August 7, 2020

SOUTHERN CALIFORNIA GEOTECHNICAL
A California Corporation

RJM Design Group
31591 Camino Capistrano
San Juan Capistrano, California 92675

Attention: Mr. Eric Chastain, LLA, LEED AP
Principal Landscape Architect

Project No.: **19G109-3**

Subject: **Results of Infiltration Testing**
Proposed Veterans Memorial Park
Faraday Avenue at Whitman Way
Carlsbad, California

References: Surficial Geologic Mapping, Proposed Veterans Memorial Park, Faraday Avenue at Whitman Way, Carlsbad, California, Prepared for RJM Design Group, by Southern California Geotechnical, Inc. (SCG), SCG Project No. 19G109-1, dated July 15, 2019.

Geotechnical Investigation, Proposed Veterans Memorial Park, Faraday Avenue at Whitman Way, Carlsbad, California, prepared for RJM Design Group, by Southern California Geotechnical, Inc. (SCG), SCG Project No. 19G109-2, dated August 7, 2020.

Mr. Chastain:

In accordance with your request, we have conducted infiltration testing at the subject site. We are pleased to present this report summarizing the results of the infiltration testing and our design recommendations.

Scope of Services

The scope of services performed for this project was in general accordance with our Proposal No. 18P372R, dated October 30, 2018. The scope of services included site reconnaissance, subsurface exploration, field testing, and engineering analysis to determine the infiltration rates of the onsite soils. The infiltration testing was performed in general accordance with the County of San Diego, Low Impact Development Handbook – Stormwater Management Strategies – Appendix F dated July 2014. San Diego County allows for infiltration testing in small-diameter borings using the falling head method.

Site and Project Description

The overall site is located at the southeast corner of Whitman Way and Faraday Avenue in Carlsbad, California. The overall site is bounded to the west and south by Faraday Avenue and to the north by Whitman Way, vacant land, and existing single-family residential tracts. The general location of the site is illustrated on the Site Location Map, enclosed as Plate 1 of this report.

The subject site consists of the westernmost 48± acres of Veteran's Memorial Park. Based on information from the client, the eastern portion of Veteran's Memorial Park is an existing preserve. The park is currently unimproved with dirt trails that are utilized for hiking and/or biking. This area of the park consists of gently sloping terrain with groundcover comprised of heavy native grass, weeds, shrubs with areas of dense large trees.

Topographic information was obtained from a plan provided by the client. Based on this plan, topography within the proposed development area consists of rolling hills. Site grades range from elevation 222± feet mean sea level (msl) in the east-central area to 44± feet msl in the northwestern area of the site.

Proposed Development

Based on the site plan provided to our office, the subject site will be developed with active and passive amenities, open space areas, public art, trails, utilities, parking, playgrounds, a bocce ball court, restrooms, and maintenance facilities. It is also expected that the park will include lighting, trellis shade structures and fencing. The primary structures will include a restroom and catering support structure located in the northwestern region of the site, a Veterans Memorial in the central region of the site, and a second restroom building located in the southern region of the site.

We understand that the proposed development may include on-site infiltration to dispose of storm water. Based on the current site layout and conversations with the client, the proposed infiltration systems may consist of relatively shallow bioswales or basins located around the perimeter of the site. The bottom of the proposed bioswales or relatively shallow basins will likely extend to depths of 8± feet below the existing site grades.

Concurrent Study

SCG recently conducted a geotechnical investigation at the subject site, referenced above. As a part of this study, five (5) borings were advanced to depths of 15 to 50± feet below existing site grades. Native alluvium was encountered at the ground surface at Boring No. B-1. The alluvium consists of medium dense clayey fine sands and stiff to very stiff fine sandy clayey extending to a depth of 32± feet. Boring No. B-1 encountered medium dense clayey fine sands and silty fine sands extending from 32± feet to the maximum depth explored of 50± feet. Native colluvium was encountered at the ground surface at Boring Nos. B-3 through B-5. The colluvium consists of medium dense silty fine sands and stiff fine sandy clays extending to depths of 2½ to 3½± feet. Bedrock of the Santiago Formation was encountered at the ground surface to beneath the colluvium at Borings Nos. B-2 through B-5. The bedrock consists of interbedded medium dense to very dense silty fine-grained sandstone and fine-grained sandy siltstone with very stiff to hard clayey siltstone. The bedrock was weakly cemented and friable with iron oxide staining throughout.

Groundwater

Groundwater was encountered during drilling at Boring No. B-1 at a depth of 43± feet. However, the boring caved to a depth of 37½± feet. Based on the depth of the water encountered during drilling, the moisture contents of the recovered soil samples, and the caving

conditions, the depth to the static groundwater table is considered to have existed at a depth of approximately 43± feet below existing site grades, at the time of the subsurface investigation.

SCG reviewed water level data obtained from the California Department of Water Resources website, http://www.water.ca.gov/waterdatalibrary/, and the California State Water Resources Control Board (SWRCB) Geotracker website https://geotracker.waterboards.ca.gov/. However, the nearest monitoring wells on record are located approximately 1.7 to 5.5± miles away from the site. Therefore, this groundwater data would not represent the groundwater at the subject site and is considered irrelevant.

Subsurface Exploration

Scope of Exploration

The subsurface exploration conducted for the infiltration testing consisted of three (3) infiltration test borings, advanced to depths of 8± feet below the existing site grades. The infiltration borings were advanced using a truck-mounted drilling rig, equipped with 8-inch diameter hollow stem augers and were logged during drilling by a member of our staff. The approximate locations of the infiltration test borings (identified as I-1 through I-3) are indicated on the Infiltration Test Location Plan, enclosed as Plate 2 of this report.

Upon the completion of the infiltration borings, the bottom of each test boring was covered with 2± inches of clean ¾-inch gravel. A sufficient length of 3-inch-diameter perforated PVC casing was then placed into each test hole so that the PVC casing extended from the bottom of the test hole to the ground surface. Clean ¾-inch gravel was then installed in the annulus surrounding the PVC casing.

Geotechnical Conditions

Alluvium

Native alluvium was encountered at the ground surface of Infiltration Boring No. I-1, extending to at least the maximum explored depth of 8± feet. The near-surface alluvium consisted of stiff fine sandy clays with some silt, extending to a depth of 5¾± feet. At depths greater than 5¾± feet, the alluvial soils consist of stiff clayey fine to medium sands with trace iron oxide staining.

Colluvium

Colluvial soils were encountered during the drilling of Infiltration Boring No. I-3, extending to a depth of 5½± feet below the ground surface these materials consist of medium stiff fine sandy clays with some silt and mottling.

Bedrock

Bedrock of the Santiago Formation was encountered beneath the ground surface at Infiltration Boring No. I-2 and beneath the colluvium at Infiltration Boring No I-3. The bedrock consists of medium dense fine sandy siltstone interbedded with stiff clayey siltstone extending to at least the maximum explored depth of 8 feet. The bedrock is friable and weakly cemented.

Infiltration Testing

The infiltration testing was performed in general accordance with the County of San Diego, Low Impact Development Handbook – Stormwater Management Strategies – Appendix F dated July 2014.

Pre-soaking

The first phase of the infiltration testing consisted of pre-soaking all of the infiltration test holes one day prior to infiltration testing. The pre-soaking process consisted of filling each test boring with clear water so that the water level reaches a level of at least 5 times the hole's radius above the gravel at the bottom of the holes. Pre-soaking was considered complete after all of the water had percolated through each test hole or after 15 hours since initiating the pre-soak.

Infiltration Testing

SCG performed the infiltration testing the day following the pre-soaking process. Each test hole was filled with water to a depth of at least 5 times the hole's radius above the gravel at the bottom of each test hole. Readings were taken at 30-minute intervals for a total of 6 hours at each of the test locations. The water level readings are presented on the spreadsheets enclosed with this report. The infiltration rates for each of the timed intervals are also tabulated on the spreadsheets.

The infiltration rates from the test are tabulated in inches per hour. In accordance with the typically accepted practice, it is recommended that the most conservative reading from the latter part of the infiltration tests be used as the design infiltration rate. The rates are summarized below:

Infiltration Test No.	Depth (feet)	Soil Description	Infiltration Rate (inches/hour)
I-1	8.0	Gray Brown Clayey fine to medium Sand	0.0
I-2	8.0	Light Gray Silty fine to medium grained Sandstone	0.0
I-3	8.0	Light Gray to Gray fine-grained Siltstone, trace medium Sand	0.0

Laboratory Testing

Moisture Content

The moisture contents for the recovered soil samples were determined in accordance with ASTM D-2216 and are expressed as a percentage of the dry weight. These test results are presented on the Boring Logs.

Grain Size Analysis

The grain size distribution of selected soils collected from the base of each infiltration test

boring have been determined using a range of wire mesh screens. These tests were performed in general accordance with ASTM D-422 and/or ASTM D-1140. The weight of the portion of the sample retained on each screen is recorded and the percentage finer or coarser of the total weight is calculated. The results of these tests are presented on Plates C-1 through C-3 of this report.

Design Recommendations

Three (3) infiltration tests were performed at the subject site. As noted above, the infiltration rates at these locations was 0.0 inches per hour. The major factors affecting the lack infiltration at these borings is the presence of bedrock and clays as well as very moist soils at the test depths. **Based on the lack of infiltration at the depths tested, infiltration is not considered feasible for this site.**

Although infiltration is not considered feasible at this site, the client may desire to use storm water disposal systems that do not rely on infiltration at this site. The design of storm water disposal systems should be performed by the project civil engineer, in accordance with the City of Carlsbad and/or County of San Diego guidelines. It is recommended any such systems be designed and constructed to facilitate removal of silt and clay, or other deleterious materials from any water that may enter the system. The presence of such materials would decrease the flow rates through the system.

Location of Storm Water Disposal Systems

Although no significant infiltration occurred at the test locations, the use of on-site storm water disposal systems which may introduce stormwater into the near surface soils carries a risk of creating adverse geotechnical conditions. Increasing the moisture content of the soil can cause the soil to lose internal shear strength and increase its compressibility, resulting in a change in the designed engineering properties. Overlying structures and pavements in areas where water is introduced into the on-site soils could potentially be damaged due to saturation of subgrade soils. Systems that introduce water into the near surface soils at this site should be located at least 25 feet away from any structures, including retaining walls. Even with this provision of locating the infiltration systems at least 25 feet from the buildings, it is possible that infiltrating water into the subsurface soils could have an adverse effect on the proposed or existing structures. It should also be noted that utility trenches which happen to collect storm water can also serve as conduits to transmit storm water toward the structure, depending on the slope of the utility trench. Therefore, consideration should also be given to the proposed locations of underground utilities which may pass near the proposed infiltration systems.

General Comments

This report has been prepared as an instrument of service for use by the client in order to aid in the evaluation of this property and to assist the architects and engineers in the design and preparation of the project plans and specifications. This report may be provided to the contractor(s) and other design consultants to disclose information relative to the project. However, this report is not intended to be utilized as a specification in and of itself, without appropriate interpretation by the project architect, structural engineer, and/or civil engineer. The design of the proposed storm water infiltration system is the responsibility of the civil engineer. The role of the geotechnical engineer is limited to determination of infiltration rate

only. By using the design infiltration rate contained herein, the civil engineer agrees to indemnify, defend, and hold harmless the geotechnical engineer for all aspects of the design and performance of the proposed storm water infiltration system. The reproduction and distribution of this report must be authorized by the client and Southern California Geotechnical, Inc. Furthermore, any reliance on this report by an unauthorized third party is at such party's sole risk, and we accept no responsibility for damage or loss which may occur. The analysis of this site was based on a subsurface profile interpolated from limited discrete soil samples. While the materials encountered in the project area are considered to be representative of the total area, some variations should be expected between boring locations and testing depths. If the conditions encountered during construction vary significantly from those detailed herein, we should be contacted immediately to determine if the conditions alter the recommendations contained herein.

This report has been based on assumed or provided characteristics of the proposed development. It is recommended that the owner, client, architect, structural engineer, and civil engineer carefully review these assumptions to ensure that they are consistent with the characteristics of the proposed development. If discrepancies exist, they should be brought to our attention to verify that they do not affect the conclusions and recommendations contained herein. We also recommend that the project plans and specifications be submitted to our office for review to verify that our recommendations have been correctly interpreted. The analysis, conclusions, and recommendations contained within this report have been promulgated in accordance with generally accepted professional geotechnical engineering practice. No other warranty is implied or expressed.

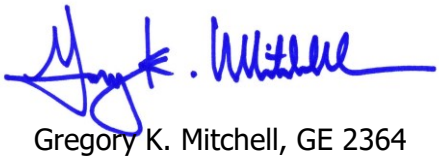
Closure

We sincerely appreciate the opportunity to be of service on this project. We look forward to providing additional consulting services during the course of the project. If we may be of further assistance in any manner, please contact our office.

Respectfully Submitted,

SOUTHERN CALIFORNIA GEOTECHNICAL, INC.

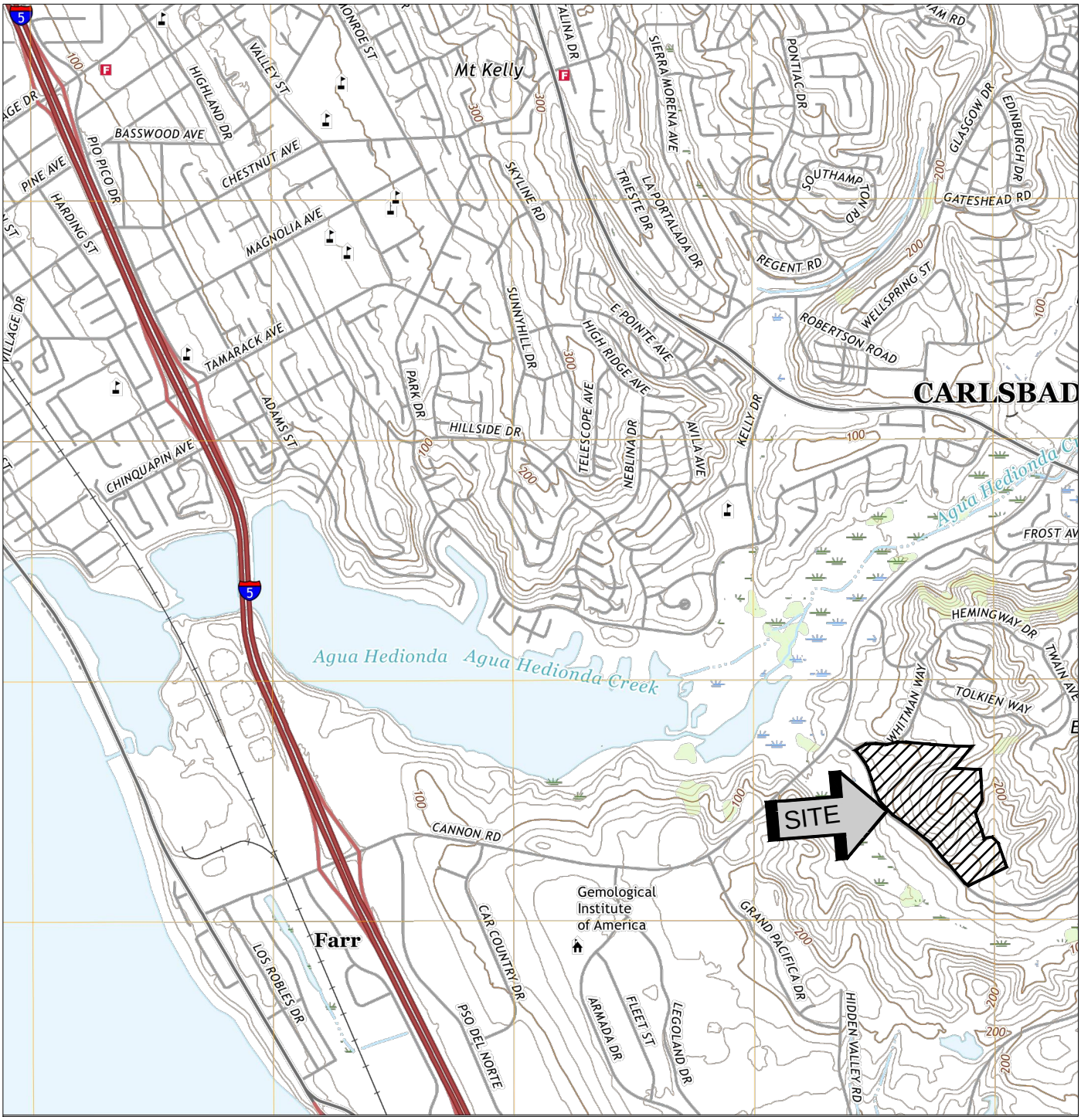
Ryan Bremer
Staff Geologist



Gregory K. Mitchell, GE 2364
Principal Engineer

Distribution: (1) Addressee

Enclosures: Plate 1 - Site Location Map
Plate 2 - Infiltration Test Location Plan
Boring Log Legend and Logs (5 pages)
Infiltration Test Results Spreadsheets (3 pages)
Grain Size Distribution Graphs (3 pages)



SOURCE: USGS TOPOGRAPHIC MAP OF THE SAN LUIS REY QUADRANGLE, SAN DIEGO COUNTY, CALIFORNIA, 2018

SITE LOCATION MAP

VETERANS MEMORIAL PARK

CARLSBAD, CALIFORNIA

SCALE: 1" = 2000'	
DRAWN: RB CHKD: RGT	
SCG PROJECT 19G109-3	
PLATE 1	

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WHITMAN WAY

FARADAY AVENUE

PROPOSED BOCCE BALL COURT

PROPOSED PAVILION, RESTROOM, AND CATERING SUPPORT ROOM

PROPOSED PLAYGROUND

PROPOSED PLAYGROUND

PROPOSED PICNIC AREAS

PROPOSED VETERANS MEMORIAL

PROPOSED RESTROOM

PROPOSED BIKE PARK TUNNEL

B-1

I-1

B-2

B-3

B-4

I-3

I-2

B-5

NORTH

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GEOTECHNICAL LEGEND

- APPROXIMATE INFILTRATION TEST LOCATION
- APPROXIMATE BORING LOCATON (SCG PROJECT NO. 19G109-2)
- WATER QUALITY TREATMENT AREAS

NOTE: BASE MAP PREPARED BY CLIENT

INFILTRATION TEST LOCATION PLAN

VETERANS MEMORIAL PARK

CARLSBAD, CALIFORNIA

SCALE: 1" = 200'

DRAWN: DRK
CHKD: GKM

SCG PROJECT 19G109-3

PLATE 2

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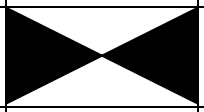
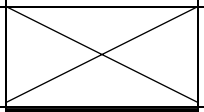
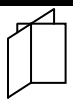
SOUTHERN CALIFORNIA GEOTECHNICAL

BORING LOG LEGEND

SAMPLE TYPE	GRAPHICAL SYMBOL	SAMPLE DESCRIPTION
AUGER		SAMPLE COLLECTED FROM AUGER CUTTINGS, NO FIELD MEASUREMENT OF SOIL STRENGTH. (DISTURBED)
CORE		ROCK CORE SAMPLE: TYPICALLY TAKEN WITH A DIAMOND-TIPPED CORE BARREL. TYPICALLY USED ONLY IN HIGHLY CONSOLIDATED BEDROCK.
GRAB		SOIL SAMPLE TAKEN WITH NO SPECIALIZED EQUIPMENT, SUCH AS FROM A STOCKPILE OR THE GROUND SURFACE. (DISTURBED)
CS		CALIFORNIA SAMPLER: 2-1/2 INCH I.D. SPLIT BARREL SAMPLER, LINED WITH 1-INCH HIGH BRASS RINGS. DRIVEN WITH SPT HAMMER. (RELATIVELY UNDISTURBED)
NSR		NO RECOVERY: THE SAMPLING ATTEMPT DID NOT RESULT IN RECOVERY OF ANY SIGNIFICANT SOIL OR ROCK MATERIAL.
SPT		STANDARD PENETRATION TEST: SAMPLER IS A 1.4 INCH INSIDE DIAMETER SPLIT BARREL, DRIVEN 18 INCHES WITH THE SPT HAMMER. (DISTURBED)
SH		SHELBY TUBE: TAKEN WITH A THIN WALL SAMPLE TUBE, PUSHED INTO THE SOIL AND THEN EXTRACTED. (UNDISTURBED)
VANE		VANE SHEAR TEST: SOIL STRENGTH OBTAINED USING A 4 BLADED SHEAR DEVICE. TYPICALLY USED IN SOFT CLAYS-NO SAMPLE RECOVERED.

COLUMN DESCRIPTIONS

DEPTH: Distance in feet below the ground surface.

SAMPLE: Sample Type as depicted above.

BLOW COUNT: Number of blows required to advance the sampler 12 inches using a 140 lb hammer with a 30-inch drop. 50/3" indicates penetration refusal (>50 blows) at 3 inches. WH indicates that the weight of the hammer was sufficient to push the sampler 6 inches or more.

POCKET PEN.: Approximate shear strength of a cohesive soil sample as measured by pocket penetrometer.

GRAPHIC LOG: Graphic Soil Symbol as depicted on the following page.

DRY DENSITY: Dry density of an undisturbed or relatively undisturbed sample in lbs/ft^3.

MOISTURE CONTENT: Moisture content of a soil sample, expressed as a percentage of the dry weight.

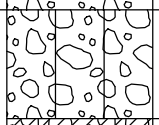
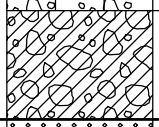
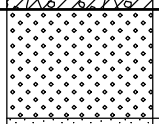
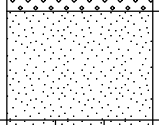
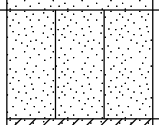
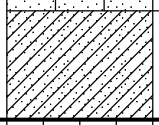
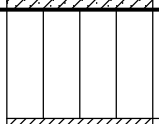
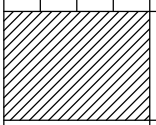
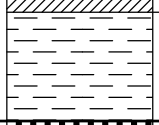
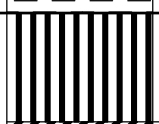
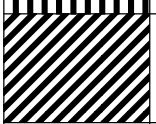
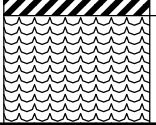
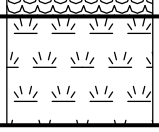
LIQUID LIMIT: The moisture content above which a soil behaves as a liquid.

PLASTIC LIMIT: The moisture content above which a soil behaves as a plastic.

PASSING #200 SIEVE: The percentage of the sample finer than the #200 standard sieve.

UNCONFINED SHEAR: The shear strength of a cohesive soil sample, as measured in the unconfined state.

SOIL CLASSIFICATION CHART

MAJOR DIVISIONS			SYMBOLS		TYPICAL DESCRIPTIONS
			GRAPH	LETTER	
COARSE GRAINED SOILS MORE THAN 50% OF MATERIAL IS LARGER THAN NO. 200 SIEVE SIZE	GRAVEL AND GRAVELLY SOILS MORE THAN 50% OF COARSE FRACTION RETAINED ON NO. 4 SIEVE	CLEAN GRAVELS (LITTLE OR NO FINES)		GW	WELL-GRADED GRAVELS, GRAVEL - SAND MIXTURES, LITTLE OR NO FINES
				GP	POORLY-GRADED GRAVELS, GRAVEL - SAND MIXTURES, LITTLE OR NO FINES
		GRAVELS WITH FINES (APPRECIABLE AMOUNT OF FINES)		GM	SILTY GRAVELS, GRAVEL - SAND - SILT MIXTURES
				GC	CLAYEY GRAVELS, GRAVEL - SAND - CLAY MIXTURES
	SAND AND SANDY SOILS MORE THAN 50% OF COARSE FRACTION PASSING ON NO. 4 SIEVE	CLEAN SANDS (LITTLE OR NO FINES)		SW	WELL-GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES
				SP	POORLY-GRADED SANDS, GRAVELLY SAND, LITTLE OR NO FINES
		SANDS WITH FINES (APPRECIABLE AMOUNT OF FINES)		SM	SILTY SANDS, SAND - SILT MIXTURES
				SC	CLAYEY SANDS, SAND - CLAY MIXTURES
FINE GRAINED SOILS MORE THAN 50% OF MATERIAL IS SMALLER THAN NO. 200 SIEVE SIZE	SILTS AND CLAYS	LIQUID LIMIT LESS THAN 50		ML	INORGANIC SILTS AND VERY FINE SANDS, ROCK FLOUR, SILTY OR CLAYEY FINE SANDS OR CLAYEY SILTS WITH SLIGHT PLASTICITY
				CL	INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS, LEAN CLAYS
				OL	ORGANIC SILTS AND ORGANIC SILTY CLAYS OF LOW PLASTICITY
	SILTS AND CLAYS	LIQUID LIMIT GREATER THAN 50		MH	INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS FINE SAND OR SILTY SOILS
				CH	INORGANIC CLAYS OF HIGH PLASTICITY
				OH	ORGANIC CLAYS OF MEDIUM TO HIGH PLASTICITY, ORGANIC SILTS
HIGHLY ORGANIC SOILS				PT	PEAT, HUMUS, SWAMP SOILS WITH HIGH ORGANIC CONTENTS

NOTE: DUAL SYMBOLS ARE USED TO INDICATE BORDERLINE SOIL CLASSIFICATIONS

SOUTHERN CALIFORNIA GEOTECHNICAL
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BORING NO. I-1

JOB NO.: 19G109-3
PROJECT: Veterans Park
LOCATION: Carlsbad, California

DRILLING DATE: 7/16/20
DRILLING METHOD: Hollow Stem Auger
LOGGED BY: Daryl Kas

WATER DEPTH: Dry
CAVE DEPTH: ---
READING TAKEN: At Completion

FIELD RESULTS						LABORATORY RESULTS						
DEPTH (FEET)	SAMPLE	BLOW COUNT	POCKET PEN. (TSF)	GRAPHIC LOG	DESCRIPTION SURFACE ELEVATION: MSL	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	LIQUID LIMIT	PLASTIC LIMIT	PASSING #200 SIEVE (%)	ORGANIC CONTENT (%)	COMMENTS
					ALLUVIUM: Dark Gray fine Sandy Clay, some Silt, stiff-very moist							
		14					18					
5												
					Gray Brown Clayey fine to medium Sand, trace Iron oxide staining, stiff-very moist							
		18					22					
					Boring Terminated at 8'							

TBL 19G109-3.GPJ SOCALGEO.GDT 8/7/20

TEST BORING LOG

PLATE B-1

SOUTHERN CALIFORNIA GEOTECHNICAL
A California Corporation

BORING NO. I-2

JOB NO.: 19G109-3
PROJECT: Veterans Park
LOCATION: Carlsbad, California

DRILLING DATE: 7/16/20
DRILLING METHOD: Hollow Stem Auger
LOGGED BY: Daryl Kas

WATER DEPTH: Dry
CAVE DEPTH: ---
READING TAKEN: At Completion

FIELD RESULTS						LABORATORY RESULTS						
DEPTH (FEET)	SAMPLE	BLOW COUNT	POCKET PEN. (TSF)	GRAPHIC LOG	DESCRIPTION SURFACE ELEVATION: MSL	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	LIQUID LIMIT	PLASTIC LIMIT	PASSING #200 SIEVE (%)	ORGANIC CONTENT (%)	COMMENTS
					SANTIAGO FORMATION (Tsa): Light Gray to Gray Clayey Siltstone interbedded with fine Sandy Siltstone, weakly-cemented, friable, stiff to medium dense-moist to very moist							
		19					13					
5												
		23			Light Gray Silty fine to medium-grained Sandstone, weakly-cemented, friable, medium dense-very moist to wet		21					
					Boring Terminated at 8'							

TBL 19G109-3.GPJ SOCALGEO.GDT 8/7/20

TEST BORING LOG

PLATE B-2

SOUTHERN CALIFORNIA GEOTECHNICAL
A California Corporation

BORING NO. I-3

JOB NO.: 19G109-3
PROJECT: Veterans Park
LOCATION: Carlsbad, California

DRILLING DATE: 7/16/20
DRILLING METHOD: Hollow Stem Auger
LOGGED BY: Daryl Kas

WATER DEPTH: Dry
CAVE DEPTH: ---
READING TAKEN: At Completion

FIELD RESULTS						LABORATORY RESULTS						
DEPTH (FEET)	SAMPLE	BLOW COUNT	POCKET PEN. (TSF)	GRAPHIC LOG	DESCRIPTION SURFACE ELEVATION: MSL	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	LIQUID LIMIT	PLASTIC LIMIT	PASSING #200 SIEVE (%)	ORGANIC CONTENT (%)	COMMENTS
					COLLUVIUM (Qc): Dark Gray fine Sandy Clay, some Silt, mottled, medium stiff-very moist							
		9					21					
5												
		28			SANTIAGO FORMATION (Tsa): Light Gray to Gray fine-grained Sandy Siltstone, trace medium sand, weakly-cemented, friable, Iron oxide staining, medium dense-very moist		18					
					Boring Terminated at 8'							

TBL 19G109-3.GPJ SOCALGEO.GDT 8/7/20

TEST BORING LOG

PLATE B-3

INFILTRATION CALCULATIONS

Project Name	Proposed Veterans Memorial Park
Project Location	Carlsbad, California
Project Number	19G109-3
Engineer	Ryan Bremer

Test Hole Radius	4	(in)
Test Depth	8.0	(ft)

Infiltration Test Hole: I-1

Interval Number		Time	Time Interval (min)	Water Depth (ft)	Change in Water Level (ft)	Average Head Height (ft)	Infiltration Rate Q (in/hr)	
1	Initial	9:18 AM	30.0	5.72	0.00	2.28	0.00	Infiltration Testing
	Final	9:48 AM		5.72				
2	Initial	9:48 AM	30.0	5.72	0.00	2.28	0.00	
	Final	10:18 AM		5.72				
3	Initial	10:18 AM	30.0	5.72	0.00	2.28	0.00	
	Final	10:48 AM		5.72				
4	Initial	10:48 AM	30.0	5.72	0.00	2.28	0.00	
	Final	11:18 AM		5.72				
5	Initial	11:18 AM	30.0	5.72	0.00	2.28	0.00	
	Final	11:48 AM		5.72				
6	Initial	11:48 AM	30.0	5.72	0.00	2.28	0.00	
	Final	12:18 PM		5.72				
7	Initial	12:18 PM	30.0	5.72	0.00	2.28	0.00	
	Final	12:48 PM		5.72				
8	Initial	12:48 PM	30.0	5.72	0.00	2.28	0.00	
	Final	1:18 PM		5.72				
9	Initial	1:18 PM	30.0	5.72	0.00	2.28	0.00	
	Final	1:48 PM		5.72				
10	Initial	1:48 PM	30.0	5.72	0.00	2.28	0.00	
	Final	2:18 PM		5.72				
11	Initial	2:18 PM	30.0	5.72	0.00	2.28	0.00	
	Final	2:48 PM		5.72				
12	Initial	2:48 PM	30.0	5.72	0.00	2.28	0.00	
	Final	3:18 PM		5.72				

Per County Standards, Infiltration Rate calculated as follows:

$$Q = \frac{\Delta H(60r)}{\Delta t(r + 2H_{avg})}$$

Where:
- Q = Infiltration Rate (in inches per hour)
- ΔH = Change in Height (Water Level) over the time interval
- r = Test Hole (Borehole) Radius
- Δt = Time Interval
- H_{avg} = Average Head Height over the time interval

INFILTRATION CALCULATIONS

Project Name	Proposed Veterans Memorial Park
Project Location	Carlsbad, California
Project Number	19G109-3
Engineer	Ryan Bremer

Test Hole Radius	4	(in)
Test Depth	8.0	(ft)

Infiltration Test Hole	I-2

Interval Number		Time	Time Interval (min)	Water Depth (ft)	Change in Water Level (ft)	Average Head Height (ft)	Infiltration Rate Q (in/hr)	
1	Initial	9:11 AM	30.0	5.51	0.00	2.49	0.00	Infiltration Testing
	Final	9:41 AM		5.51				
2	Initial	9:41 AM	30.0	5.51	0.01	2.49	0.02	
	Final	10:11 AM		5.52				
3	Initial	10:11 AM	30.0	5.52	0.02	2.47	0.03	
	Final	10:41 AM		5.54				
4	Initial	10:41 AM	30.0	5.54	0.01	2.46	0.02	
	Final	11:11 AM		5.55				
5	Initial	11:11 AM	30.0	5.55	0.00	2.45	0.00	
	Final	11:41 AM		5.55				
6	Initial	11:41 AM	30.0	5.55	0.00	2.45	0.00	
	Final	12:11 PM		5.55				
7	Initial	12:11 PM	30.0	5.55	0.01	2.45	0.02	
	Final	12:41 PM		5.56				
8	Initial	12:41 PM	30.0	5.56	0.00	2.44	0.00	
	Final	1:11 PM		5.56				
9	Initial	1:11 PM	30.0	5.56	0.01	2.44	0.02	
	Final	1:41 PM		5.57				
10	Initial	1:41 PM	30.0	5.57	0.00	2.43	0.00	
	Final	2:11 PM		5.57				
11	Initial	2:11 PM	30.0	5.57	0.01	2.43	0.02	
	Final	2:41 PM		5.58				
12	Initial	2:41 PM	30.0	5.58	0.00	2.42	0.00	
	Final	3:11 PM		5.58				

Per County Standards, Infiltration Rate calculated as follows:

$$Q = \frac{\Delta H(60r)}{\Delta t(r + 2H_{avg})}$$

Where: Q = Infiltration Rate (in inches per hour)
ΔH = Change in Height (Water Level) over the time interval
r = Test Hole (Borehole) Radius
Δt = Time Interval
H_{avg} = Average Head Height over the time interval

INFILTRATION CALCULATIONS

Project Name	Proposed Veterans Memorial Park
Project Location	Carlsbad, California
Project Number	19G109-3
Engineer	Ryan Bremer

Test Hole Radius	4	(in)
Test Depth	8.0	(ft)

Infiltration Test Hole	I-3

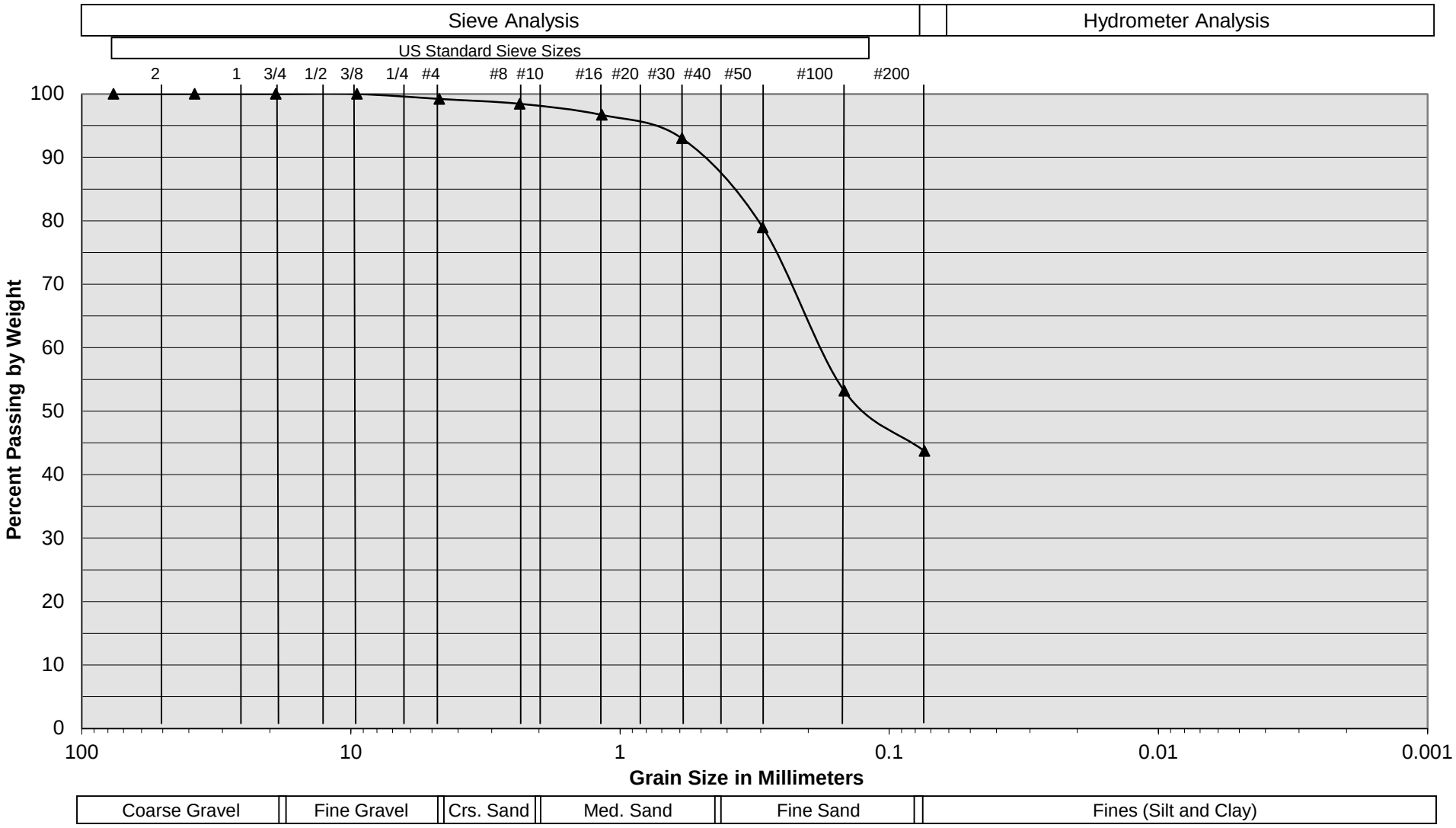
Interval Number		Time	Time Interval (min)	Water Depth (ft)	Change in Water Level (ft)	Average Head Height (ft)	Infiltration Rate Q (in/hr)	
1	Initial	9:25 AM	30.0	5.22	0.01	2.78	0.01	Infiltration Testing
	Final	9:55 AM		5.23				
2	Initial	9:55 AM	30.0	5.23	0.02	2.76	0.03	
	Final	10:25 AM		5.25				
3	Initial	10:25 AM	30.0	5.25	0.03	2.74	0.04	
	Final	10:55 AM		5.28				
4	Initial	10:55 AM	30.0	5.28	0.04	2.70	0.06	
	Final	11:25 AM		5.32				
5	Initial	11:25 AM	30.0	5.32	0.03	2.67	0.04	
	Final	11:55 AM		5.35				
6	Initial	11:55 AM	30.0	5.35	0.02	2.64	0.03	
	Final	12:25 PM		5.37				
7	Initial	12:25 PM	30.0	5.37	0.03	2.62	0.04	
	Final	12:55 PM		5.40				
8	Initial	12:55 PM	30.0	5.40	0.02	2.59	0.03	
	Final	1:25 PM		5.42				
9	Initial	1:25 PM	30.0	5.42	0.02	2.57	0.03	
	Final	1:55 PM		5.44				
10	Initial	1:55 PM	30.0	5.44	0.02	2.55	0.03	
	Final	2:25 PM		5.46				
11	Initial	2:25 PM	30.0	5.46	0.02	2.53	0.03	
	Final	2:55 PM		5.48				
12	Initial	2:55 PM	30.0	5.48	0.02	2.51	0.03	
	Final	3:25 PM		5.50				

Per County Standards, Infiltration Rate calculated as follows:

$$Q = \frac{\Delta H(60r)}{\Delta t(r + 2H_{avg})}$$

Where: Q = Infiltration Rate (in inches per hour)
ΔH = Change in Height (Water Level) over the time interval
r = Test Hole (Borehole) Radius
Δt = Time Interval
H_{avg} = Average Head Height over the time interval

Grain Size Distribution



Sample Description	I-1 @ 6½ to 8 feet
Soil Classification	Gray Brown Clayey fine to medium Sand

Veteran's Park
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PLATE C- 1

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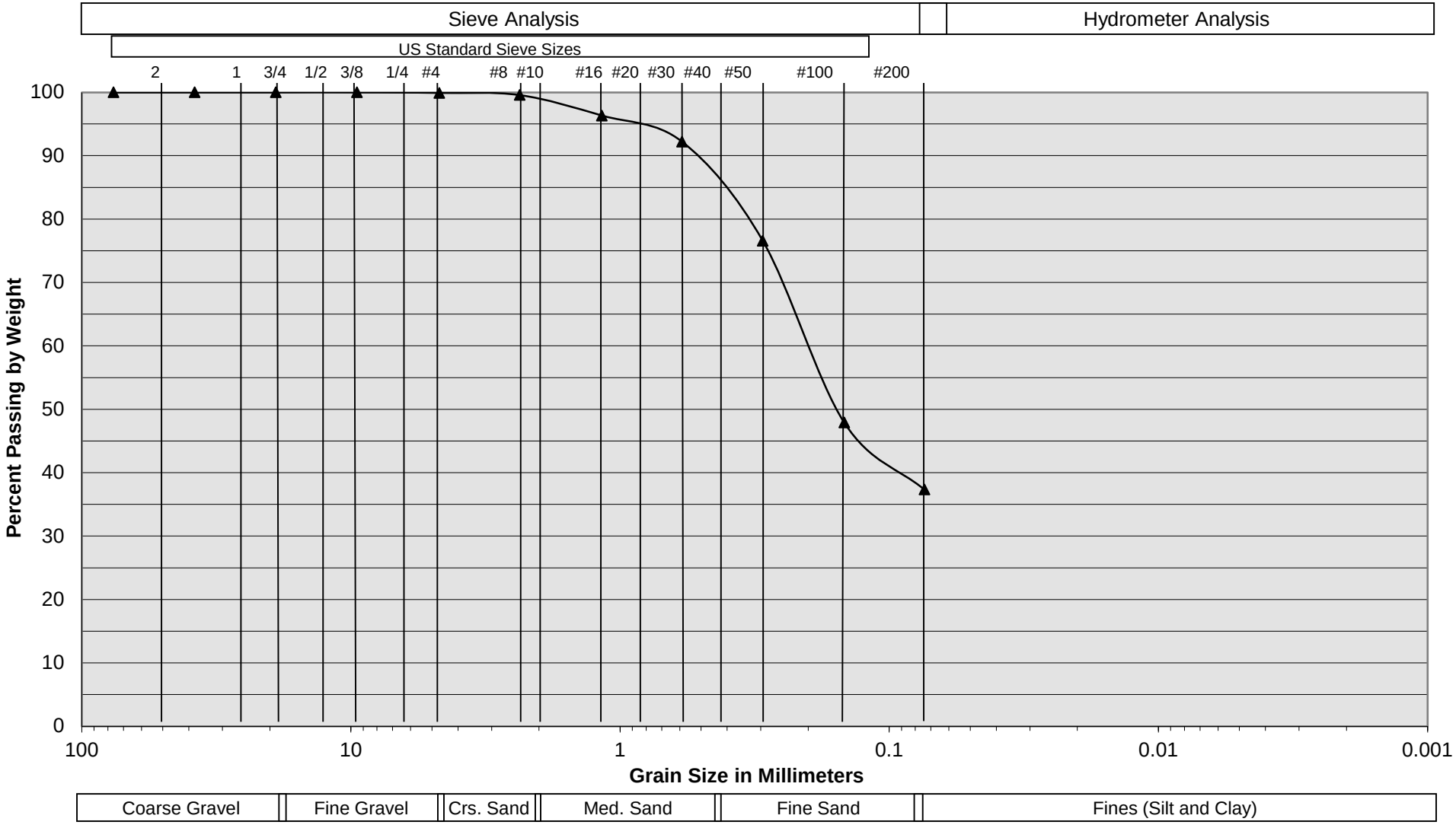
Grain Size Distribution



Sample Description	I-2 @ 6½ to 8 feet
Soil Classification	Light Gray Silty fine to medium grained Sandstone

Veteran's Park
Carlsbad, CA
Project No. 19G109-3
PLATE C- 2

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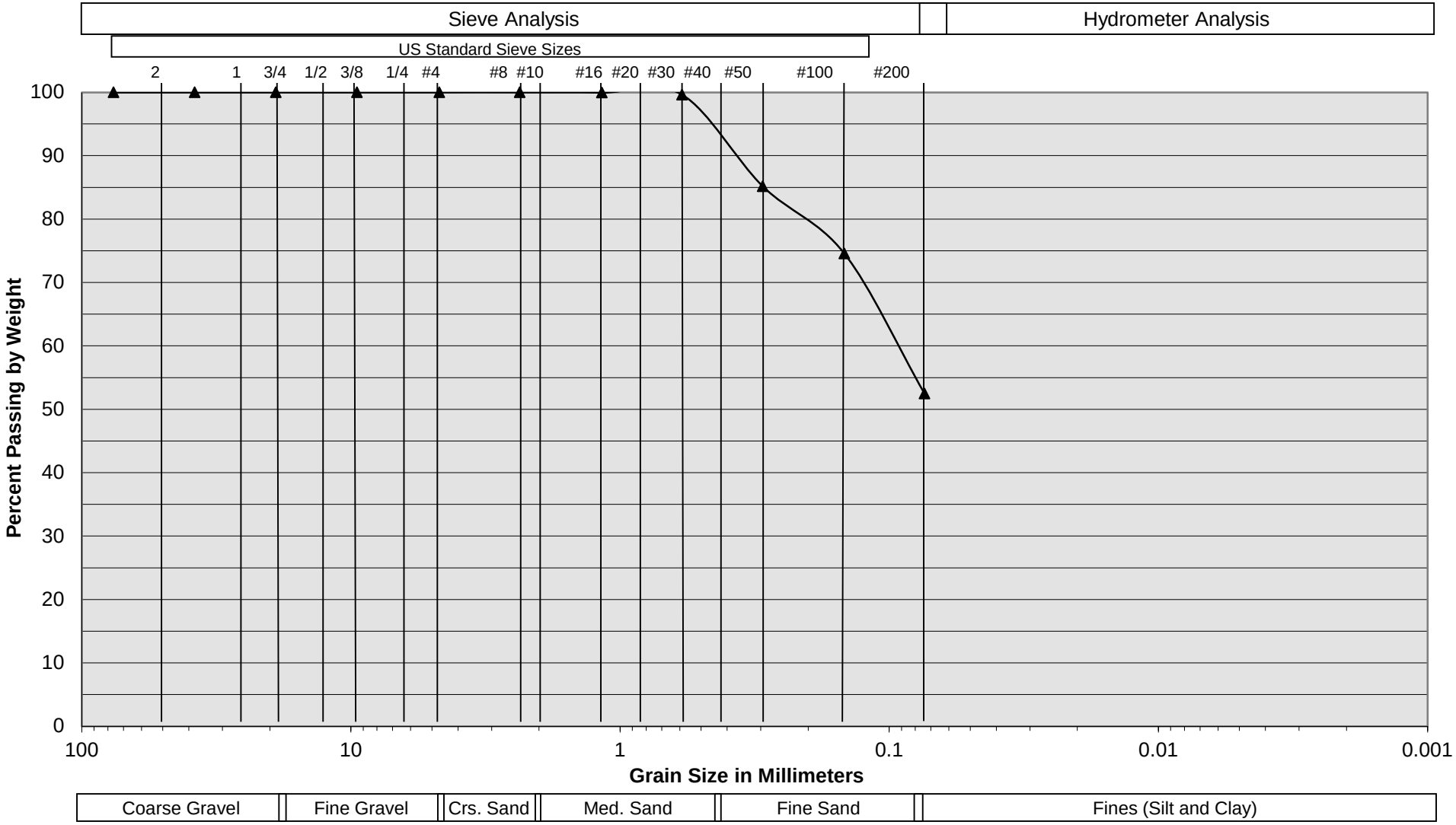
Grain Size Distribution



Sample Description	I-3 @ 6½ to 8 feet
Soil Classification	Light Gray to Gray fine grained Siltstone, trace medium Sand

Veteran's Park
Carlsbad, CA
Project No. 19G109-3
PLATE C- 3

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