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MATERIAL RESOURCE EVALUATION
ADOBE DAM SITE
Maricopa County, Arizona

prepared for

Flood Control District of Maricopa County
3335 W. Durango Street
Phoenix, Arizona 85009

ENGINEERS TESTING LABORATORIES, INC.

A
A360.902

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ENGINEERS TESTING LABORATORIES, INC.
3737 East Broadway Road
P. O. Box 21387
Phoenix, Arizona 85036
(602) 268-1381

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Flood Control District of Maricopa County
3335 W. Durango Street
Phoenix, Arizona 85009

27 April 1978

Attention: Mr. Jack Leavitt

Project: Material Resource Evaluation
Adobe Dam Site
Maricopa County, Arizona

Job No. 812-233
Addendum No. 1
Inv. No. 1121025

In accordance with our agreement ETL No. 112-2364 and Addendum No. 1, this firm has performed additional soils and materials engineering services related to an additional portion of State land related to the subject project. Also, it is our understanding that the royalty paid to the State of Arizona for mineral aggregate has changed from $0.15 to $0.19/ton.

The results of soil exploration services and evaluation of potential quality, quantity and in-situ value of the potential usable sand and gravel resources for this additional portion of the State land are presented in this Addendum. The additional area of evaluation is located on State land which lies in the following portions of Sections 21 and 22: the NE¼ of Section 21; the NW, NE and SW quarters of the NW¼ of Section 22 and a portion of the NW¼ of the SW¼ of Section 22, described as starting at the NW corner of the SW¼ of Section 22, east 450 feet, then south 1320 feet, then west 285 feet, then north 660 feet, then west 165 feet and then north 660 feet to the point of beginning in T.4N., R2E., G.&S.R.B.&M. as shown on the site plan in Maricopa County, Arizona. The site is located at the proposed Adobe Dam and Reservoir. In general, the site is south of Deer Valley Road, north of Beardsley Road, west of 35th Avenue and east of 51st Avenue. Our evaluation is limited

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to the usable sand and gravel portions of the Recent and Quartenary alluvial deposits which are existent in this area. This evaluation does not include determination of the quantity or an evaluation of the market value of the remaining portions of the alluvial materials which are composed primarily of sand and clay mixed soils, heavily cemented sands and gravels or sand and gravel containing greater than 10% fines having a Plasticity Index of 7 or greater. Our evaluation for the additional area of investigation was performed in the same manner, using the same criteria and information utilized in the original report.

EXPLORATION

In addition to the exploration accomplished in the general area by the U. S. Army Corps of Engineers, 23 test pits were excavated within the additional area at the locations shown on the accompanying site plan. In addition, two test pits were excavated in Skunk Creek at the request of representatives of the State Land Department in order to verify data previously accumulated. During this additional test pit excavation,encountered materials were continuously examined and visually classified and, where applicable, sampled by a representative from our office. The results of the test pit logs are presented at the end of this Addendum.

CONCLUSIONS

The total quantity of usable mineral aggregate in the additional area is estimated to be approximately 1,691,300 cubic yards or 2,875,200 tons. Therefore, the total quantity of usable mineral aggregate in both areas is approximately 2,802,000 cubic yards or 4,763,400 tons with an estimated total market value of approximately $905,050.00.

This Addendum should be attached to and made a part of the original report.

Material Resource Evaluation
Adobe Dam Site
Job No. 812-233/Addendum No. 1

Should you have any qeustions concerning the results of our exploration program or if we may be of further assistance to you, please do not hesitate to contact us.

Respectfully submitted,
ENGINEERS TESTING LABORATORIES, INC.

By: _____ Reviewed by: _____
Kenneth L. Ricker, P.E. Glen K. Copeland, P.E.

1-27-78

/jm

copies to: Addressee (5)

SOIL CLASSIFICATION AND LEGEND

COARSE-GRAINED SOIL

MORE THAN 50% LARGER THAN 200 SIEVE SIZE

Symbol	Letter	DESCRIPTION	MAJOR DIVISONS
	GW	WELL-GRADED GRAVELS OR GRAVEL-SAND MIXTURES, LESS THAN 5% - 200 FINES	GRAVELS More than half of coarse fraction is larger than No. 4 sieve size.
	GP	POORLY-GRADED GRAVELS OR GRAVEL-SAND MIXTURES, LESS THAN 5% - 200 FINES	
	GM	SILTY GRAVELS, GRAVEL-SAND-SILT MIXTURES, MORE THAN 12% - 200 FINES	
	GC	CLAYEY GRAVELS, GRAVEL-SAND-CLAY MIXTURES, MORE THAN 12% - 200 FINES	
	SW	WELL-GRADED SANDS OR GRAVELLY SANDS, LESS THAN 5% - 200 FINES	SANDS More than half of coarse fraction is smaller than No. 4 sieve size.
	SP	POORLY-GRADED SANDS OR GRAVELLY SANDS, LESS THAN 5% - 200 FINES	
	SM	SILTY SANDS, SAND-SILT MIXTURES MORE THAN 12% - 200 FINES	
	SC	CLAYEY SANDS, SAND-CLAY MIXTURES MORE THAN 12% - 200 FINES	

NOTE — Soils with 5 to 12 percent minus 200 fines should be classified with dual symbols

FINE-GRAINED SOIL

MORE THAN 50% SMALLER THAN 200 SIEVE SIZE

Symbol	Letter	DESCRIPTION	MAJOR DIVISIONS
	ML	INORGANIC SILTS AND VERY FINE SANDS, ROCK FLOUR, SILTY OR CLAYEY FINE SANDS OR CLAYEY SILTS WITH SLIGHT PLASTICITY	SILTS AND CLAYS Liquid limit less than 50
	CL	INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS, LEAN CLAYS	
	OL	ORGANIC SILTS AND ORGANIC SILT-CLAYS OF LOW PLASTICITY	
	MH	INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS FINE SANDY OR SILTY SOILS, ELASTIC SILTS	SILTS AND CLAYS Liquid limit greater than 50
	CH	INORGANIC CLAYS OF HIGH PLASTICITY, FAT CLAYS	
	OH	ORGANIC CLAYS OF MEDIUM TO HIGH PLASTICITY, ORGANIC SILTS	
	PT	PEAT AND OTHER HIGHLY ORGANIC SOILS	

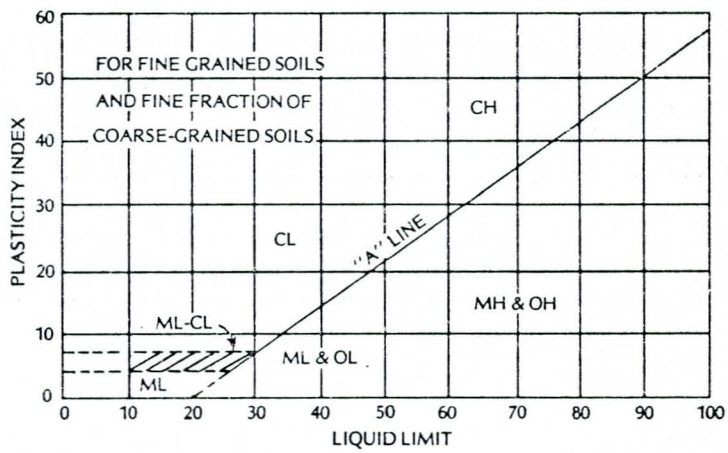
SOIL FRACTIONS

Component	Size Range
Boulders	Above 12 in.
Cobbles	3 in to 12 in.
Gravel	3 in. to No. 4 sieve
Coarse Gravel	3 in. to ¾ in.
Fine Gravel	¾ in. to No. 4 sieve
Sand	No. 4 to No. 200
Coarse	No. 4 to No. 10
Medium	No. 10 to No. 40
Fine	No. 40 to No. 200
Fines (silt or clay)	Below No. 200 sieve

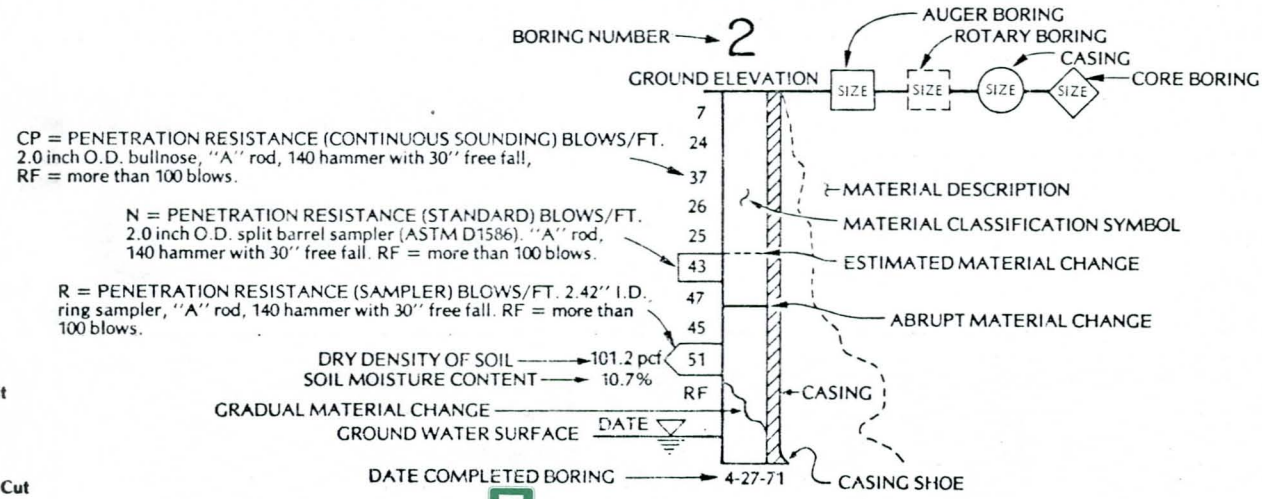
Soil Classification: ASTM D2487

Classification is visual unless accompanied by mechanical analysis and Atterberg limits. Percentage shown on log denotes visual approximation ± 5%.

PLASTICITY CHART



LEGEND OF BORING OPERATIONS



Sample Type

- R Ring
- T Shelby Tube
- S Standard Split Barrel
- B Block
- G Grab
- C Cutting
- V Vertical Face Cut

10-27

E

SOIL BORING DATA

Location of Boring TP in channel near Pinnacle Peak Rd. approx. 400 ft. S. of Road No. P10 Job No. 812-233

Elev. Top of Hole 1388 Datum Prepared By PT Date 4-20-78

Type/Size of Boring Backhoe Date 4-20-78 Driller EE Reviewed By KLR Date 4-25-78

Depth Ft.	Penetration Resistance Blows/Ft. C	N	Sample Type	Dry Density pcf	Moisture Content	Graphical Log	Description	Soil Classification	Max. Size In.	Particle Size Distribution % Boulders	Cobbles	Gravel	Sand	Silt & Clay	Gradation Well Med. Poor	Grain Shape Angular Subangular Rounded Subrounded	Relative Density Low Med High	Dry Strength None Very Low Low Medium High Very High	Plasticity None Low Medium High	Consistency Soft Firm Stiff Very Stiff Hard	Cementation None Light Moderate Heavy
1					damp		FINE TO COARSE SAND AND GRAVEL	SP-		Tr	<5	55	45	<5	X	XXXX	X	X	X		X
2							WITH OCCASIONAL COBBLES & TRACE	GW		to		40	60								
3							SILT & CLAY; Brown and Gray			some											
4							Increased clay content below 3½'.			below											
5										5'											
6																					
7																					
8																					
9							Refusal @ 7' on Silty to Clayey														
10							Sand and Gravel (very heavily cemented).														
1							No groundwater encountered														
2																					
3																					
4																					
5																					
6																					
7																					
8																					
9																					
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30																					

NOTE: THE DATA PRESENTED ON THESE BORING LOGS REPRESENTS SUBSURFACE CONDITIONS ONLY AT THE SPECIFIC TEST LOCATIONS AND AT THE TIME DESIGNATED. THIS DATA MAY NOT REPRESENT CONDITIONS AT OTHER LOCATIONS AND/OR TIMES. THIS BORING DATA WAS COMPILED PRIMARILY FOR DESIGN PURPOSES. THIS DATA SHOULD NOT BE CONSTRUED AS PART OF THE PLANS GOVERNING CONSTRUCTION OR AS DEFINING CONSTRUCTION TECHNIQUES.

10-27

E

SOIL BORING DATA

Location of Boring: In Channel approx. 700' S of Pinnacle Peak Rd. East Bank — No. P11 — Job No. 812-233

Elev. Top of Hole: 1384 — Datum: — Prepared By: PT — Date: 4-20-78

Type/Size of Boring: Backhoe — Date: 4-20-78 — Driller: EE — Reviewed By: KLR — Date: 4-25-78

Depth Ft.	Penetration Resistance Blows/Ft. C	Penetration Resistance Blows/Ft. N	Sample Type	Dry Density pcf	Moisture Content	Graphical Log	Description	Soil Classification	Max. Size, In.	Particle Size Distribution % Boulders	Cobbles	Gravel	Sand	Silt & Clay	Gradation Well / Med / Poor	Grain Shape Angular / Subangular / Rounded / Subrounded	Relative Density Low / Med / High	Dry Strength None / Very Low / Low / Medium / High / Very High	Plasticity None / Low / Medium / High	Consistency Soft / Firm / Stiff / Very Stiff / Hard	Cementation None / Light / Moderate / Heavy
1							FINE TO COARSE SAND; Gray	SP				Tr	80	< 5	xx	x xx	x	x	x		x
2													90								
3					damp		FINE TO COARSE SAND AND GRAVEL	SP-		Tr	< 5	55	45	< 5	x	xxxx	x	x	x		x
4							WITH OCCASIONAL COBBLES & TRACE	GW				40	60								
5							SILT & CLAY; Brown and Gray														
6																					
7							Refusal @ 2' on Silty to Clayey														
8							Sand & Gravel (very heavy cementation)														
9							No groundwater encountered														
10																					
1																					
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3																					
4																					
5																					
6																					
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E

SOIL BORING DATA

Location of Boring: Adobe Dam No. P12 Job No. 812-233

Elev. Top of Hole: 1347 Datum: Prepared By: PT Date: 4-20-78

Type/Size of Boring: Backhoe Date: 4-20-78 Driller: EE Reviewed By: KLR Date: 4-25-78

Depth Ft.	Penetration Resistance Blows/Ft. C	N	Sample Type	Dry Density pcf	Moisture Content	Graphical Log	Description	Soil Classification	Max. Size. In.	Particle Size Distribution % Boulders	Cobbles	Gravel	Sand	Silt & Clay	Gradation Well / Med. / Poor	Grain Shape Angular / Subangular / Rounded / Subrounded	Relative Density Low / Med / High	Dry Strength None / Very Low / Low / Medium / High / Very High	Plasticity None / Low / Medium / High	Consistency Soft / Firm / Stiff / Very Stiff / Hard	Cementation None / Light / Moderate / Heavy
1					damp		SANDY SILT; Light Brown	SM/ML	#4				10	80		XXX	X	X			
2													20	90					XX	X	X
3																					
4					damp		CLAYEY GRAVELLY SAND; Brown	SC/SM	3"			20	55	15	XXXX	XXX		X			
5												30	65	25					X		X
6																					
7																					
8					below		SANDY CLAY; Brown-Tan	CL	#4			Sli	10	70		XXX	XX				
9					PL							Tr	30	90					X		XX
10																					
1					damp		CLAYEY SAND; Red	SC	2"			Tr	70	15		XXX	X	X	X		X
2													80	30							
3																					
4							Stopped @ 11'														
5							No groundwater encountered														
6																					
7																					
8																					
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E

SOIL BORING DATA

Location of Boring: Adobe Dam No. P13 Job No. 812-233

Elev. Top of Hole: 1352 Datum: Prepared By: PT Date: 4-20-78

Type/Size of Boring: Backhoe Date: 4-20-78 Driller: EE Reviewed By: KLR Date: 4-25-78

Depth Ft.	Penetration Resistance Blows/Ft. C	Penetration Resistance Blows/Ft. N	Sample Type	Dry Density pcf	Moisture Content	Graphical Log	Description	Soil Classification	Max. Size. In.	Particle Size Distribution % Boulders	Cobbles	Gravel	Sand	Silt & Clay	Gradation Well Med. Poor	Grain Shape Angular Subangular Rounded Subrounded	Relative Density Low Med High	Dry Strength None Very Low Low Medium High Very High	Plasticity None Low Medium High	Consistency Soft Firm Stiff Very Stiff Hard	Cementation None Light Moderate Heavy
1					slightly		SANDY CLAY; Predominantly Fine	CL	#4				10	70	X	XX	X	XX	XX	X	XX
2					damp		Sand; Light Brown						30	90							
3																					
4																					
5																					
6																					
7																					
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9							Stopped @ 7'														
10							No groundwater encountered														
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E

SOIL BORING DATA

Location of Boring: Adobe Dam No. P14 Job No. 812-233

Elev. Top of Hole: 1344 Datum: Prepared By: PT Date: 4-20-78

Type/Size of Boring: Backhoe Date: 4-20-78 Driller: EE Reviewed By: KLR Date: 4-25-78

Depth Ft.	Penetration Resistance Blows/Ft. C	N	Sample Type	Dry Density pcf	Moisture Content	Graphical Log	Description	Soil Classification	Max. Size, In.	Particle Size Distribution % Boulders	Cobbles	Gravel	Sand	Silt & Clay	Gradation Well Med. Poor	Grain Shape Angular Subangular Rounded Subrounded	Relative Density Low Med High	Dry Strength None Very Low Low Medium High Very High	Plasticity None Low Medium High	Consistency Soft Firm Stiff Very Stiff Hard	Cementation None Light Moderate Heavy
1					slightly		SILTY SANDY CLAY; Brown	CL	#4				10	70		xxx	xx	x	x	mod	xx
2					damp								30	90						firm	
3																					
4																					
5					slightly		CLAYEY GRAVELLY SAND; Brown	SC/SM	3"			20	55	15	xxxx	xxx	xxx	x			
6					damp							30	65	25					x		x
7																					
8					below		SANDY CLAY; Brown	CL	#4			Sli	10	70		xxx	xx				
9					PL							Tr	30	90					x		xx
10																					
1																					
2							Stopped @ 10'														
3							No groundwater encountered														
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E

SOIL BORING DATA

Location of Boring: Adobe Dam · No. P15 · Job No. 812-233

Elev. Top of Hole: 1352 · Datum: · Prepared By: PT · Date: 4-20-78

Type/Size of Boring: Backhoe · Date: 4-20-78 · Driller: EE · Reviewed By: KLR · Date: 4-25-78

Depth Ft.	Penetration Resistance Blows/Ft. C	Penetration Resistance Blows/Ft. N	Sample Type	Dry Density pcf	Moisture Content	Graphical Log	Description	Soil Classification	Max. Size In.	Particle Size Distribution % Boulders	Cobbles	Gravel	Sand	Silt & Clay	Gradation Well Med. Poor	Grain Shape Angular Subangular Rounded Subrounded	Relative Density Low Med High	Dry Strength None Very Low Low Medium High Very High	Plasticity None Low Medium High	Consistency Soft Firm Stiff Very Stiff Hard	Cementation None Light Moderate Heavy
1					slightly		SILTY SANDY CLAY; Brown	ML/CL	#10			Tr	30	60	xxx	x		x	x	loose	x
2					damp								40	70							
3							SANDY GRAVELLY CLAY;	CL	3"			10	20	50	xxx		x	x	xx	x	x
4												20	30	60							
5																					
6							Refusal @ 3'														
7							No groundwater encountered														
8																					
9																					
10																					
1																					
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E

SOIL BORING DATA

Location of Boring: Adobe Dam No. P16 Job No. 812-233

Elev. Top of Hole: 1348 Datum: Prepared By: PT Date: 4-20-78

Type/Size of Boring: Backhoe Date: 4-24-78 Driller: EE Reviewed By: KLR Date: 4-25-78

Depth Ft	Penetration Resistance Blows/Ft. C	Penetration Resistance Blows/Ft. N	Sample Type	Dry Density pcf	Moisture Content	Graphical Log	Description	Soil Classification	Max. Size, In.	Particle Size Distribution % Boulders	Cobbles	Gravel	Sand	Silt & Clay	Gradation Well Med. Poor	Grain Shape Angular Subangular Rounded Subrounded	Relative Density Low Med High	Dry Strength None Very Low Low Medium High Very High	Plasticity None Low Medium High	Consistency Soft Firm Stiff Very Stiff Hard	Cementation None Light Moderate Heavy
1					slightly		SILTY SAND; Brown-Tan	SM	#4				50	30	X	XXX	X	X	X	XX	X
2					damp								70	50							
3																					
4																					
5																					
6																					
7																					
8					-PL		SILTY SANDY CLAY; Tan-White	CL	#4				25	75	X	XXX		XX	XX	X	XX
9																					
10																					
1							Stopped @ 8'														
2							No groundwater encountered														
3																					
4																					
5																					
6																					
7																					
8																					
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SOIL BORING DATA

Location of Boring: Adobe Dam No. P17 Job No. 812-233

Elev. Top of Hole: 1345 Datum: Prepared By: PT Date: 4-20-78

Type/Size of Boring: Backhoe Date: 4-24-78 Driller: EE Reviewed By: KLR Date: 4-25-78

Depth Ft.	Penetration Resistance Blows/Ft. C	Penetration Resistance Blows/Ft. N	Sample Type	Dry Density pcf	Moisture Content	Graphical Log	Description	Soil Classification	Max. Size. In.	Particle Size Distribution % Boulders	Cobbles	Gravel	Sand	Silt & Clay	Gradation Well Med. Poor	Grain Shape Angular Subangular Rounded Subrounded	Relative Density Low Med High	Dry Strength None Very Low Low Medium High Very High	Plasticity None Low Medium High	Consistency Soft Firm Stiff Very Stiff Hard	Cementation None Light Moderate Heavy
1					slightly		SILTY SANDY CLAY; Tan	CL	1"			Tr	10	70		xxx	xx	x	x	x	xx
2					damp								30	85							
3																					
4																			sli.		
5					slightly		SILTY GRAVELLY SAND; Brown-Tan	GM/SM	9"		Tr	30	40	5		xxxxx	xx	x	to	x	x
6					damp						10	40	50	10					none		
7																					
8							SILTY SANDY CLAY; Tan	CL					10	80		xxx	xx	x	xx	xx	xx
9													20	90							
10																					
1							Stopped @ 8'														
2							No groundwater encountered														
3																					
4																					
5																					
6																					
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9																					
20																					
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E

SOIL BORING DATA

Location of Boring: Adobe Dam No. P18 Job No. 812-233

Elev. Top of Hole: 1344 Datum: Prepared By: PT Date: 4-20-78

Type/Size of Boring: Backhoe Date: 4-20-78 Driller: EE Reviewed By: KLR Date: 4-25-78

Depth Ft.	Penetration Resistance Blows/Ft. C	N	Sample Type	Dry Density pcf	Moisture Content	Graphical Log	Description	Soil Classification	Max. Size, In.	Particle Size Distribution % Boulders	Cobbles	Gravel	Sand	Silt & Clay	Gradation Well Med. Poor	Grain Shape Angular Subangular Rounded Subrounded	Relative Density Low Med High	Dry Strength None Very Low Low Medium High Very High	Plasticity None Low Medium High	Consistency Soft Firm Stiff Very Stiff Hard	Cementation None Light Moderate Heavy
1					slightly		SILTY SANDY CLAY; Tan	CL	1"			Tr	10	70	X	XXX	XX	X	X	X	XX
2					damp								30	85							
3					slightly		SILTY GRAVELLY SAND; Brown-Tan	GM/SM	9"		Tr	30	50	5	X	XXXXX	XX	X	sli.	X	X
4					damp						10	40	50	10					to		
5																			none		
6																					
7							Refusal @ 4½'														
8							No groundwater encountered														
9																					
10																					
1																					
2																					
3																					
4																					
5																					
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10-23

SOIL BORING DATA

Location of Boring: Adobe Dam No.: P19 Job No.: 812-233

Elev. Top of Hole: 1345 Datum: Prepared By: PT Date: 4-20-78

Type/Size of Boring: Backhoe Date: 4-20-78 Driller: EE Reviewed By: KLR Date: 4-25-78

Depth Ft.	Penetration Resistance Blows/Ft. C	Penetration Resistance Blows/Ft. N	Sample Type	Dry Density pcf	Moisture Content	Graphical Log	Description	Soil Classification	Max. Size, In.	Particle Size Distribution % Boulders	Cobbles	Gravel	Sand	Silt & Clay	Gradation Well / Med. / Poor	Grain Shape Angular / Subangular / Rounded / Subrounded	Relative Density Low / Med / High	Dry Strength None / Very Low / Low / Medium / High / Very High	Plasticity None / Low / Medium / High	Consistency Soft / Firm / Stiff / Very Stiff / Hard	Cementation None / Light / Moderate / Heavy
1					slightly		SILTY SANDY CLAY; Tan	CL	1"			Tr	10	70		XXX	XX		X	X	X	XX
2					damp								30	85								
3																						
4					slightly		SILTY GRAVELLY SAND; Brown-Tan	GM/SM	9"		Tr	30	40	5		XXXXX	XX		X	sil.	X	X
5					damp						10	40	50	10						to		
6																				none		
7							Refusal @ 5'															
8							No groundwater encountered															
9																						
10																						
1																						
2																						
3																						
4																						
5																						
6																						
7																						
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10-27

E

SOIL BORING DATA

Location of Boring: Adobe Dam No. P20 Job No. 812-233

Elev. Top of Hole: 1345 Datum: Prepared By: PT Date: 4-20-78

Type/Size of Boring: Backhoe Date: 4-20-78 Driller: EE Reviewed By: KLR Date: 4-25-78

Depth Ft.	Penetration Resistance Blows/Ft. C	Penetration Resistance Blows/Ft. N	Sample Type	Dry Density pcf	Moisture Content	Graphical Log	Description	Soil Classification	Max. Size, In.	Particle Size Distribution % Boulders	Cobbles	Gravel	Sand	Silt & Clay	Gradation Well / Med. / Poor	Grain Shape Angular / Subangular / Rounded / Subrounded	Relative Density Low / Med / High	Dry Strength None / Very Low / Low / Medium / High / Very High	Plasticity None / Low / Medium / High	Consistency Soft / Firm / Stiff / Very Stiff / Hard	Cementation None / Light / Moderate / Heavy
1					slightly		SILTY SANDY CLAY; Tan	CL	1"			Tr	10	70		XXXX	XX		X	X	X	XX
2					damp								30	85								
3					slightly		SILTY GRAVELLY SAND; Brown-Tan	GM/SM	9"		Tr	30	40	5		XXXXX	XX	X	Sil.	X	X
4					damp						10	40	50	10					to		
5																			none		
6							SILTY SANDY CLAY; Tan	CL					10	80		XXX	XX	X	XX	XX	XX
7													20	90							
8																					
9							Refusal @ 4½'														
10							No groundwater encountered														
1																					
2																					
3																					
4																					
5																					
6																					
7																					
8																					
9																					
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SOIL BORING DATA

Location of Boring: Adobe Dam No.: P21 Job No.: 812-233

Elev. Top of Hole: 1344 Datum: Prepared By: PT Date: 4-20-78

Type/Size of Boring: Backhoe Date: 4-20-78 Driller: EE Reviewed By: KLR Date: 4-25-78

Depth Ft.	Penetration Resistance Blows/Ft. C	Penetration Resistance Blows/Ft. N	Sample Type	Dry Density pcf	Moisture Content	Graphical Log	Description	Soil Classification	Max. Size, In.	Particle Size Distribution % Boulders	Cobbles	Gravel	Sand	Silt & Clay	Gradation Well Med. Poor	Grain Shape Angular Subangular Rounded Subrounded	Relative Density Low Med High	Dry Strength None Very Low Low Medium High Very High	Plasticity None Low Medium High	Consistency Soft Firm Stiff Very Stiff Hard	Cementation None Light Moderate Heavy
1					slightly		SILTY GRAVELLY SAND; Brown-Tan	GM/SM	9"		Tr	30	40	5		XXXXX	XX	X	sli.	X	X
2					damp						10	40	50	10					to		
3																			none		
4																					
5																					
6							SILTY SANDY CLAY; Tan	CL					10	80		XXX	XX	X	XX	XX	XX
7													20	90							
8																					
9																					
10							Stopped @ 8½'														
1							No groundwater encountered														
2																					
3																					
4																					
5																					
6																					
7																					
8																					
9																					
20																					
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SOIL BORING DATA

Location of Boring: Adobe Dam | No. P22 | Job No. 812-233

Elev. Top of Hole: 1343 | Datum: | Prepared By: PT | Date: 4-20-78

Type/Size of Boring: Backhoe | Date: 4-20-78 | Driller: EE | Reviewed By: KLR | Date: 4-25-78

Depth Ft.	Penetration Resistance Blows/Ft. C	N	Sample Type	Dry Density pcf	Moisture Content	Graphical Log	Description	Soil Classification	Max. Size. In.	Particle Size Distribution % Boulders	Cobbles	Gravel	Sand	Silt & Clay	Gradation Well / Med. / Poor	Grain Shape Angular / Subangular / Rounded / Subrounded	Relative Density Low / Med / High	Dry Strength None / Very Low / Low / Medium / High / Very High	Plasticity None / Low / Medium / High	Consistency Soft / Firm / Stiff / Very Stiff / Hard	Cementation None / Light / Moderate / Heavy
1					slightly		SILTY SANDY CLAY; Tan	CL	1"			Tr	10	70	X	XXX	XX	X	X	X	XX
2					damp								30	85							
3																					
4							SILTY SAND & GRAVEL; Brown-Gray	GC/SC			5	30	30	15	X	XX X	XX	X	X		XX
5											15	40	40	25							
6																					
7																					
8							Refusal @ 6'														
9							No groundwater encountered														
10																					
1																					
2																					
3																					
4																					
5																					
6																					
7																					
8																					
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E

SOIL BORING DATA

Location of Boring: Adobe Dam No. P23 Job No. 812-233

Elev. Top of Hole: 1347 Datum: Prepared By: PT Date: 4-21-78

Type/Size of Boring: Backhoe Date: 4-21-78 Driller: EE Reviewed By: KLR Date: 4-25-78

Depth Ft.	Penetration Resistance Blows/Ft. C	Penetration Resistance Blows/Ft. N	Sample Type	Dry Density pcf	Moisture Content	Graphical Log	Description	Soil Classification	Max. Size. In.	Particle Size Distribution % Boulders	Cobbles	Gravel	Sand	Silt & Clay	Gradation Well / Med. / Poor	Grain Shape Angular / Subangular / Rounded / Subrounded	Relative Density Low / Med / High	Dry Strength None / Very Low / Low / Medium / High / Very High	Plasticity None / Low / Medium / High	Consistency Soft / Firm / Stiff / Very Stiff / Hard	Cementation None / Light / Moderate / Heavy
1					slightly		SANDY SILTY GRAVEL; Tan-Gray	GM	2"	Tr	5	40	30	5	X	xx	X				X
2					damp		Gravel increases w/depth.				15	50	40	15							
3																					
4																					
5					dry		GRAVELLY SAND; Black-Gray	SP/SW	4"		Tr	30	55	Tr	xx	xxx	X	X	X		X
6					to		Predominantly fine-coarse sand;					40	65								
7					slightly		fine-coarse gravel; trace fine														
8					damp		cobbles.														
9																					
10																					
1							Stopped @ 9'														
2							No groundwater encountered														
3																					
4																					
5																					
6																					
7																					
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20																					
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E

SOIL BORING DATA

Location of Boring: Adobe Dam No. P24 Job No. 812-233

Elev. Top of Hole: 1345 Datum: Prepared By: PT Date: 4-24-78

Type/Size of Boring: Backhoe Date: 4-24-78 Driller: EE Reviewed By: KLR Date: 4-25-78

Depth Ft.	Penetration Resistance Blows/Ft. C	Penetration Resistance Blows/Ft. N	Sample Type	Dry Density pcf	Moisture Content	Graphical Log	Description	Soil Classification	Max. Size, In.	Particle Size Distribution % Boulders	Cobbles	Gravel	Sand	Silt & Clay	Gradation Well	Gradation Med.	Gradation Poor	Grain Shape Angular	Grain Shape Subangular	Grain Shape Rounded	Grain Shape Subrounded	Relative Density Low	Relative Density Med	Relative Density High	Dry Strength None	Dry Strength Very Low	Dry Strength Low	Dry Strength Medium	Dry Strength High	Dry Strength Very High	Plasticity None	Plasticity Low	Plasticity Medium	Plasticity High	Consistency Soft	Consistency Firm	Consistency Stiff	Consistency Very Stiff	Consistency Hard	Cementation None	Cementation Light	Cementation Moderate	Cementation Heavy
1					slightly		CLAYEY GRAVELLY SAND-SANDY GRAVELLY	SC/	2"			Tr	40	35			X	XXX		XXX							X			X				XX				XX			
2					damp		CLAY; Brown	CL				15	50	50																												
3																																											
4																																											
5																																											
6					slightly		GRAVELLY SAND; Black-Gray	SP/SW	4"		Tr	30	55	Tr	XX			XXX			X	X						X										XX		
7					damp		Predominantly fine-coarse sand;					40	65																													
8					to		fine-coarse gravel; trace fine																																XX		
9					dry		cobbles.																																X			
10																																											
1					slightly		SANDY CLAY; Brown	CL	#4				20	70				XXX			XX							X		XX					X				XX		
2					damp		Predominantly fine sand.						30	80																												
3																																											
4																																											
5							Stopped @ 12'																																				
6							No groundwater encountered																																				
7																																											
8																																											
9																																											
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E

SOIL BORING DATA

Location of Boring: Adobe Dam No. P25 Job No. 812-233

Elev. Top of Hole: 1347 Datum: Prepared By: PT Date: 4-24-78

Type/Size of Boring: Backhoe Date: 4-24-78 Driller: EE Reviewed By: KLR Date: 4-25-78

Depth Ft.	Penetration Resistance Blows/Ft. C	N	Sample Type	Dry Density pcf	Moisture Content	Graphical Log	Description	Soil Classification	Max. Size, In.	Particle Size Distribution % Boulders	Cobbles	Gravel	Sand	Silt & Clay	Gradation Well Med. Poor	Grain Shape Angular Subangular Rounded Subrounded	Relative Density Low Med High	Dry Strength None Very Low Low Medium High Very High	Plasticity None Low Medium High	Consistency Soft Firm Stiff Very Stiff Hard	Cementation None Light Moderate Heavy
1					damp		FINE TO COARSE SAND AND GRAVEL	SP-		Tr	5	55	45	5	X	XXXX	X	X	X		X
2							WITH OCCASIONAL COBBLES & TRACE	GW				40	60								
3							SILT & CLAY; Brown and Gray														
4																					
5																					
6					damp		GRAVELLY CLAYEY SAND; Brown	SC	12"		10	20	40	10	X	XXX	X	X	X		X
7											20	30	50	20							
8																					
9																					
10																					
1							Stopped @ 9½'														
2							No groundwater encountered														
3																					
4																					
5																					
6																					
7																					
8																					
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E

SOIL BORING DATA

Location of Boring: Adobe Dam No. P26 Job No. 812-233

Elev. Top of Hole: 1333 Datum: Prepared By: PT Date: 4-24-78

Type/Size of Boring: Backhoe Date: 4-24-78 Driller: EE Reviewed By: KLR Date: 4-25-78

Depth Ft.	Penetration Resistance Blows/Ft. C	Penetration Resistance Blows/Ft. N	Sample Type	Dry Density pcf	Moisture Content	Graphical Log	Description	Soil Classification	Max. Size. In.	Particle Size Distribution % Boulders	Cobbles	Gravel	Sand	Silt & Clay	Gradation Well Med. Poor	Grain Shape Angular Subangular Rounded Subrounded	Relative Density Low Med High	Dry Strength None Very Low Low Medium High Very High	Plasticity None Low Medium High	Consistency Soft Firm Stiff Very Stiff Hard	Cementation None Light Moderate Heavy
1					damp		SILTY SAND; Light Brown	SM/ML	#4				40	40		XXX	X	XX	XX	XX	X
2					to								60	60							
3					slightly																
4					damp																
5																					
6																					
7					slightly		GRAVELLY SAND; Brown-Gray; Fine-	SP	12"		Tr	30	70	Tr	X	XXX	X	X	X	X	X
8					damp		coarse sand.					40	95								
9					to damp																
10																					
1																					
2							Stopped @ 10'														
3							No groundwater encountered														
4																					
5																					
6																					
7																					
8																					
9																					
20																					
1																					
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NOTE: THE DATA PRESENTED ON THESE BORING LOGS REPRESENTS SUBSURFACE CONDITIONS ONLY AT THE SPECIFIC TEST LOCATIONS AND AT THE TIME DESIGNATED. THIS DATA MAY NOT REPRESENT CONDITIONS AT OTHER LOCATIONS AND/OR TIMES. THIS BORING DATA WAS COMPILED PRIMARILY FOR DESIGN PURPOSES. THIS DATA SHOULD NOT BE CONSTRUED AS PART OF THE PLANS GOVERNING CONSTRUCTION OR AS DEFINING CONSTRUCTION TECHNIQUES.

SOIL BORING DATA

Location of Boring: Adobe Dam No. P27 Job No. 812-233

Elev. Top of Hole: 1343 Datum: Prepared By: PT Date: 4-24-78

Type/Size of Boring: Backhoe Date: 4-24-78 Driller: Withrow Reviewed By: KLR Date: 4-25-78

Depth Ft.	Penetration Resistance Blows/Ft. C	Penetration Resistance Blows/Ft. N	Sample Type	Dry Density pcf	Moisture Content	Graphical Log	Description	Soil Classification	Max. Size. In.	Particle Size Distribution % Boulders	Cobbles	Gravel	Sand	Silt & Clay	Gradation Well Med. Poor	Grain Shape Angular Subangular Rounded Subrounded	Relative Density Low Med High	Dry Strength None Very Low Low Medium High Very High	Plasticity None Low Medium High	Consistency Soft Firm Stiff Very Stiff Hard	Cementation None Light Moderate Heavy
1				slightly			CLAYEY GRAVELLY SAND; Gray to	SC	2"			5	60	15		XXX X	X	X	X		XX
2					damp		Brown					15	70	35							
3																					
4																					
5				slightly			SANDY SILTY GRAVEL & COBBLES;	GM/GP	1½'	Tr	40	20	15	5	X	XXX	XXX	X	XX		X
6					damp		Brown-Gray				50	30	25	15							
7					to																
8					dry		SILTY GRAVELLY SAND; Brown-Tan	GM/SM	9"		Tr	30	40	5		XXXXX	XX	X	XX	X	X
9											10	40	50	10							
10																					
1																					
2							Refusal @ 9½'														
3							No groundwater encountered														
4																					
5																					
6																					
7																					
8																					
9																					
20																					
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NOTE: THE DATA PRESENTED ON THESE BORING LOGS REPRESENTS SUBSURFACE CONDITIONS ONLY AT THE SPECIFIC TEST LOCATIONS AND AT THE TIME DESIGNATED. THIS DATA MAY NOT REPRESENT CONDITIONS AT OTHER LOCATIONS AND/OR TIMES. THIS BORING DATA WAS COMPILED PRIMARILY FOR DESIGN PURPOSES. THIS DATA SHOULD NOT BE CONSTRUED AS PART OF THE PLANS GOVERNING CONSTRUCTION OR AS DEFINING CONSTRUCTION TECHNIQUES.

E

SOIL BORING DATA

Location of Boring: Adobe Dam No. P28 Job No. 812-233

Elev. Top of Hole: 1340 Datum: Prepared By: PT Date: 4-24-78

Type/Size of Boring: Backhoe Date: 4-24-78 Driller: Withrow Reviewed By: KLR Date: 4-25-78

Depth Ft.	Penetration Resistance Blows/Ft. C	Penetration Resistance Blows/Ft. N	Sample Type	Dry Density pcf	Moisture Content	Graphical Log	Description	Soil Classification	Max. Size. In.	Particle Size Distribution % Boulders	Cobbles	Gravel	Sand	Silt & Clay	Gradation Well Med. Poor	Grain Shape Angular Subangular Rounded Subrounded	Relative Density Low Med High	Dry Strength None Very Low Low Medium High Very High	Plasticity None Low Medium High	Consistency Soft Firm Stiff Very Stiff Hard	Cementation None Light Moderate Heavy
1					slightly		SILTY SAND; Light Brown-Tan	SM	1½"			Tr	50	30		XXX	XX	X	X		X
2					damp								70	45							
3																					
4																					
5					slightly		SANDY SILTY GRAVEL & COBBLES;	GM/SP	12"	Tr	40	20	15	5	X	XXX	XXX		XX		X
6					damp to		Brown-Gray				50	30	25	15							
7					dry																
8																					
9																					
10																					
1																					
2							Refusal @ 10'														
3							No groundwater encountered														
4																					
5																					
6																					
7																					
8																					
9																					
20																					
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NOTE: THE DATA PRESENTED ON THESE BORING LOGS REPRESENTS SUBSURFACE CONDITIONS ONLY AT THE SPECIFIC TEST LOCATIONS AND AT THE TIME DESIGNATED. THIS DATA MAY NOT REPRESENT CONDITIONS AT OTHER LOCATIONS AND/OR TIMES. THIS BORING DATA WAS COMPILED PRIMARILY FOR DESIGN PURPOSES. THIS DATA SHOULD NOT BE CONSTRUED AS PART OF THE PLANS GOVERNING CONSTRUCTION OR AS DEFINING CONSTRUCTION TECHNIQUES.

E

SOIL BORING DATA

Location of Boring: Adobe Dam No.: P29 Job No.: 812-233

Elev. Top of Hole: 1336 Datum: Prepared By: PT Date: 4-24-78

Type/Size of Boring: Backhoe Date: 4-24-78 Driller: Withrow Reviewed By: KLR Date: 4-25-78

Depth Ft.	Penetration Resistance Blows/Ft. C	Penetration Resistance Blows/Ft. N	Sample Type	Dry Density pcf	Moisture Content	Graphical Log	Description	Soil Classification	Max. Size. In.	Particle Size Distribution % Boulders	Cobbles	Gravel	Sand	Silt & Clay	Gradation Well Med. Poor	Grain Shape Angular Subangular Rounded Subrounded	Relative Density Low Med High	Dry Strength None Very Low Low Medium High Very High	Plasticity None Low Medium High	Consistency Soft Firm Stiff Very Stiff Hard	Cementation None Light Moderate Heavy
1					slightly		SILTY SAND; Light Brown	SM	1½"			Tr	50	30		xxx	xx	xx	sli.		x
2					damp to								70	45							
3					dry																
4																					
5																					
6					slightly		SILTY GRAVELLY SAND; Brown-Gray	SM/SP	7"		Tr	10	60	5	xxx	xx	x	x	x		x
7					damp to		Fine-coarse sand; fine-coarse					25	85	15							
8					dry		gravel; trace predominantly fine														
9							cobbles.														
10																					
1																					
2																					
3							Stopped @ 11'														
4							No groundwater encountered														
5																					
6																					
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NOTE: THE DATA PRESENTED ON THESE BORING LOGS REPRESENTS SUBSURFACE CONDITIONS ONLY AT THE SPECIFIC TEST LOCATIONS AND AT THE TIME DESIGNATED. THIS DATA MAY NOT REPRESENT CONDITIONS AT OTHER LOCATIONS AND/OR TIMES. THIS BORING DATA WAS COMPILED PRIMARILY FOR DESIGN PURPOSES. THIS DATA SHOULD NOT BE CONSTRUED AS PART OF THE PLANS GOVERNING CONSTRUCTION OR AS DEFINING CONSTRUCTION TECHNIQUES.

E

SOIL BORING DATA

Location of Boring: Adobe Dam No. P30 Job No. 812-233

Elev. Top of Hole: 1331 Datum: Prepared By: PT Date: 4-24-78

Type/Size of Boring: Backhoe Date: 4-24-78 Driller: Withrow Reviewed By: KLR Date: 4-25-78

Depth Ft.	Penetration Resistance Blows/Ft C	Penetration Resistance Blows/Ft N	Sample Type	Dry Density pcf	Moisture Content	Graphical Log	Description	Soil Classification	Max. Size, In.	Particle Size Distribution % Boulders	Cobbles	Gravel	Sand	Silt & Clay	Gradation Well Med. Poor	Grain Shape Angular Subangular Rounded Subrounded	Relative Density Low Med High	Dry Strength None Very Low Low Medium High Very High	Plasticity None Low Medium High	Consistency Soft Firm Stiff Very Stiff Hard	Cementation None Light Moderate Heavy
1				slightly			FINE TO COARSE SAND AND GRAVEL WITH	SP-		Tr	<5	55	45	<5	x	xxxx	x	x	x		x
2				damp			OCCASIONAL COBBLES & TRACE SILT &	GW		to		40	60								
3				to			CLAY; Brown and Gray			some											
4				damp			Increased clay content below 3½'.			below											
5										5'											
6																					
7																					
8																					
9																					
10																					
1																					
2							Stopped @ 10'														
3							No groundwater encountered														
4																					
5																					
6																					
7																					
8																					
9																					
20																					
1																					
2																					
3																					
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E

SOIL BORING DATA

Location of Boring: Adobe Dam No. P31 Job No. 812-233

Elev. Top of Hole: 1351 Datum: Prepared By: PT Date: 4-24-78

Type/Size of Boring: Backhoe Date: 4-24-78 Driller: Withrow Reviewed By: KLR Date: 4-25-78

Depth Ft.	Penetration Resistance Blows/Ft. C	Penetration Resistance Blows/Ft. N	Sample Type	Dry Density pcf	Moisture Content	Graphical Log	Description	Soil Classification	Max. Size. In.	Particle Size Distribution % Boulders	Cobbles	Gravel	Sand	Silt & Clay	Gradation Well Med. Poor	Grain Shape Angular Subangular Rounded Subrounded	Relative Density Low Med High	Dry Strength None Very Low Low Medium High Very High	Plasticity None Low Medium High	Consistency Soft Firm Stiff Very Stiff Hard	Cementation None Light Moderate Heavy
1					slightly		SILTY SAND & GRAVEL; Brown-Gray	GC/SC			5	30	30	15	X	XX X	XX	X	X		XX
2					damp to						15	40	40	25							
3					dry																
4																					
5							Refusal @ 3½'														
6							No groundwater encountered														
7																					
8																					
9																					
10																					
1																					
2																					
3																					
4																					
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30																					

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E

SOIL BORING DATA

Location of Boring: Adobe Dam No. P32 Job No. 812-233

Elev. Top of Hole: 1353 Datum: Prepared By: PT Date: 4-24-78

Type/Size of Boring: Backhoe Date: 4-24-78 Driller: Withrow Reviewed By: KLR Date: 4-25-78

Depth Ft.	Penetration Resistance Blows/Ft. C	N	Sample Type	Dry Density pcf	Moisture Content	Graphical Log	Description	Soil Classification	Max. Size, In.	Particle Size Distribution % Boulders	Cobbles	Gravel	Sand	Silt & Clay	Gradation Well / Med. / Poor	Grain Shape Angular / Subangular / Rounded / Subrounded	Relative Density Low / Med / High	Dry Strength None / Very Low / Low / Medium / High / Very High	Plasticity None / Low / Medium / High	Consistency Soft / Firm / Stiff / Very Stiff / Hard	Cementation None / Light / Moderate / Heavy
1					slightly		SANDY GRAVELLY CLAY;	CL	3"			10	20	50		XXX	X		X	XX	X	X
2					damp							20	30	60								
3					to																	
4					dry																	
5							SILTY GRAVELLY SAND; Brown-Tan	GM/SM	9"		Tr	30	40	5		XXXXX	XX	X	XX	X	X	X
6											10	40	50	10								
7																						
8																						
9							Stopped @ 8'-Extensive caving															
10							No groundwater encountered															
1																						
2																						
3																						
4																						
5																						
6																						
7																						
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E

SOIL BORING DATA

Location of Boring: Adobe Dam No. P33 Job No. 812-233

Elev. Top of Hole: 1352 Datum: Prepared By: PT Date: 4-24-78

Type/Size of Boring: Backhoe Date: 4-24-78 Driller: Withrow Reviewed By: KLR Date: 4-25-78

Depth Ft.	Penetration Resistance Blows/Ft. C	Penetration Resistance Blows/Ft. N	Sample Type	Dry Density pcf	Moisture Content	Graphical Log	Description	Soil Classification	Max. Size, In.	Particle Size Distribution % Boulders	Cobbles	Gravel	Sand	Silt & Clay	Gradation Well / Med. / Poor	Grain Shape Angular / Subangular / Rounded / Subrounded	Relative Density Low / Med / High	Dry Strength None / Very Low / Low / Medium / High / Very High	Plasticity None / Low / Medium / High	Consistency Soft / Firm / Stiff / Very Stiff / Hard	Cementation None / Light / Moderate / Heavy
1							SANDY GRAVELLY CLAY;	CL	3"			10	20	50	X	XX	X	X	XX	X	X
2												20	30	60							
3																					
4																					
5																					
6																					
7																					
8																					
9							Stopped @ 7'														
10							No groundwater encountered														
1																					
2																					
3																					
4																					
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E

SOIL BORING DATA

Location of Boring: Adobe Dam · No. P34 · Job No. 812-233

Elev. Top of Hole: 1354 · Datum: · Prepared By: PT · Date: 4-24-78

Type/Size of Boring: Backhoe · Date: 4-24-78 · Driller: Withrow · Reviewed By: KLR · Date: 4-25-78

Depth Ft.	Penetration Resistance Blows/Ft. C	N	Sample Type	Dry Density pcf	Moisture Content	Graphical Log	Description	Soil Classification	Max. Size. In.	Particle Size Distribution % Boulders	Cobbles	Gravel	Sand	Silt & Clay	Gradation Well / Med. / Poor	Grain Shape Angular / Subangular / Rounded / Subrounded	Relative Density Low / Med / High	Dry Strength None / Very Low / Low / Medium / High / Very High	Plasticity None / Low / Medium / High	Consistency Soft / Firm / Stiff / Very Stiff / Hard	Cementation None / Light / Moderate / Heavy
1					slightly		SANDY GRAVELLY CLAY;	CL	3"			10	20	50	X	XX	X	X	XX	X	X
2					damp							20	30	60							
3					to																
4					dry																
5																					
6							SILTY GRAVELLY SAND; Brown-Tan	GM/SM	9"		Tr	30	40	5	X	XXXX	XX	X	XX	X	X
7											10	40	50	10							
8																					
9																					
10							Refusal @ 7½'														
1							No groundwater encountered														
2																					
3																					
4																					
5																					
6																					
7																					
8																					
9																					
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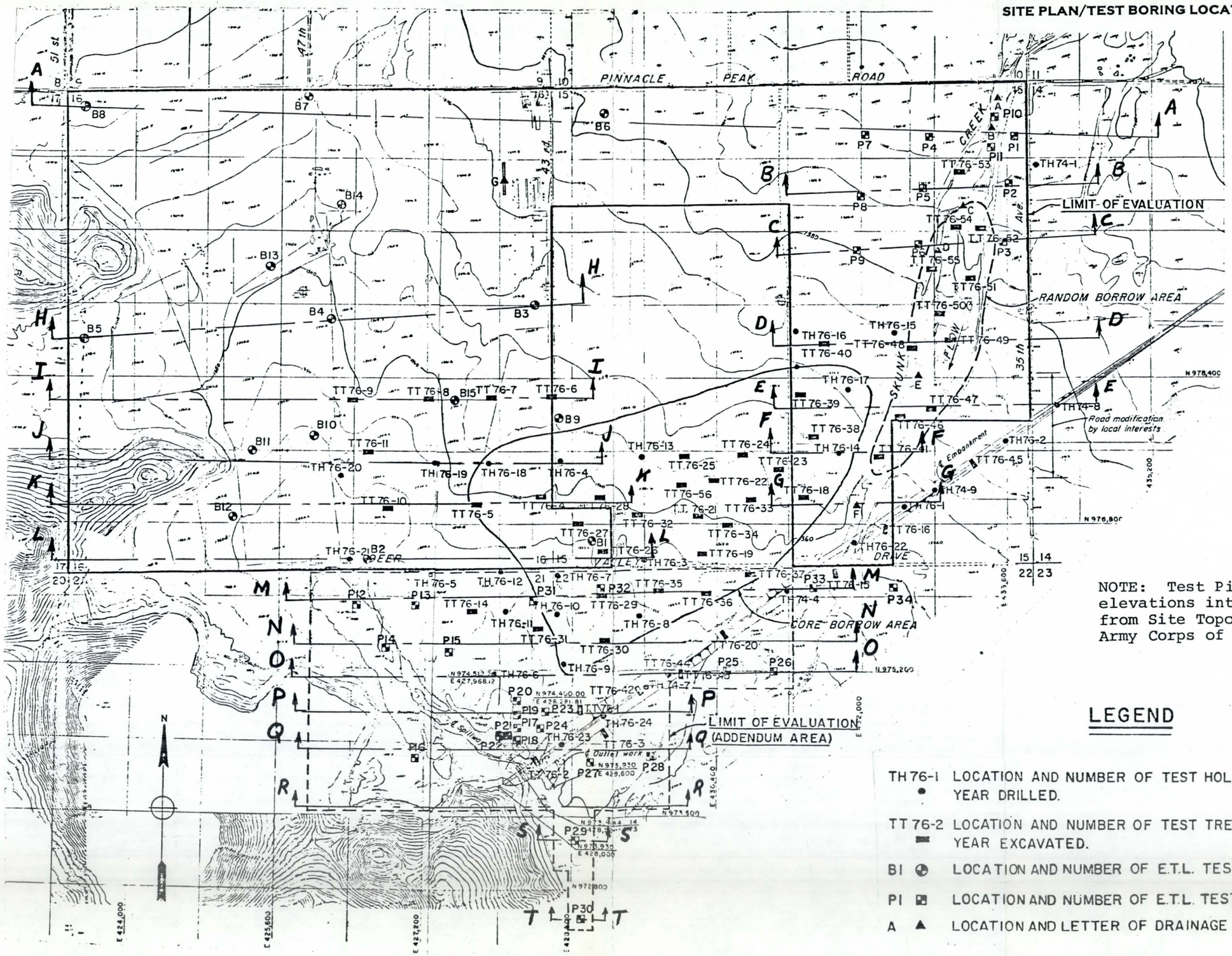
Job No. 812-233

SITE PLAN/TEST BORING LOCATION