PLANT McDONOUGH-ATKINSON
CCR SURFACE IMPOUNDMENTS
(CCR UNIT AP-2, COMBINED CCR UNIT AP-3/4)
COBB COUNTY, GEORGIA
PART B SECTION 4 – LOCATION RESTRICTION REPORT

FOR

Georgia Power

November 2020

Golder Associates Inc.
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GOLDER

Table of Contents

CERTIFICATION

This Location and Siting Restriction technical report for Georgia Power Company's (Georgia Power) Plant McDonough-Atkinson (Plant McDonough) AP-2 and AP-3/4 was prepared by Golder Associates Inc. (Golder).

I certify that this Location and Siting Restriction technical report was prepared in accordance with the Georgia Environmental Protection Division Rule 391-3-4-.10 "Rules for Solid Waste Management, Coal Combustion Residuals."

Golder Associates Inc.

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Gregory L. Hebeler, PhD, PE

Georgia Licensed Professional Engineer No. 034749

1.0 INTRODUCTION AND GENERAL SITE INFORMATION

Georgia Environmental Protection Division (EPD) Rule 391-3-4-.10 of the Georgia Solid Waste Management Regulations provides the requirements for permitting and closure of coal combustion residual (CCR) regulated facilities in Georgia. As indicated in the State of Georgia Solid Waste Management Rule 391-3-4-.10(9)(c)(6)(iv) for inactive surface impoundments, a siting report is required as part of the permit application. As an inactive CCR surface impoundment prior to initiating closure activities, the applicable location restriction for siting presented in 391-3-4-.10(9)(c)(6)(iv) demonstrating wetlands, floodplains, and seismic zones as well as 40 CFR §257.60, §257.61, §257.62, §257.63, and §257.64 for Plant McDonough CCR Unit Ash Pond 2 (AP-2) and Combined Unit AP-3/4 must be completed before April 16, 2020 as indicated in 40 CFR §257.100(e)(2) per the CCR Extension timeline.

Plant McDonough-Atkinson (Plant McDonough) is a power generating facility, owned and operated by Georgia Power, located in Cobb County, GA. In 2011, Plant McDonough ceased coal-fired electric generating activities, and subsequently ceased placing CCR in the units.

AP-2 completed CCR removal activities in the first quarter of 2017 in accordance with §257.102(c), and Combined Unit AP-3/4 is currently undergoing closure in place as one consolidated unit in accordance with §257.102(d). All units no longer receive CCR.

2.0 LOCATION RESTRICTIONS

This Location Restrictions Report is for Georgia Power's AP-2 and AP-3/4 and was prepared in accordance with State Rule 391-3-4-.10(3)(a) and Rule 391-3-4-.10(3) (b) for locations restrictions (as required by 391-3-4-.10(9)(c)(6)(v) for permitting of inactive surface impoundments). Figures A1 and A2 present an overview of the location and topography of Plant McDonough as well as AP-2 and AP-3/4.

2.1 Placement above Uppermost Aquifer

State Rule 391-3-4-.10(3)(a) and Section §257.60 of the CCR Rule requires that 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 not have 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 groundwater elevations; otherwise, the unit must undergo closure.

Plant McDonough is located within the Northwest Atlanta, GA United States Geological Survey (USGS) 7.5-minute topographic quadrangle (Figure A2), within the Piedmont/Blue Ridge geologic province and in a regional zone of deformation referred to as the Brevard Zone, which extends from Alabama to Virginia. Based on the development of the site hydrogeologic model, field investigations indicate that the site is underlain by a regional groundwater aquifer that occurs within the overburden and upper (first 30 feet of) bedrock depending on topographic location. A detailed report of the geology and hydrogeology of Plant McDonough is presented in the Geological and Hydrogeological Report for the Plant McDonough-Atkinson (Part B Section 1 of this permit application).

CCR Unit AP-2 and Combined CCR Unit AP-3/4 do not meet the requirements of separation from the uppermost aquifer as required per §257.60. As such, the units are currently undergoing closure of the inactive CCR surface impoundments per the requirements outlined in §257.101 and §257.102 of the CCR Rule. Closure activities for CCR Unit AP-2 were substantially completed in September 2016 with subsequent removal in September 2019, and consisted of dewatering and removal of CCRs. The majority of closure activities for AP-3/4 have been

initiated and are in progress, consisting of dewatering, consolidation, and closure in place of CCRs. Closure construction activities for AP-3/4 are expected to be completed in 2021. The potentiometric surface map for AP-2 and AP-3/4 is presented in the Groundwater Monitoring Plan located in Part A Section 6 of this permit application.

2.2 Proximity to Wetlands

State Rule 391-3-4-.10(3)(a) and Section §257.61 of the CCR Rules requires that an existing CCR surface impoundment must not be located in wetlands unless the requirements outlined in §257.61(a)(1) through (5) for wetlands protection are met. Under 40 CFR §232.2, wetlands are defined as areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions (i.e. swamps, marshes, bogs, and similar areas).

Jurisdictional wetlands and stream buffers are presented on Figure B1 as identified. Per EPD Watershed Protection Branch guidance (Field Guide for Determining Presence of State Waters), the perennial and intermittent streams and the corresponding buffers are identified. No wetlands were identified within the AP-2 and AP-3/4 permit boundary based on a wetlands survey dated September 25, 2019. As such, AP-2 and AP-3/4 meet the locations restriction requirement of §257.61 for proximity to wetlands.

2.3 Fault Areas

State Rule 391-3-4-.10(3)(a) and Section §257.62 of the CCR Rule requires that an existing CCR surface impoundment must not be located within 200 feet of the outermost damage zone of a fault that has had displacement in the Holocene time, unless an alternative distance is presented to prevent damage to the structural integrity of the unit.

The site is located in the Piedmont/Blue Ridge geologic province, which contains some of the oldest rocks in the Southeastern United States. Since their origin, approximately 276 to 1100 million years ago (Ma), these late Precambrian (Neoproterozoic) to late Paleozoic (Permian) rocks have undergone repeated cycles of igneous intrusions and extrusions, metamorphism, folding, faulting, shearing, and silicification. The latest regional metamorphism and associated deformation has been attributed to the collision of the North America plate with the Eurasian plate approximately 200 to 230 Ma.

Geologic mapping for the area corresponding to Plant McDonough is presented in the Geologic and Hydrogeologic Report (Part B Section 1 of this permit application). The site is located near the inactive Brevard Fault Zone. Several regionally extensive faults have been mapped near and within the site associated with the inactive Brevard Fault Zone. An inactive, unnamed, faulted, intrusive contact traverses northeast-southwest across the site, separating Ordovician-aged bedrock. This contact is observed throughout most of the metro-Atlanta area. Other regional faults characterized by near-vertical, strike-slip movement, occur north and south of the site: the Long Island Creek fault is located approximately one mile north of the site; and a series of strike-slip faults that define a zone of intense shearing within the Brevard Zone occur just south of the site.

The last known displacement in the area of Plant McDonough occurred prior to the Mesozoic Era (Higgins et al, 1988). Therefore, AP-2 and AP-3/4 meet the location restriction requirement for fault areas with regards to displacement in Holocene time as required per §257.62.

2.4 Seismic Impact Zones

State Rule 391-3-4-.10(3)(a) and Section §257.63 of the CCR Rules requires that an existing CCR surface impoundment must not be located in seismic impact zones unless all structural components are designed to resist

the maximum horizontal acceleration in lithified earth material for the site. The CCR Rule (§257.53) specifies a seismic impact zone as an area having a probability of 2% that the maximum expected horizontal acceleration, expressed as a percentage of the earth's gravitational pull (g), will exceed 0.10 g in 50 years. This probability is equivalent to an event with a return period of approximately 2,500 years, based on the United States Geological Survey (USGS) seismic hazard maps. The USGS has provided online tools to assess this hazard at specific locations using its 2014 seismic hazard model. The seismic hazard calculations in Appendix C of the Engineering Report for Plant McDonough-Atkinson CCR Units AP-2 and AP-3/4 (Part B Section 2 of this permit application) detail the use of these tools to obtain seismic hazard data for Plant McDonough CCR Unit AP-2 an AP-3/4, located at 33.82889°N and 84.4775°W.

According to the USGS seismic hazard model, CCR Units AP-2 and AP-3/4 are not located in a seismic impact zone since the maximum horizontal acceleration in lithified earth material associated with a 2% probability of exceedance in 50 years at the site (0.0963g) is below the 0.10g threshold associated with a seismic impact zone. This assessment is also graphically presented in Figure C1. Although not required, the stability of AP-2 and combined AP-3 and -4 were evaluated with regard to seismic loading and found to meet the minimum seismic stability requirements per §257.63Therefore, CCR Unit AP-2 and Combined CCR Unit AP-3/4 meet the location restriction requirement for seismic impact zones as required per §257.63.

2.5 Unstable Areas

Section 391-3-4-.10(3)(b) of the State Rule and §257.64 of the CCR Rule require that an existing CCR surface impoundment must not be located in an unstable area unless it is demonstrated that generally accepted good engineering practices have been incorporated into the design to ensure that the integrity of the structural components of the CCR unit will not be disrupted. Per the CCR Rule, an unstable area is defined as a location that is susceptible to natural or human induced events or forces capable of impairing the integrity, including structural components of some or all of the CCR unit that are responsible for preventing release from the unit. Unstable areas can include poor foundation conditions, areas susceptible to mass movements, and karst terrains. The National Karst Map (Weary and Doctor, 2014) shows locations of karst and potential karst areas in soluble rocks in the contiguous United States. The site is not located in an area of karst terrain.

Factors considered when evaluating whether an area is unstable include local soil conditions, local geologic features, and local human-made features. AP-2 and AP-3/4 meet the location restriction requirement for unstable areas as required per §257.64, and the factors previously mentioned are detailed in Sections 2.5.1 through 2.5.3 below.

2.5.1 Local Soil Conditions and Differential Settling

Data on subsurface conditions at Plant McDonough were evaluated and the results summarized in the Materials Calculation Package and the Liquefaction Assessment Calculation Package included as Appendix A and Appendix D respectively in the Engineering Report for Plant McDonough-Atkinson CCR Unit AP-2 and Combined Unit AP-3/4. The site is located in the Piedmont/Blue Ridge geologic province, characterized by igneous and metamorphic bedrock. In general, underlying rock at the site consists of schist and gneiss with overlaying Piedmont soils formed by the in-place weathering of parent rock referred to as residuum soils. Details of the soils and geologic conditions are available in the Geological and Hydrogeological Report for Plant McDonough (Part B Section 1 of this permit application).

AP-2 is located east of CCR Unit AP-1 (permitted separately as an inactive CCR surface impoundment) and south of AP-3 in the center of the eastern half of the Plant site and is over excavated into subgrade soils, creating a

topographic low point. AP-3/4 is located in a topographically high area on the property, that created a generally radial groundwater drainage downslope of AP-3/4 during impoundment operations. A small creek flows south under Plant Atkinson Rd. into a fiberglass reinforced plastic (FRP) stream diversion culvert inletting north of AP-3/4 and flowing southeast towards the Chattahoochee River.

AP-2 is a combination incised and compacted fill impoundment, with a perimeter embankment constructed on the south and east side of AP-2 consisting of residual compacted soils consisting of clayey silts, sandy clays, and silty clays.

The embankments of AP-3/4 are formed by perimeter dikes constructed with locally borrowed, compacted soils. Subsurface materials in the vicinity of the embankments of AP-3/4 consist of:

- Residuum (Silty Sands and Sandy Silts)
- Lower saprolite soils and weathered rock
- Bedrock (described in Section 2.5.2)

The results of the evaluation of the liquefaction susceptibility for local soils conditions indicate that calculated factor of safety against liquefaction is above 1.2 for the dike and foundation soils analyzed for AP-2 and AP-3/4. Thus, post liquefaction stability was evaluated using a reduced post-liquefaction strength for such materials (modeled as a post liquefaction strength ratio of 0.08). All cases analyzed for slope exceeded the factors of safety required (Sections §257.73(e)(i) to (iv)). CCR materials impounded in AP-3/4 were not analyzed for liquefaction susceptibility, as these materials will be dry in the long term and not susceptible to liquefaction.

AP-2 was not evaluated for post-closure settlement, as it is undergoing closure by removal and CCR material was removed from the unit. Settlement evaluations for the closed AP-3/4 conditions consider settlement following closure from dewatering of the CCR and minimal post capping settlement (less than a few inches) across the unit, as detailed in the Settlement Calculations for AP-3/4 in Appendix E of the Engineering Report for Plant McDonough-Atkinson CCR Unit AP-2 and Combined CCR Unit AP-3/4. Based on the engineering evaluations of subsurface conditions, liquefaction, slope stability, and settlement, AP-3/4 is not considered to be susceptible to significant differential settlement and therefore meets the requirements of §257.64(b)(1).

2.5.2 Local Geologic Features

Plant McDonough is underlain by bedrock consisting of metamorphic Ordovician-aged gneiss and schist, separated by a faulted intrusive contact, which trends northeast to southwest through the site. North of this faulted contact is the Long Island Creek Gneiss (OZli), a felsic gneiss. South of the faulted contact is an interbedded phyllonite, button schist (Ozbs). A regional, unconfined surficial aquifer system is present at the site, existing within the overburden and weathered and fractured upper bedrock (e.g., approximate first 30 feet), depending on topographic location. Deep bedrock (i.e., approximately 30 feet into the bedrock) is generally unweathered with few discontinuities available to store groundwater. The deeper bedrock aquifer is likely not readily interconnected with the uppermost aquifer system.

A detailed discussion of geologic features is presented in the Geological and Hydrogeological Report for the Plant McDonough-Atkinson (Part B Section 1 of this permit application). Based on the local geologic features in the vicinity of AP-2 and AP-3/4, following closure, the unit will not be prone to disruption due to geologic features at the site and thus meets the requirements of §257.64(b)(2).

2.5.3 Local Human-Made Features

Existing structures in the vicinity of AP-2 include a buried 24-inch fiberglass blow-down line along the eastern dike. This was modified as part of the AP-3/4 closure. Additionally, there is an existing (decommissioned) concrete emergency overflow structure. Transmission line structure foundations are located in and around AP-2 – upgrades to the transmission foundations were made as necessary to allow for excavation around these structures. Detailed information regarding the identification of pipes and utilities in the vicinity of AP-2 is presented in the Closure Plan for AP-2 and AP-3/4 (Part A Section 7 of this Permit Application).

The AP-2 area contains engineered structures and features including containment and diversion dikes, drainage channels, and outlet structures among others. Existing structures in the vicinity of AP-3/4 include natural gas pipelines to the south, including a portion of the southern embankment of AP-3, as part of the plant's power generating infrastructure, overhead electric lines above and adjacent to AP-3/4, blow-down line from the pre-closure AP-4 discharge structure to the west of AP-4 discharging to the plant stormwater pond, and a lined pipe stream diversion beneath AP-3/4 conveying the existing stream flows beneath the earthen dams of AP-3/4. Detailed information regarding the identification of pipes and utilities in the vicinity of AP-3/4 is presented in the Closure Plan for AP-2 and AP-3/4

There are no known instances of structural instability at AP-2 and AP-3/4 at the time of this submittal. Additionally, there are no human-made features or future activities at the site that are anticipated to have a potential adverse impact on the structural components or integrity of the closed units.

Based on the foregoing, AP-2 and AP-3/4 will not be prone to disruption due to human-made features at the site and therefore meet the requirements of §257.64(b)(3).

2.6 Identification of Floodplains

The permit requirements for inactive surface impoundments for the GA Solid Waste Rules (391-3-4-.10(9)(c)(6)(iv)) include the identification of wetlands, floodplains, and seismic impact zones. Wetlands and stream buffers in the vicinity of AP-2 and AP-3/4 are described in Section 2.2 of this report. Seismic impact zones are described in Section 2.4 of this report. Additionally, the 100-year floodplain in the vicinity of AP-2 and AP-3/4 is identified on Figure D1. The Chattahoochee River contributes to the floodplain to the south of AP-2 and AP-3/4.

3.0 REFERENCES

Georgia Department of Natural Resources Environmental Protection Division, Rules of Solid Waste Management, Chapter 391-3-4-.10 Coal Combustion Residuals.

Golder Associates (2018). Plant McDonough-Atkinson CCR Surface Impoundments (CCR Unit AP-2 and Combined CCR Unit AP-3/4), Cobb County, Georgia Part A: Permit Documents.

Higgins, M.W., R.L. Atkins, T.J. Crawford, R.F. Crawford III, R. Brooks, and R.B. Cook (1988). The Structure, Stratigraphy, Tectonostratigraphy, and Evolution of the Southernmost Part of the Appalachian Orogen. U.S. Geological Survey Professional Paper 1475.

U.S. Environmental Protection Agency (USEPA) (2015) "40 CFR Parts 257 and 261. Hazardous and Solid Waste Management System; Disposal of Coal Combustion Residuals from Electric Utilities; Final Rule," (referred to herein as the USEPA CCR rule).

U.S. Geological Survey, 2014. Dynamic: Conterminous U.S. 2014 (v4.1.1) Interactive Deaggregations. https://earthquake.usgs.gov/hazards/interactive/.

Weary, D.J., and Doctor, D.H. (2014). *Karst in the United States: A digital map compilation and database*: U.S. Geological Survey Open-File Report 2014–1156.

Figures

LEGEND

PERMIT BOUNDARY AP-1 & AP-2, AP-3/4

PLANT MCDONOUGH-ATKINSON PROPERTY BOUNDARY

NOTES

REFERENCE

1. AERIAL IMAGERY: GOOGLE

2. COORDINATE SYSTEM: NAD 1983 STATE PLANE GEORGIA WEST (U.S. FEET).

3. PROPERTY BOUNDARY PROVIDED BY SOUTHERN COMPANY (2018) AS SURVEYED BY METRO ENGINEERING AND SURVEY CO, INC. THE DATE OF THE SURVEY IS 10-16-2012.

0 600 1,200

1 IN= 600 FT

CLIENT
GEORGIA POWER COMPANY

PROJECT
PLANT MCDONOUGH-ATKINSON
CCR UNIT AP-1 AND CCR UNITS AP-2, AP-3/4

TITLE
SITE MAP - AERIAL VIEW

CONSULTANT
GOLDER

YYYY-MM-DD	2019-06-24
PREPARED	JDG
DESIGN	LS
CHECKED	GLH
REVIEWED/APPROVED	GLH

PROJECT No. 1777449 Rev. 0 FIGURE **A1**

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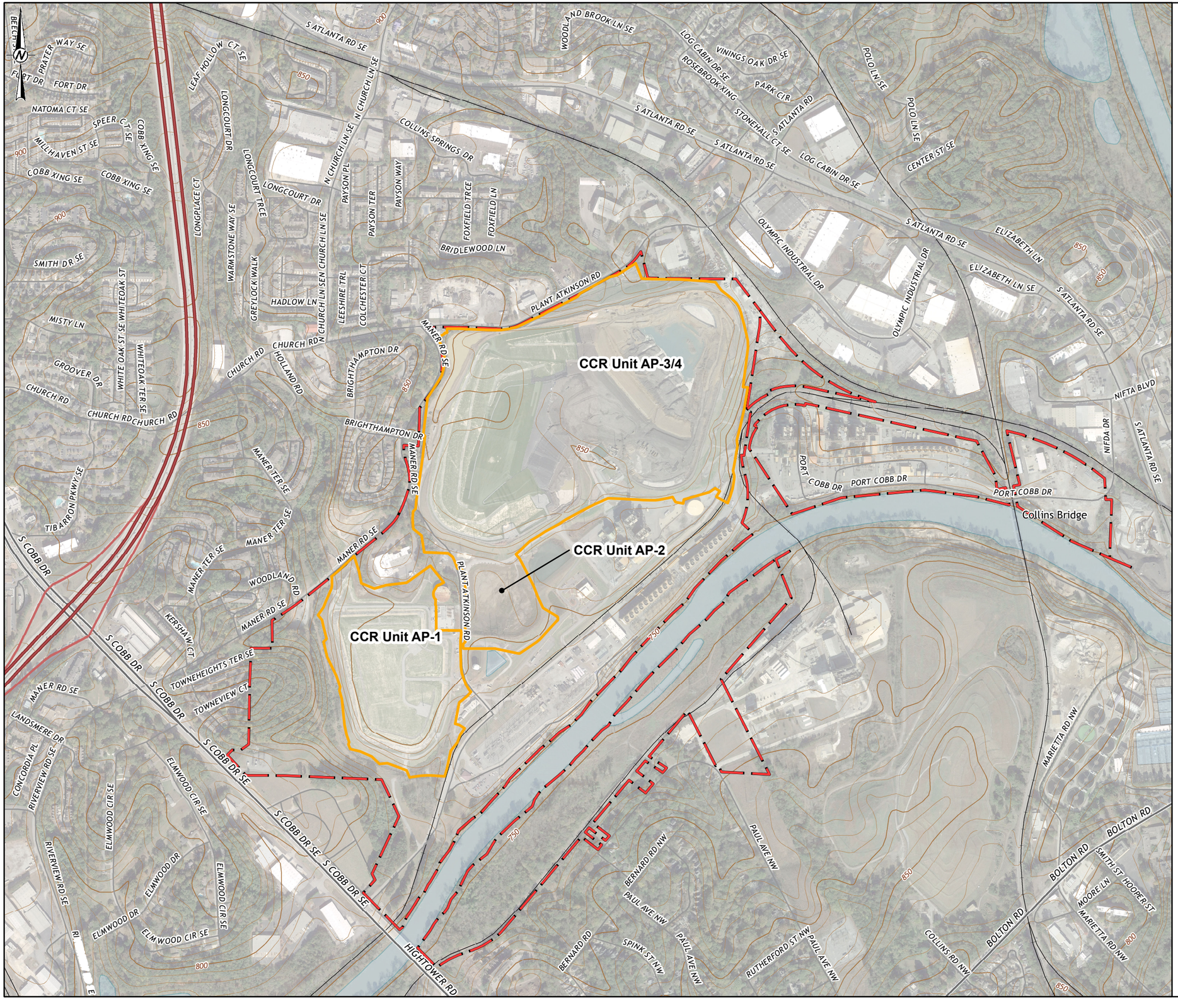

LEGEND

- PERMIT BOUNDARY AP-1 & AP-2, AP-3/4
- PLANT MCDONOUGH-ATKINSON PROPERTY BOUNDARY

NOTES

REFERENCE

1. AERIAL IMAGERY: GOOGLE, MAXAR TECHNOLOGIES, FEBRUARY 2019

2. COORDINATE SYSTEM: NAD 1983 STATE PLANE GEORGIA WEST (U.S. FEET).

3. PROPERTY BOUNDARY PROVIDED BY SOUTHERN COMPANY (2018) AS SURVEYED BY METRO ENGINEERING AND SURVEY CO, INC. THE DATE OF THE SURVEY IS 10-16-2012.

4. USGS 7.5 MINUTE QUADRANGLE MAP FOR NORTHWEST ATLANTA, GA. 2017

0 800 1,600

1 IN= 800 FT

CLIENT
GEORGIA POWER COMPANY

PROJECT
PLANT MCDONOUGH-ATKINSON
CCR UNIT AP-1 AND CCR UNITS AP-2, AP-3/4

TITLE
SITE MAP - TOPOGRAPHIC VIEW

CONSULTANT
GOLDER

YYYY-MM-DD	2019-06-24
PREPARED	JDG
DESIGN	LS
CHECKED	GLH
REVIEWED/APPROVED	GLH

PROJECT No. 1777449
Rev. 0
FIGURE **A2**

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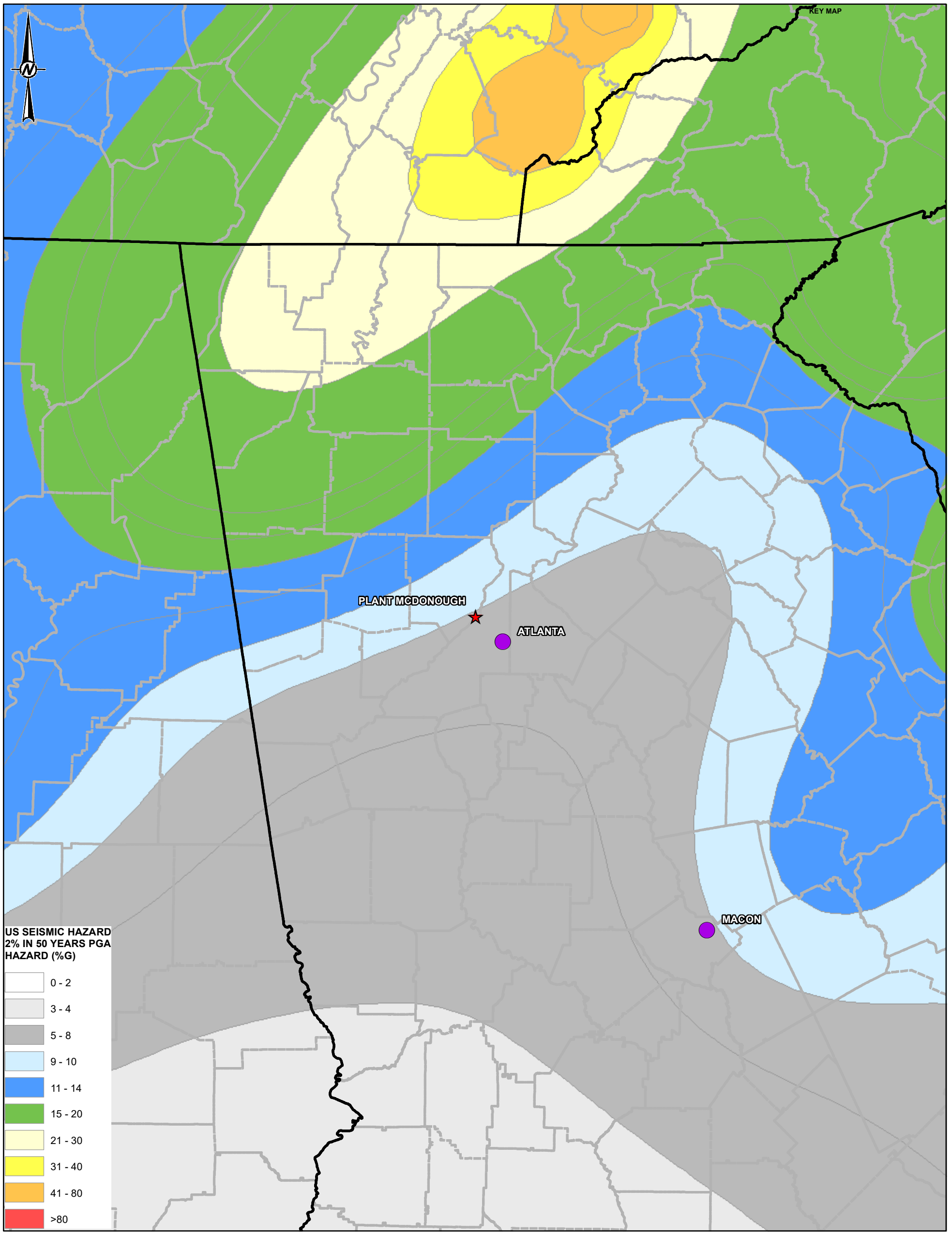
N
AP - 4
AP - 3
AP - 2
0
240
480
960
Feet
Survey Area AP - 2, 3, 4
Streams
Wetland
25' Stream buffer
Approximate Permit Boundary



LEGEND

- CITY
- PLANT MCDONOUGH
- STATE BOUNDARY
- COUNTY BOUNDARY

0 20 40
Miles
1 " = 20 miles

REFERENCE(S)

1. U.S. GEOLOGICAL SURVEY, 2014. DYNAMIC: CONTERMINOUS U.S. 2014 (V4.1.1) INTERACTIVE DEAGGREGATIONS. HTTPS://EARTHQUAKE.USGS.GOV/HAZARDS/INTERACTIVE/.

CLIENT
GEORGIA POWER COMPANY

PROJECT
LOCATION DEMONSTRATION REPORT
PLANT MCDONOUGH ATKINSON
CCR UNIT AP-1 AND CCR UNITS AP-2, AP-3/4

TITLE
PLANT MCDONOUGH ATKINSON CCR UNIT 1 & CCR UNITS AP-2, AP-3/4 SEISMIC HAZARD MAP

CONSULTANT
GOLDER

YYYY-MM-DD	2019-06-18
DESIGNED	LS
PREPARED	JDG
CHECKED	GLH
REVIEWED/APPROVED	GLH

PROJECT NO.	REV.	FIGURE
1777449	0	C1

LEGEND

- FINAL LIMITS OF WASTE (REFERENCE 4)
- PLANT MCDONOUGH-ATKINSON PROPERTY BOUNDARY
- PERMIT BOUNDARY AP-1 & AP-2, AP-3/4
- 100 YEAR FLOODPLAIN (REFERENCE 4)

NOTES

REFERENCE

1. AERIAL IMAGERY: GOOGLE

2. COORDINATE SYSTEM: NAD 1983 STATE PLANE GEORGIA WEST (U.S. FEET).

3. PROPERTY BOUNDARY PROVIDED BY SOUTHERN COMPANY (2018) AS SURVEYED BY METRO ENGINEERING AND SURVEY CO, INC. THE DATE OF THE SURVEY IS 10-16-2012.

4. FINAL LIMTIS OF WASTE AND 100 YEAR FLOODPLAIN OBTAINED FROM THE PLANT MCDONOUGH ATKINSON INACTIVE SURFACE IMPOUNDMENT ASH POND NO. 1 CLOSURE DRAWINGS OF THE SOLID WASTE CCR PERMIT APPLICATION NOVEMBER 2018 AND GOLDER ASH POND 3/4 CLOSURE DESIGN DRAWINGS 2019

0 600 1,200

1 IN= 600 FT

CLIENT
GEORGIA POWER COMPANY

PROJECT
PLANT MCDONOUGH-ATKINSON
CCR UNIT AP-1 AND CCR UNITS AP-2, AP-3/4

TITLE
IDENTIFICATION OF FLOODPLAIN MAP
CCR UNIT AP-1 AND CCR UNITS AP-2 , AP-3/4

CONSULTANT
GOLDER

YYYY-MM-DD	2019-06-24
PREPARED	JDG
DESIGN	JDG
CHECKED	LS
REVIEWED/APPROVED	GLH

PROJECT No. 1777449
Rev. 0
FIGURE **D1**

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