Phil Morris
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October 28, 2025

Joshua Rhoades
Illinois Environmental Protection Agency
2520 West Iles Avenue
P.O. Box 19276
Springfield, IL 62794

Re: Dynegy Midwest Generation, LLC - Hennepin Power Plant
Log No. 2021-490; Log No. 2021-491; Log No. 2021-492
W1550100002-01-03; W1550100002-05; W1550100002-04-07
Initial Review Letter - Part 845 Construction/Operating Permit Application(s)- Second Submittal

Mr. Rhoades:

Dynegy Midwest Generation, LLC ("Dynegy") received the Hennepin Power Plant CCR Surface Impoundment Operating and Construction Permit Application Review Letter dated October 11, 2023. On August 9, 2024 Dynegy submitted initial responses to Illinois Environmental Protection Agency's (IEPA's) initial comments with data and information that was reasonably and readily available. This submittal includes responses to those comments that were not addressed in the first letter. All documents and responses will be provided in hard copy, as requested by IEPA, as well as through a courtesy email.

The initial responses provided in August 2024 included information to address several previous comments (Comments 18, 23, and 26) related to the characterization of the CCR within the unit and groundwater modeling of 35 Ill. Adm. Code 845.600 constituents. Following the initial submittal, IEPA, IPGC representatives and their consultants met on May 2, 2024, and May 30, 2024, to discuss the initial comments and responses. During those discussions IEPA requested clarification of the following aspects included in the groundwater flow and transport model submitted per Title 35 of the Illinois Administrative Code (35 I.A.C.) § 845.220(d)(3):

- The use of porewater data to represent CCR source concentrations;
- The appropriateness of using a surrogate parameter to calculate the time to reach the groundwater protection standard (GWPS) in comparing closure alternatives; and

- The relevance of geochemical reactions to modeling outcomes.

Additional clarification has been developed and included in **Attachment 1**.

As well, please note that the initial response to IEPA's initial comments received by IEPA on August 12, 2024 included Attachment A containing the 2016 History of Construction. For clarity and completeness, the current submittal **Attachment 8** herein provides the updated 2021 History of Construction.

Initial Operating Permit Application

Emergency Action Plan [35 Ill. Adm. Code 845.230(d)(3)(D)]

Comment 5: *To comply with the application requirements of 35 Ill. Adm. Code 845.230(d)(3)(D), the applicant must provide a written Emergency Action Plan containing the information specified in 35 Ill. Adm. Code 845.520. Written Emergency Action Plans were not provided for the OWAP, OWPP, Ash Pond No. 2, or Ash Pond No. 4. Written Emergency Action Plans for these ponds need to be submitted to the Agency in accordance with the requirements of 35 Ill. Adm. Code 845.520(a-c) and (e).*

Response: The Emergency Action Plans for the OWAP, OWPP, Ash Pond No. 2, and Ash Pond No. 4 has been revised to incorporate the above comment and is provided in **Attachment 2**.

Location Restrictions [35 Ill. Adm. Code 845.230(d)(2)(D)]

Comment 6: *To comply with the application requirements of 35 Ill. Adm. Code 845.230(d)(2)(D), the applicant must provide written demonstrations that an existing CCR surface impoundment complies with, or an explanation of how it does not comply with, the location restriction requirements specified in 35 Ill. Adm. Code 845.300-340. With the exception of a demonstration of compliance for floodplain location restrictions under 35 Ill. Adm. Code 845.340(c), written demonstrations were not submitted in the initial operating permit application for the East Ash Pond. Only memorandums certifying the demonstrations were submitted for the other location restrictions. Written demonstrations of compliance with the location restrictions for the East Ash Pond need to be submitted to the Agency in accordance with 35 Ill. Adm. Code 845.300-340.*

Additionally, the submitted application contains two memorandums regarding certification of the location restriction demonstration for placement above the uppermost aquifer. One memo from Haley & Aldrich, Inc., dated October 16, 2018, states that the East Ash Pond does not meet the requirements of 40 CFR 257.60(a). which contains the same requirements as 35 Ill. Adm. Code 845.300(a), nearly verbatim. However, another memo from Burns McDonnell, dated October 25, 2021, states that the demonstration was previously certified that the East Ash Pond meets the requirements of 40 CFR 257.60. Along with the demonstration for

placement above the uppermost aquifer for the East Ash Pond, a new certification statement needs to be signed and stamped by an Illinois Registered Professional Engineer and submitted to the Agency.

Response: The written demonstrations for the EAP are included in **Attachment 3**. The purpose of the Burns & McDonnell memorandum is to provide support/ justification for using a demonstration developed for 40 CFR 257.60(a) to meet the requirements of 35 Ill. Adm. Code 845.300(a). The affirmation that the demonstration meets the requirements of 40 CFR 257.60(a) only means that the demonstration was adequate and completed but does not provide the result of the demonstration. The result of the demonstration was provided in the signed certification from Haley & Aldrich which was included to meet the requirements of 35 Ill. Adm. Code 845.300(a). This original certification indicated that the EAP does not meet the placement above the uppermost aquifer. As a result of IEPA's comment, Ramboll further evaluated the separation requirement and updated the certification (**Attachment 4**) based on additional data. The certification analysis is summarized as follows:

- The Uppermost Aquifer is unconfined and therefore the top of the aquifer is defined by groundwater elevation contours. The top of the aquifer (Figure 1 in Attachment 5) was developed using the 95th percentile groundwater elevations measured at each well using all available historical data at each location, a time span ranging from December 1994 to October 2024 (**Attachment 5**). Wells with short timespans (<5 years) of elevation data were not included because they did not capture historic flooding and appeared to bias the contours low near the EAP. The resulting top of aquifer is conservative because it captures historic flooding events.

- Based on the 95th percentile groundwater elevations described above, the top of the aquifer ranges from approximately 451 (NAVD88) on the western half of the EAP and increases to approximately 453 ft in the southeast corner of the EAP.

- The base of the unit was evaluated using the same information provided in the Haley and Aldrich Demonstration (2018). The elevation selected in that analysis (454.5 ft) represented the base of the sand filter layer underlying the clay liner which is present below the discharge pipe system in the southeast corner of the EAP. Use of this elevation is overly conservative for the following reasons:

    - This base elevation is limited to a very small (0.07%) portion of the EAP.

    - Groundwater rising to this elevation remains approximately 10 ft below CCR at this location and at least eight feet from the CCR material in the rest of the unit.

- Based on these considerations, Ramboll established the base of the unit to be 458 which represents the base of the 4-foot clay liner.

- Comparison of the top of aquifer to this base elevation indicates that there is at least five feet of separation.

In addition to allowing for a demonstration that the base of the CCR unit is located five feet above the uppermost aquifer, Part 845.300(a) allows a demonstration "that there will not be an intermittent, recurring, or sustained hydraulic connection between any portion of the base of the CCR surface impoundment and the uppermost aquifer due to normal fluctuations in groundwater elevations (including the seasonal high water table)." An evaluation of these conditions is included below:

- The lowest CCR elevation in the EAP is 462 ft. (NAVD88), which is approximately 9-11 feet above the calculated top of aquifer elevations beneath the EAP.

- The CCR material is isolated from the groundwater by a 4-foot clay liner.

- Increases in groundwater elevations above the 95th percentile of those observed from December 1994 through October 2024 are limited in duration and do not remain elevated for long enough to propagate through the clay liner. When groundwater elevations encounter the clay liner, groundwater will preferentially flow through the highly permeable UA and around the low permeability clay liner.

- The lack of intermittent saturation is supported by the groundwater data since 2015 (provided to IEPA in the HCR and subsequent quarterly and annual data transmittals) which indicates there are no exceedances of the GWPS attributed to the EAP.

Based on the additional analysis above, Ramboll certifies that the EAP meets the Placement above the Uppermost Aquifer Location Restriction (**Attachment 4**).

Hydrogeologic Site Characterization [35 Ill. Adm. Code 845.230(d)(2)(I)(i) and 35 Ill. Adm. Code 845.230(d)(3)(E)(i)]

Comment 10: *The OWAP and OWPP are located in areas of freshwater ponds and freshwater wetland areas. The hydrogeologic site characterizations for these ponds must include an evaluation of the potentials for impact on nearby wetlands pursuant to the requirements of 35 Ill. Adm. Code 845.310.*

Response: A technical memorandum that includes the evaluation of the OWAP and OWPP's potential impact on nearby wetlands is included in **Attachment 6**.

Comment 11: *The hydrogeologic site characterizations for the OWAP, OWPP, Ash Pond No. 2, and Ash Pond No. 4 must be amended to include identification of nearby dedicated nature preserves and identification of potential migration pathways, pursuant to the requirements of 35 Ill. Adm. Code 845.620(b)(5) and 845.620(b)(11), respectively. The characterizations for these surface impoundments must also be amended to include climatic aspects of the site, including seasonal and temporal fluctuations in groundwater flow, pursuant to the requirements of 35 Ill. Adm. Code 845.620(b)(2).*

Response: A technical memorandum that addresses these components of the hydrogeologic site characterization is included in **Attachment 6**.

Groundwater Monitoring Program [35 Ill. Adm. Code 845.230(d)(2)(I)(iii-iv) and 35 Ill. Adm. Code 845.230(d)(3)(E)(iii-iv)]

Comment 15: *The data provided in Attachment I, Table 3-1 for Pond No. 2, Pond No. 4, and the East Ash Pond does not include appropriate minimum detection limits for each constituent in order to evaluate the constituent statistically for comparison with the numerical groundwater protection standards pursuant to 35 Ill. Adm. Code 845.600(a)(1).*

Response: IPGC has received and reviewed IEPA's December 28, 2023 letter regarding additional comments on statistical methods proposed in the initial operating permit applications. IPGC and IEPA met on May 2, 2024 to discuss the comments in this initial review letter and in the December 28, 2023 letter. A response to the December 28, 2023 letter is included in **Attachment 7**.

Final Closure Plan and Alternatives Analysis [35 Ill. Adm. Code 845.220(d), 35 Ill. Adm. Code 845.210, 35 Ill. Adm. Code 845.720(b), and 35 Ill. Adm. Code 845.750]

Comment 32: *Section 4 and Attachment 3 of the final closure plan does not discuss the manner in which the final cover addresses groundwater flow through the East Ash Pond from the shallow aquifer. The document should be revised to address this groundwater flow.*

Response: The final cover is designed to address vertical infiltration from the surface and is not intended to deal with potential groundwater infiltration. As detailed in the demonstration included in response to Comment 6, the groundwater elevations are normally below the base of the EAP, and even the upper limit of the uppermost aquifer is below the base of the EAP. The separation indicates there is no shallow groundwater flow through the EAP during seasonal and elevated groundwater conditions and the lack of downgradient exceedances provide additional evidence that there is no significant saturation of CCR from seasonal groundwater highs.

Should you have any questions or comments regarding the above responses, please contact Rhys Fuller at rhys.fuller@vistracorp.com or (618) 975-1799.

Sincerely,

Phil Morris, P.E.
Sr. Director, Environmental

ATTACHMENTS

Attachment 1 Response to IEPA Comments on Groundwater Modeling for Closure Alternatives Analysis
Attachment 2 Emergency Action Plan
Attachment 3 Location Restriction Demonstrations
Attachment 4 Location Restriction Certification - Separation from Uppermost Aquifer Demonstration
Attachment 5 Supporting Data
Attachment 6 Hydrogeologic Site Characterization Information
Attachment 7 Comments on Statistical Methods Proposed in Initial Operating Permit Application
Attachment 8 2021 History of Construction

Attachment 1

Response to IEPA Comments on Groundwater Modeling for Closure Alternatives Analysis

Dynegy Midwest Generation, LLC (Dynegy) received the Hennepin Power Plant CCR Surface Impoundment Operating and Construction Permit Application Review Letter from Illinois Environmental Protection Agency (IEPA) dated October 11, 2023, and provided an initial response on August 9, 2024. In meetings with Dynegy representatives and consultants on May 2, 2024, and May 30, 2024, IEPA requested clarification regarding the following aspects of the groundwater flow and transport model submitted per Title 35 of the Illinois Administrative Code (35 I.A.C.) § 845.220(d)(3):

1. The use of porewater data to represent CCR source concentrations;
2. The appropriateness of using a surrogate parameter to calculate the time to reach the groundwater protection standard (GWPS) in comparing closure alternatives; and
3. The relevance of geochemical reactions to modeling outcomes.

These topics are addressed below.

1. Use of Porewater Data to Represent CCR Source Concentrations

The August 9th, 2024, initial response from Dynegy to Comment 18 provided several United States Environmental Protection Agency (USEPA) references supporting the conclusion that porewater analysis represents the best and most accurate data available for source characterization. During subsequent meetings, IEPA requested additional support for use of surrogate parameter concentrations in porewater as the CCR source concentration in the groundwater model. The use of porewater constituent concentrations as a source term for modeling the effects of CCR surface impoundments on downgradient groundwater is consistent with USEPA's approach to evaluating potential effects of CCR surface impoundments as detailed below.

The initial promulgation of a federal CCR rule was proposed to "address the risks from the disposal of CCR generated from the combustion of coal."[1] The risk of CCR stored in impoundments and landfills was characterized by USEPA in the 2014 final Human and Ecological Risk Assessment of Coal Combustion Residuals.[2] The purpose of this risk assessment was to "provide a scientific basis for the development of regulations necessary to protect human health and the environment."[3]

In the conceptual model for potential risks of impounded CCR, "chemical constituents can be released from surface impoundments through the leaching of soluble constituents into the water that comes in contact with the CCRs and percolation of the resulting leachate into the subsurface soil and ground water."[4] The risk assessment uses data from "impoundment pore water", defined as "the water present within interstitial spaces of the settled CCRs", to characterize CCR waste source chemical concentrations.[5] The risk assessment clarifies that whole CCR waste concentrations[6] are a poor indicator of what constituents may be released from a CCR impoundment. Instead, pore water "concentrations are representative of leachate released from impoundments to downgradient receptor

[1] 80 Fed. Reg. 21311 (Apr. 17, 2015). https://www.federalregister.gov/d/2015-00257/p-64.
[2] USEPA. 2014. Human and Ecological Risk Assessment of Coal Combustion Residuals. Final. Office of Solid Waste and Emergency Response and Office of Resource Conservation and Recovery. 2050-AE81. December.
[3] Ibid.
[4] Section 2.2.1, Ibid.
[5] Section 3.1, Ibid.
[6] "Whole waste represents the concentrations within CCRs at the time of generation," Ibid.

wells"[7] and are subsequently used throughout the risk assessment.[8] In the 2023 draft update to the risk assessment in support of the 2024 Final Rule – Legacy CCR Surface Impoundments and CCR Management Units, USEPA confirms that "it was most appropriate to use porewater data to model leakage from surface impoundments."[9]

The use of porewater constituent concentrations as source water concentrations in the groundwater model is therefore consistent with USEPA's well-documented conceptual site model of CCR SIs and approach for modeling potential migration of chemical constituents within groundwater.

2. Appropriate Use of Surrogate Parameters

IEPA stated in their October 11, 2023, preliminary comments on the Operating and Construction Permit Application that all constituents present in the East Ash Pond should be included in groundwater modeling (Comment 23). The initial August 9, 2024, response to IEPA's comments provided rationale for the interpretation that 35 I.A.C. § 845 does not require modeling of all constituents regulated under 35 I.A.C. § 845.600 as well as an independent subject matter expert review validating the modeling approach for evaluating closure alternatives (Attachment E). Additional considerations are provided here.

The surrogates selected for groundwater flow and transport modeling are conservative parameters (*i.e.*, aqueous concentrations are predominantly affected by physical processes such as dilution and dispersion rather than by chemical attenuation mechanisms) and therefore represent the maximum plume extent. The use of a conservative parameter to represent plume extent and clean-up times is consistent with USEPA modeling examples intended for evaluating relative remedy effectiveness.[10]

Conservative parameters are most acutely affected by closure: once the source is controlled via closure, concentrations of surrogate parameters in the groundwater will respond in timeframes consistent with groundwater flow. Source control will control, minimize, or eliminate, to the maximum extent feasible, infiltration of liquids through the CCR (per 35 I.A.C. 845 § 845.750(a)(1)), mitigating the flux of not only the surrogate parameters but all other parameters potentially leaching from the unit. The time to reach the GWPS determined by modeling surrogate parameters correlates to the effectiveness of the proposed closure as source control. Therefore, the existing model is appropriate for assessing the effect of closure on the flux of all CCR SI porewater constituents.

3. Relevance of Geochemical Reactions to Groundwater Modeling Outcomes

As described above, methods of source control that meet the performance criteria in 35 I.A.C. § 845.750 will mitigate the flux of all CCR SI porewater constituents to the groundwater after closure. However, the presence of downgradient groundwater concentrations of a surrogate parameter exceeding the GWPS is an indication that other parameters observed in CCR SI porewater may also have migrated from the unit into the groundwater or aquifer solids. These constituents may be currently attenuated in the subsurface (*i.e.*, immobilized to the solid phase by sorption or mineral precipitation)

[7] Section 3.4.1, Ibid.

[8] Leachate data collected using EPA Leaching Evaluation Assessment Framework methods were "only used […] to characterize the leachate for the range of materials resulting from various air pollution control technologies" (80 FR 21,322 [April 17 2015]) for which insufficient porewater data were available.

[9] USEPA. 2023. Risk Assessment of Coal Combustion Residuals: Legacy Impoundments and CCR Management Units. Draft. Office and Land and Emergency Management; Office of Resource Conservation and Recovery. October.

[10] USEPA. 1994. Ground-Water Modeling Compendium. Second Edition. Office of Solid Waste and Emergency Response. 500-B-94-004. July.

and are therefore not observed above groundwater protection standards in downgradient groundwater. During in-person meetings, IEPA expressed concern that the current flow and transport modeling used in the closure alternatives analysis does not account for this possibility.

All potential source control measures will mitigate the flux of CCR SI porewater to the groundwater, driving a shift toward greater influence of background groundwater on subsurface geochemistry. This creates a trailing gradient where "upgradient groundwater or rainwater flows into the infiltrating plume or enters the zone affected by the plume."[11] As IEPA noted, the trailing gradient may affect the mobility of constituents previously released to the groundwater. However, **a return to background groundwater conditions and potential creation of a trailing gradient would occur regardless of the selected closure alternative**.

Although the method of closure does not affect the behavior of constituents that may have previously migrated from the subsurface, an understanding of the geochemical controls on those constituents is important for evaluating conditions in the subsurface post-closure. The creation of a trailing gradient may cause changes in regulated constituent mobility that should not be mistaken for a failure of source control. **Attachment A** to this document provides a geochemistry overview of parameters that may have been previously released from the CCR SI based on detected concentrations in porewater. This analysis is intended to provide a foundation for future understanding of chemical behavior within the subsurface during the thirty-year post-closure care monitoring period.

In conclusion, the existing flow and transport model is appropriate for assessing the effectiveness of closure alternatives to "control, minimize, or eliminate, to the maximum extent feasible, infiltration of liquids through the CCR" (35 I.A.C. § 845.750(a)(1)). The performance of closure will be documented through post-closure care, and monitoring will occur in accordance with 35 I.A.C. § 845.780. Post-closure monitoring will be informed by the geochemistry overview presented in **Attachment A**.

[11] Savannah River National Laboratory. 2011. The Scenarios Approach to Attenuation-Based Remedies for Inorganic and Radionuclide Contaminants. Prepared for the United States Department of Energy, Contract No. DE-AC09-08-SR22470. SRNL-STI-2011-00459. August.

ATTACHMENT A

TECHNICAL MEMORANDUM

DATE January 2, 2025 **Reference No.** 23RAM01-1

TO Brian G. Hennings - Ramboll
Eric Tlachac - Ramboll

CC Stu Cravens - Vistra

FROM Shannon Zahuranec, Allie Wyman, and Pam Rohal **EMAIL:** shannon@lifecyclegeo.com

GEOCHEMICAL BEHAVIOR OF IEPA-REGULATED CONSTITUENTS IN NATURAL SYSTEMS

1.0 INTRODUCTION

Life Cycle Geo, LLC (LCG) has prepared this white paper to provide a geochemical overview of parameters that are measured at detectable levels in one or more of the Luminant coal combustion residual (CCR) surface impoundments in the State of Illinois. The measurable presence of constituents in porewater[1] does not necessarily lead to elevated constituent concentrations in groundwater downgradient. The fate and transport of constituents in groundwater is controlled by a variety of mechanisms including physical factors such as the rate of groundwater flow and dilution as well as through geochemical interaction with aquifer solids and associated attenuation by mechanisms of adsorption, ion exchange, and mineral precipitation and dissolution.

This white paper focuses on the geochemical controls on the transport and mobility of parameters detected in porewater at the Luminant Illinois fleet of CCR surface impoundments. Only a few constituents found in CCR porewater have been detected above groundwater protection standards (GWPS) in downgradient groundwater. The information presented here aims to provide a foundational explanation for the observed discrepancy between constituents detected in porewater and those in groundwater and identifies geochemical conditions that may be monitored for future assessments regarding how closure-related changes could affect the transport and attenuation of CCR constituents regulated under Illinois Environmental Protection Agency (IEPA)[2] and federal[3] programs. This white paper does not directly relate these fundamental principles to site-specific conditions, but rather provides a foundational geochemical understanding of the subsurface behavior of regulated parameters.

2.0 GROUNDWATER GEOCHEMISTRY

An overview of the geochemical behaviors and controls for each of the constituents regulated under Title 35 of the Illinois Administrative Code (35 IAC) § 845, which have been detected in CCR porewater at one or more of the Luminant sites in Illinois, is provided. The dominant geochemical controls on constituent behavior in groundwater are pH, oxidation and reduction (redox) conditions, and the presence of reactive mineral phases, which collectively influence solubility, mobility, and the potential for attenuation or transport. Constituents in groundwater are therefore grouped and discussed according to their geochemical behavior and transport mechanisms, allowing for a clearer understanding of their interactions within

[1] The USEPA Human and Ecological Risk Assessment of Coal Combustion Residuals (2024) defines "impoundment pore water" as "the water present within interstitial spaces of the settled CCRs".
[2] Title 35 of the Illinois Administrative Code (35 I.A.C.) § 845.600(a)(1)
[3] Title 40 of the Code of Federal Regulations § 257 Appendices III and IV

subsurface environments. Groupings established for this white paper are based on fundamental geochemical principles and include conservative ions, oxyanions, alkaline earth metals, metals and transition metals, pH, and fluoride (Table 1). Boron, sulfate, total dissolved solids, calcium, and turbidity are also required monitoring parameters under 35 IAC § 845 but are not discussed here for the following reasons:

- Boron and sulfate: These are the primary contaminants of concern at most Luminant sites in Illinois and geochemical behaviors are discussed at length in the geochemical conceptual site models, the groundwater modeling reports, and closure applications for each respective site.
- Total dissolved solids: Total dissolved solids behavior at most CCR sites is significantly correlated with sulfate or chloride and thus is handled in the same documents by proxy.
- Calcium and turbidity: These are required monitoring parameters but do not have regulatory limits. For this reason, they are not discussed further.

Inclusion of parameters within this document does not imply parameters are detected in downgradient groundwater. However, several Luminant fleet CCR surface impoundments have concentrations of boron and/or sulfate above the respective GWPS in downgradient groundwater, suggesting other parameters observed in CCR porewater may also migrate into the subsurface prior to closure. Closure of CCR surface impoundments, regardless of the closure method, will reduce the contribution of porewater to groundwater chemistry and will drive a shift toward greater influence of background groundwater on subsurface water chemistry. The geochemical evolution of groundwater chemistry toward background conditions is the primary factor that could potentially influence the behavior of previously released constituents, rather than the specific method of closure itself. Although the method of closure does not affect the behavior of constituents that may have previously migrated to the subsurface, an understanding of the geochemical controls on those constituents is important for evaluating conditions in the subsurface post-closure. To provide a foundation for understanding post-closure geochemical behavior within the subsurface, this document provides a geochemistry overview of parameters that may have been previously released from the CCR surface impoundments.

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Table 1: IEPA regulated parameters discussed in the text.

Grouping	Parameter	35 I.A.C. § 845 Limit[1]	Section
pH	pH (field)	6.5 to 9.0 S.U.	Section 2.1
Conservative Ion	Chloride, total	200 mg/L	Section 2.2
Fluoride	Fluoride, total	4.0 mg/L	Section 2.3
Oxyanion	Antimony, total	0.006 mg/L	Section 2.4
	Arsenic, total	0.010 mg/L	
	Molybdenum, total	0.1 mg/L	
	Selenium, total	0.05 mg/L	
Alkaline Earth	Barium, total	2.0 mg/L	Section 2.5
	Beryllium, total	0.004 mg/L	
	Radium 226 and 228 combined	5 pCi/L	
Metal/Transition Metal	Cadmium, total	0.005 mg/L	Section 2.5
	Chromium, total	0.1 mg/L	
	Cobalt, total	0.006 mg/L	
	Lead, total	0.0075 mg/L	
	Mercury, total	0.002 mg/L	
	Thallium, total	0.002 mg/L	
	Lithium, total	0.04 mg/L	

Notes: mg/L – milligrams per liter; pCi/L – picocuries per liter; S.U. – standard units
1. In accordance with 35 I.A.C. Section 845.600(a)(1), compliance with specific groundwater protection standards is required. Furthermore, per Section 845.600(a)(2), if the background concentrations of any constituents are higher than the listed groundwater protection standards, the background concentration must serve as the applicable compliance limit.

2.1 PH

Groundwater pH is a critical parameter regulated by the IEPA, as it influences the mobility of metals, transition metals, and other contaminants. Groundwater pH in the natural environment typically ranges from slightly acidic to neutral, but various natural and anthropogenic processes can drive fluctuations, affecting the transport or immobilization of dissolved species. Groundwater pH is shaped by processes like carbonate dissolution, sulfate reduction, iron oxidation, and organic matter decomposition. The net outcome of these key processes (plus additional secondary processes) drives the measured groundwater pH. Acidic conditions resulting from these processes typically enhance metal mobility (for cationic, or positively charged species, in particular), while neutral to alkaline conditions tend to promote immobilization through sorption and precipitation, limiting contaminant transport. Key influences on groundwater pH are as follows:

- **Carbonate Equilibria -** the dissolution of carbonate minerals, such as calcite ($CaCO_3$), plays a major role in buffering groundwater pH. Interaction of groundwater with carbonates raises pH toward neutral to alkaline conditions, which promotes the immobilization of metals through sorption and precipitation as metal hydroxides (Stumm and Morgan, 1996; Langmuir, 1997).

- **Sulfate Reduction -** In reducing environments, microbial oxidation of organic matter coupled with sulfate reduction produces hydrogen sulfide and acidity, decreasing the groundwater pH. This shift toward acidic pH enhances the solubility of metals such as beryllium, thereby increasing the potential for transport (Stumm & Morgan, 1996).

- **Oxidation of Dissolved Iron -** Oxidation of dissolved ferrous iron (Fe^{2+}) in groundwater can generate acidic conditions. When ferrous iron (Fe^{2+}) oxidizes to ferric iron (Fe^{3+}), it precipitates as ferric hydroxide ($Fe(OH)_3$), releasing protons (H^+) and lowering pH. This process can result in more acidic groundwater, increasing the mobility of metals like chromium (Cr(VI)) due to decreased sorption capacity (Stumm & Morgan, 1996).

- **Organic Matter Decomposition** – The decomposition of organic matter influences groundwater pH through the production of organic acids. Organic acids such as humic and fulvic acids can lower pH (Langmuir, 1997), especially in organic-rich environments like wetlands. This drop in pH enhances the solubility and transport of metals like lead and beryllium by reducing sorption to mineral surfaces (Hem, 1985). Additionally, organic matter can form complexes with certain metals, influencing their mobility independently of pH shifts.

2.2 CONSERVATIVE IONS

Chloride is the only conservative ion regulated by the IEPA that is considered in the discussion of this white paper[4]. Chloride is considered conservative because it generally is not involved in sorption, mineral precipitation, or redox reactions (Hem, 1985). Chloride can precipitate as various salts through evaporation, though this is unlikely in groundwater environments.

2.3 FLUORIDE

[4] Boron and sulfate are also considered to be generally conservative in terms of groundwater transport but are not discussed in this white paper for the reasons described in Section 2.0.

Fluoride is a major ion regulated by the IEPA and is primarily present as a dissolved anion (F^-) in natural groundwaters. Fluorite (CaF_2) precipitation is the primary control on fluoride mobility, with notable decreases in concentration in calcium rich waters (Hem, 1985). Fluoride mobility can also decrease due to the precipitation of apatite-group minerals (fluorapatite, $Ca_5(PO_4)_3F$). The precipitation of these minerals is pH-dependent, with less mobility (i.e., greater precipitation) at low pH. Conversely, fluoride mobility increases at more alkaline pH due to the increase in fluorite solubility.

Fluoride mobility also decreases due to sorption onto clay minerals as well as iron and aluminum hydroxides. The fluoride ion also has a similar ionic radius to the hydroxide ion (OH^-) and can replace hydroxide in mineral structures (Hem, 1985). While fluoride itself does not participate in any redox reactions, redox changes in a system can influence sorption as iron and aluminum hydroxides either precipitate (oxic environments) and sorb more fluoride, or dissolve (reduced environments) and release sorbed or coprecipitated fluoride.

2.4 OXYANIONS

Oxyanions, constituents that are present as negatively charged oxygen compounds in natural groundwaters, include the IEPA-regulated constituents' antimony, arsenic, molybdenum, and selenium. Chromium can also behave as an oxyanion but is primarily considered a metal based on the most prevalent behavior in groundwater and is therefore discussed in Section 2.6. Oxyanion behavior in groundwater is controlled by redox conditions, pH, and sorption to mineral surfaces, which determine whether these contaminants become mobile or remain immobilized (Oladoja, 2021).

Under oxic conditions, many oxyanions, including arsenate ($As(V)O_4^{3-}$), molybdate ($Mo(VI)O_4^{2-}$), and selenate ($Se(VI)O_4^{2-}$), exhibit strong sorption to mineral surfaces like ferrihydrite and aluminum oxides. This sorption is enhanced at low pH due to the increasingly positive charge on the oxide mineral surface under low pH, reducing oxyanion mobility. As the pH rises, desorption may occur, increasing the transport potential (Davis and Leckie 1978; Tian et al. 2017). For example, as the pH increases, arsenate can desorb from mineral surfaces, increasing mobility and potential for groundwater transport. In contrast, under reducing conditions, oxyanions like arsenite ($H_3As(III)O_3$) and selenite ($Se(IV)O_3^{2-}$) become more mobile due to redox-driven transformation and weakened sorption.

Sorption competition further influences mobility (Oladoja, 2021; Hem 1985). Oxyanions with similar charge and ionic radii can compete for sorption sites, displacing one another, particularly as pH rises. This interplay of redox conditions, pH, and sorption dynamics is key in determining the transport or immobility of oxyanions in groundwater systems.

2.5 ALKALINE EARTH METALS

Alkaline earth metals, including beryllium, barium, and radium, exist as divalent ions in natural systems (Hem, 1985). These metals, regulated by the IEPA, behave differently in groundwater based on their interactions with other chemical species and geochemical conditions, particularly the presence of sulfate, redox conditions, and sorption dynamics.

- **Beryllium -** though less commonly detected in groundwater than barium or radium, beryllium exhibits behavior strongly influenced by pH and sorption to mineral surfaces (Hem, 1985; Boschi and Willenbring, 2016). In neutral to alkaline conditions, beryllium tends to form insoluble hydroxides ($Be(OH)_2$), which limit its mobility (Boschi and Willenbring, 2016). However, under acidic conditions, beryllium generally remains dissolved as Be^{2+} and is therefore more mobile. In the divalent dissolved form, sorption to mineral surfaces, particularly clay minerals and organic compounds, also limits beryllium mobility in neutral pH environments. The transport potential of

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beryllium increases in low-pH conditions where sorption of cations is weakened, causing beryllium to remain dissolved in the groundwater (Boschi and Willenbring, 2016).

- **Barium -** the mobility of barium in groundwater is primarily controlled by the presence of sulfate. When sulfate is present, barium reacts to form the relatively insoluble mineral barite ($BaSO_4$), limiting the mobilization of barium (Hem, 1985; Gilkeson et al., 1978; Gilkeson et al., 1983). This has been observed in Illinois groundwater, where the mixing of barium-rich/sulfate-poor waters with sulfate-rich/barium-poor waters has caused barite precipitation, even leading to pump failure due to clogging (Gilkeson et al., 1978; Gilkeson et al., 1983). In the absence of sulfate, barium concentrations can become elevated due to water-rock interactions, as barium is released from bedrock minerals into the groundwater (Gilkeson et al., 1983). Additionally, sorption onto iron and manganese oxides, clay minerals, and organic matter can limit barium mobility under certain geochemical conditions. Sulfate reduction, driven by microbial activity under reducing conditions, can lower sulfate concentrations and thereby increase barium mobility (Hem, 1985).

- **Radium (Radium-226 and Radium-228) -** Radium is regulated by the IEPA as a combined parameter of Ra^{226}+Ra^{228} and represents radioactive isotopes derived from the decay of uranium and thorium (Gilkeson et al., 1983). Radium behaves similarly to barium in groundwater and is often found in the same locations where barium concentrations are elevated (Gilkeson et al., 1978; Gilkeson et al., 1983). Like barium, radium can form the insoluble sulfate mineral radium sulfate ($RaSO_4$) in the presence of sulfate, which limits its mobility (Gilkeson et al., 1983; Hem, 1985). Furthermore, radium can substitute for barium in the barite structure via isomorphous replacement, further contributing to its immobilization in groundwater (Gilkeson et al., 1978).

- **Radium** can also sorb to ferrihydrite, clay minerals, and weakly to silicate surfaces. Sorption to ferrihydrite and clays can play a role in limiting radium mobility, but factors such as increases in ionic strength can lead to radium desorption, thereby enhancing its mobility (Gilkeson et al., 1983). Additionally, radium mobility can be influenced by the radioactive decay process itself whereby radium may be ejected from a mineral surface during the decay of sorbed thorium (Gilkeson et al., 1983).

2.6 METALS AND TRANSITION METALS

Metals and transition metals regulated by the IEPA in groundwater include chromium, lead, cobalt, cadmium, lithium, mercury, and thallium. The mobility of these metals is controlled by redox conditions, pH, and ability to sorb to mineral surfaces, with behavior varying based on the specific metal and groundwater chemistry (Hem 1985, Smith and Huyck, 1999). Metals and transition metals are grouped by general behavior in groundwater as follows:

- **Cadmium, Cobalt, and Lead -** These metals exhibit varying mobility depending on redox conditions and pH and are generally immobile in sulfidic environments or in neutral to alkaline conditions.

    - **Cadmium** is generally immobile under neutral to alkaline pH conditions due to mineral precipitation (e.g. $Cd_3(PO_4)_2$, $CdCO_3$, etc.) and adsorption predominantly to iron and manganese oxy-hydroxides and clay minerals such as montmorillonite, illite, and kaolinite (Kubier et al., 2019; McComish and Ong, 1988). Similarly, cadmium is less mobile under reducing environments due to precipitation of cadmium sulfide (McComish and Ong, 1988) and co-precipitation with other sulfide minerals (e.g. sphalerite, galena, and chalcopyrite). Cadmium tends towards mobility in groundwater (as Cd^{2+}) when pH is less than 6.5 standard units (S.U.) and under oxygenated conditions due to sulfide oxidation (Kubier et al., 2019).

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- **Cobalt** primarily exists as a divalent cation (Co^{2+}), which is generally immobile under neutral pH conditions due to sorption onto iron and manganese oxide mineral surfaces and coprecipitation with iron or manganese oxides. Cobalt exhibits increased mobility under acidic, oxidized conditions. The presence of organic ligands can reduce the overall sorption of cobalt in solution (Krumpka and Serne, 2002). Reducing environments can cause the solubilization of iron oxides, which will release sorbed or co-precipitated cobalt. However, as conditions become further reducing, cobalt can precipitate as cobalt sulfide in the presence of reduced sulfur (e.g., $Co(HS)_2^0$) (Krumpka and Serne, 2002).

- **Lead** is generally immobile under neutral to alkaline pH conditions, due to precipitation as $Pb(OH)_2$ or sorption onto iron and manganese oxide mineral surfaces. Under reducing conditions, lead can also form insoluble lead sulfides (e.g., PbS) (McComish and Ong, 1988). Lead can generally be more mobile as a divalent cation (Pb^{2+}) under acidic conditions.

- **Lithium** primarily exists as a monovalent cation (Li^+) in solution and is generally more mobile than other trace elements but can be immobilized through sorption onto clay minerals with the amount of sorption dependent on cation exchange capacity (Anghel et al., 2002; Anderson et al., 1989; Robinson et al., 2018). Under certain weathering conditions, lithium may be strongly immobilized by incorporation into the matrix of secondary minerals, particularly kaolinite and vermiculite (Li and Liu 2020; Pogge von Strandmann et al., 2021; Steinhoefel et al., 2022). Lithium can also sorb onto amorphous aluminum oxides, with increased sorption occurring at higher pH (Prodromou, 2016).

- **Chromium** primarily exists as Cr(VI) in very oxidizing environments, which tends to be mobile due to weak sorption to hydroxides or clays, although it may sorb to organic matter (McComish and Ong, 1988). Cr(III), by contrast, is immobile in reducing environments due to strong sorption onto mineral surfaces or precipitation as $Cr(OH)_3$. Cr(III) is typically stable and immobile in neutral to alkaline conditions. Redox reactions facilitate oxidation of Cr(III) to Cr(VI) in the presence of oxidizers like manganese oxides while Cr(VI) can be reduced to Cr(III) in waters with organic matter, reduced iron, or sulfur compounds, as is typical of CCR porewater (McComish and Ong, 1988). Reduced iron and sulfur can also drive the reduction of chromium.

- **Thallium** primarily exists as a monovalent cation (Tl^+) and forms a stable and immobile sulfide mineral (Tl_2S) in reducing environments, such as is typical of CCR porewater (McComish and Ong, 1988). Thallium can also sorb strongly to montmorillonite clays. Conversely, thallium is mobile in oxidized environments, independent of groundwater pH.

- **Mercury** can exist as elemental mercury (Hg^0), divalent mercury (Hg^{2+}), or as methylmercury (CH_3Hg^+) in organic-rich environments. Hg^{2+} is immobile in neutral to alkaline conditions due to precipitation as $Hg(OH)_2$ or sorption onto mineral surfaces, and once sorption occurs, desorption is often negligible (McComish and Ong, 1988). In sulfidic conditions, mercury forms highly insoluble sulfides (e.g., HgS) (McComish and Ong, 1988). By contrast, mercury is generally mobile under acidic and oxidized conditions.

3.0 CONCLUSIONS

The transport and attenuation of most IEPA-regulated constituents in groundwater are primarily controlled by pH, redox, and availability of iron and sulfide, all of which can influence mineral

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precipitation/dissolution and sorption processes. Constituents can be broadly grouped according to geochemical characteristics to include, pH, conservative ions, fluoride, oxyanions, alkaline earth metals, and metals/transition metals. Yet, even within these broad groups, many constituents behave uniquely under specific redox and pH conditions and understanding these interactions is foundational for predicting contaminant movement and designing effective groundwater monitoring strategies.

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Attachment 2

Dynegy Midwest Generation, LLC

HENNEPIN POWER PLANT

VILLAGE OF HENNEPIN, PUTNAM COUNTY, IL

Emergency Action Plan (EAP)

40 C.F.R. § 257.73(a)(3), Ill. Adm. Code 845.520
Coal Combustion Residual (CCR) Impoundment
& Related Facilities

- East Ash Pond (NID # IL50363) (IEPA # W1550100002-05)
- West Ash Pond System (IEPA #W1550100002-01)
- Ash Ponds 2/4 (IEPA #W1550100002-04, #W1550100002-07)

Revision Date: August 2025

Qualified Professional Engineer Certification; Emergency Action Plan for the Hennepin Power Plant East Ash Pond

In accordance with 40 C.F.R 257.73(a)(3)(iv) and 35 Ill. Admin. Code 845.520(e), the owner or operator of a CCR unit that is required to prepare a written Emergency Action Plan under 40 C.F.R. 257.73(a)(3) and 35 Ill. Adm. Code 845.520(a) must obtain a certification from a qualified professional engineer stating that the written Emergency Action plan meets the requirements of the mentioned sections.

I, Victor Modeer, being a Professional Engineer in good standing in the state of Illinois, do hereby certify, to the best of my knowledge, information, and belief that:

1. **The information contained in this Emergency Action Plant was prepared in accordance with accepted practice of engineering, and;**
2. **This Emergency Action Plant meets the requirements of 40 C.F.R 257.73(a)(3)(iv) and 35 Ill. Admin. Code 845.520(e)**

Victor Modeer
Engineering Manager

Date: ___8/27/25_____

HENNEPIN POWER PLANT
EMERGENCY ACTION PLAN
CCR IMPOUNDMENT & RELATED FACILITIES

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HENNEPIN POWER PLANT
EMERGENCY ACTION PLAN
CCR IMPOUNDMENT & RELATED FACILITIES

PART I – EAP NARRATIVE AND EXHIBITS

1 STATEMENT OF PURPOSE

The Hennepin Power Plant (Power Plant) is located near the Village of Hennepin in Putnam County, Illinois. The location is shown in Figure 1-1. The Power Plant is a retired coal-fired electricity producing power plant owned and operated by Dynegy Midwest Generation, LLC (DMG). This Emergency Action Plan (EAP) was prepared in accordance with 40 CFR § 257.73(a)(3) and covers the following Coal Combustion Residual (CCR) surface impoundment located at the site:

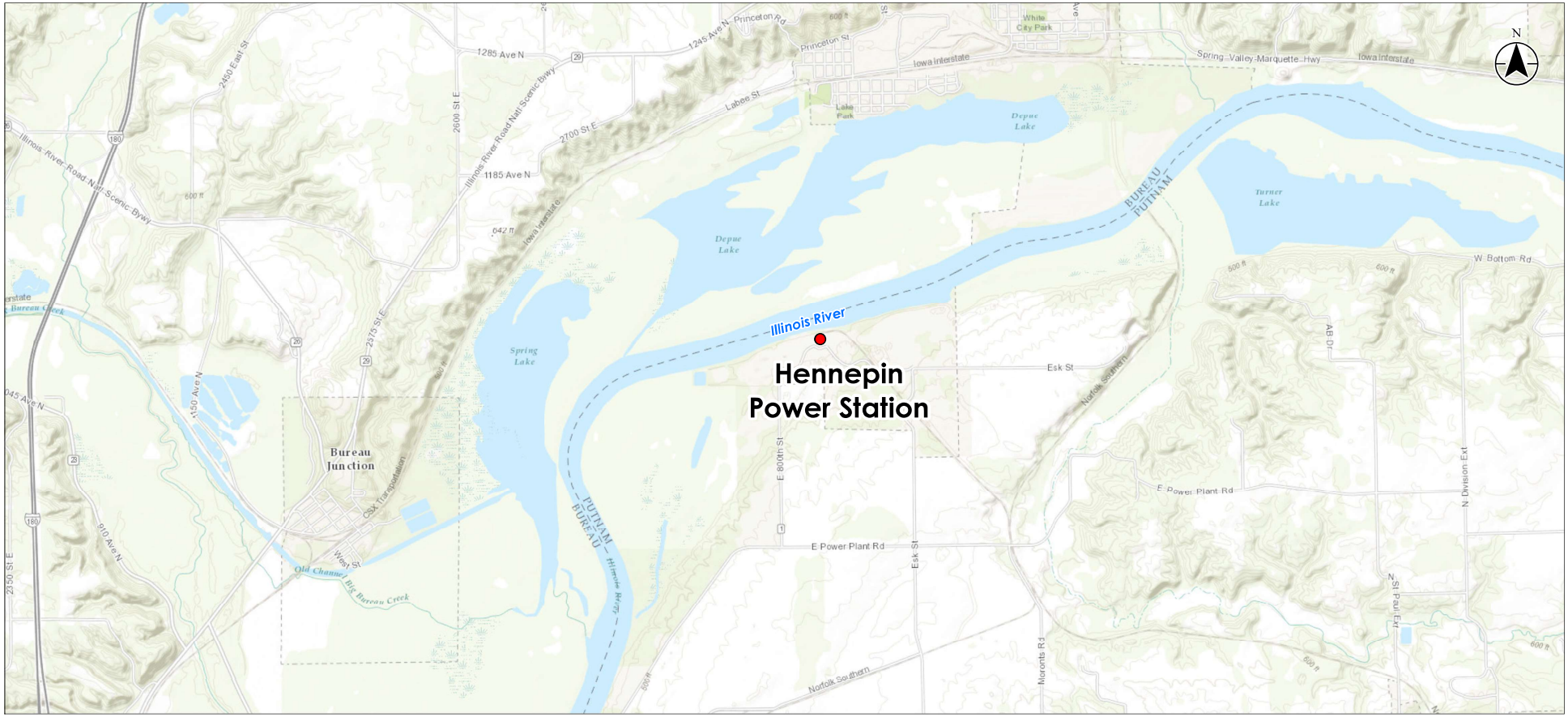
- East Ash Pond (NID # IL50363) (IEPA # W1550100002-05)
- West Ash Pond (IEPA # W1550100002-01)
- Ash Ponds 2 and 4 (IEPA # W1550100002-04, # W1550100002-07)

The location of the impoundment is shown in Figure 1-2. Section 6 of this EAP includes a description of the impoundment.

The purpose of this Emergency Action Plan (EAP) is to:

1. Safeguard the lives, as well as to reduce property damage, of citizens living within potential downstream flood inundation areas of the CCR impoundment and related facilities at the Hennepin Power Plant.
2. Define the events or circumstances involving the CCR impoundment and related facilities at the Hennepin Power Plant that represent atypical operating conditions that pose a safety hazard or emergency and how to identify those conditions.
3. Define responsible persons, their responsibilities, and notification procedures in the event of a safety emergency.
4. Provide contact information of emergency responders.
5. Identify emergency actions in the event of a potential or imminent failure of the impoundment.
6. Identify the downstream area that would be affected by failure of the impoundment.
7. Provide for effective facility surveillance, prompt notification to local Emergency Management Agencies, citizen warning and notification responses, and preparation should an emergency occur.

Information provided by DMG was utilized and relied upon in preparation of this report.



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Stantec DYNEGY

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Longitude: -89.303883	Technical Review by CI on 2017-04-12
Putnam County, Illinois	Independent Review by MT on 2017-04-12

Client/Project

Hennepin Power Station
Emergency Action Plan

Figure No.

1-1

Title

Location Map

Notes

1. Coordinate System: NAD 1983 StatePlane Illinois West FIPS 1202 Feet
2. Aerial Source: 2015 NAIP Imagery
3. Impoundment Boundaries Provided by Client (Dated 9/9/2015)

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Legend

CCR Surface Impoundment Boundary

0 1,000 Feet

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Notes

1. Coordinate System: NAD 1983 StatePlane Illinois West FIPS 1202 Feet
2. Aerial Source: 2015 NAIP Imagery
3. Impoundment Boundaries Provided by Client (Dated 9/9/2015)

Stantec

Project Location	175605019
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Longitude: -89.315035	Technical Review by CI on 2017-04-12
Putnam County, Illinois	Independent Review by MT on 2017-04-12

Client/Project

Hennepin Power Station
Emergency Action Plan

Figure No.

1-2

Title

CCR Impoundment

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2 COMMUNICATION

To facilitate understanding among everyone involved in implementing this EAP, four response levels are used to identify the condition of an impoundment. These are:

Response Levels:

- **Level 0:** Normal conditions and routine operations, including surveillance and initial investigation of unusual conditions and effects of storm events.
- **Level 1:** Potentially hazardous condition exists, requiring investigation and possible corrective action.
- **Level 2:** Potential failure situation is developing; possible mode of failure is being assessed; corrective measures are underway.
- **Level 3:** Failure is occurring or is imminent, public protective actions are required.

The 4-Step Incident Response Process is outlined in Figure 2-1 and described in detail in Appendix D. This should be used in conjunction with the Notification Flowchart (Figure 2-2) and EAP Decision Tree (Figure 2-3). Section 4 provides guidance tables for determining Response Levels and a table providing emergency actions to be taken given various situations. Table 2-1 lists contact information for the emergency responders.

Figure 2-1. Summary/Sequence of Tasks 4-Step Incident Response Process

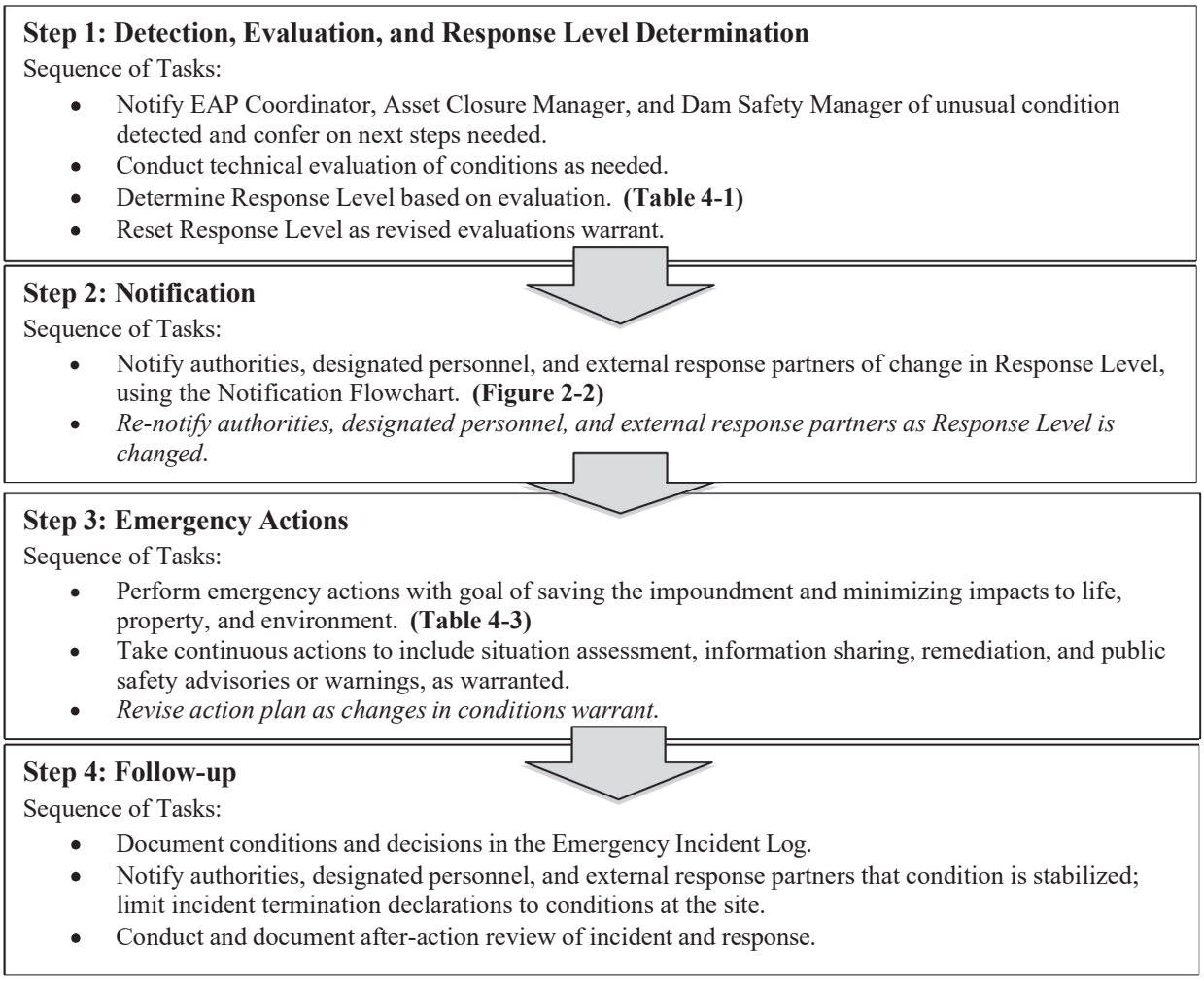

Figure 2-2. Notification Flowchart

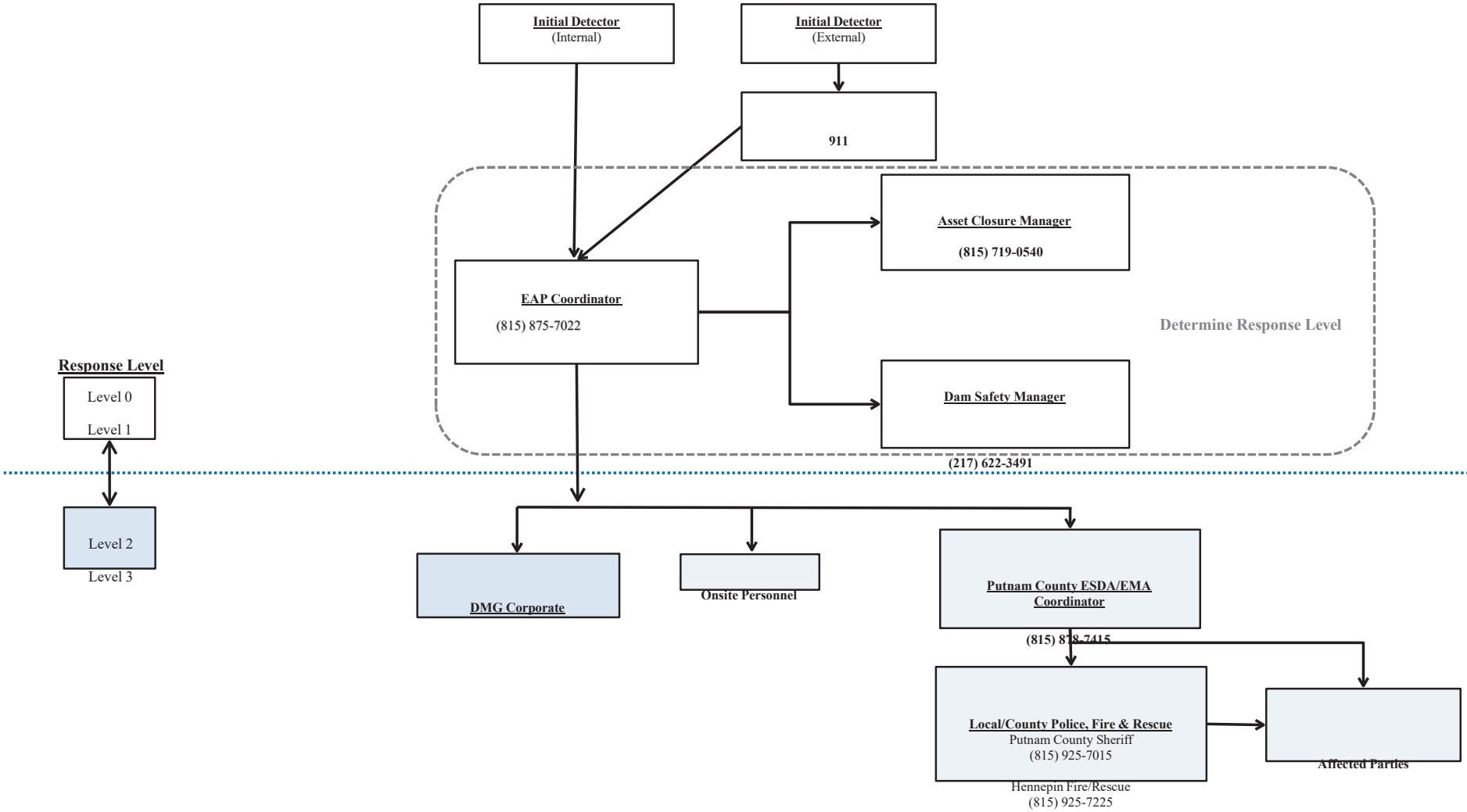

Figure 2-3. EAP Response Process Decision Tree

Note: At any given below, if failure is imminent or actively occurring **CALL 911 IMMEDIATELY** to notify emergency responders and then continue with process afterwards.

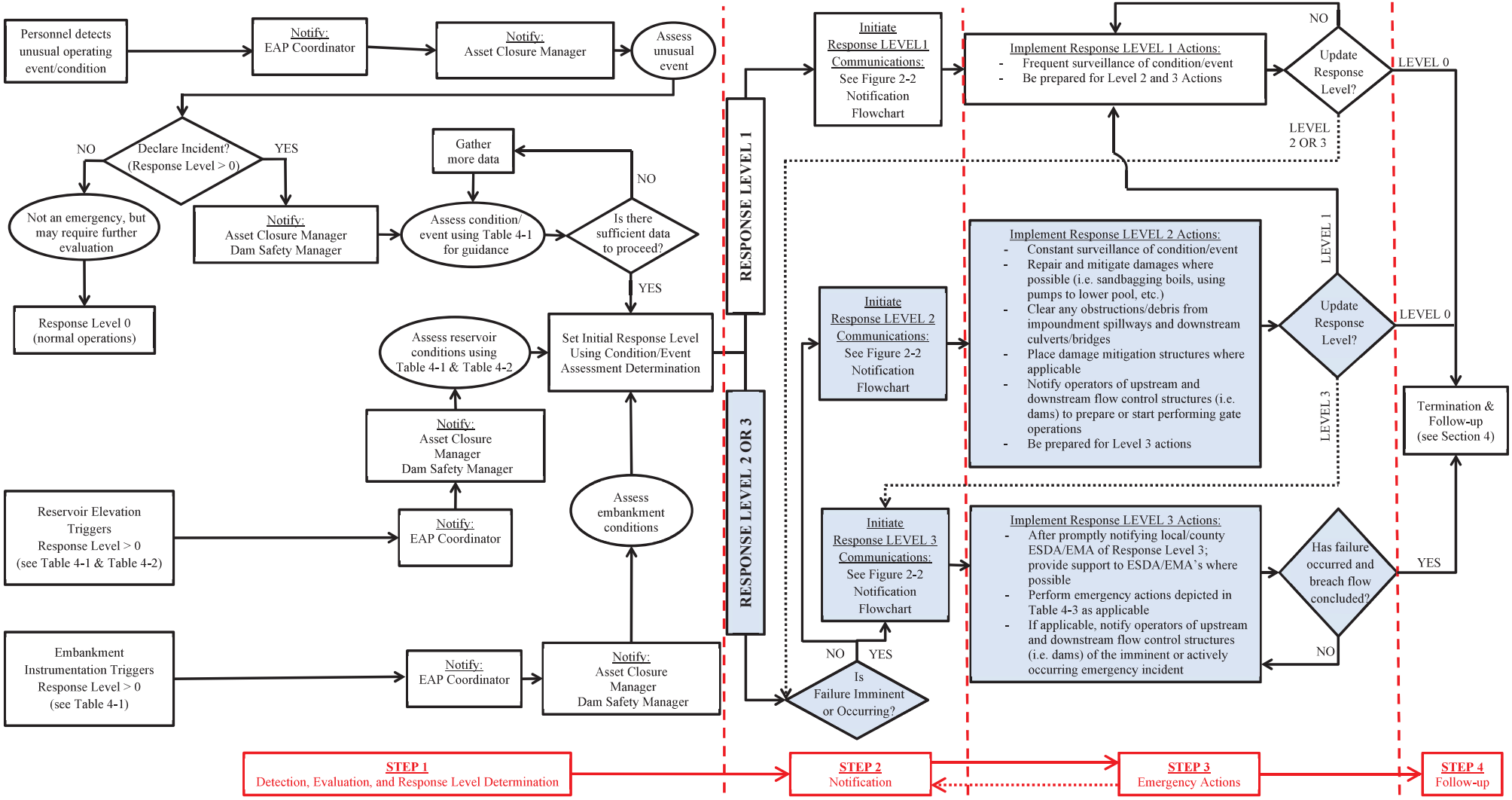

Table 2-1. EAP Emergency Responders

Position / Entity	Contact Information	
Internal Contacts		
Hennepin Power Plant	**Contact**	
Asset Closure Manager	(815) 719-0540	
EAP Coordinator	(815) 875-7022	
DMG Corporate Operations	**Contact**	
Dam Safety Manager	(217) 622-3491	
External Contacts		
Local/County ESDA/EMA, Police, & Fire	**Phone #**	**Alternate Phone #**
Putnam County 911 Emergency Communication Center	911	(815) 882-2635
Putnam County – ESDA/EMA	(815) 878-7415	(815) 925-3073
Putnam County –Sheriff Dept.	(815) 925-7015	(815) 925-7084
Village of Hennepin – Fire Dept.	(815) 925-7225	
State Emergency Management Agencies & Organizations	**Phone #**	**Alternate Phone #**
Illinois Conservation Police	(815) 587-5136	
Donnelley State Fish and Wildlife Area	(815) 447-2353	

3 EAP ROLES AND RESPONSIBILITIES

Table 3-1 provides a summary of the EAP roles during an emergency event.

Table 3-1. Summary of EAP Roles

Entity	Role Description
DMG Emergency Response Team (ERT)	**ERT:** DMG personnel responsible for EAP implementation, distribution, updates/maintenance, and training activities. The *ERT* is comprised of the following roles; 1. **DMG Corporate:** DMG corporate entity, committee, team, or position with relevant responsibility for a given generating power plant. 2. **Asset Closure Management:** Personnel responsible for day-to-day operation and management of the Power Plant. 3. **Dam Safety Manager:** Personnel that is most knowledgeable about the design and technical operation of facilities at a given power plant. 4. **EAP Coordinator:** Personnel responsible for implementing the EAP and associated activities **Emergency Event – EAP Responsibilities** 1. Respond to emergencies at the Power Plant. 2. Verify and assess emergency conditions. 3. Notify and coordinate as appropriate with participating emergency services disaster agencies or emergency management agencies (ESDA/EMA's), emergency responders, regulatory agencies, and all other entities involved or affected by this EAP. 4. Take corrective action at the Power Plant. 5. Declare termination of emergencies at the Power Plant.
Putnam County ESDA/EMA	1. Receive Response Level reports from *DMG Corporate* through *EAP Coordinator*. 2. Coordinate emergency response activities with local authorities: police, fire and rescue, etc. 3. Coordinate notification of public as necessary through established channels, which may include door-to-door contact. 4. Coordinate notification activities to affected parties within inundation areas. 5. Evaluate risk to areas beyond the inundation areas, communicate needs to the *DMG Corporate* and/or *EAP Coordinator*, and coordinate aid as appropriate. 6. Responsible for declaring termination of an emergency condition off-site upon receiving notification of an emergency status termination from the *DMG Corporate*. 7. If necessary, coordinate with *State ESDA/EMA*.
Village of Hennepin Police, Fire, and Rescue	1. Receive alert status reports from the *ERT* or the *County ESDA/EMA*. 2. If necessary, notify affected parties and general public within inundation areas (see Section 7). 3. Render assistance to Putnam County ESDA/EMA, as necessary. 4. Render assistance to *DMG Corporate* and *Power Plant Management*, as necessary.
Putnam County Police, Fire and Rescue, and Emergency Services	1. Receive alert status reports from the *ERT* or the *County ESDA/EMA*. 2. If necessary, notify affected parties within the inundation area. 3. Provide mutual aid to other affected areas, if requested and able.

4 EAP RESPONSE

The 4-Step Incident Response Process is shown in Figure 2-1. The Decision Tree shown in Figure 2-3 provides a flowchart for the various elements of the response process. Upon reaching Step 4 of the response process (termination and follow-up), the EAP Coordinator is responsible for notifying the ESDA/EMA's that the condition of the dam/impoundment has been stabilized. Additional details about the EAP response process can be found in Appendix D. The purpose of this section is to provide specific information that can be used during a response. This information is provided in the following tables:

- Table 4-1 provides guidance for determining the response level.
- Table 4-2 provides impoundment pool level trigger elevations.
- Table 4-3 lists emergency actions to be taken depending on the situation.

Table 4-1. Guidance for Determining the Response Level

Event	Situation	Response Level
Spillway flow (See Table 4-2 for relevant elevations)	Primary spillway flow is not causing active erosion.	Level 0
	Impoundment water surface elevation is at or above auxiliary spillway crest elevation (if equipped). No active erosion caused by spillway flow.	Level 1
	Spillway flow actively causing minor erosion that is not threatening the control section or dam/impoundment stability.	Level 2
	Spillway flow that could result in flooding of people downstream if the reservoir level continues to rise.	Level 2
	Abnormal operation of the spillway system due to blockage or damage that could lead to flooding.	Level 2
	Spillway flow actively eroding the soil around the spillway that is threatening the control section (e.g., undermining) or dam/impoundment stability.	Level 3
	Spillway flow that is flooding people downstream.	Level 3
Embankment overtopping (See Table 4-2 for relevant elevations)	Impoundment water surface elevation at or below typical normal pool fluctuation elevation.	Level 0
	Impoundment water surface elevation above typical normal pool fluctuation elevation.	Level 1
	Impoundment water surface elevation above high normal pool fluctuation elevation.	Level 2
	Impoundment water surface elevation at or above embankment crest elevation.	Level 3
Seepage	New seepage areas in or near the dam/impoundment with clear flow.	Level 1
	New seepage areas with cloudy discharge or increasing flow rate.	Level 2
	Heavy seepage with active erosion, muddy flow, and/or sand boils.	Level 3
Sinkholes	Observation of new sinkhole in impoundment area or on embankment.	Level 2
	Rapidly enlarging sinkhole and/or whirlpool in the impoundment.	Level 3
	New cracks in the embankment greater than ¼ inch wide without seepage.	Level 1

Table 4-1. Guidance for Determining the Response Level

Event	Situation	Response Level
Embankment cracking	Any crack in the embankment with seepage.	Level 2
	Enlarging cracks with muddy seepage.	Level 3
Embankment movement	Visual signs of movement/slippage of the embankment slope.	Level 1
	Detectable active movement/slippage of the embankment slope or other related effects (tension cracking, bulges/heaves, etc.) that could threaten the integrity of the embankment.	Level 2
	Sudden or rapidly proceeding slides of the embankment slopes.	Level 3
Embankment Monitoring Equipment (piezometers, inclinometers, surface displacement mounts, etc.)	Instrumentation readings beyond historic normal.	Level 1
	Instrumentation readings indicate the embankment is susceptible to failure.	Level 2
	Instrumentation readings indicate embankment is at threshold of failure or is currently failing.	Level 3
Earthquake or another event	Measurable earthquake felt or reported on or within 100 miles of the impoundment.	Level 1
	Earthquake or other event resulting in visible damage to the impoundment or appurtenances.	Level 2
	Earthquake or other event resulting in uncontrolled release of water or materials from the impoundment.	Level 3
Security threat	Verified bomb threat or other physical threat that, if carried out, could result in damage to the impoundment.	Level 2
	Detonated bomb or other physical damage that has resulted in damage to the impoundment or appurtenances.	Level 3
Sabotage/ vandalism	Damage to impoundment or appurtenance with no impact to the functioning of the impoundment.	Level 1
	Modification to the impoundment or appurtenances that could adversely impact the functioning of the impoundment. This would include unauthorized operation of spillway facilities.	Level 2
	Damage to impoundment or appurtenances that has resulted in seepage flow.	Level 2
	Damage to impoundment or appurtenances that has resulted in uncontrolled water release.	Level 3

Table 4-2. Impoundment Trigger Elevations

Impoundment	Embankment Crest Elevation [1]	Auxiliary Spillway Crest Elevation	Normal Pool Fluctuation	
			Typical	High
East Ash Pond	494.0 ft.	Not Applicable	490.4 ft.	492.2

Notes:
1 2015 Hennepin Topography, prepared by Weaver Consultants Group, December 2015

Table 4-3. Step 3: Emergency Actions

Condition	Description of Condition	Action to be Taken
High Water Level/ Large Spillway Release	See Table 4-1 and Table 4-2 for elevations and triggering water levels associated with the impoundments and spillways covered by this EAP.	1. Assess cause of increased reservoir stage, especially during fair weather conditions. 2. Determine Response Level. 3. Make proper notifications as outlined in the Figure 2-2 Notification Flowchart. 4. Perform additional tasks as determined through consultation with the ERT. 5. Make notifications if condition worsens such that downstream flooding is imminent. **Response Level 0**: require enhanced surveillance 3 times per day **Response Level 1**: contact internal chain of command and external response partners as necessary; inspect impoundment minimum 1 time per hour **Response Level 2**: contact internal chain of command; notify ESDA/EMA's and notify external response partners. ESDA/EMA's notify affected parties. **Response Level 3**: contact internal chain of command; notify ESDA/EMA's and notify external response partners. ESDA/EMA's notify affected parties of emergency incident.
Seepage	Localized new seepage or boil(s) observed along downstream face / toe of earthen embankment with muddy discharge and increasing but controllable discharge of water.	1. Measure and record feature dimensions, approximate flow rate, and relative location to existing surface features. Take photos. Document location on a site plan and in inspection notes. 2. Determine Response Level. 3. Make proper notifications as outlined in the Figure 2-2 Notification Flowchart 4. ERT (with Dam Safety Engineer as lead) to determine mitigation actions. The following actions may apply: a) Place a ring of sandbags with a weir at the top towards the natural drainage path to monitor flow rate. If boil becomes too large to sandbag, place a blanket filter over the area using non-woven filter fabric and pea gravel. Attempt to contain flow in such a manner (without performing any excavations) that flow rates can be measured. Stockpile gravel and sand fill for later use, if necessary. b) Inspect the embankment and collect piezometer, water level and seepage flow data daily unless otherwise instructed by the Engineer. Record any changes of conditions. Carefully observe embankment for signs of depressions, seepage, sinkholes, cracking or movement. c) Maintain continuous monitoring of feature. Record measured flow rate and any changes of condition, including presence or absence of muddy discharge.

Table 4-3. Step 3: Emergency Actions

Condition	Description of Condition	Action to be Taken
		5. Make notifications as outlined in the lower portion of the Notification Flowchart (Figure 2-2) if condition worsens such that failure is imminent.
Sabotage and Miscellaneous Other Issues	Criminal action with significant damage to embankment or structures where significant repairs are required and the integrity of the facility is compromised—condition appears stable with time.	1. Contact law enforcement authorities and restrict all access (except emergency responders) to impoundment. Restrict traffic on embankment crest to essential emergency operations only. 2. Determine Response Level. 3. Make internal notifications as outlined in the upper portion of the Notification Flowchart (Figure 2-2). 4. In conjunction with the Dam Safety Manager, assess extent of damage and visually inspect entire embankment and ancillary structures for additional less obvious damage. Based on inspection results, confirm if extent of damage to various components of the impoundment warrants a revised Response Level and additional notifications. 5. Perform additional tasks as directed by the ERT. 6. Make notifications if conditions worsen.
Embankment Deformation	**Cracks:** New longitudinal (along the embankment) or transverse (across the embankment) cracks more than 6 inches deep or more than 3 inches wide or increasing with time. New concave cracks on or near the embankment crest associated with slope movement.	1. Measure and record feature dimensions, approximate flow rate, and relative location to existing surface features. Take photos. Document location on a site plan and in inspection notes. 2. Restrict traffic on embankment crest to essential emergency operations only. 3. Determine Response Level. 4. Make notifications as outlined in the Figure 2-2 Notification Flowchart. 5. ERT (with Dam Safety Manager as lead) to determine mitigation actions. The following actions may apply: a) Place buttress fill against base of slope immediately below surface feature. Stockpile additional fill. b) Place sandbags as necessary around crack area to divert any storm water runoff from flowing into crack(s). 6. As directed by the Dam Safety Manager, additional inspection and monitoring of the dam may be required. Items may include inspect the dam on a schedule determined by the engineers; collect piezometer and water level data; and record any changes of condition. Carefully observe dam for signs of depressions, seepage, sinkholes, cracking or movement. 7. Make notifications as outlined in the Figure 2-2 Notification Flowchart if conditions worsen such that failure is imminent.
Embankment Deformation (cont.)	**Slides / Erosion:** Deep slide / erosion (greater than 2 feet deep) on the embankment that may also extend beyond the embankment toe but does not encroach onto the embankment crest and appears stable with time.	1. Measure and record feature dimensions, approximate flow rate, and relative location to existing surface features. Take photos. Document location on a site plan and in inspection report. 2. Restrict traffic on embankment crest to essential emergency operations only. 3. Determine the Response Level. 4. Make notifications as outlined in the Figure 2-2 Notification Flowchart. 5. ERT (with Dam Safety Manager as lead) to determine mitigation actions. Additional actions may include the following items. a) Place sandbags as necessary around slide area to divert any storm water runoff from flowing into slide(s). b) Increase inspections of the dam; collect piezometer and water level data; and record any changes of condition. During inspections, carefully observe dam for signs of depressions, seepage, sinkholes, cracking or movement.

Table 4-3. Step 3: Emergency Actions

Condition	Description of Condition	Action to be Taken
		6. Make notifications as outlined in the Figure 2-2 Notification Flowchart if conditions worsen such that failure is imminent.
	Sinkholes: Small depression observed on the embankment or within 50 feet of the embankment toe that is less than 5 feet deep and 30 feet wide or which is increasing with time.	1. Slowly open drain gates to lower pool elevation. 2. Measure and record feature dimensions, approximate flow rate, and relative location to existing surface features. Take photos. Document location on a site plan and in inspection notes. 3. Restrict traffic on embankment crest to essential emergency operations only. 4. Determine Response Level. 5. Make notifications as outlined in the Figure 2-2 Notification Flowchart. 6. ERT (with Dam Safety Engineer as lead) to determine mitigation actions. Additional actions may include the following items: a) Backfill the depression with relatively clean earth fill (free of organic materials) generally even with surrounding grade and slightly mounded (6 to 12 inches higher) in the center to shed storm water away from the depression. Stockpile additional fill. b) Increase inspections of the dam; collect piezometer and water level data daily unless otherwise instructed by engineer; and record any changes of condition. Carefully observe dam for signs of depressions, seepage, sinkholes, cracking or movement. 7. Make notifications as outlined in the Figure 2-2 Notification Flowchart if conditions worsen such that failure is imminent.
Gate Malfunction or Failure	Sluice gate damaged structurally (sabotage, debris, etc.) with uncontrolled release of water at a constant volume. Condition appears stable.	1. Close any other gates, if open. 2. Determine Response Level. 3. Make notifications as outlined in the Figure 2-2 Notification Flowchart. 4. Obtain instructions from the Engineer to determine if there are other methods to stop or slow down the flow of water. 5. If conditions worsen such that failure is imminent, make notifications as outlined in the lower portion of the Figure 2-2 Notification Flowchart.

5 PREPAREDNESS

The intent of this section is to provide information that will be utilized during a response. Established emergency supplies and locations, suppliers, and equipment are provided in Table 5-1. Suppliers contact information is listed in Table 5-2.

A coordination meeting shall be conducted annually between representatives of DMG Midwest Generation, LLC, and local emergency responders. This meeting may be in the form of a face-to-face meeting, tabletop exercise, or additional training regarding the EAP.

Table 5-1. Emergency Supplies and Equipment

Item	On-site (Yes/No/Occasionally)	Remarks
Flashlights	Yes	Typically, at Hennepin Power Plant maintenance facility, contact shift supervisor location(s).
Generator		
Extension Cords		
Fire extinguishers		
Floodlights		
Backhoe	No	For rental equipment contact: • Gensini Excavating, Inc. (815) 925-7050 • Central Illinois Equipment Sales, Inc. (815) 687-7022
Dozer	No	For rental equipment contact: • Gensini Excavating, Inc. (815) 925-7050 • Central Illinois Equipment Sales, Inc. (815) 687-7022
Large Equipment (Rental – including excavating equipment, pumps, lighting)	Occasionally	Portable lighting, backhoe and bobcat available on-site. Contact shift supervisor for availability and location(s). For rental equipment contact: • Gensini Excavating, Inc. (815) 925-7050 • Central Illinois Equipment Sales, Inc. (815) 687-7022
Dump Truck	No	Old one may be available on site, contact shift supervisor for location(s). For rental equipment contact: • Gensini Excavating, Inc. (815) 925-7050 • Illinois Truck & Equipment (815) 941-1900
Pump and Hoses	Yes	3” and 2” trash pumps available. Contact Closure Manager for location(s). For additional pumps/hoses contact: • United Rentals (815) 223-7962
Sandbags and Sand	Occasionally	Contact Closure Manager for location(s). For additional materials contact: • Home Depot (815) 224-2968 • Menards (815) 224-5621 • Tri-Con Material (815) 872-3206
Fill (Stone, aggregate, sand)	Yes	Quarry next door and some fill on-site. Contact Closure Manager for location(s). For additional materials contact: • Tri-Con Material (815) 872-3206 • Western Sand & Gravel Co. (815) 664-2341
Concrete/grout	No	To obtain materials contact: • Western Sand & Gravel Co. (815) 664-2341
Geotextile Filter Fabric	No	To obtain materials contact: • Home Depot (815) 224-2968 • Menards (815) 224-5621
Plastic Sheeting	No	To obtain materials contact: • Home Depot (815) 224-2968 • Menards (815) 224-5621
Rope	Yes	Contact Closure Manager for location(s).
Personal Flotation Devices	Yes	Contact Closure Manager for location(s).

Table 5-2. Supplier Addresses

Supplier	Distance from Site (miles)	Address
Gensini Excavating, Inc.	7	8100 Deer Drive, Hennepin IL
Grassers True Value	15	404 W Main Street, McNabb, IL
R.P Lumber Company	18	1315 N Main Street, Princeton, IL
Menards	17	5353 Mahoney Drive, Peru, IL
Home Depot	17	4242 Venture Drive, Peru, IL
Tri-Con Material	3	13559 Prairie Industrial Pkwy, Hennepin, IL
Western Sand & Gravel Company	11	400 Old N Road, Spring Valley, IL
Central Illinois Equipment Sales, Inc	5	1254 Old Hwy 26, Hennepin, IL
United Rentals	15	2901 Peoria Street, Peru, IL
Illinois Truck and Equipment	60	320 Briscoe Drive, Morris, IL

6 FACILITY/IMPOUNDMENT DESCRIPTION

The impoundments included in this EAP are described as follows and illustrated in Figure 1-2. Table 6-1 contains additional geometric details for the only open and active impoundment.

Hennepin Power Plant is located in Hennepin, Illinois along the east bank of the Illinois River in Putnam County approximately 100 miles southwest of Chicago.

The East Ash Pond is located east of the Hennepin Power Plant. As described in a dam assessment report prepared for the Environmental Protection Agency in 2011, East Ash Pond was originally constructed by reshaping an area that was an existing gravel pit to form the current surface impoundment. The gravel pit at the time of construction was described to be equal to or greater than the maximum elevation proposed for the impoundment. The pond functions as a sedimentation basin for coal combustion wastes, including bottom ash, fly ash, miscellaneous power plant low volume waste, and coal pile runoff streams which are piped from the plant and discharged into the impoundment. Flow through East Ash Pond is discharged into the Leachate Pond to the northeast through an 18-inch diameter reinforced concrete pipe outlet structure.

Ash Ponds 2 and 4 are located adjacent to the East Ash Pond and were closed.

The West Ash Pond is located along the west side of the station. Like Ash Ponds 2 and 4, the West Ash Pond has been closed. Closure of the West Ash Pond included closing the Old West Polishing Pond by removing, which removed and placed all ash contents within the closed footprint of the West Ash Pond.

Table 6-1. Power Plant Impoundment Characteristics

Feature/Parameter	East Ash Pond
Maximum Embankment Height[2]	32 ft.
Length of Dam[1]	950 ft.
Crest Width[1]	25 ft.
Crest Elevation[1]	494.0 ft.
Reservoir Area at Top of Dam[1]	9.9 acres
Storage Capacity at Top of Dam[1]	49.7 acre-ft.
Primary Spillway Type[2]	18 in. dia. RCP
Primary Spillway Crest Elevation[1]	489.9 ft.
Storage Capacity at Primary Spillway Elevation[1]	23.4 acre-ft.
Reservoir Area at Normal Water Surface Elevation[1]	3.9 acres
Auxiliary Spillway Type	N/A
Auxiliary Spillway Crest Elevation	N/A

Notes:
1 2015 Hennepin Topography, prepared by Weaver Consultants Group, December 2015
2 USEPA Round 10 Dam Assessment Report, Hennepin Power Station, December 2012

7 BREACH INUNDATION MAP AND POTENTIAL IMPACTS

An inundation map for the East Ash Pond, West Ash Pond and Ash Ponds 2 and 4 potential breach scenarios is provided in this section. As indicated in Section 6, the West Ash Pond and Ash Ponds 2 and 4 have been closed and capped, as such those impoundments do not contain any free water. It is the Putnam County ESDA/EMA's responsibility to keep a current list of affected parties/properties to contact in the case of emergencies that result in Response Level 2 or 3. This list should encompass all properties within and adjacent to the probable inundation extents shown in the provided maps.

The methodology used to identify probable inundation extents for potential breach scenarios varied as a function of the impoundment size, location, surrounding topography, and surrounding structures/facilities/waterbodies.

The inundation extents for the ponds were determined by visual inspection using available topography and the failure description outlined in the Illinois DNR Dam Safety Emergency Response Procedure report, dated November 2005. This methodology was chosen as failure of the East Ash Pond would only result in water transfer to a secondary cell to the east, as all other sides are landlocked and essentially constructed at grade. If failure of this secondary cell also occurred, water would flow into the Illinois River. Although no structures would be impacted by such a failure, significant environmental impacts to the River and areas outside of utility owned property could occur.

The approximate inundation area is illustrated in Figure 7-1 through 7-3.

Legend

- Expected Breach Inundation Area
- CCR Surface Impoundment Boundary

0 500 Feet

1:5,000 (At original document size of 11x17)

Notes

1. Coordinate System: NAD 1983 StatePlane Illinois West FIPS 1202 Feet
2. Aerial Source: 2015 NAIP Imagery
3. Impoundment Boundaries Provided by Client (Dated 9/9/2015)

Disclaimer: Stantec assumes no responsibility for data supplied in electronic format. The recipient accepts full responsibility for verifying the accuracy and completeness of the data. The recipient releases Stantec, its officers, employees, consultants and agents, from any and all claims arising in any way from the content or provision of the data.

Stantec DYNEGY

Project Location
Latitude: 41.302685
Longitude: -89.303883
Putnam County, Illinois

175605019
Prepared by CI on 2017-04-03
Technical Review by CI on 2017-04-03
Independent Review by MT on 2017-04-03

Client/Project
Hennepin Power Station
Emergency Action Plan

Figure No.
7-1

Title
Inundation Map
East Ash Pond

V:\1734\active\175605019\resource\report\08_Hennepin\text\working\Hennepin_cap1_caps_s1_inundation_maps.mxd Revised: 2017-04-19 By: cole

Figure 7-2: Inundation Map for West Ash Pond

Figure 7-3: Inundation Map for Ash Pond 2 and 4

Attachment 3

HALEY & ALDRICH, INC.
6500 Rockside Road
Suite 200
Cleveland, OH 44131
216.739.0555

MEMORANDUM

12 October 2018
File No. 129788

TO: Vistra Energy
Vic Modeer, P.E.

FROM: Haley & Aldrich, Inc.
Neal P. Kochis, P.E.
Steven F. Putrich, P.E.

SUBJECT: CCR Rule Location Restrictions Evaluation – East Ash Pond
Hennepin Power Station
Hennepin, Illinois

Dynegy Midwest Generation, LLC (DMG) operates the coal-fired Hennepin Power Station (Plant) located near Hennepin, Illinois. The East Ash Pond (Unit) is an existing coal combustion residuals (CCR) surface impoundment. The U.S. Environmental Protection Agency's (EPA) rule entitled *Hazardous and Solid Waste Management System; Disposal of Coal Combustion Residuals from Electric Utilities*. 80 Fed. Reg. 21,302 (Apr. 17, 2015) (promulgating 40 CFR §257.61); 83 Fed. Reg. 36,435 (July 30, 2018) (amending 40 CFR §257.61)(Rule) has established technical requirements for CCR landfills and surface impoundments. This memorandum presents the results of the Haley & Aldrich, Inc. (Haley & Aldrich) evaluation of the Rule's five (5) location restriction criteria for existing CCR surface impoundments as related to the Unit.

LOCATION RESTRICTION EVALUATION – SUMMARY OF FINDINGS/CONCLUSIONS

Based on the completion of this evaluation, the East Ash Pond was found to satisfy four (4) of the Rule's five (5) location restriction criteria (wetlands, fault areas, seismic impact zone and unstable areas).

In summary:

- In the most restrictive location, the base of the Unit was determined to be less than 5.0 feet above the upper limit of the uppermost aquifer thus fails the separation criteria defined in §257.60(a).
- The Unit was determined not to be located in wetlands as per §257.61(a) and therefore, according to the Rule, the demonstration specified in §257.61 (a)(1) through (5) is not applicable.

- Based on the known available published geologic data and information reviewed, there are no identified active faults or fault damage zones mapped or reported within 200 feet of the Unit. Therefore, the Unit satisfies the location restriction criteria as presented in §257.62.
- The 2014 USGS Hazard Map raw data for the Unit indicates that the maximum expected horizontal acceleration for 2 percent probability of exceedance in 50 years is 0.07g. Accordingly, the Unit is not located in a seismic impact zone and a demonstration that the structural components have been designed to resist the maximum horizontal acceleration in lithified earth material for the site is not required.
- The Unit is not located in an area with poor foundation conditions, an area susceptible to mass movements, or an area with karst terrain. Accordingly, the site is not located in an Unstable Area and a demonstration that recognized and generally accepted good engineering practices have been incorporated into the design of the CCR unit to ensure that the integrity of the structural components will not be disrupted is not required.

MEMORANDUM ORGANIZATION

This memorandum provides location restriction evaluation summaries as separate independent sections with associated references at the end of each section and attachments, as needed, for each location restriction evaluation. Location restriction certifications for the Unit are provided under separate cover.

This memorandum is organized as follows:

SECTION 1.0 Location Restriction Criteria & East Ash Pond Unit Background
SECTION 2.0 Placement Above Uppermost Aquifer
SECTION 3.0 Wetlands
SECTION 4.0 Fault Areas
SECTION 5.0 Seismic Impact Zone
SECTION 6.0 Unstable Areas
SECTION 7.0 Limitations

FIGURE 1 – Project Location Map

ATTACHMENTS 1 THROUGH 5 [Location Restriction Supporting Documents]

SECTION 1.0 Location Restriction Criteria & East Ash Pond Unit Background

LOCATION RESTRICTION CRITERIA

The Rule establishes location restriction criteria for CCR units in §257.60 through §257.64 as follows:

§257.60 – Placement above the Uppermost Aquifer
§257.61 - Wetlands
§257.62 – Fault Areas
§257.63 – Seismic Impact Zone
§257.64 – Unstable Areas

The Rule requires that the CCR Unit owner or operator certify by October 17, 2018 that the CCR unit meets the specified location restriction requirements.

CCR UNIT BACKGROUND

The East Ash Pond is being used to store and dispose bottom ash, fly ash, and other non-CCR waste and to clarify process water prior to discharge in accordance with the Plant's National Pollutant Discharge Elimination System (NPDES) permit. The location of the East Ash Pond is shown in **Figure 1.**

Section 2.0 Placement Above Uppermost Aquifer

EVALUATION

The "upper limit of the uppermost aquifer" and "base" of unit are described/defined in the Rule's preamble (80 Fed. Reg.at page 21362) and the definitions section (§ 257.53) of the Rule ("uppermost aquifer").

Upper Limit of Uppermost Aquifer

O'Brien & Gere (OB&G) evaluated groundwater conditions and prepared a Top of Uppermost Aquifer contour map (TOA Map) figure dated 17 October 2017 (see **Attachment 1**). Based on the provided OB&G documentation, the upper limit of the uppermost aquifer is a gradually sloping surface generally towards the interior of the Unit ranging in elevation from 450.5+/- feet to 451.5+/- feet across the base of the Unit.

Base of Unit

Haley & Aldrich reviewed available information provided by Vistra including historic record drawings and design drawings and identified a Illinois Power Company's Plans for 1995 Ash Facility Hennepin Power Station drawing CE-HEN1-C7-5 dated 21 December 1998 (IPC Drawing) that provided well documented information regarding the base of the unit (see **Attachment 1**). The lowest elevation in the base of the unit (at the outlet) is shown at 454.5+/- feet.

CONCLUSION/SEPARATION BETWEEN UPPERMOST AQUIFER AND BASE OF UNIT

When separation distances were estimated between the OB&G TOA Map and the elevations in the IPC Drawing, the resulting minimum separation was determined to be less than 5.0 feet and, therefore, does not satisfy the minimum separation requirement of §257.60(a) of the Rule.

Section 3.0 Wetlands

EVALUATION

Wetlands are defined in §257.61(a) of the Rule via reference to 40 CFR §232.2.

To determine if the Unit is located in wetlands, publicly available data (i.e., the U.S. Fish and Wildlife Service's (USFWS's) National Wetland Inventory (NWI) mapping) was reviewed by Haley & Aldrich and a site-specific wetland and stream delineation was conducted by AECOM in areas surrounding the Unit. A Waters of the U.S. Assessment report, prepared by AECOM (see **Attachment 2**), provides information about the size, location, and types of wetlands and streams identified. Haley & Aldrich reviewed this report and confirmed that the wetland and stream delineation was conducted in accordance with the U.S. Army Corps of Engineers (USACE's) *Corps of Engineers Wetlands Delineation Manual* (Environmental Laboratory, 1987) and the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Midwest Region (Version 2.0)* (USACE, 2010). The on-site wetland and stream delineation appears to have been conducted in a manner consistent with the level or care and skill ordinarily exercised by professional consultants. All of the above referenced activities are in conformance with CCR Rule section §257.61(a).

Wetland and Stream Delineation

AECOM biologists conducted a wetland and stream delineation at Vistra's Hennepin Power Station on October 8, 2015. AECOM surveyed a 250-foot buffer around the Unit.

AECOM did not identify any wetlands within the survey area surrounding the Unit.

We have reviewed current 0.5-meter aerial imagery (2017) and received confirmation from DMG that overall site conditions have not substantially changed since completion of the wetland and stream delineation performed by AECOM that would noticeably affect the reported field assessments.

NWI Mapping

The USFWS's NWI mapping does not indicate substantial areas of potential wetlands outside of the areas delineated by AECOM within the survey buffers (**Figure 1** in **Attachment 2**). One relatively small areas of potential excavated, intermittently exposed unconsolidated bottom (PUBGx) is located west of the Unit.

CONCLUSION

Haley & Aldrich's analysis of previous field assessments and NWI mapping indicates no wetlands are present adjacent to the Unit. The Unit is not contained within any wetland system or complex. As a result, Haley & Aldrich finds that the Unit is not located in wetlands as per §257.61(a) and therefore, the demonstration specified in §257.61 (a)(1) through (5) is not applicable to this location restriction evaluation.

REFERENCES

1. AECOM. 2016. *Waters of the U.S. Assessment*. Hennepin Power Station, 13498 E 800th Street, Hennepin, IL 61327.

2. Environmental Laboratory. 1987. *Corps of Engineers Wetlands Delineation Manual*, Technical Report Y-87-1, U.S. Army Engineer Waterways Experiment Station, Vicksburg, MS.

3. U.S. Army Corps of Engineers. 2010. *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Midwest Region (Version 2.0)*, ed. J.S. Wakeley, R.W. Lickvar, and C.V. Noble. ERDC/EL TR-10-16. U.S. Army Corps of Engineers Research and Development Center. Vicksburg, MS.

4. U.S. Fish and Wildlife Service. 2018. *National Wetlands Inventory website*, U.S. Department of the Interior, Fish and Wildlife Service, Washington D.C. Available at: https://www.fws.gov/wetlands/data/Mapper.html

Section 4.0 Fault Areas

EVALUATION

Haley & Aldrich evaluated the potential for the existence of Rule-defined faults in proximity to the East Ash Pond based on publicly available existing data and information. Haley & Aldrich reviewed publicly available published data and information including; geologic maps, seismic analysis maps and tools published by the United States Geological Survey (USGS), the Illinois State Geological Survey (ISGS), and others. Haley & Aldrich also contacted Mr. Robert Bauer with the ISGS.

Earthquakes in Illinois appear to be associated with deeply buried Precambrian faults. Based on communication with Mr. Bauer, there are no reported Holocene faults in the region near the Hennepin Power Station (Bauer, 2018). The *Map Showing Major Structural Features of the Illinois Basin* (Morse, et. al, 2000) does not depict any known faults within 200 feet of the East Ash Pond. Similarly, the USGS Quaternary Fault and Fold Database (USGS Database) does not show any Quaternary faults within 200 feet of the East Ash Pond. The USGS Database indicates that the East Ash Pond is located approximately 81 miles north of the Wabash Valley liquefaction features. There is no known Quaternary surface rupture on faults in the Wabash Valley region.

The nearest known mapped faults are a series of four unnamed faults associated with the Troy Grove Dome, located approximately 11 miles northeast of the East Ash Pond. The four east-west trending unnamed faults intersect the Troy Grove Dome, which is an elongated dome measuring approximately 5 miles long and 3 miles wide (Buschbach and Bond, 1967). There are no known available records indicating movement on the unnamed faults within the Quaternary period.

CONCLUSIONS

The nearest known mapped faults to the Hennepin Power Station East Ash Pond are four unnamed faults associated with the Troy Grove Dome, which are located approximately 11 miles to the northeast. No known data or information are available regarding recent activity on these faults within the Quaternary period. The distance to the known mapped faults exceeds the 200-foot distance prescribed in the Rule.

Based on the known available published geologic data and information reviewed, there are no identified active faults or fault damage zones mapped or reported within 200 feet of the Unit. Therefore, the Unit satisfies the location restriction criteria as presented in §257.62.

REFERENCES

1. Bauer, Robert, 2018. Personal Communication. May.
2. Buschbach, T.C. and D.C. Bond, 1967. Underground Storage of Natural Gas in Illinois – 1967. State of Illinois Department of Registration and Education, Illinois State Geological Survey, Illinois Petroleum 86.
3. Morse, David G., Nancy R. Hasenmueller, and Brandon C. Nuttal, 2000. Map Showing Major Structural Features of the Illinois Basin. Illinois Basin Consortium, Gas Research Institute-00/0068, Illinois Basin Consortium Study 4 Plate 1.
4. United States Geological Survey, 2018. Quaternary Fault and Fold Database of the United States: U.S. Geological Survey website, http://earthquakes.usgs.gov/hazards/qfaults, accessed 08/22/2018.

Section 5.0 Seismic Impact Zone

EVALUATION

The terms "Maximum Horizontal Acceleration in Lithified Earth Materials", "Seismic Impact Zone" and "Structural Components" are defined in §257.52 of the Rule.

To determine if the Unit is in a seismic impact zone, the 2014 U.S. Geological Survey (USGS) Hazard Map[1] was reviewed. The map displays the earthquake ground motions for 2 percent probability of exceedance in 50 years, which are derived from seismic hazard curves calculated on a grid system of sites across the United States that describe the annual frequency of exceeding a set of ground motions. The 2014 USGS Hazard Map raw data was plotted relative to the site location and a peak ground acceleration established (see **Calculations** in **Attachment 4**). The plotted data indicates that the maximum expected horizontal acceleration for 2 percent probability of exceedance in 50 years is 0.07g at the Unit.

CONCLUSION

The results of our evaluation indicate that the maximum expected horizontal acceleration at the Hennepin Power Station East Ash Pond with a 2 percent probability of exceedance in 50 years is less than 0.10g. Accordingly, the Unit is not located in a seismic impact zone and a demonstration that the structural components have been designed to resist the maximum horizontal acceleration in lithified earth material for the Unit is not required.

REFERENCES

1. U.S. Geological Survey, 2014. Earthquake Hazards Program: U.S. Seismic Design Maps, 2014 Long-Term Model, https://earthquake.usgs.gov/static/lfs/nshm/conterminous/2014/data/.

[1] At the time that this demonstration was performed, the 2014 USGS Hazard Maps were the most current set of maps published by USGS.

Section 6.0 Unstable Areas

EVALUATION

The terms “Structural Components”, “Unstable Area” and “Areas Susceptible to Mass Movement” are defined in §257.53 of the Rule.

To determine if the Unit is located in an Unstable Area, publicly available information was reviewed from the U.S. Geological Survey (USGS), Illinois Department of Natural Resources and Illinois State Geological Survey (ISGS). Existing test boring logs at the site were also reviewed to evaluate subsurface soil and groundwater conditions.

Evaluation of on-site or local soil conditions that may result in significant differential settling

Site-specific soil conditions that can contribute to differential settlement typically include soft/loose foundation soils, unstable slopes, and foundation soils that are susceptible to liquefaction. Subsurface explorations logs show the Unit is underlain by coarse-grained Alluvial deposits that generally consist of medium dense to very dense GRAVEL with varying amounts of silt and clay, silty SAND with varying amounts of gravel, and gravelly lean CLAY. Test borings performed at the Unit did not encounter bedrock and were drilled to depths of 41.5 ft (approximate El. 453) below ground surface.

For liquefaction to occur, soils must generally be coarse-grained and have a high level of saturation (i.e. – below the water table). As described above, coarse-grained soils are located below the impoundment. An evaluation of the soils was performed by AECOM and it was determined that they did not contain any layers that were susceptible to liquefaction, therefore a liquefication analysis was not performed (AECOM, 2016).

Evaluation of on-site or local geologic or geomorphologic features

According to the USGS Karst Map, the Plant is not in a karst area. In addition, the ISGS map of karst regions shows areas of karst landscape in Illinois, and none of these areas are at or near the Plant **(Attachment 5).** Accordingly, it is our opinion that the Unit is not located in an area of karst terrain.

To evaluate the susceptibility of landslides, we reviewed the USGS Landslide Overview Map of the Conterminous United States. We also reviewed locations of past occurrences of landslides documented in the Illinois Landslide Inventory Map. According to USGS Landslide Map, the Plant is in an area of high landslide susceptibility and low landslide incidence. The map does not specifically indicate the characteristics of past landslides or that landslides have specifically occurred at the Plant. A review of past landslide events documented in Illinois Landslide Inventory Map shows that there have not been any landslide occurrences at the Plant site. There is a landslide mapped approximate 3.5 miles south of the Unit along Illinois Route 26 and a landslide mapped approximately 5 miles east of the Unit along Illinois Route 89, however these landslide occurrences appear to be associated with roadway cut and fill Landslides, respectively. Accordingly, it is our opinion that the Unit is not located in an area that has high susceptibility to landslides.

Evaluation of on-site or local human-made features or events (both surface and subsurface)

A review of publicly available data collected by ISGS indicates that there are no documented mining activities at or near the Plant. Accordingly, there are no documented surface or subsurface anthropogenic activities that would be indicative of creating unstable foundation conditions at the Unit.

CONCLUSION

The results of our evaluation indicate that the East Ash Pond is not located in an area with poor foundation conditions, an area susceptible to mass movements, or an area with karst terrain. Accordingly, the Unit is not located in an Unstable Area and a demonstration that recognized and generally accepted good engineering practices have been incorporated into the design of the CCR Unit to ensure that the integrity of the structural components will not be disrupted is not required.

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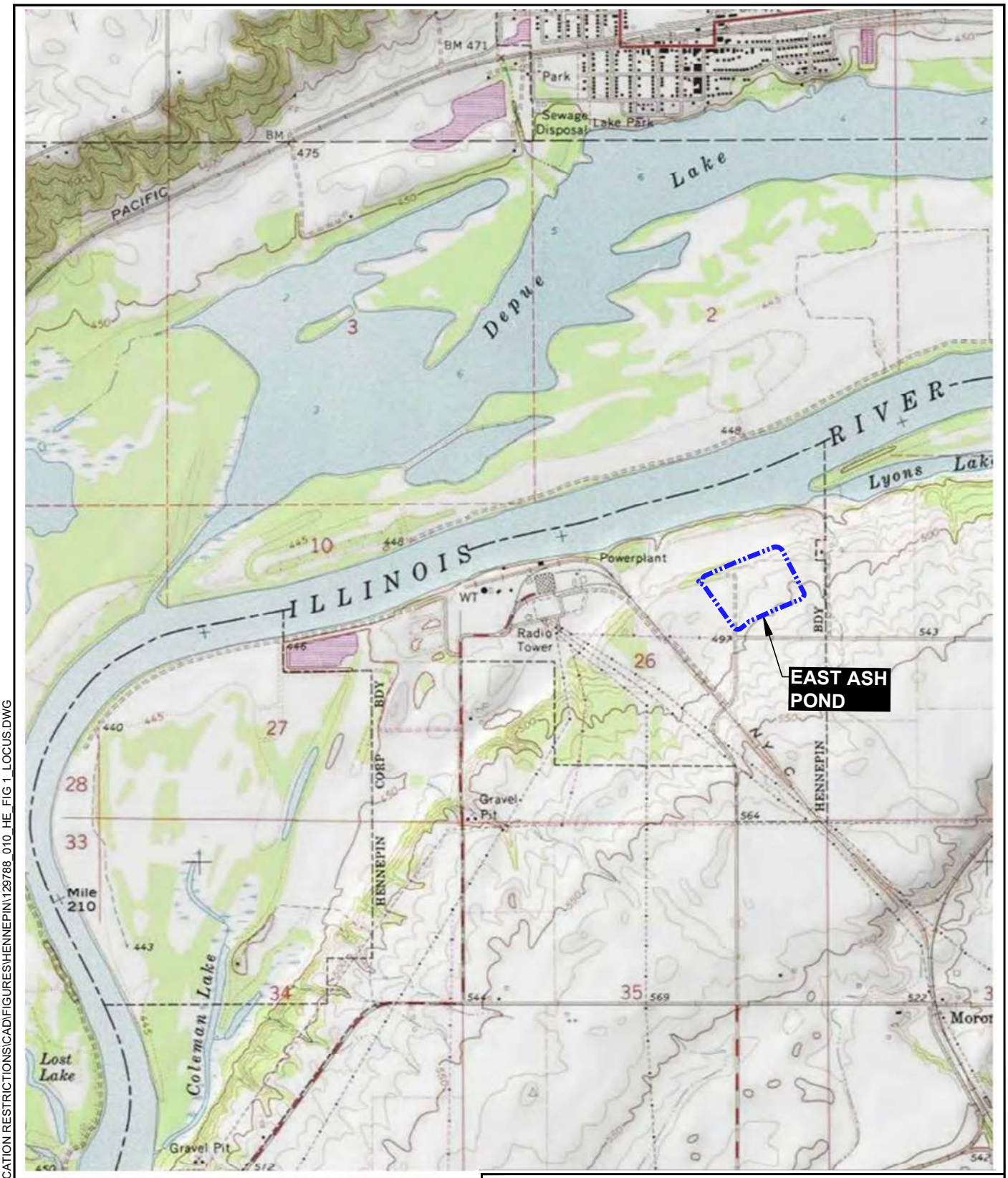
Section 7.0 Limitations

In preparing this evaluation, Haley & Aldrich has reviewed historic, design and investigative information and other data furnished by Vista Energy. Haley & Aldrich has relied on this information in completing the location restriction evaluations for this Unit.

The conclusions presented in this memorandum assume that subsurface site conditions in the vicinity of the Unit reasonably match those conditions associated with site borings, laboratory testing results, etc. The reported conclusions are also based on our understanding of current site operations, maintenance and CCR management practices at the Plant as provided by Vista Energy. Future site conditions or changes in Plant operation may result in conditions that would render these conclusions inaccurate.

FIGURES



MAP SOURCE: ESRI

SITE COORDINATES: 41°18'9"N, 89°19'1"W

HALEY ALDRICH

CCR RULE LOCATION RESTRICTIONS EVALUATION
HENNEPIN POWER STATION
HENNEPIN, ILLINOIS

PROJECT LOCATION MAP

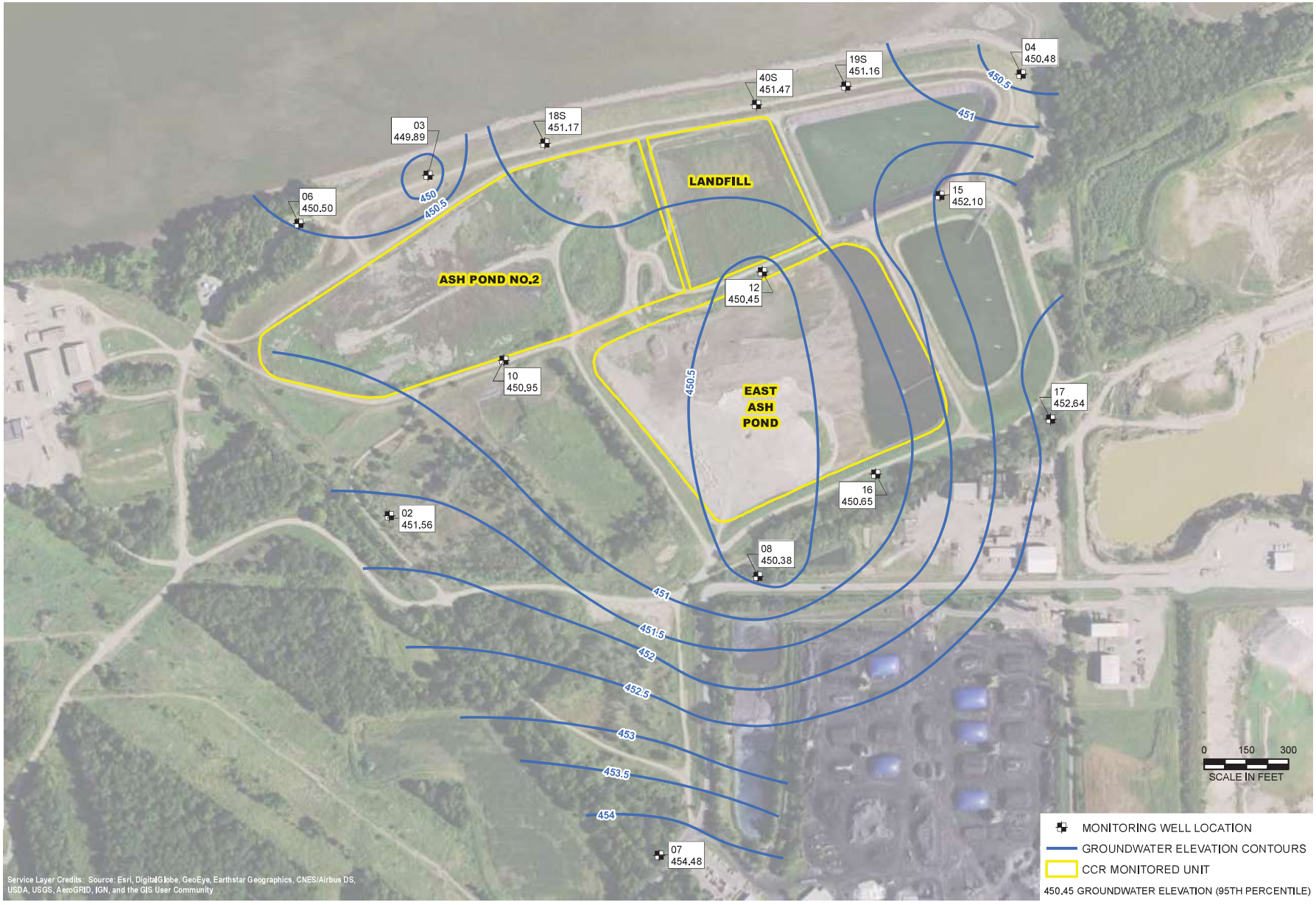
APPROXIMATE SCALE: 1IN = 2000 FT
SEPTEMBER 2018

FIGURE 1

VARI, KATALIN Printed: 9/4/2018 3:04 PM Layout: L
G:\129788 - DYNEGY FLEETWIDE LOCATION RESTRICTIONS\CAD\FIGURES\HENNEPIN\129788_010_HE_FIG 1_LOCUS.DWG

ATTACHMENT 1

Placement Above Uppermost Aquifer



DRAWN BY/DATE: SDS 8/29/17
REVIEWED BY/DATE: JJW 10/13/17
APPROVED BY/DATE: NRK 10/17/17

TOP OF UPPERMOST AQUIFER HENNEPIN LANDFILL UNIT ID:801 AND HENNEPIN EAST ASH POND UNIT ID: 803

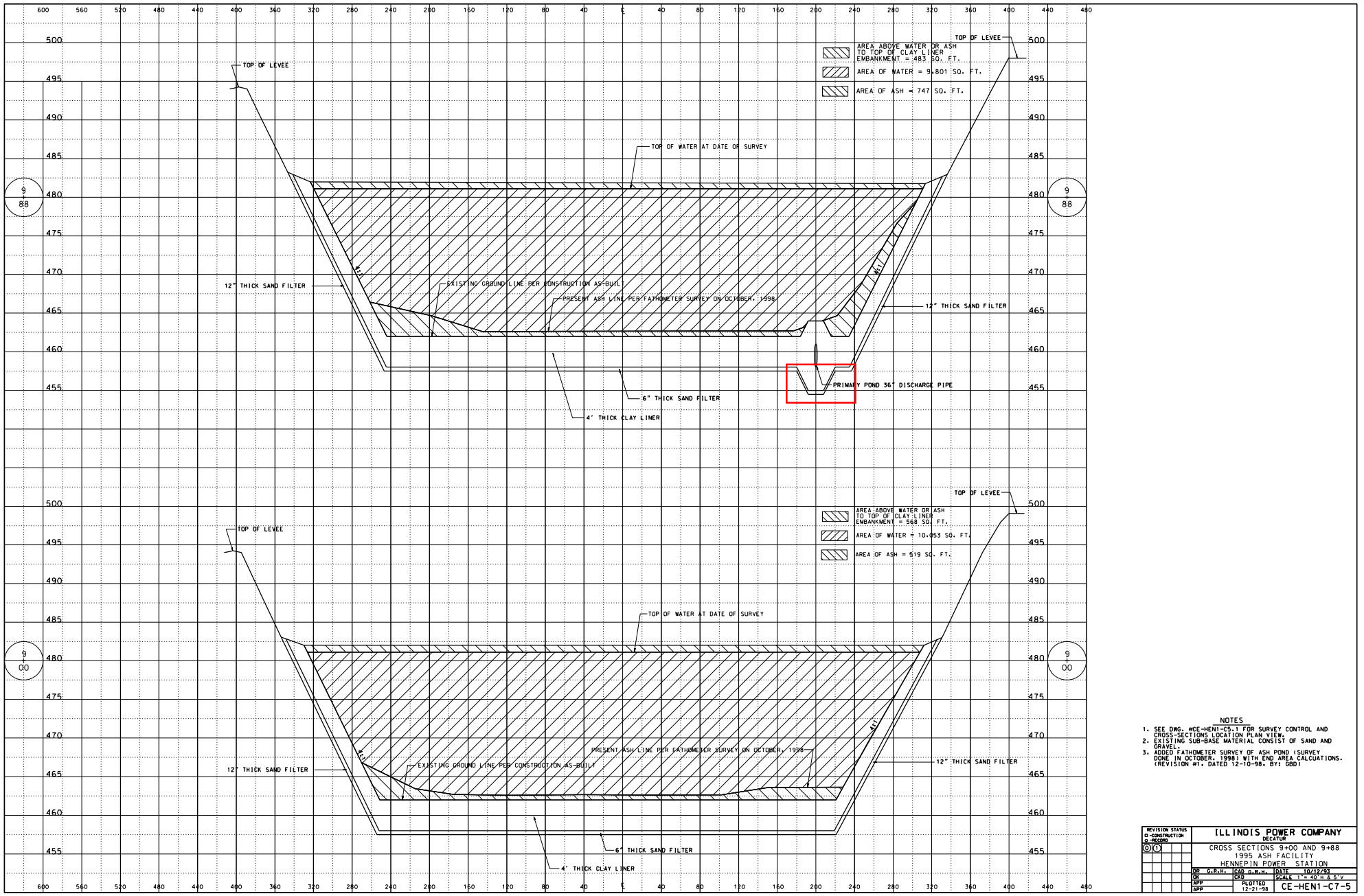
DYNEGY MIDWEST GENERATION, LLC
HENNEPIN POWER STATION, HENNEPIN, ILLINOIS

N

PROJECT NO: 2285

Natural Resource Technology
AN OBG COMPANY

Y:\Mapping\Projects\2212285_Hennepin_East\MXD\Figure 1_Top Of Aquifer Conbuns.mxd Author: stolzet DateTime: 11/1/2017 5:24:06 PM



NOTES

1. SEE DWG. #CE-HEN1-C5.1 FOR SURVEY CONTROL AND CROSS-SECTIONS LOCATION PLAN VIEW.
2. EXISTING SUB-BASE MATERIAL CONSIST OF SAND AND GRAVEL.
3. ADDED FATHOMETER SURVEY OF ASH POND (SURVEY DONE IN OCTOBER, 1998) WITH END AREA CALCUATIONS. (REVISION #1, DATED 12-10-98, BY: GBD)

REVISION STATUS C=CONSTRUCTION R=RECORD	ILLINOIS POWER COMPANY DECATUR
C R	CROSS SECTIONS 9+00 AND 9+88 1995 ASH FACILITY HENNEPIN POWER STATION
DR G.R.H.	CAD G.R.H. DATE 10/12/93
CK	CKD SCALE 1"= 40' H & 5' V
APP	PLOTTED 12-21-98 CE-HEN1-C7-5
APP	

ATTACHMENT 2

Wetlands

East Ash Pond

NWI-mapped Wetland

N

0 250 500

SCALE IN FEET

HALEY ALDRICH

CCR RULE LOCATION RESTRICTIONS
HENNEPIN POWER STATION
PUTNAM COUNTY, ILLINOIS

NWI-MAPPED WETLANDS

AUGUST 2018

FIGURE 1

GIS FILE PATH: C:\Users\mmartin\Desktop\CCR Rule\Hennepin East.mxd — USER: mmartin — LAST SAVED: 8/2/2018 10:57:32 AM

Attorney Client Privileged

Submitted to
Dynegy Midwest Generation, LLC
1500 Eastport Plaza Drive
Collinsville, IL 62234

Submitted by
AECOM
1001 Highlands Plaza Drive West, Suite 300
St. Louis, MO 63110

March 2016

Draft Waters of the U.S. Assessment

for

Dynegy Midwest Generation, LLC CCR Program at

Hennepin Power Station
13498 E 800th Street
Hennepin, IL 61327

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Executive Summary

Per the recently promulgated coal combustion residual (CCR) rule (Disposal of Coal Combustion Residuals from Electric Utilities, 2015), Dynegy Midwest Generation, LLC (Dynegy) is assessing existing CCR units at several of their power facilities. Dynegy must demonstrate their existing CCR units meet minimum criteria established in the CCR rule, which include location restrictions regarding wetlands. This report presents a summary of findings for the waters of the United States (waters of U.S.) assessment AECOM, on behalf of Dynegy, conducted at Dynegy's Hennepin Power Station.

AECOM surveyed a 250-foot buffer around four existing CCR units at the Hennepin Power Station. AECOM identified eight wetlands and one waterbody adjacent to the four surveyed CCR units. Field assessors did not observe evidence of erosion, migration of wetland soils, or impacts to fish, wildlife and other aquatic resources. Findings of this waters of the U.S. assessment demonstrate the existing CCR units at Dynegy's Hennepin Power Station do not have reasonable probability to harm waters of the U.S.

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1 Background

1.1 Project Purpose

Per the recently promulgated coal combustion residual (CCR) rule (Disposal of Coal Combustion Residuals from Electric Utilities, 2015), Dynegy Midwest Generation, LLC (Dynegy) is assessing existing CCR units at several of their power facilities. AECOM, on behalf of Dynegy, conducted a waters of the United States (waters of the U.S.) assessment at Dynegy's Hennepin Power Station. Field assessors surveyed potential wetlands and other waters of the U.S. and recorded their boundaries, when identified. This report presents a summary of findings for the waters of the U.S. assessment conducted at the Hennepin Power Station.

The United States Environmental Protection Agency (USEPA) promulgated the CCR rule to establish national applicable minimum criteria for the safe disposal of CCR in landfills, surface impoundments and lateral expansions of CCR units. The final rule regulates the disposal of CCR under Subtitle D of the Resource Conservation and Recovery Act (RCRA). Consistent with available statutory authority under subtitle D, the CCR rule is a self-implementing rule with no direct federal oversight. The rule requires the owner or operator of a CCR unit to demonstrate satisfaction of the specific minimum criteria.

Among other items, the minimum criteria established with the CCR rule include restrictions of where CCR units may be located (i.e., location restrictions). When siting CCR landfills and surface impoundments, certain locations are restricted in an effort to ensure the structure of the CCR units will not be adversely impacted by site conditions and there will be 'no reasonable probability of harm to human health or the environment' due to the location of the CCR unit. The location restrictions include (1) placement above the uppermost aquifer, (2) wetlands, (3) fault areas, (4) seismic impact zones, and (5) unstable areas.

1.2 Project Location

Dynegy's Hennepin Power Station is located along the Illinois River near the town of Hennepin within Putnam County. AECOM surveyed a 250-foot buffer around four CCR units at Dynegy's Hennepin Power Station. Assessed CCR units included:

- Hennepin East Ash Pond
- Hennepin Ash Pond Number 2
- Hennepin Old West Ash Pond
- Hennepin Old West Polishing Pond

See the Hennepin Overview Location Map in attached **Figure 1**. The waters of the U.S. assessment of the CCR units at the Hennepin Power Station was conducted on October 8, 2015. This report presents results of the waters of the U.S. assessment for all ponds surveyed.

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2 Methodology

2.1 Waters of the U.S.

The Clean Water Act of 1977 (CWA) defines the term "waters of the U.S." as:

1. All waters which are currently used, or were used in the past, or may be susceptible to use in interstate or foreign commerce, including all waters which are subject to the ebb and flow of the tide;
2. All interstate waters including interstate wetlands;
3. All other waters such as intrastate lakes, rivers, streams (including intermittent streams), mudflats, sandflats, wetlands, sloughs, prairie potholes, wet meadows, playa lakes, or natural ponds, the use, degradation or destruction of which could affect interstate or foreign commerce including any such waters: (i) Which are or could be used by interstate or foreign travelers for recreational or other purposes; or (ii) From which fish or shellfish are or could be taken and sold in interstate or foreign commerce; or (iii) Which are used or could be used for industrial purpose by industries in interstate commerce;
4. All impoundments of waters otherwise defined as waters of the U.S. under the definition;
5. Tributaries of waters identified in paragraphs (1)-(4) of this section;
6. The territorial seas; and
7. Wetlands adjacent to waters (other than waters that are themselves wetlands) identified in paragraphs (1)-(6) of this section (Definition of Waters of the United States, 2015).

The United States Army Corps of Engineers (USACE) asserts jurisdiction over waters of the U.S., including wetlands and other waters. Other waters identified within the survey buffer at Dynegy's Hennepin Power Station include rivers and streams and are referred to as "waterbodies" from this point forward. The methods employed for field assessment of wetlands are described in Sections 2.3 through 2.5. The methods employed for field assessment of waterbodies are described in Section 2.6.

2.2 Desktop and Field Work for Wetland Determination

Routinely, the process of conducting a wetland investigation and determination involves gathering preliminary information and conducting a field investigation to identify the presence of wetlands subject to USACE jurisdiction. For this assessment, the process began by using existing government agency information and data from other sources (e.g., aerial photography, as noted in attached figures) to identify potentially significant areas. U.S. Fish and Wildlife Service National Wetlands Inventory (USFWS, 2012) mapped features are included in attached **Figure 2** and Natural Resources Conservation Service Soil Survey (Soil Survey Staff, 2013) results are included in attached **Figure 3**. This information was then compiled and used to screen the project area prior to field reconnaissance.

A visual reconnaissance was performed throughout the entire project area to highlight:

- the various delineation methods to be employed;
- potential wetland areas;
- potential non-wetland areas; and,
- existing hydrologic connections.

The USACE 1987 Wetland Delineation Manual, Technical Report Y-87-1 (Environmental Laboratory, 1987), hereafter referred to as the 1987 Manual, and the USACE Regional Supplement to the USACE 1987 Wetland Delineation Manual: Midwest Region (USACE, 2010), hereafter referred to as the Midwest Regional Supplement, provided the principle guidelines for conducting the fieldwork for the delineation. The presence of wetland

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vegetation, soils, and hydrology were determined. The area was investigated using the "Routine Method," as described in the 1987 Manual.

Vegetation was characterized for a given area by dominance, stratum, and wetland indicator status. In accordance with the *Classification of Wetlands and Deepwater Habitats of the United States* (Cowardin et al., 1979), wetlands were classified per their dominant vegetation stratum. Applicable classifications included palustrine open water (POW), palustrine emergent (PEM), and palustrine forested (PFO). At least one soil probe or pit was advanced to a target depth of 16 inches below ground surface (bgs), and soils were logged for texture, color, depth, hydric soil indicators, and other taxonomic characteristics deemed important for that point. The 1987 Manual makes accommodations for advancement of a soil probe rather than establishment of a soil pit when the soil profile is not comprised of loose or rocky material or does not contain a large volume of water. The 1987 Manual recognizes wetland hydrology as the most transitory of the three wetland parameters to identify. Field assessors considered weather and climatic conditions when examining the survey area for indicators of wetland hydrology. Four groups of hydrology indicators, included in the 1987 Manual and Midwest Regional Supplement, were assessed. The hydrology indicators are based on (1) direct observation of surface water or groundwater during the site visit, (2) evidence the site is subject to flooding or ponding, (3) evidence of current or recent soil saturation, and (4) landscape and vegetation characteristics to indicate wet conditions.

Survey teams used Trimble GeoXT global positioning system (GPS) units, capable of achieving sub-meter accuracy, to survey the wetland/upland boundaries. All data were exported to ArcMap (version 10.2.2.3552).

2.3 Review of Wetland Vegetation

The dominant vegetative species were evaluated at four levels of strata: tree stratum, sapling/shrub stratum, herbaceous stratum and woody vines. For each of the four levels of strata, absolute percent cover was the abundance measure recorded for each species within a given plot. Each of the plant species observed to exist in suspected wetland areas were compared to the *2012 National Wetland Plant List, Midwest Region* (Lichvar and Kartesz, 2009), to determine their hydrophytic classification. According to the Midwest Regional Supplement, hydrophytic vegetation is present if any of the following indicators are satisfied:

1. Rapid Test for Hydrophytic Vegetation (all dominant species present are obligate or facultative wetland plants, based on a visual assessment);
2. Dominance Test (more than 50 percent of the dominant species present are obligate, facultative wetland or facultative plants);
3. Prevalence Index (a weighted-average approach in which indicator statuses of all species present are assigned numeric values and factored by absolute percent cover; index of 3.0 or less is indicator of hydrophytic vegetation); or
4. Morphological Adaptations (species present exhibit morphological adaptations for life in wetlands).

2.4 Review of Wetland Soils

Within each area investigated, soils were examined using an Oakfield-type soil probe. One probe was advanced within each potential wetland area, in an area representative of the overall vegetation community. Additional probes were advanced along the perimeter of each delineated wetland. These cores were examined for characteristics of hydric soil just below the A-horizon (at the top of the B-horizon), usually between 6 and 16 inches bgs. Some of the more important field indicators examined included the hue, value and chroma of the matrix (e.g., 10YR 3/1) and mottles (e.g., 10YR 4/3) of moist soils determined by using a Munsell Soil Color Chart (Kollmorgen Corporation, 1994). Generally, mottled soils with a matrix chroma of two or less are considered to exhibit hydric soil characteristics (Environmental Laboratory, 1987).

2.5 Review of Wetland Hydrology

AECOM examined the soils, ground surface, and other field data for evidence of the presence of wetland hydrology, in lieu of collecting detailed hydrological data. This is an acceptable approach according to the 1987 Manual. Evidence indicating the presence of wetland hydrology typically includes standing water, saturated soils,

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water marks on trees, drift lines, sediment deposits, or oxidized rhizospheres on living roots. Secondary indicators that are commonly observed in the Midwest include drainage patterns, crayfish burrows, the geomorphic position of the feature, and a positive FAC (facultative)-neutral test. The presence of one primary indicator or two or more secondary indicators are required to conclude that wetland hydrology is present (USACE, 2010).

2.6 Review of Other Waters of the U.S.

Each waterbody identified within the survey boundary was assessed and the waterbody's characteristics were recorded. Assessment began with a determination of the presence of an ordinary high water mark (OHWM) at each potential waterbody. OHWMs are defined as the line on the shore established by the fluctuations of water and indicated by physical characteristics such as a clear, natural line impressed on the bank, shelving, changes in the character of soil, destruction of terrestrial vegetation, the presence of litter and debris, or other appropriate means that consider the characteristics of the surrounding area. All water features that showed evidence of an OHWM, whether natural or man-made, were considered potentially jurisdictional and were mapped. Ditches with a vegetated, relatively level bottom/bed were considered potentially jurisdictional other waters of the U.S., and were not captured as wetlands, when they displayed an OHWM. Water features that lacked an OHWM were considered to be unregulated ditches and were not mapped. GPS coordinates were collected for each waterbody boundary, as it existed within the survey buffer, using the same equipment employed for wetland boundary mapping.

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3 Identification of Wetlands and Other Waters of the U.S.

AECOM performed the waters of the U.S. field assessment at the Hennepin Power Station on October 8, 2015. Wetlands and waterbodies identified during the assessment that meet the USACE criteria for jurisdiction are shown on attached **Figure 4** and are further described below.

3.1 Wetlands

Eight wetlands were identified within the survey buffer surrounding the CCR units at Dynegy's Hennepin Power Station. Four forested wetlands, two open water ponds and one emergent wetland were identified adjacent to the Hennepin Old West Ash Pond. Additionally, one emergent wetland was within the survey buffer of the Hennepin Old West Polishing Pond. The emergent and forested wetlands were within depressed areas that are influenced by the Illinois River floodplain, but also receive runoff from upland areas and are vegetated with diverse wetland vegetion. One of the open water ponds is likely part of the facility operations. Completed USACE field data forms for each of the wetlands are included in **Appendix A**. Photographs of the wetlands are included in **Appendix B**. Refer to **Table 3-1** for wetland feature details.

Table 3-1: Wetlands Identified at Hennepin Power Station

Wetland ID	Wetland Classification[a]	Wetland Acres[b]	Associated CCR Impoundment	Comments
W-1	PFO	0.55	Hennepin Old West Ash Pond	Forested wetland fringe around open water pond southeast of Old West Ash Pond. Both wetlands are within depressed areas of crop field.
W-2	POW	0.31		Open water pond southeast of Old West Ash Pond. Pond is within depressed area of crop field.
W-3	PFO	0.74		Forested wetland located in south-central buffer of Old West Ash Pond. Wetland extends south beyond buffer and is associated with open water area further to the south. Wetland abuts W-4.
W-4	PEM	1.56		Emergent wetland located at south-central buffer of Old West Ash Pond. Wetland extends south beyond buffer and is between W-3 and W-5.
W-5	PFO	3.96	Hennepin Old West Ash Pond and Old West Polishing Pond	Forested wetland within southwestern buffer of Old West Ash Pond and extends into the Old West Polishing Pond buffer. Wetland extends further to the south and is between W-4 and W-6.
W-6	PEM	3.99	Hennepin Old West Polishing Pond	Emergent wetland within the southern and eastern buffer of the Old West Polishing Pond. Wetland extends beyond buffer to the south and west, abuts W-5, and is connected to the Illinois River via water control structures.
W-7	PFO	1.73	Hennepin Old West Ash Pond	Forested wetland along north side of Old West Ash Pond. Wetland abuts the Illinois River.
W-8	POW	0.36		Open water pond east of Old West Ash Pond. Possible Coal Pile Runoff Pond. Assume this feature is part of facility operation and therefore, non-jurisdictional.

Notes:

a – Per the Cowardin et al. (1979) wetland classification system

b – Acres within survey buffer

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3.2 Waterbodies

One waterbody was identified within the survey buffer surrounding the CCR units at Dynegy's Hennepin Power Station. The Illinois River is within the survey buffer of the Hennepin Old West Polishing Pond, Hennepin Old West Ash Pond and Hennepin Ash Pond Number 2. Photographs of this waterbody are included in **Appendix B**. Refer to **Table 3-2** for waterbody details.

Table 3-2: Waterbodies Identified at Hennepin Power Station

Waterbody ID	Waterbody Classification[a]	Waterbody Linear Feet[b]	Stream Width at Top of Bank (feet)[c]	Stream width at OHWM (feet)[c]	Associated CCR Impoundment	Comments
S-1	perennial	3,488	1,000	900	Hennepin Old West Polishing Pond, Old West Ash Pond, & Ash Pond Number 2	Illinois River is within survey buffer of these three ponds.

Notes:
a – Waterbody classifications assigned based on field observations
b – Linear feet within survey buffer
c – Average width (in feet) visually estimated in field

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4 Conclusions

4.1 Waters of the U.S. Findings per CCR Rule

AECOM surveyed a 250-foot buffer around four CCR units at the Dynegy Hennepin Power Station to document the presence and character of wetlands and waterbodies. Assessed CCR units included:

- Hennepin East Ash Pond
- Hennepin Ash Pond Number 2
- Hennepin Old West Ash Pond
- Hennepin Old West Polishing Pond

AECOM conducted this assessment to determine if these CCR units are proximate to wetlands and waterbodies and to determine whether there is reasonable probability of harm to human health or the environment from the CCR units.

A total of eight wetlands and one waterbody were identified adjacent to the four surveyed CCR units. Field assessors did not observe evidence of harm to the wetlands and waterbodies from the CCR units. Specifically, field assessors did not observe evidence of erosion, migration of wetland soils, or impacts to fish, wildlife and other aquatic resources at Dynegy's Hennepin Power Station.

4.2 Waters of the U.S. Jurisdiction per CWA

This assessment verifies potential waters of the U.S. are present adjacent to existing CCR units at the Hennepin Power Station. Should Dynegy conduct construction activities at the existing CCR units that could impact the wetlands and/or waterbodies, such activities would need to be performed in a manner compliant with the CWA. Per Section 404 of the CWA (Discharges of Dredged or Fill Material into Waters of the U.S., 1988), permits are required for all construction activities that will impact jurisdictional wetlands and waterbodies.

Per the USEPA and USACE (B.H. Grumbles and J.P. Woodley Jr.) memorandum *Clean Water Act Jurisdiction Following the U.S. Supreme Court's Decision in Rapanos v. United States & Carabell v. United States* (personal communication, December 2, 2008), the USACE asserts jurisdiction over the following features:

- Traditionally navigable waters (TNW) and all wetlands adjacent to TNWs,
- Non-navigable tributaries of TNWs that are relatively permanent (i.e., relatively permanent waters or RPWs),
- Wetlands that directly abut RPWs, and,
- All non-RPWs that have a significant nexus with a TNW.

The evaluation of the presence of a significant nexus considers the tributary volume, duration and frequency of flow, the proximity of the tributary to a TNW and the hydrologic, ecologic and other functions performed by the tributary and its adjacent wetlands. The classes of water body that are subject to agency jurisdiction only if such a significant nexus is demonstrated are:

- Wetlands adjacent to all non-RPWs that have a significant nexus with a TNW; and,
- Wetlands adjacent to, but not directly abutting, an RPW.

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5 Limitations

The assessment presented in this report is intended only for the purpose and site location indicated. The assessment presented in this report should not be used for other purposes or sites. Conclusions or recommendations made from these data by others are their responsibilities. The conclusions and recommendations are based on AECOM's understanding of current plant operations, maintenance, stormwater, and ash handling procedures at the station, as provided by Dynegy. Changes in these operations or procedures may invalidate the findings in this report until AECOM has had the opportunity to review the findings, and revise the report if necessary.

Data used to perform the waters of the U.S. assessment are based on fieldwork and information reviews conducted by AECOM on October 8, 2015. The data produced from the acknowledged documents, photographs, and information were available during, and are limited to, this same time period. The assessment was performed in accordance with the standard of care commonly used as state-of-practice in our profession. The conclusions presented in this report are professional opinions based on the indicated project criteria and data available at the time this report was prepared. Our services were provided in a manner consistent with the level of care and skill ordinarily exercised by other professional consultants under similar circumstances. No other representation is intended.

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6 References

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Figures

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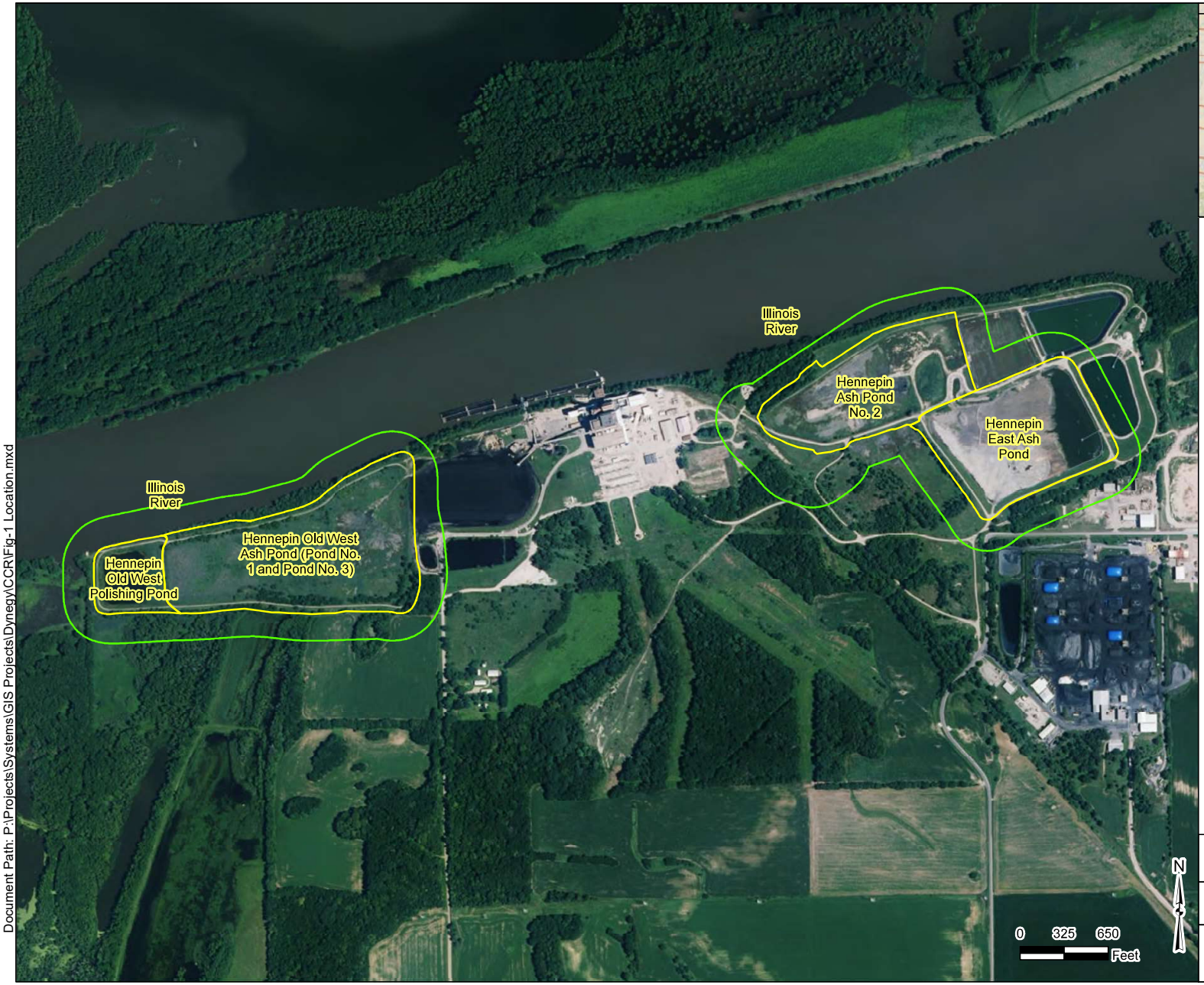

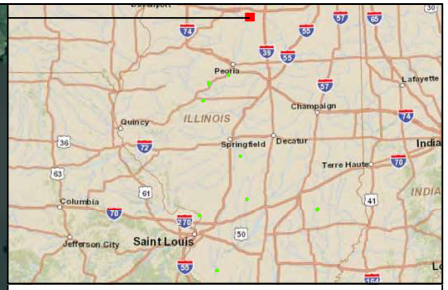

LEGEND

UNIT

WETLANDS SURVEY BOUNDARY

DRAFT

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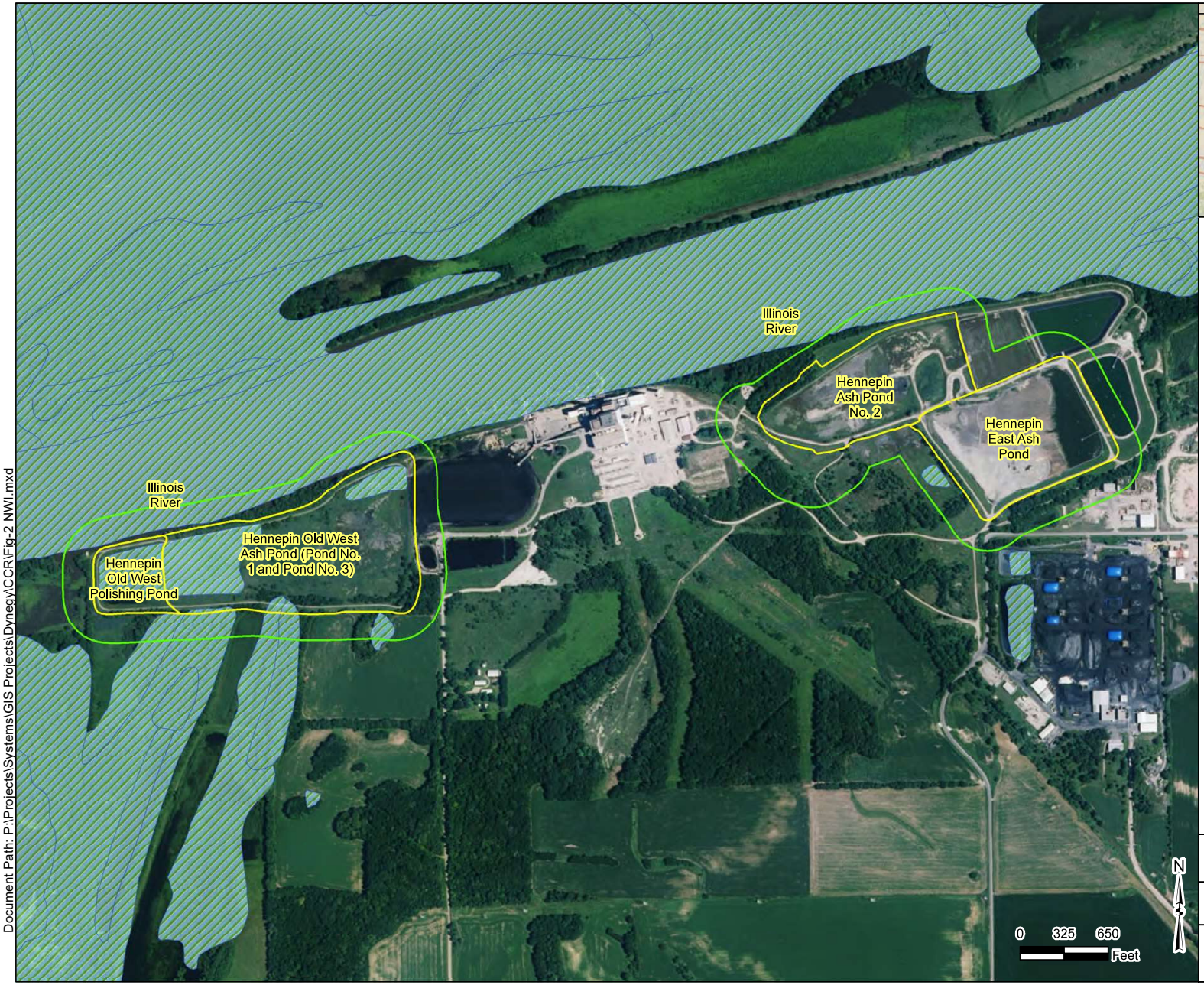
SOURCES: ESRI, DELORME, NAVTEQ, USGS, INTERMAP, IPC, NRCAN, ESRI JAPAN, METI, ESRI CHINA (HONG KONG), ESRI (THAILAND), TOMTOM, 2013

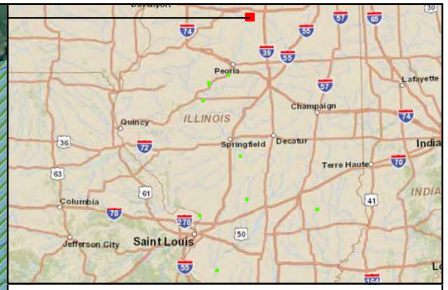
CLIENT	PROJECT NO.
Dynegy Midwest Generation, LLC	60442970

HENNEPIN POWER STATION
LOCATION MAP

DRN. BY: IP CHKD. BY: SV DATE: 3/22/2016	AECOM	FIG. NO. 1

Document Path: P:\Projects\Systems\GIS Projects\Dynegy\CCR\Fig-1 Location.mxd





LEGEND

UNIT

WETLANDS SURVEY BOUNDARY

NATIONAL WETLANDS INVENTORY

DRAFT

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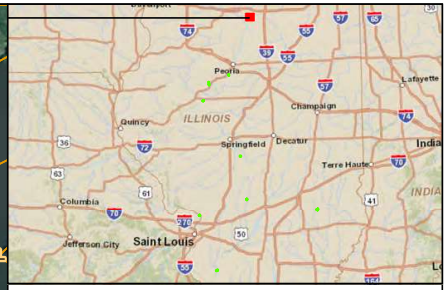
Sources: Esri, DeLorme, NAVTEQ, USGS, Intermap, iPC, NRCAN, Esri Japan, METI, Esri China (Hong Kong), Esri (Thailand), TomTom, 2013

CLIENT	PROJECT NO.
Dynegy Midwest Generation, LLC	60442970

HENNEPIN POWER STATION
NATIONAL WETLAND INVENTORY MAP

DRN. BY: IP CHKD. BY: SV DATE: 3/22/2016	AECOM	FIG. NO. 2

Document Path: P:\Projects\Systems\GIS Projects\Dynegy\CCR\Fig-2 NWI.mxd



LEGEND

NRCS SOILS

UNIT

WETLANDS SURVEY BOUNDARY

SOIL	DESCRIPTION
533	URBAN LAND
865	PITS, GRAVEL
131B2	ALVIN FINE SANDY LOAM, 2 TO 7 PERCENT SLOPES, ERODED
1480A	MOUNDPRAIRIE SILTY CLAY LOAM, UNDRAINED, 0 TO 2 PERCENT SLOPES, FREQUENTLY FLOODED
1480L	MOUNDPRAIRIE SILTY CLAY LOAM, UNDRAINED, 0 TO 2 PERCENT SLOPES, FREQUENTLY FLOODED, LONG DURATION
200A	ORIO LOAM, 0 TO 2 PERCENT SLOPES
3480A	MOUNDPRAIRIE SILTY CLAY LOAM, 0 TO 2 PERCENT SLOPES, FREQUENTLY FLOODED
379A	DAKOTA LOAM, 0 TO 2 PERCENT SLOPES
379B2	DAKOTA LOAM, 2 TO 5 PERCENT SLOPES, ERODED
398A	WEA SILT LOAM, 0 TO 2 PERCENT SLOPES
398B	WEA SILT LOAM, 2 TO 5 PERCENT SLOPES
587B	TERRIL LOAM, 2 TO 5 PERCENT SLOPES
802B	ORTHENTS, LOAMY, UNDULATING
8304A	LANDES FINE SANDY LOAM, 0 TO 2 PERCENT SLOPES, OCCASIONALLY FLOODED
93B	RODMAN GRAVELLY SANDY LOAM, 2 TO 5 PERCENT SLOPES
93E	RODMAN GRAVELLY SANDY LOAM, 12 TO 20 PERCENT SLOPES
93G	RODMAN GRAVELLY SANDY LOAM, 20 TO 70 PERCENT SLOPES
98B	ADE LOAMY FINE SAND, 1 TO 6 PERCENT SLOPES
M-W	MISCELLANEOUS WATER
W	WATER

DRAFT

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CLIENT	PROJECT NO.
Dynegy Midwest Generation, LLC	60442970

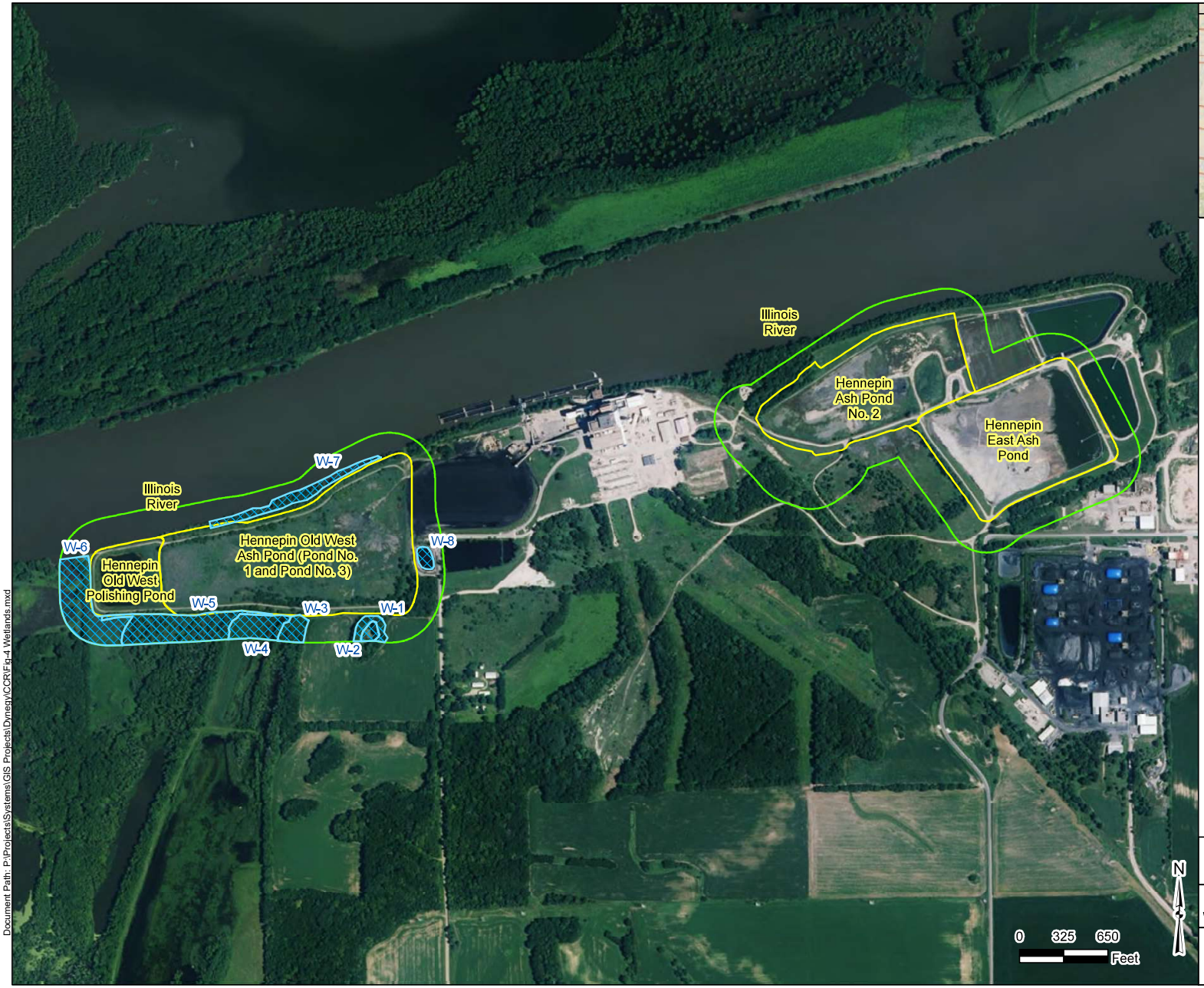
HENNEPIN POWER STATION
NRCS SOILS MAP

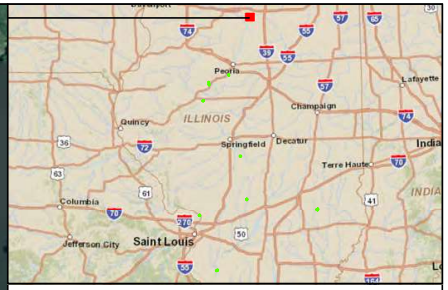
DRN. BY: IP
CHKD. BY: SV
DATE: 3/22/2016

AECOM

FIG. NO. 3

Document Path: P:\Projects\Systems\GIS Projects\Dynegy\CCR\Fig-3 Soils.mxd





LEGEND

- DELINEATED STREAM
- DELINEATED WETLAND
- UNIT
- WETLANDS SURVEY BOUNDARY

WATERS OF US FIELD SURVEY WAS CONDUCTED ON OCTOBER 8, 2015

DRAFT

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SOURCES: ESRI, DELORME, NAVTEQ, USGS, INTERMAP, IPC, NRCAN, ESRI JAPAN, METI, ESRI CHINA (HONG KONG), ESRI (THAILAND), TOMTOM, 2013
SOURCE: ESRI, DIGITALGLOBE, GEOEYE, I-CUBED, USDA, USGS, AEX,

CLIENT	PROJECT NO.
Dynegy Midwest Generation, LLC	60442970

HENNEPIN POWER STATION
WATERS OF THE U.S. ASSESSMENT RESULTS MAP

DRN. BY: IP CHKD. BY: SV DATE: 3/22/2016	AECOM	FIG. NO. 4

Document Path: P:\Projects\Systems\GIS Projects\Dynegy\CCR\Fig-4 Wetlands.mxd

Appendix A. Wetland Field Data Forms

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WETLAND DETERMINATION DATA FORM – Midwest Region

Project/Site: Hennepin PowerStation City/County: Putnam County Sampling Date: 10/08/15

Applicant/Owner: Dynegy State: IL Sampling Point: Hennepin-W-1

Investigator(s): Jen Schwent, Kevin Pulley Section, Township, Range: —

Landform (hillslope, terrace, etc.): Depression Local relief (concave, convex, none): Concave

Slope (%): 5 Lat: 41.298884 Long: -89.321758 Datum: WGS84

Soil Map Unit Name: 8304A-Landes fine sandy loam, 0 to 2% slopes, occasionally flooded NWI classification: PFO1C

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation X, Soil X, or Hydrology X significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X No ____	**Is the Sampled Area within a Wetland?** Yes X No ____
Hydric Soil Present?	Yes X No ____	
Wetland Hydrology Present?	Yes X No ____	

Remarks: Forested wetland mapped on the southeast corner of Hennepin Old West Ash Pond No.1 + Pond No.3. Wetland among crop field.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 30')	Absolute % Cover	Dominant Species?	Indicator Status
1. Acer saccharinum	60	X	FACW
2.			
3.			
4.			
5.			
	60	= Total Cover	
Sapling/Shrub Stratum (Plot size: 15')			
1.			
2.			
3.			
4.			
5.			
	0	= Total Cover	
Herb Stratum (Plot size: 5')			
1. Bidens frondosa	5	X	FACW
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	5	= Total Cover	
Woody Vine Stratum (Plot size: 30')			
1.			
2.			
	0	= Total Cover	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	65	x 2 =	130
FAC species	0	x 3 =	0
FACU species	0	x 4 =	0
UPL species	0	x 5 =	0
Column Totals:	65 (A)		130 (B)

Prevalence Index = B/A = 2.00

Hydrophytic Vegetation Indicators:

X 1 – Rapid Test for Hydrophytic Vegetation

X 2 – Dominance Test is >50%

X 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes X No ____

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: Hennepin-W-1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-12	2.5Y 2.5/1	98	10YR 5/6	2	C	M	Silty Clay	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ 2 cm Muck (A10)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 5 cm Mucky Peat or Peat (S3)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- X Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ Coast Prairie Redox (A16)
- ___ Dark Surface (S7)
- ___ Iron-Manganese Masses (F12)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: Tight Clay

Depth (inches): 12

Hydric Soil Present? Yes X No ___

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- X Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ True Aquatic Plants (B14)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Gauge or Well Data (D9)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- X Geomorphic Position (D2)
- X FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ___ No X Depth (inches): ___

Water Table Present? Yes ___ No X Depth (inches): ___

Saturation Present? (includes capillary fringe) Yes X No ___ Depth (inches): 8

Wetland Hydrology Present? Yes X No ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Midwest Region

Project/Site: Hennepin Power Station City/County: Putnam County Sampling Date: 10/08/15

Applicant/Owner: Dynegy State: IL Sampling Point: Hennepin-W-2

Investigator(s): Jen Schwent Kevin Pilley Section, Township, Range: —

Landform (hillslope, terrace, etc.): Depression Local relief (concave, convex, none): Concave

Slope (%): 20 Lat: 41.298761 Long: -89.321529 Datum: WGS 84

Soil Map Unit Name: 8304A-Landes fine sandy loam, 0 to 2% slopes, occasionally flooded NWI classification: PFO1C

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation X, Soil X, or Hydrology X significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No ____	**Is the Sampled Area within a Wetland?** Yes X No ____
Hydric Soil Present?	Yes X	No ____	
Wetland Hydrology Present?	Yes X	No ____	

Remarks: Mapped open water pond associated with forested wetland Hennepin-W-1.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 30')	Absolute % Cover	Dominant Species?	Indicator Status
1. Salix nigra	5	X	OBL
2.			
3.			
4.			
5.			
	5 = Total Cover		
Sapling/Shrub Stratum (Plot size: 15')			
1.			
2.			
3.			
4.			
5.			
	0 = Total Cover		
Herb Stratum (Plot size: 5')			
1. Lemna minor	90	X	OBL
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	90 = Total Cover		
Woody Vine Stratum (Plot size: 30')			
1.			
2.			
	0 = Total Cover		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	95	x 1 =	95
FACW species	0	x 2 =	0
FAC species	0	x 3 =	0
FACU species	0	x 4 =	0
UPL species	0	x 5 =	0
Column Totals:	95 (A)		95 (B)

Prevalence Index = B/A = 1.00

Hydrophytic Vegetation Indicators:

X 1 – Rapid Test for Hydrophytic Vegetation

X 2 – Dominance Test is >50%

X 3 - Prevalence Index is ≤3.0[1]

__ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

__ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes X No ____

Remarks: (Include photo numbers here or on a separate sheet.)

Pond contains duckweed, one live willow and several dead willows.

SOIL

Sampling Point: Hennepin-W-2

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ 2 cm Muck (A10)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 5 cm Mucky Peat or Peat (S3)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ Coast Prairie Redox (A16)
- ___ Dark Surface (S7)
- ___ Iron-Manganese Masses (F12)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes _____ No _____

Remarks:

Do not assess soils on open water area. Assume meets hydric character.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- X Surface Water (A1)
- X High Water Table (A2)
- X Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- X Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- X True Aquatic Plants (B14)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Gauge or Well Data (D9)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- X Geomorphic Position (D2)
- X FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes X No ____ Depth (inches): >36

Water Table Present? Yes X No ____ Depth (inches): 0

Saturation Present? (includes capillary fringe) Yes X No ____ Depth (inches): 0

Wetland Hydrology Present? Yes X No _____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Midwest Region

Project/Site: Hennepin Power Station City/County: Putnam County Sampling Date: 10/08/15

Applicant/Owner: Dynegy State: IL Sampling Point: Hennepin-W-3

Investigator(s): Jen Schwent, Kevin Pulley Section, Township, Range: –

Landform (hillslope, terrace, etc.): Floodplain Local relief (concave, convex, none): Concave

Slope (%): 1 Lat: 41.298832 Long: -89.323574 Datum: WGS 84

Soil Map Unit Name: 148OA-Mound prairie silty clay loam, undrained, 0-2% slopes NWI classification: PFO1C

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation X, Soil X, or Hydrology X significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No ____	**Is the Sampled Area within a Wetland?** Yes X No ____
Hydric Soil Present?	Yes X	No ____	
Wetland Hydrology Present?	Yes X	No ____	

Remarks: Forested wetland mapped at south-central buffer of Hennepin Old West Ash Pond No.1 + Pond No.3 Receives runoff from surrounding upland areas.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 30')	Absolute % Cover	Dominant Species?	Indicator Status
1. Acer saccharinum	60	X	FACW
2.			
3.			
4.			
5.			
	60	= Total Cover	
Sapling/Shrub Stratum (Plot size: 15')			
1.			
2.			
3.			
4.			
5.			
	0	= Total Cover	
Herb Stratum (Plot size: 5')			
1. Rorippa sylvestris	20	X	OBL
2. Bidens frondosa	15	X	FACW
3. Xanthium strumarium	25	X	FAC
4. Echinochloa crusgalli	10		FACW
5. Persicaria hydropiperoides	5		OBL
6.			
7.			
8.			
9.			
10.			
	75	= Total Cover	
Woody Vine Stratum (Plot size: 30')			
1.			
2.			
	0	= Total Cover	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 4 (A)

Total Number of Dominant Species Across All Strata: 4 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	25	x 1 =	25
FACW species	85	x 2 =	170
FAC species	25	x 3 =	75
FACU species	0	x 4 =	0
UPL species	0	x 5 =	0
Column Totals:	135 (A)		270 (B)

Prevalence Index = B/A = 2.00

Hydrophytic Vegetation Indicators:

- ____ 1 – Rapid Test for Hydrophytic Vegetation
- X 2 – Dominance Test is >50%
- X 3 - Prevalence Index is ≤3.0[1]
- ____ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes X No ____

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: Hennepin-W-3

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-12	10YR 2/1	95	10YR 4/4	5	C	M	Silty Clay	
12-16	2.5Y 3/1	95	10YR 4/4	5	C	M	Silty clay w/ sand	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ 2 cm Muck (A10)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 5 cm Mucky Peat or Peat (S3)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- X Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ Coast Prairie Redox (A16)
- ___ Dark Surface (S7)
- ___ Iron-Manganese Masses (F12)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes X No _____

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- X High Water Table (A2)
- X Saturation (A3)
- X Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- X Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ True Aquatic Plants (B14)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Gauge or Well Data (D9)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- X Geomorphic Position (D2)
- X FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ___ No X Depth (inches): _____

Water Table Present? Yes X No ___ Depth (inches): 12

Saturation Present? (includes capillary fringe) Yes X No ___ Depth (inches): 10

Wetland Hydrology Present? Yes X No _____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Midwest Region

Project/Site: Hennepin Power Station City/County: Putnam County Sampling Date: 10/08/15

Applicant/Owner: Dynegy State: IL Sampling Point: Hennepin-WH

Investigator(s): Jen Schwent, Kevin Pelley Section, Township, Range: —

Landform (hillslope, terrace, etc.): Floodplain Local relief (concave, convex, none): Concave

Slope (%): 1 Lat: 41.298901 Long: -89.324552 Datum: WGS 84

Soil Map Unit Name: 3480A-Moundprairie silty clay loam, 0 to 2% slopes, Frequently Flooded NWI classification: PEMCh

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No _____ (If no, explain in Remarks.)

Are Vegetation X, Soil X, or Hydrology X significantly disturbed? Are "Normal Circumstances" present? Yes X No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No _____	**Is the Sampled Area within a Wetland?** Yes X No _____
Hydric Soil Present?	Yes X	No _____	
Wetland Hydrology Present?	Yes X	No _____	

Remarks: Emergent wetland located at south-central buffer of Hennepin Old West Ash Pond No.1 and No.3. Wetland receives water from surrounding upland areas + influence from the Illinois River.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 30')	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
	0 = Total Cover		
Sapling/Shrub Stratum (Plot size: 15')			
1.			
2.			
3.			
4.			
5.			
	0 = Total Cover		
Herb Stratum (Plot size: 5')			
1. Xanthium strumerium	80	X	FAC
2. Echinochloa crusgalli	20		FACW
3. Cyperus Striqosis	15		FACW
4. Rorippa sylvestris	20		OBL
5.			
6.			
7.			
8.			
9.			
10.			
	135 = Total Cover		
Woody Vine Stratum (Plot size: 30')			
1.			
2.			
	0 = Total Cover		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	20	x 1 =	20
FACW species	35	x 2 =	70
FAC species	80	x 3 =	240
FACU species	0	x 4 =	0
UPL species	0	x 5 =	0
Column Totals:	135 (A)		330 (B)

Prevalence Index = B/A = 2.44

Hydrophytic Vegetation Indicators:

- ___ 1 – Rapid Test for Hydrophytic Vegetation
- X 2 – Dominance Test is >50%
- X 3 - Prevalence Index is ≤3.0[1]
- ___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes X No _____

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: Hennepin-W-4

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-16	2.5Y 3/1	90	10YR 3/4	10	C	M	Silty Clay	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ 2 cm Muck (A10)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 5 cm Mucky Peat or Peat (S3)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- X Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ Coast Prairie Redox (A16)
- ___ Dark Surface (S7)
- ___ Iron-Manganese Masses (F12)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes X No _____

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- X Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- X Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ True Aquatic Plants (B14)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Gauge or Well Data (D9)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- X Geomorphic Position (D2)
- X FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ___ No X Depth (inches): _____

Water Table Present? Yes ___ No X Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes X No ___ Depth (inches): 10

Wetland Hydrology Present? Yes X No _____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Midwest Region

Project/Site: Hennepin Power Station City/County: Putnam County Sampling Date: 10/08/15

Applicant/Owner: Dynegy State: IL Sampling Point: Hennepin-W-5

Investigator(s): Jen Schwent, Kevin Pulley Section, Township, Range: —

Landform (hillslope, terrace, etc.): Floodplain Local relief (concave, convex, none): Concave

Slope (%): 1 Lat: 41.298907 Long: -89.326672 Datum: WGS 84

Soil Map Unit Name: 146OL-Mountprairie silty clay loam, undrained, 0 to 2% slopes, frequently flooded, long duration NWI classification: PEMCh + PFOICh

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation X, Soil X, or Hydrology X significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No ____	**Is the Sampled Area within a Wetland?** Yes X No ____
Hydric Soil Present?	Yes X	No ____	
Wetland Hydrology Present?	Yes X	No ____	

Remarks: Forested wetland within southwestern buffer of Hennepin Old West Ash Pond No.1 and No.3 and continues into the Hennepin Old West Polishing Pond. Wetland connected to Hennepin-W-6, and is within Illinois River Floodplain.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 30')	Absolute % Cover	Dominant Species?	Indicator Status
1. Acer saccharinum	25	X	FACW
2. Salix nigra	40	X	OBL
3. Fraxinus pennsylvanica	20	X	FACW
4.			
5.			
	85	= Total Cover	

Sapling/Shrub Stratum (Plot size: 15')			
1. Salix nigra	5	X	OBL
2.			
3.			
4.			
5.			
	5	= Total Cover	

Herb Stratum (Plot size: 5')			
1. Phalaris arundinacea	30	X	FACW
2. Xanthium strumarium	25	X	FAC
3. Symphyotrichum lanceolatum	5		FAC
4. Urtica dioica	10		FACW
5. Bidens frondosa	5		FACW
6. Persicaria amphibia	20		OBL
7. Ipomoea hederacea	15		FAC
8.			
9.			
10.			
	110	= Total Cover	

Woody Vine Stratum (Plot size: 30')			
1.			
2.			
	0	= Total Cover	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 6 (A)

Total Number of Dominant Species Across All Strata: 6 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	65	x 1 =	65
FACW species	90	x 2 =	180
FAC species	45	x 3 =	135
FACU species	0	x 4 =	0
UPL species	0	x 5 =	0
Column Totals:	200 (A)		380 (B)

Prevalence Index = B/A = 1.90

Hydrophytic Vegetation Indicators:

- ___ 1 – Rapid Test for Hydrophytic Vegetation
- X 2 – Dominance Test is >50%
- X 3 - Prevalence Index is ≤3.0[1]
- ___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes X No ____

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: Hennepin-W-5

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-16	2.5Y 3/1	90	2.5Y 6/6	10	C	M	Silty Clay	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ 2 cm Muck (A10)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 5 cm Mucky Peat or Peat (S3)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- X Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ Coast Prairie Redox (A16)
- ___ Dark Surface (S7)
- ___ Iron-Manganese Masses (F12)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes X No ____

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- X Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- X Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ True Aquatic Plants (B14)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Gauge or Well Data (D9)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- X Geomorphic Position (D2)
- X FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ____ No X Depth (inches): ____

Water Table Present? Yes ____ No X Depth (inches): ____

Saturation Present? (includes capillary fringe) Yes ____ No X Depth (inches): ____

Wetland Hydrology Present? Yes X No ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Midwest Region

Project/Site: Hennepin Power Station City/County: Putnam County Sampling Date: 10-08-15

Applicant/Owner: Dynegy State: IL Sampling Point: Hennepin-W-6

Investigator(s): Jen Schwent, Kevin Pulley Section, Township, Range: —

Landform (hillslope, terrace, etc.): Floodplain Local relief (concave, convex, none): Concave

Slope (%): 1 Lat: 41.299545 Long: -89.329347 Datum: WGS 84

Soil Map Unit Name: 3480A-Meundprairie silty clay loam, 0-2% slopes, frequently flooded NWI classification: NA

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation X, Soil X, or Hydrology X significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No ____	**Is the Sampled Area within a Wetland?** Yes X No ____
Hydric Soil Present?	Yes X	No ____	
Wetland Hydrology Present?	Yes X	No ____	

Remarks: Emergent wetland mapped located along the south + west buffers of Hennepin Old West Polishing Pond. Wetland extends beyond survey buffer. Wetland connected to Illinois River by water control structures.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 30')	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
	0 = Total Cover		
Sapling/Shrub Stratum (Plot size: 15')			
1.			
2.			
3.			
4.			
5.			
	0 = Total Cover		
Herb Stratum (Plot size: 5')			
1. Xanthium strumarium	90	X	FAC
2. Persicaria pennsylvanica	15		FACW
3. Echinochloa crusgalli	10		FACW
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	115 = Total Cover		
Woody Vine Stratum (Plot size: 30')			
1.			
2.			
	0 = Total Cover		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	25	x 2 =	50
FAC species	90	x 3 =	270
FACU species	0	x 4 =	0
UPL species	0	x 5 =	0
Column Totals:	115 (A)		320 (B)

Prevalence Index = B/A = 2.78

Hydrophytic Vegetation Indicators:

__ 1 – Rapid Test for Hydrophytic Vegetation

X 2 – Dominance Test is >50%

X 3 - Prevalence Index is ≤3.0[1]

__ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

__ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes X No ____

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: Hennepin-WL6

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-16	2.5Y 3/1	90	2.5Y 6/6	10	C	M	Silty Clay	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ 2 cm Muck (A10)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 5 cm Mucky Peat or Peat (S3)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- X Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ Coast Prairie Redox (A16)
- ___ Dark Surface (S7)
- ___ Iron-Manganese Masses (F12)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes X No _____

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- X Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ True Aquatic Plants (B14)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Gauge or Well Data (D9)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- X Geomorphic Position (D2)
- X FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ___ No X Depth (inches): _____

Water Table Present? Yes ___ No X Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes ___ No X Depth (inches): _____

Wetland Hydrology Present? Yes X No _____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Midwest Region

Project/Site: Hennepin Power Station City/County: Putnam County Sampling Date: 10/08/15

Applicant/Owner: Dynegy State: IL Sampling Point: Hennepin-W-7

Investigator(s): Jen Schwent, Kevin Pulley Section, Township, Range: —

Landform (hillslope, terrace, etc.): Floodplain Local relief (concave, convex, none): None

Slope (%): 5 Lat: 41.301512 Long: -89.323509 Datum: WGS84

Soil Map Unit Name: 533 Urban land NWI classification: NA

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation X, Soil X, or Hydrology X significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No ____	**Is the Sampled Area within a Wetland?** Yes X No ____
Hydric Soil Present?	Yes X	No ____	
Wetland Hydrology Present?	Yes X	No ____	

Remarks: Forested wetland located in the north-central and northeast buffer of Hennepin Old West Ash Pond No.1 + Pond No.3. Area abuts the Illinois River.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 30')	Absolute % Cover	Dominant Species?	Indicator Status
1. Salix nigra	25	X	OBL
2. Fraxinus pensylvanica	15	X	FACW
3. Acer saccharinum	10		FACW
4. Tilia americana	10		FACW
5.			
	60	= Total Cover	

Sapling/Shrub Stratum (Plot size: 15')			
1. Fraxinus pensylvanica	5	X	FACW
2.			
3.			
4.			
5.			
	5	= Total Cover	

Herb Stratum (Plot size: 5')			
1. Echinochloa crusgalli	15	X	FACW
2. Xanthium strumarium	5		FAC
3. Rorippa Sylvestris	10	X	OBL
4. Bidens frondosa	5		FACW
5. Persicaria pensylvanicum	5		FACW
6. Phragmites australis	10	X	FACW
7.			
8.			
9.			
10.			
	50	= Total Cover	

Woody Vine Stratum (Plot size: 30')			
1.			
2.			
	0	= Total Cover	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 6 (A)

Total Number of Dominant Species Across All Strata: 6 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	35	x 1 =	35
FACW species	75	x 2 =	150
FAC species	5	x 3 =	15
FACU species	0	x 4 =	0
UPL species	0	x 5 =	0
Column Totals:	115 (A)		200 (B)

Prevalence Index = B/A = 1.74

Hydrophytic Vegetation Indicators:

X 1 – Rapid Test for Hydrophytic Vegetation

X 2 – Dominance Test is >50%

X 3 - Prevalence Index is ≤3.0[1]

__ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

__ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes X No ____

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: Hennepin-W-7

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-4	2.5Y 2.5/1	100					Silty Clay	
4-16	2.5Y 2.5/1	85	10YR 4/1	15	C	M	Silty Clay	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ 2 cm Muck (A10)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 5 cm Mucky Peat or Peat (S3)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- X Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ Coast Prairie Redox (A16)
- ___ Dark Surface (S7)
- ___ Iron-Manganese Masses (F12)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes X No ____

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- X Surface Water (A1)
- ___ High Water Table (A2)
- X Saturation (A3)
- X Water Marks (B1)
- ___ Sediment Deposits (B2)
- X Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ True Aquatic Plants (B14)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Gauge or Well Data (D9)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- X Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- X Geomorphic Position (D2)
- X FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes X No ____ Depth (inches): 1

Water Table Present? Yes ____ No X Depth (inches): ____

Saturation Present? (includes capillary fringe) Yes X No ____ Depth (inches): 0

Wetland Hydrology Present? Yes X No ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Midwest Region

Project/Site: Hennepin Power Station City/County: Putnam County Sampling Date: 10/08/15

Applicant/Owner: Dynegy State: IL Sampling Point: Hennepin-W-8

Investigator(s): Jen Schwent, Kevin Pulley Section, Township, Range: —

Landform (hillslope, terrace, etc.): Depression Local relief (concave, convex, none): Concave

Slope (%): _____ Lat: 41.300253 Long: -89.320042 Datum: WGS 84

Soil Map Unit Name: 533 Urban land NWI classification: NA

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No _____ (If no, explain in Remarks.)

Are Vegetation X, Soil X, or Hydrology X significantly disturbed? Are "Normal Circumstances" present? Yes _____ No X

Are Vegetation X, Soil X, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes _____	No X	**Is the Sampled Area within a Wetland?** Yes X No _____
Hydric Soil Present?	Yes X	No _____	
Wetland Hydrology Present?	Yes X	No _____	

Remarks: Hennepin Coal Pile Runoff Pond. Facility owned.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 30')	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
	0 = Total Cover		

Sapling/Shrub Stratum (Plot size: 15')			
1.			
2.			
3.			
4.			
5.			
	0 = Total Cover		

Herb Stratum (Plot size: 5')			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	0 = Total Cover		

Woody Vine Stratum (Plot size: 30')			
1.			
2.			
	0 = Total Cover		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: _____ (A)

Total Number of Dominant Species Across All Strata: _____ (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: _____ (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:	
OBL species	x 1 =	
FACW species	x 2 =	
FAC species	x 3 =	
FACU species	x 4 =	
UPL species	x 5 =	
Column Totals: (A)		(B)

Prevalence Index = B/A = _____

Hydrophytic Vegetation Indicators:

___ 1 – Rapid Test for Hydrophytic Vegetation

___ 2 – Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes _____ No X

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: Hennepin-W-8

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ 2 cm Muck (A10)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 5 cm Mucky Peat or Peat (S3)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ Coast Prairie Redox (A16)
- ___ Dark Surface (S7)
- ___ Iron-Manganese Masses (F12)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes _____ No _____

Remarks:

Do not assess soils in standing water. Assume hydric soils present

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- X Surface Water (A1)
- X High Water Table (A2)
- X Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ True Aquatic Plants (B14)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Gauge or Well Data (D9)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes X No _____ Depth (inches): 36

Water Table Present? Yes X No _____ Depth (inches): 0

Saturation Present? (includes capillary fringe) Yes X No _____ Depth (inches): 0

Wetland Hydrology Present? Yes X No _____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Appendix B. Site Photographs

DRAFT-Attorney Client Privileged

AECOM

PHOTOGRAPHIC LOG

Client Name: Dynegy Midwest Generation, LLC	**Site Location:** Hennepin Power Station (Hennepin, IL)	**Project No.** 60442970

Photo No. 1	**Date:** 10/08/2015

Direction Photo Taken:

Southwest

Description:

Hennepin-W-1 and Hennepin-W-2:
Looking at open water pond with surrounding wooded wetland fringe. Standing northeast of wetland.

Photo No. 2	**Date:** 10/08/2015

Direction Photo Taken:

Southeast

Description:

Hennepin-W-3:
Looking at forested wetland. Standing northwest of wetland. Open water pond in background within trees.

AECOM

PHOTOGRAPHIC LOG

Client Name: Dynegy Midwest Generation, LLC	**Site Location:** Hennepin Power Station (Hennepin, IL)	**Project No.** 60442970

Photo No. 3	**Date:** 10/08/2015

Direction Photo Taken:

Southwest

Description:

Hennepin-W-4:
Looking at emergent wetland. Standing northeast of wetland.

Photo No. 4	**Date:** 10/08/2015

Direction Photo Taken:

Southeast

Description:

Hennepin-W-5:
Looking across wooded wetland. Standing within center of mapped portion of wetland.

AECOM

PHOTOGRAPHIC LOG

Client Name: Dynegy Midwest Generation, LLC	**Site Location:** Hennepin Power Station (Hennepin, IL)	**Project No.** 60442970

Photo No. 5	**Date:** 10/08/2015

Direction Photo Taken:

Northeast

Description:

Hennepin-W-6:
Looking from within northwest portion of wetland, looking at water control structure.

Photo No. 6	**Date:** 10/08/2015

Direction Photo Taken:

Southeast

Description:

Hennepin-W-6:
Looking from within northwest portion of wetland, looking across wetland. Cocklebur in foreground and common reed in background.

AECOM

PHOTOGRAPHIC LOG

Client Name: Dynegy Midwest Generation, LLC	**Site Location:** Hennepin Power Station (Hennepin, IL)	**Project No.** 60442970

Photo No. 7	**Date:** 10/08/2015

Direction Photo Taken:

N/A

Description:

Illinois River along east bank of Hennepin Old West Polishing Pond and Old West Ash Pond No. 1 and No. 3. Note ordinary high water at grass/ tree line.

Photo No. 8	**Date:** 10/08/2015

Direction Photo Taken:

Northeast

Description:

Hennepin-W-7:
Looking at forested wetland from north edge of wetland. Standing at OHWM of Illinois River. Illinois River on left of frame.

AECOM

PHOTOGRAPHIC LOG

Client Name: Dynegy Midwest Generation, LLC	**Site Location:** Hennepin Power Station (Hennepin, IL)	**Project No.** 60442970

Photo No.	**Date:**
9	10/08/2015

Direction Photo Taken:

Southeast

Description:

Hennepin-W-8:
Looking at open water pond from northwest of the pond. Facility coal stockpile is to the left of the frame.

Photo No.	**Date:**
10	10/08/2015

Direction Photo Taken:

East

Description:

The Illinois River at Hennepin Ash Pond No. 2. Looking from the northwest buffer of the pond. Illinois River on left of frame. Ash Pond berm on right of frame.

About AECOM

AECOM (NYSE: ACM) is a global provider of professional technical and management support services to a broad range of markets, including transportation, facilities, environmental, energy, water and government. With nearly 100,000 employees around the world, AECOM is a leader in all of the key markets that it serves. AECOM provides a blend of global reach, local knowledge, innovation, and collaborative technical excellence in delivering solutions that enhance and sustain the world's built, natural, and social environments. A Fortune 500 company, AECOM serves clients in more than 100 countries and has annual revenue in excess of $19 billion.

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ATTACHMENT 3

Fault Areas

ATTACHMENT 4

Seismic Impact Zone

HALEY ALDRICH

HALEY ALDRICH	CALCULATIONS	File No.	129788-007
		Sheet	1 of 1
Client	Vistra Energy	Date	3-Aug-18
Project	Hennepin Power Station - East Ash Pond Seismic Impact Zone Evaluation	Computed by	RJW
Subject	Determination of Bedrock Peak Ground Acceleration	Checked by	EMS

Objective:

Determination of bedrock peak ground acceleration at East Ash Pond using USGS data.

Step 1

Using 2014 USGS gridded bedrock peak ground acceleration data, identify nearest four points in the USGS dataset surrounding East Ash Pond, along with their peak ground acceleration values.

Step 2

Calculate average bedrock ground acceleration based on four data points surrounding East Ash Pond.

Location	Latitude	Longitude	Bedrock PGA[1]
Center of Ash Pond	41.302	-89.304	--
Point 1	41.300	-89.300	0.0692001
Point 2	41.300	-89.350	0.0683008
Point 3	41.350	-89.300	0.0697071
Point 4	41.350	-89.350	0.0687614
		Average	**0.0689924**

Notes:

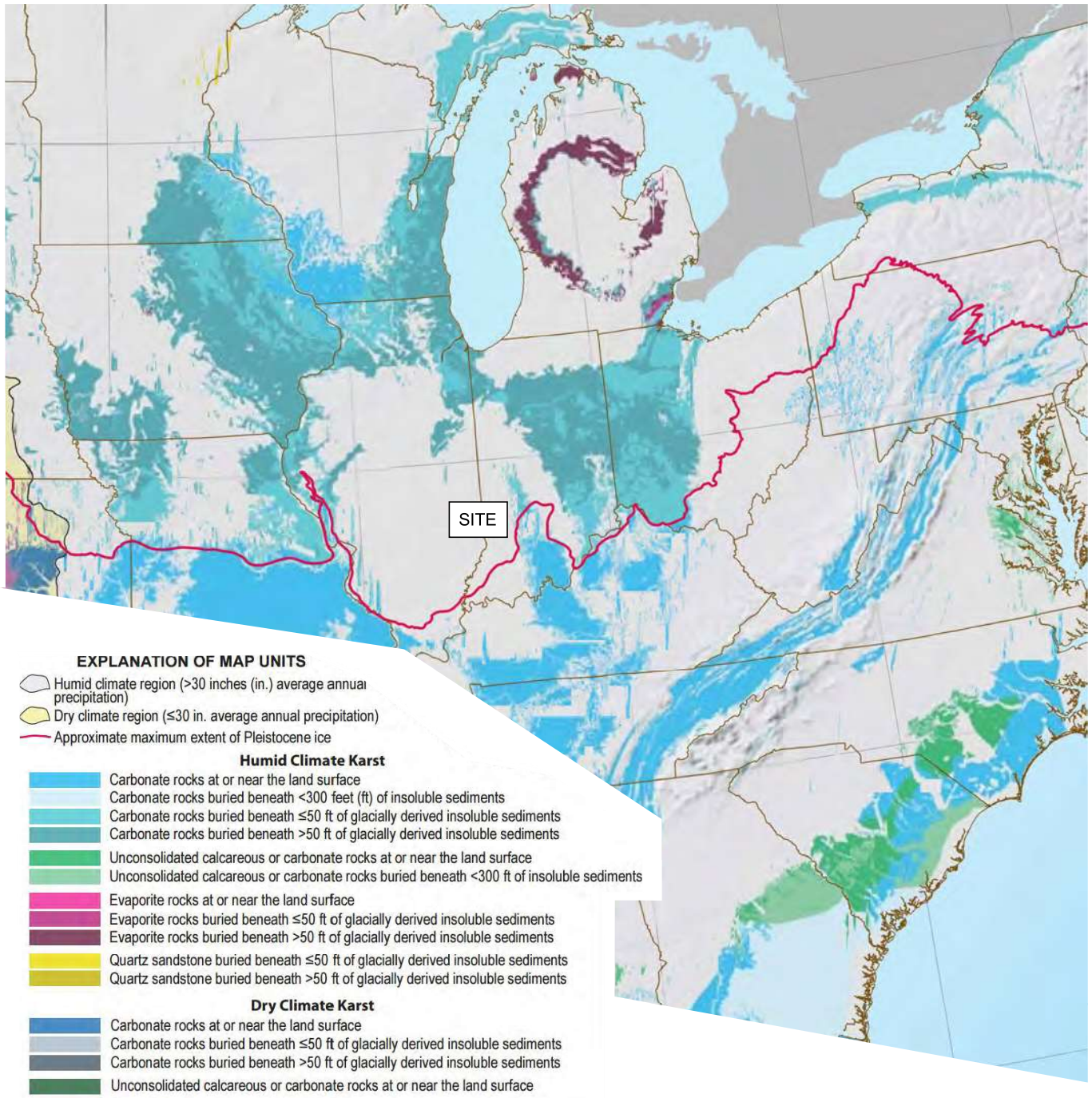
1) Bedrock PGA values are extracted from United States Geological Survey's (USGS) dataset of peak ground accelerations, representing two percent probability of exceedance in 50 years, that are used in USGS' 2014 National Seismic Hazard Map. USGS dataset available at: https://earthquake.usgs.gov/static/lfs/nshm/conterminous/2014/data/

ATTACHMENT 5

Unstable Areas

HALEY ALDRICH

Karst Supporting Documents



NOTES:

1. THIS FIGURE IS BASED ON FIGURE 1 FROM "KARST IN THE UNITED STATES: A DIGITAL MAP COMPILATION AND DATABASE," WRITTEN BY DAVID J. WEARY AND DANIEL H. DOCTOR AND PUBLISHED BY THE USGS IN 2014.

HALEY ALDRICH

VISTRA ENERGY
HENNEPIN POWER STATION - EAST ASH POND
HENNEPIN, ILLINOIS

USGS KARST MAP

SCALE: NOT TO SCALE
SEPTEMBER 2018

FIGURE 1

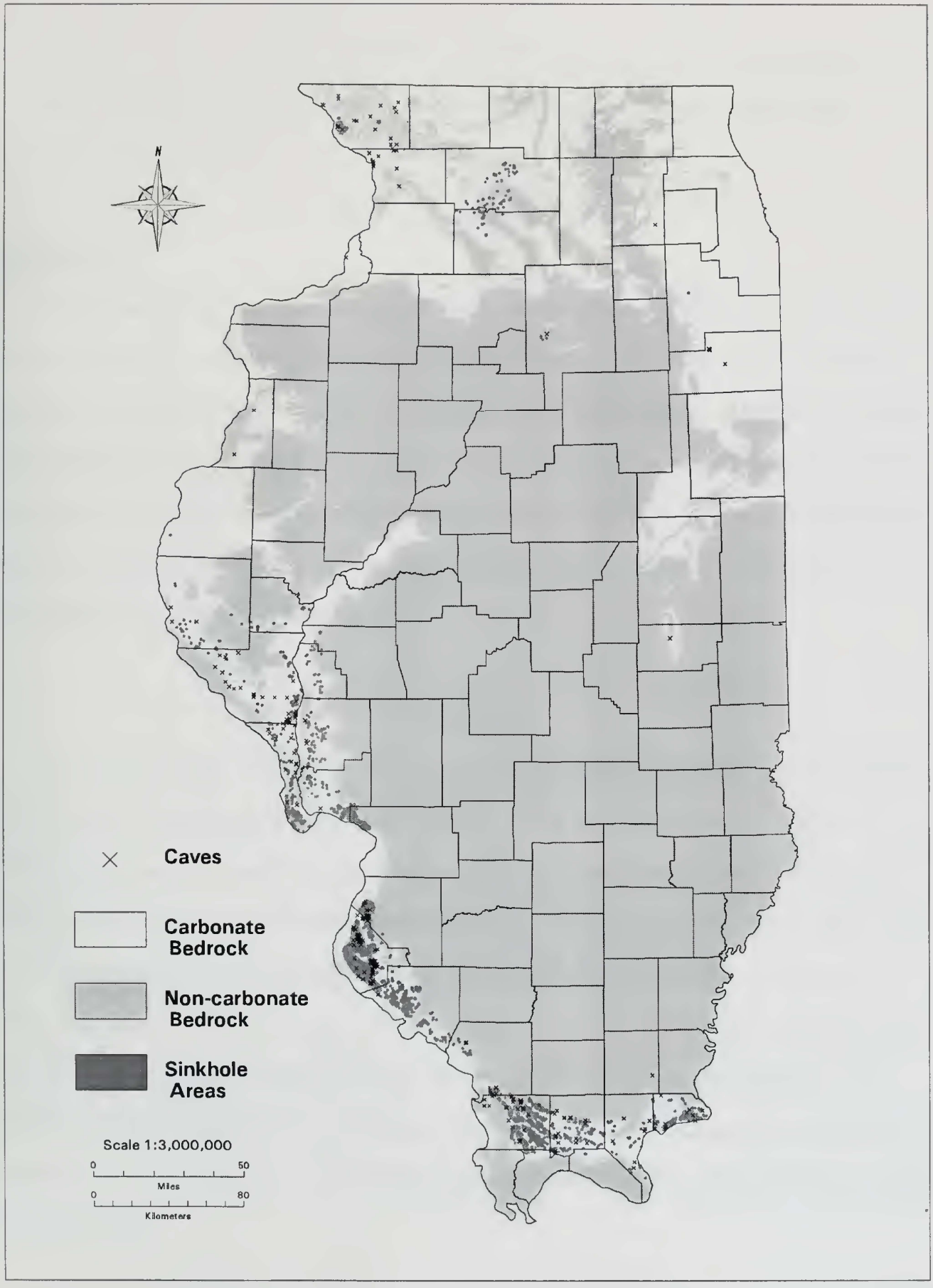
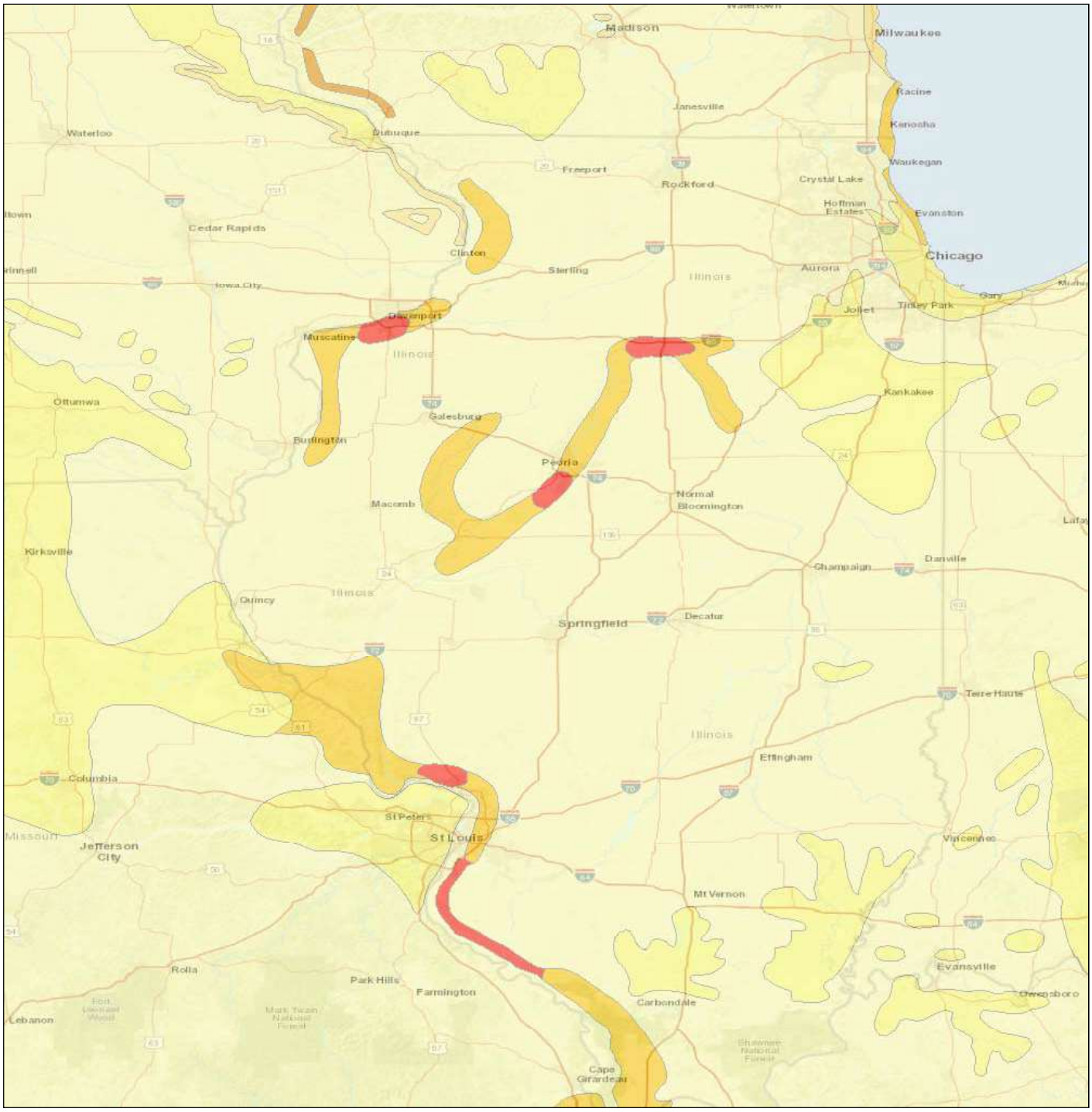


Figure 1. Map of the bedrock geology of Illinois showing sinkholes and caves (modified from Weibel and Panno, in press).

Landslides Supporting Documents



Landslide Incidence and Susceptibility

- High incidence
- High susceptibility, moderate incidence
- High susceptibility, low incidence
- Moderate incidence
- Moderate susceptibility, low incidence
- Low incidence
- No data

NOTE:

1. SOURCE: LANDLSIDE OVERVIEW MAP OF THE CONTERMINOUS UNITED STATES, U.S. GEOLOGICAL SURVEY, 1982.

HALEY ALDRICH

VISTRA ENERGY
HENNEPIN POWER STATION - EAST ASH POND
HAVANA, ILLINOIS

LANDSLIDE SUSCEPTIBILITY MAP

SCALE: NOT TO SCALE

SEPTEMBER 2018

FIGURE 2

DEPARTMENT OF THE INTERIOR
U.S. GEOLOGICAL SURVEY

ILLINOIS GEOLOGICAL SURVEY LIBRARY
DEC 6 1985

MISCELLANEOUS FIELD STUDIES
MAP MF-1691

Table 1.—Illinois landslides for which cost-of-damage information is available.

All damage information provided by Illinois Department of Transportation except for Clark County, provided by Watson (1924); Lawlaris, provided by a road foundation engineer; and Jo Daviess, provided by Illinois State Geological Survey. Landslide numbers refer to the same or nearest town to the landslide symbol on the map. All cost figures have been converted to 1982 dollars using the consumer price index (CPI) published by the Bureau of Statistics, Labor. Purchasing Power. Figures shaded in the computer display of the CPI, 1967=100. Landslide costs are arbitrarily allocated to the year the landsliding occurred.

County and number	Landslide	Date of landslide	Damage or Repair costs (1982 dollars)
Jo Daviess - 1	Earth slump	Spring 1911	$200,000 for road replacement
Carroll - 1	Mud slump with some talus	1928	$735,000 damage and repair costs for road and stream bank
Carroll - 2	Rock falls and slumps	1928	$29,400 for corrective measures during road construction
Clark - 1	Earth slump	1955	$90,000 damage
Cumberland - 1	Earth slump	1930	$90,000 damage
Cumberland - 2	Earth slump	1952	$78,000 damage
Fulton - 1	Earth slump on shale	1942	$525,000 estimated damage
Fulton - 6	Earth slump	1942	$29,000 loss or repair
Fulton - 7	Earth slump on bedrock	1972	$600,000-$28,000 cost of repair
Hancock - 7	Earth slump	Summer 1982	$780,000 cost of repair
Henry - 1	Earth slump on bedrock	1977	$1,279,000 estimated cost of repair
Jackson - 3	Earth flow	1982	$27,000 proposed remedial measures
Jackson - 2	Earth slump	Between	$28,000 remedial measures
La Salle - 1	Earth slump on bedrock	April 1981	$439,000 cost of repair
La Salle - 3	Rock slump	1938	$100,000 damage and repair costs
La Salle - 4	Earth slump on bedrock	1940	$500,000
La Salle - 5	Earth slump on bedrock	1972	$80,000-$3,000
Randolph - 1	Earth slump	1941	$241,000 damage $1,000 for similar slides in immediate area
Randolph - 6	Earth slump on shale	1982	$1,000,000 damage
Rock Island - 4	Rock slump	1974	$100,000 cost of repair
Rock Island - 5	Earth slump on bedrock	1974	$100,000 cost of repair
Schuyler - 2	Earth flow	1971	$4,200 damage repair
[illegible]	[illegible]	[illegible]	$25,000 for slope stabilization
Warren - 1	Peat flow	July 1952	$70,000 damage repair
Warren - 2	Rock and earth slumps	1970	$4,000 damage repair
Winnebago - 1	Sand flow	Until earlier	$728,000 estimated cost of repair
		Total:	$7,171,000 minimum cost

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EXPLANATION

Area of shingling and hatching where individual slides are too numerous to map. Dotted outline indicates approximate limit of landslide prone area and location of prominent individual slide not enumerated

Area of Pierian Limestone and Lower Devonian Chattanooga and Fern. (1978) mapped by Lineback (1979). Deposits resulting from creep and slope wash (Peyton Colluvium) and Rock slumps and landslides (Loess Formation)

Landslide inactive for past 130 years

Numbers refer to specific areas of Figure 1 given in Table 1. Number is located on open file at Illinois State Geological Survey

Landslide classification (adapted from Varnes, 1978)

NATURAL AND MAN-INDUCED	TYPE OF LANDSLIDE
■	□ Rock fall- Mostly rocks; may include some glacial material
▬	▭ Rock slump—Coherent block consisting of rock and soil involving little translation
▲	△ Earth slump—Rotary block consisting of glacial material
▲	▲ Earth slump on bedrock surface
◆	◇ Earth flow—Any form or earth or rock, regardless of rate of movement
●	○ Unclassified landslide
*	Rare events—Combined movement of boulders or barely perceptible earth

Scale 1:500,000

1 inch equals approximately 8 miles

0 5 10 15 20 25 30 Miles
0 10 20 30 40 50 60 70 80 90 Kilometers

CONTOUR INTERVAL 200 FEET
DATUM IS MEAN SEA LEVEL

ILLINOIS LANDSLIDE INVENTORY MAP

Compiled by
M.M. Killey, J. K. Hines, P. B. DuMontelle
Illinois State Geological Survey
and
Earl Brabb
U.S. Geological Survey

1984

Base map compiled, edited, and published by the U.S. Geological Survey. 1927 North American datum. Lambert conformal conic projection based on standard parallels 33° and 45°

Landslide data compiled in 1983

Interior—Geological Survey, Reston, Va.—1984
For sale by Branch of Distribution, U.S. Geological Survey, 1200 South Eads Street, Arlington, VA 22202

Mines Supporting Documents

ILLINOIS
Illinois State Geological Survey
PRAIRIE RESEARCH INSTITUTE

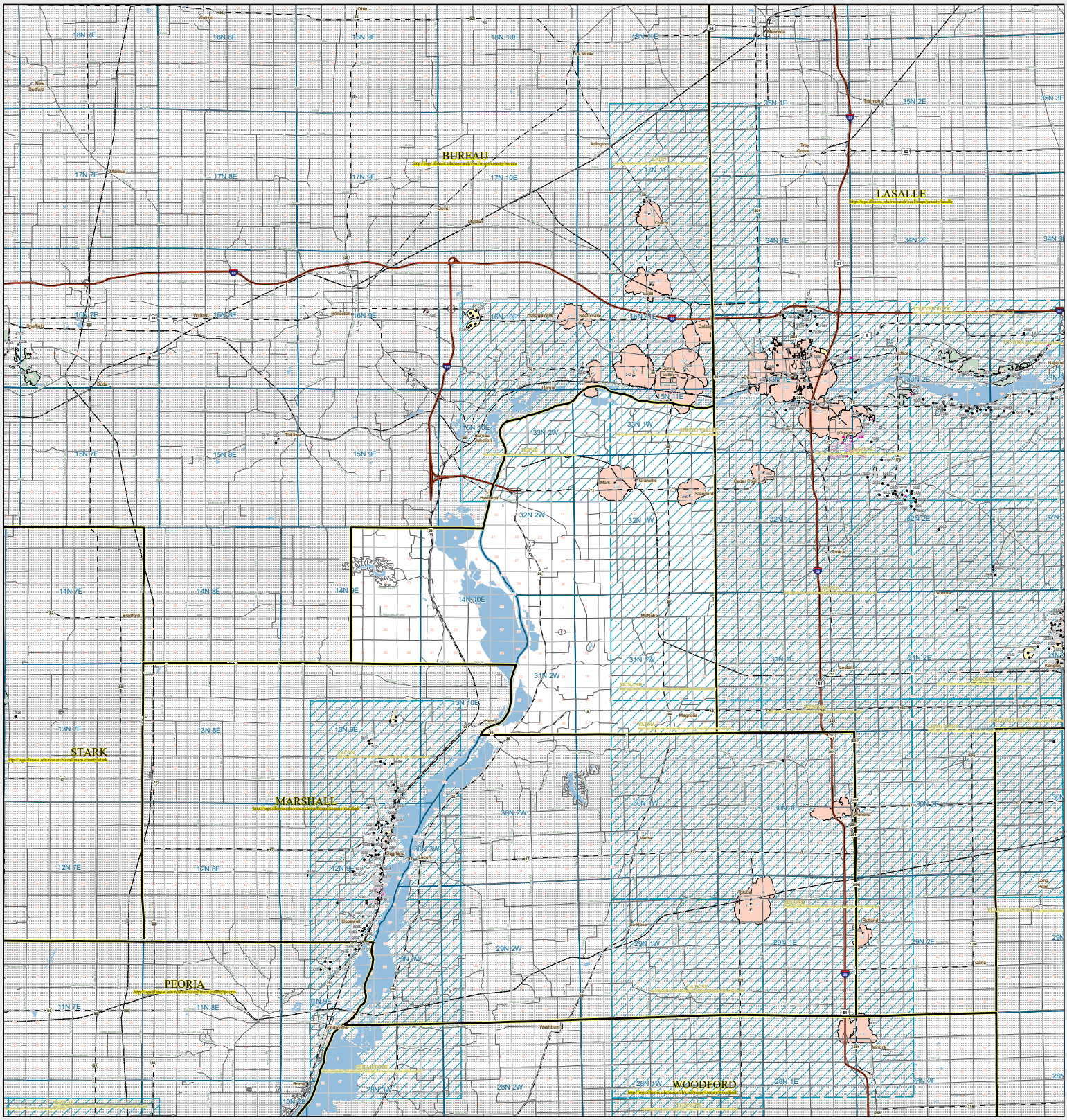
For further information contact:
Prairie Research Institute
Illinois State Geological Survey
University of Illinois at Urbana-Champaign
615 East Peabody Drive
Champaign, Illinois 61820-6964
(217) 333-4747
http://www.isgs.illinois.edu

Coal Mines and Industrial Mineral Mines
PUTNAM
County

County Coal Map Series
ISGS Coal Section
Map construction: July 20, 2018

This product is under review and may not meet the standards of the Illinois State Geological Survey.

County coal maps and select quadrangle maps available as downloadable PDF files at: http://www.isgs.illinois.edu



1:100,000
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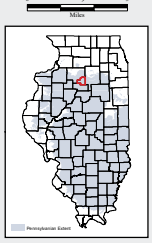

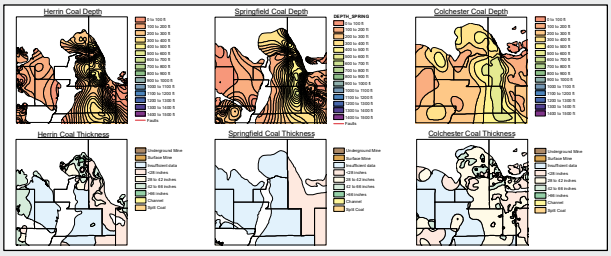

- County
- Township
- Section
- Quadrangle study (Available on Website)
- Lake or river
- Coal mine - active
- Underground coal mine - abandoned
- Surface coal mine - abandoned
- Indefinite underground coal mine boundary - abandoned
- Underground industrial mine and surrounding buffer region
- 951,951 Coal mine index number (polygon label, point label)
- Opening type unknown
- Uncertain location
- Active surface tipple
- Abandoned surface tipple
- Active shaft
- Abandoned shaft
- Active slope
- Abandoned slope
- Active drift
- Abandoned drift
- Underground industrial mine entrance or general location

Map Explanation

This map accompanies the coal mines directory for this county. Please consult the directory for an explanation of the coal mine information shown on this map. Buffer regions for industrial mineral mines were incorporated into this map due to limited information regarding these mines. The size of the buffer region is dependent on the uncertainty or inaccuracy of the mine location. For more information regarding industrial mineral mines please contact the ISGS Industrial Minerals Section.

The maps and digital files used for this study were compiled from data obtained from a variety of public and private sources and have varying degrees of completeness and accuracy. They present reasonable interpretations of the geology of the area and are based on available data. These data were compiled and digitized at a scale of 1:62,500. Locations of some features may be offset by 500 feet or more due to errors in the original source maps, the compilation process, digitizing, or a combination of these factors.

These data are not intended for use in site-specific screening or decision-making. Data included in this map are suitable for use at a scale of 1:100,000.

Disclaimer

The Illinois State Geological Survey and the University of Illinois make no guarantee, expressed or implied, regarding the correctness of the interpretations presented in this data set and accept no liability for the consequences of decisions made by others on the basis of the information presented here.

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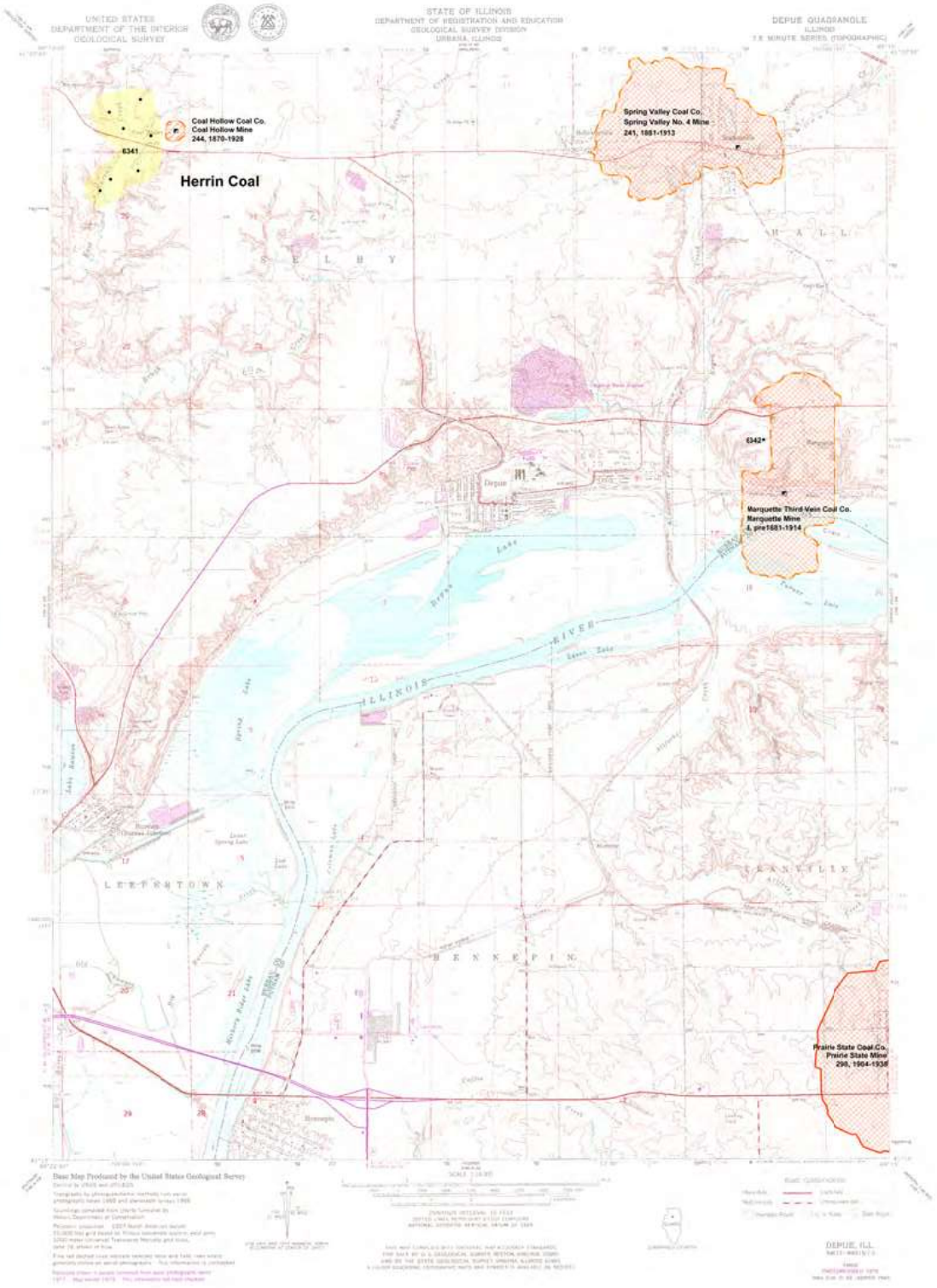


Coal Mines in Illinois
Depue Quadrangle
Bureau & Putnam Counties, Illinois

This map accompanies the Coal Mines Directory for the Depue Quadrangle. Consult the directory for a complete explanation of the information shown on this map.

Mining Method

- Room & Pillar (RP)
- Room & Pillar Basic (RPB)
- Modified Room & Pillar (MRP)
- Room & Pillar Panel (RPP)
- Blind Room & Pillar (BRP)
- Checkerboard Room & Pillar (CRP)
- High Extraction Retreat (HER)
- Longwall (LW)
- Underground, Method Unknown
- Strip Mine
- Auger Mine
- General Area of Mining

Source of Mine Outline

- Final Mine Map
- Not Final Mine Map
- Undated Mine Map
- Incomplete Mine Map
- Secondary Source Map

Tipple, Shaft, Slope, Drift Locations

- Strip Mine Tipple - Active
- Strip Mine Tipple - Abandoned
- Mine Shaft - Active
- Mine Shaft - Abandoned
- Mine Slope - Active
- Mine Slope - Abandoned
- Mine Drift - Active
- Mine Drift - Abandoned
- Air Shaft
- Uncertain Location
- Uncertain Type of Opening

Location

Mine Annotation
(space permiting)
Company
Mine Name
ISGS Index No., Years of Operation

Disclaimer

Please check the Coal Section at the Illinois State Geological Survey's web site at http://www.isgs.illinois.edu for the most up-to-date version of these products.

Note that each quadrangle scale mined-out area map requires the use of the associated text directory for full explanation of map features and mine attributes. Also note that some quadrangles have multiple seams of mining and therefore more than one map may be available for a particular quadrangle. Please take care to check for multiple maps, as extensive mining may exist in the other seams.

The maps and digital files used for these studies were compiled from data obtained from a variety of public and private sources and have varying degrees of completeness and accuracy. This compilation map presents reasonable interpretation of the geology of the area and is based on available data. Locations of some mine features may be offset by 500 feet or more due to errors in the original source maps, the compilation process, digitizing, or a combination of these factors. These data are not intended for use in site-specific screening or decision-making. Use of these documents does not eliminate the need for detailed studies to fully understand the geology of a specific site. The Illinois State Geological Survey, Institute of Natural Resource Sustainability, or the University of Illinois make no guarantee, expressed or implied, regarding the correctness of the interpretations presented in this data set and accept no liability for the consequences of decisions made by others on the basis of the information presented here.

These maps were designed for use at 1:24,000. Enlarging the map may reduce accuracy, as the original scale of the source maps used to compile the outlines shown varies from 1:400 to 1:150,000, and some mine locations are known only from text descriptions. See the accompanying mine directory for the original scale of the source map used for a specific mine to check accuracy of a given portion of the map. Areas with no mines shown may still be undermined; see the unlocated mines list at the back of each mine directory.

The image of the U.S.G.S. topographic base map was projected from the original UTM to Lambert Conformal Conic.

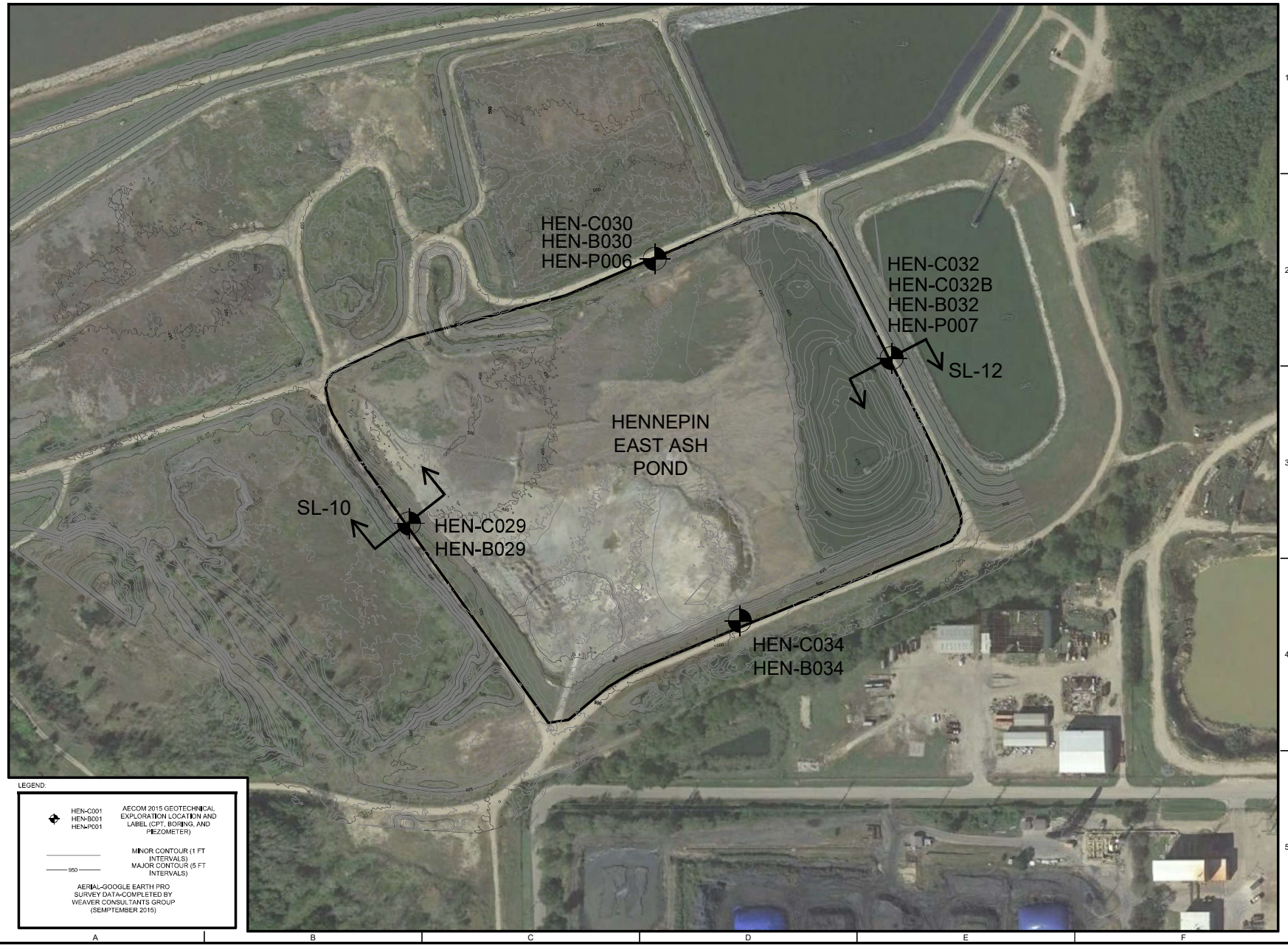
ILLINOIS
UNIVERSITY OF ILLINOIS AT URBANA-CHAMPAIGN

Institute of Natural Resource Sustainability
Illinois State Geological Survey
615 E. Peabody Dr.
Champaign, IL 61820

Mine Outlines Compiled by
Jennifer M. Obrad

December 10, 2009

Subsurface Exploration Logs



AECOM
555 N Main Street
Oshkosh, Wisconsin
920 235-0270 (phone)
920 235-0321 (fax)

DYNEGY
Dynegy Inc.
1500 East Port Plaza Drive
Collinsville, IL 62234

HENNEPIN POWER PLANT
HENNEPIN, ILLINOIS

N

0 125 250

SCALE IN FEET

ISSUED FOR BIDDING DATE BY

ISSUED FOR CONSTRUCTION DATE BY

REVISIONS

NO.	DESCRIPTION	DATE
△		
△		
△		
△		
△		

AECOM PROJECT NO:	60439752
DRAWN BY:	TPB
DESIGNED BY:	TPB
CHECKED BY:	SRA
DATE CREATED:	2/25/2016
PLOT DATE:	2/26/2016
SCALE:	AS SHOWN
ACAD VER:	2014

SHEET TITLE

OVERALL
GEOTECHNICAL
SITE PLAN

FIGURE 2

AECOM DRAWING PATH: K:\Projects\60427894--Dynegy\000--WORKING DOCS--CAD\002--SHEETS\30E Design Sheets_Esri\Draft Geotechnical Report for Dynegy Hennepin Ash Pond CCR Unit\REV 2--1 OVERALL GEOTECHNICAL SITE PLAN.dwg
BRAND, TRAVIS, 2/26/2016 8:40 AM

Report: GEO_SOIL; File P:\PROJECTS\GEOTECH\60428794_DYNEGYCCR\21_REVISED_CERT_REPORTS\08_HEN\REV 1\GEOTECH\ATTACHMENT REVISIONS\ATT. A&B_FIGURES-GINT\60439752_HENNEPINDYNEGYBORINGLOGS_EAST ASH POND.GPJ; 9/22

Project: Hennepin Power Station

Project Location: Hennepin, Illinois
Project Number: 60439752

Log of Boring HEN-B029

Date(s) Drilled	12:00AM 10/01/2015 to 12:00AM 10/01/2015	Logged By	Robert Weseljak	Checked By	AJW
Drilling Method	Mud Rotary	Drilled By	S. Komen	Borehole Depth	41.5 '
Drill Rig Type	Mobile 57 Truck Mounted	Drilling Contractor	Strata Earth Services	Surface Elevation	499.7 ' (NAVD88)
Borehole Backfill	Portland Cement and Grout	Drill Bit Size/Type	3 7/8" Tricone Roller Bit	Hammer Data	Automatic, 140 lbs, 30" drop
Boring Location	N 1689435.679 E 2533022.216 (NAD83)	Sampling Method(s)	Split Spoon/3" Thin Walled Tube	Groundwater Level(s)	Not Encountered

Elevation (feet)	Depth (feet)	SAMPLES Type	Number	Sampling Resist. OR Core RQD (%)	Recovery (%)	Graphic Symbol	MATERIAL DESCRIPTION	Natural Moisture Content (%)	Total Unit Weight (pcf)	Liquid Limit	Plasticity Index	Pocket Pen. Su (ksf)	Torvane Su (ksf)	TXUU, Su (ksf)	REMARKS
							Elevation (feet) 499.7 — Depth (feet) 0.0								
	0	SS	SS-1	24 28 34	556		Very dense, dry, brown, silty GRAVEL (GM) [Road Fill].	4.7							
	2						497.2 — 2.5								
	4	SS	SS-2	10 6 11	556		Stiff to very stiff, dry, brown to very dark brown and gray, lean CLAY (CL) with sand and gravel [Embankment Fill].	14.7				4.5			
495															
	6	ST	ST-3		417			10.8		22	7	4.5			*Pushed shelby tube from 5.0 to 7.0 feet*
	8	SS	SS-4	12 14 17	556			14.8				4.0			
490	10	ST	ST-5		417			16.7		31	14	2.5			*Pushed shelby tube from 10.0 to 12.0 feet*
	12														
	14														
485							484.7 — 15.0								
	16	SS	SS-6	4 6 8	461		Stiff, dark brown with trace rust, lean CLAY (CL), trace fine to coarse gravel [Embankment Fill].	21.7				1.5			
	18														
480	20						479.5 — 20.2								
		SS	SS-7	6 12 20	433		Dense, dry, brown, clayey GRAVEL with sand (GP-GC).	11.5				1.5			
	22														
	24														
475															
	26	SS	SS-8	17 17 43	311			8.8							
	28														
470	30														

Report: GEO_SOIL; File P:\PROJECTS\GEOTECH\60428794_DYNEGYCCR\21_REVISED_CERT_REPORTS\08_HEN\REV 1\GEOTECH\ATTACHMENT REVISIONS\ATT. A&B_FIGURES-GINT\60439752_HENNEPINDYNEGYBORINGLOGS_EAST ASH POND.GPJ; 9/22

Project: Hennepin Power Station

Project Location: Hennepin, Illinois
Project Number: 60439752

Log of Boring HEN-B029

Elevation (feet)	Depth (feet)	SAMPLES Type Number	Sampling Resist. OR Core RQD (%)	Recovery (%)	Graphic Symbol	MATERIAL DESCRIPTION (Elevation (feet) / Depth (feet))	Natural Moisture Content (%)	Total Unit Weight (pcf)	Liquid Limit	Plasticity Index	Pocket Pen. Su (ksf)	Torvane Su (ksf)	TXUU, Su (ksf)	REMARKS
	30	SS-9	29 50/5"	122			12.7							*Less fines in Sample 9*
	32													
	34													
465														
	36	SS-10	20 25 28	339			13.8							
	38													
460	40	SS-11	16 14 15	33			4.6							
						458.2 / 41.5								
	42					End of Boring at 41.5 '								*Boring backfilled with 94 pounds of Portland Cement and 25 pounds of bentonite*
	44													
455														
	46													
	48													
450	50													
	52													
	54													
445														
	56													
	58													
440	60													
	62													
	64													
435														

Report: GEO_SOIL; File P:\PROJECTS\GEOTECH\60428794_DYNEGYCCR\21_REVISED_CERT_REPORTS\08_HEN\REV 1\GEOTECH\ATTACHMENT REVISIONS\ATT. A&B_FIGURES-GINT\60439752_HENNEPINDYNEGYBORINGLOGS_EAST ASH POND.GPJ; 9/22

Project: Hennepin Power Station

Project Location: Hennepin, Illinois
Project Number: 60439752

Log of Boring HEN-B030

Date(s) Drilled	12:00AM 09/29/2015 to 12:00AM 09/30/2015	Logged By	Norm Seiler	Checked By	AJW
Drilling Method	Hollow-Stem Auger	Drilled By	S. Komen	Borehole Depth	41.5 '
Drill Rig Type	Mobile 57 Truck Mounted	Drilling Contractor	Strata Earth Services	Surface Elevation	495.4 ' (NAVD88)
Borehole Backfill	Portland Cement and Grout	Drill Bit Size/Type	3 7/8" Tricone Roller Bit	Hammer Data	Automatic, 140 lbs, 30" drop
Boring Location	N 1690014.94 E 2533585.318 (NAD83)	Sampling Method(s)	Split Spoon/3" Thin Walled Tube	Groundwater Level(s)	33.0 ' at 12:00AM on 09/30/2016

Elevation (feet)	Depth (feet)	SAMPLES Type	Number	Sampling Resist. OR Core RQD (%)	Recovery (%)	Graphic Symbol	MATERIAL DESCRIPTION	Natural Moisture Content (%)	Total Unit Weight (pcf)	Liquid Limit	Plasticity Index	Pocket Pen. Su (ksf)	Torvane Su (ksf)	TXUU, Su (ksf)	REMARKS
							Elevation (feet) 495.4 / Depth (feet) 0.0								
495	0	SS	SS-1	22 17 37	461		Very Dense, Brownish gray sand, gravel, and clay [Fill].	7.0							
	2						492.9 / 2.5								
		SS	SS-2	15 17 15	372		Dense, Brown and light brown, silty sand with gravel (SM) [Fill].	6.4							
	4						491.4 / 4.0								
490							Very Dense, Dark gray silty SAND (SM) with trace gravel, sand, and clay, with ASH [Fill].								
	6	SS	SS-3	18 20 30	461			11.5							
	8	SS	SS-4	4 5 6	556		Becomes medium dense	17.1							
							485.4 / 10.0								9.0 feet: Wet
485	10	ST	ST-5		275		Black ASH with gravel [Fill].	18.1							Pushed shelby tube from 10.0 to 11.0 feet 10.0 feet: Switch to mud rotary
	12														
	14						480.4 / 15.0								
480		SS	SS-6	11 11 16	311		Medium dense, light brown and tan, well graded GRAVEL with sand (GW) [Embankment Fill].	17.6							
	16														
	18														
	20						475.4 / 20.0								
475		SS	SS-7	3 4 7	122		Soft, dark gray and rust CLAY (CL) with organics and wood.	23.9							
	22														
	24						470.4 / 25.0								
470		SS	SS-8	30 36 40	494		Dense to very dense, brown and some black, clayey fine to coarse GRAVEL (GC) with sand.	11.2							25.0 feet - Drillers note - rock pieces in Sample 8
	26														
	28														
	30														

Report: GEO_SOIL; File P:\PROJECTS\GEOTECH\60428794_DYNEGYCCR\21_REVISED_CERT_REPORTS\08_HEN\REV 1\GEOTECH\ATTACHMENT REVISIONS\ATT. A&B_FIGURES-GINT\60439752_HENNEPINDYNEGYBORINGLOGS_EAST ASH POND.GPJ; 9/22

Project: Hennepin Power Station

Project Location: Hennepin, Illinois
Project Number: 60439752

Log of Boring HEN-B030

Elevation (feet)	Depth (feet)	SAMPLES Type Number	Sampling Resist. OR Core RQD (%)	Recovery (%)	Graphic Symbol	MATERIAL DESCRIPTION	Natural Moisture Content (%)	Total Unit Weight (pcf)	Liquid Limit	Plasticity Index	Pocket Pen. Su (ksf)	Torvane Su (ksf)	TXUU, Su (ksf)	REMARKS
465	30	SS-9	56	42										
	32													
	34													*33.0 feet - Drillers note - water level at 33.0 feet and dropping*
460	36	SS-10	7 8 25	211			8.9							
	38													
	40	SS-11	20 46 27				9.0							
455	42					453.9 / 41.5 End of Boring at 41.5 '								*Boring backfilled with 2 batches Portland Cement and bentonite grout*
	44													
450	46													
	48													
	50													
445	52													
	54													
440	56													
	58													
	60													
435	62													
	64													

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Project: Hennepin Power Station

Project Location: Hennepin, Illinois
Project Number: 60439752

Log of Boring HEN-B032

Date(s) Drilled	12:00AM 09/30/2015 to 12:00AM 09/30/2015	Logged By	Robert Weseljak	Checked By	AJW
Drilling Method	Mud Rotary	Drilled By	S. Komen	Borehole Depth	41.5 '
Drill Rig Type	Mobile 57 Truck Mounted	Drilling Contractor	Strata Earth Services	Surface Elevation	494.3 ' (NAVD88)
Borehole Backfill	Portland Cement and Grout	Drill Bit Size/Type	3 7/8" Tricone Roller Bit	Hammer Data	Automatic, 140 lbs, 30" drop
Boring Location	N 1689837.064 E 2534055.482 (NAD83)	Sampling Method(s)	Split Spoon/3" Thin Walled Tube	Groundwater Level(s)	Not Encountered

Elevation (feet)	Depth (feet)	SAMPLES Type	Number	Sampling Resist. OR Core RQD (%)	Recovery (%)	Graphic Symbol	MATERIAL DESCRIPTION	Natural Moisture Content (%)	Total Unit Weight (pcf)	Liquid Limit	Plasticity Index	Pocket Pen. Su (ksf)	Torvane Su (ksf)	TXUU, Su (ksf)	REMARKS
							Elevation (feet) 494.3 — Depth (feet) 0.0								
	0	SS	SS-1	32 29 20	372		Very dense, dry, brown, fine to coarse well graded GRAVEL with silt and sand [Fill]. 493.3 — 1.0	2.7				4.5			
	2						Hard, dry, dark brownish gray, Lean CLAY (CL)with sand and gravel [Embankment Fill]								
	4	SS	SS-2	6 18 17	556			9.7				3.5			
490															
	6	ST	ST-3		329			14.0		35	17	4.5			*Pushed shelby tube from 5.0 to 7.0 feet*
	8	SS	SS-4	8 12 16	556			16.7				3.5			
485															
	10	SS	SS-5	8 16 20	244			16.2				0.5			*10.0 feet: Coarse gravel*
	12														
480	14						479.3 — 15.0								
	16	SS	SS-6	19 39 43	400		Very dense, moist, brown, Silty SAND (SM) with gravel.	8.2							
	18														
475															
	20	SS	SS-7	18 36 50/3"	339			11.1							
	22														
470	24														
	26	SS	SS-8	98 35 50/4"	433			9.1							*24.5: Drillers Note - boulder from 24.5 to 25.2 feet*
	28														
465															
	30						464.3 — 30.0								

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Project: Hennepin Power Station

Project Location: Hennepin, Illinois
Project Number: 60439752

Log of Boring HEN-B032

Elevation (feet)	Depth (feet)	SAMPLES: Type Number	SAMPLES: Sampling Resist. OR Core RQD (%)	SAMPLES: Recovery (%)	Graphic Symbol	MATERIAL DESCRIPTION (Elevation (feet) / Depth (feet))	Natural Moisture Content (%)	Total Unit Weight (pcf)	Liquid Limit	Plasticity Index	Pocket Pen. Su (ksf)	Torvane Su (ksf)	TXUU, Su (ksf)	REMARKS
	30	SS-9	18 11 30	556		Hard, moist, brown, fine to coarse gravelly lean CLAY (CL).	10.6				3.0 4.5			
	32													
	34													
460						459.3 / 35.0								
	36	SS-10	41 28 40	372		Very dense, moist, brown and black, clayey fine to coarse Silty SAND (SM) with gravel.	5.5							
	38													
455														
	40	SS-11	12 18 50/4"	400			10.9							
						452.8 / 41.5								
	42					End of Boring at 41.5 '								*Boring backfilled with 94 pounds of Portland Cement and 25 pounds of bentonite*
	44													
450														
	46													
	48													
445														
	50													
	52													
	54													
440														
	56													
	58													
435														
	60													
	62													
	64													
430														

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Project: Hennepin Power Station

Project Location: Hennepin, Illinois
Project Number: 60439752

Log of Boring HEN-B034

Date(s) Drilled	12:00AM 09/30/2015 to 12:00AM 10/01/2015	Logged By	Robert Weseljak	Checked By	AJW
Drilling Method	Mud Rotary	Drilled By	S. Komen	Borehole Depth	41.5 '
Drill Rig Type	Mobile 57 Truck Mounted	Drilling Contractor	Strata Earth Services	Surface Elevation	499.3 ' (NAVD88)
Borehole Backfill	Portland Cement and Grout	Drill Bit Size/Type	3 7/8" Tricone Roller Bit	Hammer Data	Automatic, 140 lbs, 30" drop
Boring Location	N 1689245.6 E 2533830.734 (NAD83)	Sampling Method(s)	Split Spoon/3" Thin Walled Tube	Groundwater Level(s)	Not Encountered

Elevation (feet)	Depth (feet)	SAMPLES Type	Number	Sampling Resist. OR Core RQD (%)	Recovery (%)	Graphic Symbol	MATERIAL DESCRIPTION	Natural Moisture Content (%)	Total Unit Weight (pcf)	Liquid Limit	Plasticity Index	Pocket Pen. Su (ksf)	Torvane Su (ksf)	TXUU, Su (ksf)	REMARKS
	0						Elevation (feet) 499.3 / Depth (feet) 0.0								
			SS-1	25 19 21	556		498.8 Very dense, dry, brown, silty SAND (SM) [Fill]. 0.5 Hard, dry, black, gravelly lean CLAY (CL) [Fill].	4.2				1.5 2.5			
	2														
			SS-2	7 8 11	556			14.2				3.5 4.5			
495	4						494.3 5.0								
			SS-3	17 28 32	556		493.8 Dense, dry, brown, silty SAND (SM). 5.5 Very dense, moist, brown to gray, silty fine to coarse GRAVEL (GP-GM) with silt [Embankment Fill].	15.9							
	6														
			SS-4	11 18 32	556			2.5							
490	8														
	10		SS-5	27 35 18	311			11.2							
	12														
485	14														
			SS-6	21 24 25	244			9.1							
	16														
	18														
480	20						479.3 20.0								
			SS-7	10 11 9	244		Medium dense, dry, silty fine to coarse GRAVEL (GM).	12.5							
	22														
475	24														
			SS-8	11 13 16	33										
	26														
	28														
470	30						469.3 30.0								

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Project: Hennepin Power Station

Project Location: Hennepin, Illinois
Project Number: 60439752

Log of Boring HEN-B034

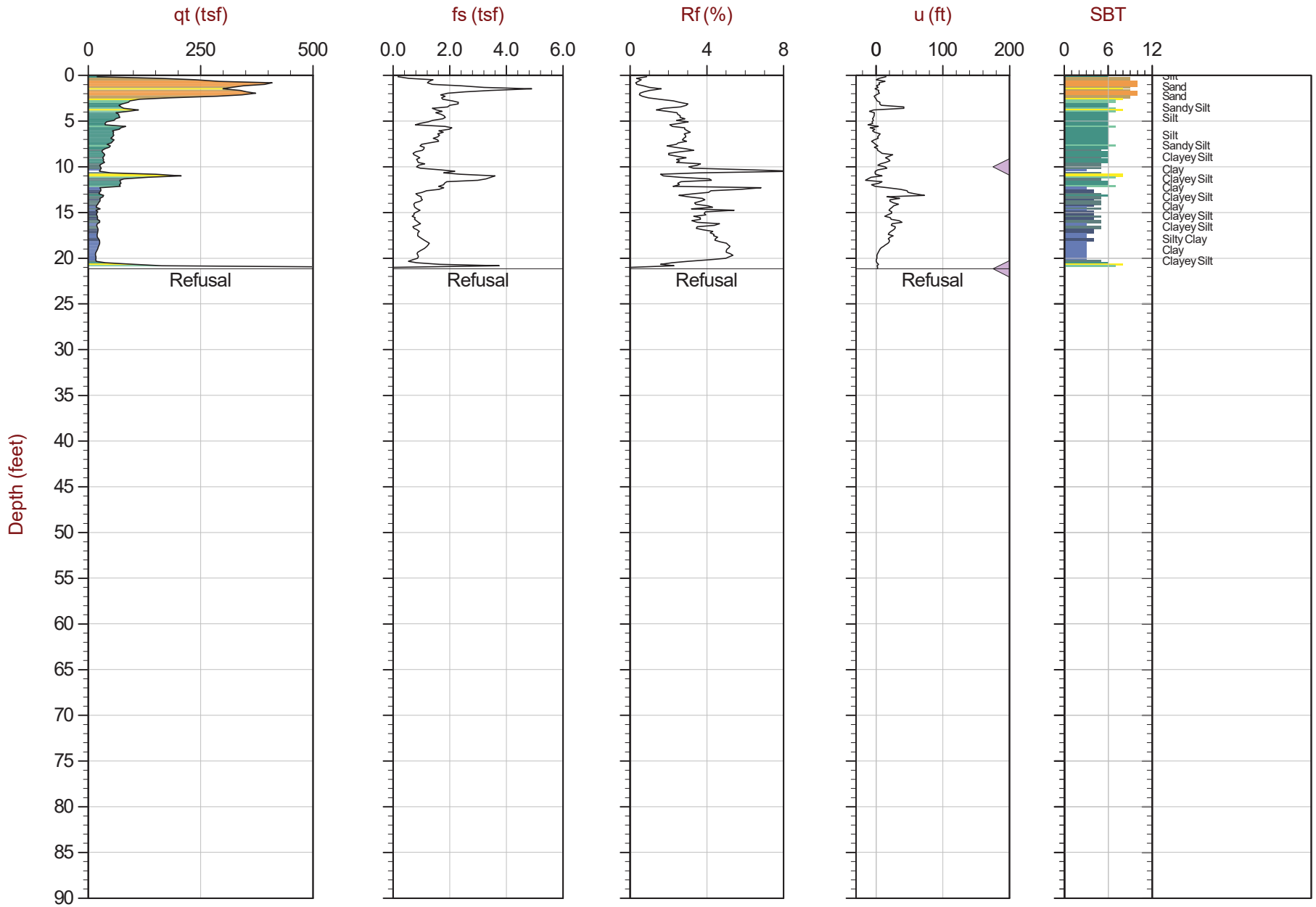
Elevation (feet)	Depth (feet)	SAMPLES Type Number	Sampling Resist. OR Core RQD (%)	Recovery (%)	Graphic Symbol	MATERIAL DESCRIPTION (Elevation (feet) / Depth (feet))	Natural Moisture Content (%)	Total Unit Weight (pcf)	Liquid Limit	Plasticity Index	Pocket Pen. Su (ksf)	Torvane Su (ksf)	TXUU, Su (ksf)	REMARKS
465	30	SS-9	14 14 12	122		Medium dense, moist to wet, light brown and tan, poorly graded GRAVEL (GP-GM) with sand and silt.	13.6							
	32													
	34													
	36	SS-10	9 11 10	372			10.9							
	38													
460	40	SS-11	10 8 9	94		457.8 / 41.5	1.5							
	42					End of Boring at 41.5 '								*Boring backfilled with 94 pounds of Portland Cement and 25 pounds of bentonite*
	44													
455	46													
	48													
	50													
450	52													
	54													
	56													
445	58													
	60													
	62													
440	64													
435														

CONETEC

AECOM

Job No: 15-53081
Date: 09:01:15 15:44
Site: Hennepin Power Station, Hennepin, IL

Sounding: HEN-C029
Cone: 374:T1500F15U500



Max Depth: 6.450 m / 21.16 ft
Depth Inc: 0.050 m / 0.164 ft
Avg Int: Every Point

File: 15-53081_CP29.COR

SBT: Robertson and Campanella, 1986
Coords: UTM Zone 16 N: 4574869m E: 306935m

Hydrostatic Line ○ Ueq ● Assumed Ueq ◁ PPD, Ueq achieved ◁ PPD, Ueq not achieved

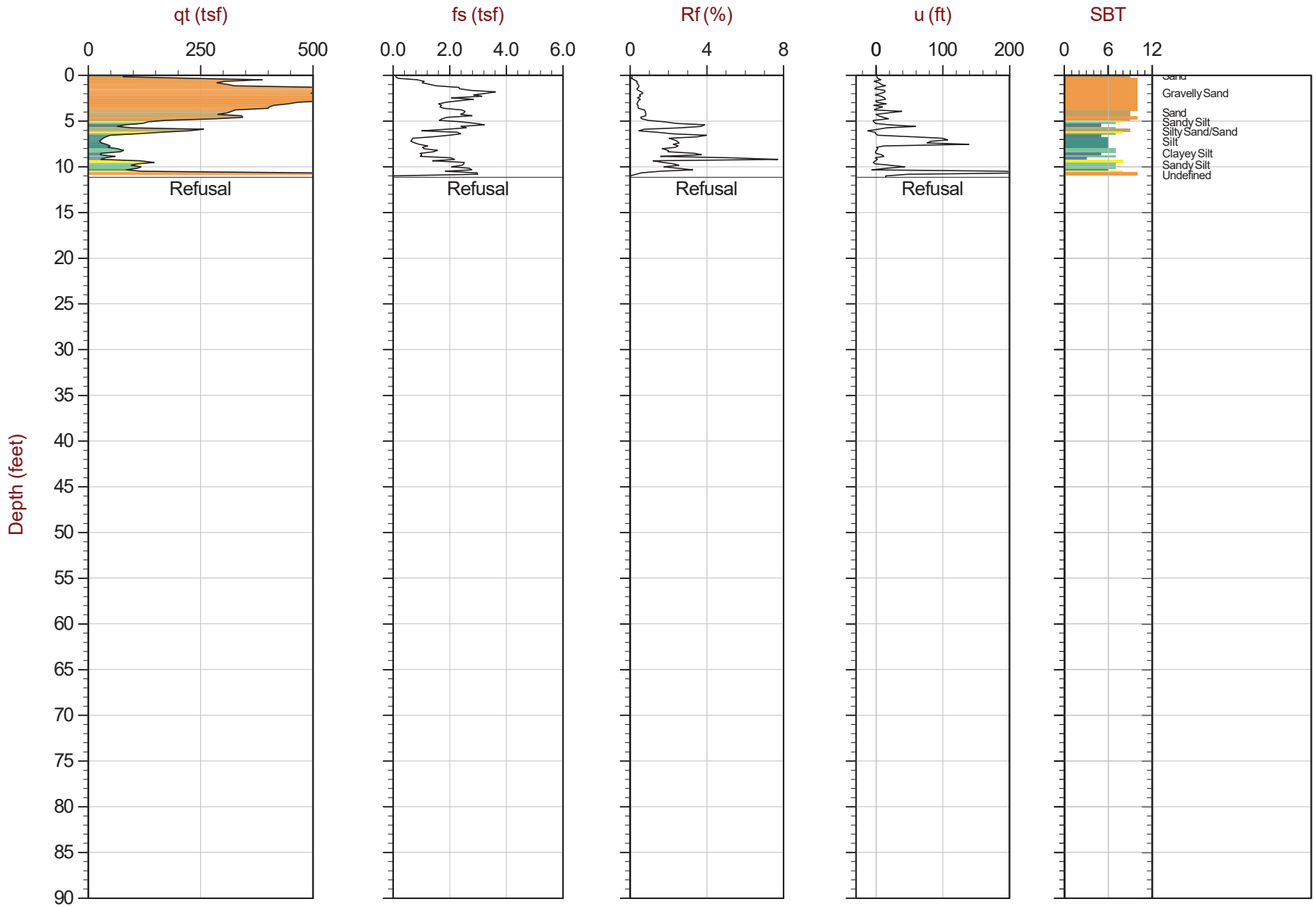
The reported coordinates were acquired from consumer-grade GPS equipment and are only approximate locations. The coordinates should not be used for design purposes.

CONETEC

AECOM

Job No: 15-53081
Date: 09:02:15 14:24
Site: Hennepin Power Station, Hennepin, IL

Sounding: HEN-C030
Cone: 374:T1500F15U500



Max Depth: 3.400 m / 11.15 ft
Depth Inc: 0.050 m / 0.164 ft
Avg Int: Every Point

File: 15-53081_SP30.COR

SBT: Robertson and Campanella, 1986
Coords: UTM Zone 16 N: 4575040m E: 307109m

Hydrostatic Line Ueq Assumed Ueq PPD, Ueq achieved PPD, Ueq not achieved

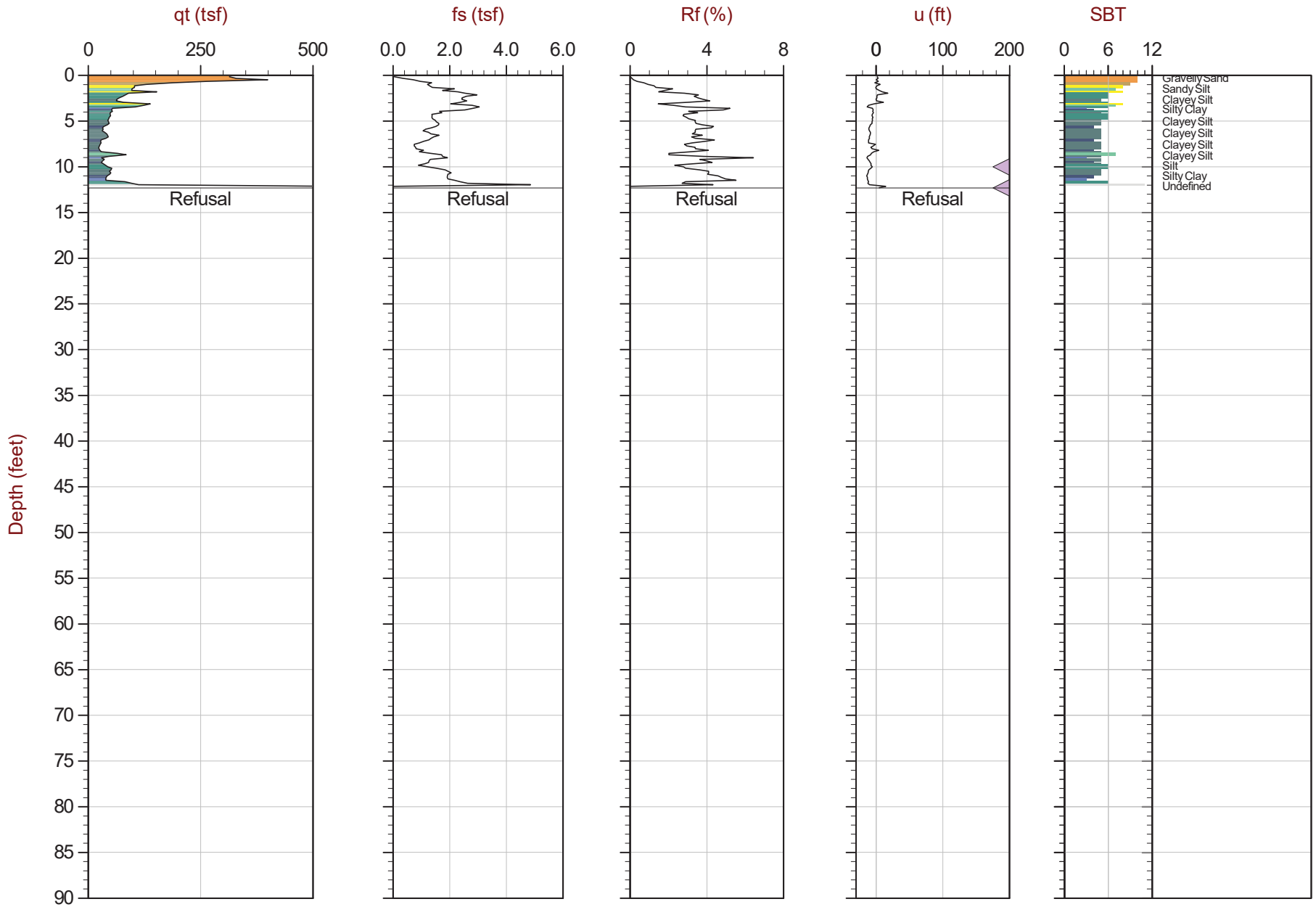
The reported coordinates were acquired from consumer-grade GPS equipment and are only approximate locations. The coordinates should not be used for design purposes.

CONETEC

AECOM

Job No: 15-53081
Date: 09:02:15 10:27
Site: Hennepin Power Station, Hennepin, IL

Sounding: HEN-C032
Cone: 374:T1500F15U500



Max Depth: 3.750 m / 12.30 ft
Depth Inc: 0.050 m / 0.164 ft
Avg Int: Every Point

File: 15-53081_CP32.COR

SBT: Robertson and Campanella, 1986
Coords: UTM Zone 16 N: 4574980m E: 307252m

Hydrostatic Line ○ Ueq ● Assumed Ueq ◁ PPD, Ueq achieved ◁ PPD, Ueq not achieved

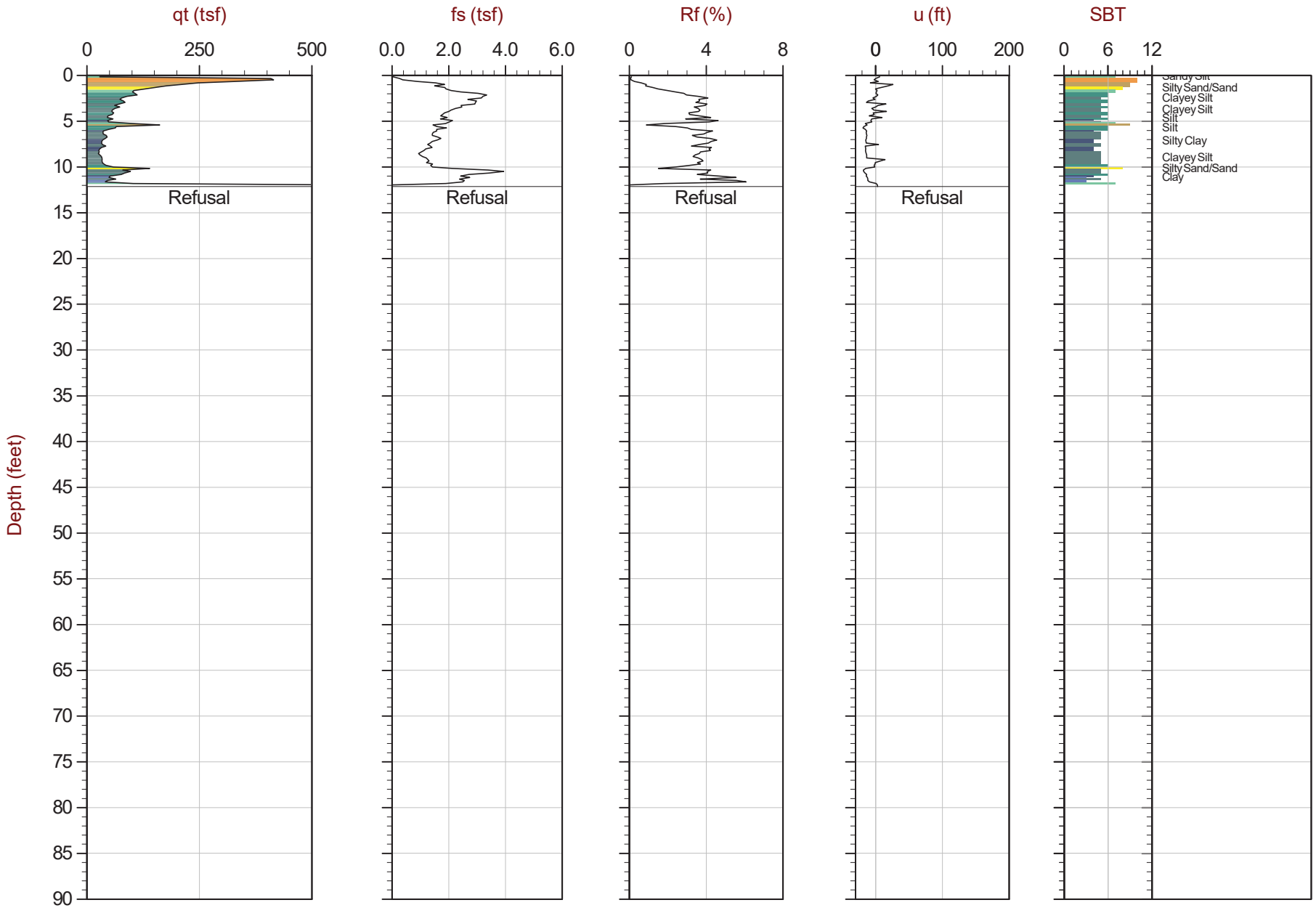
The reported coordinates were acquired from consumer-grade GPS equipment and are only approximate locations. The coordinates should not be used for design purposes.

CONETEC

AECOM

Job No: 15-53081
Date: 09:02:15 11:26
Site: Hennepin Power Station, Hennepin, IL

Sounding: HEN-C032B
Cone: 374:T1500F15U500



Max Depth: 3.700 m / 12.14 ft
Depth Inc: 0.050 m / 0.164 ft
Avg Int: Every Point

File: 15-53081_CP32B.COR

SBT: Robertson and Campanella, 1986
Coords: UTM Zone 16 N: 4574980m E: 307253m

Hydrostatic Line Ueq Assumed Ueq PPD, Ueq achieved PPD, Ueq not achieved

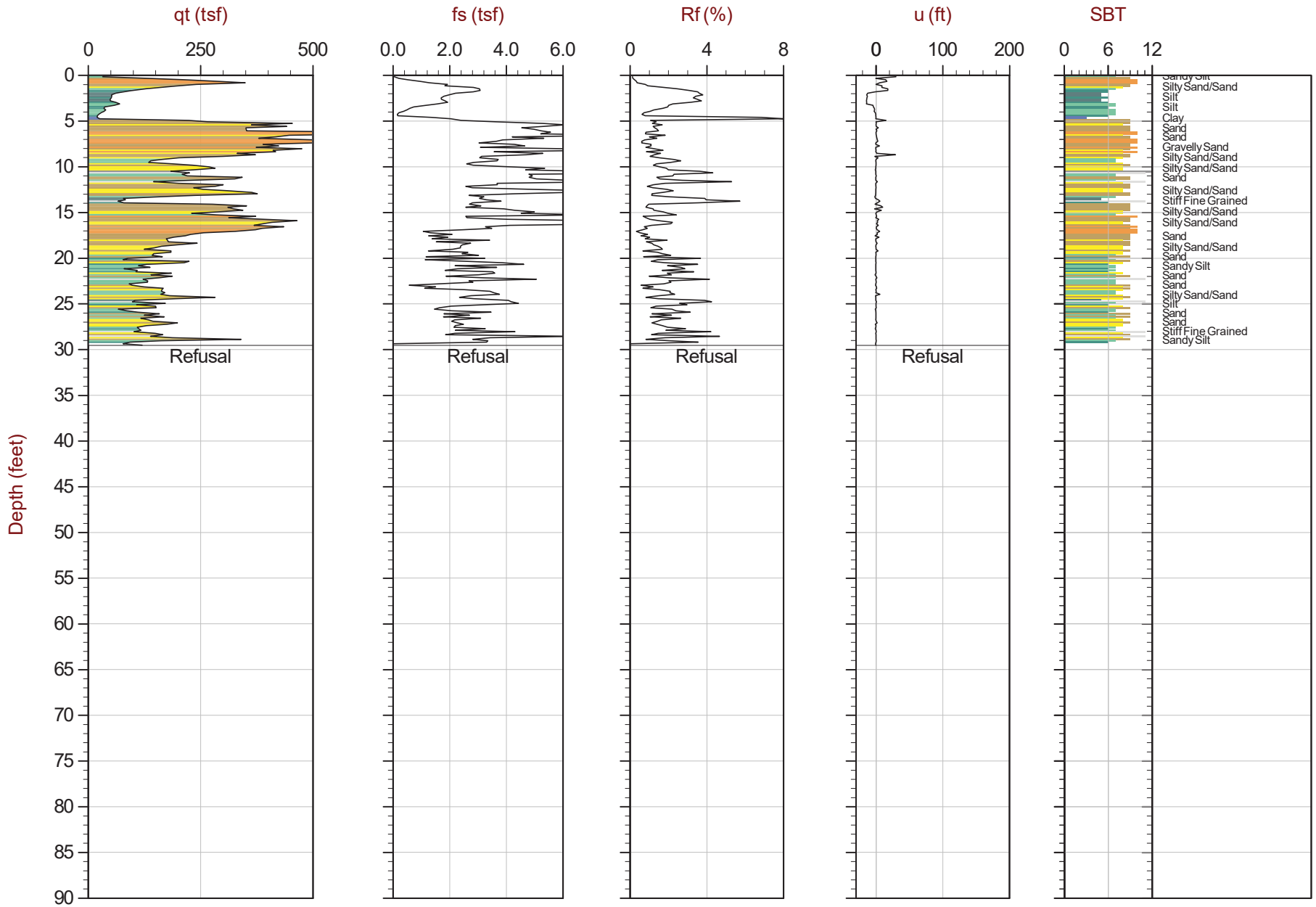
The reported coordinates were acquired from consumer-grade GPS equipment and are only approximate locations. The coordinates should not be used for design purposes.

CONETEC

AECOM

Job No: 15-53081
Date: 09:02:15 08:46
Site: Hennepin Power Station, Hennepin, IL

Sounding: HEN-C034
Cone: 374:T1500F15U500



Max Depth: 9.000 m / 29.53 ft
Depth Inc: 0.050 m / 0.164 ft
Avg Int: Every Point

File: 15-53081_SP34.COR

SBT: Robertson and Campanella, 1986
Coords: UTM Zone 16 N: 4574804m E: 307178m

Hydrostatic Line Ueq Assumed Ueq PPD, Ueq achieved PPD, Ueq not achieved

The reported coordinates were acquired from consumer-grade GPS equipment and are only approximate locations. The coordinates should not be used for design purposes.

Attachment 4

35 I.A.C. § 845.300 AND 40 C.F.R. § 257.60 AQUIFER SEPARATION CERTIFICATION
EAST ASH POND
HENNEPIN POWER PLANT

In accordance with Title 35 of the Illinois Administrative Code (35 I.A.C.), Section 845.300, and Title 40 of the Code of Federal Regulations (40 C.F.R.) Section 257.60, the owner or operator of a coal combustion residuals (CCR) surface impoundment must obtain a certification from a qualified professional engineer that the base of the impoundment is located at least 1.52 meters (five feet) above the upper limit of the uppermost aquifer, or there will not be an intermittent, recurring, or sustained hydraulic connection between any portion of the base of the CCR surface impoundment and the uppermost aquifer due to normal fluctuations in groundwater elevations (including seasonal high water table).

This certification statement is for the East Ash Pond (EAP) at the Hennepin Power Plant, located near Hennepin, Illinois.

The basis for this certification is two-fold:

1. The base of the EAP is defined in this context as the bottom elevation of the compacted clay liner throughout the majority of the surface area of the EAP, as depicted on Illinois Power Company drawing CE-HEN1-C7-5 dated October 12, 1993 and revised December 21, 1998, which is approximately 458 feet (NAVD88[1]).
2. The upper limit of the uppermost aquifer in this context is defined by the 95th percentile groundwater elevations based upon observations from December 1994 through October 2024 (Table 1), as depicted on Figure 1. This surface ranges from approximately 451 feet (NAVD88) in the northwest corner of the EAP to approximately 453 ft (NAVD88) in the southeast corner of the EAP.
    - The uppermost aquifer is identified in the Hydrogeologic Site Characterization Report (Attachment H) submitted with the initial operating permit application for the EAP[2] in accordance with 35 I.A.C. § 845.230 as the fine-grained silts and clays of the Cahokia Alluvium and highly permeable sands and gravels of the Henry Formation[3].

[1] Elevations referenced are above the North American Vertical Datum of 1988

[2] Burns McDonnell, 2021. Initial Operating Permit, Hennepin East Ash Pond. October 25, 2021. https://www.luminant.com/documents/ccr/il-ccr/Hennepin/2021/2021%2010%2030%20Hennepin%20EAP%20Op%20Permit%20App%20W1550100002-05.pdf

[3] Ramboll Americas Engineering Solutions, Inc. (Ramboll). Hydrogeologic Site Characterization Report, East Ash Pond, Hennepin Power Plant, Hennepin, Illinois. October 25, 2021. Enclosed as Attachment H in the Initial Operating Permit application for the Hennepin East Ash Pond referenced immediately above.

I, Eric J. Tlachac, a qualified professional engineer in good standing in the State of Illinois, certify that the base of the East Ash Pond (EAP) at the Hennepin Power Plant, defined in this context as the bottom elevation of the compacted clay liner throughout the majority of the surface area of the EAP, as depicted on Illinois Power Company drawing CE-HEN1-C7-5 dated October 12, 1993 and revised December 21, 1998, is located at least 1.52 meters (five feet) above the upper limit of the uppermost aquifer, defined in this context as the 95th percentile groundwater elevations (Figure 1) based upon observations from December 1994 through October 2024 (Table 1), and that there will not be an intermittent, recurring, or sustained hydraulic connection between any portion of the base of the EAP and the uppermost aquifer due to normal fluctuations in groundwater elevations (including seasonal high water table).

Eric J. Tlachac
Qualified Professional Engineer
062-063091
Illinois
Ramboll Americas Engineering Solutions, Inc.
Date: October 23, 2025

I, Brian G. Hennings, a qualified professional geologist in good standing in the State of Illinois, certify that the base of the East Ash Pond (EAP) at the Hennepin Power Plant, defined in this context as the bottom elevation of the compacted clay liner throughout the majority of the surface area of the EAP, as depicted on Illinois Power Company drawing CE-HEN1-C7-5 dated October 12, 1993 and revised December 21, 1998, is located at least 1.52 meters (five feet) above the upper limit of the uppermost aquifer, defined in this context as the 95th percentile groundwater elevations (Figure 1) based upon observations from December 1994 through October 2024 (Table 1), and that there will not be an intermittent, recurring, or sustained hydraulic connection between any portion of the base of the EAP and the uppermost aquifer due to normal fluctuations in groundwater elevations (including seasonal high water table).

Brian G. Hennings
Licensed Professional Geologist
196-001482
Illinois
Ramboll Americas Engineering Solutions, Inc.
Date: October 23, 2025

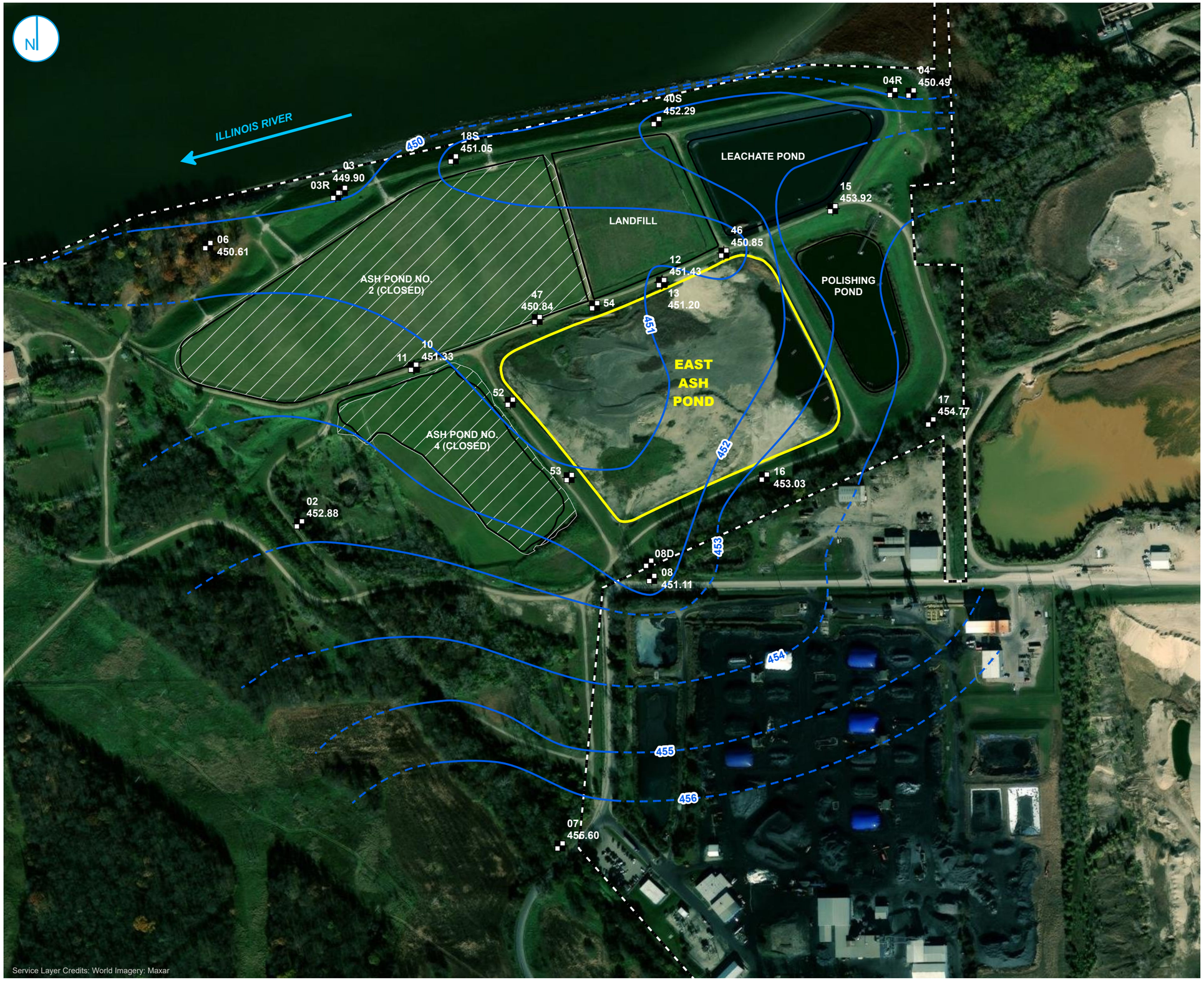
TABLES

ATTACHMENT 4.
GROUNDWATER ELEVATION DATA SUMMARY
HENNEPIN PART 845 CONSTRUCTION/OPERATING PERMIT APPLICATION(S)- SECOND SUBMITTAL
HENNEPIN POWER PLANT
HENNEPIN, ILLINOIS

Well ID	Sample Count	Date Range	Groundwater Elevation 95th Percentile (feet NAVD88)
02	157	03/17/1995 - 10/07/2024	452.88
03	88	12/02/1994 - 08/20/2014	449.90
03R	77	03/18/2015 - 10/07/2024	450.62
04	89	12/01/1994 - 08/20/2014	450.49
04R	62	03/18/2015 - 10/07/2024	450.91
06	151	12/02/1994 - 10/07/2024	450.54
07	170	12/02/1994 - 10/07/2024	455.16
08	169	03/17/1995 - 10/07/2024	451.06
08D	103	06/18/2009 - 10/07/2024	453.13
10	147	05/25/1995 - 10/07/2024	451.29
11	43	05/25/1995 - 10/07/2024	450.07
12	153	05/24/1995 - 10/07/2024	451.33
13	159	05/24/1995 - 10/07/2024	450.89
15	146	05/24/1995 - 10/07/2024	452.91
16	160	05/24/1995 - 10/07/2024	452.55
17	153	05/24/1995 - 10/07/2024	454.69
18S	97	06/25/2002 - 10/07/2024	450.67
19S	79	06/18/2009 - 01/22/2024	451.08
40S	74	03/16/2011 - 10/07/2024	451.18
46	60	12/08/2015 - 10/07/2024	450.68
47	62	12/08/2015 - 10/07/2024	450.82
52	32	02/24/2021 - 10/07/2024	449.63
53	17	02/25/2021 - 10/07/2024	461.55
54	32	02/24/2021 - 10/07/2024	449.60

Notes:
ID = identification
NAVD88 = North American Vertical Datum of 1988
Sample Count = number of samples from the Sampled Date Range used to calculate the 95th percentile.

FIGURES



MONITORING WELL
GROUNDWATER ELEVATION CONTOUR (1 FT CONTOUR INTERVAL, NAVD88)
INFERRED GROUNDWATER ELEVATION CONTOUR
GROUNDWATER FLOW DIRECTION
REGULATED UNIT (SUBJECT UNIT)
SITE FEATURE
LIMITS OF FINAL COVER
PROPERTY BOUNDARY

NOTES:
1. ELEVATION CONTOURS SHOWN IN FEET, NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88).
2. DEPICTED ELEVATIONS ARE CALCULATED 95TH PERCENTILE VALUES DERIVED FROM ALL AVAILABLE HISTORICAL DATA AT EACH LOCATION.

0 175 350
Feet

TOP OF UPPERMOST AQUIFER

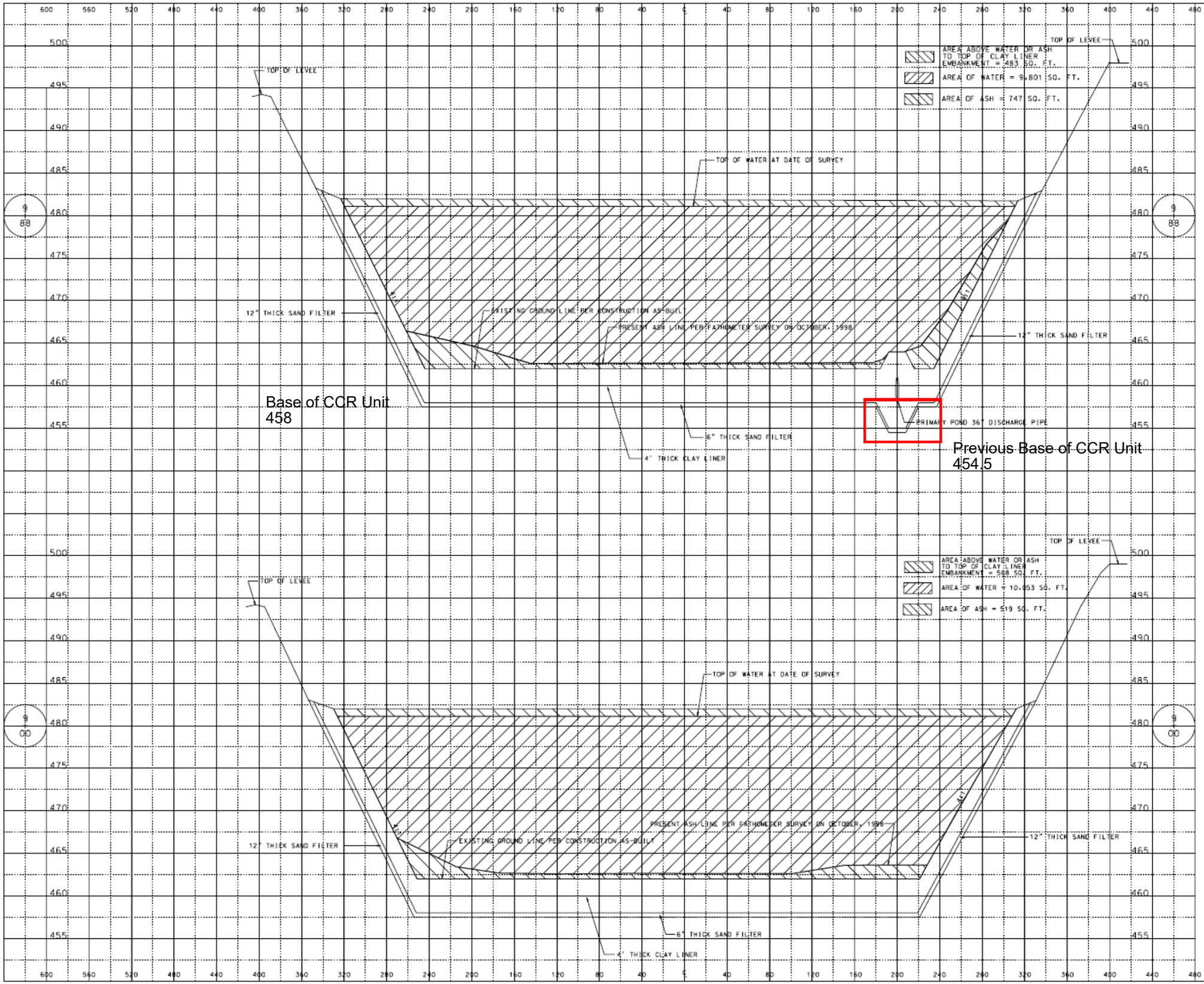
EAST ASH POND
HENNEPIN POWER PLANT
HENNEPIN, ILLINOIS

RAMBOLL AMERICAS
ENGINEERING SOLUTIONS, INC.

RAMBOLL

Y:\Mapping\Projects\22\22885MXD\845_Operating_Permit\Hennepin\EAP_AshRecertification\EAP_AshRecert.aprx\Figure 1: Top of UA

PROJECT: 169000XXXX | DATED: 12/20/2024 | DESIGNER: GALARNMC



NOTES

1. SEE DWG. #CE-HEN1-CS.1 FOR SURVEY CONTROL AND CROSS-SECTIONS LOCATION PLAN VIEW.
2. EXISTING SUB-BASE MATERIAL CONSIST OF SAND AND GRAVEL.
3. ADDED FATHOMETER SURVEY OF ASH POND (SURVEY DONE IN OCTOBER, 1998) WITH END AREA CALCUATIONS. (REVISION #1, DATED 12-10-98, BY: GBD)

REVISION STATUS C-CONSTRUCTION R-RECORD	ILLINOIS POWER COMPANY DECATUR
0 1	CROSS SECTIONS 9+00 AND 9+88
	1995 ASH FACILITY
	HENNEPIN POWER STATION
DR G.R.H. / CAD G.R.H. / DATE 10/12/93	
CK / CKD / SCALE 1"= 40'H & 5'V	
APP / PLOTTED 12-21-98	CE-HEN1-C7-5

Attachment 5

ATTACHMENT 5.
GROUNDWATER ELEVATION DATA
HENNEPIN PART 845 CONSTRUCTION/OPERATING PERMIT APPLICATION(S)- SECOND SUBMITTAL
HENNEPIN POWER PLANT
HENNEPIN, ILLINOIS

Plant ID	Well ID	Sample Date	Groundwater Elevation (feet NAVD88)
HEN	02	03/17/1995	0.40
HEN	02	04/18/1995	449.89
HEN	02	05/23/1995	451.10
HEN	02	06/30/1995	448.06
HEN	02	07/26/1995	447.41
HEN	02	08/22/1995	447.31
HEN	02	09/18/1995	446.61
HEN	02	10/12/1995	446.66
HEN	02	11/03/1995	447.24
HEN	02	12/18/1995	446.37
HEN	02	02/08/1996	446.22
HEN	02	03/18/1996	445.96
HEN	02	04/25/1996	446.03
HEN	02	05/23/1996	447.15
HEN	02	06/26/1996	450.11
HEN	02	10/08/1996	446.13
HEN	02	11/12/1996	447.20
HEN	02	02/12/1997	446.56
HEN	02	06/10/1997	446.67
HEN	02	09/15/1997	445.23
HEN	02	12/04/1997	446.16
HEN	02	03/25/1998	451.58
HEN	02	06/10/1998	447.36
HEN	02	09/16/1998	446.44
HEN	02	11/17/1998	447.81
HEN	02	02/17/1999	448.41
HEN	02	06/23/1999	449.13
HEN	02	09/09/1999	446.09
HEN	02	11/04/1999	446.56
HEN	02	03/15/2000	445.47
HEN	02	06/14/2000	446.54
HEN	02	08/16/2000	455.97
HEN	02	10/12/2000	445.40
HEN	02	03/15/2001	448.46
HEN	02	06/20/2001	447.75
HEN	02	09/12/2001	445.66
HEN	02	11/13/2001	467.63
HEN	02	03/13/2002	448.26
HEN	02	06/26/2002	447.97
HEN	02	09/24/2002	445.36
HEN	02	12/11/2002	446.05
HEN	02	03/24/2003	444.79
HEN	02	06/24/2003	445.29
HEN	02	09/22/2003	444.66
HEN	02	12/22/2003	446.50
HEN	02	03/25/2004	446.01

ATTACHMENT 5.
GROUNDWATER ELEVATION DATA
HENNEPIN PART 845 CONSTRUCTION/OPERATING PERMIT APPLICATION(S)- SECOND SUBMITTAL
HENNEPIN POWER PLANT
HENNEPIN, ILLINOIS

Plant ID	Well ID	Sample Date	Groundwater Elevation (feet NAVD88)
HEN	02	06/22/2004	449.23
HEN	02	09/20/2004	444.90
HEN	02	12/15/2004	448.69
HEN	02	03/28/2005	447.04
HEN	02	06/23/2005	445.19
HEN	02	09/22/2005	444.27
HEN	02	12/28/2005	444.70
HEN	02	03/29/2006	444.98
HEN	02	06/27/2006	444.62
HEN	02	09/20/2006	444.58
HEN	02	11/21/2006	446.36
HEN	02	03/06/2007	449.23
HEN	02	05/24/2007	446.87
HEN	02	09/05/2007	449.98
HEN	02	10/24/2007	446.66
HEN	02	03/26/2008	448.33
HEN	02	05/15/2008	447.49
HEN	02	08/25/2008	445.80
HEN	02	10/27/2008	448.21
HEN	02	12/29/2008	449.72
HEN	02	03/25/2009	452.89
HEN	02	06/18/2009	449.21
HEN	02	09/29/2009	446.82
HEN	02	12/29/2009	449.34
HEN	02	03/16/2010	449.08
HEN	02	08/31/2010	447.04
HEN	02	12/29/2010	446.34
HEN	02	03/16/2011	449.09
HEN	02	06/29/2011	449.51
HEN	02	08/23/2011	446.41
HEN	02	10/19/2011	446.54
HEN	02	03/01/2012	446.46
HEN	02	05/31/2012	446.49
HEN	02	08/29/2012	444.75
HEN	02	11/27/2012	446.42
HEN	02	03/07/2013	445.36
HEN	02	06/06/2013	451.56
HEN	02	09/04/2013	445.77
HEN	02	12/11/2013	446.27
HEN	02	03/26/2014	449.05
HEN	02	06/18/2014	447.84
HEN	02	08/20/2014	448.03
HEN	02	12/09/2014	447.09
HEN	02	03/19/2015	446.28
HEN	02	06/22/2015	455.43
HEN	02	09/17/2015	448.06

ATTACHMENT 5.
GROUNDWATER ELEVATION DATA
HENNEPIN PART 845 CONSTRUCTION/OPERATING PERMIT APPLICATION(S)- SECOND SUBMITTAL
HENNEPIN POWER PLANT
HENNEPIN, ILLINOIS

Plant ID	Well ID	Sample Date	Groundwater Elevation (feet NAVD88)
HEN	02	12/09/2015	448.74
HEN	02	03/08/2016	447.51
HEN	02	03/10/2016	447.51
HEN	02	06/07/2016	448.40
HEN	02	06/08/2016	448.40
HEN	02	08/31/2016	450.01
HEN	02	09/01/2016	450.01
HEN	02	12/07/2016	447.99
HEN	02	12/09/2016	447.99
HEN	02	02/20/2017	447.23
HEN	02	02/22/2017	447.23
HEN	02	04/25/2017	450.58
HEN	02	04/27/2017	450.58
HEN	02	06/08/2017	450.23
HEN	02	09/07/2017	448.69
HEN	02	11/15/2017	448.36
HEN	02	11/16/2017	448.36
HEN	02	03/27/2018	449.04
HEN	02	06/13/2018	449.67
HEN	02	09/12/2018	448.77
HEN	02	12/12/2018	448.16
HEN	02	03/13/2019	449.41
HEN	02	03/14/2019	449.41
HEN	02	06/18/2019	452.88
HEN	02	09/17/2019	468.26
HEN	02	09/18/2019	468.26
HEN	02	12/11/2019	448.61
HEN	02	12/12/2019	448.61
HEN	02	03/11/2020	448.41
HEN	02	03/12/2020	448.41
HEN	02	06/03/2020	454.04
HEN	02	06/04/2020	454.04
HEN	02	09/02/2020	449.59
HEN	02	12/09/2020	447.06
HEN	02	12/10/2020	447.06
HEN	02	02/24/2021	446.17
HEN	02	03/17/2021	447.04
HEN	02	03/18/2021	447.09
HEN	02	03/22/2021	447.23
HEN	02	04/07/2021	447.31
HEN	02	04/07/2021	447.22
HEN	02	05/06/2021	448.67
HEN	02	06/08/2021	448.45
HEN	02	06/24/2021	448.80
HEN	02	07/13/2021	451.11
HEN	02	08/03/2021	449.07

ATTACHMENT 5.
GROUNDWATER ELEVATION DATA
HENNEPIN PART 845 CONSTRUCTION/OPERATING PERMIT APPLICATION(S)- SECOND SUBMITTAL
HENNEPIN POWER PLANT
HENNEPIN, ILLINOIS

Plant ID	Well ID	Sample Date	Groundwater Elevation (feet NAVD88)
HEN	02	09/08/2021	446.71
HEN	02	09/09/2021	446.71
HEN	02	12/07/2021	447.29
HEN	02	12/08/2021	447.29
HEN	02	03/21/2022	447.75
HEN	02	03/22/2022	447.75
HEN	02	06/07/2022	448.60
HEN	02	09/13/2022	447.06
HEN	02	12/28/2022	446.04
HEN	02	01/22/2023	447.08
HEN	02	03/01/2023	446.98
HEN	02	05/30/2023	447.05
HEN	02	08/21/2023	450.17
HEN	02	10/31/2023	447.17
HEN	02	11/13/2023	446.93
HEN	02	01/22/2024	447.08
HEN	02	04/15/2024	449.66
HEN	02	07/15/2024	446.99
HEN	02	10/07/2024	446.78
HEN	03	12/02/1994	446.83
HEN	03	03/17/1995	446.84
HEN	03	04/18/1995	457.63
HEN	03	05/23/1995	449.83
HEN	03	06/29/1995	447.58
HEN	03	07/27/1995	446.59
HEN	03	08/22/1995	447.28
HEN	03	09/18/1995	446.18
HEN	03	10/11/1995	446.23
HEN	03	11/02/1995	446.89
HEN	03	12/18/1995	445.93
HEN	03	02/08/1996	445.86
HEN	03	03/18/1996	445.67
HEN	03	04/24/1996	445.68
HEN	03	05/22/1996	447.03
HEN	03	06/26/1996	449.64
HEN	03	10/07/1996	445.75
HEN	03	11/12/1996	446.57
HEN	03	02/12/1997	446.23
HEN	03	06/10/1997	446.61
HEN	03	12/02/1997	445.98
HEN	03	03/24/1998	457.24
HEN	03	06/10/1998	446.93
HEN	03	09/16/1998	446.03
HEN	03	11/17/1998	447.28
HEN	03	02/17/1999	448.13
HEN	03	06/22/1999	448.82

ATTACHMENT 5.
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HENNEPIN PART 845 CONSTRUCTION/OPERATING PERMIT APPLICATION(S)- SECOND SUBMITTAL
HENNEPIN POWER PLANT
HENNEPIN, ILLINOIS

Plant ID	Well ID	Sample Date	Groundwater Elevation (feet NAVD88)
HEN	03	09/08/1999	445.66
HEN	03	11/03/1999	445.16
HEN	03	03/14/2000	445.15
HEN	03	06/14/2000	446.22
HEN	03	08/15/2000	445.67
HEN	03	10/11/2000	445.06
HEN	03	03/13/2001	448.38
HEN	03	06/20/2001	447.44
HEN	03	09/12/2001	445.29
HEN	03	11/13/2001	447.20
HEN	03	03/12/2002	447.96
HEN	03	06/26/2002	447.53
HEN	03	09/24/2002	445.00
HEN	03	12/10/2002	445.71
HEN	03	03/24/2003	444.46
HEN	03	06/24/2003	445.02
HEN	03	09/22/2003	444.37
HEN	03	12/15/2003	446.68
HEN	03	03/25/2004	445.68
HEN	03	06/22/2004	448.92
HEN	03	09/20/2004	444.57
HEN	03	12/15/2004	448.41
HEN	03	03/28/2005	446.67
HEN	03	06/23/2005	444.84
HEN	03	09/22/2005	444.18
HEN	03	12/28/2005	444.82
HEN	03	03/29/2006	444.95
HEN	03	06/27/2006	444.55
HEN	03	09/20/2006	444.59
HEN	03	11/21/2006	446.30
HEN	03	03/06/2007	449.26
HEN	03	05/24/2007	446.72
HEN	03	09/06/2007	449.53
HEN	03	10/24/2007	446.49
HEN	03	03/26/2008	448.28
HEN	03	05/15/2008	447.44
HEN	03	08/25/2008	445.66
HEN	03	10/27/2008	448.02
HEN	03	12/29/2008	449.93
HEN	03	03/25/2009	452.59
HEN	03	06/18/2009	449.05
HEN	03	09/29/2009	446.62
HEN	03	12/22/2009	447.17
HEN	03	03/16/2010	449.10
HEN	03	08/31/2010	446.87
HEN	03	12/28/2010	446.16

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HENNEPIN, ILLINOIS

Plant ID	Well ID	Sample Date	Groundwater Elevation (feet NAVD88)
HEN	03	03/16/2011	449.01
HEN	03	06/29/2011	449.42
HEN	03	08/23/2011	446.21
HEN	03	10/18/2011	446.38
HEN	03	03/01/2012	446.27
HEN	03	05/30/2012	446.39
HEN	03	08/29/2012	444.68
HEN	03	11/27/2012	446.22
HEN	03	03/07/2013	445.61
HEN	03	06/06/2013	451.62
HEN	03	09/03/2013	445.63
HEN	03	12/11/2013	446.08
HEN	03	03/26/2014	448.90
HEN	03	06/17/2014	447.75
HEN	03	08/20/2014	447.76
HEN	03R	03/18/2015	446.98
HEN	03R	06/23/2015	455.64
HEN	03R	09/16/2015	447.92
HEN	03R	12/08/2015	448.75
HEN	03R	12/09/2015	448.75
HEN	03R	03/08/2016	447.33
HEN	03R	03/09/2016	447.33
HEN	03R	06/07/2016	448.25
HEN	03R	06/08/2016	448.25
HEN	03R	08/31/2016	450.05
HEN	03R	12/07/2016	447.87
HEN	03R	12/08/2016	447.87
HEN	03R	02/20/2017	447.36
HEN	03R	02/22/2017	447.36
HEN	03R	04/25/2017	450.54
HEN	03R	04/26/2017	450.54
HEN	03R	06/08/2017	450.06
HEN	03R	06/09/2017	450.06
HEN	03R	09/07/2017	448.45
HEN	03R	11/15/2017	448.18
HEN	03R	11/16/2017	448.18
HEN	03R	03/26/2018	448.97
HEN	03R	06/13/2018	449.68
HEN	03R	09/12/2018	448.61
HEN	03R	12/12/2018	448.11
HEN	03R	03/13/2019	449.35
HEN	03R	06/18/2019	452.79
HEN	03R	09/17/2019	449.72
HEN	03R	12/11/2019	448.50
HEN	03R	12/12/2019	448.50
HEN	03R	03/11/2020	448.57

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GROUNDWATER ELEVATION DATA
HENNEPIN PART 845 CONSTRUCTION/OPERATING PERMIT APPLICATION(S)- SECOND SUBMITTAL
HENNEPIN POWER PLANT
HENNEPIN, ILLINOIS

Plant ID	Well ID	Sample Date	Groundwater Elevation (feet NAVD88)
HEN	03R	03/12/2020	448.42
HEN	03R	06/03/2020	454.11
HEN	03R	09/02/2020	448.90
HEN	03R	09/03/2020	448.90
HEN	03R	12/09/2020	446.94
HEN	03R	02/24/2021	446.11
HEN	03R	03/17/2021	447.08
HEN	03R	03/18/2021	447.08
HEN	03R	03/22/2021	447.22
HEN	03R	04/07/2021	447.30
HEN	03R	05/05/2021	448.32
HEN	03R	06/08/2021	448.23
HEN	03R	06/25/2021	448.87
HEN	03R	07/13/2021	450.92
HEN	03R	08/03/2021	448.79
HEN	03R	09/08/2021	447.57
HEN	03R	09/10/2021	447.57
HEN	03R	12/07/2021	447.80
HEN	03R	12/09/2021	447.80
HEN	03R	03/21/2022	447.71
HEN	03R	03/23/2022	447.71
HEN	03R	06/07/2022	448.44
HEN	03R	06/08/2022	448.44
HEN	03R	09/14/2022	447.14
HEN	03R	12/28/2022	445.61
HEN	03R	03/01/2023	447.05
HEN	03R	03/30/2023	448.43
HEN	03R	04/30/2023	447.63
HEN	03R	05/30/2023	446.88
HEN	03R	06/21/2023	446.84
HEN	03R	07/21/2023	447.21
HEN	03R	08/21/2023	446.63
HEN	03R	09/30/2023	446.47
HEN	03R	10/31/2023	447.02
HEN	03R	11/13/2023	446.42
HEN	03R	12/21/2023	446.17
HEN	03R	01/22/2024	447.13
HEN	03R	02/15/2024	449.02
HEN	03R	03/15/2024	447.83
HEN	03R	04/15/2024	449.74
HEN	03R	05/15/2024	449.55
HEN	03R	06/15/2024	448.04
HEN	03R	07/15/2024	447.05
HEN	03R	08/07/2024	447.06
HEN	03R	09/07/2024	446.28
HEN	03R	10/07/2024	446.48

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HENNEPIN POWER PLANT
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Plant ID	Well ID	Sample Date	Groundwater Elevation (feet NAVD88)
HEN	04	12/01/1994	446.85
HEN	04	03/17/1995	446.10
HEN	04	04/18/1995	449.47
HEN	04	05/24/1995	450.59
HEN	04	06/29/1995	447.47
HEN	04	07/26/1995	447.01
HEN	04	08/23/1995	447.17
HEN	04	09/19/1995	446.61
HEN	04	10/11/1995	446.50
HEN	04	11/03/1995	446.79
HEN	04	12/18/1995	446.26
HEN	04	02/08/1996	446.13
HEN	04	03/18/1996	446.14
HEN	04	04/24/1996	446.01
HEN	04	05/22/1996	447.36
HEN	04	06/26/1996	448.94
HEN	04	10/07/1996	446.23
HEN	04	11/12/1996	447.52
HEN	04	02/12/1997	446.08
HEN	04	06/10/1997	446.57
HEN	04	09/16/1997	445.57
HEN	04	12/02/1997	445.95
HEN	04	03/24/1998	452.01
HEN	04	06/10/1998	446.70
HEN	04	09/16/1998	446.21
HEN	04	11/17/1998	447.00
HEN	04	02/17/1999	447.50
HEN	04	06/22/1999	447.85
HEN	04	09/08/1999	445.71
HEN	04	11/03/1999	445.07
HEN	04	03/14/2000	445.21
HEN	04	06/14/2000	445.76
HEN	04	08/15/2000	445.61
HEN	04	10/11/2000	445.05
HEN	04	03/13/2001	447.45
HEN	04	06/20/2001	447.09
HEN	04	09/12/2001	445.40
HEN	04	11/13/2001	446.91
HEN	04	03/12/2002	448.75
HEN	04	06/26/2002	447.24
HEN	04	09/24/2002	444.98
HEN	04	12/10/2002	445.70
HEN	04	03/24/2003	444.54
HEN	04	06/24/2003	445.04
HEN	04	09/22/2003	444.49
HEN	04	12/16/2003	446.31

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HENNEPIN PART 845 CONSTRUCTION/OPERATING PERMIT APPLICATION(S)- SECOND SUBMITTAL
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HENNEPIN, ILLINOIS

Plant ID	Well ID	Sample Date	Groundwater Elevation (feet NAVD88)
HEN	04	03/25/2004	445.79
HEN	04	06/22/2004	448.41
HEN	04	09/20/2004	444.72
HEN	04	12/15/2004	447.86
HEN	04	03/28/2005	446.49
HEN	04	06/23/2005	445.18
HEN	04	09/22/2005	444.55
HEN	04	12/28/2005	444.85
HEN	04	03/29/2006	444.95
HEN	04	06/27/2006	444.60
HEN	04	09/20/2006	444.59
HEN	04	11/21/2006	445.95
HEN	04	03/06/2007	449.53
HEN	04	05/24/2007	446.41
HEN	04	09/06/2007	448.21
HEN	04	10/24/2007	446.31
HEN	04	03/26/2008	447.31
HEN	04	05/15/2008	446.67
HEN	04	08/25/2008	445.65
HEN	04	10/27/2008	447.30
HEN	04	12/29/2008	453.57
HEN	04	03/25/2009	451.23
HEN	04	06/18/2009	447.83
HEN	04	09/29/2009	446.44
HEN	04	12/22/2009	446.78
HEN	04	03/16/2010	450.35
HEN	04	08/31/2010	446.65
HEN	04	12/28/2010	446.03
HEN	04	03/16/2011	448.04
HEN	04	06/29/2011	448.00
HEN	04	08/23/2011	446.18
HEN	04	10/18/2011	446.17
HEN	04	03/01/2012	446.09
HEN	04	05/30/2012	446.20
HEN	04	08/29/2012	444.69
HEN	04	11/27/2012	445.98
HEN	04	03/07/2013	445.47
HEN	04	06/06/2013	451.50
HEN	04	09/03/2013	445.67
HEN	04	12/11/2013	445.97
HEN	04	03/26/2014	449.71
HEN	04	06/18/2014	447.10
HEN	04	08/20/2014	447.64
HEN	04R	03/18/2015	450.93
HEN	04R	06/23/2015	455.70
HEN	04R	09/16/2015	448.05

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HENNEPIN PART 845 CONSTRUCTION/OPERATING PERMIT APPLICATION(S)- SECOND SUBMITTAL
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Plant ID	Well ID	Sample Date	Groundwater Elevation (feet NAVD88)
HEN	04R	12/09/2015	448.75
HEN	04R	03/08/2016	447.36
HEN	04R	03/10/2016	447.36
HEN	04R	06/07/2016	448.38
HEN	04R	06/08/2016	448.38
HEN	04R	08/31/2016	450.24
HEN	04R	12/07/2016	447.90
HEN	04R	12/08/2016	447.90
HEN	04R	02/20/2017	447.37
HEN	04R	02/22/2017	447.37
HEN	04R	04/25/2017	450.28
HEN	04R	04/26/2017	450.28
HEN	04R	06/08/2017	449.95
HEN	04R	09/07/2017	448.58
HEN	04R	11/15/2017	448.27
HEN	04R	11/16/2017	448.27
HEN	04R	03/26/2018	448.84
HEN	04R	06/13/2018	449.64
HEN	04R	09/12/2018	448.75
HEN	04R	12/12/2018	448.14
HEN	04R	03/13/2019	448.68
HEN	04R	06/18/2019	452.31
HEN	04R	09/17/2019	449.53
HEN	04R	09/17/2019	449.43
HEN	04R	12/11/2019	448.45
HEN	04R	03/11/2020	448.28
HEN	04R	06/03/2020	453.75
HEN	04R	09/02/2020	448.92
HEN	04R	09/03/2020	448.92
HEN	04R	12/09/2020	447.04
HEN	04R	02/24/2021	446.18
HEN	04R	03/17/2021	447.02
HEN	04R	03/18/2021	447.02
HEN	04R	03/22/2021	447.21
HEN	04R	04/07/2021	447.38
HEN	04R	05/06/2021	448.66
HEN	04R	06/08/2021	448.30
HEN	04R	06/24/2021	448.89
HEN	04R	07/13/2021	450.50
HEN	04R	08/03/2021	448.89
HEN	04R	09/08/2021	447.78
HEN	04R	09/09/2021	447.78
HEN	04R	12/07/2021	447.40
HEN	04R	12/09/2021	447.40
HEN	04R	03/21/2022	447.72
HEN	04R	03/23/2022	447.72

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HENNEPIN PART 845 CONSTRUCTION/OPERATING PERMIT APPLICATION(S)- SECOND SUBMITTAL
HENNEPIN POWER PLANT
HENNEPIN, ILLINOIS

Plant ID	Well ID	Sample Date	Groundwater Elevation (feet NAVD88)
HEN	04R	06/07/2022	448.64
HEN	04R	06/08/2022	448.64
HEN	04R	09/14/2022	447.50
HEN	04R	12/29/2022	446.16
HEN	04R	03/01/2023	447.50
HEN	04R	05/30/2023	447.19
HEN	04R	08/21/2023	449.52
HEN	04R	10/31/2023	447.28
HEN	04R	11/13/2023	447.06
HEN	04R	01/22/2024	447.21
HEN	04R	04/15/2024	449.67
HEN	04R	07/15/2024	441.23
HEN	04R	10/07/2024	446.48
HEN	06	12/02/1994	446.75
HEN	06	03/17/1995	446.73
HEN	06	04/18/1995	446.90
HEN	06	05/23/1995	450.50
HEN	06	06/29/1995	447.39
HEN	06	07/27/1995	446.62
HEN	06	08/22/1995	446.90
HEN	06	09/18/1995	443.37
HEN	06	10/11/1995	446.20
HEN	06	11/02/1995	446.84
HEN	06	12/18/1995	445.80
HEN	06	02/08/1996	445.70
HEN	06	03/18/1996	440.98
HEN	06	04/24/1996	445.64
HEN	06	05/22/1996	446.96
HEN	06	06/26/1996	449.71
HEN	06	10/07/1996	445.60
HEN	06	11/12/1996	446.74
HEN	06	02/12/1997	446.21
HEN	06	06/10/1997	446.38
HEN	06	09/17/1997	445.04
HEN	06	12/02/1997	446.03
HEN	06	03/24/1998	451.25
HEN	06	06/10/1998	446.97
HEN	06	09/16/1998	446.06
HEN	06	11/17/1998	447.35
HEN	06	02/17/1999	448.20
HEN	06	06/22/1999	448.76
HEN	06	09/08/1999	445.65
HEN	06	11/03/1999	446.19
HEN	06	03/14/2000	445.19
HEN	06	06/14/2000	446.22
HEN	06	08/15/2000	445.65

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HENNEPIN PART 845 CONSTRUCTION/OPERATING PERMIT APPLICATION(S)- SECOND SUBMITTAL
HENNEPIN POWER PLANT
HENNEPIN, ILLINOIS

Plant ID	Well ID	Sample Date	Groundwater Elevation (feet NAVD88)
HEN	06	10/11/2000	445.07
HEN	06	03/13/2001	448.39
HEN	06	06/20/2001	447.45
HEN	06	09/12/2001	445.33
HEN	06	11/13/2001	447.23
HEN	06	03/12/2002	447.92
HEN	06	06/26/2002	447.58
HEN	06	09/24/2002	444.98
HEN	06	12/10/2002	445.74
HEN	06	03/24/2003	444.49
HEN	06	06/24/2003	444.98
HEN	06	09/22/2003	444.40
HEN	06	12/15/2003	446.77
HEN	06	03/25/2004	445.70
HEN	06	06/22/2004	448.99
HEN	06	09/20/2004	444.58
HEN	06	12/15/2004	448.43
HEN	06	03/28/2005	446.70
HEN	06	06/23/2005	444.84
HEN	06	09/22/2005	444.17
HEN	06	12/28/2005	444.84
HEN	06	03/29/2006	444.97
HEN	06	06/27/2006	444.52
HEN	06	09/20/2006	444.56
HEN	06	11/21/2006	445.58
HEN	06	03/06/2007	449.27
HEN	06	05/24/2007	446.69
HEN	06	09/06/2007	449.62
HEN	06	10/24/2007	446.53
HEN	06	03/26/2008	448.28
HEN	06	05/15/2008	447.41
HEN	06	08/25/2008	445.61
HEN	06	10/27/2008	448.01
HEN	06	12/29/2008	449.84
HEN	06	03/25/2009	452.67
HEN	06	06/18/2009	449.05
HEN	06	09/29/2009	446.43
HEN	06	12/22/2009	447.21
HEN	06	03/16/2010	448.79
HEN	06	08/31/2010	446.78
HEN	06	12/28/2010	446.16
HEN	06	03/16/2011	449.05
HEN	06	06/29/2011	449.38
HEN	06	08/23/2011	446.23
HEN	06	10/18/2011	446.44
HEN	06	03/01/2012	446.27

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HENNEPIN PART 845 CONSTRUCTION/OPERATING PERMIT APPLICATION(S)- SECOND SUBMITTAL
HENNEPIN POWER PLANT
HENNEPIN, ILLINOIS

Plant ID	Well ID	Sample Date	Groundwater Elevation (feet NAVD88)
HEN	06	05/30/2012	446.43
HEN	06	08/29/2012	444.68
HEN	06	11/27/2012	446.27
HEN	06	03/07/2013	445.47
HEN	06	06/06/2013	451.61
HEN	06	09/03/2013	445.62
HEN	06	12/11/2013	446.13
HEN	06	03/26/2014	448.93
HEN	06	06/17/2014	446.73
HEN	06	08/20/2014	447.70
HEN	06	12/09/2014	446.90
HEN	06	03/18/2015	447.04
HEN	06	03/19/2015	446.28
HEN	06	06/22/2015	455.75
HEN	06	09/16/2015	448.00
HEN	06	12/09/2015	448.77
HEN	06	03/08/2016	447.45
HEN	06	03/09/2016	447.45
HEN	06	06/07/2016	448.30
HEN	06	06/08/2016	448.30
HEN	06	08/31/2016	450.03
HEN	06	12/07/2016	447.92
HEN	06	12/08/2016	447.92
HEN	06	02/20/2017	447.48
HEN	06	02/22/2017	447.48
HEN	06	04/25/2017	450.54
HEN	06	04/26/2017	450.54
HEN	06	06/08/2017	450.07
HEN	06	09/07/2017	448.50
HEN	06	11/15/2017	448.25
HEN	06	11/16/2017	448.25
HEN	06	03/26/2018	449.04
HEN	06	06/13/2018	449.65
HEN	06	09/12/2018	448.66
HEN	06	12/12/2018	448.22
HEN	06	03/13/2019	449.46
HEN	06	03/14/2019	449.46
HEN	06	06/18/2019	452.74
HEN	06	09/17/2019	447.69
HEN	06	12/11/2019	448.55
HEN	06	12/12/2019	448.55
HEN	06	03/11/2020	448.49
HEN	06	03/12/2020	448.49
HEN	06	06/03/2020	453.96
HEN	06	06/03/2020	453.99
HEN	06	09/02/2020	441.55

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HENNEPIN PART 845 CONSTRUCTION/OPERATING PERMIT APPLICATION(S)- SECOND SUBMITTAL
HENNEPIN POWER PLANT
HENNEPIN, ILLINOIS

Plant ID	Well ID	Sample Date	Groundwater Elevation (feet NAVD88)
HEN	06	09/03/2020	441.55
HEN	06	12/09/2020	447.06
HEN	06	02/24/2021	
HEN	06	03/17/2021	447.07
HEN	06	03/18/2021	447.07
HEN	06	04/07/2021	
HEN	06	06/25/2021	447.84
HEN	06	09/08/2021	447.56
HEN	06	09/10/2021	447.56
HEN	06	12/07/2021	447.30
HEN	06	12/09/2021	447.30
HEN	06	03/21/2022	447.80
HEN	06	03/23/2022	447.80
HEN	06	06/07/2022	448.55
HEN	06	06/08/2022	448.55
HEN	06	09/14/2022	447.53
HEN	06	12/28/2022	446.15
HEN	06	03/01/2023	447.20
HEN	06	05/30/2023	446.99
HEN	06	08/21/2023	448.95
HEN	06	10/31/2023	447.14
HEN	06	11/13/2023	446.93
HEN	06	01/22/2024	447.21
HEN	06	04/15/2024	449.72
HEN	06	07/15/2024	447.03
HEN	06	10/07/2024	446.40
HEN	07	12/02/1994	449.34
HEN	07	03/17/1995	449.69
HEN	07	04/18/1995	450.51
HEN	07	05/25/1995	465.87
HEN	07	06/29/1995	452.14
HEN	07	07/26/1995	450.88
HEN	07	08/22/1995	449.98
HEN	07	09/18/1995	450.20
HEN	07	10/10/1995	449.91
HEN	07	11/02/1995	449.83
HEN	07	12/18/1995	451.79
HEN	07	02/08/1996	449.01
HEN	07	03/18/1996	448.73
HEN	07	04/25/1996	448.57
HEN	07	05/23/1996	448.80
HEN	07	06/26/1996	461.13
HEN	07	10/08/1996	460.61
HEN	07	11/13/1996	449.15
HEN	07	02/12/1997	450.88
HEN	07	06/10/1997	449.48

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HENNEPIN POWER PLANT
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Plant ID	Well ID	Sample Date	Groundwater Elevation (feet NAVD88)
HEN	07	09/17/1997	450.72
HEN	07	12/04/1997	448.46
HEN	07	03/25/1998	450.24
HEN	07	06/10/1998	451.59
HEN	07	09/16/1998	450.67
HEN	07	11/17/1998	460.61
HEN	07	02/17/1999	451.41
HEN	07	06/23/1999	452.17
HEN	07	09/09/1999	449.95
HEN	07	11/04/1999	449.60
HEN	07	03/15/2000	448.82
HEN	07	06/14/2000	449.22
HEN	07	08/16/2000	449.53
HEN	07	10/12/2000	448.90
HEN	07	03/13/2001	451.66
HEN	07	06/20/2001	450.36
HEN	07	09/13/2001	449.53
HEN	07	11/14/2001	450.39
HEN	07	03/13/2002	450.21
HEN	07	06/26/2002	451.80
HEN	07	09/24/2002	449.27
HEN	07	12/10/2002	449.47
HEN	07	03/24/2003	447.72
HEN	07	06/24/2003	448.05
HEN	07	09/22/2003	447.70
HEN	07	12/22/2003	448.87
HEN	07	03/25/2004	448.28
HEN	07	06/23/2004	449.99
HEN	07	09/20/2004	447.88
HEN	07	12/15/2004	449.46
HEN	07	03/28/2005	450.00
HEN	07	06/23/2005	448.37
HEN	07	09/22/2005	447.50
HEN	07	12/28/2005	448.03
HEN	07	03/29/2006	447.39
HEN	07	06/27/2006	447.36
HEN	07	09/20/2006	446.77
HEN	07	11/21/2006	448.04
HEN	07	03/06/2007	449.75
HEN	07	05/24/2007	450.56
HEN	07	09/05/2007	452.21
HEN	07	10/24/2007	449.75
HEN	07	03/27/2008	451.55
HEN	07	05/15/2008	450.73
HEN	07	08/25/2008	449.68
HEN	07	10/27/2008	451.99

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Plant ID	Well ID	Sample Date	Groundwater Elevation (feet NAVD88)
HEN	07	12/29/2008	451.00
HEN	07	03/25/2009	455.77
HEN	07	06/18/2009	454.48
HEN	07	09/29/2009	451.49
HEN	07	12/29/2009	451.81
HEN	07	03/16/2010	451.49
HEN	07	08/31/2010	452.11
HEN	07	12/29/2010	450.21
HEN	07	03/16/2011	451.28
HEN	07	06/29/2011	453.26
HEN	07	08/24/2011	450.79
HEN	07	10/19/2011	451.21
HEN	07	03/01/2012	449.89
HEN	07	05/31/2012	449.79
HEN	07	08/29/2012	448.48
HEN	07	11/27/2012	448.93
HEN	07	03/07/2013	448.68
HEN	07	06/06/2013	452.94
HEN	07	09/04/2013	450.06
HEN	07	12/11/2013	449.61
HEN	07	03/26/2014	451.57
HEN	07	06/18/2014	451.24
HEN	07	08/20/2014	452.19
HEN	07	12/09/2014	451.09
HEN	07	03/19/2015	449.10
HEN	07	06/23/2015	454.07
HEN	07	09/17/2015	452.72
HEN	07	12/09/2015	452.15
HEN	07	03/08/2016	451.59
HEN	07	03/10/2016	451.59
HEN	07	06/07/2016	452.75
HEN	07	06/08/2016	452.75
HEN	07	07/29/2016	453.12
HEN	07	08/31/2016	453.40
HEN	07	09/01/2016	453.40
HEN	07	12/07/2016	452.21
HEN	07	12/09/2016	452.21
HEN	07	02/20/2017	451.17
HEN	07	02/22/2017	451.17
HEN	07	04/25/2017	453.50
HEN	07	04/27/2017	435.50
HEN	07	06/08/2017	454.63
HEN	07	09/07/2017	453.06
HEN	07	11/15/2017	452.34
HEN	07	11/16/2017	452.34
HEN	07	03/27/2018	452.77

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HENNEPIN PART 845 CONSTRUCTION/OPERATING PERMIT APPLICATION(S)- SECOND SUBMITTAL
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Plant ID	Well ID	Sample Date	Groundwater Elevation (feet NAVD88)
HEN	07	06/13/2018	452.73
HEN	07	09/12/2018	452.57
HEN	07	12/12/2018	451.43
HEN	07	03/13/2019	452.77
HEN	07	03/14/2019	452.77
HEN	07	06/18/2019	457.11
HEN	07	09/17/2019	453.67
HEN	07	09/18/2019	453.67
HEN	07	12/11/2019	452.93
HEN	07	12/12/2019	452.93
HEN	07	03/11/2020	452.12
HEN	07	03/12/2020	452.12
HEN	07	06/03/2020	457.05
HEN	07	06/04/2020	457.05
HEN	07	09/02/2020	453.37
HEN	07	09/03/2020	453.37
HEN	07	12/09/2020	451.07
HEN	07	12/10/2020	451.07
HEN	07	02/24/2021	449.54
HEN	07	03/17/2021	450.01
HEN	07	03/18/2021	450.01
HEN	07	03/18/2021	450.09
HEN	07	04/07/2021	450.15
HEN	07	05/05/2021	455.60
HEN	07	06/08/2021	451.55
HEN	07	06/24/2021	451.49
HEN	07	07/13/2021	452.82
HEN	07	08/03/2021	452.61
HEN	07	09/08/2021	451.25
HEN	07	09/09/2021	451.25
HEN	07	12/07/2021	451.06
HEN	07	12/08/2021	451.06
HEN	07	03/21/2022	450.65
HEN	07	03/22/2022	450.65
HEN	07	06/07/2022	451.96
HEN	07	06/08/2022	451.96
HEN	07	09/14/2022	451.57
HEN	07	12/29/2022	449.43
HEN	07	03/01/2023	449.42
HEN	07	03/30/2023	450.54
HEN	07	04/30/2023	450.82
HEN	07	05/30/2023	450.47
HEN	07	06/21/2023	450.10
HEN	07	07/21/2023	450.13
HEN	07	08/21/2023	449.87
HEN	07	10/31/2023	449.72

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HENNEPIN PART 845 CONSTRUCTION/OPERATING PERMIT APPLICATION(S)- SECOND SUBMITTAL
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Plant ID	Well ID	Sample Date	Groundwater Elevation (feet NAVD88)
HEN	07	11/13/2023	449.73
HEN	07	12/21/2023	449.24
HEN	07	01/22/2024	449.49
HEN	07	02/15/2024	451.49
HEN	07	03/15/2024	450.49
HEN	07	04/15/2024	451.46
HEN	07	05/15/2024	452.13
HEN	07	06/15/2024	451.17
HEN	07	07/15/2024	450.50
HEN	07	08/07/2024	450.58
HEN	07	09/07/2024	449.78
HEN	07	10/07/2024	449.69
HEN	08	03/17/1995	448.07
HEN	08	04/18/1995	449.75
HEN	08	05/23/1995	449.91
HEN	08	06/29/1995	448.04
HEN	08	07/26/1995	447.02
HEN	08	08/22/1995	447.29
HEN	08	09/18/1995	446.56
HEN	08	10/10/1995	446.50
HEN	08	11/01/1995	447.11
HEN	08	12/18/1995	445.65
HEN	08	02/08/1996	446.13
HEN	08	03/18/1996	445.91
HEN	08	04/25/1996	445.72
HEN	08	05/23/1996	447.17
HEN	08	06/26/1996	450.12
HEN	08	10/08/1996	446.18
HEN	08	11/13/1996	446.72
HEN	08	02/11/1997	446.54
HEN	08	06/10/1997	446.55
HEN	08	09/17/1997	444.35
HEN	08	12/04/1997	446.16
HEN	08	03/25/1998	450.99
HEN	08	06/10/1998	447.41
HEN	08	09/16/1998	446.43
HEN	08	11/17/1998	447.61
HEN	08	02/17/1999	448.41
HEN	08	06/23/1999	449.16
HEN	08	09/09/1999	446.10
HEN	08	11/04/1999	446.47
HEN	08	03/15/2000	445.41
HEN	08	06/14/2000	446.42
HEN	08	08/16/2000	446.22
HEN	08	10/11/2000	445.60
HEN	08	03/13/2001	448.80

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Plant ID	Well ID	Sample Date	Groundwater Elevation (feet NAVD88)
HEN	08	06/21/2001	447.62
HEN	08	09/13/2001	445.56
HEN	08	11/14/2001	447.44
HEN	08	03/13/2002	448.06
HEN	08	06/26/2002	448.02
HEN	08	09/24/2002	445.71
HEN	08	12/10/2002	446.06
HEN	08	03/25/2003	444.70
HEN	08	06/24/2003	445.21
HEN	08	09/22/2003	444.60
HEN	08	12/22/2003	446.42
HEN	08	03/25/2004	445.97
HEN	08	06/23/2004	448.96
HEN	08	09/20/2004	444.81
HEN	08	12/15/2004	448.51
HEN	08	03/28/2005	447.00
HEN	08	06/23/2005	445.17
HEN	08	09/22/2005	444.37
HEN	08	12/28/2005	445.05
HEN	08	03/29/2006	445.02
HEN	08	06/27/2006	444.72
HEN	08	09/20/2006	444.66
HEN	08	11/21/2006	446.40
HEN	08	03/06/2007	449.00
HEN	08	05/24/2007	447.10
HEN	08	09/05/2007	450.12
HEN	08	10/24/2007	446.77
HEN	08	03/26/2008	448.53
HEN	08	05/15/2008	447.61
HEN	08	08/25/2008	446.01
HEN	08	10/27/2008	448.37
HEN	08	12/29/2008	449.11
HEN	08	03/25/2009	453.19
HEN	08	06/18/2009	449.50
HEN	08	09/29/2009	447.08
HEN	08	12/29/2009	449.26
HEN	08	03/16/2010	448.94
HEN	08	08/31/2010	447.36
HEN	08	12/29/2010	446.44
HEN	08	03/16/2011	449.18
HEN	08	06/29/2011	449.75
HEN	08	08/24/2011	446.60
HEN	08	10/19/2011	446.66
HEN	08	03/01/2012	446.56
HEN	08	05/30/2012	446.59
HEN	08	08/29/2012	444.91

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Plant ID	Well ID	Sample Date	Groundwater Elevation (feet NAVD88)
HEN	08	11/27/2012	446.48
HEN	08	03/07/2013	445.79
HEN	08	06/06/2013	451.53
HEN	08	09/03/2013	445.98
HEN	08	12/11/2013	446.44
HEN	08	03/26/2014	449.23
HEN	08	06/18/2014	448.05
HEN	08	08/20/2014	448.43
HEN	08	12/09/2014	447.32
HEN	08	03/19/2015	447.18
HEN	08	06/22/2015	455.41
HEN	08	09/16/2015	448.60
HEN	08	12/08/2015	449.20
HEN	08	03/08/2016	447.80
HEN	08	03/10/2016	447.80
HEN	08	06/07/2016	448.93
HEN	08	08/31/2016	450.35
HEN	08	09/01/2016	450.35
HEN	08	12/07/2016	448.39
HEN	08	12/09/2016	448.39
HEN	08	02/20/2017	447.88
HEN	08	02/22/2017	447.88
HEN	08	04/25/2017	451.11
HEN	08	04/27/2017	451.11
HEN	08	06/08/2017	450.88
HEN	08	06/09/2017	450.88
HEN	08	09/07/2017	449.29
HEN	08	11/15/2017	448.79
HEN	08	11/16/2017	448.79
HEN	08	03/27/2018	449.45
HEN	08	06/13/2018	450.11
HEN	08	09/12/2018	449.33
HEN	08	12/12/2018	448.53
HEN	08	03/13/2019	449.79
HEN	08	03/14/2019	449.79
HEN	08	06/18/2019	453.61
HEN	08	09/17/2019	450.56
HEN	08	09/18/2019	450.56
HEN	08	12/11/2019	449.06
HEN	08	12/12/2019	449.06
HEN	08	03/11/2020	449.02
HEN	08	03/12/2020	448.82
HEN	08	06/03/2020	454.94
HEN	08	06/04/2020	454.94
HEN	08	09/02/2020	449.69
HEN	08	09/03/2020	449.93

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HENNEPIN PART 845 CONSTRUCTION/OPERATING PERMIT APPLICATION(S)- SECOND SUBMITTAL
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HENNEPIN, ILLINOIS

Plant ID	Well ID	Sample Date	Groundwater Elevation (feet NAVD88)
HEN	08	12/09/2020	447.52
HEN	08	12/10/2020	447.52
HEN	08	02/24/2021	446.41
HEN	08	03/17/2021	447.39
HEN	08	03/18/2021	447.39
HEN	08	03/18/2021	447.50
HEN	08	04/07/2021	447.77
HEN	08	04/08/2021	447.77
HEN	08	05/06/2021	449.09
HEN	08	06/08/2021	448.98
HEN	08	06/24/2021	449.26
HEN	08	07/13/2021	451.48
HEN	08	08/03/2021	449.67
HEN	08	09/08/2021	448.30
HEN	08	09/09/2021	448.30
HEN	08	12/07/2021	447.74
HEN	08	12/08/2021	447.74
HEN	08	03/21/2022	447.90
HEN	08	03/22/2022	447.90
HEN	08	06/07/2022	449.09
HEN	08	09/14/2022	447.65
HEN	08	12/28/2022	446.47
HEN	08	03/01/2023	447.18
HEN	08	03/30/2023	448.59
HEN	08	04/30/2023	448.15
HEN	08	05/30/2023	447.54
HEN	08	06/21/2023	447.38
HEN	08	07/21/2023	447.71
HEN	08	08/21/2023	447.13
HEN	08	09/30/2023	446.95
HEN	08	10/31/2023	447.53
HEN	08	11/13/2023	447.36
HEN	08	12/21/2023	446.58
HEN	08	01/22/2024	447.36
HEN	08	02/15/2024	449.50
HEN	08	03/15/2024	448.15
HEN	08	04/15/2024	450.06
HEN	08	05/15/2024	449.96
HEN	08	06/15/2024	448.65
HEN	08	07/15/2024	447.93
HEN	08	08/07/2024	447.68
HEN	08	09/07/2024	446.87
HEN	08	10/07/2024	446.80
HEN	08D	06/18/2009	449.50
HEN	08D	09/29/2009	447.08
HEN	08D	12/29/2009	449.94

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Plant ID	Well ID	Sample Date	Groundwater Elevation (feet NAVD88)
HEN	08D	03/16/2010	449.26
HEN	08D	08/31/2010	447.40
HEN	08D	12/29/2010	446.56
HEN	08D	03/16/2011	449.34
HEN	08D	06/29/2011	449.75
HEN	08D	08/23/2011	446.48
HEN	08D	10/19/2011	446.76
HEN	08D	03/01/2012	446.66
HEN	08D	05/30/2012	446.81
HEN	08D	08/29/2012	445.00
HEN	08D	11/27/2012	446.65
HEN	08D	03/07/2013	445.95
HEN	08D	06/06/2013	451.82
HEN	08D	09/04/2013	446.06
HEN	08D	12/11/2013	446.51
HEN	08D	03/26/2014	449.30
HEN	08D	06/18/2014	448.14
HEN	08D	08/20/2014	466.45
HEN	08D	12/10/2014	447.31
HEN	08D	03/19/2015	447.06
HEN	08D	06/22/2015	455.57
HEN	08D	09/16/2015	448.24
HEN	08D	12/08/2015	447.92
HEN	08D	03/08/2016	447.52
HEN	08D	03/10/2016	447.52
HEN	08D	06/07/2016	447.60
HEN	08D	08/31/2016	450.19
HEN	08D	09/01/2016	450.19
HEN	08D	12/07/2016	448.09
HEN	08D	12/09/2016	448.09
HEN	08D	02/20/2017	447.60
HEN	08D	02/22/2017	447.60
HEN	08D	04/25/2017	450.79
HEN	08D	04/27/2017	450.79
HEN	08D	06/08/2017	450.50
HEN	08D	06/09/2017	450.50
HEN	08D	09/07/2017	448.99
HEN	08D	11/15/2017	448.54
HEN	08D	11/16/2017	448.54
HEN	08D	03/27/2018	449.16
HEN	08D	06/13/2018	449.94
HEN	08D	09/12/2018	449.12
HEN	08D	12/12/2018	448.29
HEN	08D	03/13/2019	449.45
HEN	08D	03/14/2019	449.45
HEN	08D	06/18/2019	453.02

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Plant ID	Well ID	Sample Date	Groundwater Elevation (feet NAVD88)
HEN	08D	06/18/2019	453.14
HEN	08D	09/17/2019	450.44
HEN	08D	09/18/2019	450.44
HEN	08D	12/11/2019	448.76
HEN	08D	12/12/2019	448.76
HEN	08D	03/11/2020	448.55
HEN	08D	03/12/2020	448.55
HEN	08D	06/03/2020	454.55
HEN	08D	06/04/2020	454.55
HEN	08D	09/02/2020	449.72
HEN	08D	09/03/2020	449.72
HEN	08D	12/09/2020	447.22
HEN	08D	12/10/2020	447.22
HEN	08D	02/24/2021	446.21
HEN	08D	03/17/2021	447.17
HEN	08D	03/18/2021	447.17
HEN	08D	03/18/2021	447.34
HEN	08D	04/07/2021	447.56
HEN	08D	04/08/2021	447.56
HEN	08D	05/06/2021	449.06
HEN	08D	06/08/2021	448.75
HEN	08D	06/24/2021	449.31
HEN	08D	07/13/2021	451.44
HEN	08D	08/03/2021	449.42
HEN	08D	09/08/2021	447.54
HEN	08D	09/09/2021	447.54
HEN	08D	12/07/2021	447.42
HEN	08D	12/08/2021	447.42
HEN	08D	03/21/2022	447.85
HEN	08D	03/22/2022	457.85
HEN	08D	06/07/2022	448.87
HEN	08D	09/14/2022	447.38
HEN	08D	12/28/2022	446.14
HEN	08D	03/01/2023	447.07
HEN	08D	03/30/2023	448.44
HEN	08D	04/30/2023	447.84
HEN	08D	05/30/2023	447.22
HEN	08D	06/21/2023	447.21
HEN	08D	07/21/2023	447.58
HEN	08D	08/21/2023	446.89
HEN	08D	09/30/2023	446.73
HEN	08D	10/31/2023	447.30
HEN	08D	11/13/2023	447.11
HEN	08D	12/21/2023	446.34
HEN	08D	01/22/2024	447.21
HEN	08D	02/15/2024	

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Plant ID	Well ID	Sample Date	Groundwater Elevation (feet NAVD88)
HEN	08D	03/15/2024	447.77
HEN	08D	04/15/2024	449.83
HEN	08D	05/15/2024	449.51
HEN	08D	06/15/2024	448.16
HEN	08D	07/15/2024	447.17
HEN	08D	08/07/2024	447.13
HEN	08D	09/07/2024	446.36
HEN	08D	10/07/2024	446.65
HEN	10	05/25/1995	450.25
HEN	10	06/30/1995	447.84
HEN	10	07/26/1995	446.89
HEN	10	09/18/1995	446.43
HEN	10	10/12/1995	446.60
HEN	10	11/01/1995	447.18
HEN	10	12/18/1995	446.32
HEN	10	02/08/1996	446.09
HEN	10	03/18/1996	445.08
HEN	10	04/25/1996	446.01
HEN	10	06/26/1996	450.01
HEN	10	10/08/1996	445.94
HEN	10	09/16/1997	445.32
HEN	10	12/03/1997	446.13
HEN	10	03/24/1998	451.14
HEN	10	06/10/1998	447.35
HEN	10	09/16/1998	446.43
HEN	10	11/17/1998	447.68
HEN	10	02/17/1999	448.28
HEN	10	06/22/1999	449.17
HEN	10	09/09/1999	446.37
HEN	10	11/04/1999	446.50
HEN	10	03/15/2000	448.24
HEN	10	06/14/2000	446.47
HEN	10	08/16/2000	446.11
HEN	10	10/11/2000	445.33
HEN	10	03/15/2001	448.45
HEN	10	06/20/2001	447.71
HEN	10	09/12/2001	445.58
HEN	10	11/13/2001	447.50
HEN	10	03/13/2002	448.20
HEN	10	06/26/2002	447.96
HEN	10	09/24/2002	445.26
HEN	10	12/11/2002	446.00
HEN	10	03/24/2003	444.75
HEN	10	06/24/2003	445.26
HEN	10	09/22/2003	444.59
HEN	10	12/22/2003	446.48

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HENNEPIN PART 845 CONSTRUCTION/OPERATING PERMIT APPLICATION(S)- SECOND SUBMITTAL
HENNEPIN POWER PLANT
HENNEPIN, ILLINOIS

Plant ID	Well ID	Sample Date	Groundwater Elevation (feet NAVD88)
HEN	10	03/25/2004	445.98
HEN	10	06/22/2004	449.13
HEN	10	09/20/2004	444.83
HEN	10	12/15/2004	448.63
HEN	10	03/28/2005	446.98
HEN	10	06/23/2005	445.13
HEN	10	09/22/2005	444.24
HEN	10	12/28/2005	444.91
HEN	10	03/29/2006	445.01
HEN	10	06/27/2006	444.56
HEN	10	09/20/2006	444.58
HEN	10	11/21/2006	446.35
HEN	10	03/06/2007	449.18
HEN	10	05/24/2007	446.81
HEN	10	09/06/2007	449.62
HEN	10	10/24/2007	446.59
HEN	10	03/26/2008	446.34
HEN	10	05/15/2008	447.44
HEN	10	08/25/2008	445.79
HEN	10	10/27/2008	448.13
HEN	10	12/29/2008	449.10
HEN	10	03/25/2009	452.76
HEN	10	06/18/2009	449.14
HEN	10	09/29/2009	446.76
HEN	10	12/29/2009	494.56
HEN	10	03/16/2010	449.02
HEN	10	08/31/2010	447.09
HEN	10	12/29/2010	446.24
HEN	10	03/16/2011	449.07
HEN	10	06/29/2011	449.44
HEN	10	08/24/2011	446.36
HEN	10	10/18/2011	446.49
HEN	10	03/01/2012	446.31
HEN	10	05/30/2012	446.49
HEN	10	08/29/2012	444.72
HEN	10	11/27/2012	446.35
HEN	10	03/07/2013	445.73
HEN	10	06/06/2013	451.56
HEN	10	09/04/2013	445.72
HEN	10	12/11/2013	447.13
HEN	10	03/26/2014	449.01
HEN	10	06/18/2014	447.83
HEN	10	08/20/2014	448.04
HEN	10	12/10/2014	447.01
HEN	10	03/19/2015	447.01
HEN	10	06/22/2015	455.52

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HENNEPIN PART 845 CONSTRUCTION/OPERATING PERMIT APPLICATION(S)- SECOND SUBMITTAL
HENNEPIN POWER PLANT
HENNEPIN, ILLINOIS

Plant ID	Well ID	Sample Date	Groundwater Elevation (feet NAVD88)
HEN	10	09/17/2015	448.32
HEN	10	12/09/2015	449.01
HEN	10	03/10/2016	447.63
HEN	10	03/11/2016	447.63
HEN	10	06/07/2016	448.63
HEN	10	06/08/2016	448.63
HEN	10	08/31/2016	450.27
HEN	10	09/01/2016	450.27
HEN	10	12/07/2016	448.20
HEN	10	12/09/2016	448.20
HEN	10	02/20/2017	447.69
HEN	10	02/22/2017	447.69
HEN	10	04/25/2017	450.83
HEN	10	04/27/2017	450.83
HEN	10	06/08/2017	450.53
HEN	10	09/07/2017	448.98
HEN	10	11/15/2017	448.62
HEN	10	11/16/2017	448.62
HEN	10	03/27/2018	449.22
HEN	10	06/13/2018	449.96
HEN	10	09/12/2018	449.16
HEN	10	12/12/2018	448.43
HEN	10	03/13/2019	449.63
HEN	10	03/14/2019	449.63
HEN	10	06/18/2019	453.18
HEN	10	09/17/2019	450.08
HEN	10	12/11/2019	449.02
HEN	10	12/12/2019	449.02
HEN	10	03/11/2020	448.62
HEN	10	06/03/2020	454.46
HEN	10	06/04/2020	454.46
HEN	10	09/02/2020	449.43
HEN	10	12/09/2020	447.30
HEN	10	12/10/2020	447.30
HEN	10	02/24/2021	
HEN	10	03/17/2021	447.31
HEN	10	03/18/2021	447.31
HEN	10	03/18/2021	447.45
HEN	10	03/22/2021	447.45
HEN	10	04/07/2021	447.62
HEN	10	05/05/2021	448.73
HEN	10	06/08/2021	448.74
HEN	10	06/24/2021	448.24
HEN	10	07/13/2021	451.33
HEN	10	08/03/2021	449.41
HEN	10	09/08/2021	448.11

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HENNEPIN PART 845 CONSTRUCTION/OPERATING PERMIT APPLICATION(S)- SECOND SUBMITTAL
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Plant ID	Well ID	Sample Date	Groundwater Elevation (feet NAVD88)
HEN	10	09/09/2021	448.11
HEN	10	12/07/2021	447.55
HEN	10	12/08/2021	447.56
HEN	10	03/21/2022	448.00
HEN	10	03/22/2022	448.00
HEN	10	06/07/2022	448.86
HEN	10	09/14/2022	447.48
HEN	10	12/28/2022	446.33
HEN	10	03/01/2023	447.20
HEN	10	05/30/2023	447.25
HEN	10	08/21/2023	449.75
HEN	10	10/31/2023	447.39
HEN	10	11/13/2023	447.23
HEN	10	01/22/2024	447.31
HEN	10	04/15/2024	449.90
HEN	10	07/15/2024	447.25
HEN	10	10/07/2024	
HEN	11	05/25/1995	449.00
HEN	11	06/30/1995	447.80
HEN	11	07/26/1995	446.94
HEN	11	09/18/1995	446.40
HEN	11	10/12/1995	446.62
HEN	11	11/01/1995	447.22
HEN	11	12/18/1995	446.09
HEN	11	02/08/1996	446.17
HEN	11	03/18/1996	445.99
HEN	11	04/25/1996	446.04
HEN	11	06/26/1996	450.09
HEN	11	09/16/1997	445.38
HEN	11	12/03/1997	446.10
HEN	11	03/24/1998	451.32
HEN	11	06/10/1998	447.36
HEN	11	09/16/1998	446.47
HEN	11	11/17/1998	447.72
HEN	11	02/17/1999	448.25
HEN	11	06/22/1999	449.25
HEN	11	09/09/1999	446.15
HEN	11	11/04/1999	446.58
HEN	11	03/15/2000	445.51
HEN	11	06/14/2000	446.55
HEN	11	08/16/2000	446.26
HEN	11	10/11/2000	445.41
HEN	11	03/15/2001	448.54
HEN	11	03/28/2005	447.03
HEN	11	06/23/2005	445.20
HEN	11	09/22/2005	444.34

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HENNEPIN PART 845 CONSTRUCTION/OPERATING PERMIT APPLICATION(S)- SECOND SUBMITTAL
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HENNEPIN, ILLINOIS

Plant ID	Well ID	Sample Date	Groundwater Elevation (feet NAVD88)
HEN	11	12/28/2005	444.70
HEN	11	06/27/2006	444.63
HEN	11	07/13/2021	451.38
HEN	11	12/07/2021	447.54
HEN	11	12/28/2022	446.31
HEN	11	03/01/2023	447.35
HEN	11	05/30/2023	447.27
HEN	11	08/21/2023	449.92
HEN	11	10/31/2023	447.40
HEN	11	11/13/2023	447.25
HEN	11	01/22/2024	447.30
HEN	11	04/15/2024	449.91
HEN	11	07/15/2024	447.22
HEN	11	10/07/2024	436.44
HEN	12	05/24/1995	450.08
HEN	12	06/30/1995	448.02
HEN	12	09/18/1995	446.50
HEN	12	10/10/1995	446.78
HEN	12	11/02/1995	447.35
HEN	12	12/18/1995	446.41
HEN	12	02/08/1996	446.32
HEN	12	03/18/1996	446.09
HEN	12	04/25/1996	446.07
HEN	12	05/23/1996	447.31
HEN	12	06/26/1996	450.25
HEN	12	10/07/1996	446.21
HEN	12	11/12/1996	447.30
HEN	12	02/12/1997	446.61
HEN	12	06/10/1997	446.65
HEN	12	09/16/1997	445.53
HEN	12	12/03/1997	446.16
HEN	12	03/24/1998	451.32
HEN	12	06/10/1998	447.33
HEN	12	09/16/1998	446.44
HEN	12	11/17/1998	447.80
HEN	12	02/17/1999	448.28
HEN	12	06/22/1999	449.29
HEN	12	09/09/1999	446.18
HEN	12	11/04/1999	446.55
HEN	12	03/15/2000	445.50
HEN	12	06/14/2000	446.53
HEN	12	08/16/2000	446.13
HEN	12	10/12/2000	445.40
HEN	12	03/15/2001	448.53
HEN	12	06/20/2001	447.75
HEN	12	09/12/2001	445.66

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HENNEPIN PART 845 CONSTRUCTION/OPERATING PERMIT APPLICATION(S)- SECOND SUBMITTAL
HENNEPIN POWER PLANT
HENNEPIN, ILLINOIS

Plant ID	Well ID	Sample Date	Groundwater Elevation (feet NAVD88)
HEN	12	11/13/2001	447.54
HEN	12	03/13/2002	448.28
HEN	12	06/26/2002	447.99
HEN	12	09/24/2002	445.33
HEN	12	12/11/2002	445.51
HEN	12	03/24/2003	444.80
HEN	12	06/24/2003	445.33
HEN	12	09/22/2003	444.67
HEN	12	12/22/2003	446.51
HEN	12	03/25/2004	446.07
HEN	12	06/22/2004	449.19
HEN	12	09/20/2004	444.93
HEN	12	12/15/2004	448.70
HEN	12	03/28/2005	447.04
HEN	12	06/23/2005	445.26
HEN	12	09/22/2005	444.32
HEN	12	12/28/2005	444.97
HEN	12	03/29/2006	445.04
HEN	12	06/27/2006	444.63
HEN	12	09/20/2006	444.62
HEN	12	11/21/2006	446.39
HEN	12	03/06/2007	449.24
HEN	12	05/24/2007	446.85
HEN	12	09/06/2007	449.64
HEN	12	10/24/2007	446.64
HEN	12	03/26/2008	448.36
HEN	12	05/15/2008	447.47
HEN	12	08/25/2008	445.82
HEN	12	10/27/2008	448.20
HEN	12	12/29/2008	449.25
HEN	12	03/25/2009	452.92
HEN	12	06/18/2009	449.24
HEN	12	09/29/2009	446.84
HEN	12	12/29/2009	449.36
HEN	12	03/16/2010	449.04
HEN	12	08/31/2010	447.15
HEN	12	03/16/2011	448.41
HEN	12	06/29/2011	449.52
HEN	12	08/24/2011	446.44
HEN	12	10/18/2011	446.87
HEN	12	03/01/2012	446.75
HEN	12	05/30/2012	446.88
HEN	12	08/29/2012	445.11
HEN	12	11/27/2012	446.73
HEN	12	03/07/2013	439.91
HEN	12	06/06/2013	451.91

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HENNEPIN PART 845 CONSTRUCTION/OPERATING PERMIT APPLICATION(S)- SECOND SUBMITTAL
HENNEPIN POWER PLANT
HENNEPIN, ILLINOIS

Plant ID	Well ID	Sample Date	Groundwater Elevation (feet NAVD88)
HEN	12	12/11/2013	447.49
HEN	12	03/26/2014	449.36
HEN	12	06/18/2014	448.20
HEN	12	08/20/2014	448.50
HEN	12	12/10/2014	447.39
HEN	12	03/19/2015	447.09
HEN	12	06/22/2015	455.60
HEN	12	09/17/2015	448.29
HEN	12	12/08/2015	448.97
HEN	12	12/09/2015	448.97
HEN	12	03/08/2016	447.56
HEN	12	03/10/2016	447.56
HEN	12	06/07/2016	448.60
HEN	12	06/08/2016	448.60
HEN	12	08/31/2016	450.22
HEN	12	12/07/2016	448.14
HEN	12	12/09/2016	448.14
HEN	12	02/20/2017	447.61
HEN	12	02/22/2017	447.61
HEN	12	04/25/2017	450.79
HEN	12	04/26/2017	450.79
HEN	12	06/08/2017	450.50
HEN	12	06/09/2017	450.50
HEN	12	09/07/2017	448.96
HEN	12	11/15/2017	448.58
HEN	12	11/16/2017	448.58
HEN	12	03/26/2018	449.24
HEN	12	06/13/2018	449.94
HEN	12	09/12/2018	449.13
HEN	12	12/12/2018	448.34
HEN	12	03/13/2019	449.53
HEN	12	06/18/2019	453.18
HEN	12	09/17/2019	450.08
HEN	12	12/11/2019	457.48
HEN	12	03/11/2020	448.54
HEN	12	06/03/2020	454.49
HEN	12	06/04/2020	454.49
HEN	12	09/02/2020	449.42
HEN	12	12/09/2020	447.24
HEN	12	12/10/2020	447.24
HEN	12	02/24/2021	
HEN	12	03/17/2021	447.12
HEN	12	03/18/2021	447.12
HEN	12	03/22/2021	447.38
HEN	12	04/07/2021	447.60
HEN	12	05/05/2021	448.78

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HENNEPIN PART 845 CONSTRUCTION/OPERATING PERMIT APPLICATION(S)- SECOND SUBMITTAL
HENNEPIN POWER PLANT
HENNEPIN, ILLINOIS

Plant ID	Well ID	Sample Date	Groundwater Elevation (feet NAVD88)
HEN	12	06/08/2021	448.68
HEN	12	06/23/2021	449.15
HEN	12	07/13/2021	451.34
HEN	12	08/03/2021	449.35
HEN	12	09/08/2021	448.10
HEN	12	09/09/2021	448.10
HEN	12	12/07/2021	447.44
HEN	12	12/08/2021	447.44
HEN	12	03/21/2022	447.92
HEN	12	03/23/2022	447.92
HEN	12	06/07/2022	448.89
HEN	12	09/14/2022	447.54
HEN	12	12/28/2022	446.24
HEN	12	03/01/2023	447.12
HEN	12	05/30/2023	447.23
HEN	12	09/30/2023	446.78
HEN	12	10/31/2023	447.37
HEN	12	11/13/2023	446.18
HEN	12	12/21/2023	446.39
HEN	12	01/22/2024	447.27
HEN	12	02/15/2024	449.13
HEN	12	03/15/2024	447.90
HEN	12	04/15/2024	449.86
HEN	12	05/15/2024	449.64
HEN	12	06/15/2024	448.28
HEN	12	07/15/2024	447.20
HEN	12	08/07/2024	447.27
HEN	12	09/07/2024	446.51
HEN	12	10/07/2024	
HEN	13	05/24/1995	449.98
HEN	13	06/30/1995	447.90
HEN	13	09/18/1995	446.45
HEN	13	10/10/1995	446.73
HEN	13	11/02/1995	447.43
HEN	13	12/18/1995	446.47
HEN	13	02/08/1996	446.17
HEN	13	03/18/1996	446.06
HEN	13	04/25/1996	446.01
HEN	13	05/23/1996	447.27
HEN	13	06/26/1996	450.18
HEN	13	10/07/1996	446.20
HEN	13	11/12/1996	446.93
HEN	13	02/12/1997	446.53
HEN	13	06/10/1997	446.63
HEN	13	09/16/1997	445.43
HEN	13	12/03/1997	446.03

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HENNEPIN PART 845 CONSTRUCTION/OPERATING PERMIT APPLICATION(S)- SECOND SUBMITTAL
HENNEPIN POWER PLANT
HENNEPIN, ILLINOIS

Plant ID	Well ID	Sample Date	Groundwater Elevation (feet NAVD88)
HEN	13	03/24/1998	451.30
HEN	13	06/10/1998	447.39
HEN	13	09/16/1998	446.42
HEN	13	11/17/1998	447.73
HEN	13	02/17/1999	448.18
HEN	13	06/22/1999	449.26
HEN	13	09/09/1999	446.14
HEN	13	11/04/1999	446.55
HEN	13	03/15/2000	445.47
HEN	13	06/14/2000	446.51
HEN	13	08/16/2000	446.16
HEN	13	10/12/2000	445.38
HEN	13	03/15/2001	448.55
HEN	13	06/20/2001	447.75
HEN	13	09/12/2001	445.71
HEN	13	11/13/2001	447.50
HEN	13	03/13/2002	448.18
HEN	13	06/26/2002	448.00
HEN	13	09/24/2002	445.30
HEN	13	12/11/2002	445.48
HEN	13	03/24/2003	444.80
HEN	13	06/24/2003	445.31
HEN	13	09/22/2003	444.68
HEN	13	12/22/2003	446.51
HEN	13	03/25/2004	446.02
HEN	13	06/22/2004	449.15
HEN	13	09/20/2004	444.89
HEN	13	12/15/2004	448.66
HEN	13	03/28/2005	447.05
HEN	13	06/23/2005	445.20
HEN	13	09/22/2005	444.23
HEN	13	12/28/2005	444.92
HEN	13	03/29/2006	444.97
HEN	13	06/27/2006	444.59
HEN	13	09/20/2006	444.59
HEN	13	11/21/2006	446.32
HEN	13	03/06/2007	449.17
HEN	13	05/24/2007	446.84
HEN	13	09/06/2007	449.62
HEN	13	10/24/2007	446.62
HEN	13	03/26/2008	448.34
HEN	13	05/15/2008	447.45
HEN	13	08/25/2008	445.81
HEN	13	10/27/2008	448.16
HEN	13	12/29/2008	449.23
HEN	13	03/25/2009	452.87

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HENNEPIN PART 845 CONSTRUCTION/OPERATING PERMIT APPLICATION(S)- SECOND SUBMITTAL
HENNEPIN POWER PLANT
HENNEPIN, ILLINOIS

Plant ID	Well ID	Sample Date	Groundwater Elevation (feet NAVD88)
HEN	13	06/18/2009	449.20
HEN	13	09/29/2009	446.78
HEN	13	12/29/2009	449.34
HEN	13	03/16/2010	449.09
HEN	13	08/31/2010	447.07
HEN	13	03/16/2011	449.08
HEN	13	06/29/2011	449.49
HEN	13	08/24/2011	446.42
HEN	13	10/18/2011	447.00
HEN	13	03/01/2012	446.83
HEN	13	05/30/2012	446.91
HEN	13	08/29/2012	445.21
HEN	13	11/27/2012	446.81
HEN	13	03/07/2013	446.09
HEN	13	06/06/2013	452.00
HEN	13	09/04/2013	446.21
HEN	13	12/11/2013	446.66
HEN	13	03/26/2014	449.43
HEN	13	06/18/2014	448.57
HEN	13	08/20/2014	448.58
HEN	13	12/10/2014	447.51
HEN	13	03/19/2015	447.07
HEN	13	06/22/2015	455.58
HEN	13	09/17/2015	448.30
HEN	13	12/08/2015	449.00
HEN	13	12/09/2015	449.00
HEN	13	03/08/2016	447.59
HEN	13	03/10/2016	447.59
HEN	13	06/07/2016	448.66
HEN	13	06/08/2016	448.66
HEN	13	08/31/2016	450.23
HEN	13	12/07/2016	448.16
HEN	13	12/09/2016	448.16
HEN	13	02/20/2017	447.63
HEN	13	02/22/2017	447.63
HEN	13	04/25/2017	450.79
HEN	13	04/27/2017	450.79
HEN	13	06/08/2017	450.53
HEN	13	06/09/2017	450.53
HEN	13	09/07/2017	448.98
HEN	13	11/15/2017	448.72
HEN	13	11/16/2017	448.72
HEN	13	03/26/2018	449.26
HEN	13	06/13/2018	449.94
HEN	13	09/12/2018	449.14
HEN	13	12/12/2018	448.35

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GROUNDWATER ELEVATION DATA
HENNEPIN PART 845 CONSTRUCTION/OPERATING PERMIT APPLICATION(S)- SECOND SUBMITTAL
HENNEPIN POWER PLANT
HENNEPIN, ILLINOIS

Plant ID	Well ID	Sample Date	Groundwater Elevation (feet NAVD88)
HEN	13	03/13/2019	449.56
HEN	13	06/18/2019	453.18
HEN	13	09/17/2019	450.09
HEN	13	12/11/2019	448.82
HEN	13	03/11/2020	448.57
HEN	13	06/03/2020	454.51
HEN	13	06/04/2020	454.51
HEN	13	09/02/2020	449.47
HEN	13	12/09/2020	447.28
HEN	13	12/10/2020	447.28
HEN	13	02/24/2021	446.28
HEN	13	03/17/2021	447.15
HEN	13	03/18/2021	447.15
HEN	13	03/22/2021	447.47
HEN	13	04/07/2021	447.61
HEN	13	05/05/2021	448.77
HEN	13	06/08/2021	448.69
HEN	13	06/23/2021	449.18
HEN	13	07/13/2021	451.35
HEN	13	08/03/2021	449.33
HEN	13	09/08/2021	448.13
HEN	13	09/09/2021	448.13
HEN	13	12/07/2021	447.50
HEN	13	12/08/2021	447.50
HEN	13	03/21/2022	447.94
HEN	13	03/23/2022	447.94
HEN	13	06/07/2022	448.90
HEN	13	09/14/2022	447.56
HEN	13	12/28/2022	446.27
HEN	13	03/01/2023	447.17
HEN	13	03/30/2023	448.59
HEN	13	04/30/2023	447.96
HEN	13	05/30/2023	447.26
HEN	13	06/21/2023	447.34
HEN	13	07/21/2023	447.71
HEN	13	08/21/2023	447.06
HEN	13	09/30/2023	446.95
HEN	13	10/31/2023	447.39
HEN	13	11/13/2023	447.22
HEN	13	12/21/2023	446.42
HEN	13	01/22/2024	447.28
HEN	13	02/15/2024	
HEN	13	03/15/2024	
HEN	13	04/15/2024	449.92
HEN	13	05/15/2024	449.60
HEN	13	06/15/2024	448.25

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HENNEPIN PART 845 CONSTRUCTION/OPERATING PERMIT APPLICATION(S)- SECOND SUBMITTAL
HENNEPIN POWER PLANT
HENNEPIN, ILLINOIS

Plant ID	Well ID	Sample Date	Groundwater Elevation (feet NAVD88)
HEN	13	07/15/2024	447.28
HEN	13	08/07/2024	447.50
HEN	13	09/07/2024	446.74
HEN	13	10/07/2024	446.72
HEN	15	05/24/1995	450.54
HEN	15	06/29/1995	447.77
HEN	15	07/26/1995	447.37
HEN	15	09/18/1995	446.37
HEN	15	10/10/1995	447.14
HEN	15	11/03/1995	447.21
HEN	15	12/18/1995	446.45
HEN	15	02/08/1996	446.15
HEN	15	03/18/1996	445.93
HEN	15	04/25/1996	445.96
HEN	15	05/23/1996	447.31
HEN	15	06/26/1996	450.16
HEN	15	10/07/1996	446.43
HEN	15	11/12/1996	446.87
HEN	15	06/10/1997	446.64
HEN	15	09/16/1997	446.10
HEN	15	12/03/1997	445.94
HEN	15	03/24/1998	451.08
HEN	15	06/10/1998	477.19
HEN	15	09/16/1998	446.34
HEN	15	11/17/1998	447.99
HEN	15	02/17/1999	448.04
HEN	15	06/22/1999	450.28
HEN	15	09/09/1999	446.13
HEN	15	11/04/1999	446.33
HEN	15	03/15/2000	445.28
HEN	15	06/14/2000	446.32
HEN	15	08/16/2000	445.96
HEN	15	10/12/2000	445.20
HEN	15	03/15/2001	448.24
HEN	15	06/20/2001	447.57
HEN	15	09/12/2001	445.51
HEN	15	11/13/2001	447.39
HEN	15	03/13/2002	448.15
HEN	15	06/26/2002	447.79
HEN	15	09/24/2002	445.14
HEN	15	12/11/2002	445.86
HEN	15	03/24/2003	444.63
HEN	15	06/24/2003	445.12
HEN	15	09/22/2003	444.54
HEN	15	12/16/2003	446.81
HEN	15	03/25/2004	445.92

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HENNEPIN PART 845 CONSTRUCTION/OPERATING PERMIT APPLICATION(S)- SECOND SUBMITTAL
HENNEPIN POWER PLANT
HENNEPIN, ILLINOIS

Plant ID	Well ID	Sample Date	Groundwater Elevation (feet NAVD88)
HEN	15	06/22/2004	449.02
HEN	15	09/20/2004	444.76
HEN	15	12/15/2004	448.49
HEN	15	03/28/2005	446.84
HEN	15	06/23/2005	445.19
HEN	15	09/22/2005	444.47
HEN	15	12/28/2005	444.95
HEN	15	03/29/2006	445.11
HEN	15	06/27/2006	444.67
HEN	15	09/20/2006	444.67
HEN	15	11/21/2006	446.38
HEN	15	03/06/2007	449.25
HEN	15	05/24/2007	446.90
HEN	15	09/06/2007	452.68
HEN	15	10/24/2007	446.63
HEN	15	03/26/2008	448.33
HEN	15	05/15/2008	447.48
HEN	15	08/25/2008	445.88
HEN	15	10/27/2008	448.18
HEN	15	12/29/2008	449.41
HEN	15	03/25/2009	452.84
HEN	15	06/18/2009	449.19
HEN	15	09/29/2009	446.85
HEN	15	12/22/2009	493.79
HEN	15	08/31/2010	446.98
HEN	15	12/29/2010	446.10
HEN	15	03/16/2011	448.22
HEN	15	06/29/2011	449.73
HEN	15	08/23/2011	446.22
HEN	15	10/18/2011	446.46
HEN	15	03/01/2012	446.19
HEN	15	05/30/2012	446.71
HEN	15	08/29/2012	444.95
HEN	15	11/27/2012	446.63
HEN	15	03/07/2013	445.83
HEN	15	06/06/2013	451.79
HEN	15	09/04/2013	446.17
HEN	15	12/11/2013	446.44
HEN	15	03/26/2014	447.19
HEN	15	06/18/2014	448.23
HEN	15	08/20/2014	448.41
HEN	15	12/09/2014	447.30
HEN	15	03/19/2015	447.12
HEN	15	06/22/2015	455.65
HEN	15	09/17/2015	448.24
HEN	15	12/09/2015	448.92

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HENNEPIN PART 845 CONSTRUCTION/OPERATING PERMIT APPLICATION(S)- SECOND SUBMITTAL
HENNEPIN POWER PLANT
HENNEPIN, ILLINOIS

Plant ID	Well ID	Sample Date	Groundwater Elevation (feet NAVD88)
HEN	15	03/08/2016	447.41
HEN	15	03/10/2016	447.41
HEN	15	06/07/2016	448.56
HEN	15	06/08/2016	448.56
HEN	15	08/31/2016	450.15
HEN	15	12/07/2016	448.03
HEN	15	12/08/2016	448.03
HEN	15	02/20/2017	447.45
HEN	15	02/22/2017	447.45
HEN	15	04/25/2017	450.64
HEN	15	04/26/2017	450.64
HEN	15	06/08/2017	450.36
HEN	15	09/07/2017	448.85
HEN	15	11/15/2017	448.47
HEN	15	11/16/2017	448.47
HEN	15	03/26/2018	449.04
HEN	15	06/13/2018	449.81
HEN	15	09/12/2018	449.03
HEN	15	12/12/2018	448.16
HEN	15	03/13/2019	449.28
HEN	15	06/18/2019	452.93
HEN	15	09/17/2019	449.89
HEN	15	12/11/2019	448.60
HEN	15	03/11/2020	448.32
HEN	15	06/03/2020	454.25
HEN	15	06/04/2020	454.25
HEN	15	09/02/2020	449.69
HEN	15	09/03/2020	449.69
HEN	15	12/09/2020	447.10
HEN	15	12/10/2020	447.10
HEN	15	02/24/2021	446.09
HEN	15	03/17/2021	447.02
HEN	15	03/18/2021	447.02
HEN	15	03/22/2021	456.18
HEN	15	04/07/2021	447.46
HEN	15	05/05/2021	448.63
HEN	15	06/08/2021	448.55
HEN	15	06/24/2021	449.25
HEN	15	07/13/2021	450.35
HEN	15	08/03/2021	449.35
HEN	15	09/08/2021	448.00
HEN	15	09/09/2021	448.00
HEN	15	12/07/2021	447.22
HEN	15	12/08/2021	447.22
HEN	15	03/21/2022	447.77
HEN	15	03/23/2022	447.77

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HENNEPIN PART 845 CONSTRUCTION/OPERATING PERMIT APPLICATION(S)- SECOND SUBMITTAL
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HENNEPIN, ILLINOIS

Plant ID	Well ID	Sample Date	Groundwater Elevation (feet NAVD88)
HEN	15	06/07/2022	448.85
HEN	15	09/14/2022	454.90
HEN	15	12/28/2022	446.08
HEN	15	03/01/2023	447.01
HEN	15	05/30/2023	447.20
HEN	15	08/21/2023	449.61
HEN	15	10/31/2023	447.34
HEN	15	11/13/2023	447.13
HEN	15	01/22/2024	447.07
HEN	15	04/15/2024	449.76
HEN	15	07/15/2024	447.15
HEN	15	10/07/2024	447.46
HEN	16	05/24/1995	449.85
HEN	16	06/29/1995	447.95
HEN	16	10/10/1995	446.42
HEN	16	11/03/1995	446.90
HEN	16	12/18/1995	446.24
HEN	16	02/08/1996	446.06
HEN	16	03/18/1996	445.88
HEN	16	04/25/1996	445.56
HEN	16	05/23/1996	447.16
HEN	16	06/26/1996	449.96
HEN	16	10/08/1996	446.04
HEN	16	11/13/1996	446.78
HEN	16	02/11/1997	446.46
HEN	16	06/10/1997	446.45
HEN	16	12/04/1997	446.15
HEN	16	03/25/1998	451.28
HEN	16	06/10/1998	447.12
HEN	16	09/16/1998	446.26
HEN	16	11/17/1998	447.59
HEN	16	02/17/1999	448.34
HEN	16	06/23/1999	449.04
HEN	16	09/08/1999	445.95
HEN	16	11/04/1999	446.43
HEN	16	03/15/2000	445.34
HEN	16	06/14/2000	446.35
HEN	16	08/16/2000	445.82
HEN	16	10/12/2000	445.24
HEN	16	03/15/2001	448.35
HEN	16	06/20/2001	450.61
HEN	16	09/12/2001	445.53
HEN	16	11/13/2001	447.42
HEN	16	03/13/2002	448.10
HEN	16	06/26/2002	447.85
HEN	16	09/24/2002	445.22

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HENNEPIN PART 845 CONSTRUCTION/OPERATING PERMIT APPLICATION(S)- SECOND SUBMITTAL
HENNEPIN POWER PLANT
HENNEPIN, ILLINOIS

Plant ID	Well ID	Sample Date	Groundwater Elevation (feet NAVD88)
HEN	16	12/11/2002	445.91
HEN	16	03/24/2003	444.64
HEN	16	06/24/2003	445.19
HEN	16	09/22/2003	444.51
HEN	16	12/22/2003	446.35
HEN	16	03/25/2004	445.85
HEN	16	06/22/2004	449.03
HEN	16	09/20/2004	444.74
HEN	16	12/15/2004	448.40
HEN	16	03/28/2005	446.89
HEN	16	06/23/2005	445.05
HEN	16	09/22/2005	444.28
HEN	16	12/28/2005	444.96
HEN	16	03/29/2006	445.04
HEN	16	06/27/2006	444.28
HEN	16	09/20/2006	444.62
HEN	16	11/21/2006	446.38
HEN	16	03/06/2007	449.21
HEN	16	05/24/2007	446.87
HEN	16	09/06/2007	449.67
HEN	16	10/24/2007	446.69
HEN	16	03/26/2008	448.39
HEN	16	05/15/2008	447.49
HEN	16	08/25/2008	445.84
HEN	16	10/27/2008	448.22
HEN	16	12/29/2008	449.75
HEN	16	03/25/2009	452.88
HEN	16	06/18/2009	449.24
HEN	16	09/29/2009	446.82
HEN	16	12/22/2009	447.35
HEN	16	03/16/2010	449.02
HEN	16	08/31/2010	447.16
HEN	16	12/29/2010	446.32
HEN	16	03/16/2011	449.09
HEN	16	06/29/2011	449.48
HEN	16	08/23/2011	446.43
HEN	16	10/19/2011	446.54
HEN	16	03/01/2012	446.39
HEN	16	05/31/2012	446.46
HEN	16	08/29/2012	444.77
HEN	16	11/27/2012	446.42
HEN	16	03/07/2013	445.68
HEN	16	06/06/2013	451.60
HEN	16	09/04/2013	445.80
HEN	16	12/11/2013	443.34
HEN	16	03/26/2014	449.07

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GROUNDWATER ELEVATION DATA
HENNEPIN PART 845 CONSTRUCTION/OPERATING PERMIT APPLICATION(S)- SECOND SUBMITTAL
HENNEPIN POWER PLANT
HENNEPIN, ILLINOIS

Plant ID	Well ID	Sample Date	Groundwater Elevation (feet NAVD88)
HEN	16	06/18/2014	447.93
HEN	16	08/20/2014	448.28
HEN	16	12/09/2014	447.13
HEN	16	03/19/2015	447.00
HEN	16	06/22/2015	455.54
HEN	16	09/17/2015	448.26
HEN	16	12/08/2015	448.89
HEN	16	03/08/2016	447.49
HEN	16	03/10/2016	447.49
HEN	16	06/07/2016	448.57
HEN	16	06/08/2016	448.57
HEN	16	08/31/2016	450.19
HEN	16	09/01/2016	450.19
HEN	16	12/07/2016	448.08
HEN	16	12/09/2016	448.08
HEN	16	02/20/2017	447.56
HEN	16	02/22/2017	447.56
HEN	16	04/25/2017	450.71
HEN	16	04/27/2017	450.71
HEN	16	06/08/2017	450.53
HEN	16	09/07/2017	448.97
HEN	16	11/15/2017	448.53
HEN	16	11/16/2017	448.53
HEN	16	03/27/2018	449.08
HEN	16	06/13/2018	449.93
HEN	16	09/12/2018	449.11
HEN	16	12/12/2018	496.39
HEN	16	12/12/2018	448.24
HEN	16	03/13/2019	449.45
HEN	16	03/14/2019	483.83
HEN	16	06/18/2019	453.22
HEN	16	09/17/2019	450.44
HEN	16	09/18/2019	450.44
HEN	16	12/11/2019	448.74
HEN	16	12/12/2019	448.74
HEN	16	03/11/2020	448.49
HEN	16	03/12/2020	448.49
HEN	16	06/03/2020	454.57
HEN	16	06/04/2020	454.57
HEN	16	09/02/2020	449.52
HEN	16	09/03/2020	449.52
HEN	16	12/09/2020	447.16
HEN	16	12/10/2020	447.16
HEN	16	02/24/2021	446.18
HEN	16	03/17/2021	447.12
HEN	16	03/18/2021	447.12

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GROUNDWATER ELEVATION DATA
HENNEPIN PART 845 CONSTRUCTION/OPERATING PERMIT APPLICATION(S)- SECOND SUBMITTAL
HENNEPIN POWER PLANT
HENNEPIN, ILLINOIS

Plant ID	Well ID	Sample Date	Groundwater Elevation (feet NAVD88)
HEN	16	03/18/2021	447.24
HEN	16	04/07/2021	447.48
HEN	16	04/08/2021	447.48
HEN	16	05/06/2021	449.14
HEN	16	06/08/2021	448.76
HEN	16	06/23/2021	449.29
HEN	16	07/13/2021	452.53
HEN	16	08/03/2021	449.47
HEN	16	09/08/2021	448.19
HEN	16	09/09/2021	448.19
HEN	16	12/07/2021	447.35
HEN	16	12/08/2021	447.35
HEN	16	03/21/2022	447.82
HEN	16	03/22/2022	447.82
HEN	16	06/07/2022	468.84
HEN	16	09/14/2022	448.52
HEN	16	12/28/2022	446.19
HEN	16	02/28/2023	446.88
HEN	16	05/30/2023	447.17
HEN	16	08/28/2023	447.84
HEN	16	09/30/2023	446.74
HEN	16	10/31/2023	447.27
HEN	16	11/13/2023	447.07
HEN	16	12/21/2023	446.29
HEN	16	01/22/2024	447.13
HEN	16	02/15/2024	448.96
HEN	16	03/15/2024	447.75
HEN	16	04/15/2024	449.75
HEN	16	05/15/2024	449.50
HEN	16	06/15/2024	448.16
HEN	16	07/15/2024	447.09
HEN	16	08/07/2024	447.12
HEN	16	09/07/2024	446.35
HEN	16	10/07/2024	446.67
HEN	17	05/24/1995	450.03
HEN	17	06/29/1995	448.37
HEN	17	11/01/1995	447.46
HEN	17	06/10/1997	446.49
HEN	17	09/17/1997	445.89
HEN	17	12/04/1997	446.37
HEN	17	03/25/1998	451.13
HEN	17	06/10/1998	447.75
HEN	17	09/16/1998	446.81
HEN	17	11/17/1998	447.99
HEN	17	02/17/1999	448.69
HEN	17	06/22/1999	449.93

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HENNEPIN PART 845 CONSTRUCTION/OPERATING PERMIT APPLICATION(S)- SECOND SUBMITTAL
HENNEPIN POWER PLANT
HENNEPIN, ILLINOIS

Plant ID	Well ID	Sample Date	Groundwater Elevation (feet NAVD88)
HEN	17	09/08/1999	447.15
HEN	17	11/04/1999	447.54
HEN	17	03/15/2000	446.40
HEN	17	06/14/2000	447.70
HEN	17	08/16/2000	447.28
HEN	17	10/12/2000	446.63
HEN	17	03/15/2001	449.02
HEN	17	06/20/2001	448.55
HEN	17	09/12/2001	447.24
HEN	17	11/13/2001	448.37
HEN	17	03/13/2002	448.48
HEN	17	06/26/2002	448.89
HEN	17	09/24/2002	446.95
HEN	17	12/11/2002	447.04
HEN	17	03/24/2003	446.16
HEN	17	06/24/2003	446.54
HEN	17	09/22/2003	446.10
HEN	17	12/16/2003	447.35
HEN	17	03/25/2004	447.11
HEN	17	06/22/2004	449.58
HEN	17	09/20/2004	446.81
HEN	17	12/15/2004	448.92
HEN	17	03/28/2005	449.20
HEN	17	06/23/2005	447.58
HEN	17	09/22/2005	446.59
HEN	17	12/28/2005	446.25
HEN	17	03/29/2006	446.25
HEN	17	06/27/2006	446.18
HEN	17	09/20/2006	445.85
HEN	17	11/21/2006	447.09
HEN	17	03/06/2007	449.25
HEN	17	05/24/2007	448.29
HEN	17	09/06/2007	450.30
HEN	17	10/24/2007	447.71
HEN	17	03/26/2008	449.17
HEN	17	05/15/2008	448.50
HEN	17	08/25/2008	447.49
HEN	17	10/27/2008	449.70
HEN	17	12/29/2008	449.83
HEN	17	03/25/2009	453.25
HEN	17	06/18/2009	450.82
HEN	17	09/29/2009	448.26
HEN	17	12/22/2009	448.56
HEN	17	03/16/2010	449.45
HEN	17	08/31/2010	448.51
HEN	17	12/29/2010	447.51

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HENNEPIN PART 845 CONSTRUCTION/OPERATING PERMIT APPLICATION(S)- SECOND SUBMITTAL
HENNEPIN POWER PLANT
HENNEPIN, ILLINOIS

Plant ID	Well ID	Sample Date	Groundwater Elevation (feet NAVD88)
HEN	17	03/16/2011	449.65
HEN	17	06/29/2011	450.27
HEN	17	08/23/2011	447.86
HEN	17	10/19/2011	447.65
HEN	17	03/01/2012	447.40
HEN	17	05/31/2012	447.51
HEN	17	08/29/2012	446.34
HEN	17	11/27/2012	447.15
HEN	17	03/07/2013	446.64
HEN	17	06/06/2013	452.06
HEN	17	09/04/2013	448.22
HEN	17	12/11/2013	447.29
HEN	17	03/26/2014	449.60
HEN	17	06/18/2014	451.79
HEN	17	08/20/2014	453.29
HEN	17	12/09/2014	448.45
HEN	17	03/19/2015	447.77
HEN	17	06/22/2015	456.28
HEN	17	09/17/2015	451.54
HEN	17	12/08/2015	451.01
HEN	17	03/08/2016	448.60
HEN	17	03/10/2016	448.60
HEN	17	06/07/2016	452.01
HEN	17	06/08/2016	452.01
HEN	17	08/31/2016	452.83
HEN	17	09/01/2016	452.83
HEN	17	12/07/2016	449.78
HEN	17	12/09/2016	449.78
HEN	17	02/20/2017	448.65
HEN	17	02/22/2017	448.65
HEN	17	04/25/2017	452.78
HEN	17	04/27/2017	452.78
HEN	17	06/08/2017	455.36
HEN	17	09/07/2017	454.56
HEN	17	11/15/2017	452.49
HEN	17	11/16/2017	452.49
HEN	17	03/27/2018	449.86
HEN	17	06/13/2018	454.63
HEN	17	09/12/2018	454.77
HEN	17	12/12/2018	449.23
HEN	17	12/12/2018	
HEN	17	03/13/2019	450.07
HEN	17	03/14/2019	450.07
HEN	17	06/18/2019	457.12
HEN	17	09/17/2019	456.61
HEN	17	09/18/2019	456.61

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Plant ID	Well ID	Sample Date	Groundwater Elevation (feet NAVD88)
HEN	17	12/11/2019	449.66
HEN	17	12/12/2019	449.66
HEN	17	03/11/2020	449.23
HEN	17	03/12/2020	449.23
HEN	17	06/03/2020	457.92
HEN	17	06/04/2020	457.92
HEN	17	09/02/2020	454.51
HEN	17	09/03/2020	454.51
HEN	17	12/09/2020	448.45
HEN	17	12/10/2020	448.45
HEN	17	02/24/2021	447.45
HEN	17	03/17/2021	447.93
HEN	17	03/18/2021	447.93
HEN	17	03/18/2021	448.04
HEN	17	04/07/2021	450.39
HEN	17	04/08/2021	450.39
HEN	17	05/06/2021	453.68
HEN	17	06/08/2021	452.59
HEN	17	06/23/2021	453.57
HEN	17	07/13/2021	454.14
HEN	17	08/03/2021	453.33
HEN	17	09/08/2021	452.80
HEN	17	09/09/2021	452.80
HEN	17	12/07/2021	449.20
HEN	17	12/08/2021	449.20
HEN	17	03/21/2022	449.43
HEN	17	03/22/2022	449.43
HEN	17	06/07/2022	453.25
HEN	17	09/14/2022	451.88
HEN	17	12/28/2022	447.66
HEN	17	02/28/2023	448.05
HEN	17	03/30/2023	449.87
HEN	17	04/30/2023	450.81
HEN	17	05/30/2023	451.17
HEN	17	06/21/2023	452.13
HEN	17	07/21/2023	452.44
HEN	17	08/21/2023	451.00
HEN	17	10/31/2023	451.57
HEN	17	11/13/2023	450.90
HEN	17	12/21/2023	447.84
HEN	17	01/22/2024	448.32
HEN	17	02/15/2024	450.26
HEN	17	03/15/2024	449.96
HEN	17	04/15/2024	452.21
HEN	17	05/15/2024	452.55
HEN	17	06/15/2024	452.61

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Plant ID	Well ID	Sample Date	Groundwater Elevation (feet NAVD88)
HEN	17	07/15/2024	450.69
HEN	17	08/07/2024	451.56
HEN	17	10/07/2024	451.00
HEN	18S	06/25/2002	448.90
HEN	18S	06/18/2009	448.84
HEN	18S	09/29/2009	446.54
HEN	18S	12/22/2009	447.57
HEN	18S	03/16/2010	449.74
HEN	18S	08/31/2010	446.80
HEN	18S	12/28/2010	446.06
HEN	18S	06/29/2011	449.31
HEN	18S	08/23/2011	446.23
HEN	18S	10/18/2011	446.89
HEN	18S	03/01/2012	446.21
HEN	18S	05/30/2012	446.34
HEN	18S	08/29/2012	444.75
HEN	18S	11/27/2012	446.10
HEN	18S	03/07/2013	445.55
HEN	18S	06/06/2013	451.76
HEN	18S	09/03/2013	445.67
HEN	18S	12/11/2013	445.73
HEN	18S	03/26/2014	448.64
HEN	18S	06/17/2014	447.78
HEN	18S	08/20/2014	447.64
HEN	18S	03/18/2015	447.02
HEN	18S	06/23/2015	455.73
HEN	18S	09/16/2015	447.90
HEN	18S	12/08/2015	448.84
HEN	18S	12/09/2015	448.84
HEN	18S	03/08/2016	447.32
HEN	18S	03/09/2016	447.32
HEN	18S	06/07/2016	448.22
HEN	18S	06/08/2016	448.22
HEN	18S	08/31/2016	450.13
HEN	18S	12/07/2016	447.87
HEN	18S	12/08/2016	447.87
HEN	18S	02/20/2017	447.33
HEN	18S	02/22/2017	447.33
HEN	18S	04/25/2017	450.58
HEN	18S	04/26/2017	450.58
HEN	18S	06/08/2017	450.07
HEN	18S	06/09/2017	450.07
HEN	18S	09/07/2017	448.40
HEN	18S	11/15/2017	448.14
HEN	18S	11/16/2017	448.14
HEN	18S	03/26/2018	448.96

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HENNEPIN PART 845 CONSTRUCTION/OPERATING PERMIT APPLICATION(S)- SECOND SUBMITTAL
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Plant ID	Well ID	Sample Date	Groundwater Elevation (feet NAVD88)
HEN	18S	06/13/2018	449.79
HEN	18S	09/12/2018	448.63
HEN	18S	12/12/2018	448.19
HEN	18S	03/13/2019	449.45
HEN	18S	06/18/2019	452.94
HEN	18S	09/17/2019	449.75
HEN	18S	12/11/2019	448.46
HEN	18S	12/12/2019	448.46
HEN	18S	03/11/2020	448.48
HEN	18S	03/12/2020	448.48
HEN	18S	06/03/2020	454.35
HEN	18S	09/02/2020	447.86
HEN	18S	09/03/2020	447.86
HEN	18S	12/09/2020	446.88
HEN	18S	02/24/2021	446.12
HEN	18S	03/17/2021	447.12
HEN	18S	03/18/2021	447.12
HEN	18S	03/22/2021	447.27
HEN	18S	04/07/2021	447.30
HEN	18S	05/05/2021	448.31
HEN	18S	06/08/2021	448.26
HEN	18S	06/25/2021	448.90
HEN	18S	07/13/2021	451.05
HEN	18S	08/03/2021	448.80
HEN	18S	09/08/2021	447.58
HEN	18S	09/10/2021	447.58
HEN	18S	12/07/2021	447.14
HEN	18S	12/09/2021	447.14
HEN	18S	03/21/2022	447.77
HEN	18S	03/23/2022	447.77
HEN	18S	06/07/2022	448.51
HEN	18S	06/08/2022	448.51
HEN	18S	09/14/2022	447.15
HEN	18S	12/28/2022	445.98
HEN	18S	03/01/2023	447.19
HEN	18S	03/30/2023	448.47
HEN	18S	04/30/2023	447.59
HEN	18S	05/30/2023	446.84
HEN	18S	06/21/2023	446.85
HEN	18S	07/21/2023	447.25
HEN	18S	08/21/2023	446.67
HEN	18S	10/31/2023	447.05
HEN	18S	11/13/2023	446.85
HEN	18S	12/21/2023	446.19
HEN	18S	01/22/2024	447.26
HEN	18S	02/15/2024	449.10

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Plant ID	Well ID	Sample Date	Groundwater Elevation (feet NAVD88)
HEN	18S	03/15/2024	447.90
HEN	18S	04/15/2024	449.83
HEN	18S	05/15/2024	449.65
HEN	18S	06/15/2024	448.05
HEN	18S	07/15/2024	447.08
HEN	18S	08/07/2024	447.04
HEN	18S	09/07/2024	446.26
HEN	18S	10/07/2024	446.35
HEN	19S	06/18/2009	449.00
HEN	19S	09/29/2009	446.81
HEN	19S	12/22/2009	447.83
HEN	19S	03/16/2010	449.75
HEN	19S	08/31/2010	445.09
HEN	19S	12/28/2010	446.31
HEN	19S	06/29/2011	449.35
HEN	19S	08/23/2011	446.42
HEN	19S	10/18/2011	446.55
HEN	19S	03/01/2012	446.41
HEN	19S	05/30/2012	446.57
HEN	19S	08/29/2012	444.86
HEN	19S	11/27/2012	446.36
HEN	19S	03/07/2013	445.69
HEN	19S	06/06/2013	451.76
HEN	19S	09/03/2013	445.89
HEN	19S	12/11/2013	446.22
HEN	19S	03/26/2014	447.81
HEN	19S	06/18/2014	447.84
HEN	19S	08/20/2014	448.03
HEN	19S	12/09/2014	447.24
HEN	19S	03/18/2015	447.03
HEN	19S	06/23/2015	455.65
HEN	19S	09/16/2015	448.19
HEN	19S	12/09/2015	448.90
HEN	19S	03/08/2016	447.55
HEN	19S	03/09/2016	447.55
HEN	19S	06/07/2016	448.50
HEN	19S	06/08/2016	448.50
HEN	19S	08/31/2016	450.14
HEN	19S	12/07/2016	448.00
HEN	19S	12/08/2016	448.00
HEN	19S	02/20/2017	447.46
HEN	19S	02/22/2017	447.46
HEN	19S	04/25/2017	450.66
HEN	19S	04/26/2017	450.66
HEN	19S	06/08/2017	450.29
HEN	19S	09/07/2017	448.76

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Plant ID	Well ID	Sample Date	Groundwater Elevation (feet NAVD88)
HEN	19S	11/15/2017	448.41
HEN	19S	11/16/2017	448.41
HEN	19S	03/26/2018	448.44
HEN	19S	06/13/2018	449.81
HEN	19S	09/12/2018	448.92
HEN	19S	12/12/2018	448.21
HEN	19S	03/13/2019	449.34
HEN	19S	06/18/2019	452.86
HEN	19S	09/17/2019	449.76
HEN	19S	12/11/2019	448.57
HEN	19S	03/11/2020	448.31
HEN	19S	06/03/2020	454.24
HEN	19S	09/02/2020	449.08
HEN	19S	09/03/2020	447.46
HEN	19S	12/09/2020	447.02
HEN	19S	02/24/2021	446.42
HEN	19S	03/17/2021	446.97
HEN	19S	03/18/2021	446.97
HEN	19S	03/22/2021	447.16
HEN	19S	04/07/2021	447.37
HEN	19S	05/05/2021	448.44
HEN	19S	06/08/2021	448.37
HEN	19S	06/24/2021	448.55
HEN	19S	07/13/2021	450.96
HEN	19S	08/03/2021	449.01
HEN	19S	09/08/2021	447.75
HEN	19S	09/09/2021	447.75
HEN	19S	12/07/2021	447.24
HEN	19S	12/09/2021	447.24
HEN	19S	03/21/2022	447.74
HEN	19S	03/23/2022	447.74
HEN	19S	06/07/2022	448.72
HEN	19S	06/08/2022	448.72
HEN	19S	09/14/2022	446.35
HEN	19S	12/29/2022	446.03
HEN	19S	03/01/2023	447.11
HEN	19S	05/30/2023	447.08
HEN	19S	08/21/2023	450.06
HEN	19S	10/31/2023	447.21
HEN	19S	11/13/2023	
HEN	19S	01/22/2024	447.09
HEN	40S	03/16/2011	449.12
HEN	40S	06/29/2011	449.47
HEN	40S	08/23/2011	446.47
HEN	40S	10/18/2011	446.58
HEN	40S	03/01/2012	446.45

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HENNEPIN PART 845 CONSTRUCTION/OPERATING PERMIT APPLICATION(S)- SECOND SUBMITTAL
HENNEPIN POWER PLANT
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Plant ID	Well ID	Sample Date	Groundwater Elevation (feet NAVD88)
HEN	40S	05/30/2012	446.64
HEN	40S	08/29/2012	444.91
HEN	40S	11/27/2012	446.43
HEN	40S	03/07/2013	445.73
HEN	40S	06/06/2013	451.81
HEN	40S	09/03/2013	445.91
HEN	40S	12/11/2013	446.28
HEN	40S	03/26/2014	449.02
HEN	40S	06/18/2014	448.00
HEN	40S	08/20/2014	448.12
HEN	40S	12/09/2014	447.17
HEN	40S	03/18/2015	447.03
HEN	40S	06/23/2015	455.70
HEN	40S	09/16/2015	448.14
HEN	40S	12/08/2015	448.90
HEN	40S	12/09/2015	448.90
HEN	40S	03/08/2016	446.47
HEN	40S	03/09/2016	446.47
HEN	40S	06/07/2016	448.48
HEN	40S	06/08/2016	448.48
HEN	40S	08/31/2016	450.16
HEN	40S	12/07/2016	448.01
HEN	40S	12/08/2016	448.01
HEN	40S	02/20/2017	447.48
HEN	40S	02/22/2017	447.48
HEN	40S	04/25/2017	450.67
HEN	40S	04/26/2017	450.67
HEN	40S	06/08/2017	450.44
HEN	40S	09/07/2017	448.75
HEN	40S	11/15/2017	448.38
HEN	40S	11/16/2017	448.38
HEN	40S	03/26/2018	449.08
HEN	40S	06/13/2018	449.83
HEN	40S	09/12/2018	448.93
HEN	40S	12/12/2018	448.27
HEN	40S	03/13/2019	449.39
HEN	40S	06/18/2019	453.02
HEN	40S	09/17/2019	449.92
HEN	40S	12/11/2019	448.63
HEN	40S	12/12/2019	448.63
HEN	40S	03/11/2020	448.46
HEN	40S	06/03/2020	454.39
HEN	40S	09/02/2020	449.22
HEN	40S	09/03/2020	449.22
HEN	40S	12/09/2020	447.08
HEN	40S	02/24/2021	

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HENNEPIN PART 845 CONSTRUCTION/OPERATING PERMIT APPLICATION(S)- SECOND SUBMITTAL
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Plant ID	Well ID	Sample Date	Groundwater Elevation (feet NAVD88)
HEN	40S	03/17/2021	447.02
HEN	40S	03/18/2021	447.02
HEN	40S	04/07/2021	
HEN	40S	06/24/2021	449.12
HEN	40S	09/08/2021	447.87
HEN	40S	09/09/2021	447.87
HEN	40S	12/07/2021	447.32
HEN	40S	12/09/2021	447.32
HEN	40S	03/21/2022	447.80
HEN	40S	03/23/2022	447.80
HEN	40S	06/07/2022	448.74
HEN	40S	06/08/2022	448.74
HEN	40S	09/14/2022	446.46
HEN	40S	12/29/2022	446.12
HEN	40S	03/01/2023	447.12
HEN	40S	05/30/2023	447.13
HEN	40S	08/21/2023	449.75
HEN	40S	10/31/2023	447.25
HEN	40S	11/13/2023	447.06
HEN	40S	01/22/2024	447.18
HEN	40S	04/15/2024	449.81
HEN	40S	07/15/2024	447.12
HEN	40S	10/07/2024	446.61
HEN	46	12/08/2015	449.07
HEN	46	03/08/2016	447.63
HEN	46	06/07/2016	448.71
HEN	46	08/31/2016	450.31
HEN	46	12/07/2016	448.21
HEN	46	02/20/2017	447.68
HEN	46	04/25/2017	450.85
HEN	46	06/08/2017	450.60
HEN	46	06/09/2017	450.60
HEN	46	11/15/2017	448.66
HEN	46	03/26/2018	
HEN	46	06/13/2018	450.01
HEN	46	09/12/2018	449.23
HEN	46	12/12/2018	
HEN	46	03/13/2019	449.63
HEN	46	06/18/2019	
HEN	46	09/17/2019	450.17
HEN	46	12/11/2019	
HEN	46	03/11/2020	448.61
HEN	46	06/03/2020	454.56
HEN	46	09/02/2020	449.53
HEN	46	12/09/2020	446.81
HEN	46	02/24/2021	

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Plant ID	Well ID	Sample Date	Groundwater Elevation (feet NAVD88)
HEN	46	03/17/2021	447.23
HEN	46	03/18/2021	447.23
HEN	46	03/22/2021	447.41
HEN	46	04/07/2021	447.65
HEN	46	05/05/2021	448.89
HEN	46	06/08/2021	448.79
HEN	46	06/23/2021	449.20
HEN	46	07/13/2021	451.45
HEN	46	08/03/2021	449.52
HEN	46	09/08/2021	448.22
HEN	46	09/09/2021	448.22
HEN	46	12/07/2021	447.55
HEN	46	03/21/2022	448.00
HEN	46	03/23/2022	448.00
HEN	46	06/07/2022	449.00
HEN	46	09/14/2022	447.75
HEN	46	12/28/2022	446.35
HEN	46	02/28/2023	447.08
HEN	46	03/30/2023	448.65
HEN	46	04/30/2023	448.04
HEN	46	05/30/2023	447.35
HEN	46	06/21/2023	447.35
HEN	46	07/21/2023	447.72
HEN	46	08/21/2023	447.03
HEN	46	10/31/2023	447.53
HEN	46	11/13/2023	447.29
HEN	46	12/21/2023	446.45
HEN	46	01/22/2024	447.34
HEN	46	02/15/2024	449.03
HEN	46	03/15/2024	447.80
HEN	46	04/15/2024	449.97
HEN	46	05/15/2024	449.21
HEN	46	06/15/2024	447.88
HEN	46	07/15/2024	447.30
HEN	46	08/07/2024	447.20
HEN	46	09/07/2024	446.46
HEN	46	10/07/2024	446.97
HEN	47	12/08/2015	449.02
HEN	47	03/08/2016	447.60
HEN	47	06/07/2016	448.66
HEN	47	08/31/2016	450.28
HEN	47	09/01/2016	450.28
HEN	47	12/07/2016	448.18
HEN	47	02/20/2017	447.68
HEN	47	04/25/2017	450.84
HEN	47	06/08/2017	450.57

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Plant ID	Well ID	Sample Date	Groundwater Elevation (feet NAVD88)
HEN	47	06/09/2017	450.57
HEN	47	11/15/2017	448.64
HEN	47	03/26/2018	
HEN	47	06/13/2018	449.97
HEN	47	09/12/2018	449.19
HEN	47	12/12/2018	
HEN	47	03/13/2019	449.58
HEN	47	06/18/2019	
HEN	47	09/17/2019	450.07
HEN	47	12/11/2019	
HEN	47	03/11/2020	448.57
HEN	47	06/03/2020	454.52
HEN	47	09/02/2020	450.82
HEN	47	09/02/2020	449.15
HEN	47	12/09/2020	446.82
HEN	47	02/24/2021	446.07
HEN	47	03/17/2021	446.97
HEN	47	03/18/2021	446.97
HEN	47	04/07/2021	447.35
HEN	47	05/05/2021	448.53
HEN	47	06/08/2021	448.47
HEN	47	06/23/2021	450.42
HEN	47	07/13/2021	451.10
HEN	47	08/03/2021	449.10
HEN	47	09/08/2021	447.82
HEN	47	09/09/2021	447.82
HEN	47	12/07/2021	447.22
HEN	47	03/21/2022	447.67
HEN	47	03/23/2022	447.67
HEN	47	06/07/2022	448.63
HEN	47	09/14/2022	447.26
HEN	47	12/28/2022	445.99
HEN	47	03/01/2023	446.86
HEN	47	03/30/2023	448.28
HEN	47	04/30/2023	447.69
HEN	47	05/30/2023	446.99
HEN	47	06/21/2023	447.08
HEN	47	07/21/2023	447.42
HEN	47	08/21/2023	446.79
HEN	47	09/30/2023	446.66
HEN	47	10/31/2023	447.13
HEN	47	11/13/2023	446.93
HEN	47	12/21/2023	446.16
HEN	47	01/22/2024	446.98
HEN	47	02/15/2024	448.92
HEN	47	03/15/2024	447.68

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Plant ID	Well ID	Sample Date	Groundwater Elevation (feet NAVD88)
HEN	47	04/15/2024	449.60
HEN	47	05/15/2024	449.44
HEN	47	06/15/2024	448.08
HEN	47	07/15/2024	446.95
HEN	47	08/07/2024	447.11
HEN	47	09/07/2024	446.35
HEN	47	10/07/2024	446.66
HEN	52	02/24/2021	446.17
HEN	52	03/22/2021	447.23
HEN	52	04/07/2021	447.45
HEN	52	05/06/2021	448.95
HEN	52	06/08/2021	448.62
HEN	52	06/24/2021	449.23
HEN	52	07/13/2021	451.28
HEN	52	08/03/2021	449.37
HEN	52	12/07/2021	447.33
HEN	52	06/07/2022	448.65
HEN	52	12/28/2022	446.18
HEN	52	02/28/2023	446.88
HEN	52	03/30/2023	448.47
HEN	52	04/30/2023	447.87
HEN	52	05/30/2023	447.04
HEN	52	06/21/2023	447.18
HEN	52	07/21/2023	447.57
HEN	52	08/21/2023	446.91
HEN	52	09/30/2023	446.86
HEN	52	10/31/2023	447.25
HEN	52	11/13/2023	447.05
HEN	52	12/21/2023	446.27
HEN	52	01/22/2024	447.12
HEN	52	02/15/2024	449.00
HEN	52	03/15/2024	447.77
HEN	52	04/15/2024	449.77
HEN	52	05/15/2024	449.51
HEN	52	06/15/2024	448.15
HEN	52	07/15/2024	440.12
HEN	52	08/07/2024	447.14
HEN	52	09/07/2024	446.37
HEN	52	10/07/2024	446.62
HEN	53	02/25/2021	446.24
HEN	53	03/19/2021	447.08
HEN	53	04/07/2021	446.45
HEN	53	04/08/2021	446.45
HEN	53	05/06/2021	448.97
HEN	53	06/08/2021	502.68
HEN	53	06/23/2021	449.09

ATTACHMENT 5.
GROUNDWATER ELEVATION DATA
HENNEPIN PART 845 CONSTRUCTION/OPERATING PERMIT APPLICATION(S)- SECOND SUBMITTAL
HENNEPIN POWER PLANT
HENNEPIN, ILLINOIS

Plant ID	Well ID	Sample Date	Groundwater Elevation (feet NAVD88)
HEN	53	07/13/2021	451.27
HEN	53	08/03/2021	449.29
HEN	53	12/07/2021	447.29
HEN	53	06/07/2022	448.73
HEN	53	05/30/2023	447.08
HEN	53	10/31/2023	447.21
HEN	53	11/13/2023	447.00
HEN	53	01/22/2024	447.01
HEN	53	07/15/2024	447.06
HEN	53	10/07/2024	446.58
HEN	54	02/24/2021	446.15
HEN	54	03/22/2021	447.15
HEN	54	04/07/2021	446.40
HEN	54	05/05/2021	448.66
HEN	54	06/08/2021	448.50
HEN	54	06/23/2021	448.99
HEN	54	07/13/2021	451.13
HEN	54	08/03/2021	449.18
HEN	54	12/07/2021	447.31
HEN	54	06/07/2022	448.72
HEN	54	12/28/2022	446.09
HEN	54	03/01/2023	446.95
HEN	54	03/30/2023	448.43
HEN	54	04/30/2023	447.82
HEN	54	05/30/2023	447.07
HEN	54	06/21/2023	447.13
HEN	54	07/21/2023	447.49
HEN	54	08/21/2023	446.85
HEN	54	09/30/2023	446.76
HEN	54	10/31/2023	447.23
HEN	54	11/13/2023	446.99
HEN	54	12/21/2023	446.24
HEN	54	01/22/2024	446.45
HEN	54	02/15/2024	448.98
HEN	54	03/15/2024	447.74
HEN	54	04/15/2024	449.74
HEN	54	05/15/2024	449.49
HEN	54	06/15/2024	448.14
HEN	54	07/15/2024	447.05
HEN	54	08/07/2024	447.12
HEN	54	09/07/2024	446.35
HEN	54	10/07/2024	446.59

Notes:
ID = identification
NAVD88 = North American Vertical Datum of 1988

Attachment 6

RAMBOLL

ENVIRONMENT & HEALTH

MEMO

Project name	**Dynegy Midwest Generation, LLC - Hennepin Power Plant Phase 2 Response to Comments – Part 845 Construction/Operating Permit Application(s)**
Project no.	**1940103584-005**
Client	**Dynegy Midwest Generation**
To	**Rhys Fuller – Vistra Energy**
From	**Jeff Kampman - Ramboll**
Copy to	**Vic Modeer – Vistra Energy**

1 Background

Ramboll Americas Engineering Solutions (Ramboll) is providing this memorandum in response to the Illinois Environmental Protection Agency's (IEPA) comments on hydrogeologic site characterizations for coal combustion residuals (CCR) units at the Hennepin Power Plant. The IEPA, in their Hennepin Power Plant CCR Surface Impoundment Operating and Construction Permit Application Review Letter dated October 11, 2023, included the following comments:

> *10) The [Old West Ash Pond] OWAP and [Old West Polishing Pond] OWPP are located in areas of freshwater ponds and freshwater wetland areas. The hydrogeologic site characterizations for these ponds must include an evaluation of the potentials for impact on nearby wetlands pursuant to the requirements of 35 Ill. Adm. Code 845.310.*
>
> *11) The hydrogeologic site characterizations for the OWAP, OWPP, Ash Pond No. 2, and Ash Pond No. 4 [AP2/AP4] must be amended to include identification of nearby dedicated nature preserves and identification of potential migration pathways, pursuant to the requirements of 35 Ill. Adm. Code 845.620(b)(5) and 845.620(b)(11), respectively. The characterizations for these surface impoundments must also be amended to include climatic aspects of the site, including seasonal and temporal fluctuations in groundwater flow, pursuant to the requirements of 35 Ill. Adm. Code 845.620(b)(2).*

This memorandum provides responses and additional data to address these comments.

2 West Ash Pond System Wetland Evaluation (Comment 10)

A comprehensive search was performed utilizing the United States Fish and Wildlife Service (USFWS) National Wetlands Inventory (NWI) Wetlands Mapper[1] and the USGS National Map[2] for surface water bodies within 1,000 meters of the OWAP and OWPP (collectively referred to as the West Ash Pond System [WAPS]). The predominant surface water bodies near the WAPS are the Illinois River,

[1] USFWS Wetlands Mapper: https://www.fws.gov/wetlands/data/mapper.html
[2] USGS National Map: https://apps.nationalmap.gov/viewer/

October 23, 2025

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https://ramboll.com

located to the north of the Site, and Coleman Lake, located to the southwest of the Site. A majority of the WAPS are classified as freshwater ponds (NWI classification code: PAB4Fx).

Bordering the north perimeter of the WAPS, the river has a normal pool elevation of about 441 feet. A USGS stream gage (No. 05558300) for the Illinois River at Henry, Illinois is located 15 river miles south (downstream) of the HPP. The gage datum elevation is 425.88 feet NGVD29. Approximate base flow conditions occur at an elevation of about 441 NGVD29.

Additional surface water features indicated in the USFWS Wetlands Mapper and USGS National Map include several freshwater emergent wetlands and freshwater forested/shrub wetlands located immediately to the south of the WAPS. A map of wetlands and surface waters in the vicinity of the WAPS is presented in **Figure 1**.

The USGS National Map places the WAPS within the Depue Lake-Illinois River Watershed (Hydrologic Unit Code [HUC] 071300010804), which is part of the Alforques Creek Illinois River Watershed (HUC 0713000108) and located within the larger Lower Illinois-Senachwine Lake Watershed (HUC 07130001).

Based on groundwater elevation contours (**Figure 2-1** and **Figure 2-2**), under normal conditions groundwater predominantly flows to the north and northwest, towards the Illinois River away from the identified wetland areas. Due to the downgradient location and proximity of the Illinois River to the WAPS, the Illinois River is likely to be hydraulically connected to the uppermost aquifer beneath the Hennepin WAPS and will not impact nearby wetlands.

3 Additional Hydrogeologic Site Characterization Information for WAPS and AP2/AP4 (Comment 11)

3.1 Nature Preserves, Historic Sites, Endangered/Threatened Species

3.1.1 West Ash Pond System

A comprehensive search of the Illinois Department of Natural Resources (IDNR) Natural Heritage Database[3] for natural areas and protected areas within 1,000 meters of the Site was performed. The Donnelley State Fish and Wildlife area is located to the west and southwest of the WAPS. No other natural or protected areas were identified within 1,000 meters of the WAPS.

The IDNR Natural Heritage Database Threatened and Endangered Species by County[4] lists 23 threatened and endangered species as located within Putnam County, including 14 endangered and 9 threatened species. Habitats for endangered or threatened species are identified at the county level only. Additionally, a search of the IDNR Historic Preservation Division[5] database for historic sites in the vicinity of the Site yielded no results within 1,000 meters of the WAPS.

[3] IDNR Natural Heritage Database: https://www2.illinois.gov/dnr/conservation/NaturalHeritage/Pages/NaturalHeritageDatabase.aspx
[4] Illinois Threatened and Endangered Species by County: https://www2.illinois.gov/dnr/ESPB/Documents/ET_by_County.pdf
[5] IDNR Historic Preservation Division: https://www2.illinois.gov/dnrhistoric/Pages/default.aspx

3.1.2 Ash Pond 2 and Ash Pond 4

A comprehensive search of the Illinois Department of Natural Resources (IDNR) Natural Heritage Database[6] for natural areas and protected areas within 1,000 meters of the Site was performed. No natural or protected areas were identified within 1,000 meters of AP2/AP4.

The IDNR Natural Heritage Database Threatened and Endangered Species by County[4] lists 23 threatened and endangered species as located within Putnam County, including 14 endangered and 9 threatened species. Habitats for endangered or threatened species are identified at the county level only.

Additionally, a search of the IDNR Historic Preservation Division[5] database for historic sites in the vicinity of the Site yielded no results within 1,000 meters of the AP2/AP4.

3.2 Climate

The climate in Hennepin is humid and annual precipitation generally exceeds evapotranspiration. Illinois State Water Survey (ISWS) records from 1981 through 2010 at the Hennepin water treatment plant in Hennepin, Illinois, which is located approximately four miles southwest of the Site, indicates precipitation averages 36.2 inches per year. Monthly precipitation averages near three inches from April through November, and one to three inches in December through March. On average 15.5 inches of precipitation occur yearly as snowfall.

As shown below in **Table A**, ISWS temperature records show average maximum daily temperatures for 1981 to 2010 ranging from above 70 degrees Fahrenheit (°F) May through September and minimum average daily temperatures that are less than freezing November through March.

Table A. Average Monthly Temperature Extremes and Precipitation for Hennepin Water Treatment Plant, Hennepin, Illinois (1981-2010).

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Max Temp ºF	32.4	37.0	49.5	63.0	73.7	83.0	86.4	84.6	78.4	65.6	50.6	36.4	61.8
Min Temp ºF	13.7	17.8	28.0	38.5	49.1	58.8	62.7	60.9	51.9	40.3	30.2	18.1	39.3
Precipitation (inches)	1.74	1.71	2.55	3.02	3.93	3.87	4.02	4.18	3.36	2.97	3.04	1.79	36.2

https://www.isws.illinois.edu/statecli/newnormals/normals.USC00114013.txt

3.3 Groundwater Flow

Groundwater flow has been monitored since the 1980s. Groundwater flow is represented using groundwater elevation contour maps for sampling events conducted at the WAPS and AP2/4 in 2023 (**Figures 2-1 through 2-4**).

Groundwater elevations are primarily controlled by river stage of the Illinois River near the Site. Typically, groundwater from the Site flows from south to north toward the Illinois River (**Figures 2-1 through 2-4**). Under high river stage events or flooding, flow direction can be reversed (*i.e.,* groundwater flows in a south to southwest direction) near the river for limited durations (**Figures 2-3 and 2-4)**. Flow reversals have not been observed to extend south beyond the AP2/AP4. Seasonal variation of groundwater levels

[6] IDNR Natural Heritage Database: https://www2.illinois.gov/dnr/conservation/NaturalHeritage/Pages/NaturalHeritageDatabase.aspx

and flow direction near the CCR Units are depicted in the series of 2015 through 2021 groundwater elevation contour maps (**Appendix A**). Flow reversals and the impact of river stage are further discussed in **Section 3.3.1**.

3.3.1 Impact of River Stage on Groundwater Flow

The river basin experiences annual spring flooding during the months of March, April, May, and sometimes June, while lesser flooding occasionally occurs during autumn. River stage during high precipitation and/or flood events seasonally rises above adjacent groundwater elevations and groundwater gradients will temporarily reverse in response to the river temporarily recharging the aquifer near AP2/AP4. Groundwater gradient reversals are observed on the quarterly groundwater elevation contour maps for March and April 2023 (**Figures 2-3** and **2-4**). During these events, the groundwater flow direction reverses, moving south to southeasterly across a portions of AP2/AP4. The groundwater flow reversals are typically limited in duration and extent.

Figure A below compares the groundwater hydrograph recorded at former well 14 with the river hydrograph recorded at the HPP (STMI, 1996). Well 14 was located adjacent to wells 12 and 13 between the Coal Combustion Waste Landfill (CCWL) and East Ash Pond (EAP), in the immediate vicinity of AP2/AP4. This graph shows that groundwater elevations respond rapidly to major flood events where river elevations rise above adjacent groundwater levels. It also indicates that groundwater levels, at least as far as the south side of AP2, can be expected to rise temporarily in response to river flooding to elevations similar to those observed at the river.

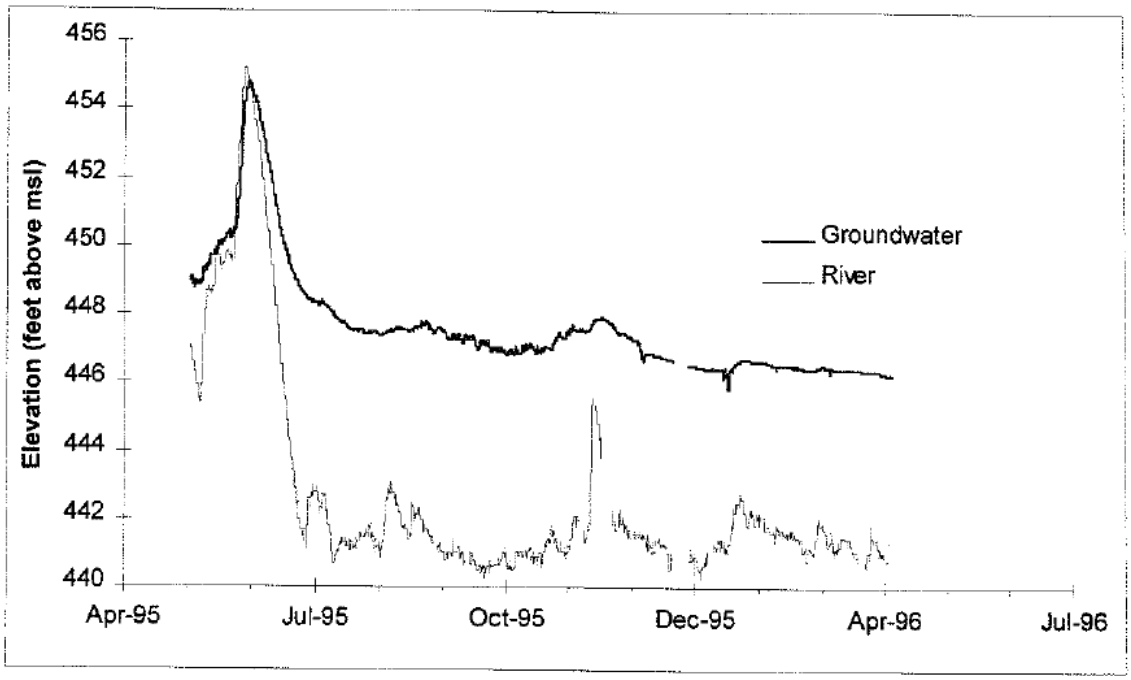


Figure A. Hydrograph Comparison for Well 14 and the Illinois River (STMI, 1996).

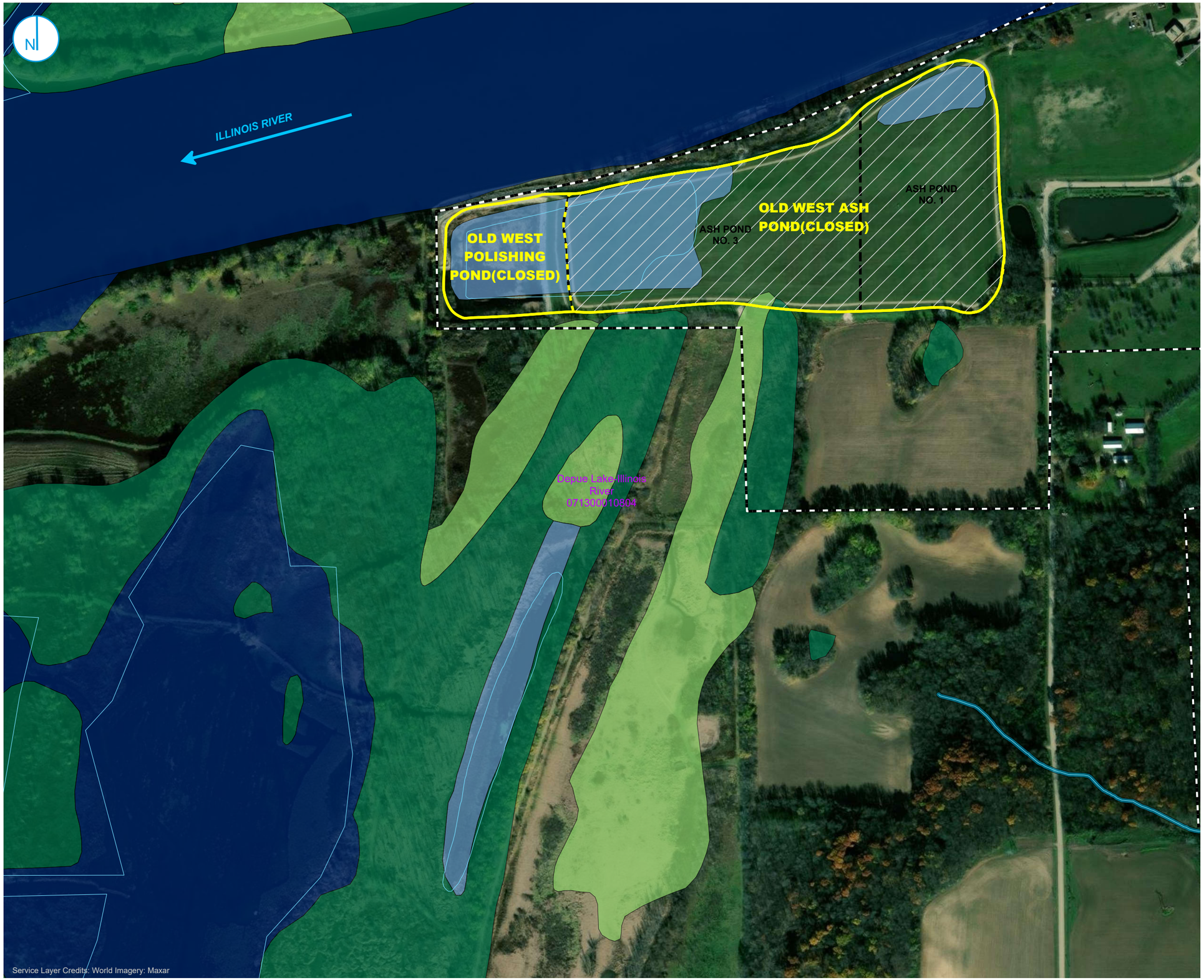
The relationship between the Illinois River and AP2/AP4 was further discussed in the River Flood Evaluation Report included as Addendum 3 to the Closure Plan[7]. Explicit simulation of flood events indicates that potential increases in simulated concentration from flooding of the Illinois River are small and transient, such that long-term concentrations will not be affected (*i.e.,* flooding events are not sufficiently impactful to require incorporation in the prediction model for AP2/AP4). The WAPS is located within the same geologic and hydrogeologic system as AP2/AP4; therefore, flow reversals are not expected to have a significant impact on long-term concentration trends at either unit.

Attachments

Figure 1	Surface Waterbodies near the West Ash Pond System
Figure 2-1	Potentiometric Surface Map – May 30, 2023
Figure 2-2	Potentiometric Surface Map – August 21 and 22, 2023
Figure 2-3	Potentiometric Surface Map – February 28 and March 1, 2023
Figure 2-4	Potentiometric Surface Map – April 30, 2023
Appendix A	Groundwater Elevation Contour Maps – 2015-2021

[7] Ramboll, 2020. *Hennepin Power Plant – State Permit for Closure Plan – Log No. 2020-65026 Review Letter*. March 19, 2020.

FIGURES



SURFACE WATERBODY
WATERSHED BOUNDARY (HUC 12)
NATIONAL WETLANDS INVENTORY
FRESHWATER EMERGENT WETLAND
FRESHWATER FORESTED/SHRUB WETLAND
FRESHWATER POND
LAKE
RIVERINE
REGULATED UNIT (SUBJECT UNIT)
SITE FEATURE
LIMITS OF FINAL COVER
PROPERTY BOUNDARY

SOURCES:
USGS, USFWS

0 200 400 Feet

SURFACE WATERBODIES NEAR THE WEST ASH POND SYSTEM

HENNEPIN POWER PLANT
HENNEPIN, ILLINOIS

FIGURE 1

RAMBOLL AMERICAS
ENGINEERING SOLUTIONS, INC.

RAMBOLL

Y:\Mapping\Projects\22\12285\MXD\845_Operating_Permit\Hennepin\WAPS\Permit_Figures.aprx\Figure 1_Surface Waterbodies

PROJECT: 169000XXXX | DATED: 11/4/2024 | DESIGNER: GALARNMC

COMPLIANCE MONITORING WELL
BACKGROUND MONITORING WELL
MONITORING WELL
GROUNDWATER ELEVATION CONTOUR (1 FT CONTOUR INTERVAL, NAVD88)
INFERRED GROUNDWATER ELEVATION CONTOUR
GROUNDWATER FLOW DIRECTION
REGULATED UNIT (SUBJECT UNIT)
LIMITS OF FINAL COVER
PROPERTY BOUNDARY

NOTES:

1.ELEVATIONS IN PARENTHESES WERE NOT USED FOR CONTOURING.

2. ELEVATION CONTOURS SHOWN IN FEET, NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88)

*ILLINOIS RIVER ELEVATION OBTAINED FROM STAFF GAGE SG02, LOCATED AT THE HENNEPIN POWER PLANT

0 200 400 Feet

POTENTIOMETRIC SURFACE MAP MAY 30, 2023

HENNEPIN POWER PLANT
HENNEPIN, ILLINOIS

FIGURE 2-1

RAMBOLL AMERICAS ENGINEERING SOLUTIONS, INC.

RAMBOLL

Y:\Mapping\Projects\22\2285\MXD\GW_Contours\Round_2023\Hennepin\OWAP_804\HEN 804 OWAP Pot Surface 20230530.mxd

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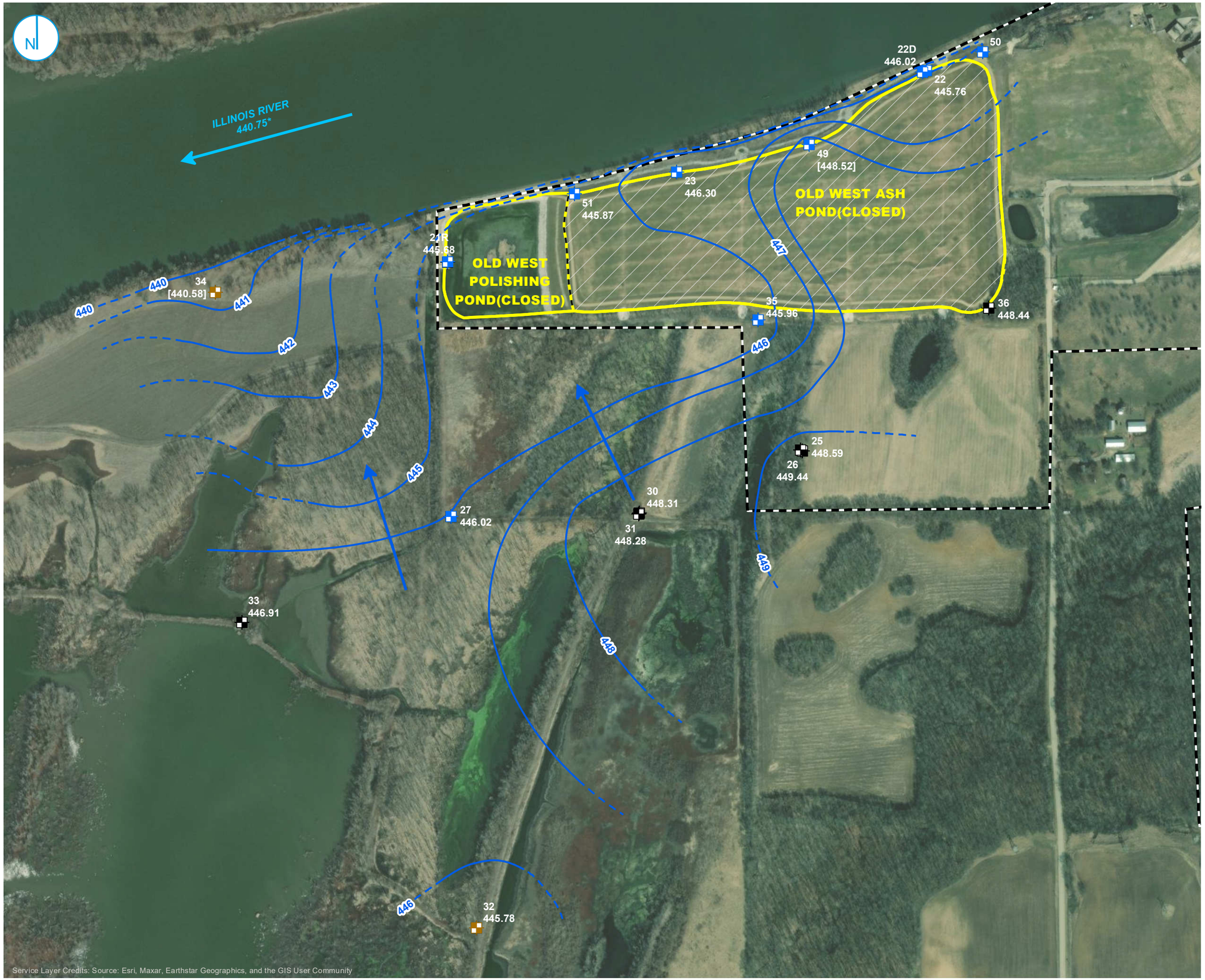


COMPLIANCE MONITORING WELL
BACKGROUND MONITORING WELL
MONITORING WELL
GROUNDWATER ELEVATION CONTOUR (1 FT CONTOUR INTERVAL, NAVD88)
INFERRED GROUNDWATER ELEVATION CONTOUR
GROUNDWATER FLOW DIRECTION
REGULATED UNIT (SUBJECT UNIT)
LIMITS OF FINAL COVER
PROPERTY BOUNDARY

NOTES:

1.ELEVATIONS IN PARENTHESES WERE NOT USED FOR CONTOURING.
2. ELEVATIONS IN BRACKETS WERE OBTAINED OUTSIDE OF THE 24 HOUR PERIOD FROM INITIATION OF DEPTH TO GROUNDWATER MEASUREMENTS BUT WITHIN THE SAME SAMPLING EVENT.
3. ELEVATION CONTOURS SHOWN IN FEET, NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88)
*ILLINOIS RIVER ELEVATION OBTAINED FROM STAFF GAGE SG02, LOCATED AT THE HENNEPIN POWER PLANT

0 200 400 Feet

POTENTIOMETRIC SURFACE MAP AUGUST 21 AND 22, 2023

HENNEPIN POWER PLANT
HENNEPIN, ILLINOIS

FIGURE 2-2

RAMBOLL AMERICAS
ENGINEERING SOLUTIONS, INC.

RAMBOLL

Y:\Mapping\Projects\22\22851\MXD\GW_Contours\Round_2023\Hennepin\OWAP_804\HEN 804 OWAP Pot Surface 20230821.mxd
PROJECT: 169000XXXX | DATED: 12/18/2023 | DESIGNER: GALARNMC

COMPLIANCE MONITORING WELL

BACKGROUND MONITORING WELL

MONITORING WELL

PORE WATER WELL

STAFF GAGE, CCR UNIT

GROUNDWATER ELEVATION CONTOUR (1 FT CONTOUR INTERVAL, NAVD88)

INFERRED GROUNDWATER ELEVATION CONTOUR

GROUNDWATER FLOW DIRECTION

REGULATED UNIT (SUBJECT UNIT)

SITE FEATURE

LIMITS OF FINAL COVER

PROPERTY BOUNDARY

NOTES:
1. ELEVATIONS IN PARENTHESES WERE NOT USED FOR CONTOURING.
2. ELEVATION CONTOURS SHOWN IN FEET, NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88)
*ILLINOIS RIVER ELEVATION OBTAINED FROM STAFF GAGE SG02, LOCATED AT THE HENNEPIN POWER PLANT

0 175 350
Feet

POTENTIOMETRIC SURFACE MAP FEBRUARY 28 AND MARCH 1, 2023

HENNEPIN POWER PLANT
HENNEPIN, ILLINOIS

FIGURE 2-3

RAMBOLL AMERICAS
ENGINEERING SOLUTIONS, INC.

RAMBOLL

Y:\Mapping\Projects\22\2285\MXD\GW_Contours\Round_2023\Hennepin\AP2_802\HEN 802 AP2 Pot Surface 20230228.mxd

PROJECT: 169000XXXX | DATED: 5/12/2023 | DESIGNER: GALARNMC

COMPLIANCE MONITORING WELL
BACKGROUND MONITORING WELL
MONITORING WELL
PORE WATER WELL
STAFF GAGE, CCR UNIT
GROUNDWATER ELEVATION CONTOUR (1 FT CONTOUR INTERVAL, NAVD88)
INFERRED GROUNDWATER ELEVATION CONTOUR
GROUNDWATER FLOW DIRECTION
REGULATED UNIT (SUBJECT UNIT)
SITE FEATURE
LIMITS OF FINAL COVER
PROPERTY BOUNDARY

NOTES:
1. ELEVATIONS IN PARENTHESES WERE NOT USED FOR CONTOURING.
2. ELEVATION CONTOURS SHOWN IN FEET, NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88)
*ILLINOIS RIVER ELEVATION OBTAINED FROM STAFF GAGE SG02, LOCATED AT THE HENNEPIN POWER PLANT

0 175 350
Feet

POTENTIOMETRIC SURFACE MAP
APRIL 30, 2023

HENNEPIN POWER PLANT
HENNEPIN, ILLINOIS

FIGURE 2-4

RAMBOLL AMERICAS
ENGINEERING SOLUTIONS, INC.

RAMBOLL

Y:\Mapping\Projects\22\2285\MXD\GW_Contours\Round_2023\HennepinAP2_802HEN 802 AP2 Pot Surface 20230430.mxd

PROJECT: 169000XXXX | DATED: 12/1/2023 | DESIGNER: GALARNMC

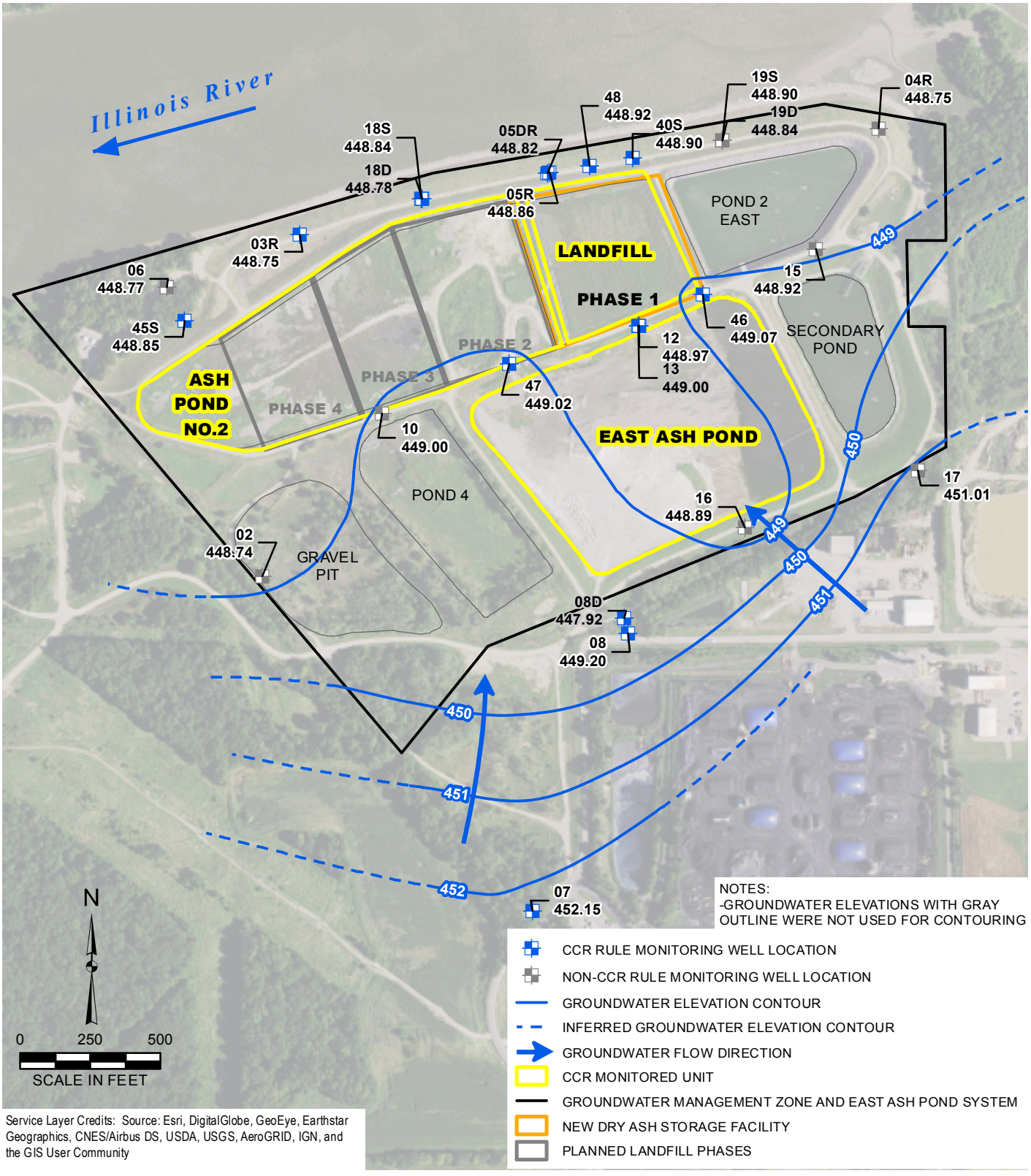
APPENDIX A
GROUNDWATER ELEVATION CONTOUR MAPS - 2015-2021

OPERATING RECORD
REVISION 2

40 C.F.R. § 257.91

GROUNDWATER ELEVATION CONTOUR MAPS
MONITORING PERIOD 2015 - 2021

LOCATION: HENNEPIN POWER PLANT
LEGAL ENTITY: DYNEGY MIDWEST GENERATION, LLC
UNIT IDENTIFICATION NUMBER: 802
UNIT NAME: ASH POND NO. 2



Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

DRAWN BY/DATE:
SDS 1/25/17
REVIEWED BY/DATE:
TBN 1/26/17
APPROVED BY/DATE:
JJW 2/9/17

HENNEPIN LANDFILL (UNIT ID: 801), HENNEPIN ASH POND NO. 2 (UNIT ID: 802), AND HENNEPIN EAST ASH POND (UNIT ID: 803)
UPPERMOST AQUIFER UNIT
GROUNDWATER ELEVATION CONTOUR MAP
ROUND 1: DECEMBER 8, 2015

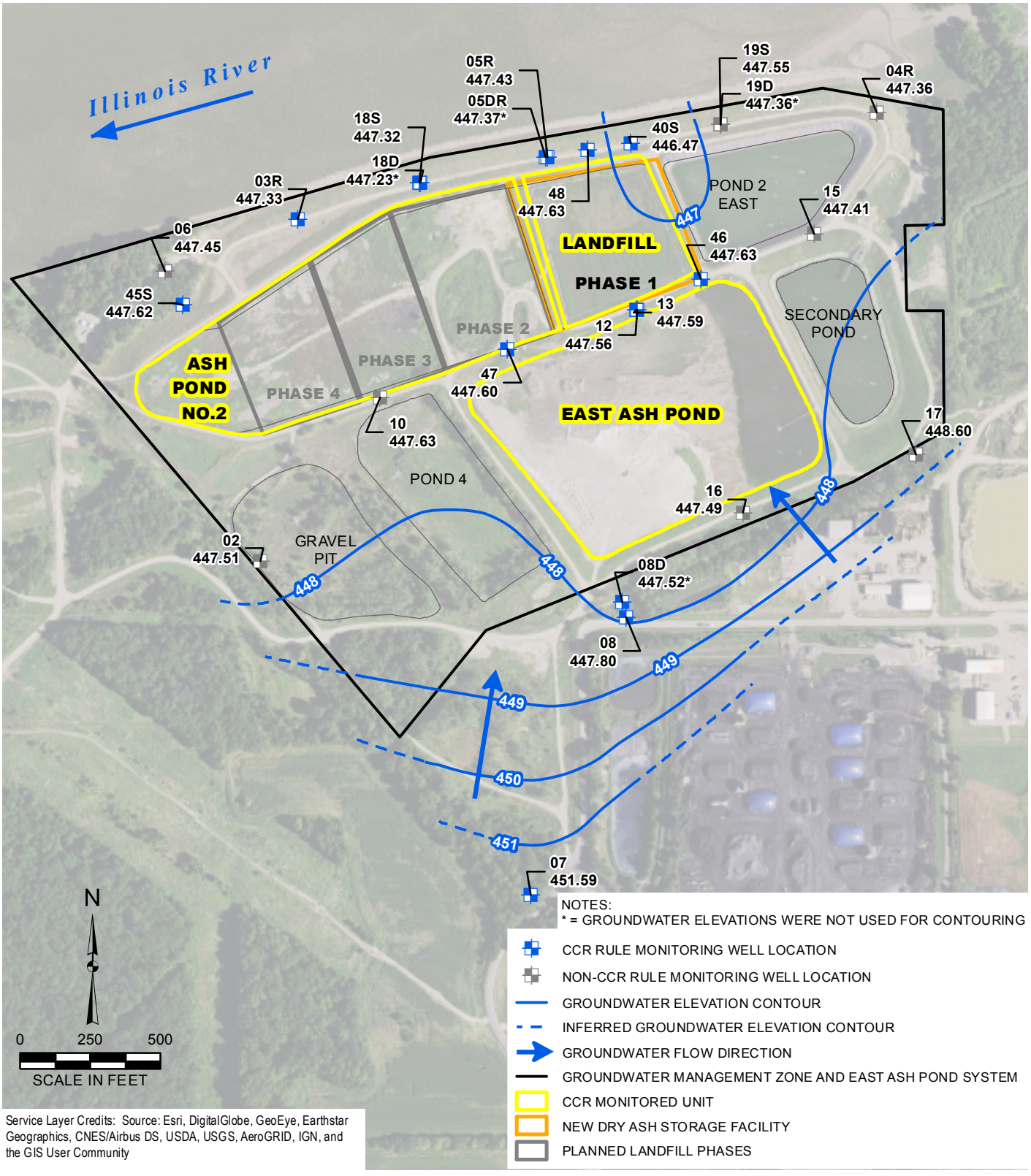
DYNEGY CCR RULE GROUNDWATER MONITORING
HENNEPIN POWER STATION
HENNEPIN, ILLINOIS

PROJECT NO: 2285

FIGURE NO: 1

Natural Resource Technology
AN OBG COMPANY

Y:\Mapping\Projects\22\2285\MXD\GW_Contours\Round_01\R1_HennepinEast_GW_Contours.mxd Author: sstolz Date/Time: 3/2/2017, 2:55:08 PM



Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

DRAWN BY/DATE:
SDS 1/25/17
REVIEWED BY/DATE:
TBN 1/26/17
APPROVED BY/DATE:
JJW 2/9/17

HENNEPIN LANDFILL (UNIT ID: 801), HENNEPIN ASH POND NO. 2 (UNIT ID: 802), AND HENNEPIN EAST ASH POND (UNIT ID: 803)
UPPERMOST AQUIFER UNIT
GROUNDWATER ELEVATION CONTOUR MAP
ROUND 2: MARCH 8, 2016

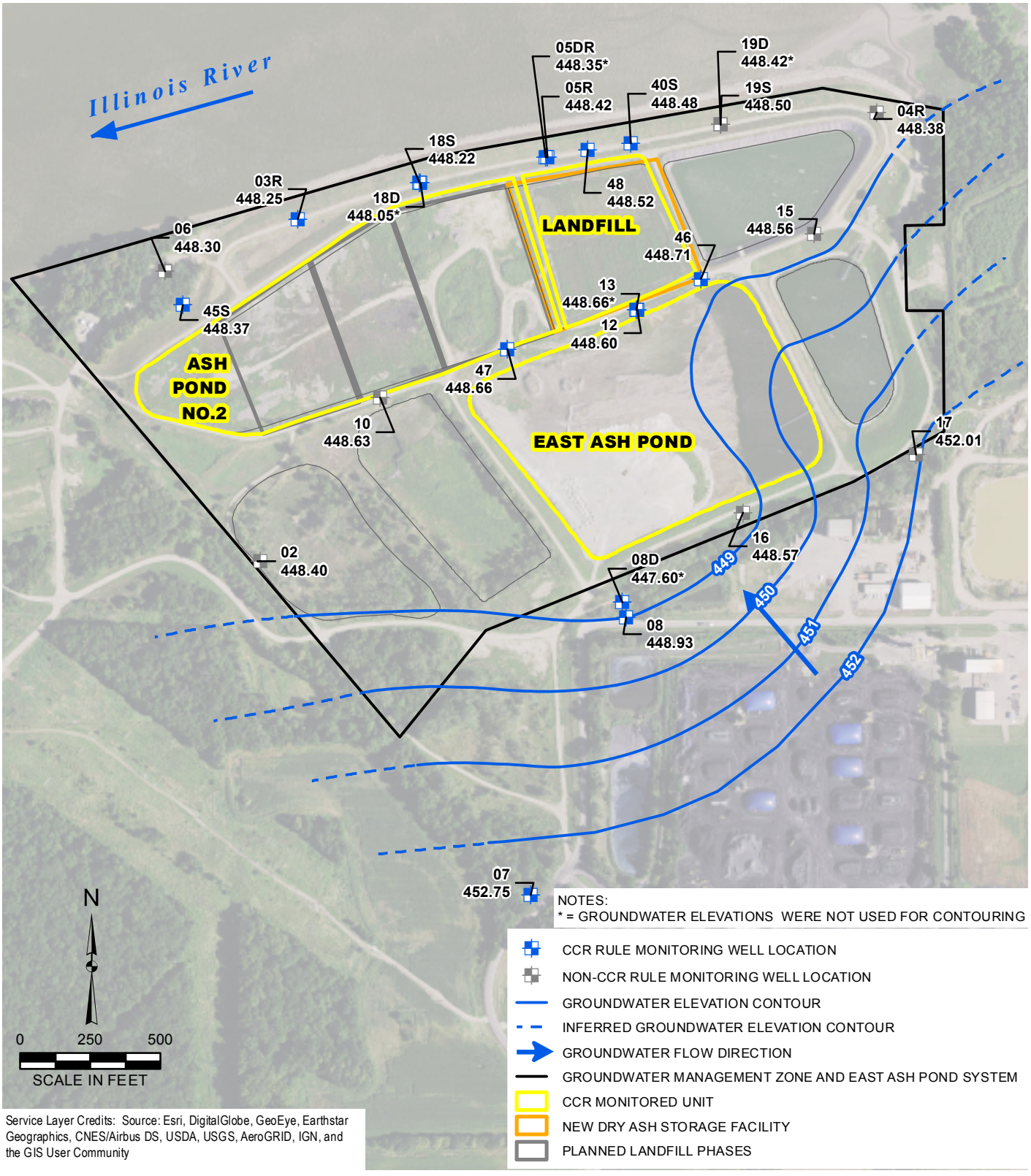
DYNEGY CCR RULE GROUNDWATER MONITORING
HENNEPIN POWER STATION
HENNEPIN, ILLINOIS

PROJECT NO: 2285

FIGURE NO: 1

Natural Resource Technology
AN OBG COMPANY

Y:\Mapping\Projects\22\2285\MXD\GW_Contours\Round_02\R2_HennepinEast_GW_Contours.mxd Author: sstolz Date/Time: 3/2/2017 4:02:59 PM



Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

DRAWN BY/DATE:
SDS 1/25/17
REVIEWED BY/DATE:
TBN 1/26/17
APPROVED BY/DATE:
JJW 2/9/17

HENNEPIN LANDFILL (UNIT ID: 801), HENNEPIN ASH POND NO. 2 (UNIT ID: 802), AND HENNEPIN EAST ASH POND (UNIT ID: 803)
UPPERMOST AQUIFER UNIT
GROUNDWATER ELEVATION CONTOUR MAP
ROUND 3: JUNE 7, 2016

DYNEGY CCR RULE GROUNDWATER MONITORING
HENNEPIN POWER STATION
HENNEPIN, ILLINOIS

PROJECT NO: 2285

FIGURE NO: 1

Natural Resource Technology
AN OBG COMPANY

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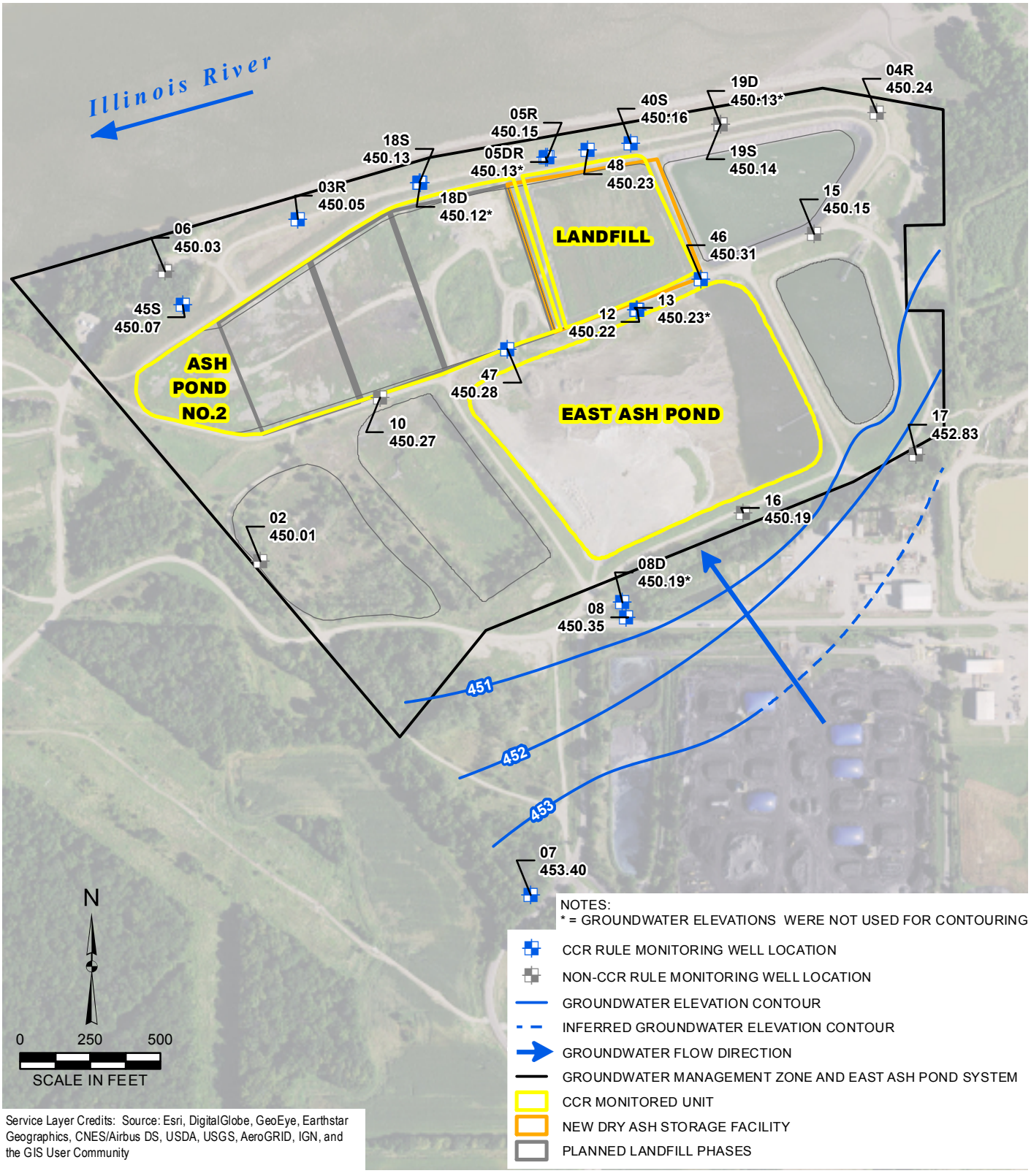

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TBN 1/27/17
APPROVED BY/DATE:
JJW 2/7/17

HENNEPIN LANDFILL (UNIT ID: 801), HENNEPIN ASH POND NO. 2 (UNIT ID: 802), AND HENNEPIN EAST ASH POND (UNIT ID: 803)
UPPERMOST AQUIFER UNIT
GROUNDWATER ELEVATION CONTOUR MAP
ROUND 4: SEPTEMBER 9, 2016

DYNEGY CCR RULE GROUNDWATER MONITORING
HENNEPIN POWER STATION
HENNEPIN, ILLINOIS

PROJECT NO: 2285

FIGURE NO: 1

Natural Resource Technology
AN OBG COMPANY

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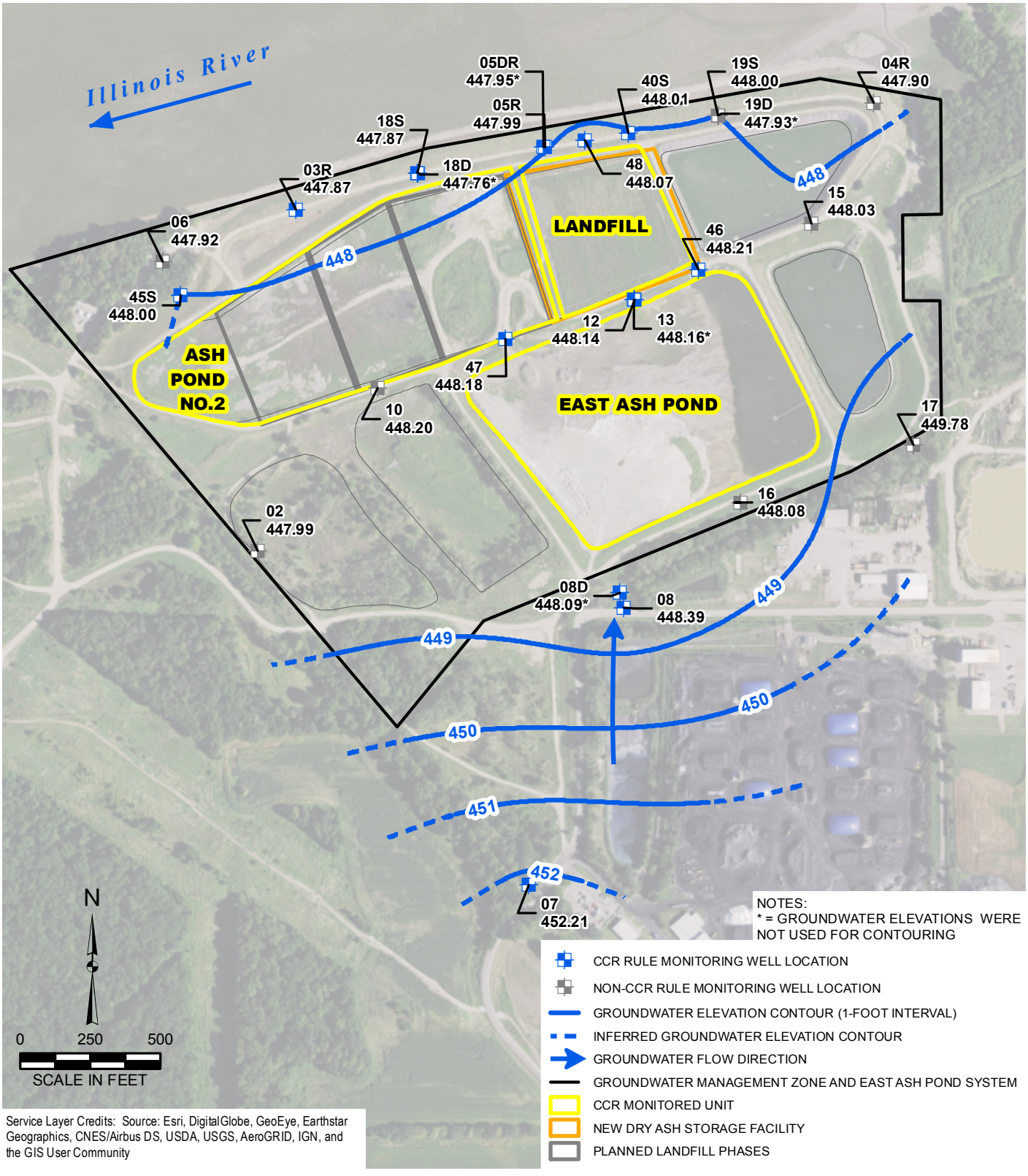

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APPROVED BY/DATE:
JJW 9/1/17

HENNEPIN LANDFILL (UNIT ID: 801), HENNEPIN ASH POND NO. 2 (UNIT ID: 802), AND HENNEPIN EAST ASH POND (UNIT ID: 803)
UPPERMOST AQUIFER UNIT
GROUNDWATER ELEVATION CONTOUR MAP
ROUND 5: DECEMBER 7, 2016

DYNEGY CCR RULE GROUNDWATER MONITORING
HENNEPIN POWER STATION
HENNEPIN, ILLINOIS

PROJECT NO: 2285

FIGURE NO: 1

Natural Resource Technology
AN OBG COMPANY

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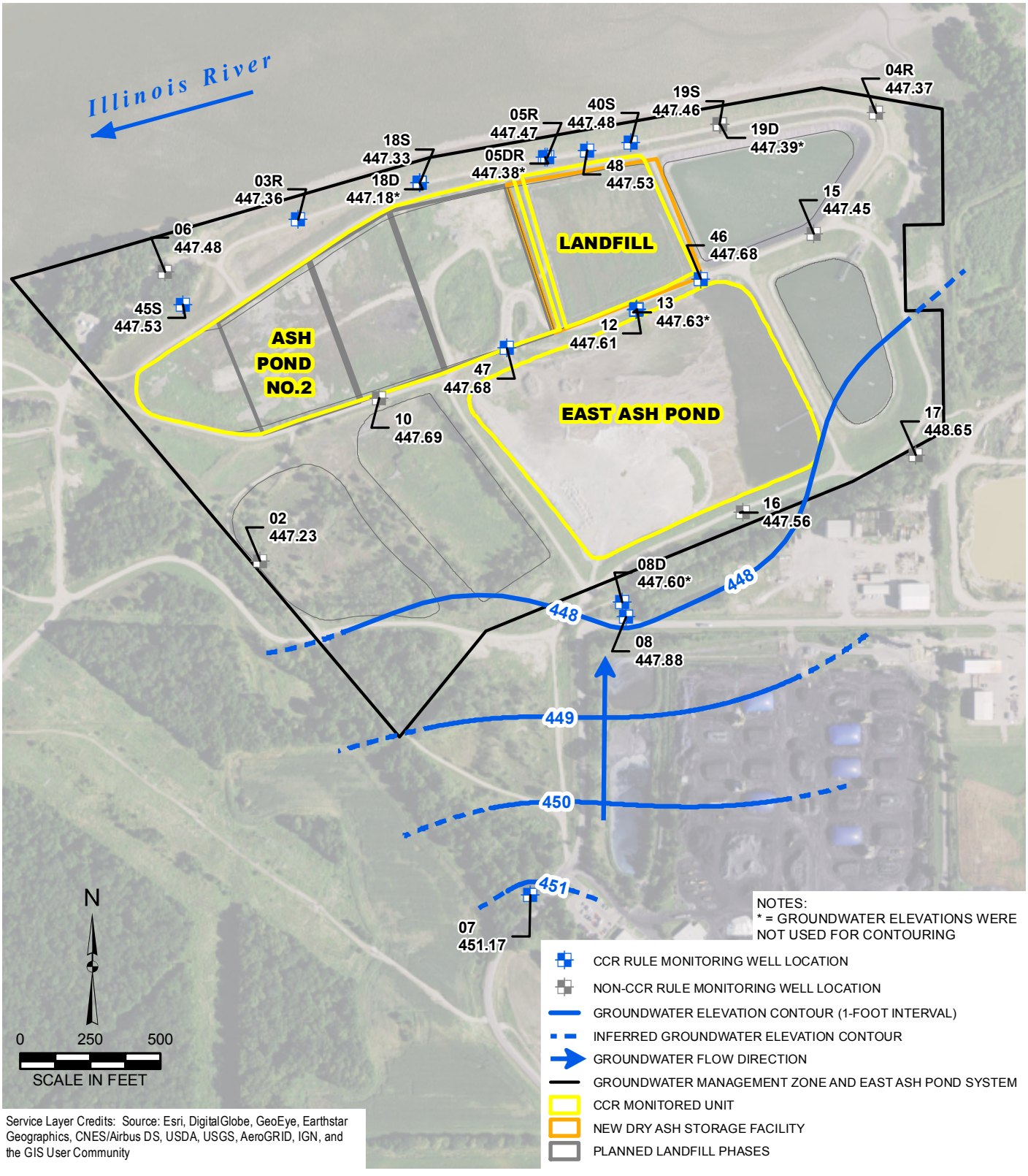

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JJW 9/1/17

HENNEPIN LANDFILL (UNIT ID: 801), HENNEPIN ASH POND NO. 2 (UNIT ID: 802), AND HENNEPIN EAST ASH POND (UNIT ID: 803)
UPPERMOST AQUIFER UNIT
GROUNDWATER ELEVATION CONTOUR MAP
ROUND 6: FEBRUARY 20, 2017

DYNEGY CCR RULE GROUNDWATER MONITORING
HENNEPIN POWER STATION
HENNEPIN, ILLINOIS

PROJECT NO: 2285

FIGURE NO: 1

Natural Resource Technology
AN OBG COMPANY

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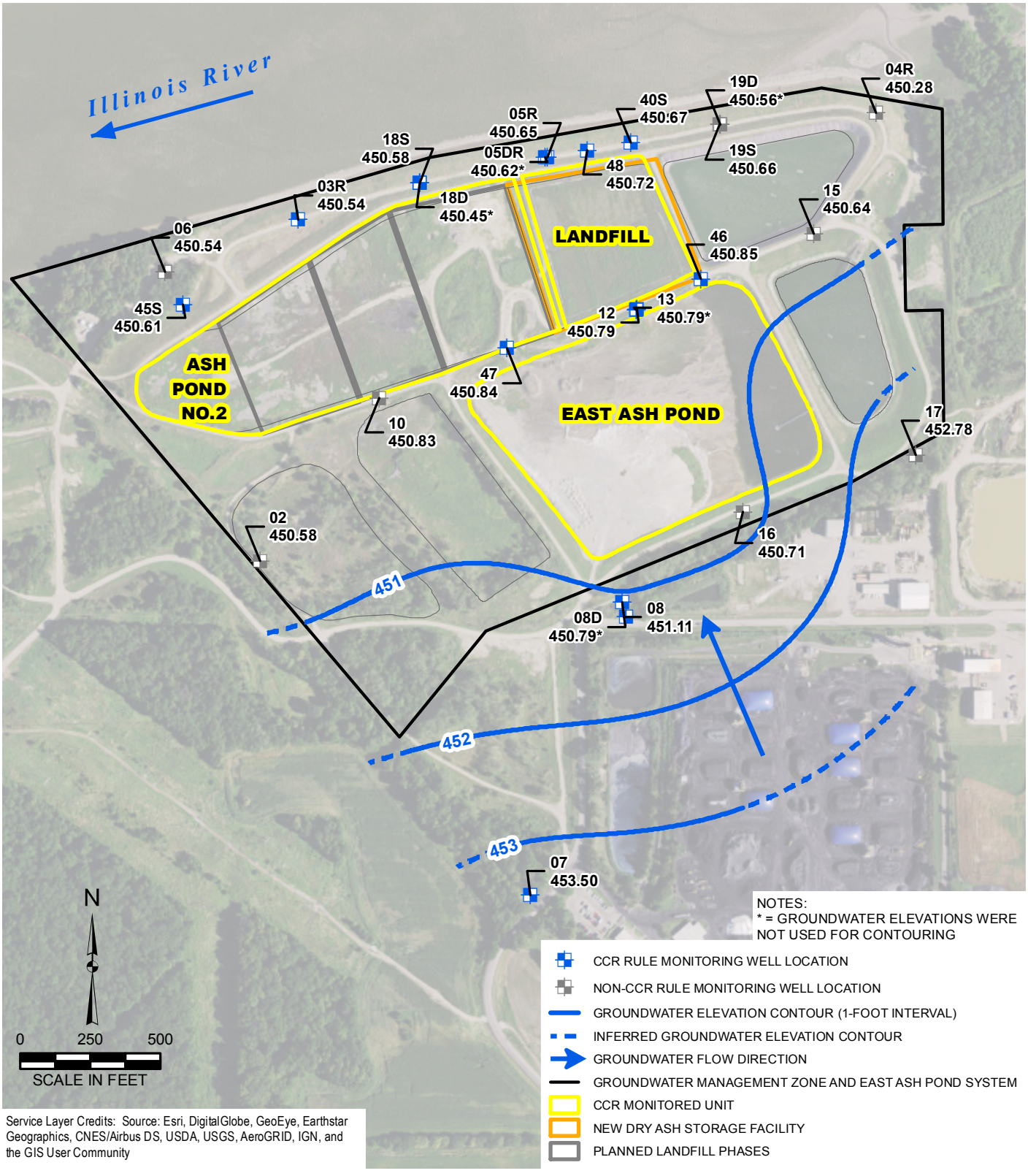

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HENNEPIN LANDFILL (UNIT ID: 801), HENNEPIN ASH POND NO. 2 (UNIT ID: 802), AND HENNEPIN EAST ASH POND (UNIT ID: 803)
UPPERMOST AQUIFER UNIT
GROUNDWATER ELEVATION CONTOUR MAP
ROUND 7: APRIL 25, 2017

DYNEGY CCR RULE GROUNDWATER MONITORING
HENNEPIN POWER STATION
HENNEPIN, ILLINOIS

PROJECT NO: 2285

FIGURE NO: 1

Natural Resource Technology
AN OBG COMPANY

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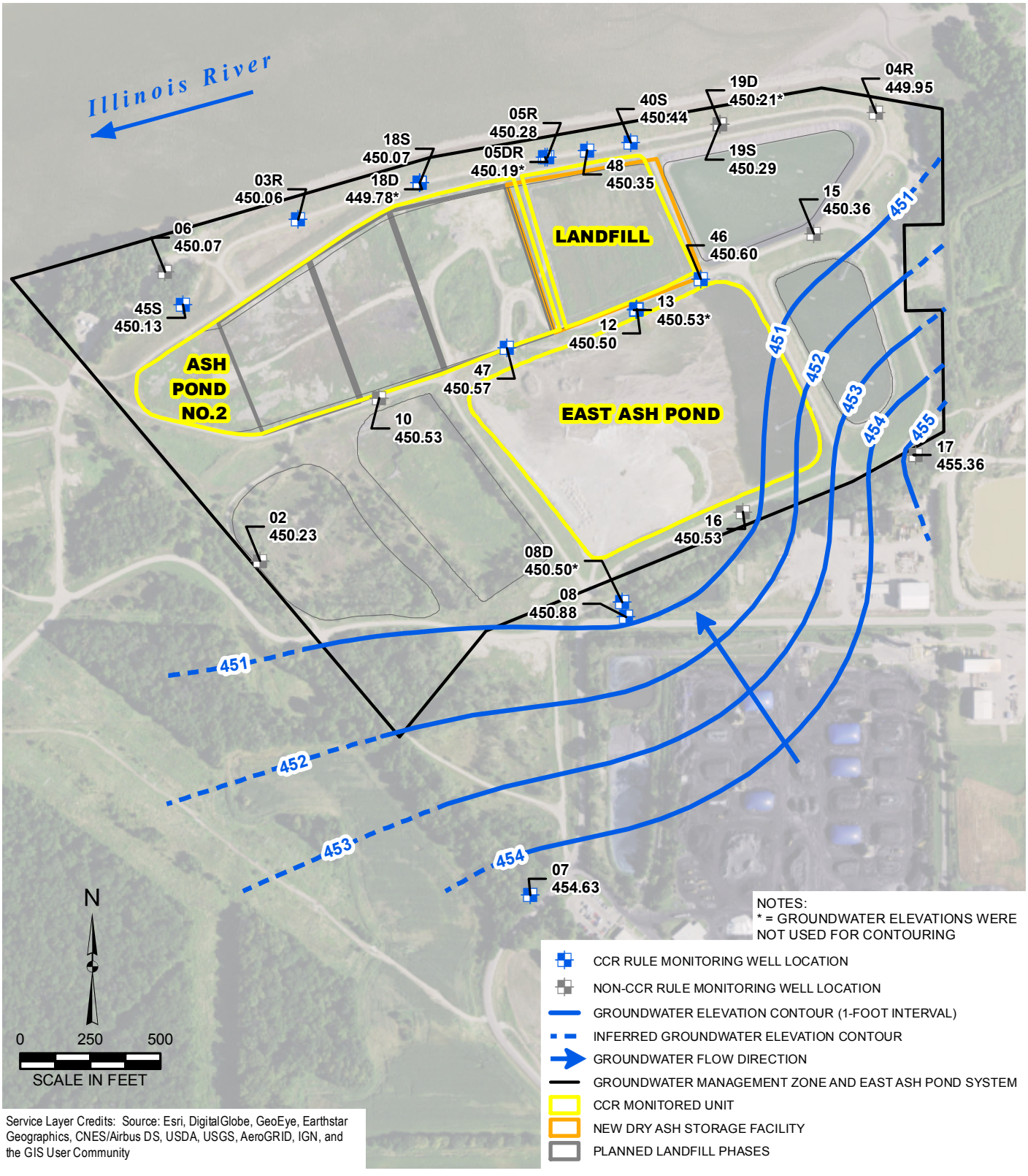

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JJW 9/1/17

HENNEPIN LANDFILL (UNIT ID: 801), HENNEPIN ASH POND NO. 2 (UNIT ID: 802), AND HENNEPIN EAST ASH POND (UNIT ID: 803)
UPPERMOST AQUIFER UNIT
GROUNDWATER ELEVATION CONTOUR MAP
ROUND 8: JUNE 8, 2017

DYNEGY CCR RULE GROUNDWATER MONITORING
HENNEPIN POWER STATION
HENNEPIN, ILLINOIS

PROJECT NO: 2285

FIGURE NO: 1

Natural Resource Technology
AN OBG COMPANY

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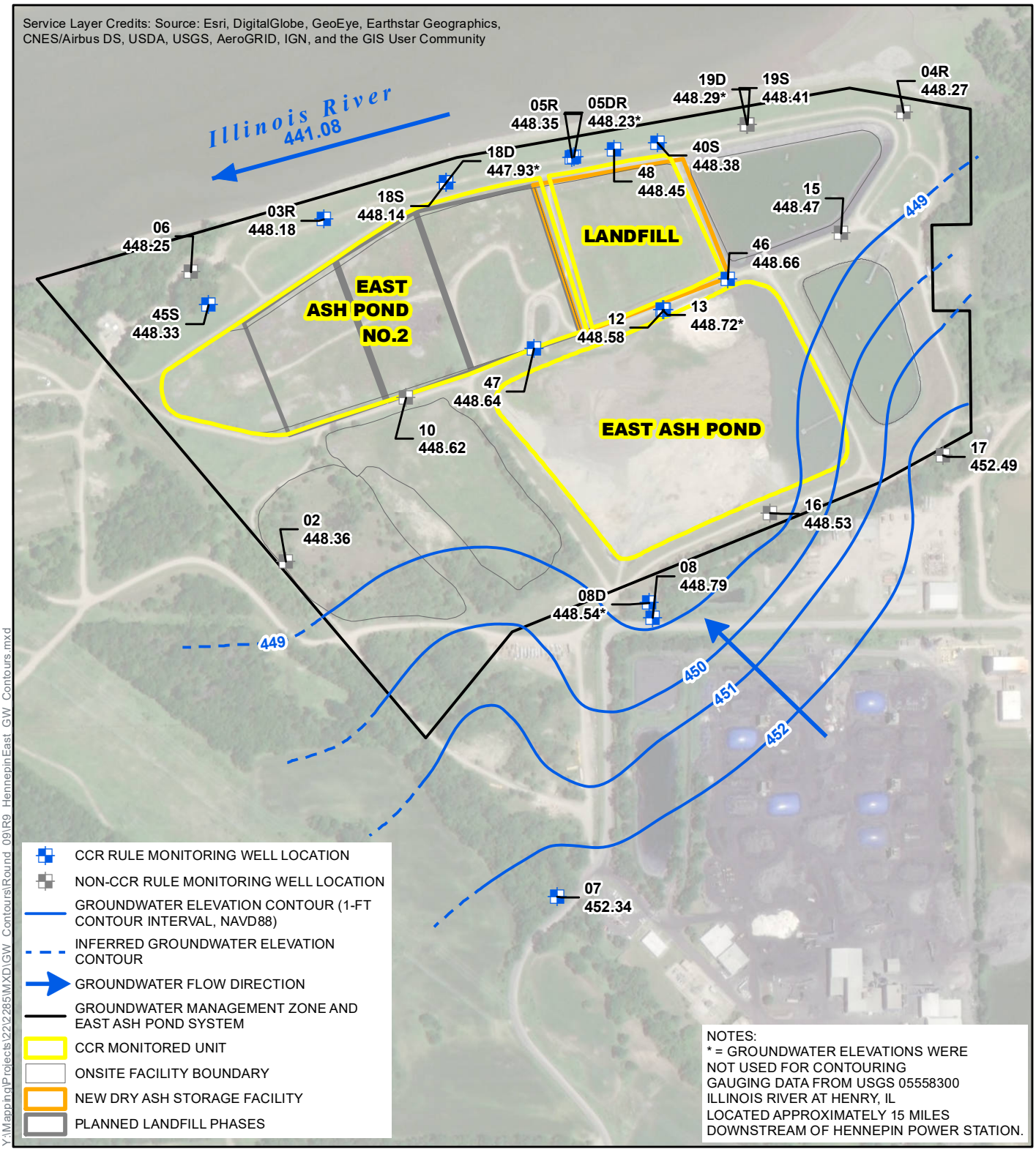


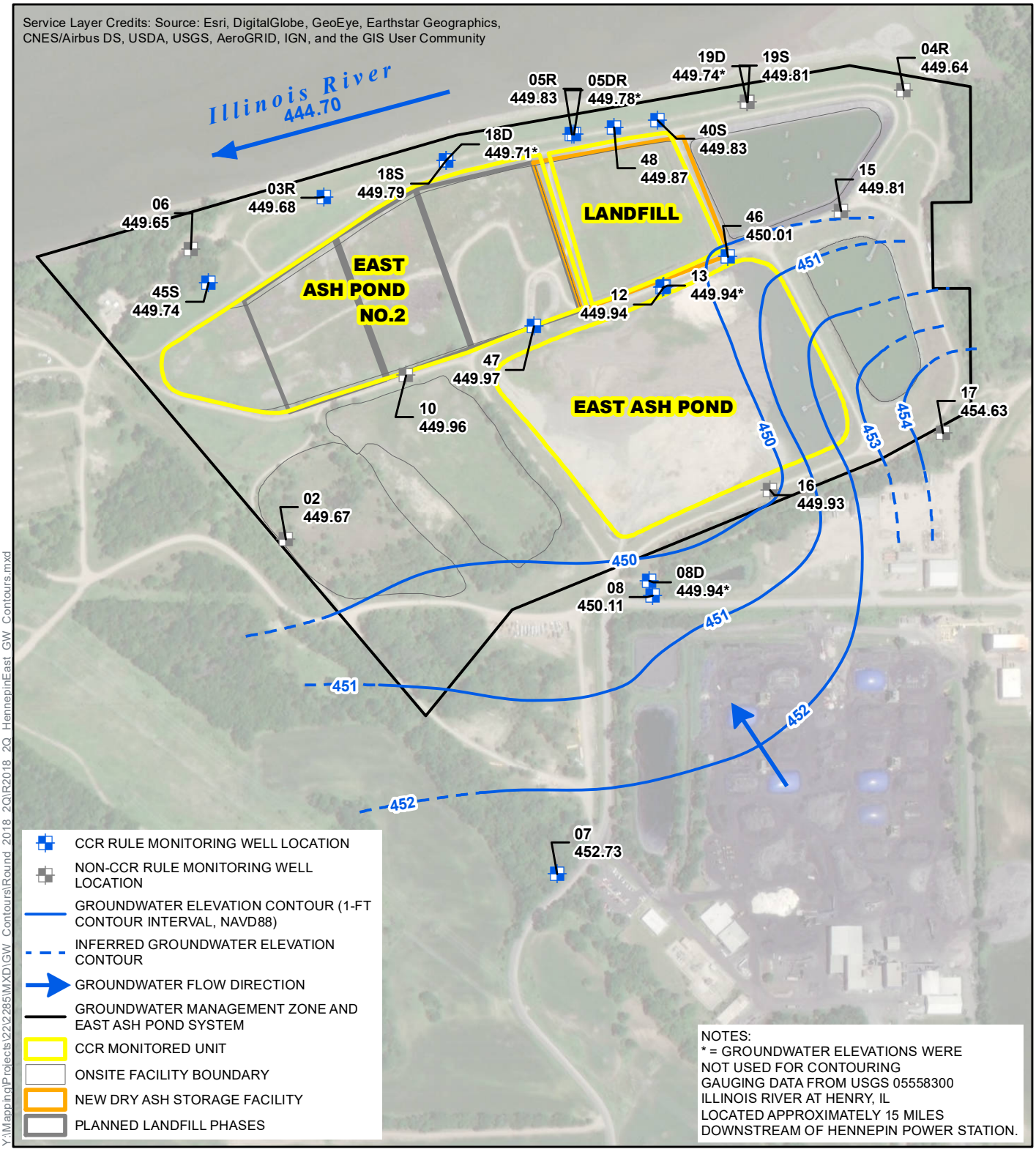
HENNEPIN LANDFILL (UNIT ID: 801), HENNEPIN ASH POND NO. 2 (UNIT ID: 802), AND HENNEPIN EAST ASH POND (UNIT ID: 803) GROUNDWATER ELEVATION CONTOUR MAP NOVEMBER 15, 2017

CCR RULE GROUNDWATER MONITORING
HENNEPIN POWER STATION
HENNEPIN, ILLINOIS

0 125 250 500
Feet

N

O'BRIEN & GERE ENGINEERS, INC.



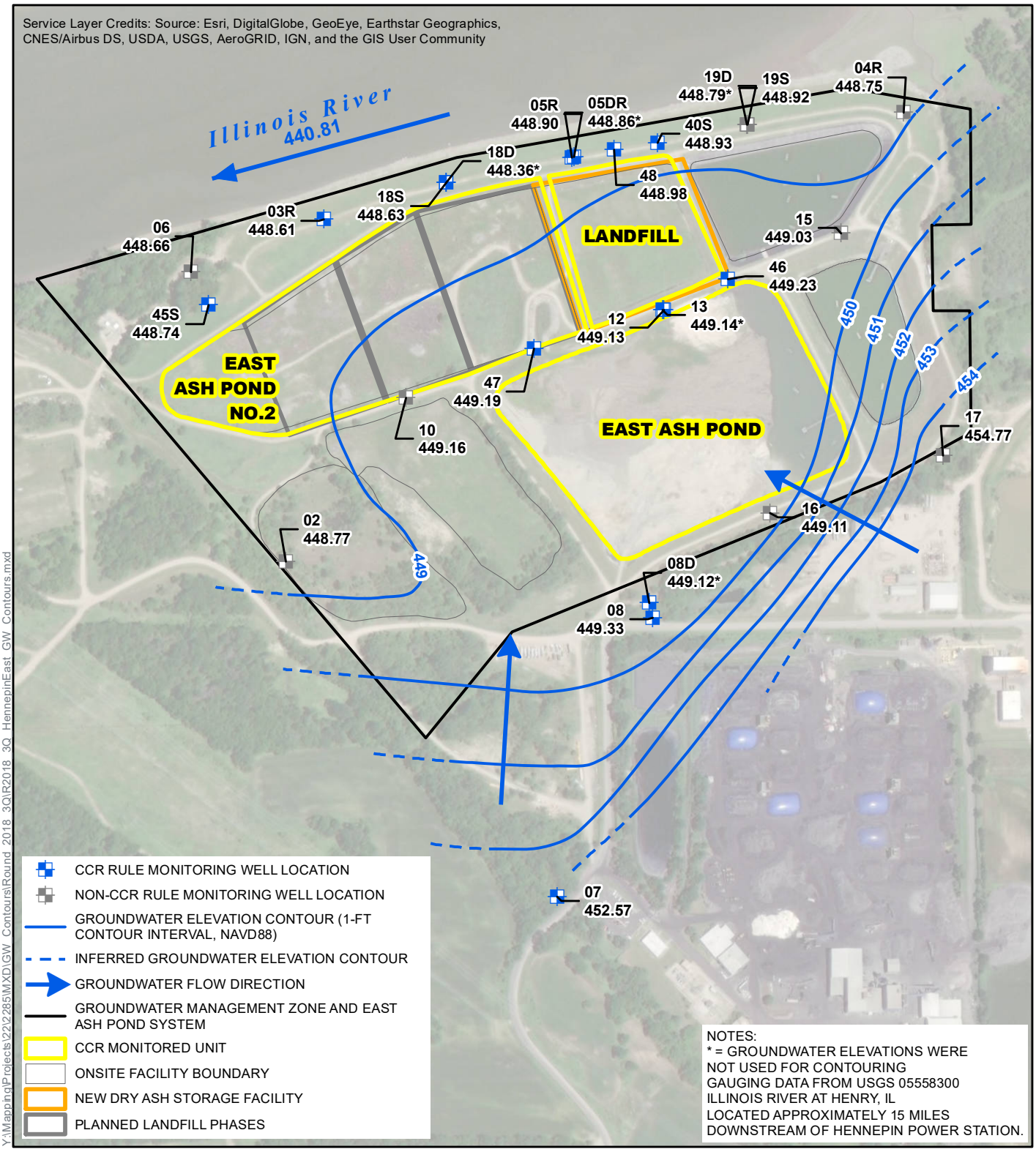
HENNEPIN LANDFILL (UNIT ID: 801), HENNEPIN ASH POND NO. 2 (UNIT ID: 802), AND HENNEPIN EAST ASH POND (UNIT ID: 803)
GROUNDWATER ELEVATION CONTOUR MAP
JUNE 13, 2018

CCR RULE GROUNDWATER MONITORING
HENNEPIN POWER STATION
HENNEPIN, ILLINOIS

N

0 125 250 500
Feet

O'BRIEN & GERE ENGINEERS, INC.



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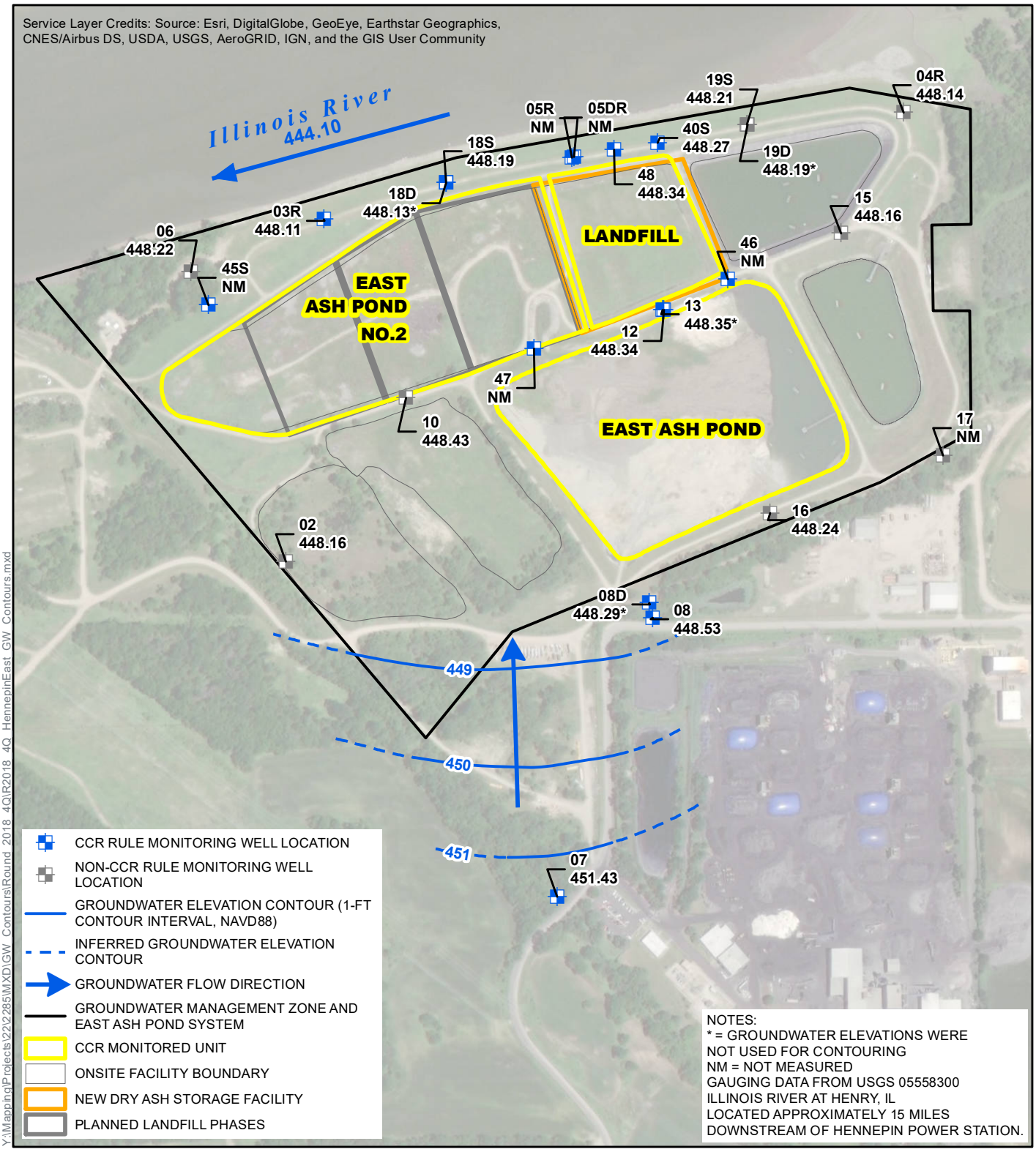
HENNEPIN LANDFILL (UNIT ID: 801), HENNEPIN ASH POND NO. 2 (UNIT ID: 802), AND HENNEPIN EAST ASH POND (UNIT ID: 803) GROUNDWATER ELEVATION CONTOUR MAP SEPTEMBER 12, 2018

CCR RULE GROUNDWATER MONITORING
HENNEPIN POWER STATION
HENNEPIN, ILLINOIS

0 125 250 500
Feet

N

O'BRIEN & GERE ENGINEERS, INC.



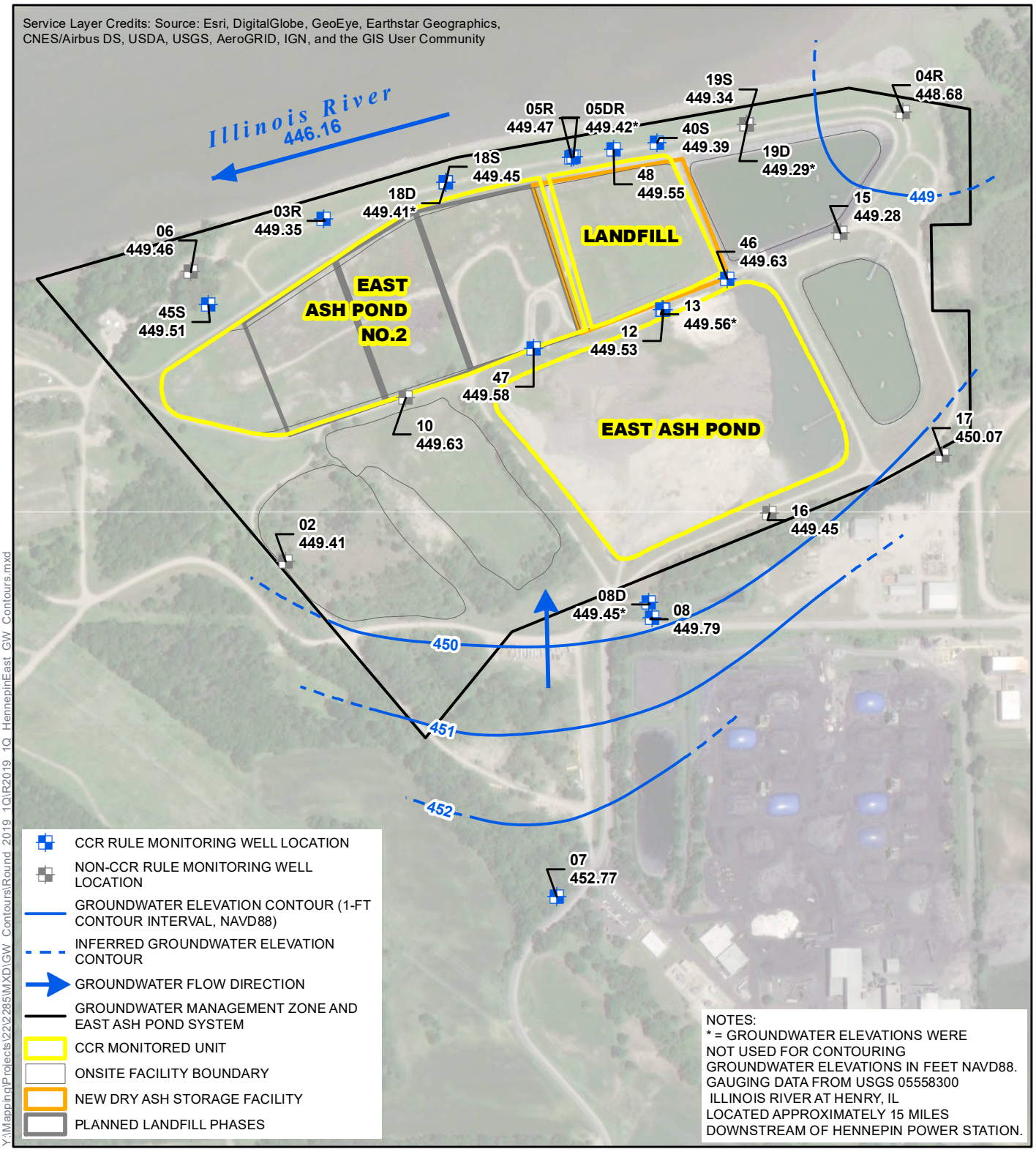
HENNEPIN LANDFILL (UNIT ID: 801), HENNEPIN ASH POND NO. 2 (UNIT ID: 802), AND HENNEPIN EAST ASH POND (UNIT ID: 803)
GROUNDWATER ELEVATION CONTOUR MAP
DECEMBER 12, 2018

CCR RULE GROUNDWATER MONITORING
HENNEPIN POWER STATION
HENNEPIN, ILLINOIS

0 125 250 500
Feet

N

O'BRIEN & GERE ENGINEERS, INC.



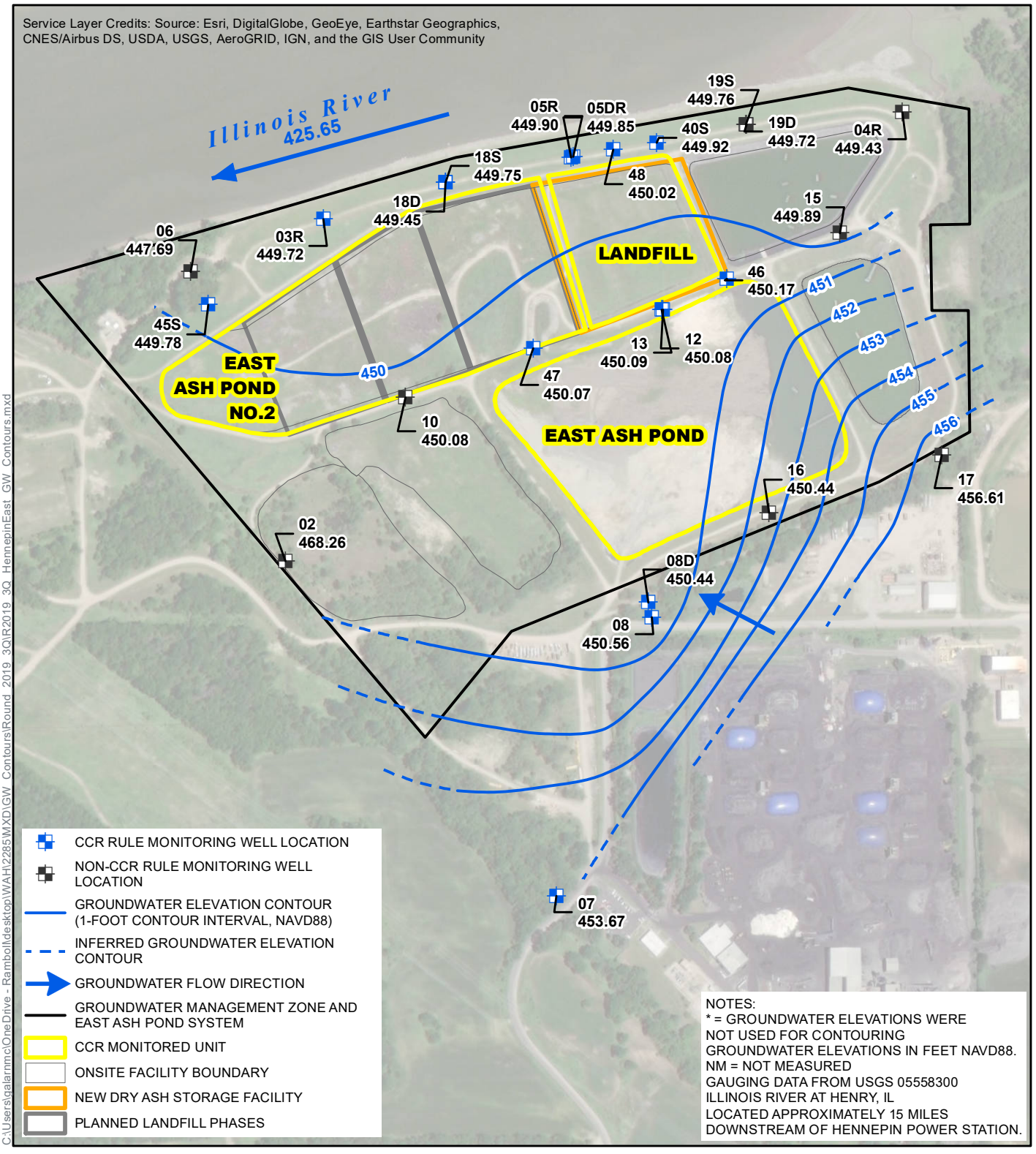
HENNEPIN LANDFILL (UNIT ID: 801), HENNEPIN ASH POND NO. 2 (UNIT ID: 802), AND HENNEPIN EAST ASH POND (UNIT ID: 803)
GROUNDWATER ELEVATION CONTOUR MAP
MARCH 13, 2019

CCR RULE GROUNDWATER MONITORING
HENNEPIN POWER STATION
HENNEPIN, ILLINOIS

N

0 125 250 500
Feet

O'BRIEN & GERE ENGINEERS, INC.



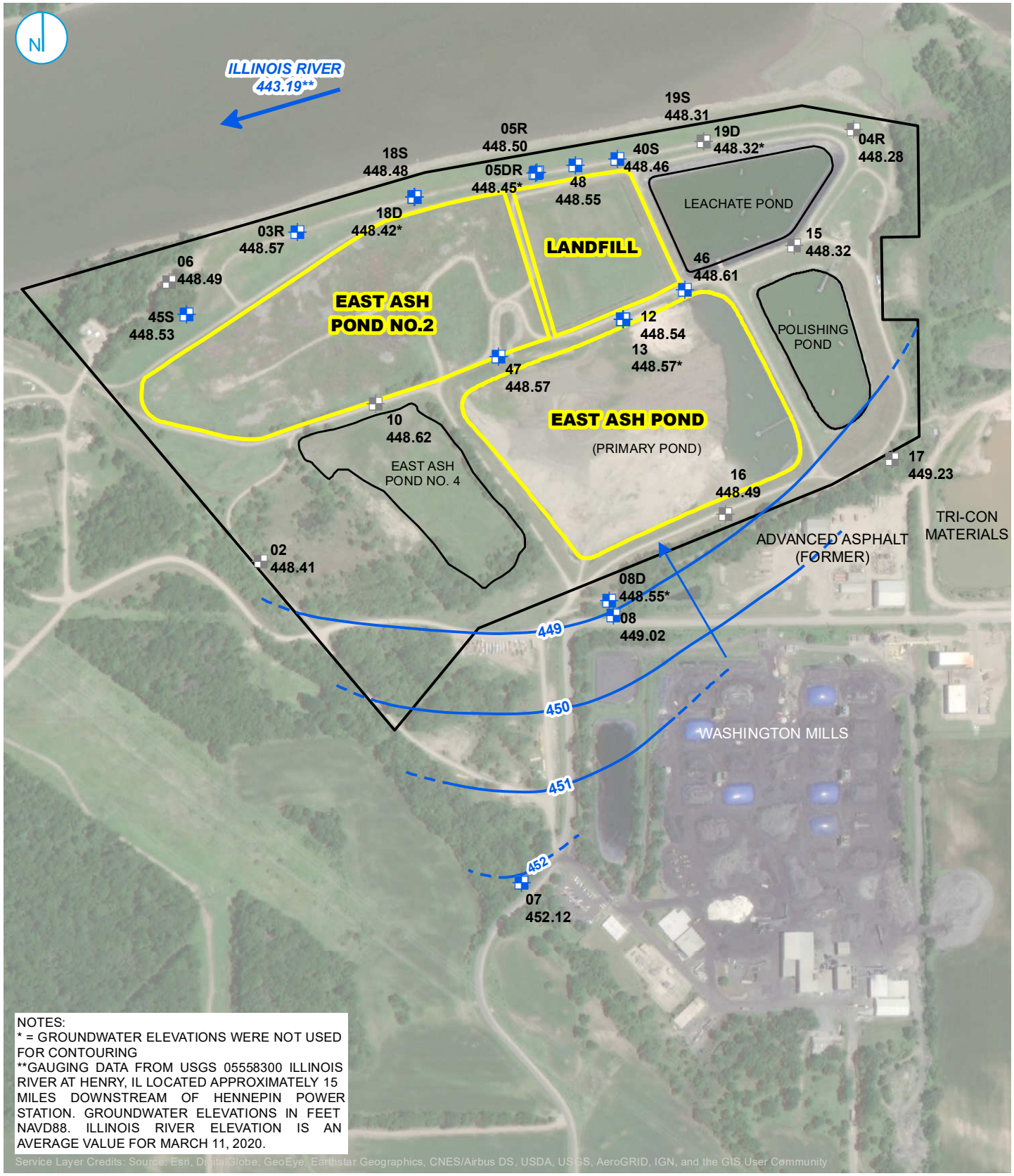
HENNEPIN LANDFILL (UNIT ID: 801), HENNEPIN ASH POND NO. 2 (UNIT ID: 802), AND HENNEPIN EAST ASH POND (UNIT ID: 803) GROUNDWATER ELEVATION CONTOUR MAP SEPTEMBER 17, 2019

CCR RULE GROUNDWATER MONITORING
HENNEPIN POWER STATION
HENNEPIN, ILLINOIS

N

0 125 250 500
Feet

O'BRIEN & GERE ENGINEERS, INC.



NOTES:
* = GROUNDWATER ELEVATIONS WERE NOT USED FOR CONTOURING
**GAUGING DATA FROM USGS 05558300 ILLINOIS RIVER AT HENRY, IL LOCATED APPROXIMATELY 15 MILES DOWNSTREAM OF HENNEPIN POWER STATION. GROUNDWATER ELEVATIONS IN FEET NAVD88. ILLINOIS RIVER ELEVATION IS AN AVERAGE VALUE FOR MARCH 11, 2020.

Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

- CCR MONITORING WELL
- NON-CCR MONITORING WELL
- GROUNDWATER ELEVATION CONTOUR (1-FT CONTOUR INTERVAL, NAVD88)
- INFERRED GROUNDWATER ELEVATION CONTOUR
- GROUNDWATER FLOW DIRECTION
- GROUNDWATER MANAGEMENT ZONE AND EAST ASH POND SYSTEM
- CCR MONITORED UNIT
- NON-CCR UNIT

0 250 500 Feet

GROUNDWATER ELEVATION CONTOUR MAP MARCH 11, 2020

HENNEPIN LANDFILL (UNIT ID: 801), HENNEPIN ASH POND NO. 2 (UNIT ID: 802), AND HENNEPIN EAST ASH POND (UNIT ID: 803)
VISTRA ENERGY
HENNEPIN POWER STATION
HENNEPIN, ILLINOIS

RAMBOLL US CORPORATION
A RAMBOLL COMPANY

RAMBOLL

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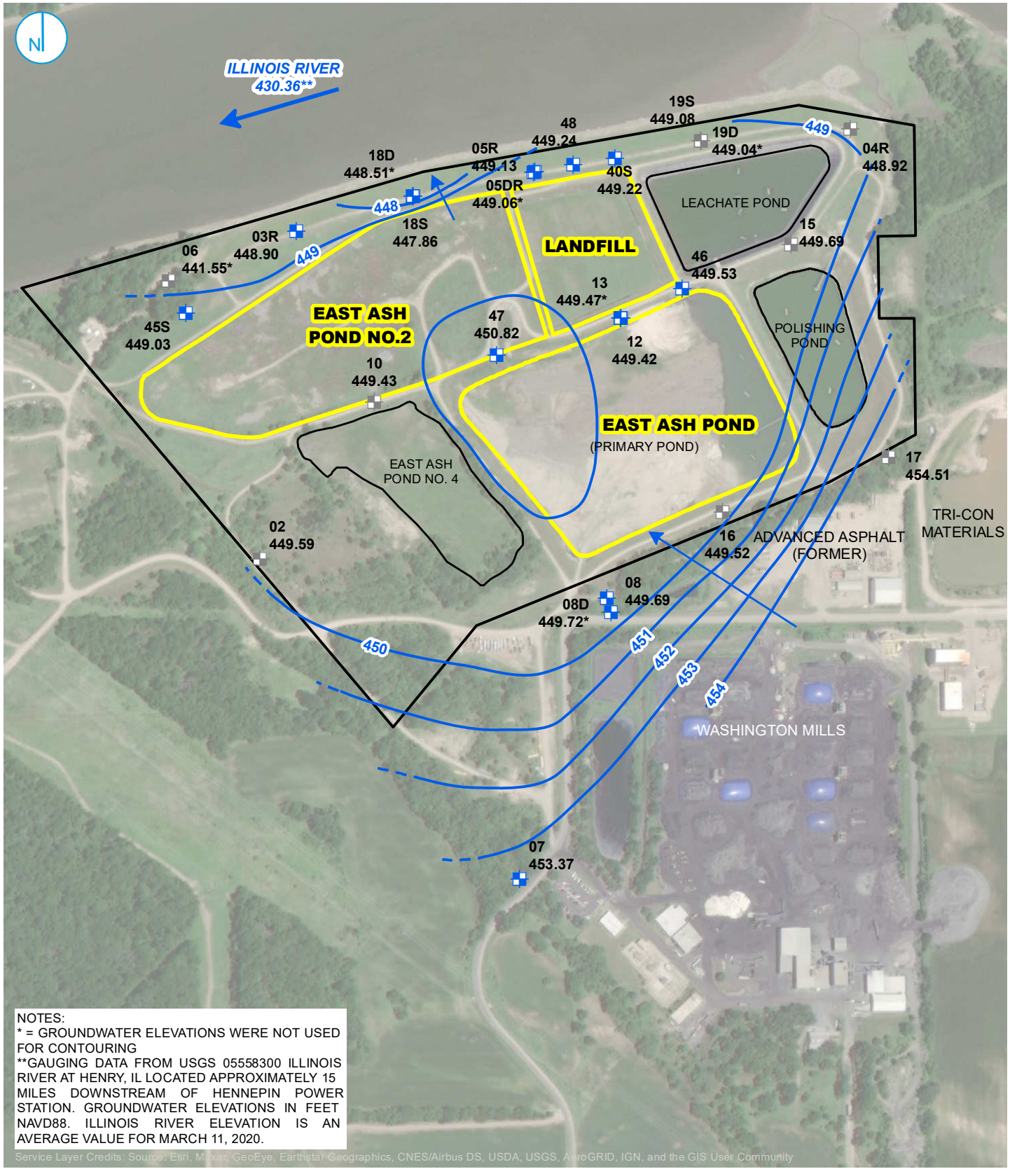

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PROJECT: 169000XXXX | DATED: 12/16/2020 | DESIGNER: MARRAMJ

CCR MONITORING WELL

NON-CCR MONITORING WELL

GROUNDWATER ELEVATION CONTOUR (1-FT CONTOUR INTERVAL, NAVD88)

INFERRED GROUNDWATER ELEVATION CONTOUR

GROUNDWATER FLOW DIRECTION

GROUNDWATER MANAGEMENT ZONE AND EAST ASH POND SYSTEM

CCR MONITORED UNIT

NON-CCR UNIT

0 250 500 Feet

GROUNDWATER ELEVATION CONTOUR MAP
SEPTEMBER 2, 2020

HENNEPIN LANDFILL (UNIT ID: 801), HENNEPIN ASH POND NO. 2 (UNIT ID: 802), AND HENNEPIN EAST ASH POND (UNIT ID: 803)
VISTRA ENERGY
HENNEPIN POWER STATION
HENNEPIN, ILLINOIS

RAMBOLL US CORPORATION
A RAMBOLL COMPANY

RAMBOLL

Service Layer Credits: Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

- BACKGROUND WELL
- COMPLIANCE WELL
- PORE WATER WELL
- MONITORING WELL
- STAFF GAGE, CCR UNIT
- GROUNDWATER ELEVATION CONTOUR (0.5 FT CONTOUR INTERVAL, NAVD88)
- INFERRED GROUNDWATER ELEVATION CONTOUR
- GROUNDWATER FLOW DIRECTION
- PART 257 REGULATED UNIT (SUBJECT UNIT)
- SITE FEATURE
- LIMITS OF FINAL COVER
- PROPERTY BOUNDARY

NOTES:
1. ELEVATIONS IN PARENTHESES WERE NOT USED FOR CONTOURING.
2. ELEVATION CONTOURS SHOWN IN FEET, NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88)
*ILLINOIS RIVER ELEVATION OBTAINED FROM STAFF GAGE SG02, LOCATED AT THE HENNEPIN POWER PLANT

0 175 350
Feet

POTENTIOMETRIC SURFACE MAP MARCH 17, 19, AND 22, 2021

2021 ANNUAL GROUNDWATER MONITORING AND CORRECTIVE ACTION REPORT
ASH POND NO. 2
HENNEPIN POWER PLANT
HENNEPIN, ILLINOIS

RAMBOLL AMERICAS
ENGINEERING SOLUTIONS, INC.

RAMBOLL

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PROJECT: 169000XXXX | DATED: 3/24/2022 | DESIGNER: galarmmc

BACKGROUND WELL
COMPLIANCE WELL
PORE WATER WELL
MONITORING WELL
STAFF GAGE, CCR UNIT
GROUNDWATER ELEVATION CONTOUR (1 FT CONTOUR INTERVAL, NAVD88)
INFERRED GROUNDWATER ELEVATION CONTOUR
GROUNDWATER FLOW DIRECTION
PART 257 REGULATED UNIT (SUBJECT UNIT)
SITE FEATURE
LIMITS OF FINAL COVER
PROPERTY BOUNDARY

NOTES:
1. ELEVATIONS IN PARENTHESES WERE NOT USED FOR CONTOURING.
2. NM = NOT MEASURED
3. ELEVATION CONTOURS SHOWN IN FEET, NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88)
*ILLINOIS RIVER ELEVATION OBTAINED FROM STAFF GAGE SG02, LOCATED AT THE HENNEPIN POWER PLANT

0 175 350
Feet

POTENTIOMETRIC SURFACE MAP SEPTEMBER 8, 2021

2021 ANNUAL GROUNDWATER MONITORING AND CORRECTIVE ACTION REPORT
ASH POND NO. 2
HENNEPIN POWER PLANT
HENNEPIN, ILLINOIS

RAMBOLL AMERICAS
ENGINEERING SOLUTIONS, INC.

RAMBOLL

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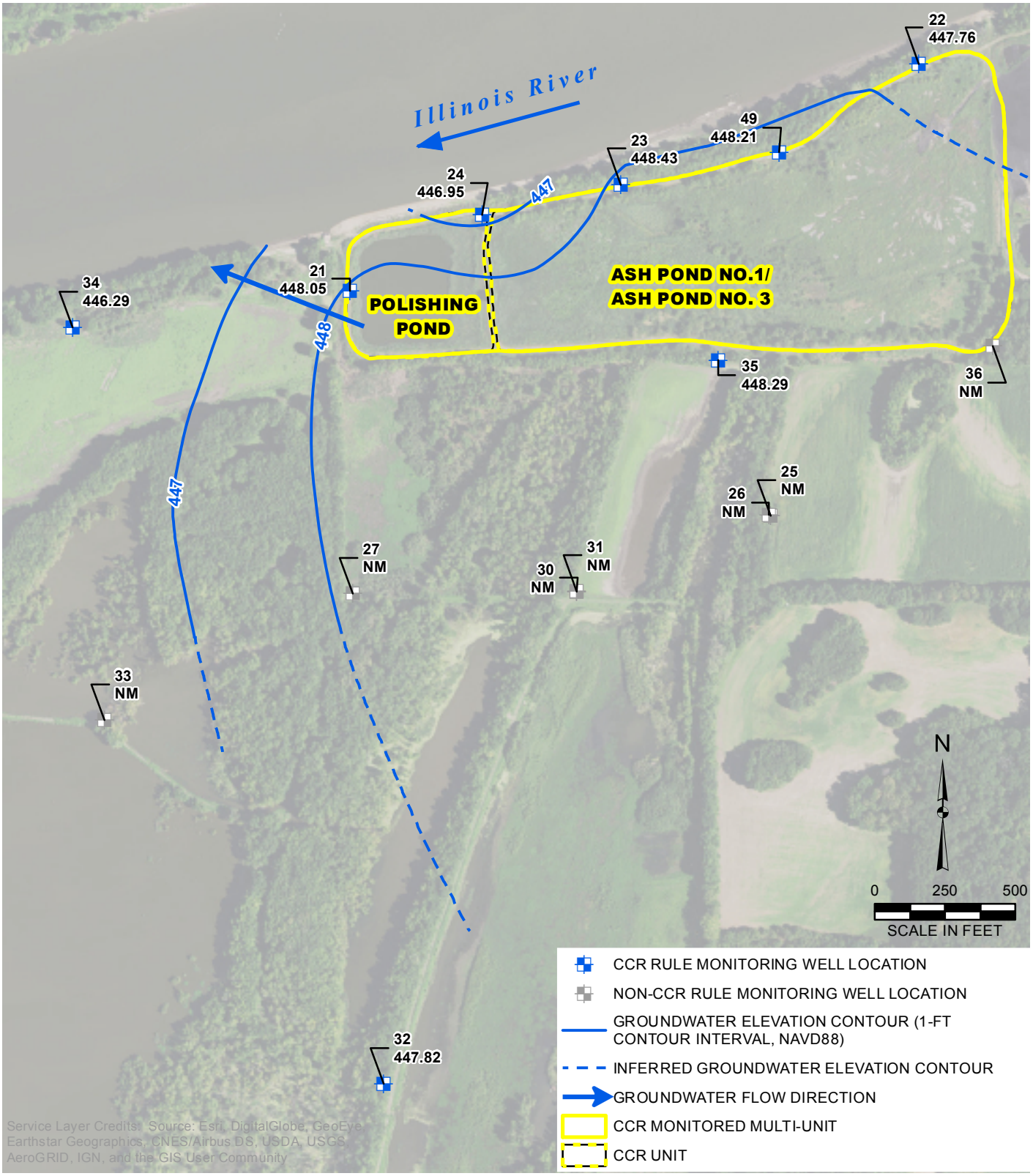
PROJECT: 169000XXXX | DATED: 3/24/2022 | DESIGNER: galammc

OPERATING RECORD
REVISION 2

40 C.F.R. § 257.91

GROUNDWATER ELEVATION CONTOUR MAPS
MONITORING PERIOD 2015 - 2021

LOCATION: HENNEPIN POWER PLANT
LEGAL ENTITY: DYNEGY MIDWEST GENERATION, LLC
UNIT IDENTIFICATION NUMBER: 804
UNIT NAME: OLD WEST ASH POND (POND NO. 1 AND POND NO. 3) AND POLISHING POND



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JJW 2/8/17

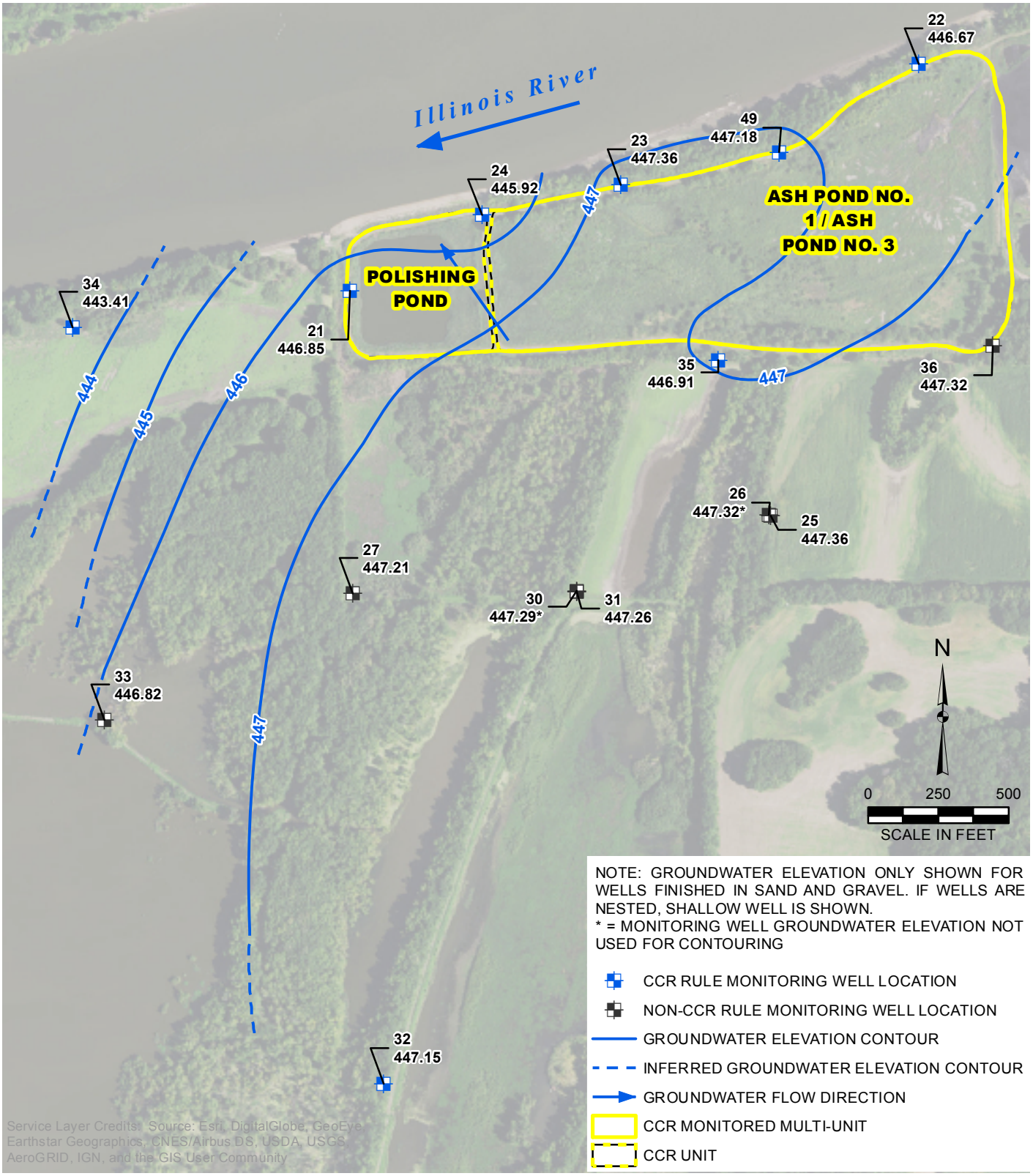
HENNEPIN OLD WEST ASH POND (POND NO.1 AND POND NO. 3) AND HENNEPIN OLD WEST POLISHING POND (UNIT ID: 804) UPPERMOST AQUIFER UNIT GROUNDWATER ELEVATION CONTOUR MAP ROUND 1: DECEMBER 8, 2015

DYNEGY MIDWEST GENERATION, LLC
HENNEPIN POWER STATION, HENNEPIN, ILLINOIS

PROJECT NO: 2285

FIGURE NO: 1

Natural Resource Technology
AN OBG COMPANY



NOTE: GROUNDWATER ELEVATION ONLY SHOWN FOR WELLS FINISHED IN SAND AND GRAVEL. IF WELLS ARE NESTED, SHALLOW WELL IS SHOWN.
* = MONITORING WELL GROUNDWATER ELEVATION NOT USED FOR CONTOURING

- CCR RULE MONITORING WELL LOCATION
- NON-CCR RULE MONITORING WELL LOCATION
- GROUNDWATER ELEVATION CONTOUR
- INFERRED GROUNDWATER ELEVATION CONTOUR
- GROUNDWATER FLOW DIRECTION
- CCR MONITORED MULTI-UNIT
- CCR UNIT

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TBN 1/20/17
APPROVED BY/DATE:
JJW 2/8/17

HENNEPIN OLD WEST ASH POND (POND NO.1 AND POND NO. 3) AND HENNEPIN OLD WEST POLISHING POND (UNIT ID: 804) UPPERMOST AQUIFER UNIT GROUNDWATER ELEVATION CONTOUR MAP ROUND 2: MARCH 8, 2016

DYNEGY MIDWEST GENERATION, LLC
HENNEPIN POWER STATION, HENNEPIN, ILLINOIS

PROJECT NO: 2285

FIGURE NO: 1

Natural Resource Technology
AN OBG COMPANY

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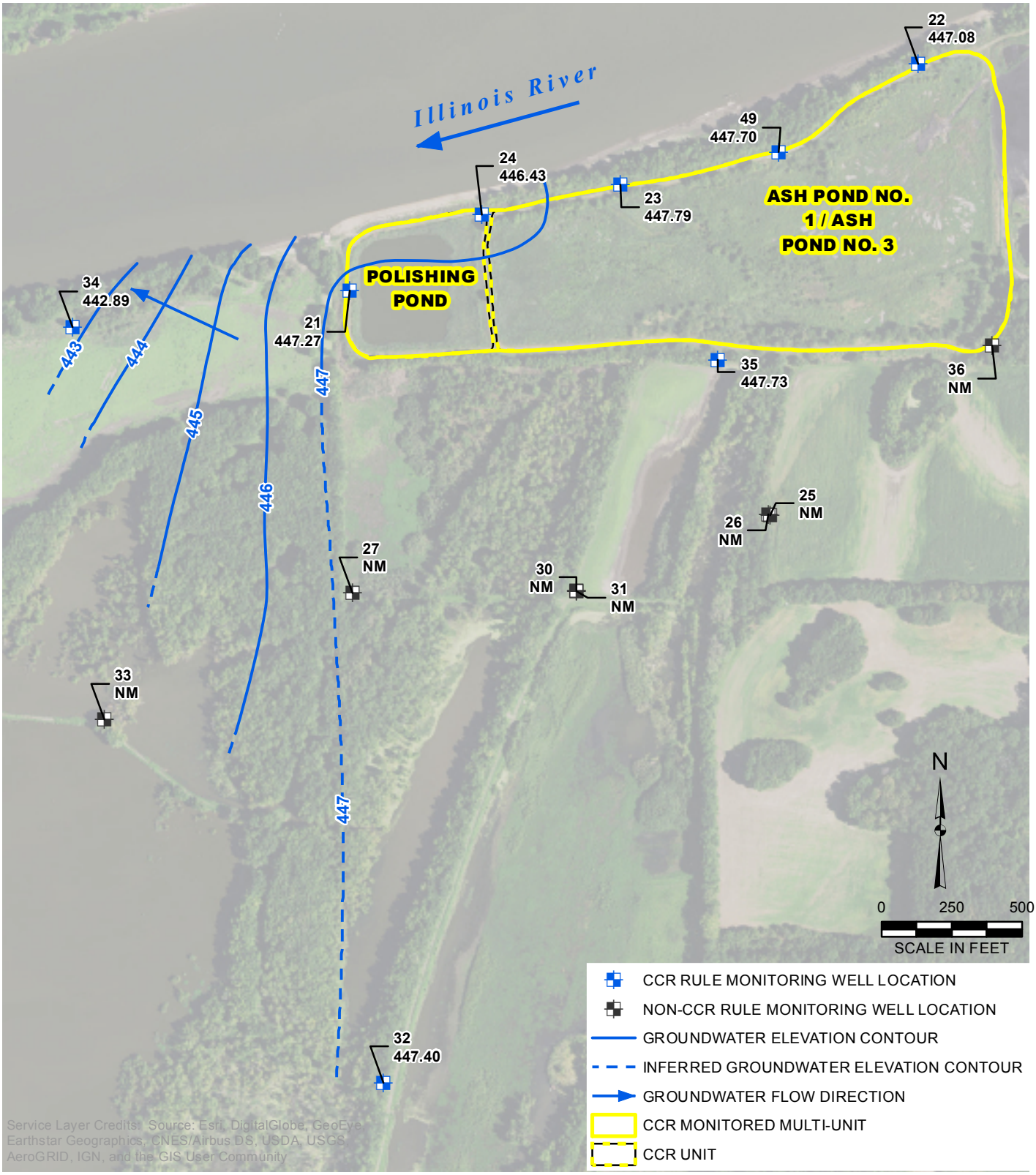

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APPROVED BY/DATE:
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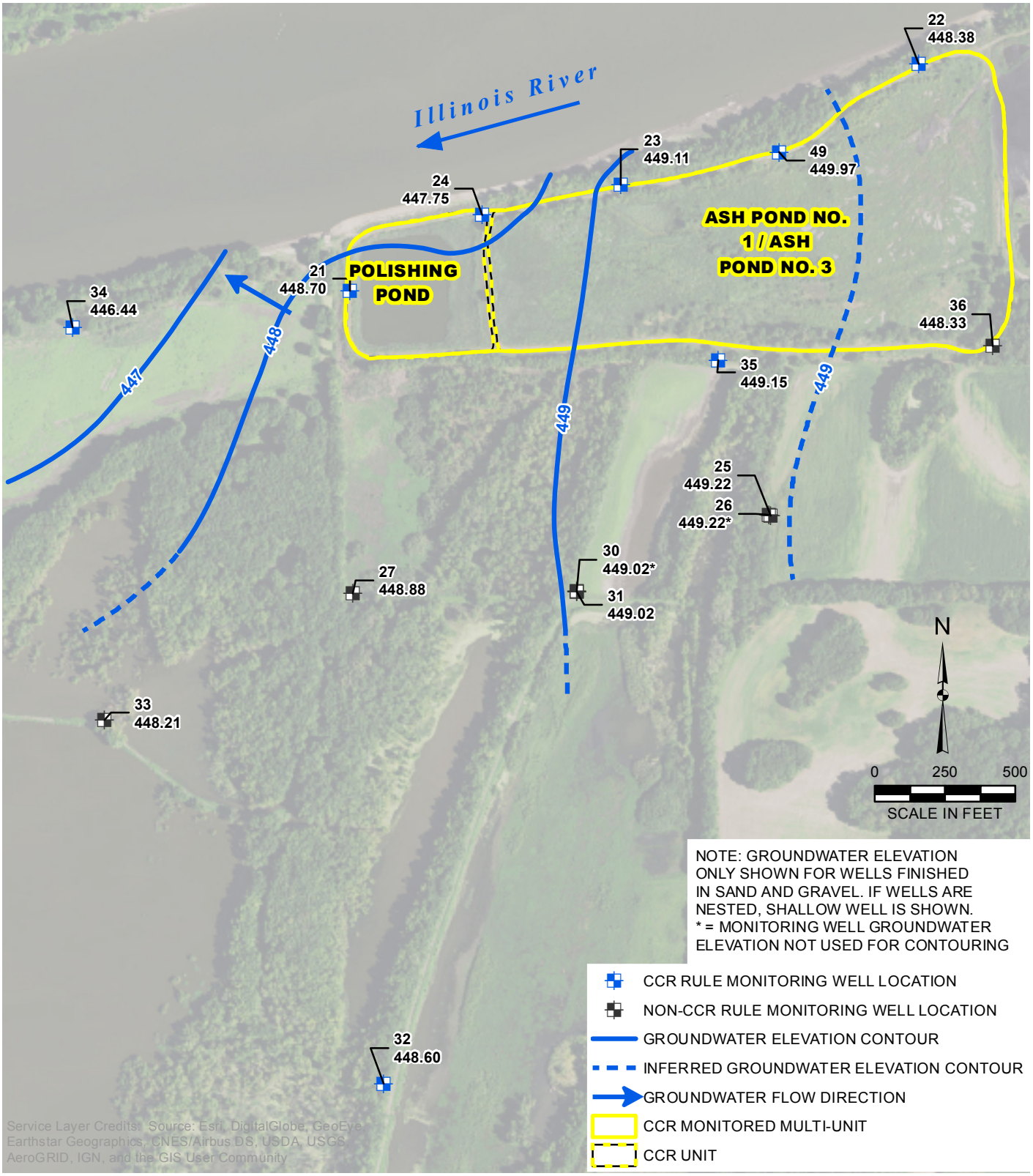
HENNEPIN OLD WEST ASH POND (POND NO.1 AND POND NO. 3) AND HENNEPIN OLD WEST POLISHING POND (UNIT ID: 804) UPPERMOST AQUIFER UNIT GROUNDWATER ELEVATION CONTOUR MAP ROUND 3: JUNE 7, 2016

DYNEGY MIDWEST GENERATION, LLC
HENNEPIN POWER STATION, HENNEPIN, ILLINOIS

PROJECT NO: 2285

FIGURE NO: 1

Natural Resource Technology
AN OBG COMPANY



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HENNEPIN OLD WEST ASH POND (POND NO.1 AND POND NO. 3) AND HENNEPIN OLD WEST POLISHING POND (UNIT ID: 804) UPPERMOST AQUIFER UNIT GROUNDWATER ELEVATION CONTOUR MAP ROUND 4: SEPTEMBER 15, 2016

DYNEGY MIDWEST GENERATION, LLC
HENNEPIN POWER STATION, HENNEPIN, ILLINOIS

PROJECT NO: 2285

FIGURE NO: 1

Natural Resource Technology
AN OBG COMPANY

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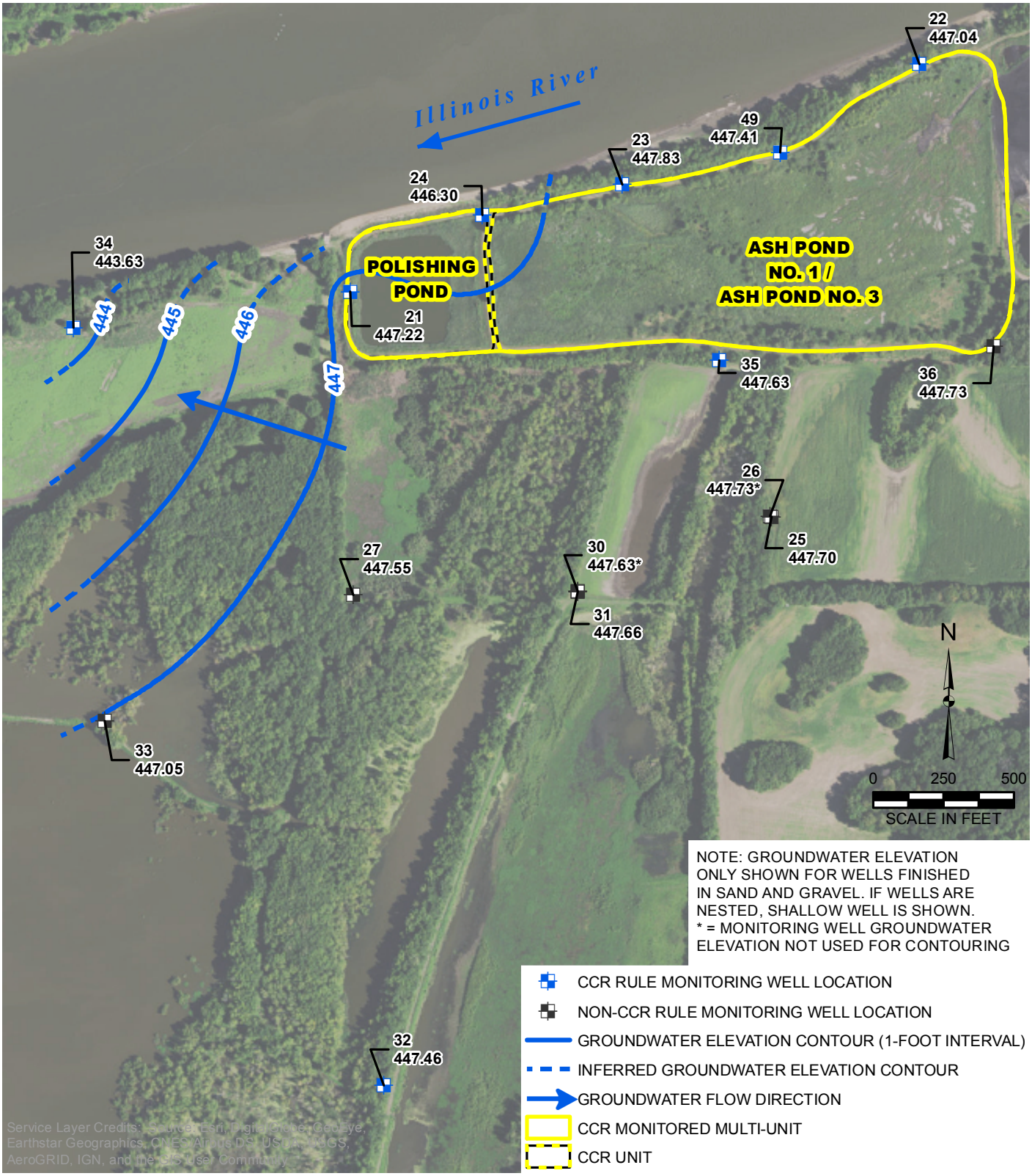

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TBN 3/6/17
APPROVED BY/DATE:
JJW 9/1/17

HENNEPIN OLD WEST ASH POND (POND NO.1 AND POND NO. 3) AND HENNEPIN OLD WEST POLISHING POND (UNIT ID: 804) UPPERMOST AQUIFER UNIT GROUNDWATER ELEVATION CONTOUR MAP ROUND 5: DECEMBER 7, 2016

DYNEGY MIDWEST GENERATION, LLC
HENNEPIN POWER STATION, HENNEPIN, ILLINOIS

PROJECT NO: 2285

FIGURE NO: 1

Natural Resource Technology
AN OBG COMPANY

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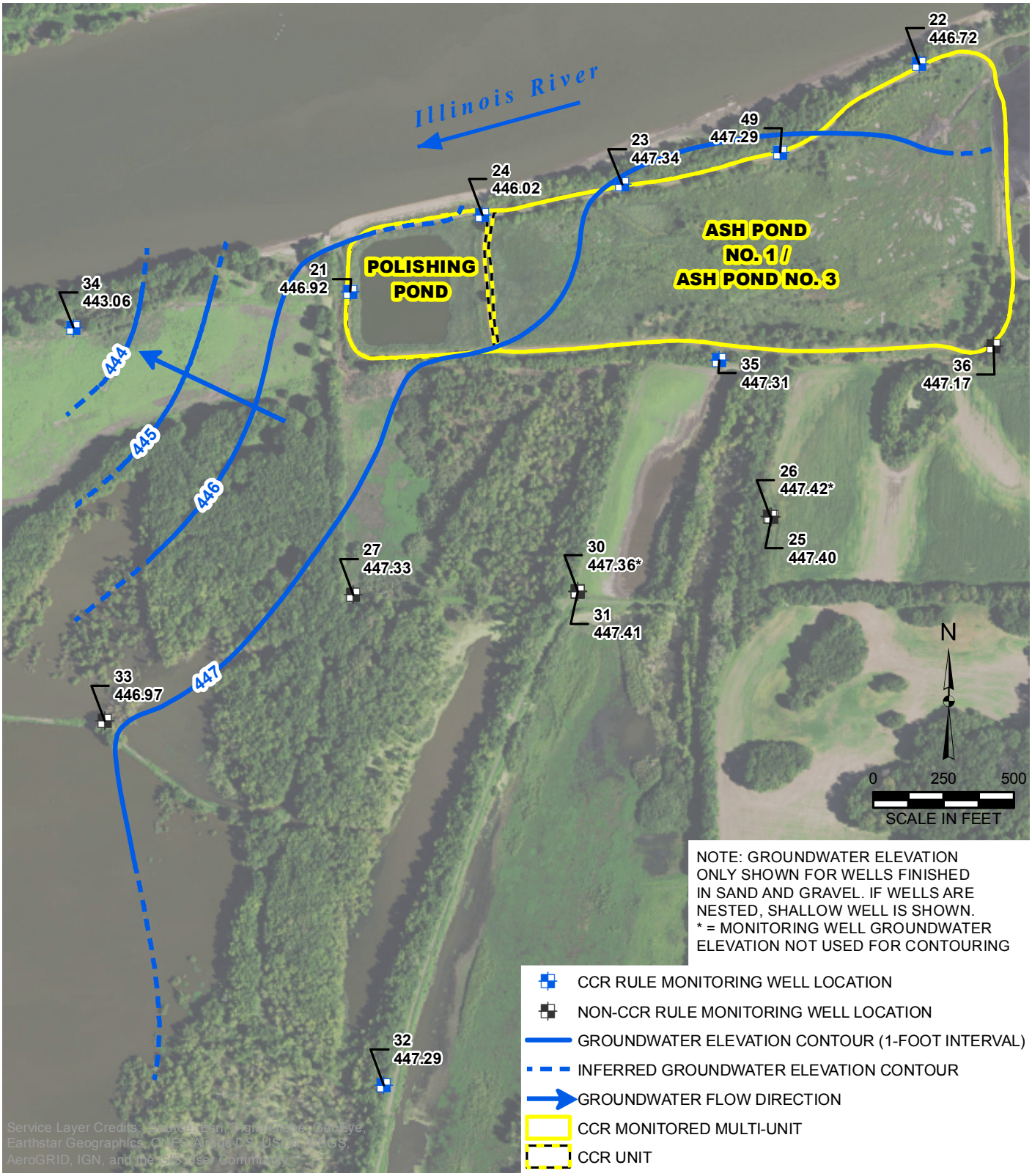

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APPROVED BY/DATE:
JJW 9/1/17

HENNEPIN OLD WEST ASH POND (POND NO.1 AND POND NO. 3) AND HENNEPIN OLD WEST POLISHING POND (UNIT ID: 804)
UPPERMOST AQUIFER UNIT
GROUNDWATER ELEVATION CONTOUR MAP
ROUND 6: FEBRUARY 20, 2017

DYNEGY MIDWEST GENERATION, LLC
HENNEPIN POWER STATION, HENNEPIN, ILLINOIS

PROJECT NO: 2285

FIGURE NO: 1

Natural Resource Technology
AN OBG COMPANY

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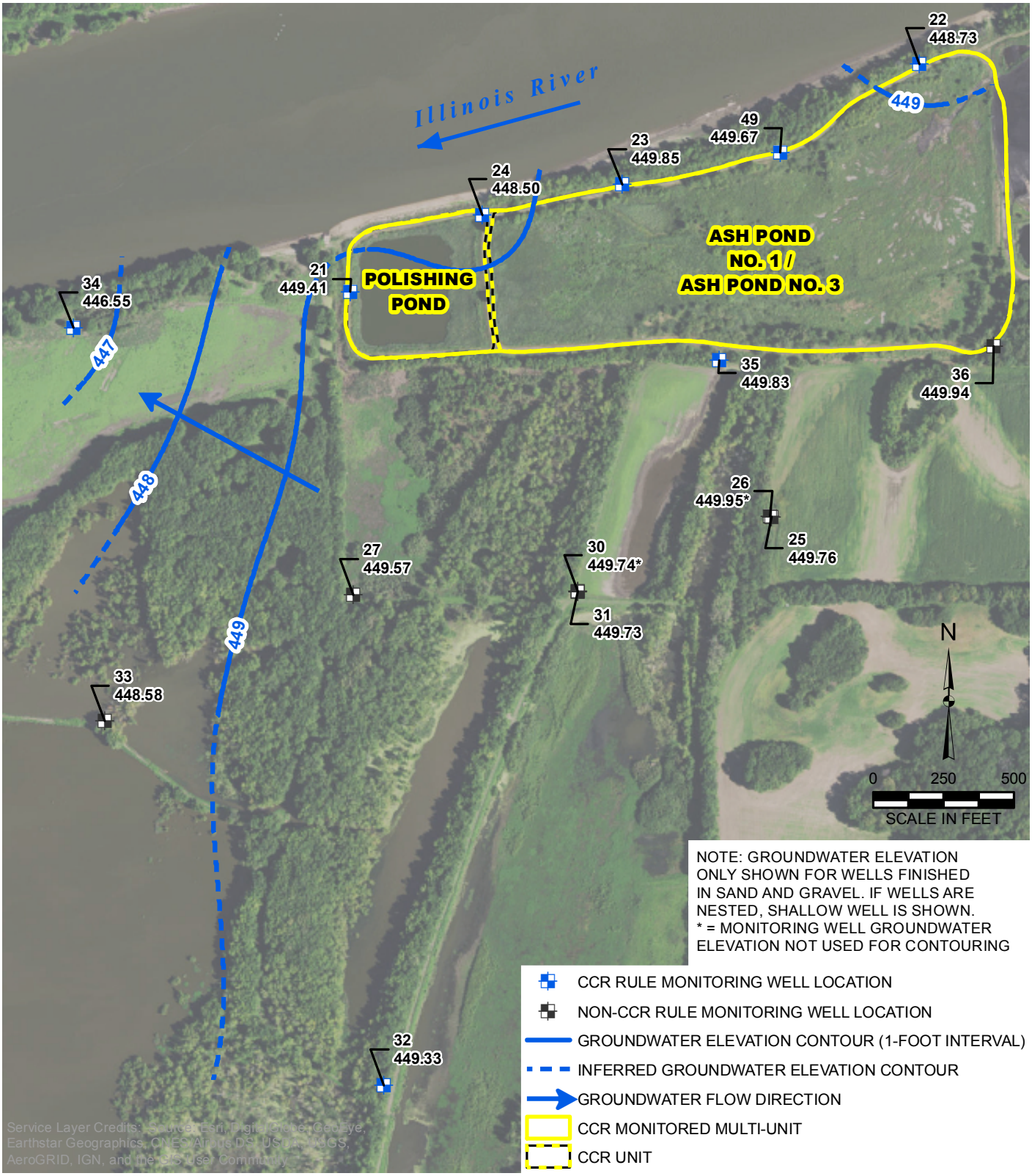

DRAWN BY/DATE:
SDS 6/14/17
REVIEWED BY/DATE:
TBN 6/14/17
APPROVED BY/DATE:
JJW 9/1/17

HENNEPIN OLD WEST ASH POND (POND NO.1 AND POND NO. 3) AND HENNEPIN OLD WEST POLISHING POND (UNIT ID: 804) UPPERMOST AQUIFER UNIT GROUNDWATER ELEVATION CONTOUR MAP ROUND 7: APRIL 25, 2017

DYNEGY MIDWEST GENERATION, LLC
HENNEPIN POWER STATION, HENNEPIN, ILLINOIS

PROJECT NO: 2285

FIGURE NO: 1

Natural Resource Technology
AN OBG COMPANY

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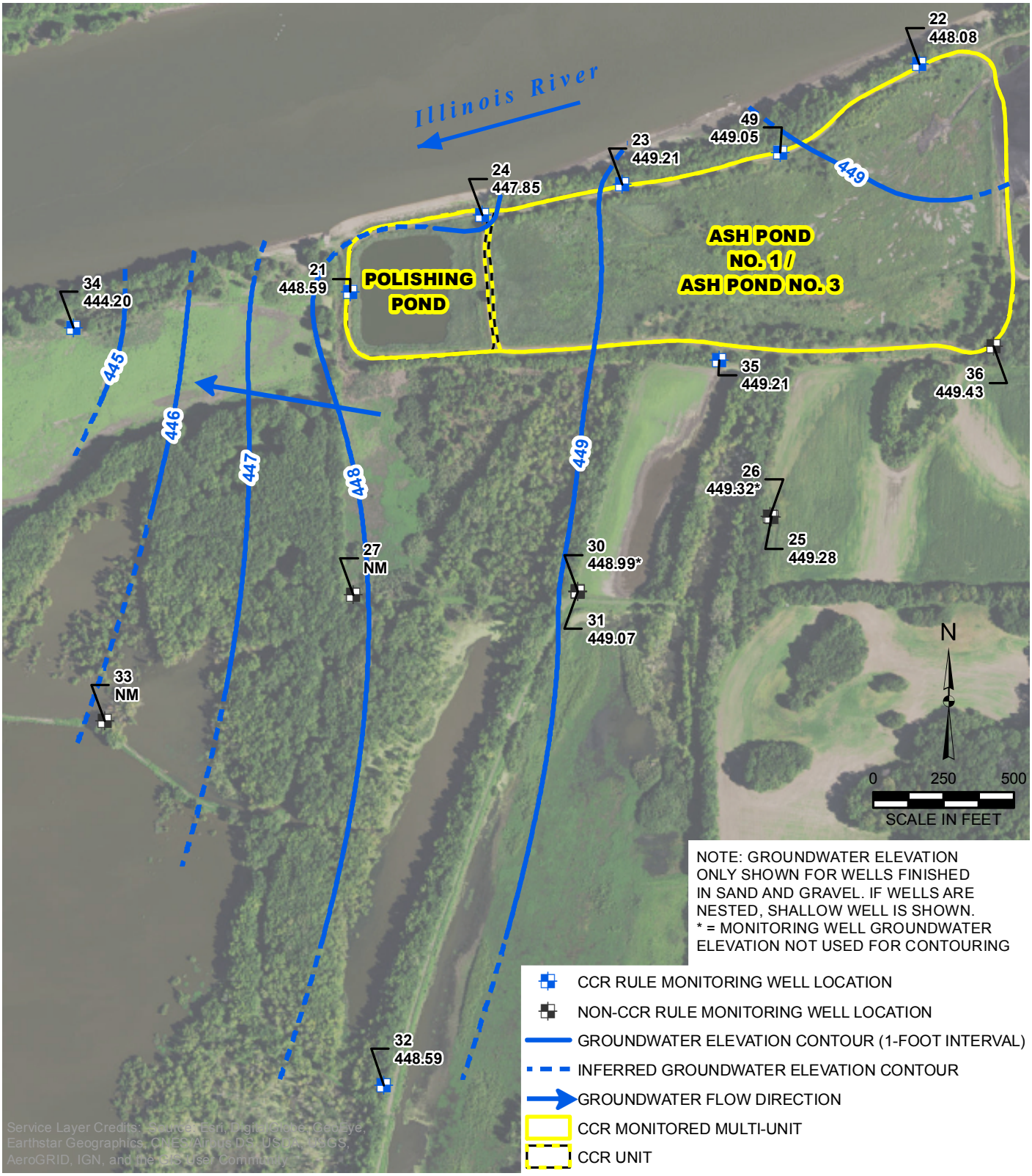

NOTE: GROUNDWATER ELEVATION ONLY SHOWN FOR WELLS FINISHED IN SAND AND GRAVEL. IF WELLS ARE NESTED, SHALLOW WELL IS SHOWN.
* = MONITORING WELL GROUNDWATER ELEVATION NOT USED FOR CONTOURING

- CCR RULE MONITORING WELL LOCATION
- NON-CCR RULE MONITORING WELL LOCATION
- GROUNDWATER ELEVATION CONTOUR (1-FOOT INTERVAL)
- INFERRED GROUNDWATER ELEVATION CONTOUR
- GROUNDWATER FLOW DIRECTION
- CCR MONITORED MULTI-UNIT
- CCR UNIT

DRAWN BY/DATE:
SDS 7/20/17
REVIEWED BY/DATE:
TBN 7/20/17
APPROVED BY/DATE:
JJW 9/1/17

HENNEPIN OLD WEST ASH POND (POND NO.1 AND POND NO. 3) AND HENNEPIN OLD WEST POLISHING POND (UNIT ID: 804) UPPERMOST AQUIFER UNIT GROUNDWATER ELEVATION CONTOUR MAP ROUND 8: JUNE 8, 2017

DYNEGY MIDWEST GENERATION, LLC
HENNEPIN POWER STATION, HENNEPIN, ILLINOIS

PROJECT NO: 2285

FIGURE NO: 1

Natural Resource Technology
AN OBG COMPANY

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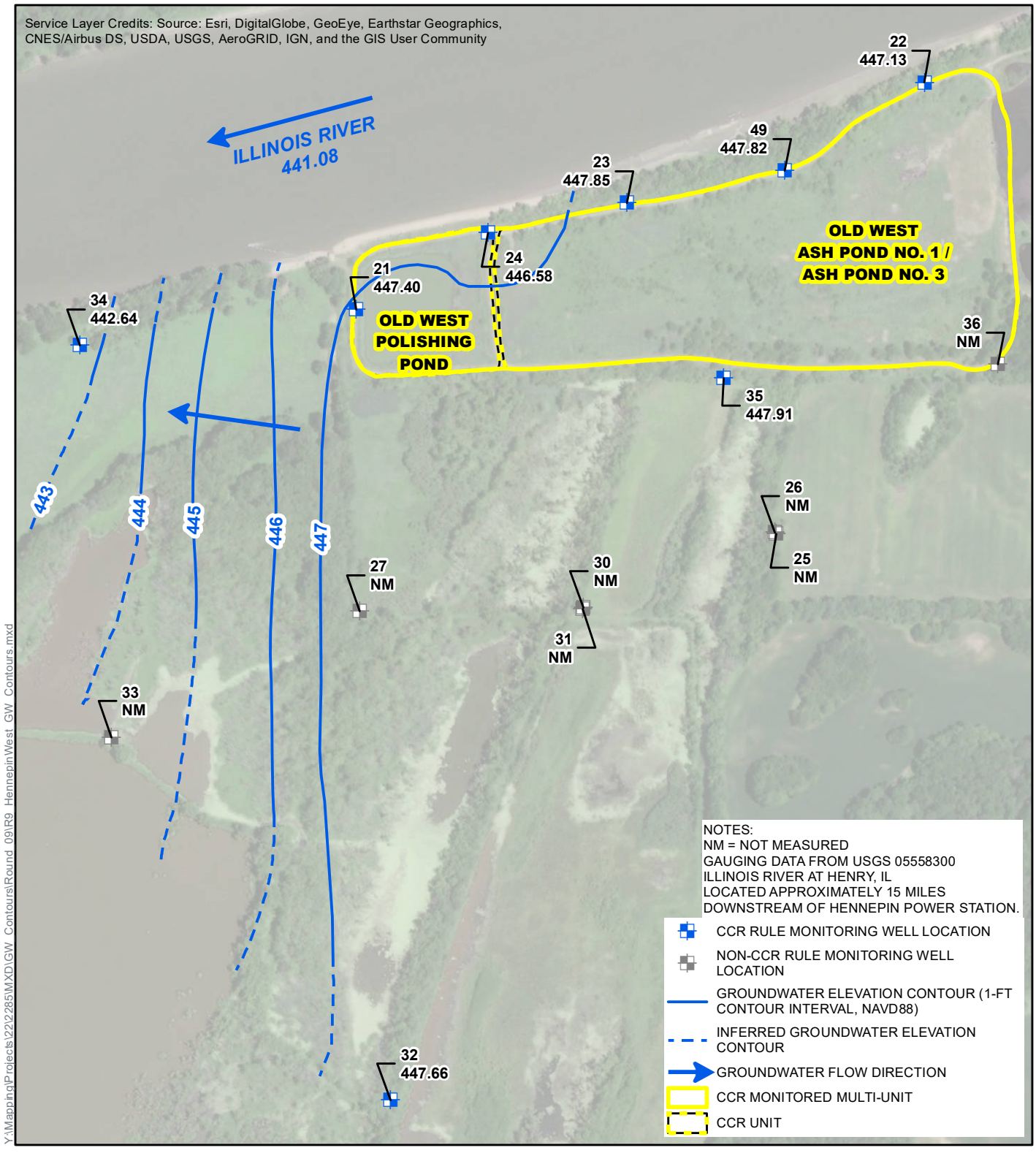


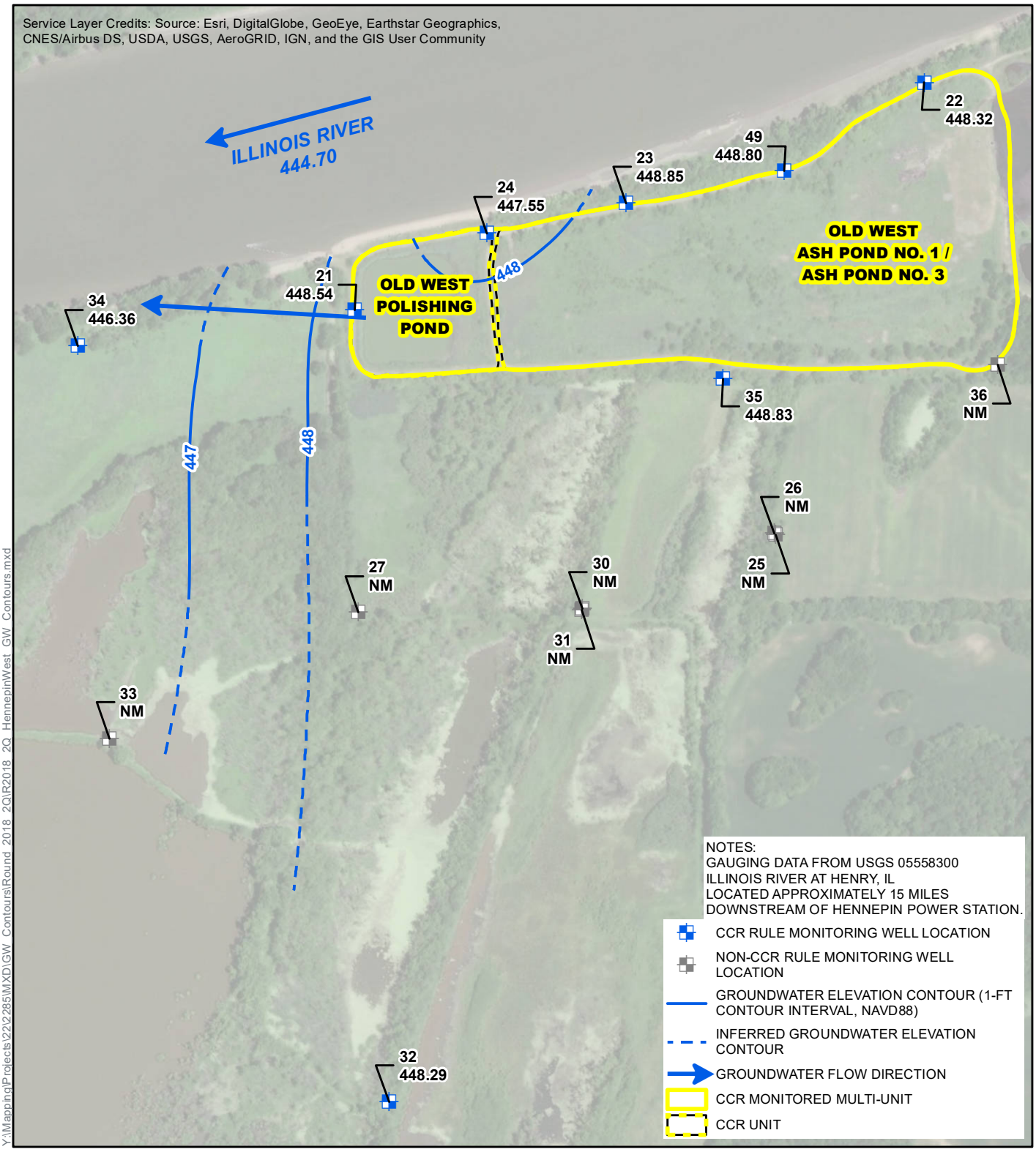
HENNEPIN OLD WEST ASH POND (POND NO.1 AND POND NO. 3) AND HENNEPIN OLD WEST POLISHING POND (UNIT ID: 804)
GROUNDWATER ELEVATION CONTOUR MAP
NOVEMBER 15, 2017

CCR RULE GROUNDWATER MONITORING
HENNEPIN POWER STATION
HENNEPIN, ILLINOIS

0 125 250 500
Feet

N

O'BRIEN & GERE ENGINEERS, INC.



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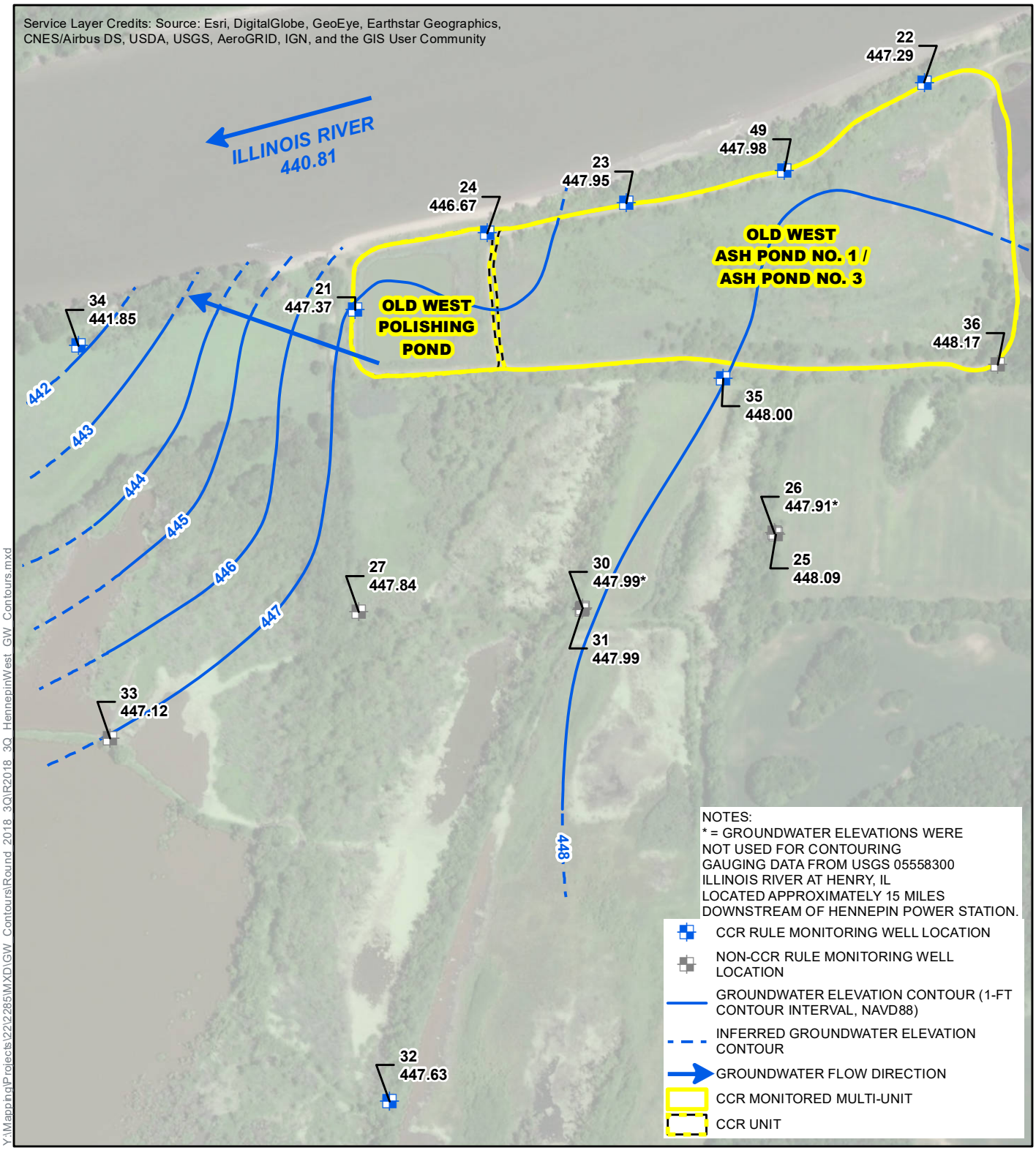
HENNEPIN OLD WEST ASH POND (POND NO.1 AND POND NO. 3) AND HENNEPIN OLD WEST POLISHING POND (UNIT ID: 804)
GROUNDWATER ELEVATION CONTOUR MAP
JUNE 13, 2018

CCR RULE GROUNDWATER MONITORING
HENNEPIN POWER STATION
HENNEPIN, ILLINOIS

0 125 250 500
Feet

N

O'BRIEN & GERE ENGINEERS, INC.



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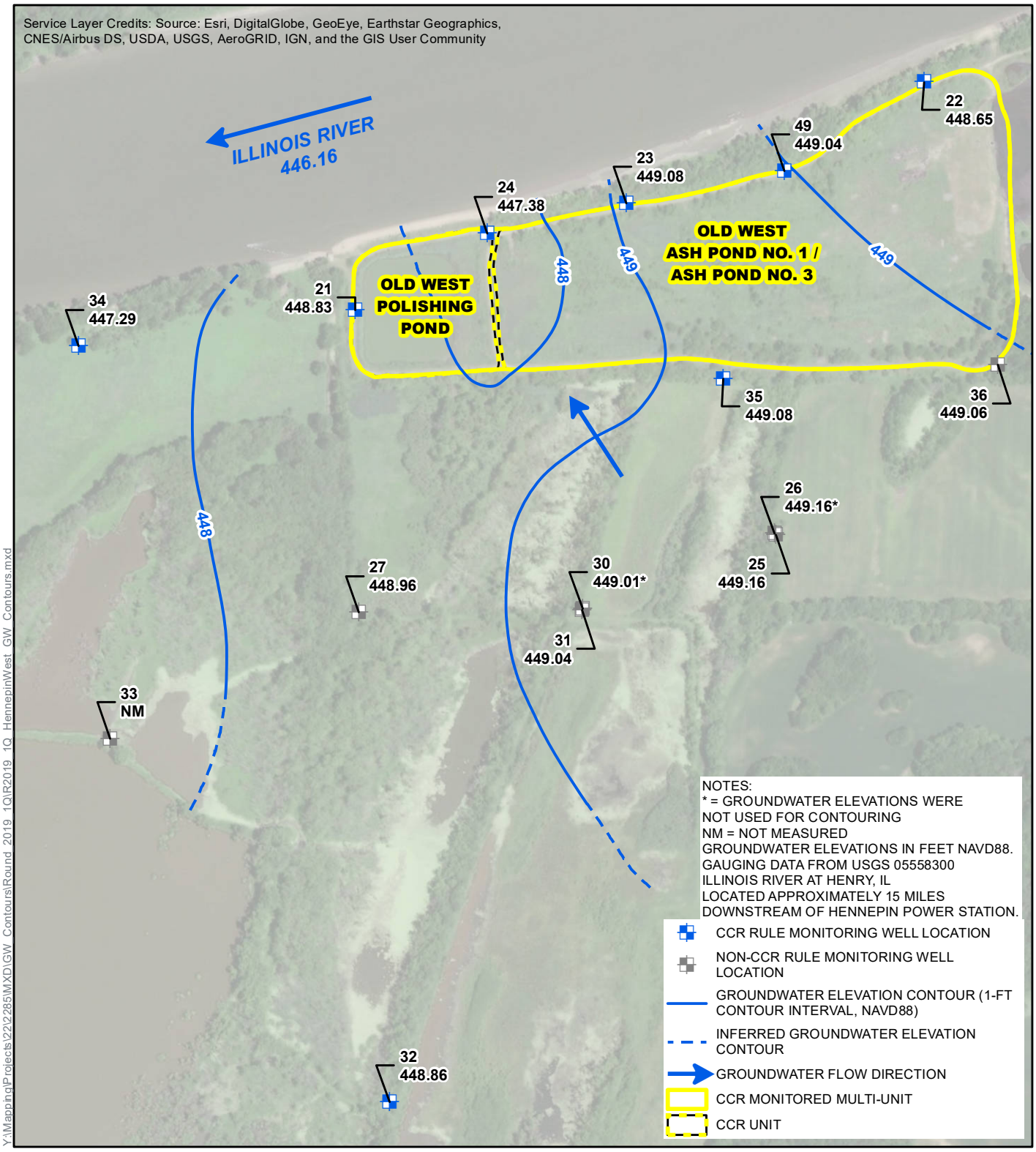
HENNEPIN OLD WEST ASH POND (POND NO.1 AND POND NO. 3) AND HENNEPIN OLD WEST POLISHING POND (UNIT ID: 804)
GROUNDWATER ELEVATION CONTOUR MAP
SEPTEMBER 12, 2018

CCR RULE GROUNDWATER MONITORING
HENNEPIN POWER STATION
HENNEPIN, ILLINOIS

0 125 250 500
Feet

N

O'BRIEN & GERE ENGINEERS, INC.



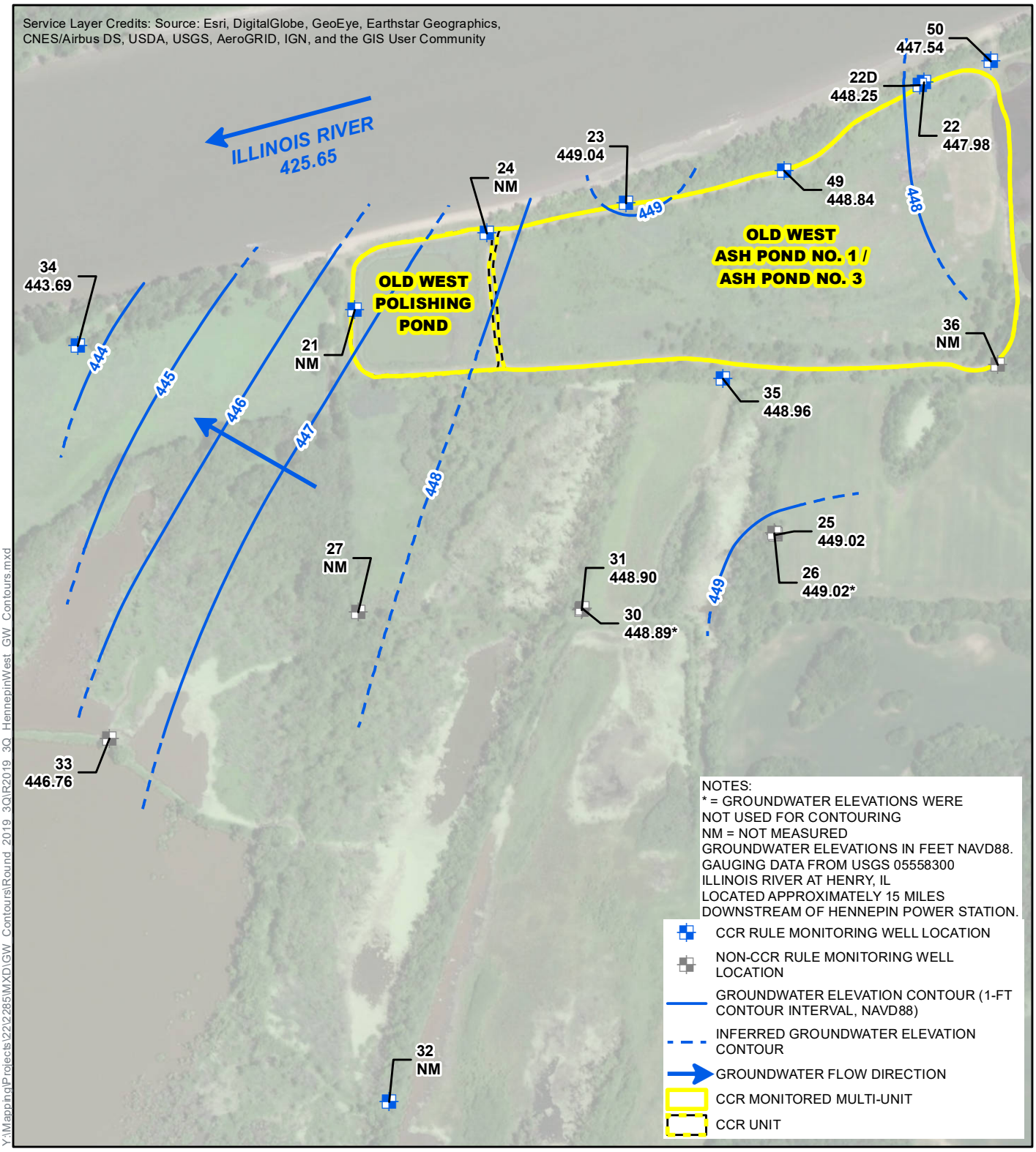
HENNEPIN OLD WEST ASH POND (POND NO.1 AND POND NO. 3) AND HENNEPIN OLD WEST POLISHING POND (UNIT ID: 804)
GROUNDWATER ELEVATION CONTOUR MAP
MARCH 13, 2019

CCR RULE GROUNDWATER MONITORING
HENNEPIN POWER STATION
HENNEPIN, ILLINOIS

0 125 250 500
Feet

N

O'BRIEN & GERE ENGINEERS, INC.



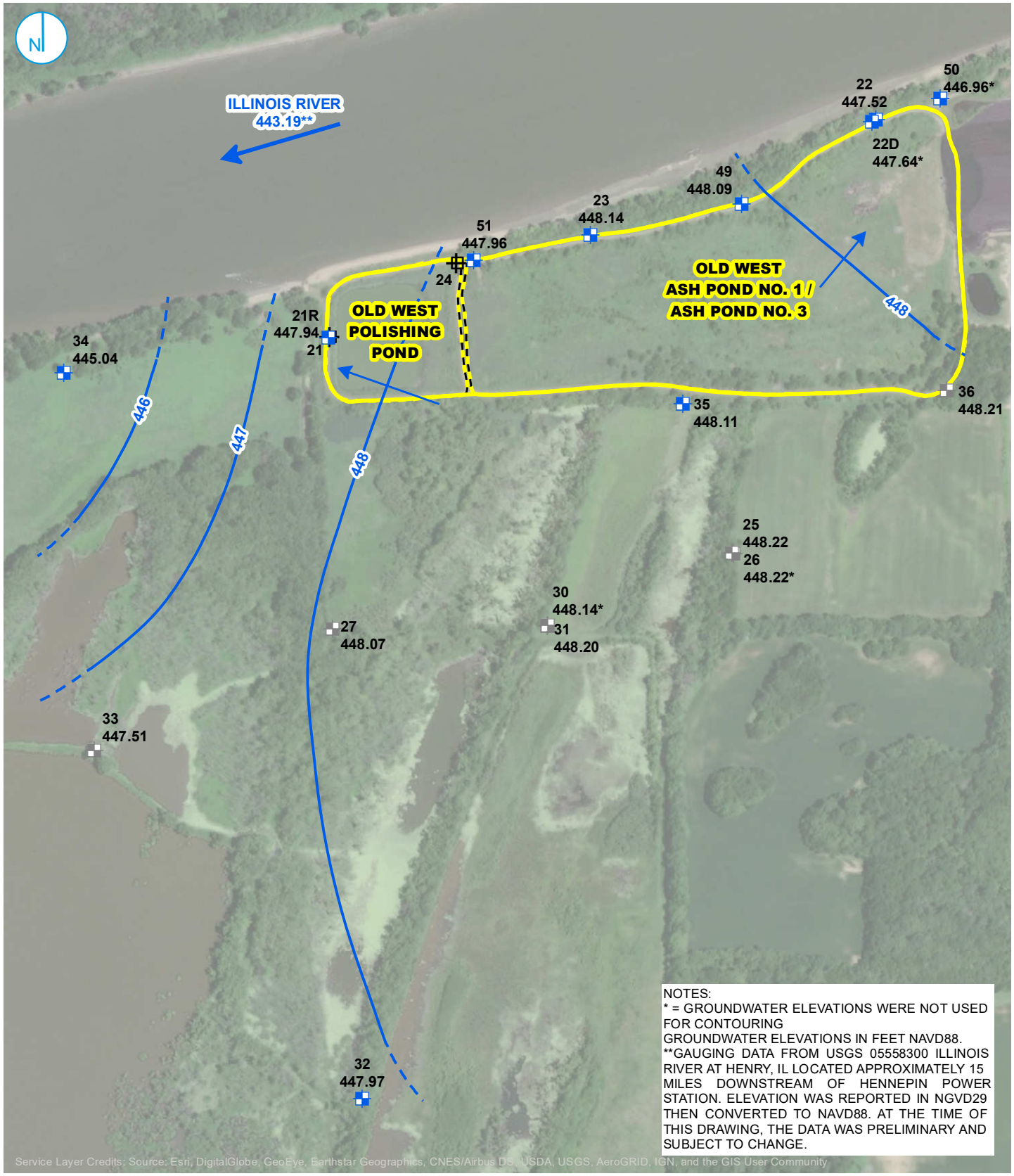
HENNEPIN OLD WEST ASH POND (POND NO.1 AND POND NO. 3) AND HENNEPIN OLD WEST POLISHING POND (UNIT ID: 804)
GROUNDWATER ELEVATION CONTOUR MAP
SEPTEMBER 17, 2019

CCR RULE GROUNDWATER MONITORING
HENNEPIN POWER STATION
HENNEPIN, ILLINOIS

0 125 250 500
Feet

N

O'BRIEN & GERE ENGINEERS, INC.



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PROJECT: 169000XXXX | DATED: 8/27/2020 | DESIGNER: galarnmc

- CCR RULE MONITORING WELL
- NON-CCR RULE MONITORING WELL
- ABANDONED MONITORING WELL
- GROUNDWATER ELEVATION CONTOUR (1-FT CONTOUR INTERVAL, NAVD88)
- INFERRED GROUNDWATER ELEVATION CONTOUR
- GROUNDWATER FLOW DIRECTION
- CCR MONITORED MULTI-UNIT
- CCR MONITORED UNIT

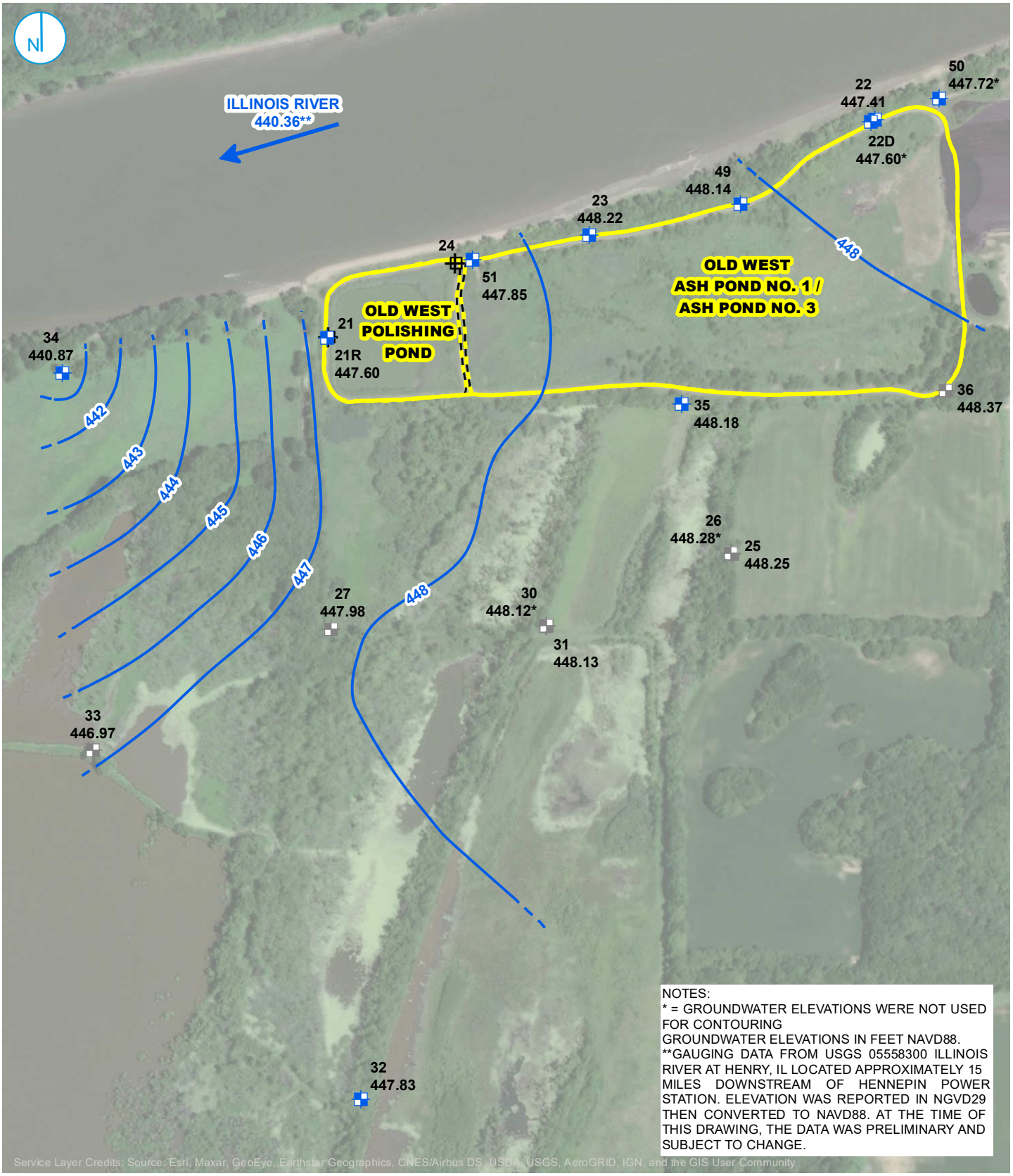
0 250 500 Feet

GROUNDWATER ELEVATION CONTOUR MAP MARCH 11, 2020

HENNEPIN OLD WEST ASH POND (POND NO.1 AND POND NO. 3) AND HENNEPIN OLD WEST POLISHING POND (UNIT ID: 804)
HENNEPIN POWER STATION
HENNEPIN, ILLINOIS

RAMBOLL US CORPORATION
A RAMBOLL COMPANY

RAMBOLL



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PROJECT: 169000XXXX | DATED: 12/16/2020 | DESIGNER: MARRAMJ

- CCR RULE MONITORING WELL
- NON-CCR RULE MONITORING WELL
- ABANDONED MONITORING WELL
- GROUNDWATER ELEVATION CONTOUR (1-FT CONTOUR INTERVAL, NAVD88)
- INFERRED GROUNDWATER ELEVATION CONTOUR
- GROUNDWATER FLOW DIRECTION
- CCR MONITORED MULTI-UNIT
- CCR MONITORED UNIT

0 250 500 Feet

GROUNDWATER ELEVATION CONTOUR MAP
SEPTEMBER 2, 2020

HENNEPIN OLD WEST ASH POND (POND NO.1 AND POND NO. 3) AND HENNEPIN OLD WEST POLISHING POND (UNIT ID: 804)
HENNEPIN POWER STATION
HENNEPIN, ILLINOIS

RAMBOLL US CORPORATION
A RAMBOLL COMPANY

RAMBOLL

- BACKGROUND WELL
- COMPLIANCE WELL
- MONITORING WELL
- GROUNDWATER ELEVATION CONTOUR (1 FT CONTOUR INTERVAL, NAVD88)
- INFERRED GROUNDWATER ELEVATION CONTOUR
- GROUNDWATER FLOW DIRECTION
- PART 257 REGULATED UNIT (SUBJECT UNIT)
- LIMITS OF FINAL COVER
- PROPERTY BOUNDARY

NOTES:

1.ELEVATIONS IN PARENTHESES WERE NOT USED FOR CONTOURING.

2. ELEVATION CONTOURS SHOWN IN FEET, NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88)

*ILLINOIS RIVER ELEVATION OBTAINED FROM STAFF GAGE SG02, LOCATED AT THE HENNEPIN POWER PLANT

0 200 400 Feet

POTENTIOMETRIC SURFACE MAP MARCH 17, 2021

2021 ANNUAL GROUNDWATER MONITORING AND CORRECTIVE ACTION REPORT
OLD WEST ASH POND
HENNEPIN POWER PLANT
HENNEPIN, ILLINOIS

RAMBOLL AMERICAS ENGINEERING SOLUTIONS, INC.

RAMBOLL

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PROJECT: 169000XXXX | DATED: 3/25/2022 | DESIGNER: galammc

- BACKGROUND WELL
- COMPLIANCE WELL
- MONITORING WELL
- GROUNDWATER ELEVATION CONTOUR (1 FT CONTOUR INTERVAL, NAVD88)
- INFERRED GROUNDWATER ELEVATION CONTOUR
- GROUNDWATER FLOW ARROW
- PART 257 REGULATED UNIT (SUBJECT UNIT)
- LIMITS OF FINAL COVER
- PROPERTY BOUNDARY

NOTES:

1.ELEVATIONS IN PARENTHESES WERE NOT USED FOR CONTOURING.

2. ELEVATION CONTOURS SHOWN IN FEET, NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88)

0 200 400 Feet

POTENTIOMETRIC SURFACE MAP SEPTEMBER 8, 2021

2021 ANNUAL GROUNDWATER MONITORING AND CORRECTIVE ACTION REPORT
OLD WEST ASH POND
HENNEPIN POWER PLANT
HENNEPIN, ILLINOIS

RAMBOLL AMERICAS
ENGINEERING SOLUTIONS, INC.

RAMBOLL

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PROJECT: 169000XXXX | DATED: 3/25/2022 | DESIGNER: galammc

Attachment 7

October 23, 2025

Joshua Rhoades
Illinois Environmental Protection Agency
2520 West Iles Avenue
Springfield, IL 62794

Re: Hennepin Power Plant Old West Ash Pond No. 1 and No.3 - Old West Ash Polishing Pond, Ash Pond No. 2 and No. 4, and East Ash Pond; W1550100002-01, W1550100002-03, W1550100002-04, W1550100002-07, and W1550100002-05
Comments on Statistical Methods Proposed in Initial Operating Permit Application

Ms. Mullenax:

Illinois Power Generating Company (IPGC) received the Hennepin Power Plant CCR Surface Impoundment Operating and Construction Permit Application Review Letter dated October 11, 2023. We submitted the responses to Illinois Environmental Protection Agency's (IEPA's) initial comments dated August 9, 2024, with data and information that was reasonably and readily available. An additional letter was received by IPGC on December 28, 2023, regarding the statistical methods proposed in the Statistical Analysis Plan. The Statistical Analysis Plan was submitted as Attachment A to the Groundwater Monitoring Plan, included as Attachment I to the Hennepin Power Plant CCR Surface Impoundment Operating and Construction Permit Application. We submit the below responses to IEPA. The content of these responses was previously discussed with IEPA personnel in a meeting held May 2, 2024.

Comment 1a: *The statistical methods must define the following in order to review the statistical plan in accordance with Illinois EPA Quality Management Plan (A17-001), Guidance on Assessing Quality Systems (EPA QA/G-3), Data Quality Assessment: Statistical Methods for Practitioners EPA QA/G-9S, Data Quality Assessment: A Reviewer's Guide EPA QA/G-9R and/or Guidance on Environmental Data Verification and Data Validation (EPA QA/G-8):*

a. The software program that is being used for statistical evaluation must be identified. If the software program is proprietary, software validation must be performed, documents, and signed off by at least the software validation draftee, senior reviewer, and project manager/quality manager. (EPA QA/G-3)

i. Software validation packages must include at least a known data set, empirical evaluation including formulas to prove the validity of the software, and outputs from both the software and the empirical calculations exhibiting that the software is producing the same output as the empirical evaluation. (EPA QA/G-3)

Response: All of the statistical results used in exceedance determinations were calculated using R. R is an open-source programming language with a strong focus on

statistical analysis and is used by both the United States Environmental Protection Agency (USEPA)[1] and United States Geological Survey (USGS)[2] in various applications. The statistical calculations used to determine exceedances are described in detail in the Statistical Analysis Plan submitted as Attachment A to the Groundwater Monitoring Plan. Each analysis described in that plan is associated with calculations done in R according to equations presented in USEPA's Unified Guidance (USEPA 2009)[3]. Table 1 identifies R functions used for these calculations, the package that is the source of the function, and the alpha associated with a statistically significant result (if applicable).

Two functions used are from the EnvStats[4] package. This package is widely used, including in USGS recommendations for statistical analyses[5]. Two functions are not from a published package: the code used to compute the Kaplan-Meier adjusted mean and standard deviation, and the code used to calculate the confidence band around the Thiel-Sen trend line. The code used to calculate the Kaplan-Meier adjusted mean and standard deviation are directly based on the equations presented in the USEPA 2009, Chapter 15, Section 15.3. The code used to calculate the confidence band around the Thiel-Sen trend line is derived from Appendix C.3.2 of USEPA 2009.

These functions are used to calculate aspects of background (upper tolerance limit) and compliance (confidence interval) statistics, respectively. Figure 1 and Figure 2 present flow charts to clarify how the upper tolerance limit and confidence interval calculations, respectively, are performed. The outcomes of the statistical evaluates are provided quarterly to IEPA as part of the detection of exceedances of the GWPSs.

Comment 1b:

b. All input data sets for each constituent must be provide in a table in accordance with SW-846 chapter 1, incorporated by reference in 35 IAC 845. Chapter 1 of SW846 states that regulatory decisions must be made with environmental data.

i. All data sets, used for statistical analysis, must be within the last eight consecutive quarterly sampling events in order to validate the statistical methods for recent activity (35 IAC 845.650(b)).

---

[1] Examples include Tools for Automated Data Analysis (https://www.epa.gov/waterdata/TADA) and Causal Analysis/Diagnosis Decision Information System (https://www.epa.gov/caddis/download-r-scripts-and-sample-data).

[2] Examples include the many projects and tutorials listed here: https://waterdata.usgs.gov/blog/tags/r/.

[3] USEPA. 2009. Statistical Analysis of Groundwater Monitoring Data at RCRA Facilities: Unified Guidance. EPA 530-R-09-007.

[4] Documented in Millard, S.P. 2013. EnvStats: An R Package for Environmental Statistics. Springer, ISBN 978-1-4614-8455-4

[5] Helsel, D.R., Hirsch, R.M., Ryberg, K.R., Archfield, S.A., and Gilroy, E.J., 2020, Statistical methods in water resources: U.S. Geological Survey Techniques and Methods, book 4, chap. A3, https://doi.org/10.3133/tm4a3.

Response: Title 35 of the Illinois Administrative Code (35 I.A.C.) § 845.650(b)(A) specifies that exceedance evaluations must use a *minimum* of eight independent samples for each background and downgradient well. There are several statistical advantages to using larger sample sizes. In general, a minimum of eight samples is required to adequately characterize the statistical features of the data, but statistical evaluations uniformly benefit from larger sample sizes (USEPA 2009, 5-3). Larger sample sizes increase the power of statistical tests (USEPA 2009, p. 3-21). Appropriate use of parametric statistics also typically gives greater statistical power and predictive ability. Parametric statistics can only be used if the data are normally distributed, or if they can be transformed to achieve normality. Data with larger sample sizes are more likely to approximate a normal distribution (the Central Limit Theorem; see USEPA 2009, p. 3-16). A test with greater statistical power "translates into a greater probability of identifying contaminated groundwater when it really exists," (USEPA 2009, p. 3-18). For these reasons, it is appropriate to use all representative data when calculating background and compliance statistics.

1. *If an impoundment is considered closed by the Agency, the data sets must be used from the eight consecutive quarters after closure or most recent eight consecutive quarters.*

Response: Once a unit has been closed, the data collected downgradient of the unit may represent a distinct population of data if the unit, prior to closure, affected downgradient groundwater quality. In these cases, post-closure data would be used in exceedance evaluations.

Comment 1c:

c. Illinois Power Generating Company (Illinois Power) must provide the laboratory reports or EDD to validate the data input sets are accurate and follow 845.640(i) and 845.640(j).

Response: IEPA has received the electronic data deliverables associated with all data used in statistical calculations, including those for data collected prior to the promulgation of 35 I.A.C. § 845, as part of previous responses to operating permit application comments.

Comment 1d:

d. Illinois Power must identify the assumptions being used to analyze the data sets and any other methods. (EPA QA/G-9S).

Response: The assumptions being used in analyzing the data sets is described in the Statistical Analysis Plan and are summarized below.

Statistical Independence – The primary means of ensuring statistical independence of groundwater samples is allowing sufficient time to elapse between sampling events to ensure that different volumes of groundwater are being sampled. However, the sampling schedules specified in 35 I.A.C. § 845.650(b) conflict with

the ability to collect independent samples, and instead represents a successive sampling design.

The testing strategy presented in the Statistical Analysis Plan based on guidance in USEPA 2009 accounts for a lack of statistical independence that may be inherent in frequent sampling programs: "Tests constructed in this way at each successive evaluation period will not be statistically independent; instead, the proposed testing strategy falls into the realm of sequential analysis," (USEPA 2009, p. 7-14).

Lack of outliers: Rigorous data validation and review is used in lieu of formal outlier testing to ensure that all data used in statistical evaluations is representative of field conditions. Quality control/quality assurance data are collected and data validation is completed in accordance with the Quality Assurance Project Plan. Project staff familiar with the site and historical data review the data generated each quarter and facilitate additional validation as needed. Exclusion of potential outliers may be considered only for data and that could cause extremely elevated background concentrations (see response to Comment 1f).

Stationarity: Groundwater data would fulfill the assumption of stationarity if measurements are consistent over both time and space. Statistical analyses of trend are used to evaluate the assumption that groundwater quality values (i.e., constituent means) are stationary over time. A 99% confidence Mann-Kendall test was used to perform the trend analysis. For the calculation of upper tolerance limits (*i.e.*, background evaluation), if any data set exhibited a statistically significant trend, each scenario was investigated case-by-case. For the calculation of confidence intervals (*i.e.*, compliance evaluation), if any data exhibited a statistically significant trend, the confidence level around either the least squares linear regression line (when residuals of that regression met the assumption of data normality; see below) or the Thiel-Sen trend line (when residuals of the least squared linear regression did not meet the assumption of data normality) was calculated. Changes in concentrations over time may also be evaluated by analysis of variance tests. Although spatial variability may occur, it cannot be addressed by using intra-well comparisons (as recommended in USEPA 2009) due to an absence of groundwater data prior to unit operation.

Data normality: Data and log-transformed data is tested for normality using a 99% confidence Shapiro-Wilk test as recommended in the Unified Guidance: "If the normal distribution is rejected by a goodness-of-fit test, one should generally test the normality of the logged data, in order to check for lognormality of the original observations. If this test also fails, one can […] use a non-parametric technique," (USEPA 2009, p. 10-9). In cases where neither the data nor log-transformed data meet the normal distribution, a non-parametric technique is used (see response to Comment 1g).

Comment 1e:

e. Illinois Power must identify the non-detects within the data set. Illinois Power must review the statistical methods guidance for appropriate use of non-detects in the statistical methods provided and provide a detailed explanation of the rationale including empirical formulas for examples of the implementation of the statistical methods. (EPA QA/G-9S).

Response: Non-detect data processing is described in the Statistical Analysis Plan, submitted as Attachment A to the Groundwater Monitoring Plan, and is summarized below.

The treatment of non-detects is based on the percent of non-detected data relative to the total number of results. If the frequency of non-detect data is less than or equal to 15%, half of the reporting limit is substituted for these data. If the non-detect frequency is greater than 15% and less than or equal to 50% and the data are normally or log-normally distributed, the Kaplan-Meier is used to estimate the mean and standard deviation adjusted for the presence of left-censored values. If the non-detect frequency is greater than 15% and data cannot be normalized, or the non-detect frequency is greater than 50%, a non-parametric test is used. This is consistent with USEPA 2009 Section 15.6.

Comment 1f:

f. The Agency's position on outliers is that verified data from a NELAP certified laboratory is representative of the aquifer properties analyzed. Outliers cannot be evaluated for exclusion from any dataset without explicit data validation identifying discrepancies from the laboratory and/or field procedures that would qualify a data point to be considered an outlier. Illinois Power must use the USEPA data validation procedures to determine when or if a data point is to be excluded from a data set. (EPA QA/G-8).

Response: No data were excluded from any Hennepin data set. Data are not excluded from the compliance well data set solely on the basis of being statistical outliers. The only circumstance in which a data point may be excluded without specific field or laboratory quality evidence that it is not representative of actual field conditions are rare, extreme cases in which a high outlier disproportionately affects the distribution of the background data and evaluation of background concentrations (USEPA 2009, p. 5-5). The exclusion of extremely elevated background data, even when no cause of the extreme observation in known, is a conservative measure intended to be protective of downgradient groundwater. This data would be retained in the database and in data presentation but would be marked as inappropriate for inclusion in statistical analysis.

TABLES

Table 1. R functions used in statistical calculations

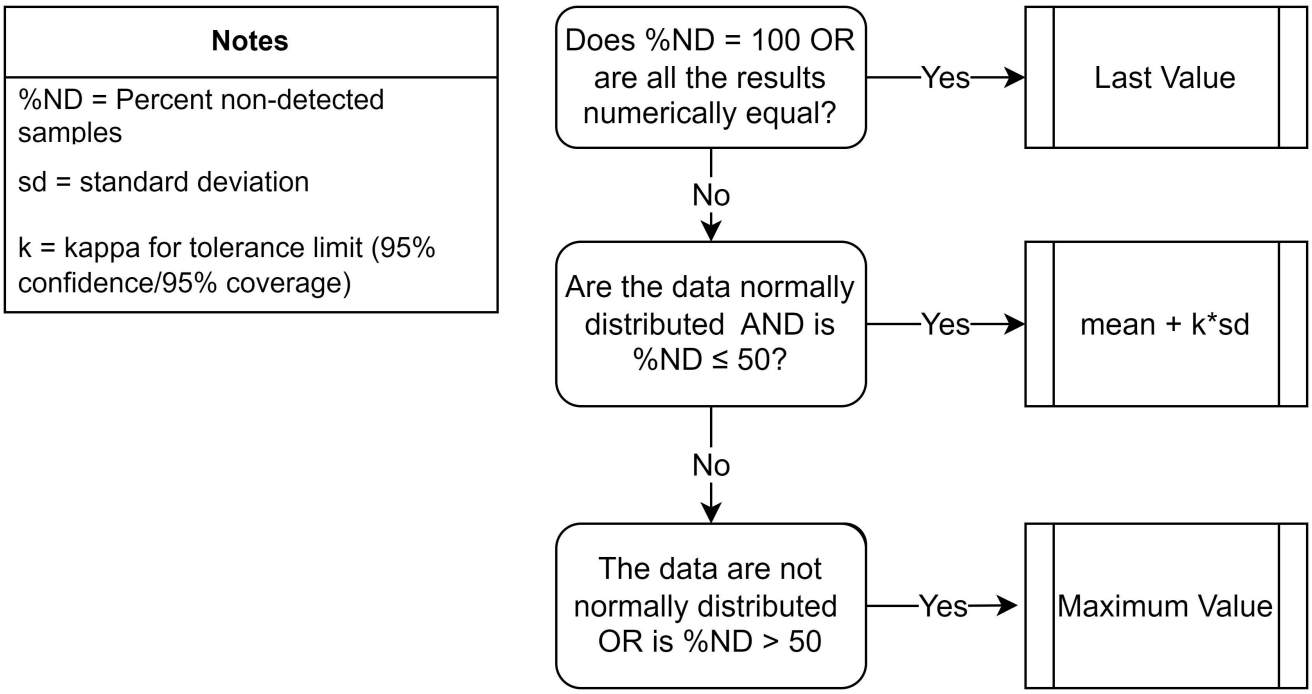
Response to Comments on Statistical Methods Proposed in Initial Operating Permit Application

Hennepin Power Plant

Hennepin, Illinois

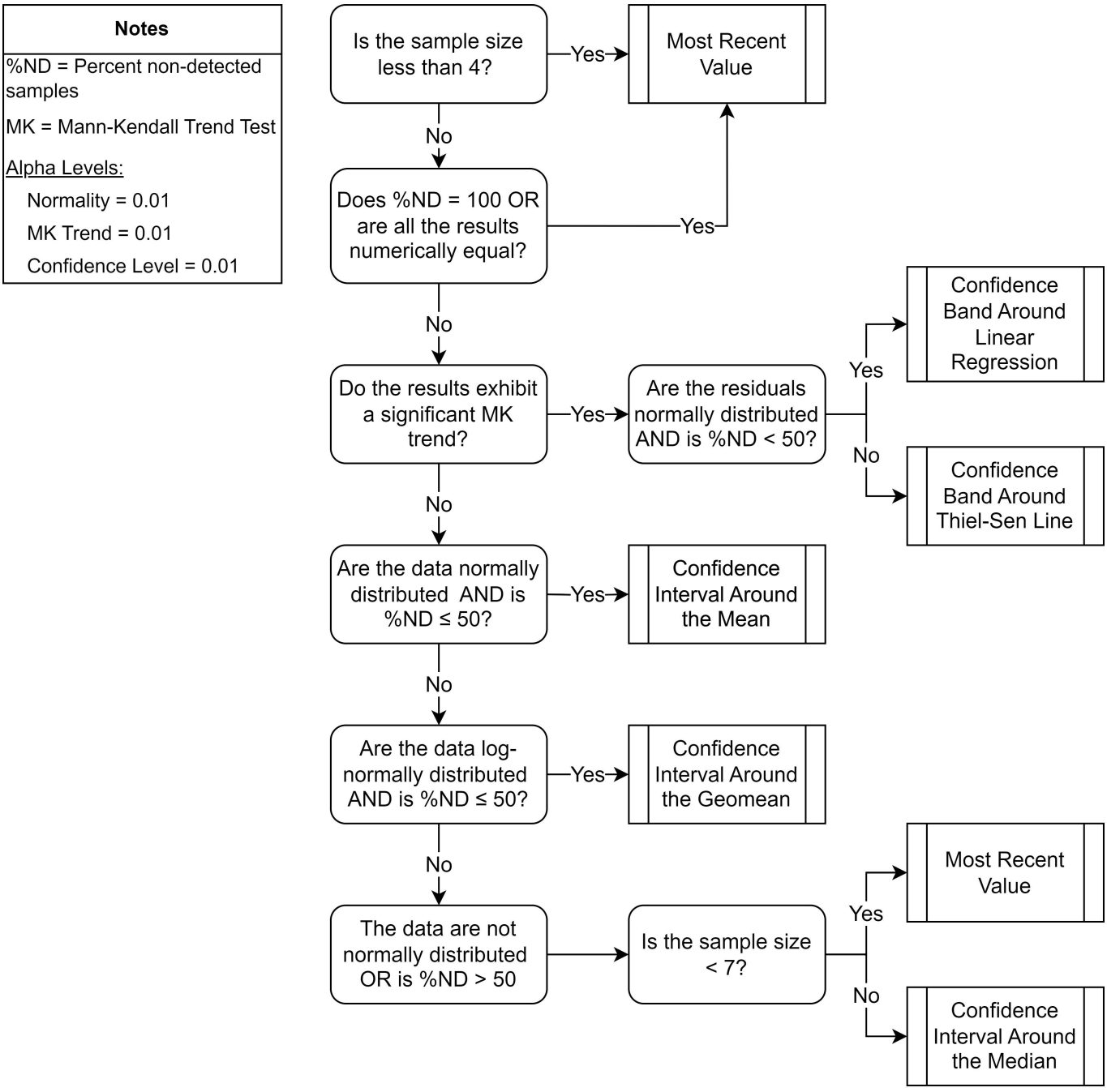
Calculation	Function	Alpha	Source	Notes
Mean	mean()	NA	Base R	
Median	median()	NA	Base R	
Log transformtion	log()	NA	Base R	
Exponentiation	exp()	NA	Base R	Used to back-transform results from calculations on log()-transformed data
Standard deviation	sd()	NA	Base R	
Normality test	shapiro.test()	0.01	Base R	
Least-squared linear regression	lm()	0.01	Base R	
Confidence band around linear regression	predict()	0.01	Base R	
t statistic	qt()	0.01	Base R	Used to determine multiplier for the standard deviation when calculating the confidence interval around a mean or geometric mean
Quantile function	qnorm()	0.01	Base R	Used to determine the rank for the confidence interval around a median
Tolerance interval k	tolIntNormK()	0.05	EnvStats	Used to determine the multiplier for the standard deviation when calculating the 95% confidence/95% coverage tolerance interval around a mean or geometric mean
Mann-Kendall trend test	kendallTrendTest()	0.01	EnvStats	

FIGURES



Statistical Methodology for Determination of Upper Tolerance Limits
Response to Comments on Statistical Methods Proposed in Initial Operating Permit Application
Hennepin Power Plant
Hennepin, Illinois

Figure 1



Statistical Methodology for Determination of Confidence Intervals
Response to Comments on Statistical Methods Proposed in Initial Operating Permit Application
Hennepin Power Plant
Hennepin, Illinois

Figure 2

ATTACHMENT A
USEPA Validation of Unified Guidance

Alison O'Connor

From: Behan, Frank <Behan.Frank@epa.gov>
Sent: Tuesday, February 11, 2025 10:21 AM
To: Alison O'Connor
Cc: Holt, Taylor; Lloyd, Michelle
Subject: RE: Unified Guidance and the CCR Rule

Good morning Alison,

The requirements for a statistical analysis plan are found in 40 CFR § 257.93. The "Unified Guidance Document: Statistical Analysis of Groundwater Monitoring Data at RCRA Facilities" (March 2009, EPA 530/R-09-007) ("Unified Guidance") contains relevant information about statistical methods and their application to groundwater data, which may be helpful in developing a plan. While the Unified Guidance has been archived on EPA's website, that is not an indication that the document should not be used as a reference.

Regards,

Frank Behan
Office of Resource Conservation and Recovery
U.S. Environmental Protection Agency
(202) 566-0531

From: Alison O'Connor <AOCONNOR@ramboll.com>
Sent: Tuesday, January 14, 2025 4:59 PM
To: Lloyd, Michelle <Lloyd.Michelle@epa.gov>
Cc: Behan, Frank <Behan.Frank@epa.gov>; Holt, Taylor <Holt.Taylor@epa.gov>
Subject: RE: Unified Guidance and the CCR Rule

Caution: This email originated from outside EPA, please exercise additional caution when deciding whether to open attachments or click on provided links.

Hi Michelle,

I just wanted to follow up on the email below. Thank you!

Best,
Alison

Alison O'Connor (she/her)

Senior Lead Consultant, Geochemist & Data Scientist

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From: Alison O'Connor
Sent: Tuesday, October 22, 2024 9:43 AM
To: lloyd.michelle@epa.gov
Subject: Unified Guidance and the CCR Rule

Hi Michelle,

I attended USEPA's May 30th webinar hosted by the Utility Solid Waste Activities Group (USWAG) on the final legacy/CCRMU rule – thank you so much for all the helpful information! It was noted during the webinar that US EPA would provide responses to the questions submitted prior to the webinar, which we appreciate. I'd like to ask for a very short written response from US EPA on the submitted question below – hopefully much simpler than a lot of the questions folks have 😊.

The Supplementary Information of the 2015 CCR rule refers to "Unified Guidance Document: Statistical Analysis of Groundwater Monitoring Data at RCRA Facilities" (March 2009, EPA 530/R-09-007) as the relevant statistical reference for the methods listed in 40 C.F.R. § 257.93(f). The Unified Guidance is now marked as "archived" on the USEPA website. When used appropriately, is the Unified Guidance still the preferred reference for preparing a statistical analysis plan? If not, what would be the appropriate reference?

During the May 30th webinar, US EPA indicated that the Unified Guidance, used appropriately, is still the preferred guidance for statistical analysis plan development despite being archived.

For context regarding this stand-alone request: we have received comments on a statistical analysis plan (included as part of groundwater monitoring plans submitted with operating permit applications for 10+ CCR impoundments) from a state environmental regulatory agency seeking permitting authorization for the federal CCR Rule. The agency has indicated that the Unified Guidance is not an appropriate reference for statistical analysis plan development because it is now marked as "archived." It would be extremely helpful for our ongoing technical discussions to be working from a common set of statistical guidance.

Thank you so much for your time!

Best,
Alison

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Attachment 8

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October 11, 2021

Dynegy Midwest Generation, LLC
13498 E. 800th Street
Hennepin, Illinois 61327

Subject: Periodic History of Construction Report Update Letter
USEPA Final CCR Rule, 40 CFR §257.73(c)
Hennepin Power Plant
Hennepin, Illinois

At the request of Dynegy Midwest Generation, LLC (DMG), Geosyntec Consultants (Geosyntec) has prepared this Letter to documents updates to the Initial History of Construction (HoC) report for the Hennepin Power Plant (HPP), also known as the Hennepin Power Station (HEN). The Initial HoC report was prepared by AECOM in October of 2016 [1] in accordance with 40 Code of Federal Regulations (CFR) §257.73(c) of the United States Environmental Protection Agency (USEPA) Coal Combustion Residuals Rule, known as the CCR Rule [2]. This letter also includes information required by Section 845.220(a)(1)(B) (Design and Construction Plans) of the state-specific Illinois Environmental Protection Agency (IEPA) Part 845 CCR Rule [3] that is not expressly required by §257.73(c).

BACKGROUND

The CCR Rule required that, by October 17, 2016, Initial HoC reports to be compiled for existing CCR surface impoundments with: (1) a height of five feet or more and a storage volume of 20 acre-feet or more, or (2) a height of 20 feet or more. The Initial HoC report was required to contain, to the extent feasible, the information specified in 40 CFR §257.73(c)(1)(i)-(xii). The Initial HoC report for HPP, which included four existing CCR surface impoundments, the Old West Polishing Pond (OWPP), Old West Ash Pond (Pond No. 1 and Pond No. 3, also known as the OWAP), Ash Pond No. 2 (AP2), and the East Ash Pond (EAP), was prepared and subsequently posted to DMG's CCR Website prior to October 17, 2016.

The CCR Rule requires that Initial HoC to be updated if there is a significant change to any information complied in the Initial HoC report, as listed below:

§ 257.73(c)(2): If there is a significant change to any information complied under paragraph (c)(1) of this section, the owner or operator of the CCR unit must update the relevant information and place it in the facility's operating record as required by § 257.105(f)(9).

DMG retained Geosyntec to review the Initial HoC report, review reasonably and readily available information for the OWPP, OWAP, AP2, EAP generated since the Initial HoC report was prepared, and perform a site visit to HPP to evaluate if significant changes may have occurred since the Initial HoC report was prepared. This Letter contains the results of Geosyntec's evaluation and documents significant changes that have occurred at the OWPP, OWAP, AP2, and EAP, as they pertain the requirements of §257.73(c)(1)(i)-(xii)

UPDATES TO HISTORY OF CONSTRUCTION REPORT

Geosyntec's evaluation for the HPP OWPP, OWAP, AP2, and EAP determined that no known significant changes requiring updates to the information in the Initial HoC report pertaining to §257.73(c)(1)(ii), (iv), (v), (vi), (vii), (xi), and (xii) of the CCR Rule had occurred since the Initial HoC report was developed.

However, Geosyntec's evaluation determined that significant changes at the HPP EAP pertaining to §257.73(c)(1)(i), (iii), (viii), (ix), and (x) of the CCR Rule had occurred since the Initial HoC report had been developed. Additionally, information how long the CCR EAP and been operating and the types of CCR in the impoundment, as required by Section 845.220(a)(1)(B) of the Part 845 Rule were not included in the Initial HoC report, as this information is not required by the CCR Rule. Each change and the subsequent updates to the Initial HoC report is described within this section.

Section 845.220(a)(1)(B): A statement of … how long the CCR surface impoundment has been in operation, and the types of CCR that have been placed in the surface impoundment.

East Ash Pond

The EAP was in operation from 1996 until the HPP was retired in December of 2019, for a total of approximately 23 years [1]. Since December of 2019 the EAP has not been actively receiving CCR but has not yet been closed. As of the date of this report, the EAP has been present for approximately 25 years.

CCR placed in the EAP has included bottom ash and fly ash, in addition to other non-CCR waste streams [1].

Old West Polishing Pond and Old West Ash Pond

The OWAP and OWPP were in operation from 1952 to approximately 1996, for a total of approximately 44 years. The OWAP and OWPP did not receive CCR after 1996 but was not closed until 2020. The OWAP and OWPP were present for a total of approximately 68 years prior to closure.

CCR placed in the OWAP and OWPP included fly ash and bottom ash.

Ash Pond No. 2

AP2 was in operation from 1958 until sometime between 2003 and 2009, for a total of approximately 45 to 51 years. AP2 did not receive CCR after sometime between 2003 and 2009, but was not closed until 2020. AP2 was present for a total of approximately 62 years.

CCR placed in AP2 included fly ash and bottom ash.

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

State identification numbers (IDs) for the OWPP, OWAP, AP2, and EAP have been assigned by the Illinois Environmental Protection Agency (IEPA). Each ID is listed in **Table 1**.

Table 1 – Results of Updated Discharge Capacity Calculations

CCR Surface Impoundment	State ID
Old West Polishing Pond (OWPP)	W1550100002-01
Old West Ash Pond (OWAP)	W1550100002-03
Ash Pond No. 2 (AP2)	W1550100002-04
East Ash Pond (EAP)	W1550100002-05

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

The OWPP, OWAP, and EAP2 were closed in 2020, in substantial compliance with the written closure plans posted to DMG's CCR Website ([4], [5], [6]), and as documented by certified Notification of Completion of Closures posted to DMG's CCR Website ([7], [8]). Therefore, the OWAP and EAP2 are no longer capable of storing additional CCR or free liquids, and all CCR was removed from the OWPP as part of closure-by-removal.

The HPP was retired in December of 2019, with the generation of electricity ceased at that time. Therefore, the EAP is no longer being used to actively store and dispose of new CCR, as CCR is no longer being generated by the HPP. The EAP also received inflows from East

Ash Pond No. 2 and the Coal Pile Runoff Pond; these inflows have also ceased as part of plant closure.

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

Instrumentation monitoring at the OWPP, OWAP, and EAP is no longer required as these CCR surface impoundments were closed in accordance with §257.102 ([7], [8]), and the instrumentation network was modified at that time. Therefore, the instrumentation locations shown in Appendix C of the Initial HoC report are no longer applicable to the OWPP, OWAP, and EAP.

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

An updated area-capacity curve was prepared for the EAP in 2021 and is provided in **Figure 1**.

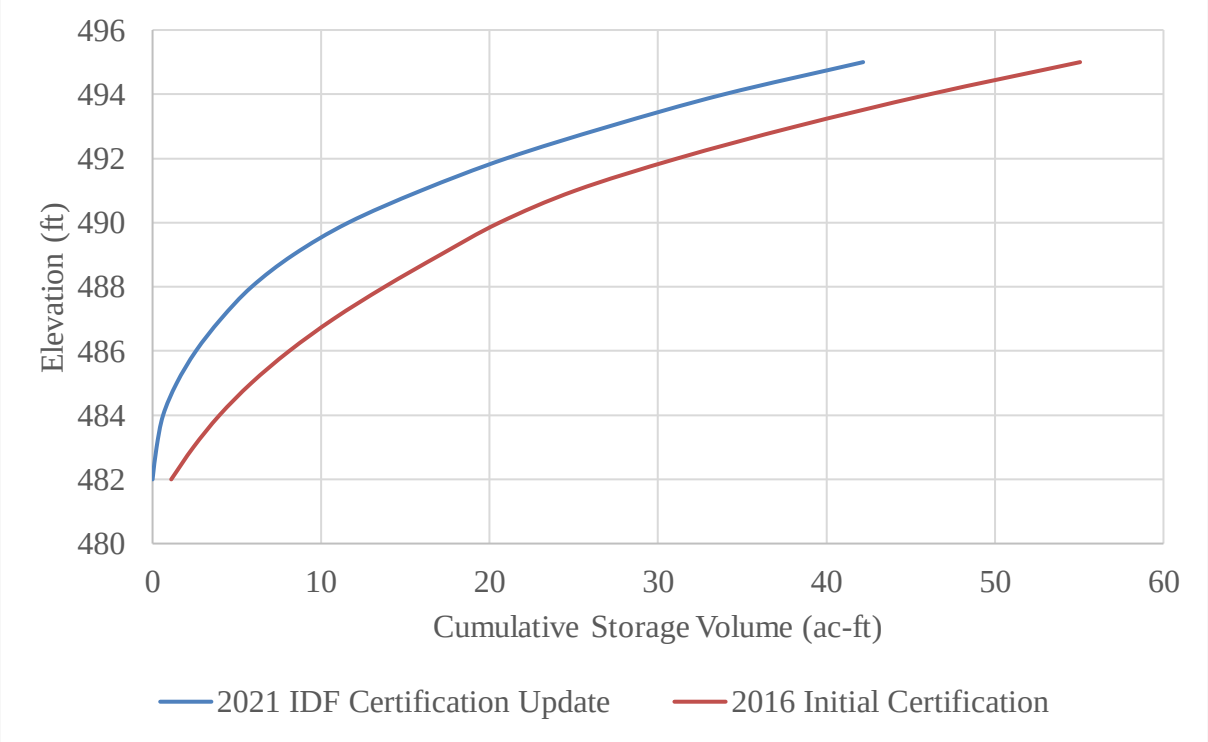


Figure 1 – Area-Capacity Curve for East Ash Pond

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

Updated discharge capacity calculations for the existing spillways of the EAP were prepared in 2021 using HydroCAD 10 modeling software. The calculations indicate that the EAP has sufficient storage capacity and will not overtop the embankments during the 1,000-year, 24-hour, storm event. The results of the calculations are provided in **Table 2**.

Table 2 – Results of Updated Discharge Capacity Calculations

	East Ash Pond
Approximate Berm Minimum Elevation[1], ft	492.0
Approximate Emergency Spillway Elevation[1], ft	Not Applicable
Starting Water Surface Elevation[1] (SWSE), ft	490.0
Peak Water Surface Elevation[1] (PWSE), ft	491.4
Time to Peak, hr	16.8
Surface Area[2], ac	5.0
Storage[3], ac-ft	6.3

Notes:
[1]Elevations are based on the NAVD88 datum
[2]Surface area is defined as the water surface area at the PWSE
[3]Storage is defined as the volume between the SWSE and PWSE

The OWPP, OWAP, and EAP2 no longer retain free water as both CCR surface impoundments were closed in 2020 ([7], [8]). Therefore, the spillways are no longer present and the information regarding the spillways of these structures, as presented in the Initial HoC report, is no longer applicable to the OWPP, OWAP, and EAP2.

CLOSING

This letter has been prepared to document Geosyntec's evaluation of changes that have occurred at the OWPP, OWAP, AP2, and EAP at the HPP since the Initial HoC was developed, based on reasonably and readily available information provided by DMG, observed by Geosyntec during the site visit, or generated by Geosyntec as part of subsequent calculations.

Sincerely,

Lucas P. Carr, P.E.
Senior Engineer

John Seymour, P.E.
Senior Principal

REFERENCES

[1] AECOM, "History of Construction, USEPA Final CCR Rule, 40 CFR § 257.73(c), Hennepin Power Station, Hennepin, Illinois," October 2016.

[2] United Stated Environmental Protection Agency, "40 CFR Parts 257 and 261, Hazardous and Solid Waste Management System, Disposal of Coal Combustion Residuals from Electric Utilities, Final Rule, 2015," 2015.

[3] Illinois Environmental Protection Agency, "35 Ill. Adm. Code Part 845, Standards for the Disposal of Coal Combustion Residuals in Surface Impoundments," Springfield, IL, 2021.

[4] V. Modeer, "Closure Plan for Existing CCR Surface Impoundment, 40 CFR 257.102(b), Hennepin Power Station, Dynegy Midwest Generation, LLC, Old West Polishing Pond," October 17, 2016.

[5] V. Modeer, "Closure Plan for Existing CCR Surface Impoundment, 40 CFR 257.102(b), Hennepin Power Station, Dynegy Midwest Generation, LLC, Old West Ash Pond," December 17, 2020.

[6] V. Modeer, "Closure Plan for Existing CCR Surface Impoundment, 40 CFR 257.102(b), Hennepin Power Station, Dynegy Midwest Generation, LLC, East Ash Pond," October 17, 2016.

[7] D. Tickner, "Hennepin Power Station; Old West Polishing Pond, Notificaiton of Completion of Closure," Luminant, December 17, 2020.

[8] D. Tickner, "Hennepin Power Station; Old West Ash Pond, Ash Pond No. 2, Notificaiton of Completion of Closure," Luminant, December 17, 2020.

AECOM

October 2016

Dynegy Midwest Generation, LLC
13498 E 800th St.
Hennepin, IL 61327

RE: History of Construction
USEPA Final CCR Rule, 40 CFR § 257.73(c)
Hennepin Power Station
Hennepin, Illinois

On behalf of Dynegy Midwest Generation, LLC, AECOM has prepared the following history of construction for the Old West Polishing Pond, Old West Ash Pond, Ash Pond No. 2, and East Ash Pond at the Hennepin Power Station in accordance with 40 CFR § 257.73(c).

BACKGROUND

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

The history of construction presented herein was compiled based on existing documentation, to the extent that it is reasonably and readily available (see 80 Fed. Reg. 21302, 21380 [April 17, 2015]), and AECOM's site experience. AECOM's document review included construction drawings, geotechnical investigations, operation and maintenance information, etc. for Old West Polishing Pond, Old West Ash Pond, Ash Pond No. 2, and East Ash Pond at the Hennepin Power Station.

AECOM

HISTORY OF CONSTRUCTION

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

Owner: Dynegy Midwest Generation, LLC

Address: 1500 Eastport Plaza Drive
Collinsville, IL 62234

CCR Units: Old West Polishing Pond
Old West Ash Pond (Pond No. 1 and Pond No. 3)
Ash Pond No. 2
East Ash Pond, IDNR Dam ID No. IL50363

The Old West Polishing Pond, Old West Ash Pond, and Ash Pond No. 2 do not have a state assigned identification number.

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

The locations of the Old West Polishing Pond, Old West Ash Pond, Ash Pond No. 2, and East Ash Pond have been identified on an USGS 7-1/2 minute topographic quadrangle map in **Appendix A**.

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

The following captures the purpose of each CCR unit:

- The Old West Polishing Pond (inactive) was used to store and dispose fly ash and bottom ash and is currently being used to clarify stormwater runoff from the Old West Ash Pond prior to discharge in accordance with the station's NPDES permit.
- The Old West Ash Pond (inactive) was used to store and dispose fly ash and bottom ash.
- The Ash Pond No. 2 (inactive) was used to store and dispose fly ash, bottom ash, and other non-CCR waste streams including coal pile runoff.
- The East Ash Pond is being used to store and dispose bottom ash, fly ash, and other non-CCR waste and to clarify process water prior to discharge in accordance with the station's NPDES permit.

Notice of intent to close the Old West Polishing Pond, Old West Ash Pond, and Ash Pond No. 2 was provided in November 2015.[1]

[1] This history of construction report was prepared on a facility-wide basis for CCR surface impoundments at the Hennepin Power Station. The inclusion of the Old West Polishing Pond, Old West Ash Pond, and Ash Pond No. 2 in this history of construction report does not concede and should not be construed to concede that the Old

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

The Hennepin Power Station and the above-referenced CCR units are located at the western edge of the Depue Lake-Illinois River Watershed with a 12-digit Hydrologic Unit Code (HUC) of 071300010804 and a drainage area of 44,525 acres (USGS 2016).

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

Physical properties of the foundation materials for the Old West Polishing Pond and Old West Ash Pond are described as cohesive material underlain by granular material. The cohesive material consists of lean clay, gravelly clay, silt, clayey silt, and sandy silt. The consistency of the cohesive material varies from very soft to medium stiff. The granular material consists of silty sand and clayey gravel. The relative density of the granular materials varies from loose to very dense and generally increases with depth. An available summary of the engineering properties of the foundation materials for the Old West Polishing Pond and Old West Ash Pond is presented in **Table 1** below. The engineering properties are based on previous geotechnical explorations and laboratory testing.

Table 1. Summary of Material Engineering Properties for the Old West Polishing Pond and Old West Ash Pond

Layer	Unit Weight (pcf)	Total (undrained) Shear Strength Parameters		Effective (drained) Shear Strength Parameters	
		ϕ (deg)	*c (psf)*	*ϕ′ (deg)*	*c′ (psf)*
CL (soft)	120	0	500	28	0
CL (medium stiff gravely clay)	120	28	0	28	0
ML (soft to medium stiff)	125	28	0	28	0
CL-ML (very soft)	120	0	400	26	0
SM (very loose)	125	28	0	28	0
GC (dense)	130	34	0	34	0
GC (very dense)	130	36	0	36	0
Fill: GC (very dense)	130	34	50	34	0

West Polishing Pond, Old West Ash Pond, and Ash Pond No. 2 are subject to the Design Criteria or all Operating Criteria in the CCR Rule.

The Old West Polishing Pond and Old West Ash Pond are enclosed impoundments with dikes and do not have abutments.

Physical properties of the foundation and abutment materials for Ash Pond No. 2 and the East Ash Pond are described as gravel materials with varying amounts of silt and clay. The relative density of the gravel is medium dense to very dense. An available summary of the engineering properties of the foundation materials for Ash Pond No. 2 and the East Ash Pond is presented in **Table 2** below. The engineering properties are based on previous geotechnical explorations and laboratory testing.

Table 2. Summary of Foundation and Abutment Material Engineering Properties for the Ash Pond No. 2 and East Ash Pond

Material	Unit Weight (pcf)	Effective (drained) Shear Strength Parameters		Total (undrained) Shear Strength Parameters	
		c' (psf)	Φ' (°)	c (psf)	Φ (°)
Alluvial Foundation	135	0	38	0	38

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

Physical properties of the embankment materials for the Old West Polishing Pond and Old West Ash Pond are described as gravel with occasional zones of clayey sand and lean clay. The gravel has a general relative density of very dense. An available summary of the engineering properties of the embankment materials for the Old West Polishing Pond and Old West Ash Pond is presented in **Table 1** above. The engineering properties are based on previous geotechnical explorations and laboratory testing.

The physical properties of Ash Pond No. 2 embankment construction materials are described in this paragraph. The original embankments are constructed of sand with varying amounts of coal pieces and gravel. The initial embankment raise is constructed of silty clay, clayey sand, sand, and gravel and the later embankment raise is constructed with layers of lean clay, silty clay, clayey silt, clayey, and gravel. An available summary of the engineering properties of the embankment materials for Ash Pond No. 2 is presented in **Table 3** below. The engineering properties are based on previous geotechnical explorations and laboratory testing.

Table 3. Summary of Construction Material Engineering Properties for Ash Pond No. 2

Material	Unit Weight (pcf)	Effective (drained) Shear Strength Parameters		Total (undrained) Shear Strength Parameters	
		c' (psf)	Φ' (°)	c (psf)	Φ (°)
Fill: GP-GM (medium dense)	125	0	32	0	32
Fill: CL (hard)	120	0	32	4000	0
Fill: ML (hard)	120	0	32	4500	0
Fill: SC (medium dense)	120	0	28	0	28

Physical properties of the embankment materials for the East Ash Pond are described as clayey silt and clay. The consistency of both the clayey silt and clay ranges from stiff to hard. The original pond surface is lined with a 4-foot thick compacted clay layer of 1.0 x 10^{-7} cm/s underlain by a 1-foot thick sand layer. The liner system of the embankment raise consists of a (from top to bottom) 45 mil reinforced polyethylene geomembrane, a 1-foot thick clay layer, and an 8 oz/sy polypropylene geotextile. A typical cross section profile of the liner system is shown on drawing C-56 presented in **Appendix B**. An available summary of the construction material engineering properties for the East Ash Pond is presented in **Table 4** below. The engineering properties are based on previous geotechnical explorations and laboratory testing.

Table 4. Summary of Construction Material Engineering Properties for the East Ash Pond

Material	Unit Weight (pcf)	Effective (drained) Shear Strength Parameters		Total (undrained) Shear Strength Parameters	
		c' (psf)	Φ' (°)	c (psf)	Φ (°)
Embankment Fill	105	30	32	2500	0
Liner System	120	60	30	2500	0

The method of site preparation and construction of the Old West Polishing Pond, Old West Ash Pond, Ash Pond No. 2, and the original East Ash Pond are not reasonably and readily available. Site preparation and construction of the 2003 East Ash Pond liner raise were completed in accordance with the applicable construction specification (see § 257.73(c)(1)(xi) below).

Reasonably and readily available approximate dates of construction of each successive stage of construction of the Old West Polishing Pond, Old West Ash Pond, Ash Pond No. 2, and East Ash Pond are provided in **Table 5** below.

Table 5. Approximate dates of construction of each successive stage of construction.

Date	Event
1951 to 1952	Construction of historical Ash Pond No. 1
1958	Construction of Ash Pond No. 2
Late 1960's	Construction of historical Ash Pond No. 3
1978	Embankment raise of Ash Pond No. 2
1985	Embankment raise of Ash Pond No. 2 to elevation 484 feet and Ash Pond No. 3 (Old West Ash Pond) to elevation 460 feet
1988 to 1989	Embankment raise of Old West Ash Pond to elevation 465 feet that merged historical Ash Pond No. 1 and Ash Pond No. 3 into one single pond and created the Old West Polishing Pond
1989	Embankment raise of Ash Pond No. 2 to elevation 494 feet
1995 to 1996	Construction of East Ash Pond
2003	Embankment liner raise of East Ash Pond
2009 to 2010	Eastern portion of Ash Pond No. 2 was removed to facilitate construction of the Leachate Pond
2011	Landfill Cell 1 was constructed over placed CCR in Ash Pond No. 2 adjacent to the Leachate Pond
2014	North Embankment tree removal, grading, and vegetation re-establishment of Ash Pond No. 2

§ 257.73(c)(1)(vii): At a scale that details engineering structures and appurtenances relevant to the design, construction, operation, and maintenance of the CCR unit, detailed dimensional drawings of the CCR unit, including a plan view and cross sections of the length and width of the CCR unit, showing all zones, foundation improvements, drainage provisions, spillways, diversion ditches, outlets, instrument locations, and slope protection, in addition to the normal operating pool surface elevation and the maximum pool surface elevation following peak discharge from the inflow design flood, the expected maximum depth of CCR within the CCR surface impoundment, and any identifiable natural or manmade features that could adversely affect operation of the CCR unit due to malfunction or mis-operation.

Drawings that contain items pertaining to the requested information for the Old West Polishing Pond, Old West Ash Pond, Ash Pond No. 2, and East Ash Pond are listed in **Table 6** below. Items marked as "Not Available" are items not found during a review of the reasonably and readily available record documentation.

Table 6. List of drawings containing items pertaining to the information requested in § 257.73(c)(1)(vii).

	Old West Polishing Pond	Old West Ash Pond	Ash Pond No. 2	East Ash Pond
Dimensional plan view (all zones)	HEN1-B460-2	HEN1-B460-1 to 2	HEN1-B461, HEN1-C117	HEN1-C55
Dimensional cross sections	HEN1-B452 to B457	HEN1-B452 to B457	HEN1-B458-1 to 7, Berm Modification Drawings 7 to 9	HEN1-C56 to C59
Foundation Improvements	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Drainage Provisions	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Spillways and Outlets	Not Available	Not Available	Not Applicable	HEN1-C8 to C9, HEN1-C109, HEN1-C113
Diversion Ditches	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Instrument Locations	Figure 2D	Figure 2C	Figure 2A	Figure 2B
Slope Protection	Not Available	Not Available	Berm Modification Drawings 3 to 9	HEN1-C56 to C59
Normal Operating Pool Elevation	Not Available	Not Available	Not Available	Not Available
Maximum Pool Elevation	Not Available	Not Available	Not Available	Not Available
Approximate Maximum Depth of CCR in 2016	11 feet	15 feet	46 feet	35 feet

All drawings referenced in **Table 6** above can be found in **Appendix B** and **Appendix C**.

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

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

Existing instrumentation consists of open-standpipe piezometers installed in 2015. The purpose of the piezometers is to measure the pore water pressures within the embankments of the Old West Polishing Pond, Old West Ash Pond, Ash Pond No. 2, and East Ash Pond. There are seven (7) existing piezometers within the Old West Polishing Pond, Old West Ash Pond, Ash Pond No. 2, and East Ash Pond. A location map of the existing instrumentation is presented in **Appendix C**.

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

Area-capacity curves for the Old West Polishing Pond, Old West Ash Pond, Ash Pond No. 2, and East Ash Pond are not reasonably and readily available.

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

The Old West Polishing Pond contains a 24-inch diameter corrugated metal pipe (CMP) outlet that discharges stormwater to the Illinois River in accordance with the station's NPDES permit. Current capacity and calculation information for the Old West Polishing Pond's discharge capability is not reasonably and readily available.

The Old West Ash Pond contains a 24-inch dia. pipe culvert. Stormwater collected within the CCR unit drains via surface flow and through the pipe culvert into the Old West Polishing Pond. Current capacity and calculation information for the Old West Ash Pond's discharge capability is not reasonably and readily available.

The Ash Pond No. 2 does not contain a spillway or diversion feature. Stormwater collected within the CCR unit drains via surface flow into the East Ash Pond. Current capacity and calculation information for the Ash Pond No. 2's discharge capability is not reasonably and readily available.

The East Ash Pond contains two outlet structures. The southeast outlet is a 5-foot wide stop-log structure that is connected to a 36-inch diameter reinforced concrete pipe (RCP). The 36-inch diameter RCP discharges into the East Polishing Pond. The northeast outlet, located on the northeast corner of the East Ash Pond, is a headwall structure connected to an 18-inch diameter RCP. The 18-inch diameter RCP discharges into the East Leachate Pond. In 2016, the discharge capacity of the East Ash Pond was evaluated using HydroCAD 10 software modeling a 1,000-year, 24-hour rainfall event. The model results indicate that the East Ash Pond has enough storage capacity and will not overtop the embankment during the 1,000-year, 24-hour storm event. The results of the HydroCAD 10 analysis are presented below in **Table 7**.

Table 7. Results of HydroCAD 10 analysis

	East Ash Pond
Approximate Minimum Berm Elevation[1] (ft)	493.0
Approximate Emergency Spillway Elevation[1] (ft)	Not Applicable
Starting Pool Elevation[1] (ft)	490.4
Peak Elevation[1] (ft)	492..2
Time to Peak (hr)	12.5
Surface Area (ac)	6.5
Storage[2] (ac-ft)	8.4

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

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

The construction specifications for Old West Polishing Pond, Old West Ash Pond, Ash Pond No. 2, and the original East Ash Pond are not reasonably and readily available. The construction specification for the 2003 East Ash Pond liner raise is located in *Specification J-2616, Rev. A* (presented in **Appendix D**).

The provisions for surveillance, maintenance, and repair of the Old West Polishing Pond and Old West Ash Pond are located in *Hennepin Power Station; West Ash Disposal Pond Maintenance Plan* (2013) (presented in **Appendix E**). The provisions for surveillance, maintenance, and repair of Ash Pond No. 2 are located in *Hennepin Power Station; Old East Ash Disposal Pond Maintenance Plan* (2013) (presented in **Appendix F**). The provisions for surveillance, maintenance, and repair of the East Ash Pond are located in *Hennepin Power Station; East Ash Disposal Pond Maintenance Plan* (2014) (presented in **Appendix G**).

The operations and maintenance plans for the Old West Polishing Pond, Old West Ash Pond, Ash Pond No. 2, and East Ash Pond are currently being revised by Dynegy Midwest Generation, LLC.

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

There is no record or knowledge of structural instability of the Old West Polishing Pond, Old West Ash Pond, Ash Pond No. 2, and East Ash Pond at the Hennepin Power Station.

AECOM

LIMITATIONS

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

Sincerely,

Claudia Prado
Project Manager

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

REFERENCES

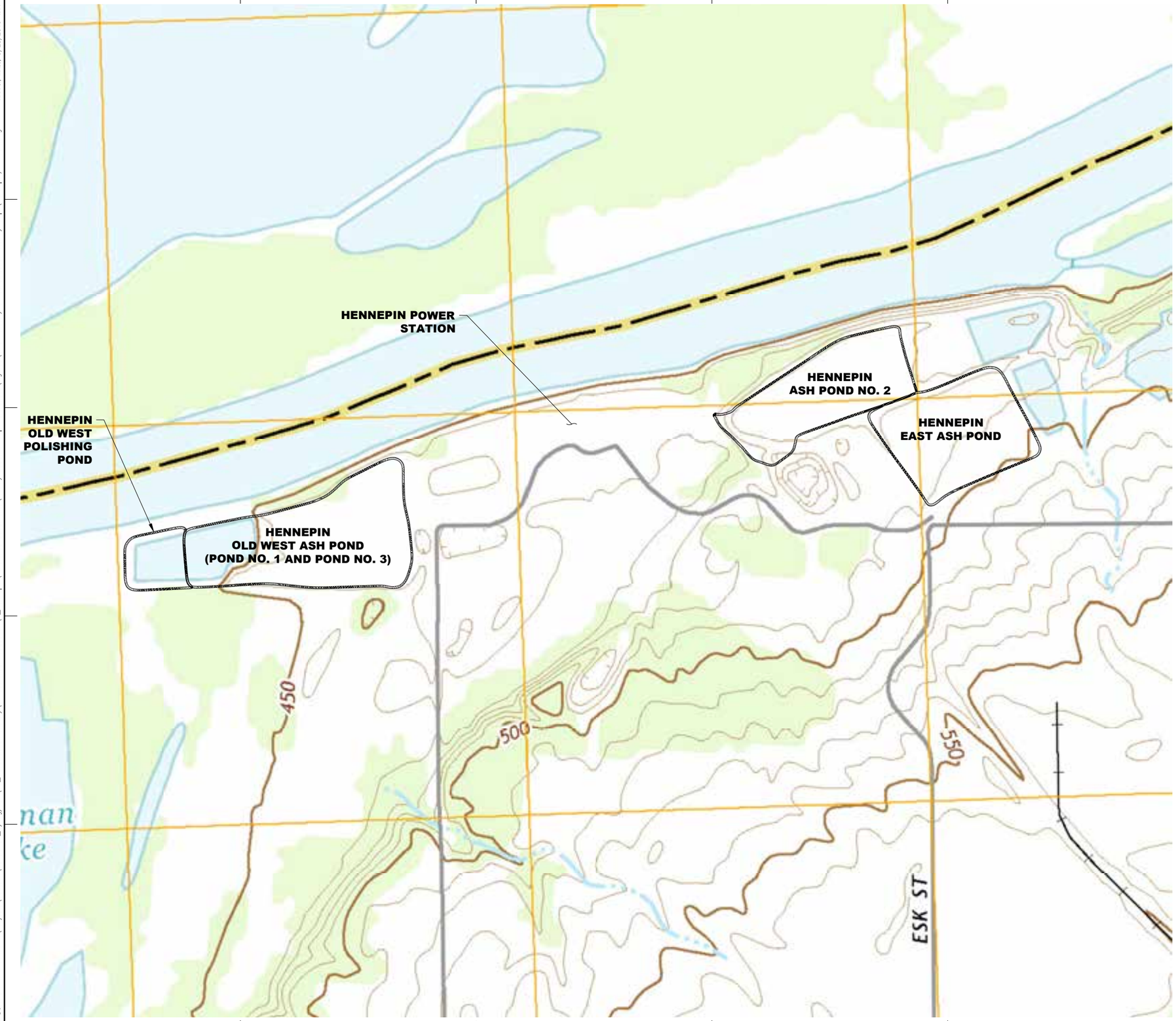
United States Environmental Protection Agency (USEPA). (2015). *Hazardous and Solid Waste Management System; Disposal of Coal Combustion Residuals From Electric Utilities; Final Rule.* 40 CFR Parts 257 and 261, 80 Fed. Reg. 21302, 21380 April 17, 2015.

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

APPENDICES

Appendix A: History of Construction Vicinity Map
Appendix B: Hennepin Power Station Drawings
Appendix C: Hennepin Power Station Piezometer Locations
Appendix D: Specification J-2616, Rev. A, Primary Ash Pond Modifications
Appendix E: Hennepin Power Station; West Ash Disposal Pond Maintenance Plan (2013)
Appendix F: Hennepin Power Station; Old East Ash Disposal Pond Maintenance Plan (2013)
Appendix G: Hennepin Power Station; East Ash Disposal Pond Maintenance Plan (2014)

Appendix A: History of Construction Vicinity Map



LEGEND

CCR UNITS

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

QUADRANGLE LOCATION

N

0 400 800 1200

SCALE IN FEET

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

DYNEGY MIDWEST GENERATION, L.L.C.
13498 East 800th Street
Hennepin, IL 61327

HISTORY OF CONSTRUCTION

HENNEPIN POWER STATION
HENNEPIN, ILLINOIS

ISSUED FOR BIDDING DATE BY

ISSUED FOR CONSTRUCTION DATE BY

REVISIONS

NO.	DESCRIPTION	DATE
△		
△		
△		
△		
△		

AECOM PROJECT NO:	60489731
DRAWN BY:	DJD
DESIGNED BY:	DJD
CHECKED BY:	MN
DATE CREATED:	2016-04-13
PLOT DATE:	
SCALE:	1" = 400'
ACAD VER:	2014

SHEET TITLE

HISTORY OF CONSTRUCTION VICINITY MAP

01

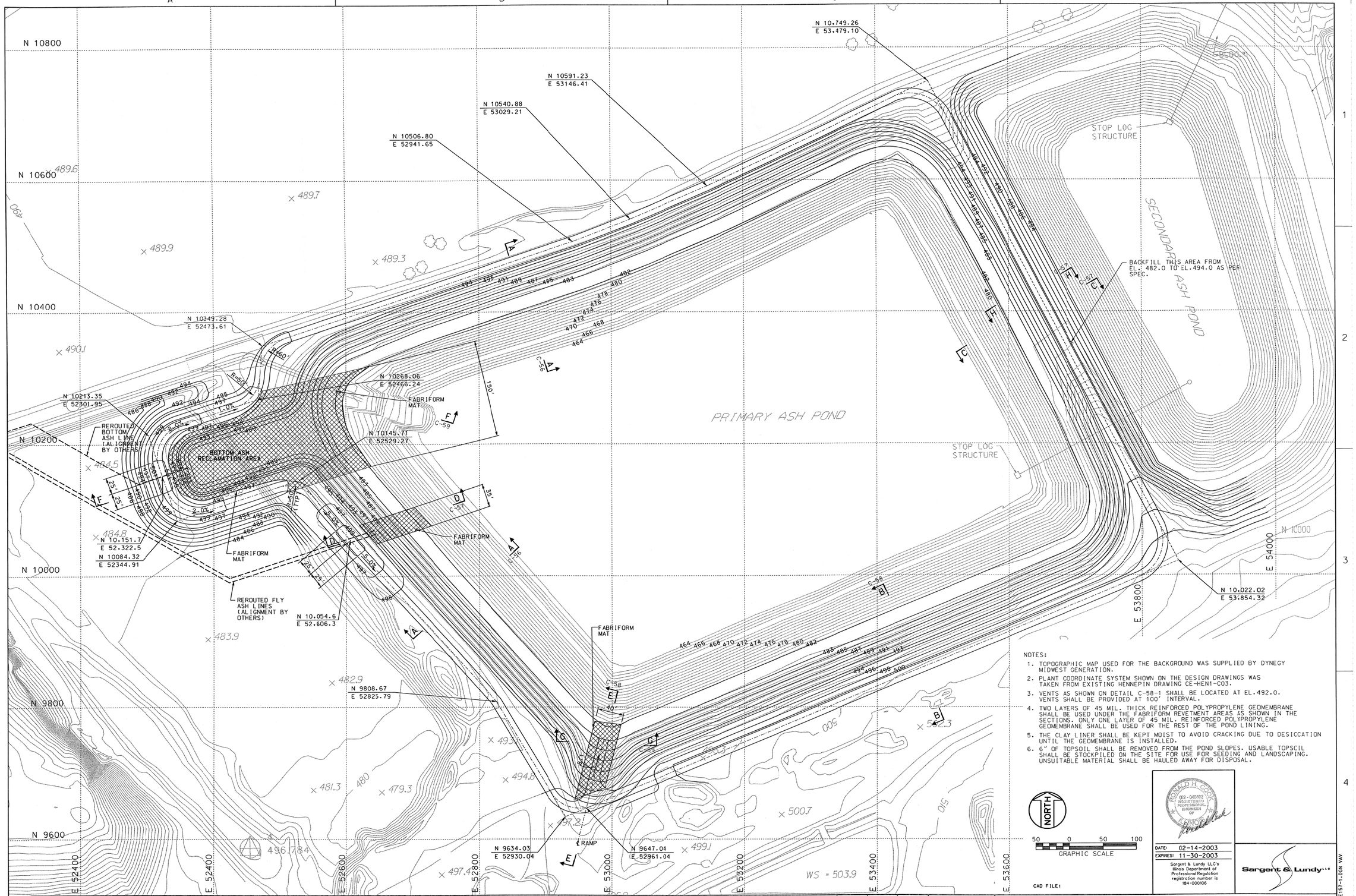
AECOM DRAWING PATH: P:\Projects\Geotech\60428794_DynegyCCR\13_Construction History\04 Technical Production\4_Hennepin\Reference Documents\Vicinity Location Map References\Figures\C-01 History of Construction Vicinity Map (Hennepin) - MAP.dwg NANAK, MATT, 9/28/2016 4:11 PM

Appendix B: Hennepin Power Station Drawings

1. “Plan of Primary Ash Pond, Modification to Primary Ash Pond”, Drawing No. C-55, Revision 0.1, 14 February, 2003, Sargent & Lundy, LLC.
2. “Sections and Details – Sheet 1, Modification to Primary Ash Pond”, Drawing No. C-56, Revision 0.1, 14 February, 2003, Sargent & Lundy, LLC.
3. “Sections and Details – Sheet 2, Modification to Primary Ash Pond”, Drawing No. C-57, Revision 0.1, 14 February, 2003, Sargent & Lundy, LLC.
4. “Sections and Details – Sheet 3, Modification to Primary Ash Pond”, Drawing No. C-58, Revision 0.1, 14 February, 2003, Sargent & Lundy, LLC.
5. “Sections and Details – Sheet 4, Modification to Primary Ash Pond”, Drawing No. C-59, Revision 0.1, 14 February, 2003, Sargent & Lundy, LLC.
6. “Cross Sections of Ash Pond Berm Extension, Sta 1+00, 5+00 & 9+50”, Drawing No. E-HEN1-B452, Revision 0, 4 November, 1997, Illinois Power Company.
7. “Cross Sections of Ash Pond Berm Extension, Sta 14+25, 20+80 & 26+00”, Drawing No. E-HEN1-B453, Revision 0, 4 November, 1997, Illinois Power Company.
8. “Cross Sections of Ash Pond Berm Extension, Sta 30+00, 35+00 & 39+00”, Drawing No. E-HEN1-B454, Revision 0, 4 November, 1997, Illinois Power Company.
9. “Cross Sections of Ash Pond Berm Extension, Sta 40+00, 42+00, 44+90”, Drawing No. E-HEN1-B455, Revision 0, 4 November, 1997, Illinois Power Company.
10. “Cross Sections of Ash Pond Berm Extension, Sta 47+00, 51+00 & 56+00”, Drawing No. E-HEN1-B456, Revision 0, 4 November, 1997, Illinois Power Company.
11. “Cross Sections of Ash Pond Berm Extension, Sta 61+50”, Drawing No. E-HEN1-B457, Revision 0, 4 November, 1997, Illinois Power Company.
12. “Cross Sections, East Ash Pond Extension”, Drawing No. E-HEN1-B458-1, Revision 0, 8 March, 1990, Illinois Power Company.
13. “Cross Sections, East Ash Pond Extension”, Drawing No. E-HEN1-B458-2, Revision 0, 8 March, 1990, Illinois Power Company.
14. “Cross Sections, East Ash Pond Extension”, Drawing No. E-HEN1-B458-3, Revision 0, 8 March, 1990, Illinois Power Company.
15. “Cross Sections, East Ash Pond Extension”, Drawing No. E-HEN1-B458-4, Revision 0, 8 March, 1990, Illinois Power Company.
16. “Cross Sections, East Ash Pond Extension”, Drawing No. E-HEN1-B458-5, Revision 0, 8 March, 1990, Illinois Power Company.
17. “Cross Sections, East Ash Pond Extension”, Drawing No. E-HEN1-B458-6, Revision 0, 8 March, 1990, Illinois Power Company.
18. “Cross Sections, East Ash Pond Extension”, Drawing No. E-HEN1-B458-7, Revision 0, 8 March, 1990, Illinois Power Company.
19. “Plan-Unit #1 Ash Pond Extension, Sheet #1”, Drawing No. E-HEN1-B460-1, 2 February, 1988, Illinois Power Company.
20. “Plan-Unit #1 Ash Pond Extension, Sheet #2”, Drawing No. E-HEN1-B460-2, 2 February, 1988, Illinois Power Company.

Appendix B: Hennepin Power Station Drawings (continued)

21. “Contour and Grading Plan, Unit #2 Ash Pond Extension”, Drawing No. CE-HEN1-B461, Revision 0, 8 March, 1990, Illinois Power Company.
22. “Pond 2 East, Flexible Membrane Liner and Structures”, Drawing No. HEN1-C109, Revision 0, 28 July, 2010, Civil & Environmental Consultants, Inc.
23. “Pond 2 East, Details”, Drawing No. HEN1-C113, Revision 0, 28 July, 2010, Civil & Environmental Consultants, Inc.
24. “Landfill Phase 1 Construction, Existing Conditions”, Drawing No. HEN1-C117, Revision 0, 28 November, 2010, Civil & Environmental Consultants, Inc.
25. “Layout-Pond Discharge Structures, 1995 Ash Facility”, Drawing No. CE-HEN1-C8, Revision 0, 17 September, 1996, Illinois Power Company.
26. “Details: Pond Discharge Structure, 1995 Ash Facility”, Drawing No. CE-HEN1-C9, Revision 0, 17 September, 1996, Illinois Power Company.
27. “East Berm Modification, Existing Site Conditions”, Drawing No. 3, Revision 3, 4 February, 2015, Civil & Environmental Consultants, Inc.
28. “East Berm Modification, Proposed Site Plan”, Drawing No. 4, Revision 3, 4 February, 2015, Civil & Environmental Consultants, Inc.
29. “East Berm Modification, Proposed Grading Plan 1 of 2”, Drawing No. 5, Revision 3, 4 February, 2015, Civil & Environmental Consultants, Inc.
30. “East Berm Modification, Proposed Grading Plan 2 of 2”, Drawing No. 6, Revision 3, 4 February, 2015, Civil & Environmental Consultants, Inc.
31. “East Berm Modification, Proposed Sections Sta 1+00 to 15+00”, Drawing No. 7, Revision 3, 4 February, 2015, Civil & Environmental Consultants, Inc.
32. “East Berm Modification, Proposed Sections Sta 16+00 to 23+50”, Drawing No. 8, Revision 3, 4 February, 2015, Civil & Environmental Consultants, Inc.
33. “East Berm Modification, Berm and Erosion Control Details”, Drawing No. 9, Revision 3, 4 February, 2015, Civil & Environmental Consultants, Inc.



NOTES:

1. TOPOGRAPHIC MAP USED FOR THE BACKGROUND WAS SUPPLIED BY DYNEGY MIDWEST GENERATION.
2. PLANT COORDINATE SYSTEM SHOWN ON THE DESIGN DRAWINGS WAS TAKEN FROM EXISTING HENNEPIN DRAWING CE-HEN1-C03.
3. VENTS AS SHOWN ON DETAIL C-58-1 SHALL BE LOCATED AT EL.492.0. VENTS SHALL BE PROVIDED AT 100' INTERVAL.
4. TWO LAYERS OF 45 MIL. THICK REINFORCED POLYPROPYLENE GEOMEMBRANE SHALL BE USED UNDER THE FABRIFORM REVETMENT AREAS AS SHOWN IN THE SECTIONS. ONLY ONE LAYER OF 45 MIL. REINFORCED POLYPROPYLENE GEOMEMBRANE SHALL BE USED FOR THE REST OF THE POND LINING.
5. THE CLAY LINER SHALL BE KEPT MOIST TO AVOID CRACKING DUE TO DESICCATION UNTIL THE GEOMEMBRANE IS INSTALLED.
6. 6" OF TOPSOIL SHALL BE REMOVED FROM THE POND SLOPES. USABLE TOPSCIL SHALL BE STOCKPILED ON THE SITE FOR USE FOR SEEDING AND LANDSCAPING. UNSUITABLE MATERIAL SHALL BE HAULED AWAY FOR DISPOSAL.

NORTH

50 0 50 100
GRAPHIC SCALE

CAD FILE:

RONALD H. COOK
062-045092
REGISTERED PROFESSIONAL ENGINEER OF ILLINOIS

DATE: 02-14-2003
EXPIRES: 11-30-2003

Sargent & Lundy LLC's Illinois Department of Professional Regulation registration number is 184-000106

Sargent & Lundy LLC

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NO.	DATE	REVISION	PREP'D	REV'D	APPR'D
0.1	02-14-2003	FOR PERMIT	MED	VP	———

NO.	DATE	REVISION	PREP'D	REV'D	APPR'D

SCALE:	1"=50'	
DWN. M.DOWNS	DATE	02-12-03
CHK. V.PATEL	DATE	02-14-03
APPV.	DATE	

DYNEGY

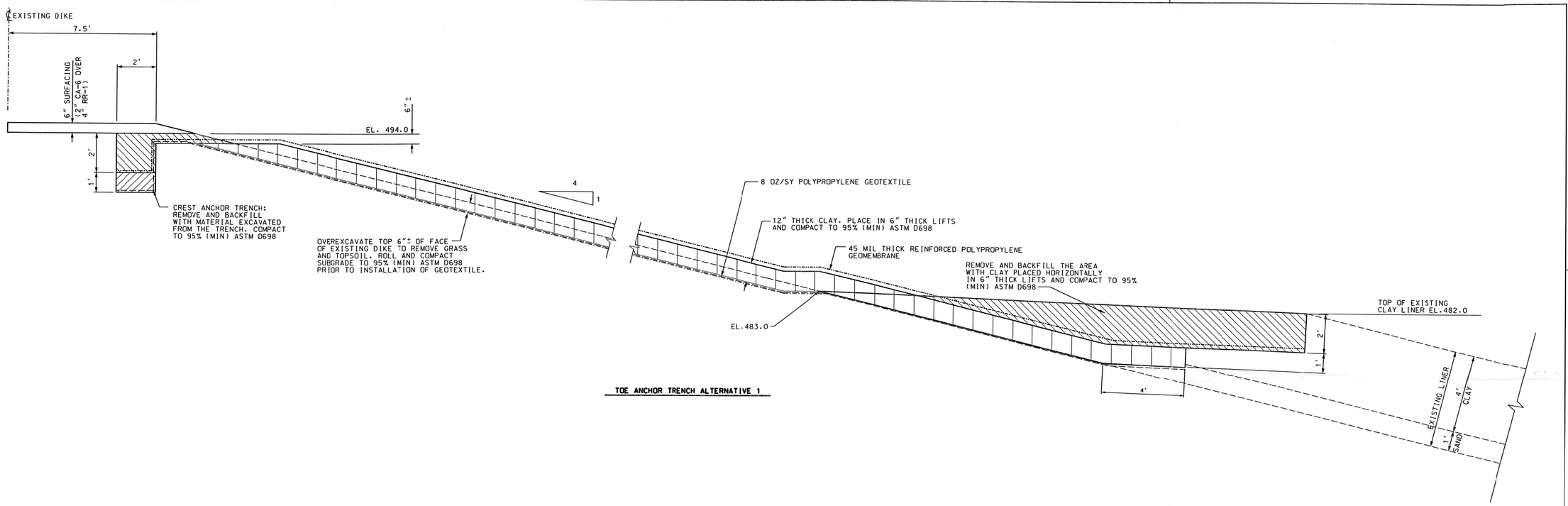
PLAN OF PRIMARY ASH POND

MODIFICATION TO PRIMARY ASH POND
HENNEPIN POWER STATION

PROJECT NO.: 08820-331
CLIENT: DYNEGY MIDWEST GENERATION
DWG. NO.: C-55
REV.: 0.1

E-MOD1-E157-1.DGN VAY
07-10-2001

02-13-03 ALS



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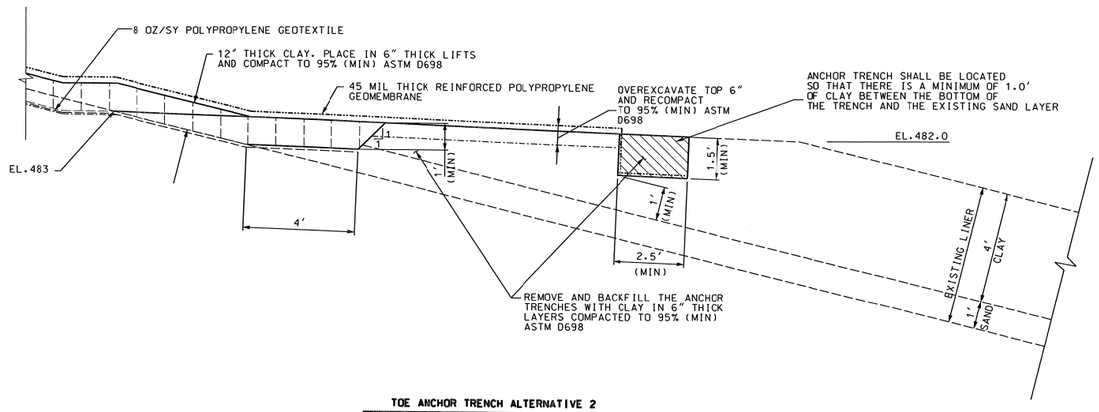

TOE ANCHOR TRENCH ALTERNATIVE 2

SECTION A
SEE DWG C-55

2 0 2 4
GRAPHIC SCALE
HOR 1/2"=1'-0"

2 0 2 4
GRAPHIC SCALE
VER 1/2"=1'-0"

NOTES:

1. CONTRACTOR SHALL BE RESPONSIBLE FOR CHECKING EXISTING ELEVATIONS AND DIMENSIONS PRIOR TO FABRICATION OF THE GEOMEMBRANE LINER.
2. CONTRACTOR MAY USE EITHER ALTENATIVE 1 OR ALTERNATIVE 2 AS APPROVED BY THE BUYER FOR ALL TOE ANCHOR TRENCH DETAILS.
3. DIMENSIONS WERE TAKEN FROM TYPICAL SECTION ON DRAWING CH-HEN1-C6.1 DATED 12-9-93.

CAD FILE:

RONALD H. COOK 062-040802 REGISTERED PROFESSIONAL ENGINEER OF ILLINOIS

DATE: 02-14-2003
EXPIRES: 11-30-2003
Sargent & Lundy LLC's Illinois Department of Professional Regulation registration number is 184-000106

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SCALE:
DWN. M.DOWNS DATE 02-12-02
CHK. V.PATEL DATE 02-14-03
APPV. DATE

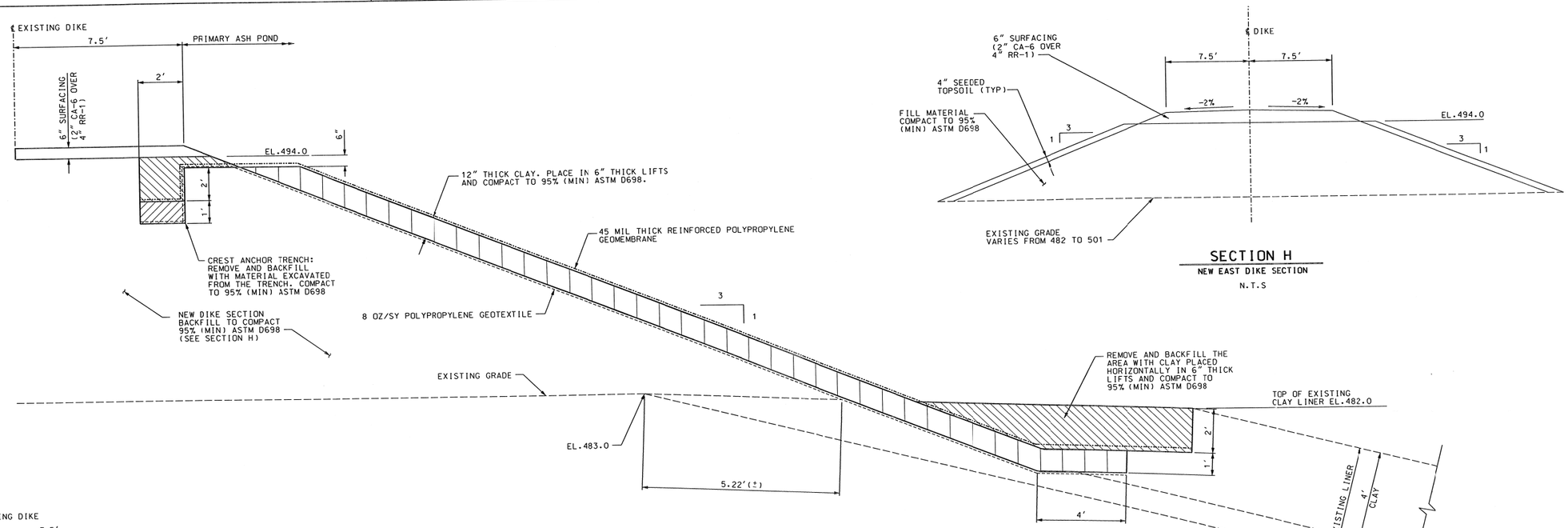
DYNEGY

SECTIONS AND DETAILS - SHEET 1
MODIFICATION TO PRIMARY ASH POND
HENNEPIN POWER STATION

PROJECT NO.: 08820-331
CLIENT: DYNEGY MIDWEST GENERATION
DWG. NO.: C-56 REV. 0.1

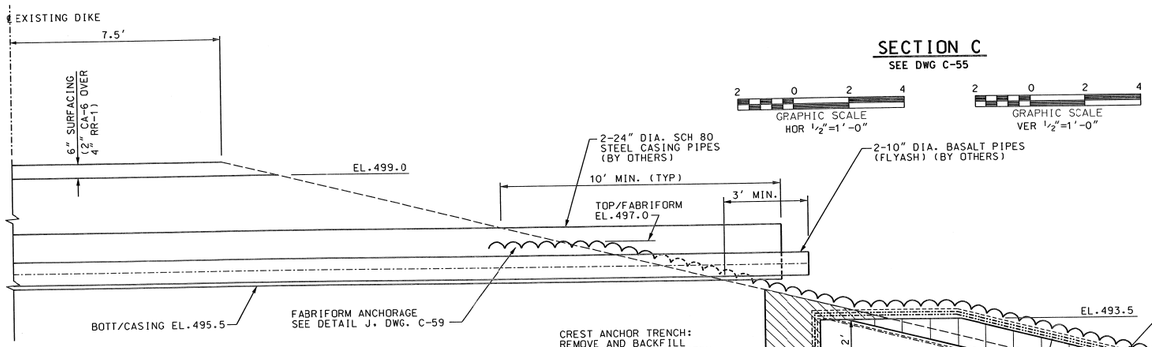
E-MOD1-E157-1.DGN VAX 07-10-2001

02-13-03 ALS



SECTION C
SEE DWG C-55

SECTION H
NEW EAST DIKE SECTION
N.T.S



SECTION D
SEE DWG C-55

DATE: 02-14-2003
EXPIRES: 11-30-2003
Sargent & Lundy LLC's Illinois Department of Professional Regulation registration number is 184-000106

Sargent & Lundy LLC

CAD FILE:

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SCALE: 1/2"=1'-0"
DWN. M.DOWNS DATE 02-12-02
CHK. V.PATEL DATE 02-14-03
APPV. DATE

DYNEGY

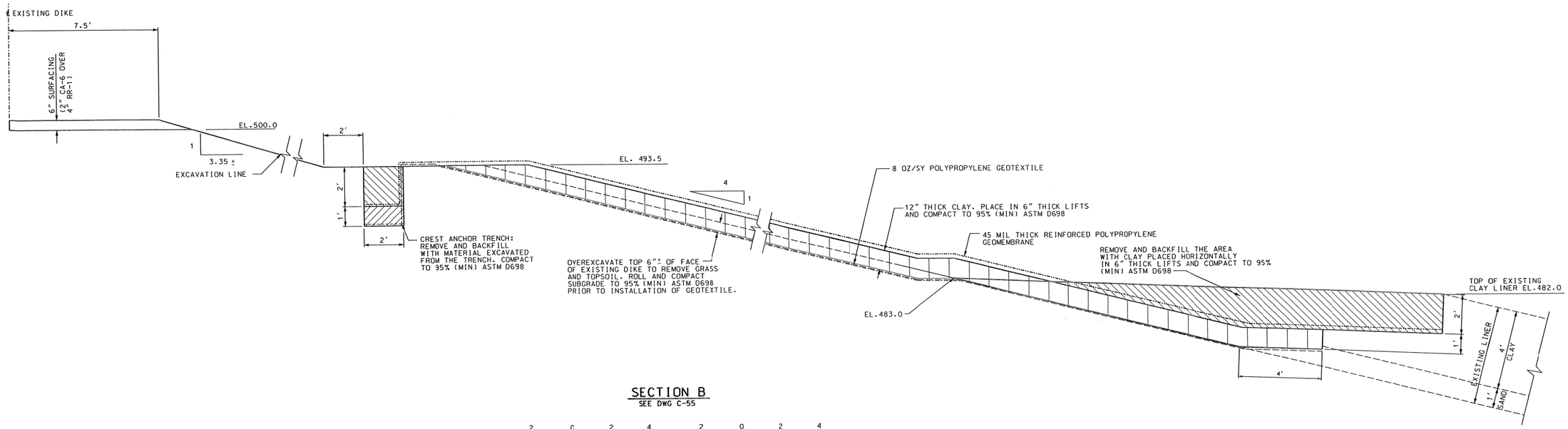
SECTIONS AND DETAILS - SHEET 2

MODIFICATION TO PRIMARY ASH POND
HENNEPIN POWER STATION

PROJECT NO.: 08820-331
CLIENT: DYNEGY MIDWEST GENERATION
DWG. NO.: C-57 REV.: 0.1

02-13-03 ALS

E-MDR-E157-1.DGN VAV 07-10-2001



SECTION B
SEE DWG C-55

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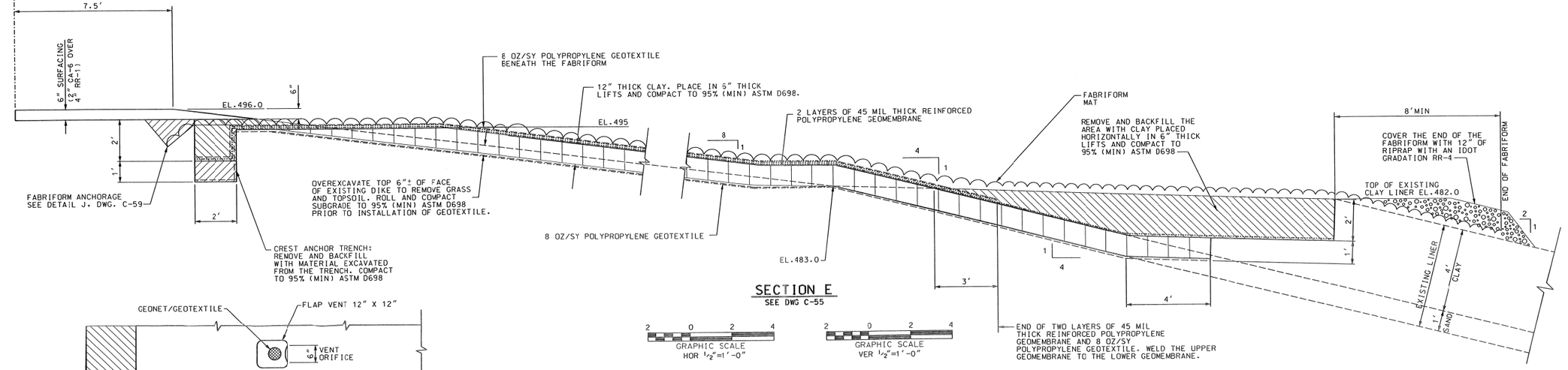
GRAPHIC SCALE
VER 1/2"=1'-0"



SECTION E
SEE DWG C-55

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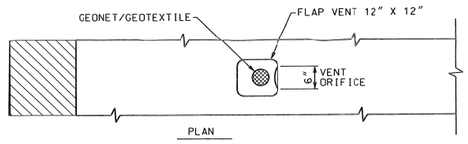
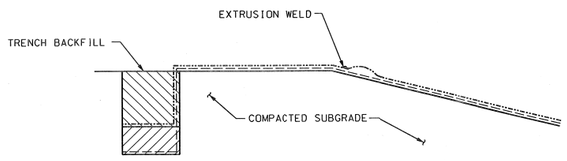
GRAPHIC SCALE
VER 1/2"=1'-0"



PLAN



SECTION

DETAIL C-58-1
MAXIMUM INTERVAL SHALL BE 100'

RONALD H. COX
062-048809
REGISTERED
PROFESSIONAL
ENGINEER
OF
ILLINOIS

DATE: 02-14-2003
EXPIRES: 11-30-2003
Sargent & Lundy LLC's Illinois Department of Professional Regulation registration number is 184-000106

Sargent & Lundy LLC

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0.1	02-14-2003	FOR PERMIT	MED	VP	———

NO.	DATE	REVISION	PREP'D	REV'D	APPR'D

SCALE 1/2"=1'-0"
DWN. M.DOWNS DATE 02-14-03
CHK. V.PATEL DATE 02-14-03
APPV. DATE

DYNEGY

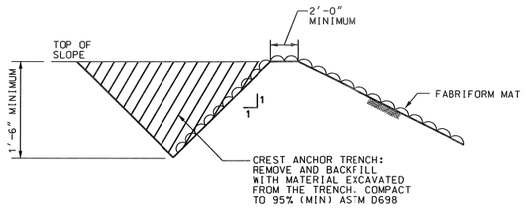
SECTIONS AND DETAILS - SHEET 3

MODIFICATION TO PRIMARY ASH POND
HENNEPIN POWER STATION

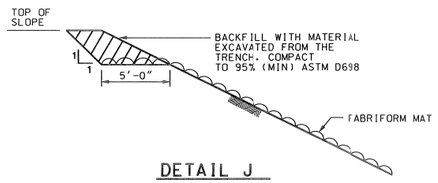
PROJECT NO.: 08820-331
CLIENT: DYNEGY MIDWEST GENERATION
DWG. NO.: C-58
REV. 0.1

02-12-03 ALS

E-MDR1-E157-1.DGN VAV
07-10-2001



ANCHORAGE IF PROTECTION IS PROVIDED TO THE TOP OF THE SLOPE



DETAIL J

ANCHORAGE FOR FABRIFORM MAT
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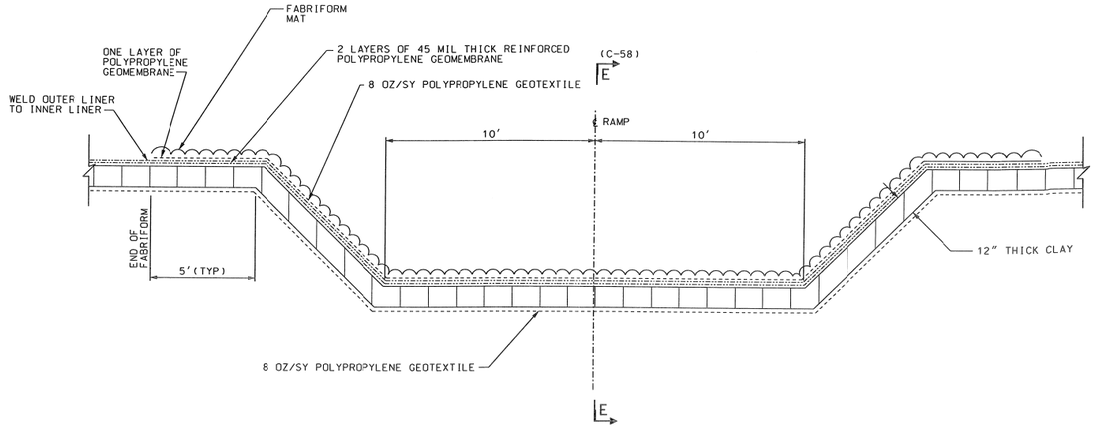
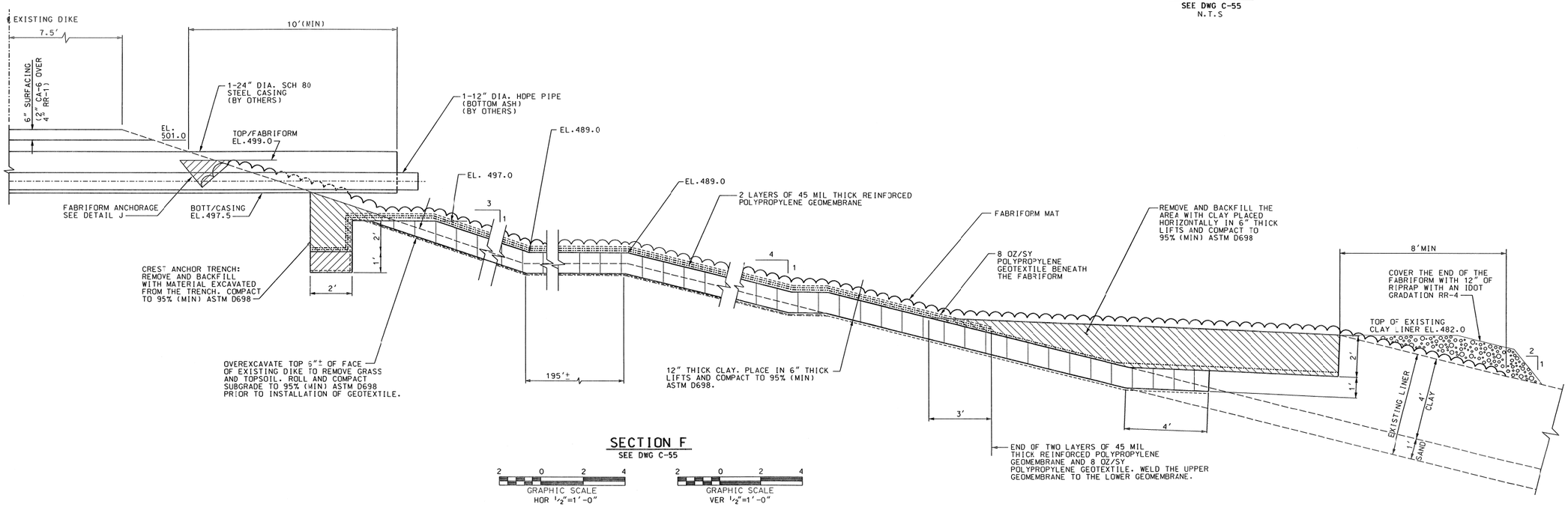


SECTION G

SEE DWG C-55
N.T.S



SECTION F

SEE DWG C-55

2 0 2 4
GRAPHIC SCALE
HOR 1/2"=1'-0"

2 0 2 4
GRAPHIC SCALE
VER 1/2"=1'-0"

RONALD H. COOK
062-048322
REGISTERED PROFESSIONAL ENGINEER OF ILLINOIS

DATE: 02-14-2003
EXPIRES: 11-30-2003
Sargent & Lundy LLC's Illinois Department of Professional Regulation registration number is 184-000106

Sargent & Lundy LLC

CAD FILE:

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REFERENCE DRAWINGS

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0.1	02-14-2003	FOR PERMIT	MED	VP	———

NO.	DATE	REVISION	PREP'D	REV'D	APPR'D

SCALE: 1/4"=1'-0"
DWN. M.DOWNS DATE 02-12-02
CHK. V.PATEL DATE 02-14-03
APPV. DATE

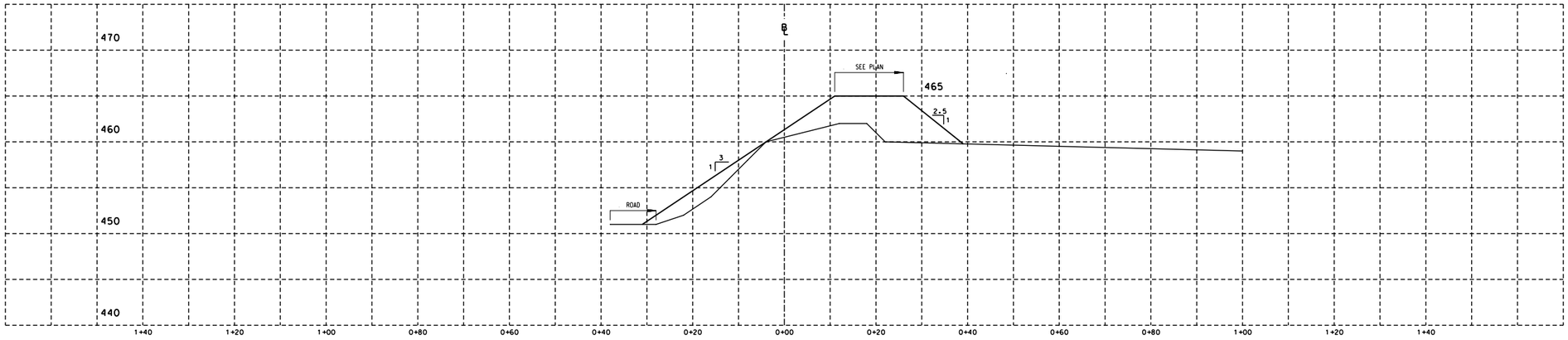
DYNEGY

SECTIONS AND DETAILS - SHEET 4

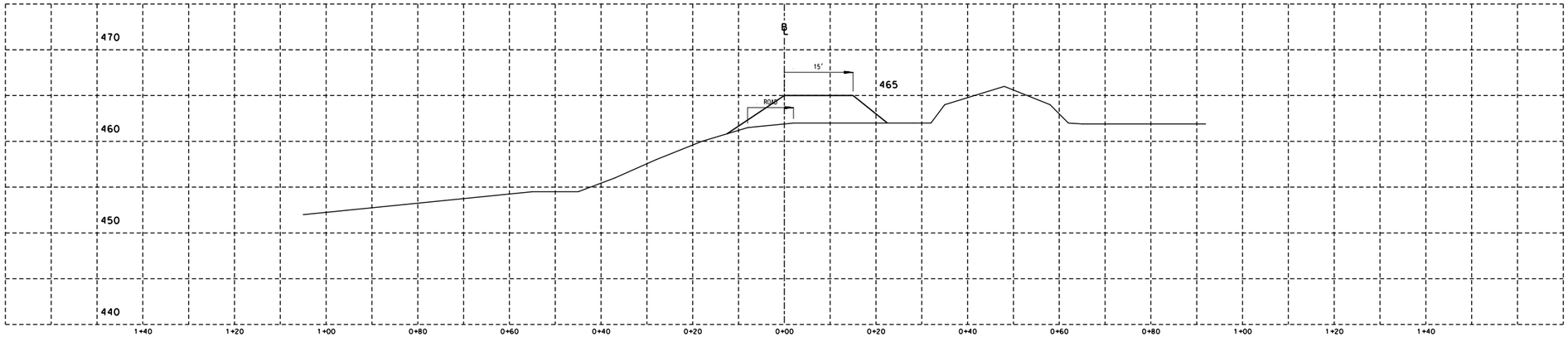
MODIFICATION TO PRIMARY ASH POND
HENNEPIN POWER STATION

PROJECT NO.: 08820-331
CLIENT: DYNEGY MIDWEST GENERATION
DWG. NO.: C-59 REV. 0.1

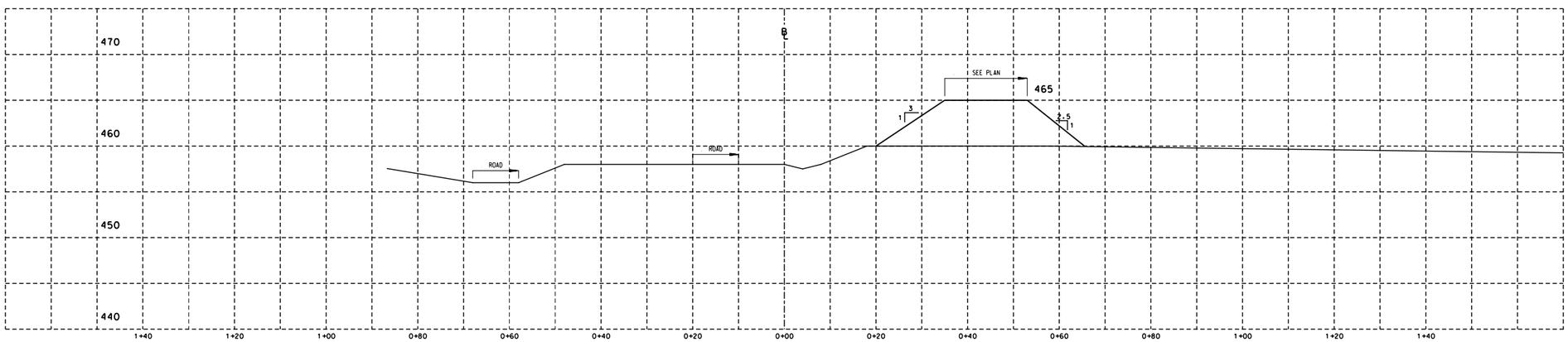
E-MOR1-S191-1.DGN VAX
01-10-2001
02-13-03 ALS



STATION 9+50



STATION 5+00



STATION 1+00

LEDGEND

- ℄ REFERENCE BASE LINE SHOWN ON PLAN
- OLD BERM
- NEW BERM
- ▽ WATER LINE
- ✳ ESTIMATED ELEVATION

NO	DATE	DRF	DESCRIPTION	E	C	A
0						

NOTES

REFERENCES

REVISION STATUS
□ -CONSTRUCTION
○ -RECORD
(0)

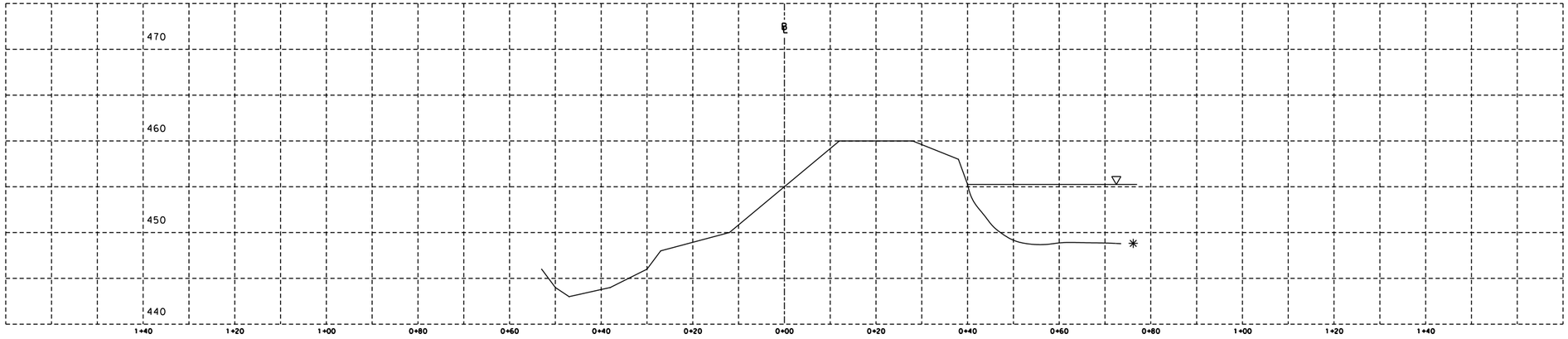
ILLINOIS POWER COMPANY
DECATUR

CROSS SECTIONS OF
ASH POND BERM EXTENSION
STA 1+00, 5+00 & 9+50
HENNEPIN POWER STATION

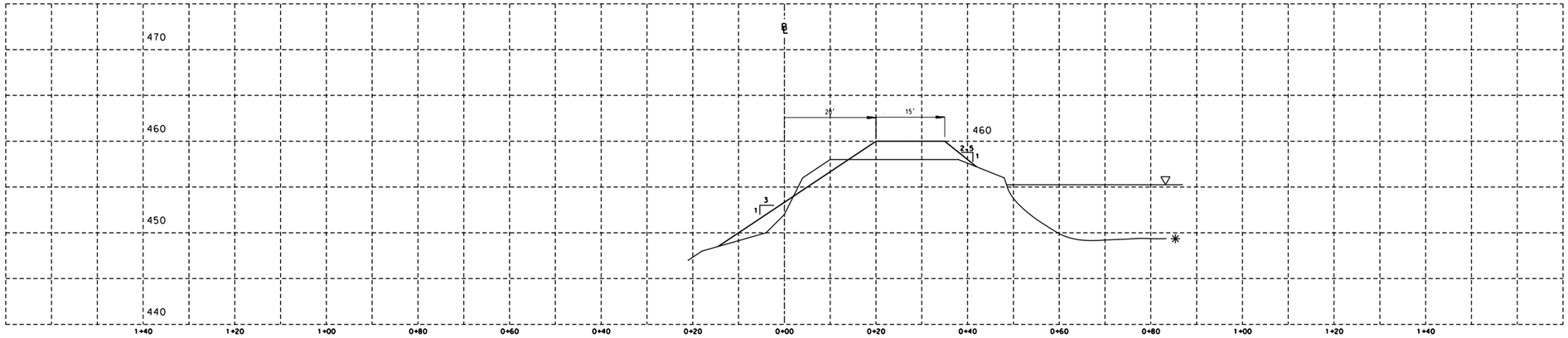
DR GRH	CAD EM	DATE 12-30-87
OK	CKD	SCALE 1"=10'H,1"=5'V
APP	PLOTTED 11-4-97	E-HEN1-B452
APP		

COMPUTER DNG. - DO NOT REVISE MANUALLY

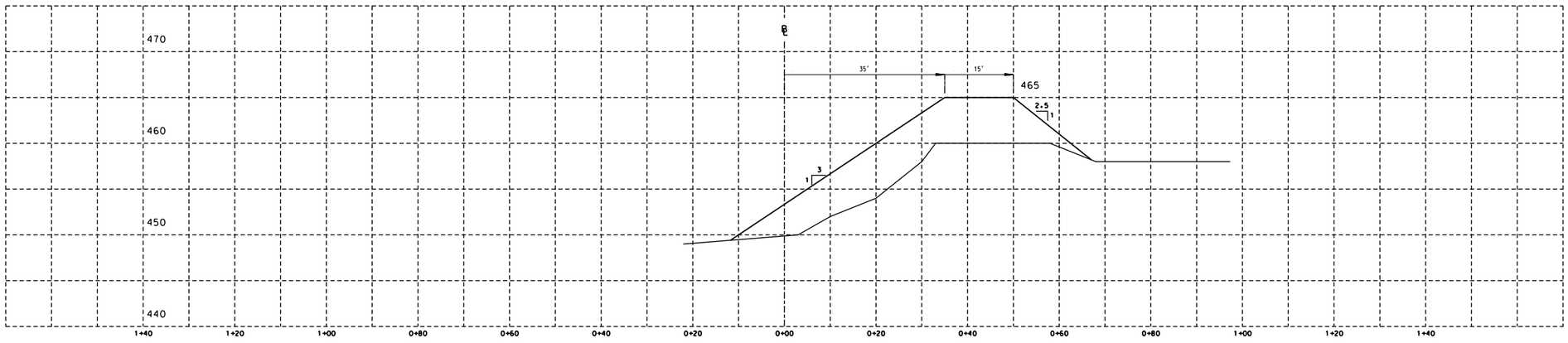
E-HEN1-B452



STATION 26+00



STATION 20+80



STATION 14+25

LEGEND

- ℄ REFERENCE BASE LINE SHOWN ON PLAN
- OLD BERM
- NEW BERM
- ▽ WATER LINE
- ✳ ESTIMATED ELEVATION

NO	DATE	DRF	DESCRIPTION	E	C	A	NO	DATE	DRF	DESCRIPTION	E	C	A
(0)													

NOTES

REFERENCES

REVISION STATUS
□ -CONSTRUCTION
○ -RECORD
(0)

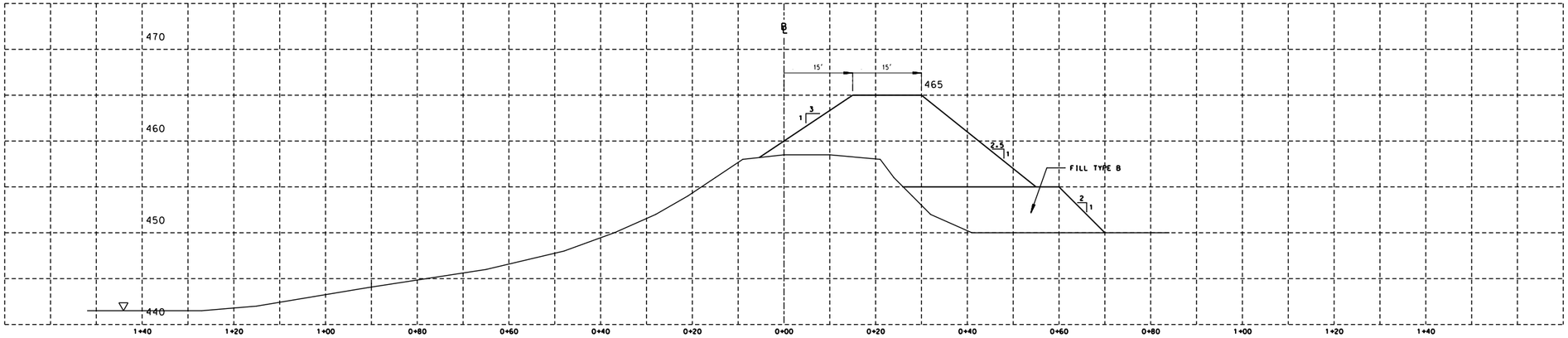
ILLINOIS POWER COMPANY
DECATUR

CROSS SECTIONS OF
ASH POND BERM EXTENSION
STA 14+25, 20+80 & 26+00
HENNEPIN POWER STATION

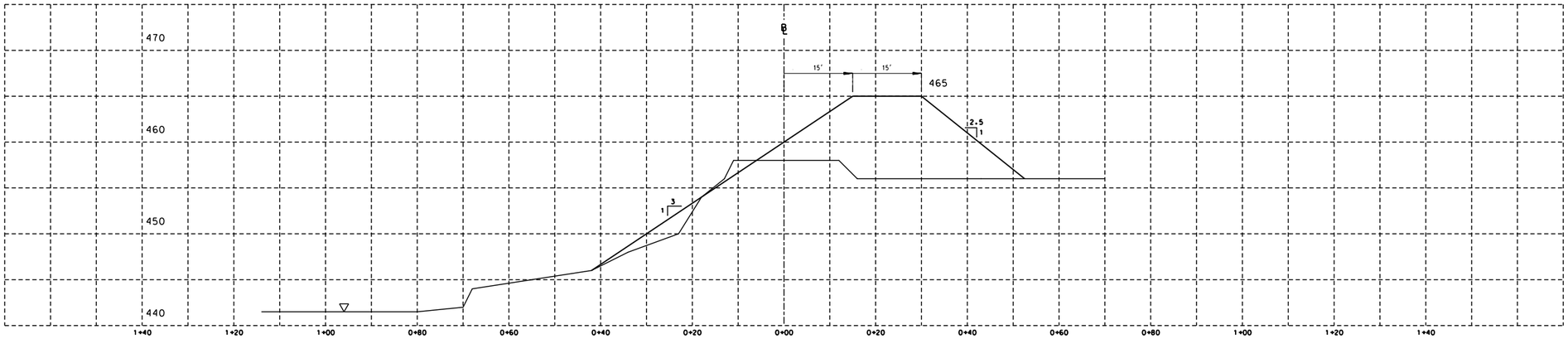
DR GRH	CAD EM	DATE 12-30-87
CK	CKD	SCALE 1"=10' H. 1"=5' V
APP	PLOTTED 11-4-97	E-HEN1-B453
APP		

COMPUTER DNG. - DO NOT REVISE MANUALLY

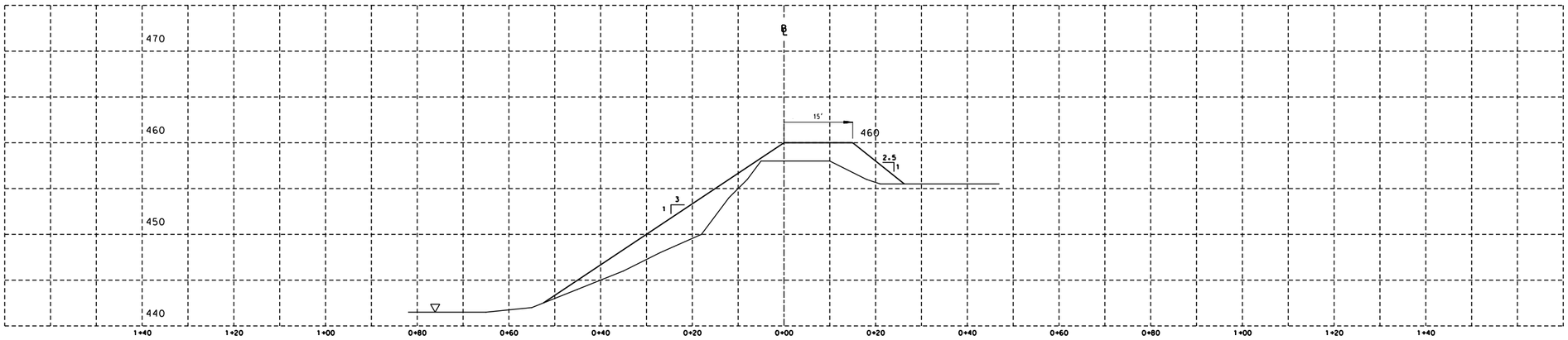
E-HEN1-B453



STATION 39+00



STATION 35+00



STATION 30+00

LEDGEND

- ℄ REFERENCE BASE LINE SHOWN ON PLAN
- OLD BERM
- NEW BERM
- ▽ WATER LINE
- ✳ ESTIMATED ELEVATION

NO	DATE	DRF	DESCRIPTION	E	C	A	NO	DATE	DRF	DESCRIPTION	E	C	A
⓪													

NOTES

REFERENCES

REVISION STATUS
□ -CONSTRUCTION
○ -RECORD
⓪

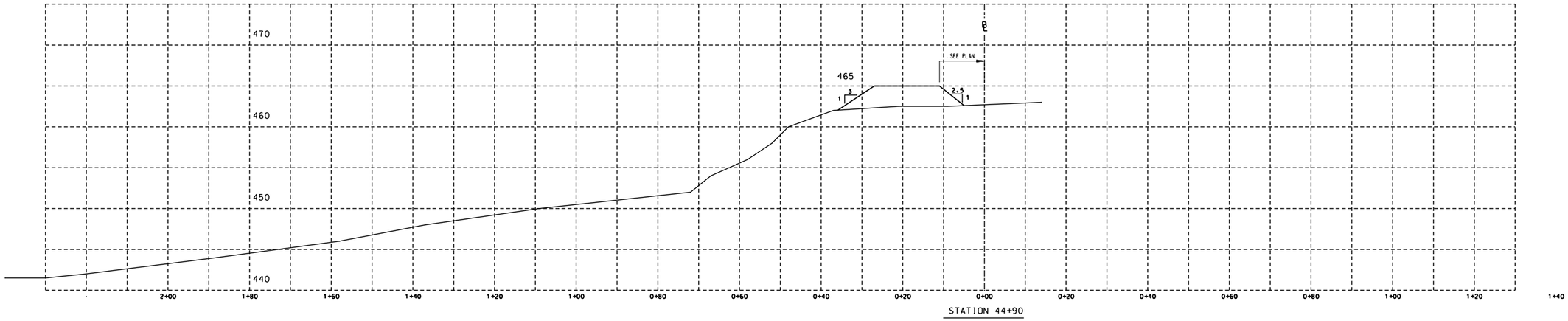
ILLINOIS POWER COMPANY
DECATUR

CROSS SECTIONS OF
ASH POND BERM EXTENSION
STA 30+00, 35+00 & 39+00
HENNEPIN POWER STATION

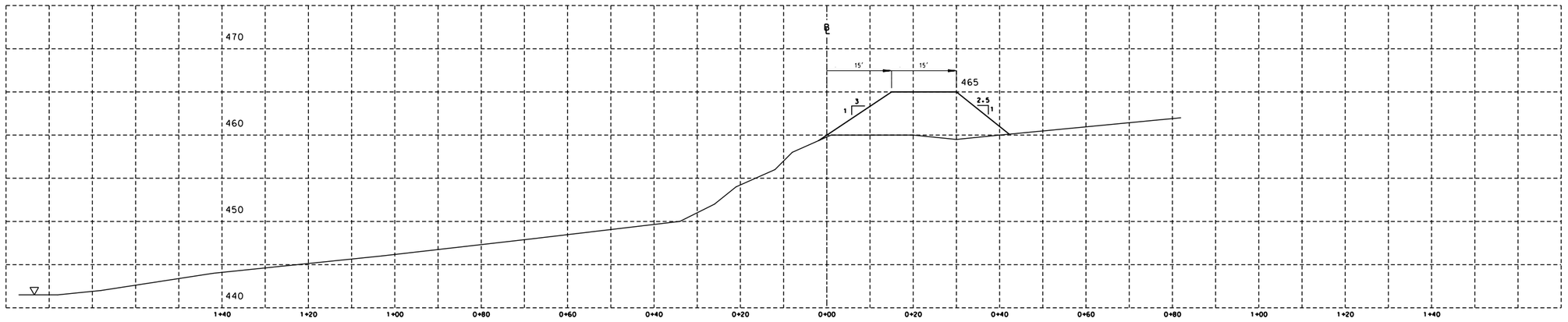
DR GRH	CAD EM	DATE 12-30-87
DK	CKD	SCALE 1"=10'H, 1"=5'V
APP	PLOTTED 11-4-97	E-HEN1-B454
APP		

E-HEN1-B454

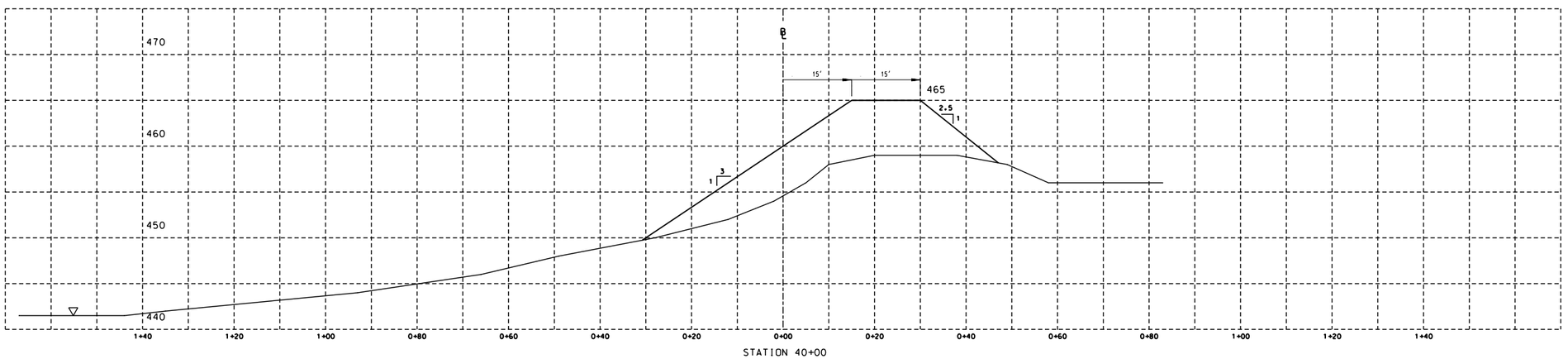
COMPUTER DWG. - DO NOT REVISE MANUALLY



STATION 44+90



STATION 42+00



STATION 40+00

LEDGEND

- ℄ REFERENCE BASE LINE SHOWN ON PLAN
- OLD BERM
- NEW BERM
- ▽ WATER LINE
- ✳ ESTIMATED ELEVATION

NO	DATE	DRF	DESCRIPTION	E	C	A	NO	DATE	DRF	DESCRIPTION	E	C	A
(0)													

NOTES

REFERENCES

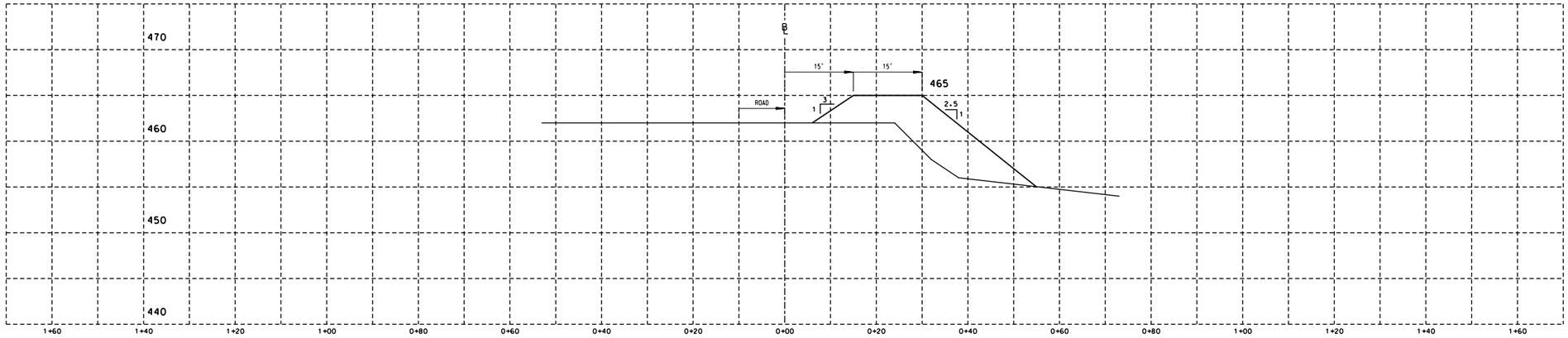
REVISION STATUS
□ -CONSTRUCTION
○ -RECORD
(0)

ILLINOIS POWER COMPANY
DECATUR
CROSS SECTIONS OF
ASH POND BERM EXTENSION
STA 40+00, 42+00 & 44+90
HENNEPIN POWER STATION

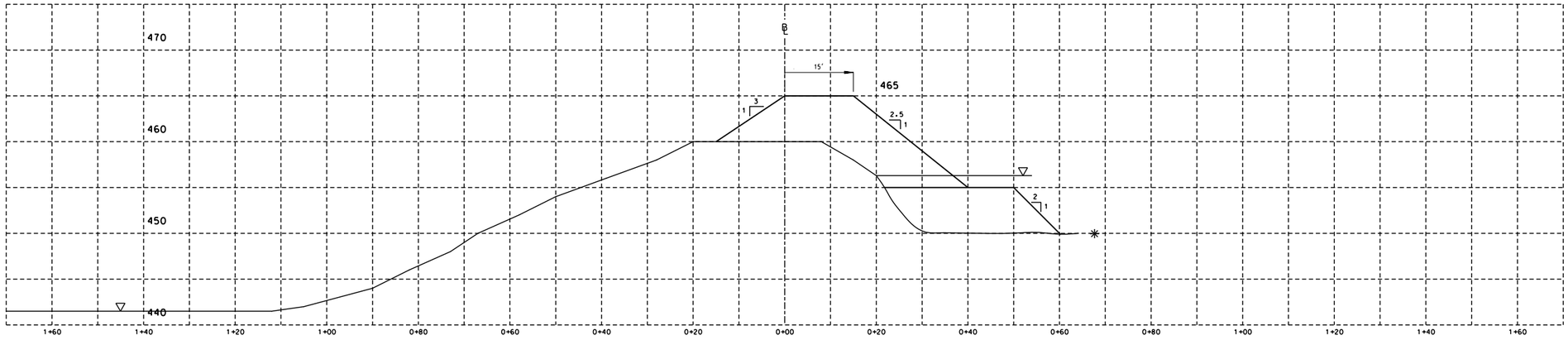
DR GRH	CAD EM	DATE 12-30-87
DK	CKD	SCALE 1"=10'H.1"=5'V
APP	PLOTTED 11-4-97	E-HEN1-B455
APP		

COMPUTER DWG. - DO NOT REVISE MANUALLY

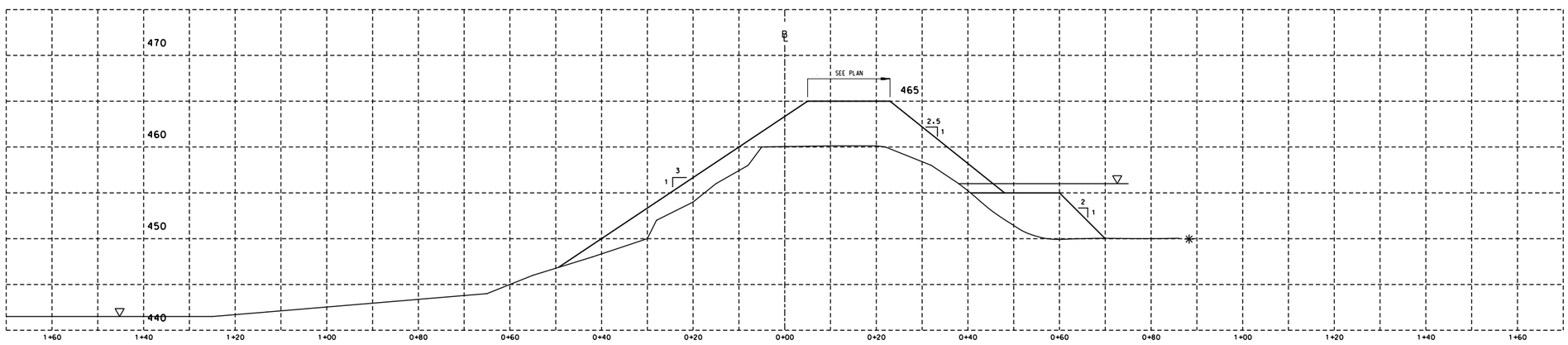
E-HEN1-B455



STATION 56+00



STATION 51+00



STATION 47+00

LEDGEND

- ℄ REFERENCE BASE LINE SHOWN ON PLAN
- OLD BERM
- NEW BERM
- ▽ WATER LINE
- ✳ ESTIMATED ELEVATION

NO	DATE	DRF	DESCRIPTION	E	C	A	NO	DATE	DRF	DESCRIPTION	E	C	A
(0)													

NOTES

REFERENCES

REVISION STATUS
□ -CONSTRUCTION
○ -RECORD
(0)

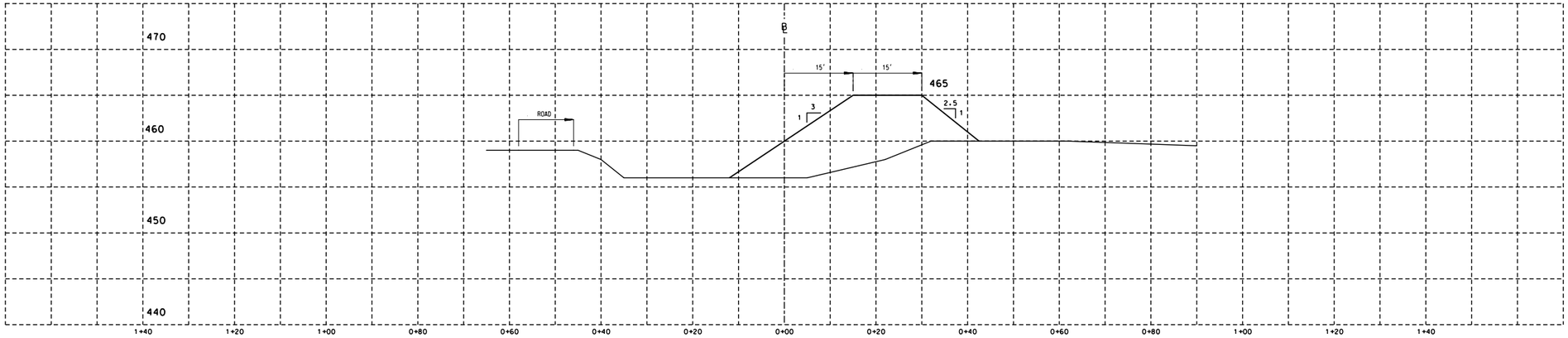
ILLINOIS POWER COMPANY
DECATUR

CROSS SECTIONS OF
ASH POND BERM EXTENSION
STA 47+00, 51+00 & 56+00
HENNEPIN POWER STATION

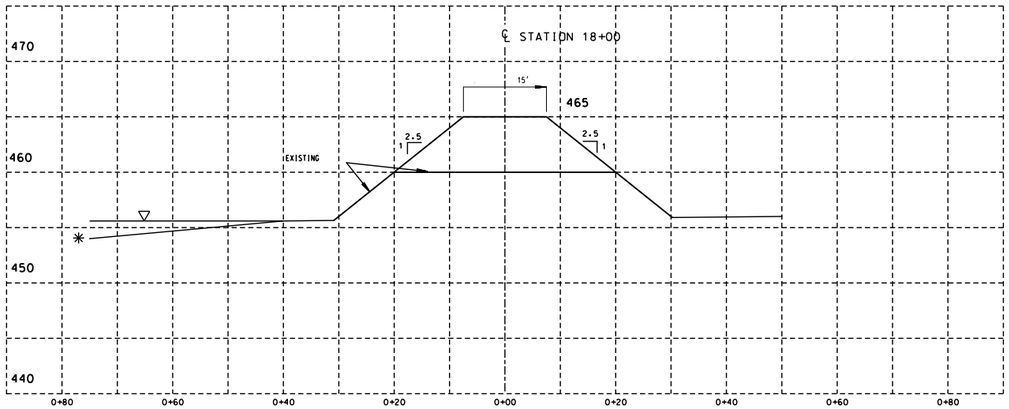
DR CRH	CAD EM	DATE 12-30-87
DR	CKD	SCALE 1"=10' H, 1"=5' V
APP	PLOTTED 11-4-97	E-HEN1-B456
APP		

E-HEN1-B456

COMPUTER DWG. - DO NOT REVISE MANUALLY



STATION 61+50



SECTION A-A

LEDGEND

- ℄ REFERENCE BASE LINE SHOWN ON PLAN
- OLD BERM
- NEW BERM
- ▽ WATER LINE
- ✳ ESTIMATED ELEVATION

NO	DATE	DRF	DESCRIPTION	E	C	A	NO	DATE	DRF	DESCRIPTION	E	C	A
0													

NOTES

REFERENCES

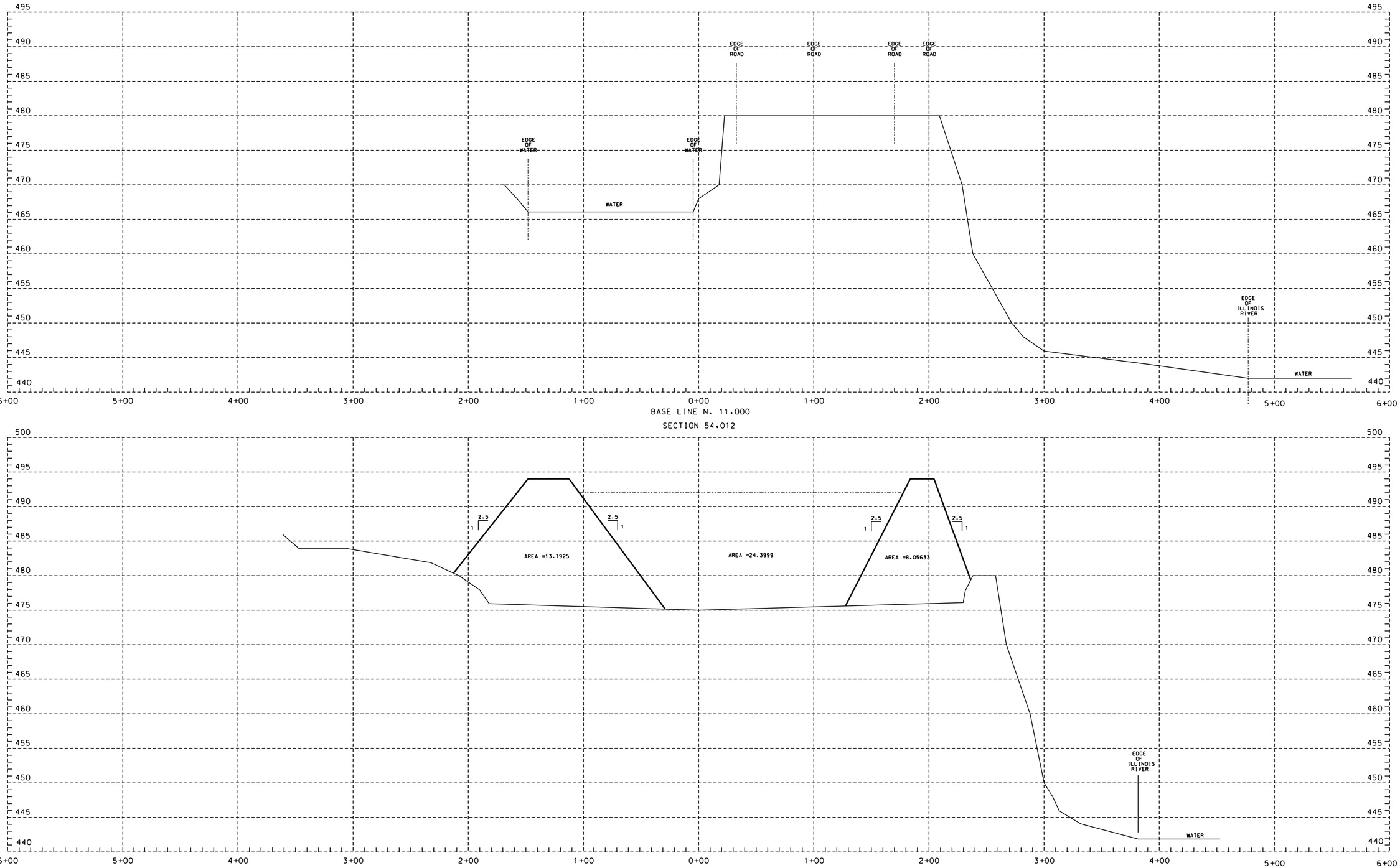
REVISION STATUS
D-CONSTRUCTION
R-RECORD
D: 0

ILLINOIS POWER COMPANY
DECATUR
CROSS SECTIONS OF
ASH POND BERM EXTENSION
STA 61+50
HENNEPIN POWER STATION

DR GRH	CAD EM	DATE 12-30-87
CK	CKD	SCALE 1"=10'H, 1"=5'V
APP	PLOTTED 11-4-97	E-HEN1-B457
APP		

E-HEN1-B457

COMPUTER DWG. - DO NOT REVISE MANUALLY



NO	DATE	DRF	DESCRIPTION	E	C	A	NO	DATE	DRF	DESCRIPTION	E	C	A
0													

NOTES

1. DATA COLLECTED FROM TOPO ON DWG. CE-HEN1-B-450 DATED NOV. 4, 1987, REV. 0
2. COORDINATES WERE SUPPLIED BY G. DECKARD FIELD INFORMATION TIEING TO J.L. FISHER'S PANELS.

REFERENCES

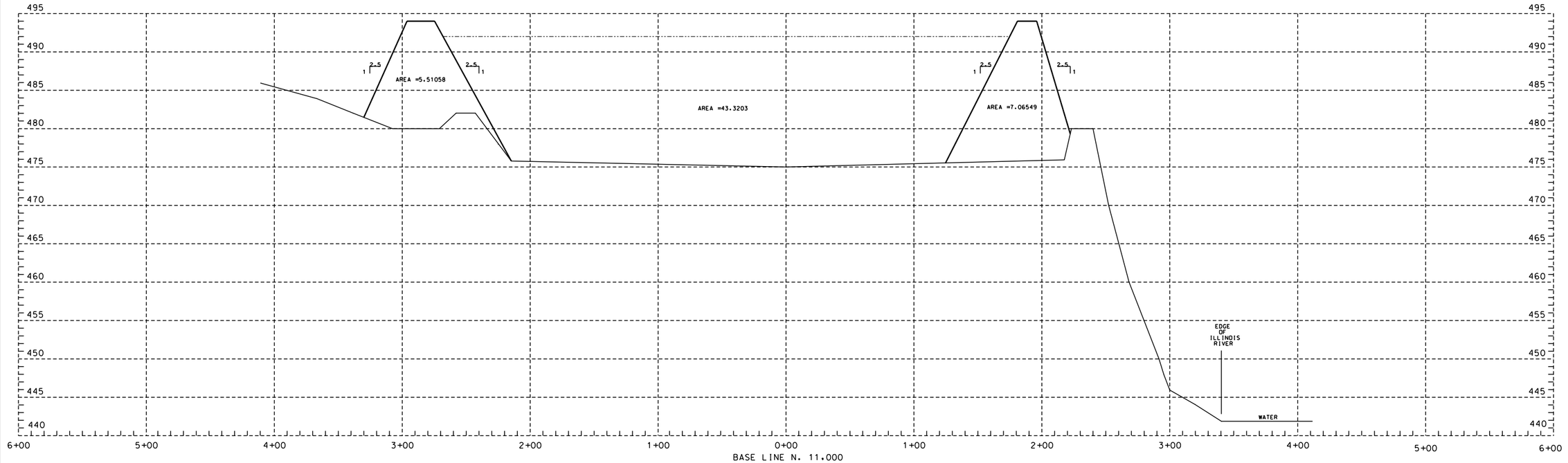
REVISION STATUS
○ -CONSTRUCTION
○ -RECORD

0

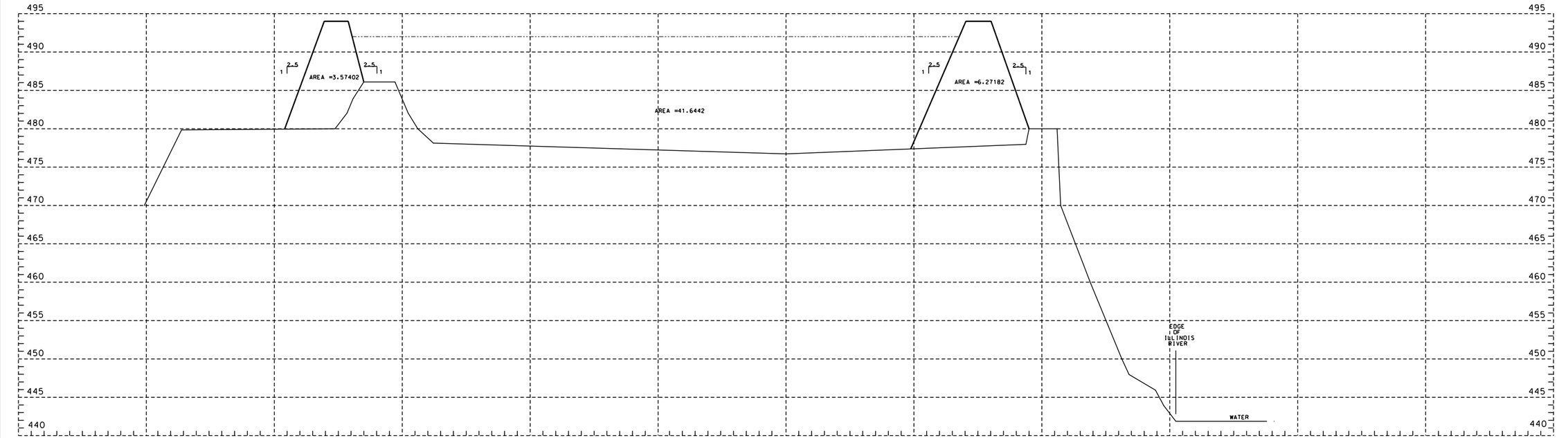
ILLINOIS POWER COMPANY
DECATUR

CROSS SECTIONS EAST ASH POND EXTENSION HENNEPIN POWER STATION

DR	WJM	CAD WJM	DATE 1-11-89
DK		CKD	SCALE 1"=5' V. 1"=30' H.
APP		PLOTTED 03-08-90	CE-HEN1-B458-1
APP			



BASE LINE N. 11.000
SECTION E. 53.692



BASE LINE N. 11.000
SECTION E. 53.492

NO	DATE	DRF	DESCRIPTION	E	C	A	NO	DATE	DRF	DESCRIPTION	E	C	A
0													

NOTES

1. DATA COLLECTED FROM TOPO ON DWG. CE-HEN1-B-450 DATED NOV. 4, 1987, REV. 0
2. COORDINATES WERE SUPPLIED BY G. DECKARD FIELD INFORMATION TIEING TO J.L. FISHER'S PANELS.

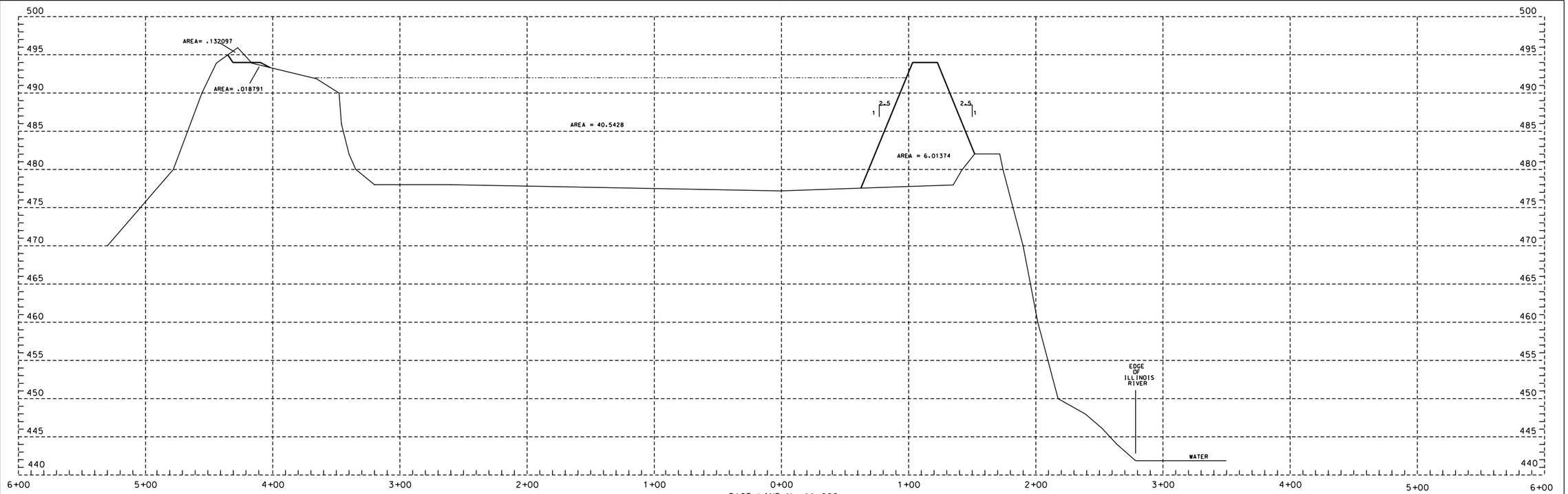
REFERENCES

REVISION STATUS
C -CONSTRUCTION
R -RECORD
0

ILLINOIS POWER COMPANY
DECATUR

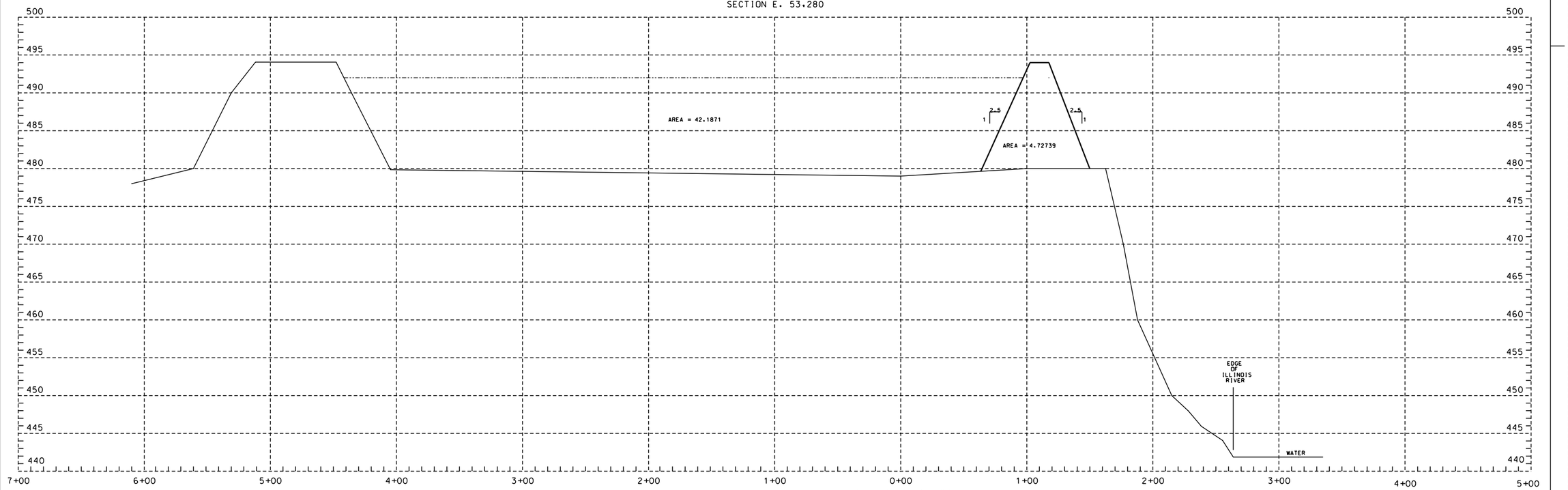
CROSS SECTIONS
EAST ASH POND EXTENSION
HENNEPIN POWER STATION

DR WJM	CAD WJM	DATE 1-12-89	
OK	CKD	SCALE 1"=5' V. 1"=30' H.	
APP	PLOTTED 03-08-90	CE-HEN1-B458-2	
APP			



BASE LINE N. 11.000

SECTION E. 53.280



BASE LINE N. 11.000

SECTION E. 53.080

NO	DATE	DRF	DESCRIPTION	E	C	A
0						

NOTES

1. DATA COLLECTED FROM TOPO ON DWG. CE-HEN1-B-450 DATED NOV. 4. 1987. REV. 0
2. COORDINATES WERE SUPPLIED BY G. DECKARD FIELD INFORMATION TIEING TO J.L. FISHER'S PANELS.

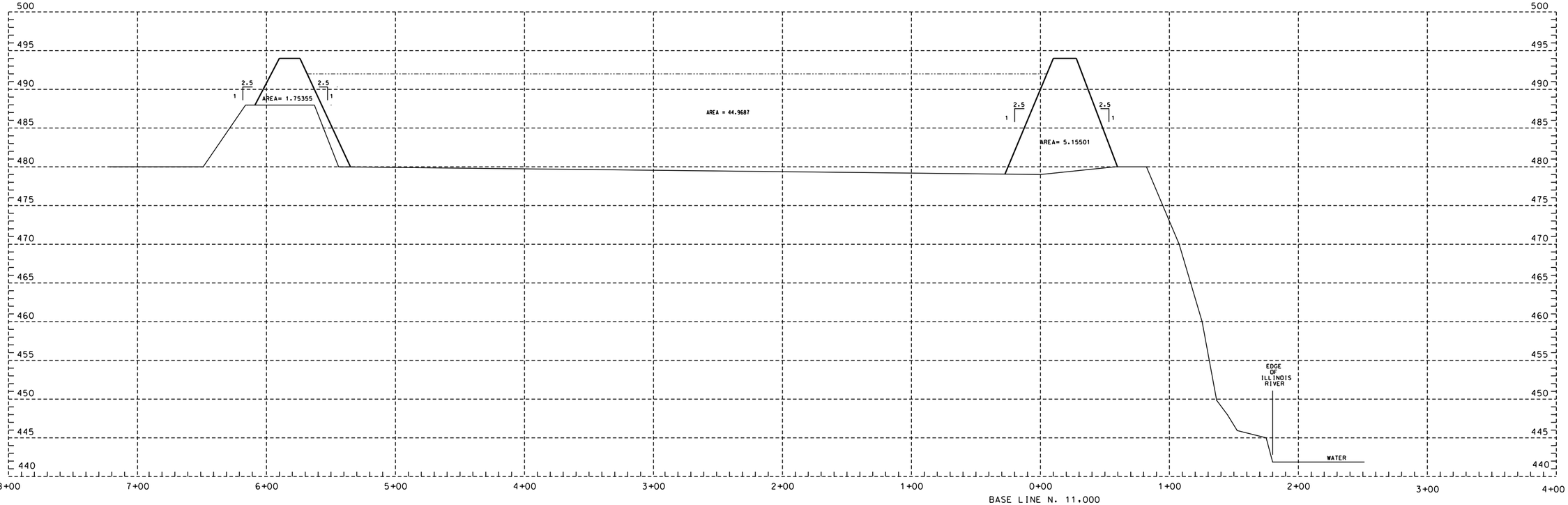
REFERENCES

REVISION STATUS
□ -CONSTRUCTION
○ -RECORD

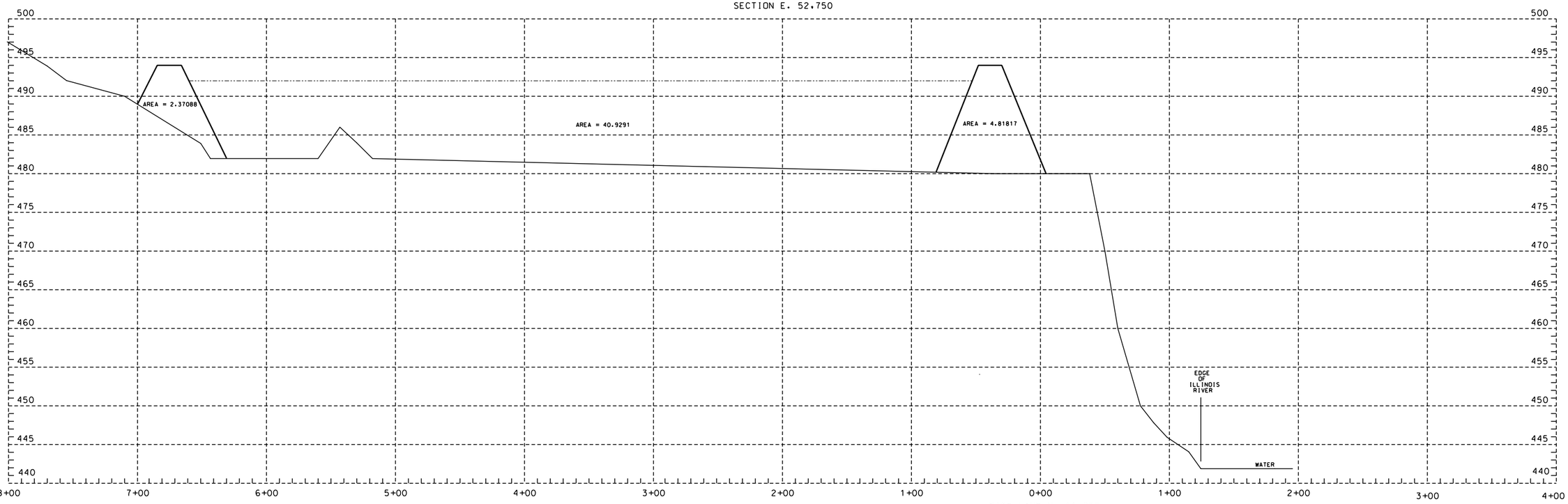
ILLINOIS POWER COMPANY
DECATUR

CROSS SECTIONS
EAST ASH POND EXTENSION
HENNEPIN POWER STATION

DR WJM	CAD WJM	DATE 1-12-89	
DK	CKD	SCALE 1"=5' V. 1"=30' H.	
APP	PLOTTED 03-08-90	CE-HEN1-B458-3	
APP			



SECTION E. 52.750



SECTION E. 52.448

NO	DATE	DRF	DESCRIPTION	E	C	A	NO	DATE	DRF	DESCRIPTION	E	C	A
0													

NOTES

1. DATA COLLECTED FROM TOPO ON DWG. CE-HEN1-B-450 DATED NOV. 4, 1987, REV. 0
2. COORDINATES WERE SUPPLIED BY G. DECKARD FIELD INFORMATION TIEING TO J.L. FISHER'S PANELS.

REFERENCES

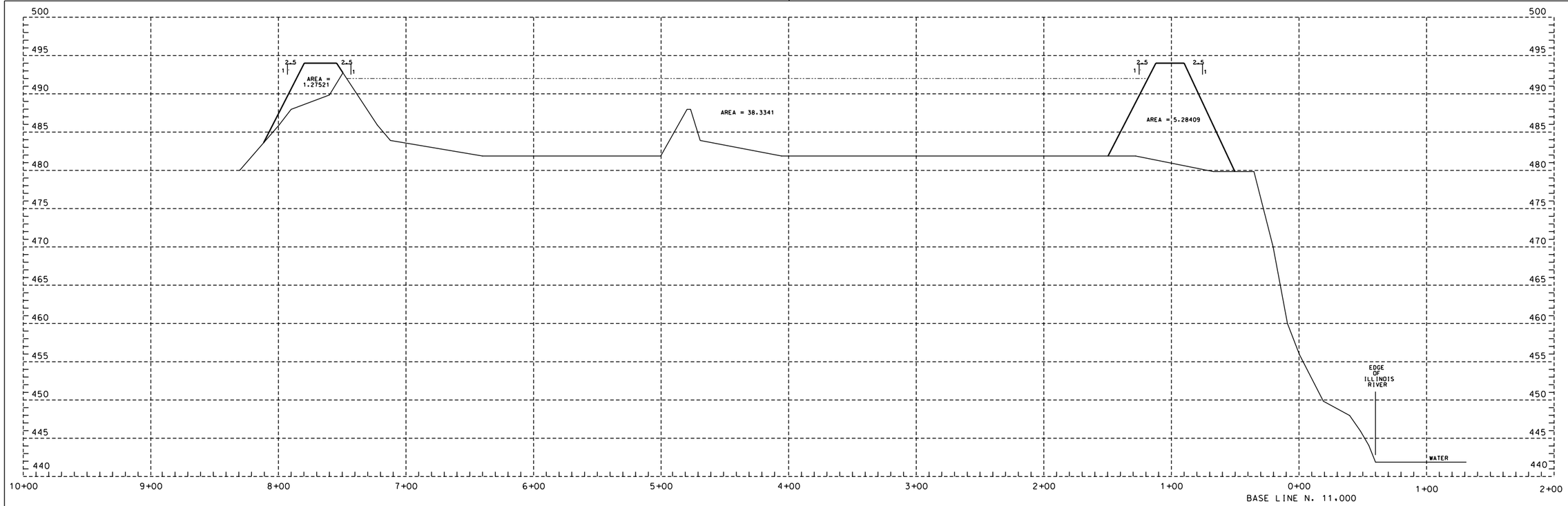
REVISION STATUS
□ -CONSTRUCTION
○ -RECORD

0

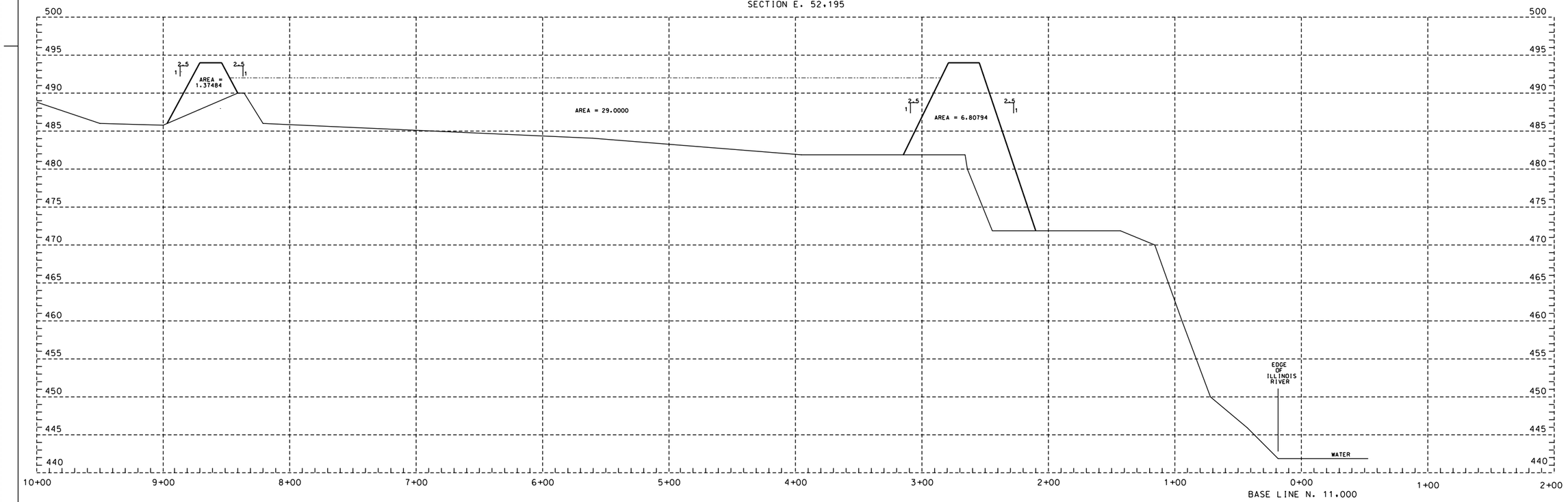
ILLINOIS POWER COMPANY
DECATUR

CROSS SECTIONS EAST ASH POND EXTENSION HENNEPIN POWER STATION

DR WJM	CAD WJM	DATE 1-12-89	
DK	CKD	SCALE 1"=5' V. 1"=30' H.	
APP	PLOTTED 03-08-90	CE-HEN1-B458-4	
APP			



SECTION E. 52.195



SECTION E. 51.920

NO	DATE	DRF	DESCRIPTION	E	C	A	NO	DATE	DRF	DESCRIPTION	E	C	A
0													

NOTES

1. DATA COLLECTED FROM TOPO ON DWG. CE-HEN1-B-450 DATED NOV. 4. 1987. REV. 0
2. COORDINATES WERE SUPPLIED BY G. DECKARD FIELD INFORMATION TIEING TO J.L. FISHER'S PANELS.

REFERENCES

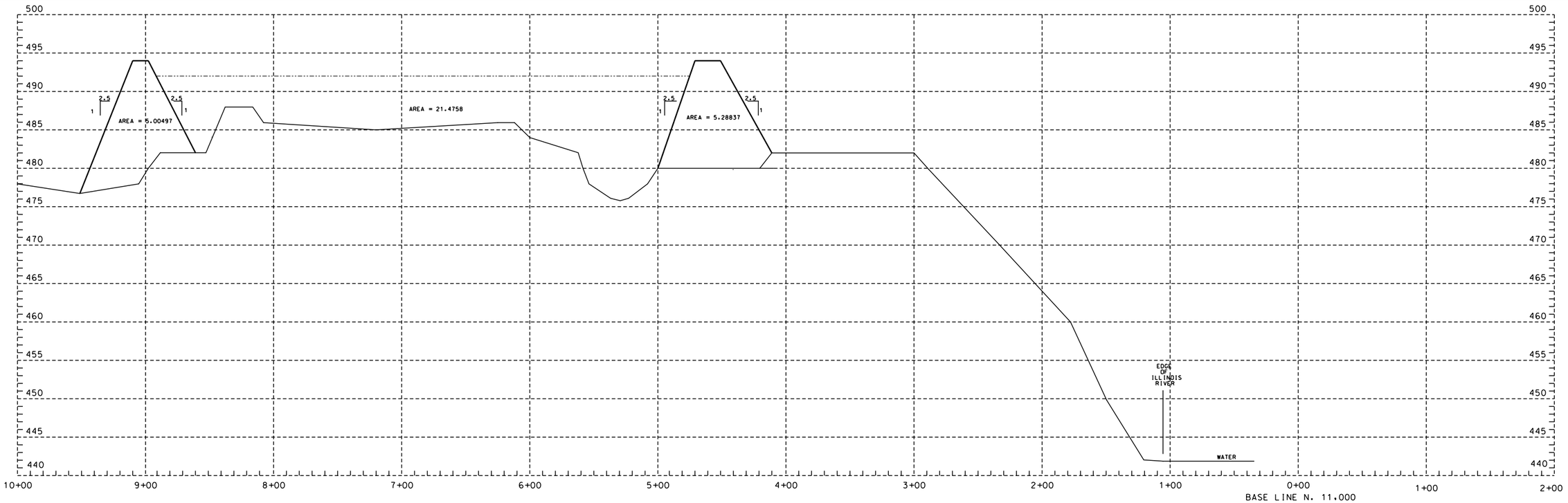
REVISION STATUS
O -CONSTRUCTION
O -RECORD

0

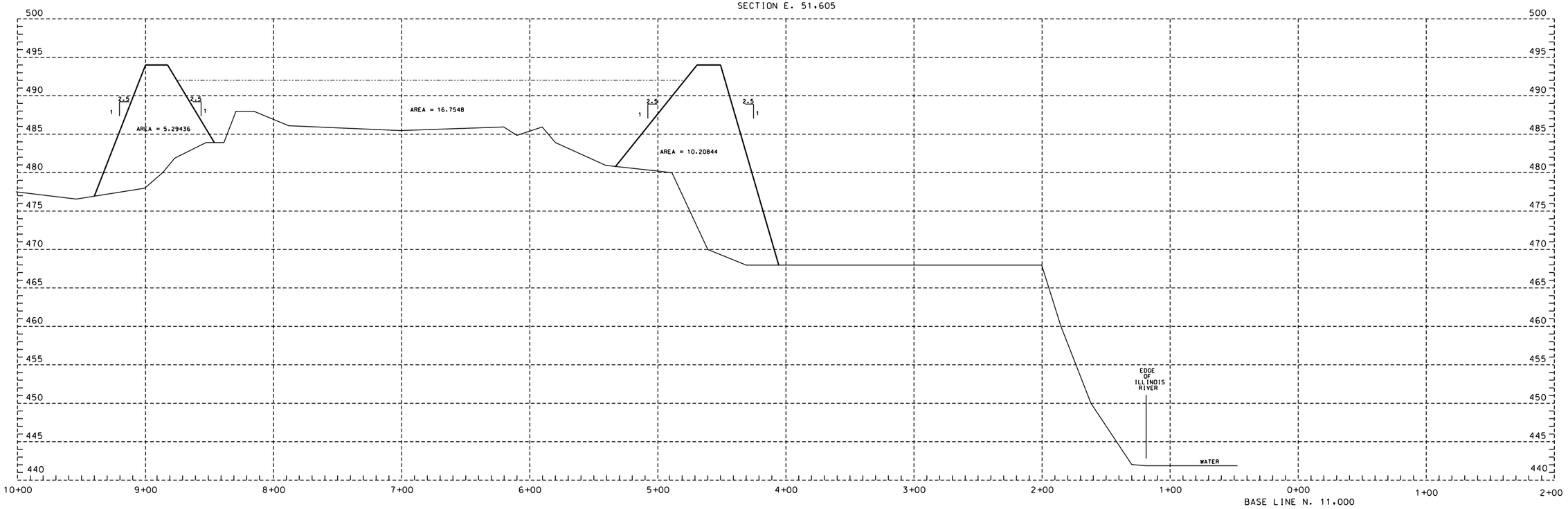
ILLINOIS POWER COMPANY
DECATUR

CROSS SECTIONS
EAST ASH POND EXTENSION
HENNEPIN POWER STATION

DR	WJM	CAD WJM	DATE 1-12-89
DK		CKD	SCALE 1"=5' V. 1"=30' H.
APP		PLOTTED 03-08-90	CE-HEN1-B458-5
APP			



SECTION E. 51.605



SECTION E. 51.552

NO	DATE	DRF	DESCRIPTION	E	C	A	NO	DATE	DRF	DESCRIPTION	E	C	A
0													

NOTES

1. DATA COLLECTED FROM TOPO ON DWG. CE-HEN1-B-450 DATED NOV. 4, 1987, REV. 0
2. COORDINATES WERE SUPPLIED BY G. DECKARD FIELD INFORMATION TIEING TO J.L. FISHER'S PANELS.

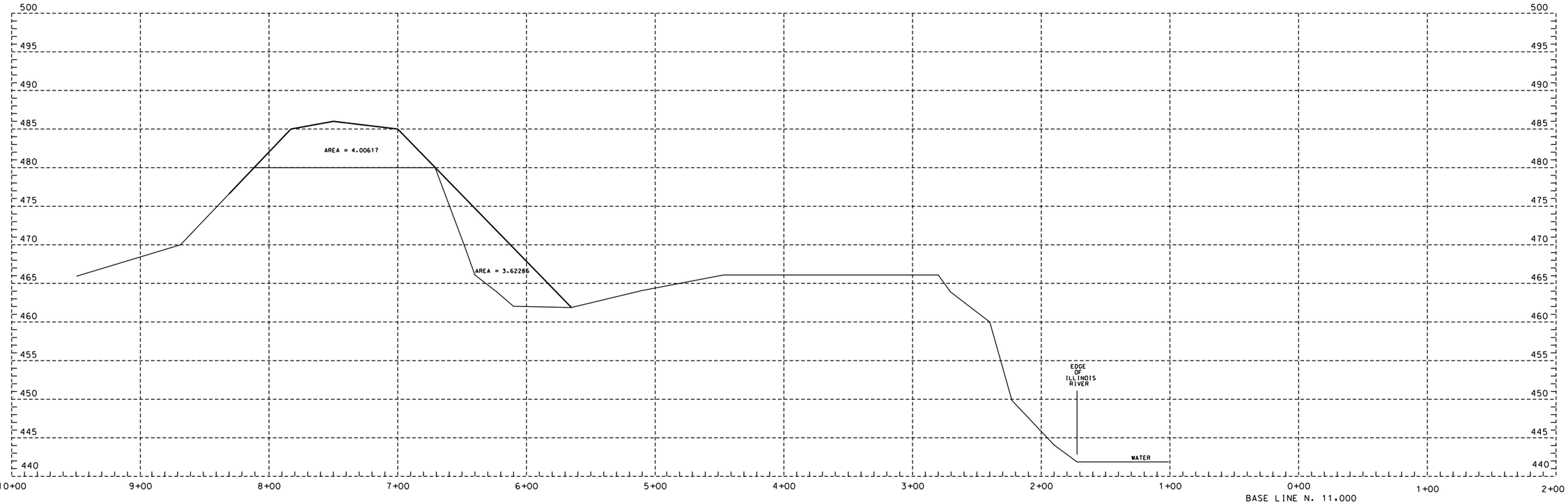
REFERENCES

REVISION STATUS
○ -CONSTRUCTION
○ -RECORD
0

ILLINOIS POWER COMPANY
DECATUR

CROSS SECTIONS
EAST ASH POND EXTENSION
HENNEPIN POWER STATION

DR	WJM	CAD WJM	DATE 1-12-89
DK		CKD	SCALE 1"=5' V. 1"=30' H.
APP		PLOTTED 03-08-90	CE-HEN1-B458-6
APP			



SECTION E. 51.285

NO	DATE	DRF	DESCRIPTION	E	C	A	NO	DATE	DRF	DESCRIPTION	E	C	A
0													

NOTES

1. DATA COLLECTED FROM TOPO ON DWG. CE-HEN1-B-450 DATED NOV. 4. 1987. REV. 0
2. COORDINATES WERE SUPPLIED BY G. DECKARD FIELD INFORMATION TIEING TO J.L. FISHER'S PANELS.

REFERENCES

REVISION STATUS
□ -CONSTRUCTION
○ -RECORD

0

ILLINOIS POWER COMPANY
DECATUR

CROSS SECTIONS
EAST ASH POND EXTENSION
HENNEPIN POWER STATION

DR	WJM	CAD WJM	DATE 1-12-89
DK		CKD	SCALE 1"=5' V. 1"=30' H.
APP		PLOTTED 03-08-90	CE-HEN1-B458-7
APP			

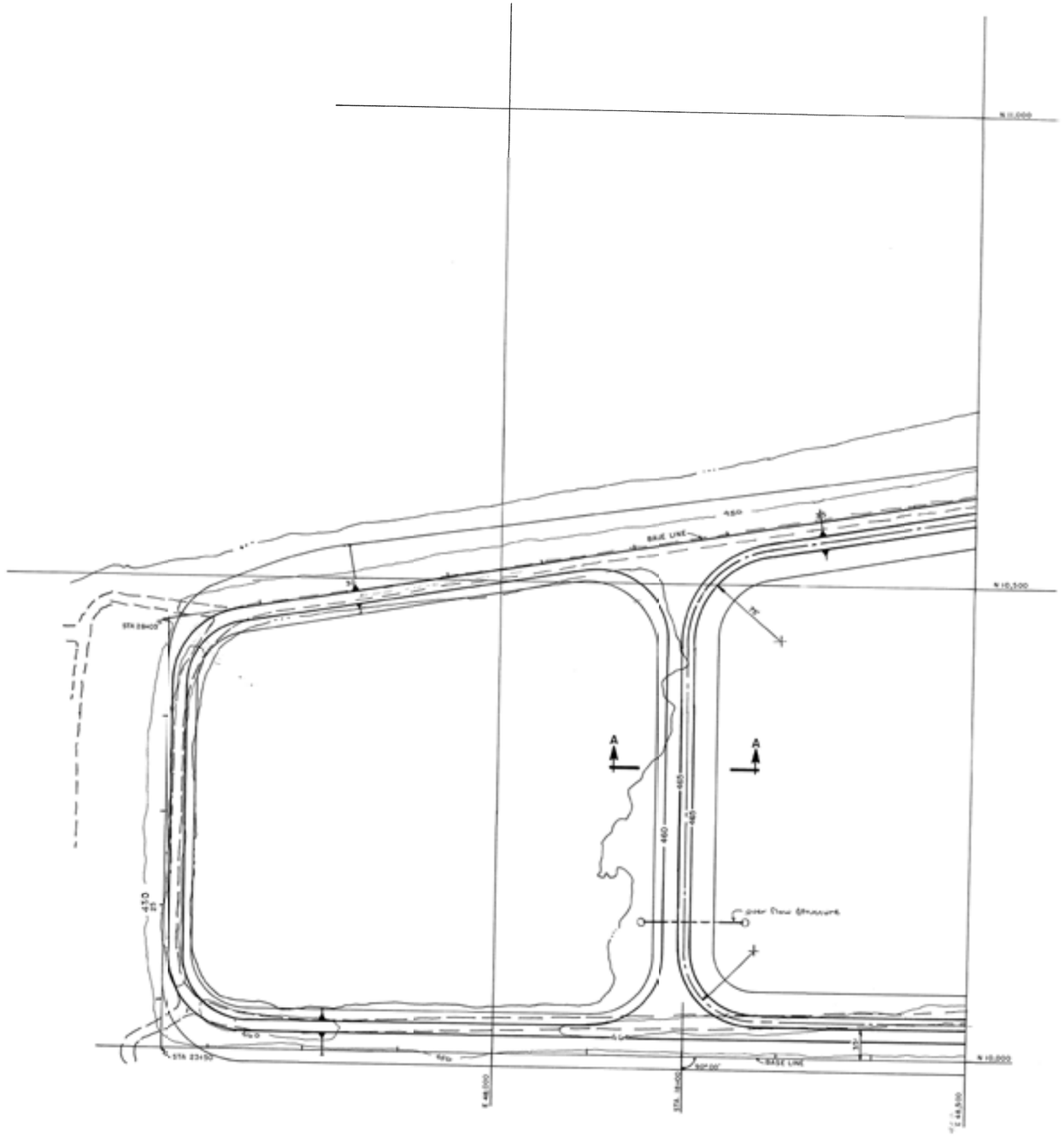
E-HEN1-B460-1

REVISION STATUS: C = CONSTRUCTION, R = RECORD	ILLINOIS POWER COMPANY, DECATUR	
	PLAN-UNITS ASH POND EXTENSION, HENNEPIN POWER STATION, SHEET 4 of 1	
DR. G.R.H.	TR.	CHK.
DES. JDO	DATE 2-2-88	SCALE 1"=50'
APP.	PROJECTED	E-HEN1-B460-1
APP.		

PLATE NO. 1

Scanned by Illinois Power Company

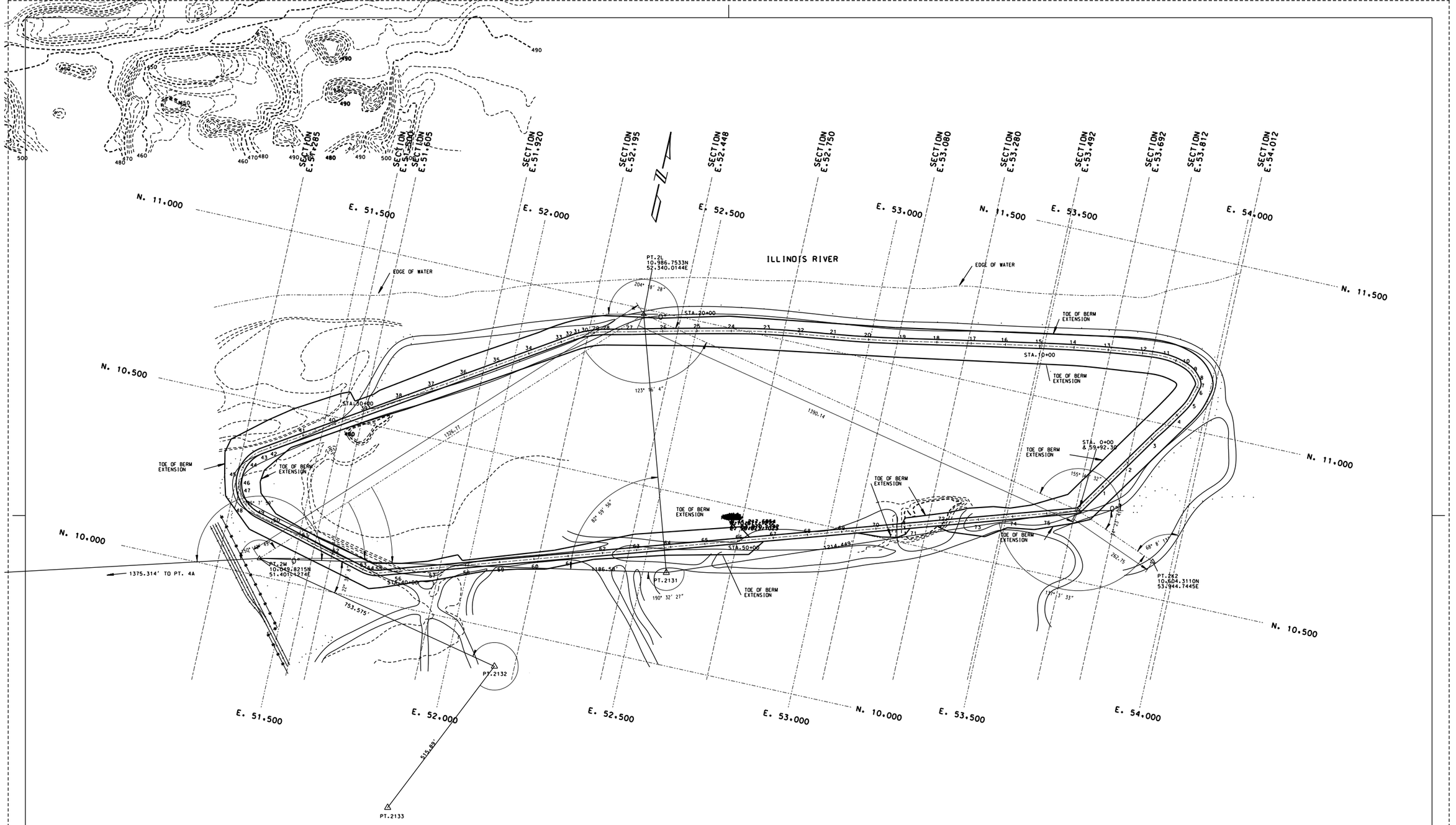
E-HEN1-B460-2



REVISION STATUS 1 CONSTRUCTION 2 RECORD	ILLINOIS POWER COMPANY DECATUR	
	PLAN - UNITH ASH POND EXTENSION HENNEPIN POWER STATION SHEET #2	
DR. G. H. H.	DES.	
CH. JWD	DATE 2-2-88	SCALE 1"=50'
APP.	PRINTED	E-HEN1-B460-2

PLATE NO. 1

Scanned by Illinois Power Company



NO	DATE	DRF	DESCRIPTION	E	C	A	NO	DATE	DRF	DESCRIPTION	E	C	A
0													

NOTES

REFERENCES

NOTE: TOPO WAS DIGITIZED FROM DWG. CE-HEN1-B-450 DATED 11-4-87

REVISION STATUS
□ -CONSTRUCTION
○ -RECORD

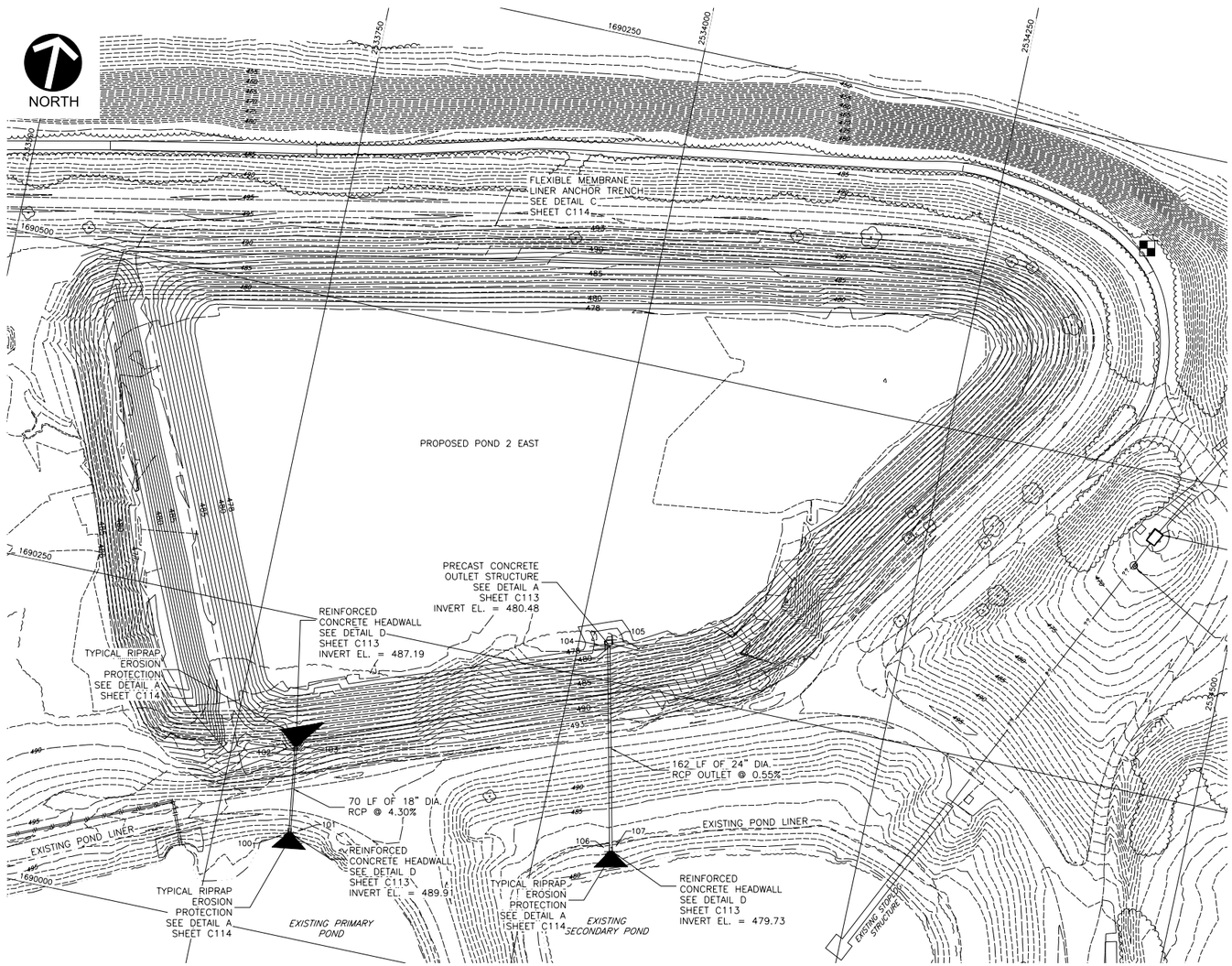
0

ILLINOIS POWER COMPANY
DECATUR

CONTOUR AND GRADING PLAN
UNIT #2 ASH POND EXTENSION
HENNEPIN POWER STATION

DR WJM	CAD WJM	DATE 1-11-89	
DR	CKD	SCALE 1"=100'	
APP	PLOTTED 03-08-90	CE-HEN1-B461	
APP			

DVO.1.2.3.4.5



SCALE IN FEET
0 40 80
DRAWING NOT TO SCALE IF SCALE BAR DOES NOT MEASURE 2 INCHES

REFERENCE

1. TOPOGRAPHIC INFORMATION BASED UPON AERIAL SURVEY CONDUCTED BY SURDEX CORPORATION FLOWN ON OCTOBER 26, 2008.

STRUCTURE TABLE		
Point #	Northing	Easting
100	1690080.864	2533807.450
101	1690081.207	2533809.928
102	1690149.246	2533797.977
103	1690149.589	2533800.456
104	1690276.331	2534020.790
105	1690282.205	2534024.973
106	1690118.909	2534057.560
107	1690119.451	2534060.003

NOTE

THE LOCATION OF THE ABOVE AND BELOW GRADE STRUCTURES SHOWN ON THESE DRAWINGS ARE APPROXIMATE. PRIOR TO PERFORMING EXCAVATIONS, THE CONTRACTOR SHALL FIELD LOCATE STRUCTURES THAT MAY BE WITHIN THE LIMITS OF WORK AND PROTECT THEM ACCORDINGLY.

LEGEND

- 495 PROPOSED INDEX CONTOURS
- 495 PROPOSED INTERMEDIATE CONTOURS
- 495 EXISTING INDEX CONTOURS
- 495 EXISTING INTERMEDIATE CONTOURS
- ?? EXISTING STORM WATER DRAINS
- EXISTING ACCESS ROAD

CEC
Civil & Environmental Consultants, Inc.
5910 Haper Road, Suite 106 • Solon, OH 44139
Ph: 330.310.6800 • 866.507.2324
www.cecinc.com

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REFERENCE DRAWINGS

NO.	DATE	REVISION	BY	APPROVED

NO.	DATE	REVISION	BY	APPROVED
0	7/28/10	RECORD REVISION - 082-255	DFB	SFP

SCALE: AS_NOTED

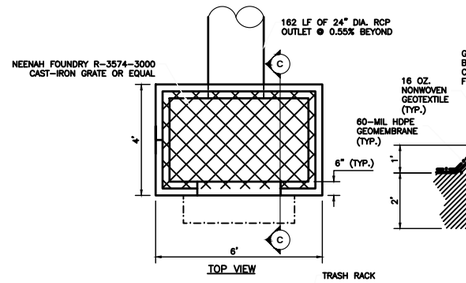
DWN DFB	DATE 07/05/2010
CHK RTM	DATE 07/12/2010
APPV SFP	DATE 07/12/2010

DYNEGY

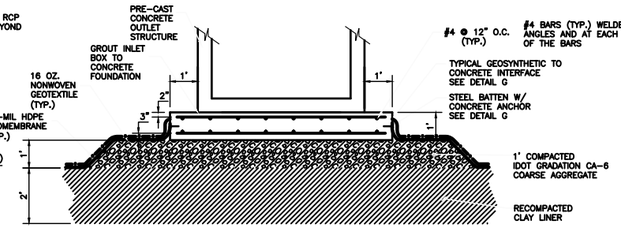
DYNEGY MIDWEST GENERATION, INC.
HENNEPIN POWER STATION
POND 2 EAST
FLEXIBLE MEMBRANE LINER AND STRUCTURES

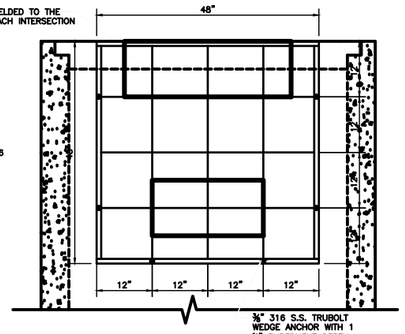
PROJECT NO: 082-255
CLIENT: DYNEGY
DWG NO: HEN1-C109
REV: 0

HEN1-C109 HENNEPIN DFB 07/05/2010

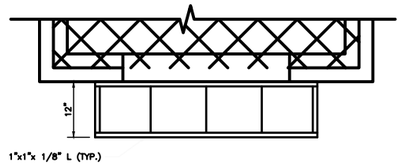


TOP VIEW

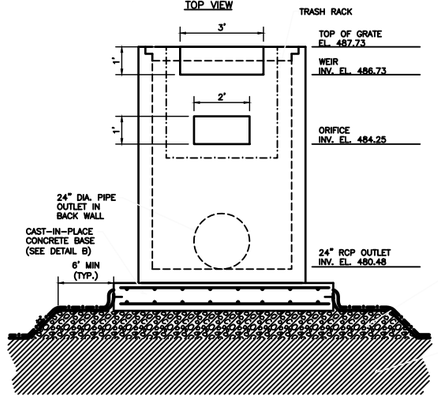




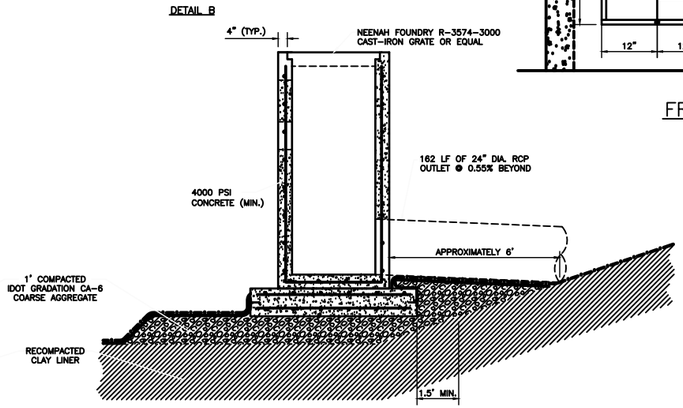
FRONT



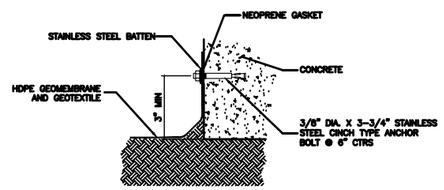
TOP



DETAIL B



DETAIL F
TRASH RACK
N.T.S.



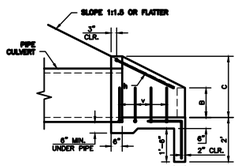
STEEL BATTEN W/ CONCRETE ANCHOR

DETAIL A
PRECAST CONCRETE OUTLET STRUCTURE
N.T.S.

NOTES

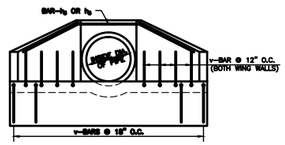
1. REFER TO ILLINOIS DEPARTMENT OF TRANSPORTATION (IDOT) STANDARD FOR OUTLET REINFORING.

FRONT VIEW



SECTION E-E

BAR v



END VIEW

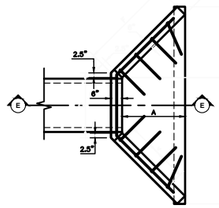
SECTION C-C

DETAIL D
REINFORCED CONCRETE HEADWALL
N.T.S.

NOTES

1. REFER TO IDOT STANDARD 542101-02 REINFORCED CONCRETE HEADWALL DETAIL FOR FINAL DESIGN.

DIMENSIONS OF BARS-h_3 AND h_5		
BAR	a	b
h_3	2'-1"	3'-3.00"
h_5	2'-8"	4'-1.00"



PLAN

DETAIL G
TYPICAL GEOSYNTHETIC TO CONCRETE INTERFACE
N.T.S.

NOTES

1. EARTH ADJACENT TO CONCRETE TO BE WELL COMPACTED TO PREVENT FUTURE DIFFERENTIAL SETTLEMENT.
2. ALL CONCRETE COLLARS TO BE CHAMFERED A MINIMUM OF 1" (TYP.) @ ALL CORNERS IN CONTACT WITH LINER

DIMENSIONS AND QUANTITIES													
DESIGN NO.	NOMINAL INSIDE DIA. OF PIPE	SLOPE OF WING WALLS	DIMENSIONS (A)	DIMENSIONS (B)	DIMENSIONS (C)	DIMENSIONS (D)	DIMENSIONS (E)	DIMENSIONS (F)	CONCRETE 2 END SECS. CU. YDS.	NO.4 REBAR h-BARS (BAR)	NO.4 REBAR h-BARS (LENGTH)	NO.4 REBAR v-BARS NO.	NO.4 REBAR TOTAL WT. 2 END SECS. LBS.
D18-2	1'-6"	1 TO 2	2'-2"	1'-1"	2'-2"	2'-3"	6'-10.20"	3'-3.25"	1.30	h_3	6'-6"	22	60
D24-2	2'-0"	1 TO 2	2'-10"	1'-4"	2'-8"	2'-11"	8'-10.20"	4'-3.00"	2.00	h_5	11'-0"	28	70

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REFERENCE DRAWINGS

NO.	DATE	REVISION	BY	APPROVED
0	7/28/10	RECORD REVISION - 082-255	DFB	SFP

SCALE: AS_NOTED

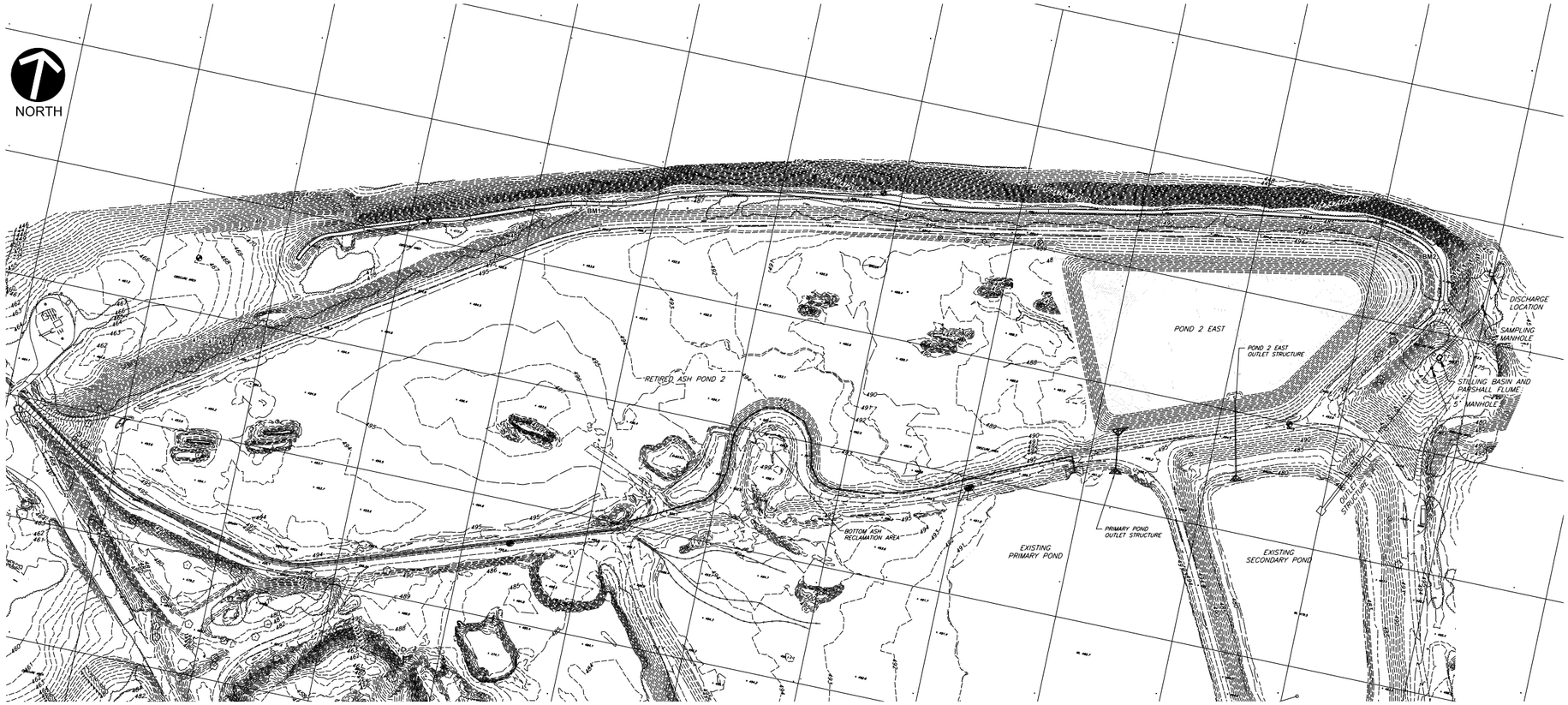
DWN. DFB	DATE 07/05/2010
CHK. RTH	DATE 07/12/2010
APPV. SFP	DATE 07/12/2010

DYNEGY

DYNEGY MIDWEST GENERATION, INC.
HENNEPIN POWER STATION
POND 2 EAST
DETAILS

PROJECT NO. 082-255
CLIENT: DYNEGY
DWG. NO. HEN1-C113
REV. 0

07/05/2010 DFB HEN-C113 HENNEPIN



BENCHMARK LOCATIONS			
NUMBER	NORTHING	EASTING	ELEVATION
1	1690395.43	2532618.60	482.19
2	1690670.86	2534372.87	484.08
3*	1689478.87	2534643.99	506.80
4*	1688458.82	2533256.76	499.45
5*	1688781.84	2531352.15	468.27
6*	1689875.08	2531310.12	463.75

* BENCHMARKS BEYOND DRAWING BOUNDARY.

SCALE IN FEET
0 100 200
DRAWING NOT TO SCALE IF SCALE BAR DOES NOT MEASURE 2 INCHES

REFERENCE:

1. TOPOGRAPHIC INFORMATION BASED UPON AERIAL SURVEY CONDUCTED BY SURDEX CORPORATION FLOWN ON SEPTEMBER 10, 2008.

   DUE TO CONSTRUCTION ACTIVITIES, ACTUAL FIELD TOPOGRAPHY MAY VARY.

2. POND 2 EAST CONTOURS FROM CONSTRUCTION DRAWINGS SUBMITTED AUGUST 2009.

LEGEND

- MISCELLANEOUS FLOW PIPING
- EXISTING STORMWATER DRAINS
- EXISTING TREELINE
- EXISTING PIPING
- EXISTING ACCESS ROAD
- EXISTING PONDS/STREAMS
- EXISTING FENCE
- EXISTING BENCHMARK
- EXISTING INDEX CONTOUR
- EXISTING INTERMEDIATE CONTOUR
- EXISTING ROCK CHANNEL PROTECTION
- EXISTING MONITORING WELL

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REFERENCE DRAWINGS

NO.	DATE	REVISION	BY	APPROVED	
0	11/28/10	RECORD REVISION - 082-255	DFB	SFP	

SCALE: AS_NOTED

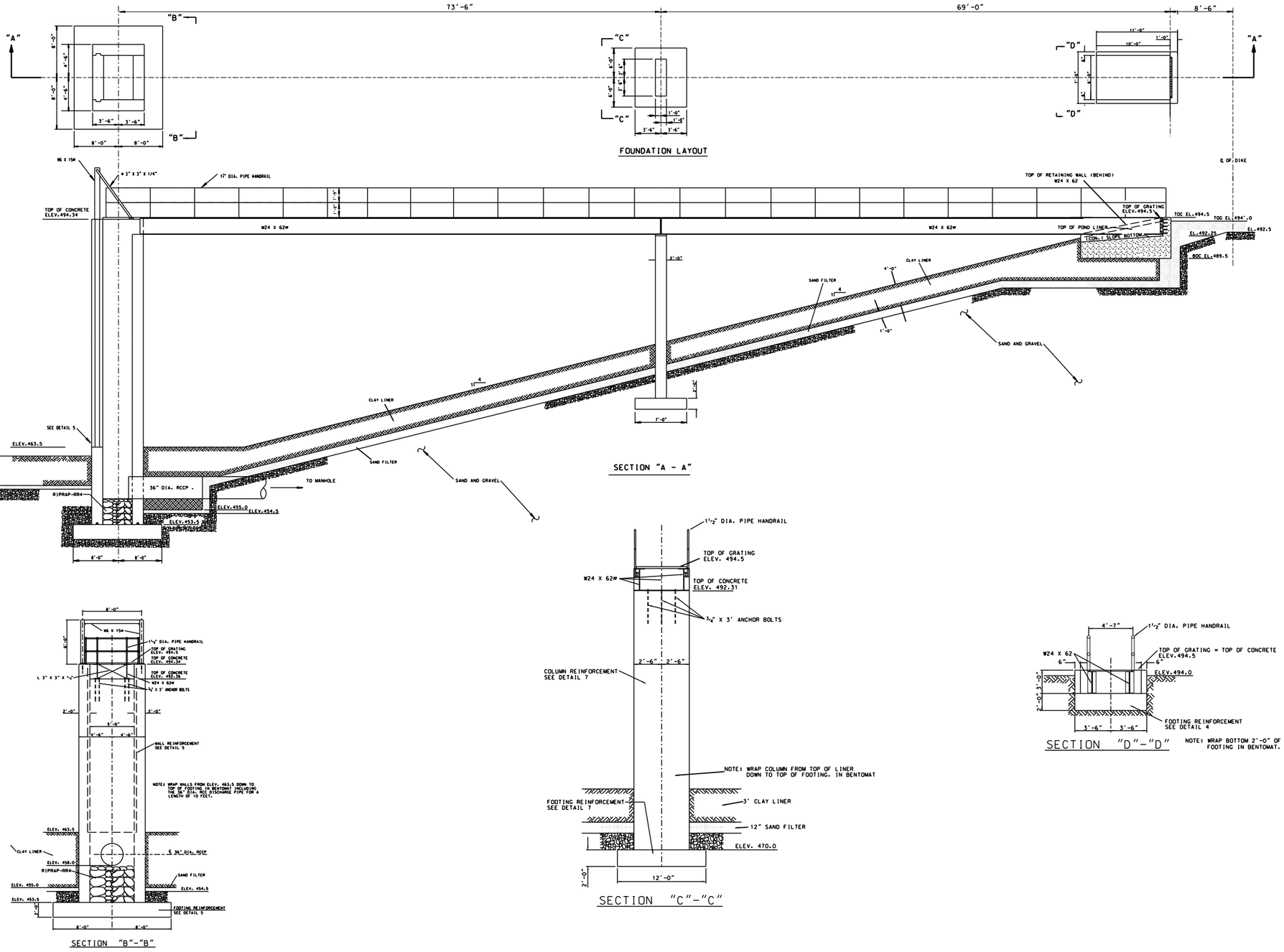
DWN. DFB	DATE 11/05/2010
CHK. RTM	DATE 11/12/2010
APPV. SFP	DATE 11/12/2010
EAPP_BY	EABD
FEAPP_BY	FEABD

DYNEGY

DYNEGY MIDWEST GENERATION, INC.
HENNEPIN POWER STATION
LANDFILL PHASE 1 CONSTRUCTION
EXISTING CONDITIONS

PROJECT NO.: 082-255
CLIENT: DYNEGY
DWG. NO.: HEN1-C117
REV.: 0

DFB
HEN1-C117
HENNEPIN
07/05/2010



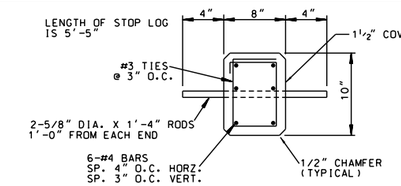
NO	DATE	DRF	DESCRIPTION	E	C	A	NO	DATE	DRF	DESCRIPTION	E	C	A
0													

REVISION STATUS
□ -CONSTRUCTION
○ -RECORD
0
p0019275.dgn

ILLINOIS POWER COMPANY
DECATUR

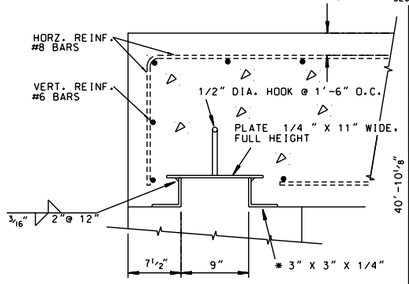
LAYOUT-POND DISCHARGE STRUCTURES
1995 ASH FACILITY
HENNEPIN POWER STATION

DR G.R.H.	CAD G.R.H.	DATE 1/5/94	
OK	CKD	SCALE NO SCALE	
APP	PLOTTED 9/17/96	CE-HEN1-C8	
APP			

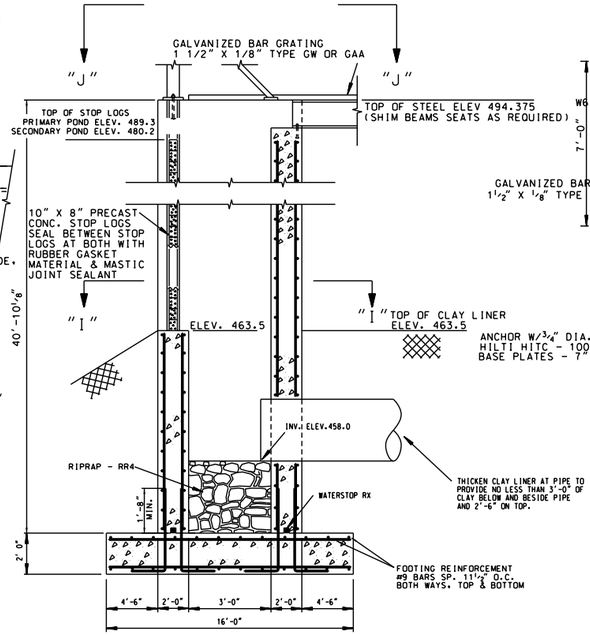


STOP LOG DETAIL

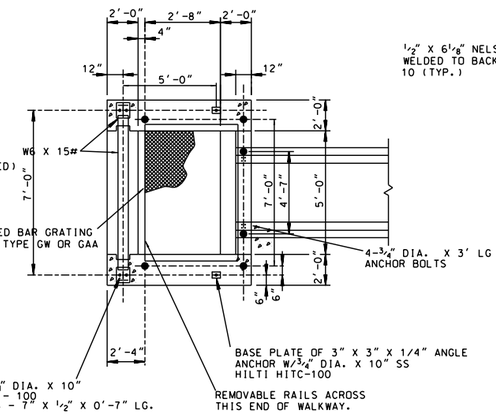
(51 REQUIRED INITIALLY, PROVIDE COMPANY WITH 10 EXTRA)
PRIMARY POND - 31
SECONDARY POND - 20



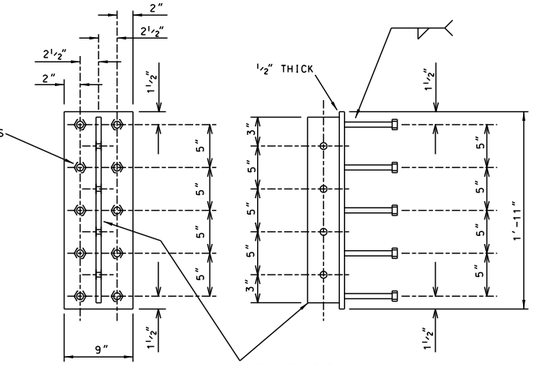
DETAIL 6



DETAIL 5

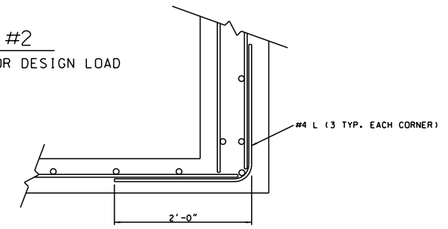


SECTION J-J

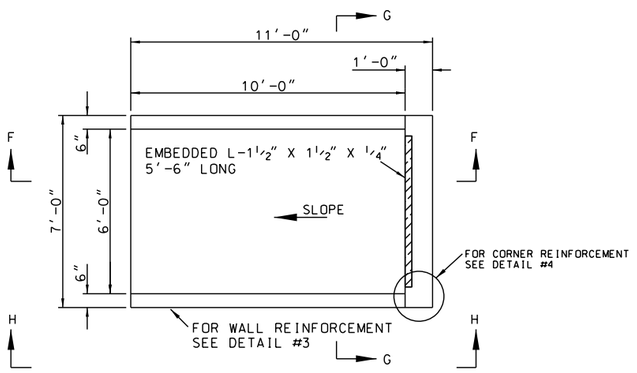


DETAIL #2

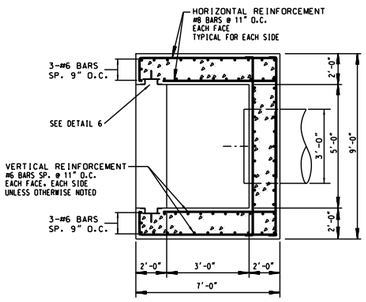
SEE CATWALK PLAN FOR DESIGN LOAD



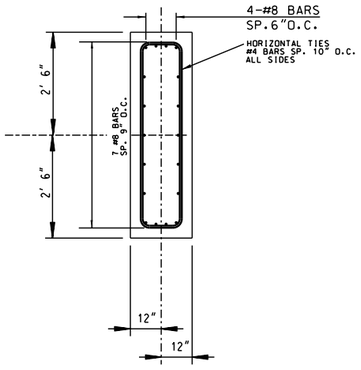
DETAIL #4



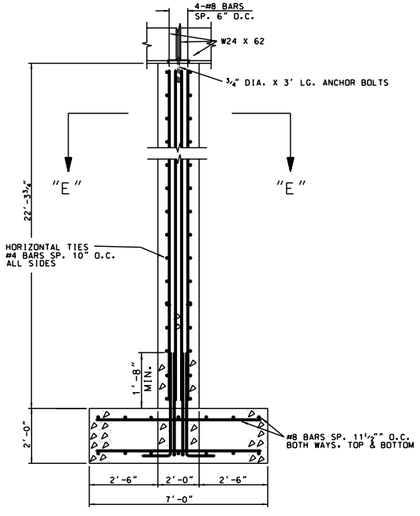
PLAN: CATWALK FOUNDATION



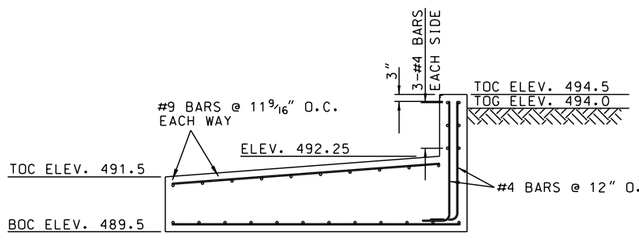
SECTION "I - I"



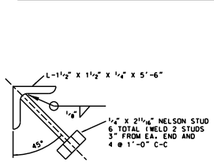
SECTION E-E



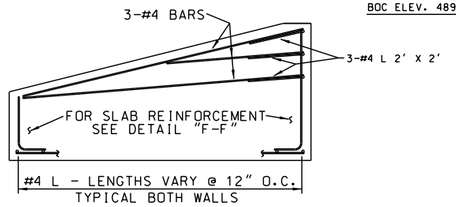
DETAIL 7



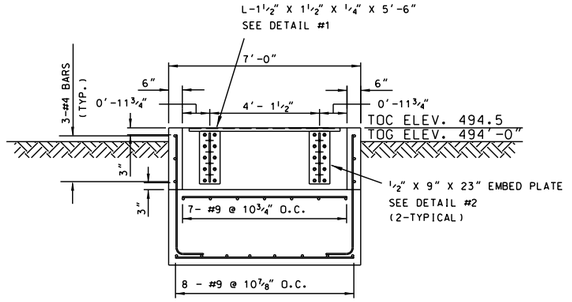
SECTION "F-F"



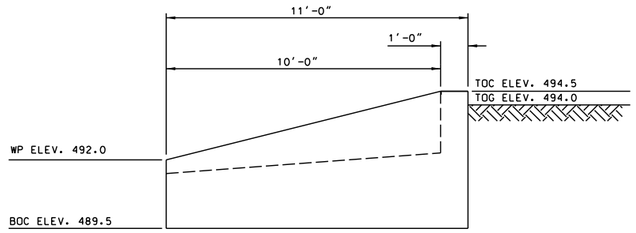
DETAIL #1



DETAIL #3



SECTION "G-G"



SECTION "H-H"

REVISION STATUS	ILLINOIS POWER COMPANY	
O -CONSTRUCTION O -RECORD	DECATUR	
0	DETAILS: POND DISCHARGE STRUCTURE 1995 ASH FACILITY HENNEPIN POWER STATION	
DR G.R.H.	CAD G.R.H.	DATE 1/5/94
OK	CKD	SCALE AS NOTED
APP	PLOTTED 9/17/96	CE-HEN1-C9
APP		
p0019276.dgn		

NORTH

SUBMITTAL RECORD		
NO	DATE	DESCRIPTION
1	5/2013	IDNR DAM MODIFICATION PERMIT
2	6/9/2014	ISSUED FOR CONSTRUCTION
3	2/4/2015	AS-BUILT CONSTRUCTION DRAWINGS

REVISION RECORD		
NO	DATE	DESCRIPTION
△		
△		
△		
△		

ILLINOIS RIVER
FLOW

BASE GRADE ELEVATION
441.0'

2'ø DEADMAN

2'ø DEADMAN

2'ø DEADMAN

18D/18S

41S

5
05D

40S

19D/19S

3

4

6

EXISTING LOWER
ACCESS ROAD

EXISTING UPPER
ACCESS ROAD

PROPOSED BERM MODIFICATION
AND VEGETATION REMOVAL AREA
BOUNDARY

RETIRED ASH POND NO. 2

LANDFILL –
PHASE 1

POND 2 EAST

EXISTING POND 2 EAST
OUTLET STRUCTURE

DISCHARGE
LOCATION

SAMPLING
MANHOLE

STILLING BASIN AND
PARSHALL FLUME

5' MANHOLE

EXISTING BOTTOM ASH
RECLAMATION AREA

MISCELLANEOUS
PLANT FLOWS

EXISTING PRIMARY
POND OUTLET
STRUCTURE

EXISTING OUTLET
STRUCTURE

SECONDARY POND

PRIMARY POND

ABANDONED OUTLET
STRUCTURE

LEGEND

- W — MISCELLANEOUS FLOW PIPING
- BASE GRADE ELEVATION
- EXISTING PIPING
- EXISTING TREELINE
- EXISTING PONDS/STREAMS
- X X X — EXISTING FENCE
- EXISTING ACCESS ROAD
- ST — EXISTING STORM WATER PIPING
- P — EXISTING UNDERGROUND PLANT FLOW PIPING
- EXISTING PLANT FLOW PIPING
- 495 — EXISTING INDEX CONTOURS
- EXISTING INTERMEDIATE CONTOURS
- 18D EXISTING MONITORING WELL LOCATIONS
- EXISTING ACCESS ROAD
- PROPOSED EAST BERM MODIFICATIONS AREA BOUNDARY

REFERENCE:

1. TOPOGRAPHIC INFORMATION BASED UPON AERIAL SURVEY CONDUCTED BY SURDEX CORPORATION FLOWN ON SEPTEMBER 10, 2008.
2. EMBANKMENT AREA SURVEY RECEIVED BY CEC FROM DLZ ON MARCH 4, 2013 AND JANUARY 10, 2014.
3. IL DNR PERMIT NO. DS2014017–DAM I.D. NO. 50663
4. AS–BUILT SURVEY RECEIVED BY CEC FROM DLZ, DECEMBER 12, 2014.

AS-BUILT CONSTRUCTION PLANS

SCALE IN FEET
0 100 200

* HAND SIGNATURE ON FILE

Civil & Environmental Consultants, Inc.
555 Butterfield Road, Suite 300 - Lombard, IL 60148
Ph: 630.963.6026 · 877.963.6026 · Fax: 630.963.6027
www.cecinc.com

DYNEGY MIDWEST GENERATION, INC.
HENNEPIN POWER STATION
EAST BERM MODIFICATION
HENNEPIN, ILLINOIS

DRAWN BY:	DFB	CHECKED BY:	MDJ	APPROVED BY:	*MDJ
DATE:	FEBRUARY 2015	DWG SCALE:	AS NOTED	PROJECT NO:	132-650

EXISTING SITE CONDITIONS PLAN

DRAWING NO.: **3**
SHEET 3 OF 9

p:\2013\1_132-650\2200\1-CAD\Dwg\C102\132650-C102-C100-Existing Conditions.dwg[EXISTING SITE CONDITIONS PLAN] LS:[2/11/2015 - lhostman] - LP: 2/11/2015 10:43 AM

SUBMITTAL RECORD		
NO	DATE	DESCRIPTION
1	5/2013	IDNR DAM MODIFICATION PERMIT
2	2/2014	ISSUED FOR CONSTRUCTION
3	2/4/2015	AS-BUILT CONSTRUCTION DRAWINGS

REVISION RECORD		
NO	DATE	DESCRIPTION
△		
△		
△		
△		

NORTH

TYPICAL BERM DETAIL 3/9

30" SILT FENCE DETAIL 1/4

PROPOSED GRADING NOT SHOWN FOR CLARITY

ILLINOIS RIVER FLOW

TYPICAL BERM DETAIL 2/9

4/9 TYPICAL BERM DETAIL WITH UNSUITABLE SOIL REMOVAL

BASE GRADE ELEVATION 441.0'

PROPOSED TEMPORARY SILT FENCE

2'ø DEADMAN

ACCESS RAMP AND HAUL ROAD

18D/18S

41S

05D

40S

19D/19S

ACCESS RAMP AND HAUL ROAD

UPPER ACCESS ROAD

LOWER ACCESS ROAD

RETIRED ASH POND NO. 2

TREE AND ROOT BALL REMOVAL ONLY ON THIS SLOPE

LANDFILL – PHASE 1

TREE AND ROOT BALL REMOVAL AS WELL AS BERM RECONFIGURATION

POND 2 EAST

TREE AND ROOT BALL REMOVAL ONLY ON THIS SLOPE

EXISTING POND 2 EAST OUTLET STRUCTURE

DISCHARGE LOCATION

SAMPLING MANHOLE

STILLING BASIN AND PARSHALL FLUME

5' MANHOLE

EXISTING BOTTOM ASH RECLAMATION AREA

MISCELLANEOUS PLANT FLOWS

EXISTING PRIMARY POND OUTLET STRUCTURE

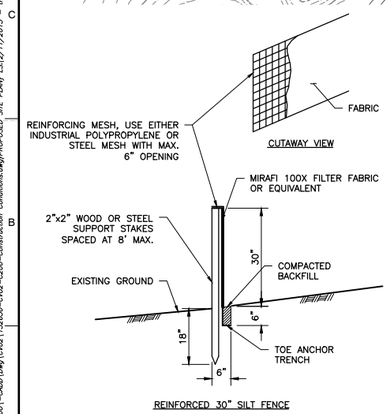
EXISTING OUTLET STRUCTURE

SECONDARY POND

PRIMARY POND

ABANDONED OUTLET STRUCTURE

SITE PLAN
SCALE: 1" = 100'



REINFORCED 30" SILT FENCE

DETAIL 1
30" SILT FENCE DETAIL
N.T.S.

SILT FENCE NOTES:

1. SILT FENCE SHALL BE PLACED ON LEVEL GRADE, WHERE POSSIBLE, AND BOTH ENDS OF THE SILT FENCE SHALL BE EXTENDED UP THE SLOPE.
2. SILT FENCE SHALL NOT BE PLACED IN ANY AREA OF CONCENTRATED FLOW NOR IN AREAS WHERE ROCK OR ROCKY SOILS PREVENT THE FULL AND UNIFORM ANCHORING OF THE FENCE TOE.
3. THE CONTRACTOR SHALL INSPECT THE SILT FENCE AFTER EVERY PRECIPITATION EVENT AND IMMEDIATELY REPAIR ANY DEFICIENCIES.
4. THE CONTRACTOR SHALL REMOVE ACCUMULATED SEDIMENTS AS REQUIRED TO KEEP THE FENCE FUNCTIONAL. IN ALL CASES, THE CONTRACTOR SHALL REMOVE DEPOSITS WHERE ACCUMULATIONS REACH ONE-HALF THE ABOVE GROUND HEIGHT OF THE FENCE.
5. THE CONTRACTOR SHALL IMMEDIATELY REPAIR ALL UNDERCUTTING OR EROSION OF THE ANCHOR TOE WITH A ROCK FILTER OUTLET.
6. THE CONTRACTOR SHALL CONFORM TO ANY RECOMMENDATIONS BY THE MANUFACTURER FOR REPLACING FILTER FABRIC FENCE DUE TO WEATHERING.

LEGEND

W	MISCELLANEOUS FLOW PIPING
	BASE GRADE ELEVATION
	EXISTING PIPING
	EXISTING TREELINE
	EXISTING PONDS/STREAMS
x x x	EXISTING FENCE
	EXISTING ACCESS ROAD
ST	EXISTING STORM WATER PIPING
P	EXISTING UNDERGROUND PLANT FLOW PIPING
	EXISTING PLANT FLOW PIPING
495	EXISTING INDEX CONTOURS
	EXISTING INTERMEDIATE CONTOURS
18D	EXISTING MONITORING WELL LOCATIONS
	PROPOSED CONSTRUCTION ACCESS ROAD
	PROPOSED EAST BERM MODIFICATIONS AREA BOUNDARY
SF	PROPOSED SILT FENCE
	PROPOSED GRADING LIMITS

AS-BUILT CONSTRUCTION PLANS

NOTE:
MONITORING WELLS EXIST WITHIN THE PROPOSED BERM MODIFICATION AREA. CONTRACTOR SHALL PROTECT EXISTING MONITORING WELLS WHILE PERFORMING BERM MODIFICATION ACTIVITIES.

REFERENCE:

1. TOPOGRAPHIC INFORMATION BASED UPON AERIAL SURVEY CONDUCTED BY SURDEX CORPORATION FLOWN ON SEPTEMBER 10, 2008.
2. EMBANKMENT AREA SURVEY RECEIVED BY CEC FROM DLZ ON MARCH 4, 2013 AND JANUARY 10, 2014.
3. IL DNR PERMIT NO. DS2014017-DAM I.D. NO. 50663
4. AS-BUILT SURVEY RECEIVED BY CEC FROM DLZ, DECEMBER 12, 2014.

SCALE IN FEET
0 100 200

* HAND SIGNATURE ON FILE

Civil & Environmental Consultants, Inc.
555 Butterfield Road, Suite 300 · Lombard, IL 60148
Ph: 630.963.6026 · 877.963.6026 · Fax: 630.963.6027
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DYNEGY MIDWEST GENERATION, INC.
HENNEPIN POWER STATION
EAST BERM MODIFICATION
HENNEPIN, ILLINOIS

DRAWN BY:	DFB	CHECKED BY:	MDJ	APPROVED BY:	*MDJ
DATE:	FEBRUARY 2015	DWG SCALE:	AS NOTED	PROJECT NO:	132-650

PROPOSED SITE PLAN

DRAWING NO.: **4**
SHEET 4 OF 9

A:\2015\132-650\02001-CAD\Dwg\CIVIL\132650-CIV02-C200-Construction Conditions.dwg[PROPOSED SITE PLAN] LS(2/11/2015 - thoatman) - LP: 2/11/2015 10:43 AM

NORTH

SUBMITTAL RECORD		
NO	DATE	DESCRIPTION
1	5/2013	IDNR DAM MODIFICATION PERMIT
2	6/9/2014	ISSUED FOR CONSTRUCTION
3	2/4/2015	AS-BUILT CONSTRUCTION DRAWINGS

REVISION RECORD		
NO	DATE	DESCRIPTION
△		
△		
△		
△		

PROPOSED SECTIONS (TYP.)
SEE SHEETS 7 & 8

TYPICAL BERM DETAIL 3/9

TYPICAL BERM DETAIL 2/9

ILLINOIS RIVER FLOW

SAFETY BENCH

BASE GRADE ELEVATION
441.0'

WEST ACCESS RAMP

LOWER ACCESS ROAD

2' ø DEADMAN

2'ø DEADMAN (REMOVED)

TREE AND ROOT BALL REMOVAL AS
WELL AS BERM RECONFIGURATION

UPPER ACCESS ROAD

TREE AND ROOT
BALL REMOVAL ONLY

RETIRED ASH POND

MATCHLINE – SEE SHEET 6

0+00 1+00 2+00 3+00 4+00 5+00 6+00 7+00 8+00 9+00 10+00 11+00

440 450 460 470 480 490

18D/18S 41S 3 6

6+49 7+00 8+00 9+00 5+00

LEGEND

- MISCELLANEOUS FLOW PIPING (W)
- BASE GRADE ELEVATION
- EXISTING TREELINE
- EXISTING PONDS/STREAMS
- EXISTING FENCE
- EXISTING ACCESS ROAD
- EXISTING STORM WATER PIPING (ST)
- EXISTING UNDERGROUND PLANT FLOW PIPING (P)
- EXISTING PLANT FLOW PIPING
- EXISTING INDEX CONTOURS (495)
- EXISTING INTERMEDIATE CONTOURS
- EXISTING MONITORING WELL LOCATIONS (18D)
- EXISTING ACCESS ROAD
- PROPOSED EAST BERM MODIFICATIONS AREA BOUNDARY
- PROPOSED INDEX CONTOUR
- PROPOSED INTERMEDIATE CONTOUR
- PROPOSED SAFETY BENCH
- TREE/ROOT BALL REMOVAL ONLY
- TREE/ROOT BALL REMOVAL WITH BERM RECONFIGURATION

AS-BUILT CONSTRUCTION PLANS

REFERENCE:

1. TOPOGRAPHIC INFORMATION BASED UPON AERIAL SURVEY CONDUCTED BY SURDEX CORPORATION FLOWN ON SEPTEMBER 10, 2008.
2. EMBANKMENT AREA SURVEY RECEIVED BY CEC FROM DLZ ON MARCH 4, 2013 AND JANUARY 10, 2014.
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4. AS–BUILT SURVEY RECEIVED BY CEC FROM DLZ, DECEMBER 12, 2014.

SCALE IN FEET
0 50 100

* HAND SIGNATURE ON FILE

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Ph: 630.963.6026 · 877.963.6026 · Fax: 630.963.6027
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DYNEGY MIDWEST GENERATION, INC.
HENNEPIN POWER STATION
EAST BERM MODIFICATION
HENNEPIN, ILLINOIS

DRAWN BY:	DFB	CHECKED BY:	MDJ	APPROVED BY:	*MDJ
DATE:	FEBRUARY 2015	DWG SCALE:	AS NOTED	PROJECT NO:	132-650

PROPOSED GRADING PLAN
1 OF 2

DRAWING NO.: **5**
SHEET 5 OF 9

A:\2013\132-650.02001-CADD\Dwg\CVG21\132650-CVG2-C300-Proposed Grading Plan.dwg[PROPOSED GRADING PLAN - 1 OF 2] LS(2/17/2015 - dbvencik) - LP: 2/17/2015 10:43 AM

NORTH

PROPOSED SECTIONS (TYP.)
SEE SHEETS 7 & 8

ILLINOIS RIVER FLOW

MATCHLINE – SEE SHEET 5

BASE GRADE ELEVATION
441.0'

SAFETY BENCH

LIMITS OF UNSUITABLE
SOIL REMOVAL

TYPICAL BERM SECTION WITH
UNSUITABLE SOIL REMOVAL 4/9

11+00 12+00 13+00 14+00 15+00 16+00 17+00 18+00 19+00 20+00 21+00 22+00 23+00 23+50

450 460 470 480 490 500

5 05D 40S 19D/19S 4

TREE AND ROOT BALL REMOVAL AS
WELL AS BERM RECONFIGURATION

TREE AND ROOT
BALL REMOVAL ONLY

DISCHARGE
LOCATION

SAMPLING MANHOLE

POND 2 EAST

LANDFILL - PHASE 1

EXISTING POND 2 EAST OUTLET STRUCTURE

STILLING BASIN AND
PARSHALL FLUME

5' MANHOLE

COAL PILE RUNOFF

MISCELLANEOUS PLANT FLOWS

LEGEND

- MISCELLANEOUS FLOW PIPING
- BASE GRADE ELEVATION
- EXISTING TREELINE
- EXISTING PONDS/STREAMS
- EXISTING FENCE
- EXISTING ACCESS ROAD
- EXISTING STORM WATER PIPING
- EXISTING UNDERGROUND PLANT FLOW PIPING
- EXISTING PLANT FLOW PIPING
- EXISTING INDEX CONTOURS
- EXISTING INTERMEDIATE CONTOURS
- EXISTING MONITORING WELL LOCATIONS
- EXISTING ACCESS ROAD
- PROPOSED EAST BERM MODIFICATIONS AREA BOUNDARY
- PROPOSED INDEX CONTOUR
- PROPOSED INTERMEDIATE CONTOUR
- PROPOSED SAFETY BENCH

- TREE/ROOT BALL REMOVAL ONLY
- TREE/ROOT BALL REMOVAL WITH BERM RECONFIGURATION

AS-BUILT CONSTRUCTION PLANS

REFERENCE:

1. TOPOGRAPHIC INFORMATION BASED UPON AERIAL SURVEY CONDUCTED BY SURDEX CORPORATION FLOWN ON SEPTEMBER 10, 2008.
2. EMBANKMENT AREA SURVEY RECEIVED BY CEC FROM DLZ ON MARCH 4, 2013 AND JANUARY 10, 2014.
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SCALE IN FEET
0 50 100

SUBMITTAL RECORD

NO	DATE	DESCRIPTION
1	5/2013	IDNR DAM MODIFICATION PERMIT
2	6/9/2014	ISSUED FOR CONSTRUCTION
3	2/4/2015	AS-BUILT CONSTRUCTION DRAWINGS

REVISION RECORD

NO	DATE	DESCRIPTION
△		
△		
△		
△		

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EAST BERM MODIFICATION
HENNEPIN, ILLINOIS

DRAWN BY:	DFB	CHECKED BY:	MDJ	APPROVED BY:	*MDJ
DATE:	FEBRUARY 2015	DWG SCALE:	AS NOTED	PROJECT NO:	132-650

PROPOSED GRADING PLAN
2 OF 2

DRAWING NO.: **6**
SHEET 6 OF 9

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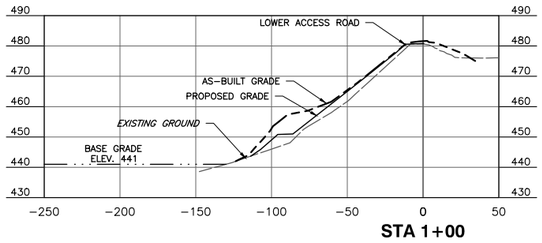

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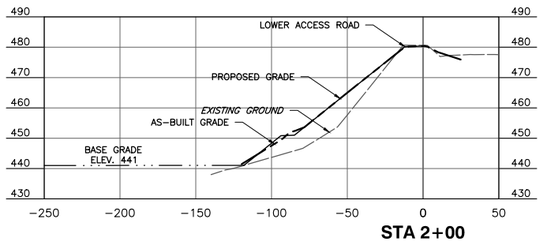

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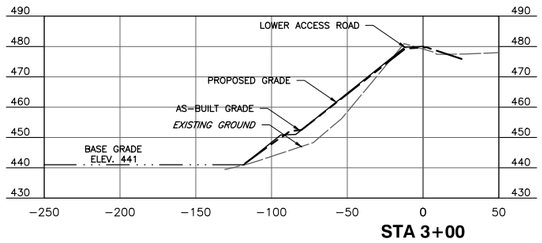

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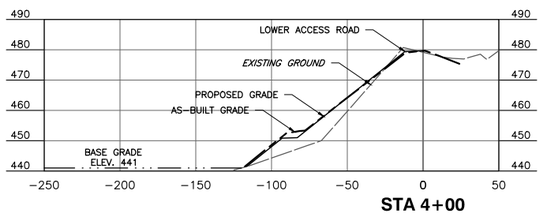

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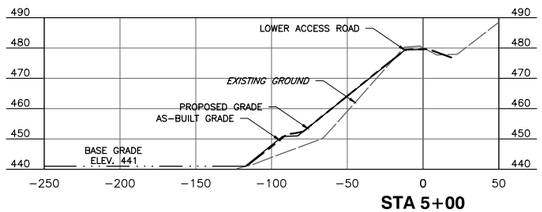

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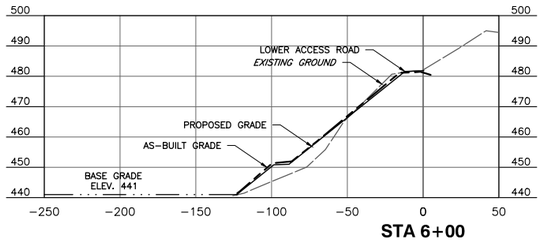

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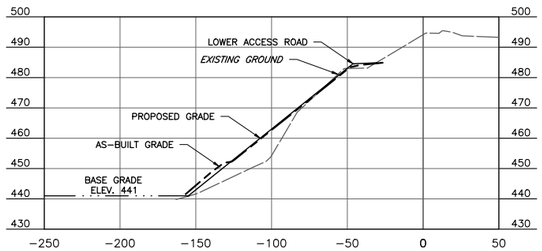

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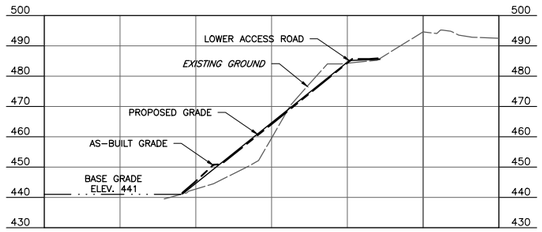

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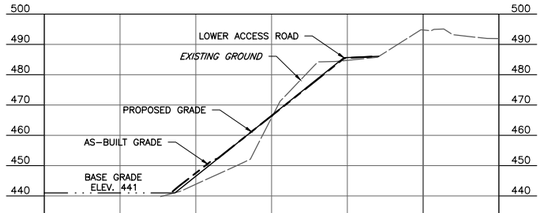

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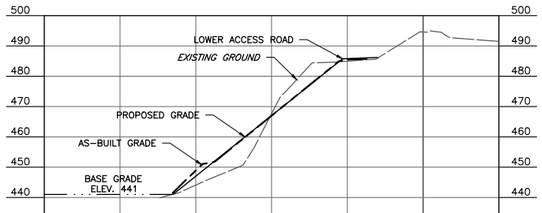

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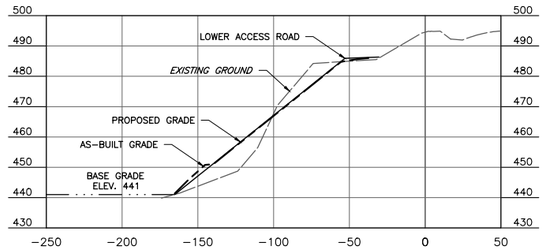

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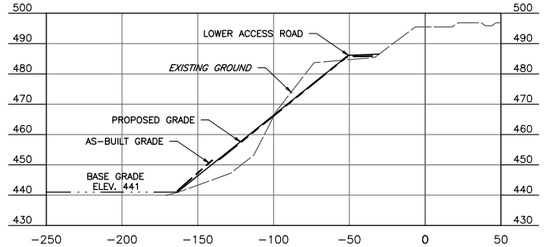

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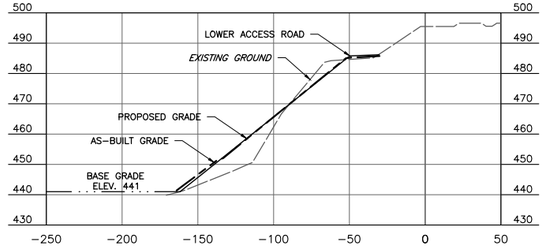

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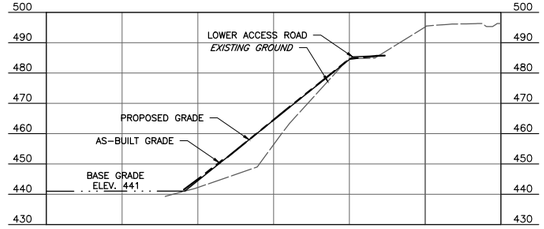

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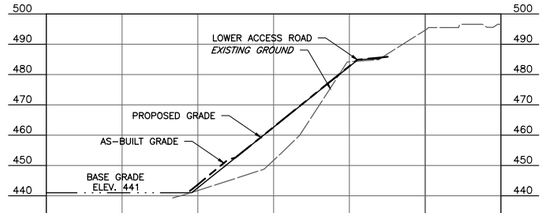

STA 15+00

SUBMITTAL RECORD

NO	DATE	DESCRIPTION
1	5/2013	IDNR DAM MODIFICATION PERMIT
2	6/9/2014	ISSUED FOR CONSTRUCTION
3	2/4/2015	AS-BUILT CONSTRUCTION DRAWINGS

REVISION RECORD

NO	DATE	DESCRIPTION
△		
△		
△		
△		

REFERENCE:

1. TOPOGRAPHIC INFORMATION BASED UPON AERIAL SURVEY CONDUCTED BY SURDEX CORPORATION FLOWN ON SEPTEMBER 10, 2008.
2. EMBANKMENT AREA SURVEY RECEIVED BY CEC FROM DLZ ON MARCH 4, 2013 AND JANUARY 10, 2014.
3. IL DNR PERMIT NO. DS2014017–DAM I.D. NO. 50663
4. AS–BUILT SURVEY RECEIVED BY CEC FROM DLZ, DECEMBER 12, 2014.

AS-BUILT CONSTRUCTION PLANS

HORIZONTAL
SCALE IN FEET
0 50 100

VERTICAL
SCALE IN FEET
0 25 50

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555 Butterfield Road, Suite 300 - Lombard, IL 60148
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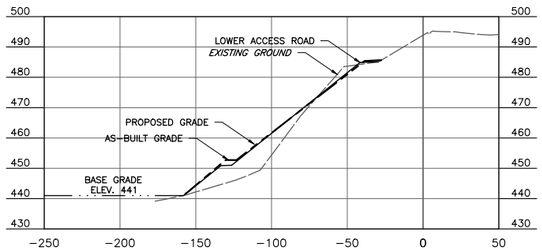
DYNEGY MIDWEST GENERATION, INC.
HENNEPIN POWER STATION
EAST BERM MODIFICATION
HENNEPIN, ILLINOIS

DRAWN BY:	DFB	CHECKED BY:	MDJ	APPROVED BY:	*MDJ
DATE:	FEBRUARY 2015	DWG SCALE:	AS NOTED	PROJECT NO:	132-650

PROPOSED SECTIONS
STA 1+00 TO 15+00

DRAWING NO.: **7**
SHEET 7 OF 9

P:\2013\132-650.0200\-CADD\Dwg\Civil\132650-Civil02-C350-Proposed Grading Plan.dwg(CROSS SECTIONS (1)) LS(2/17/2015 - dtvonulis) - LP: 2/17/2015 10:43 AM



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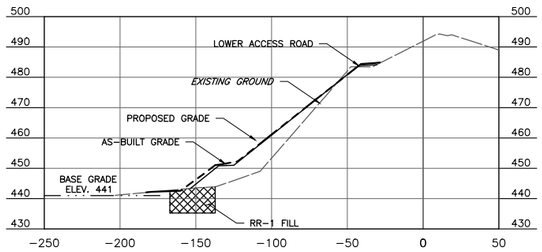

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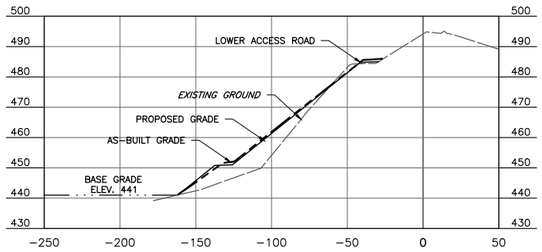

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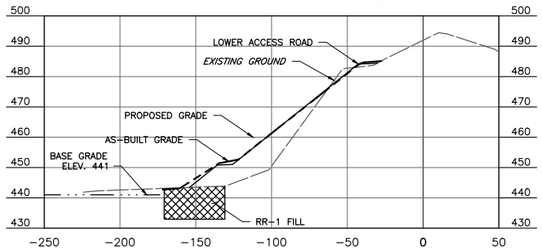

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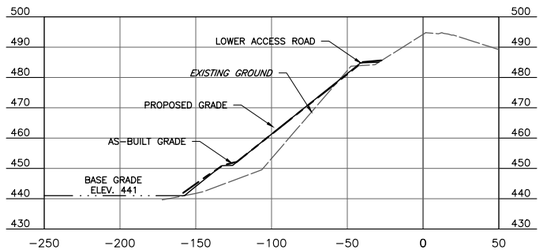

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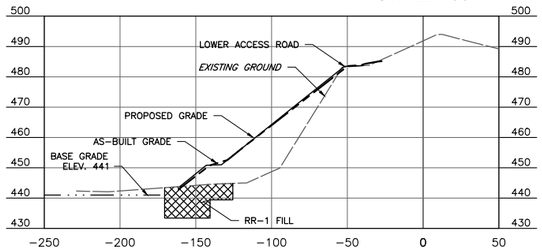

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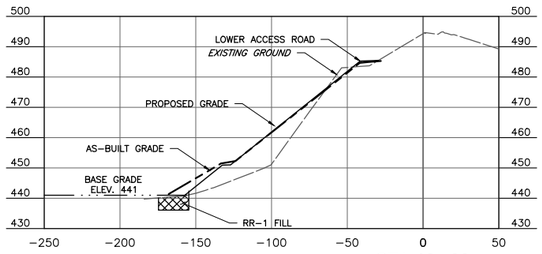

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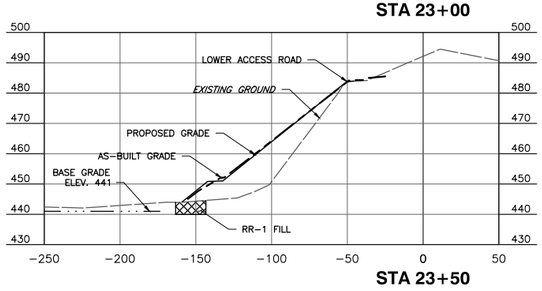

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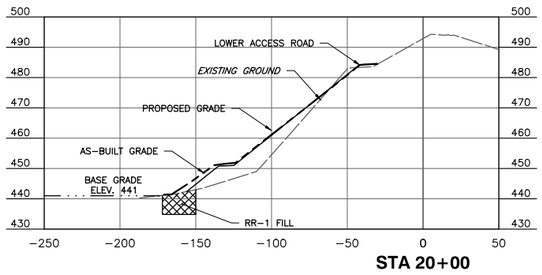

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SUBMITTAL RECORD		
NO	DATE	DESCRIPTION
1	5/2013	IDNR DAM MODIFICATION PERMIT
2	6/9/2014	ISSUED FOR CONSTRUCTION
3	2/4/2015	AS-BUILT CONSTRUCTION DRAWINGS

REVISION RECORD		
NO	DATE	DESCRIPTION
1		
2		
3		
4		

REFERENCE:

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AS-BUILT CONSTRUCTION PLANS

HORIZONTAL SCALE IN FEET
0 50 100

VERTICAL SCALE IN FEET
0 25 50

* HAND SIGNATURE ON FILE

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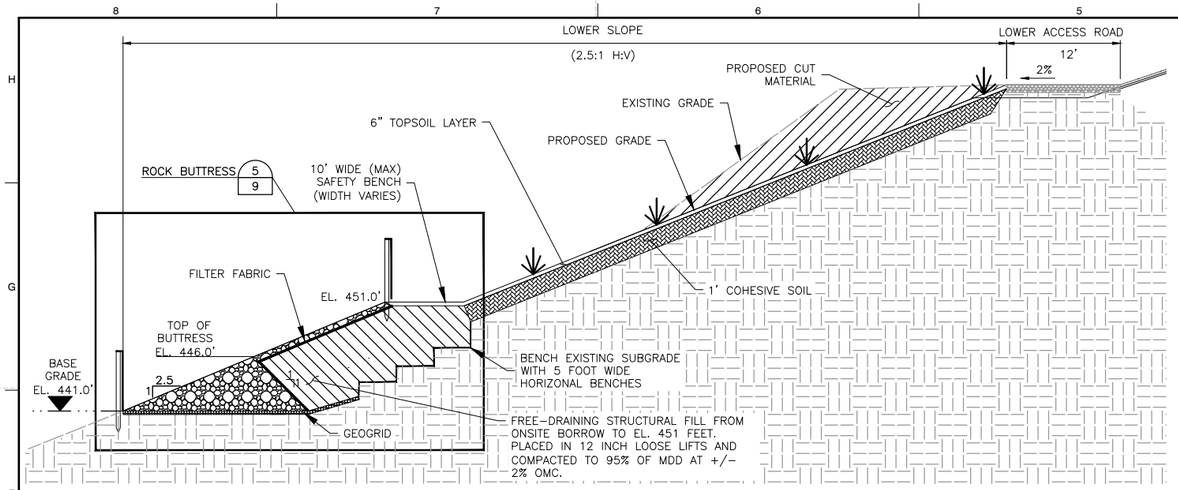
EAST BERM MODIFICATION
HENNEPIN, ILLINOIS

DRAWN BY:	DFB	CHECKED BY:	MDJ	APPROVED BY:	*MDJ
DATE:	FEBRUARY 2015	DWG SCALE:	AS NOTED	PROJECT NO:	132-650

PROPOSED SECTIONS
STA 16+00 TO 23+50

DRAWING NO.: **8**
SHEET **8** OF **9**

A:\2013\132-650.0200\1-CADD\Dwg\Civil\132650-Civil-C300-Proposed Grading Plan.dwg(SECTIONS (2)) LS(2/17/2015 - dbrondyk) - LP: 2/17/2015 10:43 AM



DETAIL 2
TYPICAL BERM DETAIL
SCALE: NTS

LEGEND

- PROPOSED CUT MATERIAL
- PROPOSED STRUCTURAL FILL
- UNSUITABLES/RR1 FILL
- RIPRAP
- DRAINAGE LAYER
- PROPOSED GRADELINE
- EXISTING GRADELINE
- WATER SURFACE ELEVATION
- VEGETATION

SUBMITTAL RECORD

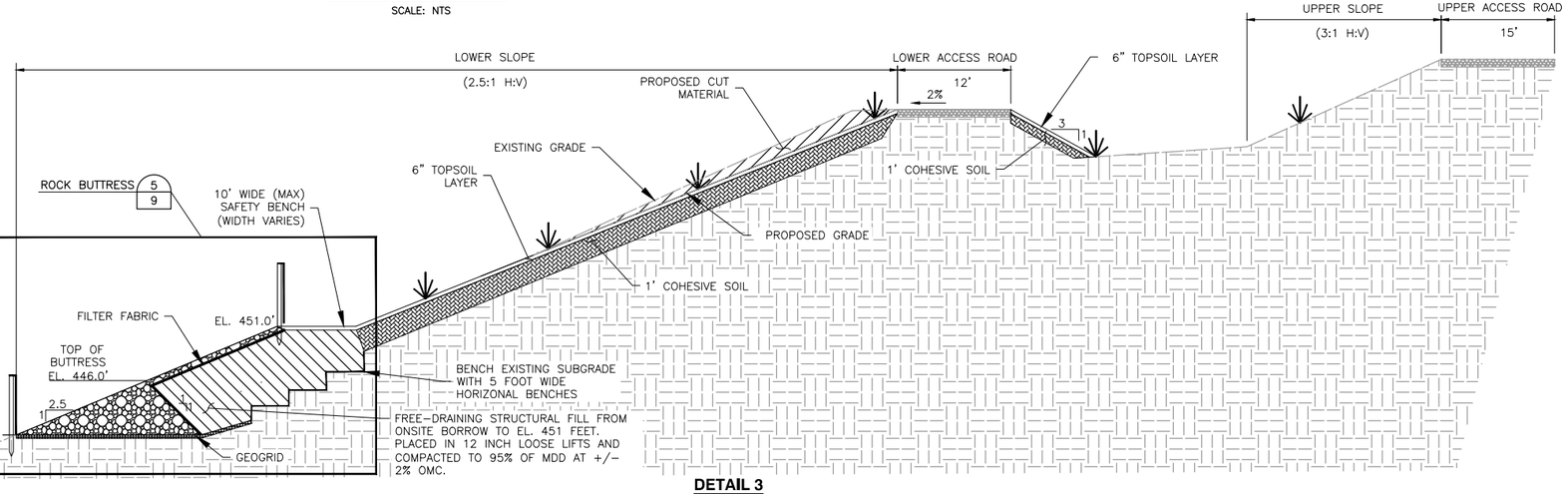
NO	DATE	DESCRIPTION
1	5/2013	IDNR DAM MODIFICATION PERMIT
2	6/9/2014	ISSUED FOR CONSTRUCTION
3	2/4/2015	AS-BUILT CONSTRUCTION DRAWINGS

REVISION RECORD

NO	DATE	DESCRIPTION
△		
△		
△		
△		

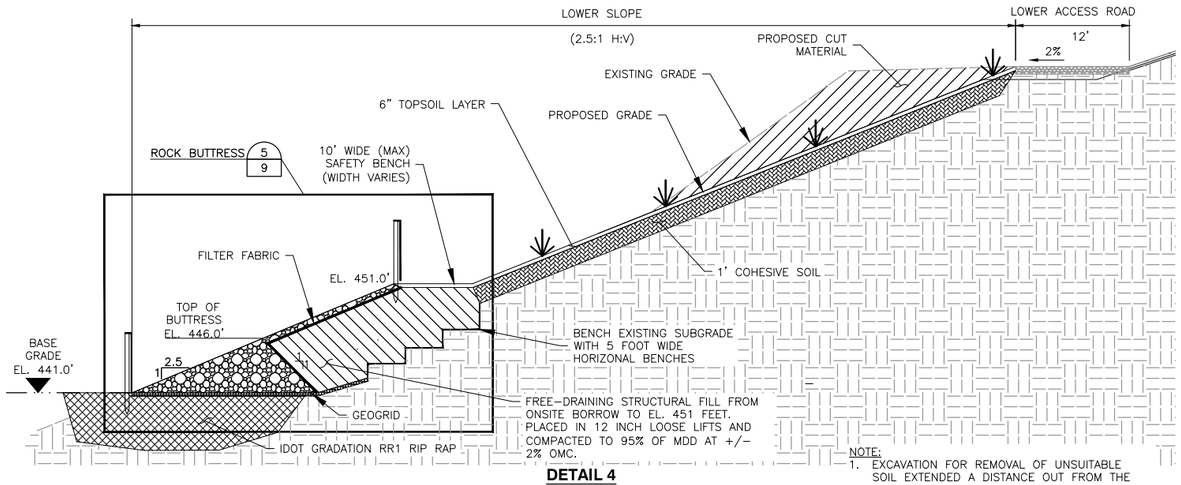
REFERENCE:

1. TOPOGRAPHIC INFORMATION BASED UPON AERIAL SURVEY CONDUCTED BY SURDEX CORPORATION FLOWN ON SEPTEMBER 10, 2008.
2. EMBANKMENT AREA SURVEY RECEIVED BY CEC FROM DLZ ON MARCH 4, 2013 AND JANUARY 10, 2014.
3. IL DNR PERMIT NO. DS2014017-DAM I.D. NO. 50663
4. AS-BUILT SURVEY RECEIVED BY CEC FROM DLZ, DECEMBER 12, 2014.



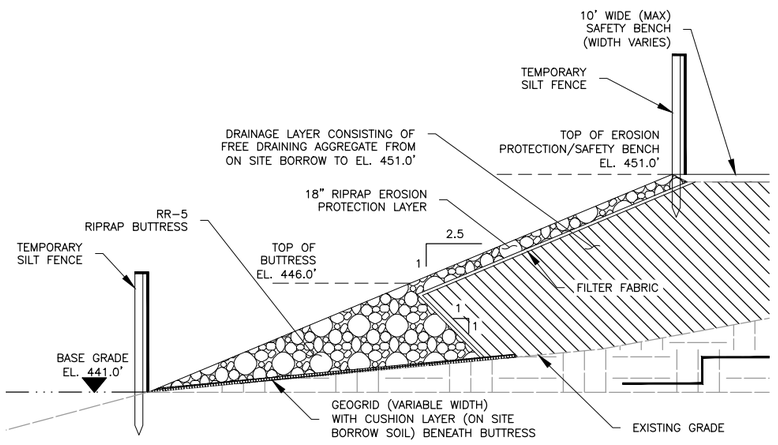
DETAIL 3
TYPICAL BERM DETAIL
SCALE: NTS

NOTE:
1. TEMPORARY SILT FENCE WAS INSTALLED PRIOR TO ROCK BUTTRESS INSTALLATION. UPON COMPLETION OF ROCK BUTTRESS. SILT FENCE WAS INSTALLED UP SLOPE OF ROCK BUTTRESS AND TEMPORARY SILT FENCE REMOVED.
2. AFTER PLACING TOPSOIL AND SEEDING, EROSION CONTROL BLANKETS WERE INSTALLED ON ALL SLOPES STEEPER THAN 3:1 FOR EROSION PROTECTION AND SEED ESTABLISHMENT. STRAW WATTLES WERE PLACED AT MID-HEIGHT OF BERM FOR ADDITIONAL EROSION PROTECTION.



DETAIL 4
TYPICAL BERM WITH UNSUTABLE SOIL REMOVAL DETAIL
SCALE: NTS

NOTE:
1. EXCAVATION FOR REMOVAL OF UNSUITABLE SOIL EXTENDED A DISTANCE OUT FROM THE TOE OF BERM EQUAL TO THE DEPTH OF EXCAVATION.



DETAIL 5
ROCK BUTRESS AND EROSION PROTECTION LAYER DETAIL
SCALE: NTS

AS-BUILT CONSTRUCTION PLANS

* HAND SIGNATURE ON FILE

Civil & Environmental Consultants, Inc.
555 Butterfield Road, Suite 300 - Lombard, IL 60148
Ph: 630.963.6026 · 877.963.6026 · Fax: 630.963.6027
www.cecinc.com

DYNEGY MIDWEST GENERATION, INC.
HENNEPIN POWER STATION
EAST BERM MODIFICATION
HENNEPIN, ILLINOIS

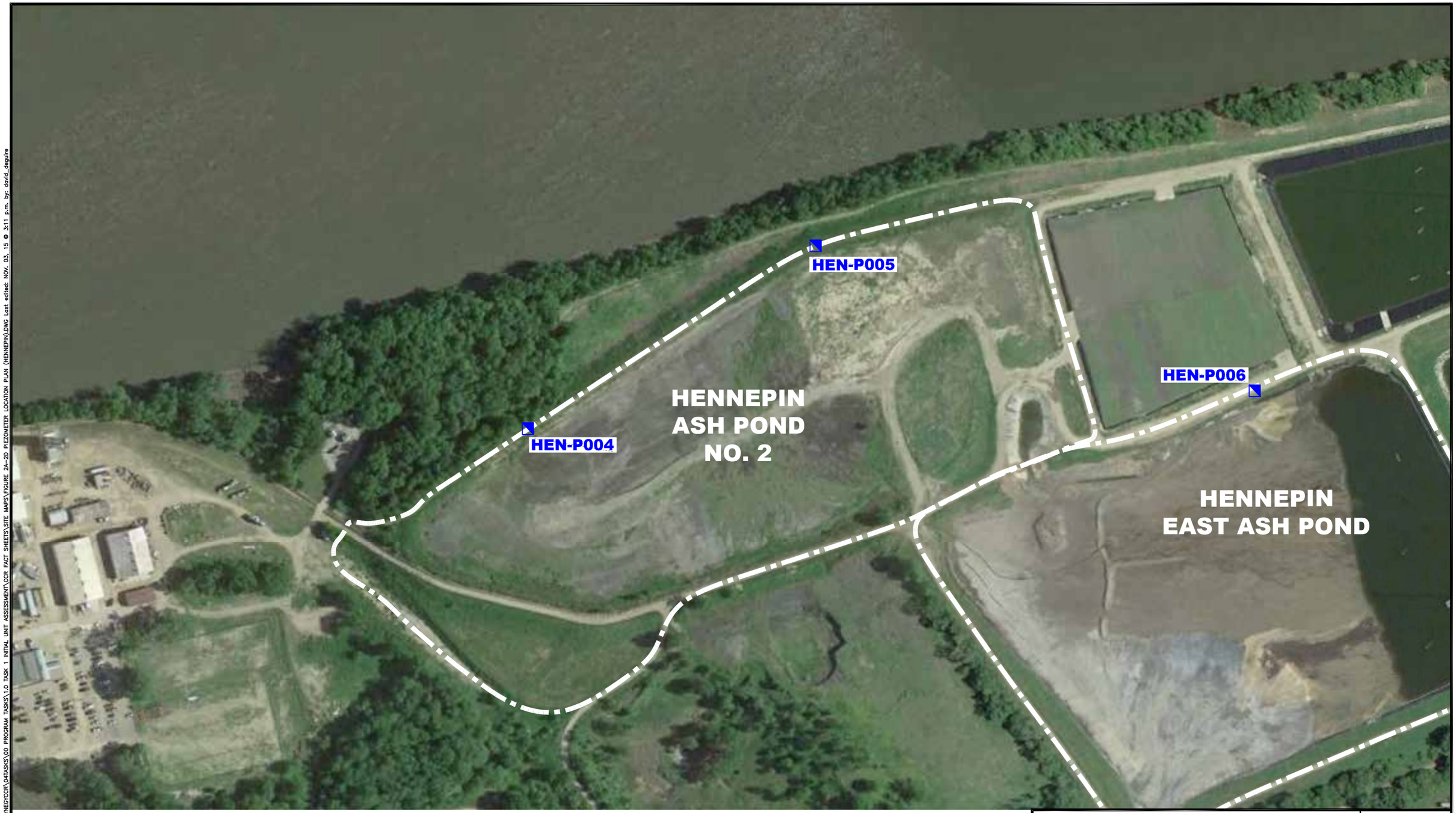
DRAWN BY:	DFB	CHECKED BY:	MDJ	APPROVED BY:	*MDJ
DATE:	FEBRUARY 2015	DWG SCALE:	AS NOTED	PROJECT NO:	132-650

BERM AND EROSION CONTROL DETAILS

DRAWING NO.: 9
SHEET 9 OF 9

P:\2013\132-650.02001\-CADD\Dwg\Civil\132650-Civil2-C900-Erosion Control Details.dwg[DETAILS 2][2] LS(2/17/2015 - dbranchi) - LP: 2/17/2015 10:43 AM

Appendix C: Hennepin Power Station Piezometer Locations



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

XXX-X###

ID NUMBER

STATION ABBREVIATION

SOURCE:
MAP PROVIDED BY GOOGLE EARTH PRO 2015

LEGEND

PIEZOMETER LOCATION

CCR UNIT BERM ALIGNMENT

0 200

APPROXIMATE SCALE FEET

DYNEGY MIDWEST GENERATION, LLC	PROJECT NO. 60439752
AECOM	
DRN. BY: djd October 2015 DSGN. BY: eg CHKD. BY: eg	Hennepin Ash Pond No. 2 Piezometer Locations
	FIG. NO. 2A

File: P:\PROJECTS\GEOTECH\60428794_DYNEGYCCR\04TASKS\00 PROGRAM TASKS\1.0 TASK 1 INITIAL UNIT ASSESSMENT\CCR FACT SHEETS\SITE MAPS\FIGURE 2A-2D PIEZOMETER LOCATION PLAN (HENNEPIN).DWG Last edited: NOV. 03, 15 @ 3:11 p.m. by: david_deguire

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

XXX-X###

ID NUMBER

STATION ABBREVIATION

SOURCE:
MAP PROVIDED BY GOOGLE EARTH PRO 2015

LEGEND

PIEZOMETER LOCATION

CCR UNIT BERM ALIGNMENT

0 200

APPROXIMATE SCALE FEET

DYNEGY MIDWEST GENERATION, LLC	PROJECT NO. 60439752
AECOM	
DRN. BY: djd October 2015 DSGN. BY: eg CHKD. BY: eg	Hennepin East Ash Pond Piezometer Locations
	FIG. NO. 2B

File: P:\PROJECTS\GEOTECH\60428794_DYNEGY\CCR\04TASKS\00 PROGRAM TASKS\1.0 TASK 1 INITIAL UNIT ASSESSMENT\CCR FACT SHEETS\SITE MAPS\FIGURE 2A-2D PIEZOMETER LOCATION PLAN (HENNEPIN).DWG Last edited: NOV. 03, 15 @ 3:11 p.m. by: david_deguire

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

XXX-X###

ID NUMBER

STATION ABBREVIATION

SOURCE:
MAP PROVIDED BY GOOGLE EARTH PRO 2015

LEGEND

PIEZOMETER LOCATION

CCR UNIT BERM ALIGNMENT

0 200

APPROXIMATE SCALE FEET

DYNEGY MIDWEST GENERATION, LLC	PROJECT NO. 60439752
AECOM	
DRN. BY: djd October 2015 DSGN. BY: eg CHKD. BY: eg	**Hennepin Old West Ash Pond (Pond No. 1 and Pond No. 3) Piezometer Locations**
	FIG. NO. 2C

File: P:\PROJECTS\GEOTECH\60428794_DYNEGYCCR\04TASKS\00 PROGRAM TASKS\1.0 TASK 1 INITIAL UNIT ASSESSMENT\CCR FACT SHEETS\SITE MAPS\FIGURE 2A-2D PIEZOMETER LOCATION PLAN (HENNEPIN).DWG Last edited: NOV. 03, 15 @ 3:11 p.m. by: david_deguire

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

XXX-X###

ID NUMBER

STATION ABBREVIATION

SOURCE:
MAP PROVIDED BY GOOGLE EARTH PRO 2015

LEGEND

PIEZOMETER LOCATION

CCR UNIT BERM ALIGNMENT

0 100

APPROXIMATE SCALE FEET

DYNEGY MIDWEST GENERATION, LLC

PROJECT NO. 60439752

AECOM

DRN. BY: djd October 2015
DSGN. BY: eg
CHKD. BY: eg

Hennepin Old West Polishing Pond Piezometer Locations

FIG. NO. 2D

File: P:\PROJECTS\GEOTECH\60428794_DYNEGYCCR\04TASKS\00 PROGRAM TASKS\1.0 TASK 1 INITIAL UNIT ASSESSMENT\CCR FACT SHEETS\SITE MAPS\FIGURE 2A-2D PIEZOMETER LOCATION PLAN (HENNEPIN).DWG Last edited: NOV. 03, 15 @ 3:11 p.m. by: david_deguire

Appendix D: Specification J-2616, Rev. A, Primary Ash Pond Modifications

Sargent & Lundy

DYNEGY MIDWEST GENERATION
HENNEPIN POWER STATION

SPECIFICATION J-2616, REV. A
PERMIT APPLICATION

PRIMARY ASH POND MODIFICATIONS

Prepared By:
Sargent & Lundy, LLC
55 East Monroe Street
Chicago, Illinois 60603

PRIMARY ASH POND MODIFICATIONS

ISSUE SUMMARY

Rev.	Purpose of Issue	Date	Sections Affected
A	Spec No. J-2616 Released for Permit Application	02/14/03	All

CERTIFICATION OF SPECIFICATION

FOR

PRIMARY ASH POND MODIFICATION

I certify that this Specification was prepared by me or under my supervision and that I am a registered professional engineer under the laws of the State of Illinois.

Sargent & Lundy LLC's Illinois Department of Professional Regulation registration number is 184-000106.

Certified By: Ronald Cook Date: Feb 14, 2003

EXP. 11-30-03

Seal

Revision: _____ Certified By: _____ Date: _____

PRIMARY ASH POND MODIFICATIONS

TABLE OF CONTENTS

Notes:

(1) Where Division and/or Sections are not included, work under the unlisted headings is not part of the Work.

(2) This Table of Contents will indicate the date of issue for the latest complete issue or revision issue of each section and any subsequent revision issue thereto.

(3) The numbering and subsequent Revisions to the Specification are in sequence with the previously issued Revision mark number.

SECTION		DATE OF ISSUE	LATEST ISSUE/REVISION
PCTC 08003	Fabric Formed Concrete Mats	02/14/03	A
PCTC 12001	Temporary and Permanent Seeding (Illinois)	02/14/03	A
PCTC 36007	Crushed Stone Surfacing for Unpaved Roads, Parking Lots, and Laydown Areas (IDOT)	02/14/03	A
PCTC 54005	Earthwork and Clay Lining for a Clay/Geomembrane Lined Ash Pond	02/14/03	A
PCTC 56008	Polypropylene Geomembrane Liner for a Pond	02/14/03	A
PCTC 57001	Geotextile for Lined Ponds	02/14/03	A
PCTC 60008	Quality Assurance for Installation of Earthwork and Clay Lining for the Ash Pond	02/14/03	A

FABRIC FORMED CONCRETE MATS

ISSUE SUMMARY

Rev.	Purpose of Issue	Date	Sections Affected	Prepared By	Reviewed By	Approved By
A	Permit Application	02/14/03	ALL	Ronald Cook	Daniel C. Kunk	Ronald Cook

FABRIC FORMED CONCRETE MATS

TABLE OF CONTENTS

Notes:

(1) This Table of Contents will indicate the date of issue for the latest complete issue or revision issue of each section and any subsequent revision issue thereto.

(2) The numbering and subsequent Revisions to the Specification are in sequence with the previously issued Revision mark number.

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Fabric Formed Concrete Mats - Technical Specification and Optional Features/Accessories

1.0 Scope of Work

The intent of this specification is to define the material and installation requirements for fabric formed concrete mats installed in accordance with the Design Drawings, technical data and as specified herein.

1.1 Work Included

The work shall include, but not be limited to, the following items as indicated:

A. Preparation and grading of surfaces to receive fabric mats.

B. Placing fabric mats and filling them with a pumpable sand/cement slurry to form a stable erosion protection system.

C. Offsite disposal of excess or unsuitable materials and debris.

2.0 Codes and Standards

A. Standards, specifications, manuals, codes and other publications of nationally recognized organizations and associations are referenced herein. Methods, equipment and materials specified herein shall comply with the specified and applicable portions of the referenced documents, in addition to federal, state or local codes having jurisdiction.

B. References to these documents are to the latest issue date of each document, unless otherwise indicated, together with the latest additions, addenda, amendments, supplements, etc., thereto, in effect as of the date of contract for the work.

C. Abbreviations listed indicate the form used to identify the reference documents in the specification text.

2.1 ASTM – American Society for Testing and Materials

A. ASTM C 31 – Standard Practice for Making and Curing Concrete Test Specimens in the Field.

B. ASTM C 39 – Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens.

C. ASTM C 143 – Standard Test Method for Slump of Hydraulic Cement Concrete.

D. ASTM C 172 – Standard Practice for Sampling Freshly Mixed Concrete.

E. ASTM C 173 – Standard Test Method for Air Content of Freshly Mixed Concrete by the Volumetric Method.

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F. ASTM C 231 – Standard Test Method for Air Content of Freshly Mixed Concrete by the Pressure Method.

G. ASTM C1064 – Standard Test Method for Temperature of Freshly Mixed Portland-Cement Concrete.

H. ASTM D 543 – Standard Practices for Evaluating the Resistance of Plastics to Chemical Reagents.

I. ASTM D 751 – Standard Test Methods for Coated Fabrics.

J. ASTM D 792 – Standard Test Methods for Density and Specific Gravity (Relative Density) of Plastics by Displacement.

K. ASTM D1777 – Standard Test Method for Thickness of Textile Materials.

L. ASTM D2101 – Standard Test Method for Tensile Properties of Single Man-Made Textile Fibers Taken From Yarns and Tows.

M. ASTM D3776 – Standard Test Methods for Mass Per Unit Area (Weight) of Fabric.

N. ASTM D3786 – Standard Test Method for Hydraulic Bursting Strength of Knitted Goods and Nonwoven Fabrics (Mullen Burst).

O. ASTM D3787 – Standard Test Method for Bursting Strength of Knitted Goods: Constant-Rate-of Traverse (CRT) Ball Burst Test.

P. ASTM D3885 – Standard Test Method for Abrasion Resistance of Textile Fabrics.

Q. ASTM D4355 – Standard Test Methods for Deterioration of Geotextiles by Exposure to Light, Moisture and Heat in a Xenon Arc Type Apparatus.

R. ASTM D4491 – Standard Test Methods for Water Permeability of Geotextiles by Permittivity.

S. ASTM D4533 – Standard Test Method for Trapezoid Tearing Strength of Geotextiles.

T. ASTM D4632 – Standard Test Method for Grab Breaking Load and Elongation of Geotextiles.

U. ASTM D5034 – Standard Test Method for Breaking Strength and Elongation of Textile Fabrics (Grab Test).

V. ASTM D5035 – Standard Test Method for Breaking Strength and Elongation of Textile Fabrics (Strip Method).

3.0
Supplier's Drawings and Data Submittals

A. Supplier shall submit drawings and data as specified. Supplier's drawings and data shall be submitted via electronic medium in a format compatible for importing into the Buyer's information systems specified by the Buyer.

3.1
Submittals Prior to Installation

The Supplier shall submit the following items at least 30 days prior to scheduled delivery of materials:

A. Manufacturer's literature providing specifications on the fabric mats that will be supplied.

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B. Manufacturer's certification that the fabric mats to be supplied comply with the requirements of this Technical Specification.

C. Manufacturer's Quality Control and Construction Quality Control Plans. The MQC Plan shall state the frequency that index tests are performed on the fabric mat during manufacturing.

D. If requested by the Buyer, four samples of each fabric mat suitable for testing.

E. Required concrete grout slurry mix design, including requirements for compressive strength, slump, air content and maximum temperature.

3.2
Submittals During and After Installation

The Supplier shall submit the following items on a daily basis during installation and a complete set of data within 30 days of the completion of the work:

A. Results of tests performed on the concrete grout fill.

4.0
Construction Quality Assurance

A. The Supplier shall examine the areas and conditions under which the work is to be installed and notify Buyer in writing of conditions detrimental to the proper and timely completion of the work that have changed from the time of the bidder's walkdown.

B. Material and installation procedures are subject to inspection and tests conducted by an Independent Testing Service employed by the Buyer. Such inspections and tests will not relieve the Supplier of responsibility for providing material and installation procedures in compliance with specified requirements. The Buyer reserves the right, at any time before final acceptance, to reject material not complying with the specified requirements.

C. The Supplier shall correct deficiencies in the work which inspections and laboratory test reports have indicated to be not in compliance with requirements. The Supplier shall perform additional tests, at his expense, as may be necessary to reconfirm any noncompliance of the original work, and as may be necessary to show compliance of corrected work.

D. The Supplier shall promptly correct errors or flaws in material or placement of the protection mats identified during construction. The Supplier shall make immediate substitution of non-complying component or make field changes to make the non-complying component acceptable. Whether the correction is made by substitution or field correction, it shall be performed without cost to the Buyer.

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4.1
Testing

4.1.1
Independent Testing Service

An Independent Testing Service shall perform the following:

A. Test material for the concrete slurry fill and prepare initial test cylinders in accordance with the requirements specified herein.

B. Prepare test cylinders and determine the compressive strength of job concrete fill test cylinders.

4.1.2
Concrete Grout Testing

A. Obtaining and testing concrete grout shall be by the Independent Testing Service in accordance with the following specifications:

- Sampling freshly mixed grout shall be done in accordance with ASTM C172.
- Making and curing concrete test specimens shall be in accordance with ASTM C31.
- Slump test shall be in accordance with ASTM C143.
- Air Content tests shall be in accordance with ASTM C173 or ASTM C231.
- Tests for the temperature of the freshly mixed grout shall be in accordance with ASTM C1064.
- Compressive strength test shall be in accordance with ASTM C39.

B. The frequency of testing shall be as directed by Buyer as follows:

- At least one test shall be made for each day's placement of grout, but not less than once for each 100 cubic yards or part thereof placed.
- A test shall consist of a minimum of four cylinders taken from the same truck. One 7-day and two 28-day tests shall be performed by the laboratory with results submitted to the Buyer as soon as possible. One spare cylinder shall be made and used as directed by the Buyer.
- A slump test and air content test shall be performed on every 100 cubic yards of concrete grout.
- The temperature of each 100 cubic yards shall be recorded in the field prior to placement. If the concrete grout temperature is in excess of 100°F, the concrete shall be rejected.

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5.0
Materials

5.1
Fabric Design

A. Fabric-forming material shall consist of double-layer, open-selvage fabric joined in a mat configuration. The fabric shall be woven of 100% continuous multi-filament nylon fiber of which 50% by weight shall be bulk textured fiber. The use of staple yarns will not be permitted.

B. The fabric shall be woven in such a manner as to provide interwoven points of attachment on spaced centers. These points of attachment shall serve to control the thickness of the finished product and to also act as a filter point to provide relief of hydrostatic uplift pressure beneath the completed revetment. The fabric shall be woven in a basket or other open pattern to provide permeability at the filter points and the main fabric field.

C. The spacing of the filter points is indicated on the Design Drawings. This spacing will result in an average revetment thickness that is consistent with the average thickness published by the manufacturer for the designated style specified.

5.2
Fiber and Fabric Material

A. The warp fiber shall be 1260 Denier Nylon, 18.5 ends/inch per single layer and the fill fiber shall be 1900 Denier Nylon, 14 picks/inch per single layer. The fiber and fabric material shall meet the minimum requirements listed in Table 1.

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TABLE 1
MATERIAL PROPERTIES

PROPERTY	ASTM TEST METHOD	MINIMUM TEST VALUE
Fiber count	-	0.164 g/m
Trapezoidal tear breaking force on the warp fiber at 70% elongation	D 4533	80 lbs/in
Trapezoidal tear breaking force on the fill fiber at 70% elongation	D 4533	40 lbs/in
Density	D 792	1.00 g/cm^3
Fiber dry breaking strength at 48% elongation	D 2101	20 lbs
Fiber wet breaking strength at 53% elongation (soaked in water for 2 hours)	D 2101	19 lbs
Tensile strength in the warp direction after exposure to 300 hours of Ca (OH) at a pH of 10	D 543	180 lbs/in
Tensile strength in the warp direction after exposure to 300 hours of H_2SO_4	D 543	170 lbs/in
Tensile breaking strength in the warp direction on a strip of the fabric at 39% elongation (1)	D 5034, D 5035	160 lbs/in
Tensile breaking strength in the fill direction on a strip of the fabric at 34% elongation (1)	D 5034, D 5035	190 lbs/in
Mass/unit area for a single layer of fabric	D 3776	7.8 oz/sq yd
Thickness of a single layer of fabric	D 1777	31 mils
Falling head permittivity of two layers of fabric woven together	D 4491	0.28 s^{-1} 0.04 cm/s (3)
Falling head permittivity of a single layer of fabric	D 4491	1.3 s^{-1} 0.12 cm/s
Seam strength (2)	D 751	35 lbs/in
Abrasion resistance in the warp direction	D 3885	160 lbs/in
Grab strength in the warp direction at 31% elongation	D 4632	350 lbs
Grab strength in the fill direction at 41% elongation	D 4632	275 lbs
Breaking strength in the warp direction after exposure to 500 hours of UV light	D 4355	190 lbs/in
Mullen burst test	D 3786	750 psi
Puncture test	D 3787	80 lbs

Notes for Table 1:

(1) 3" x 8" sample gripped along full width of the specimen with 3" of separation between grips. Strip test to be performed on single layer of fabric at cross-head speed of 5 inches per minute.

(2) Seam centered between grips 3" apart and gripped the full width of the specimen.

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(3) Applies to Filter Points only

5.3
Fabric Assembly

A. Adjacent fabric panels shall be connected by sewing or by means of zipper.

B. The two top layers of fabric and the two bottom layers of fabric shall be joined separately permitting full mat thickness between the two parallel seams. A single seam in which all four layers of the fabric are joined at one point will not be permitted.

C. If required, grout stops may be installed parallel to and in between individual mill widths at predetermined intervals to regulate the flow of the concrete fill. Grout stops shall be so designed as to produce full mat thickness along the full length of the grout stop.

5.4
Concrete Grout

A. The concrete grout shall consist of a mixture of Portland cement, fine aggregate and water so proportioned and mixed as to provide a readily pumpable slurry.

B. Admixtures and/or a pozzolan may be used with the approval of the Buyer. The use of superplasticizers and/or silica fume require special precautions and the approval of the Buyer.

C. The hardened concrete shall exhibit a minimum compressive strength of 2,500 psi at 28 days when specimens are made and tested in accordance with the provisions of ASTM C 31 and ASTM C 39.

5.5
Acceptable Materials

The following companies manufacture products that meet the requirements of the specification:

A. Fabriform Filter Point Fabric as manufactured by Construction Techniques, Inc., Cleveland, Ohio, 440-572-8300.

B. Other approved by Buyer.

6.0
Execution

6.1
Acceptance and Storage at the Project Site

6.1.1
Handling of Rolls

A. The method of off-loading the fabric at the project site shall not cause any damage to the fabric, its core, nor its protective covering.

B. Any protective covering that is accidentally damaged or stripped off of a pallet or roll shall be immediately repaired or the pallet or roll shall be moved to an enclosed facility until the repair can be made.

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6.1.2
Storage at the Field Site

A. The Buyer shall provide on-site storage space in a location near where the fabric will be placed such that on-site transportation and handling are minimized. The Supplier shall be responsible for protecting the stored material from theft and vandalism.

B. Rolls or pallets of fabric shall be stored in such a manner that cores are not crushed, the fabric damaged, and as required to provide protection from exposure to ultraviolet light, inundation, mud, dirt, dust, puncture, cutting or any other damaging or deleterious condition.

C. Outdoor storage of rolls or pallets shall not exceed the manufacturer's recommendations or longer than six months, whichever is less.

6.2
Inspection upon Delivery

A. Upon delivery of the materials to the site, the Supplier shall conduct a visual inspection of all rolls of fabric for damage or defects. This inspection shall be done without unrolling any rolls unless damage to the inside of a roll is found or suspected.

B. Any damage or defects shall be noted and immediately reported to the Buyer, the manufacturer and the carrier that transported the material. Any roll, or portion thereof, which, in the judgement of the Buyer, is seriously damaged, shall be removed from the project site and replaced with complying material at no additional cost to the Buyer.

6.3
Fabric Placement

A. Prior to concrete injection, the fabric shall be positioned over a geotextile on the grade as indicated on the Design Drawings making appropriate allowances for contraction of the fabric mats as a result of injecting the concrete grout.

B. Anchoring of fabric shall be as shown on the Design Drawings.

C. Fabric panels may be factory assembled in predetermined sizes and joined together side-by-side at the project site by field sewing or by means of zipper closures attached to the upper and lower layers of the fabric. In no case will simple unattached butt joints between panels be allowed. Overlapping shall be allowed only if approved by the Buyer.

6.4
Concrete Injection

A. Following placement of the fabric mats the specified concrete grout shall be injected between the top and bottom layers of the fabric through small slits cut in the upper layer of the fabric. The injection pipe shall be wrapped tightly at the point of injection with a strip of burlap, or similar material, during pumping to seal the joint between the injection pipe and the slit. After pumping, the burlap shall be pushed into the slit as the injection pipe is withdrawn in order to minimize spillage of the concrete slurry onto the surface of the revetment.

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B. The sequence of concrete slurry injection shall be such as to insure complete filling of the revetment-forming fabric to average thickness indicated by the manufacturer for the designated style specified on the Design Drawings.

C. Foot traffic will not be permitted on the freshly pumped mat since such traffic will cause permanent indentations in the mat surface. Walk boards shall be used where necessary.

D. Excess concrete slurry which has been inadvertently spilled on the mat surface shall be cleaned up with a broom and shovel. The use of a water hose to remove spillage from the surface of a freshly pumped mat will not be permitted.

E. During concrete slurry injection, the mat thickness shall be measured by inserting a short piece of stiff wire through the crowns of the mats midway between the filter points at several locations from the crest to the toe of the slope. Any mat measurements less than 90% of the average of all thickness measurements shall be re-injected until the average thickness indicated for the style specified has been attained.

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TEMPORARY AND PERMANENT SEEDING (ILLINOIS)

ISSUE SUMMARY

Rev.	Purpose of Issue	Date	Sections Affected	Prepared By	Reviewed By	Approved By
A	Permit Application	02/14/03	ALL	Ronald Cook	Daniel C. Kunk	Ronald Cook

TEMPORARY AND PERMANENT SEEDING (ILLINOIS)

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(2) The numbering and subsequent Revisions to the Specification are in sequence with the previously issued Revision mark number.

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Temporary and Permanent Seeding (Illinois) – Technical Specification and Optional Features/Accessories

1.0 Scope of Work

The intent of this specification is to define the minimum requirements for material and work for establishing a vegetative cover by planting grass seed.

1.1 Purpose and Use

A. All graded areas, slopes, and ditches which will not be paved or otherwise surfaced shall be provided with permanent seeding.

B. Graded areas subject to erosion shall not remain unprotected for longer than 30 days. Temporary seeding shall be provided by the Supplier to protect graded areas from erosion where permanent protection is not scheduled to be installed for 2 to 12 months after grading is completed.

1.2 Method of Seed and Mulch Application

Seed may be spread by a conventional method of application such as broadcasting, grass drill, or cultipacker followed by an application of mulch or by a hydro seeding procedure consisting of spraying a slurry mixture of water, seed, mulch, fertilizer, and tackifier onto the prepared seedbed.

1.3 Work Included

A. Furnish all materials.

B. Subgrade preparation.

C. Seedbed preparation, including placing topsoil and the addition of lime and fertilizer.

D. Seeding using broadcast, grass drill, or the cultipacker method and mulching, or hydro seeding with a mixture that contains seed, mulch and a tackifier.

E. Installation of matting where specified for erosion control.

F. Protection.

G. Maintenance.

H. Repairing and reseeding.

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2.0
Codes and Standards

A. Standards, specifications, manuals, codes and other publications of nationally recognized organizations and associations are referenced herein. Methods, equipment and materials specified herein shall comply with the specified and applicable portions of the referenced documents, in addition to federal, state or local codes having jurisdiction.

B. References to these documents are to the latest issue date of each document, unless otherwise indicated, together with the latest additions, addenda, amendments, supplements, etc., thereto, in effect as of the date of Contract for the Work.

C. Abbreviations listed indicate the form used to identify the reference documents in the Specification text.

2.1
USDA - United States Department of Agriculture, Soil Conservation Service

A. USDA-SCS Soil Classification Supplement to Soil Classification System (7th Approximation), SCS, USDA, Second Printing, March 1967.

2.2
ASTM - American Society for Testing and Materials

A. C602 - Specification for Agricultural Liming Materials.

B. D977 - Specification for Emulsified Asphalt.

C. D2026 - Specification for Cutback Asphalt (Slow-Curing Type).

D. D2027 - Specification for Cutback Asphalt (Medium-Curing Type).

E. D2028 - Specification for Cutback Asphalt (Rapid-Curing Type).

F. D2397 - Specification for Cationic Emulsified Asphalt.

G. D5268 - Specification for Topsoil Used for Landscaping Purposes.

3.0
Supplier's Drawings and Data Submittals

Supplier shall submit drawings and data not less than 30 days before material is to be delivered. Supplier's drawings and data shall be submitted via electronic medium in a format compatible for importing into the Buyer's information systems specified by the Buyer.

3.1
Topsoil

A. Topsoil Material:

- A copy of laboratory reports on two representative samples of topsoil. Laboratory tests shall be performed for:
- Percent deleterious material.
- Total organic content.

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- Silt and clay contents.
- Sand content.
- pH.

B. If it is anticipated that topsoil stripped from either the present site or the borrow area will be used for permanent seeding, if requested by the Buyer, the Supplier shall provide two 50-pound samples to the Buyer's Testing Service for analyses.

3.2 Seed

A. A certified copy of a statement signed by the seed supplier that each lot of seed has been tested by a recognized seed-testing laboratory within six months before the date of delivery to the plant site.

B. A certified statement signed by the seed supplier that the maximum percentage of noxious weeds in the seed mixture complies with state law.

3.3 Data on Materials as Applied

As applied data on the following items:

A. Seed mixture and seed application rate.

B. Limestone application rate.

C. Fertilizer type, trademark name (if any), chemical composition, and application rate.

D. Mulch.

E. Tackifier.

3.4 Binder Spray

Data on the binder spray (tackifier) to be used on straw mulch or with hydro seeding. If a synthetic binder (tackifier) will be used, the Supplier shall provide a complete set of Manufacturer's specifications at least 30 days prior to anticipated use. Manufacturer's specifications shall contain a description of the binder material, the recommended method of application, and the recommended application rate.

3.5 Matting

Catalog data on the proposed erosion control matting and Manufacturer's literature on the recommended method of installation.

3.6 Samples

If requested by the Buyer, submit a sample of each material designated by the Buyer for laboratory testing.

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4.0 Products

4.1 Topsoil

A. Topsoil shall consist of sandy clay loam, sandy loam, loam, clay loam, silty clay loam or silt loam as defined by the SCS Soil Classification System.

B. Topsoil shall be relatively free from large roots, sticks, weeds, brush or stones larger than 1 inch in diameter or other litter and waste products. It shall have at least 90 percent passing the No. 10 sieve.

C. The topsoil shall meet requirements of ASTM D5268 as follows:

- It shall contain not less than 2 percent nor more than 20 percent total organic matter.
- It shall contain not less than 35 percent nor more than 70 percent silt and clay.
- It shall contain not less than 20 percent nor more than 60 percent sand.
- The pH of the sample shall not be lower than 5.0 nor higher than 7.5.
- The percent deleterious material (rock, gravel, slag, cinder, roots, sod) shall not exceed 5 percent.

4.2 Seed

4.2.1 General Requirements

A. Grasses, legumes, or cover crop seed of the type specified herein shall conform to the standards of the United States Department of Agriculture for seed certification.

B. Seed or seeding mixtures shall be furnished in sealed bags or containers in accordance with standard commercial practice.

C. Each bag or container shall be tagged or labeled in accordance with state law. As a minimum, the tag or label shall provide the following information:

- Name and address of the supplier.
- Common name of seed.
- Lot number.
- Net weight.
- Guaranteed percentage of germination.
- Percentage of weed seed and inert material content.

D. Seed which has become wet, moldy, or otherwise damaged in transit or storage will not be accepted.

E. All seed furnished shall be free of primary noxious weed seed such as Russian or Canadian Thistle, European Birdweed, Johnson Grass and Leafy Spurge. The maximum allowable percentage of noxious weed seed in the seed mixture shall comply with state law.

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4.2.2
Seed Storage

If it is necessary to store seeds after their arrival on the site, they shall be stored in an approved weatherproof building in such a manner as to protect the seeds from deterioration and to permit easy access for inspection. The Buyer's approval for the storage building and the method of storage shall not relieve the Supplier of responsibility for the quality and fitness of the seeds at the time of their use.

4.2.3
Seed Mixture

A. Seed species, rate per acre, and other data relevant to permanent seeding are given in Table 1.

B. Seed species, rate per acre, and other data relevant to temporary seeding are given in Table 2.

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TABLE 1
ACCEPTABLE MIXTURES FOR PERMANENT SEEDING

Mixture	Seed Species (1)	Seeding Rate, Pure Live Seed for Conventional Seed Application (2)		Suitable pH	Site Suitability			Acceptable Dates for Seeding
		Lbs. per acre	Lbs. per 1,000 sq. ft.		Sunny, Dry	Well Drained	Wet	
1	Smooth Bromegrass or Tall Fescue	30	0.75	6.0-7.5	X	X	X	4-1 to 6-1 8-1 to 9-1
	Alfalfa or Birdsfoot Trefoil	10	0.25					
2	Smooth Bromegrass or Tall Fescue	30	0.75	6.0-8.0	X	X		4-1 to 6-1 8-1 to 9-1
	Crown Vetch	20	0.50					
3	Tall Fescue	15	0.35	5.5-7.5		X	X	4-1 to 6-1 8-1 to 9-1
	Timothy or Redtop	3	0.07					
	Birdsfoot Trefoil	15	0.35					
4	Reed Canary Grass	15	0.35	5.5-7.5	X	X		4-1 to 6-1 8-1 to 9-1
	Smooth Bromegrass or Tall Fescue	15	0.35					
	Ladino (optional)	3	0.07					

Notes: (1) Mixtures as defined by SCS for Illinois.

(2) Triple the seeding rate shown in the table when hydro seeding.

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TABLE 2
ACCEPTABLE MIXTURES FOR TEMPORARY SEEDING

MIXTURE	SEED SPECIES	MAXIMUM WEED SEED (percentage)	SEEDING RATE PER ACRE	SUITABLE pH	PLANTING DEPTH	ACCEPTABLE DATES FOR SEEDING
1	Wheat	0.50	150 lbs	5.5 to 7.0	1" to 1 ½"	3-1 to 5-15 7-1 to 10-15
2	Cereal Rye	0.50	150 lbs	5.5 to7.0	1" to 1 ½"	3-1 to 5-15 7-1 to 10-15
3	Spring Oats	0.50	100 lbs	5.5 to 7.0	1"	3-1 to 7-1
4	Perennial Ryegrass	0.50	40 lbs	5.0 to 7.5	1/4"	4-1 to 6-1 8-1 to 9-15

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4.3
Lime (Agricultural Ground Limestone)

Agricultural lime shall be flour grade meeting the requirements of ASTM C602.

4.4
Fertilizer

A. Fertilizer shall be a standard brand commercial grade of inorganic fertilizer furnished in unopened containers. The material may be separate or in a mixture containing the percentage of total nitrogen, available phosphoric acid and water-soluble potash in the amounts specified. If materials are separate, the Buyer shall be present when the separate fertilizers are mixed in the field. The fertilizer shall be odor free.

B. Fertilizer shall be supplied in one of the following forms:

- A dry free-flowing granular fertilizer suitable for application by an agricultural fertilizer spreader.
- A soluble form that will permit complete suspension of insoluble particles in water, suitable for application by power sprayer.

C. The following information shall be shown on the fertilizer container or on a tag attached thereto:

- Name and address of manufacturer.
- Name, brand or trademark.
- Number of net pounds of ready-mixed material in the package.
- Chemical composition or analysis.
- Guarantee of analysis.

4.5
Mulch

4.5.1
Straw Mulch

A. Straw shall be stalks of small grain straw of wheat, rye, oats, barley or other approved grain. Straw shall be air dried and free of grain and noxious weed seed, other materials detrimental to plant life, and mold.

B. Straw shall be seasoned before bailing or loading. Straw mulch shall be suitable for spreading with mulch blower equipment.

C. Old dry straw which breaks up in the crimping process instead of bending, or straw in such advanced stages of decomposition that it will smother or retard the normal growth of grass, is not acceptable.

4.5.2
Wood Cellulose Fiber Mulch

A. Wood cellulose fiber shall be partly digested wood fibers.

B. The material shall be dyed green.

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C. The material shall not contain growth or organism inhibiting agents.

D. The material shall be air-dried with a minimum of 30 percent of the fibers 3.7 mm (0.145 inch) or longer.

4.5.3
Binder Sprays

A. Cutback Asphalt shall be in accordance with ASTM D2026 (Slow-Curing Type), ASTM D2027 (Medium-Curing Type) or ASTM D2028 (Rapid-Curing Type).

B. Emulsified Asphalt shall be in accordance with D977 (Emulsified Asphalt) or D2397 (Cationic Emulsified Asphalt).

4.6
Tackifier (Synthetic Binder)

A. Tackifier material shall be an acrylic copolymer or a polyvinyl acetate emulsion in a liquid form. The material may contain additives to enhance its ability to penetrate the soil.

B. The material shall be non-toxic, non-flammable, and biodegradable.

C. Approved Materials:

- Soil Seal Concentrate manufactured by Soil Seal Corp., 1111 W. Sixth St., Los Angeles, California 90017, telephone number 213-481-7185.
- Reinco Mulch Binder and Terra Tac manufactured by Rienco Mulch Binder Corp., 520 North Avenue, Plainfield, New Jersey 07060, telephone number 1-800-526-7687.
- Aerospray 70 Binder manufactured by American Cyanamid Company, Mobile, Alabama 36601, telephone number 205-476-5800.

4.7
Inoculant

A. The inoculant for treating legume seeds shall be a pure culture of nitrogen fixing bacteria prepared specifically for the species and shall not be used later than the date indicated on the container. A mixing medium, as recommended by the manufacturer, shall be used to bond the inoculant to the seed.

B. All legumes not pre-inoculated shall be inoculated within 12 hours of seeding. If the seed was pre-inoculated more than 60 days prior to seeding then it must be reinoculated.

4.8
Matting for Erosion Control

A. Matting for erosion control may be one of the following unless a specific matting is specified on the Design Drawings.

- Jute mat shall be cloth of a uniform plain weave of undyed and unbleached single jute yarn, 48 inches in width, plus or minus 1 inch and weighing an average of 1.2 pounds per linear yard of cloth with a tolerance of plus or minus 5 percent, with approximately 78 warp ends per width of cloth and 41 weft ends per linear yard of cloth. The yarn shall be

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of a loosely twisted construction having an average twist of not less than 1.6 turns per inch and shall not vary in thickness by more than one-half its nominal diameter.

- Excelsior mat shall be wood excelsior, 48 inches in width plus or minus 1 inch and weighing 0.8 pounds per square yard plus or minus 10 percent. The excelsior material shall be covered with a netting to facilitate handling and to increase strength.
- Glass fiber matting of bonded textile glass fibers with an average fiber diameter of 8 to 12 microns, 2 to 4 inch strands of fiber bonded with phenol formaldehyde resin. Mat shall be roll type, water permeable, minimum thickness 1/4 inch, maximum thickness 1/2 inch, density not less than 3 pounds per cubic foot.

B. Staples for anchoring soil stabilizing materials shall be No. 11 gauge wire or heavier. Their length shall be 6 to 10 inches. Ten inch long staples shall be used on loose, unstable soils.

5.0 Execution

5.1 Site Preparation

A. Prior to seeding, install all erosion control facilities specified on the Design Drawings. These include: diversions, berms, sediment control traps, silt fences and straw bale dikes.

B. Grade areas as specified on the Design Drawings. Gullied and uneven areas shall be smoothed before starting seedbed preparation.

5.2 Limestone for pH Adjustment

A. The Supplier shall apply limestone as required to raise the pH of the subsoil. Apply a minimum of 4 tons of limestone per acre for clayey soils, 3 tons of limestone per acre for sandy loam, and 2 tons of limestone per acre for loamy sand or silty soils.

B. Thoroughly work the limestone into the subsoil to a depth of 2 to 3 inches with a harrow or disk. The limestone may be applied prior to or concurrently with the fertilizer described.

5.3 Fertilizer

A. The Supplier shall apply a 12-12-12 fertilizer to the subsoil at a rate of 300 pounds per acre.

B. Work the fertilizer into the soil to a depth of 2 to 3 inches with a harrow, disk, or rake. On slopes, operate the disk or rake across the slope.

C. If hydro seeding is used, the fertilizer may be added to the hydroseed mixture.

5.4 Tilling of Subsoil

Prior to placing the topsoil, scarify the subsoil to a depth of 3 inches immediately prior to spreading topsoil to ensure bonding of the topsoil and the subsoil. Repeat scarification in areas where equipment used for hauling and spreading topsoil has compacted the subsoil.

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5.5
Placing Topsoil

Note: topsoil does not have to be placed for temporary seeding. Topsoil must be placed prior to permanent seeding.

A. Place topsoil during dry weather on a dry, unfrozen subgrade. Topsoil shall not be spread if it is frozen or muddy.

B. Remove large pieces of organic matter and foreign non-organic material from topsoil while spreading. There shall be no large roots, branches or trash of any kind in the topsoil.

C. Spread the topsoil to provide a compacted thickness of not less than 4 inches.

D. Compact the topsoil with a roller not exerting more than 100 pounds per square inch. The topsoil must be loose enough for water infiltration and root penetration. The soil surface on slopes shall be roughened to catch seeds if they are to be broadcast.

5.6
Seeding (Conventional Method)

A. Tables 1 and 2 list acceptable seed mixtures that may be used for seeding. The Supplier shall select a mixture from the appropriate table and plant within the dates shown in that table for that mixture.

B. Apply seed uniformly at the rate shown in the appropriate table with a rangeland grass drill or cultipacker type seeder, or broadcast seed uniformly. The seeding methods and equipment shall be submitted to the Buyer for approval prior to beginning work.

C. All seeders shall be calibrated and adjusted to sow seeds at the proper rate. Equipment shall be operated to ensure a complete and even coverage. Do not seed areas greater than that which can be mulched on the same day.

D. Do not sow immediately following a rain, where the ground is too dry, during windy periods, or otherwise when conditions are not proper for seeding.

E. No seeds shall be sown until the purity test has been completed for the seeds to be used and the tests show that the seed meets the noxious weed seed requirements.

F. Within 12 hours, all seeded areas shall be rolled at right angles to the runoff with a cultipacker or approved roller to compact the seedbed and place the seed in contact with the soil. The optimum depth for planting shall be 1/4 inch. Rolling is not required if the seeding equipment is equipped with a roller that achieves the desired compaction or a grass drill has been used. Note: For temporary seeding planted without topsoil, the optimum planting depth is shown in Table 2.

5.7
Mulching (Conventional Method)

5.7.1
Straw Mulching

A. All seeded areas shall be mulched with straw mulch within 24 hours after seeding. The mulch may be hand or machine applied. The mulch shall be uniformly applied in a loose enough condition to permit air to circulate, but compact enough to reduce erosion. About 25 percent of

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the solid surface should show through the mulch. If baled mulch material is used, care shall be taken that the material is in a loosened condition and contains no lumps or knots of compacted material.

B. Straw mulch shall be applied at the rate of 2 tons per acre, or 75 to 100 (two bales) pounds per 1,000 square feet.

C. Straw mulch shall be anchored immediately after placement to minimize loss by wind or water. Straw mulch shall be anchored using a mulch anchoring tool or by spraying with a liquid binder.

5.7.2
Anchoring Mulch Using a Mulch Anchoring Tool

A. The mulch anchoring tool shall be designed to punch and anchor the mulch into the top 2 to 3 inches of soil at 6 inch intervals. As an alternative, a smooth disk set in a straight position may be used.

B. On slopes flatter than 3 horizontal to 1 vertical, mulch anchoring shall cross the contour of the land (across slopes). On slopes steeper than 3 horizontal to 1 vertical, the mulch shall be anchored by tracking a bulldozer with 1-1/2 inch track cleats up and down slope making grooves running across the slope.

5.7.3
Anchoring Using a Sprayed Liquid Binder

A. A sprayed liquid binder may be used in lieu of crimping to anchor the mulch. The binder may be sprayed into the mulch as it leaves the blower pipe or it may be applied as an over spray. If over sprayed, the binder spray should be heavier at the edges where wind catches the mulch, in valleys and at crests of banks. Binder shall be applied uniformly over the remainder of the area. Caution shall be used when spraying binder near areas occupied by construction personnel.

B. Binder Spray shall be applied at the following rates:

- Cutback asphalt - Rapid curing (RC-70, RC-250, and RC-800) or medium curing (MC-250 or MC-800). Apply 5 gallons per 1,000 square feet or 218 gallons per acre.
- Emulsified asphalt - (SS-1, CSS-l, CMS-2, MS, RS-l, RS-2, CRS-l, and CRS-2). Apply 5 gallons per 1,000 square feet or 218 gallons per acre.
- Synthetic binders - Synthetic binders such as Acrylic Dir (Agri-Tac), DCA-70, Petroset or Terra Tack may be used at rates recommended by the manufacturer to anchor mulch material.

5.7.4
Repairing and Reseeding

A. Areas not mulched and anchored within 24 hours after seeding shall be reseeded and mulched.

B. Areas not properly mulched, or damaged due to construction activities, shall be repaired, reseeded, and remulched.

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5.8
Hydro Seeding

A. Hydro seeding consists of spraying a slurry mixture of water, seed, fertilizer, mulch, and a tackifier on a prepared seed bed.

B. The slurry mixture shall be mixed and applied using a hydraulic seeder. Hydraulic seeding equipment shall include a pump rated and operated at not less than 100 gallons per minute and 100 psi pressure. The tank shall have a mechanical agitator powerful enough to keep the slurry mixture in a uniform suspension in water.

C. Hydrated lime **shall not** be added to the slurry mixture.

D. The slurry mixture shall contain a maximum of 55 percent solids (125 pounds of solids per 100 gallons of water).

E. The seed mixture shall be as specified in Table 1 or Table 2 except that the weight of seed in the slurry mixture shall be a minimum of three times the weight of pure live seed per acre specified in the appropriate table for conventional seed application.

F. The slurry mixture shall contain a minimum of 1500 pounds of wood cellulose fiber mulch per acre or 2000 pounds of straw mulch per acre.

G. The amount of tackifier provided per acre shall be in accordance with Manufacturer's recommendations.

H. The slurry-mixture shall contain a minimum of 1000 pounds of grade 12-12-12 fertilizer per acre or the equivalent weight of chemicals if another grade is used.

I. The soil surface shall be moist when the slurry mixture is applied.

5.9
Laying and Securing Matting

5.9.1
Laying and Securing Jute Matting

A. Prepare the seed bed as specified and lime, fertilize, and seed, except that when using jute matting, apply approximately one-half of the seed after laying the mat.

B. Most drainage channels will require multiple widths of jute matting. The total width shall be as specified on the Design Drawings. Unroll matting starting at the upper end of the channel allowing a 4 inch overlap of mattings along center of channel.

C. Bury the top ends of jute matting in a narrow trench. Backfill the trench and tamp firmly to conform to channel cross-section. Secure the matting with a row of staples about 4 inches down slope from the trench. Spacing between staples shall be a maximum of 6 inches.

D. Staple the 4 inch overlap in the center of the channel using an 18 inch spacing between staples. Before stapling the outer edges of the matting, make sure the matting is smooth and in firm contact with the soil. Staples shall be placed 2 feet apart along the outer edge of matting.

E. Where one roll of jute matting ends and another begins, the end of the top strip shall overlap the upper end of the lower strip by 4 inches, shiplap fashion.

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F. Where matting crosses erosion stops, reinforce with a double row of staples placed six (6) inches apart in a staggered pattern on either side of erosion stop. Likewise, overlaps joining the length of matting together and the discharge end of the matting liner should be similarly secured with 2 double rows of staples.

5.9.2
Laying and Securing Excelsior Matting

A. Provide the same seedbed preparation as specified for jute matting with the exception that all seeding must be completed before laying excelsior matting.

B. Bury the top ends of excelsior matting in a trench as described for jute matting. As the blankets are unrolled down slope, the matting must be on top with the wood fibers in contact with the soils. Butt snugly at the ends and sides before stapling.

C. Using two (2) foot spacing between staples, excelsior matting shall be secured with four rows for each strip, with one row along each edge and alternating parallel rows down the center. The stapling over erosion stops, entrance and discharge ends of matting and butted end joints shall be the same as described for jute matting.

5.10
Construction Completed after Acceptable Seeding Dates

When construction is completed between October 15 and March 1 prepare the seedbed, fertilize and mulch as specified. Apply seed for permanent seed sometime between December 1 and March 1 increasing the seeding rates shown in Table 1 by 50 percent.

6.0
Protection

Planted areas shall be protected from damage and erosion. The Supplier shall provide and erect temporary barriers and signs as necessary to prevent vehicles, equipment and foot traffic from damaging seeded areas.

7.0
Maintenance

The Supplier shall perform the following maintenance tasks:

A. Keep seedbed continually moist with light, frequent sprinklings several times a day to prevent seedlings from drying out.

B. Inspect periodically after planting to see that vegetative stands are adequately established. Immediately reseed areas which show bare spots larger than 2 feet by 2 feet after germination.

C. Check for erosion damage after storm events and repair damage. Reseed and mulch, if necessary.

D. Fertilize newly permanent seeded areas one year after seeding with 300 pounds per acre of a complete (N-P-K) 10-10-10 or equivalent turf type slow release fertilizer.

- Application rate per acre shall be:

  Nitrogen (N) - 120 pounds of actual nitrogen.

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Phosphorus (P) - 120 pounds of P_2O_5.

Potassium (K) - 120 pounds of K_2O.

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Appendix E: Hennepin Power Station; West Ash Disposal Pond Maintenance Plan (2013)

DYNEGY MIDWEST GENERATION, LLC

Hennepin Power Station
Hennepin, Illinois

Putnam County

West Ash Disposal Pond

IDNR Permit No. (not permitted)

Dam ID No. (not permitted)

Maintenance Plan

September 2013

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1.0 GENERAL

The following operations and maintenance procedures are provided to maintain the structural integrity of the west ash storage surface impoundment at the Hennepin Power Station, which is unclassified and unpermitted, by the Illinois Department of Natural Resources, Office of Water Resources.

2.0 EMERGENCY OPERATIONS

2.1 Unusual Conditions

Any unusual condition discovered during major storm events or routine inspection, which may constitute an emergency, shall be handled as follows. Notice of any type of emergency involving the dikes or outfall shall be made to the Shift Leader on duty [(815) 339-9211]. The Shift Leader on duty shall notify the Station Manager, Ted Lindenbusch [home: (815) 875-2381], or, in his absence, the Environmental Coordinator, John P. Augspols [home: (815) 925-7488]. One of the above designated personnel shall notify the following city, county, state and federal regulatory authorities of the emergency condition.

- Division of Water Resources, Dam Safety Section, Dam Safety Engineers (217) 782-3862
- Illinois Emergency Management Agency, 24-hour service 1-(800) 782-7860
- Putnam County Sheriff/Hennepin Police Department (815) 925-7015
- Senior Director – Environmental Compliance, Dynegy Operating Company (618) 206-5912

2.2 Dewatering

The Station Manager or the Environmental Coordinator shall have the responsibility of determining how repairs shall be accomplished and whether dewatering of the disposal facility is necessary. Emergency dewatering shall be accomplished by portable pumps.

3.0 MAINTENANCE

3.1 Vegetation

Dikes shall be maintained to protect the structural integrity of the disposal facility. Damaged and barren areas shall be repaired as soon as appropriate after being discovered. Damaged areas shall be filled with topsoil. Limed, fertilized, and seeded with appropriate vegetation. Trees and shrubs observed during semiannual inspections shall be cut and removed from the dikes and discharge channel. This shall be done as frequently as is necessary to insure that no tree reaches a size where the root structure would require removal and filling. Woody vegetation, shrubs, and trees shall be removed during the early stages of growth before reaching a three-inch diameter.

Low growing vegetation, a prairie grass mixture that grows to a height of no more than six inches, shall be planted and maintained to facilitate inspections.

3.2 Discharge Structure

The discharge structure shall be inspected periodically for significant corrosion and deterioriation. Any defects discovered shall be promptly repaired.

3.3 Animal Damage and Repairs

Animal burrows discovered during inspections shall be promptly repaired by filling with grout.

3.4 Restriction of Unauthorized Vehicles

Facility approaches shall be posted with signs restricting unauthorized travel on the roadways and slopes.

3.5 Inspections/Remedial Measures

3.5.1 Weekly Inspections

Weekly inspections of the perimeter berms shall be conducted, looking for seepage and slumping, and unusual seepage at and/or blockage of the outfall structures in each cell. All findings shall be entered into the weekly inspection checklist, discussed in Section 4.0. Maintenance activities shall be initiated, if required. Refer to Section 4.0 for the recommended inspection checklist to be used for the weekly inspections.

3.5.2 Quarterly Inspections

Inspections shall be made quarterly by Station personnel to determine the general condition of the dam and embankments. During these inspections, embankment erosion, tree growth, and embankment seepage shall be monitored. Seepage shall be observed for change in quantity and coloration. Refer to Section 4.0, for the recommended inspection checklist to be used for documenting the quarterly inspections.

3.5.3 Annual Inspections

An annual inspection shall be made by a licensed professional engineer. This inspection shall follow the Illinois Department of natural Resources (IDNR) *Guidelines and Forms for Inspection of Illinois Dams*, and shall be followed by verbal and written reports by the consulting engineer. Based on the findings of the inspection, the Station Manager shall implement corrective action as required to promote dam safety. Procedures and methods for corrective action shall be performed in accordance with recommendations of the consulting engineer and as outlined above. Because the dam is not permitted by the IDNR, copies of the engineer's report, along with corrective action taken, will not be reported to the IDNR.

4.0 INSPECTION CHECKLISTS

The following Inspection checklists should be used during the weekly and quarterly inspections.

WEEKLY DAM INSPECTION FORM

Dam Location: Hennepin Power Station – West Ash Pond
Owner: Dynegy Midwest Generation, LLC, Havana Power Station
Permit No.:Not permitted **Class of Dam: Not classified**
Type of Dam: Homogeneous earth dam
Type of Spillway: Drop structure

Date Inspected: _____
Weather Conditions: _____
Pool Elevation: _____

Inspection Personnel:

_____ _____
Name / Title **Signature**

Inspection Item	Conditions	Location of Problem and Recommended Remedial Measures and Implementation Schedule
Vertical and Horizontal Alignment of Crest		
Unusual Movement or Cracking at or Beyond Toe		
Seepage		
Vegetative Cover		
Embankment Erosion		
Structural Cracking		
Outfall Structures		
Other		

QUARTERLY DAM INSPECTION FORM

Dam Location: Hennepin Power Station – West Ash Pond
Owner: Dynegy Midwest Generation, LLC, Hennepin Power Station
Permit No.: Not permitted **Class of Dam: Not classified**
Type of Dam: Homogeneous earth dam
Type of Spillway: Drop structure

Date Inspected: _____
Weather Conditions: _____
Pool Elevation: _____

Inspection Personnel:

_____
Name / Title **Signature**

Inspection Item	Conditions	Location of Problem and Recommended Remedial Measures and Implementation Schedule
Vertical and Horizontal Alignment of Crest	Good condition, with no significant issues	
Downstream Fill Slopes	Good condition, with no significant issues	
Upstream Fill Slopes	Good condition, with no significant issues	
Unusual Movement or Cracking at or Beyond Toe	Good condition, with no significant issues	
Seepage (Condition/Color)	Good condition, with no significant issues	
Vegetative Cover (Tree growth)	Good condition, with no significant issues	
Animal Damage	Good condition, with no significant issues	
Embankment Erosion	Good condition, with no significant issues	
Water Passages	Good condition, with no significant issues	
Structural Cracking	Good condition, with no significant issues	
Outfall Structures	Good condition	
Other		

Appendix F: Hennepin Power Station; Old East Ash Disposal Pond Maintenance Plan (2013)

DYNEGY MIDWEST GENERATION, LLC

Hennepin Power Station
Hennepin, Illinois

Putnam County

Old East Ash Disposal Pond

IDNR Permit No. (not permitted)

Dam ID No. (not permitted)

Maintenance Plan

September 2013

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1.0 GENERAL

The following operations and maintenance procedures are provided to maintain the structural integrity of the old east ash storage surface impoundment at the Hennepin Power Station, which is unclassified and unpermitted, by the Illinois Department of Natural Resources, Office of Water Resources.

This is primarily the @ 0.5 mile significant berm system that extends along the Illinois River. The old east ash pond system consists of the inactive cells # 2 and # 4. As a result of the May 2011 USEPA dam assessment, a dam safety permit was submitted to IDNR in May 2013, to address major modifications to this significant berm. These major modifications include extensive tree removal and resloping. Resloping is required to improve slope stability and allow safe access to slope, for long-term mowing and maintenance.

2.0 EMERGENCY OPERATIONS

2.1 Unusual Conditions

Any unusual condition discovered during major storm events or routine inspection, which may constitute an emergency, shall be handled as follows. Notice of any type of emergency involving the dikes or outfall shall be made to the Shift Leader on duty [(815) 339-9211]. The Shift Leader on duty shall notify the Station Manager, Ted Lindenbusch [home: (815) 875-2381], or, in his absence, the Environmental Coordinator, John P. Augspols [home: (815) 925-7488]. One of the above designated personnel shall notify the following city, county, state and federal regulatory authorities of the emergency condition.

- Division of Water Resources, Dam Safety Section, Dam Safety Engineers (217) 782-3862
- Illinois Emergency Management Agency, 24-hour service 1-(800) 782-7860
- Putnam County Sheriff/Hennepin Police Department (815) 925-7015
- Senior Director – Environmental Compliance, Dynegy Operating Company (618) 206-5912

2.2 Dewatering

Not applicable.

3.0 MAINTENANCE

3.1 Vegetation

Dikes shall be maintained to protect the structural integrity of the disposal facility. Damaged and barren areas shall be repaired as soon as appropriate after being discovered. Damaged areas shall be filled with topsoil. Limed, fertilized, and seeded with appropriate vegetation. Trees and shrubs observed during semiannual inspections shall be cut and removed from the dikes and discharge channel. This shall be done as frequently as is necessary to insure that no tree reaches a size where the root structure would require removal and filling. Woody vegetation, shrubs, and trees shall be removed during the early stages of growth before reaching a three-inch diameter.

Low growing vegetation, a prairie grass mixture that grows to a height of no more than six inches, shall be planted and maintained to facilitate inspections.

3.2 Discharge Structure

Not applicable.

3.3 Animal Damage and Repairs

Animal burrows discovered during inspections shall be promptly repaired by filling with grout.

3.4 Restriction of Unauthorized Vehicles

Facility approaches shall be posted with signs restricting unauthorized travel on the roadways and slopes.

3.5 Inspections/Remedial Measures

3.5.1 Weekly Inspections

Weekly inspections of the perimeter berms shall be conducted, looking for seepage and slumping. All findings shall be entered into the weekly inspection checklist, discussed in Section 4.0. Maintenance activities shall be initiated, if required. Refer to Section 4.0 for the recommended inspection checklist to be used for the weekly inspections.

3.5.2 Quarterly Inspections

Inspections shall be made quarterly by Station personnel to determine the general condition of the dam and embankments. During these inspections, embankment erosion, tree growth, and embankment seepage shall be monitored. Seepage shall be observed for change in quantity and coloration. Refer to Section 4.0, for the recommended inspection checklist to be used for documenting the quarterly inspections.

3.5.3 Annual Inspections

An annual inspection shall be made by a licensed professional engineer. This inspection shall follow the Illinois Department of natural Resources (IDNR) *Guidelines and Forms for Inspection of Illinois Dams*, and shall be followed by verbal and written reports by the consulting engineer. Based on the findings of the inspection, the Station Manager shall implement corrective action as required to promote dam safety. Procedures and methods for corrective action shall be performed in accordance with recommendations of the consulting engineer and as outlined above. Because the dam is not permitted by the IDNR, copies of the engineer's report, along with corrective action taken, will not be reported to the IDNR.

4.0 INSPECTION CHECKLISTS

The following Inspection checklists should be used during the weekly and quarterly inspections.

WEEKLY DAM INSPECTION FORM

Dam Location: Hennepin Power Station – Old East Ash Pond
Owner: Dynegy Midwest Generation, LLC, Havana Power Station
Permit No.:Not permitted **Class of Dam: Not classified**
Type of Dam: Homogeneous earth dam
Type of Spillway: N/A

Date Inspected: _____
Weather Conditions: _____
Pool Elevation: _____

Inspection Personnel:

_____ _____
Name / Title **Signature**

Inspection Item	Conditions	Location of Problem and Recommended Remedial Measures and Implementation Schedule
Vertical and Horizontal Alignment of Crest		
Unusual Movement or Cracking at or Beyond Toe		
Seepage		
Vegetative Cover		
Embankment Erosion		
Structural Cracking		
Outfall Structures		
Other		

QUARTERLY DAM INSPECTION FORM

Dam Location: Hennepin Power Station – Old East Ash Pond
Owner: Dynegy Midwest Generation, LLC, Hennepin Power Station
Permit No.: Not permitted **Class of Dam: Not classified**
Type of Dam: Homogeneous earth dam
Type of Spillway: Not applicable

Date Inspected: _____
Weather Conditions: _____
Pool Elevation: _____

Inspection Personnel:

_____
Name / Title **Signature**

Inspection Item	Conditions	Location of Problem and Recommended Remedial Measures and Implementation Schedule
Vertical and Horizontal Alignment of Crest	Good condition, with no significant issues	
Downstream Fill Slopes	Good condition, with no significant issues	
Upstream Fill Slopes	Good condition, with no significant issues	
Unusual Movement or Cracking at or Beyond Toe	Good condition, with no significant issues	
Seepage (Condition/Color)	Good condition, with no significant issues	
Vegetative Cover (Tree growth)	Good condition, with no significant issues	
Animal Damage	Good condition, with no significant issues	
Embankment Erosion	Good condition, with no significant issues	
Water Passages	Good condition, with no significant issues	
Structural Cracking	Good condition, with no significant issues	
Outfall Structures	Good condition	
Other		

Appendix G: Hennepin Power Station; East Ash Disposal Pond Maintenance Plan (2014)

DYNEGY MIDWEST GENERATION, LLC

Hennepin Power Station
Hennepin, Illinois

Putnam County

East Ash Disposal Pond

Small Class III Dam

IDNR Permit No. DS2011079

Dam ID No. IL50363

Maintenance Plan

Revised – August 2014

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1.0 GENERAL

The following operations and maintenance procedures are provided to maintain the structural integrity of the east ash storage surface impoundment at the Hennepin Power Station, which is classified as a small Class III dam by the Illinois Department of Natural Resources, Office of Water Resources. The primary pond's maximum normal poll elevation will be 489.5 msl with a dam crest at elevation 494.0 msl. The secondary pond's maximum normal pool elevation will be 480.5 with a dam crest at 494.0 msl.

2.0 EMERGENCY OPERATIONS

2.1 Unusual Conditions

Any unusual condition discovered during major storm events or routine inspection, which may constitute an emergency, shall be handled as follows. Notice of any type of emergency involving the dikes or outfall shall be made to the Shift Leader on duty [(815) 339-9211]. The Shift Leader on duty shall notify the Managing Director, Byron Veech [cell: (309) 543-8714], or, in his absence, the Environmental Coordinator, John P. Augspols [home: (815) 925-7488]. One of the above designated personnel shall notify the following city, county, state and federal regulatory authorities of the emergency condition.

- Division of Water Resources, Dam Safety Section, Dam Safety Engineers (217) 782-3862
- Illinois Emergency Management Agency, 24-hour service 1-(800) 782-7860
- Putnam County Sheriff/Hennepin Police Department (815) 925-7015
- Senior Director – Environmental Compliance, Dynegy Operating Company (618) 343-7761

2.2 Dewatering

The Station Manager or the Environmental Coordinator shall have the responsibility of determining how repairs shall be accomplished and whether dewatering of the disposal facility is necessary. Dewatering shall be accomplished by manually removing the concrete beams from the primary and/or secondary pond structures until the desired water level is reached.

3.0 MAINTENANCE

3.1 Vegetation

Dikes shall be maintained to protect the structural integrity of the disposal facility. Damaged and barren areas shall be repaired as soon as appropriate after being discovered. Damaged areas shall be filled with topsoil. Limed, fertilized, and seeded with appropriate vegetation. Trees and shrubs observed during periodic inspections shall be cut and removed from the dikes and discharge channel. This shall be done as frequently as is necessary to insure that no tree reaches a size where the root structure would require removal and filling. Woody vegetation, shrubs, and trees shall be removed during the early stages of growth before reaching a three-inch diameter.

Low growing vegetation shall be planted and maintained to facilitate inspections.

3.2 Discharge Structure

The discharge structure shall be inspected periodically for significant corrosion, spalling, and cracking. Any defects discovered shall be promptly repaired.

3.3 Animal Damage and Repairs

Animal burrows discovered during inspections shall be promptly repaired by filling with grout.

3.4 Restriction of Unauthorized Vehicles

Facility approaches shall be posted with signs restricting unauthorized travel on the roadways and slopes.

3.5 Inspections/Remedial Measures

3.5.1 Weekly Inspections

Weekly inspections of the perimeter berms shall be conducted, looking for seepage and slumping, and unusual seepage at and/or blockage of the outfall structures in each cell. All findings shall be entered into the weekly inspection checklist, discussed in Section 4.0. Maintenance activities shall be initiated, if required. Refer to Section 4.0 for the recommended inspection checklist to be used for the weekly inspections.

3.5.2 Quarterly Inspections

Inspections shall be made quarterly by Station personnel to determine the general condition of the dam and embankments. During these inspections, embankment erosion, tree growth, and embankment seepage shall be monitored. Seepage shall be observed for change in quantity and coloration. Refer to Section 4.0, for the recommended inspection checklist to be used for documenting the quarterly inspections.

3.5.3 Five-Year Inspections

Every five years, an inspection shall be made by a licensed professional engineer. This inspection shall follow the Illinois Department of natural Resources (IDNR) *Guidelines and Forms for Inspection of Illinois Dams*, and shall be followed by verbal and written reports by the consulting engineer. Based on the findings of the inspection, the Station Manager shall implement corrective action as required to promote dam safety. Procedures and methods for corrective action shall be performed in accordance with recommendations of the consulting engineer and as outlined above. Copies of the engineer's report, along with corrective actin taken, shall be reported to the IDNR.

3.6 Annual Statement

An annual statement on forms furnished by IDNR, certifying compliance with this maintenance plan, shall be submitted to IDNR.

4.0 INSPECTION CHECKLISTS

The following Inspection checklists should be used during the weekly and quarterly inspections.

WEEKLY DAM INSPECTION FORM

Dam Location: Hennepin Power Station – East Ash Pond
Owner: Dynegy Midwest Generation, LLC, Havana Power Station
Permit No.:DS2011079 **Class of Dam: III**
Type of Dam: Homogeneous earth dam, with clay and geosynthetic / clay liner
Type of Spillway: Drop structure and stop logs

Date Inspected: _____
Weather Conditions: _____
Pool Elevation: _____

Inspection Personnel:

_____ _____
Name / Title **Signature**

Inspection Item	Conditions	Location of Problem and Recommended Remedial Measures and Implementation Schedule
Vertical and Horizontal Alignment of Crest		
Unusual Movement or Cracking at or Beyond Toe		
Seepage		
Vegetative Cover		
Embankment Erosion		
Structural Cracking		
Outfall Structures		
Other		

QUARTERLY DAM INSPECTION FORM

Dam Location: Hennepin Power Station – East Ash Pond
Owner: Dynegy Midwest Generation, LLC, Hennepin Power Station
Permit No.:DS2011079 **Class of Dam: III**
Type of Dam: Homogeneous earth dam, with clay and geosynthetic / clay liner
Type of Spillway: Drop structure and stop logs

Date Inspected: _____
Weather Conditions: _____
Pool Elevation: _____

Inspection Personnel:

_____
Name / Title **Signature**

Inspection Item	Conditions	Location of Problem and Recommended Remedial Measures and Implementation Schedule
Vertical and Horizontal Alignment of Crest	Good condition, with no significant issues	
Downstream Fill Slopes	Good condition, with no significant issues	
Upstream Fill Slopes	Good condition, with no significant issues	
Unusual Movement or Cracking at or Beyond Toe	Good condition, with no significant issues	
Seepage (Condition/Color)	Good condition, with no significant issues	
Vegetative Cover (Tree growth)	Good condition, with no significant issues	
Animal Damage	Good condition, with no significant issues	
Embankment Erosion	Good condition, with no significant issues	
Water Passages	Good condition, with no significant issues	
Structural Cracking	Good condition, with no significant issues	
Outfall Structures	Good condition	
Other		