United States Department of Agriculture



Natural Resources Conservation Service Geological Services Unit 501 Felix, Bldg. 49S Fort Worth, Texas 76115



April 28, 2014

Geology Report, Plum Creek Site 6, Hays County, Texas Subject:

To: John Mueller, State Conservation Engineer, Temple, Texas

During the month of August 2010, William York, Geologist, Fort Worth, Texas and Daniel Wilkinson, Physical Science Technician, Fort Worth, Texas performed a Geological Investigation of Plum Creek Site 6, Hays County, Texas. Additional work was performed by Bryan S. Moffatt, Geologist and Daniel Wilkinson August and September 2010. The purpose of the investigation was to acquire data for rehabilitation of the site. The following report is a reconstituted summary of the investigation due to the departure of William York from the Agency.

General Data

Watershed:	Guadalupe River
Sub-watershed:	Plum Creek (Porter Creek)
County:	Hays
State:	Texas
Location:	3 miles E and 1 mi. N of Kyle, Texas
	N 30.002337 W -97.822603
Structure Class:	High Hazard
Type of Equipment:	Simco Power Auger
Investigated by:	William York, Bryan Moffatt, Daniel Wilkinson

Site Data

Drainage Area:	5,376 acres (as-built 03/16/1966)
Type of Structure:	Earthen
Purpose:	Flood Retarding
Direction of Valley:	North – South
Sediment Storage Acre/Ft:	896 (as-built 03/16/1966)
Floodwater Storage Acre/Ft:	2,867 (as-built 03/16/1966)
Volume of Fill:	203,540 yds3
Height of Dam:	40ft (as-built 03/16/1966)
Length of Dam:	2,923ft (Sta. 10+17 CL Dam to Sta. 39+40 CL Dam
Top of Dam (effective)	642.5ft (as-built 03/16/1966)
Upstream Embankment Slope:	2.5H to 1V
Downstream Embankment Slope:	2.5H to 1V
Principal Spillway Crest:	638.5ft (as-built 03/16/1966)

The Natural Resources Conservation Service provides leadership in a partnership effort to help people conserve, maintain, and improve our natural resources and environment.

Pipe Invert: Auxiliary Spillway Location: Width Auxiliary Spillway: Auxiliary Spillway Crest: Auxiliary Spillway Capacity, ft³/sec: 607.55ft Sta.3+75 PS (as-built 03/16/1966) Left Abutment 350ft 638.5ft 6257 (as-built 03/16/1966)

Surface Geology and Physiography

Physiographic Description: Mineral Land Unit: Topography: Physical Properties:

Attitude of Beds (Regional):

Blackland Prairie C-1 Expansive Clay Flat to Gently Rolling Prairie Low Slope Stability, Low Foundation Strength, Highly Plastic and Expansive Clays, High Corrosion Potential Strike: Approximately N 24° E Dip: 0.5° N 114° E

General Geology

Two horizons are present within the Plum Creek Site 6 location. The horizons consist of Upper Cretaceous Pecan gap (Kpg) and Recent Quaternary Alluvium (Qal).

Pecan Gap

The claystone of the Kpg occurs at depth throughout the site. It outcrops on both abutments and the outside cut and floor of the Auxiliary Spillway. The Kpg is generally described as very soft rock (hard soil-like material on outcrop), silty, thinly bedded to laminated claystone. The material is light brown mottled gray when weathered and dark gray when slight to non-weathered. Iron stained and gypsum filled fractures and a few carbonate concretions are present.

Quaternary Alluvium

Qal material outcrops in the Plunge Basin, along portions of the Downstream Toe of the Dam and the Exit Slope of the Auxiliary Spillway. The material is generally composed of two broad horizons. The upper horizon is generally described as silty, stiff, highly plastic brown clay, CH. The lower horizon is generally described as stiff, highly plastic, silty clay with some fine to coarse grain sand and gravel CH. The lower horizon by Gamma Log analyses and drilling characteristics indicates some thin streaks of GC to GM material may be present.

Seismic

Probabilistic ground motion values as measured by %g for this site indicates low seismicity (Note: the term "low" is used as a descriptive term and not a classification term). The attached Texas Seismic Hazard Map and Deaggregation plots (USGS) indicate the main seismic contribution to the site is from magnitude 4 to 6 earthquakes within a 200 km radius of the site. Additional contributions are from 5.5 to 7.0 magnitude earthquakes in a 500 km radius (Meers Fault north of Lawton OK and Rio Grande Rift Zone Trans-Pecos Texas Northern Mexico) and 7.5 to 8.0 magnitude earthquakes 900 plus km away. Peak Horizontal Ground Acceleration at this site is 0.03177, 0.04956 and 0.07580 g with a Mean Return Time of 2475, 4950 and 9950 years with an Annual Exceedance Rate of 0.405×10^{-3} , 0.202×10^{-3} and 0.101×10^{-3} . respectively (Values from USGS Earthquake Hazard Custom Mapping and Analysis Tools, <u>http://earthquake.usgs.gov/hazards/apps/#deaggint</u>. Mw verses distance liquefaction plots verses the Papadopoulos and Lefkopoulos e – e' curve indicate "low" potential for occurrence of liquefaction. Further, as outlined in FEMA 65, Section IV Part 3.C.a:

- Dam and foundation materials are not subject to liquefaction and do not include loose soils or sensitive clays.
- Embankment was built with a minimum dry density, percent of field density test, maximum dry density of 85
- Phreatic Line is "well" below the slope of the embankment (projected from water levels Hole 301, 802 and lake level at time of drilling.
- Maximum peak ground acceleration at the base of the embankment is less than 0.2g (site 0.07580g, Exceedance Rate 0.101x10⁻³, Mean Return Time 9,900 years).
- Freeboard of the embankment is greater than 3% to 5% embankment height and greater than 3 feet. Embankment height 40 feet, freeboard TOD 643.4 PS Crest 626.4 = 17 feet or 42.5%. (Data from as-built 03/18/1966)

General

Background

Construction of Plum Creek 6 was completed on 03/01/1967 (as-built 03/18/1966). The structure is located on Porter Creek. Porter Creek flows into the Bunton Branch 2.6 miles south southeast of the site. Bunton Branch flows into Plum Creek 0.48 miles further southeast.

The structure was built as a "low" hazard classification and has been reclassified to "high". County Road 157, Goforth Road, is parallel and downstream of the dam's alignment, crosses between the Principal Spillway pipe and toe of the structure and crosses the exit slope of the Auxiliary Spillway at an angle. Several small businesses are on the southwest side of Goforth Road downstream of the dam.

There are several homes built along the downstream toe of the dam beginning at approximately Sta. 26+00 CL Dam 70' DS and continuing to the right abutment. A quadplex is located downstream near Sta. 31+50 CL Dam. The septic system for this dwelling is at or on the toe of the dam beginning at approximately Sta. 29+15 CL Dam 63' DS and ending at approximately Sta. 30+30 CL Dam 63' DS. Several homes and outbuildings are built northwest of the permanent pool area. Some of these structures appear by visual observation to be built within the flood pool.

Centerline of the Dam

No holes were drilled along the Centerline of the Dam during the 2010 investigation.

Auxiliary Spillway

Six holes were drilled along the inside cut of the Auxiliary Spillway for erodibility. Nine samples were taken within the Auxiliary Spillway. A list of the samples taken is outlined in the following table:

Hole	Depth	Туре	Description Remarks
201	0' – 2'	3" Push	CH Topsoil and CS, hi/wea, breaks down to hi/pl clay CH
201	10' – 11'	3" Push	CS, fe stain and gyp, hi/wea, breaks down to hi/pl clay CH
201	30' - 35'	Small	CS gyp filled frac, sl-non/wea, breaks down to hi/pl clay CH
202	5' – 7'	3" Push	CS gyp filled frac, hi/wea, breaks down to hi/pl clay CH
202	10' – 11'	3" Push	CS gyp, frac, hi/wea, breaks down to hi/pl clay CH, refusal 11'
202	15' – 16'	3" Push	CS gyp, frac, hi/wea, breaks down to hi/pl clay CH, refusal 16'
202	19' – 20'	Small	CS gyp filled frac, hi/wea, breaks down to hi/pl clay CH, fe stain
202	20' - 20.5	5'3" Push	CS gyp, frac, wea, breaks down to hi/pl clay CH, refusal 20.5'
203	17' – 19'	Small	CS gyp filled frac, hi/wea, breaks down to hi/pl clay CH, fe stain
203	24' – 25'	Small	CS gyp filled frac, hi/wea, breaks down to hi/pl clay CH, fe stain

A Labyrinth Weir over the crest of the dam is planned to replace the Auxiliary Spillway. This design change requires plugging of the existing Auxiliary Spillway in favor of a structural spillway located on the embankment negates the erodibility assessment normally provided for.

Preliminary material characterization indicated very weak to weak material existed to a depth of approximately 10 feet in the control section with the material then becoming stronger with depth. It also appears all the material may be extremely sensitive to water and may be more erosive than might be expected of a soil of this type. Any assessment would have required sensitivity analyses utilizing SITES with results yielding a high probability that engineered structural measures may be necessary to control erosion.

Principal Spillway

Two holes were drilled to investigate design for a new Principal Spillway pipe and Impact Basin. A list of the samples taken is outlined in the following table:

Hole	DepthType	Description Remarks
301	14' – 16' 5" Push	Clay, silty, sl/fine grain gravel, hi/pl, sat., CH
	7' – 8.5' 3" Push	Clay, silty, sl/fine grain gravel, hi/pl, sat., CH

The existing Principal Spillway pipe is to be filled with grout and replaced with a new 42" diameter pipe and a new intake tower constructed. In Hole 301 and 802 on the Downstream Toe there is 15ft to 16ft of CH, slight gravel alluvial material on top of weathered claystone. The alluvial material was removed to weathered claystone and replaced with compacted fill at the core trench under the current spillway. Under the slopes of the dam, the pipe is placed within CH alluvial material and compacted fill. The procedure to remove and replace material to claystone

at the centerline of the dam and thru alluvial CH under the slopes of the dam provided an adequate foundation with desired support for the existing pipe.

Toe Drain

11 holes were drilled to investigate placement of a Toe Drain. All the holes were drilled to nonweathered claystone to project core trench material removed during original construction and investigate potential water movement thru fractures. Recovery tests from holes 801 and 803 indicate permeability between 0.001799 to 0.004126 ft/day. Water levels ranged from 1.5ft (hole 802) to 9.1ft (hole 807) on 08/13/10. Holes 808 – 811 encountered no water during drilling operations in August 2010.

A profile of the downstream toe was constructed. The profile indicates that there is a secondary buried alluvial channel north and west of 807. No water was observed in the holes drilled through this buried channel.

No holes were drilled north and west of Hole 811 because of septic systems and development downstream of the dams toe. There is a septic leach field and tanks known to exist approximately 90ft northwest of Hole 811. It is unknown if the home between Sta.27+00 and 28+00 CL Dam is on a septic system.

Conclusions and Recommendations

Dam

The as-built diagrams indicate zonation construction within the dam. Claystone material from Auxiliary Spillway was used in construction of the dam. It is suggested that 5" Undisturbed samples of foundation material be taken within the footprint of the Labyrinth Weir. It is also suggested that SPT be performed through the fill material and into the claystone material under the dam to assure material integrity.

Principal Spillway

It is suggested that 5" undisturbed samples be taken at the foundation level of the Impact Structure / pipe support. An additional hole is suggested on the centerline of the dam for pipe foundation support information.

Auxiliary Spillway

The dam is to be extended filling in the Auxiliary Spillway. It is suggested to drill 2 investigation borings along the dam extension in the spillway to identify depth of desiccation. Hole depth is estimated to be 10ft

Toe Drain

No additional holes are recommended for Toe Drain investigation. Placement of the toe Drain

should take into account septic systems in the area to prevent a direct path for effluent to enter the creek. No water was observed past approximately Sta. 22+65. It is suggested that the Toe Drain not be installed northwest of this approximate location. Abundant iron staining was observed in drill cuttings. It is suggested that the upstream end of the drain be day lighted with a cleanout port.

Borrow

No borrow work was performed in 2010. It is suggested that a borrow area be designated and a minimum of 2 times the cubic yards needed for construction be confirmed and sampled.

Bryan S. Moffatt, PG 2887 State Geologist USDA/NRCS Fort Worth, Texas

Attachments

Seismic

- 1a) Earthquake Hazard map
- 1b) Probability of Exceedance, Magnitude 5.0, 50 years
- 1c) Probability of Exceedance, Magnitude 5.0, 5,000 years
- 1d) Probability of Exceedance, Magnitude 5.0, 10,000 years
- 1e) Deaggregation Plot 2% Probability of Exceedance in 50 Years
- 1f) Deaggregation Plot 2% Probability of Exceedance in 100 Years
- 1g) Deaggregation Plot 2% Probability of Exceedance in 200 Years

Sample Logs

- 2a) Auxiliary Spillway
- 2b) Principal Spillway
- 2c) Toe Drain

Maps

- 3a) Geologic Outcrop map
- 3b) Aerial Photo
- 3c) Hole Location Plat

Profiles

- 4a) Auxiliary Spillway
- 4b) Downstream Toe

Sample Data

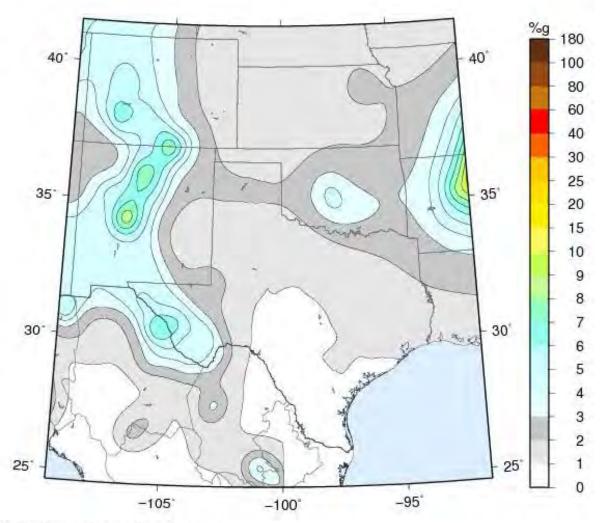
- 5a) Sample List
- 5b) Index Tests
- 5c) Shear Tests Page 1 and 2

Rising Head Tests

6a)	Hole 801

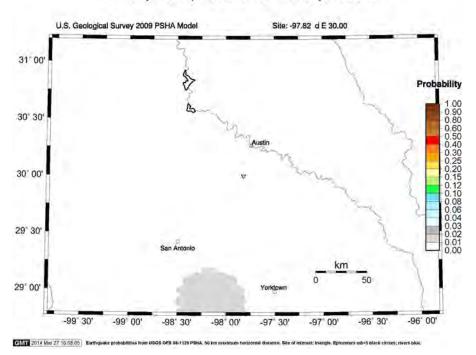
- 6b) Hole 803
- 6c) Hole 804
- 6d) Hole 805
- 6e) Hole 806

Attachment 1a Earthquake Hazard Map



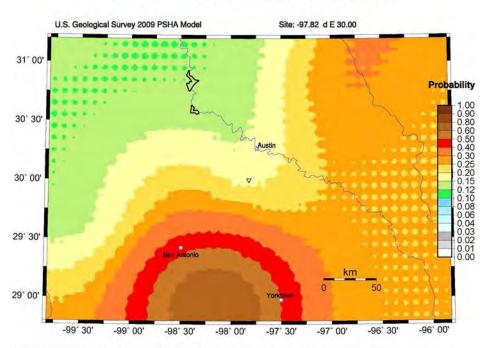
Peak Ground Acceleration

Attachment 1b Probability of Exceedance, Magnitude 5.0, 50 years



Probability of earthquake with M > 5.0 within 50 years & 50 km

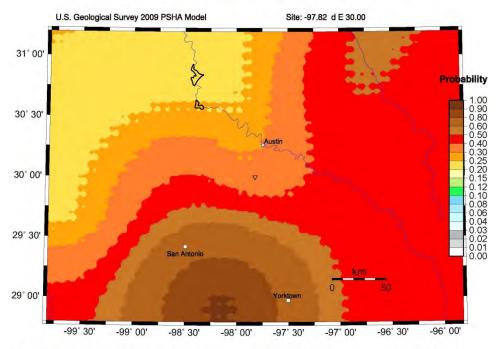
Attachment 1c Probability of Exceedance, Magnitude 5.0, 5,000 years



Probability of earthquake with M > 5.0 within 5000 years & 50 km

CMT 2014 Mar 27 16:07:07 Earthquake probabilities from USGS OFR 08-1128 PSHA. 50 km maximum horizontal distance. Site of interest: triangle. Epicenters mb>5 black circles; rivers blue

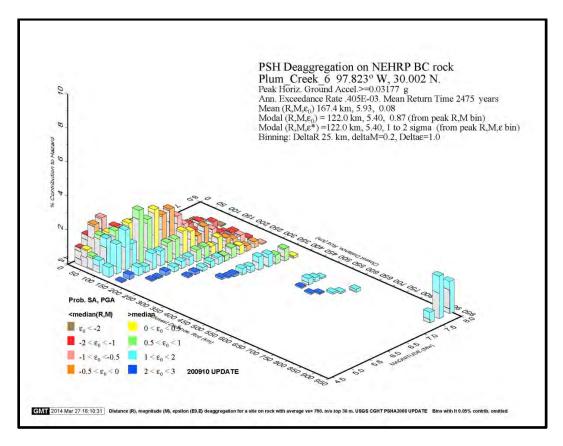
Attachment 1d Probability of Exceedance, Magnitude 5.0, 10,000 years

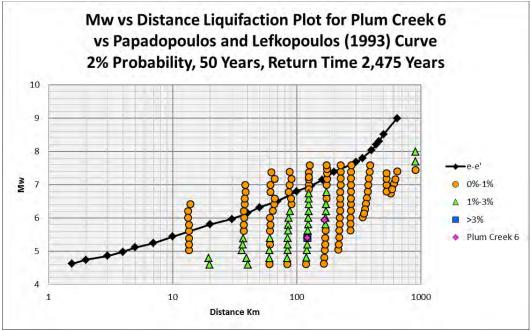


Probability of earthquake with M > 5.0 within 10000 years & 50 km

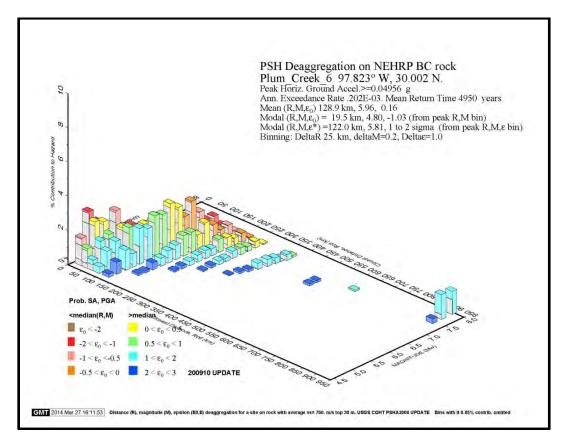
CMT 2014 Mar 27 16:04:36] Earthquake probabilities from USGS OFR 08-1128 PSHA. 50 km maximum horizontal distance. Site of interest: triangle. Epicenters mb>5 black circles; rivers blue.

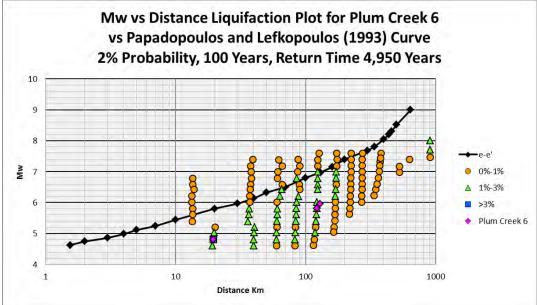
Attachment 1e Plum Creek 6 Deaggregation Plot 2% Probability of Exceedance in 50 Years



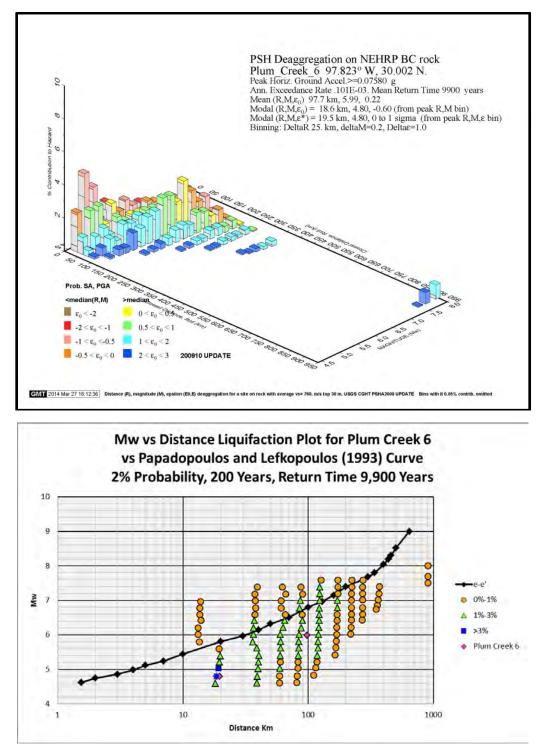


Attachment 1f Plum Creek 6 Deaggregation Plot 2% Probability of Exceedance in 100 Years





Attachment 1g Plum Creek 6 Deaggregation Plot 2% Probability of Exceedance in 200 Years



Attachments 1a-1f from <u>http://earthquake.usgs.gov/hazards/apps/#deaggint</u> Papadopoulos and Lefkopoulos data from Magnitude-Distance Relations for Liquefaction in Soil from Earthquakes, Bulletin of the Seismological Society of America, Vol. 83, June 1993

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OCAT	ISHED: ION: D BY:	Auxilian		way	SITE NO: 6 COUNTY: Hays DATE: 08/02/2	110		STA	TE:	Texas		_	PAGE 1		
			Simco	Power Auger	LOCATION OF HOLE		-	N 30.001	30.001564 W -97.821463 NAD 83 UTMZone 14						
		HOLE D	EPTH			1				SA	MPLE		1		
HOLE NO.	STA.8 ELEV.	FROM FT.	TO FT.	DESCRIPTIONS OF MATERIAL	NUMBER BLOWS	USCS	TYPE BIT USED	NO.	TYPE	FROM FT	TO FT	TEST	FIELD DISP. DEPTH/ VALUE		
201	5+00 CL AS 175' RT	0.0		Clay, silty, dry to sl/moist, stiff, hi/pl, brown		СН	CF	201.1	3" Push	0.0	2.0	Ê	1/1		
	636.9	1.0		Claystone, hi/weathered blocky, silty, sl/moist, tb-lam, gyp and fe stain, light brown, breaks down to hi/pl clay CH, sl/sand @ 15', gyp filled fe/stain frac 16'-17', 19' 20'		CS		201.2	3° Push	10.0	11.0		2-23/1		
		23.5	35.0	Claystone, sI non-weathered, silty, tb-lam, moist, breaks down to mod-hi/pl clay, dark gray, gyp and fe stain frac 34'-35'				201.3	Small	30.0	35.0		24-35/1		
			111	08/03/2010 @ 7:57 no water		1		X to 1			178		St -		
				08/04/2010 @ 8:17 no water											
				Location projected from as-built, elevation estimated from design survey 06/26/1998											

LOG OF TEST HOLES

Natural Resources Conservation Service

LOCAT	ION:	Plum Cr Auxiliar		way	SITE NO: 6 COUNTY: Hays			STA	TE:	Texas			PAGE 1
	D BY: Ng e qui		Sinco	Power Auger	DATE: 08/03/2 LOCATION OF HOLE	513. 7 m		N 30.001	278 W -	7.82118	8 NAD	83 UTM 2	one 14
1.01		HOLE D	EPTH			1		11	_	SA	MPLE	-	
HOLE NO.	STA.8 ELEV.	FROM FT.	TO FT.	DESCRIPTIONS OF MATERIAL	NUMBER BLOWS	USCS	TYPE BIT	NO.	TYPE	FROM FT	TO FT	TEST	FIELD DISP DEP TH / VALUE
202	8+00 CLAS 175' RT	0.0	1.0	Clay, silty, dry to sl/moist, stiff, hi/pl, brown	NOMBER BLOWS	CH	CF	201.1	3" Push	5.0	7.0	11.51	1/1
		1.0	27.0	Claystone, hi/weathered blocky, silty, sl/moist, tb-lam, gyp and fe stain, light brown, breaks down to hi/pl clay CH, gyp filled fe/stain frac 5'-7', 9.5'-10', 13'- 14', 1/4" gyp crystals @ 14', weathered and sl-nonweathered layers 18' to 27' transitional contact		CS		2022	3" Push	10.0	11.0		2-27/1
		27.0	35.0	Claystone, sl-non-weathered, silty, tb-lam, moist, breaks down to mod-hi/pl clay CL to CH, dark gray, gyp and fe stain frac 29'		CS		202.3	.3" Push	15.0	16.0		28-35-1
		1			2	[]		202.4	small		20.0	(<u>)</u>
				08/03/10 @ 10:00 no water				202.5	3" Push	20.0	20.5		1
1				08/05/10 @ 16:14 no water	1		11					11	1
				Location projected from as-built, elevation estimated from design survey 06/26/1998 f group names and symbols based on the Unifi		T							

LOG OF TEST HOLES



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OCAT	D BY:	Plum Cr Auxiliar York	y Spills	A stage of the state of the sta	SITE NO: 6 COUNTY: Hays DATE: 08/03/2			STA		Texas			PAGE 1	
DRILLI	NGEQU	PMENT:	Sinco	Power Auger	LOCATION OF HOLE	S:		N 30.001	106 W -	97.82156	2 NAD	83 UTM 2	one 14	
	HOLE DEPTH							1		SA	MPLE	PLE		
NO.	STA.& ELEV.	FT.	TO FJ.	DESCRIPTIONS OF MATERIAL	NUMBER BLOWS	_	TYPE BIT USED		TYPE	FROM FT	TÓ FT	TEST	FIELD DISP. DEP TH / VALUE	
203	11+50 CLAS 175' RT	1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1	0.5	Clay, silty, dry to sl/moist, stiff, hi/pl, brown	200	СН	CF	203.1	small	17.0	19,0			
		0.5	30.0	Claystone, hi/weathered blocky, silty, sl/moist, tb-lam, gyp and fe stain, light brown, breaks down to hi/pl clay CH, gyp filled fe/stain frac 6', Mg stain and gyp 9', 12' 1/4" gyp crystals @19', 9.5'-10', 13'-14', 1/4" gyp crystals @ 14' and 29', Gyp and fe frac @ 19' weathered and si- nonweathered layers 25' to 29' transitional contact		CS		203.2	small	24.0	25.0		1-30/1	
		30.0	35.0	Claystone, sl-non-weathered, silty, tb-lam, moist, breaks down to mod-hi/pl clay CL to CH, dark gray, gyp and fe stain along fracs 08/03/10 @ 12:59 no water 08/04/10 @ 8:26 no water		CS							31-35/1	
				Location projected from as-built, elevation estimated from design survey 06/26/1998 f group names and symbols based on the Unifie										

LOG OF TEST HOLES



Natural Resources Conservation Service

OCAT	D BY:		y Spilli	way Power Auger	SITE NO: COUNTY: DATE: LOCATION	6 Hays 08/03/20 OF HOLE		PAGE 1 STATE: Texas N 30.001150 W -97.821980 NAD 83 UTM Zone 14							
		HOLE C	EPTH						-		SA	MPLE			
HOLE NO.	STA.& ELEV.	FROM FT.	TO FT.	DESCRIPTIONS OF MATERIAL	NUMBER	BLOWS	USCS	T YPE BIT USE D	NO.	түре	FROM FT	TO FT	TEST	FIELD DISP. DEPTH / VALUE	
204	12+84 CL AS 175' Rt		2.0	Clay, silty, dry to sl/moist, stiff, hi/pl, brown			СН	CF						1-2/1	
	630.5	2.0	25.0	Claystone, hi/weathered blocky, silty, sl/moist, tb-lam, gyp and fe stain, light brown, breaks down to hi/pl clay CH, gyp filled fe/stain frac 12'-15',1/4" gyp crystals @19', gyp filled and fe stain frac @ 21', 23', 24'			CS							3-25/1	
		25.0	30.0	Claystone, sl-non-weathered, silty, tb-lam, moist, breaks down to mod-hi/pl clay CL to CH, dark gray, gyp and fe stain along fracs			CS							26-30/1	
				08/03/10 @ 15:02 no water 08/04/10 @ 8:27 no water											
				Location projected from as-built, elevation estimated from design survey 06/26/1998											

LOG OF TEST HOLES

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LOG OF TEST HOLES

LOCAT	3000	Auxiliary	1997 P. P. Page 1999	way	SITE NO: 6 COUNTY: Hay			ST/	ATE:	Texas			PAGE 1
	D BY: Ng Equi		Simco	Power Auger	DATE: 08/0 LOCATION OF HO	1/2010 LES:	- 1	N 30.001	128W -	7.82247	7 NAD	83 U TM Z	one 14
		HOLE D	EP TH		1	1	1			SA	MPLE		
HOLE NO.	STA.& ELEV.	FROM FT.	TO FT.	DESCRIPTIONS OF MATERIAL	NUMBER BLOW	S USCS	TYPE BIT USED	NÔ.	ТҮРЕ	FROM	TO FT	TEST	FIELD DISP DEP TH / VALUE
205	14+50 CL AS 175' Rt	0.0	6.5	Clay, silty, moist - sat., stiff, hi/p1, sl/fg gravel 2.5*3*, sl/sandy, brown, alluvium		СН	CF			Ĩ			1-6/1
	619.8	6.5	15.0	Claystone, silty, tb-lam, hi/weathered, blocky, fe/stain and gyp in fracs breaks down to mod-hi/pl clay CL-CH, brown		CS							7.15/1
				08/03/10 @ 15:45 no water 08/04/10 @ 8:33 no water									
				Location projected from as-built, elevation estimated from design survey 06/26/1998				1					

Attachment 2a Hole 205

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Attachment 2a

PAGE 1 WATERSHED: Plum Creek SITE NO: 6 LOCATION: Auxiliary Spillway COUNTY: STATE: Hays Texas LOGGED BY: York DATE: 08/03/2010 DRILLING EQUIPMENT: Simco Power Auger LOCATION OF HOLES: N 30.001146 W -97.822958 NAD 83 UTM Zone 14 HOLE DEPTH SAMPLE FIELD TYPE DISP. HOLE STA.& FROM BIT FROM TO DEP TH / TO FT. FT. USED TYPE FT FT NO. ELEV. DESCRIPTIONS OF MATERIAL NUMBER BLOWS USCS NO. TEST VALUE Hole 206 206 16+00 0.0 1-7/1 7.0 Clay, silty, moist - sat., stiff, CH CF CLAS hi/pl,carbonate concreations, 175' brown, alluvium Rt 15.0 Claystone, silty, tb-lam, soft to 613.8 7.0 CS 8-15/1 v/soft rock, hi/weathered, blocky, fe/stain and gyp in fracs breaks down to mod-hi/pl clay CL-CH brown 08/03/10 no water 08/04/10 @ 8:36 no water Location projected from as built, elevation estimated from design survey 06/26/1998 Identification of soils and assignment of group names and symbols based on the Unified Soil Classification System are based on visual-manual procedures (ASTMD 2488-84)

LOG OF TEST HOLES

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LOG OF TEST HOLES

		Plum Cr			SITE NO: 6			-					PAGE 1	
LOCAT		Plunge	Basin	Offset	COUNTY: Hays			STA	TE:	Texas	F			
	ED BY:		C	Denies August	DATE: 08/03/20 LOCATION OF HOLE			N 30.001770 W -97.823071 NAD 83 UTM Zone 14						
DRILLI	NG EQUI	PWENT	Simco	Power Auger	LOGATION OF HOLE	5:		N 30.001	770 W -	97.82307	TNAD	IAD 83 UTM Zone 14		
		HOLE	EPTH		1					SA	MPLE	1		
HOLE NO.	STA & ELEV.		TO FT.	DESCRIPTIONS OF MATERIAL	NUMBER BLOWS	USCS	TYPE BIT USED	NO.	TYPE	FROM FT	TO FT	TEST	FIELD DISP. DEPTH / VALUE	
301	15+00 CL Dam 170' DS	0.0	1.0	Clay, silty, carbonaecous concreations, sl/fg gravel, hi/pl, brown		СН	CF						1/1	
- 1	611.3	1.0	4.0	Clay, reworked claystone, sl/moist, hi/pl, stiff, brown, fill		СН							2-4/1	
		4.0	14.0	Clay, silty, carbonaecous concreations, sl/fg gravel, mod- hi/pl, brown		CL- CH		301.1	3" Push	14.0	16.0		4-14/1	
		14.0	16.0	Claystone, Hd1-2 silty, moist, hi/weathered, blocky, fractured, fe stain and gyp in fractures, breaks down to hi/pl clay brown		CS								
				08/03/10 no water										
		2 = 1		08/04/10 no water							1 11	_		
				Location projected from as-built, elevation estimated from design survey 06/26/1998										



Natural Resources Conservation Service

	RSHED:				SITE NO:	6					2010.11			PAGE 1
LOCAT	D BY:	Downst	ream 1	oe	COUNTY:	Hays 08/04/10			STA	TE:	Texas	1		_
			Simeo	Power Auger	DATE:				N 30 00	685 W -	7 82254		83 UTM 2	one 14
			Gillioc	i onei riagei							or to allo			one iv
	1	HOLED	EPTH								SA	MPLE		
	1.1.1							1						FIELD
	· · · · · · · · · · · · · · · · · · ·		1	the second second second				TYPE					1.0	DISP
	STA &		TO	A TO THE SHARE ON DESIGNATION OF	1010000	- Carlos	1000	BIT	No.	5.64	FROM	TO	0.00	DEPTH /
NO.	ELEV.	FT.	FT.	DESCRIPTIONS OF MATERIAL	NUMBER E	BLOWS	USCS	USED	NO.	TYPE	FT	FT	TEST	VALUE
801	13+80 CL Dam 70' DS	0.0	0.5	Clay, silty, dry to sl/moist, stiff, hi/pl, sl/carb, conc.,dark brown	1.		СН	CF				Ĩ		1/0
	617.0	0.5	6.0	Clay, reworked claystone, sl/moist, hi/pl, stiff, brown, fill			СН	1.1.1	1				1	2-6/0
		6.0	12.0	Clay, silty, moist - sat., stiff, hi/pl, sl/fg gravel, sl/sandy, brown			СН							6-12/0
		12.0	13.0	Gravel, fine to coarse, clay, silty, sat., stiff, hi/pl, brown			GC							13/0
		12.0	25.0	Claystone, silty, weathered, blocky, tb-lam, fractured w/fe stain and gyp., breaks down to hi/pl CH, light brown			CS							12-25/0
		25.0	30.0	Claystone, silty, non-weathered, tb-lam, fractured w/gyp and fe stain, breaks down to hi/pl clay, dark gray,	1.0		CS							25-30/0
			12.	Water Level 25.0' @18:10 08/05/10										
				Water Level 11.4' @ 8:53 08/06/10	1.	- 1		111	1					1
				Water Level 3.7' @ 15:00 08/11/10										
_				Water Level 3.5' @ 9:05 8/13/10		{		1241	12.					1
				Location projected from as-built, elevation estimated from design survey 06/26/1998										



	RSHED:				SITE NO: 6			1.1					PAGE 1
LOCAT		Downst	ream T	oe	COUNTY: Hays			ST	ATE:	Texas	-		
	ED BY:		Simco	Power Auger	DATE: 08/04/2 LOCATION OF HOLE			N 30 00	1998 W -	7 82287	7 NAD	83 UTM 2	one 14
UNILLI	NO LOU		Since	i ower Auger	LOOKINGTOTTOLL	.0.		1 00.00	1000 10 -	J1.02201	1 1140	00 011112	one 14
		HOLE D	EPTH						- 1 - 1	SA	MPLE	-	
HOLE NO.	STA & ELEV.	FROM	TO FT.	DESCRIPTIONS OF MATERIAL	NUMBER BLOWS	USCS	TYPE BIT USED	NO.	TYPE	FROM	TO FT	TEST	FIELD DISP DEPTH / VALUE
802	15+10 CL Dam 70' DS			Clay, silty, dry to sl/moist, stiff, hi/pl, sl/carb. conc.,dark brown		СН	CF					, Lor	1/0.
		1.5	7.0	Clay, reworked claystone, sl/moist, hi/pl, stiff, brown, fill	1	СН				i de la	11		2-7/0
		7.0	15.5	Clay, silty, moist - sat., stiff, hi/pl, sl/fg gravel, sl/sandy, brown		СН		0.1	3" Push	7.0	8.5		7-15/0
(area)		15.5	16.0	Gravel, fine to coarse, clay, silty, sat., stiff, hi/pl, brown	b	GC				1			16/0
		16.0	31.0	Claystone, silty, weathered, blocky, tb-lam, fractured w/fe stain and gyp., breaks down to hi/pl CH, light brown		CS						1	16-31/0
		31.0	40.0	Claystone, silty, non-weathered, tb-lam, fractured w/gyp and fe stain, breaks down to hi/pl clay, dark gray,		CS							32-40/0
				Water Level 3.0' @ 18:09 08/05/10	1								
				Water Level 2.1 @ 8:30 08/06/10						2=1			
				Water Level 1.5' @ 9:07 08/13/10									
				Location projected from as-built, elevation estimated from design survey 06/26/1998									

LOG OF TEST HOLES

WATER	SHED:	Plum Cr	eek		SITE NO: 6			-	-		_		PAGE 1
OCAT		Downst	ream 1	oe		lays		ST	ATE:	Texas			
	D BY: NG EQUI		Simco	Power Auger	DATE: 0 LOCATION OF	B/04/2010 HOLES:		N 30.00	2211 W -9	7.82315	4 NAD	83 UTM 2	one 14
_		HOLE	COTU		1		1 1			0.4	MPLE	A. 1 2 1	
HOLE NO.	STA & ELEV	FROM	TO FT.	DESCRIPTIONS OF MATERIAL	NUMBER BLC	ws uscs	TYPE BIT USED	NO.	TYPE	FROM	TO	TEST	FIELD DISP, DEPTH VALUE
803	16+65 CL Dam 70' DS	0.0		Clay, silty, dry to sl/moist, stiff, hi/pl, sl/carb. conc.,dark brown		СН	CF						1/0
	616.6	1.0	5.5	Clay, reworked claystone, sl/moist, hi/pl, stiff, brown, fill		СН		(i)					2-5/0
1	1.01	5.5	11.0	Clay, silty, moist - sat., stiff, hi/pl, sl/fg gravel, sl/sandy, brown		сн		0.1	3" Push	7.0	9.5		6-11/0
	1.4.6	11.0	15.0	Clay, silty, moist - sat., stiff, hi/pl, sl/fg-cg gravel, sl/sandy, brown w/ some fe stain		СН							12-15/0
		15.0	21.0	Claystone, silty, weathered, blocky, tb-lam, fractured w/fe stain and gyp., breaks down to hi/pl CH, light brown		CS							
		21.0	50.0	Claystone, silty, non-weathered, tb-lam, fractured w/gyp and fe stain, breaks down to hi/pl clay, dark gray,		cs							
				Water Level 43.9 @ 14:29 08/04/10									
				Water Level5.1' @ 8:10 08/05/10									
-4	-		and a	Water Level 4,9" @ 9:10 08/13/10									
				Location projected from as-built, elevation estimated from design survey 06/26/1998									

Attachment 2c Hole 803

WATER	SHED:	Plum C	reek		SITE NO:	6								PAGE 1
LOCAT		Downst	ream T	oe	COUNTY:	Hays			ST/	ATE:	Texas	-		
	D BY:				DATE:	08/05/2						-		
DRILLI	NG EQUI	PMENT:	Simco	Power Auger	LOCATION	OF HOLE	S:		N 30.002	2514 W -	97.82349	0 NAD	83 UTM Z	one 14
-	1	HOLE	соты		1			1		_	24	MPLE	_	
HOLE NO.	STA & ELEV.	FROM	TO FT.	DESCRIPTIONS OF MATERIAL	NUMBER	BLOWS	USCS	TYPE BIT USED	NO.	TYPE	FROM	TO	TEST	FIELD DISP DEPTH / VALUE
804	18+15 CL Dam	0.0	0.5	Clay, silty, dry to sl/moist, stiff, hi/pl, sl/carb. conc.,dark brown			СН	CF						1/0
	70' DS	0.5	5.0	Clay, reworked claystone, sl/moist, hi/pl, stiff, brown, fill			СН							2-5/0
	617.2	5.0	12.0	Clay, silty, moist - sat., stiff, hi/pl, sl/fg gravel, sl/sandy, brown			СН							6-12/0
		12.0	23.0	Claystone, silty, weathered, blocky, tb-lam, fractured w/fe stain and gyp., breaks down to hi/pl CH, light brown			CS						2	13-23/0
		23.0	30.0	Claystone, silty, non-weathered, tb-lam, fractured w/gyp and fe stain, breaks down to hi/pl clay, dark gray,	[]		CS							
				Water level 28.0' @ 12:45 08/05/10				-						
				Water level 24.0' @ 18:05 08/05/10										
				Water Level 18.5' @ 8:44 08/06/10										
				Water level 6.0' @ 15:16 08/11/10										
				Water level 5.5' @ 9:12 08/13/10										
				Location projected from as-built, elevation estimated from design survey 06/26/1998										

No. 10 Company Company Company



Natural Resources Conservation Service

WATER	RSHED:	Plum Cr	eek		SITE NO: 6						_		PAGE 1
LOCAT		Downst	ream T	'oe	COUNTY: Hay			STA	TE:	Texas			
	D BY:		Cimero	Pauras Auras	DATE: 08/0 LOCATION OF HC	5/2010		1 20 000	704 147	07 00004	1 1100	83 UTM 2	
DRILLI	NG EQU	PMENT	Simco	Power Auger	LOCATION OF HC	LES:		N 30.002	2794 VV -	97.82381	INAD	83 U I W 2	one 14
		HOLE D	EPTH	ř	1	1	T = 1	1.1		SA	MPLE		
HOLE NO.	STA &	ALC: N	TO FT.	DESCRIPTIONS OF MATERIAL	NUMBER BLOW	s uscs	TYPE BIT USED	NO.	TYPE	FROM FT	TO FT	TEST	FIELD DISP. DEPTH / VALUE
805	19+70 CL Dam 70' DS		2.0	Clay, silty, dry to sl/moist, stiff, hi/pl, sl/carb. conc.,dark brown		СН	CF						1-2/0
	617.5	2.0	5.0	Clay, reworked claystone, sl/moist, hi/pl, stiff, brown, fill		СН							3-5/0
		5.0	12.0	Clay, silty, moist - sat., stiff, hi/pl, sl/fg gravel, sl/sandy, brown		СН							6-12/0
		12.0	16.0	Claystone, silty, weathered, blocky, tb-lam, fractured w/fe stain and gyp., breaks down to hi/pl CH, light brown		CS							13-16/0
		16.0		Claystone, silty, non-weathered, tb-lam, fractured w/gyp and fe stain, breaks down to hi/pl clay, dark gray,		CS							17-30/0
	100	2.1	1.11	Water level 29' @ 16:36 08/05/10		1107						- 107	
				Water level 24.3' @ 8: 52 08/06/10			1						
				Water Level 7.7' @15:21 08/11/10									
			1	Water level 6.9' @ 9:15 08/13/10									
				Location projected from as-built, elevation estimated from design survey 06/26/1998									

LOC OF TEST HOLES.



Natural Resources Conservation Service

WATER	RSHED:	Plum Cr	eek		SITE NO: 6						-		PAGE 1
LOCAT	2 20 2 2 3	Downst	ream T	oe	COUNTY: Hays			STA	TE:	Texas			
	ED BY:		1000		DATE: 08/05/2						0.2.2	10000	
DRILLI	NG EQU	IPMENT:	Simco	Power Auger	LOCATION OF HOLE	S:		N 30.003	3098 W -	97.82415	2 NAD	83 UTM 2	one 14
	-	HOLE	EPTH		1	1				SA	MPLE		
HOLE NO.	STA &			DESCRIPTIONS OF MATERIAL	NUMBER BLOWS	USCS	TYPE BIT USED	NO	TYPE	FROM	TO FT	TEST	FIELD DISP. DEPTH/ VALUE
806	21+15 CL Dam 70' DS	0.0	1.5	Clay, silty, dry to sl/moist, stiff, hi/pl, sl/carb. conc.,dark brown		СН	CF						1/1
	618.4	1.5	3.0	Clay, reworked claystone, sl/moist, hi/pl, stiff, brown, fill		СН	-			÷			2-3/1
		3.0	7.0	Clay, silty, moist - sat., stiff, hi/pl, sl/fg gravel, sl/sandy, brown		СН							4-7/1
		7.0	28.0	Claystone, silty, weathered, blocky, tb-lam, fractured w/fe stain and gyp., breaks down to hi/pl CH, light brown		CS		1					8-28/1
		28.0	35.0	Claystone, silty, non-weathered, tb-lam, fractured w/gyp and fe stain, breaks down to hi/pl clay, dark gray.		CS							29-35/1
				Water level 29.0 @18:20 08/05/10									
	1-1-5			Water Level 1.08' @ 8:57 08/06/10					-	245	1		
				Water Level 5.6' 08/11/10	2				1				
				Water Level 6.5' @ 08/13/10									
				Location projected from as-built, elevation estimated from design survey 06/26/1998									

LOG OF TEST HOLES

LOG OF TEST HOLES

Natural Resources Conservation Service

USDA NRCS United States Department of Agriculture

WATER	RSHED:	Plum Cr Downst			SITE NO: 6 COUNTY: Hays	_		CT/	ATE:	Texas	_		PAGE 1
LOGGE	D BY:	York		Power Auger	DATE: 08/12/2 LOCATION OF HOLE				See 6.		4 NAD	83 UTM 2	one 14
_		HOLE	EPTH		1					SA	MPLE		
HOLE NO.	STA. & ELEV.	FROM FT.	TO FT.	DESCRIPTIONS OF MATERIAL	NUMBER BLOWS	USCS		NO.	TYPE	FROM FT	TO FT	TEST	FIELD DISP DEPTH / VALUE
807	22+65 CL Dam 70' DS	0.0	2.5	Clay, silty, dry to sl/moist, stiff, hí/pl, sl/carb. conc.,dark brown		СН	CF						1-2/1
	619.4	2.5	3.5	Clay, silty, moist - sat., stiff, hi/pl, sl/fg gravel, brown		СН					. 8.13		3/1
		3.5	26.0	Claystone, silty, weathered, blocky, tb-lam, fractured w/fe stain and gyp., breaks down to hi/pl CH, light brown		CS							4-26/1
		26.0	30.0	Claystone, silty, non-weathered, tb-lam, fractured w/gyp and fe stain, breaks down to hi/pl clay, dark gray,		CS							27-30/1
	1	1		No Water 08/12/10				1	-			2	
				Water level 9.15 08/13/10							-		
				Location projected from as-built, elevation estimated from design survey 06/26/1998				1					



United States Department of Agriculture

Natural Resources Conservation Service

Attachment

20

Hole 808

WATERSHED: Plum Creek SITE NO: 6 PAGE 1 LOCATION: **Downstream Toe** COUNTY: Hays STATE: Texas 08/12/2010 LOGGED BY: York DATE: DRILLING EQUIPMENT: Simco Power Auger LOCATION OF HOLES: N 30.003701 W -97.824826 NAD 83 UTM Zone 14 HOLE DEPTH SAMPLE FIELD DISP. TYPE HOLE STA & FROM TO BIT FROM TO DEPTH/ ELEV. FT. DESCRIPTIONS OF MATERIAL NUMBER BLOWS USCS USED NO. TYPE FT FT TEST VALUE NO. FT. 808 24+15 0.0 0.5 Sand, silty, clayey, dry to SC -CL sl/moist, medium, fine to SM coarse, brown Dam 70' DS 620.6 0.5 4.0 Clay, silty, moist, stiff, hi/pl, CH 1-4/1 shiney, brown 4.0 5.0 Gravel, fg-mg, clay, moist, stiff, GC 5/1 hi/pl, brown 7.0 Clay, silty, moist, stiff, hi/pl, 5.0 CH 6-7/1 shiney, brown 23.0 Claystone, silty, weathered, 8-23/1 7.0 CS blocky, tb-lam, fractured w/fe stain and gyp., breaks down to hi/pl CH, light brown 23.0 25.0 Claystone, silty, non-weathered, CS 24-25/1 tb-lam, fractured w/gyp and fe stain, breaks down to hi/pl clay, dark gray, No Water 08/13/10 Location projected from as-built, elevation estimated from design survey 06/26/1998 Identification of soils and assignment of group names and symbols based on the Unified Soil Classification System are based on visual-manual procedures (ASTM D 2488-84)

LOG OF TEST HOLES



Natural Resources Conservation Service

LOG OF TEST HOLES

A BARLAN AND AND	2 3 9 43 14 8 4	Plum Cr			SITE NO: 6			-					PAGE 1
LOCAT		Downst	ream T	oe	COUNTY: Hays			STA	TE:	Texas	1		
	D BY:		010000	Desire Asses	DATE: 08/12/2 LOCATION OF HOLE			1 00 000	004 144	7 00540	-	00 11714 7	
JRILLI	NG EQUI	PMENT:	Simco	Power Auger	LOCATION OF HOLE	:5:		N 30.003	981 W -	97.82513	UNAD	83 UTM 2	one 14
		HOLE D	EPTH		-	· ·	0.29	1	7.00	SA	MPLE		_
HOLE NO.	STA &		TO FT.	DESCRIPTIONS OF MATERIAL	NUMBER BLOWS	USCS	TYPE BIT USED	NO.	TYPE	FROM FT	TO FT	TEST	FIELD DISP. DEPTH VALUE
809	25+65 CL Dam 70' DS	0.0	0.5	Clay, silty, dry to sl/moist, stiff, hi/pl, sl/carb. conc.,dark brown		СН	CF						
5	621.8	0.5	7.0	Clay, silty, moist - sat., stiff, hi/pl, sl/fg gravel, brown		CH							1-7/1
		7.0		Gravel, fg-mg, clay, moist, stiff, hi/pl, brown		GC							8-9/1
		9.5	20.0	Claystone, silty, weathered, blocky, tb-lam, fractured w/fe stain and gyp., breaks down to hi/pl CH, light brown		CS							10-20/1
		20.0	25.0	Claystone, silty, non-weathered, tb-lam, fractured w/gyp and fe stain, breaks down to hi/pl clay, dark gray,		CS							21-25/1
				No water 08/13/10									
				Location projected from as-built, elevation estimated from design survey 06/26/1998									

Attachment 2c Hole 809

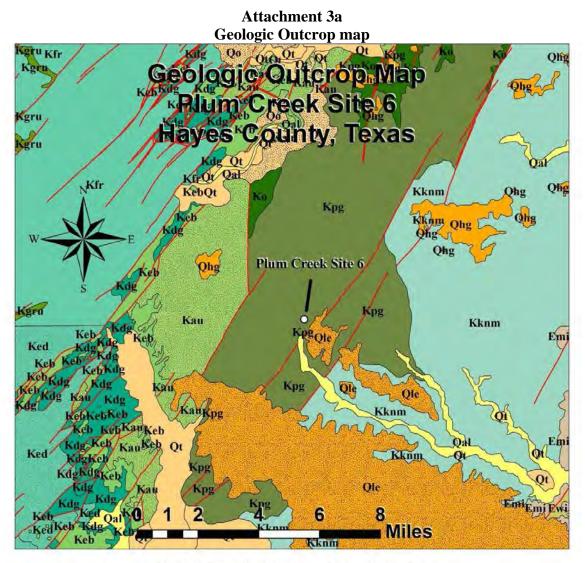
LOCAT	1.1.1.	Downst		oe .	SITE NO: 6 COUNTY: Hays			ST	ATE:	Texas			PAGE 1
	D BY: NG EQUI		Simco	Power Auger	DATE: 08/18/2 LOCATION OF HOLE		Ξđ	N 30.00	4284 W -	97.82546	1 NAD	83 UTM 2	one 14
	12.7.2.1	HOLED	EPTH			1	1 1		-	SA	MPLE	-	
HOLE NO.	STA &	FROM FT.	TO FT.	DESCRIPTIONS OF MATERIAL	NUMBER BLOWS	USCS	TYPE BIT USED	NO.	TYPE	FROM	TO FT	TEST	FIELD DISP. DEPTH / VALUE
810	27+15 CL Dam 70' DS	0.0	1.5	Clay, silty, Im streaks, sl/fg gravel, sl/moist, stiff, hi/pl, dark gray - black reworked material		СН	CF						
1	622.9	1.5	6.0	Clay, silty, sl/moist - moist, stiff, hi/pl, dark gray w/ light gray mottle		СН						ľ hľ	
		6.0	10.5	Clay, silty, sl/fg chert gravel, moist, fe stain, hi/pl - pl, light brown mottled light gray		СН						2121	
		10.5	11.0	Gravel, fg -cg, chert, multi colored, clay, silty, moist, fe stain, hi/pl - pl, light brown mottled light gray		GC							
		11.0		Claystone, hi/weathered, tb-lam, soft to very soft rock, fe stain frac 12'-13', 20'-21', light brown mottled light gray, breaks down to hi/pl stiff clay		CS							
		22.5	25.0	Claystone, silty, tb-lam, fe stain and gyp filled frac 23'-24', moist, soft rock, sl-non-weathered, dark gray to black		CS							
	1			No water 08/18/10		5				-			
		12.4		Hole plugged for safety, nearby house.		(10. se	1.4.7	1.0		11.1	2
				Location projected from as-built, elevation estimated from design survey 06/26/1998									



Natural Resources Conservation Service

VATER	RSHED:	Plum Cr Downst			SITE NO: 6 COUNTY: Havs			STA	TF.	Texas	_		PAGE 1
	D BY:		eam i	oe	COUNTY: Hays DATE: 08/18/2	010		SIA	IE:	Texas	-		
			Simco	Power Auger	LOCATION OF HOLE			N 30.004	579 W -	97.82579	8 NAC	83 UTM	Zone 14
	1	HOLE	EDTH		-	-				SA	MPLE		
HOLE	and the second sec	FROM	то				TYPE BIT		TYPE	FROM	TO	TFOT	FIELD DISP. DEPTH/
NO. 811	ELEV. 28+65 CL Dam 70' DS	FT. 0.0	FT. 2.0	DESCRIPTIONS OF MATERIAL Clay, silty, stiff, sl/moist, hi/pl, sl/carbonate, black	NUMBER BLOWS	GH	CF	NO.	TYPE	FT	FI	TEST	VALUE
	624.4	2.0	6.0	Clay silty, stiff, sl/moist - moist, sl vfg sand, hi/pl to pl, gray		CL- CH							
		6.0	7.5	Clay, silty, sl/fg chert gravel, moist, stiffmod-hi/pl, light w/slfe stain		CL- CH							
		7.5	11.0	Gravel, med-cg, chert, clay, silty, moist - saturated, abundant fe stain 7.5'-9',mod/pl, stiff, light brown		GC							
1		11.0	24.5	Claystone, hi/weathered, tb-lam, soft to very soft rock, fe stain and gyp filled frac 13'-14', 14'- 15',17'-18', 23'-24', light brown mottled light gray, breaks down to hi/pl stiff clay		CS			1				
		24.5	25.0	Claystone, silty, tb-lam, moist, soft rock, sl-non-weathered, dark gray to black		CS		Ŀ.					
				No Water 08/18/10									
		: I :	1 4	Hole plugged for safety, nearby house.	·	[=1			1	1-1-1		1.0	1
			13	Location projected from as-built, elevation estimated from design survey 06/26/1998									

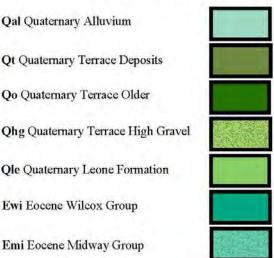
LOG OF TEST HOLES

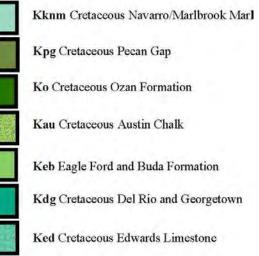


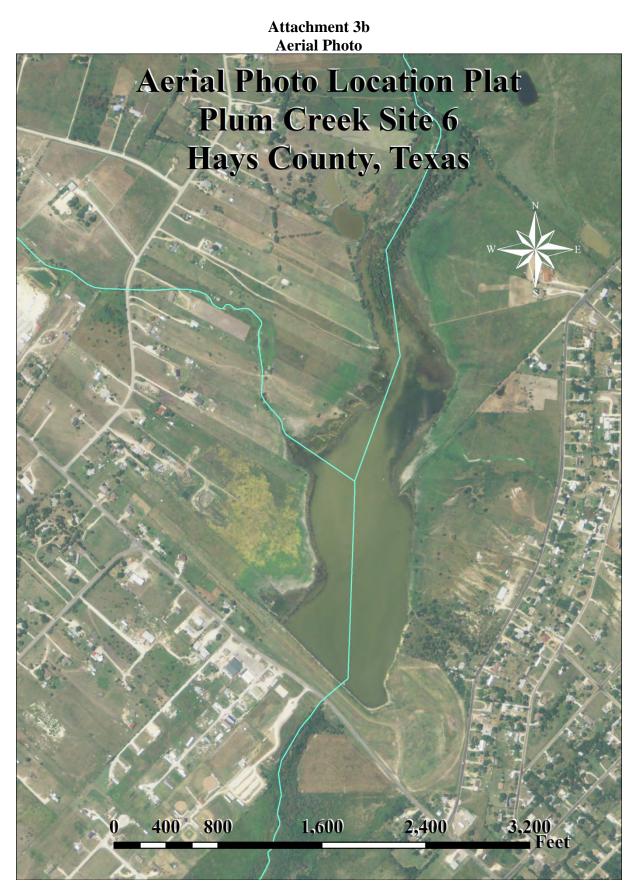
Modified From: Geologic Atlas of Texas, Austin Sheet



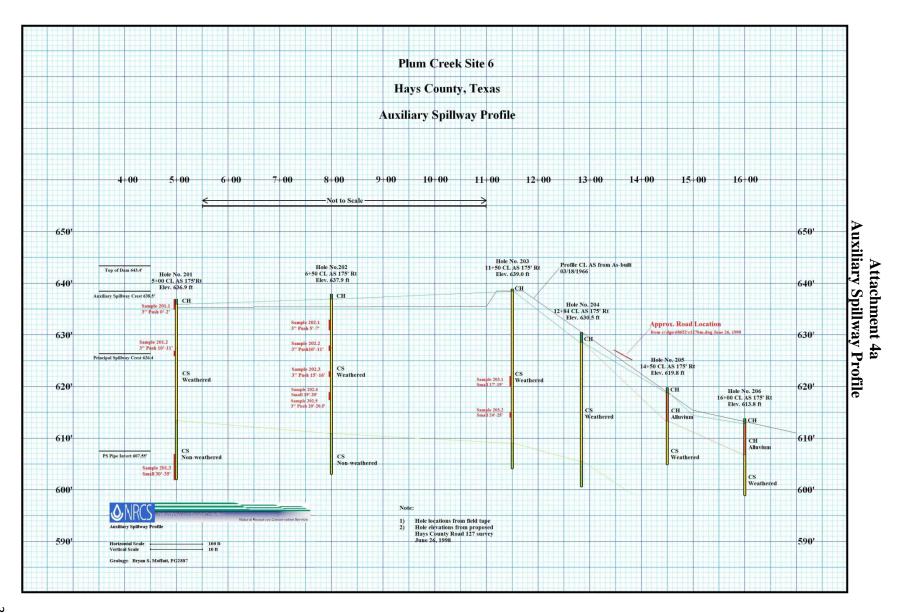
Fault

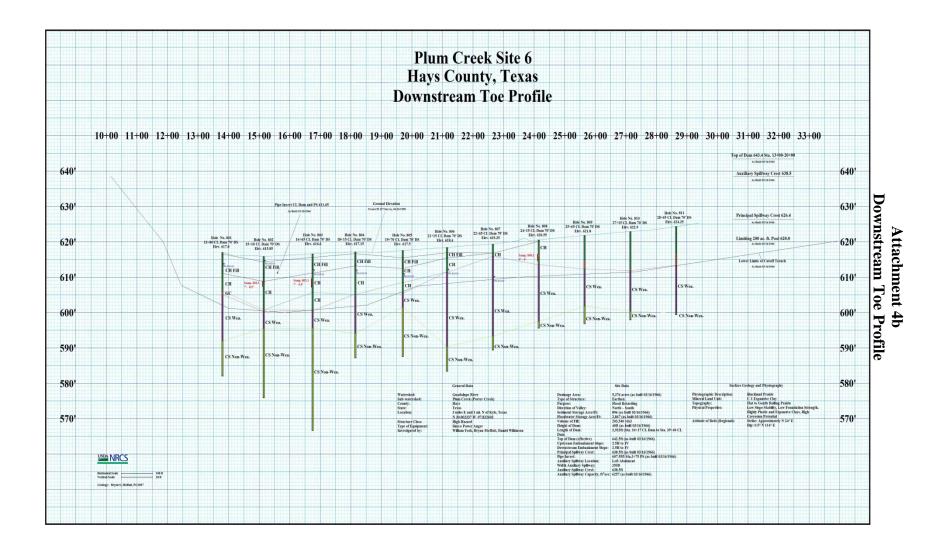












Attachment 5a Sample List

							Field Sample No.	201.1	201.2	501.3		202.2	202.3	202.4	202.5	203.1	203.2	301.1	803.1	802.1
					Index Tests = gradation, water content, LL, PI, Crumb, Double Hydrometer, Gs		Other Tests or Other Notes Sa	gypsum, compaction, complex testing as needed	gypsum, compaction, complex testing as needed	gypsum, compaction, complex testing as needed	gypsum, compaction, complex testing as needed	gypsum, compaction, complex testing as needed	gypsum, compaction, complex testing as needed	gypsum, compaction, complex testing as needed	gypsum, compaction, complex testing as needed	gypsum, compaction, complex testing as				
					umb, Do		He2	×	×	×	×	×	×	×	×	×	×	×	×	×
					L, PI, CI		əjoyuja													
					content, L	sted	1894S	×	×		×	×	×		×			×	×	×
), water c	Fests Requested	.lo2-no)													
					gradation	1	əsdej-joʻj													
					Tests = 0		Ma	×	×		×	×	×		*			×	×	*
					Index		хәриј	×	×	×	×	×	×	×	×	×	×	×	×	*
		_		-	_	-	Field Crumb	×	×	×	×	×	×	×	×	×	×	×	×	>
	Ś						Sample Size/Type	3" PT	3" PT	SS	3" PT	3" PT	3" PT	SS	3" PT	SS	SS	FPT	3" PT	3" pT
	Hays						Depth (ft)	0'-2'	10'-11'	30'-35'	5'-7'	10'-11'	15'-16'	19'-20'	20'-20.5'	17'-19'	24'-25'	14-16'	7-9.5'	7-85
	COUNTY:	9	PROGRAM (Source of Funds):	- ieologist			Description or Location	Inside Cut Auxiliary Spillway Approx. Sta. 5+00 AS	Inside Cut Auxiliary Spillway Approx. Sta. 5+00 AS	Inside Cut Auxiliary Spillway Approx. Sta. 5+00 AS	Inside Cut Auxiliary Spillway Approx. Sta. 8+00 AS	Inside Cut Auxiliary Spillway Approx. Sta. 11+50 AS	Inside Cut Auxiliary Spillway Approx. Sta. 11+50 AS	Outlet Basin Left DS Approx. Sta. 15+00 CL Dam 176' DC	DS Berm Approx. Sta. 16+65 CL Dam 70' DS	DS Berm Annrox Sta 15+10 CI Dam 70'DS				
1 141100	TX	stre : Plum Creek Site 6	Dam Rehab	CONTACT PERSON: William York, Geologist	PHONE/ FAX: 817.233.6267		Field Sample No.	201.1	201.2	201.3	202.1	202.2	202.3	202.4	202.5	203.1	203.2	301.1	803.1	802 1
	STATE:	SITE :	PROJECT TYPE:	CONTACT PERSON: 1	PHONE/ FAX:		Lab Sample No.													

Attachment 5b Index Tests

Soil Mechanics Laboratory Data Sheet _1_ of _1__

-	TX	WF-07				Grain	Mechanical Analysis Grain Size Distribution Expressed as Percent Finer by Dry Weight	ribution 1	Mechanical Analysis Expressed as Perce	al Analy:	sis cent Fine	er by Dry	Weight				Atterberg	_	1		196.3	зцбіәл/	noiti	Di	Dispersion	N	Moisture-Density	sity	_					
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U.S. Department of Agriculture Natural Resources Conservation Service

NRCS-ENG-354 Rev. Feb 2006 File Code ENG-210-22

Attachment 5c a 1

NRCS-ENG-354 Rev. June 2004 File Code ENG-210-22

U.S. Department of Agriculture Natural Resources Conservation Service

Soil Mechanics Laboratory Data Sheet _1__ of _2__

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		Sample	d.	Core					Core					Core																		
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		scripti	Sit	-					_					_																		
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Attachment 5c Shear Tests Page 2

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Attachment 6a Hole 801

Field Perr	neability 7	Festing by	Rising Head	Гest			
Hole 801							
Definition	n Sketch				1		Ւ
						<mark></mark>	2
Well Dim	ensions				H1	H2	
Radius of	boring, in	ches	2				
Length of	Test Secti	on, feet	29.6		<u> </u>	_	
Depth to '	Water Tabl	e	3.5				
Readings					L		
					<u> </u>		
	Depth 1		25	H	[1	21.5	
	Depth 2		11.4	Н	[2	7.9	
	Time, mir	nutes	863				
	Depth 1		0	Н	[1	0	
	Depth 2		0	H	12	0	
	Time, mir	nutes	0				
	Depth 1		0	Н	[1	0	
	Depth 2		0	Н	12	0	
	Time, mir	nutes	0				
	K1, ft/day		0.00406				

Attachment 6b Hole 803

Field Perr	neability 7	Festing by	Rising Head	Test			
Hole 803							
Definition	Sketch						1
					D1		D2
			••••••	••••	•• ┝╍╍╸╍┢╍┰╸	••••••• •• •	
Well Dim	ensions					H2	
					H1	_	V
Radius of	boring, in	ches	2				
Length of	Test Section	on, feet	43.8				
Depth to '	Water Tabl	e	4.9				
Readings							
	Depth 1		43.9		H1	39	
	Depth 2		38.9		H2	34	
	Time, min	nutes	200				
	Depth 1		0		H1	18.5	
	Depth 2		0		H2	13	
	Time, mir	nutes	0				
	Depth 1		0		H1	0	
	Depth 2		0		H2	0	
	Time, mir	nutes	0				
	K1, ft/day		0.001745				

Attachment 6c Hole 804

Field Peri	meability 7	Festing by	Rising Head	Test			
Hole 804							
Definition	n Sketch				1		1
					D1	••••••••••	D2
Well Dim	ensions					H2	
Radius of	boring, in	ches	2		H1	•	<u> </u>
	Test Section		22.5				
Depth to	Water Tabl	e	5.5				
Readings					L		
					<u> </u>		
			•				
	Depth 1		28	H		22.5	
	Depth 2		24	H	2	18.5	
	Time, min	iutes	320				
	Depth 1		24	Н	1	18.5	
	Depth 2		18.5	Η	2	13	
	Time, min	iutes	884				
	Depth 1		0	Η	1	0	
	Depth 2		0	H	2	0	
	Time, min	nutes	0				
	K1, ft/day		0.002667				
	K2, ft.day		0.00174				

Attachment 6d Hole 805

Field Peri	meability 7	Testing by	Rising Head	Test			
Hole 805							
Definition	n Sketch						1
			·····			·····	D2
Well Dim	ensions				H1	H2	
Radius of	boring, in	ches	2				-
	Test Section		29.5		<u> </u>		
Depth to `	Water Tabl	e	6.9				
Readings							
				1	"		
	Depth 1		29		H1	22.1	
	Depth 2		24.3		H2	17.4	
	Time, min	utes	857				
	Depth 1		0		H1	0	
	Depth 2		0		H2	0	
	Time, min	utes	0				
	Depth 1		0		H1	0	
	Depth 2		0		H2	0	
	Time, min	utes	0				
	K1, ft/day		0.000979				

Attachment 6e Hole 806

Field Perr	neability 7	Festing by	Rising Head	Test			
Hole 806							
Definitior	Sketch						1
				••••	D1	·····	D2
Well Dim	ensions				H1	H2	
Radius of	boring, in	ches	2				•
	Test Section		25.6				
Depth to	Water Tabl	e	5.6				
Readings							
	Depth 1		29		H1	23.4	
	Depth 2		18		H2	12.4	
	Time, mir	nutes	877				
	Depth 1		0		H1	0	
	Depth 2		0		H2	0	
	Time, mir	iutes	0				
	Depth 1		0		H1	0	
	Depth 2		0		H2	0	
	Time, mir	nutes	0				
	K1, ft/day		0.002848				