



2021 Site F Landfill Annual Inspection Report

Texas Municipal Power Agency
Gibbons Creek Steam Electric Station
Anderson, Texas
Project # 6703200070

Prepared for:

Texas Municipal Power Agency

PO Box 7000, Bryan, TX 77805

28 January 2021



Wood Environment & Infrastructure Solutions, Inc.
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28 January 2021

2020 CCR Landfill Annual Inspection Report
Site F Landfill
Texas Municipal Power Agency
Gibbons Creek Steam Electric Station
Anderson, Texas

Dear Mr. Meadows,

As requested by the Texas Municipal Power Agency (TMPA), Wood Environment and Infrastructure Solutions, Inc. (Wood) is submitting this Annual Coal Combustion Residual (CCR) Landfill Inspection Report (Report) to summarize observations of the Site F CCR Landfill (Site F Landfill) located at the TMPA Gibbons Creek SES station and performed on December 9, 2020. The inspection was performed in accordance with 40 CFR 257.84(b) Annual Inspections by a licensed engineer.

Wood values our long-standing partnership with TMPA, and we thank you for this opportunity. Please contact us at your convenience with questions.

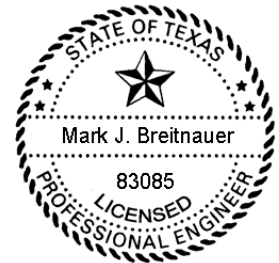
Sincerely,

**Wood Environment & Infrastructure
Solutions, Inc.**

Reviewed by:

Erik Friede, P.E.
Geotechnical Engineer

Mark Breitnauer, P.E.
Senior Geotechnical Engineer



The seal appearing on this document was authorized by Mark J. Breitnauer, P.E. on 1/28/2021.

Attachments: 2020 Annual Inspection Report
Appendix 1 – Figures
Appendix 2 – Photographic Log





2021 Site F Landfill Annual Inspection Report

Texas Municipal Power Agency
Project Location
Gibbons Creek Steam Electric Station
12824 FM 244 Road, Anderson, TX 77830

Project # 6703200070

Prepared for:

Mr. Daniel Meadows

Texas Municipal Power Agency
PO Box 7000, Bryan, TX 77805

Prepared by:

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17325 Park Row
Houston, TX 77084, USA
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28 January 2021



This document represents the detailed inspection report summarizing observations made including site photographs taken during the annual inspection of the Site F Landfill (SFL), located at the Gibbons Creek Steam Electric Station (GCSES or plant), operated by the Texas Municipal Power Agency (TMPA). The inspection was conducted in accordance with the requirements of 40 CFR 257.84(b) annual inspections, by a professional engineer. The inspection included a review of available information and a visual inspection to identify signs of distress, or malfunction of the Coal Combustion Residuals (CCR) landfill. We understand that the last documented placement of material into the SFL occurred sometime around January 2019, after GCSES was mothballed following the 2018 summer production season.

A professional engineer from Wood Environment & Infrastructure Solutions, Inc. (Wood) and TMPA staff performed the 2021 annual inspection on December 9, 2020. Our review and observations resulted in comments for maintenance (comments). These comments were communicated to TMPA personnel verbally during the inspection visit. Our inspection of the SFL did not identify areas of settlement, depressions, movement, bulges, change in geometry, significant slope failures or other conditions that would adversely affect the integrity of the landfill.

Annual Inspection Requirements

The SFL is subject to annual inspection by a qualified engineer, pursuant to 40 CFR §257.84(b)(1), "...to ensure that the design, construction, operation, and maintenance of the CCR unit is consistent with recognized and generally accepted good engineering standards". The inspection components are, as follows:

- *40 CFR §257.84 (b)(1)(i) - A review of available information regarding the status and condition of the CCR unit, including, but not limited to, files available in the operating record (e.g., the results of inspections by a qualified person, and results of previous annual inspections).*
- *40 CFR §257.84 (b)(1)(ii) - A visual inspection of the CCR unit to identify signs of distress or malfunction of the CCR unit.*

The results of the inspection must be documented pursuant to the inspection reporting requirements of 40 CFR §257.84 (b)(2):

(i) Any changes in geometry of the structure since the previous annual inspection.

(ii) The approximate volume of CCR contained in the unit at the time of the inspection

(iii) Any appearances of an actual or potential structural weakness of the CCR unit, in addition to any existing conditions that are disrupting or have the potential to disrupt the operation and safety of the CCR unit.

(iv) Any other change(s) which may have affected the stability or operation of the CCR unit since the previous annual inspection.

The frequency of inspections at the SFL is pursuant to 40 CFR §257.84 (b)(4), as follows:

- *The owner or operator of the CCR unit must conduct the inspection required by paragraphs (b)(1) and (2) of this section on an annual basis. The date of completing the initial inspection report is the basis for establishing the deadline to complete the first subsequent inspection. Any required inspection may be conducted prior to the required deadline provided the owner or operator places the completed inspection report into the facility's operating record within a reasonable amount of time. In all cases, the deadline for completing subsequent inspection reports is based on the date of completing the previous inspection report. For purposes of this section, the owner or operator has completed an inspection when the inspection report has been placed in the facility's operating record as required by §257.105(g)(9).*

40 CFR §257.84 (b)(1)(i) Review of Available Information

Wood reviewed the published information available on the TMPA website to promote understanding of the SFL history and existing conditions to support this reporting effort. We understand that the SFL was constructed by TMPA in 1990 and expanded in 1995 to increase the capacity for the disposal of CCR solid wastes generated by the GCSES. We understand the majority of the SFL was capped in 1996, after the plant was converted from locally mined lignite to Wyoming's PRB coal, and PRB combustion by-products have been placed in the uncapped portion (Active Area) through January of 2019.

Additional documents provided by TMPA were also reviewed:

- Site F Landfill and Scrubber Sludge Pond Maintenance Actions
- Scope of Work, Maintenance Repairs, Site A Landfill, Site F Landfill, and Gibbons Creek Reservoir
- Weekly Inspection reports for the SFL

40 CFR §257.84 (b)(1)(ii) Visual Inspection

Wood performed the SFL Annual Inspection in conjunction with Mr. Daniel Meadows, TMPA Compliance Specialist and Savannah Quiros, TMPA Compliance Co-Op. The goal of the inspection was to evaluate if the design, construction, operation, and maintenance of the Site F Landfill is consistent with recognized and generally accepted good engineering standards and practices.

This inspection was performed on Wednesday, December 9, 2020. The inspection consisted of visual observations of the SFL to identify signs of distress or malfunction

including appearances of actual or potential structural weaknesses and other conditions which are disrupting or have the potential to disrupt the operation or safety of the SFL. The inspection team performed a walking reconnaissance including the configuration/layout of the stormwater management systems and general operations. The landfill area covered by this annual inspection is shown in Figure 1 in Appendix 1. Photographs representing typical conditions of observations were taken as part of the inspection. These photographs are included in Appendix 2, and the approximate locations and orientation of each photograph are shown in Figure 1.

The SFL has two main areas: The Cover Area and the Active Area. The Cover Area consists of a vegetated clay cap and covers approximately 80 acres as previously reported and measured using Google Earth. The Cover Area is irregular in shape generally running in an east to west orientation with the western portion extending further to the south than the eastern portion (refer to Figure 1). We understand that CCR has not been placed in this area since the cap was installed in 1996.

The Active Area of the SFL is adjacent to the Cover Area on the southeast side and covers approximately 15 acres, as measured using Google Earth. The Active Area has a general southwest to northeast orientation. The northeast portion was retaining rain-on water at the time of the inspection. GCSES is not currently in operation and we understand no new CCR material has been placed in the Active Area since January 2019.

Stormwater is controlled with a series of vegetated and fabric formed concrete-lined channels that convey surface runoff from the Cover Area to the stormwater retention areas located on the west and northeast (SFL Pond 1) sides of the landfill and intercept surface water run-on from areas outside the Active Area. SFL Pond 1 has a principal spillway consisting of a concrete riser equipped with a trash rack, and a concrete outlet pipe emptying onto a concrete outlet apron. Stormwater run-off directed to the south from the Cover Area is diverted by a swale and diversion berm that borders the northwest portion of the Active Area, which is intended to prevent runoff from entering the Active Area. Water that falls on CCR materials appears to be generally contained within the Active Area.

Based on our field inspection, the operation and maintenance of the SFL appeared to be in accordance with generally good engineering standards and practices. The Active Area and the access roads surrounding the SFL were adequately watered for dust control.

Our field inspection did identify 9 typical maintenance items (e.g., erosional areas, animal activity, rutting, etc.) which were communicated verbally to TMPA personnel.

Additional discussion pertaining to the visual observations, with recommendations where applicable, is provided, as follows:

Impounded CCR Material in Active Area

Apparent CCR material was observed on the access road that separates the active area from the adjacent stormwater water retention area (Appendix 2, Photo 1). The material appears to be a result of vehicle traffic entering and exiting this area, but the berm separating the CCR material from the access road is not well defined. The berm should be regraded.

Vegetation

Overall, the SFL's vegetative ground cover appeared to be adequately maintained as evidenced by the established vegetation on the slopes and the covered portion of the landfill. Vegetation at the northern portion of the SFL was observed to be longer than other areas (Appendix 2, Photo 15). The length of the vegetation obscures observation of the embankment condition in this area.

Minor vegetation was observed in the Active Area and appears to be properly maintained. Woody vegetation should continue to be removed from the interior slopes during regular maintenance operations.

Erosion

No areas of major erosion were observed at the time of inspection. Evidence of erosion was observed at various locations on the embankment slopes of the Cover Area and the Active Area (Appendix 2, Photo 2, Photo 4 and Photo 5). These areas and other areas with exposed soil should be regraded and seeded to allow vegetation growth and prevent further progression of erosion in these areas.

Rutting

The access roads and cover area were observed to be in a well-maintained condition. One area of rutting was observed on the access road bordering the southeast side of SFL Pond 3 (Appendix 2, Photo 13). This area should be backfilled, compacted, and regraded to prevent water from ponding at the crest of the embankment.

Storm Water Management

The stormwater management systems of the SFL appear to be in generally good working order. Stormwater management around the SFL consists of diversion berms and swales and concrete-lined spillways directing water from the Cover Area and diverting water from entering the Active Area. Stormwater is directed to Pond 1 and an unnamed stormwater retention area via concrete-lined spillways and drainage swales. Vegetation growing in portions of the concrete-lined spillways should continue to be removed as part of TMPA's routine maintenance operations (Appendix 2, Photo 16 and 17).

The ditch bordering the northeastern corner of the Active Area directs water to the stormwater detention area adjacent to the active area to the southwest. Erosion rills were observed on the downstream side of the stormwater berm at the northeast corner of the Active Area (Appendix 2, Photo 2 and Photo 3). The swale in this area is not well defined and should be regraded to adequately capture runoff and prevent further erosion.

Animal Activity

Animal activity (primarily animal burrows and cow paths) was observed at various locations along the landfill. TMPA has taken measures to mark the location of existing animal burrows for monitoring and future repair (Appendix 2, Photo 7 and 8). We recommend that the burrows be filled with compacted soil, cement grout, or other impermeable material to prevent progression into the embankment. Future burrows should be addressed in a timely fashion as they are observed.

With regard to cow paths, current efforts are in place to force the cows to change paths periodically to avoid deterioration of the vegetation along these paths (Appendix 2, Photo 9). Remedial efforts were observed in the form of tires, and barbed wire across existing paths. These efforts appear to be an effective method to redirect cows. In addition to the current fixes, we recommend that these areas of previous cow paths continue to be re-graded and seeded to promote soil growth and prevent erosion in areas with exposed soil once the barriers are relocated.

Corrugated Plastic Pipes

Plastic pipes were observed at various locations on the embankment slopes of the Cover Area. No change was observed in these structures since the previous inspection. We recommend that these pipes be removed, backfilled with compacted soil, and seeded. If they cannot be removed, we recommend that they are filled with cement grout to prevent potential animal activity and/or the migration of water into the slope. At a minimum, gates or some type of barrier should be installed at the exposed ends to prevent animals from entering these pipes.

Representative photos of the typical condition of the SFL at the time of inspection and maintenance items are provided in Appendix 2. Approximate photo locations are presented in Figure 1 in Appendix 1.

Conclusions

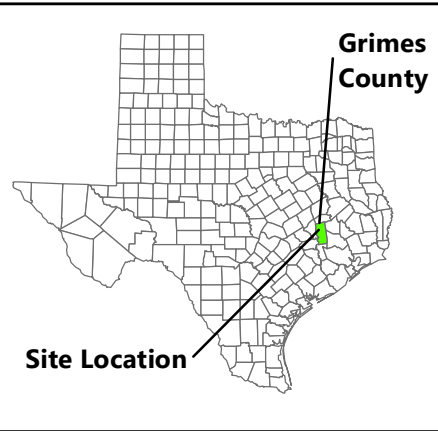
The results of the annual inspection of the SFL, as described herein, is provided in the following table:

Regulatory Citations	SFL
<i>40 CFR §257.84 (b)(2) (i) - Any changes in geometry of the structure since the previous annual inspection.</i>	No changes in the CCR unit geometry were noted.
<i>40 CFR §257.84 (b)(2) (ii) - (ii) - The approximate volume of CCR contained in the unit at the time of the inspection.</i>	In 2016, the approximate volume of ash material located at the SFL at the time of the inspection was 7,370,000 cubic yards. Since that time, an additional estimated 28,346 tons have been placed into the Active Area. No new CCR material has been placed in the Active area since January of 2019. Tmpa records indicate that 4,200 tons of material was removed from the active area in 2020.
<i>40 CFR §257.84 (b)(2)(iii) Any appearances of an actual or potential structural weakness of the CCR unit, in</i>	No such conditions were identified.

<i>addition to any existing conditions that are disrupting or have the potential to disrupt the operation and safety of the CCR unit.</i>	
<i>40 CFR §257.84 (b)(2)(iv) - Any other change(s) which may have affected the stability or operation of the CCR unit since the previous annual inspection.</i>	No such conditions were noted.

Our inspection of the SFL indicates the operation and maintenance of the SFL is consistent with recognized and generally accepted good engineering standards and practices. Areas of settlement, depressions, movement, bulges, change in geometry, or significant slope failures were not observed during our field inspection.

**APPENDIX 1 – FIGURE 1
SITE MAP AND OBSERVATIONS**



APPROXIMATE LIMITS OF ANNUAL INSPECTION PERFORMED DECEMBER 9, 2020

SFL COVER AREA

SFL POND 1

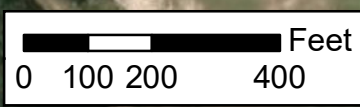
SFL POND 3 ACTIVE AREA

APPROXIMATE LIMITS OF SFL ACTIVE AREA

Legend

- ↑ Photo Location, arrow represents approximate photo direction
- 26 Photograph number corresponds to photograph included in Appendix 2
- - - Approximate Inspection Limits
- Approximate Limits of Active Area
- . - . - Approximate Limits of Cover Area

Service Layer Credits: Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community



Site F Landfill (SFL) Annual Inspection	
Site Map and Observations	
Prepared by/Date: JCD 1/13/2021	
Checked by/Date: EF 1/13/2021	
Project Number: 6703200070	
Figure Number: 1	


Document Path: G:\TMPA\mxd\Site Map and Observations.mxd

APPENDIX 2 – OBSERVATIONS AND PHOTOGRAPHIC LOG

Landfill Component		Observed	Comment No.
Liner		No	---
Temporary or Permanent Soil Cover		Yes	3, 4
Storm Water Control	Concrete Lined Stormwater Drainage	Yes	8
	Drainage Swales	Yes	2
	SFL Pond 1	Yes	4
	SFL Pond 3	Yes	2
Cover Area Slopes	Landfill Slopes	Yes	3, 4, 7, 9
Active Area	Interior Slopes	Yes	--
	Exterior Slopes	Yes	3, 4, 6
	Impounded CCR Material	Yes	1
Roads, Culverts		Yes	5

Comment No.	Description	Photo No.
1	Apparent CCR material observed on access road at the southwest corner of Pond 3. Regrade ditch to prevent material being transported from active area from vehicle traffic or heavy rain.	1
2	Erosion rills observed adjacent to drainage swale bordering the northeast corner of Pond 3. Drainage swale not well defined in this area.	2, 3
3	Erosional features and sparse vegetation observed at various locations on the exterior embankments of the SFL, Pond 3, and the Cover Area.	4, 5, 6
4	Indicators of animal activity observed at various locations on the embankments of the Cover and Active Areas.	7, 8, 9, 10, 11, 12
5	Rutting observed on access road bordering Pond 3.	13
6	Soft area observed at toe of embankment, possible due to periodic movement of the HDPE Pipe or a low area.	14
7	Length of vegetation on northwest portion of SFL Embankment obscures visual observation of the embankment.	15
8	Vegetation growing through fabric formed concrete lining in drainage channels and stormwater spillways.	16, 17
9	Corrugated plastic pipes (approximately 18" diameter) observed at various locations at the toe of the bench slopes in the Cover Area. Often infilled with soil and vegetation.	No changes observed.

<p>Structure: SFL Active Area Impounded CCR Material</p>	<p>Date & Time: Wed, Dec 09, 2020, 08:45:36 CST Position: +030.634918° / -096.068835° (±17.4ft) Altitude: 284ft (±19.4ft) Datum: WGS-84 Azimuth/Bearing: 019° N19E 0338mils Magnetic (±13°) Elevation Angle: -06.8° Horizon Angle: +00.1° Zoom: 1.0X</p> 
<p>Photo No.: 1 Date: 12/9/2020</p>	
<p>Photo Direction: N</p>	
<p>Description: Photograph of CCR materials in access road adjacent to stormwater retention area. Indicative of possible runoff exiting Pond 3 area.</p>	
<p>Structure: SFL Active Area Stormwater Management</p>	<p>Date & Time: Wed, Dec 09, 2020, 08:59:16 CST Position: +030.636504° / -096.064094° (±25.5ft) Altitude: 280ft (±26.2ft) Datum: WGS-84 Azimuth/Bearing: 324° N36W 5760mils Magnetic (±12°) Elevation Angle: -01.6° Horizon Angle: -01.7° Zoom: 1.0X</p> 
<p>Photo No.: 2 Date: 12/9/2020</p>	
<p>Photo Direction: NW</p>	
<p>Description: Erosion rills along northern border of Pond 3. Indicative of runoff entering Pond 3.</p>	

<p>Structure: SFL Active Area Stormwater Management</p>	<p>Date & Time: Wed, Dec 09, 2020, 09:02:53 CST Position: +030.636731° / -096.063960° (±30.7ft) Altitude: 285ft (±17.0ft) Datum: WGS-84 Azimuth/Bearing: 305° N55W 5422mils Magnetic (±12°) Elevation Angle: -03.0° Horizon Angle: -00.5° Zoom: 1.0X</p> 
<p>Photo No.: 3 Date: 12/9/2020</p>	
<p>Photo Direction: NW</p>	
<p>Description: Photograph of drainage berm along northern portion of Pond 3. Diversion berm not well defined, as evidenced by erosion rills observed below this area (See Photo 2).</p>	
<p>Structure: SFL Embankment Exterior Slopes</p>	<p>Date & Time: Wed, Dec 09, 2020, 09:21:42 CST Position: +030.637465° / -096.063520° (±15.8ft) Altitude: 305ft (±10.7ft) Datum: WGS-84 Azimuth/Bearing: 093° S87E 1653mils Magnetic (±10°) Elevation Angle: +01.5° Horizon Angle: -00.9° Zoom: 1.0X</p> 
<p>Photo No.: 4 Date: 12/9/2020</p>	
<p>Photo Direction: E</p>	
<p>Description: Typical photo of erosion observed at the eastern embankment.</p>	

<p>Structure: Active Area Exterior Embankment</p>	<p>Date & Time: Wed, Dec 09, 2020, 10:31:30 CST Position: +030.635034° / -096.066145° (±46.1ft) Altitude: 267ft (±20.2ft) Datum: WGS-84 Azimuth/Bearing: 022° N22E 0391mils Magnetic (±12°) Elevation Angle: +05.3° Horizon Angle: -02.2° Zoom: 1.0X</p> 
<p>Photo No.: 5 Date: 12/9/2020</p>	
<p>Photo Direction: N</p>	
<p>Description: Typical photo of bare spot observed, with exposed soil.</p>	
<p>Structure: SFL Cover Area</p>	<p>Date & Time: Wed, Dec 09, 2020, 09:39:26 CST Position: +030.639230° / -096.068493° (±23.8ft) Altitude: 344ft (±23.9ft) Datum: WGS-84 Azimuth/Bearing: 151° S29E 2684mils Magnetic (±12°) Elevation Angle: -13.3° Horizon Angle: +00.2° Zoom: 1.0X</p> 
<p>Photo No.: 6 Date: 12/9/2020</p>	
<p>Photo Direction: SE</p>	
<p>Description: Rutting and exposed wet soil observed in depressed area at NW corner of cover area. Possibly result of animal activity.</p>	

Structure: SFL Cover Area Embankment Slopes	
Photo No.: 7	Date: 12/9/2020
Photo Direction: E	
Description: Typical condition of animal burrows onsite. Photo shows markings used to monitor locations of animal burrows and designate areas to be repaired.	



Structure: AFL Active Area Exterior Embankment	
Photo No.: 8	Date: 12/9/2020
Photo Direction: NE	
Description: Typical condition of animal burrows and markings used to monitor locations.	



Structure:
 SFL Active Area
 Exterior Embankments

Photo No.: 9 **Date:** 12/9/2020

Photo Direction:
 N

Description:
 Typical animal activity, indicative of cow paths observed at various location on the embankment slopes. Shows current system used to redirect cows away from trodden paths. Tires and barbed wire periodically relocated to force new route.



Structure:
 SFL Cover Area
 Stormwater Pond

Photo No.: 10 **Date:** 12/9/2020

Photo Direction:
 E

Description:
 Stormwater pond overview.



<p>Structure: SFL Pond 1</p>	<p>Date & Time: Wed, Dec 09, 2020, 10:27:05 CST Position: +030.638135° / -096.062518° (±55.5ft) Altitude: 274ft (±24.4ft) Datum: WGS-84 Azimuth/Bearing: 009° N09E, 0160mils Magnetic (±12°) Elevation Angle: -11.3° Horizon Angle: -00.8° Zoom: 1.0X</p> 
<p>Photo No.: 11 Date: 12/9/2020</p>	
<p>Photo Direction: N</p>	
<p>Description: Typical photograph of erosion at southwest corner of stormwater pond. Likely due to animal activity.</p>	
<p>Structure: SFL Pond 1</p>	<p>Date & Time: Wed, Dec 09, 2020, 10:21:09 CST Position: +030.638070° / -096.062496° (±28.6ft) Altitude: 275ft (±17.4ft) Datum: WGS-84 Azimuth/Bearing: 111° S69E, 1973mils Magnetic (±12°) Elevation Angle: -06.8° Horizon Angle: +00.7° Zoom: 1.0X</p> 
<p>Photo No.: 12 Date: 12/9/2020</p>	
<p>Photo Direction: E</p>	
<p>Description: Typical photograph of erosion at southwest corner of pond. Likely result of animal activity.</p>	

Structure:
 SFL Active Area
 Access Road

Photo No.: 13 **Date:** 12/9/2020

Photo Direction:
 SW

Description:
 Rutting observed on access road bordering Pond 3 of the Active Area.

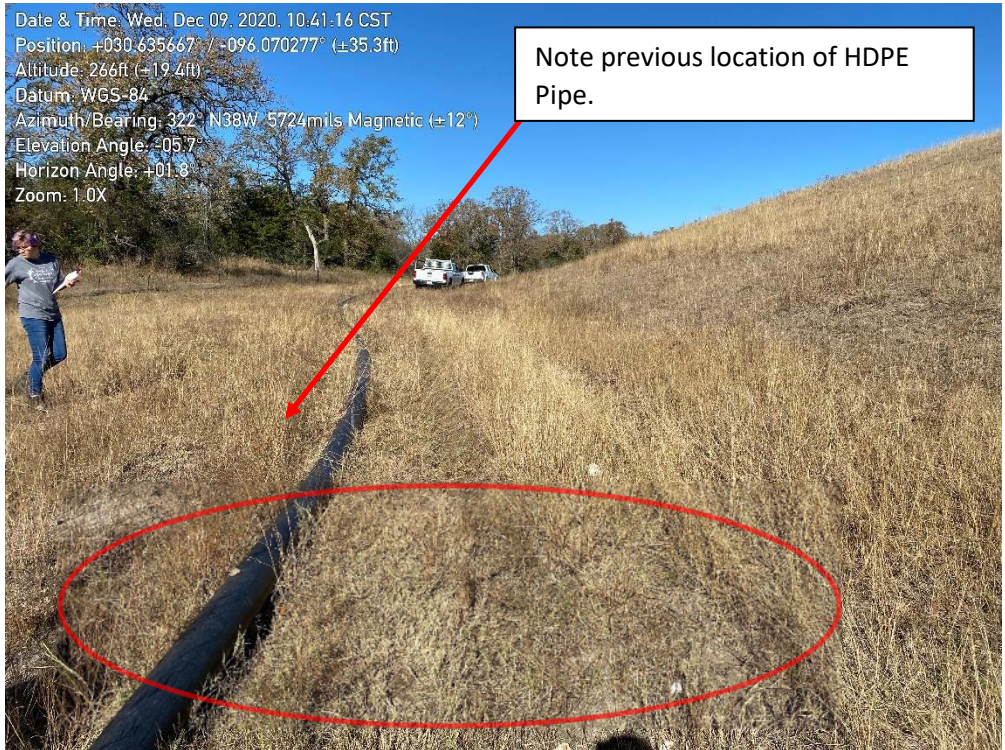


Structure:
 SFL Active Area
 Exterior Embankment

Photo No.: 14 **Date:** 12/9/2020

Photo Direction:
 NW

Description:
 Photograph of soft area noted at the toe of southern embankment. Possibly due to HDPE pipe relocation.



<p>Structure: SFL Cover Area Embankment</p>	<p>Date & Time: Wed, Dec 09, 2020, 09:51:57 CST Position: +030.641957° / -096.067693° (±46.8ft) Altitude: 303ft (±19.6ft) Datum: WGS-84 Azimuth/Bearing: 198° S18W 3520mils Magnetic (±12°) Elevation Angle: +06.3° Horizon Angle: -00.2° Zoom: 1.0X</p>
<p>Photo No.: 15 Date: 12/9/2020</p>	
<p>Photo Direction: S</p>	
<p>Description: Typical photo of vegetation along northwest embankment. Length of vegetation obscures visual observation of embankment in this area.</p>	
<p>Structure: SFL Concrete Lined Drainage Channel</p>	<p>Date & Time: Wed, Dec 09, 2020, 10:24:13 CST Position: +030.639523° / -096.062768° (±59.2ft) Altitude: 298ft (±25.7ft) Datum: WGS-84 Azimuth/Bearing: 297° N63W 5280mils Magnetic (±12°) Elevation Angle: +03.6° Horizon Angle: -00.9° Zoom: 1.0X</p>
<p>Photo No.: 16 Date: 12/9/2020</p>	
<p>Photo Direction: NW</p>	
<p>Description: Typical condition of fabric-formed concrete drainage ditch. Sediment and vegetation observed.</p>	

Structure: SFL Concrete Lined Drainage Channel	
Photo No.: 17	Date: 12/9/2020
Photo Direction: S	
Description: Typical condition of fabric-formed concrete drainage ditch. Vegetation observed in the concrete apron.	

