United States Department of Agriculture

Natural Resources Conservation Service
Geological Services Unit
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Fort Worth, Texas 76115

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Subject: Lower Plum Creek Site 28, Caldwell County, Tx – Geologic Investigation

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The geology of Lower Plum Creek Site 28 was investigated in two phases. In December 2014, the right and left auxiliary spillways were investigated for sampling and Kh information. The design investigation was done in March and April of 2019. The investigations were performed to obtain information for the upgrade of the structure due to reclassification from low hazard to high hazard. A site visit was conducted on April 21, 2022, with two additional hand-augered borings taken. This is an update to the 2020 Geology report to reflect this field visit as well as to address comments from the 30% Design Review.

General Data

Watershed:	Lower Plum Creek
County:	Caldwell
State:	Texas
Structure Class:	Low reclassified to High
Type of Equipment:	Mobile B-57, CME 45

Site Data

Drainage Area:	4691 acres (As-built 6/21/1962)
Type of Structure:	Earthen
Purpose:	Floodwater Retarding
Direction of Valley:	NE to SW
Maximum Height of Fill:	28 ft. (As-built 6/21/1962)
Volume of Fill:	237,600 yrd^3 (As-built 6/21/1962)
Length of Fill: 3	656 ft. (approximate)
Storage Capacity:	3283 Acre-ft. (As-built 6/21/1962)
Sediment pool:	199 Acre-ft. (Work Plan August 1960)
Floodwater Storage:	2892 Acre-ft. (Work Plan August 1960)
Top of Dam (elev.):	480.4 ft. (As-built 6/21/1962)

Auxiliary Spillway Crest (elev.):	474.5 ft. (As-built 6/21/1962)
Auxiliary Spillway Width (Left):	100 ft. (As-built 6/21/1962)
Auxiliary Spillway Width (Right):	400 ft. (As-built 6/21/1962)
Principal Spillway Crest (elev.):	460.2 ft. (As-built 6/21/1962)

Surface Geology and Physiography

Physiographic Description:	Post-Oak Savannah
Topography:	Rolling Hills
Attitude of Beds:	Strike: NE-SW
	Dip: ~0^0 to 2^0 SE

General

The majority of the site is underlain by the Eocene Wilcox Group (Ewi) mudstone and sandstone, with small portion of the watershed being underlain by the Eocene Carrizo Sand (Ec). A slight amount of Quaternary Alluvium, (Qal), is deposited in a channel incised into the (Ewi). Some regional faulting is in the immediate area as described on the Bureau of Economic Geology, Geologic Atlas of Texas, Austin and Seguin Sheets, 1974. No faulting is directly under the structure. Probabilistic ground motion values as measured in %g for this site indicate low seismicity.

Wilcox Group

The Wilcox Group is mostly comprised of claystone, with varying amounts of sandstone, lignite, and iron concretions. Claystone in the formation is massive to thin bedded, with some silt and very fine sand laminations. It is pale brown to yellowish-brown in color and weathers to yellowish-brown. Sandstone are mostly medium to fine grained, moderately well sorted, cross-bedded and occur in units 5 to 20 feet thick. Some lignite seams are present and the range in thickness from less than 1 to about 20 feet thick. Samples 250.6, 251.2, 252.2, 206.3, and 261.1 are representative of the weathered claystone material and samples 250.3, 250.4, 251.3 and 252.1 are representative of weathered silt and sandstone layers.

Carrizo Sand

The Carrizo Sand is comprised of medium to very coarse-grained sandstone. It tends to be thick bedded, light yellow to orange-brown in color and weathers to a yellowish brown. It can be locally banded with iron-oxide and ranges in thickness from 100 to 140 feet. No samples taken are from this unit.

Alluvial Deposits

The alluvium is deposited in the channel incised into the Ewi. The material obtains a thickness of up to 35 feet in hole 305. The material is comprised of moderately stiff, plastic clay, contain some fine-grained sand, with a grey to greenish-gray color. This was logged as CL, CH and SM

in the field in holes 305, 606, 607 and 608.

Cultural

Just south of the site is FM 713, running east to west, and FM 86 is to the west of the site, running northeast to southwest. Lower Plum Creek Site 29 is located approximately 1 mile to the southeast, and Lower Plum Creek Site 24 is located approximately 3 miles to the northwest.

Seismic

Probabilistic ground motion values as measured by %g indicates low seismicity for this site. (Note: the term "low" is used as a descriptive term and not a classification term). A map of all known seismic events with magnitudes (1811 to 2020) and faults within a 100km radius of the site was constructed (TR 210-60, Earth Dams and Reservoirs, March 2019). Seismic event locations are from published historic event, University of Texas Austin and the USGS Earthquake Hazards Program. Fault locations are from the Texas Geologic Outcrop mas, Bureau of Economic Geology. The Balcones fault zone is approximately 40km to the west of Lower Plum Site 28 and is comprised of an area of mostly normal faulting. The fault zone has been inactive for approximately 15 million years. No other significant, known faults are in the vicinity of Site 28.

Hazard curves attached are from the USGS Unified Hazard Tool program. Parameters used are from the Dynamic Conterminous U.S. 2014 (update)(v4.2.0) Edition, 760 m/s (B/C boundary) Site Class, Spectral Period is Peak Ground Acceleration with a time horizon return period of 2475 years. Peak Horizontal Ground Acceleration at this site is 0.025937407 g with an Exceedance rate of 0.00040208253 yr^{-1}.

The attached Total Deaggregation Plot (USGS) indicates the mean seismic contribution to the site is from several earthquakes of magnitude 4.8-5.1, 30 to 100 km from the site. The events are along the Balcones Fault to the northwest of the site.

The attached magnitude vs. distance vs. Papdopoulos and Lefkoppoulos (e-e') curve is from the deaggregation plot report mentioned above and the e-e' data from the Magnitude-Distance Relations for Liquefaction in Soil from Earthquakes, Bulletin of the Seismological Society of America, Vol. 83, June 1993. Magnitude/Distance points below and to the right of the e-e' curve are not considered susceptible to liquefaction. Points above and to the left of the e-e' may be subject to liquefaction. The figure included in this report is intended for informational purposes and should not be considered a complete seismic evaluation for design.

Site

Rehabilitation site plans consist of "constructing an impact basin for the Need of the Project existing principal spillway system; adding a new 30-inch hooded inlet principal spillway with an impact basin; widening the right auxiliary spillway 36 feet; lowering both auxiliary spillway

crests 0.4 feet; regrading the inlet and outlet channels of both auxiliary spillways; raising the top of the dam 0.9 feet; flattening the upstream and downstream slopes to 3:1; reconstructing an upstream wave berm and adding rock riprap for wave protection." From: FINAL SUPPLEMENTAL WATERSHED PLAN NO. VII and Environmental Evaluation for the Rehabilitation of Floodwater Retarding Structure No. 28 of the Lower Plum Creek Watershed Hays and Caldwell Counties, Texas. (May 2016)

Auxiliary Spillway

Eleven holes were drilled in the right Auxiliary Spillway to obtain samples for Kh determination in 2014 to assist in planning. All holes were drilled using a Mobil B-57 rig using hollow stem augers. All holes were drilled to at least existing Principal Spillway pipe invert elevation of 447 feet, to meet the "depth to valley floor" criteria in (TR 210-60, Earth Dams and Reservoirs, March 2019). A geologic profile of the right auxiliary spillway is in attachment 7.

Eight holes were drilled in the left Auxiliary Spillway for the same reasons in 2014 and 2015. These holes were also drilled using a Mobil B-57 rig with hollow stem augers and were also drilled to principal spillway pipe invert elevation. A geologic profile of the left auxiliary spillway is in attachment 7.

Auxiliary Spillway-Right

Sample No.	Depth	Location	Type of sample
250.5	20'-22'	~12+31 CL AS-R 157ft L	3" Push
251.2	10'-12.5'	~13+77 CL AS-R 158ft L	3" Push
252.1	5'-7'	~15+25 CL AS-R 157ft L	3" Push
253.1	5'-7.5'	~16+76 CL AS-R 160ft L	3" Push
253.2	10'-12.5'		3" Push
254.1	5'-7.5'	~18+26 CL AS-R 157ft L	3" Push
254.2	10'-12.5'		3" Push
255.1	5'-7.5'	~19+74 CL AS-R 156ft L	3" Push
256.1	5'-7.5'	~21+28 CL AS-R 158ft L	3" Push

Auxiliary Spillway-Left

Sample No.	Depth	Location	Type of sample
260.1	0'-2.5'	~10+27 CL AS-L 17ft R	3" Push
260.3	10'-12.5'		3" Push
260.5	20'-22.5'		3" Push
260.6	25'-27.5'		3" Push
261.1	5'-7.5'	~11+79 CL AS-L 20ft R	3" Push
261.2	10'-12.5'		3" Push
262.1	5'-7.5'	~13+29 CL AS-L 18ft R	3" Push
262.2	15'-17.5'		3" Push
263.2	10'-12.5'	~14+75 CL AS-L 21ft R	3" Push
264.1	5'-7.5'	~16+24 CL AS-L 18ft R	3" Push

Five additional holes were drilled in the outside cut of the right auxiliary spillway in 2019. These holes were drilled to investigate material for borrow use as well as to investigate lithology and slope stability in areas of proposed excavation for auxiliary spillway expansion.

Hole #	Sample #	Depth	Location	Type	Discussion
270	270.1	1'-5'	~11+50CL AS-R 275' RT	small	borrow
	270.2	7'-10'		small	borrow
	270.3	10'-12'		3" push	slope stability
	270.4	13.5'-15'		SPT	6+9+8/ slope stability
271	270.1	2'-5'	~10+80CL AS-R 295' RT	small	borrow
	270.2	5'-8'		small	borrow
	270.3	8'-9.5'		SPT	11+22+29/ Slope stability
	270.4	13.5'-15'		SPT	12+20+25/ Slope stability
272	272.1	2'-5'	~9+70CL AS-R 290' RT	small	borrow
	272.2	7'-10'		small	borrow
	272.3	13.5'-15.5'		3" push	slope stability
273	273.1	2'-5'	~8+80CL AS-R 265' RT	small	borrow
	273.2	10'-13.5'		small	borrow
	273.3	13.5'-15'		SPT	14+27+33/ Slope stability
274	274.1	0-5'	~7+80CL AS-R 245' RT	small	borrow
	274.2	10'-11.5'		SPT	8+12+13/ Slope stability

Current Dam

Two holes were drilled on the dam at the principal spillway in 2019 to obtain samples for pipe and inlet support, slope stability and foundation support characteristics. The follow table outlines these holes, samples taken, and purpose.

Hole #	Sample #	Depth	Location	Type	Discussion
304	304.1	5'-7.5'	~20+95CL Dam	3" push	slope stability
	304.2	10'-12.5'		3" push	slope stability Pipe support
	304.3	15'-17.5'		3" push	slope stability Pipe support
	304.4	30'-32.5'		3" push	slope stability
	304.5	35'-37.5'		3" push	foundation
	304.6	42.5'-44'		SPT	4+9+12 Foundation
	304.7	45'-46.5'		SPT	6+19+27 Foundation
305	305.1	5'-7.5'	~20+90CL Dam 95'DS	3" push	Classification

305.2	7.5’-10’	3” push	pipe support
305.3	10’-11.5’	SPT	pipe support
305.4	12.5’-15’	3” push	pipe, Impact basin
305.5	20’-21.5’	SPT	10+14+19 classification
305.6	28’-29.5’	SPT	15+26+35 classification
305.7	35’-36.5’	SPT	12+17+25 classification
305.8	45’-46.5’	SPT	29+42+46 classification
305.9	50’-51’	SPT	29+50 for 6” Classification

Downstream Toe

Eleven holes were drilled on the downstream toe of the dam in 2019. Samples were taken between 5’ and 10’ to investigate toe drain properties and foundation support material. Further samples were taken at lower depths primarily for classification purposes. The following table outlines this information, along with blow counts for SPT intervals.

Hole #	Depth	Location	Type	Discussion
601	5’-7.5’	~34+50CL Dam 93’DS	3” Push	Toe drain/foundation support
	7.5’-10’		3” Push	Toe drain/foundation support
	20’-21.5’		SPT	4+6+11, classification
	25’-26.5’		SPT	4+13+20, classification
	30’-31.5’		SPT	14+22+27, classification
	35’-36.5’		SPT	11+22+30, classification
	40’-41.5’		SPT	18+28+34, classification
602	5’-7.5’	~32+50CL Dam 95’DS	3” Push	Toe drain/foundation support
	7.5’-10’		3” Push	Toe drain/foundation support
	20’-21.5’		SPT	9+29+33, classification
	25’-26.5’		SPT	5+7+12, classification
	30’-31.5’		SPT	15+22+30, classification
	35’-36.5’		SPT	17+22+25, classification
	40’-41.5’		SPT	12+43+50 for 3”, classific.
603	5’-7.5’	~30+50CL Dam 95’DS	3” Push	Toe drain/foundation support
	7.5’-10’		3” Push	Toe drain/foundation support
	20’-21.5		SPT	7+9+12, classification
	25’-26.5’		SPT	4+9+20, classification
	30’-31.5’		SPT	15+22+36, classification
	35’-36.5’		SPT	19+39+50 for 5.75”, classif.
	40’-41.5’		SPT	20+21+50 for 4”, classif.
604	5’-7.5’	~28+50CL Dam 95’DS	3” Push	Toe drain/foundation support
	7.5’-10’		3” Push	Toe drain/foundation support
	15’-16.5’		SPT	6+9+14, classification
	25’-26.5’		SPT	22+36+43, classification

	30’-31.5’		SPT	12+30+36, classification
	35’-36.5’		SPT	50 for 6”, classification
	40’-41.5’		SPT	21+32+41, classification
605	5’-7.5’	~26+50CL Dam 95’DS	3” Push	Toe drain/foundation support
	7.5’-10’		3” Push	Toe drain/foundation support
	25’-26.5’		SPT	12+24+50 for 6” , classif.
	30-31.5’		SPT	22+31+40, classification
	35-36.5’		SPT	15+25+50 for 5.5” , classif.
606	5’-7.5’	~24+50CL Dam 95’DS	3” Push	Toe drain/foundation support
	7.5’-10’		3” Push	Toe drain/foundation support
	25’-26.5’		SPT	5+8+12, classification
	30’-31.5’		SPT	17+26+27, classification
	35’-36.5’		SPT	23+30+50 for 6” , classif.
	40’-41.5’		SPT	50 for 6”, classification
607	5’-7.5’	~22+45CL Dam 91’DS	3” Push	Toe drain/foundation support
	7.5’-10’		3” Push	Toe drain/foundation support
	25’-26.5’		SPT	12+15+21, classification
	30’-31.5’		SPT	30+43+39, classification
	35’-36.5’		SPT	12+35+50 for 5” , classif.
	40’-41.5’		SPT	29+50 for 6”, classification
608	5’-7.5’	~19+50CL Dam 83’DS	3” Push	Toe drain/foundation support
	7.5’-10’		3” Push	Toe drain/foundation support
	35’-36.5’		SPT	18+32+50 for 5”, classif.
	40’-41.5’		SPT	50 for 4.5”, classification
609	5’-7.5’	~17+58CL Dam 89’DS	3” Push	Toe drain/foundation support
	7.5’-10’		3” Push	Toe drain/foundation support
	40’-40.25’		SPT	50 for 4”, lignite
610	5’-7.5’	~15+48CL Dam 90’DS	3” Push	Toe drain/foundation support
	10’-12.5’		3” Push	Toe drain/foundation support
	35’-36.5’		SPT	17+32+47, classification
	40’-41.5’		SPT	50 for 4”, classification
611	7.5’-10’	~13+42CL Dam 95’DS	3” Push	Toe drain/foundation support
	10’-12.5’		3” Push	Toe drain/foundation support
	40’-41.5’		SPT	13+21+32, classification

Upstream Toe

Six holes were drilled on the upstream toe in 2019. Samples were taken between 5’ and 10’ to investigate for foundation support characteristics. Deeper samples were taken mainly for classification purposes. The following table outlines this information.

Hole #	Depth	Location	Type	Discussion
701	5’-7.5’	~34+50CL Dam 82’ US	3” Push	foundation support
	7.5’-10’		3” Push	foundation support
	15’-16.5’		SPT	6+10+16, classification
	20’-21.5’		SPT	4+8+12, classification
	25’-26.5’		SPT	6+9+12, classification

	30’-31.5’		SPT	13+20+20, classification
	35’-36.5’		SPT	15+23+29, classification
702	5’-7.5’	~32+50CL Dam 82’ US	3” Push	foundation support
	7.5’-10’		3” Push	foundation support
703	5’-7.5’	~30+50CL Dam 82’ US	3” Push	foundation support
	7.5’-10’		3” Push	foundation support
704	5’-7.5’	~28+50CL Dam 82’ US	3” Push	foundation support
	7.5’-10’		3” Push	foundation support
	20’-21.5’		SPT	17+28+30, classification
705	5’-7.5’	~26+50CL Dam 82’ US	3” Push	foundation support
	7.5’-10’		3” Push	foundation support
	10’-11.5’		SPT	6+9+13, classification
	20’-21.5’		SPT	16+23+36, classification
706	5’-7.5’	~9+45CL Dam 73’ US	3” Push	foundation support
	7.5’-10’		3” Push	foundation support

Penetrometer Readings

Field penetrometer readings were obtained on most push tube samples. Readings were taken at the base of the sample with units in TSF (tons per square foot). The following table outlines this information.

Hole #	Depth	Location	Material	TSF
304	7.5’	~20+95CL Dam	CL	4.5+
	12.5’		CL	2.25
	17.5’		CL	2.25
	32.5’		CL	3.75
	37.5’		CH	1.5
305	7.5’	~20+90CL Dam 95’DS	CH	4.5+
	10’		SM	1.5
	15’		SM	4.5+
601	7.5’	~34+50CL Dam 93’DS	CL	4.5+
	10’		CL	4.5+
602	7.5’	~32+50CL Dam 95’DS	CL	1.75
	10’		SM	4.5+
603	7.5	~30+50CL Dam 95’DS	SM	4.5+
	10’		SM	4.5+
604	7.5’	~28+50CL Dam 95’DS	SC	2.5
	10’		SM	4.0
605	7.5’	~26+50CL Dam 95’DS	CL	4.0
	10’		SC	4.5+
606	7.5’	~24+50CL Dam 95’DS	CL	2.75
	10’		CL	4.5
607	7.5’	~22+45CL Dam 91’DS	CL	2.75
	10’		CL	3.0
608	7.5’	~19+50CL Dam 83’DS	SM	1.75
	10’		SM	0.75

609	7.5’	~17+58CL Dam 89’DS	SC	1.5
	10		SC	1.0
610	7.5’	~15+48CL Dam 90’DS	CH	4.0
	12.5’		CL	4.0
611	10’	~13+42CL Dam 95’DS	CL	2.5
	12.5’		CL	1.0
701	7.5’	~34+50CL Dam 82’ US	CH	2.5
	10’		CH	2.25
702	7.5	~32+50CL Dam 82’ US	CL	3.75
	10’		CL	2
703	7.5’	~30+50CL Dam 82’ US	CL	3
	10’		CL	2.75
704	7.5’	~28+50CL Dam 82’ US	SC	3
	10’		SC	4.5+
705	7.5’	~26+50CL Dam 82’ US	SC	2.25
	10’		SC	4
706	7.5’	~9+45CL Dam 73’ US	CH	0.25
	10’		CH	1.25

Water Levels

Water levels in most holes were recorded. The following table outlines water level and cave-in information that was collected during drilling, immediately after drilling, and at least 24 hours after drilling (if available). No water was introduced to during the drilling of any hole, and no precipitation occurred while holes were open.

Hole #	WL(drilling)	WL(0hrs)	CI(0hrs)	WL(24hrs)	CI(24hrs)
270	n/a	n/a	n/a	dry	9.3’
271	n/a	n/a	n/a	dry	9.0’
272	n/a	n/a	n/a	dry	9.2’
273	n/a	n/a	n/a	dry	8.8’
274	n/a	n/a	n/a	dry	7.0’
304	36’	n/a	n/a	n/a	n/a
305	9’	n/a	n/a	7.6’	10.2’
601	n/a	n/a	n/a	n/a	n/a
602	15’	n/a	n/a	n/a	n/a
603	15’	n/a	n/a	n/a	n/a
604	10’	n/a	n/a	n/a	n/a
605	22’	n/a	n/a	n/a	n/a
606	20’	9.6’	25.2’	8.6’	21.1’
607	20’	n/a	n/a	7.2’	18.2’
608	35’	n/a	n/a	5.4’	27.3’
609	20’	4.4’	30.6’	4.2’	27.2’
610	10’	4.4’	33.4’	3.3’	16.2’
611	10’	2.9’	37.2’	2.7’	31.0’
701	20.5’	n/a	n/a	n/a	n/a
702	15’	n/a	n/a	n/a	n/a

703	15’	n/a	n/a	n/a	n/a
704	12’	n/a	n/a	n/a	n/a
705	n/a	10.6’	14.0’	n/a	n/a
706	n/a	n/a	n/a	n/a	n/a

Borrow

Seven borrow sampling holes were drilled in 2019 on the west side of the permanent pool, as shown in attachment 2e. The five holes drilled on the outside cut of the right auxiliary spillway were additionally sampled for borrow material. Samples of each horizon were taken, and then combined into larger composite samples sent to the Soil Mechanics Laboratory for analysis. All holes drilled in the borrow area and on the outside cut of the right auxiliary spillway were backfilled with soil the day they were drilled. The following tables outline samples and estimated yardage of material. Volume is based on an estimate of 90% of an acre-ft being usable (approximately 1350 yds^3/acre-ft usable). This conservative cubic yardage is used to account for waste during construction.

Borrow Area East of Permanent Pool

Hole #	Material	Sample	Volume	Description
176	CL	0’-7’	9450 yds^3	clay, stiff, slight coarse gravel, very Fine grained sand, gravel, slightly Moist, plastic, reddish brown
176	CL	7’-10’	4050 yds^3	Clay, stiff, organic brown- gray, Moist, plastic
176	CL	10’-15’	6750 yds^3	Clay, stiff, very fine grained sand, Light gray, moist to very moist, Plastic to slightly plastic
177	CH	0’-3’	4050 yds^3	Clay, silty, slightly moist, stiff, Moderately plastic to plastic, Dark brown
177	CL	3’-8’	6750 yds^3	Clay, silty, slight gravel, moist, Stiff, plastic, light brown
177	CL	8’-15’	9450 yds^3	Clay, very stiff, sandy, moist to Very moist, moderately plastic, Light gray
178	CH	0’-2’	2700 yds^3	clay, black, top soil, moist, stiff, Moderate to high plasticity
178	CL	3’-5’	2700 yds^3	Clay, brown, slight CaCO3, very Fine grained gravel, moist, stiff, Plastic
178	CL	5’-11’	8100 yds^3	Clay, stiff, light brown, moist, Moderately stiff, plastic
178	SC	11’-15’	5400 yds^3	Sand, clayey, very moist, plastic, Medium density, light brown to Light gray

179	CH	0’-4’	5400 yds^3	Clay, silty, stiff, slightly calcareous, Slightly moist to moist, dark brown
179	CL	4’-9’	6750 yds^3	Clay, silty, slight gravel, moist, stiff, Plastic, light brown
179	CL	9’-15’	8100 yds^3	Clay, Very fine grained sand, silty, Very moist, med. Density, light gray
180	CL	0’-2’	2700 yds^3	Dark brown, roots, clay, slight sand, Silty, slight CaCO3, slightly moist to Moist
180	CL	2’-6’	5400 yds^3	As above, becomes lighter brown With depth
180	CL	6’-10’	5400 yds^3	Clay, silty, moist, slightly sand, Calcareous, light brown/gray, stiff
180	CH	10’-15’	6750 yds^3	Clay with some very fine grained Sand and silt, very moist, plastic, Moderately stiff
181	SC	0’-5’	6750 yds^3	alternating thinly bedded very fine to Fine grained sand and sandy clay, Slightly moist, loose sand, stiff clay, Brown to gray-brown
181	CH	5’-11’	8100 yds^3	Clay, moist, stiff, brown to light Gray, plastic
181	CL	11’-15’	5400 yds^3	Clay, moist, moderately stiff, light Gray, very silty, some very fine Grained sand
182	CL	0’-1.5’	2025 yds^3	clay, silty, slightly moist, roots, Stiff, plastic, dark brown
182	CL	1.5’-10’	11475 yds^3	Clay, silty, calcareous, fine grained Gravel, moist, moderately stiff, Light brown, increase in coarseness Of gravel at 5’-8’
182	CL	10’-15’	6750 yds^3	Clay with silty light gray lamination, Moist to very moist, mod. Stiff, Light brown to light gray with Iron staining
183	CH	0’-2’	2700 yds^3	Clay, silty, slightly moist to moist, Roots, dark brown, stiff, plastic
183	CL	2’-7’	6750 yds^3	Clay, silty, sandy, calcareous gravel, Moist, stiff, light brown
183	SC	7’-10’	4050 yds^3	sand, clayey, moist, slightly muddy, Plastic, moderately dense, dark gray To brown
183	CH	10’-13’	4050 yds^3	Clay, silty, slight gray silt, slight Lignite, moist, plastic, light brown With some light gray
183	CL	13’-15’	2700 yds^3	clay, very silty, slight very fine

				Grained sand, moist, mod. Stiff, Light gray

Total potential borrow, area east of permanent pool: 160,650 yds^3

Outside Cut of Right Auxiliary Spillway

Hole #	Material	Sample	Volume	Description
270	CL	0'-1'	1350 yds^3	Clay, fine, brown, slightly moist, Plastic, stiff, brown to reddish brown
270	CL	1'-7'	8100 yds^3	Clay, silty, moist, plastic, stiff, Reddish brown
270	CL	7'-10'	4050 yds^3	Clay, sandy, slightly moist to moist, Stiff, light brown
271	SC	0'-2'	2700 yds^3	sand and clay, slightly moist, stiff
271	CL	2'-5'	4050 yds^3	clay, silty, slightly moist to moist, Mod. Stiff, light gray/light brown
271	SC	5'-10'	6750 yds^3	Sand, silty, slight clay, slightly Moist, mod. Dense, slightly plastic
272	CL	0'-2'	2700 yds^3	Clay and sand, slightly moist, stiff, Roots, dark brown
272	CL	2'-7'	6750 yds^3	Clay, silty, slight very fine grained Calcareous gravel, slightly moist to Moist, stiff, light brown
272	SM	7'-10'	4050 yds^3	Very fine grained sand, silty, slightly Moist, mod. Dense, light brown
273	SC	0'-2'	2700 yds^3	Sand, slight clay, roots, slightly Moist, dark brown
273	CL	2'-9'	9450 yds^3	Clay, very silty, moist, plastic, Mod. Dense, light brown
274	SC	0'-7'	9450 yds^3	Very fine grained sand, silty, Slightly moist, very slightly to Slightly plastic clay, light brown, Moderately dense

Total potential borrow, outside cut right Aux. spillway: 68850 yds^3

Resistivity

An electro-resistivity (ERI) survey was conducted during the investigation, due to a potential concern for loose sand near the core trench. The ERI survey was conducted by NRCS geologist Bryan Moffatt (PG) on Sept. 26, 2019. The equipment used as an Advanced Geosciences Incorporated SuperSting R8 IP, 8 channel Earth Resistivity and IP Meter. One line was done parallel across the dam, and the other was taken perpendicularly through it. Ten meter electrode spacings were used in each line. The perpendicular line was run through station 26+50 CL dam, next to hole 605. The results of these lines can be seen in Attachment 4.

Interpretations and Conclusions

Borrow material sampled in the area east of the permanent pool totals an estimated 160,650 yds^3, and in the outside cut of the right auxiliary spillway totals an estimated 68,850 yds^3. Total potential borrow material in all sampled areas totals 229,500 yds^3. The Soil Mechanics Report contains information regarding the quality and suitability of sampled material. This report indicated some dispersive soils found in Borrow Grid C, and recommended against using that area for borrow. The following borrow quantities are available based on sampled holes:

Total for Grids A and B (15' sampled in each hole):	99,900 yd^3
Top 5' of Grids A and B:	33,750 yd^3
Top 10' of Grids A and B:	67,500 yd^3

Additionally, on Apr. 21, 2022, two more holes were hand augered to investigate for further potential borrow areas. Hole 1101 was taken on the left of the pool area upstream of the dam. This hole contained CH/CL material suitable for borrow. Field testing for dispersion indicated no observable signs of dispersion in these soils. With this in mind, a minimum of another 6750 yd^3(based on the hole being representative of approx. 1 acre, and 90% of 1 acre-ft.=~1350 yd^3) of borrow material is available in this area, based on the top 5ft. of the sampled hole. More material is expected to be available in this area as well, should it be required. Hole 1102 was taken approximately 650 ft. directly downstream of the principal spillway. This borehole yielded predominately sandy soils and was not deemed a good source of borrow material.

Kh was derived from where Kh=Ms= $0.78(\text{UCS in Mpa})^{1.09}$ for UCS< 10MPa, and Ms= UCS for UCS > 10Mpa. Note: UCS in psf (4.78803E-05) = UCS in MPa (Part 628 Dams, NEH, Chapter 52, 2001, Table 52-3, Material strength number, Ms, for cohesive soil). Also, from ASDSO, Guidance on the Selection of the Soil Erodibility Index, Kh for the NRCS/ARS Auxiliary Spillway Erosion Model, Danny K. McCook, 2005, where in soil material: Kh=Ms x Kb x Kd x Js, the factors Kb, Kd and Js are considered to be equal to 1, therefore Kh = Ms.

Ms values were calculated from laboratory shear test data. The following tables outline the hole locations, depth, type of sample and Kh, for samples from which Kh could be calculated. Where field notes indicated blocky soils (in left auxiliary spillway), a range was calculated for Kh values as Kb may be less than 1 in those materials.

Auxiliary Spillway-Right

Sample No.	Depth	Location	Kh
250.5	20'-22'	~12+31 CL AS-R 157ft L	0.45
251.1	0-2.5'	~13+77 CL AS-R 158ft L	0.19
251.2	10'-12.5'		0.62
252.1	5'-7'	~15+25 CL AS-R 157ft L	0.26
253.1	5'-7.5'	~16+76 CL AS-R 160ft L	0.22
253.2	10'-12.5'		0.14
254.1	5'-7.5'	~18+26 CL AS-R 157ft L	0.33
254.2	10'-12.5'		0.26

255.1	5'-7.5'	~19+74 CL AS-R 156ft L	>1.66
256.1	5'-7.5'	~21+28 CL AS-R 158ft L	>1.66

Auxiliary Spillway-Left

Sample No.	Depth	Location	Kh
260.1	0'-2.5'	~10+27 CL AS-L 17ft R	0.04-0.07
260.3	10'-12.5'		0.34-0.67
260.5	20'-22.5'		0.26-0.52
260.6	25'-27.5'		0.15-0.29
261.1	5'-7.5'	~11+79 CL AS-L 20ft R	0.12-0.23
261.2	10'-12.5'		0.38-0.73
262.1	5'-7.5'	~13+29 CL AS-L 18ft R	0.11-0.22
262.2	15'-17.5'		0.45-0.90
263.2	10'-12.5'	~14+75 CL AS-L 21ft R	0.39-0.78
264.1	5'-7.5'	~16+24 CL AS-L 18ft R	0.24-0.48

In the 2016 soil mechanics report one auxiliary spillway sample tested as dispersive (sample 256.1, taken at a depth of 5-7.5 ft.) and one tested inconclusive (sample 260.2, also at a depth of 5-7.5 ft.). Sample 260.2 was recommended as being treated as dispersive as while the double hydrometer test did not indicate dispersion, the crumb test did. All other samples tested as non-dispersive.

A large rainfall event during the weekend of Oct. 16, 1998 resulted in auxiliary spillway flow for several hours. No information additional information regarding the flow was available. No damage to the spillways was observed following this event. There may have been some small amount of spillway flow during Aug. 2017, however this could not be confirmed. Since a majority of the soils are non-dispersive and considering that the site has been well maintained, with at least one flow event occurring with no noted damage, the presence of some areas of dispersive or possibly dispersive soils 5 ft. below the surface does not appear to be negatively affecting the auxiliary spillways.

The ERI indicates that there is a relatively high resistivity anomaly, approx. 60 ft. below the crest of the dam. This anomaly is being interpreted as a sand bar. The perpendicular transect was run between holes 605 and 606, closer to 605. The anomaly is expected to be approximately 40 ft. beneath the surface at these holes, which were drilled to 36.5 ft. and 40.5 ft. respectively. Presence of water towards the bottom of these holes suggests that the presumed sand bar is saturated, however it is also possible there may be an additional confining layer between the bottom of the holes and the top of the anomaly. Both transects indicate this sand bar is not in direct contact with the pool.

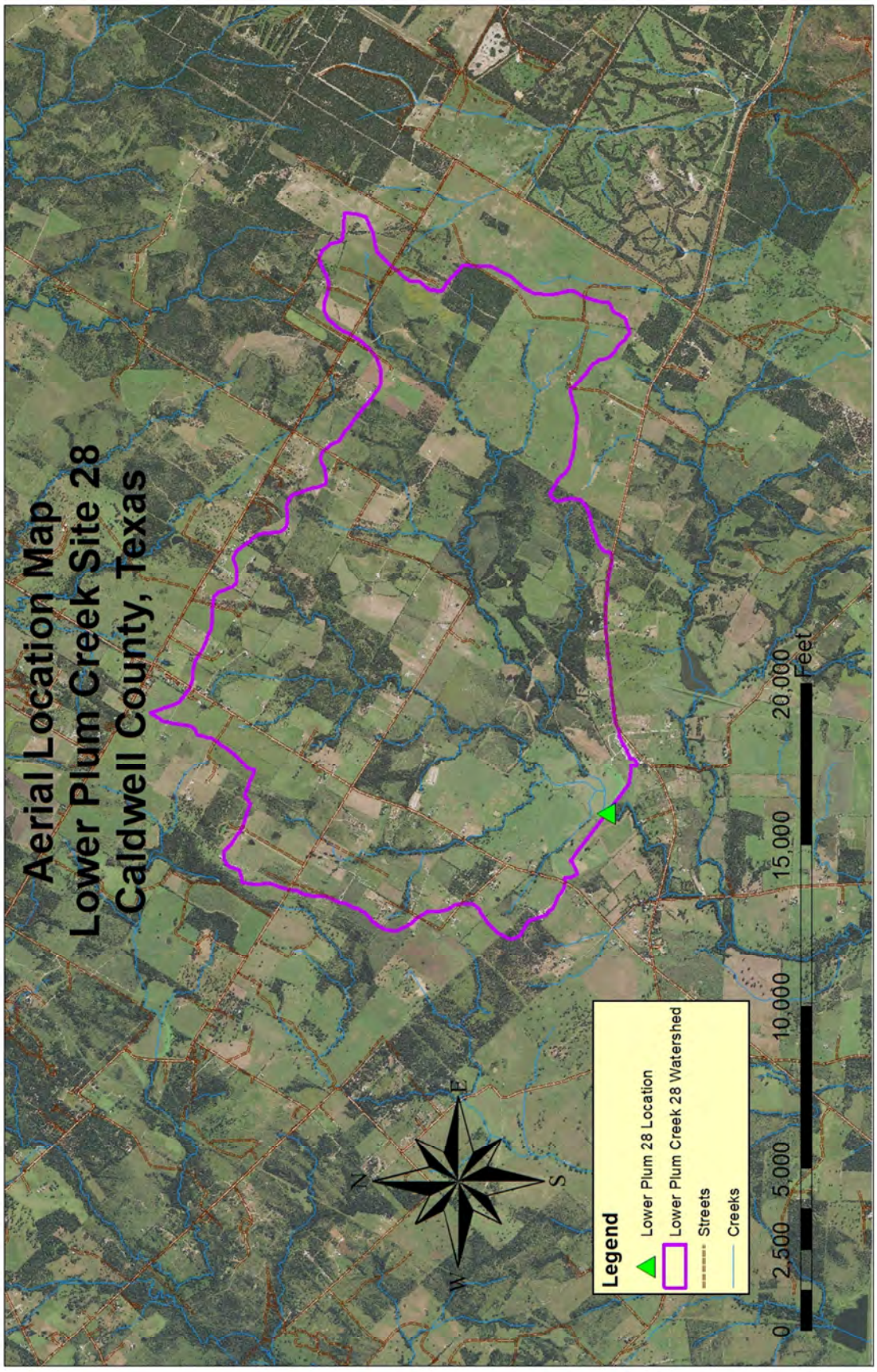
Michael Jugle, Geologist, NRCS, Temple, Tx

Attachments

1) Seismic
    a. Hazard Curves and Input Data (2 pages).
    b. Deaggregation Plot, Statistics and Contributors (3 pages).
    c. Historical Earthquakes > Mw 2 and 100 km
    d. Liquefaction Plot and Data (12 Pages)
2) Maps
    a. Aerial Photo Location Map
    b. Topographic Map
    c. Geologic Outcrop Map
    d. Soils Map and Properties (6 Pages)
    e. Hole Location Maps (2 Pages)
    f. Resistivity Transect Map
3) Sample Logs
    a. Auxiliary Spillway, Right
    b. Auxiliary Spillway, Left
    c. Principal Spillway
    d. Outside Cut, Right Auxiliary Spillway
    e. Upstream Toe
    f. Downstream Toe
    g. Borrow
4) Resistivity Plots
    a. Resistivity Line Parallel to CL Dam (2 Pages)
    b. Resistivity Line Perpendicular to CL Dam
5) Sample Lists (7 Pages)
6) Photos
7) Geologic Profiles

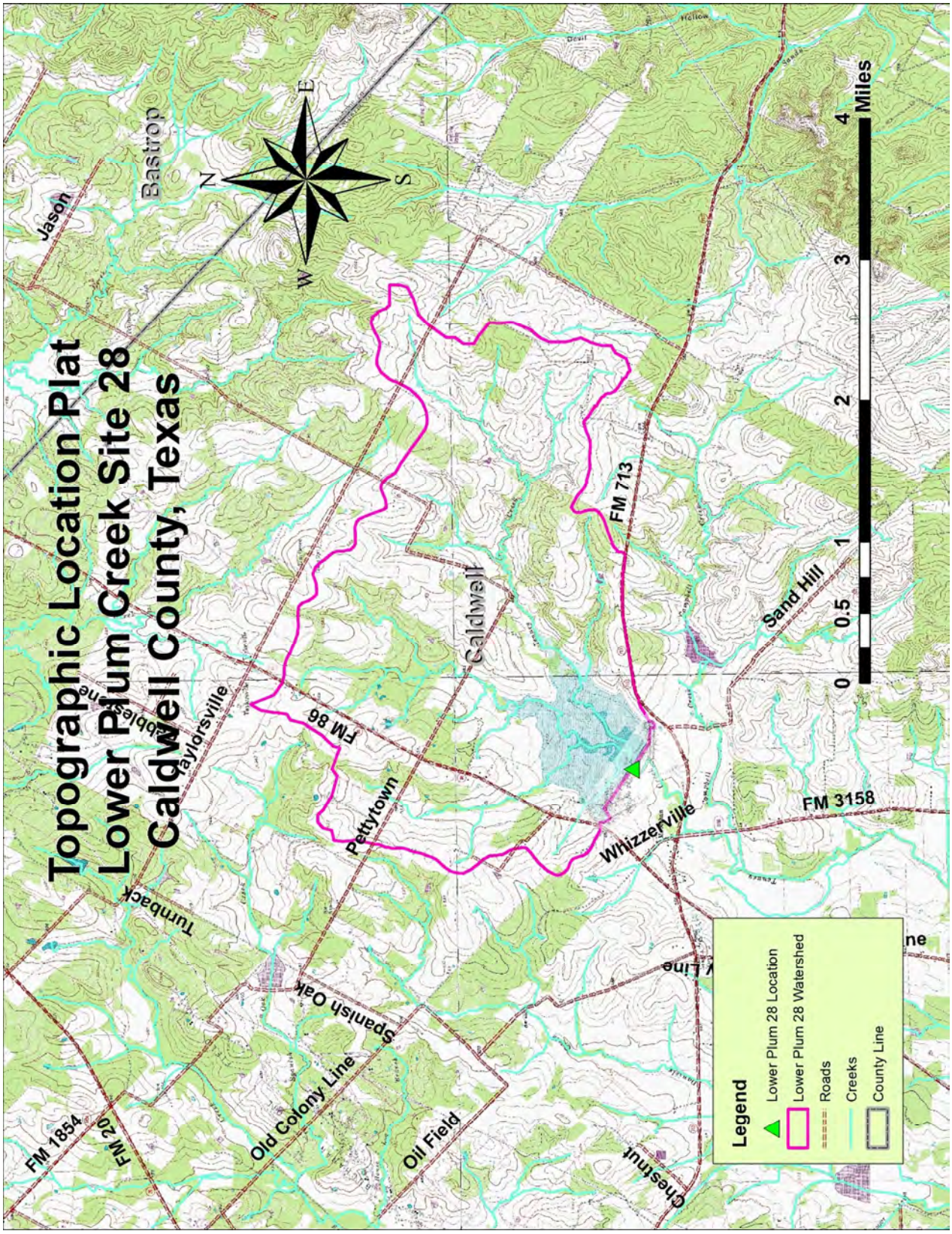
Attachment 2a

Aerial Location Map



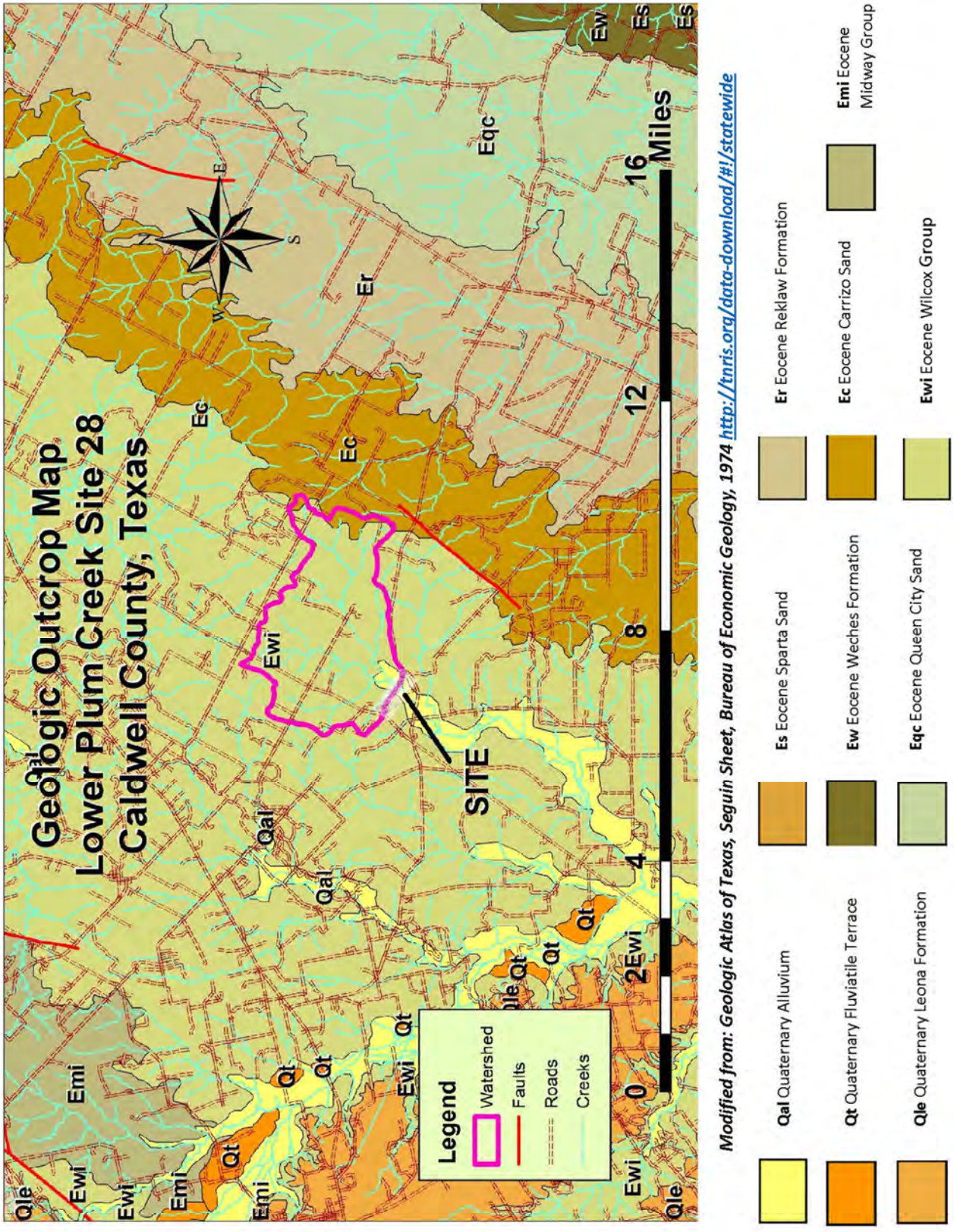
Attachment 2b

Topographic Map



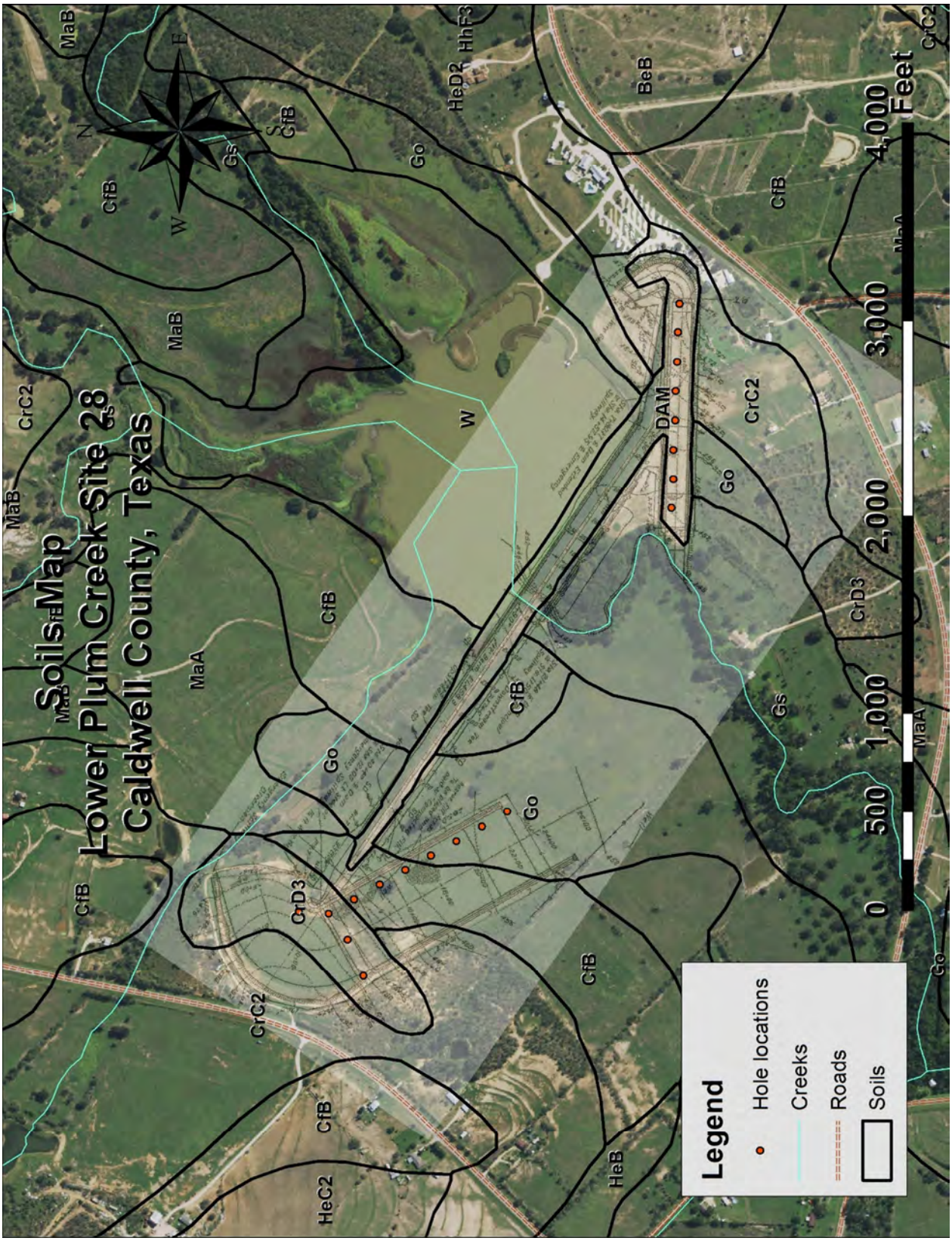
Attachment 2c

Geologic Outcrop Map



Attachment 2d, page 1

Soils Map and Properties



Engineering Properties

Caldwell County, Texas

[Absence of an entry indicates that the data were not estimated]

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percent passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	>10 Inches	3-10 Inches	4	10	40	200		
	In				*Pct*	*Pct*					*Pct*	
BeB:												
Behring	0-8	Clay loam	CH, CL	A-6, A-7-6	0	0	95-100	95-100	90-100	75-95	35-55	18-34
	8-24	Clay, silty clay	CH, CL	A-7-6	0	0	95-100	95-100	90-100	75-95	45-65	25-40
	24-49	Clay, silty clay	CH, CL	A-7-6	0	0	90-100	85-100	85-100	75-100	45-75	25-50
	49-60	Channery clay, silty clay, silty clay loam	CH	A-7-6	0	0-2	85-100	85-100	80-100	75-100	51-75	30-50
CfB:												
Crockett	0-12	Fine sandy loam	CL, ML, SC, SM	A-4, A-6	0	0-2	98-100	94-100	89-100	40-96	15-35	3-15
	12-18	Clay, clay loam, sandy clay	CH, CL	A-6, A-7-6	0	0	89-100	75-100	75-100	60-98	35-59	23-42
	18-38	Clay, clay loam, sandy clay	CH, CL	A-6, A-7-6	0	0	89-100	75-100	75-100	65-98	35-59	23-42
	38-54	Clay, clay loam, sandy clay loam	CH, CL	A-6, A-7-6	0	0-5	90-100	85-100	75-100	50-90	30-60	15-40
	54-62	Clay loam	CH, CL	A-7-6	0	0-5	90-100	90-100	90-100	70-99	45-71	27-52

Engineering Properties

Caldwell County, Texas

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percent passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	>10 Inches	3-10 Inches	4	10	40	200		
	In				*Pct*	*Pct*					*Pct*	
CrC2:												
Crockett, eroded	0-7	Loam	CL, ML, SC, SM	A-4, A-6	0	0-2	98-100	94-100	89-100	40-96	15-35	3-15
	7-12	Clay, clay loam, sandy clay	CH, CL	A-6, A-7-6	0	0	89-100	75-100	75-100	60-98	35-59	23-42
	12-30	Clay, clay loam, sandy clay	CH, CL	A-6, A-7-6	0	0	89-100	75-100	75-100	65-98	35-59	23-42
	30-48	Clay, clay loam, sandy clay loam	CH, CL	A-6, A-7-6	0	0-5	90-100	85-100	75-100	50-90	30-60	15-40
	48-62	Clay loam	CH, CL	A-7-6	0	0-5	90-100	90-100	90-100	70-99	45-71	27-52
CrD3:												
Crockett, severely eroded	0-12	Fine sandy loam, loam	CL, ML, SC, SM	A-4, A-6	0	0-2	98-100	94-100	89-100	40-96	15-35	3-15
	12-18	Clay, clay loam, sandy clay	CH, CL	A-6, A-7-6	0	0	89-100	75-100	75-100	60-98	35-59	23-42
	18-38	Clay, clay loam, sandy clay	CH, CL	A-6, A-7-6	0	0	89-100	75-100	75-100	65-98	35-59	23-42
	38-54	Clay, clay loam, sandy clay loam	CH, CL	A-6, A-7-6	0	0-5	90-100	85-100	75-100	50-90	30-60	15-40
	54-60	Clay loam	CH, CL	A-7-6	0	0-5	90-100	90-100	90-100	70-99	45-71	27-52
DAM:												
Dams	---	---	---	---	---	---	---	---	---	---	---	---

Engineering Properties

Caldwell County, Texas

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percent passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	>10 Inches	3-10 Inches	4	10	40	200		
	In				*Pct*	*Pct*					*Pct*	
Go:												
Gowen	0-20	Clay loam	CL	A-6, A-7-6	0	0	100	96-100	85-100	60-85	30-49	15-30
	20-62	Clay loam, loam, sandy clay loam	CL	A-6, A-7-6	0	0	100	96-100	80-100	55-85	25-45	11-28
Unnamed, minor components	---	---	---	---	---	---	---	---	---	---	---	---
Unnamed, hydric minor components	---	---	---	---	---	---	---	---	---	---	---	---
Gs:												
Gowen	0-20	Clay loam	CL	A-6, A-7-6	0	0	100	96-100	85-100	60-85	30-49	15-30
	20-62	Clay loam, loam, sandy clay loam	CL	A-6, A-7-6	0	0	100	96-100	80-100	55-85	25-45	11-28
Unnamed, minor components	---	---	---	---	---	---	---	---	---	---	---	---
Unnamed, hydric minor components	---	---	---	---	---	---	---	---	---	---	---	---
HeB:												
Heiden	0-8	Clay	CH	A-7-6	0	0	95-100	90-100	80-100	75-99	51-80	32-55
	8-26	Clay, silty clay	CH	A-7-6	0	0	95-100	90-100	80-100	75-99	51-80	32-55
	26-54	Clay, silty clay	CH, CL	A-7-6	0	0	95-100	90-100	75-100	70-90	49-80	32-55
	54-62	Clay	CH, CL	A-7-6	0	0	92-100	92-100	85-100	70-90	49-80	32-55

Engineering Properties

Caldwell County, Texas

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percent passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	>10 Inches	3-10 Inches	4	10	40	200		
	In				*Pct*	*Pct*					*Pct*	
HeC2:												
Heiden, eroded	0-8	Clay	CH	A-7-6	0	0	95-100	90-100	80-100	75-99	51-80	32-55
	8-26	Clay, silty clay	CH	A-7-6	0	0	95-100	90-100	80-100	75-99	51-80	32-55
	26-54	Clay, silty clay	CH, CL	A-7-6	0	0	95-100	90-100	75-100	70-90	49-80	32-55
	54-62	Clay	CH, CL	A-7-6	0	0	92-100	92-100	85-100	70-90	49-80	32-55
HeD2:												
Heiden, eroded	0-8	Clay	CH	A-7-6	0	0	95-100	90-100	80-100	75-99	51-80	32-55
	8-26	Clay, silty clay	CH	A-7-6	0	0	95-100	90-100	80-100	75-99	51-80	32-55
	26-54	Clay, silty clay	CH, CL	A-7-6	0	0	95-100	90-100	75-100	70-90	49-80	32-55
	54-62	Clay	CH, CL	A-7-6	0	0	92-100	92-100	85-100	70-90	49-80	32-55
HhF3:												
Heiden, severely eroded	0-8	Clay	CH	A-7-6	0	0	95-100	90-100	80-100	75-99	51-80	32-55
	8-26	Clay, silty clay	CH	A-7-6	0	0	95-100	90-100	80-100	75-99	51-80	32-55
	26-54	Clay, silty clay	CH, CL	A-7-6	0	0	95-100	90-100	75-100	70-90	49-80	32-55
	54-62	Clay	CH, CL	A-7-6	0	0	92-100	92-100	85-100	70-90	49-80	32-55
Ferris, severely eroded	0-6	Clay	CH	A-7-6	0	0	92-100	92-100	75-100	75-100	51-76	35-55
	6-54	Clay, silty clay	CH	A-7-6	0	0	92-100	92-100	75-100	72-100	51-78	35-56
	54-62	Clay, silty clay	CH	A-7-6	0	0	92-100	92-100	85-100	75-100	61-100	42-75
Unnamed, minor components	---	---	---	---	---	---	---	---	---	---	---	---

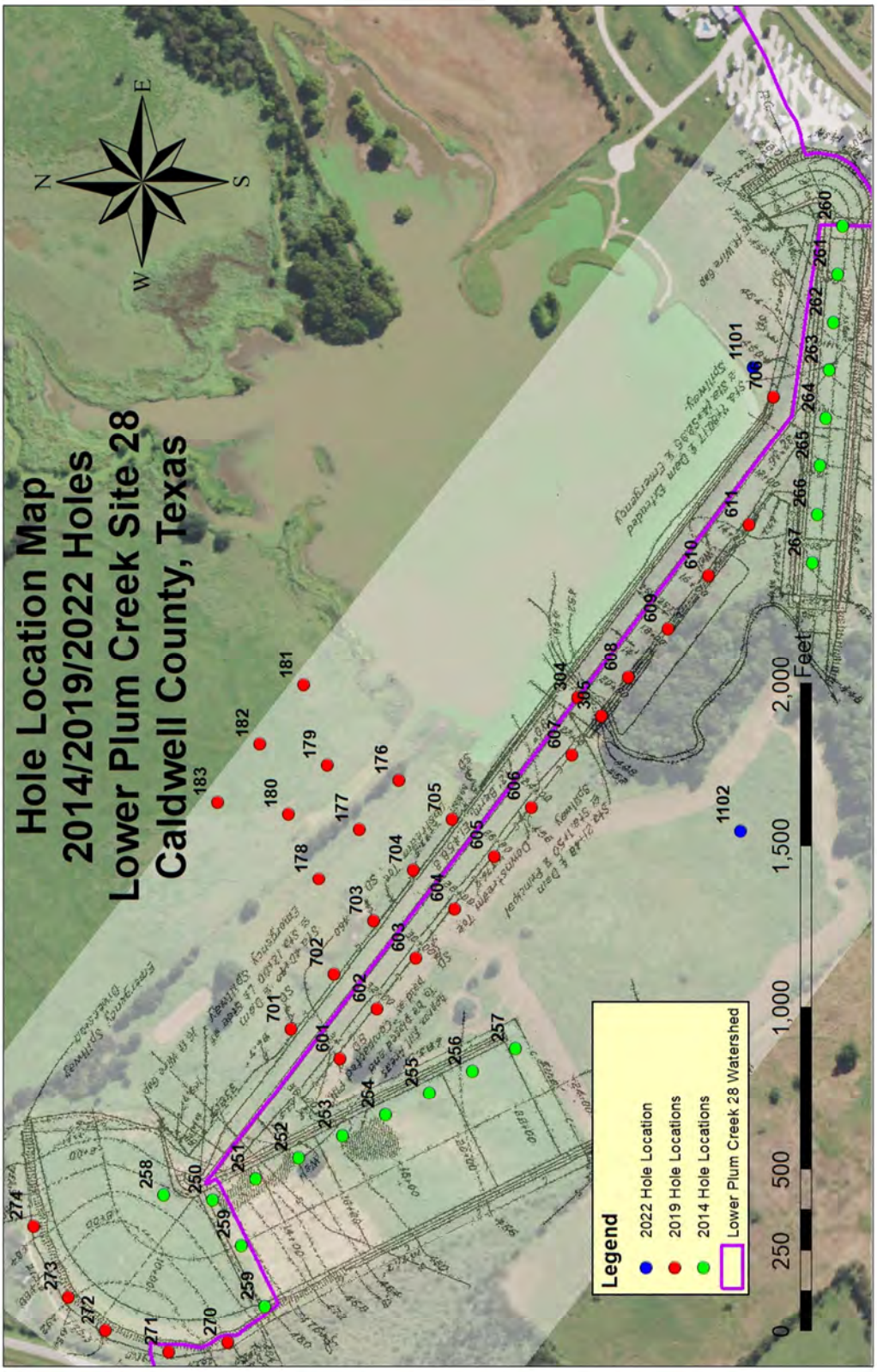
Engineering Properties

Caldwell County, Texas

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percent passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	>10 Inches	3-10 Inches	4	10	40	200		
	In				*Pct*	*Pct*					*Pct*	
MaA:												
Mabank	0-7	Loam	CL, CL-ML, SC, SC-SM	A-4, A-6	0	0	95-100	95-100	80-98	40-70	19-32	4-15
	7-39	Clay, clay loam	CH, CL	A-6, A-7-6	0	0	95-100	95-100	95-100	60-85	38-55	22-37
	39-76	Clay, clay loam, sandy clay	CH, CL	A-6, A-7-6	0	0	95-100	95-100	95-100	60-85	38-55	22-37
Unnamed, minor components	---	---	---	---	---	---	---	---	---	---	---	---
Unnamed, hydric minor components	---	---	---	---	---	---	---	---	---	---	---	---
MaB:												
Mabank	0-7	Loam	CL, CL-ML, SC, SC-SM	A-4, A-6	0	0	95-100	95-100	80-98	40-70	19-32	4-15
	7-39	Clay, clay loam	CH, CL	A-6, A-7-6	0	0	95-100	95-100	95-100	60-85	38-55	22-37
	39-76	Clay, clay loam, sandy clay	CH, CL	A-6, A-7-6	0	0	95-100	95-100	95-100	60-85	38-55	22-37
W:												
Water	---	---	---	---	---	---	---	---	---	---	---	---

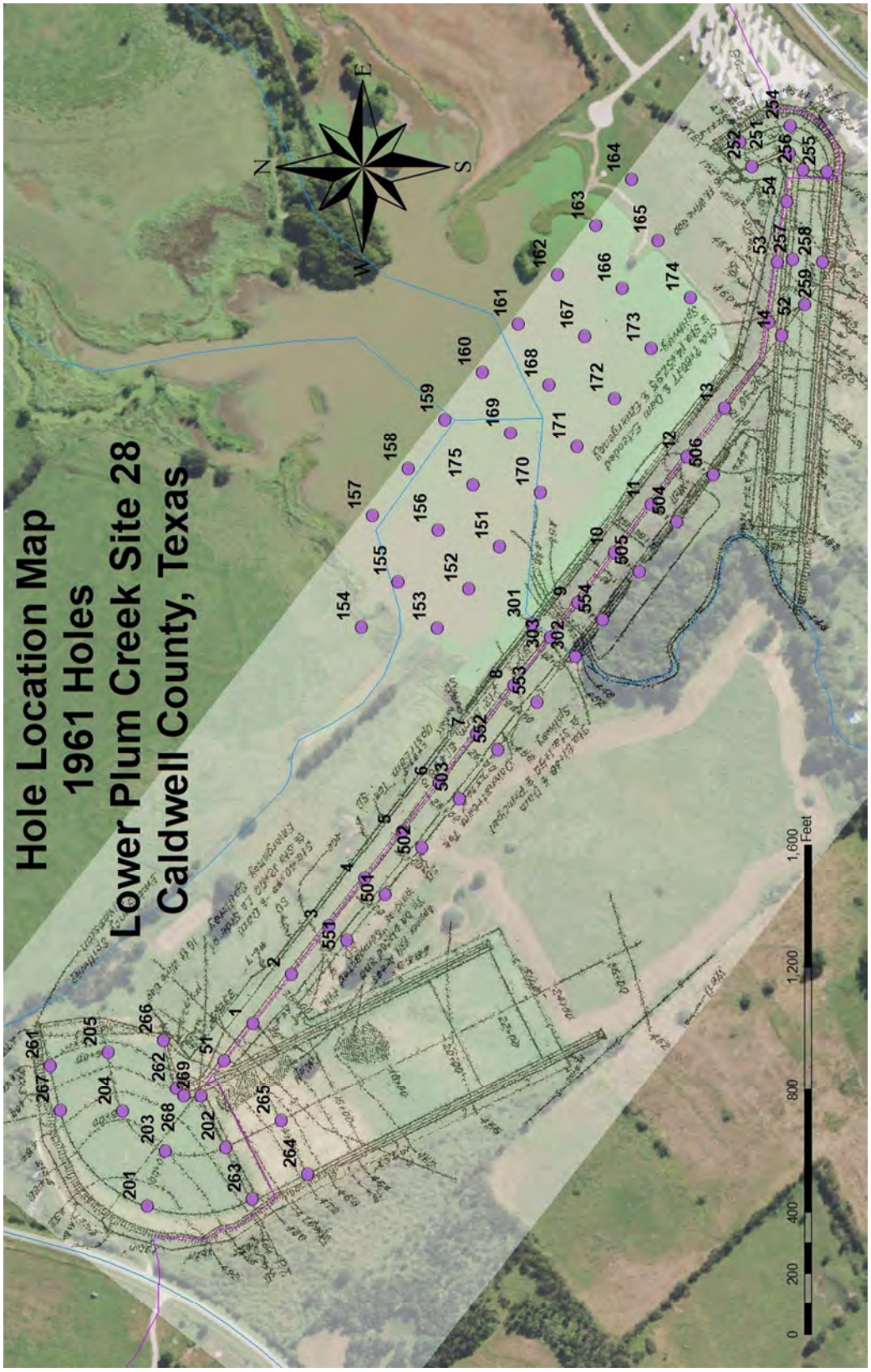
Attachment 2e

2014/2019 Hole Locations Map



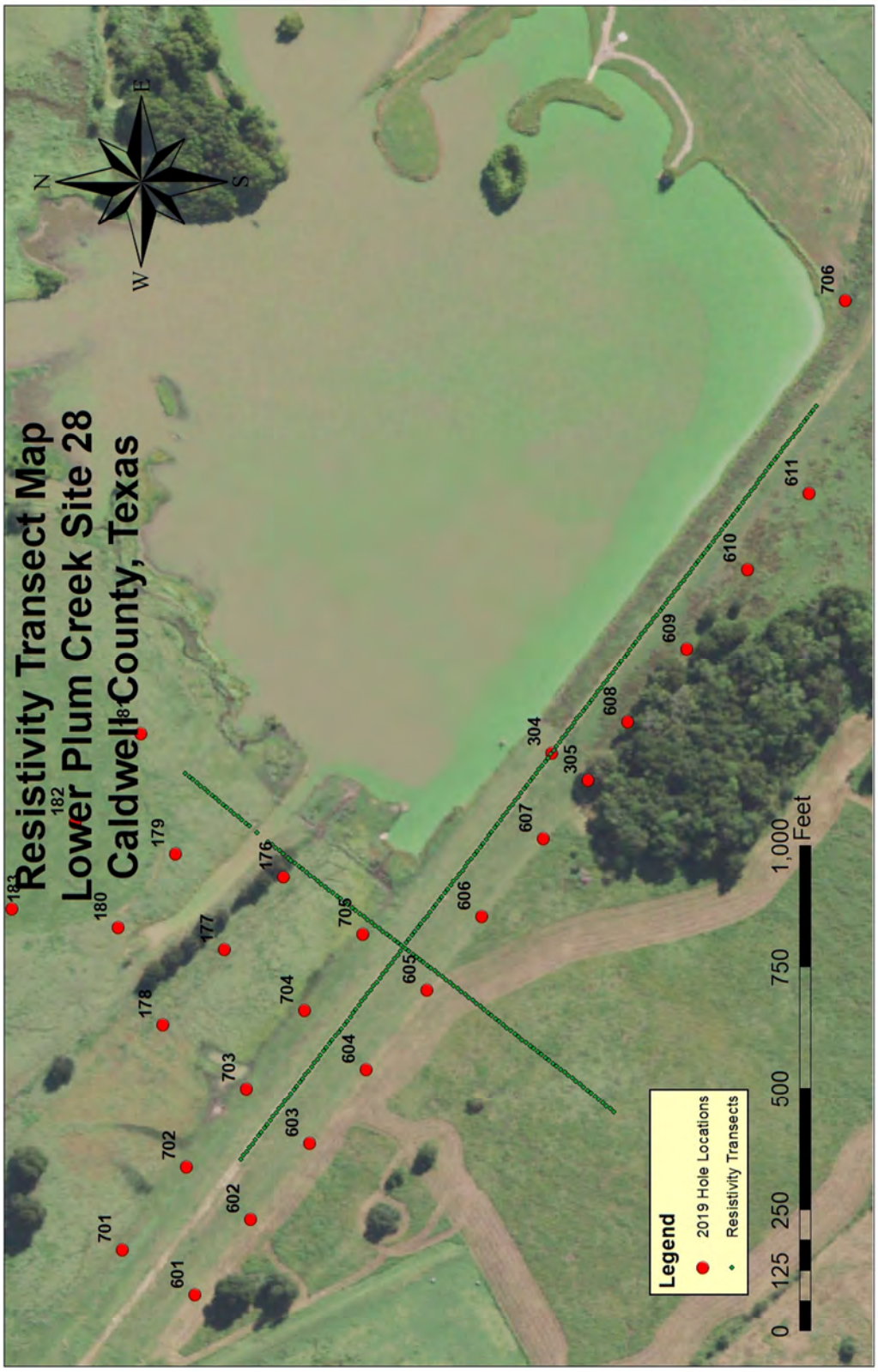
Attachment 2e

1961 Hole Locations Map



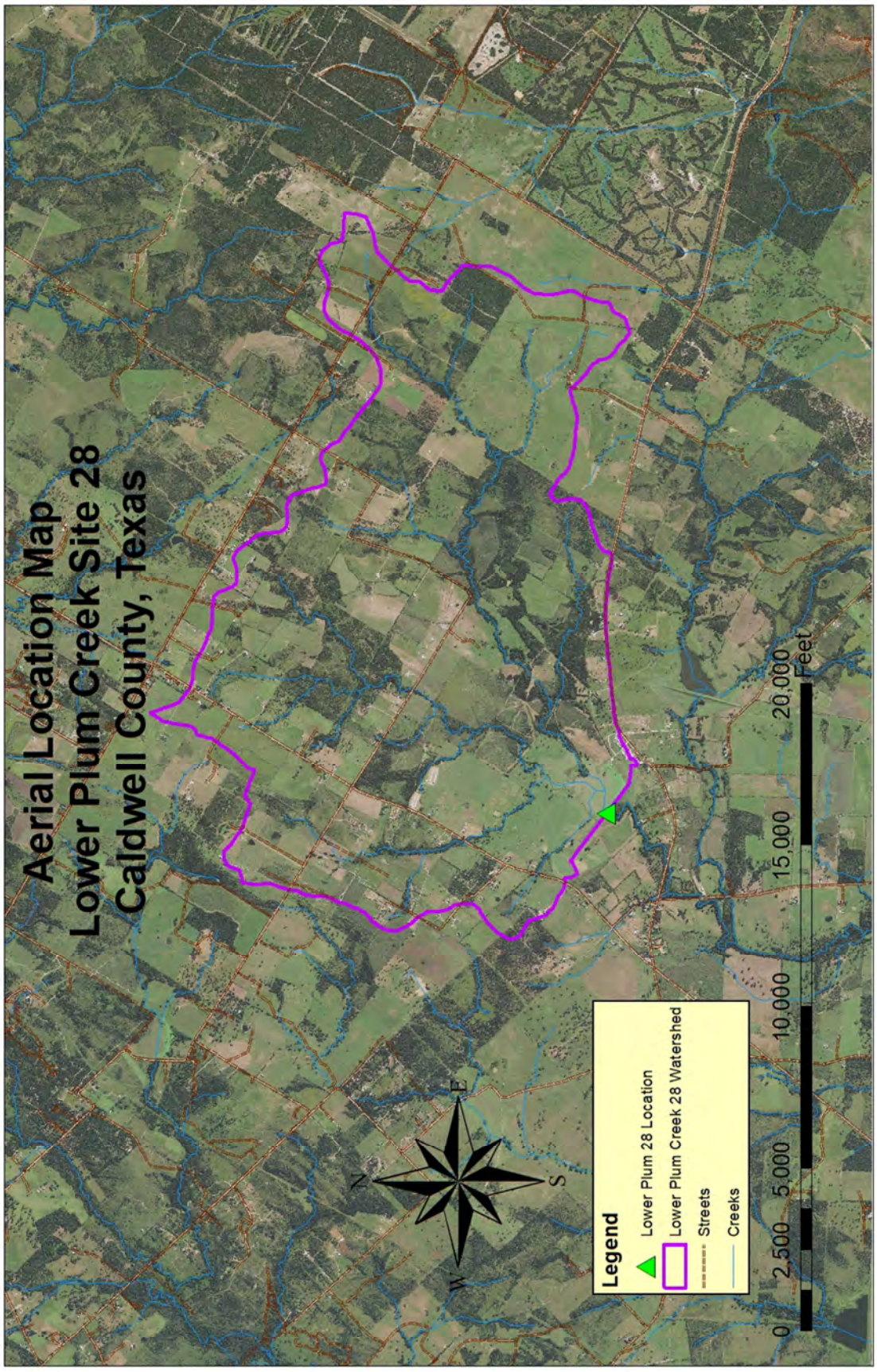
Attachment 2f

Resistivity Transect Map



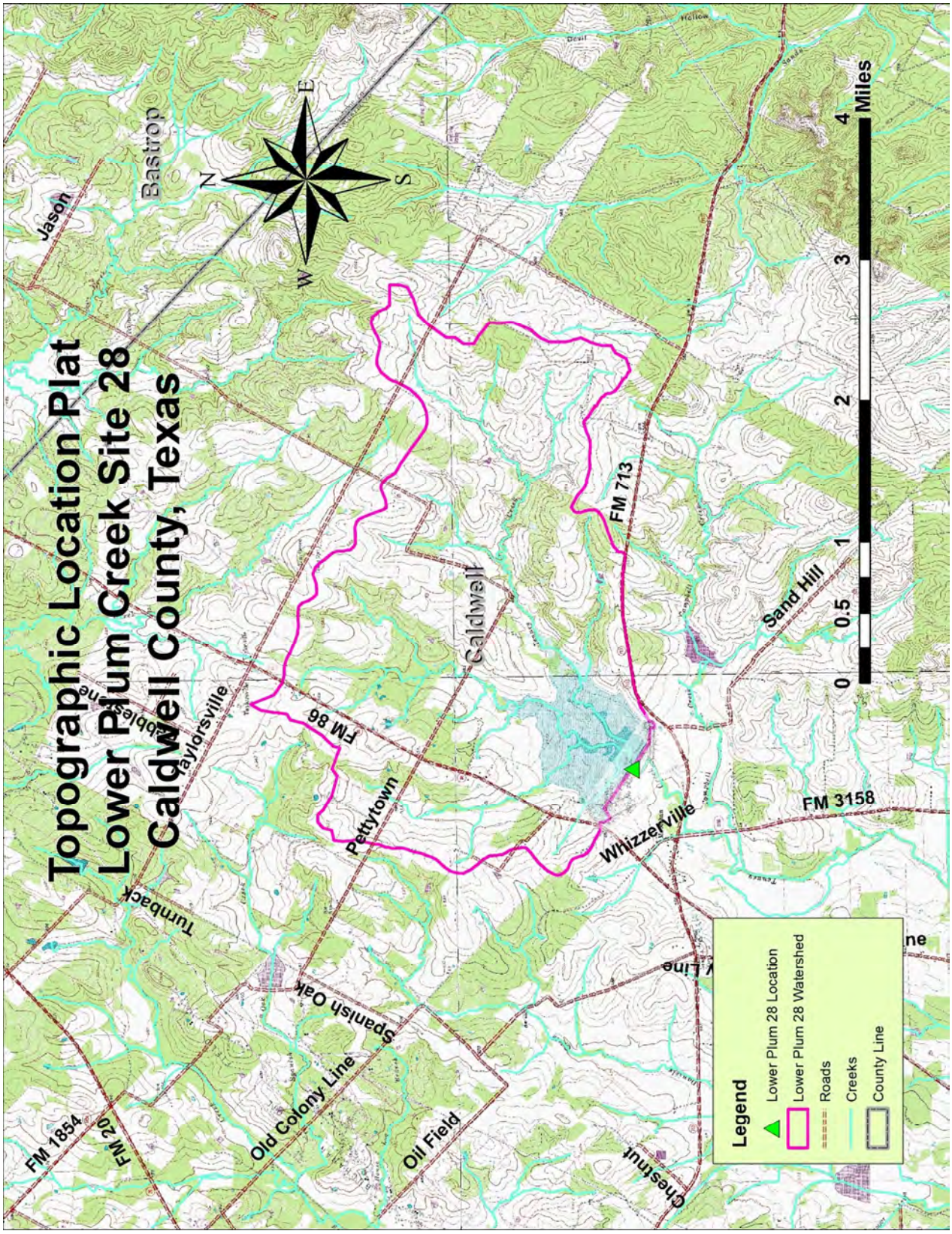
Attachment 2a

Aerial Location Map



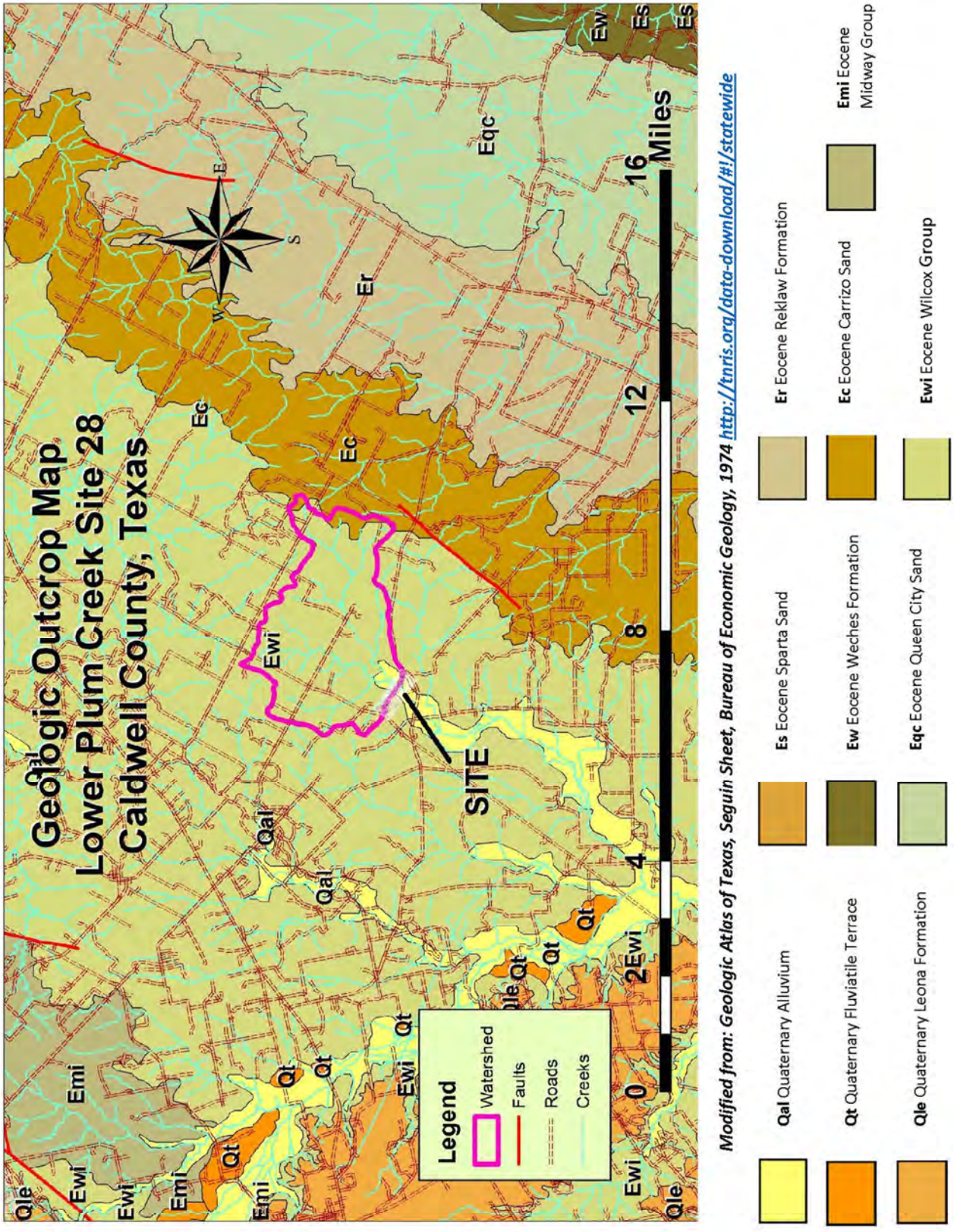
Attachment 2b

Topographic Map



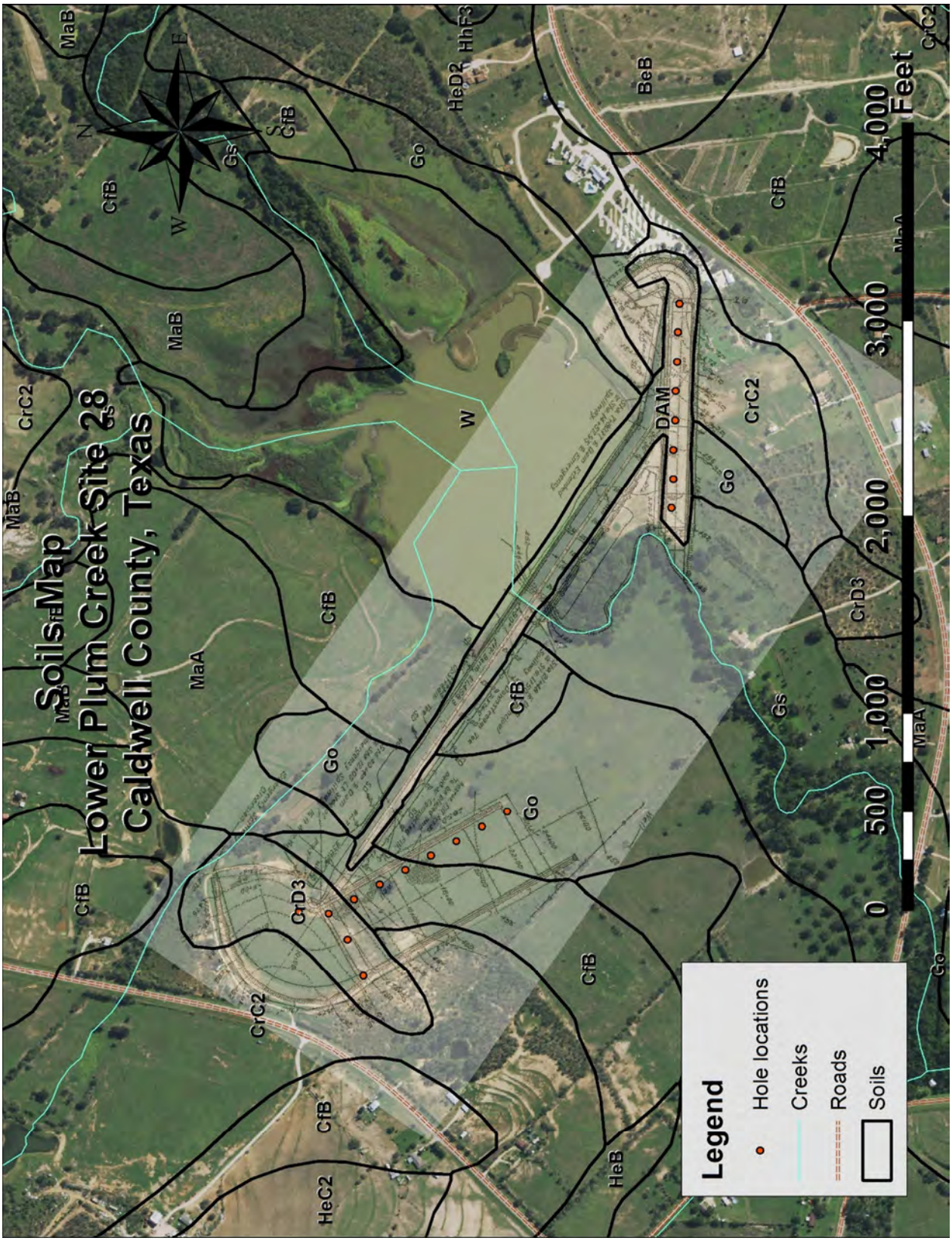
Attachment 2c

Geologic Outcrop Map



Attachment 2d, page 1

Soils Map and Properties



Engineering Properties

Caldwell County, Texas

[Absence of an entry indicates that the data were not estimated]

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percent passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	>10 Inches	3-10 Inches	4	10	40	200		
	In				*Pct*	*Pct*					*Pct*	
BeB:												
Behring	0-8	Clay loam	CH, CL	A-6, A-7-6	0	0	95-100	95-100	90-100	75-95	35-55	18-34
	8-24	Clay, silty clay	CH, CL	A-7-6	0	0	95-100	95-100	90-100	75-95	45-65	25-40
	24-49	Clay, silty clay	CH, CL	A-7-6	0	0	90-100	85-100	85-100	75-100	45-75	25-50
	49-60	Channery clay, silty clay, silty clay loam	CH	A-7-6	0	0-2	85-100	85-100	80-100	75-100	51-75	30-50
CfB:												
Crockett	0-12	Fine sandy loam	CL, ML, SC, SM	A-4, A-6	0	0-2	98-100	94-100	89-100	40-96	15-35	3-15
	12-18	Clay, clay loam, sandy clay	CH, CL	A-6, A-7-6	0	0	89-100	75-100	75-100	60-98	35-59	23-42
	18-38	Clay, clay loam, sandy clay	CH, CL	A-6, A-7-6	0	0	89-100	75-100	75-100	65-98	35-59	23-42
	38-54	Clay, clay loam, sandy clay loam	CH, CL	A-6, A-7-6	0	0-5	90-100	85-100	75-100	50-90	30-60	15-40
	54-62	Clay loam	CH, CL	A-7-6	0	0-5	90-100	90-100	90-100	70-99	45-71	27-52

Engineering Properties

Caldwell County, Texas

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percent passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	>10 Inches	3-10 Inches	4	10	40	200		
	In				*Pct*	*Pct*					*Pct*	
CrC2:												
Crockett, eroded	0-7	Loam	CL, ML, SC, SM	A-4, A-6	0	0-2	98-100	94-100	89-100	40-96	15-35	3-15
	7-12	Clay, clay loam, sandy clay	CH, CL	A-6, A-7-6	0	0	89-100	75-100	75-100	60-98	35-59	23-42
	12-30	Clay, clay loam, sandy clay	CH, CL	A-6, A-7-6	0	0	89-100	75-100	75-100	65-98	35-59	23-42
	30-48	Clay, clay loam, sandy clay loam	CH, CL	A-6, A-7-6	0	0-5	90-100	85-100	75-100	50-90	30-60	15-40
	48-62	Clay loam	CH, CL	A-7-6	0	0-5	90-100	90-100	90-100	70-99	45-71	27-52
CrD3:												
Crockett, severely eroded	0-12	Fine sandy loam, loam	CL, ML, SC, SM	A-4, A-6	0	0-2	98-100	94-100	89-100	40-96	15-35	3-15
	12-18	Clay, clay loam, sandy clay	CH, CL	A-6, A-7-6	0	0	89-100	75-100	75-100	60-98	35-59	23-42
	18-38	Clay, clay loam, sandy clay	CH, CL	A-6, A-7-6	0	0	89-100	75-100	75-100	65-98	35-59	23-42
	38-54	Clay, clay loam, sandy clay loam	CH, CL	A-6, A-7-6	0	0-5	90-100	85-100	75-100	50-90	30-60	15-40
	54-60	Clay loam	CH, CL	A-7-6	0	0-5	90-100	90-100	90-100	70-99	45-71	27-52
DAM:												
Dams	---	---	---	---	---	---	---	---	---	---	---	---

Engineering Properties

Caldwell County, Texas

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percent passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	>10 Inches	3-10 Inches	4	10	40	200		
	In				*Pct*	*Pct*					*Pct*	
Go:												
Gowen	0-20	Clay loam	CL	A-6, A-7-6	0	0	100	96-100	85-100	60-85	30-49	15-30
	20-62	Clay loam, loam, sandy clay loam	CL	A-6, A-7-6	0	0	100	96-100	80-100	55-85	25-45	11-28
Unnamed, minor components	---	---	---	---	---	---	---	---	---	---	---	---
Unnamed, hydric minor components	---	---	---	---	---	---	---	---	---	---	---	---
Gs:												
Gowen	0-20	Clay loam	CL	A-6, A-7-6	0	0	100	96-100	85-100	60-85	30-49	15-30
	20-62	Clay loam, loam, sandy clay loam	CL	A-6, A-7-6	0	0	100	96-100	80-100	55-85	25-45	11-28
Unnamed, minor components	---	---	---	---	---	---	---	---	---	---	---	---
Unnamed, hydric minor components	---	---	---	---	---	---	---	---	---	---	---	---
HeB:												
Heiden	0-8	Clay	CH	A-7-6	0	0	95-100	90-100	80-100	75-99	51-80	32-55
	8-26	Clay, silty clay	CH	A-7-6	0	0	95-100	90-100	80-100	75-99	51-80	32-55
	26-54	Clay, silty clay	CH, CL	A-7-6	0	0	95-100	90-100	75-100	70-90	49-80	32-55
	54-62	Clay	CH, CL	A-7-6	0	0	92-100	92-100	85-100	70-90	49-80	32-55

Engineering Properties

Caldwell County, Texas

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percent passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	>10 Inches	3-10 Inches	4	10	40	200		
	In				*Pct*	*Pct*					*Pct*	
HeC2:												
Heiden, eroded	0-8	Clay	CH	A-7-6	0	0	95-100	90-100	80-100	75-99	51-80	32-55
	8-26	Clay, silty clay	CH	A-7-6	0	0	95-100	90-100	80-100	75-99	51-80	32-55
	26-54	Clay, silty clay	CH, CL	A-7-6	0	0	95-100	90-100	75-100	70-90	49-80	32-55
	54-62	Clay	CH, CL	A-7-6	0	0	92-100	92-100	85-100	70-90	49-80	32-55
HeD2:												
Heiden, eroded	0-8	Clay	CH	A-7-6	0	0	95-100	90-100	80-100	75-99	51-80	32-55
	8-26	Clay, silty clay	CH	A-7-6	0	0	95-100	90-100	80-100	75-99	51-80	32-55
	26-54	Clay, silty clay	CH, CL	A-7-6	0	0	95-100	90-100	75-100	70-90	49-80	32-55
	54-62	Clay	CH, CL	A-7-6	0	0	92-100	92-100	85-100	70-90	49-80	32-55
HhF3:												
Heiden, severely eroded	0-8	Clay	CH	A-7-6	0	0	95-100	90-100	80-100	75-99	51-80	32-55
	8-26	Clay, silty clay	CH	A-7-6	0	0	95-100	90-100	80-100	75-99	51-80	32-55
	26-54	Clay, silty clay	CH, CL	A-7-6	0	0	95-100	90-100	75-100	70-90	49-80	32-55
	54-62	Clay	CH, CL	A-7-6	0	0	92-100	92-100	85-100	70-90	49-80	32-55
Ferris, severely eroded	0-6	Clay	CH	A-7-6	0	0	92-100	92-100	75-100	75-100	51-76	35-55
	6-54	Clay, silty clay	CH	A-7-6	0	0	92-100	92-100	75-100	72-100	51-78	35-56
	54-62	Clay, silty clay	CH	A-7-6	0	0	92-100	92-100	85-100	75-100	61-100	42-75
Unnamed, minor components	---	---	---	---	---	---	---	---	---	---	---	---

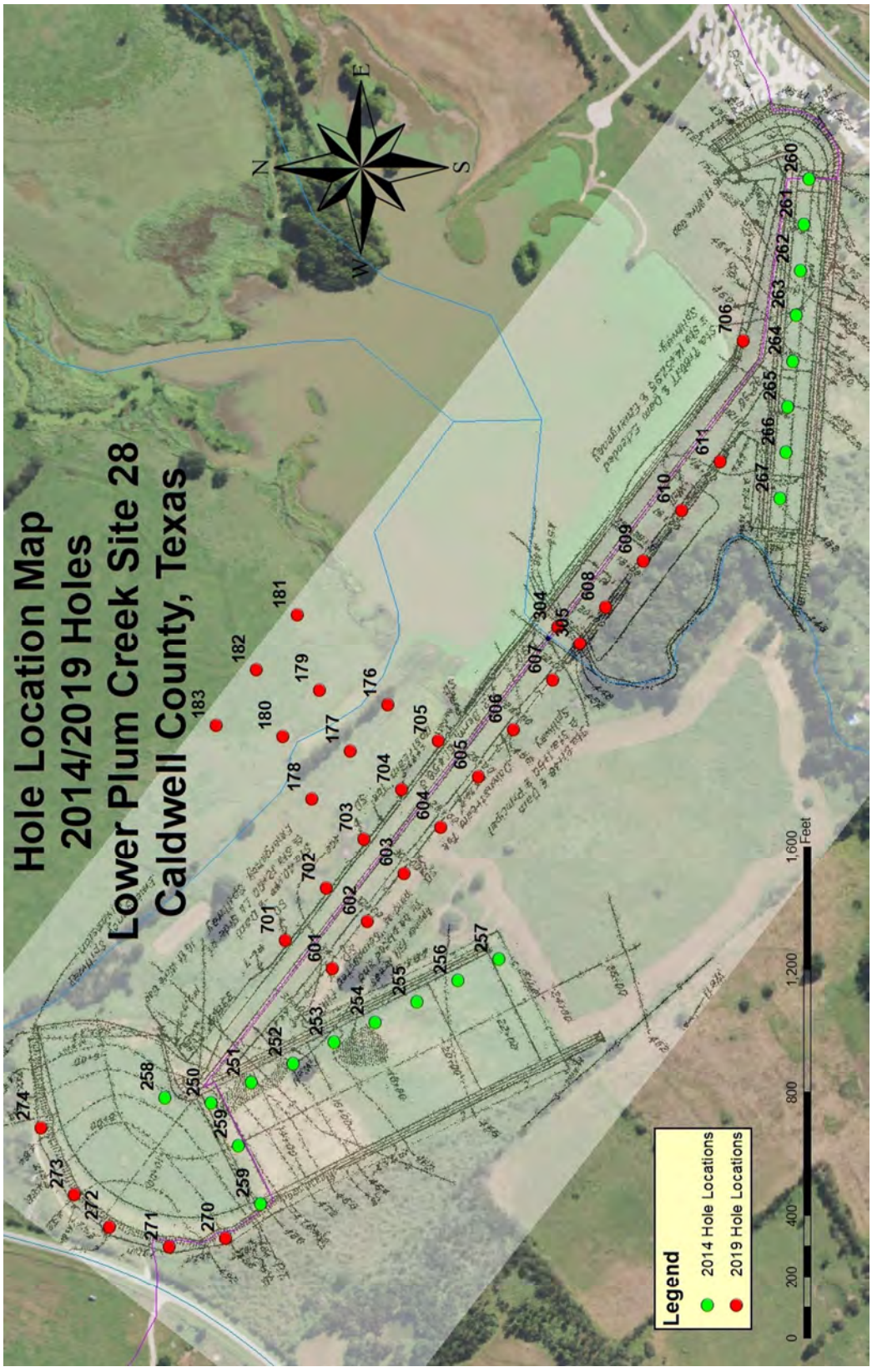
Engineering Properties

Caldwell County, Texas

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percent passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	>10 Inches	3-10 Inches	4	10	40	200		
	In				*Pct*	*Pct*					*Pct*	
MaA:												
Mabank	0-7	Loam	CL, CL-ML, SC, SC-SM	A-4, A-6	0	0	95-100	95-100	80-98	40-70	19-32	4-15
	7-39	Clay, clay loam	CH, CL	A-6, A-7-6	0	0	95-100	95-100	95-100	60-85	38-55	22-37
	39-76	Clay, clay loam, sandy clay	CH, CL	A-6, A-7-6	0	0	95-100	95-100	95-100	60-85	38-55	22-37
Unnamed, minor components	---	---	---	---	---	---	---	---	---	---	---	---
Unnamed, hydric minor components	---	---	---	---	---	---	---	---	---	---	---	---
MaB:												
Mabank	0-7	Loam	CL, CL-ML, SC, SC-SM	A-4, A-6	0	0	95-100	95-100	80-98	40-70	19-32	4-15
	7-39	Clay, clay loam	CH, CL	A-6, A-7-6	0	0	95-100	95-100	95-100	60-85	38-55	22-37
	39-76	Clay, clay loam, sandy clay	CH, CL	A-6, A-7-6	0	0	95-100	95-100	95-100	60-85	38-55	22-37
W:												
Water	---	---	---	---	---	---	---	---	---	---	---	---

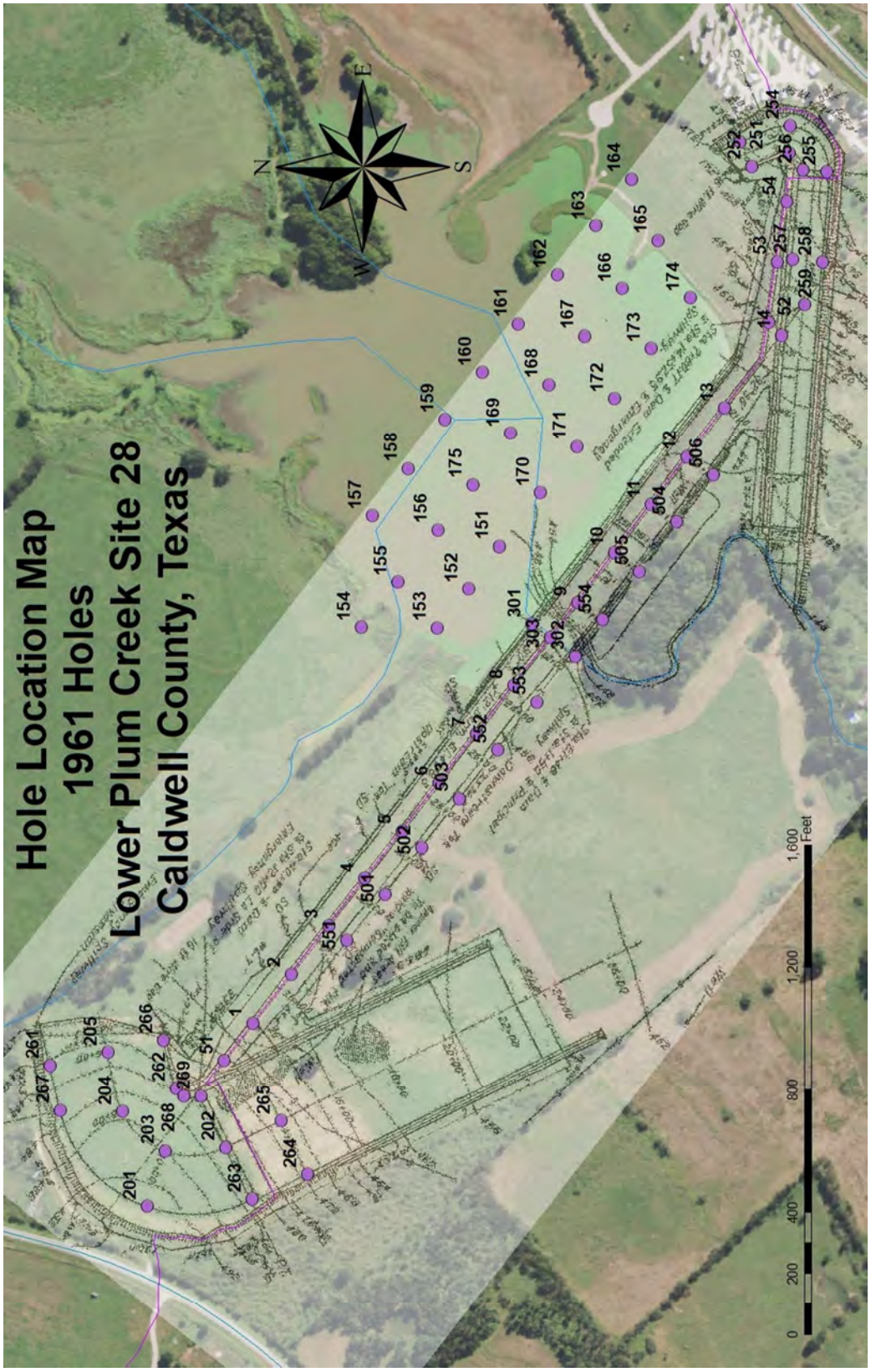
Attachment 2e

2014/2019 Hole Locations Map



Attachment 2e

1961 Hole Locations Map



U.S. DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE

NRCS-ENG-53
REV. FOR TX 08.11

LOG OF TEST HOLES

WATERSHED	Lower Plum Creek		COUNTY Caldwell		SITE NO. 28
LOCATION	Auxiliary Spillway Right	DATE 12/08/2014	LAT/LONG N 29.860005 W -97.516187		STATE Texas
LOGGED BY	Moffatt		PROJECT : WP-07 _____ WP-08 _____ FP-03 _____ P.L.-46 _____		
DRILLING EQUIPMENT	Mobile B-57		LOCTION OF HOLES Spillway Crest		

HOLE NO.	STA. & SURFACE ELEVATION	HOLE DEPTH FROM FT	HOLE DEPTH TO FT	DESCRIPTION OF MATERIALS	N	USCS	TYPE BIT USED	SAMPLES NO	SAMPLES TYPE	SAMPLES FROM FT	SAMPLES TO FT	SAMPLES REC %	SAMPLES DISP FT	SAMPLES AMT
250	~ 12+31	0	3	Clay, silty sandy very fine grain - fine grain, moist from recent rain,		CL	HS	.1	3"push	2.5'	5'	100%		
	CL RT AS			moderately plastic, medium to stiff, brown with orange iron stain				.2	3"push	5'	7.5'	100%		
	157' Left	3	6	Sandstone, very fine grain, soft rock, non-cemented, thin bedded to		SS	HS	.3	3"push	10'	12.5'	100%		
	475.668			laminated, iron stain fractures breaks down to SM to ML sandy, light brown				.4	3"push	15'	17.5'	80%		
		6	22	Sandstone, fine grain, soft rock, non-cemented, thin bedded to laminated,		SS	HS	.5	3"push	20'	22.5	80%		
				slight mica, silty, light brown. Few laminations claystone below 12.5', slight				.6	3"push	25'	27.5	100%		
				lime inclusions/streaks. Push 15'-17.5' refusal at 17'. Few streaks light gray										
				slightly weathers sandstone and claystone below 17.5. Push 20'-22.5'										
				refusal at 20', Thin bedded to laminated Claystone/siltstone with abundant										
				iron stain at 22'.										
		22	27.5	Claystone, silty, soft rock, moist, slight thin bedded siltstone/sandstone,		CL	HS							
				breaks down to sandy CH, light brown mottled with slight light gray										
				Hole plugged 12/09/2014										

DATE: 12/09/2014 TIME: 7:58 WATER LEVEL: No Water CAVE IN: 22.4'

SHEET 1 OF 1 SHEETS

Attachment 3a

Auxiliary Spillway Right, hole 250

U.S. DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE

NRCS-ENG-53
REV. FOR TX 08.11

LOG OF TEST HOLES

WATERSHED	Lower Plum Creek		COUNTY Caldwell		SITE NO. 28
LOCATION	Auxiliary Spillway Right	DATE 12/09/2014	LAT/LONG N 29.859649 W -97.515965		STATE Texas
LOGGED BY	Moffatt		PROJECT : WP-07 _____ WP-08 _____ FP-03 _____ P.L.-46 _____		
DRILLING EQUIPMENT	Mobile B-57		LOCTION OF HOLES ~ 150' Downstream Crest		

HOLE NO.	STA. & SURFACE ELEVATION	HOLE DEPTH FROM FT	HOLE DEPTH TO FT	DESCRIPTION OF MATERIALS	N	USCS	TYPE BIT USED	SAMPLES NO	SAMPLES TYPE	SAMPLES FROM FT	SAMPLES TO FT	SAMPLES REC %	SAMPLES DISP FT	SAMPLES AMT
251	~ 13+77	0	3	Clay, silty, very slight fine grain gravel, slight sand slightly moist to moist,		CL	HS	.1	3"push	0'	2.5'	100%		
	CL RT AS			medium constancy (rig foot sinks into ground), moderate plastic, brown				.2	3"push	10'	12.5	100%		
	158' Left	3	15	Claystone, few thin beds to laminations sandstone, silty, cuttings break				.3	3"push	20'	22.5'	100%		
	468.545			down to moderate plastic firm CL sandy, slight carbonate concretions,										
				light brown, increase in sand below 7'. Push 10'-12.5', breaks down to very										
				silty clay CL-ML to SC, fractures with slight carbonate at 12.5										
		15	19	Siltstone, very fine grain sand, streak of very fine grain gravel at 17', soft										
				rock, breaks down to ML sandy light brown becoming light gray slight										
				reddish brown at 19' with increase in clay										
		19	22.5	Sandstone, fine grain, silty, clay, soft rock slightly plastic, moist to very										
				moist, non-cemented, slightly weathered, breaks down to slight to										
				moderately plastic SC, thin bedded to laminated, light gray with light brown.										
				No Water @15:51 12/09/2014 CI 19.8										
				Hole plugged 12/10/2014										

DATE: 12/10/2014 TIME: 15:51 WATER LEVEL: No water CAVE IN: 18.5 SHEET 1 OF 1 SHEETS

Attachment 3a

Auxiliary Spillway Right, hole 251

U.S. DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE

NRCS-ENG-53
REV. FOR TX 08.11

LOG OF TEST HOLES

WATERSHED	Lower Plum Creek		COUNTY Caldwell		SITE NO. 28
LOCATION	Auxiliary Spillway Right	DATE 12/09/2014	LAT/LONG N 29.859286 W -97.515741		STATE Texas
LOGGED BY	Moffatt		PROJECT : WP-07 _____ WP-08 _____ FP-03 _____ P.L.-46 _____		
DRILLING EQUIPMENT	Mobile B-57		LOCTION OF HOLES ~ 300' Downstream Crest		

HOLE NO.	STA. & SURFACE ELEVATION	HOLE DEPTH FROM FT	HOLE DEPTH TO FT	DESCRIPTION OF MATERIALS	N	USCS	TYPE BIT USED	SAMPLES NO	SAMPLES TYPE	SAMPLES FROM FT	SAMPLES TO FT	SAMPLES REC %	SAMPLES DISP FT	SAMPLES AMT
252	~ 15+25	0	1	Sand, clayey, roots, topsoil, moist, loose to medium, dark brown		SM	HS	.1	3"push	5'	7.5	80%		
	CL RT AS	2	4	Sand, (sandstone weathered to a soil), very fine grained to fine grained,		SM	HS	.2	3"push	15'	17.5'	100%		
	157' Left			silty, slight clay balls, loose to medium, non-plastic, moist, dark reddish										
	463.789			brown										
		4	11	Sand, (sandstone weathered to a soil), very fine grained to fine grained,		SC	HS							
				silty, slight clay, loose to medium, non-plastic manganese stain, iron stain,										
				dark reddish brown with slight gray. Push 5' to 7.5', bottom 6" sample fell										
				out of tube, increase in clay below 8'.										
		11	17.5	Clay (claystone weathered to a soil), silty, very sandy, very fine to fine		CL	HS							
				grained, moist, medium consistency, light brown to light gray with iron stain										
				Hole plugged 12/10/2014										

DATE: 12/10/2014 TIME: 8:14 WATER LEVEL: No water CAVE IN: 11.6'

SHEET 1 OF 1 SHEETS

Attachment 3a

Auxiliary Spillway Right, hole 252

U.S. DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE

NRCS-ENG-53
REV. FOR TX 08.11

LOG OF TEST HOLES

WATERSHED	Lower Plum Creek		COUNTY Caldwell		SITE NO. 28
LOCATION	Auxiliary Spillway Right	DATE 12/09/2014	LAT/LONG	N 29.858927 W -97.515507	STATE Texas
LOGGED BY	Moffatt		PROJECT : WP-07 _____ WP-08 _____ FP-03 _____ P.L.-46 _____		
DRILLING EQUIPMENT	Mobile B-57		LOCTION OF HOLES	~ 450' Downstream Crest	

HOLE NO.	STA. & SURFACE ELEVATION	HOLE DEPTH FROM FT	HOLE DEPTH TO FT	DESCRIPTION OF MATERIALS	N	USCS	TYPE BIT USED	SAMPLES NO	SAMPLES TYPE	SAMPLES FROM FT	SAMPLES TO FT	REC %	DISP FT	AMT
253	~ 16+76	0	2	Sand, silty, clay, moist, very slightly plastic, loose to medium, roots, dark		SM	HS	.1	3"push	5'	7.5'			
	CL RT AS			brown to brown (fill - topsoil)				.2	3"push	10'	12.5'			
	160' Left	2	7	Clay, silty, moist, moderate plastic, shiny, stiff, black. Push 5'-7.5' contact		CH	HS							
	460.83			with below in push tube										
		7	12.5	Sand (sandstone weathered to a soil), very silty, clayey, slight to moderately		SC	HS							
				plastic, moist, moderate to dense, brown. Increase in grain size with depth										
				at 10' iron stain at 12.5'.										
				Hole plugged 12/10/2014										

DATE: 12/10/2014 TIME: 8:20 WATER LEVEL: No water CAVE IN: 9.6 SHEET 1 OF 1 SHEETS

Attachment 3a

Auxiliary Spillway Right, hole 253

U.S. DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE

NRCS-ENG-53
REV. FOR TX 08.11

LOG OF TEST HOLES

WATERSHED	Lower Plum Creek		COUNTY Caldwell		SITE NO. 28
LOCATION	Auxiliary Spillway Right	DATE 12/09/2014	LAT/LONG N 29.858566 W -97.515289		STATE Texas
LOGGED BY	Moffatt		PROJECT : WP-07 _____ WP-08 _____ FP-03 _____ P.L.-46 _____		
DRILLING EQUIPMENT	Mobile B-57		LOCTION OF HOLES ~ 600' Downstream Crest		

HOLE NO.	STA. & SURFACE ELEVATION	HOLE DEPTH FROM FT	HOLE DEPTH TO FT	DESCRIPTION OF MATERIALS	N	USCS	TYPE BIT USED	SAMPLES NO	SAMPLES TYPE	SAMPLES FROM FT	SAMPLES TO FT	REC %	DISP FT	AMT
254	~ 18+26	0	4	Clay, silty, sandy , moist, stiff, highly plastic, black		CH		.1	3"push	5'	7.5'			
	CL RT AS	4	12.5	Clay, silty, sandy , moist, stiff, highly plastic, slight gypsum at 7.5 brown to		CL-		.2	3"push	10'	12.5'			
	157' Left			light brown. Push 10' - 12.5' SL sandy at base of sample brown light gray		SC								
	458.451													
				Plug hole 12/10/2014										

DATE: 12/10/2014 TIME: 8:26 WATER LEVEL: No water CAVE IN: 8.6'

SHEET 1 OF 1 SHEETS

Attachment 3a

Auxiliary Spillway Right, hole 254

U.S. DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE

NRCS-ENG-53
REV. FOR TX 08.11

LOG OF TEST HOLES

WATERSHED	Lower Plum Creek		COUNTY Caldwell		SITE NO. 28
LOCATION	Auxiliary Spillway Right	DATE 12/09/2014	LAT/LONG N 29.858203 W -97.515063		STATE Texas
LOGGED BY	Moffatt		PROJECT : WP-07 _____ WP-08 _____ FP-03 _____ P.L.-46 _____		
DRILLING EQUIPMENT	Mobile B-57		LOCTION OF HOLES ~ 750' Downstream Crest		

HOLE NO.	STA. & SURFACE ELEVATION	HOLE DEPTH FROM FT	HOLE DEPTH TO FT	DESCRIPTION OF MATERIALS	N	USCS	TYPE BIT USED	SAMPLES NO	SAMPLES TYPE	SAMPLES FROM FT	SAMPLES TO FT	REC %	DISP FT	AMT
255	~ 19+74	0	7.5	Sand, very fine grained, silty, clayey, moderately plastic, medium to dense,		SC	HS	.1	3"push	5'	7.5'			
	CL RT AS			moist, brown										
	156' Left													
	456.494													
				Hole plugged 12/10/2014										

DATE: 12/10/2014 TIME: 8:31 WATER LEVEL: No water CAVE IN: 6.0 SHEET 1 OF 1 SHEETS

Attachment 3a

Auxiliary Spillway Right, hole 255

U.S. DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE

NRCS-ENG-53
REV. FOR TX 08.11

LOG OF TEST HOLES

WATERSHED	Lower Plum Creek		COUNTY Caldwell		SITE NO. 28
LOCATION	Auxiliary Spillway Right	DATE 12/09/2014	LAT/LONG N 29.857845 W -97.514831		STATE Texas
LOGGED BY	Moffatt		PROJECT : WP-07 _____ WP-08 _____ FP-03 _____ P.L.-46 _____		
DRILLING EQUIPMENT	Mobile B-57		LOCTION OF HOLES 900' Downstream Crest		

HOLE NO.	STA. & SURFACE ELEVATION	HOLE DEPTH FROM FT	HOLE DEPTH TO FT	DESCRIPTION OF MATERIALS	N	USCS	TYPE BIT USED	SAMPLES NO	SAMPLES TYPE	SAMPLES FROM FT	SAMPLES TO FT	SAMPLES REC %	SAMPLES DISP FT	SAMPLES AMT
256	~ 21+28	0	3	Clay, silty, slight sand, moist, medium dense, gray - brown		CL	HS	.1	3"push	5'	7.5'	100%		
	CL RT AS	3	7.5	Clay, silty, medium grained carbonate sand, moist, medium stiff, light brown										
	158' Left			to brown										
	455.498													
				Hole plugged 12/10/2014										

DATE: 12/10/2014 TIME: 8:36 WATER LEVEL: No water CAVE IN: 4.7'

SHEET 1 OF 1 SHEETS

Attachment 3a

Auxiliary Spillway Right, hole 256

U.S. DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE

NRCS-ENG-53
REV. FOR TX 08.11

LOG OF TEST HOLES

WATERSHED	Lower Plum Creek		COUNTY Caldwell		SITE NO. 28
LOCATION	Auxiliary Spillway Right	DATE 12/09/23014	LAT/LONG	N 29.857486 W -97.514595	STATE Texas
LOGGED BY	Moffatt		PROJECT : WP-07 _____ WP-08 _____ FP-03 _____ P.L.-46 _____		
DRILLING EQUIPMENT	Mobile B-57		LOCTION OF HOLES	Exit Auxiliary Spillway Right	

HOLE NO.	STA. & SURFACE ELEVATION	HOLE DEPTH FROM FT	HOLE DEPTH TO FT	DESCRIPTION OF MATERIALS	N	USCS	TYPE BIT USED	SAMPLES NO	SAMPLES TYPE	SAMPLES FROM FT	SAMPLES TO FT	SAMPLES REC %	SAMPLES DISP FT	SAMPLES AMT
257	~ 22+79	0	5	Clay, silty, slight sand, moist, slight medium grained carbonate sand, black		CH	HS							
	CL RT AS			to dark brown. No push sample taken. See sample 256.1		CL								
	161' Left													
	455.226			Hole plugged after drilling 12/09/2014. Cave in at 4.5'										

DATE: _____ TIME: _____ WATER LEVEL: _____ CAVE IN: _____

SHEET 1 OF 1 SHEETS

Attachment 3a

Auxiliary Spillway Right, hole 257

U.S. DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE

NRCS-ENG-53
REV. FOR TX 08.11

LOG OF TEST HOLES

WATERSHED	Lower Plum Creek		COUNTY Caldwell		SITE NO. 28
LOCATION	Auxiliary Spillway Right	DATE 12/10/2014	LAT/LONG	~ N 29.860420 W -97.516151	STATE Texas
LOGGED BY	Moffatt		PROJECT : WP-07 ____ WP-08 ____ FP-03 ____ P.L.-46 ____		
DRILLING EQUIPMENT	Mobile B-57		LOCTION OF HOLES	Forebay Auxiliary Spillway Right	

HOLE NO.	STA. & SURFACE ELEVATION	HOLE DEPTH FROM FT	HOLE DEPTH TO FT	DESCRIPTION OF MATERIALS	N	USCS	TYPE BIT USED	SAMPLES NO	SAMPLES TYPE	SAMPLES FROM FT	SAMPLES TO FT	SAMPLES REC %	SAMPLES DISP FT	SAMPLES AMT
258	~ 8+50	0	5	Clay, silty, moderately to highly plastic, moist, stiff, iron stain, brown to		CL	HS							
	CL RT AS			light gray										
	153' Left	5	8	Sandstone, very fine to fine grain, soft rock, non-cemented, thin bedded to		SS	HS							
	~ 474			laminated, iron stain, breaks down to non-plastic SM to ML sandy, silty										
				light brown										
		8	10	Sandstone, very fine grain, silty, clay, soft to medium soft rock, moist coarse		SS	HS							
				grain carbonate sand at 10', light brown										
		10	14.5	Claystone, soft rock, silty abundant iron stain 10' to 12', slight very fine		CL	HS							
				grained sand, breaks down to moderately plastic stiff CL, light brown										
		14.5	19	Sandstone, very fine to fine grain, silty, moist, thin bedded to laminated with		SS	HS							
				claystone, soft rock, breaks down to dense non-plastic sand, light brown										
		19	20	Claystone, very silty, slightly sandy, moist iron stained light brown		CL	HS							
				Hole plugged12/10/2014 at 10:35 no water.										

DATE: _____ TIME: _____ WATER LEVEL: _____ CAVE IN: _____ SHEET 1 OF 1 SHEETS

Attachment 3a

Auxiliary Spillway Right, hole 258

U.S. DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE

NRCS-ENG-53
REV. FOR TX 08.11

LOG OF TEST HOLES

WATERSHED	Lower Plum Creek		COUNTY Caldwell		SITE NO. 28
LOCATION	Auxiliary Spillway Right	DATE 12/10/2014	LAT/LONG N 29.859746 W -97.516612		STATE Texas
LOGGED BY	Moffatt		PROJECT : WP-07 _____ WP-08 _____ FP-03 _____ P.L.-46 _____		
DRILLING EQUIPMENT	Mobile B-57		LOCTION OF HOLES	CL Crest Auxiliary Spillway Right	

HOLE NO.	STA. & SURFACE ELEVATION	HOLE DEPTH FROM FT	HOLE DEPTH TO FT	DESCRIPTION OF MATERIALS	N	USCS	TYPE BIT USED	SAMPLES NO	SAMPLES TYPE	SAMPLES FROM FT	SAMPLES TO FT	SAMPLES REC %	SAMPLES DISP FT	SAMPLES AMT
259	~ 12+50	0	8	Claystone, silty, clay slightly moist, soft rock, breaks down to moderate		CS	HS							
	CL RT AS			plastic ML to CL, light brown, increasing silt below 5'										
	17' Right	8	13	Siltstone, slight very fine grain sand, slight clay soft rock, slightly moist,		Slst	HS							
	475.814			light brown, Increase in sand below 10' with slight carbonate gravel streak										
				11' - 12'. Breaks down to non-plastic ML										
		13	18	Sandstone, very fine to fine grained, silty, slight clay, non-plastic, soft to		SS	HS							
				medium soft rock, breaks down to SM, dark brown to light gray, slight very										
				fine grain carbonate gravel at 14'										
		18	20	Claystone, silty, soft to medium soft rock, moist, breaks down to moderate		CS	HS							
				to highly plastic clay, weathered, slight iron stain, brown										
				Plugged after drilling 12/10/2014										

DATE: _____ TIME: _____ WATER LEVEL: _____ CAVE IN: _____ SHEET 1 OF 1 SHEETS

Attachment 3a

Auxiliary Spillway Right, hole 259

U.S. DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE

NRCS-ENG-53
REV. FOR TX 08.11

LOG OF TEST HOLES

WATERSHED	Lower Plum Creek		COUNTY Caldwell		SITE NO. 28
LOCATION	Auxiliary Spillway Right	DATE 12/10/2014	LAT/LONG	N 29.859524 W -97.517197	STATE Texas
LOGGED BY	Moffatt		PROJECT : WP-07 _____ WP-08 _____ FP-03 _____ P.L.-46 _____		
DRILLING EQUIPMENT	Mobile B-57		LOCTION OF HOLES	Outside Cut of Crest Auxiliary Spillway Right	

HOLE NO.	STA. & SURFACE ELEVATION	HOLE DEPTH FROM FT	HOLE DEPTH TO FT	DESCRIPTION OF MATERIALS	N	USCS	TYPE BIT USED	SAMPLES NO	SAMPLES TYPE	SAMPLES FROM FT	SAMPLES TO FT	SAMPLES REC %	SAMPLES DISP FT	SAMPLES AMT
259A	~ 12+31	0	6	Claystone, silty, increasing silt with depth, clayey, slightly moist, soft rock,		CS	HS							
	CL RT AS			Breaks down to moderately plastic CL, light brown										
	205' Right	6	16	Sandstone, very fine to fine grained, very silty, slight clay, soft rock, slight		SS	HS							
	476.109			carbonate streaks, breaks down to non-plastic SM, light brown										
		16	20	Claystone, very silty, soft rock, moist, weathered, iron stain streaks, breaks		CS	HS							
				down to moderately plastic clay, light brown										
				Hole plugged after drilling 12/10/2014										

DATE: _____ TIME: _____ WATER LEVEL: _____ CAVE IN: _____ SHEET 1 OF 1 SHEETS

Attachment 3a

Auxiliary Spillway Right, hole 259a

U.S. DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE

NRCS-ENG-53
REV. FOR TX 08.11

LOG OF TEST HOLES

WATERSHED	Lower Plum Creek		COUNTY Caldwell		SITE NO. 28
LOCATION	Auxiliary Spillway Left	DATE 12/10/2014	LAT/LONG N 29.854990 W -97.506473		STATE Texas
LOGGED BY	Moffatt		PROJECT : WP-07 _____ WP-08 _____ FP-03 _____ P.L.-46 _____		
DRILLING EQUIPMENT	Mobile B-57		LOCTION OF HOLES	Crest Auxiliary Spillway Left	

HOLE NO.	STA. & SURFACE ELEVATION	HOLE DEPTH FROM FT	HOLE DEPTH TO FT	DESCRIPTION OF MATERIALS	N	USCS	TYPE BIT USED	SAMPLES NO	TYPE	FROM FT	TO FT	REC %	DISP FT	AMT
260	~ 10+27	0	5	Sand, sandstone weathered to a soil, very fine to fine grained, silty, clayey,		SC	HS	.1	3"push	0'	2.5'	100%		
	CL LT AS			moist, slight to moderately plastic, iron stain, light brown				.2	3"push	5'	7.5'	100%		
	17' Right	5	27.5	Claystone, silty, soft rock, fractured, blocky in parts, iron stain along bedding		CS	HS	.3	3"push	10'	12.5'	100%		
	474.973			planes and fractures, some manganese stain, light brown and light gray.				.4	3"push	15'	17.5'	100%		
				Becoming less blocky below 15', more light gray mottling below 15', mostly				.5	3"push	20'	22.5'	100%		
				gray below 20'.				.6	3"push	25'	27.5'	100%		
				Plugged 12/11/2014										

DATE: 12/11/2014 TIME: 7:32 WATER LEVEL: No water CAVE IN: 23.7 SHEET 1 OF 1 SHEETS

Attachment 3b
Auxiliary Spillway Left, hole 260

U.S. DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE

NRCS-ENG-53
REV. FOR TX 08.11

LOG OF TEST HOLES

WATERSHED	Lower Plum Creek		COUNTY Caldwell		SITE NO. 28
LOCATION	Auxiliary Spillway Left	DATE 04/06/2015	LAT/LONG N 29.855019 W -97.506941		STATE Texas
LOGGED BY	Moffatt		PROJECT : WP-07 _____ WP-08 _____ FP-03 _____ P.L.-46 _____		
DRILLING EQUIPMENT	Mobile B-57		LOCTION OF HOLES 150' Downstream Crest		

HOLE NO.	STA. & SURFACE ELEVATION	HOLE DEPTH FROM FT	HOLE DEPTH TO FT	DESCRIPTION OF MATERIALS	N	USCS	TYPE BIT USED	SAMPLES NO	SAMPLES TYPE	SAMPLES FROM FT	SAMPLES TO FT	SAMPLES REC %	SAMPLES DISP FT	SAMPLES AMT
261	~ 11+79	0	2	Clay, silty, moist, highly plastic, stiff, rcots, dark brown		CH	HS	.1	3"push	5'	7.5'	100%		
	CL LT AS	2	10	Claystone, silty, blocky, moist, fractured, breaks down to highly plastic clay,				.2	3"push	10'	12.5'	100%		
	20' Right			thin bedded to laminated, iron and manganese stain, soft rock, light brown										
	470.969			with some light gray becoming more light gray with depth										
		10	20	Claystone, thin bedded to laminated with siltstone, drill cuttings break down		CS	HS							
				to moderately plastic clay, push tube material (claystone) breaks down to		Slst								
				stiff plastic clay, siltstone breaks down to non-plastic ML, soft rock, moist,										
				light brown to light gray. Push 20' - 22.5', refusal at 22.1' sample crumbled										
				no recovery.										
				Hole plugged 04/07/2015										

DATE: 04/07/2015 TIME: 13:21 WATER LEVEL: No water CAVE IN: 18.3'

SHEET 1 OF 1 SHEETS

Attachment 3b

Auxiliary Spillway Left, hole 261

U.S. DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE

NRCS-ENG-53
REV. FOR TX 08.11

LOG OF TEST HOLES

WATERSHED	Lower Plum Creek		COUNTY Caldwell		SITE NO. 28
LOCATION	Auxiliary Spillway Left	DATE 04/06/2015	LAT/LONG N 29.855035 W -97.507414		STATE Texas
LOGGED BY	Moffatt		PROJECT : WP-07 _____ WP-08 _____ FP-03 _____ P.L.-46 _____		
DRILLING EQUIPMENT	Mobile B-57		LOCTION OF HOLES 300' Downstream Crest		

HOLE NO.	STA. & SURFACE ELEVATION	HOLE DEPTH FROM FT	HOLE DEPTH TO FT	DESCRIPTION OF MATERIALS	N	USCS	TYPE BIT USED	SAMPLES NO	SAMPLES TYPE	SAMPLES FROM FT	SAMPLES TO FT	SAMPLES REC %	SAMPLES DISP FT	SAMPLES AMT
262	~ 13+29	0	2	Clay, very silty, moist, moderately plastic, stiff, roots, brown. Topsoil		CL	HS	.1	3"push	5'	7.5'	60%		
	CL LT AS	2	16	Claystone, very silty, highly weathered, blocky abundant iron stain, soft		CS	HS	.2	3"push	15'	17.5	100%		
	18' Right			rock, breaks down to stiff clay, light brown mottled light gray. Push 5' - 7.5'										
	466.813			recovered 1.5 feet, part of sample fell out of tube.										
		16	17.5	Siltstone, slightly weathered, fractured, iron stain, moist, soft rock, breaks		Slst	HS							
				down to slight to non-plastic ML, light gray. Push 15' - 17.5', top of sample										
				claystone bottom of sample siltstone. Contact in sample tube.										
				Hole plugged 04/07/2015										

DATE: 04/07/2015 TIME: 13:55 WATER LEVEL: No Water CAVE IN: 14.7 SHEET 1 OF 1 SHEETS

Attachment 3b

Auxiliary Spillway Left, hole 262

U.S. DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE

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REV. FOR TX 08.11

LOG OF TEST HOLES

WATERSHED	Lower Plum Creek		COUNTY Caldwell		SITE NO. 28
LOCATION	Auxiliary Spillway Left	DATE 04/06/2015	LAT/LONG	N 29.855060 W -97.507878	STATE Texas
LOGGED BY	Moffatt		PROJECT : WP-07 _____ WP-08 _____ FP-03 _____ P.L.-46 _____		
DRILLING EQUIPMENT	Mobile B-57		LOCTION OF HOLES	450' Downstream Crest	

HOLE NO.	STA. & SURFACE ELEVATION	HOLE DEPTH FROM FT	HOLE DEPTH TO FT	DESCRIPTION OF MATERIALS	N	USCS	TYPE BIT USED	SAMPLES NO	SAMPLES TYPE	SAMPLES FROM FT	SAMPLES TO FT	SAMPLES REC %	SAMPLES DISP FT	SAMPLES AMT
263	~ 14+75	0	2	Clay, silty, moist, moderate to highly plastic, roots, stiff, brown. Topsoil		CL	HS	.1	3"push	5'	7.5'	60%		
	CL LT AS	2	12.5	Claystone, silty, moist, thin bedded to laminated, iron stain, blocky, highly		CS	HS							
	21' Right			weathered, breaks down to stiff clay CL, light brown mottled light gray										
	462.566			becoming less blocky and light gray with depth.										
				Hole plugged 04/07/2015										

DATE: 04/07/2015 TIME: 14:12 WATER LEVEL: No water CAVE IN: 9.8'

SHEET 1 OF 1 SHEETS

Attachment 3b

Auxiliary Spillway Left, hole 263

U.S. DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE

NRCS-ENG-53
REV. FOR TX 08.11

LOG OF TEST HOLES

WATERSHED	Lower Plum Creek		COUNTY Caldwell		SITE NO. 28
LOCATION	Auxiliary Spillway Left	DATE 04/07/2015	LAT/LONG N 29.855073 W -97.508347		STATE Texas
LOGGED BY	Moffatt		PROJECT : WP-07 _____ WP-08 _____ FP-03 _____ P.L.-46 _____		
DRILLING EQUIPMENT	Mobile B-57		LOCTION OF HOLES 600' Downstream Crest		

HOLE NO.	STA. & SURFACE ELEVATION	HOLE DEPTH FROM FT	HOLE DEPTH TO FT	DESCRIPTION OF MATERIALS	N	USCS	TYPE BIT USED	SAMPLES NO	SAMPLES TYPE	SAMPLES FROM FT	SAMPLES TO FT	SAMPLES REC %	SAMPLES DISP FT	SAMPLES AMT
264	~ 16+24	0	2	Silt, clayey, moist, slight to moderately plastic, medium dense to stiff, dark		ML	HS	.1	3"push	5'	7.5'	70%		
	CL LT AS			brown, topsoil.		CL								
	18' Right	2	7.5	Clay, (claystone weathered to a soil), moist, highly plastic, stiff, iron stain,		CH	HS							
	458.075			slight carbonate, light brown mottled light gray. Push 5' - 7.5' part of sample		CS								
				pulled out of tube by suction, recovered 1.75'										
				Hole plugged 04/07/2015										

DATE: 04/07/2015 TIME: 14:38 WATER LEVEL: No water CAVE IN: 4.7'

SHEET 1 OF 1 SHEETS

Attachment 3b

Auxiliary Spillway Left, hole 264

U.S. DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE

NRCS-ENG-53
REV. FOR TX 08.11

LOG OF TEST HOLES

WATERSHED	Lower Plum Creek		COUNTY Caldwell		SITE NO. 28
LOCATION	Auxiliary Spillway Left	DATE 04/07/2015	LAT/LONG	N 29.855101 W -97.508816	STATE Texas
LOGGED BY	Moffatt		PROJECT : WP-07 _____ WP-08 _____ FP-03 _____ P.L.-46 _____		
DRILLING EQUIPMENT	Mobile B-57		LOCTION OF HOLES	750' Downstream Crest	

HOLE NO.	STA. & SURFACE ELEVATION	HOLE DEPTH FROM FT	HOLE DEPTH TO FT	DESCRIPTION OF MATERIALS	N	USCS	TYPE BIT USED	SAMPLES NO	SAMPLES TYPE	SAMPLES FROM FT	SAMPLES TO FT	SAMPLES REC %	SAMPLES DISP FT	SAMPLES AMT
265	~ 17+77	2	7.5	Clay (alluvium), silty, slight sand, fine to coarse grained, slight very fine		CH	HS	.1	3"push	5'	7.5'	20%		
	CL LT AS			chert gravel, moist, stiff, highly plastic, black. Push 5' to 7.5' recovered 0.5'										
	22' Right			sample pulled out of tube by suction.										
	455.956													
				Hole plugged 04/07/2015 after drilling, No water.										

DATE: _____ TIME: _____ WATER LEVEL: _____ CAVE IN: _____ SHEET 1 OF 1 SHEETS

Attachment 3b

Auxiliary Spillway Left, hole 265

U.S. DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE

NRCS-ENG-53
REV. FOR TX 08.11

LOG OF TEST HOLES

WATERSHED	Lower Plum Creek		COUNTY Caldwell		SITE NO. 28
LOCATION	Auxiliary Spillway Left	DATE 04/07/2015	LAT/LONG N 29.855106 W -97.509285		STATE Texas
LOGGED BY	Moffatt		PROJECT : WP-07 _____ WP-08 _____ FP-03 _____ P.L.-46 _____		
DRILLING EQUIPMENT	Mobile B-57		LOCTION OF HOLES 900' Downstream Crest		

HOLE NO.	STA. & SURFACE ELEVATION	HOLE DEPTH FROM FT	HOLE DEPTH TO FT	DESCRIPTION OF MATERIALS	N	USCS	TYPE BIT USED	SAMPLES NO	SAMPLES TYPE	SAMPLES FROM FT	SAMPLES TO FT	SAMPLES REC %	SAMPLES DISP FT	SAMPLES AMT
266	~ 19+26	0	3	Clay, silty, moist, highly plastic, stiff, black, alluvium, Push 0' - 2.5',		CH	HS	.1	3"push	0'	2.5'	50%		
	CL LT AS			recovered 1.25', sample fell out of tube				.2	3"push	5'	7.5'	50%		
	18' Right	3	7.5	Clay, silty, slight sand, very fine grained, moist, highly plastic, stiff, brown to		CH	HS							
	453.716			dark brown , alluvium. Push 5' - 7.5' recovered 1.25', sample fell out of tube										
				Hole plugged after drilling 04/07/2015. No water.										

DATE: _____ TIME: _____ WATER LEVEL: _____ CAVE IN: _____ SHEET 1 OF 1 SHEETS

Attachment 3b

Auxiliary Spillway Left, hole 266

U.S. DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE

NRCS-ENG-53
REV. FOR TX 08.11

LOG OF TEST HOLES

WATERSHED	Lower Plum Creek		COUNTY Caldwell		SITE NO. 28
LOCATION	Auxiliary Spillway Left	DATE 04/07/2015	LAT/LONG N 29.855138 W -97.509758		STATE Texas
LOGGED BY	Moffatt		PROJECT : WP-07 _____ WP-08 _____ FP-03 _____ P.L.-46 _____		
DRILLING EQUIPMENT	Mobile B-57		LOCTION OF HOLES Exit		

HOLE NO.	STA. & SURFACE ELEVATION	HOLE DEPTH FROM FT	HOLE DEPTH TO FT	DESCRIPTION OF MATERIALS	N	USCS	TYPE BIT USED	SAMPLES NO	SAMPLES TYPE	SAMPLES FROM FT	SAMPLES TO FT	SAMPLES REC %	SAMPLES DISP FT	SAMPLES AMT
267	~ 20+73	0	2	Clay, silty, moist, stiff, roots, highly plastic, black, alluvium		CH	HS	.1	3"push	0'	2.5'	100%		
	CL LT AS	2	7.5	Clay, silty, slight carbonate sand, very fine to fine grained, mcist, stiff, roots,		CH	HS	.2	3"push	5'	7.5'	50%		
	21' Right			highly plastic, slight very fine grained chert gravel, brown, alluvium. Push										
	452.66			5' - 7.5' recovered 1.25', sample fell out of tube.										
				Hole plugged after drilling 04/07/2015. No water.										

DATE: _____ TIME: _____ WATER LEVEL: _____ CAVE IN: _____ SHEET 1 OF 1 SHEETS

Attachment 3b

Auxiliary Spillway Left, hole 267

U.S. DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE

NRCS-ENG-53
REV. FOR TX 08.11

LOG OF TEST HOLES

WATERSHED	Lower Plum Creek		COUNTY Caldwell		SITE NO. 28
LOCATION	CL Dam	DATE 4/9/2019	LAT/LONG	N29.857074 W-97.511188	STATE Tx
LOGGED BY	Moffatt		PROJECT : WP-07 _____ WP-08 _____ FP-03 _____ P.L.-46 _____		
DRILLING EQUIPMENT	CME 45		LOCTION OF HOLES	new PS	

HOLE NO.	STA. & SURFACE ELEVATION	HOLE DEPTH FROM FT	HOLE DEPTH TO FT	DESCRIPTION OF MATERIALS	N	USCS	TYPE BIT USED	SAMPLES NO	SAMPLES TYPE	SAMPLES FROM FT	SAMPLES TO FT	SAMPLES REC %	SAMPLES DISP FT	SAMPLES AMT
304	20+95	0	2	clay, sand, stiff, roots, topsoil, slightly moist, brown		CL		.1	3"push	5	7.5	100%		
	CL dam	2	16	clay, sandy, some very fine grained gravel, slightly moist, stiff to very stiff		CL		.2	3"push	10	12.5	100%		
	elev:480.51'			light brown/dark gray clay with increase in moisture @ 7.5/12.5, as above				.3	3"push	15	17.5	100%		
		16	17	silt, moist, slightly plastic, moderately dense, light brown clay as above @15		ML		.4	3"push	30	32.5	100%		
		17	36	clay, dark brown to black, moist plastic, stiff		CL		.5	3"push	35	37.5	75%		
		36	43	sand, saturated, loose, very fine grained to fine grained, silty, gray		CH		.6	spt	42.5	44			
				SPT 42.5-44' blows=4+9+12, recovered 6" sand 12" clay				.7	spt	45	46.5			
		43	46	clay, moderately stiff to stiff, saturated, plastic, slight lignite, dark gray		CH								
				SPT 45-46.5' blows=6+19+27										
		46	46.5	very fine grained sand, very moist to saturated, dense, light brown		SM								

DATE: _____ TIME: _____ WATER LEVEL: _____ CAVE IN: _____

SHEET 1 OF 1 SHEETS

Attachment 3c

Principal Spillway, hole 304

U.S. DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE

NRCS-ENG-53
REV. FOR TX 08.11

LOG OF TEST HOLES

WATERSHED	Lower Plum Creek		COUNTY Caldwell		SITE NO. 28
LOCATION	PS left DS toe	DATE 3/20/19	LAT/LONG N29.856869 W-97.511326		STATE Tx
LOGGED BY	Moffatt		PROJECT : WP-07 _____ WP-08 _____ FP-03 _____ P.L.-46 _____		
DRILLING EQUIPMENT	CME 45		LOCTION OF HOLES		

HOLE NO.	STA. & SURFACE ELEVATION	HOLE DEPTH FROM FT	HOLE DEPTH TO FT	DESCRIPTION OF MATERIALS	N	USCS	TYPE BIT USED	SAMPLES NO	SAMPLES TYPE	SAMPLES FROM FT	SAMPLES TO FT	SAMPLES REC %	SAMPLES DISP FT	SAMPLES AMT
305	20+90 CL	0	5	clay, sandy, silty, moderate to very stiff, plastic, roots, slight fine grained		CL		.1	3"push	0	2.5	100%		
	Dam 95' DS			gravel, brown to light brown				.2	3"push	2.5	5	60%		
	elev:454.42'	5	9	clay, silty, reddish gray, brown, moist, silty, sandy, plastic		CH		.3	3"push	5	7.5	40%		
		9	20	sand, clayey, moist, fine grained, silty, making water, spt 10-11.5'		SM		.4	3"push	7.5	10	40%		
				blows=2+3+7, push 12.5-15', fine grained sand, saturated, loose/very loose				.5	spt	10	11.5			
				fine grained sand@15', so sample @15' ,drill to 20', SPT 20-21.5ft				.6	3"push	12.5	15	100		
				blows=10+14+19, half clay half sand				.7	spt	20	21.5			
		20	20.5	clay, saturated, fine grained sand, saturated		CL		.8	spt	28	29.5			
		20.5	35	clay, medium grained sand, loose, clay plastic, moderately stiff, gray to 25'		CH		.9	spt	35	36.5			
				above=3/20/2019, below=3/21/2019				.10	spt	45	46.5			
				push 25-27.5, no recovery, cut to 28' for SPT @28-29.5ft blows=15+26+35				.11	spt	50	51			
				grayish green clayey sand, non-plastic to slightly plastic										
		35	40	SPT 35-36.5' blows=12+17+25, clay, silty, sandy, saturated, few lignite spec		CL								
				stiff, dark greenish gray, push@40' no recovery, sand											

DATE: _____ TIME: _____ WATER LEVEL: _____ CAVE IN: _____ SHEET 1 OF 2 SHEETS

Attachment 3c

Principal Spillway, hole 305

U.S. DEPARTMENT OF AGRICULTURE
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REV. FOR TX 08.11

LOG OF TEST HOLES

WATERSHED	Lower Plum Creek		COUNTY	SITE NO.	28
LOCATION	PS left DS toe	DATE 3/21/2019	LAT/LONG	STATE	Tx
LOGGED BY	Moffatt		PROJECT : WP-07 _____ WP-08 _____ FP-03 _____ P.L.-46 _____		
DRILLING EQUIPMENT	CME 45		LOCTION OF HOLES		

HOLE NO.	STA. & SURFACE ELEVATION	HOLE DEPTH FROM FT	HOLE DEPTH TO FT	DESCRIPTION OF MATERIALS	N	USCS	TYPE BIT USED	SAMPLES NO	SAMPLES TYPE	SAMPLES FROM FT	SAMPLES TO FT	SAMPLES REC %	SAMPLES DISP FT	SAMPLES AMT
305				10:00am augers separated in hole, crew went to Austin to get retrieval screw										
				back on site @13:00, augers separated @10', successfully retrieved augers										
		40	51	@13:35, SPT 45-46.5, blows=29+42+46, fine grained sand, saturated, silty		SM								
				soft, greenish gray, SPT 50-51 blows=29+50 for 6". alternating thin bedded										
				laminations of sand with silty clayey sand and slight lignite seams										

DATE: 3/27/2019 TIME: 9:02 WATER LEVEL: 7.6ft CAVE IN: 10.2ft SHEET 2 OF 2 SHEETS

Attachment 3c

Principal Spillway, hole 305

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REV. FOR TX 08.11

LOG OF TEST HOLES

WATERSHED	Lower Plum Creek		COUNTY Caldwell		SITE NO. 28
LOCATION	Outside Cut AS	DATE 4/10/2019	LAT/LONG N29.859845 W-97.517565		STATE Tx
LOGGED BY	Moffatt		PROJECT : WP-07 _____ WP-08 _____ FP-03 _____ P.L.-46 _____		
DRILLING EQUIPMENT	CME 45		LOCTION OF HOLES		

HOLE NO.	STA. & SURFACE ELEVATION	HOLE DEPTH FROM FT	HOLE DEPTH TO FT	DESCRIPTION OF MATERIALS	N	USCS	TYPE BIT USED	SAMPLES NO	SAMPLES TYPE	SAMPLES FROM FT	SAMPLES TO FT	SAMPLES REC %	SAMPLES DISP FT	SAMPLES AMT
270	11+50 CL	0	1	clay, fine, brown, slightly moist, plastic, stiff, brown to reddish brown		CL		.1	sm	1	5			
	AD 275' RT	1	7	clay, silty, moist, plastic, stiff, reddish brown		CL		.2	sm	7	10			
	elev:490.52'	7	11	clay, sandy, slightly moist to moist, stiff, light brown		CL		.3	3"/P	10	12	75%		
		11	15	sand, very fine grained to fine grained, silty, good confined ccmpressive		SM		.4	spt	13.5	15			
				strength, light brown, slightly moist										
				standard penetration test: 13.5-15, blows =6+9+7, sand										

DATE: 4/11/19 TIME: 12:40 WATER LEVEL: no water CAVE IN: 9.3ft SHEET 1 OF 1 SHEETS

Attachment 3d

Outside Cut, Auxiliary Spillway, hole 270

U.S. DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE

NRCS-ENG-53
REV. FOR TX 08.11

LOG OF TEST HOLES

WATERSHED	Lower Plum Creek		COUNTY Caldwell		SITE NO. 28
LOCATION	Outside Cut AS	DATE 4/10/2019	LAT/LONG N29.860342 W-97.517669		STATE Tx
LOGGED BY	Moffatt		PROJECT : WP-07 _____ WP-08 _____ FP-03 _____ P.L.-46 _____		
DRILLING EQUIPMENT	CME 45		LOCTION OF HOLES		

HOLE NO.	STA. & SURFACE ELEVATION	HOLE DEPTH FROM FT	HOLE DEPTH TO FT	DESCRIPTION OF MATERIALS	N	USCS	TYPE BIT USED	SAMPLES NO	SAMPLES TYPE	SAMPLES FROM FT	SAMPLES TO FT	SAMPLES REC %	SAMPLES DISP FT	SAMPLES AMT
271	10+80 CL	0	2	sand and clay, slightly moist, stiff		SC		.1	sm	2	5			
	AS 295' RT	2	5	clay, silty, slightly moist to moist, moderately stiff, light gray and light brown		CL		.2	sm	5	8			
	elev:496.01'	5	15	sand, silty, slight clay, slightly moist, moderately dense, slightly plastic		SC		.3	spt	8	9.5			
				standard penetration test: 8-9.5' blows=11+22+29				.4	spt	13.5	15			
				alternating clay and sand, thin bedded laminations										
				standard penetration test: 13.5-15, blows =12+20+25										

DATE: 4/11/19 TIME: 11:36 WATER LEVEL: no water CAVE IN: 9.0ft SHEET 1 OF 1 SHEETS

Attachment 3d
Outside Cut, Auxiliary Spillway, hole 271

U.S. DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE

NRCS-ENG-53
REV. FOR TX 08.11

LOG OF TEST HOLES

WATERSHED	Lower Plum Creek		COUNTY Caldwell		SITE NO. 28
LOCATION	Outside Cut AS	DATE 4/10/2019	LAT/LONG N29.860877 W-97.517497		STATE Tx
LOGGED BY	Moffatt		PROJECT : WP-07 _____ WP-08 _____ FP-03 _____ P.L.-46 _____		
DRILLING EQUIPMENT	CME 45		LOCTION OF HOLES		

HOLE NO.	STA. & SURFACE ELEVATION	HOLE DEPTH FROM FT	HOLE DEPTH TO FT	DESCRIPTION OF MATERIALS	N	USCS	TYPE BIT USED	SAMPLES NO	SAMPLES TYPE	SAMPLES FROM FT	SAMPLES TO FT	SAMPLES REC %	SAMPLES DISP FT	SAMPLES AMT
272	9+70 CL	0	2	clay and sand, slightly moist, stiff, roots, dark brown		CL		.1	sm	2	5			
	AS 290' RT	2	7	clay, silty, slight very fine grained calcareous gravel, slightly moist		CL		.2	sm	7	10			
	elev:497.25'			to moist, stiff, light brown				.3	3"push	13.5	15.5	80%		
		7	15.5	very fine grained sand, silty, slightly moist, moderately dense, light brown		SM								

DATE: 4/11/19 TIME: 11:37 WATER LEVEL: no water CAVE IN: 9.2ft SHEET 1 OF 1 SHEETS

Attachment 3d
Outside Cut, Auxiliary Spillway, hole 272

U.S. DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE

NRCS-ENG-53
REV. FOR TX 08.11

LOG OF TEST HOLES

WATERSHED	Lower Plum Creek		COUNTY Caldwell		SITE NO. 28
LOCATION	Outside Cut AS	DATE 4/10/2019	LAT/LONG	N29.861174 W-97.517182	STATE Tx
LOGGED BY	Moffatt		PROJECT : WP-07 _____ WP-08 _____ FP-03 _____ P.L.-46 _____		
DRILLING EQUIPMENT	CME 45		LOCTION OF HOLES		

HOLE NO.	STA. & SURFACE ELEVATION	HOLE DEPTH FROM FT	HOLE DEPTH TO FT	DESCRIPTION OF MATERIALS	N	USCS	TYPE BIT USED	SAMPLES NO	SAMPLES TYPE	SAMPLES FROM FT	SAMPLES TO FT	SAMPLES REC %	SAMPLES DISP FT	SAMPLES AMT
273	8+80 CL	0	2	sand, slight clay, roots, slightly moist, dark brown		SC		.1	sm	2	5			
	AS 265' RT	2	9	clay, very silty, moist, plastic, moderately dense, light brown		CL		.2	sm	10	13.5			
	elev:492.77	9	9.5	sandstone, slightly moist, very hard organic gravel with lime cement		SS		.3	spt	13.5	15			
		9.5	15	very fine grained to fine grained sand, silty, slightly moist, moderately dense		SM								
				light brown										
				standard penetration test: 13.5-15' blows = 14+27+33										

DATE: 4/11/19 TIME: 11:05 WATER LEVEL: no water CAVE IN: 8.8ft SHEET 1 OF 1 SHEETS

Attachment 3d

Outside Cut, Auxiliary Spillway, hole 273

U.S. DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE

NRCS-ENG-53
REV. FOR TX 08.11

LOG OF TEST HOLES

WATERSHED	Lower Plum Creek		COUNTY Caldwell		SITE NO. 28
LOCATION	Outside Cut AS	DATE 4/10/2019	LAT/LONG N29.861513 W-97.516475		STATE Tx
LOGGED BY	Moffatt		PROJECT : WP-07 _____ WP-08 _____ FP-03 _____ P.L.-46 _____		
DRILLING EQUIPMENT	CME 45		LOCTION OF HOLES		

HOLE NO.	STA. & SURFACE ELEVATION	HOLE DEPTH FROM FT	HOLE DEPTH TO FT	DESCRIPTION OF MATERIALS	N	USCS	TYPE BIT USED	SAMPLES NO	SAMPLES TYPE	SAMPLES FROM FT	SAMPLES TO FT	SAMPLES REC %	SAMPLES DISP FT	SAMPLES AMT
274	7+80 CL	0	7	very fine grained sand, silty, slightly moist, very slightly to slightly plastic clay		SC		.1	sm	0	5			
	AS 245' RT			light brown, moderately dense				.2	spt	10	11.5			
	elev: 482.77	7	9	sandstone, very dense		SS								
		9	11.5	loose sand, moist, silty, very fine grained to fine grained, light gray		SM								
				standard penetration test: 10-11.5' blows=8+12+13										

DATE: 4/11/19 TIME: 10:58 WATER LEVEL: no water CAVE IN: 7.0ft SHEET 1 OF 1 SHEETS

Attachment 3d
Outside Cut, Auxiliary Spillway, hole 274

U.S. DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE

NRCS-ENG-53
REV. FOR TX 08.11

LOG OF TEST HOLES

WATERSHED	Lower Plum Creek		COUNTY Caldwell		SITE NO. 28
LOCATION	US Toe	DATE 4/3/2019	LAT/LONG	N29.859407 W-97.514493	STATE Tx
LOGGED BY	Moffatt		PROJECT : WP-07 _____ WP-08 _____ FP-03 _____ P.L.-46 _____		
DRILLING EQUIPMENT	CME 45		LOCTION OF HOLES		

HOLE NO.	STA. & SURFACE ELEVATION	HOLE DEPTH FROM FT	HOLE DEPTH TO FT	DESCRIPTION OF MATERIALS	N	USCS	TYPE BIT USED	SAMPLES NO	SAMPLES TYPE	SAMPLES FROM FT	SAMPLES TO FT	SAMPLES REC %	SAMPLES DISP FT	SAMPLES AMT
701	34+50	0	0.5	sand, silty, clayey, roots, slightly moist, brown to light brown		SC		.1	3"push	0	2.5	100%		
	CL Dam	0.5	2.5	clay, silty, sandy, slight moist to moist, stiff to medium stiff		CL		.2	3"push	2.5	5	100		
	82' US	2.5	5	clay, silty, moist, plastic, moderately stiff, dark brown to black		CH		.3	3"P	5	7.5	100		
	elev:464.78	5	10	clay, moist, stiff, plastic, brown to orange brown, slightly sandy		CH		.4	3"P	7.5	10	100		
		10	20.5	sand, silty, slightly clayey, moist, fine grained, light grey and orange brown		SM		.5	3"P	10	12.5	100		
				slight fine grained gravel, slight streaks of lignite, spt 15-16.5'=6-10-16				.6	spt	15	16.5			
				thin streaks of iron staining @ 16.5', spt 20-21.5'=4-8-12				.7	spt	20	21.5			
		20.5	36.5	clay, silty, moist to saturated, plastic, stiff, brown and gray brown to		CH		.8	spt	25	26.5			
				orange brown, few very fine grained sand particles				.9	spt	30	31.5			
				spt 25-26.5'=6-9-12, as above with a few lignite laminations				.10	spt	35	36.5			
				spt 30-31.5'=13-20-25 as above, dark gray- brown with no lignite										
				spt 35-36.5' as above										

DATE: _____ TIME: _____ WATER LEVEL: _____ CAVE IN: _____ SHEET 1 OF 1 SHEETS

Attachment 3e
Upstream Toe, hole 701

U.S. DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE

NRCS-ENG-53
REV. FOR TX 08.11

LOG OF TEST HOLES

WATERSHED	Lower Plum Creek		COUNTY Caldwell		SITE NO. 28
LOCATION	US Toe	DATE 4/3-4/4/2019	LAT/LONG	N29.859054 W-97.513935	STATE Tx
LOGGED BY	Moffatt		PROJECT : WP-07 _____ WP-08 _____ FP-03 _____ P.L.-46 _____		
DRILLING EQUIPMENT	CME 45		LOCTION OF HOLES		

HOLE NO.	STA. & SURFACE ELEVATION	HOLE DEPTH FROM FT	HOLE DEPTH TO FT	DESCRIPTION OF MATERIALS	N	USCS	TYPE BIT USED	SAMPLES NO	SAMPLES TYPE	SAMPLES FROM FT	SAMPLES TO FT	SAMPLES REC %	SAMPLES DISP FT	SAMPLES AMT
702	32+50 CL	0	5	clay, silty, slightly moist to moist, plastic, roots to 2', dark brown to black		CL		.1	3"push	0	2.5	65		
	Dam 82' US			2-4' slightly very fine grained gravel 4/3/2019				.2	3"push	2.5	5	75		
	elev:460.94	5	15	4/4/19, clay, sandy, slightly to moderately plastic, moist, some gravel,		CL		.3	3"P	5	7.5	100		
				light brown to gray				.4	3"P	7.5	10	100		
		15	20	alternating thin bedded very fine grained silty sand and silty clay, saturated		SC		.5	3"P	10	12.5	100		
				to very moist, sand laminations orange brown and light gray				.6	3"P	15	17.5	100		
		20	22.5	fine grained sand, loose, saturated, light gray		SC		.7	3"P	20	22.5	100		

DATE: _____ TIME: _____ WATER LEVEL: _____ CAVE IN: _____

SHEET 1 OF 1 SHEETS

Attachment 3e

Upstream Toe, hole 702

U.S. DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE

NRCS-ENG-53
REV. FOR TX 08.11

LOG OF TEST HOLES

WATERSHED	Lower Plum Creek		COUNTY Caldwell		SITE NO. 28
LOCATION	US Toe	DATE 4/4/2019	LAT/LONG	N29.858699 W-97.513427	STATE Tx
LOGGED BY	Moffatt		PROJECT : WP-07 _____ WP-08 _____ FP-03 _____ P.L.-46 _____		
DRILLING EQUIPMENT	CME 45		LOCTION OF HOLES		

HOLE NO.	STA. & SURFACE ELEVATION	HOLE DEPTH FROM FT	HOLE DEPTH TO FT	DESCRIPTION OF MATERIALS	N	USCS	TYPE BIT USED	SAMPLES NO	SAMPLES TYPE	SAMPLES FROM FT	SAMPLES TO FT	SAMPLES REC %	SAMPLES DISP FT	SAMPLES AMT
703	30+50 CL	0	1	clay, sand, silty, slightly moist, very stiff		CL		.1	3"P	0	2.5	100		
	Dam 82' US	1	10	clay, silty, moist, slight sand, plastic, gray brown		CL		.2	3"P	2.5	5	100		
	elev:460.33	10	15	clay, slight very fine grained sandy, slight coarse grained sand, specks of		CL		.3	3"P	5	7.5	100		
				lignite, light gray to orange brown				.4	3"P	7.5	10	100		
		15	16	sand, saturated, fine grained, loose, gray to orange brown		SP		.5	3"P	10	12.5	100		
		16	22.5	clay with silt particles, thin bedded laminations, gray to orange brown with		CL		.6	3"P	15	17.5	100		
				thin beds of dark gray				.7	3"P	20	22.5	100		

DATE: _____ TIME: _____ WATER LEVEL: _____ CAVE IN: _____ SHEET 1 OF 1 SHEETS

Attachment 3e

Upstream Toe, hole 703

U.S. DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE

NRCS-ENG-53
REV. FOR TX 08.11

LOG OF TEST HOLES

WATERSHED	Lower Plum Creek		COUNTY Caldwell		SITE NO. 28
LOCATION	US Toe	DATE 4/4/2019	LAT/LONG	N29.858402 W-97.512921	STATE Tx
LOGGED BY	Moffatt		PROJECT : WP-07 _____ WP-08 _____ FP-03 _____ P.L.-46 _____		
DRILLING EQUIPMENT	CME 45		LOCTION OF HOLES		

HOLE NO.	STA. & SURFACE ELEVATION	HOLE DEPTH FROM FT	HOLE DEPTH TO FT	DESCRIPTION OF MATERIALS	N	USCS	TYPE BIT USED	SAMPLES NO	SAMPLES TYPE	SAMPLES FROM FT	SAMPLES TO FT	SAMPLES REC %	SAMPLES DISP FT	SAMPLES AMT
704	28+50	0	1	clay, silty, sandy, slightly moist, roots, moderately plastic, dark brown-black		CL		.1	3"push	0	2.5	40		
	CL Dam	1	5	clay, silty, very stiff, moist, plastic, dark gray-brown		CL		.2	3"push	2.5	5	80		
	82' Us	5	10.5	fine grained sand, moderately loose, slight clay, silty, slightly plastic,		SC		.3	3"P	5	7.5	100		
	elev:460.36			orange brown to gray, fine grained below 8', increasing moisture				.4	3"P	7.5	10	100		
		10.5	12	clay, silty, plastic, gypsum streak @12', moist, stiff		CL		.5	3"P	10	12.5	100		
		12	21.5	fine sand with few thin bedded clay laminations, moist to saturated, loose,		SC		.6	3"P	15	17.5	100		
				gray to orange brown, spt 20-21.5'=17-28-30				.7	spt	20	21.5			

DATE: _____ TIME: _____ WATER LEVEL: _____ CAVE IN: _____

SHEET 1 OF 1 SHEETS

Attachment 3e

Upstream Toe, hole 704

U.S. DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE

NRCS-ENG-53
REV. FOR TX 08.11

LOG OF TEST HOLES

WATERSHED	Lower Plum Creek		COUNTY Caldwell		SITE NO. 28
LOCATION	US Toe	DATE 4/4/2019	LAT/LONG	N29.858106 W-97.512383	STATE Tx
LOGGED BY	Moffatt		PROJECT : WP-07 _____ WP-08 _____ FP-03 _____ P.L.-46 _____		
DRILLING EQUIPMENT	CME 45		LOCTION OF HOLES		

HOLE NO.	STA. & SURFACE ELEVATION	HOLE DEPTH FROM FT	HOLE DEPTH TO FT	DESCRIPTION OF MATERIALS	N	USCS	TYPE BIT USED	SAMPLES NO	SAMPLES TYPE	SAMPLES FROM FT	SAMPLES TO FT	SAMPLES REC %	SAMPLES DISP FT	SAMPLES AMT
705	26+50 CL	0	1	sand, silty, roots, very slight clay, non plastic, slightly moist, brown-gray		SM		.1	3"push	0	2.5	70		
	Dam 82' Us	1	2.5	clay, reddish brown, plastic, moist, moderately stiff		CL		.2	3"push	2.5	5	75		
	elev:459.95	2.5	21.5	sand, clayey, silty, moist, slightly plastic, moderately dense, reddish brown,		SC		.3	3"P	5	7.5	65		
				slighty gravel, grayish below 5'				.4	3"P	7.5	10	100		
				spt 10-11'=6-9-13, thin bedded clay 15'-15.25',				.5	spt	10	11.5			
				spt 20-21.5'=16-23-36				.6	3"P	15	17.5	100		
								.7	spt	20	21.5			

DATE: 4/4/19 TIME: 13:15 WATER LEVEL: 10.6' CAVE IN: 14.0'

SHEET 1 OF 1 SHEETS

Attachment 3e

Upstream Toe, hole 705

U.S. DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE

NRCS-ENG-53
REV. FOR TX 08.11

LOG OF TEST HOLES

WATERSHED	Lower Plum Creek		COUNTY Caldwell		SITE NO. 28
LOCATION	US Toe	DATE 4/2-4/3/2019	LAT/LONG	N29.855518 W-97.508164	STATE Tx
LOGGED BY	Moffatt		PROJECT : WP-07 _____ WP-08 _____ FP-03 _____ P.L.-46 _____		
DRILLING EQUIPMENT	CME 45		LOCTION OF HOLES		

HOLE NO.	STA. & SURFACE ELEVATION	HOLE DEPTH FROM FT	HOLE DEPTH TO FT	DESCRIPTION OF MATERIALS	N	USCS	TYPE BIT USED	SAMPLES NO	TYPE	FROM FT	TO FT	REC %	DISP FT	AMT
706	9+45'	0	3	clay, moist, silty, thin bedded with fine grained soft sand, brown/gray/orange		CL		.1	3"push	0	2.5	80		
	CL dam			-brown, few pieces of gravel				.2	3"push	2.5	5	100		
	73' US	3	7.5	alluvium? clay, silty, sandy, brown, moist, plastic, moderately dense		CH		.3	3"P	5	7.5	90		
	elev:461.06'	7.5	10.5	clay, silty, moist, plastic, brown, stiff		CH		.4	3"P	7.5	10			
		10.5	37.5	clay, silty, thin bedded gravel @11.5, iron staining, light gray/orange brown		CL		.5	3"P	10	12.5	100		
				push 15-17.5' 4/2/19,				.6	3"P	15	17.5	100		
				4/3/19, push 20-22.5' as above, push 25-27.5' as above, transitioning to				.7	3"P	20	22.5	100		
				dark gray, push 30-32.5' as above, transition to thin bedded laminations				.8	3"P	25	27.5	100		
				with silt partings, iron staining, laminations with plant fossil imprints,				.9	3"P	30	32.5	100		
				push 35-37.5' refusal @37' as above, almost all gray				.10	3"P	35	37.5	80		

DATE: _____ TIME: _____ WATER LEVEL: _____ CAVE IN: _____ SHEET 1 OF 1 SHEETS

Attachment 3e

Upstream Toe, hole 706

U.S. DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE

NRCS-ENG-53
REV. FOR TX 08.11

LOG OF TEST HOLES

WATERSHED	Lower Plum Creek		COUNTY Caldwell		SITE NO. 28
LOCATION	DS toe	DATE 4/2/2019	LAT/LONG	N29.858968 W-97.514756	STATE Tx
LOGGED BY	Moffatt		PROJECT : WP-07 _____ WP-08 _____ FP-03 _____ P.L.-46 _____		
DRILLING EQUIPMENT	CME 45		LOCTION OF HOLES		

HOLE NO.	STA. & SURFACE ELEVATION	HOLE DEPTH FROM FT	HOLE DEPTH TO FT	DESCRIPTION OF MATERIALS	N	USCS	TYPE BIT USED	SAMPLES NO	SAMPLES TYPE	SAMPLES FROM FT	SAMPLES TO FT	SAMPLES REC %	SAMPLES DISP FT	SAMPLES AMT
601	34+50 CL	0	10	clay, silty, slightly sandy, roots, slightly moist to moist, stiff, sandier in first 1'		CL		.1	3"P	0	2.5	100		
	Dam 93' DS			dark brown, no roots below 3', 5-7.5' sandier than above, 7.5-10' less sand				.2	3"P	2.5	5	100		
	elev:460.31'			becoming brown to light brown, more moisture				.3	3"P	5	7.5	100		
		10	14.75	clay, silty, slight to trace course grained sand, very fine grained gravel		CL		.4	3"P	7.5	10	100		
				silt/sand orange brown/light gray, stiff				.5	3"P	10	12.5	100		
		14.75	20	fine grained sand, saturated, loose, few thin beds, clay, stiff, slight gravel		SC		.6	3"P	15	17.5	100		
				orange brown				.7	spt	20	21.5			
		20	41.5	clay, silty, thin bedded laminations, saturated, brown to dark gray		CL		.8	spt	25	26.5			
				spt 25--26.5'=4+13+20, clay dark gray with silt particles				.9	spt	30	31.5			
				spt 30-31.5'=14-22-27 as above				.10	spt	35	36.5			
				spt 35-36.5'=11-22-30 clay as above				.11	spt	40	41.5			
				spt 40-41.5'=18-28-34 clay as above										

DATE: _____ TIME: _____ WATER LEVEL: _____ CAVE IN: _____

SHEET 1 OF 1 SHEETS

Attachment 3f

Downstream Toe, hole 601

U.S. DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE

NRCS-ENG-53
REV. FOR TX 08.11

LOG OF TEST HOLES

WATERSHED	Lower Plum Creek		COUNTY Caldwell		SITE NO. 28
LOCATION	DS toe	DATE 4/1-4/2/2019	LAT/LONG	N29.858675 W-97.514279	STATE Tx
LOGGED BY	Moffatt		PROJECT : WP-07 _____ WP-08 _____ FP-03 _____ P.L.-46 _____		
DRILLING EQUIPMENT	CME 45		LOCTION OF HOLES		

HOLE NO.	STA. & SURFACE ELEVATION	HOLE DEPTH FROM FT	HOLE DEPTH TO FT	DESCRIPTION OF MATERIALS	N	USCS	TYPE BIT USED	SAMPLES NO	SAMPLES TYPE	SAMPLES FROM FT	SAMPLES TO FT	SAMPLES REC %	SAMPLES DISP FT	SAMPLES AMT
602	4/1/2019	0	3.5	clay, silty, sandy, slightly moist to moist, roots plastic, dark brown		CL		.1	3"P	0	2.5	100		
		3.5	7.5	clay, silty, sandy, moist, stiff, dark grayish brown, very sandy@10'		CL		.2	3"P	2.5	5	100		
	32+50 CL	7.5	11	fine grained sand, silty, clayey, moist, moderately dense, orange-brown		SM		.3	3"P	5	7.5	100		
	Dam 95'DS	11	20	clay, silty, thinly bedded fine grained sand, moist, stiff, orange-brown and		CL		.4	3"P	7.5	10	100		
	elev:459.55'			light gray, push 15-17.5 saturaed thinly bedded sand				.5	3"P	10	12.5	100		
	4/1/2019			spt 20-21.5'=9-29-33 because of sand and saturated sand				.6	3"P	15	17.5	100		
	4/2/2019	20	25.5	fine grained sand, saturated, loose, gray to orange-brown		SM		.7	spt	20	21.5			
		25.5	41.5	clay, silty, lignite, dark brown to orange-brown, very moist to saturated		CH		.8	spt	25	26.5			
				plastic, stiff				.9	spt	30	31.5			
				spt 30-31.5'=15-22-30, saturated clay as above				.10	spt	35	36.5			
				spt 35-36.5'=17-22-25				.11	spt	40	41.5			
				spt 40-41.5'= as above with lignite										

DATE: _____ TIME: _____ WATER LEVEL: _____ CAVE IN: _____

SHEET 1 OF 1 SHEETS

Attachment 3f

Downstream Toe, hole 602

U.S. DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE

NRCS-ENG-53
REV. FOR TX 08.11

LOG OF TEST HOLES

WATERSHED	Lower Plum Creek		COUNTY Caldwell		SITE NO. 28
LOCATION	DS toe	DATE 4/1/2019	LAT/LONG N29.858358 W-97.513785		STATE Tx
LOGGED BY	Moffatt		PROJECT : WP-07 _____ WP-08 _____ FP-03 _____ P.L.-46 _____		
DRILLING EQUIPMENT	CME 45		LOCTION OF HOLES		

HOLE NO.	STA. & SURFACE ELEVATION	HOLE DEPTH FROM FT	HOLE DEPTH TO FT	DESCRIPTION OF MATERIALS	N	USCS	TYPE BIT USED	SAMPLES NO	SAMPLES TYPE	SAMPLES FROM FT	SAMPLES TO FT	SAMPLES REC %	SAMPLES DISP FT	SAMPLES AMT
603	30 +50 CL	0	3	clay, silty, sandy, roots, slightly moist to moist, plastic, push 0-2.5' core stuck		CL		.1	3"P	0	2.5	100%		
	Dam 95' DS			in tube, hammer out sample, no penetration, dark brown				.2	3"P	2.5	5	100%		
	elev:459.06	3	5	clay, silty, slight coarse grained sand, slight very fine grained sand, moist,		CH		.3	3"P	5	7.5	100		
				plastic, stiff				.4	3"P	7.5	10	100		
		5	16.5	fine grained sand, dense, moist, silty, slight clay, brown to orange-brown		SM		.5	3"P	10	12.5	100		
				becoming more moist with depth, more clay @11', gray with light brown				.6	3"P	15	17.5	100		
				10-12.5 water in push tube, 15-17.5' saturated sand 15.5-16.5'				.7	spt	20	21.5			
		16.5	21.25	clay, silty, thin bedded laminations with silt particles, iron staining to light		CL		.8	spt	25	26.5			
				gray with some orange-brown, moist, stiff to very stiff, SPT 20-21.5				.9	spt	30	31.5			
				thin bedded sand @21.25				.10	spt	35	36.5			
		21.25	30	very fine grained sand, thin bedded laminations with silt, gray to light brown		SM		.11	spt	40	41.5			
				with heavy iron staining, soft to moderately dense, spt 25-26.5'=4-9-20,										
				spt 30-31.5'=15-22-30										
		30	41.5	clay with thin bedded lignite, plastic moist, very stiff, laminations, platy dark		CH								
				gray to black, spt 35-36.5'= 19-39-50 for 5 3/4",spt 40-41.5'=20-21-50 for 4"										

DATE: _____ TIME: _____ WATER LEVEL: _____ CAVE IN: _____ SHEET 1 OF 1 SHEETS

Attachment 3f

Downstream Toe, hole 603

U.S. DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE

NRCS-ENG-53
REV. FOR TX 08.11

LOG OF TEST HOLES

WATERSHED	Lower Plum Creek		COUNTY Caldwell		SITE NO. 28
LOCATION	DS toe	DATE 3/28//2019	LAT/LONG N29.858054 W-97.513252		STATE Tx
LOGGED BY	Moffatt		PROJECT : WP-07 _____ WP-08 _____ FP-03 _____ P.L.-46 _____		
DRILLING EQUIPMENT	CME 45		LOCTION OF HOLES		

HOLE NO.	STA. & SURFACE ELEVATION	HOLE DEPTH FROM FT	HOLE DEPTH TO FT	DESCRIPTION OF MATERIALS	N	USCS	TYPE BIT USED	SAMPLES NO	SAMPLES TYPE	SAMPLES FROM FT	SAMPLES TO FT	SAMPLES REC %	SAMPLES DISP FT	SAMPLES AMT
604	28+50 CL	0	3	clay, silty, sandy, plastic, slightly moist-moist, stiff, dark brown to black, roots		CL		.1	3"P	0	2.5	60		
	Dam 95' DS	3	5	clay, silty, sandy, slight fine grained gravel, moist, stiff, light brown on bottom		CL		.2	3"P	2.5	5	80		
	elev: 458.87'			gray brown on top				.3	3"P	5	7.5	40		
		5	15	very fine grained sand, slight clay, silty, moist, slightly to moderately plastic				.4	3"P	7.5	10	100		
				moderately stiff, brown to light brown, slight course grained sand with depth		SC		.5	3"P	10	12.5	100		
				10-12,5' course grained sand (SM) saturated, no clay				.6	spt	15	16.5			
		15	17	clay, silty, saturated to very moist, plastic, gray and mottled light brown		CL		.7	3"P	20	22.5	90		
				stiff, SPT 15-16.5'=6-9-14				.8	spt	25	26.5			
		17	30.5	sand with thin bedded clayey sand, saturated, soft, gray		SC		.9	spt	30	31.5			
				SPT 25-26.5'=22-36-43, thin bedded laminations with sand, iron staining				.10	spt	35	36.5			
				no clay, SPT 30-31.5'=12-30-36				.11	spt	40	41.5			
		30.5	35	clay, sandy, very silty, saturated, slightly to moderately plastic, moderately		CL								
				stiff, brownish gray, SPT 35-36.5 50 for 6"										
		35	36	lignite										
		36	41.5	clay, silty, moderately stiff, very moist to saturated, moderate to high plasticit		CL								

DATE: _____ TIME: _____ WATER LEVEL: _____ CAVE IN: _____ SHEET 1 OF 1 SHEETS

Attachment 3f

Downstream Toe, hole 604

U.S. DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE

NRCS-ENG-53
REV. FOR TX 08.11

LOG OF TEST HOLES

WATERSHED	Lower Plum Creek		COUNTY Caldwell		SITE NO. 28
LOCATION	DS toe	DATE 3/27/2019	LAT/LONG N29.857727 W-97.512731		STATE Tx
LOGGED BY	Moffatt		PROJECT : WP-07 _____ WP-08 _____ FP-03 _____ P.L.-46 _____		
DRILLING EQUIPMENT	CME 45		LOCTION OF HOLES		

HOLE NO.	STA. & SURFACE ELEVATION	HOLE DEPTH FROM FT	HOLE DEPTH TO FT	DESCRIPTION OF MATERIALS	N	USCS	TYPE BIT USED	SAMPLES NO	SAMPLES TYPE	SAMPLES FROM FT	SAMPLES TO FT	SAMPLES REC %	SAMPLES DISP FT	SAMPLES AMT
605	26+50 CL	0	3	clay, silty, sandy, plastic, slightly moist to moist, stiff, slight fine grained		CL		.1	3"P	0	2.5	70		
	Dam 95' DS			gravel, dark brown				.2	3"P	2.5	5	70		
	elev:458.32	3	7.5	as above, becoming light brown and mottle gray, slight organics		CL		.3	3"P	5	7.5	75		
		7.5	10.5	fine grained sand, moist, dense, light brown and mottled gray		SC		.4	3"P	7.5	10	100		
		10.5	17	clay, silty, slight course grained sand, plastic, moist, stiff, light brown and		CH		.5	3"P	10	12.5	80		
				mottled light gray becoming gray with depth,				.6	3"P	15	17.5	55		
		17	18	very fine grained sand, soft to medium, moist, light gray		SC		.7	3"P	20	22.5	80		
		18	22	clay, silty, slight very fine grained sand, moist, very stiff, light gray to gray		CL		.8	spt	25	26.5			
		22	36.5	very fine grained to fine grained sand, saturated, soft, silty, brownish gray		SM		.9	spt	30	31.5			
				SPT 25-26.5=12-24-50 for 6", SPT 30-31.5'=22-31-40				.10	spt	35	36.5			
				SPT 35-36.5'=15-25-50 for 5.5", thin bedded to laminated with lignite and										
				clay										

DATE: _____ TIME: _____ WATER LEVEL: _____ CAVE IN: _____ SHEET 1 OF 1 SHEETS

Attachment 3f

Downstream Toe, hole 605

U.S. DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE

NRCS-ENG-53
REV. FOR TX 08.11

LOG OF TEST HOLES

WATERSHED	Lower Plum Creek		COUNTY Caldwell		SITE NO. 28
LOCATION	DS toe	DATE 3/27/2019	LAT/LONG N29.857453 W-97.512238		STATE Tx
LOGGED BY	Moffatt		PROJECT : WP-07 _____ WP-08 _____ FP-03 _____ P.L.-46 _____		
DRILLING EQUIPMENT	CME 45		LOCTION OF HOLES		

HOLE NO.	STA. & SURFACE ELEVATION	HOLE DEPTH FROM FT	HOLE DEPTH TO FT	DESCRIPTION OF MATERIALS	N	USCS	TYPE BIT USED	SAMPLES NO	SAMPLES TYPE	SAMPLES FROM FT	SAMPLES TO FT	SAMPLES REC %	SAMPLES DISP FT	SAMPLES AMT
606	24+50 CL	0	2	clay, silty, slight sand, moderately dense, slightly moist to moist, roots		CL		.1	3"P	0	2.5	30		
	Dam 95' DS			plastic, dark brown				.2	3"P	2.5	5	35		
	elev:457.67'	2	5	clay, silty, sandy, slight fine grained gravel, slightly moist, plastic, dark brown		CL		.3	3"P	5	7.5	100		
		5	10	clay, silty, brown to light brown and mottled gray, plastic, gypsum, moist		CL		.4	3"P	7.5	10	100		
				clay, silty, slight sand, dark gray to gray, light brown lignite seams, moist				.5	3"P	10	12.5	90		
		10	20	as above, gray to brownish gray with fine grained sand streaks		CL		.6	3"P	15	17.5	80		
		20	25.5	very fine grained to fine grained sand, saturated, hole making water, soft		SM		.7	3"P	20	22.5	65		
				gray to light gray with light brown streaks				.8	spt	25	26.5			
		25.5	30	clay, silty, lignite, slight iron staining, plastic, moist to very moist, gray to		CH		.9	spt	30	31.5			
				gray-brown, SPT 25-26.5'=5-8-12				.10	spt	35	36.5			
		30	40.5	sand, silty, saturated, moderately dense, spt 30-31.5'=17-26-27, light brown		SM		.11	spt	40	41.5			
				to grayish brown, SPT 35-36.5'=23-30-50 for 6"										

DATE: 3/27&3/28/2019 TIME: 18:13 &9:06 WATER LEVEL: 9.6ft & 8.6ft CAVE IN: 25.2ft & 21.1ft SHEET 1 OF 1 SHEETS

Attachment 3f

Downstream Toe, hole 606

U.S. DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE

NRCS-ENG-53
REV. FOR TX 08.11

LOG OF TEST HOLES

WATERSHED	Lower Plum Creek		COUNTY Caldwell		SITE NO. 28
LOCATION	DS toe	DATE 3/21-22/2019	LAT/LONG N29.857127 W-97.511715		STATE Tx
LOGGED BY	Moffatt		PROJECT : WP-07 _____ WP-08 _____ FP-03 _____ P.L.-46 _____		
DRILLING EQUIPMENT	CME 45		LOCTION OF HOLES		

HOLE NO.	STA. & SURFACE ELEVATION	HOLE DEPTH FROM FT	HOLE DEPTH TO FT	DESCRIPTION OF MATERIALS	N	USCS	TYPE BIT USED	SAMPLES NO	TYPE	FROM FT	TO FT	REC %	DISP FT	AMT
607	22+45	0	2	clay, silty, slight sand, plastic, moderate density, dark brown, roots to 2'		CL		.1	3"P	5	7.5	100%		
	CL dam			slightly moist to moist				.2	3"P	7.5	10	100%		
	91'DS	2	20	clay, silty, sandy, plastic, moderate density, brown to light brown, moist		CL		.3	3"P	10	12.5	100		
	elev:455.48'			push 5-7.5' recovered 100%, push 7.5-10' recovered 100% increase in sand				.4	3"P	15	17.5	100		
				CL-SC light brown mottled gray, 3/21/2019				.5	3"P	20	22.5	100		
				3/22/2019, push 10-12.5' recovered 100% few thin very fine to fine grain				.6	spt	25	26.5			
				sandy laminations, few gravel, iron staining, push 15-17.5' recovered 100%				.7	spt	30	31.5			
				as above with single lignite streak as it become darker gray with depth				.8	spt	35	36.5			
		20	25	sand, silty, saturated, gray to light brown, soft iron staining, few thin clay		SM		.9	spt	40	41.5			
				laminations, push 20-22.5 recovered 80% soft to 25', spt 25-26.5'=12-15-21										
				lignite streak @25'										
		25	28	clay, silty, stiff, dark gray to brownish gray with single lignite streak@25'		CL								
				plastic, moist to saturated, slight sand, very hard drilling starting @28'										
				stop drilling @29', spt 50 blows for 2"										

DATE: _____ TIME: _____ WATER LEVEL: _____ CAVE IN: _____

SHEET 1 OF 2 SHEETS

Attachment 3f
Downstream Toe, hole 607

U.S. DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE

NRCS-ENG-53
REV. FOR TX 08.11

LOG OF TEST HOLES

WATERSHED	Lower Plum Creek		COUNTY	SITE NO.	28
LOCATION	DS toe	DATE 3/21-22/2019	LAT/LONG	STATE	Tx
LOGGED BY	Moffatt		PROJECT : WP-07 _____ WP-08 _____ FP-03 _____ P.L.-46 _____		
DRILLING EQUIPMENT	CME 45		LOCTION OF HOLES		

HOLE NO.	STA. & SURFACE ELEVATION	HOLE DEPTH FROM FT	HOLE DEPTH TO FT	DESCRIPTION OF MATERIALS	N	USCS	TYPE BIT USED	SAMPLES NO	SAMPLES TYPE	SAMPLES FROM FT	SAMPLES TO FT	SAMPLES REC %	SAMPLES DISP FT	SAMPLES AMT
607		28	30	sandstone, hardness 4-5, very fine grained, gray-green, well cemented		SS								
				spt 30-31.5'=30-43-39										
		30	41.5	sandstone, cemented, silty, Fe-Mg inclusions, loose, greenish-gray		SS								
				spt 35-36.5' 12-35-50 for 5", flowing sand @35', spt 40-41.5'=29-50 for 6"										
				stopped drilling										

DATE: 3/27/2019 TIME: 08:56 WATER LEVEL: 7.2 ft CAVE IN: 18.2 ft SHEET 2 OF 2 SHEETS

Attachment 3f

Downstream Toe, hole 607

U.S. DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE

NRCS-ENG-53
REV. FOR TX 08.11

LOG OF TEST HOLES

WATERSHED	Lower Plum Creek		COUNTY Caldwell		SITE NO. 28
LOCATION	DS toe PS left	DATE 3/19/2019	LAT/LONG	N29.856667 W-97.510939	STATE Tx
LOGGED BY	Moffatt		PROJECT : WP-07 _____ WP-08 _____ FP-03 _____ P.L.-46 _____		
DRILLING EQUIPMENT	CME 45		LOCTION OF HOLES		

HOLE NO.	STA. & SURFACE ELEVATION	HOLE DEPTH FROM FT	HOLE DEPTH TO FT	DESCRIPTION OF MATERIALS	N	USCS	TYPE BIT USED	SAMPLES NO	SAMPLES TYPE	SAMPLES FROM FT	SAMPLES TO FT	SAMPLES REC %	SAMPLES DISP FT	SAMPLES AMT
608	19+50	0	5	clay, silty, slight sand from 2-2.5', plastic, soft to medium, dark brown		CL		.1	3"P	0	2.5	60		
	CL Dam	5	11	very fine to fine grained sand, loose, saturated, silty, slight clay, non-plastic		SM		.2	3"P	2.5	5	60		
	83' DS			brown, gravel @11', base of alluvium				.3	3"P	5	7.5	100		
	elev:	11	12.5	medium sand, loose, silty, slight clay, slightly plastic, brown and mottle gray		SC		.4	3"P	7.5	10	100		
	453.45'			iron staining				.5	3"P	10	12.5	100		
		12.5	21.5	clay, silty, slight sand, soft to very stiff, blocky in parts, plastic, moist, light		CL		.6	3"P	12.5	15	100		
				brown & mottled light gray, slight sand @16' increasing sand to SC 18-21.5'				.7	3"P	15	17.5	100		
		21.5	22	alternating sand and lignitic clay		SC		.8	3"P	20	22.5	100		
		22	35	lignite with thin bedded lignitic laminations and loose sand		Lig		.9	3"P	25	27.5	60		
				push 25-27 recovered 60%, lignite with some iron staining				.10	spt	35	36.5			
				spt 35-36.5'=18-32-50 for 6"				.11	spt	40	41.5			
		35	37	very fine to fine grained sand, moist to saturated, dense, greenish gray		SM								
				spt 40-41.5'=50 blows for 4.5"										
		37	40.5	lignite		Lig								

DATE: 3/27/2019 TIME: 09:16 WATER LEVEL: 5.4 ft CAVE IN: 27.3 ft SHEET 1 OF 1 SHEETS

Attachment 3f

Downstream Toe, hole 608

U.S. DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE

NRCS-ENG-53
REV. FOR TX 08.11

LOG OF TEST HOLES

WATERSHED	Lower Plum Creek		COUNTY Caldwell		SITE NO. 28
LOCATION	DS Toe	DATE 3/19/2019	LAT/LONG	N29.856326 W-97.510465	STATE Tx
LOGGED BY	Moffatt		PROJECT : WP-07 _____ WP-08 _____ FP-03 _____ P.L.-46 _____		
DRILLING EQUIPMENT	CME 45		LOCTION OF HOLES		

HOLE NO.	STA. & SURFACE ELEVATION	HOLE DEPTH FROM FT	HOLE DEPTH TO FT	DESCRIPTION OF MATERIALS	N	USCS	TYPE BIT USED	SAMPLES NO	TYPE	FROM FT	TO FT	REC %	DISP FT	AMT
609	17+58	0	5	Clay, silty, slight sand, moist, soft to medium, dark brown		CL		.1	3"push	0	2.5	100		
	CL Dam	5	10.5	Very fine grained sand, silty, clayey, moist to saturated, soft to medium,		SC		.2	3"push	2.5	5	20		
	89' DS			dark brown, becomes more coarse with depth				.3	3"P	5	7.5	100		
	elev:452.8'	10.5	20	Clay, silty, sandy, slight very fine to fine grained gravel, iron staining,		CL		.4	3"P	7.5	10	100		
				light brown mottled with gray, becomes sandier with depth				.5	3"P	10	12.5	100		
		20	29	sand and clay laminations, sand is greenish gray glaucanitic, moist to		SC		.6	3"P	12.5	15	100		
				saturated, very fine grained. push 22.5-25' recovery 10%				.7	3"P	22.5	25	10		
		29	40.3	lignite, thin bedded to laminated with very fine grained sand, greenish gray,		lig		.8	3"P	30	32.5	50		
				moist, greenish gray to dark brown-black, push 35-37.5' recover 1' as above				.9	3"P	35	37.5	40		
				spt 40-41.5' 50 blows for 4",				.10	spt	40	40.25			

DATE: 3/20/19 & 3/27/19 TIME: 08:38 & 09:16 WATER LEVEL: 4.4ft & 4.2ft CAVE IN: 30.6ft & 27.2ft

SHEET 1 OF 1 SHEETS

Attachment 3f

Downstream Toe, hole 609

U.S. DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE

NRCS-ENG-53
REV. FOR TX 08.11

LOG OF TEST HOLES

WATERSHED	Lower Plum Creek		COUNTY Caldwell		SITE NO. 28
LOCATION	DS Toe	DATE 3/18/2019	LAT/LONG N29.856029 W-97.509959		STATE Tx
LOGGED BY	Moffatt		PROJECT : WP-07 _____ WP-08 _____ FP-03 _____ P.L.-46 _____		
DRILLING EQUIPMENT	CME 45		LOCTION OF HOLES		

HOLE NO.	STA. & SURFACE ELEVATION	HOLE DEPTH FROM FT	HOLE DEPTH TO FT	DESCRIPTION OF MATERIALS	N	USCS	TYPE BIT USED	SAMPLES NO	SAMPLES TYPE	SAMPLES FROM FT	SAMPLES TO FT	SAMPLES REC %	SAMPLES DISP FT	SAMPLES AMT
610	15+48	0	1	top soil, brown-black clay		CL		.1	3"push	0	2.5	100%		
	CL Dam	1	5	clay, sandy, moist, moderately stiff, dark brown, few pieces of gravel		CL		.2	3"push	2.5	5	40		
	90' DS	5	10	clay, very fine grained sandy, moist, moderately plastic, brown		CH		.3	3"P	4	7.5	100		
	elev:452.6'			attempt push 7.5-10', no recovery, mottled light gray				.4	3"P	10	12.5	75		
		10	20.5	alternating clay with thin beds of clayey sand, saturated, push 15-17.5' as		CL		.5	3"P	12.5	15	100		
				above, drill to 20, push 20-22.5'				.6	3"P	15	17.5	100		
		20.5	29	clay, thin bed laminations with very fine grained sandy, lignitic, moist		CL		.7	3"P	20	22.5	100		
				push 25-27.5', push 30-32.5' refusal at 30.25'				.8	3"P	30	30.25	13		
		29	33.5	lignite		lig		.9	spt	35	36.5			
		33.5	40.5	spt 35-36.5'=17-32-47, thinly bedded clay and silt, with some very fine grain		CL		.10	spt	40	40.25			
				sand, gray to dark brown/black										

DATE: 3/20/19 & 3/27/19 TIME: 16:29 & 09:21 WATER LEVEL: 4.4ft & 3.3ft CAVE IN: 33.4ft & 16.2ft SHEET 1 OF 1 SHEETS

Attachment 3f
Downstream Toe, hole 610

U.S. DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE

NRCS-ENG-53
REV. FOR TX 08.11

LOG OF TEST HOLES

WATERSHED	Lower Plum Creek		COUNTY Caldwell		SITE NO. 28
LOCATION	DS Toe	DATE 3/18/2019	LAT/LONG	N29.855689 W-97.509435	STATE Tx
LOGGED BY	Moffatt		PROJECT : WP-07 _____ WP-08 _____ FP-03 _____ P.L.-46 _____		
DRILLING EQUIPMENT	CME 45		LOCTION OF HOLES		

HOLE NO.	STA. & SURFACE ELEVATION	HOLE DEPTH FROM FT	HOLE DEPTH TO FT	DESCRIPTION OF MATERIALS	N	USCS	TYPE BIT USED	SAMPLES NO	SAMPLES TYPE	SAMPLES FROM FT	SAMPLES TO FT	SAMPLES REC %	SAMPLES DISP FT	SAMPLES AMT
611	13+42	0	1	top soil, clay, sandy, moist, moderately plastic, dark brown/black, roots, stiff		CL		.1	3"push	0	2.5	35		
	CL Dam	1	7.5	clay, silty, sandy, some fine gravel, moist, moderately stiff, dark brown		CL		.2						
	95' DS			push with spt 7.5-9.5 recovered 100% as above, 7.5-10 becoming brown				.3	3"push	5	7.5	100		
	elev:453.22'			and slightly mottled gray				.4	3"P	7.5	10	100		
		7.5	15	clay, silty, sandy, moist to very moist, saturated@10', soft to medium, brown		CL		.5	3"P	10	12.5	100		
		15	19	clay with sand, silty, saturated, soft, light brown becoming light gray @17'		CL		.6	3"P	15	17.5	100		
				iron staining				.7	3"P	17.5	20	100		
		19	41.5	clay with silt particles, becoming less weathered, dark gray-black, some		CL		.8	3"P	22.5	25	100		
				very fine grained sand laminations @22.5-25'				.9	spt	40	41.5			
				drill 25-30', thin bedded laminations 28-30', softer drill cuttings are lignitic										
				37-39' lignite, spt 40-41.5'=13-21-32, 35-41.5' clay with sand particles										
				2.9WL 37.2 CI 3/19/19@08:57, 2.8WL 30.6CI 3/19/19@16:20										
				2.7WL 31.0CI 3/20/19@08:30, 2.8WL 21.3CI 3/27/19@09:25										

~~DATE:~~ _____ TIME: _____ WATER LEVEL: _____ CAVE IN: _____ SHEET 1 OF 1 SHEETS

Attachment 3f
Downstream Toe, hole 611

U.S. DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE

NRCS-ENG-53
REV. FOR TX 08.11

LOG OF TEST HOLES

WATERSHED	Lower Plum Creek		COUNTY Caldwell		SITE NO. 28
LOCATION	Grid A	DATE 4/4/2019	LAT/LONG	N29.858562 W-97.512009	STATE Tx
LOGGED BY	Moffatt		PROJECT : WP-07 _____ WP-08 _____ FP-03 _____ P.L.-46 _____		
DRILLING EQUIPMENT	CME 45		LOCTION OF HOLES		

HOLE NO.	STA. & SURFACE ELEVATION	HOLE DEPTH FROM FT	HOLE DEPTH TO FT	DESCRIPTION OF MATERIALS	N	USCS	TYPE BIT USED	SAMPLES NO	SAMPLES TYPE	SAMPLES FROM FT	SAMPLES TO FT	SAMPLES REC %	SAMPLES DISP FT	SAMPLES AMT
176	Grid A	0	7	Clay, stiff, SL/CG, Sand very fine grained, Gravel		CL		.1	small	0	5			
	24+00			SL/moist, plastic, reddish brown				.2	small	7	10			
	Elev. 461.67'							.3	small	10	15	3bags		
		7	10	Clay, stiff, organic brown, gray, moist, plastic		CL								
		10	15	Clay, stiff, very fine grained sand, light gray, moist to very moist		CL								
				plastic to SL/PL										

DATE: _____ TIME: _____ WATER LEVEL: _____ CAVE IN: _____ SHEET 1 OF 1 SHEETS

Attachment 3g
Borrow, hole 176

U.S. DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE

NRCS-ENG-53
REV. FOR TX 08.11

LOG OF TEST HOLES

WATERSHED	Lower Plum Creek		COUNTY Caldwell		SITE NO. 28
LOCATION	Grid A	DATE 4/5/2019	LAT/LONG	N29.858888 W-97.512516	STATE Tx
LOGGED BY	Moffatt		PROJECT : WP-07 _____ WP-08 _____ FP-03 _____ P.L.-46 _____		
DRILLING EQUIPMENT	CME 45		LOCTION OF HOLES		

HOLE NO.	STA. & SURFACE ELEVATION	HOLE DEPTH FROM FT	HOLE DEPTH TO FT	DESCRIPTION OF MATERIALS	N	USCS	TYPE BIT USED	SAMPLES NO	SAMPLES TYPE	SAMPLES FROM FT	SAMPLES TO FT	SAMPLES REC %	SAMPLES DISP FT	SAMPLES AMT
177	Grid A	0	3	Clay, silty, SL/moist, stiff, moderately plastic to plastic, dark brown		CH		.1	sm	0	3			
	26+00							.2	sm	5	8	2bags		
	elev:461.77	3	8	clay, silty, SL/gravel, moist, stiff, plastic, light brown		CL		.3	sm	10	15	2bags		
		8	15	clay, very stiff, sandy, moist to very moist, moderately plastic, light gray		CL								

DATE: _____ TIME: _____ WATER LEVEL: _____ CAVE IN: _____ SHEET 1 OF 1 SHEETS

Attachment 3g
Borrow, hole 177

U.S. DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE

NRCS-ENG-53
REV. FOR TX 08.11

LOG OF TEST HOLES

WATERSHED	Lower Plum Creek		COUNTY Caldwell		SITE NO. 28
LOCATION	Grid A	DATE 4/9/2019	LAT/LONG	N29.859213 W-97.513040	STATE Tx
LOGGED BY	Moffatt		PROJECT : WP-07 _____ WP-08 _____ FP-03 _____ P.L.-46 _____		
DRILLING EQUIPMENT	CME 45		LOCTION OF HOLES	most western hole	

HOLE NO.	STA. & SURFACE ELEVATION	HOLE DEPTH FROM FT	HOLE DEPTH TO FT	DESCRIPTION OF MATERIALS	N	USCS	TYPE BIT USED	SAMPLES NO	SAMPLES TYPE	SAMPLES FROM FT	SAMPLES TO FT	SAMPLES REC %	SAMPLES DISP FT	SAMPLES AMT
178	Grid A	0	2	black, clay, top soil, moist, stiff, moderate to high plasticity		CH		.1	sm	3	5	2bags		
	28+00							.2	sm	5	10	2bags		
	elev:462.16	3	5	clay, brown, SL/CaCo3, very fine grained gravel, moist, stiff, plastic		CL		.3	sm	11	15	2bags		
		5	11	clay, stiff, light brown, moist, moderately stiff, plastic		CL								
		11	15	sand, clayey, very moist, plastic, medium dense, light brown/light gray		SC								

DATE: _____ TIME: _____ WATER LEVEL: _____ CAVE IN: _____ SHEET 1 OF 1 SHEETS

Attachment 3g
Borrow, hole 178

U.S. DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE

NRCS-ENG-53
REV. FOR TX 08.11

LOG OF TEST HOLES

WATERSHED	Lower Plum Creek		COUNTY Caldwell		SITE NO. 28
LOCATION	Grid B	DATE 4/9/2019	LAT/LONG	N29.859195 W-97.511890	STATE Tx
LOGGED BY	Moffatt		PROJECT : WP-07 _____ WP-08 _____ FP-03 _____ P.L.-46 _____		
DRILLING EQUIPMENT	CME 45		LOCTION OF HOLES	most eastern	

HOLE NO.	STA. & SURFACE ELEVATION	HOLE DEPTH FROM FT	HOLE DEPTH TO FT	DESCRIPTION OF MATERIALS	N	USCS	TYPE BIT USED	SAMPLES NO	SAMPLES TYPE	SAMPLES FROM FT	SAMPLES TO FT	SAMPLES REC %	SAMPLES DISP FT	SAMPLES AMT
179	Grid B	0	4	clay, silty, stiff, slightly calcareous, slightly moist to moist, dark brown		CH		.1	sm	0	3			
	27+00							.2	sm	4	8	2bags		
	elev:463.10	4	9	clay, silty, slight gravel, moist, stiff, plastic, light brown		CL		.3	sm	10	15	2bags		
		9	15	very fine grained sand, clay, silty, very moist, medium dense, light gray		CL								

DATE: _____ TIME: _____ WATER LEVEL: _____ CAVE IN: _____ SHEET 1 OF 1 SHEETS

Attachment 3g
Borrow, hole 179

U.S. DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE

NRCS-ENG-53
REV. FOR TX 08.11

LOG OF TEST HOLES

WATERSHED	Lower Plum Creek		COUNTY Caldwell		SITE NO. 28
LOCATION	Grid B	DATE 4/10/2019	LAT/LONG	N29.859506 W-97.512413	STATE Tx
LOGGED BY	Moffatt		PROJECT : WP-07 _____ WP-08 _____ FP-03 _____ P.L.-46 _____		
DRILLING EQUIPMENT	CME 45		LOCTION OF HOLES	Borrow	

HOLE NO.	STA. & SURFACE ELEVATION	HOLE DEPTH FROM FT	HOLE DEPTH TO FT	DESCRIPTION OF MATERIALS	N	USCS	TYPE BIT USED	SAMPLES NO	SAMPLES TYPE	SAMPLES FROM FT	SAMPLES TO FT	SAMPLES REC %	SAMPLES DISP FT	SAMPLES AMT
180	Grid B	0	2	dark brown, roots, slight sand, silty, slightly calcareous, slightly moist to		CL		.1	sm	2	5			
	29+00			moist, clay				.2	sm	6	10			
	elev:462.48							.3	sm	10	15			
		4	6	As above, moist, becomes lighter brown with depth		CL								
		6	10	clay, silty, moist, slightly sandy, calcareous, light brown/gray, stiff		CL								
		10	15	clay with some very fine grained sand and silt, very moist, plastic		CH								
				moderately stiff										

DATE: _____ TIME: _____ WATER LEVEL: _____ CAVE IN: _____

SHEET 1 OF 1 SHEETS

Attachment 3g
Borrow, hole 180

U.S. DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE

NRCS-ENG-53
REV. FOR TX 08.11

LOG OF TEST HOLES

WATERSHED	Lower Plum Creek		COUNTY Caldwell		SITE NO. 28
LOCATION	Grid C	DATE 4/10/2019	LAT/LONG	N29.859421 W-97.511146	STATE Tx
LOGGED BY	Moffatt		PROJECT : WP-07 _____ WP-08 _____ FP-03 _____ P.L.-46 _____		
DRILLING EQUIPMENT	CME 45		LOCTION OF HOLES	Borrow	

HOLE NO.	STA. & SURFACE ELEVATION	HOLE DEPTH FROM FT	HOLE DEPTH TO FT	DESCRIPTION OF MATERIALS	N	USCS	TYPE BIT USED	SAMPLES NO	SAMPLES TYPE	SAMPLES FROM FT	SAMPLES TO FT	SAMPLES REC %	SAMPLES DISP FT	SAMPLES AMT
181	Grid C	0	5	alternating thinly bedded very fine grained to fine grained sand and sandy		SC		.1	sm	3	5			
	24+00			clay, slightly moist, loose sand, stiff clay, brown to gray brown				.2	sm	5	8			
	elev:462.17'							.3	sm	10	15			
		5	11	clay, moist, stiff, brown to light gray, plastic		CH								
		11	15	clay, moist, moderately stiff, light gray, very silty, some very fine grain sand		CL								

DATE: 4/10/19 TIME: 09:56 WATER LEVEL: no water CAVE IN: 14.5 ft SHEET 1 OF 1 SHEETS

Attachment 3g
Borrow, hole 181

U.S. DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE

NRCS-ENG-53
REV. FOR TX 08.11

LOG OF TEST HOLES

WATERSHED	Lower Plum Creek		COUNTY Caldwell		SITE NO. 28
LOCATION	Grid C	DATE 4/10/2019	LAT/LONG	N29.859759 W-97.511735	STATE Tx
LOGGED BY	Moffatt		PROJECT : WP-07 _____ WP-08 _____ FP-03 _____ P.L.-46 _____		
DRILLING EQUIPMENT	CME 45		LOCTION OF HOLES	borrow	

HOLE NO.	STA. & SURFACE ELEVATION	HOLE DEPTH FROM FT	HOLE DEPTH TO FT	DESCRIPTION OF MATERIALS	N	USCS	TYPE BIT USED	SAMPLES NO	SAMPLES TYPE	SAMPLES FROM FT	SAMPLES TO FT	SAMPLES REC %	SAMPLES DISP FT	SAMPLES AMT
182	Grid C	0	1.5	clay, silty, slightly moist, roots, stiff, plastic, dark brown		CL		.1	sm	1.5	4			
	26+00							.2	sm	5	8			
	elev:465.22'	1.5	10	clay, silty, calcareous, fine grained gravel, moist, moderately stiff		CL		.3	sm	10	15			
				light brown, increase in coarseness of gravel at 5'-8'										
		10	15	clay with silty light gray laminations, moist to very moist		CL								
				moderately stiff, light brown to light gray with iron staining										

DATE: _____ TIME: _____ WATER LEVEL: _____ CAVE IN: _____

SHEET 1 OF 1 SHEETS

Attachment 3g
Borrow, hole 182

U.S. DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE

NRCS-ENG-53
REV. FOR TX 08.11

LOG OF TEST HOLES

WATERSHED	Lower Plum Creek		COUNTY Caldwell		SITE NO. 28
LOCATION	Grid C	DATE 4/10/2019	LAT/LONG	N29.860096 W-97.512308	STATE Tx
LOGGED BY	Moffatt		PROJECT : WP-07 _____ WP-08 _____ FP-03 _____ P.L.-46 _____		
DRILLING EQUIPMENT	CME 45		LOCTION OF HOLES	borrow	

HOLE NO.	STA. & SURFACE ELEVATION	HOLE DEPTH FROM FT	HOLE DEPTH TO FT	DESCRIPTION OF MATERIALS	N	USCS	TYPE BIT USED	SAMPLES NO	SAMPLES TYPE	SAMPLES FROM FT	SAMPLES TO FT	SAMPLES REC %	SAMPLES DISP FT	SAMPLES AMT
183	Grid C	0	2	clay, silty, slightly moist to moist, roots, dark brown, stiff, plastic		CH		.1	sm	2	5			
	28+00	2	7	clay, silty, sandy, calcareous gravel, moist, stiff, light brown		CL		.2	sm	7	10			
	elev:464.05	7	10	sand, clayey, moist, slightly muddy, plastic, moderately dense,		SC		.3	sm	10	13			
				dark gray to brown										
		10	13	Clay, silty, slight gray silt, slight lignite, moist, plastic		CH								
				light brown with some light gray										
		13	15	clay, very silty, slight very fine grained sand, moist		CL								
				moderately stiff, light gray										

DATE: _____ TIME: _____ WATER LEVEL: _____ CAVE IN: _____ SHEET 1 OF 1 SHEETS

Attachment 3g

Borrow, hole 183

U.S. DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE

NRCS-ENG-53
REV. FOR TX 08.11

LOG OF TEST HOLES

WATERSHED	Lower Plum Creek		COUNTY Caldwell		SITE NO. 28
LOCATION	Potential Left US Borrow Area	DATE Apr. 21 2022	LAT/LONG 29.85569N 97.50782W		STATE Tx
LOGGED BY	Jugle		PROJECT : WP-07 _____ WP-08 _____ FP-03 _____ P.L.-46 _____		
DRILLING EQUIPMENT	Hand Auger		LOCTION OF HOLES		

HOLE NO.	STA. & SURFACE ELEVATION	HOLE DEPTH FROM FT	HOLE DEPTH TO FT	DESCRIPTION OF MATERIALS	N	USCS	TYPE BIT USED	SAMPLES NO	SAMPLES TYPE	SAMPLES FROM FT	SAMPLES TO FT	SAMPLES REC %	SAMPLES DISP FT	SAMPLES AMT
1101		0	3	Clay, silty, some sand, some gravel. Slightly moist. Plastic.		CH/	CL							
				Brown to dark brown. Increasing moisture with depth.										
		3	3.5	Larger (1-3in.) stones start to appear, as well as increasing amounts of		CH/	CL							
				gravel, otherwise same as above. Gravel/stones mostly limestone and										
				sandstone.										
		3.5	5	Slightly sandier @ 3.5 ft, still mostly clay and same as above.		CH/	CL							
				Denser material. Less moisture than below about 3.5 feet.										
				Field test for dispersion: (after approx. 20 minutes in distilled water)										
				1.5ft: no dispersion observed										
				3ft: no dispersion observed										
				5ft: no dispersion observed										

DATE: _____ TIME: _____ WATER LEVEL: _____ CAVE IN: _____ SHEET 1 OF 1 SHEETS

Attachment 3g
Borrow, hole 1101

U.S. DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE

NRCS-ENG-53
REV. FOR TX 08.11

LOG OF TEST HOLES

WATERSHED	Lower Plum Creek		COUNTY Caldwell		SITE NO. 28
LOCATION	Potential DS Borrow Area	DATE Apr. 21 2022	LAT/LONG 29.85568N 97.51239W		STATE Tx
LOGGED BY	Jugle		PROJECT : WP-07 _____ WP-08 _____ FP-03 _____ P.L.-46 _____		
DRILLING EQUIPMENT	Hand Auger		LOCTION OF HOLES		

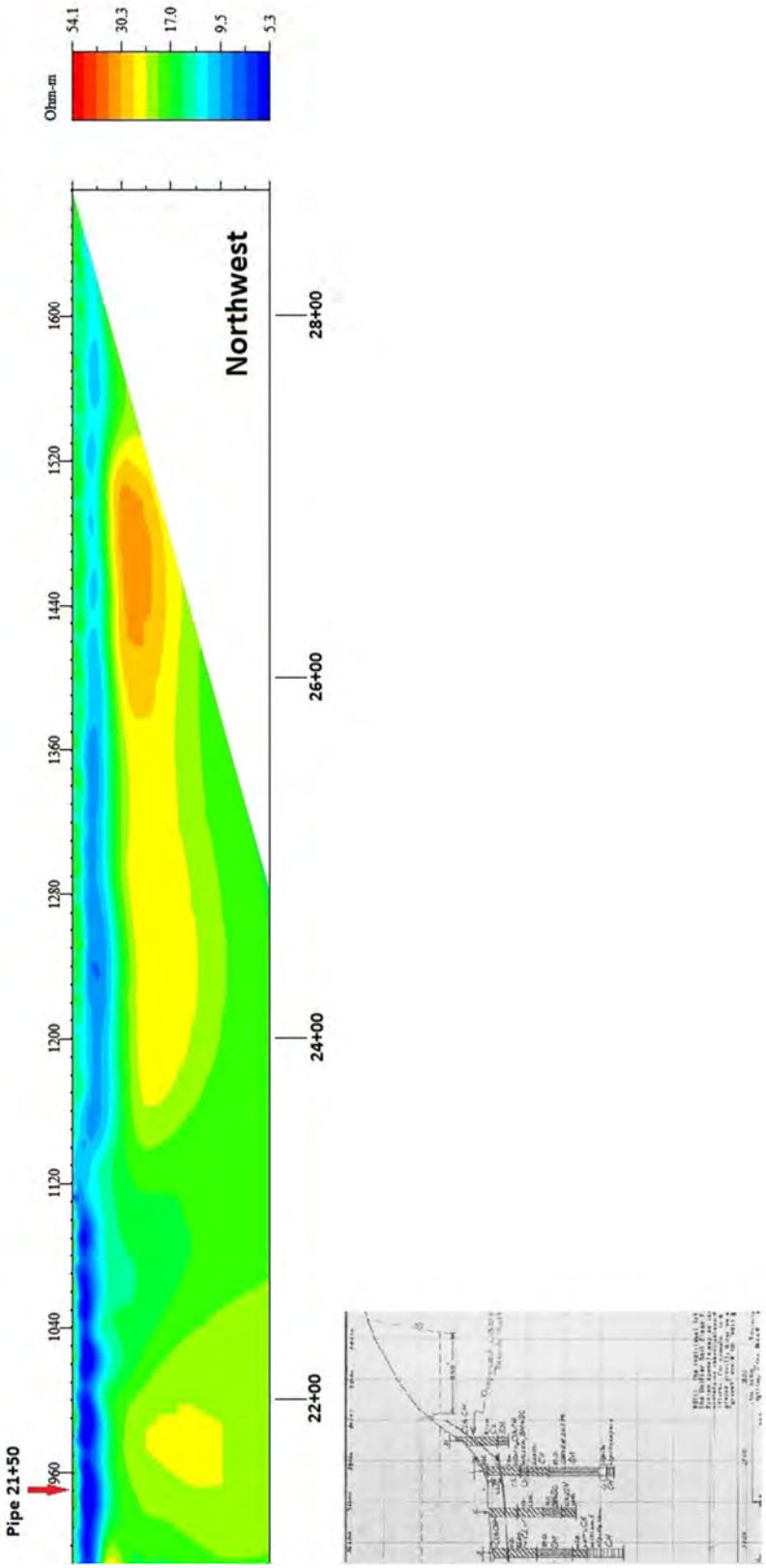
HOLE NO.	STA. & SURFACE ELEVATION	HOLE DEPTH FROM FT	HOLE DEPTH TO FT	DESCRIPTION OF MATERIALS	N	USCS	TYPE BIT USED	SAMPLES NO	SAMPLES TYPE	SAMPLES FROM FT	SAMPLES TO FT	SAMPLES REC %	SAMPLES DISP FT	SAMPLES AMT
1102		0	1.5	Sand, silty. No moisture, roots, brown. Some clay with depth		SM								
		1.5	4	Clay, very sandy. Brown to Reddish brown. Some gravel.		SC/	CL							
				Moderately plastic. Iron staining. More gravel w/ depth.										
		4	5	Sand, clay-ey. Some gravel. Brown to light brown. Iron staining.		SC								
				Gets sandier with depth.										

DATE: _____ TIME: _____ WATER LEVEL: _____ CAVE IN: _____ SHEET 1 OF 1 SHEETS

Attachment 3g
Borrow, hole 1102

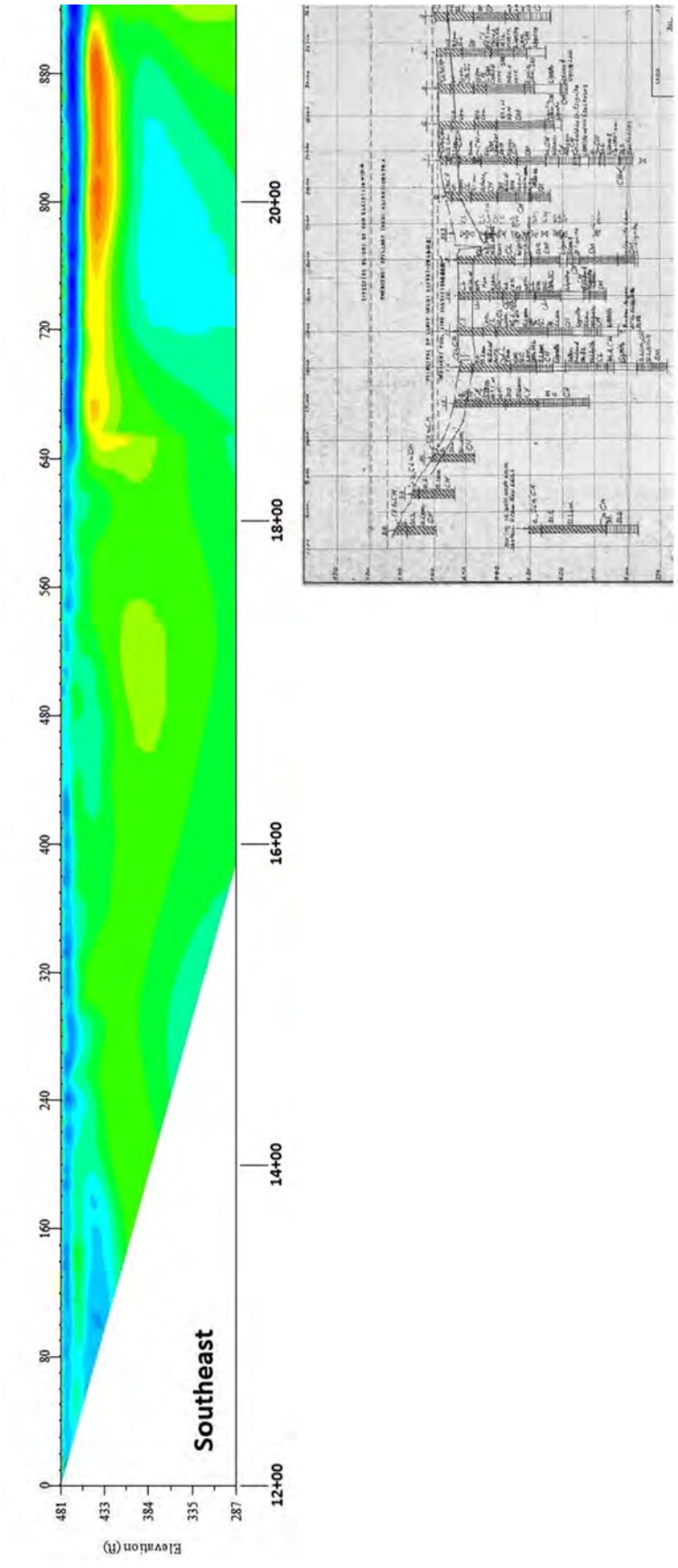
Attachment 4a

Resistivity Survey Parallel to CL Dam (Northwest Half)



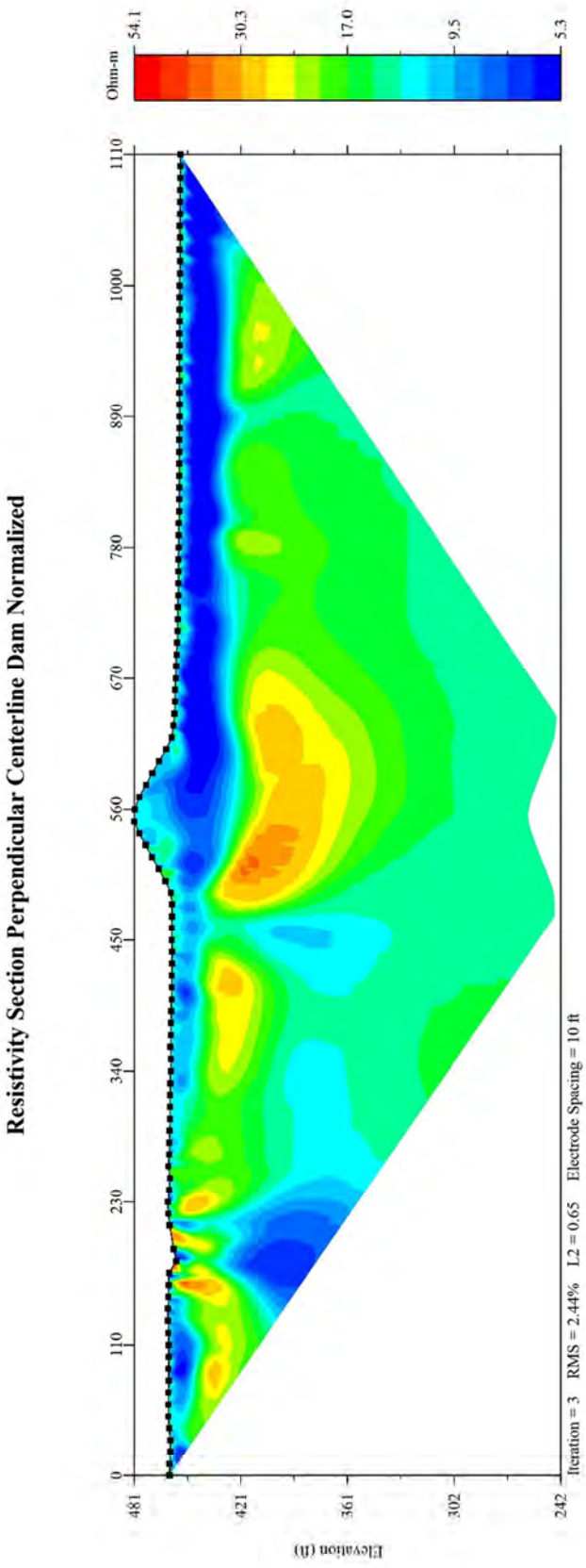
Attachment 4a

Resistivity Survey Parallel to CL Dam (Southeast Half)



Attachment 4b

Resistivity Survey Perpendicular to CL Dam



Attachment 5
Sample List (Page 1)

SAMPLE LIST FOR SOIL MECHANICS LABORATORY

STATE: TX *COUNTY:* Caldwell
SITE : Lower Plum Creek 28
PROJECT TYPE: Dam Rehab *PROGRAM (Source of Funds):*
CONTACT PERSON: Bryan Moffatt, Geologist
PHONE/ FAX: 817.233.6267

Index Tests = gradation, water content, LL, PI, Crumb, Double Hydrometer, Gs

						Tests Requested								
Lab Sample No.	*Field Sample No.*	*Description or Location*	*Depth (ft)*	*Sample Size/Type*	*Field Crumb*	*Index*	*DUW*	*Col-lapse*	*Con-sol.*	*Shear*	*Pinhole*	*Salt*	*Other Tests or Other Notes*	*Field Sample No.*
	250.1	Auxiliary	2.5'-5'	3" Push		x	x			x			Sandstone,	250.1
	250.2	Auxiliary	5'-7.5'	3" Push		x	x			x			Sandstone, grain	250.2
	250.3	Auxiliary	10'-12.5'	3" Push		x	x			x			Sandstone with	250.3
	250.4	Auxiliary	15'-17'	3" Push		x	x			x			Sandstone, Push	250.4
	250.5	Auxiliary	20'-22'	3" Push		x	x			x			Sandstone with	250.5
	250.6	Auxiliary	25'-27.5'	3" Push		x	x			x			Claystone TB to	250.6
	251.1	Auxiliary	0'-2.5'	3" Push		x	x			x			Rig sunk into	251.1
	251.2	Auxiliary	10'-12.5'	3" Push		x	x			x			Hi/weathered	251.2
	251.3	Auxiliary	20'-22.5'	3" Push		x	x			x			Non-cemented	251.3
	252.1	Auxiliary	5'-7.5'	3" Push		x	x			x			Push 5'-7.5', lost	252.1
	252.2	Auxiliary	15'-17.5'	3" Push		x	x			x			Weathered	252.2
	253.1	Auxiliary	5'-7.5'	3" Push		x	x			x			Claystone Sandston	253.1
	253.2	Auxiliary	10'-12.5'	3" Push		x	x			x			Sandstone, clayey,	253.2

Attachment 5

Sample List (Page 2)

	254.1	Auxiliary	5'-7.5'	3" Push		x	x			x			SC slight gyp	254.1
	254.2	Auxiliary	10'-12.5'	3" Push		x	x			x			SC slight gyp	254.2
	255.1	Auxiliary	5'-7.5'	3" Push		x	x			x			slight fine grained	255.1
	256.1	Auxiliary	5'-7.5'	3" Push		x	x			x			clay very sandy,	256.1
	260.1	Auxiliary	0'-2.5'	3" Push		x	x			x			Claystone, sandy	260.1
	260.2	Auxiliary	5'-7.5'	3" Push		x	x			x			Claystone, blocky,	260.2
	260.3	Auxiliary	10'-12.5'	3" Push		x	x			x			Claystone, blocky,	260.3
	260.4	Auxiliary	15'-17.5'	3" Push		x	x			x			Claystone, Breaks	260.4
	260.5	Auxiliary	20'-22.5'	3" Push		x	x			x			Claystone, Breaks	260.5
	260.6	Auxiliary	25'-27.5'	3" Push		x	x			x			Claystone, Breaks	260.6
	261.1	Auxiliary	5'-7.5'	3" Push		x	x			x			Claystone, blocky,	261.1
	261.2	Auxiliary	10'-12.5'	3" Push		x	x			x			TB to Lam	261.2
	261.3	Auxiliary	20'-22.5'	3" Push									Refusal at 22.1' No	261.3
	262.1	Auxiliary	5'-7.5'	3" Push		x	x			x			Push 5'-7.5', Rec	262.1
	262.2	Auxiliary	15'-17.5'	3" Push		x	x			x			Siltstone / Claystone	262.2
	263.1	Auxiliary	5'-7.5'	3" Push		x	x			x			Push 5'-7.5', Rec	263.1
	263.2	Auxiliary	10'-12.5'	3" Push		x	x			x			Claystone, Breaks	263.2
	264.1	Auxiliary	5'-7.5'	3" Push		x	x			x			Push 5'-7.5', Rec	264.1
	265.1	Auxiliary	5'-7.5'	3" Push		x	x			x			Push 5'-7.5', Rec	265.1
	266.1	Auxiliary	0'-2.5'	3" Push		x	x			x			Push 0'-2.5', Rec	266.1
	266.2	Auxiliary	5'-7.5'	3" Push		x	x			x			Push 5'-7.5', Rec	266.2

Attachment 5

Sample List (Page 3)

	267.1	Auxiliary	0'-2.5'	3" Push		x	x		x		Clay Alluvium,	267.1	
	267.2	Auxiliary	5'-7.5'	3" Push		x	x		x		Clay Alluvium	267.2	
		Hole location											

Lower Plum Creek Site 28
Caldwell County, Texas
Bore Hole and Sample Information
Drilled March and April 2019

Hole No.	Location	Total Depth Drilled	Date	Sample No.	Old Field Sample No	Push Tube Interval	Tube (T) Extruded (Ex)	% Recovery	SPT Interval	Blows	Small Sample Interval	Notes	Composite Large Sample Number	Composite Sample Notes	To Lab	Date	Sample to Lincoln
176	Grid A	15	4/4/2019	176.1							0' - 5'	Part of Borrow Composite Sample	Grid A, 1	Made up of 176.1, 177.1, 178.2 (2 Bags)	x	5/23/2019	
			4/4/2019	176.2							7' - 10'	Part of Borrow Composite Sample					
			4/4/2019	176.3							10' - 15'	Part of Borrow Composite Sample, 3 Bags					
177	Grid A	15	4/5/2019	177.1							0' - 3'	Part of Borrow Composite Sample	Grid A, 2	Made up of 176.2, 177.2 (2 Bags),, 178.2 (2Bags)	x	5/23/2019	
			4/5/2019	177.2							5' - 8'	Part of Borrow Composite Sample, 2 Bags					
			4/4/2019	177.3							10' - 15'	Part of Borrow Composite Sample, 2 Bags					
178	Grid A	15	4/9/2019	178.1							3' - 5'	Part of Borrow Composite Sample, 2 Bags	Grid A, 3	Made up of 176.3 (3 Bags), 177.3 (2 Bags), 178.3 (2 Bags)	x	5/23/2019	
			4/9/2019	178.2							5' - 10'	Part of Borrow Composite Sample, 2 Bags					
			4/9/2019	178.3							11' - 15'	Part of Borrow Composite Sample, 2 Bags					
179	Grid B	15	4/9/2019	179.1							0' - 3'	Part of Borrow Composite Sample	Grid B, 1	Made up of 179.1, 179.2 (2 Bags), 180.1, 180.2	x	5/23/2019	
			4/9/2019	179.2							4' - 8'	Part of Borrow Composite Sample, 2 Bags					
			4/9/2019	179.3							10' - 15'	Part of Borrow Composite Sample, 2 Bags					
180	Grid B	15	4/10/2019	180.1							2' - 5'	Part of Borrow Composite Sample	Grid B, 2	Made up of 179.3 (2 Bags), 180.3	x	5/23/2019	
			4/10/2019	180.2							6' - 10'	Part of Borrow Composite Sample					
			4/10/2019	180.3							10' - 15'	Part of Borrow Composite Sample					
181	Grid C	15	4/10/2019	181.1							3' - 5'	Part of Borrow Composite Sample	Grid C, 1	Made up of 181.1 (2 Bags), 181.2, 183.1, 182.2	x	5/23/2019	
			4/10/2019	181.2							5' - 8'	Part of Borrow Composite Sample					
			4/10/2019	181.3							10' - 15'	Part of Borrow Composite Sample					
182	Grid C	15	4/10/2019	182.1							1.5' - 4'	Part of Borrow Composite Sample	Grid C, 2	Made up of 181.3, 182.3, 183.2, 183.3	x	5/23/2019	
			4/10/2019	182.2							5' - 8'	Part of Borrow Composite Sample					
			4/10/2019	182.3							10' - 15'	Part of Borrow Composite Sample					
183	Grid C	15	4/10/2019	183.1							2' - 5'	Part of Borrow Composite Sample					
			4/10/2019	183.2							7' - 10'	Part of Borrow Composite Sample					
			4/10/2019	183.3							10' - 13'	Part of Borrow Composite Sample					
270	Outside Cut AS	15	4/10/2019	270.1							1' - 5'	Part of Borrow Composite Sample	AS 1	Made up of 270.1, 271.1 (2 Bags), 272.1	x	5/28/2019	
			4/10/2019	270.2							7' - 10'	Part of Borrow Composite Sample					
			4/10/2019	270.3		10' - 12'	T	75				Slope Stability			x	5/22/2019	6/5/2019
			4/10/2019	270.4					13.5' - 15'	6+9+8		Slope Stability			x	5/22/2019	
271	Outside Cut AS	9.5	4/10/2019	271.1							2' - 5'	Part of Borrow Composite Sample	AS 2	Made up of 270.2, 272.2, 274.1	x	5/28/2019	
			4/10/2019	271.2							5' - 8'	Part of Borrow Composite Sample					
			4/10/2019	271.3					8' - 9.5'	11+22+29		Slope Stability			x	5/22/2019	
			4/10/2019	271.4					13.5' - 15'	12+20+25		Slope Stability			x	5/22/2019	
272	Outside Cut AS	15.5	4/10/2019	272.1							2' - 5'	Part of Borrow Composite Sample	AS 3	Made up of 272.2 and 273.2	x	5/28/2019	
			4/10/2019	272.2							7' - 10	Part of Borrow Composite Sample					
			4/10/2019	272.3		13.5' - 15.5'	T	80				Slope Stability			x	5/22/2019	6/5/2019
273	Outside Cut AS	15	4/10/2019	273.1							2' - 5'	Part of Borrow Composite Sample					
			4/10/2019	273.2							10' - 13.5'	Part of Borrow Composite Sample					
			4/10/2019	273.3					13.5' - 15	14+27+33		Slope Stability			x	5/22/2019	
274	Outside Cut AS	11.5	4/10/2019	274.1							0' - 5'	Part of Borrow Composite Sample					
			4/10/2019	274.2					10' - 11.5'	8+12+13		Slope Stability			x	5/22/2019	
304	New PS	46.5	4/9/2019	304.1		5' - 7.5'	T	100				Slope Stability			x	5/22/2019	6/5/2019
			4/9/2019	304.2		10' - 12.5'	T	100				Slope Stability, Pipe Support			x	5/22/2019	6/5/2019
			4/9/2019	304.3		15' - 17.5'	T	100				Slope Stability, Pipe Support			x	5/22/2019	6/5/2019
			4/9/2019	304.4		30' - 32.5	T	100				Slope Stability			x	5/22/2019	6/5/2019
			4/9/2019	304.5		35' - 37.5'	T	75				Foundation Support			x	5/22/2019	6/5/2019
			4/9/2019	304.6					42.5' - 44'	4+9+12		Foundation Support			x	5/22/2019	
			4/9/2019	304.7					45' -46.5'	6+19+27		Foundation Support			x	5/22/2019	
305	New PS	51.5	3/20/2019	305.1		0' - 2.5'	Ex	100				Classification, 2 Bags			2 of 2	5/22/2019	
			3/20/2019	305.2		2.5' - 5'	Ex	60				Classification, 2 Bags			1 of	5/22/2019	
			3/20/2019	305.3	305.1	5' - 7.5'	T	40				Classification			x	5/22/2019	6/5/2019
			3/20/2019	305.4	305.2	7.5' - 10'	T	40				Pipe Support			x	5/22/2019	6/5/2019
			3/20/2019	305.5	305.3				10' - 11.5	2+3+7		Pipe Support			x	5/22/2019	
			3/20/2019	305.6	305.4	12.5' - 15'	Ex	100				Pipe, Impact Basin					
			3/20/2019	305.7	305.5				20' - 21.5'	10+14+19		Classification			x	5/24/2019	
			3/21/2019	305.8	305.6				28' - 29.5'	15+26+35		Classification			x	5/22/2019	
			3/21/2019	305.9	305.7				35' - 36.5'	12+17+25		Classification			x	5/22/2019	
			3/21/2019	305.10	305.8				45' - 46.5	29+42+46		Classification			x	5/22/2019	
			3/20/2019	305.11	305.9				50' - 51'	29+50 for 6"		Classification			x	5/22/2019	
601	Downstream Toe	41.5	4/2/2019	601.1		0' - 2.5'	Ex	100				Classification, 2 Bags			2 of 2	5/22/2019	
			4/2/2019	601.2		2.5' - 5'	Ex	100				Classification, 2 Bags			2 of 2	5/24/2019	
			4/2/2019	601.3	601.1	5' - 7.5'	T	100				Toe Drain, Foundation Support			x	5/22/2019	6/5/2019
			4/2/2019	601.4	601.2	7.5' - 10'	T	100				Toe Drain, Foundation Support			x	5/22/2019	6/5/2019
			4/2/2019	601.5		10' - 12.5'	Ex	100				Classification, 2 Bags			2 of 2	5/24/2019	
			4/2/2019	601.6		15' - 17.5'	Ex	100				Classification, 2 Bags			2 of 2	5/24/2019	
			4/2/2019	601.7	601.3				20' - 21.5'	4+6+11		Classification			x	5/24/2019	
			4/2/2019	601.8	601.4				25' - 26.5'	4+13+20		Classification			x	5/24/2019	
			4/2/2019	601.9	601.5				30' - 31.5'	14+22+27		Classification			x	5/24/2019	
			4/2/2019	601.10	601.6				35' - 36.5'	11+22+30		Classification			x	5/24/2019	

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			4/2/2019	601.11	601.7				40' - 41.5'	18+28+34	Classification	x	5/24/2019	
602	Downstream Toe	41.5	4/1/2019	602.1		0' - 2.5'	Ex	100			Classification, 2 Bags	2 of 2	5/24/2019	
			4/1/2019	602.2		2.5' - 5'	Ex	100			Classification, 2 Bags	2 of 2	5/24/2019	
			4/1/2019	602.3	602.1	5' - 7.5'	T	100			Toe Drain, Foundation Support	x	5/22/2019	6/5/2019
			4/1/2019	602.4	602.2	7.5' - 10'	T	100			Toe Drain, Foundation Support	x	5/22/2019	6/5/2019
			4/1/2019	602.5		10' - 12.5'	Ex	100			Classification, 2 Bags	2 of 2	5/24/2019	
			4/1/2019	602.6		15' - 17.5'	Ex	100			Classification, 2 Bags	2 of 2	5/24/2019	
			4/1/2019	602.7	602.3				20' - 21.5'	9+29+33	Classification	x	5/24/2019	
			4/2/2019	602.8	602.4				25' - 26.5'	5+7+12	Classification	x	5/24/2019	
			4/2/2019	602.9	602.5				30' - 31.5'	15+22+30	Classification	x	5/24/2019	
			4/2/2019	602.10	602.6				35' - 36.5'	17+22+25	Classification	x	5/24/2019	
			4/2/2019	602.11	602.7				40' - 41.5'	12+43+50 for 3"	Classification	x	5/24/2019	
603	Downstream Toe	41.5	4/1/2019	603.1		0' - 2.5'	Ex	100			Classification, 2 Bags	2 of 2	5/22/2019	
			4/1/2019	603.2		2.5' - 5'	Ex	100			Classification, 2 Bags	2 of 2	5/22/2019	
			4/1/2019	603.3	603.1	5' - 7.5'	T	100			Toe Drain, Foundation Support	x	5/22/2019	6/5/2019
			4/1/2019	603.4	603.2	7.5' - 10'	T	100			Toe Drain, Foundation Support	x	5/22/2019	6/5/2019
			4/1/2019	603.5		10' - 12.5'	Ex	100			Classification, 2 Bags	2 of 2	5/22/2019	
			4/1/2019	603.6		15' - 17.5'	Ex	100			Classification, 2 Bags	2 of 2	5/22/2019	
			4/1/2019	603.7	603.3				20' - 21.5'	7+9+12	Classification	x	5/22/2019	
			4/1/2019	603.8	603.4				25' - 26.5'	4+9+20	Classification	x	5/22/2019	
			4/1/2019	603.9	603.5				30' - 31.5'	15+22+36	Classification	x	5/22/2019	
			4/1/2019	603.10	603.6				35' - 36.5'	19+39+50 for 5.75"	Classification	x	5/22/2019	
			4/1/2019	603.11	603.7				40' - 41.5'	20+21+50 for 4"	Classification	x	5/22/2019	
604	Downstream Toe	41.5	3/28/2019	604.1		0' - 2.5'	Ex	60			Classification	1 of	5/23/2019	
			3/28/2019	604.2		2.5' - 5'	Ex	80			Classification, 2 Bags	2 of 2	5/22/2019	
			3/28/2019	604.3	604.1	5' - 7.5'	T	40			Toe Drain, Foundation Support	x	5/22/2019	6/5/2019
			3/28/2019	604.4	604.2	7.5' - 10'	T	100			Toe Drain, Foundation Support	x	5/22/2019	6/5/2019
			3/28/2019	604.5		10' - 12.5'	Ex	100			Classification, 2 Bags	2 of 2	5/23/2019	
			3/28/2019	604.6	604.3				15' - 16.5'	6+9+14	Classification	x	5/24/2019	
			3/28/2019	604.7		20' - 22.5'		90			Classification, 2 Bags	1 of	5/22/2019	
			3/28/2019	604.8	604.4				25' - 26.5'	22+36+43	Classification	x	5/22/2019	
			3/28/2019	604.9	604.5				30' - 31.5'	12+30+36	Classification	x	5/22/2019	
			3/28/2019	604.10	604.6				35' - 36.5'	50 for 6"	Lignite, Classification	x	5/22/2019	
			3/28/2019	604.11	604.7				40' - 41.5'	21+32+41	Classification	x	5/24/2019	
605	Downstream Toe	41.5	3/27/2019	605.1		0' - 2.5'	Ex	70			Classification, 2 Bags	2 of 2	5/23/2019	
			3/27/2019	605.2		2.5' - 5'	Ex	70			Classification, 2 Bags	2 of 2	5/23/2019	
			3/27/2019	605.3	605.1	5' - 7.5'	T	75			Toe Drain, Foundation Support	x	5/22/2019	6/5/2019
			3/27/2019	605.4	605.2	7.5' - 10'	T	100			Toe Drain, Foundation Support	x	5/22/2019	6/5/2019
			3/27/2019	605.5		10' - 12.5'	Ex	80			Classification, 2 Bags	2 of 2	5/23-24/2019	
			3/27/2019	605.6		15' - 17.5'	Ex	55			Classification, 2 Bags	2 of 2	5/23/2019	
			3/27/2019	605.7		20' - 22.5'	Ex	80			Classification, 2 Bags	2 of 2	5/23/2019	
			3/27/2019	605.8					25' - 26.5'	12+24+50 for 6"	Classification	x	5/22/2019	
			3/27/2019	605.9					30' - 31.5	22+31+40	Classification	x	5/22/2019	
			3/27/2019	605.10					35' - 36.5'	15+25+50 for 5.5"	Classification	x	5/22/2019	
606	Downstream Toe	40.5	3/27/2019	606.1		0' - 2.5'	Ex	30			Classification			
			3/27/2019	606.2		2.5' - 5'	Ex	35			Classification	1 of	5/22/2019	
			3/27/2019	606.3	606.1	5' - 7.5'	T	100			Toe Drain, Foundation Support	x	5/22/2019	6/5/2019
			3/27/2019	606.4	606.2	7.5' - 10'	T	100			Toe Drain, Foundation Support	x	5/22/2019	6/5/2019
			3/27/2019	606.5		10' - 12.5'	Ex	90			Classification, 2 Bags	2 of 2	5/22/2019	
			3/27/2019	606.6		15' - 17.5'	Ex	80			Classification, 2 Bags	2 of 2	5/22/2019	
			3/27/2019	606.7		20' - 22.5'	Ex	65			Classification, 2 Bags	2 of 2	5/22/2019	
			3/27/2019	606.8					25' - 26.5'	5+8+12	Classification	x	5/22/2019	
			3/27/2019	606.9					30' - 31.5'	17+26+27	Classification	x	5/22/2019	
			3/27/2019	606.10					35' - 36.5'	23+30+50 for 6"	Classification	x	5/22/2019	
			3/27/2019	606.11					40' - 41.5	50 for 6"	Classification	x	5/22/2019	
607	Downstream Toe	41.5	3/21/2019	607.1		5' - 7.5'	T	100			Toe Drain, Foundation Support	x	5/22/2019	6/5/2019
			3/21/2019	607.2		7.5' - 10'	T	100			Toe Drain, Foundation Support	x	5/22/2019	6/5/2019
			3/21/2019	607.3		10' - 12.5'	Ex	100			Classification, 2 Bags	2 of 2	5/22/2019	
			3/21/2019	607.4		15' - 17.5'	Ex	100			Classification, 2 Bags	2 of 2	5/22/2019	
			3/21/2019	607.5		20' - 22.5'	Ex	100			Classification, 2 Bags	2 of 2	5/22/2019	
			3/21/2019	607.6	607.3				25' - 26.5'	12+15+21	Classification	x	5/22/2019	
			3/21/2019	607.7	607.4				30' - 31.5'	30+43+39	Classification	x	5/22/2019	
			3/21/2019	607.8					35' - 36.5'	12+35+50 fo 5"	Classification	x	5/22/2019	
			3/21/2019	607.9					40' - 41.5'	29+50 for 6"	Classification	x	5/22/2019	
608	Downstream Toe	41.5	3/19/2019	608.1		0' - 2.5'	Ex	60			Classification, 2 Bags	2 of 2	5/22/2019	
			3/19/2019	608.2		2.5' - 5'	Ex	60			Classification, 2 Bags	1 of	5/22/2019	
			3/19/2019	608.3	608.1	5' - 7.5'	T	100			Classification, 2 Bags	x	5/22/2019	6/5/2019
			3/19/2019	608.4	608.2	7.5' - 10'	T	100			Classification, 2 Bags	x	5/22/2019	6/5/2019
			3/19/2019	608.5		10' - 12.5'	Ex	100			Classification, 2 Bags	2 of 2	5/22/2019	
			3/19/2019	608.6		12.5' - 15'	Ex	100			Classification, 2 Bags	2 of 2	5/22/2019	
			3/19/2019	608.7		15' - 17.5'	Ex	100			Classification, 2 Bags	2 of 2	5/22/2019	
			3/19/2019	608.8		20' - 22.5'	Ex	100			Classification, 2 Bags	2 of 2	5/22/2019	
			3/19/2019	608.9		25' - 27.5'	Ex	60			Classification, 2 Bags	1 of	5/22/2019	
			3/19/2019	608.10					35' - 36.5	18+32+50 for 5"	Classification	x	5/22/2019	
			3/19/2019	608.11					40' - 41.5'	4.5" for 50	Classification	x	5/22/2019	
609	Downstream Toe	41.5	3/19/2019	609.1		0' - 2.5'	Ex	100			Classification, 2 Bags	2 of 2	5/22/2019	
			3/19/2019	609.2		2.5' - 5'	Ex	20			Classification	x	5/22/2019	
			3/19/2019	609.3	609.1	5' - 7.5'	T	100			Toe Drain, Foundation Support	x	5/22/2019	6/5/2019
			3/19/2019	609.4	609.2	7.5' - 10'	T	100			Toe Drain, Foundation Support	x	5/22/2019	6/5/2019
			3/19/2019	609.5		10' - 12.5'	Ex	100			Classification, 2 Bags	2 of 2	5/22/2019	
			3/19/2019	609.6		12.5' - 15'	Ex	100			Classification, 2 Bags	2 of 2	5/22/2019	
			3/19/2019	609.7		22.5' - 25'	Ex	10			Classification	x	5/22/2019	

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		3/19/2019	609.8		30' - 32.5	Ex	50				Classification			x	5/22/2019				
		3/19/2019	609.9		35' - 37.5	Ex	40				Classification			x	5/22/2019				
		3/19/2019	609.10					40' - 40.25'	4" for 50		Lignite			x	5/22/2019				
610	Downstream Toe	41.5	3/18/2019	610.1							Classification, 2 Bags			2 of 2	5/22/2019				
			3/18/2019	610.2	0' - 2.5'	Ex	100				Classification			x	5/22/2019				
			3/18/2019	610.3	2.5' - 5'	Ex	40				Classification			x	5/22/2019	6/5/2019			
					610.1	5' - 7.5'	T	100				Toe Drain, Foundation Support								
			3/18/2019		7.5' - 10'	NA	0				No Recovery								
			3/18/2019	610.4	610.2	10' - 12.5'	T	75				Toe Drain, Foundation Support			x	5/22/2019	6/5/2019		
			3/18/2019	610.5		12.5' - 15'	Ex	100				Classification, 2 Bags			2 of 2	5/22/2019			
			3/18/2019	610.6		15' - 17.5'	Ex	100				Classification, 2 Bags			2 of 2	5/22/2019			
			3/18/2019	610.7		20' - 22.5'	Ex	100				Classification, 2 Bags			2 of 2	5/22/2019			
			3/18/2019	610.8		30' - 30.25'	Ex	13				Lignite, Push 30' - 32.5' Refusal at 30.25'							
			3/18/2019	610.9					35' - 36.5'	17+32+47		Classification, Lignitic Clay			x	5/22/2019			
			3/19/2019	610.10					40' - 40.25'	4" for 50		Classification							
611	Downstream Toe	41.5	3/19/2019	611.1								Classification			x	5/22/2019			
			3/19/2019		0' - 2.5'	Ex	35					No Recovery							
			3/19/2019		2.5' - 5'		0				2.5' - 5'	Ream Sample from 2.5' - 5' push			x	5/22/2019			
			3/19/2019	611.2								Push Sample with SPT Tube			x	5/22/2019			
			3/19/2019	611.3	611.1	5' - 7'	NA	100				Toe Drain, Foundation Support			x	5/22/2019	6/5/2019		
			3/19/2019	611.4	611.2	7.5' - 10'	T	100				Toe Drain, Foundation Support			x	5/22/2019	6/5/2019		
			3/19/2019	611.5	611.3	10' - 12.5'	T	100				Toe Drain, Foundation Support			x	5/22/2019	6/5/2019		
			3/19/2019	611.6		15' - 17.5'	Ex	100				Classification, 2 Bags			2 of 2	5/22/2019			
			3/19/2019	611.7		17.5' - 20'	Ex	100				Classification, 2 Bags			2 of 2	5/22/2019			
			3/19/2019	611.8		22.5' - 24.5'	Ex	100				Push 22.5' - 25', refusal at 24.5'			x	5/22/2019			
			3/19/2019	611.9					40' - 41.5'	13+21+32		Classification, Lignitic Clay			x	5/22/2019			
701	Upstream Toe	36.5	4/3/2019	701.1	0' - 2.5'	Ex	100					Classification, 2 Bags			2 of 2	5/22/2019			
			4/3/2019	701.2	2.5' - 5'	Ex	100					Classification, 2 Bags			2 of 2	5/22/2019			
			4/3/2019	701.3	701.1	5' - 7.5'	T	100				Foundation Support			x	5/22/2019	6/5/2019		
			4/3/2019	701.4	701.2	7.5' - 10'	T	100				Foundation Support			x	5/22/2019	6/5/2019		
			4/3/2019	701.5		10' - 12.5'	Ex	100				Classification, 2 Bags			2 of 2	5/22/2019			
			4/3/2019	701.6	701.3				15' - 16.5'	6+10+16		Classification			x	5/22/2019			
			4/3/2019	701.7	701.4				20' - 21.5'	4+9+12		Classification			x	5/22/2019			
			4/3/2019	701.8	701.5				25' - 26.5	6+9+12		Classification			x	5/22/2019			
			4/3/2019	701.9	701.6				30' - 31.5'	13+20+25		Classification			x	5/22/2019			
			4/3/2019	701.10	701.7				35' - 36.5'	15+23+29		Classification			x	5/22/2019			
702	Upstream Toe	22.5	4/3/2019	702.1	0' - 2.5'	Ex	65					Classification, 2 Bags			2 of 2	5/24/2019			
			4/3/2019	702.2	2.5' - 5'	Ex	75					Classification, 2 Bags			2 of 2	5/24/2019			
			4/4/2019	702.3	5' - 7.5'	T	100					Foundation Support			x	5/22/2019	6/5/2019		
			4/4/2019	702.4	7.5' - 10'	T	100					Foundation Support			x	5/22/2019	6/5/2019		
			4/4/2019	702.5	10' - 12.5'	Ex	100					Classification, 2 Bags			2 of 2	5/24/2019			
			4/4/2019	702.6	15' - 17.5'	Ex	100					Classification, 2 Bags			2 of 2	5/24/2019			
			4/4/2019	702.7	20' - 22.5'	Ex	100					Classification, 2 Bags			2 of 2	5/24/2019			
703	Upstream Toe	22.5	4/4/2019	703.1	0' - 2.5'	Ex	100					Classification, 2 Bags			2 of 2	5/24/2019			
			4/4/2019	703.2	2.5' - 5'	Ex	100					Classification, 2 Bags			2 of 2	5/24/2019			
			4/4/2019	703.3	703.1	5' - 7.5'	T	100				Foundation Support			x	5/22/2019	6/5/2019		
			4/4/2019	703.4	703.2	7.5' - 10'	T	100				Foundation Support			x	5/22/2019	6/5/2019		
			4/4/2019	703.5		10' - 12.5'	Ex	100				Classification, 2 Bags			2 of 2	5/24/2019			
			4/4/2019	703.6		15' - 17.5'	Ex	100				Classification, 2 Bags			2 of 2	5/24/2019			
			4/4/2019	703.7		20' - 21.5'	Ex	100				Classification, 2 Bags			2 of 2	5/24/2019			
704	Upstream Toe	21.5	4/4/2019	704.1	0' - 2.5'	Ex	40					Classification, 2 Bags			1 of	5/24/2019			
			4/4/2019	704.2	2.5' - 5'	Ex	80					Classification, 2 Bags			2 of 2	5/24/2019	6/5/2019		
			4/4/2019	704.3	704.1	5' - 7.5'	T	100				Foundation Support			x	5/22/2019	6/5/2019		
			4/4/2019	704.4	704.2	7.5' - 10'	T	100				Foundation Support			x	5/22/2019	6/5/2019		
			4/4/2019	704.5		10' - 12.5'	Ex	100				Classification, 2 Bags			2 of 2	5/24/2019			
			4/4/2019	704.6		15' - 17.5'	Ex	100				Classification, 2 Bags			2 of 2	5/24/2019			
			4/4/2019	704.7	704.3				20' - 21.5'	17+20+30		Classification			x	5/24/2019			
705	Upstream Toe	21.5	4/4/2019	705.1	0' - 2.5'	Ex	70					Classification, 2 Bags			2 of 2	5/24/2019			
			4/4/2019	705.2	2.5' - 5'	Ex	75					Classification, 2 Bags			2 of 2	5/24/2019			
			4/4/2019	705.3	705.1	5' - 7.5'	T	65				Foundation Support			x	5/22/2019	6/5/2019		
			4/4/2019	705.4	705.2	7.5' - 10'	T	100				Foundation Support			x	5/22/2019	6/5/2019		
			4/4/2019	705.5	705.3				10' - 11.5'	6+9+13		Foundation Support			x	5/24/2019			
			4/4/2019	705.6		15' - 17.5'	Ex	100				Classification, 2 Bags			1 of	5/24/2019			
			4/4/2019	705.7	705.4				20' - 21.5'	16+23+36		Classification			x	5/24/2019			
706	Upstream Toe	37.5	4/2/2019	706.1	0' - 2.5'	Ex	80					Classification, 2 Bags			2 of 2	5/24/2019			
			4/2/2019	706.2	2.5' - 5'	Ex	100					Classification, 2 Bags			2 of 2	5/24/2019			
			4/2/2019	706.3	706.1	5' - 7.5'	T	90				Foundation Support			x	5/22/2019	6/5/2019		
			4/2/2019	706.4	706.2	7.5' - 10'	T					Foundation Support			x	5/22/2019	6/5/2019		
			4/3/2019	706.5		10' - 12.5'	Ex	100				Classification, 2 Bags			2 of 2	5/24/2019			
			4/3/2019	706.6		15' - 17.5'	Ex	100				Classification, 2 Bags			2 of 2	5/24/2019			
?			4/3/2019	706.7		20' - 22.5'	Ex	100				Classification, 2 Bags			2 of 2	5/24/2019			
			4/3/2019	706.8		25' - 27.5'	Ex	100				Classification, 2 Bags			2 of 2	5/24/2019			
			4/3/2019	706.9		30' - 32.5'	Ex	100				Classification, 2 Bags			2 of 2	5/24/2019			
			4/3/2019	706.10		35' - 37.5'	Ex	80				Refusal @ 37', Classification, 2 Bags							
	Total Footage	879.5																	

Attachment 5

Sample List (Page 7)

SAMPLE LIST FOR SOIL MECHANICS LABORATORY

STATE: TX COUNTY: Caldwell

SITE : Plum Creek Site12 (Flood Control

PROJECT TYPE: Rehab PROGRAM (Source of Funds):

CONTACT PERSON: Bryan S. Moffatt

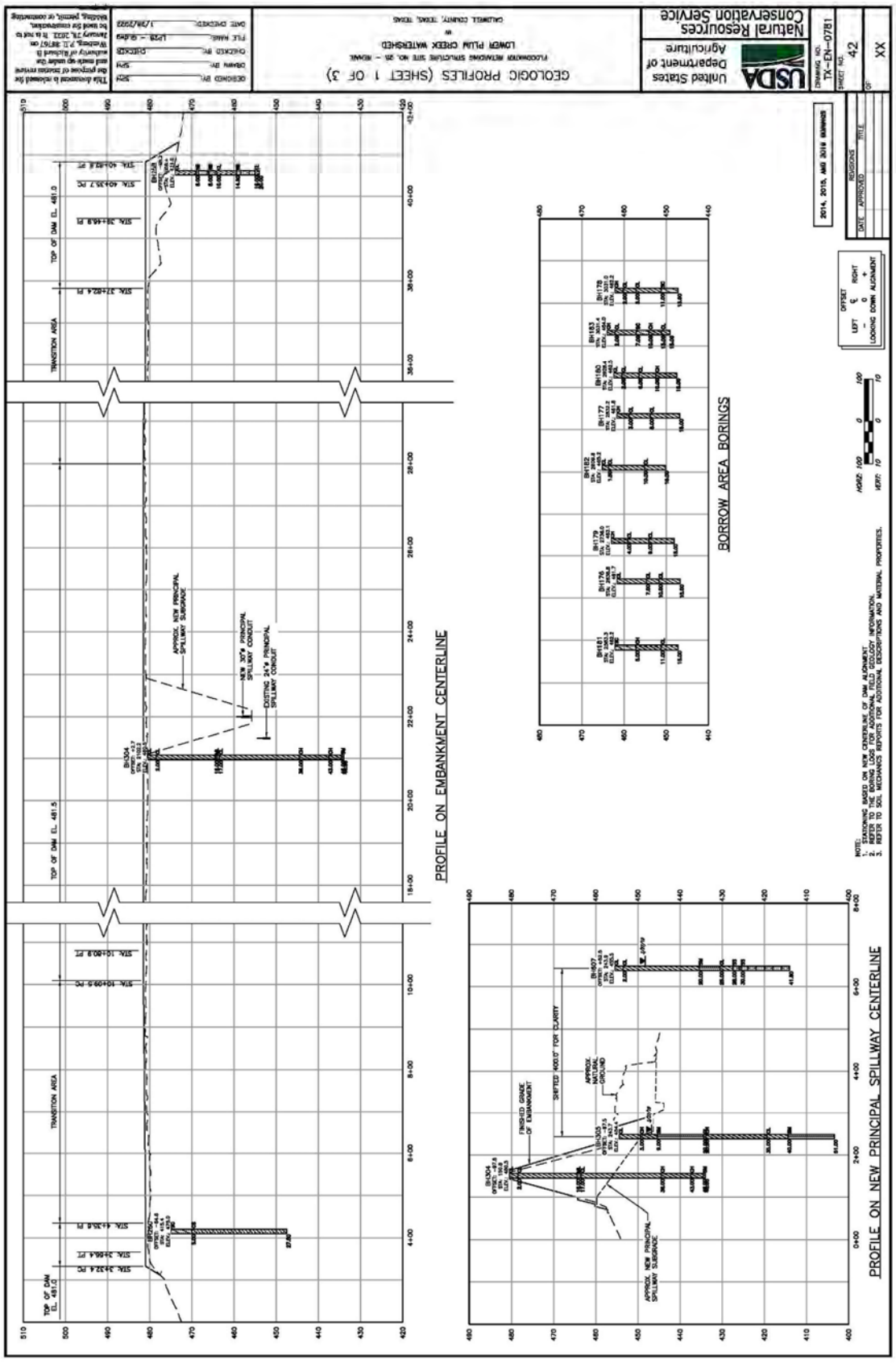
PHONE/ FAX: 817.233.6268

Index Tests = gradation, water content, LL, PI, Crumb, Double Hydrometer, Gs

						Tests Requested										
Lab Sample No.	Field Sample No.	Description or Location	Depth (ft)	Sample Size/Type	Field Crumb	Index	DUW	Col-lapse	Con-sol.	Shear	Pinhole	Salt	Gypsum	Perm	Other Tests or Other Notes	Field Sample No.
	Grid A, 1	Borrow Grid A		Large		x			x						Made up of 176.1,	Grid A, 1
	Grid A, 2	Borrow Grid A		Large		x			x						Made up of 176.2,	Grid A, 2
	Grid A, 3	Borrow Grid A		Large		x			x						Made up of 176.3	Grid A, 3
	Grid B, 1	Borrow Grid B		Large		x			x						Made up of 179.1,	Grid B, 1
	Grid B, 2	Borrow Grid B		Large		x			x						Made up of 179.3	Grid B, 2
	Grid C, 1	Borrow Grid C		Large		x			x						Made up of 181.1	Grid C, 1
	Grid C, 2	Borrow Grid C		Large		x			x						Made up of 181.3,	Grid C, 2
	AS 1	Outside Cut		Large		x			x						Made up of 270.1,	AS 1
	AS 2	Outside Cut		Large		x			x						Made up of 270.2,	AS 2
	AS 3	Outside Cut		Large		x			x						Made up of 272.2,	AS 3

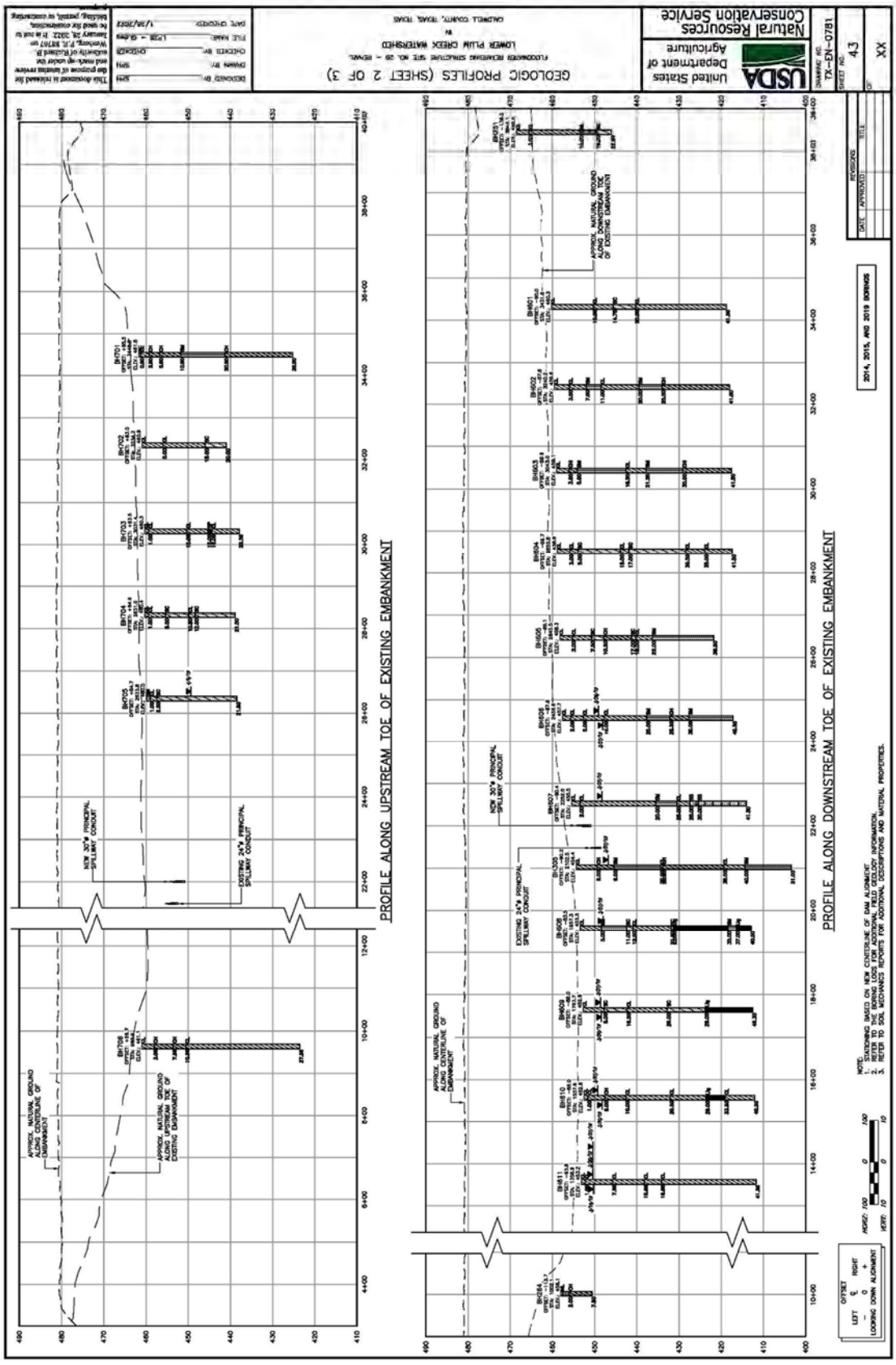
Attachment 7

Geologic Profiles



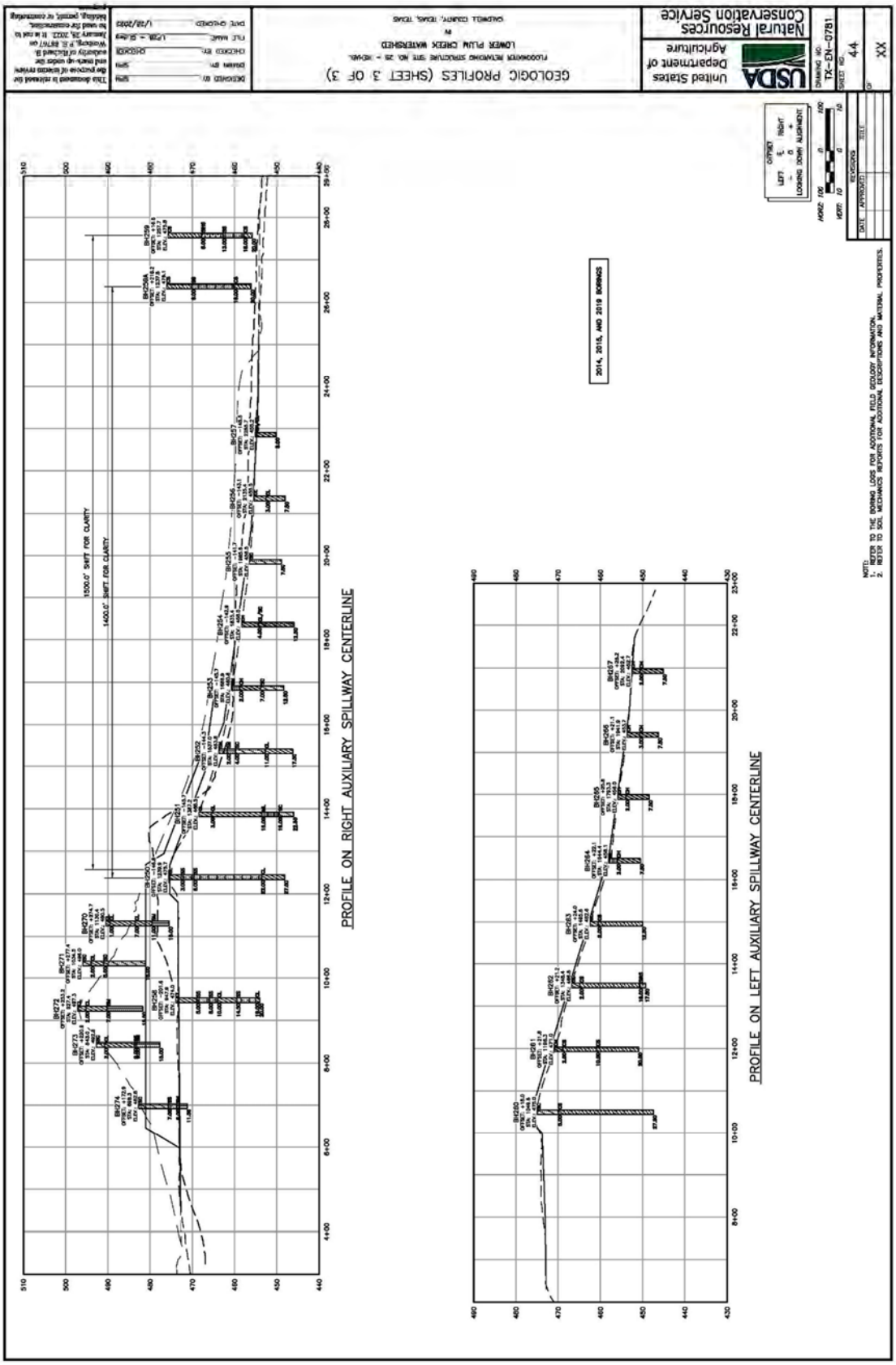
Attachment 7

Geologic Profiles



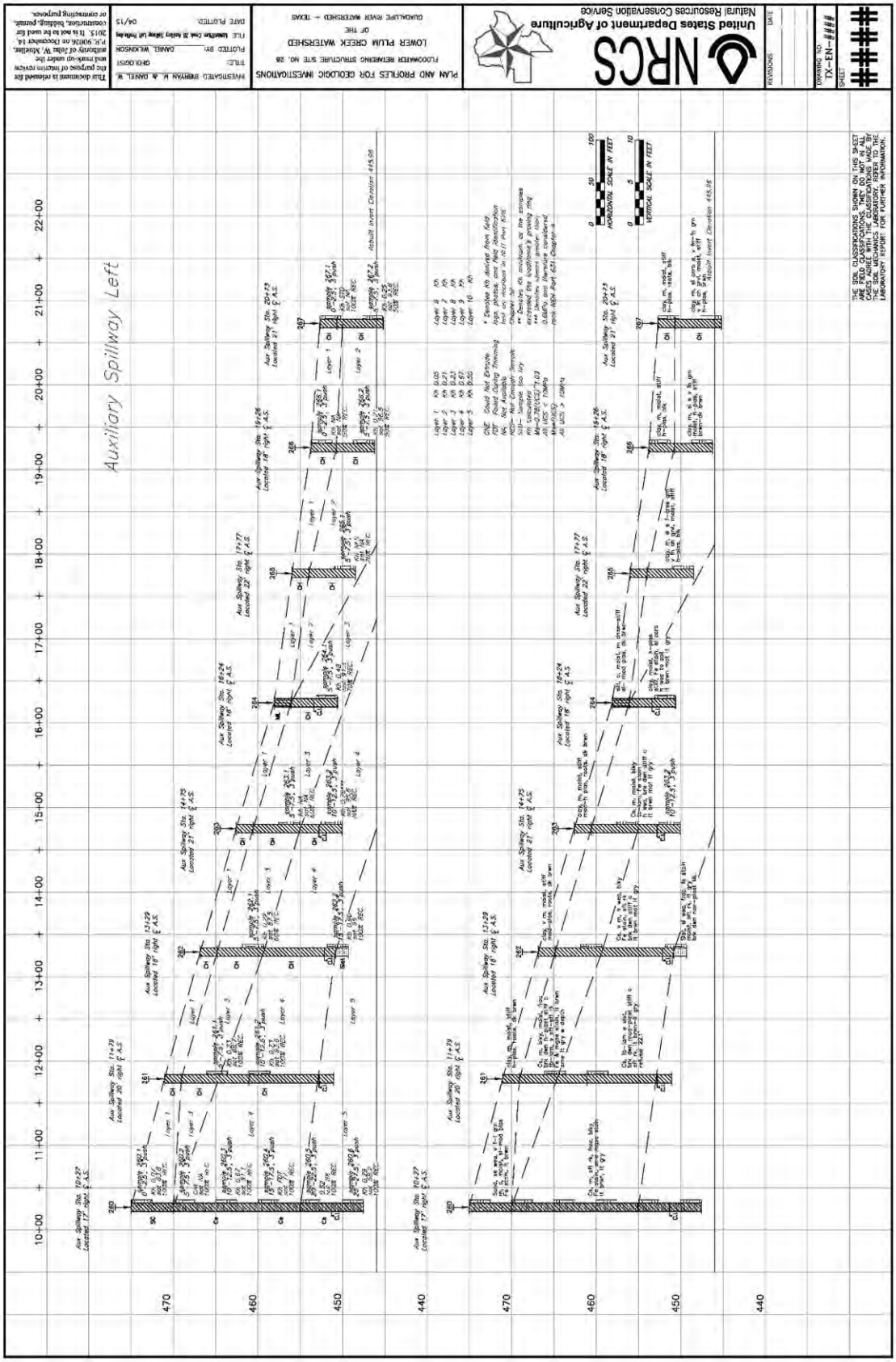
Attachment 7

Geologic Profiles



Attachment 7

Geologic Profiles, Left Auxiliary Spillway



Attachment 7

Geologic Profiles, Right Auxiliary Spillway