



4230 Kiernan Ave., Ste. 150 | Modesto, CA | Ph: (209) 543 - 1799 | Fax: (209) 543-1775

March 17, 2017

CTE Job No. 25-0484G

Mr. Tony Zarinelli
Pacific Development Group
P.O. Box 3060
Newport Beach, CA 92658

Email:tzarinelli@pdgcenters.com

Subject: Percolation Testing and Soil Suitability Study
SWC Main St. and Atherton Dr.
Manteca, California 95337

Dear Mr. Zarinelli:

As requested, Construction Testing and Engineering, Inc., (CTE) has completed a percolation and soil suitability testing report for the proposed basin at the subject site. The results of our assessment are provided below.

If you have any questions regarding our findings or recommendations, please do not hesitate to contact this office. The opportunity to be of service is appreciated.

Respectfully submitted,

CTE CAL, INC.



Rodney D. Ballard, GE #2173
Geotechnical Engineering Manager



4230 Kiernan Ave., Ste. 150 | Modesto, CA | Ph: (209) 543 - 1799 | Fax: (209) 543-1775

PERCOLATION TESTING AND SOIL SUITABILITY STUDY

SWC MAIN STREET AND AHERTON DRIVE
MANTECA, CALIFORNIA 95337

PREPARED FOR:

MR. TONY ZARINELLI
PACIFIC DEVELOPMENT GROUP
P.O. BOX 3060
NEWPORT BEACH, CALIFORNIA 92658

PREPARED BY:

CTE CAL, INC.
3628 MADISON AVENUE SUITE 22
SACRAMENTO, CA 95660

CTE JOB NO. 25-0484G
© 2016 CTE Cal, Inc. Intellectual Property
All rights reserved.

MARCH 17, 2017

TABLE OF CONTENTS

1.0 INTRODUCTION..... 1

2.0 SITE DESCRIPTION..... 1

3.0 SUBSURFACE SOILS AND GROUNDWATER 1

 3.1 Soil Profile 1

 3.2 Groundwater 2

4.0 PERCOLATION TESTING 2

 4.1 Test Locations and Number of Tests 2

 4.2 Percolation Test Protocol and Procedures 2

 4.4 Percolation Test Results and Form 3

 4.5 Discussion 3

5.0 CONCLUSIONS 3

6.0 LIMITATIONS 4

FIGURES

Figure 1	“Site Index Map”
Figure 2	“Test Location Map”

APPENDICES

APPENDIX A	“Soil Boring Log”
APPENDIX B	“Percolation Test Results”

1.0 INTRODUCTION

As requested, CTE CAL, Inc. (CTE) has completed percolation testing at the site located at 1601 South Main Street (APN 224-021-47) in Manteca, California. The purpose of this evaluation is to assess the site project suitability to dispose of increased storm water flows from the construction of additional hardscape improvements at the site. The storm water disposal is proposed to be via percolation into in-situ site soil materials.

Percolation testing was conducted at a depth of 4 feet to determine the suitability for infiltration-based storm water treatment control. The following report includes information regarding subsurface conditions encountered during our field exploration as well as the percolation test results and engineering analysis.

2.0 SITE DESCRIPTION

The new commercial property is located on 18.40 acres at 1601 S. Main St., APN 224-021-47 in Manteca, California. Topography at the site is relatively level at an elevation of 35 feet (per USGS Mapping). Previous land use at the site is indicated to be vacant, possibly agricultural. Currently the site is vacant with groundcover of grass. A “Site Map” showing existing site features is included as Figure-1.

3.0 SUBSURFACE SOILS AND GROUNDWATER

The field investigations conducted on February 27 & 28, 2017, by CTE Cal, Inc. included geologic reconnaissance and the excavation of soil/groundwater test borings, logged in accordance with ASTM Standards, to a maximum depth of 21.5 feet. The test borings were drilled using four (4) inch solid stem truck mounted flight auger. The percolation testing performed was drilled using a three (3) inch auger to a maximum depth of 4 feet. Locations and descriptions of the percolation tests and borings are shown in Appendix B and are located on Figure 2.

3.1 Soil Profile

Based on our subsurface investigation, alluvial materials were encountered throughout the depth of exploration of 21.5 feet and are considered to be consistent with Quaternary basin deposits as shown on published regional geologic map of the San Francisco - San Jose Quadrangle, prepared by Wagner et al. (1991). The mapped area shows one surficial geologic unit, Holocene Dune Sand deposits (Qs).

Our assessment indicates the site to be generally underlain by soils described as medium dense silty and clayey sands (SM/SC) with interbedded stiff to hard silts (ML) and clays (CL) to the maximum depth of 16.5 feet.

3.2 Groundwater

Observations of groundwater conditions were made in the test borings at the time of field exploration. Groundwater was observed in the borings at approximately 15 feet bgs. Groundwater levels were obtained through the California Department of Water Resource well data, for wells in the vicinity of the site dating back to 1965. The typical “Seasonal High Groundwater” at the site is approximately 15 feet bgs. The average “Low Groundwater” at the site is approximately 22 feet bgs. The highest recorded groundwater level was measured in 1983 from monitoring wells nearest to the site corresponding to a depth of about 10.4 feet below ground surface at the subject site.

4.0 PERCOLATION TESTING

4.1 Test Locations and Number of Tests

Two official percolation tests were performed, one at the northern portion of the site (P-1), the other at the southwestern portion of the site (P-2). Both tests were performed at a depth of 4 feet. Boring and test locations are shown in the attached Figure 2.

4.2 Percolation Test Protocol and Procedures

The test holes were excavated on February 28, 2017 at or near the proposed bioretention area. The percolation tests were performed within a 3.0-inch diameter test hole excavated to depth of 4 feet.

Drain pipe (3-inch diameter, slotted within the lowermost 6-inches), and, a 2-inch layer of pea gravel was placed at the base of the hole to protect from sloughing of the boring walls. A limited, approximately 24-hour, pre-saturation period was allowed; *or, until water added to the hole had drained in a short period.* Then, percolation testing was started by adjusting the water level to approximately 6 to 12 inches above the base of the test hole.

4.3 Details & Conformity

The soil percolation rate is defined by the average time in minutes for a 1-inch column of water to “seep” into the soil. Percolation rate was calculated (in minutes per inch) by dividing the differential in time (minutes) by the corresponding differential (drop) in

water level (inches). No correction factor for diameter of the test hole was used in the calculations.

4.4 Percolation Test Results and Form

Percolation tests were performed within native silty sand soil materials encountered within the test holes. Percolation rates are shown on the “Percolation Test Data” sheets in Appendix B.

As shown below the percolation rates achieved at locations P-1 and P-2 varied. Based on our experience in the general site area percolation rates of between 5 and 10 Min/inch are considered consistent with those typical of the soil types encountered in the test holes and with site vicinity. Owing to variations in material type and depth, percolation rates should be expected to fluctuate across the site and will depend upon actual construction location, depth and size. The percolation rates obtained are summarized on the following table:

TEST NUMBER	DEPTH, ft	PERCOLATION RATE (Min/In)	PERCOLATION RATE (In/Hr)	PERCOLATION RATE (Gal/Sq Ft/Day)
P-1	4.0	20.0	3.0	44.88
P-2	4.0	8.0	7.5	112.2

4.5 Discussion

The city of Manteca is classified as Phase II Municipal Separate Storm Sewer System (MS4) community. The California State Water Resources Control Board issued a National Pollutant Discharge Elimination System (NPDES) general permit (Phase II Permit) for Phase II MS4 communities to regulate stormwater discharge. Per the 2015 Multi-Agency Post-Construction Stormwater Standards Manual, made to assist MS4 communities with complying to the Phase II Permit, a suitable soil condition for use of a conventional infiltration-based stormwater treatment control systems, the soil stratum should be capable of percolating water at a rate of 0.5 to 5.0 inches per hour (in/hr). CTE’s percolation test results for this project indicate a percolation rate of 3.0 in/hr at a depth of 4 feet within P-1. A percolation rate of 7.5 in/hr was obtained in Percolation test hole P-2 at a depth 4 feet.

5.0 CONCLUSIONS

Based on soils encountered and percolation testing results of 3.0 in/hr achieved in P-1 at a depth of 4 feet during our study, it appears the proposed bioretention facilities in silty sand materials would be expected to have a percolation rate acceptable for the proposed

storm water drainage control. The percolation results obtained in P-2 of 7.5 in/hr at 4 feet produced percolation rates more consistent with the results CTE has obtained on other projects in the site area of 5 to 10 min/in.

Based on percolation test results, as described above, the soil conditions at the site are considered suitable as bioretention water disposal system. We recommend that the percolation test (P-1), located in the proposed parking lot fingers area of 3.0 in/hr at a depth of approximately 4 feet should be used in design of the bioretention disposal system.

6.0 LIMITATIONS

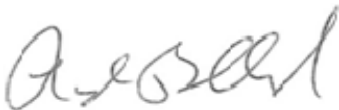
The field evaluation, laboratory testing and analysis presented in this report have been conducted according to current practice and the standard of care exercised by reputable consultants performing similar tasks in this area. No other warranty, expressed or implied, is made regarding the conclusions, recommendations and opinions expressed in this report. Variations may exist and conditions not observed or described in this report may be encountered during construction.

Our conclusions and recommendations are based on the observed conditions. If conditions different from those described in this report are encountered, our office should be notified and additional recommendations, if required, will be provided upon request.

We appreciate the opportunity to be of service on this project. This office is available for further consultation and/or field review as needed. If you have any questions regarding the foregoing, please do not hesitate to call.

Sincerely,

CTE CAL, INC.



Rodney D. Ballard, GE #2173
Geotechnical Engineering Manager



Prepared By
Kristin Kohls
Staff Geologist

FIGURE 1
SITE INDEX MAP



KEY MAP

SCALE

0 1 2 Miles



NOTES:

Location of site is approximate. Base map from Map Data ©2016 Google



3628 Madison Avenue, Suite 22
 Sacramento, CA 95660
 P: 916.331.6030
 F: 916.331.6037
 www.ctecal.com

SITE LOCATION MAP
 SWC MAIN ST & ATHERTON DR
 1601 S. Main St.
 Manteca, CA 95337

CTE JOB NO.

25-0484G

SCALE

As Shown Above

DATE

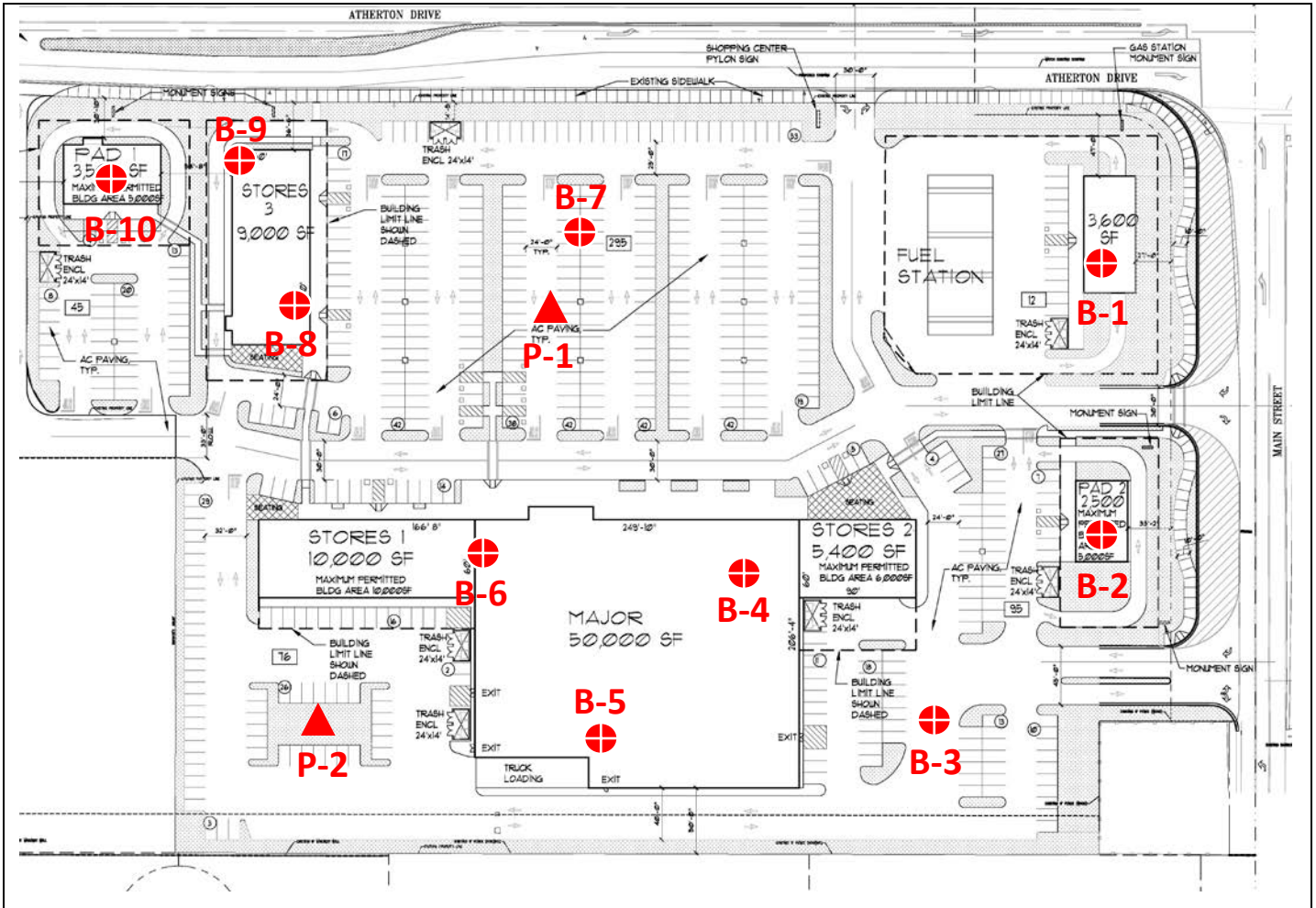
3/17/17

FIGURE

1

FIGURE 2

TEST LOCATION MAP



SCALE



LEGEND

- Borehole Locations (B-1 to B-10)**
- Percolation Test Locations (P-1 & P-2)**



NOTES:

Approximate location of test borings and percolation tests (shown as circles or triangles with adjacent boring/percolation test number).



3628 Madison Avenue, Suite 22
 Sacramento, CA 95660
 P: 916.331.6030
 F: 916.331.6037
 www.ctecal.com

EXPLORATION MAP
 SWC Main St & Atherton Dr.
 1601 S. Main St.
 Manteca, California

CTE JOB NO.
25-0484G

SCALE
See Scale Above

DATE
3/17/17

FIGURE
2

APPENDIX A
SOIL BORING LOG



DEFINITION OF TERMS

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

GRAIN SIZES

BOULDERS	COBBLES	GRAVEL		SAND			SILTS AND CLAYS
		COARSE	FINE	COARSE	MEDIUM	FINE	
12"	3"	3/4"	4	10	40	200	
CLEAR SQUARE SIEVE OPENING				U.S. STANDARD SIEVE SIZE			

ADDITIONAL TESTS

(OTHER THAN TEST PIT AND BORING LOG COLUMN HEADINGS)

MAX- Maximum Dry Density
 GS- Grain Size Distribution
 SE- Sand Equivalent
 EI- Expansion Index
 CHM- Sulfate and Chloride Content, pH, Resistivity
 COR - Corrosivity
 SD- Sample Disturbed

PM- Permeability
 SG- Specific Gravity
 HA- Hydrometer Analysis
 AL- Atterberg Limits
 RV- R-Value
 CN- Consolidation
 CP- Collapse Potential
 HC- Hydrocollapse
 REM- Remolded

PP- Pocket Penetrometer
 WA- Wash Analysis
 DS- Direct Shear
 UC- Unconfined Compression
 MD- Moisture/Density
 M- Moisture
 SC- Swell Compression
 OI- Organic Impurities



PROJECT:	DRILLER:	SHEET: of
CTE JOB NO:	DRILL METHOD:	DRILLING DATE:
LOGGED BY:	SAMPLE METHOD:	ELEVATION:

Depth (Feet)	Bulk Sample Driven Type	Blows/Foot	Dry Density (pcf)	Moisture (%)	U.S.C.S. Symbol	Graphic Log	BORING LEGEND	Laboratory Tests
							DESCRIPTION	
0	▲						Block or Chunk Sample	
2.5	⊗						Bulk Sample	
5								
7.5	□						Standard Penetration Test	
10	▧						Modified Split-Barrel Drive Sampler (Cal Sampler)	
12.5	▩						Thin Walled Army Corp. of Engineers Sample	
15				▼			Groundwater Table	
20							Soil Type or Classification Change	
22.5							? — ? — ? — ? — ? — ? — ? — ? — ? —	
							Formation Change [(Approximate boundaries queried (?))]	
25					"SM"		Quotes are placed around classifications where the soils exist in situ as bedrock	



PROJECT: SWC Main St. & Atherton Dr. DRILLER: NATS SHEET: 1 of 10
 CTE JOB NO: 25-0484G DRILL METHOD: 4" Solid Stem Auger DRILLING DATE: 2/27/17
 LOGGED BY: K. Kohls SAMPLE METHOD: SPT/Rope & Cathead 350 ft-lb ELEVATION: 40 +/-

Depth (Feet)	Bulk Sample Driven Type	Blows/6 Inches	Dry Density (pcf)	Moisture (%)	U.S.C.S. Symbol	Graphic Log	BORING: B-1	
							DESCRIPTION	Laboratory Tests
0							Native grass/brush	
2-4		2 3 4	106.1	10.0	SM		Loose, moist, brown, fine SAND with silt (15-30%)	MD, GS
9-12		9 10 12	105.9	11.8	SM		Medium dense, moist, brown, SAND with silt (15-30%)	MD, GS
10-11		1 3 8	94.6	26.7	CL		Stiff, moist to wet, brown, silty CLAY	MD, GS
15-16.5		3 7 6	98.9	26.3	SM		Medium dense, wet, brown, silty SAND Some orange mottling	MD, GS
16.5-25							Boring terminated at 16.5 feet Groundwater encountered at 15 feet Boring backfilled with slurry cement and topped with cuttings	



PROJECT:	SWC Main St. & Atherton Dr.	DRILLER:	NATS	SHEET:	2 of 10
CTE JOB NO:	25-0484G	DRILL METHOD:	4" Solid Stem Auger	DRILLING DATE:	2/27/17
LOGGED BY:	K. Kohls	SAMPLE METHOD:	SPT/Rope & Cathead 350 ft-lb	ELEVATION:	40 +/-

Depth (Feet)	Bulk Sample Driven Type	Blows/6 Inches	Dry Density (pcf)	Moisture (%)	U.S.C.S. Symbol	Graphic Log	BORING: B-2	
							DESCRIPTION	Laboratory Tests
0						Native grass/brush		
1		1					Loose, moist, brown, fine SAND with silt (15-30%)	GS
2		2						
4		4						
5		30	109.2	11.0			Very dense, moist, brown, SAND with some silt (5-15%) to Hard, dry, light tan, SILT	MD, GS
40		40						
42		42						
10		5	90.4	10.5			Stiff, moist to wet, brown, SILT with some sand (5-15%)	MD, GS
6		6						
7		7						
15		4	94.4	28.2			Stiff, wet, brown, silty CLAY	MD
6		6						
8		8						
16.5						Boring terminated at 16.5 feet Groundwater encountered at 15 feet Boring backfilled with slurry cement and topped with cuttings		
20								
25								



3628 Madison Avenue, Suite 22 | Sacramento, CA 95660 | 916.331.6030 | Fax 916.331.6037

PROJECT: SWC Main St. & Atherton Dr. DRILLER: NATS SHEET: 3 of 10
 CTE JOB NO: 25-0484G DRILL METHOD: 4" Solid Stem Auger DRILLING DATE: 2/27/17
 LOGGED BY: K. Kohls SAMPLE METHOD: SPT/Rope & Cathead 350 ft-lb ELEVATION: 40 +/-

Depth (Feet)	Bulk Sample Driven Type	Blows/6 Inches	Dry Density (pcf)	Moisture (%)	U.S.C.S. Symbol	Graphic Log	BORING: B-3	
							DESCRIPTION	Laboratory Tests
0						Native grass/brush		
5		3 4 4	109.3	6.8	SM	Moist, brown, SAND Loose, moist to wet, brown, SAND with some silt (5-15%)	MD, GS	
6.5						Boring terminated at 6.5 feet No groundwater encountered. Boring backfilled with cuttings		
10								
15								
20								
25								



PROJECT:	SWC Main St. & Atherton Dr.	DRILLER:	NATS	SHEET:	4 of 10
CTE JOB NO:	25-0484G	DRILL METHOD:	4" Solid Stem Auger	DRILLING DATE:	2/27/17
LOGGED BY:	K. Kohls	SAMPLE METHOD:	SPT/Rope & Cathead 350 ft-lb	ELEVATION:	40 +/-

Depth (Feet)	Bulk Sample Driven Type	Blows/6 Inches	Dry Density (pcf)	Moisture (%)	U.S.C.S. Symbol	Graphic Log	BORING: B-4	
							DESCRIPTION	Laboratory Tests
0						Native grass/brush		
4		4	112.5	7.7	SM	Medium dense, moist, brown, SAND with silt (15-30%)		MD, GS
10		9						
5		4	96.0	8.2	SM	Medium dense, moist, brown, SAND with silt (15-30%)		MD, GS
4		15						
10		6	97.6	22.6	CL	Stiff, moist, brown, silty CLAY to Medium dense, moist, orange-brown, SAND with some silt (~5%)		MD, GS
7		8						
15		17	107.4	19.8	SP	Very dense, wet, brown, SAND with some clay (~5%)		MD, GS
40		36						
Boring terminated at 16.5 feet Groundwater encountered at 15 feet Boring backfilled with slurry cement and topped with cuttings								



3628 Madison Avenue, Suite 22 | Sacramento, CA 95660 | 916.331.6030 | Fax 916.331.6037

PROJECT: SWC Main St. & Atherton Dr. DRILLER: NATS SHEET: 5 of 10
 CTE JOB NO: 25-0484G DRILL METHOD: 4" Solid Stem Auger DRILLING DATE: 2/27/17
 LOGGED BY: K. Kohls SAMPLE METHOD: SPT/Rope & Cathead 350 ft-lb ELEVATION: 42 +/-

Depth (Feet)	Bulk Sample Driven Type	Blows/6 Inches	Dry Density (pcf)	Moisture (%)	U.S.C.S. Symbol	Graphic Log	BORING: B-5	
							DESCRIPTION	Laboratory Tests
0							Native grass/brush	
4-7		4 6 7	114.9	7.4	SM		Medium dense, moist, dark brown, SAND with silt (15-30%)	MD, GS
5-5.5		40 50/6"	103.9	20.2	ML		Very dense, moist, dark brown, coarse SAND with silt (15-30%) to Hard, dry, light tan, SILT	MD, GS
10-12		8 13 12	100.0	22.7	CL		Very stiff, moist, orange-brown to SILT to Very stiff, moist, light gray silty CLAY	MD, GS
15-16.5		6 8 11	98.2	26.2	ML		Very stiff, moist to wet, brown SILT with fine sand (15-30%) some sulfide-rich minerals (pyrite)	MD, GS
16.5-25							Boring terminated at 16.5 feet No groundwater encountered Boring backfilled with slurry cement and topped with cuttings	



3628 Madison Avenue, Suite 22 | Sacramento, CA 95660 | 916.331.6030 | Fax 916.331.6037

PROJECT: SWC Main St. & Atherton Dr. DRILLER: NATS SHEET: 6 of 10
 CTE JOB NO: 25-0484G DRILL METHOD: 4" Solid Stem Auger DRILLING DATE: 2/27/17
 LOGGED BY: K. Kohls SAMPLE METHOD: SPT/Rope & Cathead 350 ft-lb ELEVATION: 40 +/-

Depth (Feet)	Bulk Sample Driven Type	Blows/6 Inches	Dry Density (pcf)	Moisture (%)	U.S.C.S. Symbol	Graphic Log	BORING: B-6	
							DESCRIPTION	Laboratory Tests
0						Native grass/brush		
3		3	115.0	7.7	SM	Loose, moist, dark brown, SAND with silt (15-30%)	MD, GS	
3		3						
6		6						
5		5	110.9	15.6	ML	Medium dense, moist, dark brown, SAND with silt to Hard, dry, light tan, SILT	MD	
20		20						
32		32						
10		8	102.4	20.5	CL	Medium dense, moist, brown, silty clayey SAND to Hard, dry, light gray/tan, silty CLAY with some orange mottling	MD	
26		26						
30		30						
15		8	108.7	17.0	SP	Medium dense, wet, multi-colored, SAND	MD, GS	
10		10						
16		16						
20		3	108.7	17.0	SP	Dense, wet, multi-colored, SAND	MD, GS	
25		25						
21.5		11				Boring terminated at 21.5 feet Groundwater encountered at 15 feet Boring backfilled with slurry cement and topped with cuttings		



PROJECT: SWC Main St. & Atherton Dr. DRILLER: NATS SHEET: 7 of 10
 CTE JOB NO: 25-0484G DRILL METHOD: 4" Solid Stem Auger DRILLING DATE: 2/27/17
 LOGGED BY: K. Kohls SAMPLE METHOD: SPT/Rope & Cathead 350 ft-lb ELEVATION: 40 +/-

Depth (Feet)	Bulk Sample Driven Type	Blows/6 Inches	Dry Density (pcf)	Moisture (%)	U.S.C.S. Symbol	Graphic Log	BORING: B-7	
							DESCRIPTION	Laboratory Tests
0						Native grass/brush		
0 - 4.5					ML	Slightly moist, brown, SILT with fine sand (15-30%)	RV	
4.5 - 6.5		18 38 32		13.3	SC	Very dense, moist to wet, clayey SAND	GS	
6.5 - 25						Boring terminated at 6.5 feet No groundwater encountered. Boring backfilled with cuttings		



PROJECT:	SWC Main St. & Atherton Dr.	DRILLER:	NATS	SHEET:	8 of 10
CTE JOB NO:	25-0484G	DRILL METHOD:	4" Solid Stem Auger	DRILLING DATE:	2/27/17
LOGGED BY:	K. Kohls	SAMPLE METHOD:	SPT/Rope & Cathead 350 ft-lb	ELEVATION:	40 +/-

Depth (Feet)	Bulk Sample Driven Type	Blows/6 Inches	Dry Density (pcf)	Moisture (%)	U.S.C.S. Symbol	Graphic Log	BORING: B-8	
							DESCRIPTION	Laboratory Tests
0						Native grass/brush		
5		5 10 16	115.6	9.2	SC	Medium dense, moist, brown, SAND with clay and silt (15-30%)	MD, GS	
5		11 35 50	94.0	24.3	CL	Medium dense, moist, brown, SAND with clay to Hard, dry, tan to light gray, silty CLAY	MD, GS	
10		5 5 10	95.2	19.8	ML	Stiff, moist, brown, SILT with fine sand	MD	
15		6 8 10			SC	Medium dense, wet, brown, SAND with clay and silt		
16.5						Boring terminated at 16.5 feet Groundwater encountered at 15 feet Boring backfilled with slurry cement and topped with cuttings		



PROJECT: SWC Main St. & Atherton Dr. DRILLER: NATS SHEET: 9 of 10
 CTE JOB NO: 25-0484G DRILL METHOD: 4" Solid Stem Auger DRILLING DATE: 2/27/17
 LOGGED BY: K. Kohls SAMPLE METHOD: SPT/Rope & Cathead 350 ft-lb ELEVATION: 40 +/-

Depth (Feet)	Bulk Sample Driven Type	Blows/6 Inches	Dry Density (pcf)	Moisture (%)	U.S.C.S. Symbol	Graphic Log	BORING: B-9	
							DESCRIPTION	Laboratory Tests
0						Native grass/brush		
3		3			SM	Loose, moist, brown, fine SAND with silt		
4		4						
6		6						
5		15				Medium dense, moist, brown, SAND with silt		
17		17				to		
21		21	99.9	22.8	ML	Hard, dry, tan, clayey SILT	MD, GS	
10		10				Hard, dry, tan to light gray, clayey SILT		
20		20				to		
23		23			SM	Dense, moist, brown, silty SAND		
15						Boring terminated at 11.5 feet No groundwater encountered Boring backfilled with slurry cement and topped with cuttings		
25								



3628 Madison Avenue, Suite 22 | Sacramento, CA 95660 | 916.331.6030 | Fax 916.331.6037

PROJECT: SWC Main St. & Atherton Dr. DRILLER: NATS SHEET: 10 of 10
 CTE JOB NO: 25-0484G DRILL METHOD: 4" Solid Stem Auger DRILLING DATE: 2/27/17
 LOGGED BY: K. Kohls SAMPLE METHOD: SPT/Rope & Cathead 350 ft-lb ELEVATION: 40 +/-

Depth (Feet)	Bulk Sample Driven Type	Blows/6 Inches	Dry Density (pcf)	Moisture (%)	U.S.C.S. Symbol	Graphic Log	BORING: B-10	
							DESCRIPTION	Laboratory Tests
0						Native grass/brush		
6		6	111.8	7.4	SM	Medium dense, moist, dark brown to brown, fine SAND with silt (15-30%)	MD, GS	
6		6						
7		7						
5		3	104.9	19.8	ML	Dense, moist to damp, brown, SAND with silt	MD	
14		14						
20		20						
10		5	104.9	19.8	ML	Medium dense, moist, brown, silty SAND to Very stiff, dry, tan, clayey SILT	MD	
10		10						
17		17						
11.5						Boring terminated at 11.5 feet No groundwater encountered Boring backfilled with slurry cement and topped with cuttings		
15								
20								
25								

APPENDIX B

PERCOLATION TEST RESULTS

