



REPORT

Groundwater Monitoring System Certification Addendum No. 1

*Sandow Steam Electric Station - AX Landfill
Rockdale, Texas*

Submitted to:

Luminant Generation Company LLC

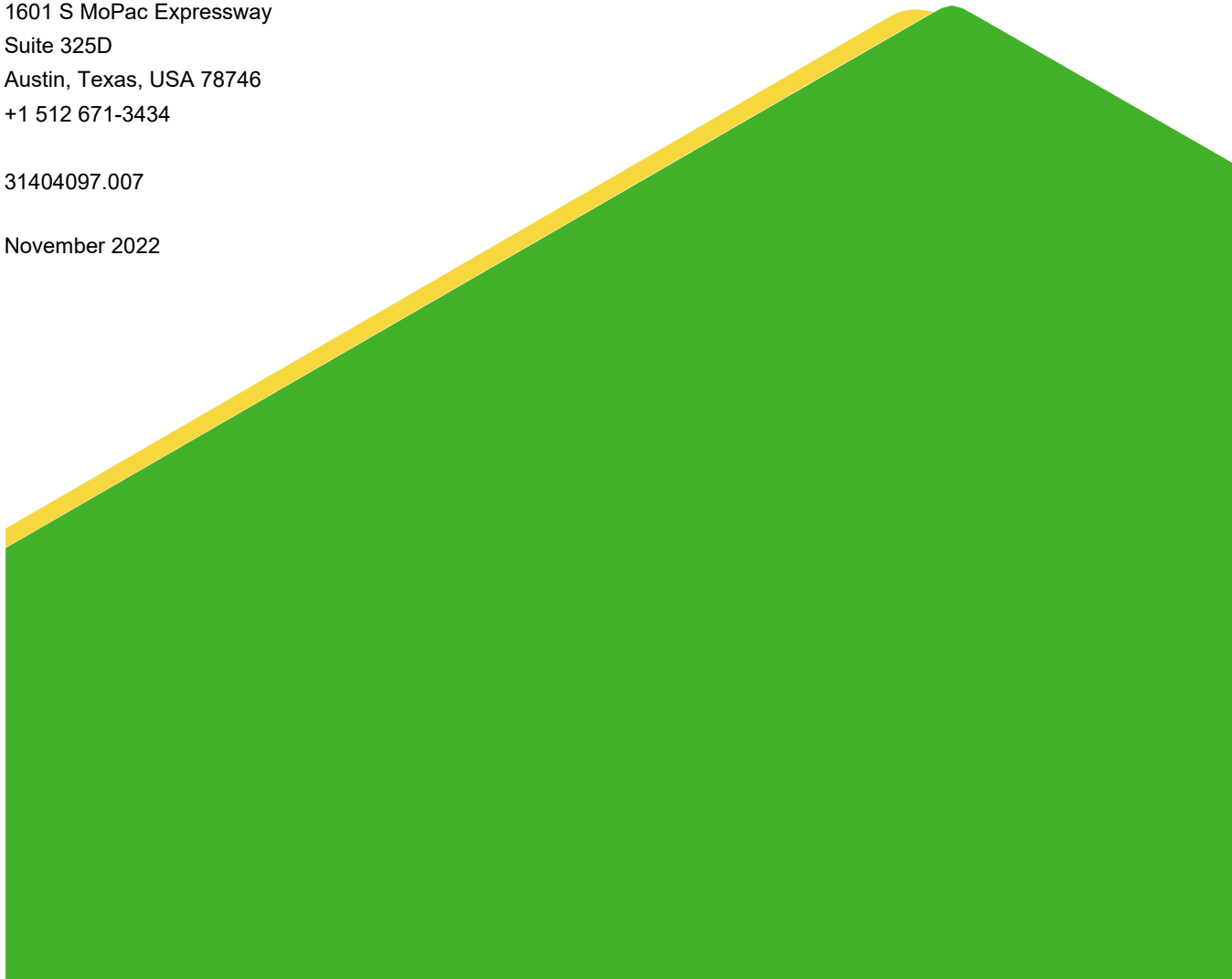
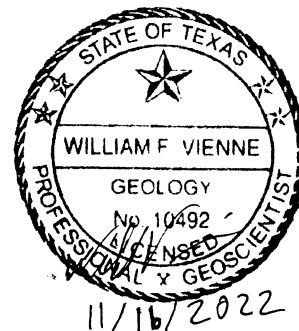
Submitted by:

WSP GOLDER

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31404097.007

November 2022



PROFESSIONAL CERTIFICATION

This document and all attachments were prepared by WSP Golder under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I hereby certify that Addendum No.1 to the Groundwater Monitoring System Certification for the AX Landfill at the Sandow Steam Electric Station has been prepared in accordance with the requirements of 40 C.F.R. §257.91.



Patrick J. Behling, P.E.
Principal Engineer
WSP Golder
Texas Firm Registration No. 22771



Table of Contents

DOCUMENT REVISION RECORD II

1.0 INTRODUCTION 1

2.0 GROUNDWATER MONITORING SYSTEM 2

 2.1 Local Geology and Hydrogeology 2

3.0 REFERENCES 5

FIGURES

- Figure 1 Site Location Map
- Figure 2 AX Landfill Cross Section Location Map
- Figure 3 AX Landfill Geologic Cross Section A – A'
- Figure 4 AX Landfill Geologic Cross Section B – B'

APPENDICES

- Appendix A Photograph of CCR Well AX-27

DOCUMENT REVISION RECORD

Issue No.	Date	Details of Revisions
Revision 0	October 2017	Original Document
Addendum 1	November 2022	Added information on the local geology/hydrogeology and groundwater monitoring system to address TCEQ comments on the original report.

1.0 INTRODUCTION

On behalf of Luminant Generation Company LLC (Luminant), WSP Golder (Golder) has prepared this Addendum No. 1 to the Groundwater Monitoring System Certification for the AX Landfill (AX LF) located at the Sandow Steam Electric Station (SASES) in Milam County, Texas (hereafter, the “Site”) (Figure 1). Luminant formerly operated the SASES and Coal Combustion Residuals (CCR) including fly ash and bed ash generated as part of SASES operation were placed in the AX LF. The AX LF is regulated as an Existing CCR Landfill under 40 C.F.R. § 257, Subpart D (the “CCR Rule”).

The original Groundwater Monitoring System Certification for the AX LF was prepared in October 2017 in accordance with 40 C.F.R. §257.91 and placed in the SASES operating record in accordance with 40 C.F.R. §257.105 (PBW, 2017). This Addendum No. 1 updates the Groundwater Monitoring System Certification to include additional information on the following:

1. Discussion about the local geological and hydrological position of uppermost aquifer at the AX Landfill and the surrounding area.
2. Discussion of the depth of the uppermost aquifer in the up dip and down dip areas of the AX Landfill.
3. Geologic cross-sections across the landfill and adjacent area that show:
 - a. Screened zone within the uppermost aquifer.
 - b. The highest observed groundwater levels.
 - c. A projection of the AX Landfill boundaries along the cross sections to show its position with respect to the groundwater table.
4. Confirmation that CCR well AX-27 is located outside the AX LF waste boundary

2.0 GROUNDWATER MONITORING SYSTEM

The CCR groundwater monitoring well system at the AX Landfill consists of nine monitoring wells (AXMW-1, AXMW-2, AX-23, AX-24, AX-25, AX-26, AX-27, AX-28, and AX-29) that are each screened in the uppermost aquifer at the Site. The locations of the CCR monitoring wells are shown on Figure 2. Based on the groundwater potentiometric surface maps presented in the original Groundwater Monitoring System Certification and in subsequent CCR reports, the location of each CCR monitoring well relative to the AX Landfill is as follows:

Upgradient Wells	Downgradient Wells
AXMW-1	AX-24
AXMW-2	AX-25
AX-23	AX-26
AX-29	AX-27
	AX-28

2.1 Local Geology and Hydrogeology

The AX Landfill is located within the boundaries of the former Sandow Lignite Mine, which is in the outcrop area of the Wilcox Group (Barnes, 1974). The Wilcox Group in the vicinity of the Site is divided into the Hooper Member, the Simsboro Member, and the Calvert Bluff Member (listed from oldest to youngest). The geologic units present at the Site regionally dip from northwest to southeast toward the Texas Gulf Coastal Plain (Barnes, 1974). The overburden interval and lignite seams mined at the Sandow Lignite Mine are part of the Calvert Bluff Formation. The following is a generalized stratigraphic column of the geologic units at the Site:

SERIES	GROUP	MEMBER	GENERAL DEPOSITIONAL ENVIRONMENT	LITHOLOGIC DESCRIPTION
PALEOCENE TO EOCENE (66 to 23 Million Years Ago)	WILCOX	Calvert Bluff	Deltaic, marsh, and swamp	Primarily silt and clay with varying amounts of sand and lignite
		Simsboro	Fluvial sands	Sand with minor silt and clay
		Hooper	Marsh and swamp	Primarily silt and clay with minor amounts of sand and lignite

Source: Barnes (1974)

The mine areas consist of an overburden interval (the interval above the lowest minable lignite seam, which was

disturbed during mining operations) and an underburden interval (the interval below the lowest minable lignite seam, which was not disturbed during mining operations). The overburden and underburden intervals are depicted on geologic cross sections constructed through the landfill area. The locations of the cross sections are shown on Figure 2 and the cross sections are presented on Figures 3 and 4.

The AX Landfill is constructed near the top of the overburden interval, which was previously excavated and backfilled during lignite mining operations. The location of the AX Landfill boundaries relative to the overburden interval are shown on the cross sections on Figure 3 and 4. The approximate extent of the mined areas near the AX Landfill is shown as the brown and purple-hatched areas on the USGS topographic map presented on Figure 1. The AX Landfill is surrounded by previously mined areas, with mined areas occurring both up dip (northwest) and down dip (southeast) of the AX Landfill.

Lithologic descriptions from soil borings completed in the mined overburden material (“mine spoil”) indicate that it consists of a highly heterogeneous mixture of sand, silty and clayey sand, and clay. The mine spoil extends from ground surface to depths ranging from approximately 100 feet below ground surface (bgs) on the northwest side of the AX Landfill to more than 160 feet bgs on the southeast side of the AX Landfill. The portions of the lowest minable lignite seam that still remain and the underlying clay shown on the cross sections mark the base of the mined overburden interval. As shown on the cross section figures, an inactive fault is present approximately 1,200 feet southeast of the AX Landfill. Mining occurred up to the fault but did not occur on the southeastern (upthrown) side of the fault, where the primary minable lignite seam is discontinuous. The mine underburden interval (the interval below the minable lignite seam) is stratigraphically higher on the upthrown side of the fault than it is on the downthrown side of the fault. Soil boring information from the upthrown side of the fault indicates that the Simsboro sand member of the Wilcox Group occurs approximately 10 feet below the base of the mined overburden interval.

As shown on the cross sections on Figures 4 and 5, groundwater is first encountered in the mine spoil material below the base of the AX Landfill. The uppermost aquifer at the Site is the saturated portion of the mined overburden interval. It extends from the water table (generally 20 to 80 feet bgs) to the base of the mined overburden interval, which is marked by the remaining native lignite and clay confining unit that sit above the Simsboro sand. The uppermost aquifer occurs under unconfined/water table conditions. Aquifer testing and total dissolved solids (TDS) data from wells completed within the mine spoil indicate that it is a Class 2 groundwater resource (i.e., it produces greater than 150 gallons per day and has TDS concentrations less than 10,000 mg/L).

3.0 POSITION OF CCR WELL AX-27 RELATIVE TO THE AX LF WASTE BOUNDARY

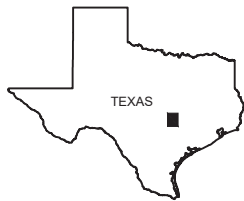
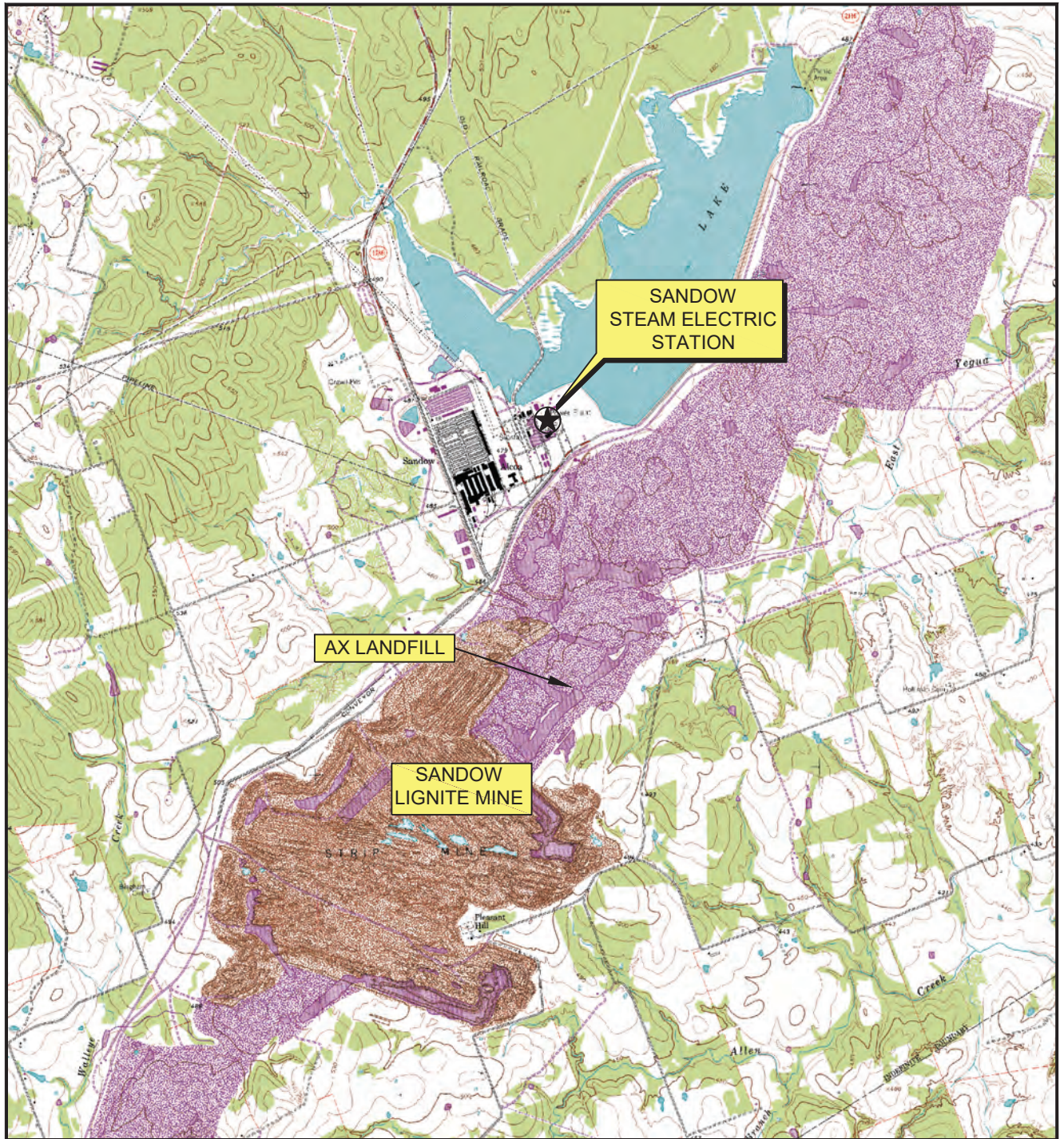
CCR well location maps included herein and provided in previous CCR reports could be mistakenly interpreted to indicate that CCR well AX-27 is located within the waste cell boundary of the AX LF. A photograph of well AX-27 is provided in Appendix A that shows AX-27(right side of photo) located outside the above-grade berm that marks the boundary of the AX LF waste cells. Although AX-27 may be located within the deed recorded boundary for the AX LF, it is outside the AX LF waste cell boundary; therefore, its position complies with the monitoring well location requirements of 40 C.F.R. § 257.91(a)(2).

4.0 REFERENCES

Barnes, Virgil E., 1974. Geologic Atlas of Texas, Austin Sheet. Texas Bureau of Economic Geology.

Pastor, Behling & Wheeler, LLC (PBW), 2016. CCR Groundwater Monitoring System Certification – Sandow 5 Generating Plant, AX Landfill, Rockdale, Texas. October 16.

FIGURES



QUADRANGLE LOCATION



Scale in Feet



SANDOW STEAM ELECTRIC STATION
ROCKDALE, TEXAS

Figure 1

SITE LOCATION MAP

PROJECT: 31404097.004

BY: AJD

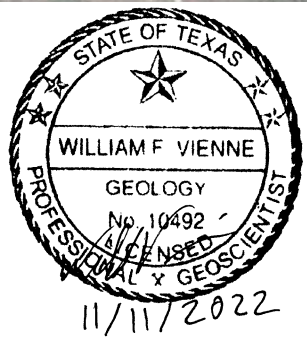
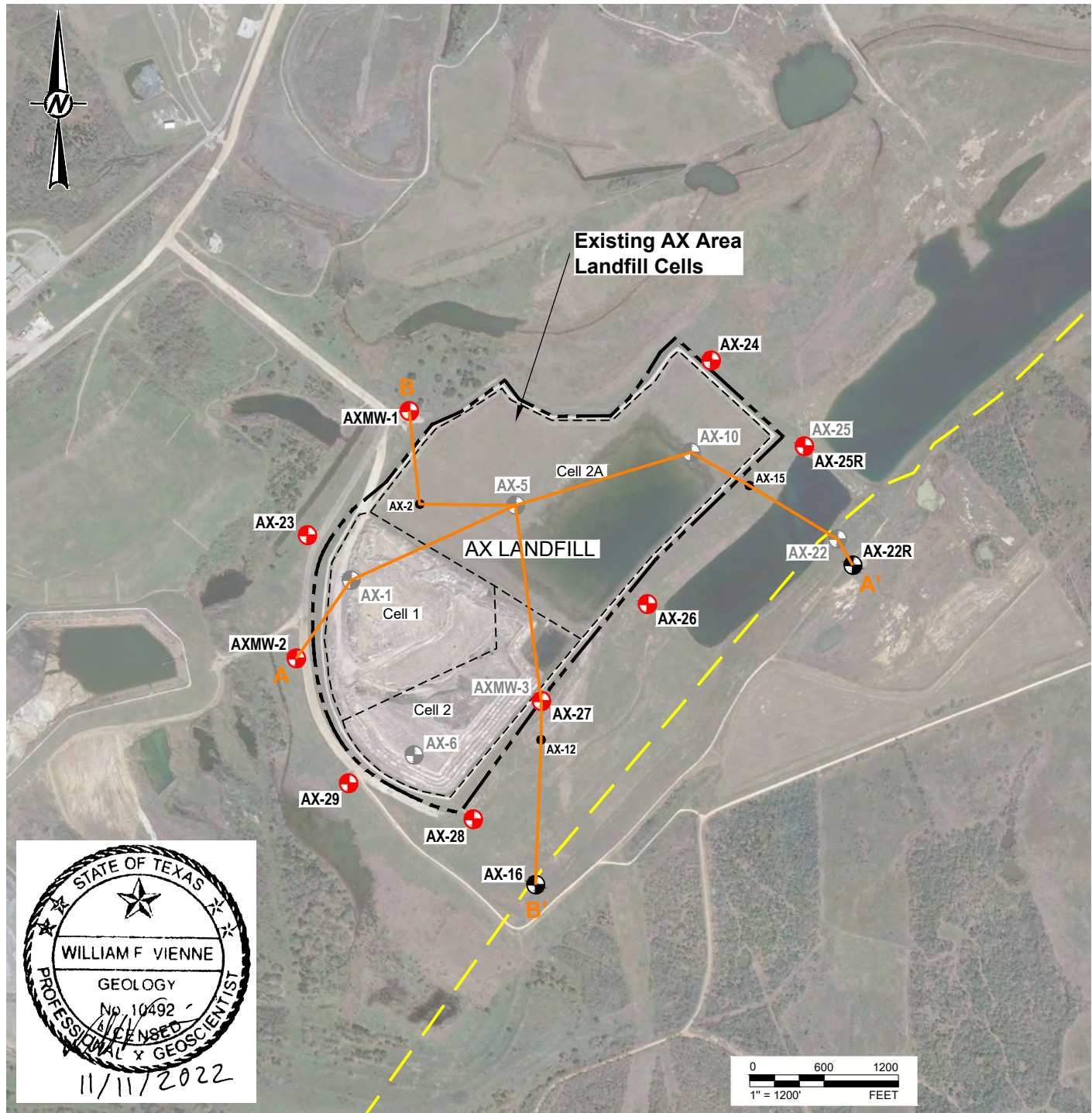
REVISIONS

DATE: MAR., 2017







CHECKED: PJB



SOURCE:
Base map from www.tnris.gov, Alcoa Lake, TX 7.5 min. USGS quadrangle dated 1963,
revised 1988.



LEGEND

-  CCR MONITORING WELL
-  NON-CCR MONITORING WELL
-  MONITORING WELL - PLUGGED
-  SOIL BORING LOCATION
-  APPROXIMATE LOCATION OF INACTIVE FAULT
-  GEOLOGIC CROSS SECTION LOCATION LINES

CLIENT
LUMINANT

PROJECT
**SANDOW 5 GENERATING PLANT
ROCKDALE, TEXAS**

TITLE
AX LANDFILL AREA

CONSULTANT



YYYY-MM-DD	2022-11-09
DESIGNED	AJD
PREPARED	AJD
REVIEWED	WFV
APPROVED	WFV

REFERENCE(S)

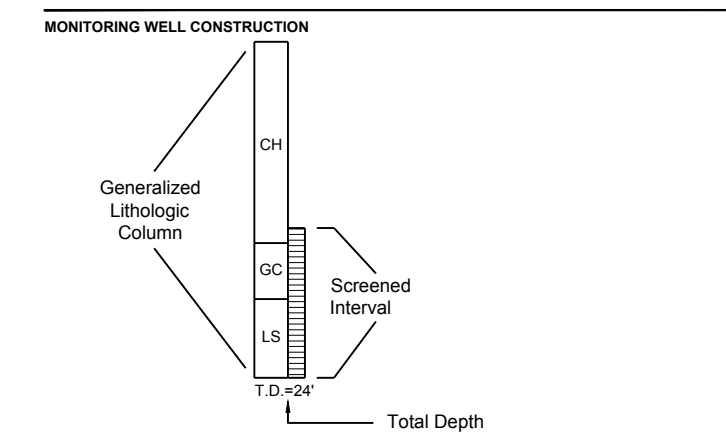
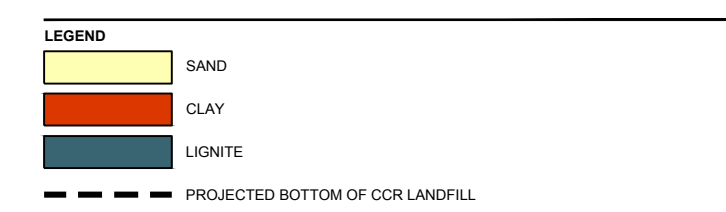
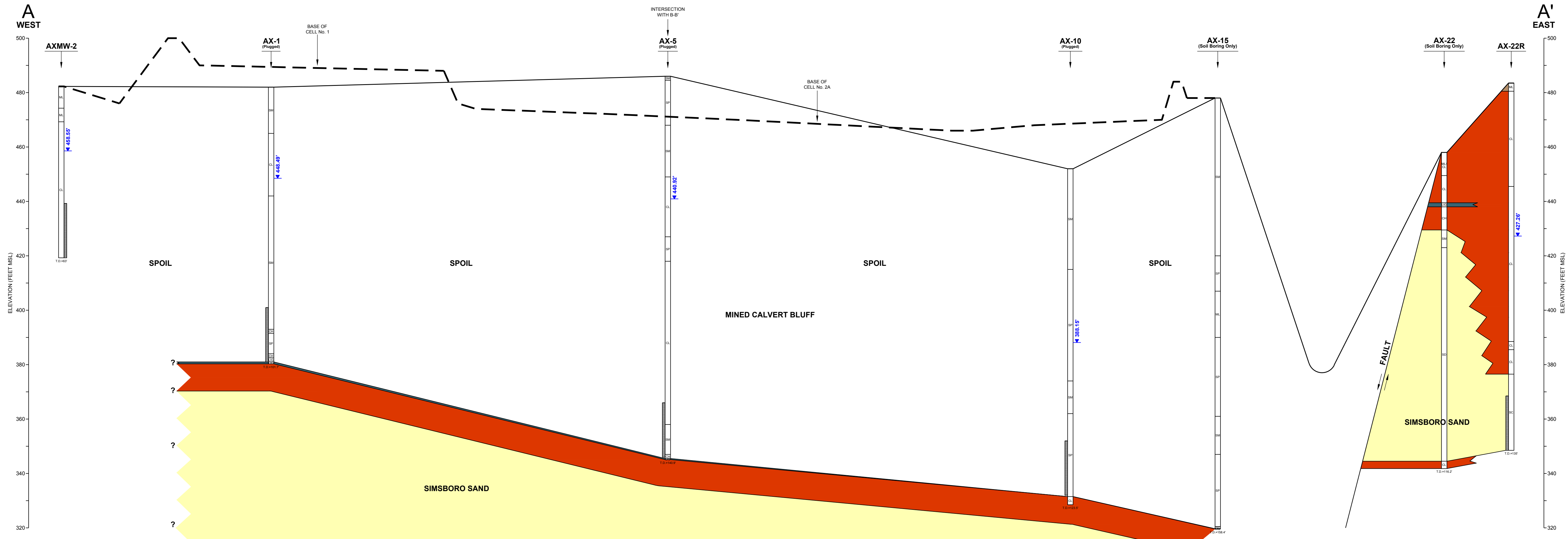
BASE MAP TAKEN FROM GOOGLE EARTH, IMAGERY DATED MARCH 2022.

PROJECT NO.
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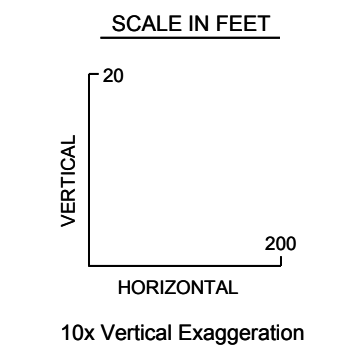
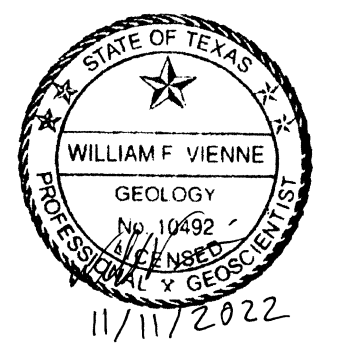
FIGURE
2

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▼ Max. Observed Historical Water Level (Ft MSL)

NOTE(S)
 1. GROUND SURFACE ELEVATION IS BASED PRIMARILY ON BOREHOLE SURVEY DATA.



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PROJECT
SANDOW 5 GENERATING PLANT
ROCKDALE, TEXAS

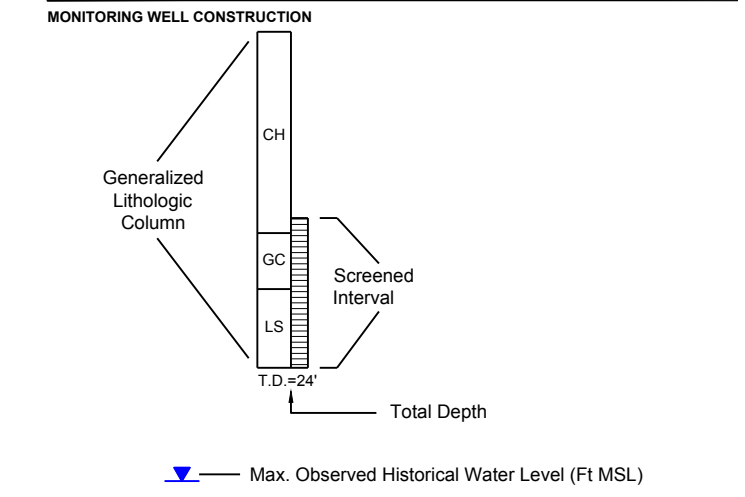
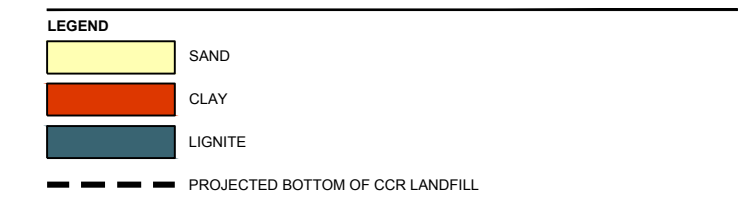
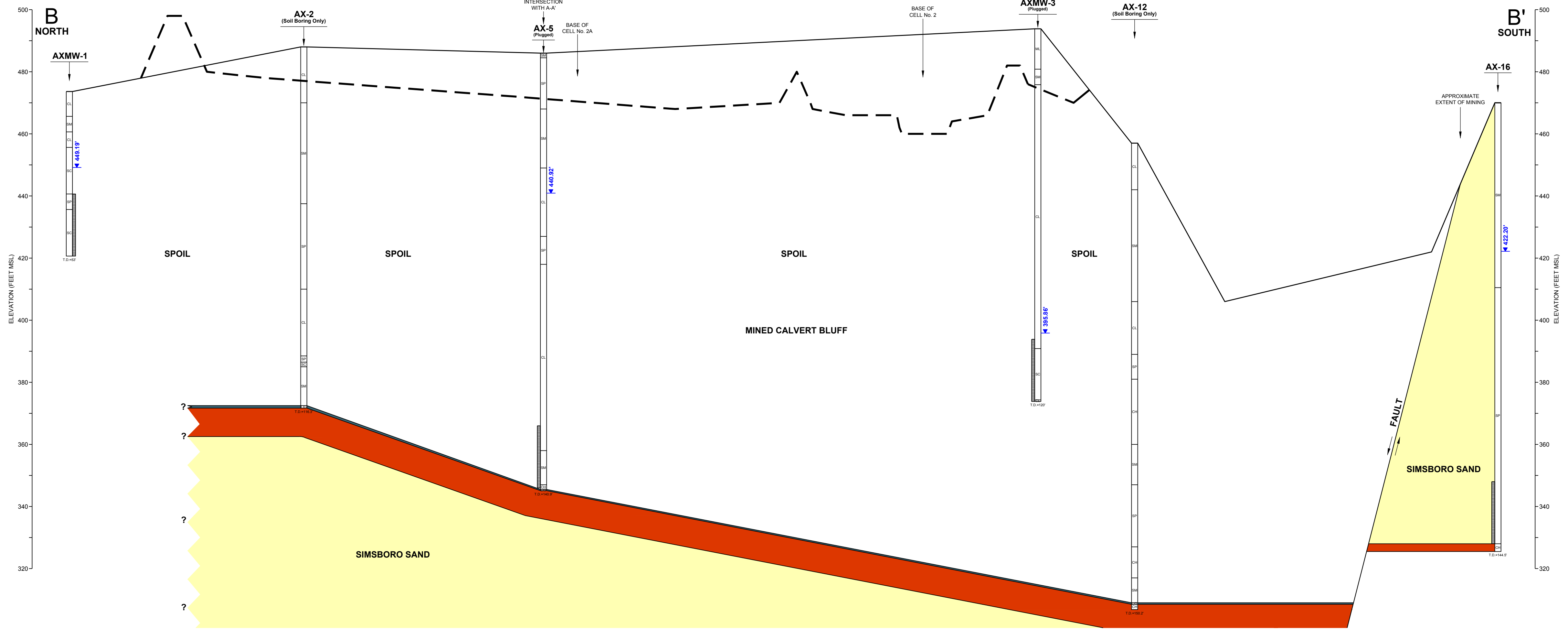
TITLE
**AX LANDFILL AREA
GEOLOGIC CROSS SECTION A-A'
WEST SIDE OF LANDFILL TO EAST SIDE OF LANDFILL**

CONSULTANT	WSP GOLDER
DESIGNED	AJD
PREPARED	AJD
REVIEWED	WFV
APPROVED	WFV

PROJECT NO.
31404097.004

REV. 0

FIGURE 3



- NOTE(S)**
- GROUND SURFACE ELEVATION IS BASED PRIMARILY ON BOREHOLE SURVEY DATA.
 - CALVERT BLUFF CLAY AND SIMSBORO SHOWN BELOW LIGNITE ON DOWNTHROWN SIDE OF FAULT ARE INFERRED BASED ON RELATIVE POSITIONS OF THESE UNITS OBSERVED ON UPTHROWN SIDE OF FAULT.

SCALE IN FEET

VERTICAL: 20, 200
HORIZONTAL: 200
10x Vertical Exaggeration

STATE OF TEXAS
WILLIAM F. VIENNE
GEOLOGY
No. 10492
LICENSED PROFESSIONAL GEOLOGIST
11/11/2022

CLIENT
LUMINANT

PROJECT
SANDOW 5 GENERATING PLANT
ROCKDALE, TEXAS

TITLE
AX LANDFILL AREA
GEOLOGIC CROSS SECTION B-B'
NORTH SIDE OF LANDFILL TO SOUTH SIDE OF LANDFILL

CONSULTANT	YYYY-MM-DD	2022-11-09
DESIGNED	AJD	
PREPARED	AJD	
REVIEWED	WFV	
APPROVED	WFV	

PROJECT NO. 31404097.004 REV. 0 FIGURE 4

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 File Name: Cross Sections.dwg - Last Edited By: user071356 Date: 2022-11-09 Time: 12:49 PM - L1
 If this measurement does not accurately show what is shown, the sheet shall be modified from page B

APPENDIX A

Photograph of CCR Well AX-27



DESCRIPTION	Photograph 1 – CCR Well AX-27 (right side of photo) shown outside the bermed AX LF waste boundary.	
SITE NAME	Sadow AX Landfill	DATE 2020