Appendix F

Geotechnical Investigation, Proposed Warehouse – Results of Infiltration Testing

February 13, 2020

Hillwood
901 Via Piemonte, Suite 175
Ontario, California 91764

Attention: Mr. Josh Cox
Vice President, Development

Project No.: 20G101-2

Subject: Results of Infiltration Testing
Proposed Warehouse
East Side of Almond Avenue, South of Arrow Route
San Bernardino County (Fontana area), California

Reference: Geotechnical Investigation, Proposed Warehouse, East Side of Almond, South of Arrow Route, San Bernardino County (Fontana Area), California, prepared by Southern California Geotechnical, Inc. (SCG) for Hillwood, SCG Project No. 20G201-1.

Dear Mr. Cox:

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. 19P386, dated October 14, 2019. The scope of services included site reconnaissance, subsurface exploration, field and laboratory testing, and engineering analysis to determine the infiltration rates of the onsite soils. The infiltration testing was performed in general accordance with ASTM Test Method D-3385-03, Standard Test Method for Infiltration Rate of Soils in Field Using Double Ring Infiltrometer.

Site and Project Description

The subject site is located on the east side of Almond Avenue, 300± feet south of Arrow Route in an unincorporated portion of San Bernardino County near Fontana, California. The site is bounded to the north by a single-family residence and a vacant lot, to the west by Almond Avenue, to the south by a vacant lot and truck/trailer parking lot, and to the east by commercial/industrial buildings. The general location of the site is illustrated on the Site Location Map, included as Plate 1 of this report.

The site consists of two rectangular-shaped parcels which total 9.49± acres in size. The northern parcel is developed with a single-family residence in the northwestern corner of the lot. The single-family residence is assumed to be a single-story structure of wood frame and stucco construction supported on conventional shallow foundations with a concrete slab-on-grade floor.

Several large trees are located west of the residence. A berm is present in the southeast portion of this parcel and sloping toward the west at a gradient of 1± percent. The berm appears to be up to 3½± feet higher compared to the surrounding topography. Ground surface cover on the berm consists of poorly graded gravel. The remainder of the northern parcel consists of exposed soils and sparse to moderate native grass and weed growth. The southern parcel is vacant and undeveloped. Several stockpiles of gravel are present in the northeastern portion of the southern parcel. Ground surface cover consists of exposed soils, sparse to moderate native grass and weed growth, and limited areas of debris (trash, furniture, and wood pallets) along the southern and eastern property lines.

Detailed topographic information was not available at the time of this report. Based on visual observations made at the time of the subsurface investigation and from elevation data obtained from Google Earth, the overall site topography generally slopes downward to the southwest at a gradient of 1.5± percent, excluding the west sloping berm in the northern parcel.

Proposed Development

A conceptual site plan for the proposed development was provided to our office by the client. Based on this site plan (Scheme 8), prepared by HPA Architecture, the site will be developed with one new warehouse located in the north-central area of the site. The new building will be 186,167± ft² in size and will be constructed with dock-high doors along a portion of the south building wall. The building will be surrounded by asphaltic concrete pavements in the parking and drive lanes, Portland cement concrete pavements in the loading dock area, concrete flatwork and landscape planters throughout.

In addition, the proposed development will use on-site storm water infiltration. The infiltration system will likely consist of below-grade chambers located in the southeastern area of the site. Based on information provided by the civil engineer, Huitt-Zollars, Inc., the bottom of the infiltration system will be approximately 10 to 12 feet below existing site grades. We have been requested to perform infiltration testing within the proposed infiltration system.

We also understand this site will include on-site sewage disposal. The new septic system will likely include a new septic tank that connects to seepage pits. Percolation testing for the proposed seepage pits is discussed in a separate report.

Concurrent Studies

A geotechnical investigation, performed in conjunction with this infiltration study consisted of six (6) borings, Boring Nos. 1 through Boring No. 6, advanced to depths of 20 to 25± feet below the existing site grades. Additionally, two (2) trenches, T-1 and T-2, were excavated to depths of 5 to 12± feet below the existing site grades. Percolation testing was also conducted in conjunction with the geotechnical investigation which consisted of three (3) borings, drilled to depths of 35 to 75± feet below the existing site grades within the proposed seepage pit area. The results of the geotechnical investigation and the percolation testing are presented in separate reports.

Subsurface Exploration

Scope of Exploration

The subsurface exploration for the infiltration testing performed consisted of four (4) backhoe-excavated trenches, extending to depths of 10 to 12 feet below existing site grades. The trenches were logged during excavation by a member of our staff. The approximate locations of the infiltration trenches (identified as I-1, I-2, I-3, and I-4) are indicated on the Infiltration Test Location Plan, enclosed as Plate 2 of this report.

Geotechnical Conditions

Fill soils were encountered at the ground surface at all of the trench locations extending to depths of 3 to 4± feet below the existing site grades. At the trench locations, the fill soils generally consist of medium dense to dense silty fine to coarse sands with fine to coarse gravel, cobbles, and trace clay. At trench I-4, a clayey lens was observed within the artificial fill soils at depths of 2 to 4± feet. In general, the fill soils possess a disturbed appearance and some samples contain artificial debris, such as plastic and metal, resulting in their classification as artificial fill.

Native alluvium was encountered below the fill soils at all of the infiltration trench locations. The native alluvial soils generally consist of medium dense to dense fine to coarse sands with variable amounts of fine to coarse gravel, cobbles, and silt, extending to at least the maximum depth explored of 12± feet below the existing site grades. The Trench Logs, which illustrate the conditions encountered at the infiltration test locations, are included with this report.

Infiltration Testing

We understand that the results of the testing will be used to prepare a preliminary design for the storm water infiltration system that will be used at the subject site. As previously mentioned, the infiltration testing was performed in general accordance with ASTM Test Method D-3385-03, Standard Test Method for Infiltration Rate of Soils in Field Using Double Ring Infiltrometer.

Two stainless steel infiltration rings were used for the infiltration testing. The outer infiltration ring is 2 feet in diameter and 20 inches in height. The inner infiltration ring is 1 foot in diameter and 20 inches in height. At the test locations, the outer ring was driven 3± inches into the soil at the base of each trench. The inner ring was centered inside the outer ring and subsequently driven 3± inches into the soil at the base of the trench. These drive depths were adequate for the existing soil conditions and no water seepage was observed during testing. The rings were driven into the soil using a ten-pound sledge hammer.

Infiltration Testing Procedure

Infiltration testing was performed at four (4) trench locations, I-1, I-2, I-3, and I-4. The infiltration testing consisted of filling the inner ring and the annular space (the space between the inner and outer rings) with water, approximately 3 to 4 inches above the soil. To prevent the flow of water from one ring to the other, the water level in both the inner ring and the annular space between the rings was maintained at a constant head using float valves. The volume of water that was added to maintain a constant head in the inner ring and the annular space during each time

interval was determined and recorded. A cap was placed over the rings to minimize the evaporation of water during the tests.

The schedule for readings was determined based on the observed soil type at the base of each backhoe-excavated trench. Based on the observed infiltration rate at each test location, the volumetric measurements were made at increments of 1 to 5 minutes. The water volume measurements are presented on the spreadsheets enclosed with this report. The infiltration rates for each of the timed intervals are also tabulated on these spreadsheets.

The infiltration rates for the infiltration tests are calculated in centimeters per hour and then converted to inches per hour. The rates are summarized below:

Infiltration Test No.	Depth (feet)	Soil Description	Infiltration Rate (inches/hour)
I-1	10	Gravely fine to coarse Sand, some Cobbles	6.2
I-2	12	Fine to coarse Sand, some fine to coarse Gravel	12.1
I-3	12	Fine to coarse Sand, some fine to coarse Gravel, trace Silt	9.1
I-4	10	Fine to coarse Sand, some fine to coarse Gravel	7.0

Laboratory Testing

Moisture Content

The moisture contents for selected soil samples within the trenches 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 Trench Logs.

Grain Size Analysis

The grain size distribution of selected soils collected from the base of each infiltration test trench has 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 the grainsize analysis are presented on Plates C-1 through C-4 of this report.

Design Recommendations

Four (4) infiltration tests were performed at the subject site. As noted above, the calculated infiltration rates at the infiltration test locations range between 6.2 and 12.1 inches per hour. Based on the results of Infiltration Test Nos. I-1, I-2, I-3, and I-4, we recommend an

infiltration rate of 6.0 inches per hour be used for the design of the proposed infiltration system.

We recommend that a representative from the geotechnical engineer be on-site during the construction of the proposed infiltration system to identify the soil classification at the base of the infiltration basin. It should be confirmed that the soils at the base of the proposed infiltration system corresponds with those presented in this report to ensure that the performance of the system will be consistent with the rates reported herein.

The design of the proposed storm water infiltration system should be performed by the project civil engineer, in accordance with the County of San Bernardino guidelines. However, it is recommended that the systems be constructed so as 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 effective infiltration rates. It is recommended that the project civil engineer apply an appropriate factor of safety. The infiltration rate recommended above is based on the assumption that only clean water will be introduced to the subsurface profile. Any fines, debris, or organic materials could significantly impact the infiltration rate. It should be noted that the recommended infiltration rate is based on infiltration testing at four (4) discrete locations, and the overall infiltration rate of the storm water infiltration system could vary considerably.

Construction Considerations

The infiltration rates presented in this report are specific to the tested locations and tested depths. Infiltration rates can be significantly reduced if the soils are exposed to excessive disturbance or compaction during construction. Therefore, the subgrade soils within proposed infiltration system areas should not be over-excavated, undercut or compacted in any significant manner. It is recommended that a note to this effect be added to the project plans and/or specifications.

Infiltration versus Permeability

Infiltration rates are based on unsaturated flow. As water is introduced into soils by infiltration, the soils become saturated and the wetting front advances from the unsaturated zone to the saturated zone. Once the soils become saturated, infiltration rates become zero, and water can only move through soils by hydraulic conductivity at a rate determined by pressure head and soil permeability. The infiltration rates presented herein were determined in accordance with the ASTM Test Method D-3385-03 standard and are considered valid for the time and place of the actual test. Changes in soil moisture content will affect these infiltration rates. Infiltration rates should be expected to decrease until the soils become saturated. Soil permeability values will then govern groundwater movement. Permeability values may be on the order of 10 to 20 times less than infiltration rates. The system designer should incorporate adequate factors of safety and allow for overflow design into appropriate traditional storm drain systems, which would transport storm water off-site.

Location of Infiltration Systems

The use of on-site storm water infiltration systems 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 the infiltration areas could potentially be damaged due to saturation of subgrade soils. The proposed infiltration system for this site should be located at least 25 feet away from any structures, including retaining walls. Even with this provision of locating the infiltration system 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 system.

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 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 rates 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 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 trench 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,

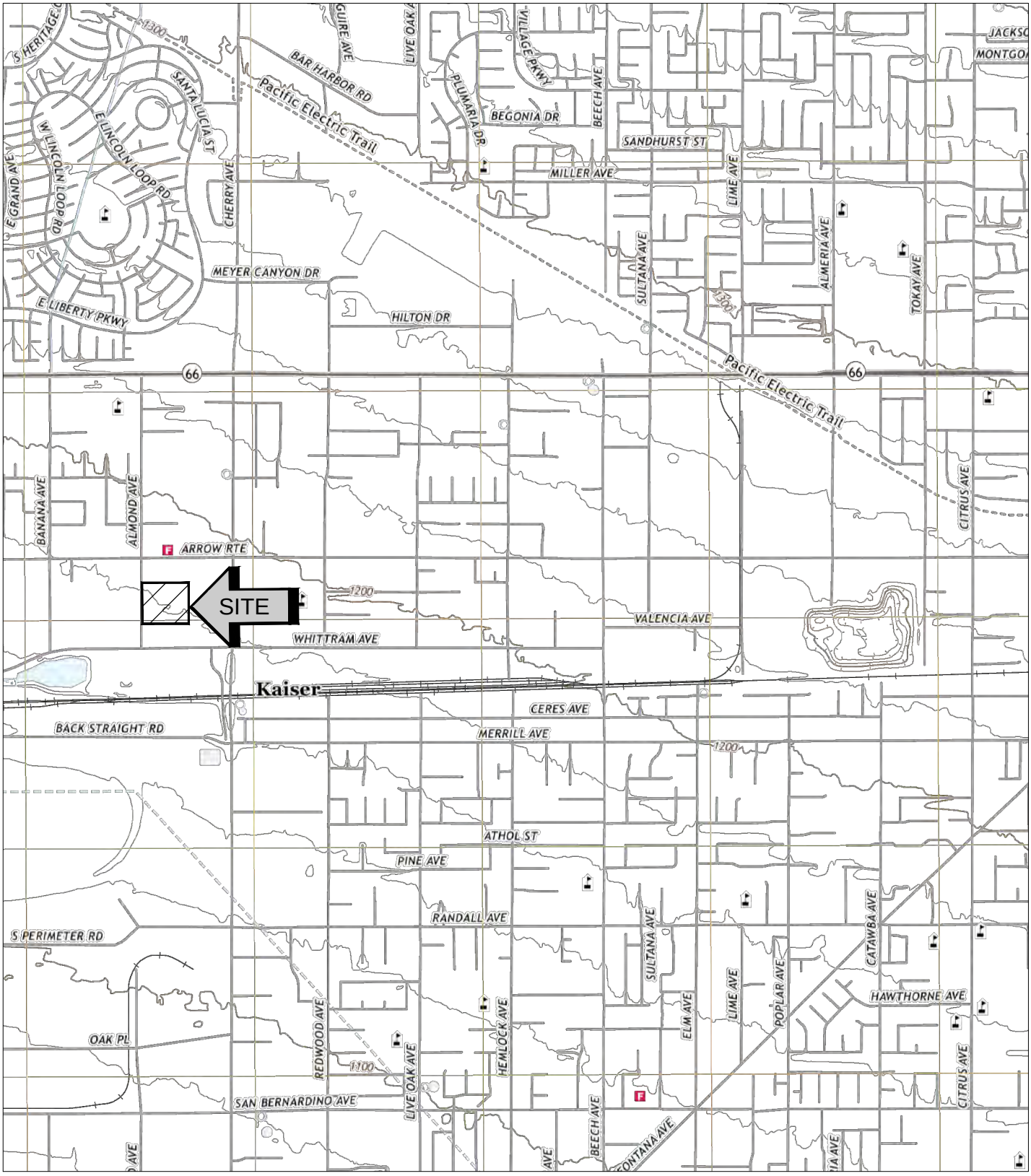
SOUTHERN CALIFORNIA GEOTECHNICAL, INC.

Jose A. Zuniga
Staff Engineer

Daniel Nielsen, RCE 77915
Senior Engineer

Distribution: (1) Addressee

Enclosures: Plate 1 - Site Location Map
Plate 2 - Infiltration Test Location Plan
Trench Logs (4 pages)
Infiltration Test Results Spreadsheets (4 pages)
Grain Size Distribution Graphs (4 pages)



SOURCE: USGS TOPOGRAPHIC MAP OF THE FONTANA QUADRANGLE, SAN BERNARDINO COUNTY, CALIFORNIA, 2018.

SITE LOCATION MAP

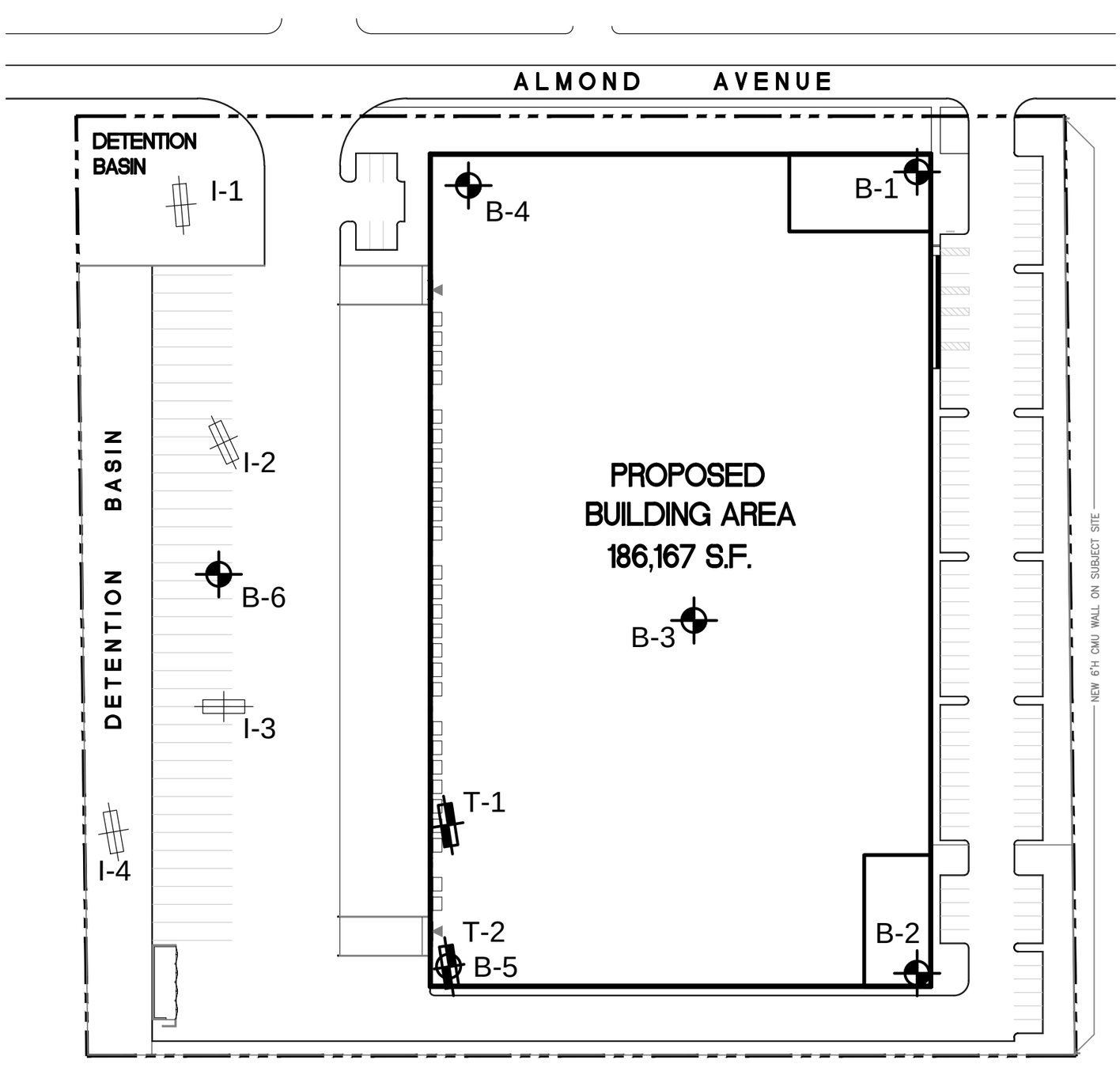
PROPOSED WAREHOUSE

SAN BERNARDINO COUNTY, CALIFORNIA

SCALE: 1" = 2000'	
DRAWN: JAH CHKD: RGT	
SCG PROJECT 20G101-2	
PLATE 1	

SoCalGeo

SOUTHERN CALIFORNIA GEOTECHNICAL



GEOTECHNICAL LEGEND

- APPROXIMATE INFILTRATION TEST LOCATION
- APPROXIMATE BORING LOCATION FROM CONCURRENT STUDY (SCG PROJECT NO. 20G101-1)
- APPROXIMATE TRENCH LOCATION FROM CONCURRENT STUDY (SCG PROJECT NO. 20G101-1)

NOTE: CONCEPTUAL SITE PLAN PREPARED BY HPA.

INFILTRATION TEST LOCATION PLAN	
PROPOSED WAREHOUSE	
SAN BERNARDINO COUNTY, CALIFORNIA	
SCALE: 1" = 80'	SOUTHERN CALIFORNIA GEOTECHNICAL
DRAWN: OS CHKD: RGT	
SCG PROJECT 20G101-2	
PLATE 2	

SOUTHERN CALIFORNIA GEOTECHNICAL

TRENCH NO. I-1

JOB NO.: 20G101-2

PROJECT: Proposed Warehouse

LOCATION: San Bernardino County, CA

DATE: 1-21-20

EQUIPMENT USED: Backhoe

LOGGED BY: Ryan Bremer

ORIENTATION: S 5 E

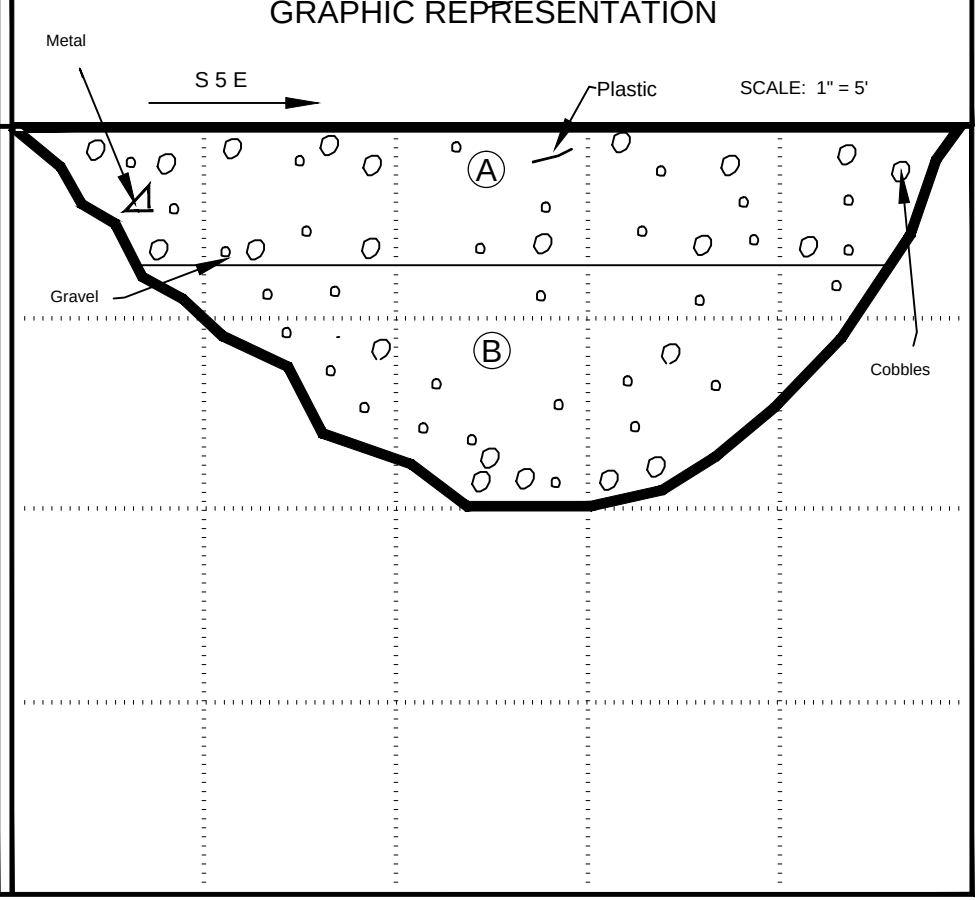
WATER DEPTH: Dry

SEEPAGE DEPTH: Dry

READINGS TAKEN: At Completion

DEPTH	SAMPLE	DRY DENSITY (PCF)	MOISTURE (%)	EARTH MATERIALS DESCRIPTION
				A: FILL: Dark Brown Silty fine Sand, trace Clay, trace medium Sand, some Cobbles, occasional fine to coarse Gravel, trace metal fragments and plastic, mottled, medium dense to dense-damp
5				B: ALLUVIUM: Gray Brown fine to coarse Sand, trace Silt, trace Clay, medium dense-damp
	b		2.0	@10 feet abundant fine to coarse Gravel, some Cobbles, dense-damp
10				Trench Terminated @ 10 feet
15				

GRAPHIC REPRESENTATION



KEY TO SAMPLE TYPES:
B - BULK SAMPLE (DISTURBED)
R - RING SAMPLE 2-1/2" DIAMETER (RELATIVELY UNDISTURBED)

TRENCH LOG

PLATE B-1

SOUTHERN CALIFORNIA GEOTECHNICAL

TRENCH NO. I-2

JOB NO.: 20G101-2

PROJECT: Proposed Warehouse

LOCATION: San Bernardino County, CA

DATE: 1/21/20

EQUIPMENT USED: Backhoe

LOGGED BY: Ryan Bremer

ORIENTATION: S 35 E

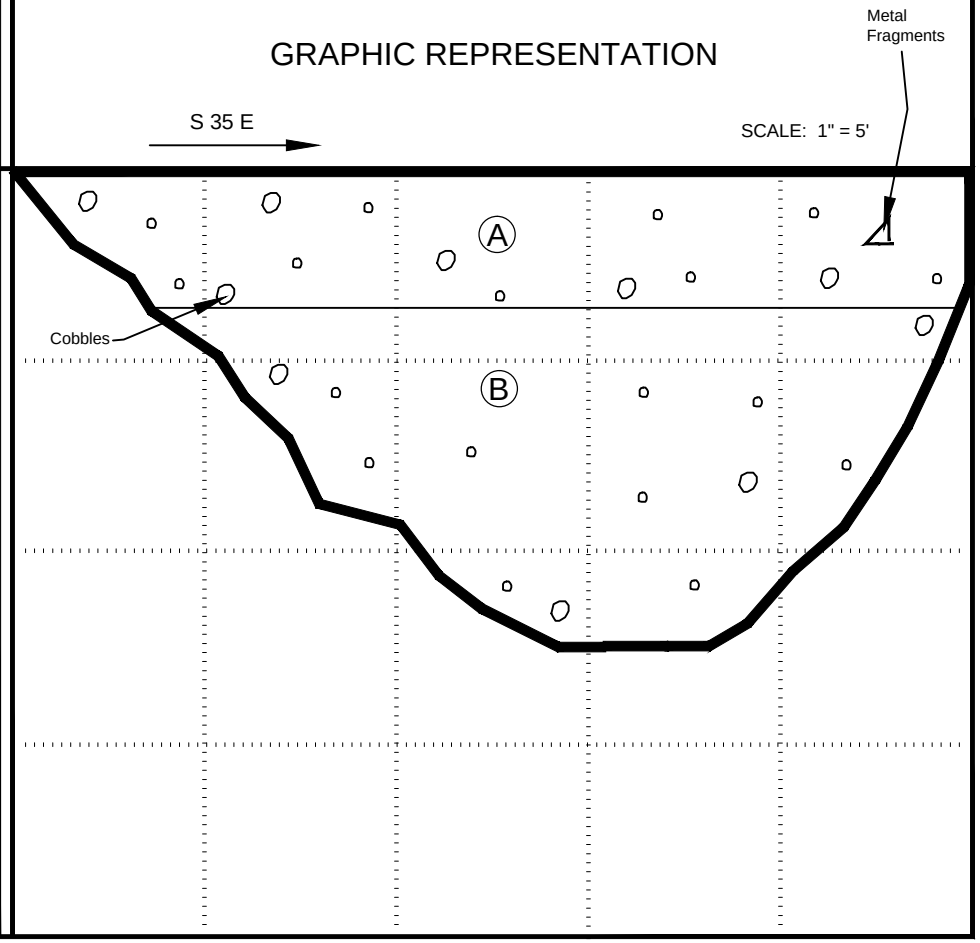
WATER DEPTH: Dry

SEEPAGE DEPTH: Dry

READINGS TAKEN: At Completion

DEPTH	SAMPLE	DRY DENSITY (PCF)	MOISTURE (%)	EARTH MATERIALS DESCRIPTION
				A: FILL: Dark Brown Silty fine to coarse Sand, trace Clay, some fine to coarse Gravel, some Cobbles, trace fine root fibers, trace metal fragments, mottled, medium dense to dense-damp
5				B: ALLUVIUM: Gray Brown fine to coarse Sand, some fine to coarse Gravel, trace Silt, occasional Cobbles, medium dense to dense-damp
10				@ 10 feet Light Gray
	b		4.0	
				Trench Terminated @ 12 feet
15				

GRAPHIC REPRESENTATION



KEY TO SAMPLE TYPES:
B - BULK SAMPLE (DISTURBED)
R - RING SAMPLE 2-1/2" DIAMETER (RELATIVELY UNDISTURBED)

TRENCH LOG

PLATE B-2

SOUTHERN CALIFORNIA GEOTECHNICAL

TRENCH NO. I-3

JOB NO.: 20G101-2

PROJECT: Proposed Warehouse

LOCATION: San Bernardino County, CA

DATE: 1-22-20

EQUIPMENT USED: Backhoe

LOGGED BY: Ryan Bremer

ORIENTATION: N 90 E

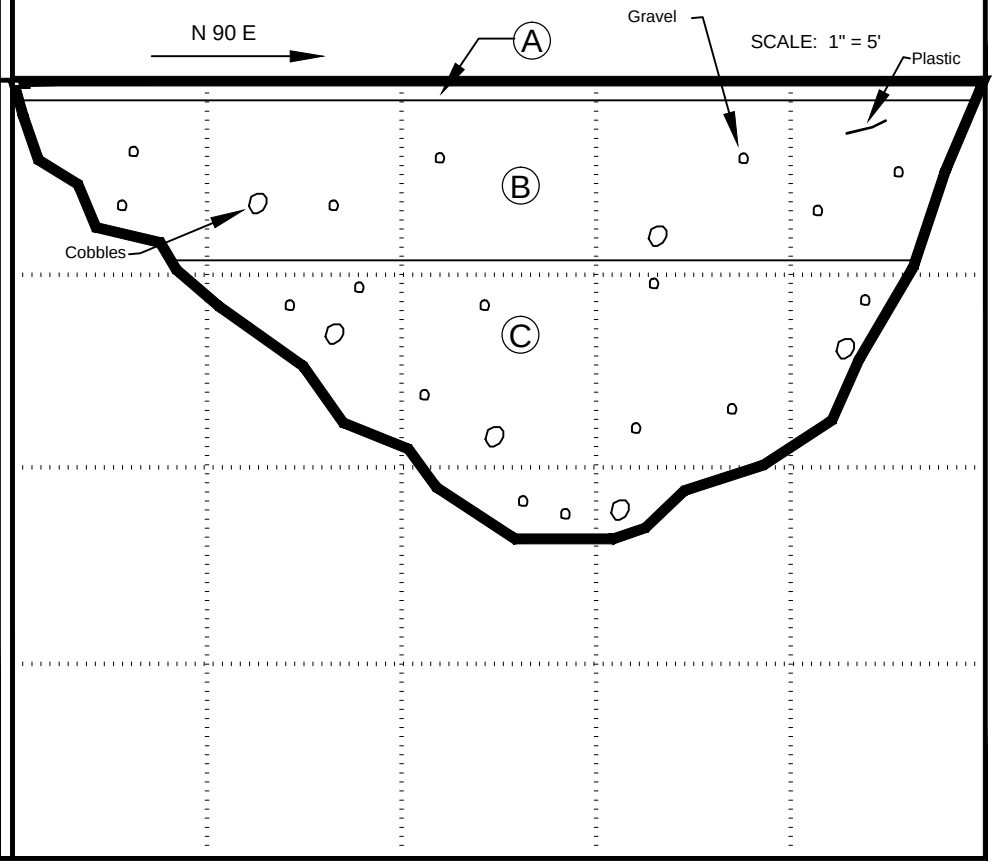
WATER DEPTH: Dry

SEEPAGE DEPTH: Dry

READINGS TAKEN: At Completion

DEPTH	SAMPLE	DRY DENSITY (PCF)	MOISTURE (%)	EARTH MATERIALS DESCRIPTION
5				A: SLAB: 6-inchs PCC B: FILL: Dark Gray Silty fine to coarse Sand, some fine to coarse Gravel, occasional Cobbles, trace plastic, medium dense to dense-damp C: ALLUVIUM: Light Gray fine to coarse Sand, some fine to coarse Gravel, occasional Cobbles, trace Silt, loose-damp
10	b		2.0	
15				Trench Terminated @ 12 feet

GRAPHIC REPRESENTATION



KEY TO SAMPLE TYPES:
B - BULK SAMPLE (DISTURBED)
R - RING SAMPLE 2-1/2" DIAMETER (RELATIVELY UNDISTURBED)

TRENCH LOG

PLATE B-3

SOUTHERN CALIFORNIA GEOTECHNICAL

TRENCH NO. I-4

JOB NO.: 20G101-2

PROJECT: Proposed Warehouse

LOCATION: San Bernardino County, CA

DATE: 1-22-20

EQUIPMENT USED: Backhoe

LOGGED BY: Ryan Bremer

ORIENTATION: N 10 W

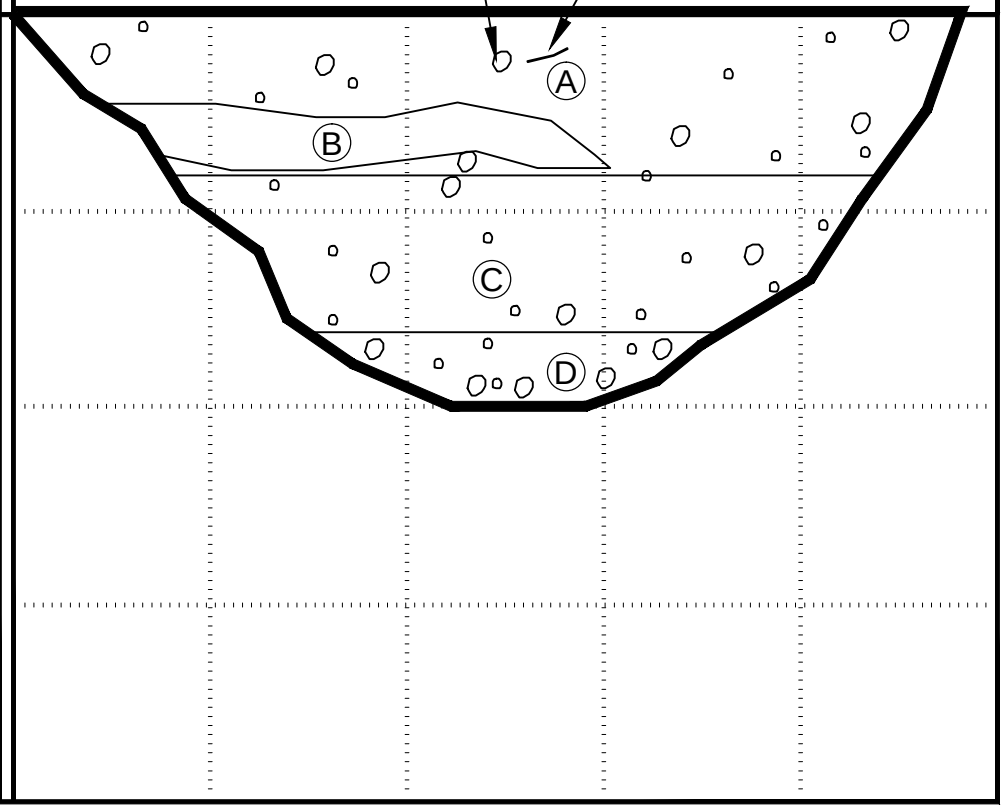
WATER DEPTH: Dry

SEEPAGE DEPTH: Dry

READINGS TAKEN: At Completion

DEPTH	SAMPLE	DRY DENSITY (PCF)	MOISTURE (%)	EARTH MATERIALS DESCRIPTION
				A: FILL: Light Gray Silty fine to coarse Sand, some fine to coarse Gravel, occasional Cobbles, trace Clay, trace plastic, loose-damp
				B: FILL: Dark Brown Silty fine Sand, trace Clay, loose-damp
5				C: ALLUVIUM: Light Gray fine to coarse Sand, some fine to coarse Gravel, little Cobble, trace Silt, loose-damp
				D: Light Gray fine to coarse Sand, some fine to coarse Gravel, some Cobbles, trace Silt, loose-moist
10	b		10.0	Trench Terminated @ 10 feet
15				

GRAPHIC REPRESENTATION

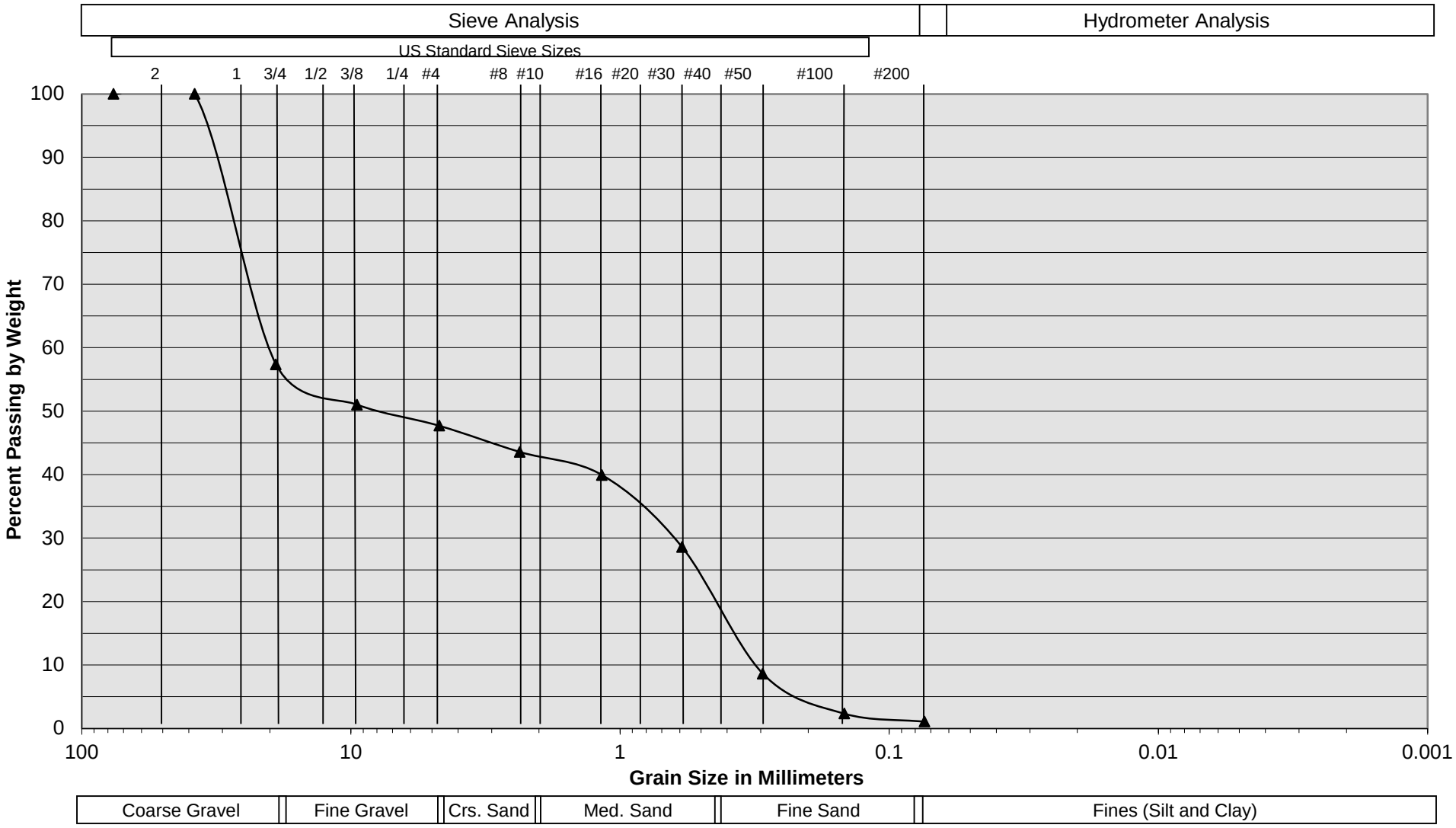


KEY TO SAMPLE TYPES:
B - BULK SAMPLE (DISTURBED)
R - RING SAMPLE 2-1/2" DIAMETER (RELATIVELY UNDISTURBED)

TRENCH LOG

PLATE B-4

Grain Size Distribution



Sample Description	I-1 @10'
Soil Classification	ALLUVIUM: Gray Brown Gravelly fine to coarse Sand

Proposed Warehouse
San Bernardino County, CA
Project No. 20G101-2
PLATE C- 1

SoCalGeo
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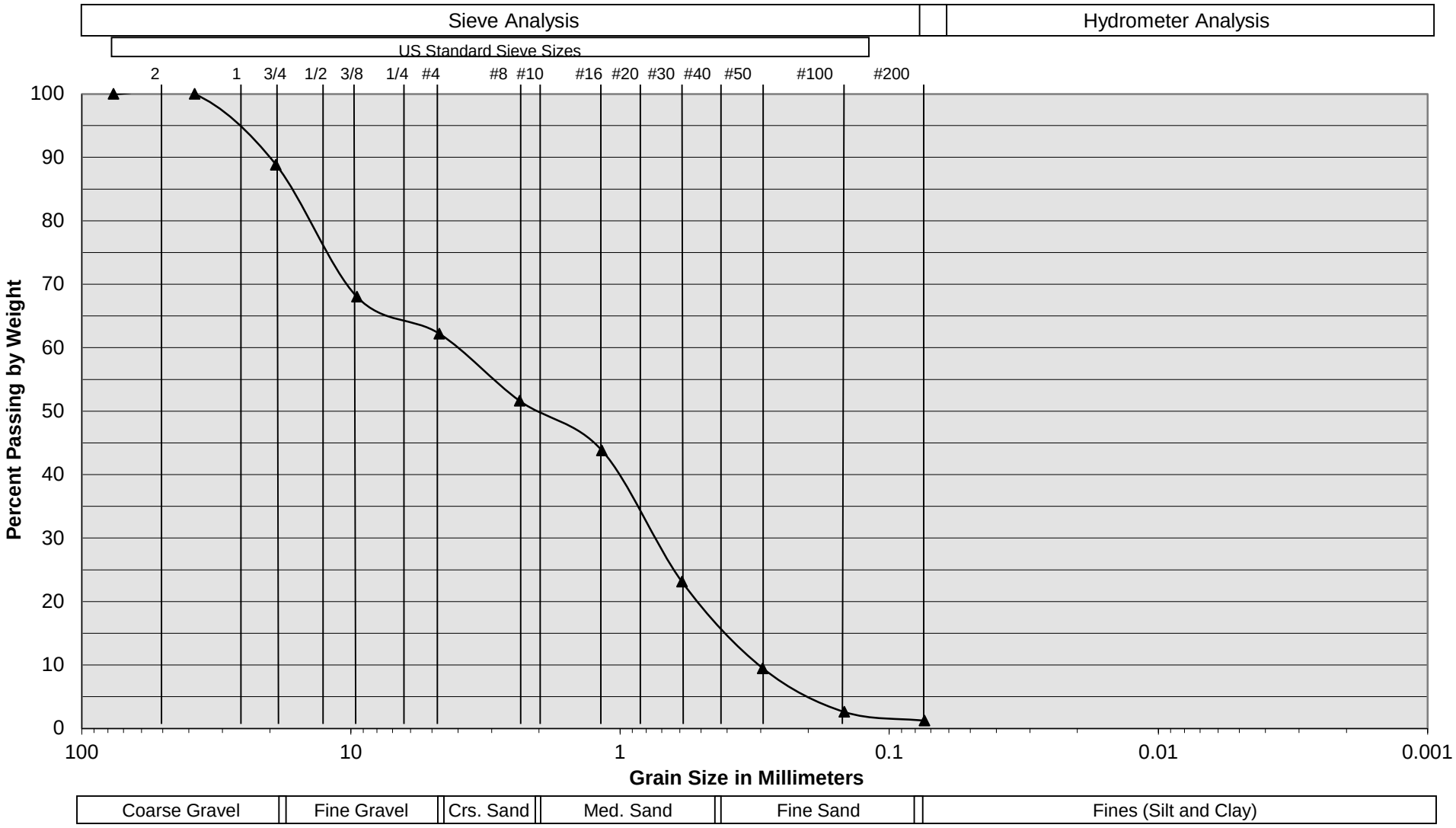
A California Corporation

Grain Size Distribution



Sample Description	I-1 @12'
Soil Classification	ALLUVIUM: Light Gray fine to coarse Sand, some fine to coarse Gravel

Proposed Warehouse
San Bernardino County, CA
Project No. 20G101-2
PLATE C- 2

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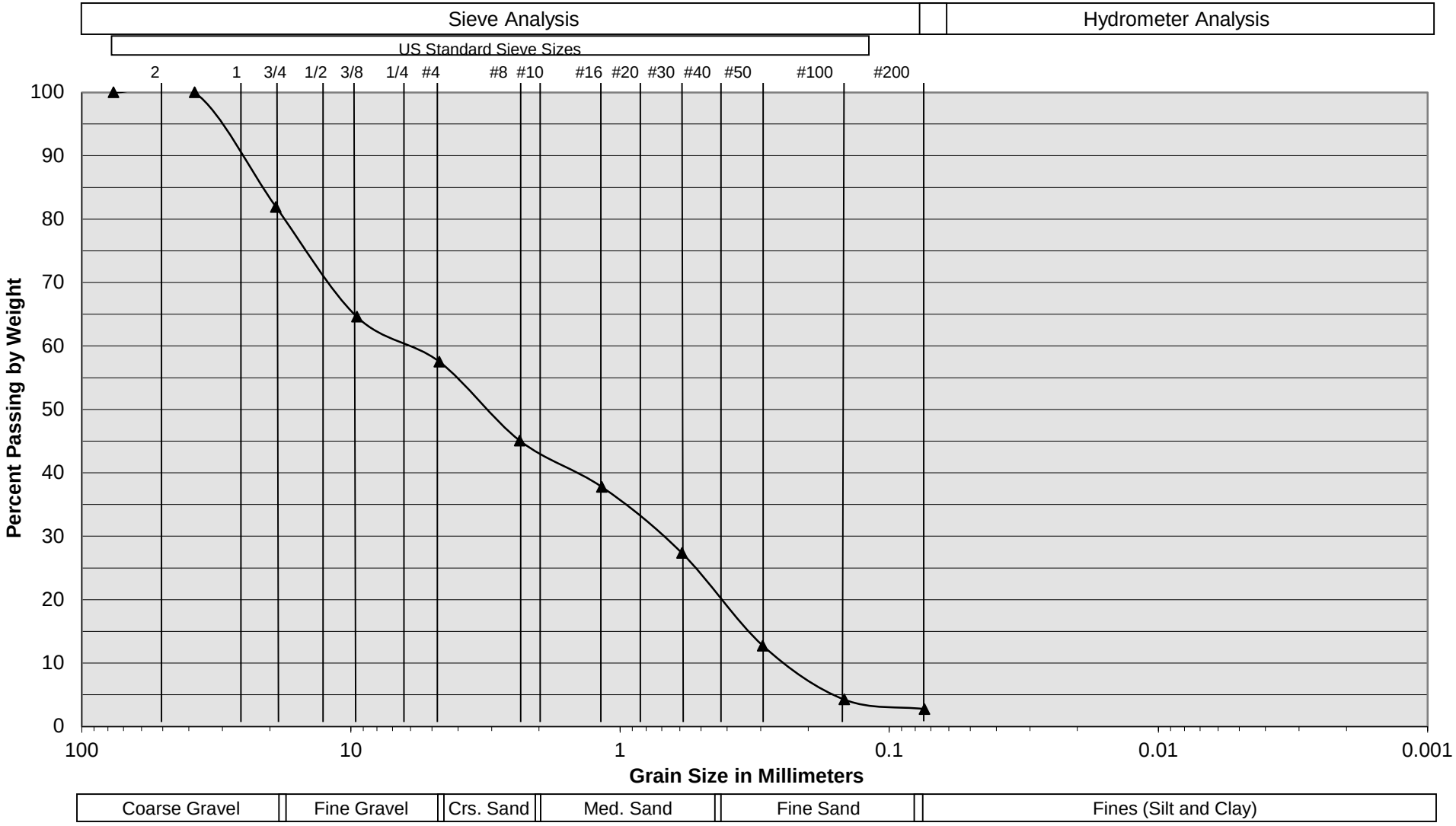
Grain Size Distribution



Sample Description	I-3 @12'
Soil Classification	ALLUVIUM: Light Gray fine to coarse Sand, some fine to coarse Gravel, trace Silt

Proposed Warehouse
San Bernardino County, CA
Project No. 20G101-2
PLATE C- 3

SoCalGeo
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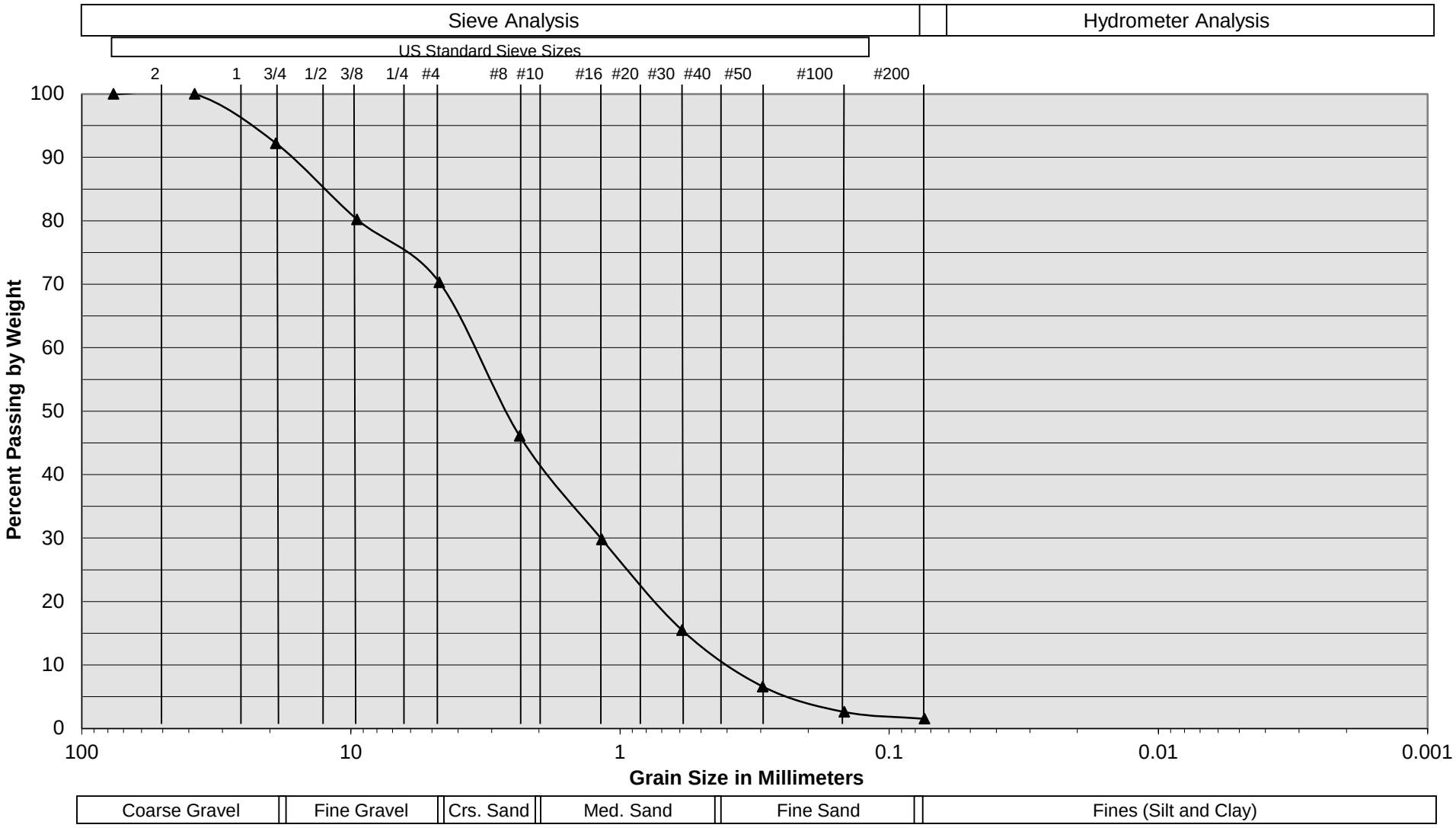
A California Corporation

Grain Size Distribution



Sample Description	I-4 @10'
Soil Classification	ALLUVIUM: Light Gray fine to coarse Sand, some fine to coarse Gravel

Proposed Warehouse
San Bernardino County, CA
Project No. 20G101-2
PLATE C- 4

SoCalGeo
SOUTHERN CALIFORNIA GEOTECHNICAL
A California Corporation

INFILTRATION CALCULATIONS

Project Name	Proposed Warehouse
Project Location	San Bernardino County, CA
Project Number	20G101-2
Engineer	Ryan Bremer

Infiltration Test No: I-1

Constants

	Diameter (ft)	Area (ft^2)	Area (cm^2)
Inner	1	0.79	730
Anlr. Spac	2	2.36	2189

*Note: The infiltration rate was calculated based on current time interval

Test Interval		Time (hr)	Interval **Elapsed** (min)	Flow Readings: Inner Ring (ml)	Flow Readings: Ring Flow (cm^3)	Flow Readings: Annular Ring (ml)	Flow Readings: Space Flow (cm^3)	Infiltration Rates: Inner Ring* (cm/hr)	Infiltration Rates: Annular Space* (cm/hr)	Infiltration Rates: Inner Ring* (in/hr)	Infiltration Rates: Annular Space* (in/hr)
1	Initial	9:37 AM	3	0	700	0	11500	19.19	105.08	7.55	41.37
	Final	9:40 AM	**3**	700		11500					
2	Initial	9:41 AM	3	0	750	0	10900	20.56	99.59	8.09	39.21
	Final	9:44 AM	**7**	750		10900					
3	Initial	9:46 AM	3	0	600	0	10000	16.45	91.37	6.48	35.97
	Final	9:49 AM	**12**	600		10000					
4	Initial	9:50 AM	3	0	600	0	10500	16.45	95.94	6.48	37.77
	Final	9:53 AM	**16**	600		10500					
5	Initial	9:54 AM	3	0	575	0	10600	15.76	96.85	6.21	38.13
	Final	9:57 AM	**20**	575		10600					
6	Initial	9:58 AM	3	0	575	0	10900	15.76	99.59	6.21	39.21
	Final	10:01 AM	**24**	575		10900					
7	Initial	10:02 AM	3	0	550	0	10800	15.08	98.68	5.94	38.85
	Final	10:05 AM	**28**	550		10800					
8	Initial	10:06 AM	3	0	575	0	10900	15.76	99.59	6.21	39.21
	Final	10:09 AM	**32**	575		10900					
9	Initial	10:10 AM	3	0	550	0	10900	15.08	99.59	5.94	39.21
	Final	10:13 AM	**36**	550		10900					
10	Initial	10:14 AM	3	0	575	0	10800	15.76	98.68	6.21	38.85
	Final	10:17 AM	**40**	575		10800					

INFILTRATION CALCULATIONS

Project Name	Proposed Warehouse
Project Location	San Bernardino County, CA
Project Number	20G101-2
Engineer	Ryan Bremer

Infiltration Test No: I-2

Constants

	Diameter (ft)	Area (ft^2)	Area (cm^2)
Inner	1	0.79	730
Anlr. Spac	2	2.36	2189

*Note: The infiltration rate was calculated based on current time interval

Test Interval		Time (hr)	Interval **Elapsed** (min)	Flow Readings: Inner Ring (ml)	Flow Readings: Ring Flow (cm^3)	Flow Readings: Annular Ring (ml)	Flow Readings: Space Flow (cm^3)	Infiltration Rates: Inner Ring* (cm/hr)	Infiltration Rates: Annular Space* (cm/hr)	Infiltration Rates: Inner Ring* (in/hr)	Infiltration Rates: Annular Space* (in/hr)
1	Initial	12:49 PM	2	0	750	0	8500	30.84	116.50	12.14	45.86
	Final	12:51 PM	**2**	750		8500					
2	Initial	12:53 PM	2	0	800	0	6500	32.89	89.09	12.95	35.07
	Final	12:55 PM	**6**	800		6500					
3	Initial	12:56 PM	2	0	800	0	6700	32.89	91.83	12.95	36.15
	Final	12:58 PM	**9**	800		6700					
4	Initial	12:59 PM	2	0	750	0	6400	30.84	87.72	12.14	34.53
	Final	1:01 PM	**12**	750		6400					
5	Initial	1:03 PM	2	0	750	0	7000	30.84	95.94	12.14	37.77
	Final	1:05 PM	**16**	750		7000					
6	Initial	1:06 PM	2	0	750	0	6700	30.84	91.83	12.14	36.15
	Final	1:08 PM	**19**	750		6700					
7	Initial	1:09 PM	2	0	750	0	5800	30.84	79.49	12.14	31.30
	Final	1:11 PM	**22**	750		5800					
8	Initial	1:13 PM	2	0	750	0	6400	30.84	87.72	12.14	34.53
	Final	1:15 PM	**26**	750		6400					
9	Initial	1:16 PM	2	0	800	0	6500	32.89	89.09	12.95	35.07
	Final	1:18 PM	**29**	800		6500					
10	Initial	1:19 PM	2	0	750	0	6500	30.84	89.09	12.14	35.07
	Final	1:21 PM	**32**	750		6500					

INFILTRATION CALCULATIONS

Project Name	Proposed Warehouse
Project Location	San Bernardino County, CA
Project Number	20G101-2
Engineer	Ryan Bremer

Infiltration Test No: I-3

Constants

	Diameter (ft)	Area (ft^2)	Area (cm^2)
Inner	1	0.785	730
Anlr. Space	2	2.356	2189

*Note: The infiltration rate was calculated based on current time interval

Test Interval		Time (hr)	Interval **Elapsed** (min)	Flow Readings: Inner Ring (ml)	Flow Readings: Ring Flow (cm^3)	Flow Readings: Annular Ring (ml)	Flow Readings: Space Flow (cm^3)	Infiltration Rates: Inner Ring* (cm/hr)	Infiltration Rates: Annular Space* (cm/hr)	Infiltration Rates: Inner Ring* (in/hr)	Infiltration Rates: Annular Space* (in/hr)
1	Initial	10:17 AM	5	0	1600	0	5400	26.31	29.60	10.36	11.66
	Final	10:22 AM	**5**	1600		5400					
2	Initial	10:23 AM	5	0	1200	0	6500	19.74	35.63	7.77	14.03
	Final	10:28 AM	**11**	1200		6500					
3	Initial	10:29 AM	5	0	1400	0	6400	23.03	35.09	9.07	13.81
	Final	10:34 AM	**17**	1400		6400					
4	Initial	10:35 AM	5	0	1400	0	5500	23.03	30.15	9.07	11.87
	Final	10:40 AM	**23**	1400		5500					
5	Initial	10:41 AM	5	0	1400	0	5600	23.03	30.70	9.07	12.09
	Final	10:46 AM	**29**	1400		5600					
6	Initial	10:47 AM	5	0	1400	0	6000	23.03	32.89	9.07	12.95
	Final	10:52 AM	**35**	1400		6000					
7	Initial	10:54 AM	5	0	1450	0	5900	23.85	32.34	9.39	12.73
	Final	10:59 AM	**42**	1450		5900					
8	Initial	11:00 AM	5	0	1400	0	5900	23.03	32.34	9.07	12.73
	Final	11:05 AM	**48**	1400		5900					

INFILTRATION CALCULATIONS

Project Name	Proposed Warehouse
Project Location	San Bernardino County, CA
Project Number	20G101-2
Engineer	Ryan Bremer

Infiltration Test No: I-4

Constants

	Diameter (ft)	Area (ft^2)	Area (cm^2)
Inner	1	0.79	730
Anlr. Space	2	2.36	2189

*Note: The infiltration rate was calculated based on current time interval

Test Interval		Time (hr)	Interval **Elapsed** (min)	Flow Readings: Inner Ring (ml)	Flow Readings: Ring Flow (cm^3)	Flow Readings: Annular Ring (ml)	Flow Readings: Space Flow (cm^3)	Infiltration Rates: Inner Ring* (cm/hr)	Infiltration Rates: Annular Space* (cm/hr)	Infiltration Rates: Inner Ring* (in/hr)	Infiltration Rates: Annular Space* (in/hr)
1	Initial	12:04 PM	3	0	700	0	5800	19.19	52.99	7.55	20.86
	Final	12:07 PM	**3**	700		5800					
2	Initial	12:08 PM	3	0	750	0	5400	20.56	49.34	8.09	19.43
	Final	12:11 PM	**7**	750		5400					
3	Initial	12:12 PM	3	0	750	0	4400	20.56	40.20	8.09	15.83
	Final	12:15 PM	**11**	750		4400					
4	Initial	12:16 PM	3	0	750	0	4400	20.56	40.20	8.09	15.83
	Final	12:19 PM	**15**	750		4400					
5	Initial	12:20 PM	3	0	750	0	4400	20.56	40.20	8.09	15.83
	Final	12:23 PM	**19**	750		4400					
6	Initial	12:24 PM	3	0	700	0	4400	19.19	40.20	7.55	15.83
	Final	12:27 PM	**23**	700		4400					
7	Initial	12:28 PM	3	0	650	0	4100	17.82	37.46	7.01	14.75
	Final	12:31 PM	**27**	650		4100					
8	Initial	12:32 PM	3	0	650	0	4100	17.82	37.46	7.01	14.75
	Final	12:35 PM	**31**	650		4100					
9	Initial	12:36 PM	3	0	650	0	4100	17.82	37.46	7.01	14.75
	Final	12:39 PM	**35**	650		4100					
10	Initial	12:40 PM	3	0	650	0	4100	17.82	37.46	7.01	14.75
	Final	12:43 PM	**39**	650		4100					