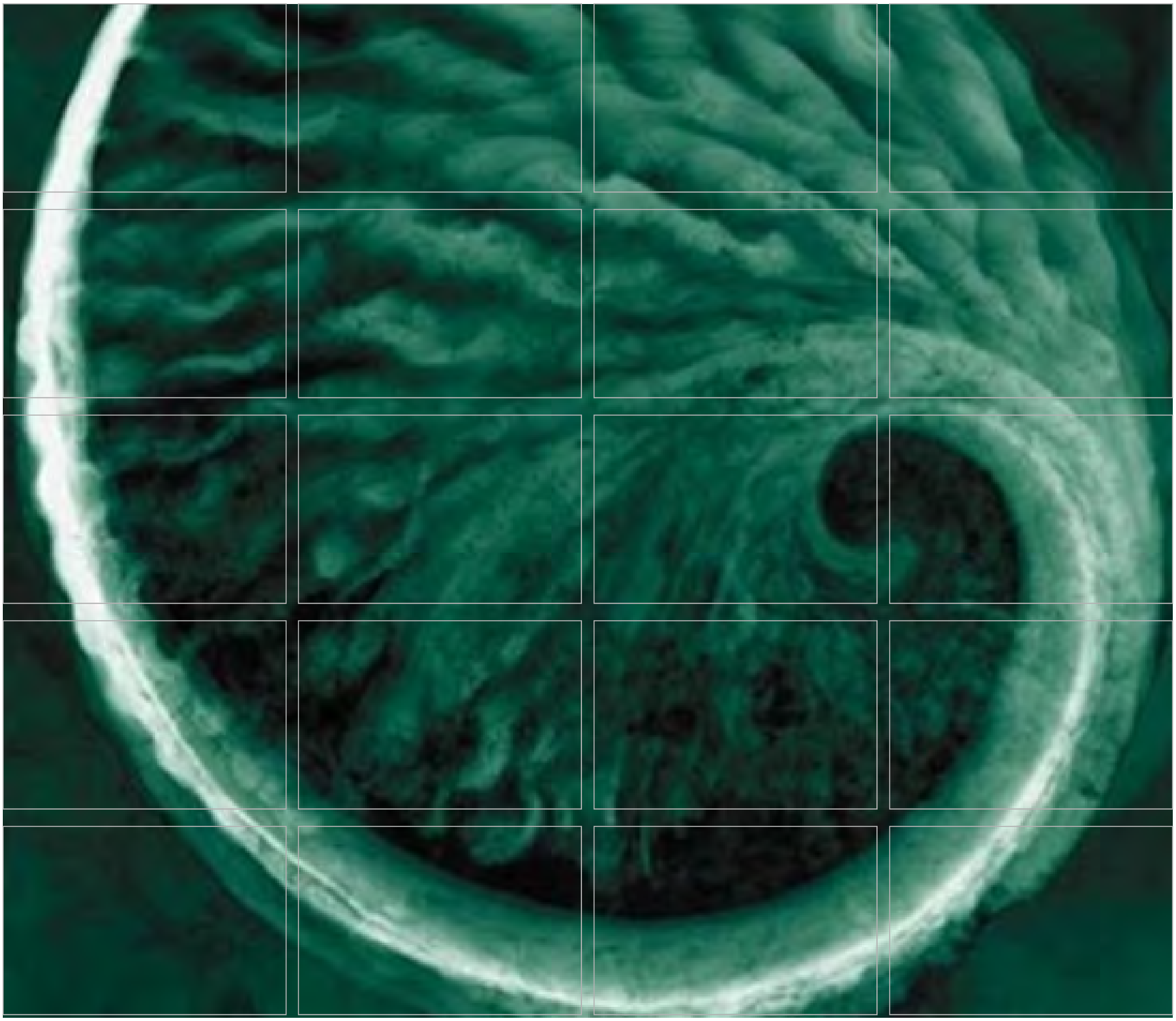

Location Restrictions Demonstration – CCR Rule 40 CFR §257.60-64

CPS Energy
Calaveras Power Station - CCR Units
San Antonio, Texas

October 2018

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CPS Energy Calaveras Power Station – CCR Units

Location Restrictions Demonstration – CCR Rule 40 CFR §257.60-64

October 17, 2018

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EXECUTIVE SUMMARY

On behalf of CPS Energy, Environmental Resource Management Southwest, Inc. (ERM) conducted evaluations of the location restrictions for the existing Coal Combustible Residuals (CCR) Units associated with the Calaveras Power Station located southeast of San Antonio, in Bexar County, Texas. The evaluations were conducted through a combination of desktop reviews and obtaining site-specific information from engineering assessments, site investigations, and site visits to assess compliance with Title 40, Code of Federal Regulations, Part 257 (40 CFR Part 257) (aka CCR Rule).

The evaluations, documented in this *Location Restrictions Demonstration*, concluded the following:

Placement Above the Uppermost Aquifer

Based on the review of the *CCR Units – 2017 Annual Inspection and Fugitive Dust Control Report,* as-built drawings, site-specific groundwater elevation data and soil geotechnical data, the bottom (bases) of the Fly Ash Landfill (FAL), Evaporation Pond (EP), Sludge Recycle Holding (SRH) Pond, and South Bottom Ash Pond (BAP) are more than 5 feet above the uppermost aquifer and unlikely to be in intermittent, recurring, or sustained hydraulic connection with the uppermost aquifer. Therefore, these four CCR Units meet the minimum requirements of 40 CFR §257.60.

Based on the review of the *CCR Units – 2017 Annual Inspection and Fugitive Dust Control Report*, as-built drawings, site-specific groundwater elevation data and soil geotechnical data, although portions of the North BAP are unlikely to be in intermittent, recurring, or sustained hydraulic connection with the uppermost aquifer, the bottom (base) of the northern portion of the North BAP is less than 5 feet above the uppermost aquifer. Therefore, this CCR Unit does not meet the minimum requirements of 40 CFR §257.60.

Wetlands

Based on the lack of current or historical evidence of wetland hydrology, hydric soils, or hydrophytic vegetation, all five CCR units are not located within any wetlands. Therefore, all five CCR Units meet the minimum requirements of 40 CFR §257.61.

Fault Areas

Based on a review of published geologic and fault maps and fault and fold databases, all five CCR Units are not located within 60 meters (200 feet) of a fault that has had displacement in Holocene time. Therefore, all five CCR Units meet the minimum requirements of 40 CFR §257.62.

Seismic Impact Zones

Based on review of published seismic hazard and earthquake maps, all five CCR Units are not located in seismic impact zones. Therefore, all five CCR Units meet the minimum requirements of 40 CFR §257.63.

Unstable Areas

Based on the review of structural and safety factor assessments, annual inspections, soil boring logs and geologic cross sections, and topographic and karst zones maps, all five CCR Units are not located in unstable areas. Therefore, all five CCR Units meet the minimum requirements of 40 CFR §257.64.

1.0 INTRODUCTION

On behalf of CPS Energy, Environmental Resource Management Southwest, Inc. (ERM) conducted evaluations of the location restrictions for the existing Coal Combustible Residuals (CCR) Units associated with the Calaveras Power Station located southeast of San Antonio, in Bexar County, Texas. The evaluations were conducted through a combination of desktop reviews and obtaining site-specific information from engineering assessments, site investigations, and site visits to assess compliance with Title 40, Code of Federal Regulations, Part 257 (40 CFR Part 257) (aka CCR Rule).

2.0 BACKGROUND

2.1 SITE DESCRIPTION

CPS Energy owns and operates the Calaveras Power Station located southeast of San Antonio in Bexar County, Texas. Within this power station, there are two coal-fired plants (J.T. Deely Power Plant and J.K. Spruce Power Plant) that generate CCR that are subject to the CCR Rule. A General Site Location Map is provided as **Figure 1**.

CPS Energy has identified five onsite CCR Units:

1. Fly Ash Landfill (FAL);
2. Evaporation Pond (EP);
3. Sludge Recycle Holding (SRH) Pond;
4. North Bottom Ash Pond (BAP); and
5. South BAP.

For the purposes of this document, the FAL and EP are termed the Northern CCR Units and the SRH Pond and BAPs are termed the Southern CCR Units. The CCR Unit locations are shown in **Figure 2**.

2.2 SITE-WIDE GEOLOGY

According to the Bureau of Economic Geology (BEG) *Geologic Atlas of Texas San Antonio Sheet*, the geology in the area of Calaveras Power Station consists of the Carizzo Sand and the Wilcox Group. According to the United States Geological Survey (USGS), the Carizzo Sand consists of medium- to coarse-grained sandstone, with finer grained material towards the top of the formation and the Wilcox Group consists mostly of mudstone, with various amounts of sandstone, lignite, and ironstone concretions. Information presented in Section 2.2 and the following subsections was obtained from the *Groundwater Monitoring System* report (ERM, October 2017).

2.2.1 *Northern CCR Units*

The stratigraphic sequence is generally characterized by approximately 8 feet to 32 feet of unconsolidated material (sands, silts, and low to medium plasticity clays), underlain by a clayey/silty to well-sorted sand (groundwater-bearing unit) approximately 5 to over 25 feet thick, underlain by grey to brown, high plasticity clay (lower confining unit). The ground water bearing unit is at its greatest observed thickness near the southwest corner of the EP, and thins towards the northwest (northwest of the FAL). The lower confining unit, generally observed at a depth between approximately 471 feet to 478 feet above mean sea level (msl) was not observed at monitor wells JKS-47 and JKS-60 (drilled to depths of 462 feet and 466 feet above msl, respectively). This possibly suggests the presence of erosional channels or gradational changes in lithology between JKS-45 and JKS-47, and JKS-46 and JKS-60. Interbedded sands and clays were observed within both the unconsolidated material and ground water bearing unit in monitor wells JKS-57, JKS-58, and JKS-61 through JKS-64. A high plasticity clay interval was observed above the groundwater-bearing unit at monitor well JKS-45, but appears to be discontinuous as it was not encountered during the installation of any other monitor wells in the vicinity of the Northern CCR Units. A CCR Well Network Location Map is provided as **Figure 3**.

Visual classifications of the geologic materials described above are consistent with results from the soil materials testing analysis conducted for samples collected at JKS-45, JKS-58, JKS-62, and JKS-64. The laboratory Unified Soil Classification System (USCS) results classify the high plasticity clay unit (above the groundwater-bearing unit) and the lower confining unit as fat clay (CH). Sandy lean clay (CL) and clayey sand (SC) USCS results from JKS-58 and JKS-62, respectively, suggest that the contact between the groundwater bearing unit and lower confining unit is gradational in some areas. The laboratory USCS results classify the groundwater-bearing unit from a silty sand (SM) at JKS-45 to a clayey sand (SC) at JKS-64. Hydraulic conductivities from cohesive samples collected from the lower confining unit were reported on the order of 10^{-7} to 10^{-8} centimeters per second (cm/sec), which is within the range of values for clay.

2.2.2 Southern CCR Units

The stratigraphic sequence is generally characterized by approximately 6 feet to 18 feet of unconsolidated material (sands, silts, and low to medium plasticity clays), underlain by clayey/silty sand to moderately-sorted sand (groundwater-bearing unit) approximately 9.5 to 21.5 feet thick, underlain by bedrock (sandstone). Discontinuous silts and interbedded clay material were observed within the groundwater-bearing unit in monitor wells JKS-48, JKS-49, and JKS-51 through JKS-55. A CCR Well Network Location Map is provided as **Figure 3**.

Visual classifications of the geologic materials described above are consistent with results from the soil materials testing analysis conducted for samples collected at JKS-48, JKS-53, and JKS-54. The laboratory USCS results classify the groundwater-bearing unit from a silty clayey sand (SC-SM) at JKS-54 to a clayey sand (SC) at JKS-48 and JKS-53. Hydraulic conductivities from cohesive samples collected from the lower confining unit were reported on the order of 10^{-6} to 10^{-8} (cm/sec).

2.3 SITE-WIDE HYDROGEOLOGY

Based on water level measurements and stratigraphic information collected during the advancement of the soil borings, ERM has provided an interpretation of the confining nature of the underlying stratigraphy. Information presented in the following subsections was obtained from the *Groundwater Monitoring System* report (ERM, October 2017).

2.3.1 Northern CCR Units

Groundwater in the vicinity of the Northern CCR Units appears to flow towards Lake Calaveras (southeast to east).

The groundwater-bearing unit in the vicinity of the Northern CCR Units appears to exhibit unconfined conditions based on the potentiometric surface of groundwater in relation to the first encountered water during drilling and the lack of continuous confining units (i.e., clay, sandy clay, or silty clay). The potentiometric surface is within approximately three feet of the first water encountered during drilling, and no continuous confining units are observed. The minimal change in elevation and the stratigraphic information indicates that a significant, laterally continuous confining layer is not present above the groundwater-bearing unit in the northern area. However, a laterally continuous lower confining unit was observed in multiple borings below the groundwater bearing unit.

2.3.2 *Southern CCR Units*

Groundwater in the vicinity of the Southern CCR Units appears to flow radially toward the lake and adjacent channel and away from a groundwater high represented by the water level elevation measured in JKS-49.

The groundwater-bearing unit in the vicinity of the Southern CCR Units appears to exhibit semi-confined conditions with confining units (i.e., clay, sandy clay, or silty clay) present in all the wells except JKS-49 and JKS-56. The potentiometric surface is within approximately 4 feet to 11 feet of where water was first encountered during drilling for all wells except JKS-56, indicative of groundwater under hydraulic head pressure with semi-confined conditions. JKS-56 appears to demonstrate unconfined conditions, due to the approximately 0.5 foot difference between the first encountered water during drilling and the potentiometric surface. There is a bedrock unit underlying the groundwater-bearing unit in the southern area.

2.4 *CCR RULE LOCATION RESTRICTION TECHNICAL REQUIREMENTS*

The U.S. Environmental Protection Agency (EPA) published rules for the management of CCR generated from electric utilities. The CCR Rule specifies requirements for active and inactive surface impoundments and active piles and landfills that manage CCR.

The evaluations discussed in this report are intended to address the following five location restrictions for the CCR units as outlined in the following CCR Rule requirements:

40 CFR §257.60 Placement Above the Uppermost Aquifer

(a) New CCR landfills, existing and new CCR surface impoundments, and all lateral expansions of CCR units must be constructed with a base that is located no less than 1.52 meters (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 groundwater elevations (including the seasonal high water table). The owner or operator must demonstrate by the dates specified in paragraph (c) of this section that the CCR unit meets the minimum requirements for placement above the uppermost aquifer.

40 CFR §257.61 Wetlands

(a) New CCR landfills, existing and new CCR surface impoundments, and all lateral expansions of CCR units must not be located in wetlands, as defined in § 232.2 of this chapter, unless the owner or operator demonstrates by the dates specified in paragraph (c) of this section that the CCR unit meets the requirements of paragraphs (a)(1) through (5) of this section.

(1) Where applicable under section 404 of the Clean Water Act or applicable state wetlands laws, a clear and objective rebuttal of the presumption that an alternative to the CCR unit is reasonably available that does not involve wetlands.

(2) The construction and operation of the CCR unit will not cause or contribute to any of the following:

- (i) A violation of any applicable state or federal water quality standard;
- (ii) A violation of any applicable toxic effluent standard or prohibition under section 307 of the Clean Water Act;
- (iii) Jeopardize the continued existence of endangered or threatened species or result in the destruction or adverse modification of a critical habitat, protected under the Endangered Species Act of 1973; and
- (iv) A violation of any requirement under the Marine Protection, Research, and Sanctuaries Act of 1972 for the protection of a marine sanctuary.

(3) The CCR unit will not cause or contribute to significant degradation of wetlands by addressing all of the following factors:

- (i) Erosion, stability, and migration potential of native wetland soils, muds and deposits used to support the CCR unit;
- (ii) Erosion, stability, and migration potential of dredged and fill materials used to support the CCR unit;
- (iii) The volume and chemical nature of the CCR;
- (iv) Impacts on fish, wildlife, and other aquatic resources and their habitat from release of CCR;
- (v) The potential effects of catastrophic release of CCR to the wetland and the resulting impacts on the environment; and
- (vi) Any additional factors, as necessary, to demonstrate that ecological resources in the wetland are sufficiently protected.

(4) To the extent required under section 404 of the Clean Water Act or applicable state wetlands laws, steps have been taken to attempt to achieve no net loss of wetlands (as defined by acreage and function) by first avoiding impacts to wetlands to the maximum extent reasonable as required by paragraphs (a)(1) through (3) of this section, then minimizing unavoidable impacts to the maximum extent reasonable, and finally offsetting remaining unavoidable wetland impacts through all appropriate and reasonable compensatory mitigation actions (e.g., restoration of existing degraded wetlands or creation of man-made wetlands); and

(5) Sufficient information is available to make a reasoned determination with respect to the demonstrations in paragraphs (a)(1) through (4) of this section.

40 CFR §257.62 Fault Areas

(a) New CCR landfills, existing and new CCR surface impoundments, and all lateral expansions of CCR units must not be located within 60 meters (200 feet) of the outermost damage zone of a fault that has had displacement in Holocene time unless the owner or operator demonstrates by the dates specified in paragraph (c) of this section that an alternative setback distance of less than 60 meters (200 feet) will prevent damage to the structural integrity of the CCR unit.

40 CFR §257.63 Seismic Impact Zones

(a) New CCR landfills, existing and new CCR surface impoundments, and all lateral expansions of CCR units must not be located in seismic impact zones unless the owner or operator demonstrates by the dates specified in paragraph (c) of this section that all structural components including liners, leachate collection and removal systems, and surface water control systems, are designed to resist the maximum horizontal acceleration in lithified earth material for the site.

40 CFR §257.64 Unstable Areas

(a) An existing or new CCR landfill, existing or new CCR surface impoundment, or any lateral expansion of a CCR unit must not be located in an unstable area unless the owner or operator demonstrates by the dates specified in paragraph (d) of this section 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.

3.0 *LOCATION RESTRICTIONS EVALUATION*

ERM evaluated technical compliance with the five location restrictions outlined in the CCR Rule through a combination of desktop reviews and obtaining site-specific information from engineering assessments, site investigations, and site visits. The certification from a qualified professional engineer stating that this *Location Restrictions Demonstration* meets the CCR Rule requirements is provided in **Appendix A**.

3.1 *PLACEMENT ABOVE THE UPPERMOST AQUIFER*

The CCR Rule defines an aquifer as "a geologic formation, group of formations, or portion of a formation capable of yielding usable quantities of groundwater to wells or springs". The CCR Rule also defines uppermost aquifer as "the geologic formation nearest the natural ground surface that is an aquifer, as well as lower aquifers that are hydraulically interconnected with this aquifer within the facility's property boundary. Upper limit is measured at a point nearest to the natural ground surface to which the aquifer rises during the wet season".

ERM obtained site-specific information from engineering assessments and site investigations to evaluate whether the bases of the CCR Units are located more than 1.52 meters (5 feet) above the upper limit of the uppermost aquifer. Information reviewed included:

- *CCR Units – 2017 Annual Inspection and Fugitive Dust Control Report, Calaveras Power Station* (ERM, January 2018); and
- *Groundwater Monitoring System, CPS Energy Calaveras Power Station* (ERM, October 2017)

The results of this evaluation are presented below for the individual CCR Units at the Calaveras Power Station.

3.1.1 *Fly Ash Landfill (FAL)*

Based on the review of the *CCR Units – 2017 Annual Inspection and Fugitive Dust Control Report* and as-built drawings, the elevation of the base of the FAL ranges from 514 to 503 feet above msl. The first groundwater beneath the FAL was encountered during well drilling at approximately 483 feet above msl, and static water levels range from 478 to 489 feet above msl based on current and historical water level data. A stratigraphic cross section (Section A-A') depicting the pertinent elevations is provided as **Figure 4**. Based on geotechnical analysis, the unit that overlies the first groundwater consists of fat clay, which typically has a hydraulic conductivity in the 10^{-8} cm/sec range signifying a very low permeability unit. Based on the above information, the base of the FAL is greater than 5 feet above the uppermost aquifer and unlikely to be in intermittent, recurring, or sustained hydraulic connection with the uppermost aquifer.

3.1.2 *Evaporation Pond (EP)*

Based on the review of the *CCR Units – 2017 Annual Inspection and Fugitive Dust Control Report* and as-built drawings, the elevation of the base of the EP ranges from 497 to 500 feet above msl. The first groundwater beneath the EP was encountered during well drilling at approximately 486 feet above msl, and static water levels range from 479 to 484 feet above msl based on current and historical water level data. A stratigraphic cross section (Section C-C') depicting the pertinent elevations is provided as **Figure 5**. Based on geotechnical analysis, the unit that overlies the first groundwater consists of interbedded sandy clay, which typically has a hydraulic conductivity in the 10^{-7} to 10^{-8} cm/sec range signifying a very low permeability unit. Based on the above information, the base of the EP is greater than 5 feet above the uppermost aquifer and unlikely to be in intermittent, recurring, or sustained hydraulic connection with the uppermost aquifer.

3.1.3 *Sludge Recycle Holding (SRH) Pond*

Based on the review of the *CCR Units – 2017 Annual Inspection and Fugitive Dust Control Report* and as-built drawings, the elevation of the base of the SRH Pond is 492 feet above msl. Although groundwater is under artesian conditions and rises to an elevation between 485 and 487 feet above msl based on available water level data, the first groundwater beneath the SRH Pond was encountered during well drilling at approximately 476 feet above msl. A stratigraphic cross section (Section D-D') depicting the pertinent elevations is provided as **Figure 6**. Based on geotechnical analysis, the unit that overlies the first groundwater consists of clayey sand, which typically has a hydraulic conductivity in the 10^{-6} to 10^{-8} cm/sec range signifying a low permeability unit. Based on the above information, the base of the SRH Pond is greater than 5 feet above the uppermost aquifer and unlikely to be in intermittent, recurring, or sustained hydraulic connection with the uppermost aquifer. Note that the first groundwater encountered in JKS-51 is perched water and not in hydraulic connection with the deeper, laterally continuous aquifer.

3.1.4 *North Bottom Ash Pond (BAP)*

Based on the review of the *CCR Units – 2017 Annual Inspection and Fugitive Dust Control Report* and as-built drawings, the elevation of the base of the BAPs ranges from 488 to 489 feet above msl. Although groundwater is under artesian conditions and rises to an elevation between 485 and 486 feet above msl based on available water level data, the first groundwater beneath the North BAP was encountered during well drilling ranging from 480 feet above msl in the south and 483.5 feet above msl in the north. A stratigraphic cross section (Section F-F') depicting the pertinent elevations is provided as **Figure 7**. Based on geotechnical analysis, the unit that overlies the first groundwater consists of clayey sand, which typically has a hydraulic conductivity in the 10^{-6} to 10^{-8} cm/sec range signifying a low permeability unit. Based on the above information, although portions of the North BAP are unlikely to be in intermittent, recurring, or sustained hydraulic connection with the uppermost aquifer, the base of the northern portion of the North BAP is less than 5 feet above the uppermost aquifer.

3.1.5 *South Bottom Ash Pond (BAP)*

Based on the review of the *CCR Units – 2017 Annual Inspection and Fugitive Dust Control Report* and as-built drawings, the elevation of the base of the BAPs ranges from 488 to 489 feet above msl. Stratigraphic cross sections (Section D-D′ and Section F-F′) depicting the pertinent elevations are provided as **Figure 6** and **Figure 7**, respectively. Although groundwater is under artesian conditions and rises to an elevation between 485 and 486 feet above msl based on available water level data, the first groundwater beneath the South BAP was encountered during well drilling at approximately 476 feet above msl. Based on geotechnical analysis, the unit that overlies the first groundwater consists of clayey sand, which typically has a hydraulic conductivity in the 10^{-6} to 10^{-8} cm/sec range signifying a low permeability unit. Based on the above information, the base of the South BAP is greater than 5 feet above the uppermost aquifer and unlikely to be in intermittent, recurring, or sustained hydraulic connection with the uppermost aquifer.

3.2 *WETLANDS*

40 CFR §232.2 (as referenced in the CCR Rule) defines wetlands as "those 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. Wetlands generally include swamps, marshes, bogs, and similar areas". Positive wetland indicators of three environmental parameters including hydrology, hydric soil, and hydrophytic vegetation are normally present within wetlands.

ERM obtained information from a desktop review and a site visit on 16 July 2018 to evaluate whether the CCR Units are located in potential wetlands and waters of the United States. Information reviewed included:

- Site Photographs;
- Historical aerial imagery;
- Topographic maps;
- U.S. Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS) Soil Surveys;
- U.S. Fish and Wildlife Service (USFWS) National Wetland Inventory (NWI);
- U.S. Geological Survey (USGS) National Hydrography Dataset (NHD);
- USFWS Information for Planning and Consultation (IPAC); and
- Texas Parks and Wildlife Department (TPWD) Calaveras Lake Survey Report.

The results of this evaluation are presented below for the individual CCR Units at the Calaveras Power Station. Supporting information including NWI maps and soil surveys/hydric ratings is provided in **Appendix B**.

3.2.1 *Fly Ash Landfill (FAL)*

Although one intermittent stream was mapped by the NHD north of the FAL, the desktop evaluation indicated that the FAL is not located in any wetlands or waterbodies mapped by the NWI or NHD. Soil survey data indicates that the FAL is located within soils mapped as Aluf sand, 0 to 5% slopes (EuC); Wilco loamy fine sand, 0 to 3 percent slopes (HkB); and Floresville fine sandy loam, 1 to 5 percent slopes, eroded (WeC2). Each of these soils has a hydric rating of "0", indicating that zero percent of the soil components meet the criteria for hydric soils. Review of historical aerial imagery did not indicate any wetlands historically existed in the footprint of the FAL. Pertinent wetlands assessment features associated with the FAL are shown on **Figure 8**.

The site visit confirmed that the FAL was not located in any wetlands or waterbodies. One intermittent stream was observed approximately 100 feet north of the buffer for the FAL that did not exhibit flow at the time of the site visit. The stream appeared to flow toward the southeast, where it lost a defined bed and banks and no longer exhibited an ordinary high water mark; therefore it is not likely jurisdictional waters of the United States.

3.2.2 *Evaporation Pond (EP)*

Although one wetland area [Palustrine Unconsolidated Shore, Temporarily Flooded, diked/impounded (PUSAh)] was mapped by the NWI south of the EP, the desktop evaluation indicated that the EP is not located in any wetlands or waterbodies mapped by the NWI or NHD. Soil survey data indicates that the EP is located within soils mapped as Wilco loamy fine sand, 0 to 3 percent slopes (HkB). This soil has a hydric rating of "0", indicating that zero percent of the soil components meet the criteria for hydric soils. Review of historical aerial imagery did not indicate any wetlands historically existed in the footprint of the EP, and that the area mapped as wetlands south of the EP appeared to result from excavation activity between 1985 and 1995. Pertinent wetlands assessment features associated with the EP are shown on **Figure 9**.

The site visit confirmed that the EP was not located in any wetlands or waterbodies. The wetland area mapped approximately 100 feet south of the buffer for the EP was observed to be two emergent wetlands within depressions resulting from excavation and berms. The wetlands appeared manmade and isolated; therefore they are expected to be non-jurisdictional.

3.2.3 *Sludge Recycle Holding (SRH) Pond*

Although open water areas associated with Calaveras Lake and one wetland area [Lacustrine, Limnetic, Unconsolidated Bottom, Permanently Flooded, diked/impounded (L1UBHh)] were mapped by the NWI south of the SRH Pond (within the intake canal), the desktop evaluation indicated that the SRH Pond is not located in any wetlands or waterbodies mapped by the NWI or NHD. Soil survey data indicates that the SRH Pond is located within soils mapped as Wilco loamy fine sand, 0 to 3 percent slopes and 3 to 5 percent slopes (HkB and HkC). These soils have a hydric rating of "0", indicating that zero percent of the soil components meet the criteria for hydric soils. Review of historical aerial imagery did not indicate any wetlands historically existed in the footprint of the SRH Pond, and that Calaveras Lake and the intake canal were created between 1966 and 1973. Pertinent wetlands assessment features associated with the SRH Pond are shown on **Figure 10**.

The site visit confirmed that the SRH Pond was not located in any wetlands or waterbodies. A concrete-lined drainage ditch was observed approximately 100 feet south of the buffer for the SRH Pond. The drainage ditch is manmade and associated with a facility outfall; therefore it is expected to be non-jurisdictional.

3.2.4 North and South Bottom Ash Ponds (BAPs)

Although open water areas associated with Calaveras Lake and one wetland area [Lacustrine, Limnetic, Unconsolidated Bottom, Permanently Flooded, diked/impounded (L1UBHh)] were mapped by the NWI south of the BAPs (within intake canal), and the BAPs are mapped as Palustrine, Unconsolidated Shore/Bottom, and Artificially/Permanently Flooded and excavated (PUSKx/PUBHx) areas by the NWI, the desktop evaluation indicated that the BAPs are not located in any wetlands or waterbodies mapped by the NWI or NHD. Soil survey data indicates that the BAPs are located within soils mapped as Wilco loamy fine sand, 0 to 3 percent slopes and 3 to 5 percent slopes (HkB and HkC). These soils have a hydric rating of "0", indicating that zero percent of the soil components meet the criteria for hydric soils. Review of historical aerial imagery did not indicate any wetlands historically existed in the footprint of the BAPs; however, imagery pre-dating the facility construction indicates there may have been an intermittent stream north of the BAPs in the area that is currently a cove of Calaveras Lake. Pertinent wetlands assessment features associated with the BAPs are shown on **Figure 11**.

The site visit confirmed that the BAPs were not located in any wetlands or waterbodies. A concrete-lined drainage ditch was observed approximately 50 feet south of the buffer for the South BAP. The drainage ditch is manmade and is a continuation of the non-jurisdictional drainage ditch described south of the SRH Pond. Although the east buffer of the BAPs is generally approximately 300 feet from Calaveras Lake, there is a cove located approximately 100 feet from the northeast corner of the North BAP. An approximately 6-foot fringe of wetland vegetation was observed along the edge of the water in the cove, but did not extend up towards the buffer of the North BAP.

3.3 FAULT AREAS

The CCR Rule defines fault as "a fracture or a zone of fractures in any material along which strata on one side have been displaced with respect to that on the other side". The CCR Rule also defines displacement as "the relative movement of any two sides of a fault measured in any direction".

ERM obtained information from a desktop review to evaluate whether the CCR Units are located within 60 meters (200 feet) of the outermost damage zone of a fault that has had displacement in Holocene time. Information reviewed included:

- USGS Geologic Map (https://txpub.usgs.gov/dss/texasgeology);
- USGS Fault Map (https://earthquake.usgs.gov/hazards/qfaults/map/#qfaults); and
- Quaternary Fault and Fold Databases (https://earthquake.usgs.gov/cfusion/qfault/ query_results_AB.cfm) and (https://earthquake.usgs.gov/cfusion/qfault/query_results_ CD.cfm)

The results of this evaluation are presented below for all the CCR Units collectively at the Calaveras Power Station.

The geology underlying the Calaveras Power Station includes the Wilcox Group that consists mostly of Eocene mudstone, with various amounts of sandstone and lignite. The Wilcox Group overlies the Midway Group, a Paleocene clay and sand. According to the Geologic Map provided as **Figure 12**, the Midway Group crops out approximately 7,000 feet north of the closest CCR unit (FAL). An unnamed normal fault is mapped approximately 8,000 feet north of the FAL and bounds the northern exposure of the Midway Group in this area. This fault dies out to the east, and to the west the fault is covered by the Pleistocene Leona Formation and Fluviatile terrace deposits and by the Pliocene Uvalde Gravel. These geologic units are all older than Holocene and do not show displacement.

According to the Fault Map provided as **Figure 13**, there are no Quaternary faults identified in proximity to the Calaveras Power Station. In addition, a review of the Quaternary Fault and Fold Database of the United States did not identify any Class A, Class B, Class C or Class D faults in Bexar County, Texas.

3.4 SEISMIC ZONES

The CCR Rule defines a seismic impact zone as "an area having a 2% or greater probability that the maximum expected horizontal acceleration, expressed as a percentage of the earth's gravitational pull (g), will exceed 0.10g in 50 years".

ERM obtained information from a desktop review to evaluate whether the CCR Units are located within a seismic impact zone. Information reviewed included:

- USGS Seismic Hazard Map (https://earthquake.usgs.gov/earthquakes/byregion/images/texas-haz); and
- USGS South Texas Earthquakes 1900-2018 (https://earthquake.usgs.gov/earthquakes/search).

The results of this evaluation are presented below for all the CCR Units collectively at the Calaveras Power Station.

The USGS produced a national Seismic Hazard Map of the 2% probability of exceedance in 50 years of peak ground acceleration. A portion of the Seismic Hazard Map that includes the State of Texas is provided as **Figure 14**. Based on this map, the Calaveras Power Station is located in the mapped area of 2-4%g. Note that the units in **Figure 14** are reported in %g. As such, a value of 2-4%g is equivalent to 0.02-0.04g and not greater than 0.10g in 50 years.

In addition, according to the South Texas Earthquakes Map provided as **Figure 15**, the nearest earthquake in proximity to the Calaveras Power Station was located in western Wilson County, more than 10 miles to the south. The earthquake occurred on 8 August 1984 as a magnitude 3 earthquake at a depth of 5 km. A search of earthquakes in Bexar County did not reveal any historical earthquakes from 1900 to July 2018.

3.5 UNSTABLE AREAS

The CCR Rule defines an unstable area 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 releases from such unit. Unstable areas can include poor foundation conditions, areas susceptible to mass movements, and karst terrains". The CCR Rule also defines areas susceptible to mass movement as "those areas of influence (i.e., areas characterized as having an active or substantial possibility of mass movement) where, because of natural or human-induced events, the movement of earthen material at, beneath, or adjacent to the CCR unit results in the downslope transport of soil and rock material by means of gravitational influence. Areas of mass movement include, but are not limited to, landslides, avalanches, debris slides and flows, soil fluctuation, block sliding, and rock fall". In addition, the CCR Rule defines karst terrain means as "an area where karst topography, with its characteristic erosional surface and subterranean features, is developed as the result of dissolution of limestone, dolomite, or other soluble rock. Characteristic physiographic features present in karst terranes include, but are not limited to, dolines, collapse shafts (sinkholes), sinking streams, caves, seeps, large springs, and blind valleys".

ERM obtained information from a desktop review and site-specific information from engineering assessments to evaluate whether the CCR Units are located within unstable areas. Information reviewed included:

- *Geotechnical Engineering Study for Ash Pond Berms – Spruce/Deely Generation Units, San Antonio, Texas* (Raba Kistner Consultants, May 2014) (Appendix A in CDM Smith reports);
- *Assessment of Dam Safety of Coal Combustion Surface Impoundments Final Report, J.T. Deely Power Plant* (CDM Smith, June 2014);
- *Assessment of Dam Safety of Coal Combustion Surface Impoundments Final Report, J.K. Spruce Power Plant* (CDM Smith, June 2014);
- *Structural Stability and Safety Factor Assessments, Calaveras Power Station, San Antonio, Texas* (ERM, October 2016);
- *Bexar County Area Karst Zones Map from Delineation of Hydrogeologic Areas and Zones for the Management and Recovery of Endangered Karst Invertebrate Species in Bexar County, Texas* (Veni, George & Associates, April 2003); and
- *Groundwater Monitoring System, CPS Energy Calaveras Power Station* (ERM, October 2017).

The results of this evaluation are presented below for all the CCR Units collectively at the Calaveras Power Station.

3.5.1 Structural Integrity

As summarized in the CDM Smith reports, embankment material is light clay (ASTM "CL") with clay fraction of approximately 45%, and an assumed liquid limit between 35 and 47. Foundation material for the BAPs and SRH Pond consists of sandy clay (ASTM "CL") with clay fraction between 50% and 60%, and liquid limit approximately 51; or clayey sand (ASTM "ML") with clay fraction approximately 35% and liquid limit approximately 33. Foundation material for the EP is similar, except the liquid limits are approximately 55.

No information on the embankment and foundation materials were available for the FAL, but foundation materials are anticipated to be similar to those of the EP based on the proximity of the units.

3.5.2 Structural Stability and Safety Factor Assessments

Structural stability and safety factors for the surface impoundments were summarized in the CDM Smith reports and ERM report. Based on these reports, the surface impoundments are structurally stable, with safety factors that meet the CCR Rule requirements.

Based on the annual inspections of all the CCR Units starting in 2015, no visual evidence of geometry changes or other evidence of differential settlement have occurred at the CCR Units.

3.5.3 Mass Material Movement Considerations

With the exception of the engineered berms that have previously been assessed, slopes at the Calaveras Power Station are gradual, with grades ranging from 0%

to 5%. Based on the annual inspections of all the CCR Units starting in 2015, the land surrounding the CCR Units does not show evidence of movement, including slumping, tension cracks, hummocky topography, or vegetation growth that would suggest slow moving soil (curved tree trunks/trunks angled toward the upward slope). Liquefaction was considered in the CDM Smith reports and considered to be very low risk for the CCR Units based on two factors: 1) the limited potential for earthquakes in the area (discussed in Section 3.4) and 2) presence of cohesive soils. A review of the soil borings and geologic cross sections indicate a variety of clays, silts and clayey silts, and clayey and silty sands in the uppermost 25 to 30 feet below ground surface. At the Southern CCR Units, sandstone was encountered at a depth of approximately 25 feet below ground surface.

In addition, a review of historical topographic maps from before Calaveras Lake was created do not indicate a topography that has experienced extensive mass wasting, other than expected stream incisions in an area of generally flat or gently sloping topography. Also note that the presence of Calaveras Lake is a stabilizing feature in the area. In general, according to CPS Energy, Calaveras Lake is maintained at an elevation of approximately 485 feet above msl, with a variability of approximately 0.5 feet under normal conditions.

3.5.4 Karst Terrain

An evaluation of potential karst terrain was conducted using the Bexar County Area Karst Zones Map provided as **Figure 16**. The Calaveras Power Station is located in Karst Zone 5, which is not known to contain karst invertebrate species and associated karst features. The karst zones are based on a review of geological maps depicting the Edwards Aquifer recharge zone and the Glen Rose Formation within Bexar County, Texas.

4.0 *CONCLUSIONS*

The evaluations, documented in this *Location Restrictions Demonstration*, concluded the following:

<u>Placement Above the Uppermost Aquifer</u>

Based on the review of the *CCR Units – 2017 Annual Inspection and Fugitive Dust Control Report,* as-built drawings, site-specific groundwater elevation data and soil geotechnical data, the bottom (bases) of the Fly Ash Landfill (FAL), Evaporation Pond (EP), Sludge Recycle Holding (SRH) Pond, and South Bottom Ash Pond (BAP) are more than 5 feet above the uppermost aquifer and unlikely to be in intermittent, recurring, or sustained hydraulic connection with the uppermost aquifer. Therefore, these four CCR Units meet the minimum requirements of 40 CFR §257.60.

Based on the review of the *CCR Units – 2017 Annual Inspection and Fugitive Dust Control Report*, as-built drawings, site-specific groundwater elevation data and soil geotechnical data, although portions of the North BAP are unlikely to be in intermittent, recurring, or sustained hydraulic connection with the uppermost aquifer, the bottom (base) of the northern portion of the North BAP is less than 5 feet above the uppermost aquifer. Therefore, this CCR Unit does not meet the minimum requirements of 40 CFR §257.60.

<u>Wetlands</u>

Based on the lack of current or historical evidence of wetland hydrology, hydric soils, or hydrophytic vegetation, all five CCR units are not located within any wetlands. Therefore, all five CCR Units meet the minimum requirements of 40 CFR §257.61.

<u>Fault Areas</u>

Based on a review of published geologic and fault maps and fault and fold databases, all five CCR Units are not located within 60 meters (200 feet) of a fault that has had displacement in Holocene time. Therefore, all five CCR Units meet the minimum requirements of 40 CFR §257.62.

<u>Seismic Impact Zones</u>

Based on review of published seismic hazard and earthquake maps, all five CCR Units are not located in seismic impact zones. Therefore, all five CCR Units meet the minimum requirements of 40 CFR §257.63.

<u>Unstable Areas</u>

Based on the review of structural and safety factor assessments, annual inspections, soil boring logs and geologic cross sections, and topographic and karst zones maps, all five CCR Units are not located in unstable areas. Therefore, all five CCR Units meet the minimum requirements of 40 CFR §257.64.

Figures

October 2018

Environmental Resources Management
206 East 9th Street, Suite 1700
Austin, Texas 78701
(512) 459-4700

Environmental Resources Management

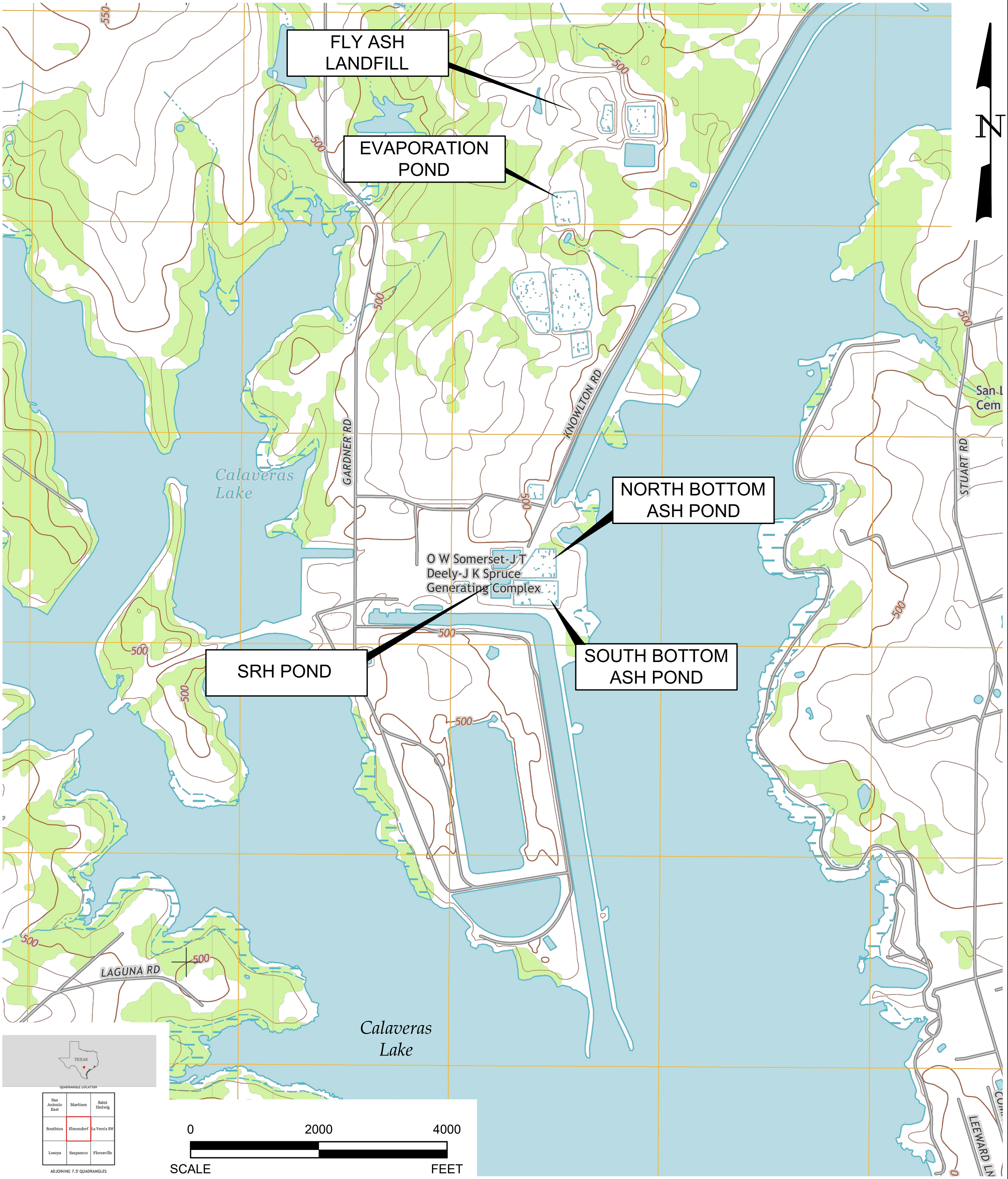
DESIGN:	NH	DRAWN:	EFC	CHKD.:	WZ
DATE:	7/25/2016	SCALE:	AS SHOWN	REVISION:	1

W.O.NO.: K:\GIS\CPS\Calaveras\MXD\0337367_CPSCalaveras_SiteLoc.mxd

FIGURE 1
GENERAL SITE LOCATION MAP

CPS Energy - Calaveras Power Station
San Antonio, Texas

ERM



ERM-Southwest, Inc. TX PE Firm No. 2393

Environmental Resources Management

DESIGN: CC	DRAWN: RLM	CHKD.: CC
DATE: 9/19/2018	SCALE: AS SHOWN	REV.:
W.O. NO.: T:\DWG\AutoCAD\dwg\0337367\0337367_CCRUnitLocs_topo.dwg		

FIGURE 2
CCR UNIT LOCATIONS

CPS Energy - Calaveras Power Station
San Antonio, Texas

ERM

Environmental Resources Management

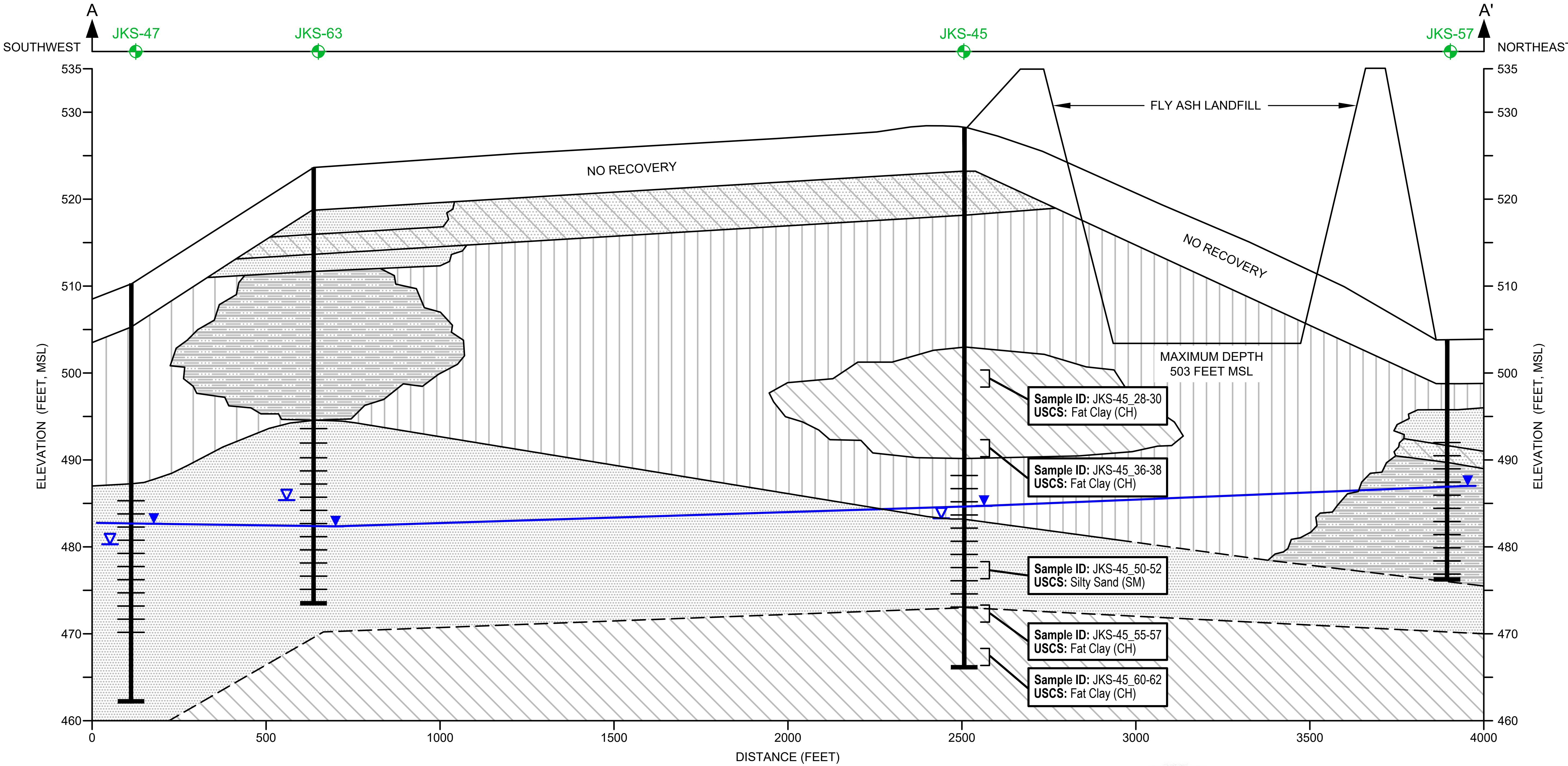
DESIGN: NH	DRAWN: EFC	CHKD.: WZ
DATE: 9/19/2018	SCALE: AS SHOWN	REVISION: 0

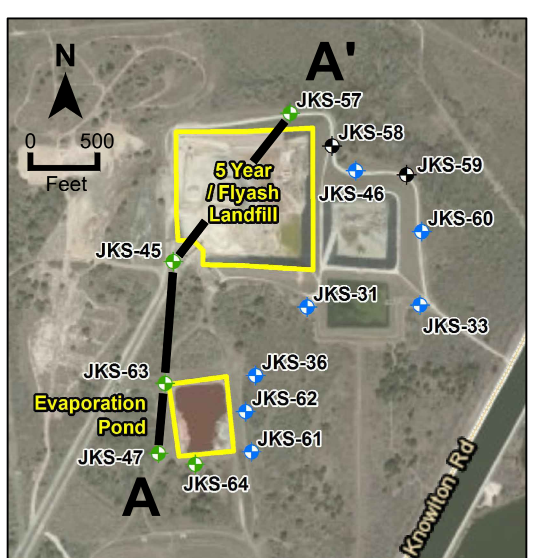
W.O.NO.: P:\Projects\0366643 CPS Energy Calaveras CCR Well Network.WZ\GIS\MXD\HydroInv\0337367_CPSCalv_WellsLocs2.mxd

FIGURE 3
CCR WELL NETWORK LOCATION MAP

CPS Energy - Calaveras Power Station
San Antonio, Texas

ERM





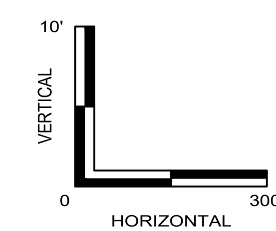
LEGEND

- SAND, SILTY SAND, AND/OR CLAYEY SAND
- SILT, SANDY SILT, AND/OR CLAYEY SILT
- LOW TO MEDIUM PLASTICITY CLAY, SANDY CLAY, AND/OR SILTY CLAY
- HIGH PLASTICITY CLAY
- INTERBEDDED SAND, AND CLAY
- POTENTIOMETRIC SURFACE (MEASURED DECEMBER 6, 2016)
- INITIAL GROUNDWATER LEVEL ENCOUNTERED DURING WELL INSTALLATION
- MONITOR WELL (SCREENED INTERVAL DASHED)
- BACKGROUND MONITOR WELL

SOIL TEST DATA KEY

Sample ID
USCS Soil Classification

MELISSA BOYSUN
GEOLOGY
No. 11387
LICENSED
PROFESSIONAL GEOSCIENTIST
STATE OF TEXAS
10/13/2017



Notes:
1. Approximate ground surface elevation interpolated from surveyed elevations.
2. Aerial Source: ESRI.

Environmental Resources Management

Figure 4
Stratigraphic Cross Section A-A'
Groundwater Monitoring System
CPS Energy - Calaveras Power Station
San Antonio, Texas

ERM

DESIGN: NH	DRAWN: RLM	CHKD.:
DATE: 9/17/2018	SCALE: AS SHOWN	REV.:

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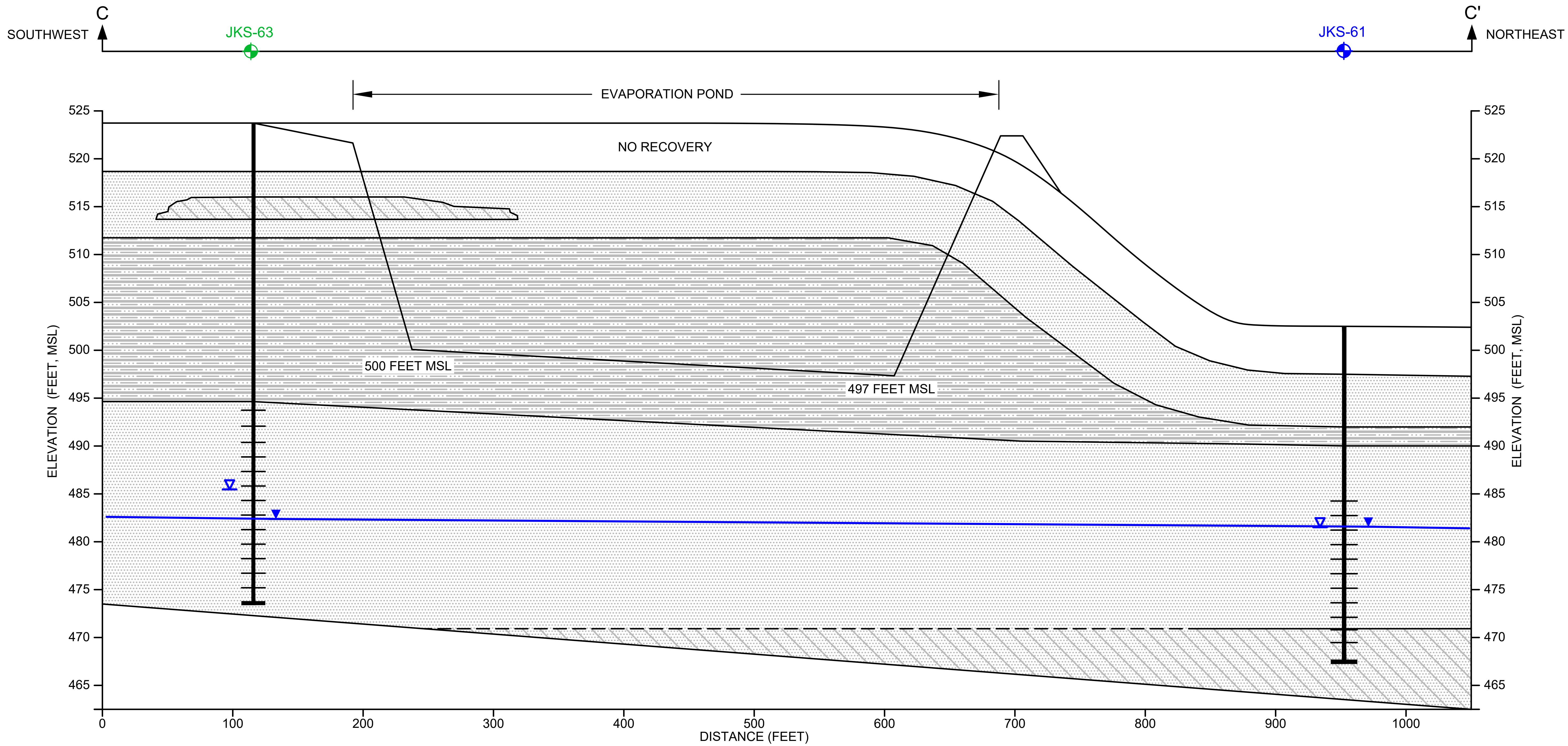
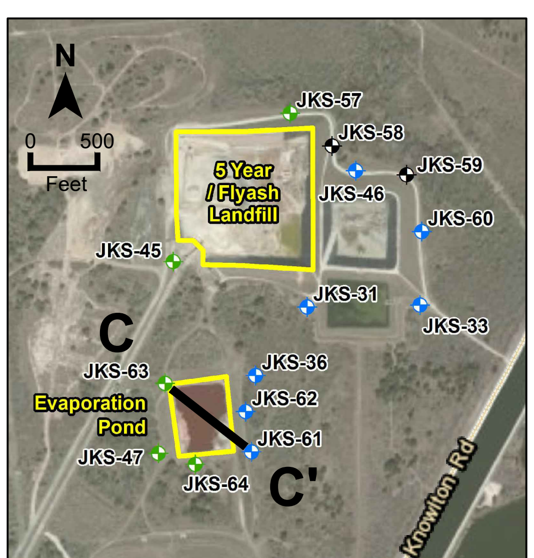
ERM-Southwest, Inc. TX PE Firm No. 2393

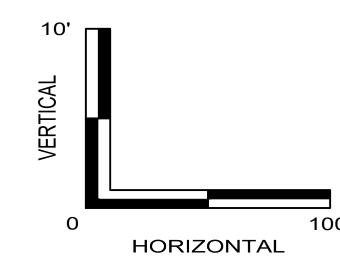




LEGEND

- SAND, SILTY SAND, AND/OR CLAYEY SAND
- SILT, SANDY SILT, AND/OR CLAYEY SILT
- LOW TO MEDIUM PLASTICITY CLAY, SANDY CLAY, AND/OR SILTY CLAY
- HIGH PLASTICITY CLAY
- INTERBEDDED SAND, AND CLAY
- POTENTIOMETRIC SURFACE (MEASURED DECEMBER 6, 2016)
- INITIAL GROUNDWATER LEVEL ENCOUNTERED DURING WELL INSTALLATION
- MONITOR WELL (SCREENED INTERVAL DASHED)
- DOWNGRADIENT MONITOR WELL
- BACKGROUND MONITOR WELL

STATE OF TEXAS
MELISSA BOYSUN
GEOLOGY
No. 11387
LICENSED
PROFESSIONAL GEOSCIENTIST
10/31/2017



Notes:
1. Approximate ground surface elevation interpolated from surveyed elevations.
2. Aerial Source: ESRI.

Environmental Resources Management

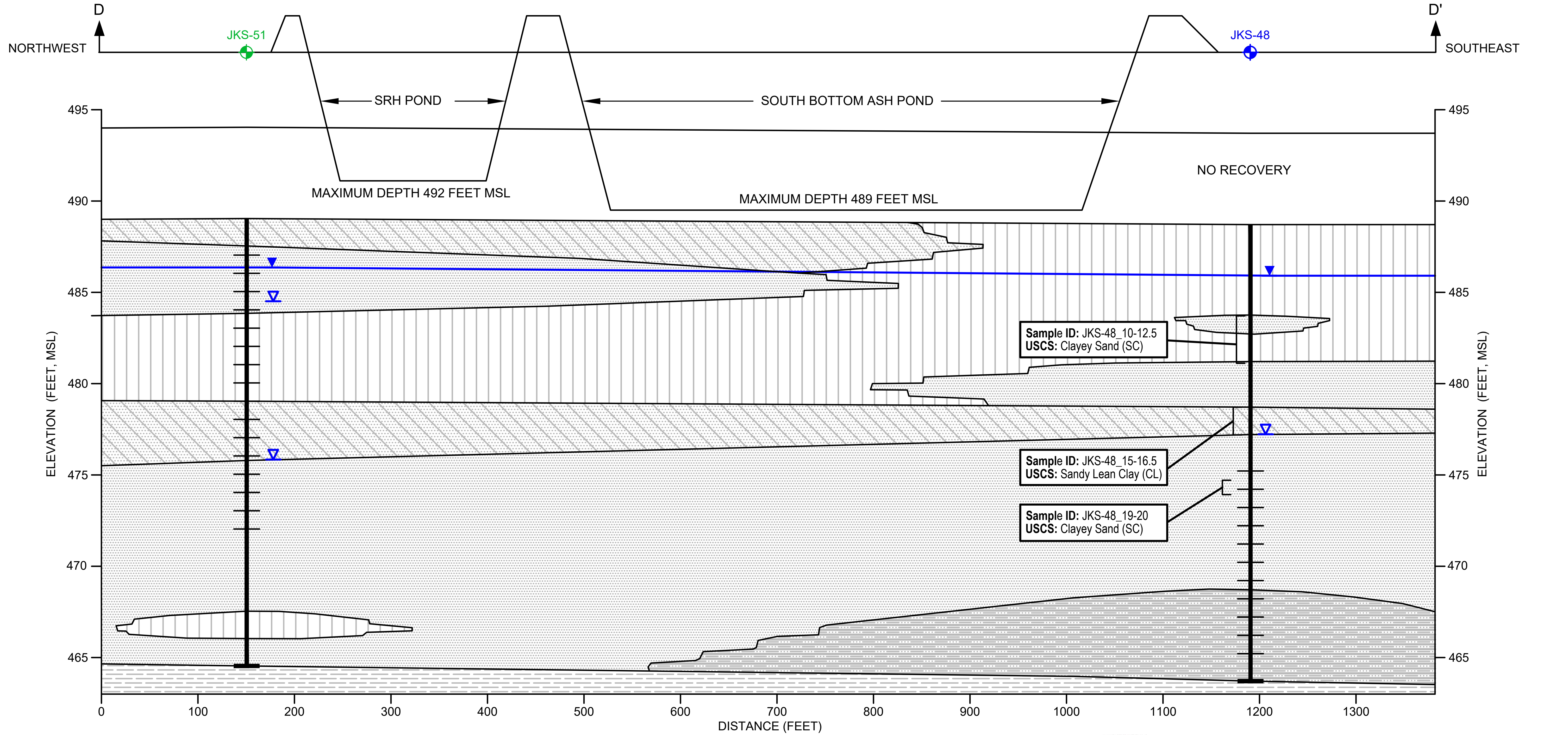
Figure 5
Stratigraphic Cross Section C-C'
Groundwater Monitoring System
CPS Energy - Calaveras Power Station
San Antonio, Texas

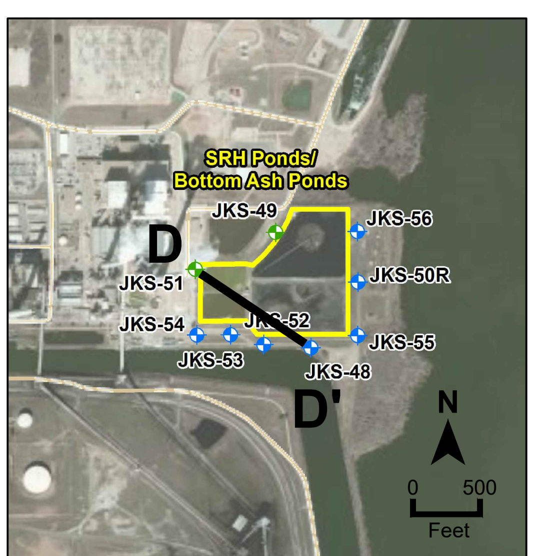
ERM

DESIGN: NH	DRAWN: RLM	CHKD.:
DATE: 9/17/2018	SCALE: AS SHOWN	REV.:

W.O.NO.: T:\DWG\AutoCAD\dwg\0337367\0337367_xsecs.dwg, 9/17/2018 12:14:57 PM

ERM-Southwest, Inc. TX PE Firm No. 2393



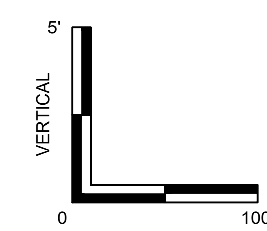


LEGEND

- SAND, SILTY SAND, AND/OR CLAYEY SAND
- SILT, SANDY SILT, AND/OR CLAYEY SILT
- LOW TO MEDIUM PLASTICITY CLAY, SANDY CLAY, AND/OR SILTY CLAY
- INTERBEDDED SAND, SILT, AND CLAY
- BEDROCK (SANDSTONE)
- POTENTIOMETRIC SURFACE (MEASURED DECEMBER 6, 2016)
- INITIAL GROUNDWATER LEVEL ENCOUNTERED DURING WELL INSTALLATION
- MONITOR WELL (SCREENED INTERVAL DASHED)
- DOWNGRADIENT MONITOR WELL
- BACKGROUND MONITOR WELL

SOIL TEST DATA KEY

Sample ID
USCS Soil Classification



Notes:
1. Approximate ground surface elevation interpolated from surveyed elevations.
2. Aerial Source: ESRI.

Environmental Resources Management

Figure 6
Stratigraphic Cross Section D-D'
Groundwater Monitoring System
CPS Energy - Calaveras Power Station
San Antonio, Texas

ERM

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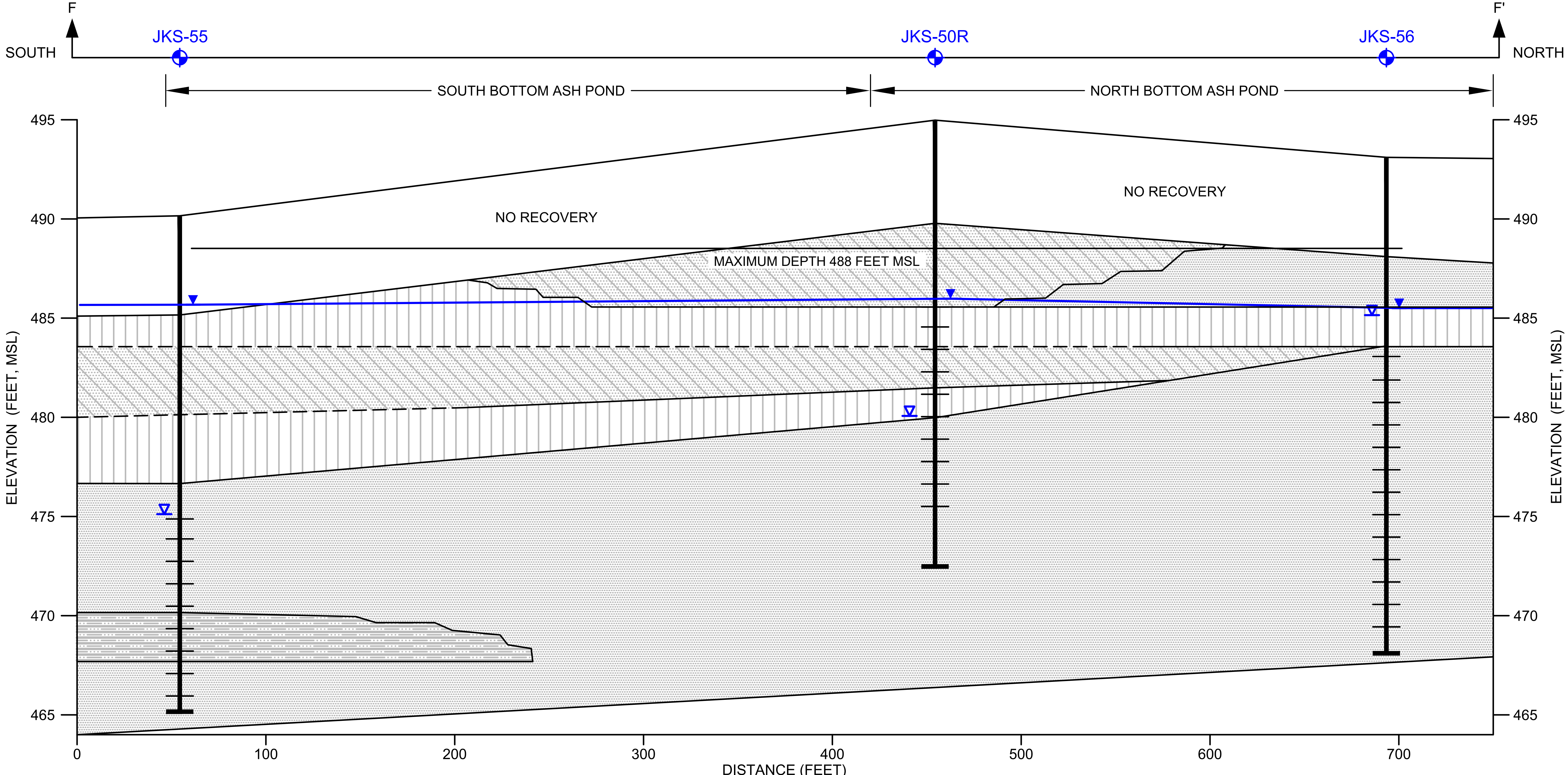
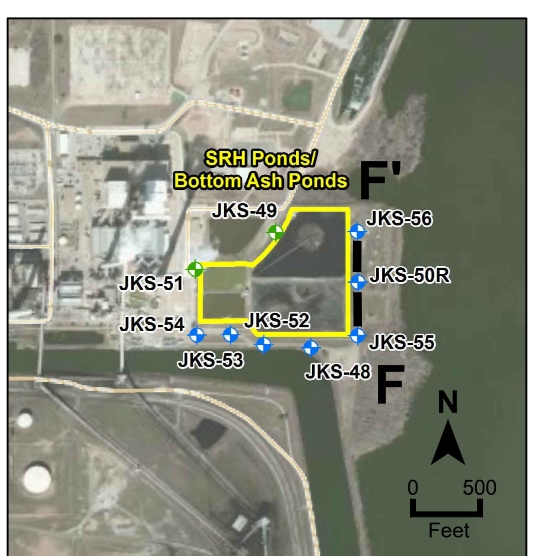
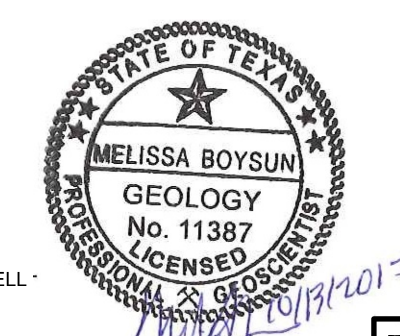
ERM-Southwest, Inc. TX PE Firm No. 2393

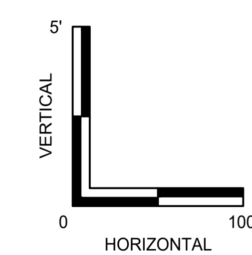




LEGEND

	SAND, SILTY SAND, AND/OR CLAYEY SAND
	SILT, SANDY SILT, AND/OR CLAYEY SILT
	LOW TO MEDIUM PLASTICITY CLAY, SANDY CLAY, AND/OR SILTY CLAY
	INTERBEDDED SAND, AND CLAY
	BEDROCK (SANDSTONE)
	POTENTIOMETRIC SURFACE (MEASURED DECEMBER 6, 2016)
	INITIAL GROUNDWATER LEVEL ENCOUNTERED DURING WELL INSTALLATION
	MONITOR WELL (SCREENED INTERVAL DASHED)
	DOWNGRADIENT MONITOR WELL





Notes:
1. Approximate ground surface elevation interpolated from surveyed elevations.
2. Aerial Source: ESRI.

Environmental Resources Management

Figure 7
Stratigraphic Cross Section F-F'
Groundwater Monitoring System
CPS Energy - Calaveras Power Station
San Antonio, Texas

ERM

DESIGN: NH	DRAWN: EFC	CHKD.: WZ
DATE: 9/17/2018	SCALE: AS SHOWN	REV.: 1

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ERM-Southwest, Inc. TX PE Firm No. 2393

Legend

- Upland Point
- Intermittent Stream
- Unit Boundary

Figure 8
Fly Ash Landfill
Wetlands Assessment
CPS Energy - Calaveras Power Station
San Antonio, Texas

ERM

H:\Projects\0352436 CPS Energy Calaveras CCR Engineering WZ\GIS\MXD\WetlandsAssessment2018\WetlandsAssessment2018.aprx, REVISED: 09/19/2018, SCALE: 1: when printed at 8.5x11 DRAWN BY: GIS

Source: Esri - World Topographic Map;

Legend

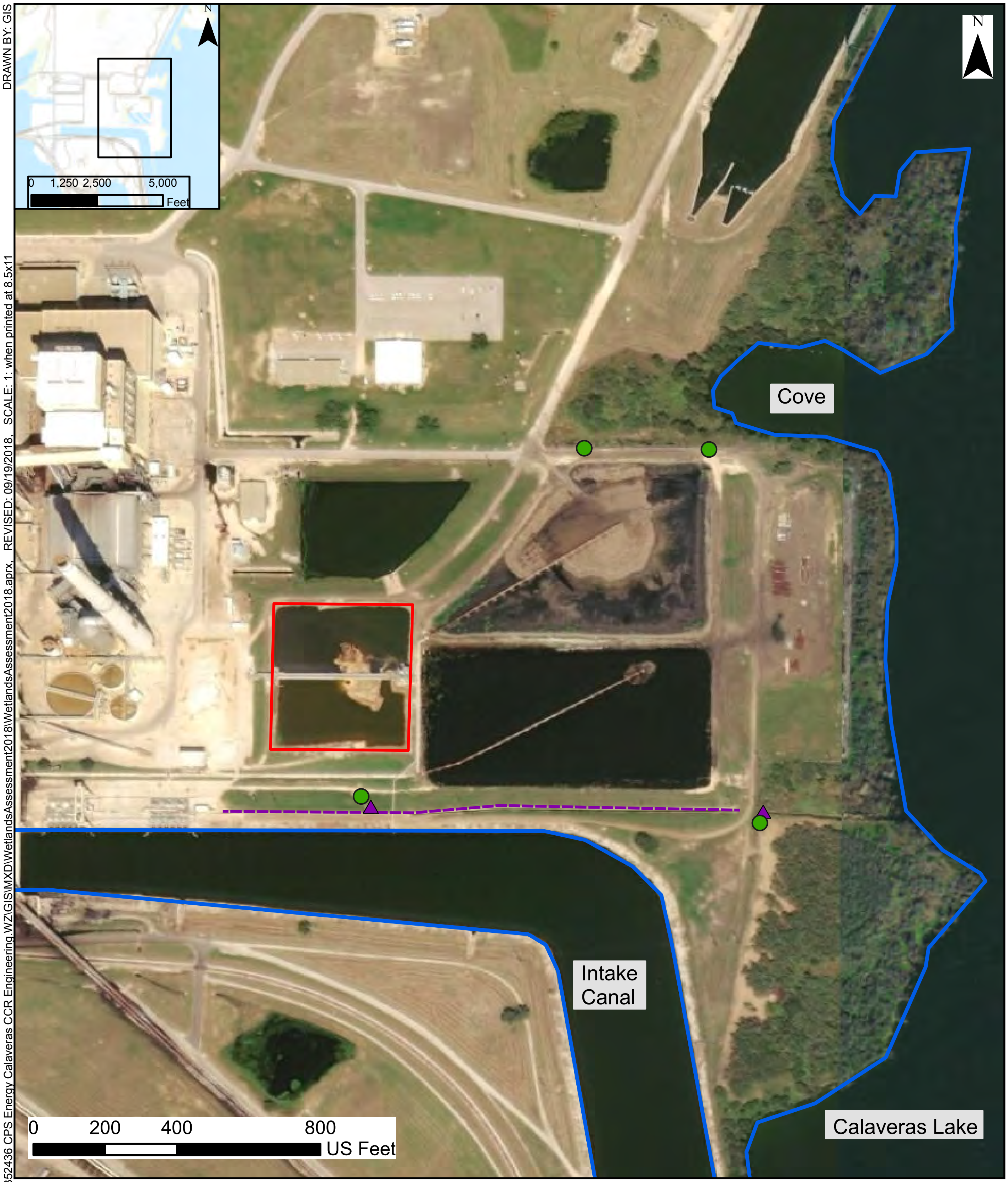
- Upland Point
- Wetland Point
- Wetland Area
- UnitBoundary

Figure 9
Evaporation Pond
Wetlands Assessment
CPS Energy - Calaveras Power Station
San Antonio, Texas

ERM

Source: Esri - World Topographic Map;

DRAWN BY: GIS
\\ushoufs01\data\Houston\Projects\0352436 CPS Energy Calaveras CCR Engineering.WZ\GIS\MXD\WetlandsAssessment2018\WetlandsAssessment2018.aprx. REVISED: 09/19/2018. SCALE: 1: when printed at 8.5x11



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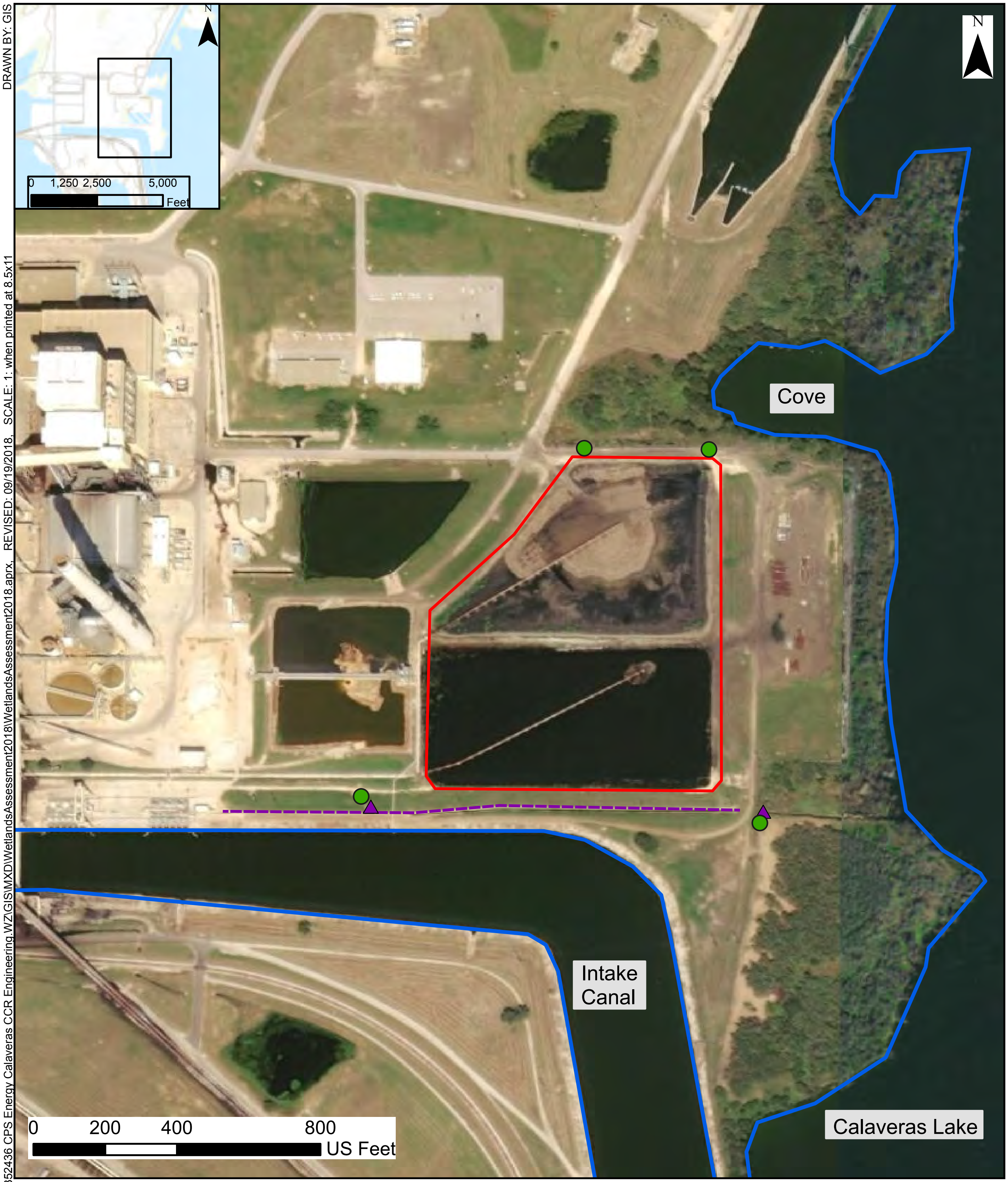
Legend

- Upland Point
- Drain / Outfall
- Ditch
- Unit Boundary

Figure 10
SRH Pond
Wetlands Assessment
CPS Energy - Calaveras Power Station
San Antonio, Texas

ERM

Source: Esri - World Topographic Map;



DRAWN BY: GIS REVISED: 09/19/2018, SCALE: 1: when printed at 8.5x11

\\ushoufs01\data\Houston\Projects\0352436 CPS Energy Calaveras CCR Engineering.WZ\GIS\MXD\WetlandsAssessment2018\WetlandsAssessment2018.aprx

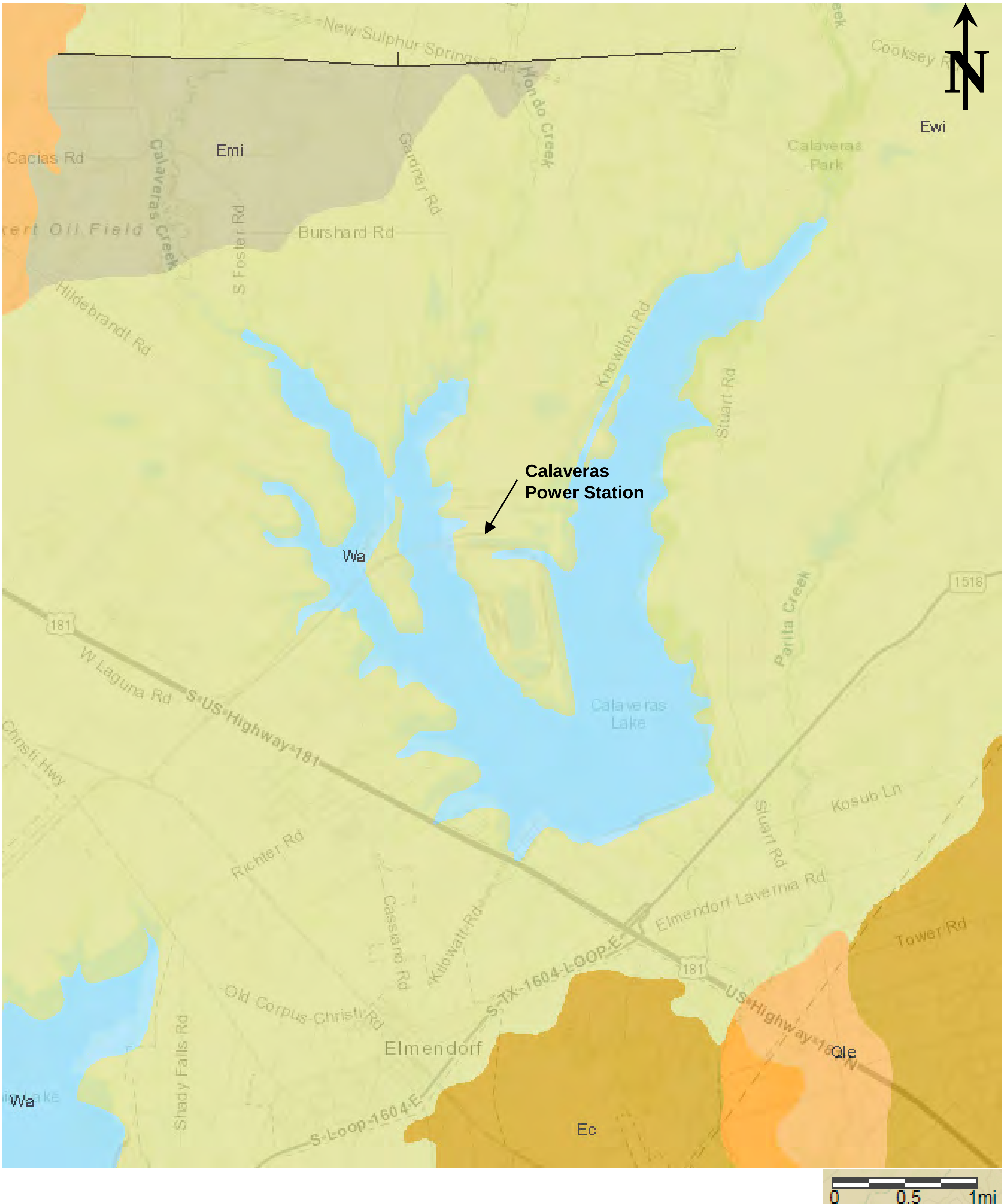
Legend

- Upland Point
- Drain / Outfall
- Ditch
- Unit Boundary

Figure 11
Bottom Ash Ponds
Wetlands Assessment
CPS Energy - Calaveras Power Station
San Antonio, Texas

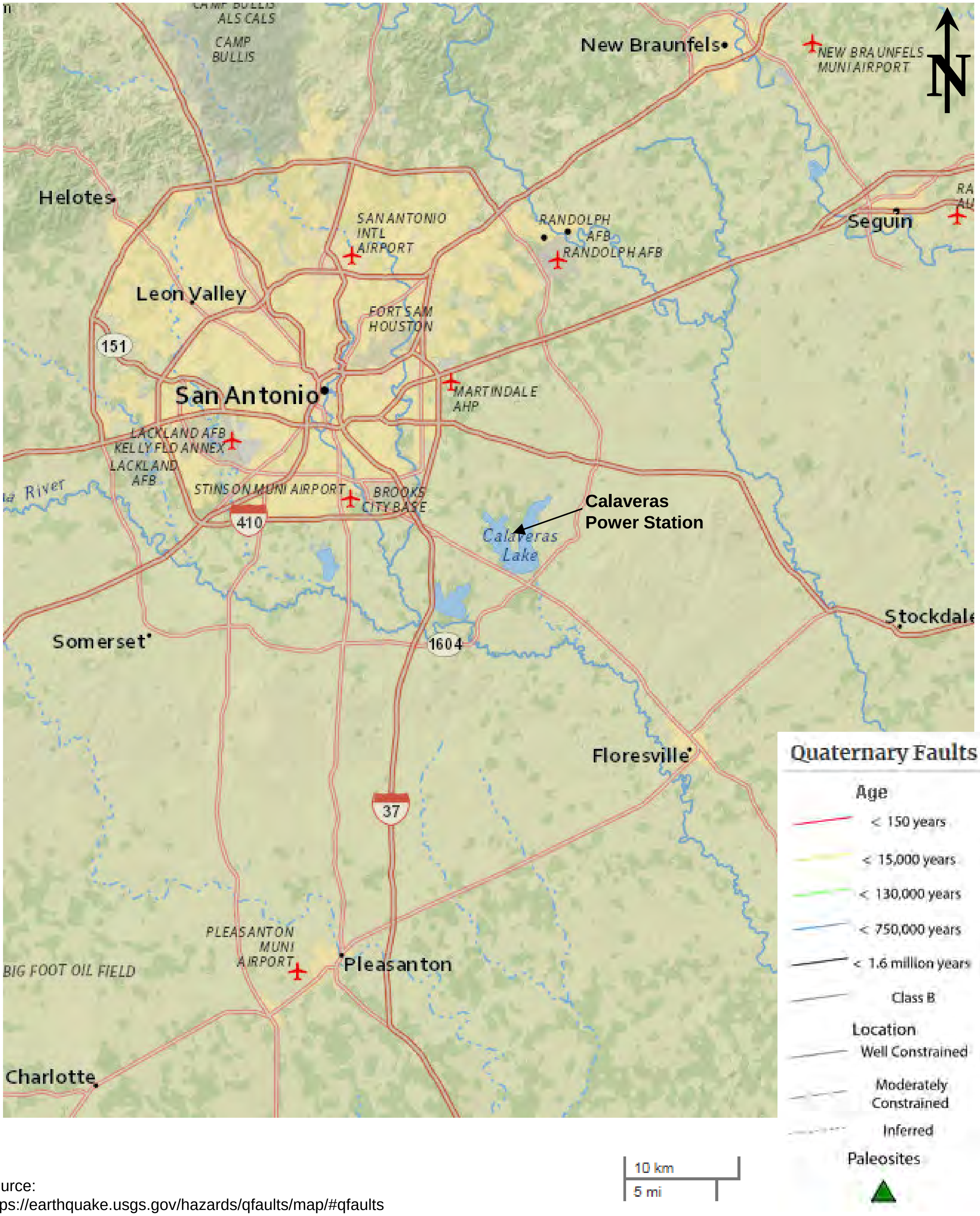
ERM

Source: Esri - World Topographic Map;



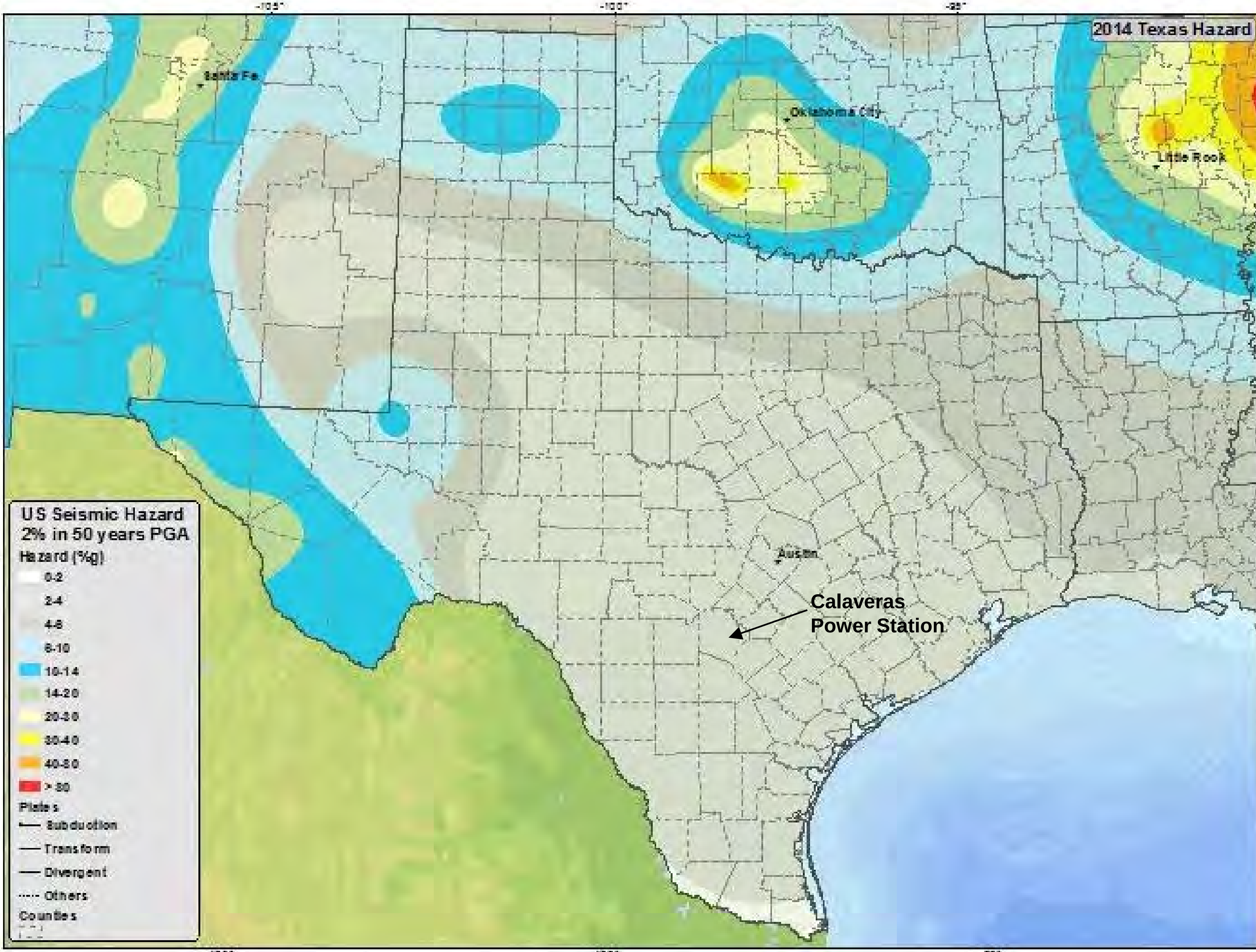
Source: txpub.usgs.gov/dss/texasgeology/

Environmental Resources Management		FIGURE 12 USGS Geologic Map CPS Energy - Calaveras Power Station San Antonio, Texas	ERM
DATE: Sep 2018	PROJ. NO.: 0337367		



Source:
https://earthquake.usgs.gov/hazards/qfaults/map/#qfaults

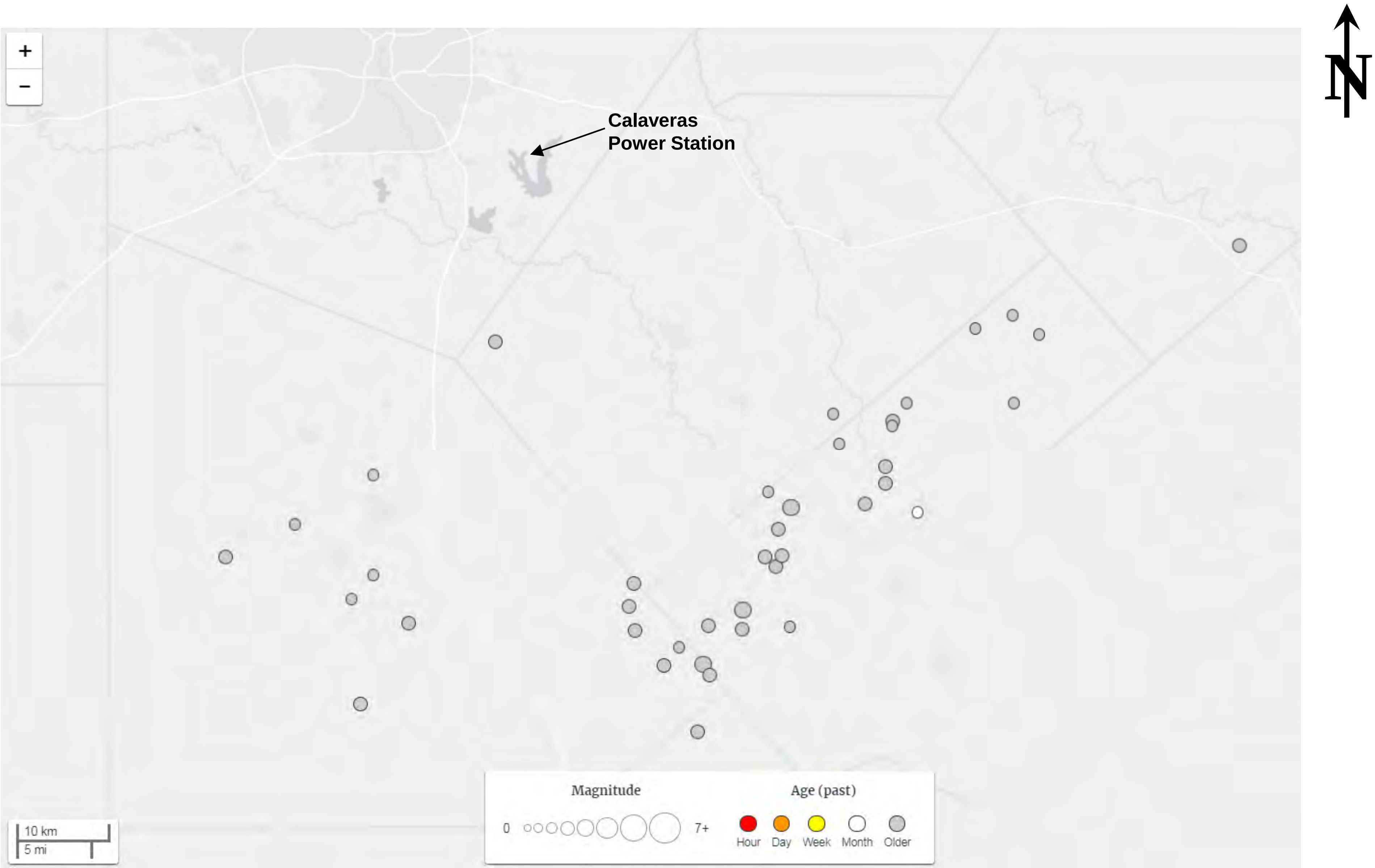
Environmental Resources Management	**FIGURE 13** **USGS Fault Map** **CPS Energy - Calaveras Power Station** **San Antonio, Texas**	ERM
DATE: Sep 2018 — PROJ. NO.: 0337367		



Source: https://earthquake.usgs.gov/earthquakes/byregion/images/texas-haz.jpg

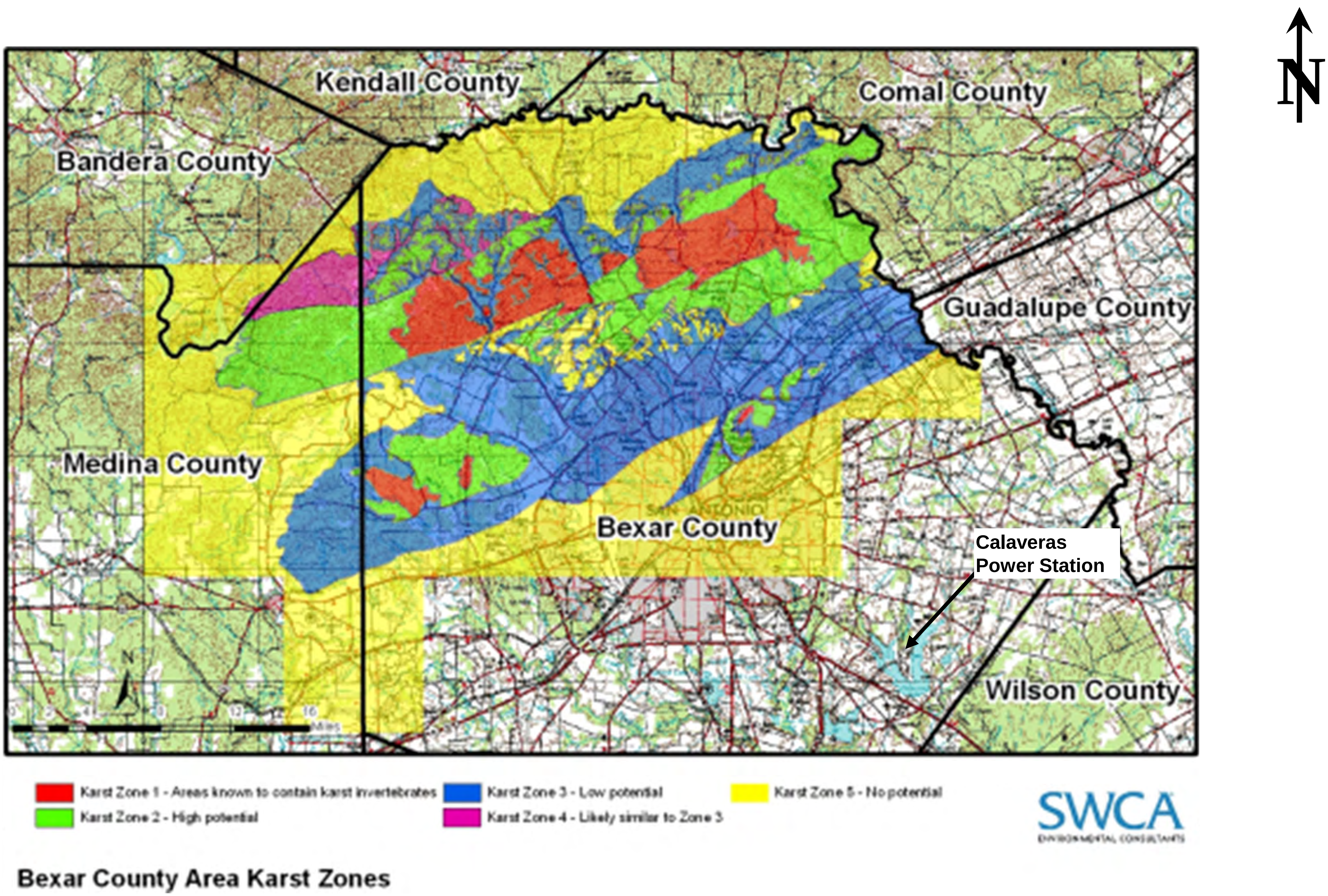
Environmental Resources Management	**FIGURE 14** **Seismic Hazard Map** **CPS Energy – Calaveras Power Station** **San Antonio, Texas**
DATE: September 2018 / PROJ.NO.: 0337367	

ERM



Source: Earthquake.usgs.gov/earthquakes/search (7/20/2018 search date)

Environmental Resources Management	FIGURE 15 South Texas Earthquakes 1900-2018 CPS Energy – Calaveras Power Station San Antonio, Texas	ERM
DATE: September 2018 — PROJ.NO.: 0337367		



Source: SWCA, Bexar County Area Karst Zones

Environmental Resources Management	FIGURE 16 Bexar County Area Karst Zones Map CPS Energy – Calaveras Power Station San Antonio, Texas	ERM
DATE: September 2018 — PROJ.NO.: 0337367		

Certification

Appendix A

October 2018

Environmental Resources Management
206 East 9th Street, Suite 1700
Austin, Texas 78701
(512) 459-4700

LOCATION RESTRICTIONS DEMONSTRATION CERTIFICATION

Calaveras Power Station
San Antonio, Texas
CPS Energy

CERTIFICATION

I hereby verify the accuracy of the information provided in this *Location Restrictions Demonstration* in accordance with the requirements of 40 CFR §257.60, §257.61, §257.62, §257.63, and §257.64.

Jeffery L. Bauguss, P.E.

Texas Licensed Professional Engineer No. 86195

STATE OF TEXAS
JEFFERY L. BAUGUSS
86195
LICENSED
PROFESSIONAL ENGINEER

10/15/18

Supporting Information

Appendix B

October 2018

Environmental Resources Management
206 East 9th Street, Suite 1700
Austin, Texas 78701
(512) 459-4700

Northern CCR Units - Calaveras Station

September 18, 2018

Wetlands

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

U.S. Fish and Wildlife Service

National Wetlands Inventory

Southern CCR Units - Calaveras Station

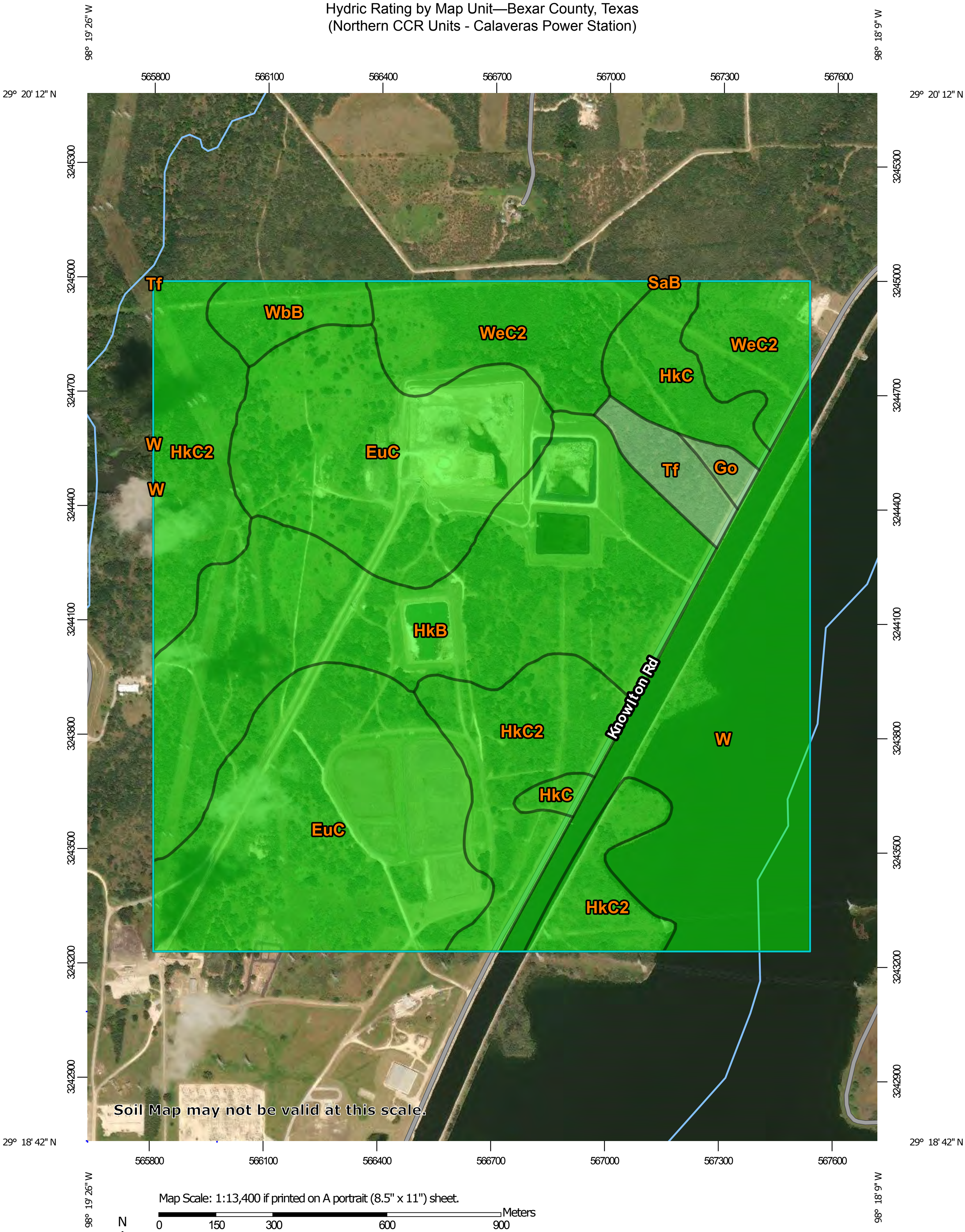
September 18, 2018

Wetlands

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

Hydric Rating by Map Unit—Bexar County, Texas
(Northern CCR Units - Calaveras Power Station)



Map Scale: 1:13,400 if printed on A portrait (8.5" x 11") sheet.

N

Meters: 0 150 300 600 900

Feet: 0 500 1000 2000 3000

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 14N WGS84

MAP LEGEND

Area of Interest (AOI)

Area of Interest (AOI)

Soils

Soil Rating Polygons

Hydric (100%)

Hydric (66 to 99%)

Hydric (33 to 65%)

Hydric (1 to 32%)

Not Hydric (0%)

Not rated or not available

Soil Rating Lines

Hydric (100%)

Hydric (66 to 99%)

Hydric (33 to 65%)

Hydric (1 to 32%)

Not Hydric (0%)

Not rated or not available

Soil Rating Points

Hydric (100%)

Hydric (66 to 99%)

Hydric (33 to 65%)

Hydric (1 to 32%)

Not Hydric (0%)

Not rated or not available

Water Features

Streams and Canals

Transportation

Rails

Interstate Highways

US Routes

Major Roads

Local Roads

Background

Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Bexar County, Texas
Survey Area Data: Version 21, Nov 7, 2017

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Jan 23, 2015—Oct 31, 2017

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Hydric Rating by Map Unit

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
EuC	Aluf sand, 0 to 5 percent slopes	0	218.3	28.9%
Go	Gowen clay loam, 0 to 2 percent slopes, occasionally flooded	1	3.9	0.5%
HkB	Wilco loamy fine sand, 0 to 3 percent slopes	0	157.3	20.8%
HkC	Wilco loamy fine sand, 3 to 5 percent slopes	0	28.6	3.8%
HkC2	Wilco loamy fine sand, 3 to 5 percent slopes, eroded	0	117.5	15.6%
SaB	San Antonio clay loam, 1 to 3 percent slopes	0	0.1	0.0%
Tf	Tinn and Frio soils, 0 to 1 percent slopes, frequently flooded	1	13.6	1.8%
W	Water	0	131.1	17.4%
WbB	Floresville fine sandy loam, 1 to 3 percent slopes	0	15.6	2.1%
WeC2	Floresville fine sandy loam, 1 to 5 percent slopes, eroded	0	69.3	9.2%
Totals for Area of Interest			**755.4**	**100.0%**

Description

This rating indicates the percentage of map units that meets the criteria for hydric soils. Map units are composed of one or more map unit components or soil types, each of which is rated as hydric soil or not hydric. Map units that are made up dominantly of hydric soils may have small areas of minor nonhydric components in the higher positions on the landform, and map units that are made up dominantly of nonhydric soils may have small areas of minor hydric components in the lower positions on the landform. Each map unit is rated based on its respective components and the percentage of each component within the map unit.

The thematic map is color coded based on the composition of hydric components. The five color classes are separated as 100 percent hydric components, 66 to 99 percent hydric components, 33 to 65 percent hydric components, 1 to 32 percent hydric components, and less than one percent hydric components.

In Web Soil Survey, the Summary by Map Unit table that is displayed below the map pane contains a column named 'Rating'. In this column the percentage of each map unit that is classified as hydric is displayed.

Hydric soils are defined by the National Technical Committee for Hydric Soils (NTCHS) as soils that formed under conditions of saturation, flooding, or ponding long enough during the growing season to develop anaerobic conditions in the upper part (Federal Register, 1994). Under natural conditions, these soils are either saturated or inundated long enough during the growing season to support the growth and reproduction of hydrophytic vegetation.

The NTCHS definition identifies general soil properties that are associated with wetness. In order to determine whether a specific soil is a hydric soil or nonhydric soil, however, more specific information, such as information about the depth and duration of the water table, is needed. Thus, criteria that identify those estimated soil properties unique to hydric soils have been established (Federal Register, 2002). These criteria are used to identify map unit components that normally are associated with wetlands. The criteria used are selected estimated soil properties that are described in "Soil Taxonomy" (Soil Survey Staff, 1999) and "Keys to Soil Taxonomy" (Soil Survey Staff, 2006) and in the "Soil Survey Manual" (Soil Survey Division Staff, 1993).

If soils are wet enough for a long enough period of time to be considered hydric, they should exhibit certain properties that can be easily observed in the field. These visible properties are indicators of hydric soils. The indicators used to make onsite determinations of hydric soils are specified in "Field Indicators of Hydric Soils in the United States" (Hurt and Vasilas, 2006).

References:

Federal Register. July 13, 1994. Changes in hydric soils of the United States.

Federal Register. September 18, 2002. Hydric soils of the United States.

Hurt, G.W., and L.M. Vasilas, editors. Version 6.0, 2006. Field indicators of hydric soils in the United States.

Soil Survey Division Staff. 1993. Soil survey manual. Soil Conservation Service. U.S. Department of Agriculture Handbook 18.

Soil Survey Staff. 1999. Soil taxonomy: A basic system of soil classification for making and interpreting soil surveys. 2nd edition. Natural Resources Conservation Service. U.S. Department of Agriculture Handbook 436.

Soil Survey Staff. 2006. Keys to soil taxonomy. 10th edition. U.S. Department of Agriculture, Natural Resources Conservation Service.

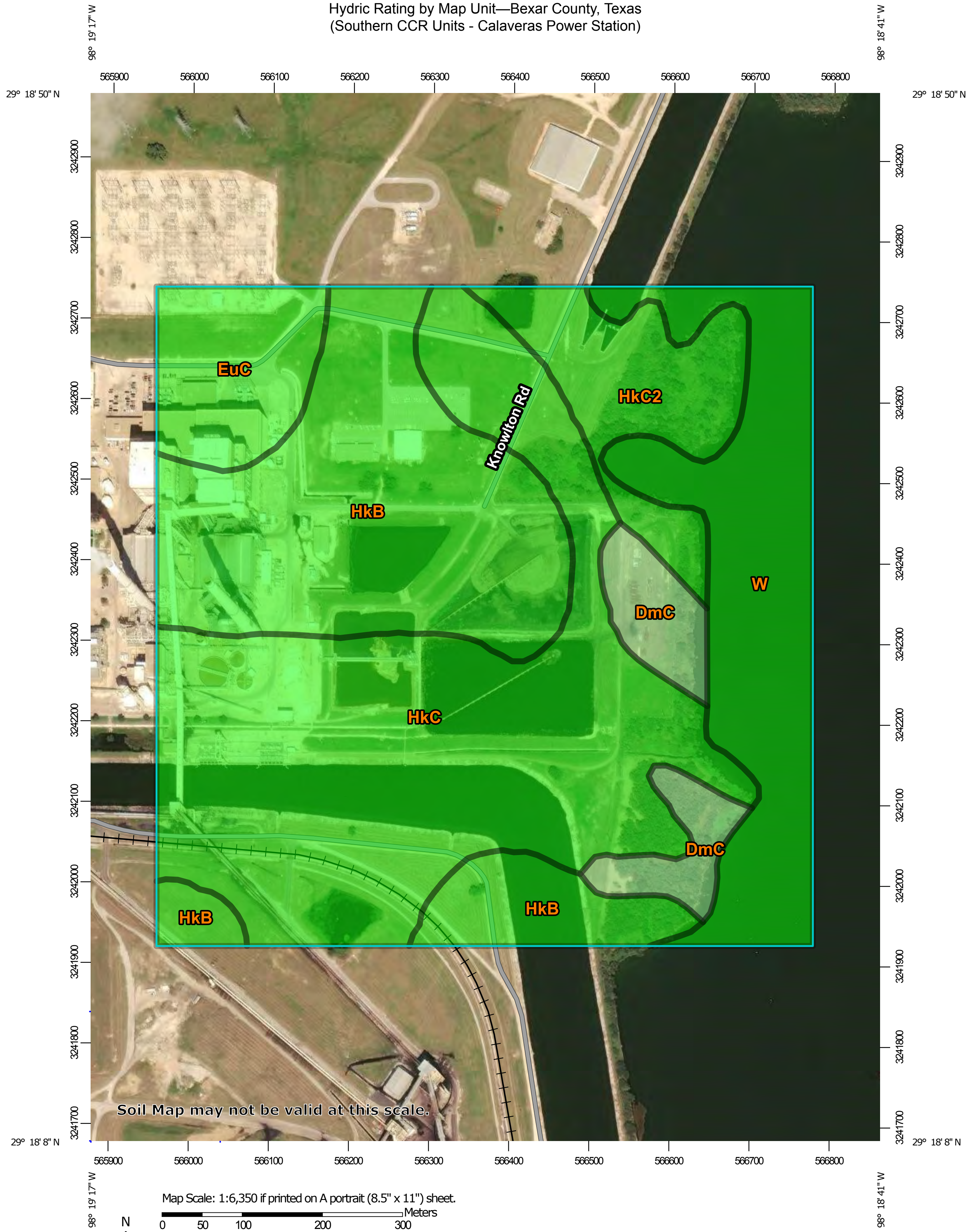
Rating Options

Aggregation Method: Percent Present

Component Percent Cutoff: None Specified

Tie-break Rule: Lower

Hydric Rating by Map Unit—Bexar County, Texas
(Southern CCR Units - Calaveras Power Station)



Map Scale: 1:6,350 if printed on A portrait (8.5" x 11") sheet.

Meters: 0, 50, 100, 200, 300

N

Feet: 0, 300, 600, 1200, 1800

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 14N WGS84

MAP LEGEND

Area of Interest (AOI)

Area of Interest (AOI)

Soils

Soil Rating Polygons

- Hydric (100%)
- Hydric (66 to 99%)
- Hydric (33 to 65%)
- Hydric (1 to 32%)
- Not Hydric (0%)
- Not rated or not available

Soil Rating Lines

- Hydric (100%)
- Hydric (66 to 99%)
- Hydric (33 to 65%)
- Hydric (1 to 32%)
- Not Hydric (0%)
- Not rated or not available

Soil Rating Points

- Hydric (100%)
- Hydric (66 to 99%)
- Hydric (33 to 65%)
- Hydric (1 to 32%)
- Not Hydric (0%)
- Not rated or not available

Water Features

- Streams and Canals

Transportation

- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background

- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

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Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

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Soil Survey Area: Bexar County, Texas
Survey Area Data: Version 21, Nov 7, 2017

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Jan 23, 2015—Oct 31, 2017

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Hydric Rating by Map Unit

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
DmC	Duval loamy fine sand, 0 to 5 percent slopes	1	8.3	5.0%
EuC	Aluf sand, 0 to 5 percent slopes	0	10.4	6.2%
HkB	Wilco loamy fine sand, 0 to 3 percent slopes	0	45.3	27.2%
HkC	Wilco loamy fine sand, 3 to 5 percent slopes	0	62.1	37.3%
HkC2	Wilco loamy fine sand, 3 to 5 percent slopes, eroded	0	13.2	7.9%
W	Water	0	27.1	16.3%
Totals for Area of Interest			**166.4**	**100.0%**

Description

This rating indicates the percentage of map units that meets the criteria for hydric soils. Map units are composed of one or more map unit components or soil types, each of which is rated as hydric soil or not hydric. Map units that are made up dominantly of hydric soils may have small areas of minor nonhydric components in the higher positions on the landform, and map units that are made up dominantly of nonhydric soils may have small areas of minor hydric components in the lower positions on the landform. Each map unit is rated based on its respective components and the percentage of each component within the map unit.

The thematic map is color coded based on the composition of hydric components. The five color classes are separated as 100 percent hydric components, 66 to 99 percent hydric components, 33 to 65 percent hydric components, 1 to 32 percent hydric components, and less than one percent hydric components.

In Web Soil Survey, the Summary by Map Unit table that is displayed below the map pane contains a column named 'Rating'. In this column the percentage of each map unit that is classified as hydric is displayed.

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Soil Survey Staff. 2006. Keys to soil taxonomy. 10th edition. U.S. Department of Agriculture, Natural Resources Conservation Service.

Rating Options

Aggregation Method: Percent Present

Component Percent Cutoff: None Specified

Tie-break Rule: Lower