

Whitewater Valley Station Surface Impoundment Coal Combustion Residuals Location Restrictions Assessment

Richmond Power and Light
Whitewater Valley Station
Wayne County, Indiana

GAI Project Number: C151119.07

April 2020



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Certification/Statement of Professional Opinion

The Location Restrictions Assessment (Assessment) for the Surface Impoundment (Impoundment) for Richmond Power and Light's Whitewater Valley Station (Station) was prepared by GAI Consultants, Inc. (GAI). The Assessment was based on certain information that, other than for information GAI originally prepared, GAI has relied on but not independently verified. This Certification/Statement of Professional Opinion is, therefore, limited to the information available to GAI at the time the Assessment was written. On the basis of and subject to the foregoing, it is my professional opinion as a Professional Engineer licensed in the State of Indiana that the Assessment has been prepared in accordance with good and accepted engineering practices as exercised by other engineers practicing in the same discipline(s), under similar circumstances, at the same time, and in the same locale. It is my professional opinion that the Assessment was prepared consistent with the requirements of §§257.60-64 of the United States Environmental Protection Agency's "Standards for the Disposal of Coal Combustion Residuals in Landfills and Surface Impoundments," published in the Federal Register on April 17, 2015 with an effective date of October 19, 2015 (40 CFR 257 Subpart D), and meeting the provisions of the "Extension of Compliance Deadlines for Certain Inactive Surface Impoundments: Response to Partial Vacatur," effective October 4, 2016.

The use of the words "certification" and/or "certify" in this document shall be interpreted and construed as a Statement of Professional Opinion and is not and shall not be interpreted or construed as a guarantee, warranty or legal opinion.

GAI Consultants, Inc.



John R. Klamut, P.E.
Senior Project Manager

Date

4/15/2020



1.0 Introduction

The Whitewater Valley Station (Station) is a coal-fired electric generating station located in the city of Richmond, Wayne County, Indiana, and is owned by Richmond Power & Light (RP&L). The Station consists of two generating units, which can produce a combined 100 megawatts of electricity.

Coal Combustion Residuals (CCR) generated at the Station were historically sluiced to the Surface Impoundment (Impoundment), which was built in the 1950s. From discussion with Station personnel, sluicing of fly ash and bottom ash to the Impoundment was reduced significantly during the mid-1970s, with rare instances when the Impoundment received sluiced fly ash as a backup option until October 19, 2015. From the mid-1970s to October 19, 2015, the Surface Impoundment also received Bottom Ash Hydrobin overflow and drain water on days the Station operated, as reported by Station personnel. Starting in 2012, the Station began operating as a peaking station and typically operates on the order of 20 to 30 days per year. The size of the Impoundment is approximately 14 acres. The state identification number for the Impoundment is 89-UP-04.

The Impoundment is currently inactive and only receives localized site stormwater runoff. A polishing pond known as Pond P1-P3 is situated just north of the Impoundment. The Impoundment currently discharges to Pond P1-P3 via a series of gravel drains, and some CCR material has been observed in Pond P1-P3. Water can eventually drain from Pond P1-P3 through Pond P4 to the Richmond Sanitary District sewer line on the north side of the property, as part of a Non-Categorical Industrial Wastewater Discharge Permit.

The Impoundment is regulated as an existing CCR surface impoundment under the Environmental Protection Agency's "Standards for the Disposal of Coal Combustion Residuals in Landfills and Surface Impoundments" [40 CFR 257 Subpart D] published in the Federal Register on April 17, 2015, with an effective date of October 19, 2015, (CCR Rule), and meeting the provisions of the "Extension of Compliance Deadlines for Certain Inactive Surface Impoundments: Response to Partial Vacatur," effective October 4, 2016.

2.0 Purpose

This Location Restrictions Assessment is prepared pursuant to §§257.60-64 of the CCR Rule [40 CFR §§ 257.60-64]. In accordance with §§257.60-64 and §257.100(e)(2)(i), an existing CCR surface impoundment owner or operator must demonstrate compliance by April 16, 2020 with location restriction requirements for the following features:

- ▶ Placement above the uppermost aquifer (§257.60);
- ▶ Wetlands (§257.61);
- ▶ Fault areas (§257.62);
- ▶ Seismic impacts zones (§257.63); and
- ▶ Unstable areas (§257.64).

Each of the features' restrictions will be addressed within this Assessment.

3.0 Placement Above the Uppermost Aquifer

According to §257.60 of the CCR Rule [40 CFR §257.60] an existing CCR surface impoundment must be constructed with a base that is located no less than five feet above the upper limit of the uppermost aquifer, or must demonstrate that there will not be "an intermittent, recurring, or sustained hydraulic connection between any portion of the base of the CCR unit and the uppermost aquifer due to normal fluctuations in ground water elevations".

The 2016 report *Coal Combustion Residuals Unit Liner Documentation* (GAI Consultants, 2018d) states that the Impoundment was not constructed with a liner meeting the requirements of CCR Rule §257.71(a)(1).

Piezometers have been established in and around the Impoundment to obtain ground water elevation data. A potentiometric surface map (GAI Consultants, 2019) shows that ground water elevations through the Impoundment range from approximately 975 feet in the southeast corner to 960 feet in the northwest corner. Cross sections based on site borings (GAI Consultants, 2018b) and previously obtained ground water elevations (GAI Consultants, 2016) show that CCR material extends down to elevation 960 in the Impoundment. Representative drawings documenting this data are provided in Appendix A.

Since the Impoundment was not constructed with a liner, and CCR material extends into the observed ground water levels, it is GAI's opinion that the Impoundment does not meet the location restriction requirements for placement above the uppermost aquifer as presented in §257.60 of the CCR Rule.

4.0 Wetlands

Location restrictions for wetlands are contained in §257.61 of the CCR Rule [40 CFR §257.61]. According to §257.61, existing CCR surface impoundments must not be located in wetlands.

The online United States Fish and Wildlife Service's (USFWS) National Wetlands Inventory (NWI) Wetlands Mapper (USFWS, 2020) indicates that there are three areas of standing water within the Impoundment and Pond P4 (as of the date of the assessment). These areas are mapped as freshwater ponds and all fall within areas that, historically, have been subject to normal operations at the Station. The NWI map for the Impoundment is included in Appendix B.

The large area delineated in the northeast corner of the Impoundment corresponds to the area where sluiced fly ash was historically discharged into the Impoundment. This area has significantly dried up since cessation of the sluice activity. The area in the southwest corner of the Impoundment received runoff from the Station coal pile; this runoff is now directed to a settling pond and no longer discharges into the Impoundment.

Pond P4 receives surface runoff from the Impoundment area, and the standing water in Pond P4 represents its normal pool prior to discharging to the Richmond Sanitary District. While this pond receives runoff from the Impoundment, it is not considered part of the Impoundment, and discharge from the pond is regulated under a National Pollutant Discharge Elimination System permit.

No other areas are delineated on the NWI map within the Impoundment limits. The Impoundment's dikes are vegetated and routinely monitored, precluding the development of wetlands on the dike structures. Internal drainage facilities within the Impoundment meet the 1,000-year inflow design flood requirements of the CCR Rule (GAI Consultants, 2018c), which indicates that runoff is controlled up to the design event and stormwater/CCR will not exit the Impoundment, potentially affecting downgradient environmental features.

It is GAI's opinion that the Impoundment meets the CCR Rule location standards for wetlands.

5.0 Fault Areas

According to §257.62 [40 CFR § 257.62], existing CCR surface impoundments "must not be located within 60 meters (200 feet) of the outermost damage zone of a fault that has displacement in Holocene time". Reviews of available mapping (Gray and Steinmetz, 2012) indicate that the Impoundment is located approximately 50 miles from the Fortville Fault, the fault line in Indiana that is closest to the Impoundment (see Appendix C). The Impoundment is also approximately 4.5 miles from

the Ohio border, so any fault lines in Ohio would not be within the 200-foot window referenced by the CCR Rule.

It is GAI's opinion that the Impoundment is not located within 200 feet of the outermost damage zone of a fault that has displacement in Holocene time.

6.0 Seismic Impact Zones

Section 257.63 of the CCR Rule [40 CFR § 257.63] states that existing surface impoundments "must not be located in seismic impact zones unless the owner or operator demonstrates...that all structural components including liners...and surface water control systems, are designed to resist the maximum horizontal acceleration in lithified earth material for the site." Section 257.73(e)(1)(iii) states that the calculated seismic factor of safety must "equal or exceed 1.00."

The CCR Rule requires a seismic factor of safety for slope stability of 1.00 using the peak ground acceleration for a seismic event with a two percent probability of exceedance in 50 years. Stability analyses performed in 2018 are contained in the Impoundment's *Factor of Safety Assessment* (GAI Consultants, 2018a) show that the required factor of safety is met. It is GAI's opinion that the Impoundment is in compliance with the CCR Rule location standards for seismic impact zones.

7.0 Unstable Areas

Location restrictions for unstable areas are contained in §257.64 of the CCR Rule [40 CFR §257.64]. According to §257.64, existing CCR surface impoundments must not be located in unstable areas unless it can be demonstrated that "recognized and generally accepted good engineering practices have been incorporated into the design of the CCR unit to ensure that the integrity of the structural components of the CCR unit will not be disrupted". At a minimum, this demonstration must consider:

- ▶ "On-site or local soil conditions that may result in significant differential settling;
- ▶ On-site or local geologic or geomorphologic features; and
- ▶ On-site or local human-made features or events (both surface and subsurface)".

Local soil conditions are discussed in the Impoundment's *History of Construction Report* (GAI Consultants, 2018b). Surficially, the Impoundment area consists of surficial loamy orthents and is underlain by clays, sands, and gravels. The report also states that there is no record of knowledge suggesting structural instability.

Stability of the Impoundment embankment was evaluated in the Impoundment's *Factor of Safety Assessment* (GAI Consultants, 2018a). This assessment included provisions for piezometric surfaces, underlying material, and surrounding soils. Liquefaction potential of the embankment soils was also evaluated. All analyses met the minimum requirements of the CCR Rule.

The Impoundment's *Structural Stability Assessment* (GAI Consultants, 2018e) states that there are no adjacent water bodies which would subject the Impoundment embankment to inundation.

Karst areas could cause instability at CCR impoundments. In Indiana, Karst features are located primarily in southern Indiana, and not in the vicinity of the Impoundment (Indiana Department of Transportation, 2017).

There are no human-made features that would be expected to influence the Impoundment. Placement of CCR material no longer occurs, so outside of routine inspections and occasional light vehicle traffic no impacts to the Impoundment are anticipated.

It is GAI's opinion that the Impoundment is in compliance with the CCR Rule location standards for unstable areas.

8.0 Conclusion

In GAI's opinion, the CCR Surface Impoundment at the Whitewater Valley Station is in compliance with the CCR Rule location restrictions for the following features:

- ▶ Wetlands;
- ▶ Fault areas;
- ▶ Seismic impacts zones; and
- ▶ Unstable areas.

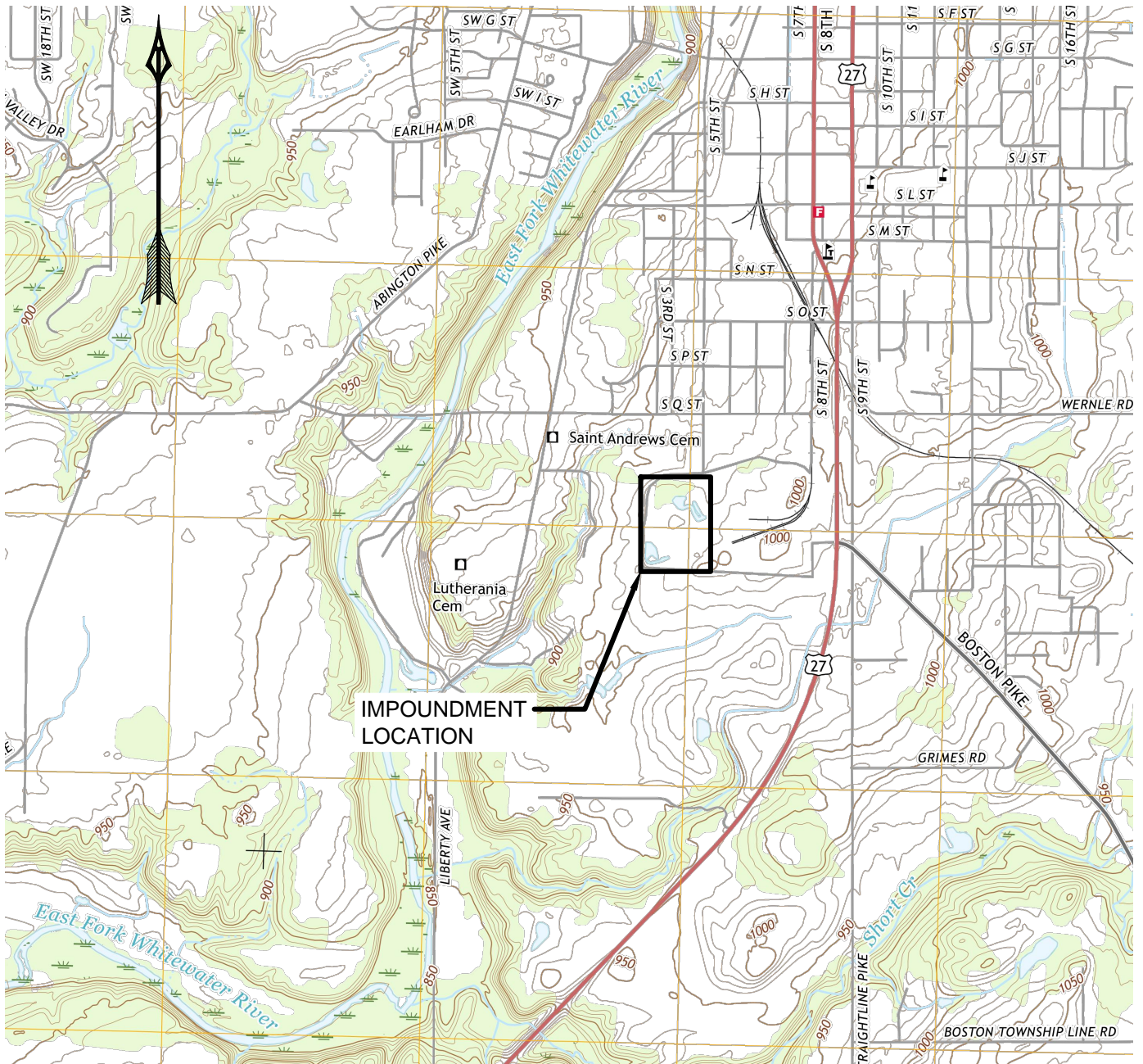
In GAI's opinion, the Impoundment does not meet the location restriction for placement above the uppermost aquifer.

9.0 References

- GAI Consultants, Inc. 2019. *Annual Groundwater Monitoring and Corrective Action, Richmond Power and Light, Whitewater Valley Station Impoundment, Richmond, Indiana.*
- GAI Consultants, Inc. 2018a. *Coal Combustion Residuals Unit Factor of Safety Assessment, Richmond Power & Light, Whitewater Valley Station, Surface Impoundment, Wayne County, Indiana*
- GAI Consultants, Inc. 2018b. *Coal Combustion Residuals Unit History of Construction, Richmond Power & Light, Whitewater Valley Station, Surface Impoundment, Wayne County, Indiana*
- GAI Consultants, Inc. 2016c. *Coal Combustion Residuals Unit Inflow Design Flood Control System Plan, Richmond Power & Light, Whitewater Valley Station, Surface Impoundment, Wayne County, Indiana.*
- GAI Consultants, Inc. 2018d. *Coal Combustion Residuals Unit Liner Documentation, Richmond Power & Light, Whitewater Valley Station, Surface Impoundment, Wayne County, Indiana.*
- GAI Consultants, Inc. 2018e. *Coal Combustion Residuals Unit Structural Stability Assessment, Richmond Power & Light, Whitewater Valley Station, Surface Impoundment, Wayne County, Indiana.*
- GAI Consultants, Inc. 2016. *Groundwater Characterization Report, Richmond Power and Light, Whitewater Valley Station Impoundment Closure Plan, Richmond, Indiana.*
- Gray, W. E., and Steinmetz, J. C. 2012. *Map of Indiana showing known faults and historic earthquake epicenters having magnitude of 3.0 and larger.* Indiana Geological Survey Miscellaneous Map 84, scale 1:500,000.
- Indiana Department of Transportation, Ecology and Waterway Permitting Office, Environmental Services Division. 2017. *Karst Geological Resources and INDOT Construction.*
- United States Environmental Protection Agency. 2015. *40 CFR Parts 257 and 261 Hazardous and Solid Waste Management System; Disposal of Coal Combustion Residuals from Electric Utilities; Final Rule.* April 17, 2015.
- United States Environmental Protection Agency. 2015. *40 CFR Parts 257 and 261 Hazardous and Solid Waste Management System; Disposal of Coal Combustion Residuals from Electric Utilities; Extension of Compliance Deadlines for Certain Inactive Surface Impoundments: Response to Partial Vacatur,* effective October 4, 2016.
- United States Fish and Wildlife Service. *National Wetlands Inventory.* Website visited April 10, 2020.

FIGURE

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MAP REFERENCE:
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QUADRANGLE DATED 2014
PHOTO REVISED 2016

SCALE: 1" = 2000'



DRAWING TITLE

FIGURE 1 - SITE LOCATION MAP

PROJECT

**WHITWATER VALLEY IMPOUNDMENT
LOCATION RESTRICTIONS**

CLIENT

**RICHMOND POWER AND LIGHT COMPANY
RICHMOND, INDIANA**



gai consultants

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A2-001

GAI FILE NUMBER:

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MAYHOEJ

CHECKED BY:

BORTZKM

APPROVED BY:

BORTZKM

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04/10/2020

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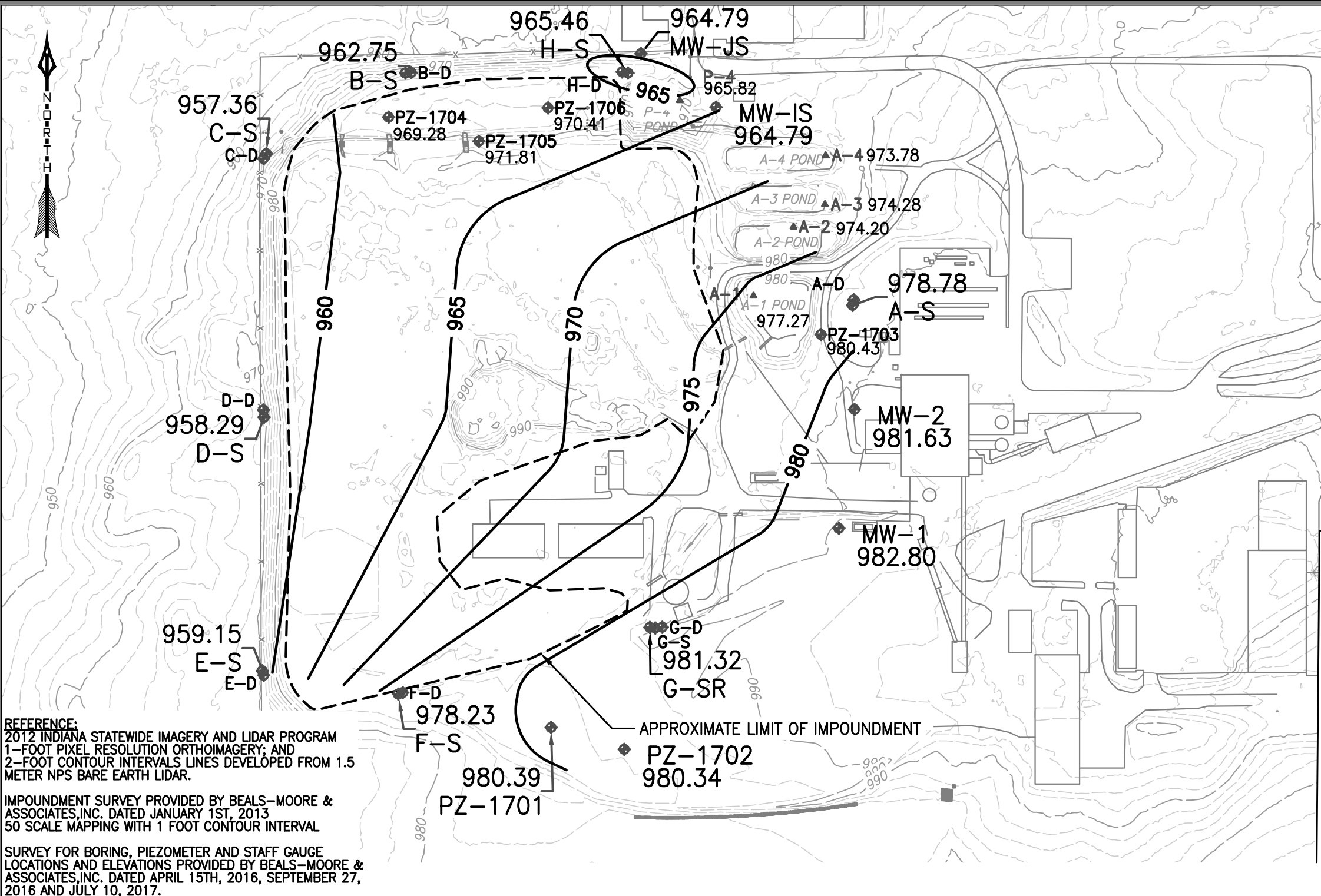
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APPENDIX A

GROUNDWATER DRAWINGS

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REFERENCE:
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 2-FOOT CONTOUR INTERVALS LINES DEVELOPED FROM 1.5
 METER NPS BARE EARTH LIDAR.
 IMPOUNDMENT SURVEY PROVIDED BY BEALS-MOORE &
 ASSOCIATES, INC. DATED JANUARY 1ST, 2013
 50 SCALE MAPPING WITH 1 FOOT CONTOUR INTERVAL
 SURVEY FOR BORING, PIEZOMETER AND STAFF GAUGE
 LOCATIONS AND ELEVATIONS PROVIDED BY BEALS-MOORE &
 ASSOCIATES, INC. DATED APRIL 15TH, 2016, SEPTEMBER 27,
 2016 AND JULY 10, 2017.

LEGEND

▲A-2

STAFF GAUGE LOCATION

⊕ A-S

BORING LOCATION

977.60

GROUNDWATER/POND WATER ELEVATION

—950—

GROUNDWATER CONTOURS (DASHED WHERE APPROXIMATE)

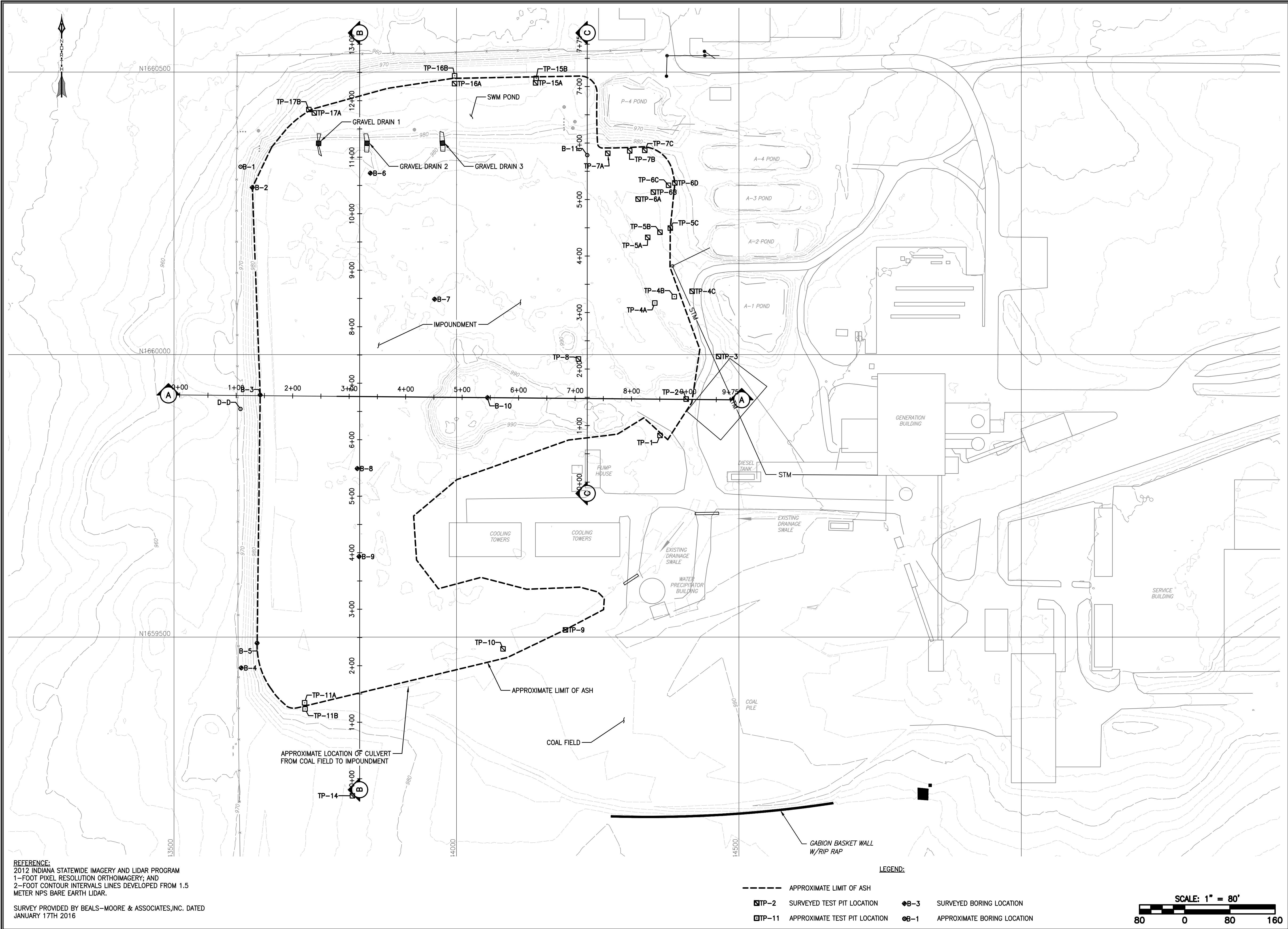
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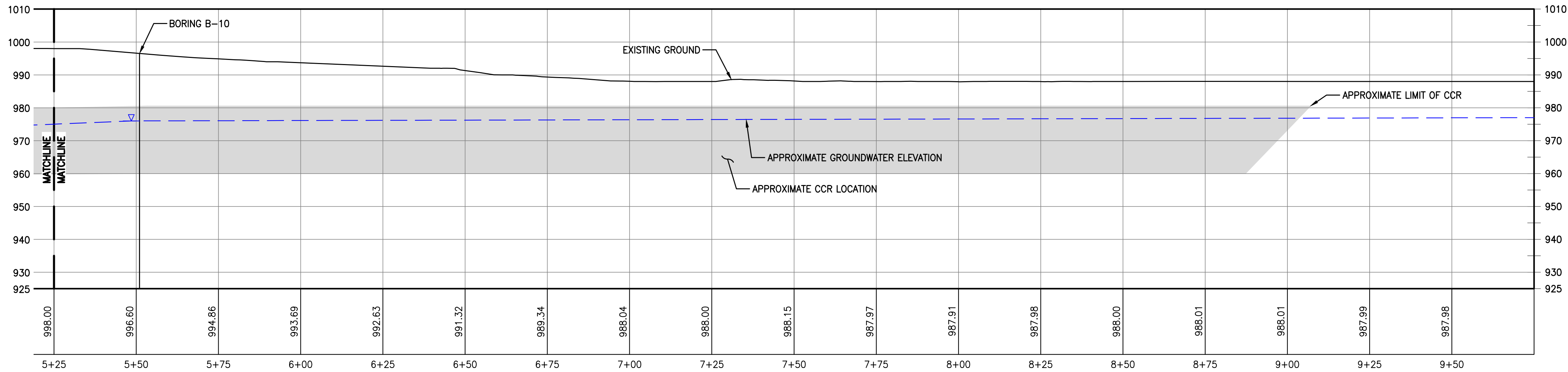
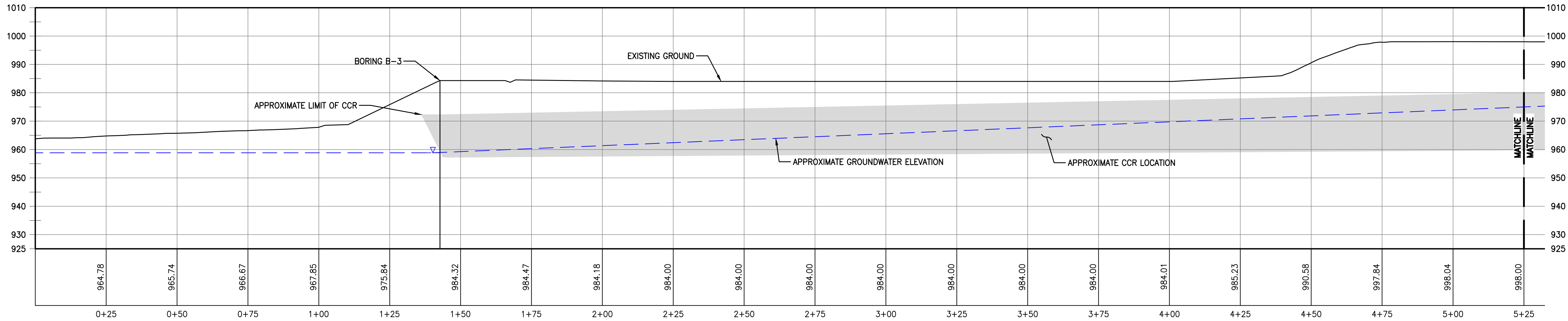
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PROJECT		CLIENT
IMPOUNDMENT CLOSURE WHITEWATER VALLEY STATION WAYNE COUNTY RICHMOND, INDIANA 47374	 gai consultants	RICHMOND POWER & LIGHT 2000 US 27 SOUTH RICHMOND, INDIANA 47374

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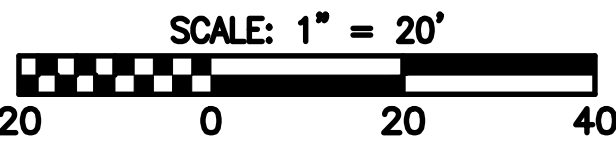
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PROJECT		RICHMOND, INDIANA	
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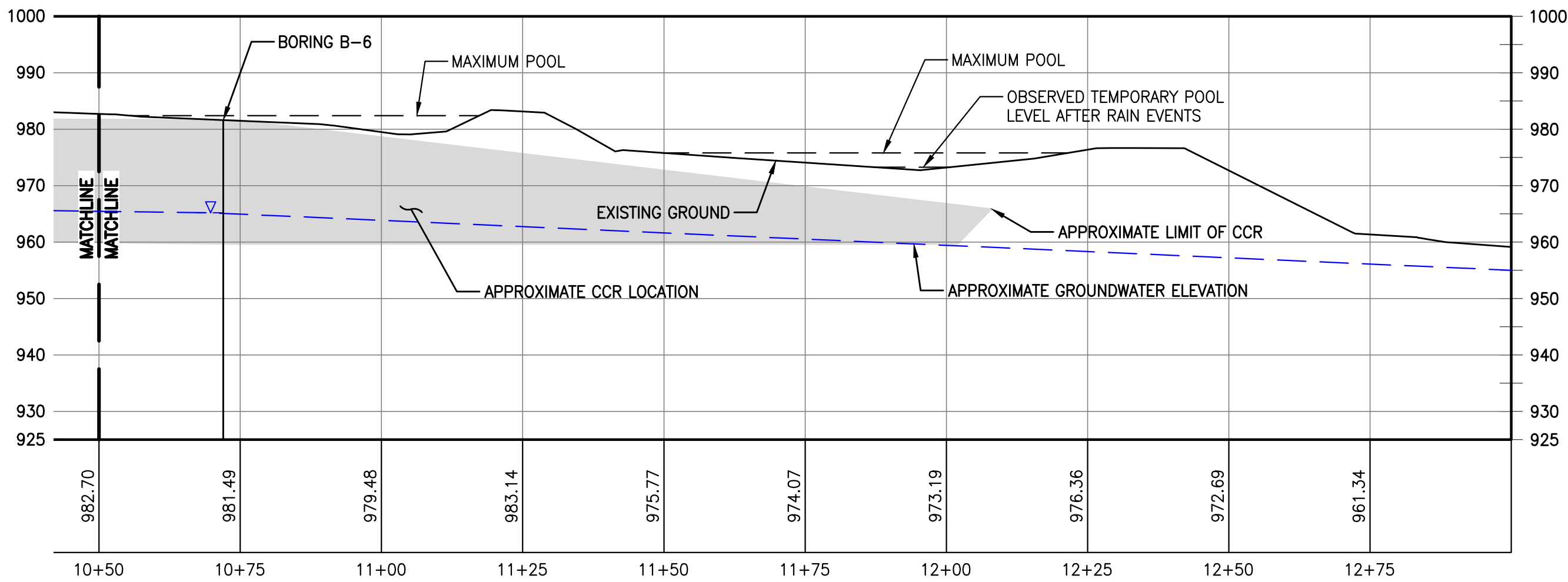
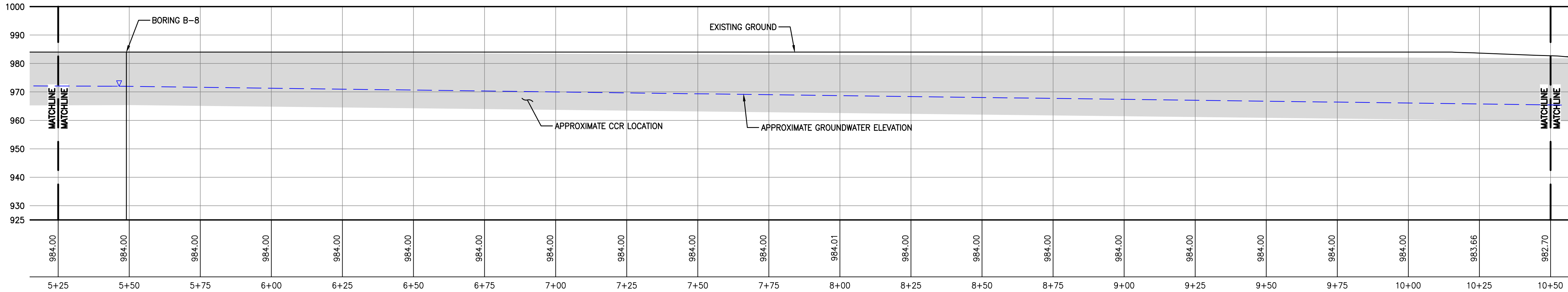
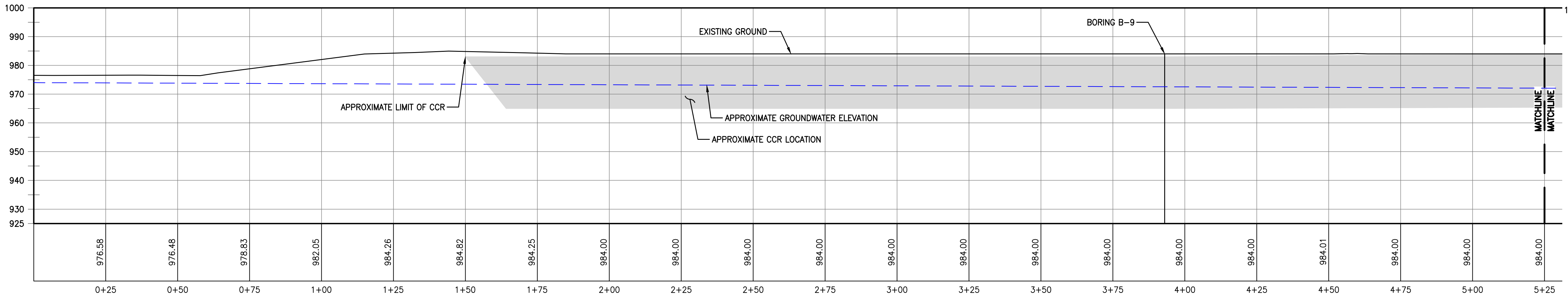
SECTION A

NOTES:

- INFORMATION SHOWN IS APPROXIMATED FROM EXISTING TOPOGRAPHY, TEST PIT DATA, AND BORING DATA. BORINGS ARE FROM SEPTEMBER AND OCTOBER 2015.
- THE APPROXIMATE CCR LOCATION SHOWN REPRESENTS THE MAXIMUM CCR PLACEMENT THAT WILL OCCUR IN THE IMPOUNDMENT.



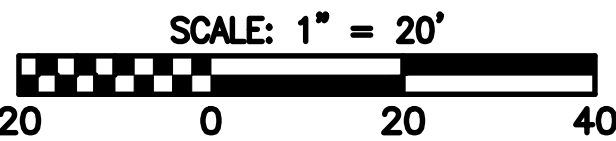
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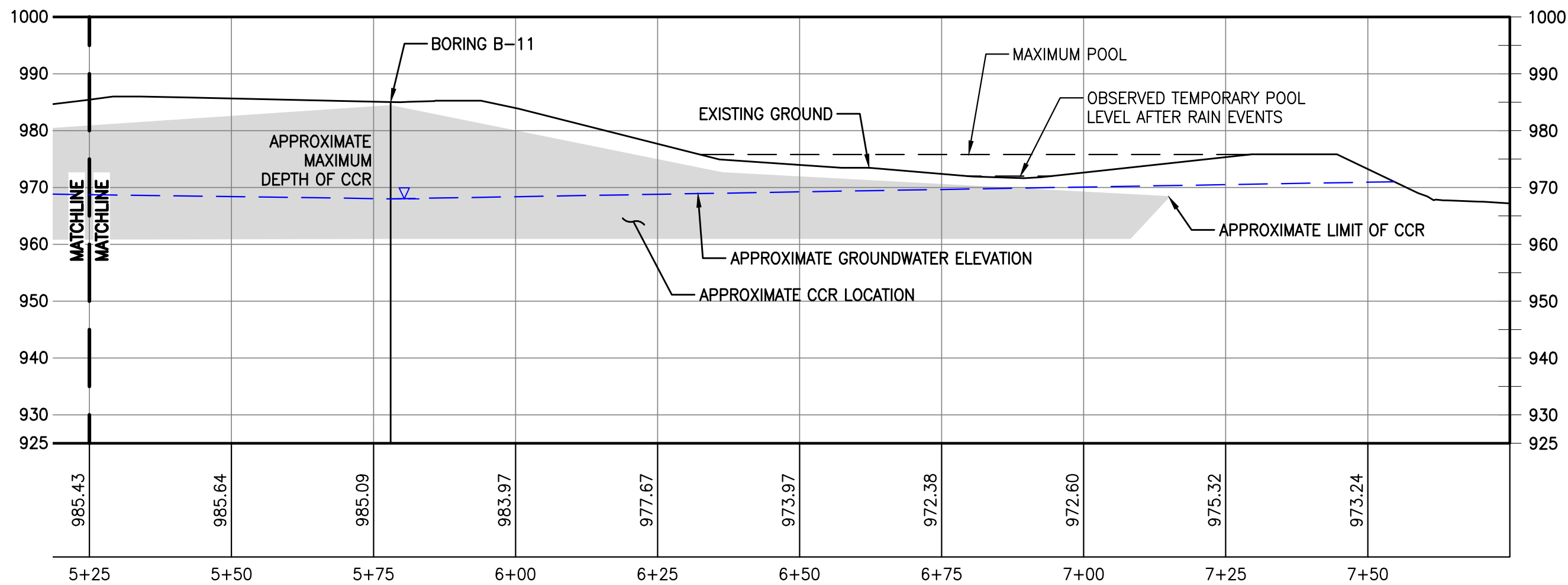
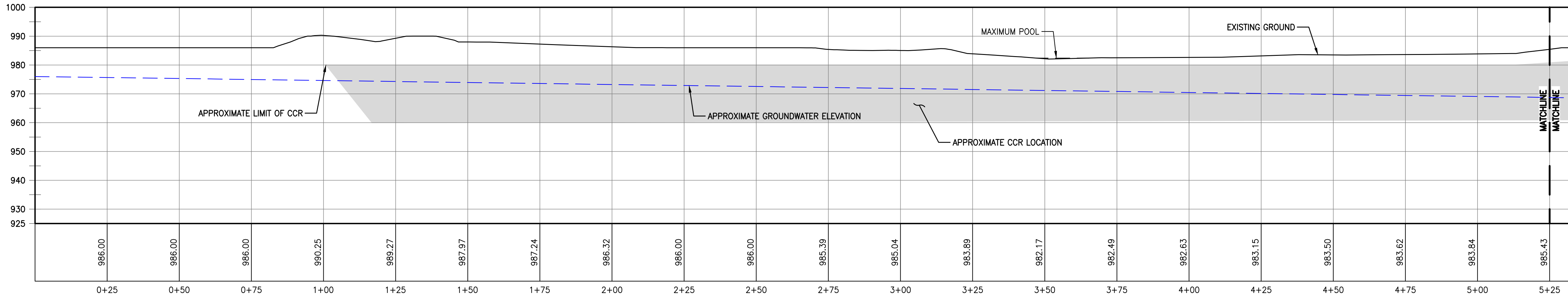
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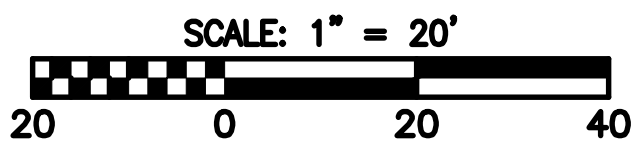
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SECTION C

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1. INFORMATION SHOWN IS APPROXIMATED FROM EXISTING TOPOGRAPHY, TEST PIT DATA, AND BORING DATA. BORINGS ARE FROM SEPTEMBER AND OCTOBER 2015.
2. THE APPROXIMATE CCR LOCATION SHOWN REPRESENTS THE MAXIMUM CCR PLACEMENT THAT WILL OCCUR IN THE IMPOUNDMENT.



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APPENDIX B

WETLAND FIGURE



U.S. Fish and Wildlife Service

National Wetlands Inventory

Whitewater Valley Impoundment



U.S. Fish and Wildlife Service, National Standards and Support Team,
wetlands_team@fws.gov

April 10, 2020

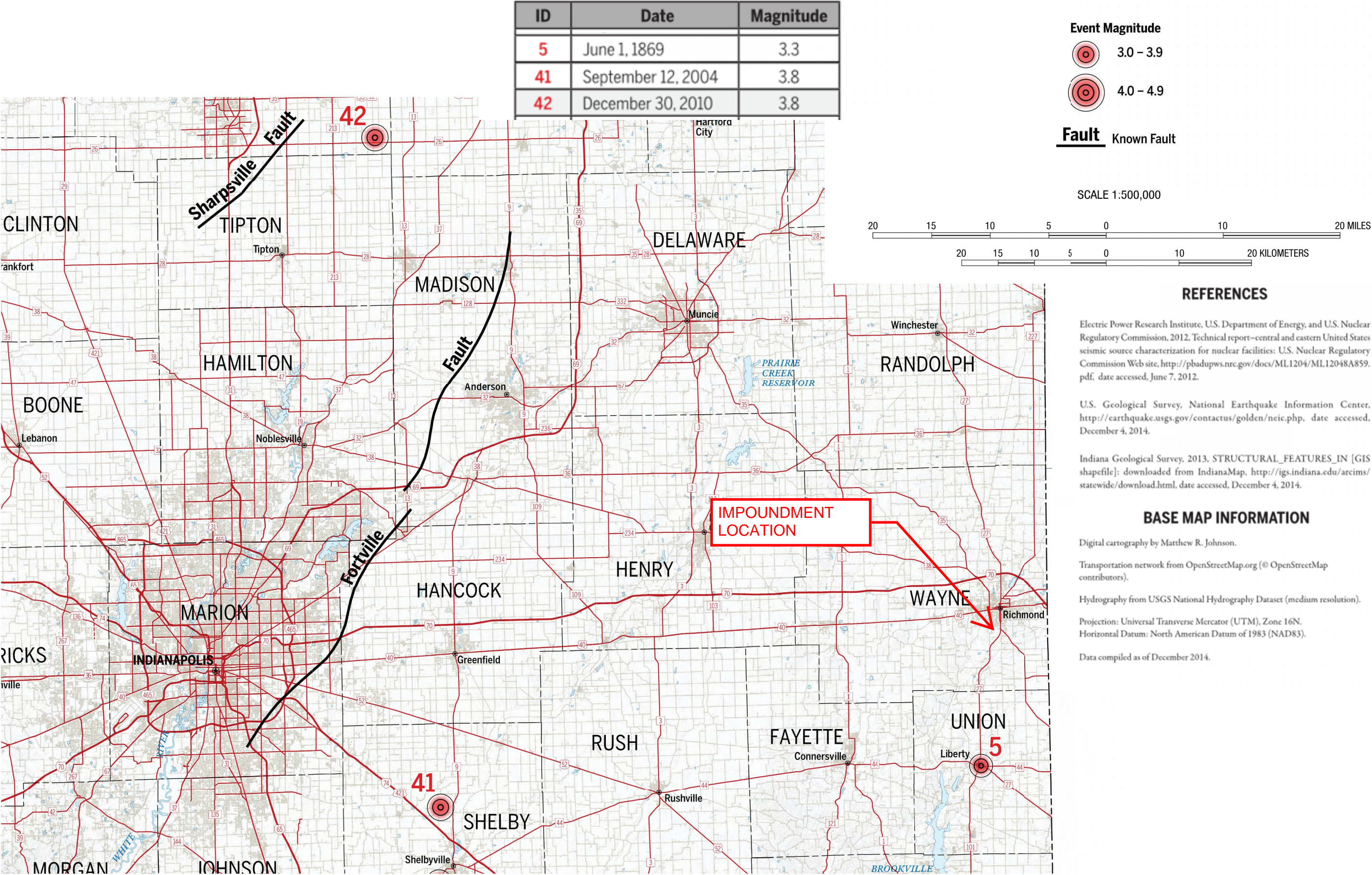
Wetlands

	Estuarine and Marine Deepwater		Freshwater Emergent Wetland		Lake
	Estuarine and Marine Wetland		Freshwater Forested/Shrub Wetland		Other
			Freshwater Pond		Riverine

This map is for general reference only. The US Fish and Wildlife Service is not responsible for the accuracy or currentness of the base data shown on this map. All wetlands related data should be used in accordance with the layer metadata found on the Wetlands Mapper web site.

APPENDIX C

FAULT MAP



From MAP OF INDIANA SHOWING KNOWN FAULTS AND HISTORIC EARTHQUAKE EPICENTERS HAVING MAGNITUDE OF 3.0 AND LARGER by GRAY AND STEINMETZ