DRILLING COMPANY/DRILLING EQUIPMENT BORING NO. Martini Drilling / CME 75 **T8-B3** THIS RECORD IS AN INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. LATITUDE AND LONGITUDE OF BORING LOCATION SHOWN ON LOGS ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BETWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL BOREHOLE LOCATION DRILLING METHOD ELEVATION (ft) RECOVERY SAMPLE LOC. (Continued) DEPTH (ft) Hollow-Stem Auger See Plate 3 RUN HOLE DIAMETER DATES DRILLED GROUND EL. BOX ≠ 5/25/11 8 inches 292 feet GROUNDWATER READINGS Not encountered during drilling Qlw Continued SM Silty Sand, fine grained; pale brown (2.5Y 8/2); appears damp and dense At 60.3 to 60.9': Strongly mottled, pale brown (2.5Y 8/2) to strong brown (7.5YR 5/8) At 61.2': Rounded meta-basalt clast, up to 3 inches 230 At 62.3 to 63.4': Grades to fine to medium Poorly Graded Sand with Silt 4 12 86 SM At 63.4 to 64.7': Distinct oxidized laminations defined by varying color and oxidation SM METRO SOIL CORE S:/70131 GEOTECH/GINTW/FAULT INVESTIGATION_WSE_LIBRARY AMEC OCTOBER2011 (2),GLB
G:|PROJECT_DIRECTORIES/4953/2010/101561_METRO_WESTSIDE_EXTENSION/6.2.3.2 FAULT HAZARD INVESTIGATION/3.2 ALL FIELD NOTES/GINT LOGS/101561-TRANSECT 8.GPJ 65 At 65.0 to 66.1': Appears moist, some irregular, lightly cemented pockets Silty Sand, fine grained; varying color, mainly light brownish gray (10Y 6/2) to SM yellowish brown (10YR 5/8); appears very moist and dense; variable mottling and laminations; lower contact is sharp 225 5 13 100 SAN PEDRO FORMATION [Osp] SM At 69.2': Marker Bed M_B - Clay bed (½ inch thick), oxidized; strong brown (7.5YR 70 Silty Sand, fine grained; light greenish gray (10Y 7/1); appears moist and dense; lower contact is sharp
At 69.4 to 70.0': Wavy, Sandy Silt laminations; light olive gray (5Y 6/2) At 71.0 to 72.4': Becomes light olive gray (5Y 6/2); appears very moist 220 5 14 100 At 72.5 to 73.2': Becomes light yellowish brown (2.5Y 6/4) At 73.2 to 73.8': Becomes mottled, light olive gray (5Y 6/2) to light yellowish brown At 73.8': Highly oxidized; yellowish red (5YR 5/6) lamination At 73.8 to 74.6': Numerous oxidized strong brown (7.5YR 5/6) laminations; trace fine gravel (Jsm) At 74.6': Clay bed (½ to 1 inch thick), olive brown (2.5Y 4/4) 75 At 75.0 to 75.5': Marker Bed M_A - Some subrounded gravel, clasts 5 to 15%, up to 3/4 inches in size, mainly slate (Jsm) and quartzite SP Poorly Graded Sand, fine grained; light greenish gray (10Y 7/1); appears damp and dense; trace mica 215 5 15 70 Geologist: ME/MF Prepared/Date: WL/PK 10/13/2011 (CONTINUED ON FOLLOWING FIGURE) Checked/Date: MF/MW 10/13/2011

MTA Westside Subway Extension Los Angeles, California



OG OF BORING

Project No.: 4953-10-1561 Figure: T8-B3d

						I	5 COMPANY/DRILLIN	IG EQUIFMENT	BORING NO.
SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER LIMES MAY DIFFER. INTERFACES BETWEEN STRAIN ARE APPROXIMATE. TRANSITIONS BETWEEN STRAIN MAY BE GRADUAL. 100 ELEVATION (ft) 101 ELEVATION (ft)					1	I	lling / CME 75 G METHOD	BOREHOLE LOCATION	T8-B3
J (ft	F			ЗRY	0C.	Hollow-Ste		See Plate 3	(Continued)
IOI	H (f	#	# 7)VE	EL	DATES DI	•	HOLE DIAMETER	GROUND EL.
VAT	DEPTH (ft)	BOX#	RUN#	% RECOVERY	SAMPLE LOC.	5/25/11		8 inches	292 feet
ELEVATION (ft)	1	"		% R	SAN	I	WATER READINGS		
E						Not encoun	tered during drilling		
	+				-	 \	END OF BORING A	AT 80 FEET	
						'	NOTES:		
	+ .	-						th cement/bentonite grout from bottom u	p and patched.
							-Munsell colors listed	d in order of predominance (most predom	ninant color first).
210	† '	1					-Where observed, co -Non-recovery interv	ntacts and bedding appear subhorizontal rals are assumed to occur at the bottom of	unless otherwise noted. Frun unless otherwise
							noted.	(Jsm) clasts are generally very dark gray	
	† •	1					subrounded slate unle	ess otherwise noted. Modelo Formation (Tm) clasts are generally
							otherwise noted.	to tan, subangular to subrounded shale a	
	† .	1					-The term "clasts" he -Beds are generally n	rein describes gravel-size rock fragments nassive unless otherwise noted.	(larger than ¼ inch).
	0.5						generally is		
	85 -	1							
	1 .								
	T '								
205 -	╽ .								
_05									
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200	+ .	-							
	+ .								
	+ .	-							
	95 -								
	+ .	-							
195	+ .	-							
	+ .	1							
	+ .	-							
	⊥ 100 −					<u> </u>	1	Geologist: ME/M	F
								Prepared/Date: W Checked/Date: M	L/PK 10/13/2011
 ИТ	A West	side Sı	ihwev l	Extens	ion				F BORING
VII.			, Califo		,1VII		amec	Project No.: 4953-10-	
								F10Ject No., 4933-10-	1301 Tiguie. 10-D3e



DRILLING COMPANY/DRILLING EQUIPMENT BORING NO. Jet Drilling / CME 75 THIS RECORD IS AN INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION LATITUDE AND LONGITUDE OF BORING LOCATION SHOWN ON LOGS ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BETWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL **T8-B4** DRILLING METHOD BOREHOLE LOCATION ELEVATION (ft) RECOVERY SAMPLE LOC. See Plate 3 DEPTH (ft) Hollow-Stem Auger RUN# BOX# DATES DRILLED HOLE DIAMETER GROUND EL. 5/26/11-5/27/11 and 5/31/11 8 inches 289 feet GROUNDWATER READINGS Not encountered during drilling 9 inches of asphalt concrete over 4 inches of base Hand Augered to 6 feet FILL [Af] CL/ Silty Clay and Clayey Silt, variable fine to coarse grained sand, trace fine gravel; ML varying color, mainly dark grayish brown (10YR 4/2); appears moist to very moist and very stiff; occasional more gravelly layers with up to 70% gravel (up to 34 inch) METRO SOIL CORE S:\70131 GEOTECH\GINTW\FAULT_INVESTIGATION_WSE_LIBRARY AMEC OCTOBER2011 (2).GLB G\PROJECT_DIRECTORIES\4953\2010\101561_METRO_WESTSIDE_EXTENSION\6.2.3.2 FAULT HAZARD INVESTIGATION\3.2 ALL FIELD NOTES\GINT LOGS\101561-TRANSECT 8.GPI 10/14/11 285 5 At 7.0 to 9.0': No recovery 33 280 $\overline{\text{CL}}$ Clay with Gravel 10 1 2 100 275 Clay CL 15 3 90 270 Geologist: BF/MF Prepared/Date: WL/PK 10/13/2011 (CONTINUED ON FOLLOWING FIGURE) Checked/Date: MF/MW 10/13/2011

MTA Westside Subway Extension Los Angeles, California



Figure: T8-B4a Project No.: 4953-10-1561

						Jet Drilling	G COMPANY/DRILLING / CME 75	EQUIPMENT	BORING NO. T8-B4
(ft)	£			ЖY)C	DRILLING Hollow-Ste	G METHOD m Auger	BOREHOLE LOCATION See Plate 3	(Continued)
TIOL	DEPTH (ft)	BOX#	RUN#	OVE	LEL	DATES DI 5/26/11-5/2 5/31/11	RILLED	HOLE DIAMETER	GROUND EL.
ELEVATION (ft)	DEP	BO	RI	% RECOVERY	SAMPLE LOC.	5/26/11-5/2 5/31/11	WATER READINGS	8 inches	289 feet
EI				%	S		ntered during drilling		
					+	Y CL	Af Continued		
	-								
		1	4	80					
	-	_					At 23.0 to 24.0': No red	covery	
265 -	ļ .				1	1 × 4 0	Clay with Gravel		
						CL	Ciay with Gravei		
	25 -					. 00			
	-								
-	ļ .	2	5	74					
						. 00	At 27.7 to 29.0': No red	oover.	
•	<u> </u>	-					At 27.7 to 29.0 . No lea	Covery	
260-	-				-		At 29.0 to 31.5': No sa	mpling	
	30 -								
	<u> </u>						At 31.5 to 33.0': No red	COVerv	
	-	_					74 31.3 to 33.0 . 110 for	covery	
-	ļ .	2	6	0			At 33.0 to 36.0': No sa	mpling	
255									
255 –									
	35 -	-							
-	ļ -	-							
					$\dagger \uparrow$	<u> </u>	At 36.5': Large concret	te fragment	
		2	7	33			At 37.5 to 38.0': No sa	mpling	
	-				$\dagger \uparrow$. 0	
250 –	-	-				6			
	L 40 -					1	At 39.5 to 43.0': No red	covery	
	-10 -					(CON	FINUED ON FOLLOWING	Geologist: BF/MF Prepared/Date: W FIGURE) Checked/Date: MI	L/PK 10/13/2011
MTA	A West				sion		(<u> </u>	BORING
	Los A	ngeles,	, Califo	rnia			amec		561 Figure: T8-B4b



DRILLING COMPANY/DRILLING EQUIPMENT BORING NO. Jet Drilling / CME 75 **T8-B4** THIS RECORD IS AN INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. LATITUDE AND LONGITUDE OF BORING LOCATION SHOWN ON LOGS ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BETWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL DRILLING METHOD BOREHOLE LOCATION ELEVATION (ft) RECOVERY SAMPLE LOC. (Continued) DEPTH (ft) Hollow-Stem Auger See Plate 3 RUN# BOX# HOLE DIAMETER GROUND EL. DATES DRILLED 5/26/11-5/27/11 and 5/31/11 8 inches 289 feet GROUNDWATER READINGS Not encountered during drilling Af Continued 2 8 30 At 43.0 to 43.2': Concrete fragments, up to 1½ inches SM LAKEWOOD FORMATION [Olw] METRO SOIL CORE 5:70131 GEOTECH/GINTW/FAULT INVESTIGATION WSE LIBRARY AMEC OCTOBER2011 (2),GLB
G/PROJECT DIRECTORIES/4953/2010/101561 METRO WESTSIDE EXTENSION/6,2,3,2,PROJECT DIRECTORIES/GINT LOGS/101561-TRANSECT 8,GPJ Silty Sand, fine to medium grained, trace clay; yellowish brown (10YR 5/4); appears 245 moist and dense; well sorted; lower contact occurs between runs At 44.0 to 46.0': No recovery 2 9 33 45 SM-SC 10 2 50 At 47.0 to 48.0': No recovery At 48.0 to 48.3': Grades to Poorly Graded Sand, fine grained; light yellowish brown SP SM-Clayey to Silty Sand, fine grained, dark brown (7.5YR 3/4); appears very moist and 240 dense; well sorted; lower contact occurs between runs 3 72 11 50 At 50.0 to 51.5': Becomes yellowish brown (10YR 3/2) At 50.8 to 51.0': Manganesium oxide-rich bed At 51.5 to 51.9': Distinct laminations defined by varying oxidation, silt and 3 12 56 manganese oxide content At 51.9 to 53.0': No recovery CL At 53.0 to 53.4': Clay, trace coarse gravel (Jsm); brown (7.5YR 4/4); appears very SM-Clayey, Silty Sand with Gravel, fine grained, clasts 25 to 35%, up to 1½ inches, 235 mainly subrounded granitic rock and slate; brown (7.5YR 4/4); appears moist and dense; lower contact occurs between runs 4 13 33 Laminated beds of fine to medium grained Silty Sand, varying color 55 At 54.0 to 56.0': No recovery Marker Bed M_C - Silty Gravel, clasts 50 to 60%, up to 1½ inches, mainly GM subangular to subrounded granitic rock, meta-basalt and slate, fine to coarse silty sand matrix; strong brown (7.5YR 4/6); appears damp and dense; lower contact occurs between runs Refusal at 57.0' on gravel/cobbles. **END OF BORING AT 57.0 FEET** NOTES: Boring backfilled with cement/bentonite grout from bottom up and patched. 230 -Munsell colors listed in order of predominance (most predominant color first). -Where observed, contacts and bedding appear subhorizontal unless otherwise noted. -Non-recovery intervals are assumed to occur at the bottom of run unless otherwise Geologist: BF/MF Prepared/Date: WL/PK 10/13/2011 (CONTINUED ON FOLLOWING FIGURE) Checked/Date: MF/MW 10/13/2011

MTA Westside Subway Extension Los Angeles, California



OG OF BORING

Project No.: 4953-10-1561 Figure: T8-B4c

	1				Т	DRILLING COMPANY/DE	RILLING EQUIPMEN	NT	BORING NO.
						Jet Drilling / CME 75 DRILLING METHOD	BUDER	OLE LOCATION	T8-B4
ELEVATION (ft)	(£)			ERY	LOC.	Hollow-Stem Auger	See Plate		(Continued)
2) H	# X	RUN#	OVI	EL	DATES DRILLED		DIAMETER	GROUND EL.
	DEPTH (ft)	BOX#	Rt	% RECOVERY	SAMPLE	5/26/11-5/27/11 and 5/31/11	8 inches		289 feet
<u> </u>	1			%	SA	GROUNDWATER READING Not encountered during drilling			
						Not encountered during drilling	ıg		
225 —	- 65 -					white to pale otherwise not -The term "cl -Beds are ger Boring redrill	yellow to tan, subanguled. asts" herein describes gerally massive unless of ed offset approximately this refusal. Drilled do	generally very dark gray, subar oted. Modelo Formation (Tm) color to subrounded shale and san ravel-size rock fragments (large therwise noted. 7 1-foot south-west from origina with the stand hit refusal during to the south of	dstone unless or than ¼ inch).
0+	1								
	_ 80 _								
								Geologist: BF/MF Prepared/Date: WL/PK Checked/Date: MF/MW	10/13/2011 10/13/2011
MTA I	Wests Los Ar	ide Su igeles,	bway l Califo	Extens rnia	ion	ame	ec®	LOG OF B Project No.: 4953-10-1561	



DRILLING COMPANY/DRILLING EQUIPMENT BORING NO. Martini Drilling / CME 75 THIS RECORD IS AN INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. LATITUDE AND LONGITUDE OF BORING LOCATION SHOWN ON LOGS ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BETWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL **T8-B5** DRILLING METHOD BOREHOLE LOCATION ELEVATION (ft) RECOVERY SAMPLE LOC. See Plate 3 DEPTH (ft) Hollow-Stem Auger RUN# BOX# DATES DRILLED HOLE DIAMETER GROUND EL. 5/25/11 8 inches 287 feet GROUNDWATER READINGS Not encountered during drilling 18 inches of asphaltic concrete Hand augered to 5.5 feet CL FILL [Af] Clay, trace coarse sand; dark brown (10YR 3/3); appears moist and very stiff; 285 occasional more sandy beds; lower contact is sharp NOTE: Jsm = Santa Monica Slate METRO SOIL CORE S./70131 GEOTECH/GINTW/FAULT_INVESTIGATION_WSE_LIBRARY AMEC OCTOBER2011 (2),GLB
G:\PROJECT_DIRECTORIES/4953/2010/101561_METRO_WESTSIDE_EXTENSION\6.2.3.2 FAULT HAZARD INVESTIGATION\3.2 ALL FIELD NOTES\GINT LOGS\101561-TRANSECT 8.GPJ Tm = Modelo Formation See end of log for more detailed clast descriptions 5 Silty Clay and Clayey Silt, variable fine sand, trace coarse sand and fine gravel (Jsm ML CL and Tm); yellowish brown (10YR 5/4); appears very moist and stiff MLAt 6.3 to 6.7': Organic-rich bed, Sandy to Clayey Silt, 10 to 15% fine gravel up to ½ inch; very dark gray (10YR 3/1); appears very moist and stiff ML/ 280 CL. 100 At 7.5 to 8.2': Clayey, Silty Sand At 9.8 to 10.2': Increasing organic content and gravel 10 CL Clay and Silty Clay, trace coarse sand (Jsm and Tm); dark brown (7.5YR 3/2); appears very moist and medium stiff to stiff; organic-rich 275 2 100 1 At 12.6 to 13.0': Decreasing organics 15 270 At 16.9 to 20.0': Organic-rich zones/layers become infrequent, sand increases, occasional sandy silt layers 1 3 100 Geologist: ME/MF Prepared/Date: WL/PK 10/13/2011 (CONTINUED ON FOLLOWING FIGURE) Checked/Date: MF/MW 10/13/2011

MTA Westside Subway Extension Los Angeles, California



Project No.: 4953-10-1561 Figure: T8-B5a

(ft)				RY	Marti	LLING COMPANY/DRILLING ini Drilling / CME 75 LLING METHOD	BOREHOLE LOCATION	T8-B5 (Continued
ELEVATION (ft)	DEPTH (ft)	# >	# Z	% RECOVERY	Holic H DAT	ow-Stem Auger ES DRILLED	See Plate 3 HOLE DIAMETER	GROUND EL
EVAT)EPT	BOX#	RUN	REC	5/25/	11	8 inches	287 feet
ELE	Ι			%		OUNDWATER READINGS encountered during drilling		
						CL Af Continued At 20.3 to 21.1': Becom	nes mottled, strong brown (7.5YR 5/6) to	grayish brown (10YR
265		2	4	100		ML OLDER ALLUVIAL Clayey to Sandy Silt, al yellowish-brown (10YF) clasts 20 to 30%, up to (Tm) and sandstone (Tr	FAN DEPOSITS [Qfo] ternating gravelly and non-gravelly beds (\$ 5/6), gravelly beds very dark grayish bit 34 inch, mainly subangular to subrounder), organic-rich; appears moist to very moto 6 inches, lower contact is narrowly grant to 6 inches, lo	rown (10YR 3/2); ed slate (Jsm), shale noist and very stiff;
+	- 25 -					SM- Clayey, Silty Sand, fine brown (7.5YR 3/4); app	grained, trace coarse sand and fine grave bears moist and dense	el (Jsm and Tm); dark
260						Silty Gravel, clasts 30 t (Jsm), some shale (Tm) matrix is fine to coarse appears moist and dens SC At 26.5 to 27.8': Clayey	LLUVIAL FAN DEPOSITS (Qfo _n /Qfo 60%, up to 2 inches; mainly subangula, sandstone (Tm), quartzite and granitic silty sand; color variable, generally darke; lower contact is gradational solution, Silty Sand, fine grained, trace coarse sol; appears moist and dense	ar to subrounded slate rock also observed; brown (7.5YR 3/4);
-		2	5	56		At 27.8 to 30.0': No red	covery	
255	- 30 -					GC-GM At 30.0 to 32.3': Matrix	becomes fine to coarse silty, clayey sand	i
233		2	6	100		SM 15-30%, up to ½ inch, is sandstone (Tm); dark b	Clayey Sand with Gravel, fine to medium mainly subangular to subrounded slate (crown (7.5YR 3/4); appears very moist are	Ism), shale (Tm) and
						CH ESTUARINE DEPOS Clay, trace coarse sand grayish brown (2.5Y 5/		n (10YR 5/6) to trace manganese oxide
+	- 35 -					At 34.4 to 35.0': Silty, 0	Clayey Sand with Gravel, fine to coarse g nly subangular to subrounded slate (Jsm	grained, clasts 15 to
250		3	7	100		sandstone (Tm); dark g contact is sharp, irregul	rayish brown (10YR 4/2/); appears mois	t and dense; upper
+						At 38.0 to 40.0': Varve-	like bedding	
	- 40 -					At 39.7 to 40.2': Manga	nese oxide flecks increase to 5 to 10% Geologist: ME/MF	
						CONTINUED ON FOLLOWING	Prepared/Date: WL/	
			bway i	Extens	ion	amec®		BORING
J	LUS AL	igues,	Сашо	r ma		<u> </u>	Project No.: 4953-10-15	61 Figure: T8-B

									COMPANY/DRILLING	EQUIFMEN	11	BORING NO.
ıj.						1 1			ling / CME 75	DODELL	NAME OF THE OWNER OW	T8-B5
THIS RECORD IS AN INTERFECTATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LATTICUE AND LONGITUDE OF BOKING 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	[ff]	$\overline{}$			RY	ا <u>ن</u> ا			METHOD	See Plate	OLE LOCATION	(Continued)
	0	I (ft	#	#	VE	3 LC			n Auger			
1	ATI	DEPTH (ft)	BOX	RUN#	S	PLE	5/25/1		RILLED	8 inches	IAMETER	GROUND EL. 287 feet
	ELEVATION (ft)	DE	Ă		% RECOVERY	141			WATER READINGS	o inches		267 1001
4	EI				%				ered during drilling			
							Λ					
	245		3	8	100			MIL/ CL	Qe Continued Marker Bed M_E - Clay (10YR 4/2) to brown (10	ey Silt and Si OYR 4/3); app	ilty Clay, variable fine sand pears very moist and stiff; l	; dark grayish brown ower contact is sharp
	†						$\langle \parallel \parallel$	SM	LAKEWOOD FORMA	ATION [Olw	1	
								CL	Silty Sand, very fine gra	ined; pale bro	own (2.5Y 7/3); appears mo	
	+	- 45 -				H		SM	At 44.6 to 44.8': Clay, by lower contacts are sharp		4/3); appears moist and ver	ry stiff; upper and
	240	 - 50 —	3	9	94				Silty Sand, very fine gra (10YR 5/8); appears mo	ined; mottled ist and dense	, pale brown (2.5Y 7/3) to g ; well sorted; lower contact one, weathering decreases a	is sharp
	235—		4	10	56			SP/ SM	At 51.2 to 52.1': Little or Poorly Graded Sand with brown (2.5Y 7/4) to yell abundant non-micaceous At 52.8 to 55.0': No reco	h Silt, fine to lowish brown s, mafic sand	medium grained; color vari (10YR 5/8); appears damp	iable, generally pale to moist and dense;
	230	- 55	4	11	64		0	SP/ SM	5/8) to yellowish red (5Y At 55.9 to 56.1': Color b Marker Bed M _C - Silty	YR 4/6) becomes dark Sand with G c; clasts 30 to r contact occur	brown (7.5YR 3/2), abund ravel, fine to coarse grained 40 %, up to 1 inch; mainly urs between runs	ant mafic sand grains
1 ∟		- 60 -	<u> </u>	1	<u> </u>		\overline{A}				Geologist: ME/MF	
							(C	CONT	INUED ON FOLLOWING F	FIGURE)	Prepared/Date: WL/. Checked/Date: MF/N	PK 10/13/2011 MW 10/13/2011
_	N ATTO A	XX 7 = 4		L '		.		JO111	I TOLLO OIT I OLLOWING I	IGURL)		
				lbway] Califo		ıon			amec®		LOG OF	
		LUS A	ngeres,	Camb	ıııa						Project No.: 4953-10-156	Figure: T8-B5c

							COMPANY/DRILLING ling / CME 75	EQUIPMENT	BORING NO.
(ft)				₹		RILLING	METHOD	BOREHOLE LOCATION	T8-B5 (Continued)
ION	H (ft)	#	#	VEF	H E LO	ollow-Sten	=	See Plate 3 HOLE DIAMETER	GROUND EL.
ELEVATION (ft)	DEPTH (ft)	BOX#	RUN	% RECOVERY		25/11	ILLED	8 inches	287 feet
ELE	D			% F			VATER READINGS		
						ot encount	ered during drilling		
225 —	_) 0	SM	maximum 3 inches; ma subangular slate (Jsm);	fine to coarse grained, clasts 30 to 509 inly subrounded to rounded granitic rovarying color, generally strong brown contact is narrowly gradational	ck, quartzite and
-		4	12	64			Silty Sand, fine grained brown (10YR 5/8); app At 63.2 to 65': No reco	; mottled, light yellowish brown (2.5Y) ears moist and dense; lower contact is very	6/3) to yellowish narrowly gradational
-	— 65 —					SP/ SM	Poorly Graded Sand wi to strong brown (7.5YF	th Silt, fine to medium grained; mottle (\$\fo\$5/8); appears moist and dense	d, pale brown (2.5Y 8/2)
220-		5	13	80					
_							At 69.0 to 70.0': No red	covery	
-	- 70 -					SM	Silty Sand, fine grained (7.5YR 5/8); appears m	; mottled, light yellowish brown (2.5Y) oist and dense; well sorted; lower cont	6/3) to strong brown act is sharp
215—		5	14	100					
-							At 73.6 to 75.0': Mottle 6/8)	d, light yellowish brown (2.5Y 6/3) to	brownish yellow (10YR
-	- 75 - 					SM	SAN PEDRO FORMA At 75.0': Marker Bed Silty Sand, fine grained	ATION [Qsp] M _B - Oxidized Clay/Silt bed (<1/2 incl ; light greenish gray (10Y 7/1); appear	n thick), oxidized red rs moist and dense
210 —		5	15	100					
_	80								
						(CONT	INUED ON FOLLOWING	Geologist: ME/MI Prepared/Date: W Checked/Date: MI	L/PK 10/13/2011
			ibway] Califo		ion		amec®	LOG OF Project No.: 4953-10-1	F BORING 561 Figure: T8-B5d



	T				1	1	G COMPANY/DRILLII	NG EQUIPMEN	NT	BORING NO.
							lling / CME 75 G METHOD	PODEU	OLE LOCATION	T8-B5
ELEVATION (ft)	(£)			RY	OC.	Hollow-Ste		See Plate		(Continued)
ĮOĮ.	H (f	#	# Z	OVE	ΈĽ	DATES DI	-	1	DIAMETER	GROUND EL.
	DEPTH (ft)	BOX#	RUN	% RECOVERY	SAMPLE LOC.	5/25/11		8 inches		287 feet
ELE)	D	"		% R	SAN	GROUND	WATER READINGS			
П						Not encoun	ntered during drilling			
						\overline{N}	END OF BORING	AT 80 FEET		
							NOTES:			
	+ -	1						ith cement/bento	nite grout from bottom up and	l patched.
							-Munsell colors liste	ed in order of pre	dominance (most predominar	t color first).
)5 -	† -	1					-Non-recovery inter	ontacts and bedd vals are assumed	ing appear subhorizontal unle to occur at the bottom of run	unless otherwise
							noted. -Santa Monica Slate	(Jsm) clasts are	generally very dark gray, sub	angular to
	† -						subrounded slate un	less otherwise no	generally very dark gray, sub ted. Modelo Formation (Tm) lar to subrounded shale and sa	clasts are generally
							otherwise noted.	_		
							-The term "clasts" h -Beds are generally	erein describes g massive unless o	ravel-size rock fragments (lar therwise noted.	ger tnan ¼ inch).
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	<u> </u>	-	I	1		ı			Geologist: ME/MF	
									Prepared/Date: WL/Pl Checked/Date: MF/M	X 10/13/2011 W 10/13/2011
MT.	A West	side Su	ıhway	Extens	ร่อก			<u>~</u>	LOG OF I	
			, Califo				amec		Project No.: 4953-10-1561	
		-							110,000110 4755-10-1501	1.5 10 150

DRILLING COMPANY/DRILLING EQUIPMENT BORING NO. Tri Country Drilling / Deidrich D-120 THIS RECORD IS AN INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. LATITUDE AND LONGITUDE OF BORING LOCATION SHOWN ON LOGS ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BETWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL **T8-B6** DRILLING METHOD BOREHOLE LOCATION ELEVATION (ft) RECOVERY SAMPLE LOC. See Plate 3 DEPTH (ft) Hollow-Stem Auger RUN# BOX# DATES DRILLED HOLE DIAMETER GROUND EL. 284 feet 6/16/11-6/17/11 8 inches GROUNDWATER READINGS Encountered at 69-ft during drilling 6 inches of asphaltic concrete over 18 inches of base FILL [Af] CL Clay, some fine to coarse sand and trace gravel; brown METRO SOIL CORE S:\70131 GEOTECH\GINTW\FAULT_INVESTIGATION_WSE_LIBRARY AMEC OCTOBER2011 (2).GLB G\PROJECT_DIRECTORIES\4953\2010\101561_METRO_WESTSIDE_EXTENSION\6.2.3.2 FAULT HAZARD INVESTIGATION\3.2 ALL FIELD NOTES\GINT LOGS\101561-TRANSECT 8.GPI 10/14/11 NOTE: Jsm = Santa Monica Slate 280 Tm = Modelo Formation See end of log for more detailed clast descriptions 5 SC Poor recovery 5.0 to 19.0' Clayey Sand, trace gravel; light olive brown (2.5Y 5/4); appears moist and medium At 5.9 to 9.0': No recovery 1 1 23 275 $\overline{\text{CL}}$ Clay with gravel; dark grayish brown (2.5Y 4/2); appears moist and stiff 10 At 10.3 to 14': No recovery 1 2 26 270 At 14.7 to 19': No recovery 15 1 3 14 265 GM FLUVIAL DEPOSITS [Qfof1] Silty Gravel, clasts 50 to 60 %, up to 1½ inches, mainly angular to subangular slate (Jsm) sandstone (Tm); granitic, volcanic and other, matrix is fine to coarse silty sand; Geologist: ME/MW/MF Prepared/Date: WL/PK 10/13/2011 (CONTINUED ON FOLLOWING FIGURE) Checked/Date: MF/MW 10/13/2011

MTA Westside Subway Extension Los Angeles, California



OG OF BORING

Project No.: 4953-10-1561 Figure: T8-B6a

r (ft)	(;			RY	J J			BOREHOLE LOCATION See Plate 3	T8-B6 (Continued
ELEVATION (ft)	DEPTH (ft)	BOX#	RUN#	% RECOVERY	SAMPLE	DATES DRI 5/16/11-6/17 GROUNDW	ILLED	HOLE DIAMETER 8 inches	GROUND EL 284 feet
(f) (f) (g) 260 + + + + + + + + + + + + + + + + + + +	-	1	4	60	000000000000000000000000000000000000000	M GM	dark gray (10YR 4/1) Qfoff Continued appears dry to damp and the state of the s	and dense; lower contact is sharp	
260-	- 25 — -				000	ML ML	Silt with varying fine appears moist and sti	trace to some coarse sand and fine grave	el (Jsm and Tm)
255	-	1	5	50			decreasing with depth	, light olive brown (2.5Y 5/6); appears a olor becomes dark yellowish brown (10°	moist and medium dense
	- 30 -	1	6	80		ML	ESTUARINE DEPO Silt with varying fine some varve like beddi	sand; very dark brown (7.5YR 2.5/3); a	ppears moist and stiff;
250—	-						At 33.0 to 34.0': No n At 34.5 to 36.0': Grad	ecovery es to Clayey Silt with Sand, prominent	varve-like bedding
250	- 35 - -	1	7	46				Sand layer (2 inches thick), fine grained	
245	- 40					SM/ ML	Silty Sand to Sandy S and medium dense; g	ilt, very fine grained; light olive brown (enerally thickly bedded, occasional faint	varve-like bedding
			ıbway l		sion	(CONTI	NUED ON FOLLOWING	Prepared/Date: W Checked/Date: M	F BORING

DRILLING COMPANY/DRILLING EQUIPMENT BORING NO. Tri Country Drilling / Deidrich D-120 **T8-B6** THIS RECORD IS AN INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. LATITUDE AND LONGITUDE OF BORING LOCATION SHOWN ON LOGS ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BETWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL DRILLING METHOD BOREHOLE LOCATION ELEVATION (ft) RECOVERY SAMPLE LOC. (Continued) DEPTH (ft) Hollow-Stem Auger See Plate 3 RUN# DATES DRILLED HOLE DIAMETER GROUND EL. BOX ≠ 6/16/11-6/17/11 8 inches 284 feet GROUNDWATER READINGS Encountered at 69-ft during drilling SP Qe Continued At 40.0 to 40.4': Sand with Gravel bed, fine to coarse grained SM/ ML 8 50 1 At 41.5 to 44.0': No recovery METRO SOIL CORE S:/70131 GEOTECH/GINTW/FAULT INVESTIGATION_WSE_LIBRARY AMEC OCTOBER2011 (2),GLB
G:|PROJECT_DIRECTORIES/4953/2010/101561_METRO_WESTSIDE_EXTENSION/6.2.3.2 FAULT HAZARD INVESTIGATION/3.2 ALL FIELD NOTES/GINT LOGS/101561-TRANSECT 8.GPJ 240 45 At 49.5' Clay Silt bed (1/2 inch thick); dark reddish brown SM At 45.9 to 47.0': Silty Sand, very fine grained, thinly bedded clayey and silty layers; light olive brown 2.5Y 5/4); appears moist and dense; some beds slightly cemented 2 9 60 At 47.0 to 49.0': No recovery 235 Silty Sand as above, becomes coarser with depth Clayey to Sandy Silt; yellowish brown (10YR 5/4); prominent varve like bedding; ML coarsens with depth 50 2 10 80 Sandy Silt to Silty Sand, fine grained, trace coarse sand; light olive brown (2.5Y 5/4), SM appears moist and dense/stiff, some varve-like bedding 230 SP At 54.6 to 55.3': Becomes light yellowish brown (2.5Y 6/3); coarsens to fine sand 55 FLUVIAL DEPOSITS [Ofof1] SM Silty Sand with Gravel, fine to coarse grained, coarsens with depth, increasing gravel SP content, clasts maily Jsm and Tm; color variable; appears moist and dense At 55.7 to 56.4': Sand, very fine grained; light olive brown (2.5Y 5/6); appears moist 2 11 60 and dense At 57.0 to 59.0': No recovery 225 Silty Gravel, clasts 60 to 70%, up to 2 inches, mainly angualr to subangular granitic GM rock and quartzite, trace slate (Jsm) and shale (Tm), matrix is fine to coarse silty sand; olive brown (2.5Y 4/3); appears dry; depth of contacts uncertain due to poor recovery Geologist: ME/MW/MF Prepared/Date: WL/PK 10/13/2011 (CONTINUED ON FOLLOWING FIGURE) Checked/Date: MF/MW 10/13/2011

MTA Westside Subway Extension Los Angeles, California



OG OF BORING

Project No.: 4953-10-1561 Figure: T8-B6c

ft)				>	ri	Tri Co	ountry	COMPANY/DRILLING EO Drilling / Deidrich D-120 EMETHOD	QUIPMENT BOREHOLE LOC	CATION	BORING NO. T8-B6
ELEVATION (ft)	(ft)	#	#	% RECOVERY	SAMPLE LOC.			n Auger	See Plate 3	D.	(Continued) GROUND EL.
VAT	DEPTH (ft)	BOX#	RUN	ECO	MPLI	6/16/1		ILLED 7/11	HOLE DIAMETE 8 inches	K	284 feet
ELE				% R	SAI			VATER READINGS	1		
						Encou	intered	l at 69-ft during drilling			
ELEVATION (ft)		2	12	50			GP	Qfofl Continued At 61.5 to 64.0': No recov	very		
220-	65 -						SP- SM	Depth of contact uncertair LAKEWOOD FORMAT At 64.0 to 64.5': Sandy Si Poorly Graded Sand with yellowish brown (2.5Y 6/2 runs Marker Bed M _C - Silty S	ITON [Qlw] It Silt, fine to medium g 3); appears moist and	grained, coarsens d dense; lower conta	to 20%, up to ½
215 —	 	3	13	60				inch, mainly subrounded sappears moist and dense; At 67.0 to 69.0': No recov	slate (Jsm) quartzite a lower contact occurs ery	nd granitic rock; co between runs	olor variable;
213							SP- SM	At 69': Groundwater enco At 69.0 to 74.0': Poor reco	untered during drillin overy sample appears	g wet/disturbed	
-	- 70 -	-					SP- SM	Poorly Graded Sand with brown (2.5Y 5/4); appears			
-		_					DI.I		·		
_	 	3	14	48				At 71.4 to 74.0': No recov	ery		
210-	- 75 -						SM	At 74.0 to 76.0': Grades to	very fine Silty Sand		
-	-						ML	Silt interbeds, thin; olive (•	_	•
-		3	15	70			SP- SM	Poorly Graded Sand with	Sut; pale yellow (5 Y	//o); appears mois	and dense
210								At 77.5 to 79.0': No recov	ery		
205 —	-				$\dagger \uparrow$			At 79.0 to 80.2': Sample a	ppears wet		
	L ₈₀ –								Geol Pren	logist: ME/MW/M ared/Date: WL/P	IF K 10/13/2011
						((CONT	INUED ON FOLLOWING FIG	GURE) Chec	cked/Date: MF/M	W 10/13/2011
			ıbway l Califo		sion			amec®			BORING
		<u> </u>		-					Project I	No.: 4953-10-1561	Figure: T8-B6

DRILLING COMPANY/DRILLING EQUIPMENT BORING NO. Tri Country Drilling / Deidrich D-120 **T8-B6** THIS RECORD IS AN INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. LATITUDE AND LONGITUDE OF BORING LOCATION SHOWN ON LOGS ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BETWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL BOREHOLE LOCATION DRILLING METHOD ELEVATION (ft) RECOVERY (Continued) SAMPLE LOC DEPTH (ft) Hollow-Stem Auger See Plate 3 RUN DATES DRILLED HOLE DIAMETER GROUND EL. BOX ≠ 6/16/11-6/17/11 8 inches 284 feet GROUNDWATER READINGS Encountered at 69-ft during drilling **Olw Continued** SP-SAN PEDRO FORMATION [Qsp] 16 56 Poorly Graded Sand with Silt, fine to medium grained; dark grayish green (5Y 3/2); SM appears moist and dense; thickly bedded; oxidizes upon exposure to air; lower contact At 81.8 to 84.0': No recovery METRO SOIL CORE 5:70131 GEOTECH/GINTW/FAULT INVESTIGATION WSE LIBRARY AMEC OCTOBER2011 (2),GLB
G/PROJECT DIRECTORIES/4953/2010/101561 METRO WESTSIDE EXTENSION/6,2,3,2,PROJECT DIRECTORIES/GINT LOGS/101561-TRANSECT 8,GPJ 200 85 17 At 86.7 to 89.0': No recovery 195 90 18 96 At 91.8 to 93.0': Trace subrounded gravel; mostly granitic SM At 93.0 to 93.8': Becomes very fine grained; dark grayish green (5GY 5/2); appears wet and medium dense; bedding dip near horizontal 190 **END OF BORING AT 94 FEET** 95 Boring backfilled with cement/bentonite grout from bottom up and patched. -Munsell colors listed in order of predominance (most predominant color first). -Where observed, contacts and bedding appear subhorizontal unless otherwise noted. -Non-recovery intervals are assumed to occur at the bottom of run unless otherwise -Santa Monica Slate (Jsm) clasts are generally very dark gray, subangular to subrounded slate unless otherwise noted. Modelo Formation (Tm) clasts are generally white to pale yellow to tan, subangular to subrounded shale and sandstone unless otherwise noted. -The term "clasts" herein describes gravel-size rock fragments (larger than ¼ inch). -Beds are generally massive unless otherwise noted. 185 Geologist: ME/MW/MF Prepared/Date: WL/PK 10/13/2011 Checked/Date: MF/MW 10/13/2011

MTA Westside Subway Extension

Los Angeles, California

OG OF BORING

Project No.: 4953-10-1561 Figure: T8-B6e

APPENDIX C-2 LOGS OF BORINGS – CURRENT GEOTECHNICAL INVESTIGATION

Amec, Current Geotechnical Investigation

Rotary Wash Borings:

G-154, G-156, G-159, G-161, G-162, G-164, G-165, G-166A/B, G-168, G-169, G-171, G-173, G-174A, and G-200Alt - Lab Testing

Sonic Core Borings:

S-110 and S-111 – Lab Testing

Cone Penetrometer Tests:

C-115, C-117, and C-118, C-119, C-119A, C-120, C-120A, and C-120A1

				ы								COMPANY/DR	ILLING EQUIPMENT	BORING NO.
ADUAL N (ft)	ft)	E	**(NTEN wt.)	SITY	*LZ	SSING	,0C.	TESTS	DRIL		METHOD	BOREHOLE LOCATION Sta 696+10, Lt 10 feet	G-154
BE GR ATIO	DEPTH (ft)	VALU EN.TE	OVA (ppm)**	TURE CONT (% of dry wt.)	DENS (pcf)	COU ws/ft)	VT PA 00 SII	SAMPLE LOC.	HOLE			ILLED 10/2011	HOLE DIAMETER 4-7/8 inches	GROUND EL. 274 feet
ELEVATION (ft)	DE	"N" VALUE STD.PEN.TEST	OVA	MOISTURE CONTENT (% of dry wt.)	DRY DENSITY (pcf)	BLOW COUNT* (blows/ft)	PERCENT PASSING No. 200 SIEVE	SAM	DOWNHOLE TESTS	GRO	UND-V	VATER READI		
ES MAY DIFFER. INTERFACES BETWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL Monica/Centuty City Station ELEVATION (ft)		-									ML	Grass Surface FILL [Af] SANDY SILT	- moist, brown to dark brown	
TIONS BI	 	_												
3. TKANDI	_ 5 _ 	_	9.3	16.2	103	8					ML		RY YOUNGER ALLUVIUM ND - medium stiff, moist, dark b clay	
	- ·		7.3	10.2	103	8				X				
	- 10 -	24	5.1	16.2	_			М			CL	SANDY LEA	N CLAY - very stiff, moist, dark	brown
On	- 15 -		8.6	21.9	100	16		×				December at the	Tr. dayly alive known two a good	
ity Stati	 	-	8.0	21.9	100	10						Becomes sur	ff, dark olive brown, trace sand	
ntuty C	_ 20 _	-										GT T 14 G 1		
Monica/Centuty City Station	 	14	11.8	26.8	-						ML	SILT with SA	ND - stiff, moist, gray, some clay	7
Santa Mo	 	_												
3	- 25 - 		9.2	16.6	114	90/10"		፟				Becomes har	d .RY OLDER ALLUVIUM [Qal	lol
TOINS AINT	 		8.7	17.3	110	88/10"		\boxtimes			CL		with SAND - very stiff to hard, 1	
ENEOCAL	- 30 -	26	12.2	19.1	-							Some thin la	yers of Silty Sand	
SALOIH	 	_	5.3	13.4	113	55	78	<u></u>					(up to 3/8 inch in size), thin laye	r of
NOTION	- - 35 -	10	11.6	17.1			46					Silty Sand		
ACE CO	- 	42	11.6	17.1	-		46				SM CH	trace gravel	O - dense, moist, brown, fine to m very stiff, moist, gray, trace sand	_
SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIM Santa	 		10.9	21.6	103	20		፟					- 2.	
	└ 40 −			•		(0	CONTI	NUE	D 0	N FOL	LOWIN	NG FIGURE)	Field Tech: AF Prepared/Date: Checked/Date:	
		side Si ngeles				<u> </u>				m		9	LOG OF BC Project No.: 4953-10-1561 F	ORING



											1			ILLING EQUIFMENT	BORING NO.
ا ن					Ţ			ריז		S	C &	L Dri	ling / Mayhew 1000	1	G-154
			.		E	7	*	ΙŽm	١.,	SŢ	DRI	LLIN	G METHOD	BOREHOLE LOCATION	
T¥5		£	ST	* *	T.	(T)	Ţ		$ \mathcal{C} $	Ĕ		ry Wa		Sta 696+10, Lt 10 feet	(Continued)
XX		J)]	5日	m)) V W	ZS]	50	A H	$ \mathcal{I} $	Щ		•		·	
188		Ŧ	4z	dd)	E (DEI pcf	\s\ \s\ \s\	T O	LE	OF	1		RILLED	HOLE DIAMETER	GROUND EL.
API Y B	Y	DEPTH (ft)	PE	A (STURE CONT (% of dry wt.)	Y L	N (X 8	M	Ĕ	2/9/2	2011 -	2/10/2011	4-7/8 inches	274 feet
NS AT THE EXPLORATION LOCATION. LATITUDE AND LONGITUDE OF BORING LOCATION SHOWN ON LOGS ARE APPROXIMATE. THE STATE MAY DIFFER. INTERFACES BETWEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.	ELEVATION (ft)	D	"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	GRO	OUND	-WATER READIN	VGS	1
\(\frac{1}{2} \)	田田		S	•	OI	Ι	BI	買了		Ó	Drill	ing m	ud bailed on 2/9/201	1. Ground-water level measured	at 50 feet below
ΙöΣ					M			"		П	the g	round	surface on 2/10/201	11.	
									H		H_{M}	ML	SILT - very sti	iff, moist, brown and gray, trace s	and trace
[og			26	10.0	16.9	-			M			IVIL		/4 inch in size), some clay	and, trace
													3 (
												SC	CLAYEY SAN	ND with GRAVEL - very dense, 1	noist, brown
				11.4	12.6	115	68	31	\boxtimes					grained, gravel (up to 3/4 inch in	
				11.4	12.0	113	08	31) 			
]									3			
		— 45 —							Н			CL	LEANCLAY	with GRAVEL - hard, moist, bro	wn and orav
: ⊡≱			37	7.2	17.3	-			M		W/S/			/2 inch in size)	wii ana gray,
									Ш		1//N	1	1	l (6 inch layer)	
			1								<i>(2)</i>	<u> </u>		· ·	
길				12.0	11.1	118	85/8"	24	\boxtimes		ŊΜ	SM		with GRAVEL - very dense, mo	
H8		_		12.0	11.1	110	03/0		XX		1.74	<u>. </u>	gray, fine to co	parse-grained, gravel (up to 1/2 in	cn in size)
											KJ-1-1	[]			
[]5₹		- 50 -							H			GW	■ WELL GRAD	ED GRAVEL - very dense, mois	t orav oravel
			58	10.2	9.1	-			M		. 6.] "	(up to 3/4 inch	in size)	i, gray, graver
									Ш			1		,	
\(\frac{1}{2}\)											. • (
				11.8	10.3	129	68	14	\boxtimes		KXX	₽ GC	CLAYEY GR.	AVEL with SAND - very dense,	wet, brown, fine
				11.0	10.5	129	00	17	XX		6/2	\$	to coarse-grain	ned, gravel (up to 3/4 inch in size)	
	l no											4			
	Station	– 55 –							H		}	GW	WELLGRAD	ED GRAVEL - very dense, brow	n. gravel (up to
	St		83		1.7	-			M		. 8.] "]		very little recovery	ii, graver (up to
	City											1	1	, ,	
POL	∭5										3/M	SM		with GRAVEL - very dense, wet	
	i∭ ţ.			8.5	10.3	119	87	16	\boxtimes				gray, fine to co	parse-grained, gravel (up to 3/4 in	ch in size)
<u> 2</u>	■]	0.5	10.5	117	07	10			[3,] }				
∏∑∠	© ಲಿ														
	Santa Monica/Centuty	– 60 –										ML	SILT - verv sti	iff, wet, olive brown, trace sand, t	race iron oxide
	¦∭ ii ∭		23	10.2	30.1	-			M			1112	stains, some cl		
E E E															
HEX.	[E		1									CL		with SAND - very stiff to hard, n	noist, brown
HA H					18.5	110	36		\boxtimes				and gray		
	S S				10.0	110									
		– 65 –													
			29	10.5	21.6	-			IM				Iron oxide sta	ains	
DEC DEC		_]								<i>\\\\\</i>	1			
NA N]												
				10.1	26.3	99	37		\boxtimes						
												SM	SILTY SAND	- dense, wet, olive brown, fine-gr	rained
		70										:			
163		— 70 —	25	5.6	21.0							ML	SANDY SILT	- very stiff, very moist, olive brow	wn, some clay
			25	5.6	21.9	-			IXI						-
												3			
LOI													1		
- R- Z				9.8	24.0	93	32		\boxtimes			- CT	LEANCLAN		
 				·							<i>\\\\\</i>	CL	LEAN CLAY	- very stiff, moist, olive brown	
		75									KKK	ML	SILT - hard m	noist, brown and gray, some clay	
39		— 75 —	20	7.0	27.1							IVIL		, oro and gray, some city	
			39	7.8	27.1	-			$\ X\ $						
													Thin layer of	Silty Sand, fine-grained	
THIS RECORD IS AN INTERPRETATION OF SUBSURFACE CONDITIONS THIS RECORD IS AN INTERPRETATION OF SUBSURFACE CONDITIONS AND AT OTHER LOCATIONS AND AT OTHER LOCATIONS AND AT OTHER														- · · · ·	
				9.2	33.7	87	32		₩			CL	LEAN CLAY	with SAND - very stiff, moist, oli	ve gray
HS HS	195—										<i>\\\\\</i>	3		, ,	
		90										1	1		
5		- 80 -									1			Field Tech: AR	
														Prepared/Date:	
9							(C	CONTIN	NUE	DO	N FOI	LLOW	'ING FIGURE)		LT/PE 9/20/2011
\vdash							<u> </u>								

DRILLING COMPANY/DRILLING EQUIPMENT

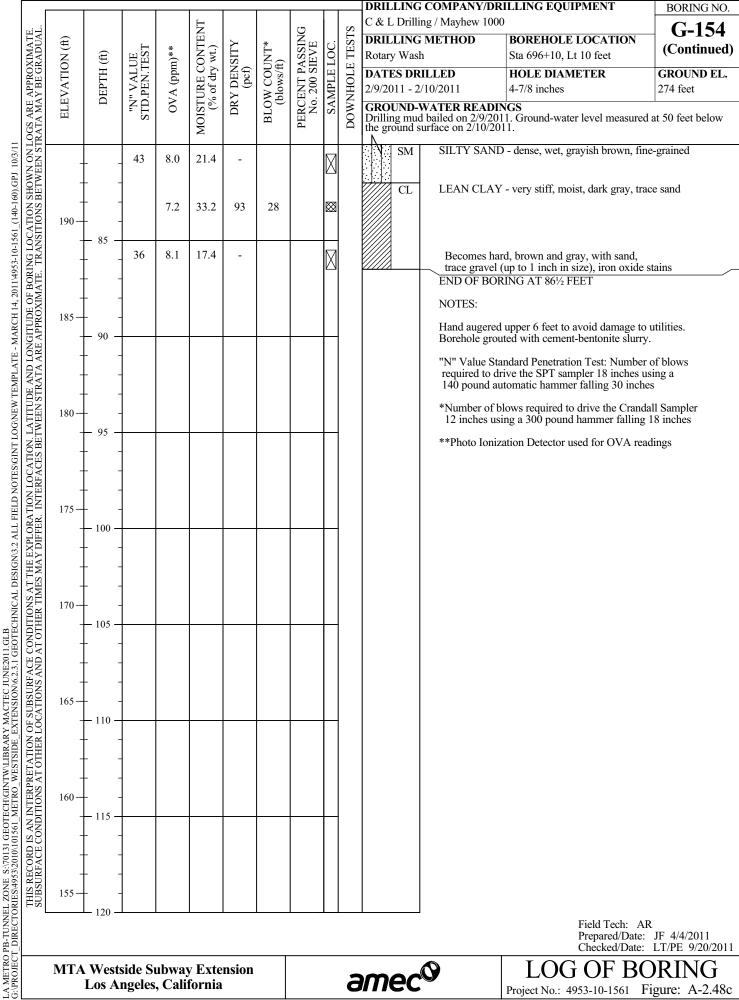
BORING NO.

MTA Westside Subway Extension Los Angeles, California

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 DESIGN3.2 ALL FIELD NOTES/GINT LOGINEW TEMPLATE - MARCH 14, 2011/4953-10-1561_(140-160).GPJ 10:3/11

amec®

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



OG OF BORING

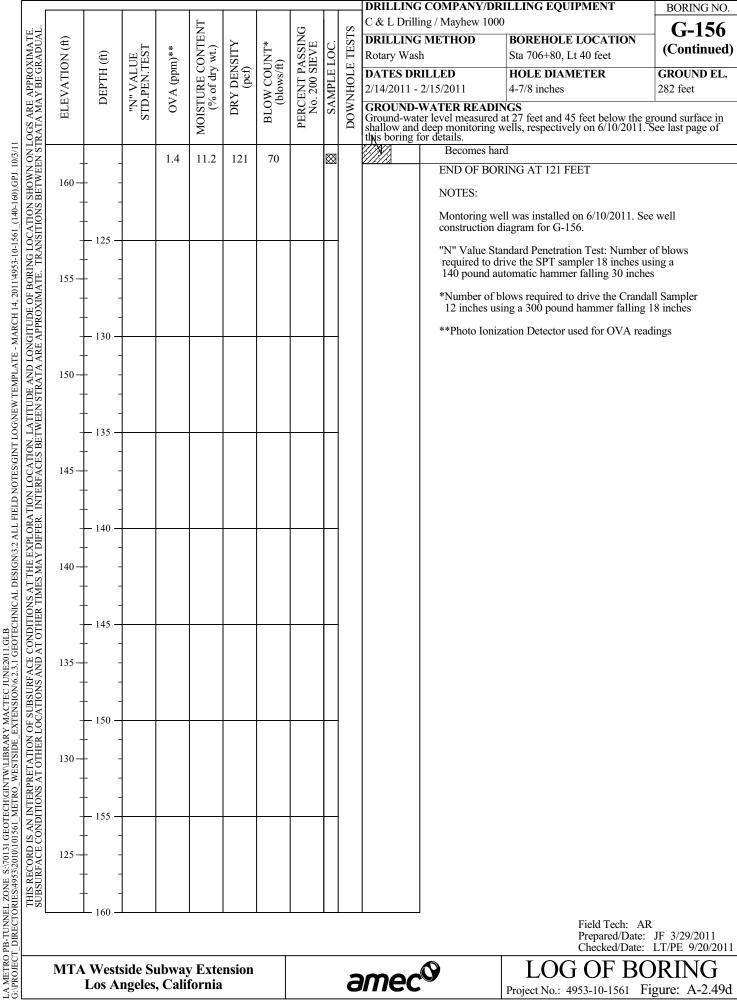
Project No.: 4953-10-1561 Figure: A-2.48c

					LN.			DJ.		S	C & L Dril	ling / Mayhew 1000		BORING
ELEVATION (ft)		(H)	JE EST	ı)**	ONTE wt.)	SITY	*LN	SSIN EVE	0C.	TES	Rotary Wa	G METHOD sh	Sta 706+80, Lt 40 feet	G-15
ATIO		DEPTH (ft)	VALU EN.T	OVA (ppm)**	RE CO	DEN; (pcf)	COU Jws/ft	NT PA	SAMPLE LOC.	HOLE	DATES D 1 2/14/2011		HOLE DIAMETER 4-7/8 inches	GROUND
ELEV		DE	"N" VALUE STD.PEN.TEST	OVA	MOISTURE CONTENT (% of dry wt.)	DRY DENSITY (pcf)	BLOW COUNT* (blows/ft)	PERCENT PASSING No. 200 SIEVE	SAM	DOWNHOLE TESTS	GROUND	-WATER READIN		
	-				_				H		this boring	8-inch thick G	rass Surface, No Base Course	
280	†	-									SM	FILL [Af] SILTY SAND gravel, layer of	- moist, brown, fine to medium- f base course	grained, some
	+	-										OHATERNA	RY YOUNGER ALLUVIUM [Oall
	Ŧ	5 —		1.9	0.6		12		NX.		SM	SILTY SAND	with GRAVEL - loose, moist, br grained, fine gravel (up to 1/4 inc	ownish red,
275	‡	-			9.6	-	12		⊠ ∞					
	+	-		2.1	17.3	106	17		▩				dium dense, trace gravel	
	+:	10 —	12	4.7	15.7	_			М		CL	SANDY LEAD	N CLAY - stiff, moist, brown, fin	e to medium
270	Ţ	-												
	+	-		1.7	16.1	108	11		\boxtimes		SC	CLAYEY SAI	ND - loose, moist, brown, fine to ed, some coarse	
	‡	- 15 —							Ш			QUATERNA	RY OLDER ALLUVIUM [Qal	
	+	-	15	3.2	33.5	-					CL- ML	SILTY CLAY	- stiff, moist, brown, trace fine sa	and
265	‡	-		2.1	15.4	104	1.4	26	NA		SM		- medium dense, moist, olive broad, some coarse, trace fine gravel	
	+	_		2.1	15.4	104	14	36	\boxtimes			in size)	, ,	
	+ 2	20 —	14	2.5	14.2	-			M				oist, brown, some fine sand, thin	layers of Sil
260	+	-										Clay		
	<u> </u>	-		1.5	13.7	117	28		₩		SM	SILTY SAND medium-grains	- medium dense, moist, brown, f	ine to
	+ :	25 —							Н				, , , , , , , , , , , , , , , , , , ,	/
255	<u> </u>	-	20	2.1	12.0	-						$ \underline{\nabla}$		
	+	-		1.2	15.9	112	26	42	\boxtimes				(up to 1/2 inch in size)	
	<u></u>	30 —											,	
	+	-	20	2.6	23.6	-					ML	SILT - stiff. m	oist, brown, some fine sand, som	e clav
250	†	-										,		j
	+	_		1.2	21.8	100	16		\boxtimes					
	+ 3	35 —	17	2.8	31.2	-		90			СН	FAT CLAY -	very stiff, moist, dark brown, trac	ce fine sand
245	+	_												
	+	-		1.4	-	-	32		\boxtimes		CL	LEAN CLAY sand, trace fine	with SAND - hard, moist, brown	, very fine
	I.	40 —										Saliu, trace fine		
							(C	CONTI	NUF	DΩ	N FOLLOW	ING FIGURE)	Field Tech: AR Prepared/Date: Checked/Date:	JF 3/29/20
MT.					y Exte							0	LOG OF BC	
	Lo	s A	ngeles	, Cali	fornia	!				Ö	med		Project No.: 4953-10-1561 Fi	

				L						1		COMPANY/DR ing / Mayhew 1000	ILLING EQUIPMENT	BORING NO
ELEVATION (ft)	(ff)	UE	»*(u	MOISTURE CONTENT (% of dry wt.)	DRY DENSITY (pcf)	JNT* (f	PERCENT PASSING No. 200 SIEVE	LOC.	DOWNHOLE TESTS	DRII		METHOD	BOREHOLE LOCATION Sta 706+80, Lt 40 feet	G-156 (Continued
VATIO	DEPTH (ft)	"N" VALUE STD.PEN.TEST	OVA (ppm)**	STURE CONT (% of dry wt.)	Y DEN (pcf)	BLOW COUNT* (blows/ft)	ENT P	SAMPLE LOC.	MHOLI	1		2/15/2011	HOLE DIAMETER 4-7/8 inches	GROUND EL. 282 feet
ELE		N" STD	AO.	MOIST %)	DR	BLO	PERC	SA	DOW	Grou	nd-wat w and	WATER READING or level measured a deep monitoring wor details.	NGS at 27 feet and 45 feet below the g wells, respectively on 6/10/2011.	ground surface in See last page of
240-		23	2.8	26.4	-		82					Becomes ver	y stiff	
	+	-		-	-	26						(Sample not	recovered)	
	45	_ 25	3.6	26.6	-							Ţ		
235 -	† - -		1.0	16.2	110	46	63	፟			CL	SANDY LEA	N CLAY - hard, moist, light brow	wn, fine sand
230-	50	25	2.3	18.3	-		58					Very stiff, tra	ace gravel (up to 3/8 inch in size)	
230 -	 		1.0	14.5	113	51		₩			SM ML	medium-grain	O - dense, very moist, brown, fine ed, some coarse C - moist, brown, fine sand	to
225 –	55	92/11"	2.8	22.0	-						SM	SILTY SAND fine to coarse-	with GRAVEL - very dense, ver grained, gravel (up to 1/4 inch in	ry moist, brown, size)
	 - -	-	1.5	7.2	118	65/6"		፟				Gravel (up to	o 1 inch in size)	
220-	60	76	2.5	13.0	-		21					Gravel (up to	o 3/4 inch in size)	
	 - -	-	1.4	13.5	112	75/6"		፟						
	65	81	2.1	15.2	-		19							
	-	-	1.0	9.4	123	100/10'	<u> </u> 	፟			GW	WELL GRAD	DED GRAVEL - very dense, wet, d, gravel (up to 1 inch in size)	fine to
	- 70 -	_ 65	2.4	21.2	-		28				SM	SILTY SAND trace gravel (u	O - very dense, wet, brown, fine to up to 1/2 inch in size)	coarse-grained,
1	- - -		0.8	23.5	96	47		▧			CL- ML	SILTY CLAY	7 - hard, moist, grayish brown, tra	ace fine sand
Tunnel	- 75 -	57/6"	1.5	2.1	-						SM	SILTY SAND to medium-gra	with GRAVEL - very dense, mo ained, slate gravel (up to 2 inches	oist, brown, fine s in size)
	- - -		0.8	15.5	116	38		፟		1434	ML	SILT - hard, v gravel, some c	vet, grayish dark brown, trace fin slay	ne sand, trace
	L 80					((CONTI	NUF	ED O	N FOI	LOW	NG FIGURE)	Field Tech: AF Prepared/Date: Checked/Date:	JF 3/29/2011
MTA	A Wes	tside Si Angeles	ubwa , Cali	y Exte	ension	i				m		6	LOG OF BC Project No.: 4953-10-1561 Fi	DRING

		1		Ι.							BORING NO
£				ENT	_	<u></u>	NG.		TESTS	C & L Drilling / Mayhew 1000 DRILLING METHOD BOREHOLE LOCATION	G-156
)N((£)	JE TEST	**(1	oni wt.)	SIT	NI TNI	ASSI EVE		TE	Rotary Wash Sta 706+80, Lt 40 feet	Continued
ATIC	DEPTH (ft)	ALI EN.T	udd)	E C f dry	DEN (pcf)	COL ws/fi	TT P/ 00 SI	JLE]	OLE		ROUND EL.
ELEVATION (ft)	DE	"N" VALUE STD.PEN.TEST	OVA (ppm)**	STURE CONT (% of dry wt.)	DRY DENSITY (pcf)	BLOW COUNT* (blows/ft)	PERCENT PASSING No. 200 SIEVE	SAMPLE LOC.	DOWNHOLE	2/14/2011 - 2/15/2011 4-7/8 inches 28 GROUND-WATER READINGS	32 feet
EI		" SI		MOISTURE CONTENT (% of dry wt.)	Ω	BL	PER	S	DOV	Ground-water level measured at 27 feet and 45 feet below the ground shallow and deep monitoring wells, respectively on 6/10/2011. See this boring for details.	
	_	27	2.1	17.1	-			M		CL- SILTY CLAY - very stiff, moist, gray, with layers of ML Silt	of Clayey
]									
	_	-	0.8	23.5	101	60		₩		Becomes hard	
	85 -	<u> </u>									
		41	2.5	15.6	-					Trace gravel	
195 –	<u> </u>]									
	_	-								CI SANDY I FAN CI AV hard majet light brown	fina cand
	90 -	1	0.5	12.9	108	46		×		CL SANDY LEAN CLAY - hard, moist, light brown, f	inic saliu
	†	1									
190 –	<u> </u>]									
	_	-									
	95 -	 						H			
		50		-	-					(Sample not recovered)	
185 –	<u> </u>]									
	_	-								WELL GRADED SAND with GRAVEL - very der	ise, wet,
	100 -	-	^ 7		100	0.1		NZZZ		dark gray, fine to coarse-grained	
		1	0.7	6.9	122	81		▩		SANDY SILT - moist, brown to gray, fine sand	
180 -	Ī]									
-	-	-								CL- SILTY CLAY - hard, moist, brown to gray	
	105 -	41	1.0	21.7						ML SIETT CETT mad, moist, stewn to gray	
177		41	1.9	21.7	-						
175 –	I]									
	+	-								Alternating with clay layers	
	110 -	+	1.0	23.5	100	50		⊠		Thin layer of Silts Soud become	
170-	<u> </u>	1	1.0	23.3	100	30				Thin layer of Silty Sand, brown SANDY LEAN CLAY - hard, moist, gray and brown	wn, fine
1,0	-	-								sand	•
	+	-									
	115 -	28	1.5	8.9	_					Some gravel	
165 –	<u> </u>	1 2	1.5	0.7						Joine graver	
	+	-									
	+	-									
	⊥ ₁₂₀ –	1	<u> </u>	1	<u> </u>	<u> </u>	<u> </u>	Ш		Field Tech: AR	
						(0	CONTIN	NUE	D O	FOLLOWING FIGURE) Prepared/Date: JF Checked/Date: LT/	3/29/2011 /PE 9/20/20
MTA	\ West								_	LOG OF BOR	RING
	Los A	ngeles	, Cali	fornia	<u> </u>				d	Project No.: 4953-10-1561 Figur	





OG OF BORING

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

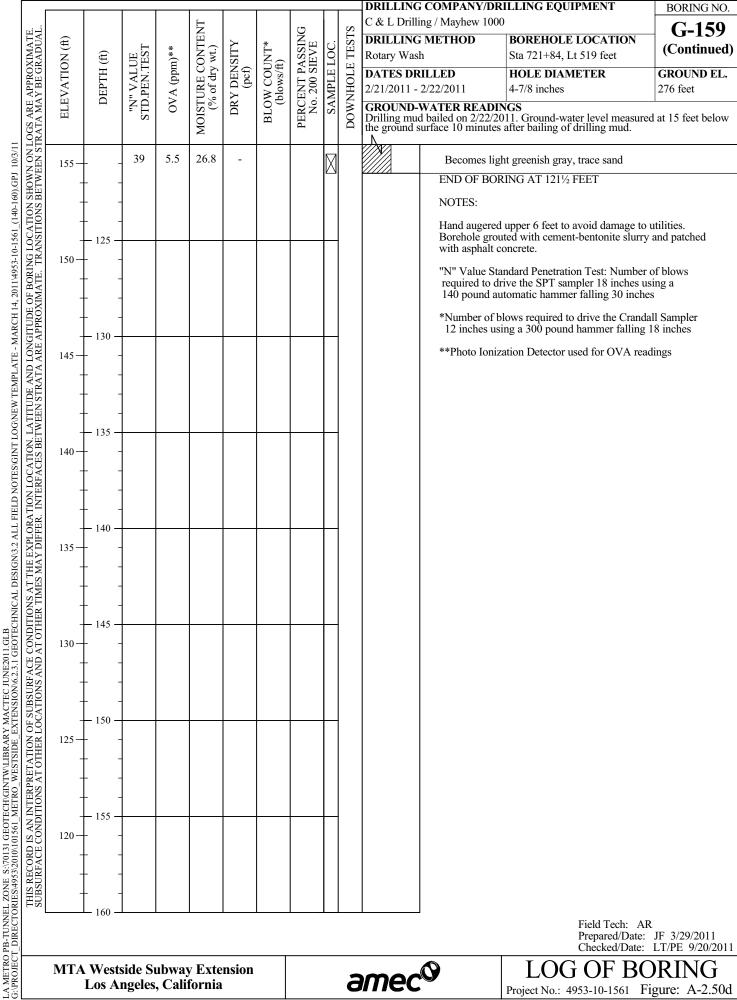
DRILLING COMPANY/DRILLING EQUIPMENT BORING NO. C & L Drilling / Mayhew 1000 MOISTURE CONTENT (% of dry wt.) DOWNHOLE TESTS PERCENT PASSING No. 200 SIEVE THIS RECORD IS AN INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. LATITUDE AND LONGITUDE OF BORING LOCATION SHOWN ON LOGS ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BETWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL G-159 DRILLING METHOD BOREHOLE LOCATION ELEVATION (ft) DRY DENSITY (pcf) SAMPLE LOC. BLOW COUNT* (blows/ft) "N" VALUE STD.PEN.TEST OVA (ppm)** Rotary Wash DEPTH (ft) 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. 12-inch thick Asphalt Concrete over 12-inch thick Portland Cement Concrete, No Base Course 275 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 DESIGN3.2 ALL FIELD NOTES/GINT LOG/NEW TEMPLATE - MARCH 14, 2011/4953-10-1561_(140-160).GPJ FILL [Af] QUATERNARY OLDER ALLUVIUM [Qalo] 270 8/4" 11.3 16.4 100 ML SILT with SAND - medium stiff, moist, olive brown and gray 10 SANDY SILT - stiff, moist, brown and gray ML 14 8.7 26.0 265 ∇ 15 16.0 103 11 260 SM SILTY SAND - loose, wet, brown, fine to medium-grained, trace gravel SANDY LEAN CLAY - stiff, moist, gray and brown, trace CL gravel (up to 3/4 inch in size), scattered calcium carbonate 11 9.4 16.9 255 25 9.6 14.2 \boxtimes 116 31 Becomes very stiff, trace gravel (up to 1/4 inch in size) 250 30 26 22.9 Decrease in sand content, becomes olive gray, 245 trace iron oxide stains 35 18.6 109 27 \boxtimes Becomes brown 240 Field Tech: AR Prepared/Date: JF 3/29/2011 (CONTINUED ON FOLLOWING FIGURE) Checked/Date: LT/PE 9/20/2011

MTA Westside Subway Extension Los Angeles, California



				F			75		70	I .	NG COMPANY/Dailling / Mayhew 100	RILLING EQUIPMENT	BORING NO G-159
(ff)		E	*	TEN t.)	TY	*_	SINC	C.	EST	DRILLI Rotary W	NG METHOD	BOREHOLE LOCATION	(Continued
IION	DEPTH (ft)	"N" VALUE STD.PEN.TEST	OVA (ppm)**	TURE CONT (% of dry wt.)	DRY DENSITY (pcf)	BLOW COUNT* (blows/ft)	PAS	SAMPLE LOC.	LE T		DRILLED	Sta 721+84, Lt 519 feet HOLE DIAMETER	GROUND EL
ELEVATION (ft)	OEPT	("VA	VA (F	TURE % of 6	(P)	W C	ENT 2. 200	MPI	NHO	2/21/201	- 2/22/2011	4-7/8 inches	276 feet
BLI		A".	6	MOISTURE CONTENT (% of dry wt.)	DR	BLC	PERCENT PASSING No. 200 SIEVE	SA	DOWNHOLE TESTS	GROUN Drilling r the groun	D-WATER READ nud bailed on 2/22/2 d surface 10 minute	INGS 2011. Ground-water level measure es after bailing of drilling mud.	ed at 15 feet below
235-		_ 22	8.5	19.3	-			M					
-	<u> </u>												
	45 -	<u> </u>	3.9	21.4	103	29		 					
230 -	<u> </u>		3.9	21.1	103	23							
-	Ī	1											
225 –	50 -	_ 29	8.1	20.8	-								
-	‡	-											
-	55 -	-									ELACTIC CI	III T with SAND ware at iff an aint	
220-	1		8.6	19.2	101	35	78	▩		M	H ELASTIC SI	ILT with SAND - very stiff, moist,	, gray
		_											
	60 -	43	4.3	20.0	_					C		Y with SAND - hard, moist, brow 1/8 inch in size)	n and gray, trace
215 -	†]									graver (up to	1/8 men in size)	
-	†	1											
210-	65 -	-	8.5	16.6	112	71	50	₩		SI		D - very dense, moist, brown, fine ined, trace gravel (up to 3/8 inch in	
-	+	-											
-	70 -	-								C	SANDY LE.	AN CLAY - hard, moist, brownish	n gray
205 -	<u> </u>	52	7.6	19.4	-		39			So	CLAYEY SA coarse-graine	AND - very dense, moist, brown, fed, gravel (up to 3/8 inch in size)	fine to
	<u> </u>	_								C	LEAN CLA	Y - hard, moist, brown, trace sand	
200-	75 -		4.8	36.7	87	53	91	₩					
_00										S		D - dense, wet, light brown, fine to ined, trace gravel	0
-	00	_											
	- 80 -	•				((CONTI	NUF	ED O	N FOLLO	─ WING FIGURE)	Field Tech: Al Prepared/Date: Checked/Date:	
MTA		tside S									6	LOG OF BO	
	Los A	ngeles	s, Cali	itornia	1				0	me	<u> </u>	Project No.: 4953-10-1561 F	igure: A-2.50

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.	NHOLE TE	DRILLI Rotary V DATES 2/21/201	Wash DRI	S	Sta 721+84, Lt 519 feet	G-159 (Continued
74			BLOW COUI (blows/ft)	PERCENT PA No. 200 SII	SAMPLE	I 2					
74			Old) (blo	PERCEN No. 20	SAMI		2/21/201			HOLE DIAMETER	GROUND EL
74			B	PE		× (0	GROUN	ND-V	VATER READING	I-7/8 inches	276 feet
95 _ 74	5.9 23.4	-			Ш		Drilling : the grou	mud nd su	bailed on 2/22/2011 urface 10 minutes aft	. Ground-water level measured ter bailing of drilling mud.	d at 15 feet below
+ + 1					M			СН	SANDY FAT Cl carbonate nodule	LAY - hard, moist, gray, trace es, trace gravel	calcium
85		110	40		NA.				_		
	5.0 16.2	113	48	63	₩				Trace gravel (u	p to 3/8 inch in size)	
- 90					Ш						
********	4.3 15.7	-		50			//// S	SC	medium-grained inch in size)	O - very dense, moist, gray, fine, trace iron oxide stains, trace g	e to gravel (up to 1/8
95 - 95		- 8	30/10"			<u> </u>	/// S	SM	SILTY SAND - medium-grained	very dense, moist, brown, fine, some coarse sand and gravel	to
									(Sample not rec	covered)	
_ 100 _ 47	4.7 24.5	-					N	ЛL	SANDY SILT - stains	hard, very moist, olive brown,	trace iron oxide
								CL		ith SAND - hard, moist, gray, s	some calcium
105					Ц				carbonate nodule	es	
170 —	5.6 18.0	111	44								
† †											
110 - 37	3.6 19.4	-			M						
115											
	4.2 31.3	87	51		▩				Becomes dark g	gray	
									Coarse gravel la	ayer	
120										Field Tech: AR	
			(CC	ONTIN	NUE	D ON	FOLLO	OWIN	NG FIGURE)	Prepared/Date: Checked/Date:	JF 3/29/2011
ITA Westside Sub Los Angeles, (21	me		9	LOG OF BC	



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

DRILLING COMPANY/DRILLING EQUIPMENT BORING NO. C & L Drilling / Mayhew 1000 MOISTURE CONTENT (% of dry wt.) DOWNHOLE TESTS PERCENT PASSING No. 200 SIEVE THIS RECORD IS AN INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. LATITUDE AND LONGITUDE OF BORING LOCATION SHOWN ON LOGS ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BETWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL G-161 DRILLING METHOD BOREHOLE LOCATION ELEVATION (ft) DRY DENSITY (pcf) SAMPLE LOC. BLOW COUNT* (blows/ft) "N" VALUE STD.PEN.TEST OVA (ppm)** Rotary Wash DEPTH (ft) 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 Bailed drilling mud to 45 feet. Ground-water level measured at 29 feet below ground surface 30 minutes after bailing of drilling mud. 4-inch thick Asphalt Concrete over 12-inch thick Portland LA METRO PB S:/70131 GEOTECHGINTWLIBRARY MACTEC JUNE2011.GLB G:/PROJECT_DIRECTORIES/495332010/101561_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 8/9/11 Cement Concrete and 2-inch thick Base Course FILL [Af] SC CLAYEY SAND - moist, gray 255 CL SANDY LEAN CLAY - moist, dark brown, trace brick 0.0 15.3 109 Push \boxtimes fragments CL QUATERNARY YOUNGER ALLUVIUM [Qal] 250 LEAN CLAY - very soft, moist, gray 10 10 0.0 25.4 Becomes stiff, dark olive brown 245 SM SILTY SAND with Gravel - medium dense, moist, olive brown, fine to medium-grained, gravel (up to 1/4" in size), 0.2 18 some clay, sample disturbed 240 LEAN CLAY with Sand - soft, moist, olive brown CL 20 0.1 23.5 235 25 \boxtimes 0.0 24.6 94 ∇ 230 30 SANDY SILT - stiff, wet, olive gray **QUATERNARY OLDER ALLUVIUM [Qalo]** ML10 0.0 27.3 SM SILTY SAND - loose, wet, gray, fine-grained 225 35 30 Becomes medium dense, some gravel (Sample not recovered) 220 SM Field Tech: DW Prepared/Date: JF 3/31/2011 (CONTINUED ON FOLLOWING FIGURE) Checked/Date: JAG/PE 6/30/2011

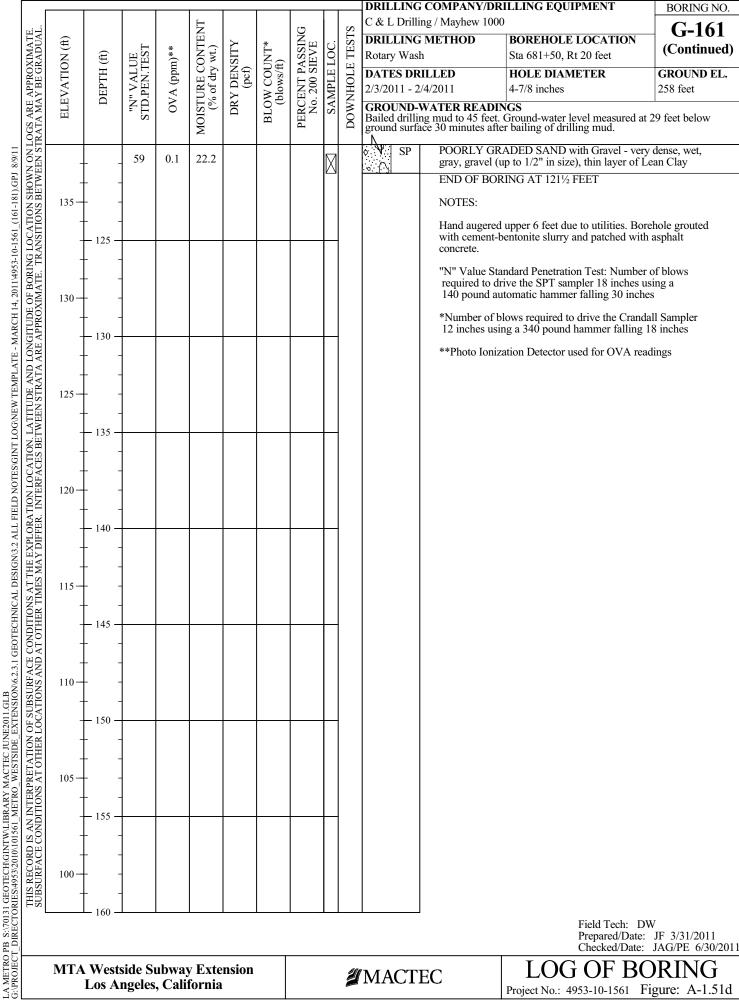
MTA Westside Subway Extension Los Angeles, California

MACTEC

OG OF BORING

				F							NG COMPANY/Dilling / Mayhew 100	RILLING EQUIPMENT	BORING NO
(ft)		H	*	TEN (7	*	SING	C.	ESTS	DRILLI	NG METHOD	BOREHOLE LOCATION	G-161 (Continued
ION	H (ft)	LUE TES	*(md	CON	NSI f)	(#)	PAS:	E LO	LE TI	Rotary W	orilled	Sta 681+50, Rt 20 feet HOLE DIAMETER	GROUND EL
ELEVATION (ft)	DEPTH (ft)	"N" VALUE STD.PEN.TEST	OVA (ppm)**	STURE CONT (% of dry wt.)	DRY DENSITY (pcf)	BLOW COUNT* (blows/ft)	ENT 200	SAMPLE LOC.	(HO)	2/3/2011		4-7/8 inches	258 feet
ELE	Д	N". STD	VO	MOISTURE CONTENT (% of dry wt.)	DR	BLO'	PERCENT PASSING No. 200 SIEVE	SA]	DOWNHOLE TESTS	GROUN Bailed dr ground su	D-WATER READ lling mud to 45 fee rface 30 minutes af	INGS t. Ground-water level measured at the bailing of drilling mud.	29 feet below
	-	_ 25	0.0	18.0			19				brown, fine t	D with Gravel - medium dense, we to medium-grained, gravel (up to of Poorly Graded Sand	ret, grayish 1/4" in size),
215 –	†	-											
	45 -							L					
	+	-		-	-	30					(Sample no	t recovered)	
210-	<u> </u>	-											
	50 -	62	0.2	10.8			17				Becomes v	ery dense, dark gray, gravel (up to	1" in size)
205-													
	- 55 -	-								SI	POORLY G to medium-g	RADED SAND - medium dense,	wet, brown, fine
		-	0.0	28.0	93	11		₩		M		moist, brown, trace sand	
200 -	<u> </u>												
	60 -									S	CLAYEY SA	AND - wet, olive brown, fine-grain	ned
	-	50	0.0	16.9						M	SILT - hard,	moist, olive brown to olive gray	
195-													
	65 -		0.1	23.0	102	28		⊠		SI		D - wet, olive gray Y - very stiff, moist, olive gray, tra	1
	‡		0.1	23.0	102	26				C	LEAN CLA	r - very sun, moist, onve gray, tra	ace sand
190-	-	-											
	70 -	38	0.0	17.9							Dag 1	and array trace arrayal (to 1/40)	in circ)
	‡	1 30	0.0	17.9							Becomes h	ard, gray, trace gravel (up to 1/4"	iii Size)
185 -	†	-											
	75 -	<u> </u>	0.0	21.8	106	30	80	 		C	LEAN CLA	Y with Sand - very stiff, wet, gray	, fine sand
	†	1	0.0	21.0	100	30	00						
180-	+	-											
	L ₈₀ -	1	<u> </u>	<u> </u>	<u> </u>	1	<u> </u>					Field Tech: D Prepared/Date:	JF 3/31/2011
<u></u>	Wast	tside S	ubwe	v Evto	neinn	ì	CONTI	NUE			WING FIGURE)	Checked/Date:	JAG/PE 6/30/2
VI 1 F	Los A								20	MAC	rer'		UPILLIC

									7.0	1		ng / Mayhew 100	RILLING EQUIPMENT 0	BORING N
(ff)		L E	*	L)	ΙΥ	*	SINC	C.	ESTS			METHOD	BOREHOLE LOCATION	G-161 (Continue
NOL	H (ft		*(md	CO)	ENSI (f:	OUN (#/s	PAS SIE	ELC	LE T	1	y Wasł ES DR	ı ILLED	Sta 681+50, Rt 20 feet HOLE DIAMETER	GROUND E
ELEVATION (ft)	DEPTH (ft)	"N" VALUE STD.PEN.TEST	OVA (ppm)**	STURE CONT (% of dry wt.)	DRY DENSITY (pcf)	W Co	ENT 200	SAMPLE LOC.	NHO			/4/2011	4-7/8 inches	258 feet
ELE		N" OTS	0	MOISTURE CONTENT (% of dry wt.)	DR	BLOW COUNT* (blows/ft)	PERCENT PASSING No. 200 SIEVE	SA	DOWNHOLE TESTS	GRO Bailed groun	UND-V d drillir d surfa	WATER READIng mud to 45 feet. ce 30 minutes aft	NGS Ground-water level measured at er bailing of drilling mud.	t 29 feet below
	+	_ 24	0.0	32.1							CL/ CH	LEAN to FA	Γ CLAY - very stiff, wet, olive gr	ray
175 -	‡	-												
	1 85	1												
	+	-	0.0	17.6	111	31	66	፟			CL	SANDY LEA grayish brown	AN CLAY - very stiff, wet, olive b	prown to olive
170-	‡	-												
	1 90	1												
	+	39	0.0	28.2							CL	oxide stains	7 - hard, wet, olive brown to olive	e gray, trace iror
165	Ŧ	-									SP	POORLY GF	RADED SAND - dense, wet, brow	wn, fine to
	95	1										medium-grair	ned	
	+	-	0.1	19.9	109	36	43	▩			SC	CLAYEY SA size)	AND - dense, wet, gray, trace grav	wel (up to 1/4" in
160-	Ŧ]												
	100	-									CL	SANDY I FA	AN CLAY - hard, wet, reddish br	own and some
	_	46	0.0	14.7			66				CL	olive gray, tra	ace gravel (up to 1/4" in size)	own and some
155 -	+	-												
	105	1												
	<u> </u>	-	0.0	15.3	114	45		₩				Alternating	with layers of Lean Clay with Sa	nd, olive brown
150-	+	-												
	110	1												
	‡	33	0.0	26.3								Becomes oli	ive gray and some reddish blue, t	race sand
145	+	-												
	115	1						 			SC		AND with Gravel - dense, wet, oli	
	‡	-	0.0	12.8	124	45		₩					n, medium to coarse-grained, gra	
140-	1	}												
	I 120	1]								Field Tech: D	W
						((CONTI	NUE	ED O	N FOL	LOWI	NG FIGURE)	Prepared/Date:	
MT.		tside S								MA	CT]	EC	LOG OF BO	
	LUS A	Angele	, call	iorilla	l .								Project No.: 4953-10-1561 I	Figure: A-1.



MACTEC

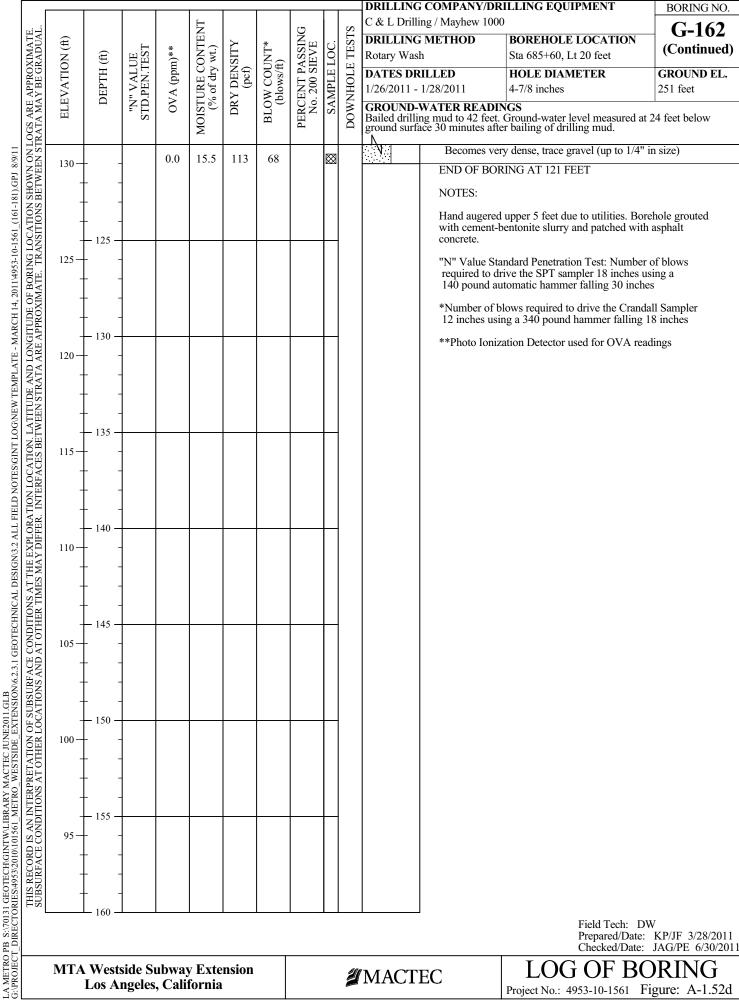
LOG OF BORING

Project No.: 4953-10-1561 Figure: A-1.51d

				Ę			U		S	C & I	Drill	ng / Mayhew 1000		BORING NO
ELEVATION (ft)	(ft)	JE EST	*	ONTE wt.)	SITY	*LN	SSIN	.0C	TEST	DRII Rotar		METHOD	BOREHOLE LOCATION Sta 685+60, Lt 20 feet	G-162
ATIO	DEPTH (ft)	VALU EN.T	OVA (ppm)**	RE CO	DRY DENSITY (pcf)	COU Jws/ft	NT PA	SAMPLE LOC.	HOLE	l .		ILLED 1/28/2011	HOLE DIAMETER 4-7/8 inches	GROUND EL
ELEV	DE	"N" VALUE STD.PEN.TEST	OVA	MOISTURE CONTENT (% of dry wt.)	DRY	BLOW COUNT* (blows/ft)	PERCENT PASSING No. 200 SIEVE	SAM	DOWNHOLE TESTS	GRO	UND-	WATER READI		
250 —	_	-										4-inch thick A Cement Conc	Asphalt Concrete over 12-inch thi rete and 3-inch thick Base Course	ck Portland e
-	-	-									SC CL	gravel	CLAYEY SAND - moist, brown,	
-	-	-									CL	QUATERNA SANDY LEA	N CLAY - moist, brown	[Qal]
245—	— 5 · - -		0.0	23.3	101	Push		፟			CL/ CH	LEAN to FAT sand	T CLAY - very soft, moist, olive b	prown, trace fine
-	-	-									ML	SANDY SILT gravel (up to 1	Γ - soft, moist, olive brownish gra 1/4" in size)	y, trace slate
_	– 10 ·		0.0	18.0	104	5		▧					,	
240 —	-	-	0.0	10.0	104	3		IXXI						
-	-													
235—	— 15 ·	4	0.1	22.2				М				Becomes oliv	ve brown	
_	-	-												
-	-	-												
230 —	— 20 · -	-	0.2	27.1	91	5		▧			CL		N CLAY - soft, moist, olive brownvel (up to 1/4" in size)	vn, trace fine
-	-													
-	-	-										∑ Becomes we	t	
225 —	— 25 · -	Push	0.0	30.8				M				Becomes ve (up to 1/4" ir	ery soft, trace sand, trace gravel	
-	-	-										. 2		
-	- - 30 ·	_									- CV		RY OLDER ALLUVIUM [Qa	
220 —	-	-		-	-	12					CL	sand, trace gra (Sample not	N CLAY - stiff, wet, olive brown avel (up to 1/4" in size) recovered)	i, trace fine
-	_													
-	- - 35 ·	1						\sqcup						
215 —	-	12	0.0	21.7								Trace gravel	(up to 1/2" in size)	
-	-	-												
	40												Field Tech: DV	W
						((CONTIN	NUE	ED O	N FOL	LOWI	NG FIGURE)	Prepared/Date: Checked/Date:	KP/JF 3/28/20 JAG/PE 6/30/2
		tside S Angeles							2	MA	CT	EC	LOG OF BO	
		<i></i>	,										Project No.: 4953-10-1561 F	iguic. A-1.3

					LN			4G		LS	C & L D	rilling	g / Mayhew 1000		BORING NO. - G-162
N (ft)		(ft)	UE	**(u	ONTE wt.)	SITY	JNT*	ASSIN IEVE	LOC.	E TES	Rotary V		METHOD	Sta 685+60, Lt 20 feet	(Continued
ELEVATION (ft)		DEPTH (ft)	"N" VALUE STD.PEN.TEST	OVA (ppm)**	JRE C of dry	DRY DENSITY (pcf)	BLOW COUNT* (blows/ft)	SNT P	SAMPLE LOC.	HOL	DATES 1/26/201			HOLE DIAMETER 4-7/8 inches	GROUND EL. 251 feet
ELE		[Q	"N" STD.]	'ΛΟ	MOISTURE CONTENT (% of dry wt.)	DRY	BLOV (b	PERCENT PASSING No. 200 SIEVE	SAN	DOWNHOLE TESTS	GROUN Bailed di ground s	ND-W rilling surface	ATER READI mud to 42 feet. e 30 minutes after	NGS Ground-water level measured at er bailing of drilling mud.	24 feet below
21	0 +		-	0.0	-	-	65						(Sample not Becomes har	recovered) rd, more gravel	
20	5-	- 45 -	38	0.0	7.8						5	SC	CLAYEY SA (up to 1/2" in	ND with Gravel - dense, wet, oli size)	ve brown, gravel
20	0-	- 50 -	-		-	-	51						(Sample not	recovered)	
19	5—	- 55 -	40	0.0	13.9			27	\boxtimes		S	SC	CLAYEY SA coarse-grained	ND - dense, wet, olive brown, find, gravel (up to 1" in size)	ne to
19	0-	- 60 -	30	0.0	19.8			62				CL	SANDY LEA	N CLAY - very stiff, wet, olive b	orown
18	5-	- 65 -	-												
18	0 -	- 70 -	-	0.0	9.1	116	80/10"	14	፟		S	SC SC		ND with Gravel - very dense, we grained, gravel (up to 1" in size)	
17	5—	- 75 -	-							Pressuremeter					
	+	- 80 -	-								N. FOUL		C EIGHBE	Field Tech: D Prepared/Date:	KP/JF 3/28/201
M			side Si				(0	CONTI	NUE				G FIGURE)	Checked/Date:	JAG/PE 6/30/20
			ngeles								MAC	.1 C	<u> </u>	Project No.: 4953-10-1561 F	

				F			rh		7.0			COMPANY/DR	RILLING EQUIPMENT	BORING NO. G-162
N (ft)	Œ	E	**(MOISTURE CONTENT (% of dry wt.)	ITY	*LN	PERCENT PASSING No. 200 SIEVE	0C.	DOWNHOLE TESTS	1	LING y Wasi	METHOD	BOREHOLE LOCATION Sta 685+60, Lt 20 feet	(Continued
ATIO	DEPTH (ft)	/ALU EN.TE	OVA (ppm)**	STURE CONT (% of dry wt.)	DENS (pcf)	COU)	T PA 00 SIE	SAMPLE LOC.	IOLE '	DAT	ES DR	ILLED	HOLE DIAMETER	GROUND EL.
ELEVATION (ft)	DE	"N" VALUE STD.PEN.TEST	OVA	ISTUF (% o	DRY DENSITY (pcf)	BLOW COUNT* (blows/ft)	RCEN No. 2	SAM	MNE)	GRO	UND-	1/28/2011 WATER READII	4-7/8 inches	251 feet
		01		МО		В	PE		ĭ	groun			Ground-water level measured at er bailing of drilling mud.	
170		1	0.0	19.8	109	32		▩			CL	LEAN CLAY gravel (up to	with Sand - very stiff, wet, olive 1/2" in size), trace iron oxide stair	brown, trace
	 								er					
-	- 85 -								Pressuremeter					
165	- 83 - 								Press					
-		92/9"	0.0	16.0			34				SC- SM	brown, fine to	YEY SAND with Gravel - very do coarse-grained, abundant slate g	ense, wet, olive gravel (up to
-		1										1-1/4" in size))	
160	- 90 - -		0.0	18.2	109	45		×			СН	FAT CLAY v fine gravel	with Sand - hard, wet, olive gray,	fine sand, trace
-		30	0.0	20.2			77					Becomes ver	ry stiff, olive brown to olive gray	
155	- 95 - - ·													
			0.1	19.2	113	29		₩						
-		10	0.0	20.1			58				CL	SANDY LEA	N CLAY - hard, wet, olive gray,	trace gravel (up
150	— 100 — -	40	0.0	20.1			36					to 1/4" in size)	
-		1	0.0	20.3	106	35		⊠			CL/ CH	LEAN to FAT	Γ CLAY - hard, wet, olive gray, to	race sand
145 —	— 105 — -			-	-	45						(Sample not	recovered)	
-		1												
140	— 110 — -		0.0	26.2	99	73/9"		×				With calcium	n carbonate nodules	
-														
-														
135	— 115 — -		0.0	10.8	122	36		⊠		<u>/////</u>	SP	POORLY GR to medium-gr	ADED SAND - medium dense, vained, trace coarse	wet, brown, fine
-		-												
-]												
	— 120 —	1	<u> </u>	1	<u> </u>	<u> </u>	<u> </u>	Ш		1.1			Field Tech: DV Prepared/Date:	W KP/JF 3/28/201
MT ▲	West	eida S-	ıbwa	v Evto	ncier	((CONTIN	NUE				NG FIGURE)	Checked/Date:	JAG/PE 6/30/20
		side Si ngeles								MA	CT.	EC	LOG OF BC Project No.: 4953-10-1561 F	



MACTEC

OG OF BORING

Project No.: 4953-10-1561 Figure: A-1.52d

C & L Drilling / Mayhew 1000 MOISTURE CONTENT (% of dry wt.) DOWNHOLE TESTS PERCENT PASSING No. 200 SIEVE 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 BE GRADUAL G-164 DRILLING METHOD BOREHOLE LOCATION ELEVATION (ft) DRY DENSITY (pcf) SAMPLE LOC. BLOW COUNT* (blows/ft) "N" VALUE STD.PEN.TEST OVA (ppm)** DEPTH (ft) 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. 5-inch thick Asphalt Concrete over 8-inch thick Base Course FILL [Af] CL 2011\(\pmage 953-10-1561\) (161-181).GPJ SANDY LEAN CLAY - moist, dark brown and gray, trace slate gravel (up to 1-1/4 inches in size) 245 **QUATERNARY YOUNGER ALLUVIUM [Qal]** 0.0 12.5 116 12 CL SANDY LEAN CLAY - stiff, dark reddish brown, trace gravel (up to 1/4 inch in size) 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, 7 240 10 10 0.0 19.4 Thin layer of Silty Sand 235 0.0 13.4 104 8 XX Becomes medium stiff, moist, olive brown 230 Increase in sand content 20 (Sample not recovered) 13 0 225 **QUATERNARY OLDER ALLUVIUM [Qalo]** 25 ML SILT with SAND - stiff, moist, olive brown 105 18 75 \boxtimes 0.3 16.1 220 30 10 0.0 21.9 59 Becomes dark olive brown, some clay SILT - medium stiff, moist, dark olive brown, trace fine sand ML 0.1 32.0 90 89 215 35 SM SILTY SAND - medium dense, moist, gray, fine to 17 0.0 18.7 28 medium-grained, trace gravel (up to 3/8 inch in size) POORLY GRADED SAND - mediume dense, wet, gray, fine SP to medium-grained, trace iron oxide stains SM Field Tech: AR Prepared/Date: JF 3/28/2011 (CONTINUED ON FOLLOWING FIGURE) Checked/Date: LT/PE 9/20/2011

DRILLING COMPANY/DRILLING EQUIPMENT

BORING NO.

MTA Westside Subway Extension Los Angeles, California



OG OF BORING

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

C & L Drilling / Mayhew 1000 MOISTURE CONTENT (% of dry wt.) G-164 DOWNHOLE TESTS PERCENT PASSING No. 200 SIEVE RECORD IS AN INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. LATITUDE AND LONGITUDE OF BORING LOCATION SHOWN ON LOGS ARE APPROXIMATE.

SURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BETWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL DRILLING METHOD BOREHOLE LOCATION ELEVATION (ft) DRY DENSITY (pcf) SAMPLE LOC. BLOW COUNT* (blows/ft) (Continued) "N" VALUE STD.PEN.TEST OVA (ppm)** DEPTH (ft) 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. SILTY SAND with GRAVEL - medium dense, wet, gray, fine to medium-grained, with silt seams, trace iron oxide stains Becomes very dense, fine to coarse-grained, gravel 54 0.0 11.4 15 (up to 3/4 inch in size) 205 $\frac{1}{2}$ 45 SILTY SAND - dense, wet, brownish gray, fine to medium-grained, some coarse sand, trace slate gravel, with 4-inch cobble POORLY GRADED GRAVEL with SILT and SAND - dense, GW-0.0 10.3 119 57 10 GM wet, gray, fine to coarse-grained, gravel (up to 1 inch in size) 200 50 CH SANDY FAT CLAY - very stiff, moist, olive green, fine sand, trace iron oxide stains 29 0.1 26.7 LAKEWOOD FORMATION [Qlw] 195 SANDY FAT CLAY - stiff, moist, olive brown and gray, trace 0.2 27.6 97 16 55 slate gravel 27 1.0 21.2 55 Becomes olive gray and greenish gray, calcium carbonate nodules SM SILTY SAND - very dense, moist, light brown, fine to medium-grained 12.6 109 70 20 \boxtimes 1.1 POORLY GRADED SAND - very dense, wet, light greenish SP 50/6' 1.5 17.6 gray, fine to coarse-grained \geq 65 Tunnel Some coarse sand 19.5 107 90 12 1.2 \boxtimes SILTY SAND - very dense, wet, light greenish yellow and SM 50/5" 20.1 gray, fine to medium-grained 70 SP POORLY GRADED SAND - very dense, wet, yellowish 20.1 105 75 1.6 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)THIS RI SUBSU \boxtimes 19.4 1.0 100 75 Becomes yellowish gray 170 Field Tech: AR Prepared/Date: JF 3/28/2011 (CONTINUED ON FOLLOWING FIGURE) Checked/Date: LT/PE 9/20/2011

2011\(\pmage 953-10-1561\) (161-181).GPJ

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 LOGNEW TEMPLATE - MARCH 14,

MTA Westside Subway Extension Los Angeles, California DRILLING COMPANY/DRILLING EQUIPMENT

BORING NO.

OG OF BORING

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

DRILLING COMPANY/DRILLING EQUIPMENT BORING NO. C & L Drilling / Mayhew 1000 MOISTURE CONTENT (% of dry wt.) G-164 DOWNHOLE TESTS PERCENT PASSING No. 200 SIEVE 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 BE GRADUAL DRILLING METHOD **BOREHOLE LOCATION** ELEVATION (ft) DRY DENSITY (pcf) SAMPLE LOC. BLOW COUNT* (blows/ft) (Continued) "N" VALUE STD.PEN.TEST OVA (ppm)** DEPTH (ft) 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. 2011\4953-10-1561 (161-181).GPJ 50/2' (Sample not recovered) 4-inch to 6-inch thick cobble layer 165 85 Becomes olive gray, fine to medium-grained, iron oxide stains 18.2 101 80 \boxtimes 1.2 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, 7 160 90 SILTY SAND - very dense, wet, olive gray, fine to SM 93/11 1.3 24.0 22 medium-grained, iron oxide stains 155 SAN PEDRO FORMATION [Qsp] 95 SP POORLY GRADED SAND - very dense, wet, olive gray, fine 1.5 23.8 98 78 XX to medium-grained, trace silt 150 95/10' 1.9 31.5 Becomes dark gray, fine-grained, trace shell fragments SANDY SILT - hard, moist, dark gray, with clay ML 145 105 SM SILTY SAND - very dense, wet, dark gray, fine-grained, trace 102 75 \boxtimes 1.1 16.6 shell fragments 140 0.9 24.7 Trace gravel, trace shell fragments 135 17.6 111 100 \boxtimes SANDY SILT - hard, moist, blueish gray, trace shell ML fragments, with clay 130 Field Tech: AR Prepared/Date: JF 3/28/2011 (CONTINUED ON FOLLOWING FIGURE) Checked/Date: LT/PE 9/20/2011

MTA Westside Subway Extension Los Angeles, California



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

				INI			1G		LS	C & 1	L Drill	ng / Mayhew 1000		BORING NO G-164
ELEVATION (ft)	(ft)	UE	**(u	ONTE wt.)	DRY DENSITY (pcf)	t)	ASSIN IEVE	LOC.	E TES	1	y Was	METHOD h	Sta 692+60, Rt 5 feet	(Continue
/ATIC	DEPTH (ft)	"N" VALUE STD.PEN.TEST	OVA (ppm)**	STURE CONT (% of dry wt.)	DEN (pcf)	OW COUN (blows/ft)	NT P. 200 SI	SAMPLE LOC.	HOLE			ILLED 1/28/2011	HOLE DIAMETER 4-7/8 inches	GROUND EI 249 feet
ELEV	DE	"N" STD.F	400	MOISTURE CONTENT (% of dry wt.)	DRY	BLOW COUNT* (blows/ft)	PERCENT PASSING No. 200 SIEVE	SAN	DOWNHOLE TESTS	1			NGS 011. Ground-water level measure 11.	
		61	0.8	22.0	-			М			CL		with SAND - hard, moist, blueis	
-		-												
125 —	_	1												
-	125 -		0.9	17.6	96	125		፟			SP- SM	POORLY GR blueish gray, f odor	ADED SAND with SILT - very fine to medium-grained, trace gra	dense, moist, avel, organic
-	_											odoi		
120 —	130 -											noonyyyan		
-		50/4"	0.6	16.1	-						SP	fine to mediur		st, blueish gray,
-		-										Increase in g	gravel content	
115	135 –		1.0	10.0	110	100		NXI						
-	 	1	1.0	10.0	118	100		₩						
110-	-	-												
-	140 -	50/4"	0.8	16.9	-			M				Trace organi	ic odor	
-														
105 —	- 145 -	-									SM		O - very dense, wet, dark gray, finded, some coarse, trace gravel, or	
-	143		0.8	12.5	116	100/5"		▩				medanii giuni	ica, some coarse, trace graver, or,	guine odoi
-	<u> </u>	1												
100 -	150 -	50/5"	0.7	14.0	-								(up to 1/4 inch in size)	
-	 	-										NOTES: Hand augered	RING AT 150½ FEET I upper 6 feet to avoid damage to	utilities.
- 95 –	<u> </u>	-										with asphalt c		
-	<u> </u>							H				required to dr	andard Penetration Test: Number rive the SPT sampler 18 inches untomatic hammer falling 30 inchest.	sing a
-												*Number of b 12 inches us	plows required to drive the Cranding a 300 pound hammer falling	all Sampler 18 inches
90-	160												ration Detector used for OVA rea st: NV = Noise/Vibration	ndings
	└ 160 -	•		•				• 1		•		Dominiole 1et	Field Tech: Al Prepared/Date:	
MTA	West	side S	ubwa	y Exte	nsion				_		00	0		DRING
	Los A	ngeles	, Cali	10rnia					0		てし	·	Project No.: 4953-10-1561 F	Figure: A-2.5

DRILLING COMPANY/DRILLING EQUIPMENT BORING NO. C & L Drilling / Mayhew 1000 MOISTURE CONTENT (% of dry wt.) DOWNHOLE TESTS PERCENT PASSING No. 200 SIEVE G-165 THIS RECORD IS AN INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. LATITUDE AND LONGITUDE OF BORING LOCATION SHOWN ON LOGS ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BETWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL DRILLING METHOD BOREHOLE LOCATION ELEVATION (ft) DRY DENSITY (pcf) SAMPLE LOC. BLOW COUNT* (blows/ft) "N" VALUE STD.PEN.TEST OVA (ppm)** DEPTH (ft) 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. 4-inch thick Asphalt Concrete, No Base Course SP 280 POORLY GRADED SAND - moist, fine to medium-grained, 2011\(\pmage 953-10-1561\) (161-181).GPJ with silt and clay, trace gravel (up to 1½ inches in size) 275 **QUATERNARY OLDER ALLUVIUM [Qalo]** 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, 7 SM SILTY SAND - moist, brown, fine to coarse-grained, trace fine 10 0.3 16.8 109 Push \boxtimes CL LEAN CLAY - stiff, moist, light brown 9 0.1 24.2 POORLY GRADED SAND - loose, moist, brown, fine to SP coarse-grained 265 22.7 101 10 49 \boxtimes 0.1 CLAYEY SAND - loose, moist, brown, fine-grained, trace SC gravel (up to 3/8 inch in size) 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 25 CLAYEY SAND - medium dense, moist, brown, fine to 23 0.0 13.1 48 ∇ medium-grained, trace gravel (up to 1/2 inch in size) 255 0.0 18.4 112 26 30 250 20 0.0 15.6 21.1 101 Thin layer of Silty Sand 35 245 SILTY SAND - medium dense, moist, brown, fine to SM 15 0.1 25.4 medium-grained $\overline{\text{CL}}$ LEAN CLAY - stiff, moist, brown Field Tech: DW Prepared/Date: JF 5/11/2011 (CONTINUED ON FOLLOWING FIGURE) Checked/Date: LT/RM 9/20/2011

MTA Westside Subway Extension Los Angeles, California



OG OF BORING

DRILLING COMPANY/DRILLING EQUIPMENT BORING NO. C & L Drilling / Mayhew 1000 MOISTURE CONTENT (% of dry wt.) G-165 DOWNHOLE TESTS PERCENT PASSING No. 200 SIEVE THIS RECORD IS AN INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. LATITUDE AND LONGITUDE OF BORING LOCATION SHOWN ON LOGS ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BETWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL DRILLING METHOD **BOREHOLE LOCATION** ELEVATION (ft) DRY DENSITY (pcf) SAMPLE LOC. BLOW COUNT* (blows/ft) (Continued) "N" VALUE STD.PEN.TEST OVA (ppm)** Sta 698+10, Rt 30 feet DEPTH (ft) Rotary Wash 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 $64\frac{1}{2}$ feet below the ground surface in shallow and deep monitoring wells, respectively on $4\frac{22}{2011}$. See last page of this boring for details. CLAYEY SAND - medium dense, moist, brown and gray, 19.6 97 \boxtimes 0.1 16 fine-grained 240 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 DESIGN3.2 ALL FIELD NOTES/GINT LOG/NEW TEMPLATE - MARCH 14, 2011/4953-10-1561_(161-181).GPJ LEAN CLAY with SAND - very stiff, moist, brown, trace CL 17 0.0 76 24.8 gravel (up to 3/8 inch in size) 235 0.0 28.9 95 15 SM SILTY SAND - medium dense, moist, brown, fine to medium-grained CL LEAN CLAY - hard, moist, brown 50 18.9 0.0 105 30 Trace fine sand \geq 55 36/10' 0.0 17.3 58 Alternating with layers of Sandy Lean Clay, 225 trace gravel (up to 3/8 inch in size) SM SILTY SAND - dense, moist, brown, fine-grained $\overline{\text{CL}}$ LEAN CLAY - very stiff, moist, light brown, with fine sand 0.0 21.0 101 24 220 17 0.1 31.4 With calcium carbonate nodules and iron oxide Y 19.4 \geq 65 77 2.8 25.5 0.0With sand \boxtimes 0.1 37.5 82 26 Becomes olive gray to olive brown, trace iron 210 oxide stains Becomes hard LAKEWOOD FORMATION [Qlw] 68/11 0.0 16.4 SM SILTY SAND - very dense, moist, gray, fine-grained \geq 75 Becomes light brown and gray Tunnel \boxtimes 0.2 14.5 105 50/6 Field Tech: DW Prepared/Date: JF 5/11/2011 (CONTINUED ON FOLLOWING FIGURE) Checked/Date: LT/RM 9/20/2011

MTA Westside Subway Extension Los Angeles, California



OG OF BORING

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

DRILLING COMPANY/DRILLING EQUIPMENT BORING NO. C & L Drilling / Mayhew 1000 MOISTURE CONTENT (% of dry wt.) G-165 DOWNHOLE TESTS PERCENT PASSING No. 200 SIEVE THIS RECORD IS AN INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. LATITUDE AND LONGITUDE OF BORING LOCATION SHOWN ON LOGS ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BETWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL DRILLING METHOD **BOREHOLE LOCATION** ELEVATION (ft) DRY DENSITY (pcf) SAMPLE LOC. BLOW COUNT* (blows/ft) (Continued) "N" VALUE STD.PEN.TEST OVA (ppm)** DEPTH (ft) 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 $64\frac{1}{2}$ feet below the ground surface in shallow and deep monitoring wells, respectively on $4\frac{22}{2011}$. See last page of this boring for details. LA METRO PB-TUNNEL ZONE S:70131 GEOTECH/GINTW/LIBRARY MACTEC JUNE2011.GLB
G:PROJECT_DIRECTORIES/4953/2010/101561_METRO_WESTSIDE_EXTENSION%.2.3.1 GEOTECHNICAL DESIGN3.2 ALL FIELD NOTES/GINT LOG/NEW TEMPLATE - MARCH 14, 2011/4953-10-1561_(161-181).GPJ 0.1 19.1 94 80 Becomes yellowish brown, trace medium sand, trace silt 85 Becomes dark gray, fine to coarse-grained 90/11 0.2 23.9 LEAN CLAY - hard, moist, greenish gray, trace fine sand CL Tunnel 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 23.8 99 95 185 97/11 0.6 15.9 Becomes yellowish brown 75/10 XX 0.4 14.1 108 Trace coarse sand 180 Brown to olive brown, fine-grained 63 0.1 24.3 32 105 175 22.6 99 42/10' \boxtimes 0.1 Becomes dense SC CLAYEY SAND - very dense, moist, brown to olive brown, 91 0.0 26.1 fine-grained 170 50/3' (Sample not recovered) SAN PEDRO FORMATION [Qsp] SP POORLY GRADED SAND - very dense, moist, gray, 50/10' 0.3 20.2 165 fine-grained \boxtimes 60/10' 0.0 18.8 106 Trace coarse sand Field Tech: DW Prepared/Date: JF 5/11/2011 (CONTINUED ON FOLLOWING FIGURE) Checked/Date: LT/RM 9/20/2011

MTA Westside Subway Extension Los Angeles, California

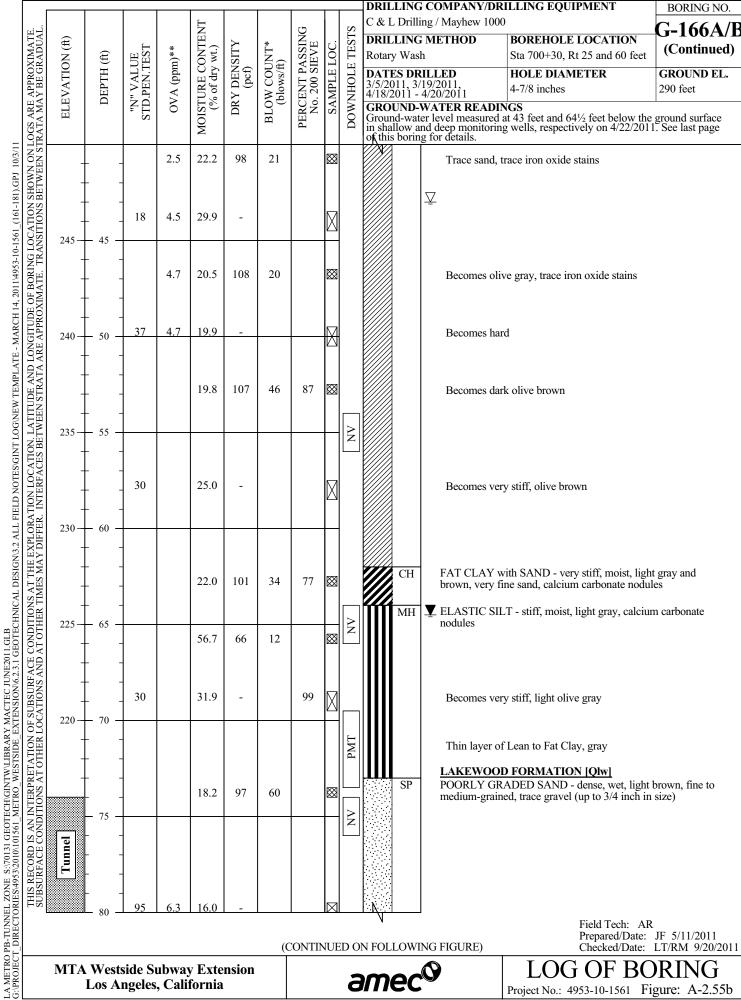


OG OF BORING

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

160 — 155 — 150 — 145 — 140 —					i			ıl		P. I. Duilling / Marsharry 1000	
EVATION (fi	l	1		ENT			NG.		SL	C & L Drilling / Mayhew 1000 DRILLING METHOD BOREHOLE LOCATIO	G-165
EVATION	æ	ST	* *	NTI vt.)	ITY	*LZ	SSIN	OC.	TES	Rotary Wash Sta 698+10, Rt 30 feet	(Continued
EVAT	H (f		(md	CO ry v	ENS Ef)	OU)	PA. SIE	ΕĽ	LE,	DATES DRILLED HOLE DIAMETER	GROUND EL
in I	DEPTH (ft)	AA PEN	OVA (ppm)**	JRE of d	Z DE (pc	V CC lows	:NT 200	ſΡL	HOH	/5/2011 and 3/19/2011 4-7/8 inches	281 feet
<u> </u>	Ē	"N" VALUE STD.PEN.TEST	7A0	STC (%)	DRY DENSITY (pcf)	BLOW COUNT* (blows/ft)	PERCENT PASSING No. 200 SIEVE	SAMPLE LOC.	DOWNHOLE TESTS	GROUND-WATER READINGS	
田		S		MOISTURE CONTENT (% of dry wt.)	I	BI	PEF	3 1	DOO	Ground-water level measured at 26 feet and 64½ feet below a shallow and deep monitoring wells, respectively on 4/22 of this boring for details.	v the ground surface /2011. See last page
160		59	0.0	27.2	-		86	M		MH ELASTIC SILT - hard, moist, gray	
										<u> </u>	
_										SP POORLY GRADED SAND - very dense, medium-grained	moist, gray, fine to
_	<u> </u>										
155		.	0.0	17.5	-	50/10"				(Sample not recovered)	
_											
_		.								With a seed	
_	-									With gravel	
_	<u> </u>									Trace fine gravel, trace organic odor	
150	-	50/5"	0.1	14.9	-			M		Trace line graver, trace organic odor	
4		-									
+	-	-									
4	-	-								(2) (2) (2) (3) (3) (3) (3) (3) (3) (3) (3) (3) (3	
+	<u> </u>									왕화 -	
145	-		4.6	13.5	97	50/1"		₩		Fine to coarse-grained, trace gravel (up to	1/2 inch in size)
+	-	-								홍경 -	
+	-	-								<u> </u>	
+	-	1									
+	- 140 -		2.4	10.6	0.4	50/5"				사실 -	
140	-	1	3.4	18.6	94	50/5"		▩			
†	-	1								(현실 (현실	
†	-	1									
1	145	1								(2) 전 숙성	
135	- 145 -		0.5	13.3	116	50/5"		\boxtimes		왕경 -	
										<u> </u>	
_	_ 150 _		0.4	10.0	05	50/5"		IXXI			
130	-		0.4	18.9	95	50/5"		▩		END OF BORING AT 150½ FEET	
-	-	.								NOTES: Hand augered upper 8 feet to avoid damag	
_	-									Montoring well was installed on 4/22/2011 construction diagram for G-165.	. See well
+	_									"N" Value Standard Penetration Test: Nun	nher of blows
+	– 155 –							Н		required to drive the SPT sampler 18 inch	es using a
125	-									140 pound automatic hammer falling 30 i	
+	-									*Number of blows required to drive the Control 12 inches using a 340 pound hammer fall	
+	-									**Photo Ionization Detector used for OVA	
†										Downhole Test: NV = Noise/Vibration	5 -
	└ 160 −			•						Field Tech:	
											ate: JF 5/11/2011 ate: LT/RM 9/20/20
МТА	West	eida S.	ıhwa	v Evto	ncion						
	Los A								8	nec LOG OF 1	

							-		7.0			COMPANY/DR ng / Mayhew 1000	ILLING EQUIPMENT)	BORING NO.
(ft			*	TEN (Ľ	*	SING Æ	ر ي	TESTS	l		METHOD	BOREHOLE LOCATION	G-166A/I
ELEVATION (ft)	H (ff.)	LUE L'TES	*(md	CON Iry wi	ENSI Ef)	NGN/s	PAS SIE	ELC	LE T		y Was	n ILLED	Sta 700+30, Rt 25 and 60 feet HOLE DIAMETER	GROUND EL.
VAI	DEPTH (ft)	"N" VALUE STD.PEN.TES1	OVA (ppm)**	STURE CONT (% of dry wt.)	DRY DENSITY (pcf)	W CC	ENT 200	SAMPLE LOC.	OHN	3/5/20	011.3/	19/2011, 4/20/2011	4-7/8 inches	290 feet
ELE		"N" STD.P	00	MOISTURE CONTENT (% of dry wt.)	DR	BLOW COUNT* (blows/ft)	PERCENT PASSING No. 200 SIEVE	SA	DOWNHOLE	GRO Groun in sha	UND- nd-wat illow a	WATER READIN	NGS at 43 feet and 64½ feet below the g wells, respectively on 4/22/201	e ground surface 1. See last page
											CL	FILL [Af] LEAN CLAY	- moist, light brown and gray, tr	ace gravel, trace
-		-										brick fragmen	ts	
-	-	1												
285 —	5 -	<u> </u>									SM	SILTY SAND with slate grav	O - moist, brown and gray, fine to yel	coarse-grained,
-	_	-												
-	+	1												
-	Ţ]												
280 —	10 -	-		-				L			SW		ARY OLDER ALLUVIUM [Qa DED SAND with GRAVEL - den	
-	-	-	6.6	9.3	118	49		₩				brown, fine to in size)	coarse-grained, trace silt, gravel	(up to 1/4 inch
-	Ī										CM	CH TV CAND) dames majot husayan fina to ma	a dissus amain a d
-	_	32	4.0	8.7	-		20				SM	some gravel (1	O - dense, moist, brown, fine to map to 3/4 inch in size)	ledium-grained,
.75 —	15 -	+						H						
-			3.2	7.4	114	32		₩				Becomes me	dium dense, some gravel (up to 1	l inch in size)
-	-	-												
-	1	54	3.2	20.9	_						CL		- hard, moist, light brown, trace	gravel (up to
270 -	20 -							M			SM	1/4 inch in siz SILTY SAND	o) - very dense, moist, reddish bro ed, trace gravel (up to 1/8 inch in	wn, fine to
-	-	-										medium-gram	ed, trace graver (up to 1/8 men n	i size)
-	-	1	4.5	6.8	112	65/11"		₩						
- 265	25 -	1									CL	LEAN CLAY sand, trace gra	with SAND - hard, moist, brown avel (up to 3/8 inch in size)	n, fine to coarse
-		33	4.3	12.8	-		75							
-	+	1												
-]	2.9	11.0	84	70		₩				Becomes dar	k reddish brown	
260 —	30 -	1						H						
-	<u> </u>	49	5.1	10.9	_			M			CL	SANDY LEA sand	N CLAY - hard, moist, brown, fi	ne to medium
-	-	-										Saild		
-		-	4.7	10.4	118	82		 				Traca crove1	(up to 1/4 inch in size), thin laye	er of Sandy Silt
255 -	35 -		1.,	10.7	110	02		IVXI				_		a or sandy silt
-	_	1										i nin layer of	Silty Sand, olive brown	
-	<u> </u>	29	3.4	22.6	-						CL	LEAN CLAY	- very stiff, moist, olive brown	
	L _{40 -}												priim i i	
						((CONTI	NUF	ED O	N FOI	LOWI	NG FIGURE)	Field Tech: AI Prepared/Date: Checked/Date:	
		side S				<u> </u>	. 021111						LOG OF BO	
		ngeles							đ		ec		Project No.: 4953-10-1561 F	



MTA Westside Subway Extension Los Angeles, California

OG OF BORING

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

DRILLING COMPANY/DRILLING EQUIPMENT BORING NO. C & L Drilling / Mayhew 1000 MOISTURE CONTENT (% of dry wt.) G-166A/B DOWNHOLE TESTS PERCENT PASSING No. 200 SIEVE THIS RECORD IS AN INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. LATITUDE AND LONGITUDE OF BORING LOCATION SHOWN ON LOGS ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BETWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL DRILLING METHOD **BOREHOLE LOCATION** ELEVATION (ft) DRY DENSITY (pcf) BLOW COUNT* (blows/ft) SAMPLE LOC. (Continued) "N" VALUE STD.PEN.TEST OVA (ppm)** Rotary Wash Sta 700+30, Rt 25 and 60 feet DEPTH (ft) 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 $64\frac{1}{2}$ feet below the ground surface in shallow and deep monitoring wells, respectively on $4\frac{22}{2011}$. See last page of this boring for details. Becomes very dense, some coarse sand, trace silt, trace gravel LA METRO PB-TUNNEL ZONE S:70131 GEOTECH/GINTW/LIBRARY MACTEC JUNE2011.GLB
G:PROJECT_DIRECTORIES/4953/2010/101561_METRO_WESTSIDE_EXTENSION%.2.3.1 GEOTECHNICAL DESIGN3.2 ALL FIELD NOTES/GINT LOG/NEW TEMPLATE - MARCH 14, 2011/4953-10-1561_(161-181).GPJ **SAN PEDRO FORMATION [Qsp]** 85 23.0 75/6' 16 SM SILTY SAND - very dense, moist, gray, very fine-grained Tunnel 90 POORLY GRADED SAND with SILT - very dense, moist, SP-50/6' 21.7 light gray, fine-grained SM ML SANDY SILT - hard, moist, light greenish gray 195 95 4.9 13.3 92 75/6 XXI POORLY GRADED SAND - very dense, moist, light gray, SP fine to medium-grained 190 SM SILTY SAND - very dense, moist, greenish gray, fine to 99/10' 9.5 20.6 49 medium-grained Becomes fine-grained 185 105 103 80/10' 49 \boxtimes 20.8 6.7 Becomes light brown 180 4.5 17.8 SP POORLY GRADED SAND - very dense, moist, gray, fine to medium-grained SC CLAYEY SAND - dense, moist, dark grayish green, fine to 175 medium-grained 4.5 12.8 123 47 45 \boxtimes POORLY GRADED SAND - very dense, moist, greenish gray, SP fine to coarse-grained, with gravel Field Tech: AR Prepared/Date: JF 5/11/2011 (CONTINUED ON FOLLOWING FIGURE) Checked/Date: LT/RM 9/20/2011

MTA Westside Subway Extension Los Angeles, California



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

		Τ		F			75		7.0	I		r COMPANY/DR ng / Mayhew 1000	CILLING EQUIPMENT	BORING NO.
ELEVATION (ft)		Į "	*	TTEN:	ΤΥ	* E	SING Æ	Č.	ESTS	DRII	LING	METHOD	BOREHOLE LOCATION	G-166A/I (Continued)
Z C	H (ff.)	LUE TES	*(md	CON	ENSI En	NG (#/s	PAS SIE	ELC	LE T	Rotar		1 ILLED	Sta 700+30, Rt 25 and 60 feet HOLE DIAMETER	GROUND EL.
4 4 4 4	DEPTH (ft)	"N" VALUE STD.PEN.TEST	OVA (ppm)**	STURE CONT (% of dry wt.)	DRY DENSITY (pcf)	BLOW COUNT* (blows/ft)	ENT 200	SAMPLE LOC.	NHO	3/5/20	011, 3/	19/2011, 4/20/2011	4-7/8 inches	290 feet
H H H		N".	0	MOISTURE CONTENT (% of dry wt.)	DR	BLO	PERCENT PASSING No. 200 SIEVE	SA	DOWNHOLE TESTS	Groui in sha	nd-wat Ilow a	WATER READING TO THE WATER REA	NGS at 43 feet and 64½ feet below the g wells, respectively on 4/22/201	e ground surface 1. See last page
	_	50/5"	4.7	12.2	-			M		V		Becomes blu	eish gray, fine-grained	
- - 165 —	- - - 125 -	_ _ _									SW	coarse-grained	DED SAND - very dense, wet, grad, with gravel nch thick cobble layer	ay, fine to
,5 - -	- 123	-	4.1	-	-	100/3"						(Sample not	recovered)	
-	_	-									SP	POORLY GR fine-grained	ADED SAND - very dense, wet,	light gray,
160 -	130 -	50/4"	1.9	18.9	-									
-	_	-												
- 155 —	135 -	-	3.9	15.7	96	75/6"		 ₩				Becomes gra	ıy, moist	
-	 	1												
-	140	-										Trace gravel		
150 —	140 -	50/5"	3.6	20.9	-		34	M			SM	SILTY SAND gravel (up to 3	O - very dense, moist, gray, fine-g 3/8 inch in size)	rained, trace
-														
145 —	<u> </u>		3.0	20.5	88	75/6"		₩			SP	POORLY GR fine-grained	ADED SAND - very dense, mois	st, gray,
-	_	-												
140-	150 -													
-	_	50/4"	4.1	17.9	-			\boxtimes				END OF BOF NOTES:	RING AT 151 FEET	
-	_	-										Hand augered G-166A was t	upper 5 feet to avoid damage to terminated at 74 feet and backfill sampled between 74 feet and 151	ed. Boring
135 —	155 -	1										well was insta diagram for G	illed on 4/20/2011. See well cons	truction
-		1										required to di 140 pound au	andard Penetration Test: Number rive the SPT sampler 18 inches u atomatic hammer falling 30 inche- allows required to drive the Cranda	sing a es
_	160 -	-										12 inches us **Photo Ioniz	ing a 300 pound hammer falling artion Detector used for OVA reasts: PMT = Pressuremeter, NV =	18 inches dings
													Field Tech: AF Prepared/Date: Checked/Date:	
МТА	West	tside S	ubwa	y Exte	ension				_			0	LOG OF BO	
	LOS A	ngeles	, Cali	nornia	l						しし		Project No.: 4953-10-1561 F	igure: A-2.55d



C & L Drilling / Mayhew 1000 MOISTURE CONTENT (% of dry wt.) DOWNHOLE TESTS PERCENT PASSING No. 200 SIEVE G-168 THIS RECORD IS AN INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. LATITUDE AND LONGITUDE OF BORING LOCATION SHOWN ON LOGS ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BETWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL DRILLING METHOD BOREHOLE LOCATION ELEVATION (ft) DRY DENSITY (pcf) SAMPLE LOC. BLOW COUNT* (blows/ft) "N" VALUE STD.PEN.TEST OVA (ppm)** Rotary Wash DEPTH (ft) 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. 8-inch thick Asphalt Concrete over 10-inch thick Base Course 2011\(\pmage 953-10-1561\) (161-181).GPJ CL-SILTY CLAY - moist, light brown, trace fine sand ML Becomes more sandy, trace gravel 280 Becomes clayey, trace slate gravel (up to 1/4 inch 5 15.3 118 30 \boxtimes 1.3 SC CLAYEY SAND - moist, brown, trace gravel **QUATERNARY OLDER ALLUVIUM [Qalo]** 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, SM SILTY SAND - medium dense, moist, brown and gray, fine to 26 0.7 13.7 medium-grained, some coarse sand, some gravel 10 12.2 113 1.2 13 Becomes brown, trace clay and slate gravel CL LEAN CLAY with SAND - stiff, moist, olive brown, fine sand, trace gravel 0.8 22 Century City / Constellation Station 0.9 26.7 95 19 Becomes stiff to very stiff, trace sand, trace iron oxide stains 16 0.7 31.5 Becomes olive gray to gray 1.3 23.7 34 25 30 26.6 0.6 17.3 107 37 Becomes olive brown to gray, trace fine sand, trace iron oxide 30 28 29.7 0.6 35 1.2 18.7 113 36 Becomes with sand, olive brown, fine sand 0.8 17.2 87 24 Trace sand Field Tech: AR Prepared/Date: JF 3/17/2011 (CONTINUED ON FOLLOWING FIGURE) Checked/Date: LT/RM 9/20/2011

DRILLING COMPANY/DRILLING EQUIPMENT

BORING NO.

MTA Westside Subway Extension Los Angeles, California



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

											G COMPANY/DR ing / Mayhew 1000	RILLING EQUIPMENT	BORING NO.
N (ft)	ft)	E	**(NTEN vt.)	IITY	* E	SSING	0C.	DOWNHOLE TESTS		G METHOD	BOREHOLE LOCATION Sta 707+00, Lt 30 feet	G-168 (Continued
ELEVATION (ft)	DEPTH (ft)	"N" VALUE STD.PEN.TEST	OVA (ppm)**	RE CC of dry v	DRY DENSITY (pcf)	BLOW COUNT* (blows/ft)	NT PA 200 SIE	SAMPLE LOC.	HOLE	DATES DI 1/12/2011 -	RILLED	HOLE DIAMETER 4-7/8 inches	GROUND EL. 284 feet
CLE	DI	"N" STD.I	7AO	MOISTURE CONTENT (% of dry wt.)	DRY	BLOW (b)	PERCENT PASSING No. 200 SIEVE	SAN	DOWN	GROUND-	WATER READI		
				~						CL	LEAN CLAY	' - hard, moist, olive gray to greer pods and calcium carbonate node	nish gray,
	_	-	1.4	32.1	87	50		▩				podo dila carotani carotina non	
	- -										LAKEWOO!	D FORMATION [QIW]	. 1. 1.
	- 45 - -	_ 68	0.5	25.8	-					SM ML	fine to mediu	O - very dense, moist, blueish gray m-grained moist, bluish gray, some clay	y to light gray,
	_	-								SM	SILTY SAND	O - very dense, moist, blueish gray	v to greenish
	- - 50 -	-	1.1	18.4	105	75/9"		×			gray, fine-gra	ined	_
	- -									SP	fine to mediu	ADED SAND - very dense, mois m-grained cobble at 50½ feet	si, fight gray,
	-	97/9"	0.4	17.9	_			\square			Becomes gre	eenish gray	
101	- 55 -									SM	SILTY SANI	O - very dense, moist, blueish gray	y, fine to
	_	-	1.4	12.7	112	100/5"	15	፟			6 to 8-inch th	hick cobble at 55½ feet (up to 1/2 inch in size)	
	-											O FORMATION [Qsp]	
	- 60 - -	-								SP	POORLY GR	ADED SAND - very dense, mois ay, fine to medium-grained	st, blueish gray
	-	93/9"	0.5	10.2	-								
	- - 65 -	-									Thin layer of	f Silty Sand	
	_	-								SM	SILTY SANI	O - very dense, moist, greenish to	blueish grav.
	<u>-</u>	-	1.3	22.0	100	50/5"	21	▩			fine to mediu	m-grained	
	- 70 -	-											
	 - -	50/5"	1.0	18.0	-					SP	POORLY GR fine to medium	ADED SAND - very dense, mois m-grained	st, dark gray,
	- - 75 -	-											
	- -	1											
	_	}	1.2	14.4	100	50/3"		▧					
	[_{80 -}]								V]	Field Tech: A	₹
						((CONTI	NUE	D O	N FOLLOW	ING FIGURE)		LT/RM 9/20/20
ITA	West Los A	tside Su Angeles	ıbway , Cali	y Exte fornia	ension				8	med		LOG OF BC Project No.: 4953-10-1561 F	

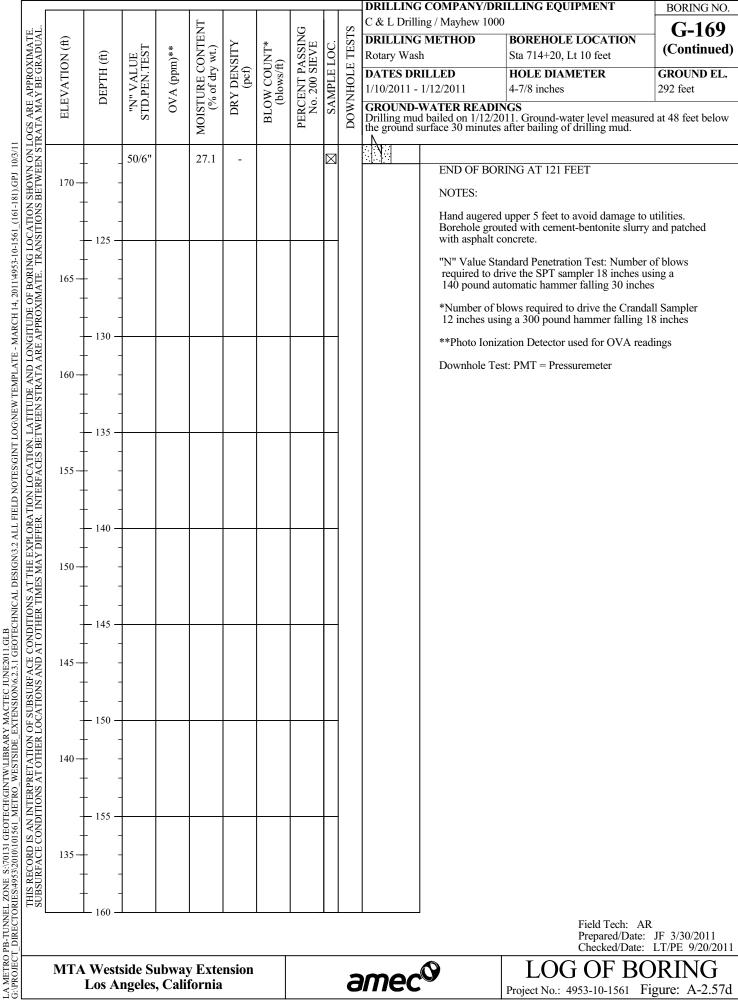
(ii)				MOISTURE CONTENT (% of dry wt.)	Υ	*	DNI M	, ·	STS	DRILLING COMPANY/D C & L Drilling / Mayhew 100 DRILLING METHOD		BORING NO - G-168
i) NO	(ff.)	UE	m)**	ONJ Wt.)	VSIT.)	E) CINT (F)	ASSI	TOC	E TE	Rotary Wash	Sta 707+00, Lt 30 feet	(Continued
ELEVATION (ft)	DEPTH (ft)	"N" VALUE STD.PEN.TEST	OVA (ppm)**	IRE (of dry	DRY DENSITY (pcf)	BLOW COUNT* (blows/ft)	PERCENT PASSING No. 200 SIEVE	SAMPLE LOC.	DOWNHOLE TESTS	DATES DRILLED 1/12/2011 - 1/14/2011	HOLE DIAMETER 4-7/8 inches	GROUND EL. 284 feet
ELE1		"N" TD.F	OV.	ISTU (%)	DRY	LOW (bl	RCE No.	SAN	NMC	GROUND-WATER READ	INGS	
				MO		В	be		DC	Ground-water level not meas	ured.	
tion	_									SM SILTY SAN medium-grai	D - very dense, moist, dark gray, ined	fine to
n Sta	-	-										
latio	-	50/3"	1.0	13.1	-		22	M		1100 600		
/ Constellation Station	- - 85 -									시작성 성실실		
C -		-								[144] [44]		
City	-	-		_	_	100/				(Sample no	t recovered)	
Century						4½"		V		Cample no	r recovered)	
ပီ	90 -			27.	25	70/				SP POORLY G	RADED SAND - very dense, moi	st, dark gray,
-	-	-	1.2	27.2	92	70/5"		▩		fine to mediu	ım-grained	2 • ,
-]										
190 —	_	-										
-	95 -											
-	-	-								CH FAT CLAY medium sand	with SAND - hard, moist, dark gr d	ay, fine to
-	-	43	1.0	10.3	-		81					
185 —	100 -											
-		-								SP POORLY G	RADED SAND - moist, gray, fine	: to
-	_	-									ned, some coarse sand, trace grav D with GRAVEL - very dense, sli	
180 —										moist, dark g	gray, fine to coarse-grained	<i>5</i> . ,
-	105 -		1.2	9.9	119	75/5"		X				
-												
-	_	-										
175 —		-								[
-	110 -	_										
-	<u> </u>	50/4"	1.2	13.8	-		19	\boxtimes		Gravel (up	to 3/4 inch in size) PRING AT 112 FEET	
170 —	<u> </u>]								NOTES: Hand augere	d upper 5 feet to avoid damage to	utilities.
1/0-	115 -									Borehole growith asphalt	outed with cement-bentonite slurry	and patched
-	_	-									tandard Penetration Test: Number drive the SPT sampler 18 inches u	
-	 	-								140 pound at *Number of	utomatic hammer falling 30 inche blows required to drive the Crand sing a 300 pound hammer falling	s all Sampler
165 —	120 -								_		ization Detector used for OVA rea	
	120 -										Field Tech: Al Prepared/Date:	R
		tside Sı							_			DRING
	Los A	ngeles	, Cali	fornia	1				Ô	mec	Project No.: 4953-10-1561 F	



		1		Ι.								ILLING EQUIPMENT	BORING NO
)N (ft)	(ft)	JE EST	ı)**	MOISTURE CONTENT (% of dry wt.)	DRY DENSITY (pcf)	*LNI	PERCENT PASSING No. 200 SIEVE	LOC.	TESTS		ing / Mayhew 1000 G METHOD sh	BOREHOLE LOCATION Sta 714+20, Lt 10 feet	G-169
ELEVATION (ft)	DEPTH (ft)	"N" VALUE STD.PEN.TEST	OVA (ppm)**	JRE C of dry	DEN (pcf)	OW COUP (blows/ft)	NT P/ 200 SI	SAMPLE LOC.	HOLE	DATES DI 1/10/2011 -		HOLE DIAMETER 4-7/8 inches	GROUND EL. 292 feet
ELEV	ĬΩ	"N" STD.I	7AO	MOISTU	DRY	BLOW COUNT* (blows/ft)	PERCE No.	SAN	DOWNHOLE	GROUND	WATER READI	NGS 011. Ground-water level measured after bailing of drilling mud.	d at 48 feet below
											8-inch thick A	sphalt Concrete over 6-inch thick	Base Course
		-								CL- ML	SILTY CLAY gravel	7 - moist, brown with some gray,	trace slate
	- ·												
-	- 5 -		0.2	25.7	93	15		⊠ ⊠		CL	LEAN CLAY	with SAND - moist, olive brown	, fine sand,
			0.2	23.7)3						trace gravel		
-		14	0.2	14.2	_					SM	SILTY SAND	O - moist, light brown, fine to med	ium-grained
	- 10 -												
			0.7	17.5	109	10		\boxtimes		CL	SANDY LEA	N CLAY - moist, brown to dark §	gray, fine sand
	- - 15 -	4/6"	0.3	21.1	-					CL	LEAN CLAY coarse sand	with SAND - soft, moist, light br	rown, fine to
tation													
tion S			0.4	25.9	101	11		⊠			Becomes stif	ff, thin layer of Silt, trace clay and	l sand
/ Constellation Station		-											
/ Co	- 20 -	15	0.5	21.2	-						Becomes oliv	ve brown, trace very fine sand	
ry City													
Centur		-	0.1	27.3	97	17		⊠					
	- 25 - -							П					
-		25	0.1	27.2	-						Becomes ver	ry stiff, trace organics	
-										SC		D FORMATION [Qlw] ND - dense, moist, olive brown, f	ine to
-	- 30 -		0.6	13.0	120	41		X			medium-grain	ed, trace gravel	ine to
]								SM	SILTY SAND some clay	O - dense, moist, light brown, fine-	-grained, with
-		43	0.4	15.7	-		43						
-	- 35 -		0.3	14.7	109	72/11"		 ⊠			Alternating	with layers of Doorly Graded Son	l light grov
-		1	0.5	14.7	10)	/2/11		XX			Atternating v	with layers of Poorly Graded Sand	ı, liglit gray
		90	0.4	14.9	-		12			SP- SM	POORLY GR brown, fine to	ADED SAND with SILT - very demedium-grained	lense, moist,
	- 40 -						NA ITEM	TH.	D (C)	NECK CY	DIC FIGURE,	Field Tech: AR Prepared/Date:	JF 3/30/2011
MTA	West	side Sı	ubwa	y Exte	nsion	i	UNTI	NUE			ING FIGURE)	LOG OF BC	1 LT/PE 9/20/201
		ngeles							6	med		Project No.: 4953-10-1561 Fi	

				I _H						l .		G COMPANY/DR ing / Mayhew 1000	ILLING EQUIPMENT	BORING NO.
ELEVATION (ft)	æ	ST TS	* *	NTEN 1.)	ITY	* * ! !	SSING	oc.	FESTS	DRII		G METHOD	BOREHOLE LOCATION Sta 714+20, Lt 10 feet	G-169 (Continued)
AHC	DEPTH (ft)	"N" VALUE STD.PEN.TEST	OVA (ppm)**	RE CO	DRY DENSITY (pcf)	BLOW COUNT* (blows/ft)	NT PA:	SAMPLE LOC.	HOLE 7	DAT	ES DI	RILLED - 1/12/2011	HOLE DIAMETER 4-7/8 inches	GROUND EL. 292 feet
	DE	STD.P	OVA	MOISTURE CONTENT (% of dry wt.)	DRY	BLOW (blc	PERCENT PASSING No. 200 SIEVE	SAM	DOWNHOLE TESTS	GRO	UND-	WATER READIN		
	_	-	0.1	19.0	101	94/8"		X		N		Becomes ligh	nt brown, trace iron oxide stains	
	- - 45 -	96/11"	0.6	18.4	_			X				Gray to olive	brown	
	_ _	-	0	12.8	106	50/5"		፟					W/D	
	- - - 50 -	-							PMT			Some gravel	WII	
	- -	- -							P		SM	SILTY SAND	• very dense, moist, brown, fine	-orained
-	- -	84	0.2	24.2	-								,,,	g
	- 55 - - -	-										DOODLY CD	ADED GAND I'd GUT	1
	_ _	- -	0.3	17.7	107	93/10"	26	₩			SP- SM	light brown to oxide stains	ADED SAND with SILT - very yellowish brown, fine to medium	n-grained, iron
	- 60 - -	-									SM		- very dense, moist, olive brown ed, iron oxide stains	, fine to
	_ _	63	0.1	21.8	-									
Centur	- 65 - -											SAN PEDRO	FORMATION [Qsp]	
	_ _ _	-	0	18.3	94	93/10"	33	₩			SM		- very dense, moist, light bluish	gray, fine to
	- 70 - -	-												
	_ _ _	50/6"	0.1	22.9	-						SP- SM	POORLY GR. bluish gray, fii slate gravel	ADED SAND with SILT - very one to medium-grained, shell frag	dense, moist, ments, some
	75 - -	-												
	_ _ _	_	0.1	30.5	86	66	15	▧			SM	SILTY SAND medium-grain	o - very dense, moist, bluish gray ed	to gray, fine to
	L ₈₀ -					100	CONTEN			NEC	LOW	DIC EIGUDE	Field Tech: Al Prepared/Date:	JF 3/30/2011
TA		tside Si				i	CONTI	NUE	~ ⊙ O	N FOI	LOW	ING FIGURE)	LOG OF BC	DRING
	Los A	ngeles	, Cali	tornia	!				0		C	•	Project No.: 4953-10-1561 F	igure: A-2.57h

Γ			Ι										ng / Mayhew 1000	CILLING EQUIPMENT	BORING NO.
	(ft)	_	H	*	MOISTURE CONTENT (% of dry wt.)	Ł	*	SING Æ	C.	ESTS	DRII	LLING	METHOD	BOREHOLE LOCATION	G-169 (Continued
	ELEVATION (ft)	DEPTH (ft)	"N" VALUE STD.PEN.TEST	OVA (ppm)**	STURE CONT (% of dry wt.)	DRY DENSITY (pcf)	BLOW COUNT* (blows/ft)	PERCENT PASSING No. 200 SIEVE	SAMPLE LOC.	DOWNHOLE TESTS		ry Was ES DR	h HLLED	Sta 714+20, Lt 10 feet HOLE DIAMETER	GROUND EL.
	EVA	DEPT	N" V/ D.PEN	VA (F	TURE % of 6	RY DJ (p	OW C (blow	CENT 0. 200	AMPI	VNHC	1/10/	2011 -	1/12/2011	4-7/8 inches	292 feet
	EL		ST		MOIS)	D	BL	PER	S	DOV	Drilli the gi	ng mu round s	WATER READING the bailed on 1/12/20 surface 30 minutes	111. Ground-water level measure after bailing of drilling mud.	ed at 48 feet below
	ш.														
	Stati		93	0.1	14.6	_			M				Some coarse	e sand, trace gravel	
	/ Constellation Station	<u> </u>													
	onstel	- 85 -			19.0	103	90/11"	11	₩			SW- SM	dense, wet, bl	DED SAND with SILT and GRA' uish gray to gray, fine to medium	
	ry/C	-	-										(up to 1 inch i	in size)	
	ry City	-													
	Century	– 90 –	50/4"		29.4	_			М			SP	POORLY GR fine-grained	ADED SAND - very dense, wet,	dark gray,
	200	-											illie-grained		
	-	- :													
	-	- 95 -			17.2	112	5.1	5.5	IXXI			CL	SANDY LEA	N CLAY - hard, moist, dark gra	y, fine sand,
	- 195 —	- ·			17.3	112	51	55	₩				trace gravel (ı	up to 3/8 inch in size), some shell	fragments
	-	-													
	-	— 100 –										ML	SII T - hard r	noist, dark bluish gray, trace san	d
	- 190 —		44	1.5	13.4	-						IVIL	SIET mara, i	noist, dark ordish gray, nace san	u
	-		-												
	-	- 105													
	-			0	14.6	116	87/8"		₩				Becomes gra	y	
	185 —	-											Trace gravel		
	-	– – 110 –											_		
	-	-	50/4"	0	23.8	-						SP	POORLY GR to medium-gra	ADED SAND - very dense, wet, ained	dark gray, fine
	180 —	- ·	1												
	-	- 117	-												
	-	— 115 – -			-	-	91/9"						(Sample not	recovered)	
	175 —		-												
	-		-									SM	SILTY SAND medium-grain	O - very dense, wet, dark gray, fin	e to
		L 120 -	ı	l	l	<u> </u>		I	1	<u> </u>	I. (.1	-	Field Tech: Al Prepared/Date:	JF 3/30/2011
_	МТА	West	side Sı	ubwe	v Evto	nsion	((CONTI	NUE	ED O	N FOL	LOWI	NG FIGURE)	Checked/Date: LOG OF BC	LT/PE 9/20/2011
			ngeles							9	M	ec		Project No.: 4953-10-1561 F	



MTA Westside Subway Extension Los Angeles, California

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

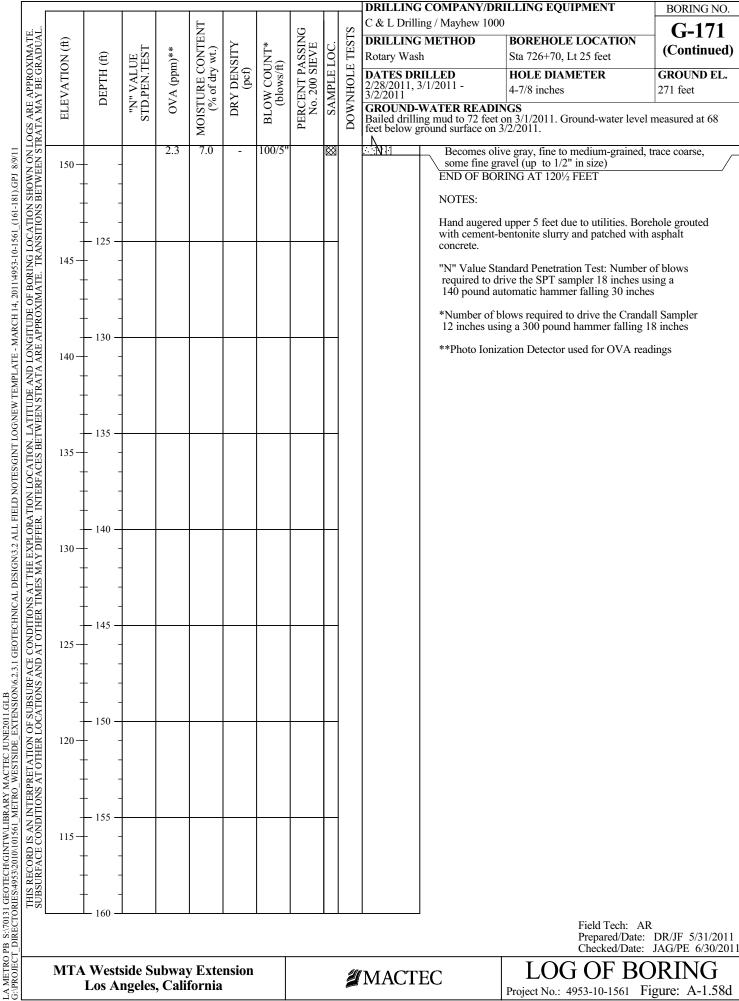
t)				ENT	2		NG .		STS	С&	L Drilli	rg / Mayhew 1000 METHOD	ILLING EQUIPMENT) BOREHOLE LOCATION	BORING NO. G-171
J) NC	(£)	UE	n)**	ONT wt.)	VSITY	#LNC	ASSI	TOC	E TES	Rota	ry Was	h	Sta 726+70, Lt 25 feet	
ELEVATION (ft)	DEPTH (ft)	"N" VALUE STD.PEN.TEST	OVA (ppm)**	JRE C of dry	DRY DENSITY (pcf)	V COI	SNT P	SAMPLE LOC.	HOL	DAT 2/28 3/2/2	Γ ES DR /2011, 3	ILLED 8/1/2011 -	HOLE DIAMETER 4-7/8 inches	GROUND EL. 271 feet
ELE	[]	"N" STD.	ΛO	MOISTURE CONTENT (% of dry wt.)	DRY	BLOW COUNT* (blows/ft)	PERCENT PASSING No. 200 SIEVE	SAN	DOWNHOLE TESTS	GRO	JUND.	WATER READI	NGS on 3/1/2011. Ground-water level 3/2/2011.	measured at 68
270-	<u> </u>	+									ML	LAKEWOOL	Asphalt Concrete over 4-inch thick D FORMATION [Qlw] T - moist, olive, some fine sand	Base Course
	†	-										CLAYEYSII	21 - moist, onve, some tine sand	
	5 -	1	3.3	_	_	17		\boxtimes				Becomes ligh	ht brown	
265 -			3.3			17						Decomes ligh	nt orown	
	10										SM	SILTY SAND very fine-grain	D - medium dense, moist, olive yel	llow, fine to
260-		25	10.2	-								very mie grun		
	<u> </u>													
255 -	15	-	1.6	-	-	39		₩				Becomes der of Poorly Gr	nse, light olive to light olive yellow aded Sand with Silt	w, thin layer
	<u> </u>										SP-	DOODI V CD	ADED SAND with Silt - very der	nsa moist
	20	-									SM	brown, fine to	medium-grained, some shell frag	gments
250-	<u> </u> 	64	8.6	24.5										
	 													
245-	25	-	4.1	16.4		52						(Sample not		
	+											Becomes der	nse, olive yellow	
	30													
240 -	<u> </u> 	71	8.5	21.9									ve, some oxidized seems, trace fingravel (up to 1/4" in size)	ne
	+	-								φ. <u>(</u>	SP	POORLY GR light brown, fi to 1/2" in size	ADED SAND with Gravel - very ine to medium grained, some coard)	dense, moist, rse, gravel (up
235 -	35	-	2.3	5.9	106	69		₩		, 0				
	+	-) . ())	<u> </u>			
	40 .	-									ML			
						((CONTIN	NUE	D O	N FO	LLOWI	NG FIGURE)	Field Tech: AR Prepared/Date: Checked/Date:	DR/JF 5/31/20
MTA		tside S Angeles								\mathbf{M}_{I}	ACT	EC	LOG OF BC	
		50103	, Can		•								Project No.: 4953-10-1561 F	igure: A-1.5

Γ										_	DRILLING	G COMPANY/DRI	LLING EQUIPMENT	BORING NO.
	ы́-j					F			Ŋ		C & L Drill	ing / Mayhew 1000		G-171
	MATI	(f)		L	*	t de	TY	* L	SIN	از ا	DRILLING	G METHOD	BOREHOLE LOCATION	(Continued)
	GRA	NOI	H (ff		*(mc	CO	DENSITY (pcf)	(ft)	PAS SIE	3 LC	Rotary Was		Sta 726+70, Lt 25 feet HOLE DIAMETER	GROUND EL.
	PPR BE	/AT	DEPTH (ft)	VA PEN	OVA (ppm)**	RE of di	(pc	V CC lows	NT 200	(PL)	$\frac{1}{2}$ $\frac{1}$	3/1/2011 -	4-7/8 inches	271 feet
	MAY	ELEVATION (ft)	DI	"N" VALUE STD.PEN.TEST	400	MOISTURE CONTENT (% of dry wt.)	DRY	BLOW COUNT* (blows/ft)	PERCENT PASSING No. 200 SIEVE	SAMPLE LOC.	DRILLING Rotary Was DATES DI 2/28/2011, 3/2/2011 GROUND Bailed drill feat below	WATER READIN	GS	
	SHOWN ON LOGS ARE APPROXIMATE. BETWEEN STRATA MAY BE GRADUAL	"		\sigma		MO		B	PE		Bailed drill feet below:	ng mud to 72 feet oground surface on 3/	n 3/1/2011. Ground-water level 2/2/2011.	measured at 68
/9/11	INO	220		79		-						SANDY SILT gravel	- hard, moist, light brown, fine s	and, trace
3PJ 8	WEE	230	-									(Sample not re	ecovered)	
DESIGN3.2 ALL FIELD NOTES/GINT LOG/NEW TEMPLATE - MARCH 14, 20114953-10-1561_(161-181),GP1 8/9/11	ATION SHO	+			6.2	22.3	91	80/10"		₩		Becomes olive	e to light olive brown, trace iron	oxide stains
-1561	LOC/ NNSI	+	- 45 -							Н	SM	SILTY SAND	- very dense, moist to wet, light of	olive to olive.
53-10	ING TRA	225		98	7.2	21.3						very fine to fine	e-grained, trace medium	, , , , , , , , , , , , , , , , , , ,
011/45	BOR ATE.	†												
RCH 14, 20	AT THE EXPLORATION LOCATION. LATITUDE AND LONGITUDE OF BORING LOCATION MES MAY DIFFER. INTERFACES BETWEEN STRATA ARE APPROXIMATE. TRANSITIONS	†			6.2	14.5	101	81		▩		Becomes light	t olive brown, trace iron oxide st	ains
- MA	SE AF	†	- 50 -	63	2.9	12.0						Thin layer of	Clavey Silt	
LATE	PA A	220	-		2.9	12.0						Tilli layer or	Clayey Silt	
LEMP	JE AN	I												
VEW J	ENS	1			5.3	13.2	101	84/10"	47	X		Becomes light oxide stains, s	t brown to olive yellow, with ligh scattered with small grayish clay	nt gray iron pockets
Sog	TWE	1	- 55 -							Ш				
Ī	SS BE	215		54	4.1	22.5						Increase in sil	t content	
TES/C	FACE	+												
D NO	TER	+		.	7.6	17.9	103	75/7"		\boxtimes		Trace mediun	n sand, with iron oxide stains	
FIEL	R. IN	+		.										
ALL	PLOR	†	- 60 -	70	2.9	23.5			55		ML		- hard, moist, olive, very fine to	fine sand, trace
3N/3.2	E EX	210		'0	2.9	23.3			33	M		shell fragments	3	
DESIC	T THE	Ť	-								ML	SILT with San	d - hard, moist, bluish gray, fine	sand, with iron
	ASA	I			6.7	23.5	97	66	84	\boxtimes		oxide stains		, ···
CHIN	HER	1	- 65 -							Ш	3 8 6		FORMATION [Qsp]	
EOTE	ONO	205		50/5"	2.3	18.7				M	SM	fine-grained, so	with Gravel - very dense, moist, ome medium	light gray,
3.1 G	SE N	+										Some gravel ((up to 3/4" in size)	
N/6.2.	URFA NS A	+			6.1	25.6	90	86/6"		\boxtimes		▼	, olive to light olive gray, increase	e in silt content
OISN	ATIO	+												
EXTE	OF S LOC	†	– 70 –	53/6"	3.2	144			13			Some gravel ((up to 1/2" in size)	
SIDE	HER	200		33/0	3.2	14.4			13		SP-		ADED SAND with Silt - very der	nse, wet, olive,
ÆSTS	TOT	Ť	-		4.3	15.8	106	75/7"		\boxtimes	SM	fine to medium	-grained, trace gravel	
RO_W	ERPR NS A]										
MET	TNI	I	- 75 -							Ц				
1561	SAN	195		50/5"	9.2	19.0			12			Trace fine sub	prounded gravel (up to 1/4" in size	ze)
910/10	SED 1	1												
953/2(RECC	+												
IES/4	THIS RECORD IS AN INTERPRETATION OF SUBSURFACE CONDITIONS / SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIN	+			3.1	21.8	100	50/6"		⊠		Becomes olive	e to light olive gray	
CT_DIRECTORIES(4953)2010\(101561_METRO_WESTSIDE_EXTENSION\(6.2.3.1\) GEOTECHNICAL	_ v ₁ _		- 80 -			<u> </u>	<u> </u>			Ш	IINII		Field Tech: AR	
DIRE								(6	'Alten	л п	ON FOLLOW	NC EICHDE	Prepared/Date:	DR/JF 5/31/2011
F								(C	UNIII	NUE	ON FOLLOW	ING FIGURE)	Cnecked/Date:	JAG/PE 6/30/2011

MTA Westside Subway Extension Los Angeles, California

#MACTEC

				I _L								COMPANY/DIng / Mayhew 100	RILLING EQUIPMENT	BORING NO.
V (ft)	.j)	E SST	*	NTEN vt.)	ITY	* L	SSING	OC.	TESTS	DRI		METHOD	BOREHOLE LOCATION Sta 726+70, Lt 25 feet	G-171 (Continued)
ELEVATION (ft)	DEPTH (ft)	"N" VALUE STD.PEN.TEST	OVA (ppm)**	STURE CONT (% of dry wt.)	DRY DENSITY (pcf)	BLOW COUNT* (blows/ft)	NT PA 200 SIE	SAMPLE LOC.	HOLE		•	ILLED 3/1/2011 -	HOLE DIAMETER 4-7/8 inches	GROUND EL. 271 feet
ELEV	DE	"N" STD.F	OV≜	MOISTURE CONTENT (% of dry wt.)	DRY	BLOW (bl	PERCENT PASSING No. 200 SIEVE	SAM	DOWNHOLE TESTS	GRO	UND-	WATER READI		
190 —		72/9"	2.8	25.2			81				ML	SILT with Sa shell fragmen	and - hard, wet, dark gray, very fints	ne sand, trace
-		-	8.4	12.8	106	110/3"		₩			SP- SM	POORLY GR	RADED SAND with Silt - very demedium-grained, trace gravel	ense, wet, dark
- 185 —	— 85 – -	90/6"	4.8	11.5								Some coarse	e, trace fine rounded gravel (up to	o 1/2" in size)
-	- ·	- -	5.2	-	-	100/4"	6	፟				Increase in s	silt content	
180 —	- 90 - -	50/5"	2.6	17.5				M				Cobble (up	to 8" in size)	
-	- ·	- -	2.3	12.4	107	75/6"		፟						
- 175 —	− 95 − -	50/6"	2.9	15.5				M						
- -		-	4.1	16.2	107	66/10"		\boxtimes			CL- ML SM		Y - hard, wet, dark gray, trace fin D - very dense, dark gray, fine to	
- 170 —	- 100 -	50/6"	2.6	17.3								Trace grave	1 (up to 1/2" in size)	
-		-									CL- ML	SILTY CLA' shell fragmer	Y - hard, wet, dark gray, trace finats, trace iron oxide stains	e sand, trace
-	- 105		4.4	17.9	109	75		፟						
165 —	- ·	90/11"	3.2	21.9							SM	SILTY SANI medium-grain Trace grave	D - very dense, wet, olive gray, find the clayey silt interbeds	ne to
160 —	- 110 - -	-	2.0	11.8	121	75/6"		×				Becomes fir	ne-grained, some medium to coars	se
-		-										More gravel	I	
155—	115 	50/3"	3.7	6.2				M			SP- SM	gray, fine-gra (up to 1/4" in	RADED SAND with SILT - very nined, some medium to coarse, transize), thin layer of Silty Sand r with shell fragments	dense, wet, dark ace fine gravel
_	- - 120 -	_											Field Tech: A	R
						(0	CONTI	NUE	ED O	N FOI	LLOWI	NG FIGURE)	Prepared/Date: Checked/Date:	DR/JF 5/31/201 JAG/PE 6/30/20
		side Su ngeles							2	MA	ACT:	EC.	LOG OF BO	ORING



LOG OF BORING

Project No.: 4953-10-1561 Figure: A-1.58d

				ENT			DN.		STS	C & L D	rillin	g / Mayhew 1000 METHOD	ILLING EQUIPMENT BOREHOLE LOCATION	BORING:
ELE VA HON (II)	(E)	UE TST	* *(1	ONT]	DRY DENSITY (pcf)	t)	ASSII IEVE	SAMPLE LOC.	E TES	Rotary W			Sta 731+20, Lt 5 feet	G-17
AIIC	DEPTH (ft)	VAL	OVA (ppm)**	RE C	DEN; (pcf)	COL ows/f	NT P.	PLE	НОГІ	DATES 2/21/201			HOLE DIAMETER 4-7/8 inches	GROUND 1 280 feet
rre v	DE	"N" VALUE	OVA	MOISTURE CONTENT (% of dry wt.)	DRY	BLOW COUNT* (blows/ft)	PERCENT PASSING No. 200 SIEVE	SAM	DOWNHOLE TESTS	GROUN	D-V	VATER READI		
		<u> </u>								3		4-inch thick A	sphalt Concrete over 8-inch thick ILTY SAND - moist, brown	k Base Course
	-	-								SI		QUATERNA	RY OLDER ALLUVIUM [Qa N CLAY - very soft, moist, brow	
	+	-									L	gravel fragmen	nts	ii, wiiii siate
275 -	5	1												
	<u> </u>	-		16.5	110	Push		\boxtimes				Plant roots p	resent	
	<u> </u>													
	+	-												
270-	10	+		20.7	103	9		\boxtimes		//// S	C	CLAYEY SA	ND - loose, moist, brown, fine-g	grained, trace
	Ţ											graver (up to 1		
	\dagger	-												
265 -	15	1										CANDVIEA	N.C. A.V	4
	+	_ 18	0.1	18.7						C	L	SANDY LEA	N CLAY - very stiff, moist, brow	vn, trace grave
	<u> </u>													
	+	-								S	C	CLAYEY SA	ND - dense, moist, brown, fine-g	grained, trace
260-	20	+	0.0	12.0	114	14	46	⊠				graver (up to 1	77 III SIZC)	
	‡	1	0.0	12.0		'								
	+	-										LEANCLAY	4:66 h	
255 -	25	1								C	니	LEAN CLAY	- very stiff, moist, brown	
200	+ =	18		22.0										
	†	-										LAKEWOOI	D FORMATION [Qlw]	
	Ī.]								SI	M	SILTY SAND fine-grained, t	o - medium dense, moist, olive brace clay	own,
250-	30	+	0.0	23.9	101	21		\boxtimes				Trace iron ox		
	‡	1	0.0		101			المحما		C	L	LEAN CLAY	- very stiff, moist, gray, with iro	n oxide stains
	+	-												
245 -	35	1						Ц		SI	М	SILTY SAND fine-grained	- dense to very dense, moist, oli	ve gray,
•	+	50		17.0			41					-		
	<u> </u>	_												
	+	-												
	L ₄₀			1			<u> </u>	Ш		1. 1			Field Tech: DV	
						((CONTIN	NUE	D O	N FOLLO	WIN	NG FIGURE)	Prepared/Date: Checked/Date:	JAG/PE 6/3
MTA				ay Exte lifornia					2	MAC	TE	EC	LOG OF BO	
		mgul	, Ca		•								Project No.: 4953-10-1561 F	ıgure: A-l.

					INS			Ş		LS	C & L Dr	rilling	g / Mayhew 1000		BORING NO. G-173
E) NO	_ €		UE	m)**	ONTE	DRY DENSITY (pcf)	r)	PERCENT PASSING No. 200 SIEVE	LOC.	DOWNHOLE TESTS	Rotary W	ash	METHOD	Sta 731+20, Lt 5 feet	(Continued
ELEVATION (ft)	DEPTH (ft)		"N" VALUE STD.PEN.TEST	OVA (ppm)**	URE C	Y DEN (pcf)	BLOW COUNT* (blows/ft)	ENT P	SAMPLE LOC.	HOL)	DATES I 2/21/2011			HOLE DIAMETER 4-7/8 inches	GROUND EL. 280 feet
ELE		١	STD	OV	MOISTURE CONTENT (% of dry wt.)	DR	BLO'	PERCI No.	SA	DOW	GROUN Bailed dri feet below	D-W illing v gro	ATER READINg mud to 77 feet ound surface on 2	NGS on 2/22/2011. Ground-water level 2/23/2011.	el measured at 57
	<u> </u>				-	-	26				SI	P	(Sample not a Becomes me	recovered) dium dense ADED SAND - dense to very de	ence clightly
	†	-			3.7	97	53		⊠				moist, brown,	fine-grained	onse, siightly
235 -	45	- ; _	89/11"		9.0								Dagamas dar	k brown, trace iron oxide stains	
	†	-	09/11		9.0								Becomes dar	k brown, trace from oxide stains	
	†	-									SN	М	SILTY SAND brown, fine to size)	with Gravel - very dense, moist medium-grained, with slate grav	, yellowish vel (up to 1/8" in
230 -	50) -	_		12.3	110	81	13	⊠						
	†	-													
225 -	+ - 55	- ; _			15.1		83/11"		IXXI		SI	P	POORLY GR and gray, fine-	ADED SAND - very dense, moi- grained	st, olive brown
	†	-			13.1		83/11		⊠			Ī	<u>Z</u>		
	†	-													
220-	 60) — -		0.0	21.6	99	65	27	⊠	N	SN	М	SILTY SAND with iron oxid	O - very dense, wet, light olive grade stains	ay, fine-grained,
	†	-													
215-	65	; <u> </u>													
	†	-	-												
	†	-													
210-	+ 70 +) — -			19.6	103	59		▧	N			Becomes bro	own	
	†	-								l a					
205 -	75	- 5 —								Pressuremeter					
	†	-	73/10"	0.0	24.0			54		Pres		L	SANDY SILT	FORMATION [Qsp] - hard, wet, olive brown to olive	e gray, with shell
	†	-	73/10	0.0	24.0			34					fragments		
	⊥ 80) —	I	<u> </u>	1	<u>I</u>	((ONTO	Пп	ED C	N EOL LO		G FIGURE)	Field Tech: D' Prepared/Date:	KP/JF 3/29/201
MTA			side Si				Ì	ONTI	NUE		MAC			LOG OF BO	JAG/PE 6/30/20 ORING
	Los	A	ngeles	, Cali	10rnia						1,1110			Project No.: 4953-10-1561 F	Figure: A-1.59

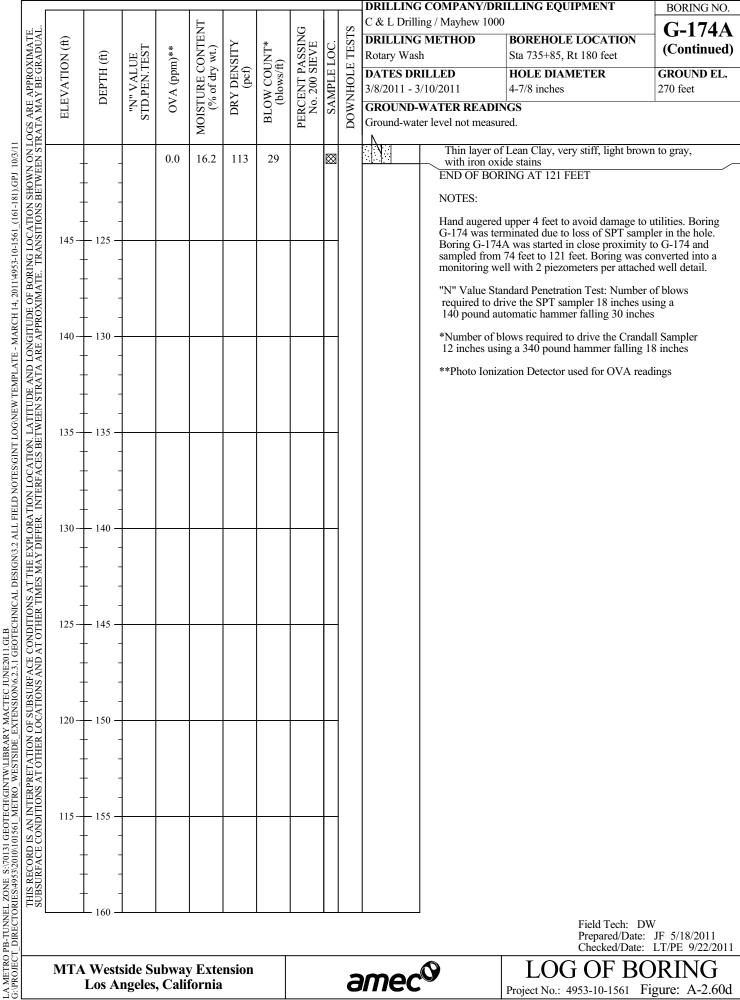
					LNI			£ G		LS	C & L Drilling / Mayhew 1000	ORING NO. G-173
ELEVATION (ft)		(ft)	JE EST	ı)**	ONTE wt.)	SITY	*LV	ASSIN	LOC.	TES		ontinued
/ATIC		DEPTH (ft)	"N" VALUE STD.PEN.TEST	OVA (ppm)**	RE Co	DRY DENSITY (pcf)	/ COU	NT P/ 200 SI	SAMPLE LOC.	HOLE	DATES DRILLED HOLE DIAMETER GRO 2/21/2011 - 2/23/2011 4-7/8 inches 280 ft	OUND EL.
ELE/		DE	"N" STD.F	4VO	OVA (ppm)** MOISTURE CONTENT (% of dry wt.)		BLOW COUNT* (blows/ft)	PERCENT PASSING No. 200 SIEVE	SAM	DOWNHOLE TESTS	GROUND-WATER READINGS Bailed drilling mud to 77 feet on 2/22/2011. Ground-water level meas feet below ground surface on 2/23/2011.	
	+	_			21.9	101	54	85	₩	NV	With iron oxide stains	
	†	-									SM SILTY SAND - very dense, wet, olive brown, fine-grawith iron oxide stains	nined,
195	+	85 —	84		22.6						POORLY GRADED SAND with Silt - very dense, we fine to medium-grained, with dark manganese nodule	
	†	-								ter	The to medium granied, with dark maniganese house	5
190	-	90 –								Pressuremeter		
	+	-								P1		
185	+	95 —	66		20.0			9	M		Becomes fine-grained	
	†	-										
180	I	100 —									MH ELASTIC SILT with Sand - hard, wet, dark gray to b with shell fragments	lack,
	+	-		0.0	29.3	90	66	78	₩			
	+	-										
175	+	105 -		0.0	19.8		50/3"		፟		SP POORLY GRADED SAND - very dense, wet, gray, fine-grained, trace slate gravel fragments	
	<u> </u>	-										
170	\perp	110 —		0.1	19.5	105	37		₩		ML SANDY SILT - hard, wet, dark gray, some fossils, interbedded, trace sulfor odor, weak	
	+	-										
165	+	- 115 -	40	0.0	20.5							
	+	-	42	0.0	29.6						Thin layer of Lean Clay, gray END OF BORING AT 116½ FEET	
	+	_									NOTES:	
	<u></u>	120 —									Borehole grouted with cement-bentonite slurry and pa with asphalt concrete.	atched
							((CONTII	NUE	D O	Field Tech: DW Prepared/Date: KP/JF Checked/Date: JAG/I	F 3/29/20 PE 6/30/2
MT.					y Exte					4	MACTEC LOG OF BORI	
	L	us Al	ugetes	, Cali	fornia	l .					Project No.: 4953-10-1561 Figure:	A-1.59

		1		1	1	1	I			DRILLING COMPANY/DI		BORING NO
N (ft)	(£)	E	**(NTENT vt.)	ITY	*LZ	SSING	OC.	TESTS	C & L Drilling / Mayhew 100 DRILLING METHOD Rotary Wash	BOREHOLE LOCATION Sta 731+20, Lt 5 feet	G-173 (Continued
ELEVATION (ft)	DEPTH (ft)	"N" VALUE STD.PEN.TEST	OVA (ppm)**	RE CC of dry v	DRY DENSITY (pcf)	COUT ows/ft)	NT PA 200 SIE	SAMPLE LOC.	НОГЕ	DATES DRILLED 2/21/2011 - 2/23/2011	HOLE DIAMETER 4-7/8 inches	GROUND EL
ELEV	DE	"N" STD.P	OVA	MOISTURE CONTENT (% of dry wt.)	DRY	BLOW COUNT* (blows/ft)	PERCENT PASSING No. 200 SIEVE	SAM	DOWNHOLE TESTS	GROUND-WATER READI		
		-								required to d	andard Penetration Test: Number of the SPT sampler 18 inches us utomatic hammer falling 30 inche	sing a
-										*Number of l 12 inches us	plows required to drive the Cranda ing a 340 pound hammer falling 1	ll Sampler 8 inches
-	— 125 — -									**Photo Ioni:	zation Detector used for OVA read	lings
-	 											
150 — -	— 130 — -											
-		-										
145 -	— 135 —	_										
-		-										
140 —	— 140 —											
-												
135—	- 145 -											
-												
130-	- 150 -											
<u>-</u>		_										
125	 155 -											
123 —	- 133 - 		_									
-	- ·	-										
	— 160 —	<u> </u>		<u> </u>			<u> </u>				Field Tech: DV Prepared/Date: Checked/Date:	KP/JF 3/29/20
		side Si ngeles							4	MACTEC	LOG OF BC Project No.: 4953-10-1561 Fi	RING

Γ													COMPANY/DR	ILLING EQUIPMENT	BORING NO
	N (ff)	(ft)	JE EST	**(1	MOISTURE CONTENT (% of dry wt.)	SITY	*LN	PERCENT PASSING No. 200 SIEVE	.0C.	DOWNHOLE TESTS	1	NG	METHOD	BOREHOLE LOCATION Sta 735+85, Rt 180 feet	G-174A
	ELEVATION (ft)	DEPTH (ft)	"N" VALUE STD.PEN.TEST	OVA (ppm)**	RE CO	DRY DENSITY (pcf)	BLOW COUNT* (blows/ft)	NT PA	SAMPLE LOC.	HOLE	DATES 1 3/8/2011			HOLE DIAMETER 4-7/8 inches	GROUND EL
	ELEV	DE	"N" STD.P	OVA	USTU (% 6	DRY	3LOW (bl	ERCE No. 2	SAM	OWN	GROUN	D-V	VATER READIN	NGS	270 1000
					MC			l d		ă	Ground-v	vate	r level not measur		
	1		-										36-inch thick	Asphalt Concrete	
	1	- ·											FILL [Af]		
	+		-								SI SI M	М	coarse-grained		
	265	- 5 -		0.2	15.5	114	Push		×		C C	_		`with GRAVEL - moist, dark bro RY OLDER ALLUVIUM [Qa N CLAY with GRAVEL - very s	
]]										brown, some i	ron oxide stains, subangular to s	ubrounded fine
	+	-	-										_		
	260	- - 10 -											Alternating v	vith layers of Lean Clay, very sti	ff brown trace
	-		18	0.1	30.4	-		90				1	fine sand	o - medium dense, moist, brown,	
	1	-									SI	VI	SILT I SAND	- medium dense, moist, brown,	ime-gramed
			-										Becomes ora	naish brown	
-	255	- 15 - -		0.1	14.5	101	30		×		SI		POORLY GR	ADED SAND with SILT - dense	e, moist, brown,
	-		-								Sì	M	fine-grained		
	1	- :													
	250	– 20 –	20	0.2	14.4										
	1	- ·	28	0.2	14.4	-							Fine to medi with layers o	um-grained, trace coarse, fine graf Sandy Silt and Silty Sand	avel, alternating
	+		-												
	245	- - 25 -													_
	- 1	-	-	0.0	23.1	93	15		⊠		C	L	SANDY LEA gravel	N CLAY - stiff, moist, dark brow	vn, trace fine
	1	- ·													
	+		-												
	240	- 30 -	23	0.0	22.7	-		41	M		S	С	CLAYEY SA	ND - medium dense, moist, brow	n, fine-grained,
	+		-											Lean Clay, brown to gray	
	1	- ·	1										-		
	235	- 35 -							H						
	+	- ·	_	0.0	13.7	119	26		₩				Some slate fi	ne gravel	
	1														
	+	- 40	-												
		- 40 -	•	•	•		•	•	• 1					Field Tech: DV Prepared/Date:	JF 5/18/2011
_	МТА	West	side S	uhwa	v Exte	nsian		CONTIN	NUE				NG FIGURE)	Checked/Date:	LT/PE 9/22/20
			ngeles							â	me	C		Project No.: 4953-10-1561 F	

				LZ			U		ò	C & L Dri	lling / Mayhew 100		BORING NO G-174
ELEVATION (ft)	£	E ST	*	NTE]	ITY	*LZ	SSIN	OC.	TEST	DRILLIN Rotary Wa	G METHOD	BOREHOLE LOCATION Sta 735+85, Rt 180 feet	(Continued
100	DEPTH (ft)	"N" VALUE STD.PEN.TEST	OVA (ppm)**	E CO dry w	DRY DENSITY (pcf)	BLOW COUNT* (blows/ft)	PERCENT PASSING No. 200 SIEVE	SAMPLE LOC.	DOWNHOLE TESTS	DATES D	RILLED	HOLE DIAMETER	GROUND EL.
EVA	DEP	N" V. D.PE	VA (TUR % of	RY D	O W C	CEN o. 20	AMP]	NHC	3/8/2011 -		4-7/8 inches	270 feet
豆		ST		MOISTURE CONTENT (% of dry wt.)	D	BL(PER	S	DOV		D-WATER READI ater level not measu		
-	-	32	0.2	14.5	-					V SP		RADED SAND - dense, moist, broned, trace coarse, trace fine grave	
225 —	- - - 45 -	-	0.1	19.6	106	27		\boxtimes		SC	CLAYEY SA medium-grain	AND - dense, moist, brown, fine to)
-	- -	- - -											
220 —	_ 50 - -	_ 16	0.1	19.6	-						Becomes gra	ay, fine-grained, trace fine gravel	
215—	- - 55 -	-	0.0	20.0	101	27		\boxtimes		CI	LEAN CLAY	? - very stiff, moist, brown	
210—	- 60 -	- - -											
-	-	29	0.0	20.3	-								
205 —	- 65 -										Alternating	with layers of Lean Clay with Sa	nd hard reddish
- -	- -	- - -	0.1	15.5	114	39					brown with	gray mottling, trace fine slate gra	vel
200 —	70 -	-						Ш					
- -	- -	33	0.0	24.7	-								
-		-											
195 —	— 75 - -	-	0.0	22.8	107	19		₩			Becomes sti	ff, brown, trace fine sand, some codules	alcium
Tunnel	- -	- - -											
	L 80 -					(0	CONTIN	NUE	ED O	N FOLLOV	/ING FIGURE)	Field Tech: D' Prepared/Date: Checked/Date:	
MTA	West	tside S	ubwa	y Exte	nsion	Ì					6	LOG OF BO	
	Los A	angeles	, Cali	tornia	l				O	me	• <u> </u>	Project No.: 4953-10-1561 F	

				L						C 0 I D :11: /N/ 1 1000	BORING NO.
Tunnel ELEVATION (ft)	ft)	E	* *	NTEN wt.)	SITY	* L Z	SSING	,OC.	TESTS	DDILLING METHOD POPEHOLE LOCATION	G-174 <i>A</i> Continued
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	DATES DRILLED HOLE DIAMETER GF 3/8/2011 - 3/10/2011 4-7/8 inches 270	ROUND EL.
EL		r" STJ	0))	D	BL(PER(S _z	DOW	GROUND-WATER READINGS Ground-water level not measured.	
	 	75/11"	0.0	26.9	-		71	\boxtimes		Becomes hard, grayish brown, with thin layers of Graded Sand, trace gravel (up to 3/8 inch in size)	Poorly
el	- 85 - 		0.0	25.8	98	18		፟		Becomes stiff, gray, some calcium carbonate nodu	ıles
Tunnel	 - 90 -	45	0.0	20.7	-		65	M		Alternating with layers of Sandy Lean Clay, hard, with	brown
										gray mottling, fine sand	
	- 95 - 		0.0	15.3	114	85/8"				Becomes grayish brown, trace fine sand, trace grav	vel
170	- 100 - - 100 -	36	0.0	22.0	-			\square		Becomes light brown to gray, fine sand	
165	 - 105 -		0.1	13.6	112	48	37	₩ ₩		SC CLAYEY SAND - dense, moist, gray, fine to mediu trace gravel (up to 3/4 inch in size)	um-grained,
+	 										
160	- 110 - 	51	0.0	16.6	-					CL LEAN CLAY - hard, moist, gray, some iron oxide s Becomes brown to gary, fine to medium sand	stains
155	 - 115										
165 — 160 — 155 — 155 — -			0.0	23.3	-	27				SILTY SAND - medium dense, moist, dark brown, fine-grained	
_	- 120 -					(1)	ONTIN	JI 11	TD C	Field Tech: DW Prepared/Date: JF Checked/Date: JT	5/18/2011 /PE 0/22/20
		side Su				(C	ONTI	NUE		rollowing Figure) Checked/Date: LT/ LOG OF BOR Project No.: 4953-10-1561 Figure	UNG



MTA Westside Subway Extension Los Angeles, California

LOG OF BORING

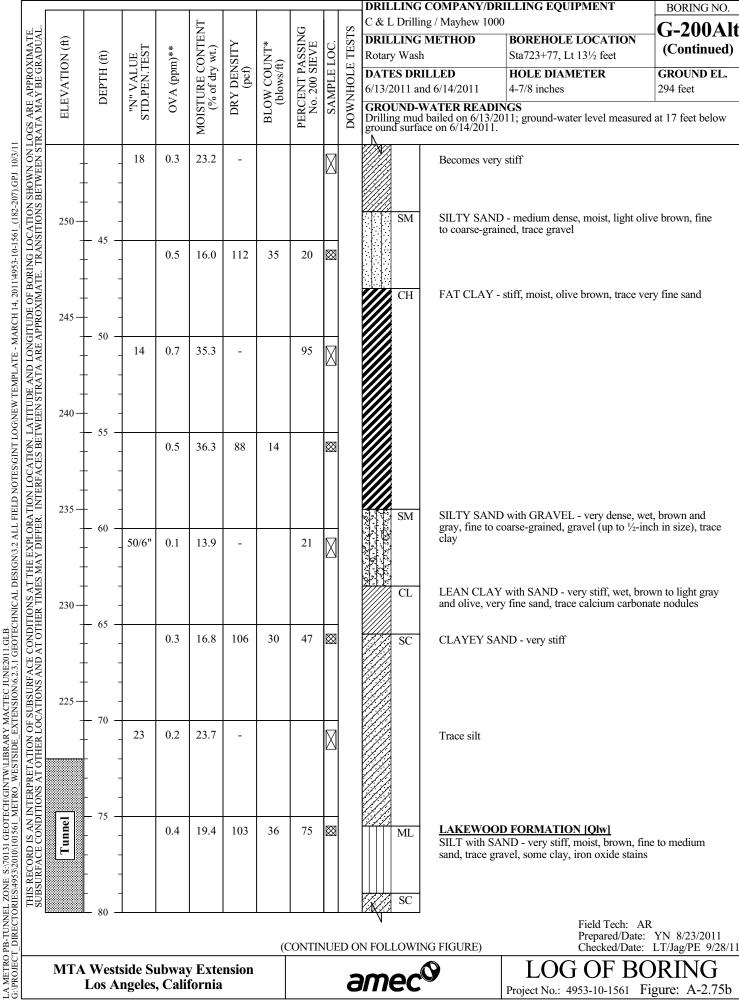
Project No.: 4953-10-1561 Figure: A-2.60d

DRILLING COMPANY/DRILLING EQUIPMENT BORING NO. C & L Drilling / Mayhew 1000 MOISTURE CONTENT (% of dry wt.) DOWNHOLE TESTS PERCENT PASSING No. 200 SIEVE 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 BE GRADUAL **G-200Alt** DRILLING METHOD BOREHOLE LOCATION ELEVATION (ft) DRY DENSITY (pcf) SAMPLE LOC. BLOW COUNT* (blows/ft) "N" VALUE STD.PEN.TEST OVA (ppm)** Rotary Wash DEPTH (ft) Sta723+77, Lt 131/2 feet DATES DRILLED HOLE DIAMETER GROUND EL. 6/13/2011 and 6/14/2011 4-7/8 inches 294 feet GROUND-WATER READINGS Drilling mud bailed on 6/13/2011; ground-water level measured at 17 feet below ground surface on 6/14/2011. 3-inch thick Asphalt Concrete over 3-inch thick Base Course CL QUATERNARY OLDER ALLUVIUM [Qalo] 2011\4953-10-1561 (182-207).GPJ SANDY LEAN CLAY - very stiff, moist, dark gray, fine sand 290 19.5 105 7 0 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, 7 285 10 Becomes stiff, greenish gray to dark olive, more sand, trace 15 0.1 19.0 69 gravel 280 0.3 21.5 105 8 Becomes very stiff, olive 275 Becomes wet, light brown, very fine sand 20 19 20.3 Some gravel 270 SILTY SAND - medium dense, moist, olive, fine to SM 25 medium-grained 22.2 104 49 \boxtimes 0.1 24 SANDY LEAN CLAY - wet, olive, very fine sand, layers of $\overline{\text{CL}}$ Clayey Sand 265 30 26 0.1 26.7 SM SILTY SAND - medium dense, wet, light brown, fine-grained SANDY LEAN CLAY - stiff, wet, light olive, very fine sand, $\overline{\text{CL}}$ trace fine sand seems 260 35 22.0 103 16 \boxtimes 255 Field Tech: AR Prepared/Date: YN 8/23/2011 (CONTINUED ON FOLLOWING FIGURE) Checked/Date: LT/Jag/PE 9/28/11

MTA Westside Subway Extension Los Angeles, California



Project No.: 4953-10-1561 Figure: A-2.75a



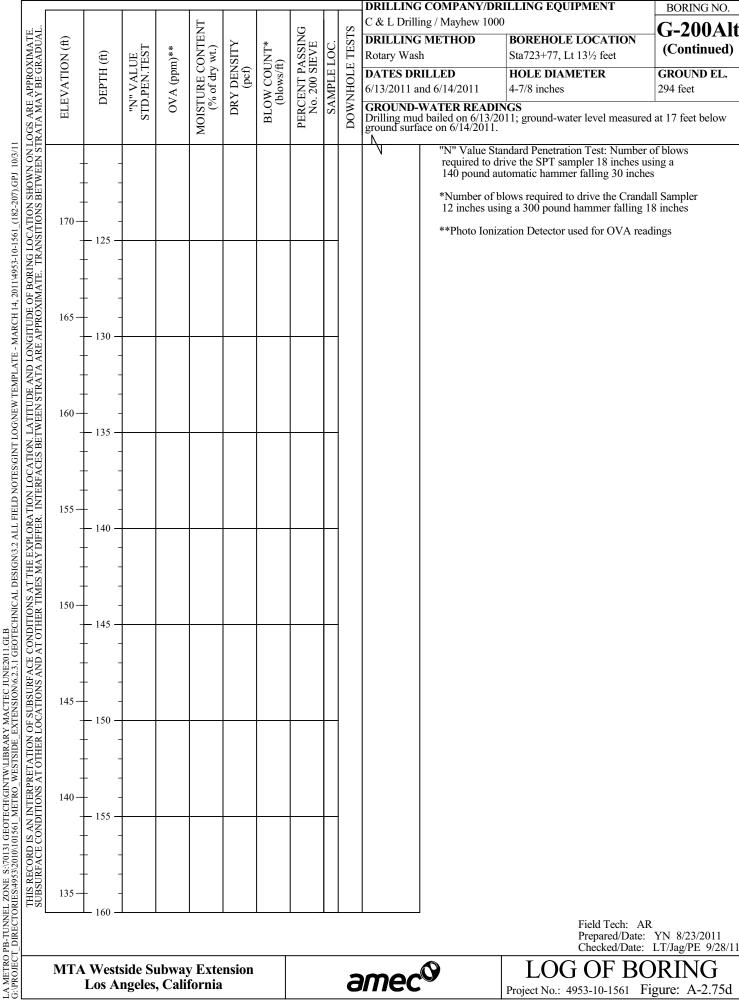
MTA Westside Subway Extension Los Angeles, California



OG OF BORING

Project No.: 4953-10-1561 Figure: A-2.75b

				Ę			ליז		S	C & L Drilling	g / Mayhew 1000		BORING NO G-200A
N (ft)	ft)	JE 3ST	**(MOISTURE CONTENT (% of dry wt.)	SITY	*LZ	PERCENT PASSING No. 200 SIEVE	OC.	DOWNHOLE TESTS	DRILLING M Rotary Wash	METHOD	BOREHOLE LOCATION Sta723+77, Lt 13½ feet	(Continued
4TIO.	DEPTH (ft)	"N" VALUE STD.PEN.TEST	OVA (ppm)**	TURE CONT (% of dry wt.)	DRY DENSITY (pcf)	BLOW COUNT* (blows/ft)	RCENT PASSIN No. 200 SIEVE	SAMPLE LOC.	OLE	DATES DRII		HOLE DIAMETER	GROUND EL
ELEVATION (ft)	DEF	"N" \\ D.PE	JVA	STUR (% of)RY1	WO.	SCEN No. 20	AME	WNH	6/13/2011 and	ATER READI	4-7/8 inches	294 feet
ম		ST		MOI		BI	PEF		<u> </u>	Drilling mud I ground surfac	pailed on 6/13/20 e on 6/14/2011.	11; ground-water level measure	ed at 17 feet below
	_	_ 39	0.2	18.0	-			M			CLAYEY SA trace gravel	ND - dense, wet, olive, fine to m	nedium-grained,
	-	-									Increase in gra	avel content	
	_	-								CL	SANDY LEA	N CLAY - very stiff, wet, light of	olive, fine to
	- - 85 -	_									coarse sand		
Tunnel	_	-	0.1	20.7	106	30	68	₩		SM	SILTY SAND	- wet, light olive, fine to mediu	m-grained, some
I	L	-									coarse	FORMATION [Qsp]	5,
										CL	SANDY LEA	N CLAY - very stiff, wet, light of	olive, fine sand
	- 90 -							L					
	L	_ 26	0.0	32.4	-								
_	F												
200 —		-											
-	95 -		0.0	14.6	108	37	66	×			Becomes hard	, gray, thin layers of Clayey Silt	
-	-	-											
-	_	-											
195 — -	100 -	1											
-		_ 27	0.1	34.9	-						Becomes very	stiff, fine to medium sand	
-		1											
190 —	Ĺ	-											
-	105 -		0.2	27.5	95	31	93	 		CH	FAT CLAY -	very stiff, moist, gray, some fine	e to coarse sand,
-	_		0.2	21.3	93	31	93	₩			trace fine grav	rel	
-	_	-											
185 —	110	-								SP	POORLY GR to medium-gra	ADED SAND - very dense, wet ained	, bluish gray, find
-	- 110 -	50/6"	0.0	18.3	-			M					
-	_	-											
180 —	_												
-	– 115 -										Layers of Silty	Clay, very fine sand	
-	_	-	0.0	17.9	112	87/10"		₩			-	RING AT 116 FEET	
-	-	_									NOTES:	upper 5 feet due to utilities. Bor	rehale arouted
175 —		-									with cement-b	pentonite slurry and patched with	h asphalt
	L ₁₂₀ -		<u> </u>	1	<u> </u>	(C	ONTI	I VI IF	ED O	N FOLLOWIN		Field Tech: A Prepared/Date: Checked/Date:	R YN 8/23/2011 LT/Jag/PE 9/2
MTA	West	tside Sı	ubwa	y Exte	nsion			,01			0	LOG OF BO	
		ngeles							ā	mec°	.	Project No.: 4953-10-1561 I	



Los Angeles, California

DRILLING COMPANY/DRILLING EQUIPMENT BORING NO. Boart Longyear / 600T Trusonic Drilling Rig MOISTURE CONTENT PERCENT PASSING No. 200 SIEVE THIS RECORD IS AN INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. LATITUDE AND LONGITUDE OF BORING LOCATION SHOWN ON LOGS ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BETWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL S-110 DRILLING METHOD BOREHOLE LOCATION ELEVATION (ft) % RECOVERY SAMPLE LOC (% of dry wt.) DEPTH (ft) Sonic Coring 710+7, Lt 78 feet RUN# METRO SOIL CORE MC 200 TUNNEL ZONE S:/70131 GEOTECH/GINTWLIBRARY MACTEC JUNE2011.GLB
G:/PROJECT_DIRECTORIES/4953/2010/101561_METRO_WESTSIDE_EXTENSION/6.2.3.1 GEOTECHNICAL DESIGN3.2 ALL FIELD NOTES/GINT LOGNEW TEMPLATE - MARCH 14, 2011/SONIC GINT LOGS/101561 SONIC (101-110),GPJ 10:3/11 DATES DRILLED HOLE DIAMETER GROUND EL. BOX# 2/22/2011 - 2/24/2011 6 inches 282 feet **GROUND-WATER READINGS** Ground-water level not measured. SM FILL [Af] SILTY SAND - moist to wet, brown, fine grained, some gravel and cobble (up to 3 inches in size), layers of Poorly Graded Sand with Silt, some glass debris 280 5 QUATERNARY OLDER ALLUVIUM [Qalo] ML SANDY SILT - wet, very dark brown (10YR 2/2), trace to some subangular gravel, (up to $\frac{3}{4}$ - inch in size), mainly slate shale and siltstone, some dispersed organics, trace clay At 6 to 8.5': No core recovery 275 62 10 Becomes dark yellowish brown (10YR 3/4), more gravel, fewer organics 270 Becomes very dark brown (10YR 2/2), trace fine gravel 2 50 Becomes dark yellowish brown (10YR 4/6) SILTY CLAY - soft to medium stiff, wet, dark yellowish brown (10YR 4/6), CLtrace fine gravel 15 At 17.0 - 27.0': Samples recovered in bags 265 SANDY SILT with GRAVEL - medium stiff, wet, very dark brown (10YR 2/2) to dark yellowish brown (10YR 4/3), subangular shale, slate and sandstone (up to 3/4- inch in size), occasional sand lenses SILTY CLAY - medium stiff, moist, very dark brown, varying fine sand, Field Tech: PR/MF Prepared/Date: YN/WL 10/1/2011 (CONTINUED ON FOLLOWING FIGURE) Checked/Date: LT/PE 9/30/2011

MTA Westside Subway Extension Los Angeles, California



OG OF BORING

Project No.: 4953-10-1561 Figure: A-3.10a

DRILLING COMPANY/DRILLING EQUIPMENT BORING NO. Boart Longyear / 600T Trusonic Drilling Rig MOISTURE CONTENT S-110 PERCENT PASSING No. 200 SIEVE THIS RECORD IS AN INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. LATITUDE AND LONGITUDE OF BORING LOCATION SHOWN ON LOGS ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BETWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL DRILLING METHOD BOREHOLE LOCATION ELEVATION (ft) % RECOVERY (Continued) SAMPLE LOC (% of dry wt.) 710+7, Lt 78 feet DEPTH (ft) Sonic Coring RUN# METRO SOIL CORE MC 200 TUNNEL ZONE S:/70131 GEOTECH/GINTWLIBRARY MACTEC JUNE2011.GLB
G:/PROJECT_DIRECTORIES/4953/2010/101561_METRO_WESTSIDE_EXTENSION%.2.3.1 GEOTECHNICAL DESIGN3.2 ALL FIELD NOTES/GINT LOGNEW TEMPLATE - MARCH 14, 2011/SONIC GINT LOGS/101561 SONIC (101-110),GPJ 103/11 DATES DRILLED HOLE DIAMETER GROUND EL. BOX# 2/22/2011 - 2/24/2011 6 inches 282 feet **GROUND-WATER READINGS** Ground-water level not measured. trace coarse sand and fine gravel, layers of Silt with Clay 90 3 260 SANDY SILT with GRAVEL - stiff, wet, very dark brown, some clay ML 25 SILTY SAND with GRAVEL - moist, brown to dark grayish brown, fine to coarse grained, mainly subrounded to subangular slate and sandstone gravel (up to 1 inch in size) 255 SILT - very soft, wet, brown (7.5YR 4/3) to very dark grayish brown (10YR ML 2/2), fine to coarse sand, trace fine gravel, slate and sandstone, poorly consolidated, trace clay 100 30 250 SANDY SILT - soft to medium stiff, wet, mottled grayish brown (10YR 5/2) to MLbrown (7.5YR 4/4), fine sand, trace medium to coarse, texture defined by variable oxidation (alternating oxidized and unoxidized) 59 22.2 5 100 21.3 Lenticular sand lense (2-inch thick) 35 245 Zone of sand and gravel 100 6 Field Tech: PR/MF Prepared/Date: YN/WL 10/1/201 (CONTINUED ON FOLLOWING FIGURE) Checked/Date: LT/PE 9/30/2011

MTA Westside Subway Extension Los Angeles, California



DRILLING COMPANY/DRILLING EQUIPMENT BORING NO. Boart Longyear / 600T Trusonic Drilling Rig MOISTURE CONTENT S-110 PERCENT PASSING No. 200 SIEVE THIS RECORD IS AN INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. LATITUDE AND LONGITUDE OF BORING LOCATION SHOWN ON LOGS ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BETWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL DRILLING METHOD BOREHOLE LOCATION ELEVATION (ft) % RECOVERY (Continued) SAMPLE LOC (% of dry wt.) 710+7, Lt 78 feet DEPTH (ft) Sonic Coring RUN# METRO SOIL CORE MC 200 TUNNEL ZONE S:/70131 GEOTECH/GINTWLIBRARY MACTEC JUNE2011.GLB
G:/PROJECT_DIRECTORIES/4953/2010/101561_METRO_WESTSIDE_EXTENSION%.2.3.1 GEOTECHNICAL DESIGN3.2 ALL FIELD NOTES/GINT LOGNEW TEMPLATE - MARCH 14, 2011/SONIC GINT LOGS/101561 SONIC (101-110),GPJ 103/11 DATES DRILLED HOLE DIAMETER GROUND EL. BOX ≠ 2/22/2011 - 2/24/2011 6 inches 282 feet GROUND-WATER READINGS Ground-water level not measured. 9.7 13 SILTY, CLAYEY GRAVEL with SAND - medium dense, wet, dark brown GC-GM (10YR 3/3), mainly subangular slate, some metabasalt and quartzite, fine to coarse sand, grades to fine to coarse gravels (up to 1 inch in size), lower contact is gradational 240 LEAN CLAY - stiff, wet, strongly mottled, dark grayish brown (2.5YR 3/4) to brown (7.5YR 4/4), occasional dark reddish brown (5YR 3/4) mottling, subhorizontal, dark brown Becomes dark brown, (1/4 inch thick), bedding appears subhorizontal 17.8 100 45 Prominent wavy, subhorizontal laminations, very dark grayish brown (10YR 4/2) to dark reddish brown (5YR 3/2) 235 Subrounded sandstone clast (1 inch in size) 38.0 99 100 Occasional fine to medium sand 50 230 Mottling becomes less prominent, brown (7.5YR 4/4) with some dark grayish brown (10YR 4/2) mottling 20.0 100 55 Some wavy, subhorizontal laminations 225 CLAYEY GRAVEL - loose, wet, brown (7.5YR 4/2), clasts up to 3 inches in GC size, mainly subangular to subrounded slate More sand 100 10 SANDY LEAN CLAY - very stiff, wet, brown (10YR 4/4), fine sand, trace medium to coarse Field Tech: PR/MF Prepared/Date: YN/WL 10/1/201 (CONTINUED ON FOLLOWING FIGURE) Checked/Date: LT/PE 9/30/2011

MTA Westside Subway Extension Los Angeles, California



Project No.: 4953-10-1561 Figure: A-3.10c

DRILLING COMPANY/DRILLING EQUIPMENT BORING NO. Boart Longyear / 600T Trusonic Drilling Rig MOISTURE CONTENT S-110 PERCENT PASSING No. 200 SIEVE THIS RECORD IS AN INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. LATITUDE AND LONGITUDE OF BORING LOCATION SHOWN ON LOGS ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BETWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL DRILLING METHOD BOREHOLE LOCATION ELEVATION (ft) % RECOVERY (Continued) SAMPLE LOC (% of dry wt.) 710+7, Lt 78 feet DEPTH (ft) Sonic Coring RUN# METRO SOIL CORE MC 200 TUNNEL ZONE S:/70131 GEOTECH/GINTWLIBRARY MACTEC JUNE2011.GLB
G:/PROJECT_DIRECTORIES/4953/2010/101561_METRO_WESTSIDE_EXTENSION%.2.3.1 GEOTECHNICAL DESIGN3.2 ALL FIELD NOTES/GINT LOGNEW TEMPLATE - MARCH 14, 2011/SONIC GINT LOGS/101561 SONIC (101-110),GPJ 103/11 DATES DRILLED HOLE DIAMETER GROUND EL. BOX# 2/22/2011 - 2/24/2011 6 inches 282 feet GROUND-WATER READINGS Ground-water level not measured. 17.1 68 CL At 61.4': Some gravel (up to 3/4 inch in size) 220 Becomes yellowish brown (10YR 5/4) 100 11 65 16.7 37 Layer of Silty Sand, fine to coarse grained, some fine gravel (up to 3/4 inch in SM size), clasts (up to 1 inch in size), mainly subangular slate and subrounded 14.0 19 SM shale and sandstone, Clayey Sand lenses SILTY SAND with GRAVEL - wet, yellowish brown (6YR 5/4), fine to coarse grained, fine gravel (up to 3/4 inch in size), mainly subangular to subrounded slate, some subrounded shale 100 12 70 29 6.3 More sand Clasts (up to 3 inches in size), mainly angular to subangular slate, some subangular sandstone, varying colors Tunnel 16.7 Granitic clast, unweathered, subrounded, (2 inches in size) 13 100 Becomes very dark grayish brown (10YR 3/2), clasts (up to 3/4-inch in size), 11.6 mainly subangular slate and subangular to subrounded shale and sandstone, 75 matrix is fine to coarse grained sand, some silt SANDY SILT - stiff, wet, brown (10YR 4/4), trace fine gravel, layers of Clayey ML Sand WELL GRADED SAND with SILT and GRAVEL - dense, wet, brown (10YR SW-12.1 10 4/4), fine to coarse grained, fine to coarse gravel (up to 1 inch in size), mainly subrounded slate and shale 100 14 Field Tech: PR/MF Prepared/Date: YN/WL 10/1/201 (CONTINUED ON FOLLOWING FIGURE) Checked/Date: LT/PE 9/30/2011

MTA Westside Subway Extension Los Angeles, California



Project No.: 4953-10-1561 Figure: A-3.10d

DRILLING COMPANY/DRILLING EQUIPMENT BORING NO. Boart Longyear / 600T Trusonic Drilling Rig MOISTURE CONTENT S-110 PERCENT PASSING No. 200 SIEVE THIS RECORD IS AN INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. LATITUDE AND LONGITUDE OF BORING LOCATION SHOWN ON LOGS ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BETWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL DRILLING METHOD BOREHOLE LOCATION ELEVATION (ft) % RECOVERY (Continued) SAMPLE LOC (% of dry wt.) 710+7, Lt 78 feet DEPTH (ft) Sonic Coring RUN# METRO SOIL CORE MC 200 TUNNEL ZONE S:/70131 GEOTECH/GINTWLIBRARY MACTEC JUNE2011.GLB
G:/PROJECT_DIRECTORIES/4953/2010/101561_METRO_WESTSIDE_EXTENSION/6.2.3.1 GEOTECHNICAL DESIGN3.2 ALL FIELD NOTES/GINT LOGNEW TEMPLATE - MARCH 14, 2011/SONIC GINT LOGS/101561 SONIC (101-110),GPJ 10:3/11 DATES DRILLED HOLE DIAMETER GROUND EL. BOX ≠ 2/22/2011 - 2/24/2011 6 inches 282 feet GROUND-WATER READINGS Ground-water level not measured. SILTY SAND - dense, wet, fine to coarse grained, some fine gravel (up to ½ SM inch in size) 9.9 38 Tunnel Sharp contact, erosional, appears to dip 10-20 degrees CL-SILTY CLAY - very stiff, wet, brown (7.5YR 4/4), some fine sand, trace fine to ML coarse gravel, alternating layers of Silty Sand and Sandy Silt 15 100 85 18.9 Becomes dark yellowish brown (10YR 4/4) Becomes brown (7.5YR 4/3) 195 Becomes dark grayish brown (10YR 4/2) mottled with faint brown (7.5YR 4/4), some wavy, subhorizontal laminations Becomes strongly mottled, dark brown (7.5YR 3/3) to very dark gray (7.5YR 100 16 90 SANDY SILT with GRAVEL - very stiff, wet, brown (7.5YR 4/4), clasts (up to ³/₄-inch in size), mainly angular to subangular slate, subangular shale and sandstone, some subrounded quartzite, some clay 190 17 100 SILTY GRAVEL - dense, wet, dark grayish brown (10YR 5/2), clasts (up to 3/4inch in size), mainly subangular slate, lesser subangular to subrounded shale 95 and sandstone, some subangular granite clasts, trace to some clay 185 18 100 More clay, gradational Field Tech: PR/MF Prepared/Date: YN/WL 10/1/201 (CONTINUED ON FOLLOWING FIGURE) Checked/Date: LT/PE 9/30/2011

MTA Westside Subway Extension Los Angeles, California



Boart Longyear / 600T Trusonic Drilling Rig MOISTURE CONTENT S-110 PERCENT PASSING No. 200 SIEVE THIS RECORD IS AN INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. LATITUDE AND LONGITUDE OF BORING LOCATION SHOWN ON LOGS ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BETWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL DRILLING METHOD BOREHOLE LOCATION ELEVATION (ft) % RECOVERY (Continued) (% of dry wt.) SAMPLE LOC 710+7, Lt 78 feet DEPTH (ft) Sonic Coring RUN# METRO SOIL CORE MC 200 TUNNEL ZONE S:/70131 GEOTECH/GINTWLIBRARY MACTEC JUNE2011.GLB
G:/PROJECT_DIRECTORIES/4953/2010/101561_METRO_WESTSIDE_EXTENSION%.2.3.1 GEOTECHNICAL DESIGN3.2 ALL FIELD NOTES/GINT LOGNEW TEMPLATE - MARCH 14, 2011/SONIC GINT LOGS/101561 SONIC (101-110),GPJ 103/11 DATES DRILLED HOLE DIAMETER GROUND EL. BOX ≠ 2/22/2011 - 2/24/2011 6 inches 282 feet GROUND-WATER READINGS Ground-water level not measured. SILTY, CLAYEY GRAVEL - very stiff, wet, very dark gray (2.5YR 3/1), clasts (up to 3/4- inch in size), mainly subangular to subrounded slate, shale and GC sandstone, fine to coarse sand, irregular sharp contact, oxidized beds 19 100 180 SANDY SILT with GRAVEL - stiff, wet, very dark grayish brown (10YR 3/2) ML to brown (10YR 4/4), clasts (up to ½- inch in size, some to 1 inch), mainly subangular to subrounded slate, some subrounded to rounded shale and sandstone, trace gravel, some clay SILTY CLAY - very stiff, wet, dark brown (7.5YR 3/3) to dark gray (2.5YR CL-100 20 ML 4/1), mottled, varying color, trace coarse sand, trace manganese oxide 105 Increasing sand, some fine gravel, some wavy subhorizontal laminations 175 ML SANDY SILT with GRAVEL - very stiff, moist, brown to dark gray, clasts (up to 1 inch in size), subangular to subrounded slate, subrounded shale and Layers of Sandy Silty Clay, some brown (7.5YR 4/2) mottling, trace coarse sand, some wavy subhorizontal laminations 100 21 110 More gravel, subhorizontal laminations, fine to coarse LEAN CLAY - very stiff, wet, olive brown (2.5Y 4/3) mottling with strong CL brown (7.5YR 4/4), trace coarse sand, trace calcium carbonate nodules, occasional sand pockets 170 Calcium carbonate nodules (up to 1/4 inch in size), some rounded fine gravel 22 100 SANDY SILT with GRAVEL - very stiff, wet, olive brown (2.5YR 4/3) and ML yellowish brown (10YR 5/4) mottling, some coarse sand, fine gravel (up to 3/4) 115 inch in size), subangular slate and subrounded shale and sandstone, calcium carbonate nodules (up to 1/4 inch in size) 165 Becomes light yellowish brown (2.5Y 6/3), more fine gravel (up to ½- inch in size, some ³/₄- inch), subangular slate, fewer shale and sandstone 100 23 Field Tech: PR/MF Prepared/Date: YN/WL 10/1/201 (CONTINUED ON FOLLOWING FIGURE) Checked/Date: LT/PE 9/30/2011

DRILLING COMPANY/DRILLING EQUIPMENT

MTA Westside Subway Extension Los Angeles, California



BORING NO.

DRILLING COMPANY/DRILLING EQUIPMENT BORING NO. Boart Longyear / 600T Trusonic Drilling Rig MOISTURE CONTENT S-110 PERCENT PASSING No. 200 SIEVE THIS RECORD IS AN INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. LATITUDE AND LONGITUDE OF BORING LOCATION SHOWN ON LOGS ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BETWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL DRILLING METHOD BOREHOLE LOCATION ELEVATION (ft) % RECOVERY (Continued) SAMPLE LOC (% of dry wt.) Sonic Coring 710+7, Lt 78 feet DEPTH (ft) RUN# METRO SOIL CORE MC 200 TUNNEL ZONE S:/70131 GEOTECH/GINTWLIBRARY MACTEC JUNE2011.GLB
G:/PROJECT_DIRECTORIES/4953/2010/101561_METRO_WESTSIDE_EXTENSION/6.2.3.1 GEOTECHNICAL DESIGN3.2 ALL FIELD NOTES/GINT LOGNEW TEMPLATE - MARCH 14, 2011/SONIC GINT LOGS/101561 SONIC (101-110),GPJ 10:3/11 BOX# DATES DRILLED HOLE DIAMETER GROUND EL. 2/22/2011 - 2/24/2011 6 inches 282 feet GROUND-WATER READINGS Ground-water level not measured. ML Becomes light yellow brown (2.5YR 6/3) 160 END OF BORING AT 122 FEET Consistency description on this log is based on pocket penetrometer test results and/or visual observation of soil samples. Hand augered upper 6 feet to avoid damage to utilities. Borehole grouted with cement-bentonite slurry and patched with asphalt 125 concrete. 155 130 150 135 145 Field Tech: PR/MF Prepared/Date: YN/WL 10/1/201 Checked/Date: LT/PE 9/30/2011 MTA Westside Subway Extension

Los Angeles, California

OG OF BORING

Project No.: 4953-10-1561 Figure: A-3.10g

DRILLING COMPANY/DRILLING EQUIPMENT BORING NO. Boart Longyear / 600T Trusonic drill rig MOISTURE CONTENT PERCENT PASSING No. 200 SIEVE THIS RECORD IS AN INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. LATITUDE AND LONGITUDE OF BORING LOCATION SHOWN ON LOGS ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BETWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL **S-111** DRILLING METHOD BOREHOLE LOCATION ELEVATION (ft) % RECOVERY SAMPLE LOC (% of dry wt.) 692+57, Rt 16 feet DEPTH (ft) Sonic Coring RUN# METRO SOIL CORE MC 200 TUNNEL ZONE S:/70131 GEOTECH/GINTWLIBRARY MACTEC JUNE2011.GLB
G:/PROJECT_DIRECTORIES/4953/2010/101561_METRO_WESTSIDE_EXTENSION%.2.3.1 GEOTECHNICAL DESIGN3.2 ALL FIELD NOTES/GINT LOGNEW TEMPLATE - MARCH 14, 2011/SONIC GINT LOGS/101561 SONIC (111-120),GPJ 103/11 DATES DRILLED HOLE DIAMETER GROUND EL. BOX# 2/14/2011 - 2/18/2011 249 feet 6 inches **GROUND-WATER READINGS** Ground-water level not measured. 12-inch thick Asphalt Concrete CL-SILT to SILTY CLAY with GRAVEL - moist, dark brown to gray (7.5YR 3/3 MLto 7.5Y 6/1), slate gravel (up to 1 inch in size) 245 5 No core recovery from 7½ to 11' 12.7 240 10 1 1 65 **QUATERNARY YOUNGER ALLUVIUM [Qal]** CL-SILTY CLAY - stiff, very moist, dark brown to dark yellowish brown (7.5YR ML 3/3 to 10YR 3/4), trace to some coarse sand, some subangular to subrounded slate gravel (up to ½ inch in size), layer of Silt SILT - moist, dark yellowish brown (10YR 3/4), fine sand and trace to some ML clay, some slate gravel (up to 11/2 inches in size), few shale fragments, 235 alternating with layers of Sandy Silt 15 No core recovery from 17 to 20' 230 Field Tech: DL Prepared/Date: PK/WL 10/1/2011 (CONTINUED ON FOLLOWING FIGURE) Checked/Date: HP/PE 10/2/2011

MTA Westside Subway Extension Los Angeles, California



LOG OF BORING

Project No.: 4953-10-1561 Figure: A-3.11a

DRILLING COMPANY/DRILLING EQUIPMENT BORING NO. Boart Longyear / 600T Trusonic drill rig MOISTURE CONTENT S-111 PERCENT PASSING No. 200 SIEVE THIS RECORD IS AN INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. LATITUDE AND LONGITUDE OF BORING LOCATION SHOWN ON LOGS ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BETWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL DRILLING METHOD BOREHOLE LOCATION ELEVATION (ft) % RECOVERY (Continued) SAMPLE LOC (% of dry wt.) 692+57, Rt 16 feet DEPTH (ft) Sonic Coring RUN# METRO SOIL CORE MC 200 TUNNEL ZONE S:/70131 GEOTECH/GINTWLIBRARY MACTEC JUNE2011.GLB
G:/PROJECT_DIRECTORIES/4953/2010/101561_METRO_WESTSIDE_EXTENSION%.2.3.1 GEOTECHNICAL DESIGN3.2 ALL FIELD NOTES/GINT LOGNEW TEMPLATE - MARCH 14, 2011/SONIC GINT LOGS/101561 SONIC (111-120),GPJ 103/11 DATES DRILLED HOLE DIAMETER GROUND EL. BOX; 2/14/2011 - 2/18/2011 6 inches 249 feet **GROUND-WATER READINGS** Ground-water level not measured. Becomes dark yellowish brown (10YR 3/4), fine sand and trace gravel, 2 2 70 subrounded to well rounded slate gravel (up to 3/4 inch in size) SILTY SAND - moist, dark yellowish brown, fine to medium-grained, some SM gravel, subrounded to well rounded (up to 1 inch in size) ML **QUATERNARY OLDER ALLUVIUM [Qalo]** SILT with SAND - moist, dark yellowish brown (10YR 3/4), fine sand, trace subrounded to well rounded gravel (up to 1-inch in size) 225 25 Some clay No core recovery from 27' to 27.9' SANDY SILT - moist, dark yellowish brown (10YR 3/4), fine grained, trace ML clay, occasional slate gravel (up to 2 inches in size), disturbed, alternating with layers of Silty Sand 3 3 80 220 ML SILT - moist, dark yellowish brown, fine sand, some shale fragments, some clay 30 More clay Lenses of Silty Sand, moist, dark olive brown (2.5YR 3/3), massive 215 100 35 SILTY SAND with GRAVEL - moist, dark olive green (5Y 3/3), fine to medium grained, slate gravel, subround to suboval (up to 1½ inches in size), 3 to 4-inch thick, occasional interbedded Sandy Silt 16 Becomes wet, fine to coarse grained, gravel (up to 3/4 inch in size) 210 100 5 Becomes fine to medium grained, trace gravel (up to ½ inch in size) Field Tech: DL Prepared/Date: PK/WL 10/1/2011 (CONTINUED ON FOLLOWING FIGURE) Checked/Date: HP/PE 10/2/2011

MTA Westside Subway Extension Los Angeles, California

