Prepared for
Dynegy Midwest Generation, LLC

Date
January 31, 2022

Project No.
1940100711-007

2021 ANNUAL GROUNDWATER MONITORING AND CORRECTIVE ACTION REPORT

LANDFILL

HENNEPIN POWER PLANT

HENNEPIN, ILLINOIS

CCR UNIT 801

RAMBOLL Bright ideas. Sustainable change.

2021 ANNUAL GROUNDWATER MONITORING AND CORRECTIVE ACTION REPORT
HENNEPIN POWER PLANT LANDFILL

Project name	**Hennepin Power Plant**
Project no.	**1940100711-007**
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Description	**Annual Report in Support of the CCR Rule Groundwater Monitoring Program**

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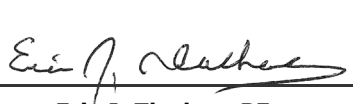

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ACRONYMS AND ABBREVIATIONS

§	Section
40 C.F.R.	Title 40 of the Code of Federal Regulations
ASD	Alternate Source Demonstration
CCR	coal combustion residuals
CMA	Corrective Measures Assessment
GWPS	groundwater protection standard
HPP	Hennepin Power Plant
LF	Landfill
NA	not applicable
NRT/OBG	Natural Resource Technology, an OBG Company
Ramboll	Ramboll Americas Engineering Solutions, Inc.
SAP	Sampling and Analysis Plan
SSI	Statistically Significant Increase
SSL	Statistically Significant Level
TBD	to be determined

EXECUTIVE SUMMARY

This report has been prepared to provide the information required by Title 40 of the Code of Federal Regulations (40 C.F.R.) Section (§) 257.90(e) for the Landfill (LF) located at Hennepin Power Plant (HPP) near Hennepin, Illinois.

Groundwater is being monitored at the LF in accordance with the Detection Monitoring Program requirements specified in 40 C.F.R. § 257.94.

No changes were made to the monitoring system in 2021 (no wells were installed or decommissioned).

The following Statistically Significant Increases (SSIs) of 40 C.F.R. § 257 Appendix III parameter concentrations greater than background concentrations were determined:

- Boron at wells 05R, 05DR, 40S, and 48
- Fluoride at wells 05R, 05DR, 40S, and 48
- pH at wells 05R, 40S, and 48

Alternate Source Demonstrations (ASDs) were completed for the SSIs referenced above and the LF remains in the Detection Monitoring Program.

1. INTRODUCTION

This report has been prepared by Ramboll Americas Engineering Solutions, Inc. (Ramboll) on behalf of Dynegy Midwest Generation, LLC, to provide the information required by 40 C.F.R. § 257.90(e) for the LF located at the HPP near Hennepin, Illinois.

In accordance with 40 C.F.R. § 257.90(e), the owner or operator of a coal combustion residuals (CCR) unit must prepare an Annual Groundwater Monitoring and Corrective Action Report for the preceding calendar year that documents the status of the Groundwater Monitoring and Corrective Action Program for the CCR unit, summarizes key actions completed, describes any problems encountered, discusses actions to resolve the problems, and projects key activities for the upcoming year. At a minimum, the annual report must contain the following information, to the extent available:

1. A map, aerial image, or diagram showing the CCR unit and all background (or upgradient) and downgradient monitoring wells, to include the well identification numbers, that are part of the groundwater monitoring program for the CCR unit.
2. Identification of any monitoring wells that were installed or decommissioned during the preceding year, along with a narrative description of why those actions were taken.
3. In addition to all the monitoring data obtained under §§ 257.90 through 257.98, a summary including the number of groundwater samples that were collected for analysis for each background and downgradient well, the dates the samples were collected, and whether the sample was required by the Detection Monitoring or Assessment Monitoring Programs.
4. A narrative discussion of any transition between monitoring programs (*e.g.*, the date and circumstances for transitioning from Detection Monitoring to Assessment Monitoring in addition to identifying the constituent(s) detected at a Statistically Significant Increase [SSI] relative to background levels).
5. Other information required to be included in the annual report as specified in §§ 257.90 through 257.98.
6. A section at the beginning of the annual report that provides an overview of the current status of groundwater monitoring and corrective action programs for the CCR unit. At a minimum, the summary must specify all of the following:
    i. At the start of the current annual reporting period, whether the CCR unit was operating under the detection monitoring program in §257.94 or the assessment monitoring program in §257.95.
    ii. At the end of the current annual reporting period, whether the CCR unit was operating under the detection monitoring program in §257.94 or the assessment monitoring program in §257.95.
    iii. If it was determined that there was a SSI over background for one or more constituents listed in Appendix III of §257 pursuant to §257.94(e):
        A. Identify those constituents listed in Appendix III of §257 and the names of the monitoring wells associated with the SSI(s).
        B. Provide the date when the assessment monitoring program was initiated for the CCR unit.

iv. If it was determined that there was a [Statistically Significant Level] SSL above the Groundwater Protection Standard [GWPS] for one or more constituents listed in Appendix IV of §257 pursuant to §257.95(g) include all of the following:

   A. Identify those constituents listed in Appendix IV of §257 and the names of the monitoring wells associated with the SSL(s).

   B. Provide the date when the corrective measures assessment [CMA] was initiated for the CCR unit.

   C. Provide the date when the public meeting was held for CMA for the CCR unit.

   D. Provide the date when the CMA was completed for the CCR unit.

v. Whether a remedy was selected pursuant to §257.97 during the current annual reporting period, and if so, the date of remedy selection.

vi. Whether remedial activities were initiated or are ongoing pursuant to §257.98 during the current annual reporting period.

This report provides the required information for the LF for calendar year 2021.

2. MONITORING AND CORRECTIVE ACTION PROGRAM STATUS

No changes have occurred to the monitoring program status in calendar year 2021 and LF remains in the Detection Monitoring Program in accordance with 40 C.F.R. § 257.94.

3. KEY ACTIONS COMPLETED IN 2021

The Detection Monitoring Program is summarized in **Table A** on the following page. The groundwater monitoring system, including the CCR unit and all background and compliance monitoring wells, is presented in **Figure 1**. No changes were made to the monitoring system in 2021. In general, one groundwater sample was collected from each background and compliance well during each monitoring event. All samples were collected and analyzed in accordance with the Sampling and Analysis Plan (SAP; Natural Resource Technology, an OBG Company [NRT/OBG], 2017a). All monitoring data obtained under 40 C.F.R. § 257.90 through 257.98 (as applicable) in 2021, and analytical results for the September 2020 sampling event, are presented in **Tables 1** and **2**. Analytical data were evaluated in accordance with the Statistical Analysis Plan (NRT/OBG, 2017b) to determine any SSIs of Appendix III parameters relative to background concentrations.

Statistical background values are provided in **Table 3**. The background values reported in **Table 3** are slightly different from those reported previously because different software was utilized to calculate these values in 2021.

Potential alternate sources were evaluated as outlined in the 40 C.F.R. § 257.94(e)(2). ASDs were completed and certified by a qualified professional engineer. The dates the ASDs were completed are provided in **Table A**. The ASDs are included in **Appendix A**.

Table A. 2020-2021 Detection Monitoring Program Summary

Sampling Date	Analytical Data Receipt Date	Parameters Collected	SSI(s)	SSI(s) Determination Date	ASD Completion Date
September 3, 2020	October 16, 2020	Appendix III	Boron (05DR, 05R, 40S, 48) Fluoride (05DR, 05R, 40S, 48) pH (05R, 40S, 48)	January 14, 2021	April 14, 2021
March 18, 2021	April 14, 2021	Appendix III	Boron (05DR, 05R, 40S, 48) Fluoride (05DR, 05R, 40S, 48) pH (05R, 40S, 48)	July 13, 2021	October 11, 2021
September 9 - 22, 2021	October 15, 2021	Appendix III	TBD	TBD	TBD

Notes:

NA: not applicable

TBD: to be determined

4. PROBLEMS ENCOUNTERED AND ACTIONS TO RESOLVE THE PROBLEMS

No problems were encountered with the Groundwater Monitoring Program during 2021. Groundwater samples were collected and analyzed in accordance with the SAP (NRT/OBG, 2017a), and all data were accepted.

5. KEY ACTIVITIES PLANNED FOR 2022

The following key activities are planned for 2022:

- Continuation of the Detection Monitoring Program with semi-annual sampling scheduled for the first and third quarters of 2022.
- Complete evaluation of analytical data from the compliance wells, using background data to determine whether an SSI of Appendix III parameters detected at concentrations greater than background concentrations has occurred.
- If an SSI is identified, potential alternate sources (*i.e.,* a source other than the CCR unit caused the SSI or that the SSI resulted from error in sampling, analysis, statistical evaluation, or natural variation in groundwater quality) will be evaluated. If an alternate source is demonstrated to be the cause of the SSI, a written demonstration will be completed within 90 days of SSI determination and included in the 2022 Annual Groundwater Monitoring and Corrective Action Report.
- If an alternate source(s) is not identified to be the cause of the SSI, the applicable requirements of 40 C.F.R. § 257.94 through 257.98 as may apply in 2022 (*e.g.,* Assessment Monitoring) will be met, including associated recordkeeping/notifications required by 40 C.F.R. § 257.105 through 257.108.

6. REFERENCES

Natural Resource Technology, an OBG Company (NRT/OBG), 2017a. Sampling and Analysis Plan, Hennepin Landfill, Hennepin Power Station, Hennepin, Illinois, Project No. 2285, Revision 0, October 17, 2017.

Natural Resource Technology, an OBG Company (NRT/OBG), 2017b. Statistical Analysis Plan, Baldwin Energy Complex, Havana Power Station, Hennepin Power Station, Wood River Power Station, Dynegy Midwest Generation, LLC, October 17, 2017.

TABLES

TABLE 1
GROUNDWATER ELEVATIONS
2021 ANNUAL GROUNDWATER MONITORING AND CORRECTIVE ACTION REPORT
HENNEPIN POWER PLANT
801 - LANDFILL
HENNEPIN, IL

Well ID	Well Type	Latitude (Decimal Degrees)	Longitude (Decimal Degrees)	Date	Depth to Groundwater (ft BMP)	Groundwater Elevation (ft NAVD88)
05R	Compliance	41.30516	-89.30545	09/02/2020	39.30	449.13
				12/09/2020	41.35	447.08
				02/24/2021	42.27	446.16
				03/22/2021	41.11	447.32
				04/07/2021	40.41	448.02
				05/05/2021	39.90	448.53
				06/08/2021	39.95	448.48
				06/24/2021	39.38	449.05
				07/13/2021	37.27	451.16
				08/03/2021	39.31	449.12
				09/08/2021	40.59	447.84
				12/07/2021	41.11	447.32
05DR	Compliance	41.30516	-89.30547	09/02/2020	39.31	449.06
				12/09/2020	41.45	446.92
				02/24/2021	42.24	446.13
				03/22/2021	41.13	447.24
				04/07/2021	40.91	447.46
				05/05/2021	39.95	448.42
				06/08/2021	40.05	448.32
				06/24/2021	39.48	448.89
				07/13/2021	37.35	451.02
				08/03/2021	39.39	448.98
				09/08/2021	40.67	447.70
07	Background	41.29799	-89.30571	09/02/2020	64.90	453.37
				12/09/2020	67.20	451.07
				02/24/2021	68.73	449.54
				03/18/2021	68.18	450.09
				04/07/2021	68.12	450.15
				05/05/2021	62.67	455.60
				06/08/2021	66.72	451.55
				06/24/2021	66.78	451.49
				07/13/2021	65.45	452.82
				08/03/2021	65.66	452.61
				09/08/2021	67.02	451.25
				12/07/2021	67.21	451.06
08	Background	41.30070	-89.30440	09/02/2020	51.69	449.69
				12/09/2020	53.86	447.52
				02/24/2021	54.97	446.41
				03/18/2021	53.88	447.50
				04/07/2021	53.61	447.77
				05/06/2021	52.29	449.09
				06/08/2021	52.40	448.98
				06/24/2021	52.12	449.26
				07/13/2021	49.90	451.48
				08/03/2021	51.71	449.67
				09/08/2021	53.08	448.30

TABLE 1
GROUNDWATER ELEVATIONS
2021 ANNUAL GROUNDWATER MONITORING AND CORRECTIVE ACTION REPORT
HENNEPIN POWER PLANT
801 - LANDFILL
HENNEPIN, IL

Well ID	Well Type	Latitude (Decimal Degrees)	Longitude (Decimal Degrees)	Date	Depth to Groundwater (ft BMP)	Groundwater Elevation (ft NAVD88)
08	Background	41.30070	-89.30440	12/07/2021	53.64	447.74
08D	Background	41.30080	-89.30452	09/02/2020	51.62	449.72
				12/09/2020	54.12	447.22
				02/24/2021	55.13	446.21
				03/18/2021	54.00	447.34
				04/07/2021	53.78	447.56
				05/06/2021	52.28	449.06
				06/08/2021	52.59	448.75
				06/24/2021	52.03	449.31
				07/13/2021	49.90	451.44
				08/03/2021	51.92	449.42
				09/08/2021	53.80	447.54
				12/07/2021	53.92	447.42
40S	Compliance	41.30529	-89.30436	09/02/2020	38.45	449.22
				12/09/2020	40.59	447.08
				02/24/2021	Not Measured	
				04/07/2021	Not Measured	
				06/24/2021	38.55	449.12
				09/08/2021	39.80	447.87
				12/07/2021	40.35	447.32
48	Compliance	41.30523	-89.30493	09/02/2020	38.22	449.24
				12/09/2020	40.30	447.16
				02/24/2021	Not Measured	
				04/07/2021	Not Measured	
				09/08/2021	39.55	447.91
				12/07/2021	40.06	447.40

Notes:
ATC = above top of casing (well under pressure)
BMP = below measuring point
ft = foot/feet
NAVD88 = North American Vertical Datum of 1988

TABLE 2
ANALYTICAL RESULTS - APPENDIX III PARAMETERS
2021 ANNUAL GROUNDWATER MONITORING AND CORRECTIVE ACTION REPORT
HENNEPIN POWER PLANT
801 - LANDFILL
HENNEPIN, IL

Well ID	Well Type	Latitude (Decimal Degrees)	Longitude (Decimal Degrees)	Date	Boron, total (mg/L)	Calcium, total (mg/L)	Chloride, total (mg/L)	Fluoride, total (mg/L)	pH (field) (SU)	Sulfate, total (mg/L)	Total Dissolved Solids (mg/L)
05R	Compliance	41.30516	-89.30545	09/03/2020	0.783	84.8	75	0.13	7.7	79	478
				03/18/2021	0.824	84.5	72	0.13	7.8	74	506
				09/10/2021	0.715	89.3	83	0.12	7.4	74	502
05DR	Compliance	41.30516	-89.30547	09/03/2020	1.02	88.3	65	0.16	7.5	81	498
				03/18/2021	0.944	89.1	76	0.15	7.4	75	504
				09/10/2021	0.824	88.4	85	0.15	7.2	84	508
				09/22/2021	--	--	--	--	7.3	--	--
07	Background	41.29799	-89.30571	09/03/2020	0.0811	146	38	0.1	6.8	67	606
				03/18/2021	0.0714	135	58	0.11	6.9	78	712
				09/09/2021	0.0764	156	70	0.11	6.7	52	654
08	Background	41.30070	-89.30440	09/03/2020	0.119	202	168	<0.1	6.7	154	1010
				03/18/2021	0.124	215	273	<0.1	6.7	128	1200
				09/09/2021	0.111	188	152	<0.1	6.6	100	876
08D	Background	41.30080	-89.30452	09/03/2020	0.0942	226	222	0.11	6.7	213	1200
				03/18/2021	0.106	224	243	0.1	6.7	199	1250
				09/09/2021	0.0965	216	250	0.1	6.6	123	1090
				09/22/2021	--	--	--	--	6.6	--	--
40S	Compliance	41.30529	-89.30436	09/03/2020	1.94	90.4	70	0.15	7.7	119	522
				03/18/2021	1.3	73.2	76	0.16	7.8	83	488
				09/09/2021	1.73	71.5	79	0.15	7.7	95	466
48	Compliance	41.30523	-89.30493	09/03/2020	1.34	86	69	0.19	7.7	93	474
				03/18/2021	0.808	92.3	77	0.16	7.6	72	536
				09/10/2021	1.09	87	79	0.16	7.5	89	484

Notes:
mg/L = milligrams per liter
SU = Standard Units
< = concentration is less than the concentration shown, which corresponds to the reporting limit for the method; estimated concentrations below the reporting limit and associated qualifiers are not provided since they are not utilized in statistics to determine Statistically Significant Increases (SSIs) over background
-- = not analyzed

TABLE 3
STATISTICAL BACKGROUND VALUES
2021 ANNUAL GROUNDWATER MONITORING AND CORRECTIVE ACTION REPORT
HENNEPIN POWER PLANT
801 - LANDFILL
HENNEPIN, IL

Parameter	**Statistical Background Value (LPL/UPL)**
40 C.F.R. Part 257 Appendix III	
Boron (mg/L)	0.153
Calcium (mg/L)	280
Chloride (mg/L)	396
Fluoride (mg/L)	0.120
pH (field) (SU)	6.6/7.5
Sulfate (mg/L)	200
Total Dissolved Solids (mg/L)	1520

Notes:
40 C.F.R. = Title 40 of the Code of Federal Regulations
LPL = Lower Prediction Limit (applicable for pH only)
mg/L = milligrams per liter
SU = Standard Units
UPL = Upper Prediction Limit

FIGURES

BACKGROUND WELL
COMPLIANCE WELL
MONITORING WELL
PART 257 REGULATED UNIT (SUBJECT UNIT)
SITE FEATURE
LIMITS OF FINAL COVER
PROPERTY BOUNDARY

0 175 350
Feet

MONITORING WELL LOCATION MAP

2021 ANNUAL GROUNDWATER MONITORING AND CORRECTIVE ACTION REPORT
LANDFILL
HENNEPIN POWER PLANT
HENNEPIN, ILLINOIS

FIGURE 1

RAMBOLL AMERICAS
ENGINEERING SOLUTIONS, INC.

RAMBOLL

Y:\Mapping\Projects\222285\MXD\2021_AnnualGWM_CAR\Hennepin\Landfill_801\Figure 1 HEN Landfill MW Location Map.mxd

PROJECT: 169000XXXX | DATED: 1/6/2022 | DESIGNER: galarmmc

APPENDICES

APPENDIX A
ALTERNATE SOURCE DEMONSTRATIONS

Prepared for
Dynegy Midwest Generation, LLC

Date
April 14, 2021

Project No.
1940100711-007

40 C.F.R. § 257.94(e)(2): ALTERNATE SOURCE DEMONSTRATION

HENNEPIN LANDFILL

RAMBOLL Bright ideas. Sustainable change.

CERTIFICATIONS

I, Brian G. Hennings, a professional geologist in good standing in the State of Illinois, certify that the information in this report is accurate as of the date of my signature below. The content of this report is not to be used for other than its intended purpose and meaning, or for extrapolations beyond the interpretations contained herein.

Brian G. Hennings
Professional Geologist
196-001482
Illinois
Ramboll Americas Engineering Solutions, Inc.
Date: April 14, 2021

I, Eric J. Tlachac, a qualified professional engineer in good standing in the State of Illinois, certify that the information in this report is accurate as of the date of my signature below. The content of this report is not to be used for other than its intended purpose and meaning, or for extrapolations beyond the interpretations contained herein.

Eric J. Tlachac
Qualified Professional Engineer
062-063091
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Ramboll Americas Engineering Solutions, Inc.
Date: April 14, 2021

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TABLES (IN TEXT)

FIGURES (IN TEXT)

FIGURES (ATTACHED)

APPENDICES

ACRONYMS AND ABBREVIATIONS

40 C.F.R.	Title 40 of the Code of Federal Regulations
ASD	Alternate Source Demonstration
Ash Pond No. 2	Hennepin East Ash Pond No. 2
CCR	Coal Combustion Residuals
CCR Rule	40 C.F.R. Part 257 Subpart D
CEC	Civil & Environmental Consultants, Inc.
cm/s	centimeters per second
East Ash Pond	Hennepin East Ash Pond
HDPE	High-density Polyethylene
IEPA	Illinois Environmental Protection Agency
Landfill	Hennepin Coal Combustion Waste Landfill
LOE	line of evidence
mg/L	milligrams per liter
mil	millimeter
NAVD88	North American Vertical Datum of 1988
NPDES	National Pollutant Discharge Elimination System
NRT/OBG	Natural Resource Technology, an OBG Company
OBG	O'Brien & Gere Engineers, Inc.
oz/sy	ounce per square yard
Ramboll	Ramboll Americas Engineering Solutions, Inc.
Site	East Ash Pond System
SSI	Statistically Significant Increase

1. INTRODUCTION

Title 40 of the Code of Federal Regulations (40 C.F.R.) § 257.94(e)(2) allows the owner or operator of a Coal Combustion Residuals (CCR) unit 90 days from the date of determination of a Statistically Significant Increase (SSI) over background for groundwater constituents listed in Appendix III of 40 C.F.R. Part 257 to complete a written demonstration that a source other than the CCR unit being monitored caused the SSI(s), or that the SSI(s) resulted from error in sampling, analysis, statistical evaluation, or natural variation in groundwater quality (Alternate Source Demonstration [ASD]).

This ASD has been prepared on behalf of Dynegy Midwest Generation, LLC, by Ramboll Americas Engineering Solutions, Inc. (Ramboll), to provide pertinent information pursuant to 40 C.F.R. § 257.94(e)(2) for the Hennepin Coal Combustion Waste Landfill (Landfill), located near Hennepin, Illinois.

The most recent Detection Monitoring sampling event (D7) was completed on September 3, 2020, and analytical data were received on October 16, 2020. Analytical data from D7 were evaluated in accordance with the Statistical Analysis Plan (Natural Resource Technology, an OBG Company [NRT/OBG], 2017a) to determine any SSIs of Appendix III parameters over background concentrations. That evaluation identified SSIs at downgradient monitoring wells as follows:

- Boron at wells 05R, 05DR, 40S, and 48
- Fluoride at wells 05R, 05DR, 40S, and 48
- pH at wells 05R, 40S, and 48

Pursuant to 40 C.F.R. § 257.94(e)(2), the lines of evidence (LOE) described in Section 3 demonstrate that sources other than the Landfill were the cause of the boron, fluoride, and pH SSIs listed above. This ASD was completed by April 14, 2021, within 90 days of determination of the SSIs, as required by 40 C.F.R. § 257.94(e)(2).

2. BACKGROUND

2.1 Site Location and Description

The Hennepin Power Station is located in the northeast quarter of Section 26, Township 33 North, Range 2 West, Putnam County, Illinois and approximately 3 miles north-northeast of the Village of Hennepin. The Landfill is located east of the Hennepin Power Station and situated less than 200 feet from the south bank of the Illinois River and approximately one mile east of the Big Bend, where the river shifts course from predominantly west to predominantly south.

The Landfill is one of four CCR units regulated under 40 C.F.R. Part 257 Subpart D (CCR Rule) at the Hennepin Power Station. One of the CCR units is located west of the Hennepin Power Station. Three of the CCR units are located adjacent to or near each other in the eastern portion of the Hennepin Power Station and are collectively known as Hennepin East. The three Hennepin East CCR units include the Landfill, Hennepin East Ash Pond No. 2 (Ash Pond No. 2), and Hennepin East Ash Pond (East Ash Pond). The CCR units at Hennepin East, shown on Figure 1, are also referred to as the East Ash Pond System (Site).

Surrounding areas include industrial properties to the east and south of the Site, agricultural land to the southwest, and the Hennepin Power Station to the west (also shown on Figure 1).

2.2 Groundwater Monitoring

The Landfill groundwater monitoring system for compliance with the CCR Rule consists of three background monitoring wells (07, 08, 08D) and four downgradient monitoring wells (05R, 05DR, 40S, and 48). A map showing the groundwater monitoring system, including the CCR unit and all background and downgradient monitoring wells, is presented in Figure 1. Figure 1 also includes other CCR unit monitoring wells located upgradient of the Landfill (12, 13, 16, and 17) and along the Illinois River (18S and 18D) which are not part of the Landfill monitoring network but are used to support the LOEs discussed in Section 3.

Groundwater samples are collected and analyzed in accordance with the Sampling and Analysis Plan prepared for the Landfill (NRT/OBG, 2017b). Statistical evaluation of analytical data is performed in accordance with the Statistical Analysis Plan.

2.3 Site History

The Hennepin Power Station has two coal-fired generating units constructed in 1953 and 1959 with a total capacity of 210 Megawatts. Operations were ceased in November 2019. The coal source changed several times during the station's operational history. Information related to the Hennepin East CCR units shown on Figure 1 includes:

Ash Pond No. 2: Ash Pond No. 2 was used to store and dispose fly ash, bottom ash, and other non-CCR waste streams, including coal pile runoff. The pond originally encompassed the area that currently includes the existing Ash Pond No. 2, the Landfill, and the Leachate Pond (not a CCR unit). It has been inactive since 1996 and currently encompasses approximately 18 acres. It is unlined with a lowermost, but variable, bottom elevation (referenced to the North American Vertical Datum of 1988 [NAVD88]) of 451 feet. The approximate dates of construction affecting Ash Pond No. 2 are summarized below (Table A).

Table A. Construction Events Affecting Ash Pond No. 2

Date	Event
1958	Construction of Ash Pond No. 2
1978	Embankment raise of Ash Pond No. 2
1985	Embankment raise of Ash Pond No. 2 to elevation 484 feet
1989	Embankment raise of Ash Pond No. 2 to elevation 494 feet
1996	Pond was removed from service and completely dewatered
2009 to 2010	Eastern portion of Ash Pond No. 2 was removed to facilitate construction of the Leachate Pond
2010/2011	Landfill Phase I cell was constructed in 2010 over placed CCR in Ash Pond No. 2 adjacent to the Leachate Pond. In February 2011, 7,500 cubic yards of bottom ash was placed into the Phase I cell as a post-construction freeze-protection measure to protect the leachate collection system and geomembrane liner. No other material (fly ash or bottom ash) has been placed in the Landfill since.
2014	North Embankment tree removal, grading, and vegetation re-establishment adjacent to Ash Pond No. 2
2020	Ash Ponds No. 2 and No. 4 closed in-place in accordance with IEPA-approved closure plan

A Modified Closure Work Plan was submitted to the Illinois Environmental Protection Agency (IEPA) in 2010 proposing closure of Ash Pond No. 2 by capping with future Landfill phases as they were constructed (Kelron, NRT, 2010). This Work Plan was approved by IEPA in a letter dated March 3, 2010. The Landfill is Phase I of this 2010 Closure Plan. The formerly proposed Landfill Phases II, III, and IV will no longer be constructed upon Ash Pond No. 2. Therefore, a revised Closure Plan for Ash Pond No. 2 was submitted for IEPA approval in February 2018 (Civil & Environmental Consultants, Inc. [CEC], 2018), with addenda submitted in October 2018, July 2019, and January 2020. IEPA subsequently approved the revised closure plan on February 26, 2020, and closure construction was completed May 21 through November 17, 2020. The final cover system on Ash Pond No. 2 (and on East Ash Pond No. 4) consists of a 24-inch compacted soil barrier with a hydraulic conductivity of no more than 1×10^{-7} centimeters per second overlain by a 6-inch thick vegetative cover layer. The cover system was extended eastward to overlap with the western end of the Landfill geomembrane liner and southward to the side slope of the East Ash Pond.

Landfill: The Landfill Phase I cell, covering approximately 4.5 acres, was constructed in 2010 over existing, dewatered CCR in Ash Pond No. 2 as part of the 2010 Closure Plan for Ash Pond No. 2. The Phase I cell was constructed with a composite liner (geomembrane over compacted clay) and leachate collection system above the liner that transfers collected precipitation and leachate to the Leachate Pond. Ash fill underlying the Landfill is known to be present to a minimum elevation of 454 feet.

In February 2011, 7,500 cubic yards of bottom ash was placed into the Landfill as a post-construction freeze protection measure to protect the leachate collection system and geomembrane liner.

No other material has been placed in the Landfill since then. The Landfill has not yet been placed into service.

East Ash Pond: The East Ash Pond was 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 National Pollutant Discharge Elimination System (NPDES) permit. The pond was constructed in two phases. The first phase occurred in 1995 when the initial embankment was constructed to a total height of 32 feet with a lowermost, but variable, bottom elevation of the pond at 458 feet. The original pond bottom was lined with a 4-foot thick layer of compacted clay with a hydraulic conductivity of 1 x 10^{-7} centimeters per second (cm/s), underlain by a 1-foot thick sand layer (AECOM, 2016). The pond depth behind the original embankment was 15 feet with 5 feet of freeboard. The embankment was raised 12 feet in 2003 to a total impoundment depth of 30 feet with 2 feet of freeboard. The liner system of the embankment raise consisted of (from top to bottom) a 45-millimeter (mil) reinforced polypropylene geomembrane, a 1-foot thick clay layer, and an 8 ounce per square yard (oz/sy) polypropylene geotextile fabric. This pond was used for the treatment of bottom ash transport water, miscellaneous low volume wastewater streams, and storage of unsold fly ash until station operations ceased in November 2019.

Figure 1 also shows three additional ponds that are not subject to CCR Rule requirements, including East Ash Pond No. 4 (located south of Ash Pond No. 2), the Polishing Pond (located east of the East Ash Pond) and the Leachate Pond (located east of the Landfill). East Ash Pond No. 4 is an unlined impoundment, now dry, and classified as a closed impoundment (capped or otherwise maintained). It was closed in 2020 in conjunction with Ash Pond No. 2 as specified in the Closure Work Plan and Addenda referenced above. The Polishing Pond was constructed in 1995 with a 48-inch-thick compacted clay liner having a vertical hydraulic conductivity of 1 x 10^{-7} cm/s. The Leachate Pond is a 25.5-acre-foot pond constructed with a composite liner consisting of 60-mil high-density polyethylene (HDPE) overlying two feet of compacted clay with a vertical hydraulic conductivity of 1 x 10^{-7} cm/s. Construction was completed December 2010.

2.4 Site Hydrogeology and Stratigraphy

A detailed hydrogeological assessment of the Hennepin East area was completed and submitted as part of the February 2018 Closure Plan for Ash Pond No. 2 and subsequent Addenda (previously referenced). Information pertinent to this ASD is included in this report, however, more complete information on Site hydrogeology and stratigraphy is available in the 2018 Closure Plan and Addenda.

There are three dominant geomorphic features in the immediate vicinity of the Hennepin Power Station: an upper river terrace at an elevation of about 500 to 550 feet, a lower river terrace at an elevation of about 450 to 460 feet, and the current river valley filled with alluvium to an elevation of about 445 feet. The Hennepin Power Station, Ash Pond No. 2, and the Landfill were constructed on the original, narrow lower river terrace, between the Illinois River and the upper terrace. The original lower river terrace is approximately 10 to 20 feet above the average river level at the Hennepin Power Station (elevation 443.7 feet) based upon measurements collected between 2003 and 2018 (O'Brien & Gere Engineers, Inc., part of Ramboll, 2020). The Ash Pond No. 2 berm slopes steeply toward the river and its toe is close to the riverbank. The East Ash Pond, Polishing Pond, and East Ash Pond No. 4 were constructed on the upper river terrace at an elevation of approximately 500 to 505 feet, or 60 to 65 feet above the average river level.

The hydrogeological assessment identified that the stratigraphy within and immediately surrounding the Site consists of fill, unlithified river alluvium, and Pleistocene-age glacial outwash deposits overlying Pennsylvanian-age shale bedrock. Constructed berms consist of a variety of

locally available materials, primarily sand, gravel, and coal ash. Where undisturbed or partially excavated, the native surficial soil at the Site is poorly drained, moderately permeable silty clay loam formed as alluvium in floodplains.

There are two hydrogeologic units present at the Site: alluvium and Henry Formation sands and gravels. The river is immediately adjacent to the lower terrace, east of the Site, and there is minimal alluvium between the Site and the river. The highly permeable Henry Formation sands and gravels make up the upper and lower terraces and fill the valley beneath the alluvium. The sands and gravels of the two terraces are indistinguishable, consisting of a heterogeneous mixture of silty-sandy gravel with cobble zones and boulders up to several feet in diameter. The Henry Formation is more than 100 feet thick in the river valley and at least 130 feet thick on the upper terrace.

The Henry Formation and alluvium comprise the Uppermost Aquifer at the Site and extend from the water table to the bedrock. The Uppermost Aquifer extends about 7,000 feet upgradient from the Site, to the south, where clay-rich glacial till is encountered. Glacial tills such as this typically yield little water.

The Pennsylvanian-age bedrock consists of interbedded layers of shale with thin limestone, sandstone, and coal beds. The shale bedrock unit has low hydraulic conductivity and defines the lower boundary of the Uppermost Aquifer.

The direction of groundwater flow and hydraulic gradient within the Uppermost Aquifer varies with the elevation of the Illinois River (see select groundwater elevation contour maps in Appendix A). The direction of groundwater flow is most often toward the river to the north and west, but comparison of groundwater and river elevation data indicate reversals in this flow direction during times of high river elevations. The relative duration of these events is short, which leads to the determination of a predominant groundwater flow direction toward the river to the north and west.

Groundwater elevations were obtained from measurements in monitoring wells on September 2, 2020 prior to a sampling event for the four CCR units at Hennepin Power Station. As noted above, groundwater sampling for D7 occurred on September 3, 2020. Groundwater elevations for the Hennepin Power Station during the D7 sampling event are shown in Figure 2. Groundwater elevations beneath the Landfill area ranged from approximately 449.06 to 449.53 feet (Figure 2). Groundwater flow was generally towards the Illinois River with groundwater flowing from southeast to northwest beneath the Landfill.

3. ALTERNATE SOURCE DEMONSTRATION: LINES OF EVIDENCE

As allowed by 40 C.F.R. § 257.94(e)(2), this ASD demonstrates that sources other than Hennepin Landfill (the CCR unit) caused the SSIs based on the following LOEs:

- Landfill liner design: The Landfill was constructed in 2010 with a composite liner (geomembrane over compacted clay).
- Concentrations of boron in landfill leachate are lower than those observed in downgradient groundwater: The only material ever placed in the lined Landfill is bottom ash that was placed as a post-construction freeze protection measure to protect the leachate collection system and geomembrane liner. Analytical data available for laboratory-derived leachate from the bottom ash placed in the Landfill indicates that the bottom ash is not capable of leaching boron in concentrations observed in the downgradient monitoring wells.
- Vertical infiltration of surface water through ash fill in Ash Pond No. 2: The Landfill was constructed upon a portion of Ash Pond No. 2 as Phase I of an IEPA-approved Closure Plan for the pond. The other portions of Ash Pond No. 2, which is unlined, were previously exposed and subject to the infiltration of precipitation and potential movement of CCR constituents to groundwater. A cover designed to minimize surface water infiltration and leachate generation was constructed over these exposed portions of Ash Pond No 2 in 2020 as part of an amended closure plan approved by IEPA.
- Upgradient concentrations of fluoride: Concentrations of fluoride are higher in monitoring wells upgradient of the Landfill than in those downgradient, indicating that the Landfill is not the source of fluoride.
- Upgradient pH values: pH values are higher in monitoring wells upgradient of the Landfill than in those downgradient, indicating that the Landfill is not the source of elevated pH.

Data and information supporting these ASD LOEs are discussed in more detail below.

3.1 LOE #1: Landfill Liner Design

The Landfill was constructed in 2010 with a 60-mil HDPE geomembrane overlying three feet of compacted clay with hydraulic conductivity of $1x10^{-7}$ cm/sec (CEC, 2010). Precipitation and/or leachate that collects on top of the liner is removed by a leachate collection system and transferred to the Leachate Pond for management. The Leachate Pond is also lined with a 60-mil HDPE liner overlying two feet of compacted clay.

The IEPA-approved Landfill composite liner system exceeds the design criteria for a composite liner for new CCR landfills established by 40 C.F.R. § 257.70(b). The composite liner design criteria were established to help prevent contaminants in CCR from leaking from the CCR unit and impacting groundwater. Therefore, the presence of the composite liner suggests that the Landfill is not the source of the observed SSIs.

3.2 LOE #2: Concentrations of Boron in Landfill Leachate Are Lower than Those Observed in Downgradient Groundwater

The only material that has been placed in the Landfill consists of a layer of coarse bottom ash (7,500 cubic yards or 11,625 tons) to protect the leachate collection system and geomembrane

liner from freezing. There has been no additional CCR landfilling activity within the lined area since the bottom ash freeze protection layer was installed.

Analytical data (Appendix B) from two samples of bottom ash leachate derived in the laboratory (extraction method ASTM D3987, shake extraction with water) identified boron concentrations of 0.193 milligrams per liter (mg/L) (2009 sample) and 0.197 mg/L (2008 sample).

A box-whisker plot of total boron concentrations collected between 2015 and 2020 at monitoring wells at the Landfill is shown below (Figure A). The boron concentrations of 0.193 and 0.197 mg/L detected in the leachate samples are below the boron concentrations observed in downgradient wells as shown in Figure A.

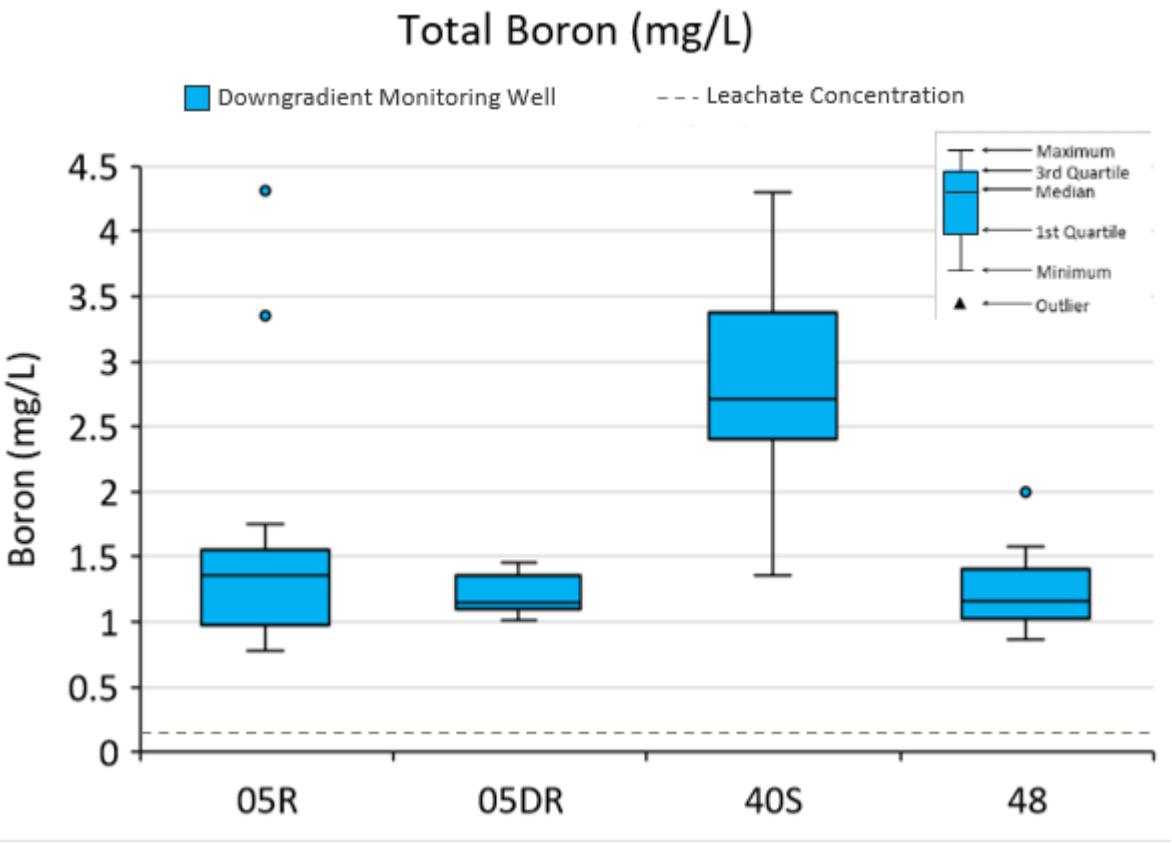

Figure A. Box-Whisker Plot Showing Distribution of Boron.

3.3 LOE #3: Vertical Infiltration of Surface Water through Ash Fill in Ash Pond No. 2

The Landfill was constructed over the eastern portion of Ash Pond No. 2 as Phase I of an IEPA-approved Closure Plan for Ash Pond No. 2. The other portions of Ash Pond No. 2 to the west of the Landfill were previously exposed, and subject to infiltration of precipitation and generation of CCR leachate. The pond is unlined, potentially allowing CCR constituents to percolate downward to groundwater. Consequently, the previously exposed portions of Ash Pond No. 2 outside of the footprint of the Landfill may be an alternate source for CCR parameters observed in groundwater near the Landfill. However, a soil cover designed to minimize surface water

infiltration and CCR-impacts to groundwater was constructed over these exposed portions of Ash Pond No 2 in 2020 as part of an amended closure plan for Ash Pond No. 2 approved by IEPA on February 26, 2020.

Comparison of groundwater and Illinois River elevation data indicate that natural variation in river elevation related to flood events occasionally causes groundwater flow reversal and increases in groundwater elevations in the Uppermost Aquifer beneath the Landfill. When river elevations rise above 451 to 454 feet, low-lying ash deposits underlying the Landfill have the potential to become partially saturated for a transient period. The short-term, partial saturation may result in a temporary change to some CCR constituent concentrations at some downgradient locations after the predominant groundwater flow direction is reestablished. Explicit simulation of flood events (Closure Plan Addendum 3 [Ramboll, 2020]) indicates that potential increases in concentrations from flooding of the Illinois River are small and transient, such that long-term concentrations will not be significantly affected.

3.4 LOE #4: Upgradient Concentrations of Fluoride

Select groundwater contour maps in Appendix A show a major component of groundwater flow from the east and southeast. A box-whisker plot of dissolved fluoride concentrations detected between 2015 and 2020 at monitoring wells near the Landfill is shown below (Figure B). Included on this figure are dissolved fluoride concentrations detected at other wells located upgradient of the Landfill (12, 13, 16, and 17) and along the Illinois River (18S, 18D). Dissolved fluoride is plotted rather than total fluoride due to the greater availability of data; dissolved fluoride data is not available for monitoring well 48. Dissolved fluoride concentrations at the monitoring wells shown in Figure B are similar to total fluoride concentrations detected at these wells.

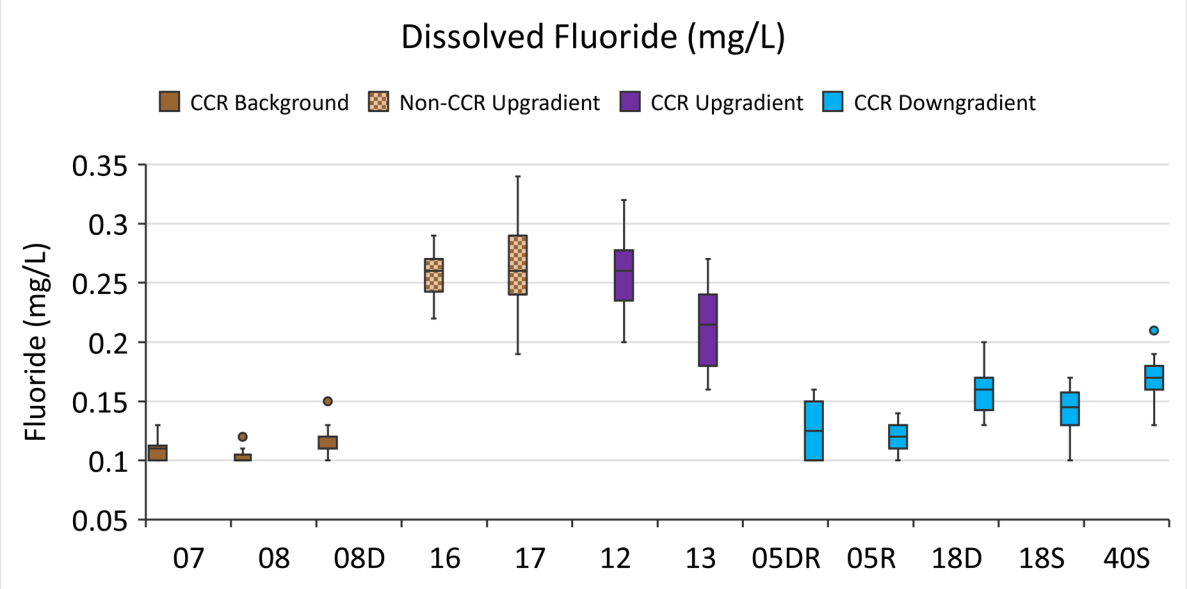

Figure B. Distribution of Detected Dissolved Fluoride Concentrations at Hennepin East Wells.

The box-whisker plot shows two groupings of dissolved fluoride concentrations as follows:

- Low Concentrations: The low concentrations are at background wells 07, 08, and 08D and downgradient wells 05R, 05DR, 18S, 18D, and 40S.

- High Concentrations: The high concentrations of fluoride occur at wells 12 and 13, located upgradient of the Landfill, and at non-CCR wells 16 and 17 located upgradient of the East Ash Pond near the property boundary.

The fact that the higher concentrations of fluoride are located upgradient of the Landfill demonstrates that the Landfill is not the source of fluoride.

3.5 LOE #5: Upgradient pH Values

Groundwater contour maps in Appendix A show a major component of groundwater flow from the east and southeast. A box-whisker plot of pH values observed between 2015 and 2020 at monitoring wells near the Landfill is shown below (Figure C). Also included on this figure are pH values observed at other wells located upgradient of the Landfill (12, 13, 16, and 17) and wells located along the Illinois River (18S, 18D).

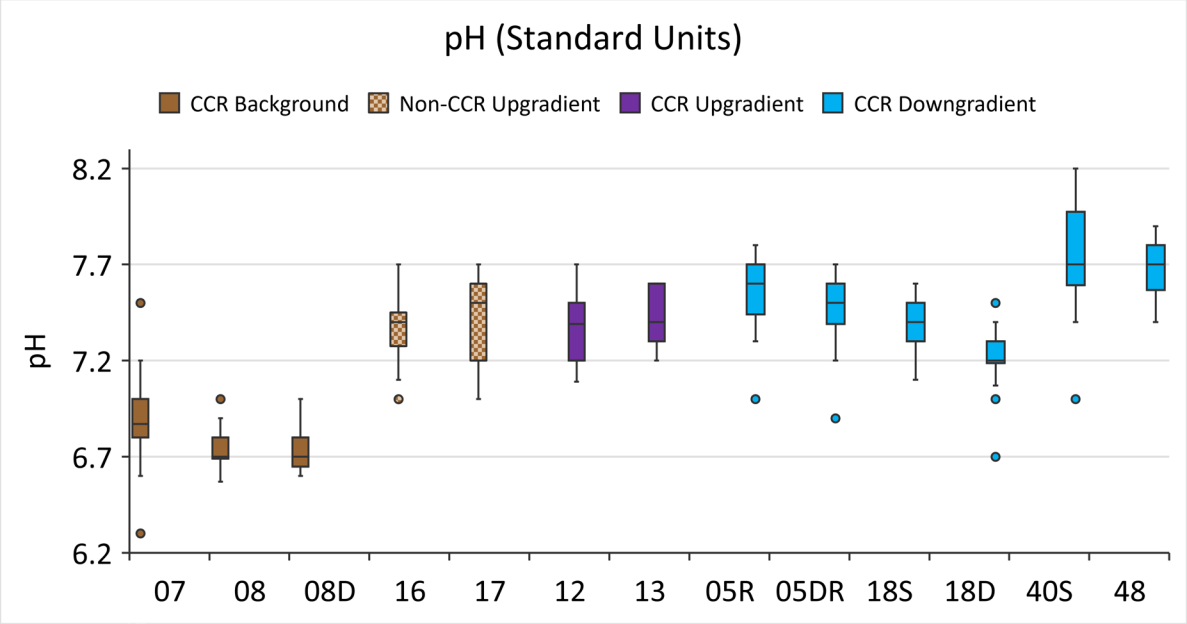

Figure C. Distribution of pH Values at Hennepin East Wells.

The box-whisker plot shows two groupings of pH values as follows:

- Lower pH: The lower pH values relative to all monitoring wells compared are at background monitoring wells 07, 08, and 08D.
- Higher pH: The groundwater monitoring wells with higher pH values relative to all monitoring wells compared include CCR downgradient wells located along the river (18S, 18D) and in the vicinity of the Landfill (05R, 05DR, 40S, and 48), as well as non-CCR wells located upgradient of the Landfill (12, 13) and upgradient of the East Ash Pond near the property boundary (16, 17).

The fact that the pH values upgradient of the Landfill (12, 13, 16, and 17) are elevated above background pH values (07, 08, 08D), and similar to pH values downgradient of the Landfill (05R, 05DR, 18S, 18D, 40S, and 48), demonstrates that the Landfill is not the source of the observed pH SSIs. If the Landfill were affecting pH values, those downgradient would be different from those upgradient.

4. CONCLUSIONS

Pursuant to 40 C.F.R. § 257.94(e)(2), the following LOEs were presented in this report to demonstrate that the SSIs identified at the Landfill (Section 2.1) are due to alternate sources:

- Landfill liner design
- Concentrations of boron in landfill leachate are lower than those observed in downgradient groundwater
- Vertical infiltration of surface water through ash fill in Ash Pond No. 2
- Upgradient concentrations of fluoride
- Upgradient pH values

Based on the LOEs presented, the following alternate sources are causing the SSIs observed in the Landfill's downgradient wells:

- Boron: SSIs for boron may be caused by movement of CCR constituents from previously exposed ash deposits in Ash Pond No. 2 outside the Landfill boundary.
- Fluoride: It is likely that areas upgradient of the Landfill present alternate sources of fluoride based on the fact that concentrations of fluoride are higher upgradient of the Landfill than downgradient.
- pH: It is likely that areas upgradient of the Landfill present alternate sources of elevated pH based on the fact that pH values upgradient of the Landfill are above background pH values and similar to those observed downgradient of the Landfill.

This information serves as the written ASD report prepared in accordance with 40 C.F.R. § 257.94(e)(2) that SSIs observed during the detection monitoring program were not caused by the Landfill but were from other sources. Therefore, an assessment monitoring program is not required, and the Landfill will remain in detection monitoring.

5. REFERENCES

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FIGURES

BACKGROUND MONITORING WELL
DOWNGRADIENT MONITORING WELL
OTHER CCR UNIT MONITORING WELL
NON-CCR MONITORING WELL
CCR UNIT BOUNDARY, SUBJECT SITE
CCR UNIT BOUNDARY
NON-CCR UNIT

0 175 350
Feet

HENNEPIN LANDFILL MONITORING WELL LOCATION MAP
HENNEPIN LANDFILL, UNIT ID: 801

ALTERNATE SOURCE DEMONSTRATION
HENNEPIN POWER STATION
HENNEPIN, ILLINOIS

FIGURE 1

RAMBOLL AMERICAS
ENGINEERING SOLUTIONS, INC.
A RAMBOLL COMPANY

RAMBOLL

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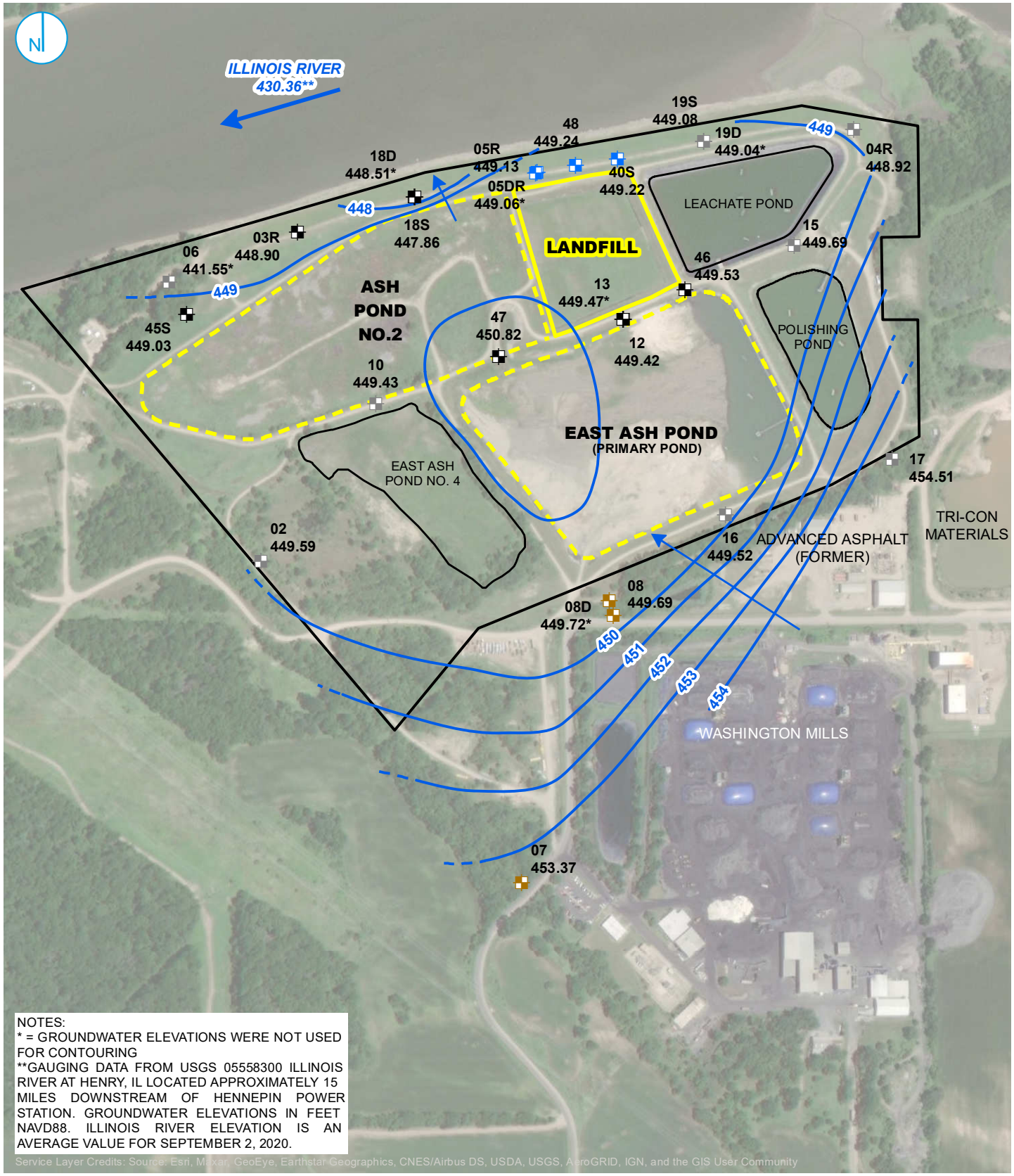
PROJECT: 169000XXXX | DATED: 3/26/2021 | DESIGNER: galammc



Y:\Mapping\Projects\22\2285_Hennepin East\MXD\ASD\Figure 2_Groundwater Contour Map_HenLF.mxd

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BACKGROUND MONITORING WELL
DOWNGRADIENT MONITORING WELL
CCR RULE MONITORING WELL
NON-CCR RULE MONITORING WELL
GROUNDWATER MANAGEMENT ZONE AND EAST ASH POND

0 250 500 Feet

GROUNDWATER ELEVATION CONTOUR (1-FT CONTOUR INTERVAL, NAVD88)
INFERRED GROUNDWATER ELEVATION CONTOUR
GROUNDWATER FLOW DIRECTION
CCR MONITORED UNIT, SUBJECT SITE
CCR MONITORED UNIT
NON-CCR UNIT

GROUNDWATER ELEVATION CONTOUR MAP SEPTEMBER 2, 2020

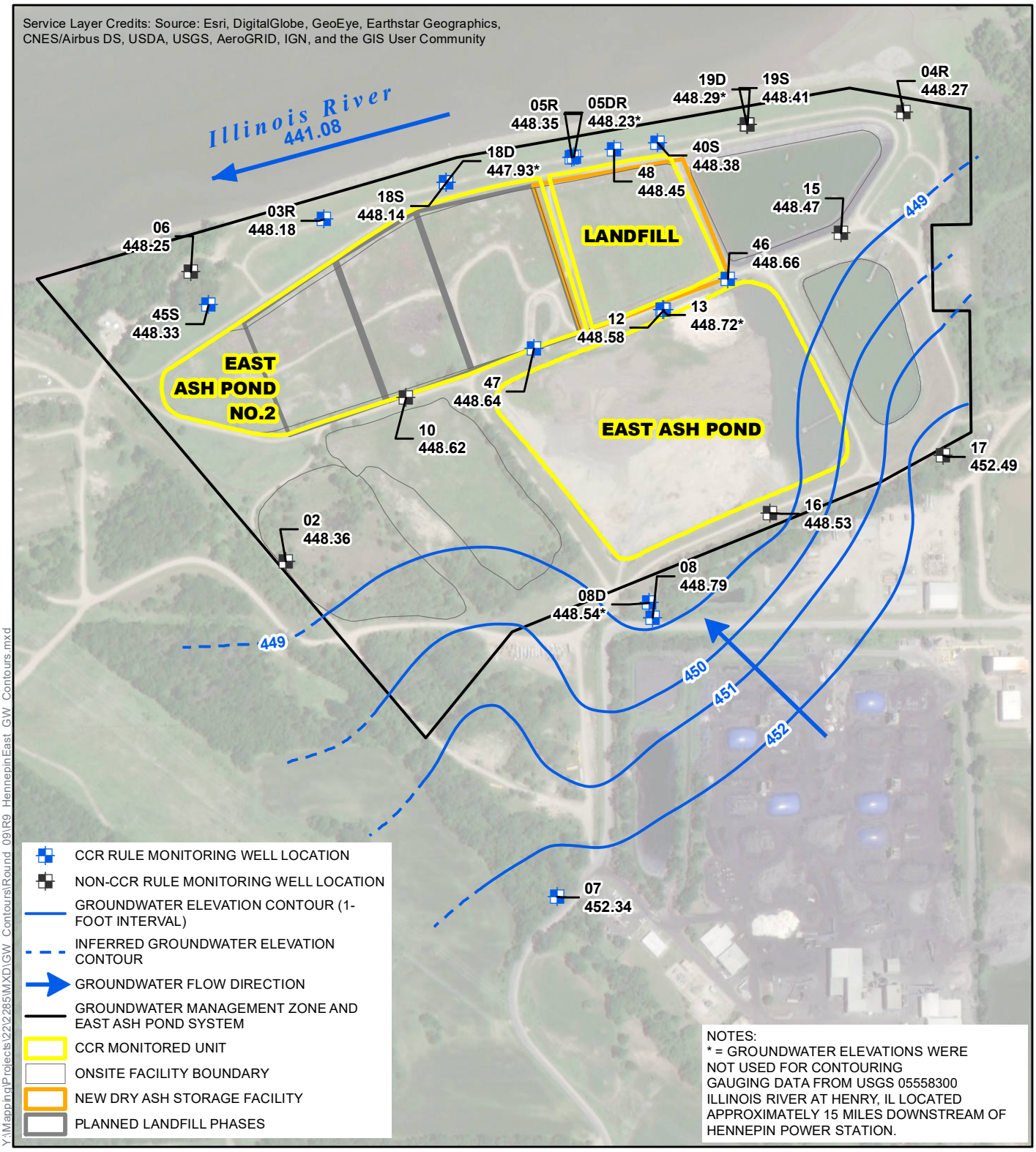
ALTERNATE SOURCE DEMONSTRATION
HENNEPIN POWER STATION
HENNEPIN, ILLINOIS

FIGURE 2

RAMBOLL AMERICAS
ENGINEERING SOLUTIONS, INC.

RAMBOLL

APPENDIX A
GROUNDWATER CONTOUR MAPS



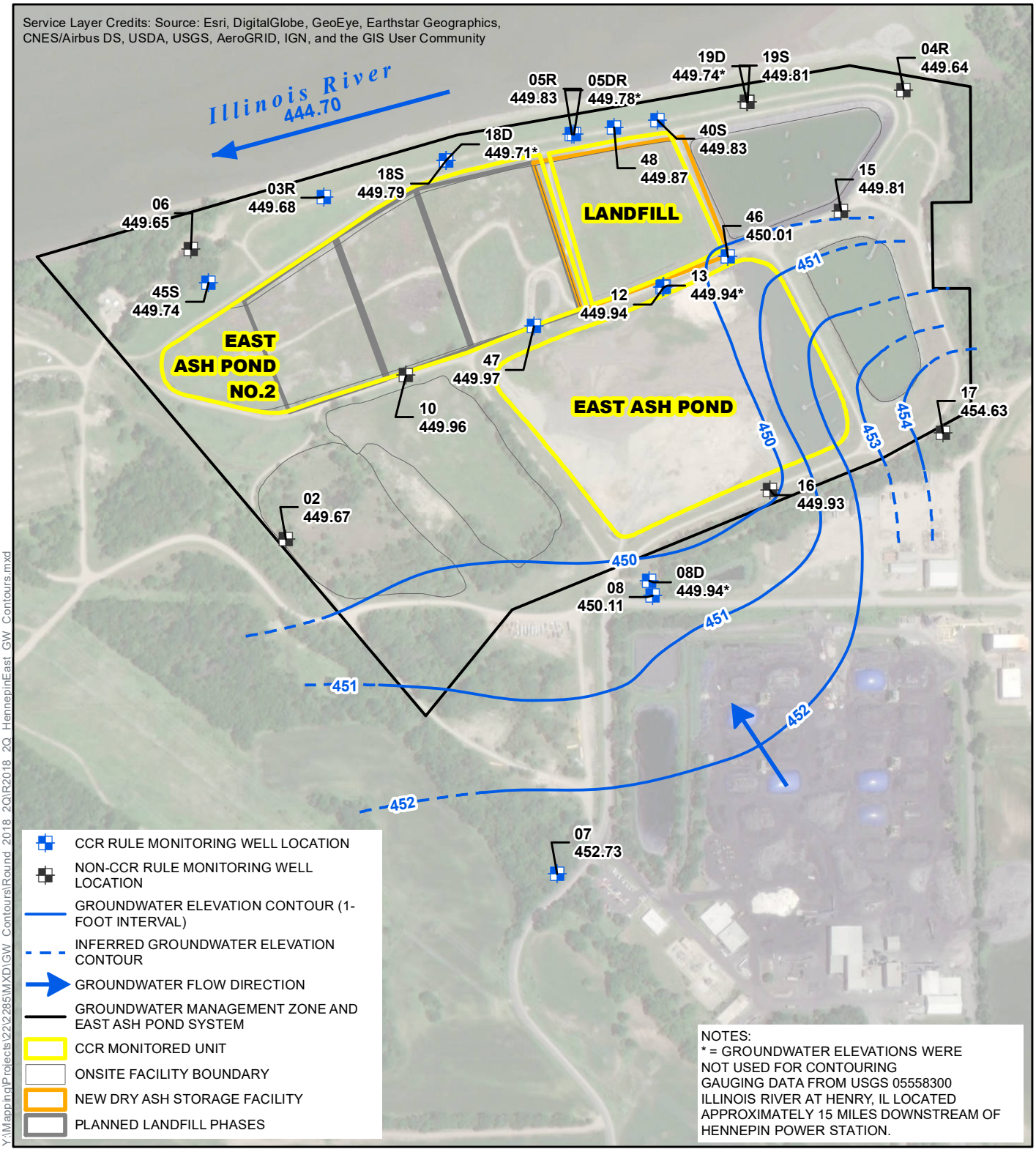
HENNEPIN LANDFILL (UNIT ID: 801), HENNEPIN ASH POND NO. 2 (UNIT ID: 802), AND HENNEPIN EAST ASH POND (UNIT ID: 803)
GROUNDWATER ELEVATION CONTOUR MAP
NOVEMBER 15, 2017

CCR RULE GROUNDWATER MONITORING
HENNEPIN POWER STATION
HENNEPIN, ILLINOIS

N

0 125 250 500
Feet

O'BRIEN & GERE ENGINEERS, INC.



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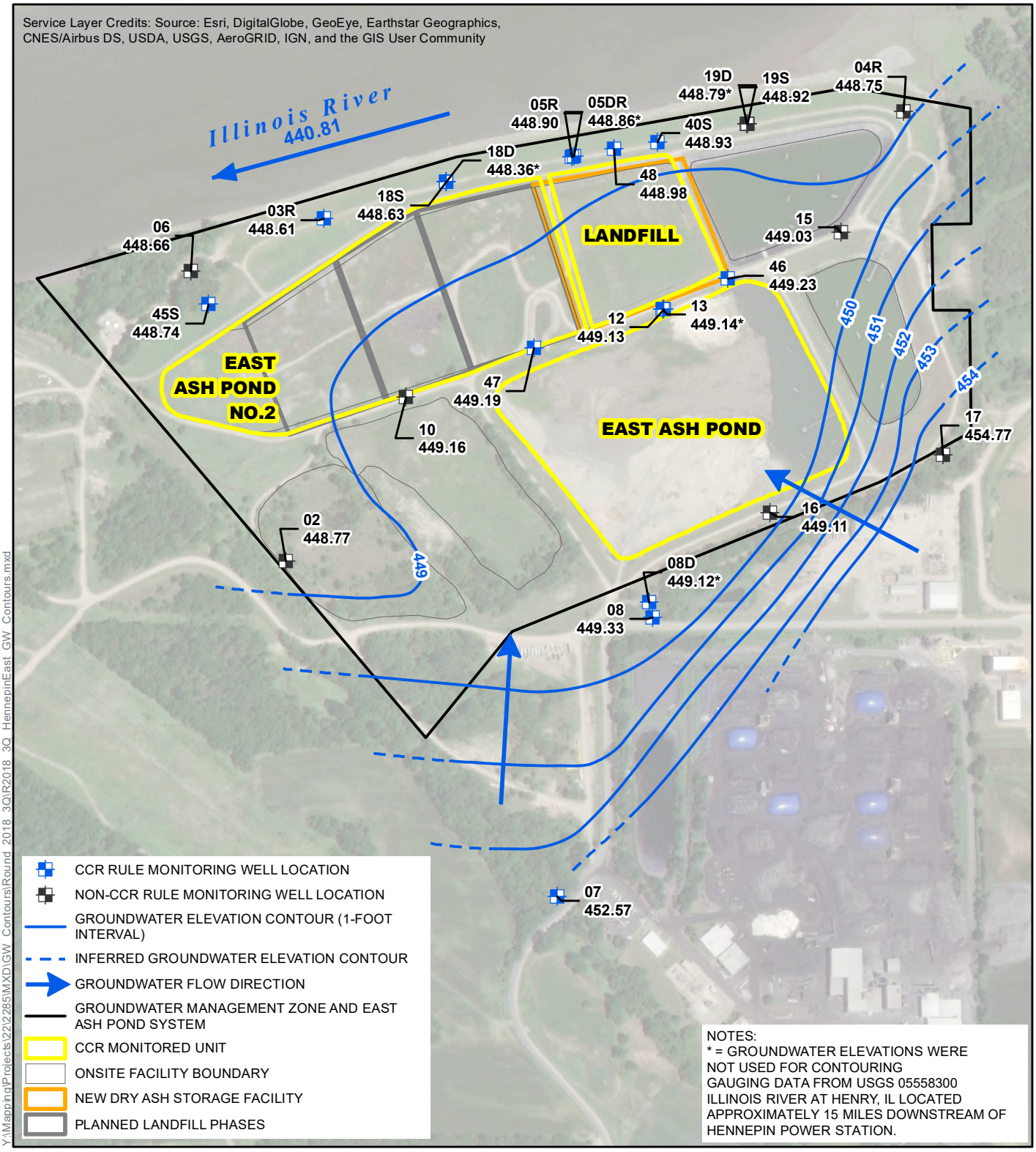
HENNEPIN LANDFILL (UNIT ID: 801), HENNEPIN ASH POND NO. 2 (UNIT ID: 802), AND HENNEPIN EAST ASH POND (UNIT ID: 803) GROUNDWATER ELEVATION CONTOUR MAP JUNE 13, 2018

CCR RULE GROUNDWATER MONITORING
HENNEPIN POWER STATION
HENNEPIN, ILLINOIS

N

0 125 250 500
Feet

O'BRIEN & GERE ENGINEERS, INC.



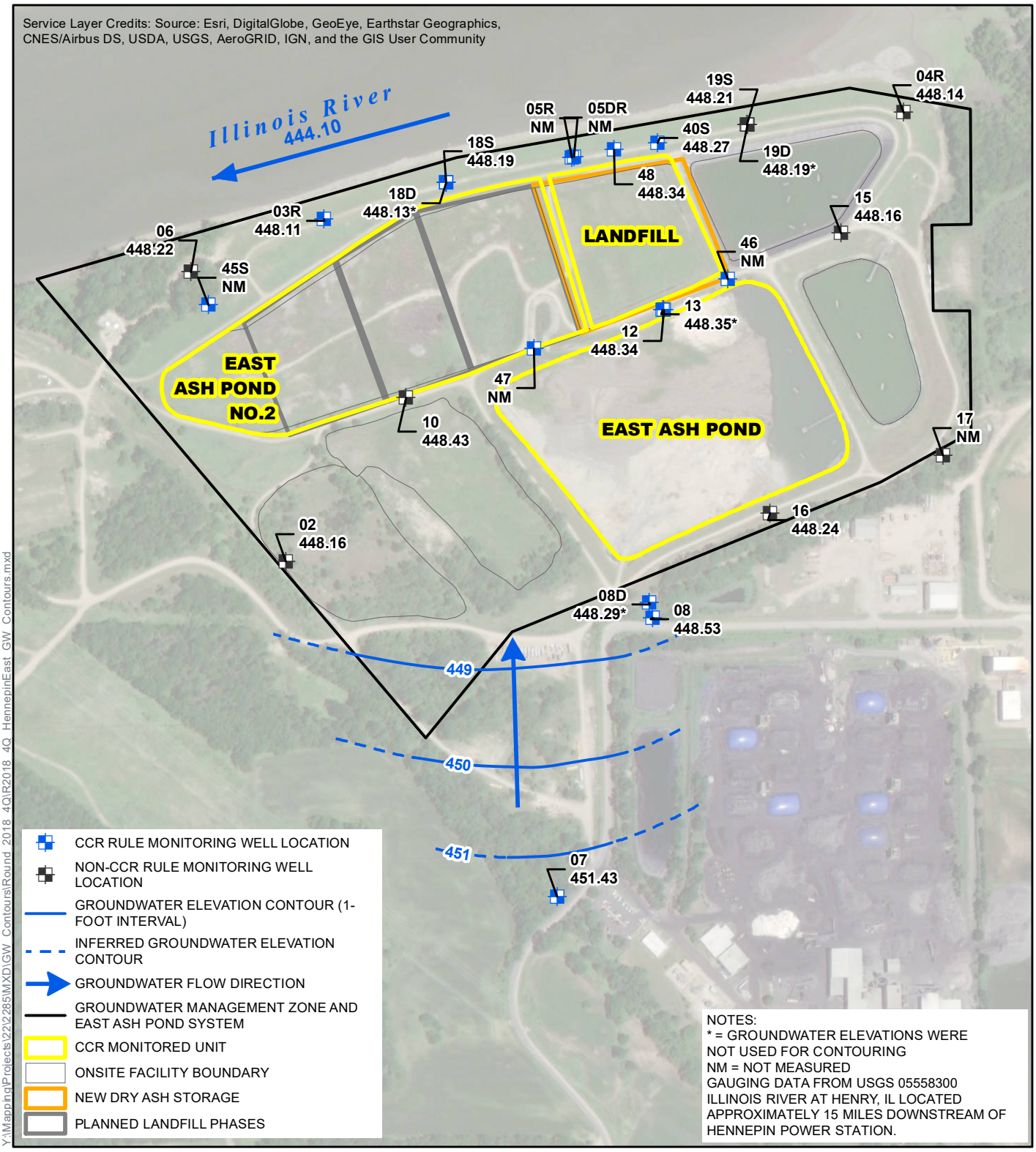
HENNEPIN LANDFILL (UNIT ID: 801), HENNEPIN ASH POND NO. 2 (UNIT ID: 802), AND HENNEPIN EAST ASH POND (UNIT ID: 803)
GROUNDWATER ELEVATION CONTOUR MAP
SEPTEMBER 12, 2018

CCR RULE GROUNDWATER MONITORING
HENNEPIN POWER STATION
HENNEPIN, ILLINOIS

0 125 250 500
Feet

N

O'BRIEN & GERE ENGINEERS, INC.



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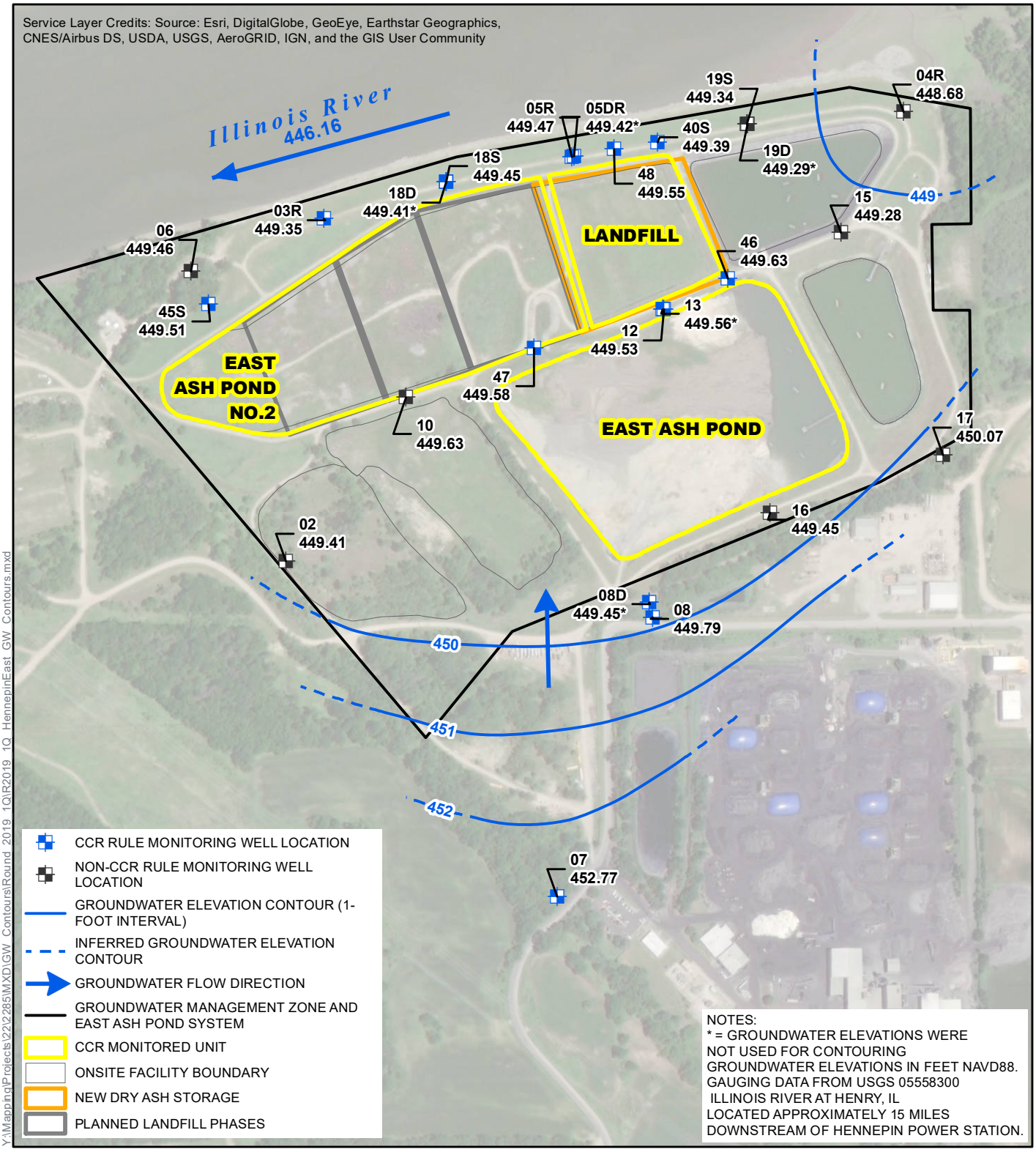
HENNEPIN LANDFILL (UNIT ID: 801), HENNEPIN ASH POND NO. 2 (UNIT ID: 802), AND HENNEPIN EAST ASH POND (UNIT ID: 803) GROUNDWATER ELEVATION CONTOUR MAP DECEMBER 12, 2018

CCR RULE GROUNDWATER MONITORING
HENNEPIN POWER STATION
HENNEPIN, ILLINOIS

0 125 250 500
Feet

N

O'BRIEN & GERE ENGINEERS, INC.



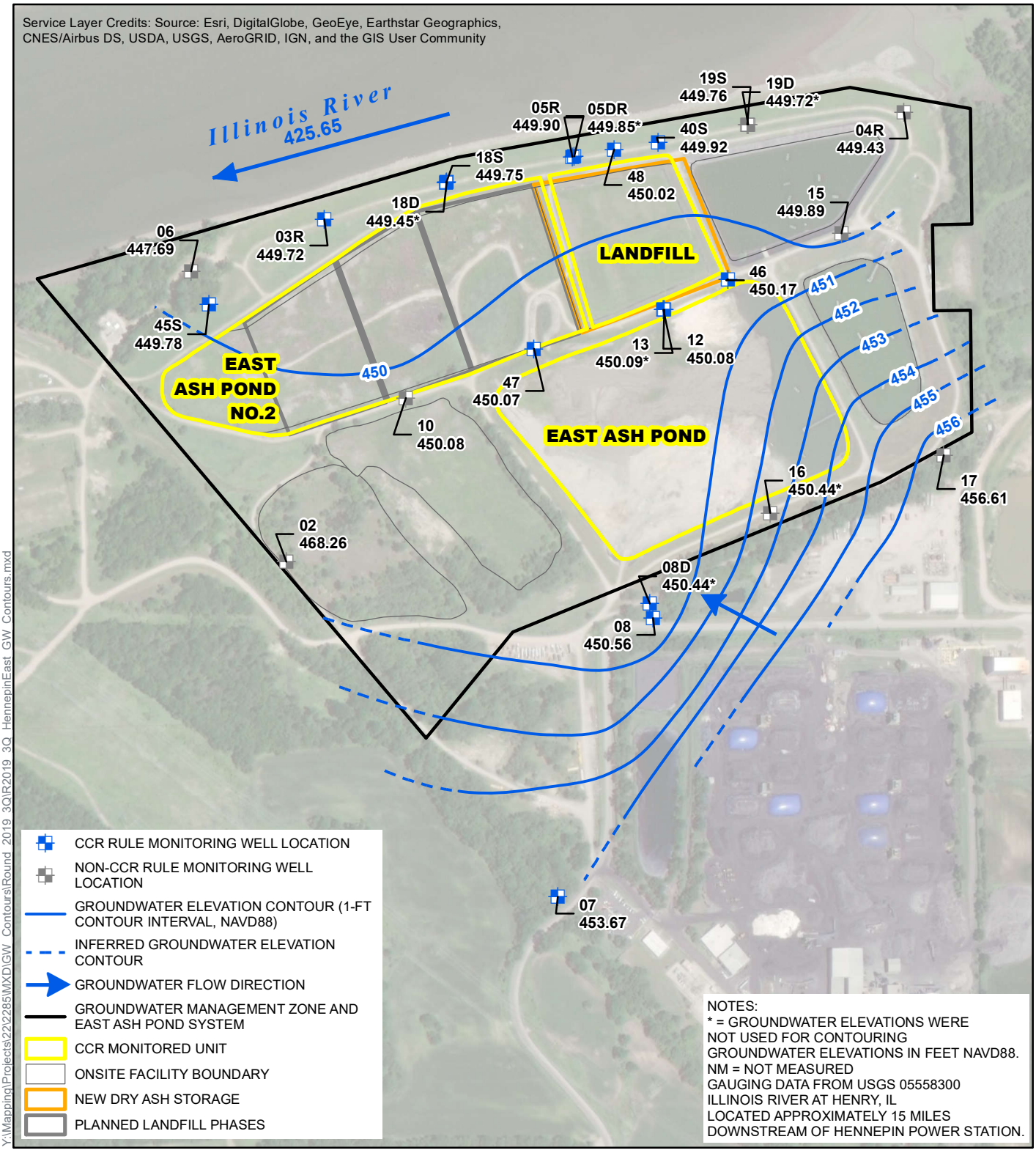
HENNEPIN LANDFILL (UNIT ID: 801), HENNEPIN ASH POND NO. 2 (UNIT ID: 802), AND HENNEPIN EAST ASH POND (UNIT ID: 803)
GROUNDWATER ELEVATION CONTOUR MAP
MARCH 13, 2019

CCR RULE GROUNDWATER MONITORING
HENNEPIN POWER STATION
HENNEPIN, ILLINOIS

0 125 250 500
Feet

N

O'BRIEN & GERE ENGINEERS, INC.



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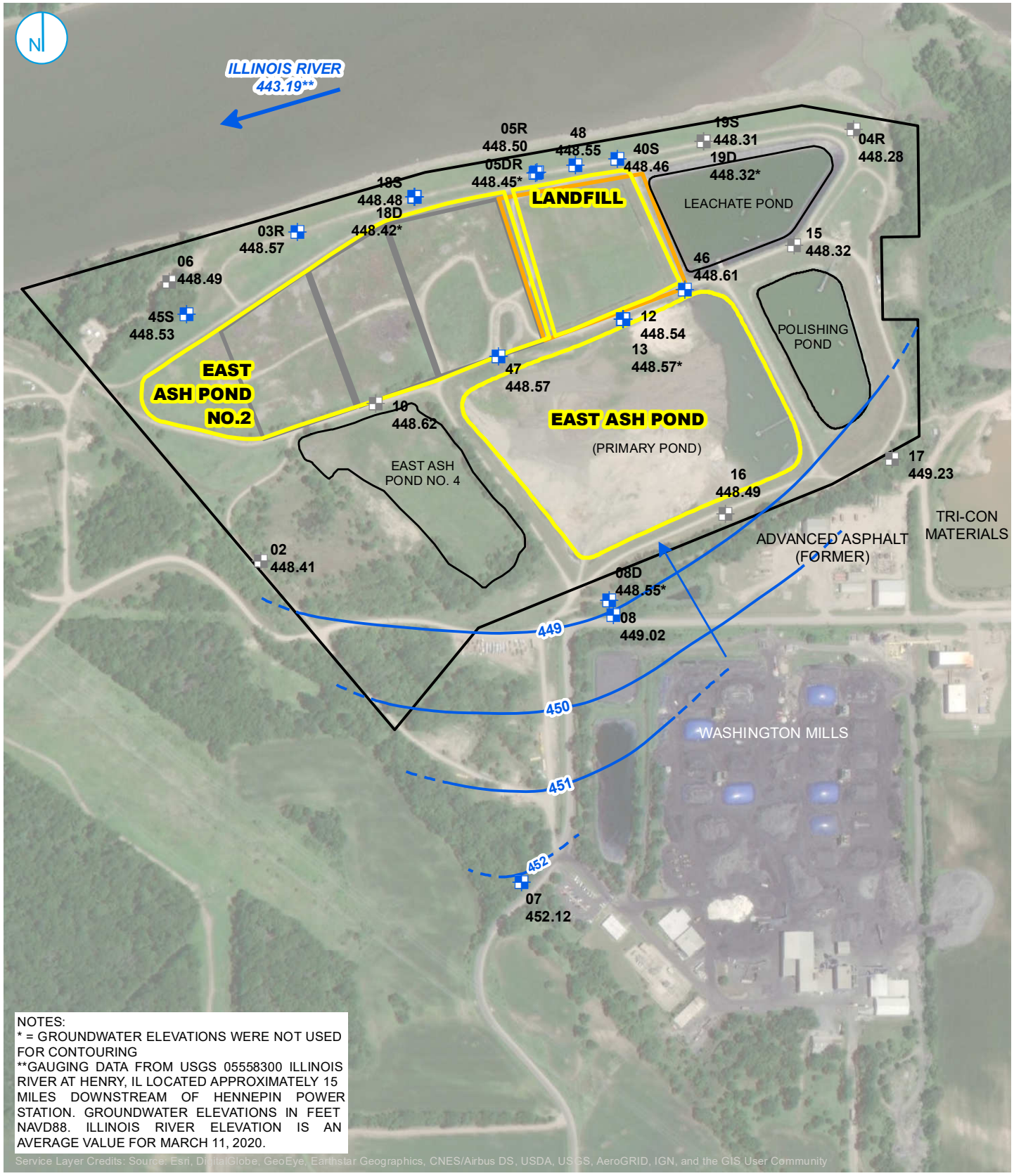
HENNEPIN LANDFILL (UNIT ID: 801), HENNEPIN ASH POND NO. 2 (UNIT ID: 802), AND HENNEPIN EAST ASH POND (UNIT ID: 803)
GROUNDWATER ELEVATION CONTOUR MAP
SEPTEMBER 17, 2019

CCR RULE GROUNDWATER MONITORING
HENNEPIN POWER STATION
HENNEPIN, ILLINOIS

N

0 125 250 500
Feet

O'BRIEN & GERE ENGINEERS, INC.



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PROJECT: 169000XXXX | DATED: 7/30/2020 | DESIGNER: galarnmc

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

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

APPENDIX B
BOTTOM ASH LEACHATE DATA

TEKLAB, INC.

5445 HORSESHOE LAKE ROAD
COLLINSVILLE, ILLINOIS 62234

ENVIRONMENTAL TESTING LABORATORY

TEL: 618-344-1004
FAX: 618-344-1005

August 03, 2009

John Augspols
Dynegy Midwest Generation
13498 East 800th Street
Hennepin, IL 61327
TEL: (815) 339-9218
FAX:

NELAP Accredited #100226

RE: Hennepin Station Bottom Ash **WorkOrder:** 09070896

Dear John Augspols:

TEKLAB, INC received 1 sample on 7/24/2009 9:00:00 AM for the analysis presented in the following report.

Samples are analyzed on an as received basis unless otherwise requested and documented. The sample results contained in this report relate only to the requested analytes of interest as directed on the chain of custody. IL ELAP and NELAP accredited fields of testing are indicated by the letters NELAP under the Certification column.

All quality control criteria applicable to the test methods employed for this project have been satisfactorily met and are in accordance with NELAP except where noted. The following report shall not be reproduced, except in full, without the written approval of Teklab, Inc.

If you have any questions regarding these tests results, please feel free to call.

Sincerely,

Heather A. White

Heather A. White
Project Manager
(618)344-1004 ex 20

TEKLAB, INC.

5445 HORSESHOE LAKE ROAD
COLLINSVILLE, ILLINOIS 62234

ENVIRONMENTAL TESTING LABORATORY

TEL: 618-344-1004
FAX: 618-344-1005

Client: Dynegy Midwest Generation
Project: Hennepin Station Bottom Ash
LabOrder: 09070896
Report Date: 03-Aug-09

CASE NARRATIVE

Cooler Receipt Temp: 22.8 °C

State accreditations:

KS: NELAP #E-10347 | KY: UST #0073 | MO: DNR #00930 | AR: ADEQ #70-028-0

Qualifiers

DF - Dilution Factor	**B** - Analyte detected in the associated Method Blank	**C** - Client requested RL below PQL
RL - Reporting Limit	**J** - Analyte detected below reporting limits	**D** - Diluted out of sample
ND - Not Detected at the Reporting Limit	**R** - RPD outside accepted recovery limits	**E** - Value above quantitation range
Surr - Surrogate Standard added by lab	**S** - Spike Recovery outside accepted recovery limits	**H** - Holding time exceeded
TNTC - Too numerous to count (> 200 CFU)	X - Value exceeds Maximum Contaminant Level	**MI** - Matrix interference
Q - QC criteria failed or noncompliant CCV	# - Unknown hydrocarbon	**DNI** - Did not ignite
NELAP - IL ELAP and NELAP Accredited Field of Testing	**IDPH** - IL Dept. of Public Health	

TEKLAB, INC.

5445 HORSESHOE LAKE ROAD
COLLINSVILLE, ILLINOIS 62234

ENVIRONMENTAL TESTING LABORATORY

TEL: 618-344-1004
FAX: 618-344-1005

LABORATORY RESULTS

Client: Dynegy Midwest Generation
WorkOrder: 09070896
Lab ID: 09070896-001
Report Date: 03-Aug-09

Client Project: Hennepin Station Bottom Ash
Client Sample ID: Hennipin Station Bottom Ash
Collection Date: 7/22/2009 11:00:00 AM
Matrix: SOLID

Analyses	Certification	RL	Qual	Result	Units	DF	Date Analyzed	Analyst
ASTM D3987, SW-846 3005A, 6010B, METALS IN SHAKE EXTRACT BY ICP								
Arsenic		0.0250		**< 0.0250**	mg/L	1	7/29/2009 3:49:50 PM	LAL
Barium		0.0050		**0.116**	mg/L	1	7/29/2009 11:19:44 AM	LAL
Beryllium		0.0010		**< 0.0010**	mg/L	1	7/29/2009 11:19:44 AM	LAL
Boron		0.0200		**0.193**	mg/L	1	8/3/2009 10:30:48 AM	LAL
Cadmium		0.0020		**< 0.0020**	mg/L	1	7/29/2009 3:49:50 PM	LAL
Chromium		0.0100		**< 0.0100**	mg/L	1	7/29/2009 11:19:44 AM	LAL
Cobalt		0.0100		**< 0.0100**	mg/L	1	7/29/2009 11:19:44 AM	LAL
Copper		0.0100		**< 0.0100**	mg/L	1	7/29/2009 11:19:44 AM	LAL
Iron		0.0300		**0.0687**	mg/L	1	7/29/2009 3:49:50 PM	LAL
Manganese		0.0050		**< 0.0050**	mg/L	1	7/29/2009 3:49:50 PM	LAL
Nickel		0.0100		**< 0.0100**	mg/L	1	7/29/2009 3:49:50 PM	LAL
Selenium		0.0500		**< 0.0500**	mg/L	1	7/29/2009 3:49:50 PM	LAL
Silver		0.0100		**< 0.0100**	mg/L	1	7/29/2009 11:19:44 AM	LAL
Zinc		0.0100		**< 0.0100**	mg/L	1	7/29/2009 11:19:44 AM	LAL
ASTM D3987, SW-846 3020A, METALS IN SHAKE EXTRACT BY GFAA								
Antimony, SHAKE by GFAA	7041	0.0050		**< 0.0050**	mg/L	1	7/29/2009 2:45:16 PM	MEK
Lead, SHAKE by GFAA	7421	0.0020	J	**0.0011**	mg/L	1	7/29/2009 10:18:30 AM	MEK
Thallium, SHAKE by GFAA	7841	0.0020		**< 0.0020**	mg/L	1	7/29/2009 2:41:30 PM	MEK
ASTM D3987, SW-846 7470A IN SHAKE EXTRACT								
Mercury, SHAKE		0.00020		**< 0.00020**	mg/L	1	7/28/2009	ALU

Sample Narrative

TEKLAB, INC.

5445 HORSESHOE LAKE ROAD
COLLINSVILLE, ILLINOIS 62234

ENVIRONMENTAL TESTING LABORATORY

TEL: 618-344-1004
FAX: 618-344-1005

RECEIVING CHECK LIST

Client: Dynegy Midwest Generation
Project: Hennepin Station Bottom Ash
Lab Order: 09070896
Report Date: 03-Aug-09

Carrier: UPS

Received By: DB

Completed by: Marvin L. Darling II
On: 24-Jul-09
Marvin L. Darling

Reviewed by: Heather A. White
On: 24-Jul-09
Heather A. White

Pages to follow: Chain of custody 1 Extra pages included 2

Shipping container/cooler in good condition?	Yes ☑	No ☐	Not Present ☐	Temp °C 22.8			
Type of thermal preservation?	None ☑	Ice ☐	Blue Ice ☐	Dry Ice ☐			
Chain of custody present?	Yes ☐	No ☑					
Chain of custody signed when relinquished and received?	Yes ☐	No ☑					
Chain of custody agrees with sample labels?	Yes ☑	No ☐					
Samples in proper container/bottle?	Yes ☑	No ☐					
Sample containers intact?	Yes ☑	No ☐					
Sufficient sample volume for indicated test?	Yes ☑	No ☐					
All samples received within holding time?	Yes ☑	No ☐					
Reported field parameters measured:	Field ☐	Lab ☐	NA ☑				
Container/Temp Blank temperature in compliance?	Yes ☑	No ☐					

When thermal preservation is required, samples are compliant with a temperature between 0.1°C - 6.0°C, or when samples are received on ice the same day as collected.

Water - VOA vials have zero headspace?	Yes ☐	No ☐	No VOA vials submitted ☑
Water - pH acceptable upon receipt?	Yes ☑	No ☐	

Any No responses must be detailed below or on the COC.

Sample id and collection date/time obtained from sample container. Per John Augspols, sample ID and collection/date time on the container are correct. Analyze for the same list of parameters as in 2008. EAH 7/27/09

09070896

TEKLAB, INC
5445 Horseshoe Lake Road
Collinsville, IL 62234-7425
TEL: (618) 344-1004
FAX: (618) 344-1005

CHAIN-OF-CUSTODY RECORD

WorkOrder: 09070896

Client:
Dynegy Midwest Generation
13498 East 800th Street
Hennepin, IL 61327

TEL: (815) 339-9218
FAX:
Project: Hennepin Station Bottom As

24-Jul-09

					Requested Tests						
Sample ID	**ClientSampID**	**Matrix**	**Date Collected**	**Bottle**	**D3987/6010B**	**D3987/7000 G**	**D3987/SW7470A**				
09070896-001	Hennipin Station Bottom	Solid	7/22/2009 11:00:00 AM		A	A	A				

Comments:

22.8°C ICE

	Date/Time		**Date/Time**
Relinquished by:		**Received by:** Rec Bottle (UPS)	7/24/09 900
Relinquished by:		**Received by:**	
Relinquished by:		**Received by:**	

NOTE: Samples are discarded 60 days after results are reported unless other arrangements are made. Hazardous samples will be returned to client or disposed of at client expense.

Bottle Type: L-Liter V-Voa S-Soil Jar O-Orbo T-Tedlar B-Brass P-Plastic OT-Other

Teklab: 7/22/09

Please find enclosed a bottom ash sample to be run for the same parameters as last year. I enclosed those results with the sample. I would like to pay for this with a credit card. If you have any questions please contact me :

John Augspols

Supv. Environmental and Chemistry

(815) 339-9218

Fax (815) 339 -2772

TEKLAB, INC.

5445 HORSESHOE LAKE ROAD
COLLINSVILLE, ILLINOIS 62234

ENVIRONMENTAL TESTING LABORATORY

TEL: 618-344-1004
FAX: 618-344-1005

LABORATORY RESULTS

Client: Dynegy Midwest Generation
WorkOrder: 08060909
Lab ID: 08060909-001
Report Date: 02-Jul-08

Client Project: Hennepin Station Bottom Ash
Client Sample ID: Hennipin Station Botton Ash
Collection Date: 6/24/2008 9:00:00 AM
Matrix: SOLID

Analyses	Certification	RL	Qual	Result	Units	DF	Date Analyzed	Analyst
ASTM D3987, SW-846 3005A, 6010B, METALS IN SHAKE EXTRACT BY ICP								
Arsenic		0.0250		< 0.0250	mg/L	1	6/30/2008 12:29:55 PM	LAL
Barium		0.0050		0.0699	mg/L	1	6/30/2008 12:29:55 PM	LAL
Beryllium		0.0010		< 0.0010	mg/L	1	6/30/2008 12:29:55 PM	LAL
Boron		0.0200		0.197	mg/L	1	6/30/2008 12:29:55 PM	LAL
Cadmium		0.0020		< 0.0020	mg/L	1	6/30/2008 12:29:55 PM	LAL
Chromium		0.0100		< 0.0100	mg/L	1	6/30/2008 12:29:55 PM	LAL
Cobalt		0.0100		< 0.0100	mg/L	1	6/30/2008 12:29:55 PM	LAL
Copper		0.0100		< 0.0100	mg/L	1	6/30/2008 12:29:55 PM	LAL
Iron		0.0200		0.110	mg/L	1	6/30/2008 12:29:55 PM	LAL
Manganese		0.0050		< 0.0050	mg/L	1	6/30/2008 12:29:55 PM	LAL
Nickel		0.0100		< 0.0100	mg/L	1	6/30/2008 12:29:55 PM	LAL
Selenium		0.0500		< 0.0500	mg/L	1	6/30/2008 12:29:55 PM	LAL
Silver		0.0100		< 0.0100	mg/L	1	6/30/2008 12:29:55 PM	LAL
Zinc		0.0100	J	0.0025	mg/L	1	6/30/2008 12:29:55 PM	LAL
ASTM D3987, SW-846 3020A, METALS IN SHAKE EXTRACT BY GFAA								
Antimony, SHAKE by GFAA	7041	0.0050	J	0.0024	mg/L	1	6/30/2008 11:51:48 AM	JMW
Lead, SHAKE by GFAA	7421	0.0020		< 0.0020	mg/L	1	6/30/2008 9:45:10 AM	JMW
Thallium, SHAKE by GFAA	7841	0.0020	S	< 0.0020	mg/L	1	6/30/2008 11:17:06 AM	JMW
ASTM D3987, SW-846 7470A IN SHAKE EXTRACT								
Mercury, SHAKE		0.00020	J	0.00006	mg/L	1	6/30/2008	SRH

Sample Narrative
ASTM D3987, SW-846 3020A, Metals in Shake Extract by GFAA
TI - Matrix interference present in sample.

22-8 notice
DB 7/24/09

900 ~~Fe~~ UPS
DB 7/24/09

Prepared for
Dynegy Midwest Generation, LLC

Date
October 11, 2021

Project No.
1940100711-007

40 C.F.R. § 257.94(e)(2): ALTERNATE SOURCE DEMONSTRATION

COAL COMBUSTION WASTE LANDFILL
HENNEPIN POWER PLANT
HENNEPIN, ILLINOIS
CCR UNIT 801

RAMBOLL Bright ideas. Sustainable change.

CERTIFICATIONS

I, Brian G. Hennings, a professional geologist in good standing in the State of Illinois, certify that the information in this report is accurate as of the date of my signature below. The content of this report is not to be used other than for its intended purpose and meaning, or for extrapolations beyond the interpretations contained herein.

Brian G. Hennings
Professional Geologist
196-001482
Illinois
Ramboll Americas Engineering Solutions, Inc.
Date: October 11, 2021

I, Eric J. Tlachac, a qualified professional engineer in good standing in the State of Illinois, certify that the information in this report is accurate as of the date of my signature below. The content of this report is not to be used other than for its intended purpose and meaning, or for extrapolations beyond the interpretations contained herein.

Eric J. Tlachac
Qualified Professional Engineer
062-063091
Illinois
Ramboll Americas Engineering Solutions, Inc.
Date: October 11, 2021

Ramboll
234 W. Florida Street
Fifth Floor
Milwaukee, WI 53204
USA
T 414-837-3607
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https://ramboll.com

CONTENTS

TABLES (IN TEXT)

FIGURES (IN TEXT)

FIGURES (ATTACHED)

APPENDICES

ACRONYMS AND ABBREVIATIONS

40 C.F.R.	Title 40 of the Code of Federal Regulations
AP2	Ash Pond No. 2
AP4	Ash Pond No. 4
ASD	Alternate Source Demonstration
Ash Pond No. 2	Hennepin East Ash Pond No. 2
CCR	Coal Combustion Residuals
CCR Rule	40 C.F.R. Part 257 Subpart D
CEC	Civil & Environmental Consultants, Inc.
cm/s	centimeters per second
D8	Detection Monitoring Round 8
EAPS	East Ash Pond System (Landfill, AP2, AP4, and East Ash Pond)
HDPE	high-density polyethylene
HPP	Hennepin Power Plant
IEPA	Illinois Environmental Protection Agency
Landfill	Coal Combustion Waste Landfill
LOE	line of evidence
mg/L	milligrams per liter
mil	millimeter
NAVD88	North American Vertical Datum of 1988
NPDES	National Pollutant Discharge Elimination System
NRT/OBG	Natural Resource Technology, an OBG Company
OBG	O'Brien & Gere Engineers, Inc.
oz/sy	ounce per square yard
Ramboll	Ramboll Americas Engineering Solutions, Inc.
SSI	Statistically Significant Increase

1. INTRODUCTION

Title 40 of the Code of Federal Regulations (40 C.F.R.) § 257.94(e)(2) allows the owner or operator of a Coal Combustion Residuals (CCR) unit 90 days from the date of determination of a Statistically Significant Increase (SSI) over background for groundwater constituents listed in Appendix III of 40 C.F.R. § 257 to complete a written demonstration that a source other than the CCR unit being monitored caused the SSI(s), or that the SSI(s) resulted from error in sampling, analysis, statistical evaluation, or natural variation in groundwater quality (Alternate Source Demonstration [ASD]).

This ASD has been prepared on behalf of Dynegy Midwest Generation, LLC, by Ramboll Americas Engineering Solutions, Inc. (Ramboll), to provide pertinent information pursuant to 40 C.F.R. § 257.94(e)(2) for the Hennepin Power Plant (HPP) Coal Combustion Waste Landfill (Landfill), located near Hennepin, Illinois.

The most recent Detection Monitoring sampling event (Detection Monitoring Round 8 [D8]) was completed on March 18, 2021, and analytical data were received on April 14, 2021. In accordance with 40 C.F.R. § 257.93(h)(2), statistical analysis of the data to identify SSIs of 40 C.F.R. § 257 Subpart D (CCR Rule) Appendix III parameters over background concentrations was completed by July 13, 2021, within 90 days of receipt of the analytical data. The statistical determination identified the following SSIs at compliance monitoring wells:

- Boron at wells 05R, 05DR, 40S, and 48
- Fluoride at wells 05R, 05DR, 40S, and 48
- pH at wells 05R, 40S, and 48

Pursuant to 40 C.F.R. § 257.94(e)(2), the lines of evidence (LOE) described in Section 3 demonstrate that sources other than the Landfill were the cause of the SSIs listed above. This ASD was completed by October 11, 2021, within 90 days of determination of the SSIs, as required by 40 C.F.R. § 257.94(e)(2).

2. BACKGROUND

2.1 Site Location and Description

The HPP is located in the northeast quarter of Section 26, Township 33 North, Range 2 West, Putnam County, Illinois and approximately 3 miles north-northeast of the Village of Hennepin. The Landfill is located east of the HPP, situated less than 200 feet from the south bank of the Illinois River and approximately one mile east of the Big Bend, where the river shifts course from predominantly west to predominantly south.

The Landfill is one of four CCR units regulated under the CCR Rule at the HPP. One of the CCR units is located west of the HPP. Three CCR units (the Landfill, Ash Pond No. 2 [AP2], and the East Ash Pond) and one unit not regulated by the CCR Rule (Ash Pond No. 4 [AP4]) are located adjacent to each other and east of the HPP, and are collectively known as the East Ash Pond System (EAPS). Surrounding areas include industrial properties to the east and south, agricultural land to the southwest, and the HPP to the west. The CCR units at EAPS and surrounding properties are shown on Figure 1.

2.2 Groundwater Monitoring

The Landfill groundwater monitoring system for compliance with the CCR Rule consists of three background monitoring wells (07, 08, 08D) and four compliance monitoring wells (05R, 05DR, 40S, and 48). A map showing the groundwater monitoring system, including the CCR unit and all background and compliance monitoring wells, is presented in Figure 1. Figure 1 also includes other CCR unit monitoring wells located upgradient of the Landfill (12, 13, 16, and 17) and along the Illinois River (18S and 18D) which are not part of the Landfill monitoring network but are used to support the LOEs discussed in Section 3.

Groundwater samples are collected and analyzed in accordance with the Sampling and Analysis Plan prepared for the Landfill (NRT/OBG, 2017a). Statistical evaluation of analytical data is performed in accordance with the Statistical Analysis Plan (Natural Resource Technology, an OBG Company [NRT/OBG], 2017b).

2.3 Site History

The HPP has two coal-fired generating units constructed in 1953 and 1959 with a total capacity of 210 Megawatts. Operations were ceased in November 2019. The coal source changed several times during the plant's operational history. Information related to the site features shown on Figure 1 includes:

AP2/AP4: AP2 was used to store and dispose fly ash, bottom ash, and other non-CCR waste streams, including coal pile runoff. The pond originally encompassed the area that currently includes the existing AP2, the Landfill, and the Leachate Pond (not a CCR unit). AP2 has been inactive since 1996 and currently encompasses approximately 18 acres. AP2 is unlined with a lowermost, but variable, bottom elevation (referenced to the North American Vertical Datum of 1988 [NAVD88]) of 451 feet. AP4 (located south of AP2) is an unlined, closed impoundment (capped or otherwise maintained) not subject to CCR Rule requirements.

A Modified Closure Work Plan was submitted to the Illinois Environmental Protection Agency (IEPA) in 2010 proposing closure of AP2 by capping with future Landfill phases as they were

constructed (Kelron Environmental and Natural Resource Technology, Inc. [NRT], 2010). This Work Plan was approved by IEPA in a letter dated March 3, 2010. The Landfill is Phase I of this 2010 Closure Plan. The formerly proposed Landfill Phases II, III, and IV will no longer be constructed upon AP2. Therefore, a revised Closure Plan for AP2 was submitted for IEPA approval in February 2018 (Civil & Environmental Consultants, Inc. [CEC], 2018). An addendum to the Closure Plan, which incorporates AP4, was submitted in October 2018 (O'Brien & Gere Engineers, Inc. [OBG] and CEC, 2018). IEPA approved the Closure and Post Closure Care Plan for Hennepin AP2/AP4 on March 5, 2020 following correspondence in 2019 and early 2020 to address IEPA comments. Closure construction began on May 21, 2020 and was completed on November 17, 2020. The final cover system on AP2/AP4 consists of a 24-inch compacted soil barrier with a hydraulic conductivity of no more than 1×10^{-7} centimeters per second (cm/s) overlain by a 6-inch thick vegetative cover layer. The cover system was extended eastward to overlap with the western end of the Landfill geomembrane liner and southward to the side slope of the East Ash Pond. The approximate dates of construction affecting AP2/AP4 are summarized in Table A below (AECOM, 2016).

Table A. Construction Events Affecting AP2 and AP4

Date	Event
1958	Construction of AP2.
1978	Embankment raise of AP2.
1985	Embankment raise of AP2 to elevation 484 feet.
1989	Embankment raise of AP2 to elevation 494 feet.
1996	Pond was removed from service and completely dewatered.
2009 to 2010	Eastern portion of AP2 was removed to facilitate construction of the Leachate Pond.
2010/2011	Landfill Phase I cell was constructed in 2010 over placed CCR in AP2 adjacent to the Leachate Pond. In February 2011, 7,500 cubic yards of bottom ash was placed into the Phase I cell as a post-construction freeze-protection measure to protect the leachate collection system and geomembrane liner. No other material (fly ash or bottom ash) has been placed in the Landfill since.
2014	North Embankment tree removal, grading, and vegetation re-establishment adjacent to AP2.
2020	AP2 and AP4 closed in-place in accordance with IEPA-approved closure plan.

Landfill: The Landfill Phase I cell, covering approximately 4.5 acres, was constructed in 2010 over existing, dewatered CCR in AP2 as part of the 2010 Closure Plan for AP2. The Phase I cell was constructed with a composite liner (geomembrane over compacted clay) and leachate collection system above the liner that transfers collected precipitation and leachate to the Leachate Pond. Ash fill underlying the Landfill is known to be present to a minimum elevation of 454 feet (referenced to NAVD88).

In February 2011, 7,500 cubic yards of bottom ash was placed into the Landfill as a post-construction freeze protection measure to protect the leachate collection system and geomembrane liner. No other material has been placed in the Landfill since then. The Landfill has not yet been placed into service.

East Ash Pond: The East Ash Pond was 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 pond was constructed in two phases. The first phase occurred in 1995 when the initial embankment was constructed to a total height of 32 feet with a lowermost, but variable, bottom elevation of the pond at 458 feet. The original pond bottom was lined with a 4-foot thick layer of compacted clay with a hydraulic conductivity of 1 x 10^{-7} cm/s, underlain by a 1-foot thick sand layer (AECOM, 2016). The pond depth behind the original embankment was 15 feet with 5 feet of freeboard. The embankment was raised 12 feet in 2003 to a total impoundment depth of 30 feet with 2 feet of freeboard. The liner system of the embankment raise consisted of (from top to bottom) a 45-millimeter (mil) reinforced polypropylene geomembrane, a 1-foot thick clay layer, and an 8 ounce per square yard (oz/sy) polypropylene geotextile fabric. This pond was used for the treatment of bottom ash transport water, miscellaneous low volume wastewater streams, and storage of unsold fly ash until plant operations ceased in November 2019.

Polishing Pond: The Polishing Pond (located east of the East Ash Pond) is not subject to CCR Rule requirements and was constructed in 1995 with a 48-inch-thick compacted clay liner having a vertical hydraulic conductivity of 1 x 10^{-7} cm/s.

Leachate Pond: The Leachate Pond (located east of the Landfill) is not subject to CCR Rule requirements and is a 25.5-acre-foot pond constructed with a composite liner consisting of 60-mil high-density polyethylene (HDPE) overlying two feet of compacted clay with a vertical hydraulic conductivity of 1 x 10^{-7} cm/s. Construction was completed December 2010.

2.4 Site Hydrogeology and Stratigraphy

A detailed hydrogeological assessment of the HPP was completed and submitted as part of the February 2018 Closure Plan for AP2 and subsequent Addenda (previously referenced). Information pertinent to this ASD is included in this report; however, more complete information on Site hydrogeology and stratigraphy is available in the 2018 Closure Plan and Addenda.

There are three dominant geomorphic features in the immediate vicinity of the HPP: an upper river terrace at an elevation of about 500 to 550 feet NAVD88, a lower river terrace at an elevation of about 450 to 460 feet NAVD88, and the current river valley filled with alluvium to an elevation of about 445 feet NAVD88. The HPP, AP2, and the Landfill were constructed on the original, narrow lower river terrace, between the Illinois River and the upper terrace. The original lower river terrace is approximately 10 to 20 feet above the average river level at the Hennepin Power Plant (elevation 443.7 feet NAVD88) based upon measurements collected between 2003 and 2018 (OBG, part of Ramboll, 2020). The AP2 berm slopes steeply toward the river and its toe is close to the riverbank. The East Ash Pond, Polishing Pond, and AP4 were constructed on the upper river terrace at an elevation of approximately 500 to 505 feet NAVD88, or 60 to 65 feet above the average river level.

The hydrogeological assessment identified that the stratigraphy within and immediately surrounding the EAPS consists of fill, unlithified river alluvium, and Pleistocene-age glacial outwash deposits overlying Pennsylvanian-age shale bedrock. Constructed berms consist of a variety of locally available materials, primarily sand, gravel, and coal ash. Where undisturbed or partially excavated, the native surficial soil at the Site is poorly drained, moderately permeable silty clay loam formed as alluvium in floodplains.

There are two hydrogeologic units present at the EAPS: alluvium and Henry Formation sands and gravels. The river is immediately adjacent to the lower terrace, east of the EAPS, and there is

minimal alluvium between the EAPS and the river. The highly permeable Henry Formation sands and gravels make up the upper and lower terraces and fill the valley beneath the alluvium. The sands and gravels of the two terraces are indistinguishable, consisting of a heterogeneous mixture of silty-sandy gravel with cobble zones and boulders up to several feet in diameter. The Henry Formation is more than 100 feet thick in the river valley and at least 130 feet thick on the upper terrace.

The Henry Formation and alluvium comprise the Uppermost Aquifer at the EAPS and extend from the water table to the bedrock. The Uppermost Aquifer extends about 7,000 feet upgradient from the EAPS, to the south, where clay-rich glacial till is encountered. Glacial tills such as this typically yield little water.

The Pennsylvanian-age bedrock consists of interbedded layers of shale with thin limestone, sandstone, and coal beds. The shale bedrock unit has low hydraulic conductivity and defines the lower boundary of the Uppermost Aquifer.

The direction of groundwater flow and hydraulic gradient within the Uppermost Aquifer varies with the elevation of the Illinois River (see select groundwater elevation contour maps in Appendix A). The direction of groundwater flow is most often toward the river to the north and west, but comparison of groundwater and river elevation data indicate reversals in this flow direction during times of high river elevations. The relative duration of these events is short, which leads to the determination of a predominant groundwater flow direction toward the river to the north and west.

Groundwater elevations were obtained from measurements in monitoring wells on March 17, 2021 prior to the D8 sampling event at the Site. Groundwater elevations for the EAPS during the D8 sampling event are shown in Figure 2 and ranged from approximately 447.24 feet (in compliance well 05DR) to 450.09 feet (in background well 07) (Figure 2). Groundwater flow was generally towards the Illinois River with groundwater flowing from southeast to northwest beneath the Landfill.

3. ALTERNATE SOURCE DEMONSTRATION: LINES OF EVIDENCE

As allowed by 40 C.F.R. § 257.94(e)(2), this ASD demonstrates that sources other than the Landfill (the CCR unit) caused the SSIs. LOEs supporting this ASD include the following:

1. Landfill liner design.
2. Concentrations of boron in landfill leachate are lower than those observed in downgradient groundwater.
3. Former vertical infiltration of surface water through ash fill in AP2.
4. Upgradient concentrations of fluoride.
5. Upgradient pH values.

Data and information supporting these ASD LOEs are discussed in more detail below.

3.1 LOE #1: Landfill Liner Design

The Landfill was constructed in 2010 with a 60-mil HDPE geomembrane overlying three feet of compacted clay with hydraulic conductivity of $1x10^{-7}$ cm/sec (CEC, 2010). Precipitation and/or leachate that collects on top of the liner is removed by a leachate collection system and transferred to the Leachate Pond for management. The Leachate Pond is also lined with a 60-mil HDPE liner overlying two feet of compacted clay.

The IEPA-approved Landfill composite liner system exceeds the design criteria for a composite liner for new CCR landfills established by 40 C.F.R. § 257.70(b). The composite liner design criteria were established to help prevent contaminants in CCR from leaking from the CCR unit and impacting groundwater. Therefore, the presence of the composite liner suggests that the Landfill is not the source of the observed SSIs.

3.2 LOE #2: Concentrations of Boron in Landfill Leachate Are Lower than Those Observed in Downgradient Groundwater

The only material that has been placed in the lined Landfill consists of a layer of coarse bottom ash (7,500 cubic yards or 11,625 tons) to protect the leachate collection system and geomembrane liner from freezing. There has been no additional CCR landfilling activity within the lined area since the bottom ash freeze protection layer was installed.

Analytical data (Appendix B) from two samples of bottom ash leachate derived in the laboratory (extraction method ASTM D3987, shake extraction with water) identified boron concentrations of 0.193 milligrams per liter (mg/L) (2009 sample) and 0.197 mg/L (2008 sample).

A box-whisker plot of total boron concentrations detected between 2015 and 2021 at monitoring wells near the Landfill is shown on Figure A below. The boron concentrations of 0.193 and 0.197 mg/L detected in the laboratory-derived leachate samples are below the boron concentrations observed in downgradient wells as shown in Figure A. Analytical data available for laboratory-derived leachate from the bottom ash placed in the Landfill indicates that the bottom ash is not capable of leaching boron in concentrations observed in the downgradient monitoring wells.

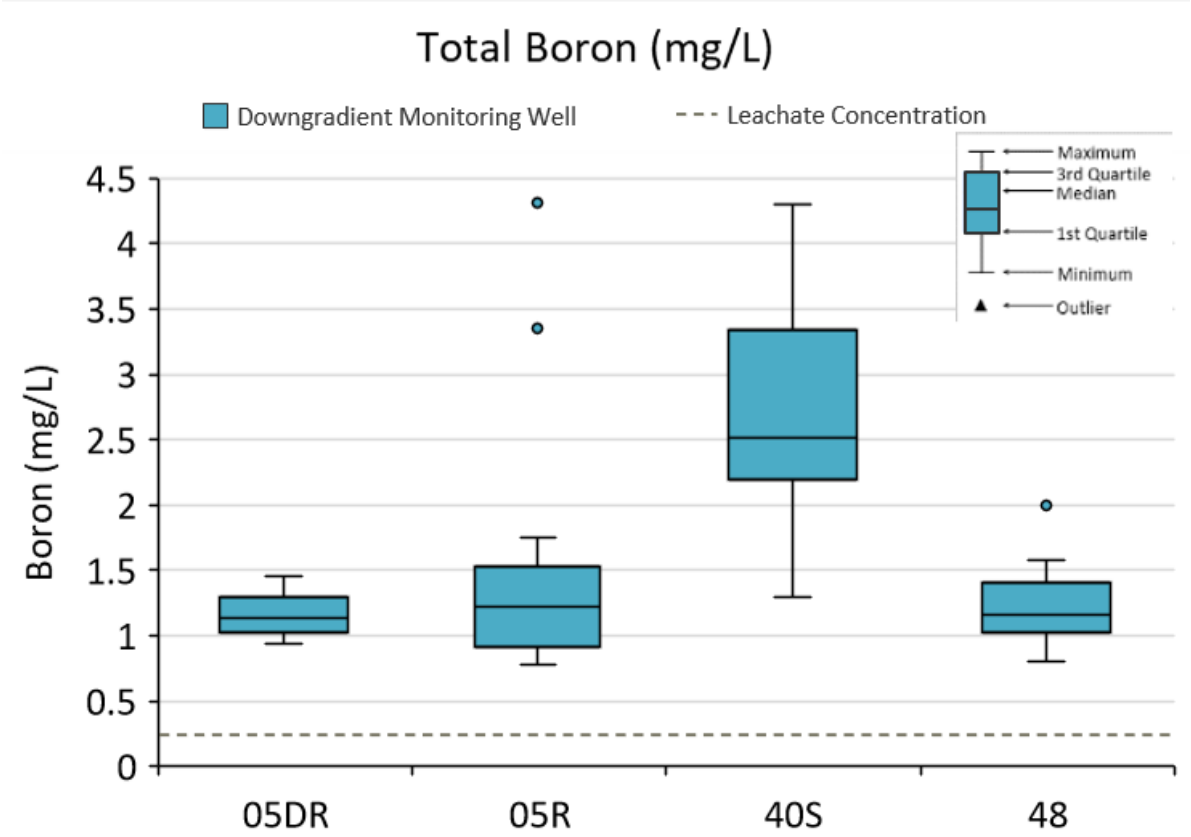

Figure A. Box-Whisker Plot Showing Distribution of Boron.

3.3 LOE #3: Former vertical Infiltration of Surface Water through Ash Fill in AP2

The Landfill was constructed over the eastern portion of AP2 as Phase I of an IEPA-approved Closure Plan for AP2. The portions of AP2 to the west of the Landfill were previously exposed, and subject to infiltration of precipitation and generation of CCR leachate. The pond is unlined, potentially allowing CCR constituents to percolate downward to groundwater. Consequently, the previously exposed portions of AP2 outside of the footprint of the Landfill may be an alternate source for CCR parameters observed in groundwater near the Landfill. However, a soil cover designed to minimize surface water infiltration and CCR-impacts to groundwater was constructed over these exposed portions of AP2 in 2020 as part of an amended closure plan for AP2 approved by IEPA on February 26, 2020.

Comparison of groundwater and Illinois River elevation data indicate that natural variation in river elevation related to flood events occasionally causes groundwater flow reversal and increases in groundwater elevations in the Uppermost Aquifer beneath the Landfill. When river elevations rise above 451 to 454 feet, low-lying ash deposits underlying the Landfill have the potential to become partially saturated for a transient period. The short-term, partial saturation may result in a temporary change to some CCR constituent concentrations at some compliance locations after the predominant groundwater flow direction is reestablished. Explicit simulation of flood events (Closure Plan Addendum 3 [Ramboll, 2020]) indicates that potential increases in

concentrations from flooding of the Illinois River are small and transient, such that long-term concentrations will not be significantly affected.

3.4 LOE #4: Upgradient Concentrations of Fluoride

Select groundwater contour maps in Appendix A show a major component of groundwater flow from the east and southeast. A box-whisker plot of dissolved fluoride concentrations detected between 2015 and 2021 at monitoring wells near the Landfill is shown in Figure B below. Included on this figure are dissolved fluoride concentrations detected at other wells located upgradient of the Landfill (12, 13, 16, and 17) and along the Illinois River (18S, 18D). Dissolved fluoride is plotted rather than total fluoride due to the greater availability of data; dissolved fluoride data is not available for monitoring well 48. Dissolved fluoride concentrations at the monitoring wells shown in Figure B are similar to total fluoride concentrations detected at these wells.

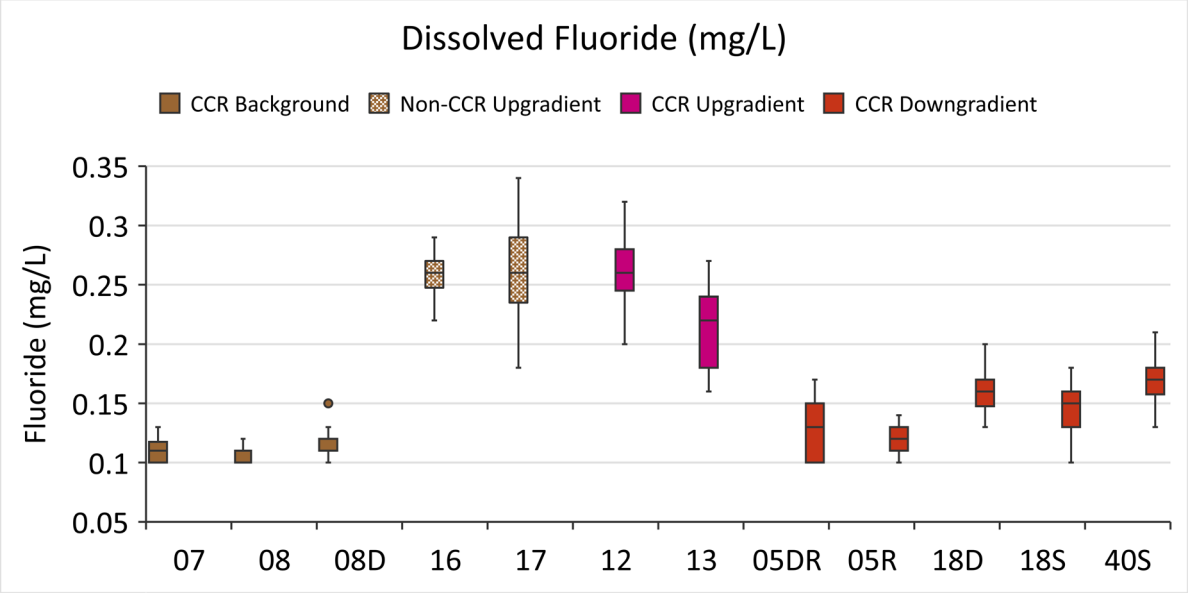

Figure B. Distribution of Detected Dissolved Fluoride Concentrations at EAPS Wells.

The box-whisker plot shows two groupings of dissolved fluoride concentrations as follows:

- Low Concentrations: The low concentrations are at background wells 07, 08, and 08D and downgradient compliance wells 05R, 05DR, 18S, 18D, and 40S.
- High Concentrations: The high concentrations of fluoride occur at wells 12 and 13, located upgradient of the Landfill, and at non-CCR wells 16 and 17 located upgradient of the East Ash Pond near the property boundary.

The fact that concentrations of fluoride are higher in monitoring wells upgradient of the Landfill than those in downgradient wells demonstrates that the Landfill is not the source of fluoride.

3.5 LOE #5: Upgradient pH Values

Groundwater contour maps in Appendix A show a major component of groundwater flow from the east and southeast. A box-whisker plot of pH values observed between 2015 and 2021 at monitoring wells near the Landfill is shown below (Figure C). Also included on this figure are pH

values observed at other wells located upgradient of the Landfill (12, 13, 16, and 17) and wells located along the Illinois River (18S, 18D).

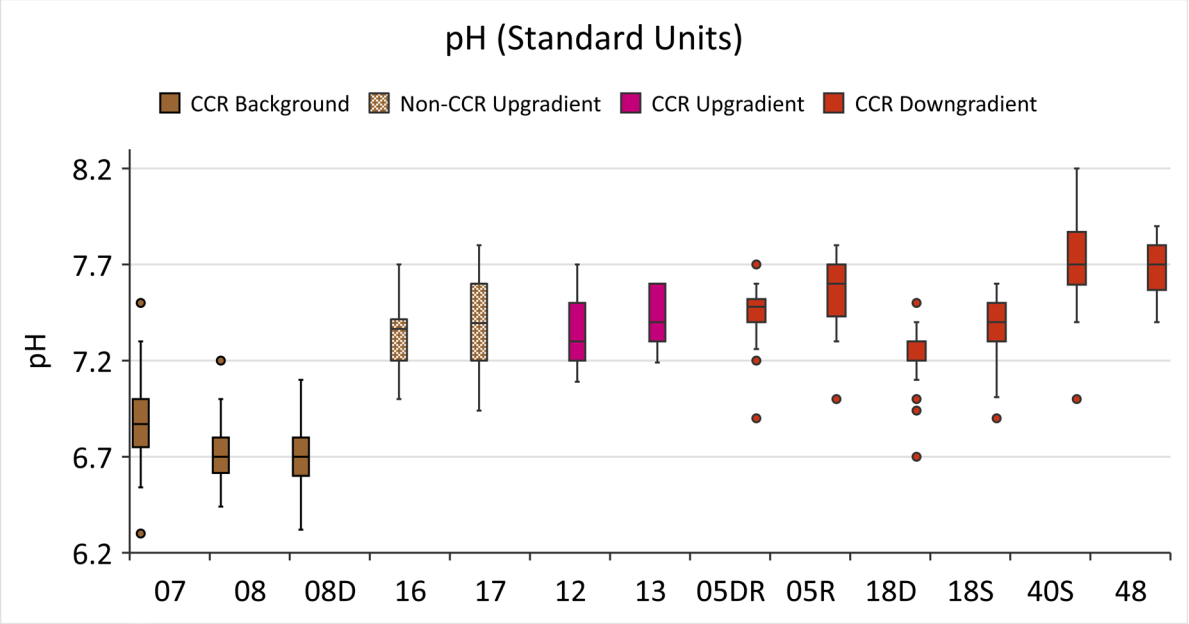

Figure C. Distribution of pH Values at EAPS Wells.

The box-whisker plot shows two groupings of pH values as follows:

- Lower pH: The lower pH values relative to all monitoring wells compared are at background monitoring wells 07, 08, and 08D.
- Higher pH: The groundwater monitoring wells with higher pH values relative to all monitoring wells compared include CCR downgradient wells located along the river (18S, 18D) and in the vicinity of the Landfill (05R, 05DR, 40S, and 48), as well as non-CCR wells located upgradient of the Landfill (12, 13) and upgradient of the East Ash Pond near the property boundary (16, 17).

The fact that the pH values upgradient of the Landfill (12, 13, 16, and 17) are elevated above background pH values (07, 08, 08D), and similar to pH values downgradient of the Landfill (05R, 05DR, 18S, 18D, 40S, and 48), demonstrates that the Landfill is not the source of the observed pH SSIs. If the Landfill were affecting pH values, those downgradient would be different from those upgradient.

4. CONCLUSIONS

Based on these five LOEs, it has been demonstrated that the Landfill is not the source of the boron, fluoride, and pH SSIs identified in wells 05R, 05DR, 40S, and 48.

1. Landfill liner design.
2. Concentrations of boron in landfill leachate are lower than those observed in downgradient groundwater.
3. Former vertical infiltration of surface water through ash fill in AP2.
4. Upgradient concentrations of fluoride.
5. Upgradient pH values.

Based on the LOEs presented, the following alternate sources are causing the SSIs observed in the Landfill's compliance wells:

- Boron: SSIs for boron may be caused by movement of CCR constituents from previously exposed ash deposits in AP2 outside the Landfill boundary.
- Fluoride: It is likely that areas upgradient of the Landfill present alternate sources of fluoride based on the fact that concentrations of fluoride are higher upgradient of the Landfill than downgradient.
- pH: It is likely that areas upgradient of the Landfill present alternate sources of elevated pH based on the fact that pH values upgradient of the Landfill are above background pH values and similar to those observed downgradient of the Landfill.

This information serves as the written ASD report prepared in accordance with 40 C.F.R. § 257.94(e)(2) that SSIs observed during the D8 monitoring event were not caused by the Landfill but were from other sources. Therefore, an assessment monitoring program is not required, and the Landfill will remain in detection monitoring.

5. REFERENCES

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FIGURES

COMPLIANCE WELL
BACKGROUND WELL
MONITORING WELL
PART 257 REGULATED UNIT (SUBJECT UNIT)
SITE FEATURE
LIMITS OF FINAL COVER
PROPERTY BOUNDARY

0 175 350
Feet

MONITORING WELL LOCATION MAP

ALTERNATE SOURCE DEMONSTRATION
COAL COMBUSTION WASTE LANDFILL
HENNEPIN POWER PLANT
HENNEPIN, ILLINOIS

FIGURE 1

RAMBOLL AMERICAS
ENGINEERING SOLUTIONS, INC.

RAMBOLL

Y:\Mapping\Projects\222285MXD\Alt_Source_Dem\HenEast\Figure 1_Monitoring Well Location Map.mxd
PROJECT: 169000XXXX | DATED: 10/4/2021 | DESIGNER: STOLZSD

BACKGROUND WELL

MONITORING WELL

SOURCE SAMPLE LOCATION

STAFF GAGE

GROUNDWATER ELEVATION CONTOUR (0.5 FT CONTOUR INTERVAL, NAVD88)

INFERRED GROUNDWATER ELEVATION CONTOUR

GROUNDWATER FLOW ARROW

PART 257 REGULATED UNIT (SUBJECT UNIT)

SITE FEATURE

LIMITS OF FINAL COVER

PROPERTY BOUNDARY

NOTE:
*GROUNDWATER ELEVATIONS SHOWN IN FEET, NAVD88. ELEVATIONS IN PARENTHESIS WERE NOT USED FOR CONTOURING.
**GAUGING DATA FROM USGS 05558300 ILLINOIS RIVER AT HENRY, IL LOCATED APPROXIMATELY 15 MILES DOWNSTREAM OF HENNEPIN POWER STATION. SURFACE WATER ELEVATIONS IN FEET NAVD88. ILLINOIS RIVER ELEVATION IS AN AVERAGE VALUE FOR MARCH 18, 2021.

0 175 350
Feet

GROUNDWATER ELEVATION CONTOUR MAP MARCH 17, 2021

ALTERNATE SOURCE DEMONSTRATION
COAL COMBUSTION WASTE LANDFILL
HENNEPIN POWER PLANT
HENNEPIN, ILLINOIS

FIGURE 2

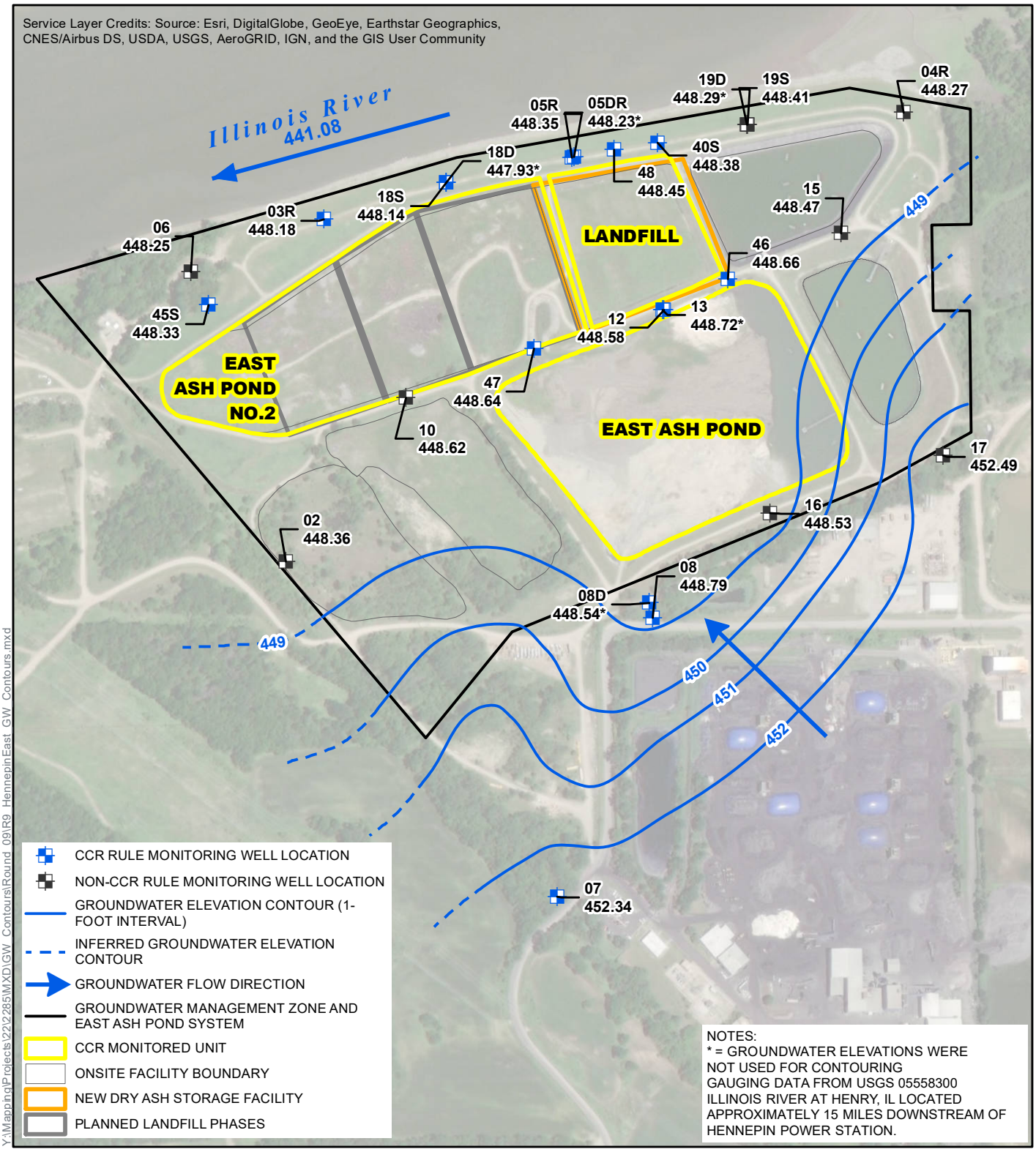
RAMBOLL AMERICAS
ENGINEERING SOLUTIONS, INC.

RAMBOLL

Y:\Mapping\Projects\2202285MXD\Alt_Source_Dem\HenEast\Figure 2_GWE Contours 20210317.mxd

PROJECT: 169000XXXX | DATED: 10/6/2021 | DESIGNER: STOLZSD

APPENDIX A
GROUNDWATER CONTOUR MAPS



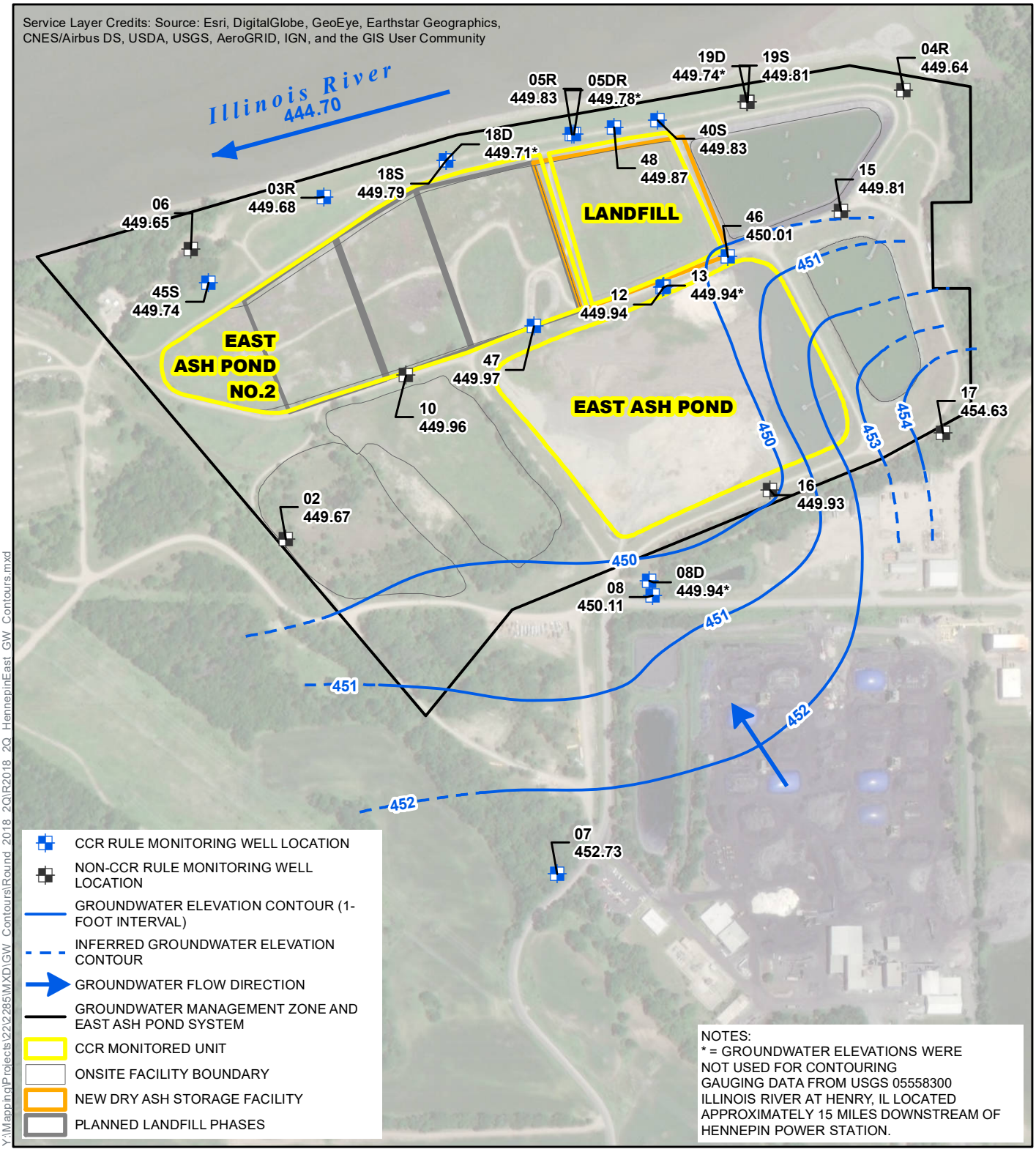
HENNEPIN LANDFILL (UNIT ID: 801), HENNEPIN ASH POND NO. 2 (UNIT ID: 802), AND HENNEPIN EAST ASH POND (UNIT ID: 803)
GROUNDWATER ELEVATION CONTOUR MAP
NOVEMBER 15, 2017

CCR RULE GROUNDWATER MONITORING
HENNEPIN POWER STATION
HENNEPIN, ILLINOIS

N

0 125 250 500
Feet

O'BRIEN & GERE ENGINEERS, INC.



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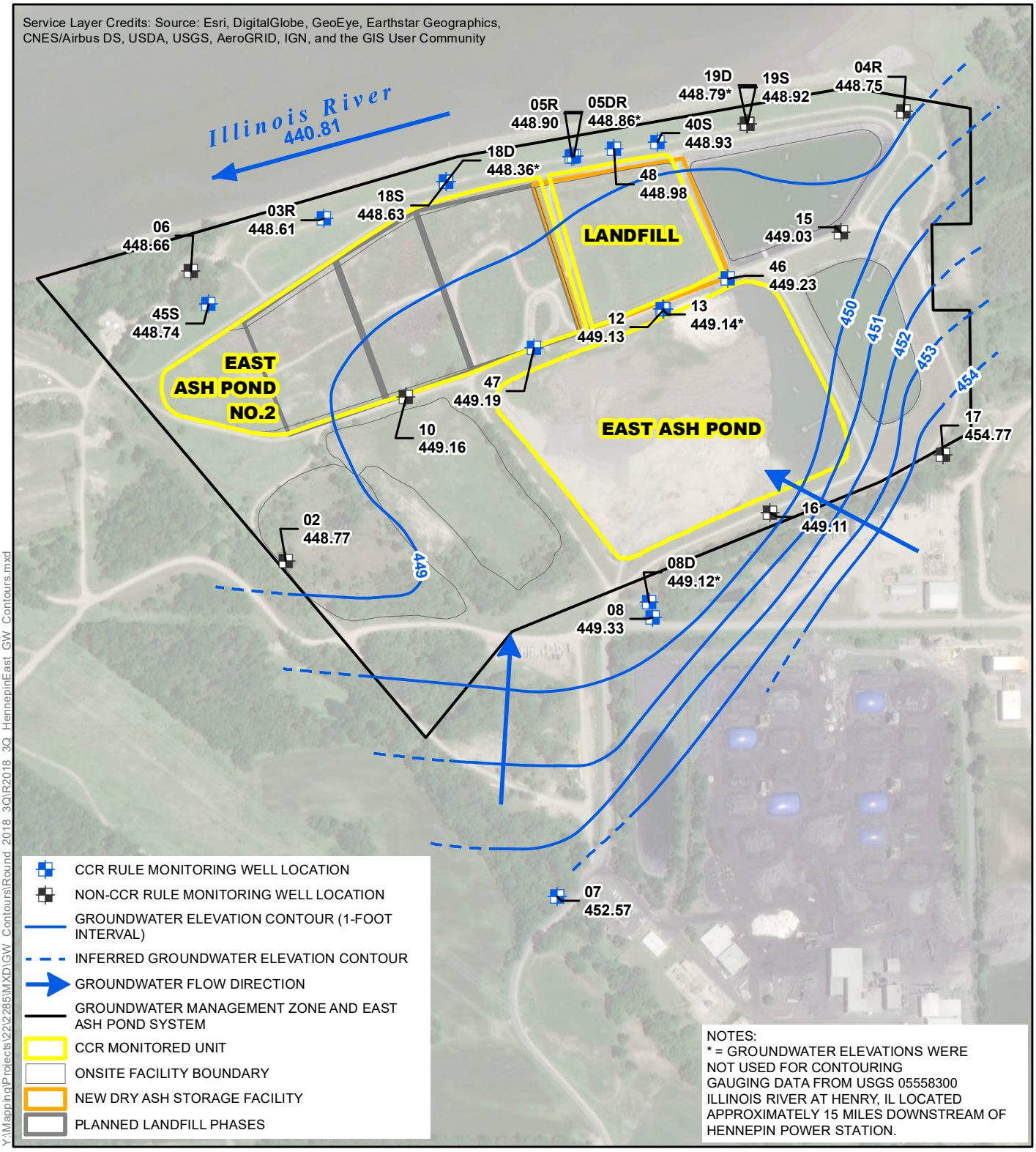
HENNEPIN LANDFILL (UNIT ID: 801), HENNEPIN ASH POND NO. 2 (UNIT ID: 802), AND HENNEPIN EAST ASH POND (UNIT ID: 803) GROUNDWATER ELEVATION CONTOUR MAP JUNE 13, 2018

CCR RULE GROUNDWATER MONITORING
HENNEPIN POWER STATION
HENNEPIN, ILLINOIS

N

0 125 250 500
Feet

O'BRIEN & GERE ENGINEERS, INC.



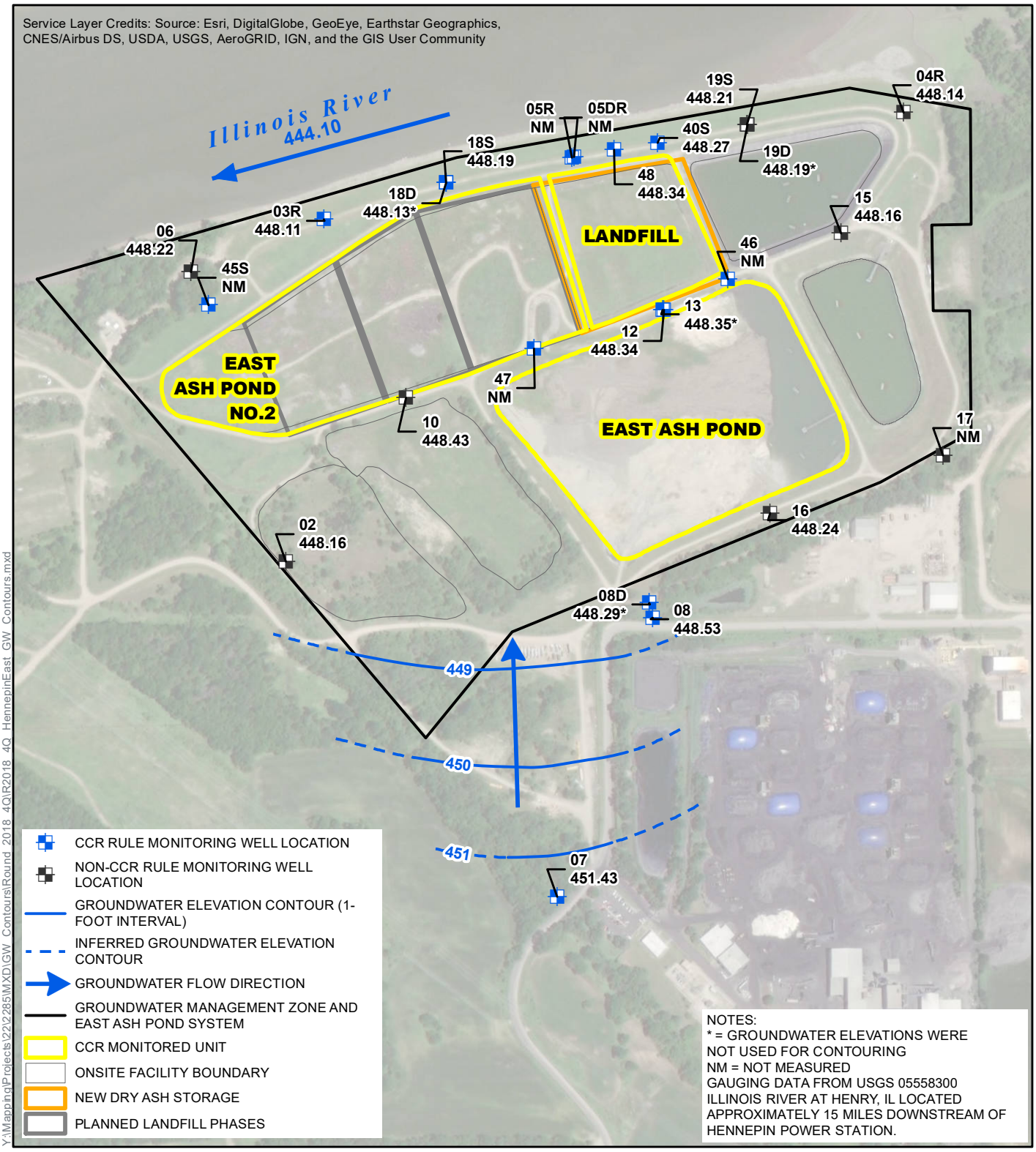
HENNEPIN LANDFILL (UNIT ID: 801), HENNEPIN ASH POND NO. 2 (UNIT ID: 802), AND HENNEPIN EAST ASH POND (UNIT ID: 803)
GROUNDWATER ELEVATION CONTOUR MAP
SEPTEMBER 12, 2018

CCR RULE GROUNDWATER MONITORING
HENNEPIN POWER STATION
HENNEPIN, ILLINOIS

0 125 250 500
Feet

N

O'BRIEN & GERE ENGINEERS, INC.



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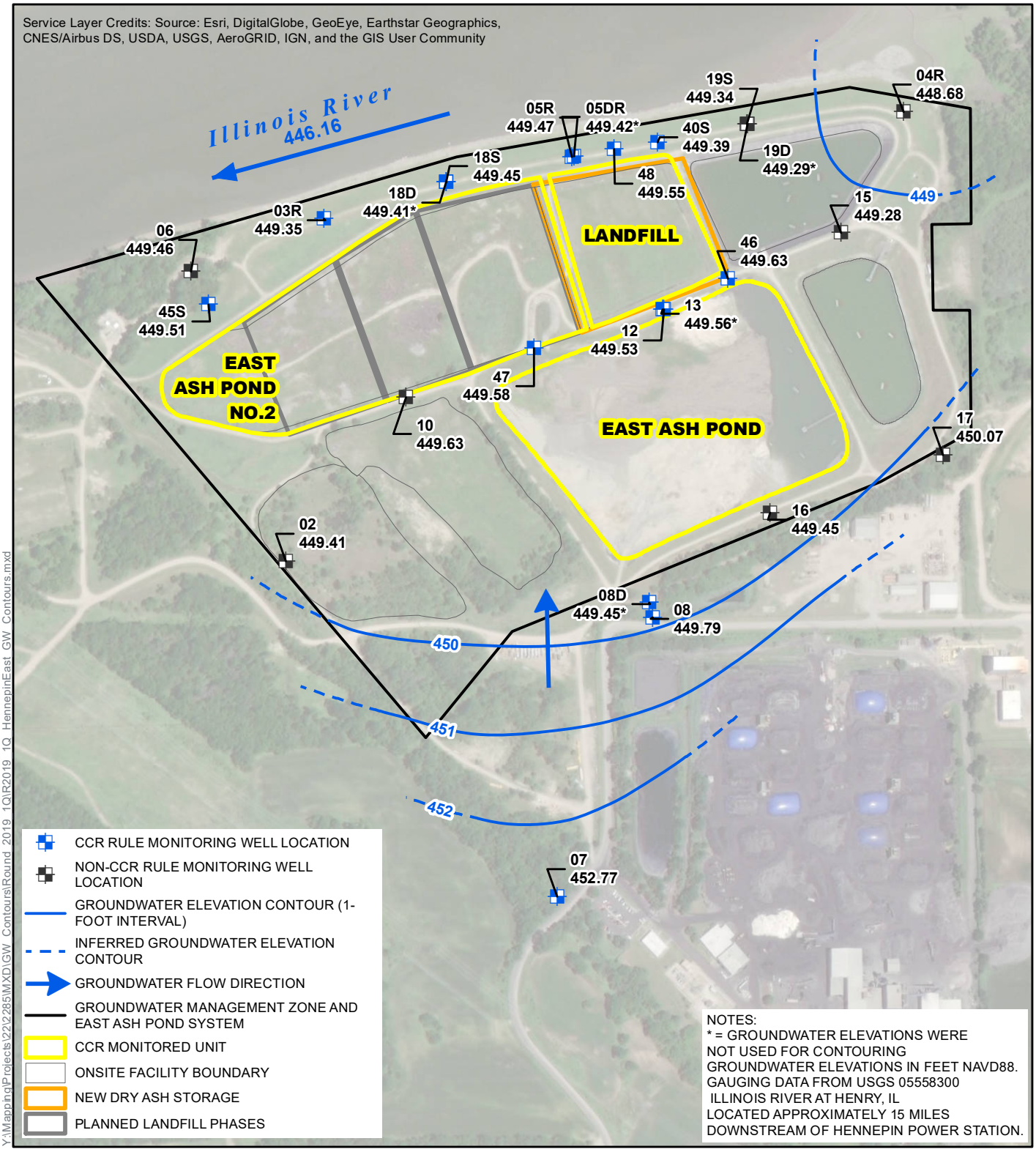
HENNEPIN LANDFILL (UNIT ID: 801), HENNEPIN ASH POND NO. 2 (UNIT ID: 802), AND HENNEPIN EAST ASH POND (UNIT ID: 803) GROUNDWATER ELEVATION CONTOUR MAP DECEMBER 12, 2018

CCR RULE GROUNDWATER MONITORING
HENNEPIN POWER STATION
HENNEPIN, ILLINOIS

0 125 250 500
Feet

N

O'BRIEN & GERE ENGINEERS, INC.



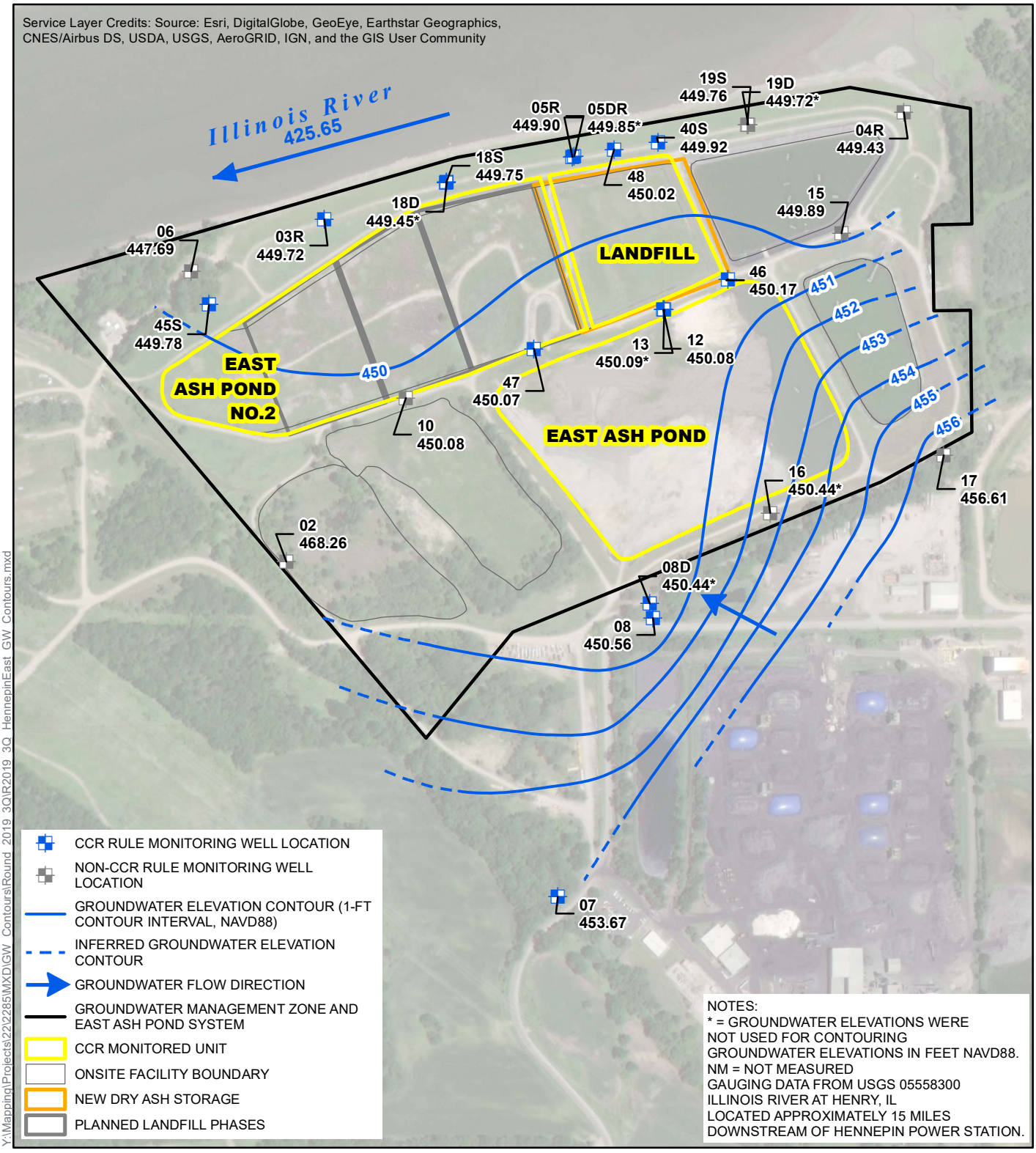
HENNEPIN LANDFILL (UNIT ID: 801), HENNEPIN ASH POND NO. 2 (UNIT ID: 802), AND HENNEPIN EAST ASH POND (UNIT ID: 803)
GROUNDWATER ELEVATION CONTOUR MAP
MARCH 13, 2019

CCR RULE GROUNDWATER MONITORING
HENNEPIN POWER STATION
HENNEPIN, ILLINOIS

0 125 250 500
Feet

N

O'BRIEN & GERE ENGINEERS, INC.



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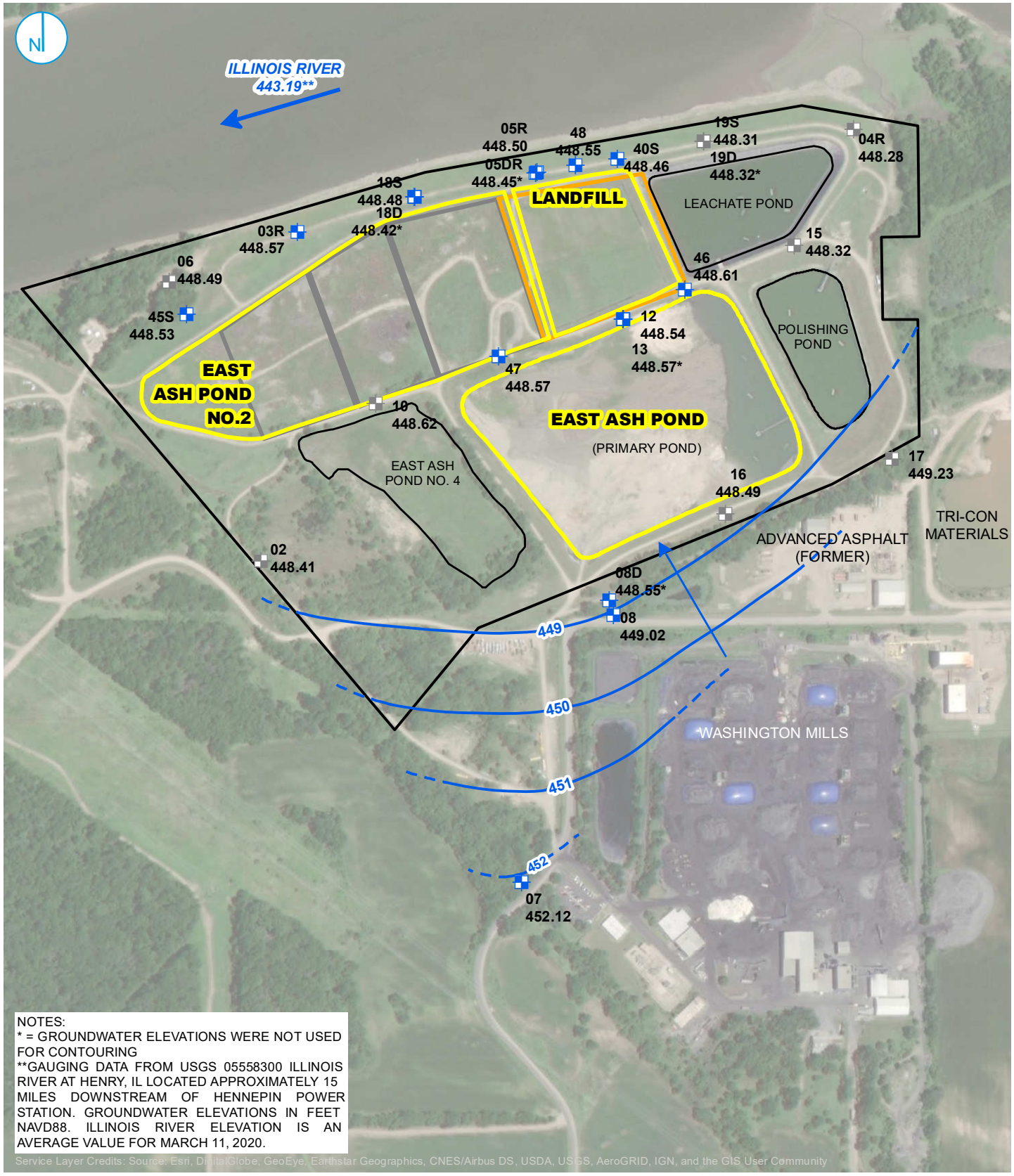
HENNEPIN LANDFILL (UNIT ID: 801), HENNEPIN ASH POND NO. 2 (UNIT ID: 802), AND HENNEPIN EAST ASH POND (UNIT ID: 803)
GROUNDWATER ELEVATION CONTOUR MAP
SEPTEMBER 17, 2019

CCR RULE GROUNDWATER MONITORING
HENNEPIN POWER STATION
HENNEPIN, ILLINOIS

N

0 125 250 500
Feet

O'BRIEN & GERE ENGINEERS, INC.



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PROJECT: 169000XXXX | DATED: 7/30/2020 | DESIGNER: galarnmc

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

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

APPENDIX B
BOTTOM ASH LEACHATE DATA

TEKLAB, INC.

5445 HORSESHOE LAKE ROAD
COLLINSVILLE, ILLINOIS 62234

ENVIRONMENTAL TESTING LABORATORY

TEL: 618-344-1004
FAX: 618-344-1005

August 03, 2009

John Augspols
Dynegy Midwest Generation
13498 East 800th Street
Hennepin, IL 61327
TEL: (815) 339-9218
FAX:

NELAP Accredited #100226

RE: Hennepin Station Bottom Ash **WorkOrder:** 09070896

Dear John Augspols:

TEKLAB, INC received 1 sample on 7/24/2009 9:00:00 AM for the analysis presented in the following report.

Samples are analyzed on an as received basis unless otherwise requested and documented. The sample results contained in this report relate only to the requested analytes of interest as directed on the chain of custody. IL ELAP and NELAP accredited fields of testing are indicated by the letters NELAP under the Certification column.

All quality control criteria applicable to the test methods employed for this project have been satisfactorily met and are in accordance with NELAP except where noted. The following report shall not be reproduced, except in full, without the written approval of Teklab, Inc.

If you have any questions regarding these tests results, please feel free to call.

Sincerely,

Heather A. White

Heather A. White
Project Manager
(618)344-1004 ex 20

TEKLAB, INC.

5445 HORSESHOE LAKE ROAD
COLLINSVILLE, ILLINOIS 62234

ENVIRONMENTAL TESTING LABORATORY

TEL: 618-344-1004
FAX: 618-344-1005

Client: Dynegy Midwest Generation
Project: Hennepin Station Bottom Ash
LabOrder: 09070896
Report Date: 03-Aug-09

CASE NARRATIVE

Cooler Receipt Temp: 22.8 °C

State accreditations:

KS: NELAP #E-10347 | KY: UST #0073 | MO: DNR #00930 | AR: ADEQ #70-028-0

Qualifiers

DF - Dilution Factor	**B** - Analyte detected in the associated Method Blank	**C** - Client requested RL below PQL
RL - Reporting Limit	**J** - Analyte detected below reporting limits	**D** - Diluted out of sample
ND - Not Detected at the Reporting Limit	**R** - RPD outside accepted recovery limits	**E** - Value above quantitation range
Surr - Surrogate Standard added by lab	**S** - Spike Recovery outside accepted recovery limits	**H** - Holding time exceeded
TNTC - Too numerous to count (> 200 CFU)	X - Value exceeds Maximum Contaminant Level	**MI** - Matrix interference
Q - QC criteria failed or noncompliant CCV	# - Unknown hydrocarbon	**DNI** - Did not ignite
NELAP - IL ELAP and NELAP Accredited Field of Testing	**IDPH** - IL Dept. of Public Health	

TEKLAB, INC.

5445 HORSESHOE LAKE ROAD
COLLINSVILLE, ILLINOIS 62234

ENVIRONMENTAL TESTING LABORATORY

TEL: 618-344-1004
FAX: 618-344-1005

LABORATORY RESULTS

Client: Dynegy Midwest Generation
WorkOrder: 09070896
Lab ID: 09070896-001
Report Date: 03-Aug-09

Client Project: Hennepin Station Bottom Ash
Client Sample ID: Hennipin Station Bottom Ash
Collection Date: 7/22/2009 11:00:00 AM
Matrix: SOLID

Analyses	Certification	RL	Qual	Result	Units	DF	Date Analyzed	Analyst
ASTM D3987, SW-846 3005A, 6010B, METALS IN SHAKE EXTRACT BY ICP								
Arsenic		0.0250		**< 0.0250**	mg/L	1	7/29/2009 3:49:50 PM	LAL
Barium		0.0050		**0.116**	mg/L	1	7/29/2009 11:19:44 AM	LAL
Beryllium		0.0010		**< 0.0010**	mg/L	1	7/29/2009 11:19:44 AM	LAL
Boron		0.0200		**0.193**	mg/L	1	8/3/2009 10:30:48 AM	LAL
Cadmium		0.0020		**< 0.0020**	mg/L	1	7/29/2009 3:49:50 PM	LAL
Chromium		0.0100		**< 0.0100**	mg/L	1	7/29/2009 11:19:44 AM	LAL
Cobalt		0.0100		**< 0.0100**	mg/L	1	7/29/2009 11:19:44 AM	LAL
Copper		0.0100		**< 0.0100**	mg/L	1	7/29/2009 11:19:44 AM	LAL
Iron		0.0300		**0.0687**	mg/L	1	7/29/2009 3:49:50 PM	LAL
Manganese		0.0050		**< 0.0050**	mg/L	1	7/29/2009 3:49:50 PM	LAL
Nickel		0.0100		**< 0.0100**	mg/L	1	7/29/2009 3:49:50 PM	LAL
Selenium		0.0500		**< 0.0500**	mg/L	1	7/29/2009 3:49:50 PM	LAL
Silver		0.0100		**< 0.0100**	mg/L	1	7/29/2009 11:19:44 AM	LAL
Zinc		0.0100		**< 0.0100**	mg/L	1	7/29/2009 11:19:44 AM	LAL
ASTM D3987, SW-846 3020A, METALS IN SHAKE EXTRACT BY GFAA								
Antimony, SHAKE by GFAA	7041	0.0050		**< 0.0050**	mg/L	1	7/29/2009 2:45:16 PM	MEK
Lead, SHAKE by GFAA	7421	0.0020	J	**0.0011**	mg/L	1	7/29/2009 10:18:30 AM	MEK
Thallium, SHAKE by GFAA	7841	0.0020		**< 0.0020**	mg/L	1	7/29/2009 2:41:30 PM	MEK
ASTM D3987, SW-846 7470A IN SHAKE EXTRACT								
Mercury, SHAKE		0.00020		**< 0.00020**	mg/L	1	7/28/2009	ALU

Sample Narrative

TEKLAB, INC.

5445 HORSESHOE LAKE ROAD
COLLINSVILLE, ILLINOIS 62234

ENVIRONMENTAL TESTING LABORATORY

TEL: 618-344-1004
FAX: 618-344-1005

RECEIVING CHECK LIST

Client: Dynegy Midwest Generation
Project: Hennepin Station Bottom Ash
Lab Order: 09070896
Report Date: 03-Aug-09

Carrier: UPS

Received By: DB

Completed by: Marvin L. Darling II
On: 24-Jul-09
Marvin L. Darling

Reviewed by: Heather A. White
On: 24-Jul-09
Heather A. White

Pages to follow: Chain of custody 1 Extra pages included 2

Shipping container/cooler in good condition?	Yes ☑	No ☐	Not Present ☐	Temp °C 22.8			
Type of thermal preservation?	None ☑	Ice ☐	Blue Ice ☐	Dry Ice ☐			
Chain of custody present?	Yes ☐	No ☑					
Chain of custody signed when relinquished and received?	Yes ☐	No ☑					
Chain of custody agrees with sample labels?	Yes ☑	No ☐					
Samples in proper container/bottle?	Yes ☑	No ☐					
Sample containers intact?	Yes ☑	No ☐					
Sufficient sample volume for indicated test?	Yes ☑	No ☐					
All samples received within holding time?	Yes ☑	No ☐					
Reported field parameters measured:	Field ☐	Lab ☐	NA ☑				
Container/Temp Blank temperature in compliance?	Yes ☑	No ☐					

When thermal preservation is required, samples are compliant with a temperature between 0.1°C - 6.0°C, or when samples are received on ice the same day as collected.

Water - VOA vials have zero headspace?	Yes ☐	No ☐	No VOA vials submitted ☑
Water - pH acceptable upon receipt?	Yes ☑	No ☐	

Any No responses must be detailed below or on the COC.

Sample id and collection date/time obtained from sample container. Per John Augspols, sample ID and collection/date time on the container are correct. Analyze for the same list of parameters as in 2008. EAH 7/27/09

09070896

TEKLAB, INC
5445 Horseshoe Lake Road
Collinsville, IL 62234-7425
TEL: (618) 344-1004
FAX: (618) 344-1005

CHAIN-OF-CUSTODY RECORD

WorkOrder: 09070896

Client:
Dynegy Midwest Generation
13498 East 800th Street
Hennepin, IL 61327

TEL: (815) 339-9218
FAX:
Project: Hennepin Station Bottom As

24-Jul-09

					Requested Tests						
Sample ID	**ClientSampID**	**Matrix**	**Date Collected**	**Bottle**	**D3987/6010B**	**D3987/7000 G**	**D3987/SW7470A**				
09070896-001	Hennipin Station Bottom	Solid	7/22/2009 11:00:00 AM		A	A	A				

Comments:

22.8°C ICE

	Date/Time		**Date/Time**
Relinquished by:		**Received by:** Rec Bottle (UPS)	7/24/09 900
Relinquished by:		**Received by:**	
Relinquished by:		**Received by:**	

NOTE: Samples are discarded 60 days after results are reported unless other arrangements are made. Hazardous samples will be returned to client or disposed of at client expense.

Bottle Type: L-Liter V-Voa S-Soil Jar O-Orbo T-Tedlar B-Brass P-Plastic OT-Other

Teklab: 7/22/09

Please find enclosed a bottom ash sample to be run for the same parameters as last year. I enclosed those results with the sample. I would like to pay for this with a credit card. If you have any questions please contact me :

John Augspols

Supv. Environmental and Chemistry

(815) 339-9218

Fax (815) 339 -2772

TEKLAB, INC.

5445 HORSESHOE LAKE ROAD
COLLINSVILLE, ILLINOIS 62234

ENVIRONMENTAL TESTING LABORATORY

TEL: 618-344-1004
FAX: 618-344-1005

LABORATORY RESULTS

Client: Dynegy Midwest Generation
WorkOrder: 08060909
Lab ID: 08060909-001
Report Date: 02-Jul-08

Client Project: Hennepin Station Bottom Ash
Client Sample ID: Hennipin Station Botton Ash
Collection Date: 6/24/2008 9:00:00 AM
Matrix: SOLID

Analyses	Certification	RL	Qual	Result	Units	DF	Date Analyzed	Analyst
ASTM D3987, SW-846 3005A, 6010B, METALS IN SHAKE EXTRACT BY ICP								
Arsenic		0.0250		< 0.0250	mg/L	1	6/30/2008 12:29:55 PM	LAL
Barium		0.0050		0.0699	mg/L	1	6/30/2008 12:29:55 PM	LAL
Beryllium		0.0010		< 0.0010	mg/L	1	6/30/2008 12:29:55 PM	LAL
Boron		0.0200		0.197	mg/L	1	6/30/2008 12:29:55 PM	LAL
Cadmium		0.0020		< 0.0020	mg/L	1	6/30/2008 12:29:55 PM	LAL
Chromium		0.0100		< 0.0100	mg/L	1	6/30/2008 12:29:55 PM	LAL
Cobalt		0.0100		< 0.0100	mg/L	1	6/30/2008 12:29:55 PM	LAL
Copper		0.0100		< 0.0100	mg/L	1	6/30/2008 12:29:55 PM	LAL
Iron		0.0200		0.110	mg/L	1	6/30/2008 12:29:55 PM	LAL
Manganese		0.0050		< 0.0050	mg/L	1	6/30/2008 12:29:55 PM	LAL
Nickel		0.0100		< 0.0100	mg/L	1	6/30/2008 12:29:55 PM	LAL
Selenium		0.0500		< 0.0500	mg/L	1	6/30/2008 12:29:55 PM	LAL
Silver		0.0100		< 0.0100	mg/L	1	6/30/2008 12:29:55 PM	LAL
Zinc		0.0100	J	0.0025	mg/L	1	6/30/2008 12:29:55 PM	LAL
ASTM D3987, SW-846 3020A, METALS IN SHAKE EXTRACT BY GFAA								
Antimony, SHAKE by GFAA	7041	0.0050	J	0.0024	mg/L	1	6/30/2008 11:51:48 AM	JMW
Lead, SHAKE by GFAA	7421	0.0020		< 0.0020	mg/L	1	6/30/2008 9:45:10 AM	JMW
Thallium, SHAKE by GFAA	7841	0.0020	S	< 0.0020	mg/L	1	6/30/2008 11:17:06 AM	JMW
ASTM D3987, SW-846 7470A IN SHAKE EXTRACT								
Mercury, SHAKE		0.00020	J	0.00006	mg/L	1	6/30/2008	SRH

Sample Narrative
ASTM D3987, SW-846 3020A, Metals in Shake Extract by GFAA
TI - Matrix interference present in sample.

22-8 notice
DB 7/24/09

900 ~~Fe~~ UPS
DB 7/24/09