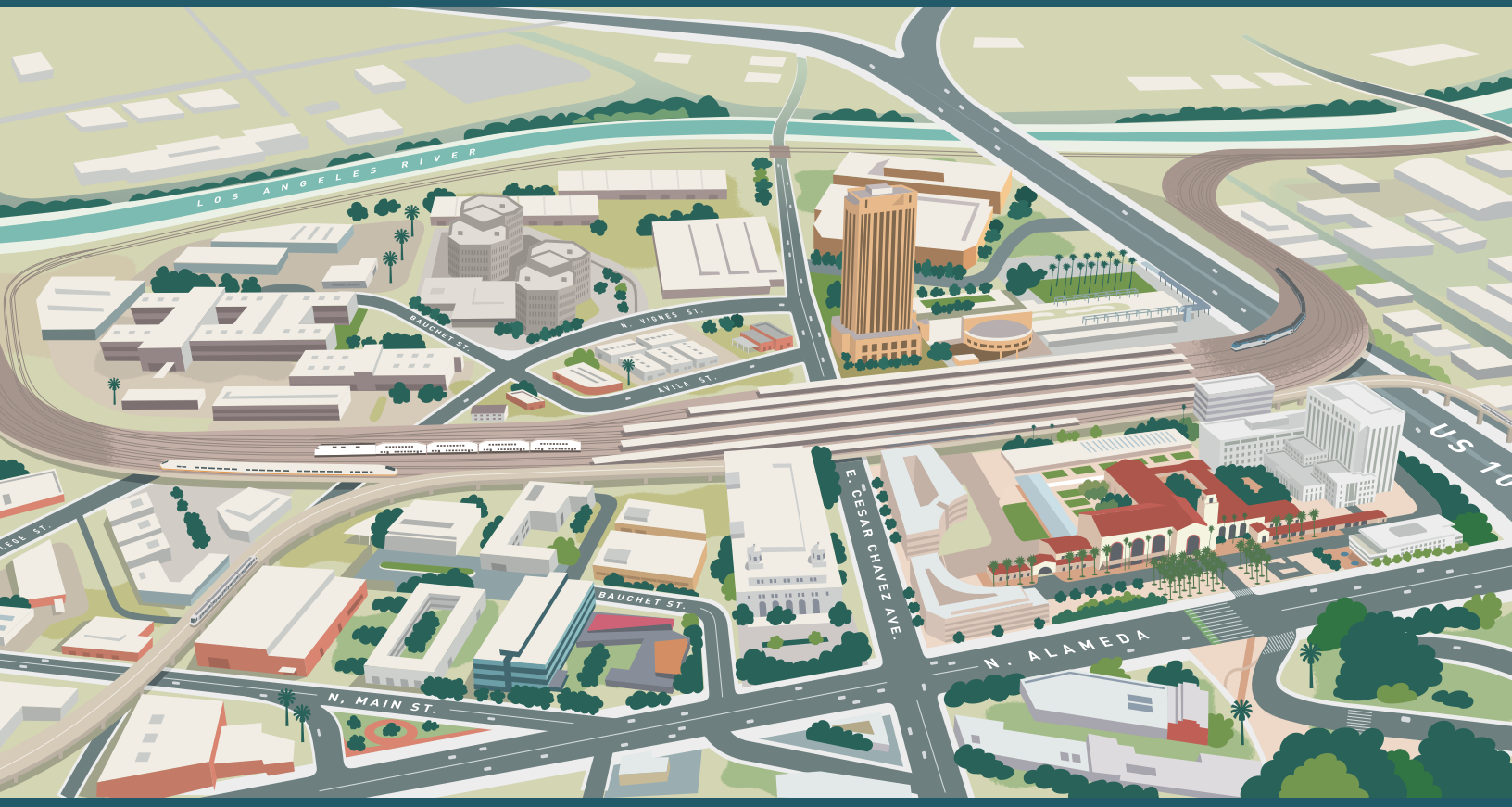
Los Angeles County
Metropolitan Transportation Authority

Link Union Station

Preliminary Geotechnical Report

July 2016



Metro

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Appendix C:
Existing Geotechnical Boring Logs

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Existing Geotechnical Boring Logs
ARCADIS, 2014

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SOIL DESCRIPTION

Soil descriptions on the exploration logs are based on visual observations and laboratory testing on selected samples.

MOISTURE

Dry	Little perceptible moisture
Damp	Below optimum moisture for compaction
Moist	Likely near optimum moisture content
Wet	Likely wet of optimum moisture content
Saturated	Probably below water table or in perched groundwater

SAMPLE TYPE SYMBOLS

MCS 2.0 = Modified California (ID 1.9 inch with liner)
CT = Cuttings
CR = Core Run
ST = Shelby Tube

TEST SYMBOLS

MC	Moisture Content
GS	Grain Size
AL	Atterberg Limits
SG	Specific Gravity
DT	Density Test
OG	Organic Content
CN	Consolidation
UU	Unconsolidated Undrained Triaxial
CU	Consolidated Undrained Triaxial
UC	Unconfined Compression
DS	Direct Shear
K	Permeability
PP	Pocket Penetrometer in tons/ft^2
CT	Corrosivity Test
PID	Photoionization Detector Reading
CA	Chemical Analysis

KEY TO EXPLORATION LOGS

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Date Start/Finish: 8/19/14

Drilling Company: Jet Drilling

Driller's Name: Gary Buss

Drilling Method: Hollow Stem Auger

Rig Type: CME 75

Sampling Method: CA Modified Split Spoon

Northing: NA
Easting: NA
Casing Elevation: NA

Borehole Depth: 50 ft
Borehole Diameter: 8"
Surface Elevation: NA
Descriptions By: Brent Anderson

Well/Boring ID: **B-01**

Client: Los Angeles Metropolitan Transportation Authority

Location: MTA Metro
410 Center Street
Los Angeles, California

DEPTH	Sample ID	Sample Type	Recovery (feet)	Blow Counts	PID (ppm)	Lab Tests	USCS Code	Geologic Column	Stratigraphic Description
0									Gravel and asphalt debris.
					0.0		SW		WELL GRADED SAND Fill (20, 80, 0, 0), olive brown (2.5Y 4/3), dry, subangular, with little fine- to coarse-grained gravel.
	B-01-5	MCS 2.0	1.5	4 5 12	0.0	GS, MC, DT	SW		WELL GRADED SAND (18, 84, 2, 0), brown (10YR 4/3), dry, medium- to coarse-grained, subangular to angular.
5									
	B-01-10	MCS 2.0	1.5	11 18 15	0.0	DS	SW		WELL GRADED SAND (0, 95, 5, 0), brown (10YR 4/3), dry, medium-grained, subangular.
10									
	B-01-15	MCS 2.0	1.5	12 23 32	0.0	GS, MC, DT	SW		WELL GRADED SAND WITH GRAVEL (14, 82, 4, 0), light brownish gray (10YR 6/2), dry, medium- to very coarse-grained, angular.
15									

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Remarks:
amsl = above mean sea level; bgs = below ground surface; Dia. = diameter; ft/' = feet, NA = not applicable/available; ppm = parts per million

(5, 95, 0, 0) = %(gravel, sand, silt, clay)

▽ = First Encountered Water ○ = Static Water

Water Level Data

Date		Depth	Elev.
8/19/14	▽	30 ft bgs	NA ft amsl
NA	○	NA btoc	NA ft amsl

Client: Los Angeles Metropolitan Transportation Authority

Well/Boring ID: **B-01**

Site Location:
MTA Metro
410 Center Street
Los Angeles, California

Borehole Depth: 50 ft

DEPTH	Sample ID	Sample Type	Recovery (feet)	Blow Counts	PID (ppm)	Lab Tests	USCS Code	Geologic Column	Stratigraphic Description
20	B-01-20	MCS 2.0	1.5	17 45 50	0.0		SW		WELL GRADED SAND (20, 80, 0, 0), dark yellowish brown (10YR 4/4), dry, medium- to very coarse-grained, angular.
25	B-01-26	MCS 2.0	1.5	25 28 30		GS, MC, DT	SW		WELL GRADED SAND (16, 78, 6, 0), dark yellowish brown (10YR 4/4), dry, medium- to coarse-grained, subangular.
30	B-01-30	MCS 2.0	1.5	41 32 23	3.2	GS, MC, DT	GP		Poorly Graded GRAVEL, pulverized.
35	B-01-35	MCS 2.0	0.8	50 50		GS, MC, DT	GP		Same as above.

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(5, 95, 0, 0) = %(gravel, sand, silt, clay)

▽ = First Encountered Water ○ = Static Water

Water Level Data

Date		Depth	Elev.
8/19/14	▽	30 ft bgs	NA ft amsl
NA	○	NA btoc	NA ft amsl

Project: LO492301.0000 Template:G:\Projects\LogPlot\Logs\LO490000\LO492301\0000\ldfx and dat temp...\boring_well HSA 2007 analytical USCS WL_25 ft per p
Data File: B-01.dat Date: 10/23/2014 Created/Edited by: Geoff Bishop

Client: Los Angeles Metropolitan Transportation Authority

Well/Boring ID: **B-01**

Site Location:
MTA Metro
410 Center Street
Los Angeles, California

Borehole Depth: 50 ft

DEPTH	Sample ID	Sample Type	Recovery (feet)	Blow Counts	PID (ppm)	Lab Tests	USCS Code	Geologic Column	Stratigraphic Description
40	B-01-40	MCS 2.0	0.8	45 50	9.8		GP		Poorly Graded GRAVEL WITH SAND (55, 45, 0, 0), dark gray (10YR 4/1), wet, coarse gravel with medium- to very coarse-grained sand.
45	B-01-45	MCS 2.0	0.8	27 50	0.0		SP		POORLY GRADED SAND (25, 75, 0, 0), dark grayish brown (2.5Y 4/2), wet, medium- to coarse-grained, subangular, with some fine to coarse gravel, some larger rock fragments.
50	B-01-50	MCS 2.0	0.8	28 50	0.0		SP		POORLY GRADED SAND (0, 100, 0, 0), dark gray (2.5Y 4/1), wet, coarse-grained, subangular to angular, compacted.
									Bottom of boring at 50 ft bgs.
55									

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Remarks:
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(5, 95, 0, 0) = %(gravel, sand, silt, clay)

▽ = First Encountered Water ○ = Static Water

Water Level Data

Date		Depth	Elev.
8/19/14	▽	30 ft bgs	NA ft amsl
NA	○	NA btoc	NA ft amsl

Date Start/Finish: 8/26/14

Drilling Company: Jet Drilling

Driller's Name: Gary Buss

Drilling Method: Mud Rotary

Rig Type: CME 75

Sampling Method: CA Modified Split Spoon

Northing: NA
Easting: NA
Casing Elevation: NA

Borehole Depth: 50 ft
Borehole Diameter: 8.25"
Surface Elevation: NA
Descriptions By: Ali Zafarani

Well/Boring ID: **B-02**

Client: Los Angeles Metropolitan Transportation Authority

Location: MTA Metro
410 Center Street
Los Angeles, California

DEPTH	Sample ID	Sample Type	Recovery (feet)	Blow Counts	PID (ppm)	Lab Tests	USCS Code	Geologic Column	Stratigraphic Description
0									
									4" Asphalt at surface.
									3' Concrete slab.
5									
	B-02-9	MCS 2.0	1.0	7 12 20	0.0	GS, MC	SW		WELL GRADED SAND (11, 82, 7, 0), pale brown (10YR 6/3), dry, fine- to coarse-grained, subrounded, fine to medium gravel.
10									
	B-02-14	MCS 2.0	0.9	20 34 38	0.0		SW		Same as above.
15									
				12			SW		WELL GRADED SAND (8, 86, 6, 0), brown (10YR 5/3), dry, fine- to coarse-grained, subrounded, trace gravel.

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(5, 95, 0, 0) = %(gravel, sand, silt, clay)

▽ = First Encountered Water ○ = Static Water

Water Level Data

Date		Depth	Elev.
8/26/14	▽	NA ft bgs	NA ft amsl
NA	○	NA btoc	NA ft amsl

Client: Los Angeles Metropolitan Transportation Authority

Well/Boring ID: **B-02**

Site Location:
MTA Metro
410 Center Street
Los Angeles, California

Borehole Depth: 50 ft

DEPTH	Sample ID	Sample Type	Recovery (feet)	Blow Counts	PID (ppm)	Lab Tests	USCS Code	Geologic Column	Stratigraphic Description
	B-02-19	MCS 2.0	0.9	22 28	0.0	GS, MC	SW		
20									
	B-02-23	MCS 2.0	0.9	27 50-5"	0.0		GP		POORLY GRADED GRAVEL (66, 32, 2, 0), dark yellowish brown (10YR 4/4), dry, fine- to coarse-grained, fine gravel.
25									
	B-02-28	MCS 2.0	0.5	36 50-5"	0.0	GS, MC	GP		Same as above.
30									
	B-02-33	MCS 2.0	0.7	40 50-5"	1.7		SW		WELL GRADED SAND (5, 95, 0, 0), very dark gray (10YR 3/1), wet, fine- to coarse-grained, subangular, trace fine to medium gravel.
35									

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(5, 95, 0, 0) = %(gravel, sand, silt, clay)

▽ = First Encountered Water ○ = Static Water

Water Level Data

Date		Depth	Elev.
8/26/14	▽	NA ft bgs	NA ft amsl
NA	○	NA btoc	NA ft amsl

Project: LO492301.0000 Template:G:\Projects\LogPlot\Logs\LO490000\LO492301\0000\ldfx and dat temp...\boring_well HSA 2007 analytical USCS WL_25 ft per p
Data File: B-02.dat Date: 10/23/2014 Created/Edited by: Geoff Bishop

Client: Los Angeles Metropolitan Transportation Authority

Well/Boring ID: **B-02**

Site Location:
MTA Metro
410 Center Street
Los Angeles, California

Borehole Depth: 50 ft

DEPTH	Sample ID	Sample Type	Recovery (feet)	Blow Counts	PID (ppm)	Lab Tests	USCS Code	Geologic Column	Stratigraphic Description
	B-02-39	MCS 2.0	1.3	45 48 50-2"	0.0		SW		Same as above.
40									
	B-02-43	MCS 2.0	0.3	50 50-3"			SW		WELL GRADED SAND (30, 70, 0, 0), very dark gray (10YR 3/1), wet, fine- to coarse-grained, subrounded, trace medium gravel and crushed rock.
45									
	B-02-49	MCS 2.0	1.2	50 45 45	0.0		SP		POORLY GRADED SAND (0, 98, 2, 0), very dark gray (10YR 3/1), wet, fine- to medium-grained, subrounded, trace silt.
50									Bottom of boring at 50 ft bgs.
55									

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(5, 95, 0, 0) = %(gravel, sand, silt, clay)

▽ = First Encountered Water ○ = Static Water

Water Level Data

Date		Depth	Elev.
8/26/14	▽	NA ft bgs	NA ft amsl
NA	○	NA btoc	NA ft amsl

Date Start/Finish: 8/20/14

Drilling Company: Jet Drilling

Driller's Name: Gary Buss

Drilling Method: Hollow Stem Auger

Rig Type: CME 75

Sampling Method: CA Modified Split Spoon

Northing: NA
Easting: NA
Casing Elevation: NA

Borehole Depth: 5 ft
Borehole Diameter: 8"
Surface Elevation: NA
Descriptions By: Brent Anderson

Well/Boring ID: **B-03**

Client: Los Angeles Metropolitan Transportation Authority

Location: MTA Metro
410 Center Street
Los Angeles, California

DEPTH	Sample ID	Sample Type	Recovery (feet)	Blow Counts	PID (ppm)	Lab Tests	USCS Code	Geologic Column	Stratigraphic Description
0									
					0.0		SP		POORLY GRADED SAND (0, 85, 15, 0), dry, fine grained, rounded.
					0.0		SP		POORLY GRADED SAND (0, 100, 0, 0), slightly moist, fine to medium grained, subangular.
5									Boring terminated @ 5 ft bgs due to unknown obstruction.
10									
15									

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Remarks:
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(5, 95, 0, 0) = %(gravel, sand, silt, clay)

▽ = First Encountered Water ○ = Static Water

Water Level Data

Date		Depth	Elev.
NA	▽	NA ft bgs	NA ft amsl
NA	○	NA btoc	NA ft amsl

Project: LO492301.0000 Template:G:\Projects\LogPlot\Logs\LO490000\LO492301\0000\ldfx and dat temp...\boring_well HSA 2007 analytical USCS WL_25 ft per p
Data File: B-02.dat Date: 10/23/2014 Created/Edited by: Geoff Bishop

Date Start/Finish: 8/22/14

Drilling Company: Jet Drilling

Driller's Name: Gary Buss

Drilling Method: Hollow Stem Auger

Rig Type: CME 75

Sampling Method: CA Modified Split Spoon

Northing: NA
Easting: NA
Casing Elevation: NA

Borehole Depth: 20 ft
Borehole Diameter: 8"
Surface Elevation: NA
Descriptions By: Brent Anderson

Well/Boring ID: **B-04**

Client: Los Angeles Metropolitan Transportation Authority

Location: MTA Metro
410 Center Street
Los Angeles, California

DEPTH	Sample ID	Sample Type	Recovery (feet)	Blow Counts	PID (ppm)	Lab Tests	USCS Code	Geologic Column	Stratigraphic Description
0									
									Decomposed brick mixed with fill, sand and trace fine gravel, metal debris.
5									Unknown fill objects impeading auger rods, concrete structure.
10									
15									Approximately 1' of concrete.

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(5, 95, 0, 0) = %(gravel, sand, silt, clay)

▽ = First Encountered Water ○ = Static Water

Water Level Data

Date		Depth	Elev.
NA	▽	NA ft bgs	NA ft amsl
NA	○	NA btoc	NA ft amsl

Project: LO492301.0000 Template:G:\Projects\LogPlot\Logs\LO490000\LO492301\0000\ldfx and dat temp...\boring_well HSA 2007 analytical USCS WL_25 ft per p
Data File: B-02.dat Date: 10/23/2014 Created/Edited by: Geoff Bishop

Client: Los Angeles Metropolitan Transportation Authority

Well/Boring ID: **B-04**

Site Location:
MTA Metro
410 Center Street
Los Angeles, California

Borehole Depth: 20 ft

DEPTH	Sample ID	Sample Type	Recovery (feet)	Blow Counts	PID (ppm)	Lab Tests	USCS Code	Geologic Column	Stratigraphic Description
20									Boring terminated @ ~20' bgs due to broken auger.
25									
30									
35									

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Remarks:
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(5, 95, 0, 0) = %(gravel, sand, silt, clay)

▽ = First Encountered Water ○ = Static Water

Water Level Data

Date		Depth	Elev.
NA	▽	NA ft bgs	NA ft amsl
NA	○	NA btoc	NA ft amsl

Project: LO492301.0000 Template:G:\Projects\LogPlot\Logs\LO490000\LO492301\0000\ldfx and dat temp...\boring_well HSA 2007 analytical USCS WL_25 ft per p
Data File: B-02.dat Date: 10/23/2014 Created/Edited by: Geoff Bishop

Date Start/Finish: 8/22/14 - 8/25/14

Drilling Company: Jet Drilling

Driller's Name: Gary Buss

Drilling Method: Mud Rotary

Rig Type: CME 75

Sampling Method: CA Modified Split Spoon

Northing: NA
Easting: NA
Casing Elevation: NA

Borehole Depth: 49 ft
Borehole Diameter: 8"
Surface Elevation: NA

Descriptions By: Brent Anderson (8/22)
James Gonzales (8/25)

Well/Boring ID: **B-05**

Client: Los Angeles Metropolitan Transportation Authority

Location: MTA Metro
410 Center Street
Los Angeles, California

DEPTH	Sample ID	Sample Type	Recovery (feet)	Blow Counts	PID (ppm)	Lab Tests	USCS Code	Geologic Column	Stratigraphic Description
0									
	B-05-5	MCS 2.0	1.5		0.0	CT	SP		POORLY GRADED SAND Fill (5, 95, 0, 0), brown (10YR 4/3), dry, medium dense, fine-grained, subrounded.
5									Concrete slab.
	B-05-10	MCS 2.0	1.2	5 6 10	0.0		SW		WELL GRADED SAND (25, 75, 0, 0), very dark gray (7.5YR 3/1), fine- to coarse-grained, subangular, organic matter present.
10									
15				16					WELL GRADED SAND (2, 89, 9, 0), very dark brown (10YR 2/2), medium- to coarse-grained, subrounded to

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Remarks:

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Drilled to 17.5 ft bgs on 8/22/14.

(5, 95, 0, 0) = %(gravel, sand, silt, clay)

▽ = First Encountered Water ○ = Static Water

Water Level Data

Date		Depth	Elev.
8/25/14	▽	NA ft bgs	NA ft amsl
NA	○	NA btoc	NA ft amsl

Client: Los Angeles Metropolitan Transportation Authority

Well/Boring ID: **B-05**

Site Location:
MTA Metro
410 Center Street
Los Angeles, California

Borehole Depth: 49 ft

DEPTH	Sample ID	Sample Type	Recovery (feet)	Blow Counts	PID (ppm)	Lab Tests	USCS Code	Geologic Column	Stratigraphic Description
	B-05-19	MCS 2.0	1.5	38 23	0.0	GS	SW		subangular, trace fine subangular gravel, trace silt.
20									
	B-05-24	MCS 2.0	1.5	22 31 50	0.0	GS	SW		WELL GRADED SAND (0, 90, 8, 2), very dark brown (10YR 2/2), medium- to coarse-grained, subrounded to subangular, trace fine subangular gravel, trace silt.
25									
	B-05-28	MCS 2.0	0.4	50-5"	0.0		SW		WELL GRADED SAND (20, 80, 0, 0), very dark grayish brown (10YR 3/2), medium- to coarse-grained, subrounded, fine to medium gravel.
30									
	B-05-33	MCS 2.0	0.75	50 50-3"	0.0		SW		Same as above.
35									

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Remarks:
amsl = above mean sea level; bgs = below ground surface; Dia. = diameter; ft/' = feet, NA = not applicable/available; ppm = parts per million

Drilled to 17.5 ft bgs on 8/22/14.

(5, 95, 0, 0) = %(gravel, sand, silt, clay)

▽ = First Encountered Water ○ = Static Water

Water Level Data

Date		Depth	Elev.
8/25/14	▽	NA ft bgs	NA ft amsl
NA	○	NA btoc	NA ft amsl

Client: Los Angeles Metropolitan Transportation Authority

Well/Boring ID: **B-05**

Site Location:
MTA Metro
410 Center Street
Los Angeles, California

Borehole Depth: 49 ft

DEPTH	Sample ID	Sample Type	Recovery (feet)	Blow Counts	PID (ppm)	Lab Tests	USCS Code	Geologic Column	Stratigraphic Description
	B-05-38	MCS 2.0	0.9	40 50-5"	0.0		SW		WELL GRADED SAND (35, 65, 0, 0), very dark gray (10YR 3/1), medium- to coarse-grained, subrounded, fine to medium gravel, rounded.
40									
	B-05-43	MCS 2.0	1.5	20 37 48			SW		WELL GRADED SAND (20, 79, 1, 0), very dark gray (10YR 3/1), subrounded, fine to coarse gravel, subangular, trace silt.
45									
	B-05-48	MCS 2.0	1.5	28 44 49			SW		Same as above.
									Bottom of boring at 49 ft bgs.
50									
55									

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Remarks:
amsl = above mean sea level; bgs = below ground surface; Dia. = diameter; ft/' = feet, NA = not applicable/available; ppm = parts per million

Drilled to 17.5 ft bgs on 8/22/14.

(5, 95, 0, 0) = %(gravel, sand, silt, clay)

▽ = First Encountered Water ○ = Static Water

Water Level Data

Date		Depth	Elev.
8/25/14	▽	NA ft bgs	NA ft amsl
NA	○	NA btoc	NA ft amsl

Date Start/Finish: 8/25/14

Drilling Company: Jet Drilling

Driller's Name: Gary Buss

Drilling Method: Mud Rotary

Rig Type: CME 75

Sampling Method: CA Modified Split Spoon

Northing: NA
Easting: NA
Casing Elevation: NA

Borehole Depth: 49 ft
Borehole Diameter: 8.25"
Surface Elevation: NA
Descriptions By: Ali Zafarani

Well/Boring ID: **B-06**

Client: Los Angeles Metropolitan Transportation Authority

Location: MTA Metro
410 Center Street
Los Angeles, California

DEPTH	Sample ID	Sample Type	Recovery (feet)	Blow Counts	PID (ppm)	Lab Tests	USCS Code	Geologic Column	Stratigraphic Description
0									
									4" Asphalt at surface.
							SW		Aggregate Base Fill.
5									6" Concrete slab.
	B-06-9	MCS 2.0	1.5	16 17 21	0.0		SW		WELL GRADED SAND (5, 95, 0, 0), brown (7.5YR 4/3), moist, fine- to coarse-grained, subrounded, fine to medium gravel, trace silt.
10									
	B-06-13	MCS 2.0	0.45	50-5"	0.0		SW		WELL GRADED SAND (5, 95, 0, 0), very dark gray (10YR 3/1), moist, medium- to coarse-grained, subangular, trace fine gravel, trace pulverized cobbles.
15									
				17			SW		WELL GRADED SAND (24, 72, 4, 0), very dark grayish brown (10YR 3/2), dry, fine- to coarse-grained, subrounded, fine

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Remarks:
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(5, 95, 0, 0) = %(gravel, sand, silt, clay)

▽ = First Encountered Water ○ = Static Water

Water Level Data

Date		Depth	Elev.
8/25/14	▽	NA ft bgs	NA ft amsl
NA	○	NA btoc	NA ft amsl

Client: Los Angeles Metropolitan Transportation Authority

Well/Boring ID: **B-06**

Site Location:
MTA Metro
410 Center Street
Los Angeles, California

Borehole Depth: 49 ft

DEPTH	Sample ID	Sample Type	Recovery (feet)	Blow Counts	PID (ppm)	Lab Tests	USCS Code	Geologic Column	Stratigraphic Description
	B-06-19	MCS 2.0	1.35	19 20	0.0	GS, MC	SW		gravel.
20									
	B-06-23	MCS 2.0	0.75	28 50-3"			SW		Same as above.
25									
	B-06-29	MCS 2.0	1.2	38 35 42	0.0	GS, MC	SW		WELL GRADED SAND (2, 92, 6, 0), very dark gray (10YR 3/1), moist, fine- to coarse-grained, subangular, trace gravel.
30									
	B-06-34	MCS 2.0	1.2	30 39 43	0.0		SW		Same as above.
35									

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Remarks:
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(5, 95, 0, 0) = %(gravel, sand, silt, clay)

▽ = First Encountered Water ○ = Static Water

Water Level Data

Date		Depth	Elev.
8/25/14	▽	NA ft bgs	NA ft amsl
NA	○	NA btoc	NA ft amsl

Client: Los Angeles Metropolitan Transportation Authority

Well/Boring ID: **B-06**

Site Location:
MTA Metro
410 Center Street
Los Angeles, California

Borehole Depth: 49 ft

DEPTH	Sample ID	Sample Type	Recovery (feet)	Blow Counts	PID (ppm)	Lab Tests	USCS Code	Geologic Column	Stratigraphic Description
		MCS 2.0	0.0						No Recovery.
40									
	B-06-43	MCS 2.0	0.45	50-5"	0.0		SW		WELL GRADED SAND (5, 95, 0, 0), black (10YR 2/1), wet, fine- to coarse-grained, subrounded, trace fine gravel.
45									
	B-06-48	MCS 2.0	1.35	40 42 50	2.1		SW		WELL GRADED SAND (5, 95, 0, 0), black (10YR 2/1), wet, fine- to coarse-grained, subrounded, trace medium gravel.
									Bottom of boring at 49 ft bgs.
50									
55									

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Remarks:
amsl = above mean sea level; bgs = below ground surface; Dia. = diameter; ft/' = feet, NA = not applicable/available; ppm = parts per million

(5, 95, 0, 0) = %(gravel, sand, silt, clay)

▽ = First Encountered Water ○ = Static Water

Water Level Data

Date		Depth	Elev.
8/25/14	▽	NA ft bgs	NA ft amsl
NA	○	NA btoc	NA ft amsl

Project: LO492301.0000 Template:G:\Projects\LogPlot\Logs\LO490000\LO492301\0000\ldfx and dat temp...\boring_well HSA 2007 analytical USCS WL_25 ft per p
Data File: B-06.dat Date: 10/23/2014 Created/Edited by: Geoff Bishop

Date Start/Finish: 8/21/14

Drilling Company: Jet Drilling

Driller's Name: Gary Buss

Drilling Method: Hollow Stem Auger

Rig Type: CME 75

Sampling Method: CA Modified Split Spoon

Northing: NA
Easting: NA
Casing Elevation: NA

Borehole Depth: 50 ft bgs
Borehole Diameter: 8"
Surface Elevation: NA
Descriptions By: Brent Anderson

Well/Boring ID: **B-07**

Client: Los Angeles Metropolitan Transportation Authority

Location: MTA Metro
410 Center Street
Los Angeles, California

DEPTH	Sample ID	Sample Type	Recovery (feet)	Blow Counts	PID (ppm)	Lab Tests	USCS Code	Geologic Column	Stratigraphic Description
0									
							SW		SAND Fill and asphalt debris.
5	B-07-5	MCS 2.0	0.5		0.0		SW		WELL GRADED SAND (5, 95, 0, 0), dark reddish brown (5YR 3/2), dry, fine- to very coarse-grained, subangular.
10	B-07-10	MCS 2.0	0.25	50-3"		GS, MC	SW		WELL GRADED SAND (12, 79, 9, 0), dark reddish brown (5YR 3/2), dry, fine- to very coarse-grained, subangular, poor recovery.
15	B-07-15	MCS 2.0	1.5	11 17 20	0.0	GS, MC	SW		WELL GRADED SAND (29, 66, 5, 0), brown (10YR 5/3), dry, fine- to coarse-grained, angular.

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Remarks:
amsl = above mean sea level; bgs = below ground surface; Dia. = diameter; ft/' = feet, NA = not applicable/available; ppm = parts per million

(5, 95, 0, 0) = %(gravel, sand, silt, clay)

▽ = First Encountered Water ○ = Static Water

Water Level Data

Date		Depth	Elev.
8/21/14	▽	28 ft bgs	NA ft amsl
NA	○	NA btoc	NA ft amsl

Project: LO492301.0000 Template:G:\Projects\LogPlot\Logs\LO490000\LO492301\0000\ldfx and dat temp...\boring_well HSA 2007 analytical USCS WL_25 ft per p
Data File: B-07.dat Date: 10/28/2014 Created/Edited by: Geoff Bishop

Client: Los Angeles Metropolitan Transportation Authority

Well/Boring ID: **B-07**

Site Location:
MTA Metro
410 Center Street
Los Angeles, California

Borehole Depth: 50 ft bgs

DEPTH	Sample ID	Sample Type	Recovery (feet)	Blow Counts	PID (ppm)	Lab Tests	USCS Code	Geologic Column	Stratigraphic Description
20	B-07-20	MCS 2.0	1.5	25 28 35	0.0	GS, MC	SW		WELL GRADED SAND (7, 88, 5, 0), dark reddish brown (5YR 3/2), dry, fine- to coarse-grained, subrounded.
25	B-07-25	MCS 2.0	0.9	27 50-5"	0.0		SW		WELL GRADED SAND (20, 80, 0, 0), dark reddish brown (5YR 3/3), dry, fine- to very coarse-grained, angular, some fine to coarse gravel, trace crushed rock, mica.
30	B-07-30	MCS 2.0	1.5	28 47 40		GS, MC	GP		POORLY GRADED GRAVEL (53, 41, 6, 0), very dark gray (10YR 3/1), wet, medium- to coarse-grained, subrounded, fine to medium gravel.
35	B-07-30	MCS 2.0	0.4	50-5"			GP		Same as above, saturated.

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(5, 95, 0, 0) = %(gravel, sand, silt, clay)

▽ = First Encountered Water ○ = Static Water

Water Level Data

Date		Depth	Elev.
8/21/14	▽	28 ft bgs	NA ft amsl
NA	○	NA btoc	NA ft amsl

Project: LO492301.0000 Template:G:\Projects\LogPlot\Logs\LO490000\LO492301\0000\ldfx and dat temp...\boring_well HSA 2007 analytical USCS WL_25 ft per p
Data File: B-07.dat Date: 10/28/2014 Created/Edited by: Geoff Bishop

Client: Los Angeles Metropolitan Transportation Authority

Well/Boring ID: **B-07**

Site Location:
MTA Metro
410 Center Street
Los Angeles, California

Borehole Depth: 50 ft bgs

DEPTH	Sample ID	Sample Type	Recovery (feet)	Blow Counts	PID (ppm)	Lab Tests	USCS Code	Geologic Column	Stratigraphic Description
40	B-07-40	MCS 2.0	0.7	44 50-2"	0.0		SW		WELL GRADED SAND WITH GRAVEL (40, 60, 0, 0), very dark gray (10YR 3/1), wet, fine- to coarse-grained, subangular, fine to coarse gravel.
45	B-07-45	MCS 2.0	1.5	20 33 50	0.0		SP		POORLY GRADED SAND (0, 100, 0, 0), dark gray (10YR 4/1), wet, fine-grained, subangular.
50	B-07-50	MCS 2.0	1.5	14 20 20			SW		WELL GRADED SAND (5, 95, 0, 0), dark gray (10YR 4/1), wet, fine- to medium-grained, subangular.
									Bottom of boring at 50 ft bgs.
55									

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Remarks:
amsl = above mean sea level; bgs = below ground surface; Dia. = diameter; ft/' = feet, NA = not applicable/available; ppm = parts per million

(5, 95, 0, 0) = %(gravel, sand, silt, clay)

▽ = First Encountered Water ○ = Static Water

Water Level Data

Date		Depth	Elev.
8/21/14	▽	28 ft bgs	NA ft amsl
NA	○	NA btoc	NA ft amsl

Project: LO492301.0000 Template:G:\Projects\LogPlot\Logs\LO490000\LO492301\0000\ldfx and dat temp...\boring_well HSA 2007 analytical USCS WL_25 ft per p
Data File: B-07.dat Date: 10/28/2014 Created/Edited by: Geoff Bishop

Date Start/Finish: 8/21/14

Drilling Company: Jet Drilling

Driller's Name: Gary Buss

Drilling Method: Hollow Stem Auger

Rig Type: CME 75

Sampling Method: CA Modified Split Spoon

Northing: NA
Easting: NA
Casing Elevation: NA

Borehole Depth: 44 ft bgs
Borehole Diameter: 8"
Surface Elevation: NA

Descriptions By: Brent Anderson

Well/Boring ID: **B-08**

Client: Los Angeles Metropolitan Transportation Authority

Location: MTA Metro
410 Center Street
Los Angeles, California

DEPTH	Sample ID	Sample Type	Recovery (feet)	Blow Counts	PID (ppm)	Lab Tests	USCS Code	Geologic Column	Stratigraphic Description
0									
5	B-08-5	MCS 2.0	0.5		0.0	GS, MC	SP		POORLY GRADED SAND Fill (5, 95, 0, 0), brown (10YR 4/3), dry, fine-grained, subrounded.
10	B-08-10	MCS 2.0	1.5	9 14 20	0.0		SW		WELL GRADED SAND (30, 66, 4, 0), reddish gray (5YR 5/2), dry, fine- to coarse-grained, rounded, little fine gravel.
15	B-08-15	MCS 2.0	1.5	20 23 40	0.0		SW		Same as above, micaceous.

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Remarks:
amsl = above mean sea level; bgs = below ground surface; Dia. = diameter; ft/' = feet, NA = not applicable/available; ppm = parts per million

(5, 95, 0, 0) = %(gravel, sand, silt, clay)

▽ = First Encountered Water ○ = Static Water

Water Level Data

Date		Depth	Elev.
8/21/14	▽	30 ft bgs	NA ft amsl
NA	○	NA btoc	NA ft amsl

Client: Los Angeles Metropolitan Transportation Authority

Well/Boring ID: **B-08**

Site Location:
MTA Metro
410 Center Street
Los Angeles, California

Borehole Depth: 44 ft bgs

DEPTH	Sample ID	Sample Type	Recovery (feet)	Blow Counts	PID (ppm)	Lab Tests	USCS Code	Geologic Column	Stratigraphic Description
20	B-08-20	MCS 2.0	1.5	26 32 40	0.0	GS, MC	SW		WELL GRADED SAND (43, 52, 5, 0, reddish brown (5YR 4/3), dry, medium- to coarse-grained, fine subrounded gravel.
25	B-08-25	MCS 2.0	0.9	43 50-5"		GS, MC	SW		Crushed micaceous rock.
30	B-08-30	MCS 2.0	0.25	50-3"	0.0		SW		WELL GRADED SAND (10, 90, 0, 0), very dark grayish brown (10YR 3/2), moist, fine- to coarse-grained, subrounded.
35	B-08-35	MCS 2.0	0.4	50-5"			SW		WELL GRADED SAND (30, 70, 0, 0), very dark gray (10YR 3/1), wet, medium- to coarse-grained, subrounded.

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Remarks:
amsl = above mean sea level; bgs = below ground surface; Dia. = diameter; ft/' = feet, NA = not applicable/available; ppm = parts per million

(5, 95, 0, 0) = %(gravel, sand, silt, clay)

▽ = First Encountered Water ○ = Static Water

Water Level Data

Date		Depth	Elev.
8/21/14	▽	30 ft bgs	NA ft amsl
NA	○	NA btoc	NA ft amsl

Project: LO492301.0000 Template:G:\Projects\LogPlot\Logs\LO490000\LO492301\0000\ldfx and dat temp...\boring_well HSA 2007 analytical USCS WL_25 ft per p
Data File: B-08.dat Date: 10/23/2014 Created/Edited by: Geoff Bishop

Client: Los Angeles Metropolitan Transportation Authority

Well/Boring ID: **B-08**

Site Location:
MTA Metro
410 Center Street
Los Angeles, California

Borehole Depth: 44 ft bgs

DEPTH	Sample ID	Sample Type	Recovery (feet)	Blow Counts	PID (ppm)	Lab Tests	USCS Code	Geologic Column	Stratigraphic Description
40	B-08-40	MCS 2.0	1.5	20 25 50-3"	0.0		SP		POORLY GRADED SAND (15, 85, 0, 0), very dark gray (10YR 3/1), wet, medium- to coarse-grained, subrounded.
45									Bottom of boring at 44 ft bgs due to refusal.
50									
55									

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Remarks:
amsl = above mean sea level; bgs = below ground surface; Dia. = diameter; ft/' = feet, NA = not applicable/available; ppm = parts per million

(5, 95, 0, 0) = %(gravel, sand, silt, clay)

▽ = First Encountered Water ○ = Static Water

Water Level Data

Date		Depth	Elev.
8/21/14	▽	30 ft bgs	NA ft amsl
NA	○	NA btoc	NA ft amsl

Date Start/Finish: 8/14/14 - 8/20/14

Drilling Company: Jet Drilling

Driller's Name: Gary Buss

Drilling Method: Hollow Stem Auger

Rig Type: CME 75

Sampling Method: CA Modified Split Spoon

Northing: NA
Easting: NA
Casing Elevation: NA

Borehole Depth: 45 ft bgs
Borehole Diameter: 8"
Surface Elevation: NA
Descriptions By: Brent Anderson

Well/Boring ID: **B-09**

Client: Los Angeles Metropolitan Transportation Authority

Location: MTA Metro
410 Center Street
Los Angeles, California

DEPTH	Sample ID	Sample Type	Recovery (feet)	Blow Counts	PID (ppm)	Lab Tests	USCS Code	Geologic Column	Stratigraphic Description
0							SP		POORLY GRADED SAND Fill (0, 90, 10, 0), dark yellowish brown (10YR 3/4), dry, fine- to medium-grained, subrounded.
5	B-09-5	MCS 2.0	0.5		0.0	GS, MC	SP		POORLY GRADED SAND (6, 93, 1, 0), dark yellowish brown (10YR 3/4), dry, fine- to medium-grained, subangular to angular.
10	B-09-10	MCS 2.0	1.5	9 12 25	0.0	DS	SP		Same as above, increased silt (0, 90, 10, 0).
15	B-09-15	MCS 2.0	1.5	16 28 24	0.0	GS, MC	SW		WELL GRADED SAND (17, 79, 4, 0), brown (10YR 5/3), dry, fine- to coarse-grained, subangular, trace fine gravel.

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Remarks:
amsl = above mean sea level; bgs = below ground surface; Dia. = diameter; ft/' = feet, NA = not applicable/available; ppm = parts per million

(5, 95, 0, 0) = %(gravel, sand, silt, clay)

▽ = First Encountered Water ○ = Static Water

Water Level Data

Date		Depth	Elev.
8/20/14	▽	35 ft bgs	NA ft amsl
NA	○	NA btoc	NA ft amsl

Client: Los Angeles Metropolitan Transportation Authority

Well/Boring ID: **B-09**

Site Location:
MTA Metro
410 Center Street
Los Angeles, California

Borehole Depth: 45 ft bgs

DEPTH	Sample ID	Sample Type	Recovery (feet)	Blow Counts	PID (ppm)	Lab Tests	USCS Code	Geologic Column	Stratigraphic Description
20	B-09-20	MCS 2.0	1.5	27 18 27	0.0		SW		Same as above.
25	B-09-25	MCS 2.0	1.5	20 25 33	0.0	GS, MC	SW		WELL GRADED SAND (4, 92, 4, 0), brown (10YR 5/3), dry, fine- to coarse-grained, subangular.
30	B-09-30	MCS 2.0	1.5	20 30 36	0.0		SP		POORLY GRADED SAND (5, 95, 0, 0), yellowish brown (10YR 5/6), moist, medium- to coarse-grained, subrounded.
35	B-09-35	MCS 2.0	1.5	41 50 50	0.0	GS, MC	SP		POORLY GRADED SAND (20, 73, 7, 0), yellowish brown (10YR 5/6), wet, medium- to coarse-grained, subrounded.

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Remarks:
amsl = above mean sea level; bgs = below ground surface; Dia. = diameter; ft/' = feet, NA = not applicable/available; ppm = parts per million

(5, 95, 0, 0) = %(gravel, sand, silt, clay)

▽ = First Encountered Water ○ = Static Water

Water Level Data

Date		Depth	Elev.
8/20/14	▽	35 ft bgs	NA ft amsl
NA	○	NA btoc	NA ft amsl

Client: Los Angeles Metropolitan Transportation Authority

Well/Boring ID: **B-09**

Site Location:
MTA Metro
410 Center Street
Los Angeles, California

Borehole Depth: 45 ft bgs

DEPTH	Sample ID	Sample Type	Recovery (feet)	Blow Counts	PID (ppm)	Lab Tests	USCS Code	Geologic Column	Stratigraphic Description
40	B-09-40	MCS 2.0	0.75	50 50-3"	0.0		SW		WELL GRADED SAND (10, 90, 0, 0), very dark gray (10YR 3/1), wet, fine- to coarse-grained, subrounded, trace fine and coarse gravel.
45	B-09-45	MCS 2.0	1.25	20 20 50-3"	0.0		SW		Same as above, increased gravel (25, 75, 0, 0). Bottom of boring at 45 ft bgs due to sheared rod.
50									
55									

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Remarks:
amsl = above mean sea level; bgs = below ground surface; Dia. = diameter; ft/' = feet, NA = not applicable/available; ppm = parts per million

(5, 95, 0, 0) = %(gravel, sand, silt, clay)

▽ = First Encountered Water ○ = Static Water

Water Level Data

Date		Depth	Elev.
8/20/14	▽	35 ft bgs	NA ft amsl
NA	○	NA btoc	NA ft amsl

Date Start/Finish: 8/29/14

Drilling Company: Jet Drilling

Driller's Name: Gary Buss

Drilling Method: Hollow Stem Auger

Rig Type: CME 75

Sampling Method: CA Modified Split Spoon

Northing: NA
Easting: NA
Casing Elevation: NA

Borehole Depth: 50 ft bgs
Borehole Diameter: 8"
Surface Elevation: NA
Descriptions By: Brent Anderson

Well/Boring ID: **B-10**

Client: Los Angeles Metropolitan Transportation Authority

Location: MTA Metro
410 Center Street
Los Angeles, California

DEPTH	Sample ID	Sample Type	Recovery (feet)	Blow Counts	PID (ppm)	Lab Tests	USCS Code	Geologic Column	Stratigraphic Description
0									
5	B-10-5	MCS 2.0	0.5		0.0	MC, DS	SP		POORLY GRADED SAND WITH GRAVEL (50, 50, 0, 0), dark yellowish brown (10YR 4/4), dry, medium-grained sand, fine to coarse gravel.
10	B-10-10	MCS 2.0	1.5	24 32 32	0.0	GS, MC	GP		POORLY GRADED GRAVEL (54, 39, 7, 0), pale brown (10YR 6/3), dry, fine- to medium-grained, subrounded.
15	B-10-15	MCS 2.0	1.5	20 28 34	0.0		GP		Same as above, increasing grain size.

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Remarks:
amsl = above mean sea level; bgs = below ground surface; Dia. = diameter; ft/' = feet, NA = not applicable/available; ppm = parts per million

(5, 95, 0, 0) = %(gravel, sand, silt, clay)

▽ = First Encountered Water ○ = Static Water

Water Level Data

Date		Depth	Elev.
8/29/14	▽	31 ft bgs	NA ft amsl
NA	○	NA btoc	NA ft amsl

Project: LO492301.0000 Template:G:\Projects\LogPlot\Logs\LO490000\LO492301\0000\ldfx and dat temp...\boring_well HSA 2007 analytical USCS WL_25 ft per p
Data File: B-10.dat Date: 10/23/2014 Created/Edited by: Geoff Bishop

Client: Los Angeles Metropolitan Transportation Authority

Well/Boring ID: **B-10**

Site Location:
MTA Metro
410 Center Street
Los Angeles, California

Borehole Depth: 50 ft bgs

DEPTH	Sample ID	Sample Type	Recovery (feet)	Blow Counts	PID (ppm)	Lab Tests	USCS Code	Geologic Column	Stratigraphic Description
20	B-10-20	MCS 2.0	1.5	25 28 44	0.0	GS, MC	GP		POORLY GRADED GRAVEL (58, 38, 4, 0), light brownish gray (2.5Y 6/2), dry, medium- to very coarse-grained, subrounded.
25	B-10-25	MCS 2.0	1.5	33 45 30	0.0		SW		WELL GRADED SAND (15, 85, 0, 0), light yellowish brown (2.5Y 6/3), slightly moist, fine- to very coarse-grained, subangular.
30	B-10-29	MCS 2.0	1.5	30 36 40	0.0	GS, MC	SP		POORLY GRADED SAND (20, 73, 7, 0), dark gray (7.5YR 4/1), wet, medium-grained, subrounded.
35	B-10-35	MCS 2.0	1.5	20 25 38	0.0	GS, MC	SP		POORLY GRADED SAND (32, 60, 8, 0), dark gray (7.5YR 4/1), wet, medium-grained, subrounded. 30% fine to coarse gravel.

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Remarks:
amsl = above mean sea level; bgs = below ground surface; Dia. = diameter; ft/' = feet, NA = not applicable/available; ppm = parts per million

(5, 95, 0, 0) = %(gravel, sand, silt, clay)

▽ = First Encountered Water ○ = Static Water

Water Level Data

Date		Depth	Elev.
8/29/14	▽	31 ft bgs	NA ft amsl
NA	○	NA btoc	NA ft amsl

Client: Los Angeles Metropolitan Transportation Authority

Well/Boring ID: **B-10**

Site Location:
MTA Metro
410 Center Street
Los Angeles, California

Borehole Depth: 50 ft bgs

DEPTH	Sample ID	Sample Type	Recovery (feet)	Blow Counts	PID (ppm)	Lab Tests	USCS Code	Geologic Column	Stratigraphic Description
40	B-10-40	MCS 2.0	0.75	38 50-3"	0.0		SP		POORLY GRADED SAND (0, 100, 0, 0), dark gray (7.5YR 4/1), wet, medium-grained, subrounded.
45	B-10-45	MCS 2.0	0.8	50 50-4"	0.0		SP		Same as above, 5% medium gravel.
50	B-10-50	MCS 2.0	0.9	50 50-5"	0.0		SP		Same as above, slight increase in grain size.
									Bottom of boring at 50 ft bgs.
55									

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Remarks:
amsl = above mean sea level; bgs = below ground surface; Dia. = diameter; ft/' = feet, NA = not applicable/available; ppm = parts per million

(5, 95, 0, 0) = %(gravel, sand, silt, clay)

▽ = First Encountered Water ○ = Static Water

Water Level Data

Date		Depth	Elev.
8/29/14	▽	31 ft bgs	NA ft amsl
NA	○	NA btoc	NA ft amsl

Project: LO492301.0000 Template:G:\Projects\LogPlot\Logs\LO490000\LO492301\0000\ldfx and dat temp...\boring_well HSA 2007 analytical USCS WL_25 ft per p
Data File: B-10.dat Date: 10/23/2014 Created/Edited by: Geoff Bishop

Existing Geotechnical Boring Logs
Caltrans (Updated)

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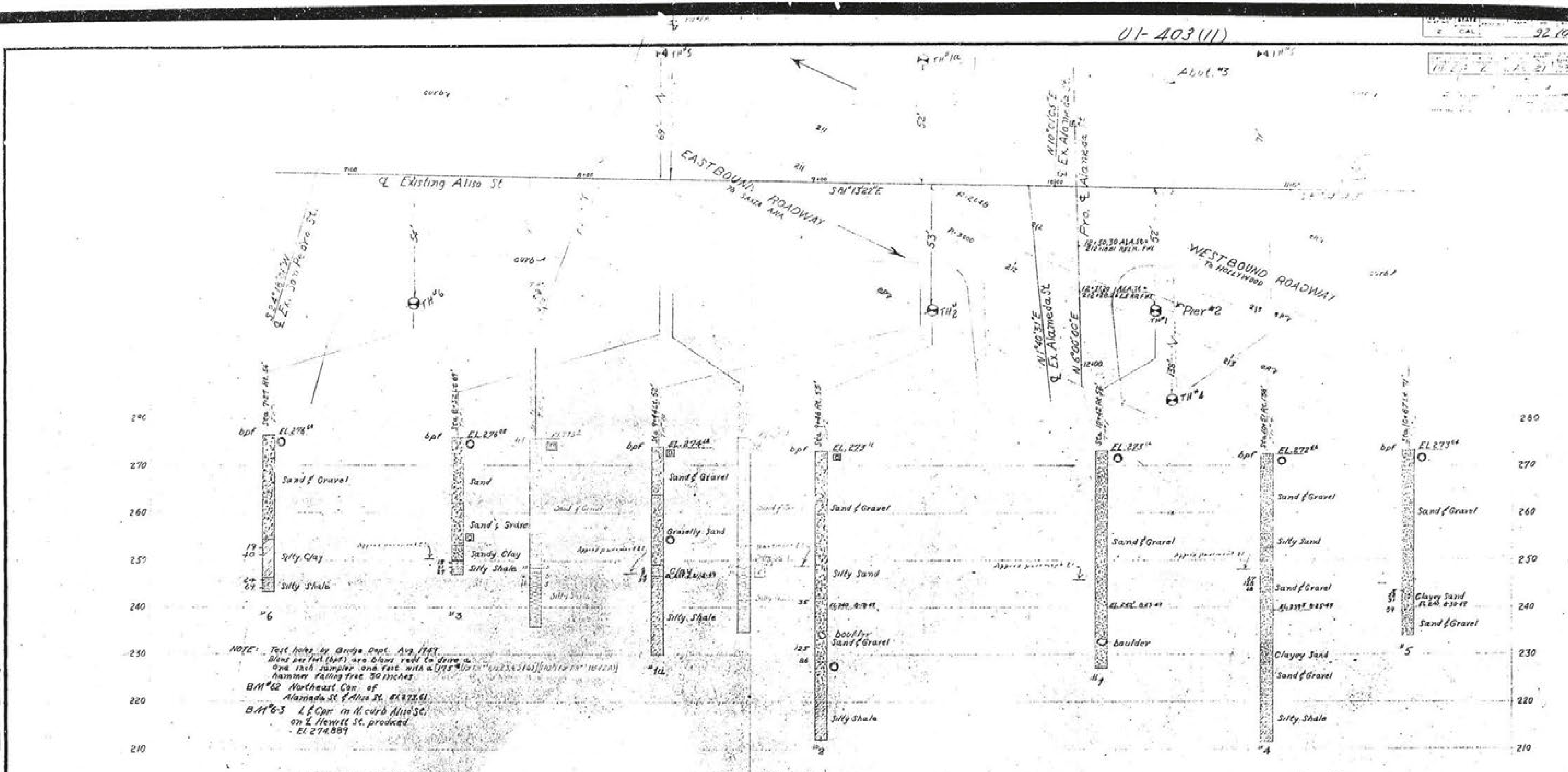
U1-403 (11)



Classification of Material Based on Standard Grade Size Limits

Diagram and table showing the basis for estimates of grade size distribution used in determination of class names.

Class Name	Percentage of Sizes Present: Sand	Silt	Clay
Sand	80-100	0-20	0-20
Silty Sand	45-80	0-85	0-20
Sandy Silt	0-45	35-80	0-20
Silt	0-20	80-100	0-20
Clayey Sand	38-80	0-42	20-30
Clayey Silt	0-38	32-80	20-30
Sandy Clay	30-70	0-40	30-50
Silty Clay	0-30	20-70	30-50
Clay	0-50	0-50	50-100

If gravel is present in appreciable amounts the term "Gravelly" may be added to the class name, vis "Gravelly sand". The terms "Coarse," "Medium" and "Fine" when used to describe Gravel, Sand and Silt refer to Standard Grade Size limits.

Legend of Boring Operations

- Plan of any boring
- 1" Sampler boring
- Rotary wash boring
- 1" Closed sampler driven
- Core boring
- 2½" Penetrometer driven
- 2" Sampler boring
- 2" to 5" Auger boring
- 8" to 20" Auger boring
- Casing driven
- Jet boring
- (S) Sample taken

The appropriate "boring" symbols designating the method of operation are shown at the upper right-hand corner of the respective boring. Where tool changes were made during the boring operation symbols are shown at the point of change.

Legend of Earth Materials

- Gravel—G
- Sand—S
- Silt—Si
- Clay—C
- Silty Sand—Si S
- Clayey Sand—C S
- Sandy Silt—S Si
- Clayey Silt—C Si
- Sandy Clay—SC
- Silty Clay—Si C
- Peat and/or Organic Clay—O
- Sandstone—SS
- Shale—Sh
- Broken Rock (Fragments)—Br
- Rock—R

Abbreviations

EL 69.4	Elevation of ground at test hole
bpf	Blows per foot—(see note above)
P	Pulled pipe
M	Moisture as % dry weight
EL 63.5 6-12-49	Elevation of ground water and date

Notes

The contractor's attention is directed to Section 2, Article (c) of the Standard Specifications and to the Special Provisions accompanying this set of plans.

Classification of earth material as shown on this sheet is based upon field inspection and is not to be construed to imply mechanical analysis.

ALAMEDA ST. UNDERPASS

LOG OF TEST BORINGS

Scale: Hor. 1" = 25', Vert. 1" = 15'

File No.

Bridge No. 53-782

Drawing No.

Existing Geotechnical Boring Logs
Caltrans, 1954

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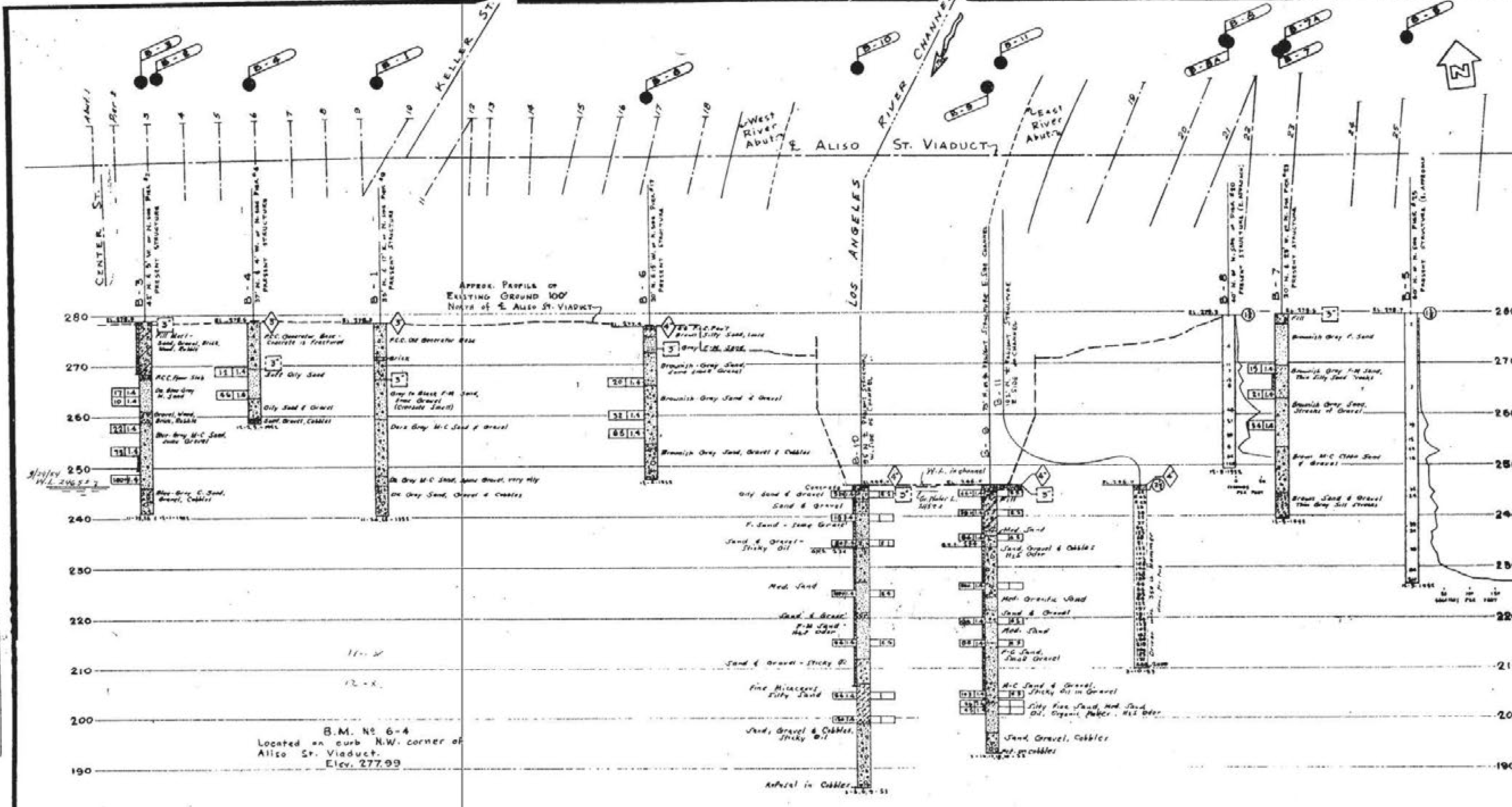
70

FED. ROAD DIST. NO.	STATE				
2	CAL.				

VII	LA	2	LA	5	139

APRIL 26 1954



AS BUILT

CORRECTIONS BY ________

DATE 10-11-55

Test Boring By Bridge Dept.

BRIDGE DEPARTMENT

MICROFILM

Classification of Material Based on Standard Grade Size Limits

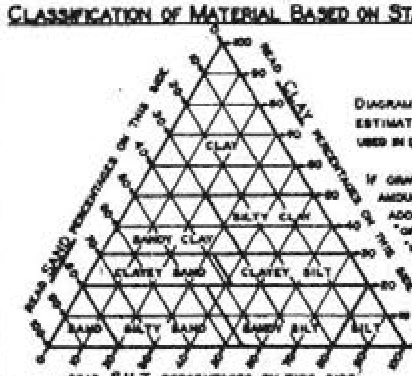


Diagram showing the basis for estimates of grade size distribution used in determination of class names.

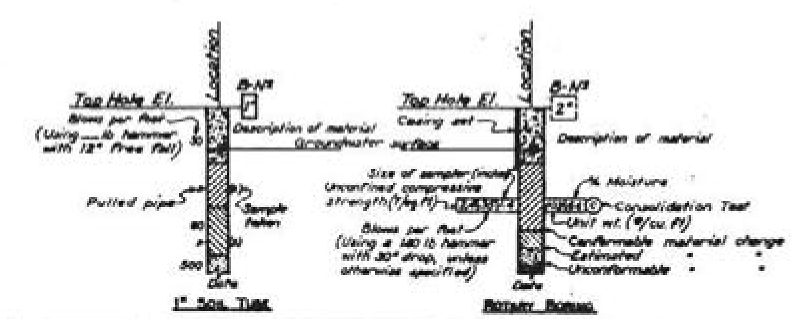
If gravel is present in appreciable amounts the term "gravelly" may be added to the class name, viz. "gravelly sand". The terms "coarse", "medium" and "fine" when used to describe gravel, sand and silt refer to standard grade size limits.

Legend of Earth Materials

Gravel	Silty Clay or Clayey Silt
Sand	Peat and/or Organic Clay
Silt	Filled Material
Clay	Igneous Rock
Sandy Clay or Clayey Sand	Sedimentary Rock
Sandy Silt or Silty Sand	Metamorphic Rock

Legend of Boring Operations

- Plan of any boring
- Penetrometer
- 2¼" Cone penetrometer
- Sampler boring (dry)
- Rotary boring (wet)
- Auger boring (dry)
- Jet boring
- Core boring
- Test pit



Notes

The contractor's attention is directed to Section 2, Article (c) of the Standard Specifications and to the Special Provisions accompanying this set of plans.

Classification of earth material as shown on this sheet is based upon field inspection and is not to be construed to imply mechanical analysis.

Penetrometer borings having a rate of penetration measured in seconds per foot are driven with a No. 2 McKiernan-Terry air hammer at 115 PSI.

STATE OF CALIFORNIA
DEPARTMENT OF PUBLIC WORKS
DIVISION OF HIGHWAYS

WIDENING OF L.A. RIV. BR. & OH AT ALISO ST.

LOG OF TEST BORINGS (1 of 3)

SCALE: HORIZ. 1" = 50', VERT. 1" = 10' | BRIDGE 53-405 | FILE | DRAWING C-3243-5

PREL. DRAWING NO. P-3243

71

	STATE				
2	CAL.				

VII	LA	2	LA	6	139

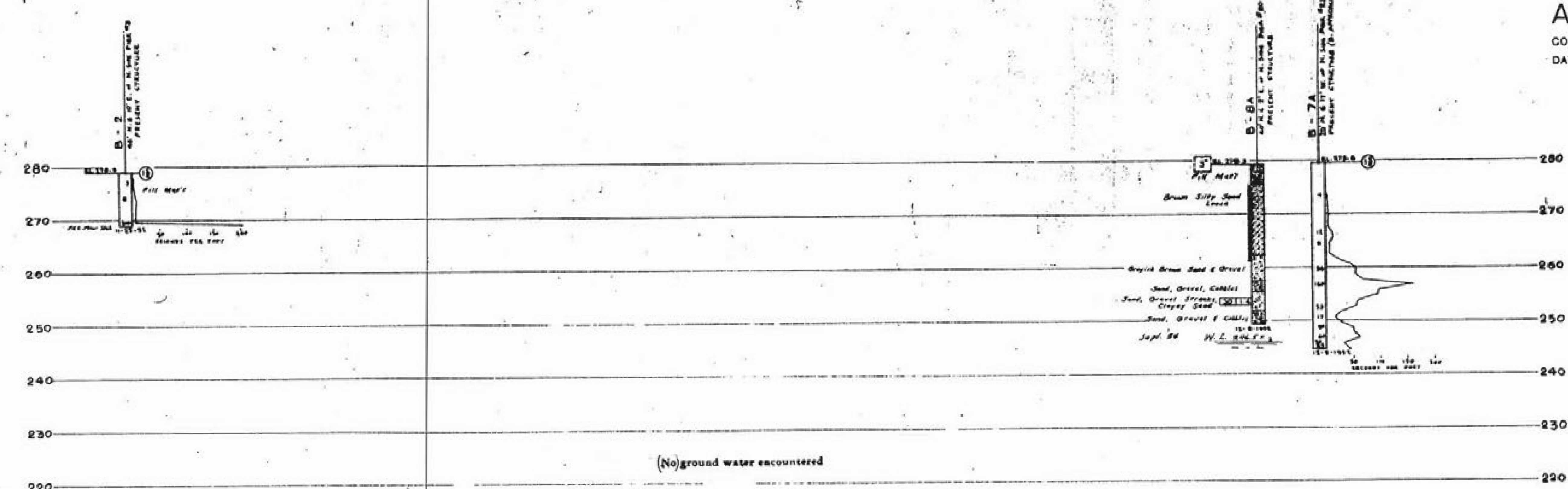
APRIL 26 1954

AS BUILT

CORRECTIONS BY ____

DATE 10-11-55

BRIDGE DEPARTMENT



Test Boring By Bridge Dept.

(No) ground water encountered

MICROFILM

Classification of Material Based on Standard Grade Size Limits

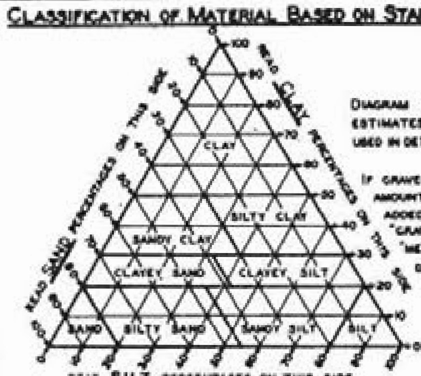


Diagram showing the basis for estimates of grade size distribution used in determination of class names.

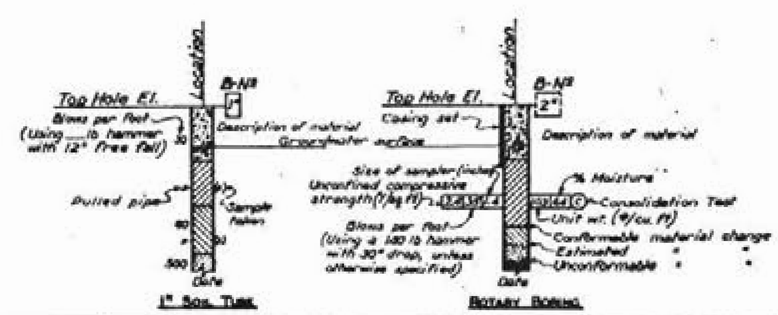
If gravel is present in appreciable amounts the term "gravelly" may be added to the class name, viz. "gravelly sand". The terms "coarse", "medium" and "fine" when used to describe gravel, sand and silt refer to standard grade size limits.

Legend of Earth Materials

- Gravel
- Sand
- Silt
- Clay
- Sandy Clay or Clayey Sand
- Sandy Silt or Silty Sand
- Silty Clay or Clayey Silt
- Peat and/or Organic Clay
- Filled Material
- Igneous Rock
- Sedimentary Rock
- Metamorphic Rock

Legend of Boring Operations

- Plan of any boring
- Penetrometer
- 2½" Cone penetrometer
- Sampler boring (dry)
- Rotary boring (wet)
- Auger boring (dry)
- Jet boring
- Core boring
- Test pit



Notes

The contractor's attention is directed to Section 2, Article (c) of the Standard Specifications and to the special provisions accompanying this set of plans.

Classification of earth material as shown on this sheet is based upon field inspection and is not to be construed to imply mechanical analysis.

Penetrometer borings having a rate of penetration measured in seconds per foot are driven with a No 2 McKiernan-Terry air hammer at 115 PSI.

STATE OF CALIFORNIA
DEPARTMENT OF PUBLIC WORKS
DIVISION OF HIGHWAYS

WIDENING OF L.A. RIV. BR. & OH AT ALISO ST.

LOG OF TEST BORINGS (2 of 3)

Scale: Horiz. 1" = 50', Vert. 1" = 10' | Bridge 53-405 | File | Drawing E-3243-6

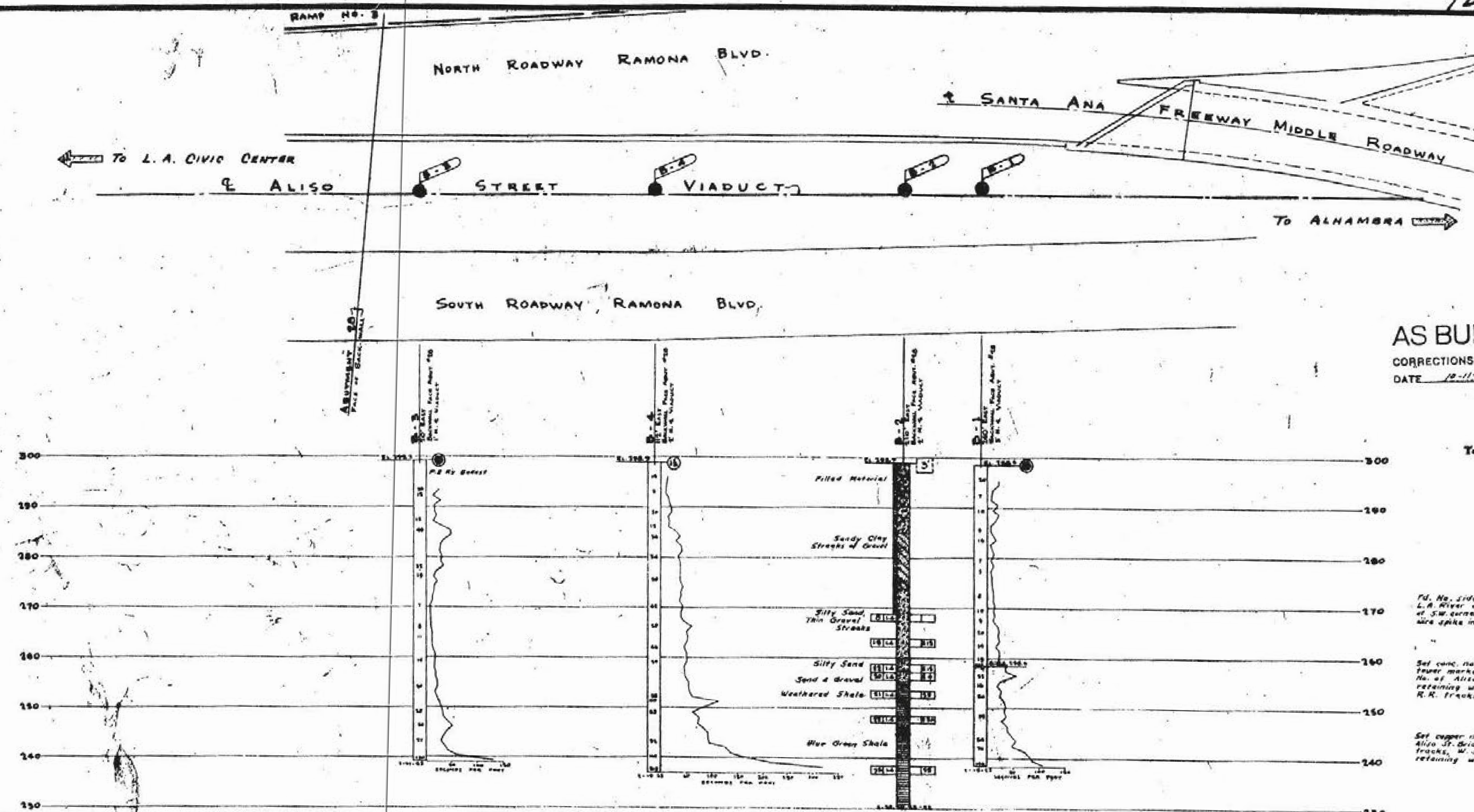
PREL. DRAWING NO. P-3243

72

Fed. Road Dist. No.	State	Fed. Aid Proj. No.	Fiscal Year	Sheet No.	Total Sheets
2	CAL.				

Dist.	County	Route	Section	Sheet No.	Total Sheets
VII	LA	2	LA	7	139

APRIL 26 1954



AS BUILT
CORRECTIONS BY
DATE 10-11-55

Test Boring By Bridge Dept.

B.M. #6-5
Fd. No. side Aliso St. Viaduct on E. side L.A. River at West end of Ramp 84 in No. curb at S.W. corner of C.B. 66' E. of ℄ Mission Rd., a wire spike in curb.
Elev. 278.75

B.M. #Y-11
Set conc. nail in lead SW corner powerline tower marked #7 East side L.A. River, 65'± No. of Aliso St. Bridge, 13.5 East of river retaining wall, 35'± West of Westerly most R.R. tracks.
Elev. 273.30

B.M. #12-Y
Set copper nail in lead in conc. ftg. N. side Aliso St. Bridge between L.A. River & S.F.R.R. tracks, W. side of river. 21'± West of river retaining wall
Elev. 272.94

MICROFILM

BRIDGE DEPARTMENT

CLASSIFICATION OF MATERIAL BASED ON STANDARD GRADE SIZE LIMITS

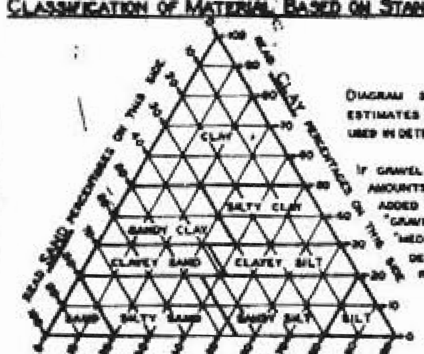


DIAGRAM SHOWING THE BASIS FOR ESTIMATES OF GRADE SIZE DISTRIBUTION USED IN DETERMINATION OF CLASS NAMES

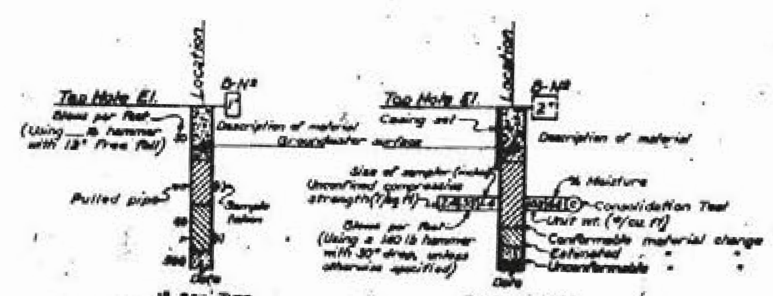
IF GRAVEL IS PRESENT IN APPRECIABLE AMOUNTS THE TERM "GRAVELLY" MAY BE ADDED TO THE CLASS NAME, VIS. "GRAVELLY SAND". THE TERMS "COARSE", "MEDIUM" AND "FINE" WHEN USED TO DESCRIBE GRAVEL, SAND AND SILT REFER TO STANDARD GRADE SIZE LIMITS.

LEGEND OF EARTH MATERIALS

- GRAVEL
- SAND
- SILT
- CLAY
- SANDY CLAY OR CLAYEY SAND
- SANDY SILT OR SILTY SAND
- SILTY CLAY OR CLAYEY SILT
- PEAT AND/OR ORGANIC CLAY
- FILLED MATERIAL
- IGNEOUS ROCK
- SEDIMENTARY ROCK
- METAMORPHIC ROCK

LEGEND OF BORING OPERATIONS

- PLAN OF ANY BORING
- PENETROMETER
- 2½" CONE PENETROMETER
- SAMPLER BORING (DRY)
- ROTARY BORING (WET)
- AUGER BORING (DRY)
- JET BORING
- CORE BORING
- TEST PIT



NOTES

THE CONTRACTOR'S ATTENTION IS DIRECTED TO SECTION 2, ARTICLE (c) OF THE STANDARD SPECIFICATIONS AND TO THE SPECIAL PROVISIONS ACCOMPANYING THIS SET OF PLANS.

CLASSIFICATION OF EARTH MATERIAL AS SHOWN ON THIS SHEET IS BASED UPON FIELD INSPECTION AND IS NOT TO BE CONSTRUED TO IMPLY MECHANICAL ANALYSIS.

PENETROMETER BORINGS HAVING A RATE OF PENETRATION MEASURED IN SECONDS PER FOOT ARE DRIVEN WITH A No 2 McKIERNAN-TERRY AIR HAMMER AT 115 PSI.

STATE OF CALIFORNIA
DEPARTMENT OF PUBLIC WORKS
DIVISION OF HIGHWAYS

WIDENING OF L.A. RIV. BR. & OH AT ALISO ST.

LOG OF TEST BORINGS (3 of 3)

SCALE: HORIZ. 1" = 20' VERT. 1" = 10' | BRIDGE 53-405 | FILE | DRAWING C-3243-7

PREL. DRAWING NO. P-3243

Existing Geotechnical Boring Logs
Caltrans, 2004

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DIST	COUNTY	ROUTE	KILOMETER POST TOTAL PROJECT	SHEET No	TOTAL SHEETS
07	LA	101	0.6/1.4	322	326

Caltrans now has a web site! To get to the web site, go to: http://www.dot.ca.gov

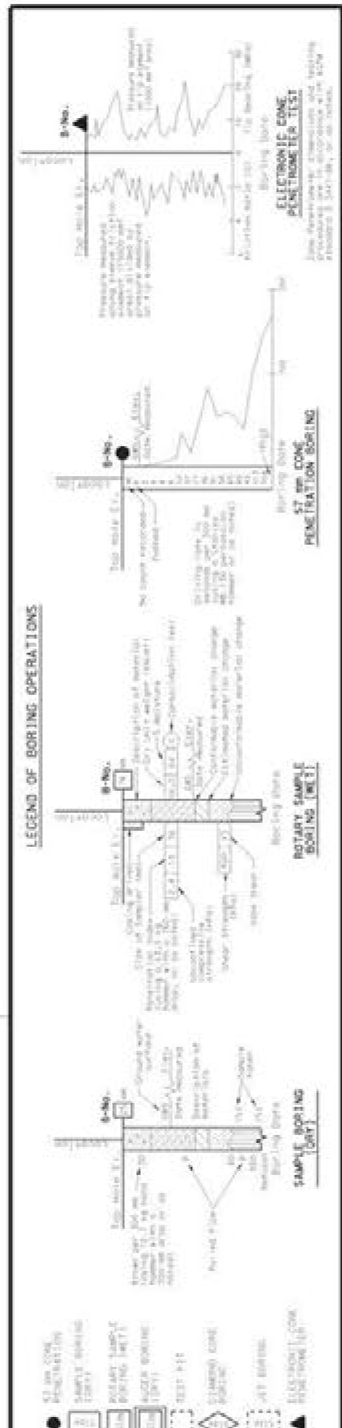
GEOTECHNICAL PROFESSIONAL

6-7-04
PLANS APPROVAL DATE

The State of California or its officers or agents shall not be responsible for the accuracy or completeness of electronic copies of this plan sheet.

METROPOLITAN TRANSPORTATION AUTHORITY
ONE GATEWAY PLAZA
LOS ANGELES, CA. 90012

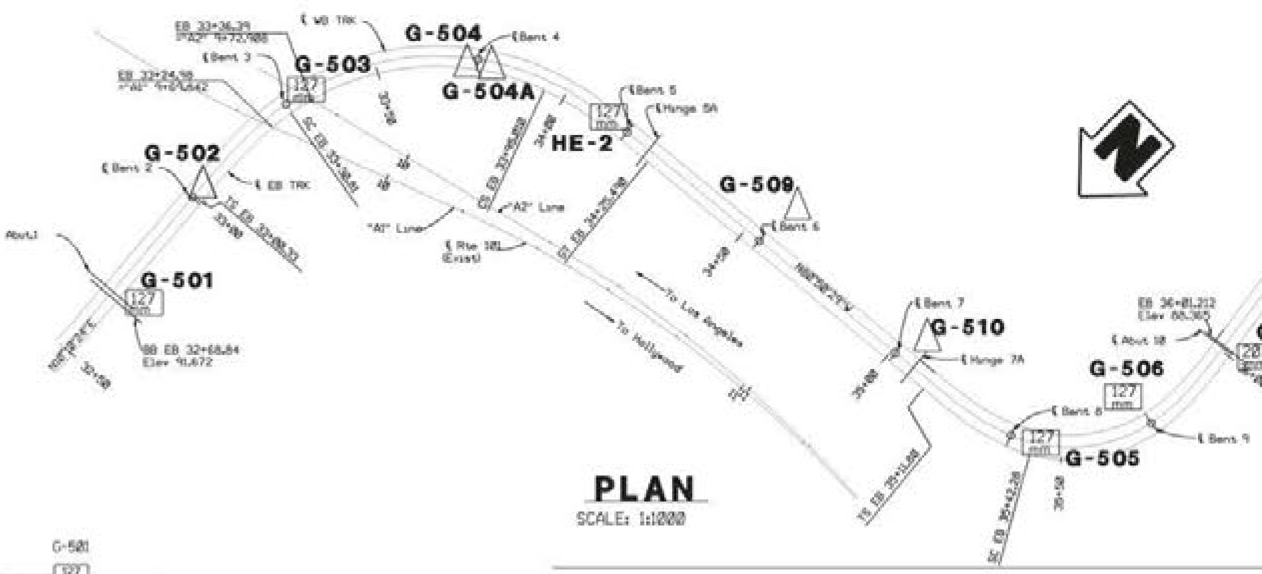
EASTSIDE LRT PARTNERS
707 WILSHIRE BLVD. SUITE 2900
LOS ANGELES, CA 90017



BENCHMARK
ESE-252 CALTRANS SR 98-146
FD CALTRANS BRASS DISC IN EAST SIDEWALK OF ALAMEDA ST. O/C AND ROUTE 101

NORTHING: 561498.646
EASTING: 1978051.044
ELEVATION: 83.920 m

Horizontal Datum: NAD83 1996.35 EPOCH, California State Plane Zone 5.
Vertical Datum: NAVD 88



PLAN
SCALE: 1:1000

DRIVE SAMPLER AND HAMMER DATA (ALL BORINGS)

TYPE OF SAMPLER	OUTSIDE DIAMETER (mm)	INSIDE DIAMETER (mm)	TYPE OF HAMMER	WEIGHT OF HAMMER (kN)	HEIGHT OF DROP (mm)
California Ring	76.2	61.5	Automatic	0.623	762
TYPE OF SAMPLER	50.8	34.9	Automatic	0.623	762

G-501 — Sta. 32+74, 9m R of EB Track — ELEV. 89.8 m — 127 mm

Blows	Sampler	Sample	Col. 1	Col. 2	Tests
		SK-1	--	10.2	AL CO WA
9/152	61	R-1	14.4	23.4	WA
9	35	S-2	--	28.2	DS
12/152	61	R-3	17.7	17.9	AL WA PP
7	35	S-4	--	21.2	WA
5/152	61	R-5	10.6	49.0	CO DS WA PP
23	35	S-6	--	8.1	WA
50/102	61	R-7	20.3	10.5	DS
50/76	35	S-8	--	10.4	
50/102	61	R-9	17.1	10.7	DS
72	35	S-10	--	10.6	
35/152	61	R-11	21.9	9.8	WA
50/102	35	S-12	--	14.2	WA
REF/86	61	R-13	--	11.8	WA
REF/106	35	S-14	--	11.6	WA

GWS ▽ El. 75.3m 06/01/02

FILL:
Silty SAND w/Gravel (SM), dark brown, moist, fine to medium gravel, trace clay, slight plasticity
LL = 22, PI = 3

Clayey SAND to Sandy CLAY w/Gravel (SC/CL), medium dense to stiff, orange and brown, moist to wet

Silty SAND w/Gravel (SM), loose, dark olive and brown, moist to wet, with pieces of brick
@ El. 84.4 m, drilling fluid was lost instantly. The borehole had to be terminated and moved. The first 4.6 m of the new hole was drilled through.

Sandy CLAY (CL), stiff, moist to wet, olive
LL = 33, PI = 14
PP Su: 84 to 132 kPa

Silty SAND w/Gravel (SM), loose, dark olive, wet

Lean CLAY (CL), stiff, olive brown, moist
PP Su= 68 kPa

ALLUVIUM (Qal):
Poorly Graded GRAVEL w/Sand (GP), medium dense, gray and brown, moist

Silty SAND w/Gravel (SM), very dense, light olive, moist, fine to coarse grained sand with fine to coarse gravel

Poorly Graded SAND (SP), very dense, gray, moist, fine to coarse sand, with gravel

Poorly Graded SAND w/Silt & Gravel (SP-SM), gray, moist to wet, fine to coarse sand with medium size gravel
- soil odor observed

Poorly Graded SAND and GRAVEL w/Silt (SP-SM / GP-GM), very dense, gray, wet, fine to medium size gravel
- no odor observed

Silty SAND w/Gravel (SM), very dense, gray, wet, medium size gravel

CONTINUED IN INSET

ELEVATION (M): 90, 87, 84, 81, 78, 75, 72, 69, 66

BORING G-501 CONTINUED

Blows	Sampler	Sample	Col. 1	Col. 2	Tests
50/102	61	R-15	12.8	37.3	AL DS PP
67	35	S-16	--	30.7	
50/76	61	R-17	15.4	28.0	PP
50/127	35	S-18	--	34.1	
REF/138	61	R-19	15.6	25.0	
50/102	35	S-20	--	28.5	

BEDROCK, PUENTE FORMATION (Tp):
Elastic SILT (MH), hard, dark olive, moist

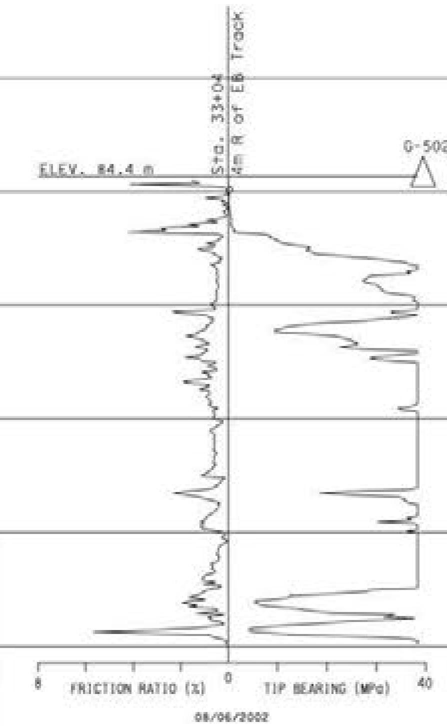
PP Su >215 kPa

06/01/2002

Bottom of boring at El. 58.9 m
Groundwater encountered at El. 75.3 m
Borehole backfilled with grout, cold asphalt patched.

ELEVATION: 66, 63, 60, 57

G-502 — Sta. 33+04, 4m R of EB Track — ELEV. 84.4 m



ELEVATION (M): 87, 84, 81, 78, 75, 72, 69, 66

PROFILE
VERTICAL SCALE: 1:100
HORIZONTAL SCALE: NONE

PLATE 1

All dimensions and elevations are in meters except as noted

DESIGN OVERSIGHT	DRAWN BY	K. FERNANDES	N. NGHIEM	PREPARED FOR THE STATE OF CALIFORNIA DEPARTMENT OF TRANSPORTATION	D. YAVORSKY	BRIDGE NO. 53-2975 53C-2148	EASTSIDE LRT PROJECT BRIDGE OVER HWY 101
SIGN OFF DATE	CHECKED BY	C. SCHEYHING	FIELD INVESTIGATION BY: DATE:		PROJECT ENGINEER	KILOMETER POST 1.07	LOG OF TEST BORINGS SHEET 1 OF 5

GEOTECHNICAL LOG OF TEST BORINGS SHEET (METRIC) (REV 2/1/00)

ORIGINAL SCALE IN MILLIMETERS FOR REDUCED PLANS 0 10 20 30 40 50 60 70 80 90 100

CU 07225
EA 1199U1

DISREGARD PRINTS BEARING EARLIER REVISION DATES

DIST	COUNTY	ROUTE	KILOMETER POST TOTAL PROJECT	SHEET No	TOTAL SHEETS
07	LA	101	0.6/1.4	323	326

Karl Brumbaugh 12/15/03
GEOTECHNICAL PROFESSIONAL

6-7-04
PLANS APPROVAL DATE

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REGISTERED PROFESSIONAL ENGINEER Karl Brumbaugh No. G.E. 144 EXP. 12/31/05 GEOTECHNICAL STATE OF CALIFORNIA

METROPOLITAN TRANSPORTATION AUTHORITY
ONE GATEWAY PLAZA
LOS ANGELES, CA. 90012

EASTSIDE LRT PARTNERS
707 WILSHIRE BLVD. SUITE 2900
LOS ANGELES, CA 90017

Caltrans Metric

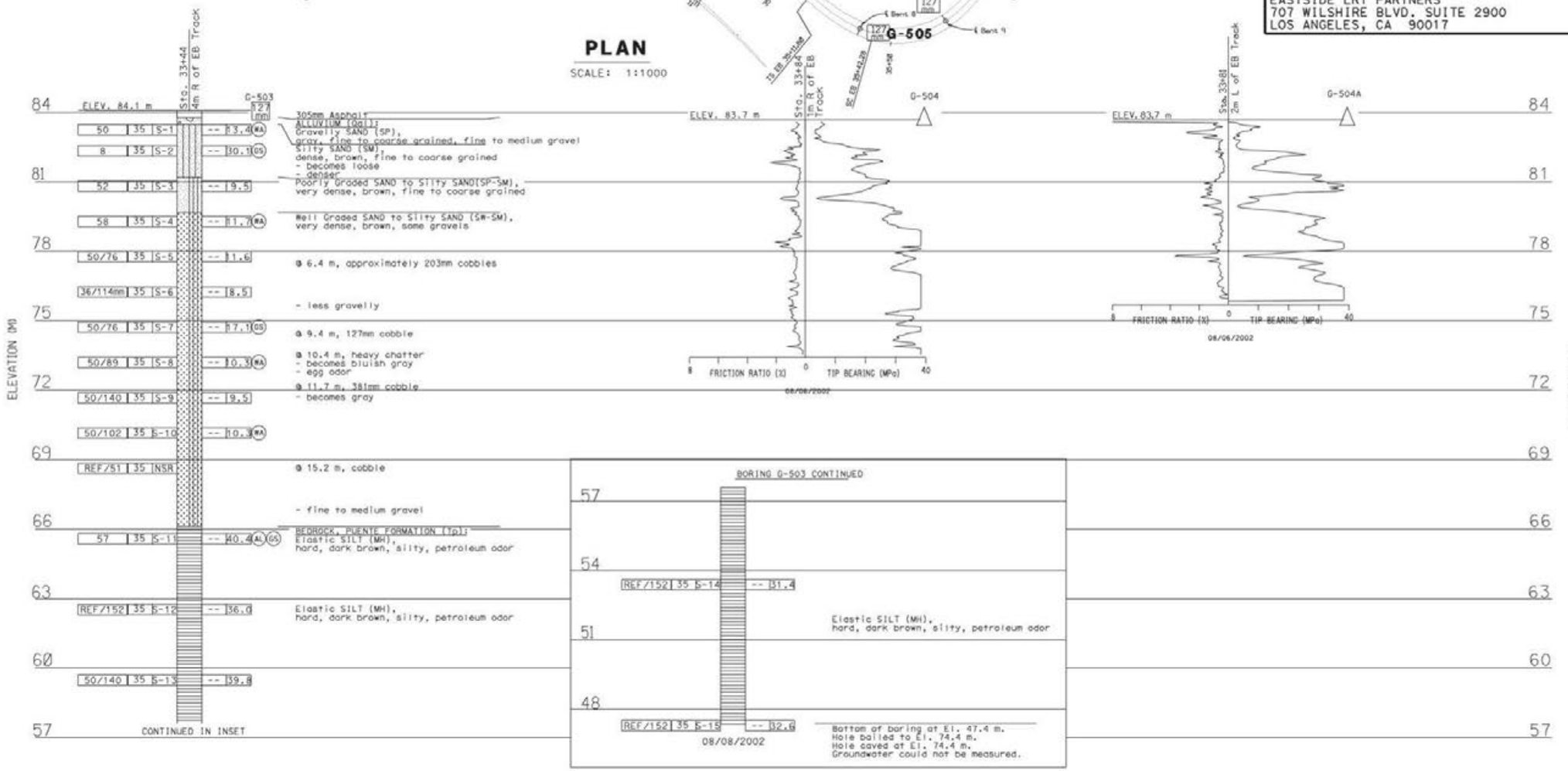
BENCHMARK
ESE-252 CALTRANS SR 98-146
FD CALTRANS BRASS DISC IN EAST SIDEWALK OF ALAMEDA ST. O/C AND ROUTE 101

NORTHING: 561498.646
EASTING: 1978051.044
ELEVATION: 83.920 m

Horizontal Datum: NAD83 1996.35 EPOCH, California State Plane Zone 5.
Vertical Datum: NAVD 88

PLAN

SCALE: 1:1000



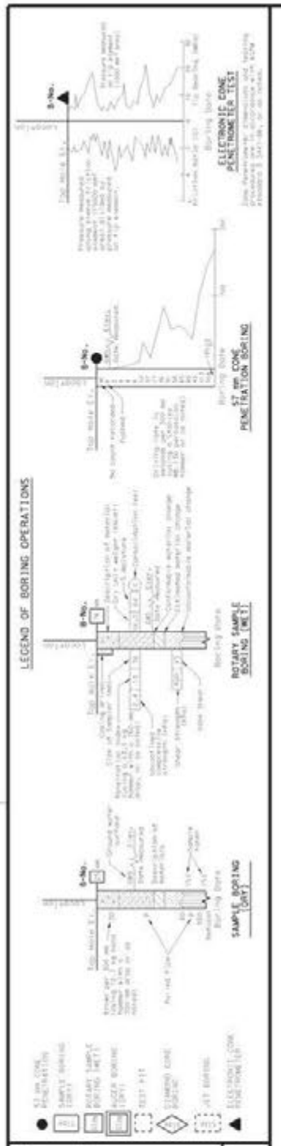
PROFILE

VERTICAL SCALE: 1:100
HORIZONTAL SCALE: NONE

PLATE 2

All dimensions and elevations are in meters except as noted

LEGEND OF BORING OPERATIONS



LEGEND OF EARTH MATERIALS

CONSISTENCY CLASSIFICATION FOR SOILS

According to the Standard Penetration Test

Cohesive	0-2	Very Soft	
	2-4	Soft	
	4-8	Firm	
	8-15	Stiff	
	15-30	Very Stiff	
	30+	Hard	
Granular	0-4	Very Loose	
	4-10	Loose	
	10-30	Medium Dense	
	30-50	Dense	
	50+	Very Dense	

NOTE: Classification of earth materials as shown on this sheet is based upon visual inspection and is not to be construed to imply geological properties.

DESIGN OVERSIGHT: Ba Nguyen	DRAWN BY: K. FERNANDES	N. NGHIEM	PREPARED FOR THE STATE OF CALIFORNIA DEPARTMENT OF TRANSPORTATION	D. YAVORSKY	BRIDGE NO. 53-2975 53C-2148
7-10-03 SIGN OFF DATE	CHECKED BY: C. SCHEYHING	FIELD INVESTIGATION BY: DATE:		PROJECT ENGINEER	KILOMETER POST 1.07

EASTSIDE LRT PROJECT BRIDGE OVER HWY 101

LOG OF TEST BORINGS SHEET 2 OF 5

GEOTECHNICAL LOG OF TEST BORINGS SHEET (METRIC) (REV 2/1/00)

ORIGINAL SCALE IN MILLIMETERS FOR REDUCED PLANS 0 10 20 30 40 50 60 70 80 90 100

CU 07225
EA 1199U1

FILE =: d1199b1058.dgn

DISREGARD PRINTS BEARING EARLIER REVISION DATES →

REVISION DATES (PRELIMINARY STAGE ONLY)

SHEET 58 OF 61

Caltrans now has a web site! To get to the web site, go to: http://www.dot.ca.gov

DIST	COUNTY	ROUTE	KILOMETER POST TOTAL PROJECT	SHEET No.	TOTAL SHEETS
07	LA	101	0.6/1.4	324	326

GEOTECHNICAL PROFESSIONAL

6-7-04
PLANS APPROVAL DATE

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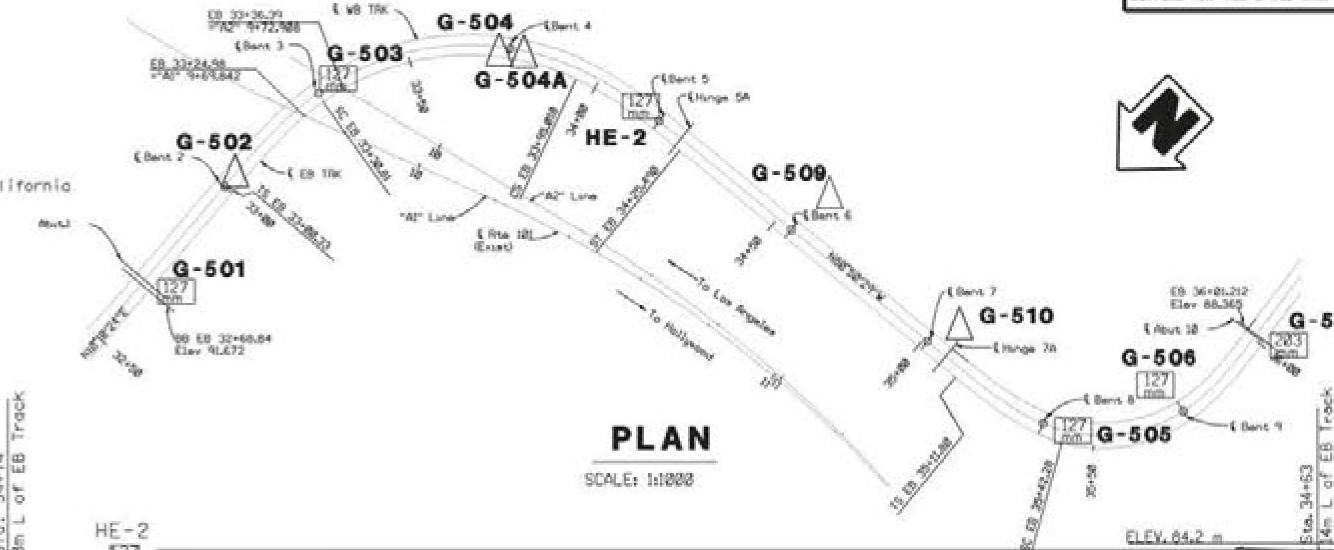
METROPOLITAN TRANSPORTATION AUTHORITY
ONE GATEWAY PLAZA
LOS ANGELES, CA. 90012

EASTSIDE LRT PARTNERS
707 WILSHIRE BLVD. SUITE 2900
LOS ANGELES, CA 90017

BENCHMARK
ESE-252 CALTRANS SR 98-146
FD CALTRANS BRASS DISC IN EAST SIDEWALK OF ALAMEDA ST. O/C AND ROUTE 101

NORTHING: 561498.646
EASTING: 1978051.044
ELEVATION: 83.920 m

Horizontal Datum: NAD83 1996.35 EPOCH, California State Plane Zone 5.
Vertical Datum: NAVD 88



PLAN

SCALE: 1:1000

PROFILE

VERTICAL SCALE: 1:100
HORIZONTAL SCALE: NONE

HE-2 — Sta. 34+14, 3m L of EB Track — Elev. 83.1

Blows	Hammer	Sample	Lab		Tests
17/152	61	1	1.4	3.6	WA
18	35	1a			
29/152	61	2	17.6	8.0	WA
29	35	2a			
50/76	61	3			WA
25	35	3a			
20/152	61	4	16.7	17.5	CO WA
25	35	4a			
50/102	61	5	--	9.9	WA
86	35	5a			
42/152	61	6	19.5	8.1	WA
37	35	6a			
REF/152	61	7	--	8.2	WA
60	35	7a			
38/152	61	8	--	8.9	WA
17	35	8a			
REF/76	61	9	--	4.0	WA
REF/95	35	9a			
REF/51	61	10			WA
REF/25	35	10a			
50/127	61	11	12.7	33.9	AL WA
54	35	11a			
50/102	61	12	12.2	38.3	AL WA
60	35	12a			
50/127	61	13	13.2	33.8	WA
85/254	35	13a			
50/127	61	14	13.4	33.6	WA
66	35	14a			
50/75	61	15	12.8	34.7	AL WA
86	35	15a			
50/127	61	16	12.8	36.2	AL WA
76/254	35	16a			

GWS ∇ EL. 73.8m 08/07/2001

ARTIFICIAL FILL:
Top Soil: High organic content, numerous roots
QUATERNARY ALLUVIUM (Qal):
GRAVELLY SAND (SW),
brown, dry, fine- to coarse-grained sand, fine to coarse gravel
- medium dense
SAND WITH SILT AND GRAVEL (SP-SM),
yellow brown, medium dense, moist, fine- to coarse-grained sand, fine to coarse gravel
GRAVEL WITH SILT (GP-GM),
light gray brown, very dense, fine to coarse gravel
SAND WITH SILT (SP-SM),
light gray brown, medium dense, moist, medium- to coarse-grained sand, trace gravel
SILTY SAND (SM),
light gray, brown with green gray mottling, medium dense, moist, medium- to coarse-grained sand, trace gravel
SAND WITH SILT (SP-SM),
brown, very dense, moist, fine- to coarse-grained sand, fine to coarse gravel
SAND WITH SILT (SW-SM),
light brown gray, dense, moist, coarse-grained sand, coarse gravel
- medium- to coarse-grained sand
- gravel lens
- dark green gray, very dense
SANDY GRAVEL (GP),
dark bluish gray, very dense (SPT blow counts low because material sampled was highly disturbed), moist to wet, fine- to coarse-grained sand, fine to coarse gravel
SILTY SAND (SM),
dark bluish gray, very dense, moist to wet, fine- to coarse-grained sand, fine to coarse gravel
SANDY GRAVEL (GP-GM),
dark bluish gray, very dense, moist to wet, fine- to coarse-grained sand, fine to coarse gravel
PUENTE FORMATION (Tp) (BEDROCK)
SILTSTONE,
dark greenish gray, low hardness, dry, little weathered, massive, intensely fractured, heavy hydrogen sulfide odor
- greenish black, moderately fractured
- faintly developed bedding dipping 45 degrees from horizontal
- very little fractured

CONTINUED IN INSET

BORING HE-2 CONTINUED

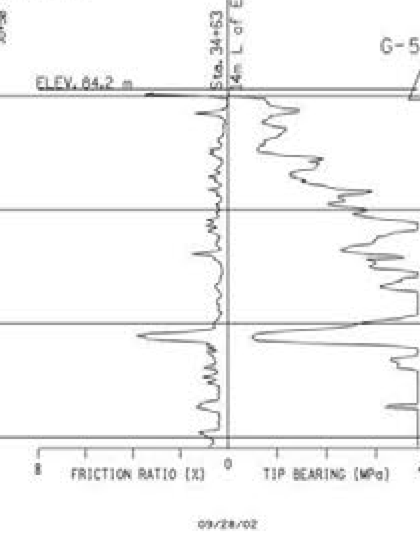
Blows	Hammer	Sample	Lab		Tests
20/127	61	17	14.5	28.4	AL
65	35	17a			

Drilled without sampling from 32 to 36 meters to allow P & S Logging from depth of 32 meters and above.

08/07/2001

Boring terminated at El. 47.8m
Groundwater encountered at El. 73.8 m
Stabilized groundwater measured at El. 73.1 m from top of casing (TOC) on August 7, 2001.
Boring converted to monitoring well on July 12, 2001.
P&S Logging from depths 0 to 32 m

ELEVATION (M): 84, 81, 78, 75, 72, 69, 66, 63, 60, 57 (inset: 57, 54, 51, 48)



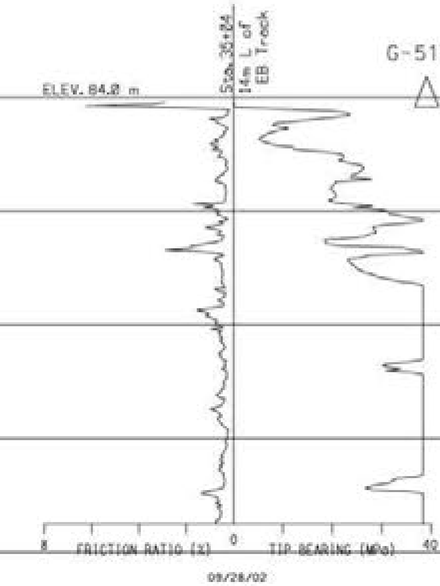
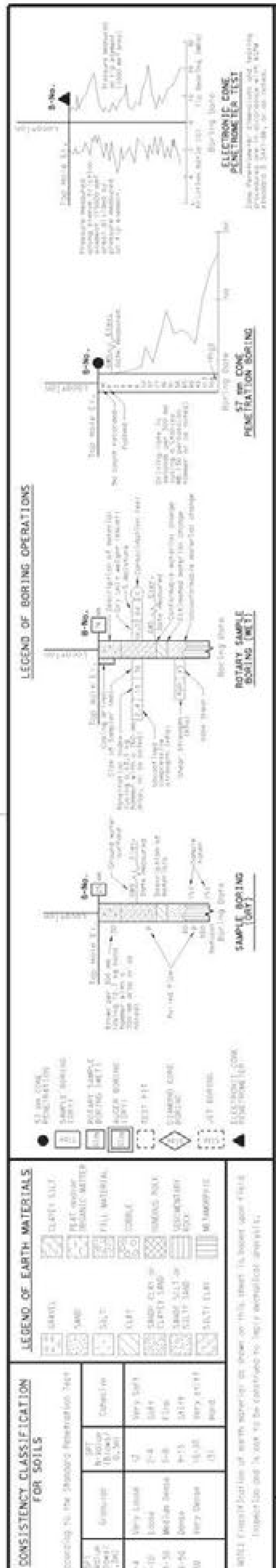


PLATE 3

All dimensions and elevations are in meters except as noted



DESIGN OVERSIGHT 7-10-03 SIGN OFF DATE	DRAWN BY K. FERNANDES	N. NGHIEM FIELD INVESTIGATION BY:	PREPARED FOR THE STATE OF CALIFORNIA DEPARTMENT OF TRANSPORTATION
	CHECKED BY C. SCHEYHING	DATE:	D. YAVORSKY PROJECT ENGINEER

BRIDGE NO. 53-2975 53C-2146
KILOMETER POST 1.07

EASTSIDE LRT PROJECT BRIDGE OVER HWY 101

LOG OF TEST BORINGS SHEET 3 OF 5

GEOTECHNICAL LOG OF TEST BORINGS SHEET (METRIC) (REV 2/1/00)

ORIGINAL SCALE IN MILLIMETERS FOR REDUCED PLANS 0 10 20 30 40 50 60 70 80 90 100

CU 07225
EA 1199U1

DISREGARD PRINTS BEARING EARLIER REVISION DATES

59 | 61

FILE => a11f63059.dgn

DIST	COUNTY	ROUTE	KILOMETER POST TOTAL PROJECT	SHEET No.	TOTAL SHEETS
07	LA	101	0.6/1.4	325	326

GEOTECHNICAL PROFESSIONAL

6-7-04
PLANS APPROVAL DATE

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Caltrans now has a web site! To get to the web site, go to: http://www.dot.ca.gov

METROPOLITAN TRANSPORTATION AUTHORITY
ONE GATEWAY PLAZA
LOS ANGELES, CA. 90012

EASTSIDE LRT PARTNERS
707 WILSHIRE BLVD. SUITE 2900
LOS ANGELES, CA 90017

BENCHMARK
ESE-252 CALTRANS SR 98-146
FD CALTRANS BRASS DISC IN EAST SIDEWALK OF ALAMEDA ST. O/C AND ROUTE 101

NORTHING: 561498.646
EASTING: 1978051.044
ELEVATION: 83.920 m

Horizontal Datum: NAD83 1996.35 EPOCH, California State Plane Zone 5.
Vertical Datum: NAVD 88

PLAN

SCALE: 1:1000

G-505 — Sta. 35+46, 5m L of EB Track — ELEV. 83.9 m — 127 mm

Blows		Sample	Moisture (%)		Tests
		SK-1			
12/152	61	R-1	19.9	1.0	MA
18	35	S-2	--	11.2	MA
30/152	61	R-3	--	6.5	MA
50/127	36	S-4	--	9.2	MA
50/114	61	R-5	19.6	9.6	MA
52/152	35	S-6	--	12.8	MA
REF/51	61	R-7	--	5.1	MA
REF/51	35	S-8	--	10.3	MA
REF/76	61	--			
REF/43	35	S-9	--	10.8	MA
54	35	S-10	--	68.7	CO, MA
REF/133	61	R-11	--	28.4	CO
50/127	61	R-12	13.9	30.7	CO, MA, PP
53/152	35	S-13	--	35.6	CO
52/152	35	S-14	--	42.5	
REF/43	61	R-15	--	28.5	

GWS El. 73.0 m 06/11/02

06/11/2002

ALLUVIUM (Qal):
Poorly Graded SAND w/Gravel (SP), brown, moist, fine to medium size gravel

Poorly Graded SAND w/Silt (SP-SM), medium dense, brown, moist, fine to coarse grained sand, few gravels

Poorly Graded GRAVEL (GP), dense, brown, moist, with little fine to coarse sand, fine to coarse gravel

Poorly Graded GRAVEL w/Silt and Sand (GP-GM), very dense, brown, moist, fine to coarse sand, fine to coarse gravel

Poorly Graded SAND w/Silt & Gravel (SP-SM), very dense, yellow brown, moist, coarse sand with medium size gravel

Well Graded SAND w/Silt (SW-SM), very dense, brown, moist, few fine to medium size gravels

Poorly Graded GRAVEL w/Sand (GP), very dense, gray, wet, fine grained sand and medium to big size gravel

Poorly Graded SAND and GRAVEL w/Silt (SP-SM / GP-GM), very dense, gray, wet, fine to coarse sand and medium size gravel

No sample recovery.
Cobbles encountered at El. 69.7 m.

BEDROCK, PUENTE FORMATION (Tp):
Elastic SILT (MH) to Fat Silty CLAY (CH), hard, dark olive, moist

PP Su > 215 kPa

Elastic SILT (MH) to Fat Silty CLAY (CH), hard, dark olive, moist

Bottom of boring at El. 59.2 m
Groundwater encountered at El. 73.0 m
Borehole backfilled with grout, cold asphalt patched.

G-506 — Sta. 35+67, 9m L of EB Track — ELEV. 83.9 m — 127 mm

Blows		Sample	Moisture (%)		Tests
		SK-1			
12/152	61	R-1	21.9	17.0	MA
21	35	S-2			
52/152	61	R-3	18.7	7.6	DS, MA
55/152	35	S-4			
50/102	61	R-5	18.5	10.8	MA
50/140	35	S-6			
50/51	35	S-7			
REF/127	61	R-8	--	10.8	MA
50/102	61	R-9	9.9	59.6	MA
54/152mm	35	S-10	--	46.0	
50/76mm	61	R-11	14.6	51.7	AL, MA, PP
51	35	S-12			
50/102	61	R-13			

GWS El. 72.8m 6/12/02

06/12/2002

ALLUVIUM (Qal):
Poorly Graded SAND w/Silt & Gravel (SP-SM), medium dense, brown, moist, medium size gravel

- becomes yellowish brown with fine grained sand
- sand becomes fine to coarse
- traces of broken granitic cobbles
- becomes dense
- becomes very dense

Poorly Graded SAND w/Silt & Gravel (SP-SM), very dense, yellowish brown, moist, medium size gravel
- Hard drilling through cobbles to El. 71.9 m
- sampled and collected in plastic bag
- odor observed
- hard drilling in granitic cobbles

BEDROCK, PUENTE FORMATION (Tp):
Elastic SILT (MH), hard, black olive, moist

LL = 78, PI = 21
PP Su > 215 kPa

Bottom of boring at El. 62.3 m
Groundwater encountered at El. 72.8 m
Borehole backfilled with grout, cold asphalt patched.

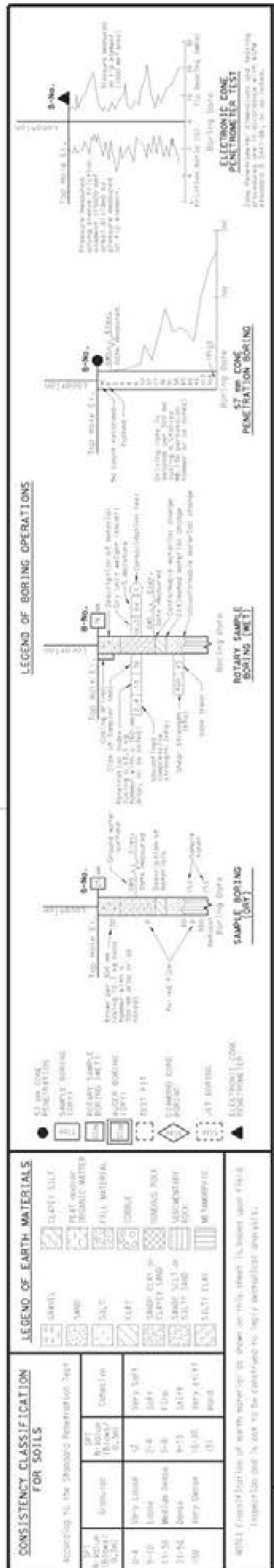
ELEVATION (M): 84, 81, 78, 75, 72, 69, 66, 63, 60, 57

PROFILE

VERTICAL SCALE: 1:100
HORIZONTAL SCALE: NONE

PLATE 4

All dimensions and elevations are in meters except as noted



DESIGN OVERSIGHT	DRAWN BY	K. FERNANDES	N. NGHIEM	PREPARED FOR THE STATE OF CALIFORNIA DEPARTMENT OF TRANSPORTATION	D. YAVORSKY	BRIDGE NO. 53-2975 53C-2148	EASTSIDE LRT PROJECT BRIDGE OVER HWY 101
7-10-03 SIGN OFF DATE	CHECKED BY	C. SCHEYHING	FIELD INVESTIGATION BY: DATE:		PROJECT ENGINEER	KILOMETER POST 1.07	LOG OF TEST BORINGS SHEET 4 OF 5

GEOTECHNICAL LOG OF TEST BORINGS SHEET (METRIC) (REV 2/1/00)

ORIGINAL SCALE IN MILLIMETERS FOR REDUCED PLANS 0 10 20 30 40 50 60 70 80 90 100

CU 07
EA 1035F1

DISREGARD PRINTS BEARING EARLIER REVISION DATES

FILE => a1164060.dgn

DIST	COUNTY	ROUTE	KILOMETER POST TOTAL PROJECT	SHEET No	TOTAL SHEETS
07	LA	101	0.6/1.4	326	326

GEOTECHNICAL PROFESSIONAL

6-7-04
PLANS APPROVAL DATE

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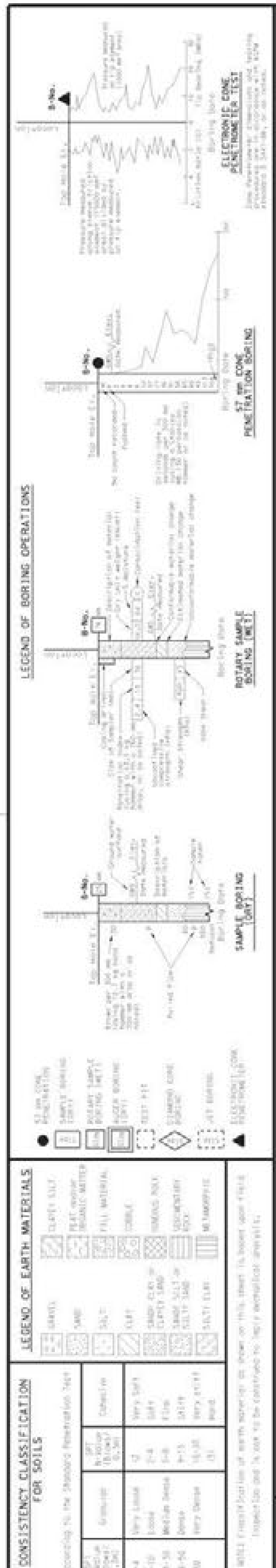
METROPOLITAN TRANSPORTATION AUTHORITY
ONE GATEWAY PLAZA
LOS ANGELES, CA. 90012

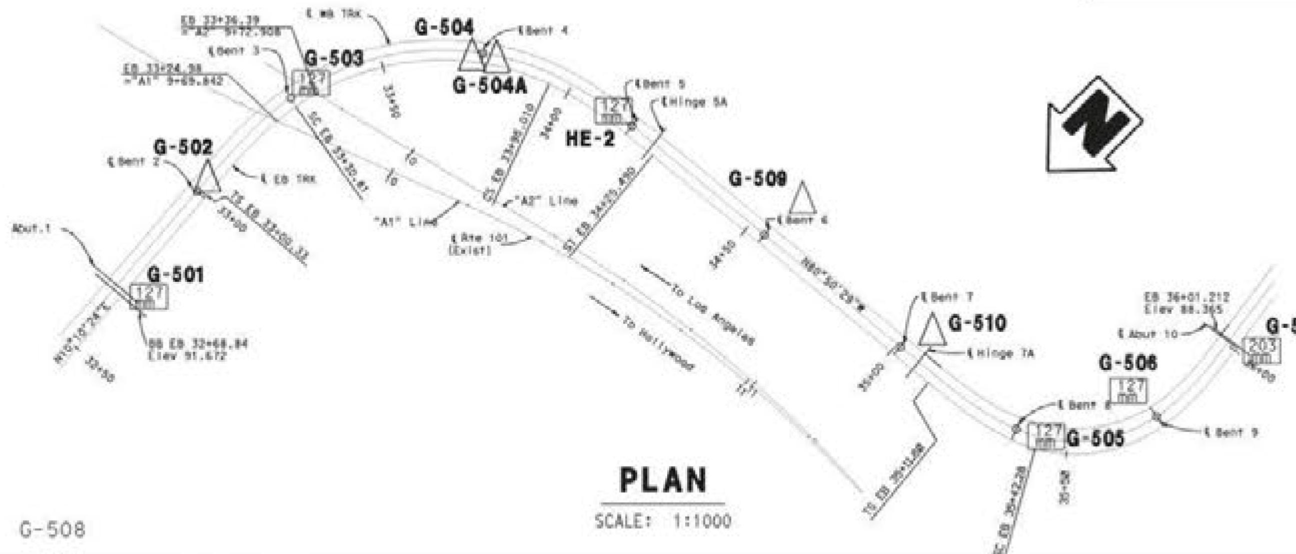
EASTSIDE LRT PARTNERS
707 WILSHIRE BLVD. SUITE 2900
LOS ANGELES, CA 90017



BENCHMARK
ESE-252 CALTRANS SR 98-146
FD CALTRANS BRASS DISC IN EAST SIDEWALK OF ALAMEDA ST. O/C AND ROUTE 101

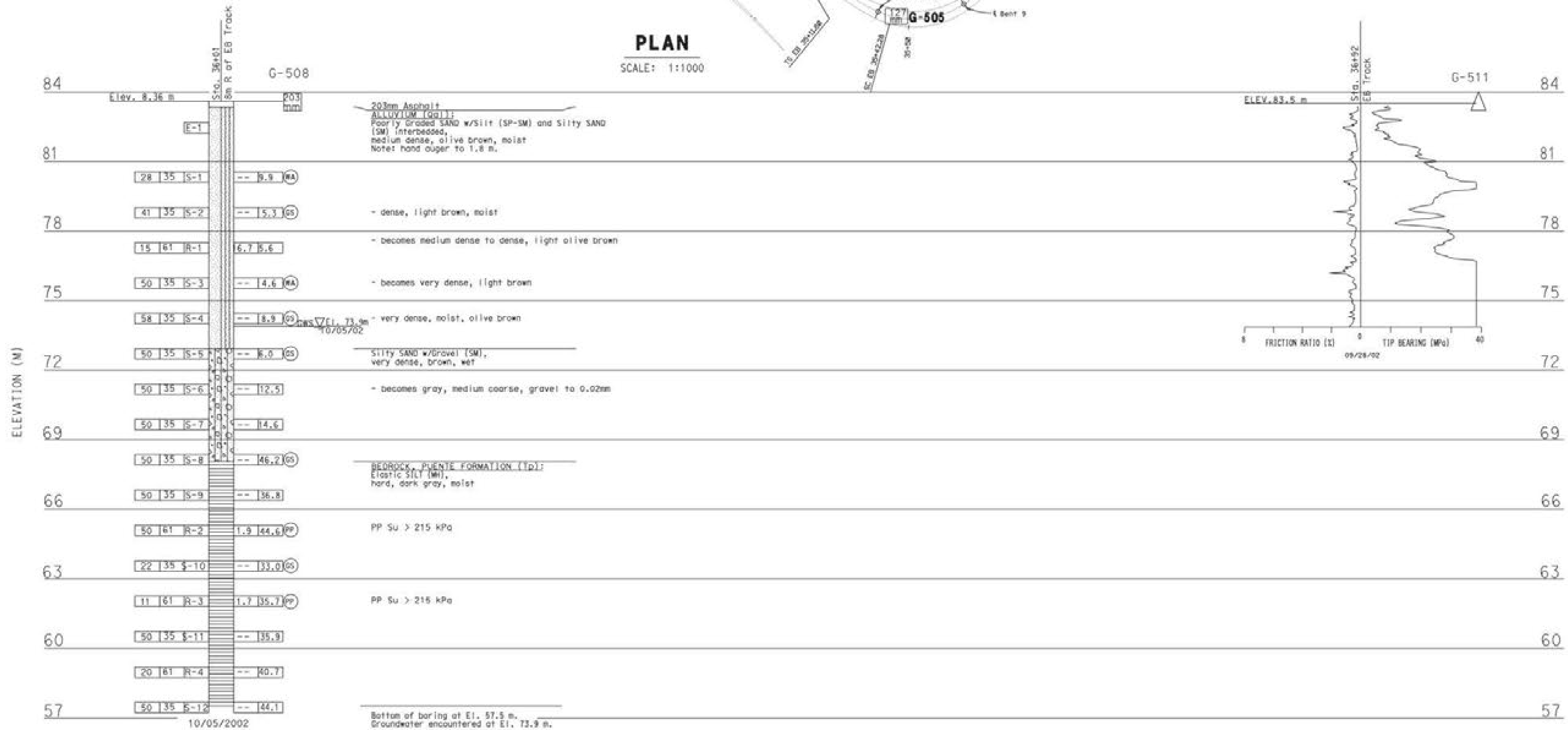
NORTHING: 561498.646
EASTING: 1978051.044
ELEVATION: 83.920 m

Horizontal Datum: NAD83 1996.35 EPOCH, California State Plabe Zone 5.
Vertical Datum: NAVD 88



PLAN

SCALE: 1:1000



PROFILE

VERTICAL SCALE: 1:100
HORIZONTAL SCALE: NONE

PLATE 5

All dimensions and elevations are in meters except as noted

DESIGN OVERSIGHT	DRAWN BY	K. FERNANDES	N. NGHIEM	PREPARED FOR THE STATE OF CALIFORNIA DEPARTMENT OF TRANSPORTATION	D. YAVORSKY	BRIDGE NO. 53-2976 53C-2148	EASTSIDE LRT PROJECT BRIDGE OVER HWY 101
7-10-03 SIGN OFF DATE	CHECKED BY	C. SCHEYHING	FIELD INVESTIGATION BY: DATE:		PROJECT ENGINEER	KILOMETER POST 1.07	LOG OF TEST BORINGS SHEET 5 OF 5

GEOTECHNICAL LOG OF TEST BORINGS SHEET (METRIC) (REV 2/1/00)

ORIGINAL SCALE IN MILLIMETERS FOR REDUCED PLANS 0 10 20 30 40 50 60 70 80 90 100

CU 07225
EA 1199U1

DISREGARD PRINTS BEARING EARLIER REVISION DATES

SHEET 61 OF 61

Existing Geotechnical Boring Logs
City of Los Angeles, 1993

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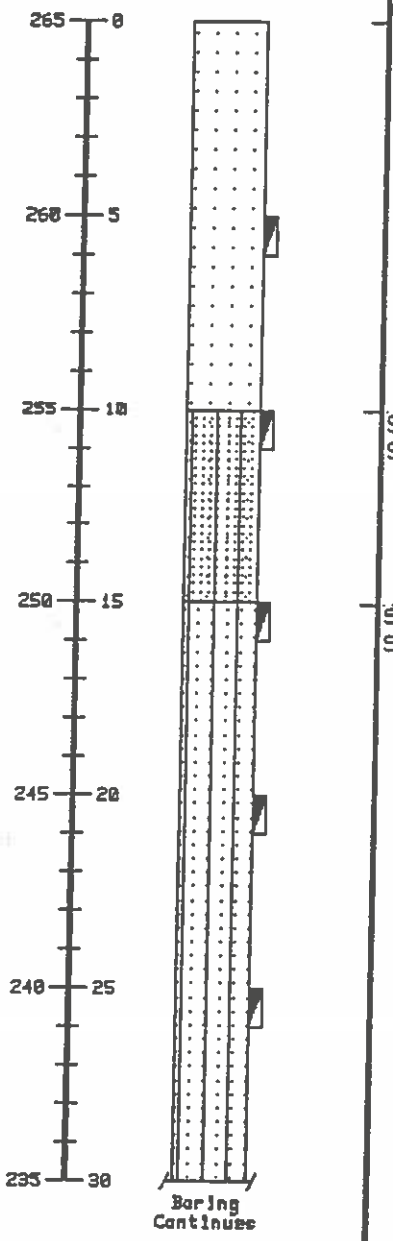
LOG OF TEST BORING

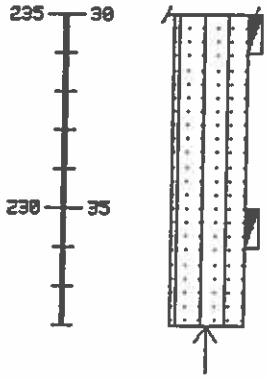
PROJECT: 140-4046 DATE: Nov. 18, 1992
BORING NO.: 1 ELEV.: 265'
BORING LOCATION: 124' W/O N. Myers St. & 76' S/O SCF E. 1st St.
DRILL RIG TYPE: CME-75 HT using 8" diameter hollow stem augers
DRILLER: Cooksey LOGGER: C. Kunesh ENGINEER: Yew/Adams
DEPTH TO STANDING WATER: none DEPTH TO WATER SEEPAGE: none



USCS	Field Description	Standard Pen. Readings 1st 6" / 2nd 6" / 3rd 6"
SP	Brown poorly graded sand with gravel. Trace of silt. Moist and dense.	8 / 6 / 9
SW-SM	Light brown to tan, well graded sand with silt, granitic gravel and cobbles. Dry to moist and dense.	6 / 9 / 10
SP-SM	Light brown to tan poorly graded sand with silt and gravel. Gravel content ranges from 8% to 42% . Moist and dense to very dense.	10 / 14 / 19
		19 / 33 / 18
		20 / 30 / 24

LOG OF TEST BORING

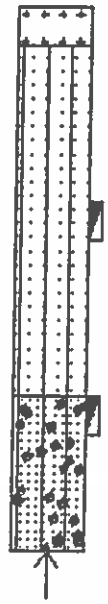
PROJECT: 140-4046 DATE: Nov. 18, 1992
BORING NO.: 1 ELEV.: 265'
BORING LOCATION: 124' W/O N. Myers St. & 76' S/O SCF E. 1st St.
DRILL RIG TYPE: CME-75 HT using 8" diameter hollow stem augers
DRILLER: Cooksey LOGGER: C. Kunesh ENGINEER: Yew/Adams
DEPTH TO STANDING WATER: none DEPTH TO WATER SEEPAGE: none

ELEVATION / DEPTH	SOIL SYMBOLS SAMPLER SYMBOLS AND BLOWS/INCHES	USCS	Field Description	Standard Pen. Readings 1st 6" / 2nd 6" / 3rd 6"
235 — 30		SP-SM	Light brown to tan poorly graded sand with silt and gravel. Gravel content is 41 %. Moist and dense to very dense.	18 / 31 / 44
230 — 35				50 @ 5"/ - / -
			— No Water —	

LOG OF TEST BORING

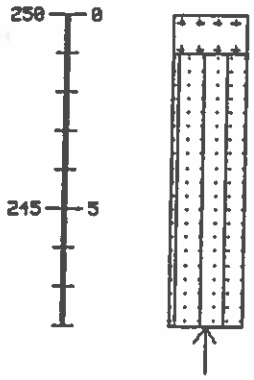
PROJECT: 140-4046 DATE: Nov. 13, 1992
BORING NO.: 2 ELEV.: 250'
BORING LOCATION: W/S L.A. River channel, below 1st St. Bridge
DRILL RIG TYPE: CME-75 HT using 8" diameter hollow stem augers
DRILLER: Cooksey LOGGER: C. Kunesh ENGINEER: Yew/Adams
DEPTH TO STANDING WATER: none DEPTH TO WATER SEEPAGE: none

ELEVATION / DEPTH	SOIL SYMBOLS SAMPLER SYMBOLS AND BLOWS/INCHES	USCS	Field Description	Standard Pen. Readings 1st 6" / 2nd 6" / 3rd 6"
250 — 0			12" PCC.	
		SP-SM	Brown to rusty brown poorly graded sand with silt and gravel. Gravel content is 29%. Moist and dense. Encountered granitic cobbles from 4' to 10'.	
245 — 5				18 / 20 / 31
240 — 10		GW-GM	Brown to rusty brown well graded gravel with silt, sand and granitic cobbles. Sand content is 31% . Moist and dense.	25 / 27 / 27
			— No Water —	



LOG OF TEST BORING

PROJECT: 140-4046 DATE: Nov. 17, 1992
BORING NO.: 2A " ELEV.: 250'
BORING LOCATION: W/S River channel, below 1st St. Bridge, 17' N/O T.H. 2
DRILL RIG TYPE: CME-75 HT using 8" diameter hollow stem augers
DRILLER: Cooksey LOGGER: C. Kunesh ENGINEER: Yew/Adams
DEPTH TO STANDING WATER: none DEPTH TO WATER SEEPAGE: none

ELEVATION / DEPTH	SOIL SYMBOLS SAMPLER SYMBOLS AND BLOWS/INCHES	USCS	Field Description	Standard Pen. Readings 1st 6" / 2nd 6" / 3rd 6"
250 — 0			12" PCC.	
		SP-SM	Brown to rusty brown poorly graded sand with silt and gravel. Gravel content is about 29% . Moist and dense. Encountered cobbles from 4' to 8'.	
245 — 5			No Water	

Existing Geotechnical Boring Logs
City of Los Angeles, 1994a

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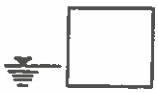
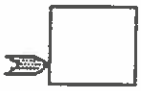
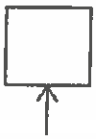
Legend:

Symbol:	Description:	Symbol:	Description:
	Poorly graded sand with gravel. Trace of silt.		
	Well graded sand with silt, granitic gravel and cobbles.		
	Poorly graded sand with silt and gravel.		PCC.
	Well graded gravel with silt, sand and granitic cobbles.		
	Representative sample (disturbed)		Water at depth indicated during drilling
	Depth to perched water		Rig refusal or end of boring

Notes:

1. Exploratory borings were drilled on November 13, 17, & 18, 1992 with a CME-75 HT drill rig using 8" diameter hollow stem augers.

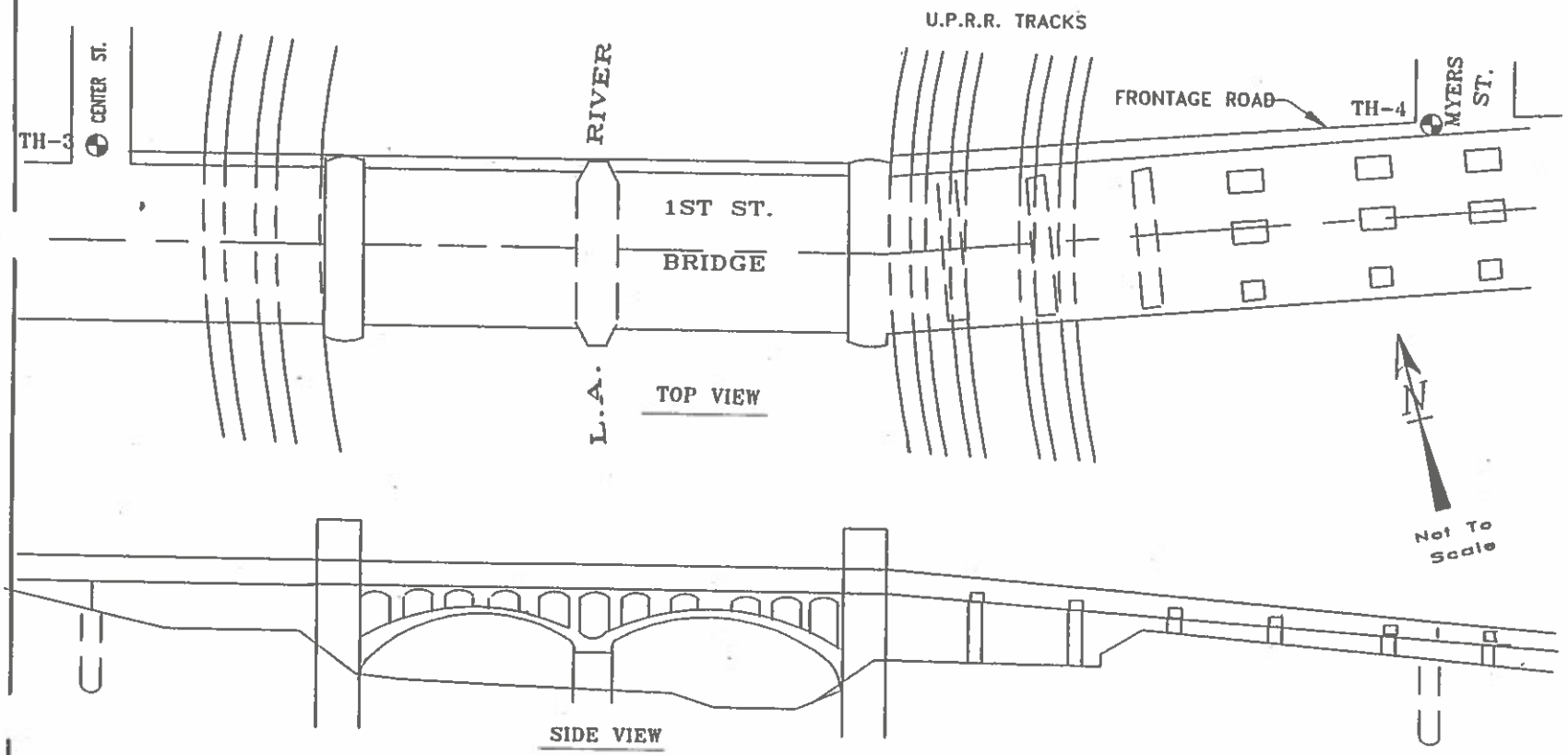
2. Free water was not encountered during the drilling of this project.

3. The boring locations and elevations were provided by Geotechnical Services.

4. Abbreviations used on logs: HT = high torque

N/O = north of	NCF = north curb face	C/L = center line	
S/O = south of	SCF = south curb face	BCR = begin curb return	
E/O = east of	ECF = east curb face	PL = property line	
W/O = west of	WCF = west curb face	ELEV. = elevation	
OVA = organic vapor analyzer		LEL = lower explosive limit	
AC = asphalt concrete	PCC = Portland cement concrete		

5. A maximum blow count value of 75 per 6 inch increment was used for the Standard Penetration Test.



CITY OF LOS ANGELES
DEPARTMENT OF GENERAL SERVICES
STANDARDS DIVISION

TEST BORING LOCATIONS

Lab No. 140- 4046 Ref. No. 06573

Date: 3-19-93

CADD BY R.B.

Project Title : 1ST STREET VIADUCT OVER L.A. RIVER-SUPPLEMENTAL

LOG OF TEST BORING

LAB. NO.: 140- 4046 **PROJECT:** FIRST STREET VIADUCT OVER L.A. RIVER-SUPPLEMENTAL

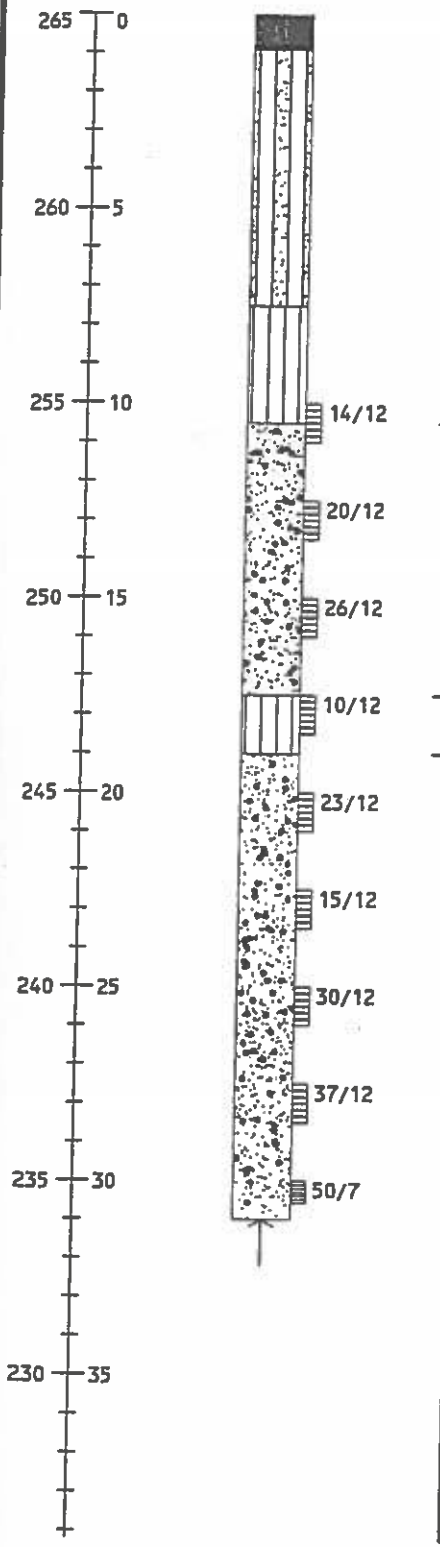
BORING NO.: 3 **ELEVATION:** 265' **DRILLING DATE:** January 21, 1993

BORING LOCATION: 25' N/O NCF 1st St. frontage road & 46' W/O ECF Center St.

DRILL RIG TYPE: CME-75HT using 8" diameter hollow stem augers

DEPTH TO STANDING WATER: none **DEPTH TO WATER SEEPAGE:** none

DRILLER: Cooksey **LOGGER:** C. Kunesh **ENGINEER:** B. Adams



ELEVATION / DEPTH (ft)	USCS	Field Description	Moisture %	Density Pcf
		10" AC pavement in good condition.		
	SM	Brown silty sand. Few gravels and red brick fragments. Fill material to 2.5'. Moist. Color changes to light brown at 2.5'.		
	ML	Brown silt. Little amount of clay. Moist and firm.		
	SW	Gray well graded sand. Few granitic gravel. Moist and dense. Moisture decreasing with depth.	6.3	107
			3.7	116
		Encountered a 1' lense of poorly graded gravel with sand at 15'.	2.5	120
	ML	Brown-gray silt. Little to some fine sand. Moist and firm.	16.1	98
	SW	Gray-brown well graded sand with silt and gravels. Gravel is granitic. Moist and dense.	2.6	119
		Encountered a 1' poorly graded sand lense at 22'.	7.6	101
			3.2	118
			3.1	115
			2.1	126
		- No Water -		

LOG OF TEST BORING

LAB. NO.: 140- 4046 **PROJECT:** FIRST STREET VIADUCT OVER L.A. RIVER-SUPPLEMENTAL

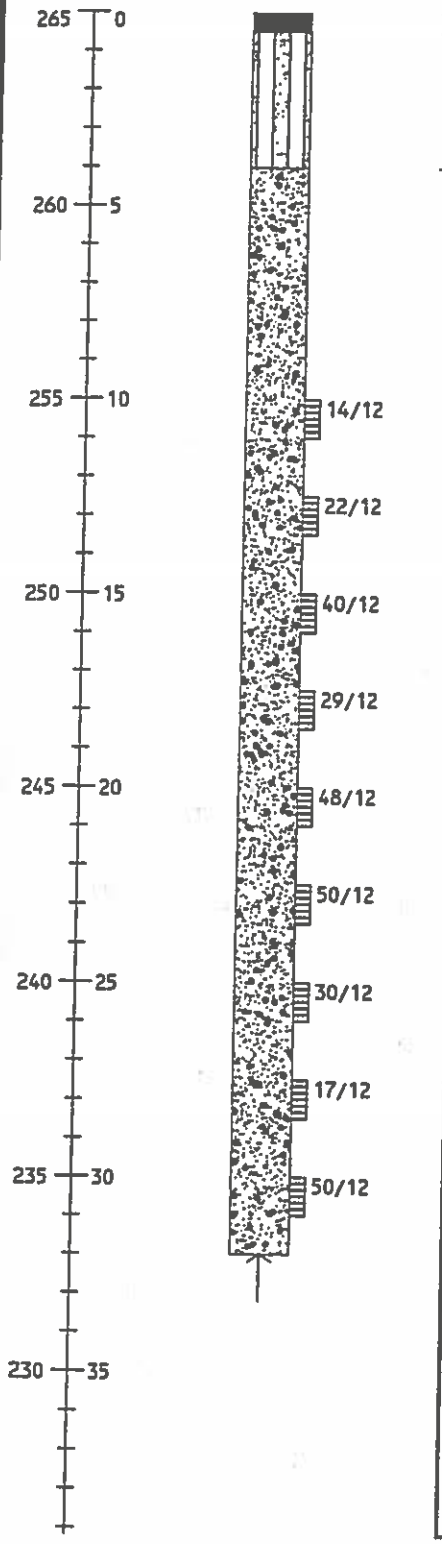
BORING NO.: 4 **ELEVATION:** 265' **DRILLING DATE:** January 22, 1993

BORING LOCATION: 7' W/O C/L N. Myers St. & approx. C/L 1st St. frontage Road

DRILL RIG TYPE: CME-75 using 8" diameter hollow stem augers

DEPTH TO STANDING WATER: none **DEPTH TO WATER SEEPAGE:** none

DRILLER: Cooksey **LOGGER:** C. Kunesh **ENGINEER:** Zadoorian



ELEVATION / DEPTH (ft)	SOIL SYMBOLS, SAMPLER SYMBOLS AND BLOWS/INCHES	USCS	Field Description	Moisture %	Density Pcf
			6" AC pavement in good condition.		
		SM	Brown silty sand. Few gravels and red brick fragments. Fill material. Moist.		
		SW/SP	Brown well to poorly graded sand. Trace of silt. Few granitic gravel. Silt content decreasing with depth. Moist and dense to very dense.		
	14/12			2.9	127
	22/12		Encountered 1' lense of well graded gravel with sand at 12.5'.	1.9	123
	40/12			2.8	125
	29/12			2.5	118
	48/12			3.0	127
	50/12			1.7	135
	30/12			2.4	112
	17/12			2.9	124
	50/12			2.1	132
			No Water		

Existing Geotechnical Boring Logs
City of Los Angeles, 1994b

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LOG OF TEST BORING 9402300H2

LAB. NO.: 140- 4340 **PROJECT:** PIPER TECHNICAL CENTER

BORING NO.: H-2 **ELEVATION:** 280' **DRILLING DATE:** 07-14-94 (CONTAMINATION)

BORING LOCATION: 188' S/o and 13' W/o Northwest corner of building #1 (Police garage)

DRILL RIG TYPE: CME-55 using 8" diameter hollow stem augers.

DEPTH TO STANDING WATER: none **DEPTH TO WATER SEEPAGE:** none

DRILLER: Myles **LOGGER:** Redlin **ENGINEER:** Burnett

ELEVATION / DEPTH (ft)	SOIL SYMBOLS, SAMPLER SYMBOLS AND BLOWS/INCHES	OVA (PPM)	USCS	Field Description
280 — 0				4" AC pavement in fair condition.
				Sand/gravel base.
				FILL MATERIAL To 15'. Light brown poorly graded sand with some silt and a little gravel. Moist and loose to dense. Encountered 2' silty lense at 15'. Encountered coarse gravel and small cobbles at 20'. Encountered silty sand at 25'. No petrochemical odor.
275 — 5	5/12	0		
270 — 10	3/12	0		
265 — 15	10/12	0		
260 — 20	14/12	0		
255 — 25	20/12	0		
T26				
				--- No water ---
250 — 30				
245 — 35				

LOG OF TEST BORING 940230H12

LAB. NO.: 140- 4340 **PROJECT:** PIPER TECHNICAL CENTER

BORING NO.: H-9A **ELEVATION:** 280' **DRILLING DATE:** 08-31-94 (CONTAMINATION)

BORING LOCATION: 56' S/o and 32' W/o NW corner of column QR at Space 120' Building #2

DRILL RIG TYPE: CME-55 using 8" diameter hollow stem augers.

DEPTH TO STANDING WATER: none **DEPTH TO WATER SEEPAGE:** none

DRILLER: L. Cooksey **LOGGER:** J. Kunesh **ENGINEER:** Burnett

ELEVATION / DEPTH (ft)	SOIL SYMBOLS, SAMPLER SYMBOLS AND BLOWS/INCHES	OVA (PPM)	USCS	Field Description
280 — 0				4" AC pavement in good condition.
				Crushed aggregate base with some sand.
275 — 5				FILL MATERIAL. Grayish-brown silty sand with some gravel. Slight petrochemical odor from 8' depth. No sampling at 5' and 10' depths per engineer present. Concrete fragments present from 11' to 13' depth. Granite cobble lodged in split spoon sampler at 16' depth. Petrochemical odor decreasing with depth. Moist and dense.
270 — 10				
265 — 15	40/12	7		
			SP	Brown poorly graded sand with some granitic gravel and cobbles. Sand color becoming lighter with depth. Trace of petrochemical odor present. Moist and dense.
260 — 20	16/12	8		
-21				--- No water ---
255 — 25				
250 — 30				
245 — 35				

LOG OF TEST BORING 9402304 21

LAB. NO.: 140- 4340 **PROJECT:** PIPER TECHNICAL CENTER

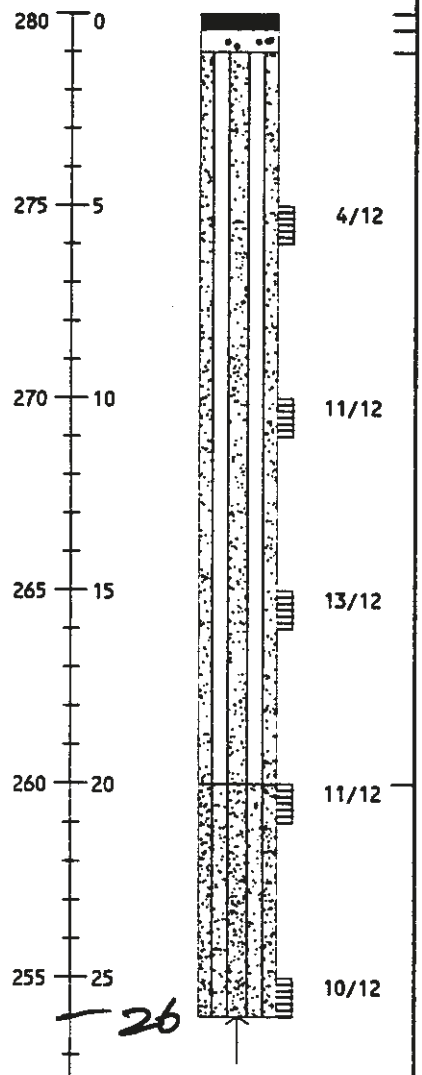
BORING NO.: H-18 **ELEVATION:** 280' **DRILLING DATE:** 08-25-94 (CONTAMINATION)

BORING LOCATION: 61' W/o and 11' N/o Diesel Pump at back of building #1 Space 150

DRILL RIG TYPE: CME-75 using 8" diameter hollow stem augers.

DEPTH TO STANDING WATER: none **DEPTH TO WATER SEEPAGE:** none

DRILLER: L. Cooksey **LOGGER:** Redlin **ENGINEER:** Burnett



ELEVATION / DEPTH (ft)	SOIL SYMBOLS, SAMPLER SYMBOLS AND BLOWS/INCHES	OVA (PPM)	USCS	Field Description
				5" AC pavement in fair condition.
				Sand/gravel base.
				FILL MATERIAL. Gray/brown silty sand with some clay binders, gravel and a few red brick fragments. Moist and fairly loose. Slight petrochemical odor at 10'.
			SP-SM	Light brown/tan poorly graded sand. Moist and fairly loose. No petrochemical odor. Encountered some gravel at 25'. Sand is becoming coarser with depth.
				--- No water ---

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Existing Geotechnical Boring Logs
City of Los Angeles, 1994c

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941100001A

LOG OF TEST BORING

LAB. NO.: 140- 4413 **PROJECT:** ALAMEDA SEWER REHABILITATION AT LOS ANGELES ST.

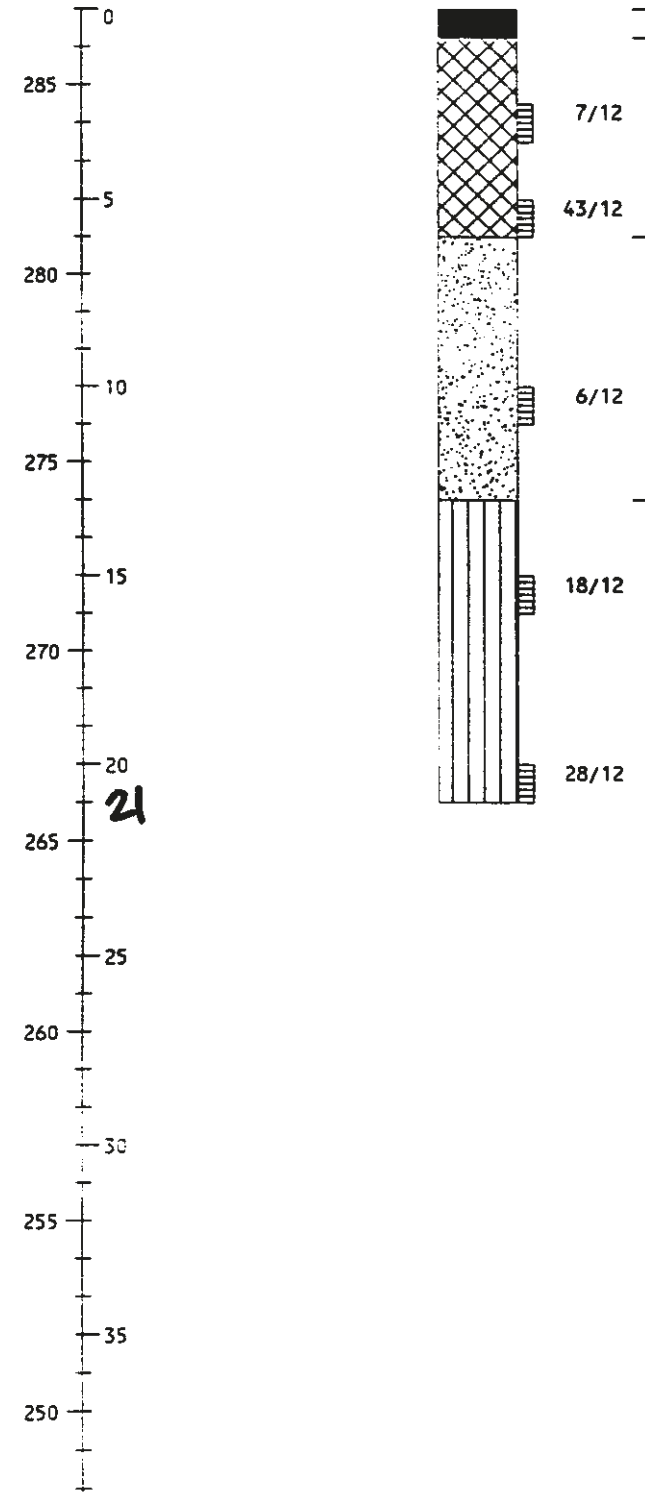
BORING NO.: B-1A **ELEVATION:** 287' **DRILLING DATE:** 12-28-94

BORING LOCATION: 3.5' W/o ECF Alameda St. and 92' S/o SCF Union Station Parking Ent.

DRILL RIG TYPE: CME-75 using 8" diameter hollow stem augers.

DEPTH TO STANDING WATER: None **DEPTH TO WATER SEEPAGE:** None

DRILLER: Adams **LOGGER:** A. Gharai **ENGINEER:** None Present



ELEVATION / DEPTH (ft)	SOIL SYMBOLS, SAMPLER SYMBOLS AND BLOWS/INCHES	USCS	Field Description	Moist. %	Dens. Pcf
			9" AC pavement in good condition.		
	7/12		FILL MATERIAL. Light brown poorly graded sand with some silt and gravel. Concrete slurry present from 4.5' to 6' depth.	3.1	122
	43/12			7.2	116
		SP	POSSIBLE FILL MATERIAL from existing sewer line. Light brown sand with some granitic gravel and traces of silt. Moist and loose.		
	6/12			3.7	111
		ML	Light green silt with clay. Moist and firm. Density increasing with depth.		
	18/12			28.0	96
	28/12			23.1	104
			--- No water. ---		

CITY OF LOS ANGELES - STANDARDS DIVISION

941100002

LOG OF TEST BORING

LAB. NO.: 140- 4413 **PROJECT:** ALAMEDA SEWER REHABILITATION AT LOS ANGELES ST.

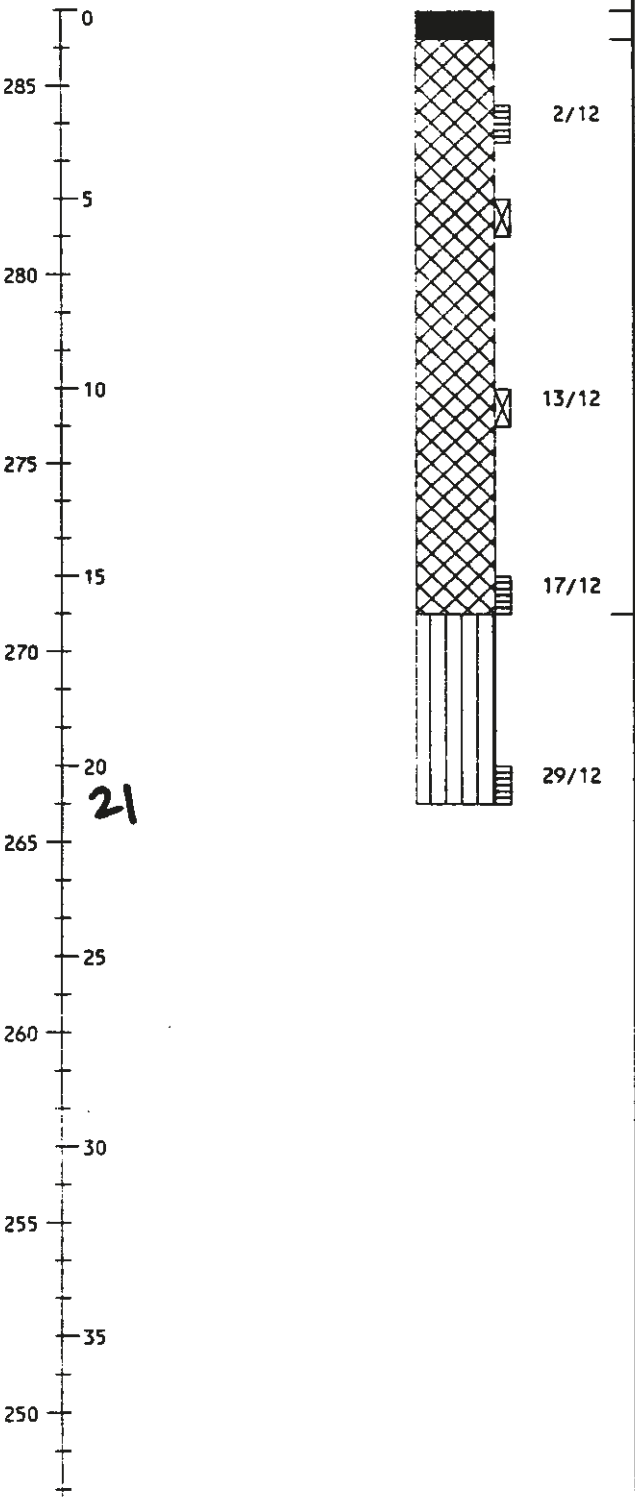
BORING NO.: B-2 **ELEVATION:** 287' **DRILLING DATE:** 12-28-94

BORING LOCATION: 3.5' W/o ECF Alameda St. and 24' S/o SCF Union Station Parking Exit

DRILL RIG TYPE: CME-75 using 8" diameter hollow stem augers.

DEPTH TO STANDING WATER: None **DEPTH TO WATER SEEPAGE:** None

DRILLER: Adams **LOGGER:** A. Gharai **ENGINEER:** None Present



ELEVATION / DEPTH (ft)	SOIL SYMBOLS, SAMPLER SYMBOLS AND BLOWS/INCHES	USCS	Field Description	Moist. %	Dens. Pcf
			9" AC pavement in good condition.		
	2/12		FILL MATERIAL. Light brown silty sand with some gravel. Wood fragments (plywood) present at 3' depth. PVC pipe and concrete slurry present at 5' depth. Concrete fragments, sand and cobbles present from 10' to 15' depth. Moist.	10.2	100
	13/12				
	17/12			27.8	96
		ML	Light green/brown silt with sand and clay. Moist and firm. Moisture increasing with depth.		
	29/12			32.9	91
			--- No water. ---		

Existing Geotechnical Boring Logs
City of Los Angeles, 1996

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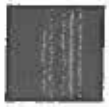
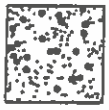
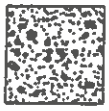
KEY TO SYMBOLS

Symbol	Description
STRATA	
	AC pavement
	Silty sand.
	Fine to very fine sandy silt.
	Well graded sands. Few granitic gravel.
	Well to poorly graded sand. Trace of silt.
MISCELLANEOUS	
	End of Boring
SAMPLERS	
	Split spoon sampler

LAB NO.: 140- 4046

KEY TO SYMBOLS

Notes:

1. Exploratory borings were drilled on January 21, 1993 with a CME-75 HT drill rig and on January 22, 1993 with a CME-75 drill rig using 8" diameter hollow stem augers.

2. Free water was not encountered during the drilling of this project.

3. The boring locations and elevations were provided by Geotechnical Services.

4. Test Holes No. 1 & 2 were drilled on November 17th & 18th, 1992.

5. Abbreviations used on logs:

N/O = north of	NCF = north curb face	NE = northeast
S/O = south of	SCF = south curb face	NW = northwest
E/O = east of	ECF = east curb face	SE = southeast
W/O = west of	WCF = west curb face	SW = southwest
C/L = center line	PL = property line	
AC = asphalt concrete	PCC = Portland cement concrete	
OVA = organic vapor analyzer	LEL = lower explosive limit	
HT = high torque		

LAB NO.: 140- 4046

.OG OF TEST BORINC

LAB. NO.: 140- 4536 PROJECT: 1ST STREET VIADUCT OVER L.A. RIVER-SEISMIC RETROFIT

BORING NO.: H-2 ELEVATION: 270' DRILLING DATE: 02-15-96 (CONTAMINATION)

BORING LOCATION: 5' N/o SCF 1st St. (N/s Frontage Rd.) and 48' E/o ECF Santa Fe Ave.

DRILL RIG TYPE: CME-75 using 6" diameter conventional flight augers.

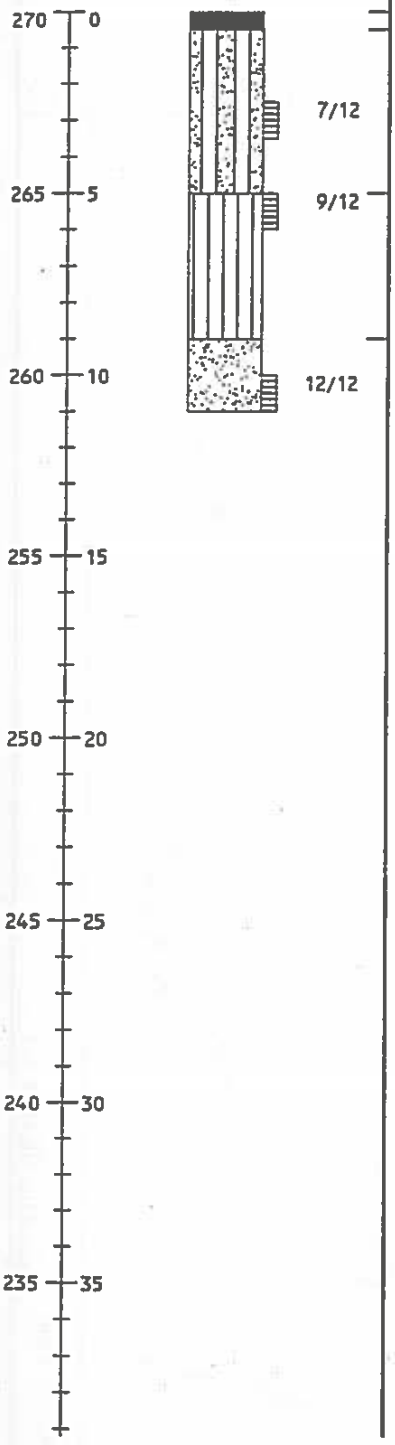
DEPTH TO STANDING WATER: None DEPTH TO WATER SEEPAGE: None

DRILLER: Ramirez LOGGER: Redlin ENGINEER: Burnett

.EVATION / DEPTH (ft)	SOIL SYMBOLS, SAMPLER SYMBOLS AND BLOWS/INCHES	OVA (PPM)	USCS	Field Description
70 — 0				6" AC pavement in poor condition.
	5/12	0	SM-ML	Light brown silty sand/sandy silt with some clay binders. Sand is fine in texture. Moist and firm. No petrochemical odor.
65 — 5	6/12	0	SP	Light tan sand with a little silt and gravel. Moist and dense. Sand is becoming coarser in texture with depth. Gravel content is increasing with depth. No petrochemical odor.
60 — 10	15/12	0		
				--- No free water. ---
55 — 15				
50 — 20				
45 — 25				
40 — 30				
35 — 35				

OG OF TEST BORING

LAB. NO.: 140- 4536 **PROJECT:** 1ST STREET VIADUCT OVER L.A. RIVER-SEISMIC RETROFIT
BORING NO.: H-1 **ELEVATION:** 270' **DRILLING DATE:** 02-15-96 (CONTAMINATION)
BORING LOCATION: 11' E/o WCF Center St. and 53' S/o SCF 1st St. (N/s Frontage Rd.) under bridge
DRILL RIG TYPE: CME-75 using 6" diameter conventional flight augers.
DEPTH TO STANDING WATER: None **DEPTH TO WATER SEEPAGE:** None
DRILLER: Ramirez **LOGGER:** Redlin **ENGINEER:** Burnett



ELEVATION / DEPTH (ft)	SOIL SYMBOLS, SAMPLER SYMBOLS AND BLOWS/INCHES	OVA (PPM)	USCS	Field Description
				6" AC pavement in poor condition.
	7/12	0	SM	FILL MATERIAL. Light brown silty sand with some clay binders and a trace of gravel. Sand is fine in texture. Moist and firm. Encountered some red brick fragments at 2.5' depth.
	9/12	0	ML	Light brown sandy silt with some clay binders. Moist and firm. No petrochemical odor.
	12/12	0	SP	Light tan sand with some gravel. Moist and dense. No petrochemical odor.
				--- No free water. --- Used break down mast under bridge.

LOG OF TEST BORING

LAB. NO.: 140- 4536 **PROJECT:** 1ST STREET VIADUCT OVER L.A. RIVER-SEISMIC RETROFIT

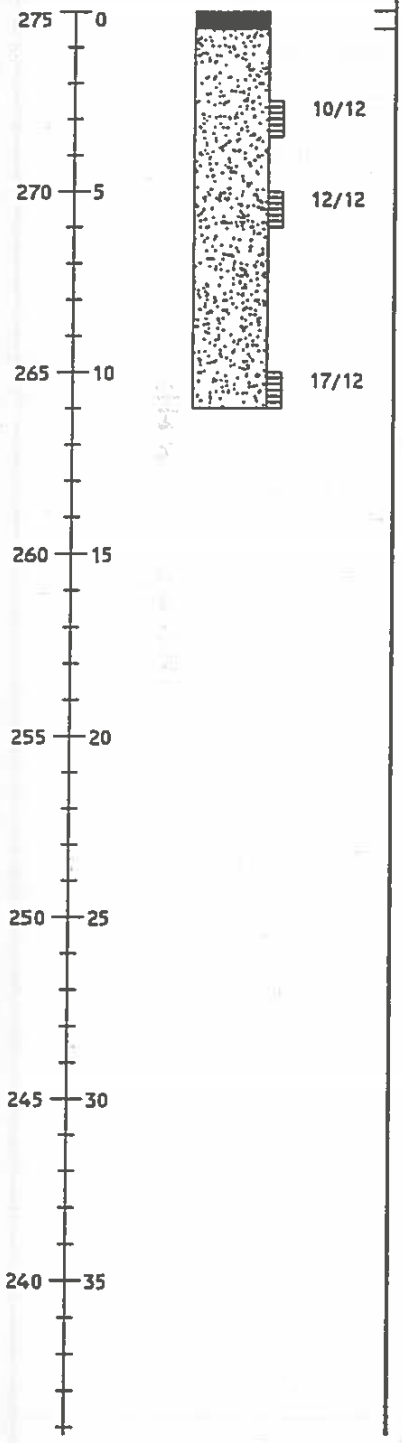
BORING NO.: H-5 **ELEVATION:** 275' **DRILLING DATE:** 02-15-96 (CONTAMINATION)

BORING LOCATION: 45' W/o ECF Myers St. and 53' S/o SCF 1st St. (N/s Frontage Rd.)- under bridge

DRILL RIG TYPE: CME-75 using 6" diameter conventional flight augers.

DEPTH TO STANDING WATER: None **DEPTH TO WATER SEEPAGE:** None

DRILLER: Ramirez **LOGGER:** Redlin **ENGINEER:** Burnett



.OG OF TEST BORING

.AB. NO.: 140- 4536 PROJECT: 1ST STREET VIADUCT OVER L.A. RIVER-SEISMIC RETROFIT

3ORING NO.: H-4 ELEVATION: 275' DRILLING DATE: 02-15-96 (CONTAMINATION)

3ORING LOCATION: 28' S/o SCF 1st St. (N/s Frontage Rd.) and 104' W/o ECF Myers St.- under bridge

)RILL RIG TYPE: CME-75 using 6" diameter conventional flight augers.

)EPTH TO STANDING WATER: None DEPTH TO WATER SEEPAGE: None

)RILLER: Ramirez LOGGER: Redlin ENGINEER: Burnett

.EVATION /)EPTH (ft)	SOIL SYMBOLS, SAMPLER SYMBOLS AND BLOWS/INCHES	OVA (PPM)	USCS	Field Description
75 — 0				6" AC pavement in poor condition.
	9/12	0	CL-ML	POSSIBLE FILL MATERIAL (due to presense of disturbed soil matrix) Light brown silty clay/clayey silt with some sand and gravel pockets. Moist and firm. No petrochemical odor.
			SP	
70 — 5	10/12	0		Light brown/tan sand with some gravel. Moist and dense. Gravel content is increasing with depth. No petrochemical odor.
65 — 10	17/12	0		Encountered small cobbles at 10' depth.
60 — 15				--- No free water. --- Used break down mast under bridge.
55 — 20				
50 — 25				
45 — 30				
40 — 35				

.OG OF TEST BORINC

LAB. NO.: 140- 4536 **PROJECT:** 1ST STREET VIADUCT OVER L.A. RIVER-SEISMIC RETROFIT

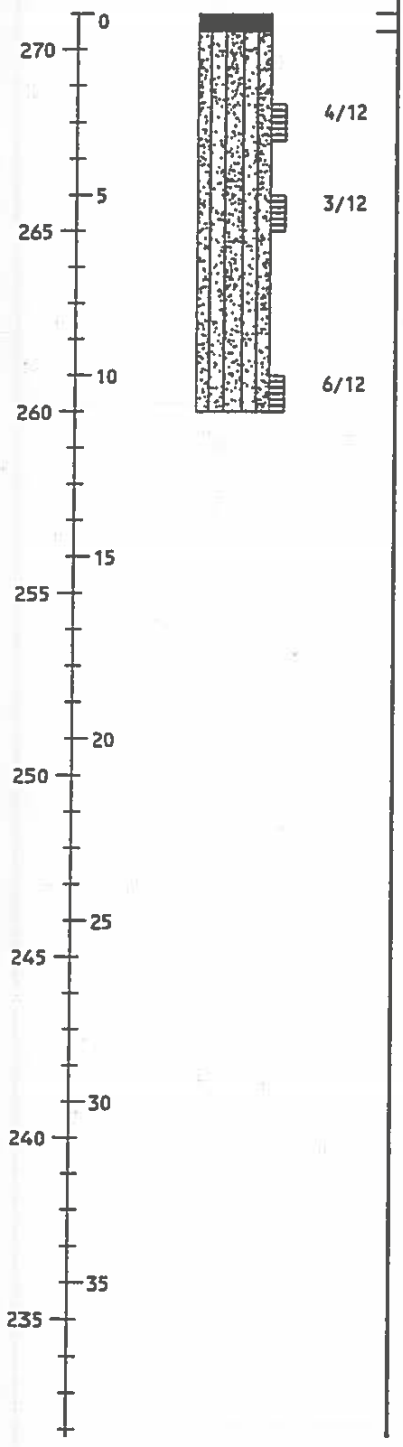
BORING NO.: H-3 **ELEVATION:** 271' **DRILLING DATE:** 02-15-96 (CONTAMINATION)

BORING LOCATION: 59' E/o ECF Center St. and 54' S/o SCF 1st St. (N/s Frontage Rd.) under bridge

DRILL RIG TYPE: CME-75 using 6" diameter conventional flight augers.

DEPTH TO STANDING WATER: None **DEPTH TO WATER SEEPAGE:** None

DRILLER: Ramirez **LOGGER:** Redlin **ENGINEER:** Burnett



ELEVATION / DEPTH (ft)	SOIL SYMBOLS, SAMPLER SYMBOLS AND BLOWS/INCHES	OVA (PPM)	USCS	Field Description
				6" AC pavement in poor condition.
	4/12	0	SP-SM	POSSIBLE FILL MATERIAL (due to low blow count and location near bridge footing) Light brown poorly graded sand with some silt and gravel. Moist and loose.
	3/12	0		
				Encountered some small cobbles at 7' depth.
	6/12	0		

				No free water.

				Used break down mast under bridge.

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Existing Geotechnical Boring Logs
Converse Consultants/Earth Sciences Associates
Geo/Resource Consultants, 1983 and 1986

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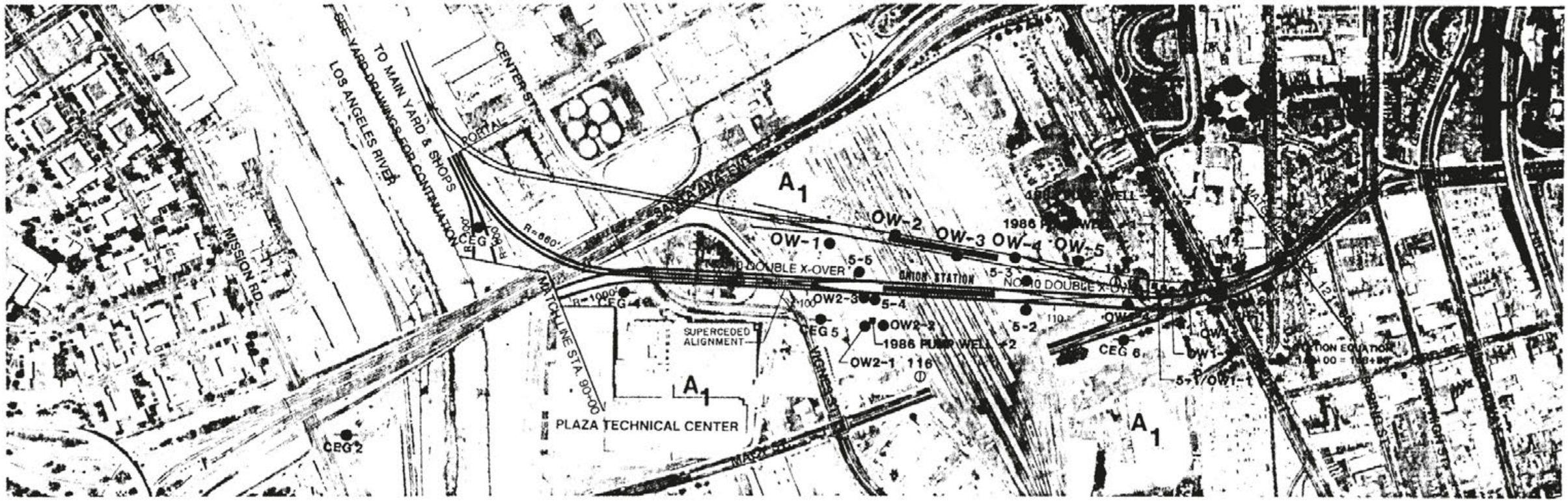
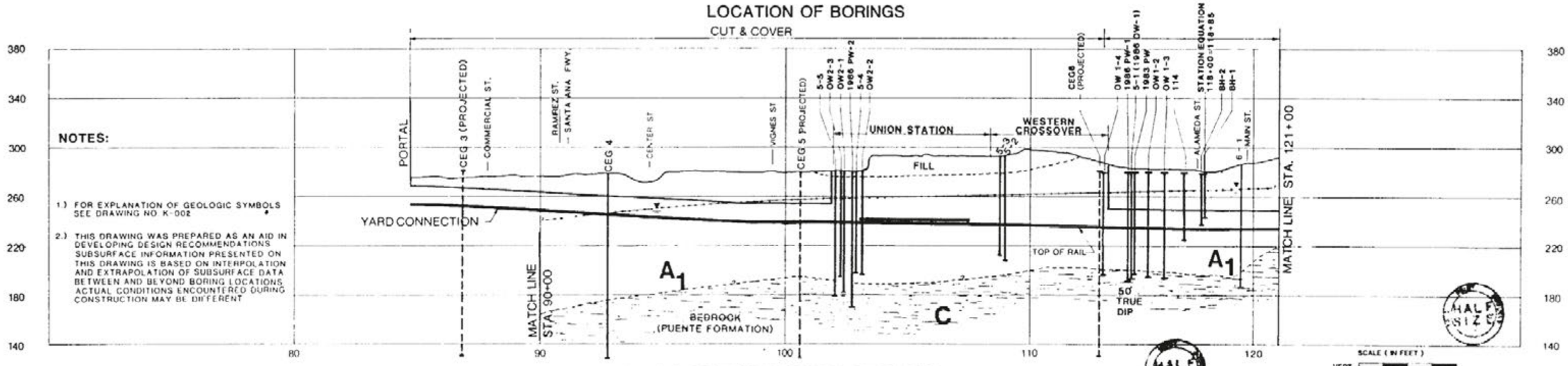


LOCATION OF BORINGS



NOTES:

1.) FOR EXPLANATION OF GEOLOGIC SYMBOLS SEE DRAWING NO. K-002

2.) THIS DRAWING WAS PREPARED AS AN AID IN DEVELOPING DESIGN RECOMMENDATIONS. SUBSURFACE INFORMATION PRESENTED ON THIS DRAWING IS BASED ON INTERPOLATION AND EXTRAPOLATION OF SUBSURFACE DATA BETWEEN AND BEYOND BORING LOCATIONS. ACTUAL CONDITIONS ENCOUNTERED DURING CONSTRUCTION MAY BE DIFFERENT

HALF SIZE

SCALE (IN FEET)
VERT. 0 20 40 60 80
HORIZ. 0 200 400

GEOLOGIC SECTION THROUGH SUPERCEDED ALIGNMENT

HALF SIZE

REV	DATE	BY	SUB	APP	DESCRIPTION
0	8/87	JAR	WJA		INITIAL ISSUE

THE PREPARATION OF THIS DRAWING HAS BEEN FINANCED IN PART THROUGH A GRANT FROM THE U.S. DEPARTMENT OF TRANSPORTATION, URBAN MASS TRANSPORTATION ADMINISTRATION, UNDER THE URBAN MASS TRANSPORTATION ACT OF 1964, AS AMENDED, AND IN PART BY THE TAXES OF THE CITIZENS OF LOS ANGELES COUNTY AND OF THE STATE OF CALIFORNIA

DESIGNED BY
DRAWN BY
CHECKED BY
IN CHARGE
DATE 2-13-87

N/A

SOUTHERN CALIFORNIA RAPID TRANSIT DISTRICT
METRO RAIL PROJECT
RTD

CCI/ESA/GRC
General Geotechnical Consultants
Submitted _____ Date 12-21-87

DMJM/PBOD/KE/HWA
GENERAL CONSULTANTS
APPROVED _____

LA CBD TO NORTH HOLLYWOOD
UNION STATION

LOCATION OF BORINGS AND GEOLOGIC SECTION

CONTRACT NO. A136
DRAWING NO. K-001 REV. 0
SCALE AS SHOWN
SHEET NO. 47

GEOLOGIC EXPLANATION

GEOLOGIC UNITS

QUATERNARY

PLEISTOCENE HOLOCENE

A_1 YOUNG ALLUVIUM (Granular): Includes clean sands, silty sands, gravelly sands, sandy gravels, and locally contains cobbles and boulders. Primarily dense, but ranges from loose to very dense.

A_2 YOUNG ALLUVIUM (Fine-grained) : Includes clays, clayey silts, sandy silts, sandy clays, clayey sands. Primarily stiff, but ranges from firm to hard.

A_3 OLD ALLUVIUM (Granular): Includes clean sands, silty sands, gravelly sands, and sandy gravels. Primarily dense, but ranges from medium dense to very dense.

A_4 OLD ALLUVIUM (Fine-grained): Includes clays, clayey silts, sandy silts, sandy clays, and clayey sands. Primarily stiff, but ranges from firm to hard

SP SAN PEDRO FORMATION: Predominantly clean, cohesionless, fine to medium-grained sands, but includes layers of silts, silty sands, and fine gravels. Primarily dense, but ranges from medium dense to very dense. Locally impregnated with oil or tar.

TERTIARY

MIOCENE PLIOCENE

C FERNANDO AND PUENTE FORMATIONS: Claystone, siltstone, and sandstone; thinly to thickly bedded. Primarily low hardness, weak to moderately strong. Locally contains very hard, thin cemented beds and cemented nodules. Locally contains gas and oil.

SYMBOLS

- Geologic contact: approximately located, queried where inferred.
- Fault: approximately located; queried where inferrred; arrows indicate probable movement; attitude in profile is an apparent dip and is not corrected for scale distortion.
- 40 — Dip of bedding: from unoriented core samples; bedding attitudes may not be correctly orjented to the plane of the profile, but represent dips to illustrate regional geologic trends; number gives true dip in degrees, as encountered in boring.
- Perched water level: approximately located; queried where inferred.
- Permanent water level: approximately located; queried where inferred.
- Boring - CEG (1981)
- Boring - CCI/ESA/GRC (1983, 1984 & 1985)
- Boring - Woodward - Clyde (1977)
- Boring - Kaiser Engineers (1962)

  } See appropriate Woodward - Clyde and Kaiser report(s).

- Boring - Other (USGS 1977 and various foundation studies)
- Boring - Nuclear Regulatory Commision (1980)

  } Borings not drilled for Metro Rail Project. Logs not available in Metro Rail Transit Consultants' office.

NOTES

1) The geologic sections are based on interpolation between borings and were prepared as an aid in developing design recommendations. Actual conditions encountered during construction may be different. Geologic sections are plotted for AR (Outbound) track.
2) Track alignment plan and profiles are approximate.
3) Borings projected more than 200' to the profile line were considered in some of the interpretation of subsurface conditions. However, final interpretation is based on numerous factors and may not reflect the boring logs as presented on Drawings No. K-001.
4) Displacements shown along faults are graphic representations. Actual vertical offsets are unknown.
5) Additional information on observation wells (OW) and pump wells (PW), located in the Union Station vicinity, is presented in the report titled "Union Station Area Aquifer Pump Test", dated November 11, 1986.
6) CONTRACTOR SHOULD BE AWARE OF THE PRESENCE OF COBBLES AND BOULDERS AT LOWER DEPTHS IN THE BORINGS, ABOVE THE PUENTE FORMATION

REVISIONS

1) Added supplemental borings to plan and geologic section.
2) The following data was added to boring logs

Boring 5-1 : Drill Rig - Failing 1500
Boring 5-2 : Drill Rig - Failing 1500
Boring 5-3 : Drill Rig - Failing 1500
Boring 5-4 : Drill Rig - Failing 1500
Boring 5-5 : Drill Rig - Failing 1500

HALF SIZE

REV	DATE	BY	SUB	APP	DESCRIPTION

THE PREPARATION OF THIS DRAWING HAS BEEN FINANCED IN PART THROUGH A GRANT FROM THE U. S. DEPARTMENT OF TRANSPORTATION, URBAN MASS TRANSPORTATION ADMINISTRATION, UNDER THE URBAN MASS TRANSPORTATION ACT OF 1964, AS AMENDED, AND IN PART BY THE TAXES OF THE CITIZENS OF LOS ANGELES COUNTY AND OF THE STATE OF CALIFORNIA

REV	DATE	BY	SUB	APP	DESCRIPTION
0	4/15/88	JAR	WLA		INITIAL ISSUE

DESIGNED BY —
DRAWN BY —
CHECKED BY —
IN CHARGE —
DATE 2-13-87

N/A

SOUTHERN CALIFORNIA RAPID TRANSIT DISTRICT
METRO RAIL PROJECT
RTD

CCI/ESA/GRC
General Geotechnical Consultants
SUBMITTED [signature] 4-13-87

DMJM/PBQD.KE/HWA
A JOINT VENTURE
GENERAL CONSULTANTS
APPROVED [signature]

LA CBD TO NORTH HOLLYWOOD
UNION STATION

EXPLANATIONS, NOTES AND REVISIONS

CONTRACT NO A136
DRAWING NO K-002 REV 0
SCALE NONE
SHEET NO 48

Boring Log 5-1

Converse Consultants, Inc.
Earth Sciences Associates
Geo/Resource Consultants

BORING LOG 5-1

Proj: DESIGN UNIT A135 — Date Drilled: 2-4-83 — Ground Elev. 279.1'
Drill Rig: — Logged By: B. Ingham — Total Depth: 85.0
Hole Diameter: 4 3/4" — Hammer Weight & Fall: 320 lbs. @ 36"

Sheet 1 of 4

Depth (ft)	USCS	Material Classification	Sample	Blows	Sample type	Remarks
0		0.0-0.4 ASPHALT PAVEMENT			RD	
	SM	0.4-2.0 FILL: SILTY SAND, mottled brown, moist, dense	1-1		SH	
2	SM/ML	ALLUVIUM: 2.0-4.0 SILTY SAND/SANDY SILT: red-brown, moist, medium dense, fine sand with silt, slightly porous				
4	SM	4.0-8.0 SILTY SAND: gray brown, moist, medium dense, fine sand with silt and trace gravel to 1"	1-2		DB, RD	
8	SW	8.0-70.0 GRAVELLY SAND				
10				100	SS, RD	Refusal at 5"

Sheet 2 of 4

Project: DESIGN UNIT A135 — Date Drilled: 2-4-83 — Hole No. 5-1

Depth (ft)	USCS	Material Classification	Sample	Blows	Sample type	Remarks
20	SW	8.0-70.0 GRAVELLY SAND (continued)			DB, RD	NO RECOVERY
30			1-3		DB, RD	Poor Recovery
33		Intermittent lenses of increased gravel content				
40			1-4		DB, RD	Sulphur odor in sample; Poor Recovery

Sheet 3 of 4

Project: DESIGN UNIT A135 — Date Drilled: 2-4-83 — Hole No. 5-1

Depth (ft)	USCS	Material Classification	Sample	Blows	Sample type	Remarks
44	SW	8.0-70.0 GRAVELLY SAND (continued)	1-5		RD, CCI, DB, RD	Sulphur odor; Poor Sample Recovery
50					CCI, DB, RD	No Recovery
56			1-6		CCI, DB, RD	Slight Sulphur Odor; Poor Sample Recovery
66			1-7		CCI, DB, RD	Sulphur Odor; Poor Recovery

Sheet 4 of 4

Project: DESIGN UNIT A135 — Date Drilled: 2-4-83 — Hole No. 5-1

Depth (ft)	USCS	Material Classification	Sample	Blows	Sample type	Remarks
68	SW	8.0-70.0 GRAVELLY SAND (continued)			RD	
70		70.0-79.5 BOULDERS				No Recovery; Refusal
79.5		BEDROCK: 79.5-85.0 SANDY CLAYSTONE AND CLAYEY SANDSTONE: olive-gray, moist; fresh, thinly laminated, friable strength, friable to low hardness. Tends to fracture along laminations	1-8		DB, RD	
84			1-9		DB	
85		END OF BORING 85.0 FT				Piezometer set to 85.0' perforated interval 45'-85'

Boring Log 5-2

Converse Consultants, Inc.
Earth Sciences Associates
Geo/Resource Consultants

BORING LOG 5-2

Proj: DESIGN UNIT A135 — Date Drilled: 2-3-83 — Ground Elev. 282.2'
Drill Rig: — Logged By: B. Ingham — Total Depth: 85.0
Hole Diameter: 4 3/4" — Hammer Weight & Fall: 320 lbs. @ 36"

Sheet 1 of 4

Depth (ft)	USCS	Material Classification	Sample	Blows	Sample type	Remarks
0		0.0-0.4 Concrete Slab			RD	
		0.4-0.8 Base Course				
	ML & CL	0.8-14.0 FILL: CLAYEY SILT AND SILTY CLAY, mottled brown and green-gray, moist, stiff with trace gravel and fine sand	2-1		DB, RD	
10		becoming hard		9/11, 24	SS, RD	
13		13.0 Rock or Concrete		100	SS	SPT REFUSAL AT 0"
14	SM	14.0-19.0 ALLUVIUM: SILTY SAND: gray-brown, moist, medium dense, fine to very fine sand with silt		6/7, 14	SS, RD	
19	SW	19.0-72.0 GRAVELLY SAND				

Sheet 2 of 4

Project: DESIGN UNIT A135 — Date Drilled: 2-3-83 — Hole No. 5-2

Depth (ft)	USCS	Material Classification	Sample	Blows	Sample type	Remarks
20	SW	19.0-72.0 GRAVELLY SAND (continued): gray, dense, medium to coarse sand, gravel to 2"+	2-2		DB, RD	Disturbed Sample
30				75/100	SS, RD	Refusal at 9"
39		Increasing content of fine and very fine sand				
40					DB, RD	No sample recovery

Sheet 3 of 4

Project: DESIGN UNIT A135 — Date Drilled: 2-3-83 — Hole No. 5-2

Depth (ft)	USCS	Material Classification	Sample	Blows	Sample type	Remarks
44	SW	19.0-72.0 GRAVELLY SAND (continued): color change observed to dark gray	2-3		RD, DB, RD	Slight sulphur odor; poor sample recovery
57					DB, RD	No sample recovery
62					DB, RD	No sample recovery
66			2-?	100	SS, RD	Refusal at 6"

Sheet 4 of 4

Project: DESIGN UNIT A135 — Date Drilled: 2-3-83 — Hole No. 5-2

Depth (ft)	USCS	Material Classification	Sample	Blows	Sample type	Remarks
68	SW	19.0-72.0 GRAVELLY SAND (continued): decreasing gravel content	2-4		RD, DB, RD	slight sulphur odor
72	SP	72.0-83.0 SAND: dark gray; very dense, medium sand with trace gravel to 2"		100	SS, RD	sulphur odor; refusal at 5"
80		Fine to very fine sand; thin lenses of silty sand	2-5		DB, RD	Sulphur odor
83		83.0-84.0 BOULDERS				
84		END OF BORING 84.0 FT				

HALF SIZE

REV	DATE	BY	SUB	APP	DESCRIPTION

THE PREPARATION OF THIS DRAWING HAS BEEN FINANCED IN PART THROUGH A GRANT FROM THE U.S. DEPARTMENT OF TRANSPORTATION, URBAN MASS TRANSPORTATION ADMINISTRATION, UNDER THE URBAN MASS TRANSPORTATION ACT OF 1964, AS AMENDED, AND IN PART BY THE TAXES OF THE CITIZENS OF LOS ANGELES COUNTY AND OF THE STATE OF CALIFORNIA

REV	DATE	BY	SUB	APP	DESCRIPTION
0	11/31/84	JAR	WJA		INITIAL ISSUE

DESIGNED BY: —
DRAWN BY: DKM/JAP
CHECKED BY: J.A. Doolittle
IN CHARGE: K.M. Price
DATE: 26 NOV. 84

N/A

SOUTHERN CALIFORNIA RAPID TRANSIT DISTRICT
METRO RAIL PROJECT
RTD

CCI/ESA/GRC
General Geotechnical Consultants
SUBMITTED: K.M. Price

DMJM/PE QD/KE/HWA
GENERAL CONSULTANTS
APPROVED: [signature]

LA CBD TO NORTH HOLLYWOOD
UNION STATION
BORING LOGS 5-1 & 5-2

CONTRACT NO. A136
DRAWING NO. K-003 — REV 0
SCALE: NO SCALE
SHEET NO. 49

Converse Consultants, Inc.
Earth Sciences Associates
Geo/Resource Consultants

BORING LOG 5-3

Proj: DESIGN UNIT A135 — Date Drilled: 2-2-83 — Ground Elev: 252.8'
Drill Rig: — Logged By: B. Ingram — Total Depth: 80.0'
Hole Diameter: 4 3/4" — Hammer Weight & Fall: 320#, 30"

MATERIAL CLASSIFICATION	REMARKS
0.0-0.8 ASPHALT PAVEMENT	
FILL 0.8-4.6 GRAVEL, gravel to 2-1/2", subangular to subrounded	No sample recovery
4.6-14.0 CLAYEY SILT, green gray, moist, stiff, with variable sand content	
very stiff to hard	
ALLUVIUM 14.0-19.0 SILTY SAND, gray brown, moist, dense, fine to very fine sand with silt	
19.0-74.0 GRAVELLY SAND	

Sheet 1 of 4

Project: DESIGN UNIT A135 — Date Drilled: 2-2-83 — Hole No: 5-3

MATERIAL CLASSIFICATION	REMARKS
19.0-74.0 GRAVELLY SAND, continued brown, very dense, medium to coarse sand and gravel to 3", subangular to subrounded	No sample recovery
sand and gravel strata	24-28 intermittent drill rig chatter
	poor sample recovery
	sulphur odor
	drill rig chatter at 41'

Sheet 2 of 4

Project: DESIGN UNIT A135 — Date Drilled: 2-2-83 — Hole No: 5-3

MATERIAL CLASSIFICATION	REMARKS
19.0-74.0 GRAVELLY SAND, continued	
sand and gravel strata	sulphur odor in sample
	53' intermittent drill rig chatter to 58'
	slight sulphur odor in sample poor recovery

Sheet 3 of 4

Project: DESIGN UNIT A135 — Date Drilled: 2-2-83 — Hole No: 5-3

MATERIAL CLASSIFICATION	REMARKS
19.0-74.0 GRAVELLY SAND, continued	slight sulphur odor in sample
74.0-80.0 SAND, dark gray, medium dense to dense, fine to very fine, micaceous silty sand lenses	sulphur odor in sample
End of Boring 80.0'	

Sheet 4 of 4

Converse Consultants, Inc.
Earth Sciences Associates
Geo/Resource Consultants

BORING LOG 5-4

Proj: DESIGN UNIT A135 — Date Drilled: 1-31-83 — Ground Elev: 280.6'
Drill Rig: — Logged By: B. Ingram — Total Depth: 80.0
Hole Diameter: 4 3/4" — Hammer Weight & Fall: 320#, 36"

MATERIAL CLASSIFICATION	REMARKS
0.0-0.3 ASPHALT PAVEMENT	
FILL 0.3-3.5 SANDY SILT, dark brown, moist, stiff, with fine to medium sand, trace gravel and brick chunks	
3.5-4.0 CONCRETE BLOCK	
ALLUVIUM 4.0-7.0 SILTY SAND, gray brown, moist, dense, fine to very fine sand with silt	
7.0-18.0 SAND, gray, moist, dense, clean fine sand	
18.0-28.0 GRAVELLY SAND, brown/gray/umbra, moist, medium to coarse sand with gravel to 2", subrounded to subangular grains	

Sheet 1 of 4

Project: DESIGN UNIT A135 — Date Drilled: 1-31-83 — Hole No: 5-4

MATERIAL CLASSIFICATION	REMARKS
18.0-28.0 GRAVELLY SAND, continued	
	Refusal at 5"
28.0-41.0 SAND/SILTY CLAY, gray, moist, very dense clean sand, interbeds of dark gray, stiff, moist silty clay	
	no sample recovery
41.0-68.0 GRAVELLY SAND, dark gray, very dense, subrounded grains, fine to coarse sand with gravel to 1", micaceous	

Sheet 2 of 4

Project: DESIGN UNIT A135 — Date Drilled: 1-31-83 — Hole No: 5-4

MATERIAL CLASSIFICATION	REMARKS
41.0-68.0 GRAVELLY SAND, continued	Refusal at 17"
50.5' clay interbeds	sulphurous odor in sample
	sulphurous odor refusal at 3"
	sulphur/hydrothermal odor
	sulphur odor refusal at 7"

Sheet 3 of 4

Project: DESIGN UNIT A135 — Date Drilled: 1-31-83 — Hole No: 5-4

MATERIAL CLASSIFICATION	REMARKS
68.0-75.0 SAND, gray, dense, micaceous, fine to very fine sand	sulphur/hydrothermal odor in sample
75.0-80.0 GRAVELLY SAND, gravel to 1-1/2", gray, dense to very dense	
End of Boring 80.0'	

Sheet 4 of 4

HALF SIZE

THE PREPARATION OF THIS DRAWING HAS BEEN FINANCED IN PART THROUGH A GRANT FROM THE U. S. DEPARTMENT OF TRANSPORTATION, URBAN MASS TRANSPORTATION ADMINISTRATION, UNDER THE URBAN MASS TRANSPORTATION ACT OF 1964, AS AMENDED, AND IN PART BY THE TAXES OF THE CITIZENS OF LOS ANGELES COUNTY AND OF THE STATE OF CALIFORNIA

REV	DATE	BY	SUB	APP	DESCRIPTION
0	8/31/84	JAK	WHA		INITIAL ISSUE

DESIGNED BY — DRAWN BY: DKM/JAP — CHECKED BY: J.A. Doolittle — IN CHARGE: K.M. Pride — DATE: 30 NOV. 84

N/A

SOUTHERN CALIFORNIA RAPID TRANSIT DISTRICT
METRO RAIL PROJECT
RTD

CCI/ESA/GRC
General Geotechnical Consultants
SUBMITTED: K.M. Pride

DMJM/PBQD/KE/HWA
A JOINT VENTURE
GENERAL CONSULTANTS
APPROVED: [signature]

LA CBD TO NORTH HOLLYWOOD
UNION STATION
BORING LOGS 5-3 & 5-4

CONTRACT NO: A136
DRAWING NO: K-004 — REV: 0
SCALE: NO SCALE
SHEET NO: 50

Converse Consultants, Inc.
Earth Sciences Associates
Geo/Resource Consultants

BORING LOG 5-5

Proj: DESIGN UNIT A-135 — Date Drilled: 2/1/83 — Ground Elev: 280.8'
Drill Rig: — Logged By: B. Lodhrae — Total Depth: 100.0
Hole Diameter: 4 3/4" — Hammer Weight & Fall: 320 lb, 36"

MATERIAL CLASSIFICATION — REMARKS

0.0-0.3 ASPHALT Pavement
0.3-5.5 FILL - SANDY SILT & SILTY SAND. Mottled and interlayered, moist, stiff/medium dense w/brick debris
ALLUVIUM
5.5-11 - SILTY SAND. Gray-brown, moist, medium dense, fine to very fine sand with silt
11.0-14.0 SAND. Gray-brown, moist, medium dense to dense, poorly graded fine sand with trace silt
14.0-62.0 GRAVELLY SAND. Brown, dense, medium to coarse sand with gravel to 2", subangular to subrounded grains

Sheet 1 of 5

Project: DESIGN UNIT A-135 — Date Drilled: 2/1/83 — Hole No. 5-5

14.0-62.0 GRAVELLY SAND (Cont'd) — refusal at 6"
25.5-26.0 lens of fine sand
30.0 color change to dark gray — slight gas odor; refusal at 9"
slight gas odor
refusal at 15"

Sheet 2 of 5

Project: DESIGN UNIT A-135 — Date Drilled: 2/1/83 — Hole No. 5-5

14.0-62.0 GRAVELLY SAND (Cont'd)
sulphur odor; poor sample recovery
decreasing gravel content
slight sulphur odor
62.0-78.0 SAND. dark gray, dense, fine to very fine sand, micaceous

Sheet 3 of 5

Project: DESIGN UNIT A-135 — Date Drilled: 2/1/83 — Hole No. 5-5

62.0-78.0 SAND (Cont'd)
sulphur odor
78.0-90.0 BOULDERS
no sample recovery
BEDROCK
90.0-100.0 CLAYSTONE (see next page)

Sheet 4 of 5

Project: DESIGN UNIT A-135 — Date Drilled: 2/1/83 — Hole No. 5-5

90.0-100.0 CLAYSTONE (Cont'd). olive-gray color, moist, plastic to friable strength, soft to friable hardness, thinly laminated with silty claystone and sandstone blebs, tends to fracture along laminations
End of Boring 100.0 ft. — Piezometer set to 100', perforated to lowest 40'

Sheet 5 of 5

Converse Consultants, Inc.
Earth Sciences Associates
Geo/Resource Consultants

BORING LOG 6A

Proj: DESIGN UNIT A135 — Date Drilled: 2-10-83 — Ground Elev: 290.0'
Drill Rig: Bucket Auger — Logged By: D. Gillette — Total Depth: 55.0
Hole Diameter: 30" — Hammer Weight & Fall: NA

ALLUVIUM
0.0-22.0 SAND AND GRAVEL. light brown, medium to coarse sand with silt, little gravel to 1 2", subrounded, trace cobbles and boulders, moist, medium dense — 0.0-15.0 belling and caving
12.0-13.0 clay with trace gravel
15.5-16.0 clay
gravel lens

Sheet 1 of 3

Project: DESIGN UNIT A135 — Date Drilled: 2-10-83 — Hole No. 6A

0.0-22.0 SAND AND GRAVEL continued
22.0-55.0 SILTY SAND. olive gray, fine sand, slightly micaceous, moist to very moist, medium dense — water seeps at 22.0'
28.0 dark greenish gray

Sheet 2 of 3

Project: DESIGN UNIT A135 — Date Drilled: 2-10-83 — Hole No. 6A

22.0-55.0 SILTY SAND continued
END OF BORING 55.0' — Special hole closure

Sheet 3 of 3

HALF SIZE

THE PREPARATION OF THIS DRAWING HAS BEEN FINANCED IN PART THROUGH A GRANT FROM THE U.S. DEPARTMENT OF TRANSPORTATION, URBAN MASS TRANSPORTATION ADMINISTRATION, UNDER THE URBAN MASS TRANSPORTATION ACT OF 1964, AS AMENDED, AND IN PART BY THE TAXES OF THE CITIZENS OF LOS ANGELES COUNTY AND OF THE STATE OF CALIFORNIA

REV	DATE	BY	SUB	APP	DESCRIPTION
0	11/30/84	JAH	WWA		INITIAL ISSUE

DESIGNED BY — DRAWN BY: DKM/JAP — CHECKED BY: J.A. Doogitto — IN CHARGE: K.M. Pride — DATE: 30 Nov 84

N/A

SOUTHERN CALIFORNIA RAPID TRANSIT DISTRICT
METRO RAIL PROJECT — RTD

CCI/ESA/GRC — General Geotechnical Consultants — SUBMITTED: K.M. Pride
DMJM/PBQD/KE/HWA — General Consultants — APPROVED

LA CBD TO NORTH HOLLYWOOD
UNION STATION
BORING LOGS 5-5 & 6A

CONTRACT NO. A136 — DRAWING NO. K-005 — REV 0 — SCALE: NO SCALE — SHEET NO. 51

MOISTURE (%)	DRY DENSITY (PCF)	GAS READING (PPM)	PENETRATION RESISTANCE BLOWS/FOOT	SAMPLE NO.	DEPTH (FEET)	DESCRIPTION OF SUBSURFACE MATERIALS	ELEVATION (FEET)
					0	THIS SUMMARY APPLIES ONLY AT THE LOCATION OF THIS BORING AND AT THE TIME OF DRILLING. SUBSURFACE CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH THE PASSAGE OF TIME. THE DATA PRESENTED IS A SIMPLIFICATION OF ACTUAL CONDITIONS ENCOUNTERED.	
		0	10	1		Silty SAND (SM) gray, slightly moist	
		0	7	2	5		
					10		
		0	27	3		Sandy GRAVEL (GP)	
		0	47	4	15	Silty SAND (SM)	
		0	23	5	20	Sandy GRAVEL (GP), some cobbles	
						No recovery	
		0	38	6	25	Silty CLAY (CL) grayish brown, some cobbles	
13.70	118.2	0	72	7	30	Sandy GRAVEL (GP) gray	
		0	97	8	35		
		0	60	9	40	Sandy GRAVEL (GP) gray	
9.90	112.4	2	82	10	45		
		1	72	11	50		
						Silty CLAY (CL) gray	
			48	12	55	Sandy GRAVEL (GP) gray, cobbles Silty CLAY (CL) greenish gray	
						Gravelly SAND (SP)	
12.70	123.3	12	73	13	60	Silty SAND (SW-SM) traces of gravel, H2S odor	
			85	14	65	no recovery	
3.30	111.3	9	91	15	70	Silty SAND (SM) gray, some gravel, H2S odor	
					75		

DATE DRILLED: 11-17-88

ND:Not detected

EQUIPMENT USED: 6" Rotary Wash

GROUNDWATER ELEVATION: NOT MEASURED

GEOFON Incorporated

PROJECT NO.: METRO A-135

LOG OF BORING NO. OW-1

MOISTURE (%)	DRY DENSITY (PCF)	GAS READING (PPM)	PENETRATION RESISTANCE BLOWS/FOOT	SAMPLE NO.	DEPTH (FEET)	DESCRIPTION OF SUBSURFACE MATERIALS	ELEVATION (FEET)
					80	THIS SUMMARY APPLIES ONLY AT THE LOCATION OF THIS BORING AND AT THE TIME OF DRILLING. SUBSURFACE CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH THE PASSAGE OF TIME. THE DATA PRESENTED IS A SIMPLIFICATION OF ACTUAL CONDITIONS ENCOUNTERED.	
		10	95	16		Silty Sand (SM)	
					85		
		10	70	17	90	Increasing gravel, poorly graded sand	
						SILTSTONE unsaturated	
		0		18	95	H2S odor	
						Total depth drilled, 98 feet	

DATE DRILLED: 11-17-88

ND:Not detected

EQUIPMENT USED: 6" Rotary Wash

GROUNDWATER ELEVATION: NOT MEASURED

GEOFON Incorporated

PROJECT NO.: METRO A-135

LOG OF BORING NO. OW-1

MOISTURE (%)	DRY DENSITY (PCF)	GAS READING (PPM)	PENETRATION RESISTANCE BLOWS/FOOT	SAMPLE NO.	DEPTH (FEET)	DESCRIPTION OF SUBSURFACE MATERIALS	ELEVATION (FEET)
					0	THIS SUMMARY APPLIES ONLY AT THE LOCATION OF THIS BORING AND AT THE TIME OF DRILLING. SUBSURFACE CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH THE PASSAGE OF TIME. THE DATA PRESENTED IS A SIMPLIFICATION OF ACTUAL CONDITIONS ENCOUNTERED.	
						Silty SAND (SM) brown, some clay, loose and dry	
			11	1A	5	Clayey SILT (ML) dark brown with black mottling some fine sand, firm and dry	
			10	1	10	Trace of gravel	
16.60	116.9		7	2	15	Silty SAND (SM) gray, some gravel, loose and dry, piece of brick	
			8	3	20	Silty SAND (SM) light brown, very fine to fine sand, loose and dry, traces of mica	
16.40	105.9		11	4	25	Silty SAND (SM) medium to coarse, some gravel to 1", grayish-brown, loose and dry, pieces of brick	
			67	5	30	SAND (SP) light brown, some gravel to 1/2", dense and dry	
12.00	102.6		47	6	35	Silty SAND (SP-SM) light brown, dry, dense	
7.50	124.6		63	7	40	SAND (SW) medium to coarse, some gravel to 1 1/2", gray, trace of silt, dense and dry	
21.80	95.3		8	8	45	Silty SAND (SM) gray, very fine to fine sand, loose and dry Gravelly SAND (SP)	
17.60	106.6		40	9	50	Gravelly SAND (SP) gray, medium to coarse Sandy SILT (ML) gray, sand is fine to very fine, stiff and dry Gravelly SAND (SP)	
9.70			70	10	55	Silty SAND-Gravelly SAND (SM-SW) gray, gravel to 1", dense and dry Increasing gravel size and percentage	
			64	11	60	Gravelly SAND (SP) gray, medium to coarse, dense to very dense and dry Sandy SILT (ML)	
					65	Gravelly SAND (SP) Sandy SILT (ML)	
			97	12	70	Gravelly SAND (SP) gray, very dense and dry, H2S odor	
						Sandy SILT (ML)	
					75	Gravelly SAND (SP)	
						Sandy SILT (ML)	
						Gravelly SAND (SP)	

DATE DRILLED: 11-16-88

ND:Not detected

EQUIPMENT USED: 6" Rotary Wash

GROUNDWATER ELEVATION: NOT MEASURED

GEOFON Incorporated

PROJECT NO.: METRO A-135

LOG OF BORING NO. OW-2

MOISTURE (%)	DRY DENSITY (PCF)	GAS READING (PPM)	PENETRATION RESISTANCE BLOWS/FOOT	SAMPLE NO.	DEPTH (FEET)	DESCRIPTION OF SUBSURFACE MATERIALS	ELEVATION (FEET)
					80	THIS SUMMARY APPLIES ONLY AT THE LOCATION OF THIS BORING AND AT THE TIME OF DRILLING. SUBSURFACE CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH THE PASSAGE OF TIME. THE DATA PRESENTED IS A SIMPLIFICATION OF ACTUAL CONDITIONS ENCOUNTERED.	
			33	13		Gravelly SAND (SP) gray, gravel to 1", dense and dry, H2S odor	
			50	14	85	SAND (SP) medium to coarse, trace of gravel, dense and dry, H2S odor	
						Total depth drilled, 86.5 feet	

DATE DRILLED: 11-16-88

ND:Not detected

EQUIPMENT USED: 6" Rotary Wash

GROUNDWATER ELEVATION: NOT MEASURED

GEOFON Incorporated

PROJECT NO.: METRO A-135

LOG OF BORING NO. OW-2

REV	DATE	BY	SUB	APP	DESCRIPTION
0	7/6/89	JAA	WJA		INITIAL ISSUE

THE PREPARATION OF THIS DRAWING HAS BEEN FINANCED IN PART THROUGH A GRANT FROM THE U. S. DEPARTMENT OF TRANSPORTATION, URBAN MASS TRANSPORTATION ADMINISTRATION, UNDER THE URBAN MASS TRANSPORTATION ACT OF 1964, AS AMENDED, AND IN PART BY THE TAXES OF THE CITIZENS OF LOS ANGELES COUNTY AND OF THE STATE OF CALIFORNIA

DESIGNED BY

DRAWN BY

CHECKED BY

IN CHARGE

DATE 020CT89

N/A

SOUTHERN CALIFORNIA RAPID TRANSIT DISTRICT
METRO RAIL PROJECT
RTD

METRO RAIL TRANSIT CONSULTANTS
(DMJM PBQD AE Joint Venture)

SUBMITTED

DMJM/PBQD/KE/HWA
A Joint Venture
GENERAL CONSULTANTS

APPROVED

LA CBD TO NORTH HOLLYWOOD UNION STATION

BORING LOGS OW-1 & OW-2

CONTRACT NO A136

DRAWING NO K-006 REV 0

SCALE NO SCALE

SHEET NO 52

HALF SIZE

MOISTURE (%)	DRY DENSITY (PCF)	PUN. READING (PPM)	PENETRATION RESISTANCE BLOWS/FOOT	SAMPLE NO.	DEPTH (FEET)	DESCRIPTION OF SUBSURFACE MATERIALS	ELEVATION (FEET)
					0	Silty SAND (SM) brown, trace of clay Cobble	
		0	16	1	5	Sandy CLAY (CL) brown with black mottling,some silt and gravel to 1", firm and dry	
		0	18	2			
		0	14	3	10	Increasing gravel Bricks and wood	
		0	16	4	15	Silty SAND (SM) dark brown, very fine to fine micaceous sand, firm and dry,traces of some gravels	
13.80	106.9	0	27	5	20	Silty GRAVEL (GM) some fine to medium sand, brown, medium dense and dry	
		0	70	6	25	Gravelly SAND (SP) light brown, gravel to 1 1/2", very dense and dry	
					30	No recovery	
3.60	128.4	0	47	7	35	SAND (SP) fine to medium, light brown, trace of gravel, dense and dry	
		0	48	8	40	SAND (SP) fine to medium, some coarse with a trace of gravel, gray, dense and dry	
8.90	120.9	0.1	62	9	45		
17.50	100.4	0	95	10	50	Increasing gravel Silty SAND-Gravelly SAND (SM-SP) gray, medium to coarse sand with gravel to 1 1/2", very dense and dry Increasing gravel	
		0.4	75	11	55	Gravelly SAND (SP) gray, medium to coarse sand with gravel to 1 1/2", very dense and dry Decreasing gravel size and percentage	
		1.3	80	12	60	Gravelly SAND (SP) gray, medium to coarse with gravel to 3/4", very dense and dry, H2S odor Sandy SILT (ML)	
					65	SAND (SP)	
		15	105	13	70	Gravelly SAND (SP) gray, medium to coarse sand with gravel to 3/4", very dense and dry, H2S odor	
					75	SAND (SP) medium to coarse with some gravel, very dense and wet, H2S odor	

ND:Not detected

DATE DRILLED: 11-21-88

EQUIPMENT USED: 8" Rotary Wash

GROUNDWATER ELEVATION: NOT MEASURED

GEOFON Incorporated

PROJECT NO.: METRO A-135

LOG OF BORING NO. OW-3

MOISTURE (%)	DRY DENSITY (PCF)	PUN. READING (PPM)	PENETRATION RESISTANCE BLOWS/FOOT	SAMPLE NO.	DEPTH (FEET)	DESCRIPTION OF SUBSURFACE MATERIALS	ELEVATION (FEET)
12.10	123.1	200	87	14	80	SAND (SP) medium to coarse with some gravel, very dense and wet, H2S odor	
		30	85	15	85	Gravelly SAND (SP) gray, medium to coarse sand with gravel to 1", very dense and wet, H2S odor	
		290	76	16	90	Sandy SILT (ML) Silty SAND (SM) fine to medium sand with a trace of gravel, very dense and wet, H2S odor, very stiff SILTSTONE and thinly bedded SANDSTONE greenish-gray, H2S odor	
		380	72	17	95	SILTSTONE-CLAYSTONE greenish gray, thin sand layers, very stiff, H2S odor	
						Total depth drilled, 98 feet	

ND:Not detected

DATE DRILLED: 11-21-88

EQUIPMENT USED: 8" Rotary Wash

GROUNDWATER ELEVATION: NOT MEASURED

GEOFON Incorporated

PROJECT NO.: METRO A-135

LOG OF BORING NO. OW-3

MOISTURE (%)	DRY DENSITY (PCF)	PUN. READING (PPM)	PENETRATION RESISTANCE BLOWS/FOOT	SAMPLE NO.	DEPTH (FEET)	DESCRIPTION OF SUBSURFACE MATERIALS	ELEVATION (FEET)
					0	ASPHALT FILL	
				1	5	Silty SAND (SM) dark gray, slightly moist, trace of gravel no recovery	
				2	10	Silty SAND (SM) light brown, slightly moist, some gravel	
				3	15	Silty SAND (SM) dark gray, slightly moist, some bricks and wood	
				4	20	Gravelly SAND (SP) gray, slightly moist	
6.70	132.3		95	5	30	Silty GRAVEL-Sandy GRAVEL (GM-GW) gray, medium moist	
				6	35		
7.80	101.1			7	40	Silty CLAY (CL) dark gray Sandy GRAVEL (GW) gray	
				8	45		
			95	9	50	Sandy GRAVEL (GW) gray, slightly moist	
			75	10	55		
			52	11	60	Sandy SILT (ML) Gravelly SAND (SP) gray, fine to medium sand, some silt	
					65		
			72	12	70	Gravelly SAND (SP) gray, some silt, traces of clay, Occasional gravel to 1/2".	
					75		

ND:Not detected

DATE DRILLED: 11-14-88

EQUIPMENT USED: 6" Rotary Wash

GROUNDWATER ELEVATION: NOT MEASURED

GEOFON Incorporated

PROJECT NO.: METRO A-135

LOG OF BORING NO. OW-4

MOISTURE (%)	DRY DENSITY (PCF)	PUN. READING (PPM)	PENETRATION RESISTANCE BLOWS/FOOT	SAMPLE NO.	DEPTH (FEET)	DESCRIPTION OF SUBSURFACE MATERIALS	ELEVATION (FEET)
			80	13	80	Gravelly SAND (SP) gray.	
			110	14	85	no recovery Increasing gravel size and percentage	
			125	15	90	Clayey SILT (ML) Gravelly SAND (SP) gray, medium to coarse, slightly moist, very dense	
			41	16	95	SILTSTONE and thinly bedded SANDSTONE greenish-gray, very fine sand, dense and dry, H2S odor.	
			44	17		Bedding planes at approximately 30 degrees	
						Total depth drilled, 99 feet	

ND:Not detected

DATE DRILLED: 11-14-88

EQUIPMENT USED: 6" Rotary Wash

GROUNDWATER ELEVATION: NOT MEASURED

GEOFON Incorporated

PROJECT NO.: METRO A-135

LOG OF BORING NO. OW-4

REV	DATE	BY	SUB	APP	DESCRIPTION
0	10/6/89	JAR	WJA		INITIAL ISSUE

THE PREPARATION OF THIS DRAWING HAS BEEN FINANCED IN PART THROUGH A GRANT FROM THE U. S. DEPARTMENT OF TRANSPORTATION, URBAN MASS TRANSPORTATION ADMINISTRATION, UNDER THE URBAN MASS TRANSPORTATION ACT OF 1964, AS AMENDED, AND IN PART BY THE TAXES OF THE CITIZENS OF LOS ANGELES COUNTY AND OF THE STATE OF CALIFORNIA

DESIGNED BY
DRAWN BY
CHECKED BY
IN CHARGE
DATE 020CT89

N/A

SOUTHERN CALIFORNIA RAPID TRANSIT DISTRICT
METRO RAIL PROJECT

RTD

METRO RAIL TRANSIT CONSULTANTS
DMJM PBQD KE HWA

SUBMITTED

DMJM/PBQD/KE/HWA
A JOINT VENTURE
GENERAL CONSULTANTS

APPROVED

LA CBD TO NORTH HOLLYWOOD
UNION STATION

BORING LOGS OW-3 & OW-4

CONTRACT NO: A136
DRAWING NO: K-007
REV: 0
SCALE: NO SCALE
SHEET NO: 53

HALF SIZE

LOG OF BORING NO. OW-5

DESCRIPTION OF SUBSURFACE MATERIALS

THIS SUMMARY APPLIES ONLY AT THE LOCATION OF THIS BORING AND AT THE TIME OF DRILLING. SUBSURFACE CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH THE PASSAGE OF TIME. THE DATA PRESENTED IS A SIMPLIFICATION OF ACTUAL CONDITIONS ENCOUNTERED.

MOISTURE (%)	DRY DENSITY (PCF)	OVA READING (PPM)	PENETRATION RESISTANCE BLOWS/FOOT	SAMPLE NO.	DEPTH (FEET)	DESCRIPTION OF SUBSURFACE MATERIALS	ELEVATION (FEET)
		0	11	1	5	Silty SAND (SM) dark brown, some gravel, slightly moist	
		0	22	2		Sand (SP) light brown, slightly moist	
		0	33	3	10	SAND (SP) fine, light brown, slightly moist, medium dense	
		0	85	4	15	Silty SAND (SM) brown, trace of gravel	
7.10	100.8	0	60	5	20	Sandy GRAVEL (GP) gray, some gravel to 3/4", dense and dry.	
		0	33	6	25	No recovery SAND (SP)	
						Silty SAND (SM)	
7.60	109.6	0	85	7	30	Sandy GRAVEL (GP)	
		0	60	8	35	No recovery, Granodiorite cobble	
						Silty CLAY (CL) H2S odor Silty SAND (SM)	
		0	60	9	40	No recovery Gravel, strong H2S odor	
		0	60	10	45	Silty SAND (SM) gray, medium to coarse sand with gravel to 1 1/2", very dense and dry, slight H2S odor	
		0	75	11	50	Silty SAND (SM) gray, very dense and dry, some gravel to 3/8"	
		0	75	12	55	No recovery	
		0	70	13	60	No recovery	
					65	No recovery	
						Clayey SILT (ML)	
		0	67	14	70	Gravelly SAND (SW) No recovery Sandy SILT (ML) green, very dense	
		0	65	15	75	Sandy GRAVEL (GP) gray, granodiorite cobbles, no recovery	
		0	45	16		SILTSTONE with thinly bedded SANDSTONE greenish gray, no recovery	

ND:Not detected

DATE DRILLED: 12-21-88
EQUIPMENT USED: 6" Rotary Wash
GROUNDWATER ELEVATION: NOT MEASURED

GEOFON Incorporated | PROJECT NO.: METRO A-135

LOG OF BORING NO. OW-5

MOISTURE (%)	DRY DENSITY (PCF)	OVA READING (PPM)	PENETRATION RESISTANCE BLOWS/FOOT	SAMPLE NO.	DEPTH (FEET)	DESCRIPTION OF SUBSURFACE MATERIALS	ELEVATION (FEET)
					80	SILTSTONE with thinly bedded SANDSTONE	
						Total depth drilled, 83 feet	

ND:Not detected

DATE DRILLED: 12-21-88
EQUIPMENT USED: 6" Rotary Wash
GROUNDWATER ELEVATION: NOT MEASURED

GEOFON Incorporated | PROJECT NO.: METRO A-135

LOG OF BORING NO. OW-5

UNIFIED SOIL CLASSIFICATION SYSTEM (ASTM D-2487)

PRIMARY DIVISIONS			GROUP SYMBOL	SECONDARY DIVISIONS
COARSE GRAINED SOILS MORE THAN HALF OF MATERIAL IS LARGER THAN # 200 SIEVE SIZE	GRAVELS MORE THAN HALF OF COARSE FRACTION IS LARGER THAN # 4 SIEVE	CLEAN GRAVELS (LESS THAN 5% FINES)	GW	WELL GRADED GRAVELS, GRAVEL-SAND MIXTURES, LITTLE OR NO FINES
			GP	POORLY GRADED GRAVELS OR GRAVEL-SAND MIXTURES, LITTLE OR NO FINES
		GRAVEL WITH FINES	GM	SILTY GRAVELS, GRAVEL-SAND-SILT MIXTURE, NON PLASTIC FINES
			GC	CLAYEY GRAVELS, GRAVEL-SAND-CLAY MIXTURES, PLASTIC FINES
	SANDS MORE THAN HALF OF COARSE FRACTION IS SMALLER THAN # 4 SIEVE	CLEAN SANDS (LESS THAN 5% FINES)	SW	WELL GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES
			SP	POORLY GRADED SANDS OR GRAVELLY SANDS, LITTLE OR NO FINES
		SANDS WITH FINES	SM	SILTY SANDS, SAND-SILT MIXTURES, NON-PLASTIC FINES
			SC	CLAYEY SANDS, SAND-CLAY MIXTURES, PLASTIC FINES
FINE GRAINED SOILS MORE THAN HALF OF MATERIAL IS SMALLER THAN # 200 SIEVE SIZE	SILTS AND CLAYS	LIQUID LIMIT IS LESS THAN 50	ML	INORGANIC SILTS AND VERY FINE SANDS, ROCK FLOUR, SILTY OR CLAYEY FINE SANDS OR CLAYEY SILTS WITH SLIGHT PLASTICITY
			CL	INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS, LEAN CLAYS
			OL	ORGANIC SILTS AND ORGANIC SILTY CLAYS OF LOW PLASTICITY.
	SILTS AND CLAYS	LIQUID LIMIT IS GREATER THAN 50	MH	INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS FINE SANDY OR SILTY SOILS, PLASTIC SILTS
			CH	INORGANIC CLAYS OF HIGH PLASTICITY, FAT CLAYS
			OH	ORGANIC CLAYS OF MEDIUM TO HIGH PLASTICITY, ORGANIC SILTS
	HIGHLY ORGANIC SOILS		PT	PEAT AND OTHER HIGHLY ORGANIC SOILS

CLASSIFICATION CRITERIA BASED ON FIELD TESTS

PENETRATION RESISTANCE (PR)

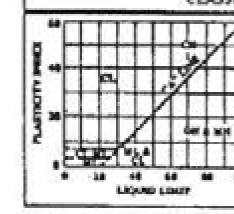
SANDS AND GRAVELS	
RELATIVE DENSITY	BLOWS/FOOT*
VERY LOOSE	0 - 4
LOOSE	4 - 10
MEDIUM DENSE	10 - 30
DENSE	30 - 50
VERY DENSE	OVER 50

CLAYS AND SILTS		
CONSISTENCY	BLOWS/FOOT*	STRENGTH**
VERY SOFT	0 - 2	0 - ¼
SOFT	2 - 4	¼ - ½
FIRM	4 - 8	½ - 1
STIFF	8 - 15	1 - 2
VERY STIFF	15 - 30	2 - 4
HARD	OVER 30	OVER 4

* NUMBER OF BLOWS OF 140 POUND HAMMER FALLING 30 INCHES TO DRIVE A 2 INCH O.D. (1 3/8 INCH I.D.) SPLIT BARREL SAMPLER (ASTM-1586 STANDARD PENETRATION TEST)

** UNCONFINED COMPRESSIVE STRENGTH IN TONS/SQ. FT. READ FROM POCKET PENETROMETER

CLASSIFICATION CRITERIA BASED ON LAB TESTS



GW AND SW - $C_u = \frac{D_{60}}{D_{10}}$ GREATER THAN 4 FOR GW AND 6 FOR SW; $C_c = \frac{(D_{30})^2}{D_{10} \times D_{60}}$ BETWEEN 1 AND 3

GP AND SP - CLEAN GRAVEL OR SAND NOT MEETING REQUIREMENT FOR GW AND SW

GM AND SM - ATTERBERG LIMIT BELOW "A" LINE OR P.I. LESS THAN 4
GC AND SC - ATTERBERG LIMIT ABOVE "A" LINE P.I. GREATER THAN 7

FINES SILT OR CLAY	FINE SAND	MEDIUM SAND	COARSE SAND	FINE GRAVEL	COARSE GRAVEL	COBBLES	BOULDERS
SIEVE SIZES 200	40	10	4	3/4"	3"	12"	

CLASSIFICATION OF EARTH MATERIALS IS BASED ON FIELD INSPECTION AND SHOULD NOT BE CONSTRUED TO IMPLY LABORATORY ANALYSIS UNLESS SO STATED.

GEOFON

REV	DATE	BY	SUB	APP	DESCRIPTION
0	10/2/89	JAR	WJA		INITIAL ISSUE

THE PREPARATION OF THIS DRAWING HAS BEEN FINANCED IN PART THROUGH A GRANT FROM THE U. S. DEPARTMENT OF TRANSPORTATION, URBAN MASS TRANSPORTATION ADMINISTRATION, UNDER THE URBAN MASS TRANSPORTATION ACT OF 1964, AS AMENDED, AND IN PART BY THE TAXES OF THE CITIZENS OF LOS ANGELES COUNTY AND OF THE STATE OF CALIFORNIA

DESIGNED BY — DRAWN BY — CHECKED BY — IN CHARGE — DATE 02OCT89

N/A

SOUTHERN CALIFORNIA RAPID TRANSIT DISTRICT
METRO RAIL PROJECT
RTD

METRO RAIL TRANSIT CONSULTANTS DMJM PBQD KE/HWA
SUBMITTED

DMJM/PBQD/KE/HWA
A JOINT VENTURE
GENERAL CONSULTANTS
APPROVED

LA CBD TO NORTH HOLLYWOOD
UNION STATION

BORING LOG 5 &
CLASSIFICATION CRITERIA

CONTRACT NO A136
DRAWING NO K-008 REV 0
SCALE NO SCALE
SHEET NO 54

THIS BORING LOG IS BASED ON FIELD CLASSIFICATION AND VISUAL SOIL DESCRIPTION ONLY. IT IS MODIFIED TO INCLUDE RESULTS OF LABORATORY CLASSIFICATION TESTS WHERE AVAILABLE. THIS LOG IS APPLICABLE ONLY AT THIS LOCATION AND TIME. CONDITIONS MAY DIFFER AT OTHER LOCATIONS OR TIME.

Converse Consultants, Inc.
Earth Sciences Associates
Geo/Resource Consultants

BORING LOG 5

Proj: DESIGN UNIT A135 Date Drilled 1-2-80/1-6-80 Ground Elev. +20'
Drill Rig Failing 1500 Logged By Stephen M. Tetik Total Depth 150.0'
Hole Diameter 6 7/8, 4 7/8 Hammer Weight & Fall 140 lb @ 30"

DEPTH	USCS	MATERIAL CLASSIFICATION	SAMPLE	BLOWS/FT	CORE RUN	DRILL RATE	REMARKS
0	CP	0.0-0.1 ASPHALT: ALLUVIUM 0.3-52.0 SANDY GRAVEL: primarily gravel up to 6" with medium to coarse sand; poorly graded				RD	moderate to heavy rig chatter from 3.0

Sheet 1 of 7

Project DESIGN UNIT A135 Date Drilled 1-2-80 Hole No. 5

DEPTH	USCS	MATERIAL CLASSIFICATION	SAMPLE	BLOWS/FT	CORE RUN	DRILL RATE	REMARKS
20	CP	0.3-52.0 SANDY GRAVEL: (continued)				RD	moderate to heavy rig chatter from 3.0

Sheet 2 of 7

Project DESIGN UNIT A135 Date Drilled 1-2-80 Hole No. 5

DEPTH	USCS	MATERIAL CLASSIFICATION	SAMPLE	BLOWS/FT	CORE RUN	DRILL RATE	REMARKS
44	CP	0.3-52.0 SANDY GRAVEL: (continued)				RD	heavy rig shaking to 52.0
48	SP	52.0-55.0 GRAVELLY SAND: medium dark gray; medium to coarse sand with gravel up to 3 inch; sewer odor	1-1	47 50		SS	0.5-1.5 recovery refusal at 30"
52	CP	55.0-84.2 SANDY GRAVEL:				RD	rig shaking from 55.0 to 60.0
56				60 50		SS	no recovery refusal at 8"
60		medium dark gray; very fine sand; moist				RD	heavy rig shaking from 60.5 to 66.0
64			1-2	8 20 50		SS	0.3/1.5 recovery refusal at 16"
68						RD	

Sheet 3 of 7

Project DESIGN UNIT A135 Date Drilled 1-2-81/1-3-81 Hole No. 5

DEPTH	USCS	MATERIAL CLASSIFICATION	SAMPLE	BLOWS/FT	CORE RUN	DRILL RATE	REMARKS
68	CP	55.0-84.2 SANDY GRAVEL: (continued)				RD	
70				50 50		SS	no recovery refusal at 7"
72						RD	moderate to heavy rig shaking from 70.5 to 84.2
74							
76							heavy rig shaking at 75.0
78							
80							heavy rig shaking at 80.0
82							
84		BEDROCK 84.2-150.0 CLAYSTONE: primarily olive gray claystone with alternating very thin to thin lamina of dusky yellowish brown silty claystone fossiliferous PHYSICAL CONDITION: soft to friable hardness; plastic to friable strength; fresh; tends to fracture along bedding plane		Rec 1		PB	1-2-81 1-3-81 1.0/1.0 recovery 1.5/2.5 recovery 1.5/2.5 recovery

Sheet 4 of 7

Project DESIGN UNIT A135 Date Drilled 1-3-80 Hole No. 5

DEPTH	USCS	MATERIAL CLASSIFICATION	SAMPLE	BLOWS/FT	CORE RUN	DRILL RATE	REMARKS
92		84.2-150.0 CLAYSTONE: (continued) primarily claystone from 93.5 to 100.4	Box 1				pocket penetrometer +0.5 tsf 2-9-81 2.2/2.5 recovery
96		thin sandstone lamina at 96.8; 97.1'					1.9/2.5 recovery
100			Box 2				2.0/2.5 recovery pocket penetrometer +0.5 tsf 2-9-81
102		alternating very thin to medium lamina of claystone; sandstone and silty claystone					1.9/2.5 recovery 1.9/2.5 recovery
106							1.5/2.5 recovery pocket penetrometer +0.5 tsf 2-9-81
110			Box 3				2.5/2.5 recovery 2.5/2.5 recovery
114							1.9/2.5 recovery
118							2.5/2.5 recovery

Sheet 5 of 7

Project DESIGN UNIT A135 Date Drilled 1-3-80 Hole No. 5

DEPTH	USCS	MATERIAL CLASSIFICATION	SAMPLE	BLOWS/FT	CORE RUN	DRILL RATE	REMARKS
118		84.2-150.0 CLAYSTONE: (continued) primarily claystone with alternating very thin to medium lamina of sandstone; micaceous; fossiliferous claystone	Box 3			PB	2.5/2.5 recovery
122		dip of bedding planes variable (10-46°); folding apparent					1.7/2.5 recovery
126		folding apparent from 125-126.0'	Box 4				1.9/2.5 recovery 1.9/2.5 recovery
130		alternating lamina of sandstone; claystone and silty claystone; dark yellowish brown					1.7/2.5 recovery pocket penetrometer +0.5 tsf 1.0/2.5 recovery
134		132' clay filled fracture with offsets					1.3/2.5 recovery
138		PHYSICAL CONDITIONS: soft to friable hardness; plastic to friable strength; fresh; tends to fracture along bedding plane; friable sandstone lamina	Box 5				1.0/2.0 recovery 2.0/2.7 recovery

Sheet 6 of 7

Project DESIGN UNIT A135 Date Drilled 1-2-81 Hole No. 5

DEPTH	USCS	MATERIAL CLASSIFICATION	SAMPLE	BLOWS/FT	CORE RUN	DRILL RATE	REMARKS
140		84.2-150.0 CLAYSTONE: (continued) very thin to medium alternating lamina of claystone; sandstone and silty claystone; variable thickness of laming; primary claystone to 142.7', very fine sandstone from 142.3-142.8' 143.1-145.3'					pocket penetrometer in sand lens 3.5 1.9/2.8 recovery
144			Box 5				1.5/2.7 recovery
148		PHYSICAL CONDITION: soft to friable hardness; plastic to friable strength; fresh; tends to fracture along bedding plane; notably sandstone lamina					1.8/2.8 recovery 2.0/2.7 recovery
152	BH	TERMINATED HOLE AT 150.0'					12-3-81 12-8-81 Installed 100.0' Piezometer

Sheet 7 of 7

RECORD DRAWING

REV.	DATE	BY	SUB.	APP.	DESCRIPTION
2	5-3-91	RCV	9/2A	CME	NO REVISIONS INDICATED ON CM'S AS BUILT MARK UPS RECEIVED 5-3-91
1	6-4-91	CM			REVISED PER CR5-208

THE PREPARATION OF THIS DRAWING HAS BEEN FINANCED IN PART THROUGH A GRANT FROM THE U. S. DEPARTMENT OF TRANSPORTATION, URBAN MASS TRANSPORTATION ADMINISTRATION, UNDER THE URBAN MASS TRANSPORTATION ACT OF 1964, AS AMENDED, AND IN PART BY THE TAXES OF THE CITIZENS OF LOS ANGELES COUNTY AND OF THE STATE OF CALIFORNIA

DESIGNED BY
DRAWN BY DKM/JAP
CHECKED BY J.A. Doolittle
BY CHARGE K.M. Price
DATE

SOUTHERN CALIFORNIA RAPID TRANSIT DISTRICT
METRO RAIL PROJECT
RTD

CCI/ESA/GRC
General Geotechnical Consultants
SUBMITTED K.M. Price

DMJM/PBQD/KE/HWA
A JOINT VENTURE
GENERAL CONSULTANTS
APPROVED Howard Scheiff

LA CBD TO NORTH HOLLYWOOD
UNION STATION
BORING LOG 5

CONTRACT NO. A-135
DRAWING NO. K-003
SCALE NO SCALE
SHEET NO. 39

THIS BORING LOG IS BASED ON FIELD CLASSIFICATION AND VISUAL SOIL DESCRIPTION BUT IS MODIFIED TO INCLUDE RESULTS OF LABORATORY CLASSIFICATION TESTS WHERE AVAILABLE. THIS LOG IS APPLICABLE ONLY AT THIS LOCATION AND TIME. CONDITIONS MAY DIFFER AT OTHER LOCATIONS OR TIME.

Converse Consultants, Inc.
Earth Sciences Associates
Geo/Resource Consultants

BORING LOG 4

Proj: DESIGN UNIT A135 Date Drilled 2-9-81 Ground Elev. 279'
Drill Rig Failing 1500 Logged By Stephen M. Tetta Total Depth 150.0'
Hole Diameter 4 7/8" Hammer Weight & Fall 140 lb. @ 30"

Depth	USCS	MATERIAL CLASSIFICATION	Sample	Blows/ft	Drill Mode	REMARKS
0		0.0-0.2 CONCRETE; 0.2-14.0 FILL: Primarily crushed asphalt and brick			AD	
10					RD	
14	SP	ALLUVIUM 14.0-21.0 GRAVELLY SAND: olive-black; fine to medium sand and gravel; wet; very dense; oil odor	S-1	19 / 30 / 50	SS / RD	1.0/1.5 Recovery

Sheet 1 of 7

Project DESIGN UNIT A 135 Date Drilled 2-9-81 Hole No. 4

Depth	USCS	MATERIAL CLASSIFICATION	Sample	Blows/ft	Drill Mode	REMARKS
20	SP	14.0-21.0 GRAVELLY SAND: (continued)		50 / 50	DR / SS	No Recovery; SPT at 20.5'; No Recovery, refusal at 5"
21	GP	21.0-101.5 SANDY GRAVEL Numerous cobbles and boulders				moderate to heavy rod chatter from 21.0 to 30.0'
30				50	SS / RD	No Recovery refusal at 4" caving at 32'
32		gravel ; subangular to subrounded; poorly graded	S-2			
40				50	SS / RD	refusal at 3" No Recovery; difficulty getting back into hole

Sheet 2 of 7

Project DESIGN UNIT A135 Date Drilled 2-9-81/2-10-81 Hole No. 4

Depth	USCS	MATERIAL CLASSIFICATION	Sample	Blows/ft	Drill Mode	REMARKS
44	GP	21.0-101.5 SANDY GRAVEL: (continued) numerous cobbles and boulders			RD	moderate to heavy rig shaking continues
60		continued; numerous cobbles and boulders		50	SS / RD	No Recovery refusal at 3"
62						2-9-81 / 2-10-81

Sheet 3 of 7

Project DESIGN UNIT A 135 Date Drilled 2-10-81 Hole No. 4

Depth	USCS	MATERIAL CLASSIFICATION	Sample	Blows/ft	Drill Mode	REMARKS
66	GP	21.0-101.5 SANDY GRAVEL: (continued) primarily cobbles and boulders			RD	moderate to heavy ri[g] shaking continues
70				50	SS	No recovery; diffic[ulty] getting back into h[ole] refusal at 2"
80		continued; primarily cobbles and boulders		50	SS / RD	No recovery refusal at 4"

Sheet 4 of 7

Project DESIGN UNIT A135 Date Drilled 2-10-81 Hole No. 4

Depth	USCS	MATERIAL CLASSIFICATION	Sample	Blows/ft	Drill Mode	REMARKS
92	GP	21.0-101.5 SANDY GRAVEL: (continued) sand with numerous cobbles and boulders			RD	moderate to heavy rig shaking to 101.5
101.5		BEDROCK 101.5-150.0 CLAYSTONE: olive-gray; micaceous claystone; with very fine sand PHYSICAL CONDITION: massive; soft to friable hardness; plastic to weak strength; fresh; tends to fracture along bedding planes	Box 1		PD	2.0/2.0 recovery
106						2.0/2.0 recovery
107.8		107.8'; very thin to medium banding				
110						2.0/2.0 recovery
112	70	112.1'; clay filled fracture with undeterminable offset				2.0/2.0 recovery
114		115.7'; alternating claystone and very thin grayish brown fine sand lamina	Box 2			2.0/2.0 recovery

Sheet 5 of 7

Project DESIGN UNIT A135 Date Drilled 2-10-81/2-11-81 Hole No. 4

Depth	USCS	MATERIAL CLASSIFICATION	Sample	Blows/ft	Drill Mode	REMARKS
116		101.5-150.0 CLAYSTONE: (continued) PHYSICAL CONDITION: (continued) massive; soft to friable hardness; plastic to weak strength; fresh; tends to fracture along bedding planes; primarily claystone with alternating very thin to thin sandstone lamina 119.3-119.9 intensely fractured	Box 2 / S-1			2.0/2.0 recovery
120			Box 2			2.4/2.0 recovery
122						2.0/2.0 recovery
125		primarily claystone with fine sandstone	Box 3			2-10-81 / 2-11-81
126						2.0/2.0 recovery
128	70					2.0/2.0 recovery
132			Box 4			Pocket penetrometer >4.5 tsf 2.0/2.0 recovery
134			S-2			2.5/2.0 recovery
136		continued	Box 4 (cont)			2.0/2.0 recovery

Sheet 6 of 7

Project DESIGN UNIT A135 Date Drilled 2-11-81 Hole No. 4

Depth	USCS	MATERIAL CLASSIFICATION	Sample	Blows/ft	Drill Mode	REMARKS
140		101.5-150.0 CLAYSTONE: (continued) 140.7-141.7 cemented; very fine greenish gray sandstone	Box 4			2.0/2.0 recovery
143			Box 5			pocket penetrometer > 4.5 tsf 1.0/2.0 recovery
144	10-20	144.5-145.3 grayish brown; fine to medium sand; partially saturated with oil 145.3 mottled claystone with oil saturated fine to medium sand				petroleum sample 145-146'
146						2.5/2.0 recovery 2.7/2.7 recovery
149			S-3			
150	BH	150.0' TERMINATED HOLE E-LOG CONDUCTED				Installed 150.0 piezometer and backfilled hole with pea gravel and bentonite plug at surface

Sheet 7 of 7

◊5

NOTES:

1. DRILL THREE PROPOSED BORINGS TO AT LEAST 5 FEET INTO BEDROCK.
2. TAKE SOIL SAMPLES AT EVERY 5-FOOT INTERVALS TO AT LEAST 60 FEET DEPTH REQUIRED AT CLOSER DEPTHS. AFTER 60 FEET TAKE SAMPLES AT EVERY 10-FOOT I VALS OR AS REQUIRED. TAKE N-VALUES (STANDARD PENETRATION TEST) WHILE SAM USING A SPLIT SPOON OR EQUIVALENT CALIFORNIA SAMPLER.
3. DETERMINE GROUND WATER DEPTHS, DURING AND AFTER DRILLING TO LOCATE EXI GROUNDWATER LEVEL IN EACH BORING. MONITOR FOR PRESENCE OF GAS/OIL.
4. PERFORM NECESSARY LABORATORY TESTING ON RELATIVELY UNDISTURBED SOIL SAMPL DETERMINE MOISTURE/DENSITY, C AND Ø VALUES, SETTLEMENT PARAMETERS, PERMEAB PARAMETERS AND GRAIN SIZE DISTRIBUTION. CONTRACTOR SHALL PROVIDE ADDIT SOIL TEST DATA, IF REQUIRED BY THE DISTRICT OR ITS DESIGNEE. ALL SAMPLES BE TESTED AND STORED IN A RECOGNIZED SOILS LABORATORY. SAMPLES SHAL PRESERVED FOR ONE MONTH AFTER COMPLETION OF TESTINGS AND THEN THE SA SHOULD BE TRANSFERRED TO THE DISTRICT OR ITS DESIGNEE. SOIL TESTS SHAL PERFORMED AS PER APPROPRIATE ASTM CRITERIA.
5. TEST WATER AND SOIL SAMPLES FOR MEASURING LEVELS OF PRIORITY POLLUTANTS. AT LEAST FIVE SOIL SAMPLES (COLLECTED IN AIRTIGHT GLASS JARS) AND TWO SAMPLES FOR FOLLOWING CHEMICAL ANALYSIS IN A STATE APPROVED LABORATORY 604, 608, 624, 625, 6020, 8020, 8040, 8080, 8240 AND 8270-APHA 209B.
6. COLLECT AND DISPOSE OF ALL SPOIL AS APPROPRIATE, MEETING CITY AND STATE R REQUIREMENTS.
7. CONTRACTOR MAY USE THESE BORINGS TO PROVIDE OBSERVATION WELLS. IN THAT BORINGS SHALL BE COVERED WITH TIMBER OR METAL PLATE FOR SITE SAFETY UNTIL ARE INSTALLED. CONTRACTOR MUST ENSURE BEFORE DRILLING SPECIFIED REQUIRE FOR INSTALLING AND DEVELOPING WELLS.
8. CHECK PRESENCE OF POLYCHLORINATED BIPHENOLS ALONG THE TRACK AREA IN THE UP TO 5 FEET OF SUBSOIL, IN THE THREE BORINGS OR NEAR BY.
9. FINAL BORING LOGS SHOULD BE PREPARED BY A GEOTECHNICAL ENGINEER. SOILS BE IDENTIFIED BY USING THE UNIFIED SOILS CLASSIFICATION SYSTEM.
10. FIELD AND LABORATORY WORK SHALL BE CARRIED OUT UNDER THE FULL SUPERVISION GEOTECHNICAL ENGINEER REGISTERED IN THE STATE OF CALIFORNIA, WHO WILL PR SEAL AND SIGNATURE ON ALL PERTINENT DOCUMENTS. FIELD AND TEST DATA SHOU MADE AVAILABLE TO THE DISTRICT OR ITS DESIGNEE IMMEDIATELY UPON COMPLE

RECORD DRAWING

REV.	DATE	BY	SUB.	APP.	DESCRIPTION
4	5-3-91	RCV	9DA	GML	NO REVISIONS INDICATED ON CM'S AS BUILT MARK UPS RECEIVED 5-3-91

REV.	DATE	BY	SUB.	APP.	DESCRIPTION
3	10-8-87	AL			REVISED PER ACR/35-3
2	8-3-87	LG			REVISED PER CR 7-507
1	8-4-86	CM			REVISED PER CRS-208

THE PREPARATION OF THIS DRAWING HAS BEEN FINANCED IN PART THROUGH A GRANT FROM THE U. S. DEPARTMENT OF TRANSPORTATION, URBAN MASS TRANSPORTATION ADMINISTRATION, UNDER THE URBAN MASS TRANSPORTATION ACT OF 1964, AS AMENDED, AND IN PART BY THE TAXES OF THE CITIZENS OF LOS ANGELES COUNTY AND OF THE STATE OF CALIFORNIA

DESIGNED BY
DRAWN BY DKM/JAP
CHECKED BY J.A. Doolittle
IN CHARGE R.M. Pride
DATE 2-4-85

SOUTHERN CALIFORNIA RAPID TRANSIT DISTRICT
METRO RAIL PROJECT
RTD

CCI/ESA/GRC
General Geotechnical Consultants
SUBMITTED R.M. Pride

DMJM/PBQD/KE/HWA
A JOINT VENTURE
GENERAL CONSULTANTS
APPROVED

LA CBD TO NORTH HOLLYWOOD
UNION STATION
BORING LOG 4

CONTRACT NO. A-135
DRAWING NO. K-002
SCALE NO SCALE
SHEET NO. 38

B.4 SAMPLING AND LOGGING PROCEDURES

Logging and sampling were performed in the field by the geologist. The following describes sampling equipment and procedures and notations used on the lithologic logs to indicate drilling and sampling modes.

B.4.1 Sampling

In the overburden at about 10-foot intervals, the Converse ring sampler was driven using a down-hole 450-pound slip-jar hammer. The Converse sampler was followed with the standard split spoon sample (SPT) driven with a 140-pound hammer with a 30 inch stroke. Where the Puente Formation was encountered, the borings were sampled using a Pitcher-Barrel and Converse ring sampler at 20-foot intervals.

The most common cause for loss of samples or altering the sample interval was when gravels were encountered at the desired sampling depth. Standard penetration blow count information can often be misleading in this type of formation, and it is difficult to recover an undisturbed sample. Therefore at some locations borings were advanced until drill response and cutting suggested a change in formation.

The following symbols were used on the logs to indicate the type of sample and the drilling mode:

Log Symbol	Sample Type	Type of Sampler
B	Bag	-
J	Jar	Split Spoon
C	Can	Converse Ring
S	Shelby Tube	Pitcher Barrel
Box	Box	Pitcher Barrel, Core Barrel

Log Symbol	Drilling Mode
AD	Auger Drill
RD	Rotary Drill
PB	Pitcher Barrel Sampling
SS	Split Spoon
DR	Converse Drive Sample
C	Coring

B.4.2 Field Classification of Soils

All soil types were classified in the field by the site geologist using the "Unified Soil Classification System". Based on the characteristics of the soil, this system indicates the behavior of the soil as an engineering construction material.* Although particle size distribution estimates were based on volume rather than weight, the field estimates should fall within an acceptable range of accuracy.

Table A-1 shows the correlation of standard penetration information and the physical description of the consistency of clays (hand-specimen) and the compactness of sands used by the field geologists for describing the materials encountered.

TABLE A-1 Correlation of N-Values and Consistency/Compactness of Soil Obtained in the Field

N-Values (blows/foot)	Hand-Specimen (clay only)	Consistency (clay or silt)	Compactness (sand only)	N-Values (blows/foot)
0 - 2	Will squeeze between fingers when hand is closed	Very soft	Very loose	0 - 4
2 - 4	Easily molded by fingers	Soft	Loose	4 - 10
4 - 8	Molded by strong pressure of fingers	Firm	---	---
8 - 16	Dented by strong pressure of fingers	Stiff	Medium dense	10 - 30
16 - 32	Dented only slightly by finger pressure	Very stiff	Dense	30 - 50
32+	Dented only slightly by pencil point	Hard	Very dense	50+

B.4.3 Field Description of the Formations

The description of the formations is subdivided in two parts: lithology and physical condition. The lithologic description consists of:

- rock name;
- color of wet core (from GSA rock color chart);
- mineralogy, textural and structural features; and
- any other distinctive features which aid in correlating or interpreting the geology.

The physical condition describes the physical characteristics of the rock believed important for engineering design consideration. The form for the description is as follows:

Physical condition: _____ fractured, minimum _____, maximum _____, mostly _____; _____ hardness; _____ strength; _____ weathered.

* For a more complete discussion of the Unified Soil Classification System, refer to Corps of Engineers, Technical Memorandum No. 3-357, March 1953, or Department of the Interior, Bureau of Reclamation, Earth Manual, 1963.

UNION STATION-SITE#1-1983

Converse Consultants

Boring Log PT-1

THIS LOG IS APPLICABLE ONLY AT THIS LOCATION AND TIME.
CONDITIONS MAY DIFFER AT OTHER LOCATIONS OR TIME.

PROJECT SC RTD 83-1101-11 DATE DRILLED 3/15,16,17,18/83 HOLE NO. PT-1
LOCATION 194' E/o ALAMEDA S/o MACY AT N edge of Union Sta Pool Lot GROUND ELEV. 279.1
DRILLING CONTRACTOR Roscoe Moss LOGGED BY Dan Gillette DEPTH TO GROUND WATER 20.0 3/21
TYPE OF RIG Cable Tool HOLE DIAMETER 14-15 INCH HAMMER WEIGHT AND FALL NA
SURFACE CONDITIONS Asphalt Parking Lot TOTAL DEPTH 82.5 NO. CORE BOXES NA

DEPTH	CLASS.	FIELD DESCRIPTION	SAMPLE	SPT (6")	DRILL MODE	RUN NO.	CORE REC. %	REMARKS
0	Af	0.0-1.5 ARTIFICIAL FILL		PUMP				ASPHALT PAVING TOP 3"
2	SP	1.5-60.0 SAND AND GRAVEL		TEST				
4		MODERATE REDDISH		HOLE				
6		BROWN (10R 4/6); contains	NO	SAMPLES				
8		50-75% SAND		REQUIRED				
10.0					RD			
20.0								
30.0								
40.0								

SHEET 1 OF 3

3/21

PROJECT SC RTD 83-1101-11 DATE DRILLED 3/15,16,17,18/83 HOLE NO. PT-1

DEPTH	CLASS.	FIELD DESCRIPTION	SAMPLE	SPT (6")	DRILL MODE	RUN NO.	CORE REC. %	REMARKS
40.0	SP	1.5-60.0 SAND AND GRAVEL			RD ↓			31
60.0		60.0-80.0 SAND AND Boulders light gray (N 7), contains 40-80% SAND AND Granitic Boulders						31 / 31
80.0	TP	80.0-82.0 SILTSTONE AND Claystone Olive Black (5Y 2/1)						
82.5		END BORING 82.5						5

SHEET 2 OF 3

SUMMARY BORING NO. PT-1

83-1101-11

PROJECT SC RTD STATION HOLE YES DATE DRILLED 3/15,16,17,18/83

OVERBURDEN DEPTH (FT.) 0.0 TO 80.0.

BEDROCK DEPTH (FT.) 80.0 TO 82.5 (T.D.).

WATER PRESS. TEST No; INTERVAL(S) — TO —, — TO —.

GROUND WATER DEPTH (FT.) 20.6 DATE 3/[illegible]; 19.7 DATE 3/[illegible]. { Rainfall 3/17, 3/20 Use 20.0 as Mean

GAS No; DEPTH FIRST NOTICED —, DATE —.

E-LOG No.

DOWN-HOLE SURVEY No.

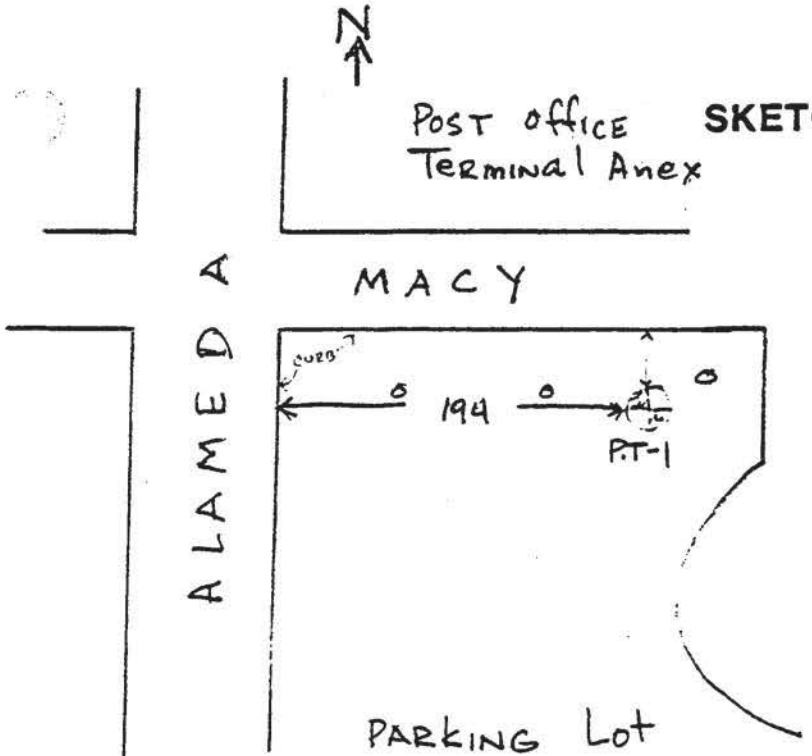
CROSS-HOLE SURVEY No.

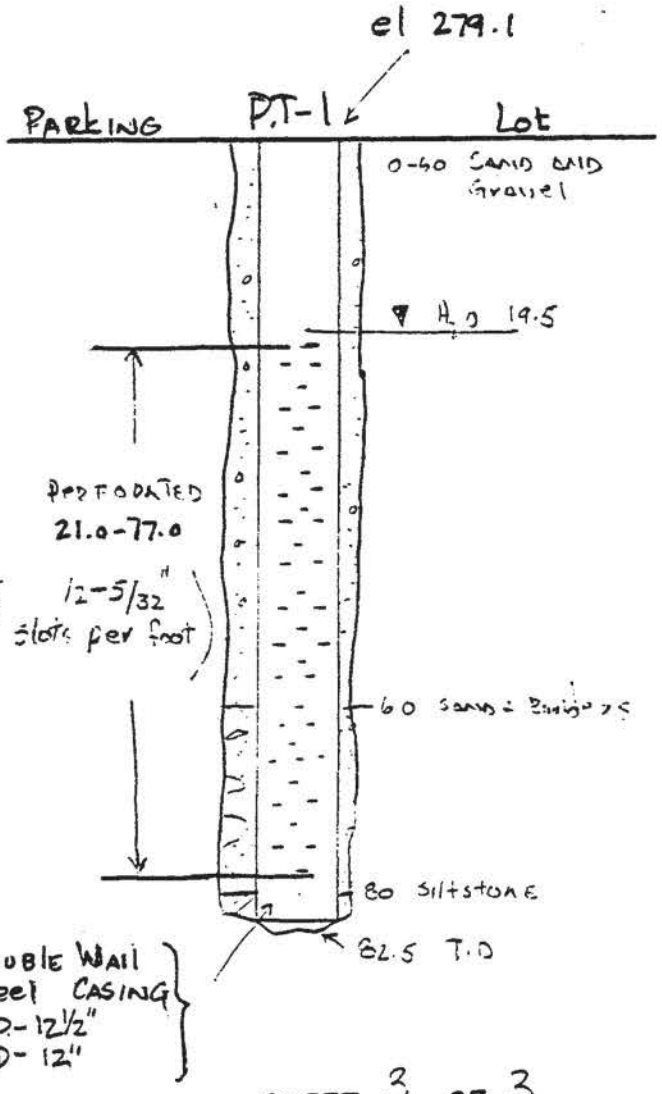
PVC CASING (I.D.): 4" No TO —; 3" No TO —; 2" No TO —.

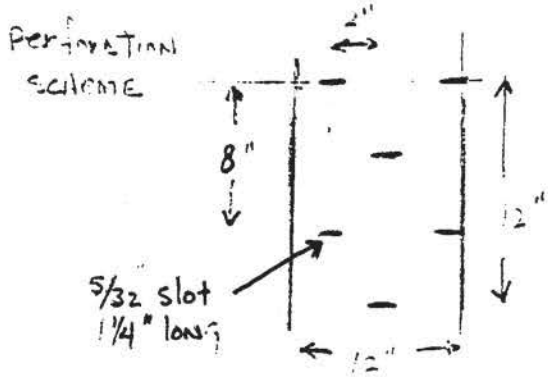
Steel CASING - [illegible]

GROUND ELEVATION REF. —.

SKETCH







THIS BORING LOG IS BASED ON FIELD CLASSIFICATION AND VISUAL SOIL DESCRIPTION, BUT IS MODIFIED TO INCLUDE RESULTS OF LABORATORY CLASSIFICATION TESTS WHERE AVAILABLE. THIS LOG IS APPLICABLE ONLY AT THIS LOCATION AND TIME. CONDITIONS MAY DIFFER AT OTHER LOCATIONS OR TIME.

Converse Consultants, Inc.
Earth Sciences Associates
Geo/Resource Consultants

BORING LOG SITE #1 PUMP WELL

Proj: 83-1140-06 Date Drilled 6/18-20/96 Ground Elev. 279

Drill Rig GUS DELH 4 SLOPE KELLY Logged By MBS Total Depth 88'

Hole Diameter 24" BUCKET Hammer Weight & Fall (NO SAMPLING PERFORMED)

DEPTH	USCS	MATERIAL CLASSIFICATION	SAMPLE	BLOWS (6")	DRILL MODE	REMARKS
0		0.0-0.3 ASPHALTIC PAVEMENT	(NO SAMPLING)			0700
	ML	0.3-6.0 SANDY SILT W/ DEBRI (FILL) SILT WITH FINE SAND, SOME CLAY BINDER, MOIST, LOOSE - MEDIUM DENSE, MISC. DEBRI AND RUBBLE DECREASING WITH DEPTH, OLIVE BROWN COLOR	(0-20-80)		24" BUCKET AUGER AD	FILL RED BRICK LAYER @ 2'
6	SW	6.0-70.0 GRAVELLY SAND FINE TO COARSE SAND WITH GRAVELS, OCCASSIONAL COBBLES TO 5", CLASTS SUBROUNDED TO ROUNDED, RIVER DEPOSITS	(35-65-0)			6' ADDED DRILLING FLUID (SUPERCOL (20lbs) AND WATER MIX) BUILT SOIL BERM TO CONTAIN FLUIDS AT SURFACE
10						DRILLING FLUID IN BORING WASHING OUT MANY OF THE FINES IN EACH BUCKET
12		OCCASSIONAL DRILL RIG CHATTER FROM COBBLES AND BOULDERS				
14	SW/(GW)	OCCASSIONAL COBBLES TO 14" SUBROUNDED TO ROUNDED PREDOMINANTLY GRAVELLY SAND				
16						
18						
20						

SITE #1

Project 83-1140-06 Date Drilled 6-18-86 Hole No. PUMP WELL

DEPTH	USCS	MATERIAL CLASSIFICATION	SAMPLE	BLOWS 16"	DRILL MODE	REMARKS
20		GRAVELLY SAND WITH OCCASSIONAL COBBLES - CONTINUED	X		AD ↓	
22		INTERBEDDED LENSES OF COARSE GRAVEL AND SMALL COBBLES ALTERNATING WITH LENSES OF SANDS AND GRAVELLY SANDS				H_2S ODOR ↓
24						
26						
28		28' COBBLES WITH POSSIBLE SMALL BOULDERS, DIFFICULT DRILLING, DRILL RIG CHATTER, COBBLES TO 14"				(0900) PLACED NEW TEETH ON 24" BUCKET
30						
32		INTERBEDDED THIN LAYERS OF CLAY AND SILT, OLIVE GRAY TO GRAY, PREDOMINANTLY SAND AND GRAVELLY SANDS WITH COBBLES, AVERAGE COBBLE SIZE 3"-6", OCCASSIONAL COBBLES TO 14"	(40-60-0)			
34						
36						
38						
40		OCCASSIONAL CLAYEY GRAVEL LAYERS VARIABLE THICKNESS, 1-2", OLIVE GRAY COLOR WITH H_2S ODOR				
42						
44						

Project 83-1140-06 Date Drilled 6-18-86 Hole No. SITE #1 PUMP WELL

DEPTH	USCS	MATERIAL CLASSIFICATION	SAMPLE	RUN NO.	DRILL MODE	REMARKS
44	SW	GRAVELLY SANDS - CONTINUED	Ø		AD ↓	(1000)
46		FINE TO COARSE SAND WITH GRAVEL, OCCASSIONAL COBBLES FROM 6"-14", SUBROUNDED TO ROUNDED.				
48		INTERBEDDED THIN LENSES OF CLAY AND SILTY CLAY - VARIABLE, PREDOMINANTLY GRAVELLY SANDS				
50						
52						
54						(1100)
56						HYDRAULIC LEAK DEVELOPING ON DRILL RIG RING GEAR
58						
60		GRAVELLY SANDS - CONTINUED, OCCASSIONAL SMALL COBBLES				
62						
64						
66						(1200)
68						Sheet 3 of 4

Project 83-1140-06 Date Drilled 6-18 Hole No. PUMP WELL SITE #1

DEPTH	USCS	MATERIAL CLASSIFICATION	SAMPLE	RUN NO.	DRILL MODE	REMARKS
68		GRAVELLY SANDS - CONTINUED INCREASING FINES			AD ↓	
70	SC/GC	70.0 - 74.0 GRAVELLY SAND w/ CLAY MIXTURE OF SAND AND GRAVEL WITH A CLAY / SILTY CLAY BINDER, GRAY, DENSE, H_2S ODOR IN FINER MATERIALS, OCCASSIONAL COBBLES, CLASTS SUBANGULAR TO SUBROUNDED	(35-40-25)			ADDED ±20lbs OF SUPERGEL TO DRILLING FLUID IN BORING. (1320)
74	GW	74.0 - 80.0 COBBLES WITH SANDY GRAVEL SUBROUNDED TO ROUNDED COBBLES TO 12", COBBLES GENERALLY 4"-8", SOME SANDY GRAVEL CONSISTING OF MEDIUM TO COARSE SANDS AND GRAVELS, RIVER DEPOSITS, H_2S ODOR GRADATIONAL CONTACT				PLACED NEW TEETH (2ND SET) ON 24" BUCKET 6-18-86 (1400) 74' - SHUTDOWN AT 1430, NEED SPECIAL BUCKETS TO REMOVE COBBLES, SECURED SITE 6-20-86 ATTEMPTED TO BREAK THROUGH ROCK IN BOTTOM OF BORING APPEARS TO BE LARGE COBBLE OR BOULDER, USING CHOPPING BUCKET AND LARGE SINGLE TOOTH WITH NO SUCCESS 6-21-86 USING CORING BUCKET TO ADVANCE THROUGH ROCK, HOLE REMAINED OPEN PAST TWO DAYS WITH A MINIMUM OF DRILLING FLUID
80		80.0 - 88' BEDROCK CLAYSTONE / SILTSTONE PUENTE FORMATION OLIVE GRAY SILTSTONE AND CLAYSTONE, MEDIUM PLASTICITY, AQUICLUDE MATERIAL				EASY DRILLING (0900) THROUGH SILTSTONE / CLAYSTONE (0930)
88		END OF BORING 88' USED 1 BAG SUPERGEL (50lbs) FOR BORING INSTALLED PUMP WELL CASINGS CONSISTING OF CASINGS FROM APPROX 7' TO 87', 0-7' NON SLOTTED CASING CENTRALIZERS AT 7', 40', 87', BACKFILLED AROUND SLOTTED CASING WITH (SW) SAND CONSISTING OF IMPORTED DESIGN FILTER MIX FROM 5'-88', MONITORED BACKFILLING WITH TAPE SOUNDINGS	12" AND 2"			MACHINE SLOTTED PVC ENDS CAPPED, WELL
90						
92						

Sheet 4 of 4

Converse Consultants

SITE #1
OBSERVATION WELL #1
Boring Log

THIS LOG IS APPLICABLE ONLY AT THIS LOCATION AND TIME.
CONDITIONS MAY DIFFER AT OTHER LOCATIONS OR TIME.

PROJECT SCRTD - UNION STATION DATE DRILLED 2/4/83 HOLE NO. 5-1 (1983)
LOCATION NORTHEAST CORNER OF PUBLIC PARKING LOT GROUND ELEV. 279.1'
DRILLING CONTRACTOR CONVERSE-LAS VEGAS LOGGED BY B. INGHRAM DEPTH TO GROUND WATER 20.3
TYPE OF RIG _____ HOLE DIAMETER 4¾" HAMMER WEIGHT AND FALL 320#, 36" 2-8-83
SURFACE CONDITIONS A.C. PARKING AREA TOTAL DEPTH 85.0 NO. CORE BOXES _____

DEPTH	CLASS.	FIELD DESCRIPTION	SAMPLE	SPT (6")	DRILL MODE	RUN NO.	CORE REC. %	REMARKS
0.0	SM	0.0 - 0.4' ASPHALT PAVEMENT 0.4 - 2.0 FILL - SILTY SAND MOTTLED BRN, MOIST, DENSE VARIABLE COMPOSITION	1-1 12K		RD CCI DR			SET UP 7:00 AM BEGIN DRILLING 7:30 AM WEATHER: CLEAR, WARM
2.0	SM/ML	YOUNG ALLUVIUM 2.0 - 4.0 SILTY SAND / SANDY SILT RED-BRN., MOIST, M. DENSE V. FINE SAND - 50-60% SILT - 40-50%			RD			SLIGHTLY POROUS
4.0	SM	4.0 - 8.0 SILTY SAND GRAY-BRN., MOIST, M. DENSE FINE SAND WITH 20% SILT AND TRACE GRAVEL TO 1"	1-2 6K		CCI DR RD			
6.0								
8.0	SW	8.0 - 70.0 GRAVELLY SAND						
10.0			5" REFUSAL	100	SPT RD			
12.0								
14.0								
16.0								
18.0								
20.0								

SHEET 1 OF 5

PROJECT SCRTD - UNION STATION DATE DRILLED 2/4/83 SITE #1 OBSERVATION WELL #1 HOLE NO.

DEPTH	CLASS.	FIELD DESCRIPTION	SAMPLE	SPT (6")	DRILL MODE	RUN NO.	CORE REC. %	REMARKS
20.0	SW	8.0-70.0 GRAVELLY SAND (CONTINUED)	50K		CCI DR			DELICATE SAMPLE, DIFFICULTY EXTRUDING - SAMPLE DESTROYED
					RD			
22.0								
24.0								
26.0								
28.0								
30.0			1-3 45K		CCI DR			POOR RECOVERY, DELICATE SAMPLE 3 RINGS ONLY
					RD			
32.0		INTERMITTENT LENSES OF INCREASED GRAVEL CONTENT						
34.0								
36.0								
38.0								
40.0			1-4 55K		CCI DR			SULPHUR ODOR IN SAMPLE
					RD			POOR RECOVERY, 2 RINGS ONLY
42.0								
44.0								

SITE #1
OBSERVATION WELL #1

PROJECT SCRTD - UNION STATION DATE DRILLED 2/4/83 HOLE NO. _____

DEPTH	CLASS.	FIELD DESCRIPTION	SAMPLE	SPT (6")	DRILL MODE	RUN NO.	CORE REC. %	REMARKS
44.0	SW	8.0 - 70.0 GRAVELLY SAND (CONTINUED)			RD			
			1-5 57K		CCI DR			SULPHUR ODOR POOR SAMPLE RECOVERY - 2 RINGS ONLY
46.0					RD			
48.0								
50.0			80K		CCI DR			GRAVELLY SAMPLE - FELL OUT OF SAMPLER
					RD			
52.0								
54.0								SLIGHT SULPHUR ODOR
			1-6 100K	-10"	CCI DR			POOR SAMPLE RECOVERY 5 RINGS ONLY
56.0					RD			
58.0								
60.0								
62.0								
64.0								SULPHUR ODOR POOR RECOVERY 4 RINGS ONLY
			1-7 100K	-10"	CCI DR			
66.0					RD			
68.0								

SHEET 3 OF 5

PROJECT SCRTD - UNION STA. DATE DRILLED 2/4/83 HOLE NO. SITE #1 OBSERVATION WELL #1

DEPTH	CLASS.	FIELD DESCRIPTION	SAMPLE	SPT (6")	DRILL MODE	RUN NO.	CORE REC. %	REMARKS
68.0	SW	8.0 - 70.0 GRAVELLY SAND (CONTINUED)			RD			
70.0	B	70.0 - 79.5 BOULDERS. GRANITIC-TYPE CUTTINGS						
72.0								
74.0			100K	-0" REFUSAL				ATTEMPTED TO SAMPLE - COULD NOT DRIVE SAMPLER
76.0								TOO HARD TO SAMPLE
78.0								
80.0	CL/SC	PUENTE FORMATION 79.5 - 85.0. SANDY CLAYSTONE AND CLAYEY SANDSTONE	1-8 50K		CCI DR			
82.0		OLIVE-GRAY COLOR, MOIST, FRESH, THINLY LAMINATED, BEDDING PLANES DIP ≈ 50° (SAMPLES NOT ORIENTED). FRIABLE STRENGTH, FRIABLE TO LOW HARDNESS. TENDS TO FRACTURE ALONG LAMINATIONS			RD			
84.0			1-9 40K		CCI DR			
		END BORING 85.0 FT. PIEZOMETER SET TO 85.0' PERFORATED INTERVAL: 45'-85'						

SHEET 4 OF 5

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SITE #1
BORING LOG O.W.-4

Proj: 83-1140-06 MRTC PUMP TEST UNION STATION AREA Date Drilled 3/1-3/86 Ground Elev. 281'

Drill Rig FAILING 1500 ROTARY WASH Logged By EMIR UTUSH Total Depth 84'

Hole Diameter 4 7/8" Hammer Weight & Fall 250# @ 30"

DEPTH	USCS	MATERIAL CLASSIFICATION	SAMPLE	RUN NO.	DRILL MODE	REMARKS
0		0-0.5' ASPHALTIC PAVEMENT AND BASE			C	
	ML	0.5'-5' SANDY SILT BROWN, MOIST, VERY FINE SAND AND SILT			AD	
6	SP	5'-6' GRAVELLY SAND, BROWN				
	GP	6'-13' SANDY GRAVEL LIGHT BROWN AND GRAY, MEDIUM TO COARSE SAND, POORLY GRADED, COBBLES TO 4", SUBROUNDED; MOIST, LOOSE TO MEDIUM DENSE, TRACE FINES			RD	INSTALLED CASING MIXED REVERT
10			C-1		DR	
12					RD	
	SP	13'-15' SAND YELLOWISH BROWN, GRANITIC FRAGMENTS, MEDIUM TO COARSE, TRACE FINE GRAVEL				
	GP/SP	15'-20' SAND AND GRAVEL YELLOWISH BROWN, MEDIUM TO COARSE SAND, COARSE GRAVEL AND SMALL COBBLES, SAND LENSES, TRACE SILT AND CLAY, POORLY GRADED WITH TRACE FINES	C-2		DR	
18					RD	
20		▼ APPROXIMATE GROUNDWATER LEVEL: 20.0'				

Sheet 1 of 4

Project 83-1140-06 MRTC PUMP TEST Date Drilled 2/28 - 3/3/86 Hole No. SITE #1 O.W.-4

DEPTH	USCS	MATERIAL CLASSIFICATION	SAMPLE	BLOWS (6")	DRILL MODE	REMARKS
20	GM	20'-22' SANDY GRAVEL DARK GRAY, SILT, COARSE GRAVEL TO 3"			RD	
			C-3		DR	3/28/86
22	SM	22'-30' SILTY SAND DARK GRAY TO GREENISH GRAY, COARSE SAND			RD	3/3/86 CAVING TO 17.5' REDRILLED BORING
24						
26		COARSE GRAVEL, ANGULAR, MEDIUM SAND, LENSES OF SANDY SILT AND CLAY	C-4		DR	
28					RD	HYDROGEN SULFIDE ODOR
30	SP	30'-34' SAND GRAY, MEDIUM TO COARSE SAND, POORLY GRADED, LITTLE GRAVEL, TRACE SILT.				
			C-5		DR	
32						
34	GP	34-35.6 SANDY GRAVEL			RD	DRILL RIG CHATTER
36	SP	35.6-40 SAND GRAY, MEDIUM TO COARSE SAND, GRAVEL TO 1.5", TRACE SILT, H_2S ODOR	C-6		DR	
38	SP GP				RD	DRILL RIG CHATTER
40	SP	40-45.5 SAND GRAY, MEDIUM TO COARSE SAND			DR	SAMPLES NOT RECOVERED
42	SM	SAND SILT LENSE WITH CLAY BINDER				
	SP		C-7		DR	
44					RD	Sheet 2 of 4

Project 83-1140-06 MRTC PUMP TEST Date Drilled 3/3/86 Hole No. SITE #1 O.W.-4

DEPTH	USCS	MATERIAL CLASSIFICATION	SAMPLE	RUN NO.	DRILL MODE	REMARKS
44	SP	40'-45.5' SAND - CONTINUED				HYDROGEN SULPHIDE ODOR - CONTINUED
46	GM/GP	45.5'-47' SANDY GRAVEL WITH SILT, SUBROUNDED GRAVEL TO 1/2", GREEN CLAYEY SILT			RD	DRILL RIG CHATTER
48	SP	47'-49' SAND GRAY, MEDIUM TO COARSE	C-8		DR	
50	GP/SP/GP	49'-51' SANDY GRAVEL TRACE FINES OCCASSIONAL SAND LENSES			RD	DRILL RIG CHATTER
52	GM/SM	51'-52.8' SILTY SAND AND GRAVEL				
54	SW	52.8'-57' SAND GRAY, MODERATELY TO POORLY GRADED, MEDIUM TO COARSE SAND, TRACE SILT	C-9		DR	
56					RD	
58	GP	57'-58' SANDY GRAVEL				DRILL RIG CHATTER
	SW/SM	58'-60' SILTY SAND GRAY, FINE TO MEDIUM SAND MODERATELY GRADED, TRACE SILT	C-10		DR	H_2S ODOR
60	SM	60'-67.4 SILTY SAND GREENISH-GRAY VERY FINE SAND, TRACE CLAY, POORLY GRADED, DECAYING PLANT MATERIAL			RD	
62						
64			C-11		DR	
66					RD	
	SM	LENSE OF SILTY GRAVEL WITH CLAY				DRILL RIG CHATTER
68	GP	67.4-70.0 SANDY GRAVEL				

Project 83-1140-06 MRTC PUMP TEST Date Drilled 3/3/86 Hole No. SITE #1 O.W.-4

DEPTH	USCS	MATERIAL CLASSIFICATION	SAMPLE	RUN NO.	DRILL MODE	REMARKS
68	GP	67.4-70' SANDY GRAVEL GRAY, COARSE, TRACE FINES			RD	
70	SW	70'-72' GRAVELLY SAND GRAY, FINE TO COARSE SAND, SOME SILT, GRAVELS TO 3", MODERATELY WELL GRADED, COBBLES	C-12		DR	SMALL COBBLE IN SAMPLER TIP
72	GP	72'-78' SANDY GRAVEL GRAY, COARSE, COBBLES AND BOULDERS, TRACE FINES			RD	DRILL RIG CHATTER
74						
76						
78	SM	78'-79' SANDY SILT BROWNISH GREEN, POORLY GRADED, TRANSITION ZONE				
80	TP	79'-84' BEDROCK - PUENTE FORMATION SILTSTONE / CLAYSTONE OLIVE GRAY, STIFF, TRACE VERY FINE SAND				
82						
84		END OF BORING 84' - INSTALLED PIEZOMETER 0'-10' NON SLOTTED 2" PVC CASING 10'-79' MACHINE SLOTTED 2" CASING, 0.20" SLOTS, END CAPPED - FLUSHED CASING AND BORING WITH CLEAN WATER (± 1000 GALLONS) - BACKFILLED BORING WITH #3 MONTEREY SAND, 12-100# SACS - SEALED TOP 5' WITH CONCRETE GROUT AND BENTONITE, INSTALLED 2.5' CASING AND WELL COVER.				
86						
88						
90						
92						

Sheet 4 of 4

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SITE #2

BORING LOG PUMP WELL

83-1140-06
MRTC PUMP TEST

Proj: UNION STATION AREA Date Drilled 3/3-6/86 Ground Elev. 279.5

Drill Rig INGERSOL RAND TH60 Logged By MARK SCHLUTER Total Depth ____

Hole Diameter 10" REAMED TO 24" Hammer Weight & Fall (NO SAMPLING PERFORMED)

DEPTH	USCS	MATERIAL CLASSIFICATION	SAMPLE	BLOWS (6")	DRILL MODE	REMARKS
0		0.0 - 9.0 FILL GRAVELLY SAND, SILT, AND SANDY SILT, TRACE AMOUNT OF DEBRI AND RUBBLE INCLUDING FRAGMENTS OF CONCRETE, BRICK, METAL	(NO SAMPLING)			STARTED DRILLING AT (0945) 3-3-86 3/3/86 AIR-LIFTED CUTTING WITH DRILL RIG COMPRESSOR FROM 0-10' 3/3/86 (1240) STARTED REAMING BORING WITH MODIFIED 24" DRILL BIT
2						
4					AIR ROTARY	
6						3/4/86 (0730) DRILLED OUT HOLE WITH 12" TRI-CONE BIT TO CLEAN OUT FALLEN GRAVELS AND COBBLES FROM 24" REAMING DRILLED TO 110' WITH 12" BIT. (1100)
8						
10		9.0 - 85' GRAVELLY SAND MEDIUM TO COARSE SAND, SOME GRAVELS, TRACE SILT BORING LOGGED BASED ON ROTARY WASH CUTTING, GRAVELS AND COBBLES BROKEN UP DURING DRILLING.				3/3/86 DRILLED TO 10', SET UP FOR 10" ROTARY WASH DRILLING
12					ROTARY WASH RD	3-3-86 ATTACHED 10" TRI-CONE BIT TO 10' LONG REAMING SECTION AND STARTED ROTARY WASH DRILLING OF PILOT HOLE. DRILLED 10" PILOT HOLE TO 100'
14						3-3-86 ADDED SUPERCOL GUAR GUM TO DRILLING FLUID.
16		16' - DRILL RIG CHATTER GRAVELS AND COBBLES PROGRESS SLOWED				3/3/86 (1340) AT 16" WITH 24" MODIFIED DRILL BIT
18						
20						Sheet 1 of 5

83-1140-06
MRTC PUMP TEST

Project UNION STATION AREA Date Drilled 3/3-6/86 Hole No. SITE #2 PUMP WELL

DEPTH	USCS	MATERIAL CLASSIFICATION	SAMPLE	BLOWS 16"	DRILL MODE	REMARKS
20		9.0 - 85' GRAVELLY SANDS — CONTINUED —	(NO SAMPLING)			3/3/86 (1030) AT 20' WITH 10" TRI-CONE BIT.
22					RD ↓	
24						
26		25' - DRILL RIG CHATTER-10" BIT COBBLES AND GRAVELS				3/3/86 (1040) AT 25' WITH 10" TRI-CONE BIT
28						3/3/86 (1510) AT 28' WITH MODIFIED 24" BIT, GRAVELS AND COBBLES FALLING INTO PILOT HOLE, PULLED 24" MODIFIED BIT OUT OF HOLE AND ATTACHED 12" TRI-CONE BIT TO CLEAN OUT PILOT HOLE
30						
32						
34						
36						
38						
40						
42						
44						

83-1140-06
MRTC PUMP TEST

Project UNION STATION AREA Date Drilled 3/3-6/86 Hole No. SITE #2 PUMP WELL

DEPTH	USCS	MATERIAL CLASSIFICATION	SAMPLE	RUN NO.	DRILL MODE	REMARKS
44		9.0-85' GRAVELLY SANDS — CONTINUED —	(NO SAMPLING)			
46					RD ↓	
48						
50						3/4/86 (1430) AT 50' WITH 24" MODIFIED DRILL BIT
52						
54						
56						
58						
60						3/5/86 (0820) AT 60', STARTED DRILLING WITH NEW 24" MODIFIED DRILL BIT, 2ND BIT USED. GRAVELS AND COBBLES FALLING INTO CLEANED OUT PILOT HOLE AS 24" BIT IS ADVANCED
62						
64						
66						
68						

Project 83-1140-06 MRTC PUMP TEST UNION STATION AREA Date Drilled 3/3-6/86 Hole No. SITE #2 PUMP WELL

DEPTH	USCS	MATERIAL CLASSIFICATION	SAMPLE	RUN NO.	DRILL MODE	REMARKS
68		9.0 - 85' GRAVELLY SANDS — CONTINUED —	(NO SAMPLING)			
70					RD ↓	3/4/86 (1630) AT 70' WITH MODIFIED DRILL BIT, WELDED WINGS WORN DOWN TO NUBS (14") PULLED RODS AND BIT TO ATTACH SECOND MODIFIED DRILL BIT ON 3/5/86 A.M. (SEE 3/5/86 AT 60')
72						
74						
76						
78						
80						3/3/86 (1145) AT 80' WITH PILOT HOLE USING 10" TRI-CONE BIT.
82						3/5/86 (1400) AT 80' WITH 2ND 24" MODIFIED DRILL BIT, PROGRESS SLOW, GRAVELS AND COBBLES ACCUMULATING IN PILOT BORING
84						
86		85' - 110' BEDROCK PUENTE FORMATION SILTSTONE / CLAYSTONE OLIVE GRAY COLOR				
88						3/5/86 (1450) AT 88' WITH WORN 20" MODIFIED BIT, DRILLING MUCH EASIER IN BEDROCK, STILL SOME DRILL RIG CHATTER FROM GRAVELS AND COBBLES THAT FELL INTO PILOT BORING
90						
92						

Project 83-1140-06 MRTL PUMP TEST UNION STATION AREA Date Drilled 3/3-6/86 Hole No. SITE #2 PUMP WELL

DEPTH	USCS	MATERIAL CLASSIFICATION	SAMPLE	RUN NO.	DRILL MODE	REMARKS
92		85'-110' BEDROCK PUENTE FORMATION SILTSTONE / CLAYSTONE — CONTINUED —	(NO SAMPLING)		RD ↓	
94						
96						
98						
100						-3/3/86 (1220) COMPLETED 10" PILOT HOLE TO 100', REMOVED DRILL RODS AND BIT AND STARTED REAMING 24" HOLE, USING 14.75" TRI-CONE BIT MODIFIED WITH WELDED WINGS TO 24"
102						
104						
106						
108						
110		END OF BORING 110'				3/4/86 (1100) COMPLETED PILOT HOLE CLEAN-OUT WITH 12" BIT TO 110', PULLED OUT AND ATTACHED 24" MODIFIED BIT
112		4/5/86 (1500) FLUSHED BORING WITH DRILLING FLUID TO REMOVE CUTTINGS (1535) - ADDED FRESH WATER TO THIN DOWN SUPERCOL GUAR GUM DRILLING FLUID. — CONTINUED TO FLUSH BORING WITH CLEAN WATER FROM WATER TRUCK — BOTTOM OF BORING SOUNDED @ 87' WITH TAPE (SOFT BOTTOM) (1605) INSTALLED 12" AND 2" MACHINE SLOTTED CASING INTO BORING 0-7' NON SLOTTED 7'-87' MACHINE SLOTTED BACKFILLED AROUND CASING WITH FILTER MIXED SAND, REPEATEDLY SOUNDED DEPTH TO SAND DURING BACKFILL				3/5/86 (1500) AT 110' WITH WORN 20" MODIFIED BIT, HEAVY DRILL RIG CHATTER — GRAVELS & COBBLES ACCUMULATED IN PILOT HOLE, LAST 20' - EASIER DRILLING IN BEDROCK
114						
116		4/6/86 (0800) STARTED "AIR-LIFT" DEVELOPMENT OF PUMP WELL				Sheet 5 of 5

THIS BORING LOG IS BASED ON FIELD CLASSIFICATION AND VISUAL SOIL DESCRIPTION, BUT IS MODIFIED TO INCLUDE RESULTS OF LABORATORY CLASSIFICATION TESTS WHERE AVAILABLE. THIS LOG IS APPLICABLE ONLY AT THIS LOCATION AND TIME. CONDITIONS MAY DIFFER AT OTHER LOCATIONS OR TIME.

Converse Consultants, Inc.
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SITE #2
BORING LOG OW-1

83-1140-06
MRTC PUMP TEST
Proj: UNION STATION AREA Date Drilled 2/24-25/86 Ground Elev. 279'

Drill Rig FAILING 1500 ROTARY WASH Logged By EMIR UTUSH Total Depth 94'

Hole Diameter 4 7/8" Hammer Weight & Fall 250# @ 30"

DEPTH	USCS	MATERIAL CLASSIFICATION	SAMPLE	RUN NO.	DRILL MODE	REMARKS
0	FILL (Af)	0-2' GRAVELLY SAND – (FILL)			AD/C	FILL
2	FILL (Af)	2'-7' SILT – (FILL), DARK BROWN GRADING INTO OLIVE GREEN, LITTLE FINE-TO-MEDIUM GRAVEL AND SAND				PIECE OF METAL AT 3.5'
4						
6						
8	SM/ML	7'-9' SANDY SILT, LIGHT OLIVE BROWN, SOME GRAVEL AND FINE SAND. GRADATIONAL FILL CONTACT.				3" SMALL COBBLE
10	SP/GP	9'-28' GRAVELLY SAND/SANDY GRAVEL ANGULAR TO SUBROUNDED GRAVEL WITH MEDIUM TO COARSE SAND. TRACE FINES	C-1		DR	
12	SP/GP	COARSE SAND AND GRAVEL			RD	SET 12.5' OF CASING ADDED ½ BAG OF JOHNSON REVERT STRONG DRILL RIG CHATTER AT 11'
14						
16	SP/GP	MEDIUM TO COARSE SAND LENSE				DRILL RIG CHATTER STOPPED FROM 16-17'
18						
20						

Sheet 1 of 5

Project 83-1140-06 MRTC PUMP TEST Date Drilled 2-24-86 Hole No. SITE #2 OW-1

DEPTH	USCS	MATERIAL CLASSIFICATION	SAMPLE	BLOWS (6")	DRILL MODE	REMARKS
20	GP	SANDY GRAVEL – (CONTINUED) WHITE AND GRAY COBBLES WITH COARSE SAND, TRACE SILT AND CLAY	C-2		DR	
22					RD	SOFT ZONE @ 22'
			C-3		DR	
24					RD	
		▼ GROUND WATER AT 25.7' LEVEL MEASURED @ 1100 A.M. ON 3/3/86				VARIABLE DRILL RIG CHATTER
26	GP/SP					
28	SM/ML	28'-30' FINE SAND AND SILT TRACE CLAY, SLIGHTLY DAMP, DARK GREEN, TRACE ORGANICS	C-4		DR	
30	GP	30'-31' SANDY GRAVEL			RD	DRILL RIG CHATTER AT 30'
	ML AND GP	31'-36' SILT AND SANDY GRAVEL INTERBEDDED LENSES OF SILT AND SANDY GRAVEL, SILT – DARK GREEN, TRACE CLAY; SANDY GRAVEL – COARSE GRAVEL AND SAND, LITTLE FINES IN SANDS, SILT SEAMS	C-5		DR	2" COBBLE FRAGMENT IN DRIVE SAMPLE
32						
34					RD	
36	GP	36'-39.5' SANDY GRAVEL SAND AND GRAVEL WITH COBBLES AND BOULDERS				STRONG DRILL RIG CHATTER AT 36' VERY STRONG DRILL RIG CHATTER AT ~37' – BOULDER?
38			NO RECOVERY		DR	
40	ML	39.5'-40.5' SILT (?) SOFT ZONE			RD	VERY STRONG DRILL RIG CHATTER 39.5'
	GP	40.5'-43.5' SANDY GRAVEL SAND AND GRAVEL WITH COBBLES AND BOULDERS				INCREASING RESISTANCE
42						GASTEL METER READING – NO COMBUSTIBLE GAS AT SURFACE ABOVE DRILLING FLUID
44	GP	43.5'-45.5' SANDY GRAVEL	C-7		DR	

83-1140-06

Project MRTC PUMP TEST Date Drilled 2-24-86 Hole No. SITE #2 OW-1

DEPTH	USCS	MATERIAL CLASSIFICATION	SAMPLE	RUN NO.	DRILL MODE	REMARKS
44	GP	SANDY GRAVEL - CONTINUED MOTTLED WHITE AND GRAY, CLASTS SUBANGULAR TO SUBROUNDED, TRACE SILT WITH CLAY			DR	
46	SP	45.5'-49.5' GRAVELLY SAND LIGHT GRAY AND WHITE, COARSE SAND, TRACE SILT, SOME GRAVEL			RD	STRONG DRILL RIG CHATTER AT 45'
48						
50	SP	49.5'-52.5' SAND GRAY, LITTLE GRAVEL, TRACE SILT, MEDIUM TO COARSE SAND	C-8		DR	
52					RD	VARIABLE DRILL RIG CHATTER AT: 52.5', 53.5', 54'
54	SP GP	52.5'-57.5' SAND SAND WITH INTERBEDDED SANDY GRAVEL LENSES MEDIUM TO COARSE SAND, CLASTS SUBANGULAR TO SUBROUNDED	C-9		DR	
56	SP					
58	GP	57.5'-61.5' GRAVEL GRAVELS WITH SOME MEDIUM TO COARSE SAND			RD	DRILL RIG CHATTER AT 57.5' AND 60'
60		GRADATIONAL CONTACT				DRILL RIG CHATTER AT 61'
62	SM/ML	61.5'-69.5' SAND AND SILT DARK GREEN, FINE SAND AND SILT, TRACE CLAY, TRACE SMALL GRAVEL, H_2S ODOR IN SAMPLE	C-10		DR	LOST DRILLING FLUID CIRCULATION SMELL OF HYDROGEN SULPHIDE IN SAMPLE
64					RD	CAVING - BORING CAVED TO 7'
66						
68						

Project 83-1140-06 MRTC PUMP TEST Date Drilled 2/24-25/86 Hole No. SITE #2 OW-1

DEPTH	USCS	MATERIAL CLASSIFICATION	SAMPLE	RUN NO.	DRILL MODE	REMARKS
68	SP/ML	SAND AND SILT - CONTINUED			RD	
70	SP	69.5-71' SAND GRAY, MEDIUM COARSE, TRACE SMALL GRAVEL	C-11		DR	
72	GP	71'-76.5' SANDY GRAVEL			RD	DRILL RIG CHATTER AT 71'
74		(SP) SAND LENSE AT 74'				DECREASED DRILL RIG CHATTER AT 74' AND 75.5'
76		(SP) SAND LENSE AT 76'				
	SP	76.5'-77.5' GRAVELLY SAND				DRILL RIG CHATTER AT 77.5'
78	GP	77.5'-80.5' SANDY GRAVEL				
80		(SP) AND (GP) SAND AND GRAVEL LENSES				
82	GM/GP	80.5'-84.5' SANDY GRAVEL FINE TO COARSE SAND, SUBROUNDED FINE TO MEDIUM GRAVEL, TRACE BLUISH GRAY SILT AND CLAY	C-12		DR	2-24-86 2-25-86
84		GRADATIONAL CONTACT			RD	
86	TP	84.5'-94.0' BEDROCK - SILTSTONE/CLAYSTONE PUENTE FORMATION, OLIVE GREEN, SOFT, MOIST, INTERBEDDED FINE SAND LAYERS				
88		VERY FINE SAND INTERBEDS THINLY BEDDED TO LAMINATED DIPPING AT APPROX. 40°	NO RECOVERY		DR	
90		STIFF TO VERY STIFF			RD	ADDED 1 SAC (25#) OF REVERT
92			C-14		DR	Sheet 4 of 5

Project 83-1140-06 MRTC PUMP TEST Date Drilled 2/25/86 Hole No. SITE #2 OW-1

DEPTH	USCS	MATERIAL CLASSIFICATION	SAMPLE	RUN NO.	DRILL MODE	REMARKS
92	Tp	BEDROCK - SILTSTONE / CLAYSTONE — CONTINUED — PUENTE FORMATION			RD	
94		END OF BORING 94.0' - FLUSHED BORING - INSTALLED PIEZOMETER 0'-10' NON SLOTTED 2" CASING 10'-89' MACHINE SLOTTED 2" CASING, 0.20" SLOTS, END CAPPED BACKFILLED BORING WITH #3 MONTEREY SAND, 6-100# SACS - FLUSHED PIEZOMETER WITH FRESH WATER. - INSTALLED WELL COVER AND SEALED TOP 4.5' WITH CONCRETE GROUT AND BENTONITE.				
96						
98						
100						
102						
104						
106						
108						
110						
112						
114						
116						

Sheet 5 of 5

THIS BORING LOG IS BASED ON FIELD CLASSIFICATION AND VISUAL SOIL DESCRIPTION, BUT IS MODIFIED TO INCLUDE RESULTS OF LABORATORY CLASSIFICATION TESTS WHERE AVAILABLE. THIS LOG IS APPLICABLE ONLY AT THIS LOCATION AND TIME. CONDITIONS MAY DIFFER AT OTHER LOCATIONS OR TIME.

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SITE #2

BORING LOG O.W.-2

Proj: 83-1140-06 MRTC PUMP TEST UNION STATION AREA Date Drilled 2/25-27/86 Ground Elev. 280'

Drill Rig FAILING 1500 ROTARY WASH Logged By EMIR UTUSH Total Depth 84'

Hole Diameter 4 7/8" Hammer Weight & Fall 250# @ 30"

DEPTH	USCS	MATERIAL CLASSIFICATION	SAMPLE	RUN NO.	DRILL MODE	REMARKS
0	Fill (Af)	0-4' SAND AND GRAVEL - (FILL) WITH DARK BROWN SILT			AD/C	FILL
4	Fill (Af)	4-7' SILT - (FILL) BROWN, DRY, LOOSE SLIGHTLY DAMP LITTLE CLAY BINDER AT 7'				PIECES OF METAL, NAILS, GLASS AND SLAG-LIKE MATERIAL AT 4' LARGE BENT METAL SPIKE AT 5'
8	ML	7-8' SILT - BROWN, SLIGHTLY DAMP, TRACE CLAY, SOFT				
	SP	8-10' SAND - LIGHT BROWN, DAMP, LOOSE TO MEDIUM DENSE, LITTLE FINE GRAVEL, POORLY GRADED	C-1		DR	SET 11.5' OF CASING ADDED JOHNSON REVERT
10	GP	10-16' SANDY GRAVEL BROWN TO LIGHT GRAY. GRAVEL - COARSE, SUB-ROUNDED SAND - POORLY GRADED WITH LITTLE SILT LARGE GRAVEL AT 13'			RD	
16			C-2		DR	POOR RECOVERY
	SP	16'-20.5' GRAVELLY SAND LIGHT BROWN TO SPECKLED YELLOW/GREY, WET, MEDIUM DENSE, POORLY GRADED MEDIUM TO COARSE SAND, MEDIUM GRAVEL TO 3/4", TRACE SILT			RD	
20						

Project 83-1140-06 MRTC PUMP TEST Date Drilled 2/25/86 Hole No. SITE #2 O.W.-2

DEPTH	USCS	MATERIAL CLASSIFICATION	SAMPLE	BLOWS (6")	DRILL MODE	REMARKS
20	SP	GRAVELLY SAND				
		20.5'-24' SANDY GRAVEL			RD	DRILL RIG CHATTER AT 20.5'
	GP GM	LIGHT BROWN WITH GRAY AND YELLOW, MEDIUM TO COARSE GRAVEL, POORLY GRADED SAND, LITTLE SILT				
22						
	ML	25' THIN CLAY SILT SEAM, SOME SAND				
	GP					
24		24'-26.8' SILTY SAND				GROUNDWATER AT 25.9'
	SM	BROWN, MEDIUM DENSE, WET, SOME GRAVEL, TRACE CLAY	C-3		DR	LEVEL MEASURED @ 1158 A.M. ON 3/3/86
26		26.8'-30.2' SAND				CAVING FROM 26' TO 31'
	SP	GRAY, MEDIUM TO COARSE SAND, SOME GRAVEL, TRACE SILT, POORLY GRADED				
28						
		SLIGHT INCREASE IN SILT			RD	
30						INCREASED DRILL RIG CHATTER
	GP	30.2'-30.7' GRAVEL				
		30.7'-37'				SMOOTH
32	GM					
		SANDY GRAVEL				
34		WITH SILT, GRAY, LOOSE TO MEDIUM DENSE	C-4		DR	
	GP					DRILL RIG CHATTER AT 35'
36	GM					
		37'-45' SANDY GRAVEL				
38	GP	COARSE SAND AND GRAVEL COBBLE AND BOULDER ZONES			RD	STRONG DRILL CHATTER AT 38'
40		LENSES OF COBBLES AND BOULDERS — VARIABLE —				STRONG DRILL CHATTER AT 41'
42						STRONG DRILL CHATTER AT 42'
44						

Project 83-1140-06 MRTC PUMP TEST Date Drilled 2/25-26/86 Hole No. SITE #2 O.W.-2

DEPTH	USCS	MATERIAL CLASSIFICATION	SAMPLE	RUN NO.	DRILL MODE	REMARKS
44	GP	SANDY GRAVEL			RD	
	SP	45'-46' GRAVELLY SAND				SLIGHT H_2S ODOR
46	GP	46-51.4 GRAVEL GRAY, WITH SAND AND SOME SILT, COARSE GRAVEL TO COBBLE SIZE CLASTS, COARSE SAND	C-5		DR	
48	GP/SP					CAVING TO 44', STRONG DRILL RIG CHATTER, ADDED ADDITIONAL REVERT TO DRILLING FLUID, BOULDERS AND COBBLES BLOCKING BORING. 2-25-86
50		SANDY GRAVEL COARSE SAND, TRACE FINES			RD	2-26-86
52	SP	51.4'-56' GRAVELLY SAND GRAY, COARSE SAND, POORLY GRADED, LITTLE SILT				CAVING TO 31', BORING BLOCKED, REPOSITIONED BORING ADJACENT TO CAVED HOLE, DROVE CASING TO 32' RESUMED DRILLING ADDED REVERT TO DRILLING FLUID.
54		H_2S ODOR IN SAMPLE				
56	SP	56'-58' SAND GRAY, MEDIUM DENSE, FINE TO MEDIUM SAND, TRACE SILT H_2S ODOR IN SAMPLE	C-6		DR	
58	GP	58'-61' SANDY GRAVEL GRAY				
60					RD	
62	SM/ML	61'-70' SAND AND SILT DARK GREEN TO GRAY, LOOSE TO MEDIUM DENSE, SOME CLAY AND GRAVEL, VERY FINE SAND, TRACE ORGANICS (PLANT ROOTLETS)				
64			C-7		DR	
66					RD	
68						

83-1140-06

Project MRTC PUMP TEST Date Drilled 2/26-27/86 Hole No. SITE#2 O.W.-2

DEPTH	USCS	MATERIAL CLASSIFICATION	SAMPLE	RUN NO.	DRILL MODE	REMARKS
68	ML	SAND AND SILT - CONTINUED -				
70	SP	70'-71' SAND MEDIUM COARSE, LITTLE GRAVEL			RD	
72	GP	71'-72' SANDY GRAVEL COARSE SAND AND GRAVEL, COBBLES AND BOULDERS				STRONG DRILL RIG CHATTER
74						
76			X		DR	NO RECOVERY
					RD	STRONG DRILL RIG CHATTER
78						LOST DRILLING FLUID CIRCULATION MIXED IN ADDITIONAL REVERT
80						CAVING UP TO 32' ADDING ADDITIONAL REVERT
	GM/GP	81'-82' SANDY GRAVEL WITH SILT, LUMPS OF DARK GRAY/GREEN SILT WITH CLAY BINDER				
82	GP	82'-84' SANDY GRAVEL COARSE SAND AND GRAVEL, LITTLE FINES				82' LOSING FLUID ADDED TOTAL 3 SACS OF REVERT, DRILLED TO 84' AND INSTALLED 2" CASING
84		END OF BORING 84.0 (BORING CLOSE TO BEDROCK)				
86		-INSTALLED PIEZOMETER 0-12' NON SLOTTED 2" CASING 12'-81' MACHINE SLOTTED 2" CASING 0.20" SLOTS, END CAPPED				
88		-FLUSHED BORING AND CASING WITH CLEAN WATER (±400 GALLONS), CONTINUED TO FLUSH, WATER NOT RETURNING TO SURFACE - LOST TO FORMATION, PUMPED DOWN ADDITIONAL WATER AND 1 GALLON OF BLEACH (±800 GALLONS)				
90		- BACKFILLED BORING WITH #3 MONTEREY SAND, 8 - 100# SACS - INSTALLED WELL COVER AND SEALED TOP 5' WITH CONCRETE GROUT AND BETONITE,				
92						

THIS BORING LOG IS BASED ON FIELD CLASSIFICATION AND VISUAL SOIL DESCRIPTION, BUT IS MODIFIED TO INCLUDE RESULTS OF LABORATORY CLASSIFICATION TESTS WHERE AVAILABLE. THIS LOG IS APPLICABLE ONLY AT THIS LOCATION AND TIME. CONDITIONS MAY DIFFER AT OTHER LOCATIONS OR TIME.

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SITE #2
BORING LOG O.W.-3

83-1140-06
MRTL PUMP TEST
Proj: UNION STATION AREA Date Drilled 2/28 - 3/1/86 Ground Elev. 280'

Drill Rig FAILING 1500 ROTARY WASH Logged By EMIR OTUSH Total Depth 85'

Hole Diameter 4 7/8" Hammer Weight & Fall 250# @ 30"

DEPTH	USCS	MATERIAL CLASSIFICATION	SAMPLE	RUN NO.	DRILL MODE	REMARKS
0	FILL (Af)	0.0'-8' SILTY SAND BROWN, DRY, LOOSE, BROKEN BRICK FRAGMENTS, TOP 6" ASPHALT AND BASE SUBGRADE			AD	CORED THROUGH ASPHALTIC PAVEMENT FILL
8	ML	8'-11' SANDY SILT SILT WITH VERY FINE SAND, BROWN, LOOSE, TRACE CLAY, POSSIBLE FILL?	C-1		DR RD	SET CASING AND ADDED REVERT TO DRILLING FLUID
12	GP	11'-17' SANDY GRAVEL LIGHT GRAY TO LIGHT BROWN, GRANITIC CLASTS, POORLY GRADED, CLASTS SUBANGULAR TO SUBROUNDED				DRILL RIG CHATTER
18	SP	17-18.4 SAND GRAY TO LIGHT BROWN, LOOSE, WITH SILT AND GRAVEL	C-2		DR RD	DRILL RIG CHATTER AT 19'
	GP	INCREASING GRAVELS				
20	GM	18.4-23 SILTY GRAVEL				

Project 83-1140-06 MRTC PUMP TEST Date Drilled 2/28/86 Hole No. SITE #2 O.W.-3

DEPTH	USCS	MATERIAL CLASSIFICATION	SAMPLE	BLOWS/6"	DRILL MODE	REMARKS
20	GM/SM	18.4'-23' **SILTY SAND AND GRAVEL** SILT WITH COARSE SAND AND GRAVEL, LUMPS OF GRAY/GREEN CLAY	C-3		RD / DR	
22					RD	DRILL RIG CHATTER @ 22'
24	GP	23'-26' **SANDY GRAVEL** SAND AND GRAVEL, POORLY GRADED, COARSE, TRACE SILT	C-4		DR	
26					RD	GROUNDWATER ▼ AT 26.8' — LEVEL MEASURED AT 1050 A.M. ON 3/3/86
28	SP	26'-29' **GRAVELLY SAND** COARSE, POORLY GRADED, LITTLE SILT				
30	GP	29'-30.6' **SANDY GRAVEL** COARSE GRAVEL, SUBANGULAR TO SUBROUNDED				DRILL RIG CHATTER AT 29'
	SM	30.6'-31' SILTY GRAVEL WITH TRACE CLAY				
32	SP	31'-33.5' **SAND** GRAY, MODERATELY GRADED, MEDIUM TO COARSE SAND, SOME FINE SAND, TRACE SILT	C-5		DR	
34	GM	33.5'-43.0' **SANDY GRAVEL** WHITE TO GRAY WITH CLAYEY SILT INCLUSIONS, SOME SILT, POORLY GRADED COARSE SAND			RD	ADDING ADDITIONAL REVERT TO THICKEN FLUID. ROCK FRAGMENTS AND GRAVELS ACCUMULATING IN BOTTOM OF BORING, ATTEMPTING TO FLUSH WITH THICKENED FLUID
36						DRILL RIG CHATTER
38						
40		GRAY, COARSE GRAVEL TO 3"; COARSE SAND WITH SILT, DENSE	C-6		DR / RD	
42						DRILL RIG CHATTER AT 43'
44	GP	43'-47' **SANDY GRAVEL** SOME SILT, COARSE GRAVEL				

83-1140-06
Project MRTC PUMP TEST Date Drilled 2/28/86 Hole No. SITE #2 O.W.-3

DEPTH	USCS	MATERIAL CLASSIFICATION	SAMPLE	RUN NO.	DRILL MODE	REMARKS
44	GP	43'-47' **SANDY GRAVEL** SOME SILT, COARSE GRAVEL			RD	DRILL RIG CHATTER
46						
48	GM	47'-49' **SANDY GRAVEL** WITH SILT, GREEN CLAYEY SILT				
50	SP/SM	49'-52' **SAND** GRAY, DENSE, SOME SILT AND GRAVEL, COARSE TO MEDIUM COARSE SAND, POORLY GRADED.	C-7		DR	
52	GP/SP	52'-61' **SANDY GRAVEL** MIXTURE OF SAND AND GRAVEL, TRACES FINES, OCCASSIONAL LENSES OF GRAVELS AND COBBLES			RD	OCCASSIONAL DRILL RIG CHATTER
54						54' - STRONG DRILL RIG CHATTER
56						
58						VARIABLE DRILL RIG CHATTER
60						
62	SP	61'-64' **SAND** GRAY, MEDIUM COARSE SAND, SOME GRAVEL, TRACE FINES	C-8		DR	LOOSE SAMPLE
	GP	OCCASSIONAL GRAVEL/COBBLE LENSES			RD	
64	SM/ML	64'-69' **SAND AND SILT** DARK GRAYISH GREEN, FINE SAND AND SILT, POORLY GRADED, TRACE ORGANICS (PLANT ROOTLETS), TRACE GRAVEL.	C-9		DR	
66					RD	
68						

Project 83-1140-06 MRTC PUMP TEST Date Drilled 2/28 - 3/1/86 Hole No. SITE #2 O.W.-3

DEPTH	USCS	MATERIAL CLASSIFICATION	SAMPLE	RUN NO.	DRILL MODE	REMARKS
68	SM/ML	64'-69' SAND AND SILT DARK GREEN TO GRAY, FINE SAND, LITTLE GRAVEL				
	GP	69'-71' SANDY GRAVEL				DRILL RIG CHATTER
70					RD	
	SP	71'-74' SAND GRAY, COARSE SAND LITTLE GRAVEL				
72						
74						DRILL RIG CHATTER
	GP	74'-84' GRAVEL COARSE GRAVEL TO 2", WITH MEDIUM TO COARSE SAND, TRACE SILT, GRAY COLOR	C-10		DR	
76						STARTED LOSING DRILLING FLUID TO FORMATION, MIXING IN ADDITIONAL REVERT
78					RD	2/28/86
						3/1/86 CAVING TO 72', MIXED ADDITIONAL REVERT, BOTTOM OF BORING CAVING
80		SANDY GRAVEL SUBROUNDED TO WELL ROUNDED PEBBLES				
82						
						DRILLED TO 85' AND INSTALLED CASING
84	TP	84'-85' BEDROCK - PUENTE FORMATION OLIVE GRAY SILTSTONE/CLAYSTONE				
		END OF BORING 85'				
86		- INSTALLED PIEZOMETER 0-10' NON SLOTTED 2" PVC CASING 10'-78.5' MACHINE SLOTTED 2" CASING 0.20" SLOTS, END CAPPED				
88		- FLUSHED CASING AND BORING WITH CLEAN WATER (±1800 GALLONS WITH ±650 GALLONS RETURNING) RETURN FLUID REDUCED AS BORING WAS FLUSHED. ADDED ½ QUART BLEACH.				
90		- BACKFILLED BORING WITH #3 MONTEREY SAND - INSTALLED WELL COVER AND CASING TOP 2.5', SEALED TOP 5' WITH CONCRETE GROUT AND BENTONITE				
92						Sheet 4 of 4

SITE #2
OBSERVATION WELL #4

Converse Consultants

Boring Log 5-5 (1983)

THIS LOG IS APPLICABLE ONLY AT THIS LOCATION AND TIME.
CONDITIONS MAY DIFFER AT OTHER LOCATIONS OR TIME.

PROJECT SCRTD - Union Sta. DATE DRILLED 2/1/83 HOLE NO. 5-5
LOCATION Loading Dock at Int: Vignes & Railing? Sts GROUND ELEV. 280.8'
DRILLING CONTRACTOR Converse - Las Vegas LOGGED BY R. Ingram DEPTH TO GROUND WATER 27.9
TYPE OF RIG _____ HOLE DIAMETER 4¾" HAMMER WEIGHT AND FALL 320# , 36" (2-8-82)
SURFACE CONDITIONS A.C. Parking Area TOTAL DEPTH 100.0 NO. CORE BOXES _____

DEPTH	CLASS.	FIELD DESCRIPTION	SAMPLE	SPT (16")	DRILL MODE	RUN NO.	CORE REC. %	REMARKS
0.0		0.0 - 0.3 · ASPHALT PAVEMENT			RD			SET UP 2:45 PM 1/31
	ML & SM	0.3 - 5.5 · FILL · SANDY SILT & SILTY SAND		16	SPT			BEGIN DRILLING 7:15 AM
2.0				25				WEATHER: CLEAR, WARM 2/1/82
				57				
		MOTTLED & INTERMIXED MOIST, STIFF / M. DENSE W/ BRICK DEBRIS			RD			DRILLED TO 5' WITH 7" BIT FOR PIEZO INSTALLATION. 4¾" BIT BELOW
4.0								
			5-1 3K		CCI DR			
6.0	SM	YOUNG ALLUVIUM			RD			CONTACT CONTAINED WITHIN SAMPLE
		5.5 - 11.0 · SILTY SAND						
		GRAY-BRN., MOIST, MED. DENSE FINE TO V. FINE SAND - 70% 30% SILT						
8.0								
10.0				10	SPT			
				12				
	SP	11.0 - 14.0 · SAND		25				
		GRAY-BRN, MOIST, M. DENSE TO DENSE POORLY GRADED FINE SAND W/ TRACE SILT			RD			
12.0								
14.0	SW	14.0 - 62.0 · GRAVELLY SAND						
		BROWN, DENSE WELL GRADED - MED TO COARSE CLEAN SAND - 70%, GRAVEL TO 2" - 30% SUBANGULAR TO SUBROUNDED GRAINS, GRANITIC COMP.	5-2 50K		CCI DR			GRAVELLY - DISTURBED SAMPLE
16.0					RD			
18.0								
20.0								

SHEET 1 OF 6

SITE #2
OBSERVATION WELL #4

PROJECT SCRTD - UNION STA. DATE DRILLED 2/1/83 HOLE NO. 5-5 (1983)

DEPTH	CLASS.	FIELD DESCRIPTION	SAMPLE	SPT (6")	DRILL MODE	RUN NO.	CORE REC. %	REMARKS
20.0	SW	14.0-62.0 GRAVELLY SAND (CONTINUED)	5" RECOVERY	100	SPT RD			
22.0								
24.0								
		25.5-26.0 - LENSE OF FINE SAND IN SAMPLE	S-3 36K		CCI OR RD			
26.0								
28.0								
30.0		30.0 COLOR CHANGE TO DK. GRAY INCREASED MAFIC CONTENT: GRANITIC/DIORITIC COMP.	3" RECOVERY	75/100	SPT RD			SLIGHT GAS ODOR
32.0								
34.0								
			S-4 40K		CCI OR RD			SLIGHT GAS ODOR. GRAVELLY SAMPLE - ONLY 5 GOOD RINGS
36.0								
38.0								
40.0			J-1 7" RECOVERY	25/75/100	SPT RD			
42.0								
44.0								

SHEET 1 OF 6

SITE #2
OBSERVATION WELL #4

PROJECT SCRTD - UNION STA. DATE DRILLED 2/1/83 HOLE NO. 5-5 (1983)

DEPTH	CLASS.	FIELD DESCRIPTION	SAMPLE	SPT (6")	DRILL MODE	RUN NO.	CORE REC. %	REMARKS
44.0		14.0 - 62.0 GRAVELLY SAND (CONTINUED)			RD			
46.0								
48.0								
50.0					CCI DR			SULPHUR ODOR
			75K		RD			POOR SAMPLE RECOVERY - REMAINING SAMPLE DESTROYED IN HANDLING
52.0								
54.0								
		GRAD. DECREASING GRAVEL CONTENT						
56.0								
58.0								
60.0			5-5		CCI DR			SLIGHT SULPHUR ODOR
			50K		RD			
62.0	SP	62.0 - 78.0 SAND						
		DARK GRAY, DENSE POORLY GRADED UNIFORM FINE TO VERY FINE GRAINED MICACEOUS						
64.0								
66.0								
68.0								

SHEET 3 OF 6

SITE #2
OBSERVATION WELL #4

PROJECT SCRTD - UNION STA. DATE DRILLED 2/1/83 HOLE NO. 5-5 (1983)

DEPTH	CLASS.	FIELD DESCRIPTION	SAMPLE	SPT (6")	DRILL MODE	RUN NO.	CORE REC. %	REMARKS
66.0	SP	62.0-78.0 SAND (CONTINUED)			RD			
70.0			S-6 50K		CCI DR			STRONGER SULPHUR ODOR. POOR SAMPLE RECOVERY: 4½ RINGS ONLY
					RD			
72.0								
74.0								
76.0								
78.0		78.0-90.0 BOULDERS						78.0 - CHANGE IN DRILLING CONDITIONS - V. HARD DRILLING, FULL WT. OF RIG (10 TON) ON BIT. TOO HARD TO SAMPLE TO 90.0'
		CUTTINGS: MED. TO COARSE SUBANGULAR GRAINS GRANITIC COMPOSITION						
80.0			60K-1" REFUSAL		CCI DR RD			NO SAMPLE RECOVERY
82.0								
84.0								
			100K-0" REFUSAL		RD			ATTEMPTED TO SAMPLE - UNSUCCESSFUL
86.0								
			J-2 CUTTINGS					JAR SAMPLE OF CUTTINGS TAKEN
88.0								
90.0	CL	PUENTE FORMATION 90.0-100.0 CLAYSTONE						EASY DRILLING FROM 90.0' CLAYSTONE CUTTINGS OBTAINED
		(SEE NEXT PAGE)						
92.0								

SITE #2
OBSERVATION WELL #1

PROJECT SCRTD - UNION STA DATE DRILLED 2/1/83 HOLE NO. 5-5 (1983)

DEPTH	CLASS.	FIELD DESCRIPTION	SAMPLE	SPT (6")	DRILL MODE	RUN NO.	CORE REC. %	REMARKS
92.0	CL	90.0-100.0 CLAYSTONE (CONTINUED)			RD			
94.0		OLIVE-GRAY COLOR, MOIST.						
		PLASTIC TO FRIABLE STRENGTH,						
		SOFT FRIABLE HARDNESS,						
96.0		THINLY LAMINATED W/						
		SILTY CLAYSTONE - 20%.						
		SANDSTONE BLEBS.						
		TENDS TO FRACTURE						
98.0		ALONG LAMINATIONS						
			5-7		CCI			
100.0			SOK		DR			
		END BORING 100.0 FT						
		PIEZOMETER SET TO 100'						
		PERFORATED IN LOWEST 40'						

SITE #2 — OBSERVATION WELL #

SUMMARY BORING NO. 5-5 (1983)

PROJECT SCRTD STATION HOLE UNION STA. DATE DRILLED 2/1/83.

OVERBURDEN DEPTH (FT.) 0.0 TO 90.0.

BEDROCK DEPTH (FT.) 90.0 TO 100.0 (T.D.).

WATER PRESS. TEST No; INTERVAL(S) — TO —, — TO —.

GROUND WATER DEPTH (FT.) 28.0' DATE 2/3/83; 27.9 DATE 2/8/83.

GAS YES; DEPTH FIRST NOTICED 30', DATE —. (SULPHUR ODOR)

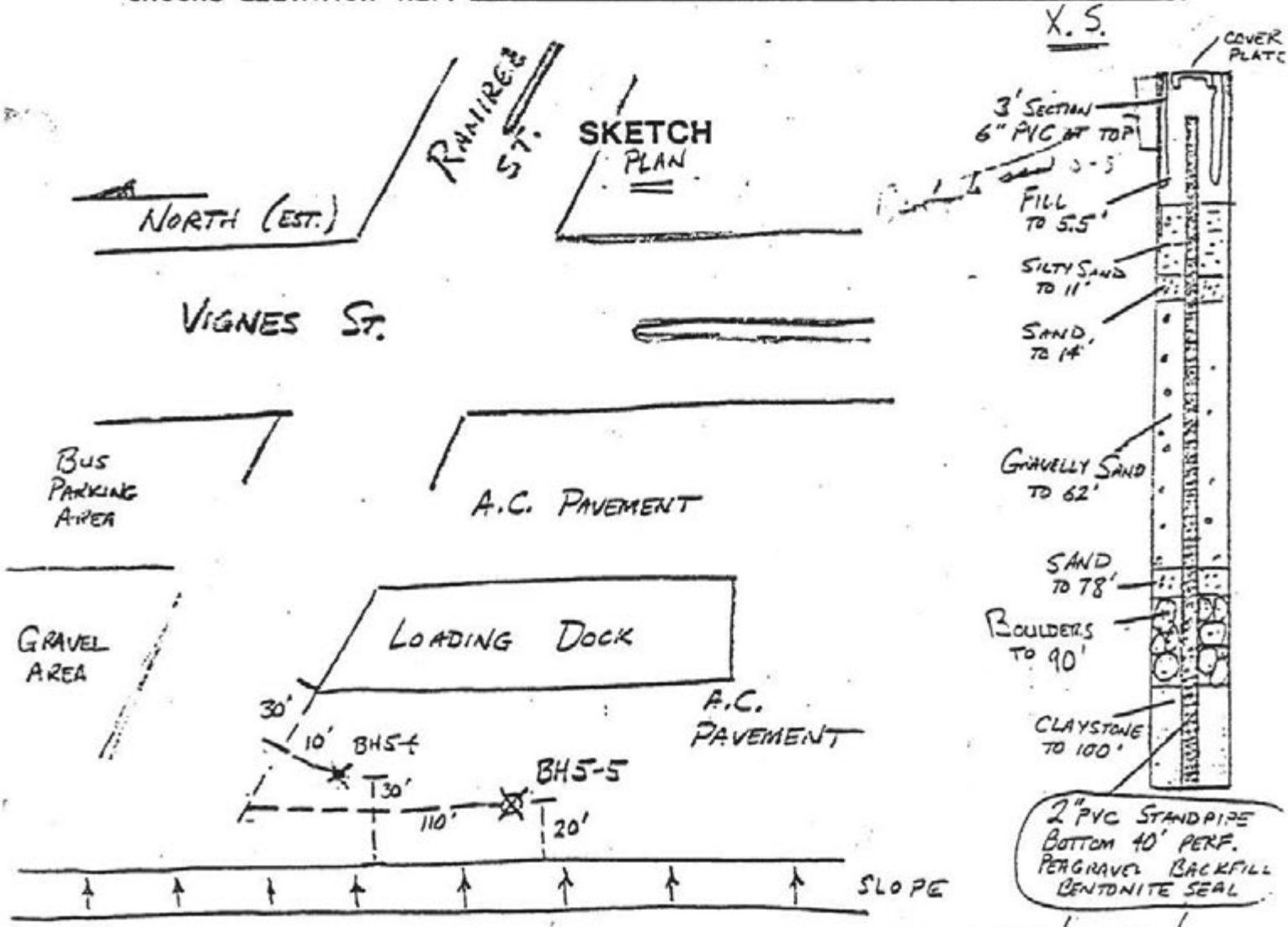
E-LOG No.

DOWN-HOLE SURVEY No.

CROSS-HOLE SURVEY No.

PVC CASING (I.D.): 4" — TO —; 3" — TO —; 2" 0.4 TO 100.0.

GROUND ELEVATION REF. —



1983 UNION STATION BORING LOGS

DESIGN UNIT A135

BORING LOGS FOR HOLE NUMBERS 5-2, 5-3 and 5-4

Converse Consultants

Boring Log 5-2

THIS LOG IS APPLICABLE ONLY AT THIS LOCATION AND TIME.
CONDITIONS MAY DIFFER AT OTHER LOCATIONS OR TIME.

PROJECT SCRTD - UNION STATION DATE DRILLED 2/3/82 HOLE NO. 5-2
LOCATION BETWEEN TRACKS & BAGGAGE BUILDING GROUND ELEV. 292.7'
DRILLING CONTRACTOR CONVERSE-LAS VEGAS LOGGED BY B. INGHRAM DEPTH TO GROUND WATER
TYPE OF RIG HOLE DIAMETER 4¾" HAMMER WEIGHT AND FALL 320 #, 36"
SURFACE CONDITIONS A.C. / CONCRETE PAVED AREA TOTAL DEPTH 85.0' NO. CORE BOXES

DEPTH	CLASS.	FIELD DESCRIPTION	SAMPLE	SPT (6")	DRILL MODE	RUN NO.	CORE REC. %	REMARKS
0.0		0.0 - 0.4' CONCRETE SLAB			RD			SET UP 7:00 AM
		0.4 - 0.8' BASE COURSE						BEGIN DRILLING 7:30 AM
	ML & CL	0.8 - 14.0' FILL - CLAYEY SILT AND SILTY CLAY	2-1		CORE DR			WEATHER: OVERCAST, COOL
2.0		MOTTLED BRN & GREEN-GRAY, MOIST, STIFF, W/ TRACE GRAVEL AND 10% FINE SAND	BK		RD			
4.0								
6.0								
8.0								
10.0				8	SPT			
				11				
12.0				24				
					RD			
		13.0' - ROCK OR CONCRETE ENCOUNTERED		100+ REFUSAL	SPT			TRIED TO SAMPLE WITH SPT - COULD NOT DRIVE,
14.0	SM	YOUNG ALLUVIUM						
		14.0 - 19.0 SILTY SAND						
16.0		GRAY - BRN, MOIST, MED. DENSE FINE TO V. FINE SAND W/ 20% SILT		6	SPT			
				7				
				14				
18.0					RD			
	SW	19.0 - 72.0 GRAVELLY SAND						
20.0		(SEE NEXT PAGE)						

SHEET 1 OF 5

PROJECT SCRTD - Union Station DATE DRILLED 2/3/83 HOLE NO. 5-2

DEPTH	CLASS.	FIELD DESCRIPTION	SAMPLE	SPT (6")	DRILL MODE	RUN NO.	CORE REC. %	REMARKS
20.0	SW	17.0 - 72.0 GRAVELLY SAND (CONTINUED) GRAY, DENSE WELL GRADED - MED. TO COARSE SAND, GRAVEL TO 2"+, PERCENTAGES VARYING WITH DEPTH GRANITIC COMPOSITION	2-2		CCI DR			DISTURBED SAMPLE - 4 RINGS ONLY
			25K		RD			
22.0								
24.0								
26.0								
28.0								
30.0				70	S P T			RUSTY STAINED GRAINS IN SAMPLE - OXYDIZING ENVIRONMENT
			3" REFUSAL	100	RD			
32.0								
34.0								
36.0								
38.0		INCREASING CONTENT OF FINE & V. FINE GRAINED SAND						
40.0					CCI DR			NO SAMPLE RECOVERY
			50K		RD			
42.0								
44.0								

PROJECT SCRTD - Union Station DATE DRILLED 2/3/83 HOLE NO. 5-2

DEPTH	CLASS.	FIELD DESCRIPTION	SAMPLE	SPT (6")	DRILL MODE	RUN NO.	CORE REC. %	REMARKS
44.0	SW	19.0 - 72.0 GRAVELLY SAND (CONTINUED)			RD			
		COLOR CHANGE OBSERVED - TO DK. GRAY	2-3 75K		CCI DR			SLIGHT SULPHUR ODOR, GRAY SAMPLE - REDUCING ENVIRONMENT
46.0					RD			POOR SAMPLE RECOVERY - 4 DISTURBED RINGS ONLY
48.0								
50.0								
52.0								
54.0								
			80K		CCI DR			NO SAMPLE RECOVERY
56.0					RD			
58.0								
60.0			75K		CCI DR			NO SAMPLE RECOVERY
					RD			
		GRAVEL CONTENT DECREASES W/ DEPTH ↓						
62.0								
64.0								
			5" REFUSAL	100	SPT			
66.0					RD			
68.0								

PROJECT SCRTD - UNION STATION DATE DRILLED 2/3/83 HOLE NO. 5-2

DEPTH	CLASS.	FIELD DESCRIPTION	SAMPLE	SPT (6")	DRILL MODE	RUN NO.	CORE REC. %	REMARKS
68.0	SW	19.0-72.0 GRAVELLY SAND (CONTINUED)			RD			
70.0		DECREASING GRAVEL CONTENT	2-4 60K		CCI DR			SLIGHT SULPHUR ODOR
					RD			
72.0	SP	72.0-83.0 SAND						EASIER DRILLING
		DARK GRAY, DENSE, POORLY GRADED PREDOM. MED GRAINED TRACE GRAVEL TO 2"						
74.0			5"	100	SPT			SULPHUR ODOR
					RD			
76.0								
		SAND BECOMES MORE FINE-GRAINED						
78.0								
		FINE TO V. FINE GRAINED						
80.0			2-5 50K		CCI DR			SULPHUR ODOR DISTURBED SAMPLE ONLY 5 RINGS
		THIN LENSES OF SILTY SAND			RD			
82.0								
		83.0-84.0 BOULDERS						HARD DRILLING
		GRANITIC-TYPE CUTTINGS	50K-0" REFUSAL		CCI			TRIED TO SAMPLE - COULD NOT DRIVE SAMPLER
84.0		END BORING 84.0 FT						

SUMMARY BORING NO. 5-2

PROJECT SCRTD STATION HOLE UNION STATION DATE DRILLED 2/3/83.

OVERBURDEN DEPTH (FT.) 0.0 TO 84.0 (T.D.)

BEDROCK DEPTH (FT.) — TO — (~~T.D.~~).

WATER PRESS. TEST No; INTERVAL(S) — TO —, — TO —.

GROUND WATER DEPTH (FT.) — DATE —; — DATE —. ROTARY WASH BORING - COULD NOT DETERMINE

GAS YES; DEPTH FIRST NOTICED 45', DATE 2/3/83. - SULPHUR ODOR

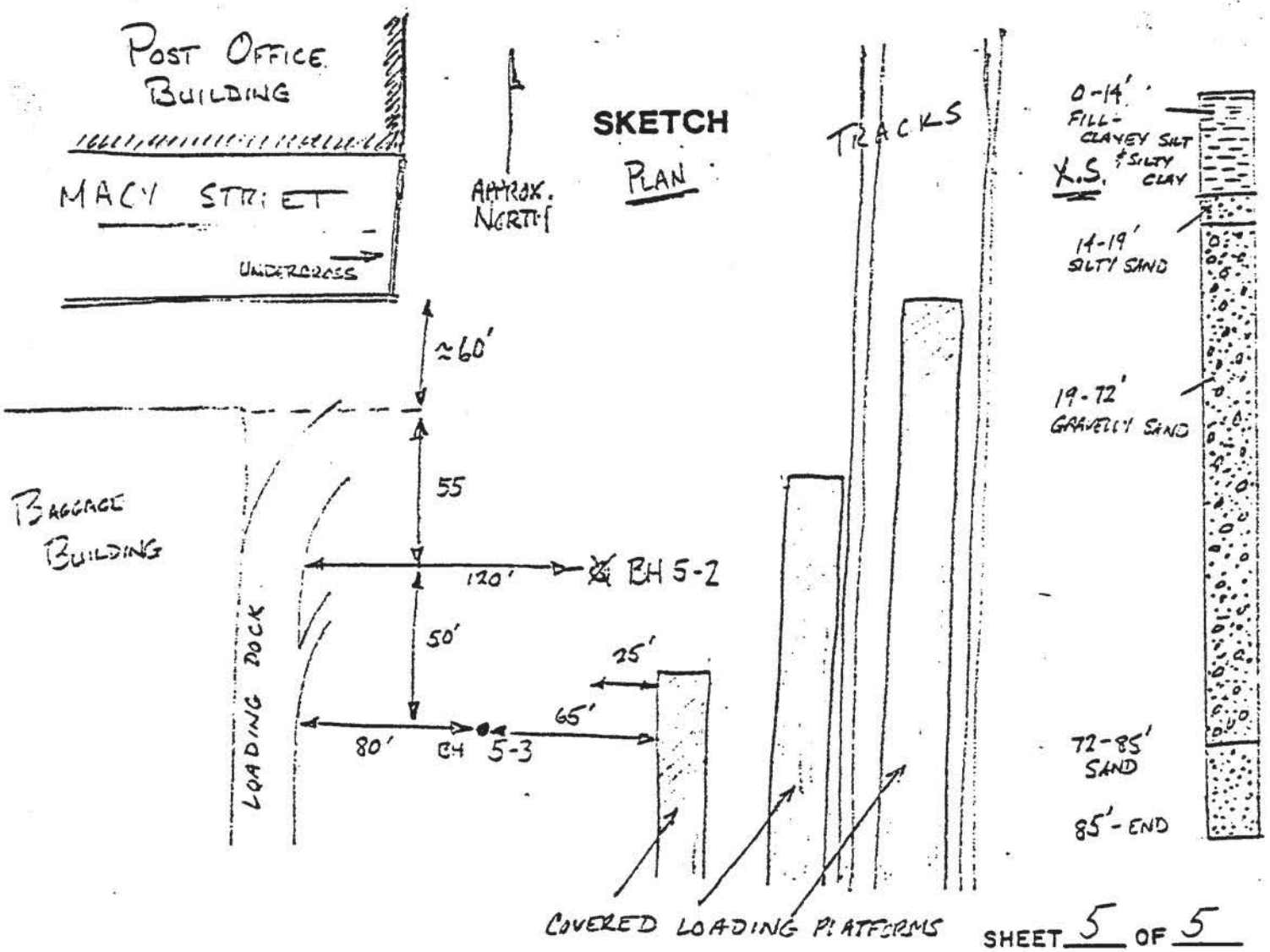
E-LOG No.

DOWN-HOLE SURVEY No.

CROSS-HOLE SURVEY No.

PVC CASING (I.D.): 4" NONE TO —; 3" — TO —; 2" — TO —.

GROUND ELEVATION REF. —



SHEET 5 OF 5

Converse Consultants

Boring Log 5-3

THIS LOG IS APPLICABLE ONLY AT THIS LOCATION AND TIME.
CONDITIONS MAY DIFFER AT OTHER LOCATIONS OR TIME.

PROJECT SCRTD - UNION STATION DATE DRILLED 2/2/83 HOLE NO. 5-3
LOCATION BETWEEN TRACKS & BAGGAGE BLDG. GROUND ELEV. 292.8'
DRILLING CONTRACTOR CONVERSE - LAS VEGAS LOGGED BY B. INGHRAM DEPTH TO GROUND WATER
TYPE OF RIG HOLE DIAMETER 4¾" HAMMER WEIGHT AND FALL 320#, 36"
SURFACE CONDITIONS A.C. PAVED AREA TOTAL DEPTH 80.0' NO. CORE BOXES

DEPTH	CLASS.	FIELD DESCRIPTION	SAMPLE	SPT (6")	DRILL MODE	RUN NO.	CORE REC. %	REMARKS
0.0		0.0 - 0.8' ASPHALT PAVEMENT			RD			SET UP 7:00 AM
	GW	0.8 - 4.6' FILL - GRAVEL						BEGIN DRILLING 7:30 AM
		WELL GRADED GRAVEL			CC: DR			WEATHER: COOL, RAINING
2.0		TO 2½", COMPOSITION VARIABLE	20K					NO SAMPLE RECOVERY
		SUBANGULAR TO SUBROUNDED			RD			
4.0								LOST CIRCULATION OF DRILLING FLUID
	ML	4.6 - 14.0 CLAYEY SILT						
		GREEN-GRAY, MOIST,	3-1		CC: DR			
6.0		STIFF CONSISTENCY	15K					
		VARIABLE SAND CONTENT			RD			
		(LOCALLY 3 - 20%)						
8.0								
		TO VERY STIFF CONSISTENCY						
10.0				15	S			
				25	P			
				45	T			
12.0					RD			
14.0	SM	YOUNG ALLUVIUM						
		14.0 - 19.0 SILTY SAND		20	S			
		GRAY-BROWN, MOIST,		13	P			
16.0		MED. DENSE.		20	T			
		FINE TO V. FINE SAND			RD			
		WITH 20% SILT						
18.0								
	SW	19.0 - 74.0 GRAVELLY SAND						
20.0		(SEE NEXT PAGE)						

SHEET 1 OF 5

PROJECT SCRTD - UNION STA. DATE DRILLED 2/2/83 HOLE NO. 5-3

DEPTH	CLASS.	FIELD DESCRIPTION	SAMPLE	SPT (6")	DRILL MODE	RUN NO.	CORE REC. %	REMARKS
20.0	SW	19.0 - 74.0 GRAVELLY SAND (CONTINUED) BROWN, VERY DENSE, WELL GRADED - MED. TO COARSE SAND (70%), GRAVEL TO 3"+ (30%) SUBANGULAR TO SUBROUNDED GRAINS, GRANITIC COMP. ALTERNATING SAND & GRAVEL STRATA	37K		CCI DR / RD			NO SAMPLE RECOVERY
22.0								
24.0								24-28' INTERMITTENT RIG CHATTER
26.0								
28.0								
30.0			20K	9"	CCI DR / RD			POOR SAMPLE RECOVERY LARGE GRAVEL - SAMPLE DESTROYED BY HANDLING
32.0								
34.0								
36.0								
38.0								
40.0		CHANGE OF SAMPLE COLOR TO DARK GRAY	57K		CCI DR / RD			SULPHUR ODOR LARGE GRAVEL IN SAMPLE - SAMPLE DESTROYED BY HANDLING
42.0								RIG CHATTER AT 43'
44.0								

PROJECT SCRTD - UNION STA. DATE DRILLED 2/2/83 HOLE NO. 5-3

DEPTH	CLASS.	FIELD DESCRIPTION	SAMPLE	SPT (6")	DRILL MODE	RUN NO.	CORE REC. %	REMARKS
44.0	SW	19.0-74.0 GRAVELLY SAND (CONTINUED)			RD			
46.0								
48.0								
50.0			3-2 41K		CCI DR			SULPHUR ODOR IN SAMPLE
		ALTERNATING SAND AND GRAVEL STRATA			RD			
52.0								
								53' INTERMITTENT RIG CHATTER TO 58'
54.0								
56.0								
58.0								
60.0			82K		CCI DR			SLIGHT SULPHUR ODOR IN SAMPLE
					RD			POOR RECOVERY - SAMPLE DESTROYED BY HANDLING
62.0								
64.0		LESS GRAVEL, LENSES FURTHER APART						
66.0								
68.0								

PROJECT SCRTD - UNION STA DATE DRILLED 2/2/83 HOLE NO. 5-3

DEPTH	CLASS.	FIELD DESCRIPTION	SAMPLE	SPT (6")	DRILL MODE	RUN NO.	CORE REC. %	REMARKS
68.0	SW	19.0 - 74.0 GRAVELLY SAND (CONTINUED)			RD			
70.0		(SAND STRATA SAMPLED)	3-3 85K		CCI DR			SLIGHT SULPHUR ODOR IN SAMPLE
72.0					RD			
74.0	SP	74.0 - 80.0 SAND						74' EASIER DRILLING
76.0		DARK GRAY, MED. DENSE TO DENSE; POORLY GRADED, UNIFORM FINE TO V. FINE GRAINED, MICACEOUS						
78.0		SILTY SAND LENSES						
			3-4 35K		CCI DR			SULAHUR ODOR IN SAMPLE
80.0		END BORING 80.0 FT						

SUMMARY BORING NO. 5-3

PROJECT SCRTD STATION HOLE UNION STATION DATE DRILLED 2/2/83.

OVERBURDEN DEPTH (FT.) 0.0 TO 80.0 (T.D.)

BEDROCK DEPTH (FT.) — TO — ~~(T.D.)~~.

WATER PRESS. TEST No; INTERVAL(S) — TO —, — TO —.

GROUND WATER DEPTH (FT.) — DATE —; — DATE —. ROTARY WASH BOILING - COULD NOT DETERMINE

GAS Yes; DEPTH FIRST NOTICED 40', DATE 2/2/83. - SULPHUR ODOR

E-LOG No.

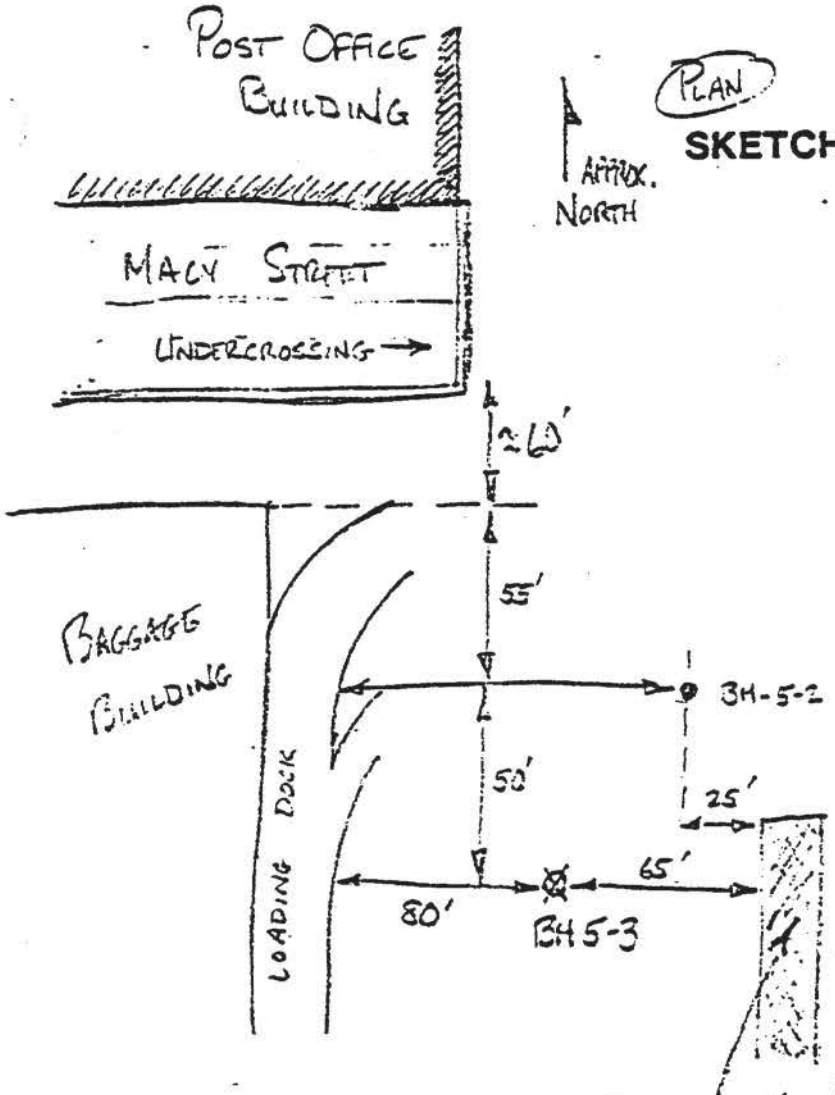
DOWN-HOLE SURVEY No.

CROSS-HOLE SURVEY No.

PVC CASING (I.D.): 4" — TO NONE; 3" — TO —; 2" — TO —.

GROUND ELEVATION REF. —.

PLAN SKETCH



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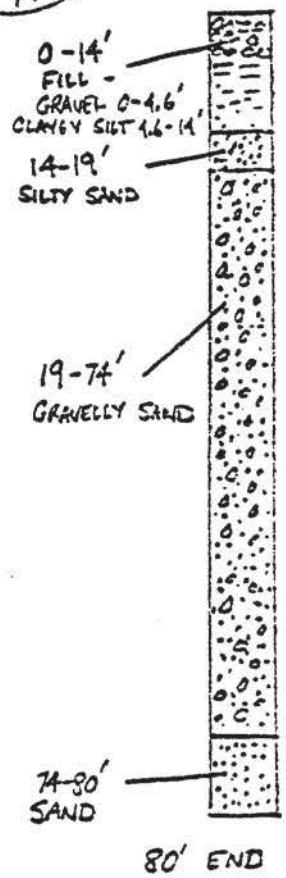


Converse Consultants

Boring Log 5-4

THIS LOG IS APPLICABLE ONLY AT THIS LOCATION AND TIME.
CONDITIONS MAY DIFFER AT OTHER LOCATIONS OR TIME.

PROJECT SCRTD DATE DRILLED 1/31/83 HOLE NO. 5-4
LOCATION Loading Dock, Int. Vignes & Ramirez Streets GROUND ELEV. 29?.6'
DRILLING CONTRACTOR Converse - Las Vegas LOGGED BY B. Ingram DEPTH TO GROUND WATER
TYPE OF RIG HOLE DIAMETER 4¾" HAMMER WEIGHT AND FALL 320#, 36"
SURFACE CONDITIONS A.C. Parking Area TOTAL DEPTH 80.0' NO. CORE BOXES

DEPTH	CLASS.	FIELD DESCRIPTION	SAMPLE	SPT (6")	DRILL MODE	RUN NO.	CORE REC. %	REMARKS
0.0		0.0 - 0.3 Asphalt Pavement			RD			Begin Drilling 8:15AM
	ML	0.3 - 3.5 **Fill - Sandy Silt**						Weather: clear, warm
		Dark Brn, Moist, Stiff	4-1		CCI DR			
2.0		Silt - 50%, Fine to Med. Sand 40%, 10% Gravel & Brick Chunks	16K		RD			
		2.5 - 4.0 Concrete Block						
4.0	SM	- Young Alluvium -						
		4.0 - 7.0 **Silty Sand**						
		Gray - Brn, Moist, Dense	J-1	30	S			
6.0		Fine to Very Fine - 70%, Silt - 30%		18	P			
				24	T			
					RD			
	SP	7.0 - 12.0 **Sand**						
8.0		Gray, Moist, Dense. Clean, Uniform Fine Sand						
10.0			4-2		CCI DR			
			17K					
					RD			
12.0		Becomes coarser: to Med. Grained						
14.0								
				5	S			
16.0			J-2	4	P			
				11	T			
					RD			
18.0	SW	18.0 - 28.0 **Gravelly Sand**						
		Brn / Gray / Wht, Moist, Dense Med. to Coarse Clean Sand - 60%, Gravel to 2" - 40%; Subrounded to Subangular Grains; Granitic / Crystalline Composition						
20.0								

PROJECT SCRTD - UNION STA. DATE DRILLED 1/31/83 HOLE NO. 5-4

DEPTH	CLASS.	FIELD DESCRIPTION	SAMPLE	SPT (6")	DRILL MODE	RUN NO.	CORE REC. %	REMARKS
20.0	SW	18.0-28.0 GRAVELLY SAND (CONTINUED)	A-3 75K		CCI DR			HIGHLY DISTURBED SAMPLE DUE TO LG. GRAVEL PECES IN SAMPLE BARREL
22.0					RD			
24.0								
			5" REFUSAL	100	SPT RD			
26.0								
28.0	SP/CL	25.0-41.0' SAND/SILTY CLAY GRAY, MOIST, DENSE CLEAN SAND; INTERBEDS OF DARK GRAY, STIFF, MOIST SILTY CLAY TO 31.5'						
30.0			44 55K		CCI DR RD			
32.0	SP	31.5' END CLAY INTERBEDS						
34.0								
			J-3	57 55 70	SPT			
36.0					RD			
38.0								
40.0			30K 0" REFUSAL					NO SAMPLE RECOVERY
	SW	41.0-68.0 GRAVELLY SAND DARK GRAY, VERY DENSE SUBROUNDED GRAINS, WELLGRADED V. FINE TO COARSE SAND - 75% GRAVEL TO 1" - 25% HIGHLY MICACEOUS - DIORITIC COMPOSITION						
42.0								
44.0								

PROJECT SCRTD - UNION STA. DATE DRILLED 1/31/83 HOLE NO. 5-4

DEPTH	CLASS.	FIELD DESCRIPTION	SAMPLE	SPT (6")	DRILL MODE	RUN NO.	CORE REC. %	REMARKS
44.0	SW	41.0-68.0 GRAVELLY SAND (CONTINUED)			RD			
				75	SPT			
46.0			5"-	78				
				100	RD			
48.0								
50.0			4-5		CCI DR			4 RINGS ONLY
		50.5' CLAY INTERBEDS DECREASING GRAVEL (TO ≈ 15%)	70K		RD			SULPHUREOUS ODOR IN SAMPLE
52.0								
54.0								
			3"-	100	SPT			SULPHUREOUS ODOR
56.0			REFUSAL		RD			
58.0								
60.0			4-6		CCI DR			SULPHUR, HYDROTHERMAL ODOR
			15K-9"		RD			
62.0								
64.0								
				105	SPT			SULPHUR ODOR
66.0			1"-	50				
					RD			
68.0								

SHEET 3 OF 5

PROJECT SCRTD - UNION STA. DATE DRILLED 1/31/83 HOLE NO. 5-4

DEPTH	CLASS.	FIELD DESCRIPTION	SAMPLE	SPT (6")	DRILL MODE	RUN NO.	CORE REC. %	REMARKS
68.0	SP	68.0 - 75.0 SAND GRAY, DENSE UNIFORM MICACEOUS FINE TO VERY FINE GRAINED			RD			
70.0			T-7 25K		CCI DR RD			SULPHUR / HYDROTHERMAL ODOR IN SAMPLE
72.0								
74.0								
75.0	SW	75.0 - 80.0 GRAVELLY SAND 20% GRAVEL TO 1½" GRAY, DENSE TO V. DENSE						
76.0								
78.0								
80.0			T-8 75K		CCI DR			STOP DRILLING 2:30 PM
		END BORING 80.0 FT						

SHEET 4 OF 5

SUMMARY BORING NO. 5-4

PROJECT 83-1101-41 STATION HOLE UNION STA. DATE DRILLED 1/31/83.

OVERBURDEN DEPTH (FT.) 0.0 TO 80.0 (T.D.)

BEDROCK DEPTH (FT.) NOT ENCOUNTED TO ~~(T.D.)~~.

WATER PRESS. TEST No; INTERVAL(S) — TO ——, —— TO ——.

GROUND WATER DEPTH (FT.) ROTARY WASH - COULD NOT DETERMINE DATE ——; —— DATE ——.

GAS Yes; DEPTH FIRST NOTICED 50', DATE 1/31. - SULFUR ODOR

E-LOG No.

DOWN-HOLE SURVEY No.

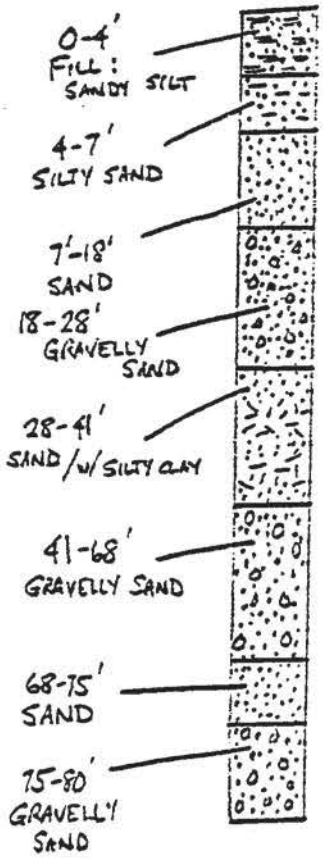
CROSS-HOLE SURVEY No.

PVC CASING (I.D.): 4" — (NONE) TO ——; 3" — TO ——; 2" — TO ——.

GROUND ELEVATION REF. ——.

PLAN SKETCH

X.S.



SHEET 5 OF 5

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