DRILLING COMPANY/DRILLING EQUIPMENT		BORING NO.
Tri County Drilling / CME 75		**G-142 (Continued)**
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		
		17	0.5	29.9	-			☒		CL	LEAN CLAY - very stiff, very moist, dark bluish gray, trace gravel
165	45										Less gravel
			0.0	26.3	102	21	88	⊠		MH	ELASTIC SILT - stiff, moist, dark greenish gray, some fine to medium sand
	50	13	2.4	26.9	-			☒			Becomes greenish gray to bluish gray
											More fine gravel
	55		2.3	18.7	109	44	29	⊠		SM	SILTY SAND with GRAVEL - medium dense, moist, dark greenish gray, fine to coarse-grained, fine gravel (up to 3/4 inch in size)
	60	23	2.9	19.2	-			☒			Some clay, trace gravel
										CL	LEAN CLAY with SAND - very stiff, moist, dark greenish gray to bluish gray, fine sand, trace medium
	65		2.0	25.2	99	33	73	⊠			
140	70	57	2.9	19.2	-			☒		CL	LEAN CLAY with GRAVEL - hard, moist, dark gray, coarse gravel
											Less gravel
135	75			14.8	116	43		⊠			Becomes very stiff, some gravel
130	80										Shale interbedded

Tunnel

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

(CONTINUED ON FOLLOWING FIGURE)

MTA Westside Subway Extension
Los Angeles, California

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LOG OF BORING

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

DRILLING COMPANY/DRILLING EQUIPMENT		BORING NO.
Tri County Drilling / CME 75		**G-142 (Continued)**
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.

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	85	35	2.9	19.1	-		66	☒		CL	SANDY LEAN CLAY - hard, moist, dark gray, fine to coarse sand, some shale interbedded, trace fine gravel (up to 3/4 inch in size)
			2.3	6.0	122	51		⊠		ML	SANDY SILT with GRAVEL - hard, moist, dark greenish gray, gravel (up to 1/4 inch in size), trace clay
120	90	27	3.5	29.0	-			☒		CL	SANDY LEAN CLAY - very stiff, moist, dark greenish gray
											Trace coarse gravel
115	95		2.9	24.5	-	46		⊠			Some silt
											END OF BORING AT 96 FEET
110	100										
105	105										
100	110										
95	115										
90	120										

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 140 pound automatic hammer falling 30 inches

**Photo Ionization Detector used for OVA readings

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

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_(140-160).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-2.38c

DRILLING COMPANY/DRILLING EQUIPMENT		BORING NO.
Tri County Drilling / CME 75		G-143
DRILLING METHOD	**BOREHOLE LOCATION**	
Rotary Wash	Sta 635+40, Lt 16 feet	
DATES DRILLED	**HOLE DIAMETER**	**GROUND EL.**
5/12/2011 - 5/13/2011	4-¼ inches	216 feet

GROUND-WATER READINGS
Drilling mud bailed on 5/12/2011. Ground-water level measured at 35 feet below the 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		
215	0										10-inch thick Asphalt Concrete over 5-inch thick Portland Cement Concrete and 3-inch thick Base Course
										ML	**QUATERNARY YOUNGER ALLUVIUM [Qal]** SANDY SILT - moist, brown, fine sand
210	5		3.2	18.0	102	12		⊠		CH	FAT CLAY - medium stiff, moist, brown
										CL	LEAN CLAY - very stiff, moist, orangish brown, trace shale fragments
205	10	23	5.3	17.9	-			⊠			
200	15		4.7	12.5	122	27		⊠		SC	CLAYEY SAND - medium dense, brown with greenish gray mottling, fine to medium-grained, abundant shale fragments, layers of Clayey Sand
											QUATERNARY OLDER ALLUVIUM [Qalo]
										CL	LEAN CLAY with GRAVEL - hard, moist, brown, trace shale
195	20	32	3.8	14.8	-			⊠			More small shale fragments
190	25		2.9	10.6	119	27		⊠		SM	SILTY SAND - medium dense, moist, brown with dark gray mottling, fine to medium-grained, some gravel, some clay
185	30	55	3.2	14.2	-			⊠			Becomes very dense, very moist, dark brown, medium-grained, abundant shale fragments
180	35		4.4	10.5	110	34	16	⊠		SM	▼ SILTY SAND with GRAVEL - medium dense, moist, brownish gray, fine to coarse-grained, fine to coarse gravel (up to 1 inch in size)
	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: JHD
Prepared/Date: YN 6/9/2011
Checked/Date: LT/PE 9/27/2011

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Los Angeles, California

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LOG OF BORING

Project No.: 4953-10-1561 Figure: A-2.39a

DRILLING COMPANY/DRILLING EQUIPMENT		BORING NO.
Tri County Drilling / CME 75		**G-143 (Continued)**
DRILLING METHOD	**BOREHOLE LOCATION**	
Rotary Wash	Sta 635+40, Lt 16 feet	
DATES DRILLED	**HOLE DIAMETER**	**GROUND EL.**
5/12/2011 - 5/13/2011	4-¼ inches	216 feet

GROUND-WATER READINGS
Drilling mud bailed on 5/12/2011. Ground-water level measured at 35 feet below the 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		
		41	5.6	13.1	-			☒			Becomes dense, more shale fragments, layer of Well Graded Sand
	45		5.3	22.6	102	23		⊠		CL	LEAN CLAY - stiff, moist, dark olive brown, trace coarse gravel
Tunnel	50	19	6.2	18.8	-			☒			Becomes very stiff, olive brown, trace shale fragments, thin layer of silt
	55		5.9	22.1	102	22	72	⊠		CL	LEAN CLAY with SAND - stiff, moist, brown, some fine sand, occasional medium
155	60	19	5.5	22.9	-			☒			Becomes very stiff, dark brown, trace coarse shale fragments
150	65		4.7	14.4	120	45	25	⊠		SC	CLAYEY SAND with GRAVEL - medium dense, moist, dark brown, brown and olive brown mottling, fine to coarse-grained, fine gravel (up to 3/4 inch in size)
145	70	42	3.2	14.2	-		29	☒			Becomes dense, dark olive brown
	75									CL	LEAN CLAY - very stiff, moist, dark brown, trace shale fragments
140			3.8	16.7	115	42		⊠			
	80										

(CONTINUED ON FOLLOWING FIGURE)

Field Tech: JHD
Prepared/Date: YN 6/9/2011
Checked/Date: LT/PE 9/27/2011

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LOG OF BORING

Project No.: 4953-10-1561 Figure: A-2.39b

DRILLING COMPANY/DRILLING EQUIPMENT		BORING NO.
Tri County Drilling / CME 75		**G-143 (Continued)**
DRILLING METHOD	**BOREHOLE LOCATION**	
Rotary Wash	Sta 635+40, Lt 16 feet	
DATES DRILLED	**HOLE DIAMETER**	**GROUND EL.**
5/12/2011 - 5/13/2011	4-¼ inches	216 feet

GROUND-WATER READINGS
Drilling mud bailed on 5/12/2011. Ground-water level measured at 35 feet below the 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
135		28	3.6	17.8	-			☒	
	85								
130			2.9	10.8	111	80	34	⊠	
	90								
125		50/4"	3.2	11.6	-			☒	
	95								
120									
	100								
115									
	105								
110									
	110								
105									
	115								
100									
	120								

ML — SANDY SILT - very stiff, moist, olive brown, trace clay, trace shale fragments

SAN PEDRO FORMATION [Qsp]

SM — SILTY SAND - very dense, dry, greenish gray, fine to coarse-grained, occasional fine gravel (up to 3/8 inch in size)

Becomes dark gray, thin layer of gravel

END OF BORING AT 91½ FEET

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 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 6/9/2011
Checked/Date: LT/PE 9/27/2011

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LOG OF BORING
Project No.: 4953-10-1561 Figure: A-2.39c

DRILLING COMPANY/DRILLING EQUIPMENT		BORING NO.
C & L Drilling / Mayhew 1000		G-144
DRILLING METHOD	**BOREHOLE LOCATION**	
Rotary Wash	Sta 642+55, Lt 25 feet	
DATES DRILLED	**HOLE DIAMETER**	**GROUND EL.**
5/31/2011 - 6/1/2011	4-7/8 inches	223 feet

GROUND-WATER READINGS
Ground-water level measured at 53 feet below the ground surface on 6/2/2011.

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 / Rodeo Station	5			21.2	99	22		⊠		ML	10-inch thick Asphalt Concrete over 5-inch thick Portland Cement Concrete and 3-inch thick Base Course **QUATERNARY YOUNGER ALLUVIUM [Qal]** SANDY SILT - moist, brown, very fine sand
	10	13		26.8	-			⊠		SM	Some clay SILTY SAND - medium dense, moist, light brown, fine-grained
	15			17.0	113	20	85	⊠		CL	LEAN CLAY with SAND - stiff, moist, light brown, fine sand
	20	28		17.9	-			⊠	PMT	CH	**QUATERNARY OLDER ALLUVIUM [Qalo]** FAT CLAY with SAND - stiff, moist, brown, fine sand, trace medium to coarse sand Trace gravel (up to 3/8 inch in size) Becomes very stiff, olive brown, some gravel
	25			8.7	123	42	12	⊠		SM	SILTY SAND - medium dense, moist, brown, fine-grained
	30	15		22.1	-			⊠		GC	CLAYEY GRAVEL with SAND - medium dense, moist, light brown, fine gravel (up to 3/4 inch in size), fine to medium sand, trace coarse
	35			8.4	130	45		⊠		CL-ML	SILTY CLAY - stiff, moist, olive brown, fine sand, some clay, trace gravel
	40									CL	LEAN CLAY with SAND - very stiff, moist, light brown, fine to coarse sand, trace gravel (up to 3/4 inch in size)

(CONTINUED ON FOLLOWING FIGURE)

Field Tech: AR
Prepared/Date: YN 6/17/2011
Checked/Date: HP/PE 9/19/2011

MTA Westside Subway Extension
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LOG OF BORING

Project No.: 4953-10-1561 Figure: A-2.40a

DRILLING COMPANY/DRILLING EQUIPMENT		BORING NO.
C & L Drilling / Mayhew 1000		**G-144 (Continued)**
DRILLING METHOD	**BOREHOLE LOCATION**	
Rotary Wash	Sta 642+55, Lt 25 feet	
DATES DRILLED	**HOLE DIAMETER**	**GROUND EL.**
5/31/2011 - 6/1/2011	4-7/8 inches	223 feet

GROUND-WATER READINGS
Ground-water level measured at 53 feet below the ground surface on 6/2/2011.

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		
	45	85/10"		9.3	-		21	☒		SM	SILTY SAND with GRAVEL - very dense, moist, dark olive yellow, fine to caorse-grained, some gravel (up to 1/2 inch in size)
				8.8	113	43	27	⊠		SM	SILTY SAND - medium dense, moist, dark olive yellow to olive brown, fine to medium-grained, some coarse, trace fine gravel (up to 1/2 inch in size)
	50	19		22.4	-			☒		CL	LEAN CLAY with SAND - very stiff, moist, olive brown, fine to medium sand
									PMT		▽
	55			19.8	110	26		⊠			More sand
	60	26		20.7	-			☒			
									PMT		Some slate gravel
	65			21.7	100	25	77	⊠			
	70	26		20.1	-			☒			
	150										
	75			16.7	112	25	79	⊠			Fine sand, trace fine to coarse gravel (up to 3/8 inch in size)
	145										
Wilshire / Rodeo Station	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: AR
Prepared/Date: YN 6/17/2011
Checked/Date: HP/PE 9/19/2011

MTA Westside Subway Extension
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LOG OF BORING

Project No.: 4953-10-1561 Figure: A-2.40b

DRILLING COMPANY/DRILLING EQUIPMENT		BORING NO.
C & L Drilling / Mayhew 1000		**G-144 (Continued)**
DRILLING METHOD	**BOREHOLE LOCATION**	
Rotary Wash	Sta 642+55, Lt 25 feet	
DATES DRILLED	**HOLE DIAMETER**	**GROUND EL.**
5/31/2011 - 6/1/2011	4-7/8 inches	223 feet

GROUND-WATER READINGS
Ground-water level measured at 53 feet below the ground surface on 6/2/2011.

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		39		15.3	-			☒			Becomes hard, yellowish brown
	85									SC	CLAYEY SAND with GRAVEL - dense, moist, dark olive yellow, fine to medium-grained, gravel (up to 1/2 inch in size)
135				12.1	117	46	33	▨			
	90	75		11.9	-			☒			Becomes very dense, fine to coarse-grained, gravel (up to 1 inch in size)
130											
	95			21.6	104	31	72	▨		CL	LEAN CLAY with SAND - very stiff, moist, dark olive, fine sand, trace silt nodules
125											Trace gravel
	100	40		10.4	-			☒		SC	CLAYEY SAND - dense, fine to medium-grained, trace fine gravel (up to 1/2 inch in size)
120										SC	CLAYEY SAND with GRAVEL - medium dense, moist, brownish gray, fine to coarse-grained, gravel (up to 1/2 inch in size)
	105			13.7	110	41	29	▨			
115											
	110	51		17.6	-			☒		SC	**SAN PEDRO FORMATION [Qsp]** CLAYEY SAND - very dense, moist, greenish gray, fine to coarse-grained, trace fine gravel (up to 3/4 inch in size)
110											
	115			7.9	126	81		▨		SM	SILTY SAND with GRAVEL - very dense, moist, greenish gray, fine to coarse-grained
105											
	120										

(CONTINUED ON FOLLOWING FIGURE)

Field Tech: AR
Prepared/Date: YN 6/17/2011
Checked/Date: HP/PE 9/19/2011

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LOG OF BORING

Project No.: 4953-10-1561 Figure: A-2.40c

DRILLING COMPANY/DRILLING EQUIPMENT		BORING NO.
C & L Drilling / Mayhew 1000		**G-144 (Continued)**
DRILLING METHOD	**BOREHOLE LOCATION**	
Rotary Wash	Sta 642+55, Lt 25 feet	
DATES DRILLED	**HOLE DIAMETER**	**GROUND EL.**
5/31/2011 - 6/1/2011	4-7/8 inches	223 feet

GROUND-WATER READINGS
Ground-water level measured at 53 feet below the ground surface on 6/2/2011.

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
100	125	50/3"		10.3	-			☒	
95	130								
90	135								
85	140								
80	145								
75	150								
70	155								
65	160								

END OF BORING AT 121½ feet

NOTES:

Hand augered upper 5 feet due 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 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 6/17/2011
Checked/Date: HP/PE 9/19/2011

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LOG OF BORING
Project No.: 4953-10-1561 Figure: A-2.40d

DRILLING COMPANY/DRILLING EQUIPMENT		BORING NO.
C & L Drilling / Mayhew 1000		G-145
DRILLING METHOD	**BOREHOLE LOCATION**	
Rotary Wash	Sta 648+40, Lt 50 feet	
DATES DRILLED	**HOLE DIAMETER**	**GROUND EL.**
4/14/2011 - 4/15/2011	4-7/8 inches	231 feet

GROUND-WATER READINGS
Drilling mud bailed on 4/15/2011. Ground-water level measured at 71 feet below the ground surface on 4/18/2011.

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 / Rodeo Station	5										4½-inch thick Asphalt Concrete over 12-inch thick Portland Cement Concrete
										SM	**FILL [Af]** SILTY SAND with GRAVEL - moist, brown
	10		0.5	18.8	104	Push	84	⊠		CL	**QUATERNARY YOUNGER ALLUVIUM [Qal]** LEAN CLAY with SAND - very soft, moist, olive grayish brown, fine to medium sand Trace gravel (up to 3/8 inch in size)
	15	10	0.4	13.6	-			⊠		CH	FAT CLAY with SAND - stiff, moist, brown, fine to coarse sand, trace gravel (up to 1/2 inch in size)
										GP	POORLY GRADED GRAVEL - loose, moist, brown
	20		0.0	18.6	111	5		⊠		GP-GC	POORLY GRADED GRAVEL with CLAY - loose, moist, brown, fine to coarse sand
										CL	**QUATERNARY OLDER ALLUVIUM [Qalo]** SANDY LEAN CLAY - very stiff, moist, brown, fine to coarse sand
	25	22		16.2	-		59	⊠			Trace gravel (up to 1/2 inch in size)
	30			-	-	7		○			(Sample not recovered)
		10		16.8	-			⊠			Becomes stiff, trace gravel
	35	33		12.9	-		42	⊠		SM	SILTY SAND - dense, moist, light olive brown, fine to medium-grained, some coarse, some fine gravel (up to 1/2 inch in size)
	40										

(CONTINUED ON FOLLOWING FIGURE)

Field Tech: DW
Prepared/Date: YN 6/20/2011
Checked/Date: HP/PE 9/19/2011

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LOG OF BORING

Project No.: 4953-10-1561 Figure: A-2.41a

DRILLING COMPANY/DRILLING EQUIPMENT		BORING NO.
C & L Drilling / Mayhew 1000		**G-145 (Continued)**
DRILLING METHOD	**BOREHOLE LOCATION**	
Rotary Wash	Sta 648+40, Lt 50 feet	
DATES DRILLED	**HOLE DIAMETER**	**GROUND EL.**
4/14/2011 - 4/15/2011	4-7/8 inches	231 feet

GROUND-WATER READINGS
Drilling mud bailed on 4/15/2011. Ground-water level measured at 71 feet below the ground surface on 4/18/2011.

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 / Rodeo Station	45	8		- / 5.6	- / -	4	20	○ / ☒			(Sample not recovered)
										SP-SM	POORLY GRADED SAND - loose, moist, brown, fine to coarse-grained, thin layers of Sandy Silt, trace fine gravel (up to 1/2 inch in size)
		19		16.0	-			☒	NV	CL	SANDY LEAN CLAY - very stiff, moist, brown, some fine gravel
	50										
		25		- / 19.5	- / -	4	73	○ / ☒		CL	(Sample not recovered) LEAN CLAY with SAND - very stiff, moist, brown, some fine gravel (up to 3/4 inch in size)
	55	18		-	-			○			(Sample not recovered)
	60								NV		
		15		- / 17.4	- / -	16		○ / ☒			(Sample not recovered) Becomes stiff, with fine gravel
	65									CL	SANDY LEAN CLAY - very stiff, moist, brown, trace clay, trace gravel (up to 1/2 inch in size)
				14.8	111	20	61	⊠			
	70								NV		
		18		- / 20.4	- / -	10	70	○ / ☒			▼ (Sample not recovered)
	75										
		28		-	-			○			(Sample not recovered)
	80										

(CONTINUED ON FOLLOWING FIGURE)

Field Tech: DW
Prepared/Date: YN 6/20/2011
Checked/Date: HP/PE 9/19/2011

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LOG OF BORING

Project No.: 4953-10-1561 Figure: A-2.41b

DRILLING COMPANY/DRILLING EQUIPMENT		BORING NO.
C & L Drilling / Mayhew 1000		**G-145 (Continued)**
DRILLING METHOD	**BOREHOLE LOCATION**	
Rotary Wash	Sta 648+40, Lt 50 feet	
DATES DRILLED	**HOLE DIAMETER**	**GROUND EL.**
4/14/2011 - 4/15/2011	4-7/8 inches	231 feet

GROUND-WATER READINGS
Drilling mud bailed on 4/15/2011. Ground-water level measured at 71 feet below the ground surface on 4/18/2011.

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		
				5.5	115	69	16	⊠		SM	SILTY SAND with GRAVEL - very dense, moist, brown, fine to coarse-grained, gravel (up to 1/2 inch in size)
	85									SM	SILTY SAND - very dense, moist, light brownish gray, fine to medium-grained, iron oxide stains, trace gravel (up to 3/4 inch in size), trace clay
145		74/11"		17.5	-			⊠			
	90										
140				19.2	105	30		⊠		SP-SM	POORLY GRADED SAND with SILT and GRAVEL - medium dense to dense, moist, light brownish gray, fine to coarse-grained, gravel (up to 1/4 inch in size)
	95										
135		60		10.5	-			⊠		SM	SILTY SAND with GRAVEL - very dense, moist, olive yellow, fine to medium-grained, slate gravel (up to 1½ inch in size)
	100										**SAN PEDRO FORMATION [Qsp]**
130				20.5	101	17	50	⊠		SM	SILTY SAND - medium dense, moist, olive, fine sand, trace gravel (up to 3/8 inch in size)
	105										Thin layer of Sandy Silt
125		67		19.0	-			⊠		SM	SILTY SAND - very dense, brown, fine-grained, iron oxide stains, trace gravel
										SP	POORLY GRADED SAND - very dense, moist, brown, fine to medium-grained
	110									CL	LEAN CLAY with SAND - very stiff, moist, gray to light brown, trace gravel (up to 3/8 inch in size)
120				3.5	112	27	78	⊠			
	115									CL	SANDY LEAN CLAY - hard, moist, gray, fine sand, some medium
115		37		22.5	-			⊠			
	120										

(CONTINUED ON FOLLOWING FIGURE)

Field Tech: DW
Prepared/Date: YN 6/20/2011
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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LOG OF BORING

Project No.: 4953-10-1561 Figure: A-2.41c

DRILLING COMPANY/DRILLING EQUIPMENT		BORING NO.
C & L Drilling / Mayhew 1000		**G-145 (Continued)**
DRILLING METHOD	**BOREHOLE LOCATION**	
Rotary Wash	Sta 648+40, Lt 50 feet	
DATES DRILLED	**HOLE DIAMETER**	**GROUND EL.**
4/14/2011 - 4/15/2011	4-7/8 inches	231 feet

GROUND-WATER READINGS
Drilling mud bailed on 4/15/2011. Ground-water level measured at 71 feet below the ground surface on 4/18/2011.

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	125			15.7	118	26		⊠		SC	SANDY LEAN CLAY - very stiff, moist, gray, fine to medium sand, trace fine gravel
105											END OF BORING AT 121 FEET
	130										
100											NOTES:
	135										Hand augered upper 8 feet to avoid damage to utilities. Borehole grouted with cement-bentonite slurry and patched with quick set cement.
95											"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
	140										
90											*Number of blows required to drive the Crandall Sampler 12 inches using a 380 pound hammer falling 18 inches
	145										
85											**Photo Ionization Detector used for OVA readings
	150										
80											Downhole Test: NV = Noise/Vibration
	155										
75											
	160										

Field Tech: DW
Prepared/Date: YN 6/20/2011
Checked/Date: HP/PE 9/19/2011

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LOG OF BORING

Project No.: 4953-10-1561 Figure: A-2.41d

DRILLING COMPANY/DRILLING EQUIPMENT		BORING NO.
C & L Drilling / Mayhew 1000		G-146
DRILLING METHOD	**BOREHOLE LOCATION**	
Rotary Wash	Sta 652+80, Lt 20 feet	
DATES DRILLED	**HOLE DIAMETER**	**GROUND EL.**
4/21/2011 and 5/5/2011	4-7/8 inches	239 feet

GROUND-WATER READINGS
Drilling mud bailed on 4/21/2011. Ground-water level measured at 32 feet below the ground surface on 5/5/2011 (after two weeks).

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		
											9-inch thick Asphalt Concrete over 5-inch thick Portland Cement Concrete and 3-inch thick Base Course
											QUATERNARY YOUNGER ALLUVIUM [Qal]
										ML	SANDY SILT - moist, light brown, fine sand
235										SM	SILTY SAND - moist, light brown, fine to medium-grained, trace slate gravel
	5		2.8	20.1	96	10				CL-ML	SANDY SILTY CLAY - medium stiff, moist, brown, fine sand, trace coarse, rootlets (up to 1/4 inch in size)
											Trace gravel
											QUATERNARY OLDER ALLUVIUM [Qalo]
230	10	13	2.1	22.4	-					CL-ML	SILTY CLAY - stiff, moist, dark olive, some fine sand, trace slate gravel
225	15			-	-	10					(Sample not recovered)
			2.9			21				CL	SANDY LEAN CLAY - very stiff, moist, brown, fine sand, trace coarse, trace calcium carbonate nodules, trace magnesium nodules
220	20	32	3.2	16.0	-						Becomes hard. dark olive, fine to medium sand, trace gravel
215	25		0.3	16.4	115	20					Becomes very stiff, olive brown to brown, fine sand, trace medium
210	30									SM	SILTY SAND - medium dense, moist, brown, fine to medium-grained, some coarse, trace gravel
		30	1.0	16.5	-					SP-SM	POORLY GRADED SAND with SILT - medium dense, moist, brown, fine to coarse-grained, trace gravel
205	35										Some slate fragments (up to 3 inches in size)
			3.4	13.1	116	44				SP	POORLY GRADED SAND - dense, moist, brown to yellowish brown, fine to coarse-grained, fine to coarse gravel (up to 1 inch in size), trace clay, trace mica
											Alternating with thin layers of Silt
200	40										

(CONTINUED ON FOLLOWING FIGURE)

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

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LOG OF BORING

Project No.: 4953-10-1561 Figure: A-2.42a

DRILLING COMPANY/DRILLING EQUIPMENT		BORING NO.
C & L Drilling / Mayhew 1000		**G-146 (Continued)**
DRILLING METHOD	**BOREHOLE LOCATION**	
Rotary Wash	Sta 652+80, Lt 20 feet	
DATES DRILLED	**HOLE DIAMETER**	**GROUND EL.**
4/21/2011 and 5/5/2011	4-7/8 inches	239 feet

GROUND-WATER READINGS
Drilling mud bailed on 4/21/2011. Ground-water level measured at 32 feet below the ground surface on 5/5/2011 (after two weeks).

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		
		16	0.0	19.1	-					SM	SILTY SAND - medium dense, moist, brown, fine to medium-grained, trace coarse
195	45		3.1	12.4	118	22				ML	SANDY SILT - very stiff, moist, dark olive, fine to coarse sand, trace fine gravel (up to 3/8 inch in size)
190	50	20	3.2	16.7	-		58				
			2.5	21.5	101	13				CL-ML	SILTY CLAY - stiff, moist, dark brown, some fine sand, trace medium to coarse, trace fine gravel (up to 1/4 inch in size)
185	55	23	0.5	17.1	-					CL	SANDY LEAN CLAY - very stiff, moist, olive brown, fine sand, trace medium and coarse, trace fine gravel (up to 1/4 inch in size)
			2.7	17.0	111	27	64				More sand, slate gravel (up to ½ inch in size)
180	60										Thin layer of Silty Sand, olive brown, fine to medium-grained
		17	0.5	21.3	-					ML	SILT - very stiff, wet, dark olive, trace fine sand, some clay
			2.9	19.0	107	24				CL	SANDY LEAN CLAY - very stiff, moist, dark brown to olive brown, fine sand
	65										Thin layers of Silt and Sandy Silt
		23	1.4	29.6	-					CL	LEAN CLAY - very stiff, moist, olive brown, trace fine sand
	70		4.3	24.0	101	19	90				
Tunnel		36	7.9	15.7	-					ML	SANDY SILT - hard, moist, dark olive, very fine to fine sand, trace fine gravel (up to ½ inch in size)
	75		9.2	20.3	108	34					Becomes very stiff, trace fine to coarse gravel (up to ¾ inch in size)
	80	25	7.9	16.7	-						Becomes olive yellow to dark olive, some clay

(CONTINUED ON FOLLOWING FIGURE)

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

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LOG OF BORING

Project No.: 4953-10-1561 Figure: A-2.42b

DRILLING COMPANY/DRILLING EQUIPMENT		BORING NO.
C & L Drilling / Mayhew 1000		**G-146 (Continued)**
DRILLING METHOD	**BOREHOLE LOCATION**	
Rotary Wash	Sta 652+80, Lt 20 feet	
DATES DRILLED	**HOLE DIAMETER**	**GROUND EL.**
4/21/2011 and 5/5/2011	4-7/8 inches	239 feet

GROUND-WATER READINGS
Drilling mud bailed on 4/21/2011. Ground-water level measured at 32 feet below the ground surface on 5/5/2011 (after two weeks).

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		
			7.2	17.7	112	33	75	⊠		CL	LEAN CLAY with SAND - very stiff, moist, olive yellow to dark olive, fine sand
155	85	49	5.4	22.4	-			⊠			Becomes hard, trace fine gravel (up to ½ inch in size)
			5.7	24.7	99	28		⊠			Coarse gravel (up to 3 inches in size) Some medium sand and fine gravel (up to ¼ inch in size)
150	90	75	6.1	11.2	-		17	⊠		SM	Thin layer of Sandy Silt, brown, fine sand SILTY SAND - very dense, moist, dark olive brown, fine to coarse-grained, trace fine gravel (up to ½ inch in size)
										ML	SILT - moist, brown, trace gravel
145	95		5.6	13.7	116	63		⊠		SM	SILTY SAND with GRAVEL - very dense, moist, brown, fine-grained
										SW-SM	WELL GRADED SAND with SILT and GRAVEL - very dense, moist to wet, olive brown, fine to coarse-grained, fine gravel (up to ½ inch in size), alternating with layer of Poorly Graded Sand
140	100	53/6"	5.9	14.4	-			⊠			Becomes dark olive to dark olive yellow, more clay, fine gravel (up to 3/4 inch in size)
135	105		5.4	9.4	129	80/6"		⊠			END OF BORING AT 105 FEET
130	110										
125	115										
120	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 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: YN 9/21/2011
Checked/Date: LT/PE 9/26/2011

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LOG OF BORING

Project No.: 4953-10-1561 Figure: A-2.42c

DRILLING COMPANY/DRILLING EQUIPMENT		BORING NO.
Tri Country Drilling / CME 75		G-147
DRILLING METHOD	**BOREHOLE LOCATION**	
Rotary Wash	Sta 659+52, Lt 45 feet	
DATES DRILLED	**HOLE DIAMETER**	**GROUND EL.**
5/16/2011 - 5/18/2011	4-¼ inches	246 feet

GROUND-WATER READINGS
Drilling mud bailed on 5/17/2011. Ground-water level measured at 46 feet on 5/18/2011.

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		
245	0										6-inch thick Asphalt Concrete over 10-inch thick Portland Cement Concrete, No Base Course
										ML	**QUATERNARY YOUNGER ALUVIUM [Qal]** SANDY SILT - moist, dark brown, fine sand
	5										Thin layers of Lean Clay
240			0.0	-	-	12		⊠		SM	SILTY SAND - loose, dark brown, fine to medium-grained, slightly porous
	10	16	0.4	18.8	-			☒		CL	LEAN CLAY - very stiff, moist, dark brown, trace gravel
235											**QUATERNARY OLDER ALUVIUM [Qalo]**
										SM	SILTY SAND with GRAVEL - medium dense, moist, orange brown to brown, fine to medium-grained
	15		0.2	15.7	104	23		⊠			
230											
	20	28	0.5	11.1	-			☒		CL	SANDY LEAN CLAY - very stiff, moist, dark orangish brown, fine to medium sand
225											
	25		1.0	20.4	106	23		⊠			
220										GM	SILTY GRAVEL with SAND - dense, moist, brownish gray, shale gravel, some quartz gravel, fine to coarse sand
	30	35	1.1	6.3	-			☒			
215											
	35		1.4	20.4	100	22		⊠		CL	GRAVELLY LEAN CLAY - stiff, moist, dark brown, some coarse shale gravel
210	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: JHD
Prepared/Date: YN 6/13/2011
Checked/Date: HP/LT 10/2/2011

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LOG OF BORING

Project No.: 4953-10-1561 Figure: A-2.43a

DRILLING COMPANY/DRILLING EQUIPMENT		BORING NO.
Tri Country Drilling / CME 75		G-147 (Continued)
DRILLING METHOD	**BOREHOLE LOCATION**	
Rotary Wash	Sta 659+52, Lt 45 feet	
DATES DRILLED	**HOLE DIAMETER**	**GROUND EL.**
5/16/2011 - 5/18/2011	4-¼ inches	246 feet

GROUND-WATER READINGS
Drilling mud bailed on 5/17/2011. Ground-water level measured at 46 feet on 5/18/2011.

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		
205		15	1.4	23.7	-			☒		CL-ML	SILTY CLAY - stiff to very stiff, moist, dark orangish brown
	45										
200			1.4	15.9	112	38		⊠			▼
	50									SM	SILTY SAND with GRAVEL - very dense, moist, orangish brown, some shale and quartz gravel
195		94/8"	1.1	10.2	-			☒			
	55									CL	LEAN CLAY with GRAVEL - very stiff, moist, dark orangish brown, coarse gravel
190			1.6	18.5	108	32		⊠			
	60										
185		23	2.1	25.7	-			☒			
	65										
180			1.6	13.3	114	63		⊠			Becomes hard
	70									SM	SILTY SAND - very dense, moist, orangish brown, fine to coarse-grained, some fine gravel (up to 3/8 inch in size)
175		90	0.6	9.3	-		22	☒			
	75									CL	SANDY LEAN CLAY - hard, moist, dark orangish brown, fine to medium sand, trace coarse, trace fine gravel (up to 3/8 inch in size)
170			0.2	15.8	113	50	59	⊠			
	80										

(CONTINUED ON FOLLOWING FIGURE)

Field Tech: JHD
Prepared/Date: YN 6/13/2011
Checked/Date: HP/LT 10/2/2011

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LOG OF BORING

Project No.: 4953-10-1561 Figure: A-2.43b

DRILLING COMPANY/DRILLING EQUIPMENT		BORING NO.
Tri Country Drilling / CME 75		G-147 (Continued)
DRILLING METHOD	**BOREHOLE LOCATION**	
Rotary Wash	Sta 659+52, Lt 45 feet	
DATES DRILLED	**HOLE DIAMETER**	**GROUND EL.**
5/16/2011 - 5/18/2011	4-¼ inches	246 feet

GROUND-WATER READINGS
Drilling mud bailed on 5/17/2011. Ground-water level measured at 46 feet on 5/18/2011.

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	45	0.4	18.0	-		65	☒		SM	SILTY SAND - dense, moist, orangish brown, fine to coarse-grained
			0.5	18.0	113	65	25	⊠			
	90	50/3"	1.1	7.5	-		25	☒		SM	SILTY SAND with GRAVEL - very dense, moist, dark gray, fine to coarse-grained, fine gravel (up to 1/2 inch in size)
	95		0.6	14.1	119	42	19	⊠			Becomes medium dense, very moist, dark orangish brown
145	100	50/4"	0.5	8.1	-		20	☒		SM	SILTY SAND - very dense, moist, dark orangish brown, fine to coarse-grained, fine gravel (up to 1/2 inch in size)
										GW	WELL GRADED GRAVEL - dense, moist, dark gray, coarse gravel
140	105		0.2	17.6	114	78		⊠		CL	SANDY LEAN CLAY - hard, moist, dark orangish brown, some coarse gravel
135	110	43	0.0	16.9	-			☒			Trace gravel
130	115			26.0	99	55	81	⊠		ML	SILT with SAND - hard, very moist, dark brown
	120										

(CONTINUED ON FOLLOWING FIGURE)

Field Tech: JHD
Prepared/Date: YN 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-2.43c

DRILLING COMPANY/DRILLING EQUIPMENT		BORING NO.
Tri Country Drilling / CME 75		G-147 (Continued)
DRILLING METHOD	**BOREHOLE LOCATION**	
Rotary Wash	Sta 659+52, Lt 45 feet	
DATES DRILLED	**HOLE DIAMETER**	**GROUND EL.**
5/16/2011 - 5/18/2011	4-¼ inches	246 feet

GROUND-WATER READINGS
Drilling mud bailed on 5/17/2011. Ground-water level measured at 46 feet on 5/18/2011.

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		18.0	-			☒	
	125								
120									
	130								
115									
	135								
110									
	140								
105									
	145								
100									
	150								
95									
	155								
90									
	160								

END OF BORING AT 121½ FEET

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 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 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-2.43d

DRILLING COMPANY/DRILLING EQUIPMENT		BORING NO.
C & L Drilling / Mayhew 1000		G-148
DRILLING METHOD	**BOREHOLE LOCATION**	
Rotary Wash	Sta 664+00, Lt 15 feet	
DATES DRILLED	**HOLE DIAMETER**	**GROUND EL.**
5/16/2011 - 5/18/2011	4-7/8 inches	252 feet

GROUND-WATER READINGS
Drilling mud bailed on 5/16/2011. Ground-water level measured at 41 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		
250	0										6-inch Asphalt Concrete over 8-inch thick Portland Cement Concrete, 5-inch thick Base Course
											QUATERNARY YOUNGER ALLUVIUM [Qal]
										ML	SANDY SILT - medium stiff, moist, brown, fine sand, slightly porous
	5		1.5	23.3	97	12					Becomes dark brown, trace clay
245										CL	LEAN CLAY - stiff, moist, brown
	10	10/10"	1.2	25.2	-						
240											
	15		-	-	28						(Sample not recovered)
235			1.7	16.9	114	13					Becomes very stiff
											QUATERNARY OLDER ALLUVIUM [Qalo]
										CL	LEAN CLAY with SAND - very stiff, moist, olive brown, fine to medium sand
	20	21	3.6	18.5	-		82				
230											
	25		5.9	21.7	107	20					Trace slate gravel
225											
										SP-SM	POORLY GRADED SAND with SILT and GRAVEL - medium dense, moist, brown, fine to medium-grained
	30	25	4.7	12.8	-						
220											
										ML	SANDY SILT - very stiff, moist, light brown, fine to medium sand, some coarse, some gravel
	35		4.1	6.5	124	24	62				
215											
	40										Becomes stiff, brown, fine sand, some clay

(CONTINUED ON FOLLOWING FIGURE)

Field Tech: AR
Prepared/Date: YN 6/14/2011
Checked/Date: JAG/PE 9/26/2011

MTA Westside Subway Extension
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LOG OF BORING

Project No.: 4953-10-1561 Figure: A-2.44a

DRILLING COMPANY/DRILLING EQUIPMENT		BORING NO.
C & L Drilling / Mayhew 1000		**G-148 (Continued)**
DRILLING METHOD	**BOREHOLE LOCATION**	
Rotary Wash	Sta 664+00, Lt 15 feet	
DATES DRILLED	**HOLE DIAMETER**	**GROUND EL.**
5/16/2011 - 5/18/2011	4-7/8 inches	252 feet

GROUND-WATER READINGS
Drilling mud bailed on 5/16/2011. Ground-water level measured at 41 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		
210	45	12	5.2	20.8	-			☒		CL	▼ LEAN CLAY - stiff, very moist, brown
			5.9	15.6	119	32	40	⊠		SM	SILTY SAND with GRAVEL - medium dense, moist, orangish brown, trace gravel
205	50										Trace gravel
200	55	14	6.2	19.2	-			☒		CL	LEAN CLAY - stiff, very moist, brown
			6.1	19.4	111	22		⊠		CL	SANDY LEAN CLAY - very stiff, very moist, reddish brown
195	60										
190	65	19	6.7	29.4	-			☒		CH	FAT CLAY - very stiff, very moist, brown
			6.9	14.9	117	44		⊠		SC	CLAYEY SAND - dense, moist, olive yellow to olive, fine to medium-grained, some coarse, some gravel (up to ½-inch in size)
185	70										
180	75	40	7.1	19.5	-		45	☒			Alternating thin fine to medium-grained layers, very dense
			5.4	14.7	-	40	64	⊠		CL	SANDY LEAN CLAY - hard, moist, brownish orange, fine to coarse sand, some gravel
175	80										Becomes more sandy with trace silt

(CONTINUED ON FOLLOWING FIGURE)

Field Tech: AR
Prepared/Date: YN 6/14/2011
Checked/Date: JAG/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-2.44b

DRILLING COMPANY/DRILLING EQUIPMENT		BORING NO.
C & L Drilling / Mayhew 1000		**G-148 (Continued)**
DRILLING METHOD	**BOREHOLE LOCATION**	
Rotary Wash	Sta 664+00, Lt 15 feet	
DATES DRILLED	**HOLE DIAMETER**	**GROUND EL.**
5/16/2011 - 5/18/2011	4-7/8 inches	252 feet

GROUND-WATER READINGS
Drilling mud bailed on 5/16/2011. Ground-water level measured at 41 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		
170	85	66	5.9	11.4	-			☒		SM	SILTY SAND - very dense, moist, brown, fine-grained, trace clay
			4.3	13.1	113	57	28	⊠			Becomes dense, very moist to wet, orangish brown, fine to medium-grained, some coarse, trace clay and gravel
										CL	SANDY LEAN CLAY - moist, brown, fine to coarse sand
										SM	SILTY SAND - very moist to wet, fine to medium grained
	90	32	4.7	13.5	-			☒		CL	SANDY LEAN CLAY - hard, moist, brown, fine to coarse sand, trace gravel
	95		4.9	8.5	119	40	26	⊠		SM	SILTY SAND - dense, moist, brown, fine to coarse-grained, some gravel
											Large slate gravel and small cobble
	100	31	4.4	19.5	-		65	☒		CL	SANDY LEAN CLAY - hard, moist, brown, fine to coarse sand
	105		5.1	11.7	120	56	29	⊠			Layers of Clayey Sand, fine to coarse
	110	33	5.7	23.6	-			☒			
140	115		5.1	19.4	108	34	63	⊠			Becomes very stiff
135	120										

Tunnel

(CONTINUED ON FOLLOWING FIGURE)

Field Tech: AR
Prepared/Date: YN 6/14/2011
Checked/Date: JAG/PE 9/26/2011

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LOG OF BORING

Project No.: 4953-10-1561 Figure: A-2.44c

DRILLING COMPANY/DRILLING EQUIPMENT		BORING NO.
C & L Drilling / Mayhew 1000		**G-148 (Continued)**
DRILLING METHOD	**BOREHOLE LOCATION**	
Rotary Wash	Sta 664+00, Lt 15 feet	
DATES DRILLED	**HOLE DIAMETER**	**GROUND EL.**
5/16/2011 - 5/18/2011	4-7/8 inches	252 feet

GROUND-WATER READINGS
Drilling mud bailed on 5/16/2011. Ground-water level measured at 41 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		
130	125	44	5.8	14.0	-			☒		ML	SANDY SILT - hard, moist, brown, fine to coarse sand, some gravel
125	130		2.3	16.7	110	64	68	⊠		CL	SANDY LEAN CLAY - hard, moist, light brown
120	135	44	2.5	24.0	-			☒			Becomes more silty
115	140		3.1	18.7	111	44		⊠			
110	145	56	5.4	-	-		54	☒			Mottled brown and gray, some cemented clay layers
105	150										END OF BORING AT 141½ FEET
100	155										
95	160										

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 6/14/2011
Checked/Date: JAG/PE 9/26/2011

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LOG OF BORING

Project No.: 4953-10-1561 Figure: A-2.44d

DRILLING COMPANY/DRILLING EQUIPMENT		BORING NO.
C & L Drilling / Mayhew 1000		G-149
DRILLING METHOD	**BOREHOLE LOCATION**	
Rotary Wash	Sta 670+60, Lt 5 feet	
DATES DRILLED	**HOLE DIAMETER**	**GROUND EL.**
2/2/2011 - 2/5/2011	4-7/8 inches	258 feet

GROUND-WATER READINGS
Drilling mud bailed on 2/4/2011. Ground-water level measured at 33 feet below the ground surface on 2/5/2011.

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		
255	0										10-inch thick Asphalt Concrete over 6-inch thick Portland Cement Concrete and 4-inch thick Base Course
											FILL [Af]
										ML	SANDY SILT - moist, brown, trace gravel
											QUATERNARY YOUNGER ALLUVIUM [Qal]
	5									ML	SILT with SAND - very stiff, moist, dark olive brown, fine to medium sand, some clay
250			1.9	14.8	108	19		⊠			
	10	21	1.2	12.3	-			⊠		SM	SILTY SAND with GRAVEL - medium dense, moist, gray, fine to medium-grained, some coarse, slate gravel (up to 1 inch in size)
245											
	15		1.7	18.7	97	5		⊠		ML	SILT with SAND - soft, moist, olive brown, very fine sand, trace gravel, some clay
240											
	20	12	4.3	18.6	-		39	⊠		SM	SILTY SAND - medium dense, moist, light brown and gray, fine-grained, trace gravel (up to 1 inch in size)
235											
	25		1.4	9.4	106	14		⊠			Becomes brown, fine to medium-grained, with thin layers of Sandy Silt
230											
	30										**QUATERNARY OLDER ALLUVIUM [Qalo]**
		37	3.2	17.4	-			⊠		CL	SANDY LEAN CLAY - hard, moist, brown to gray, fine to coarse sand, slate gravel (up to 3/4 inch in size)
225											▼
	35									ML	SILT with SAND - stiff, moist, olive brown to gray, with thin layers of fine sand, some clay
220			2.1	27.4	93	14		⊠			
	40										

(CONTINUED ON FOLLOWING FIGURE)

Field Tech: AR
Prepared/Date: JF 3/31/2011
Checked/Date: LT/PE 9/19/2011

MTA Westside Subway Extension
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LOG OF BORING

Project No.: 4953-10-1561 Figure: A-2.45a

DRILLING COMPANY/DRILLING EQUIPMENT		BORING NO.
C & L Drilling / Mayhew 1000		**G-149 (Continued)**
DRILLING METHOD	**BOREHOLE LOCATION**	
Rotary Wash	Sta 670+60, Lt 5 feet	
DATES DRILLED	**HOLE DIAMETER**	**GROUND EL.**
2/2/2011 - 2/5/2011	4-7/8 inches	258 feet

GROUND-WATER READINGS
Drilling mud bailed on 2/4/2011. Ground-water level measured at 33 feet below the ground surface on 2/5/2011.

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		
		13	2.3	23.6	-			⊠			Gray to brown, trace fine sand, trace iron oxide stains
215	45										
			1.9	20.8	107	29		⊠		SM	Becomes olive gray SILTY SAND - medium dense, wet, brown, fine to coarse-grained, trace gravel (up to 1/4 inch in size)
210			4.3	18.1	106	22		⊠		ML	SANDY SILT - very stiff, moist, olive gray, very fine sand, trace gravel
	50	21	0.7	14.9	-			⊠		ML	SILT with SAND - very stiff, moist, olive gray, trace gravel (up to 1/4 inch in size), some clay
205			2.3	20.9	105	28	62	⊠			Iron oxide stains
	55	28	7.5	24.0	-			⊠		CL	LEAN CLAY - very stiff, moist, reddish brown to gray, with thin layer of sand
200			1.4	16.4	114	40	35	⊠		SM	SILTY SAND with GRAVEL - dense, wet, brown and gray, fine-grained, gravel (up to 3/4 inch in size)
	60	93	5.8	12.9	-			⊠		ML	SANDY SILT with GRAVEL - hard, moist, olive gray, fine sand, some coarse, gravel (up to 1/2 inch in size)
195			2.1	12.6	122	81	32	⊠		SM	SILTY SAND - very dense, moist, brown, fine to coarse-grained, trace gravel (up to 1/2 inch in size), trace clay
	65	23	1.7	22.2	-		86	⊠		CL	LEAN CLAY - very stiff, moist, dark brown, trace sand, trace gravel (up to 3/8 inch in size)
190				-	-	45		○			(Sample not recovered)
	70	24	1.2	23.9	-			⊠			Dark brown to gray
185			2.1	24.4	101	39	49	⊠		SM	SILTY SAND - dense, moist, brown, trace gravel (up to 3/8 inch in size), some clay
	75	27	1.5	28.4	-			⊠		CL	LEAN CLAY - very stiff to hard, moist, dark brown to gray
180			2.7	25.9	97	40		⊠			
	80										

(CONTINUED ON FOLLOWING FIGURE)

Field Tech: AR
Prepared/Date: JF 3/31/2011
Checked/Date: LT/PE 9/19/2011

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LOG OF BORING

Project No.: 4953-10-1561 Figure: A-2.45b

DRILLING COMPANY/DRILLING EQUIPMENT		BORING NO.
C & L Drilling / Mayhew 1000		**G-149 (Continued)**
DRILLING METHOD	**BOREHOLE LOCATION**	
Rotary Wash	Sta 670+60, Lt 5 feet	
DATES DRILLED	**HOLE DIAMETER**	**GROUND EL.**
2/2/2011 - 2/5/2011	4-7/8 inches	258 feet

GROUND-WATER READINGS
Drilling mud bailed on 2/4/2011. Ground-water level measured at 33 feet below the ground surface on 2/5/2011.

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		
		43	1.9	15.4	-		52	☒			Becomes Sandy Lean Clay, gravel (up to 3/8 inch in size)
175				17.6	110	43	56	⊠			
	85	88	2.9	13.5	-			☒		SC	CLAYEY SAND with GRAVEL - very dense, brown, gravel (up to 1 inch in size)
170				15.8	110	50		⊠		SM	SILTY SAND - very dense, moist, brown, fine to coarse-grained, with gravel
	90										Thin layers of Clay
		32	2.7	28.0	-			☒		ML	SILT - hard, moist, brown to gray, with thin layers of sand, some clay
165			1.4	19.3	100	46		⊠			Thin layer of Silty Sand, brown, fine to medium-grained
											Thin layer of Lean Clay, dark brown
	95	34	1.7	31.4	-			☒			Becomes dark brown
160			1.3	24.0	101	70		⊠		SM	SILTY SAND with GRAVEL - very dense, wet, brown, fine to coarse-grained, gravel (up to 1/4 inch in size)
	100	62	1.5	17.9	-			☒		SM	SILTY SAND - very dense, wet, brown, fine to medium-grained, trace gravel (up to 1 inch in size)
											Becomes fine-grained
	105		0.9	24.0	101	73		⊠			Coarse gravel layer
	110	92/10"	1.2	12.0	-			☒			Becomes fine to coarse-grained, trace gravel (up to 1/2 inch in size)
145											END OF BORING AT 111½ FEET
	115										
140											
	120										

Tunnel

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 300 pound hammer falling 18 inches

**Photo Ionization Detector used for OVA readings

Field Tech: AR
Prepared/Date: JF 3/31/2011
Checked/Date: LT/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-2.45c

DRILLING COMPANY/DRILLING EQUIPMENT		BORING NO.
C & L Drilling / Mayhew 1000		G-150
DRILLING METHOD	**BOREHOLE LOCATION**	
Rotary Wash	Sta 674+70, Lt 15 feet	
DATES DRILLED	**HOLE DIAMETER**	**GROUND EL.**
1/31/2011 - 2/2/2011	4-7/8 inches	265 feet

GROUND-WATER READINGS
Drilling mud bailed on 2/2/2011. Ground-water level measured at 22 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		
											4-inch thick Asphalt Concrete over 12-inch thick Portland Cement Concrete
										SP	**FILL [Af]** - POORLY GRADED SAND with GRAVEL
											QUATERNARY YOUNGER ALLUVIUM [Qal]
										ML	SANDY SILT - moist, gray
260	5		0.0	21.3	102	Push				CL	LEAN CLAY - very soft, moist, dark brown
255	10	7		-	-						Becomes medium stiff, (Sample not recovered)
250	15		0.0	21.0	98	8				ML	SILT with SAND - medium stiff, moist, brown
245	20	7	0.0	10.8	-					GP	POORLY GRADED GRAVEL - loose, moist, slate gravel fragments (up to 3/4 inch in size), with sand
											▽ **QUATERNARY OLDER ALLUVIUM [Qalo]**
										CL	SANDY LEAN CLAY - very stiff, moist, reddish brown, trace gravel (up to 1/4 inch in size), iron oxide stains
240	25		0.0	14.9	117	28	54				Trace gravel (up to 3/8 inch in size)
235	30	19	0.0	31.7	-					CL	LEAN CLAY - very stiff, moist, dark brown
										SP	POORLY GRADED SAND - medium dense, moist, brown, fine to coarse-grained, trace fine gravel
230	35		0.0	16.2	109	20				SC	CLAYEY SAND - medium dense, moist, brown
	40										

(CONTINUED ON FOLLOWING FIGURE)

Field Tech: DW
Prepared/Date: JF 3/31/2011
Checked/Date: LT/PE 9/19/2011

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LOG OF BORING

Project No.: 4953-10-1561 Figure: A-2.46a

DRILLING COMPANY/DRILLING EQUIPMENT		BORING NO.
C & L Drilling / Mayhew 1000		**G-150 (Continued)**
DRILLING METHOD	**BOREHOLE LOCATION**	
Rotary Wash	Sta 674+70, Lt 15 feet	
DATES DRILLED	**HOLE DIAMETER**	**GROUND EL.**
1/31/2011 - 2/2/2011	4-7/8 inches	265 feet

GROUND-WATER READINGS
Drilling mud bailed on 2/2/2011. Ground-water level measured at 22 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		
		20	0.0	18.1	-		35	☒			Becomes gray to brown, fine to coarse-grained, trace fine gravel (up to 3/8 inch in size)
220	45		0.0	21.6	106	26		⊠		CL	LEAN CLAY - very stiff, moist, olive brown, trace sand, trace gravel (up to 1/4 inch in size)
										SM	SILTY SAND with GRAVEL - medium dense, moist, gray to brown, fine to coarse-grained
										CL	LEAN CLAY with SAND - very stiff, moist, gray
	50	20	0.0	23.9	-		75	☒			
	55								PMT		
Tunnel										SC	CLAYEY SAND - medium dense, moist, brown to grayish brown, trace slate gravel (up to 1-1/2 inches in size)
	60		0.0	18.4	110	28	41	⊠			Trace gravel (up to 1/2 inch in size)
	65								PMT		
										SM	SILTY SAND - very dense, moist, brown, fine to medium-grained, some coarse, trace gravel
195	70		0.3	14.8	113	53	24	⊠			Trace gravel (up to 3/8 inch in size)
190	75		0.0	23.7	102	27	78	⊠		CH	SANDY FAT CLAY - very stiff, moist, dark brown and gray
	80										

(CONTINUED ON FOLLOWING FIGURE)

Field Tech: DW
Prepared/Date: JF 3/31/2011
Checked/Date: LT/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-2.46b

DRILLING COMPANY/DRILLING EQUIPMENT		BORING NO.
C & L Drilling / Mayhew 1000		**G-150 (Continued)**
DRILLING METHOD	**BOREHOLE LOCATION**	
Rotary Wash	Sta 674+70, Lt 15 feet	
DATES DRILLED	**HOLE DIAMETER**	**GROUND EL.**
1/31/2011 - 2/2/2011	4-7/8 inches	265 feet

GROUND-WATER READINGS
Drilling mud bailed on 2/2/2011. Ground-water level measured at 22 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			
180	85								PMT			
175	90		0.3	29.5	93	27	26	⊠		SM	SILTY SAND - medium dense, wet, gray to brown, fine to medium-grained	
170	95	66	0.0	18.3	-			⊠			Becomes very dense, brown	
165	100		0.0	19.7	103	35		⊠		SM	SILTY SAND with GRAVEL - dense, moist, brown, fine to coarse-grained, gravel (up to 1/4 inch in size)	
160	105		0.0	18.4	-	45		⊠		SP	POORLY GRADED SAND - dense, wet, gray to brown, fine to medium-grained, some coarse sand (Sample disturbed)	
155	110		0.1	22.5	103	75		⊠		CL	SANDY LEAN CLAY - hard, moist, brown	
150	115										END OF BORING AT 111 FEET	
	120											

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 340 pound hammer falling 18 inches

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

Field Tech: DW
Prepared/Date: JF 3/31/2011
Checked/Date: LT/PE 9/19/2011

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LOG OF BORING

Project No.: 4953-10-1561 Figure: A-2.46c

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_(140-160).GPJ 10/18/11

DRILLING COMPANY/DRILLING EQUIPMENT		BORING NO.
C & L Drilling / Mayhew 1000		G-152
DRILLING METHOD	**BOREHOLE LOCATION**	
Rotary Wash	Sta 683+20, Lt 40 feet	
DATES DRILLED	**HOLE DIAMETER**	**GROUND EL.**
1/31/2011 - 2/1/2011	4-7/8 inches	271 feet

GROUND-WATER READINGS
Drilling mud bailed on 2/1/2011. Ground-water level measured at 37 feet below the ground surface 20 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		
270	0										5-inch thick Asphalt Concrete over 6-inch thick Portland Cement Concrete and 4-inch thick Base Course
										SM	**FILL [Af]** SILTY SAND - moist, light brown to brown, fine to medium-grained, some coarse, trace slate gravel
265	5										**QUATERNARY YOUNGER ALLUVIUM [Qal]**
										SM	SILTY SAND - moist, brown, fine to medium-grained
260	10		0.8	19.6	103	14		⊠		CL	LEAN CLAY - stiff, moist, dark olive brown, trace slate gravel (up to 1/4 inch in size)
255	15	8	5.4	22.6	-			☒		CL	**QUATERNARY OLDER ALLUVIUM [Qalo]** LEAN CLAY - medium stiff, olive brown
250	20		3.7	15.5	104	7		⊠		SM	SILTY SAND - loose, moist, olive brown, fine to medium-grained, some coarse, some gravel
										ML	SILT - moist, olive brown, some clay
245	25	18	4.7	10.4	-		12	☒		SW-SM	WELL GRADED SAND with SILT - medium dense, moist, gray, fine to coarse-grained, some gravel (up to 1/2 inch in size)
240	30		3.9	15.0	110	25		⊠		SM	SILTY SAND - medium dense, moist, olive brown, fine to medium-grained, some coarse
235	35	8	13.1	28.3	-			☒		ML	SANDY SILT - medium stiff, moist, gray, with sand lenses
										SM	SILTY SAND - loose, moist, gray, fine to medium-grained, trace gravel
	40										

(CONTINUED ON FOLLOWING FIGURE)

Field Tech: AR
Prepared/Date: JF 3/31/2011
Checked/Date: LT/PE 9/19/2011

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LOG OF BORING

Project No.: 4953-10-1561 Figure: A-2.47a

DRILLING COMPANY/DRILLING EQUIPMENT		BORING NO.
C & L Drilling / Mayhew 1000		**G-152 (Continued)**
DRILLING METHOD	**BOREHOLE LOCATION**	
Rotary Wash	Sta 683+20, Lt 40 feet	
DATES DRILLED	**HOLE DIAMETER**	**GROUND EL.**
1/31/2011 - 2/1/2011	4-7/8 inches	271 feet

GROUND-WATER READINGS
Drilling mud bailed on 2/1/2011. Ground-water level measured at 37 feet below the ground surface 20 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		
230			3.0	15.6	107	57		⊠		SW	Becomes wet, brownish gray, some coarse sand WELL GRADED SAND with GRAVEL - dense, wet, brown, fine to coarse-grained
				-	-	38		○			(Sample not recovered)
	45	44	8.5	8.3	-			⊠			Becomes gray, gravel (up to 1 inch in size)
				10.8	116	55		⊠			
	50	50/6"	8.7	10.3	-		16	⊠		SM	SILTY SAND with GRAVEL - very dense, very moist, brown, fine to coarse-grained, gravel (up to 3/4 inch in size)
				4.9	116	49		⊠		ML	SILT - hard, moist, reddish brown
	55		3.0	30.9	88	10	39	⊠	NV	SM	SILTY SAND - loose, wet, light to dark brown, fine to medium-grained, some coarse, trace gravel (up to 1/2 inch in size), with thin layers of Clayey Silt
	60	28	9.6	19.2	-			⊠			Slate gravel (up to 1 inch in size) Becomes medium dense, thin layer of Well Graded Sand with gravel (up to 1 inch in size)
			5.1	18.8	99	29	59	⊠		CL	SANDY LEAN CLAY - very stiff, moist, olive brown, trace gravel (up to 1/2 inch in size), with thin layers of Silty Sand
205	65								NV		
			4.5	23.9	97	54	82	⊠			Becomes hard
	70	22	7.0	22.2	-		64	⊠		CH	FAT CLAY - very stiff, moist, dark and reddish brown, trace sand, trace gravel
200			3.7	27.4	95	67		⊠			Becomes hard
	75								NV		
195			3.7	15.3	112	57	50	⊠		CL	SANDY LEAN CLAY - hard, moist, brown, trace gravel (up to 3/8 inch in size)
	80										

Tunnel

(CONTINUED ON FOLLOWING FIGURE)

Field Tech: AR
Prepared/Date: JF 3/31/2011
Checked/Date: LT/PE 9/19/2011

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LOG OF BORING

Project No.: 4953-10-1561 Figure: A-2.47b

DRILLING COMPANY/DRILLING EQUIPMENT		BORING NO.
C & L Drilling / Mayhew 1000		**G-152 (Continued)**
DRILLING METHOD	**BOREHOLE LOCATION**	
Rotary Wash	Sta 683+20, Lt 40 feet	
DATES DRILLED	**HOLE DIAMETER**	**GROUND EL.**
1/31/2011 - 2/1/2011	4-7/8 inches	271 feet

GROUND-WATER READINGS
Drilling mud bailed on 2/1/2011. Ground-water level measured at 37 feet below the ground surface 20 minutes after bailing of drilling mud.

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		55	1.4	14.0	-		26			SC	CLAYEY SAND with GRAVEL - very dense, wet, brown, fine to medium-grained, some coarse, gravel (up to 1 inch in size)
											Increase in gravel content
				11.1	123	75				SM	SILTY SAND - very dense, very moist, brown, fine to coarse-grained, gravel (up to 1/4 inch in size)
	85									SW	WELL GRADED SAND - very dense, wet, gray, fine to coarse-grained, with gravel (up to 3/4 inch in size)
185		50/5"	6.5	13.3	-						
										MH	ELASTIC SILT - hard, moist, olive gray to gray, trace sand, calcium carbonate nodules
			3.6	20.0	105	45					
	90										
180		41	5.8	19.5	-						Trace gravel (up to 1/4 inch in size)
			4.3	15.0	115	52				CL	SANDY LEAN CLAY - hard, moist, brown, with gravel (up to 1/4 inch in size)
	95										
175		42	4.9	17.1	-						
	100									ML	SANDY SILT - hard, moist, brown, some clay
170			4.3	21.8	105	42				SW	WELL GRADED SAND - wet, brown, fine to coarse-grained, with gravel (up to 1/4 inch in size)
	105										
		59	2.9	15.1	-					SP	POORLY GRADED SAND - very dense, moist, fine to coarse-grained, trace gravel (up to 1/4 inch in size)
165											
	110									SM	SILTY SAND - dense, moist, reddish brown, fine to coarse-grained, trace gravel
160			3.2	14.5	117	49					END OF BORING AT 111 FEET
	115										NOTES:
155											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 300 pound hammer falling 18 inches
	120										**Photo Ionization Detector used for OVA readings Downhole Test: NV = Noise/Vibration

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 3/31/2011
Checked/Date: LT/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-2.47c

DRILLING COMPANY/DRILLING EQUIPMENT		BORING NO.
C & L Drilling / Mayhew 1000		G-154
DRILLING METHOD	**BOREHOLE LOCATION**	
Rotary Wash	Sta 696+10, Lt 10 feet	
DATES DRILLED	**HOLE DIAMETER**	**GROUND EL.**
2/9/2011 - 2/10/2011	4-7/8 inches	274 feet

GROUND-WATER READINGS
Drilling mud bailed on 2/9/2011. Ground-water level measured at 50 feet below the ground surface on 2/10/2011.

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		
Santa Monica / Centuty City Station	0										Grass Surface
										ML	**FILL [Af]** SANDY SILT - moist, brown to dark brown
	5										**QUATERNARY YOUNGER/OLDER ALLUVIUM [Qalo]**
			9.3	16.2	103	8		⊠		ML	SILT with SAND - medium stiff, moist, dark brown, slightly porous, some clay
	10	24	5.1	16.2	-			☒		CL	SANDY LEAN CLAY - very stiff, moist, dark brown
	15		8.6	21.9	100	16		⊠			Becomes stiff, dark olive brown, trace sand
	20	14	11.8	26.8	-			☒		ML	**QUATERNARY OLDER ALLUVIUM [Qalo]** SILT with SAND - stiff, moist, gray, some clay
	25		9.2	16.6	114	90/10"		⊠			Becomes hard
			8.7	17.3	110	88/10"		⊠		CL	LEAN CLAY with SAND - very stiff to hard, moist, brown and gray
	30	26	12.2	19.1	-			☒			Some thin layers of Silty Sand
			5.3	13.4	113	55	78	⊠			Trace gravel (up to 3/8 inch in size), thin layer of Silty Sand
	35	42	11.6	17.1	-		46	☒		SM	SILTY SAND - dense, moist, brown, fine to medium-grained, trace gravel
			10.9	21.6	103	20		⊠		CH	FAT CLAY - very stiff, moist, gray, trace sand
	40										

(CONTINUED ON FOLLOWING FIGURE)

Field Tech: AR
Prepared/Date: JF/WL 10/13/2011
Checked/Date: PE/RM 10/13/2011

MTA Westside Subway Extension
Los Angeles, California

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LOG OF BORING

Project No.: 4953-10-1561 Figure: A-2.48a

DRILLING COMPANY/DRILLING EQUIPMENT		BORING NO.
C & L Drilling / Mayhew 1000		**G-154 (Continued)**
DRILLING METHOD	**BOREHOLE LOCATION**	
Rotary Wash	Sta 696+10, Lt 10 feet	
DATES DRILLED	**HOLE DIAMETER**	**GROUND EL.**
2/9/2011 - 2/10/2011	4-7/8 inches	274 feet

GROUND-WATER READINGS
Drilling mud bailed on 2/9/2011. Ground-water level measured at 50 feet below the ground surface on 2/10/2011.

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.

Santa Monica / Century City 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		
		26	10.0	16.9	-			☒		ML	SILT - very stiff, moist, brown and gray, trace sand, trace gravel (up to 1/4 inch in size), some clay
			11.4	12.6	115	68	31	☒		SC	CLAYEY SAND with GRAVEL - very dense, moist, brown and gray, fine-grained, gravel (up to 3/4 inch in size)
	45	37	7.2	17.3	-			☒		CL	LEAN CLAY with GRAVEL - hard, moist, brown and gray, gravel (up to 1/2 inch in size)
											Coarse gravel (6 inch layer)
			12.0	11.1	118	85/8"	24	☒		SM	SILTY SAND with GRAVEL - very dense, moist, brown and gray, fine to coarse-grained, gravel (up to 1/2 inch in size)
	50	58	10.2	9.1	-			☒		GW	WELL GRADED GRAVEL - very dense, moist, gray, gravel (up to 3/4 inch in size)
			11.8	10.3	129	68	14	☒		GC	CLAYEY GRAVEL with SAND - very dense, wet, brown, fine to coarse-grained, gravel (up to 3/4 inch in size)
	55	83		1.7	-			☒		GW	WELL GRADED GRAVEL - very dense, brown, gravel (up to 1 inch in size), very little recovery
			8.5	10.3	119	87	16	☒		SM	SILTY SAND with GRAVEL - very dense, wet, brown and gray, fine to coarse-grained, gravel (up to 3/4 inch in size)
	60	23	10.2	30.1	-			☒		ML	SILT - very stiff, wet, olive brown, trace sand, trace iron oxide stains, some clay
				18.5	110	36		☒		CL	LEAN CLAY with SAND - very stiff to hard, moist, brown and gray
	65	29	10.5	21.6	-			☒			Iron oxide stains
			10.1	26.3	99	37		☒		SM	SILTY SAND - dense, wet, olive brown, fine-grained
	70	25	5.6	21.9	-			☒		ML	SANDY SILT - very stiff, very moist, olive brown, some clay
			9.8	24.0	93	32		☒		CL	LEAN CLAY - very stiff, moist, olive brown
	75	39	7.8	27.1	-			☒		ML	SILT - hard, moist, brown and gray, some clay
											Thin layer of Silty Sand, fine-grained
195			9.2	33.7	87	32		☒		CL	LEAN CLAY with SAND - very stiff, moist, olive gray
	80										

(CONTINUED ON FOLLOWING FIGURE)

Field Tech: AR
Prepared/Date: JF/WL 10/13/2011
Checked/Date: PE/RM 10/13/2011

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LOG OF BORING

Project No.: 4953-10-1561 Figure: A-2.48b

DRILLING COMPANY/DRILLING EQUIPMENT		BORING NO.
C & L Drilling / Mayhew 1000		**G-154 (Continued)**
DRILLING METHOD	**BOREHOLE LOCATION**	
Rotary Wash	Sta 696+10, Lt 10 feet	
DATES DRILLED	**HOLE DIAMETER**	**GROUND EL.**
2/9/2011 - 2/10/2011	4-7/8 inches	274 feet

GROUND-WATER READINGS
Drilling mud bailed on 2/9/2011. Ground-water level measured at 50 feet below the ground surface on 2/10/2011.

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
		43	8.0	21.4	-			☒	
			7.2	33.2	93	28		⊠	
190	85	36	8.1	17.4	-			☒	
185	90								
180	95								
175	100								
170	105								
165	110								
160	115								
155	120								

SM SILTY SAND - dense, wet, grayish brown, fine-grained

CL LEAN CLAY - very stiff, moist, dark gray, trace sand

Becomes hard, brown and gray, with sand, trace gravel (up to 1 inch in size), iron oxide stains

END OF BORING AT 86½ FEET

NOTES:

Hand augered upper 6 feet to avoid damage to utilities.
Borehole grouted with cement-bentonite slurry.

"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/WL 10/13/2011
Checked/Date: PE/RM 10/13/2011

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LOG OF BORING
Project No.: 4953-10-1561 Figure: A-2.48c

DRILLING COMPANY/DRILLING EQUIPMENT		BORING NO.
C & L Drilling / Mayhew 1000		G-156
DRILLING METHOD	**BOREHOLE LOCATION**	
Rotary Wash	Sta 706+80, Lt 40 feet	
DATES DRILLED	**HOLE DIAMETER**	**GROUND EL.**
2/14/2011 - 2/15/2011	4-7/8 inches	282 feet

GROUND-WATER READINGS
Ground-water level measured at 27 feet and 45 feet below the ground surface in shallow and deep monitoring wells, respectively on 6/10/2011. 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		
280	0										8-inch thick Grass Surface, No Base Course
										SM	**FILL [Af]** SILTY SAND - moist, brown, fine to medium-grained, some gravel, layer of base course
	5										**QUATERNARY YOUNGER ALLUVIUM [Qal]**
275			1.9	9.6	-	12				SM	SILTY SAND with GRAVEL - loose, moist, brownish red, fine to coarse-grained, fine gravel (up to 1/4 inch in size)
			2.1	17.3	106	17					Becomes medium dense, trace gravel
	10	12	4.7	15.7	-					CL	SANDY LEAN CLAY - stiff, moist, brown, fine to medium sand
270			1.7	16.1	108	11				SC	CLAYEY SAND - loose, moist, brown, fine to medium-grained, some coarse
	15										**QUATERNARY OLDER ALLUVIUM [Qalo]**
		15	3.2	33.5	-					CL-ML	SILTY CLAY - stiff, moist, brown, trace fine sand
265			2.1	15.4	104	14	36			SM	SILTY SAND - medium dense, moist, olive brown, fine to medium-grained, some coarse, trace fine gravel (up to 1/2 inch in size)
	20	14	2.5	14.2	-					ML	SILT - stiff, moist, brown, some fine sand, thin layers of Silty Clay
260			1.5	13.7	117	28				SM	SILTY SAND - medium dense, moist, brown, fine to medium-grained, some gravel (up to 1/4 inch in size)
	25	20	2.1	12.0	-						▽
255			1.2	15.9	112	26	42				Trace gravel (up to 1/2 inch in size)
	30	20	2.6	23.6	-					ML	SILT - stiff, moist, brown, some fine sand, some clay
250			1.2	21.8	100	16					
	35	17	2.8	31.2	-		90			CH	FAT CLAY - very stiff, moist, dark brown, trace fine sand
245			1.4	-	-	32				CL	LEAN CLAY with SAND - hard, moist, brown, very fine sand, trace fine gravel
	40										

(CONTINUED ON FOLLOWING FIGURE)

Field Tech: AR
Prepared/Date: JF 3/29/2011
Checked/Date: LT/PE 9/20/2011

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LOG OF BORING

Project No.: 4953-10-1561 Figure: A-2.49a

DRILLING COMPANY/DRILLING EQUIPMENT		BORING NO.
C & L Drilling / Mayhew 1000		**G-156 (Continued)**
DRILLING METHOD	**BOREHOLE LOCATION**	
Rotary Wash	Sta 706+80, Lt 40 feet	
DATES DRILLED	**HOLE DIAMETER**	**GROUND EL.**
2/14/2011 - 2/15/2011	4-7/8 inches	282 feet

GROUND-WATER READINGS
Ground-water level measured at 27 feet and 45 feet below the ground surface in shallow and deep monitoring wells, respectively on 6/10/2011. See last page of this boring for details.

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		
240		23	2.8	26.4	-		82				Becomes very stiff
				-	-	26					(Sample not recovered)
	45	25	3.6	26.6	-						
235			1.0	16.2	110	46	63			CL	SANDY LEAN CLAY - hard, moist, light brown, fine sand
	50	25	2.3	18.3	-		58				Very stiff, trace gravel (up to 3/8 inch in size)
230			1.0	14.5	113	51				SM	SILTY SAND - dense, very moist, brown, fine to medium-grained, some coarse
										ML	SANDY SILT - moist, brown, fine sand
	55	92/11"	2.8	22.0	-					SM	SILTY SAND with GRAVEL - very dense, very moist, brown, fine to coarse-grained, gravel (up to 1/4 inch in size)
225			1.5	7.2	118	65/6"					Gravel (up to 1 inch in size)
	60	76	2.5	13.0	-		21				
220			1.4	13.5	112	75/6"					Gravel (up to 3/4 inch in size)
	65	81	2.1	15.2	-		19				
			1.0	9.4	123	100/10"				GW	WELL GRADED GRAVEL - very dense, wet, fine to coarse-grained, gravel (up to 1 inch in size)
	70	65	2.4	21.2	-		28			SM	SILTY SAND - very dense, wet, brown, fine to coarse-grained, trace gravel (up to 1/2 inch in size)
			0.8	23.5	96	47				CL-ML	SILTY CLAY - hard, moist, grayish brown, trace fine sand
	75	57/6"	1.5	2.1	-					SM	SILTY SAND with GRAVEL - very dense, moist, brown, fine to medium-grained, slate gravel (up to 2 inches in size)
			0.8	15.5	116	38				ML	SILT - hard, wet, grayish dark brown, trace fine sand, trace gravel, some clay
	80										

Tunnel

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 3/29/2011
Checked/Date: LT/PE 9/20/2011

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LOG OF BORING

Project No.: 4953-10-1561 Figure: A-2.49b

DRILLING COMPANY/DRILLING EQUIPMENT		BORING NO.
C & L Drilling / Mayhew 1000		**G-156 (Continued)**
DRILLING METHOD	**BOREHOLE LOCATION**	
Rotary Wash	Sta 706+80, Lt 40 feet	
DATES DRILLED	**HOLE DIAMETER**	**GROUND EL.**
2/14/2011 - 2/15/2011	4-7/8 inches	282 feet

GROUND-WATER READINGS
Ground-water level measured at 27 feet and 45 feet below the ground surface in shallow and deep monitoring wells, respectively on 6/10/2011. 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		
Tunnel		27	2.1	17.1	-			☒		CL-ML	SILTY CLAY - very stiff, moist, gray, with layers of Silt
			0.8	23.5	101	60		⊠			Becomes hard
195	85	41	2.5	15.6	-			☒			Trace gravel
190	90		0.5	12.9	108	46		⊠		CL	SANDY LEAN CLAY - hard, moist, light brown, fine sand
185	95	50		-	-			○			(Sample not recovered)
	100		0.7	6.9	122	81		⊠		SW	WELL GRADED SAND with GRAVEL - very dense, wet, dark gray, fine to coarse-grained
180										ML	SANDY SILT - moist, brown to gray, fine sand
175	105	41	1.9	21.7	-			☒		CL-ML	SILTY CLAY - hard, moist, brown to gray
											Alternating with clay layers
170	110		1.0	23.5	100	50		⊠			Thin layer of Silty Sand, brown
										CL	SANDY LEAN CLAY - hard, moist, gray and brown, fine sand
165	115	28	1.5	8.9	-			☒			Some gravel
	120										

(CONTINUED ON FOLLOWING FIGURE)

Field Tech: AR
Prepared/Date: JF 3/29/2011
Checked/Date: LT/PE 9/20/2011

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LOG OF BORING

Project No.: 4953-10-1561 Figure: A-2.49c

DRILLING COMPANY/DRILLING EQUIPMENT		BORING NO.
C & L Drilling / Mayhew 1000		**G-156 (Continued)**
DRILLING METHOD	**BOREHOLE LOCATION**	
Rotary Wash	Sta 706+80, Lt 40 feet	
DATES DRILLED	**HOLE DIAMETER**	**GROUND EL.**
2/14/2011 - 2/15/2011	4-7/8 inches	282 feet

GROUND-WATER READINGS
Ground-water level measured at 27 feet and 45 feet below the ground surface in shallow and deep monitoring wells, respectively on 6/10/2011. See last page of this boring for details.

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	125		1.4	11.2	121	70		⊠	
155	130								
150	135								
145	140								
140	145								
135	150								
130	155								
125	160								

Becomes hard

END OF BORING AT 121 FEET

NOTES:

Montoring well was installed on 2/15/2011. See well construction diagram for G-156.

"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 3/29/2011
Checked/Date: LT/PE 9/20/2011

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LOG OF BORING
Project No.: 4953-10-1561 Figure: A-2.49d

DRILLING COMPANY/DRILLING EQUIPMENT		BORING NO.
C & L Drilling / Mayhew 1000		G-159
DRILLING METHOD	**BOREHOLE LOCATION**	
Rotary Wash	Sta 721+84, Lt 519 feet	
DATES DRILLED	**HOLE DIAMETER**	**GROUND EL.**
2/21/2011 - 2/22/2011	4-7/8 inches	276 feet

GROUND-WATER READINGS
Drilling mud bailed on 2/22/2011. Ground-water level measured at 15 feet below the ground surface 10 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		
275	0										12-inch thick Asphalt Concrete over 12-inch thick Portland Cement Concrete, No Base Course **FILL [Af]**
	5										
270			11.3	16.4	100	8/4"		⊠		ML	**QUATERNARY OLDER ALLUVIUM [Qalo]** SILT with SAND - medium stiff, moist, olive brown and gray
	10										
265		14	8.7	26.0	-			⊠		ML	SANDY SILT - stiff, moist, brown and gray
	15										▽
260			7.6	16.0	103	11		⊠		SM	SILTY SAND - loose, wet, brown, fine to medium-grained, trace gravel
	20									CL	
255		11	9.4	16.9	-			⊠			SANDY LEAN CLAY - stiff, moist, gray and brown, trace gravel (up to 3/4 inch in size), scattered calcium carbonate nodules
	25										
250			9.6	14.2	116	31		⊠			Becomes very stiff, trace gravel (up to 1/4 inch in size)
	30										
245		26	8.8	22.9	-			⊠			Decrease in sand content, becomes olive gray, trace iron oxide stains
	35										
240			6.5	18.6	109	27		⊠			Becomes brown
	40										

(CONTINUED ON FOLLOWING FIGURE)

Field Tech: AR
Prepared/Date: JF 3/29/2011
Checked/Date: LT/PE 9/20/2011

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LOG OF BORING

Project No.: 4953-10-1561 Figure: A-2.50a

DRILLING COMPANY/DRILLING EQUIPMENT		BORING NO.
C & L Drilling / Mayhew 1000		**G-159 (Continued)**
DRILLING METHOD	**BOREHOLE LOCATION**	
Rotary Wash	Sta 721+84, Lt 519 feet	
DATES DRILLED	**HOLE DIAMETER**	**GROUND EL.**
2/21/2011 - 2/22/2011	4-7/8 inches	276 feet

GROUND-WATER READINGS
Drilling mud bailed on 2/22/2011. Ground-water level measured at 15 feet below the ground surface 10 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		
235	45	22	8.5	19.3	-			☒			
230	50		3.9	21.4	103	29		▨			
225	55	29	8.1	20.8	-			☒			
220	60		8.6	19.2	101	35	78	▨		MH	ELASTIC SILT with SAND - very stiff, moist, gray
215	65	43	4.3	20.0	-			☒		CL	LEAN CLAY with SAND - hard, moist, brown and gray, trace gravel (up to 1/8 inch in size)
210	70		8.5	16.6	112	71	50	▨		SM	SILTY SAND - very dense, moist, brown, fine to medium-grained, trace gravel (up to 3/8 inch in size), with clay
										CL	SANDY LEAN CLAY - hard, moist, brownish gray
205	75	52	7.6	19.4	-		39	☒		SC	CLAYEY SAND - very dense, moist, brown, fine to coarse-grained, gravel (up to 3/8 inch in size)
										CL	LEAN CLAY - hard, moist, brown, trace sand
200	80		4.8	36.7	87	53	91	▨		SM	SILTY SAND - dense, wet, light brown, fine to medium-grained, trace gravel

(CONTINUED ON FOLLOWING FIGURE)

Field Tech: AR
Prepared/Date: JF 3/29/2011
Checked/Date: LT/PE 9/20/2011

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LOG OF BORING

Project No.: 4953-10-1561 Figure: A-2.50b

DRILLING COMPANY/DRILLING EQUIPMENT		BORING NO.
C & L Drilling / Mayhew 1000		**G-159 (Continued)**
DRILLING METHOD	**BOREHOLE LOCATION**	
Rotary Wash	Sta 721+84, Lt 519 feet	
DATES DRILLED	**HOLE DIAMETER**	**GROUND EL.**
2/21/2011 - 2/22/2011	4-7/8 inches	276 feet

GROUND-WATER READINGS
Drilling mud bailed on 2/22/2011. Ground-water level measured at 15 feet below the ground surface 10 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		
195		74	5.9	23.4	-			☒		CH	SANDY FAT CLAY - hard, moist, gray, trace calcium carbonate nodules, trace gravel
	85		5.0	16.2	113	48	63	⊠			Trace gravel (up to 3/8 inch in size)
	90	90/11"	4.3	15.7	-		50	☒		SC	CLAYEY SAND - very dense, moist, gray, fine to medium-grained, trace iron oxide stains, trace gravel (up to 1/8 inch in size)
Tunnel	95		-	-	-	80/10"		○		SM	SILTY SAND - very dense, moist, brown, fine to medium-grained, some coarse sand and gravel (Sample not recovered)
	100	47	4.7	24.5	-			☒		ML	SANDY SILT - hard, very moist, olive brown, trace iron oxide stains
	105									CL	LEAN CLAY with SAND - hard, moist, gray, some calcium carbonate nodules
170			5.6	18.0	111	44		⊠			
	110										
165		37	3.6	19.4	-			☒			
	115										
160			4.2	31.3	87	51		⊠			Becomes dark gray
	120										Coarse gravel layer

(CONTINUED ON FOLLOWING FIGURE)

Field Tech: AR
Prepared/Date: JF 3/29/2011
Checked/Date: LT/PE 9/20/2011

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LOG OF BORING

Project No.: 4953-10-1561 Figure: A-2.50c

DRILLING COMPANY/DRILLING EQUIPMENT		BORING NO.
C & L Drilling / Mayhew 1000		**G-159 (Continued)**
DRILLING METHOD	**BOREHOLE LOCATION**	
Rotary Wash	Sta 721+84, Lt 519 feet	
DATES DRILLED	**HOLE DIAMETER**	**GROUND EL.**
2/21/2011 - 2/22/2011	4-7/8 inches	276 feet

GROUND-WATER READINGS
Drilling mud bailed on 2/22/2011. Ground-water level measured at 15 feet below the ground surface 10 minutes after bailing of drilling mud.

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	0	39	5.5	26.8	-			☒	
150	5								
145	10								
140	15								
135	20								
130	25								
125	30								
120	35								
	40								

Becomes light greenish gray, trace sand

END OF BORING AT 121½ FEET

NOTES:

Hand augered upper 6 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 3/29/2011
Checked/Date: LT/PE 9/20/2011

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LOG OF BORING
Project No.: 4953-10-1561 Figure: A-2.50d

DRILLING COMPANY/DRILLING EQUIPMENT		BORING NO.
C & L Drilling / Mayhew 1000		G-161
DRILLING METHOD	**BOREHOLE LOCATION**	
Rotary Wash	Sta 681+50, Rt 20 feet	
DATES DRILLED	**HOLE DIAMETER**	**GROUND EL.**
2/3/2011 - 2/4/2011	4-7/8 inches	258 feet

GROUND-WATER READINGS
Drilling mud bailed on 2/4/2011. Ground-water level measured at 29 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		
255	5										4-inch thick Asphalt Concrete over 12-inch thick Portland Cement Concrete and 2-inch thick Base Course
										SC	**FILL [Af]** CLAYEY SAND - moist, gray
			0.0	15.3	109	Push				CL	SANDY LEAN CLAY - moist, dark brown, trace brick fragments
250	10									CL	**QUATERNARY YOUNGER ALLUVIUM [Qal]** LEAN CLAY - very soft, moist, gray
		10	0.0	25.4	-						Becomes stiff, dark olive brown
245	15									SM	SILTY SAND with GRAVEL - medium dense, moist, olive brown, fine to medium-grained, gravel (up to 1/4 inch in size), some clay, sample disturbed
			0.2	-	-	18					
240	20									CL	LEAN CLAY with SAND - soft, moist, olive brown
		5	0.1	23.5	-						
235	25										
			0.0	24.6	94	4					
230	30										▽
		10	0.0	27.3	-					ML	SANDY SILT - stiff, moist to wet, olive gray **QUATERNARY OLDER ALLUVIUM [Qalo]**
225	35									SM	SILTY SAND - loose, wet, gray, fine-grained
				-	-	30					Becomes medium dense, some gravel (Sample not recovered)
220	40									SM	

(CONTINUED ON FOLLOWING FIGURE)

Field Tech: DW
Prepared/Date: JF 3/31/2011
Checked/Date: LT/PE 9/20/2011

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LOG OF BORING

Project No.: 4953-10-1561 Figure: A-2.51a

DRILLING COMPANY/DRILLING EQUIPMENT		BORING NO.
C & L Drilling / Mayhew 1000		**G-161 (Continued)**
DRILLING METHOD	**BOREHOLE LOCATION**	
Rotary Wash	Sta 681+50, Rt 20 feet	
DATES DRILLED	**HOLE DIAMETER**	**GROUND EL.**
2/3/2011 - 2/4/2011	4-7/8 inches	258 feet

GROUND-WATER READINGS
Drilling mud bailed on 2/4/2011. Ground-water level measured at 29 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		
		25	0.0	18.0	-		19	☒			SILTY SAND with GRAVEL - medium dense, moist to wet, grayish brown, fine to medium-grained, gravel (up to 1/4 inch in size), with layers of Poorly Graded Sand
215	45			-	-	30		○			(Sample not recovered)
210	50	62	0.2	10.8	-		17	☒			Becomes very dense, dark gray, gravel (up to 1 inch in size)
205	55		0.0	28.0	93	11		⊠		SP	POORLY GRADED SAND - medium dense, moist, brown, fine to medium-grained
										ML	SILT - stiff, moist, brown, trace sand
200	60	50	0.0	16.9	-			☒		SC	CLAYEY SAND - moist, olive brown, fine-grained
										ML	SILT - hard, moist, olive brown to olive gray
195	65		0.1	23.0	102	28		⊠		SM	SILTY SAND - wet, olive gray
										CL	LEAN CLAY - very stiff, moist, olive gray, trace sand
190	70	38	0.0	17.9	-			☒			Becomes hard, gray, trace gravel (up to 1/4 inch in size)
185	75		0.0	24.1	102	30	80	⊠		CL	LEAN CLAY with SAND - very stiff, moist, gray, fine sand
180	80										

(CONTINUED ON FOLLOWING FIGURE)

Field Tech: DW
Prepared/Date: JF 3/31/2011
Checked/Date: LT/PE 9/20/2011

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LOG OF BORING

Project No.: 4953-10-1561 Figure: A-2.51b

DRILLING COMPANY/DRILLING EQUIPMENT		BORING NO.
C & L Drilling / Mayhew 1000		**G-161 (Continued)**
DRILLING METHOD	**BOREHOLE LOCATION**	
Rotary Wash	Sta 681+50, Rt 20 feet	
DATES DRILLED	**HOLE DIAMETER**	**GROUND EL.**
2/3/2011 - 2/4/2011	4-7/8 inches	258 feet

GROUND-WATER READINGS
Drilling mud bailed on 2/4/2011. Ground-water level measured at 29 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		
175	85	24	0.0	32.1	-			☒		CL/CH	LEAN to FAT CLAY - very stiff, moist, olive gray
			0.0	17.6	111	31	66	⊠		CL	SANDY LEAN CLAY - very stiff, moist, olive brown to olive grayish brown
170	90	39	0.0	28.2	-			☒		CL	LEAN CLAY - hard, moist, olive brown to olive gray, trace iron oxide stains
165	95									SP	POORLY GRADED SAND - dense, moist, brown, fine to medium-grained
			0.1	22.7	106	36	43	⊠		SC	CLAYEY SAND - dense, moist, gray, trace gravel (up to 1/2 inch in size)
	100	46	0.0	14.7	-		66	☒		CL	SANDY LEAN CLAY - hard, moist, reddish brown and some olive gray, trace gravel (up to 3/8 inch in size)
Tunnel	105		0.0	15.3	114	45		⊠			Alternating with layers of Lean Clay with Sand, olive brown
	110	33	0.0	26.3	-			☒			Becomes olive gray and some reddish blue, trace sand
140	115		0.0	12.8	124	45		⊠		SC	CLAYEY SAND with GRAVEL - dense, moist, olive brown to reddish brown, medium to coarse-grained, gravel (up to 1/4 inch in size)
	120										

(CONTINUED ON FOLLOWING FIGURE)

Field Tech: DW
Prepared/Date: JF 3/31/2011
Checked/Date: LT/PE 9/20/2011

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LOG OF BORING

Project No.: 4953-10-1561 Figure: A-2.51c

DRILLING COMPANY/DRILLING EQUIPMENT		BORING NO.
C & L Drilling / Mayhew 1000		**G-161 (Continued)**
DRILLING METHOD	**BOREHOLE LOCATION**	
Rotary Wash	Sta 681+50, Rt 20 feet	
DATES DRILLED	**HOLE DIAMETER**	**GROUND EL.**
2/3/2011 - 2/4/2011	4-7/8 inches	258 feet

GROUND-WATER READINGS
Drilling mud bailed on 2/4/2011. Ground-water level measured at 29 feet below the ground surface 30 minutes after bailing of drilling mud.

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	125	59	0.1	22.2	-			☒		SP	POORLY GRADED SAND with GRAVEL - very dense, moist, gray, gravel (up to 1/2 inch in size), thin layer of Lean Clay
130	130										END OF BORING AT 121½ FEET
125	135										
120	140										
115	145										
110	150										
105	155										
100	160										

NOTES:

Hand augered upper 6 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 340 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 3/31/2011
Checked/Date: LT/PE 9/20/2011

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LOG OF BORING
Project No.: 4953-10-1561 Figure: A-2.51d

DRILLING COMPANY/DRILLING EQUIPMENT		BORING NO.
C & L Drilling / Mayhew 1000		G-162
DRILLING METHOD	**BOREHOLE LOCATION**	
Rotary Wash	Sta 685+60, Lt 20 feet	
DATES DRILLED	**HOLE DIAMETER**	**GROUND EL.**
1/26/2011 - 1/28/2011	4-7/8 inches	251 feet

GROUND-WATER READINGS
Drilling mud bailed on 1/28/2011. Ground-water level measured at 24 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		
250	0										4-inch thick Asphalt Concrete over 12-inch thick Portland Cement Concrete and 3-inch thick Base Course
										SC	**FILL [Af]** - CLAYEY SAND - moist, brown, with fine gravel
										CL	**QUATERNARY YOUNGER ALLUVIUM [Qal]** SANDY LEAN CLAY - moist, brown
245	5		0.0	23.3	101	Push		⊠		CL/ CH	LEAN to FAT CLAY - very soft, moist, olive brown, trace fine sand
240	10		0.0	18.0	104	5		⊠		ML	SANDY SILT - soft, moist, olive brownish gray, trace slate gravel (up to 1/4 inch in size)
235	15	4	0.1	22.2	-			⊠			Becomes olive brown
230	20		0.2	27.1	91	5		⊠		CL	SANDY LEAN CLAY - soft, moist, olive brown, trace fine sand, trace gravel (up to 1/4 inch in size)
	25										▽ Becomes wet
225	25	Push	0.0	30.8	-			⊠			Becomes very soft, trace sand, trace gravel (up to 1/4 inch in size)
220	30			-	-	12		○		CL	**QUATERNARY OLDER ALLUVIUM [Qalo]** SANDY LEAN CLAY - stiff, moist, olive brown, trace fine sand, trace gravel (up to 1/4 inch in size) (Sample not recovered)
215	35	12	0.0	21.7	-			⊠			Trace gravel (up to 1/2 inch in size)
	40										

(CONTINUED ON FOLLOWING FIGURE)

Field Tech: DW
Prepared/Date: JF 3/28/2011
Checked/Date: LT/PE 9/20/2011

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LOG OF BORING

Project No.: 4953-10-1561 Figure: A-2.52a

DRILLING COMPANY/DRILLING EQUIPMENT		BORING NO.
C & L Drilling / Mayhew 1000		**G-162 (Continued)**
DRILLING METHOD	**BOREHOLE LOCATION**	
Rotary Wash	Sta 685+60, Lt 20 feet	
DATES DRILLED	**HOLE DIAMETER**	**GROUND EL.**
1/26/2011 - 1/28/2011	4-7/8 inches	251 feet

GROUND-WATER READINGS
Drilling mud bailed on 1/28/2011. Ground-water level measured at 24 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		
210	45		0.0	-	-	65		○			(Sample not recovered) Becomes hard, more gravel
205		38	0.0	7.8	-			⊠		SC	CLAYEY SAND with GRAVEL - dense, moist, olive brown, gravel (up to 1/2 inch in size)
200	50			-	-	51		○			(Sample not recovered)
195	55	40	0.0	13.9	-		27	⊠		SC	CLAYEY SAND - dense, wet, olive brown, fine to coarse-grained, gravel (up to 3/4 inch in size)
190	60	30	0.0	19.8	-		62	⊠		CL	SANDY LEAN CLAY - very stiff, moist, olive brown, trace gravel (up to 3/8 inch in size)
185	65										
180	70		0.0	11.6	114	80/10"	14	⊠	PMT	SC	CLAYEY SAND with GRAVEL - very dense, wet, olive brown, fine to coarse grained, gravel (up to 3/4 inch in size), iron oxide stains
175	75										
	80										

(CONTINUED ON FOLLOWING FIGURE)

Field Tech: DW
Prepared/Date: JF 3/28/2011
Checked/Date: LT/PE 9/20/2011

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LOG OF BORING

Project No.: 4953-10-1561 Figure: A-2.52b

DRILLING COMPANY/DRILLING EQUIPMENT		BORING NO.
C & L Drilling / Mayhew 1000		**G-162 (Continued)**
DRILLING METHOD	**BOREHOLE LOCATION**	
Rotary Wash	Sta 685+60, Lt 20 feet	
DATES DRILLED	**HOLE DIAMETER**	**GROUND EL.**
1/26/2011 - 1/28/2011	4-7/8 inches	251 feet

GROUND-WATER READINGS
Drilling mud bailed on 1/28/2011. Ground-water level measured at 24 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			
Tunnel	85		0.0	19.8	109	32		⊠	PMT	CL	LEAN CLAY with SAND - very stiff, moist, olive brown, trace gravel (up to 1/2 inch in size), trace iron oxide stains
		92/9"	0.0	16.0	-		34	⊠		SC-SM	SILTY, CLAYEY SAND with GRAVEL - very dense, moist, olive brown, fine to coarse-grained, abundant slate gravel (up to 3/4 inch in size)
	90		0.0	19.8	108	45		⊠		CH	FAT CLAY with SAND - hard, moist, olive gray, fine sand, trace fine gravel
		30	0.0	20.2	-		77	⊠			Becomes very stiff, olive brown to olive gray
	95		0.1	19.2	113	29		⊠			
	100	40	0.0	20.1	-		58	⊠		CL	SANDY LEAN CLAY - hard, moist, olive gray, trace gravel (up to 1/4 inch in size)
	150		0.0	20.3	106	35		⊠		CL/CH	LEAN to FAT CLAY - hard, moist, olive gray, trace sand
	105			-	-	45		○			(Sample not recovered)
	145										
	110		0.0	26.2	99	73/9"		⊠			With calcium carbonate nodules
	140										
	115		0.0	10.8	122	36		⊠		SP	POORLY GRADED SAND - medium dense, moist, brown, fine to medium-grained, trace coarse
	135										
	120										

(CONTINUED ON FOLLOWING FIGURE)

Field Tech: DW
Prepared/Date: JF 3/28/2011
Checked/Date: LT/PE 9/20/2011

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LOG OF BORING

Project No.: 4953-10-1561 Figure: A-2.52c

DRILLING COMPANY/DRILLING EQUIPMENT		BORING NO.
C & L Drilling / Mayhew 1000		**G-162 (Continued)**
DRILLING METHOD	**BOREHOLE LOCATION**	
Rotary Wash	Sta 685+60, Lt 20 feet	
DATES DRILLED	**HOLE DIAMETER**	**GROUND EL.**
1/26/2011 - 1/28/2011	4-7/8 inches	251 feet

GROUND-WATER READINGS
Drilling mud bailed on 1/28/2011. Ground-water level measured at 24 feet below the ground surface 30 minutes after bailing of drilling mud.

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	125		0.0	15.5	113	68		⊠	
125	130								
120	135								
115	140								
110	145								
105	150								
100	155								
95	160								

Becomes very dense, trace gravel (up to 1/4 inch in size)

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 340 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: DW
Prepared/Date: JF 3/28/2011
Checked/Date: LT/PE 9/20/2011

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LOG OF BORING
Project No.: 4953-10-1561 Figure: A-2.52d

DRILLING COMPANY/DRILLING EQUIPMENT		BORING NO.
C & L Drilling / Mayhew 1000		G-164
DRILLING METHOD	**BOREHOLE LOCATION**	
Rotary Wash	Sta 692+60, Rt 5 feet	
DATES DRILLED	**HOLE DIAMETER**	**GROUND EL.**
1/26/2011 - 1/28/2011	4-7/8 inches	249 feet

GROUND-WATER READINGS
Drilling mud bailed on 1/27/2011. Ground-water level measured at 38 feet below the ground surface on 1/28/2011.

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		
											5-inch thick Asphalt Concrete over 8-inch thick Base Course
											FILL [Af]
										CL	SANDY LEAN CLAY - moist, dark brown and gray, trace slate gravel (up to 1-1/4 inches in size)
245	5										
			0.0	12.5	116	12					**QUATERNARY YOUNGER ALLUVIUM [Qal]**
										CL	SANDY LEAN CLAY - stiff, dark reddish brown, trace gravel (up to 1/4 inch in size)
240	10										
		10	0.0	19.4	-						Thin layer of Silty Sand
235	15										
			0.0	13.4	104	8					Becomes medium stiff, moist, olive brown
230	20										
		13		-	-						Increase in sand content (Sample not recovered)
225	25										
											QUATERNARY OLDER ALLUVIUM [Qalo]
			0.3	16.1	105	18	75			ML	SILT with SAND - stiff, moist, olive brown
220	30										
		10	0.0	21.9	-		59				Becomes dark olive brown, some clay
215	35		0.1	32.0	90	9	89			ML	SILT - medium stiff, moist, dark olive brown, trace fine sand
		17	0.0	18.7	-		28			SM	SILTY SAND - medium dense, moist, gray, fine to medium-grained, trace gravel (up to 3/8 inch in size)
210	40									SP	POORLY GRADED SAND - mediume dense, wet, gray, fine to medium-grained, trace iron oxide stains
			0.0	22.6	103	24				SM	

(CONTINUED ON FOLLOWING FIGURE)

Field Tech: AR
Prepared/Date: JF 3/28/2011
Checked/Date: LT/PE 9/20/2011

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LOG OF BORING

Project No.: 4953-10-1561 Figure: A-2.53a

DRILLING COMPANY/DRILLING EQUIPMENT		BORING NO.
C & L Drilling / Mayhew 1000		**G-164 (Continued)**
DRILLING METHOD	**BOREHOLE LOCATION**	
Rotary Wash	Sta 692+60, Rt 5 feet	
DATES DRILLED	**HOLE DIAMETER**	**GROUND EL.**
1/26/2011 - 1/28/2011	4-7/8 inches	249 feet

GROUND-WATER READINGS
Drilling mud bailed on 1/27/2011. Ground-water level measured at 38 feet below the ground surface on 1/28/2011.

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		
		54	0.0	11.4	-		15		NV		SILTY SAND with GRAVEL - medium dense, wet, gray, fine to medium-grained, with silt seams, trace iron oxide stains
205	45										Becomes very dense, fine to coarse-grained, gravel (up to 3/4 inch in size)
										SM	SILTY SAND - dense, wet, brownish gray, fine to medium-grained, some coarse sand, trace slate gravel, with 4-inch cobble
200	50		0.0	10.3	119	57	10			GW-GM	POORLY GRADED GRAVEL with SILT and SAND - dense, wet, gray, fine to coarse-grained, gravel (up to 1 inch in size)
		29	0.1	26.7	-		91			CH	SANDY FAT CLAY - very stiff, moist, olive green, fine sand, trace iron oxide stains
195	55		0.2	27.6	97	16			NV	CH	**LAKEWOOD FORMATION [Qlw]** SANDY FAT CLAY - stiff, moist, olive brown and gray, trace slate gravel
		27	1.0	21.2	-		55				Becomes olive gray and greenish gray, calcium carbonate nodules
	60		1.1	12.6	109	70	20			SM	SILTY SAND - very dense, moist, light brown, fine to medium-grained
		50/6"	1.5	17.6	-				NV	SP	POORLY GRADED SAND - very dense, wet, light greenish gray, fine to coarse-grained
	65		1.2	19.5	107	90	12				Some coarse sand
		50/5"	1.1	20.1	-		12			SM	SILTY SAND - very dense, wet, light greenish yellow and gray, fine to medium-grained
	70		1.6	20.1	105	75				SP	POORLY GRADED SAND - very dense, wet, yellowish brown, fine to medium-grained
	75	50/4"	0.9	17.3	-		18				Becomes yellowish brown and gray, with coarse sand, with gravel up to (1/2 inch in size)
170	80		1.0	19.4	100	75					Becomes yellowish gray

Tunnel

(CONTINUED ON FOLLOWING FIGURE)

Field Tech: AR
Prepared/Date: JF 3/28/2011
Checked/Date: LT/PE 9/20/2011

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LOG OF BORING

Project No.: 4953-10-1561 Figure: A-2.53b

DRILLING COMPANY/DRILLING EQUIPMENT		BORING NO.
C & L Drilling / Mayhew 1000		**G-164 (Continued)**
DRILLING METHOD	**BOREHOLE LOCATION**	
Rotary Wash	Sta 692+60, Rt 5 feet	
DATES DRILLED	**HOLE DIAMETER**	**GROUND EL.**
1/26/2011 - 1/28/2011	4-7/8 inches	249 feet

GROUND-WATER READINGS
Drilling mud bailed on 1/27/2011. Ground-water level measured at 38 feet below the ground surface on 1/28/2011.

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	85	50/2"		-	-			○			(Sample not recovered) 4-inch to 6-inch thick cobble layer
			1.2	18.2	101	80		⊠			Becomes olive gray, fine to medium-grained, iron oxide stains
160	90	93/11"	1.3	24.0	-		22	⊠		SM	SILTY SAND - very dense, wet, olive gray, fine to medium-grained, iron oxide stains
155	95		1.5	23.8	98	78		⊠		SP	**SAN PEDRO FORMATION [Qsp]** POORLY GRADED SAND - very dense, wet, olive gray, fine to medium-grained, trace silt
150	100	95/10"	1.9	31.5	-			⊠			Becomes dark gray, fine-grained, trace shell fragments
145	105		1.1	16.6	102	75		⊠		ML	SANDY SILT - hard, moist, dark gray, with clay
140	110	87	0.9	24.7	-			⊠		SM	SILTY SAND - very dense, wet, dark gray, fine-grained, trace shell fragments
135	115		0.9	17.6	111	100		⊠			Trace gravel, trace shell fragments
130	120									ML	SANDY SILT - hard, moist, blueish gray, trace shell fragments, with clay

(CONTINUED ON FOLLOWING FIGURE)

Field Tech: AR
Prepared/Date: JF 3/28/2011
Checked/Date: LT/PE 9/20/2011

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LOG OF BORING
Project No.: 4953-10-1561 Figure: A-2.53c

DRILLING COMPANY/DRILLING EQUIPMENT		BORING NO.
C & L Drilling / Mayhew 1000		**G-164 (Continued)**
DRILLING METHOD	**BOREHOLE LOCATION**	
Rotary Wash	Sta 692+60, Rt 5 feet	
DATES DRILLED	**HOLE DIAMETER**	**GROUND EL.**
1/26/2011 - 1/28/2011	4-7/8 inches	249 feet

GROUND-WATER READINGS
Drilling mud bailed on 1/27/2011. Ground-water level measured at 38 feet below the ground surface on 1/28/2011.

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	125	61	0.8	22.0	-			☒		CL	LEAN CLAY with SAND - hard, moist, blueish gray
	125		0.9	17.6	96	125		⊠		SP-SM	POORLY GRADED SAND with SILT - very dense, moist, blueish gray, fine to medium-grained, trace gravel, organic odor
120	130	50/4"	0.6	16.1	-			☒		SP	POORLY GRADED SAND - very dense, moist, blueish gray, fine to medium-grained
115											Increase in gravel content
	135		1.0	10.0	118	100		⊠			
110	140	50/4"	0.8	16.9	-			☒			Trace organic odor
105	145		0.8	12.5	116	100/5"		⊠		SM	SILTY SAND - very dense, wet, dark gray, fine to meduim-grained, some coarse, trace gravel, organic odor
100	150	50/5"	0.7	14.0	-			☒			Trace gravel (up to 1/4 inch in size)
95	155										END OF BORING AT 150½ FEET
90	160										

NOTES:
Hand augered upper 6 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: NV = Noise/Vibration

Field Tech: AR
Prepared/Date: JF 3/28/2011
Checked/Date: LT/PE 9/20/2011

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.

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_(161-181).GPJ 10/18/11

MTA Westside Subway Extension
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LOG OF BORING

Project No.: 4953-10-1561 Figure: A-2.53d

DRILLING COMPANY/DRILLING EQUIPMENT		BORING NO.
C & L Drilling / Mayhew 1000		G-165
DRILLING METHOD	**BOREHOLE LOCATION**	
Rotary Wash	Sta 698+10, Rt 30 feet	
DATES DRILLED	**HOLE DIAMETER**	**GROUND EL.**
3/5/2011 and 3/19/2011	4-7/8 inches	281 feet

GROUND-WATER READINGS
Ground-water level measured at 26 feet and 64½ feet below the ground surface in shallow and deep monitoring wells, respectively on 4/22/2011. See last page of this boring for details.

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		
280	0										4-inch thick Asphalt Concrete, No Base Course
										SP	**FILL [Af]**
											POORLY GRADED SAND - moist, fine to medium-grained, with silt and clay, trace gravel (up to 1½ inches in size)
275	5										
											QUATERNARY OLDER ALLUVIUM [Qalo]
										SM	SILTY SAND - moist, brown, fine to coarse-grained, trace fine gravel
270	10		0.3	16.8	109	Push					
		9	0.1	24.2	-					CL	LEAN CLAY - stiff, moist, light brown
265	15									SP	POORLY GRADED SAND - loose, moist, brown, fine to coarse-grained
			0.1	22.7	101	10	49			SC	CLAYEY SAND - loose, moist, brown, fine-grained, trace gravel (up to 3/8 inch in size)
	20	11	0.2	22.1	-						Thin layer of Sandy Silt
260										CL	SANDY LEAN CLAY - stiff, moist, reddish brown, trace gravel (up to 1/4 inch in size)
			0.1	17.6	106	12					Trace sand
255	25	23	0.0	13.1	-		48			SC	▽ CLAYEY SAND - medium dense, moist, brown, fine to medium-grained, trace gravel (up to 1/2 inch in size)
			0.0	18.4	112	26					
250	30	20	0.0	15.6	-						
	35		0.1	21.1	101	12					Thin layer of Silty Sand
245		15	0.1	25.4	-					SM	SILTY SAND - medium dense, moist, brown, fine to medium-grained
	40									CL	LEAN CLAY - stiff, moist, brown

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: DW
Prepared/Date: JF 5/11/2011
Checked/Date: LT/RM 9/20/2011

MTA Westside Subway Extension
Los Angeles, California

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LOG OF BORING

Project No.: 4953-10-1561 Figure: A-2.54a

DRILLING COMPANY/DRILLING EQUIPMENT		BORING NO.
C & L Drilling / Mayhew 1000		**G-165 (Continued)**
DRILLING METHOD	**BOREHOLE LOCATION**	
Rotary Wash	Sta 698+10, Rt 30 feet	
DATES DRILLED	**HOLE DIAMETER**	**GROUND EL.**
3/5/2011 and 3/19/2011	4-7/8 inches	281 feet

GROUND-WATER READINGS
Ground-water level measured at 26 feet and 64½ feet below the ground surface in shallow and deep monitoring wells, respectively on 4/22/2011. 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		
240			0.1	19.6	97	16				SC	CLAYEY SAND - medium dense, moist, brown and gray, fine-grained
		17	0.0	24.8	-		76			CL	LEAN CLAY with SAND - very stiff, moist, brown, trace gravel (up to 3/8 inch in size)
235	45		0.0	28.9	95	15				SM	SILTY SAND - medium dense, moist, brown, fine to medium-grained
	50	41	0.0	18.4	-					CL	LEAN CLAY - hard, moist, brown
230			0.0	18.9	105	30					Trace fine sand
	55	36/10"	0.0	17.3	-		58		NV		Alternating with layers of Sandy Lean Clay, trace gravel (up to 3/8 inch in size)
225										SM	SILTY SAND - dense, moist, brown, fine-grained
			0.0	21.0	101	24				CL	LEAN CLAY - very stiff, moist, light brown, with fine sand
	60										
220		17	0.1	31.4	-						With calcium carbonate nodules and iron oxide stains
	65		0.0	19.4	97	18			NV		▼
215		28	0.0	25.5	-		77				With sand
	70										
210			0.1	37.5	82	26					Becomes olive gray to olive brown, trace iron oxide stains
											Becomes hard
		68/11"	0.0	16.4	-						**LAKEWOOD FORMATION [Qlw]**
	75								NV	SM	SILTY SAND - very dense, moist, gray, fine-grained
Tunnel			0.2	14.5	105	50/6"					Becomes light brown and gray
	80	95/11"		16.9	-		15				

(CONTINUED ON FOLLOWING FIGURE)

Field Tech: DW
Prepared/Date: JF 5/11/2011
Checked/Date: LT/RM 9/20/2011

MTA Westside Subway Extension
Los Angeles, California

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LOG OF BORING

Project No.: 4953-10-1561 Figure: A-2.54b

DRILLING COMPANY/DRILLING EQUIPMENT		BORING NO.
C & L Drilling / Mayhew 1000		G-165 (Continued)
DRILLING METHOD	**BOREHOLE LOCATION**	
Rotary Wash	Sta 698+10, Rt 30 feet	
DATES DRILLED	**HOLE DIAMETER**	**GROUND EL.**
3/5/2011 and 3/19/2011	4-7/8 inches	281 feet

GROUND-WATER READINGS
Ground-water level measured at 26 feet and 64½ feet below the ground surface in shallow and deep monitoring wells, respectively on 4/22/2011. 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			
			0.1	19.1	94	80		⊠				Becomes yellowish brown, trace medium sand, trace silt
	85											Becomes dark gray, fine to coarse-grained
Tunnel		90/11"	0.2	23.9	-			⊠		CL		LEAN CLAY - hard, moist, greenish gray, trace fine sand
										SM		SILTY SAND - very dense, moist, olive brown to gray, fine to medium-grained
			0.2	18.2	100	79/10"		⊠				
	90											
		88/10"	1.1	20.7	-		28	⊠				Becomes greenish gray to gray, trace iron oxide stains
	95		1.2	23.8	99	56		⊠				
185												
		97/11"	0.6	15.9	-			⊠				Becomes yellowish brown
	100											
180			0.4	14.1	108	75/10"		⊠				Trace coarse sand
		63	0.1	24.3	-		32	⊠				Brown to olive brown, fine-grained
	105											
175			0.1	22.6	99	42/10"		⊠				Becomes dense
		91	0.0	26.1	-			⊠		SC		CLAYEY SAND - very dense, moist, brown to olive brown, fine-grained
	110											
170				-	-	50/3"		○				(Sample not recovered)
	115											**SAN PEDRO FORMATION [Qsp]**
165		50/10"	0.3	20.2	-			⊠		SP		POORLY GRADED SAND - very dense, moist, gray, fine-grained
			0.0	18.8	106	60/10"		⊠				Trace coarse sand
	120											

(CONTINUED ON FOLLOWING FIGURE)

Field Tech: DW
Prepared/Date: JF 5/11/2011
Checked/Date: LT/RM 9/20/2011

MTA Westside Subway Extension
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LOG OF BORING

Project No.: 4953-10-1561 Figure: A-2.54c

DRILLING COMPANY/DRILLING EQUIPMENT		BORING NO.
C & L Drilling / Mayhew 1000		**G-165 (Continued)**
DRILLING METHOD	**BOREHOLE LOCATION**	
Rotary Wash	Sta 698+10, Rt 30 feet	
DATES DRILLED	**HOLE DIAMETER**	**GROUND EL.**
3/5/2011 and 3/19/2011	4-7/8 inches	281 feet

GROUND-WATER READINGS
Ground-water level measured at 26 feet and 64½ feet below the ground surface in shallow and deep monitoring wells, respectively on 4/22/2011. See last page of this boring for details.

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	125	59	0.0	27.2	-		86	☒		MH	ELASTIC SILT - hard, moist, gray
155	130		0.0	17.5	-	50/10"		○		SP	POORLY GRADED SAND - very dense, moist, gray, fine to medium-grained
150	135	50/5"	0.1	14.9	-			☒			(Sample not recovered)
145	140		4.6	13.5	97	50/1"		⊠			With gravel
140	145		3.4	18.6	94	50/5"		⊠			Trace fine gravel, trace organic odor
135	150		0.5	13.3	116	50/5"		⊠			Fine to coarse-grained, trace gravel (up to 1/2 inch in size)
130	155		0.4	18.9	95	50/5"		⊠			
125	160										END OF BORING AT 150½ FEET

NOTES:
Hand augered upper 8 feet to avoid damage to utilities.
Montoring well was installed on 4/22/2011. See well construction diagram for G-165.

"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 340 pound hammer falling 18 inches

**Photo Ionization Detector used for OVA readings

Downhole Test: NV = Noise/Vibration

Field Tech: DW
Prepared/Date: JF 5/11/2011
Checked/Date: LT/RM 9/20/2011

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.

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LOG OF BORING

Project No.: 4953-10-1561 Figure: A-2.54d

DRILLING COMPANY/DRILLING EQUIPMENT		BORING NO.
C & L Drilling / Mayhew 1000		G-166A/B
DRILLING METHOD	**BOREHOLE LOCATION**	
Rotary Wash	Sta 700+30, Rt 25 and 60 feet	
DATES DRILLED	**HOLE DIAMETER**	**GROUND EL.**
3/5/2011, 3/19/2011, 4/18/2011 - 4/20/2011	4-7/8 inches	290 feet

GROUND-WATER READINGS
Ground-water level measured at 43 feet and 64½ feet below the ground surface in shallow and deep monitoring wells, respectively on 4/22/2011. 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		
285	5									CL	**FILL [Af]** LEAN CLAY - moist, light brown and gray, trace gravel, trace brick fragments
										SM	SILTY SAND - moist, brown and gray, fine to coarse-grained, with slate gravel
280	10		6.6	9.3	118	49				SW	**QUATERNARY OLDER ALLUVIUM [Qalo]** WELL GRADED SAND with GRAVEL - dense, moist, brown, fine to coarse-grained, trace silt, gravel (up to 1/4 inch in size)
		32	4.0	8.7	-		20			SM	SILTY SAND - dense, moist, brown, fine to medium-grained, some gravel (up to 3/4 inch in size)
275	15		3.2	7.4	114	32					Becomes medium dense, some gravel (up to 1 inch in size)
		54	3.2	20.9	-					CL	LEAN CLAY - hard, moist, light brown, trace gravel (up to 1/4 inch in size)
270	20									SM	SILTY SAND - very dense, moist, reddish brown, fine to medium-grained, trace gravel (up to 1/8 inch in size)
			4.5	6.8	112	65/11"					
265	25	33	4.3	12.8	-		75			CL	LEAN CLAY with SAND - hard, moist, brown, fine to coarse sand, trace gravel (up to 3/8 inch in size)
			2.9	11.0	84	70					Becomes dark reddish brown
260	30	49	5.1	10.9	-					CL	SANDY LEAN CLAY - hard, moist, brown, fine to medium sand
255	35		4.7	10.4	118	82					Trace gravel (up to 1/4 inch in size), thin layer of Sandy Silt
											Thin layer of Silty Sand, olive brown
		29	3.4	22.6	-					CL	LEAN CLAY - very stiff, moist, olive brown
	40										

(CONTINUED ON FOLLOWING FIGURE)

Field Tech: AR
Prepared/Date: JF 5/11/2011
Checked/Date: LT/RM 9/20/2011

MTA Westside Subway Extension
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LOG OF BORING

Project No.: 4953-10-1561 Figure: A-2.55a

DRILLING COMPANY/DRILLING EQUIPMENT		BORING NO.
C & L Drilling / Mayhew 1000		G-166A/B (Continued)
DRILLING METHOD Rotary Wash	**BOREHOLE LOCATION** Sta 700+30, Rt 25 and 60 feet	
DATES DRILLED 3/5/2011, 3/19/2011, 4/18/2011 - 4/20/2011	**HOLE DIAMETER** 4-7/8 inches	**GROUND EL.** 290 feet

GROUND-WATER READINGS
Ground-water level measured at 43 feet and 64½ feet below the ground surface in shallow and deep monitoring wells, respectively on 4/22/2011. 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		
			2.5	22.2	98	21					Trace sand, trace iron oxide stains
		18	4.5	29.9	-						
245	45		4.7	20.5	108	20					Becomes olive gray, trace iron oxide stains
240	50	37	4.7	19.9	-						Becomes hard
				19.8	107	46	87				Becomes dark olive brown
235	55	30		25.0	-				NV		Becomes very stiff, olive brown
230	60			22.0	101	34	77			CH	FAT CLAY with SAND - very stiff, moist, light gray and brown, very fine sand, calcium carbonate nodules
225	65			56.7	66	12			NV	MH	ELASTIC SILT - stiff, moist, light gray, calcium carbonate nodules
		30		31.9	-		99				Becomes very stiff, light olive gray
220	70								PMT		Thin layer of Lean to Fat Clay, gray
				18.2	97	60				SP	**LAKEWOOD FORMATION [Qlw]** POORLY GRADED SAND - dense, wet, light brown, fine to medium-grained, trace gravel (up to 3/4 inch in size)
Tunnel	75								NV		
	80	95	6.3	16.0	-						

(CONTINUED ON FOLLOWING FIGURE)

Field Tech: AR
Prepared/Date: JF 5/11/2011
Checked/Date: LT/RM 9/20/2011

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LOG OF BORING

Project No.: 4953-10-1561 Figure: A-2.55b

DRILLING COMPANY/DRILLING EQUIPMENT		BORING NO.
C & L Drilling / Mayhew 1000		G-166A/B (Continued)
DRILLING METHOD	**BOREHOLE LOCATION**	
Rotary Wash	Sta 700+30, Rt 25 and 60 feet	
DATES DRILLED	**HOLE DIAMETER**	**GROUND EL.**
3/5/2011, 3/19/2011, 4/18/2011 - 4/20/2011	4-7/8 inches	290 feet

GROUND-WATER READINGS
Ground-water level measured at 43 feet and 64½ feet below the ground surface in shallow and deep monitoring wells, respectively on 4/22/2011. 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			
								☒				Becomes very dense, some coarse sand, trace silt, trace gravel
Tunnel	85			23.0	89	75/6"	16	☒			SM	**SAN PEDRO FORMATION [Qsp]** SILTY SAND - very dense, moist, gray, very fine-grained
	90	50/6"	5.4	21.7	-			☒			SP-SM	POORLY GRADED SAND with SILT - very dense, moist, light gray, fine-grained
											ML	SANDY SILT - hard, moist, light greenish gray
195	95		4.9	13.3	92	75/6"		☒			SP	POORLY GRADED SAND - very dense, moist, light gray, fine to medium-grained
190	100	99/10"	9.5	20.6	-		49	☒			SM	SILTY SAND - very dense, moist, greenish gray, fine to medium-grained Becomes fine-grained
185	105		6.7	20.8	103	80/10"	49	☒				Becomes light brown
180	110	50/6"	4.5	17.8	-			☒			SP	POORLY GRADED SAND - very dense, moist, gray, fine to medium-grained
175	115		4.5	12.8	123	47	45	☒			SC	CLAYEY SAND - dense, moist, dark grayish green, fine to medium-grained
	120										SP	POORLY GRADED SAND - very dense, moist, greenish gray, fine to coarse-grained, with gravel

(CONTINUED ON FOLLOWING FIGURE)

Field Tech: AR
Prepared/Date: JF 5/11/2011
Checked/Date: LT/RM 9/20/2011

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LOG OF BORING

Project No.: 4953-10-1561 Figure: A-2.55c

DRILLING COMPANY/DRILLING EQUIPMENT		BORING NO.
C & L Drilling / Mayhew 1000		G-166A/B (Continued)
DRILLING METHOD	**BOREHOLE LOCATION**	
Rotary Wash	Sta 700+30, Rt 25 and 60 feet	
DATES DRILLED	**HOLE DIAMETER**	**GROUND EL.**
3/5/2011, 3/19/2011, 4/18/2011 - 4/20/2011	4-7/8 inches	290 feet

GROUND-WATER READINGS
Ground-water level measured at 43 feet and 64½ feet below the ground surface in shallow and deep monitoring wells, respectively on 4/22/2011. 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		
		50/5"	4.7	12.2	-						Becomes blueish gray, fine-grained
165	125		4.1	-	-	100/3"				SW	WELL GRADED SAND - very dense, wet, gray, fine to coarse-grained, with gravel 6-inch to 8-inch thick cobble layer (Sample not recovered)
160	130	50/4"	1.9	18.9	-					SP	POORLY GRADED SAND - very dense, wet, light gray, fine-grained
155	135		3.9	15.7	96	75/6"					Becomes gray, moist Trace gravel
150	140	50/5"	3.6	20.9	-		34			SM	SILTY SAND - very dense, moist, gray, fine-grained, trace gravel (up to 3/8 inch in size)
145	145		3.0	20.5	88	75/6"				SP	POORLY GRADED SAND - very dense, moist, gray, fine-grained
140	150	50/4"	4.1	17.9	-						
135	155										END OF BORING AT 151 FEET
	160										

NOTES:
Hand augered upper 5 feet to avoid damage to utilities. Boring G-166A was terminated at 74 feet and backfilled. Boring G-166B was sampled between 74 feet and 151 feet. Montoring well was installed on 4/20/2011. See well construction diagram for G-166.

"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 Tests: PMT = Pressuremeter, NV = Noise/Vibration

Field Tech: AR
Prepared/Date: JF 5/11/2011
Checked/Date: LT/RM 9/20/2011

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LOG OF BORING

Project No.: 4953-10-1561 Figure: A-2.55d

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_(161-181).GPJ 10/18/11

DRILLING COMPANY/DRILLING EQUIPMENT		BORING NO.
C & L Drilling / Mayhew 1000		G-168
DRILLING METHOD	**BOREHOLE LOCATION**	
Rotary Wash	Sta 707+00, Lt 30 feet	
DATES DRILLED	**HOLE DIAMETER**	**GROUND EL.**
1/12/2011 - 1/14/2011	4-7/8 inches	284 feet

GROUND-WATER READINGS
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.

Century City / Constellation 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 10-inch thick Base Course
											FILL [Af]
										CL-ML	SILTY CLAY - moist, light brown, trace fine sand
											Becomes more sandy, trace gravel
											Becomes clayey, trace slate gravel (up to 1/4 inch in size)
	5		1.3	15.3	118	30				SC	CLAYEY SAND - moist, brown, trace gravel
		26	0.7	13.7	-						**QUATERNARY OLDER ALLUVIUM [Qalo]**
										SM	SILTY SAND - medium dense, moist, brown and gray, fine to medium-grained, some coarse sand, some gravel
	10		1.2	12.2	113	13					Becomes brown, trace clay and slate gravel
		15	0.8	22.1	-					CL	LEAN CLAY with SAND - stiff, moist, olive brown, fine sand, trace gravel
	15		0.9	26.7	95	19					Becomes stiff to very stiff, trace sand, trace iron oxide stains
	20	16	0.7	31.5	-						Becomes olive gray to gray
			1.3	23.7	-	34					
	25	30	0.6	26.6	-						
	30		1.5	17.3	107	37					Becomes olive brown to gray, trace fine sand, trace iron oxide stains
		28	0.6	29.7	-						
	35		1.2	18.7	113	36					Becomes with sand, olive brown, fine sand
		24	0.8	17.2	-		87				Trace sand
	40										

(CONTINUED ON FOLLOWING FIGURE)

Field Tech: AR
Prepared/Date: JF 3/17/2011
Checked/Date: LT/RM 9/20/2011

MTA Westside Subway Extension
Los Angeles, California

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LOG OF BORING

Project No.: 4953-10-1561 Figure: A-2.56a

DRILLING COMPANY/DRILLING EQUIPMENT		BORING NO.
C & L Drilling / Mayhew 1000		**G-168 (Continued)**
DRILLING METHOD Rotary Wash	**BOREHOLE LOCATION** Sta 707+00, Lt 30 feet	
DATES DRILLED 1/12/2011 - 1/14/2011	**HOLE DIAMETER** 4-7/8 inches	**GROUND EL.** 284 feet

GROUND-WATER READINGS
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.

Century City / Constellation 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		
			1.4	32.1	87	50		⊠		CL	LEAN CLAY - hard, moist, olive gray to greenish gray, cemented silt pods and calcium carbonate nodules
	45										**LAKEWOOD FORMATION [Qlw]**
		68	0.5	25.8	-			⊠		SM	SILTY SAND - very dense, moist, blueish gray to light gray, fine to medium-grained
										ML	SILT - hard, moist, bluish gray, some clay
										SM	SILTY SAND - very dense, moist, blueish gray to greenish gray, fine-grained
	50		1.1	18.4	105	75/9"		⊠		SP	POORLY GRADED SAND - very dense, moist, light gray, fine to medium-grained 6-inch thick cobble at 50½ feet
		97/9"	0.4	17.9	-			⊠			Becomes greenish gray
	55									SM	SILTY SAND - very dense, moist, blueish gray, fine to medium-grained, some coarse sand 6 to 8-inch thick cobble at 55½ feet
			1.4	12.7	112	100/5"	15	⊠			Some gravel (up to 1/2 inch in size)
	60										**SAN PEDRO FORMATION [Qsp]**
		93/9"	0.5	10.2	-			⊠		SP	POORLY GRADED SAND - very dense, moist, blueish gray to greenish gray, fine to medium-grained
											Thin layer of Silty Sand
	65										
			1.3	22.0	100	50/5"	21	⊠		SM	SILTY SAND - very dense, moist, greenish to blueish gray, fine to medium-grained
	70										
		50/5"	1.0	18.0	-			⊠		SP	POORLY GRADED SAND - very dense, moist, dark gray, fine to medium-grained
	75										
			1.2	14.4	100	50/3"		⊠			
	80										

(CONTINUED ON FOLLOWING FIGURE)

Field Tech: AR
Prepared/Date: JF 3/17/2011
Checked/Date: LT/RM 9/20/2011

MTA Westside Subway Extension
Los Angeles, California

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LOG OF BORING

Project No.: 4953-10-1561 Figure: A-2.56b

DRILLING COMPANY/DRILLING EQUIPMENT		BORING NO.
C & L Drilling / Mayhew 1000		**G-168 (Continued)**
DRILLING METHOD Rotary Wash	**BOREHOLE LOCATION** Sta 707+00, Lt 30 feet	
DATES DRILLED 1/12/2011 - 1/14/2011	**HOLE DIAMETER** 4-7/8 inches	**GROUND EL.** 284 feet

GROUND-WATER READINGS
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		
		50/3"	1.0	13.1	-		22	☒		SM	SILTY SAND - very dense, moist, dark gray, fine to medium-grained
195	85			-	-	100/ 4½"		○			(Sample not recovered)
190	90		1.2	27.2	92	70/5"		⊠		SP	POORLY GRADED SAND - very dense, moist, dark gray, fine to medium-grained
185	95	43	1.0	10.3	-		81	☒		CH	FAT CLAY with SAND - hard, moist, dark gray, fine to medium sand
180	100									SP	POORLY GRADED SAND - moist, gray, fine to medium-grained, some coarse sand, trace gravel
	105		1.2	9.9	119	75/5"		⊠		SM	SILTY SAND with GRAVEL - very dense, slightly moist to moist, dark gray, fine to coarse-grained
175	110										
		50/4"	1.2	13.8	-		19	☒			Gravel (up to 3/4 inch in size)
170	115										END OF BORING AT 112 FEET
165	120										

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 3/17/2011
Checked/Date: LT/RM 9/20/2011

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.

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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_(161-181).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-2.56c

DRILLING COMPANY/DRILLING EQUIPMENT		BORING NO.
C & L Drilling / Mayhew 1000		G-169
DRILLING METHOD	**BOREHOLE LOCATION**	
Rotary Wash	Sta 714+20, Lt 10 feet	
DATES DRILLED	**HOLE DIAMETER**	**GROUND EL.**
1/10/2011 - 1/12/2011	4-7/8 inches	292 feet

GROUND-WATER READINGS
Drilling mud bailed on 1/12/2011. Ground-water level measured at 48 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.

Century City / Constellation 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 6-inch thick Base Course
											FILL [Af]
										CL-ML	SILTY CLAY - moist, brown with some gray, trace slate gravel
	5		0.2	25.7	93	15				CL	LEAN CLAY with SAND - moist, olive brown, fine sand, trace gravel
		14	0.2	14.2	-					SM	SILTY SAND - moist, light brown, fine to medium-grained
	10		0.7	17.5	109	10				CL	SANDY LEAN CLAY - moist, brown to dark gray, fine sand
		4/6"	0.3	21.1	-					CL	LEAN CLAY with SAND - soft, moist, light brown, fine to coarse sand
	15		0.4	25.9	101	11					Becomes stiff, thin layer of Silt, trace clay and sand
	20	15	0.5	21.2	-						Becomes olive brown, trace very fine sand
			0.1	27.3	97	17					
	25	25	0.1	27.2	-						Becomes very stiff, trace organics
	30		0.6	13.0	120	41					**LAKEWOOD FORMATION [Qlw]**
										SC	CLAYEY SAND - dense, moist, olive brown, fine to medium-grained, trace gravel
		43	0.4	15.7	-		43			SM	SILTY SAND - dense, moist, light brown, fine-grained, with some clay
	35		0.3	14.7	109	72/11"					Alternating with layers of Poorly Graded Sand, light gray
		90	0.4	14.9	-		12			SP-SM	POORLY GRADED SAND with SILT - very dense, moist, brown, fine to medium-grained
	40										

(CONTINUED ON FOLLOWING FIGURE)

Field Tech: AR
Prepared/Date: JF 3/30/2011
Checked/Date: LT/PE 9/20/2011

MTA Westside Subway Extension
Los Angeles, California

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LOG OF BORING

Project No.: 4953-10-1561 Figure: A-2.57a

DRILLING COMPANY/DRILLING EQUIPMENT		BORING NO.
C & L Drilling / Mayhew 1000		**G-169 (Continued)**
DRILLING METHOD	**BOREHOLE LOCATION**	
Rotary Wash	Sta 714+20, Lt 10 feet	
DATES DRILLED	**HOLE DIAMETER**	**GROUND EL.**
1/10/2011 - 1/12/2011	4-7/8 inches	292 feet

GROUND-WATER READINGS
Drilling mud bailed on 1/12/2011. Ground-water level measured at 48 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.

Century City / Constellation 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		
			0.1	19.0	101	94/8"		⊠			Becomes light brown, trace iron oxide stains
	45	96/11"	0.6	18.4	-			⊠			Gray to olive brown
			0	12.8	106	50/5"		⊠	PMT		▽ Becomes brown
	50										Some gravel
		84	0.2	24.2	-			⊠		SM	SILTY SAND - very dense, moist, brown, fine-grained
	55		0.3	17.7	107	93/10"	26	⊠		SP-SM	POORLY GRADED SAND with SILT - very dense, moist, light brown to yellowish brown, fine to medium-grained, iron oxide stains
	60									SM	SILTY SAND - very dense, moist, olive brown, fine to medium-grained, iron oxide stains
		63	0.1	21.8	-			⊠			
	65										**SAN PEDRO FORMATION [Qsp]**
			0	18.3	94	93/10"	33	⊠		SM	SILTY SAND - very dense, moist, light bluish gray, fine to medium-grained
	70										
		50/6"	0.1	22.9	-			⊠		SP-SM	POORLY GRADED SAND with SILT - very dense, moist, bluish gray, fine to medium-grained, shell fragments, some slate gravel
	75										
			0.1	30.5	86	66	15	⊠		SM	SILTY SAND - very dense, moist, bluish gray to gray, fine to medium-grained
	80										

(CONTINUED ON FOLLOWING FIGURE)

Field Tech: AR
Prepared/Date: JF 3/30/2011
Checked/Date: LT/PE 9/20/2011

MTA Westside Subway Extension
Los Angeles, California

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LOG OF BORING

Project No.: 4953-10-1561 Figure: A-2.57b

DRILLING COMPANY/DRILLING EQUIPMENT		BORING NO.
C & L Drilling / Mayhew 1000		**G-169 (Continued)**
DRILLING METHOD	**BOREHOLE LOCATION**	
Rotary Wash	Sta 714+20, Lt 10 feet	
DATES DRILLED	**HOLE DIAMETER**	**GROUND EL.**
1/10/2011 - 1/12/2011	4-7/8 inches	292 feet

GROUND-WATER READINGS
Drilling mud bailed on 1/12/2011. Ground-water level measured at 48 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		
Century City / Constellation Station	85	93	0.1	14.6	-			☒			Some coarse sand, trace gravel
	90			19.0	103	90/11"	11	⊠		SW-SM	WELL GRADED SAND with SILT and GRAVEL - very dense, wet, bluish gray to gray, fine to medium-grained, gravel (up to 1 inch in size)
		50/4"		29.4	-			☒		SP	POORLY GRADED SAND - very dense, wet, dark gray, fine-grained
195	95			17.3	112	51	55	⊠		CL	SANDY LEAN CLAY - hard, moist, dark gray, fine sand, trace gravel (up to 3/8 inch in size), some shell fragments
190	100	44	1.5	13.4	-			☒		ML	SILT - hard, moist, dark bluish gray, trace sand
185	105		0	14.6	116	87/8"		⊠			Becomes gray
	110										Trace gravel
180		50/4"	0	23.8	-			☒		SP	POORLY GRADED SAND - very dense, wet, dark gray, fine to medium-grained
175	115			-	-	91/9"		⊙			(Sample not recovered)
	120									SM	SILTY SAND - very dense, wet, dark gray, fine to medium-grained

(CONTINUED ON FOLLOWING FIGURE)

Field Tech: AR
Prepared/Date: JF 3/30/2011
Checked/Date: LT/PE 9/20/2011

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LOG OF BORING

Project No.: 4953-10-1561 Figure: A-2.57c

DRILLING COMPANY/DRILLING EQUIPMENT		BORING NO.
C & L Drilling / Mayhew 1000		**G-169 (Continued)**
DRILLING METHOD	**BOREHOLE LOCATION**	
Rotary Wash	Sta 714+20, Lt 10 feet	
DATES DRILLED	**HOLE DIAMETER**	**GROUND EL.**
1/10/2011 - 1/12/2011	4-7/8 inches	292 feet

GROUND-WATER READINGS
Drilling mud bailed on 1/12/2011. Ground-water level measured at 48 feet below the ground surface 30 minutes after bailing of drilling mud.

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
170	125	50/6"		27.1	-			☒	
165	130								
160	135								
155	140								
150	145								
145	150								
140	155								
135	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 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: JF 3/30/2011
Checked/Date: LT/PE 9/20/2011

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LOG OF BORING
Project No.: 4953-10-1561 Figure: A-2.57d

DRILLING COMPANY/DRILLING EQUIPMENT		BORING NO.
C & L Drilling / Mayhew 1000		G-171
DRILLING METHOD	**BOREHOLE LOCATION**	
Rotary Wash	Sta 726+70, Lt 25 feet	
DATES DRILLED	**HOLE DIAMETER**	**GROUND EL.**
2/28/2011, 3/1/2011 and 3/2/2011	4-7/8 inches	271 feet

GROUND-WATER READINGS
Drilling mud bailed on 3/1/2011. Ground-water level measured at 68 feet below the ground surface on 3/2/2011.

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		
270											7-inch thick Asphalt Concrete over 4-inch thick Base Course
										ML	**LAKEWOOD FORMATION [Qlw]** SILT - stiff, moist, olive, some fine sand, some clay
	5										
265			3.3	-	-	17					Becomes light brown
										SM	SILTY SAND - medium dense, moist, olive yellow, very fine to fine-grained
	10										
260		25	10.2	-	-						
	15										
255			1.6	-	-	39					Becomes dense, light olive to light olive yellow, thin layer of Poorly Graded Sand with Silt
										SP-SM	POORLY GRADED SAND with SILT - very dense, moist, brown, fine to medium-grained, some shell fragments
	20										
250		64	8.6	24.5	-						
	25										
245			4.1	16.4	-	52					(Sample not recovered) Becomes olive yellow
	30										
240		71	8.5	21.9	-						Becomes olive, some oxidized seems, trace fine subrounded gravel (up to 1/4 inch in size)
										SP	POORLY GRADED SAND with GRAVEL - very dense, moist, light brown, fine to medium grained, some coarse, gravel (up to 1/2 inch in size)
	35										
235			2.3	5.9	106	69					
	40									ML	

(CONTINUED ON FOLLOWING FIGURE)

Field Tech: AR
Prepared/Date: JF 5/31/2011
Checked/Date: LT/PE 9/20/2011

MTA Westside Subway Extension
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LOG OF BORING

Project No.: 4953-10-1561 Figure: A-2.58a

DRILLING COMPANY/DRILLING EQUIPMENT		BORING NO.
C & L Drilling / Mayhew 1000		**G-171 (Continued)**
DRILLING METHOD Rotary Wash	**BOREHOLE LOCATION** Sta 726+70, Lt 25 feet	
DATES DRILLED 2/28/2011, 3/1/2011 and 3/2/2011	**HOLE DIAMETER** 4-7/8 inches	**GROUND EL.** 271 feet

GROUND-WATER READINGS
Drilling mud bailed on 3/1/2011. Ground-water level measured at 68 feet below the ground surface on 3/2/2011.

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		
230		79		-	-			○			SANDY SILT - hard, moist, light brown, fine sand, trace gravel (Sample not recovered)
			6.2	22.3	91	80/10"		⊠			Becomes olive to light olive brown, trace iron oxide stains
	45										
225		98	7.2	21.3	-			⊠		SM	SILTY SAND - very dense, moist to wet, light olive to olive, very fine to fine-grained, trace medium
			6.2	14.5	101	81		⊠			Becomes light olive brown, trace iron oxide stains
	50										
220		63	2.9	12.0	-			⊠			Thin layer of Silt, some clay
			5.3	18.6	96	84/10"	47	⊠			Becomes light brown to olive yellow with light gray iron oxide stains, scattered small grayish clay pockets
	55										
215		54	4.1	22.5	-			⊠			Increased silt content
			7.6	17.9	103	75/7"		⊠			Trace medium sand, with iron oxide stains
	60										
210		70	2.9	23.5	-		55	⊠		ML	SANDY SILT - hard, moist, olive, very fine to fine sand, trace shell fragments, trace gravel (up to 3/8 inch in size)
			6.7	25.8	95	66	84	⊠		ML	SILT with SAND - hard, moist, bluish gray, fine sand, with iron oxide stains
	65										**SAN PEDRO FORMATION [Qsp]**
		50/5"	2.3	18.7	-			⊠		SM	SILTY SAND with GRAVEL - very dense, moist, light gray, fine-grained, some medium
			6.1	25.6	90	86/6"		⊠			Some gravel (up to 3/4 inch in size) ▼ Becomes wet, olive to light olive gray, increase in silt content
	70										
		53/6"	3.2	14.4	-		13	⊠			Some gravel (up to 3/4 inch in size)
			4.3	28.7	96	75/7"		⊠		SP-SM	POORLY GRADED SAND with SILT - very dense, wet, olive, fine to medium-grained, trace gravel
	75										
		50/5"	9.2	19.0	-		12	⊠			Trace fine subrounded gravel (up to 3/8 inch in size)
			3.1	22.1	100	50/6"		⊠			Becomes olive to light olive gray
	80										

Tunnel

(CONTINUED ON FOLLOWING FIGURE)

Field Tech: AR
Prepared/Date: JF 5/31/2011
Checked/Date: LT/PE 9/20/2011

MTA Westside Subway Extension
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LOG OF BORING

Project No.: 4953-10-1561 Figure: A-2.58b

DRILLING COMPANY/DRILLING EQUIPMENT		BORING NO.
C & L Drilling / Mayhew 1000		**G-171 (Continued)**
DRILLING METHOD Rotary Wash	**BOREHOLE LOCATION** Sta 726+70, Lt 25 feet	
DATES DRILLED 2/28/2011, 3/1/2011 and 3/2/2011	**HOLE DIAMETER** 4-7/8 inches	**GROUND EL.** 271 feet

GROUND-WATER READINGS
Drilling mud bailed on 3/1/2011. Ground-water level measured at 68 feet below the ground surface on 3/2/2011.

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		72/9"	2.8	25.2	-		81	☒		ML	SILT with SAND - hard, moist, dark gray, very fine sand, trace shell fragments
			8.4	12.9	106	110/3"		⊠		SP-SM	POORLY GRADED SAND with SILT - very dense, moist, dark gray, fine to medium-grained, trace gravel
	85										
185		90/6"	4.8	11.5	-			☒			Some coarse, trace fine rounded gravel (up to 1/2 inch in size)
			5.2	-	-	100/4"	6	⊠			Increased silt content
	90										
180		50/5"	2.6	17.5	-			☒			Cobble (up to 8 inches in size)
			2.3	12.4	107	75/6"		⊠			
	95										
175		50/6"	2.9	15.5	-			☒			
			4.1	16.2	107	66/10"		⊠		CL-ML	SILTY CLAY - hard, moist, dark gray, trace fine sand
										SM	SILTY SAND - very dense, dark gray, fine to medium-grained, some clay
	100										
170		50/6"	2.6	17.3	-			☒			Trace gravel (up to 1/2 inch in size)
			4.4	17.9	109	75		⊠		CL-ML	SILTY CLAY - hard, very moist, dark gray, trace fine sand, trace shell fragments, trace iron oxide stains
	105										
165		90/11"	3.2	21.9	-			☒		SM	SILTY SAND - very dense, moist, olive gray, fine to medium-grained, with clayey silt interbeds
											Some gravel
	110		2.0	11.8	121	75/6"		⊠			Becomes fine-grained, some medium to coarse
160											More gravel
	115	50/3"	3.7	6.2	-			☒		SP-SM	POORLY GRADED SAND with SILT - very dense, moist, dark gray, fine-grained, some medium to coarse, trace fine gravel (up to 1/4 inch in size), thin layer of Silty Sand
155											Gravel layer with shell fragments
	120										

(CONTINUED ON FOLLOWING FIGURE)

Field Tech: AR
Prepared/Date: JF 5/31/2011
Checked/Date: LT/PE 9/20/2011

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LOG OF BORING

Project No.: 4953-10-1561 Figure: A-2.58c

DRILLING COMPANY/DRILLING EQUIPMENT		BORING NO.
C & L Drilling / Mayhew 1000		**G-171 (Continued)**
DRILLING METHOD Rotary Wash	**BOREHOLE LOCATION** Sta 726+70, Lt 25 feet	
DATES DRILLED 2/28/2011, 3/1/2011 and 3/2/2011	**HOLE DIAMETER** 4-7/8 inches	**GROUND EL.** 271 feet

GROUND-WATER READINGS
Drilling mud bailed on 3/1/2011. Ground-water level measured at 68 feet below the ground surface on 3/2/2011.

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
150	125		2.3	7.0	-	100/5"		⊠	
145									
	130								
140									
	135								
135									
	140								
130									
	145								
125									
	150								
120									
	155								
115									
	160								

Becomes olive gray, fine to medium-grained, trace coarse, some fine gravel (up to 1/2 inch in size)

END OF BORING AT 120½ 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 5/31/2011
Checked/Date: LT/PE 9/20/2011

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LOG OF BORING
Project No.: 4953-10-1561 Figure: A-2.58d

DRILLING COMPANY/DRILLING EQUIPMENT		BORING NO.
C & L Drilling / Mayhew 1000		G-173
DRILLING METHOD	**BOREHOLE LOCATION**	
Rotary Wash	Sta 731+20, Lt 5 feet	
DATES DRILLED	**HOLE DIAMETER**	**GROUND EL.**
2/21/2011 - 2/23/2011	4-7/8 inches	280 feet

GROUND-WATER READINGS
Drilling mud bailed on 2/22/2011. Ground-water level measured at 57 feet below the ground surface on 2/23/2011.

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			
												4-inch thick Asphalt Concrete over 8-inch thick Base Course
										SM		**FILL [Af]** - SILTY SAND - moist, brown
										CL		**QUATERNARY OLDER ALLUVIUM [Qalo]**
275	5			16.5	110	Push						SANDY LEAN CLAY - very soft, moist, brown, with slate gravel fragments
												Plant roots present
270	10			20.7	103	9				SC		CLAYEY SAND - loose, moist, brown, fine-grained, trace gravel (up to 1/2 inch in size)
265	15	18	0.1	18.7	-					CL		SANDY LEAN CLAY - very stiff, moist, brown, trace gravel
260	20		0.0	12.0	114	14	46			SC		CLAYEY SAND - dense, moist, brown, fine-grained, trace gravel (up to 1/4 inch in size)
255	25	18		22.0	-					CL		LEAN CLAY - very stiff, moist, brown
												LAKEWOOD FORMATION [Qlw]
250	30		0.0	23.9	101	21				SM		SILTY SAND - medium dense, moist, olive brown, fine-grained, trace clay
												Trace iron oxide stains
										CL		LEAN CLAY - very stiff, moist, gray, with iron oxide stains
245	35	50		17.0	-		41			SM		SILTY SAND - dense to very dense, moist, olive gray, fine-grained
	40											

(CONTINUED ON FOLLOWING FIGURE)

Field Tech: DW
Prepared/Date: JF 3/29/2011
Checked/Date: LT/PE 9/20/2011

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LOG OF BORING

Project No.: 4953-10-1561 Figure: A-2.59a

DRILLING COMPANY/DRILLING EQUIPMENT		BORING NO.
C & L Drilling / Mayhew 1000		**G-173 (Continued)**
DRILLING METHOD	**BOREHOLE LOCATION**	
Rotary Wash	Sta 731+20, Lt 5 feet	
DATES DRILLED	**HOLE DIAMETER**	**GROUND EL.**
2/21/2011 - 2/23/2011	4-7/8 inches	280 feet

GROUND-WATER READINGS
Drilling mud bailed on 2/22/2011. Ground-water level measured at 57 feet below the ground surface on 2/23/2011.

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		
				-	-	26		○			Becomes medium dense, (sample not recovered)
				3.7	97	53		⊠		SP	POORLY GRADED SAND - dense to very dense, slightly moist, brown, fine-grained
235	45	89/11"		9.0	-			☒			Becomes dark brown, trace iron oxide stains
										SM	SILTY SAND with GRAVEL - very dense, moist, yellowish brown, fine to medium-grained, with slate gravel (up to 3/4 inch in size)
230	50			12.3	110	81	13	⊠			
225	55			15.1	-	83/11"		⊠		SP	POORLY GRADED SAND - very dense, moist, olive brown and gray, fine-grained
220	60		0.0	13.8	102	65	27	⊠	NV	SM	SILTY SAND - very dense, moist, light olive gray, fine-grained, with iron oxide stains
215	65										
210	70			23.5	97	59		⊠	NV		Becomes brown
205	75	73/10"	0.0	24.0	-		54	☒	PMT	ML	**SAN PEDRO FORMATION [Qsp]** SANDY SILT - hard, moist, olive brown to olive gray, with shell fragments
	80										

(CONTINUED ON FOLLOWING FIGURE)

Field Tech: DW
Prepared/Date: JF 3/29/2011
Checked/Date: LT/PE 9/20/2011

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LOG OF BORING

Project No.: 4953-10-1561 Figure: A-2.59b

DRILLING COMPANY/DRILLING EQUIPMENT		BORING NO.
C & L Drilling / Mayhew 1000		**G-173 (Continued)**
DRILLING METHOD	**BOREHOLE LOCATION**	
Rotary Wash	Sta 731+20, Lt 5 feet	
DATES DRILLED	**HOLE DIAMETER**	**GROUND EL.**
2/21/2011 - 2/23/2011	4-7/8 inches	280 feet

GROUND-WATER READINGS
Drilling mud bailed on 2/22/2011. Ground-water level measured at 57 feet below the ground surface on 2/23/2011.

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		
				24.2	99	54	85	⊠	NV		With iron oxide stains
	85									SM	SILTY SAND - very dense, moist, olive brown, fine-grained, with iron oxide stains
		84		22.6	-			☒		SP-SM	POORLY GRADED SAND with SILT - very dense, moist, brown, fine to medium-grained, with dark manganese nodules
	90								PMT		
		66		20.0	-		9	☒			Becomes wet, fine-grained, trace gravel (up to 3/4 inch in size)
Tunnel	95										
										MH	ELASTIC SILT with SAND - hard, moist, dark gray to black, with shell fragments
	100		0.0	30.7	88	66	78	⊠			
	105		0.0	19.8	-	50/3"		⊠		SP	POORLY GRADED SAND - very dense, moist, gray, fine-grained, trace slate gravel fragments
170	110		0.1	19.5	105	37		⊠		ML	SANDY SILT - hard, moist, dark gray, some fossils, interbedded, trace sulfor odor, weak
165	115	42	0.0	29.6	-			☒			Thin layer of Lean Clay, gray
	120										END OF BORING AT 116½ FEET

NOTES:

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

Field Tech: DW
Prepared/Date: JF 3/29/2011
Checked/Date: LT/PE 9/20/2011

(CONTINUED ON FOLLOWING FIGURE)

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LOG OF BORING
Project No.: 4953-10-1561 Figure: A-2.59c

DRILLING COMPANY/DRILLING EQUIPMENT		BORING NO.
C & L Drilling / Mayhew 1000		**G-173 (Continued)**
DRILLING METHOD	**BOREHOLE LOCATION**	
Rotary Wash	Sta 731+20, Lt 5 feet	
DATES DRILLED	**HOLE DIAMETER**	**GROUND EL.**
2/21/2011 - 2/23/2011	4-7/8 inches	280 feet

GROUND-WATER READINGS
Drilling mud bailed on 2/22/2011. Ground-water level measured at 57 feet below the ground surface on 2/23/2011.

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
155	125								
150	130								
145	135								
140	140								
135	145								
130	150								
125	155								
	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 340 pound hammer falling 18 inches.

**Photo Ionization Detector used for OVA readings.

Downhole Tests: PMT = Pressuremeter, NV = Noise/Vibration

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 9/20/2011

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LOG OF BORING
Project No.: 4953-10-1561 Figure: A-2.59d

DRILLING COMPANY/DRILLING EQUIPMENT		BORING NO.
C & L Drilling / Mayhew 1000		G-174A
DRILLING METHOD	**BOREHOLE LOCATION**	
Rotary Wash	Sta 735+85, Rt 180 feet	
DATES DRILLED	**HOLE DIAMETER**	**GROUND EL.**
3/8/2011 - 3/10/2011	4-7/8 inches	270 feet

GROUND-WATER READINGS
Groundwater overflowing to surface on 3/29/2011. Montoring well was installed on 3/10/2011. See well construction diagram for G-174A.

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		
											36-inch thick Asphalt Concrete
											FILL [Af]
										SP-SM	POORLY GRADED SAND with SILT - moist, brown, fine to coarse-grained
										ML	SANDY SILT with GRAVEL - moist, dark brown, slate gravel
265	5		0.2	15.5	114	Push				CL	**QUATERNARY OLDER ALLUVIUM [Qalo]** SANDY LEAN CLAY with GRAVEL - very soft, moist, dark brown, some iron oxide stains, subangular to subrounded fine gravel
260	10	18	0.1	30.4	-		90				Alternating with layers of Lean Clay, very stiff, brown, trace fine sand
										SM	SILTY SAND - medium dense, moist, brown, fine-grained
255	15		0.1	14.5	101	30					Becomes orangish brown
										SP-SM	POORLY GRADED SAND with SILT - dense, moist, brown, fine-grained
250	20	28	0.2	14.4	-						Fine to medium-grained, trace coarse, fine gravel, alternating with layers of Sandy Silt and Silty Sand
245	25		0.0	23.1	93	15				CL	SANDY LEAN CLAY - stiff, moist, dark brown, trace fine gravel
240	30	23	0.0	22.7	-		41			SC	CLAYEY SAND - medium dense, moist, brown, fine-grained, some silt
											Thin layer of Lean Clay, brown to gray
235	35		0.0	13.7	119	26					Some slate fine gravel
	40										

(CONTINUED ON FOLLOWING FIGURE)

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

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LOG OF BORING

Project No.: 4953-10-1561 Figure: A-2.60a

DRILLING COMPANY/DRILLING EQUIPMENT		BORING NO.
C & L Drilling / Mayhew 1000		**G-174A (Continued)**
DRILLING METHOD	**BOREHOLE LOCATION**	
Rotary Wash	Sta 735+85, Rt 180 feet	
DATES DRILLED	**HOLE DIAMETER**	**GROUND EL.**
3/8/2011 - 3/10/2011	4-7/8 inches	270 feet

GROUND-WATER READINGS
Groundwater overflowing to surface on 3/29/2011. Montoring well was installed on 3/10/2011. See well construction diagram for G-174A.

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			
		32	0.2	14.5	-			☒		SP	POORLY GRADED SAND - dense, moist, brown, fine to medium-grained, trace coarse, trace fine gravel	
225	45		0.1	19.6	106	27		⊠		SC	CLAYEY SAND - dense, moist, brown, fine to medium-grained, trace gravel	
220	50	16	0.1	19.6	-			☒			Becomes gray, fine-grained, trace fine gravel	
215	55		0.0	20.0	101	27		⊠		CL	LEAN CLAY - very stiff, moist, brown	
210	60	29	0.0	20.3	-			☒				
205	65		0.1	15.5	114	39		⊠			Alternating with layers of Lean Clay with Sand, hard, reddish brown with gray mottling, trace fine slate gravel	
200	70	33	0.0	24.7	-			☒				
195	75		0.0	22.8	107	19		⊠			Becomes stiff, brown, trace fine sand, some calcium carbonate nodules	
	80											

(CONTINUED ON FOLLOWING FIGURE)

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

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LOG OF BORING

Project No.: 4953-10-1561 Figure: A-2.60b

DRILLING COMPANY/DRILLING EQUIPMENT		BORING NO.
C & L Drilling / Mayhew 1000		**G-174A (Continued)**
DRILLING METHOD	**BOREHOLE LOCATION**	
Rotary Wash	Sta 735+85, Rt 180 feet	
DATES DRILLED	**HOLE DIAMETER**	**GROUND EL.**
3/8/2011 - 3/10/2011	4-7/8 inches	270 feet

GROUND-WATER READINGS
Groundwater overflowing to surface on 3/29/2011. Montoring well was installed on 3/10/2011. See well construction diagram for G-174A.

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	75/11"	0.0	26.9	-		71	☒			Becomes hard, grayish brown, with thin layers of Poorly Graded Sand, trace gravel (up to 3/8 inch in size)
	90		0.0	25.8	98	18		⊠			Becomes stiff, gray, some calcium carbonate nodules
	95	45	0.0	20.7	-		65	☒			Alternating with layers of Sandy Lean Clay, hard, brown with gray mottling, fine sand
170	100		0.0	15.3	114	85/8"		⊠			Becomes grayish brown, trace fine sand, trace gravel
	105	36	0.0	22.0	-			☒			Becomes light brown to gray, fine sand
165	110		0.1	13.6	112	48	37	⊠		SC	CLAYEY SAND - dense, moist, gray, fine to medium-grained, trace gravel (up to 3/4 inch in size)
160	115	51	0.0	16.6	-			☒		CL	LEAN CLAY - hard, moist, gray, some iron oxide stains
											Becomes brown to gary, fine to medium sand
155	120		0.0	23.3	-	27		○		SM	SILTY SAND - medium dense, moist, dark brown, fine-grained

(CONTINUED ON FOLLOWING FIGURE)

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

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LOG OF BORING

Project No.: 4953-10-1561 Figure: A-2.60c

DRILLING COMPANY/DRILLING EQUIPMENT		BORING NO.
C & L Drilling / Mayhew 1000		**G-174A (Continued)**
DRILLING METHOD	**BOREHOLE LOCATION**	
Rotary Wash	Sta 735+85, Rt 180 feet	
DATES DRILLED	**HOLE DIAMETER**	**GROUND EL.**
3/8/2011 - 3/10/2011	4-7/8 inches	270 feet

GROUND-WATER READINGS
Groundwater overflowing to surface on 3/29/2011. Montoring well was installed on 3/10/2011. See well construction diagram for G-174A.

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	16.2	113	29		⊠		Thin layer of Lean Clay, very stiff, light brown to gray, with iron oxide stains
145	125									
140	130									
135	135									
130	140									
125	145									
120	150									
115	155									
	160									

END OF BORING AT 121 FEET

NOTES:

Hand augered upper 4 feet to avoid damage to utilities. Boring G-174 was terminated due to loss of SPT sampler in the hole. Boring G-174A was started in close proximity to G-174 and sampled from 74 feet to 121 feet. Boring was converted into a monitoring well with 2 piezometers per attached well detail.

"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 340 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 5/18/2011
Checked/Date: LT/PE 9/22/2011

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LOG OF BORING
Project No.: 4953-10-1561 Figure: A-2.60d

DRILLING COMPANY/DRILLING EQUIPMENT		BORING NO.
C & L Drilling / Mayhew 1000		G-175
DRILLING METHOD	**BOREHOLE LOCATION**	
Rotary Wash	Sta 747+65, Lt 30 feet	
DATES DRILLED	**HOLE DIAMETER**	**GROUND EL.**
12/15/2011 - 12/17/11	4-7/8 inches	302 feet

GROUND-WATER READINGS
Drilling mud bailed on 12/17/2010. Ground-water level measured at 42 feet below the ground surface 50 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		
300	0										3-inch thick Asphalt Concrete over 3½-inch thick Base Course
										SM	**FILL [Af]**
										SM	SILTY SAND - moist, brown, fine-grained, trace fine gravel
											QUATERNARY OLDER ALLUVIUM [Qalo]
										ML	SILTY SAND - moist, brown, fine-grained, trace coarse, trace fine gravel
											SANDY SILT - very soft, moist, olive brown, trace fine gravel
295	5		0.0	11.9	119	Push					Becomes brown
										SM	SILTY SAND - medium dense, moist, dark brown, fine to coarse-grained, fine gravel
290	10	20	0.0	8.4	-		22				Thin layer of Sandy Silt, more gravel
285	15		0.0	15.4	111	27				ML	SANDY SILT with GRAVEL - very stiff, moist, brown, fine sand
280	20	14	0.0	28.7	-					CL	LEAN CLAY - stiff, moist, brown
											Thin layer of Silt
										SP	POORLY GRADED SAND - dense, moist, brown, fine to coarse-grained, trace medium to coarse gravel
275	25		0.0	10.7	111	37					
										CL	SANDY LEAN CLAY - very stiff, moist, olive brown and gray mottling
270	30	16	0.0	23.2	-						
										ML	SANDY SILT - very stiff, moist, olive brown to brown
265	35		0.0	24.5	103	19					
	40									CL/	LEAN to FAT CLAY - hard, moist, brown

(CONTINUED ON FOLLOWING FIGURE)

Field Tech: DW
Prepared/Date: JF 3/14/2011
Checked/Date: LT/PE 9/22/2011

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LOG OF BORING

Project No.: 4953-10-1561 Figure: A-2.61a

DRILLING COMPANY/DRILLING EQUIPMENT		BORING NO.
C & L Drilling / Mayhew 1000		**G-175 (Continued)**
DRILLING METHOD	**BOREHOLE LOCATION**	
Rotary Wash	Sta 747+65, Lt 30 feet	
DATES DRILLED	**HOLE DIAMETER**	**GROUND EL.**
12/15/2011 - 12/17/11	4-7/8 inches	302 feet

GROUND-WATER READINGS
Drilling mud bailed on 12/17/2010. Ground-water level measured at 42 feet below the ground surface 50 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		
		47	0.0	12.4	-			☒		CH	
260										SM	SILTY SAND with GRAVEL - moist, olive gray, fine to coarse-grained
	45									ML	SANDY SILT - very stiff, moist, brown, iron oxide stains
			0.0	13.8	120	27		⊠			
255											
	50	50/4"	0.0	-	-			○			(Sample not recovered) Becomes hard
250											
	55									CL/ CH	LEAN to FAT CLAY - very stiff, moist, brown
			0.0	19.8	107	26		⊠			
245											
	60	35		18.5	-			☒			Becomes hard, iron oxide stains, trace gravel
240											
	65									SM	SILTY SAND - moist, brown, fine to medium-grained, trace gravel (up to 3/4 inch in size)
			0.0	13.6	106	46		⊠		CL	SANDY LEAN CLAY - hard, moist, brown, trace fine gravel
235											
										SM	SILTY SAND - moist, brown, fine-grained
	70	73/11"	0.0	18.9	-			☒		ML	SANDY SILT - hard, moist, brown, slate fragments (up to 2 inches in size)
230											
	75									SM	SILTY SAND with GRAVEL - dense, moist, dark brown, fine to coarse-grained, medium to coarse gravel
			0.0	11.7	115	39		⊠			
225											Alternating with layers of Sandy Silt
	80										

(CONTINUED ON FOLLOWING FIGURE)

Field Tech: DW
Prepared/Date: JF 3/14/2011
Checked/Date: LT/PE 9/22/2011

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LOG OF BORING

Project No.: 4953-10-1561 Figure: A-2.61b

DRILLING COMPANY/DRILLING EQUIPMENT		BORING NO.
C & L Drilling / Mayhew 1000		G-175 (Continued)
DRILLING METHOD	**BOREHOLE LOCATION**	
Rotary Wash	Sta 747+65, Lt 30 feet	
DATES DRILLED	**HOLE DIAMETER**	**GROUND EL.**
12/15/2011 - 12/17/11	4-7/8 inches	302 feet

GROUND-WATER READINGS
Drilling mud bailed on 12/17/2010. Ground-water level measured at 42 feet below the ground surface 50 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		
220		37	0.0	20.6	-			☒		CL/CH	LEAN to FAT CLAY - hard, moist, olive brown
	85										
215			0.0	18.5	105	33		⊠		CL	SANDY LEAN CLAY - hard, moist, brown with gray mottling
	90	42	0.0	21.5	-			☒			Becomes olive brown, some sand lenses
210											
	95		0.0	17.1	113	58	40	⊠		SP-SM	POORLY GRADED SAND with SILT - very dense, moist, brown, fine to coarse-grained, iron oxide stains
205											
	100	26		36.0	-			☒		CL	LEAN CLAY - very stiff, moist, olive gray, trace iron oxide stains
200											
	105			16.6	114	52		⊠		CH	FAT CLAY - hard, moist, olive gray, trace sand
195											
	110	50/4"		17.3	-		73	☒		CL	LEAN CLAY with SAND - hard, moist, slate gravel, some sandstone fragments (up to 1-1/2 inches in size)
190										SM	SILTY SAND with GRAVEL - moist, brown
	115									CL	SANDY LEAN CLAY - hard, moist, olive gray, medium to coarse sand, trace gravel
185				19.2	112	94		⊠			
	120	42		18.2	-			☒			Shale fragments (up to 1/2 inch in size)

(CONTINUED ON FOLLOWING FIGURE)

Field Tech: DW
Prepared/Date: JF 3/14/2011
Checked/Date: LT/PE 9/22/2011

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LOG OF BORING

Project No.: 4953-10-1561 Figure: A-2.61c

DRILLING COMPANY/DRILLING EQUIPMENT		BORING NO.
C & L Drilling / Mayhew 1000		**G-175 (Continued)**
DRILLING METHOD	**BOREHOLE LOCATION**	
Rotary Wash	Sta 747+65, Lt 30 feet	
DATES DRILLED	**HOLE DIAMETER**	**GROUND EL.**
12/15/2011 - 12/17/11	4-7/8 inches	302 feet

GROUND-WATER READINGS
Drilling mud bailed on 12/17/2010. Ground-water level measured at 42 feet below the ground surface 50 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			
180		73	0.0	15.3	-		50	☒				Becomes olive brown, sand lenses, abundant shale fragments, trace gravel (up to 3/8 inch in size)
			0.0	16.8	115	39		⊠			ML	SANDY SILT - hard, moist, olive brown, some clay
	125	64	0.0	18.9	-		28	☒			SM	SILTY SAND - very dense, moist, brown, fine to medium-grained, trace coarse, trace gravel (up to 3/8 inch in size)
175			0.0	24.0	101	33		⊠			ML	SANDY SILT - hard, moist, olive brown, medium sand, shale fragments
	130	89/9"		19.8	-		54	☒				Fine to medium sand, trace slate fragments, trace gravel (up to 1/2 inch in size)
	135			15.1	-	66	24	○			SM	SILTY SAND - medium dense, moist, brown, fine to medium-grained, trace slate fragments, trace gravel (up to 3/4 inch in size) (Disturbed sample)
Tunnel	140	50	0.0	19.8	-			☒			CL	LEAN CLAY - hard, moist, olive gray
	145		0.0	23.1	104	27		⊠			CL/ CH	LEAN to FAT CLAY - very stiff, moist, olive gray
150	150	46		29.7	-			☒				Becomes hard
	155											END OF BORING AT 151½ FEET
145												
	160											

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 340 pound hammer falling 18 inches

**Photo Ionization Detector used for OVA readings

Field Tech: DW
Prepared/Date: JF 3/14/2011
Checked/Date: LT/PE 9/22/2011

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LOG OF BORING

Project No.: 4953-10-1561 Figure: A-2.61d

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_(161-181).GPJ 10/18/11

DRILLING COMPANY/DRILLING EQUIPMENT		BORING NO.
C & L Drilling / Mayhew 1000		G-176
DRILLING METHOD	**BOREHOLE LOCATION**	
Rotary Wash	Sta 754+60, Lt 25 feet	
DATES DRILLED	**HOLE DIAMETER**	**GROUND EL.**
12/27/2010 and 12/30/2010	4-7/8 inches	294 feet

GROUND-WATER READINGS
Drilling mud bailed on 12/30/2010. Ground-water level measured at 29 feet below the ground surface 45 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		
											12-inch thick Asphalt Concrete, No Base Course
											QUATERNARY YOUNGER ALLUVIUM [Qal]
										ML	SANDY SILT - moist, light brown with some reddish brown
290	5										Thin layer of Silty Sand, fine to medium-grained
											Some very small slate fragments
			0.1	18.1	99	Push				SM	SILTY SAND - very loose, moist, olive gray, fine to medium-grained, some coarse, some slate gravel (up to 1/4 inch in size)
285	10	26	0.0	32.0	-						**QUATERNARY OLDER ALLUVIUM [Qalo]**
										ML	SILT - very stiff, moist, olive brown, trace sand, trace iron oxide stains
280	15		0.1	28.8	89	20					Slighthly clayier
										CL	LEAN CLAY - hard, moist, olive brown, trace sand and slate gravel
275	20	65	0.0	12.4	-						
										SM	SILTY SAND - dense, moist, olive brown, fine to medium-grained, some coarse, with clay
270	25		0.2	12.0	114	38					
										CL	LEAN CLAY - hard, moist, olive gray, trace sand, trace iron oxide stains
265											▽
	30	33	0.0	20.3	-						
260											
	35		0.1	17.5	111	25					Becomes very stiff, more fine to medium sand
255											
	40	52	0.2	16.5	-						Becomes hard, with thin layer of Well Graded Sand with Silt

(CONTINUED ON FOLLOWING FIGURE)

Field Tech: AR/DW
Prepared/Date: JF 3/16/2011
Checked/Date: LT/PE 9/22/2011

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LOG OF BORING

Project No.: 4953-10-1561 Figure: A-2.62a

DRILLING COMPANY/DRILLING EQUIPMENT		BORING NO.
C & L Drilling / Mayhew 1000		**G-176 (Continued)**
DRILLING METHOD	**BOREHOLE LOCATION**	
Rotary Wash	Sta 754+60, Lt 25 feet	
DATES DRILLED	**HOLE DIAMETER**	**GROUND EL.**
12/27/2010 and 12/30/2010	4-7/8 inches	294 feet

GROUND-WATER READINGS
Drilling mud bailed on 12/30/2010. Ground-water level measured at 29 feet below the ground surface 45 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		
250	45		0.1	15.7	-	35		☒		CL	SANDY LEAN CLAY - hard, moist, brown
								○			Trace gravel (up to 3/4 inch in size) (Disturbed sample)
245	50	44	0.0	14.6	-			☒			Trace slate gravel (up to 1/8 inch in size)
240	55		0.2	11.0	-	38	23	☒		SM	SILTY SAND - medium dense, moist, light brown, fine to medium-grained, some coarse, with clay, trace gravel (up to 1/8 inch in size)
235	60	47	0.1	14.4	-			☒			Thin layer of Poorly Graded Sand
										CL	LEAN CLAY with SAND - hard, moist, olive brown to brown, fine sand
230	65		0.0	24.7	100	38		☒			
225	70	48	0.3	38.0	-			☒			Alternating with Clayey Sand lenses
										ML	SILT - hard, moist, gray, trace iron oxide stains
220	75		0.1	17.1	112	37		☒		CL	SANDY LEAN CLAY - hard, moist, olive brown to brown, trace iron oxide stains
215	80	33	0.0	24.6	-		67	☒			

(CONTINUED ON FOLLOWING FIGURE)

Field Tech: AR/DW
Prepared/Date: JF 3/16/2011
Checked/Date: LT/PE 9/22/2011

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LOG OF BORING

Project No.: 4953-10-1561 Figure: A-2.62b

DRILLING COMPANY/DRILLING EQUIPMENT		BORING NO.
C & L Drilling / Mayhew 1000		**G-176 (Continued)**
DRILLING METHOD	**BOREHOLE LOCATION**	
Rotary Wash	Sta 754+60, Lt 25 feet	
DATES DRILLED	**HOLE DIAMETER**	**GROUND EL.**
12/27/2010 and 12/30/2010	4-7/8 inches	294 feet

GROUND-WATER READINGS
Drilling mud bailed on 12/30/2010. Ground-water level measured at 29 feet below the ground surface 45 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			
210	85		0.0	16.8	115	41	33	⊠	NV		SM	Becomes light gray SILTY SAND - dense, wet, brown, fine to coarse-grained Slightly clayier, trace gravel (up to 1/2 inch in size)
205	90							⊠	PMT		ML	SILT - moist, brown, some clay
				12.6	124	39	53	⊠	NV		CL-ML	SANDY SILTY CLAY - hard, moist, olive brown, trace sand Becomes gray
200	95			17.7	113	46	68	⊠	NV		CL	SANDY LEAN CLAY - hard, moist, olive brown, trace slate gravel (up to 3/8 inch in size)
195	100								PMT		ML	SILT - moist, medium gray, trace gravel, some clay
				11.3	125	46	37	⊠			SC	CLAYEY SAND - dense, moist, light gray, fine to medium-grained, some coarse, trace gravel (up to 3/8 inch in size)
190	105			-	-	67		○				Becomes very dense (Sample not recovered)
185	110								PMT			
				-	-	74		○				(Sample not recovered)
180	115											
		88	0.0	10.6	-		35	⊠			SM	SILTY SAND - very dense, moist, gray, fine to medium-grained, trace gravel (up to 1/2 inch in size)
175	120											

(CONTINUED ON FOLLOWING FIGURE)

Field Tech: AR/DW
Prepared/Date: JF 3/16/2011
Checked/Date: LT/PE 9/22/2011

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LOG OF BORING

Project No.: 4953-10-1561 Figure: A-2.62c

DRILLING COMPANY/DRILLING EQUIPMENT		BORING NO.
C & L Drilling / Mayhew 1000		**G-176 (Continued)**
DRILLING METHOD	**BOREHOLE LOCATION**	
Rotary Wash	Sta 754+60, Lt 25 feet	
DATES DRILLED	**HOLE DIAMETER**	**GROUND EL.**
12/27/2010 and 12/30/2010	4-7/8 inches	294 feet

GROUND-WATER READINGS
Drilling mud bailed on 12/30/2010. Ground-water level measured at 29 feet below the ground surface 45 minutes after bailing of drilling mud.

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	125		0.0	12.8	114	40	33	⊠		SC-SM	SILTY, CLAYEY SAND - dense, moist to wet, gray, fine-grained, with gravel (up to 2 inches in size), trace iron oxide stains
										SP	POORLY GRADED SAND - moist, dark gray, medium to coarse-grained, some gravel (up to 3/4 inch in size)
		87/9"	0.0	13.6	-			☒		CL	SANDY LEAN CLAY - hard, moist, brown, with alternating layers of Clayey Sand
	130			12.8	116	78	36	⊠			
160	135										END OF BORING AT 131 FEET
155	140										NOTES:
150	145										Hand augered upper 5 feet to avoid damage to utilities. Borehole grouted with cement-bentonite slurry and patched with asphalt concrete.
145	150										"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.
140	155										*Number of blows required to drive the Crandall Sampler 12 inches using a 340 pound hammer falling 18 inches.
135	160										**Photo Ionization Detector used for OVA readings
											Downhole Tests: PMT = Pressuremeter, NV = Noise/Vibration

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/DW
Prepared/Date: JF 3/16/2011
Checked/Date: LT/PE 9/22/2011

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LOG OF BORING

Project No.: 4953-10-1561 Figure: A-2.62d

DRILLING COMPANY/DRILLING EQUIPMENT		BORING NO.
C & L Drilling / Mayhew 1000		G-177
DRILLING METHOD	**BOREHOLE LOCATION**	
Rotary Wash	Sta 759+40, Lt 25 feet	
DATES DRILLED	**HOLE DIAMETER**	**GROUND EL.**
12/13/2010 - 12/15/2010	4-7/8 inches	305 feet

GROUND-WATER READINGS
Ground-water level measured at 42 feet below the ground surface 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		
											3-inch thick Asphalt Concrete
											FILL [Af]
										SM	**QUATERNARY OLDER ALLUVIUM [Qalo]**
											SILTY SAND - damp to moist, brown, fine to medium-grained, trace gravel
300	5		0.0	23.5	95	Push				CL	SANDY LEAN CLAY - very stiff, moist, brown, fine sand
295	10	18	0.0	16.7	-		50			SC	CLAYEY SAND - medium dense, moist, brown, fine to coarse gravel
290	15		0.0	11.2	111	11					Becomes loose
285	20	57	0.0	12.0	-					SM	SILTY SAND - very dense, moist, brown, fine-grained
280	25		0.0	15.3	117	36				CL	LEAN CLAY - hard, moist, brown, trace fine gravel
275	30	26	0.0	19.9	-						
270	35		0.0	14.4	111	22	60			ML	SANDY SILT - hard, moist, greenish gray, fine sand, trace clay
	40										

(CONTINUED ON FOLLOWING FIGURE)

Field Tech: DW
Prepared/Date: JF 2/2/2011
Checked/Date: LT/PE 9/20/2011

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LOG OF BORING

Project No.: 4953-10-1561 Figure: A-2.63a

DRILLING COMPANY/DRILLING EQUIPMENT		BORING NO.
C & L Drilling / Mayhew 1000		**G-177 (Continued)**
DRILLING METHOD	**BOREHOLE LOCATION**	
Rotary Wash	Sta 759+40, Lt 25 feet	
DATES DRILLED	**HOLE DIAMETER**	**GROUND EL.**
12/13/2010 - 12/15/2010	4-7/8 inches	305 feet

GROUND-WATER READINGS
Ground-water level measured at 42 feet below the ground surface 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		
		69	0.0	11.1	-			☒			Thin layer of Poorly Graded Sand
										CL	SANDY LEAN CLAY - hard, brown, with alternating layers of Sandy Silt
260	45		0.0	17.0	111	42		⊠		ML	SILT - hard, moist, brown, trace sand, some clay
255	50	45	0.0	16.7	-			☒		SM	SILTY SAND - dense, wet, brown, fine-grained, trace gravel
250	55		0.0	15.4	113	24		⊠		SC-SM	SILTY, CLAYEY SAND - medium dense, wet, brown, coarse gravel
245	60	23	0.0	19.4	-			☒		ML	SANDY SILT - very stiff, moist, brown, fine sand
240	65		0.0	16.6	112	50		⊠		SC	CLAYEY SAND - dense, wet, brown, fine to medium-grained
235	70	40	0.0	21.3	-		62	☒		CL	SANDY LEAN CLAY - hard, moist, brown, fine sand
230	75		0.0	32.4	90	24		⊠		CH	FAT CLAY - very stiff, moist, dark brownish gray
	80										

(CONTINUED ON FOLLOWING FIGURE)

Field Tech: DW
Prepared/Date: JF 2/2/2011
Checked/Date: LT/PE 9/20/2011

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LOG OF BORING

Project No.: 4953-10-1561 Figure: A-2.63b

DRILLING COMPANY/DRILLING EQUIPMENT		BORING NO.
C & L Drilling / Mayhew 1000		**G-177 (Continued)**
DRILLING METHOD	**BOREHOLE LOCATION**	
Rotary Wash	Sta 759+40, Lt 25 feet	
DATES DRILLED	**HOLE DIAMETER**	**GROUND EL.**
12/13/2010 - 12/15/2010	4-7/8 inches	305 feet

GROUND-WATER READINGS
Ground-water level measured at 42 feet below the ground surface 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		
		44	0.0	17.3	-			⊠		ML	SILT - hard, moist, gray, some clay
			0.0	16.8	110	39	63	⊠		CL	SANDY LEAN CLAY - hard, moist, brown
220	85	51	0.0	20.6	-			⊠		ML	SANDY SILT - hard, moist, gray, trace fine gravel
			0.0	17.4	110	37		⊠			Becomes light brown
215	90	75	0.0	15.2	-		51	⊠		ML	SILT - hard, brown, moist, trace gravel, with alternating layers of Silty Clay
			0.0	21.2	105	34		⊠		SC	CLAYEY SAND - dense, wet, brown, trace fine stains
210	95	55	0.0	12.6	-		49	⊠			Becomes very dense, gray, trace gravel (up to 3/8 inch in size)
			0.0	13.5	122	64		⊠			Increased gravel content
205	100	80/10"	0.0	13.6	-		41	⊠		SM	SILTY SAND - very dense, wet, gray, fine-grained, trace gravel (up to 3/8 inch in size)
			0.0	17.6	111	36		⊠		ML	SANDY SILT - hard, moist, gray
200	105	74	0.0	21.0	-		74	⊠		CL	LEAN CLAY with SAND - hard, moist, gray
			0.0	15.0	115	71		⊠		SP	POORLY GRADED SAND - very dense, wet, some clay, trace gravel
195	110	50/5"	0.0	11.2	-		29	⊠		SM	SILTY SAND - very dense, wet, dark brown, fine to coarse-grained, trace gravel (up to 1/2" in size)
			0.0	-	-	32		○			(Sample not recovered)
190	115	50/4"	0.0	15.3	-			⊠			
			0.0	11.8	113	55		⊠			
	120										

(CONTINUED ON FOLLOWING FIGURE)

Field Tech: DW
Prepared/Date: JF 2/2/2011
Checked/Date: LT/PE 9/20/2011

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LOG OF BORING

Project No.: 4953-10-1561 Figure: A-2.63c

DRILLING COMPANY/DRILLING EQUIPMENT		BORING NO.
C & L Drilling / Mayhew 1000		**G-177 (Continued)**
DRILLING METHOD	**BOREHOLE LOCATION**	
Rotary Wash	Sta 759+40, Lt 25 feet	
DATES DRILLED	**HOLE DIAMETER**	**GROUND EL.**
12/13/2010 - 12/15/2010	4-7/8 inches	305 feet

GROUND-WATER READINGS
Ground-water level measured at 42 feet below the ground surface after bailing of drilling mud.

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		
		50/5"	0.0	-	-		34				Some gravel (up to 3/4 inch in size)
	125		0.0	12.6	118	107	19				Some gravel (up to 1/2 inch in size)
Tunnel	130	50/5"	0.0	7.0	-					SP-SM	POORLY GRADED SAND with SILT - very dense, wet, dark brown, fine to coarse-grained, trace gravel
	135		0.0	-	-	45					(Sample not recovered) Becomes dense
160	140		0.0	13.2	118	55	12			SM	SILTY SAND - very dense, wet, dark brown, fine to coarse-grained, trace gravel
	145										END OF BORING AT 141 FEET
155	150										
150	155										
	160										

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 340 pound automatic hammer falling 18 inches

**Photo Ionization Detector used for OVA readings

Field Tech: DW
Prepared/Date: JF 2/2/2011
Checked/Date: LT/PE 9/20/2011

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.

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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_(161-181).GPJ 10/18/11

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LOG OF BORING

Project No.: 4953-10-1561 Figure: A-2.63d

DRILLING COMPANY/DRILLING EQUIPMENT		BORING NO.
C & L Drilling / Mayhew 1000		G-178
DRILLING METHOD	**BOREHOLE LOCATION**	
Rotary Wash	Sta 776+5, Lt 15 feet	
DATES DRILLED	**HOLE DIAMETER**	**GROUND EL.**
1/17/2011 - 1/18/2011	4-7/8 inches	326 feet

GROUND-WATER READINGS
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		
325	0										4-inch thick Asphalt Concrete over 8-inch thick Portland Cement Concrete, No Base Course
										SW-SM	**QUATERNARY OLDER ALLUVIUM [Qalo]** WELL GRADED SAND with SILT - moist, brown, fine to coarse-grained, trace gravel
320	5		0.6	8.2	119	28		⊠		SW	WELL GRADED SAND - medium dense, moist, brown, fine to coarse-grained, trace gravel (up to 3/4 inch in size)
											Some slate gravel (up to 3 inches in size)
315	10	27	0.6	14.4	-			⊠		SW	WELL GRADED SAND with GRAVEL - medium dense, moist, brown, fine to coarse-grained, gravel (up to 3/4 inch in size)
310	15		1.1	18.5	109	7		⊠		CL	LEAN CLAY - medium stiff, moist, reddish brown, porous
305	20	19	0.7	17.0	-			⊠			Becomes very stiff, brown, trace slate gravel
											Thin layer of Clayey Sand
	25										Trace gravel, cobble (up to 4 inches in size)
300			0.6	16.9	113	35	52	⊠		ML	SANDY SILT - hard, moist, trace gravel
295	30	45	0.3	19.4	-			⊠		CL	LEAN CLAY - hard, moist, brown, trace sand
290	35		1.2	14.3	109	49	45	⊠		SM	SILTY SAND - dense, moist, brown, fine to medium-grained, trace gravel, slightly porous
	40									CL	LEAN CLAY - hard, moist, brown, trace gravel

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 3/17/2011
Checked/Date: LT/PE 9/22/2011

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LOG OF BORING

Project No.: 4953-10-1561 Figure: A-2.64a

DRILLING COMPANY/DRILLING EQUIPMENT		BORING NO.
C & L Drilling / Mayhew 1000		**G-178 (Continued)**
DRILLING METHOD Rotary Wash	**BOREHOLE LOCATION** Sta 776+5, Lt 15 feet	
DATES DRILLED 1/17/2011 - 1/18/2011	**HOLE DIAMETER** 4-7/8 inches	**GROUND EL.** 326 feet
GROUND-WATER READINGS 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		
285		46	0.8	16.1	-			☒			Becomes reddish brown
	45									SW	WELL GRADED SAND - moist, brown, fine to coarse-grained, some gravel
280			1.0	8.3	118	65/6"		⊠			Becomes very dense, with gravel (up to 1/2 inch in size)
										ML	SANDY SILT - moist, brown, some clay
	50										
275		47	0.5	15.6	-			☒		SC	CLAYEY SAND - dense, moist, brown, fine to medium-grained, some coarse sand, trace gravel
										SW	WELL GRADED SAND - dense, moist, light brown to brownish orange, fine to coarse-grained, some gravel
	55										
270			0.9	12.7	115	75/5"		⊠			Becomes very dense, brown, with gravel (up to 1 inch in size)
											Thin layer of Silty Sand
			0.8	18.3	110	36		⊠		ML	SILT - very stiff, moist, dark brown to reddish brown, trace sand, some clay
	60										
265		88	0.8	12.7	-		21	☒		SM	SILTY SAND - very dense, moist, brown, fine to coarse-grained, some gravel (up to 1/2 inch in size)
			0.6	13.1	121	66	47	⊠		SC	CLAYEY SAND - dense, moist, brown, fine to medium-grained
	65								NV		
260											
			0.8	15.3	116	58	59	⊠		CL	SANDY LEAN CLAY - hard, moist, brown, trace gravel (up to 3/8 inch in size)
	70										
255		69	0.3	16.7	-		41	☒		SC	CLAYEY SAND - very dense, moist, brown, fine to coarse-grained, trace gravel (up to 3/8 inch in size)
			0.5	14.6	118	65/6"	51	⊠		CL	SANDY LEAN CLAY - hard, moist, brown, trace gravel (up to 1/2 inch in size)
	75								NV		Alternating with layers of Sandy Silt
250											
			0.6	20.3	108	59		⊠		SC	CLAYEY SAND - dense, moist, brown, fine to coarse-grained, some gravel
	80										

(CONTINUED ON FOLLOWING FIGURE)

Field Tech: AR
Prepared/Date: JF 3/17/2011
Checked/Date: LT/PE 9/22/2011

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LOG OF BORING

Project No.: 4953-10-1561 Figure: A-2.64b

DRILLING COMPANY/DRILLING EQUIPMENT		BORING NO.
C & L Drilling / Mayhew 1000		**G-178 (Continued)**
DRILLING METHOD	**BOREHOLE LOCATION**	
Rotary Wash	Sta 776+5, Lt 15 feet	
DATES DRILLED	**HOLE DIAMETER**	**GROUND EL.**
1/17/2011 - 1/18/2011	4-7/8 inches	326 feet

GROUND-WATER READINGS
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		
245		62	0.8	17.9	-			☒			Becomes very dense, fine to coarse-grained, some medium, trace gravel
			0.8	10.9	123	70/6"	12	⊠	NV	SP-SM	POORLY GRADED SAND with SILT and GRAVEL - very dense, moist, brown, fine to coarse-grained, gravel (up to 3/4 inch in size)
240	85										
			0.8	21.0	108	96		⊠		SM	SILTY SAND with GRAVEL - very dense, moist, brown, fine to medium-grained
235	90	50/4"	0.6	11.0	-		22	☒			Some slate gravel (up to 3/4 inch in size)
			0.7	19.0	110	91		⊠		CL	LEAN CLAY - hard, moist, brown, trace gravel
230	95	78	0.6	17.5	-			☒		SM	SILTY SAND - very dense, moist, brown, fine to medium-grained, trace gravel (up to 3/4 inch in size)
	100		0.8	17.6	111	84		⊠			
225		56	0.9	17.9	-			☒		ML	SILT- hard, moist, brown, with sand, some clay
	105									SM	SILTY SAND - very dense, moist, brown, fine to medium-grained, trace slate gravel
220			0.7	18.4	110	84		⊠		ML	SILT - hard, moist, brown, trace gravel, trace sand, some clay
	110	81	0.8	17.6	-			☒			
215											END OF BORING AT 110 FEET
	115										
210											
	120										

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: NV = Noise/Vibration

Field Tech: AR
Prepared/Date: JF 3/17/2011
Checked/Date: LT/PE 9/22/2011

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LOG OF BORING

Project No.: 4953-10-1561 Figure: A-2.64c

DRILLING COMPANY/DRILLING EQUIPMENT		BORING NO.
C & L Drilling / Mayhew 1000		G-179
DRILLING METHOD	**BOREHOLE LOCATION**	
Rotary Wash	Sta 780+40, Lt 20 feet	
DATES DRILLED	**HOLE DIAMETER**	**GROUND EL.**
1/17/2011 - 1/20/2011	4-7/8 inches	340 feet

GROUND-WATER READINGS
Drilling mud bailed on 1/19/2011. Ground-water level measured at 34 feet on 1/20/2011. Monitoring well was installed on 1/20/2011.

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		
											6-inch thick Asphalt Concrete over 12-inch thick Portland Cement Concrete, No Base Course
										SM	**FILL [Af]** - SILTY SAND - dark brown, trace gravel
											QUATERNARY OLDER ALLUVIUM [Qalo]
										CL	LEAN CLAY - brown to olive brown, trace slate gravel, trace fine sand
335	5		0.0	14.0	118	27		⊠		ML	SANDY SILT - very stiff, moist, reddish brown, with slate gravel
330	10		0.0	10.8	120	34		⊠		SM	SILTY SAND - dense, moist, brown, fine to medium-grained, with gravel (up to 1/2 inch in size)
325	15	34	0.1	13.3	-			☒			Becomes fine to coarse-grained, trace gravel (up to 1/4 inch in size)
320	20		0.1	8.9	114	24		⊠			Becomes medium dense, trace coarse sand, trace gravel (up to 3/4 inch in size)
315	25	24	0.0	14.4	-		19	☒		SP	POORLY GRADED SAND - medium dense, moist, brown, fine to medium-grained, trace fine gravel
										SM	SILTY SAND - medium dense, moist, light brown to light reddish brown, fine-grained, trace medium sand, trace fine gravel
310	30		0.0	14.4	117	68		⊠			Becomes very dense, brown, fine to medium-grained, with gravel (1/2 inch to 3/4 inch in size)
305	35	44	0.0	15.9	-			☒		CL	SANDY LEAN CLAY - hard, moist, brown
	40										

(CONTINUED ON FOLLOWING FIGURE)

Field Tech: DW
Prepared/Date: JF 3/23/2011
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-2.65a

DRILLING COMPANY/DRILLING EQUIPMENT		BORING NO.
C & L Drilling / Mayhew 1000		**G-179 (Continued)**
DRILLING METHOD	**BOREHOLE LOCATION**	
Rotary Wash	Sta 780+40, Lt 20 feet	
DATES DRILLED	**HOLE DIAMETER**	**GROUND EL.**
1/17/2011 - 1/20/2011	4-7/8 inches	340 feet

GROUND-WATER READINGS
Drilling mud bailed on 1/19/2011. Ground-water level measured at 34 feet on 1/20/2011. Monitoring well was installed on 1/20/2011.

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		
			0.0	16.3	115	29		⊠			Becomes very stiff
295	45	24	0.0	19.5	-			⊠		CL	LEAN CLAY - very stiff, moist, brown
290	50		0.0	16.5	117	26		⊠			Trace fine sand, trace gravel (1/4 inch in size)
285	55	31		-	-			○			(Sample not recovered)
280	60		0.0	14.2	120	27	27	⊠		SC	CLAYEY SAND with GRAVEL - medium dense, moist, brown, fine to coarse-grained, gravel (up to 3/4 inch in size)
275	65		0.0	4.5	116	84		⊠		SP	POORLY GRADED SAND with GRAVEL - very dense, moist, brown, fine-grained
270	70		0.0	19.7	107	32	52	⊠		CL	SANDY LEAN CLAY - hard, moist, brown, trace gravel (up to 3/8 inch in size)
265	75	49	0.0	14.3	-		42	⊠	PMT	SC	CLAYEY SAND - dense, moist, brown, fine to coarse-grained, trace gravel (up to 1/2 inch in size)
	80										

(CONTINUED ON FOLLOWING FIGURE)

Field Tech: DW
Prepared/Date: JF 3/23/2011
Checked/Date: LT/PE 9/22/2011

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LOG OF BORING

Project No.: 4953-10-1561 Figure: A-2.65b

DRILLING COMPANY/DRILLING EQUIPMENT		BORING NO.
C & L Drilling / Mayhew 1000		**G-179 (Continued)**
DRILLING METHOD	**BOREHOLE LOCATION**	
Rotary Wash	Sta 780+40, Lt 20 feet	
DATES DRILLED	**HOLE DIAMETER**	**GROUND EL.**
1/17/2011 - 1/20/2011	4-7/8 inches	340 feet

GROUND-WATER READINGS
Drilling mud bailed on 1/19/2011. Ground-water level measured at 34 feet on 1/20/2011. Monitoring well was installed on 1/20/2011.

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		
				7.7	-	42	42	⊠			(Disturbed sample)
										SM	SILTY SAND - dense, moist, brown, fine to medium-grained
255	85										
									PMT		
250	90										
245	95			17.8	111	40	60	⊠		CL	SANDY LEAN CLAY - hard, moist, brown
240	100	89/9"		14.4	-		39	⊠		SC	CLAYEY SAND - very dense, moist, brown, fine-grained, trace fine slate gravel (up to 3/4 inch in size)
									PMT		
235	105										
										SM	SILTY SAND - dense, moist, brown, fine-grained, trace gravel (up to 1/2 inch in size)
230	110			17.5	-	84	41	⊠			(Little recovery, disturbed sample)
225	115			12.4	121	93	13	⊠			Alternating with layers of Poorly Graded Sand with Silt, very dense, moist, brown, with gravel
	120										

(CONTINUED ON FOLLOWING FIGURE)

Field Tech: DW
Prepared/Date: JF 3/23/2011
Checked/Date: LT/PE 9/22/2011

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LOG OF BORING

Project No.: 4953-10-1561 Figure: A-2.65c

DRILLING COMPANY/DRILLING EQUIPMENT		BORING NO.
C & L Drilling / Mayhew 1000		**G-179 (Continued)**
DRILLING METHOD	**BOREHOLE LOCATION**	
Rotary Wash	Sta 780+40, Lt 20 feet	
DATES DRILLED	**HOLE DIAMETER**	**GROUND EL.**
1/17/2011 - 1/20/2011	4-7/8 inches	340 feet

GROUND-WATER READINGS
Drilling mud bailed on 1/19/2011. Ground-water level measured at 34 feet on 1/20/2011. Monitoring well was installed on 1/20/2011.

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		
		52		17.4	-			☒		CL	LEAN CLAY - hard, moist, brown
215	125										END OF BORING AT 121½ FEET
210	130										NOTES:
205	135										Hand augered upper 5 feet to avoid damage to utilities. Borehole grouted with cement-bentonite slurry and patched with asphalt concrete.
200	140										"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
195	145										*Number of blows required to drive the Crandall Sampler 12 inches using a 340 pound hammer falling 18 inches
190	150										**Photo Ionization Detector used for OVA readings
185	155										Downhole Test: PMT = Pressuremeter
	160										

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 3/23/2011
Checked/Date: LT/PE 9/22/2011

MTA Westside Subway Extension
Los Angeles, California

amec

LOG OF BORING
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