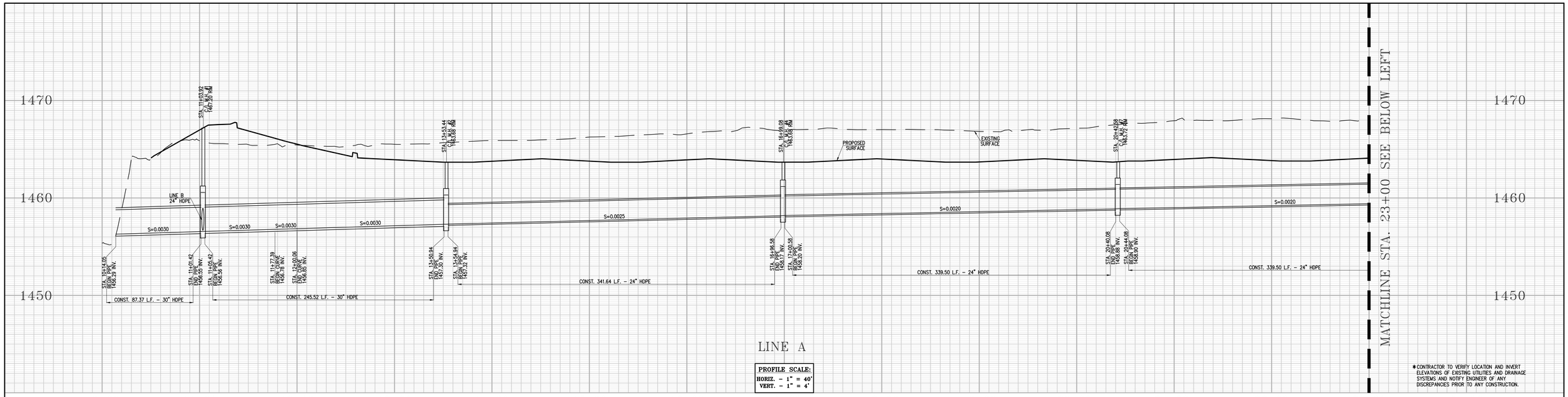
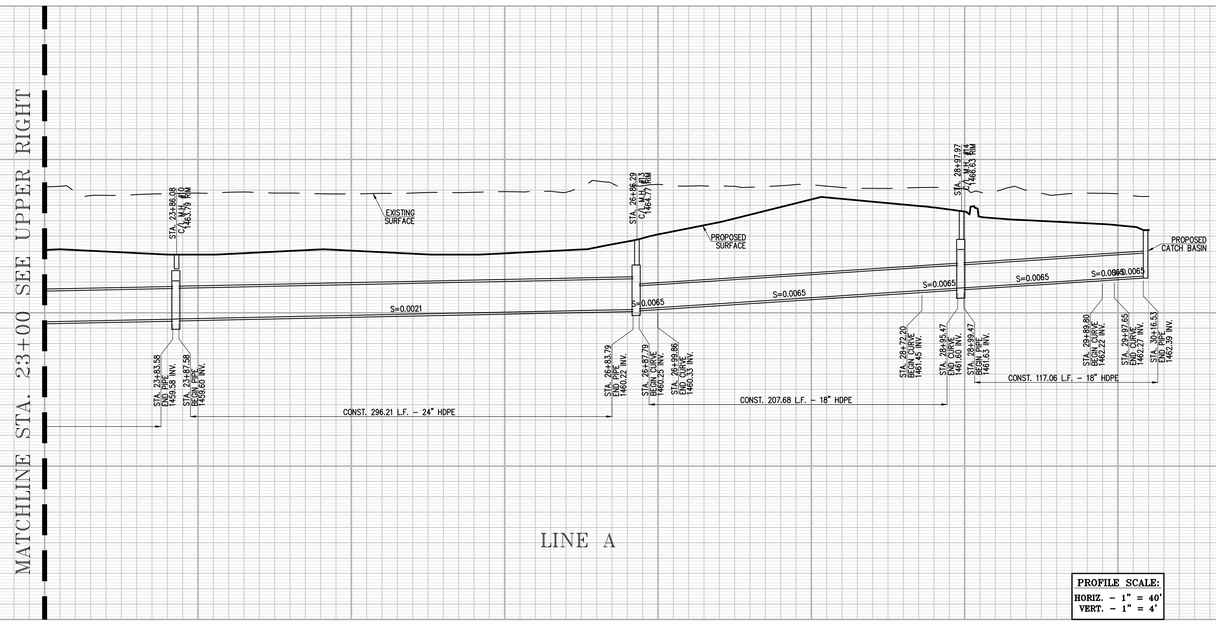
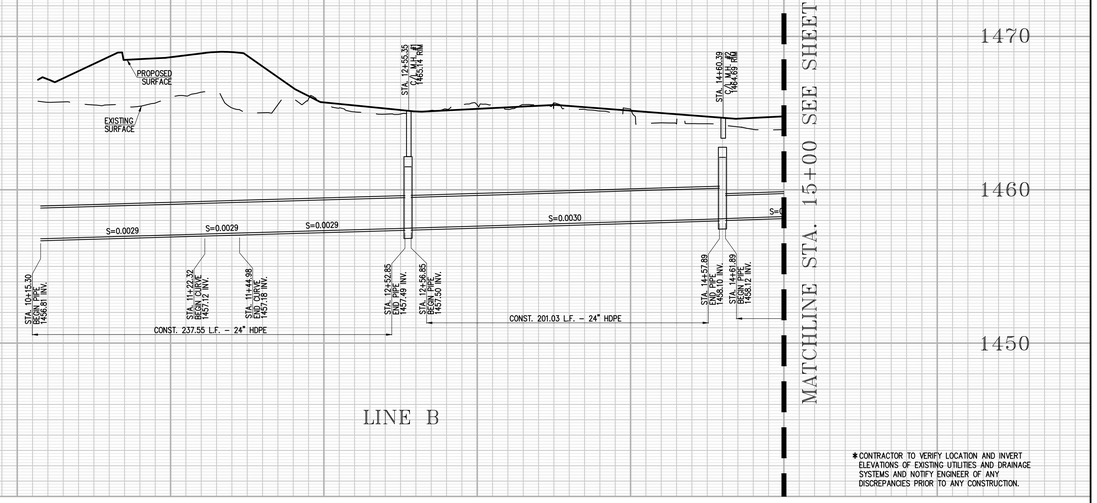


PROFILE SCALE:
HORIZ. – 1" = 40'
VERT. – 1" = 4'

*CONTRACTOR TO VERIFY LOCATION AND INVERT ELEVATIONS OF EXISTING UTILITIES AND DRAINAGE SYSTEMS AND NOTIFY ENGINEER OF ANY DISCREPANCIES PRIOR TO ANY CONSTRUCTION.





PROFILE SCALE:
HORIZ. – 1" = 40'
VERT. – 1" = 4'

*CONTRACTOR TO VERIFY LOCATION AND INVERT ELEVATIONS OF EXISTING UTILITIES AND DRAINAGE SYSTEMS AND NOTIFY ENGINEER OF ANY DISCREPANCIES PRIOR TO ANY CONSTRUCTION.

OPTION A

CITY OF PERRIS
PUBLIC WORKS DEPARTMENT

CONCEPTUAL STORM DRAIN PROFILES

HARLEY KNOX INDUSTRIAL DEVELPMENT

PREPARED FOR:
First Industrial Realty Trust, Inc.
898 N. Pacific Coast Highway Blvd., Suite 175
El Segundo, CA 90245
PHONE: (310) 414-5400
CONTACT: Matt Pioli
EMAIL: mpioli@firstindustrial.com

Thienes Engineering, Inc.
CIVIL ENGINEERING • LAND SURVEYING
14349 FIRESTONE BOULEVARD
LA MIRADA, CALIFORNIA 90638
PH.(714)521-4811 FAX(714)521-4173

Last Update: 3/17/23
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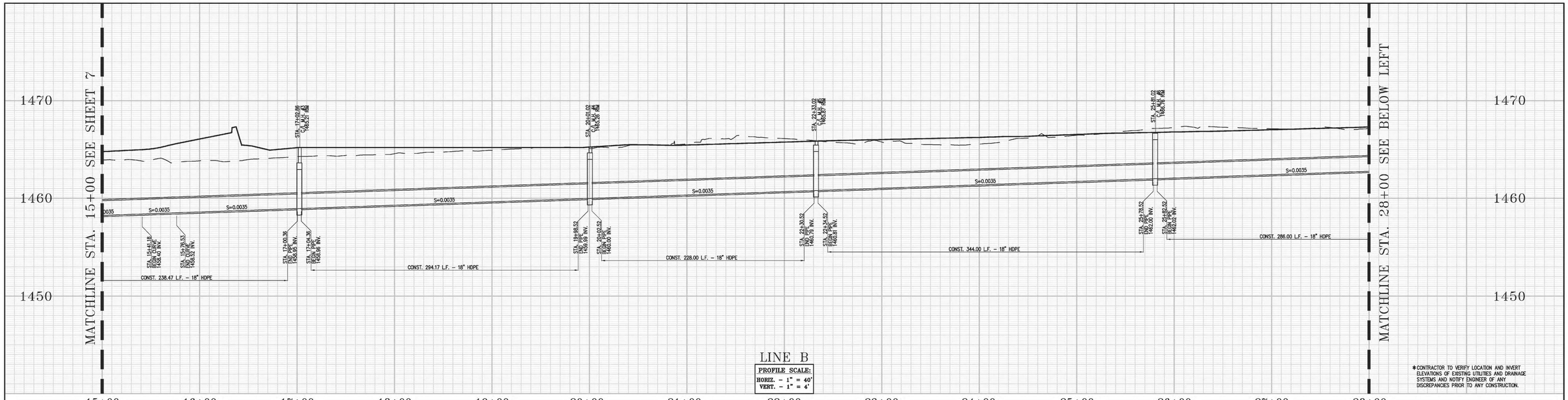
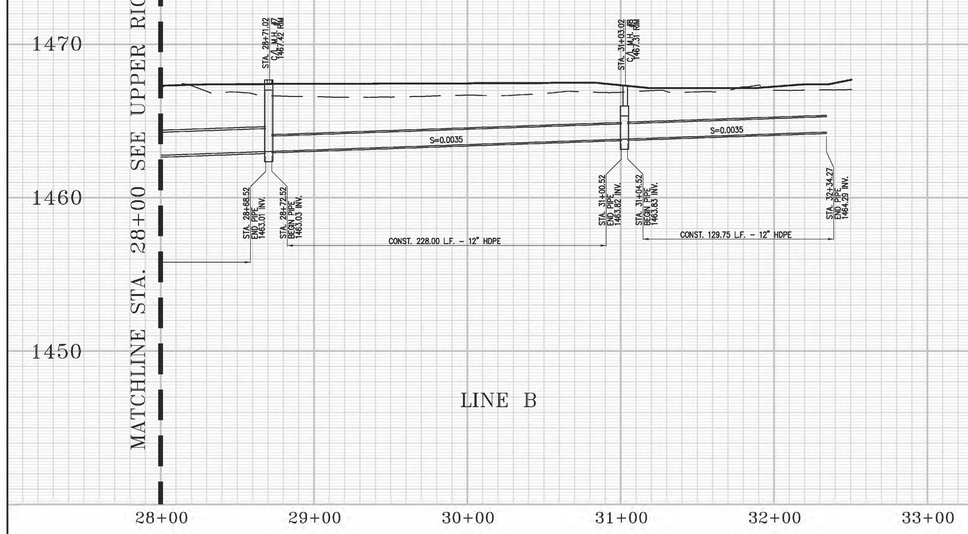
Designed by		Approved by	Date
Date			
Checked by			
Date			
Designed by		Public Works Director	R.C.E. XXXXX
Date			
Checked by			
Date		Sheet 7 of 9 Sheets	

4066/7 OF 9 SHEET



*CONTRACTOR TO VERIFY LOCATION AND INVERT ELEVATIONS OF EXISTING UTILITIES AND DRAINAGE SYSTEMS AND NOTIFY ENGINEER OF ANY DISCREPANCIES PRIOR TO ANY CONSTRUCTION.



*CONTRACTOR TO VERIFY LOCATION AND INVERT ELEVATIONS OF EXISTING UTILITIES AND DRAINAGE SYSTEMS AND NOTIFY ENGINEER OF ANY DISCREPANCIES PRIOR TO ANY CONSTRUCTION.

OPTION A

CITY OF PERRIS
PUBLIC WORKS DEPARTMENT

CONCEPTUAL STORM DRAIN PROFILES

HARLEY KNOX INDUSTRIAL DEVELPMENT

PREPARED FOR:
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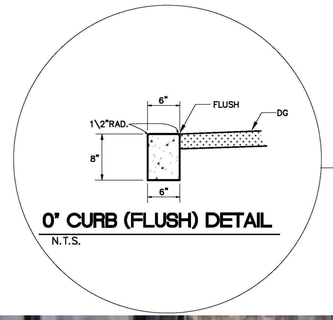
Designed by _____ Date _____
Checked by _____ Date _____
Designed by _____ Date _____
Checked by _____ Date _____

Approved by _____ Date _____

Public Works Director _____ R.C.E. XXXXX

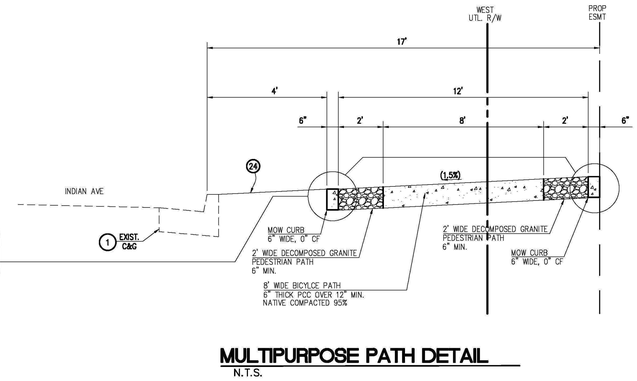
Sheet 8 of 9 Sheets

4066/8 OF 9 SHEET



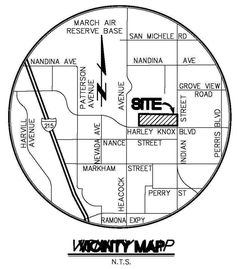
0" CURB (FLUSH) DETAIL

N.T.S.



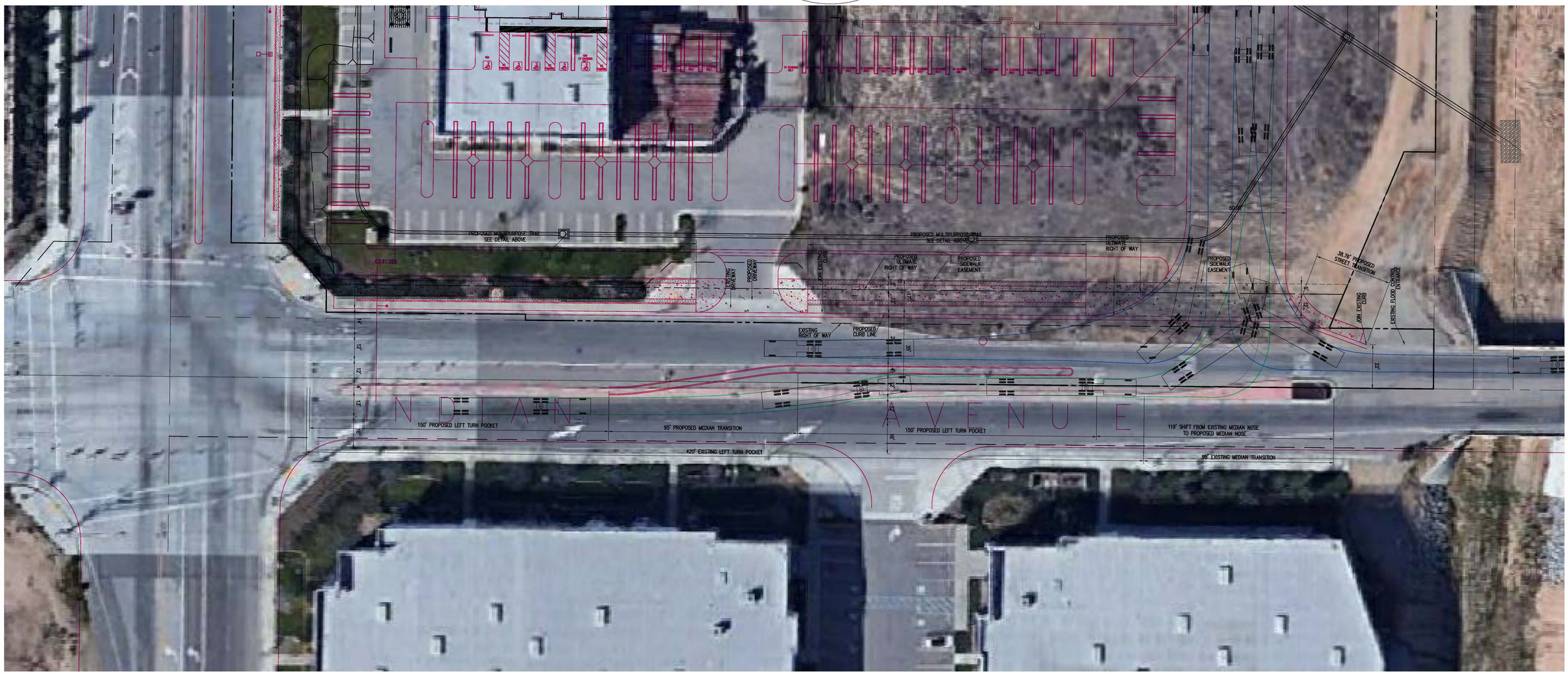
MULTIPURPOSE PATH DETAIL

N.T.S.



VICINITY MAP

N.T.S.



OPTION A

0 10 20 40 60

SCALE: 1"=20'

PREPARED FOR:

First Industrial Realty Trust, Inc.
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Last Update:8/5/22
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CITY OF PERRIS
PUBLIC WORKS DEPARTMENT

CONCEPTUAL STREET IMPROVEMENTS INDIAN AVENUE

HARLEY KNOX INDUSTRIAL DEVELPMENT

Designed by _____ Date _____
Checked by _____ Date _____
Designed by _____ Date _____
Checked by _____ Date _____

Approved by _____ Date _____

Public Works Director _____ R.C.E. XXXX

Sheet 9 of 9 Sheets

4066/ 9 OF 9 SHEET

Appendix 3: Soils Information

Geotechnical Study and Other Infiltration Testing Data

February 18, 2022

SOUTHERN CALIFORNIA GEOTECHNICAL
A California Corporation

First Industrial Realty Trust, Inc.
898 N. Pacific Coast Highway. STE 175
El Segundo, CA 90245

Attention: Mr. Matt Pioli
Investment Officer

Project No.: **22G106-2**

Subject: **Results of Infiltration Testing**
Proposed Industrial Building
Murrieta Road, North of McLaughlin Road
Menifee, California

Reference: Geotechnical Investigation, Proposed Warehouse, Harley Knox, West of Indian Avenue, Perris, California, prepared for First Industrial Realty Trust, Inc., by Southern California Geotechnical, Inc. (SCG), SCG Project No. 22G106-1, dated February 18, 2022.

Mr. Snyder:

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. 21P510, dated December 17, 2021. 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 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 site is located 630± feet west of the intersection of Harley Knox Boulevard and Indian Avenue in Perris, California. The site is bounded to the north by a storm drain channel, to the east by Indian Avenue and an existing commercial/industrial building, to the south by Harley Knox Boulevard and to the west by vacant land. 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 (2) rectangular-shaped parcels, which total 20.26± acres in size. The site is presently vacant and undeveloped. Ground surface cover consists of exposed soil with moderate to dense native grass and weed growth. Trash and debris are scattered on the ground surface throughout the site.

Detailed topographic information was not available at the time of this report. Based on elevations obtained from Google Earth and visual observations made at the time of the subsurface investigation, the overall site slopes downward to the east at a gradient of less than 1± percent. The ground surface is generally uneven to due previous tilling activities.

Proposed Development

SCG was provided with A conceptual site plan prepared by HPA Architecture (Scheme 2). Based on Scheme 2, the site will be developed with one (1) new warehouse building, 384,620± ft^2 in size, located in the western and central areas of the site. Dock-high doors will be constructed along a portion of the northern 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 areas, and limited areas of concrete flatwork and landscape planters throughout.

The proposed development is expected to include on-site storm water infiltration. Based on our experience with similar projects in the vicinity of the site, we expect that the infiltration system will consist of below-grade chamber systems, located in the northern truck-court area of the site. The bottom of the infiltration system is expected to extend to a depth of 10± feet below the existing site grades.

Concurrent Study

SCG concurrently conducted a geotechnical investigation at the subject site, which is referenced above. As part of this study, eight (8) borings were advanced to depths of 10 to 25± feet below existing site grades. Younger alluvium was encountered at the ground surface at all of the boring locations, extending to depths of 3 to 8± feet below ground surface. The younger alluvial soils consist of medium dense sandy silts, silty sands, clayey sands, and fine to coarse sands with varying silt content. Occasional layers of very stiff to hard fine sandy clays were encountered. The younger alluvial soils generally possess calcareous nodules and veining and are slightly cemented. Native older alluvium was encountered beneath the younger alluvium at all of the boring locations, extending to at least the maximum depth explored of 25± feet below ground surface. The older alluvial soils generally consist of medium dense to very dense fine sandy silts, silty fine to medium sands, clayey fine to coarse sands, and very stiff to hard silty clays and fine sandy clays. Some samples within the upper 5 to 15± feet are slightly cemented.

Groundwater

Free water was not encountered during any of our subsurface explorations. Based on the lack of any water within the borings and the moisture contents of the recovered soil samples, the static groundwater table is considered to have existed at a depth in excess of 25± feet at the time of the subsurface exploration.

Recent water level data was obtained from the California State Water Resources Control Board, GeoTracker, website, https://geotracker.waterboards.ca.gov/. One monitoring well on record is located 1,670± feet south of the site. Water level readings within this monitoring well indicate a high groundwater level of 61± feet below the ground surface in October 2021.

Subsurface Exploration

Scope of Exploration

The subsurface exploration for the infiltration testing consisted of two (2) backhoe-excavated trenches, extending to a depth of 10± 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 and I-2) are indicated on the Infiltration Test Location Plan, enclosed as Plate 2 of this report.

Geotechnical Conditions

Native alluvial soils were encountered at the ground surface at both of the infiltration test locations. The near-surface alluvial soils consist of younger alluvium, comprised of loose fine sandy silts, extending to a depth of 2± feet below the existing site grades. Below these materials, the older alluvium generally consists of very stiff, fine sandy clays, with varying silt content, and dense silty fine to medium sands and clayey fine to medium sands. The older alluvium extends to the maximum depth explored of 10± feet. The Trench Logs, which illustrate the conditions encountered at the infiltration test locations, are presented in 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. The rings were driven into the soil using a ten-pound sledge hammer. The soil surrounding the wall of the infiltration rings was only slightly disturbed during the driving process.

Infiltration Testing Procedure

Infiltration testing was performed at both of the trench locations. 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 using constant-head 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 existing soils at the trench locations, the volumetric

measurements were made at 30-minute increments. 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	Brown Clayey fine to medium Sand	0.5
I-2	10	Brown Silty fine to medium Sand, trace Clay	1.4

Design Recommendations

Two (2) infiltration tests were performed at the subject site. As noted above, the calculated infiltration rates at the infiltration test locations range from 0 to 1.4 inch per hour. The major factors affecting the lack of infiltration at these locations is the presence of dense to very dense older alluvium, with moderate silt and clay concentrations. **Based on the lack of infiltration at the depths tested, infiltration is not considered feasible for this site. Although an infiltration rate of 1.4 inch per hour was calculated at Infiltration Test No I-2, the underlying soils are much less permeable.**

Although infiltration is not considered feasible at the 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 Perris and/or County of Riverside 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. It should be noted that the recommended infiltration rates are based on infiltration testing at two (2) discrete locations and that the overall infiltration rates of the proposed infiltration systems could vary considerably.

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 area could potentially be damaged due to saturation of the subgrade soils. **The proposed infiltration systems 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 building(s), 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.

The infiltration system designer should also give special consideration to the effect that the proposed infiltration systems may have on nearby subterranean structures, open excavations, or descending slopes. In particular, infiltration systems should not be located near the crest of descending slopes, particularly where the slopes are comprised of granular soils. Such systems will require specialized design and analysis to evaluate the potential for slope instability, piping failures and other phenomena that typically apply to earthen dam design. This type of analysis is beyond the scope of this infiltration test report, but these factors should be considered by the infiltration system designer when locating the 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,

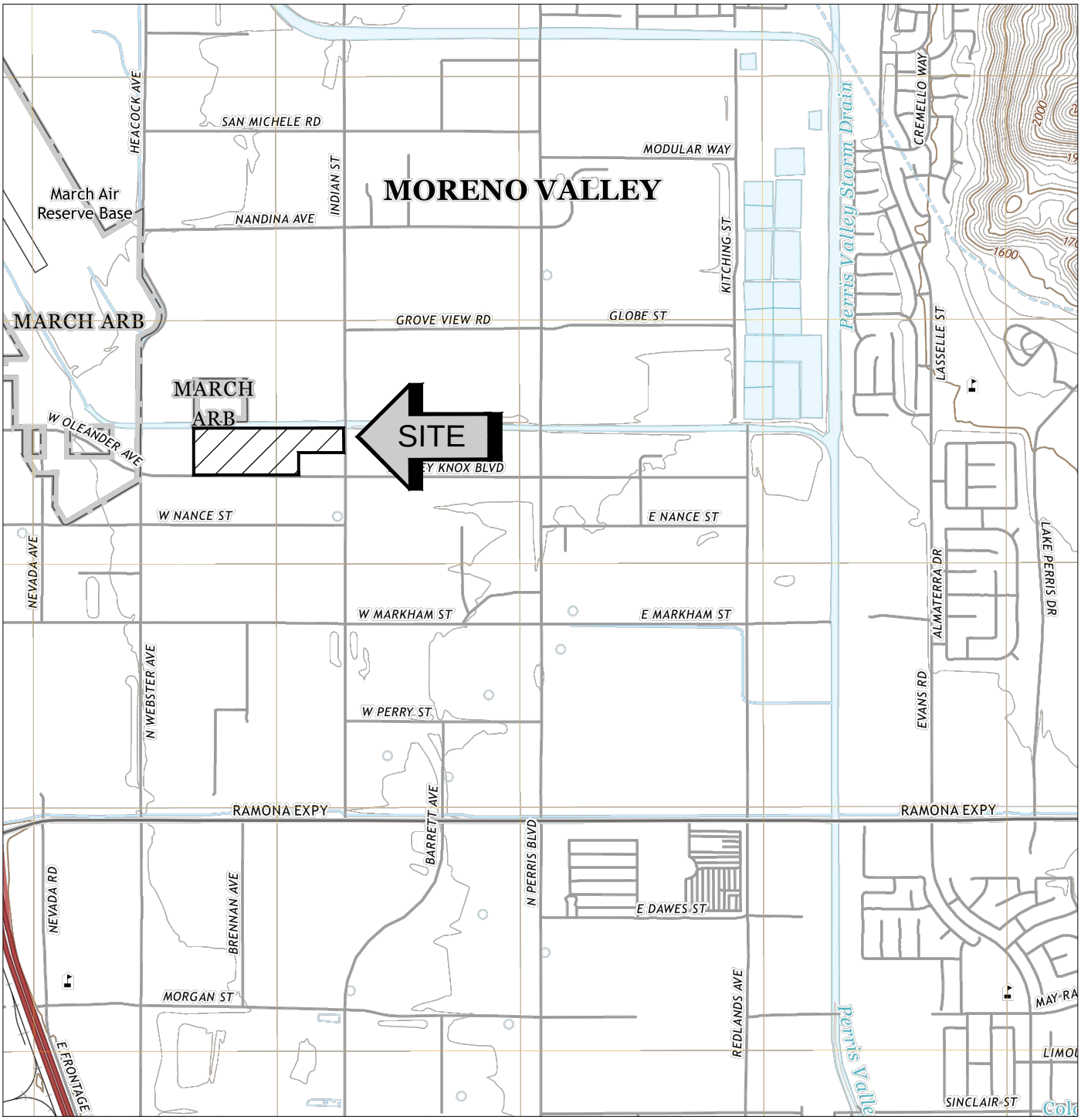
SOUTHERN CALIFORNIA GEOTECHNICAL, INC.

Pablo Montes Jr.
Project Engineer

Robert G. Trazo, GE 2655
Principal Engineer

Distribution: (1) Addressee

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



SOURCE: USGS TOPOGRAPHIC MAP OF THE PERRIS QUADRANGLE, LOS ANGELES COUNTY, CALIFORNIA, 2021.

SITE LOCATION MAP

PROPOSED WAREHOUSE

PERRIS, CALIFORNIA

SCALE: 1" = 2000'	
DRAWN: JAH CHKD: PM	
SCG PROJECT 22G106-2	
PLATE 1	

SoCalGeo

SOUTHERN CALIFORNIA GEOTECHNICAL

GEOTECHNICAL LEGEND

APPROXIMATE INFILTRATION LOCATION

APPROXIMATE BORING LOCATION FROM CONCURRENT STUDY
(SCG PROJECT NO.: 22G106-1)

PROPOSED BUILDING OUTLINE

PROPERTY LINE

NORTH

SoCalGeo

NOTE: CONCEPTUAL SITE PLAN PREPARED BY HPA ARCHITECTS.
AERIAL PHOTOGRAPH OBTAINED FROM GOOGLE EARTH.

INFILTRATION TEST LOCATION PLAN

PROPOSED WAREHOUSE

PERRIS, CALIFORNIA

SCALE: 1" = 150'	SoCalGeo SOUTHERN CALIFORNIA GEOTECHNICAL
DRAWN: MD CHKD: RGT	
SCG PROJECT 22G106-2	
PLATE 2	

SOUTHERN CALIFORNIA GEOTECHNICAL

TRENCH NO. I-1

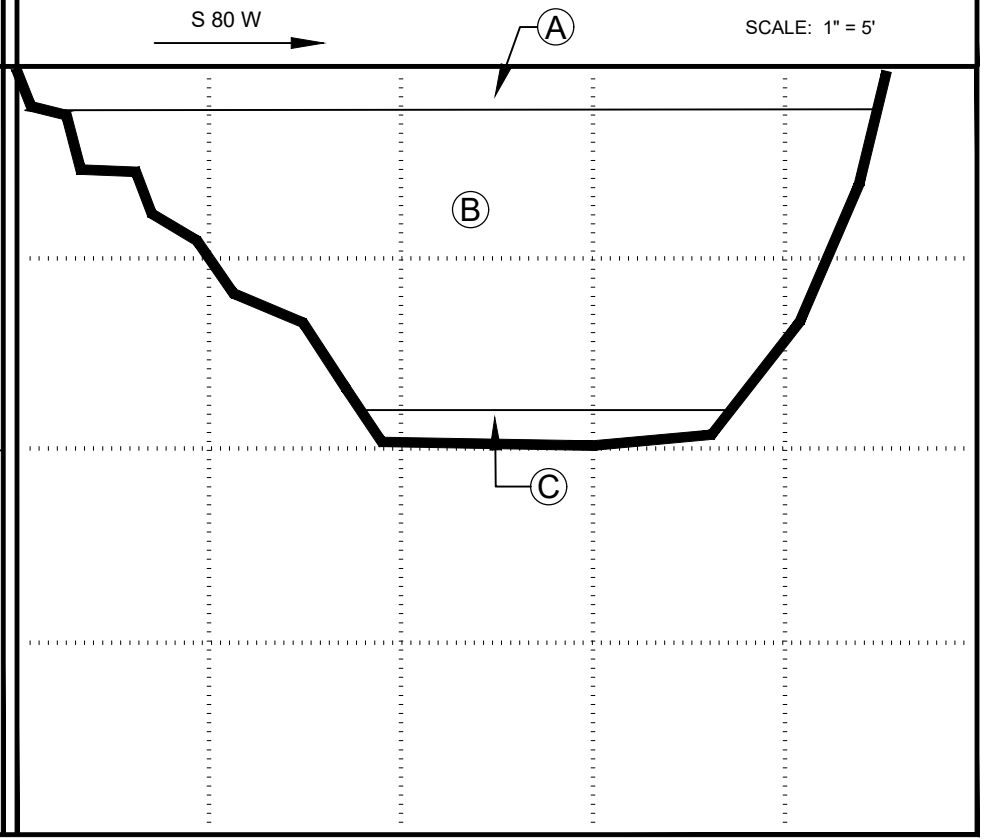
JOB NO.: 22G106-2
PROJECT: Proposed Warehouse
LOCATION: Perris, California
DATE: 1/14/2022

EQUIPMENT USED: Backhoe
LOGGED BY: Caleb Brackett
ORIENTATION: S 80 W
ELEVATION: -- feet msl

WATER DEPTH: Dry
SEEPAGE DEPTH: Dry
READINGS TAKEN: At Completion

DEPTH	SAMPLE	DRY DENSITY (PCF)	MOISTURE (%)	EARTH MATERIALS DESCRIPTION
				A: ALLUVIUM: Light Brown fine Sandy Silt, trace fine root fibers, loose-damp
				B: OLDER ALLUVIUM: Brown fine Sandy Clay, trace to little Silt, slightly porous, very stiff-damp
				C: OLDER ALLUVIUM: Brown Clay fine to medium Sand, dense-damp
5				
10			3	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

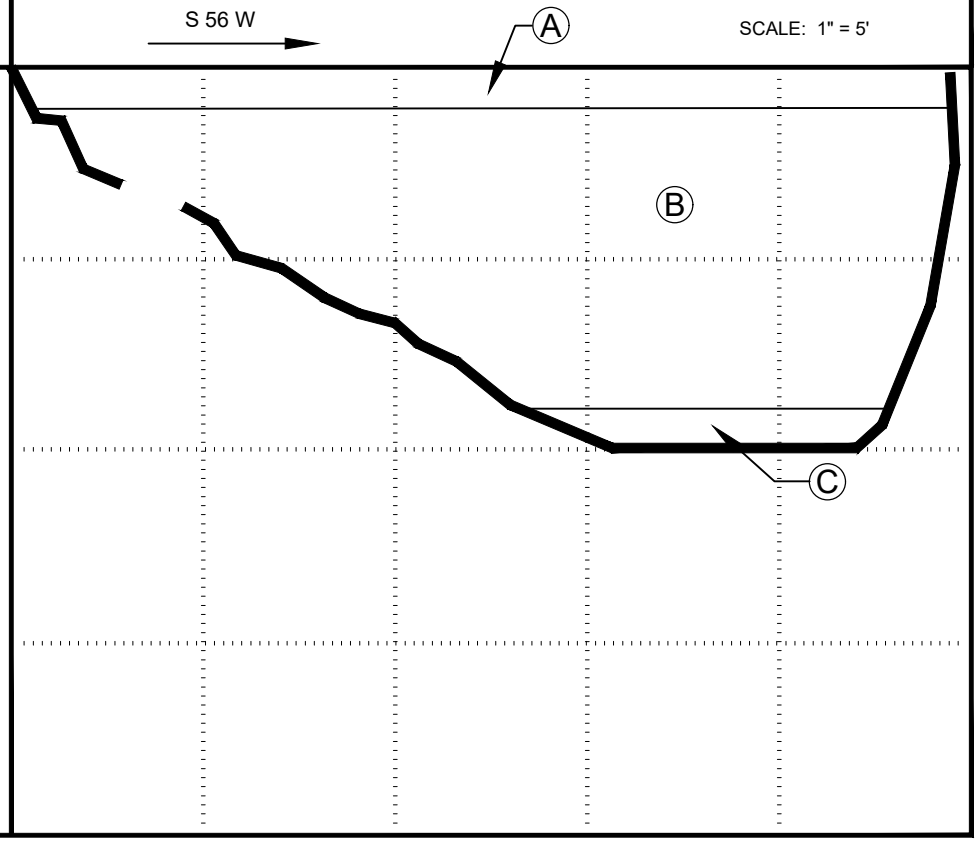
JOB NO.: 22G106-2
PROJECT: Proposed Warehouse
LOCATION: Perris, California
DATE: 1/14/2022

EQUIPMENT USED: Backhoe
LOGGED BY: Caleb Brackett
ORIENTATION: S 56 W
ELEVATION: -- feet msl

WATER DEPTH: Dry
SEEPAGE DEPTH: Dry
READINGS TAKEN: At Completion

DEPTH	SAMPLE	DRY DENSITY (PCF)	MOISTURE (%)	EARTH MATERIALS DESCRIPTION
				A: ALLUVIUM: Brown fine Sandy Silt, trace fine root fibers, loose-damp
				B: OLDER ALLUVIUM: Brown fine Sandy Clay, trace to little Silt, slightly porous, little Calcareous nodules, very stiff-damp
5				C: OLDER ALLUVIUM: Brown Silty fine to medium Sand, trace Clay, dense-damp
			6	
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-2

INFILTRATION CALCULATIONS

Project Name	Proposed Warehouse
Project Location	Perris, California
Project Number	22G106-2
Engineer	PM

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)	Ring Flow (cm^3)	Annular Ring (ml)	Space Flow (cm^3)	Infiltration Rates: Inner Ring* (cm/hr)	Annular Space* (cm/hr)	Inner Ring* (in/hr)	Annular Space* (in/hr)
1	Initial	9:22 AM	30	0	650	0	5300	1.78	4.84	0.70	1.91
	Final	9:52 AM	**30**	650		5300					
2	Initial	9:55 AM	30	0	600	0	4600	1.64	4.20	0.65	1.65
	Final	10:25 AM	**60**	600		4600					
3	Initial	10:25 AM	30	0	550	0	3000	1.51	2.74	0.59	1.08
	Final	10:55 AM	**90**	550		3000					
4	Initial	10:55 AM	30	0	500	0	2800	1.37	2.56	0.54	1.01
	Final	11:25 AM	**120**	500		2800					
5	Initial	11:25 AM	30	0	450	0	2900	1.23	2.65	0.49	1.04
	Final	11:55 AM	**150**	450		2900					
6	Initial	11:55 AM	30	0	500	0	2800	1.37	2.56	0.54	1.01
	Final	12:25 PM	**180**	500		2800					

INFILTRATION CALCULATIONS

Project Name	Proposed Warehouse
Project Location	Perris, California
Project Number	22G106-2
Engineer	PM

Infiltration Test No: I-2

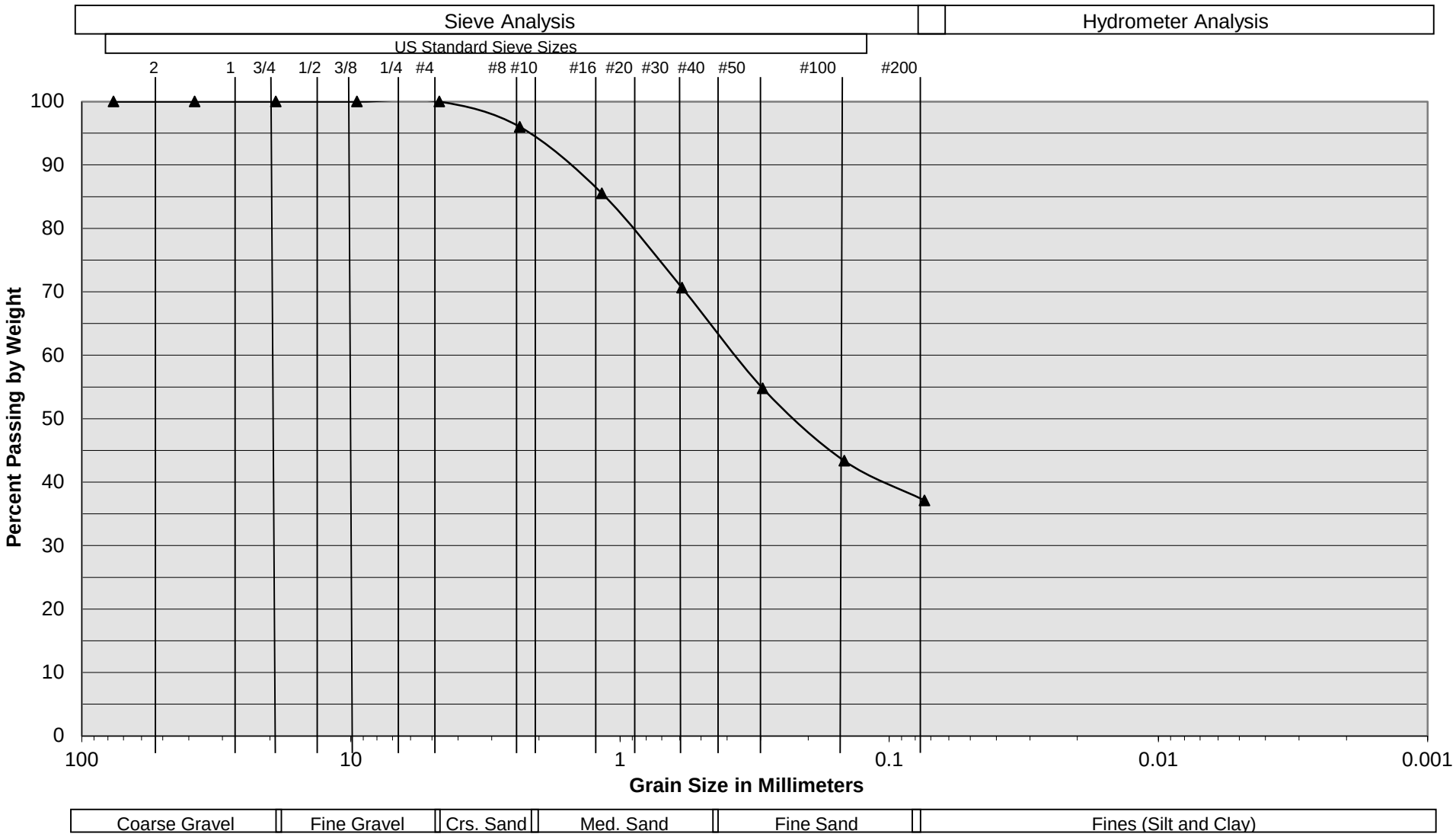
Constants

	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	1:00 PM	30	0	1150	0	11500	3.15	10.51	1.24	4.14
	Final	1:30 PM	**30**	1150		11500					
2	Initial	1:30 PM	30	0	1400	0	6000	3.84	5.48	1.51	2.16
	Final	2:00 PM	**60**	1400		6000					
3	Initial	2:00 PM	30	0	1250	0	5900	3.43	5.39	1.35	2.12
	Final	2:30 PM	**90**	1250		5900					
4	Initial	2:30 PM	30	0	1250	0	6000	3.43	5.48	1.35	2.16
	Final	3:00 PM	**120**	1250		6000					
5	Initial	3:00 PM	30	0	1200	0	5900	3.29	5.39	1.30	2.12
	Final	3:30 PM	**150**	1200		5900					
6	Initial	3:30 PM	30	0	1250	0	6000	3.43	5.48	1.35	2.16
	Final	4:00 PM	**180**	1250		6000					

Grain Size Distribution

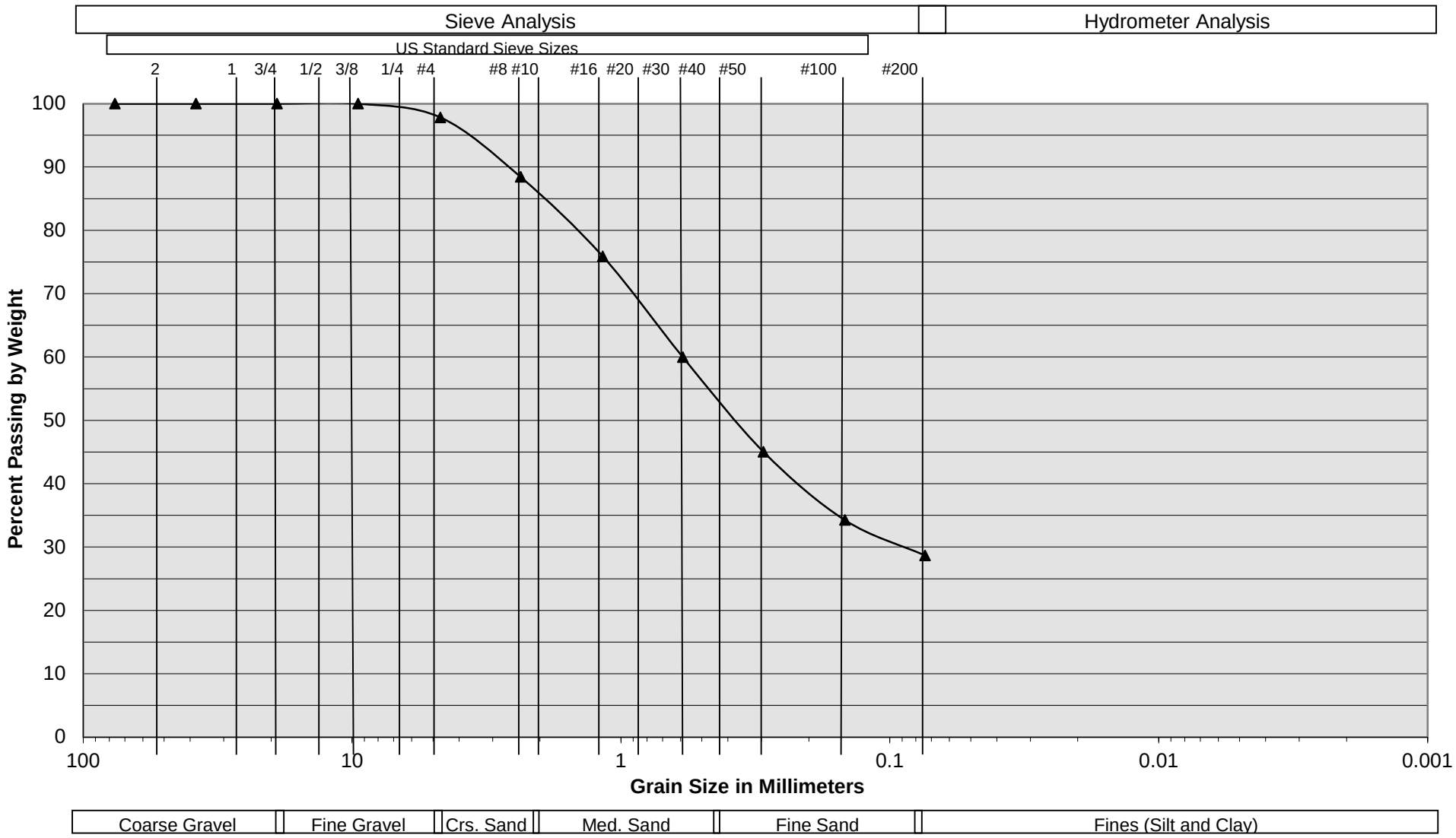


Sample Description	I-1 @ 10'
Soil Classification	Brown Clayey fine to medium Sand

Proposed Warehouse
Perris, California
Project No. 22G106-2
PLATE C- 1

SoCalGeo
SOUTHERN CALIFORNIA GEOTECHNICAL
A California Corporation

Grain Size Distribution



Sample Description	I-2 @ 10'
Soil Classification	Brown Silty fine to medium Sand, trace Clay

Proposed Warehouse
Perris, California
Project No. 22G106-2
PLATE C- 2

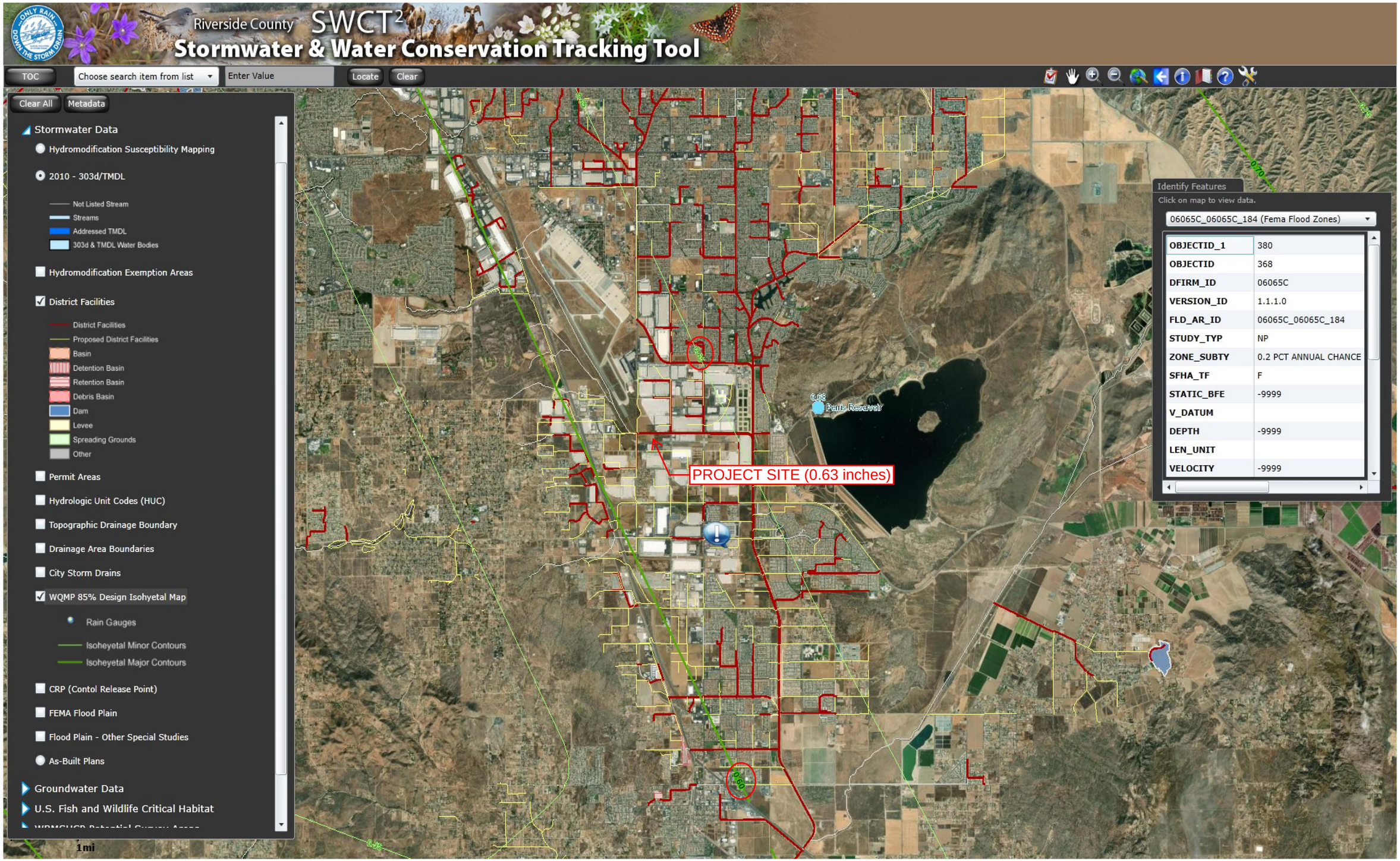
SoCalGeo
SOUTHERN CALIFORNIA GEOTECHNICAL
A California Corporation

Appendix 4: Historical Site Conditions

Phase I Environmental Site Assessment or Other Information on Past Site Use (NOT APPLICABLE)

Appendix 6: BMP Design Details

BMP Sizing, Design Details and other Supporting Documentation


Riverside County SWCT²
Stormwater & Water Conservation Tracking Tool
TOC
Choose search item from list
Enter Value
Locate
Clear
Clear All
Metadata
Stormwater Data
Hydromodification Susceptibility Mapping
2010 - 303d/TMDL
Not Listed Stream
Streams
Addressed TMDL
303d & TMDL Water Bodies
Hydromodification Exemption Areas
District Facilities
District Facilities
Proposed District Facilities
Basin
Detention Basin
Retention Basin
Debris Basin
Dam
Levee
Spreading Grounds
Other
Permit Areas
Hydrologic Unit Codes (HUC)
Topographic Drainage Boundary
Drainage Area Boundaries
City Storm Drains
WQMP 85% Design Isohyetal Map
Rain Gauges
Isoheyetal Minor Contours
Isoheyetal Major Contours
CRP (Contol Release Point)
FEMA Flood Plain
Flood Plain - Other Special Studies
As-Built Plans
Groundwater Data
U.S. Fish and Wildlife Critical Habitat
1mi
Identify Features
Click on map to view data.
06065C_06065C_184 (Fema Flood Zones)
OBJECTID_1 380
OBJECTID 368
DFIRM_ID 06065C
VERSION_ID 1.1.1.0
FLD_AR_ID 06065C_06065C_184
STUDY_TYP NP
ZONE_SUBTY 0.2 PCT ANNUAL CHANCE
SFHA_TF F
STATIC_BFE -9999
V_DATUM
DEPTH -9999
LEN_UNIT
VELOCITY -9999
Perris Reservoir
PROJECT SITE (0.63 inches)

Santa Ana Watershed - BMP Design Volume, V_{BMP}

(Rev. 10-2011)

Legend: Required Entries / Calculated Cells

*(Note this worksheet shall **only** be used in conjunction with BMP designs from the **LID BMP Design Handbook**)*

Company Name	Thienes Engineering, Inc.	Date	3/16/2023
Designed by	Luis Prado	Case No	
Company Project Number/Name	Harley Knox Industrial Development, Perris (4066)		

BMP Identification

BMP NAME / ID STC-A & MWS-A / DMA A

Must match Name/ID used on BMP Design Calculation Sheet

Design Rainfall Depth

85th Percentile, 24-hour Rainfall Depth, from the Isohyetal Map in Handbook Appendix E

D_{85}= 0.63 inches

Drainage Management Area Tabulation

Insert additional rows if needed to accommodate all DMAs draining to the BMP

DMA Type/ID	DMA Area (square feet)	Post-Project Surface Type	Effective Imperivous Fraction, I_f	DMA Runoff Factor	DMA Areas x Runoff Factor	*Design Storm Depth (in)*	*Design Capture Volume, V_{BMP} (cubic feet)*	*Proposed Volume on Plans (cubic feet)*
A-1	*953964*	*Roofs*	*1*	*0.89*	*850935.9*			
A-2	*50094*	*Ornamental Landscaping*	*0.1*	*0.11*	*5533.3*			
	1004058	**Total**			**856469.2**	**0.63**	**44964.6**	**44975**

Notes:

Tributary area = 23.05 ac.

Proposed volume = Installed Storage Volume + MWS Linear Static Capacity

= 44,546 cu-ft + 429 cu-ft = 44,975 cu-ft

MWS VOLUME BASED SIZING SHEET

Project Information

Project ID	
Project Name	Harley Knox Industrial Development (DMA A)
Project Location	Harley Knox Blvd, Perris
Date	3/16/2023

Horizontal Flow Biofiltration System

SIZING CALCULATIONS	Inputs	Units	Notes/References
Impervious Area			
BMP Drainage Area (not required - manual entry - not part of formula)	23.05	Acres	This includes all areas that will contribute runoff to the proposed BMP, including pervious areas, impervious areas, and off-site areas, whether or not they are directly or indirectly connected to the BMP.
Watershed Impervious Ratio (not required - manual entry - not part of formula)			Watershed Imperviousness Ratio", is equal to the percent of total impervious area in the "BMP Drainage Area" divided by 100
Runoff Coefficient "C" (not required - manual entry - not part of formula)			
Water Quality Volume (required)	44965	cubic feet	Use sizing procedures provided by state or local agencies to determine the appropriate Water Quality Volume. Intensities and design storms vary widely by region and method.
Design Storm Duration	0	hours	Varies depending on geographical region. Set at 0 for pump system set up. LA County 3 hours. Call for details.
MWS Sizing			
WetlandMod Model Number (from matrix)	MWS-L-10-20		Please choose size from "Model Size Matrix" Tab
HGL	3.4		Treatment Hydraulic Grade Line
# Of Units	1	quantity	Select the number of systems required to treat the water quality volume. Will very depending on drain down time regulaitons.
Discharge Rate (from matrix)	78.50	gallons/minute	Loading Rate of 0.26 gpm/sq ft or 25 in/hr. Field Verified.
Volume Treated During Event			
Processed through MWS - Linear	0	cubic feet	78.4992 gals/minute
Volume Treated Following Event			
MWS Static Capacity (from matrix)	428.67	cubic feet	
Volume Needed in *Pre-Storage*	44536	cubic feet	Set at zero to start. Size pre-storage system to hold this volume
			Sizing complete when eqaul to value of zero.
TOTAL STORMWATER TREATED	44965	cubic feet	Note: This amount should be equal to the "Water Quality Volume"
Drain Down Time	71.60	hours	Drain down time must be equal to or less than requirement of local juristiction. Default 48 hours.

Feel free to call or email proposed sizing calculations to Modular Wetlands Systems for assistance with sizing, compliance, and design.

Phone: 1-800-338-1122

Email: info@conteches.com

CONTECH ENGINEERED SOLUTIONS
A QUIKRETE COMPANY

StormTech
Detention • Retention • Recharge
Subsurface Stormwater Management℠

MC-3500 Site Calculator

Project Information:

Project Name:	Harley Knox Industrial Development (DMA A)
Location:	Perris, CA
Date:	16-Mar
Engineer:	Thienes Engineering Inc.
StormTech RPM:	

System Requirements

Units		Imperial	
Required Storage Volume		44536	CF
Stone Porosity (Industry Standard = 40%)		40	%
Stone Above Chambers	(12 inch min.)	12	inches
Stone Foundation Depth	(9 inch min.)	30	inches
Average Cover over Chambers	(24 inch min.)	24	inches
Bed size controlled by WIDTH or LENGTH?		WIDTH	
Limiting WIDTH or LENGTH dimension		50	feet
Storage Volume per Chamber		214.9	CF
Storage Volume per End Cap		58.9	CF

System Sizing

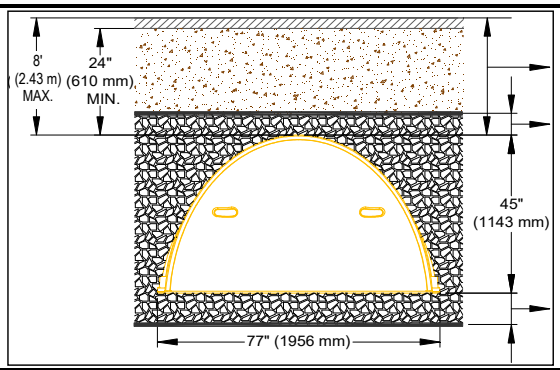
Number of Chambers Required	204	each
Number of End Caps Required	12	each
Bed Size (including perimeter stone)	10,994	square feet
Stone Required (including perimeter stone)	2965	tons
Volume of Excavation	3359	cubic yards
Non-woven Filter Fabric Required (20% Safety Factor)	3498	square yards
Length of Isolator Row	248.4	feet
Non-woven Isolator Row Fabric (20% Safety Factor)	431	square yards
Woven Isolator Row Fabric (20% Safety Factor)	547	square yards
Installed Storage Volume	44,546	cubic feet

Controlled by Width (Rows)

Maximum Width =	50	feet

6 rows of 34 chambers

Maximum Length =	248.44	feet
Maximum Width =	44.25	feet



*This represents the estimated material and site work costs (US dollars) for the project. Materials excluded from this estimate are conveyance pipe, pavement design, etc. It is always advisable to seek detailed construction costs from local installers. Please contact STORMTECH at 888-892-2694 for additional cost information.

Santa Ana Watershed - BMP Design Flow Rate, Q_{BMP}

(Rev. 10-2011)

Legend: Required Entries / Calculated Cells

*(Note this worksheet shall **only** be used in conjunction with BMP designs from the **LID BMP Design Handbook**)*

Company Name: Thienes Engineering, Inc. Date: 3/17/2023
Designed by: Luis Prado Case No:
Company Project Number/Name: Harley Knox Industrial Development, Perris (4066)

BMP Identification

BMP NAME / ID: CDS-A

Must match Name/ID used on BMP Design Calculation Sheet

Design Rainfall Depth

Design Rainfall Intensity I = 0.20 in/hr

Drainage Management Area Tabulation

Insert additional rows if needed to accommodate all DMAs draining to the BMP

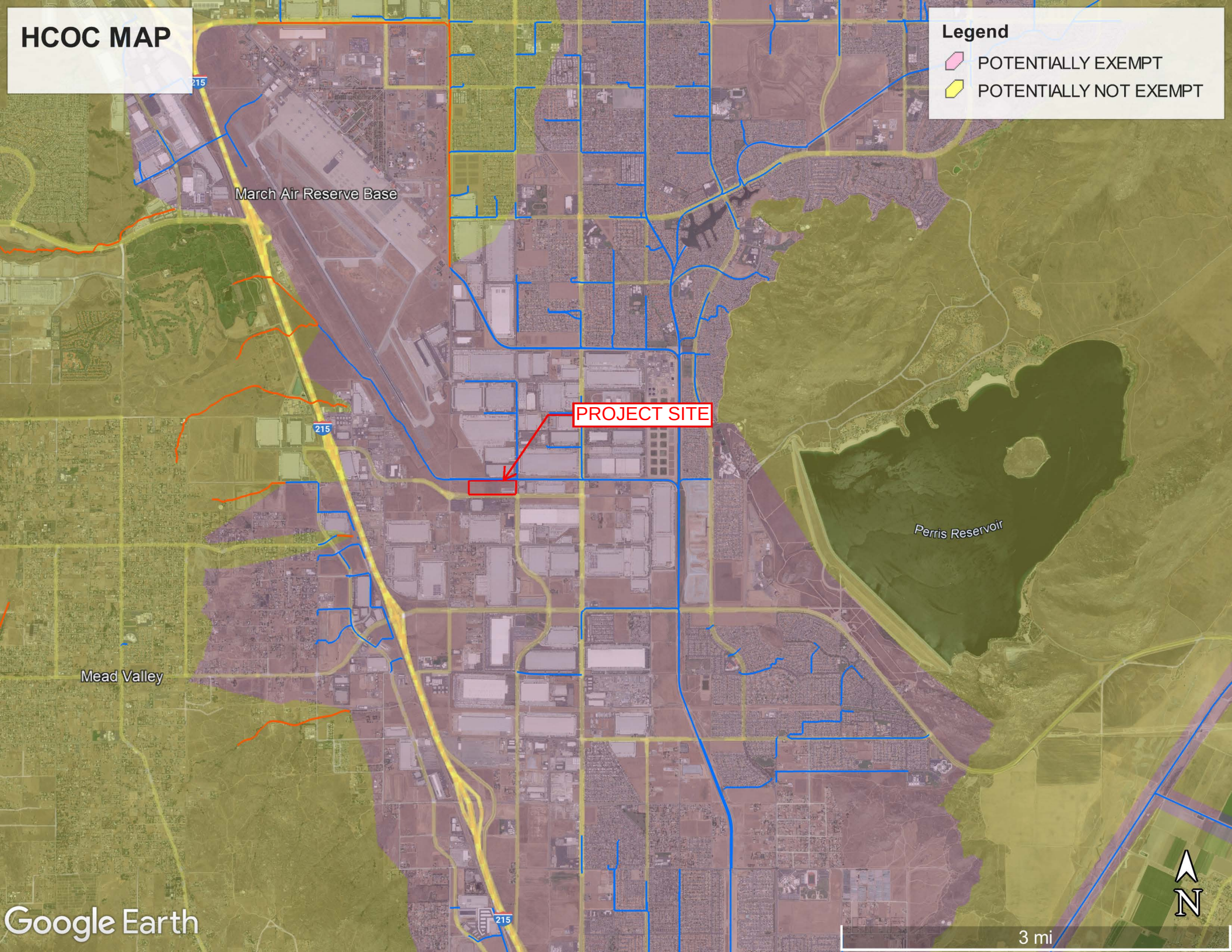
	DMA Type/ID	DMA Area (square feet)	Post-Project Surface Type (use pull-down menu)	Effective Imperivous Fraction, I_f	DMA Runoff Factor	DMA Areas x Runoff Factor	*Design Rainfall Intensity (in/hr)*	*Design Flow Rate (cfs)*	*Proposed Flow Rate (cfs)*
DMAs	*A-1*	*953964*	*Roofs*	*1*	*0.89*	*850935.9*			
	A-2	*50094*	*Ornamental Landscaping*	*0.1*	*0.110458*	*5533.3*			
		1004058	***Total***			**856469.2**	**0.20**	**3.9**	**4.5**

Notes:
Tributary area = 23.05 ac.

Proposing a CDS as pretreatment
CDS4030-8 (max treatment flow = 4.5 cfs)

Appendix 7: Hydromodification

Supporting Detail Relating to Hydrologic Conditions of Concern


HCOC MAP
Legend
POTENTIALLY EXEMPT
POTENTIALLY NOT EXEMPT
March Air Reserve Base
PROJECT SITE
Perris Reservoir
Mead Valley
215
Google Earth
3 mi
N

Appendix 8: Source Control

Pollutant Sources/Source Control Checklist

Appendix 9: O&M

Operation and Maintenance Plan and Documentation of Finance, Maintenance and Recording Mechanisms

Appendix 10: Educational Materials

BMP Fact Sheets, Maintenance Guidelines and Other End-User BMP Information