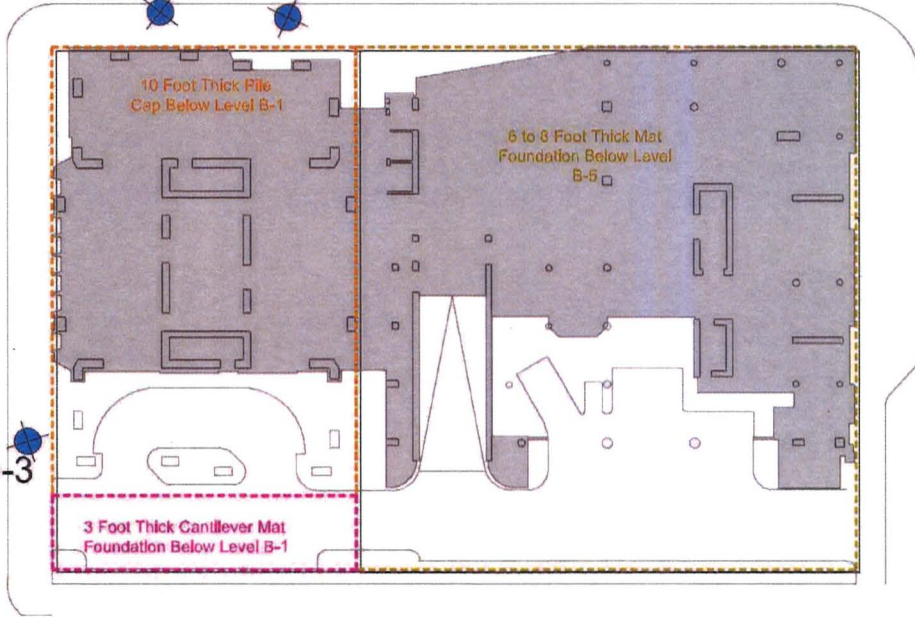


FREMONT STREET

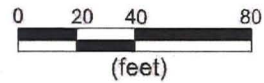
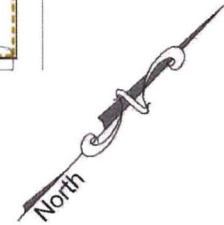
MISSION STREET


BEALE STREET

CSA/SD-2 CSA/SD-1



CSA/SD-3



 COTTON, SHIRES AND ASSOCIATES, INC. CONSULTING ENGINEERS AND GEOLOGISTS		
LEVEL 1 SITE PLAN AND BORING LOCATION MAP 301 Mission Street SAN FRANCISCO, CALIFORNIA		
GEO/ENG BY AM	SCALE 1"=40'	PROJECT NO. E5343
APPROVED BY POS	DATE November 2016	FIGURE NO. 1

COTTON, SHIRES AND ASSOCIATES, INC.

LOG OF EXPLORATORY DRILLING

Project MILLENNIUM TOWER Boring CSA/SD-1
 Location Sidewalk on Mission Street 14.8' North and 18' West of Tower Corner Project No. E5343A
 Drilling Contractor/Rig Gregg / Track Mounted Fraste MXL Date of Drilling 9/26/16 - 9/29/16
 Ground Surface Elev. 12.8' (NAVD88) Logged By AM/KW Hole Diameter 5" (later reamed out to 6")
 Surface Concrete sidewalk Weather Varied

Depth (feet)	Graphic Log	USCS Class.	Geotechnical Description	Sample Desig.	Dry Unit Weight(pcf)	Moisture Content (%)	SPT Blows/ft	Sample Type	Recov. (%)	Remarks	
			<u>FILL 0'-18'</u>							START DRILLING 8:30 9/26/16	
2		GP	0.0'-0.33' Concrete Sidewalk 4" thick								
			0.33"-0.7" Void; 5" air gap below concrete sidewalk.								
4		CH	0.7'-3.5' Gravels; granitic gravels 2" Ø, angular	B-1							
6			3.5'-7.0' Clay with Gravels; light brown to yellow brown, soft to medium stiff, moist, gravels up to 2" Ø, clay is highly plastic	B-2							
8		SC	7.0'-18' Sandy Clay with minor Gravels; light brown to yellowish brown, soft to medium stiff, moist to wet, minor rounded gravels	B-3							
				B-4							
10				T-1		2			MC		8:41
						4					8:42-9:15 set casing, switch to mud rotary
12			@ 13' increased rootlet/organic presence								
14											
16										9:13	
18		SP	<u>SAND 18'-24'</u> 18.0'-24.0' Sand; dusky brown, loose, wet, fine to medium grained sand	B-5			7				
				T-2				15			
20				T-3			15		MC		9:26
							20				
22											
24		CH	<u>YOUNG SANDY BAY MUD 24'-42'</u> 24.0'-34.0' Sandy Clay; medium gray, loose, wet, fine to medium grained sand abundant shells in cuttings	ST-1							
26											
28											

PRELIMINARY

Depth (feet)	Graphic Log	USCS Class.	Geotechnical Description	Sample Desig.	Dry Unit Weight (pcf)	Moisture Content (%)	SPT Blows/ft	Sample Type	Recov. (%)	Remarks
32		CH	@30' increased sand content							
34		CH	34'-42' Sandy Clay; medium gray, soft to medium stiff, moist	ST-2				ST		0 psi
36										
38			Below 37' no shell fragments in cuttings							
40			PRELIMINARY							
42		SP	MARINE SAND 42'-69'							Pressure Spike @ 6" 500+ psi
44			42.0'-51.0' Sand; dark gray, medium dense, wet	B-5.5				ST		10:33
46				B-6			17 11 9 <u>20</u>	SPT		
48										
50							3 4 6 <u>7</u>	MC		11:25
52		SC	51.0'-56.0' Clayey Sand; dusky brown, loose, wet, blebs of light gray clay in cuttings							11:29
54				B-7			0 0 2 <u>20</u>	SPT		12:15
56			56.0'-59.0' Clayey Sand; yellowish brown, dense, moist, minor rock fragments in cuttings, trace shell fragments	T-4 T-5			8 18 33 <u>35</u>	MC		12:42
58										
60		SP	59.0'-69.0' Sand; yellowish gray, dense to very dense, moist to wet	T-6 T-7			14 17 21 <u>26</u>	MC		1:13
62										

Depth (feet)	Graphic Log	USCS Class.	Geotechnical Description	Sample Desig.	Dry Unit Weight(pcf)	Moisture Content (%)	SPT Blows/ft	Sample Type	Recov. (%)	Remarks
		SP		B-8			11 27 42 (69)	SPT		1:39
66			PRELIMINARY							
68										
70		SM	COLMA SAND 69'-97' 69.0'-74.0' Silty Sand; orange brown to yellow brown, dense to very dense, moist	B-9			17 12 17 (29)	SPT		1:56 2:14
72										
74		SP	74.0'-79.0' Sand; yellowish gray brown, dense to very dense, moist	T-8			25 50/6" 34/6"	MC		2:22 2:52
76										
78										
80		SM	79.0'-80.0' Silty Sand; yellow brown, very dense to hard, moist	B-10			5 17 20 (37)	SPT		2:58 3:19
82		SP	80.0'-84.0' Sand; yellowish gray brown, dense to very dense, moist							
84		SC	84.0'-89.0' Clayey Sand; yellowish gray dense to very dense, moist	T-9 T-10			11 15 14 (20)	MC		3:54
86										
88		SP	89.0'-90.0' Sand; brownish gray, dense to very dense, moist							
90		CH	90.0'-94.0' Clay; dark gray, stiff, moist, highly plastic (cuttings)	T-11			15 21 24 (31)	MC		4:10 End Drilling For Day (9/26/16) 7:36 Start Drilling For Day (9/27/16)
92										
94		SC	94.0'-97.0' Clayey Sand; dark yellowish gray, dense, moist	DM-1				DM		Piston did not shoot 400+ psi 5" total sampled
96		CH	OLD BAY CLAY 97'-199.5' 97.0'-109.0' Clay; light bluish gray, stiff to very stiff, moist, highly plastic							

9/26/16

9/27/16

Depth (feet)	Graphic Log	USCS Class.	Geotechnical Description	Sample Desig.	Dry Unit Weight(pcf)	Moisture Content (%)	SPT Blows/ft	Sample Type	Recov. (%)	Remarks	
100		CH	Clay continued as above	PB-1				PB		9:06	
102											9:30
104											
106											
108		CH	109.0'-119.0' Clay; moderate greenish gray, very stiff to hard, moist, 1" Ø sandstone clast in clay matrix at top of sample	DM-2				DM		10:14 Piston shot at 350 psi	
110											10:57
112											
114		CH	119'-169' Clay; light to moderate gray, very stiff to hard, moist	DM-3				DM		11:25 Piston shot at 400 psi	
120											11:59
122											
124		CH		DM-4				DM		12:15 Piston shot at 380 psi	
126											12:57
128											
130											

Magnet Extensometer

Magnet Extensometer

PRELIMINARY

9/27/16

Depth (feet)	Graphic Log	USCS Class.	Geotechnical Description	Sample Desig.	Dry Unit Weight (pcf)	Moisture Content (%)	SPT Blows/ft	Sample Type	Recov. (%)	Remarks	
134		CH	Clay continued as above								
136											
138											
140				DM-5					DM		1:16 Piston shot at 390 psi 2:06
142											
144											
146											
148											
150				DM-6					DM		2:14 Piston shot at 400 psi 2:50
152											
154											
156											
158									Piston shot at 410 psi 3:59		
160	DM-7					DM		4:27 End Drilling For Day (9/27/16)			
162								7:26 Start Drilling For Day (9/28/16)			
164											

PRELIMINARY

9/27/16

9/28/16

Depth (feet)	Graphic Log	USCS Class.	Geotechnical Description	Sample Desig.	Dry Unit Weight (pcf)	Moisture Content (%)	SPT Blows/ft	Sample Type	Recov. (%)	Remarks
168		CH								
170		CH	169.0'-179.0' Clay; light bluish gray, hard, moist	DM-8				DM		7:52 Piston shot at 450 psi 9:00-9:34 repair water pump
172										
174										
176										
178										
180		CH	179.0'-199.5' Clay; medium to dark gray, very stiff to hard, moist	DM-9				DM		9:53 Piston shot at 400 psi 10:55
182										
184										
186										
188										
190										
192										
194										
196										
198										
198										
198		SC	199.5'-214.0' Clayey Sand; dusky brown, hard moist	DM-11				DM		11:14 Piston shot at 380 psi 12:11 sample disturbed tube oblong shaped Piston shot at 450 psi 12:31 2:08

PRELIMINARY

Magnet Extensometer

ALAMEDA FORMATION
199.5'-252'
 199.5'-214.0' Clayey Sand; dusky brown, hard moist

9/28/16

9/28/16

Depth (feet)	Graphic Log	USCS Class.	Geotechnical Description	Sample Desig.	Dry Unit Weight(pcf)	Moisture Content (%)	SPT Blows/ft	Sample Type	Recov. (%)	Remarks
202		SC	clayey sand continued	PB-2				PB		2:20
204										3:21
206										
208										
210		CH	214.0'-220.0' Clay; greenish gray, hard, moist	PB-3				PB		3:34
212										tip dented
214										4:36
216		SC	220.0'-223.5' Clayey Sand; bluish gray, hard, moist (cuttings)							
218										
220		GC	223.5'-233.0' Clayey Gravel; dark bluish gray clay matrix supporting clasts of franciscan complex rock fragments (primarily chert and wacke) gravels are sub-rounded	PB-4				PB		tip pulverized, highly disturbed sample
222										4:56
224		CH	233.0'-236.0' Clay; bluish gray, very stiff to hard, trace amounts of sand and clasts of chert and wacke (logged from tip of drag bit)							5:54 End Drilling For Day (9/28/16)
226										7:41 Start Drilling For Day (9/29/16)
228		CH								
230										
232										

Magnet Extensometer

9/29/16

Depth (feet)	Graphic Log	USCS Class.	Geotechnical Description	Sample Desig.	Dry Unit Weight(pcf)	Moisture Content (%)	SPT Blows/ft	Sample Type	Recov. (%)	Remarks
236		CH	Clay continued as above (logged from tip of drag bit)	B-11			5 23 20 (43)	SPT	Ø	7:53
238		GC	236.0'-252.0' Clayey Gravel; dark bluish gray clay with abundant clasts of franciscan complex rock fragments (primarily chert and wacke) gravels are sub-rounded, trace sand in clay matrix							8:52
244			PRELIMINARY	B-12			11 13 14/4.5 (27/10.5)	SPT		9:23 sampler bouncing at 4.5", stopped sample 10:18
252		SC		FRANCISCAN COMPLEX BEDROCK 252'-BOH	B-13			50/4" (50/4)	SPT	
254			252.0'-262.0' Sheared Shale; black shale with dark gray clay seams, highly sheared shale matrix supporting clasts of wacke	RUN #1			RQD 0	HQ	2.5 2.5	
256				RUN #2			RQD 0	HQ	1.4 2.5	
260										Datum Magnet
262										
264										
266										
			Total Depth = 262' Boring reamed out to 6" Ø. 2.75" Slope inclinometer casing installed to bottom of hole. Hole grouted with cement bentonite grout (94lb cement 25lb bentonite 35 gal water). Three vibrating wire piezometers installed. One 1/2" filter tip standpipe installed. Five magnetic extensometers and one magnetic extensometer datum magnet installed in boring							

9/29/16

COTTON, SHIRES AND ASSOCIATES, INC.

LOG OF EXPLORATORY DRILLING

Project MILLENNIUM TOWER Boring CSA/SD-2
 Location Sidewalk on Mission Street 15' North and 61' West of Tower Corner Project No. E5343A
 Drilling Contractor/Rig Gregg / Track Mounted Fraste MXL Date of Drilling 10/3/16 - 10/10/16
 Ground Surface Elev. 13.2' (NAVD88) Logged By AM/KW Hole Diameter 5" (later reamed out to 6")
 Surface Concrete sidewalk Weather Varied

Depth (feet)	Graphic Log	USCS Class.	Geotechnical Description	Sample Desig.	Dry Unit Weight(pcf)	Moisture Content (%)	SPT Blows/ft	Sample Type	Recov. (%)	Remarks
		GP	FILL 0'-13'							START DRILLING 9:59
2		CH	0.0'-0.3' Concrete Sidewalk 3.5" thick							10/3/16
			0.3'-1.0' Gravels; granitic gravels 2" Ø, angular							
4			1.0'-5.0' Clay with Gravels; yellow gray, soft, moist, gravels up to 2" Ø							
6			5.0'-9.0' Clay with Gravels; orange brown, soft, moist gravels are sub angular, up to 1" Ø							
8										10:22
10		GP	9.0'-13.0' Construction Debris; concrete and brick	T-1 T-2			1 2 8 ⑦	MC		10:25-12:10 set casing, switch to mud rotary
12										
14		SP	SAND 13'-22'							
			13.0'-22.0' Sand; yellowish gray, medium dense, moist to wet	T-3			6 9 14 ⑩	MC		12:24-12:55 Drive 10' of additional casing
16										
18										
20										
22		CH	YOUNG SANDY BAY MUD 22'-37.5'							
			22.0'-35.0' Sandy Clay; dark bluish gray, soft, wet, fine to medium grained sand abundant shell fragments in cuttings							
24										Tip Dented top 8" oblong
										1:13
26				OB-1				OB		Piston shot at 440 psi
										1:47
										Piston shot at 440 psi
										2:05
				OB-2				OB		

PRELIMINARY

Piezo P-1

Depth (feet)	Graphic Log	USCS Class.	Geotechnical Description	Sample Desig.	Dry Unit Weight (pcf)	Moisture Content (%)	SPT Blows/ft	Sample Type	Recov. (%)	Remarks	
32		CH		OB-2				OB		2:30	
34		SC	35.0'-37.5' Clayey Sand; dark gray, medium dense, moist to wet								
36		SW	MARINE SAND 37.5'-69' 37.5'-47.0' Sand; medium gray, loose, wet, minor gravels								
40				T-4 T-5			4 4 3 ⑤	MC		3:06	
42											
44					B-1			9 21 14 ③⑤	SPT		3:13
46											3:25-4:35 Crew cleans out mud tub and install well cover on SD-1
48		SC	47.0'-53.0' Clayey Sand; dark gray, loose, wet								
50				B-2			2 5 5 ⑦	MC		4:47	
52										5:02	
54		CH	53'-54.5' Clay; dark gray, soft, moist to wet								
56		SC	54.5'-69' Clayey Sand; medium yellowish gray, dense to very dense, wet				0 0 7 ⑤	MC	∅	5:09	
58											
60											
62											

PRELIMINARY

Tip of Standpipe Piezo
Piezo P-2

10/3/16

Depth (feet)	Graphic Log	USCS Class.	Geotechnical Description	Sample Desig.	Dry Unit Weight (pcf)	Moisture Content (%)	SPT Blows/ft	Sample Type	Recov. (%)	Remarks
66			Clayey Sand continued as above	B-3			16 33 36 (69)	SPT		5:45 End Drilling For Day (10/3/16) 7:47 Start Drilling For Day (10/4/16)
68										
70		SM	COLMA SAND 69'-93' 69.0'-75.5' Silty Sand; yellow brown with streaks of orange brown oxidation, very dense to hard, moist, medium grained sand	T-6 T-7			33 30 28 (39)	MC		8:00
72										
74										
76		SC	75.5'-83.0' Clayey Sand; yellow brown, very dense to hard, moist	B-4			15 32 32 (64)	SPT		8:22 8:42
78										
80										
82										
84		CH	83.0'-88.0' Sandy Clay; bluish gray, stiff to very stiff, moist	T-8 T-9			17 25 32 (39)	MC		9:00
86										
88		SP	88.0'-93.0' Sand; bluish gray, dense, moist	B-5			8 8 9 (17)	SPT		9:22
90										
92										
94		CH	OLD BAY CLAY 93'-204' 93.0'-164' Clay; light bluish gray, stiff to very stiff, moist, highly plastic	T-10 T-11			8 19 26 (31)	MC		9:55 Piston did not shoot 450+ psi
96										

PRELIMINARY

10/3/16

10/4/16

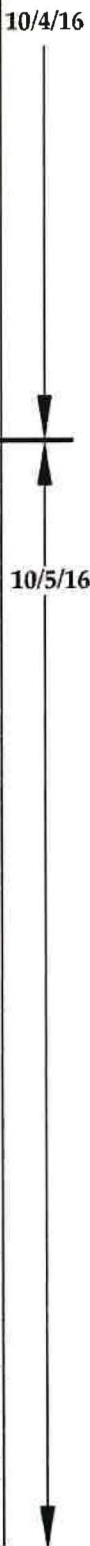
Depth (feet)	Graphic Log	USCS Class.	Geotechnical Description	Sample Desig.	Dry Unit Weight(pcf)	Moisture Content (%)	SPT Blows/ft	Sample Type	Recov. (%)	Remarks
		CH	Clay continued as above							
100				OB-4				OB		Piston did not shoot 450+ psi 12:19
102										
104								PB		
106				PB-1						1:15
108										
110										
112										
114								PB		
116				PB-2						2:38
118										
120										
122										
124										
126	Magnet Extensometer			OB-5				OB		Piston did not shoot 450+ psi 3:39
128										
130				PB-3				PB		4:48

PRELIMINARY

10/4/16

Depth (feet)	Graphic Log	USCS Class.	Geotechnical Description	Sample Desig.	Dry Unit Weight (pcf)	Moisture Content (%)	SPT Blows/ft	Sample Type	Recov. (%)	Remarks		
134		CH	Clay continued as above									
136												
138												
140										PB	5:43	
142											∅	End Drilling For Day (10/4/16)
144												Start Drilling For Day (10/5/16)
146							PB-4					9:44
148												
154												
156							PB-5					11:10
164		SC	164.0'-173.0' Clayey Sand; dark gray, very dense, moist	PB-6								

PRELIMINARY



Depth (feet)	Graphic Log	USCS Class.	Geotechnical Description	Sample Desig.	Dry Unit Weight (pcf)	Moisture Content (%)	SPT Blows/ft	Sample Type	Recov. (%)	Remarks
168		SC	clayey sand continued	PB-6						
170										
172		CH	173.0'-204.0' Clay; bluish gray with lenses of dark gray clay, very stiff to hard							
174				PB-7				PB		
176										1:53
178			Below 184.0' Cuttings are primarily dark gray in color							
180										
182										
184					PB-8				PB	
186										3:12
188										
190										
192										@4:00 Engineer from Tower informs crew that drilling mud is seeping into the mechanical room on level B-1. Crew provides 55 gal. drum for cleanup. Crew will install 8" casing down to 27' on 10/5/16
194										3:34
196				PB-9				PB		End Drilling For Day 4:40 (10/5/16)
198			NOT LOGGED Drillers over drilled by 10' when re-establishing hole							8:00-5:15 set casing re-establish hole

Magnet Extensometer

PRELIMINARY

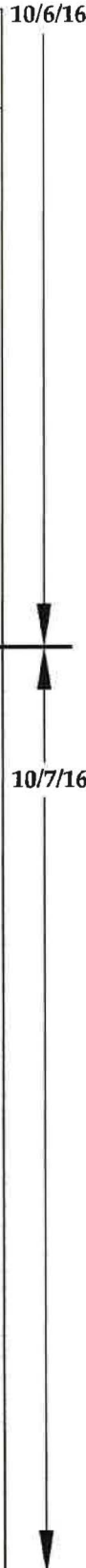
10/5/16

10/6/16

Depth (feet)	Graphic Log	USCS Class.	Geotechnical Description	Sample Desig.	Dry Unit Weight(pcf)	Moisture Content (%)	SPT Blows/ft	Sample Type	Recov. (%)	Remarks
202			NOT LOGGED Drillers over drilled by 10' when re-establishing hole							
204		SC	ALAMEDA FORMATION 204'-253' 204.0'-215.0' Clayey Sand; bluish gray, very stiff, moist							Start Drilling For Day 5:15 (10/6/16)
206										
208										
210								PB		5:30
212				PB-10						End Drilling For Day 6:15 (10/6/16)
214			215.0'-216.0' Clayey Gravel; dark bluish gray clay with clasts of chert, wacke and sandstone, very dense, minor wood debris in cuttings							Start Drilling For Day 7:52 (10/7/16)
216		GC								
218		CH	216.0'-217.5' Sandy Clay; bluish gray, very stiff to hard, moist (cuttings)							
220		CH	217.5'-222.5' Clay; dark gray very stiff to hard, moist, minor shell fragments in cuttings					PB		8:18
222				PB-11						9:26
224		CH	222.5'-225.5' Sandy Clay; bluish gray, hard, moist (cuttings)							
226		GC	225.5'-230.0' Clayey Gravels; dusky brown clay with clasts of chert and wacke, very dense, moist (cuttings)							
228										
230		CH	230.0'-238.0' Clay; dusky brown, hard, moist	PB-12				PB		9:51
232										11:01

PRELIMINARY

Magnet
Extensometer



Depth (feet)	Graphic Log	USCS Class.	Geotechnical Description	Sample Desig.	Dry Unit Weight (pcf)	Moisture Content (%)	SPT Blows/ft	Sample Type	Recov. (%)	Remarks		
236		CH	Clay continued as above									
238		GC	238.0'-253.0' Clayey Gravel; dusky brown clay matrix supporting gravels of chert, wacke, and sandstone	PB-13				PB		11:21 1:04		
240												
242												
244				RUN #1					HQ	0'3"	1:16-3:15 Switch to HQ core	
246											3:31 3:56	
248				RUN #2					HQ	0'2"	4:02-5:52 switch to mud rotary end drilling 10/7/16	
250											Start Drilling For Day 8:15 (10/9/16)	
252				B-6					16 21 29 50	SPT		8:18 9:47
254												9:55 11:00-12:03 Switch to HQ core
256					FRANCISCAN COMPLEX BEDROCK 253'-BOH 253.0'-BOH Sheared Shale supporting blocks of Wacke; dark gray to black, weak, low hardness	B-7			30 50/6"	SPT		
258			below 256.0' sheared fabric becomes more prominent, undulatory shears throughout, clayey surfaces on shears, paper thin gouge surrounding pulverized shale and wacke	RUN #1A			50/6"	HQ	1.8' 3.0'	12:18 12:50		
260				RUN #2A			RQD 0	HQ	4.2' 5.0'			
262			261.3'-263.1' block of hard, strong, wacke, 50° fracture plane at top of block minor discontinuous quartz veins throughout up to 0.5" thick	RUN #3			RQD 60	HQ	3.0' 3.0'	1:36 2:12		
264			263.1'-264.0' sheared shale, weak, low hardness	RUN #3				HQ				
266			264.0'-265.3' block of wacke	RUN #4			RQD 32	HQ	3.0' 3.0'			
			265.3'-269.4' sheared shale minor serpenitized material encapsulated within shear fabric at 266.1'							3:32 3:47		

PRELIMINARY

10/7/16

10/8/16

Depth (feet)	Graphic Log	USCS Class.	Geotechnical Description	Sample Desig.	Dry Unit Weight(pcf)	Moisture Content (%)	SPT Blows/ft	Sample Type	Recov. (%)	Remarks	
270			sheared shale as above	RUN #5			RQD 23	HQ	4.9 5.0	End Drilling For Day 4:37 (10/8/16)	
272			269.4'-270.5' Wacke; dark gray, hard, strong, discontinuous quartz veins throughout							Start Drilling For Day 8:15 (10/10/16)	
274			270.5'-277.9 Sheared Shale; dark gray, weak, low hardness, soil like	RUN #6				RQD 0	HQ	4.5 5.0	
276											
278				277.9'-280.6' Shale supporting brecciated Wacke; dark gray to black; weak, low to moderate hardness	RUN #7			RQD 9	HQ	4.8 5.0	
280				280.6'-292.8' Sheared Shale; dark gray to black, weak, low hardness							
282											
284					RUN #8			RQD 0	HQ	1.4 3.0	
286					RUN #9			RQD 0	HQ	2.0 2.0	
288											
290					RUN #10			RQD 0	HQ	5.0 5.0	
292				292.3'-293.2' Shale; black, weak, moderate hardness, minor quartz veins							
294			293.2'-297.1' Serpentinite Block; bluish green, hard, strong, quartz veins throughout	RUN #11			RQD 63	HQ	5.0 5.0		
296			297.1'- 298.5' Sheared Shale; dark gray to black, weak, low hardness, minor serpentinite within shale, blocks of harder shale and quartzite within sheared matrix								
298			298.5'-299.6' Wacke; dark gray, hard, strong								
300			299.6'-300.6' Sheared Shale; dark gray to black, weak, low hardness	RUN #12			RQD 46	HQ	5.0 5.0		
			300.6'-BOH Wacke; dark gray, hard, strong								

PRELIMINARY

Datum Magnet

10/8/16
↓
10/10/16
↑

Depth (feet)	Graphic Log	USCS Class.	Geotechnical Description	Sample Desig.	Dry Unit Weight(pcf)	Moisture Content (%)	SPT Blows/ft	Sample Type	Recov. (%)	Remarks	
304			Total Depth = 302.3' Boring reamed out to 6" Ø. 2.75" Slope inclinometer casing installed to bottom of hole. Hole grouted with cement bentonite grout (94lb cement 25lb bentonite 35 gal water). Three vibrating wire piezometers installed. One 1/2" filter tip standpipe installed. Five magnetic extensometers and one magnetic extensometer datum magnet installed in boring <div style="text-align: center; color: red; font-weight: bold; font-size: 2em; transform: rotate(-15deg);">PRELIMINARY</div>								
306											
308											
310											
312											
314											
316											
318											
320											
322											
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332											
334											

COTTON, SHIRES AND ASSOCIATES, INC.

LOG OF EXPLORATORY DRILLING

Project MILLENNIUM TOWER Boring CSA/SD-3
 Location Sidewalk on Fremont Street 18.5' North and 8.5' West of SW Tower Corner Project No. E5343A
 Drilling Contractor/Rig Gregg / Track Mounted Fraste MXL Date of Drilling 10/12/16-10/22/16
 Ground Surface Elev. 13.6' (NAVD88) Logged By AM/KW Hole Diameter 5" (later reamed out to 6")
 Surface Concrete sidewalk Weather Varied

Depth (feet)	Graphic Log	USCS Class.	Geotechnical Description	Sample Desig.	Dry Unit Weight(pcf)	Moisture Content (%)	SPT Blows/ft	Sample Type	Recov. (%)	Remarks
		GP	FILL 0'-17'							START DRILLING 12:30
0-2			0.0'-0.33' Concrete Sidewalk 3.5" thick							
2-17			0.33'-17.0' Concrete with interbedded Clay;							
10-12		Void								
12-14		GP					50/3"	MC	Ø	2:30-3:40 set casing, switch to mud rotary
14-16							50/3"			3:50 4:08
16-18		SP	SAND 17'-24'							@4:15 Engineer from Tower informs crew that water is seeping into the Equipment Room on level B-1 4:20-4:58 set 10' of additional casing
18-20			17.0'-24.0' Sand; dusky brown, loose, moist	T-1			2 4 3	MC		4:58 End Drilling For Day (10/12/16)
20-24			below 20' abundant shell fragments in cuttings				5			7:58 Start Drilling For Day (10/13/16)
24-26		CH	YOUNG SANDY BAY MUD 24'-33'				1 5 4	MC	Ø	8:18-8:40 set 5' of additional casing
26-28			24.0'-33.0' Sandy Clay; dark gray to dusky brown, soft, moist, abundant shell fragments in cuttings				6			
28				ST-1				ST		0 psi

PRELIMINARY

10/12/16

10/13/16

Depth (feet)	Graphic Log	USCS Class.	Geotechnical Description	Sample Desig.	Dry Unit Weight (pcf)	Moisture Content (%)	SPT Blows/ft	Sample Type	Recov. (%)	Remarks
32		CH	Sandy Clay continued as above	ST-1				ST		9:09
34		SP	MARINE SAND 33'-39' 33.0'-39.0' Sand; medium gray, dense, wet, minor rounded gravels in cuttings							
36							7 8 4	SPT		9:57
38										
40		CH	LOWER YOUNG BAY MUD 39'-46' 39.0'-46.0' Clay; medium gray, soft to medium stiff, moist, highly plastic				(12)			10:12
42										
44	PRELIMINARY									
46		SP	MARINE SAND 46'-59' 46.0'-59.0' Sand; medium gray, medium dense to dense, wet							
48										
50							6 9 8	SPT		10:35
52										10:48-12:08 work on water pump
54										
56										
58							4 4 2	SPT		12:16
60		CH	SANDY BAY MUD 59'-67' 59.0'-67.0' Sandy Clay; medium bluish gray, soft, moist				(6)			12:30-1:07 clean out mud tub
62										
				ST-2				ST		0 psi 1:15

10/13/16

Piezo P-1

Tip of Standpipe Piezo

Piezo P-2

Magnet
Extensometer

10/13/16

Depth (feet)	Graphic Log	USCS Class.	Geotechnical Description	Sample Desig.	Dry Unit Weight(pcf)	Moisture Content (%)	SPT Blows/ft	Sample Type	Recov. (%)	Remarks
66		CH	Sandy Clay continued as above	ST-2				ST	0 psi	2:10
68		SM	COLMA SAND 67'-98' 67.0'-78.0' Silty Sand; medium gray, very dense, moist							
74							18 24 20 (44)	SPT	Ø	2:16
78		SC	78.0'-81.5' Clayey Sand; greenish gray, dense, moist	B-4			9 11 12 (23)	SPT		2:43
82		CH	81.5'-83.0' Sandy Clay; black, stiff, moist (seen on tip of auger)							
84		SC SP	83.0'-83.5' Clayey Sand; greenish gray, very dense, moist	T-2 T-3			9 37 50/5" (59/11")	MC		3:18
86			83.5'-88.0' Sand; greenish gray, very dense, moist, fine to medium grained							
88		SC	88.0'-98.0' Clayey Sand; dark gray, very dense, moist, fine to medium grained sand	B-5			18 30 30 (60)	SPT		3:50
94										

Plezo
P-3

PRELIMINARY

Depth (feet)	Graphic Log	USCS Class.	Geotechnical Description	Sample Desig.	Dry Unit Weight(kpcf)	Moisture Content (%)	SPT Blows/ft	Sample Type	Recov. (%)	Remarks		
98.0		CH	OLD BAY CLAY 98'-171' 98.0'-105.0' Sandy Clay; greenish gray, stiff, moist	B-7			3 7 9 (16)	SPT		4:55 End Drilling For Day (10/13/16)		
100											9:09 Start Drilling For Day (10/14/16)	
102		CH	105.0'-123.0' Clay; bluish gray, stiff to very stiff, moist									
104												
106												
108							T-4 T-5 T-6			1 7 8 (10)	MC	9:36
110		CH	123.0'-171.0' Clay; medium gray, very stiff to hard, moist									
112											10:21 11:00-4:30 Rig Broken Down, crew attempts to repair. Rig down for three days (missing fuse)	
114							PB-1				PB	11:00 End Drilling For Day (10/14/16)
116										12:24 Start Drilling For Day (10/18/16)		
118												
120												
122												
124				PB-2						PB	12:48	
126											1:47	
128												
130												

PRELIMINARY

Magnet Extensometer

Piezo P-4

10/13/16

10/14/16

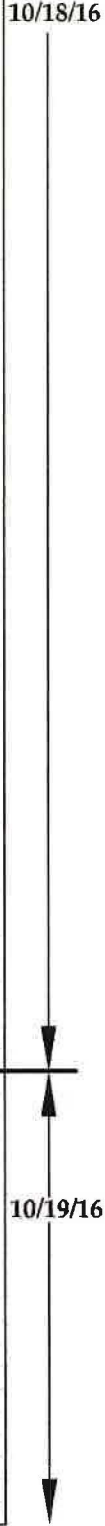
10/18/16

Depth (feet)	Graphic Log	USCS Class.	Geotechnical Description	Sample Desig.	Dry Unit Weight(pcf)	Moisture Content (%)	SPT Blows/ft	Sample Type	Recov. (%)	Remarks
	X	CH	Clay continued as above							
134				PB-3				PB		2:13
136										3:10
144				PB-4				PB		3:39
146										4:37
154				PB-5				PB		5:04
156										6:00 End Drilling For Day (10/18/16)
158										8:05 Start Drilling For Day (10/19/16)
164				PB-6				PB		8:26
	X									9:15

PRELIMINARY

Magnet Extensometer

Magnet Extensometer



Depth (feet)	Graphic Log	USCS Class.	Geotechnical Description	Sample Desig.	Dry Unit Weight (pcf)	Moisture Content (%)	SPT Blows/ft	Sample Type	Recov. (%)	Remarks
168		CH	Clay continued as above							
170										
172		SP	ALAMEDA FORMATION 171'-248'							
174			171.0'-175.5' Sand; medium gray, loose to medium dense, moist to wet, fine to medium grained sand	PB-7				PB		9:47
176		CH	175.5'-179' Clay; medium gray, very stiff to hard, moist (cuttings)							10:38
178										
180		SP	@ 179.0' wood debris in cuttings 179.0'-189.0' Sand; medium gray, dense, wet							
182										
184				PB-8				PB		10:53
186										11:52
188										
190		CH	189.0'-213.0' Clay; greenish gray, very stiff to hard, moist							
192										
194				PB-9				PB		12:12
196										1:13
198										

10/19/16

PRELIMINARY

10/19/16

Depth (feet)	Graphic Log	USCS Class.	Geotechnical Description	Sample Desig.	Dry Unit Weight (pcf)	Moisture Content (%)	SPT Blows/ft	Sample Type	Recov. (%)	Remarks	
202			Clay continued as above								
204				PB-10				PB		1:32	
206										2:37	
210											
212											
214		CH	213.0'-223.0' Clay; brownish gray, very stiff, moist (cuttings)					PB		2:57	
216										4:09	
224		SC	223.5'-224.3' Sandy Clay; brownish gray, hard, moist	ST-3				ST		4:26	
226		GC	224.3'-230.0' Clayey Gravel; brownish gray clay matrix supporting rounded gravels of chert and wacke, very dense, moist							5:21	pressure increased to 400 psi at 224.3' stopped pushing sample
230		CH	230.0'-236.5' Clay; medium gray, very stiff, moist								
232				B-8			0 6	SPT		5:37	

PRELIMINARY

Magnet Extensometer

X

Depth (feet)	Graphic Log	USCS Class.	Geotechnical Description	Sample Desig.	Dry Unit Weight (pcf)	Moisture Content (%)	SPT Blows/ft	Sample Type	Recov. (%)	Remarks
		CH	Clay continued as above	B-8			11	SPT		6:15 End Drilling For Day (10/19/16)
236							(17)			7:52 Start Drilling For Day (10/20/16)
238		GC	236.5'-248.0' Clayey Gravel; blue green clay matrix supporting clasts of wacke and chert	B-9			50/5"	SPT		8:08 8:55
240							50/5"			
242										
244				B-10			19 24 27	SPT		9:07 10:17
246							(51)			
248										10:35
250			FRANCISCAN COMPLEX BEDROCK 248'-BOH 248.0'-BOH Sheared Shale with blocks of Wacke and Sandstone; dark gray to black shale, weak, low hardness	B-11			31 34 49	SPT		11:27-1:19 Switch to HQ Core
252			252.2'-252.5' Wacke 252.5'-254.5' Sheared Shale	RUN #1			(83)		0.0 1.5	1:56 2:12
254			254.7'-254.8' Wacke 254.8'-255.1' Sheared Shale 255.1'-255.3' Wacke	RUN #2			RQD 0	HQ	0.6 2.0	2:49 3:43
256			255.3'-259.9' Sheared Shale with angular clasts of wacke	RUN #3			RQD 0	HQ	1.75 3.0	4:35 5:12
258				RUN #4			RQD 0	HQ	4.9 5.0	
260			259.9'-260.3' Wacke 260.3'-264.1' Sheared Shale							6:10 End Drilling For Day (10/20/16)
262				RUN #5			RQD 28	HQ	3.2 5.0	8:07 Start Drilling For Day (10/21/16)
264			264.1'-265.0' Sandstone/Wacke							
266			265.0'-270.2' Sheared Shale	RUN #8			RQD 8	HQ	5.9 5.0	9:35 10:02

PRELIMINARY

Depth (feet)	Graphic Log	USCS Class.	Geotechnical Description	Sample Desig.	Dry Unit Weight (pcf)	Moisture Content (%)	SPT Blows/ft	Sample Type	Recov. (%)	Remarks		
270			270.2'-270.8' Sandstone and Wacke Breccia with Shale matrix; hard, strong	RUN #6			RQD 8	HQ	5.0 5.0	11:12		
272			270.8'-272.3' Sheared Shale	RUN #7			RQD 0	HQ	1.7 3.0	11:38		
274			272.3'-272.4' Quartzite	RUN #8	272.4'-272.6' Sheared Shale			RQD 35	HQ	2.0 2.0	12:38	
276			272.6'-272.8' Wacke with interbedded sheared shale		12:50							
278			272.8'-273.8' Sheared Shale	RUN #9	273.8'-274.5' Sandstone and Wacke Breccia with Shale matrix; hard, strong, quartz veins throughout			RQD 0	HQ	2.1 5.0	1:28	
280			274.5'-278.8' Sheared Shale		1:48							
282			278.8'-279.0' Serpentine	RUN #10	279.0'-283.7' Sheared Shale			RQD 0	HQ	1.2 1.2	3:24	
284			283.7'-284.0' Quartzite with interbedded Shale								4:01	
286			284.0'-284.7' Sheared Shale	RUN #11	284.7'-285.8' Sandstone and Wacke Breccia with Shale matrix; hard, strong			RQD 18	HQ	3.3 3.8	4:20	
288			285.8'-298.7' Sheared Shale								4:43	
290			PRELIMINARY			RUN #12			RQD 0	HQ	2.4 5.0	6:14
292												6:40
294												6:24 End Drilling For Day (10/21/16)
296												8:30 Start Drilling For Day (10/22/16)
298	298.2'-298.7' Block of Wacke in half of the core	RUN #13				RQD 0	HQ	4.6 5.0				
300				RUN #14			RQD 0	HQ	2.9 2.9	10:13		
										10:40		
										11:13 End Drilling (10/22/16)		

Datum Magnet

Total Depth = 298.7'
 Boring reamed out to 6" Ø. 2.75" Slope inclinometer casing installed to bottom of hole. Hole grouted with cement bentonite grout (94lb cement 25lb bentonite 35 gal water). Four vibrating wire piezometers installed. One 1/2" filter tip standpipe installed. Five magnetic extensometers and one magnetic extensometer datum magnet installed in boring

10/21/16

10/22/16