UNITED STATES GOVERNMENT

Memorandum

(1)

TO : P. M. Price, State Conservation Engineer, SCS, Temple, Texas

DATE: July 18, 1967

FROM : Jack W. Adair, Head, E&WP Unit, SCS, Fort Worth, Texas

Truman Bruce, Acting

SUBJECT: ENG - Soil Mechanics 22 - Texas, (WP-08) 2029
Plum Creek, Site 2
Hays County

ATTACHMENTS

1.	Form SCS-372, Placement of Earth Fill Materials	1 sheet
2.	Form SCS-354, Soil Mechanics Laboratory Data	1 sheet
3.	Form SCS-352, Compaction and Penetration Resistance	2 sheets
4.	Form SCS-35, Plan and Profiles for Geologic Investigations	3 sheets

INTERPRETATION OF DATA AND RECOMMENDATIONS

Foundation

This will be a 37' high class "a" dam on the Taylor formation. During the site investigation, foundation soils found consisted of about 7' of alluvial, slightly gravelly stiff CL and CH soils overlying 5' to 17' of residual shaly CH soils. Bedrock consists of hardness 1-2 shale at depths of 15' on the left abutment to 24' in the floodplain. No water table was found.

No foundation samples were submitted for testing. Relative permeabilities of the stiff CL and CH foundation soils are estimated to be low to very low.

At station 24 + 27 longtime settlement due to consolidation of the foundation is estimated to be 0.2'.

Centerline Cutoff

A cutoff similar to the one recommended by the Geologist and Project Engineer should be effective in controlling seepage in the foundation. The trench should extend below all dry-weather cracks.

Principal Spillway (Station 24 + 27 ℄ Dam)

Excavation for the conduit foundation need not extend deeper than is required to remove topsoil and roots and to provide grade for the pipe with its cradle. No joint gap problems are anticipated.

Borrow and Excavation

Compaction tests were performed on one composite sample from the emergency spillway and one from the borrow area. Densities obtained are recorded on Form SCS-352. The samples tested classify as SC and CH soils.

Refer to Form SCS-372 for recommended placement and compaction of earth fill materials.

Embankment Design (Maximum Embankment Height = 37')
Using shear strength values of ϕ = 1-1/2° with c = 1700 psf for the embankment and ϕ = 9° with c = 1150 psf for the foundation, MTS charts give factors of safety for slope stability of more than 2.0.

A standard embankment design with 2-1/2:1 slopes is recommended.

Residual settlement within the embankment is estimated to be 2% of the height of fill.

A total allowance of 1.0' should be added to the fill height for settlement of the foundation and embankment.

Drainage
No drainage measures are recommended.

cc: H. J. Behrens, Fort Worth, Texas
Harry W. Arfman, Fort Worth, Texas
James C. Evans, Waco, Texas
D. L Bidwell, Seguin, Texas - 2 copies
J. G. Hill, Corsicana, Texas

Prepared by: Gerald Tefft

Reviewed and Approved by:
Morris Reedy

Form SCS 372 A
10-65

U. S. DEPARTMENT of AGRICULTURE
SOIL CONSERVATION SERVICE

PLACEMENT OF EARTH FILL MATERIALS

MATERIALS TESTING REPORT

PROJECT and STATE: Plum Creek, Site 2, Texas

BY: GHT

DATE: 7-67

Embankment Zone No.	FILL MATERIALS: Type	Location	Average Depth (ft.) From	Average Depth (ft.) To	Description (Origin, Group No., Hardness, Classification, etc.)	RECOMMENDED COMPACTION REQUIREMENTS: Class	Degree of Compaction (%)	Moisture Limits (%) ± Optimum From	Moisture Limits (%) ± Optimum To	Control Test ASTM Designation	Control Test ASTM Method	REFERENCE COMPACTION TEST: Sample No. Field	Sample No. Lab.	Maximum Density (pcf)	Optimum Moisture (%)
Outer	1	Emer. Spwy.	2	5	Silty, clayey sand - SC	A	95	-3	+4	D698	A	Comp. #1	Curve #1	118.0	13.0
Any	2	Borrow	1	4	silty clay - CH	A	85	-5	+8	D1557	A	Comp. #2	Curve #2	113.0	15.5
Any	2	Borrow	4	8	" " - CH	A	85	-5	+8	"	"	—	—	—	1

REMARKS

Sheet 1 of 1

Maximum Height = 37'+ Volume = 145000 Structure Class 2 2051

Form SCS- 354
Rev. 3/59

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SOIL MECHANICS LABORATORY DATA
Sheet 1 of 1

LABORATORY SAMPLE NUMBER	FIELD NUMBER	LOCATION AND DESCRIPTION		DEPTH	FIELD CLASSIFICATION	MECHANICAL ANALYSIS GRAIN SIZE DISTRIBUTION EXPRESSED AS PERCENT FINER BY DRY WEIGHT																		ATTERBERG LIMITS		UNIFIED CLASSIFICATION	SOLUBLE SALTS %	DISPERSION %	MOISTURE - DENSITY RELATIONSHIPS (STANDARD / MODIFIED)			UNDISTURBED SAMPLE DATA		Gs	SPECIAL TESTS
						FINES					SANDS						GRAVEL																	
						0.002 mm	0.005	0.02	0.05	#200 0.074	#140 0.105	#60 0.250	#40 0.42	#20 0.84	#10 2.0	#4 4.76	3/8" 9.525	1/2" 12.7	3/4" 19.05	1" 38.1	1 1/2" 28.4	3" 76.2 mm	3/4 1 1/2 3 6 12	L.L.	P.I.				CURVE NO.	DRY DENSITY γ IN LBS./FT.³	OPTIMUM H_2O w IN %	DRY UNIT WEIGHT g/cc	H_2O w IN %		
F 67		Texas WP-08 Plum Creek Site 2		Ft.																													
	255.1	Emer. Spw. 75'Lt. 16+00 ℄		2-4	CL																												
2939	256.1	" " 75'Rt. 16+00 ℄	Comp 1	3-6	CL	17	29	41	42	48	50	58	62	68	75	85	93	98	100				28	13	SC	40.5	21	(1)	118.0 std.	13.0			2.68	1622
	257.1	" " " " 18+00 ℄		2-5	CL	23	39			64					100																		
	155.1	Borrow A 31+00		1-5	CH																												
2940	161.1	" B 32+00	Comp 2	1-4	CH	45	65	82	88	90					100								56	34	CH	40.5	12	(2)	113.0 mod.	15.5			2.69
	167.1	" C 34+00		1-4	CH																												
	155.2	" A 31+00		5-7	CL																												
2941	161.2	" B 32+00	Comp 3	4-8	CL	40	56	69	70	77	79	82	84	87	90	93	96	99	100				52	32	CH	2.0	16						
	167.2	" C 34+00		4-8	CL	44	62			85					100																		

REPRODUCED BY: U. S. D. A., SOIL CONSERVATION SERVICE, FORT WORTH, TEXAS
USDA-SCS-FORT WORTH, TEX. 1968

Form SCS 352
Rev 5-65

LABORATORY NO F67-2939

MATERIALS TESTING REPORT	U. S. DEPARTMENT of AGRICULTURE SOIL CONSERVATION SERVICE	COMPACTION AND PENETRATION RESISTANCE

PROJECT and STATE: Plum Creek Site 2 Texas

FIELD SAMPLE NO.	LOCATION	DEPTH
Comp. #1	Emer. Spw.	2'-6'

GEOLOGIC ORIGIN	TESTED AT	APPROVED BY	DATE
	FWMTS		6-7-67

CLASSIFICATION SC LL 28 PI 13

MAX. PARTICLE SIZE INCLUDED IN TEST #4 "

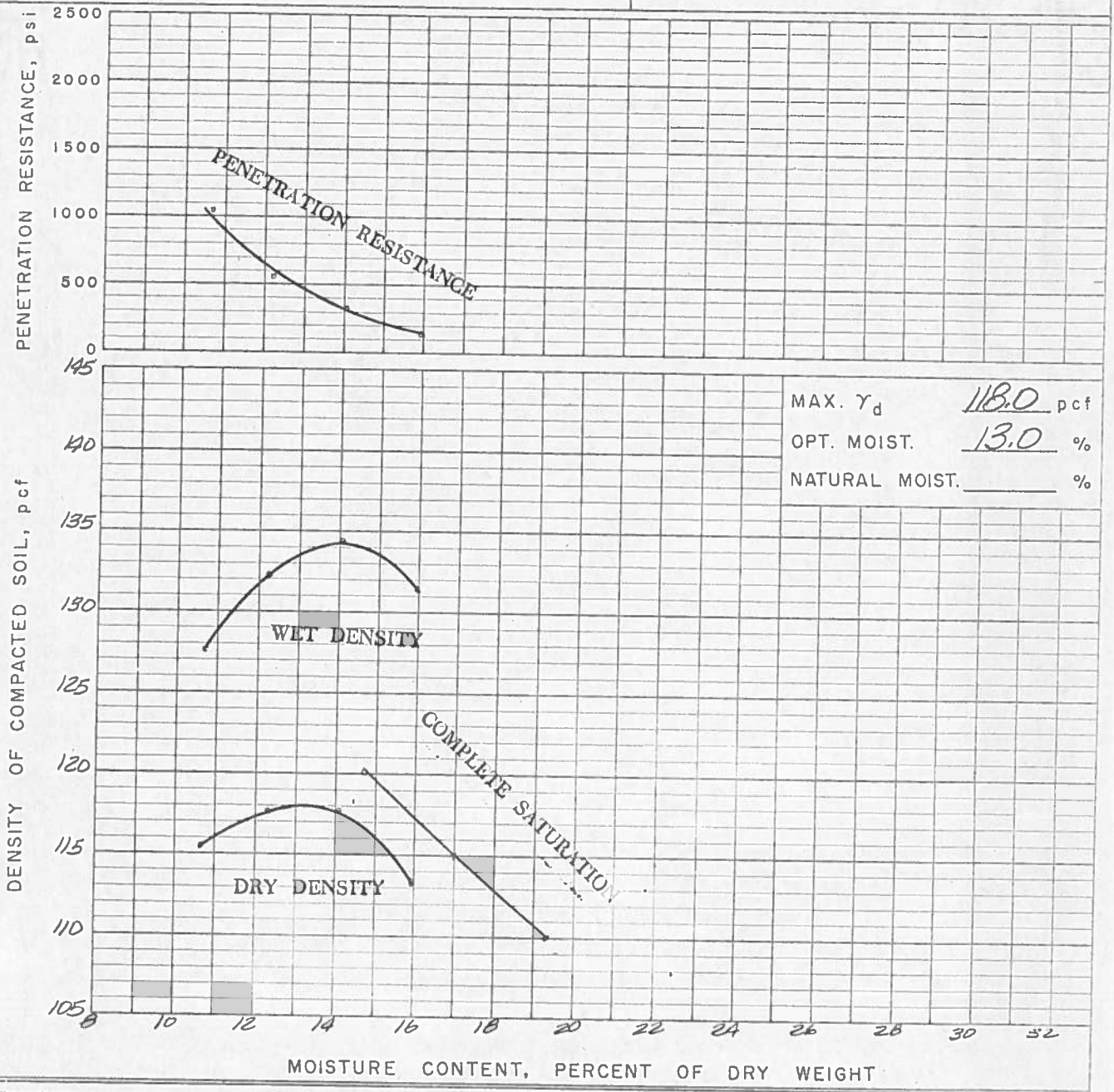
SPECIFIC GRAVITY (G_s) { MINUS NO. 4 2.68 ; PLUS NO. 4 —

CURVE NO. 1 OF 2

STD. (ASTM D-698) ☒; METHOD A

MOD. (ASTM D-1557) ☐; METHOD —

OTHER TEST ☐ (SEE REMARKS)



REMARKS

USDA SCS LINCOLN, NEBR. 1965

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Rev 5-65

LABORATORY NO F67-2940

MATERIALS TESTING REPORT	U. S. DEPARTMENT of AGRICULTURE SOIL CONSERVATION SERVICE	COMPACTION AND PENETRATION RESISTANCE

PROJECT and STATE: Plum Creek Site 2 Texas

FIELD SAMPLE NO.	LOCATION	DEPTH
Comp #2	Borrow	1'-5'

GEOLOGIC ORIGIN	TESTED AT	APPROVED BY	DATE
	FWMTS		6-9-67

CLASSIFICATION CH LL 56 PI 34

MAX. PARTICLE SIZE INCLUDED IN TEST #4 "

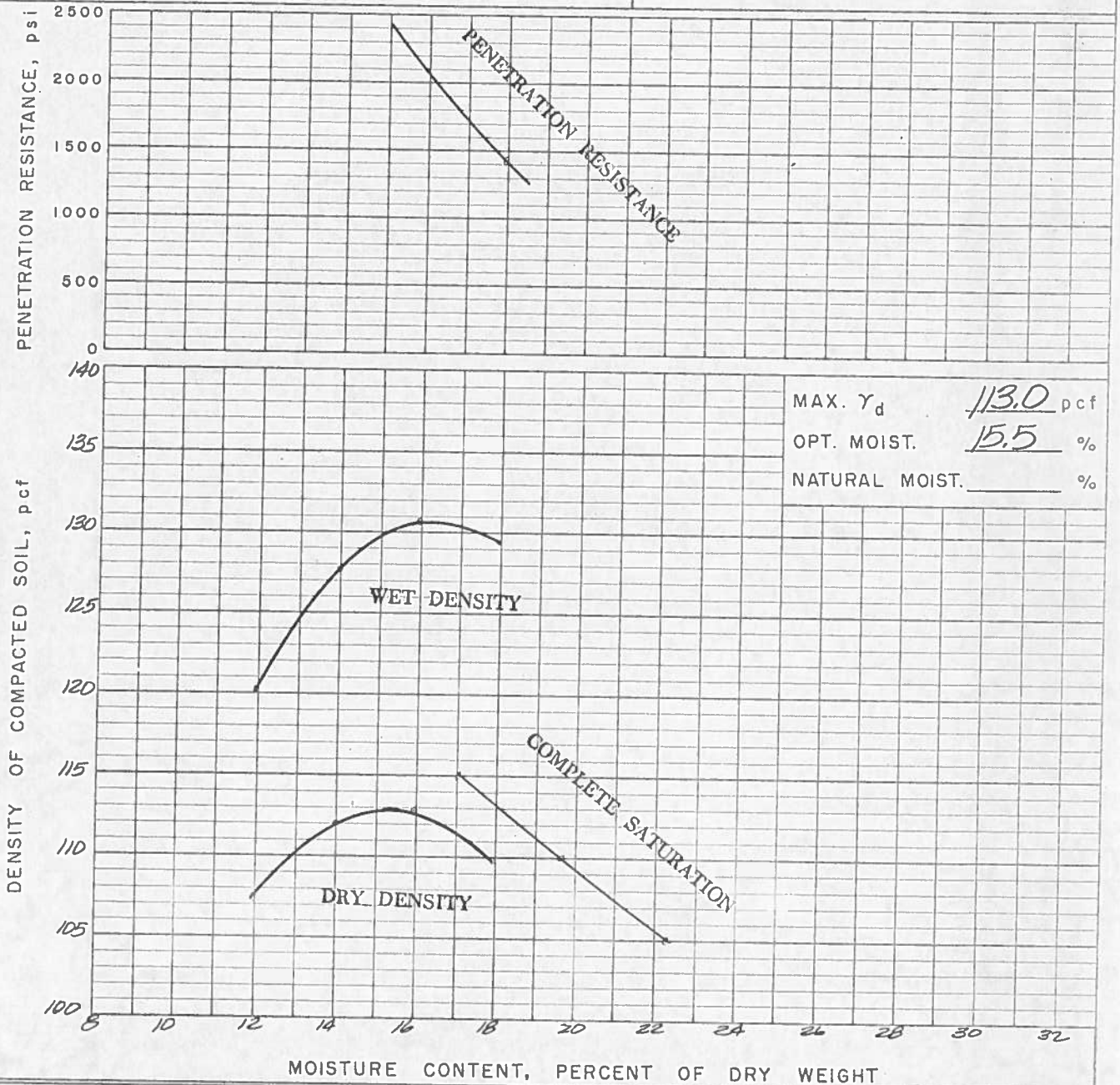
SPECIFIC GRAVITY (G_s) { MINUS NO. 4 2.69 ; PLUS NO. 4 —

CURVE NO. 2 OF 2

STD. (ASTM D-698) ☐; METHOD —

MOD. (ASTM D-1557) ☒; METHOD A

OTHER TEST ☐ (SEE REMARKS)



MAX. γ_d 113.0 pcf

OPT. MOIST. 15.5 %

NATURAL MOIST. _____ %

REMARKS

USDA SCS-LINCOLN, NEBR 1965

FW-MTS-18 (Trial Form)
Rev. 12-66

P. M. Price

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

TO: H. N. Smith, State Conservationist,
SCS, Temple, Texas

Invoice No.: 371-67
Date: 7/18/67
Lab. Work Order No. 2051

FROM: Jack W. Adair, Head, E&WP Unit,
SCS, Fort Worth, Texas

SUBJECT: B&F - Records Management, Billing Invoice for Material Testing Service

Project and/or Site: Plum Creek, Site 2

The total amount shown is chargeable to State Order No.: TX-A153-67
Appropriation: 12x1067-TX-S(WP-08)2029

TESTING AND ENGINEERING				
Sieve Analysis-Gravel	2	@	$3.00	6.00
Sieve Analysis-Sand	2	@	2.75	5.50
Hydrometer Analysis, Total Salt and Dispersion	3	@	6.00	18.00
Hydrometer Analysis and Dispersion		@	5.75	
Dispersion		@	5.75	
Total Soluble Salt		@	1.50	
Atterberg Limits, (LL, PL, & PI)	3	@	11.00	33.00
Shrinkage Limit, Lineal		@	3.00	
Shrinkage Limit, Volumetric		@	4.50	
Specific Gravity (G_s & G_m)	3	@	2.50	7.50
Compaction D-698, Standard	1	@	25.00	25.00
Compaction D-1557, Modified	1	@	32.50	32.50
Core Opening and Preparation		@	7.00	
Unit Dry Weight γ_d Undisturbed (Core or Clod)		@	4.50	
Unit Dry Weight γ_d (Sedimentation Sample)		@	2.50	
Moisture Content, Disturbed		@	1.50	
Ignition Loss		@	5.00	
Shear, Triaxial, 1.4" and 2.8"		@	134.00	
Shear, Direct, 2" x 2"		@	134.00	
Shear, Unconfined Compression		@	45.00	
Consolidation		@	110.00	
Permeability (Per Setup)		@	22.00	
Sealing, Ponds and Reservoirs		@	65.00	
Free Swell		@	1.00	
Wet-Dry, Freeze-Thaw		@	25.00	
		@		
		@		

Received 7/21/67

TOTAL $127.50

Asst. State Conservation Engineer

Copies sent to: Fiscal Office
P. M. Price
Harry W. Arfman
James C. Evans

USDA SCS FORT WORTH, TEX. 1966