DRILLING COMPANY/DRILLING EQUIPMENT		BORING NO.
C & L Drilling / Mayhew 1000		**G-110 (Continued)**
DRILLING METHOD	**BOREHOLE LOCATION**	
Rotary Wash	Sta 450+30, Lt 20 feet	
DATES DRILLED	**HOLE DIAMETER**	**GROUND EL.**
4/28/2011 - 5/2/2011	4-7/8 inches	212 feet

GROUND-WATER READINGS
Drilling mud bailed on 4/29/2011. Ground-water level measured at 31 feet below the ground surface on 5/2/2011.

ELEVATION (ft)	DEPTH (ft)	"N" VALUE STD.PEN.TEST	OVA (ppm)**	MOISTURE CONTENT (% of dry wt.)	DRY DENSITY (pcf)	BLOW COUNT* (blows/ft)	PERCENT PASSING No. 200 SIEVE	SAMPLE LOC.	DOWNHOLE TESTS
130	85	62	2.9	45.8	-			⊠	PMT
	90		3.7	48.6	69	34	95	⊠	
	95	37	1.4	34.7	-			⊠	
Tunnel	100		7.6	38.8	79	50	99	⊠	
	105	38	6.3	45.7	-			⊠	
105	110		6.3	33.0	86	46	98	⊠	
100	115	31	6.1	37.4	-			⊠	
95	120		1.5	40.5	79	51	99	⊠	

Becomes grayish green

(½-inch thick cemented layer)

(3 feet thick very hard cemented layer)

THIS RECORD IS AN INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. LATITUDE AND LONGITUDE OF BORING LOCATION SHOWN ON LOGS ARE APPROXIMATE. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BETWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

(CONTINUED ON FOLLOWING FIGURE)

Field Tech: AR
Prepared/Date: YN 8/9/2011
Checked/Date: JAG/PE 9/28/2011

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Los Angeles, California

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LOG OF BORING

Project No.: 4953-10-1561 Figure: A-2.10c

DRILLING COMPANY/DRILLING EQUIPMENT		BORING NO.
C & L Drilling / Mayhew 1000		**G-110 (Continued)**
DRILLING METHOD	**BOREHOLE LOCATION**	
Rotary Wash	Sta 450+30, Lt 20 feet	
DATES DRILLED	**HOLE DIAMETER**	**GROUND EL.**
4/28/2011 - 5/2/2011	4-7/8 inches	212 feet

GROUND-WATER READINGS
Drilling mud bailed on 4/29/2011. Ground-water level measured at 31 feet below the ground surface on 5/2/2011.

ELEVATION (ft)	DEPTH (ft)	"N" VALUE STD.PEN.TEST	OVA (ppm)**	MOISTURE CONTENT (% of dry wt.)	DRY DENSITY (pcf)	BLOW COUNT* (blows/ft)	PERCENT PASSING No. 200 SIEVE	SAMPLE LOC.	DOWNHOLE TESTS
90	125		1.4	37.0	80	69	99	⊠	
85	130		5.6	38.0	82	40		⊠	
80	135		8.5	41.8	78	48		⊠	
75	140								
70	145								
65	150								
60	155								
55	160								

END OF BORING AT 131 FEET

NOTES:

Hand augered upper 5 feet to avoid damage to utilites. Borehole grouted with cement-bentonite slurry and patched with asphalt concrete.

"N" Value Standard Penetration Test: Number of blows required to drive the SPT sampler 18 inches using a 140 pound automatic hammer falling 30 inches

*Number of blows required to drive the Crandall Sampler 12 inches using a 140 pound hammer falling 30 inches

**Photo Ionization Detector used for OVA readings

Downhole Test: PMT = Pressuremeter

THIS RECORD IS AN INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. LATITUDE AND LONGITUDE OF BORING LOCATION SHOWN ON LOGS ARE APPROXIMATE. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BETWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

Field Tech: AR
Prepared/Date: YN 8/9/2011
Checked/Date: JAG/PE 9/28/2011

MTA Westside Subway Extension
Los Angeles, California

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LOG OF BORING

Project No.: 4953-10-1561 Figure: A-2.10d

DRILLING COMPANY/DRILLING EQUIPMENT		BORING NO.
C & L Drilling / Mayhew 1000		G-111
DRILLING METHOD	**BOREHOLE LOCATION**	
Rotary Wash	Sta 457+95, Lt 25 feet	
DATES DRILLED	**HOLE DIAMETER**	**GROUND EL.**
5/12/2011 and 5/13/2011	4-7/8 inches	195 feet

GROUND-WATER READINGS
Drilling mud bailed on 5/12/2011. Ground-water level measured at 28 feet below ground surface on 5/13/2011.

THIS RECORD IS AN INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. LATITUDE AND LONGITUDE OF BORING LOCATION SHOWN ON LOGS ARE APPROXIMATE. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BETWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

ELEVATION (ft)	DEPTH (ft)	"N" VALUE STD.PEN.TEST	OVA (ppm)**	MOISTURE CONTENT (% of dry wt.)	DRY DENSITY (pcf)	BLOW COUNT* (blows/ft)	PERCENT PASSING No. 200 SIEVE	SAMPLE LOC.	DOWNHOLE TESTS		
											6-inch thick Asphalt Concrete over 8-inch thick Portland Cement Concrete and 4-inch thick Base Course
										SM	**FILL [Af]** SILTY SAND - moist, brown, fine to medium-grained, trace coarse
190	5		30	13.6	103	25				ML	**LAKEWOOD FORMATION [Qlw]** SANDY SILT - very stilff, moist, olive yellow to brown, fine sand, trace calcium carbonate nodules
185	10	27		-	-					GW	WELL GRADED GRAVEL - medium dense, moist, gravel (up to 3 inches in size) (Sample not recovered)
										ML	SANDY SILT - hard, light brown, fine sand, trace gravel (up to 3 inches in size)
180	15		15.6	18.7	107	37				SM	SILTY SAND - moist, light grayish brown to light olive, fine-grained
										CL	SANDY LEAN CLAY - very stiff, moist, light brown, fine to medium sand
175	20	16	7.9	20.7	-		52				Trace mica
										ML	SANDY SILT - stiff, moist, light brown, fine sand
170	25		10.2	25.0	93	16					Becomes light olive, trace iron oxide stains
165	30	35	9.5	28.4	-						Becomes hard, olive gray
										SP	POORLY GRADED SAND - dense, wet, light olive, fine to medium-grained, trace coarse sand, trace gravel (up to ½ inch in size)
160	35		10.4	16.4	106	37				ML	**SAN PEDRO FORMATION [Qsp]** SILT - very stiff, moist, greenish gray, some clay
	40										

(CONTINUED ON FOLLOWING FIGURE)

Field Tech: AR
Prepared/Date: YN 6/21/2011
Checked/Date: LT/PE 9/26/2011

MTA Westside Subway Extension
Los Angeles, California

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LOG OF BORING

Project No.: 4953-10-1561 Figure: A-2.11a

DRILLING COMPANY/DRILLING EQUIPMENT		BORING NO.
C & L Drilling / Mayhew 1000		**G-111 (Continued)**
DRILLING METHOD	**BOREHOLE LOCATION**	
Rotary Wash	Sta 457+95, Lt 25 feet	
DATES DRILLED	**HOLE DIAMETER**	**GROUND EL.**
5/12/2011 and 5/13/2011	4-7/8 inches	195 feet

GROUND-WATER READINGS
Drilling mud bailed on 5/12/2011. Ground-water level measured at 28 feet below ground surface on 5/13/2011.

THIS RECORD IS AN INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. LATITUDE AND LONGITUDE OF BORING LOCATION SHOWN ON LOGS ARE APPROXIMATE. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BETWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

ELEVATION (ft)	DEPTH (ft)	"N" VALUE STD.PEN.TEST	OVA (ppm)**	MOISTURE CONTENT (% of dry wt.)	DRY DENSITY (pcf)	BLOW COUNT* (blows/ft)	PERCENT PASSING No. 200 SIEVE	SAMPLE LOC.	DOWNHOLE TESTS		
		28	>3000	52.0	-			○			(Sample not recovered)
150	45		>3000	25.2	92	27		⊠			More fine sand
145	50	32	3.0	21.3	-		58	⊠		CL	SANDY LEAN CLAY - hard, very moist, greenish gray, fine sand, occasional medium
140	55		3.6	14.3	110	54		⊠		SP-SM	POORLY GRADED SAND with SILT - dense, wet, light gray, fine to medium-grained, trace coarse, slight hydrogen sulfide odor
135	60	47	>3000	15.7	-			⊠			Becomes greenish gray
130	65		3.9	23.3	97	80	9	⊠			Becomes very dense, fine-grained, occasional medium
125	70	53	>3000	21.7	-		15	⊠			Trace fine gravel
120	75		3.6	28.3	90	62		⊠		SM	SILTY SAND - very dense, wet, gray, fine-grained, some medium and coarse, occasional gravel (up to 3/8 inch in size), trace mica
	80										Slight hydrogen sulfide odor

(CONTINUED ON FOLLOWING FIGURE)

Field Tech: AR
Prepared/Date: YN 6/21/2011
Checked/Date: LT/PE 9/26/2011

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LOG OF BORING

Project No.: 4953-10-1561 Figure: A-2.11b

DRILLING COMPANY/DRILLING EQUIPMENT		BORING NO.
C & L Drilling / Mayhew 1000		**G-111 (Continued)**
DRILLING METHOD	**BOREHOLE LOCATION**	
Rotary Wash	Sta 457+95, Lt 25 feet	
DATES DRILLED	**HOLE DIAMETER**	**GROUND EL.**
5/12/2011 and 5/13/2011	4-7/8 inches	195 feet

GROUND-WATER READINGS
Drilling mud bailed on 5/12/2011. Ground-water level measured at 28 feet below ground surface on 5/13/2011.

ELEVATION (ft)	DEPTH (ft)	"N" VALUE STD.PEN.TEST	OVA (ppm)**	MOISTURE CONTENT (% of dry wt.)	DRY DENSITY (pcf)	BLOW COUNT* (blows/ft)	PERCENT PASSING No. 200 SIEVE	SAMPLE LOC.	DOWNHOLE TESTS
		38	>2550	19.3	-		93	☒	
110	85		>2550	17.5	86	26	98	⊠	
105	90	40	>3000	59.8	-			☒	
100	95		>3000	39.4	79	34		⊠	
95	100	35	>3000	46.8	-			☒	
90	105		>1550	34.8	83	35		⊠	
85	110								
80	115								
	120								

ML

SILT - hard, wet, dark gray, trace fine sand, occasional medium, trace clay

FERNANDO FORMATION [Tf]

SILTSTONE - very stiff to hard, moist, dark olive gray to dark greenish gray, occasional fine sand, interbeded with sand layers, trace calcium carbonate nodules, weakly cemented

Becomes dark greenish gray, trace fine sand

END OF BORING AT 106 FEET

NOTES:

Hand augered upper 5 feet to avoid damage to utilities. Borehole grouted with cement-bentonite slurry and patched with asphalt concrete.

"N" Value Standard Penetration Test: Number of blows required to drive the SPT sampler 18 inches using a 140 pound automatic hammer falling 30 inches

*Number of blows required to drive the Crandall Sampler 12 inches using a 300 pound hammer falling 18 inches

**Photo Ionization Detector used for OVA readings

Field Tech: AR
Prepared/Date: YN 6/21/2011
Checked/Date: LT/PE 9/26/2011

THIS RECORD IS AN INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. LATITUDE AND LONGITUDE OF BORING LOCATION SHOWN ON LOGS ARE APPROXIMATE. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BETWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

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G:\PROJECT_DIRECTORIES\4953\2010\101561_METRO_WESTSIDE_EXTENSION\6.2.3.1 GEOTECHNICAL DESIGN\3.2 ALL FIELD NOTES\GINT LOG\NEW TEMPLATE - MARCH 14, 2011\4953-10-1561_(100-119).GPJ 10/18/11

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LOG OF BORING

Project No.: 4953-10-1561 Figure: A-2.11c

DRILLING COMPANY/DRILLING EQUIPMENT		BORING NO.
C & L Drilling / Mayhew 1000		G-112
DRILLING METHOD	**BOREHOLE LOCATION**	
Rotary Wash	Sta 473+50, Lt 30 feet	
DATES DRILLED	**HOLE DIAMETER**	**GROUND EL.**
5/11/2011 and 5/12/2011	4-7/8 inches	200 feet

GROUND-WATER READINGS
Drilling mud bailed on 5/11/2011. Ground-water level measured at 18 feet below the ground surface on 5/12/2011.

THIS RECORD IS AN INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. LATITUDE AND LONGITUDE OF BORING LOCATION SHOWN ON LOGS ARE APPROXIMATE. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BETWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

ELEVATION (ft)	DEPTH (ft)	"N" VALUE STD.PEN.TEST	OVA (ppm)**	MOISTURE CONTENT (% of dry wt.)	DRY DENSITY (pcf)	BLOW COUNT* (blows/ft)	PERCENT PASSING No. 200 SIEVE	SAMPLE LOC.	DOWNHOLE TESTS		
Wilshire / La Brea Station	5		0.0	15.9	101	15		⊠			6-inch thick Asphalt Concrete over 10-inch thick Portland Cement Concrete, No Base Course
										SM	**FILL [Af]** SILTY SAND - moist, light brown, fine-grained, trace medium to coarse
										CL	**QUATERNARY YOUNGER ALUVIUM [Qal]** SANDY LEAN CLAY - stiff, moist, light brown and trace olive yellow, medium to coarse sand, trace fine gravel (up to 1/2 inch in size)
	10	35	0.0	16.1	-			⊠			Becomes brown
										SM	**LAKEWOOD FORMATION [Qlw]** SILTY SAND - dense, moist, olive brown, fine-grained, trace medium, trace fine gravel (up to 1/2 inch in size)
	15		0.0	20.8	102	7		⊠	PMT		Becomes medium to coarse-grained, more gravel
	20									CL	LEAN CLAY with SAND - very stiff, moist, light gray to light olive, fine to coarse sand, trace fine gravel, some rootlets
	25	22	0.0	29.5	-			⊠			Trace calcium carbonate nodules and iron oxide stains
	30		0.0	25.2	97	18		⊠		ML	SANDY SILT - moist, light brown
	35	36	0.0	19.2	-			⊠		SM	SILTY SAND - wet, light brown
										CL	SANDY LEAN CLAY - moist, light brown, trace gravel (up to ½ inch in size), trace calcium carbonate nodules
	40									SM	SILTY SAND - medium dense, moist, light olive brown, fine to medium-grained, some coarse, trace calcium carbonate nodules, trace iron oxide stains

(CONTINUED ON FOLLOWING FIGURE)

Field Tech: HTY
Prepared/Date: YN 9/21/2011
Checked/Date: LT/PE 9/26/2011

MTA Westside Subway Extension
Los Angeles, California

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LOG OF BORING

Project No.: 4953-10-1561 Figure: A-2.12a

DRILLING COMPANY/DRILLING EQUIPMENT		BORING NO.
C & L Drilling / Mayhew 1000		**G-112 (Continued)**
DRILLING METHOD	**BOREHOLE LOCATION**	
Rotary Wash	Sta 473+50, Lt 30 feet	
DATES DRILLED	**HOLE DIAMETER**	**GROUND EL.**
5/11/2011 and 5/12/2011	4-7/8 inches	200 feet

GROUND-WATER READINGS
Drilling mud bailed on 5/11/2011. Ground-water level measured at 18 feet below the ground surface on 5/12/2011.

THIS RECORD IS AN INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. LATITUDE AND LONGITUDE OF BORING LOCATION SHOWN ON LOGS ARE APPROXIMATE. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BETWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

ELEVATION (ft)	DEPTH (ft)	"N" VALUE STD.PEN.TEST	OVA (ppm)**	MOISTURE CONTENT (% of dry wt.)	DRY DENSITY (pcf)	BLOW COUNT* (blows/ft)	PERCENT PASSING No. 200 SIEVE	SAMPLE LOC.	DOWNHOLE TESTS		
Wilshire / La Brea Station	45		0.0	21.0	105	11	47	⊠			Trace gravel (up to 3/8 inch in size)
		68	0.0	20.0	-			☒	PMT	CH	**SAN PEDRO FORMATION [Qsp]** FAT CLAY - hard, olive, some fine sand, trace medium to coarse, trace fine gravel (up to 3/4 inch in size), trace mica
	50										
	55		0.3	27.2	97	12		⊠		ML	SANDY SILT - stiff, moist, greeenish gray, fine sand, trace medium, trace calcium carbonate nodules
	60	27	0.0	24.3	-			☒			Becomes very stiff, more sand, some clay
	65		0.0	23.9	100	27	8	⊠	PMT	SP-SM	POORLY GRADED SAND with SILT - medium dense, wet, gray, fine to medium-grained
	70										
	75	76	0.0	20.5	-		9	☒			Becomes very dense, fine-grained, some medium
	80										

(CONTINUED ON FOLLOWING FIGURE)

Field Tech: HTY
Prepared/Date: YN 9/21/2011
Checked/Date: LT/PE 9/26/2011

MTA Westside Subway Extension
Los Angeles, California

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LOG OF BORING

Project No.: 4953-10-1561 Figure: A-2.12b

DRILLING COMPANY/DRILLING EQUIPMENT		BORING NO.
C & L Drilling / Mayhew 1000		**G-112 (Continued)**
DRILLING METHOD	**BOREHOLE LOCATION**	
Rotary Wash	Sta 473+50, Lt 30 feet	
DATES DRILLED	**HOLE DIAMETER**	**GROUND EL.**
5/11/2011 and 5/12/2011	4-7/8 inches	200 feet

GROUND-WATER READINGS
Drilling mud bailed on 5/11/2011. Ground-water level measured at 18 feet below the ground surface on 5/12/2011.

ELEVATION (ft)	DEPTH (ft)	"N" VALUE STD.PEN.TEST	OVA (ppm)**	MOISTURE CONTENT (% of dry wt.)	DRY DENSITY (pcf)	BLOW COUNT* (blows/ft)	PERCENT PASSING No. 200 SIEVE	SAMPLE LOC.	DOWNHOLE TESTS	
			0.0	24.3	99	25		⊠		Gravel (up to 3/4 inch in size)
115	85	72	0.0	25.8	-		23	☒		SM SILTY SAND - very dense, wet, gray, fine-grained, some medium, occasional gravel
										FERNANDO FORMATION [Tf]
110	90		0.0	28.4	92	12		⊠		SILTSTONE - hard, moist, olive gray, trace fine sand, weakly cemented
105	95	43	0.0	37.6	-			☒		
100	100		0.0	42.8	76	13		⊠		Small pockets of fine sand, gray
95	105	55	0.0	45.8	-			☒		
90	110		0.0	36.7	84	12	95	⊠		
85	115	57	0.0	48.0	-			☒		
	120									

THIS RECORD IS AN INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. LATITUDE AND LONGITUDE OF BORING LOCATION SHOWN ON LOGS ARE APPROXIMATE. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BETWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

(CONTINUED ON FOLLOWING FIGURE)

Field Tech: HTY
Prepared/Date: YN 9/21/2011
Checked/Date: LT/PE 9/26/2011

MTA Westside Subway Extension
Los Angeles, California

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LOG OF BORING

Project No.: 4953-10-1561 Figure: A-2.12c

DRILLING COMPANY/DRILLING EQUIPMENT		BORING NO.
C & L Drilling / Mayhew 1000		**G-112 (Continued)**
DRILLING METHOD	**BOREHOLE LOCATION**	
Rotary Wash	Sta 473+50, Lt 30 feet	
DATES DRILLED	**HOLE DIAMETER**	**GROUND EL.**
5/11/2011 and 5/12/2011	4-7/8 inches	200 feet

GROUND-WATER READINGS
Drilling mud bailed on 5/11/2011. Ground-water level measured at 18 feet below the ground surface on 5/12/2011.

ELEVATION (ft)	DEPTH (ft)	"N" VALUE STD.PEN.TEST	OVA (ppm)**	MOISTURE CONTENT (% of dry wt.)	DRY DENSITY (pcf)	BLOW COUNT* (blows/ft)	PERCENT PASSING No. 200 SIEVE	SAMPLE LOC.	DOWNHOLE TESTS
			0.0	57.9	61	16		⊠	
75	125								
70	130								
65	135								
60	140								
55	145								
50	150								
45	155								
	160								

END OF BORING AT 121 FEET

NOTES:

Hand augered upper 5 feet to avoid damage to utilities. Borehole grouted with cement-bentonite slurry and patched with asphalt concrete.

"N" Value Standard Penetration Test: Number of blows required to drive the SPT sampler 18 inches using a 140 pound automatic hammer falling 30 inches

*Number of blows required to drive the Crandall Sampler 12 inches using a 380 pound hammer falling 18 inches

**Photo Ionization Detector used for OVA readings

Downhole Test: PMT = Pressuremeter

THIS RECORD IS AN INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. LATITUDE AND LONGITUDE OF BORING LOCATION SHOWN ON LOGS ARE APPROXIMATE. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BETWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

Field Tech: HTY
Prepared/Date: YN 9/21/2011
Checked/Date: LT/PE 9/26/2011

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Los Angeles, California

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LOG OF BORING
Project No.: 4953-10-1561 Figure: A-2.12d

DRILLING COMPANY/DRILLING EQUIPMENT		BORING NO.
TRI County / CME 75		G-113
DRILLING METHOD	**BOREHOLE LOCATION**	
Rotary Wash	Sta 465+60, Lt 15 feet	
DATES DRILLED	**HOLE DIAMETER**	**GROUND EL.**
5/23/2011, 5/24/2011, and 6/2/2011	4-¼ inches	198 feet

GROUND-WATER READINGS

Ground-water level measured at 19 feet below the ground surface on 5/24/2011.

THIS RECORD IS AN INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. LATITUDE AND LONGITUDE OF BORING LOCATION SHOWN ON LOGS ARE APPROXIMATE. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BETWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

ELEVATION (ft)	DEPTH (ft)	"N" VALUE STD.PEN.TEST	OVA (ppm)**	MOISTURE CONTENT (% of dry wt.)	DRY DENSITY (pcf)	BLOW COUNT* (blows/ft)	PERCENT PASSING No. 200 SIEVE	SAMPLE LOC.	DOWNHOLE TESTS		
195	5			20.3	-		63			SM	1½-inch thick Asphalt Concrete over 12-inch thick Portland Cement Concrete and 2-inch thick Base Course **FILL [Af]** SILTY SAND - moist, brown, some gravel
										SM	**LAKEWOOD FORMATION [Qlw]** SILTY SAND - moist, reddish brown
190	10			23.1	99	21				CL	SANDY LEAN CLAY - stiff, moist, brown, trace fine sand
185	15	11		23.6	-					CL-ML	SILTY CLAY with SAND - stiff, moist, brown, fine sand
180	20			14.6	-	31	31			CL	LEAN CLAY - stiff, moist, brown, trace fine sand, trace calcium carbonate nodules
175	25	35		14.5	-					SM	SILTY SAND - medium dense, moist, light brown to olive, medium to coarse-grained, trace fine sand
170	30			25.7	106	33				CL	LEAN CLAY with SAND - hard, moist, fine to coarse sand, trace calcium carbonate nodules
165	35	30		31.6	-					ML	Layers of Silty Clay, very stiff, olive, trace fine sand SILT with SAND - very stiff, moist, greenish gray, fine sand
160	40										**SAN PEDRO FORMATION [Qsp]**

(CONTINUED ON FOLLOWING FIGURE)

Field Tech: MH
Prepared/Date: YN 6/21/2011
Checked/Date: HP/PE 9/19/2011

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LOG OF BORING

Project No.: 4953-10-1561 Figure: A-2.13a

DRILLING COMPANY/DRILLING EQUIPMENT		BORING NO.
TRI County / CME 75		**G-113 (Continued)**
DRILLING METHOD Rotary Wash	**BOREHOLE LOCATION** Sta 465+60, Lt 15 feet	
DATES DRILLED 5/23/2011, 5/24/2011, and 6/2/2011	**HOLE DIAMETER** 4-¼ inches	**GROUND EL.** 198 feet

GROUND-WATER READINGS
Ground-water level measured at 19 feet below the ground surface on 5/24/2011.

THIS RECORD IS AN INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. LATITUDE AND LONGITUDE OF BORING LOCATION SHOWN ON LOGS ARE APPROXIMATE. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BETWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

ELEVATION (ft)	DEPTH (ft)	"N" VALUE STD.PEN.TEST	OVA (ppm)**	MOISTURE CONTENT (% of dry wt.)	DRY DENSITY (pcf)	BLOW COUNT* (blows/ft)	PERCENT PASSING No. 200 SIEVE	SAMPLE LOC.	DOWNHOLE TESTS		
155	45			34.7	-	33	92	⊠		CH	FAT CLAY - very stiff, moist, bluish gray, trace calcium carbonate nodules
											With sand, hard, moist, greenish gray, fine sand
150	50	38		24.0	-			☒			
				26.1	102	49	84	⊠			
145	55	50		24.3	-			☒		CL-ML	SILTY CLAY - hard, moist, greenish gray, trace sand
										SP-SM	POORLY GRADED SAND with SILT - dense, moist, greenish gray, fine to medium-grained
140	60			-	-	97		⊠			Becomes very dense
	65	50/3"		15.9	-			☒			
	70			-	-	50/1"		⊠		SW	WELL GRADED SAND - very dense, moist to wet, greenish gray, fine to coarse-grained, trace fine gravel, trace silt
										SM	SILTY SAND - very dense, moist, greenish gray, fine-grained
130	75	50/5"		-	-			☒			
	80										

Wilshire / La Brea Station

(CONTINUED ON FOLLOWING FIGURE)

Field Tech: MH
Prepared/Date: YN 6/21/2011
Checked/Date: HP/PE 9/19/2011

MTA Westside Subway Extension
Los Angeles, California

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LOG OF BORING

Project No.: 4953-10-1561 Figure: A-2.13b

DRILLING COMPANY/DRILLING EQUIPMENT		BORING NO.
TRI County / CME 75		**G-113 (Continued)**
DRILLING METHOD Rotary Wash	**BOREHOLE LOCATION** Sta 465+60, Lt 15 feet	
DATES DRILLED 5/23/2011, 5/24/2011, and 6/2/2011	**HOLE DIAMETER** 4-¼ inches	**GROUND EL.** 198 feet

GROUND-WATER READINGS
Ground-water level measured at 19 feet below the ground surface on 5/24/2011.

ELEVATION (ft)	DEPTH (ft)	"N" VALUE STD.PEN.TEST	OVA (ppm)**	MOISTURE CONTENT (% of dry wt.)	DRY DENSITY (pcf)	BLOW COUNT* (blows/ft)	PERCENT PASSING No. 200 SIEVE	SAMPLE LOC.	DOWNHOLE TESTS
115	85			17.7	112	50/1"	39	⊠	
110	90	33		47.5	-			☒	
105	95			34.1	85	67	99	⊠	
100	100	86		37.0	-			☒	
95	105								
90	110			41.8	81	70		⊠	
85	115								
80	120								

Becomes dark greenish gray, trace coarse gravel

FERNANDO FORMATION [Tf]
CLAYEY SILTSTONE - hard, moist, dark greenish gray

SILTSTONE - hard, moist, dark greenish gray to dark brown

END OF BORING AT 106 FEET

NOTES:

Hand augered upper 10 feet to avoid damage to utilites. Borehole grouted with cement-bentonite slurry and patched with asphalt concrete.

"N" Value Standard Penetration Test: Number of blows required to drive the SPT sampler 18 inches using a 140 pound automatic hammer falling 30 inches

*Number of blows required to drive the Crandall Sampler 12 inches using a 140 pound automatic hammer falling 30 inches

**Photo Ionization Detector used for OVA readings

THIS RECORD IS AN INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. LATITUDE AND LONGITUDE OF BORING LOCATION SHOWN ON LOGS ARE APPROXIMATE. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BETWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

Field Tech: MH
Prepared/Date: YN 6/21/2011
Checked/Date: HP/PE 9/19/2011

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LOG OF BORING
Project No.: 4953-10-1561 Figure: A-2.13c

LA METRO PB-TUNNEL ZONE S:\70131 GEOTECH\GINTW\LIBRARY MACTEC JUNE2011.GLB
G:\PROJECT_DIRECTORIES\4953\2010\101561_METRO_WESTSIDE_EXTENSION\6.2.3.1 GEOTECHNICAL DESIGN\3.2 ALL FIELD NOTES\GINT LOG\NEW TEMPLATE - MARCH 14, 2011\4953-10-1561_(100-119).GPJ 10/18/11

DRILLING COMPANY/DRILLING EQUIPMENT		BORING NO.
Fugro / CME 75		G-114
DRILLING METHOD	**BOREHOLE LOCATION**	
Rotary Wash	Sta 475+12, Lt 10 feet	
DATES DRILLED	**HOLE DIAMETER**	**GROUND EL.**
5/9/2011 - 5/11/2011	4-7/8 inches	199 feet

GROUND-WATER READINGS
Drilling mud bailed on 5/10/2011. Ground-water level measured at 29 feet below the ground surface on 5/11/2011.

THIS RECORD IS AN INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. LATITUDE AND LONGITUDE OF BORING LOCATION SHOWN ON LOGS ARE APPROXIMATE. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BETWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

Wilshire / La Brea Station

ELEVATION (ft)	DEPTH (ft)	"N" VALUE STD.PEN.TEST	OVA (ppm)**	MOISTURE CONTENT (% of dry wt.)	DRY DENSITY (pcf)	BLOW COUNT* (blows/ft)	PERCENT PASSING No. 200 SIEVE	SAMPLE LOC.	DOWNHOLE TESTS		
											8-inch thick Asphalt Concrete over 12-inch thick Portland Cement Concrete
											FILL [Af]
										CL	SANDY LEAN CLAY - moist, olive brown, medium sand
										SM	SILTY SAND - moist, olive yellow, fine to coarse-grained, trace fine gravel (up to ½ inch in size)
	5									SM	**LAKEWOOD FORMATION [Qlw]**
											SILTY SAND - moist, olive yellow, fine-grained, some medium to coarse
	10		0.0	20.7	101	12				CL	LEAN CLAY - medium stiff, light olive, fine to medium sand
											Some coarse sand, trace gravel (up to 1/4 inch in size)
										ML	SANDY SILT - moist, olive, fine sand
	15	10	0.0	25.6	-					SM	SILTY SAND - loose, moist, olive yellow, fine to medium-grained
	20		0.0	24.6	98	20				CH	FAT CLAY with SAND - stiff, moist, light olive, fine sand, trace medium to coarse, some calcium carbonate nodules
	25	11	0.0	37.7	-					CL-ML	SILTY CLAY - stiff, moist to wet, light olive, trace sand
	30			21.1	104	20				SM	▼ SILTY SAND - medium dense, light olive, fine to medium-grained, some coarse, trace gravel (up to ½ inch in size), some clay
										CL	SANDY LEAN CLAY - very stiff, moist, light olive to yellowish olive brown, fine sand, some silt
	35	29		24.4	-						More clay, trace gravel (up to ½ inch in size) Some calcium carbonate nodules
	40			12.4	114	29	22			SC	CLAYEY SAND - medium dense, moist to wet, light olive to olive yellow, fine to medium-grained, some coarse, some clay nodules

(CONTINUED ON FOLLOWING FIGURE)

Field Tech: LH
Prepared/Date: YN 8/29/2011
Checked/Date: HP/PE 9/19/2011

MTA Westside Subway Extension
Los Angeles, California

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LOG OF BORING

Project No.: 4953-10-1561 Figure: A-2.14a

DRILLING COMPANY/DRILLING EQUIPMENT		BORING NO.
Fugro / CME 75		**G-114 (Continued)**
DRILLING METHOD	**BOREHOLE LOCATION**	
Rotary Wash	Sta 475+12, Lt 10 feet	
DATES DRILLED	**HOLE DIAMETER**	**GROUND EL.**
5/9/2011 - 5/11/2011	4-7/8 inches	199 feet

GROUND-WATER READINGS
Drilling mud bailed on 5/10/2011. Ground-water level measured at 29 feet below the ground surface on 5/11/2011.

THIS RECORD IS AN INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. LATITUDE AND LONGITUDE OF BORING LOCATION SHOWN ON LOGS ARE APPROXIMATE. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BETWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

ELEVATION (ft)	DEPTH (ft)	"N" VALUE STD.PEN.TEST	OVA (ppm)**	MOISTURE CONTENT (% of dry wt.)	DRY DENSITY (pcf)	BLOW COUNT* (blows/ft)	PERCENT PASSING No. 200 SIEVE	SAMPLE LOC.	DOWNHOLE TESTS		
Wilshire / La Brea Station		25	0.0	-	-			☒			Becomes yellowish brown to olive brown, more silt and clay, fine-grained, trace gravel (up to 1/4 inch in size)
	45		0.0	23.6	99	34		⊠		CH	SANDY FAT CLAY - very stiff, moist, olive, fine to medium sand, trace gravel (up to 1 inch in size)
		29	0.0	-	-		57	☒			Gravel (up to ¼ inch in size)
	50										Layers of Silty Clay, very stiff, moist, greenish yellowish gray, some fine sand
			0.0	24.4	98	35	70	⊠		CL	**SAN PEDRO FORMATION [Qsp]**
		21		22.2	-			☒			SANDY LEAN CLAY - very stiff, moist, greenish-gray, fine sand
	55										More silt
				30.6	91	28	81	⊠		CH	FAT CLAY with SAND - very stiff, moist, greenish-gray, fine sand, some medium
	60	49	0.0	18.7	-		17	☒		SM	SILTY SAND - dense, wet, greenish-gray, fine to medium-grained
			0.0	-	-	60		⊠			
	65	57	0.0	19.3	-			☒		SP	POORLY GRADED SAND - very dense, wet, greenish-gray, fine to medium-grained
	70		0.0	11.6	107	90	5	⊠			Trace coarse sand
		68	0.0	17.4	-			☒		SP-SM	POORLY GRADED SAND with SILT - very dense, wet, greenish-gray, fine to medium-grained, some coarse
	75			-	-	87		⊠			Becomes fine-grained, more silt
											Becomes fine to coarse-grained, trace gravel (up to ¼ inch in size)
		62	0.0	20.3	-			☒		SM	SILTY SAND - very dense, wet, greenish gray, fine-grained, some medium to coarse
	80										

(CONTINUED ON FOLLOWING FIGURE)

Field Tech: LH
Prepared/Date: YN 8/29/2011
Checked/Date: HP/PE 9/19/2011

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Los Angeles, California

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LOG OF BORING

Project No.: 4953-10-1561 Figure: A-2.14b

DRILLING COMPANY/DRILLING EQUIPMENT		BORING NO.
Fugro / CME 75		**G-114 (Continued)**
DRILLING METHOD	**BOREHOLE LOCATION**	
Rotary Wash	Sta 475+12, Lt 10 feet	
DATES DRILLED	**HOLE DIAMETER**	**GROUND EL.**
5/9/2011 - 5/11/2011	4-7/8 inches	199 feet

GROUND-WATER READINGS
Drilling mud bailed on 5/10/2011. Ground-water level measured at 29 feet below the ground surface on 5/11/2011.

THIS RECORD IS AN INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. LATITUDE AND LONGITUDE OF BORING LOCATION SHOWN ON LOGS ARE APPROXIMATE. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BETWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

ELEVATION (ft)	DEPTH (ft)	"N" VALUE STD.PEN.TEST	OVA (ppm)**	MOISTURE CONTENT (% of dry wt.)	DRY DENSITY (pcf)	BLOW COUNT* (blows/ft)	PERCENT PASSING No. 200 SIEVE	SAMPLE LOC.	DOWNHOLE TESTS	
			0.0	14.2	104	63	13	⊠		Becomes dense, trace gravel (up to 3/4 inch in size)
115	85	58	0.0	23.7	-			⊠		Becomes very dense, more fine sand
				-	-	50/1"		○		**FERNANDO FORMATION [Tf]** CLAYEY SILTSTONE - hard, moist, dark olive brown to olive gray, some fine sand, weakly cemented (Sample not recovered)
110	90	63	0.0	49.3	-			⊠		
			0.0	30.0	89	54	98	⊠		
105	95	44	0.0	35.6	-			⊠		Becomes wet, trace fine sand, no cementation
100	100			35.3	86	60		⊠		Weakly to moderately cemented, alternating thin layers of grayish sand interbedded
		51	0.0	40.4	-			⊠		Becomes olive brown to olive gray, no cementation to weakly cemented
95	105		0.0	38.5	81	38		⊠		Becomes very stiff, weakly cemented
90	110	40	0.0	51.5	-			⊠		SILTSTONE - hard, moist, olive brown to olive gray, weakly cemented
85	115		0.0	31.1	89	63		⊠		Becomes dry to moist, pale olive, moderately to strongly cemented
80	120	38	0.0	36.5	-			⊠		CLAYEY SILTSTONE - hard, moist, olive green, no cementation to weakly cemented, trace fine sand

(CONTINUED ON FOLLOWING FIGURE)

Field Tech: LH
Prepared/Date: YN 8/29/2011
Checked/Date: HP/PE 9/19/2011

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LOG OF BORING

Project No.: 4953-10-1561 Figure: A-2.14c

DRILLING COMPANY/DRILLING EQUIPMENT		BORING NO.
Fugro / CME 75		**G-114 (Continued)**
DRILLING METHOD	**BOREHOLE LOCATION**	
Rotary Wash	Sta 475+12, Lt 10 feet	
DATES DRILLED	**HOLE DIAMETER**	**GROUND EL.**
5/9/2011 - 5/11/2011	4-7/8 inches	199 feet

GROUND-WATER READINGS
Drilling mud bailed on 5/10/2011. Ground-water level measured at 29 feet below the ground surface on 5/11/2011.

ELEVATION (ft)	DEPTH (ft)	"N" VALUE STD.PEN.TEST	OVA (ppm)**	MOISTURE CONTENT (% of dry wt.)	DRY DENSITY (pcf)	BLOW COUNT* (blows/ft)	PERCENT PASSING No. 200 SIEVE	SAMPLE LOC.	DOWNHOLE TESTS
75	125								
70	130								
65	135								
60	140								
55	145								
50	150								
45	155								
40	160								

END OF BORING AT 120 FEET

NOTES:

Hand augered upper 6½ feet to avoid damage to utilities. Borehole grouted with cement-bentonite slurry and patched with quick set cement.

"N" Value Standard Penetration Test: Number of blows required to drive the SPT sampler 18 inches using a 140 pound automatic hammer falling 30 inches

*Number of blows required to drive the Crandall Sampler 12 inches using a 140 pound automatic hammer falling 30 inches

**Photo Ionization Detector used for OVA readings

THIS RECORD IS AN INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. LATITUDE AND LONGITUDE OF BORING LOCATION SHOWN ON LOGS ARE APPROXIMATE. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BETWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

Field Tech: LH
Prepared/Date: YN 8/29/2011
Checked/Date: HP/PE 9/19/2011

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LOG OF BORING
Project No.: 4953-10-1561 Figure: A-2.14d

LA METRO PB-TUNNEL ZONE S:\70131 GEOTECH\GINTW\LIBRARY MACTEC JUNE2011.GLB
G:\PROJECT_DIRECTORIES\4953\2010\101561_METRO_WESTSIDE_EXTENSION\6.2.3.1 GEOTECHNICAL DESIGN\3.2 ALL FIELD NOTES\GINT LOG\NEW TEMPLATE - MARCH 14, 2011\4953-10-1561_(100-119).GPJ 10/18/11

DRILLING COMPANY/DRILLING EQUIPMENT		BORING NO.
C & L Drilling / Mayhew 1000		G-116
DRILLING METHOD	**BOREHOLE LOCATION**	
Rotary Wash	Sta 487+00, Lt 15 feet	
DATES DRILLED	**HOLE DIAMETER**	**GROUND EL.**
6/23/2011 and 6/24/2011	4-7/8 inches	197 feet

GROUND-WATER READINGS
Drilling mud bailed on 6/23/2011. Ground-water level measured at 16 feet below the ground surface on 6/24/2011.

THIS RECORD IS AN INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. LATITUDE AND LONGITUDE OF BORING LOCATION SHOWN ON LOGS ARE APPROXIMATE. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BETWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

ELEVATION (ft)	DEPTH (ft)	"N" VALUE STD.PEN.TEST	OVA (ppm)**	MOISTURE CONTENT (% of dry wt.)	DRY DENSITY (pcf)	BLOW COUNT* (blows/ft)	PERCENT PASSING No. 200 SIEVE	SAMPLE LOC.	DOWNHOLE TESTS		
195	0										10-inch thick Asphalt Concrete over 10-inch thick Portland Cement Concrete
											FILL [Af]
										CL	SANDY LEAN CLAY - moist, dark gray, fine to medium sand, some coarse, some fine to coarse gravel (up to 1½ inches in size)
	5										Becomes light brownish yellow to white, trace calcium carbonate nodules
190											
	10		3.2	21.4	101	Push	46	⊠			**LAKEWOOD FORMATION [Qlw]**
										SM	SILTY SAND - very loose, moist, olive yellow, fine to coarse-grained, trace gravel (up to 1/2 inch in size)
185											Layers of Poorly Graded Sand with Silt, yellowish brown
										ML	SANDY SILT - very stiff, wet, olive green, fine sand, some medium, some clay, some mica
	15	18	1.5	25.1	-			⊠			▼ Becomes wet
180											
	20		1.2	26.9	96	25		⊠			**SAN PEDRO FORMATION [Qsp]**
										CL	SANDY LEAN CLAY - very stiff, moist, light olive green, fine sand, iron oxide stains, some calcium carbonate nodules
175											
	25	24	0.0	32.9	-			⊠			More calcium carbonate nodules
170											
	30		0.0	20.6	105	21		⊠		CL	LEAN CLAY with SAND - stiff, moist, light grayish green, fine sand, some calcium carbonate nodules, trace iron oxide stains
165											
	35	11	0.0	35.6	-			⊠		CL-ML	SILTY CLAY - stiff, wet, light greenish gray, more calcium carbonate nodules
160											
	40										

(CONTINUED ON FOLLOWING FIGURE)

Field Tech: LH
Prepared/Date: JF 6/28/2011
Checked/Date: LT/PE 9/23/2011

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Los Angeles, California

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LOG OF BORING

Project No.: 4953-10-1561 Figure: A-2.15a

DRILLING COMPANY/DRILLING EQUIPMENT		BORING NO.
C & L Drilling / Mayhew 1000		**G-116 (Continued)**
DRILLING METHOD	**BOREHOLE LOCATION**	
Rotary Wash	Sta 487+00, Lt 15 feet	
DATES DRILLED	**HOLE DIAMETER**	**GROUND EL.**
6/23/2011 and 6/24/2011	4-7/8 inches	197 feet

GROUND-WATER READINGS
Drilling mud bailed on 6/23/2011. Ground-water level measured at 16 feet below the ground surface on 6/24/2011.

THIS RECORD IS AN INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. LATITUDE AND LONGITUDE OF BORING LOCATION SHOWN ON LOGS ARE APPROXIMATE. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BETWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

ELEVATION (ft)	DEPTH (ft)	"N" VALUE STD.PEN.TEST	OVA (ppm)**	MOISTURE CONTENT (% of dry wt.)	DRY DENSITY (pcf)	BLOW COUNT* (blows/ft)	PERCENT PASSING No. 200 SIEVE	SAMPLE LOC.	DOWNHOLE TESTS		
155	45		0.0	27.1	100	13	40	⊠		GC	CLAYEY GRAVEL with SAND - medium dense, moist, bluish green, coarse-grained, some fine and medium, fine gravel (up to 1/2 inch in size)
150	50	29	0.0	22.9	-		33	☒		SC	CLAYEY SAND with GRAVEL - medium dense, moist, light grayish green, fine to coarse-grained, some coarse, fine gravel (up to 1 inch in size)
145	55		0.0	19.3	112	14	60	⊠		ML	SANDY SILT - stiff, very moist, light greenish gray, fine sand, trace medium
	60	12	0.0	19.1	-		29	☒		SM	SILTY SAND - medium dense, wet, light grayish green, fine-grained, trace medium, trace shell fragments
	65		0.0	25.8	101	32	9	⊠		SP-SM	POORLY GRADED SAND with SILT - dense, wet, light greenish gray, fine-grained, some medium, occasional coarse
Tunnel	70	49	0.0	21.0	-		13	☒		SM	SILTY SAND - dense, wet, light greenish gray, fine to medium-grained, trace coarse
	75		0.0	18.7	107	23		⊠		SP-SM	POORLY GRADED SAND with SILT - medium dense, wet, dark olive gray, fine to coarse-grained
120	80	55	0.0	17.7	-			☒			Becomes very dense, trace gravel (up to 1/2 inch in size)

(CONTINUED ON FOLLOWING FIGURE)

Field Tech: LH
Prepared/Date: JF 6/28/2011
Checked/Date: LT/PE 9/23/2011

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LOG OF BORING

Project No.: 4953-10-1561 Figure: A-2.15b

DRILLING COMPANY/DRILLING EQUIPMENT		BORING NO.
C & L Drilling / Mayhew 1000		**G-116 (Continued)**
DRILLING METHOD	**BOREHOLE LOCATION**	
Rotary Wash	Sta 487+00, Lt 15 feet	
DATES DRILLED	**HOLE DIAMETER**	**GROUND EL.**
6/23/2011 and 6/24/2011	4-7/8 inches	197 feet

GROUND-WATER READINGS
Drilling mud bailed on 6/23/2011. Ground-water level measured at 16 feet below the ground surface on 6/24/2011.

ELEVATION (ft)	DEPTH (ft)	"N" VALUE STD.PEN.TEST	OVA (ppm)**	MOISTURE CONTENT (% of dry wt.)	DRY DENSITY (pcf)	BLOW COUNT* (blows/ft)	PERCENT PASSING No. 200 SIEVE	SAMPLE LOC.	DOWNHOLE TESTS
115	85		0.0	34.5	91	35	9	⊠	
110	90	50/5"	0.0	16.7	-			☒	
105	95		0.0	-	-	12		○	
100	100	57	0.0	2.3	-		1	☒	
95	105		0.0	11.3	107	29		⊠	
90	110	52	0.0	53.4	-		90	☒	
85	115								
80	120								

Becomes olive gray to gray, fine-grained, occasional medium, some coarse

More coarse sand

Fine to coarse sand, some shell fragments

GP — POORLY GRADED GRAVEL with SAND - very dense, wet, gray, fine rounded to subrounded gravel (up to 1/2 inch in size), some shell fragments, fine to coarse sand

(Sample not recovered)

Gravel (up to 1 inch in size)

FERNANDO FORMATION [Tf]
SILTSTONE - hard, moist, dark olive to grayish green, some fine sand, occasional medium, some mica, some clay

END OF BORING AT 106½ FEET

NOTES:

Hand augered upper 9½ feet to avoid damage to utilities. Borehole grouted with cement-bentonite slurry and patched with asphalt concrete.

"N" Value Standard Penetration Test: Number of blows required to drive the SPT sampler 18 inches using a 140 pound automatic hammer falling 30 inches

*Number of blows required to drive the Crandall Sampler 12 inches using a 380 pound hammer falling 18 inches

**Photo Ionization Detector used for OVA readings

THIS RECORD IS AN INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. LATITUDE AND LONGITUDE OF BORING LOCATION SHOWN ON LOGS ARE APPROXIMATE. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BETWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

Field Tech: LH
Prepared/Date: JF 6/28/2011
Checked/Date: LT/PE 9/23/2011

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LOG OF BORING
Project No.: 4953-10-1561 Figure: A-2.15c

DRILLING COMPANY/DRILLING EQUIPMENT		BORING NO.
C & L Drilling / Mayhew 1000		G-118
DRILLING METHOD	**BOREHOLE LOCATION**	
Rotary Wash	Sta 502+15, Lt 20 feet	
DATES DRILLED	**HOLE DIAMETER**	**GROUND EL.**
3/22/2011 - 3/24/2011	4-7/8 inches	195 feet

GROUND-WATER READINGS
Ground-water level measured at 38 feet on 3/24/2011.

THIS RECORD IS AN INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. LATITUDE AND LONGITUDE OF BORING LOCATION SHOWN ON LOGS ARE APPROXIMATE. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BETWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

ELEVATION (ft)	DEPTH (ft)	"N" VALUE STD.PEN.TEST	OVA (ppm)**	MOISTURE CONTENT (% of dry wt.)	DRY DENSITY (pcf)	BLOW COUNT* (blows/ft)	PERCENT PASSING No. 200 SIEVE	SAMPLE LOC.	DOWNHOLE TESTS		
											6 inches thick Asphalt Concrete over 12 inches thick Portland Cement Concrete, No Base Course
										ML	**FILL [Af]** - SILT - soft, moist, light brown to tan
											QUATERNARY OLDER ALLUVIUM [Qalo]
										CL	SANDY LEAN CLAY - moist, light brown to tan
190	5										
185	10			24.3	98	Push		⊠			**SAN PEDRO FORMATION [Qsp]**
										CL	LEAN CLAY - very soft, moist, greenish gray, trace sand, trace calcium carbonate nodules
180	15	23		26.2	-			⊠			Becomes very stiff, with sand
175	20			24.4	100	11		⊠		SM	SILTY SAND - medium dense, moist, greenish gray, fine to medium-grained, with thin layer of Sandy Silt
170	25	16		25.5	-			⊠		ML	SILT with SAND - very stiff, moist, greenish gray, fine sand, with calcium carbonate nodules, some clay
	30			-	-	27		○			(Sample not recovered)
165		63	168	21.3	-		13	⊠		SM	***TAR IMPACTED SOILS*** SILTY SAND - very dense, moist, dark grayish black, fine to medium-grained, strong sulfuric odor, moderately infused tar (8%)
160	35			10.2	117	54		⊠			Thin layer of Sandy Silt, dense, black
		42		13.6	-		59	⊠		ML	▼ SANDY SILT - hard, moist, dark gray to black, moderately infused tar (14%)
	40										

(CONTINUED ON FOLLOWING FIGURE)

Field Tech: DW
Prepared/Date: JF 5/19/2011
Checked/Date: LT/PE 9/23/2011

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LOG OF BORING

Project No.: 4953-10-1561 Figure: A-2.16a

DRILLING COMPANY/DRILLING EQUIPMENT		BORING NO.
C & L Drilling / Mayhew 1000		**G-118 (Continued)**
DRILLING METHOD Rotary Wash	**BOREHOLE LOCATION** Sta 502+15, Lt 20 feet	
DATES DRILLED 3/22/2011 - 3/24/2011	**HOLE DIAMETER** 4-7/8 inches	**GROUND EL.** 195 feet

GROUND-WATER READINGS
Ground-water level measured at 38 feet on 3/24/2011.

THIS RECORD IS AN INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. LATITUDE AND LONGITUDE OF BORING LOCATION SHOWN ON LOGS ARE APPROXIMATE. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BETWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

ELEVATION (ft)	DEPTH (ft)	"N" VALUE STD.PEN.TEST	OVA (ppm)**	MOISTURE CONTENT (% of dry wt.)	DRY DENSITY (pcf)	BLOW COUNT* (blows/ft)	PERCENT PASSING No. 200 SIEVE	SAMPLE LOC.	DOWNHOLE TESTS		
				14.7	101	27	61				Becomes very stiff
		44		18.2	-						Becomes dark grayish black, fine sand, trace gravel
150	45			8.3	115	26					Becomes black
145	50	87/11"	284	7.4	-		27			SM	SILTY SAND - very dense, dark gray to black, fine to medium-grained, trace gravel (up to 3/8 inch in size), saturated with tar
				7.0	109	25	7			SP-SM	POORLY GRADED SAND with SILT - medium dense, moist, black, moderately infused tar (14%)
140	55	80	198	-	-						Becomes very dense
				4.1	119	24					Becomes medium dense
135	60	51	386	6.6	-		13			SM	Becomes very dense, saturated with tar SILTY SAND - very dense, wet, black, saturated with tar (17%)
130	65			8.2	101	29					
		83/11"	360	2.9	-						
125	70			-	-	47					(Sample not recovered) Becomes gravelly
		50	190	8.4	-		28				Becomes dense, dark grayish black, fine-grained, trace gravel (up to 3/8 inch in size), saturated with tar (17%)
120	75			10.2	100	35					Becomes medium dense, fine gravel
	80	51		18.5	-						**FERNANDO FORMATION [Tf]** SILTSTONE - hard, moist, dark brown, with sand, slightly infused tar

(CONTINUED ON FOLLOWING FIGURE)

Field Tech: DW
Prepared/Date: JF 5/19/2011
Checked/Date: LT/PE 9/23/2011

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LOG OF BORING

Project No.: 4953-10-1561 Figure: A-2.16b

DRILLING COMPANY/DRILLING EQUIPMENT		BORING NO.
C & L Drilling / Mayhew 1000		**G-118 (Continued)**
DRILLING METHOD	**BOREHOLE LOCATION**	
Rotary Wash	Sta 502+15, Lt 20 feet	
DATES DRILLED	**HOLE DIAMETER**	**GROUND EL.**
3/22/2011 - 3/24/2011	4-7/8 inches	195 feet

GROUND-WATER READINGS
Ground-water level measured at 38 feet on 3/24/2011.

ELEVATION (ft)	DEPTH (ft)	"N" VALUE STD.PEN.TEST	OVA (ppm)**	MOISTURE CONTENT (% of dry wt.)	DRY DENSITY (pcf)	BLOW COUNT* (blows/ft)	PERCENT PASSING No. 200 SIEVE	SAMPLE LOC.	DOWNHOLE TESTS	
			186	21.7	85	55		⊠		Becomes dark grayish black, moderately infused tar
	85	54	182	20.8	-			⊠		Slightly infused tar
				28.0	75	22		⊠		Becomes stiff, moderately infused tar
Tunnel	90	40	108	21.8	-			⊠		Becomes hard, slightly infused tar
	95			18.6	92	20		⊠		Becomes stiff
		52	99	24.5	-			⊠		Becomes hard
	100		14	25.9	86	21		⊠		Becomes stiff
				26.0	-	29		⊠		
90	105	58	106	23.3	-			⊠		
										END OF BORING AT 105½ FEET
85	110									
80	115									
	120									

THIS RECORD IS AN INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. LATITUDE AND LONGITUDE OF BORING LOCATION SHOWN ON LOGS ARE APPROXIMATE. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BETWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

NOTES:

Hand augered upper 10 feet to avoid damage to utilities. Borehole grouted with cement-bentonite slurry and patched with asphalt concrete.

"N" Value Standard Penetration Test: Number of blows required to drive the SPT sampler 18 inches using a 140 pound automatic hammer falling 30 inches

*Number of blows required to drive the Crandall Sampler 12 inches using a 380 pound hammer falling 18 inches

**Photo Ionization Detector used for OVA readings

Field Tech: DW
Prepared/Date: JF 5/19/2011
Checked/Date: LT/PE 9/23/2011

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LOG OF BORING

Project No.: 4953-10-1561 Figure: A-2.16c

LA METRO PB-TUNNEL ZONE S:\70131 GEOTECH\GINTW\LIBRARY MACTEC JUNE2011.GLB
G:\PROJECT_DIRECTORIES\4953\2010\101561_METRO_WESTSIDE_EXTENSION\6.2.3.1 GEOTECHNICAL DESIGN\3.2 ALL FIELD NOTES\GINT LOG\NEW TEMPLATE - MARCH 14, 2011\4953-10-1561_(100-119).GPJ 10/20/11

DRILLING COMPANY/DRILLING EQUIPMENT		BORING NO.
C & L Drilling / Mayhew 1000		G-119
DRILLING METHOD	**BOREHOLE LOCATION**	
Rotary Wash	Sta 505+90, Lt 15 feet	
DATES DRILLED	**HOLE DIAMETER**	**GROUND EL.**
4/4/2011 and 4/5/2011	4-7/8 inches	192 feet

GROUND-WATER READINGS
Drilling mud could not be bailed below 22 feet due to presence of heavy tar. Ground-water level not measured.

THIS RECORD IS AN INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. LATITUDE AND LONGITUDE OF BORING LOCATION SHOWN ON LOGS ARE APPROXIMATE. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BETWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

ELEVATION (ft)	DEPTH (ft)	"N" VALUE STD.PEN.TEST	OVA (ppm)**	MOISTURE CONTENT (% of dry wt.)	DRY DENSITY (pcf)	BLOW COUNT* (blows/ft)	PERCENT PASSING No. 200 SIEVE	SAMPLE LOC.	DOWNHOLE TESTS		
190	0										8-inch thick Asphalt Concrete over 6-inch thick Portland Cement Concrete and 1-inch thick Base Course
										CL-ML	**QUATERNARY OLDER ALLUVIUM [Qalo]** SILTY CLAY - moist, dark brown, trace fine sand
	5		28	27.2	88	13		⊠		CL	**SAN PEDRO FORMATION [Qsp]** LEAN CLAY - stiff, moist, light brown and light gray, some fine sand
185											Trace cemented silt pods
	10	10	46	26.1	-			⊠			
180											Layers of greenish gray, more sand
	15		19	16.5	104	12		⊠			
175											
	20	41	20	14.4	-			⊠		SP-SM	***TAR IMPACTED SOILS*** POORLY GRADED SAND with SILT - dense, moist, black, fine to medium-grained, some coarse, moderately infused tar, layers of Silty Sand
170											Saturated with tar
	25		235	3.1	119	57	6	⊠			Trace gravel (up to 1/2 inch in size), moderately infused tar (14%)
165										ML	SILT - hard, moist, greenish gray, slightly infused tar
	30										Becomes brownish gray
		66	100	12.2	-			⊠		SM	SILTY SAND - very dense, moist, black, fine to medium-grained, saturated with tar (17%)
160											
	35		76	39.5	74	17	17	⊠			Becomes medium dense, greenish gray, moderately tar infused (9%)
155											
	40										

(CONTINUED ON FOLLOWING FIGURE)

Field Tech: AR
Prepared/Date: JF 6/15/2011
Checked/Date: LT/PE 9/23/2011

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LOG OF BORING

Project No.: 4953-10-1561 Figure: A-2.17a

DRILLING COMPANY/DRILLING EQUIPMENT		BORING NO.
C & L Drilling / Mayhew 1000		**G-119 (Continued)**
DRILLING METHOD	**BOREHOLE LOCATION**	
Rotary Wash	Sta 505+90, Lt 15 feet	
DATES DRILLED	**HOLE DIAMETER**	**GROUND EL.**
4/4/2011 and 4/5/2011	4-7/8 inches	192 feet

GROUND-WATER READINGS
Drilling mud could not be bailed below 22 feet due to presence of heavy tar. Ground-water level not measured.

THIS RECORD IS AN INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. LATITUDE AND LONGITUDE OF BORING LOCATION SHOWN ON LOGS ARE APPROXIMATE. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BETWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

ELEVATION (ft)	DEPTH (ft)	"N" VALUE STD.PEN.TEST	OVA (ppm)**	MOISTURE CONTENT (% of dry wt.)	DRY DENSITY (pcf)	BLOW COUNT* (blows/ft)	PERCENT PASSING No. 200 SIEVE	SAMPLE LOC.	DOWNHOLE TESTS		
		28	235	11.3	-			☒			Becomes brownish gray
150										SP-SM	POORLY GRADED SAND with SILT - medium dense, moist, black, fine to medium-grained, saturated with tar
	45		422	2.7	111	47		⊠			Becomes dense, decomposed organic fragments
145											Trace gravel (up to ½ inch in size)
	50	52	430	6.6	-		12	☒			Becomes very dense, fine-grained, trace medium to coarse, occasional gravel (up to 3/8 inch in size), saturated with tar (17%)
140											
	55		156	3.0	105	63		⊠			
135											
	60	50	311	7.4	-		8	☒		SP-SM	POORLY GRADED SAND with SILT and GRAVEL - dense, moist, black, fine-grained, some medium to coarse, fine to coarse gravel (up to 1 inch in size), moderately infused tar (15%)
130											
	65		269	6.5	90	70		⊠			Becomes very dense
125											
	70										**FERNANDO FORMATION [Tf]**
		42	312	21.4	-			☒			SILTSTONE - hard, moist, brownish dark gray, slightly infused tar
120											
	75		466	25.6	84	38	72	⊠			Becomes moderately infused tar, fine sand, trace medium
115											
	80										

(CONTINUED ON FOLLOWING FIGURE)

Field Tech: AR
Prepared/Date: JF 6/15/2011
Checked/Date: LT/PE 9/23/2011

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LOG OF BORING

Project No.: 4953-10-1561 Figure: A-2.17b

DRILLING COMPANY/DRILLING EQUIPMENT		BORING NO.
C & L Drilling / Mayhew 1000		**G-119 (Continued)**
DRILLING METHOD	**BOREHOLE LOCATION**	
Rotary Wash	Sta 505+90, Lt 15 feet	
DATES DRILLED	**HOLE DIAMETER**	**GROUND EL.**
4/4/2011 and 4/5/2011	4-7/8 inches	192 feet

GROUND-WATER READINGS
Drilling mud could not be bailed below 22 feet due to presence of heavy tar. Ground-water level not measured.

ELEVATION (ft)	DEPTH (ft)	"N" VALUE STD.PEN.TEST	OVA (ppm)**	MOISTURE CONTENT (% of dry wt.)	DRY DENSITY (pcf)	BLOW COUNT* (blows/ft)	PERCENT PASSING No. 200 SIEVE	SAMPLE LOC.	DOWNHOLE TESTS	
110	85	52	457	21.0	-			☒		Becomes brownish gray
			437	18.8	85	50		⊠		Saturated with tar (18%)
	90	35	311	23.4	-			☒		
Tunnel	95		985	21.1	87	49	78	⊠		Fine sand, some medium
	100	36	312	21.5	-			☒		
85	105		1243	18.0	89	55	68	⊠		Alternating with Sandy Siltstone, fine to medium sand
										END OF BORING AT 106 FEET
80	110									
	115									
75	120									

THIS RECORD IS AN INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. LATITUDE AND LONGITUDE OF BORING LOCATION SHOWN ON LOGS ARE APPROXIMATE. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BETWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

NOTES:

Hand augered upper 5 feet to avoid damage to utilities. Borehole grouted with cement-bentonite slurry and patched with asphalt concrete.

"N" Value Standard Penetration Test: Number of blows required to drive the SPT sampler 18 inches using a 140 pound automatic hammer falling 30 inches

*Number of blows required to drive the Crandall Sampler 12 inches using a 300 pound hammer falling 18 inches

**Photo Ionization Detector used for OVA readings

Field Tech: AR
Prepared/Date: JF 6/15/2011
Checked/Date: LT/PE 9/23/2011

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LOG OF BORING

Project No.: 4953-10-1561 Figure: A-2.17c

DRILLING COMPANY/DRILLING EQUIPMENT		BORING NO.
C & L Drilling / Mayhew 1000		G-121
DRILLING METHOD	**BOREHOLE LOCATION**	
Rotary Wash	Sta 516+36, Rt 14 feet	
DATES DRILLED	**HOLE DIAMETER**	**GROUND EL.**
5/16/2011 - 5/18/2011	4-7/8 inches	177 feet

GROUND-WATER READINGS
Drilling mud bailed. Ground-water level measured at 14 feet below the ground surface.

THIS RECORD IS AN INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. LATITUDE AND LONGITUDE OF BORING LOCATION SHOWN ON LOGS ARE APPROXIMATE. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BETWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

ELEVATION (ft)	DEPTH (ft)	"N" VALUE STD.PEN.TEST	OVA (ppm)**	MOISTURE CONTENT (% of dry wt.)	DRY DENSITY (pcf)	BLOW COUNT* (blows/ft)	PERCENT PASSING No. 200 SIEVE	SAMPLE LOC.	DOWNHOLE TESTS		
175	0										4-inch thick Asphalt Concrete over 7-inch Portland Cement Concrete
										CL	**FILL [Af]** SANDY LEAN CLAY - moist, brown, fine to medium sand, occasional fine gravel
	5		0.0	24.5	90	Push		⊠			More gravel
170											
	10	23	0.0	29.0	-		3	☒		GP	**LAKEWOOD FORMATION [Qlw]** POORLY GRADED GRAVEL with SAND - medium dense, wet, olive brown to bluish gray with light brown mottled, fine, fine to coarse sand, gravel (up to 3/4 inch in size)
165										SP-SM	**SAN PEDRO FORMATION [Qsp]** ▼ POORLY GRADED SAND with SILT - medium dense, moist, black to dark brown, fine-grained
	15		0.0	18.0	77	18		⊠			
160										GM	SILTY GRAVEL with SAND - wet, dark reddish brown, fine to coarse sand
	20	24	0.0	13.6	-		59	☒		ML	***TAR IMPACTED SOILS*** SANDY SILT - very stiff, moist, black, fine sand, some medium to coarse, occasional gravel (up to 3/8 inch in size), slightly infused tar
155											
	25		0.0	29.3	84	7		⊠			Becomes medium stiff, wet, dark brown
150										SP-SM	POORLY GRADED SAND with SILT - dense, moist, black, fine to medium-grained, moderately infused tar
	30	33	0.0	12.1	-			☒			
145											
	35		0.0	6.9	101	10	7	⊠			Becomes loose, fine-grained, trace medium
140											
	40										

(CONTINUED ON FOLLOWING FIGURE)

Field Tech: HTY
Prepared/Date: YN 6/20/2011
Checked/Date: LT/RM 9/21/2011

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LOG OF BORING

Project No.: 4953-10-1561 Figure: A-2.18a

DRILLING COMPANY/DRILLING EQUIPMENT		BORING NO.
C & L Drilling / Mayhew 1000		**G-121 (Continued)**
DRILLING METHOD	**BOREHOLE LOCATION**	
Rotary Wash	Sta 516+36, Rt 14 feet	
DATES DRILLED	**HOLE DIAMETER**	**GROUND EL.**
5/16/2011 - 5/18/2011	4-7/8 inches	177 feet

GROUND-WATER READINGS
Drilling mud bailed. Ground-water level measured at 14 feet below the ground surface.

THIS RECORD IS AN INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. LATITUDE AND LONGITUDE OF BORING LOCATION SHOWN ON LOGS ARE APPROXIMATE. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BETWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

ELEVATION (ft)	DEPTH (ft)	"N" VALUE STD.PEN.TEST	OVA (ppm)**	MOISTURE CONTENT (% of dry wt.)	DRY DENSITY (pcf)	BLOW COUNT* (blows/ft)	PERCENT PASSING No. 200 SIEVE	SAMPLE LOC.	DOWNHOLE TESTS		
135	45								PMT	GW	CLAYEY GRAVEL with SAND - very dense, moist, black, fine to coarse gravel, moderately infused tar
		56	0.0	8.0	-			☒			
130	50									SP	POORLY GRADED SAND - dense, moist, dark brown, fine to medium-grained, saturated with tar
		41	0.0	10.2	-			☒			
125	55									GW	WELL GRADED GRAVEL with SAND - wet, black, fine to coarse gravel, saturated with tar
				-	-	13		⊠		SP	POORLY GRADED SAND - medium dense, moist, black, fine to medium-grained, trace gravel, saturated with tar
120	60									GP	POORLY GRADED GRAVEL with SAND - medium dense, wet, black, fine to coarse, fine sand
				-	-	15		⊠			
	65										Becomes fine (up to 3/4 inch in size), coarse sand, some fine to coarse sand
		16	0.0	3.4	-		2	☒			
Tunnel	70									SW-SM	WELL GRADED SAND with SILT and GRAVEL - medium dense, moist, fine to coarse-grained, fine gravel (up to 1/2 inch in size)
		23	0.0	6.8	-		8	☒			
	75									ML	SILT with SAND - hard, moist, dark brown, fine sand, moderately infused tar
		53	0.0	25.5	-			☒			
	80										

(CONTINUED ON FOLLOWING FIGURE)

Field Tech: HTY
Prepared/Date: YN 6/20/2011
Checked/Date: LT/RM 9/21/2011

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LOG OF BORING

Project No.: 4953-10-1561 Figure: A-2.18b

DRILLING COMPANY/DRILLING EQUIPMENT		BORING NO.
C & L Drilling / Mayhew 1000		**G-121 (Continued)**
DRILLING METHOD	**BOREHOLE LOCATION**	
Rotary Wash	Sta 516+36, Rt 14 feet	
DATES DRILLED	**HOLE DIAMETER**	**GROUND EL.**
5/16/2011 - 5/18/2011	4-7/8 inches	177 feet

GROUND-WATER READINGS
Drilling mud bailed. Ground-water level measured at 14 feet below the ground surface.

ELEVATION (ft)	DEPTH (ft)	"N" VALUE STD.PEN.TEST	OVA (ppm)**	MOISTURE CONTENT (% of dry wt.)	DRY DENSITY (pcf)	BLOW COUNT* (blows/ft)	PERCENT PASSING No. 200 SIEVE	SAMPLE LOC.	DOWNHOLE TESTS	
95	85		0.0	21.5	91	18	77	⊠		Becomes very stiff, fine grained, some medium
90	90	45	0.0	22.2	-			☒		Becomes hard Trace gravel
85	95		0.0	21.4	-	21		⊠		GM SILTY GRAVEL with SAND - medium dense, wet, dark brown, fine gravel (up to 3/4 inch in size), fine to coarse sand, moderately infused tar, (sample disturbed)
80	100	54	0.0	23.5	-		33	☒		ML GRAVELLY SILT with SAND - hard, wet, dark brown, fine to coarse sand, fine gravel (up to 3/4 inch in size), slightly infused tar
75	105		0.0	14.0	-	17		⊠		**FERNANDO FORMATION [Tf]** SILTSTONE - very stiff to hard (Sample disturbed)
70	110	62	0.0	24.8	-			☒		More sand
65	115		0.0	22.3	88	21		⊠		Less sand
60	120									END OF BORING AT 111 FEET

NOTES:
Hand augered upper 5 feet to avoid damage to utilities.
Borehole grouted with cement-bentonite slurry and patched with asphalt concrete.
"N" Value Standard Penetration Test: Number of blows required to drive the SPT sampler 18 inches using a 140 pound automatic hammer falling 30 inches

*Number of blows required to drive the Crandall Sampler 12 inches using a 380 pound hammer falling 18 inches

**Photo Ionization Detector used for OVA readings
Downhole Test: PMT = Pressuremeter

Field Tech: HTY
Prepared/Date: YN 6/20/2011
Checked/Date: LT/RM 9/21/2011

THIS RECORD IS AN INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. LATITUDE AND LONGITUDE OF BORING LOCATION SHOWN ON LOGS ARE APPROXIMATE. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BETWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

LA METRO PB-TUNNEL ZONE S:\70131 GEOTECH\GINTW\LIBRARY MACTEC JUNE2011.GLB
G:\PROJECT_DIRECTORIES\4953\2010\101561_METRO_WESTSIDE_EXTENSION\6.2.3.1 GEOTECHNICAL DESIGN\3.2 ALL FIELD NOTES\GINT LOG\NEW TEMPLATE - MARCH 14, 2011\4953-10-1561_(120-139).GPJ 10/18/11

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LOG OF BORING

Project No.: 4953-10-1561 Figure: A-2.18c

DRILLING COMPANY/DRILLING EQUIPMENT		BORING NO.
C & L Drilling / Mayhew 1000		G-123
DRILLING METHOD	**BOREHOLE LOCATION**	
Rotary Wash	Sta 528+40, Lt 20 feet	
DATES DRILLED	**HOLE DIAMETER**	**GROUND EL.**
3/16/2011 - 3/18/2011	4-7/8 inches	168 feet

GROUND-WATER READINGS
Drilling mud bailed on 3/18/2011. Ground-water level measured at 32 feet below the ground surface 15 minutes after drilling.

THIS RECORD IS AN INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. LATITUDE AND LONGITUDE OF BORING LOCATION SHOWN ON LOGS ARE APPROXIMATE. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BETWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

ELEVATION (ft)	DEPTH (ft)	"N" VALUE STD.PEN.TEST	OVA (ppm)**	MOISTURE CONTENT (% of dry wt.)	DRY DENSITY (pcf)	BLOW COUNT* (blows/ft)	PERCENT PASSING No. 200 SIEVE	SAMPLE LOC.	DOWNHOLE TESTS		
Wilshire / Fairfax Station	5										11-inch thick Asphalt Concrete over 9-inch thick Slurry Backfill and 5-inch thick Base Course **FILL [Af]** SANDY SILT - moist, brown, fine to medium sand
	10									ML	
	15		4.8	15.9	111	10				SM	SILTY SAND with GRAVEL - moist, light brown, fine to coarse-grained **QUATERNARY YOUNGER ALLUVIUM [Qal]**
	20	16	6.3	19.4	-		17			ML	SILT - moist, light brown, some fine sand, some clay
	25		4.7	16.5	109	15			PMT	SM	SILTY SAND - loose, light brown, fine to medium-grained Some gravel
	30	19	16.7	19.5	-					SC	**QUATERNARY OLDER ALLUVIUM [Qalo]** ***TAR IMPACTED SOILS*** CLAYEY SAND - medium dense, moist, brown to grayish brown, fine to medium-grained, trace coarse, slightly infused tar (5%) Becomes greenish gray Less clay Becomes greenish gray, some coarse, occasional gravel, some small tar pods
	35			-	-	34				ML	SILT - moist, light brown, some clay, slight hydrogen sulfide odor Becomes greenish gray, 4-inch cobbles
	40	16	4.5	30.7	-		67			CL	SANDY LEAN CLAY - very stiff, dark gray to black, fine to medium sand, layers of coarse sand, very light hydrogen sulfide odor, some gravel (Sample not recovered) Trace gravel (up to 1/4 inch in size) **SAN PEDRO FORMATION [Qsp]**
			7.0	17.2	105	38			PMT	ML	SANDY SILT - very stiff, moist, greenish gray, fine to medium sand, slightly infused tar (4%), trace clay
										SM	SILTY SAND - dense, moist, dark brown to grayish black, fine-grained, moderately to saturated with tar, heavy hydrogen sulfide odor,

(CONTINUED ON FOLLOWING FIGURE)

Field Tech: AR
Prepared/Date: LH 6/22/2011
Checked/Date: LT/RM 10/1/2011

MTA Westside Subway Extension
Los Angeles, California

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LOG OF BORING

Project No.: 4953-10-1561 Figure: A-2.19a

DRILLING COMPANY/DRILLING EQUIPMENT		BORING NO.
C & L Drilling / Mayhew 1000		**G-123 (Continued)**
DRILLING METHOD	**BOREHOLE LOCATION**	
Rotary Wash	Sta 528+40, Lt 20 feet	
DATES DRILLED	**HOLE DIAMETER**	**GROUND EL.**
3/16/2011 - 3/18/2011	4-7/8 inches	168 feet

GROUND-WATER READINGS
Drilling mud bailed on 3/18/2011. Ground-water level measured at 32 feet below the ground surface 15 minutes after drilling.

THIS RECORD IS AN INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. LATITUDE AND LONGITUDE OF BORING LOCATION SHOWN ON LOGS ARE APPROXIMATE. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BETWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

Wilshire / Fairfax Station

ELEVATION (ft)	DEPTH (ft)	"N" VALUE STD.PEN.TEST	OVA (ppm)**	MOISTURE CONTENT (% of dry wt.)	DRY DENSITY (pcf)	BLOW COUNT* (blows/ft)	PERCENT PASSING No. 200 SIEVE	SAMPLE LOC.	DOWNHOLE TESTS		
		67	46.7	10.0	-			⊠			Becomes very dense, black
	45		76.8	6.4	114	96/9"	8	⊠		SW-SM	WELL GRADED SAND with SILT - very dense, moist, black, fine to coarse-grained, trace gravel (up to 3/4 inch in size), moderately infused tar (10%)
		56	135	8.5	-			⊠			
	50		62.4	5.8	109	98/11"		⊠			Less gravel
	55	42	145	9.4	-		15	⊠		SM	SILTY SAND - dense, moist, black, fine-grained, trace medium to coarse, trace fine gravel (up to 3/8 inch in size), moderately infused tar (11%)
			201	7.9	105	86/9"		⊠			Becomes very dense
	60	71	147	5.5	-			⊠			6-inch layer of gravel
	65		228	5.1	120	75/5"		⊠			Becomes greenish gray, trace gravel (up to 1 inch in size)
100											Becomes black, some gravel, saturated with tar
	70	50/5"	93	2.0	-		6	⊠		SP-SM	POORLY GRADED SAND with SILT - very dense, dry to moist, fine to medium-grained, occasional coarse, saturated with tar (16%)
95			475	5.3	107	75/9"		⊠		SM	SILTY SAND - very dense, dry to moist, black, fine gravel
	75	50/4"	214	3.1	-			⊠			
90			153	1.8	113	75/5"		⊠			
	80										

(CONTINUED ON FOLLOWING FIGURE)

Field Tech: AR
Prepared/Date: LH 6/22/2011
Checked/Date: LT/RM 10/1/2011

MTA Westside Subway Extension
Los Angeles, California

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LOG OF BORING

Project No.: 4953-10-1561 Figure: A-2.19b

DRILLING COMPANY/DRILLING EQUIPMENT		BORING NO.
C & L Drilling / Mayhew 1000		**G-123 (Continued)**
DRILLING METHOD	**BOREHOLE LOCATION**	
Rotary Wash	Sta 528+40, Lt 20 feet	
DATES DRILLED	**HOLE DIAMETER**	**GROUND EL.**
3/16/2011 - 3/18/2011	4-7/8 inches	168 feet

GROUND-WATER READINGS
Drilling mud bailed on 3/18/2011. Ground-water level measured at 32 feet below the ground surface 15 minutes after drilling.

THIS RECORD IS AN INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. LATITUDE AND LONGITUDE OF BORING LOCATION SHOWN ON LOGS ARE APPROXIMATE. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BETWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

ELEVATION (ft)	DEPTH (ft)	"N" VALUE STD.PEN.TEST	OVA (ppm)**	MOISTURE CONTENT (% of dry wt.)	DRY DENSITY (pcf)	BLOW COUNT* (blows/ft)	PERCENT PASSING No. 200 SIEVE	SAMPLE LOC.	DOWNHOLE TESTS	
85		89	558	5.9	-					Becomes moist
	85		117	4.7	109	99/8"				
80										
	90	74	95.4	6.3	-					
75										**FERNANDO FORMATION [Tf]** SILTSTONE - hard, moist, dark gray, fine sand, trace fine gravel, moderately infused tar to saturated with tar
	95		>3000	20.1	97	45				
70										
	100	53	2692	14.2	-					No gravel
65										
	105	46	1132	21.2	-					
60										
	110		2934	16.5	97	48				END OF BORING AT 110 FEET
55										
	115									
50										
	120									

NOTES:
Hand augered upper 7 feet to avoid damage to utilites.
Borehole grouted with cement-bentonite slurry and patched with asphalt concrete.

"N" Value Standard Penetration Test: Number of blows required to drive the SPT sampler 18 inches using a 140 pound automatic hammer falling 30 inches

*Number of blows required to drive the Crandall Sampler 12 inches using a 300 pound hammer falling 18 inches

**Photo Ionization Detector used for OVA readings

Downhole Test: PMT = Pressuremeter

Field Tech: AR
Prepared/Date: LH 6/22/2011
Checked/Date: LT/RM 10/1/2011

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LOG OF BORING

Project No.: 4953-10-1561 Figure: A-2.19c

DRILLING COMPANY/DRILLING EQUIPMENT		BORING NO.
C & L Drilling / Mayhew 1000		G-124
DRILLING METHOD	**BOREHOLE LOCATION**	
Rotary Wash	Sta 533+75, Lt 25 feet	
DATES DRILLED	**HOLE DIAMETER**	**GROUND EL.**
3/17/2011 - 3/21/2011	4-7/8 inches	162 feet

GROUND-WATER READINGS
Drilling mud bailed. Ground-water level measured at 34 feet below the ground surface.

THIS RECORD IS AN INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. LATITUDE AND LONGITUDE OF BORING LOCATION SHOWN ON LOGS ARE APPROXIMATE. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BETWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

ELEVATION (ft)	DEPTH (ft)	"N" VALUE STD.PEN.TEST	OVA (ppm)**	MOISTURE CONTENT (% of dry wt.)	DRY DENSITY (pcf)	BLOW COUNT* (blows/ft)	PERCENT PASSING No. 200 SIEVE	SAMPLE LOC.	DOWNHOLE TESTS		
Wilshire / Fairfax Station	5									SM	6-inch thick Asphalt Concrete over 12-inch thick Portland Cement Concrete **FILL [Af]** SILTY SAND with CLAY - moist, brown
										SM	**LAKEWOOD FORMATION [Qlw]** SILTY SAND - moist, orangish brown, fine to medium-grained, trace fine gravel, layers of Clayey Sand
	10										Becomes yellowish brown, fine-grained, trace medium to coarse, trace gravel
			0.0	17.1	108	Push		⊠		SC	CLAYEY SAND - very loose, moist, yellowish brown, fine-grained, trace medium to coarse gravel, micaceous
	15	16	0.1	19.7	-		35	☒		SC	**SAN PEDRO FORMATION [Qsp]** ***TAR IMPACTED SOILS*** CLAYEY SAND - medium dense, moist, olive brown to grayish-brown, fine to medium-grained, some coarse-grained, trace iron oxide stains, slightly infused tar (4%)
	20		0.5	23.1	99	11		⊠		CH	FAT CLAY - stiff, moist, gray, trace fine sand
	25	34	0.6	19.9	-			☒			Becomes hard, gray to very dark brown, some iron oxide, some calcium carbonate nodules, heavy organic odor
	30		78	23.0	95	21	32	⊠		SC	CLAYEY SAND - medium dense to dense, wet, gray to very dark brown, fine to medium-grained, occasional coarse, moderately infused tar (10%)
	35	42	76	13.6	-			☒	NV		Strong organinc odor
	40										

(CONTINUED ON FOLLOWING FIGURE)

Field Tech: DW
Prepared/Date: JF 3/29/2011
Checked/Date: RH/LT 10/1/2011

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LOG OF BORING

Project No.: 4953-10-1561 Figure: A-2.20a

DRILLING COMPANY/DRILLING EQUIPMENT		BORING NO.
C & L Drilling / Mayhew 1000		**G-124 (Continued)**
DRILLING METHOD	**BOREHOLE LOCATION**	
Rotary Wash	Sta 533+75, Lt 25 feet	
DATES DRILLED	**HOLE DIAMETER**	**GROUND EL.**
3/17/2011 - 3/21/2011	4-7/8 inches	162 feet

GROUND-WATER READINGS
Drilling mud bailed. Ground-water level measured at 34 feet below the ground surface.

THIS RECORD IS AN INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. LATITUDE AND LONGITUDE OF BORING LOCATION SHOWN ON LOGS ARE APPROXIMATE. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BETWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

ELEVATION (ft)	DEPTH (ft)	"N" VALUE STD.PEN.TEST	OVA (ppm)**	MOISTURE CONTENT (% of dry wt.)	DRY DENSITY (pcf)	BLOW COUNT* (blows/ft)	PERCENT PASSING No. 200 SIEVE	SAMPLE LOC.	DOWNHOLE TESTS		
Wilshire / Fairfax Station	45		60	-	-	15		○			Becomes dark brown, some tar, (sample not recovered)
		52	262	11.7	-		14	⊠		SM	SILTY SAND - very dense, moist, dark brown, fine-grained, some medium, occasional coarse, moderately infused tar (7%)
	50		402	-	-	40		⊠			Becomes dense
	55	97	366	5.1	-			⊠	NV	SP-SM	POORLY GRADED SAND with SILT - dense to very dense, moist, black to dark brown, fine-grained, some gravel
	60		489	6.1	113	33	9	⊠	NV		Becomes very dark brown, fine to medium-grained, trace coarse, some gravel (up to 3/4 inch in size), moderatly infused tar (13%)
100	65										
95			382	8.2	106	28		⊠			Becomes medium dense, black, fine-grained
90	70										
	75		467	5.6	114	40		⊠			Becomes dense
85											
	80										

(CONTINUED ON FOLLOWING FIGURE)

Field Tech: DW
Prepared/Date: JF 3/29/2011
Checked/Date: RH/LT 10/1/2011

MTA Westside Subway Extension
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LOG OF BORING

Project No.: 4953-10-1561 Figure: A-2.20b

DRILLING COMPANY/DRILLING EQUIPMENT		BORING NO.
C & L Drilling / Mayhew 1000		**G-124 (Continued)**
DRILLING METHOD	**BOREHOLE LOCATION**	
Rotary Wash	Sta 533+75, Lt 25 feet	
DATES DRILLED	**HOLE DIAMETER**	**GROUND EL.**
3/17/2011 - 3/21/2011	4-7/8 inches	162 feet

GROUND-WATER READINGS
Drilling mud bailed. Ground-water level measured at 34 feet below the ground surface.

ELEVATION (ft)	DEPTH (ft)	"N" VALUE STD.PEN.TEST	OVA (ppm)**	MOISTURE CONTENT (% of dry wt.)	DRY DENSITY (pcf)	BLOW COUNT* (blows/ft)	PERCENT PASSING No. 200 SIEVE	SAMPLE LOC.	DOWNHOLE TESTS		
80	85	97/9"	482	5.2	-		10	⊠		SW-SM	WELL GRADED SAND with SILT - very dense, moist, fine to coarse-grained, fine gravel (up to 1 inch in size), moderately infused tar (12%)
75	90		565	3.4	121	70		⊠		SM	SILTY SAND - very dense, moist, very dark brown to black, fine grained, moderately infused tar
70	95	88		5.1	-			⊠			
65	100			8.2	106	48		⊠			Becomes black to dark brown
60	105	51		25.4	-			⊠		ML	SANDY SILT - hard, moist, olive gray, fine sand, slightly infused tar (<5%)
55	110			-	-	85		○			(Sample not recovered)
50	115										END OF BORING AT 106 FEET
45	120										

NOTES:

Hand augered upper 10 feet to avoid damage to utilities. Borehole grouted with cement-bentonite slurry and patched with quick set cement.

"N" Value Standard Penetration Test: Number of blows required to drive the SPT sampler 18 inches using a 140 pound automatic hammer falling 30 inches

*Number of blows required to drive the Crandall Sampler 12 inches using a 380 pound hammer falling 18 inches

**Photo Ionization Detector used for OVA readings

Downhole Test: NV = Noise/Vibration

Field Tech: DW
Prepared/Date: JF 3/29/2011
Checked/Date: RH/LT 10/1/2011

THIS RECORD IS AN INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. LATITUDE AND LONGITUDE OF BORING LOCATION SHOWN ON LOGS ARE APPROXIMATE. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BETWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

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G:\PROJECT_DIRECTORIES\4953\2010\101561_METRO_WESTSIDE_EXTENSION\6.2.3.1 GEOTECHNICAL DESIGN\3.2 ALL FIELD NOTES\GINT LOG\NEW TEMPLATE - MARCH 14, 2011\4953-10-1561_(120-139).GPJ 10/18/11

MTA Westside Subway Extension
Los Angeles, California

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LOG OF BORING

Project No.: 4953-10-1561 Figure: A-2.20c

DRILLING COMPANY/DRILLING EQUIPMENT		BORING NO.
C & L Drilling / Mayhew 1000		G-125
DRILLING METHOD	**BOREHOLE LOCATION**	
Rotary Wash	Sta 550+50, Lt 20 feet	
DATES DRILLED	**HOLE DIAMETER**	**GROUND EL.**
4/6/2011 - 4/8/2011	4-7/8 inches	146 feet

GROUND-WATER READINGS
Drilling mud bailed on 4/7/2011. Ground-water level measured at 49 feet below the ground surface on 4/8/2011.

ELEVATION (ft)	DEPTH (ft)	"N" VALUE STD.PEN.TEST	OVA (ppm)**	MOISTURE CONTENT (% of dry wt.)	DRY DENSITY (pcf)	BLOW COUNT* (blows/ft)	PERCENT PASSING No. 200 SIEVE	SAMPLE LOC.	DOWNHOLE TESTS		
145											8-inch thick Asphalt Concrete over 5-inch thick Portland Cement Concrete and 12-inch thick Base Course
											QUATERNARY YOUNGER ALLUVIUM [Qal]
										ML	SILT - moist, trace fine sand, some clay
	5										
140			0.0	14.5	112	12		⊠		ML	SANDY SILT - stiff, moist, brown, fine to medium sand
	10									ML	SILT - very stiff, moist, light brown, some fine sand, some clay
135		22	0.1	19.0	-			☒			**LAKEWOOD FORMATION [Qlw]**
										SM	SILTY SAND - loose, moist, light brown, fine to medium-grained
	15										
130			0.3	18.4	104	12		⊠			Becomes olive brown, fine-grained, trace iron oxide stains
	20										
125		24	0.0	20.1	-			☒			Becomes medium dense, brown to olive brown
	25										
120			0.5	15.4	107	33	19	⊠			Occasional medium sand
											SAN PEDRO FORMATION [Qsp]
										ML	SANDY SILT - very stiff, moist, olive brown
	30										
115		18	3.4	36.6	-			☒			
										SM	SILTY SAND - moist, bluish gray, fine to medium-grained
	35										
110			0.7	27.3	94	37		⊠		SP	POORLY GRADED SAND - dense, moist, bluish gray, fine to medium-grained
		24	2.9	22.8	-			☒		ML	SILT - very stiff, moist, bluish gray, fine to medium sand, some clay
	40										

THIS RECORD IS AN INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. LATITUDE AND LONGITUDE OF BORING LOCATION SHOWN ON LOGS ARE APPROXIMATE. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BETWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

(CONTINUED ON FOLLOWING FIGURE)

Field Tech: AR
Prepared/Date: JF 6/10/2011
Checked/Date: LT 9/22/2011

MTA Westside Subway Extension
Los Angeles, California

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LOG OF BORING

Project No.: 4953-10-1561 Figure: A-2.21a

DRILLING COMPANY/DRILLING EQUIPMENT		BORING NO.
C & L Drilling / Mayhew 1000		**G-125 (Continued)**
DRILLING METHOD	**BOREHOLE LOCATION**	
Rotary Wash	Sta 550+50, Lt 20 feet	
DATES DRILLED	**HOLE DIAMETER**	**GROUND EL.**
4/6/2011 - 4/8/2011	4-7/8 inches	146 feet

GROUND-WATER READINGS
Drilling mud bailed on 4/7/2011. Ground-water level measured at 49 feet below the ground surface on 4/8/2011.

THIS RECORD IS AN INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. LATITUDE AND LONGITUDE OF BORING LOCATION SHOWN ON LOGS ARE APPROXIMATE. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BETWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

ELEVATION (ft)	DEPTH (ft)	"N" VALUE STD.PEN.TEST	OVA (ppm)**	MOISTURE CONTENT (% of dry wt.)	DRY DENSITY (pcf)	BLOW COUNT* (blows/ft)	PERCENT PASSING No. 200 SIEVE	SAMPLE LOC.	DOWNHOLE TESTS		
105			3.8	14.1	115	21					Becomes greenish gray, trace gravel (up to 1/8 inch in size)
	45	36	4.9	19.1	-					SM	SILTY SAND - dense, moist, bluish gray, fine to coarse-grained, layers of Silt
100			5.9	19.5	107	23	61			ML	SANDY SILT - very stiff to hard, moist, greenish gray, fine to medium sand, trace coarse sand, occasional gravel (up to 3/8 inch in size), layers of Sandy Lean Clay
	50	40	8.3	18.6	-						
95			8.1	22.6	99	34					
	55	32	8.3	24.1	-						
			8.6	16.2	112	62	15			SM	SILTY SAND - very dense, greenish gray, fine to medium-grained, occasional coarse, some fine gravel (up to 3/4 inch in size), trace hydrogen sulfide odor
	60	42	8.4	23.3	-					MH	ELASTIC SILT - hard, wet, greenish gray, some fine sand, trace medium to coarse sand, some clay, trace hydrogen sulfide odor
	65		8.4	28.4	96	37	90				
		66	8.3	19.6	-					SP	POORLY GRADED SAND - dense to very dense, moist, bluish gray, fine to medium-grained
	70		8.2	24.7	103	53					Becomes greenish gray
	75	83	8.1	15.6	-						
70			8.3	27.8	96	95	14			SM	SILTY SAND with GRAVEL - very dense, moist, gray, fine-grained, some medium to coarse, fine gravel (up to 3/4 inch in size)
	80										

Tunnel

(CONTINUED ON FOLLOWING FIGURE)

Field Tech: AR
Prepared/Date: JF 6/10/2011
Checked/Date: LT 9/22/2011

MTA Westside Subway Extension
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LOG OF BORING

Project No.: 4953-10-1561 Figure: A-2.21b

DRILLING COMPANY/DRILLING EQUIPMENT		BORING NO.
C & L Drilling / Mayhew 1000		**G-125 (Continued)**
DRILLING METHOD	**BOREHOLE LOCATION**	
Rotary Wash	Sta 550+50, Lt 20 feet	
DATES DRILLED	**HOLE DIAMETER**	**GROUND EL.**
4/6/2011 - 4/8/2011	4-7/8 inches	146 feet

GROUND-WATER READINGS
Drilling mud bailed on 4/7/2011. Ground-water level measured at 49 feet below the ground surface on 4/8/2011.

THIS RECORD IS AN INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. LATITUDE AND LONGITUDE OF BORING LOCATION SHOWN ON LOGS ARE APPROXIMATE. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BETWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

ELEVATION (ft)	DEPTH (ft)	"N" VALUE STD.PEN.TEST	OVA (ppm)**	MOISTURE CONTENT (% of dry wt.)	DRY DENSITY (pcf)	BLOW COUNT* (blows/ft)	PERCENT PASSING No. 200 SIEVE	SAMPLE LOC.	DOWNHOLE TESTS		
65		50/4"	7.6	15.7	-			☒		SP	POORLY GRADED SAND - very dense, moist, bluish gray
			10.5	18.3	99	75/6"		⊠			Trace gravel (up to ½ inch in size), trace hydrogen sulfide odor
60	85	74	13.0	16.0	-			☒			
	90		10.1	25.5	93	80/11"	15	⊠		SM	SILTY SAND - very dense, wet, dark gray, fine-grained
55		62	9.2	25.8	-			☒			
	95									ML	SILT with SAND - moist, greenish gray
50			8.7	23.0	94	66		⊠		SP-SM	POORLY GRADED SAND with SILT - very dense, dark gray, fine-grained
	100	34	7.9	27.1	-			☒		ML	SILT with SAND - hard, wet, greenish gray, some clay
45										SM	SILTY SAND - dense, moist, greenish gray, fine to medium-grained, trace gravel, trace cobble (up to 6 inches in size)
	105		8.9	19.5	107	50		⊠			Thin layer of Silt, some clay
40										SP	POORLY GRADED SAND - very dense, moist, greenish gray, fine-grained, trace hydrogen sulfide odor
	110	52/6"	7.8	16.0	-			☒			Becomes gray, fine to medium-grained
35											
	115		9.3	19.0	103	75/5"		⊠		SP	POORLY GRADED SAND with GRAVEL - very dense, wet, greenish gray, fine to medium-grained, trace hydrogen sulfide odor, gravel (up to 1/4 inch in size)
30											
	120	50/5"	9.4	22.3	-			☒			

(CONTINUED ON FOLLOWING FIGURE)

Field Tech: AR
Prepared/Date: JF 6/10/2011
Checked/Date: LT 9/22/2011

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LOG OF BORING

Project No.: 4953-10-1561 Figure: A-2.21c

DRILLING COMPANY/DRILLING EQUIPMENT		BORING NO.
C & L Drilling / Mayhew 1000		**G-125 (Continued)**
DRILLING METHOD	**BOREHOLE LOCATION**	
Rotary Wash	Sta 550+50, Lt 20 feet	
DATES DRILLED	**HOLE DIAMETER**	**GROUND EL.**
4/6/2011 - 4/8/2011	4-7/8 inches	146 feet

GROUND-WATER READINGS
Drilling mud bailed on 4/7/2011. Ground-water level measured at 49 feet below the ground surface on 4/8/2011.

ELEVATION (ft)	DEPTH (ft)	"N" VALUE STD.PEN.TEST	OVA (ppm)**	MOISTURE CONTENT (% of dry wt.)	DRY DENSITY (pcf)	BLOW COUNT* (blows/ft)	PERCENT PASSING No. 200 SIEVE	SAMPLE LOC.	DOWNHOLE TESTS
25	125							☒	
20	130								
15	135								
10	140								
5	145								
0	150								
-5	155								
-10	160								

END OF BORING AT 120 FEET

NOTES:

Hand augered upper 5 feet to avoid damage to utilities. Borehole grouted with cement-bentonite slurry and patched with asphalt concrete.

"N" Value Standard Penetration Test: Number of blows required to drive the SPT sampler 18 inches using a 140 pound automatic hammer falling 30 inches

*Number of blows required to drive the Crandall Sampler 12 inches using a 300 pound hammer falling 18 inches

**Photo Ionization Detector used for OVA readings

THIS RECORD IS AN INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. LATITUDE AND LONGITUDE OF BORING LOCATION SHOWN ON LOGS ARE APPROXIMATE. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BETWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

Field Tech: AR
Prepared/Date: JF 6/10/2011
Checked/Date: LT 9/22/2011

MTA Westside Subway Extension
Los Angeles, California

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LOG OF BORING
Project No.: 4953-10-1561 Figure: A-2.21d

DRILLING COMPANY/DRILLING EQUIPMENT		BORING NO.
C & L Drilling / Mayhew 1000		G-126
DRILLING METHOD	**BOREHOLE LOCATION**	
Rotary Wash	Sta 556+85, Lt 10 feet	
DATES DRILLED	**HOLE DIAMETER**	**GROUND EL.**
4/4/2011-4/7/2011	4-7/8 inches	143 feet

GROUND-WATER READINGS
Ground-water level encountered at 31 feet below ground surface.

THIS RECORD IS AN INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. LATITUDE AND LONGITUDE OF BORING LOCATION SHOWN ON LOGS ARE APPROXIMATE. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BETWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

ELEVATION (ft)	DEPTH (ft)	"N" VALUE STD.PEN.TEST	OVA (ppm)**	MOISTURE CONTENT (% of dry wt.)	DRY DENSITY (pcf)	BLOW COUNT* (blows/ft)	PERCENT PASSING No. 200 SIEVE	SAMPLE LOC.	DOWNHOLE TESTS		
140	0										4-inch thick Asphalt Concrete over 12-inch thick Portland Cement Concrete, No Base Course
										CL	**FILL [Af]** CLAY and SAND - moist, dark brown to dark gray, with gravel (Sand - possible utility backfill)
135	5										**QUATERNARY YOUNGER ALLUVIUM [Qal]**
										CL	LEAN CLAY - very soft, moist, light brown
130	10			30.2	88	Push		⊠			
125	15	8		25.3	-			☒			Becomes medium stiff, brown, thin layer of fine Silty Sand
120	20			30.6	89	6		⊠			Trace sand
115	25	13		27.4	-			☒			Becomes stiff, thin layers of Sandy Lean Clay
											SAN PEDRO FORMATION [Qsp]
										MH	ELASTIC SILT - stiff, moist, greenish gray, trace fine sand
110	30			30.0	90	9		⊠			▽
105	35	15		31.8	-			☒			Becomes very stiff, wet, trace calcium carbonate nodules
	40										

(CONTINUED ON FOLLOWING FIGURE)

Field Tech: DW
Prepared/Date: JF 5/18/2011
Checked/Date: LT/PE 9/22/2011

MTA Westside Subway Extension
Los Angeles, California

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LOG OF BORING

Project No.: 4953-10-1561 Figure: A-2.22a

DRILLING COMPANY/DRILLING EQUIPMENT		BORING NO.
C & L Drilling / Mayhew 1000		**G-126 (Continued)**
DRILLING METHOD	**BOREHOLE LOCATION**	
Rotary Wash	Sta 556+85, Lt 10 feet	
DATES DRILLED	**HOLE DIAMETER**	**GROUND EL.**
4/4/2011-4/7/2011	4-7/8 inches	143 feet

GROUND-WATER READINGS
Ground-water level encountered at 31 feet below ground surface.

THIS RECORD IS AN INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. LATITUDE AND LONGITUDE OF BORING LOCATION SHOWN ON LOGS ARE APPROXIMATE. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BETWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

ELEVATION (ft)	DEPTH (ft)	"N" VALUE STD.PEN.TEST	OVA (ppm)**	MOISTURE CONTENT (% of dry wt.)	DRY DENSITY (pcf)	BLOW COUNT* (blows/ft)	PERCENT PASSING No. 200 SIEVE	SAMPLE LOC.	DOWNHOLE TESTS			
				23.6	101	10		⊠				Alternating with layers of Poorly Graded Gravel
100	45	30		20.5	-		42	☒			SC	CLAYEY SAND - dense, wet, light gray to gray, fine-grained, trace gravel, calcium carbonate nodules
95	50			21.0	-	21		⊠				Cobbles (up to 3 inches in size)
90	55	44		29.1	94			☒			SM	SILTY SAND - dense, wet, gray, fine-grained
	60			34.9	92	43		⊠				Becomes greenish gray
Tunnel	65	49		29.2	-		55	☒			ML	SANDY SILT - hard, wet, gray, fine sand
	70			25.9	98	79		⊠			SP	POORLY GRADED SAND - very dense, wet, gray, fine-grained, trace silt, micaceous
65	75	36		28.3	-		45	☒			SM	SILTY SAND - dense, wet, greenish gray, fine-grained, thin layer of Lean Clay
	80											

(CONTINUED ON FOLLOWING FIGURE)

Field Tech: DW
Prepared/Date: JF 5/18/2011
Checked/Date: LT/PE 9/22/2011

MTA Westside Subway Extension
Los Angeles, California

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LOG OF BORING

Project No.: 4953-10-1561 Figure: A-2.22b

DRILLING COMPANY/DRILLING EQUIPMENT		BORING NO.
C & L Drilling / Mayhew 1000		**G-126 (Continued)**
DRILLING METHOD	**BOREHOLE LOCATION**	
Rotary Wash	Sta 556+85, Lt 10 feet	
DATES DRILLED	**HOLE DIAMETER**	**GROUND EL.**
4/4/2011-4/7/2011	4-7/8 inches	143 feet

GROUND-WATER READINGS
Ground-water level encountered at 31 feet below ground surface.

ELEVATION (ft)	DEPTH (ft)	"N" VALUE STD.PEN.TEST	OVA (ppm)**	MOISTURE CONTENT (% of dry wt.)	DRY DENSITY (pcf)	BLOW COUNT* (blows/ft)	PERCENT PASSING No. 200 SIEVE	SAMPLE LOC.	DOWNHOLE TESTS		
60	85			22.8	-	29	50	☒		SC	CLAYEY SAND - medium dense, wet, gray, fine to medium-grained, trace gravel
55	90	32		18.8	-		40	☒			Becomes dense, calcium carbonate nodules
50	95	37		17.2	-			☒		CL	SANDY LEAN CLAY - hard, wet, gray, fine to medium sand, calcium carbonate nodules
45	100			23.3	103	36	33	⊠		SM	SILTY SAND - dense, wet, greenish gray, fine to medium-grained, trace gravel
40	105	68		18.4	-			☒			Becomes very dense, gray, fine-grained
35	110			18.6	109	53		⊠		SP	POORLY GRADED SAND - very dense, wet, greenish gray, fine to medium-grained, some coarse, thin layer of fine Silty Sand
30	115	45		23.2	-			☒		ML	SANDY SILT - hard, wet, gray, fine sand, thin layer of Lean Clay
25	120										END OF BORING AT 111½ FEET

NOTES:
Hand augered upper 10 feet to avoid damage to utilities.
Borehole grouted with cement-bentonite slurry and patched with asphalt concrete.

"N" Value Standard Penetration Test: Number of blows required to drive the SPT sampler 18 inches using a 140 pound automatic hammer falling 30 inches

*Number of blows required to drive the Crandall Sampler 12 inches using a 380 pound hammer falling 18 inches

**Photo Ionization Detector used for OVA readings

Field Tech: DW
Prepared/Date: JF 5/18/2011
Checked/Date: LT/PE 9/22/2011

THIS RECORD IS AN INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. LATITUDE AND LONGITUDE OF BORING LOCATION SHOWN ON LOGS ARE APPROXIMATE. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BETWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

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G:\PROJECT_DIRECTORIES\4953\2010\101561_METRO_WESTSIDE_EXTENSION\6.2.3.1 GEOTECHNICAL DESIGN\3.2 ALL FIELD NOTES\GINT LOG\NEW TEMPLATE - MARCH 14, 2011\4953-10-1561_(120-139).GPJ 10/18/11

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Los Angeles, California

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LOG OF BORING

Project No.: 4953-10-1561 Figure: A-2.22c

DRILLING COMPANY/DRILLING EQUIPMENT		BORING NO.
C & L Drilling / Mayhew 1000		G-127
DRILLING METHOD	**BOREHOLE LOCATION**	
Rotary Wash	Sta 560+95, Rt 5 feet	
DATES DRILLED	**HOLE DIAMETER**	**GROUND EL.**
4/11/2011 and 4/12/2011	4-7/8 inches	142 feet

GROUND-WATER READINGS
Drilling mud bailed on 4/11/2011. Ground-water level measured at 41 feet below the ground surface on 4/12/2011.

THIS RECORD IS AN INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. LATITUDE AND LONGITUDE OF BORING LOCATION SHOWN ON LOGS ARE APPROXIMATE. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BETWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

ELEVATION (ft)	DEPTH (ft)	"N" VALUE STD.PEN.TEST	OVA (ppm)**	MOISTURE CONTENT (% of dry wt.)	DRY DENSITY (pcf)	BLOW COUNT* (blows/ft)	PERCENT PASSING No. 200 SIEVE	SAMPLE LOC.	DOWNHOLE TESTS		
140	0										4-inch thick Asphalt Concrete over 18-inch thick Portland Cement Concrete, No Base Course
											FILL [Af]
										SC	CLAYEY SAND - moist, brown to orangish brown, fine to medium-grained
	5										
135											**QUATERNARY YOUNGER ALLUVIUM [Qal]**
										CL	SANDY LEAN CLAY - very soft, moist, gray, sandy silt interbedded
	10		0.0	22.5	97	Push		⊠			Becomes brown, layers of Sandy Silt
130											
	15	8	0.1	24.6	-		83	☒			Becomes medium stiff, fine sand
125											
	20		0.0	27.0	98	7		⊠			Becomes brown to light olive brown, trace fine sand
120											
	25	13	0.0	21.6	-		72	☒			**SAN PEDRO FORMATION [Qsp]**
										ML	SANDY SILT - stiff, moist, olive brown to olive gray, fine sand, layers of Silty Sand
115											
										SM	SILTY SAND - medium dense, moist, greenish gray, fine-grained
	30		0.0	23.3	95	11	46	⊠			
110											
	35	24	0.1	19.3	-			☒		ML	SILT - very stiff, moist, greenish gray, interbeds silt and sand, some clay
105											
	40										

(CONTINUED ON FOLLOWING FIGURE)

Field Tech: DW
Prepared/Date: LH 5/20/2011
Checked/Date: LT 9/22/2011

MTA Westside Subway Extension
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LOG OF BORING

Project No.: 4953-10-1561 Figure: A-2.23a

DRILLING COMPANY/DRILLING EQUIPMENT		BORING NO.
C & L Drilling / Mayhew 1000		**G-127 (Continued)**
DRILLING METHOD	**BOREHOLE LOCATION**	
Rotary Wash	Sta 560+95, Rt 5 feet	
DATES DRILLED	**HOLE DIAMETER**	**GROUND EL.**
4/11/2011 and 4/12/2011	4-7/8 inches	142 feet

GROUND-WATER READINGS
Drilling mud bailed on 4/11/2011. Ground-water level measured at 41 feet below the ground surface on 4/12/2011.

THIS RECORD IS AN INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. LATITUDE AND LONGITUDE OF BORING LOCATION SHOWN ON LOGS ARE APPROXIMATE. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BETWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

ELEVATION (ft)	DEPTH (ft)	"N" VALUE STD.PEN.TEST	OVA (ppm)**	MOISTURE CONTENT (% of dry wt.)	DRY DENSITY (pcf)	BLOW COUNT* (blows/ft)	PERCENT PASSING No. 200 SIEVE	SAMPLE LOC.	DOWNHOLE TESTS		
100	45		0.0	26.3	97	11	61	⊠		ML	SANDY SILT - stiff, moist, olive gray, fine to medium sand, occasional coarse
95		27	0.6	22.2	-			☒			Becomes very stiff, olive gray, fine to medium sand, some calcium carbonate nodules
	50		0.1	21.9	100	17		⊠		ML	SILT with SAND - very stiff, moist, greenish gray, fine sand
	55	21	0.4	25.8	-		53	☒		CL	SANDY LEAN CLAY - very stiff, moist, gray, fine sand, occasional medium
Tunnel	60		0.0	28.3	90	11		⊠		CL	LEAN CLAY - stiff, moist, olive gray, trace sand
	65	10		-	-			○			(Sample not recovered)
	70		1.4	11.1	-	24	12	⊠		SM	SILTY SAND with GRAVEL - medium dense, moist to wet, gray, fine to coarse-grained, fine to coarse gravel (up to 1 inch in size)
70	75	52	1.2	-	-		80	☒		ML	SILT with SAND - hard, moist, gray, fine sand, occasional medium to coarse, some clay
65	80									SP	

(CONTINUED ON FOLLOWING FIGURE)

Field Tech: DW
Prepared/Date: LH 5/20/2011
Checked/Date: LT 9/22/2011

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LOG OF BORING

Project No.: 4953-10-1561 Figure: A-2.23b

DRILLING COMPANY/DRILLING EQUIPMENT		BORING NO.
C & L Drilling / Mayhew 1000		**G-127 (Continued)**
DRILLING METHOD	**BOREHOLE LOCATION**	
Rotary Wash	Sta 560+95, Rt 5 feet	
DATES DRILLED	**HOLE DIAMETER**	**GROUND EL.**
4/11/2011 and 4/12/2011	4-7/8 inches	142 feet

GROUND-WATER READINGS
Drilling mud bailed on 4/11/2011. Ground-water level measured at 41 feet below the ground surface on 4/12/2011.

ELEVATION (ft)	DEPTH (ft)	"N" VALUE STD.PEN.TEST	OVA (ppm)**	MOISTURE CONTENT (% of dry wt.)	DRY DENSITY (pcf)	BLOW COUNT* (blows/ft)	PERCENT PASSING No. 200 SIEVE	SAMPLE LOC.	DOWNHOLE TESTS		
60	85		1.6	31.5	91	21		⊠			POORLY GRADED SAND - medium dense, wet, gray, fine grained, trace silt
55	90	32	0.2	29.1	-			☒		CL	SANDY LEAN CLAY - hard, moist, gray to light gray
50	95		0.0	16.9	111	25	40	⊠		SM	SILTY SAND - medium dense, moist, greenish gray, fine to coarse-grained, occasional gravel (3/8 inch in size)
45	100	37	0.0	25.4	-			☒		CL	SANDY LEAN CLAY - very stiff to hard, moist, greenish gray, fine sand
40	105		0.0	23.7	97	15		⊠			Some calcium carbonate nodules
35	110	49	0.0	24.6	-			☒		SM	SILTY SAND - medium dense, moist, gray, fine-grained, layers of Sandy Silt
30	115		0.0	17.7	111	17		⊠			END OF BORING AT 112 FEET
25	120										

NOTES:
Hand augered upper 10 feet to avoid damage to utilities.
Borehole grouted with cement bentonite slurry and patched with asphalt concrete.

"N" Value Standard Penetration Test: Number of blows required to drive the SPT sampler 18 inches using a 140 pound automatic hammer falling 30 inches

*Number of blows required to drive the Crandall Sampler 12 inches using a 380 pound hammer falling 18 inches
**Photo Ionization Detector used for OVA readings

Field Tech: DW
Prepared/Date: LH 5/20/2011
Checked/Date: LT 9/22/2011

THIS RECORD IS AN INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. LATITUDE AND LONGITUDE OF BORING LOCATION SHOWN ON LOGS ARE APPROXIMATE. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BETWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

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G:\PROJECT_DIRECTORIES\4953\2010\101561_METRO_WESTSIDE_EXTENSION\6.2.3.1 GEOTECHNICAL DESIGN\3.2 ALL FIELD NOTES\GINT LOG\NEW TEMPLATE - MARCH 14, 2011\4953-10-1561_(120-139).GPJ 10/18/11

MTA Westside Subway Extension
Los Angeles, California

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LOG OF BORING

Project No.: 4953-10-1561 Figure: A-2.23c

DRILLING COMPANY/DRILLING EQUIPMENT		BORING NO.
C & L Drilling / Mayhew 1000		G-128
DRILLING METHOD	**BOREHOLE LOCATION**	
Rotary Wash	Sta 563+55, Lt 28 feet	
DATES DRILLED	**HOLE DIAMETER**	**GROUND EL.**
4/14/2011, 5/23/2011 and 5/24/2011	4-7/8 inches	141 feet

GROUND-WATER READINGS

Ground-water level measured at 26 feet below the ground surface on 5/24/2011.

ELEVATION (ft)	DEPTH (ft)	"N" VALUE STD.PEN.TEST	OVA (ppm)**	MOISTURE CONTENT (% of dry wt.)	DRY DENSITY (pcf)	BLOW COUNT* (blows/ft)	PERCENT PASSING No. 200 SIEVE	SAMPLE LOC.	DOWNHOLE TESTS
140	0								
	5		0.0	21.2	101	15	64	⊠	
135	10	12	0.0	30.4	-			☒	
130	15		0.0	34.5	-	3	95	⊠	PMT
125	20	18	0.0	25.6	-			☒	
120	25		0.0	19.8	107	7	75	⊠	
115	30	16	0.0	34.0	-		84	☒	
110	35		0.0	45.7	78	4		⊠	PMT
105	40								

10-inch thick Asphalt Concrete over 4-inch thick Portland Cement Concrete

GW **FILL [Af]** - WELL GRADED GRAVEL with SAND - wet, dark gray to black, fine to medium gravel, fine to coarse sand

QUATERNARY YOUNGER ALUVIUM [Qal]

CL SANDY LEAN CLAY - stiff, moist, dark gray, fine to medium sand

Becomes dark olive gray

QUATERNARY OLDER ALLUVIUM [Qalo]

CH FAT CLAY - soft, moist, olive gray, some silt, trace fine sand

CL LEAN CLAY with SAND - very stiff, moist, light brown, fine to medium sand, some root fragments

▼ Becomes medium stiff, light yellowish brown, fine sand, trace medium

SAN PEDRO FORMATION [Qsp]

CL LEAN CLAY with SAND - very stiff, moist, light yellowish brown to olive, fine sand, occasional medium

CH FAT CLAY - soft, moist, dark greenish gray, trace fine sand

SC CLAYEY SAND with GRAVEL- very dense, wet, bluish gray, fine to medium-grained, fine gravel (up to ¾ inch in size)

THIS RECORD IS AN INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. LATITUDE AND LONGITUDE OF BORING LOCATION SHOWN ON LOGS ARE APPROXIMATE. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BETWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

(CONTINUED ON FOLLOWING FIGURE)

Field Tech: HTY
Prepared/Date: YN 6/16/2011
Checked/Date: HP/PE 9/19/2011

MTA Westside Subway Extension
Los Angeles, California

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LOG OF BORING

Project No.: 4953-10-1561 Figure: A-2.24a

DRILLING COMPANY/DRILLING EQUIPMENT		BORING NO.
C & L Drilling / Mayhew 1000		**G-128 (Continued)**
DRILLING METHOD Rotary Wash	**BOREHOLE LOCATION** Sta 563+55, Lt 28 feet	
DATES DRILLED 4/14/2011, 5/23/2011 and 5/24/2011	**HOLE DIAMETER** 4-7/8 inches	**GROUND EL.** 141 feet

GROUND-WATER READINGS
Ground-water level measured at 26 feet below the ground surface on 5/24/2011.

THIS RECORD IS AN INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. LATITUDE AND LONGITUDE OF BORING LOCATION SHOWN ON LOGS ARE APPROXIMATE. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BETWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

ELEVATION (ft)	DEPTH (ft)	"N" VALUE STD.PEN.TEST	OVA (ppm)**	MOISTURE CONTENT (% of dry wt.)	DRY DENSITY (pcf)	BLOW COUNT* (blows/ft)	PERCENT PASSING No. 200 SIEVE	SAMPLE LOC.	DOWNHOLE TESTS		
100	45	69		20.2	-			☒			Becomes greenish gray
95	50		0.0	19.0	-	18	43	⊠			Becomes medium dense
	55	29	0.0	-	-			☒			
	60		0.0	18.3	111	13	52	⊠		CL	SANDY LEAN CLAY - stiff, moist, greenish gray, fine sand, some medium
	65								PMT		
	70	68	0.0	19.2	-			☒			Becomes hard, trace fine to coarse gravel
70	75		0.1	22.5	102	12	53	⊠			Layer of Sandy Silt, stiff, fine to medium sand
										SP-SM	POORLY GRADED SAND with SILT - very dense, wet, dark greenish gray
65	80	58	0.0	23.9	-			☒			

Wilshire / La Cienega Station

(CONTINUED ON FOLLOWING FIGURE)

Field Tech: HTY
Prepared/Date: YN 6/16/2011
Checked/Date: HP/PE 9/19/2011

MTA Westside Subway Extension
Los Angeles, California

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LOG OF BORING

Project No.: 4953-10-1561 Figure: A-2.24b

DRILLING COMPANY/DRILLING EQUIPMENT		BORING NO.
C & L Drilling / Mayhew 1000		**G-128 (Continued)**
DRILLING METHOD Rotary Wash	**BOREHOLE LOCATION** Sta 563+55, Lt 28 feet	
DATES DRILLED 4/14/2011, 5/23/2011 and 5/24/2011	**HOLE DIAMETER** 4-7/8 inches	**GROUND EL.** 141 feet
GROUND-WATER READINGS Ground-water level measured at 26 feet below the ground surface on 5/24/2011.		

ELEVATION (ft)	DEPTH (ft)	"N" VALUE STD.PEN.TEST	OVA (ppm)**	MOISTURE CONTENT (% of dry wt.)	DRY DENSITY (pcf)	BLOW COUNT* (blows/ft)	PERCENT PASSING No. 200 SIEVE	SAMPLE LOC.	DOWNHOLE TESTS			
60			0.0	25.4	97	16		⊠		CH	FAT CLAY with SAND - very stiff, moist, dark greenish gray
	85											
55		39	0.2	25.5	-		49	☒		SC	CLAYEY SAND - dense, moist, light greenish gray, fine to medium-grained, trace coarse, trace gravel
	90											
50			0.0	13.3	108	15		⊠		SW	WELL GRADED SAND - medium dense, moist, dark greenish gray, trace clay
										CL	SANDY LEAN CLAY - moist, dark greenish gray, fine sand
	95											
45		32	0.1	26.4	-			☒		CH	FAT CLAY with SAND - hard, moist, medium sand
	100											
40			0.1	31.7	92	9		⊠		SC	CLAYEY SAND with GRAVEL - loose, wet, light greenish gray, fine to coarse sand, fine gravel
										CL	LEAN CLAY with SAND - moist, dark greenish gray
	105											
35		75	0.1	21.4	-			☒		SC	CLAYEY SAND - very dense, wet, fine-grained
	110											
										CL	SANDY LEAN CLAY - stiff, moist, dark greenish gray, fine sand
30			0.1	28.5	93	12		⊠			END OF BORING AT 111 FEET
	115										
25											
	120										

NOTES:
Hand augered uppper 5 feet to avoid damage to utilities.
Borehole grouted with cement bentonite and patched with asphalt concrete.

"N" Value Standard Penetration Test: Number of blows required to drive the SPT sampler 18 inches using a 140 pound automatic hammer falling 30 inches

*Number of blows required to drive Crandall Sampler 12 inches using 380 pound hammer falling 18 inches

**Photo Ionization Detector used for OVA readings
Downhole Test: PMT = Pressuremeter

Field Tech: HTY
Prepared/Date: YN 6/16/2011
Checked/Date: HP/PE 9/19/2011

THIS RECORD IS AN INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. LATITUDE AND LONGITUDE OF BORING LOCATION SHOWN ON LOGS ARE APPROXIMATE. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BETWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

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G:\PROJECT_DIRECTORIES\4953\2010\10561_METRO_WESTSIDE_EXTENSION\6.2.3.1 GEOTECHNICAL DESIGN\3.2 ALL FIELD NOTES\GINT LOG\ROTARY WASH GINT LOGS\4953-10-1561_(120-139).GPJ 12/7/11

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LOG OF BORING

Project No.: 4953-10-1561 Figure: A-2.24c

DRILLING COMPANY/DRILLING EQUIPMENT		BORING NO.
Fugro / CME 75		G-129
DRILLING METHOD	**BOREHOLE LOCATION**	
Rotary Wash	Sta 567+90, Lt 10 feet	
DATES DRILLED	**HOLE DIAMETER**	**GROUND EL.**
5/16/2011 - 5/18/2011	4-7/8 inches	139 feet

GROUND-WATER READINGS
Ground-water level measured at 31 feet below the ground surface on 5/17/2011.

THIS RECORD IS AN INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. LATITUDE AND LONGITUDE OF BORING LOCATION SHOWN ON LOGS ARE APPROXIMATE. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BETWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

Wilshire / La Cienega Station

ELEVATION (ft)	DEPTH (ft)	"N" VALUE STD.PEN.TEST	OVA (ppm)**	MOISTURE CONTENT (% of dry wt.)	DRY DENSITY (pcf)	BLOW COUNT* (blows/ft)	PERCENT PASSING No. 200 SIEVE	SAMPLE LOC.	DOWNHOLE TESTS		
	5										8-inch thick Asphalt Concrete over 10-inch thick Portland Cement Concrete **FILL [Af]** SANDY LEAN CLAY - moist, light olive yellow, fine to coarse sand, trace gravel (up to ½ inch in size), porous
										CL	
											More sand
	10		5.6	28.9	90	11					
											SAN PEDRO FORMATION [Qsp]
	15	10	4.2	23.9	-		84			CL	LEAN CLAY with SAND - stiff, moist, dark olive, trace fine sand, trace medium
	20		3.9	19.4	109	20				CL	SANDY LEAN CLAY - very stiff, moist, light olive to olive, fine sand
	25	10	4.2	28.4	-		88			CH	FAT CLAY - stiff, moist, olive gray, some fine sand, trace medium, trace calcium carbonate nodules
	30		8.5	15.4	114	21				CL	SANDY LEAN CLAY - very stiff, moist, olive gray, fine to medium sand, trace calcium carbonate nodules
	35	12	2.8	20.6	-		47			SC	CLAYEY SAND - medium dense, wet, light olive gray to greenish gray, fine to medium-grained, trace coarse, trace shell fragments, trace black manganese stains, trace calcium carbonate nodules
	40		1.9	-	-	22				CL	

(CONTINUED ON FOLLOWING FIGURE)

Field Tech: LH
Prepared/Date: YN 6/17/2011
Checked/Date: HP/LT 9/19/2011

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LOG OF BORING

Project No.: 4953-10-1561 Figure: A-2.25a

DRILLING COMPANY/DRILLING EQUIPMENT		BORING NO.
Fugro / CME 75		**G-129 (Continued)**
DRILLING METHOD	**BOREHOLE LOCATION**	
Rotary Wash	Sta 567+90, Lt 10 feet	
DATES DRILLED	**HOLE DIAMETER**	**GROUND EL.**
5/16/2011 - 5/18/2011	4-7/8 inches	139 feet

GROUND-WATER READINGS
Ground-water level measured at 31 feet below the ground surface on 5/17/2011.

THIS RECORD IS AN INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. LATITUDE AND LONGITUDE OF BORING LOCATION SHOWN ON LOGS ARE APPROXIMATE. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BETWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

Wilshire / La Cienega Station

ELEVATION (ft)	DEPTH (ft)	"N" VALUE STD.PEN.TEST	OVA (ppm)**	MOISTURE CONTENT (% of dry wt.)	DRY DENSITY (pcf)	BLOW COUNT* (blows/ft)	PERCENT PASSING No. 200 SIEVE	SAMPLE LOC.	DOWNHOLE TESTS		
	45	53	6.9	12.7	-		19	☒		SM	SANDY LEAN CLAY - very stiff, moist, greenish gray, fine sand, some calcium carbonate nodules SILTY SAND with GRAVEL - very dense, moist to wet, greenish gray, fine to coarse-grained, gravel (up to ½ inch in size)
	50		5.2	23.4	104	23		⊠		CL	SANDY LEAN CLAY - very stiff, moist, greenish gray, fine sand, trace calcium carbonate nodules
	55	24	1.2	27.7	-			☒			
	60		0.0	15.0	110	26	15	⊠		SM	SILTY SAND - medium dense, wet, fine to medium-grained, trace coarse, trace coarse gravel (up to ½ inch in size)
	65	35	1.2	14.7	-		16	☒		SM	SILTY SAND with GRAVEL - dense, wet, greenish gray, fine to coarse-grained, some fine to coarse gravel (up to 1½ inches in size)
70	70		0.0	26.5	95	40	83	⊠		ML	SILT with SAND - hard, moist, greenish gray, fine sand, trace medium to coarse, some mica
65	75	37	0.0	32.1	-			☒			
60	80		1.1	29.2	95	53		⊠			

(CONTINUED ON FOLLOWING FIGURE)

Field Tech: LH
Prepared/Date: YN 6/17/2011
Checked/Date: HP/LT 9/19/2011

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LOG OF BORING

Project No.: 4953-10-1561 Figure: A-2.25b

DRILLING COMPANY/DRILLING EQUIPMENT		BORING NO.
Fugro / CME 75		**G-129 (Continued)**
DRILLING METHOD	**BOREHOLE LOCATION**	
Rotary Wash	Sta 567+90, Lt 10 feet	
DATES DRILLED	**HOLE DIAMETER**	**GROUND EL.**
5/16/2011 - 5/18/2011	4-7/8 inches	139 feet

GROUND-WATER READINGS
Ground-water level measured at 31 feet below the ground surface on 5/17/2011.

THIS RECORD IS AN INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. LATITUDE AND LONGITUDE OF BORING LOCATION SHOWN ON LOGS ARE APPROXIMATE. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BETWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

ELEVATION (ft)	DEPTH (ft)	"N" VALUE STD.PEN.TEST	OVA (ppm)**	MOISTURE CONTENT (% of dry wt.)	DRY DENSITY (pcf)	BLOW COUNT* (blows/ft)	PERCENT PASSING No. 200 SIEVE	SAMPLE LOC.	DOWNHOLE TESTS		
55	85	11	1.0	32.6	-			☒		CH	FAT CLAY with SAND - stiff, moist, light greenish gray, fine sand, trace calcium carbonate nodules
50	90		0.3	25.8	-	30	76	⊠			Becomes very stiff, some fine to medium sand, trace coarse, weakly cemented, some gravel (up to 1/4 inch in size)
45	95	55	1.5	22.1	-			☒			Becomes hard
40	100		0.0	26.5	92	42		⊠		SC	CLAYEY SAND - medium dense, moist, greenish gray, fine to coarse-grained, trace fine to coarse gravel (up to ½ inch in size), trace calcium carbonate nodules
35	105	28	0.0	16.5	-		32	☒			
30	110		0.0	29.6	96	21		⊠		CL	SANDY LEAN CLAY - very stiff, moist, greenish gray, fine to medium sand, trace silt, trace calcium carbonate nodules
25	115	14	0.0	28.7	-			☒			Becomes stiff, less calcium carbonate nodules, more clay
20	120			22.4	104	48		⊠		SC	CLAYEY SAND - dense, moist, greenish gray, fine-grained, trace calcium carbonate nodules

(CONTINUED ON FOLLOWING FIGURE)

Field Tech: LH
Prepared/Date: YN 6/17/2011
Checked/Date: HP/LT 9/19/2011

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LOG OF BORING

Project No.: 4953-10-1561 Figure: A-2.25c

DRILLING COMPANY/DRILLING EQUIPMENT		BORING NO.
Fugro / CME 75		**G-129 (Continued)**
DRILLING METHOD	**BOREHOLE LOCATION**	
Rotary Wash	Sta 567+90, Lt 10 feet	
DATES DRILLED	**HOLE DIAMETER**	**GROUND EL.**
5/16/2011 - 5/18/2011	4-7/8 inches	139 feet

GROUND-WATER READINGS

Ground-water level measured at 31 feet below the ground surface on 5/17/2011.

ELEVATION (ft)	DEPTH (ft)	"N" VALUE STD.PEN.TEST	OVA (ppm)**	MOISTURE CONTENT (% of dry wt.)	DRY DENSITY (pcf)	BLOW COUNT* (blows/ft)	PERCENT PASSING No. 200 SIEVE	SAMPLE LOC.	DOWNHOLE TESTS
15	125								
10	130								
5	135								
0	140								
-5	145								
-10	150								
-15	155								
-20	160								

END OF BORING AT 120 FEET

NOTES:

Hand augered upper 7 feet to avoid damage to utilites.
Borehole grouted with cement-bentonite slurry and patched with asphalt concrete.

"N" Value Standard Penetration Test: Number of blows required to drive the SPT sampler 18 inches using a 140 pound automatic hammer falling 30 inches

*Number of blows required to drive the Crandall Sampler 12 inches using a 140 pound automatic hammer falling 30 inches

**Photo Ionization Detector used for OVA readings

THIS RECORD IS AN INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. LATITUDE AND LONGITUDE OF BORING LOCATION SHOWN ON LOGS ARE APPROXIMATE. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BETWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

Field Tech: LH
Prepared/Date: YN 6/17/2011
Checked/Date: HP/LT 9/19/2011

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LOG OF BORING

Project No.: 4953-10-1561 Figure: A-2.25d

DRILLING COMPANY/DRILLING EQUIPMENT		BORING NO.
C & L Drilling / Meyhew 1000		G-130B
DRILLING METHOD	**BOREHOLE LOCATION**	
Rotary Wash	Sta 570+12, Rt 5 feet	
DATES DRILLED	**HOLE DIAMETER**	**GROUND EL.**
4/20/2011 - 4/22/2011	4-7/8 inches	138 feet

GROUND-WATER READINGS
Drilling mud bailed on 4/21/2011. Ground-water level measured at 22 feet below the ground surface on 4/22/2011.

THIS RECORD IS AN INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. LATITUDE AND LONGITUDE OF BORING LOCATION SHOWN ON LOGS ARE APPROXIMATE. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BETWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

ELEVATION (ft)	DEPTH (ft)	"N" VALUE STD.PEN.TEST	OVA (ppm)**	MOISTURE CONTENT (% of dry wt.)	DRY DENSITY (pcf)	BLOW COUNT* (blows/ft)	PERCENT PASSING No. 200 SIEVE	SAMPLE LOC.	DOWNHOLE TESTS		
Wilshire / La Cienega Station	5										6-inch thick Asphalt Concrete over 12-inch thick Portland Cement Concrete **FILL [Af]** CLAYEY SAND - moist, brown, fine to coarse-grained
										SC	
										CH	FAT CLAY with SAND - moist, brown, fine to coarse sand
	10			18.4	104	Push				SC	**QUATERNARY YOUNGER ALLUVIUM [Qal]** CLAYEY SAND - very loose, moist, olive brown, fine to medium-grained
	15	8	0	26.8	-					CL	LEAN CLAY - medium stiff, moist, gray to greenish gray, trace fine sand
	20		0	-	-	5				CL	SANDY LEAN CLAY - medium stiff, wet, brown, fine to coarse sand, (disturbed sample recovered)
	25	20	0	26.0	-					SM	SILTY SAND - medium dense, moist, brown, fine-grained, layer of Poorly Graded Sand, medium to coarse
	30		0	26.6	99	6				CL	**SAN PEDRO FORMATION [Qsp]** LEAN CLAY - medium stiff, moist, gray, abundant calcium carbonate nodules
	35	17		-	-						Becomes very stiff, (sample not recovered)
		15		-	-						Becomes stiff, (sample not recovered)
	40										

(CONTINUED ON FOLLOWING FIGURE)

Field Tech: LH
Prepared/Date: JF 6/27/2011
Checked/Date: LT/PE 9/27/2011

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LOG OF BORING

Project No.: 4953-10-1561 Figure: A-2.26a

DRILLING COMPANY/DRILLING EQUIPMENT		BORING NO.
C & L Drilling / Meyhew 1000		**G-130B (Continued)**
DRILLING METHOD	**BOREHOLE LOCATION**	
Rotary Wash	Sta 570+12, Rt 5 feet	
DATES DRILLED	**HOLE DIAMETER**	**GROUND EL.**
4/20/2011 - 4/22/2011	4-7/8 inches	138 feet

GROUND-WATER READINGS
Drilling mud bailed on 4/21/2011. Ground-water level measured at 22 feet below the ground surface on 4/22/2011.

THIS RECORD IS AN INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. LATITUDE AND LONGITUDE OF BORING LOCATION SHOWN ON LOGS ARE APPROXIMATE. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BETWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

Wilshire / La Cienega Station

ELEVATION (ft)	DEPTH (ft)	"N" VALUE STD.PEN.TEST	OVA (ppm)**	MOISTURE CONTENT (% of dry wt.)	DRY DENSITY (pcf)	BLOW COUNT* (blows/ft)	PERCENT PASSING No. 200 SIEVE	SAMPLE LOC.	DOWNHOLE TESTS		
				23.4	98	18	98	⊠			Becomes very stiff, greenish gray, occasional fine sand
	45	20	0	24.5	-			☒			Becomes olive greenish gray, fine to medium sand, trace calcium carbonate
	50		0	23.1	102	14		⊠		CH	FAT CLAY - stiff, moist, light greenish gray, trace fine sand
	55	42	0	14.5	-		30	☒		SC	CLAYEY SAND with GRAVEL - dense, moist, light greenish gray, fine to medium-grained, trace coarse, fine to coarse gravel (up to 1 inch in size)
	60		0	28.3	93	11	63	⊠		ML	SANDY SILT - stiff, moist, light greenish gray, fine to medium sand, occasional coarse
	65	16	0	31.7	-			☒		CL-ML	SILTY CLAY - very stiff, moist, greenish gray, trace fine sand
70	70		0	35.0	89	10		⊠		CH	FAT CLAY with SAND - stiff, moist, dark greenish gray, fine to medium sand
65	75	19	0	31.4	-			☒		ML	SILT - very stiff, moist, olive greenish gray, trace fine gravel, trace calcium carbonate nodules
60	80										

(CONTINUED ON FOLLOWING FIGURE)

Field Tech: LH
Prepared/Date: JF 6/27/2011
Checked/Date: LT/PE 9/27/2011

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LOG OF BORING

Project No.: 4953-10-1561 Figure: A-2.26b

DRILLING COMPANY/DRILLING EQUIPMENT		BORING NO.
C & L Drilling / Meyhew 1000		**G-130B (Continued)**
DRILLING METHOD	**BOREHOLE LOCATION**	
Rotary Wash	Sta 570+12, Rt 5 feet	
DATES DRILLED	**HOLE DIAMETER**	**GROUND EL.**
4/20/2011 - 4/22/2011	4-7/8 inches	138 feet

GROUND-WATER READINGS
Drilling mud bailed on 4/21/2011. Ground-water level measured at 22 feet below the ground surface on 4/22/2011.

THIS RECORD IS AN INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. LATITUDE AND LONGITUDE OF BORING LOCATION SHOWN ON LOGS ARE APPROXIMATE. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BETWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

ELEVATION (ft)	DEPTH (ft)	"N" VALUE STD.PEN.TEST	OVA (ppm)**	MOISTURE CONTENT (% of dry wt.)	DRY DENSITY (pcf)	BLOW COUNT* (blows/ft)	PERCENT PASSING No. 200 SIEVE	SAMPLE LOC.	DOWNHOLE TESTS		
55	85		0	28.1	96	40	45	⊠		SM	SILTY SAND - dense, moist to wet, greenish gray, fine-grained, trace mica
50	90	34	0	34.4	-			☒		CL-ML	SILTY CLAY - hard, moist, greenish gray, trace fine sand Thin layer of Sandy Lean Clay, fine to medium sand
45	95		0	43.2	79	30		⊠		CL	LEAN CLAY - hard, moist, light gray, trace fine to medium sand, trace calcium carbonate nodules
40	100	31		-	-			○			(Sample not recovered) More sand
35	105		0	22.9	97	13	55	⊠		CL	SANDY LEAN CLAY - stiff, moist, greenish gray, fine sand, trace medium Less sand
30	110	27	0	35.7	-			☒			Alternating with layers of Lean Clay, trace fine sand, trace calcium carbonate nodules More sand
25	115		0	19.7	105	18		⊠		ML	SANDY SILT - very stiff, moist, greenish gray, fine to medium sand, trace fine gravel, trace clay, thin layer of Silty Sand
20	120	24	0	24.6	-			☒		CL	LEAN CLAY with SAND - very stiff, moist, greenish gray, fine to medium sand, trace calcium carbonate nodules
										SM	SILTY SAND - dense, moist to wet, gray, fine to medium-grained

(CONTINUED ON FOLLOWING FIGURE)

Field Tech: LH
Prepared/Date: JF 6/27/2011
Checked/Date: LT/PE 9/27/2011

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LOG OF BORING

Project No.: 4953-10-1561 Figure: A-2.26c

DRILLING COMPANY/DRILLING EQUIPMENT		BORING NO.
C & L Drilling / Meyhew 1000		**G-130B (Continued)**
DRILLING METHOD	**BOREHOLE LOCATION**	
Rotary Wash	Sta 570+12, Rt 5 feet	
DATES DRILLED	**HOLE DIAMETER**	**GROUND EL.**
4/20/2011 - 4/22/2011	4-7/8 inches	138 feet

GROUND-WATER READINGS
Drilling mud bailed on 4/21/2011. Ground-water level measured at 22 feet below the ground surface on 4/22/2011.

ELEVATION (ft)	DEPTH (ft)	"N" VALUE STD.PEN.TEST	OVA (ppm)**	MOISTURE CONTENT (% of dry wt.)	DRY DENSITY (pcf)	BLOW COUNT* (blows/ft)	PERCENT PASSING No. 200 SIEVE	SAMPLE LOC.	DOWNHOLE TESTS
15	125		0	17.0	110	47	18	⊠	
10	130								
5	135								
0	140								
-5	145								
-10	150								
-15	155								
-20	160								

Thin layer of Silt

END OF BORING AT 121 FEET

NOTES:

Hand augered upper 10 feet to avoid damage to utilities. Borehole grouted with cement-bentonite slurry and patched with asphalt concrete.

"N" Value Standard Penetration Test: Number of blows required to drive the SPT sampler 18 inches using a 140 pound automatic hammer falling 30 inches

*Number of blows required to drive the Crandall Sampler 12 inches using a 380 pound hammer falling 18 inches

**Photo Ionization Detector used for OVA readings

THIS RECORD IS AN INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. LATITUDE AND LONGITUDE OF BORING LOCATION SHOWN ON LOGS ARE APPROXIMATE. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BETWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

Field Tech: LH
Prepared/Date: JF 6/27/2011
Checked/Date: LT/PE 9/27/2011

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LOG OF BORING

Project No.: 4953-10-1561 Figure: A-2.26d

DRILLING COMPANY/DRILLING EQUIPMENT		BORING NO.
C & L Drilling / Mayhew 1000		G-131
DRILLING METHOD	**BOREHOLE LOCATION**	
Rotary Wash	Sta 573+90, Lt 20' feet	
DATES DRILLED	**HOLE DIAMETER**	**GROUND EL.**
4/25/2011 - 4/27/2011	4-7/8 inches	138 feet

GROUND-WATER READINGS
Drilling mud bailed on 4/26/2011. Ground-water level measured at 21½ feet below the ground surface on 4/27/2011.

THIS RECORD IS AN INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. LATITUDE AND LONGITUDE OF BORING LOCATION SHOWN ON LOGS ARE APPROXIMATE. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BETWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

ELEVATION (ft)	DEPTH (ft)	"N" VALUE STD.PEN.TEST	OVA (ppm)**	MOISTURE CONTENT (% of dry wt.)	DRY DENSITY (pcf)	BLOW COUNT* (blows/ft)	PERCENT PASSING No. 200 SIEVE	SAMPLE LOC.	DOWNHOLE TESTS		
Wilshire / La Cienega Station	5		7.7	32.0	87	12		⊠		CL-ML	8-inch thick Asphalt Concrete over 7-inch thick Portland Cement Concrete and 12-inch thick Base Course **QUATERNARY YOUNGER ALUVIUM [Qal]** SILTY CLAY - stiff, moist, dark gray to black, trace fine sand
	10	16	8.5	12.9	-		22	⊠		SC	**QUATERNARY OLDER ALUVIUM [Qalo]** CLAYEY SAND - medium dense, moist, olive brown, fine to coarse-grained, trace fine gravel (up to 3/8 inch in size)
	15		4.7	10.0	-	23		⊠		SW	WELL GRADED SAND - medium dense, moist, gray, fine to coarse-grained, trace gravel (up to 1/4 inch in size)
	20	14	14.2	25.9	-			⊠		ML	**SAN PEDRO FORMATION [Qsp]** SILT - stiff, moist, light olive gray, trace fine sand, some tar odor ▼
	25		0.7	25.2	99	20		⊠		CL	LEAN CLAY - very stiff, moist, olive gray
	30	16	2.7	38.1	-			⊠	PMT		
	35		2.3	32.7	87	11	91	⊠		CH	FAT CLAY - stiff, moist, bluish gray, trace shell fragments, some fine sand, trace medium to coarse
	40										

(CONTINUED ON FOLLOWING FIGURE)

Field Tech: AR
Prepared/Date: YN 5/17/2011
Checked/Date: LT/PE 9/22/2011

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LOG OF BORING

Project No.: 4953-10-1561 Figure: A-2.27a

DRILLING COMPANY/DRILLING EQUIPMENT		BORING NO.
C & L Drilling / Mayhew 1000		**G-131 (Continued)**
DRILLING METHOD	**BOREHOLE LOCATION**	
Rotary Wash	Sta 573+90, Lt 20' feet	
DATES DRILLED	**HOLE DIAMETER**	**GROUND EL.**
4/25/2011 - 4/27/2011	4-7/8 inches	138 feet

GROUND-WATER READINGS
Drilling mud bailed on 4/26/2011. Ground-water level measured at 21½ feet below the ground surface on 4/27/2011.

THIS RECORD IS AN INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. LATITUDE AND LONGITUDE OF BORING LOCATION SHOWN ON LOGS ARE APPROXIMATE. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BETWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

Wilshire / La Cienega Station

ELEVATION (ft)	DEPTH (ft)	"N" VALUE STD.PEN.TEST	OVA (ppm)**	MOISTURE CONTENT (% of dry wt.)	DRY DENSITY (pcf)	BLOW COUNT* (blows/ft)	PERCENT PASSING No. 200 SIEVE	SAMPLE LOC.	DOWNHOLE TESTS		
	45	14	6.3	21.6	-			☒	PMT	ML	SANDY SILT - stiff, moist, greenish gray, fine to medium sand
			5.9	15.1	111	11		⊠		CL	SANDY LEAN CLAY - stiff, moist, greenish gray, trace sand
	50	46	7.2	22.3	-		51	☒			Becomes hard, gray, trace calcium carbonate nodules
	55		7.2	19.3	78	19	46	⊠		SM	SILTY SAND - medium dense, moist, bluish gray, fine to medium-grained, trace coarse, trace fine gravel (up to 3/8 inch in size)
	60	23	7.6	25.1	-			☒			Becomes greenish gray, some clay, fine to medium sand, trace gravel (up to 1/4 inch in size)
	65		6.3	25.3	99	15	42	⊠		SC	CLAYEY SAND with GRAVEL - medium dense, moist, greenish gray, fine to medium-grained, gravel (up to 1 inch in size)
70	70	17	4.6	43.3	-			☒			
65	75		1.4	39.7	80	10		⊠			Becomes gray to black
60	80										

(CONTINUED ON FOLLOWING FIGURE)

Field Tech: AR
Prepared/Date: YN 5/17/2011
Checked/Date: LT/PE 9/22/2011

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LOG OF BORING

Project No.: 4953-10-1561 Figure: A-2.27b

DRILLING COMPANY/DRILLING EQUIPMENT		BORING NO.
C & L Drilling / Mayhew 1000		**G-131 (Continued)**
DRILLING METHOD	**BOREHOLE LOCATION**	
Rotary Wash	Sta 573+90, Lt 20' feet	
DATES DRILLED	**HOLE DIAMETER**	**GROUND EL.**
4/25/2011 - 4/27/2011	4-7/8 inches	138 feet

GROUND-WATER READINGS
Drilling mud bailed on 4/26/2011. Ground-water level measured at 21½ feet below the ground surface on 4/27/2011.

ELEVATION (ft)	DEPTH (ft)	"N" VALUE STD.PEN.TEST	OVA (ppm)**	MOISTURE CONTENT (% of dry wt.)	DRY DENSITY (pcf)	BLOW COUNT* (blows/ft)	PERCENT PASSING No. 200 SIEVE	SAMPLE LOC.	DOWNHOLE TESTS		
55	85	72	0.7	14.8	-		18	☒		SM	SILTY SAND - very dense, moist, bluish gray, fine to coarse-grained, some fine gravel (up to ¾ inch in size)
50	90		8.5	28.8	94	26		⊠			Becomes medium dense, some tar odor
45	95	23	2.5	33.9	-			☒			Becomes light gray, some coarse gravel
40	100		9.9	18.7	110	24	27	⊠			Becomes greenish gray, some fine gravel (up to 1/2 inch in size)
35	105	30	10.1	21.6	-			☒			
30	110		8.2	34.9	85	21		⊠		MH	ELASTIC SILT - very stiff, wet, bluish gray, trace sand
25	115	50	6.1	20.6	-			☒			Becomes hard
20	120		8.8	32.7	-	57		○		ML	SANDY SILT - hard, moist, gray, fine to medium sand, (disturbed sample)

THIS RECORD IS AN INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. LATITUDE AND LONGITUDE OF BORING LOCATION SHOWN ON LOGS ARE APPROXIMATE. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BETWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

(CONTINUED ON FOLLOWING FIGURE)

Field Tech: AR
Prepared/Date: YN 5/17/2011
Checked/Date: LT/PE 9/22/2011

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LOG OF BORING

Project No.: 4953-10-1561 Figure: A-2.27c

DRILLING COMPANY/DRILLING EQUIPMENT		BORING NO.
C & L Drilling / Mayhew 1000		**G-131 (Continued)**
DRILLING METHOD	**BOREHOLE LOCATION**	
Rotary Wash	Sta 573+90, Lt 20' feet	
DATES DRILLED	**HOLE DIAMETER**	**GROUND EL.**
4/25/2011 - 4/27/2011	4-7/8 inches	138 feet

GROUND-WATER READINGS
Drilling mud bailed on 4/26/2011. Ground-water level measured at 21½ feet below the ground surface on 4/27/2011.

ELEVATION (ft)	DEPTH (ft)	"N" VALUE STD.PEN.TEST	OVA (ppm)**	MOISTURE CONTENT (% of dry wt.)	DRY DENSITY (pcf)	BLOW COUNT* (blows/ft)	PERCENT PASSING No. 200 SIEVE	SAMPLE LOC.	DOWNHOLE TESTS
15	125	34	6.1	22.0	-			☒	
10	130								
5	135								
0	140								
-5	145								
-10	150								
-15	155								
-20	160								

Becomes bluish gray

END OF BORING AT 121½ FEET

NOTES:

Hand augered upper 5 feet to avoid damage to utilities. Borehole grouted with cement-bentonite slurry and patched with asphalt concrete.

"N" Value Standard Penetration Test: Number of blows required to drive the SPT sampler 18 inches using a 140 pound automatic hammer falling 30 inches

*Number of blows required to drive the Crandall Sampler 12 inches using a 300 pound hammer falling 18 inches

**Photo Ionization Detector used for OVA readings

Downhole Test: PMT = Pressuremeter

THIS RECORD IS AN INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. LATITUDE AND LONGITUDE OF BORING LOCATION SHOWN ON LOGS ARE APPROXIMATE. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BETWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

Field Tech: AR
Prepared/Date: YN 5/17/2011
Checked/Date: LT/PE 9/22/2011

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LOG OF BORING

Project No.: 4953-10-1561 Figure: A-2.27d

DRILLING COMPANY/DRILLING EQUIPMENT		BORING NO.
C & L Drilling / Mayhew 1000		G-132
DRILLING METHOD	**BOREHOLE LOCATION**	
Rotary Wash	Sta 578+00, Lt 10 feet	
DATES DRILLED	**HOLE DIAMETER**	**GROUND EL.**
4/14/2011 and 4/15/2011	4-7/8 inches	139 feet

GROUND-WATER READINGS
Drilling mud bailed on 4/14/2011. Ground-water level measured at 28 feet below the ground surface.

THIS RECORD IS AN INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. LATITUDE AND LONGITUDE OF BORING LOCATION SHOWN ON LOGS ARE APPROXIMATE. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BETWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

ELEVATION (ft)	DEPTH (ft)	"N" VALUE STD.PEN.TEST	OVA (ppm)**	MOISTURE CONTENT (% of dry wt.)	DRY DENSITY (pcf)	BLOW COUNT* (blows/ft)	PERCENT PASSING No. 200 SIEVE	SAMPLE LOC.	DOWNHOLE TESTS		
135	5										5-inch thick Asphalt Concrete over 12-inch thick Portland Cement Concrete **FILL [Af]** SITLY CLAY - moist, dark brown to black, expansive
			0.0	-	-	27		⊠		CL-ML	
130	10	10	0.0	29.4	-			⊠		CL	SANDY LEAN CLAY - moist, light olive brown, fine to medium sand
125	15		0.0	-	-	8		⊠		CL	**QUATERNARY YOUNGER ALLUVIUM [Qal]** LEAN CLAY - medium stiff to stiff, moist, olive brown, trace sand
120	20	9	0.0	33.3	-			⊠			Becomes dark olive brown to brown, trace fine sand, alternating layers of Silty Clay
115	25		0.0	19.5	108	17	77	⊠		CL	Becomes olive brown **QUATERNARY OLDER ALLUVIUM [Qalo]** LEAN CLAY with SAND - stiff, moist, olive brown, fine sand, occasional medium
110	30	22	0.0	28.1	-			⊠			▼ Becomes very stiff, olive brown, fine sand
105	35		0.0	26.5	89	14	89	⊠		MH	**SAN PEDRO FORMATION [Qsp]** ELASTIC SILT - stiff, moist, gray, some fine sand, occasional medium, trace calcium carbonate nodules
100	40										

(CONTINUED ON FOLLOWING FIGURE)

Field Tech: LH
Prepared/Date: YN 9/2/2011
Checked/Date: LT/PE 9/26/2011

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LOG OF BORING

Project No.: 4953-10-1561 Figure: A-2.28a

DRILLING COMPANY/DRILLING EQUIPMENT		BORING NO.
C & L Drilling / Mayhew 1000		**G-132 (Continued)**
DRILLING METHOD	**BOREHOLE LOCATION**	
Rotary Wash	Sta 578+00, Lt 10 feet	
DATES DRILLED	**HOLE DIAMETER**	**GROUND EL.**
4/14/2011 and 4/15/2011	4-7/8 inches	139 feet

GROUND-WATER READINGS
Drilling mud bailed on 4/14/2011. Ground-water level measured at 28 feet below the ground surface.

THIS RECORD IS AN INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. LATITUDE AND LONGITUDE OF BORING LOCATION SHOWN ON LOGS ARE APPROXIMATE. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BETWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

ELEVATION (ft)	DEPTH (ft)	"N" VALUE STD.PEN.TEST	OVA (ppm)**	MOISTURE CONTENT (% of dry wt.)	DRY DENSITY (pcf)	BLOW COUNT* (blows/ft)	PERCENT PASSING No. 200 SIEVE	SAMPLE LOC.	DOWNHOLE TESTS		
		13	0.0	37.0	-			☒			
95	45										
			0.0	29.7	91	27	91	⊠			Becomes very stiff, greenish gray, trace fine and medium sand
	50	29	0.0	25.3	-			☒			Becomes light olive gray, trace calcium carbonate nodules
	55		0.0	33.0	97	55		⊠		CL	SANDY LEAN CLAY - hard, wet, gray, fine to coarse sand
	60	69	0.0	18.4	-		16	☒		SM	SILTY SAND - very dense, moist, gray, fine to coarse-grained, trace fine gravel (up to 3/8 inch in size)
											Some fine to medium gravel
	65			-	-	91		○			Gravel (up to 1½ inches in size), (sample not recovered)
70	70	41	0.0	18.8	-			☒		CL	LEAN CLAY - hard, olive gray, trace fine to medium sand
										SP-SC	POORLY GRADED SAND with CLAY - dense, olive gray, fine to medium-grained, trace coarse
65	75		0.0	9.7	120	49		⊠		SP	POORLY GRADED SAND - very dense, wet, gray, fine to coarse-grained, trace fine gravel (up to 1/8 inch in size), some clay
60	80										Becomes medium to coarse-grained

Wilshire / La Cienega Station

(CONTINUED ON FOLLOWING FIGURE)

Field Tech: LH
Prepared/Date: YN 9/2/2011
Checked/Date: LT/PE 9/26/2011

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LOG OF BORING

Project No.: 4953-10-1561 Figure: A-2.28b

DRILLING COMPANY/DRILLING EQUIPMENT		BORING NO.
C & L Drilling / Mayhew 1000		**G-132 (Continued)**
DRILLING METHOD	**BOREHOLE LOCATION**	
Rotary Wash	Sta 578+00, Lt 10 feet	
DATES DRILLED	**HOLE DIAMETER**	**GROUND EL.**
4/14/2011 and 4/15/2011	4-7/8 inches	139 feet

GROUND-WATER READINGS
Drilling mud bailed on 4/14/2011. Ground-water level measured at 28 feet below the ground surface.

ELEVATION (ft)	DEPTH (ft)	"N" VALUE STD.PEN.TEST	OVA (ppm)**	MOISTURE CONTENT (% of dry wt.)	DRY DENSITY (pcf)	BLOW COUNT* (blows/ft)	PERCENT PASSING No. 200 SIEVE	SAMPLE LOC.	DOWNHOLE TESTS		
55	85	64	0.0	10.3	-		19	⊠		SC	CLAYEY SAND - very dense, wet, gray, fine to coarse-grained, some clay, occasional gravel (up to 1/8 inch in size)
				-	-	68/9"		○			(Sample not recovered)
											Becomes medium to coarse-grained
50	90		0.0	-	-	75/8"		○			(Sample not recovered)
		63	0.0	23.4	-		62	⊠		ML	SANDY SILT - hard, moist, gray, fine-grained
45	95										
			0.0	34.4	91	86/9"		⊠			Becomes greenish gray, very fine sand
40	100										
		42	0.0	27.8	-		71	⊠		CL	LEAN CLAY with SAND - hard, moist, gray, fine sand, trace medium
35	105										
			0.0	20.0	107	46		⊠			Becomes light gray, trace calcium carbonate nodules
30	110										
		65	0.0	16.8	-			⊠		SC	CLAYEY SAND - very dense, moist, light olive gray, fine to medium-grained
25	115										END OF BORING AT 111½ FEET
20	120										

NOTES:
Hand augered upper 5½ feet to avoid damage to utilities.
Borehole grouted with cement-bentonite slurry and patched with asphalt concrete.

"N" Value Standard Penetration Test: Number of blows required to drive the SPT sampler 18 inches using a 140 pound automatic hammer falling 30 inches

*Number of blows required to drive the Crandall Sampler 12 inches using a 300 pound hammer falling 18 inches

**Photo Ionization Detector used for OVA readings

Field Tech: LH
Prepared/Date: YN 9/2/2011
Checked/Date: LT/PE 9/26/2011

THIS RECORD IS AN INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. LATITUDE AND LONGITUDE OF BORING LOCATION SHOWN ON LOGS ARE APPROXIMATE. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BETWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

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G:\PROJECT_DIRECTORIES\4953\2010\101561_METRO_WESTSIDE_EXTENSION\6.2.3.1 GEOTECHNICAL DESIGN\3.2 ALL FIELD NOTES\GINT LOG\NEW TEMPLATE - MARCH 14, 2011\4953-10-1561_(120-139).GPJ 10/18/11

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LOG OF BORING

Project No.: 4953-10-1561 Figure: A-2.28c

DRILLING COMPANY/DRILLING EQUIPMENT		BORING NO.
C & L Drilling / Mayhew 1000		G-133
DRILLING METHOD	**BOREHOLE LOCATION**	
Rotary Wash	Sta 584+80, Lt 15 feet	
DATES DRILLED	**HOLE DIAMETER**	**GROUND EL.**
3/14/2011 - 3/16/2011	4-7/8 inches	144 feet

GROUND-WATER READINGS
Drilling mud bailed on 3/15/2011. Ground-water level measured at 33 feet below the ground surface on 3/16/2011.

THIS RECORD IS AN INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. LATITUDE AND LONGITUDE OF BORING LOCATION SHOWN ON LOGS ARE APPROXIMATE. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BETWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

ELEVATION (ft)	DEPTH (ft)	"N" VALUE STD.PEN.TEST	OVA (ppm)**	MOISTURE CONTENT (% of dry wt.)	DRY DENSITY (pcf)	BLOW COUNT* (blows/ft)	PERCENT PASSING No. 200 SIEVE	SAMPLE LOC.	DOWNHOLE TESTS		
											6-inch thick Asphalt Concrete over 12-inch thick Portland Cement Concrete
											QUATERNARY YOUNGER ALLUVIUM [Qal]
140										CL	SANDY LEAN CLAY - very soft, moist, dark brownish gray, trace slate gravel
	5		0.0	20.5	101	Push					Becomes dark gray, trace fine gravel
135											
	10	14	0.0	20.2	-						Becomes stiff, light olive brown, fine to medium sand
130											**QUATERNARY OLDER ALLUVIUM [Qalo]**
	15		0.0	18.8	107	11				CL	SANDY LEAN CLAY - stiff, moist, light brown, trace calcium carbonate nodules
125											
	20	9/10"	0.0	22.9	-						
120											**SAN PEDRO FORMATION [Qsp]**
	25		0.0	26.2	95	9				CL	SANDY LEAN CLAY - stiff, moist, gray, fine sand
115											
	30	18	0.1	23.0	-						Becomes very stiff, light brown to gray
110											▼
	35		0.1	25.8	96	13				ML	SANDY SILT - stiff, moist to wet, gray, fine sand
105		16	0.0	36.6	-					CL	LEAN CLAY - very stiff, moist, olive brown, trace fine sand, iron oxide stains
	40										

(CONTINUED ON FOLLOWING FIGURE)

Field Tech: DW
Prepared/Date: JF 3/29/2011
Checked/Date: LT/PE 9/26/2011

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LOG OF BORING

Project No.: 4953-10-1561 Figure: A-2.29a

DRILLING COMPANY/DRILLING EQUIPMENT		BORING NO.
C & L Drilling / Mayhew 1000		**G-133 (Continued)**
DRILLING METHOD	**BOREHOLE LOCATION**	
Rotary Wash	Sta 584+80, Lt 15 feet	
DATES DRILLED	**HOLE DIAMETER**	**GROUND EL.**
3/14/2011 - 3/16/2011	4-7/8 inches	144 feet

GROUND-WATER READINGS
Drilling mud bailed on 3/15/2011. Ground-water level measured at 33 feet below the ground surface on 3/16/2011.

THIS RECORD IS AN INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. LATITUDE AND LONGITUDE OF BORING LOCATION SHOWN ON LOGS ARE APPROXIMATE. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BETWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

ELEVATION (ft)	DEPTH (ft)	"N" VALUE STD.PEN.TEST	OVA (ppm)**	MOISTURE CONTENT (% of dry wt.)	DRY DENSITY (pcf)	BLOW COUNT* (blows/ft)	PERCENT PASSING No. 200 SIEVE	SAMPLE LOC.	DOWNHOLE TESTS		
			0.2	25.9	100	13		⊠			Alternating with layers of Silty Sand, gray
100	45	16	0.0	35.1	-			☒		MH	ELASTIC SILT - very stiff, moist to wet, gray, trace fine sand
			0.0	32.0	88	16		⊠			Some iron oxide stains
95	50	28	0.0	28.1	-		98	☒			
			0.0	28.6	93	27		⊠		CL	LEAN CLAY - very stiff, moist to wet, bluish gray, trace fine gravel
90	55	21	0.0	33.0	-			☒			Alternating with layers of Silty Sand, brown
85	60		0.0	25.3	100	23	80	⊠		ML	SILT with SAND - very stiff, moist, brown, micaceous
		20		28.5	-			☒		CL	SANDY LEAN CLAY - very stiff, moist, light brown to light gray
80	65			23.0	104	18		⊠			Becomes gray, fine to medium sand
75	70	46	0.2	14.2	-		28	☒		SM	SILTY SAND with GRAVEL - dense, moist, gray, fine to medium-grained, gravel (up to 1½ inches in size)
			0.0	21.6	104	20		⊠		CL	SANDY LEAN CLAY - very stiff, moist, gray to bluish gray, fine sand
Tunnel	75	27	0.0	23.4	-		57	☒		ML	SANDY SILT - very stiff, moist, gray to bluish gray, fine sand, trace gravel (up to 3/8 inch in size)
			0.0	21.4	107	24		⊠			
	80									SM	

(CONTINUED ON FOLLOWING FIGURE)

Field Tech: DW
Prepared/Date: JF 3/29/2011
Checked/Date: LT/PE 9/26/2011

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LOG OF BORING

Project No.: 4953-10-1561 Figure: A-2.29b

DRILLING COMPANY/DRILLING EQUIPMENT		BORING NO.
C & L Drilling / Mayhew 1000		**G-133 (Continued)**
DRILLING METHOD	**BOREHOLE LOCATION**	
Rotary Wash	Sta 584+80, Lt 15 feet	
DATES DRILLED	**HOLE DIAMETER**	**GROUND EL.**
3/14/2011 - 3/16/2011	4-7/8 inches	144 feet

GROUND-WATER READINGS
Drilling mud bailed on 3/15/2011. Ground-water level measured at 33 feet below the ground surface on 3/16/2011.

ELEVATION (ft)	DEPTH (ft)	"N" VALUE STD.PEN.TEST	OVA (ppm)**	MOISTURE CONTENT (% of dry wt.)	DRY DENSITY (pcf)	BLOW COUNT* (blows/ft)	PERCENT PASSING No. 200 SIEVE	SAMPLE LOC.	DOWNHOLE TESTS		
Tunnel	85	52	0.1	15.6	-						SILTY SAND - very dense, moist, gray to bluish gray, fine to coarse-grained, alternating thin layer of Sandy Silt
			0.0	12.6	120	56	20			SC	CLAYEY SAND - very dense, moist to wet, gray, fine to coarse-grained, trace gravel (up to 3/8 inch in size)
	90	34	0.1	-	-		34			SM	SILTY SAND - dense, moist, gray, fine to coarse-grained, with thin layers of Lean Clay
			0.0	21.4	99	25					Becomes medium dense, fine-grained, with thin layer of Silt
50	95	29	0.0	17.1	-						Alternating with layers of Lean Clay, very stiff
45			0.0	26.6	93	18				ML	SILT - very stiff, moist, dark gray, micaceous, trace clay
40	100			-	-	30				SW	WELL GRADED SAND - dense, moist, gray, fine to medium-grained, trace coarse
35	105			22.5	99	45				SM	SILTY SAND - dense, moist to wet, gray, fine-grained, micaceous
30	110			10.8	118	36				SW	WELL GRADED SAND - dense, moist to wet, gray, fine to coarse-grained
25	115										END OF BORING AT 111 FEET
	120										

NOTES:
Borehole grouted with cement-bentonite slurry and patched with asphalt concrete.

"N" Value Standard Penetration Test: Number of blows required to drive the SPT sampler 18 inches using a 140 pound automatic hammer falling 30 inches

*Number of blows required to drive the Crandall Sampler 12 inches using a 380 pound hammer falling 18 inches

**Photo Ionization Detector used for OVA readings

THIS RECORD IS AN INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. LATITUDE AND LONGITUDE OF BORING LOCATION SHOWN ON LOGS ARE APPROXIMATE. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BETWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

Field Tech: DW
Prepared/Date: JF 3/29/2011
Checked/Date: LT/PE 9/26/2011

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LOG OF BORING

Project No.: 4953-10-1561 Figure: A-2.29c

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DRILLING COMPANY/DRILLING EQUIPMENT		BORING NO.
C & L Drilling / Mayhew 1000		G-134
DRILLING METHOD	**BOREHOLE LOCATION**	
Rotary Wash	Sta 590+40, Lt 27 feet	
DATES DRILLED	**HOLE DIAMETER**	**GROUND EL.**
3/29/2011, 3/30/2011, 4/8/2011	4-7/8 inches	148 feet

GROUND-WATER READINGS
Drilling mud bailed on 4/8/2011. Ground-water level measured at 31 feet below the ground surface 30 minutes after bailing of drilling mud.

THIS RECORD IS AN INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. LATITUDE AND LONGITUDE OF BORING LOCATION SHOWN ON LOGS ARE APPROXIMATE. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BETWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

ELEVATION (ft)	DEPTH (ft)	"N" VALUE STD.PEN.TEST	OVA (ppm)**	MOISTURE CONTENT (% of dry wt.)	DRY DENSITY (pcf)	BLOW COUNT* (blows/ft)	PERCENT PASSING No. 200 SIEVE	SAMPLE LOC.	DOWNHOLE TESTS		
145	0										6-inch thick Asphalt Concrete over 12-inch thick Portland Cement Concrete, No Base Course
										ML	**QUATERNARY YOUNGER ALLUVIUM [Qal]** SANDY SILT - very soft, moist, brownish gray, with slate gravel
	5		0.0	21.6	99	Push					Trace sand, dark olive brown
140										CL	LEAN CLAY - stiff, moist, dark gray, trace sand
	10	9	0.1	30.6	-						
135	15			-	-	4					Becomes soft, (sample not recovered)
130										CL	**QUATERNARY OLDER ALLUVIUM [Qalo]** SANDY LEAN CLAY - very stiff, moist, gray, fine to medium sand
	20	17	0.2	23.2	-						
125	25		1.2	14.6	109	13				SP	POORLY GRADED SAND - medium dense, moist, gray and brown, fine to medium-grained, trace fine gravel
										SC	CLAYEY SAND - medium dense, moist, gray and brown, fine to medium-grained
120	30	16	0.5	18.6	-						▽ Becomes brown, fine-grained
										CL	SANDY LEAN CLAY - very stiff, moist, brown
115	35									ML	SANDY SILT - stiff, moist, brown
			0.5	33.5	91	13	66				Alternating with layers of Silty Sand, brown, fine to medium-grained
110	40									CL	LEAN CLAY - stiff, moist, dark olive brown, trace sand

(CONTINUED ON FOLLOWING FIGURE)

Field Tech: DW
Prepared/Date: JF 5/18/2011
Checked/Date: LT/PE 9/27/2011

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LOG OF BORING

Project No.: 4953-10-1561 Figure: A-2.30a

DRILLING COMPANY/DRILLING EQUIPMENT		BORING NO.
C & L Drilling / Mayhew 1000		**G-134 (Continued)**
DRILLING METHOD Rotary Wash	**BOREHOLE LOCATION** Sta 590+40, Lt 27 feet	
DATES DRILLED 3/29/2011, 3/30/2011, 4/8/2011	**HOLE DIAMETER** 4-7/8 inches	**GROUND EL.** 148 feet

GROUND-WATER READINGS
Drilling mud bailed on 4/8/2011. Ground-water level measured at 31 feet below the ground surface 30 minutes after bailing of drilling mud.

THIS RECORD IS AN INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. LATITUDE AND LONGITUDE OF BORING LOCATION SHOWN ON LOGS ARE APPROXIMATE. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BETWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

ELEVATION (ft)	DEPTH (ft)	"N" VALUE STD.PEN.TEST	OVA (ppm)**	MOISTURE CONTENT (% of dry wt.)	DRY DENSITY (pcf)	BLOW COUNT* (blows/ft)	PERCENT PASSING No. 200 SIEVE	SAMPLE LOC.	DOWNHOLE TESTS		
105	45	13	6.0	23.6	-			⊠		ML	SILT with SAND - stiff, moist, brown, fine sand, alternating with layers of Silty Sand
			0.1	27.7	99	12	78	⊠			
100	50	41	0.2	20.0	-			⊠	NV		
95	55		0.1	23.8	101	16	72	⊠		CL	Becomes very stiff, gray LEAN CLAY - very stiff, moist, gray, trace sand
90	60	20	0.0	32.4	-		94	⊠	NV		Becomes greenish gray
85	65		0.0	32.9	91	28		⊠			Becomes gray, trace sand
80	70								NV		
75	75			-	-	21		○			(Sample not recovered)
70	80	22	0.0	21.5	-		68	⊠			Alternating with layers of Sandy Lean Clay, light green, trace calcium carbonate nodules

(CONTINUED ON FOLLOWING FIGURE)

Field Tech: DW
Prepared/Date: JF 5/18/2011
Checked/Date: LT/PE 9/27/2011

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LOG OF BORING

Project No.: 4953-10-1561 Figure: A-2.30b

DRILLING COMPANY/DRILLING EQUIPMENT		BORING NO.
C & L Drilling / Mayhew 1000		**G-134 (Continued)**
DRILLING METHOD Rotary Wash	**BOREHOLE LOCATION** Sta 590+40, Lt 27 feet	
DATES DRILLED 3/29/2011, 3/30/2011, 4/8/2011	**HOLE DIAMETER** 4-7/8 inches	**GROUND EL.** 148 feet

GROUND-WATER READINGS
Drilling mud bailed on 4/8/2011. Ground-water level measured at 31 feet below the ground surface 30 minutes after bailing of drilling mud.

THIS RECORD IS AN INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. LATITUDE AND LONGITUDE OF BORING LOCATION SHOWN ON LOGS ARE APPROXIMATE. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BETWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

ELEVATION (ft)	DEPTH (ft)	"N" VALUE STD.PEN.TEST	OVA (ppm)**	MOISTURE CONTENT (% of dry wt.)	DRY DENSITY (pcf)	BLOW COUNT* (blows/ft)	PERCENT PASSING No. 200 SIEVE	SAMPLE LOC.	DOWNHOLE TESTS		
65	85		0.0	-	-	23		☒			Becomes brown and olive brown, fine to medium sand
60	90	30	0.0	19.0	-		55	☒			Fine sand
55	95	49	0.3	20.0	-			☒		SC	CLAYEY SAND - dense, moist, olive brown, fine to medium-grained, alternating with layers of Sandy Lean Clay
50	100		0.6	14.7	118	32	33	⊠		SM	SILTY SAND - dense, moist, brown, fine to medium-grained, some coarse, trace gravel (up to 3/8 inch in size)
45	105	50/2"	1.4	13.7	-			☒		SP	**SAN PEDRO FORMATION [Qsp]** POORLY GRADED SAND - very dense, moist, olive brown, fine to coarse-grained
40	110		0.6	21.6	102	13		⊠		SM	SILTY SAND - moist, gray, fine to medium-grained, alternating with layers of Sandy Silt
35	115	62	0.0	29.6	-			☒		ML	SILT - stiff, moist, gray, trace fine sand
30	120										Becomes hard

END OF BORING AT 111½ FEET

NOTES:
Hand augered upper 5 feet to avoid damage to utilities.
Borehole grouted with cement-bentonite slurry and patched with asphalt concrete.

"N" Value Standard Penetration Test: Number of blows required to drive the SPT sampler 18 inches using a 140 pound automatic hammer falling 30 inches
*Number of blows required to drive the Crandall Sampler 12 inches using a 380 pound hammer falling 18 inches

**Photo Ionization Detector used for OVA readings
Downhole Test: NV = Noise/Vibration

Field Tech: DW
Prepared/Date: JF 5/18/2011
Checked/Date: LT/PE 9/27/2011

MTA Westside Subway Extension
Los Angeles, California

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LOG OF BORING

Project No.: 4953-10-1561 Figure: A-2.30c

LA METRO PB-TUNNEL ZONE S:\70131 GEOTECH\GINTW\LIBRARY MACTEC JUNE2011.GLB
G:\PROJECT_DIRECTORIES\4953\2010\101561_METRO_WESTSIDE_EXTENSION\6.2.3.1 GEOTECHNICAL DESIGN\3.2 ALL FIELD NOTES\GINT LOG\NEW TEMPLATE - MARCH 14, 2011\4953-10-1561_(120-139).GPJ 10/18/11

DRILLING COMPANY/DRILLING EQUIPMENT		BORING NO.
Fugro / CME 75		G-135
DRILLING METHOD	**BOREHOLE LOCATION**	
Rotary Wash	Sta 594+60, Rt 5 feet	
DATES DRILLED	**HOLE DIAMETER**	**GROUND EL.**
5/19/2011 and 5/20/2011	4-7/8 inches	153 feet

GROUND-WATER READINGS
Drilling mud bailed on 5/19/2011. Ground-water level measured at 15 feet below the ground surface on 5/20/2011.

THIS RECORD IS AN INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. LATITUDE AND LONGITUDE OF BORING LOCATION SHOWN ON LOGS ARE APPROXIMATE. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BETWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

ELEVATION (ft)	DEPTH (ft)	"N" VALUE STD.PEN.TEST	OVA (ppm)**	MOISTURE CONTENT (% of dry wt.)	DRY DENSITY (pcf)	BLOW COUNT* (blows/ft)	PERCENT PASSING No. 200 SIEVE	SAMPLE LOC.	DOWNHOLE TESTS		
150	0										7-inch thick Asphalt Concrete over 8-inch thick Portland Cement Concrete
										SC	**FILL [Af]** CLAYEY SAND - moist, olive brown, fine to medium-grained, some coarse, some gravel (up to 1 inch in size), trace roots
	5										
145											**QUATERNARY YOUNGER ALLUVIUM [Qal]**
										CH	SANDY FAT CLAY - soft, moist, dark olive brown, fine sand, trace gravel (up to ½ inch in size)
	10		1.2	22.7	97	7					
140											
		8	2.1	24.3	-						Becomes medium stiff
	15									SC	**QUATERNARY OLDER ALLUVIUM [Qalo]** CLAYEY SAND - loose, moist, olive to olive yellow, fine to coarse-grained, trace gravel (up to ½ inch in size), trace iron oxide stains
135											
	20		0.9	18.8	107	10	19				
										CL	SANDY LEAN CLAY - stiff, moist, dark olive, fine to medium sand, trace gravel (up to ½ inch in size)
130		13	0.3	18.8	-						
	25									SC	CLAYEY SAND with GRAVEL - medium dense, moist, olive, fine to coarse-grained, fine slate gravel (up to 3/4 inch in size), trace iron oxide stains
125											
										CL-ML	SILTY CLAY - stiff, moist, olive brown, fine to coarse sand, trace gravel (up to 1/4 inch in size)
	30		1.3	15.9	113	19					
120											
		18	2.2	17.4	-		59			SC	CLAYEY SAND - medium dense, moist, olive yellow, fine to coarse-grained, trace gravel (up to 1/4 inch in size)
	35										
115										CL	LEAN CLAY with SAND - stiff, moist, olive, fine sand, some coarse, trace gravel (up to 1/4 inch in size)
	40		0.5	28.1	95	16					

(CONTINUED ON FOLLOWING FIGURE)

Field Tech: LH
Prepared/Date: YN 6/27/2011
Checked/Date: HP/LT 9/22/2011

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Los Angeles, California

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LOG OF BORING

Project No.: 4953-10-1561 Figure: A-2.31a

DRILLING COMPANY/DRILLING EQUIPMENT		BORING NO.
Fugro / CME 75		**G-135 (Continued)**
DRILLING METHOD	**BOREHOLE LOCATION**	
Rotary Wash	Sta 594+60, Rt 5 feet	
DATES DRILLED	**HOLE DIAMETER**	**GROUND EL.**
5/19/2011 and 5/20/2011	4-7/8 inches	153 feet

GROUND-WATER READINGS
Drilling mud bailed on 5/19/2011. Ground-water level measured at 15 feet below the ground surface on 5/20/2011.

THIS RECORD IS AN INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. LATITUDE AND LONGITUDE OF BORING LOCATION SHOWN ON LOGS ARE APPROXIMATE. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BETWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

ELEVATION (ft)	DEPTH (ft)	"N" VALUE STD.PEN.TEST	OVA (ppm)**	MOISTURE CONTENT (% of dry wt.)	DRY DENSITY (pcf)	BLOW COUNT* (blows/ft)	PERCENT PASSING No. 200 SIEVE	SAMPLE LOC.	DOWNHOLE TESTS		
110	45	22	0.3	17.6	-		45	⊠		SC	CLAYEY SAND - medium dense, moist, olive brown, fine to coarse-grained, some gravel (up to ½ inch in size)
105			1.1	24.8	99	22		⊠		CL	SANDY LEAN CLAY - stiff, moist, olive, fine sand, some silt, trace manganese stains
										ML	SANDY SILT - moist, olive, fine sand
	50	20	1.2	39.5	-			⊠		MH	ELASTIC SILT - very stiff, moist, light olive to olive, trace fine sand, trace magnesium stains
100			0.0	37.9	81	28		⊠			
	55	18	1.1	34.6	-		90	⊠			Becomes olive, some fine sand
95			1.3	35.1	87	25		⊠		CH	FAT CLAY with SAND - very stiff to hard, moist, gray, fine sand, some silt, trace iron oxide and magnesium stains
	60	23	2.2	34.0	-			⊠			Trace calcium carbonate nodules
90	65		1.8	26.4	94	26	83	⊠			Becomes olive brown, more fine sand, some medium to coarse
85		24	0.9	18.8	-			⊠			Becomes light olive gray to olive
	70										Trace gravel (up to 1/4 inch in size)
			0.0	19.0	109	26		⊠			Becomes yellowish brown, some calcium carbonate nodules
80		33	0.0	24.6	-		82	⊠			Some iron oxide stains
	75										Becomes light gray
75			0.0	-	-	25		○			Trace gravel (up to ½ inch in size), (sample not recovered)
	80										

(CONTINUED ON FOLLOWING FIGURE)

Field Tech: LH
Prepared/Date: YN 6/27/2011
Checked/Date: HP/LT 9/22/2011

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Los Angeles, California

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LOG OF BORING

Project No.: 4953-10-1561 Figure: A-2.31b

DRILLING COMPANY/DRILLING EQUIPMENT		BORING NO.
Fugro / CME 75		**G-135 (Continued)**
DRILLING METHOD	**BOREHOLE LOCATION**	
Rotary Wash	Sta 594+60, Rt 5 feet	
DATES DRILLED	**HOLE DIAMETER**	**GROUND EL.**
5/19/2011 and 5/20/2011	4-7/8 inches	153 feet

GROUND-WATER READINGS
Drilling mud bailed on 5/19/2011. Ground-water level measured at 15 feet below the ground surface on 5/20/2011.

THIS RECORD IS AN INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. LATITUDE AND LONGITUDE OF BORING LOCATION SHOWN ON LOGS ARE APPROXIMATE. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BETWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

ELEVATION (ft)	DEPTH (ft)	"N" VALUE STD.PEN.TEST	OVA (ppm)**	MOISTURE CONTENT (% of dry wt.)	DRY DENSITY (pcf)	BLOW COUNT* (blows/ft)	PERCENT PASSING No. 200 SIEVE	SAMPLE LOC.	DOWNHOLE TESTS		
Tunnel	85		0.3	18.3	-	32		⊠		CL	SANDY LEAN CLAY - very stiff, moist, olive to light gray, fine to medium sand, trace coarse
			0.0	19.7	107	33	50	⊠			
		29	0.0	18.2	-			☒		SW	WELL GRADED SAND with GRAVEL - medium dense, wet, yellowish brown, fine-grained, fine gravel (up to 3/4 inch in size)
	90		0.0	14.0	114	40		⊠			
		42	0.0	11.3	-		13	☒		SM	SILTY SAND with GRAVEL - dense, wet, yellowish brown, fine to coarse-grained, fine to coarse gravel (up to 1 inch in size)
	95		0.0	21.0	106	79/11"		⊠			**SAN PEDRO FORMATION [Qsp]**
		34	0.0	16.8	-		33	☒		SM	SILTY SAND - very dense, moist, olive, fine-grained, micacious
	100		0.0	28.1	95	65		⊠			Becomes dense
50		38	0.0	33.3	-			☒			
	105										
45			0.0	29.5	93	52		⊠			
	110	31	0.0	34.9	-		99	☒		MH	ELASTIC SILT - hard, moist, greenish gray, trace fine sand, trace magnesium stains
40			0.0	27.1	95	52		⊠			
	115										
35											Becomes dark greenish gray
	120	28	0.0	38.4	-			☒			Becomes very stiff

(CONTINUED ON FOLLOWING FIGURE)

Field Tech: LH
Prepared/Date: YN 6/27/2011
Checked/Date: HP/LT 9/22/2011

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Los Angeles, California

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LOG OF BORING

Project No.: 4953-10-1561 Figure: A-2.31c

DRILLING COMPANY/DRILLING EQUIPMENT		BORING NO.
Fugro / CME 75		**G-135 (Continued)**
DRILLING METHOD	**BOREHOLE LOCATION**	
Rotary Wash	Sta 594+60, Rt 5 feet	
DATES DRILLED	**HOLE DIAMETER**	**GROUND EL.**
5/19/2011 and 5/20/2011	4-7/8 inches	153 feet

GROUND-WATER READINGS
Drilling mud bailed on 5/19/2011. Ground-water level measured at 15 feet below the ground surface on 5/20/2011.

ELEVATION (ft)	DEPTH (ft)	"N" VALUE STD.PEN.TEST	OVA (ppm)**	MOISTURE CONTENT (% of dry wt.)	DRY DENSITY (pcf)	BLOW COUNT* (blows/ft)	PERCENT PASSING No. 200 SIEVE	SAMPLE LOC.	DOWNHOLE TESTS
30	125								
25	130								
20	135								
15	140								
10	145								
5	150								
0	155								
-5	160								

END OF BORING AT 120 FEET

NOTES:

Hand augered upper 9 feet to avoid damage to utilities.
Borehole grouted with cement-bentonite slurry and patched with asphalt concrete.

"N" Value Standard Penetration Test: Number of blows required to drive the SPT sampler 18 inches using a 140 pound automatic hammer falling 30 inches

*Number of blows required to drive the Crandall Sampler 12 inches using a 140 pound automatic hammer falling 30 inches

**Photo Ionization Detector used for OVA readings

THIS RECORD IS AN INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. LATITUDE AND LONGITUDE OF BORING LOCATION SHOWN ON LOGS ARE APPROXIMATE. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BETWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

Field Tech: LH
Prepared/Date: YN 6/27/2011
Checked/Date: HP/LT 9/22/2011

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Los Angeles, California

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LOG OF BORING
Project No.: 4953-10-1561 Figure: A-2.31d

LA METRO PB-TUNNEL ZONE S:\70131 GEOTECH\GINTW\LIBRARY MACTEC JUNE2011.GLB
G:\PROJECT_DIRECTORIES\4953\2010\101561_METRO_WESTSIDE_EXTENSION\6.2.3.1 GEOTECHNICAL DESIGN\3.2 ALL FIELD NOTES\GINT LOG\NEW TEMPLATE - MARCH 14, 2011\4953-10-1561_(120-139).GPJ 10/18/11

DRILLING COMPANY/DRILLING EQUIPMENT		BORING NO.
C & L Drilling / Mayhew 1000		G-136
DRILLING METHOD	**BOREHOLE LOCATION**	
Rotary Wash	Sta 597+30, Lt 10 feet	
DATES DRILLED	**HOLE DIAMETER**	**GROUND EL.**
4/25/2011 and 4/26/2011	4-7/8 inches	159 feet

GROUND-WATER READINGS
Drilling mud bailed on 4/25/2011. Ground-water level measured at 24½ feet below the ground surface.

THIS RECORD IS AN INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. LATITUDE AND LONGITUDE OF BORING LOCATION SHOWN ON LOGS ARE APPROXIMATE. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BETWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

ELEVATION (ft)	DEPTH (ft)	"N" VALUE STD.PEN.TEST	OVA (ppm)**	MOISTURE CONTENT (% of dry wt.)	DRY DENSITY (pcf)	BLOW COUNT* (blows/ft)	PERCENT PASSING No. 200 SIEVE	SAMPLE LOC.	DOWNHOLE TESTS		
155	5										6-inch thick Asphalt Concrete over 12-inch thick Concrete, no Base Course
										SC	**FILL [Af]** CLAYEY SAND - moist, dark brown, fine to medium-grained
150	10		0.1	25.6	96	Push		⊠		CL-ML	**QUATERNARY YOUNGER ALLUVIUM [Qal]** SILTY CLAY - very soft, moist, olive brown, trace fine sand
145	15	23	0.0	18.3	-		53	⊠		CL	SANDY LEAN CLAY - very stiff, moist, olive brown, fine to coarse sand, trace gravel (up to 1/8 inch in size), trace iron oxide stains
140	20		0.0	12.4	120	7		⊠			Becomes medium stiff, fine to medium sand, some gravel (up to 3/4 inch in size)
135	25	9/10"	0.0	24.0	-			⊠		CL	LEAN CLAY - stiff, moist, olive brown, trace gravel (up to 1/8 inch in size), some iron oxide stains
130	30		0.0	19.2	104	8		⊠		CL	**QUATERNARY OLDER ALLUVIUM [Qalo]** LEAN CLAY with SAND - medium stiff, olive brown and brown, fine sand, trace iron oxide stains
125	35	33/8"	0.0	13.0	-		23	⊠		SC	CLAYEY SAND - dense, moist, brown, fine to coarse-grained, trace fine gravel (up to 1/2 inch in size)
120	40										

(CONTINUED ON FOLLOWING FIGURE)

Field Tech: LH
Prepared/Date: YN 6/20/2011
Checked/Date: LT/PE 9/22/2011

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Los Angeles, California

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LOG OF BORING

Project No.: 4953-10-1561 Figure: A-2.32a

DRILLING COMPANY/DRILLING EQUIPMENT		BORING NO.
C & L Drilling / Mayhew 1000		**G-136 (Continued)**
DRILLING METHOD	**BOREHOLE LOCATION**	
Rotary Wash	Sta 597+30, Lt 10 feet	
DATES DRILLED	**HOLE DIAMETER**	**GROUND EL.**
4/25/2011 and 4/26/2011	4-7/8 inches	159 feet

GROUND-WATER READINGS
Drilling mud bailed on 4/25/2011. Ground-water level measured at 24½ feet below the ground surface.

THIS RECORD IS AN INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. LATITUDE AND LONGITUDE OF BORING LOCATION SHOWN ON LOGS ARE APPROXIMATE. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BETWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

ELEVATION (ft)	DEPTH (ft)	"N" VALUE STD.PEN.TEST	OVA (ppm)**	MOISTURE CONTENT (% of dry wt.)	DRY DENSITY (pcf)	BLOW COUNT* (blows/ft)	PERCENT PASSING No. 200 SIEVE	SAMPLE LOC.	DOWNHOLE TESTS			
			0.0	21.2	102	10		⊠		CL-ML	SANDY SILTY CLAY - stiff, moist, olive brown, fine sand, trace coarse, trace iron oxide stains	
115										ML	SILT - moist, brown, some fine sand	
	45	54	0.0	18.4	-		48	⊠		SC-SM	SILTY CLAYEY SAND - very dense, moist, brown, fine to medium-grained, some small clay nodules	
110										ML	SILT with SAND - stiff, moist, brown, some clay	
	50		0.0	26.3	97	10		⊠				
105										CL	LEAN CLAY - very stiff, moist, olive brown, trace fine sand, trace iron oxide stains	
	55	16	0.0	32.2	-			⊠				
100											Becomes light brownish gray	
	60		0.0	34.6	86	20		⊠			Becomes greenish gray	
95												
	65	28/10"	0.0	32.8	-		97	⊠		CH	FAT CLAY - hard, moist, gray, trace fine to medium sand, trace calcium carbonate nodules	
90												
	70		0.0	30.1	91	20		⊠			Becomes very stiff, olive gray to gray	
85												
	75	20	0.0	30.4	-		84	⊠		CL	LEAN CLAY with SAND - very stiff, moist, gray, fine to coarse sand, occasional gravel (up to 3/8 inch in size), some calcium carbonate nodules	
80												
	80											

(CONTINUED ON FOLLOWING FIGURE)

Field Tech: LH
Prepared/Date: YN 6/20/2011
Checked/Date: LT/PE 9/22/2011

MTA Westside Subway Extension
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LOG OF BORING

Project No.: 4953-10-1561 Figure: A-2.32b

DRILLING COMPANY/DRILLING EQUIPMENT		BORING NO.
C & L Drilling / Mayhew 1000		**G-136 (Continued)**
DRILLING METHOD	**BOREHOLE LOCATION**	
Rotary Wash	Sta 597+30, Lt 10 feet	
DATES DRILLED	**HOLE DIAMETER**	**GROUND EL.**
4/25/2011 and 4/26/2011	4-7/8 inches	159 feet

GROUND-WATER READINGS
Drilling mud bailed on 4/25/2011. Ground-water level measured at 24½ feet below the ground surface.

THIS RECORD IS AN INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. LATITUDE AND LONGITUDE OF BORING LOCATION SHOWN ON LOGS ARE APPROXIMATE. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BETWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

ELEVATION (ft)	DEPTH (ft)	"N" VALUE STD.PEN.TEST	OVA (ppm)**	MOISTURE CONTENT (% of dry wt.)	DRY DENSITY (pcf)	BLOW COUNT* (blows/ft)	PERCENT PASSING No. 200 SIEVE	SAMPLE LOC.	DOWNHOLE TESTS		
			0.0	24.2	101	13		⊠		CL	SANDY LEAN CLAY - stiff, moist, olive brown, fine sand, trace calcium carbonate nodules, trace iron oxide stains
										CL	LEAN CLAY - very stiff, moist, olive gray, trace fine sand
	85	20	0.0	21.1	-			☒			
Tunnel										SC	CLAYEY SAND - very dense, moist, dark olive brown to olive gray, fine to coarse-grained, some fine gravel (up to 1/2 inch in size), heavy iron oxide stains
	90		0.0	13.9	117	52	40	⊠			
											SAN PEDRO FORMATION [Qsp]
										CL	LEAN CLAY with SAND - very stiff, moist, olive brown, fine sand, trace medium, trace manganese stains
	95	28	0.0	21.0	-		71	☒			
	100									SP-SM	POORLY GRADED SAND with SILT - moist to wet, brown, fine-grained, trace mica
			0.2	20.8	101	20	45	⊠		SM	SILTY SAND - medium dense to very dense, moist, olive, fine-grained, occasional medium, some clay, trace manganese stains
55											
	105	60	0.1	27.3	-			☒			Becomes, olive to olive brown, trace mica
50											
	110		0.1	16.6	108	20		⊠			
45											
	115	51	0.1	24.0	-			☒			
40										ML	SANDY SILT - very stiff, moist, gray, fine sand
	120										

(CONTINUED ON FOLLOWING FIGURE)

Field Tech: LH
Prepared/Date: YN 6/20/2011
Checked/Date: LT/PE 9/22/2011

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Los Angeles, California

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LOG OF BORING

Project No.: 4953-10-1561 Figure: A-2.32c

DRILLING COMPANY/DRILLING EQUIPMENT		BORING NO.
C & L Drilling / Mayhew 1000		**G-136 (Continued)**
DRILLING METHOD	**BOREHOLE LOCATION**	
Rotary Wash	Sta 597+30, Lt 10 feet	
DATES DRILLED	**HOLE DIAMETER**	**GROUND EL.**
4/25/2011 and 4/26/2011	4-7/8 inches	159 feet

GROUND-WATER READINGS
Drilling mud bailed on 4/25/2011. Ground-water level measured at 24½ feet below the ground surface.

ELEVATION (ft)	DEPTH (ft)	"N" VALUE STD.PEN.TEST	OVA (ppm)**	MOISTURE CONTENT (% of dry wt.)	DRY DENSITY (pcf)	BLOW COUNT* (blows/ft)	PERCENT PASSING No. 200 SIEVE	SAMPLE LOC.	DOWNHOLE TESTS
35	125		0.0	26.8	95	23		⊠	
30	130								
25	135								
20	140								
15	145								
10	150								
5	155								
0	160								

END OF BORING AT 121 FEET

NOTES:

Hand augered upper 9 feet to avoid damage to utilities. Borehole grouted with cement bentonite and patched with quick set cement.

"N" Value Standard Penetration Test: Number of blows required to drive the SPT sampler 18 inches using a 140 pound automatic hammer falling 30 inches

*Number of blows required to drive the Crandall Sampler 12 inches using a 380 pound hammer falling 18 inches

**Photo Ionization Detector used for OVA readings.

THIS RECORD IS AN INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. LATITUDE AND LONGITUDE OF BORING LOCATION SHOWN ON LOGS ARE APPROXIMATE. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BETWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

Field Tech: LH
Prepared/Date: YN 6/20/2011
Checked/Date: LT/PE 9/22/2011

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LOG OF BORING
Project No.: 4953-10-1561 Figure: A-2.32d

DRILLING COMPANY/DRILLING EQUIPMENT		BORING NO.
Fugro / CME 75		G-137
DRILLING METHOD	**BOREHOLE LOCATION**	
Rotary Wash	Sta 600+80, Lt 33 feet	
DATES DRILLED	**HOLE DIAMETER**	**GROUND EL.**
5/23/2011 and 5/24/2011	4-7/8 inches	164 feet

GROUND-WATER READINGS
Drilling mud bailed on 5/23/2011. Ground-water level measured at 32½ feet below the ground surface on 5/24/2011.

ELEVATION (ft)	DEPTH (ft)	"N" VALUE STD.PEN.TEST	OVA (ppm)**	MOISTURE CONTENT (% of dry wt.)	DRY DENSITY (pcf)	BLOW COUNT* (blows/ft)	PERCENT PASSING No. 200 SIEVE	SAMPLE LOC.	DOWNHOLE TESTS
160	5								
155	10								
			0.3	20.6	97	9			
150	15	12	0.5	16.9	-				
145	20		1.2	16.9	110	20			
140	25	11	0.9	18.5	-				
135	30			-	-	11			
130	35								
125	40	15	1.6	16.4	-		57		

8-inch Asphalt Concrete over 13-inch thick Portland Cement Concrete

FILL [Af]

SM — SILTY SAND - moist, olive brown, fine to medium-grained, trace gravel (up to ½ inch in size)

Becomes yellowish brown, trace gravel (up to 1 inch in size)

Becomes olive yellow, more slate gravel

Some small silt nodules, trace roots

QUATERNARY YOUNGER ALLUVIUM [Qal]

CL — SANDY LEAN CLAY - medium stiff, moist, olive brown, fine to medium sand, trace gravel (up to 1/4 inch in size)

Becomes stiff, more sand, some coarse, some silt

QUATERNARY OLDER ALLUVIUM [Qalo]

CL — SANDY LEAN CLAY - stiff, moist, olive brown, fine to coarse sand, trace gravel (up to 1/4 inch in size)

Becomes olive to dark olive, fine to medium sand, trace coarse, some silt

Becomes medium stiff, (sample not recovered)

▼

Becomes hard, fine to coarse sand, trace gravel (up to 3/4 inch in size)

THIS RECORD IS AN INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. LATITUDE AND LONGITUDE OF BORING LOCATION SHOWN ON LOGS ARE APPROXIMATE. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BETWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

(CONTINUED ON FOLLOWING FIGURE)

Field Tech: LH
Prepared/Date: YN 9/9/2011
Checked/Date: LT/PE 9/26/2011

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Los Angeles, California

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LOG OF BORING

Project No.: 4953-10-1561 Figure: A-2.33a

DRILLING COMPANY/DRILLING EQUIPMENT		BORING NO.
Fugro / CME 75		**G-137 (Continued)**
DRILLING METHOD	**BOREHOLE LOCATION**	
Rotary Wash	Sta 600+80, Lt 33 feet	
DATES DRILLED	**HOLE DIAMETER**	**GROUND EL.**
5/23/2011 and 5/24/2011	4-7/8 inches	164 feet

GROUND-WATER READINGS
Drilling mud bailed on 5/23/2011. Ground-water level measured at 32½ feet below the ground surface on 5/24/2011.

THIS RECORD IS AN INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. LATITUDE AND LONGITUDE OF BORING LOCATION SHOWN ON LOGS ARE APPROXIMATE. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BETWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

ELEVATION (ft)	DEPTH (ft)	"N" VALUE STD.PEN.TEST	OVA (ppm)**	MOISTURE CONTENT (% of dry wt.)	DRY DENSITY (pcf)	BLOW COUNT* (blows/ft)	PERCENT PASSING No. 200 SIEVE	SAMPLE LOC.	DOWNHOLE TESTS		
120	45		0.0	20.4	101	17		⊠		SC	CLAYEY SAND - medium dense, moist, olive brown, fine to medium-grained, trace coarse, trace gravel (up to ½ inch in size)
115	50	14	0.0	17.5	-		48	⊠			Fine to coarse-grained, trace fine gravel (up to 3/8-inch in size), small silt nodules
			0.0	18.8	104	18		⊠		SM	SILTY SAND - medium dense, moist, dark olive, fine to medium-grained, trace coarse-grained, trace gravel (up to ½ inch in size)
110	55	20	0.0	21.5	-			⊠			Becomes yellowish brown, fine-grained, some medium, trace coarse, trace mica
105	60		0.0	18.0	112	30	38	⊠		CL	SANDY LEAN CLAY - stiff, moist, olive, fine sand, trace medium to coarse, thin layers of silt interbedded, trace gravel (up to 1/4 inch in size)
		14	0.0	26.2	-			⊠			
100	65		0.0	18.5	102	34	70	⊠		SM	SILTY SAND - moist, light gray, fine to medium-grained
										CH	SANDY FAT CLAY - very stiff, moist, light gray, fine sand, trace medium
		33	0.0	33.1	-			⊠			Becomes hard, light gray to greenish-gray, some medium sand, trace calcium carbonate nodules
95	70		0.0	30.2	92	26	92	⊠		CH	FAT CLAY - very stiff, moist, light gray, some fine to medium sand, moderately cemented, trace calcium carbonate nodules
90	75	25	0.0	25.5	-			⊠			More fine sand, more calcium carbonate nodules
			0.0	22.8	99	25		⊠		CL	SANDY LEAN CLAY - very stiff, moist, olive, fine sand, some calcium carbonate nodules, thin silt layers interbedded
Tunnel	80	32		23.4	-			⊠			Becomes hard, more calcium carbonate nodules

(CONTINUED ON FOLLOWING FIGURE)

Field Tech: LH
Prepared/Date: YN 9/9/2011
Checked/Date: LT/PE 9/26/2011

MTA Westside Subway Extension
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LOG OF BORING

Project No.: 4953-10-1561 Figure: A-2.33b

DRILLING COMPANY/DRILLING EQUIPMENT		BORING NO.
Fugro / CME 75		G-137 (Continued)
DRILLING METHOD	**BOREHOLE LOCATION**	
Rotary Wash	Sta 600+80, Lt 33 feet	
DATES DRILLED	**HOLE DIAMETER**	**GROUND EL.**
5/23/2011 and 5/24/2011	4-7/8 inches	164 feet

GROUND-WATER READINGS
Drilling mud bailed on 5/23/2011. Ground-water level measured at 32½ feet below the ground surface on 5/24/2011.

ELEVATION (ft)	DEPTH (ft)	"N" VALUE STD.PEN.TEST	OVA (ppm)**	MOISTURE CONTENT (% of dry wt.)	DRY DENSITY (pcf)	BLOW COUNT* (blows/ft)	PERCENT PASSING No. 200 SIEVE	SAMPLE LOC.	DOWNHOLE TESTS		
Tunnel	85		0.0	17.2	105	30	67	⊠			More sand, weakly cemented
		27	0.0	21.4	-			⊠			Becomes very stiff, fine to medium sand, trace mica
	90		0.0	-	-	28		○		SC	Less fine sand CLAYEY SAND with GRAVEL - medium dense, moist, olive, fine to coarse-grained, fine gravel (up to 1/2- inch in size) (Sample not recovered)
		34	0.0	12.6	-		26	⊠			Becomes dense
	95		0.0	14.2	117	38	27	⊠		SM	SILTY SAND - medium dense, moist, olive yellow, fine to coarse-grained, trace gravel (up to 1/2-inch in size), no cementation to moderately cemented, trace mica
		30	0.0	13.4	-		40	⊠		SC	CLAYEY SAND - medium dense, moist, fine to coarse-grained, trace fine gravel
65	100		0.0	23.2	102	27	86	⊠		CH	**SAN PEDRO FORMATION [Qsp]** FAT CLAY - stiff to very stiff, moist, olive brown, some fine sand, trace medium, some calcium carbonate nodules, trace magnesium stains, moderately cemented
60		26	0.0	21.4	-			⊠			More calcium carbonate nodules
	105		0.0	26.2	93	23		⊠			
55		18	0.0	44.1	-		97	⊠			More silt, trace fine sand
	110										
50			0.0	35.2	85	27		⊠		CL	SANDY LEAN CLAY - very stiff, moist, olive brown, fine sand, trace calcium carbonate nodules, trace shell fragments and organics
	115										
45		16	0.0	31.6	-			⊠		CL-ML	SILTY CLAY - very stiff, moist, dark greenish-gray, some fine sand, trace shell, no cementation to weakly cemented, trace calcium carbonate nodules
	120										

THIS RECORD IS AN INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. LATITUDE AND LONGITUDE OF BORING LOCATION SHOWN ON LOGS ARE APPROXIMATE. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BETWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

(CONTINUED ON FOLLOWING FIGURE)

Field Tech: LH
Prepared/Date: YN 9/9/2011
Checked/Date: LT/PE 9/26/2011

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LOG OF BORING

Project No.: 4953-10-1561 Figure: A-2.33c

DRILLING COMPANY/DRILLING EQUIPMENT		BORING NO.
Fugro / CME 75		**G-137 (Continued)**
DRILLING METHOD	**BOREHOLE LOCATION**	
Rotary Wash	Sta 600+80, Lt 33 feet	
DATES DRILLED	**HOLE DIAMETER**	**GROUND EL.**
5/23/2011 and 5/24/2011	4-7/8 inches	164 feet

GROUND-WATER READINGS
Drilling mud bailed on 5/23/2011. Ground-water level measured at 32½ feet below the ground surface on 5/24/2011.

ELEVATION (ft)	DEPTH (ft)	"N" VALUE STD.PEN.TEST	OVA (ppm)**	MOISTURE CONTENT (% of dry wt.)	DRY DENSITY (pcf)	BLOW COUNT* (blows/ft)	PERCENT PASSING No. 200 SIEVE	SAMPLE LOC.	DOWNHOLE TESTS
40	125								
35	130								
30	135								
25	140								
20	145								
15	150								
10	155								
5	160								

END OF BORING AT 120 FEET

NOTES:

Hand augered upper 12 feet to avoid damage to utilities. Borehole grouted with cement-bentonite slurry and patched with asphalt concrete.

"N" Value Standard Penetration Test: Number of blows required to drive the SPT sampler 18 inches using a 140 pound automatic hammer falling 30 inches

*Number of blows required to drive the Crandall Sampler 12 inches using a 140 pound automatic hammer falling 30 inches

**Photo Ionization Detector used for OVA readings

THIS RECORD IS AN INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. LATITUDE AND LONGITUDE OF BORING LOCATION SHOWN ON LOGS ARE APPROXIMATE. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BETWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

Field Tech: LH
Prepared/Date: YN 9/9/2011
Checked/Date: LT/PE 9/26/2011

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LOG OF BORING
Project No.: 4953-10-1561 Figure: A-2.33d

DRILLING COMPANY/DRILLING EQUIPMENT		BORING NO.
Tri County / CME 75		G-138
DRILLING METHOD	**BOREHOLE LOCATION**	
Rotary Wash	Sta 603+80, Lt 25 feet	
DATES DRILLED	**HOLE DIAMETER**	**GROUND EL.**
5/19/2011 and 5/20/2011	4-¼ inches	168 feet

GROUND-WATER READINGS
Drilling mud bailed on 5/19/2011. Ground-water level measured at 31 feet below the ground surface on 5/20/2011.

THIS RECORD IS AN INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. LATITUDE AND LONGITUDE OF BORING LOCATION SHOWN ON LOGS ARE APPROXIMATE. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BETWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

ELEVATION (ft)	DEPTH (ft)	"N" VALUE STD.PEN.TEST	OVA (ppm)**	MOISTURE CONTENT (% of dry wt.)	DRY DENSITY (pcf)	BLOW COUNT* (blows/ft)	PERCENT PASSING No. 200 SIEVE	SAMPLE LOC.	DOWNHOLE TESTS		
165	5		0.5	3.9	110	28		⊠		ML	4-inch thick Asphalt Concrete over 8-inch thick Portland Cement Concrete and 6-inch thick Base Course **QUATERNARY YOUNGER ALLUVIUM [Qal]** SANDY SILT - moist, dark brown, fine sand
										SW	WELL GRADED SAND with GRAVEL - medium dense, moist, brown, coarse-grained, coarse gravel
160	10	9	1.4	24.4	-			⊠		ML	SILT with SAND - stiff, moist, brown, fine sand
155	15		1.7	11.0	123	49		⊠		CL	**QUATERNARY OLDER ALLUVIUM [Qalo]** LEAN CLAY with GRAVEL - hard, moist, dark brown, some slate gravel
150	20	37	1.0	15.3	-			⊠			
145	25		0.5	14.9	109	25		⊠			Becomes very stiff, trace coarse sand
140	30	30	1.7	13.8	-		44	⊠		SC	CLAYEY SAND - medium dense, moist, dark orangish brown, fine to coarse-grained, occasional gravel (up to 3/8 inch in size)
135	35		2.2	-	-	10		○		GW	WELL GRADED GRAVEL with SAND - loose, moist, dark gray, coarse-grained (Sample not recovered)
130	40									CL	SANDY LEAN CLAY - very stiff, moist, orangish brown, fine sand

(CONTINUED ON FOLLOWING FIGURE)

Field Tech: JHD
Prepared/Date: YN 9/9/2011
Checked/Date: LT/PE 9/26/2011

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LOG OF BORING

Project No.: 4953-10-1561 Figure: A-2.34a

DRILLING COMPANY/DRILLING EQUIPMENT		BORING NO.
Tri County / CME 75		G-138 (Continued)
DRILLING METHOD	**BOREHOLE LOCATION**	
Rotary Wash	Sta 603+80, Lt 25 feet	
DATES DRILLED	**HOLE DIAMETER**	**GROUND EL.**
5/19/2011 and 5/20/2011	4-¼ inches	168 feet

GROUND-WATER READINGS
Drilling mud bailed on 5/19/2011. Ground-water level measured at 31 feet below the ground surface on 5/20/2011.

ELEVATION (ft)	DEPTH (ft)	"N" VALUE STD.PEN.TEST	OVA (ppm)**	MOISTURE CONTENT (% of dry wt.)	DRY DENSITY (pcf)	BLOW COUNT* (blows/ft)	PERCENT PASSING No. 200 SIEVE	SAMPLE LOC.	DOWNHOLE TESTS		
125	45	21	1.4	22.1	-			☒		SM	SILTY SAND with GRAVEL - medium dense, moist, dark brown, coarse-grained
			1.0	10.1	117	41		⊠			
120	50	28	0.5	22.9	-			☒		CL	LEAN CLAY with GRAVEL - very stiff, wet, olive brown, coarse gravel
115	55		0.7	24.6	99	26		⊠		CL	SANDY LEAN CLAY - very stiff, moist, olive brown, fine sand
110	60	25	0.6	31.4	-			☒		CH	FAT CLAY with SAND - very stiff, moist, olive gray, fine to medium sand, trace fine
105	65		0.0	30.0	92	46	82	⊠			
100	70	23	0.4	16.6	-			☒		CL	SANDY LEAN CLAY - very stiff, moist, olive gray, fine to medium sand
Tunnel	75		0.2	32.3	89	33	68	⊠			
	80										

THIS RECORD IS AN INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. LATITUDE AND LONGITUDE OF BORING LOCATION SHOWN ON LOGS ARE APPROXIMATE. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BETWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

(CONTINUED ON FOLLOWING FIGURE)

Field Tech: JHD
Prepared/Date: YN 9/9/2011
Checked/Date: LT/PE 9/26/2011

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LOG OF BORING

Project No.: 4953-10-1561 Figure: A-2.34b

DRILLING COMPANY/DRILLING EQUIPMENT		BORING NO.
Tri County / CME 75		G-138 (Continued)
DRILLING METHOD	**BOREHOLE LOCATION**	
Rotary Wash	Sta 603+80, Lt 25 feet	
DATES DRILLED	**HOLE DIAMETER**	**GROUND EL.**
5/19/2011 and 5/20/2011	4-¼ inches	168 feet

GROUND-WATER READINGS
Drilling mud bailed on 5/19/2011. Ground-water level measured at 31 feet below the ground surface on 5/20/2011.

THIS RECORD IS AN INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. LATITUDE AND LONGITUDE OF BORING LOCATION SHOWN ON LOGS ARE APPROXIMATE. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BETWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

ELEVATION (ft)	DEPTH (ft)	"N" VALUE STD.PEN.TEST	OVA (ppm)**	MOISTURE CONTENT (% of dry wt.)	DRY DENSITY (pcf)	BLOW COUNT* (blows/ft)	PERCENT PASSING No. 200 SIEVE	SAMPLE LOC.	DOWNHOLE TESTS		
Tunnel	85	36	0.5	20.1	-			☒			Becomes hard
			0.5	14.6	114	58	58	⊠			Trace slate gravel Fine to coarse, some fine gravel (up to 1/2 inch in size)
	90	49	0.7	13.5	-			☒		CL	SANDY LEAN CLAY with GRAVEL - hard, moist, brownish gray
75	95		0.5	14.1	115	78	28	⊠		SM	SILTY SAND - very dense, moist, orangish brown, fine to coarse-grained, trace fine gravel (up to 3/8 inch in size)
70	100	81	0.8	23.8	-		72	☒		CL	**SAN PEDRO FORMATION [Qsp]** LEAN CLAY with SAND- hard, moist, olive brown, fine to medium sand, trace coarse
65	105		1.1	32.9	90	55	91	⊠		ML	SILT - hard, moist, olive brown, some fine to coarse sand, occasional gravel (up to 3/8 inch in size)
60	110	38	0.5	-	-			○			(Sample not recovered)
55	115		0.9	38.6	83	32		⊠		CH	FAT CLAY - very stiff, moist, dark gray
50	120										END OF BORING AT 116 FEET

NOTES:
Hand augered upper 5½ feet to avoid damage to utilities.
Borehole grouted with cement-bentonite slurry and patched with asphalt concrete.

(CONTINUED ON FOLLOWING FIGURE)

Field Tech: JHD
Prepared/Date: YN 9/9/2011
Checked/Date: LT/PE 9/26/2011

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LOG OF BORING

Project No.: 4953-10-1561 Figure: A-2.34c

DRILLING COMPANY/DRILLING EQUIPMENT		BORING NO.
Tri County / CME 75		**G-138 (Continued)**
DRILLING METHOD	**BOREHOLE LOCATION**	
Rotary Wash	Sta 603+80, Lt 25 feet	
DATES DRILLED	**HOLE DIAMETER**	**GROUND EL.**
5/19/2011 and 5/20/2011	4-¼ inches	168 feet

GROUND-WATER READINGS
Drilling mud bailed on 5/19/2011. Ground-water level measured at 31 feet below the ground surface on 5/20/2011.

ELEVATION (ft)	DEPTH (ft)	"N" VALUE STD.PEN.TEST	OVA (ppm)**	MOISTURE CONTENT (% of dry wt.)	DRY DENSITY (pcf)	BLOW COUNT* (blows/ft)	PERCENT PASSING No. 200 SIEVE	SAMPLE LOC.	DOWNHOLE TESTS
45	125								
40	130								
35	135								
30	140								
25	145								
20	150								
15	155								
10	160								

"N" Value Standard Penetration Test: Number of blows required to drive the SPT sampler 18 inches using a 140 pound automatic hammer falling 30 inches

*Number of blows required to drive the Crandall Sampler 12 inches using a 140 pound automatic hammer falling 30 inches

**Photo Ionization Detector used for OVA readings

THIS RECORD IS AN INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. LATITUDE AND LONGITUDE OF BORING LOCATION SHOWN ON LOGS ARE APPROXIMATE. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BETWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

Field Tech: JHD
Prepared/Date: YN 9/9/2011
Checked/Date: LT/PE 9/26/2011

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LOG OF BORING
Project No.: 4953-10-1561 Figure: A-2.34d

DRILLING COMPANY/DRILLING EQUIPMENT		BORING NO.
C & L Drilling / Mayhew 1000		G-139
DRILLING METHOD	**BOREHOLE LOCATION**	
Rotary Wash	Sta 611+70, Lt 22 feet	
DATES DRILLED	**HOLE DIAMETER**	**GROUND EL.**
5/6/2011, 5/19/2011, and 5/20/2011	4-7/8 inches	177 feet

GROUND-WATER READINGS
Ground-water level measured at 36½ feet and 42 feet below the ground surface in shallow and deep monitoring wells, respectively on 7/29/11. See last page of this boring for details.

THIS RECORD IS AN INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. LATITUDE AND LONGITUDE OF BORING LOCATION SHOWN ON LOGS ARE APPROXIMATE. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BETWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

ELEVATION (ft)	DEPTH (ft)	"N" VALUE STD.PEN.TEST	OVA (ppm)**	MOISTURE CONTENT (% of dry wt.)	DRY DENSITY (pcf)	BLOW COUNT* (blows/ft)	PERCENT PASSING No. 200 SIEVE	SAMPLE LOC.	DOWNHOLE TESTS	
175	0									10-inch thick Asphalt Concrete over 5-inch thick Portland Cement Concrete and 4-inch thick Base Course
										QUATERNARY YOUNGER ALUVIUM [Qal]
										SM — SILTY SAND - medium dense, moist, brown, fine to medium-grained, abundant fine to medium gravel
	5		8.7	8.5	104	19		⊠		Some slate gravel
170										**QUATERNARY OLDER ALUVIUM [Qalo]**
	10	29	4.7	14.1	-			⊠		CL — SANDY LEAN CLAY - very stiff, moist, reddish brown, fine to medium sand, some coarse, trace gravel
165										
	15		6.6	13.4	121	28		⊠		More sand
160										
	20	36	6.7	10.9	-			⊠		Becomes hard
155										SM — SILTY SAND - medium dense, moist, brown, fine to coarse-grained, trace gravel, alternating sandy silt lenses
	25		3.9	14.2	112	19		⊠		Becomes reddish brown, fine to medium-grained, trace gravel, trace clay
150										
	30	46	4.3	12.0	-			⊠		CL — SANDY LEAN CLAY with GRAVEL - hard, moist, brown, fine to coarse sand
145										
	35		4.3	10.0	125	40		⊠		SW-SM — WELL GRADED SAND with SILT and GRAVEL - dense, moist, brown, fine to coarse sand
140										▽
	40									

(CONTINUED ON FOLLOWING FIGURE)

Field Tech: AR
Prepared/Date: YN 6/14/2011
Checked/Date: AB/PE 9/23/2011

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LOG OF BORING

Project No.: 4953-10-1561 Figure: A-2.35a

DRILLING COMPANY/DRILLING EQUIPMENT		BORING NO.
C & L Drilling / Mayhew 1000		**G-139 (Continued)**
DRILLING METHOD Rotary Wash	**BOREHOLE LOCATION** Sta 611+70, Lt 22 feet	
DATES DRILLED 5/6/2011, 5/19/2011, and 5/20/2011	**HOLE DIAMETER** 4-7/8 inches	**GROUND EL.** 177 feet

GROUND-WATER READINGS
Ground-water level measured at 36½ feet and 42 feet below the ground surface in shallow and deep monitoring wells, respectively on 7/29/11. See last page of this boring for details.

THIS RECORD IS AN INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. LATITUDE AND LONGITUDE OF BORING LOCATION SHOWN ON LOGS ARE APPROXIMATE. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BETWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

ELEVATION (ft)	DEPTH (ft)	"N" VALUE STD.PEN.TEST	OVA (ppm)**	MOISTURE CONTENT (% of dry wt.)	DRY DENSITY (pcf)	BLOW COUNT* (blows/ft)	PERCENT PASSING No. 200 SIEVE	SAMPLE LOC.	DOWNHOLE TESTS		
135	45	32	4.3	12.6	-			☒			Becomes orangish brown, fine to coarse sand, trace gravel
			4.5	15.3	116	33		⊠			Becomes medium dense, more gravel, more silt
130	50	64	5.1	11.7	-		31	☒		SM	SILTY SAND - very dense, moist, olive brown, fine to medium-grained, occasional gravel (up to 1/2 inch in size)
125	55		5.7	23.1	101	35	86	⊠		CL	**SAN PEDRO FORMATION [Qsp]** LEAN CLAY - very stiff, moist, olive brown
120	60	21	4.3	22.9	-			☒			
Tunnel	65		4.7	26.7	100	24		⊠			Some silty clay seams
	70	39	4.2	18.3	-			☒			Becomes hard, some white mottling, possible calcium carbonate nodules
	75		4.4	14.0	114	44	38	⊠		SC	CLAYEY SAND - dense, moist, bluish gray, fine to medium-grained, fine gravel (up to 3/4 inch in size) Slightly more clay
	80										

(CONTINUED ON FOLLOWING FIGURE)

Field Tech: AR
Prepared/Date: YN 6/14/2011
Checked/Date: AB/PE 9/23/2011

MTA Westside Subway Extension
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LOG OF BORING

Project No.: 4953-10-1561 Figure: A-2.35b

DRILLING COMPANY/DRILLING EQUIPMENT		BORING NO.
C & L Drilling / Mayhew 1000		**G-139 (Continued)**
DRILLING METHOD	**BOREHOLE LOCATION**	
Rotary Wash	Sta 611+70, Lt 22 feet	
DATES DRILLED	**HOLE DIAMETER**	**GROUND EL.**
5/6/2011, 5/19/2011, and 5/20/2011	4-7/8 inches	177 feet

GROUND-WATER READINGS
Ground-water level measured at 36½ feet and 42 feet below the ground surface in shallow and deep monitoring wells, respectively on 7/29/11. See last page of this boring for details.

THIS RECORD IS AN INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. LATITUDE AND LONGITUDE OF BORING LOCATION SHOWN ON LOGS ARE APPROXIMATE. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BETWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

ELEVATION (ft)	DEPTH (ft)	"N" VALUE STD.PEN.TEST	OVA (ppm)**	MOISTURE CONTENT (% of dry wt.)	DRY DENSITY (pcf)	BLOW COUNT* (blows/ft)	PERCENT PASSING No. 200 SIEVE	SAMPLE LOC.	DOWNHOLE TESTS		
95		39	3.8	18.8	-			☒			Some fine gravel
	85										
90			3.3	13.1	112	37	48	⊠			Becomes bluish gray and green with black silt spots, trace gravel (up to 3/8 inch in size)
	90										
85		30	4.1	27.0	-			☒			Becomes medium dense, olive green
	95									SM	SILTY SAND - dense, moist, olive green, fine to medium-grained, some gravel
80			4.7	18.7	114	58	30	⊠			Layers of Poorly Graded Sand with Silt
	100										
75		28		23.8	-			☒		CL	LEAN CLAY - very stiff, moist, brown, trace fine sand
	105										
70				27.5	96	46		⊠		ML	SANDY SILT - hard, moist, olive green, fine sand
	110										Layers of Poorly Graded Sand with Silt
65		93		26.1	-			☒			
	115										END OF BORING AT 111½ FEET
60											NOTES: Hand augered upper 5 feet to avoid damage to utilites. Montoring well was installed on 5/20/2011. See well construction diagram for G-139.
	120										

"N" Value Standard Penetration Test: Number of blows required to drive the SPT sampler 18 inches using a 140 pound automatic hammer falling 30 inches

*Number of blows required to drive the Crandall Sampler 12 inches using a 300 pound hammer falling 18 inches

**Photo Ionization Detector used for OVA readings

Field Tech: AR
Prepared/Date: YN 6/14/2011
Checked/Date: AB/PE 9/23/2011

MTA Westside Subway Extension
Los Angeles, California

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LOG OF BORING

Project No.: 4953-10-1561 Figure: A-2.35c

LA METRO PB-TUNNEL ZONE S:\70131 GEOTECH\GINTW\LIBRARY MACTEC JUNE2011.GLB
G:\PROJECT_DIRECTORIES\4953\2010\101561_METRO_WESTSIDE_EXTENSION\6.2.3.1 GEOTECHNICAL DESIGN\3.2 ALL FIELD NOTES\GINT LOG\NEW TEMPLATE - MARCH 14, 2011\4953-10-1561_(120-139).GPJ 10/24/11

DRILLING COMPANY/DRILLING EQUIPMENT		BORING NO.
C & L Drilling / Mayhew 1000		G-140
DRILLING METHOD	**BOREHOLE LOCATION**	
Rotary Wash	Sta 615+00, Lt 2 feet	
DATES DRILLED	**HOLE DIAMETER**	**GROUND EL.**
3/25/2011 - 3/30/2011	4-7/8 inches	181 feet

GROUND-WATER READINGS
Ground-water level measured at 56 feet below ground surface on 3/29/2011.

THIS RECORD IS AN INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. LATITUDE AND LONGITUDE OF BORING LOCATION SHOWN ON LOGS ARE APPROXIMATE. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BETWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

ELEVATION (ft)	DEPTH (ft)	"N" VALUE STD.PEN.TEST	OVA (ppm)**	MOISTURE CONTENT (% of dry wt.)	DRY DENSITY (pcf)	BLOW COUNT* (blows/ft)	PERCENT PASSING No. 200 SIEVE	SAMPLE LOC.	DOWNHOLE TESTS		
180	0										4-inch thick Asphalt Concrete over 9-inch thick Portland Cement Concrete, No Base Course
										SP	**FILL [Af]** - POORLY GRADED SAND - moist, brown, trace gravel and silt
										ML	**QUATERNARY YOUNGER ALLUVIUM [Qal]** SANDY SILT - moist, brown
	5									SC	CLAYEY SAND - medium dense, moist, dark brown, fine-grained, trace fine gravel
175			0.4	10.6	119	Push					
		24	0.2	15.2	-		48				Becomes reddish brown
	10										
170			0.0	12.9	117	19					Becomes brown
	15	22	0.0	18.9	-						Alternating with layers of Sandy Lean Clay
165											
	20										
160			1.7	15.7	98	9					Becomes loose, fine to medium-grained
										CL	LEAN CLAY - stiff, moist, brown, trace sand
	25										
155		14	0.0	23.2	-						
										ML	SANDY SILT - stiff, moist, brown, fine to medium sand, thin layers of Silty Sand
	30										
150			0.0	14.6	108	12					
											QUATERNARY OLDER ALLUVIUM [Qalo]
	35									SP	POORLY GRADED SAND with GRAVEL - very dense, moist, brown, fine to medium-grained, some coarse, gravel (up to 1/4 inch in size)
145		54	0.6	13.6	-						
	40										Alternating with layers of Silty Sand

(CONTINUED ON FOLLOWING FIGURE)

Field Tech: DW
Prepared/Date: JF 5/13/2011
Checked/Date: LT/PE 9/26/2011

MTA Westside Subway Extension
Los Angeles, California

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LOG OF BORING

Project No.: 4953-10-1561 Figure: A-2.36a

DRILLING COMPANY/DRILLING EQUIPMENT		BORING NO.
C & L Drilling / Mayhew 1000		**G-140 (Continued)**
DRILLING METHOD	**BOREHOLE LOCATION**	
Rotary Wash	Sta 615+00, Lt 2 feet	
DATES DRILLED	**HOLE DIAMETER**	**GROUND EL.**
3/25/2011 - 3/30/2011	4-7/8 inches	181 feet

GROUND-WATER READINGS
Ground-water level measured at 56 feet below ground surface on 3/29/2011.

THIS RECORD IS AN INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. LATITUDE AND LONGITUDE OF BORING LOCATION SHOWN ON LOGS ARE APPROXIMATE. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BETWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

ELEVATION (ft)	DEPTH (ft)	"N" VALUE STD.PEN.TEST	OVA (ppm)**	MOISTURE CONTENT (% of dry wt.)	DRY DENSITY (pcf)	BLOW COUNT* (blows/ft)	PERCENT PASSING No. 200 SIEVE	SAMPLE LOC.	DOWNHOLE TESTS		
140			0.8	24.5	96	24		⊠			Becomes medium dense, gravel up to (3/4 inch in size)
	45									SM	**SAN PEDRO FORMATION [Qsp]** SILTY SAND - medium dense, moist, dark gray, fine to medium-grained, with some clay
135		19	0.7	15.6	-			☒			
	50										Thin layer of Sandy Silt, gray
130			0.0	18.1	111	21	36	⊠			Trace gravel (up to 3/8 inch in size)
		23	0.0	28.0	-			☒		CL	LEAN CLAY - very stiff, moist, dark gray
	55										▼
			0.0	22.5	104	12		⊠		ML	SANDY SILT - stiff, moist to wet, gray
	60	26	0.0	27.5	-			☒		CL	LEAN CLAY - very stiff, moist, greenish gray
			0.0	23.8	102	22		⊠			Trace fine to medium sand
	65										
		38	0.0	16.8	-			☒		CL	SANDY LEAN CLAY - hard, moist, greenish gray, fine to medium sand
			0.0	19.0	108	14	71	⊠			Alternating with layers of Lean Clay with Sand, stiff, trace gravel (up to 1/2 inch in size)
	70										
		47	0.0	15.5	-			☒			Becomes dark gray
			0.2	14.4	117	25	40	⊠		SC	CLAYEY SAND - medium dense, moist, greenish gray, fine to medium-grained
	75										
105											
		71	0.0	14.7	-		18	☒		SM	SILTY SAND - very dense, moist, greenish gray, fine-grained, trace gravel (up to 1/2 inch in size)
	80										

Tunnel

(CONTINUED ON FOLLOWING FIGURE)

Field Tech: DW
Prepared/Date: JF 5/13/2011
Checked/Date: LT/PE 9/26/2011

MTA Westside Subway Extension
Los Angeles, California

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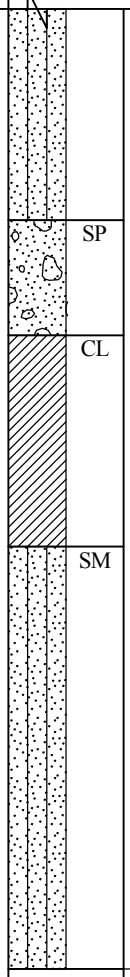
LOG OF BORING

Project No.: 4953-10-1561 Figure: A-2.36b

DRILLING COMPANY/DRILLING EQUIPMENT		BORING NO.
C & L Drilling / Mayhew 1000		**G-140 (Continued)**
DRILLING METHOD	**BOREHOLE LOCATION**	
Rotary Wash	Sta 615+00, Lt 2 feet	
DATES DRILLED	**HOLE DIAMETER**	**GROUND EL.**
3/25/2011 - 3/30/2011	4-7/8 inches	181 feet

GROUND-WATER READINGS
Ground-water level measured at 56 feet below ground surface on 3/29/2011.

ELEVATION (ft)	DEPTH (ft)	"N" VALUE STD.PEN.TEST	OVA (ppm)**	MOISTURE CONTENT (% of dry wt.)	DRY DENSITY (pcf)	BLOW COUNT* (blows/ft)	PERCENT PASSING No. 200 SIEVE	SAMPLE LOC.	DOWNHOLE TESTS
100			0.2	23.2	103	22	36	⊠	
		76	1.2	15.5	-			☒	
	85								
95			0.0	19.5	109	39		⊠	
		29	0.6	25.6	-		75	☒	
	90								
90			0.0	17.6	111	20		⊠	
	95								
85		69	0.0	22.6	-		53	☒	
			0.0	20.1	107	36		⊠	
	100								
80		77/10"	0.0	25.5	-			☒	
	105		0.0	26.0	94	20		⊠	
75									
	110								
70									
	115								
65									
	120								



Thin layer of Sandy Silt

POORLY GRADED SAND with GRAVEL - dense, moist, greenish gray, fine to medium-grained, gravel (up to 1/2 inch in size)

LEAN CLAY with SAND - very stiff, moist, greenish gray and dark gray, fine sand

SILTY SAND - very dense, moist, greenish gray, fine-grained

Layers of Sandy Silt

Becomes dense, with alternating layers of Poorly Graded Sand

Thin layer of Sandy Silt

END OF BORING AT 105 FEET

NOTES:

Borehole grouted with cement-bentonite slurry and patched with asphalt concrete.

"N" Value Standard Penetration Test: Number of blows required to drive the SPT sampler 18 inches using a 140 pound automatic hammer falling 30 inches

*Number of blows required to drive the Crandall Sampler 12 inches using a 380 pound hammer falling 18 inches

**Photo Ionization Detector used for OVA readings

THIS RECORD IS AN INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. LATITUDE AND LONGITUDE OF BORING LOCATION SHOWN ON LOGS ARE APPROXIMATE. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BETWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

Field Tech: DW
Prepared/Date: JF 5/13/2011
Checked/Date: LT/PE 9/26/2011

MTA Westside Subway Extension
Los Angeles, California

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LOG OF BORING
Project No.: 4953-10-1561 Figure: A-2.36c

DRILLING COMPANY/DRILLING EQUIPMENT		BORING NO.
C & L Drilling / Mayhew 1000		G-141
DRILLING METHOD	**BOREHOLE LOCATION**	
Rotary Wash	Sta 621+70, Lt 11 feet	
DATES DRILLED	**HOLE DIAMETER**	**GROUND EL.**
5/6/2011 - 5/23/2011	4-7/8 inches	195 feet

GROUND-WATER READINGS
Drilling mud bailed. Ground-water level measured at 46 feet below the ground surface.

THIS RECORD IS AN INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. LATITUDE AND LONGITUDE OF BORING LOCATION SHOWN ON LOGS ARE APPROXIMATE. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BETWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

ELEVATION (ft)	DEPTH (ft)	"N" VALUE STD.PEN.TEST	OVA (ppm)**	MOISTURE CONTENT (% of dry wt.)	DRY DENSITY (pcf)	BLOW COUNT* (blows/ft)	PERCENT PASSING No. 200 SIEVE	SAMPLE LOC.	DOWNHOLE TESTS		
											4-inch thick Asphalt Concrete over 10-inch thick Portland Cement Concrete, No Base Course
										SP-SM	**FILL [Af]** - POORLY GRADED SAND with SILT - moist, olive yellow, fine to medium-grained, some coarse, trace fine to coarse gravel (up to 3/4 inch in size)
										SM	**QUATERNARY YOUNGER ALUVIUM [Qal]** SILTY SAND - moist, brown, fine to medium-grained, some fine to coarse gravel (up to 1 inch in size), trace clay
190	5		0.0	11.4	116	Push		⊠			
										SC	**QUATERNARY OLDER ALUVIUM [Qalo]** CLAYEY SAND - medium dense, moist, brown, fine to coarse-grained, fine to coarse angular gravel (up to 1 inch in size)
185	10		0.0	13.5	118	13		⊠			
										ML	SANDY SILT - stiff, moist, brown, fine to medium sand, some clay
180	15	13	0.0	18.7	-			☒			
										GW-GM	WELL GRADED GRAVEL with SILT and SAND - medium dense, moist to wet, dark brown, fine gravel (up to 3/4 inch in size), fine to coarse sand
175	20		0.0	6.1	105	15	6	⊠			
										ML	SANDY SILT - very stiff, moist, brown, fine sand, trace clay
170	25	16	0.0	29.0	-		68	☒			
										CL-ML	SILTY CLAY with SAND - medium stiff, moist, brown, fine sand
165	30		0.0	21.9	107	6		⊠			More sand
										SM	SILTY SAND - medium dense to dense, moist to wet, brown, fine to coarse-grained, some fine subrounded to subangular gravel (up to 1/2 inch in size)
160	35	46	0.0	8.1	-		19	☒			
	40										

(CONTINUED ON FOLLOWING FIGURE)

Field Tech: LH/AR
Prepared/Date: WL 6/13/2011
Checked/Date: HP/LT 10/2/2011

MTA Westside Subway Extension
Los Angeles, California

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LOG OF BORING

Project No.: 4953-10-1561 Figure: A-2.37a

DRILLING COMPANY/DRILLING EQUIPMENT		BORING NO.
C & L Drilling / Mayhew 1000		**G-141 (Continued)**
DRILLING METHOD	**BOREHOLE LOCATION**	
Rotary Wash	Sta 621+70, Lt 11 feet	
DATES DRILLED	**HOLE DIAMETER**	**GROUND EL.**
5/6/2011 - 5/23/2011	4-7/8 inches	195 feet

GROUND-WATER READINGS
Drilling mud bailed. Ground-water level measured at 46 feet below the ground surface.

THIS RECORD IS AN INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. LATITUDE AND LONGITUDE OF BORING LOCATION SHOWN ON LOGS ARE APPROXIMATE. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BETWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

ELEVATION (ft)	DEPTH (ft)	"N" VALUE STD.PEN.TEST	OVA (ppm)**	MOISTURE CONTENT (% of dry wt.)	DRY DENSITY (pcf)	BLOW COUNT* (blows/ft)	PERCENT PASSING No. 200 SIEVE	SAMPLE LOC.	DOWNHOLE TESTS		
			0.0	22.0	90	16		⊠			Layers of Clayey Sand seems interbedded Becomes moist, orange brown, fine to medium-grained, some coarse, some gravel
150	45	41	0.0	14.0	-		34	☒			▽ Becomes wet, yellowish brown, some fine gravel (up to 3/4 inch in size), some iron oxide stains, trace small clay nodules
										ML	SANDY SILT - very stiff, moist, olive brown, fine sand, some mica
145	50		0.0	22.4	102	17	69	⊠		ML	**SAN PEDRO FORMATION [Qsp]** SANDY SILT - very stiff, moist to wet, olive brown, fine sand, some medium, trace iron oxide stains
										CL	SANDY LEAN CLAY - hard, moist, greenish gray to bluish gray, some calcium carbonate nodules, trace subrounded fine gravel (up to 1/2 inch in size)
	55	31	0.0	18.9	-			☒			
Tunnel	60		0.0	20.8	104	14	72	⊠		CL	LEAN CLAY with SAND- stiff to hard, moist to wet, bluish gray to dark bluish gray, fine sand, some medium
	65	32	0.0	22.4	-			☒			Becomes olive gray, more calcium carbonate nodules
	70		0.0	25.1	105	18	64	⊠		CL	SANDY LEAN CLAY - very stiff to hard, moist, olive gray, fine sand, some medium
120	75	53		20.1	-			☒			Becomes olive green, some layers of Silty Sand
	80									CL	LEAN CLAY with SAND- very stiff, moist, bluish gray, fine sand, some medium

(CONTINUED ON FOLLOWING FIGURE)

Field Tech: LH/AR
Prepared/Date: WL 6/13/2011
Checked/Date: HP/LT 10/2/2011

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Los Angeles, California

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LOG OF BORING
Project No.: 4953-10-1561 Figure: A-2.37b

DRILLING COMPANY/DRILLING EQUIPMENT		BORING NO.
C & L Drilling / Mayhew 1000		**G-141 (Continued)**
DRILLING METHOD	**BOREHOLE LOCATION**	
Rotary Wash	Sta 621+70, Lt 11 feet	
DATES DRILLED	**HOLE DIAMETER**	**GROUND EL.**
5/6/2011 - 5/23/2011	4-7/8 inches	195 feet

GROUND-WATER READINGS
Drilling mud bailed. Ground-water level measured at 46 feet below the ground surface.

THIS RECORD IS AN INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. LATITUDE AND LONGITUDE OF BORING LOCATION SHOWN ON LOGS ARE APPROXIMATE. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BETWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

ELEVATION (ft)	DEPTH (ft)	"N" VALUE STD.PEN.TEST	OVA (ppm)**	MOISTURE CONTENT (% of dry wt.)	DRY DENSITY (pcf)	BLOW COUNT* (blows/ft)	PERCENT PASSING No. 200 SIEVE	SAMPLE LOC.	DOWNHOLE TESTS		
				21.5	100	24	74	⊠			
110	85	50		21.1	-			☒		CL-ML	SILTY CLAY with SAND - hard, moist, bluish gray, fine sand
105	90			20.5	105	49		⊠		CL	SANDY LEAN CLAY - hard, moist, bluish gray, fine sand
100	95	59		22.4	-			☒		ML	SANDY SILT - hard, moist to wet, bluish gray, fine sand
95	100			25.8	95	73		⊠			
90	105	54		27.4	-			☒			Becomes bluish gray to olive green
85	110										END OF BORING AT 106½ FEET
80	115										
	120										

NOTES:

Hand augered upper 5 feet due to utilities. Borehole grouted with cement-bentonite slurry and patched with asphalt concrete.

"N" Value Standard Penetration Test: Number of blows required to drive the SPT sampler 18 inches using a 140 pound automatic hammer falling 30 inches

*Number of blows required to drive the Crandall Sampler 12 inches using a 380 pound hammer falling 18 inches

**Photo Ionization Detector used for OVA readings

Field Tech: LH/AR
Prepared/Date: WL 6/13/2011
Checked/Date: HP/LT 10/2/2011

MTA Westside Subway Extension
Los Angeles, California

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LOG OF BORING

Project No.: 4953-10-1561 Figure: A-2.37c

DRILLING COMPANY/DRILLING EQUIPMENT		BORING NO.
Tri County Drilling / CME 75		G-142
DRILLING METHOD	**BOREHOLE LOCATION**	
Rotary Wash	Sta 628+70, Lt 11 feet	
DATES DRILLED	**HOLE DIAMETER**	**GROUND EL.**
5/9/2011 - 5/11/2011	4-¼ inches	209 feet

GROUND-WATER READINGS
Drilling mud bailed on 5/10/2011. Ground-water level measured at 32 feet below the ground surface on 5/11/2011.

THIS RECORD IS AN INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. LATITUDE AND LONGITUDE OF BORING LOCATION SHOWN ON LOGS ARE APPROXIMATE. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BETWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

ELEVATION (ft)	DEPTH (ft)	"N" VALUE STD.PEN.TEST	OVA (ppm)**	MOISTURE CONTENT (% of dry wt.)	DRY DENSITY (pcf)	BLOW COUNT* (blows/ft)	PERCENT PASSING No. 200 SIEVE	SAMPLE LOC.	DOWNHOLE TESTS		
											7-inch thick Asphalt Concrete over 5-inch thick Portland Cement Concrete, 4-inch thick Base Course
										ML	**QUATERNARY YOUNGER ALLUVIUM [Qal]** SANDY SILT - moist, brown, fine sand
205	5		2.2	18.4	104	11		⊠		SM	SILTY SAND - loose, moist, brown, fine to medium-grained, trace clay, trace fine gravel
200	10	18	0.5	16.6	-			☒		CL	**QUATERNARY OLDER ALLUVIUM [Qalo]** SANDY LEAN CLAY - very stiff, moist, brown, fine sand
195	15		0.0	10.1	111	31		⊠		SM	SILTY SAND - medium dense, moist, orangish brown, fine to medium-grained, trace clay, trace fine gravel
190	20	15		18.0	-			☒			
185	25		1.1	12.7	120	26		⊠		SW	WELL GRADED SAND with GRAVEL - medium dense, moist, brownish gray, fine to coarse-grained, coarse slate gravel
180	30	41	1.4	10.1	-		17	☒		SM	Becomes dark greenish gray, sandier seams SILTY SAND with GRAVEL - dense, very moist, fine to coarse-grained, fine gravel (up to 1/2 inch in size)
175	35			13.9	110	34		⊠		SP	POORLY GRADED SAND - medium dense, very moist, brown, fine to medium-grained, alternating Well Graded Sand, some fine gravel
170	40									CL	**SAN PEDRO FORMATION [Qsp]** LEAN CLAY with GRAVEL - moist, dark greenish gray

(CONTINUED ON FOLLOWING FIGURE)

Field Tech: JHD
Prepared/Date: WL 6/28/2011
Checked/Date: LT 10/6/2011

MTA Westside Subway Extension
Los Angeles, California

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LOG OF BORING

Project No.: 4953-10-1561 Figure: A-2.38a