

**STRUCTURAL STABILITY ASSESSMENT
FORMER ASH BASIN
POWERTON STATION
APRIL 2018**

This report presents documentation of the initial periodic structural stability assessment for the Former Ash Basin (FAB) at the Powerton Station (Site) in Pekin, Illinois (Figure 1). This report addresses the initial structural stability assessment requirement for the Coal Combustion Residuals (CCR) regulations, Code of Federal Regulations Title 40, Part 257, Subpart D (referred to as the CCR Rule). These regulations were published in the Federal Register on 17 April 2015, became effective on 19 October 2015, and were amended on 05 August 2016. The Powerton Station is owned and operated by Midwest Generation, LLC (Midwest Generation). Based on the results provided in this report, the FAB does not meet the requirements of §257.73(d) of the CCR Rule.

This Report was prepared by Ms. Beth Pittaway and reviewed in accordance with Geosyntec's internal review policy by Mr. Michael Houlihan and Mr. Jesse Varsho, P.E., P.G. Mr. Varsho is a registered Professional Engineer in the State of Illinois.

1. Regulation Requirements - §257.73

Structural integrity criteria for inactive CCR surface impoundments is described in §257.73. The FAB meets the minimum size and capacity criteria under §257.73(b) and is therefore subject to the structural stability assessment requirements.

2. Site Conditions

Located to the east of the existing Ash Surge Basin, the FAB is an inactive CCR surface impoundment which was historically used for bottom ash disposal. It is estimated that the FAB stopped receiving CCRs by the 1970s. Originally a single pond, in 2010 the FAB was bisected into two areas by construction of a railroad embankment. The two bisected ponds are now designated as the North Pond and South Pond (Figure 2). Due to the duration of inactive use, both areas contain heavy vegetation. The volumes of apparent CCR in the North Pond and South Pond are estimated to be less than 300,000 and 200,000 cubic yards, respectively.

The FAB is irregularly shaped with maximum dimensions of approximately 1250 feet by 2150 feet with a total area of approximately 25 acres. The surface impoundment is surrounded by a gravel and soil perimeter road which allows access to monitoring wells.

3. Structural Stability Assessment

The following subsections address the components of §257.73(d)(1).

3.1 Foundations and Abutments – §257.73(d)(1)(i)

No formational materials provide lateral structural support for the embankments; therefore, the FAB does not include abutments. The remainder of this section addresses the foundation materials for the Basins.

Subsurface investigations performed at the Site for the installation of the railway, and exploratory sampling performed in 2016 indicate foundation materials underlying the embankments for the FAB consist of clay fills, clayey sand, and gravel with sand and clay. A loose clayey sand layer was observed from 8 to 18 ft-bgs on the North Pond. From 18 to 50 ft-bgs, poor-graded gravel with sand and clay is present consistent with river sediments. (Geosyntec, 2016a)

Elastic settlement of the clay and sand layers underlying the embankments likely occurred very soon after construction. Because of the age of the embankments, most consolidation and secondary compression settlement of the clay layer has likely already occurred. There are no proposed changes in operation which would increase loading conditions on the foundation materials; therefore, no significant settlement of the foundation materials underlying the embankments is anticipated to occur in the future. Further, the embankment was not constructed with abutments or separate engineered zones that would be most susceptible to the adverse effects of differential settlement. Therefore, potential settlement of the foundation is not anticipated to impact the integrity of the impoundment embankments.

3.2 Upstream Slope Protection – §257.73(d)(1)(ii)

The FAB interior basin slopes are protected from erosion, the effects of wave action, and potential effects of rapid drawdown by vegetation.

3.3 Dike Compaction – §257.73(d)(1)(iii)

The dike conditions are not highly controlled and inconsistent in height around the FAB. Documentation of as-built construction conditions for the FAB embankments was not available at the time of this report and no quantitative evaluation of the degree of compaction of the embankments was performed for the dikes in their current state. Therefore, it is unknown if the embankments are compacted to a density sufficient to withstand the range of loading conditions for the CCR unit.

3.4 Downstream Slope Vegetation – §257.73(d)(1)(iv)

The FAB embankment slopes and the surrounding areas are protected from erosion by vegetation.

3.5 Spillway – §257.73(d)(1)(v)

The FAB does not contain a single spillway or combination of spillways configured to the specifications of §257.73(d)(1)(v).

3.6 Structural Integrity of Hydraulic Structures – §257.73(d)(1)(vi)

Documentation of as-built or construction conditions for the FAB was not available at the time of this report due to the age of the FAB. An Ash Surge Basin Overflow Structure, shown on Figure 3, is known to pass through the embankments of the FAB on the west side of the South Pond. The spillway is constructed in the Ash Surge Basin with two box culverts, each approximately 4.5 feet in width and approximately 1.5 feet in height that extend beneath the Ash Surge Basin embankment crest into the FAB (Geosyntec, 2016b). A concrete apron is located east of the box culvert terminating in the FAB. Downstream of the concrete apron is rip rap. Calculations for the original design of the overflow structure were not available at the time of this report. The integrity or deficiencies of this structure that would negatively affect operation of the structure is not known at this time.

3.7 Downstream Slopes Adjacent to Water Bodies – §257.73(d)(1)(vii)

Since the FAB contains no outlet structures, there is no true downstream side. For the purpose of this section, we assume water inundation would occur from the Illinois River and impact the north side of the FAB. Because the type of construction and materials utilized on the FAB embankment are unknown, we cannot evaluate if they are designed and constructed to maintain structural stability during “low pool” and rapid drawdown conditions. Since the embankments of the FAB may not provide downstream inundation protection; the FAB will be closed as required by §257.101.

3.8 Structural Stability Assessment Deficiencies - §257.73(d)(2)

The initial structural stability assessment of the design, construction, operation, and maintenance of the FAB, cannot be accurately assessed due to the age of the impoundment and lack of information. To address the lack of information, the FAB will be closed as required by §257.101.

4. *Limitations and Certification*

This initial periodic structural stability assessment meets the requirements of §257.73(d) of the Code of Federal Regulations Title 40, Part 257, Subpart D, and was prepared in accordance with current practices and the standard of care exercised by scientists and engineers performing similar tasks in the field of civil engineering. The contents of this report are based solely on the observations of the conditions observed by Geosyntec personnel and information provided to Geosyntec by Midwest Generation. Consistent with applicable professional standards of care, our opinions and recommendations were based in part on data furnished by others, which was consistent with other information that we developed in the course of our performance of the scope of services. The information contained in this report is intended for use solely by Midwest Generation and their subconsultants.



Jesse Varsho

April 13, 2018

Jesse Varsho, P.E., P.G.
Illinois Professional Engineer No. 062.059069
Expiration Date: 11/30/2019

Former Ash Basin, Powerton Station
Structural Stability Assessment
April 2018

5. *References*

Geosyntec, 2016a. Geotechnical Report for Former Ash Basin (FAB) Closure, Powerton Station, April.

Geosyntec, 2016b. History of Construction Report, Ash Surge Basin and Bypass Basin, Powerton Station, October.

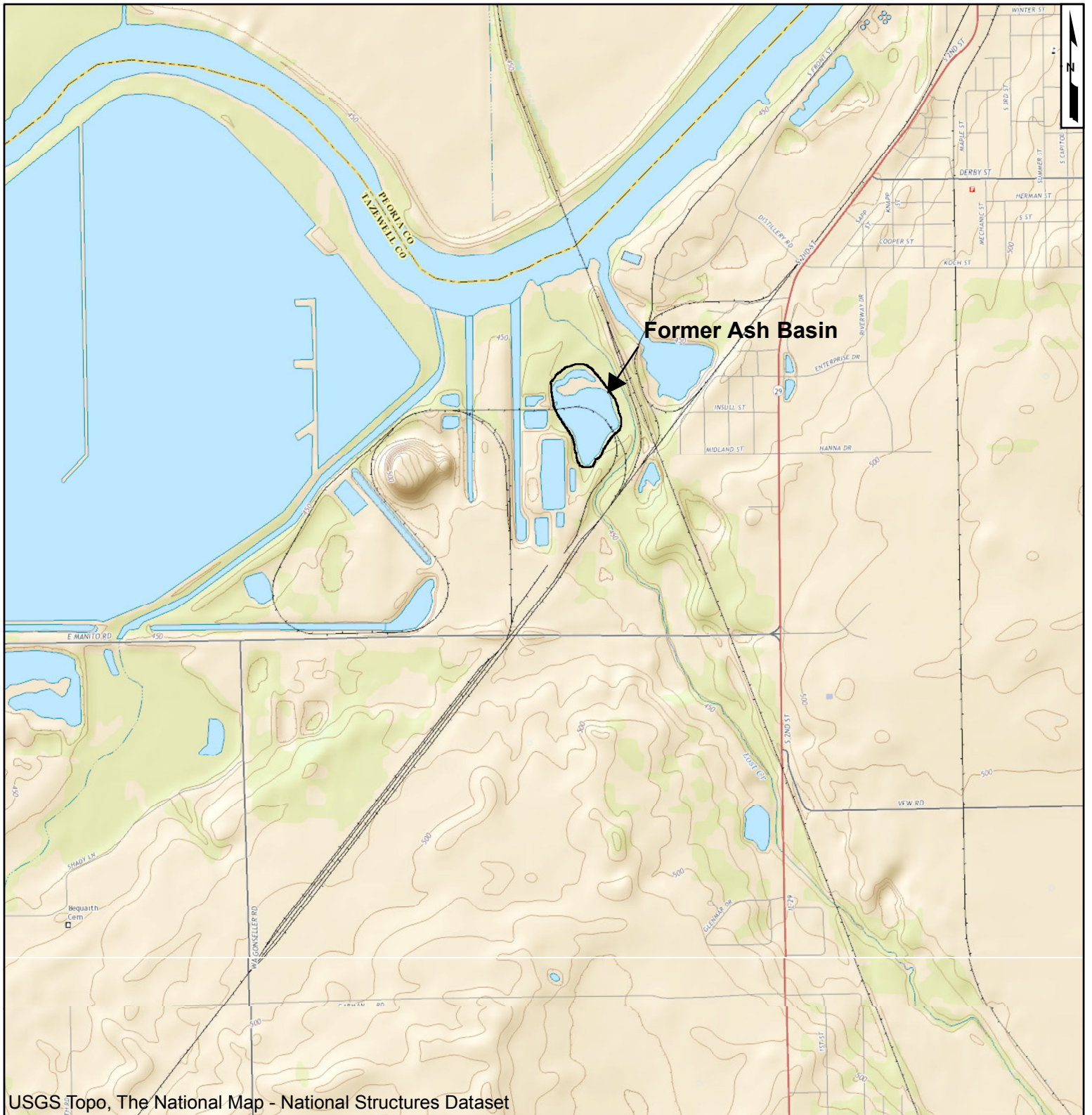
Attachments

Figure 1 – Site Location

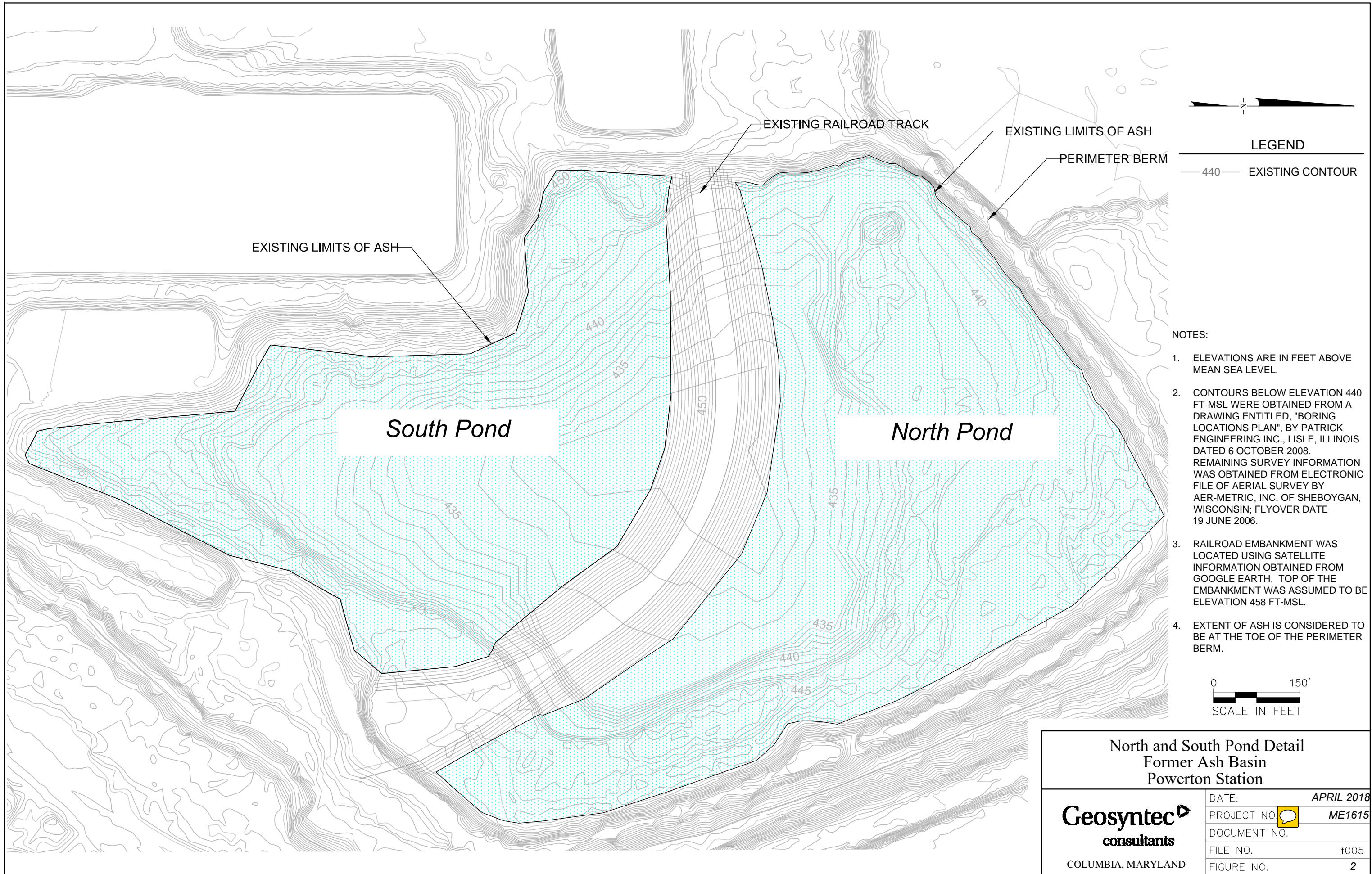
Figure 2 – North and South Pond Detail

Figure 3 – Hydraulic Structure Locations

FIGURES



2,000 1,000 0 2,000 Feet 	
Site Location Former Ash Basin Powerton Station Pekin, IL	
Columbia, MD	APRIL 2018
Figure 1	



N

LEGEND

— 440 — EXISTING CONTOUR

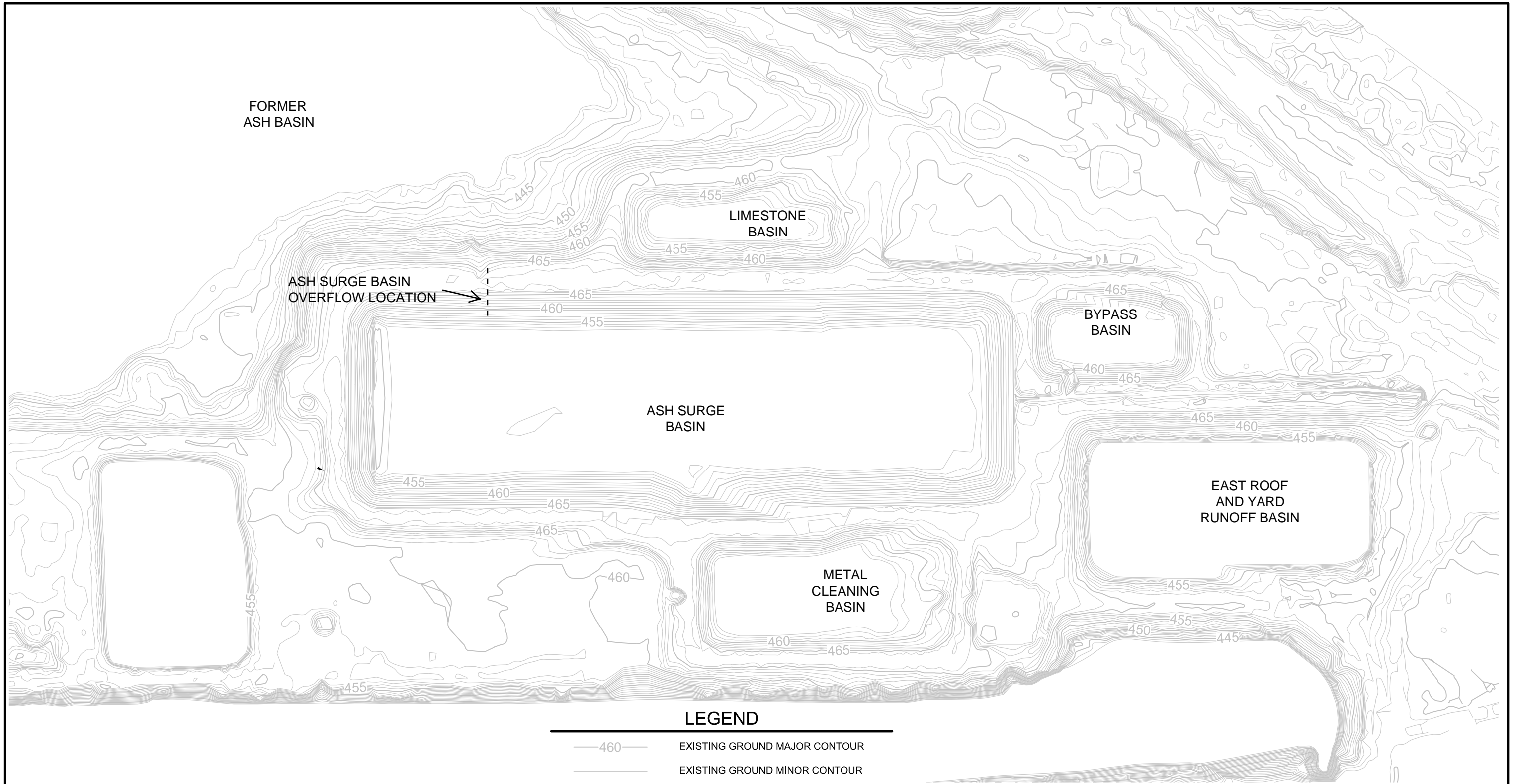
- NOTES:**
1. ELEVATIONS ARE IN FEET ABOVE MEAN SEA LEVEL.
 2. CONTOURS BELOW ELEVATION 440 FT-MSL WERE OBTAINED FROM A DRAWING ENTITLED, "BORING LOCATIONS PLAN", BY PATRICK ENGINEERING INC., LISLE, ILLINOIS DATED 6 OCTOBER 2008. REMAINING SURVEY INFORMATION WAS OBTAINED FROM ELECTRONIC FILE OF AERIAL SURVEY BY AER-METRIC, INC. OF SHEBOYGAN, WISCONSIN; FLYOVER DATE 19 JUNE 2006.
 3. RAILROAD EMBANKMENT WAS LOCATED USING SATELLITE INFORMATION OBTAINED FROM GOOGLE EARTH. TOP OF THE EMBANKMENT WAS ASSUMED TO BE ELEVATION 458 FT-MSL.
 4. EXTENT OF ASH IS CONSIDERED TO BE AT THE TOE OF THE PERIMETER BERM.



**North and South Pond Detail
Former Ash Basin
Powerton Station**

Geosyntec consultants COLUMBIA, MARYLAND	DATE:	APRIL 2018
	PROJECT NO.	ME1615
	DOCUMENT NO.	
	FILE NO.	f005
	FIGURE NO.	2

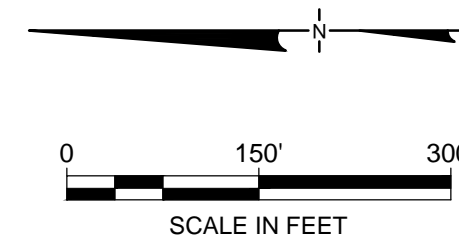
Z:\CADD\FIGURES\POWERTON\SW0251-F02 HYDRAULIC STRUCTURES



LEGEND

- 460— EXISTING GROUND MAJOR CONTOUR
- — — EXISTING GROUND MINOR CONTOUR

SOURCE OF SURVEY:
 TOPOGRAPHY WITHIN THE ASH SURGE AND BYPASS BASINS IS BASED ON TOP OF LINER TOPOGRAPHY FOR LINER REPLACEMENT PROJECTS (NRT, 2011 AND 2013). TOPOGRAPHY OUTSIDE THE LINER LIMIT OF THE BASINS IS AEROMETRIC, INC. PROJECT NUMBER 1080611, DATED 6-19-2008.
 HORIZONTAL DATUM: NAD83 IL SPC WEST
 VERTICAL DATUM: LOCAL PLANT DATUM



HYDRAULIC STRUCTURE LOCATIONS
 FORMER ASH BASIN
 POWERTON STATION
 PEKIN, ILLINOIS



PROJECT NO: ME1615

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FIGURE

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