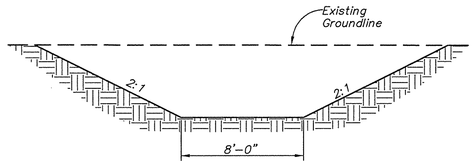
SEE SHEET 136



NOTE:
See Sheets BR0-0-00136, BR0-C-00137 and BR0-C-00138 for Emergency Spillway grading at inlet.

2/184 PROFILE – PHASE I EMERGENCY SPILLWAY
SCALE: 1"=20' Horizontal
1"=10' Vertical

SEE THIS SHEET



3/184 DETAIL – EMERGENCY SPILLWAY
SCALE: 1/4"= 1'–0"

SEE THIS SHEET

SURVEY NOTE:
As Constructed survey data provided by Bizzack Construction. Based on field observations this data is believed to be correct, but has not been surveyed by FMSM Engineers.

NOTE:
AS DESIGNED PHASE I EMERGENCY SPILLWAY PLAN REPLACED BY AS CONSTRUCTED PLAN FROM SURVEY INFORMATION PROVIDED BY BIZZACK CONSTRUCTION.

Section or Detail No.
Sheet Where Shown
REFERENCE KEY

AS CONSTRUCTED - 06/17/08

DAN A. BACK 139301 LICENSED PROFESSIONAL ENGINEER
6-17-08

REVISIONS			
Rev.	Drawn Date:	Drawn By:	Revision Made
A	6-16-06		
C	10-02-06		
H	06-17-08		

Title
PLAN VIEW AND PROFILE
PHASE I EMERGENCY SPILLWAY
AUXILIARY ASH POND – PHASE I

Location and Unit:
E.W. BROWN GENERATING STATION

Scale: AS SHOWN
Drawn: SLB/DMG
Date: MAY, 2006
Checked: DAB/BLP
Approved:

JOB NO.	JOB NO.	JOB NO.	JOB NO.
119961			

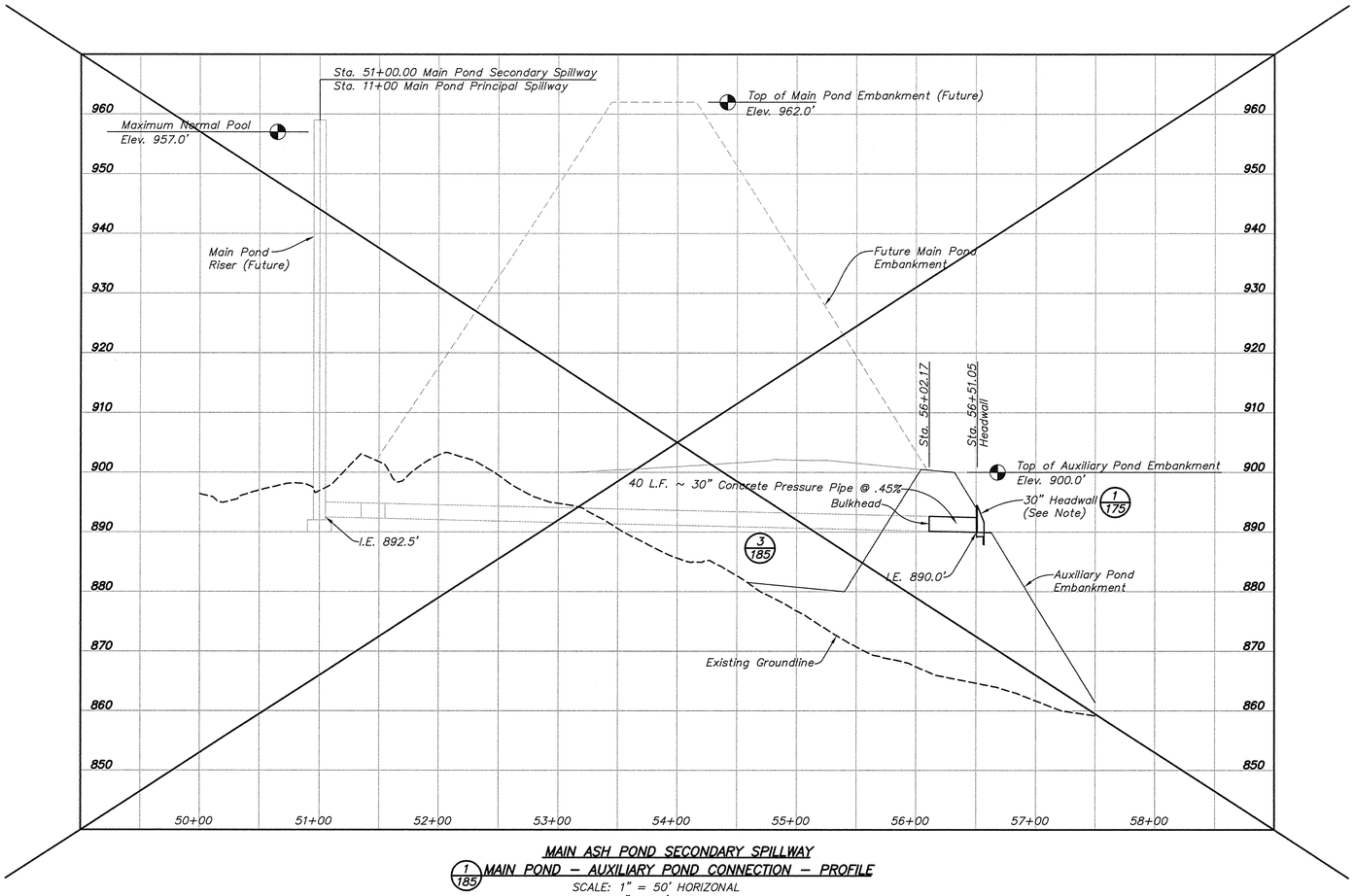
Drawing No: BR0-C-00184
Rev.: H

Fuller Massbarger Scott & May
FMSM ENGINEERS
LEXINGTON ST. LOUIS LOUISVILLE JEFFERSONVILLE CINCINNATI ATLANTA COLUMBUS NASHVILLE

Kentucky Utilities Company
an E·ON company

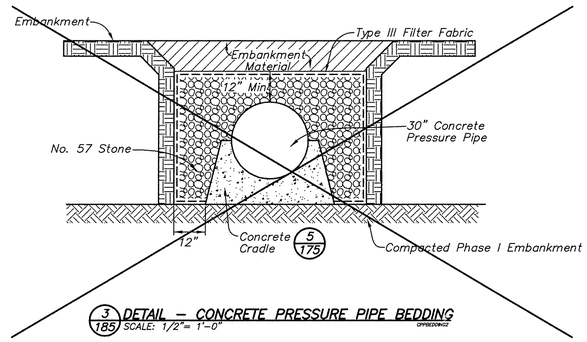
LX2006228\REVIT\EMERGENCY-SPILLWAY-PHASE-1-PROFILE.DWG

DMS Version 2.0



1/185 MAIN ASH POND SECONDARY SPILLWAY
MAIN POND – AUXILIARY POND CONNECTION – PROFILE
SCALE: 1" = 50' HORIZONAL
1" = 10' VERTICAL

NOTE:
Install blind flanges and cover plates on each end of pipe. The downstream end shall project 12 inches out from the vertical exposed face of the precast headwall.



3/185 DETAIL – CONCRETE PRESSURE PIPE BEDDING
SCALE: 1/2"= 1'-0"

Section or Detail No.
Sheet Where Shown
REFERENCE KEY

NOTE:
REFER TO BRO-C-01134, BRO-C-01134A, AND BRO-C-01135 FOR AS CONSTRUCTED DETAILS

AS CONSTRUCTED - 06/17/08

DAN A. BLACK 136378 LICENSED PROFESSIONAL ENGINEER 6/17/08

REVISIONS			
Rev.	Drawn Date:	Drawn By:	Revision Made
A	6-16-06		
C	10-02-06		
H	06-17-08		

Title
PROFILE – SECONDARY SPILLWAY
MAIN ASH POND
AUXILIARY ASH POND – PHASE I

Location and Unit:
E.W. BROWN GENERATING STATION

Scale: AS SHOWN
Drawn: SLB
Date: MAY, 2006
Checked: DAB/BLP
Approved:

Fuller Mossbarger Scott & May
EMSM ENGINEERS
LEXINGTON ST. LOUIS LOUISVILLE JEFFERSONVILLE CINCINNATI ATLANTA COLUMBUS NASHVILLE

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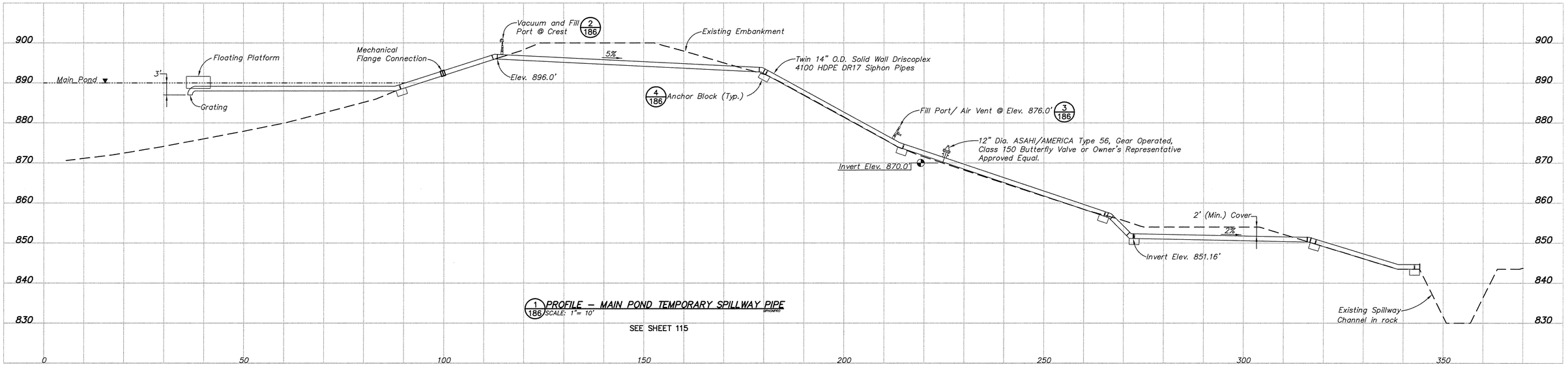
JOB NO.	JOB NO.	JOB NO.	JOB NO.	Drawing No:	Rev.
119961				BRO-C-00185	H

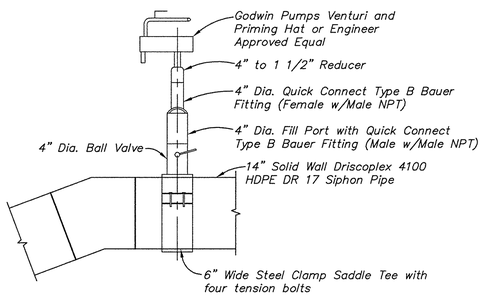
DMS Version 2.0

LX2006228\REVH\SECONDARY-SPILLWAY-PROFILE.dwg



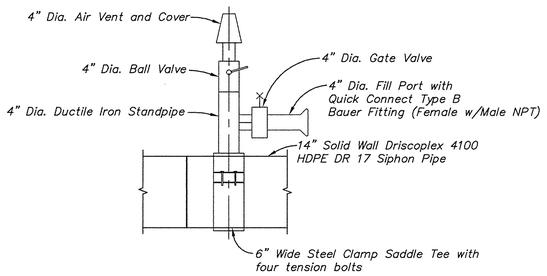
1/186 PROFILE – MAIN POND TEMPORARY SPILLWAY PIPE
SCALE: 1"= 10'

SEE SHEET 115



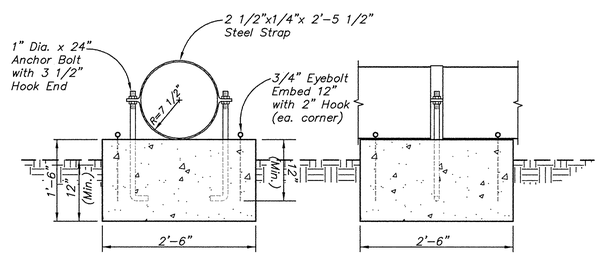
2/186 DETAIL – VACUUM/FILL PORT AT CREST
SCALE: 1"= 1'-0"

SEE THIS SHEET



3/186 DETAIL – DOWNSTREAM FILL PORT/AIR VENT
SCALE: 1"= 1'-0"

SEE THIS SHEET



4/186 DETAIL – ANCHOR BLOCK
SCALE: 1"= 1'-0"

SEE THIS SHEET

NOTES:

1. The Main Ash Pond Temporary Spillway Pipe (Siphon) shall be operated by the Contractor at the direction of the Owner. The Contractor shall be responsible for installing, maintaining, periodically priming and regulating the flow of the Siphon. The Owner is solely responsible for directing the Contractor on Siphon operation. The Contractor shall not modify the flow unless directed to do so by the Owner.
2. The temporary spillway siphon pipes shall be used instead of the existing riser to maintain the normal pool of the Main Ash Pond during construction of the junction box and the main ash pond spillway pipe extension within the existing spillway channel. The existing Main Ash Pond Riser Valve will be closed during this period but shall remain operable at all times for potential use in high storm or process flow events.
3. The siphons must be properly primed prior to each operation with a Godwin Pumps Venturi and priming hat apparatus or an Owner's Representative approved equivalent together with filling hoses and a water pump.
4. One siphon will be operated daily to convey normal baseflows to the existing spillway channel and maintain a relatively constant pool elevation. The second siphon pipe shall be used as necessary to lower the pool elevation during higher inflows or heavy precipitation events.
5. The contractor shall provide or construct a temporary floating platform at the inlet of each siphon pipe. The platform shall be located 50 feet from the shore line at normal pool.
6. The siphon pipe shall be positioned below the floating platform with the inlet located approximately 3 feet below the water surface. A minimum 6 ft x 6 ft piece of marine grade plywood or metal plate shall be positioned above each pipe inlet to prevent cavitation directly to the water surface.
7. The floating platform shall be sufficiently anchored in place in a manner acceptable to the Owners Representative.
8. Under no circumstances shall the siphon be in operation while workers are on or near the floating platform.
9. Fill Hoses shall be 4" Dia. 150 psi, reinforced EPDM Rubber Hoses with 4" Dia. Quick Connect Type B Bauer Fittings (Male w/ Hose Shank and Cam Locks).
10. The Contractor shall be responsible for removing the Main Ash Pond Temporary Spillway Siphon System at the end of the project as directed by the Owner's Representative.

NOTE:
MAIN POND TEMPORARY SPILLWAY REMOVED AFTER MAIN POND PRINCIPAL SPILLWAY PIPE CONSTRUCTION.

AS CONSTRUCTED - 06/17/08

Section or Detail No.
Sheet Where Shown
REFERENCE KEY

LX2006229\REV#1\SIPHONSHT.DWG

REVISIONS				
Rev.	Drawn Date:	Drawn By:	Revision Mode	
A	6-16-06			
B	7-05-06			
C	10-02-06			
H	06-17-08			

Title
DETAILS
MAIN POND TEMPORARY SPILLWAY PIPE
AUXILIARY ASH POND – PHASE I

Location and Unit:
E.W. BROWN GENERATING STATION

Scale: AS SHOWN
Drawn: TJ/DMG
Date: JUNE, 2006
Checked: DAB/BLP
Approved:

JOB NO.	JOB NO.	JOB NO.	JOB NO.
119961			

Drawing No: BR0-C-00186
Rev. H

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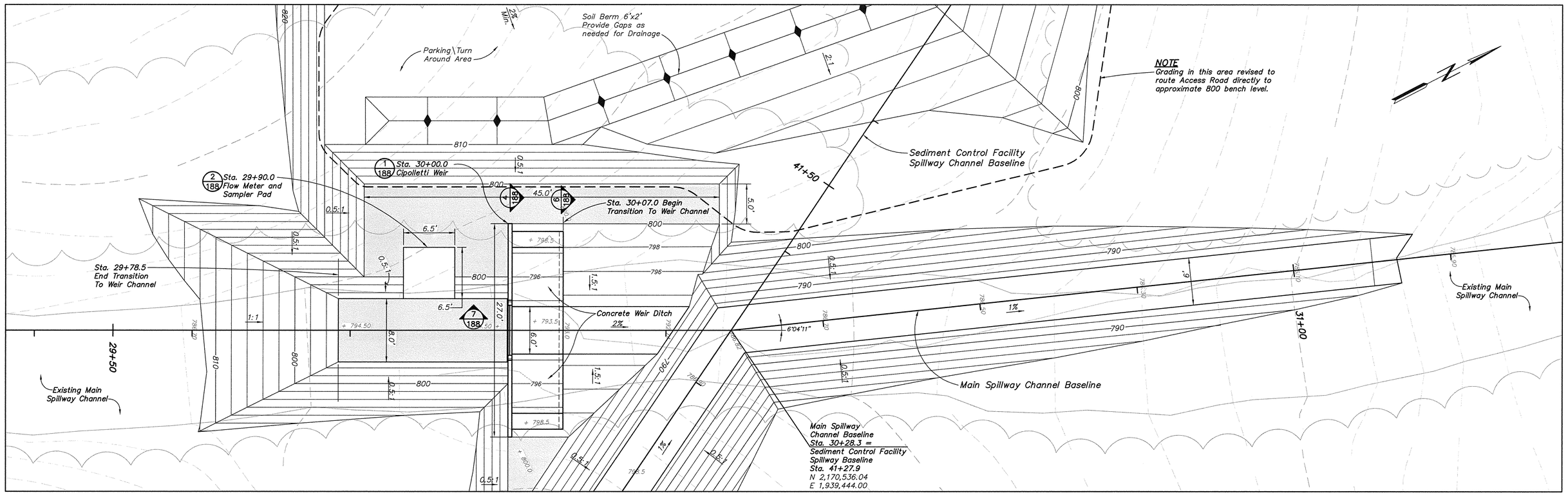
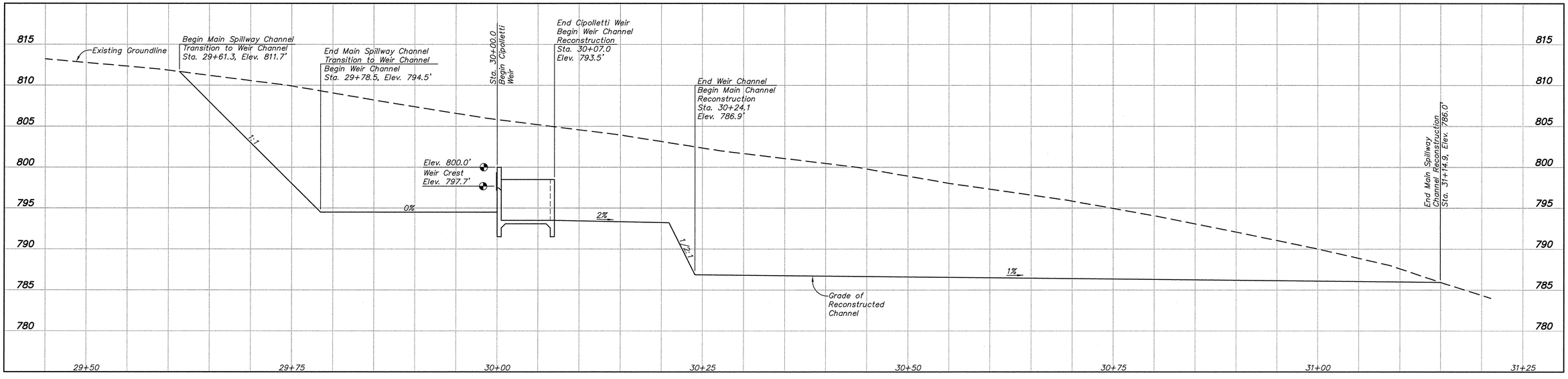
BRO-C-00187



1 / 187 PLAN VIEW – CIPOLLETTI WEIR
SCALE: 1" = 5'

SEE SHEET 115



Section or Detail No.

Sheet Where Shown

REFERENCE KEY

AS CONSTRUCTED - 06/17/08

REVISIONS			
Rev.	Drawn Date:	Drawn By:	Revision Mode
A	6-16-06		
C	10-02-06		
H	06-17-08		

Title
PLAN VIEW AND PROFILE
CIPOLLETTI WEIR
AUXILIARY ASH POND – PHASE I

Location and Unit:
E.W. BROWN GENERATING STATION

Scale: AS SHOWN
Drawn: TJ/CDV
Date: MAY, 2006
Checked: DAB/BLP
Approved:

JOB NO.	JOB NO.	JOB NO.	JOB NO.
119961			

Drawing No: BRO-C-00187
Rev.: H

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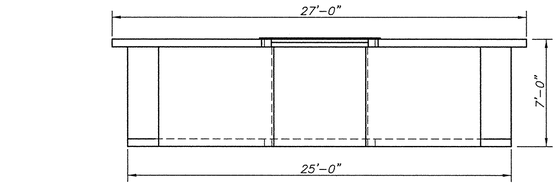
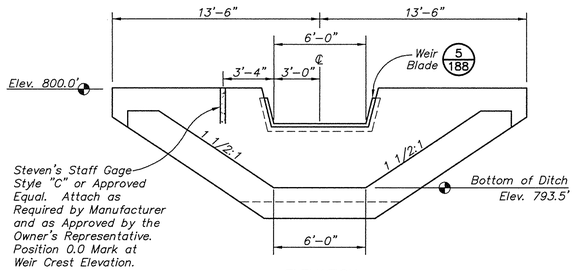
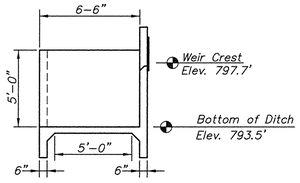
DMS Version 2.0



PLAN



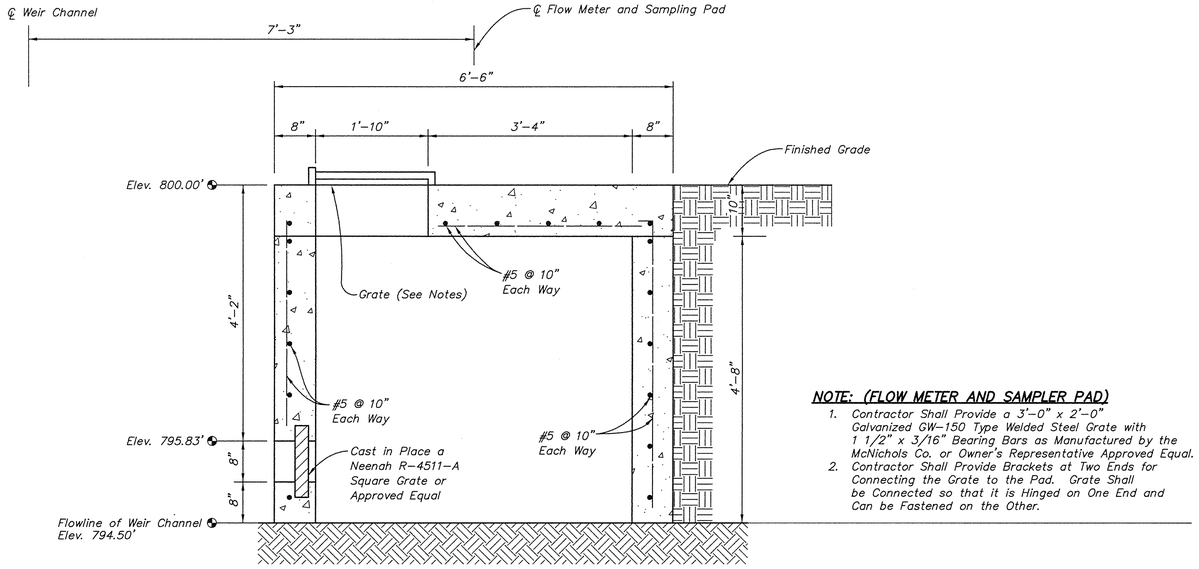
ELEVATION



SECTION

1/188 DETAIL – WEIR WALL
SCALE: 1/4"=1'-0"

SEE SHEET 187

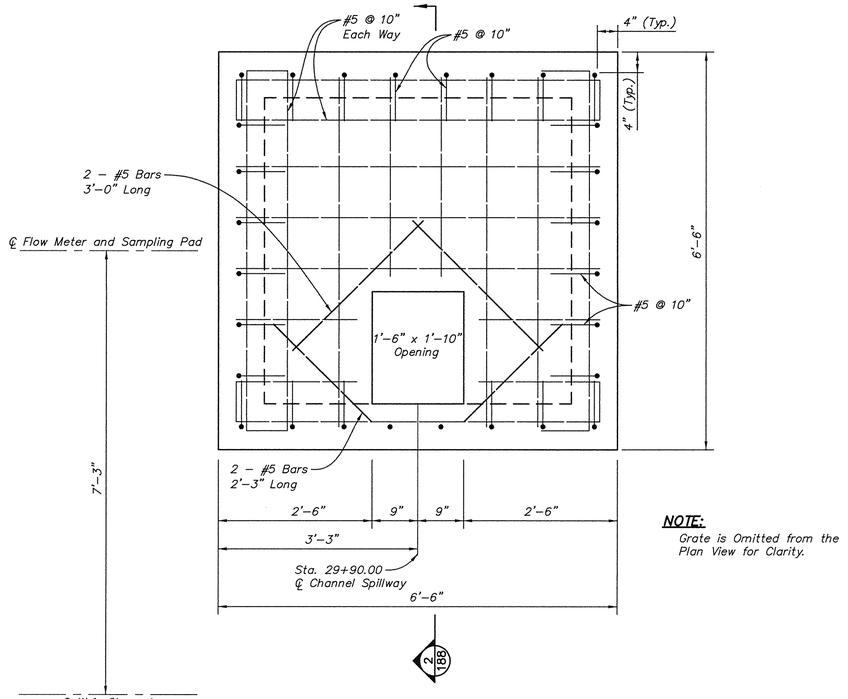


NOTE: (FLOW METER AND SAMPLER PAD)

1. Contractor Shall Provide a 3'-0" x 2'-0" Galvanized GW-150 Type Welded Steel Grate with 1 1/2" x 3/16" Bearing Bars as Manufactured by the McNichols Co. or Owner's Representative Approved Equal.
2. Contractor Shall Provide Brackets at Two Ends for Connecting the Grate to the Pad. Grate Shall be Connected so that it is Hinged on One End and Can be Fastened on the Other.

2/188 SECTION – FLOW METER AND SAMPLER PAD
SCALE: 1"=1'-0"

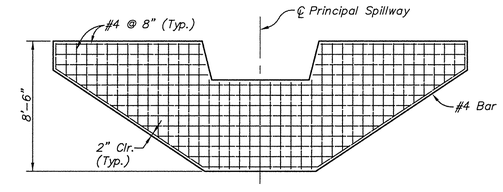
SEE SHEET 187



NOTE:
Grate is Omitted from the Plan View for Clarity.

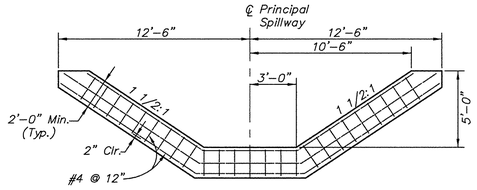
3/188 PLAN VIEW – FLOW METER AND SAMPLER PAD
SCALE: 1"=1'-0"

SEE THIS SHEET



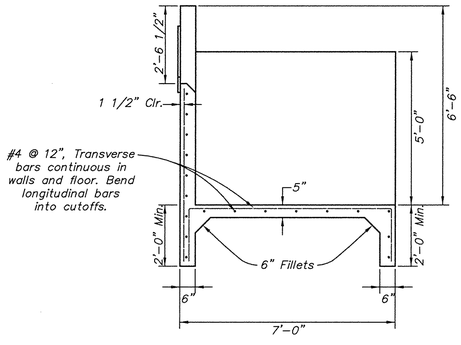
4/188 DETAIL – STEEL PLACEMENT FOR WEIR WALL
SCALE: 1/4"=1'-0"

SEE SHEET 187



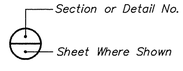
6/188 DETAIL – CONCRETE DITCH AND CUTOFF
SCALE: 1/4"=1'-0"

SEE SHEET 187



7/188 DETAIL – SECTION ALONG CENTERLINE
SCALE: 1/2"=1'-0"

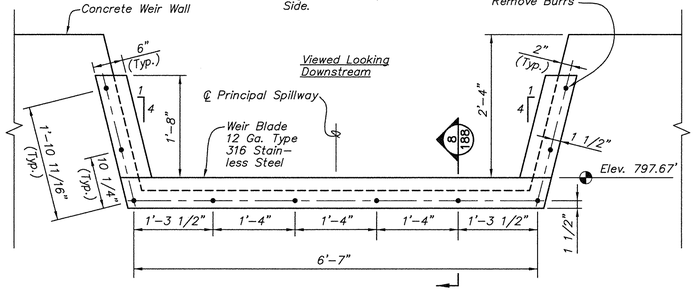
SEE SHEET 187



REFERENCE KEY

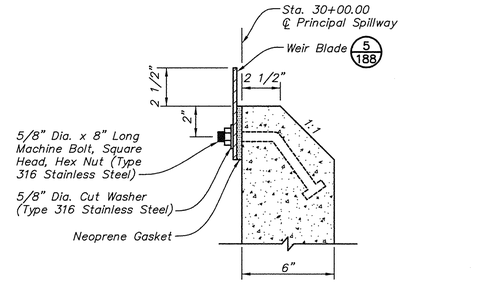
NOTE: Weir Blades Shall Have Sharp Right Angle edges on the Upstream Side.

1" Dia. Holes in Weir Blade. Remove Burrs



5/188 DETAIL – WEIR BLADE
SCALE: 1"=1'-0"

SEE THIS SHEET



Note: Reinforcing Not Shown

8/188 SECTION – ANCHOR BOLT AND BLADE
SCALE: 3"=1'-0"

SEE THIS SHEET

AS CONSTRUCTED - 06/17/08

REVISIONS

Rev.	Drawn Date:	Drawn By:	Revision Made
A	6-16-06		
B	7-05-06		
C	10-02-06		
H	06-17-08		

Title
DETAILS
CIPOLLETTI WEIR
AUXILIARY ASH POND – PHASE I

Location and Unit:
E.W. BROWN GENERATING STATION

Scale: AS SHOWN
Drawn: TJ/COV
Date: MAY, 2006
Checked: DAB/BLP
Approved:

JOB NO.	JOB NO.	JOB NO.	JOB NO.
119961			

Drawing No: BR0-C-00188
Rev. H

Fuller Mossbarger Scott & May
EMSM ENGINEERS
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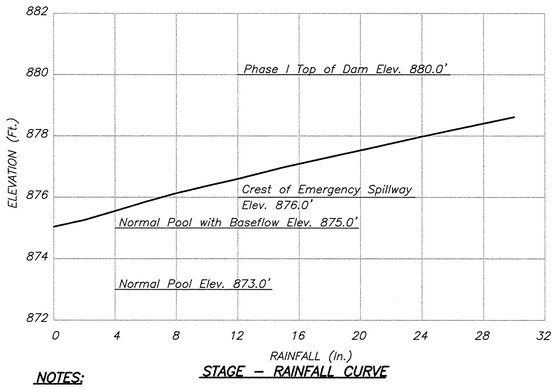
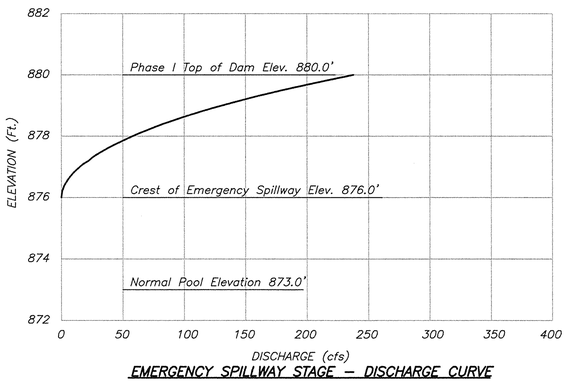


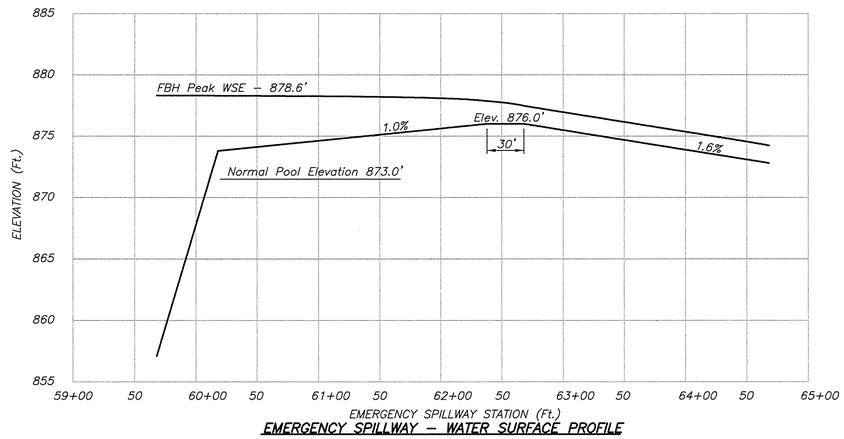
STAGE – RAINFALL CURVE

NOTES:

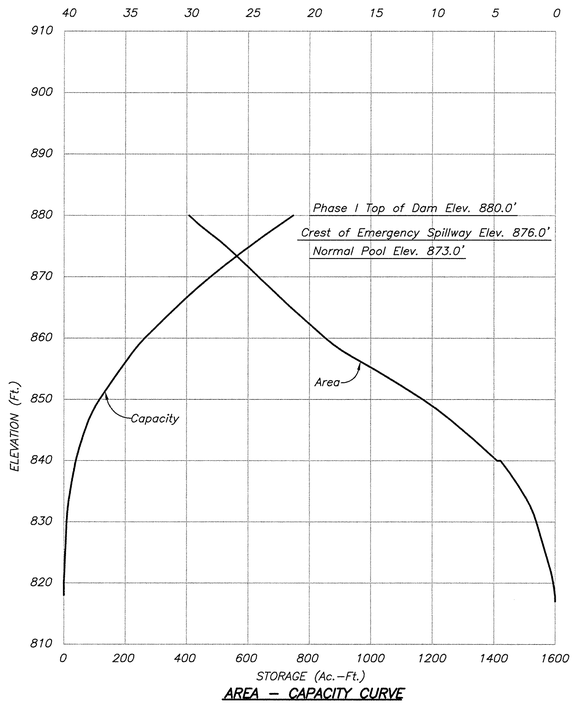
1. Rainfall depth corresponds to an event having an SCS Type II storm distribution with a 6-hour duration.
2. Pool elevation includes constant process baseflow of 27.15 cfs and the routing of the indicated 6-hour SCS Type II rainfall depth.



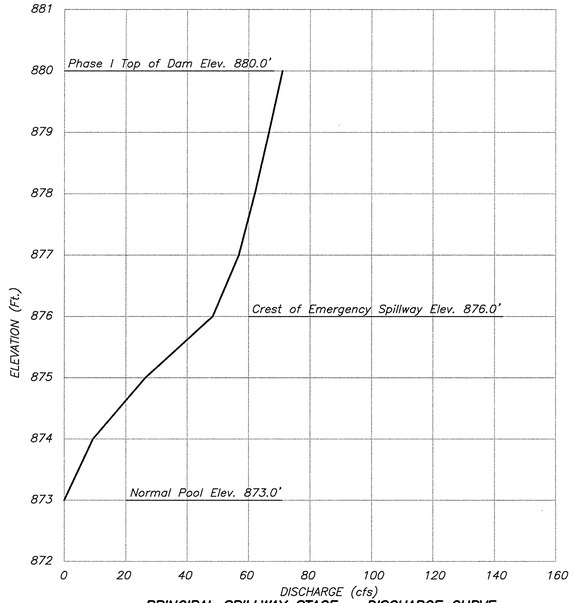
EMERGENCY SPILLWAY STAGE – DISCHARGE CURVE



EMERGENCY SPILLWAY – WATER SURFACE PROFILE



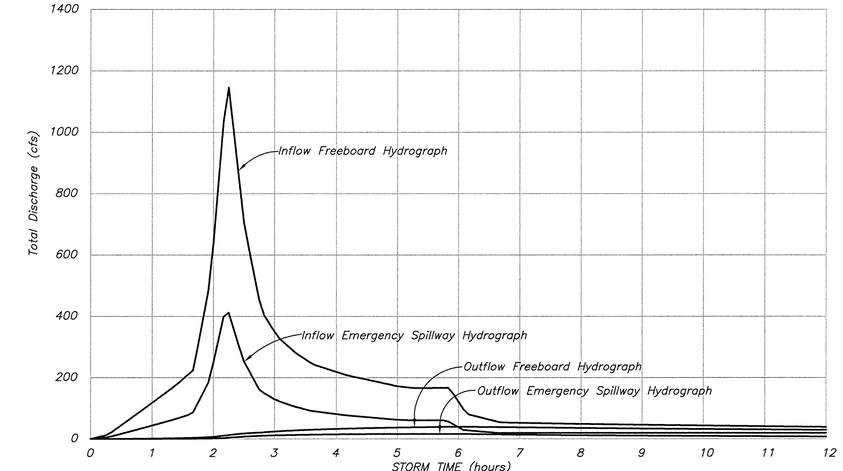
AREA – CAPACITY CURVE



PRINCIPAL SPILLWAY STAGE – DISCHARGE CURVE

NOTE:

Principal Spillway Discharge Curve does not include flow through the Emergency Spillway.



DESIGN HYDROGRAPHS

FLOODROUTING SUMMARY

Normal Pool Elevation (Feet)	873.0
Impoundment Area (Acres)	25.7 (See Note 2)
Volume at Normal Pool (Ac.–Ft.)	552.6 (See Note 2)
Top of Dam Elevation (Feet)	880.0'
Emergency Spillway Elevation (Feet)	876.0'

	100–Year/6–Hour Storm	Principal Spillway Hydrograph	Emergency Spillway Hydrograph	Freeboard Hydrograph
Design Storm	$P_{100,6}$	$P_{100,10\ DAY}$	$P_{100,6}$ + 0.26(PMP–$P_{100,6}$)	PMP
Precipitation (Inches)	4.53"	10.49"	10.6"	28.0"
Runoff (Inches)	3.95"	9.27"	10.0"	27.4"
Peak Q Inflow (cfs)	514	49	439	1172
Peak Q Total Outflow (cfs)	40	49	60	166
Emergency Spillway Discharge (cfs)	--	1	8	101
Emergency Spillway Flow Depth (feet)	--	.1'	0.5'	2.6'
Maximum Water Surface Elevation (Feet)	875.6'	876.1'	876.5'	878.6'

AUXILIARY POND WATERSHED DATA

Drainage Area = 52 Acres = 0.08 Square Miles (See Note 1)
Time of Concentration = 15 Minutes = 0.25 Hours
Runoff Curve Number = 95
Baseflow = 27.15 cfs (See Note 3)

NOTES:

1. The drainage area for Phase I of the Auxiliary Pond includes the area west of the Auxiliary Pond that will drain to the Pond prior to construction of Phase II.
2. Impounded pool volume includes existing ash storage volume. Stage–storage curve for storm routing purposes is based on available storm retardance volume.
3. Flood routing includes outflow from the Principal Spillway of the Main Pond routed through the 30–inch interconnector pipe to the Auxiliary Pond. Process baseflow for the Main Pond is 15.45 cfs and baseflow for the Auxiliary Pond is an additional 11.7 cfs for a total of 27.15 cfs. Baseflow is included in the storm hydrograph routing results.

RELEASED FOR CONSTRUCTION - 10/02/06

REVISIONS

Rev.	Drawn Date:	Drawn By:	Revision Mode
A	6-16-06		
B	7-05-06		
C	10-02-06		

Title
HYDRAULIC AND HYDROLOGIC DATA
AUXILIARY ASH POND – PHASE I

Location and Unit:
E.W. BROWN GENERATING STATION

Scale: AS SHOWN
Drawn: CDH
Date: MAY, 2006
Checked: ELC/WJS
Approved:

JOB NO.	JOB NO.	JOB NO.	JOB NO.
119961			

Drawing No: BR0-C-00194 Rev. C

Fuller Mossbarger Scott & May ENGINEERS
LEXINGTON ST. LOUIS LOUISVILLE JEFFERSONVILLE CINCINNATI ATLANTA COLUMBUS NASHVILLE

Kentucky Utilities Company, an E-ON company

LX2006229\REVH1\AUX-BRO-HYDRO-DATA.DWG

DMS Version 2.0

BRO-C-00196

NOTES:

1. Topographic information is based on aerial mapping performed by L. Robert Kimball & Associates, Inc. Refer to general notes on Sheets 104–111 for complete explanation.

2. The boring logs and related information shown depict approximate conditions only at the specific boring locations at the time of drilling. Soil and rock conditions occurring at other locations may differ from conditions occurring at the boring locations. Also, the passage of time may result in a change in conditions at the boring locations. Any geologic correlations shown between borings on the drawings are generally based on straight-line interpolation. Actual conditions between borings are unknown and may differ from those shown. It shall be distinctly understood that neither the Owner nor the Owner's Representative will be responsible for any deduction, interpretation or conclusion drawn therefrom by the Contractor. The information is made available in order that the contractor may have ready access to the same information available to the Owner and the Owner's Representative and is not part of this contract.

3. It shall be distinctly understood that any reference to rock, soil, or any other material on the drawings or in the technical specifications whether in numbers, words, letters or lines, is solely for the Owner's information and is not to be taken as an indication of classified excavation or the quantity of any of the various materials involved. The bidder must draw his own conclusions as to the conditions likely to be encountered at the site.

BORING LOCATION TABLE

Boring	Northing	Easting	Elevation (Feet)
RD-05-03	2,169,714.2	1,937,276.4	912.8
RD-05-04	2,170,097.9	1,936,981.3	909.9
RD-05-05	2,170,603.8	1,936,762.8	912.7
T16-06-01	2,169,631.6	1,937,145.3	903.6
T17-06-01	2,169,956.6	1,936,746.7	931.8
T17-06-02	2,169,949.8	1,936,773.5	931.7
T17-06-03	2,169,922.7	1,936,766.9	929.8
T17-06-04	2,169,929.6	1,936,739.3	929.2

LEGEND

- ● Soil Boring
- ○ Soil Boring with Rock Core
- [7.8] Depth in feet to Auger Refusal

50 0 100 200 FEET
GRAPHIC SCALE: 1" = 100'
CONTOUR INTERVAL = 2'

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RELEASED FOR CONSTRUCTION - 10/02/06

Fuller Mossbarger Scott & May
FMSM ENGINEERS
LEXINGTON ST. LOUIS · LOUISVILLE JEFFERSONVILLE · CINCINNATI ATLANTA · COLUMBUS NASHVILLE

STATE OF KENTUCKY · DAN A. BACK · 13930 · LICENSED PROFESSIONAL ENGINEER · 6-18-08

REVISIONS

Rev.	Drawn Date:	Drawn By:	Revision Mode
A	6-16-06		
B	7-05-06		
C	10-02-06		

Title
PLAN VIEW
BORING LAYOUT
AUXILIARY ASH POND – PHASE I

Location and Unit:
E.W. BROWN GENERATING STATION

Scale: 1"= 100'
Drawn: TJ/CDV
Date: MAY, 2006
Checked: VJS/KOH
Approved:

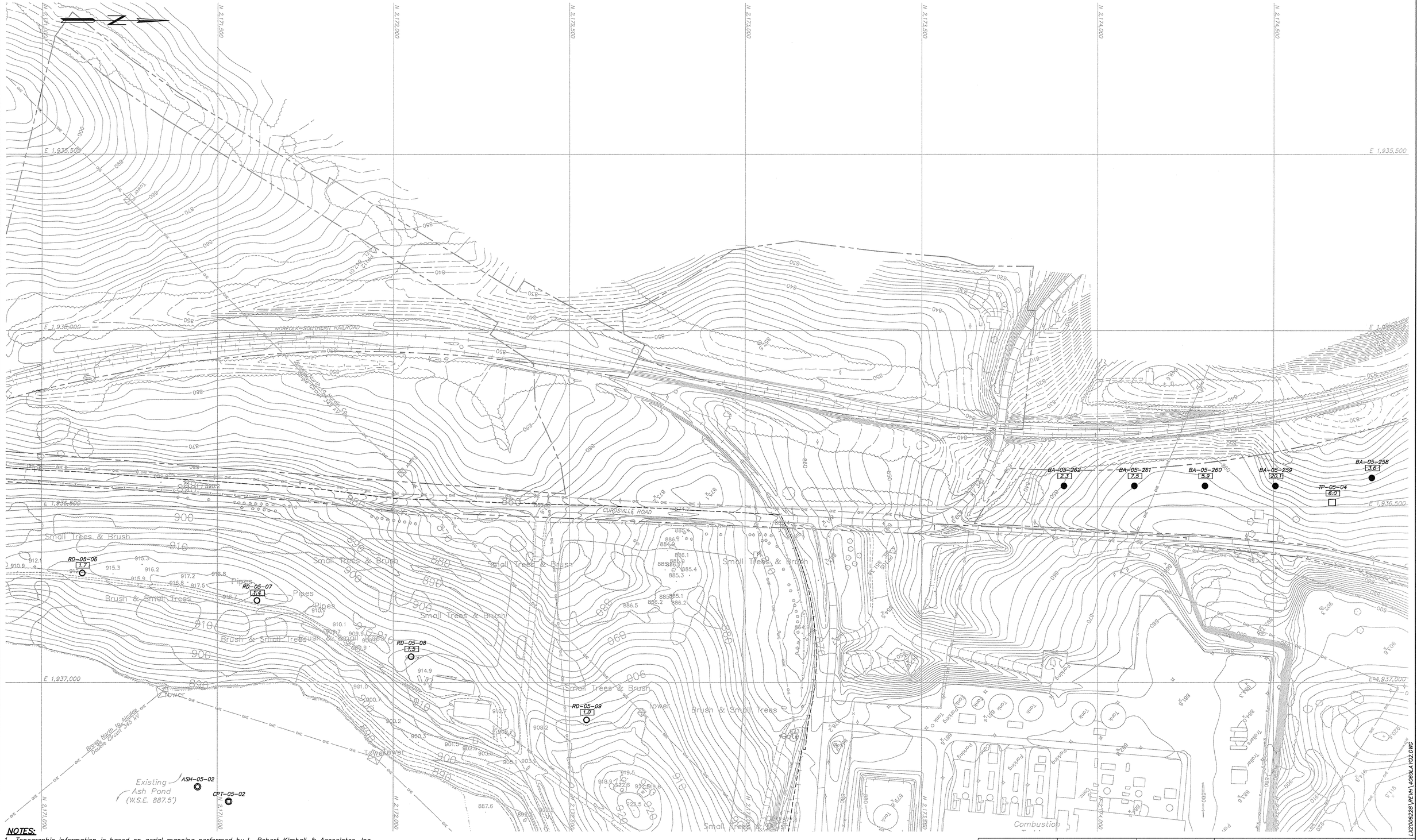
JOB NO.	JOB NO.	JOB NO.	JOB NO.
119961			

KU Kentucky Utilities Company, an e·on company

Drawing No: BRO-C-00196
Rev.: C

DMS Version 2.0

BR0-C-00197



NOTES:

1. *Topographic information is based on aerial mapping performed by L. Robert Kimball & Associates, Inc. Refer to general notes on Sheets 104–111 for complete explanation.*
2. *The boring logs and related information shown depict approximate conditions only at the specific boring locations at the time of drilling. Soil and rock conditions occurring at other locations may differ from conditions occurring at the boring locations. Also, the passage of time may result in a change in conditions at the boring locations. Any geologic correlations shown between borings on the drawings are generally based on straight–line interpolation. Actual conditions between borings are unknown and may differ from those shown. It shall be distinctly understood that neither the Owner nor the Owner's Representative will be responsible for any deduction, interpretation or conclusion drawn therefrom by the Contractor. The information is made available in order that the contractor may have ready access to the same information available to the Owner and the Owner's Representative and is not part of this contract.*
3. *It shall be distinctly understood that any reference to rock, soil, or any other material on the drawings or in the technical specifications whether in numbers, words, letters or lines, is solely for the Owner's information and is not to be taken as an indication of classified excavation or the quantity of any of the various materials involved. The bidder must draw his own conclusions as to the conditions likely to be encountered at the site.*

BORING LOCATION TABLE

Boring	Northing	Easting	Elevation (Feet)
ASH–05–02	2,171,469.9	1,937,272.3	892.0
BA–05–258	2,174,778.5	1,936,417.4	849.5
BA–05–259	2,174,505.2	1,936,440.4	854.0
BA–05–260	2,174,305.1	1,936,440.4	863.5
BA–05–261	2,174,105.1	1,936,440.4	860.9
BA–05–262	2,173,905.2	1,936,440.4	850.2
CPT–05–02	2,171,532.5	1,937,338.1	892.0
RD–05–06	2,171,116.0	1,936,888.4	911.9
RD–05–07	2,171,612.2	1,936,766.1	914.6
RD–05–08	2,172,050.7	1,936,926.2	913.0
RD–05–09	2,172,549.0	1,937,106.2	904.8
TP–05–04	2,174,666.0	1,936,487.3	857.5

LEGEND

- Soil Boring
- Soil Boring with Standard Penetration Tests
- Soil Boring with Rock Core
- Cone Penetration Tests
- Test Pit
- 7.8 Depth in feet to Auger Refusal

50 0 100 200 FEET
GRAPHIC SCALE: 1" = 100'
CONTOUR INTERVAL = 2'

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RELEASED FOR CONSTRUCTION - 10/02/06

Fuller Mossbarger Scott & May

ENGINEERS
LEXINGTON ST. LOUIS LOUISVILLE JEFFERSONVILLE CINCINNATI ATLANTA COLUMBUS NASHVILLE

REVISIONS				
Rev.	Drawn Date:	Drawn By:	Revision Mode	
A	6–16–06			
B	7–05–06			
C	10–02–06			

Title
PLAN VIEW
BORING LAYOUT
AUXILIARY ASH POND – PHASE I

Location and Unit:
E.W. BROWN GENERATING STATION

Scale: 1" = 100'
Drawn: TJ/CDV
Date: MAY, 2006
Checked: VJS/KOH
Approved:

Kentucky Utilities Company
an E·ON company

JOB NO.	JOB NO.	JOB NO.	JOB NO.	Drawing No:	Rev.
119961				BR0–C–00197	C

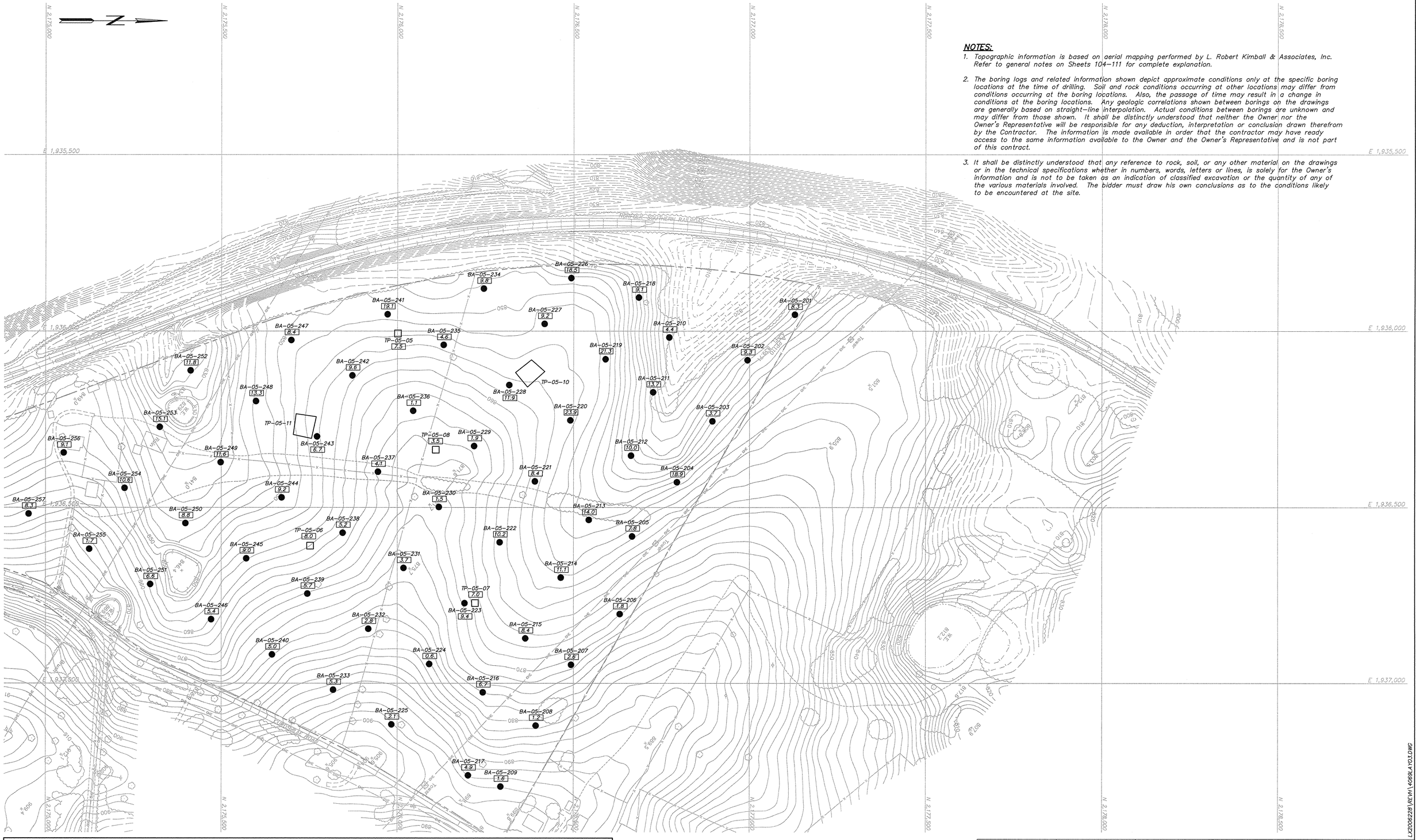
LX2006228\REVA\1409LAT02.DWG

DMS Version 2.0

BR0-C-00198

NOTES:

1. *Topographic information is based on aerial mapping performed by L. Robert Kimball & Associates, Inc. Refer to general notes on Sheets 104–111 for complete explanation.*
2. *The boring logs and related information shown depict approximate conditions only at the specific boring locations at the time of drilling. Soil and rock conditions occurring at other locations may differ from conditions occurring at the boring locations. Also, the passage of time may result in a change in conditions at the boring locations. Any geologic correlations shown between borings on the drawings are generally based on straight–line interpolation. Actual conditions between borings are unknown and may differ from those shown. It shall be distinctly understood that neither the Owner nor the Owner's Representative will be responsible for any deduction, interpretation or conclusion drawn therefrom by the Contractor. The information is made available in order that the contractor may have ready access to the same information available to the Owner and the Owner's Representative and is not part of this contract.*
3. *It shall be distinctly understood that any reference to rock, soil, or any other material on the drawings or in the technical specifications whether in numbers, words, letters or lines, is solely for the Owner's information and is not to be taken as an indication of classified excavation or the quantity of any of the various materials involved. The bidder must draw his own conclusions as to the conditions likely to be encountered at the site.*



BORING LOCATION TABLE

Boring	Northing	Easting	Elevation (Feet)	Boring	Northing	Easting	Elevation (Feet)	Boring	Northing	Easting	Elevation (Feet)	Boring	Northing	Easting	Elevation (Feet)
BA–05–201	2,177,128.6	1,935,953.3	836.2	BA–05–217	2,176,200.7	1,937,261.7	895.1	BA–05–233	2,175,817.2	1,937,018.1	893.0	BA–05–249	2,175,498.1	1,936,371.4	841.1
BA–05–202	2,176,994.3	1,936,082.1	837.6	BA–05–218	2,176,685.3	1,935,904.7	835.4	BA–05–234	2,176,244.8	1,935,879.2	849.0	BA–05–250	2,175,397.9	1,936,544.5	844.6
BA–05–203	2,176,894.5	1,936,255.1	842.1	BA–05–219	2,176,591.0	1,936,079.4	850.3	BA–05–235	2,176,130.8	1,936,038.9	855.6	BA–05–251	2,175,297.8	1,936,717.7	858.4
BA–05–204	2,176,793.9	1,936,428.1	849.7	BA–05–220	2,176,491.0	1,936,252.6	854.2	BA–05–236	2,176,044.6	1,936,225.4	866.6	BA–05–252	2,175,412.2	1,936,111.4	828.7
BA–05–205	2,176,667.1	1,936,582.1	854.9	BA–05–221	2,176,390.8	1,936,425.8	857.6	BA–05–237	2,175,944.5	1,936,398.5	868.0	BA–05–253	2,175,324.8	1,936,271.4	839.0
BA–05–206	2,176,632.2	1,936,802.9	867.4	BA–05–222	2,176,290.7	1,936,598.9	861.4	BA–05–238	2,175,844.3	1,936,571.8	863.1	BA–05–254	2,175,224.9	1,936,444.5	852.6
BA–05–207	2,176,493.5	1,936,947.2	871.3	BA–05–223	2,176,190.6	1,936,772.0	870.2	BA–05–239	2,175,744.2	1,936,745.0	872.4	BA–05–255	2,175,124.7	1,936,617.6	867.0
BA–05–208	2,176,393.3	1,937,120.3	882.1	BA–05–224	2,176,090.4	1,936,945.1	883.5	BA–05–240	2,175,644.0	1,936,918.0	879.5	BA–05–256	2,175,051.7	1,936,344.3	853.0
BA–05–209	2,176,293.3	1,937,293.5	896.8	BA–05–225	2,175,983.0	1,937,117.0	897.9	BA–05–241	2,175,971.6	1,935,852.1	852.0	BA–05–257	2,174,951.5	1,936,517.6	862.3
BA–05–210	2,176,771.8	1,936,017.7	821.0	BA–05–226	2,176,493.0	1,935,849.4	845.5	BA–05–242	2,175,871.5	1,936,125.4	858.4	TP–05–05	2,176,001.1	1,936,006.6	856.6
BA–05–211	2,176,726.3	1,936,173.1	830.9	BA–05–227	2,176,417.8	1,935,979.3	853.0	BA–05–243	2,175,771.3	1,936,298.4	857.0	TP–05–06	2,175,752.0	1,936,608.7	862.5
BA–05–212	2,176,663.8	1,936,352.9	838.5	BA–05–228	2,176,317.7	1,936,152.5	857.5	BA–05–244	2,175,671.2	1,936,471.6	850.4	TP–05–07	2,176,220.3	1,936,771.7	869.5
BA–05–213	2,176,543.7	1,936,535.3	850.5	BA–05–229	2,176,217.6	1,936,325.6	868.3	BA–05–245	2,175,571.0	1,936,644.7	858.7	TP–05–08	2,176,108.6	1,936,336.1	871.0
BA–05–214	2,176,464.2	1,936,699.2	856.4	BA–05–230	2,176,117.5	1,936,498.7	871.4	BA–05–246	2,175,470.9	1,936,818.0	861.7	TP–05–10	2,176,375.7	1,936,115.8	857.1
BA–05–215	2,176,363.6	1,936,872.1	865.4	BA–05–231	2,176,017.5	1,936,671.7	875.9	BA–05–247	2,175,698.4	1,936,025.3	852.4	TP–05–11	2,175,734.2	1,936,269.8	857.4
BA–05–216	2,176,242.8	1,937,025.5	877.2	BA–05–232	2,175,917.3	1,936,845.0	882.3	BA–05–248	2,175,598.2	1,936,198.3	848.4				

LEGEND

- ● Soil Boring
- □ Test Pit
- 7.8 Depth in feet to Auger Refusal

50 0 100 200 FEET
GRAPHIC SCALE: 1" = 100'
CONTOUR INTERVAL = 2'

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RELEASED FOR CONSTRUCTION - 10/02/06

Fuller Massberger Scott & May

EMSM ENGINEERS
LEXINGTON ST. LOUIS LOUISVILLE JEFFERSONVILLE CINCINNATI ATLANTA COLUMBUS NASHVILLE

REVISIONS

Rev.	Drawn Date:	Drawn By:	Revision Made
A	6–16–06		
B	7–05–06		
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Title
PLAN VIEW
BORING LAYOUT
AUXILIARY ASH POND – PHASE I

Location and Unit:
E.W. BROWN GENERATING STATION

Scale: 1"= 100'
Drawn: TJ/CDV
Date: MAY, 2006
Checked: WJS/KOH
Approved:

Kentucky Utilities Company
an E·ON company

JOB NO.	JOB NO.	JOB NO.	JOB NO.	Drawing No:	Rev.
119961				BR0–C–00198	C

DMS Version 2.0

LX2006228\REVA\14696A1103.DWG

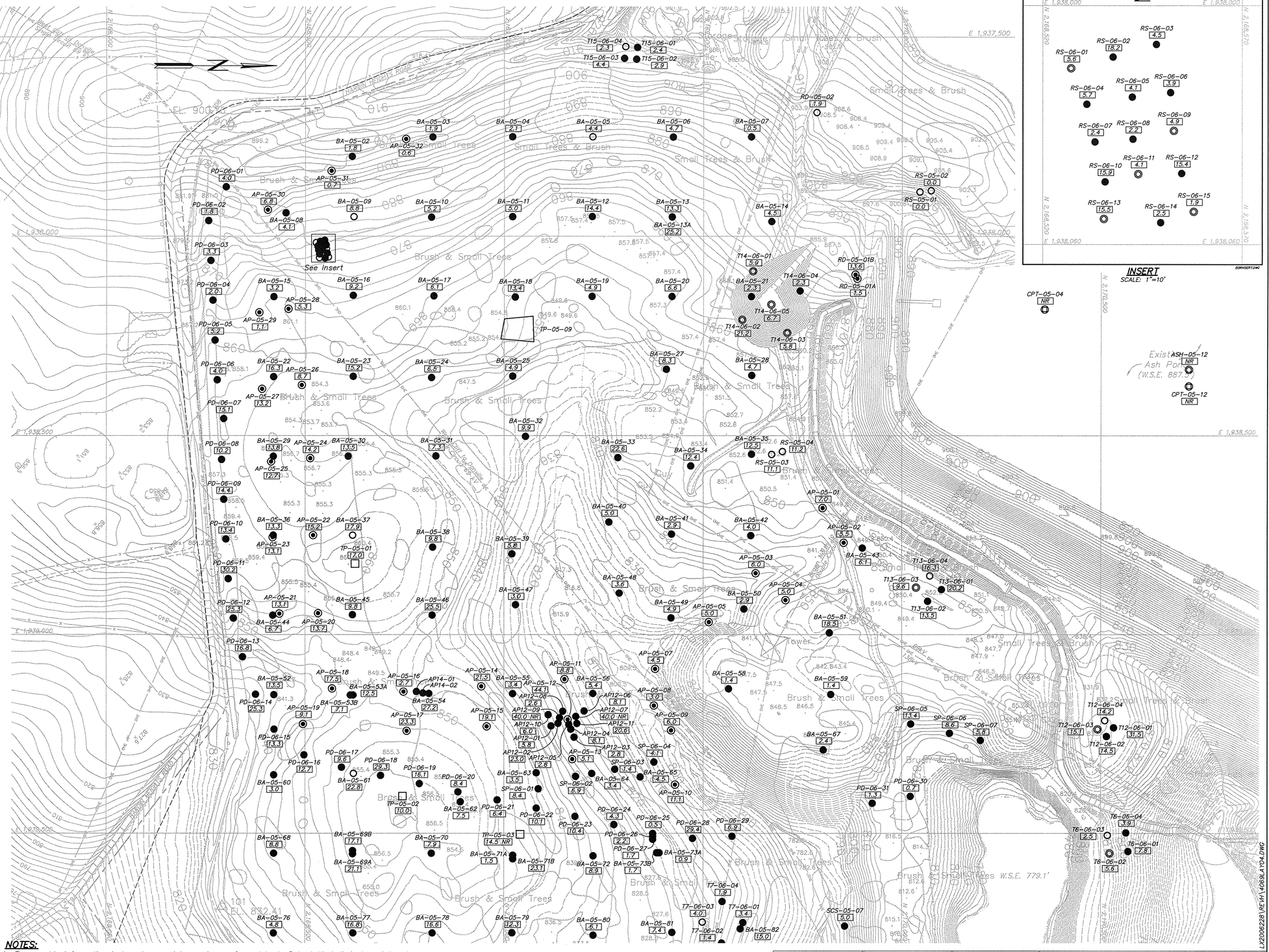
BR0-C-00199

LEGEND

- Soil Boring
- Soil Boring with Standard Penetration Tests
- Soil Boring with Standard Penetration Tests and Rock Core
- Soil Boring with Rock Core
- Cone Penetration Tests
- Test Pit
- 7.8 Depth in feet to Auger Refusal

BORING LOCATION TABLE

Boring	Northing	Easting	Elevation (Feet)	Boring	Northing	Easting	Elevation (Feet)
AP-05-01	2,169,800.4	1,938,681.6	848.2	BA-05-68	2,168,421.0	1,939,550.5	843.8
AP-05-02	2,169,853.4	1,938,768.8	846.8	BA-05-69A	2,168,620.0	1,939,551.8	853.9
AP-05-03	2,169,632.4	1,938,845.4	837.2	BA-05-69B	2,168,620.0	1,939,543.8	853.9
AP-05-04	2,169,707.6	1,938,913.2	845.9	BA-05-70	2,168,818.0	1,939,550.4	853.1
AP-05-05	2,169,514.5	1,938,968.3	825.3	BA-05-71A	2,169,022.3	1,939,555.4	849.3
AP-05-07	2,169,379.7	1,939,086.0	811.7	BA-05-71B	2,169,022.3	1,939,564.4	849.3
AP-05-08	2,169,376.6	1,939,178.6	805.4	BA-05-72	2,169,224.5	1,939,556.9	834.9
AP-05-09	2,169,412.4	1,939,243.5	802.6	BA-05-73A	2,169,389.8	1,939,549.1	825.5
AP-05-10	2,169,431.4	1,939,381.0	805.2	BA-05-73B	2,169,383.8	1,939,549.1	825.5
AP-05-11	2,169,152.2	1,939,111.9	822.2	BA-05-76	2,168,420.8	1,939,751.0	837.6
AP-05-12	2,169,160.1	1,939,213.6	824.9	BA-05-77	2,168,621.0	1,939,750.9	847.6
AP-05-13	2,169,171.8	1,939,313.4	828.9	BA-05-78	2,168,820.6	1,939,750.8	845.5
AP-05-14	2,168,943.4	1,939,130.1	843.9	BA-05-79	2,169,020.8	1,939,750.6	842.0
AP-05-15	2,168,956.8	1,939,252.8	852.4	BA-05-80	2,169,224.8	1,939,756.4	834.4
AP-05-16	2,168,747.2	1,939,143.4	848.8	BA-05-81	2,169,422.0	1,939,749.6	826.1
AP-05-17	2,168,755.3	1,939,242.2	852.7	BA-05-82	2,169,594.5	1,939,740.5	807.3
AP-05-18	2,168,568.2	1,939,135.6	846.3	CPT-05-04	2,170,358.2	1,938,183.3	892.0
AP-05-19	2,168,494.9	1,939,225.0	845.4	CPT-05-12	2,170,720.8	1,938,375.8	892.0
AP-05-20	2,168,533.0	1,938,946.0	852.3	PD-06-01	2,168,300.7	1,937,875.8	886.5
AP-05-21	2,168,435.4	1,938,947.2	853.1	PD-06-02	2,168,256.8	1,937,960.6	878.1
AP-05-22	2,168,520.3	1,938,749.9	858.8	PD-06-03	2,168,262.4	1,938,060.6	870.2
AP-05-23	2,168,418.2	1,938,754.9	857.3	PD-06-04	2,168,267.8	1,938,160.2	865.1
AP-05-24	2,168,512.9	1,938,556.6	856.0	PD-06-05	2,168,273.1	1,938,260.3	860.9
AP-05-25	2,168,414.0	1,938,565.0	855.2	PD-06-06	2,168,278.7	1,938,360.0	858.0
AP-05-26	2,168,491.4	1,938,372.9	854.8	PD-06-07	2,168,295.0	1,938,457.0	857.5
AP-05-27	2,168,391.0	1,938,382.7	856.4	PD-06-08	2,168,289.9	1,938,559.7	857.8
AP-05-28	2,168,457.5	1,938,182.0	861.6	PD-06-09	2,168,295.4	1,938,659.7	858.9
AP-05-29	2,168,383.7	1,938,190.8	863.0	PD-06-10	2,168,300.9	1,938,759.6	858.4
AP-05-30	2,168,405.1	1,937,933.5	884.6	PD-06-11	2,168,306.8	1,938,859.3	856.5
AP-05-31	2,168,565.9	1,937,835.8	891.9	PD-06-12	2,168,319.7	1,938,958.5	851.1
AP-05-32	2,168,752.6	1,937,756.0	898.1	PD-06-13	2,168,342.6	1,939,055.8	842.8
AP12-01	2,169,118.1	1,939,229.9	829.0	PD-06-14	2,168,375.2	1,939,150.2	838.6
AP12-02	2,169,135.7	1,939,223.3	827.7	PD-06-15	2,168,421.8	1,939,238.2	840.0
AP12-03	2,169,176.3	1,939,258.0	825.7	PD-06-16	2,168,497.6	1,939,302.7	849.0
AP12-04	2,169,168.1	1,939,238.0	825.6	PD-06-17	2,168,592.2	1,939,333.9	852.1
AP12-05	2,169,163.1	1,939,226.4	825.1	PD-06-18	2,168,689.8	1,939,354.6	855.3
AP12-06	2,169,201.8	1,939,192.2	818.3	PD-06-19	2,168,787.6	1,939,375.0	857.2
AP12-07	2,169,180.8	1,939,205.9	822.4	PD-06-20	2,168,885.2	1,939,395.9	857.1
AP12-08	2,169,147.9	1,939,192.9	825.2	PD-06-21	2,168,983.5	1,939,416.2	850.7
AP12-09	2,169,139.8	1,939,209.2	826.7	PD-06-22	2,169,081.1	1,939,436.9	844.1
AP12-10	2,169,111.0	1,939,201.4	828.8	PD-06-23	2,169,178.7	1,939,457.7	835.6
AP12-11	2,169,183.4	1,939,223.6	823.0	PD-06-24	2,169,276.6	1,939,478.3	828.5
AP14-01	2,168,779.8	1,939,143.2	848.4	PD-06-25	2,169,373.8	1,939,500.6	824.5
AP14-02	2,168,796.3	1,939,146.7	849.0	PD-06-26	2,169,373.8	1,939,507.0	824.5
ASH-05-12	2,170,746.0	1,938,349.6	892.0	PD-06-27	2,169,373.8	1,939,515.0	824.5
BA-05-02	2,168,617.9	1,937,799.7	896.7	PD-06-28	2,169,473.5	1,939,512.9	810.7
BA-05-03	2,168,820.4	1,937,750.9	895.2	PD-06-29	2,169,573.4	1,939,507.5	799.3
BA-05-04	2,169,020.8	1,937,750.6	884.0	PD-06-30	2,170,021.8	1,939,407.1	820.0
BA-05-05	2,169,222.5	1,937,750.6	878.5	PD-06-31	2,169,925.9	1,939,424.5	820.8
BA-05-06	2,169,423.7	1,937,751.2	880.8	RD-05-01A	2,169,887.1	1,938,106.1	880.6
BA-05-07	2,169,620.9	1,937,750.7	890.1	RD-05-01B	2,169,882.1	1,938,096.1	885.0
BA-05-08	2,168,450.8	1,937,941.1	881.8	RD-05-02	2,169,785.2	1,937,689.4	907.4
BA-05-09	2,168,622.1	1,937,950.8	878.0	RS-05-01	2,170,044.8	1,937,888.8	898.0
BA-05-10	2,168,817.2	1,937,952.0	875.1	RS-05-02	2,170,073.0	1,937,885.7	896.5
BA-05-11	2,169,020.8	1,937,950.8	862.9	RS-05-03	2,169,672.3	1,938,547.3	854.9
BA-05-12	2,169,221.1	1,937,950.5	858.8	RS-05-04	2,169,699.5	1,938,539.9	855.1
BA-05-13	2,169,421.1	1,937,951.4	864.9	RS-06-01	2,168,527.1	1,938,015.8	874.4
BA-05-14	2,169,671.9	1,937,963.0	878.9	RS-06-02	2,168,537.6	1,938,012.9	874.8
BA-05-15	2,168,420.6	1,938,151.6	862.7	RS-06-03	2,168,548.5	1,938,009.8	874.8
BA-05-16	2,168,620.6	1,938,148.3	863.5	RS-06-04	2,168,531.1	1,938,024.8	873.7
BA-05-17	2,168,823.1	1,938,149.4	860.0	RS-06-05	2,168,542.4	1,938,023.0	873.4
BA-05-18	2,169,027.5	1,938,152.4	854.7	RS-06-06	2,168,552.1	1,938,021.9	873.5
BA-05-19	2,169,220.7	1,938,150.7	851.5	RS-06-07	2,168,533.1	1,938,034.3	872.6
BA-05-20	2,169,420.9	1,938,151.0	855.4	RS-06-08	2,168,542.6	1,938,033.6	872.6
BA-05-21	2,169,620.9	1,938,151.2	866.4	RS-06-09	2,168,552.9	1,938,031.5	872.5
BA-05-22	2,168,420.3	1,938,352.2	856.7	RS-06-10	2,168,535.6	1,938,044.3	871.9
BA-05-23	2,168,620.9	1,938,351.3	856.2	RS-06-11	2,168,543.9	1,938,042.3	871.6
BA-05-24	2,168,817.6	1,938,354.1	850.4	RS-06-12	2,168,554.9	1,938,042.2	871.8
BA-05-25	2,169,021.4	1,938,350.8	844.6	RS-06-13	2,168,535.3	1,938,053.6	870.8
BA-05-27	2,169,407.0	1,938,333.5	850.8	RS-06-14	2,168,549.6	1,938,054.5	870.5
BA-05-28	2,169,622.2	1,938,348.9	856.9	RS-06-15	2,168,557.9	1,938,051.8	870.1
BA-05-29	2,168,419.9	1,938,551.7	854.9	SCS-05-07	2,169,656.6	1,939,733.6	783.1
BA-05-30	2,168,608.5	1,938,551.4	856.1	SP-06-01	2,169,086.0	1,939,388.0	841.0
BA-05-31	2,168,828.8	1,938,550.9	846.6	SP-06-02	2,169,180.3	1,939,356.9	830.9
BA-05-32	2,169,053.6	1,938,501.8	836.1	SP-06-03	2,169,278.7	1,939,339.0	820.8
BA-05-33	2,169,286.0	1,938,555.1	848.3	SP-06-04	2,169,376.8	1,939,320.7	805.8
BA-05-34	2,169,468.4	1,938,575.9	853.0	SP-06-05	2,170,022.7	1,939,225.0	831.8
BA-05-35	2,169,621.7	1,938,546.5	852.6	SP-06-06	2,170,120.1	1,939,248.1	827.3
BA-05-36	2,168,419.9	1,938,749.7	857.0	SP-06-07	2,170,197.3	1,939,266.2	825.2
BA-05-37	2,168,619.8	1,938,749.9	860.1	T6-06-01	2,170,568.4	1,939,545.9	808.2
BA-05-38	2,168,820.8	1,938,750.0	852.1	T6-06-02	2,170,722.2	1,939,550.6	813.6
BA-05-39	2,169,019.8	1,938,796.9	825.7	T6-06-03	2,170,516.6	1,939,505.0	814.0
BA-05-40	2,169,263.7	1,938,716.8	832.7	T6-06-04	2,170,562.9	1,939,498.8	806.8
BA-05-41	2,169,420.3	1,938,747.1	844.4	T7-06-01	2,169,601.1	1,939,724.7	807.4
BA-05-42	2,169,620.2	1,938,750.9	845.2	T7-06-02	2,169,547.3	1,939,776.3	810.3
BA-05-43	2,169,900.5	1,938,782.2	847.7	T7-06-03	2,169,498.4	1,939,723.4	817.8
BA-05-44	2,168,418.7	1,938,951.2	853.2	T7-06-04	2,169,548.6	1,939,671.8	810.5
BA-05-45	2,168,619.4	1,938,949.9	854.1	T12-06-01	2,170,532.1	1,939,234.2	830.7
BA-05-46	2,168,819.8	1,938,950.7	847.2	T12-06-02	2,170,514.2	1,939,256.2	830.8
BA-05-47	2,169,029.0	1,938,924.7	824.2	T12-06-03	2,170,492.1	1,939,238.2	831.4
BA-05-48	2,169,289.9	1,938,895.4	823.5	T12-06-04	2,170,510.1	1,939,216.2	831.3
BA-05-49	2,169,419.3	1,938,957.8	823.8	T13-06-01	2,170,100.1	1,938,886.5	853.7
BA-05-50	2,169,603.2	1,938,935.5	838.6	T13-06-02	2,170,065.4	1,938,916.0	851.7
BA-05-51	2,169,817.7	1,938,995.3	851.1	T13-06-03	2,170,035.9	1,938,881.4	852.0
BA-05-52	2,168,421.4	1,939,151.1	839.0	T13-06-04	2,170,070.6	1,938,852.1	854.2
BA-05-53A	2,168,621.0	1,939,152.0	848.2	T14-06-01	2,169,625.2	1,938,087.4	869.2
BA-05-53B	2,168,614.0	1,939,152.0	848.2	T14-06-02	2,169,598.0	1,938,208.2	862.8
BA-05-54	2,168,811.5	1,939,148.0	850.3	T14-06-03	2,169,711.2	1,938,242.1	863.2
BA-05-55	2,169,021.9	1,939,148.6	835.5	T14-06-04	2,169,743.2	1,938,137.0	871.7
BA-05-56	2,169,223.9	1,939,148.0	814.1	T14-06-05	2,169,671.0	1,938,171.1	866.3
BA-05-58	2,169,564.5	1,939,136.3	847.9	T15-06-01	2,169,334.4	1,937,525.9	907.2
BA-05-59	2,169,821.1	1,939,150.4	845.0	T15-06-02	2,169,332.0	1,937,555.7	906.3
BA-05-60	2,168,421.1	1,939,353.0	841.9	T15-06-03	2,169,301.9	1,937,553.4	906.8
BA-05-61	2,168,622.0	1,939,349.4	853.1	T15-06-04	2,169,304.8	1,937,523.8	908.3
BA-05-62	2,168,891.0	1,939,420.9	856.4	TP-05-01	2,168,625.8	1,938,821.2	863.4
BA-05-63	2,169,081.1	1,939,347.9	839.3	TP-05-02	2,168,744.9	1,939,406.6	859.4
BA-05-64	2,169,221.0	1,939,349.6	827.1	TP-05-03	2,169,040.8	1,939,502.9	848.7
BA-05-65	2,169,342.4	1,939,358.1	814.0	TP-05-09	2,169,030.0	1,938,230.2	854.8
BA-05-67	2,169,802.4	1,939,290.3	846.3				



NOTES:

1. Topographic information is based on aerial mapping performed by L. Robert Kimball & Associates, Inc. Refer to general notes on Sheets 104–111 for explanation.
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50 0 100 200 FEET
GRAPHIC SCALE: 1" = 100'
CONTOUR INTERVAL = 2'

RELEASED FOR CONSTRUCTION - 10/02/06

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MAP 4	MAP 5	
MAP 6		

DAN A. BAIZE 13930 LICENSED PROFESSIONAL ENGINEER STATE OF KENTUCKY

REVISIONS			
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A	6-16-06		
B	7-05-06		
C	10-02-06		

Fuller Mossbarger Scott & May ENGINEERS — LEXINGTON, ST. LOUIS, LOUISVILLE, JEFFERSONVILLE, CINCINNATI, ATLANTA, COLUMBUS, NASHVILLE

Title
PLAN VIEW
BORING LAYOUT
AUXILIARY ASH POND – PHASE I

Location and Unit:
E.W. BROWN GENERATING STATION

Scale: 1"= 100'
Drawn: TJ/CDV
Date: MAY, 2006
Checked: MJS/KOH
Approved:

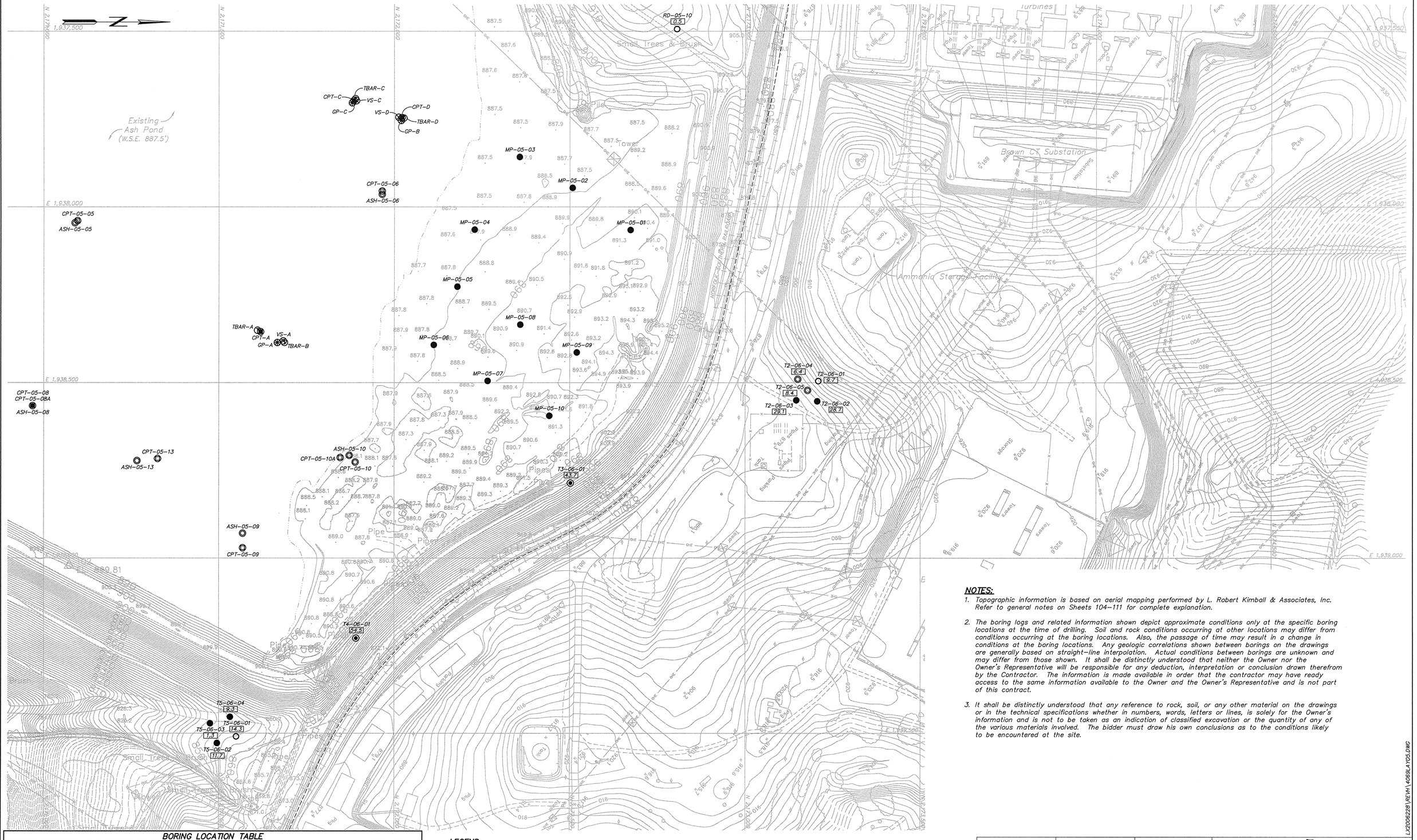
Kentucky Utilities Company, an E·ON company

JOB NO.	JOB NO.	JOB NO.	JOB NO.
119961			

Drawing No: BR0-C-00199
Rev. C

LX2006228.RCW\V06LAY04.DWG

DMS Version 2.0



BORING LOCATION TABLE

Boring	Northing	Easting	Elevation (Feet)	Boring	Northing	Easting	Elevation (Feet)	Boring	Northing	Easting	Elevation (Feet)
ASH-05-05	2,171,103.3	1,938,050.9	892.0	CPT-D	2,172,021.8	1,937,745.9	892.1	TBAR-C	2,171,889.1	1,937,692.1	891.6
ASH-05-06	2,171,994.6	1,937,974.7	892.0	GP-A	2,171,666.8	1,938,385.7	890.8	TBAR-D	2,172,027.0	1,937,747.3	892.6
ASH-05-08	2,170,974.3	1,938,575.4	892.0	GP-B	2,172,019.4	1,937,754.2	894.2	VS-A	2,171,683.6	1,938,381.2	890.3
ASH-05-09	2,171,582.9	1,938,950.2	892.0	GP-C	2,171,879.8	1,937,703.8	891.1	VS-C	2,171,891.8	1,937,698.0	891.7
ASH-05-10	2,171,871.5	1,938,707.2	892.0	MP-05-01	2,172,673.0	1,938,065.5	--	VS-D	2,172,012.2	1,937,744.9	892.3
ASH-05-12	2,170,746.0	1,938,349.6	892.0	MP-05-02	2,172,507.8	1,937,946.0	--	T2-06-01	2,173,208.3	1,938,495.2	891.5
ASH-05-13	2,171,267.2	1,938,722.5	892.0	MP-05-03	2,172,357.5	1,937,858.0	--	T2-06-02	2,173,205.5	1,938,552.8	884.5
CPT-05-05	2,171,088.7	1,938,045.2	892.0	MP-05-04	2,172,228.7	1,938,064.6	--	T2-06-03	2,173,146.0	1,938,550.0	879.9
CPT-05-06	2,171,965.3	1,937,954.8	892.0	MP-05-05	2,172,179.5	1,938,227.0	--	T2-06-04	2,173,150.4	1,938,490.0	883.5
CPT-05-08	2,170,959.5	1,938,561.1	892.0	MP-05-06	2,172,112.1	1,938,392.4	--	T2-06-05	2,173,178.2	1,938,521.7	884.9
CPT-05-08A	2,170,959.5	1,938,561.1	892.0	MP-05-07	2,172,266.2	1,938,494.8	--	T3-06-01	2,172,502.3	1,938,785.7	900.2
CPT-05-09	2,171,568.5	1,938,970.6	892.0	MP-05-08	2,172,359.1	1,938,334.8	--	T4-06-01	2,171,891.0	1,939,228.6	899.7
CPT-05-10	2,171,897.3	1,938,730.0	892.0	MP-05-09	2,172,520.2	1,938,414.0	--	T5-06-01	2,171,550.1	1,939,509.3	858.4
CPT-05-10A	2,171,846.1	1,938,713.2	892.0	MP-05-10	2,172,442.0	1,938,594.0	--	T5-06-02	2,171,495.3	1,939,528.2	855.7
CPT-05-13	2,171,325.4	1,938,716.0	892.0	R0-05-10	2,172,805.4	1,937,493.6	911.6	T5-06-03	2,171,475.4	1,939,471.8	849.9
CPT-A	2,171,619.6	1,938,355.0	889.2	TBAR-A	2,171,610.5	1,938,351.0	889.0	T5-06-04	2,171,532.7	1,939,453.5	852.8
CPT-C	2,171,884.2	1,937,697.4	891.9	TBAR-B	2,171,686.9	1,938,385.4	890.1				

LEGEND

- Soil Boring
- Soil Boring with Standard Penetration Tests
- Soil Boring with Rock Core
- Borings with Vane Shear Tests and Sampling Attempts
- Cone Penetration Tests
- Cone Penetration Tests with Downhole Seismic Tests
- T-bar Penetration Tests
- Borehole Geophysics (Gamma and Neutron Logging)
- 7.8 Depth in feet to Auger Refusal

50 0 100 200 FEET
GRAPHIC SCALE: 1" = 100'
CONTOUR INTERVAL = 2'

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RELEASED FOR CONSTRUCTION - 10/02/06

NOTES:

1. Topographic information is based on aerial mapping performed by L. Robert Kimball & Associates, Inc. Refer to general notes on Sheets 104-111 for complete explanation.
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Fuller Massbarger Scott & May

FMSM ENGINEERS
LEXINGTON ST. LOUIS LOUISVILLE JEFFERSONVILLE CINCINNATI ATLANTA COLUMBUS NASHVILLE

REVISIONS			
Rev.	Drawn Date:	Drawn By:	Revision Mode
A	6-16-06		
B	7-05-06		
C	10-02-06		

Title
PLAN VIEW
BORING LAYOUT
AUXILIARY ASH POND - PHASE I

Location and Unit:
E.W. BROWN GENERATING STATION

Scale: 1"= 100'
Drawn: TJ/CDV
Date: MAY, 2006
Checked: VJS/KOH
Approved:

Kentucky Utilities Company
an E·ON company

JOB NO.	JOB NO.	JOB NO.	JOB NO.	JOB NO.
119961				

Drawing No: BR0-C-00200
Rev.: C

DMS Version 2.0

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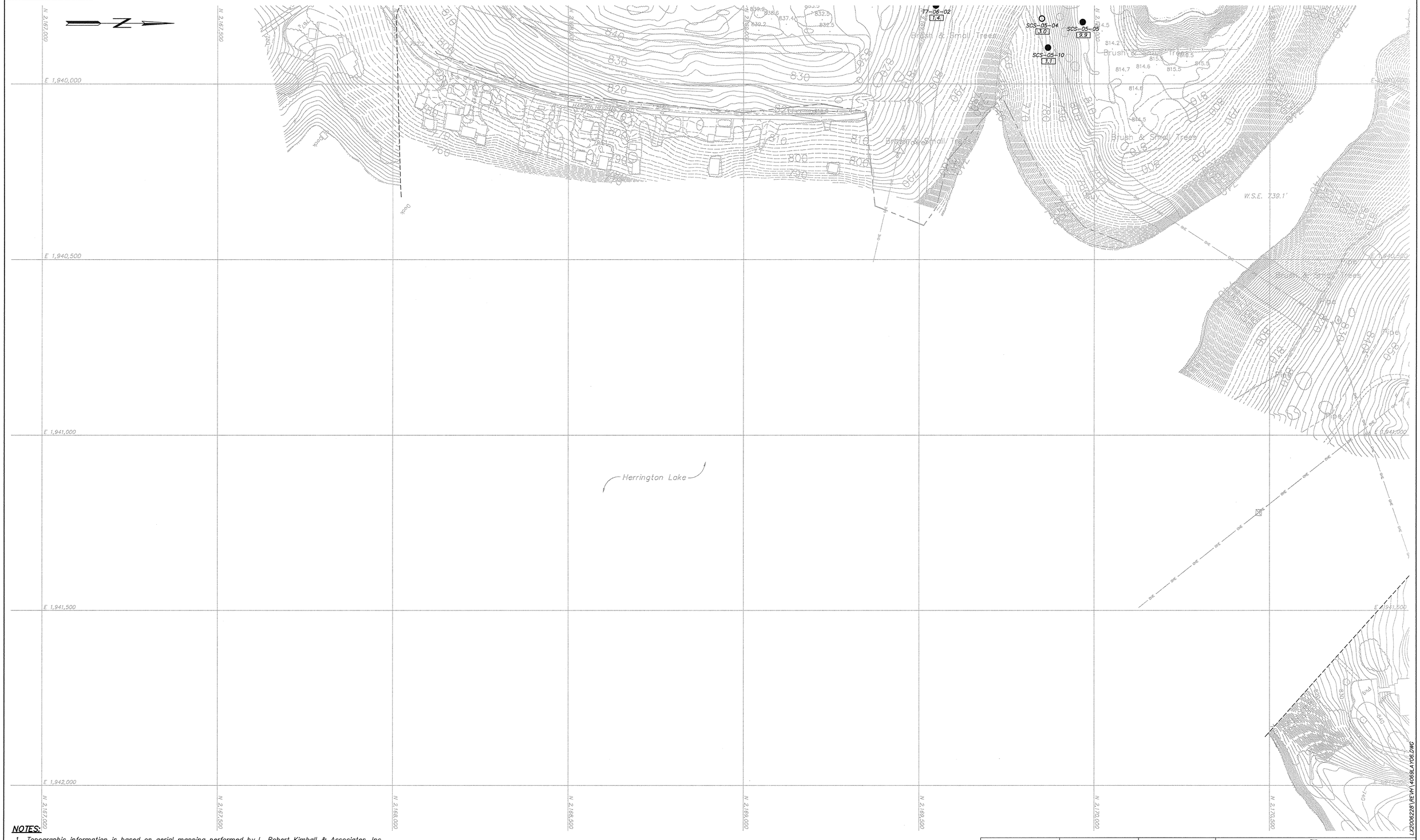
BR0-C-00201



NOTES:

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BORING LOCATION TABLE

Boring	Northing	Easting	Elevation (Feet)
SCS–05–04	2,169,850.1	1,939,813.6	782.1
SCS–05–05	2,169,966.6	1,939,823.4	815.8
SCS–05–10	2,169,867.4	1,939,896.4	786.5
T7–06–04	2,169,548.6	1,939,671.8	810.5

LEGEND

- ● Soil Boring
- 7.8 Depth in feet to Auger Refusal
- ○ Soil Boring with Rock Core

50 0 100 200 FEET
GRAPHIC SCALE: 1" = 100'
CONTOUR INTERVAL = 2'

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RELEASED FOR CONSTRUCTION - 10/02/06

Dan A. Back — 13918 — Licensed Professional Engineer — 6-16-06

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Rev.	Drawn Date:	Drawn By:	Revision Made	
A	6–16–06			
B	7–05–06			
C	10–02–06			

Fuller Massbarger Scott & May

EMSM ENGINEERS
LEXINGTON ST. LOUIS LOUISVILLE JEFFERSONVILLE CINCINNATI ATLANTA COLUMBUS NASHVILLE

Title
PLAN VIEW
BORING LAYOUT
AUXILIARY ASH POND – PHASE I

Location and Unit:
E.W. BROWN GENERATING STATION

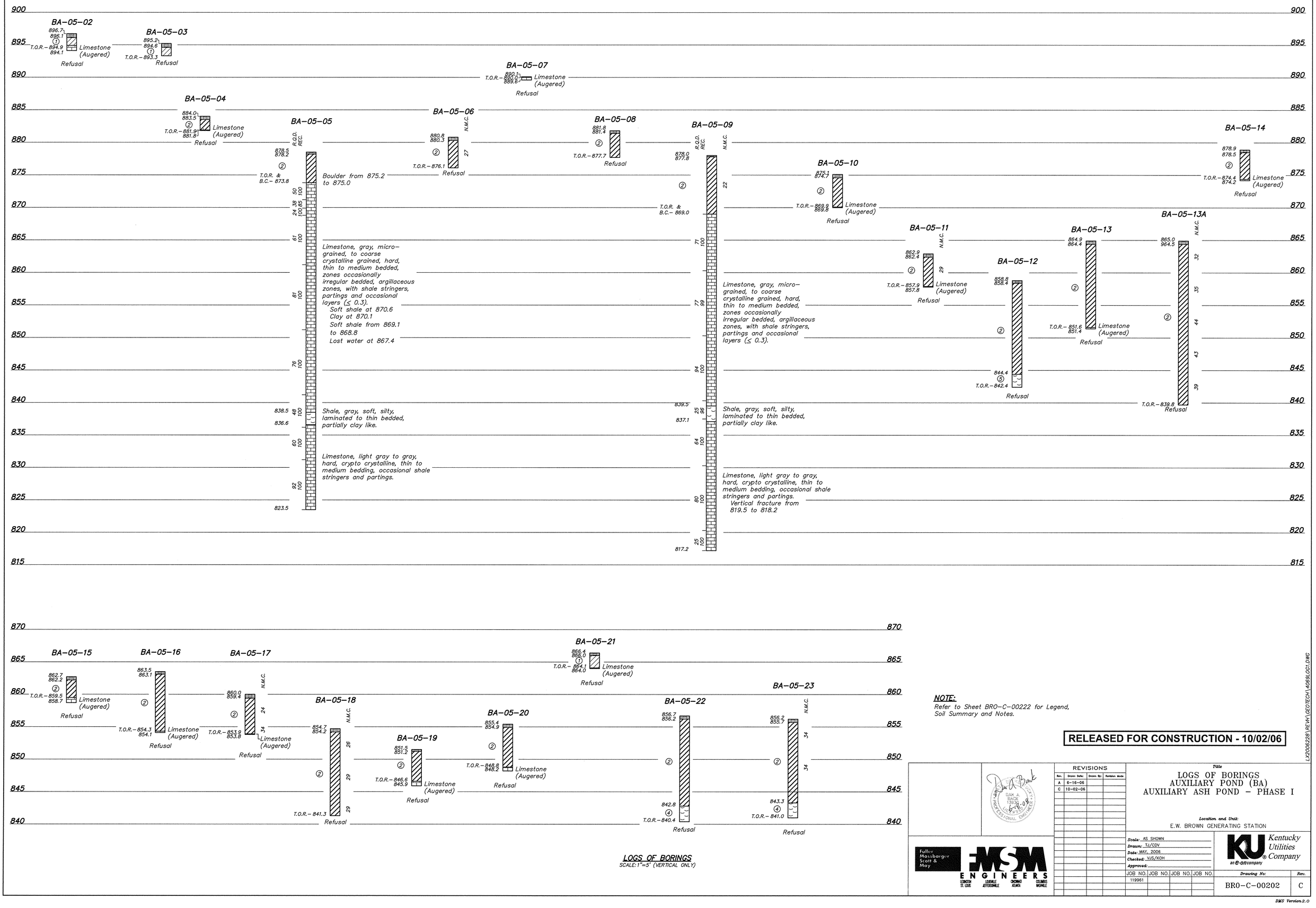
Scale: 1"= 100'
Drawn: TJ/CDV
Date: MAY, 2006
Checked: VJS/KOH
Approved:

Kentucky Utilities Company
an E·ON company

JOB NO.	JOB NO.	JOB NO.	JOB NO.
119961			

Drawing No: BR0–C–00201 Rev. C

DMS Version 2.0



LOGS OF BORINGS
SCALE: 1"=5" (VERTICAL ONLY)

NOTE:
Refer to Sheet BR0-C-00222 for Legend, Soil Summary and Notes.

RELEASED FOR CONSTRUCTION - 10/02/06

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REVISIONS				
Rev.	Drawn Date:	Drawn By:	Revision Made	
A	6-16-06			
C	10-02-06			

Title
LOGS OF BORINGS
AUXILIARY POND (BA)
AUXILIARY ASH POND – PHASE I

Location and Unit:
E.W. BROWN GENERATING STATION

Scale: AS SHOWN
Drawn: TJ/CDV
Date: MAY, 2006
Checked: WJS/KOH
Approved:

JOB NO.	JOB NO.	JOB NO.	JOB NO.
119961			

Drawing No: BR0-C-00202
Rev. C

Fuller Mossbarger Scott & May
EMSM ENGINEERS
LEXINGTON ST. LOUIS LOUISVILLE JEFFERSONVILLE CINCINNATI ATLANTA COLUMBUS NASHVILLE

Kentucky Utilities Company
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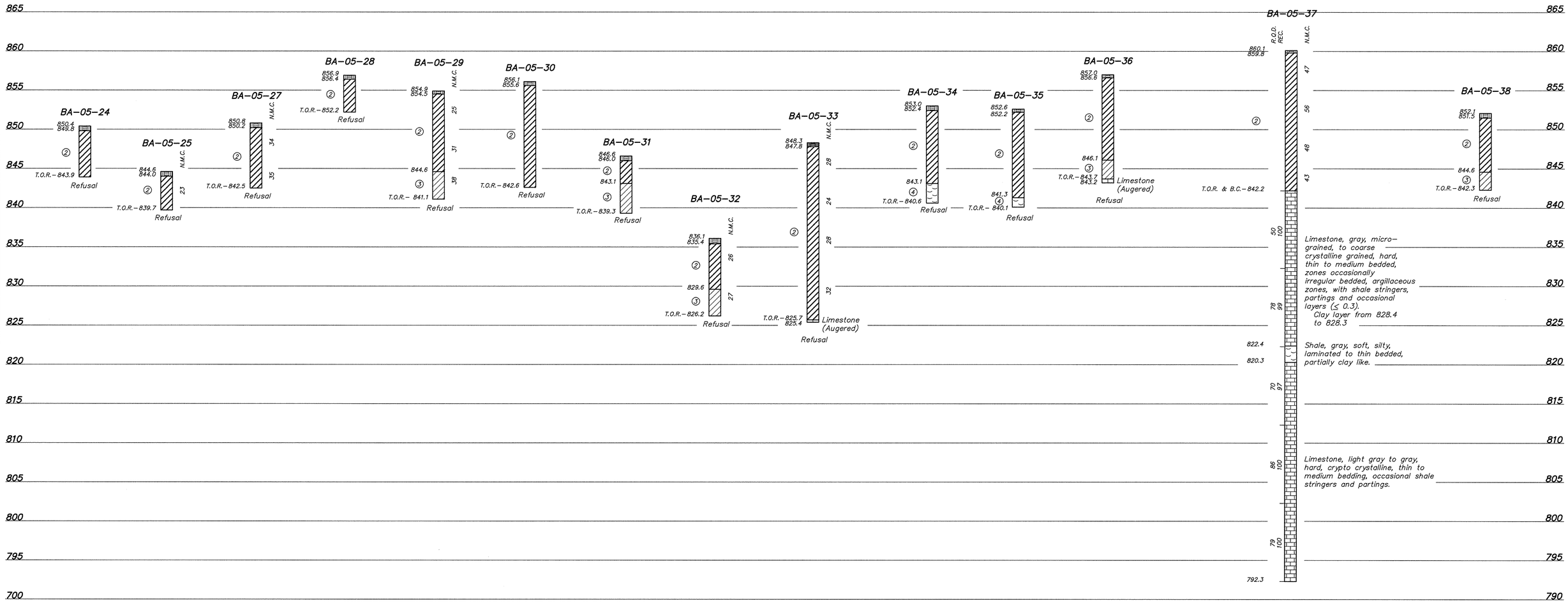
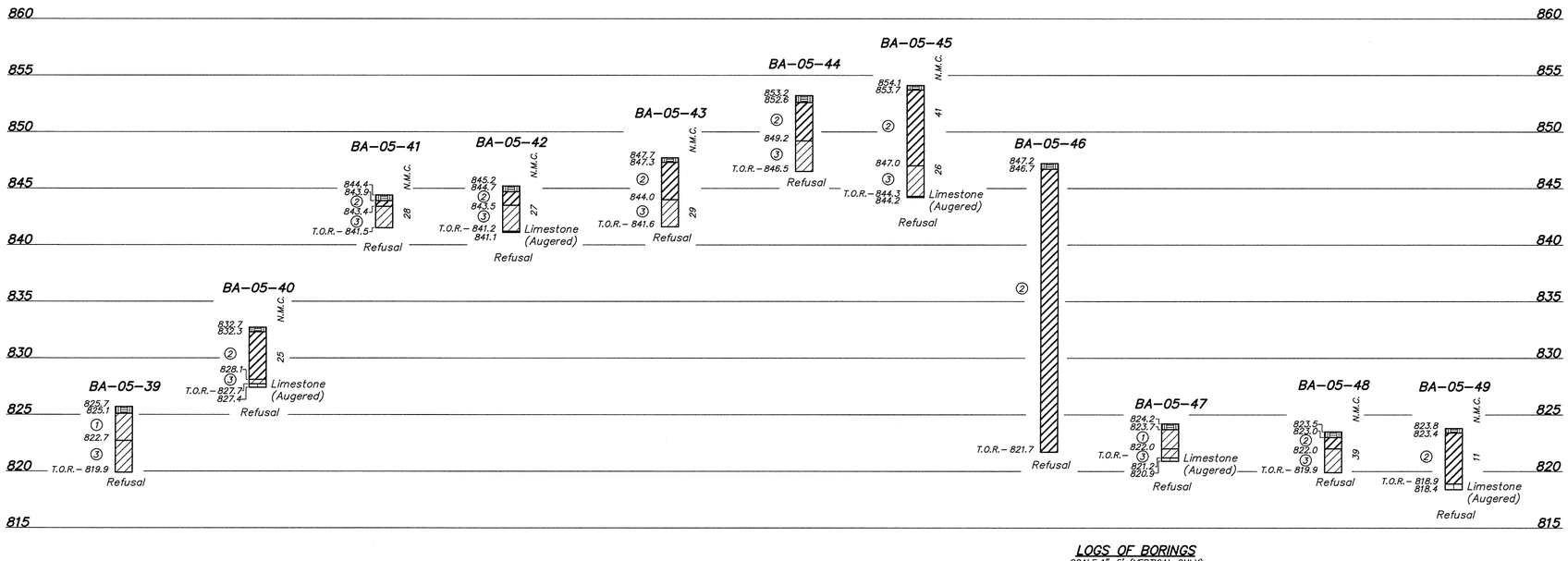
DMS Version 2.0

BR0-C-00203





LOGS OF BORINGS
SCALE: 1"=5' (VERTICAL ONLY)

NOTE:
Refer to Sheet BR0-C-00222 for Legend, Soil Summary and Notes.

RELEASED FOR CONSTRUCTION - 10/02/06

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REVISIONS			
Rev.	Drawn Date:	Drawn By:	Revision Mode
A	6-16-06		
C	10-02-06		

Title
LOGS OF BORINGS
AUXILIARY POND (BA)
AUXILIARY ASH POND – PHASE I

Location and Unit:
E.W. BROWN GENERATING STATION

Scale: AS SHOWN
Drawn: TJ/CDV
Date: MAY, 2006
Checked: VJS/KOH
Approved:

JOB NO.	JOB NO.	JOB NO.	JOB NO.	JOB NO.
119961				

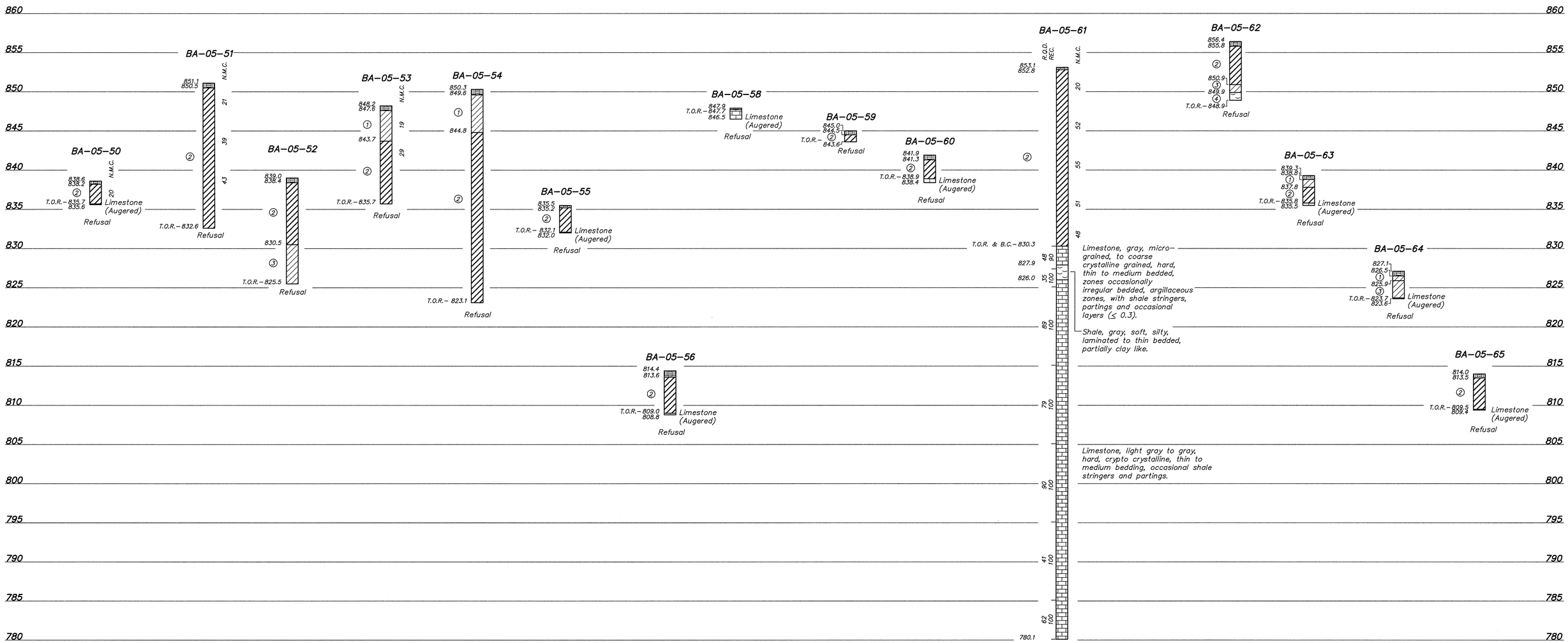
Drawing No: BR0-C-00203
Rev.: C

Fuller Mossbarger Scott & May
EMSM ENGINEERS
LEXINGTON ST. LOUIS LOUISVILLE JEFFERSONVILLE CINCINNATI ATLANTA COLUMBUS NASHVILLE

Kentucky Utilities Company
an E·ON company

DMS Version 2.0

BR0-C-00204



LOGS OF BORINGS
SCALE: 1"=5' (VERTICAL ONLY)

NOTE:
Refer to Sheet BRO-C-00222 for Legend, Soil Summary and Notes.

RELEASED FOR CONSTRUCTION - 10/02/06

LX2006228\REVIT\40BALOG3.DWG

REVISIONS			
Rev.	Drawn Date:	Drawn By:	Revision Made
A	6-16-06		
B	7-05-06		
C	10-02-06		

Title
LOGS OF BORINGS
AUXILIARY POND (BA)
AUXILIARY ASH POND – PHASE I

Location and Unit:
E.W. BROWN GENERATING STATION

Scale: AS SHOWN
Drawn: TJ/CDV
Date: MAY, 2006
Checked: VJS/KOH
Approved:

JOB NO.	JOB NO.	JOB NO.	JOB NO.
119961			

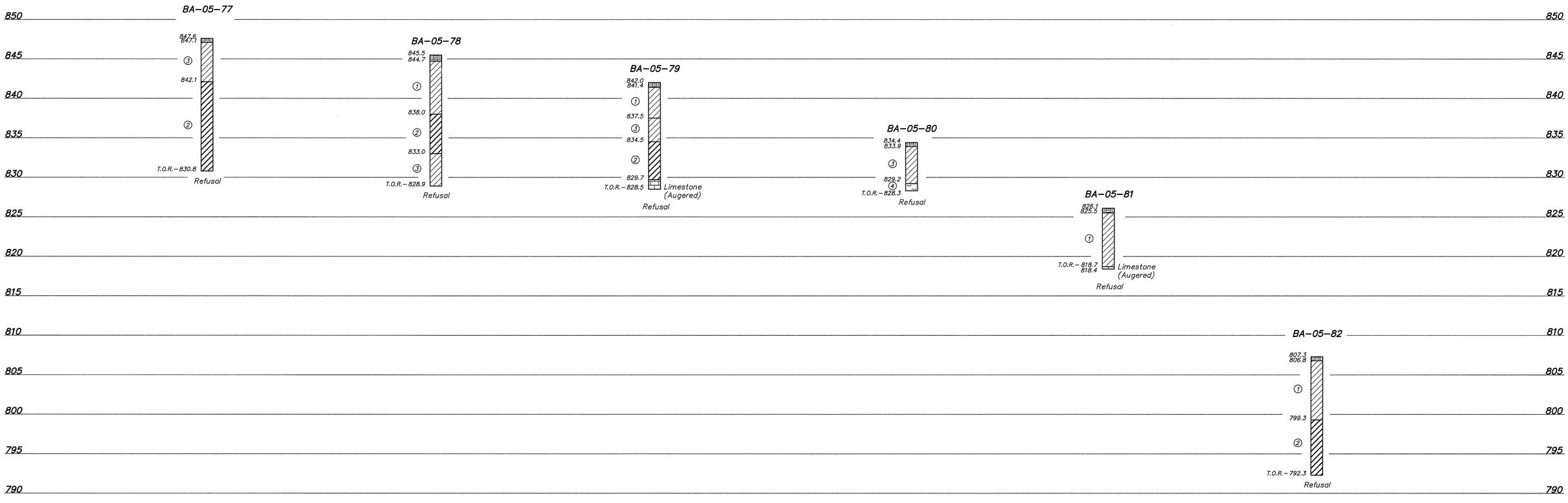
Drawing No: BR0-C-00204
Rev.: C

Fuller Massbarger Scott & May
FMSM ENGINEERS
LEXINGTON ST. LOUIS LOUISVILLE JEFFERSONVILLE CINCINNATI ATLANTA COLUMBUS NASHVILLE

Kentucky Utilities Company
an E·ON company

DMS Version 2.0

BR0-C-00205



LOGS OF BORINGS
SCALE: 1"=5' (VERTICAL ONLY)

NOTE:
Refer to Sheet BR0-C-00222 for Legend, Soil Summary and Notes.

RELEASED FOR CONSTRUCTION - 10/02/06

LX2006228\REVIT\40581LOG4.DWG

REVISIONS

Rev.	Drawn Date:	Drawn By:	Revision Mode
A	6-16-06		
C	10-02-06		

Title
LOGS OF BORINGS
AUXILIARY POND (BA)
AUXILIARY ASH POND – PHASE I

Location and Unit:
E.W. BROWN GENERATING STATION

Scale: AS SHOWN
Drawn: TJ/CDV
Date: MAY, 2006
Checked: VJS/KOH
Approved:

JOB NO.	JOB NO.	JOB NO.	JOB NO.
119961			

Drawing No: BR0-C-00205
Rev. C

Fuller Mossbarger Scott & May
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Kentucky Utilities Company
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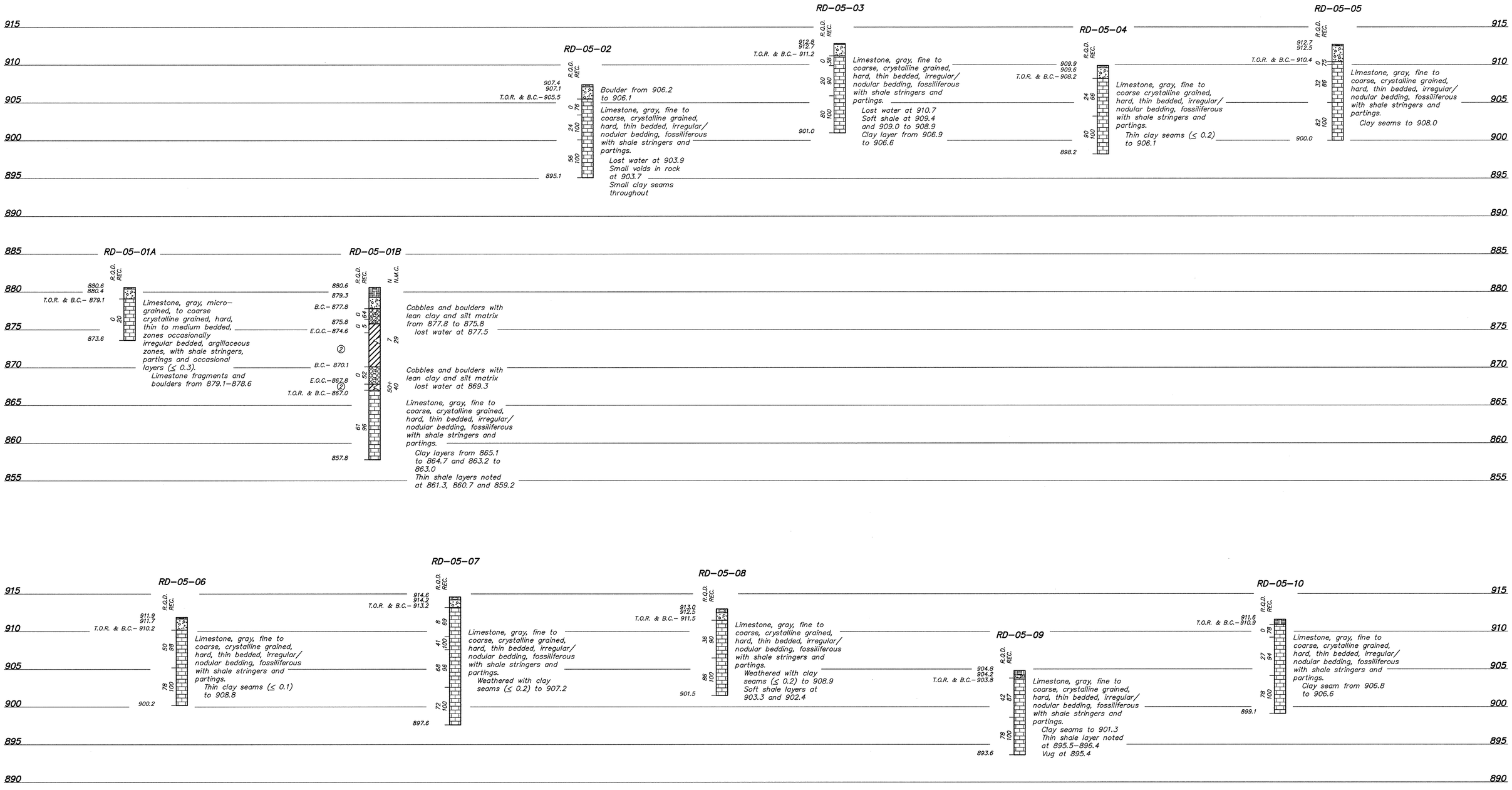
DMS Version 2.0



LOGS OF BORINGS
SCALE: 1" = 5' (VERTICAL ONLY)

NOTE:
Refer to Sheet BRO-C-00222 for Legend, Soil Summary and Notes.

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RELEASED FOR CONSTRUCTION - 10/02/06

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REVISIONS

Rev.	Drawn Date:	Drawn By:	Revision Mode
A	6-16-06		
C	10-02-06		

Title
LOGS OF BORINGS
AUXILIARY POND EMBANKMENT (RD)
AUXILIARY ASH POND – PHASE I

Location and Unit:
E.W. BROWN GENERATING STATION

Scale: AS SHOWN
Drawn: TJ/CDV
Date: MAY, 2006
Checked: VJS/KOH
Approved:

JOB NO.	JOB NO.	JOB NO.	JOB NO.
119961			

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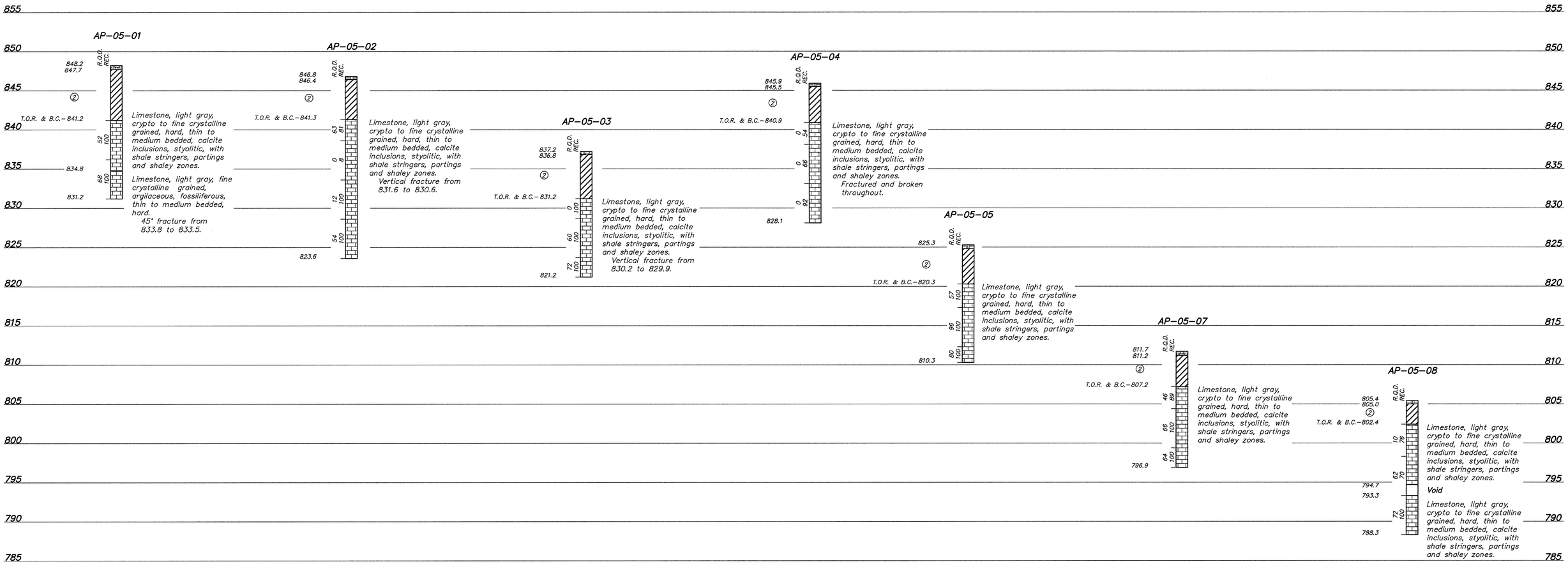
Drawing No: BRO-C-00206 Rev. C

DMS Version 2.0



NOTE:
Refer to Sheet BRO-C-00222 for Legend, Soil Summary and Notes.

RELEASED FOR CONSTRUCTION - 10/02/06

LOGS OF BORINGS
SCALE: 1" = 5' (VERTICAL ONLY)

REVISIONS			
Rev.	Drawn Date:	Drawn By:	Revision Made
A	6-16-06		
C	10-02-06		

Title
LOGS OF BORINGS
AUXILIARY POND EMBANKMENT (AP)
AUXILIARY ASH POND – PHASE I

Location and Unit:
E.W. BROWN GENERATING STATION

Scale: AS SHOWN
Drawn: TJ/CDV
Date: MAY, 2006
Checked: KJS/KOH
Approved:

JOB NO.	JOB NO.	JOB NO.	JOB NO.
119961			

Drawing No: BRO-C-00207
Rev.: C

Fuller Mossbarger Scott & May
EMSM ENGINEERS
LEXINGTON ST. LOUIS LOUISVILLE JEFFERSONVILLE CINCINNATI ASHWA COLUMBUS NICHOLLE

Kentucky Utilities Company
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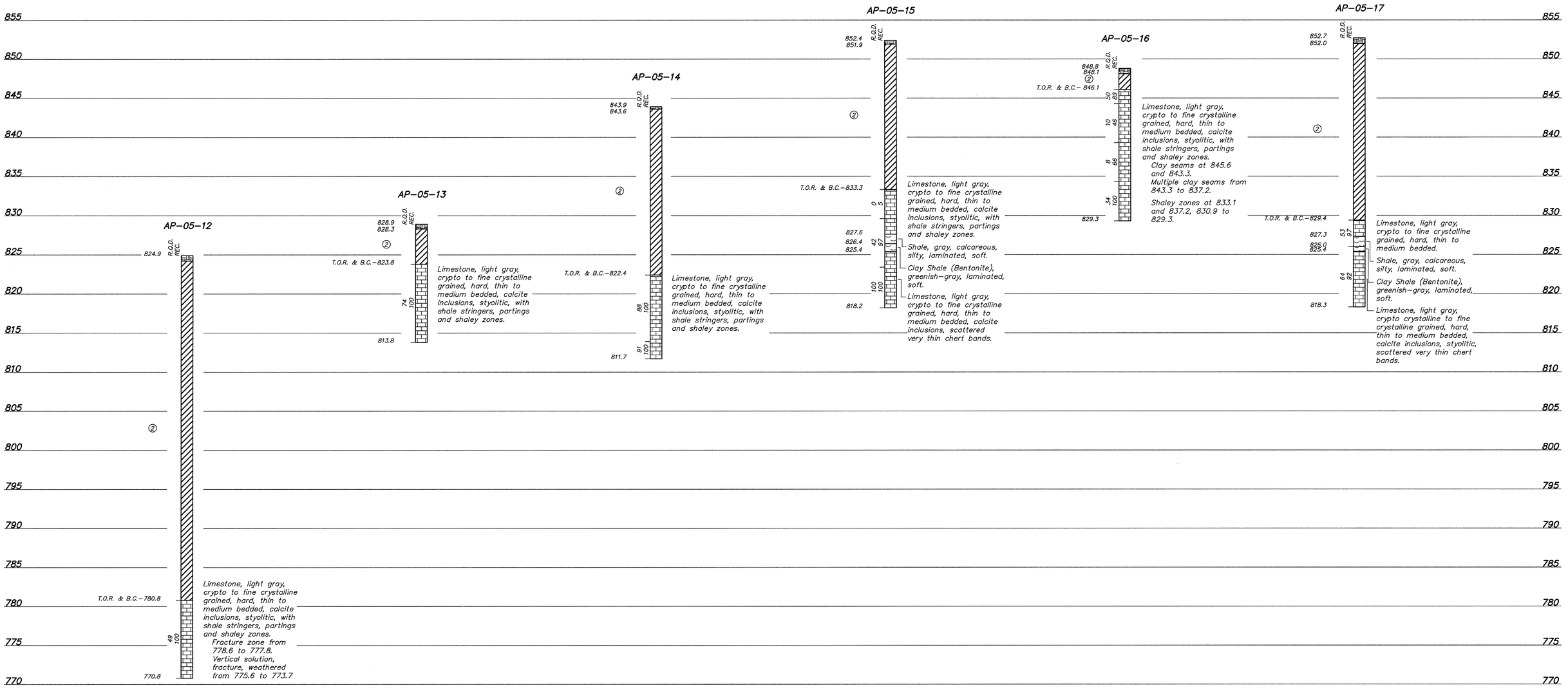
DMS Version 2.0



LOGS OF BORINGS
SCALE: 1" = 5' (VERTICAL ONLY)

NOTE:
Refer to Sheet BRO-C-00222 for Legend, Soil Summary and Notes.

RELEASED FOR CONSTRUCTION - 10/02/06

LZ2006228\REVA\068L007.DWG

REVISIONS			
Rev.	Drawn Date:	Drawn By:	Revision Mode
A	6-16-06		
C	10-02-06		

Title
LOGS OF BORINGS
AUXILIARY POND EMBANKMENT (AP)
AUXILIARY ASH POND - PHASE I

Location and Unit:
E.W. BROWN GENERATING STATION

Scale: AS SHOWN
Drawn: TJ/CDV
Date: MAY, 2006
Checked: VJS/KOH
Approved:

JOB NO.	JOB NO.	JOB NO.	JOB NO.
119961			

Drawing No: BRO-C-00208
Rev. C

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LEXINGTON ST. LOUIS LOUISVILLE JEFFERSONVILLE CINCINNATI ATLANTA COLUMBUS NASHVILLE

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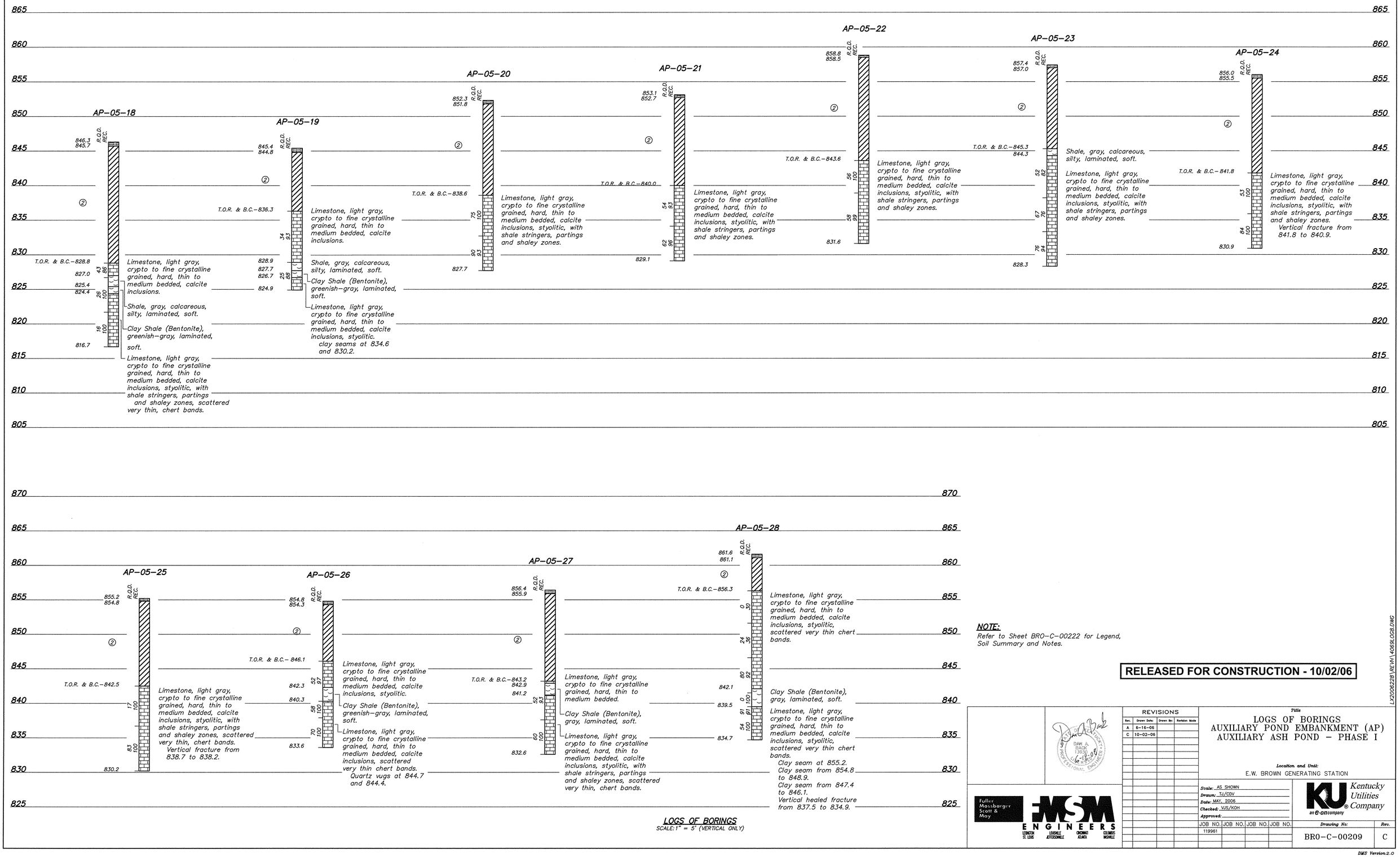


LOGS OF BORINGS
SCALE: 1" = 5' (VERTICAL ONLY)

NOTE:
Refer to Sheet BRO-C-00222 for Legend, Soil Summary and Notes.

RELEASED FOR CONSTRUCTION - 10/02/06

LX2006228\REVA\4069L008.DWG

DAM, A BACK 1303 6-16-06 PROFESSIONAL ENGINEER

REVISIONS			
Rev.	Drawn Date:	Drawn By:	Revision Mode
A	6-16-06		
C	10-02-06		

Title
LOGS OF BORINGS
AUXILIARY POND EMBANKMENT (AP)
AUXILIARY ASH POND – PHASE I

Location and Unit:
E.W. BROWN GENERATING STATION

Scale: AS SHOWN
Drawn: TJ/CDV
Date: MAY, 2006
Checked: WJS/KOH
Approved:

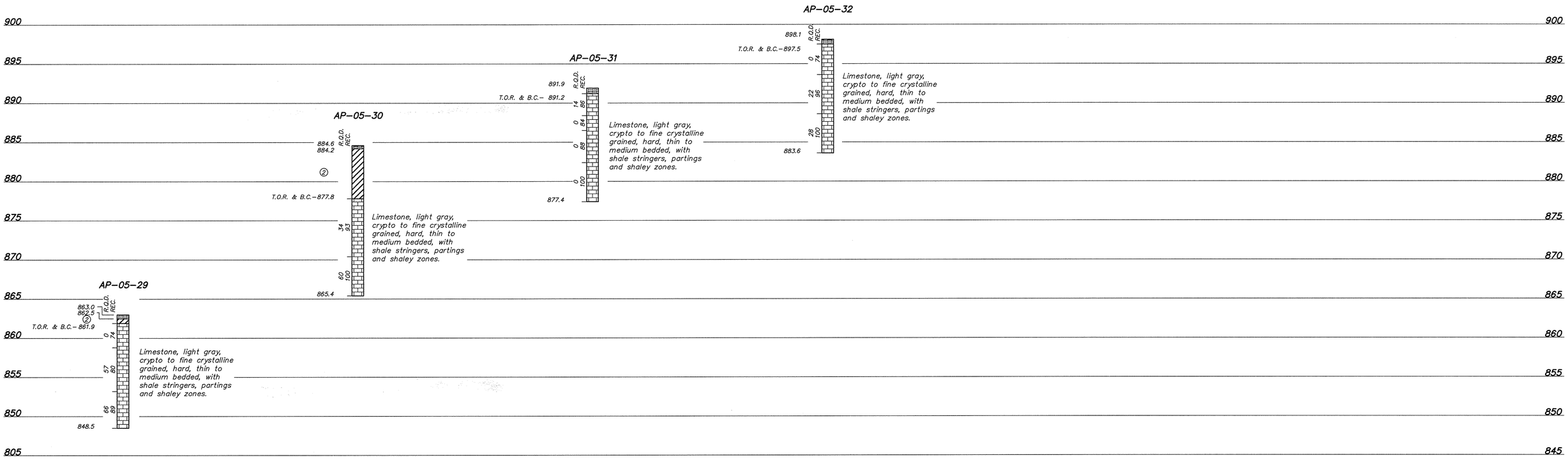
JOB NO.	JOB NO.	JOB NO.	JOB NO.
119961			

Drawing No: BRO-C-00209
Rev. C

Fuller Mossbarger Scott & May
EMSM ENGINEERS
LEXINGTON ST. LOUIS LOUISVILLE JEFFERSONVILLE CINCINNATI ATLANTA COLUMBUS NASHVILLE

Kentucky Utilities Company
an E·ON company

DMS Version 2.0



LOGS OF BORINGS
SCALE: 1" = 5' (VERTICAL ONLY)

NOTE:
Refer to Sheet BR0-C-00222 for Legend, Soil Summary and Notes.

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Fuller Mossbarger Scott & May

EMSM ENGINEERS
LEXINGTON ST. LOUIS LOUISVILLE JEFFERSONVILLE CINCINNATI ATLANTA COLUMBUS NASHVILLE

DAN A. BACK 13638 LICENSED PROFESSIONAL ENGINEER 6-16-06

REVISIONS			
Rev.	Drawn Date:	Drawn By:	Revision Mode
A	6-16-06		
C	10-02-06		

Title
LOGS OF BORINGS
AUXILIARY POND EMBANKMENT (AP)
AUXILIARY ASH POND - PHASE I

Location and Unit:
E.W. BROWN GENERATING STATION

Scale: AS SHOWN
Drawn: TJ/CDV
Date: MAY, 2006
Checked: VJS/KOH
Approved:

Kentucky Utilities Company
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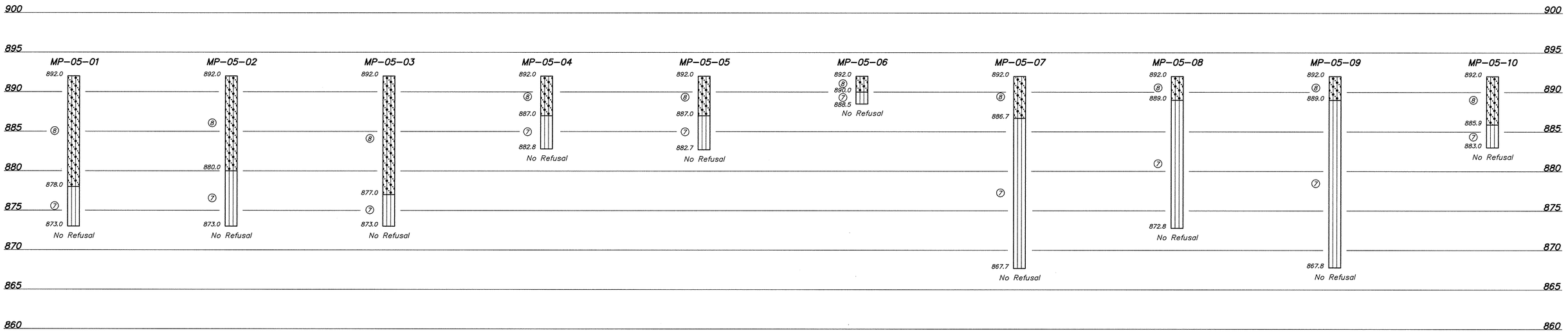
JOB NO.	JOB NO.	JOB NO.	JOB NO.
119961			

Drawing No: BR0-C-00210
Rev. C

LX2006228\REVIT\140691.OGD.DWG

DMS Version 2.0

BR0-C-00211



LOGS OF BORINGS
SCALE: 1"=5' (VERTICAL ONLY)

NOTE:
Refer to Sheet BR0-C-00222 for Legend, Soil Summary and Notes.

RELEASED FOR CONSTRUCTION - 10/02/06

LX2006228\REV\140BL0014.DWG

REVISIONS			
Rev.	Drawn Date:	Drawn By:	Revision Made
A	6-16-06		
C	10-02-06		

Mark A. Back 13930 LICENSED PROFESSIONAL ENGINEER 10-18-06

Fuller Mossbarger Scott & May ENGINEERS
LEXINGTON ST. LOUIS LOUISVILLE JEFFERSONVILLE CINCINNATI ATLANTA COLUMBUS NASHVILLE

Title
LOGS OF BORINGS
BORROW AREA 7 (MP)
AUXILIARY ASH POND - PHASE I

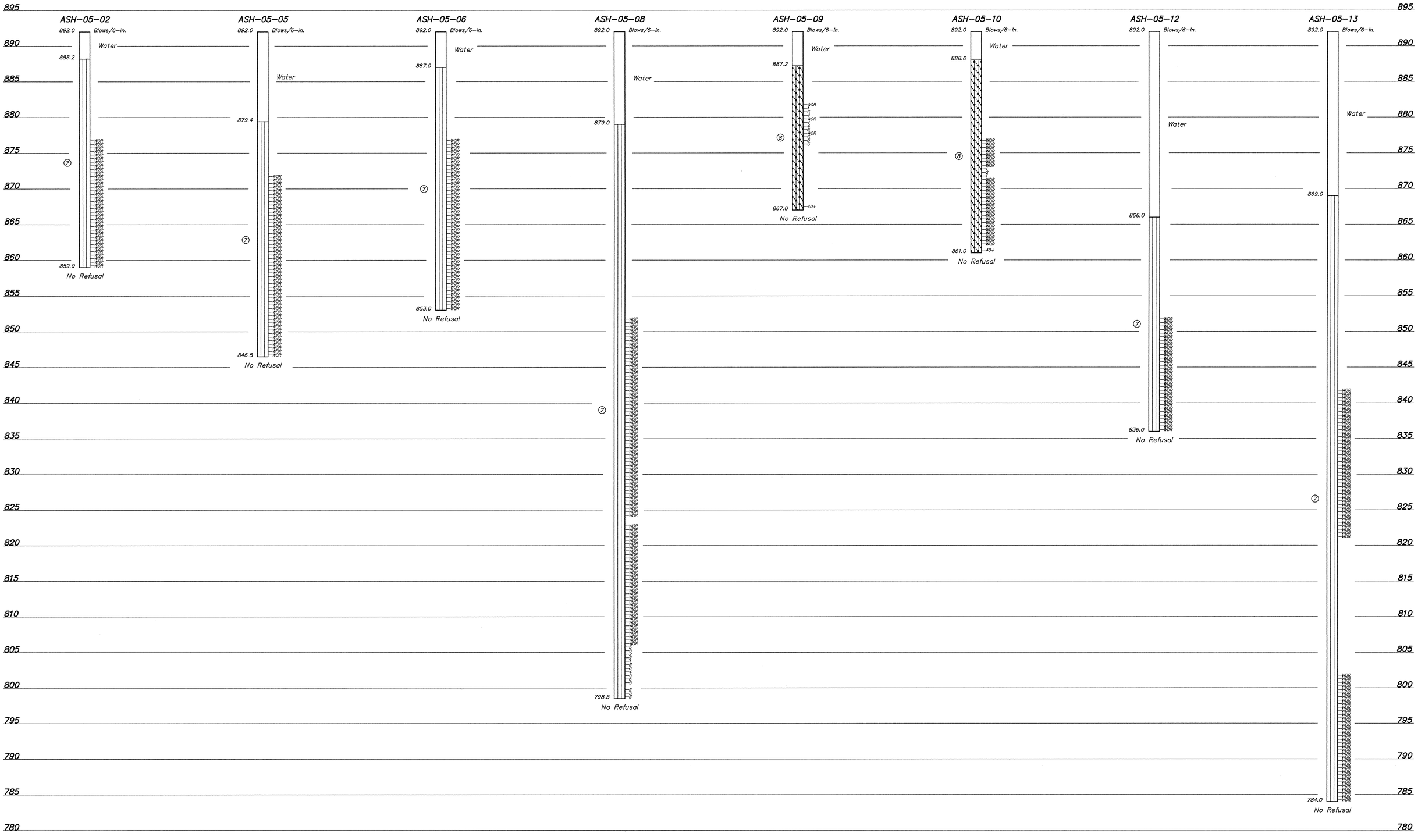
Location and Unit:
E.W. BROWN GENERATING STATION

Scale: AS SHOWN
Drawn: TJ/CDV
Date: MAY, 2006
Checked: WJS/KOH
Approved:

Kentucky Utilities Company, an E·ON company

JOB NO.	JOB NO.	JOB NO.	JOB NO.	Drawing No:	Rev.
119961				BR0-C-00211	C

DMS Version 2.0



NOTES:

1. The surface elevation corresponds to the approximate water surface elevation at the time of the boring.
2. The boring logs and related information shown on this drawing depict the approximate ash thickness and subsurface conditions only at the specific boring locations noted and at the time of drilling. Conditions at other locations may differ from those occurring at the boring locations. Also, the passage of time may result in a change in the subsurface conditions at the boring locations. Actual conditions between borings are unknown.
3. The ASH-05-XX borings were terminated when the underlying native soils were encountered.
4. Blow counts indicated for the ASH-05-XX borings are the number of blows that were required to advance a 3-inch O.D. driver sampler 6 inches in depth using an automatic hammer with a 140 lb. weight dropped 30 inches in each blow.

LEGEND

⑦	Silt, gray, non-plastic, wet, loose (Fine Ash, Hydraulically Placed)
⑧	Silty Coarse Sand with Gravel, gray and black, non-plastic, wet, loose (Bottom Ash with Variable Fines, Hydraulically Placed)
No Refusal	No Refusal Encountered
WOR	Weight of Rods (Penetration without Hammer Blow)
Blows/6-in.	Penetration Test Blow Count (blows/6-in.)

NOTE:
Refer to Sheet BR0-C-00222 for Legend, Soil Summary and Notes.

LOGS OF BORINGS
SCALE: 1"=5' (VERTICAL ONLY)

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Fuller Mossbarger Scott & May

EMSM ENGINEERS
LEXINGTON ST. LOUIS LOUISVILLE JEFFERSONVILLE CINCINNATI KENNER COLUMBUS NEWVILLE

DAN A. BACH 10-16-06 LICENSED PROFESSIONAL ENGINEER

REVISIONS			
Rev.	Drawn Date	Drawn By:	Revision Made
A	6-16-06		
C	10-02-06		

Title
LOGS OF BORINGS
BORROW AREA 7 (ASH)
AUXILIARY ASH POND - PHASE I

Location and Unit:
E.W. BROWN GENERATING STATION

Scale: AS SHOWN
Drawn: TJ/CDV
Date: MAY, 2006
Checked: VJS/KOH
Approved:

JOB NO.	JOB NO.	JOB NO.	JOB NO.
119961			

Kentucky Utilities Company
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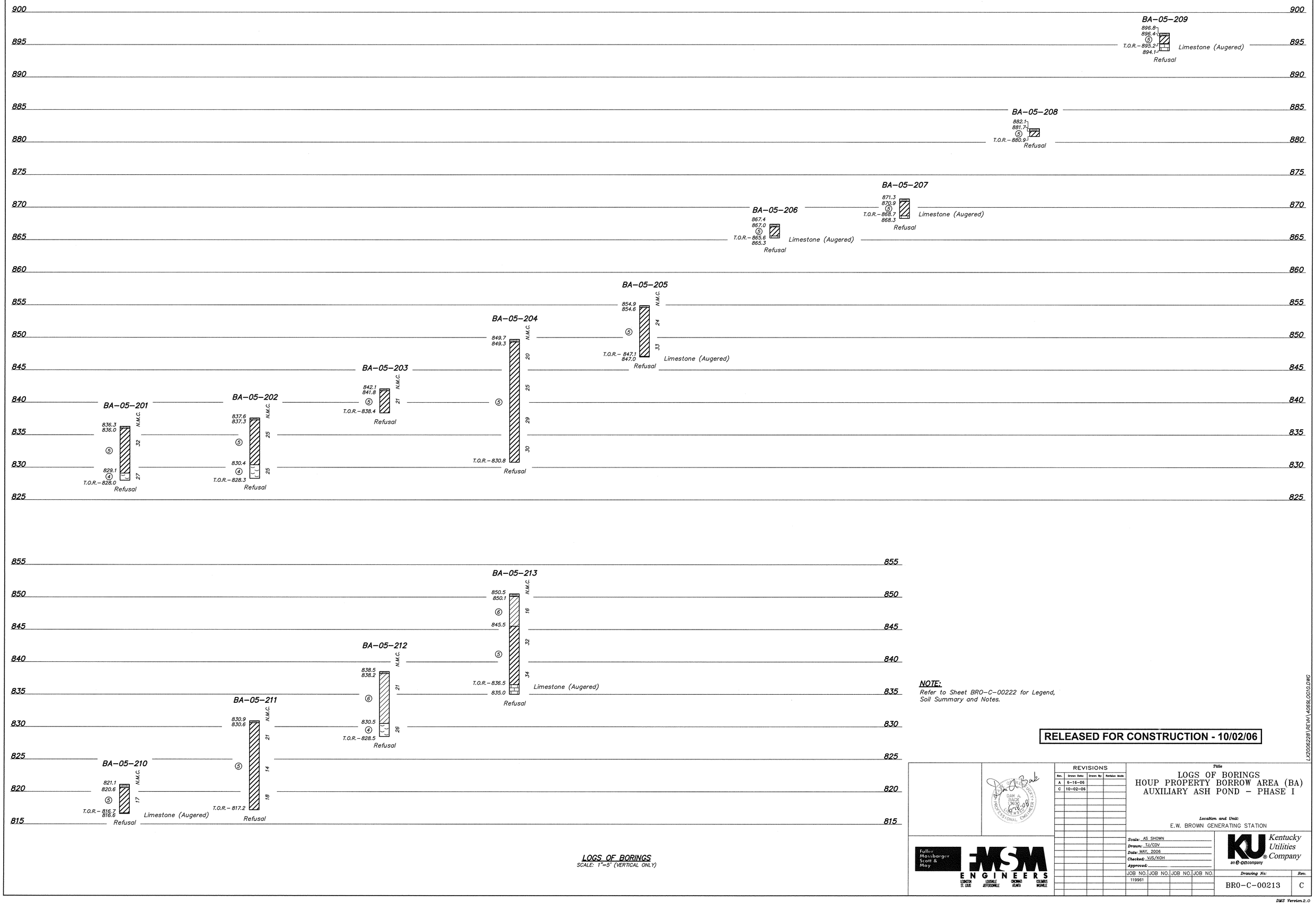
Drawing No: BR0-C-00212
Rev. C

LX2006228\REVA\4069LOG15.DWG

DMS Version 2.0

BR0-C-00213



LOGS OF BORINGS
SCALE: 1"=5' (VERTICAL ONLY)

NOTE:
Refer to Sheet BR0-C-00222 for Legend, Soil Summary and Notes.

RELEASED FOR CONSTRUCTION - 10/02/06

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DAN A. BACK — LICENSED PROFESSIONAL ENGINEER — 6-8-06

REVISIONS			
Rev.	Drawn Date:	Drawn By:	Revision Made
A	6-16-06		
C	10-02-06		

Title
LOGS OF BORINGS
HOUP PROPERTY BORROW AREA (BA)
AUXILIARY ASH POND - PHASE I

Location and Unit:
E.W. BROWN GENERATING STATION

Scale: AS SHOWN
Drawn: TJ/CDV
Date: MAY, 2006
Checked: WJS/KOH
Approved:

Fuller Mossbarger Scott & May
EMSM ENGINEERS
LEXINGTON ST. LOUIS LOUISVILLE JEFFERSONVILLE CINCINNATI ATLANTA COLUMBUS NASHVILLE

Kentucky Utilities Company
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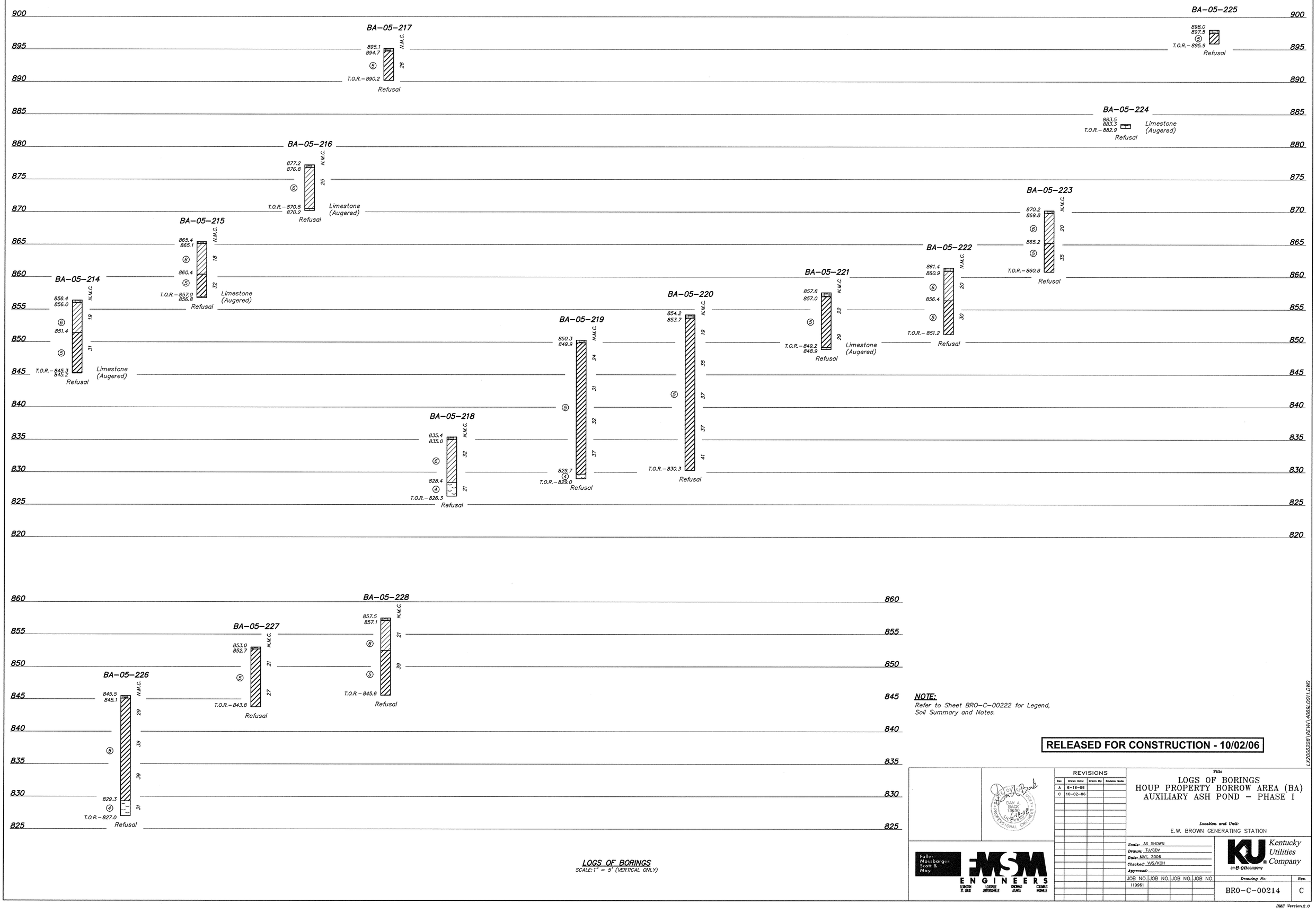
JOB NO.	JOB NO.	JOB NO.	JOB NO.	JOB NO.
119961				

Drawing No: BR0-C-00213
Rev. C

DMS Version 2.0



LOGS OF BORINGS
SCALE: 1" = 5' (VERTICAL ONLY)

NOTE:
Refer to Sheet BRO-C-00222 for Legend, Soil Summary and Notes.

RELEASED FOR CONSTRUCTION - 10/02/06

LX20062281\REVIT\406BLOG11.DWG

REVISIONS			
Rev.	Drawn Date:	Drawn By:	Revision Mode
A	6-16-06		
C	10-02-06		

Title
LOGS OF BORINGS
HOUP PROPERTY BORROW AREA (BA)
AUXILIARY ASH POND – PHASE I

Location and Unit:
E.W. BROWN GENERATING STATION

Scale: AS SHOWN
Drawn: TJ/CDV
Date: MAY, 2006
Checked: VJS/KDH
Approved:

JOB NO.	JOB NO.	JOB NO.	JOB NO.
119961			

Drawing No: BRO-C-00214
Rev. C

Fuller Mossbarger Scott & May ENGINEERS
LEXINGTON ST. LOUIS LOUISVILLE JEFFERSONVILLE CINCINNATI ATLANTA COLUMBUS WGMLLC

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DMS Version 2.0

LOGS OF BORINGS
SCALE: 1"=5' (VERTICAL ONLY)

NOTE:
Refer to Sheet BR0-C-00222 for Legend, Soil Summary and Notes.

RELEASED FOR CONSTRUCTION - 10/02/06

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REVISIONS				
Rev.	Drawn Date:	Drawn By:	Revision Made	
A	6-16-06			
C	10-02-06			

Title
LOGS OF BORINGS
HOUP PROPERTY BORROW AREA (BA)
AUXILIARY ASH POND – PHASE I

Location and Unit:
E.W. BROWN GENERATING STATION

Scale: AS SHOWN
Drawn: TJ/CDV
Date: MAY, 2006
Checked: MJS/KOH
Approved:

Fuller Mossbarger Scott & May
EMSM ENGINEERS
LEXINGTON ST. LOUIS LOUISVILLE JEFFERSONVILLE CINCINNATI ATLANTA COLUMBUS NASHVILLE

Kentucky Utilities Company
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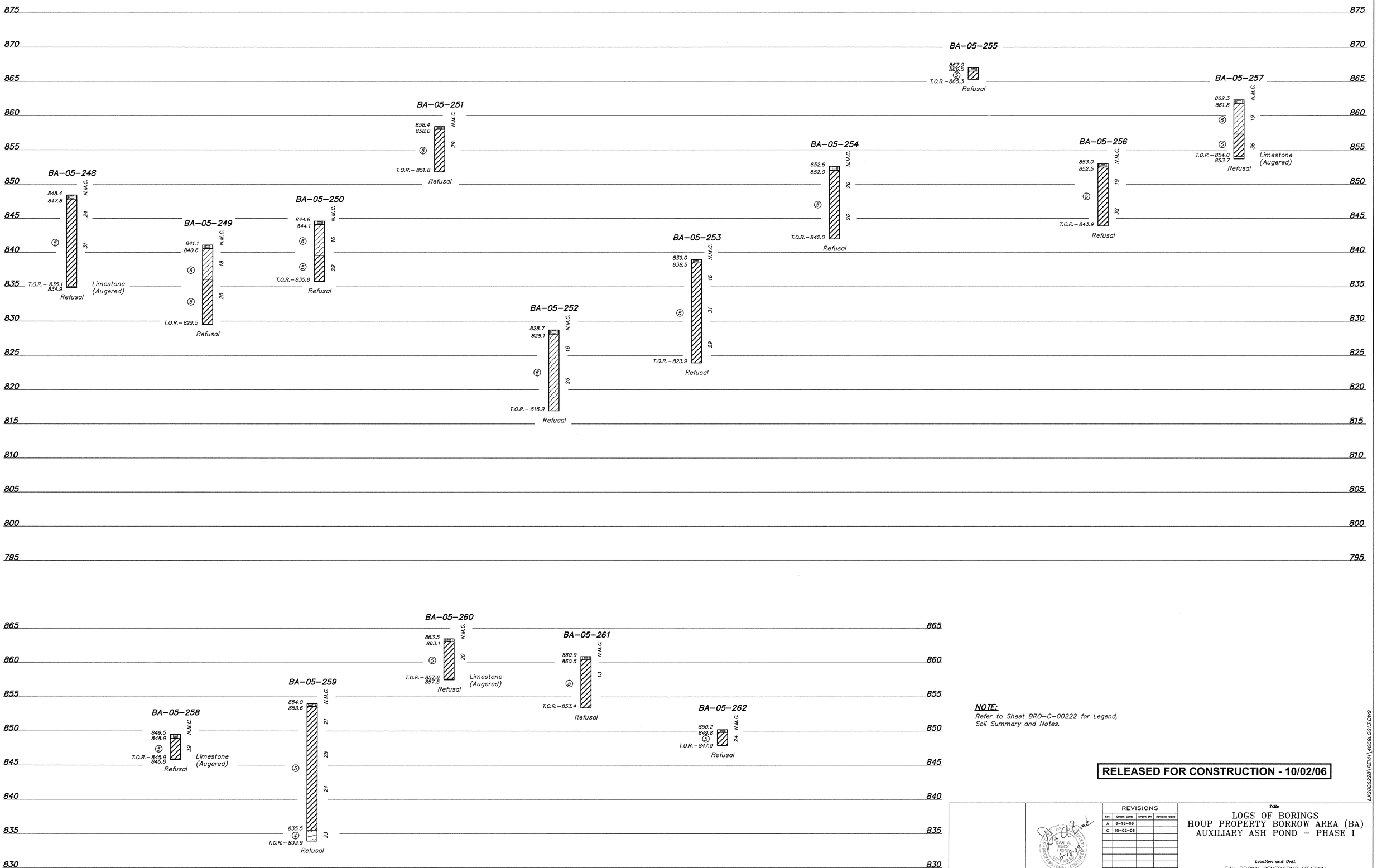
JOB NO.	JOB NO.	JOB NO.	JOB NO.	Drawing No:	Rev.
119961				BR0-C-00215	C

DMS Version 2.0

BR0-C-00216



LOGS OF BORINGS
SCALE: 1"=5' (VERTICAL ONLY)

NOTE:
Refer to Sheet BR0-C-00222 for Legend, Soil Summary and Notes.

RELEASED FOR CONSTRUCTION - 10/02/06

LX2006228\REM\40656.0013.DWG

REVISIONS			
Rev.	Drawn Date:	Drawn By:	Revision Made
A	6-16-06		
C	10-02-06		

Title
LOGS OF BORINGS
HOUP PROPERTY BORROW AREA (BA)
AUXILIARY ASH POND – PHASE I

Location and Unit:
E.W. BROWN GENERATING STATION

Scale: AS SHOWN
Drawn: TJ/CDV
Date: MAY, 2006
Checked: WJS/KOH
Approved:

Fuller Mossbarger Scott & May
EMSM ENGINEERS
LEXINGTON ST. LOUIS LOUISVILLE JEFFERSONVILLE CINCINNATI ATLANTA COLUMBUS NASHVILLE

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JOB NO.	JOB NO.	JOB NO.	JOB NO.
119961			

Drawing No: BR0-C-00216
Rev. C

DMS Version 2.0

890 885 880 875 870 865 860 855 850 845 840 835 830 825 820 815 810 805 800 795 790 785 780

SP-06-01
841.0
840.5
②
833.0
④
T.O.R.– 832.6
Refusal

SP-06-02
830.8
830.3
②
824.9
④
T.O.R.– 824.0
Refusal

SP-06-03
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820.3
②
T.O.R.– 819.4
Refusal

SP-06-04
805.8
805.4
②
T.O.R.– 801.7
Refusal

SP-06-05
821.8
821.3
②
T.O.R.– 808.4
Refusal

SP-06-06
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②
T.O.R.– 818.7
Refusal

SP-06-07
825.1
824.6
②
T.O.R.– 819.3
Refusal

LOGS OF BORINGS
SCALE: 1"=5' (VERTICAL ONLY)

NOTE:
Refer to Sheet BR0-C-00222 for Legend, Soil Summary and Notes.

RELEASED FOR CONSTRUCTION - 10/02/06

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REVISIONS				
Rev.	Drawn Date:	Drawn By:	Revision Mode	
A	6-16-06			
C	10-02-06			

Fuller Mossbargir Scott & May
FMSM ENGINEERS
LEXINGTON ST. LOUIS LOUISVILLE JEFFERSONVILLE CINCINNATI ATLANTA COLUMBUS NASHVILLE

Title
LOGS OF BORINGS
PRINCIPAL SPILLWAY PIPE (SP)
AUXILIARY ASH POND – PHASE I

Location and Unit:
E.W. BROWN GENERATING STATION

Scale: AS SHOWN
Drawn: TJ/CDV
Date: MAY, 2006
Checked: VJS/KOH
Approved:

Kentucky Utilities Company
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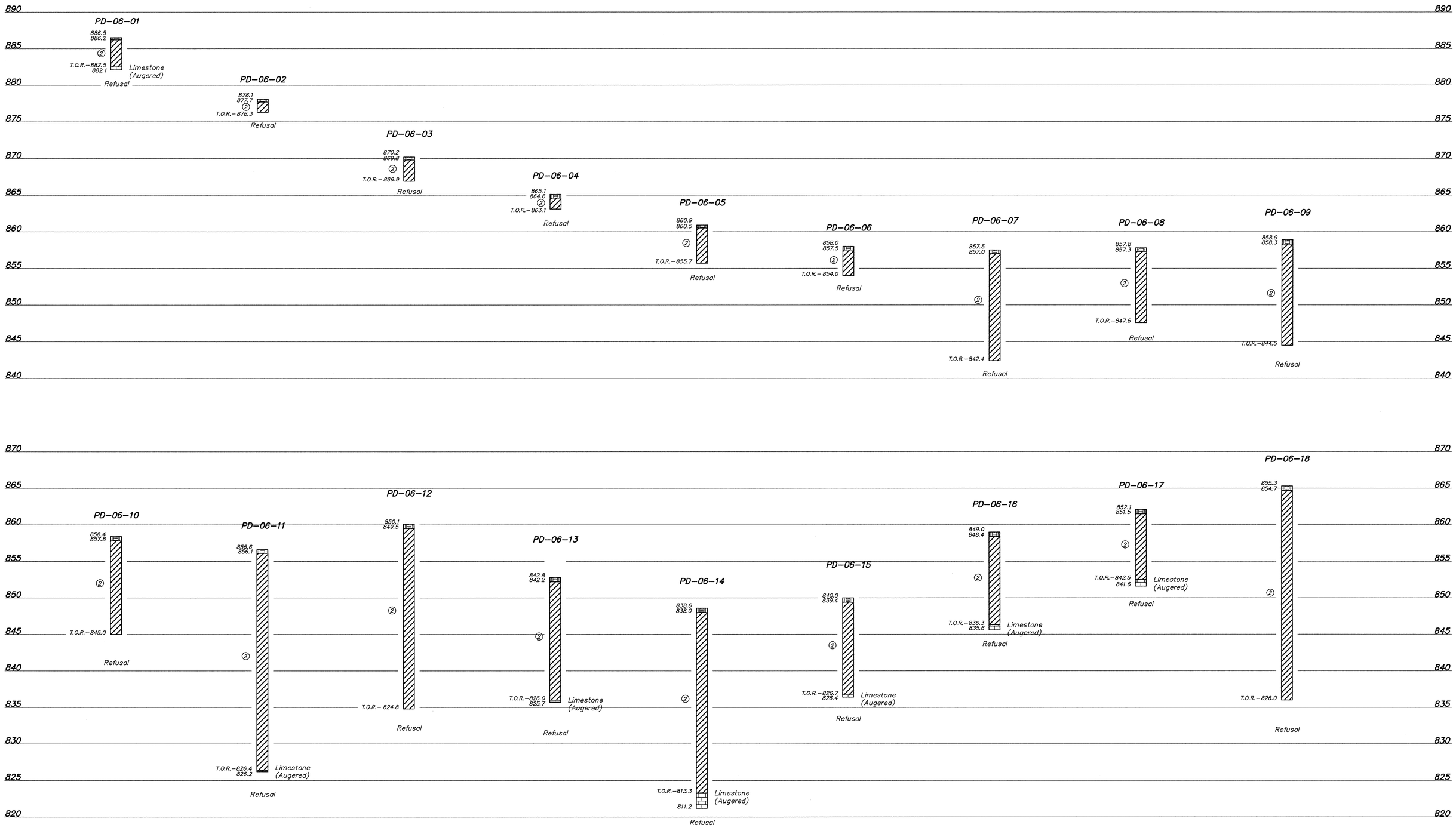
JOB NO.	JOB NO.	JOB NO.	JOB NO.	Drawing No:	Rev.
119961				BR0-C-00217	C

DMS Version 2.0



LOGS OF BORINGS
SCALE: 1"=5' (VERTICAL ONLY)

NOTE:
Refer to Sheet BRO-C-00222 for Legend, Soil Summary and Notes.

RELEASED FOR CONSTRUCTION - 10/02/06

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REVISIONS			
Rev.	Drawn Date:	Drawn By:	Revision Made
A	6-16-06		
C	10-02-06		

Title
LOGS OF BORINGS
PERIMETER DITCH (PD)
AUXILIARY ASH POND - PHASE I

Location and Unit:
E.W. BROWN GENERATING STATION

Scale: AS SHOWN
Drawn: TJ/CDV
Date: MAY, 2006
Checked: VJS/KOH
Approved:

JOB NO.	JOB NO.	JOB NO.	JOB NO.
119961			

Drawing No: BRO-C-00218
Rev. C

Fuller Mossbarger Scott & May
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LEXINGTON ST. LOUIS LOUISVILLE JEFFERSONVILLE CINCINNATI ATLANTA COLUMBUS NASHVILLE

Kentucky Utilities Company
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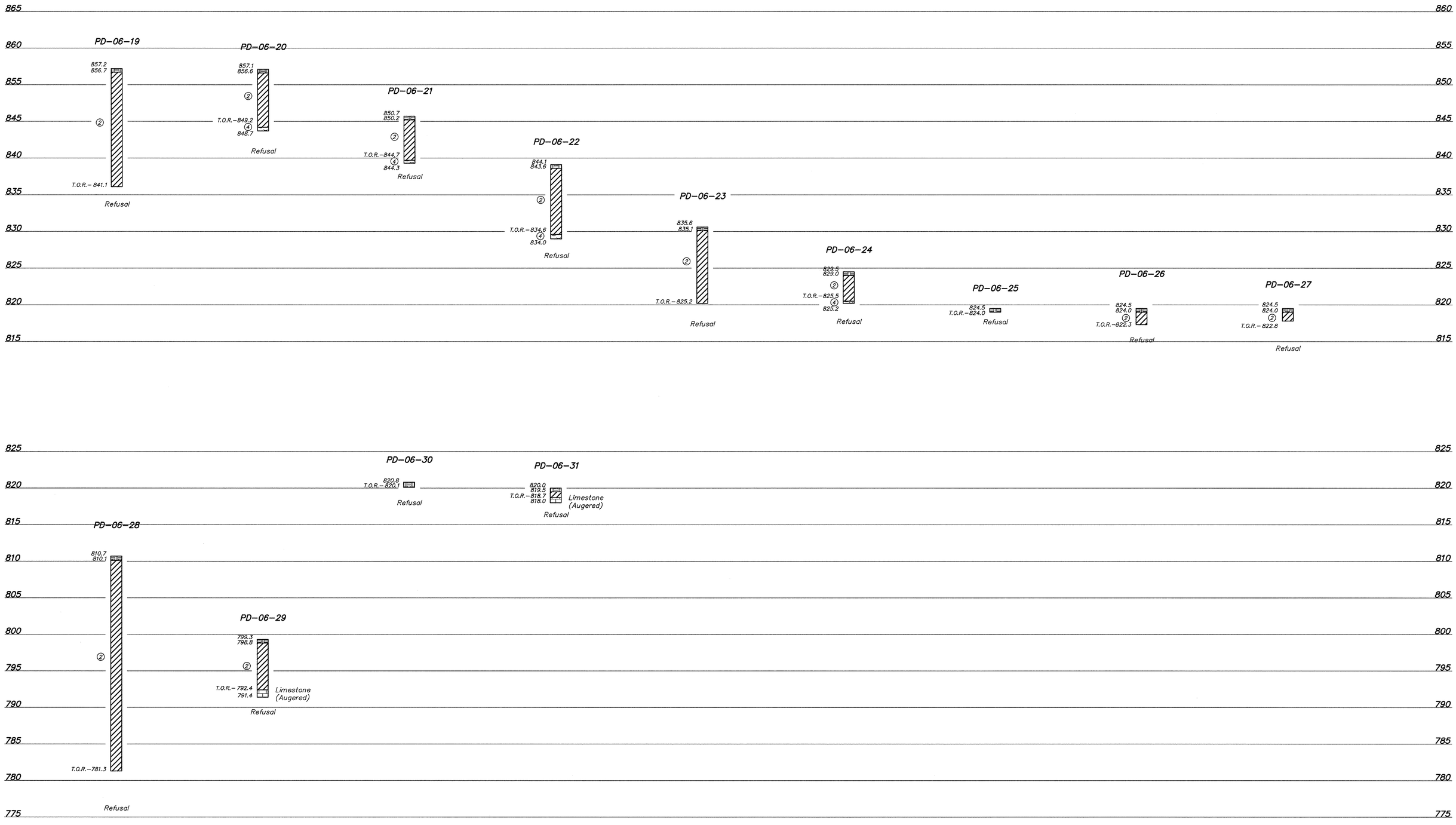
DMS Version 2.0



LOGS OF BORINGS
SCALE: 1"=5' (VERTICAL ONLY)

NOTE:
Refer to Sheet BR0-C-00222 for Legend, Soil Summary and Notes.

RELEASED FOR CONSTRUCTION - 10/02/06

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REVISIONS			
Rev.	Drawn Date:	Drawn By:	Revision Mode
A	6-16-06		
C	10-02-06		

Title
LOGS OF BORINGS
PERIMETER DITCH (PD)
AUXILIARY ASH POND – PHASE I

Location and Unit:
E.W. BROWN GENERATING STATION

Scale: AS SHOWN
Drawn: TJ/CDV
Date: MAY, 2006
Checked: VJS/KOH
Approved:

JOB NO.	JOB NO.	JOB NO.	JOB NO.
119961			

Drawing No: BR0-C-00219
Rev.: C

Fuller Mossbarger Scott & May ENGINEERS
LEXINGTON ST. LOUIS LOUISVILLE JEFFERSONVILLE CINCINNATI ATLANTA COLUMBUS NASHVILLE

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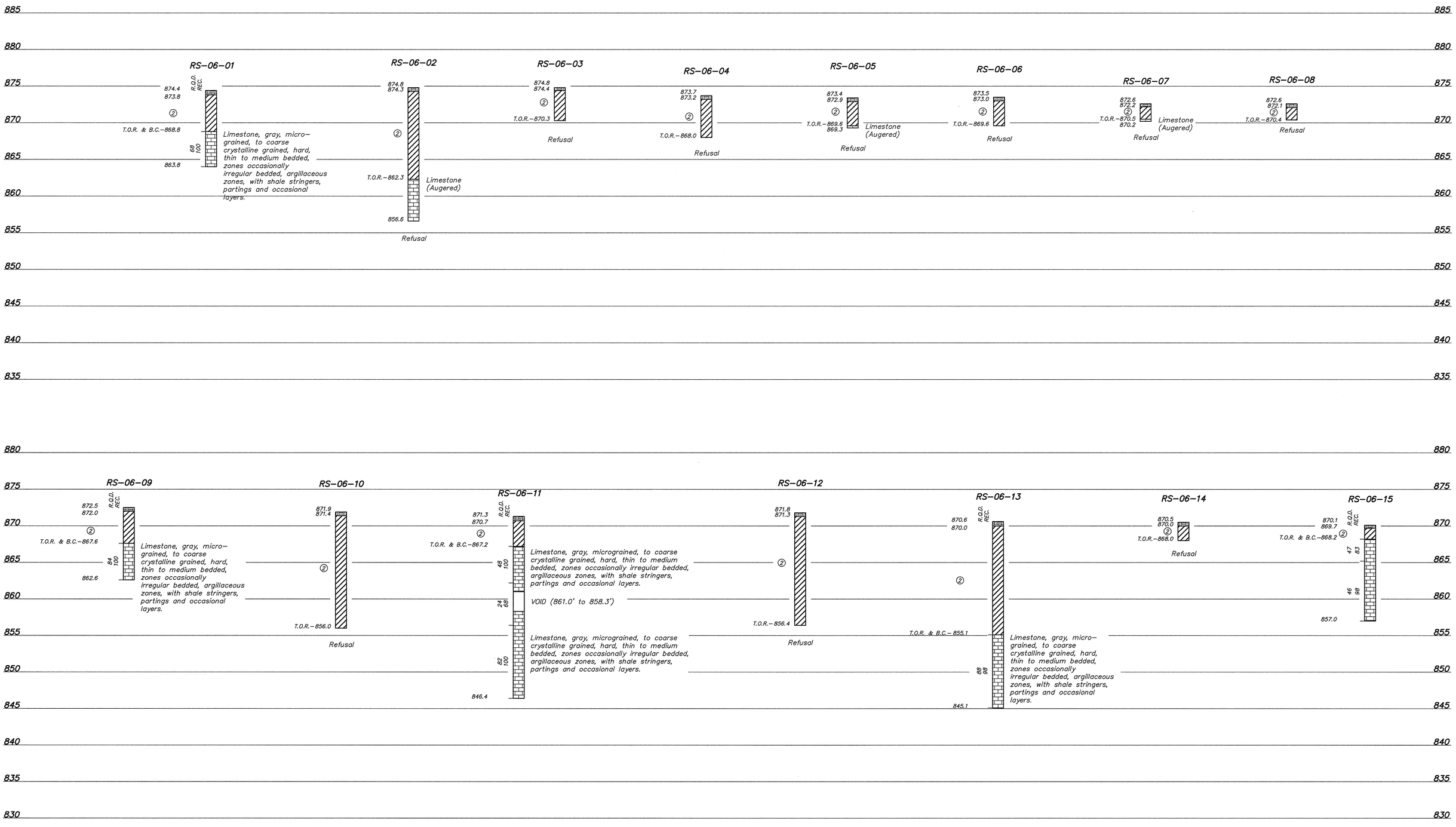
BR0-C-00220



LOGS OF BORINGS
SCALE: 1"=5' (VERTICAL ONLY)

NOTE:
Refer to Sheet BR0-C-00222 for Legend, Soil Summary and Notes.

RELEASED FOR CONSTRUCTION - 10/02/06

Dan A. Bade 6-13-06

REVISIONS			
Rev.	Drawn Date:	Drawn By:	Revision Mode
A	6-16-06		
C	10-02-06		

Title
LOGS OF BORINGS
RISER STRUCTURE (RS)
AUXILIARY ASH POND - PHASE I

Location and Unit:
E.W. BROWN GENERATING STATION

Scale: AS SHOWN
Drawn: TJ/CDV
Date: MAY, 2006
Checked: WJS/KOH
Approved:

JOB NO.	JOB NO.	JOB NO.	JOB NO.
119961			

Drawing No: BR0-C-00220 Rev. C

Fuller Mossbarger Scott & May ENGINEERS
LEXINGTON ST. LOUIS LOUISVILLE JEFFERSONVILLE CINCINNATI ATLANTA COLUMBUS NASHVILLE

Kentucky Utilities Company
an E.ON company

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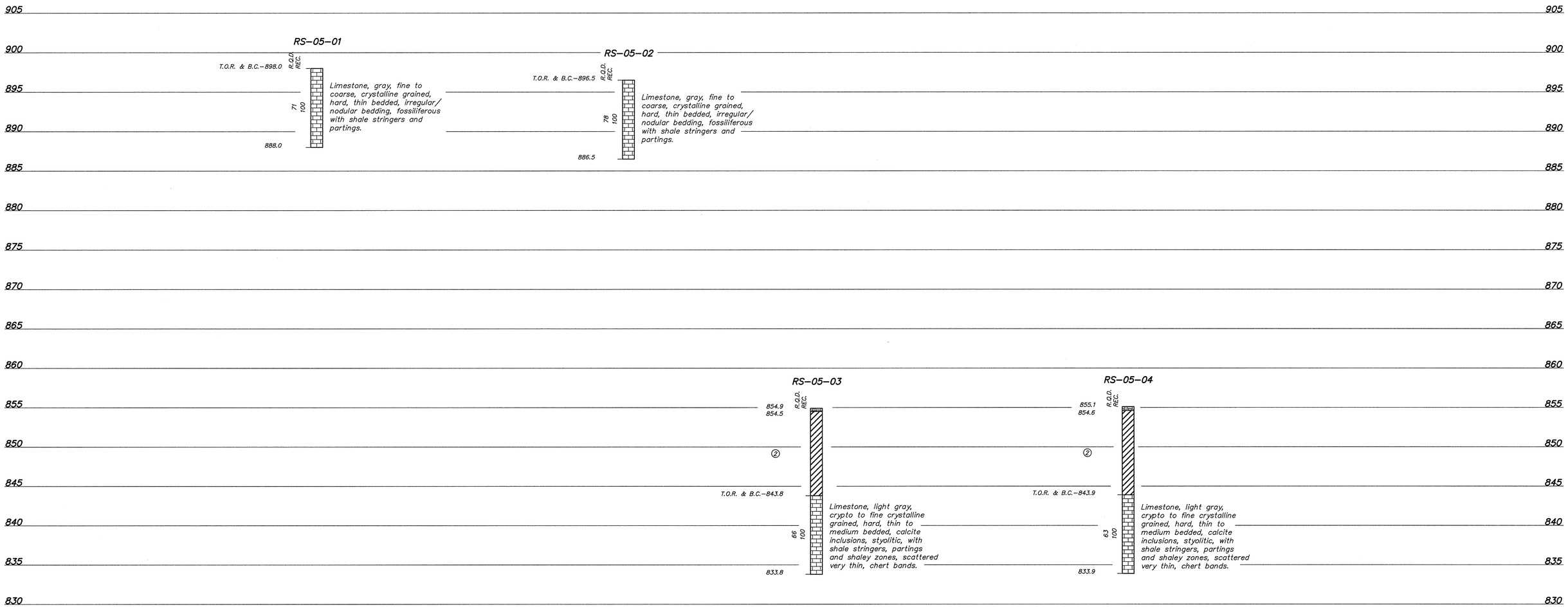
DMS Version 2.0



LOGS OF BORINGS
SCALE: 1"=5' (VERTICAL ONLY)

NOTE:
Refer to Sheet BR0-C-00222 for Legend, Soil Summary and Notes.

RELEASED FOR CONSTRUCTION - 10/02/06

LX2006228\REVIT\40690021.DWG

REVISIONS			
Rev.	Drawn Date:	Drawn By:	Revision Mode
A	6-16-06		
C	10-02-06		

Title
LOGS OF BORINGS
RISER STRUCTURE (RS)
AUXILIARY ASH POND - PHASE I

Location and Unit:
E.W. BROWN GENERATING STATION

Scale: AS SHOWN
Drawn: TJ/CDV
Date: MAY, 2006
Checked: VJS/KOH
Approved:

Fuller Mossbarger Scott & May
EMSM ENGINEERS
LEXINGTON ST. LOUIS LOUISVILLE JEFFERSONVILLE CINCINNATI ATLANTA COLUMBUS NASHVILLE

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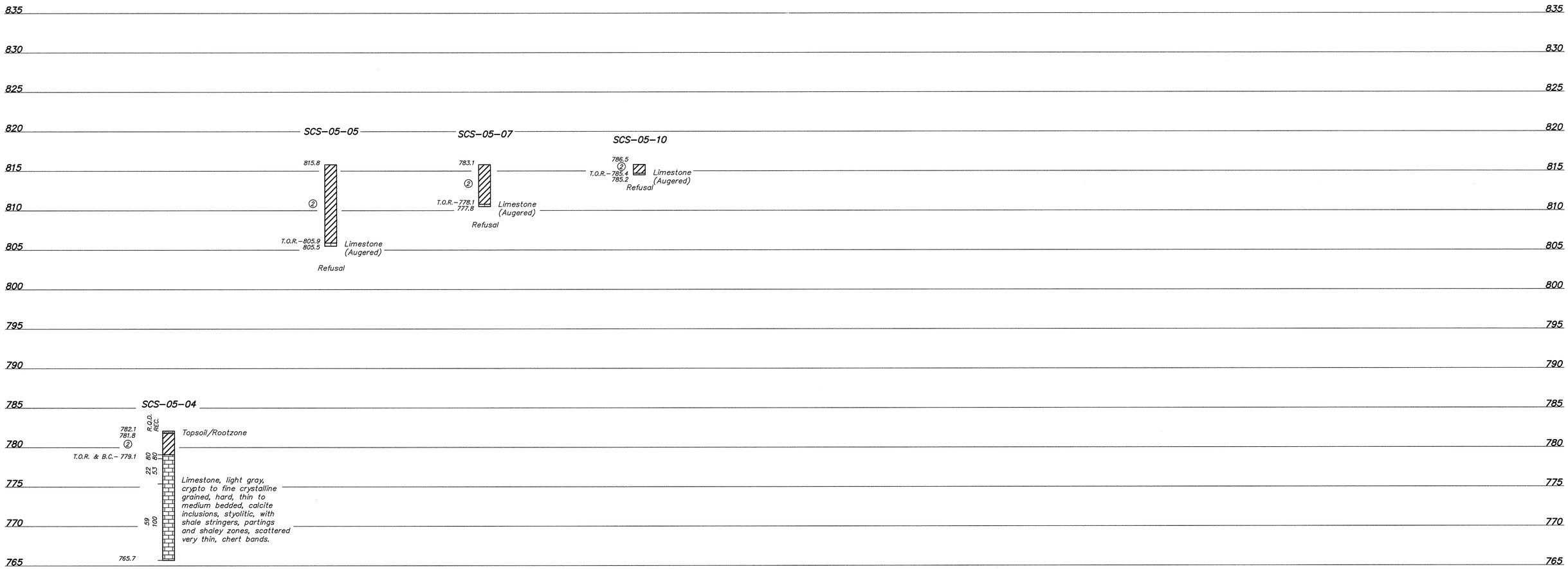
JOB NO.	JOB NO.	JOB NO.	JOB NO.
119961			

Drawing No: BR0-C-00221
Rev. C

DMS Version 2.0

BR0-C-00222



LOGS OF BORINGS
SCALE: 1"=5' (VERTICAL ONLY)

LEGEND

- Topsoil/Rootzone
- Limestone layers, cobbles, gray, highly weathered
- ① Lean to Fat Clay, medium brown, moist, medium stiff, with manganese and iron concretions (Field Classified)
- ② Fat Clay, medium brown, moist to wet, soft to medium stiff.
- ③ Lean to Fat Clay, light brown, moist, medium stiff, with manganese concretions and chert fragments. (Field Classified)
- ④ Clay Shale (Bentonite), greenish-gray, laminated, and soft. (Field Classified)
- ⑤ Fat Clay, medium brown, moist to wet, soft to medium stiff. (Houp Property)
- ⑥ Lean Clay, medium brown, moist to wet, soft to medium stiff. (Houp Property)
- ⑦ Silt, gray, non-plastic, wet, loose. (Fly Ash, Hydraulically Placed)
- ⑧ Silty coarse sand with gravel, gray and black, non-plastic, wet, loose. (Bottom Ash with Variable Fines, Hydraulically Placed)

■	Undisturbed Thin-Walled (Shelby) Tube Sample
◁	Standard Penetration Test Interval
N	Standard Penetration Test Blow Count (blows/ft.)
N.M.C.	Natural Moisture Content (%)
U.W.W.	Unit Weight Wet (lbs./cu.ft.)
U.W.D.	Unit Weight Dry (lbs./cu.ft.)
U.C.	Unconfined Compressive Strength (tons/sq. ft.)
T.O.R.-	Top of Rock (Indicates the beginning of rock-like resistance to the advancement of the augers. This may indicate the beginning of weathered bedrock, boulders or rock remnants. An exact determination cannot be made without performing rock coring.)
B.C.-	Begin Rock Core
E.O.C.-	End Rock Core
Refusal	Auger Refusal using a carbide-tipped tooth auger bit
No Refusal	No Refusal Encountered
R.Q.D.	Rock Quality Designation(%)
REC.	Recovery(%)

OFF SITE MATERIALS SUMMARY

SAMPLE DESCRIPTION		Trimble Plant Gypsum	Trimble Plant Fly Ash	Mercer Stone Class I Sand	Tyrone Plant Ash Pond
Composition of Total Sample	GRAVEL(-3" +No.4)	0	0	5	1
	SAND(-No.4 +No.200)	0	22	79	16
	SILT(-No.200 +0.005mm)	93	52	11	70
	CLAY(-0.005mm)	7	26	5	13
LIQUID LIMIT		–	–	–	–
PLASTIC LIMIT		Non Plastic	Non Plastic	Non Plastic	Non Plastic
PLASTICITY INDEX		–	–	–	–
ACTIVITY INDEX		–	–	–	–
SPECIFIC GRAVITY		2.36	2.61	2.74	2.27
AASHTO CLASSIFICATION		A-4(0)	A-4(0)	A-1-b(0)	A-4(0)
UNIFIED CLASSIFICATION		ML	ML	SM	ML
CALIF. BEARING RATIO		–	–	–	–
MAXIMUM DRY DENSITY (pcf)		92.6	–	133.6	76.1
OPTIMUM MOISTURE (%)		17.6	–	7.9	31.2
PERMEABILITY (CM/SEC)		9.12E-05	–	3.81E-05	1.22E-05
ANGLE OF INTERNAL FRICTION (°)		43.1	–	–	–
EFFECTIVE COHESION (PSF)		390	–	–	–
MIN. INDEX DENSITY (PCF)		59.1	–	103.7	–
MAX. INDEX DENSITY (PCF)		80.3	–	132.9	–

SOIL SUMMARY

SAMPLE NO.		2	2	5	6	7	7	7	7	7	7	7	8	8
STATION		BA-05-09	BA-05-61	BA-05-244	TP-05-11	ASH-05-02	ASH-05-05	ASH-05-06	ASH-05-08	ASH-05-08	ASH-05-12	ASH-05-13	ASH-05-09	ASH-05-10
OFFSET		–	–	–	–	–	–	–	–	–	–	–	–	–
DEPTH		0.2'-9.0'	18.5'-22.8'	0.4'-9.2'	8.0'-9.0'	15.0'-33.0'	20.0'-45.5'	15.0'-39.0'	40.0'-68.0'	69.0'-93.5'	40.0'-56.0'	50.0'-71.0'	90.0'-108.0'	10.0'-25.0' 15.0'-31.0'
Composition of Total Sample	GRAVEL(-3" +No.4)	1	–	–	0	0	0	1	13	0	0	1	13	38 19
	SAND(-No.4 +No.200)	15	–	–	14	7	20	9	28	10	6	25	31	51 50
	SILT(-No.200 +0.005mm)	28	–	–	38	86	71	79	51	82	75	67	54	10 28
	CLAY(-0.005mm)	56	–	–	48	7	9	11	8	8	19	7	2	1 3
LIQUID LIMIT		55	–	59	42	–	–	–	–	–	–	–	–	– –
PLASTIC LIMIT		21	–	23	21	Non Plastic	Non Plastic	Non Plastic	Non Plastic	Non Plastic	Non Plastic	Non Plastic	Non Plastic	Non Plastic Non Plastic
PLASTICITY INDEX		34	–	36	21	–	–	–	–	–	–	–	–	– –
ACTIVITY INDEX		0.71	–	–	0.53	–	–	–	–	–	–	–	–	– –
SPECIFIC GRAVITY		2.81	–	–	2.79	2.19	2.40	2.28	2.29	2.20	2.30	2.20	2.64	2.42 2.17
AASHTO CLASSIFICATION		A-7-6(30)	–	–	A-7-6(19)	A-4(0)	A-4(0)	A-4(0)	A-4(0)	A-4(0)	A-4(0)	A-4(0)	A-4(0)	A-1-b(0) A-2-4(0)
UNIFIED CLASSIFICATION		CH	CH(Visual)	CH	CL	ML	ML	ML	ML	ML	ML	ML	ML	SP-SM SM
CALIF. BEARING RATIO		–	–	–	–	–	–	–	–	–	–	–	–	– –
MAXIMUM DRY DENSITY (pcf)		94.2	91.0	94.2	99.4	–	–	–	–	–	–	–	–	– –
OPTIMUM MOISTURE (%)		27.0	27.5	26.5	23.8	–	–	–	–	–	–	–	–	– –

NOTE:

The boring logs and related information shown depict approximate conditions only at the specific boring locations at the time of drilling. Soil and rock conditions occurring at other locations may differ from conditions occurring at the boring locations. Also, the passage of time may result in a change in conditions at the boring locations. Any geologic correlations shown between borings on the drawings are generally based on straight-line interpolation. Actual conditions between borings are unknown and may differ from those shown. It shall be distinctly understood that neither the Owner nor the Owner's Representative will be responsible for any deduction, interpretation or conclusion drawn therefrom by the Contractor. The information is made available in order that the contractor may have ready access to the same information available to the Owner and the Owner's Representative and is not part of this contract.

RELEASED FOR CONSTRUCTION - 10/02/06

DAN A. BACK LICENSED PROFESSIONAL ENGINEER 10-02-06

REVISIONS			
Rev.	Drawn Date:	Drawn By:	Revision Made
A	6-16-06		
B	7-05-06		
C	10-02-06		

Title
LOGS OF BORINGS
SCS BORINGS AND SOIL SUMMARY
AUXILIARY ASH POND - PHASE I

Location and Unit:
E.W. BROWN GENERATING STATION

Scale: AS SHOWN
Drawn: TJ/CDV
Date: MAY, 2006
Checked: VJS/KOH
Approved:

JOB NO.	JOB NO.	JOB NO.	JOB NO.	JOB NO.
119961				

Drawing No: BR0-C-00222
Rev.: C

Fuller Mossbarger Scott & May
EMSM ENGINEERS
LEXINGTON ST. LOUIS LOUISVILLE JEFFERSONVILLE CINCINNATI ATLANTA COLUMBUS NASHVILLE

Kentucky Utilities Company
an E·ON company

LX2006228\REVIT\4069LOG19.DWG

DMS Version 2.0

BR-C-00223

TOWER NO. 2

T2-06-01

881.5 / 891.0 — R.O.D. REC.

② 22/100, 64/100, 82/100, 94/100, 74/100, 98/100

T.O.R. & B.C. – 881.8

Limestone, light gray, crypto to fine crystalline grained, hard, thin to medium bedded, calcite inclusions, styolitic, with shale stringers, partings and shaley zones.

846.8

T2-06-02

884.5 / 884.1

② T.O.R. – 855.8

Refusal

T2-06-03

879.9 / 879.5

② T.O.R. – 850.8

Refusal

T2-06-04

883.5 / 883.1 — N. N.M.C.

② 35/27, 50+/25

T.O.R. – 877.1

Refusal

T2-06-05

884.9 / 884.5 — N. N.M.C.

② 17/32, 20/23

T.O.R. – 876.5

Refusal

TOWER NO. 3

T3-06-01

900.2 / 899.0 — R.O.D. REC. — N. N.M.C.

Gravel (DGA and No. 57) — 16, 11/30

No Recovery — 15/36

Existing Embankment Clay fill. — 35

No Recovery — 19/28

No Recovery — 11/34

29/19

9/41

T.O.R. & B.C. – 856.5

82/96

Limestone, light gray, crypto to fine crystalline grained, hard, thin to medium bedded, calcite inclusions, styolitic, with shale stringers, partings and shaley zones.

846.5

TOWER NO. 4

T4-06-01

899.7 / 898.8 — R.O.D. REC. — N. N.M.C.

Gravel (DGA and No. 57) — 12/34, 8/29

No Recovery — 31

No Recovery — 10/34

6

Existing Embankment Clay fill. — 20/31, 8/23

18

12/27

12/43

42/22

T.O.R. – 845.2
B.C. – 844.7
844.3

0/78, 33/81

Shale, gray, silty, laminated, soft (Augered to 844.7)

61/100

Limestone, light gray, crypto to fine crystalline grained, hard, thin to medium bedded, calcite inclusions, styolitic, with shale stringers, partings and shaley zones.

833.7

TOWER NO. 5

T5-06-01

858.4 / 857.9 — R.O.D. REC.

② 78/100, 78/100, 98/98

T.O.R. & B.C. – 844.1

Limestone, light gray, crypto to fine crystalline grained, hard, thin to medium bedded, calcite inclusions, styolitic, with shale stringers, partings and shaley zones.

831.4

T5-06-02

855.7 / 855.3

② T.O.R. – 844.0

Refusal

T5-06-03

849.9 / 849.5

② T.O.R. – 848.6

Refusal

T5-06-04

852.8 / 852.2

Gravel Roadway

② T.O.R. – 843.5

Refusal

NOTE:
Refer to Sheet BRO-C-00222 for Legend, Soil Summary and Notes.

LOGS OF BORINGS
SCALE: 1"=5' (VERTICAL ONLY)

RELEASED FOR CONSTRUCTION - 10/02/06

LX2006228\REVA\4058.0222.DWG

REVISIONS			
Rev.	Drawn Date:	Drawn By:	Revision Mode
A	6-16-06		
C	10-02-06		

DAN A. BACK, LICENSED PROFESSIONAL ENGINEER, 17.18.06

Fuller Mossbarger Scott & May ENGINEERS
LEXINGTON ST. LOUIS LOUISVILLE JEFFERSONVILLE CINCINNATI ATLANTA COLUMBUS NASHVILLE

Kentucky Utilities Company — an E·ON company

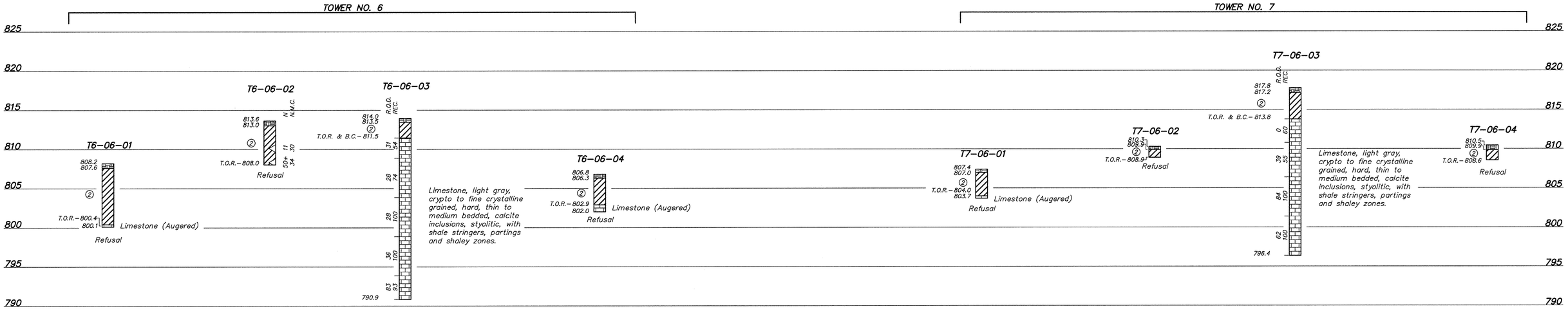
Title:
LOGS OF BORINGS
TRANSMISSION LINE RELOCATIONS (T)
AUXILIARY ASH POND - PHASE I

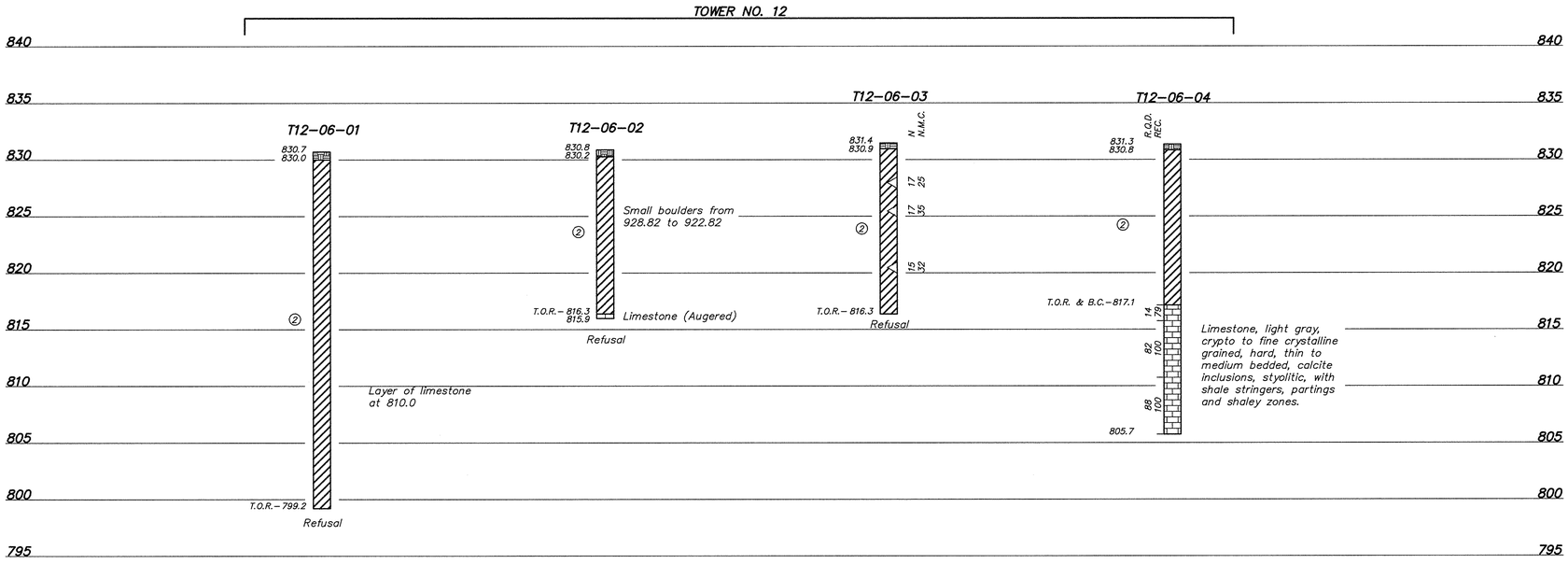
Location and Unit:
E.W. BROWN GENERATING STATION

Scale: AS SHOWN
Drawn: TJ/CDV
Date: MAY, 2006
Checked: DAB/KJS
Approved:

JOB NO.	JOB NO.	JOB NO.	JOB NO.	Drawing No:	Rev.
				BR-C-00223	C

DMS Version 2.0





NOTE:
Refer to Sheet BRO-C-00222 for Legend, Soil Summary and Notes.

LOGS OF BORINGS
SCALE: 1"=5' (VERTICAL ONLY)

RELEASED FOR CONSTRUCTION - 10/02/06

LX2006229\REVIA\4068.0023.DWG

REVISIONS			
Rev.	Drawn Date:	Drawn By:	Revision Mode
A	6-16-06		
C	10-02-06		

Title
LOGS OF BORINGS
TRANSMISSION LINE RELOCATIONS (T)
AUXILIARY ASH POND - PHASE I

Location and Unit:
E.W. BROWN GENERATING STATION

Scale: AS SHOWN
Drawn: TJ/CDV
Date: MAY, 2006
Checked: DAB/VJS
Approved:

Fuller Mossbarger Scott & May
EMSM ENGINEERS
LEXINGTON ST. LOUIS LOUISVILLE JEFFERSONVILLE CINCINNATI ALUMIA COLUMBUS HIGHVILLE

Kentucky Utilities Company
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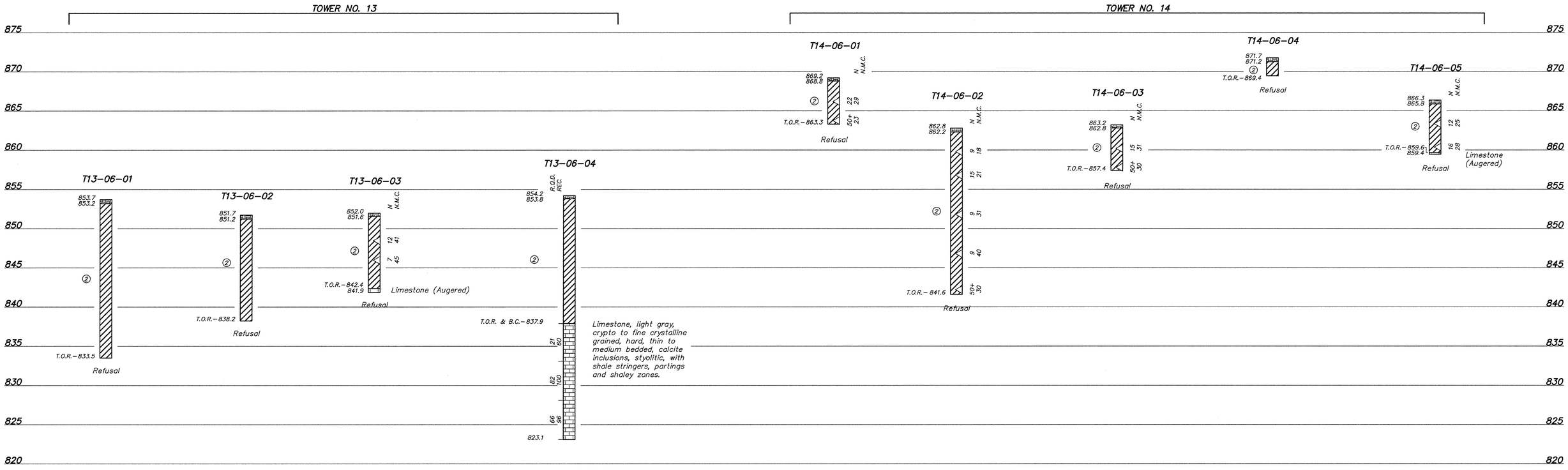
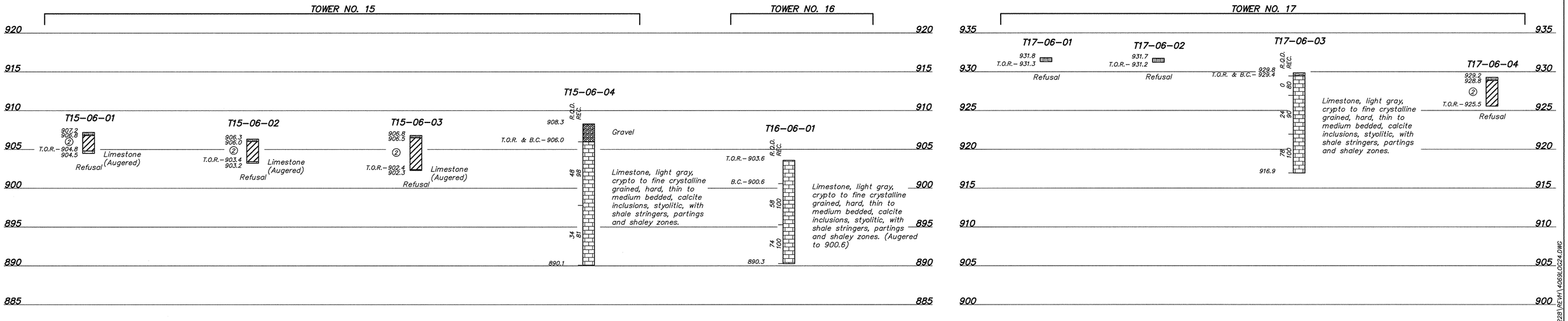
JOB NO.	JOB NO.	JOB NO.	JOB NO.	Drawing No:	Rev.
				BR-C-00224	C

DMS Version 2.0

BR-C-00225





LOGS OF BORINGS
SCALE: 1"=5' (VERTICAL ONLY)

NOTE:
Refer to Sheet BRO-C-00222 for Legend, Soil Summary and Notes.

RELEASED FOR CONSTRUCTION - 10/02/06

REVISIONS				
Rev.	Drawn Date:	Drawn By:	Revision Made	
A	6-16-06			
C	10-02-06			

Title
LOGS OF BORINGS
TRANSMISSION LINE RELOCATIONS (T)
AUXILIARY ASH POND – PHASE I

Location and Unit:
E.W. BROWN GENERATING STATION

Scale: AS SHOWN
Drawn: TJ/CDV
Date: MAY, 2006
Checked: DAB/WJS
Approved:

JOB NO.	JOB NO.	JOB NO.	JOB NO.

Drawing No: BR-C-00225
Rev. C

Fuller Mossbarger Scott & May ENGINEERS
LEXINGTON ST. LOUIS LOUISVILLE JEFFERSONVILLE CINCINNATI ATLANTA COLUMBUS NASHVILLE

Kentucky Utilities Company
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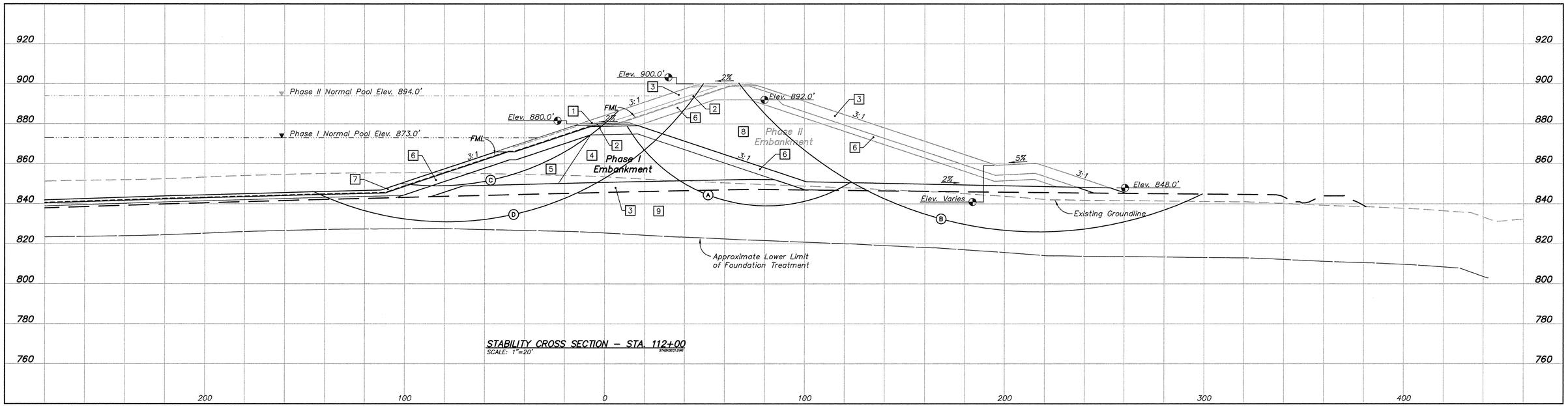
LX2006228\REVIT\6698_0024.DWG

DMS Version 2.0

BR0-C-00226



STABILITY CROSS SECTION – STA. 112+00

SCALE: 1"=20'

STA00200.SWC

SUMMARY OF SLOPE STABILITY ANALYSES

Failure Surface	Failure Zone	Failure Mode	Factor of Safety	
A	Long Term Phase I Configuration	Rotational	Static	2.2
A'			Dynamic(1)	1.6
B	Long Term Phase II Configuration	Rotational	Static	2.0
B'			Dynamic(1)	1.4
C	Long Term Phase I Configuration – No Pool	Rotational	Static	2.2
C'			Dynamic(1)	1.6
D	Long Term Phase II Configuration – No Pool	Rotational	Static	1.9
D'			Dynamic(1)	1.4

(1) The factors of safety under dynamic (pseudo-static) loading conditions are based on a peak ground acceleration (k_{max}) value of 0.100g for a 2 percent probability of exceedance in 50 years.

SUMMARY OF SHEAR STRENGTH PARAMETERS

Material No.	Description	Effective Stress		
		$\bar{C}$ (p.s.f.)	$\bar{\Phi}'$(deg.)	γ (p.c.f.)
1	Dense Graded Aggregate	0	38	118
2	No. 57 Stone	0	38	110
3	Zone I (Phase II Rock, Rock Zone)	0	38	118
4	Zone IIa/24 (Blasted Materials)	100	28	118
5	Zone IIb/4 (Blasted Materials)	100	28	118
6	Zone III (Clay)	100	28	118
7	Zone IV (Bottom Ash)	0	38	118
8	Zone V (Gypsum)	0	35	118
9	Rubble Zone (Blasting Treatment Zone)	0	28	118

RELEASED FOR CONSTRUCTION - 10/02/06

LX2006228\REVA\STABXSHT1.DWG

Fuller Mossbarger Scott & May ENGINEERS
LEXINGTON ST. LOUIS LOUISVILLE JEFFERSONVILLE CINCINNATI ATLANTA COLUMBUS NASHVILLE

COMMONWEALTH OF KENTUCKY – JAMES A. BACK – 19080 – LICENSED PROFESSIONAL ENGINEER – 6-18-08

REVISIONS

Rev.	Drawn Date:	Drawn By:	Revision Made
A	6-16-06		
B	7-05-06		
C	10-02-06		

Title
STABILITY ANALYSES
AUXILIARY POND EMBANKMENT
AUXILIARY ASH POND – PHASE I

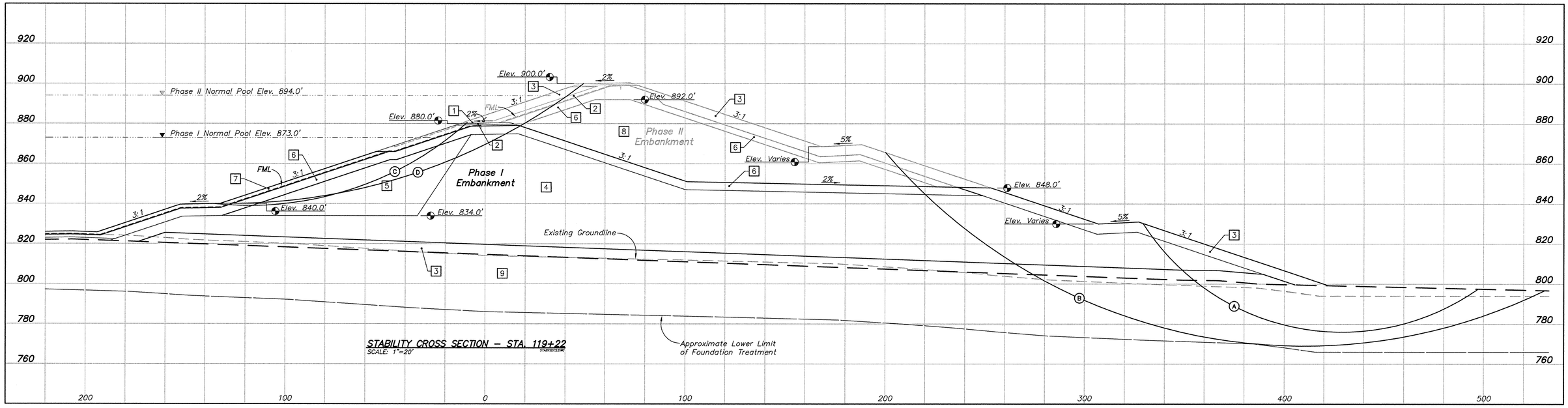
Location and Unit:
E.W. BROWN GENERATING STATION

Scale: 1"= 20'
Drawn: DMG
Date: MAY, 2006
Checked: VJS/KOH
Approved:

Kentucky Utilities Company
an E·ON company

JOB NO.	JOB NO.	JOB NO.	JOB NO.	Drawing No:	Rev.
119961				BR0-C-00226	C

DMS Version 2.0



STABILITY CROSS SECTION – STA. 119+22
SCALE: 1"=20'

SUMMARY OF SLOPE STABILITY ANALYSES				
Failure Surface	Failure Zone	Failure Mode	Factor of Safety	
A	Long Term Phase I Configuration	Rotational	Static	1.8
			Dynamic(1)	1.3
B	Long Term Phase II Configuration	Rotational	Static	1.9
			Dynamic(1)	1.3
C	Long Term Phase I Configuration – No Pool	Rotational	Static	2.0
			Dynamic(1)	1.5
D	Long Term Phase II Configuration – No Pool	Rotational	Static	1.9
			Dynamic(1)	1.4

(1) The factors of safety under dynamic (pseudo-static) loading conditions are based on a peak ground acceleration (k_{max}) value of 0.100g for a 2 percent probability of exceedance in 50 years.

SUMMARY OF SHEAR STRENGTH PARAMETERS				
Material No.	Description	Effective Stress		
		$\bar{c}$ (p.s.f.)	$\bar{\Phi}'$(deg.)	γ (p.c.f.)
1	Dense Graded Aggregate	0	38	118
2	No. 57 Stone	0	38	110
3	Zone I (Phase II Rock, Rock Zone)	0	38	118
4	Zone IIa/24 (Blasted Materials)	100	28	118
5	Zone IIb/4 (Blasted Materials)	100	28	118
6	Zone III (Clay)	100	28	118
7	Zone IV (Bottom Ash)	0	38	118
8	Zone V (Gypsum)	0	35	118
9	Rubble Zone (Blasting Treatment Zone)	0	28	118

RELEASED FOR CONSTRUCTION - 10/02/06

LX2006228\REVIT\STABXSHT2.DWG

REVISIONS			
Rev.	Drawn Date:	Drawn By:	Revision Mode
A	6-16-06		
B	7-05-06		
C	10-02-06		

Fuller Mossbarger Scott & May ENGINEERS
LEXINGTON ST. LOUIS LOUISVILLE JEFFERSONVILLE CINCINNATI ATLANTA COLUMBUS NASHVILLE

Title
STABILITY ANALYSES
AUXILIARY POND EMBANKMENT
AUXILIARY ASH POND – PHASE I

Location and Unit:
E.W. BROWN GENERATING STATION

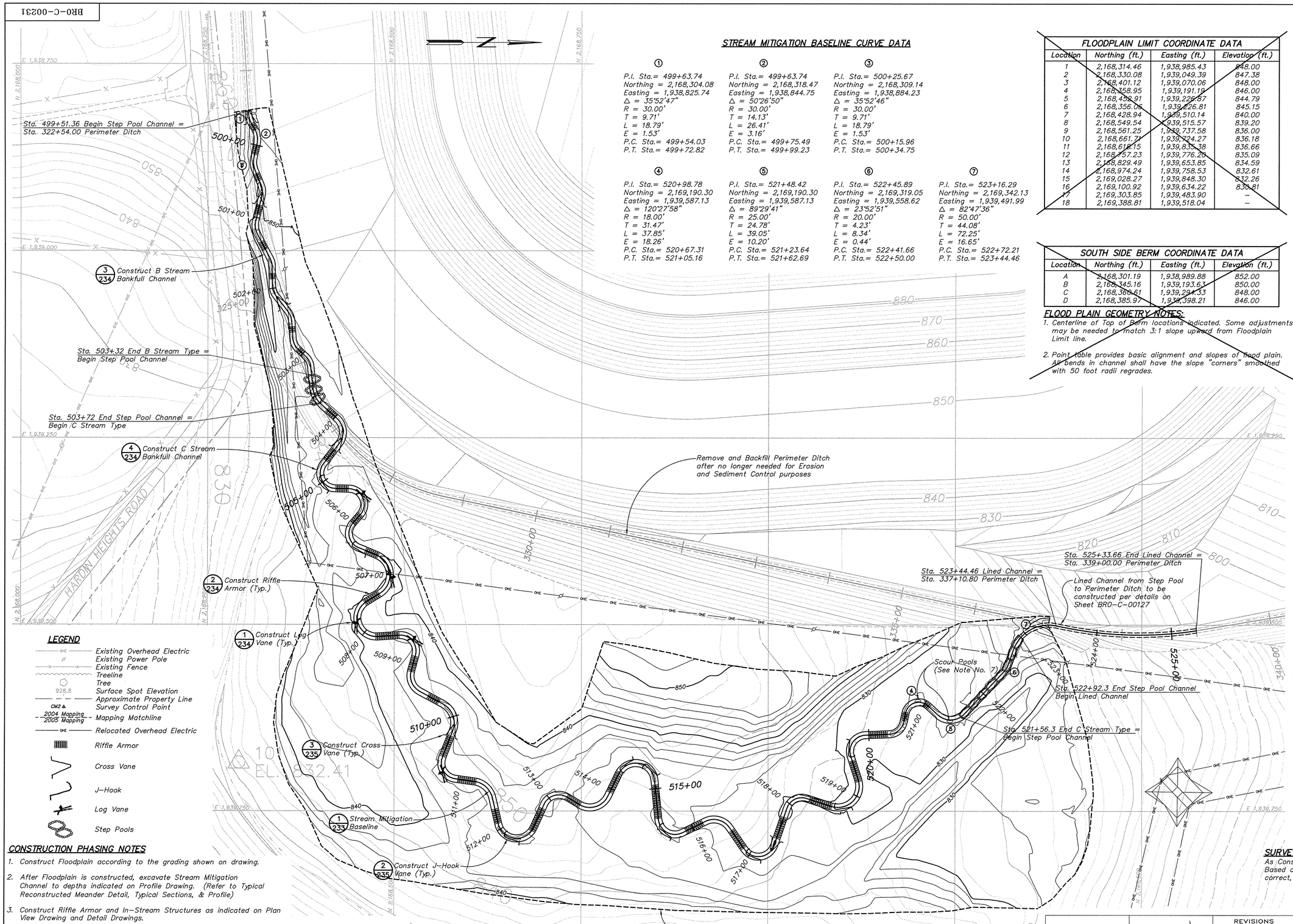
Scale: 1"= 20'
Drawn: DMG
Date: MAY, 2006
Checked: VJS/KOH
Approved:

Kentucky Utilities Company
an E·ON company

JOB NO.	JOB NO.	JOB NO.	JOB NO.	Drawing No:	Rev.
119961				BR0-C-00227	C

DMS Version 2.0

BR0-C-00231



STREAM MITIGATION BASELINE CURVE DATA

① P.I. Sta.= 499+63.74; Northing = 2,168,304.08; Easting = 1,938,825.74; Δ = 35°52'47"; R = 30.00'; T = 9.71'; L = 18.79'; E = 1.53'; P.C. Sta.= 499+54.03; P.T. Sta.= 499+72.82

② P.I. Sta.= 499+63.74; Northing = 2,168,318.47; Easting = 1,938,844.75; Δ = 50°26'50"; R = 30.00'; T = 14.13'; L = 26.41'; E = 3.16'; P.C. Sta.= 499+75.49; P.T. Sta.= 499+99.23

③ P.I. Sta.= 500+25.67; Northing = 2,168,309.14; Easting = 1,938,884.23; Δ = 35°52'46"; R = 30.00'; T = 9.71'; L = 18.79'; E = 1.53'; P.C. Sta.= 500+15.96; P.T. Sta.= 500+34.75

④ P.I. Sta.= 520+98.78; Northing = 2,169,190.30; Easting = 1,939,587.13; Δ = 120°27'58"; R = 18.00'; T = 31.47'; L = 37.85'; E = 18.26'; P.C. Sta.= 520+67.31; P.T. Sta.= 521+05.16

⑤ P.I. Sta.= 521+48.42; Northing = 2,169,190.30; Easting = 1,939,587.13; Δ = 89°29'41"; R = 25.00'; T = 24.78'; L = 39.05'; E = 10.20'; P.C. Sta.= 521+23.64; P.T. Sta.= 521+62.69

⑥ P.I. Sta.= 522+45.89; Northing = 2,169,319.05; Easting = 1,939,558.62; Δ = 23°52'51"; R = 20.00'; T = 4.23'; L = 8.34'; E = 0.44'; P.C. Sta.= 522+41.66; P.T. Sta.= 522+50.00

⑦ P.I. Sta.= 523+16.29; Northing = 2,169,342.13; Easting = 1,939,491.99; Δ = 82°47'36"; R = 50.00'; T = 44.08'; L = 72.25'; E = 16.65'; P.C. Sta.= 522+72.21; P.T. Sta.= 523+44.46

FLOODPLAIN LIMIT COORDINATE DATA

Location	Northing (ft.)	Easting (ft.)	Elevation (ft.)
1	2,168,314.46	1,938,985.43	848.00
2	2,168,330.08	1,939,049.39	847.38
3	2,168,401.12	1,939,070.06	848.00
4	2,168,358.95	1,939,191.19	846.00
5	2,168,432.91	1,939,226.87	844.79
6	2,168,356.06	1,939,226.81	845.15
7	2,168,428.94	1,939,510.14	840.00
8	2,168,549.54	1,939,515.57	839.20
9	2,168,561.25	1,939,737.58	836.00
10	2,168,661.71	1,939,724.27	836.18
11	2,168,618.15	1,939,835.38	836.66
12	2,168,757.23	1,939,776.26	835.09
13	2,168,829.49	1,939,653.85	834.59
14	2,168,974.24	1,939,758.53	832.61
15	2,169,028.27	1,939,848.30	832.26
16	2,169,100.92	1,939,634.22	830.81
17	2,169,303.85	1,939,483.90	–
18	2,169,388.81	1,939,518.04	–

SOUTH SIDE BERM COORDINATE DATA

Location	Northing (ft.)	Easting (ft.)	Elevation (ft.)
A	2,168,301.19	1,938,989.88	852.00
B	2,168,345.16	1,939,193.63	850.00
C	2,168,366.61	1,939,294.33	848.00
D	2,168,385.97	1,939,398.21	846.00

FLOOD PLAIN GEOMETRY NOTES:

1. Centerline of Top of Berm locations indicated. Some adjustments may be needed to match 3:1 slope upward from Floodplain Limit line.
2. Point table provides basic alignment and slopes of flood plain. All bends in channel shall have the slope "corners" smoothed with 50 foot radii regrades.

STREAM CENTERLINE COORDINATE TABLE

Station	Northing (ft.)	Easting (ft.)
499+75	2,168,311.20	1,938,835.27
500+00	2,168,315.22	1,938,858.50
500+25	2,168,310.64	1,938,883.76
500+50	2,168,318.72	1,938,907.29
500+75	2,168,320.80	1,938,931.44
501+00	2,168,314.75	1,938,955.69
501+25	2,168,316.88	1,938,979.76
501+50	2,168,328.44	1,939,001.93
501+75	2,168,335.64	1,939,025.39
502+00	2,168,336.26	1,939,050.37
502+25	2,168,349.24	1,939,071.41
502+50	2,168,361.79	1,939,092.65
502+75	2,168,363.64	1,939,117.58
503+00	2,168,376.92	1,939,137.88
503+25	2,168,387.92	1,939,159.24
503+50	2,168,390.61	1,939,184.09
503+75	2,168,401.96	1,939,205.60
504+00	2,168,420.57	1,939,222.30
504+25	2,168,430.71	1,939,244.08
504+50	2,168,419.39	1,939,265.81
504+75	2,168,404.08	1,939,285.58
505+00	2,168,404.07	1,939,309.06
505+25	2,168,426.16	1,939,317.94
505+50	2,168,450.42	1,939,321.83
505+75	2,168,458.87	1,939,343.78
506+00	2,168,444.52	1,939,363.92
506+25	2,168,441.02	1,939,387.15
506+50	2,168,461.10	1,939,400.76
506+75	2,168,483.63	1,939,411.36
507+00	2,168,494.24	1,939,433.15
507+25	2,168,484.65	1,939,455.41
507+50	2,168,463.55	1,939,468.78
507+75	2,168,450.44	1,939,488.88
508+00	2,168,460.03	1,939,510.87
508+25	2,168,483.80	1,939,515.77
508+50	2,168,508.75	1,939,514.25
508+75	2,168,527.92	1,939,527.95
509+00	2,168,525.41	1,939,552.31
509+25	2,168,523.11	1,939,576.72
509+50	2,168,540.81	1,939,593.31
509+75	2,168,562.73	1,939,605.34
510+00	2,168,578.87	1,939,623.47
510+25	2,168,576.14	1,939,647.71
510+50	2,168,567.18	1,939,671.05
510+75	2,168,565.18	1,939,695.06
511+00	2,168,585.40	1,939,707.53
511+25	2,168,610.15	1,939,711.01
511+50	2,168,629.04	1,939,726.18
511+75	2,168,635.40	1,939,750.31
512+00	2,168,642.03	1,939,774.32
512+25	2,168,662.49	1,939,786.84
512+50	2,168,684.19	1,939,776.62
512+75	2,168,694.89	1,939,754.06
513+00	2,168,707.25	1,939,732.69
513+25	2,168,730.82	1,939,731.05
513+50	2,168,752.39	1,939,743.64
513+75	2,168,776.29	1,939,740.70
514+00	2,168,790.15	1,939,720.35
514+25	2,168,801.14	1,939,697.90
514+50	2,168,821.74	1,939,685.57
514+75	2,168,843.40	1,939,695.90
515+00	2,168,849.35	1,939,719.82
515+25	2,168,851.88	1,939,744.69
515+50	2,168,855.87	1,939,769.23
515+75	2,168,876.24	1,939,781.36
516+00	2,168,899.29	1,939,772.26
516+25	2,168,921.92	1,939,761.72
516+50	2,168,945.00	1,939,768.21
516+75	2,168,959.63	1,939,788.45
517+00	2,168,975.31	1,939,807.68
517+25	2,168,999.05	1,939,807.54
517+50	2,169,011.55	1,939,786.62
517+75	2,169,019.70	1,939,762.99
518+00	2,169,028.85	1,939,739.83
518+25	2,169,051.25	1,939,732.71
518+50	2,169,075.03	1,939,740.43
518+75	2,169,099.34	1,939,744.34
519+00	2,169,118.63	1,939,729.72
519+25	2,169,119.71	1,939,705.51
519+50	2,169,112.23	1,939,681.65
519+75	2,169,112.98	1,939,657.71
520+00	2,169,134.63	1,939,647.77
520+25	2,169,159.61	1,939,646.81
520+50	2,169,179.75	1,939,634.73
520+75	2,169,186.89	1,939,610.96
521+00	2,169,209.27	1,939,605.50
521+25	2,169,228.17	1,939,621.76
521+50	2,169,251.73	1,939,626.22
521+75	2,169,270.71	1,939,610.47
522+00	2,169,287.76	1,939,592.19
522+25	2,169,304.80	1,939,573.90
522+50	2,169,320.43	1,939,554.62
522+75	2,169,328.69	1,939,531.03
523+00	2,169,343.45	1,939,511.17
523+25	2,169,365.93	1,939,500.83
523+44	2,169,384.81	1,939,500.99

LEGEND

- Existing Overhead Electric
- Existing Power Pole
- Existing Fence
- Treeline
- Tree
- 928.8 Surface Spot Elevation
- Approximate Property Line
- CM2 ▲ 2004 Mapping / 2005 Mapping Survey Control Point
- Mapping Matchline
- Relocated Overhead Electric
- Riffle Armor
- Cross Vane
- J-Hook
- Log Vane
- Step Pools

CONSTRUCTION PHASING NOTES

1. Construct Floodplain according to the grading shown on drawing.
2. After Floodplain is constructed, excavate Stream Mitigation Channel to depths indicated on Profile Drawing. (Refer to Typical Reconstructed Meander Detail, Typical Sections, & Profile)
3. Construct Riffle Armor and In-Stream Structures as indicated on Plan View Drawing and Detail Drawings.
4. Construct Final Grading of Floodplain in accordance with Floodplain Contouring Detail. Floodplain shall have a minimum of 4 inches of topsoil at the surface.
5. Plant seed, shrubs, trees, and live stakes in accordance with Specifications.
6. Timing of Stream Mitigation Construction shall be phased to allow vegetation to become established along stream banks and along Floodplain prior to flows being routed into Stream Mitigation Channel.
7. Scour Hole – Excavate Scour Hole into Bedrock Surface at Locations shown. Scour Holes shall be Approximately 20 Square Feet in Surface Area and Approximately 0.8 Feet in Depth. They Shall be Located on one side of the stream. Baseline towards the Outside of Their Respective Bends.
8. Location of Stream Mitigation features may be modified or altered during construction based on the judgement of the Eco-System Design Professional directing the work.

MAPPING NOTES

1. Existing site conditions are based on topographical mapping taken from an aerial survey dated September 1, 2005 by L. Robert Kimball & Associates, Inc., and aerial survey dated August 25, 2004 by L. Robert Kimball & Associates. The topographic mapping presented within these drawings consist of a combination of these two topographic maps. The topographic information within the Auxiliary Ash Pond and Main Ash Pond is based on August 25, 2004 aerial survey and the area ouside these limits are from the September 1, 2005 aerial survey. The matchline between these two surveys is shown on Sheets 104 through 111.
2. Coordinate system is based on Kentucky State Plane, South Zone NAD83. Vertical Datum NAVD88.

SURVEY NOTE:

As Constructed survey data provided by Bizzack Construction. Based on field observations this data is believed to be correct, but has not been surveyed by FMSM Engineers.

AS CONSTRUCTED - 06/17/08

LX2000232B \REVIT \ EWSTREAMPLAN.DWG

REVISIONS				
Rev.	Drawn Date:	Drawn By:	Revision Mode	
A	6-16-06			
B	7-05-06			
C	10-02-06			
H	06-17-08			

Fuller Mossbarger Scott & May

FMSM ENGINEERS

LEXINGTON • LOUISVILLE • CINCINNATI • COLUMBUS • ST. LOUIS • JEFFERSONVILLE

Title: PLAN VIEW STREAM MITIGATION AUXILIARY ASH POND – PHASE I

Location and Unit: E.W. BROWN GENERATING STATION

Scale: AS SHOWN
Drawn: SB/TJ
Date: MAY, 2006
Checked: GA
Approved:

JOB NO.	JOB NO.	JOB NO.	JOB NO.
119961			

Kentucky Utilities Company, an E·ON company

Drawing No: BR0-C-00231 Rev: H

DMS Version 2.0

BR0-C-00232

BARE ROOT SEEDLING PLANTING SCHEDULE

Common Name	Scientific Name	Indicator Status	Spacing (feet)	Stems/ per Acre	Frequency (%)	Total Stems
ZONE 1: Planting Area = 3.20 Acres						
SHRUBS						
Silky Dogwood	Cornus amomum	FACW	8 x 8	218	32	698
Alternate-leaf Dogwood	Cornus alternifolia	FAC+	8 x 8	136	20	435
Red Chokeberry	Aronia arbutifolia	FACW	8 x 8	82	12	262
Spicebush	Lindera benzoin	FACW-	8 x 8	82	12	262
Elderberry	Sambucus canadensis	FACW	8 x 8	82	12	262
Arrowwood	Viburnum dentatum	FACW-	8 x 8	82	12	262
			Total	682	100	2181
TREES						
Black Willow	Salix nigra	FACW+	10 x 10	66	15	211
Red Maple	Acer rubrum	FAC	10 x 10	88	20	282
Green Ash	Fraxinus pennsylvanica	FACW	10 x 10	44	10	141
Pin Oak	Quercus palustris	FACW	10 x 10	66	15	211
Swamp White Oak	Quercus bicolor	FACW+	10 x 10	66	15	211
Sycamore	Platanus occidentalis	FACW-	10 x 10	66	15	211
Yellow Birch	Betula alleghaniensis (syn. B. lutea)	FAC	10 x 10	44	10	141
			Total	440	100	1408
ZONE 2: Planting Area = 3.33 Acres						
SHRUBS						
Black Haw	Viburnum prunifolium	FACU-	8 x 8	150	22	500
Silky Dogwood	Cornus amomum	FACW	8 x 8	150	22	500
Alternate-leaf Dogwood	Cornus alternifolia	FAC+	8 x 8	82	12	273
Spicebush	Lindera benzoin	FACW-	8 x 8	150	22	500
Arrowwood	Viburnum dentatum	FACW-	8 x 8	150	22	500
			Total	682	100	2273
TREES						
Flowering Dogwood	Cornus florida	FACU-	10 x 10	48	11	160
Red Maple	Acer rubrum	FAC	10 x 10	48	11	160
Sweet Gum	Fraxinus pennsylvanica	FAC	10 x 10	96	22	320
Red Oak	Quercus rubra	FACU-	10 x 10	96	22	320
Sycamore	Platanus occidentalis	FACW-	10 x 10	73	17	243
Yellow Birch	Betula alleghaniensis (syn. B. lutea)	FAC	10 x 10	73	17	243
			Total	434	100	1446

* All shrubs and trees shall be bare root seedlings with minimum height of 18"
* All shrub and tree species shall be distributed in a random pattern

TEMPORARY COVER SEEDING SCHEDULE

Common Name	Scientific Name	Indicator Status	Pounds of PLS per acre	Frequency (%)	Total Pounds of PLS
Millet	Panicum miliaceum	UPL	15	30	98
Annual Rye	Lolium multiflorum	UPL	25	50	163
Austrian Winter Pea	Pisum arvense	NI	10	20	65
		Total	50	100	326

* PLS = Pure Live Seed (minimum pounds per acre)
* All seed to be broadcast and raked into soil

PERMANENT SEEDING SCHEDULE

Common Name	Scientific Name	Indicator Status	Pounds of PLS per acre	Frequency (%)	Total Pounds of PLS
Annual Rye	Lolium multiflorum	UPL	15	20	98
Big Bluestern Grass	Andropogon gerrardii	FAC	8	11	52
Little Bluestern Grass	Andropogon scoparius	FACU-	8	11	52
Fowl Mannagrass	Glyceria Striata	OBL	4	6	26
Indian Grass	Sorghastrum nutans	UPL	4	6	26
Switchgrass	Panclum virgatum	FAC	8	11	52
Tioga Deertongue	Panclum clandestinum	FAC+	8	11	52
Fox Sedge	Carex vulpinoidea	OBL	3	4	20
Soft Rush	Juncus effusus	FACW+	3	4	20
Black-Eyed Susan	Rudbeckia hirta	FACU-	2	3	13
New England Aster	Aster novae-angliae	FACW-	2	3	13
Turtlehead	Chelone glabra	OBL	1	2	7
Ohio Spiderwort	Tradescantia ohiensis	FAC	1	2	7
Marsh Marigold	Caltha palustris	OBL	2	3	13
Purple Joe Pye Weed	Eupatorium purpureum	FAC	2	3	13
Beggar Ticks	Bidens fondosa	FACW	4	6	26
		Total	75	106	490

* PLS = Pure Live Seed (minimum pounds per acre)
* All seed to be broadcast and raked into soil
* Planting Area = 6.06 acres

LIVE STAKING SCHEDULE: EROSION CONTROL BLANKET

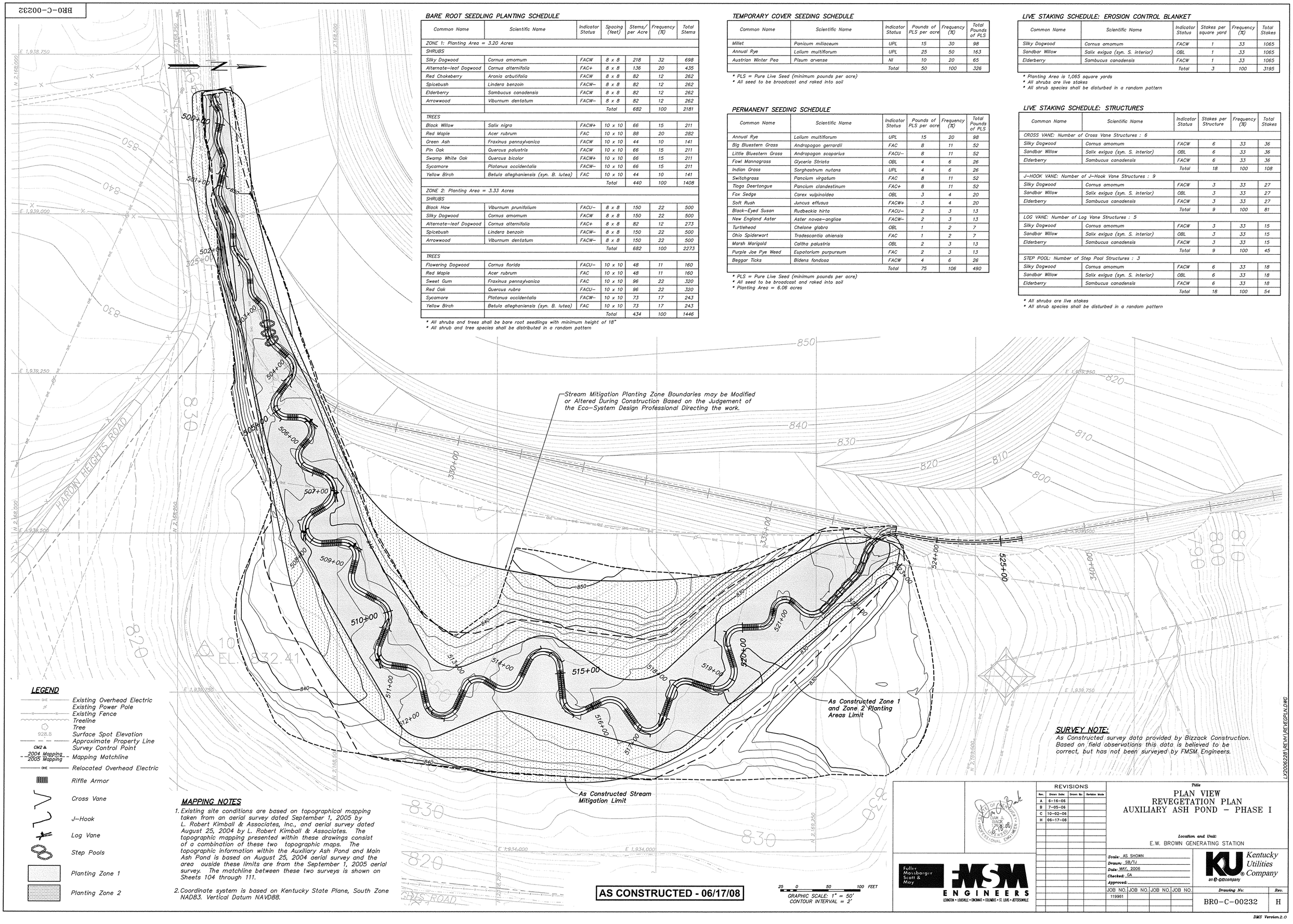
Common Name	Scientific Name	Indicator Status	Stakes per square yard	Frequency (%)	Total Stakes
Silky Dogwood	Cornus amomum	FACW	1	33	1065
Sandbar Willow	Salix exigua (syn. S. interior)	OBL	1	33	1065
Elderberry	Sambucus canadensis	FACW	1	33	1065
		Total	3	100	3195

* Planting Area is 1,065 square yards
* All shrubs are live stakes
* All shrub species shall be disturbed in a random pattern

LIVE STAKING SCHEDULE: STRUCTURES

Common Name	Scientific Name	Indicator Status	Stakes per Structure	Frequency (%)	Total Stakes
CROSS VANE: Number of Cross Vane Structures : 6					
Silky Dogwood	Cornus amomum	FACW	6	33	36
Sandbar Willow	Salix exigua (syn. S. interior)	OBL	6	33	36
Elderberry	Sambucus canadensis	FACW	6	33	36
		Total	18	100	108
J-HOOK VANE: Number of J-Hook Vane Structures : 9					
Silky Dogwood	Cornus amomum	FACW	3	33	27
Sandbar Willow	Salix exigua (syn. S. interior)	OBL	3	33	27
Elderberry	Sambucus canadensis	FACW	3	33	27
		Total	9	100	81
LOG VANE: Number of Log Vane Structures : 5					
Silky Dogwood	Cornus amomum	FACW	3	33	15
Sandbar Willow	Salix exigua (syn. S. interior)	OBL	3	33	15
Elderberry	Sambucus canadensis	FACW	3	33	15
		Total	9	100	45
STEP POOL: Number of Step Pool Structures : 3					
Silky Dogwood	Cornus amomum	FACW	6	33	18
Sandbar Willow	Salix exigua (syn. S. interior)	OBL	6	33	18
Elderberry	Sambucus canadensis	FACW	6	33	18
		Total	18	100	54

* All shrubs are live stakes
* All shrub species shall be disturbed in a random pattern



LEGEND

- Existing Overhead Electric
- Existing Power Pole
- Existing Fence
- Treeline
- Tree
- 928.8 Surface Spot Elevation
- Approximate Property Line
- CM2 ▲ Survey Control Point
- 2004 Mapping / 2005 Mapping — Mapping Matchline
- Relocated Overhead Electric
- Riffle Armor
- Cross Vane
- J-Hook
- Log Vane
- Step Pools
- Planting Zone 1
- Planting Zone 2

MAPPING NOTES

1. Existing site conditions are based on topographical mapping taken from an aerial survey dated September 1, 2005 by L. Robert Kimball & Associates, Inc., and aerial survey dated August 25, 2004 by L. Robert Kimball & Associates. The topographic mapping presented within these drawings consist of a combination of these two topographic maps. The topographic information within the Auxiliary Ash Pond and Main Ash Pond is based on August 25, 2004 aerial survey and the area ouside these limits are from the September 1, 2005 aerial survey. The matchline between these two surveys is shown on Sheets 104 through 111.
2. Coordinate system is based on Kentucky State Plane, South Zone NAD83. Vertical Datum NAVD88.

AS CONSTRUCTED - 06/17/08

25 0 50 100 FEET
GRAPHIC SCALE: 1" = 50'
CONTOUR INTERVAL = 2'

SURVEY NOTE:

As Constructed survey data provided by Bizzack Construction. Based on field observations this data is believed to be correct, but has not been surveyed by FMSM Engineers.

LX2006228\VIEW1\REVEGPLN.DWG

Fuller Mossbarger Scott & May ENGINEERS
LEXINGTON • LOUISVILLE • CINCINNATI • COLUMBUS • ST. LOUIS • JEFFERSONVILLE

REVISIONS			
Rev.	Drawn Date:	Drawn By:	Revision Made
A	6-16-06		
B	7-05-06		
C	10-02-06		
H	06-17-08		

Title
PLAN VIEW
REVEGETATION PLAN
AUXILIARY ASH POND - PHASE I

Location and Unit:
E.W. BROWN GENERATING STATION

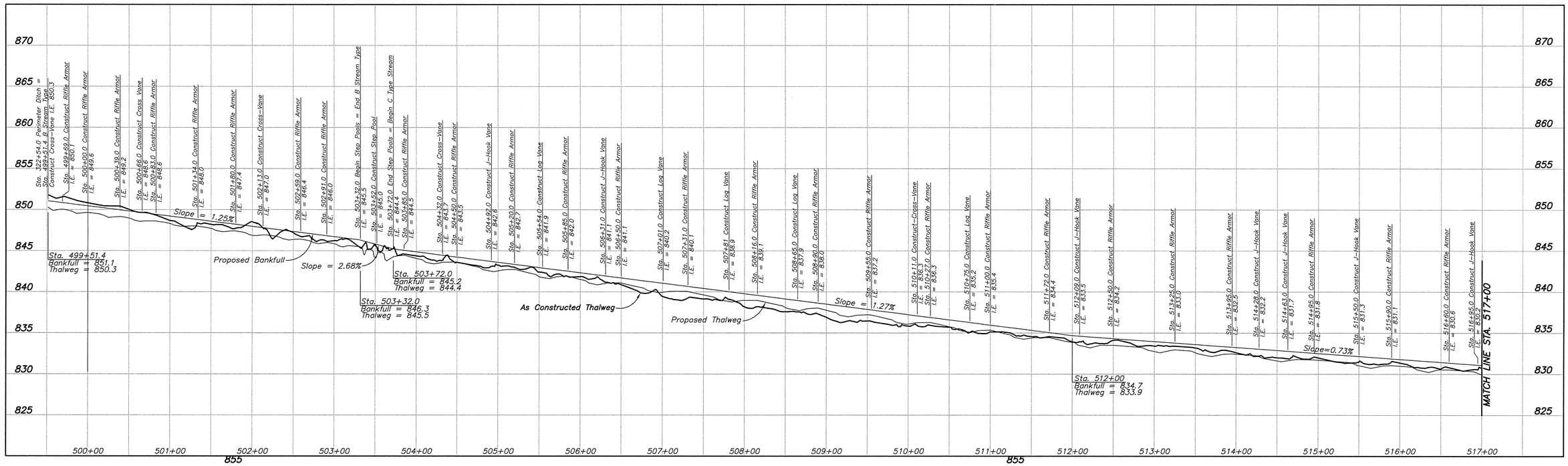
Scale: AS SHOWN
Drawn: SB/TJ
Date: MAY, 2006
Checked: GA
Approved:

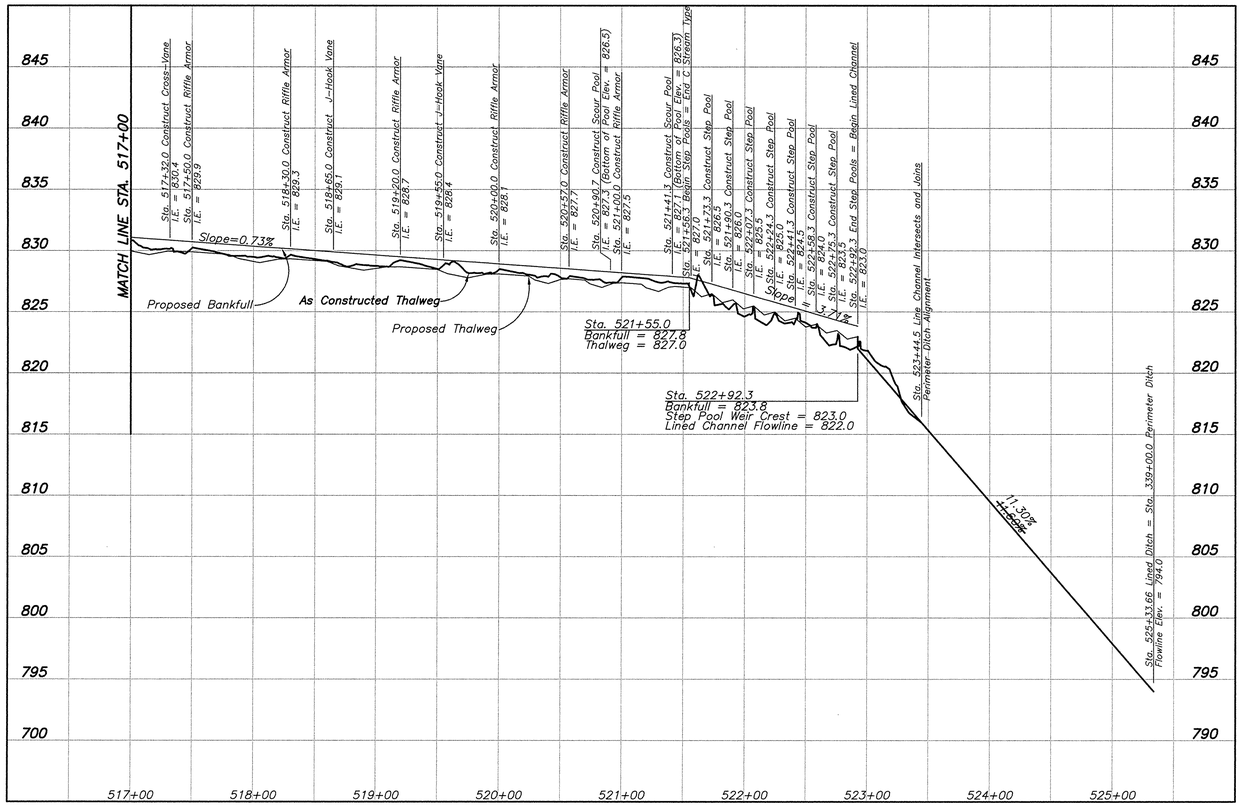
Kentucky Utilities Company
an E·ON company

JOB NO.	JOB NO.	JOB NO.	JOB NO.	Drawing No:	Rev.
119961				BR0-C-00232	H

DMS Version 2.0

BR0-C-00233





1/233 PROFILE-STREAM MITIGATION
Scale: 1"=50' Horizontal
1"=5' Vertical
See Sheet 231

Section or Detail No.
Sheet Where Shown
REFERENCE KEY

CONSTRUCTION NOTE:
Location of Stream Mitigation features may be modified or altered during construction based on the judgement of the Eco-System Design Professional directing the work.

SURVEY NOTE:
As Constructed survey data provided by Bizzack Construction. Based on field observations this data is believed to be correct, but has not been surveyed by FMSM Engineers.

AS CONSTRUCTED - 06/17/08

LX2006229\REVA\ESTREAMPROFILES.DWG

REVISIONS			
Rev.	Drawn Date:	Drawn By:	Revision Mode
A	6-16-06		
B	7-05-06		
C	10-02-06		
H	06-17-08		

Title
STREAM PROFILE MITIGATION
AUXILIARY ASH POND - PHASE I

Location and Unit:
E.W. BROWN GENERATING STATION

Scale: AS SHOWN
Drawn: SB/TJ
Date: MAY, 2006
Checked: GA
Approved:

Fuller Mossbarger Scott & May
FMSM ENGINEERS
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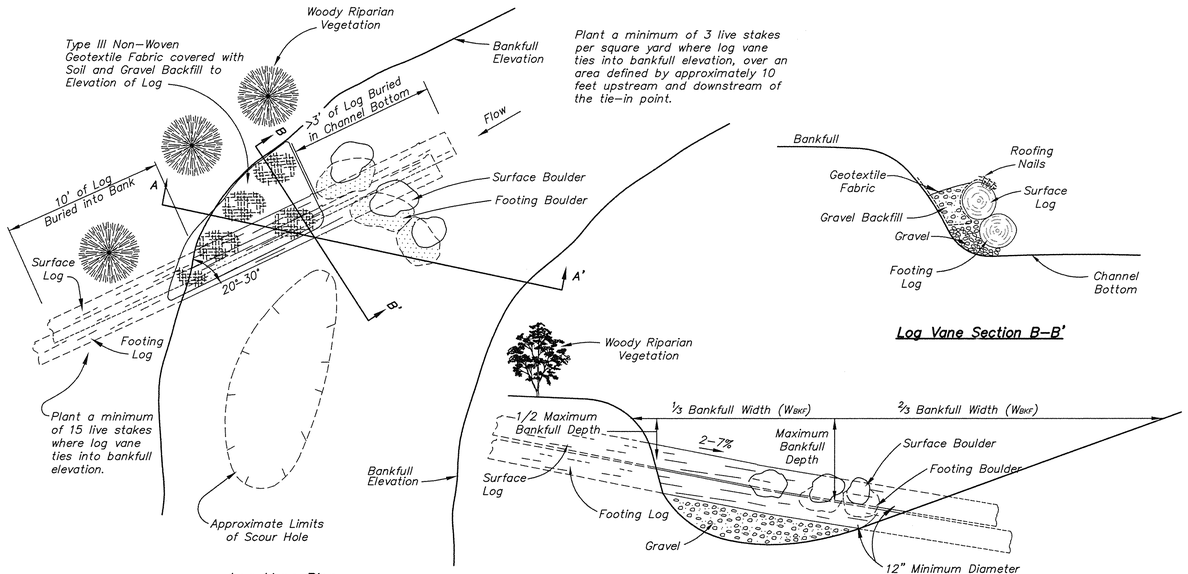
JOB NO.	JOB NO.	JOB NO.	JOB NO.	Drawing No:	Rev.
119961				BR0-C-00233	H

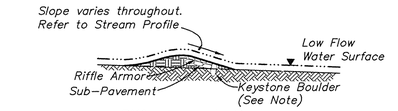
DMS Version 2.0



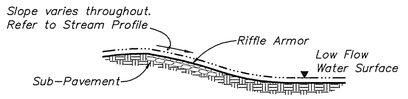
Log Vane Plan

1/234 LOG VANE DETAIL DETAIL - LOGVANE
NOT TO SCALE

SEE SHEET 231



Riffle Armor In Rock



Riffle Armor In Soil

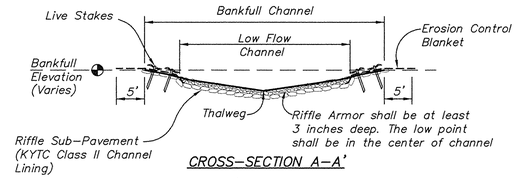
PROFILE B-B'

COMPOSITION OF RIFFLE ARMOR

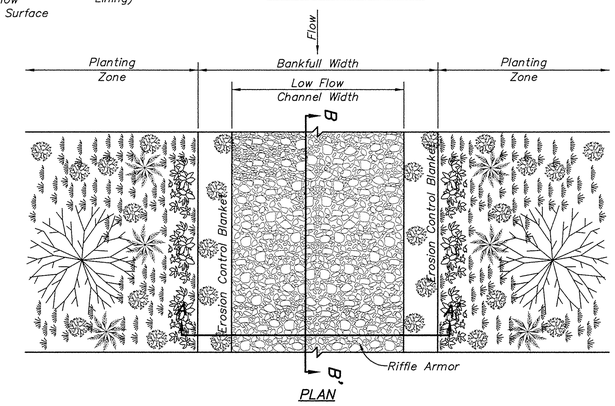
KYTC No. 57 Crushed Stone 25%
KYTC No. 2 Crushed Stone 75%

NOTES:

1. Riffle Armor extends up to Low-Flow Water Surface
2. Riffle Sub-Pavement extends up to Bankfull Elevation.
3. Place 4 inches of soil on top of Riffle Sub-Pavement between the Bankfull Channel and low flow channel
4. Erosion Control Blanket extends down to Low-Flow Water Surface and a minimum of 5 feet onto floodplain.
5. Live Stakes planted from floodplain down to Low-Flow Water Surface.
6. Notch a keystone boulder at the downstream end of riffles constructed directly on bedrock.



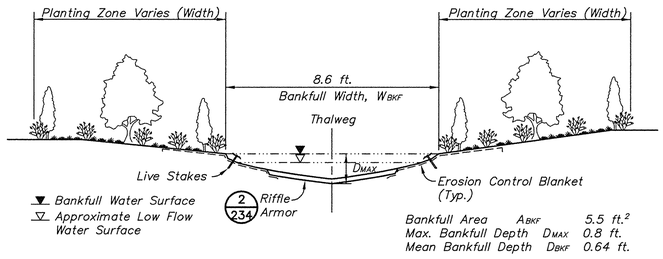
CROSS-SECTION A-A'



PLAN

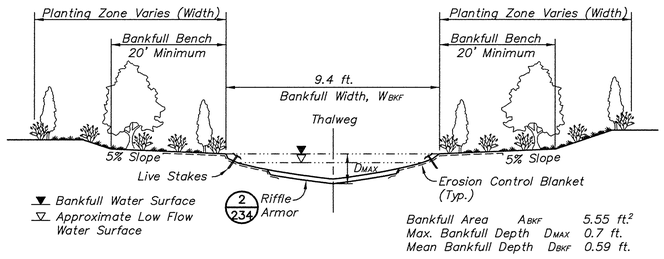
2/234 DETAIL - RIFFLE ARMOR DETAIL - RIFFLE ARMOR
NOT TO SCALE

SEE SHEET 231



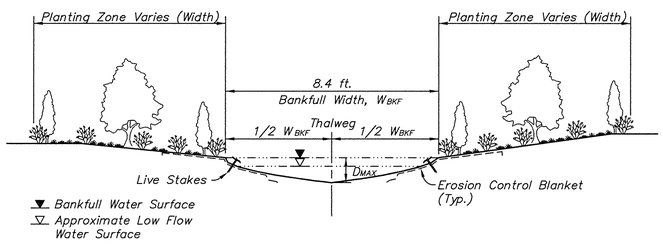
Bankfull Area ABKF 5.5 ft.²
Max. Bankfull Depth DMAX 0.8 ft.
Mean Bankfull Depth DBKF 0.64 ft.

RIFFLE



Bankfull Area ABKF 5.55 ft.²
Max. Bankfull Depth DMAX 0.7 ft.
Mean Bankfull Depth DBKF 0.59 ft.

RIFFLE



POOL

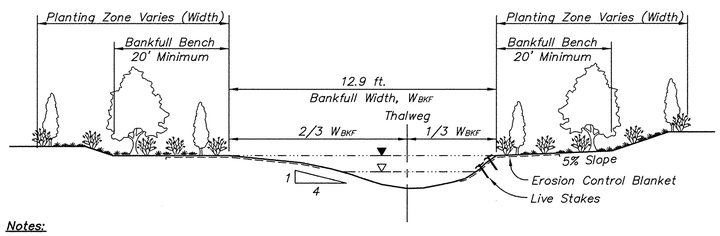
Bankfull Area ABKF 6.79 ft.²
Max. Bankfull Depth DMAX 1.1 ft.
Mean Bankfull Depth DBKF 0.81 ft.

Notes:

1. Construct channel cross-sections as shown at all Riffle and Pool locations. Provide a smooth transition between Riffles and Pools using depths shown on the profile.
2. Top of topsoil shall be at bankfull elevation.
3. Overall width of planting zones varies See Revegetation Plan.

3/234 B STREAM TYPICAL CROSS SECTION
NOT TO SCALE

SEE SHEET 231



POOL

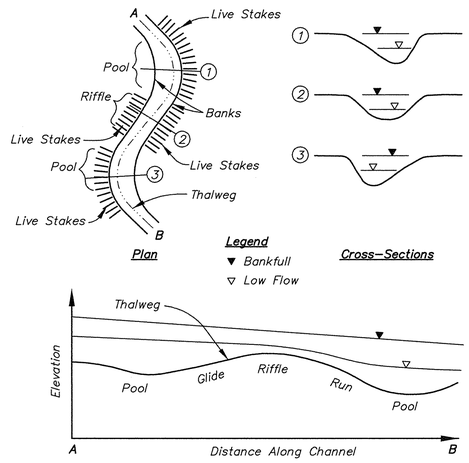
Bankfull Area ABKF 8.95 ft.²
Max. Bankfull Depth DMAX 1.2 ft.
Mean Bankfull Depth DBKF 0.69 ft.

Notes:

1. Construct channel cross-sections as shown at all Riffle and Pool locations. Provide a smooth transition between Riffles and Pools using depths shown on the profile.
2. Top of topsoil shall be at bankfull elevation.
3. Overall width of planting zones varies See Revegetation Plan.
4. Bankfull bench shall slope up to existing ground at a maximum slope of 3(H):1(V) a minimum distance of 20 ft from edge of channel.

4/234 C STREAM TYPICAL CROSS SECTION
NOT TO SCALE

SEE SHEET 231



Notes

1. Install live stakes along outside of meander bend and along both banks of riffle.
2. Live stakes shall be planted in an irregular pattern.

5/234 TYPICAL RECONSTRUCTED MEANDER DETAIL TYPICAL MEANDER
NOT TO SCALE

CONSTRUCTION NOTE:
Detail of Stream Mitigation features may be modified or altered during construction based on the judgement of the Eco-System Design Professional directing the work.

AS CONSTRUCTED - 06/17/08

Section or Detail No.
Sheet Where Shown
REFERENCE KEY

Fuller Mossbarger Scott & May ENGINEERS
LEXINGTON • LOUISVILLE • CINCINNATI • COLUMBUS • ST. LOUIS • JEFFERSONVILLE

REVISIONS			
Rev.	Drawn Date:	Drawn By:	Revision Made
A	6-16-06		
C	10-02-06		
H	06-17-08		

Title
DETAILS
STREAM MITIGATION DETAILS
AUXILIARY ASH POND - PHASE I

Location and Unit:
E.W. BROWN GENERATING STATION

Scale: AS SHOWN
Drawn: SB
Date: MAY, 2006
Checked: GA
Approved:

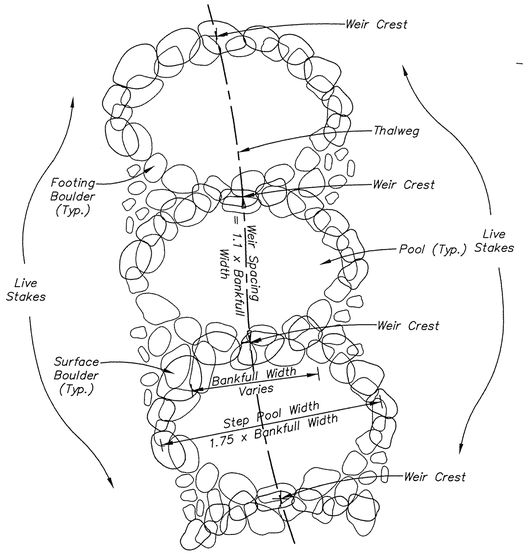
JOB NO. 119961 | JOB NO. | JOB NO. | JOB NO.

Kentucky Utilities Company, an E·ON company

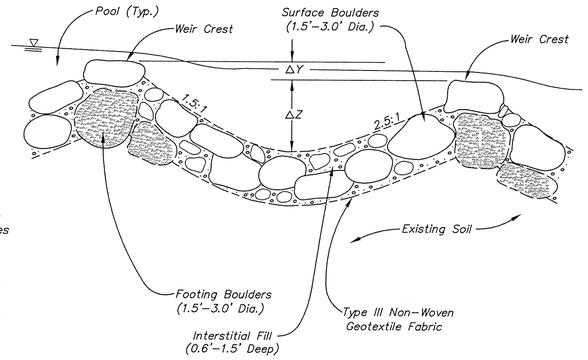
Drawing No: BR0-C-00234 | Rev. H

LX2006228\REVIT\EWSTREAMDETAILS.DWG

DMS Version 2.0



Step Pool Plan View



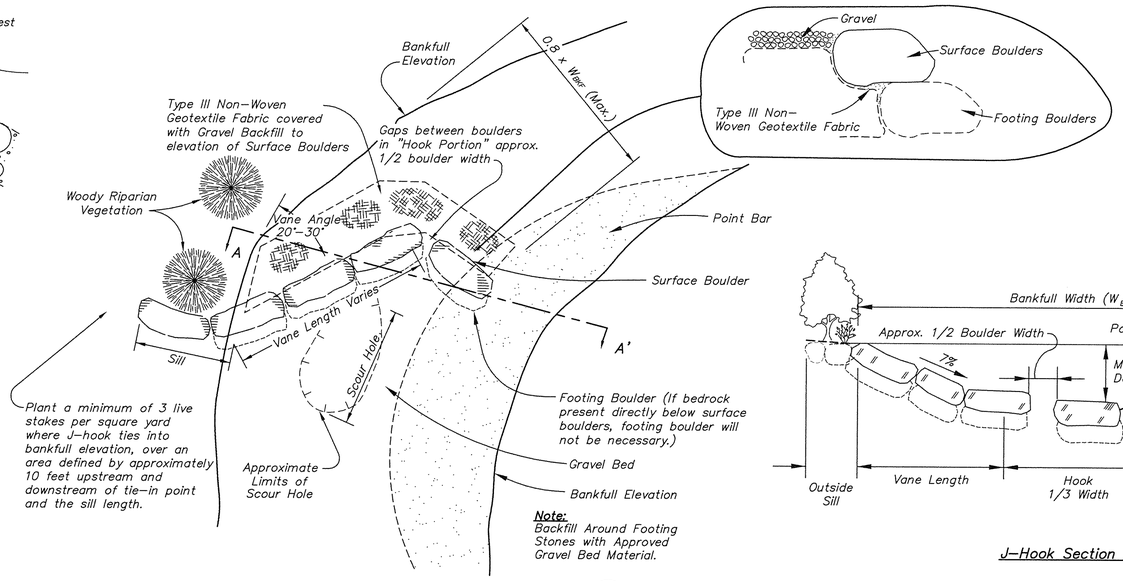
Notes:

1. Step height (ΔY) varies. See profile.
2. Pool depth (ΔZ) varies. See profile.
3. Interstitial Fill is a mixture of sands, gravels and cobbles. KYTC No. 2 Stone mixed with boulders may be used for interstitial fill.
4. Construct weir crest such that center of crest is a minimum of 6–inches lower than surrounding boulders to ensure flow directed over center of weir.
5. Live Stakes to be planted at a density of 3 stakes per square yard extending 6 feet from both sides for the entire length of the step pools.

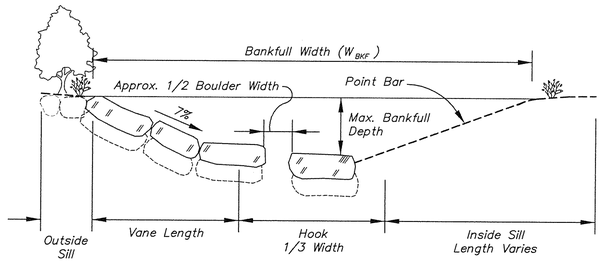
Step Pool Profile

1/235 STEP POOL DETAIL
Not To Scale POOLPLAN POOLPROF

SEE SHEET 231



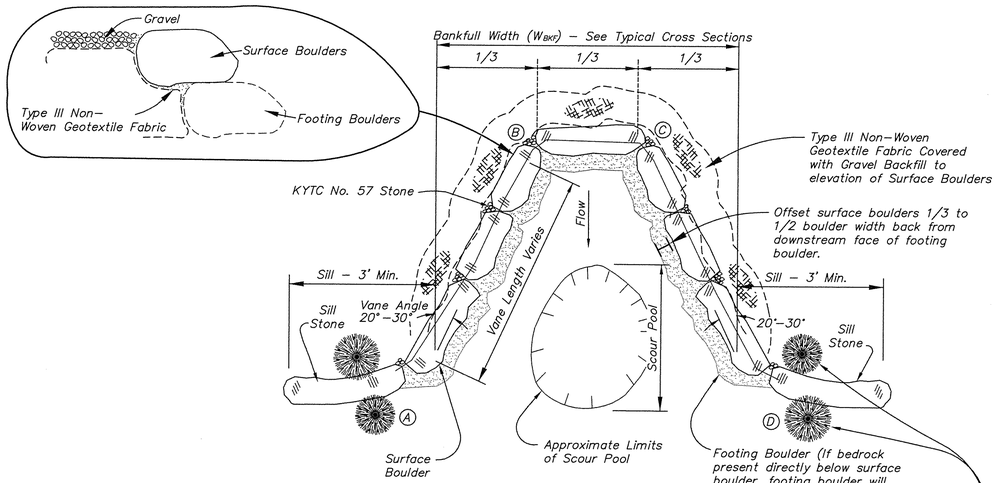
Note:
Backfill Around Footing Stones with Approved Gravel Bed Material.



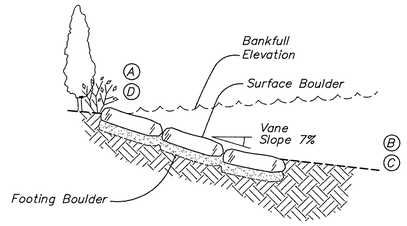
J–Hook Section A–A'

2/235 J–HOOK VANE – DETAIL
NOT TO SCALE

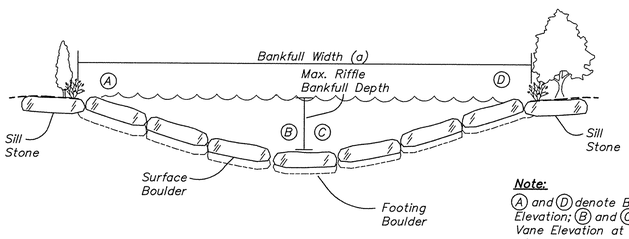
SEE SHEET 231



Cross–Vane Plan View



Cross–Vane Longitudinal Profile

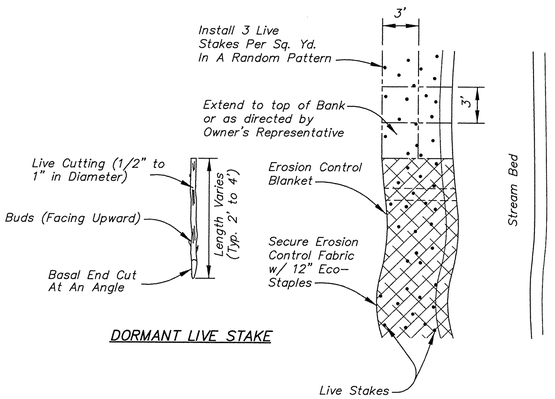


Cross–Vane Typical Cross–Section

Note:
(A) and (D) denote Bankfull Elevation; (B) and (C) mark Vane Elevation at head of vane

3/235 CROSS–VANE – DETAIL
NOT TO SCALE

SEE SHEET 231

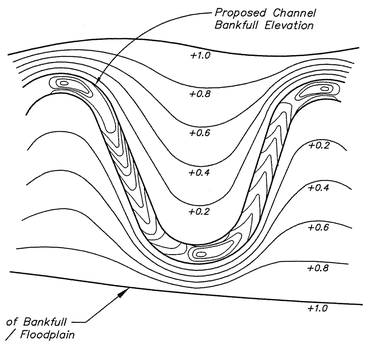


TYPICAL PLAN

DORMANT LIVE STAKE

4/235 DORMANT LIVE STAKE DETAIL
NOT TO SCALE STAKE

SEE SHEET 231



Note:
Contour Elevations are relative to Bankfull Elevation

5/235 STREAMBED AND BENCH CONTOURING
NOT TO SCALE

CONSTRUCTION NOTE:
Detail of Stream Mitigation features may be modified or altered during construction based on the judgement of the Eco–System Design Professional directing the work.

AS CONSTRUCTED - 06/17/08

Section or Detail No.
Sheet Where Shown
REFERENCE KEY

Fuller Mossbarger Scott & May
FMSM ENGINEERS
LEXINGTON • LOUISVILLE • CINCINNATI • COLUMBUS • ST. LOUIS • JEFFERSONVILLE

Dan A. Bach, Licensed Professional Engineer, Commonwealth of Kentucky, 13935, 6-18-08

REVISIONS				
Rev.	Drawn Date:	Drawn By:	Revision Mode	
A	6-16-06			
B	7-05-06			
C	10-02-06			
H	06-17-08			

Title
DETAILS
STREAM MITIGATION DETAILS
AUXILIARY ASH POND – PHASE I

Location and Unit:
E.W. BROWN GENERATING STATION

Scale: AS SHOWN
Drawn: SB
Date: MAY, 2006
Checked: GA
Approved:

JOB NO. 119961 | JOB NO. | JOB NO. | JOB NO.

Kentucky Utilities Company
an E·ON company

Drawing No: BR0-C-00235 | Rev. H

DMS Version 2.0

LX2006228\REVPAL\ENSTREAMDETAILS2.DWG

BRO-C-01130

NOTE

This Drawing and the associated Design Elements and Computations have been prepared by T. H. E. Engineers, Inc. under the review of Fuller, Mossbarger, Scott and May Engineers, Inc. Based on that review, it is my professional opinion that the information portrayed on this sheet is consistent with the original design intentions for the facility and the requirements for Class C, High Hazard dams. Accordingly, this sheet is incorporated as a part of the construction plans for the E. W. Brown Generating Station Auxiliary Ash Pond.

Name	P.E. License No.	Date
David Bank	13930	6-18-08

NOTE:
AS CONSTRUCTED ALIGNMENT FROM BIZZACK CONSTRUCTION SURVEY.

N 2,170,500 | E 1,937,500 | E 1,938,000 | E 1,938,500 | E 1,939,000 | N 2,170,000 | N 2,169,500

Main Ash Pond Baseline (Future Construction)

Main Ash Pond Principal Spillway Baseline & ℄ HDPE Pipe

Main Ash Pond Secondary Spillway Baseline

Auxiliary Ash Pond Principal Spillway Baseline

Auxiliary Ash Pond Baseline

N 2,170,121.76
E 1,937,808.76

Begin 32" Pipe w/ encasement

End 32" Pipe w/ encasement

HDPE Pipe Encasement

℄ Survey & ℄ HDPE Pipe

Headwall

Road

Double Circuit To Brown

69kV

138kV

890 880 870 860 850 840 830

MAPPING NOTES:

See sheet 115 for Baseline Alignment information.
HDPE Pipe w/ Encasement Mapping and Groundline Survey conducted by Bizzack Construction, LLC.

25 0 50 100 FEET
Graphic Scale: 1" = 50'
Contour Interval = 2'

SURVEY NOTE:
As Constructed survey data provided by Bizzack Construction. Based on field observations this data is believed to be correct, but has not been surveyed by FMSM Engineers.

PLAN

Main Ash Pond Principal Spillway Pipe
See sheet 109

AS CONSTRUCTED - 06/17/08

DAVID A. BANK 13930 LICENSED PROFESSIONAL ENGINEER 6-18-08

DAVID W. SIMONS 23420 STATE OF KENTUCKY LICENSED PROFESSIONAL ENGINEER 5/4/07

FMSM ENGINEERS

T.H.E. ENGINEERS, INC.

REVISIONS			
Rev.	Drawn Date	Drawn By	Revision Made
E	06-14-07		
H	06-17-08		

Title
PLAN VIEW:

MAIN ASH POND PRINCIPAL SPILLWAY PIPE

AUXILIARY ASH POND - PHASE I

Location and Unit:
E.W. BROWN GENERATING STATION

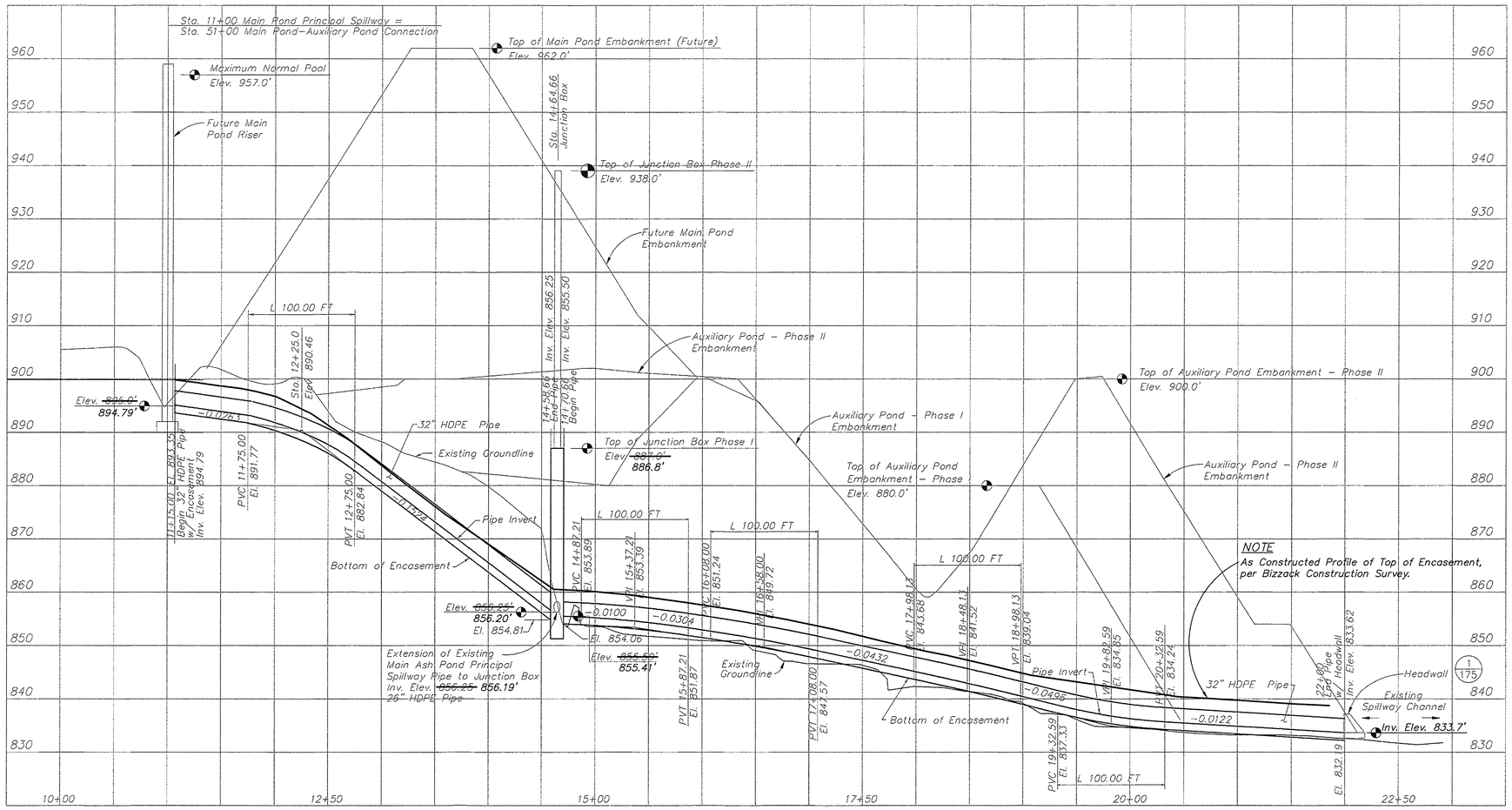
Scale: 1" = 50'
Drawn: D.W.S.
Date: MARCH 2007
Checked: P.F.H.
Approved:

Kentucky Utilities Company
an LG&E company

JOB NO.	JOB NO.	JOB NO.	JOB NO.	Drawing No:	Rev.
119961				BRO-C-01130	H

DMS Version

LX2006228\REVH\BRO-C-01130.DWG



NOTE:
All pipe lengths shown are horizontal distances.
No corrections have been applied for slope length.

1/174 PROFILE – MAIN ASH POND PRINCIPAL SPILLWAY
SCALE: 1" = 50' (Horizontal)
1" = 10' (Vertical)

SEE SHEET 115

MATERIAL SPECIFICATIONS

HDPE PIPE – Pipe shall be in accordance with the contract specifications.
32 inch IPS HDPE DriscoPlex Series 4100 pipe, SDR 26.
26 inch IPS HDPE DriscoPlex, Series 4100 pipe, SDR 26.

CONCRETE – Concrete for encasement structure shall be Class A (4000 psi) in accordance with the contract specification.

FILL CONCRETE – Fill concrete shall be Class B (2500 psi) in accordance with the contract specifications.

REINFORCING STEEL – Reinforcing steel shall be grade 60 in accordance with the contract specifications.

ANCHOR BOLTS AND RODS – Anchor bolts and rods shall be ASTM A307 or ASTM A36.

MISCELLANEOUS STEEL – Miscellaneous steel for straps shall be of ASTM A36.

PADDING – Padding material under the hold down straps shall be of 30 lbs. Roofing felt.

MAPPING NOTES:

See sheet 115 for Baseline Alignment information.
HDPE Pipe w/ Encasement Mapping and Groundline Survey conducted by Bizzack Construction, LLC.

NOTE

This Drawing and the associated Design Elements and Computations have been prepared by T. H. E. Engineers, Inc. under the review of Fuller, Mossbarger, Scott and May Engineers, Inc. Based on that review, it is my professional opinion that the information portrayed on this sheet is consistent with the original design intentions for the facility and the requirements for Class C, High Hazard dams. Accordingly, this sheet is incorporated as a part of the construction plans for the E. W. Brown Generating Station Auxiliary Ash Pond.

Dan A Back | 13930 | 6-18-08
Name | P.E. License No. | Date

SURVEY NOTE:

As Constructed survey data provided by Bizzack Construction. Based on field observations this data is believed to be correct, but has not been surveyed by FMSM Engineers.

AS CONSTRUCTED - 06/17/08

COMMONWEALTH OF KENTUCKY DAN A. BACK 13930 6-18-08 PROFESSIONAL ENGINEER

STATE OF KENTUCKY DAVID W. SIMONS 23420 LICENSED PROFESSIONAL ENGINEER
David W. Simons 5/4/07

FMSM ENGINEERS

T.H.E. ENGINEERS, INC.

REVISIONS			
Rev.	Drawn Date	Drawn By	Revision Note
E	06-14-07		
H	06-17-08		

Title
PROFILE:
MAIN ASH POND PRINCIPAL SPILLWAY PIPE
AUXILIARY ASH POND – PHASE I
Location and Unit:
E.W. BROWN GENERATING STATION

Scale: As Shown
Drawn: D.W.S.
Date: MARCH 2007
Checked: P.F.H.
Approved:

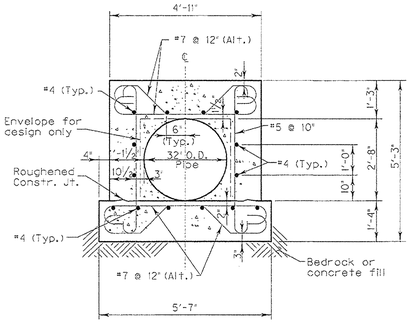
JOB NO. 119961 | JOB NO. | JOB NO. | JOB NO.

Kentucky Utilities Company, an E.ON company

Drawing No: BRO-C-01131 | Rev.: H

L:\2006228\REVIT\BRO-C-01131.DWG

DMS Version: DMS_VER5

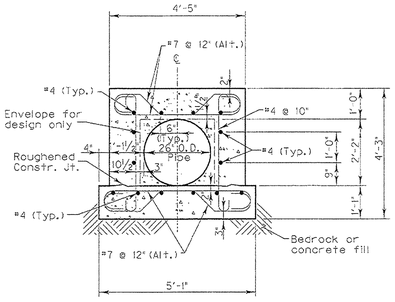


TYPICAL SECTION

Main Ash Pond Principal Spillway Pipe

Scale: ½"= 1'

See Sheets 182, 185, 1131

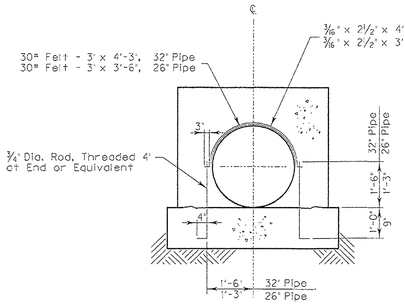


TYPICAL SECTION

Extension Main Ash Pond Principal Spillway Pipe

Scale: ½"= 1'

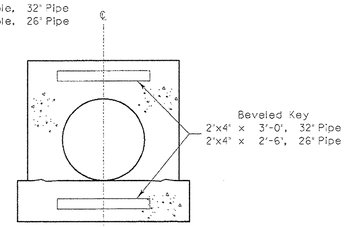
See Sheet 177



TYPICAL HOLD DOWN STRAP

Spacing at 10'-0" o.c.

Scale: ½"= 1'



CONSTRUCTION JOINT

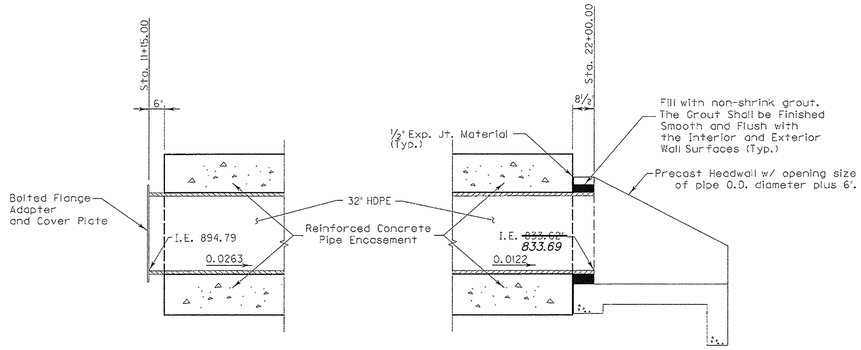
Scale: ½"= 1'

NOTE:

Locate Construction Joints in the field.
Min. pour length 30'
Max. pour lenght 120'

NOTE:

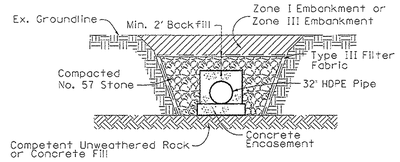
Hold Down Detail modified during construction replaced Threaded Rod embeded in the Footer with Rebar Loops and Straps with Turnbuckle Tensioned Cables with a Rubber Strap to protect the HPDPE Pipe.



SECTION

Main Ash Pond Principal Spillway Pipe

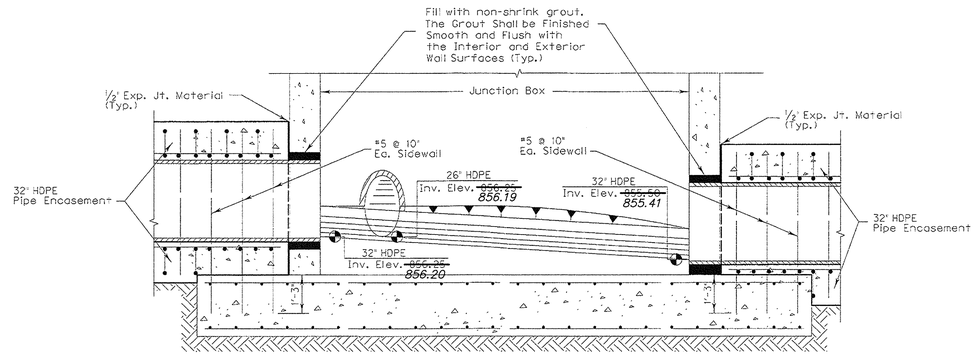
Scale: ½"= 1' See Sheet 1131



MAIN POND PRINCIPAL SPILLWAY

NOT TO SCALE

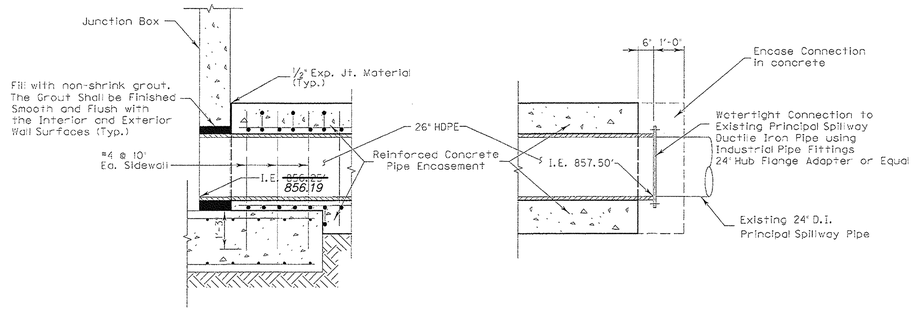
See Sheet 1131



SECTION

Main Ash Pond Principal Spillway Pipe Junction Box

Scale: ½"= 1' See Sheet 1131



SECTION

Extension Main Ash Pond Principal Spillway Pipe

Scale: ½"= 1'

See Sheet 177

SURVEY NOTE:

As Constructed survey data provided by Bizzack Construction. Based on field observations this data is believed to be correct, but has not been surveyed by FMSM Engineers.

AS CONSTRUCTED - 06/17/08

NOTE

This Drawing and the associated Design Elements and Computations have been prepared by T. H. E. Engineers, Inc. under the review of Fuller, Mossbarger, Scott and May Engineers, Inc. Based on that review, it is my professional opinion that the information portrayed on this sheet is consistent with the original design intentions for the facility and the requirements for Class C, High Hazard dams. Accordingly, this sheet is incorporated as a part of the construction plans for the E. W. Brown Generating Station Auxiliary Ash Pond.

Dan A Bak	13930	6-18-08
Name	P.E. License No.	Date

COMMONWEALTH OF KENTUCKY — DANIEL A. BACK — 13930 — LICENSED PROFESSIONAL ENGINEER — 6-18-08

STATE OF KENTUCKY — DAVID W. SIMONS — 23420 — LICENSED PROFESSIONAL ENGINEER — 5/14/07

FMSM ENGINEERS

T.H.E. ENGINEERS, INC.

REVISIONS			
Rev.	Drawn Date:	Drawn By:	Revision Made
E	06-14-07		
H	06-17-08		

Title: DETAILS:

MAIN ASH POND PRINCIPAL SPILLWAY PIPE

AUXILIARY ASH POND - PHASE I

Location and Units: E.W. BROWN GENERATING STATION

Scale: ½"=1'
Drawn: D.B.S.
Date: MARCH 2007
Checked: P.F.H.
Approved:

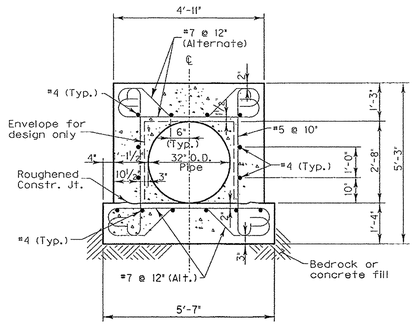
Kentucky Utilities Company — an E.ON U.S. company

JOB NO.	JOB NO.	JOB NO.	JOB NO.
11998			

Drawing No: BRO-C-01132 — Rev. H

LX2006228\REVH\BRO-C-01132.DWG

DMS Version

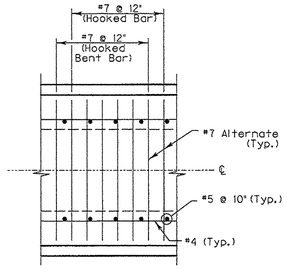


TYPICAL SECTION

Auxiliary Ash Pond Riser/Manhole Pipe

Scale: ½"= 1'

See Sheets 109 & 182.

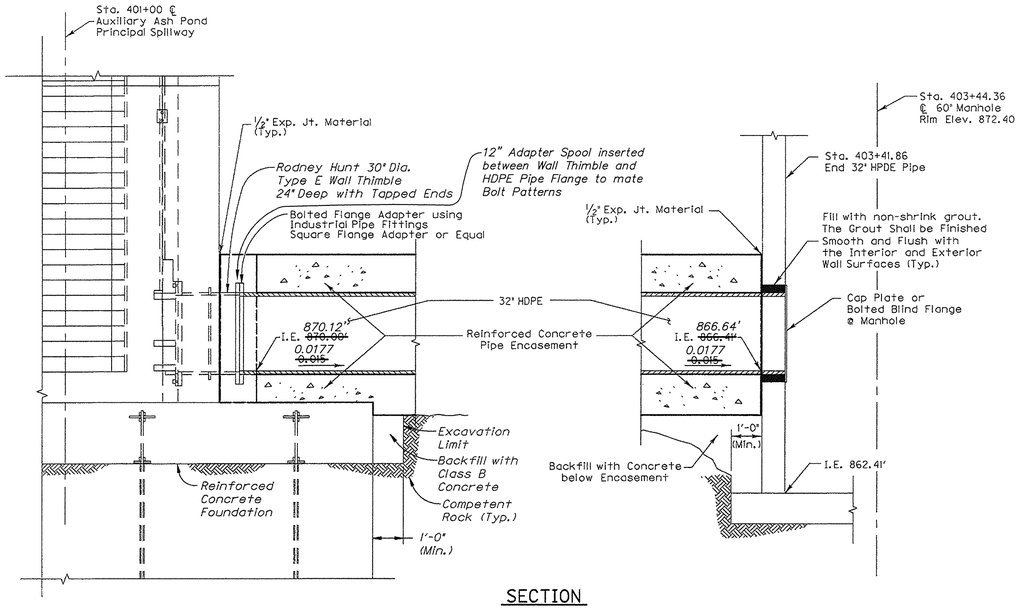


PART PLAN

(Showing Top of Encasement Reinforcement, Bottom of Encasement, Similar) (Typical)

NOTE:

The Alignment is 'Auxiliary Ash Pond Principal Spillway Baseline'.
The Horizontal and Vertical Alignments will not change.
See Sheet 109 for the Plan view and sheet 182 for the Profile view.



SECTION

Auxiliary Ash Pond Riser/Manhole Pipe (237')

Scale: ½"= 1'

See sheets 115 & 182

NOTE

This Drawing and the associated Design Elements and Computations have been prepared by T. H. E. Engineers, Inc. under the review of Fuller, Mossbarger, Scott and May Engineers, Inc. Based on that review, it is my professional opinion that the information portrayed on this sheet is consistent with the original design intentions for the facility and the requirements for Class C, High Hazard dams. Accordingly, this sheet is incorporated as a part of the construction plans for the E. W. Brown Generating Station Auxiliary Ash Pond.

Dan A Bak — 13930 — 6-18-08

Name — P.E. License No. — Date

SURVEY NOTE:

As Constructed survey data provided by Bizzack Construction. Based on field observations this data is believed to be correct, but has not been surveyed by FMSM Engineers.

AS CONSTRUCTED - 06/17/08

FMSM ENGINEERS

T.H.E. ENGINEERS, INC.

REVISIONS			
Rev.	Drawn Date	Drawn By	Revision Made
G	11-15-07		
H	06-17-08		

Title: DETAILS:

AUXILIARY ASH POND PRINCIPAL SPILLWAY PIPE

AUXILIARY ASH POND - PHASE I

Location and Units: E.W. BROWN GENERATING STATION

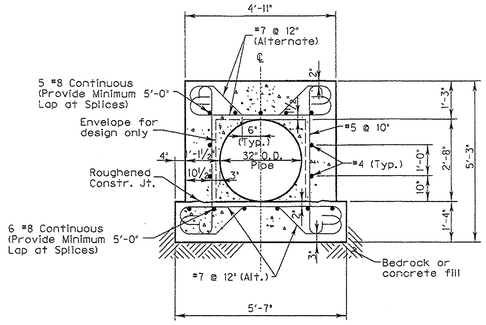
Scale: ½"=1'
Drawn: D.W.S.
Date: JULY 2007
Checked: P.F.H.
Approved:

Kentucky Utilities Company — an E·ON company

JOB NO.	JOB NO.	JOB NO.	JOB NO.	Drawing No:	Rev.
119961				BRO-C-01133	H

DMS Version

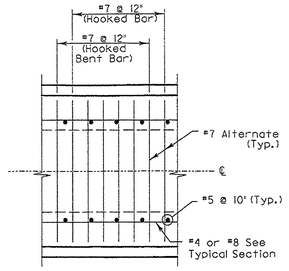
LX2006228\REVH\BRO-C-01133.DWG



TYPICAL SECTION

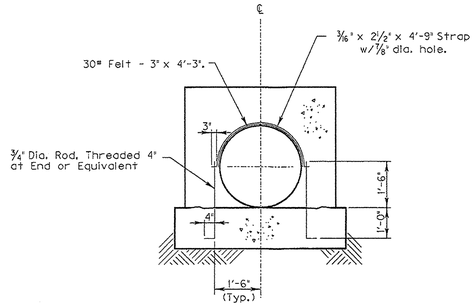
Main Ash Pond Secondary Spillway Pipe

Scale: ½" = 1'



PART PLAN

(Showing Top of Encasement Reinforcement, Bottom of Encasement, Similar) (Typical)



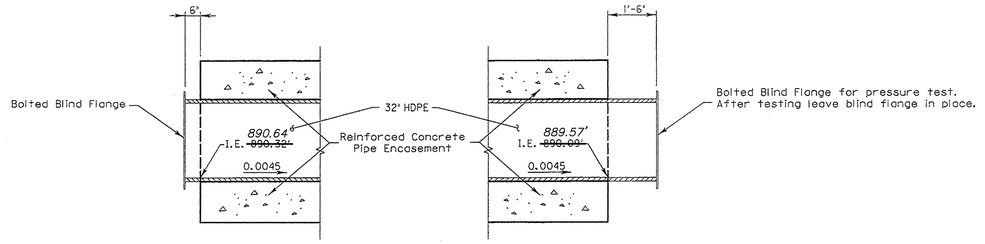
TYPICAL HOLD DOWN STRAP

Spacing at 10'-0" o.c.

Scale: ½" = 1'

NOTE:

Hold Down Detail modified during construction replaced Threaded Rod embeded in the Footer with Rebar Loops and Straps with Turnbuckle Tensioned Cables with a Rubber Strap to protect the HPDPE Pipe.



SECTION

Main Ash Pond Secondary Spillway Pipe (70')

Scale: ½" = 1'

See Sheets 115 & 185

NOTE:

See Sheet 115 for the Plan view and Sheet 185 for the Profile view.

FMSM NOTES:

1. *#8 bar lap splices shall be staggered with no more than 3 bars spliced at one location.*
2. *Alternate #8 bars shall extend 5 feet beyond limit of upstream end of encasement. All other No. 8 bars shall extend 10 feet beyond upstream end of encasement. All protruding bars shall be wrapped with plastic and taped to provide protection from weathering.*

NOTE:

This Drawing and the associated Design Elements and Computations have been prepared by T. H. E. Engineers, Inc. under the review of Fuller, Massbarger, Scott and May Engineers, Inc. Based on that review, and the addition contained hereon, it is my professional opinion that the information portrayed on this sheet is consistent with the original design intentions for the facility and the requirements for Class C, High Hazard dams. Accordingly, this sheet is incorporated as a part of the construction plans for the E. W. Brown Generating Station Auxiliary Ash Pond.

Dan A Burk | 13930 | 6-18-08

Name | P.E. License No. | Date

SURVEY NOTE:

As Constructed survey data provided by Bizzack Construction. Based on field observations this data is believed to be correct, but has not been surveyed by FMSM Engineers.

AS CONSTRUCTED - 06/17/08

DAN A. BURK 13930 6-18-08 LICENSED PROFESSIONAL ENGINEER

DAVID W. SIMONS 23420 LICENSED PROFESSIONAL ENGINEER 10/9/07

FMSM ENGINEERS

T.H.E. ENGINEERS, INC.

REVISIONS			
Rev.	Drawn Date	Drawn By	Revision Made
G	11-15-07		
H	06-17-08		

Title: DETAILS:

MAIN ASH POND SECONDARY SPILLWAY PIPE

AUXILIARY ASH POND - PHASE I

Location and Units: E.W. BROWN GENERATING STATION

Scale: ½"=1'
Drawn: D.W.S.
Date: SEPTEMBER 2007
Checked: P.F.H.
Approved:

Kentucky Utilities Company — an E.ON company

JOB NO.	JOB NO.	JOB NO.	JOB NO.
11996I			

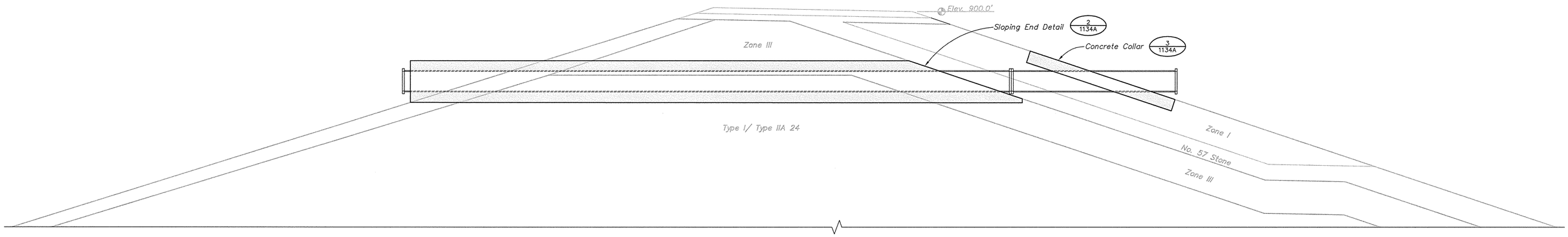
Drawing No: BRO-C-01134

Rev. H

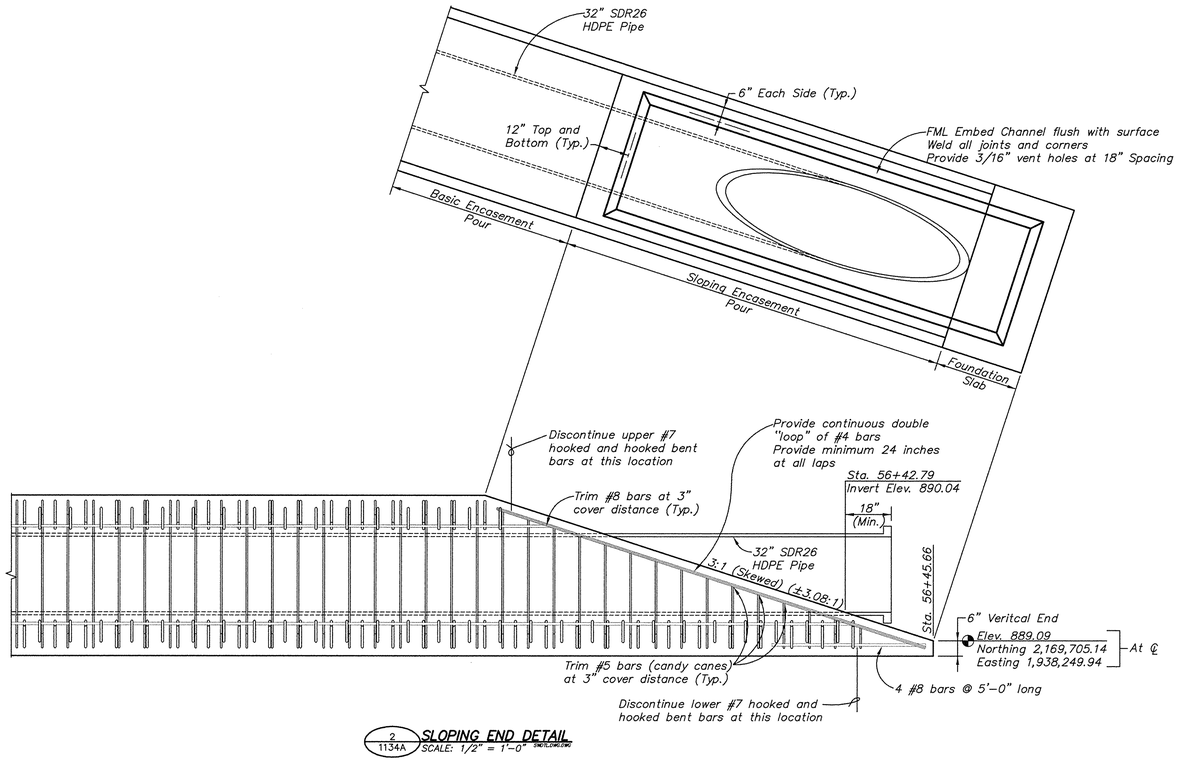
LX2006228\REVH\BRO-C-01134.DWG

DMS Version

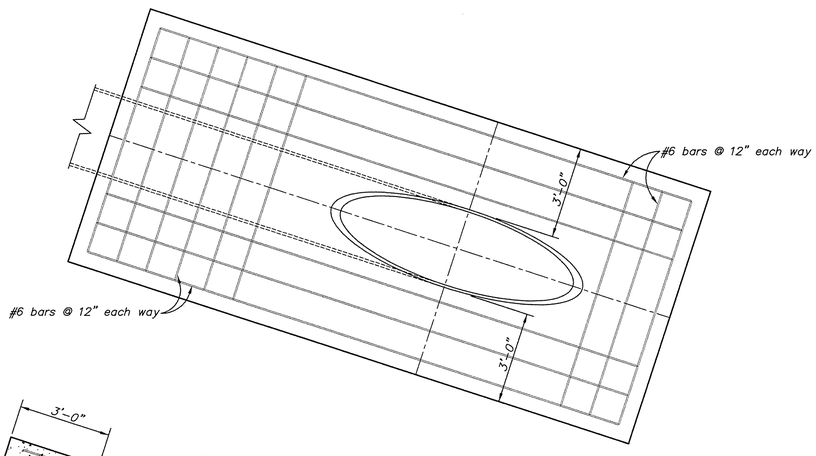
BR0-C-01134A



1/1134A **SECONDARY SPILLWAY END TREATMENT**
SCALE: 1" = 5'



2/1134A **SLOPING END DETAIL**
SCALE: 1/2" = 1'-0"



3/1134A **DETAIL – CONCRETE COLLAR**
SCALE: 1/2" = 1'-0"

Section or Detail No.
Sheet Where Shown
REFERENCE KEY

AS CONSTRUCTED - 06/17/08

REVISIONS			
Rev.	Drawn Date:	Drawn By:	Revision Made
G	11-15-07		
H	06-17-08		

Title
DETAILS
MAIN ASH POND
SECONDARY SPILLWAY PIPE
AUXILIARY ASH POND – PHASE I

Location and Unit:
E.W. BROWN GENERATING STATION

Scale: AS SHOWN
Drawn: DMG
Date: NOVEMBER, 2007
Checked: DAB/BLP
Approved:

JOB NO.	JOB NO.	JOB NO.	JOB NO.
119961			

Drawing No: BR0-C-01134A
Rev.: H

Fuller Mossbarger Scott & May
EMSM ENGINEERS
LEXINGTON ST. LOUIS LOUISVILLE JEFFERSONVILLE CINCINNATI ATLANTA COLUMBUS NASHVILLE

Kentucky Utilities Company
an E·ON company

DMS Version 2.0

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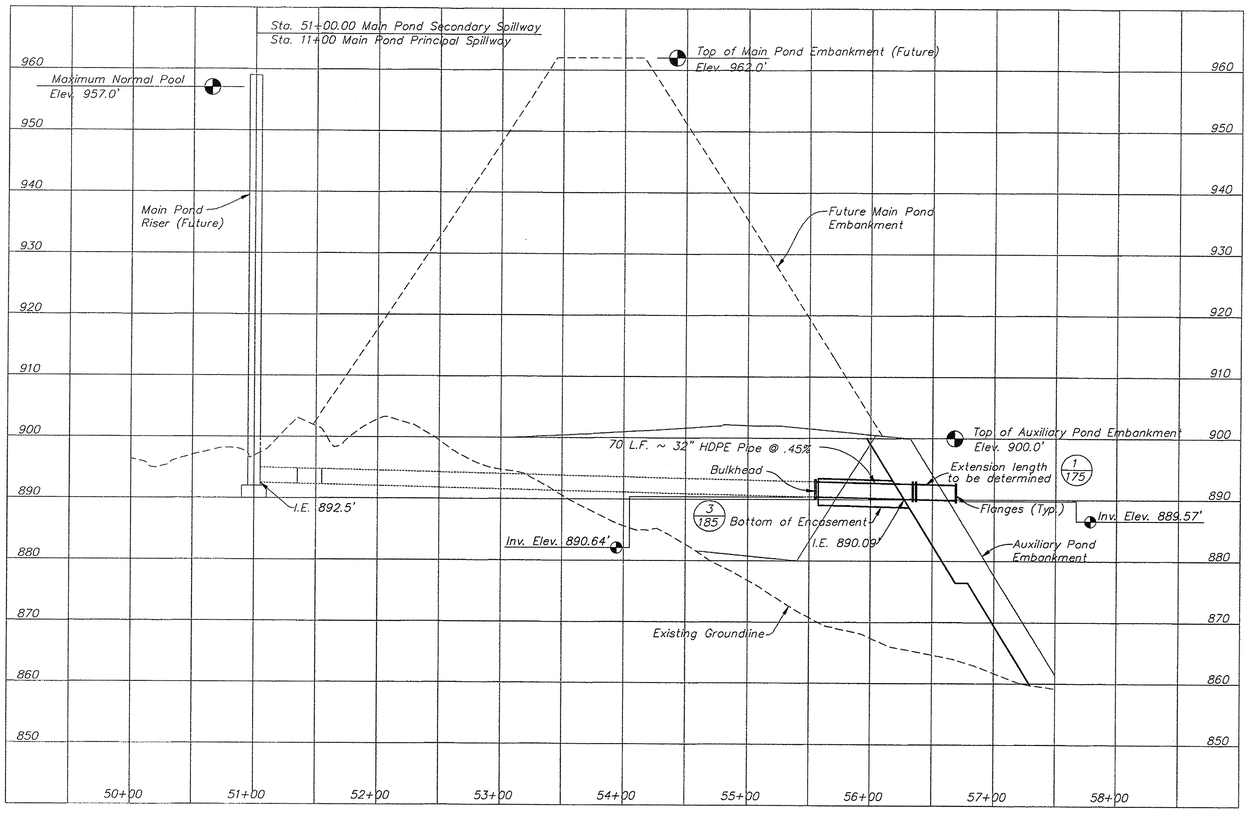


MAIN ASH POND SECONDARY SPILLWAY
1/185 MAIN POND – AUXILIARY POND CONNECTION – PROFILE
SCALE: 1" = 50' HORIZONAL
1" = 10' VERTICAL

NOTE:
Install blind flanges and cover plates on each end of pipe. The downstream end shall project 12 inches out from the vertical exposed face of the precast headwall.

For Material Specifications see sheet 01131.

Section or Detail No.
Sheet Where Shown
REFERENCE KEY

NOTE
This Drawing and the associated Design Elements and Computations have been prepared by T. H. E. Engineers, Inc. under the review of Fuller, Mossbarger, Scott and May Engineers, Inc. Based on that review, it is my professional opinion that the information portrayed on this sheet is consistent with the original design intentions for the facility and the requirements for Class C, High Hazard dams. Accordingly, this sheet is incorporated as a part of the construction plans for the E. W. Brown Generating Station Auxiliary Ash Pond.

Name	P.E. License No.	Date
Dan A Bak	13930	6-18-08

AS CONSTRUCTED - 06/17/08

COMMONWEALTH OF KENTUCKY – DAN A. BAK – 13930 – REGISTERED PROFESSIONAL ENGINEER – 6-18-08

STATE OF KENTUCKY – DAVID W. SIMONS – 23426 – LICENSED PROFESSIONAL ENGINEER – 107

FMSM ENGINEERS

T.H.E. ENGINEERS, INC.

REVISIONS			
Rev.	Drawn Date:	Drawn By:	Revision Made:
G	11-15-07		
H	06-17-08		

Title
PROFILE – SECONDARY SPILLWAY
MAIN ASH POND
AUXILIARY ASH POND – PHASE 1

Location and Unit:
E.W. BROWN GENERATING STATION

Scale: AS SHOWN
Drawn: D.W.S.
Date: OCTOBER 2007
Checked: P.F.H.
Approved:

JOB NO.	JOB NO.	JOB NO.	JOB NO.
119961			

Kentucky Utilities Company
an E.ON company

Drawing No: BRO-C-01135
Rev.: H

DMS Version

LX2006228\REVH\BRO-C-01135.DWG

DAM ASSESSMENT FORM

Name of Professional Conducting Inspection: Mark J. Schuhmann P.E.				KY Professional License No.: 12,500	
Company Name: ATC Associates, Inc.				Phone:502-722-1401	
Address: 132 Citizens Blvd. Simpsonville, KY 40067					
Inspection Preparation: Reviewed all pertinent technical documentation related to this dam and site in: the State's files Yes ☒ No ☐ ; and Owner's Files: Yes ☒ No ☐					
Comments: Due to weather conditions at time of Assessment in January of 2009 a follow-up assessment should be performed					
Dam/Pond Name: **E.W.Brown Auxiliary Ash Pond**		Hazard Rating: High	Topographic Quad: Wilmore	Date of Inspection: 1/19/09	
State Dam ID: **1213**	County: Mercer	Latitude 37° 46.8975'	Longitude 84° 42.9797	Last Inspection: Constructed fall of 2008	
Power Station Name: E. W. Brown Station				Owner Phone: 859-748-4456	
Address: 815 Dix Dam Road, Harrodsburg, KY					
Site Contact: Tom Moore			Phone:		
Drainage Area (AC): 40	Surface Area(AC): 40	Height (Ft): 50	Crest Length (Ft) 2200	Crest Width (Ft): 27	Crest Elevation(Ft): 880
Slope: Upstream: 3H:1V Downstream: 3H:1V	Principal Spillway Type: Concrete Drop Inlet	Principal Spillway Size: Unknown	Spillway Control Elevation: 880	Freeboard(Ft): 7 (design)	
CCP placed in Pond: Pyrites, fly ash, bottom ash	Emergency Spillway Type: Open Channel	Emergency Spillway Size: Not Available	Spillway Control Elevation: Not Available	Freeboard(Ft): Not Available	

FIELD CONDITIONS OBSERVED

Ash Exposed: Yes: ☐ None: ☒	Location:	Max. Height above pool
Water Level (Below Dam Crest, Ft): 8		
Ground Moisture Condition: Dry ☐ Wet ☐ Snow cover ☒ Other:		
Monitoring: Yes ☒ None: ☐ (☐ Gage Rod ☒ Piezometers ☐ Seepage Weirs ☐ Survey Monuments ☐ Other)		
Comments: Data not provided at time of assessment		

A **UPSTREAM SLOPE**	**Problems Noted:** ☐ None ☐ Riprap – Missing, Sparse ☐ Wave Erosion ☐ Cracks ☐ Sinkholes ☐ Appears Too Steep ☐ Depressions or Bulges ☐ Slides ☐ Animal Burrows ☐ Trees, Bushes, Briars ☒ Other
GOOD ☒	
ACCEPTABLE ☐	**Comments:** Exposed geo-web near water surface
DEFICIENT ☐	
POOR ☐	
B **CREST**	**Problems Noted:** ☒ None ☐ Ruts or Puddles ☐ Erosion ☐ Cracks ☐ Sinkholes ☐ Not Wide Enough ☐ Low Areas ☐ Misalignment ☐ Inadequate Surface Drainage ☐ Trees, Bushes, Briars ☐ Other
GOOD ☒	
ACCEPTABLE ☐	**Comments:**
DEFICIENT ☐	
POOR ☐	

CCP: Coal Combustion Products;
Spillway Size: Pipe Dia. for drop inlet; open channel width (typically emergency or (auxiliary) spillway) at the control section, Ft;.
Freeboard: vertical distance from the emergency spillway control section to the lowest point of the crest of the dam.

DAM ASSESSMENT FORM

C DOWNSTREAM SLOPE

GOOD ☐
ACCEPTABLE ☒
DEFICIENT ☐
POOR ☐

Problems Noted: ☐ None ☐ Livestock Damage ☒ Erosion, Gullies ☐ Cracks ☐ Sinkholes ☐ Appears Too Steep ☐ Depression or Bulges ☐ Slide ☐ Soft Areas ☐ Trees, Bushes, Briars ☐ Animal Burrows ☒ Other

Comments: Minor erosion gullies north of lower berm. Wet areas noted – possibly due to pipe connections. First six manholes leaking on south and east side

D SEEPAGE

GOOD ☒
ACCEPTABLE ☐
DEFICIENT ☐
POOR ☐

Problems Noted: ☒ None ☐ Saturated Embankment Area ☐ Seepage Exits on Embankment ☐ Seepage Exits at Point Source ☐ Seepage Area at Toe ☐ Flow Adjacent to Outlet

If Seepage: ☐ Clear ☐ Muddy

Drain Outfalls Seen: Yes ☐ No ☐ Flow: ☐ Clear ☐ Muddy ☐ Dry ☐ Obstructed

Comments:

E PRINCIPAL SPILLWAY

GOOD ☐
ACCEPTABLE ☒
DEFICIENT ☐
POOR ☐

Description: Concrete drop inlet

Problems Noted: ☐ None ☐ Deterioration ☒ Separation ☐ Cracking ☐ Inlet, Outlet Deficiency ☐ Stilling Basin Inadequacies ☐ Trash Rack ☐ Other

Comments: Piping connections for spillway to manholes is reportedly cracked and leaking. Repairs are scheduled to be made. Leaks may be generating seepage noted existing below gabion wall at south property line.

F AUXILIARY SPILLWAY

GOOD ☒
ACCEPTABLE ☐
DEFICIENT ☐
POOR ☐

Description: Open Channel

Problems Noted: ☒ None ☐ No Auxiliary Spillway Found ☐ Erosion with Backcutting ☐ Crack with Displacement ☐ Appears to be Structurally Inadequate ☐ Appears too Small ☐ Inadequate Freeboard ☐ Flow Obstructed ☐ Concreted Deteriorated/Undermined ☐ Other

Comments:

G MAINTENANCE AND REPAIRS

GOOD ☒
ACCEPTABLE ☐
DEFICIENT ☐
POOR ☐

Problems Noted: ☐ None ☐ Access Road Needs Maintenance ☐ Cattle Damage ☐ Spillway Obstruction ☐ Vegetation on Upstream Slope, Crest, Downstream Slope, Toe ☐ Trees on Upstream Slope, Crest, Downstream Slope, Toe ☐ Rodent Activity on Upstream Slope, Crest, Downstream Slope, Toe ☐ Deteriorated Concrete –Facing, Outlet, Spillway ☐ Gate and/or Drawdown Need Repair ☐ Other

Comments: Recommendations on Findings and Recommendations Table

H IMPOUNDMENT AREA

GOOD ☒
ACCEPTABLE ☐
DEFICIENT ☐
POOR ☐

Problems Noted: ☒ None ☐ Exposed Ash ☐ Ponded Water within Ash ☐ Ash blocking spill way ☐ Signs of damage from dredging ☐ Ash deposits in spillway ☐ Other

Impoundment receives surface water runoff in addition to sluiced ash: Yes ☐ No ☒

Release of ponded water could cause overtopping of dam: Yes ☐ No ☐ N/A ☒

Comments:

I OVERALL CONDITIONS		Comments: Leakage of water at spillway manholes requires correction.
SATISFACTORY	☒	
FAIR	☐	
CONDITIONALLY POOR	☐	
POOR	☐	
UNSATISFACTORY	☐	

If this rating is different than the previous inspection, please attach an explanation and reasons for change on page 5.

Summary of Findings and Recommendations in Attached Table .

This visual dam assessment was conducted to assess the general overall condition of the reservoir/ash pond/dam, identify visible deficiencies, and recommend areas for monitoring, additional investigative studies and corrective actions. The assessment is based only on visible features/areas of the dam on the day of inspection; it does not constitute a formal safety inspection nor a review or evaluation from each specialist of an inspection team, such as geologists, civil, geotechnical, structural, or hydraulics engineer. The owner should verify the findings of this report and take corrective actions. This assessment does not relieve the owner/operator from their responsibility to conduct routine inspections, maintenance, repairs, modifications, monitoring, documentation, and/or investigative studies.

Professional Engineer's Signature: _____ Date: 1-26-09

Reviewed by: _____ Date: _____

Owner/Owner Representative Signature

GUIDELINES FOR DETERMINING CONDITIONS

Conditions Observed – Applies to Upstream Slope, Crest, Downstream Slope, Principal Spillway , Auxiliary Spillway and Impoundment area			
Good In general, this part of the structure has a good appearance, and conditions observed in this area do not appear to threaten the safety of the dam	**Acceptable** Although general cross-section is maintained, surfaces may be irregular, eroded, rutted, spalled, or otherwise not in new conditions. Conditions in this area do not currently appear to threaten the safety of the dam.	**Deficient** Continued deterioration and/or unusual loading may threaten the safety of the dam.	**Poor** Conditions observed in this area appear to threaten the safety of the dam. Conditions observed in this area are unacceptable.
Conditions Observed – Applies to Seepage			
Good No evidence of uncontrolled seepage. No unexplained increase in flows from designed drains. All seepage is clear. Seepage conditions do not appear to threaten the safety of the dam.	**Acceptable** Some seepage exposits at areas other than drain outfalls, or other designed drains. No unexplained increase in flows from designed drains. All seepage is clear. Seepage conditions observed do not currently appear to threaten the safety of the dam.	**Deficient** Excessive seepage exists at areas other than drain outfalls and other designed drains. Seepage needs to be evaluated; increase flow and/or continued deterioration in seepage conditions may threaten the safety of the dam.	**Poor** Excessive seepage conditions observed appear to threaten the safety of the dam and is unacceptable. Examples: 1) Designed drain or seepage flow have increased without increase in reservoir level. 2) Drain or seepage flows contain sediment. 3) Widespread seepage, concentrated seepage or ponding appears to threaten the safety of the dam.
Conditions Observed – Applies to Maintenance and Repair			
Good Dam appears to receive effective on-going maintenance and repair, and only a few minor items may need to be addressed.	**Acceptable** Dam appears to receive maintenance, but some maintenance items need to be addressed. No major repairs are required.	**Deficient** Level of maintenance of the dam needs significant improvement. Major repairs may be required. Continued neglect of maintenance may threaten the safety of the dam.	**Poor** Dam does not receive adequate maintenance. One or more items needing maintenance or repair have begun to threaten the safety of the dam. Level of maintenance is unacceptable.

Overall Conditions				
Satisfactory No existing or potential dam safety deficiencies recognized. Safe performance is expected under all anticipated loading conditions, including such events as infrequent hydrologic and/or seismic events. Project files contain necessary hydrologic and other engineering calculations to verify dam safety and performance.	**Fair** No existing dam safety deficiencies are recognized for normal loading conditions. Infrequent hydrologic and/or seismic events would probably result in a dam safety deficiency.	**Conditionally Poor** A potential safety deficiency is recognized for unusual loading conditions which may realistically occur during the expected life of the structure. This designation may also be used when uncertainties exist as to critical analysis parameters which identify a potential dam safety deficiency; further investigations and studies are necessary.	**Poor** A potential dam safety deficiency is clearly recognized for normal loading conditions. Immediate actions to resolve the deficiency are recommended; reservoir restrictions may be necessary until problem resolution.	**Unsatisfactory** A dam safety deficiency exists for normal conditions. Immediate remedial action is required for problem resolution.

Findings and Recommendations

Plant Name: E.W. Brown
Structure Name: Auxiliary Ash Pond
State Facility ID: 1213
Assessment date: 1/19/2009

Item Number	Priority Rating	Photo Number	Location Description	Description
1	High	8	Spillway	Repair reported leaks at principal spillway manholes, below toe of dam
2	High	8	Toe	Monitor seep at South property line below gabion wall
3	Normal	2	Upstream Slope	Evaluate need to cover wave protection geoweb with rip rap
4	Normal	--	Below toe	Repair erosion gullies north of lower berm toe, east of borrow area
5	Normal	7	Spillway	Evaluate need to remove accumulated ash at entrance to emergency spillway
6	Normal	N/A	General	Prepare Operation and Maintenance Plan for all aspects of structure
7	Moderate	N/A	General	Prepare Emergency Action Plan (EAP) for structure distress scenarios
8	Normal	N/A	General	Institute and document regular facility inspection plan
9	Moderate	N/A	General	Conduct visual inspection of facility during 2009 growing season
10	Normal	N/A	General	Prepare current topographic mapping

Priority: High - Recommend that action item be addressed as soon as possible.
Moderate - Recommend that action item be addressed as soon as feasible - preferably before the next state inspection.
Normal - Recommend that action item be addressed as part of the ongoing maintenace of the structure.

Location:

Crest	Principal Spillway
Abutment	Emergency Spillway
Downstream Slope	Toe
Upstream Slope	

E. W. BROWN AUXILIARY ASH POND
January 19, 2009

Photo #1: NW corner of auxiliary pond, looking SE

Photo #2: North embankment, crest and upstream slope, exposed Geoweb wave erosion protection at water surface, looking West

E. W. BROWN AUXILIARY ASH POND

January 19, 2009

Photo #3: Emergency Spillway, SW corner, looking South

Photo #4: South embankment crest and upstream slope, looking East
leaking manholes at right side of photo

E. W. BROWN AUXILIARY ASH POND

January 19, 2009

Photo #5: NE corner, downstream slope, looking NW

Photo #6: East embankment, downstream toe, looking South

E. W. BROWN AUXILIARY ASH POND

January 19, 2009

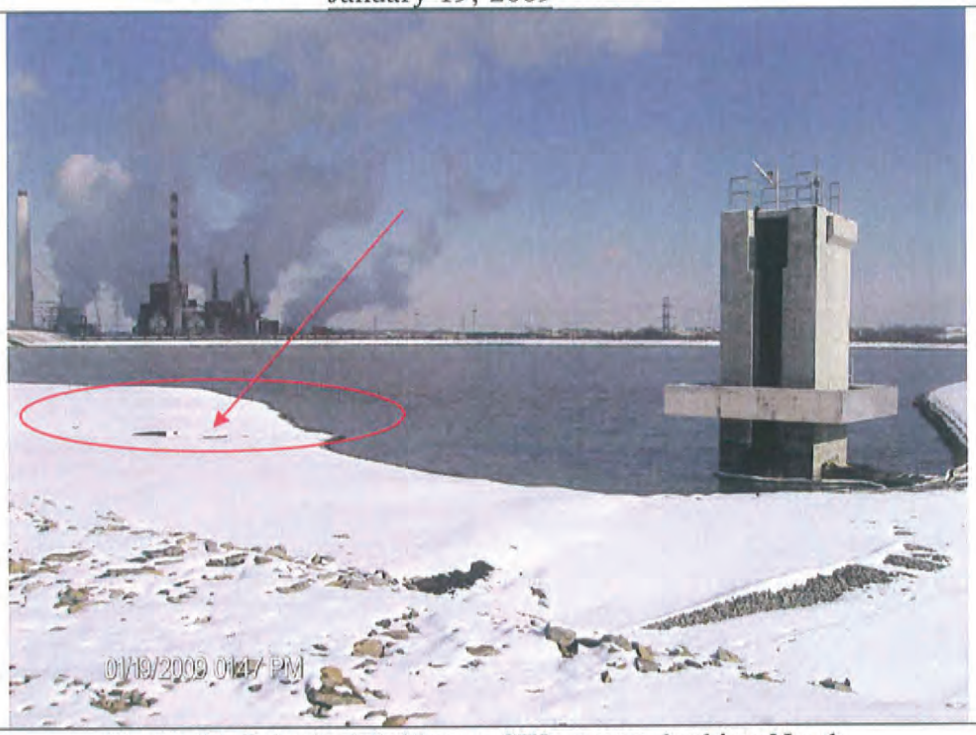
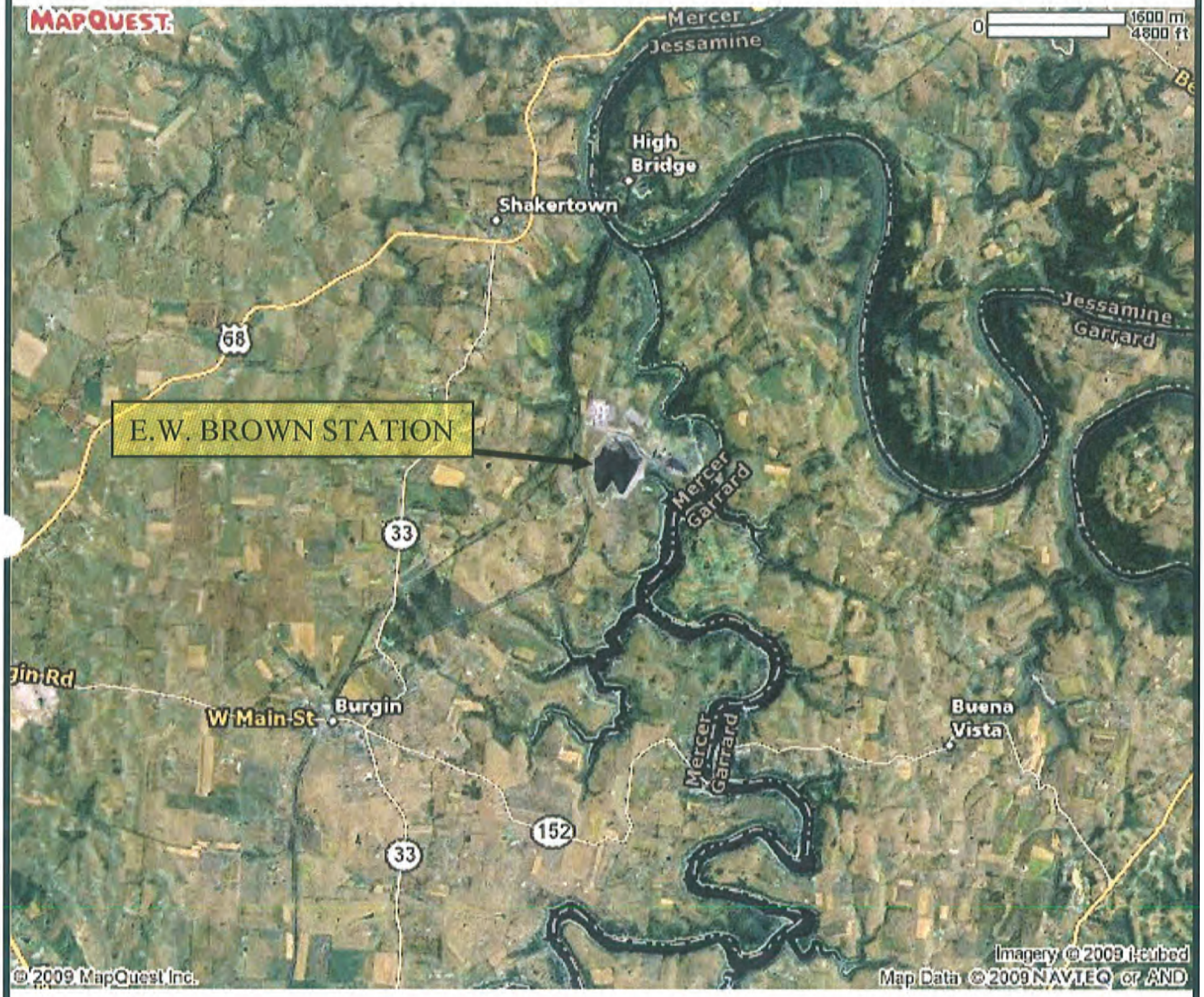


Photo #7: Principal Spillway, SW corner, looking North, emergency spillway located at arrow

Photo #8: Seepage below gabion wall east of auxiliary pond, flowrate approx. 10 gpm, near SE corner of property, looking North



VATC ASSOCIATES INC.
132 Citizens Boulevard
Simpsonville, KY 40067
(502) 722-1401

SITE VICINITY MAP

E.W. BROWN AUXILIARY ASH POND
EON-US Dam Inspections
Burgin, KY

PROJECT NO: 27.11000.9G99		
DESIGNED BY: RR	SCALE:N/A	REVIEWED BY: JE
DRAWN BY: RR	DATE: 1/27/09	FIGURE: 1

S:\PROJECTS\GEOTECHNICAL\2009 Projects\27.11000.9099 - E.ON Dam Inspections Kentucky Facilities\Drawings

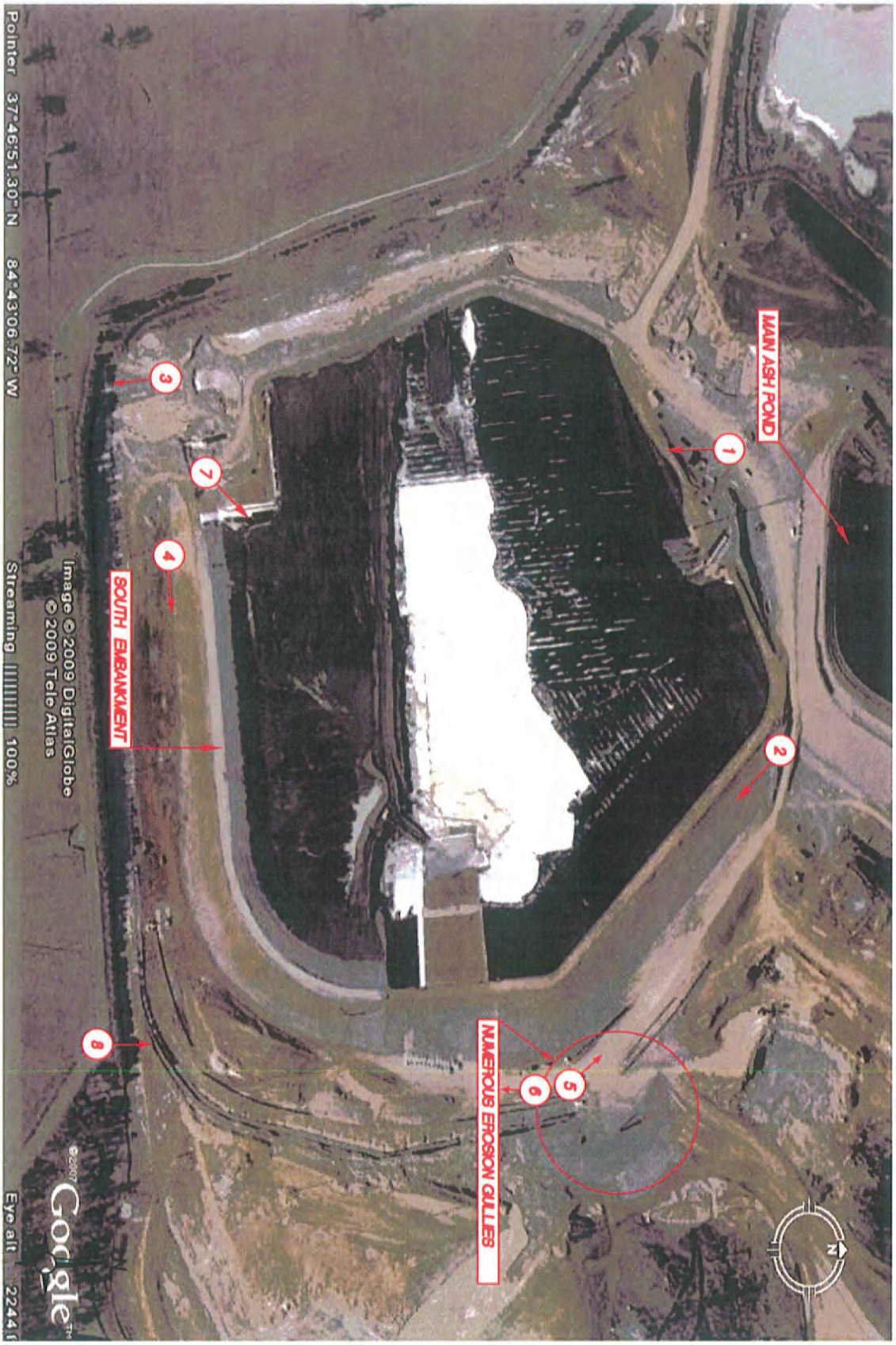


Figure 2	Scale: N.T.S.	Date: 1/09	**2009 POND ASSESSMENT SITE PLAN** **E.W. BROWN AUXILIARY POND** KU/E.ON U.S. BURGIN, KY

LEGEND:

NO. LOCATION OF PHOTOGRAPHY
DIRECTION OF PHOTOGRAPHY
PHOTO DESIGNATION

Project Number: 27.11000.9099	Drn. By: SP/RR
Drawing File: E.ON Dam Inspections	Chd. By: JE
ATC ASSOCIATES INC.	App'd By:
	Chd. Date:

ASSOCIATES INC.

STATE FILE REVIEW
INFORMATION WORK SHEET

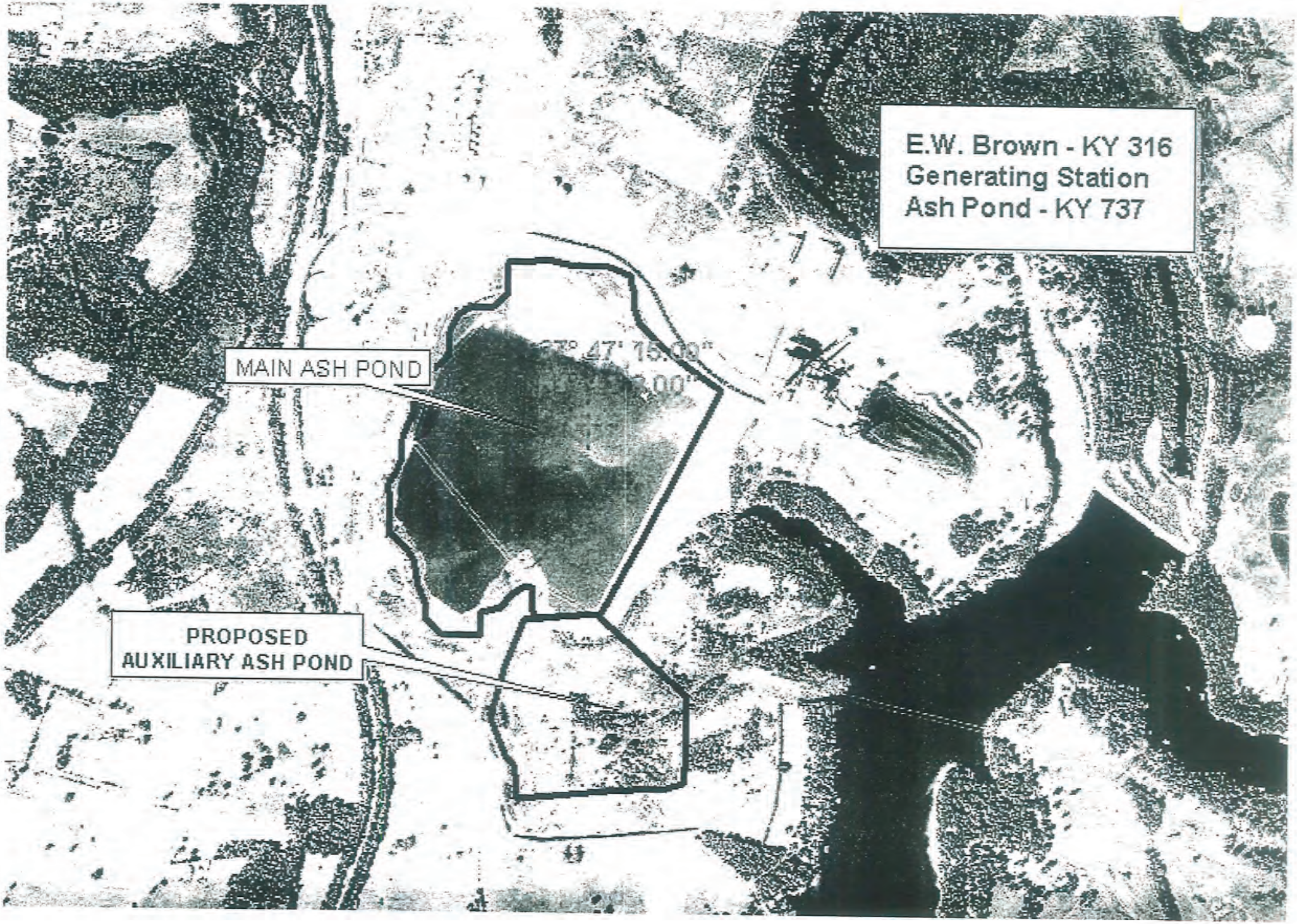
SITE : E W Brown - Auxiliary Ash Pond
ID #: 1213
HAZARD RATING: __C (high)____
COPY OF RATING CERTIFICATION: _Referenced in file____
RECOMMENDED INSPECTION FREQUENCY: _____
DATE OF LAST INSPECTION: _N/A___
DATES OF PREVIOUS INSPECTIONS: N/A

6/27/08 Approval to Impound

INSPECTION FINDINGS (deficiencies):

OTHER INFORMATION AVAILABLE (design criteria, modifications, etc):
Permit Application data

Date: __1/22/09___
By: ____DHB_____
Additional Sheets: _2 copies from DOW files


E.W. Brown - KY 316
Generating Station
Ash Pond - KY 737
MAIN ASH POND
PROPOSED
AUXILIARY ASH POND

STEVEN L. BESHEAR
GOVERNOR

LEONARD K. PETERS
SECRETARY

ENERGY AND ENVIRONMENT CABINET
DEPARTMENT FOR ENVIRONMENTAL PROTECTION
DIVISION OF WATER
14 REILLY ROAD
FRANKFORT, KENTUCKY 40601
www.kentucky.gov

June 27, 2008

Attention: Michael Winkler
Kentucky Utilities Company
220 West Main Street
Louisville, KY 40202

RE: **Inspection of EW Brown Auxiliary Ash Pond – Phase I**
AI 3148
KY 1213 in Mercer County
Class: High Hazard, Class C

Dear Mr. Winkler:

We have reviewed the as-built plans submitted by your engineers for the above referenced structure. Based on our review and an on-site inspection on June 20, 2008, we have determined that the **Phase I** of this structure has been constructed in accordance with the approved plans and specifications.

You are hereby granted **approval to impound** water (or process waste) effective this date. This dam has been placed in the Division of Water's active inventory as a high hazard structure and has been assigned inventory number **KY 1213**. High hazard structures are presently being inspected every two years. Should you have any questions concerning this matter, please contact me at (502) 564-3410.

Sincerely,

Gary Wells

Gary Wells, PE
Dam Safety and Floodplain Compliance
Division of Water

Appendix B

Site Inspection Photographs

E. W. Brown

Photo 1: Auxiliary Pond: Crest and Downstream Face @ Southwest Abutment

Photo2: Auxiliary Pond: Crest and Upstream Face @ Southwest Abutment

Photo 3: Auxiliary Pond: Decant Riser

Photo 4: Auxiliary Pond: Decant Riser

Photo 5: Auxiliary Pond: Crest and Downstream Face @ Southwest Abutment

Photo 6: Auxiliary Pond: Downstream Face at Southwest Corner Facing East

Photo 7: Auxiliary Pond: Crest and Downstream Face at Southwest Corner Facing East

Photo 8: Auxiliary Pond: Auxiliary Pond: Downstream Slope near Southwest Corner

Photo 9: Auxiliary Pond: Downstream Toe along South Section of Embankment

Photo 10: Auxiliary Pond: Downstream Toe along South Section of Embankment

Photo 11: Auxiliary Pond: Small Erosion at Downstream Toe along South Section of Embankment

Photo 12: Auxiliary Pond: Downstream Toe along South Section of Embankment Facing West

Photo 13: Auxiliary Pond: Downstream Slope along South Section of Embankment

Photo 14: Auxiliary Pond: Downstream Toe along South Section of Embankment

Photo 15: Auxiliary Pond: Downstream Toe along South Section of Embankment Facing West

Photo 16: Auxiliary Pond: Downstream Toe along South Section of Embankment Facing West

Photo 17: Auxiliary Pond: Downstream Toe along South Section of Embankment Facing East

Photo 18: Auxiliary Pond: Downstream Toe along South Section of Embankment

Photo 19: Auxiliary Pond: Downstream Toe along South Section of Embankment

Photo 20: Auxiliary Pond: Downstream Toe along South Section of Embankment Facing East

Photo 21: Auxiliary Pond: Downstream Slope along South Section of Embankment

Photo 22: Auxiliary Pond: Downstream Slope along South Section of Embankment

Photo 23: Auxiliary Pond: Downstream Slope along South Section of Embankment

Photo 24: Auxiliary Pond: Downstream Slope along South Section of Embankment

Photo 25: Auxiliary Pond: Small Seepage Area near Downstream Toe near Southeast Corner

Photo 26: Auxiliary Pond: Small Seepage Area near Downstream Toe near Southeast Corner

Photo 27: Auxiliary Pond: Small Seepage Area near Downstream Toe near Southeast Corner

Photo 28: Auxiliary Pond: Small Seepage Area near Downstream Toe near Southeast Corner

Photo 29: Auxiliary Pond: Small Seepage Area near Downstream Toe near Southeast Corner

Photo 30: Auxiliary Pond: Downstream Slope along South Section of Embankment Facing West

Photo 31: Auxiliary Pond: Downstream Toe near Southeast Corner of Pond

Photo 32: Auxiliary Pond: Downstream Slope along South Section of Embankment Facing West

Photo 33: Auxiliary Pond: Downstream Slope and Toe near Southeast Corner of Pond

Photo 34: Auxiliary Pond: Downstream Slope and Toe near Southeast Corner of Pond

Photo 35: Auxiliary Pond: Downstream Slope and Toe near Southeast Corner of Pond

Photo 36: Auxiliary Pond: Downstream Slope and Toe East Section Facing North

Photo 37: Auxiliary Pond: Downstream Slope and Toe East Section Facing North

Photo 38: Auxiliary Pond: Downstream Slope East Section

Photo 39: Auxiliary Pond: Downstream Slope and Toe East Section Facing North

Photo 40: Auxiliary Pond: Downstream Slope at Northeast Corner

Photo 41: Auxiliary Pond: Downstream Slope and Toe at Northeast Corner

Photo 42: Auxiliary Pond: Downstream Slope along North Section at Main Pond

Photo 43: Auxiliary Pond: CCW Discharge Pipes near Northeast Corner of Pond

Photo 44: Auxiliary Pond: CCW Discharge Pipes near Northeast Corner of Pond

Photo 45: Auxiliary Pond: Northeast Corner of Impoundment

Photo 46: Auxiliary Pond: Downstream Slope along North Section

Photo 47: Auxiliary Pond: Downstream Toe along North Section

Photo 48: Auxiliary Pond: Downstream Slope and Toe along North Section

Photo 49: Auxiliary Pond: Downstream Slope and Toe along North Section

Photo 50: Auxiliary Pond: Downstream Slope and Toe along North Section

Photo 51: Auxiliary Pond: Downstream Toe along North Section

Photo 52: Auxiliary Pond: Downstream Toe along North Section

Photo 53: Main Ash Pond: New Secondary Spillway Entrance, Discharge to Auxiliary Pond

Photo 54: Auxiliary Pond: Downstream Slope along North Section

Photo 55: Auxiliary Pond: Small Erosion Features along North Section of Downstream Slope

P-56: Auxiliary Pond: Embankment Crest near North Abutment

Photo 57: Auxiliary Pond: Crest and Upstream Slope at North Abutment

Photo 58: Auxiliary Pond near Northwest Corner

Photo 59: Auxiliary Pond: Crest and Upstream Slope at Northeast Corner Facing Southeast

Photo 60: Auxiliary Pond: Crest and Upstream Slope at Northeast Corner Facing Southeast

Photo 61: Auxiliary Pond: Crest and Upstream Slope East Section Facing Southeast

Photo 62: Auxiliary Pond: Crest and Upstream Slope East Section Facing Southeast

Photo 63: Auxiliary Pond: Crest and Upstream Slope East Section Facing South

Photo 64: Auxiliary Pond: Crest and Upstream Slope East Section Facing South

Photo 64: Auxiliary Pond: Crest and Upstream Slope North Section Facing East

Photo 66: Auxiliary Pond: New Secondary Spillway Entrance, Discharge from Main Pond

Photo 67: Auxiliary Pond: New Secondary Spillway Entrance, Discharge from Main Pond

Photo 68: Auxiliary Pond: New Secondary Spillway Entrance, Discharge from Main Pond

Photo 69: Auxiliary Pond: CCW Discharge Pipes near Northeast Corner of Pond

Photo 70: Auxiliary Pond: CCW Discharge Pipes near Northeast Corner of Pond

Photo 71: Auxiliary Pond: CCW Discharge Pipes near Northeast Corner of Pond

Photo 72: Auxiliary Pond: CCW Discharge Pipes near Northeast Corner of Pond

Photo 73: Auxiliary Pond: Crest and Upstream Slope East Section Facing Southeast

Photo 74: Auxiliary Pond: Crest and Upstream Slope East Section Facing Southeast

Photo 75: Auxiliary Pond Surface: East Side

Photo 76: Auxiliary Pond: East Side

Photo 77: Auxiliary Pond: Downstream Slope from Crest: East Section

Photo 78: Auxiliary Pond: Upstream Slope East Section. Geo-grid Reinforcing at Water Edge

Photo 79: Auxiliary Pond: Upstream Slope East Section. Geo-grid Reinforcing at Water Edge

Photo 80: Auxiliary Pond: Upstream Slope East Section. Geo-grid Reinforcing at Water Edge

Photo 81: Auxiliary Pond: Upstream Slope East Section. Geo-grid Reinforcing at Water

Photo 82: Auxiliary Pond: Downstream Slope from Crest: Southeast Section

Photo 83: Auxiliary Pond: Downstream Slope from Crest: Southeast Section

Photo 84: Auxiliary Pond: Upstream Slope Southeast Section. Geo-grid Reinforcing at Water

Photo 85: Auxiliary Pond: Downstream Slope from Crest: East Section

Photo 86: Auxiliary Pond: Downstream Slope from Crest: East Section

Photo 87: Auxiliary Pond: Upstream Slope East Section. Geo-grid Reinforcing at Water

Photo 88: Auxiliary Pond: Upstream Slope Southeast Corner. Geo-grid Reinforcing at Water

Photo 89: Auxiliary Pond: Crest and Downstream Slope Southeast Corner

Photo 90: Auxiliary Pond: Crest and Downstream Slope Southeast Corner

Photo 91: Auxiliary Pond: Crest at Southeast Corner

Photo 92: Auxiliary Pond: From South Embankment across to Secondary Spillway Discharge from Main Pond

Photo 93: Auxiliary Pond: Crest and Upstream Slope at Southeast Corner

Photo 94: Auxiliary Pond: From South Embankment across to CCW Discharge Pipes near Northeast Corner of Pond

Photo 95: Auxiliary Pond: Crest at South Section of Embankment

Photo 96: Auxiliary Pond: Crest and Downstream Slope at South Section of Embankment

Photo 97: Auxiliary Pond: Upstream Slope South Section. Geo-grid Reinforcing at Water

Photo 98: Auxiliary Pond: Crest and Downstream Slope at West End of South Section of Embankment

Photo 99: Auxiliary Pond: Crest and Downstream Slope at West End of South Section of Embankment

Photo 100: Auxiliary Pond: Crest and Downstream Slope at West End of South Section of Embankment

Photo 101: Auxiliary Pond: Crest and Downstream Slope at West End of South Section of Embankment

Photo 102: Auxiliary Pond: Crest and Upstream Slope at West End of South Section of Embankment

Photo 103: Auxiliary Pond: Upstream Slope at West End of South Section of Embankment

Photo 104: Auxiliary Pond: Upstream Slope at West End of South Section of Embankment

Photo 105: Auxiliary Pond: Upstream Slope near Northwest Abutment

Photo 106: Auxiliary Pond: Decant Riser Southwest Corner of Pond

Photo 107: Auxiliary Pond: Decant Riser - Southwest Corner of Pond

Photo 108: Auxiliary Pond: Emergency Spillway - Southwest Corner of Pond

Photo 109: Auxiliary Pond: Emergency Spillway along South End of West Abutment

Photo 110: Auxiliary Pond: Emergency Spillway along South End of West Abutment

Photo 111: Auxiliary Pond: Emergency Spillway along South End of West Abutment

Photo 112: Auxiliary Pond: Emergency Spillway along South End of West Abutment

Photo 113: Auxiliary Pond: Emergency Spillway Turned Eastward

Photo 114: Auxiliary Pond: Downstream Slope, South Section

Photo 115: Auxiliary Pond: Primary Spillway Discharge

Photo 116: Auxiliary Pond: Primary Spillway Discharge

Photo 117: Auxiliary Pond: Primary Spillway Discharge

Photo 118: Auxiliary Pond: Primary Spillway Discharge

Photo 119: Auxiliary Pond: Primary Spillway Discharge

Photo 120: Auxiliary Pond: Primary Spillway Discharge

Photo 121: Auxiliary Pond: Primary Spillway Discharge Stream

Photo 122: Auxiliary Pond: Primary Spillway Discharge Receiving Stream Bank

Photo 123: Auxiliary Pond: Primary Spillway Discharge

Photo 124: Auxiliary Pond: Primary Spillway Discharge

Photo 125: Auxiliary Pond: Primary Spillway Discharge Receiving Stream

Photo 126: Auxiliary Pond: Primary Spillway Discharge

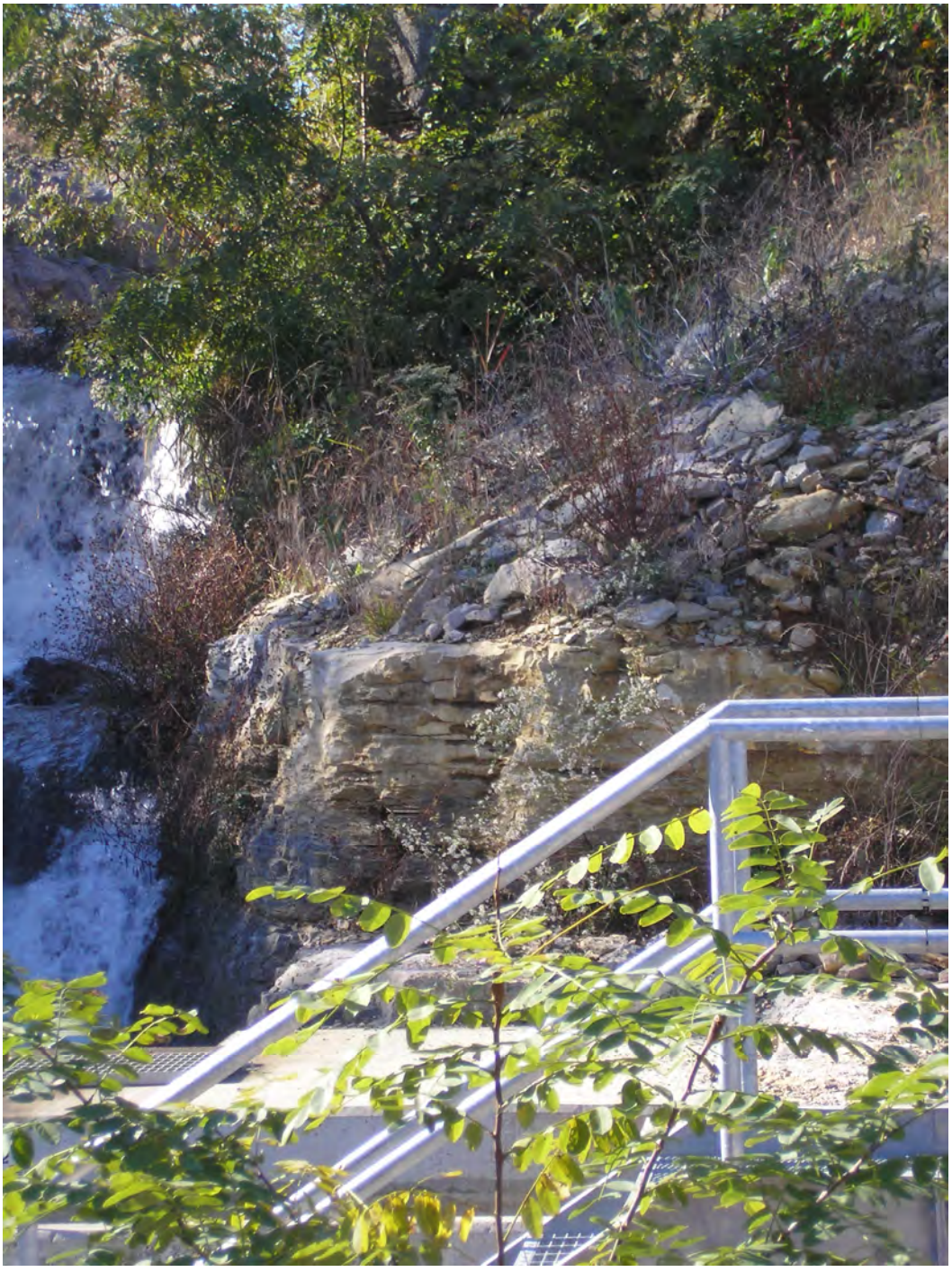


Photo 127: Auxiliary Pond: Primary Spillway Discharge

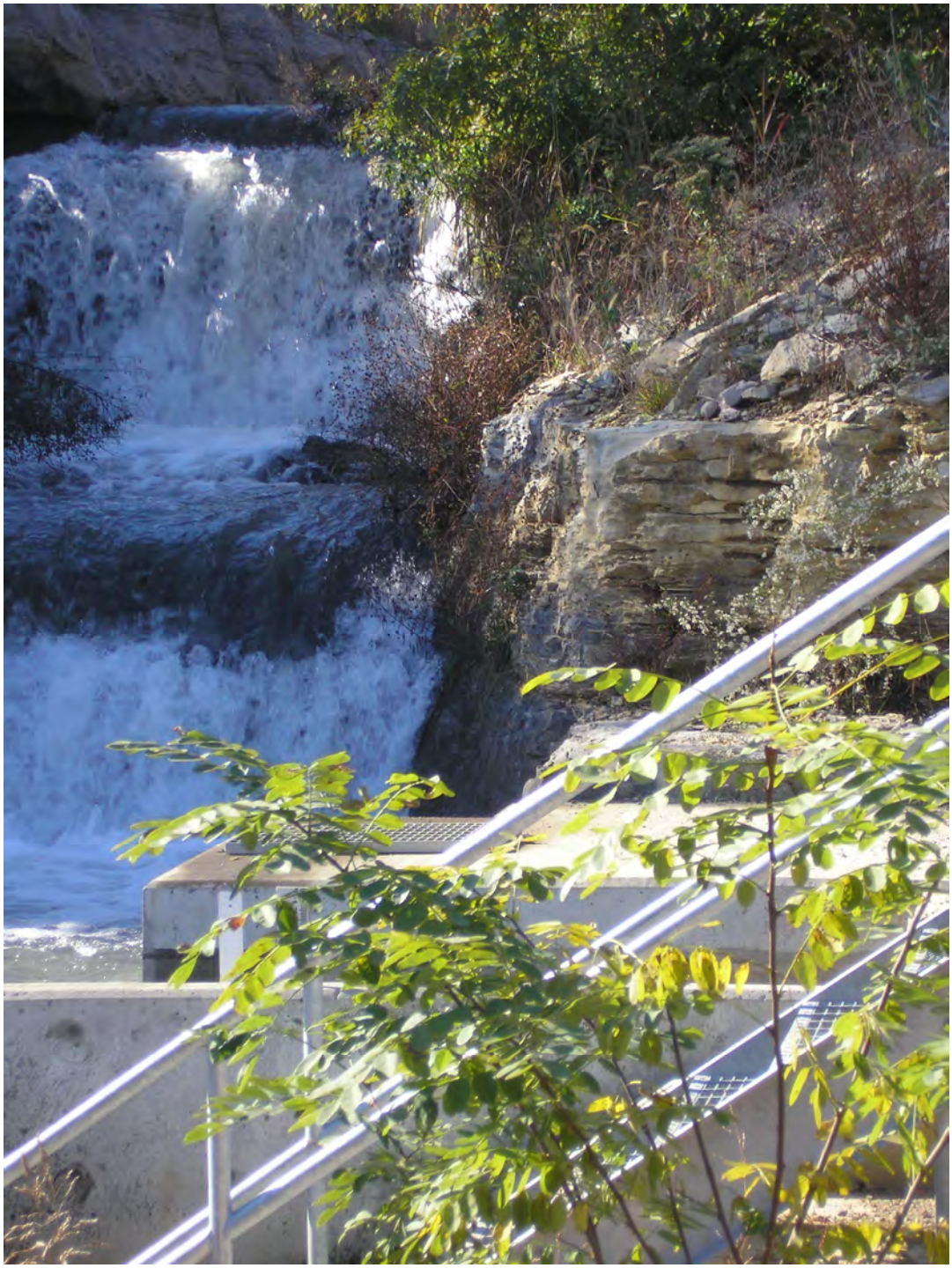


Photo 128: Auxiliary Pond: Primary Spillway Discharge

Photo 129: Auxiliary Pond: Primary Spillway Discharge

Photo 130: Auxiliary Pond: Primary Spillway Discharge Receiving Stream Bank

Photo 131: Auxiliary Pond Spillway Discharge Receiving Stream from Crest of Main Pond Embankment

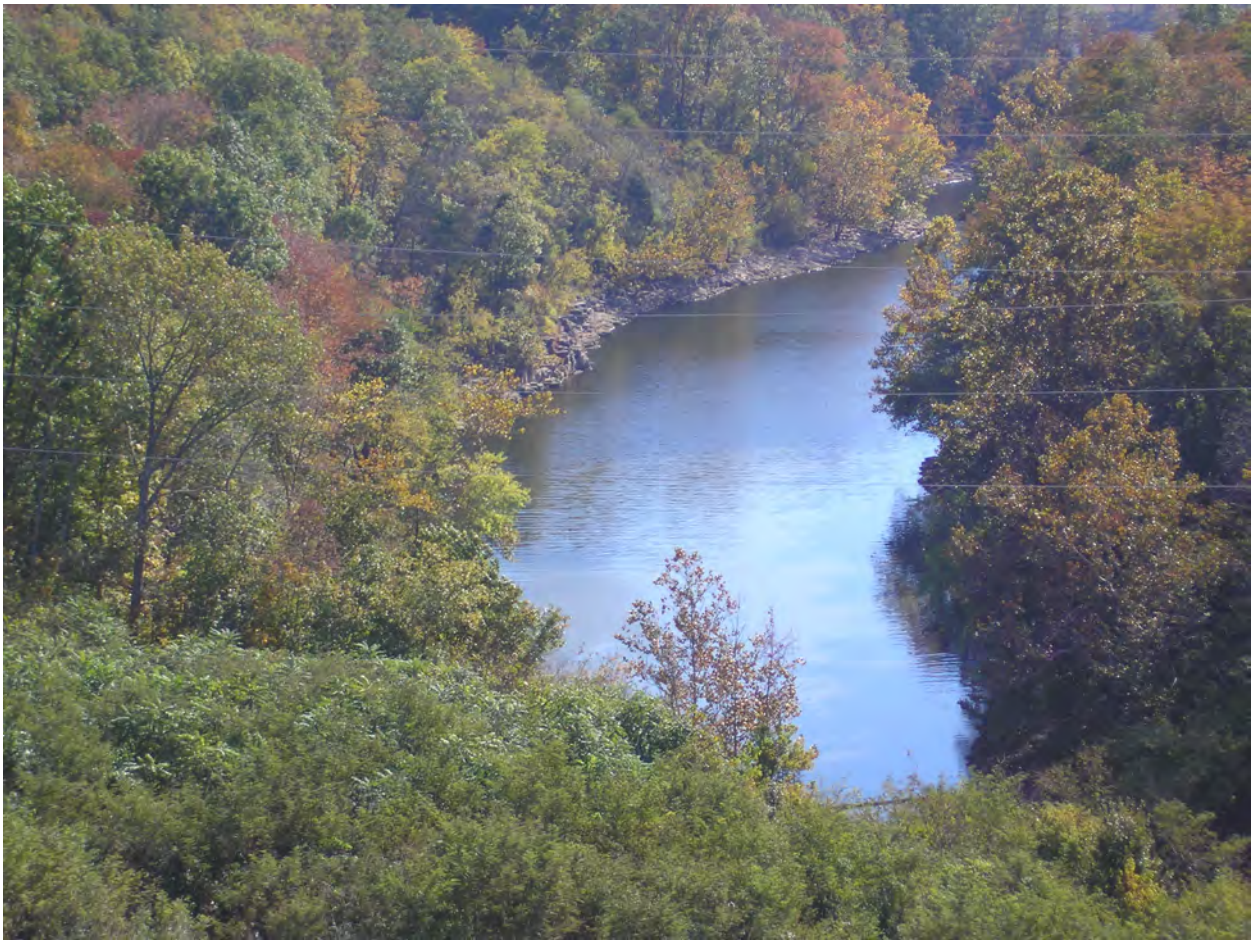


Photo 132: Auxiliary Pond Spillway Discharge Receiving Stream from Crest of Main Pond Embankment

Coal Combustion Dam Inspection Checklist Form

US Environmental Protection Agency

Site Name: E. W. Brown Gen Sta. Date: October 20, 2009

Unit Name: Auxiliary Ash Pond Operator's Name: Kentucky Utilities Co.

Unit I.D.: KY 12013 Hazard Potential Classification (High) Significant Low

Inspector's Name: Hugh A. Ward, P.E. (KY 7164) Joseph P Klein III, P.E.

Check the appropriate box below. Provide comments when appropriate. If not applicable or not available, record "N/A". Any unusual conditions or construction practices that should be noted in the comments section. For large diked embankments, separate checklists may be used for different embankment areas. If separate forms are used, identify approximate area that the form applies to in comments.

	Yes	No		Yes	No
1. Frequency of Company's Dam Inspections?	Weekly		18. Sloughing or bulging on slopes?		✓
2. Pool elevation (operator records)?	875.0		19. Major erosion or slope deterioration?		✓
3. Decant inlet elevation (operator records)?	873.5		20. Decant Pipes:		
4. Open channel spillway elevation (operator records)?	876.0		Is water entering inlet, but not exiting outlet?		✓
5. Lowest dam crest elevation (operator records)?	880.0		Is water exiting outlet, but not entering inlet?		✓
6. If instrumentation is present, are readings recorded (operator records)?		✓	Is water exiting outlet flowing clear?	✓	
7. Is the embankment currently under construction?		✓	21. Seepage (specify location, if seepage carries fines, and approximate seepage rate below):		
8. Foundation preparation (remove vegetation, stumps, topsoil in area where embankment fill will be placed)?	✓		From underdrain?		✓
9. Trees growing on embankment? (If so, indicate largest diameter below)		✓	At isolated points on embankment slopes?	✓	
10. Cracks or scarps on crest?		✓	At natural hillside in the embankment area?		✓
11. Is there significant settlement along the crest?		✓	Over widespread areas?		✓
12. Are decant trashracks clear and in place?		✓	From downstream foundation area?		✓
13. Depressions or sinkholes in tailings surface or whirlpool in the pool area?		✓	"Boils" beneath stream or ponded water?		✓
14. Clogged spillways, groin or diversion ditches?		✓	Around the outside of the decant pipe?		✓
15. Are spillway or ditch linings deteriorated?		✓	22. Surface movements in valley bottom or on hillside?		✓
16. Are outlets of decant or underdrains blocked?		✓	23. Water against downstream toe?		✓
17. Cracks or scarps on slopes?		✓	24. Were Photos taken during the dam inspection?	✓	

Major adverse changes in these items could cause instability and should be reported for further evaluation. Adverse conditions noted in these items should normally be described (extent, location, volume, etc.) in the space below and on the back of this sheet.

Inspection Issue #	Comments
#6	No instrumentation currently in-place
#12	No trash rack in-place. Debris boom protects decant riser pipe.
#21	Small seepage area above toe of downstream slope along south section of embankment.

U. S. Environmental Protection Agency

Coal Combustion Waste (CCW)
Impoundment Inspection

Impoundment NPDES Permit # KY0002020 INSPECTOR Hugh A. Ward, P.E. / Joseph P. Klein III, P.E.

Date Feb 1, 2002 - Jan. 31, 2007

Impoundment Name Auxiliary Ash Pond

Impoundment Company Kentucky Utilities Co.

EPA Region 4

State Agency (Field Office) Addresss KY Department for Environmental Protection Div. of Water: 14 Reilly Rd, Frankfort, KY 40601

Name of Impoundment Auxiliary Ash Pond

(Report each impoundment on a separate form under the same Impoundment NPDES Permit number)

New ✓ Update _____

	Yes	No
Is impoundment currently under construction?	_____	✓
Is water or ccw currently being pumped into the impoundment?	✓	_____

IMPOUNDMENT FUNCTION: Storage of fly ash and bottom ash CCW.

Nearest Downstream Town : Name High Bridge, KY

Distance from the impoundment 2.5 miles

Impoundment Location: Longitude 84 Degrees 42 Minutes 52 Seconds

Latitude 37 Degrees 47 Minutes 11 Seconds

State KY County Mercer

Does a state agency regulate this impoundment? YES ✓ NO _____

If So Which State Agency? Department of Environmental Protection Division of Water.

HAZARD POTENTIAL (In the event the impoundment should fail, the following would occur):

_____ **LESS THAN LOW HAZARD POTENTIAL:** Failure or misoperation of the dam results in no probable loss of human life or economic or environmental losses.

_____ **LOW HAZARD POTENTIAL:** Dams assigned the low hazard potential classification are those where failure or misoperation results in no probable loss of human life and low economic and/or environmental losses. Losses are principally limited to the owner's property.

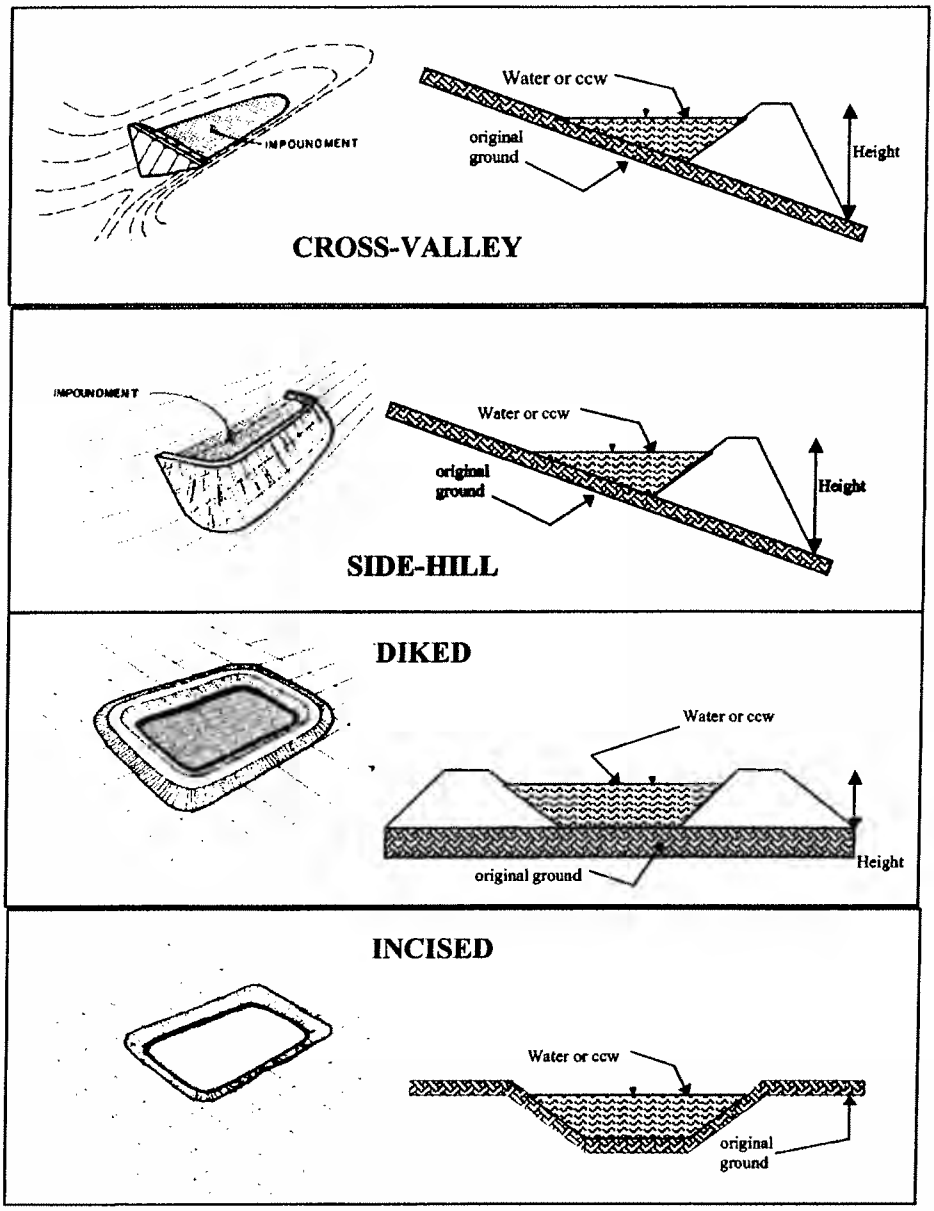
_____ **SIGNIFICANT HAZARD POTENTIAL:** Dams assigned the significant hazard potential classification are those dams where failure or misoperation results in no probable loss of human life but can cause economic loss, environmental damage, disruption of lifeline facilities, or can impact other concerns. Significant hazard potential classification dams are often located in predominantly rural or agricultural areas but could be located in areas with population and significant infrastructure.

__✓__ **HIGH HAZARD POTENTIAL:** Dams assigned the high hazard potential classification are those where failure or misoperation will probably cause loss of human life.

DESCRIBE REASONING FOR HAZARD RATING CHOSEN:

Qualitative assessment of threat to downstream residences.
Dam break analyses and preparation of Emergency Action Plan currently underway

CONFIGURATION:



✓ Cross-Valley
____ Side-Hill
✓ Diked
____ Incised (form completion optional)
____ Combination Incised/Diked

Embankment Height 90 feet
Pool Area 25.7 acres
Current Freeboard 5 feet

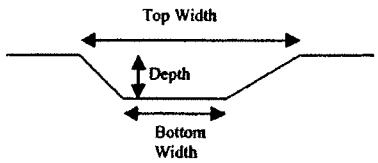
Embankment Material Rock Fill w/30% Clay
Liner 60-mil Low-Density Polyethylene flexible membrane
Liner Permeability Impermeable

TYPE OF OUTLET (Mark all that apply)

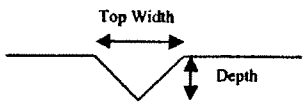
_____ **Open Channel Spillway**
_____ Trapezoidal
_____ Triangular
_____ Rectangular
_____ Irregular

_____ depth
_____ bottom (or average) width
_____ top width
_____

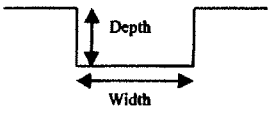
TRAPEZOIDAL



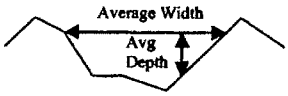
TRIANGULAR



RECTANGULAR

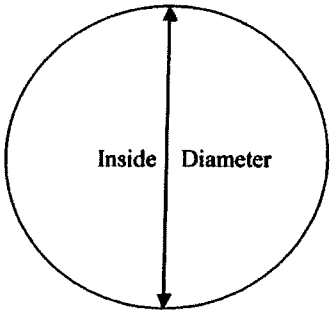


IRREGULAR



✓ **Outlet**

30" inside diameter



Material
_____ corrugated metal
_____ welded steel
_____ concrete
✓ plastic (hdpe, pvc, etc.)
_____ other (specify) _____

_____

Is water flowing through the outlet? YES ✓ NO _____

_____ **No Outlet**

_____

✓ **Other Type of Outlet** (specify) Trapezoidal Open Channel Emergency Sp.Hway. Bottom width: 8ft Top width 24ft. Depth: 4ft.

The Impoundment was Designed By Fuller, Mossbarger, Scott & May Engineers

Has there ever been a failure at this site? YES _____ NO ✓

If So When? _____

If So Please Describe : _____

Has there ever been significant seepages at this site? YES _____ NO ✓

If So When? _____

IF So Please Describe: _____

Has there ever been any measures undertaken to monitor/lower Phreatic water table levels based on past seepages or breaches at this site? YES _____ NO ✓

If so, which method (e.g., piezometers, gw pumping,...)? _____

If so Please Describe : _____