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PRELIMINARY HYDROLOGY AND HYDRAULICS STUDY

FOR:
Newland Kirby Hemet
S Kirby Street
Hemet, Riverside County, CA 92545

Prepared for:
Newland Capital Group, LLC
200 Spectrum Center Dr. Suite 300
Irvine, CA 92618

Project No: IRV21-0146

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Prepared by: ______________________ 10/05/2023
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I. Introduction

i. Background

The purpose of this Hydrology and Hydraulics study is to quantify the pre-and-post-project drainage conditions and support the grading and storm drain design of the project site to retain the full proposed condition 100-year, 3-hour storm event volume and associated peak flows for the 100-year 3-hour storm event. This is to ensure that there will be no negative impacts to surrounding and downstream properties. The subject site is located on undeveloped, vacant land off Kirby Street in Hemet, CA 92545, located in Riverside County. The site is bound to the north and west by neighboring properties, to the south by the Riverside County Transportation Commission (RCTC) right-of-way, and to the east by Kirby Street. Refer to the vicinity map in Appendix "A." The site consists of a portion of Section 17, Township 5 South, Range 1 West, San Bernardino Meridian, in Tract 16 of Rancho San Jacinto Viejo, Map Book 456, Page 03 (APN 456-030-020) totaling an area of approximately 43.018 acres. This site acreage includes a portion of Kirby Street to the centerline. This portion will be dedicated to Kirby Street with a 47-ft dedication. As a result, this area will not be accounted for in the following calculations.

The project will be disturbing approximately 41.86 acres of currently vacant, barren land. The proposed project includes clearing and grubbing of existing barren land to construct a new industrial warehouse building, appurtenant parking and loading areas, private storm drain improvements, on-site BMPs for stormwater pollutant control and mitigation of increases in runoff, 32-ft dedication improvements for the half street section of Whittier Blvd., and public storm drain improvements. An additional strip of area adjacent to the proposed Whittier Blvd half street will be roughly graded to allow proposed grades to meet existing grades. This area will not be accounted for in this study.

Based on conversations with Riverside County Flood and Water Conservation District (RCFC), Hemet Channel does not have capacity that would allow for a connection via jack and bore below the RCTC railroad to the Hemet Channel, directly south of the project site. Therefore, the most feasible solution is to construct a public storm drain to the existing 72-inch RCP storm drain (Hemet Line A-3) in Sanderson Ave. that is west of the project site.

In the existing condition, the site generally flows from east to west. All the undeveloped land west of the site sheet flows to the west, where the runoff will be intercepted by a series of existing catch basins and conveyed to the existing 72" RCP RCFC storm drain in Sanderson Ave. The 72" RCP storm drain eventually discharges to Hemet Channel further downstream. The proposed hydrology will mimic the existing hydrology to the maximum extent practicable

In the proposed condition, runoff from the on-site improvements will be conveyed via valley gutters into various catch basins that will convey the flows via a proposed underground storm drain system into two proposed underground detention basins, OldCastle StormCapture systems. Runoff will be detained and eventually pumped into two Modular Wetland systems for stormwater pollutant treatment of low flow storm events. The Modular Wetland systems and their respective pumps will be oversized to treat and pump the 100-year 3-hour storm event volume. Runoff from high flow storm events will overtop the proposed internal weirs within the underground detention basins before being conveyed via storm drain outlet pipes to the proposed 24" RCP public storm drain in Whittier Blvd. This overflow discharges to the west of the site, mimicking the existing drainage pattern of the site. Ultimately, the flows will be conveyed to a proposed 36" RCP public storm drain in Whittier Avenue and conveyed west towards S. Sanderson Ave to connect to the existing 72" RCP RCFC storm drain.

Per the Santa Ana River Watershed Technical Guidance Document, the site will require a WQMP for post-construction stormwater quality permitting.

II. Site Discussion & Methodology

i. Site Information and Properties

The site is located within the Santa Ana River Watershed, with runoff from the site traveling via overland flow onto the neighboring property, into the public storm drain network and eventually discharging into the San Jacinto River. The site is vacant and barren, with minimal vegetative cover and minimal impervious surfaces in the existing condition. Per the Riverside County Hydrology Manual, the site is composed of soils belonging to Hydrologic Soil Group (HSG) B according to the Hemet Map, which can be found in Appendix "B".

The site is very flat, with elevations ranging from just over 1538 feet along the eastern border of the site to just under 1530 feet along the western border of the site. The site naturally drains to the west, with slopes generally ranging from 0.5% to 1% throughout.

Three in-situ percolation tests were performed on site at depths ranging from 5 feet to 10 feet to determine the infiltration rate of the soil. The testing resulted in infiltration rates ranging from 0.18 to 0.72 inches per hour. The infiltration testing was performed by Terracon Consultants, Inc. The Geotechnical Investigation Report can be found in Appendix "I".

The project development is a single development and is not part of a larger phased development.

In the proposed condition, the site will feature an 850,655 SF industrial warehouse building in the center of the site, with loading docks along its eastern and western faces, and access routes surrounding the building. Trailer spaces are proposed across from the eastern and western faces of the building, while parking spaces are proposed across from the northern and southern faces of the building. Two access driveways will be provided from South Kirby Street at the northeastern and southeastern corners of the site. The site is approximately 90% impervious surfaces and 10% pervious surfaces.

ii. Design Standards

The City of Hemet Storm Drain Development Standards Storm Drain Criteria and Drainage Design Manual (1996) was used as a guide for the design of drainage facilities and to establish criteria for flood protection levels within this project. The Riverside County Flood Control and Water Conservation District Hydrology Manual (1978) was used as an additional reference.

iii. Hydrology Software

The Riverside County Module in the CivilCADD/Civil Design (CivilD) Engineering Software was used for the Unit Hydrograph hydrology calculations. The Unit Hydrograph Method Analysis was utilized to determine peak flows and volumes for the 100-year storm event frequencies for the 3-hour as stated in section 10.2.1 of the City of Hemet Drainage Design Manual for detention/retention facility design.

iv. Hydraulics Software

The CivilCADD/Civil Design (CivilD) Engineering Software was used for the Flood Hydrograph Routing. The 2020 Hydraflow Storm Sewer ACAD extension will be used in the final design to support the design of the proposed storm drain network. The Bentley Systems FlowMaster Hydraulic Calculator was used to analyze the proposed street inlet capacity for handling the 10-year and 100-year storm event. The FlowMaster calculator will be used to size the proposed storm drain pipes on-site and analyze the on-site inlet capacities in final design.

III. Hydrologic Analysis

i. Existing Condition

In the existing condition, the project site consists of undeveloped barren land with minimal vegetation. There are no impervious surfaces within the project limits in the existing condition. Stormwater from the site sheet flows westerly from the eastern border of the site along South Kirby Street and eventually sheet flows off site onto the neighboring property. Runoff finally drains into the public storm drain network and discharges into the Salt Creek. The existing outfall is located near the middle of the western border of the site, where stormwater travels to via overland flow. In the existing condition, there is one drainage area (DA) identified as Drainage Area EX. DA EX encompasses the entire site, and it largely consists of undeveloped barren areas that will be disturbed. The total resulting study area is 41.78 acres. This area excluded the two existing driveway approaches that drain to Kirby Street.

Offsite flow drains into the public storm drain network along South Kirby Street along the eastern border, and into other neighboring properties along the site's northern and southern borders.

The Existing Hydrology Exhibit can be found in Appendix "D".

ii. Proposed Condition

In the proposed condition, the project site has three drainage areas: A.1, A.2, and B. Drainage Area A.1 and A.2 includes the majority of the site. Drainage Area A1 encompasses roughly the northern half of the site, which is 18.069 acres. Drainage Area A.2 encompasses the southern half of the site, which is 22.255 acres. Drainage Area B is the portion of the site that will be dedicated to the new half section of Whittier Blvd along the project's northwestern property line and small landscape areas that will drain to the proposed street. Drainage Area B encompasses 1.536 acres and has two subareas, Drainage Area B1 and Drainage Area B2. The total study area is 41.86 acres. This acreage includes the proposed driveway approaches on Kirby Street as the proposed grades convey runoff onsite that conveyed off-site in the existing condition. Drainage Areas A.1 and A.2 will be analyzed using the Unit Hydrograph Method and Drainage Area B areas will be analyzed using the Rational Method.

Runoff from Drainage Areas A.1 and A.2 will be conveyed via valley gutters into various catch basins that will convey the flows via a proposed underground storm drain system into two proposed underground detention basins, OldCastle StormCapture systems. Runoff will be detained and eventually pumped into two Modular Wetland systems for stormwater pollutant treatment of low flow storm events. The Modular Wetland systems and their respective pumps will be oversized to treat and pump the 100-year 3-hour storm event volume. Runoff from high flow storm events will overtop the proposed internal weirs within the underground detention basins before being conveyed via storm drain outlet pipes to a proposed 24" RCP public storm drain in Whittier Blvd. The underground detention basins will drawdown within 72 hours per the City of Hemet Drainage Policy.

Runoff from Drainage Area B will be conveyed via concrete ditch swale and sheet flow from landscaping into the proposed curb and gutter on Whittier Blvd, where the flows are eventually conveyed into a proposed public catch basin that will convey flows to the proposed 24" RCP public storm drain in Whittier Blvd. Ultimately, the flows will be conveyed to a proposed 36" RCP public storm drain in Whittier Avenue and conveyed west towards S. Sanderson Ave to connect to the existing 72" RCP RCFC storm drain.

The Proposed Hydrology Exhibit can be found in Appendix "E".

iii. Unit Hydrograph Analysis

The Unit Hydrograph Method of Riverside County was used via Civil Design Hydrologic software to calculate the peak flow rates and total runoff volumes. The 3-hour, 100-year storm event rainfall depth is analyzed for detention/retention facility design as stated in section 10.2.1 of the City of Hemet Drainage Design Manual. The City of Hemet Drainage Design Manual is also utilized for Antecedent Moisture Condition (AMC), Runoff Index (RI), soil type, loss rates, and land use conditions characteristics of flow conveyance.

Flow rates and volumes were determined for existing and proposed conditions for the 100-year storm event frequencies for the 3-hour storm duration. Underground detention vaults will be used for storage to fully detain the design storm volume and reduce the peak flow upon discharge of stormwater runoff to the west. The sizing for the underground detention basin was determined based on total runoff volumes from the proposed 100-year, 3-hour storm event.

Rainfall depth data was obtained from the NOAA Atlas 14 Point Precipitation Frequency Data Server for the 3-hour, 100-year storm events. The NOAA Atlas 14 data Server information can be found in Appendix "C".

In accordance with the Riverside County Hydrology Manual, AMC III was used for the 3-hour, 100-year storm event.

The soil type was determined using the C-1.44 Hemet Plate in the Riverside County Hydrology Manual, which is based on the United States Department of Agriculture (USDA), National Resource Conservation Service (NRCS) classification for soil runoff potential. The Hydrologic Soil Group was determined to be B.

An RI of 61 (Grass, Annual, or Perennial – Good) was used for the existing condition and an RI of 56 (Residential/Commercial Landscaping - Good) was used for the proposed condition.

A low loss rate of 90% (0.9) was used for the existing condition. The following equation was used to calculate the low loss rate for proposed condition:

$$0.9 - (0.8 \times \%\ \text{impervious})$$

The Unit Hydrograph Method calculations performed via the Civil Design Hydrologic software determined the pre-development and post-development peak flow rates and volumes for the existing drainage area EX and the proposed drainage areas A.1 and A.2. Proposed condition drainage area B was not analyzed as this portion will not be retained. The rainfall depths used for the unit hydrograph method are summarized in Table 1 below. Table 2 below summarizes the peak flow rates and volumes by storm event and frequency and duration in the existing condition. Table 3 below summarizes the peak flow rates and volumes by storm event and frequency and duration in the proposed condition. Refer to Appendix "F" and Appendix "G" for the pre-development and post-development unit hydrograph calculation printouts.

Table 1 – Summary of Rainfall Depths

Storm Event Frequency	Storm Duration	Rainfall Depth (inches)
2-Year	3-hour	0.836
100-Year	3-hour	2.20

Table 2 – Summary of Peak Flow Rates and Volumes for 100-year 3-hour Storm Event – Existing

HYDROLOGIC SUMMARY TABLE			
EXISTING CONDITION – 100 YEAR 3 HOUR DURATION			
BASIN ID	AREA (ACRES)	Q100 (CFS)	V100 (FT^3)
EX	41.78	67.28	217,647

Table 3 – Summary of Peak Flow Rates for 100-year 3-hour Storm Event – Proposed

HYDROLOGIC SUMMARY TABLE			
PROPOSED CONDITION – 100 YEAR 3 HOUR DURATION			
BASIN ID	AREA (ACRES)	Q100 (UNMIT) (CFS)	V100 (UNMIT) (FT^3)
A.1	18.069	36.57	135,185.4
A.2	22.255	44.487	163,300
B	1.536	N/A	N/A

iv. Rational Method Analysis

The Rational Method of Riverside County was used via Civil Design Hydrologic software to calculate the peak flow rates for the 10-year and 100-year storm events for the portions of the site that will be dedicated to the new Whittier Blvd half street section and areas draining to the Whittier Blvd section, Basin B1 and B2. The Riverside County Hydrology Manual was used to determine the Antecedent Moisture Condition (AMC), soil type, and land use conditions, and characteristics of flow conveyance.

IV. Hydraulic Analysis

i. Design/Analyze Storm Drain Facilities

In the final design, the storm drain system will be sized to convey the 10-year storm event as stated in Section 9.1 of the City of Hemet Drainage Design Manual. The calculations performed using the CivilCADD/Civil Design (CivilD) Engineering Software, Flood Hydrograph Routing extension to determine the underground detention basins' sizes can be found in Appendix "H".

ii. Flood Routing Analysis

There are two underground detention basins, BMP-3 & BMP-4, that will retain the 100-year 3-hour volume. The two basins will each have an internal overflow weir that is located 1 ft below the top of chamber. The weirs will be 7-ft long to match the inner width dimension of one of the OldCastle StormCapture modules. BMP-3 will be 6.5 ft deep providing approximately 135,666 CF of storage below the weir and has a total storage of 160,332 CF. BMP-4 will be 7.0 ft deep providing approximately 168,909 CF of storage below the weir and has a total storage of 197,061 CF.

The resulting hydrographs from the Unit Hydrograph Method Analysis were input into the CivilCADD/Civil Design (CivilD) Engineering Software, Flood Hydrograph Routing extension to analyze the proposed underground detention basins and determine the mitigated peak flows resulting from the internal weirs. The storage system will be sized such that the peak flows discharging from the site does not exceed the pre-development peak flows for the 100-year 3-hour proposed condition. See Table 4 for summary of the flood routing analyses. The flood routing analyses do not model the pumps that will convey runoff into the Modular Wetlands systems for stormwater pollutant treatment. Separate calculations were prepared to determine the proposed pumps' flow rates that will ensure that the proposed basins will drawdown within 72 hours. Refer to the "Outlet Structure Discharge" printouts in Appendix "H" for the pumps' sizing.

Table 4 – Summary of Flood Routing Analyses of the 100-year 3-Hour Storm Event

HYDROLOGIC SUMMARY TABLE						
PROPOSED CONDITIONS - 100 YEAR STORM 3 HOUR DURATION						
BASIN ID	AREA	DEPTH	TOTAL VOLUME PROVIDED	Q100 (EX)*	Q100 (MIT)	VOLUME REMAINING IN BASIN (MIT)
	(ACRES)	(FT)	(FT3)	(CFS)	(CFS)	(FT3)
A.1	18,069	6.5	160,332	29.10	21.70	135,026 (3.1 ac-ft)
A.2	22.255	7.0	197,061	35.84	21.70	163,350 (3.75 ac-ft)
*The existing 100-year 3-hour flow rate were prorated by acreage to compare equivalent areas in the proposed condition.						

iii. Retention

Per the City of Hemet Storm Drain Criteria and Drainage Design Manual, the project will be retaining the post-development 100-year, 3-hour storm volume. Table 5 summarizes the required retention volumes for the proposed condition. Stage-Storage Volume calculations are provided in Appendix "H". The proposed basins are designed to drawdown within the required 72 hours per the City of Hemet Drainage Criteria. Drawdown calculations are provided in Appendix "H".

Table 5 – Summary of Required Retention Volumes

PROPOSED BASIN ID	REQUIRED RETENTION VOLUME (FT^3)	PROVIDED RETENTION VOLUME (FT^3) *Storage Volume Below Internal Weir	DRAWDOWN (HRS)
BMP 3 (Underground Basin for Area A.1)	135,185.4	135,666	71.98
BMP 4 (Underground Basin for Area A.2)	163,300	168,909	71.90

iv. Street Storm Facilities

The City of Hemet's Street Drainage design criteria are to ensure that 10-year storm event flow does not cause water to overtop the curb and that the 100-year storm event flows does not result in more than 6 inches of water levels at the centerline of the road.

The proposed North-South Whittier Blvd half section was designed with a sump condition with a minimum slope of 0.3% to match existing grades. A City of Hemet standard catch basin with a 7.75-ft curb opening and 2-inch local depression is proposed at the low point. The catch basin was modeled as a "Curb in Sag" inlet using the 100-year storm flow rate and calculated for the spread in the Bentley Systems FlowMaster Hydraulic Calculator. The resulting spread is 8.6-ft with a 3.6-in depth of water. The 100-year storm event flow does not overtop the proposed 8" curb and gutter within Whittier Blvd., conservatively meeting the City of Hemet's criteria. See Appendix H for the catch basin calculation.

The proposed public storm drain will be preliminarily sized as 24" and 36" RCP storm drains, meeting or exceeding the City of Hemet design standards to handle flows from the project site and the proposed roadway alignments that connects the site to Sanderson Ave. The proposed public storm drain is only designed for the project site flows as well as any parcels that do not have frontage to Sanderson Ave. All parcels with frontage at Sanderson Ave. should only have downstream connections to Sanderson Ave. storm drain after retaining the 100-year 3-hour storm event volume. As a result of the proposed storm drain connection, the project will be proposing a new street, Whittier Avenue, that travels east-west from the site to Sanderson Avenue.

The storm drain pipe sizes will be confirmed in final design with WSPG calculations to confirm that the HGL will be 1-ft below the normal gutter flow line at any point in a specific reach of the storm drain. In reaches where no surface flow will be intercepted, the HGL will be confirmed to be slightly higher than the ground or street surface per the City of Hemet's Drainage Manual "Closed Conduits" Section 9.1.1.

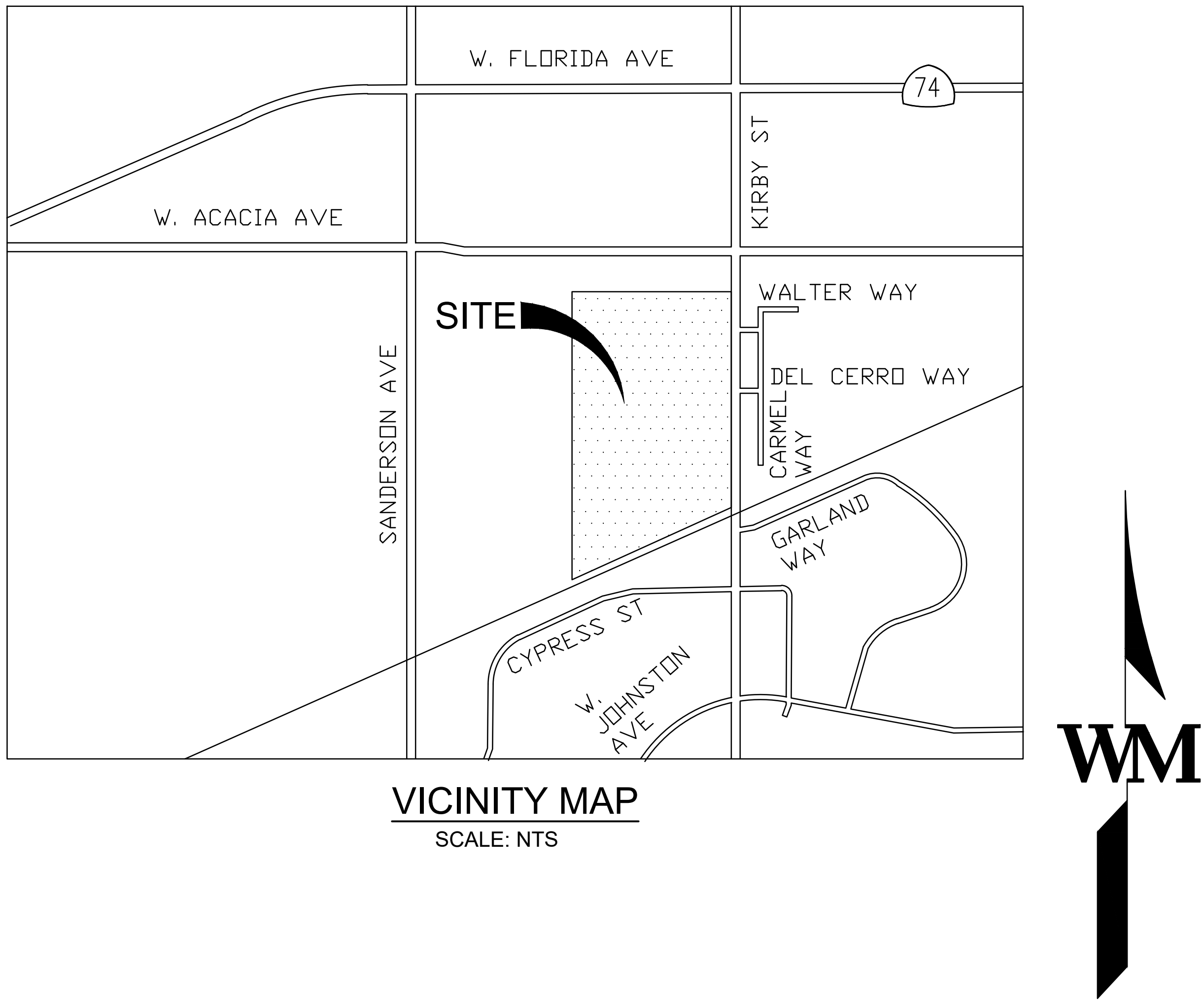
As the resulting flows from the site have been significantly reduced, therefore the capacity of existing 72" RCP storm drain will not be exceeded as a result of this project and that the proposed storm drain connection will be permitted with RCFC in final design.

V. Conclusion

The result of this study shows that the proposed flood facilities will provide adequate flood protection for the proposed project site. It can therefore be concluded that the development of this project will result in no negative impact on the existing downstream storm drain facilities and downstream properties.

Appendix A – Vicinity Map

VICINITY MAP



VICINITY MAP

SCALE: NTS

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CIVIL ENGINEERING & SURVEYING

PROJECT NAME: NEWLAND KIRBY HEMET		
JOB NO.: IRV21-0146	DATE : 6/8/22	
DRAWN: AC	PA/PM: LC	SCALE: NTS

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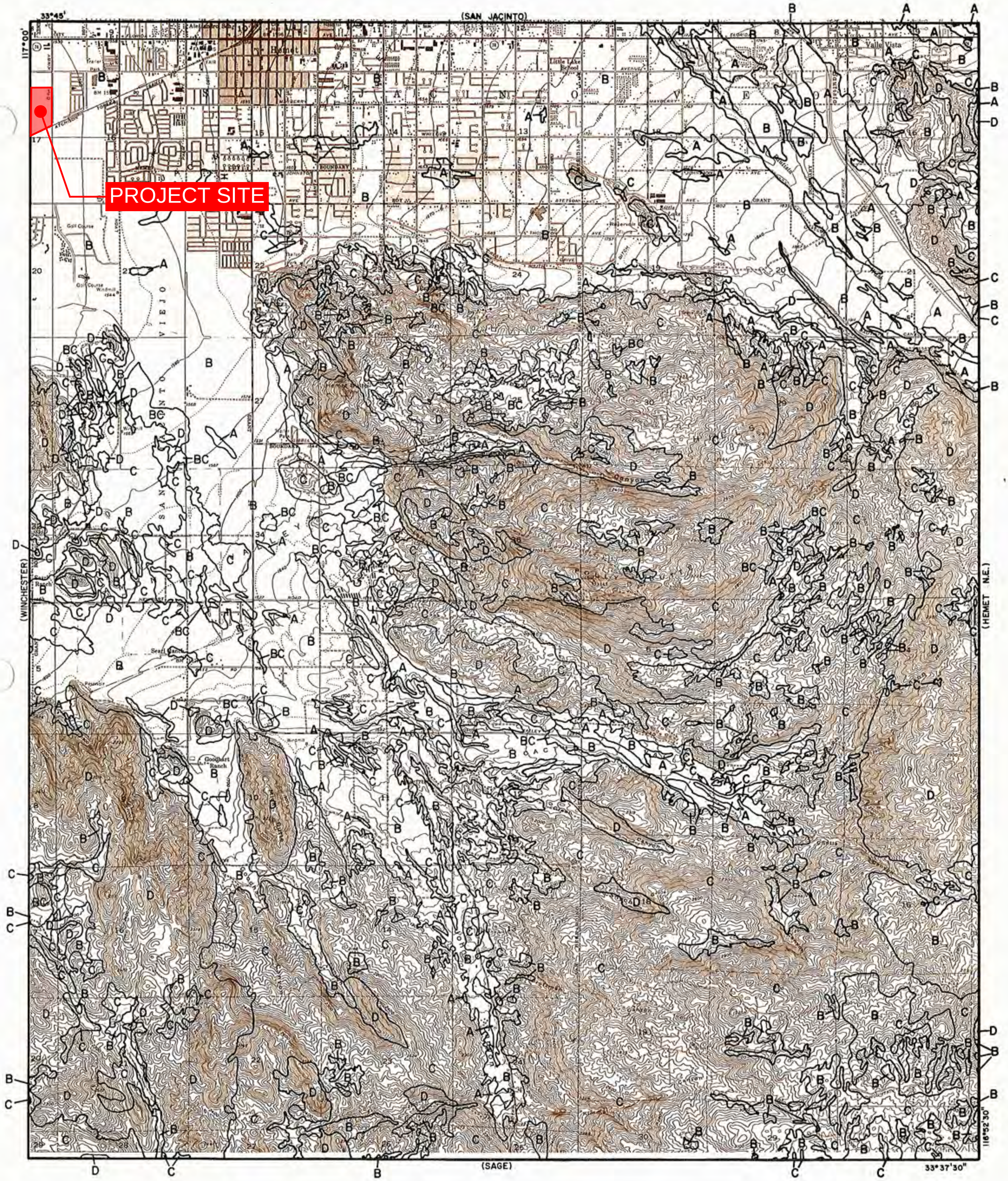
Appendix B – Soil Map



LEGEND

—— SOILS GROUP BOUNDARY

A SOILS GROUP DESIGNATION

RCFC & WCD

HYDROLOGY MANUAL

N

0 FEET 5000

HYDROLOGIC SOILS GROUP MAP FOR HEMET

PLATE C-1.44

Appendix C – NOAA Precipitation Frequency Data

NOAA Atlas 14, Volume 6, Version 2
Location name: Hemet, California, USA*
Latitude: 33.74°, Longitude: -117.0021°
Elevation: m/ft**
* source: ESRI Maps
** source: USGS

POINT PRECIPITATION FREQUENCY ESTIMATES

Sanja Perica, Sarah Dietz, Sarah Heim, Lillian Hiner, Kazungu Maitaria, Deborah Martin, Sandra Pavlovic, Ishani Roy, Carl Trypaluk, Dale Unruh, Fenglin Yan, Michael Yekta, Tan Zhao, Geoffrey Bonnin, Daniel Brewer, Li-Chuan Chen, Tye Parzybok, John Yarchoan

NOAA, National Weather Service, Silver Spring, Maryland

PF_tabular | PF_graphical | Maps_&_aerials

PF tabular

PDS-based point precipitation frequency estimates with 90% confidence intervals (in inches)[1]

Duration	Average recurrence interval (years)									
	1	2	5	10	25	50	100	200	500	1000
5-min	**0.083** (0.069-0.100)	**0.115** (0.096-0.139)	**0.162** (0.135-0.197)	**0.204** (0.168-0.249)	**0.266** (0.212-0.336)	**0.318** (0.248-0.412)	**0.377** (0.287-0.501)	**0.443** (0.328-0.606)	**0.544** (0.385-0.777)	**0.639** (0.436-0.946)
10-min	**0.119** (0.099-0.143)	**0.165** (0.138-0.200)	**0.232** (0.194-0.282)	**0.292** (0.241-0.357)	**0.381** (0.304-0.482)	**0.456** (0.356-0.591)	**0.541** (0.411-0.718)	**0.636** (0.469-0.869)	**0.780** (0.551-1.11)	**0.916** (0.625-1.36)
15-min	**0.143** (0.120-0.173)	**0.200** (0.167-0.242)	**0.281** (0.234-0.341)	**0.353** (0.291-0.432)	**0.460** (0.367-0.583)	**0.552** (0.431-0.715)	**0.654** (0.497-0.868)	**0.769** (0.568-1.05)	**0.943** (0.667-1.35)	**1.11** (0.756-1.64)
30-min	**0.227** (0.190-0.275)	**0.317** (0.265-0.383)	**0.445** (0.371-0.540)	**0.559** (0.462-0.684)	**0.730** (0.582-0.924)	**0.875** (0.683-1.13)	**1.04** (0.788-1.38)	**1.22** (0.900-1.67)	**1.50** (1.06-2.13)	**1.76** (1.20-2.60)
60-min	**0.351** (0.294-0.424)	**0.489** (0.409-0.592)	**0.687** (0.572-0.833)	**0.863** (0.713-1.06)	**1.13** (0.898-1.43)	**1.35** (1.05-1.75)	**1.60** (1.22-2.12)	**1.88** (1.39-2.57)	**2.31** (1.63-3.29)	**2.71** (1.85-4.01)
2-hr	**0.524** (0.439-0.633)	**0.693** (0.579-0.838)	**0.928** (0.773-1.13)	**1.13** (0.935-1.38)	**1.43** (1.14-1.81)	**1.67** (1.30-2.16)	**1.94** (1.47-2.57)	**2.23** (1.64-3.04)	**2.65** (1.88-3.79)	**3.01** (2.06-4.46)
3-hr	**0.644** (0.538-0.777)	**0.836** (0.698-1.01)	**1.10** (0.916-1.33)	**1.33** (1.10-1.62)	**1.65** (1.32-2.09)	**1.92** (1.50-2.48)	**2.20** (1.67-2.92)	**2.51** (1.85-3.43)	**2.96** (2.09-4.22)	**3.33** (2.27-4.93)
6-hr	**0.910** (0.761-1.10)	**1.16** (0.972-1.41)	**1.51** (1.25-1.83)	**1.80** (1.49-2.20)	**2.21** (1.76-2.80)	**2.54** (1.98-3.29)	**2.89** (2.20-3.84)	**3.27** (2.42-4.47)	**3.81** (2.69-5.44)	**4.25** (2.90-6.29)
12-hr	**1.19** (0.997-1.44)	**1.53** (1.28-1.85)	**1.99** (1.65-2.41)	**2.37** (1.96-2.90)	**2.92** (2.33-3.70)	**3.37** (2.63-4.36)	**3.84** (2.92-5.10)	**4.34** (3.21-5.94)	**5.07** (3.58-7.23)	**5.66** (3.86-8.37)
24-hr	**1.56** (1.38-1.80)	**2.03** (1.79-2.35)	**2.68** (2.36-3.10)	**3.23** (2.82-3.77)	**4.02** (3.41-4.85)	**4.66** (3.87-5.74)	**5.35** (4.33-6.74)	**6.09** (4.80-7.88)	**7.15** (5.42-9.63)	**8.03** (5.89-11.2)
2-day	**1.87** (1.66-2.16)	**2.49** (2.20-2.88)	**3.34** (2.94-3.87)	**4.06** (3.55-4.74)	**5.09** (4.31-6.13)	**5.92** (4.91-7.28)	**6.81** (5.51-8.57)	**7.76** (6.12-10.0)	**9.12** (6.91-12.3)	**10.2** (7.50-14.2)
3-day	**2.02** (1.78-2.33)	**2.72** (2.40-3.14)	**3.68** (3.25-4.26)	**4.50** (3.94-5.26)	**5.67** (4.80-6.84)	**6.62** (5.49-8.14)	**7.62** (6.17-9.59)	**8.69** (6.86-11.2)	**10.2** (7.75-13.8)	**11.5** (8.41-16.0)
4-day	**2.15** (1.90-2.48)	**2.93** (2.59-3.39)	**4.01** (3.53-4.64)	**4.92** (4.30-5.74)	**6.22** (5.27-7.50)	**7.27** (6.03-8.94)	**8.38** (6.79-10.6)	**9.57** (7.55-12.4)	**11.3** (8.54-15.2)	**12.7** (9.28-17.6)
7-day	**2.41** (2.13-2.78)	**3.35** (2.96-3.87)	**4.65** (4.10-5.38)	**5.75** (5.03-6.72)	**7.34** (6.21-8.84)	**8.62** (7.15-10.6)	**9.98** (8.08-12.6)	**11.4** (9.02-14.8)	**13.5** (10.3-18.2)	**15.2** (11.2-21.2)
10-day	**2.57** (2.28-2.97)	**3.63** (3.20-4.19)	**5.08** (4.47-5.88)	**6.32** (5.52-7.37)	**8.10** (6.85-9.76)	**9.54** (7.91-11.7)	**11.1** (8.97-13.9)	**12.7** (10.0-16.5)	**15.1** (11.4-20.3)	**17.1** (12.5-23.7)
20-day	**3.10** (2.74-3.58)	**4.42** (3.91-5.11)	**6.26** (5.51-7.25)	**7.84** (6.85-9.15)	**10.1** (8.56-12.2)	**12.0** (9.93-14.7)	**14.0** (11.3-17.6)	**16.1** (12.7-20.8)	**19.2** (14.6-25.9)	**21.8** (16.0-30.3)
30-day	**3.63** (3.21-4.19)	**5.17** (4.57-5.98)	**7.32** (6.45-8.48)	**9.18** (8.03-10.7)	**11.9** (10.1-14.3)	**14.1** (11.7-17.3)	**16.5** (13.3-20.7)	**19.0** (15.0-24.6)	**22.8** (17.3-30.7)	**25.9** (19.0-36.0)
45-day	**4.30** (3.81-4.97)	**6.07** (5.36-7.01)	**8.54** (7.52-9.89)	**10.7** (9.34-12.5)	**13.8** (11.7-16.6)	**16.4** (13.6-20.2)	**19.2** (15.5-24.1)	**22.2** (17.5-28.7)	**26.7** (20.2-35.9)	**30.4** (22.3-42.3)
60-day	**5.02** (4.44-5.79)	**6.97** (6.16-8.06)	**9.73** (8.57-11.3)	**12.1** (10.6-14.2)	**15.6** (13.2-18.9)	**18.6** (15.4-22.8)	**21.7** (17.6-27.3)	**25.2** (19.9-32.6)	**30.3** (23.0-40.8)	**34.6** (25.3-48.1)

[1] Precipitation frequency (PF) estimates in this table are based on frequency analysis of partial duration series (PDS).

Numbers in parenthesis are PF estimates at lower and upper bounds of the 90% confidence interval. The probability that precipitation frequency estimates (for a given duration and average recurrence interval) will be greater than the upper bound (or less than the lower bound) is 5%. Estimates at upper bounds are not checked against probable maximum precipitation (PMP) estimates and may be higher than currently valid PMP values.

Please refer to NOAA Atlas 14 document for more information.

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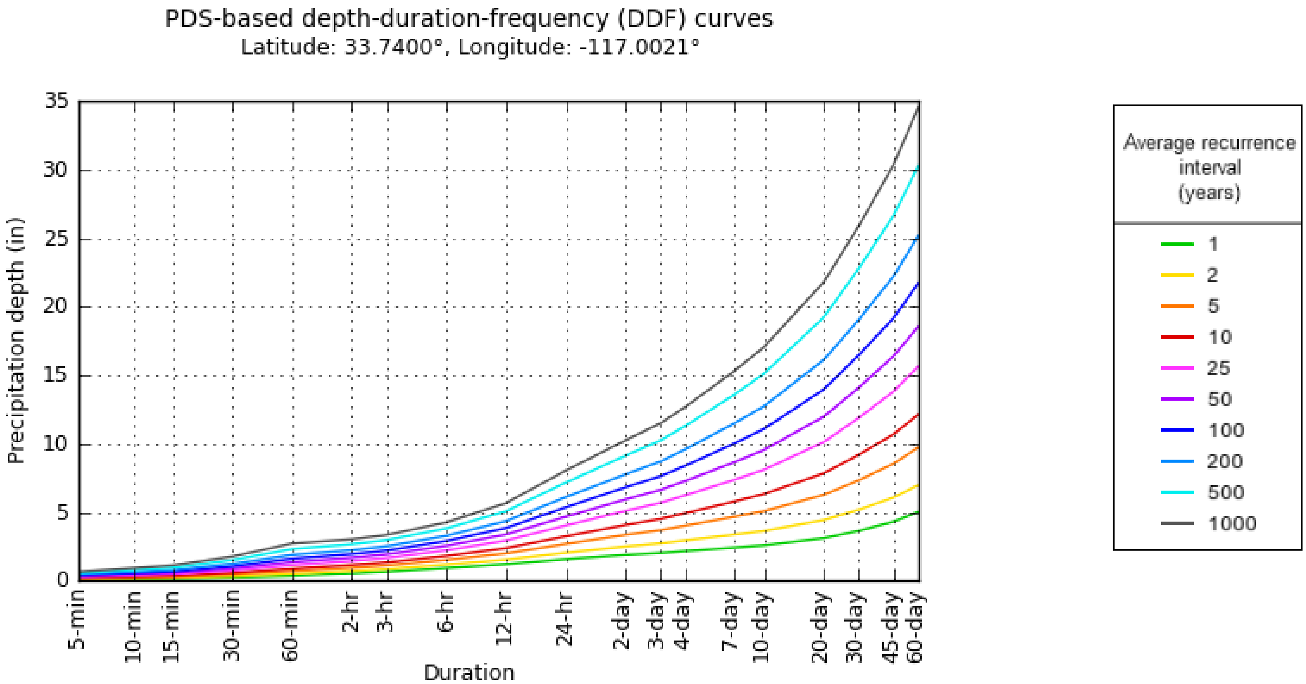
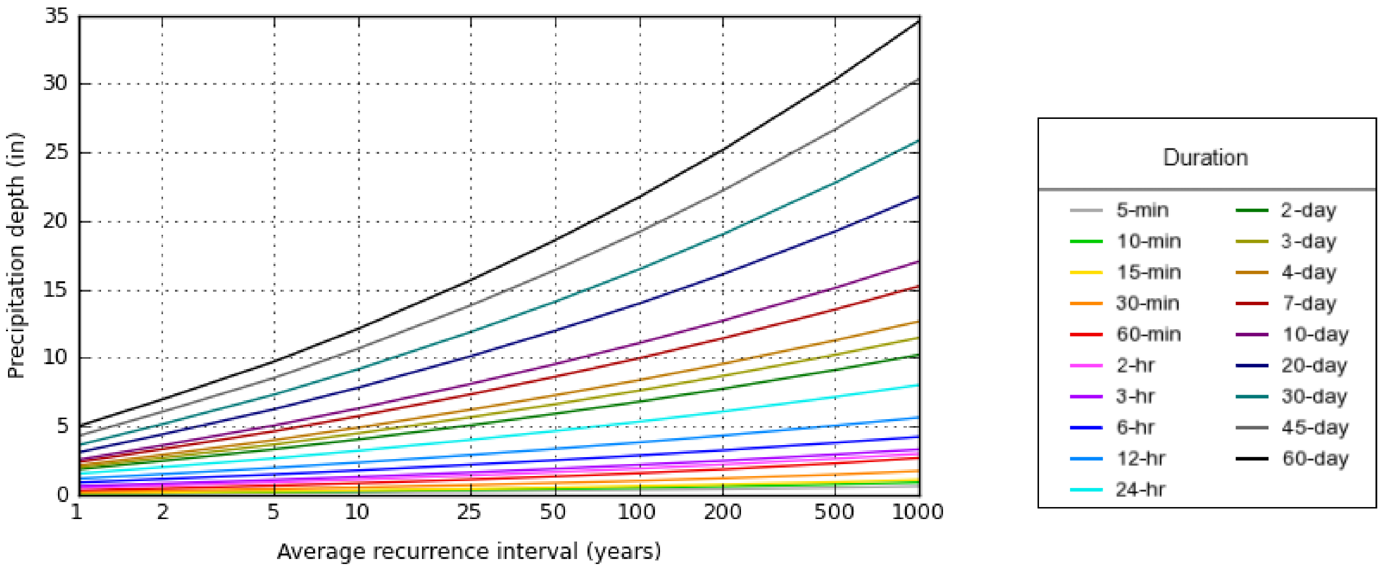
PF graphical





NOAA Atlas 14, Volume 6, Version 2 Created (GMT): Wed Apr 26 20:45:01 2023

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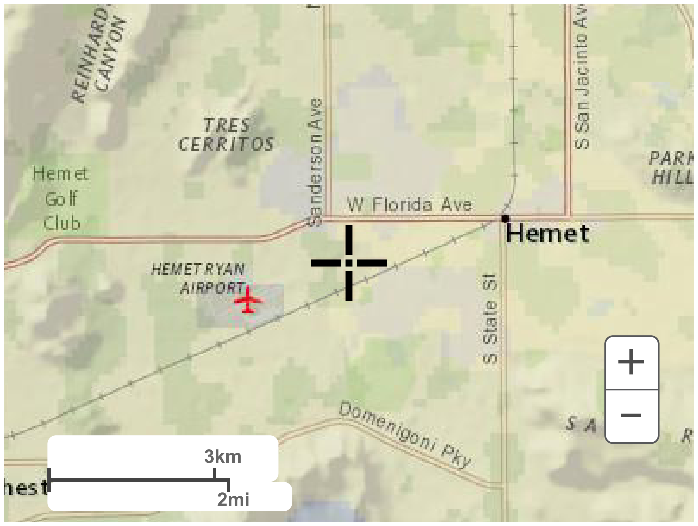
Maps & aerials

Small scale terrain



Large scale terrain

Large scale map

Large scale aerial

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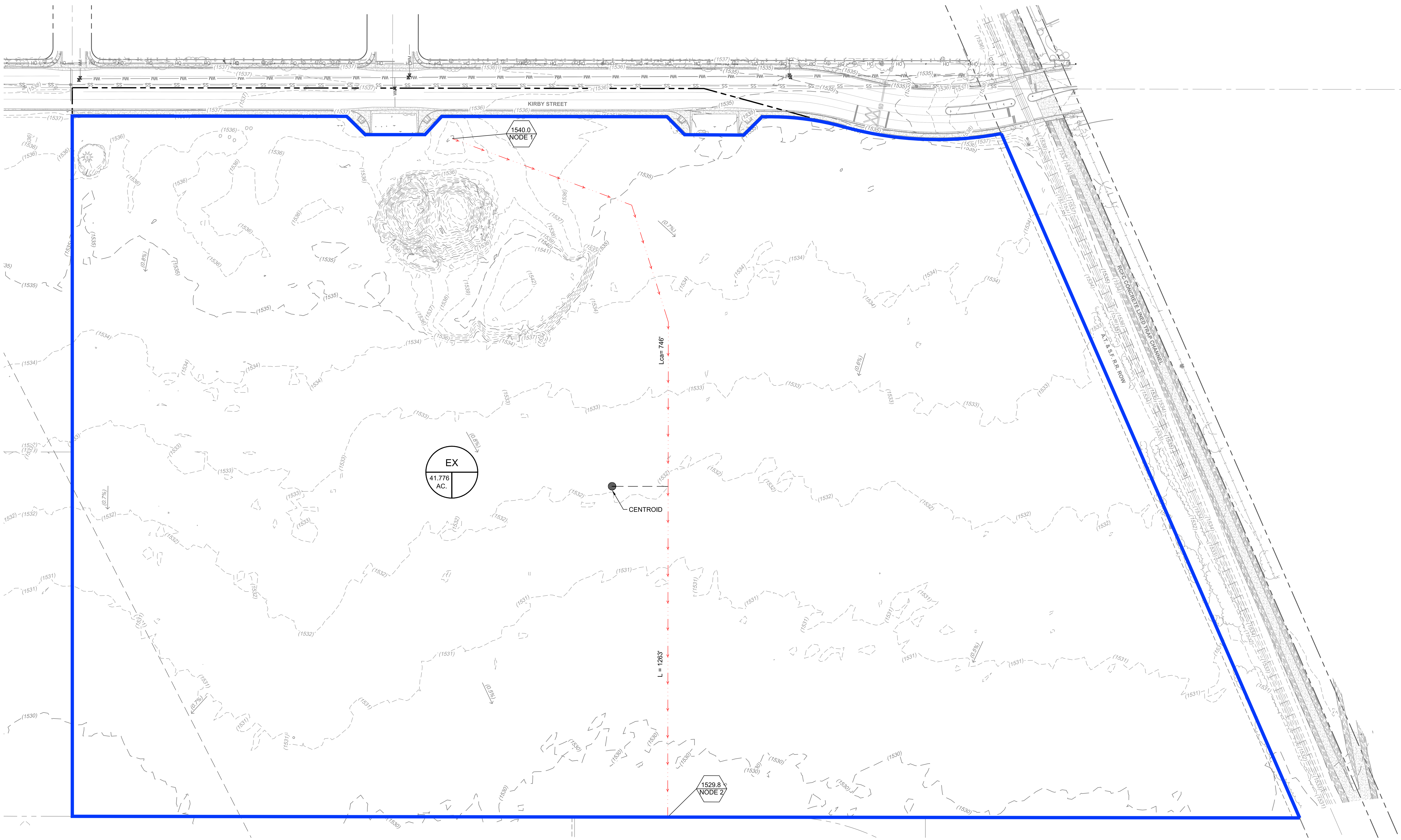
US Department of Commerce
National Oceanic and Atmospheric Administration
National Weather Service
National Water Center
1325 East West Highway
Silver Spring, MD 20910
Questions?: HDSC.Questions@noaa.gov

Appendix D – Existing Condition Hydrology Exhibit

CAUTION: IF THIS SHEET IS NOT 30"x42" IT IS A REDUCED PRINT



LEGEND

BASIN ID / AREA AC.

ELEV. / NODE #

Lca = FLOW PATH LENGTH TO CENTROID
L= FLOW PATH LENGTH

DRAINAGE AREA BOUNDARY

SUBAREA BOUNDARY

SURFACE FLOW PATH

EXISTING STORM DRAIN

EXISTING DRAINAGE SLOPE (2.5%)

SITE CENTROID

COMPOSITVE C-VALUE CALCULATIONS					
EXISTING CONDITIONS					
TOTAL PROJECT AREA	IMPERVIOUS AREA	IMPERVIOUS RUNOFF FACTOR	PERVIOUS AREA	PERVIOUS RUNOFF FACTOR	PERCENT IMPERVIOUS
(SF)	(SF)		(SF)		(%)
1,819,751	0	0.90	1,819,751	0.10	0%

HYDROLOGIC SUMMARY TABLE			
EXISTING CONDITIONS - 3 HOUR DURATION			
BASIN ID	AREA	Q100	V100
	(ACRES)	(CFS)	(FT3)
EX	41.78	67.28	217,647

SCALE: 1" = 60'

W:\IRV21\0146\00\Civil\CAD\Sheets\Exhibits\IRV21-0146_Existing Hydrology Plan.dwg 5/2/2023 12:24 PM ALUND 1:1

WARE MALCOMB
LEADING DESIGN FOR COMMERCIAL REAL ESTATE

915 wilshire blvd.
suite 2150
los angeles, ca 90017
p 310.903.4000
waremalcomb.com

FOR AND ON BEHALF OF WARE MALCOMB

NEWLAND KIRBY
EXISTING CONDITIONS

NO.	DATE	REMARKS

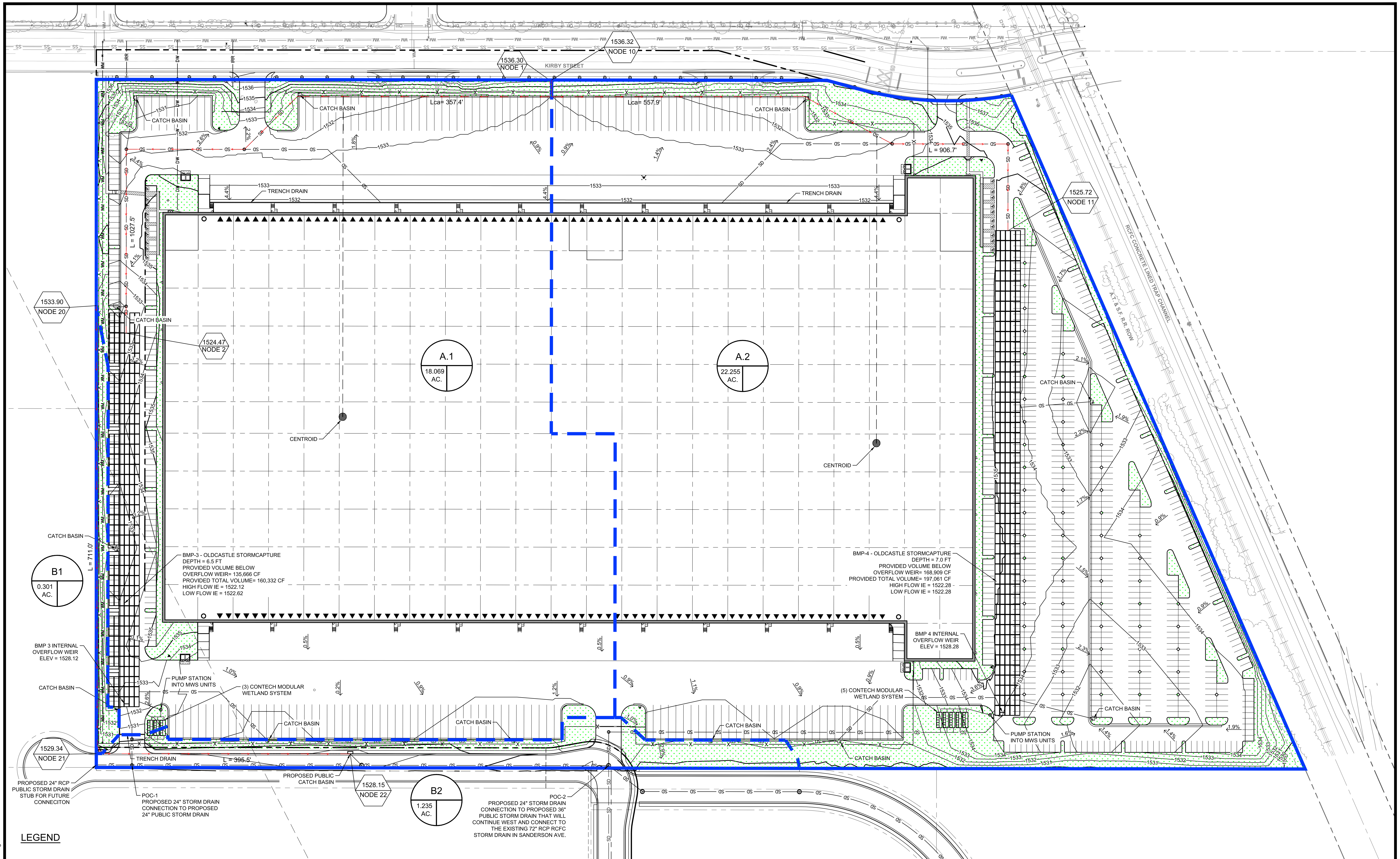
JOB NO.:	IRV21-0146
PA / PM:	LC
DESIGNED:	
DATE:	
PLOT DATE:	5/02/23

SHEET
EX1
Sheet EX1 of

NOT FOR CONSTRUCTION

Appendix E – Proposed Condition Hydrology Exhibit

CAUTION: IF THIS SHEET IS NOT 30"x42" IT IS A REDUCED PRINT



LEGEND

- BASIN ID / AREA AC.
- ELEV. / NODE #
- Lca = FLOW PATH LENGTH TO CENTROID
- L= FLOW PATH LENGTH
- DRAINAGE AREA BOUNDARY
- SUBAREA BOUNDARY
- SURFACE FLOW PATH
- EXISTING STORM DRAIN
- EXISTING DRAINAGE SLOPE (2.5%)
- PROPOSED STORM DRAIN
- PROPOSED DRAINAGE SLOPE 2.5%
- SITE CENTROID

PROPOSED CONDITIONS						
	DRAINAGE AREA	IMPERVIOUS AREA	IMPERVIOUS RUNOFF FACTOR	PERVIOUS AREA	PERVIOUS RUNOFF FACTOR	PERCENT IMPERVIOUS
	(SF)	(SF)		(SF)		(%)
A.1	787,107	739,834	0.90	47,273	0.10	0.940
A.2	969,446	863,431	0.90	106,014	0.10	0.891
B1	13,114	94	0.90	13,019	0.10	0.007
B2	53,802	27,044	0.90	26,759	0.10	0.503
TOTAL PROJECT AREA	1,823,469	1,630,404	0.90	193,065	0.10	0.894

UNDEGROUND GROUND DETENTION SUMMARY TABLE PROPOSED CONDITIONS - 100 YEAR							
BASIN ID	AREA	DEPTH	VOLUME PROVIDED	Q100 (EX)	Q100 (MIT)	VOLUME REMAINING IN BASIN (MIT)	DRAWDOWN TIME (HRS)
	(ACRES)	(FT)	(FT3)	(CFS)	(CFS)	(FT3)	(CFS)
A.1	18.07	6.5	160,332	29.10	21.70	135,026	71.98
A.2	22.255	7.00	197,061	35.84	21.70	163,350	71.90

SCALE: 1" = 60'

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irvine, ca 92618
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REGISTERED PROFESSIONAL ENGINEER LUCAS A. CORSBIE No. 72588 CIVIL STATE OF CALIFORNIA
10/04/2023
FOR AND ON BEHALF OF WARE MALCOMB

NEWLAND KIRBY
PROPOSED CONDITIONS
UNIT HYDROGRAPHS

NO.	DATE	REMARKS

JOB NO.:	IRV21-0146
PA / PM:	LC
DESIGNED:	JP
DATE:	
PLOT DATE:	10/04/23

SHEET
P1
Sheet P1 of

NOT FOR CONSTRUCTION

Appendix F – Existing Condition Hydrologic Calculations

```
                U n i t   H y d r o g r a p h   A n a l y s i s

                Copyright (c) CIVILCADD/CIVILDESIGN, 1989 - 2014, Version 9.0
                        Study date  05/01/23 File: NKEX3100.out


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------------------------------------------------------------------------

        Riverside County Synthetic Unit Hydrology Method
        RCFC & WCD Manual date - April 1978


        Program License Serial Number 6350

        ---------------------------------------------------------------------
         English (in-lb) Input Units Used
         English Rainfall Data (Inches) Input Values Used

         English Units used in output format



        ---------------------------------------------------------------------
        NEWLAND KIRBY
        EXISITING CONDITIONS
        BY WARE MALCOMB

        --------------------------------------------------------------------
        Drainage Area =      41.78(Ac.)  =      0.065 Sq. Mi.
        Drainage Area for Depth-Area Areal Adjustment =      41.78(Ac.)  =
  0.065 Sq. Mi.
        Length along longest watercourse =    1263.00(Ft.)
        Length along longest watercourse measured to centroid =
746.00(Ft.)
        Length along longest watercourse =      0.239 Mi.
        Length along longest watercourse measured to centroid =      0.141
Mi.
        Difference in elevation =      10.20(Ft.)
        Slope along watercourse =     42.6413 Ft./Mi.
        Average Manning's 'N' = 0.030
        Lag time =    0.097 Hr.
        Lag time =     5.85 Min.
        25% of lag time =     1.46 Min.
        40% of lag time =     2.34 Min.
        Unit time =     5.00 Min.
        Duration of storm = 3 Hour(s)
```

```
User Entered Base Flow =     0.00(CFS)

2 YEAR Area rainfall data:


Area(Ac.)[1]       Rainfall(In)[2]      Weighting[1*2]
       41.78            0.84                  34.92

100 YEAR Area rainfall data:


Area(Ac.)[1]       Rainfall(In)[2]      Weighting[1*2]
       41.78            2.20                  91.91

STORM EVENT (YEAR) =  100.00
Area Averaged 2-Year Rainfall =    0.836(In)
Area Averaged 100-Year Rainfall =    2.200(In)

Point rain (area averaged) =    2.200(In)
Areal adjustment factor =   99.98 %
Adjusted average point rain =    2.200(In)

Sub-Area Data:
Area(Ac.)         Runoff Index   Impervious %
    41.776           61.00         0.000
 Total Area Entered =     41.78(Ac.)


RI    RI   Infil. Rate Impervious   Adj. Infil. Rate  Area%     F
AMC2 AMC-3     (In/Hr)    (Dec.%)     (In/Hr)      (Dec.)    (In/Hr)
61.0  78.8      0.258     0.000       0.258       1.000      0.258
                                                 Sum (F) =   0.258
Area averaged mean soil loss (F) (In/Hr) =  0.258
Minimum soil loss rate ((In/Hr)) =  0.129
(for 24 hour storm duration)
Note: User entry of the fm value
Note: User entry of the f value
Soil low loss rate (decimal) =   0.900
---------------------------------------------------------------------

                U n i t  H y d r o g r a p h
                        VALLEY S-Curve
--------------------------------------------------------------------
                Unit Hydrograph Data
---------------------------------------------------------------------
Unit time period   Time % of lag   Distribution   Unit Hydrograph
    (hrs)                           Graph %            (CFS)
---------------------------------------------------------------------
    1   0.083         85.542         14.874              6.262
    2   0.167        171.085         46.084             19.403
```

3	0.250	256.627	18.445		7.766
4	0.333	342.170	7.896		3.325
5	0.417	427.712	4.677		1.969
6	0.500	513.255	2.923		1.231
7	0.583	598.797	2.076		0.874
8	0.667	684.340	1.377		0.580
9	0.750	769.882	0.917		0.386
10	0.833	855.425	0.729		0.307
			Sum = 100.000	Sum=	42.102

The following loss rate calculations reflect use of the minimum calculated loss rate subtracted from the Storm Rain to produce the maximum Effective Rain value

Unit	Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)
1	0.08	1.30	0.343	0.258	(0.309)	0.085
2	0.17	1.30	0.343	0.258	(0.309)	0.085
3	0.25	1.10	0.290	0.258	(0.261)	0.032
4	0.33	1.50	0.396	0.258	(0.356)	0.138
5	0.42	1.50	0.396	0.258	(0.356)	0.138
6	0.50	1.80	0.475	0.258	(0.428)	0.217
7	0.58	1.50	0.396	0.258	(0.356)	0.138
8	0.67	1.80	0.475	0.258	(0.428)	0.217
9	0.75	1.80	0.475	0.258	(0.428)	0.217
10	0.83	1.50	0.396	0.258	(0.356)	0.138
11	0.92	1.60	0.422	0.258	(0.380)	0.164
12	1.00	1.80	0.475	0.258	(0.428)	0.217
13	1.08	2.20	0.581	0.258	(0.523)	0.323
14	1.17	2.20	0.581	0.258	(0.523)	0.323
15	1.25	2.20	0.581	0.258	(0.523)	0.323
16	1.33	2.00	0.528	0.258	(0.475)	0.270
17	1.42	2.60	0.686	0.258	(0.618)	0.428
18	1.50	2.70	0.713	0.258	(0.641)	0.455
19	1.58	2.40	0.633	0.258	(0.570)	0.375
20	1.67	2.70	0.713	0.258	(0.641)	0.455
21	1.75	3.30	0.871	0.258	(0.784)	0.613
22	1.83	3.10	0.818	0.258	(0.736)	0.560
23	1.92	2.90	0.765	0.258	(0.689)	0.507
24	2.00	3.00	0.792	0.258	(0.713)	0.534
25	2.08	3.10	0.818	0.258	(0.736)	0.560
26	2.17	4.20	1.109	0.258	(0.998)	0.851
27	2.25	5.00	1.320	0.258	(1.188)	1.062
28	2.33	3.50	0.924	0.258	(0.831)	0.666
29	2.42	6.80	1.795	0.258	(1.615)	1.537
30	2.50	7.30	1.927	0.258	(1.734)	1.669
31	2.58	8.20	2.164	0.258	(1.948)	1.906

```
32   2.67     5.90      1.557          0.258    (  1.402)        1.299
33   2.75     2.00      0.528          0.258    (  0.475)        0.270
34   2.83     1.80      0.475          0.258    (  0.428)        0.217
35   2.92     1.80      0.475          0.258    (  0.428)        0.217
36   3.00     0.60      0.158       (  0.258)       0.143        0.016
               (Loss Rate Not Used)
   Sum =     100.0                                 Sum =    17.2
      Flood volume = Effective rainfall      1.44(In)
       times area      41.8(Ac.)/[(In)/(Ft.)] =      5.0(Ac.Ft)
      Total soil loss =      0.76(In)
      Total soil loss =     2.661(Ac.Ft)
      Total rainfall =      2.20(In)
      Flood volume =      217646.6 Cubic Feet
      Total soil loss =      115915.5 Cubic Feet
      --------------------------------------------------------------------
       Peak flow rate of this hydrograph =     67.279(CFS)
      --------------------------------------------------------------------
      ++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
                          3 - H O U R   S T O R M
                     R u n o f f     H y d r o g r a p h
      --------------------------------------------------------------------
                  Hydrograph in   5   Minute intervals ((CFS))

      --------------------------------------------------------------------
Time(h+m) Volume Ac.Ft   Q(CFS)  0       17.5      35.0      52.5      70.0
-----------------------------------------------------------------------
  0+ 5       0.0037      0.53  Q          |         |         |         |
  0+10       0.0187      2.19  VQ         |         |         |         |
  0+15       0.0361      2.52  VQ         |         |         |         |
  0+20       0.0528      2.44  VQ         |         |         |         |
  0+25       0.0821      4.24  V Q        |         |         |         |
  0+30       0.1199      5.49  V  Q       |         |         |         |
  0+35       0.1671      6.85  |V Q       |         |         |         |
  0+40       0.2127      6.62  |V Q       |         |         |         |
  0+45       0.2672      7.92  | V Q      |         |         |         |
  0+50       0.3225      8.02  | V Q      |         |         |         |
  0+55       0.3699      6.89  | VQ       |         |         |         |
  1+ 0       0.4200      7.27  |  VQ      |         |         |         |
  1+ 5       0.4821      9.01  |  V Q     |         |         |         |
  1+10       0.5610     11.45  |   V Q    |         |         |         |
  1+15       0.6467     12.45  |    V Q   |         |         |         |
  1+20       0.7330     12.54  |    V Q   |         |         |         |
  1+25       0.8211     12.78  |     VQ   |         |         |         |
  1+30       0.9297     15.77  |      V Q|         |         |         |
  1+35       1.0464     16.95  |       VQ|         |         |         |
  1+40       1.1610     16.63  |        Q|         |         |         |
  1+45       1.2914     18.93  |         Q         |         |         |
  1+50       1.4447     22.26  |         |VQ       |         |         |
  1+55       1.5989     22.39  |         | Q       |         |         |
  2+ 0       1.7490     21.80  |         | Q V     |         |         |
```

```
    2+ 5       1.9025     22.29  |         | Q  V    |         |         |
    2+10       2.0734     24.82  |         |   Q V   |         |         |
    2+15       2.2943     32.07  |         |       Q |         |         |
    2+20       2.5427     36.07  |         |         Q         |         |
    2+25       2.7943     36.54  |         |         Q V       |         |
    2+30       3.1561     52.53  |         |         |    V    Q         |
    2+35       3.5886     62.80  |         |         |       V |    Q    |
    2+40       4.0520     67.28  |         |         |         | V     Q |
    2+45       4.4165     52.93  |         |         |         Q    V    |
    2+50       4.6226     29.92  |         |      Q  |         |      V  |
    2+55       4.7617     20.21  |         |Q        |         |       V |
    3+ 0       4.8632     14.74  |       Q |         |         |       V |
    3+ 5       4.9203      8.28  |   Q     |         |         |        V|
    3+10       4.9545      4.96  | Q       |         |         |        V|
    3+15       4.9750      2.99  |Q        |         |         |        V|
    3+20       4.9870      1.73  Q         |         |         |        V|
    3+25       4.9927      0.84  Q         |         |         |        V|
    3+30       4.9948      0.31  Q         |         |         |        V|
    3+35       4.9959      0.16  Q         |         |         |        V|
    3+40       4.9964      0.07  Q         |         |         |        V|
    3+45       4.9965      0.00  Q         |         |         |        V|
-----------------------------------------------------------------------
```

Appendix G – Proposed Condition Hydrologic Calculations

```
        U n i t   H y d r o g r a p h   A n a l y s i s

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                Study date  10/03/23 File: PRA1UH3100.out

++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
------------------------------------------------------------------------

Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978


Program License Serial Number 6350

---------------------------------------------------------------------
 English (in-lb) Input Units Used
 English Rainfall Data (Inches) Input Values Used

 English Units used in output format




---------------------------------------------------------------------
PROPOSED CONDITION
UNIT HYDROGRAPH
BASIN A.1
100-YEAR 3-HOUR STORM
--------------------------------------------------------------------
Drainage Area =      18.07(Ac.)  =      0.028 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment =      18.07(Ac.)  =      0.028 Sq. Mi.
Length along longest watercourse =    1027.00(Ft.)
Length along longest watercourse measured to centroid =     357.40(Ft.)
Length along longest watercourse =      0.195 Mi.
Length along longest watercourse measured to centroid =      0.068 Mi.
Difference in elevation =      11.83(Ft.)
Slope along watercourse =     60.8203 Ft./Mi.
Average Manning's 'N' = 0.013
Lag time =    0.028 Hr.
Lag time =     1.65 Min.
25% of lag time =     0.41 Min.
40% of lag time =     0.66 Min.
Unit time =     5.00 Min.
Duration of storm = 3 Hour(s)
User Entered Base Flow =     0.00(CFS)

2 YEAR Area rainfall data:


Area(Ac.)[1]       Rainfall(In)[2]      Weighting[1*2]
       18.07            0.84                  15.11

100 YEAR Area rainfall data:


Area(Ac.)[1]       Rainfall(In)[2]      Weighting[1*2]
       18.07            2.20                  39.75

STORM EVENT (YEAR) =  100.00
Area Averaged 2-Year Rainfall =    0.836(In)
Area Averaged 100-Year Rainfall =    2.200(In)

Point rain (area averaged) =    2.200(In)
Areal adjustment factor =   99.99 %
Adjusted average point rain =    2.200(In)

Sub-Area Data:
Area(Ac.)         Runoff Index   Impervious %
```

18.069	56.00	0.940

Total Area Entered = 18.07(Ac.)

RI AMC2	RI AMC-3	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
56.0	74.8	0.305	0.940	0.047	1.000	0.047
					Sum (F) =	0.047

Area averaged mean soil loss (F) (In/Hr) = 0.047
Minimum soil loss rate ((In/Hr)) = 0.024
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.148

U n i t H y d r o g r a p h
VALLEY S-Curve

Unit Hydrograph Data

Unit time period	(hrs)	Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	302.162	56.901	10.362
2	0.167	604.324	37.010	6.740
3	0.250	906.485	6.089	1.109
			Sum = 100.000	Sum= 18.210

The following loss rate calculations reflect use of the minimum calculated loss rate subtracted from the Storm Rain to produce the maximum Effective Rain value

Unit	Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)
1	0.08	1.30	0.343	0.047	(0.051)	0.296
2	0.17	1.30	0.343	0.047	(0.051)	0.296
3	0.25	1.10	0.290	(0.047)	0.043	0.247
4	0.33	1.50	0.396	0.047	(0.059)	0.349
5	0.42	1.50	0.396	0.047	(0.059)	0.349
6	0.50	1.80	0.475	0.047	(0.070)	0.428
7	0.58	1.50	0.396	0.047	(0.059)	0.349
8	0.67	1.80	0.475	0.047	(0.070)	0.428
9	0.75	1.80	0.475	0.047	(0.070)	0.428
10	0.83	1.50	0.396	0.047	(0.059)	0.349
11	0.92	1.60	0.422	0.047	(0.063)	0.375
12	1.00	1.80	0.475	0.047	(0.070)	0.428
13	1.08	2.20	0.581	0.047	(0.086)	0.534
14	1.17	2.20	0.581	0.047	(0.086)	0.534
15	1.25	2.20	0.581	0.047	(0.086)	0.534
16	1.33	2.00	0.528	0.047	(0.078)	0.481
17	1.42	2.60	0.686	0.047	(0.102)	0.639
18	1.50	2.70	0.713	0.047	(0.105)	0.666
19	1.58	2.40	0.634	0.047	(0.094)	0.587
20	1.67	2.70	0.713	0.047	(0.105)	0.666
21	1.75	3.30	0.871	0.047	(0.129)	0.824
22	1.83	3.10	0.818	0.047	(0.121)	0.771
23	1.92	2.90	0.766	0.047	(0.113)	0.719
24	2.00	3.00	0.792	0.047	(0.117)	0.745
25	2.08	3.10	0.818	0.047	(0.121)	0.771
26	2.17	4.20	1.109	0.047	(0.164)	1.062
27	2.25	5.00	1.320	0.047	(0.195)	1.273
28	2.33	3.50	0.924	0.047	(0.137)	0.877
29	2.42	6.80	1.795	0.047	(0.266)	1.748
30	2.50	7.30	1.927	0.047	(0.285)	1.880
31	2.58	8.20	2.165	0.047	(0.320)	2.118
32	2.67	5.90	1.557	0.047	(0.231)	1.510
33	2.75	2.00	0.528	0.047	(0.078)	0.481
34	2.83	1.80	0.475	0.047	(0.070)	0.428
35	2.92	1.80	0.475	0.047	(0.070)	0.428

```
36   3.00     0.60      0.158       (  0.047)       0.023        0.135
               (Loss Rate Not Used)
   Sum =     100.0                                  Sum =     24.7
      Flood volume = Effective rainfall      2.06(In)
       times area      18.1(Ac.)/[(In)/(Ft.)] =       3.1(Ac.Ft)
      Total soil loss =      0.14(In)
      Total soil loss =     0.209(Ac.Ft)
      Total rainfall =      2.20(In)
      Flood volume =      135185.4 Cubic Feet
      Total soil loss =       9102.2 Cubic Feet
      --------------------------------------------------------------------
       Peak flow rate of this hydrograph =     36.570(CFS)
      --------------------------------------------------------------------
      ++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
                          3 - H O U R    S T O R M
                     R u n o f f      H y d r o g r a p h
      --------------------------------------------------------------------
                  Hydrograph in   5   Minute intervals ((CFS))

      --------------------------------------------------------------------
Time(h+m) Volume Ac.Ft   Q(CFS)  0       10.0      20.0      30.0      40.0
-----------------------------------------------------------------------
  0+ 5       0.0211      3.07  V  Q      |         |         |         |
  0+10       0.0560      5.07  V    Q    |         |         |         |
  0+15       0.0897      4.89  |V  Q     |         |         |         |
  0+20       0.1284      5.61  |V   Q    |         |         |         |
  0+25       0.1714      6.24  | V   Q   |         |         |         |
  0+30       0.2208      7.18  | V    Q  |         |         |         |
  0+35       0.2683      6.89  |  V  Q   |         |         |         |
  0+40       0.3183      7.27  |   V  Q  |         |         |         |
  0+45       0.3715      7.71  |   V  Q  |         |         |         |
  0+50       0.4195      6.98  |    VQ   |         |         |         |
  0+55       0.4658      6.72  |     Q   |         |         |         |
  1+ 0       0.5165      7.36  |     VQ  |         |         |         |
  1+ 5       0.5773      8.84  |      VQ |         |         |         |
  1+10       0.6435      9.61  |       VQ|         |         |         |
  1+15       0.7105      9.72  |        Q|         |         |         |
  1+20       0.7737      9.18  |        Q|         |         |         |
  1+25       0.8457     10.46  |         Q         |         |         |
  1+30       0.9266     11.75  |         |Q        |         |         |
  1+35       1.0043     11.28  |         |QV       |         |         |
  1+40       1.0842     11.60  |         |Q V      |         |         |
  1+45       1.1784     13.68  |         |  Q V    |         |         |
  1+50       1.2768     14.29  |         |   Q V   |         |         |
  1+55       1.3702     13.56  |         |  Q   V  |         |         |
  2+ 0       1.4627     13.42  |         |  Q    V |         |         |
  2+ 5       1.5578     13.82  |         |  Q      V         |         |
  2+10       1.6752     17.03  |         |      Q  |V        |         |
  2+15       1.8212     21.21  |         |         |Q V      |         |
  2+20       1.9511     18.85  |         |       Q |    V    |         |
  2+25       2.1263     25.45  |         |         |    Q V  |         |
  2+30       2.3484     32.25  |         |         |         V Q       |
  2+35       2.6003     36.57  |         |         |         |  V  Q   |
  2+40       2.8208     32.02  |         |         |         | Q   V   |
  2+45       2.9415     17.52  |         |      Q  |         |      V  |
  2+50       3.0059      9.36  |        Q|         |         |       V |
  2+55       3.0601      7.86  |      Q  |         |         |        V|
  3+ 0       3.0929      4.76  |   Q     |         |         |        V|
  3+ 5       3.1024      1.38  |Q        |         |         |        V|
  3+10       3.1034      0.15  Q         |         |         |        V|
-----------------------------------------------------------------------
```

```
       U n i t   H y d r o g r a p h   A n a l y s i s

       Copyright (c) CIVILCADD/CIVILDESIGN, 1989 - 2018, Version 9.0
               Study date  10/03/23 File: PRA2UH3100.out

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Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978


Program License Serial Number 6350

---------------------------------------------------------------------
 English (in-lb) Input Units Used
 English Rainfall Data (Inches) Input Values Used

 English Units used in output format



---------------------------------------------------------------------
PROPOSED CONDITION
UNIT HYDROGRAPH
BASIN A.2
100-YEAR 3-HOUR STORM
--------------------------------------------------------------------
Drainage Area =      22.25(Ac.)  =      0.035 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment =      22.25(Ac.)  =      0.035 Sq. Mi.
Length along longest watercourse =     906.70(Ft.)
Length along longest watercourse measured to centroid =     557.90(Ft.)
Length along longest watercourse =      0.172 Mi.
Length along longest watercourse measured to centroid =      0.106 Mi.
Difference in elevation =      10.60(Ft.)
Slope along watercourse =     61.7271 Ft./Mi.
Average Manning's 'N' = 0.013
Lag time =    0.031 Hr.
Lag time =     1.86 Min.
25% of lag time =     0.47 Min.
40% of lag time =     0.75 Min.
Unit time =     5.00 Min.
Duration of storm = 3 Hour(s)
User Entered Base Flow =     0.00(CFS)

2 YEAR Area rainfall data:


Area(Ac.)[1]       Rainfall(In)[2]      Weighting[1*2]
       22.25            0.84                  18.61

100 YEAR Area rainfall data:


Area(Ac.)[1]       Rainfall(In)[2]      Weighting[1*2]
       22.25            2.20                  48.96

STORM EVENT (YEAR) =  100.00
Area Averaged 2-Year Rainfall =    0.836(In)
Area Averaged 100-Year Rainfall =    2.200(In)

Point rain (area averaged) =    2.200(In)
Areal adjustment factor =   99.99 %
Adjusted average point rain =    2.200(In)

Sub-Area Data:
Area(Ac.)         Runoff Index   Impervious %
```

```
   22.255           56.00         0.891
 Total Area Entered =     22.25(Ac.)


RI    RI   Infil. Rate Impervious   Adj. Infil. Rate  Area%     F
AMC2 AMC-3     (In/Hr)    (Dec.%)     (In/Hr)      (Dec.)    (In/Hr)
56.0  74.8      0.305     0.891       0.060       1.000      0.060
                                                  Sum (F) =   0.060
Area averaged mean soil loss (F) (In/Hr) =  0.060
Minimum soil loss rate ((In/Hr)) =  0.030
(for 24 hour storm duration)
Soil low loss rate (decimal) =   0.187
---------------------------------------------------------------------

                U n i t  H y d r o g r a p h
                        VALLEY S-Curve
--------------------------------------------------------------------
                Unit Hydrograph Data
---------------------------------------------------------------------
Unit time period   Time % of lag   Distribution   Unit Hydrograph
    (hrs)                            Graph %           (CFS)
---------------------------------------------------------------------
    1   0.083        268.243         53.168            11.925
    2   0.167        536.487         38.948             8.736
    3   0.250        804.730          7.884             1.768
                              Sum = 100.000   Sum=      22.429
-----------------------------------------------------------------------
```

The following loss rate calculations reflect use of the minimum calculated loss rate subtracted from the Storm Rain to produce the maximum Effective Rain value

Unit	Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)
1	0.08	1.30	0.343	0.060	(0.064)	0.283
2	0.17	1.30	0.343	0.060	(0.064)	0.283
3	0.25	1.10	0.290	(0.060)	0.054	0.236
4	0.33	1.50	0.396	0.060	(0.074)	0.335
5	0.42	1.50	0.396	0.060	(0.074)	0.335
6	0.50	1.80	0.475	0.060	(0.089)	0.415
7	0.58	1.50	0.396	0.060	(0.074)	0.335
8	0.67	1.80	0.475	0.060	(0.089)	0.415
9	0.75	1.80	0.475	0.060	(0.089)	0.415
10	0.83	1.50	0.396	0.060	(0.074)	0.335
11	0.92	1.60	0.422	0.060	(0.079)	0.362
12	1.00	1.80	0.475	0.060	(0.089)	0.415
13	1.08	2.20	0.581	0.060	(0.109)	0.520
14	1.17	2.20	0.581	0.060	(0.109)	0.520
15	1.25	2.20	0.581	0.060	(0.109)	0.520
16	1.33	2.00	0.528	0.060	(0.099)	0.467
17	1.42	2.60	0.686	0.060	(0.128)	0.626
18	1.50	2.70	0.713	0.060	(0.133)	0.652
19	1.58	2.40	0.634	0.060	(0.118)	0.573
20	1.67	2.70	0.713	0.060	(0.133)	0.652
21	1.75	3.30	0.871	0.060	(0.163)	0.811
22	1.83	3.10	0.818	0.060	(0.153)	0.758
23	1.92	2.90	0.766	0.060	(0.143)	0.705
24	2.00	3.00	0.792	0.060	(0.148)	0.731
25	2.08	3.10	0.818	0.060	(0.153)	0.758
26	2.17	4.20	1.109	0.060	(0.207)	1.048
27	2.25	5.00	1.320	0.060	(0.247)	1.259
28	2.33	3.50	0.924	0.060	(0.173)	0.863
29	2.42	6.80	1.795	0.060	(0.336)	1.735
30	2.50	7.30	1.927	0.060	(0.360)	1.867
31	2.58	8.20	2.165	0.060	(0.405)	2.104
32	2.67	5.90	1.557	0.060	(0.291)	1.497
33	2.75	2.00	0.528	0.060	(0.099)	0.467
34	2.83	1.80	0.475	0.060	(0.089)	0.415
35	2.92	1.80	0.475	0.060	(0.089)	0.415

```
36   3.00     0.60      0.158       (  0.060)       0.030        0.129
               (Loss Rate Not Used)
   Sum =     100.0                                 Sum =    24.3
      Flood volume = Effective rainfall      2.02(In)
       times area      22.3(Ac.)/[(In)/(Ft.)] =       3.7(Ac.Ft)
      Total soil loss =      0.18(In)
      Total soil loss =     0.331(Ac.Ft)
      Total rainfall =      2.20(In)
      Flood volume =      163300.0 Cubic Feet
      Total soil loss =       14411.1 Cubic Feet
      --------------------------------------------------------------------
       Peak flow rate of this hydrograph =     44.487(CFS)
      --------------------------------------------------------------------
      ++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
                          3 - H O U R    S T O R M
                     R u n o f f      H y d r o g r a p h
      --------------------------------------------------------------------
                  Hydrograph in   5   Minute intervals ((CFS))

      --------------------------------------------------------------------
Time(h+m) Volume Ac.Ft   Q(CFS)  0       12.5      25.0      37.5      50.0
-----------------------------------------------------------------------
  0+ 5       0.0232      3.37  V Q       |         |         |         |
  0+10       0.0635      5.84  V   Q     |         |         |         |
  0+15       0.1033      5.79  |V  Q     |         |         |         |
  0+20       0.1485      6.57  |V   Q    |         |         |         |
  0+25       0.1992      7.35  | V  Q    |         |         |         |
  0+30       0.2575      8.47  | V   Q   |         |         |         |
  0+35       0.3142      8.22  |  V  Q   |         |         |         |
  0+40       0.3735      8.61  |  V  Q   |         |         |         |
  0+45       0.4366      9.17  |   V  Q  |         |         |         |
  0+50       0.4942      8.36  |    VQ   |         |         |         |
  0+55       0.5491      7.98  |    VQ   |         |         |         |
  1+ 0       0.6091      8.70  |     Q   |         |         |         |
  1+ 5       0.6812     10.47  |      VQ |         |         |         |
  1+10       0.7603     11.49  |       VQ|         |         |         |
  1+15       0.8407     11.67  |       VQ|         |         |         |
  1+20       0.9168     11.04  |       QV|         |         |         |
  1+25       1.0027     12.47  |        QV         |         |         |
  1+30       1.0997     14.08  |         |Q        |         |         |
  1+35       1.1936     13.64  |         Q V       |         |         |
  1+40       1.2897     13.94  |         |Q V      |         |         |
  1+45       1.4025     16.39  |         |  QV     |         |         |
  1+50       1.5215     17.28  |         |  Q  V   |         |         |
  1+55       1.6350     16.47  |         |  Q   V  |         |         |
  2+ 0       1.7467     16.23  |         | Q     V |         |         |
  2+ 5       1.8616     16.68  |         |  Q     V|         |         |
  2+10       2.0023     20.42  |         |     Q   |V        |         |
  2+15       2.1781     25.53  |         |         Q  V      |         |
  2+20       2.3376     23.16  |         |       Q |   V     |         |
  2+25       2.5475     30.47  |         |         |   Q  V  |         |
  2+30       2.8158     38.96  |         |         |         VQ        |
  2+35       3.1222     44.49  |         |         |         |  V Q    |
  2+40       3.3946     39.55  |         |         |         |Q    V   |
  2+45       3.5487     22.38  |         |      Q  |         |      V  |
  2+50       3.6292     11.68  |        Q|         |         |       V |
  2+55       3.6939      9.40  |      Q  |         |         |        V|
  3+ 0       3.7345      5.89  |   Q     |         |         |        V|
  3+ 5       3.7473      1.86  |Q        |         |         |        V|
  3+10       3.7489      0.23  Q         |         |         |         V
-----------------------------------------------------------------------
```

```
                Riverside County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c) 1989 - 2018 Version 9.0
        Rational Hydrology Study        Date: 10/04/23  File:PRBRAT10.out
------------------------------------------------------------------------
PROPOSED CONDITION
RATIONAL METHOD
BASIN B
10-YEAR STORM EVENT
------------------------------------------------------------------------
 *********   Hydrology Study Control Information **********

 English (in-lb) Units used in input data file

------------------------------------------------------------------------


Program License Serial Number 6350

------------------------------------------------------------------------
Rational Method Hydrology Program based on
Riverside County Flood Control & Water Conservation District
1978 hydrology manual

Storm event (year) =   10.00 Antecedent Moisture Condition = 2

Standard intensity-duration curves data (Plate D-4.1)
For the [ Hemet ] area used.
10 year storm 10 minute intensity =  1.960(In/Hr)
10 year storm 60 minute intensity =  0.760(In/Hr)
100 year storm 10 minute intensity =  3.050(In/Hr)
100 year storm 60 minute intensity =  1.180(In/Hr)

Storm event year =  10.0
Calculated rainfall intensity data:
1 hour intensity =  0.760(In/Hr)
Slope of intensity duration curve = 0.5300




++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       20.000 to Point/Station       21.000
**** INITIAL AREA EVALUATION ****
______________________________________________________________________
Initial area flow distance =   711.000(Ft.)
Top (of initial area) elevation =  1533.900(Ft.)
Bottom (of initial area) elevation =  1529.340(Ft.)
Difference in elevation =     4.560(Ft.)
Slope =    0.00641  s(percent)=       0.64
TC = k(0.940)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   35.683 min.
Rainfall intensity =      1.001(In/Hr) for a    10.0 year storm
UNDEVELOPED (good cover) subarea
Runoff Coefficient = 0.486
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  61.00
Pervious area fraction =  1.000; Impervious fraction =  0.000
Initial subarea runoff =      0.146(CFS)
Total initial stream area =        0.301(Ac.)
Pervious area fraction = 1.000


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Process from Point/Station       21.000 to Point/Station       22.000
**** IRREGULAR CHANNEL FLOW TRAVEL TIME ****
______________________________________________________________________
Estimated mean flow rate at midpoint of channel =      0.555(CFS)
Depth of flow =   0.245(Ft.), Average velocity =   1.124(Ft/s)
        ******* Irregular Channel Data ***********
-----------------------------------------------------------------
Information entered for subchannel number 1 :
Point number      'X' coordinate     'Y' coordinate
        1             0.00             0.67
        2             0.50             0.67
        3             0.67             0.00
        4             2.67             0.17
        5            24.67             0.57
Manning's 'N' friction factor =   0.013
-----------------------------------------------------------------
Sub-Channel flow  =      0.555(CFS)
  '     '        flow top width =      6.305(Ft.)
  '     '    velocity=    1.124(Ft/s)
  '     '        area =      0.494(Sq.Ft)
  '     '        Froude number =     0.708

Upstream point elevation =  1529.340(Ft.)
Downstream point elevation =  1528.150(Ft.)
Flow length =   395.500(Ft.)
Travel time  =    5.86 min.
Time of concentration =   41.55 min.
Depth of flow =   0.245(Ft.)
Average velocity =   1.124(Ft/s)
Total irregular channel flow =     0.555(CFS)
Irregular channel normal depth above invert elev. =   0.245(Ft.)
Average velocity of channel(s) =   1.124(Ft/s)
 Adding area flow to channel
MOBILE HOME PARK subarea type
Runoff Coefficient = 0.780
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  56.00
Pervious area fraction =  0.250; Impervious fraction =  0.750
Rainfall intensity =      0.923(In/Hr) for a    10.0 year storm
Subarea runoff =      0.890(CFS) for      1.235(Ac.)
Total runoff =      1.036(CFS)  Total area =       1.536(Ac.)
Depth of flow =   0.288(Ft.), Average velocity =   1.273(Ft/s)
End of computations, total study area =            1.54 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.

Area averaged pervious area fraction(Ap) = 0.397
Area averaged RI index number =  57.0
```

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                Riverside County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c) 1989 - 2018 Version 9.0
        Rational Hydrology Study        Date: 10/04/23  File:PRBRAT100.out
------------------------------------------------------------------------
PROPOSED CONDITION
RATIONAL METHOD
BASIN B
100-YEAR STORM EVENT
------------------------------------------------------------------------
 *********   Hydrology Study Control Information **********

 English (in-lb) Units used in input data file

------------------------------------------------------------------------


Program License Serial Number 6350

------------------------------------------------------------------------
Rational Method Hydrology Program based on
Riverside County Flood Control & Water Conservation District
1978 hydrology manual

Storm event (year) =  100.00 Antecedent Moisture Condition = 3

Standard intensity-duration curves data (Plate D-4.1)
For the [ Hemet ] area used.
10 year storm 10 minute intensity =  1.960(In/Hr)
10 year storm 60 minute intensity =  0.760(In/Hr)
100 year storm 10 minute intensity =  3.050(In/Hr)
100 year storm 60 minute intensity =  1.180(In/Hr)

Storm event year = 100.0
Calculated rainfall intensity data:
1 hour intensity =  1.180(In/Hr)
Slope of intensity duration curve = 0.5300





++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       20.000 to Point/Station       21.000
**** INITIAL AREA EVALUATION ****
______________________________________________________________________
Initial area flow distance =   711.000(Ft.)
Top (of initial area) elevation =  1533.900(Ft.)
Bottom (of initial area) elevation =  1529.340(Ft.)
Difference in elevation =     4.560(Ft.)
Slope =    0.00641  s(percent)=       0.64
TC = k(0.940)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   35.683 min.
Rainfall intensity =      1.554(In/Hr) for a   100.0 year storm
UNDEVELOPED (good cover) subarea
Runoff Coefficient = 0.731
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 3)  =  78.80
Pervious area fraction =  1.000; Impervious fraction =  0.000
Initial subarea runoff =      0.342(CFS)
Total initial stream area =        0.301(Ac.)
Pervious area fraction = 1.000


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```

```
Process from Point/Station      21.000 to Point/Station      22.000
**** IRREGULAR CHANNEL FLOW TRAVEL TIME ****
______________________________________________________________________
Estimated mean flow rate at midpoint of channel =      1.071(CFS)
Depth of flow =   0.290(Ft.), Average velocity =   1.282(Ft/s)
        ******* Irregular Channel Data ***********
-----------------------------------------------------------------
Information entered for subchannel number 1 :
Point number      'X' coordinate     'Y' coordinate
       1              0.00              0.67
       2              0.50              0.67
       3              0.67              0.00
       4              2.67              0.17
       5             24.67              0.57
Manning's 'N' friction factor =   0.013
-----------------------------------------------------------------
Sub-Channel flow  =      1.071(CFS)
  '     '        flow top width =      8.807(Ft.)
  '     '    velocity=    1.282(Ft/s)
  '     '        area =      0.836(Sq.Ft)
  '     '        Froude number =     0.733

Upstream point elevation =  1529.340(Ft.)
Downstream point elevation =  1528.150(Ft.)
Flow length =   395.500(Ft.)
Travel time  =    5.14 min.
Time of concentration =   40.83 min.
Depth of flow =   0.290(Ft.)
Average velocity =   1.282(Ft/s)
Total irregular channel flow =     1.071(CFS)
Irregular channel normal depth above invert elev. =   0.290(Ft.)
Average velocity of channel(s) =   1.282(Ft/s)
 Adding area flow to channel
MOBILE HOME PARK subarea type
Runoff Coefficient = 0.847
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 3)  =  74.80
Pervious area fraction =  0.250; Impervious fraction =  0.750
Rainfall intensity =      1.447(In/Hr) for a   100.0 year storm
Subarea runoff =      1.513(CFS) for      1.235(Ac.)
Total runoff =      1.855(CFS)  Total area =       1.536(Ac.)
Depth of flow =   0.335(Ft.), Average velocity =   1.449(Ft/s)
End of computations, total study area =            1.54 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.

Area averaged pervious area fraction(Ap) = 0.397
Area averaged RI index number =  57.0
```

Appendix H – Hydraulic Analysis Calculations

```
                 FLOOD HYDROGRAPH ROUTING PROGRAM
        Copyright (c) CIVILCADD/CIVILDESIGN, 1989 - 2022
                    Study date: 10/03/23

---------------------------------------------------------------------


PROPOSED CONDITION
FLOOD ROUTING BASIN A.1
100-YEAR 3-HOUR STORM


--------------------------------------------------------------------


Program License Serial Number 6350

--------------------------------------------------------------------
******************** HYDROGRAPH INFORMATION *********************

                From study/file name: PRA1UH3100.rte
****************************HYDROGRAPH DATA****************************
                Number of intervals =    38
                Time interval =    5.0 (Min.)
                Maximum/Peak flow rate =       36.570 (CFS)
                Total volume =       3.103 (Ac.Ft)
        Status of hydrographs being held in storage
                   Stream 1  Stream 2  Stream 3  Stream 4  Stream 5
        Peak (CFS)      0.000     0.000     0.000     0.000     0.000
        Vol (Ac.Ft)      0.000     0.000     0.000     0.000     0.000
***********************************************************************



++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        2.000 to Point/Station       2.000
**** RETARDING BASIN ROUTING ****
______________________________________________________________________

Program computation of outflow v. depth




CALCULATED OUTFLOW DATA AT DEPTH =    0.50(Ft.))
Total outflow at this depth =      0.00(CFS)


CALCULATED OUTFLOW DATA AT DEPTH =    1.00(Ft.))
Total outflow at this depth =      0.00(CFS)


CALCULATED OUTFLOW DATA AT DEPTH =    1.50(Ft.))
Total outflow at this depth =      0.00(CFS)


CALCULATED OUTFLOW DATA AT DEPTH =    2.00(Ft.))
Total outflow at this depth =      0.00(CFS)


CALCULATED OUTFLOW DATA AT DEPTH =    2.50(Ft.))
Total outflow at this depth =      0.00(CFS)


CALCULATED OUTFLOW DATA AT DEPTH =    3.00(Ft.))
Total outflow at this depth =      0.00(CFS)
```

```
CALCULATED OUTFLOW DATA AT DEPTH =    3.50(Ft.))
Total outflow at this depth =      0.00(CFS)


CALCULATED OUTFLOW DATA AT DEPTH =    4.00(Ft.))
Total outflow at this depth =      0.00(CFS)


CALCULATED OUTFLOW DATA AT DEPTH =    4.50(Ft.))
Total outflow at this depth =      0.00(CFS)


CALCULATED OUTFLOW DATA AT DEPTH =    5.00(Ft.))
Total outflow at this depth =      0.00(CFS)


CALCULATED OUTFLOW DATA AT DEPTH =    5.50(Ft.))
Total outflow at this depth =      0.00(CFS)


CALCULATED OUTFLOW DATA AT DEPTH =    6.00(Ft.))

Weir capacity using equation Q = CLH^Exp(Using Feet as units)
Weir Length =   7.00(Ft.)   C value =   3.10   Exp =   1.50
Weir flow:      Depth = H =    0.50(Ft.)   Flow =      7.67 (CFS)

Total outflow at this depth =      7.67(CFS)


CALCULATED OUTFLOW DATA AT DEPTH =    6.50(Ft.))

Weir capacity using equation Q = CLH^Exp(Using Feet as units)
Weir Length =   7.00(Ft.)   C value =   3.10   Exp =   1.50
Weir flow:      Depth = H =    1.00(Ft.)   Flow =     21.70 (CFS)

Total outflow at this depth =     21.70(CFS)

--------------------------------------------------------------------
Total number of inflow hydrograph intervals = 38
Hydrograph time unit =  5.000 (Min.)
Initial depth in storage basin =   0.00(Ft.)
--------------------------------------------------------------------
--------------------------------------------------------------------
Initial basin depth =   0.00 (Ft.)
Initial basin storage =      0.00 (Ac.Ft)
Initial basin outflow =   0.00 (CFS)
---------------------------------------------------------------------
--------------------------------------------------------------------
Depth vs. Storage and Depth vs. Discharge data:
 Basin Depth  Storage    Outflow   (S-O*dt/2)   (S+O*dt/2)
     (Ft.)    (Ac.Ft)    (CFS)     (Ac.Ft)    (Ac.Ft)
---------------------------------------------------------------------
  0.000      0.000      0.000      0.000       0.000
  0.500      0.283      0.000      0.283       0.283
  1.000      0.566      0.000      0.566       0.566
  1.500      0.849      0.000      0.849       0.849
  2.000      1.133      0.000      1.133       1.133
  2.500      1.416      0.000      1.416       1.416
  3.000      1.699      0.000      1.699       1.699
  3.500      1.982      0.000      1.982       1.982
  4.000      2.265      0.000      2.265       2.265
  4.500      2.548      0.000      2.548       2.548
  5.000      2.831      0.000      2.831       2.831
  5.500      3.115      0.000      3.115       3.115
  6.000      3.398      7.672      3.372       3.424
  6.500      3.681     21.700      3.606       3.756
--------------------------------------------------------------------
```

```
                       Hydrograph Detention Basin Routing
       ------------------------------------------------------------------

       Graph values: 'I'= unit inflow; 'O'=outflow at time shown
       ------------------------------------------------------------------
 Time   Inflow  Outflow    Storage                                        Depth
(Hours)  (CFS)   (CFS)     (Ac.Ft) .0       9.1   18.28   27.43   36.57 (Ft.)
 0.083    3.07    0.00      0.011  O I     |       |       |       |      0.02
 0.167    5.07    0.00      0.039  O   I   |       |       |       |      0.07
 0.250    4.89    0.00      0.073  O   I   |       |       |       |      0.13
 0.333    5.61    0.00      0.109  O   I   |       |       |       |      0.19
 0.417    6.24    0.00      0.150  O    I  |       |       |       |      0.26
 0.500    7.18    0.00      0.196  O     I |       |       |       |      0.35
 0.583    6.89    0.00      0.245  O     I |       |       |       |      0.43
 0.667    7.27    0.00      0.293  O     I |       |       |       |      0.52
 0.750    7.71    0.00      0.345  O     I |       |       |       |      0.61
 0.833    6.98    0.00      0.395  O     I |       |       |       |      0.70
 0.917    6.72    0.00      0.443  O    I  |       |       |       |      0.78
 1.000    7.36    0.00      0.491  O     I |       |       |       |      0.87
 1.083    8.84    0.00      0.547  O      I|       |       |       |      0.97
 1.167    9.61    0.00      0.610  O       I       |       |       |      1.08
 1.250    9.72    0.00      0.677  O       I       |       |       |      1.20
 1.333    9.18    0.00      0.742  O       I       |       |       |      1.31
 1.417   10.46    0.00      0.810  O       |I      |       |       |      1.43
 1.500   11.75    0.00      0.886  O       | I     |       |       |      1.57
 1.583   11.28    0.00      0.965  O       |I      |       |       |      1.71
 1.667   11.60    0.00      1.044  O       | I     |       |       |      1.84
 1.750   13.68    0.00      1.131  O       |  I    |       |       |      2.00
 1.833   14.29    0.00      1.228  O       |   I   |       |       |      2.17
 1.917   13.56    0.00      1.324  O       |  I    |       |       |      2.34
 2.000   13.42    0.00      1.416  O       |  I    |       |       |      2.50
 2.083   13.82    0.00      1.510  O       |   I   |       |       |      2.67
 2.167   17.03    0.00      1.616  O       |     I |       |       |      2.85
 2.250   21.21    0.00      1.748  O       |       | I     |       |      3.09
 2.333   18.85    0.00      1.886  O       |       I       |       |      3.33
 2.417   25.45    0.00      2.039  O       |       |     I |       |      3.60
 2.500   32.25    0.00      2.237  O       |       |       |   I   |      3.95
 2.583   36.57    0.00      2.474  O       |       |       |       I      4.37
 2.667   32.02    0.00      2.711  O       |       |       |   I   |      4.79
 2.750   17.52    0.00      2.881  O       |      I|       |       |      5.09
 2.833    9.36    0.00      2.974  O       I       |       |       |      5.25
 2.917    7.86    0.00      3.033  O     I |       |       |       |      5.36
 3.000    4.76    0.00      3.076  O   I   |       |       |       |      5.43
 3.083    1.38    0.00      3.098  OI      |       |       |       |      5.47
 3.167    0.15    0.00      3.103  O       |       |       |       |      5.48
 3.250    0.00    0.00      3.103  O       |       |       |       |      5.48

       Remaining water in basin =    3.10 (Ac.Ft)


       ****************************HYDROGRAPH DATA****************************
                       Number of intervals =    39
                       Time interval =    5.0 (Min.)
                       Maximum/Peak flow rate =        0.000 (CFS)
                       Total volume =       0.000 (Ac.Ft)
               Status of hydrographs being held in storage
                          Stream 1  Stream 2  Stream 3  Stream 4  Stream 5
               Peak (CFS)      0.000     0.000     0.000     0.000     0.000
               Vol (Ac.Ft)      0.000     0.000     0.000     0.000     0.000
       ***********************************************************************

       ------------------------------------------------------------------


       ++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
       Process from Point/Station       2.000 to Point/Station       2.000
       **** PRINT CURRENT HYDROGRAPH ****
       ______________________________________________________________________
```

```
       ++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
                         P R I N T   O F   S T O R M
                      R u n o f f      H y d r o g r a p h
       --------------------------------------------------------------------
                   Hydrograph in   5   Minute intervals (CFS)

       --------------------------------------------------------------------
 Time(h+m) Volume(Ac.Ft)   Q(CFS)  0        0.0       0.0       0.0       0.0
 -----------------------------------------------------------------------
   0+ 5       0.0000      0.00  Q         |         |         |         |
   0+10       0.0000      0.00  Q         |         |         |         |
   0+15       0.0000      0.00  Q         |         |         |         |
   0+20       0.0000      0.00  Q         |         |         |         |
   0+25       0.0000      0.00  Q         |         |         |         |
   0+30       0.0000      0.00  Q         |         |         |         |
   0+35       0.0000      0.00  Q         |         |         |         |
   0+40       0.0000      0.00  Q         |         |         |         |
   0+45       0.0000      0.00  Q         |         |         |         |
   0+50       0.0000      0.00  Q         |         |         |         |
   0+55       0.0000      0.00  Q         |         |         |         |
   1+ 0       0.0000      0.00  Q         |         |         |         |
   1+ 5       0.0000      0.00  Q         |         |         |         |
   1+10       0.0000      0.00  Q         |         |         |         |
   1+15       0.0000      0.00  Q         |         |         |         |
   1+20       0.0000      0.00  Q         |         |         |         |
   1+25       0.0000      0.00  Q         |         |         |         |
   1+30       0.0000      0.00  Q         |         |         |         |
   1+35       0.0000      0.00  Q         |         |         |         |
   1+40       0.0000      0.00  Q         |         |         |         |
   1+45       0.0000      0.00  Q         |         |         |         |
   1+50       0.0000      0.00  Q         |         |         |         |
   1+55       0.0000      0.00  Q         |         |         |         |
   2+ 0       0.0000      0.00  Q         |         |         |         |
   2+ 5       0.0000      0.00  Q         |         |         |         |
   2+10       0.0000      0.00  Q         |         |         |         |
   2+15       0.0000      0.00  Q         |         |         |         |
   2+20       0.0000      0.00  Q         |         |         |         |
   2+25       0.0000      0.00  Q         |         |         |         |
   2+30       0.0000      0.00  Q         |         |         |         |
   2+35       0.0000      0.00  Q         |         |         |         |
   2+40       0.0000      0.00  Q         |         |         |         |
   2+45       0.0000      0.00  Q         |         |         |         |
   2+50       0.0000      0.00  Q         |         |         |         |
   2+55       0.0000      0.00  Q         |         |         |         |
   3+ 0       0.0000      0.00  Q         |         |         |         |
   3+ 5       0.0000      0.00  Q         |         |         |         |
   3+10       0.0000      0.00  Q         |         |         |         |
   3+15       0.0000      0.00  Q         |         |         |         |
-----------------------------------------------------------------------
       ****************************HYDROGRAPH DATA****************************
                       Number of intervals =    39
                       Time interval =    5.0 (Min.)
                       Maximum/Peak flow rate =        0.000 (CFS)
                       Total volume =       0.000 (Ac.Ft)
               Status of hydrographs being held in storage
                          Stream 1  Stream 2  Stream 3  Stream 4  Stream 5
               Peak (CFS)      0.000     0.000     0.000     0.000     0.000
               Vol (Ac.Ft)      0.000     0.000     0.000     0.000     0.000
       ***********************************************************************

       --------------------------------------------------------------------
```

```
                     FLOOD HYDROGRAPH ROUTING PROGRAM
            Copyright (c) CIVILCADD/CIVILDESIGN, 1989 - 2022
                        Study date: 10/03/23

 ---------------------------------------------------------------------


PROPOSED CONDITION
FLOOD ROUTING BASIN A.2
100-YEAR 3-HOUR STORM


 --------------------------------------------------------------------


Program License Serial Number 6350

 --------------------------------------------------------------------
********************* HYDROGRAPH INFORMATION **********************

                From study/file name: PRA2UH3100.rte
****************************HYDROGRAPH DATA****************************
                Number of intervals =    38
                Time interval =    5.0 (Min.)
                Maximum/Peak flow rate =       44.487 (CFS)
                Total volume =       3.749 (Ac.Ft)
        Status of hydrographs being held in storage
                   Stream 1  Stream 2  Stream 3  Stream 4  Stream 5
        Peak (CFS)      0.000     0.000     0.000     0.000     0.000
        Vol (Ac.Ft)      0.000     0.000     0.000     0.000     0.000
***********************************************************************



++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       11.000 to Point/Station       11.000
**** RETARDING BASIN ROUTING ****
______________________________________________________________________

Program computation of outflow v. depth





CALCULATED OUTFLOW DATA AT DEPTH =    0.50(Ft.))
Total outflow at this depth =      0.00(CFS)


CALCULATED OUTFLOW DATA AT DEPTH =    1.00(Ft.))
Total outflow at this depth =      0.00(CFS)


CALCULATED OUTFLOW DATA AT DEPTH =    1.50(Ft.))
Total outflow at this depth =      0.00(CFS)


CALCULATED OUTFLOW DATA AT DEPTH =    2.00(Ft.))
Total outflow at this depth =      0.00(CFS)


CALCULATED OUTFLOW DATA AT DEPTH =    2.50(Ft.))
Total outflow at this depth =      0.00(CFS)


CALCULATED OUTFLOW DATA AT DEPTH =    3.00(Ft.))
Total outflow at this depth =      0.00(CFS)
```

```
CALCULATED OUTFLOW DATA AT DEPTH =    3.50(Ft.))
Total outflow at this depth =      0.00(CFS)


CALCULATED OUTFLOW DATA AT DEPTH =    4.00(Ft.))
Total outflow at this depth =      0.00(CFS)


CALCULATED OUTFLOW DATA AT DEPTH =    4.50(Ft.))
Total outflow at this depth =      0.00(CFS)


CALCULATED OUTFLOW DATA AT DEPTH =    5.00(Ft.))
Total outflow at this depth =      0.00(CFS)


CALCULATED OUTFLOW DATA AT DEPTH =    5.50(Ft.))
Total outflow at this depth =      0.00(CFS)


CALCULATED OUTFLOW DATA AT DEPTH =    6.00(Ft.))
Total outflow at this depth =      0.00(CFS)


CALCULATED OUTFLOW DATA AT DEPTH =    6.50(Ft.))

Weir capacity using equation Q = CLH^Exp(Using Feet as units)
Weir Length =   7.00(Ft.)   C value =   3.10   Exp =   1.50
Weir flow:      Depth = H =    0.50(Ft.)   Flow =      7.67 (CFS)

Total outflow at this depth =      7.67(CFS)


CALCULATED OUTFLOW DATA AT DEPTH =    7.00(Ft.))

Weir capacity using equation Q = CLH^Exp(Using Feet as units)
Weir Length =   7.00(Ft.)   C value =   3.10   Exp =   1.50
Weir flow:      Depth = H =    1.00(Ft.)   Flow =     21.70 (CFS)

Total outflow at this depth =     21.70(CFS)

--------------------------------------------------------------------
Total number of inflow hydrograph intervals = 38
Hydrograph time unit =  5.000 (Min.)
Initial depth in storage basin =   0.00(Ft.)
--------------------------------------------------------------------
--------------------------------------------------------------------
Initial basin depth =   0.00 (Ft.)
Initial basin storage =      0.00 (Ac.Ft)
Initial basin outflow =   0.00 (CFS)
---------------------------------------------------------------------
--------------------------------------------------------------------
Depth vs. Storage and Depth vs. Discharge data:
 Basin Depth  Storage    Outflow   (S-O*dt/2)   (S+O*dt/2)
     (Ft.)    (Ac.Ft)    (CFS)     (Ac.Ft)    (Ac.Ft)
---------------------------------------------------------------------
  0.000      0.000      0.000      0.000        0.000
  0.500      0.323      0.000      0.323        0.323
  1.000      0.646      0.000      0.646        0.646
  1.500      0.969      0.000      0.969        0.969
  2.000      1.293      0.000      1.293        1.293
  2.500      1.616      0.000      1.616        1.616
  3.000      1.939      0.000      1.939        1.939
  3.500      2.262      0.000      2.262        2.262
  4.000      2.585      0.000      2.585        2.585
  4.500      2.908      0.000      2.908        2.908
  5.000      3.231      0.000      3.231        3.231
```

```
         5.500      3.555      0.000      3.555        3.555
         6.000      3.878      0.000      3.878        3.878
         6.500      4.201      7.672      4.175        4.227
         7.000      4.524     21.700      4.449        4.599
       --------------------------------------------------------------------
                       Hydrograph Detention Basin Routing
       ---------------------------------------------------------------------

       Graph values: 'I'= unit inflow; 'O'=outflow at time shown
       ---------------------------------------------------------------------
 Time   Inflow  Outflow    Storage                                    Depth
(Hours)  (CFS)   (CFS)     (Ac.Ft) .0      11.1   22.24   33.36   44.49 (Ft.)
 0.083    3.37    0.00      0.012  O I     |       |       |       |     0.02
 0.167    5.84    0.00      0.043  O   I   |       |       |       |     0.07
 0.250    5.79    0.00      0.083  O   I   |       |       |       |     0.13
 0.333    6.57    0.00      0.126  O   I   |       |       |       |     0.19
 0.417    7.35    0.00      0.174  O    I  |       |       |       |     0.27
 0.500    8.47    0.00      0.228  O     I |       |       |       |     0.35
 0.583    8.22    0.00      0.286  O    I  |       |       |       |     0.44
 0.667    8.61    0.00      0.344  O     I |       |       |       |     0.53
 0.750    9.17    0.00      0.405  O     I |       |       |       |     0.63
 0.833    8.36    0.00      0.465  O     I |       |       |       |     0.72
 0.917    7.98    0.00      0.522  O    I  |       |       |       |     0.81
 1.000    8.70    0.00      0.579  O     I |       |       |       |     0.90
 1.083   10.47    0.00      0.645  O      I|       |       |       |     1.00
 1.167   11.49    0.00      0.721  O       I       |       |       |     1.12
 1.250   11.67    0.00      0.801  O       I       |       |       |     1.24
 1.333   11.04    0.00      0.879  O      I|       |       |       |     1.36
 1.417   12.47    0.00      0.960  O       I       |       |       |     1.49
 1.500   14.08    0.00      1.051  O       | I     |       |       |     1.63
 1.583   13.64    0.00      1.147  O       |I      |       |       |     1.77
 1.667   13.94    0.00      1.242  O       | I     |       |       |     1.92
 1.750   16.39    0.00      1.346  O       |  I    |       |       |     2.08
 1.833   17.28    0.00      1.462  O       |   I   |       |       |     2.26
 1.917   16.47    0.00      1.578  O       |  I    |       |       |     2.44
 2.000   16.23    0.00      1.691  O       |  I    |       |       |     2.62
 2.083   16.68    0.00      1.804  O       |  I    |       |       |     2.79
 2.167   20.42    0.00      1.932  O       |     I |       |       |     2.99
 2.250   25.53    0.00      2.090  O       |       | I     |       |     3.23
 2.333   23.16    0.00      2.258  O       |       I       |       |     3.49
 2.417   30.47    0.00      2.443  O       |       |    I  |       |     3.78
 2.500   38.96    0.00      2.682  O       |       |       |    I  |     4.15
 2.583   44.49    0.00      2.969  O       |       |       |       I     4.59
 2.667   39.55    0.00      3.258  O       |       |       |    I  |     5.04
 2.750   22.38    0.00      3.472  O       |       I       |       |     5.37
 2.833   11.68    0.00      3.589  O       I       |       |       |     5.55
 2.917    9.40    0.00      3.662  O     I |       |       |       |     5.66
 3.000    5.89    0.00      3.714  O   I   |       |       |       |     5.75
 3.083    1.86    0.00      3.741  OI      |       |       |       |     5.79
 3.167    0.23    0.00      3.748  O       |       |       |       |     5.80
 3.250    0.00    0.00      3.749  O       |       |       |       |     5.80


       Remaining water in basin =    3.75 (Ac.Ft)


       ****************************HYDROGRAPH DATA*****************************
                       Number of intervals =    39
                       Time interval =    5.0 (Min.)
                       Maximum/Peak flow rate =        0.000 (CFS)
                       Total volume =       0.000 (Ac.Ft)
               Status of hydrographs being held in storage
                          Stream 1  Stream 2  Stream 3  Stream 4  Stream 5
               Peak (CFS)      0.000     0.000     0.000     0.000     0.000
               Vol (Ac.Ft)      0.000     0.000     0.000     0.000     0.000
       ************************************************************************

       --------------------------------------------------------------------
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+++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      11.000 to Point/Station      11.000
**** PRINT CURRENT HYDROGRAPH ****
______________________________________________________________________
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
                  P R I N T   O F   S T O R M
               R u n o f f     H y d r o g r a p h
--------------------------------------------------------------------
            Hydrograph in   5   Minute intervals (CFS)

--------------------------------------------------------------------
Time(h+m) Volume(Ac.Ft)   Q(CFS)  0        0.0       0.0       0.0       0.0
--------------------------------------------------------------------
  0+ 5       0.0000      0.00  Q        |         |         |         |
  0+10       0.0000      0.00  Q        |         |         |         |
  0+15       0.0000      0.00  Q        |         |         |         |
  0+20       0.0000      0.00  Q        |         |         |         |
  0+25       0.0000      0.00  Q        |         |         |         |
  0+30       0.0000      0.00  Q        |         |         |         |
  0+35       0.0000      0.00  Q        |         |         |         |
  0+40       0.0000      0.00  Q        |         |         |         |
  0+45       0.0000      0.00  Q        |         |         |         |
  0+50       0.0000      0.00  Q        |         |         |         |
  0+55       0.0000      0.00  Q        |         |         |         |
  1+ 0       0.0000      0.00  Q        |         |         |         |
  1+ 5       0.0000      0.00  Q        |         |         |         |
  1+10       0.0000      0.00  Q        |         |         |         |
  1+15       0.0000      0.00  Q        |         |         |         |
  1+20       0.0000      0.00  Q        |         |         |         |
  1+25       0.0000      0.00  Q        |         |         |         |
  1+30       0.0000      0.00  Q        |         |         |         |
  1+35       0.0000      0.00  Q        |         |         |         |
  1+40       0.0000      0.00  Q        |         |         |         |
  1+45       0.0000      0.00  Q        |         |         |         |
  1+50       0.0000      0.00  Q        |         |         |         |
  1+55       0.0000      0.00  Q        |         |         |         |
  2+ 0       0.0000      0.00  Q        |         |         |         |
  2+ 5       0.0000      0.00  Q        |         |         |         |
  2+10       0.0000      0.00  Q        |         |         |         |
  2+15       0.0000      0.00  Q        |         |         |         |
  2+20       0.0000      0.00  Q        |         |         |         |
  2+25       0.0000      0.00  Q        |         |         |         |
  2+30       0.0000      0.00  Q        |         |         |         |
  2+35       0.0000      0.00  Q        |         |         |         |
  2+40       0.0000      0.00  Q        |         |         |         |
  2+45       0.0000      0.00  Q        |         |         |         |
  2+50       0.0000      0.00  Q        |         |         |         |
  2+55       0.0000      0.00  Q        |         |         |         |
  3+ 0       0.0000      0.00  Q        |         |         |         |
  3+ 5       0.0000      0.00  Q        |         |         |         |
  3+10       0.0000      0.00  Q        |         |         |         |
  3+15       0.0000      0.00  Q        |         |         |         |
----------------------------------------------------------------------
***************************HYDROGRAPH DATA****************************
                Number of intervals =    39
                Time interval =    5.0 (Min.)
                Maximum/Peak flow rate =        0.000 (CFS)
                Total volume =       0.000 (Ac.Ft)
        Status of hydrographs being held in storage
                   Stream 1  Stream 2  Stream 3  Stream 4  Stream 5
        Peak (CFS)      0.000     0.000     0.000     0.000     0.000
        Vol (Ac.Ft)      0.000     0.000     0.000     0.000     0.000
**********************************************************************

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Stage-Storage & Stage-Discharge Table

Newland Kirby BMP 3

Detention Inputs

Total Volume: 160,332 ft^2

Bottom Elev: 1522.62 ft

Depth: 6.5 ft

Entry Point	Basin Elev.	Basin Volume (ft^3)	Basin Depth (ft)	Volume (acre-ft)	Q_{tot} (cfs)	
1	1522.62	0.00	0.000	0.0000	0.000	Pump to MWS
2	1523.12	12,333.23	0.500	0.2831	0.526	
3	1523.62	24,666.46	1.000	0.5663	0.526	
4	1524.12	36,999.69	1.500	0.8494	0.526	
5	1524.62	49,332.92	2.000	1.1325	0.526	
6	1525.12	61,666.15	2.500	1.4157	0.526	
7	1525.62	73,999.38	3.000	1.6988	0.526	
8	1526.12	86,332.62	3.500	1.9819	0.526	
9	1526.62	98,665.85	4.000	2.2651	0.526	
10	1527.12	110,999.08	4.500	2.5482	0.526	
11	1527.62	123,332.31	5.000	2.8313	0.526	
12	1528.12	135,665.54	5.500	3.1145	0.526	Overflow Weir
13	1528.62	147,998.77	6.000	3.3976	8.196	
14	1529.12	160,332.00	6.500	3.6807	22.226	

Stage-Storage & Stage-Discharge Table

Newland Kirby BMP 4

Detention Inputs

Total Volume: 197,061 ft^2

Bottom Elev: 1522.28 ft

Depth: 7.0 ft

Entry Point	Basin Elev.	Basin Volume (ft^3)	Basin Depth (ft)	Volume (acre-ft)	Q_{tot} (cfs)	
1	1522.28	0.00	0.000	0.0000	0.000	Pump to MWS
2	1522.78	14,075.79	0.500	0.3231	0.656	
3	1523.28	28,151.57	1.000	0.6463	0.656	
4	1523.78	42,227.36	1.500	0.9694	0.656	
5	1524.28	56,303.14	2.000	1.2925	0.656	
6	1524.78	70,378.93	2.500	1.6157	0.656	
7	1525.28	84,454.71	3.000	1.9388	0.656	
8	1525.78	98,530.50	3.500	2.2619	0.656	
9	1526.28	112,606.29	4.000	2.5851	0.656	
10	1526.78	126,682.07	4.500	2.9082	0.656	
11	1527.28	140,757.86	5.000	3.2314	0.656	
12	1527.78	154,833.64	5.500	3.5545	0.656	
13	1528.28	168,909.43	6.000	3.8776	0.656	Overflow Weir
14	1528.78	182,985.21	6.500	4.2008	8.326	
15	1529.28	197,061.00	7.000	4.5239	22.356	

Outlet Structure Discharge

Newland Kirby BMP 3

Sharp-Crested Weir

Weir			Pump		
Depth:	6.5	ft	Volume	136300	
Depth*:	1.0	ft	Flow Rate	0.525848765	cfs
Weir Coeff, Cw:	3.10		Flow Rate	236.0324769	gpm
Length, Le:	7.0	ft			

72 max hour drawdown

***Note: h = head above the invert of the lowest surface discharge opening.**

H (ft)	h* (ft)	Q_{Weir} (cfs)	Q_{pump} (cfs)	Q_{total} (cfs)
0.000	0.000	0.000	0.526	0.526
0.500	0.000	0.000	0.526	0.526
1.000	0.000	0.000	0.526	0.526
1.500	0.000	0.000	0.526	0.526
2.000	0.000	0.000	0.526	0.526
2.500	0.000	0.000	0.526	0.526
3.000	0.000	0.000	0.526	0.526
3.500	0.000	0.000	0.526	0.526
4.000	0.000	0.000	0.526	0.526
4.500	0.500	0.000	0.526	0.526
5.000	1.000	0.000	0.526	0.526
5.500	1.500	0.000	0.526	0.526
6.000	2.000	7.670	0.526	8.196
6.500	2.500	21.700	0.526	22.226

Note:

1. Weir equation, $Q=CwLw(h)^{3/2}$

Outlet Structure Discharge

Newland Kirby BMP 4

Sharp-Crested Weir

Weir			Pump			
Depth:	7.0	ft	Volume	170000		72 max hour drawdown
Depth*:	1.0	ft	Flow Rate	0.655864198	cfs	
Weir Coeff, Cw:	3.10		Flow Rate	294.3912037	gpm	
Length, Le:	7.0	ft				

***Note: h = head above the invert of the lowest surface discharge opening.**

H (ft)	h* (ft)	Q_{Weir} (cfs)	Q_{pump} (cfs)	Q_{total} (cfs)
0.000	0.000	0.000	0.656	0.656
0.500	0.000	0.000	0.656	0.656
1.000	0.000	0.000	0.656	0.656
1.500	0.000	0.000	0.656	0.656
2.000	0.000	0.000	0.656	0.656
2.500	0.000	0.000	0.656	0.656
3.000	0.000	0.000	0.656	0.656
3.500	0.000	0.000	0.656	0.656
4.000	0.000	0.000	0.656	0.656
4.500	0.500	0.000	0.656	0.656
5.000	1.000	0.000	0.656	0.656
5.500	1.500	0.000	0.656	0.656
6.000	2.000	0.000	0.656	0.656
6.500	2.500	7.670	0.656	8.326
7.000	3.000	21.700	0.656	22.356

Note:

1. Weir equation, $Q=CwLw(h)^{3/2}$

Drawdown Calculation

Newland Kirby BMP 3

PARAMETER	BMP	
Flow Rate (Volumetric)	236.03248	gpm
Flow Rate (Volumetric)	0.526	cfs
Length of Weir	7.0	ft
Head Above Weir Crest	1.0	ft
Weir Coefficient	3.10	--
Flow Rate (Volumetric)	21.700	cfs
Total Depth	6.5	ft
Total Storage Provided	160,332	cf
Total Drawdown Time	71.98	hrs

*72 hour max drawdown per Section 3.2.3 of City of Hemet Drainage Design Manual

Drawdown Calculation

Newland Kirby BMP 4

PARAMETER	BMP	
Flow Rate (Volumetric)	236.03248	gpm
Flow Rate (Volumetric)	0.656	cfs
Length of Weir	7.0	ft
Head Above Weir Crest	1.0	ft
Weir Coefficient	3.10	--
Flow Rate (Volumetric)	21.700	cfs
Total Depth	7.0	ft
Total Storage Provided	197,061	cf
Total Drawdown Time	71.90	hrs

*72 hour max drawdown per Section 3.2.3 of City of Hemet Drainage Design Manual

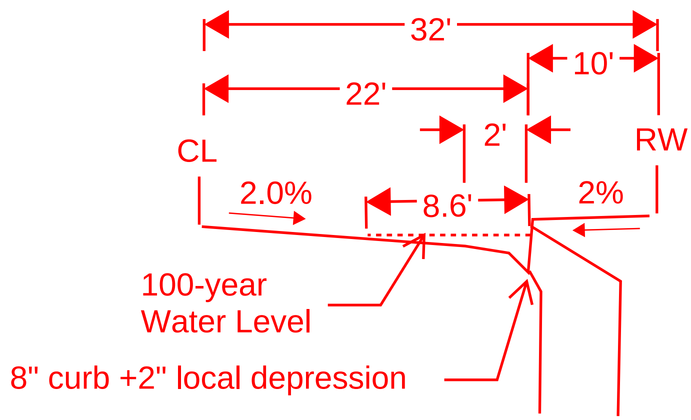
PROPOSED WHITTIER BLVD.
HALF STREET CAPACITY

Worksheet for Curb Inlet In Sag - Whittier Blvd.

Project Description	
Solve For	Spread

Input Data		
Discharge	1.86 cfs	100-year storm Basin B
Gutter Width	2.00 ft	
Gutter Cross Slope	0.083 ft/ft	
Road Cross Slope	0.020 ft/ft	
Curb Opening Length	7.8 ft	
Opening Height	0.7 ft	
Curb Throat Type	Inclined	
Local Depression	2.0 in	
Local Depression Width	24.0 in	
Throat Incline Angle	45.00 degrees	

Results	
Spread	8.6 ft
Depth	3.6 in
Gutter Depression	1.5 in
Total Depression	3.5 in



Appendix I – Geotechnical Investigation Report

January 27, 2022

Newland Capital Group, LLC
200 Spectrum Center Dr. Suite 300
Irvine, California 92618

Attn: Ms. Rocio Budetta
P: (310) 339-7735
E: Rocio.budetta@newlandcapitalgroup.com

Re: Geotechnical Engineering Report
Proposed Industrial Development
South of W Acacia Ave. and West of S Kirby St.
Hemet, California
Terracon Project No. CB215163

Dear Ms. Budetta:

We have completed the Geotechnical Engineering services for the above referenced project. This study was performed in general accordance with Terracon Proposal No. PCB215163 dated November 5, 2021. This report presents the findings of the subsurface exploration and provides geotechnical recommendations concerning earthwork, the design and construction of foundations, floor slabs, pavement and stormwater infiltration results for the proposed project.

We appreciate the opportunity to be of service to you on this project. If you have any questions concerning this report or if we may be of further service, please contact us.

Sincerely,
Terracon Consultants, Inc.

Ali Tabatabaei, Ph.D., G.E.
Geotechnical Project Engineer

Keith P. Askew, P.E., G.E.
Department Manager

REPORT TOPICS

Note: This report was originally delivered in a web-based format. **Orange Bold** text in the report indicates a referenced section heading. The PDF version also includes hyperlinks which direct the reader to that section and clicking on the ***GeoReport*** logo will bring you back to this page. For more interactive features, please view your project online at client.terracon.com.

ATTACHMENTS

Note: Refer to each individual Attachment for a listing of contents.

Geotechnical Engineering Report

Proposed Industrial Development
South of W Acacia Ave. and West of S Kirby St.
Hemet, California
Terracon Project No. CB215163
January 27, 2022

INTRODUCTION

This report presents the results of our subsurface exploration and geotechnical engineering services performed for the proposed Warehouse facility to be located at South of W Acacia Ave. and West of S Kirby St. in Hemet, California. The purpose of these services is to provide information and geotechnical engineering recommendations relative to:

- Subsurface soil conditions
- Groundwater conditions
- 2019 California Building Code (CBC) seismic design parameters
- Seismic settlement
- Site preparation and earthwork
- Excavation considerations
- Seismic site classification
- Lateral earth pressures
- Foundation design and concrete slabs-on-grade
- Pavement section design
- Infiltration and drainage

The geotechnical engineering Scope of Services for this project included the advancement of twenty-one (21) test borings to depths ranging from approximately 5 to 51½ feet below existing site grades.

Maps showing the site and boring locations are shown in the **Site Location** and **Exploration Plan** sections, respectively. The results of the laboratory testing performed on soil samples obtained from the site during the field exploration are included on the boring logs and/or as separate graphs in the **Exploration Results** section.

SITE CONDITIONS

The following description of site conditions is derived from our site visit in association with the field exploration and our review of publicly available geologic and topographic maps.

Item	Description
Parcel Information	The project is located South of W Acacia Ave. and West of S Kirby St. in Hemet, California. APN: 456-030-020. The property is approximately 43.56 acres. Latitude 33.7398°N/Longitude 117.0001°W (approximate) See **Site Location**
Existing Improvements	The project site generally consists of an undeveloped tract of land. The land is currently vacant and from historical images available from Google Earth minimum ground work has been performed for leveling. A large retail shopping center is located approximately 1,000 ft northwest of the site.
Current Ground Cover	The project site is primarily underlain with native soils with a light growth of grass and vegetation at the surface.
Existing Topography	The site generally slopes to the west with elevations ranging from about 1,533 feet in the east to about 1,527 feet in the west.

PROJECT DESCRIPTION

Our initial understanding of the project was provided in our proposal and was discussed during project planning. A period of collaboration has transpired since the project was initiated, and our final understanding of the project conditions is as follows:

Item	Description
Project Description	The project generally consists of the construction of a large warehouse facility. The warehouse building will have a footprint area of approximately 825,440 square feet (sf). The project will also include truck-trailer parking, car parking, utilities, and driveways. We assume loading docks on the order of 4 feet will be included. We assume that stormwater diversion structures such as culverts, open channels, and storm drains will also be constructed on the site. Development will also include on-site Low Impact Development (LID) infiltration structures. The Conceptual Site Plan was appended with three concept chamber locations and provided to us on October 28, 2021.
Proposed Structures	Warehouse building with an approximate area of 825,440 square feet. New concept plans in preparation may change the size slightly.
Building Construction	Concrete construction founded on conventional continuous and spread footings with concrete slabs on grade.
Finished Floor Elevation	We assume the final floor elevations will be within 5 feet of existing grades.
Maximum Loads (assumed)	■ Columns: 50 to 250 kips ■ Walls: 2 to 5 kips per linear foot (klf) ■ Slabs: 150 pounds per square foot (psf). This loading is for conventional live loads and does not include storage racks loads or forklift vehicular loads.

Item	Description
Grading/Slopes	Grading is anticipated to consist of cuts and fills with maximum thicknesses of approximately 10 feet, excluding remedial grading requirements. Cut and fill slopes with heights less than 5 feet and inclinations of 2:1 (horizontal:vertical) are expected to achieve final grades.
Below-Grade Structures	Culverts and storm drain lines; sizes and depths are unknown.
Infiltration Systems	Low Impact Development (LID) structures for stormwater infiltration are proposed within the project site.
Free-Standing Retaining Walls	Retaining walls with maximum heights of 5 feet are expected to be constructed as part of site development to achieve final grades.
Pavements	We understand new pavements will be constructed as parking areas and travel lanes and are included in this project. Assumed traffic indices (TIs) are as follows: ■ Auto Parking Areas: TI=5.0 ■ Auto Drive Lanes: TI=5.5 ■ Truck Parking areas: TI=7.0 ■ Truck Drive Lanes: TI=8.0 ■ Pavement design period: 20 years

GEOTECHNICAL CHARACTERIZATION

Site Geology

The site is located within the San Jacinto Valley, part of the Peninsular Ranges geomorphic province. Most of the Peninsular Ranges is underlain by batholithic rocks of granitic composition. The San Jacinto Valley is characterized by a downdropped structural block between two major strike-slip faults of the San Jacinto fault zone: the Claremont fault and the Casa Loma fault. The site is located west of the Claremont fault and is on the Perris structural block.

The site is underlain by Holocene- and late Pleistocene-age alluvial fan deposits of Bautista Canyon (Morton and Matti, 2005, https://ngmdb.usgs.gov/Prodesc/proddesc_72184.htm). These materials are described as unconsolidated and consisting predominantly of gravel, sand and silt.

Subsurface Profile

We have developed a general characterization of the subsurface soil and groundwater conditions based upon our review of the data and our understanding of the geologic setting and planned construction. The following table provides our geotechnical characterization.

The geotechnical characterization forms the basis of our geotechnical calculations and evaluation of site preparation, foundation options and pavement options. As noted in **General Comments**, the characterization is based upon widely spaced exploration points across the site, and variations are likely.

Conditions encountered at each boring location are indicated on the individual boring logs shown in the **Exploration Results** section and are attached to this report. Stratification boundaries on the boring logs represent the approximate location of changes in native soil types; in situ, the transition between materials may be gradual.

Stratum	Approximate Depth to Bottom of Stratum (feet)	Material Description [1]	Consistency/Relative Density
Stratum I	51 ½ (Maximum depth of exploration)	Interbedded layers of silty sand, sandy silt, lean clay with sand, sandy lean clay and well graded sand with silt, brown and olive brown	---

1. The soil materials encountered are not expected to experience substantial volumetric changes (shrink/swell) with fluctuations in moisture content.

Groundwater Conditions

The borings were advanced using continuous flight auger drilling techniques that allow short-term groundwater observations to be made while drilling. Groundwater was not encountered during the course of drilling. Groundwater level fluctuations occur due to seasonal variations in the amount of rainfall, runoff and other factors not evident at the time the borings were performed.

The site is located in the Eastern Municipal Water District of Riverside groundwater management area. The historical-high groundwater depth beneath the site is approximately 187 feet bgs based on historical groundwater monitoring well information obtained from the State Groundwater Management Agency (SGMA), Well No. EMWD10521, located approximately 0.45 miles northwest of the site. Data for this well indicate groundwater depths at approximately 187 feet bgs at the location of the well (elevation 1525 feet) for the time period from 2012 to 2021.

Hydro-consolidation

To evaluate the potential deformation that may be caused by the addition of water to subsurface soils, hydroconsolidation testing was performed on a selected, representative relatively undisturbed samples. The results are shown in **Exploration Results** section. The test results indicate collapse potentials of -1.5% (expansion) (B-2 at 15 feet), 2% (B-3 at 10 feet), 0.1% (B-4 at 7.5 feet), 1.25% (B-9 at 10 feet), 1.0% (B-11 at 10 feet) and 6.5% (B-12 at 7.5 feet), boring number and sample depths summarized in parenthesizes. all samples were saturated under a confining pressure of 2,000 psf. The risk of hydro collapse can be mitigated by removal and replacement of the top 5 feet of on- site soil with engineered fill.

SEISMIC CONSIDERATIONS

Based on the soil properties encountered at the site and as described on the exploration logs and results, it is our opinion that the Seismic Site Classification is D. The 2019 California Building Code (CBC) Seismic Design Parameters have been generated using the SEAOC/OSHPD Seismic Design Maps Tool. This web-based software application calculates seismic design parameters in accordance with ASCE 7-16 and 2019 CBC. The 2019 CBC requires that a site-specific ground motion study be performed in accordance with Section 11.4.8 of ASCE 7-16 for Site Class D sites with a mapped S_1 value greater than or equal 0.2.

However, Section 11.4.8 of ASCE 7-16 includes an exception from such analysis for specific structures on Site Class D sites. The commentary for Section 11 of ASCE 7-16 (Page 534 of Section C11 of ASCE 7-16) states that "In general, this exception effectively limits the requirements for site-specific hazard analysis to very tall and or flexible structures at Site Class D sites." Based on our understanding of the proposed structures, it is our assumption that the exception in Section 11.4.8 applies to the proposed structure. However, the structural engineer should verify the applicability of this exception.

Based on this exception, the spectral response accelerations presented below were calculated using the site coefficients (F_a and F_v) from Tables 1613.2.3(1) and 1613.2.3(2) presented in Section 16.4.4 of the 2019 CBC.

Description	Value
Site Classification (CBC) [1]	D [2]
Site Latitude (°N)	33.7398
Site Longitude (°W)	117.0001
S_s Spectral Acceleration for a 0.2-Second Period	1.81
S_1 Spectral Acceleration for a 1-Second Period	0.71
F_a Site Coefficient for a 0.2-Second Period	1.0
F_v Site Coefficient for a 1-Second Period	1.7
Site Modified Peak Ground Acceleration	0.842g
De-aggregated Mode Magnitude [3]	8.1

Description	Value

1. Seismic site classification in general accordance with the *2019 California Building Code*.
2. The 2019 California Building Code (CBC) requires a site soil profile determination extending to a depth of 100 feet for seismic site classification. The current scope does not include the required 100-foot soil profile determination. Our borings were extended to a maximum depth of 51½ feet. This seismic site class definition considers that similar or denser soils continue below the maximum depth of the subsurface exploration. Additional exploration to deeper depths would be required to confirm the conditions below the current depth of exploration.
3. These values were obtained using on-line Unified Hazard Tool by the USGS (https://earthquake.usgs.gov/hazards/interactive/) for return period of 2% in 50 years accessed

A site-specific ground motion study may reduce design values and consequently construction costs. We recommend consulting with a structural engineer to evaluate the need for such study and its potential impact on construction costs. Terracon should be contacted if a site-specific ground motion study is desired.

Faulting and Estimated Ground Motions

The site is located in the seismically active southern California area. The type and magnitude of seismic hazards affecting the site are dependent on the distance to causative faults, the intensity, and the magnitude of the seismic event. As calculated using the USGS Unified Hazard Tool, the San Jacinto Fault, which is considered to have the most significant effect at the site from a design standpoint, has a maximum earthquake magnitude of 7.9 and is located approximately 5.8 kilometers from the site.

Based on the USGS Design Maps Summary Report, using the American Society of Civil Engineers (ASCE 7-16) standard, the peak ground acceleration (PGA_M) at the project site is expected to be 0.842 g. Based on the USGS Unified Hazard Tool, the project site has a de-aggregated modal magnitude of 8.1. The site is not located within an Alquist-Priolo Earthquake Fault Zone based on our review of the State Fault Hazard Maps.

LIQUEFACTION AND SEISMIC SETTLEMENT

Liquefaction Potential

Liquefaction is a mode of ground failure that results from the generation of high pore-water pressures during earthquake ground shaking, causing loss of shear strength, and is typically a hazard where loose sandy soils exist below groundwater. Riverside County has designated certain areas as potential liquefaction hazard zones. These are areas considered at a risk of liquefaction-related ground failure during a seismic event, based upon mapped surficial deposits and the presence of a relatively shallow water table.

The subsurface materials generally consist of Interbedded layers of silty sand, sandy silt, lean clay with sand, sandy lean clay and well graded sand with silt extending to the maximum depth of the borings approximately 51½ feet bgs. Groundwater was not encountered during the course of drilling and has historically been greater than 100 feet bgs.

According to the County of Riverside geologic hazard GIS map, the site is located within an area having a moderate liquefaction potential. Based on the County of Riverside map, and the subsurface conditions encountered, we performed a liquefaction evaluation using the data from boring B-1.

Seismic Settlement

To determine the amount of seismic settlement, we utilized the software "LiquefyPro" by CivilTech Software, seismic settlement was estimated using the soil profile from exploratory boring B-1. A Peak Ground Acceleration (PGA) of 1.105g and the de-aggregated mode magnitude of 8.1 were utilized as input into the liquefaction analysis program. Settlement analysis used the Ishihara / Yoshimine method and the fines percentage were corrected for liquefaction using the Modify Stark/Olson method. Groundwater was not encountered within the maximum depths of exploration during or at the completion of drilling and has historically been greater than 100 feet bgs.

Based on the calculation results, seismically induced settlement (dry sand settlement) is estimated to be on the order of 4 inches. Earthwork recommendations to remove and recompact the upper zones of the subgrade soils are provided below to lower the total seismic settlement to be on the order of 3 inches. The maximum differential seismic settlement could be on the order of half of total seismic settlement over a distance of 50 feet.

GEOTECHNICAL OVERVIEW

The site appears suitable for the proposed construction based upon geotechnical conditions encountered in the test borings, provided that the recommendations provided in this report are implemented in the design and construction phases of this project.

Geotechnical engineering recommendations for foundation systems and other earth connected phases of the project are outlined below. The recommendations contained in this report are based upon the results of field and laboratory testing, engineering analyses, and our current understanding of the proposed project.

Based on the conditions encountered, the proposed buildings can be supported on shallow foundations, such as spread footings, provided the structures are designed to tolerate the anticipated total and differential seismic settlements.

Groundwater was not encountered during the course of drilling.

The **General Comments** section provides an understanding of the report limitations.

EARTHWORK

The following recommendations include site preparation, excavation, subgrade preparation and placement of engineered fills on the project. The recommendations presented for design and construction of earth supported elements including foundations, slabs, and pavements are contingent upon following the recommendations outlined in this section.

Earthwork on the project should be observed and evaluated by Terracon. The evaluation of earthwork should include observation and testing of engineered fill, subgrade preparation, foundation bearing soils, and other geotechnical conditions exposed during the construction of the project. The **General Comments** section provides an understanding of the report limitations.

Site Preparation

Strip and remove existing vegetation, debris, pavements, and other deleterious materials from proposed building and pavement areas. Exposed surfaces should be free of mounds and depressions which could prevent uniform compaction. The site should be initially graded to create a relatively level surface to receive fill and provide for a relatively uniform thickness of fill beneath proposed building structures.

Although there was no evidence of underground facilities such as septic tanks, cesspools and basements, such features could be encountered during construction. If unexpected fills, utilities or underground facilities are encountered such features should be removed and the excavation thoroughly cleaned prior to backfill placement and/or construction.

Subgrade Preparation

Due to the presence of relatively loose and soft soils and potential for seismic settlement in the upper zones of the on-site soils, we recommend that the proposed structures be supported on engineered fill extending to a minimum depth of 3 feet below the bottom of foundations, or 5 feet below existing grades, whichever is greater. Engineered fill placed beneath the entire footprint of the structures should extend horizontally a minimum distance of 5 feet beyond the outside edge of perimeter footings.

Subgrade soils beneath exterior slabs and pavements should be removed and replaced to a depth of 1 foot below the proposed pavement section, or 1 foot below existing grade, whichever is deeper.

Exposed areas which will receive fill, once properly cleared and benched where necessary, should be scarified to a minimum depth of 10 inches, moisture conditioned as necessary and compacted per the compaction requirements in this report. Compacted fill soils should then be placed to the design grades, and the moisture content and compaction of soils should be maintained until slab, pavement, or proposed improvements are constructed.

Based upon the subsurface conditions determined from the geotechnical exploration, the on-site soils are suitable for the proposed fill soils, and are anticipated to be relatively workable. However, the workability of the soils may be affected by precipitation, repetitive construction traffic or other factors. If unworkable conditions develop, workable may be improved by scarifying and drying.

Excavation

We anticipate that excavations for the proposed construction can be accomplished with conventional earthmoving equipment. The bottom of excavations should be thoroughly cleaned of loose soils and disturbed materials prior to backfill placement and/or construction.

Individual contractors are responsible for designing and constructing stable, temporary excavations. Excavations should be sloped or shored in the interest of safety following local, and federal regulations, including current OSHA excavation and trench safety standards.

Fill Material Types

All fill materials should be inorganic soils free of vegetation, debris, and fragments larger than three inches in size. Pea gravel or other similar non-cementitious, poorly-graded materials should not be used as fill or backfill without the prior approval of the geotechnical engineer.

Clean on-site soils or approved imported materials may be used as fill material for the following:

■ general site grading	■ foundation backfill
■ foundation areas	■ pavement areas
■ interior floor slab areas	■ exterior slab areas

If imported soils are used as fill materials to raise grades, these soils should conform to low volume change materials and should conform to the following requirements:

Gradation	**Percent Finer by Weight (ASTM C 136)**
3”	100
No. 4 Sieve	50 - 100
No. 200 Sieve	20 - 50

■ Liquid Limit .... 30 (max)

- Plasticity Index .... 15 (max)
- Maximum Expansive Index* .... 20 (max)

*ASTM D 4829

The contractor shall notify the Geotechnical Engineer of import sources sufficiently ahead of their use so that the sources can be observed and approved as to the physical characteristic of the import material. For all import material, the contractor shall also submit current verified reports from a recognized analytical laboratory indicating that the import has a "not applicable" (Class S0) potential for sulfate attack based upon current ACI criteria and is "mildly corrosive" to ferrous metal and copper. The reports shall be accompanied by a written statement from the contractor that the laboratory test results are representative of all import material that will be brought to the job.

Engineered fill should be placed and compacted in horizontal lifts, using equipment and procedures that will produce recommended moisture contents and densities throughout the lift. Fill lifts should not exceed 10 inches loose thickness.

Fill Compaction Requirements

Recommended compaction and moisture content criteria for engineered fill materials are as follows:

Material Type and Location	Per the Modified Proctor Test (ASTM D 1557)		
	Minimum Compaction Requirement (%)	Range of Moisture Contents for Compaction Above Optimum	
		Minimum	Maximum
On-site soils and/or low volume change imported fill:			
Beneath foundations:	90	0%	+2%
Beneath interior slabs:	90	0%	+2%
Miscellaneous backfill and behind retained walls:	90	0%	+2%
Beneath pavements:	95	0%	+2%
Utility Trenches*:	90	0%	+2%
Bottom of excavation receiving fill:	90	0%	+2%
Aggregate base (beneath pavements):	95	0%	+2%

* Upper 12 inches should be compacted to 95% within pavement and structural areas.

Utility Trenches

We anticipate that the on-site soils will provide suitable support for underground utilities and piping that may be installed. Any soft and/or unsuitable material encountered at the bottom of excavations should be removed and be replaced with an adequate bedding material. A non-expansive granular material with a sand equivalent greater than 30 is recommended for bedding and shading of utilities, unless otherwise allowed by the utility manufacturer.

On-site materials are considered suitable for backfill of utility and pipe trenches from one foot above the top of the pipe to the final ground surface, provided the material is free of organic matter and deleterious substances.

Trench backfill should be mechanically placed and compacted as discussed earlier in this report. Compaction of initial lifts should be accomplished with hand-operated tampers or other lightweight compactors. Where trenches are placed beneath slabs or footings, the backfill should satisfy the gradation and expansion index requirements of engineered fill discussed in this report. Flooding or jetting for placement and compaction of backfill is not recommended.

Grading and Drainage

Positive drainage should be provided during construction and maintained throughout the life of the development. Infiltration of water into utility trenches or foundation excavations should be prevented during construction. Planters and other surface features which could retain water in areas adjacent to the building or pavements should be sealed or eliminated. In areas where sidewalks or paving do not immediately adjoin the structure, we recommend that protective slopes be provided with a minimum grade of approximately 5 percent for at least 10 feet from perimeter walls. Backfill against footings, exterior walls, and in utility and sprinkler line trenches should be well compacted and free of all construction debris to reduce the possibility of moisture infiltration.

We recommend a minimum horizontal setback distance of 10 feet from the perimeter of any building and the high-water elevation of the nearest storm-water retention basin.

Roof drainage should discharge into splash blocks or extensions when the ground surface beneath such features is not protected by exterior slabs or paving. Sprinkler systems and landscaped irrigation should not be installed within 5 feet of foundation walls.

Exterior Slab Design and Construction

Exterior slabs-on-grade, exterior architectural features, and utilities founded on, or in backfill may experience some movement due to the volume change of the backfill. To reduce the potential for damage caused by movement, we recommend:

- minimizing moisture increases in the backfill;
- controlling moisture-density during placement of backfill;

- using designs which allow vertical movement between the exterior features and adjoining structural elements;
- placing effective control joints on relatively close centers.

Construction Considerations

Upon completion of filling and grading, care should be taken to maintain the subgrade moisture content prior to construction of improvements including foundations, floor slabs and pavements. Construction traffic over the completed subgrade should be avoided to the extent practical. The site should also be graded to prevent ponding of surface water on the prepared subgrades or in excavations. If the subgrade should become desiccated, saturated, or disturbed, the affected material should be removed or these materials should be scarified, moisture conditioned, and recompacted prior to floor slab and pavement construction.

Onsite soils contains zones of cohesionless sandy soils. Such soils have the tendency to cave and slough during excavations. Therefore, formwork may be needed for foundation excavations.

Should unstable subgrade conditions develop stabilization measures may need to be employed. Stabilization measures may include placement of aggregate base and multi-axial geogrid. Use of lime, fly ash, kiln dust or cement could also be considered as a stabilization technique. Laboratory evaluation is recommended to determine the effect of chemical stabilization on subgrade soils prior to construction.

We recommend that the earthwork portion of this project be completed during extended periods of dry weather if possible. If earthwork is completed during the wet season (typically November through April) it may be necessary to take extra precautionary measures to protect subgrade soils. Wet season earthwork operations may require additional mitigative measures beyond that which would be expected during the drier summer and fall months. This could include diversion of surface runoff around exposed soils and draining of ponded water on the site. Once subgrades are established, it may be necessary to protect the exposed subgrade soils from construction traffic.

As a safety measure, no equipment should be operated within 5 feet of the edge of the excavation and no materials should be stockpiled within 10 feet of the excavation. Excavations should not approach closer than a distance equal to the depth of excavation from existing structures/facilities without some form of protection for the facilities. Proper berming or ditching should be performed to divert any surface runoff away from the excavation.

Construction Observation and Testing

The geotechnical engineer should be retained during the construction phase of the project to observe earthwork and to perform necessary tests and observations during subgrade preparation, proof-rolling, placement and compaction of controlled compacted fills, backfilling of excavations to the completed subgrade.

The exposed subgrade and each lift of compacted fill should be tested, evaluated, and reworked as necessary until approved by the Geotechnical Engineer prior to placement of additional lifts. Each lift of fill should be tested for density and water content at a frequency of at least one test for every 2,500 square feet of compacted fill in the building areas and 5,000 square feet in pavement areas. One density and water content test for every 50 linear feet of compacted utility trench backfill.

In areas of foundation excavations, the bearing subgrade should be evaluated under the direction of the Geotechnical Engineer. In the event that unanticipated conditions are encountered, the Geotechnical Engineer should prescribe mitigation options.

In addition to the documentation of the essential parameters necessary for construction, the continuation of the Geotechnical Engineer into the construction phase of the project provides the continuity to maintain the Geotechnical Engineer's evaluation of subsurface conditions, including assessing variations and associated design changes.

SHALLOW FOUNDATIONS

If the site has been prepared in accordance with the requirements noted in **Earthwork**, the following design parameters are applicable for shallow foundations.

Item	Description
Foundation Support	Engineered fill extending 3 feet below the bottom of foundations, or 5 feet below existing grades, whichever is greater.
Net Allowable Bearing pressure [1, 2] **(On-site soils or structural fill)**	2,500 psf
Minimum Foundation Dimensions	Columns: 24 inches Continuous: 18 inches
Minimum Footing Depth	18" below finished grade
Ultimate Passive Resistance [4]	375 pcf
Ultimate Coefficient of Sliding Friction [5]	0.36
Estimated Total Static Settlement from Structural Loads [2]	about 1 inch
Estimated Total Seismic Settlement	about 3 inches
Estimated Differential Settlement [2, 6]	about 1/2 of total settlement

Item	Description

1. The maximum net allowable bearing pressure is the pressure in excess of the minimum surrounding overburden pressure at the footing base elevation. An appropriate factor of safety has been applied.
2. Values provided are for maximum loads noted in **Project Description**. The foundation settlement will depend upon the variations within the subsurface soil profile, the structural loading conditions, the embedment depth of the footings, the thickness of compacted fill, and the quality of the earthwork operations.
3. Unsuitable or soft soils should be over-excavated and replaced per the recommendations presented in the **Earthwork**.
4. Use of passive earth pressures requires the footing forms be removed and compacted structural fill be placed against the vertical footing face. A factor of safety of 2.0 is recommended.
5. Can be used to compute sliding resistance where foundations are placed on suitable soil/materials. Should be neglected for foundations subject to net uplift conditions. A factor of safety of 1.5 is recommended.
6. Differential settlements are as measured over a span of 40 feet.

Foundation Construction Considerations

As noted in **Earthwork**, the footing excavations should be evaluated under the direction of the Geotechnical Engineer. The base of all foundation excavations should be free of water and loose soil, prior to placing concrete. Concrete should be placed soon after excavating to reduce bearing soil disturbance. Care should be taken to prevent wetting or drying of the bearing materials during construction. Excessively wet or dry material or any loose/disturbed material in the bottom of the footing excavations should be removed/reconditioned before foundation concrete is placed.

If unsuitable bearing soils are encountered at the base of the planned footing excavation, the excavation should be extended deeper to suitable soils, and the footings could bear directly on these soils at the lower level or on lean concrete backfill placed in the excavations.

To ensure foundations have adequate support, special care should be taken when footings are located adjacent to trenches. The bottom of such footings should be at least 1 foot below an imaginary plane with an inclination of 1.5 horizontal to 1.0 vertical extending upward from the nearest edge of adjacent trenches.

FLOOR SLABS

DESCRIPTION	RECOMMENDATION
Interior floor system	Slab-on-grade concrete
Floor slab support	Engineered fill extending 3 feet below the bottom of associated foundations, or 5 feet below existing grades, whichever is greater.
Subbase	Minimum 4-inches of Aggregate Base
Modulus of subgrade reaction	200 pounds per square inch per inch (psi/in) (The modulus was obtained based on estimates obtained from NAVFAC 7.1 design charts). This value is for a small loaded area (1 Sq. ft or less) such as for forklift wheel loads or point loads and should be adjusted for larger loaded areas.

The use of a vapor retarder should be considered beneath concrete slabs on grade covered with wood, tile, carpet, or other moisture sensitive or impervious coverings, or when the slab will support equipment sensitive to moisture. When conditions warrant the use of a vapor retarder, the slab designer should refer to ACI 302 and/or ACI 360 for procedures and cautions regarding the use and placement of a vapor retarder.

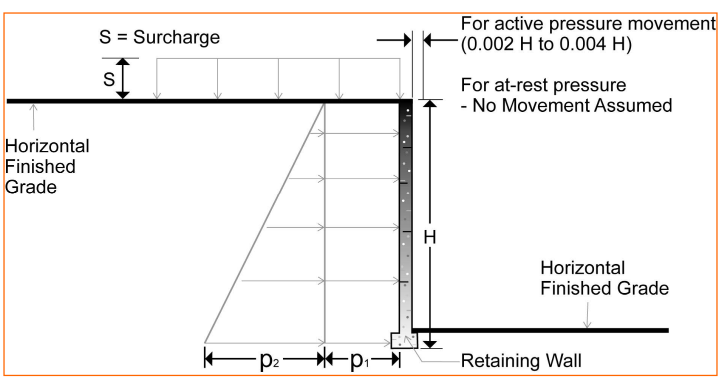
Saw-cut control joints should be placed in the slab to help control the location and extent of cracking. For additional recommendations refer to the ACI Design Manual. Joints or cracks should be sealed with a water-proof, non-extruding compressible compound specifically recommended for heavy duty concrete pavement and wet environments.

Where floor slabs are tied to perimeter walls or turn-down slabs to meet structural or other construction objectives, our experience indicates differential movement between the walls and slabs will likely be observed in adjacent slab expansion joints or floor slab cracks beyond the length of the structural dowels. The Structural Engineer should account for potential differential settlement through use of sufficient control joints, appropriate reinforcing or other means.

LATERAL EARTH PRESSURES

Design Parameters

Structures with unbalanced backfill levels on opposite sides should be designed for earth pressures at least equal to values indicated in the following table. Earth pressures will be influenced by structural design of the walls, conditions of wall restraint, methods of construction and/or compaction and the strength of the materials being restrained. Two wall restraint conditions are shown in the diagram below. Active earth pressure is commonly used for design of free-standing cantilever retaining walls and assumes wall movement. The “at-rest” condition assumes no wall movement and is commonly used for basement walls, loading dock walls, or other walls restrained at the top. The recommended design lateral earth pressures do not include a factor of safety and do not provide for possible hydrostatic pressure on the walls (unless stated).



For on-site or import materials that are compacted as recommended in this report, we recommend the following preliminary lateral earth pressure parameters

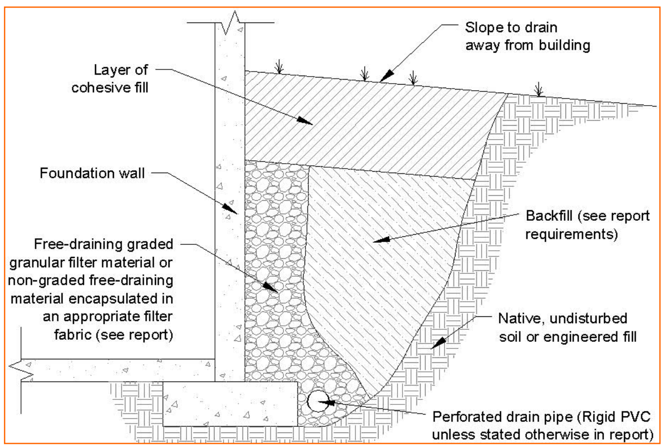
ITEM[1,2]	EFFECTIVE FLUID PRESSURE[5] (UNSATURATED)[6]
Active (K_a)	42 psf/ft
Passive (K_p)	375 psf/ft
At-Rest (K_0)	63 psf/ft
Surcharge Loads[3,4]	0.33 x (S) psf
Coefficient of Friction**	0.36
Wall Foundation Support	Engineered fill extending 2-feet below the bottom of wall foundation
Net Allowable Bearing Pressure[7]	2,200 psf

1. For active earth pressure, wall must rotate about base, with top lateral movements 0.002 H to 0.004 H, where H is wall height. For passive earth pressure conditions, wall movement in a range of 0.005H to 0.01H (H is the height of the wall) is required to fully mobilize passive earth pressures. If this scale of wall movement is not expected, a reduction factor of 50% may be used for passive earth pressure condition design.
2. Uniform, horizontal backfill, compacted to at least 90 percent of the ASTM D1557 maximum dry density, rendering a maximum unit weight of 125 pcf.
3. Uniform surcharge, where S is surcharge pressure. The project structural engineer should provide any surcharge loading.
4. Loading from heavy compaction equipment is not included.
5. No safety factor is included in these values.
6. To achieve “Unsaturated” conditions, follow guidelines in Retaining Wall Drainage below. Terracon should be contacted if drainage systems will not be installed behind retaining walls or if the walls will be located below groundwater.
7. The maximum net allowable bearing pressure is the pressure in excess of the minimum surrounding overburden pressure at the footing base elevation. An appropriate factor of safety has been applied.

Backfill placed against structures should consist of granular soils. For the granular values to be valid, the granular backfill must extend out and up from the base of the wall at an angle of at least 45 and 60 degrees from vertical for the active and passive cases, respectively.

Subsurface Drainage for Below-Grade Walls

A perforated rigid plastic drain line installed behind the base of walls and extends below adjacent grade is recommended to prevent hydrostatic loading on the walls. The invert of a drain line around a below-grade building area or exterior retaining wall should be placed near foundation bearing level. The drain line should be sloped to provide positive gravity drainage to daylight or to a sump pit and pump. The drain line should be surrounded by clean, free-draining granular material having less than 5% passing the No. 200 sieve. The free-draining aggregate should be encapsulated in a filter fabric. The granular fill should extend to within 2 feet of final grade, where it should be capped with compacted cohesive fill to reduce infiltration of surface water into the drain system.



As an alternative to free-draining granular fill, a pre-fabricated drainage structure may be used. A pre-fabricated drainage structure is a plastic drainage core or mesh which is covered with filter fabric to prevent soil intrusion, and is fastened to the wall prior to placing backfill.

Subsurface Drainage for Below Grade Walls

Backfill behind retaining walls should consist of a soil of granularity sufficient that the backfill will properly drain. The granular soil should be classified per the USCS as GW, GP, SW, SP, SW-SM or SP-SM. Surface drainage should be provided to prevent ponding of water behind walls. A drainage system consisting of either or both of the following should be installed behind all retaining walls:

- A 4-inch-diameter perforated PVC (Schedule 40) pipe or equivalent at the base of the stem encased in 2 cubic feet of granular drain material per linear foot of pipe or
- Synthetic drains such as Enkadrain, Miradrain, Hydraway 300 or equivalent.

Perforations in the PVC pipe should be 3/8 inch in diameter and should be placed facing down. Granular drain material should be wrapped with filter cloth such as Mirafi 140 or equivalent to prevent clogging of the drains with fines. Walls should be waterproofed to prevent nuisance seepage and damage. Water should outlet to an approved drain.

PAVEMENTS

General Pavement Comments

Pavement designs are provided for the traffic conditions and pavement life conditions as noted in **Project Description** and in the following sections of this report. A critical aspect of pavement performance is site preparation. Pavement designs noted in this section must be applied to the site which has been prepared as recommended in the **Earthwork** section.

Pavement Design Parameters

Design of asphalt concrete (AC) pavements is based on the procedures outlined in the Caltrans "Highway Design Manual for Safety Roadside Rest Areas" (Caltrans, 2016). Design of Portland cement concrete (PCC) pavements are based upon American Concrete Institute (ACI) 330R-08; "Guide for Design and Construction of Concrete Parking Lots."

Laboratory R-value tests were performed on two samples retrieved from the exploratory borings. The tests resulted in R-values of 16, and 19. An R-value of 16 was used for the design of pavement sections. A modulus of rupture of 600 psi was used for pavement concrete.

The structural sections are predicated upon proper compaction of the utility trench backfills and the subgrade soils as prescribed by in **Earthwork**, with the upper 12 inches of subgrade soils and all aggregate base material brought to a minimum relative compaction of 95 percent in accordance with ASTM D 1557 prior to paving. The aggregate base should meet Caltrans requirements for Class 2 base.

The pavement designs were based upon the results of preliminary sampling and testing and should be verified by additional sampling and testing (specifically R-value testing) during construction when the actual subgrade soils are exposed. Additionally, the preliminary sections provided are minimums based on procedures previously referenced. The project civil engineer should confirm minimum Traffic Indices and sections required by local agencies or jurisdictions if applicable.

Pavement Section Thicknesses

The following table provides options for AC and PCC Sections:

Asphalt Concrete Design		
Usage	**Assumed Traffic Index**	**Recommended Structural Section**
Auto Parking Areas	5.0	3" HMA[1]/8" Class 2 AB[2]
Auto Roads	5.5	3" HMA[1]/10" Class 2 AB[2]
Truck Roads	7.0	4" HMA[1]/13" Class 2 AB[2]
Truck Loading Areas	8.0	4.5" HMA[1]/16" Class 2 AB[2]

1. HMA = hot mix asphalt
2. AB = aggregate base

Portland Cement Concrete Design			
Layer	**Thickness (inches)**		
	Light Duty[1]	**Medium Duty**[2]	**Heavy Duty**[3]
PCC	5.0	6.0	7.5
Aggregate Base [4]	--	--	--

1. Car Parking and Access Lanes, Average Daily Truck Traffic (ADTT) = 1 (Category A).
2. Truck Parking Areas, Multiple Units, ADTT = 25 (Category B)
3. In areas of anticipated heavy traffic, fire trucks, delivery trucks, or concentrated loads (e.g., dumpster pads), and areas with repeated turning or maneuvering of heavy vehicles, ADTT = 700 (Category C).
4. Aggregate base is not required. Compacted on-site material is considered competent.

Recommended structural sections were calculated based on assumed TIs and our preliminary sampling and testing.

Terracon does not practice traffic engineering. We recommend that the project civil engineer or traffic engineer verify that the TIs and ADTT traffic indices used are appropriate for this project.

Areas for parking of heavy vehicles, concentrated turn areas, and start/stop maneuvers could require thicker pavement sections. Edge restraints (i.e. concrete curbs or aggregate shoulders) should be planned along curves and areas of maneuvering vehicles. A maintenance program including surface sealing, joint cleaning and sealing, and timely repair of cracks and deteriorated areas will increase the pavement's service life. As an option, thicker sections could be constructed to decrease future maintenance.

Concrete for rigid pavements should have a minimum 28-day compressive strength of 4,000 psi, and be placed with a maximum slump of 4 inches. Although not required for structural support, a minimum 4-inchthick base course layer is recommended to help reduce potential for slab curl, shrinkage cracking, and subgrade pumping through joints. Proper joint spacing will also be required to prevent excessive slab curling and shrinkage cracking. Joints should be sealed to prevent entry of foreign material and doweled where necessary for load transfer.

Where practical, we recommend early-entry cutting of crack-control joints in PCC pavements. Cutting of the concrete in its “green” state typically reduces the potential for micro-cracking of the pavements prior to the crack control joints being formed, compared to cutting the joints after the concrete has fully set. Micro-cracking of pavements may lead to crack formation in locations other than the sawed joints, and/or reduction of fatigue life of the pavement.

Openings in pavements, such as decorative landscaped areas, are sources for water infiltration into surrounding pavement systems. Water can collect in the islands and migrate into the surrounding subgrade soils thereby degrading support of the pavement. This is especially applicable for islands with raised concrete curbs, irrigated foliage, and low permeability near-surface soils. The civil design for the pavements with these conditions should include features to restrict or collect and discharge excess water from the islands. Examples of features are edge drains connected to the storm water collection system, longitudinal subdrains, or other suitable outlets and impermeable barriers preventing lateral migration of water such as a cutoff wall installed to a depth below the pavement structure.

Dishing in parking lots surfaced with ACC is usually observed in frequently-used parking stalls (such as near the front of buildings), and occurs under the wheel footprint in these stalls. The use of higher-grade asphalt cement, or surfacing these areas with PCC, should be considered. The dishing is exacerbated by factors such as irrigated islands or planter areas, sheet surface drainage to the front of structures, and placing the ACC directly on a compacted clay subgrade.

PCC pavement details for joint spacing, joint reinforcement, and joint sealing should be prepared in accordance with ACI 330 and ACI 325. PCC pavements should be provided with mechanically reinforced joints (doweled or keyed) in accordance with ACI 330.

Pavement Drainage

Pavements should be sloped to provide rapid drainage of surface water. Water allowed to pond on or adjacent to the pavements could saturate the subgrade and contribute to premature pavement deterioration. In addition, the pavement subgrade should be graded to provide positive drainage within the granular base section. Appropriate sub-drainage or connection to a suitable daylight outlet should be provided to remove water from the granular subbase.

Pavement Maintenance

The pavement sections represent minimum recommended thicknesses and, as such, periodic maintenance should be anticipated. Therefore, preventive maintenance should be planned and provided for through an on-going pavement management program. Maintenance activities are intended to slow the rate of pavement deterioration and to preserve the pavement investment. Maintenance consists of both localized maintenance (e.g., crack and joint sealing and patching) and global maintenance (e.g., surface sealing). Preventive maintenance is usually the priority when implementing a pavement maintenance program. Additional engineering observation is recommended to determine the type and extent of a cost-effective program. Even with periodic maintenance, some movements and related cracking may still occur and repairs may be required.

Pavement performance is affected by its surroundings. In addition to providing preventive maintenance, the civil engineer should consider the following recommendations in the design and layout of pavements:

- Final grade adjacent to paved areas should slope down from the edges at a minimum 2 percent.
- Subgrade and pavement surfaces should have a minimum 2 percent slope to promote proper surface drainage.
- Install below pavement drainage systems surrounding areas anticipated for frequent wetting.
- Install joint sealant and seal cracks immediately.
- Seal all landscaped areas in or adjacent to pavements to reduce moisture migration to subgrade soils.
- Place compacted, low permeability backfill against the exterior side of curb and gutter.
- Place curb, gutter and/or sidewalk directly on clay subgrade soils rather than on unbound granular base course materials.

STORM WATER MANAGEMENT

Three (3) in-situ percolation tests (falling head borehole permeability) were performed at approximate depths of 5 and 10 feet bgs. The objective of the testing is to provide infiltration rates for designing the proposed storm water infiltration system.

A 2-inch thick, 3/8-inch gravel layer was placed in the bottom of each boring after the borings were drilled to investigate the soil profile. Three-inch diameter perforated pipes were installed on top of the gravel layer. Gravel was used to backfill between the perforated pipes and the boring sidewall. The borings were then filled with water for a pre-soak period.

At the beginning of each test, the pipes were refilled with water and readings were taken at periodic time intervals as the water level dropped. The soil at the percolation test locations was classified in the field using a visual/manual procedure. The infiltration velocity is presented as the infiltration rate and is summarized in the following table. The infiltration rates provided do not include safety factors.

Test Location	Boring Depth (ft.) [1]	Test Depth Range (ft.) [1]	Soil Type	Water Head (ft)	Measured Percolation Rate Average (in./hr.)	Design Infiltration Rate Average (in./hr.) [2]
P-1	10	5 to 10	CL/SC	5	20.4	0.72
P-2	10	5 to 10	SC	5	5.4	0.18
P-3	5	0 to 5	CL	5	12.6	0.45

1. Below existing ground surface.
2. If proposed infiltration system will mainly rely on vertical downward seepage, the correlated infiltration rates should be used. The correlated infiltration rates were calculated using the Porchet method.

The rate obtained at specific location and depth is representative of the location and depth tested. If these rates are used for infiltration designed structures, an application of an appropriate safety factor is prudent to account for subsoil inconsistencies, possible compaction related to site grading, and potential silting of the percolating soils, depending on the application.

The design engineer should also check with the local agency for the limitation of the infiltration rate allowed in the design. If the maximum allowable design infiltration rate is lower than the above recommended rate, the maximum allowable design infiltration rate should be used. The designer of the basins should also consider other possible site variability in the design.

The percolation tests were performed with clear water, whereas the storm water will likely not be clear, but may contain organics, fines, and grease/oil. The presence of these deleterious materials will tend to decrease the rate that water percolates from the infiltration systems. Design of any storm water infiltration systems should account for the presence of these materials and should incorporate structures/devices to remove these deleterious materials

Based on the soils encountered in our borings, we expect the percolation rates of the soils could be different than measured in the field due to variations in the fines content of the subsurface soils encountered. The design elevation and size of the proposed infiltration system (if used) should account for this expected variability in infiltration rates.

If infiltration type structures for storm water management are used on the site, infiltration testing may be performed after construction of the infiltration system to verify the design infiltration rates. It should be noted that siltation and vegetation growth along with other factors may affect the infiltration rates of the infiltration areas. The actual infiltration rate may vary from the values reported here. Infiltration systems should be located at least 10 feet from any existing or proposed foundation system. Infiltration rates can be affected by silt buildup, debris, degree of soil saturation, site variability and other factors.

CORROSIVITY

The following table lists the laboratory electrical resistivity (standard and as-received), chlorides, soluble sulfates, and pH testing results. These values may be used to estimate potential corrosive characteristics of the on-site soils with respect to contact with the various underground materials which will be used for project construction.

Boring	Depth (feet)	Soluble Sulfate (mg/kg)	Soluble Chloride (mg/kg)	Total Salts (mg/kg)	pH	Resistivity (as-received) (Ohm-cm)	Resistivity (saturated) (Ohm-cm)
B-7	0 - 5	135	70	465	8.59	47,045	4,171
B-16	0 - 5	88	78	579	8.64	67,900	3,395

Results of soluble sulfate testing indicate the samples tested possess negligible sulfate concentrations when classified in accordance with Table 4.3.1 of the ACI Design Manual. Concrete should be designed in accordance with the provisions of the ACI Design Manual, Section 318, Chapter 4.

For protection against corrosion to buried metals, Terracon recommends that an experienced corrosion engineer be retained to design a suitable corrosion protection system for underground metal structures or components. If corrosion of buried metal is critical, it should be protected using a non-corrosive backfill, wrapping, coating, sacrificial anodes, or a combination of these methods, as designed by a qualified corrosion engineer.

GENERAL COMMENTS

Our analysis and opinions are based upon our understanding of the project, the geotechnical conditions in the area, and the data obtained from our site exploration. Natural variations will occur between exploration point locations or due to the modifying effects of construction or weather. The nature and extent of such variations may not become evident until during or after construction. Terracon should be retained as the Geotechnical Engineer, where noted in this report, to provide observation and testing services during pertinent construction phases. If variations appear, we can provide further evaluation and supplemental recommendations. If variations are noted in the absence of our observation and testing services on-site, we should be immediately notified so that we can provide evaluation and supplemental recommendations.

Our Scope of Services does not include either specifically or by implication any environmental or biological (e.g., mold, fungi, bacteria) assessment of the site or identification or prevention of pollutants, hazardous materials or conditions. If the owner is concerned about the potential for such contamination or pollution, other studies should be undertaken.

Our services and any correspondence or collaboration through this system are intended for the sole benefit and exclusive use of our client for specific application to the project discussed and are accomplished in accordance with generally accepted geotechnical engineering practices with no third-party beneficiaries intended. Any third-party access to services or correspondence is solely for information purposes to support the services provided by Terracon to our client. Reliance upon the services and any work product is limited to our client, and is not intended for third parties. Any use or reliance of the provided information by third parties is done solely at their own risk. No warranties, either express or implied, are intended or made.

Site characteristics as provided are for design purposes and not to estimate excavation cost. Any use of our report in that regard is done at the sole risk of the excavating cost estimator as there may be variations on the site that are not apparent in the data that could significantly impact excavation cost. Any parties charged with estimating excavation costs should seek their own site characterization for specific purposes to obtain the specific level of detail necessary for costing. Site safety, and cost estimating including, excavation support, and dewatering requirements/design are the responsibility of others. If changes in the nature, design, or location of the project are planned, our conclusions and recommendations shall not be considered valid unless we review the changes and either verify or modify our conclusions in writing.

ATTACHMENTS

EXPLORATION AND TESTING PROCEDURES

Field Exploration

Terracon conducted 21 soil-testing borings as shown on the Exploration Plan. These borings were drilled at the locations and to depths indicated in the table below.

Boring Nos.	Boring Depth (feet) [1]	Location
2 (B-1 and B-13)	51 ½	Building footprint
8 (B-2 to B-5, B-7, B-9, B-10 and B-12)	26 ½	Building footprint
1 (B-6)	21 ½	Building footprint
2 (B-8 and B-11)	31 ½	Building footprint
2 (B-14 and B-15)	6 ½	Parking area
3 (B-16 to B-18)	11 ½	Parking area
2 (P-1 and P-2)	10 ½	Infiltration basin
1 (P-3)	5 ½	Infiltration basin

1. Below ground surface.
2. Auger refusal was encountered in boring B-4.

Boring Layout and Elevations: Unless otherwise noted, Terracon personnel provided the boring layout. Coordinates were obtained with a handheld GPS unit (estimated horizontal accuracy of about ±10 feet) and approximate elevations were obtained by interpolation from the Google Earth. If elevations and a more precise boring layout are desired, we recommend borings be surveyed following completion of fieldwork.

Subsurface Exploration Procedures: We advance the borings with a truck-mounted drill rig using hollow-stem augers. Both a standard penetration test (SPT) sampler (2-inch outer diameter and 1-3/8-inch inner diameter) and a modified California ring-lined sampler (3-inch outer diameter and 2-3/8-inch inner diameter) are utilized in our investigation. The penetration resistance is recorded on the boring logs as the number of hammer blows used to advance the sampler in 6-inch increments (or less if noted). The samplers are driven with an automatic hammer that drops a 140-pound weight 30 inches for each blow. After the required seating, samplers are advanced up to 18 inches, providing up to three sets of blowcounts at each sampling interval. The sampling depths, penetration distances, and other sampling information are recorded on the field boring logs. The recorded blows are raw numbers without any corrections for hammer type (automatic vs. manual cathead) or sampler size (ring sampler vs. SPT sampler). Relatively undisturbed and bulk samples of the soils encountered are placed in sealed containers and returned to the laboratory for testing and evaluation.

We observe and record groundwater levels during drilling and sampling. For safety purposes, all borings are backfilled with auger cuttings after their completion.

Our exploration team prepares field boring logs as part of the drilling operations. These field logs include visual classifications of the materials encountered during drilling and our interpretation of the subsurface conditions between samples. Final boring logs are prepared from the field logs. The final boring logs represent the Geotechnical Engineer's interpretation of the field logs and include modifications based on observations and tests of the samples in our laboratory.

Laboratory Testing

The project engineer reviewed the field data and assigned laboratory tests to understand the engineering properties of the various soil strata, as necessary, for this project. Tests listed below are for reference to methodology in general. In some cases, variations to methods were applied because of local practice or professional judgment. Standards noted below include reference to other, related standards. Such references are not necessarily applicable to describe the specific test performed.

- Water (Moisture) Content of Soil by Mass
- Laboratory Determination of Density (Unit Weight) of Soil Specimens
- Modified Proctor test
- Particle-Size Distribution (Gradation) of Soils Using Sieve Analysis
- Atterberg Limits
- Direct Shear Strength
- Consolidation/Hydrocollapse
- R-value
- Corrosion suite

The laboratory testing program often included examination of soil samples by an engineer. Based on the material's texture and plasticity, we described and classified the soil samples in accordance with the Unified Soil Classification System.

SITE LOCATION AND EXPLORATION PLANS

Contents:

Note: All attachments are one page unless noted above.

SITE LOCATION

Proposed Industrial Development ■ Hemet, California
January 27, 2022 ■ Terracon Project No. CB215163

DIAGRAM IS FOR GENERAL LOCATION ONLY, AND IS NOT INTENDED FOR CONSTRUCTION PURPOSES

MAP PROVIDED BY MICROSOFT BING MAPS

EXPLORATION PLAN A

Proposed Industrial Development ■ Hemet, California

January 27, 2022 ■ Terracon Project No. CB215163

DIAGRAM IS FOR GENERAL LOCATION ONLY, AND IS NOT INTENDED FOR CONSTRUCTION PURPOSES

MAP PROVIDED BY MICROSOFT BING MAPS

EXPLORATION RESULTS

BORING LOG NO. B-1

PROJECT: Proposed Industrial Development

CLIENT: Newland Capital Group LLC
Irvine, CA

SITE: S. Kirby Street
Hemet, CA

LOCATION See Exploration Plan

Latitude: 33.7413° Longitude: -117.001°

DEPTH	Description	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
	SILTY SAND (SM), fine to coarse grained, olive brown, very loose								
	fine to medium grained, loose, with occasional clay lenses				2-3-4 N=7				27
	frequent clay lenses	5			3-3-3 N=6				
7.0	**SANDY SILT (ML)**, olive brown, medium stiff				3-3-4 N=7				65
10.0	**SILTY SAND (SM)**, fine to medium grained, olive brown, loose	10			3-3-4 N=7				33
15.0	**LEAN CLAY WITH SAND (CL)**, olive brown, stiff	15			2-2-3 N=5				76
18.0	**SANDY LEAN CLAY (CL)**, olive brown, stiff								
	silt and sand lenses	20			3-3-5 N=8	13		26-19-7	62
	reddish brown, very stiff	25			6-8-9 N=17				
28.0	**WELL GRADED SAND WITH SILT (SW-SM)**, fine to coarse grained, reddish brown, medium dense	30							

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
6" Hollow-Stem Auger

Abandonment Method:
Boring backfilled with auger cuttings upon completion.

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Notes:

WATER LEVEL OBSERVATIONS

Groundwater not encountered

Terracon
1355 E Cooley Dr, Ste C
Colton, CA

Boring Started: 12-01-2021	Boring Completed: 12-01-2021
Drill Rig: CME 75	Driller: Martini Driller
Project No.: CB215163	

BORING LOG NO. B-1

PROJECT: Proposed Industrial Development

CLIENT: Newland Capital Group LLC
Irvine, CA

SITE: S. Kirby Street
Hemet, CA

LOCATION See Exploration Plan

Latitude: 33.7413° Longitude: -117.001°

DEPTH	Description	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
33.0	**WELL GRADED SAND WITH SILT (SW-SM)**, fine to coarse grained, reddish brown, medium dense *(continued)*			X	7-11-12 N=23				8
36.5	**SILTY SAND (SM)**, fine grained, olive brown, dense	35		X	13-21-13 N=34	9		NP	41
39.0	**LEAN CLAY WITH SAND (CL)**, olive brown, hard								
	SILTY SAND (SM), fine to medium grained, olive brown, medium dense	40		X	6-12-14 N=26				19
48.0	grayish brown	45		X	6-11-14 N=25				36
51.5	**SANDY LEAN CLAY (CL)**, olive, stiff	50		X	2-3-4 N=7				62

Boring Terminated at 51.5 Feet

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
6" Hollow-Stem Auger

Abandonment Method:
Boring backfilled with auger cuttings upon completion.

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Notes:

WATER LEVEL OBSERVATIONS

Groundwater not encountered

Terracon
1355 E Cooley Dr, Ste C
Colton, CA

Boring Started: 12-01-2021	Boring Completed: 12-01-2021
Drill Rig: CME 75	Driller: Martini Driller
Project No.: CB215163	

BORING LOG NO. B-2

PROJECT: Proposed Industrial Development

CLIENT: Newland Capital Group LLC
Irvine, CA

SITE: S. Kirby Street
Hemet, CA

LOCATION See Exploration Plan

Latitude: 33.7417° Longitude: -117°

DEPTH	Description	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
	SILTY SAND (SM), fine to medium grained, olive brown, loose								
	clay lens				5-8-10	7	97		
	occasional clay lenses	5			2-3-2 N=5				
7.0	**SANDY SILT (ML)**, olive brown, very stiff				6-9-13	3	104		
10.0	**SILTY SAND (SM)**, fine to medium grained, olive brown, loose	10			3-4-5 N=9				
	3" clay lens				3-4-4 N=8				
15.0	**LEAN CLAY (CL)**, olive, very stiff	15			3-8-14				86
	stiff	20			2-4-6 N=10				
	silty sand lens								
23.0	**SANDY LEAN CLAY (CL)**, reddish brown, stiff								
		25			4-6-6 N=12				
26.5	***Boring Terminated at 26.5 Feet***								

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
6" Hollow-Stem Auger

Abandonment Method:
Boring backfilled with auger cuttings upon completion.

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Notes:

WATER LEVEL OBSERVATIONS

Groundwater not encountered

Terracon
1355 E Cooley Dr, Ste C
Colton, CA

Boring Started: 12-01-2021	Boring Completed: 12-01-2021
Drill Rig: CME 75	Driller: Martini Driller
Project No.: CB215163	

BORING LOG NO. B-3

PROJECT: Proposed Industrial Development

CLIENT: Newland Capital Group LLC, Irvine, CA

SITE: S. Kirby Street, Hemet, CA

LOCATION See Exploration Plan

Latitude: 33.7413° Longitude: -116.9991°

DEPTH	MATERIAL DESCRIPTION	SAMPLE DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
	SILTY SAND (SM), fine to medium grained, olive brown, very loose								
	loose	2.5		X	2-4-4 N=8				
	occasional clay lenses	5		ring	3-7-11	3	105		
7.0	**SANDY SILT (ML)**, olive brown, stiff	7.5		X	3-4-4 N=8				
10.0	**SILTY SAND (SM)**, fine to medium grained, olive brown, medium dense	10		ring	6-10-13	2	108		
	fine to coarse grained, loose	15		X	5-6-3 N=9				14
18.0	**LEAN CLAY WITH SAND (CL)**, olive brown, medium stiff, with occasional silt lenses	20		X	2-3-4 N=7				72
23.0	**SANDY LEAN CLAY (CL)**, reddish brown, stiff	25		X	5-5-6 N=11				
26.5	***Boring Terminated at 26.5 Feet***								

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
6" Hollow-Stem Auger

Abandonment Method:
Boring backfilled with auger cuttings upon completion.

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Notes:

WATER LEVEL OBSERVATIONS

Groundwater not encountered

Terracon
1355 E Cooley Dr, Ste C
Colton, CA

Boring Started: 12-01-2021	Boring Completed: 12-01-2021
Drill Rig: CME 75	Driller: Martini Driller
Project No.: CB215163	

BORING LOG NO. B-4

PROJECT: Proposed Industrial Development

CLIENT: Newland Capital Group LLC
Irvine, CA

SITE: S. Kirby Street
Hemet, CA

LOCATION See Exploration Plan

Latitude: 33.7408° Longitude: -117°

GRAPHIC LOG DEPTH	Description	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
	SILTY SAND (SM), fine to medium grained, olive brown, very loose								
	medium dense				6-11-14	2	107		
	loose	5			4-5-4 N=9				
7.0	**SANDY SILT (ML)**, olive brown, very stiff, with pinholes				9-14-17	4	106		
10.0	**SILTY SAND (SM)**, fine to medium grained, olive brown, loose	10			4-3-4 N=7				
15.5	**LEAN CLAY WITH SAND (CL)**, olive, medium stiff	15			3-3-4 N=7			35-22-13	79
18.0	**SANDY LEAN CLAY (CL)**, olive brown, medium stiff	20			2-3-4 N=7				
21.5	**SILTY SAND (SM)**, fine to coarse grained, reddish brown, medium dense	25			5-7-8 N=15				24
26.5	***Boring Terminated at 26.5 Feet***								

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
6" Hollow-Stem Auger

Abandonment Method:
Boring backfilled with auger cuttings upon completion.

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Notes:

WATER LEVEL OBSERVATIONS

Groundwater not encountered

Terracon
1355 E Cooley Dr, Ste C
Colton, CA

Boring Started: 12-01-2021	Boring Completed: 12-01-2021
Drill Rig: CME 75	Driller: Martini Driller
Project No.: CB215163	

BORING LOG NO. B-5

PROJECT: Proposed Industrial Development

CLIENT: Newland Capital Group LLC
Irvine, CA

SITE: S. Kirby Street
Hemet, CA

LOCATION See Exploration Plan

Latitude: 33.7402° Longitude: -117.001°

DEPTH	Description	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
	SILTY SAND (SM), fine to medium grained, olive brown, very loose								
	loose			Split spoon	3-3-4 N=7				
6.5	medium dense	5		Ring sampler	6-8-12	4	106		
9.5	**SANDY SILT (ML)**, olive brown, medium stiff			Split spoon	3-3-4 N=7				
14.0	**SILTY SAND (SM)**, fine to medium grained, olive brown, loose	10		Ring sampler	4-8-9	5	102		
18.0	**LEAN CLAY WITH SAND (CL)**, olive brown, medium stiff	15		Split spoon	2-2-3 N=5				
	SANDY LEAN CLAY (CL), fine to coarse grained, olive brown to reddish brown, stiff								
25.5	1" lean clay lens	20		Split spoon	3-4-8 N=12				54
26.5	**LEAN CLAY (CL)**, stiff	25		Split spoon	6-6-7 N=13				
	Boring Terminated at 26.5 Feet								

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
6" Hollow-Stem Auger

Abandonment Method:
Boring backfilled with auger cuttings upon completion.

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Notes:

WATER LEVEL OBSERVATIONS

Groundwater not encountered

Terracon
1355 E Cooley Dr, Ste C
Colton, CA

Boring Started: 12-01-2021	Boring Completed: 12-01-2021
Drill Rig: CME 75	Driller: Martini Driller
Project No.: CB215163	

BORING LOG NO. B-6

PROJECT: Proposed Industrial Development

CLIENT: Newland Capital Group LLC
Irvine, CA

SITE: S. Kirby Street
Hemet, CA

LOCATION See Exploration Plan

Latitude: 33.74° Longitude: -117°

DEPTH	GRAPHIC LOG / DESCRIPTION	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
	SILTY SAND (SM), fine to medium grained, olive brown, very loose								
	medium dense, pinholes				4-7-13				33
	loose, with occasional silt lenses	5			4-4-4 N=8				
7.0	**SANDY SILT (ML)**, olive brown, very stiff				9-12-16	4	101		
9.5	**SILTY SAND (SM)**, fine to medium grained, olive brown, loose	10			5-4-5 N=9				35
15.0	**SANDY LEAN CLAY (CL)**, olive, stiff	15			3-4-5 N=9				55
18.0	**SILTY SAND (SM)**, fine to coarse grained, olive brown to reddish brown, medium dense	20			4-5-8 N=13				
21.5	***Boring Terminated at 21.5 Feet***								

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
6" Hollow-Stem Auger

Abandonment Method:
Boring backfilled with auger cuttings upon completion.

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Notes:

WATER LEVEL OBSERVATIONS

Groundwater not encountered

Terracon
1355 E Cooley Dr, Ste C
Colton, CA

Boring Started: 12-01-2021	Boring Completed: 12-01-2021
Drill Rig: CME 75	Driller: Martini Driller
Project No.: CB215163	

BORING LOG NO. B-7

PROJECT: Proposed Industrial Development

CLIENT: Newland Capital Group LLC
Irvine, CA

SITE: S. Kirby Street
Hemet, CA

LOCATION See Exploration Plan

Latitude: 33.74° Longitude: -116.9991°

DEPTH	Material Description
	SILTY SAND (SM), fine to medium grained, olive brown, very loose
	loose
6.5	**SANDY SILT (ML)**, olive brown, stiff
	very stiff
11.0	**SILTY SAND (SM)**, fine to medium grained, olive brown, medium dense
15.5	**SANDY LEAN CLAY (CL)**, olive, medium stiff
	stiff
	6" silty sand lens
23.0	**SILTY SAND (SM)**, fine to coarse grained, reddish brown, medium dense
26.5	***Boring Terminated at 26.5 Feet***

DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
2.5			3-3-3 N=6				
5			4-7-7				
7.5			2-2-2 N=4				
10			3-7-12	6	93		
15			2-3-4 N=7				
20			3-5-5 N=10	15		33-19-14	61
25			4-7-9 N=16				

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
6" Hollow-Stem Auger

Abandonment Method:
Boring backfilled with auger cuttings upon completion.

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Notes:

WATER LEVEL OBSERVATIONS

Groundwater not encountered

Terracon
1355 E Cooley Dr, Ste C
Colton, CA

Boring Started: 12-01-2021	Boring Completed: 12-01-2021
Drill Rig: CME 75	Driller: Martini Driller
Project No.: CB215163	

BORING LOG NO. B-8

PROJECT: Proposed Industrial Development

CLIENT: Newland Capital Group LLC
Irvine, CA

SITE: S. Kirby Street
Hemet, CA

LOCATION See Exploration Plan

Latitude: 33.7391° Longitude: -117.001°

GRAPHIC LOG / DEPTH	Description	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
	SILTY SAND (SM), fine to medium grained, olive brown, very loose								
3.0	**SANDY SILT (ML)**, olive brown, very stiff, pinholes				6-12-16	5	98		
	stiff, with 1" clay lens	5			9-4-4 N=8				
					3-6-8				
9.5	**SILTY SAND (SM)**, fine grained, olive brown, loose	10			2-3-3 N=6				
14.0	**SANDY LEAN CLAY (CL)**, olive brown, medium stiff	15			2-2-3 N=5	14		30-20-10	67
	reddish brown	20			3-3-3 N=6				
23.0	**SILTY SAND (SM)**, fine grained, brown, loose	25			3-5-5 N=10	11		20-18-2	37
28.0	**SILTY SAND (SM)**, fine grained, brown, medium dense	30							

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
6" Hollow-Stem Auger

Abandonment Method:
Boring backfilled with auger cuttings upon completion.

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Notes:

WATER LEVEL OBSERVATIONS

Groundwater not encountered

Terracon
1355 E Cooley Dr, Ste C
Colton, CA

Boring Started: 12-01-2021	Boring Completed: 12-01-2021
Drill Rig: CME 75	Driller: Martini Driller
Project No.: CB215163	

BORING LOG NO. B-8

PROJECT: Proposed Industrial Development

CLIENT: Newland Capital Group LLC
Irvine, CA

SITE: S. Kirby Street
Hemet, CA

GRAPHIC LOG	LOCATION See Exploration Plan Latitude: 33.7391° Longitude: -117.001° DEPTH	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
	SILTY SAND (SM), fine grained, brown, medium dense *(continued)* 31.5				4-7-8 N=15				35
	Boring Terminated at 31.5 Feet								

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
6" Hollow-Stem Auger

Abandonment Method:
Boring backfilled with auger cuttings upon completion.

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Notes:

WATER LEVEL OBSERVATIONS

Groundwater not encountered

Terracon
1355 E Cooley Dr, Ste C
Colton, CA

Boring Started: 12-01-2021	Boring Completed: 12-01-2021
Drill Rig: CME 75	Driller: Martini Driller
Project No.: CB215163	

BORING LOG NO. B-9

PROJECT: Proposed Industrial Development

CLIENT: Newland Capital Group LLC
Irvine, CA

SITE: S. Kirby Street
Hemet, CA

LOCATION See Exploration Plan

Latitude: 33.7391° Longitude: -117.0001°

DEPTH	Description	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
2.0	**SILTY SAND (SM)**, fine grained, olive brown, loose								
	SANDY LEAN CLAY (CL), olive brown, medium stiff			SPT	3-4-3 N=7				
	stiff	5		Ring	9-7-9	9	98		
	silty sand lens								
	medium stiff			SPT	2-2-3 N=5				
	stiff	10		Ring	4-7-9				
13.0	silty sand lens								
18.0	**LEAN CLAY WITH SAND (CL)**, olive brown, medium stiff	15		SPT	2-2-3 N=5				
20.5	**SILTY SAND (SM)**, fine to medium grained, olive brown, loose								
	SANDY LEAN CLAY (CL), reddish brown, stiff	20		SPT	3-5-4 N=9				
26.5		25		SPT	5-6-8 N=14				

Boring Terminated at 26.5 Feet

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
6" Hollow-Stem Auger

Abandonment Method:
Boring backfilled with auger cuttings upon completion.

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Notes:

WATER LEVEL OBSERVATIONS

Groundwater not encountered

Terracon
1355 E Cooley Dr, Ste C
Colton, CA

Boring Started: 12-02-2021	Boring Completed: 12-02-2021
Drill Rig: CME 75	Driller: Martini Driller
Project No.: CB215163	

BORING LOG NO. B-10

PROJECT: Proposed Industrial Development

SITE: S. Kirby Street, Hemet, CA

CLIENT: Newland Capital Group LLC, Irvine, CA

LOCATION See Exploration Plan

Latitude: 33.739° Longitude: -116.9991°

DEPTH	Description	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
	SILTY SAND (SM), fine to medium grained, olive brown, loose								
3.5				Ring	4-7-10	5	96		
	SANDY LEAN CLAY (CL), olive brown, stiff	5		SPT	4-4-4 N=8				
7.0									
	LEAN CLAY (CL), olive brown, very stiff			Ring	5-8-11	13	114		
10.0		10							
	LEAN CLAY WITH SAND (CL), olive brown, medium stiff			SPT	4-4-3 N=7				
	stiff	15		SPT	2-3-5 N=8				
18.0									
	SILTY SAND (SM), fine to medium grained, olive brown, medium dense	20		SPT	2-5-7 N=12				
21.5									
	SANDY LEAN CLAY (CL), reddish brown, stiff								
24.0									
	SILTY SAND (SM), fine to coarse grained, reddish brown, medium dense	25		SPT	4-8-12 N=20				
26.5	*Boring Terminated at 26.5 Feet*								

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
6" Hollow-Stem Auger

Abandonment Method:
Boring backfilled with auger cuttings upon completion.

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Notes:

WATER LEVEL OBSERVATIONS

Groundwater not encountered

Terracon
1355 E Cooley Dr, Ste C
Colton, CA

Boring Started: 12-02-2021	Boring Completed: 12-02-2021
Drill Rig: CME 75	Driller: Martini Driller
Project No.: CB215163	

BORING LOG NO. B-11

PROJECT: Proposed Industrial Development

CLIENT: Newland Capital Group LLC
Irvine, CA

SITE: S. Kirby Street
Hemet, CA

LOCATION See Exploration Plan

Latitude: 33.7381° Longitude: -117.001°

DEPTH	Material Description	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
	SILTY SAND (SM), fine to medium grained, olive brown, loose								
2.5	**LEAN CLAY WITH SAND (CL)**, olive brown, stiff				4-6-6 N=12				
4.5	**SILTY SAND (SM)**, fine to medium grained, olive brown, medium dense	5			5-9-12	7	91		
6.5	**LEAN CLAY WITH SAND (CL)**, olive brown, medium stiff; occasional silt and silty sand lenses				2-2-2 N=4				
	silty sand lens	10			3-5-6				
13.0	**LEAN CLAY WITH SAND (CL)**, olive, soft	15			2-1-2 N=3	19		39-20-19	78
18.0	**SANDY LEAN CLAY (CL)**, reddish brown, stiff	20			3-4-5 N=9				
23.0	**SILTY SAND (SM)**, fine to coarse grained, olive brown, loose	25			2-4-5 N=9	16		28-23-5	35
		30							

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
6" Hollow-Stem Auger

Abandonment Method:
Boring backfilled with auger cuttings upon completion.

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Notes:

WATER LEVEL OBSERVATIONS

Groundwater not encountered

Terracon
1355 E Cooley Dr, Ste C
Colton, CA

Boring Started: 12-02-2021	Boring Completed: 12-02-2021
Drill Rig: CME 75	Driller: Martini Driller
Project No.: CB215163	

BORING LOG NO. B-11

PROJECT: Proposed Industrial Development

**CLIENT: Newland Capital Group LLC
Irvine, CA**

**SITE: S. Kirby Street
Hemet, CA**

LOCATION See Exploration Plan

Latitude: 33.7381° Longitude: -117.001°

GRAPHIC LOG	DEPTH	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
	SILTY SAND (SM), fine to coarse grained, olive brown, loose *(continued)*			X	4-5-8 N=13				
	31.5								
	Boring Terminated at 31.5 Feet								

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
6" Hollow-Stem Auger

Abandonment Method:
Boring backfilled with auger cuttings upon completion.

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Notes:

WATER LEVEL OBSERVATIONS

Groundwater not encountered

Terracon
1355 E Cooley Dr, Ste C
Colton, CA

Boring Started: 12-02-2021	Boring Completed: 12-02-2021
Drill Rig: CME 75	Driller: Martini Driller
Project No.: CB215163	

BORING LOG NO. B-12

PROJECT: Proposed Industrial Development

CLIENT: Newland Capital Group LLC
Irvine, CA

SITE: S. Kirby Street
Hemet, CA

LOCATION See Exploration Plan

Latitude: 33.7383° Longitude: -117.0001°

DEPTH	Description	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
	SILTY SAND (SM), fine to medium grained, olive brown, loose								
2.5	**SANDY LEAN CLAY (CL)**, olive brown, very stiff				3-12-19	4	98		
	stiff	5			4-4-5 N=9				
					4-7-7				
10.5	**SILTY SAND (SM)**, fine grained, olive brown, loose	10			2-3-2 N=5				
13.0	**LEAN CLAY WITH SAND (CL)**, olive brown, medium stiff	15			2-3-4 N=7				72
18.0	**SANDY LEAN CLAY (CL)**, reddish brown, stiff	20			5-4-6 N=10				
25.0	**WELL GRADED SAND (SW)**, medium to coarse grained, tan, medium dense	25			5-8-9 N=17				5
26.5	***Boring Terminated at 26.5 Feet***								

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
6" Hollow-Stem Auger

Abandonment Method:
Boring backfilled with auger cuttings upon completion.

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Notes:

WATER LEVEL OBSERVATIONS

Groundwater not encountered

Terracon

1355 E Cooley Dr, Ste C
Colton, CA

Boring Started: 12-02-2021	Boring Completed: 12-02-2021
Drill Rig: CME 75	Driller: Martini Driller
Project No.: CB215163	

BORING LOG NO. B-13

PROJECT: Proposed Industrial Development

CLIENT: Newland Capital Group LLC
Irvine, CA

SITE: S. Kirby Street
Hemet, CA

LOCATION See Exploration Plan

Latitude: 33.7381° Longitude: -116.9991°

DEPTH	Description	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
1.0	**SILTY SAND (SM)**, fine to medium grained, olive brown, very loose								
5.5	**SANDY LEAN CLAY (CL)**, olive brown, stiff				4-5-5 N=10				47
	6" silty sand lens	5			3-3-4 N=7				78
	LEAN CLAY WITH SAND (CL), olive brown, medium stiff								
	2" silty sand lens				2-2-2 N=4	12		30-21-9	73
		10			1-2-3 N=5				76
18.0	olive, occasional silt lenses	15			2-2-2 N=4	28		43-33-10	85
	SILTY SAND (SM), fine to coarse grained, reddish brown, medium dense								
25.0	1" lean clay lens	20			4-7-11 N=18	8		NP	37
28.0	**SANDY LEAN CLAY (CL)**, brown, very stiff	25			5-7-8 N=15				57
	CLAYEY SAND (SC), fine to coarse grained, olive brown, medium dense	30							

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
6" Hollow-Stem Auger

Abandonment Method:
Boring backfilled with auger cuttings upon completion.

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Notes:

WATER LEVEL OBSERVATIONS

Groundwater not encountered

1355 E Cooley Dr, Ste C
Colton, CA

Boring Started: 12-02-2021

Boring Completed: 12-02-2021

Drill Rig: CME 75

Driller: Martini Driller

Project No.: CB215163

BORING LOG NO. B-13

PROJECT: Proposed Industrial Development

CLIENT: Newland Capital Group LLC
Irvine, CA

SITE: S. Kirby Street
Hemet, CA

LOCATION See Exploration Plan

Latitude: 33.7381° Longitude: -116.9991°

DEPTH	Description	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
	CLAYEY SAND (SC), fine to coarse grained, olive brown, medium dense *(continued)*			X	3-7-5 N=12				46
		35		X	5-11-13 N=24				
38.0	**SANDY SILTY CLAY (CL-ML)**, olive, stiff								
		40		X	3-4-5 N=9	19		28-21-7	51
43.0	**CLAYEY SAND (SC)**, fine to medium grained, olive brown, medium dense								
		45		X	6-10-8 N=18				42
48.0	**SILTY SAND (SM)**, fine to medium grained, olive brown, medium dense								
		50		X	8-10-7 N=17				24
51.5	2" sandy clay lens								
	Boring Terminated at 51.5 Feet								

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
6" Hollow-Stem Auger

Abandonment Method:
Boring backfilled with auger cuttings upon completion.

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Notes:

WATER LEVEL OBSERVATIONS

Groundwater not encountered

Terracon
1355 E Cooley Dr, Ste C
Colton, CA

Boring Started: 12-02-2021	Boring Completed: 12-02-2021
Drill Rig: CME 75	Driller: Martini Driller
Project No.: CB215163	

BORING LOG NO. B-14

PROJECT: Proposed Industrial Development

CLIENT: Newland Capital Group LLC
Irvine, CA

SITE: S. Kirby Street
Hemet, CA

LOCATION See Exploration Plan

Latitude: 33.7375° Longitude: -116.9994°

DEPTH	DESCRIPTION	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
	SILTY SAND (SM), fine to medium grained, olive brown, very loose								
3.5	medium dense				6-10-13	5	101		
	SANDY LEAN CLAY (CL), olive brown, stiff	5							
6.5					5-8-10	9	88		
	Boring Terminated at 6.5 Feet								

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
6" Hollow-Stem Auger

Abandonment Method:
Boring backfilled with auger cuttings upon completion.

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Notes:

WATER LEVEL OBSERVATIONS

Groundwater not encountered

Terracon
1355 E Cooley Dr, Ste C
Colton, CA

Boring Started: 12-02-2021	Boring Completed: 12-02-2021
Drill Rig: CME 75	Driller: Martini Driller
Project No.: CB215163	

BORING LOG NO. B-15

PROJECT: Proposed Industrial Development

CLIENT: Newland Capital Group LLC
Irvine, CA

SITE: S. Kirby Street
Hemet, CA

LOCATION See Exploration Plan

Latitude: 33.7371° Longitude: -117.001°

GRAPHIC LOG	DEPTH	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
	SILTY SAND (SM), fine to medium grained, olive brown, loose								
	2.0 **SANDY LEAN CLAY (CL)**, olive brown, very stiff				3-7-12	7	90		
		5			7-10-11	7	100		
	6.5								
	Boring Terminated at 6.5 Feet								

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
6" Hollow-Stem Auger

Abandonment Method:
Boring backfilled with auger cuttings upon completion.

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Notes:

WATER LEVEL OBSERVATIONS

Groundwater not encountered

Terracon
1355 E Cooley Dr, Ste C
Colton, CA

Boring Started: 12-02-2021	Boring Completed: 12-02-2021
Drill Rig: CME 75	Driller: Martini Driller
Project No.: CB215163	

BORING LOG NO. B-16

PROJECT: Proposed Industrial Development

CLIENT: Newland Capital Group LLC
Irvine, CA

SITE: S. Kirby Street
Hemet, CA

LOCATION See Exploration Plan

Latitude: 33.739° Longitude: -117.0016°

GRAPHIC LOG	DEPTH	DESCRIPTION	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
		SILTY SAND (SM), fine to medium grained, olive brown, loose								
	2.0	**SANDY LEAN CLAY (CL)**, olive brown, very stiff				10-12-14	5	97		
			5			8-13-16	7	94		
			10			5-9-11	9	94		
	11.5	***Boring Terminated at 11.5 Feet***								

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
6" Hollow-Stem Auger

Abandonment Method:
Boring backfilled with auger cuttings upon completion.

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Notes:

WATER LEVEL OBSERVATIONS

Groundwater not encountered

Terracon
1355 E Cooley Dr, Ste C
Colton, CA

Boring Started: 12-03-2021	Boring Completed: 12-03-2021
Drill Rig: CME 75	Driller: Martini Driller
Project No.: CB215163	

BORING LOG NO. B-17

PROJECT: Proposed Industrial Development

CLIENT: Newland Capital Group LLC
Irvine, CA

SITE: S. Kirby Street
Hemet, CA

LOCATION See Exploration Plan

Latitude: 33.7407° Longitude: -117.0015°

GRAPHIC LOG	DEPTH	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
	SILTY SAND (SM), fine to medium grained, olive brown, loose								
	medium dense				5-8-11	4	100		
	sandy clay lens	5			7-10-11	3	104		
	8.0 **SANDY LEAN CLAY (CL)**, olive brown, very stiff								
	11.5	10			5-8-14				
	Boring Terminated at 11.5 Feet								

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
6" Hollow-Stem Auger

Abandonment Method:
Boring backfilled with auger cuttings upon completion.

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Notes:

WATER LEVEL OBSERVATIONS

Groundwater not encountered

Terracon
1355 E Cooley Dr, Ste C
Colton, CA

Boring Started: 12-03-2021	Boring Completed: 12-03-2021
Drill Rig: CME 75	Driller: Martini Driller
Project No.: CB215163	

BORING LOG NO. B-18

PROJECT: Proposed Industrial Development

CLIENT: Newland Capital Group LLC
Irvine, CA

SITE: S. Kirby Street
Hemet, CA

LOCATION See Exploration Plan

Latitude: 33.7407° Longitude: -116.9983°

DEPTH	Description	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
	SILTY SAND (SM), fine to medium grained, olive brown, loose				8-9-9	2	112		
5.5		5			3-4-6	5	96		
	SANDY LEAN CLAY (CL), olive, stiff								
8.0									
	SILTY SAND (SM)	10			4-5-8	7	101		
11.5									
	Boring Terminated at 11.5 Feet								

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
6" Hollow-Stem Auger

Abandonment Method:
Boring backfilled with auger cuttings upon completion.

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Notes:

WATER LEVEL OBSERVATIONS

Groundwater not encountered

Terracon
1355 E Cooley Dr, Ste C
Colton, CA

Boring Started: 12-03-2021	Boring Completed: 12-03-2021
Drill Rig: CME 75	Driller: Martini Driller
Project No.: CB215163	

BORING LOG NO. P-1

PROJECT: Proposed Industrial Development

CLIENT: Newland Capital Group LLC
Irvine, CA

SITE: S. Kirby Street
Hemet, CA

LOCATION See Exploration Plan

Latitude: 33.7417° Longitude: -117.0016°

GRAPHIC LOG / DEPTH	DESCRIPTION	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
3.0	**SILTY SAND (SM)**, fine to medium grained, olive brown, loose								
6.0	**SANDY LEAN CLAY (CL)**, olive brown	5		Sample (5–10 ft)					
10.2	**CLAYEY SAND (SC)**, fine grained, olive brown	10							43
	Boring Terminated at 10.2 Feet								

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
6" Hollow-Stem Auger

Abandonment Method:
Boring backfilled with auger cuttings upon completion.

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Notes:

WATER LEVEL OBSERVATIONS

Groundwater not encountered

Terracon
1355 E Cooley Dr, Ste C
Colton, CA

Boring Started: 12-03-2021
Boring Completed: 12-03-2021
Drill Rig: CME 75
Driller: Martini Driller
Project No.: CB215163

BORING LOG NO. P-2

PROJECT: Proposed Industrial Development

SITE: S. Kirby Street, Hemet, CA

CLIENT: Newland Capital Group LLC, Irvine, CA

LOCATION See Exploration Plan

Latitude: 33.7394° Longitude: -116.9983°

GRAPHIC LOG / DEPTH	Description	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
3.0	**SILTY SAND (SM)**, fine to medium grained, olive brown, loose								
10.2	**CLAYEY SAND (SC)**, fine to medium grained, olive brown	5–10		Sample					44
	Boring Terminated at 10.2 Feet								

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
6" Hollow-Stem Auger

Abandonment Method:
Boring backfilled with auger cuttings upon completion.

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Notes:

WATER LEVEL OBSERVATIONS

Groundwater not encountered

Terracon
1355 E Cooley Dr, Ste C
Colton, CA

Boring Started: 12-03-2021	Boring Completed: 12-03-2021
Drill Rig: CME 75	Driller: Martini Driller
Project No.: CB215163	

BORING LOG NO. P-3

PROJECT: Proposed Industrial Development

CLIENT: Newland Capital Group LLC
Irvine, CA

SITE: S. Kirby Street
Hemet, CA

GRAPHIC LOG	LOCATION See Exploration Plan Latitude: 33.7375° Longitude: -117.0015° DEPTH	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
	SILTY SAND (SM), fine to medium grained, olive brown, loose								
	1.5								
	SANDY LEAN CLAY (CL), olive brown								55
	5.2	5							
	Boring Terminated at 5.2 Feet								

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
6" Hollow-Stem Auger

Abandonment Method:
Boring backfilled with auger cuttings upon completion.

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Notes:

WATER LEVEL OBSERVATIONS

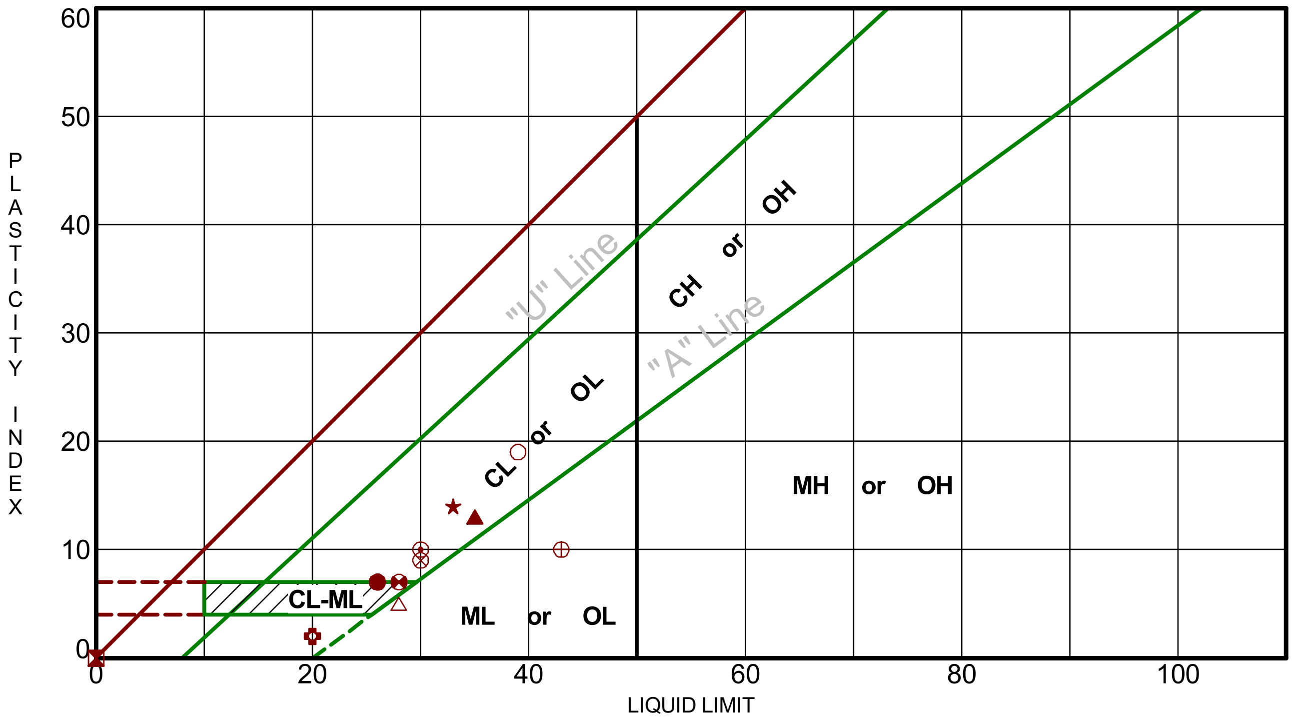
Groundwater not encountered

Terracon
1355 E Cooley Dr, Ste C
Colton, CA

Boring Started: 12-03-2021	Boring Completed: 12-03-2021
Drill Rig: CME 75	Driller: Martini Driller
Project No.: CB215163	

ATTERBERG LIMITS RESULTS

ASTM D4318



	Boring ID	Depth	LL	PL	PI	Fines	USCS	Description
●	B-1	20 - 21.5	26	19	7	62.2	CL-ML	SANDY SILTY CLAY
⊠	B-1	35 - 36.5	NP	NP	NP	41.2	SM	SILTY SAND
▲	B-4	15 - 16.5	35	22	13	79.2	CL	LEAN CLAY with SAND
★	B-7	20 - 21.5	33	19	14	61.4	CL	SANDY LEAN CLAY
⊙	B-8	15 - 16.5	30	20	10	66.5	CL	SANDY LEAN CLAY
✿	B-8	25 - 26.5	20	18	2	36.7	SM	SILTY SAND
○	B-11	15 - 16.5	39	20	19	78.3	CL	LEAN CLAY with SAND
△	B-11	25 - 26.5	28	23	5	35.3	SM	SILTY SAND
⊗	B-13	7.5 - 9	30	21	9	72.7	CL	LEAN CLAY with SAND
⊕	B-13	15 - 16.5	43	33	10	84.5	ML	SILT with SAND
□	B-13	20 - 21.5	NP	NP	NP	36.9	SM	SILTY SAND
⊗	B-13	40 - 41.5	28	21	7	51.1	CL-ML	SANDY SILTY CLAY

PROJECT: Proposed Industrial Development

SITE: S. Kirby Street
Hemet, CA

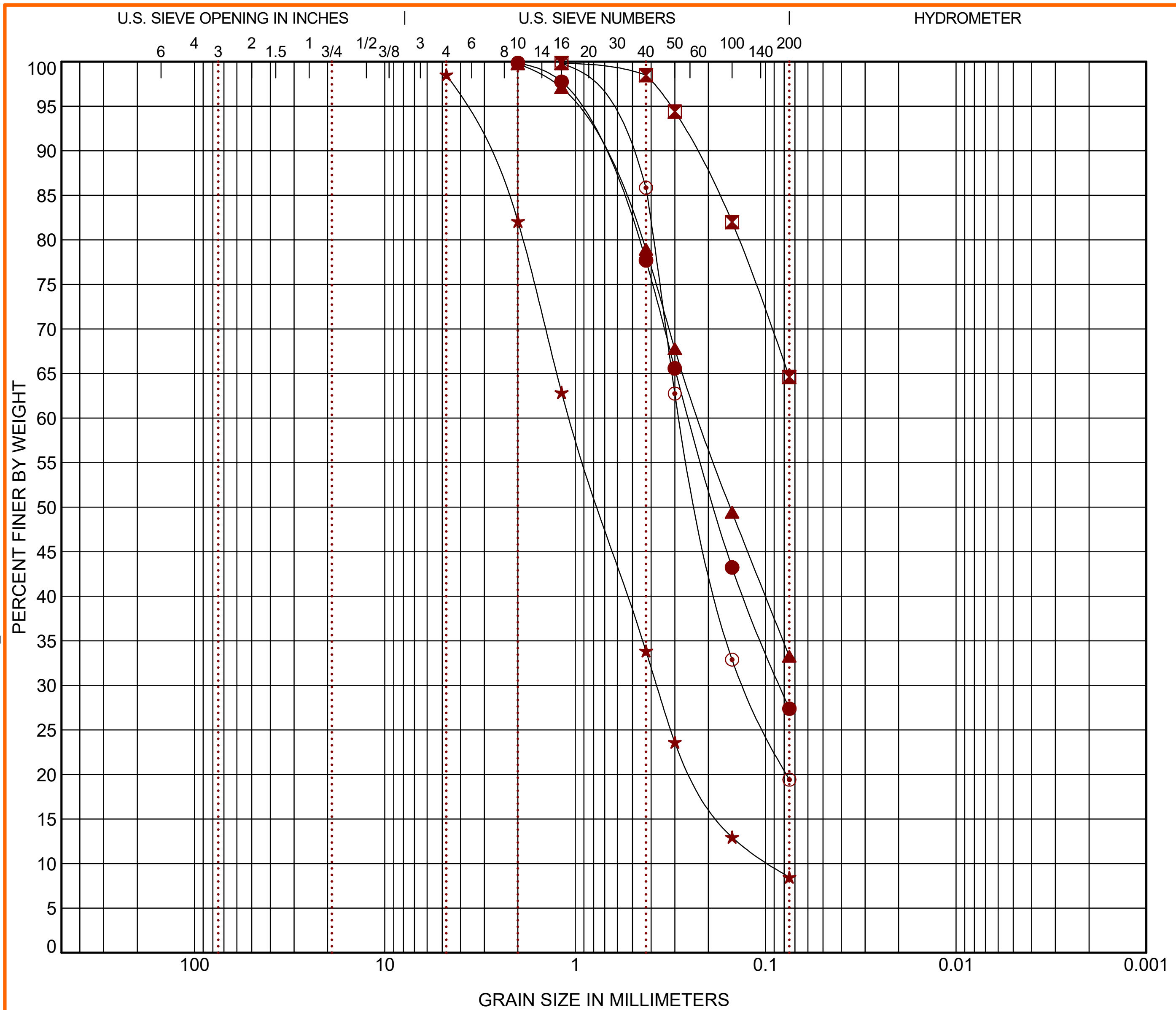
Terracon
1355 E Cooley Dr, Ste C
Colton, CA

PROJECT NUMBER: CB215163

CLIENT: Newland Capital Group LLC
Irvine, CA

GRAIN SIZE DISTRIBUTION

ASTM D422 / ASTM C136



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Boring ID	Depth	USCS Classification	WC (%)	LL	PL	PI	Cc	Cu
●	B-1	0 - 5							
⊠	B-1	7.5 - 9							
▲	B-1	10 - 11.5							
★	B-1	30 - 31.5						1.37	11.23
⊙	B-1	40 - 41.5							

	Boring ID	Depth	D_{100}	D_{60}	D_{30}	D_{10}	%Cobbles	%Gravel	%Sand	%Silt	%Fines	%Clay
●	B-1	0 - 5	2	0.252	0.084				72.5		27.4	
⊠	B-1	7.5 - 9	1.18						35.2		64.6	
▲	B-1	10 - 11.5	2	0.224					66.5		33.3	
★	B-1	30 - 31.5	4.75	1.066	0.373	0.095			90.1		8.5	
⊙	B-1	40 - 41.5	1.18	0.281	0.129				80.4		19.4	

PROJECT: Proposed Industrial Development

SITE: S. Kirby Street
Hemet, CA

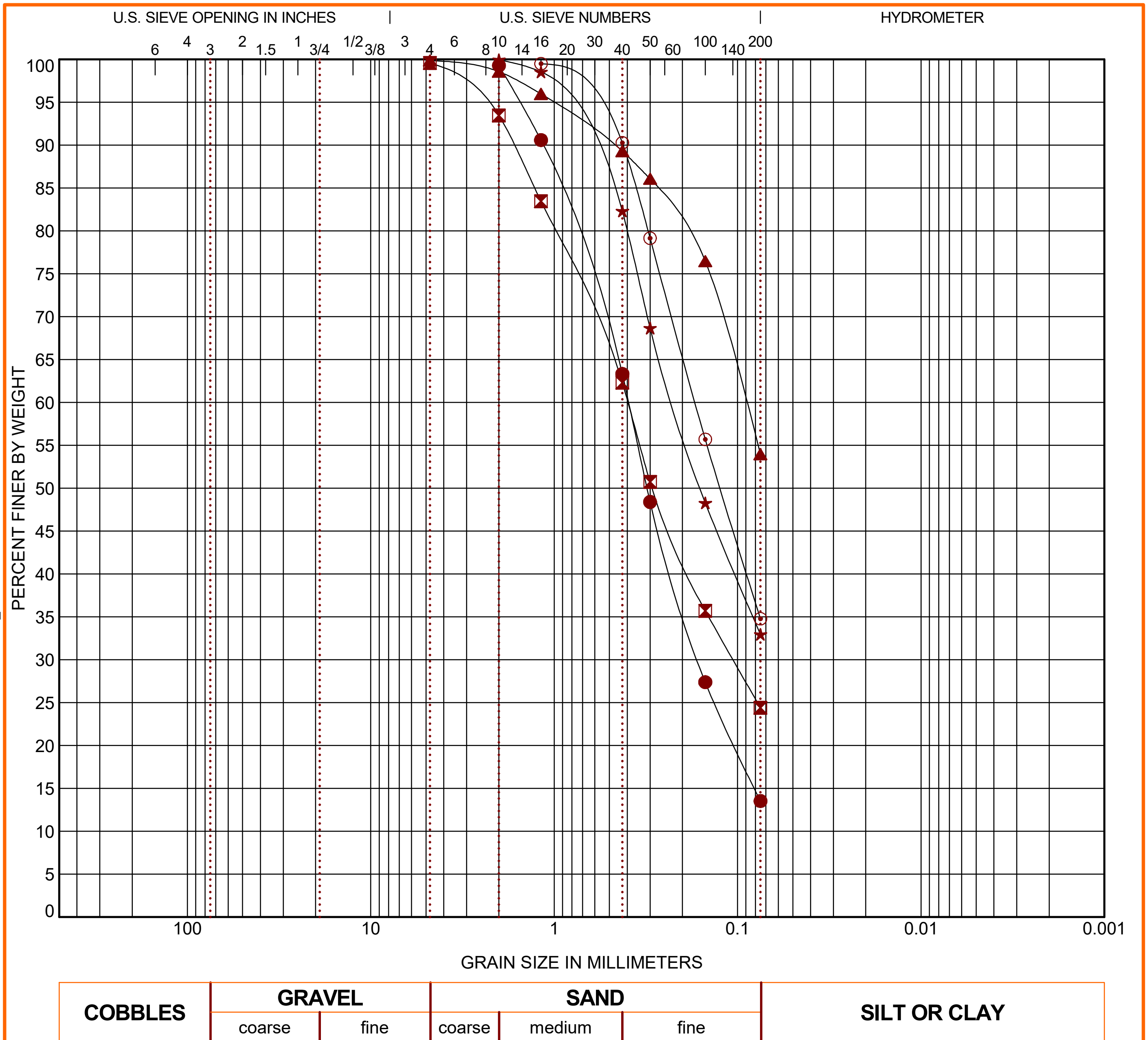
Terracon
1355 E Cooley Dr, Ste C
Colton, CA

PROJECT NUMBER: CB215163

CLIENT: Newland Capital Group LLC
Irvine, CA

GRAIN SIZE DISTRIBUTION

ASTM D422 / ASTM C136



Boring ID	Depth	USCS Classification	WC (%)	LL	PL	PI	Cc	Cu
● B-3	15 - 16.5							
⊠ B-4	25 - 26.5							
▲ B-5	20 - 21.5							
★ B-6	2.5 - 4							
⊙ B-6	10 - 11.5							

Boring ID	Depth	D_{100}	D_{60}	D_{30}	D_{10}	%Cobbles	%Gravel	%Sand	%Silt	%Fines	%Clay
● B-3	15 - 16.5	2	0.393	0.164				85.8		13.5	
⊠ B-4	25 - 26.5	4.75	0.397	0.106				75.2		24.4	
▲ B-5	20 - 21.5	4.75	0.09					45.9		54.0	
★ B-6	2.5 - 4	2	0.223					67.0		33.0	
⊙ B-6	10 - 11.5	1.18	0.17					64.7		34.8	

PROJECT: Proposed Industrial Development

SITE: S. Kirby Street
Hemet, CA

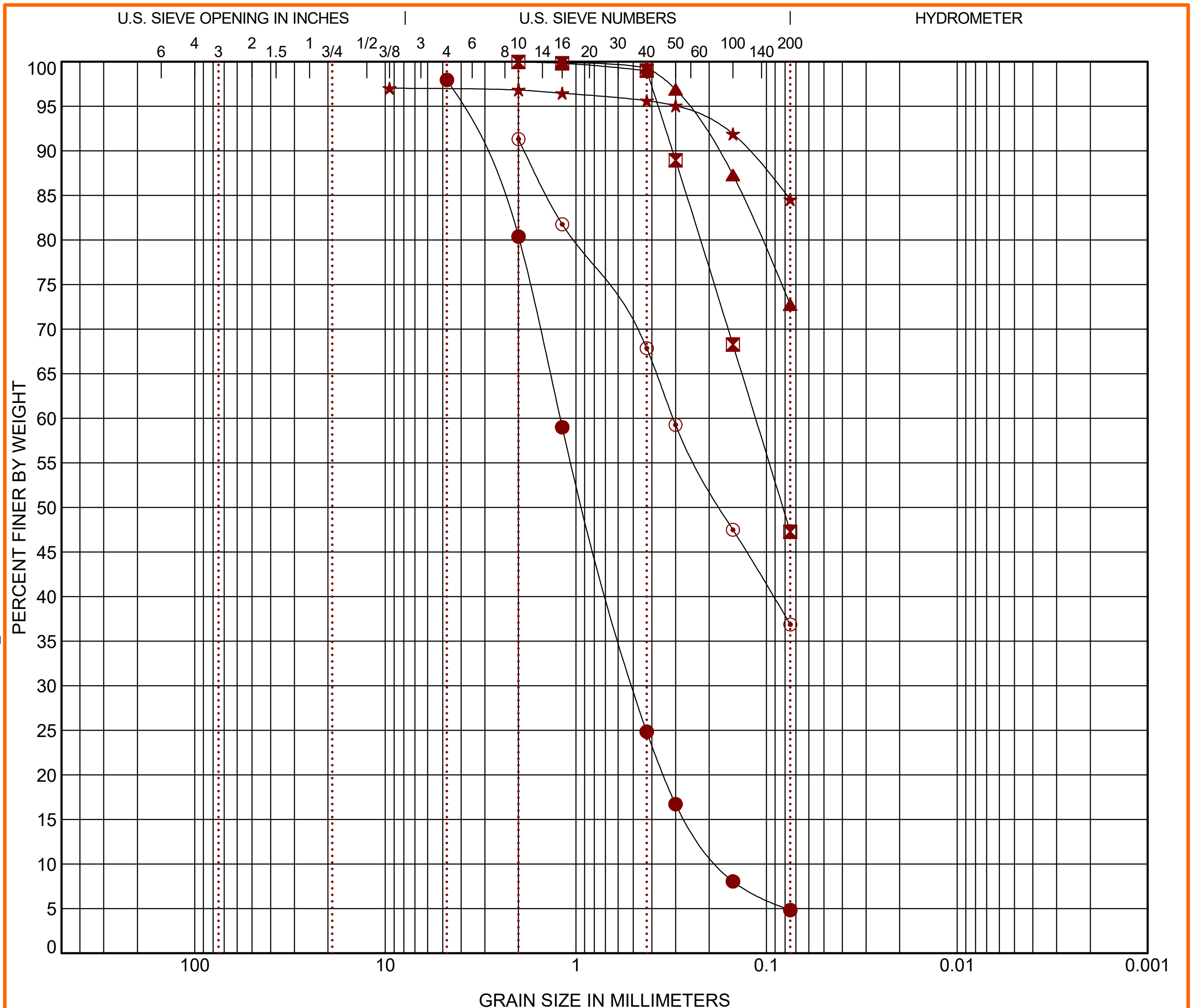
Terracon
1355 E Cooley Dr, Ste C
Colton, CA

PROJECT NUMBER: CB215163

CLIENT: Newland Capital Group LLC
Irvine, CA

GRAIN SIZE DISTRIBUTION

ASTM D422 / ASTM C136



Boring ID		Depth	USCS Classification	WC (%)	LL	PL	PI	Cc	Cu
●	B-12	25 - 26.5	WELL-GRADED SAND (SW)					1.16	6.90
⊠	B-13	0 - 5							
▲	B-13	7.5 - 9		11.6					
★	B-13	15 - 16.5		27.9					
⊙	B-13	20 - 21.5		8.2					

Boring ID		Depth	D_{100}	D_{60}	D_{30}	D_{10}	%Cobbles	%Gravel	%Sand	%Silt	%Fines	%Clay
●	B-12	25 - 26.5	4.75	1.21	0.496	0.175			93.1		4.8	
⊠	B-13	0 - 5	2	0.114					52.7		47.3	
▲	B-13	7.5 - 9	1.18						27.2		72.7	
★	B-13	15 - 16.5	9.5					0.1	12.4		84.5	
⊙	B-13	20 - 21.5	2	0.309					54.4		36.9	

PROJECT: Proposed Industrial Development

SITE: S. Kirby Street
Hemet, CA

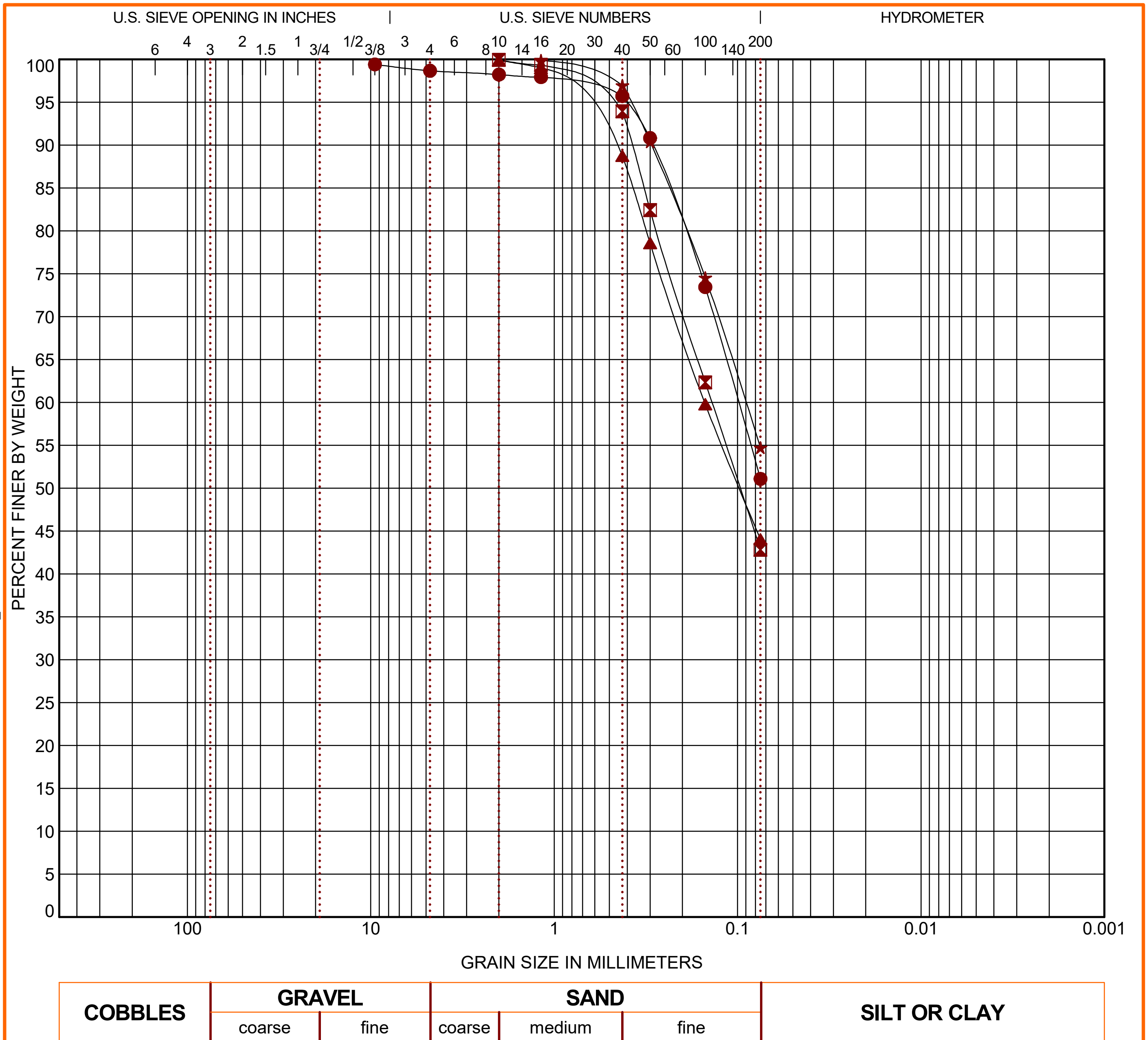
Terracon
1355 E Cooley Dr, Ste C
Colton, CA

PROJECT NUMBER: CB215163

CLIENT: Newland Capital Group LLC
Irvine, CA

GRAIN SIZE DISTRIBUTION

ASTM D422 / ASTM C136



	Boring ID	Depth	USCS Classification	WC (%)	LL	PL	PI	Cc	Cu
●	B-13	40 - 41.5		19.0					
⊠	P-1	5 - 10							
▲	P-2	5 - 10							
★	P-3	0 - 5							

	Boring ID	Depth	D_{100}	D_{60}	D_{30}	D_{10}	%Cobbles	%Gravel	%Sand	%Silt	%Fines	%Clay
●	B-13	40 - 41.5	9.5	0.099				0.7	47.6		51.1	
⊠	P-1	5 - 10	2	0.138					57.1		42.8	
▲	P-2	5 - 10	2	0.151					55.8		44.0	
★	P-3	0 - 5	1.18	0.09					45.2		54.7	

PROJECT: Proposed Industrial Development

SITE: S. Kirby Street
Hemet, CA

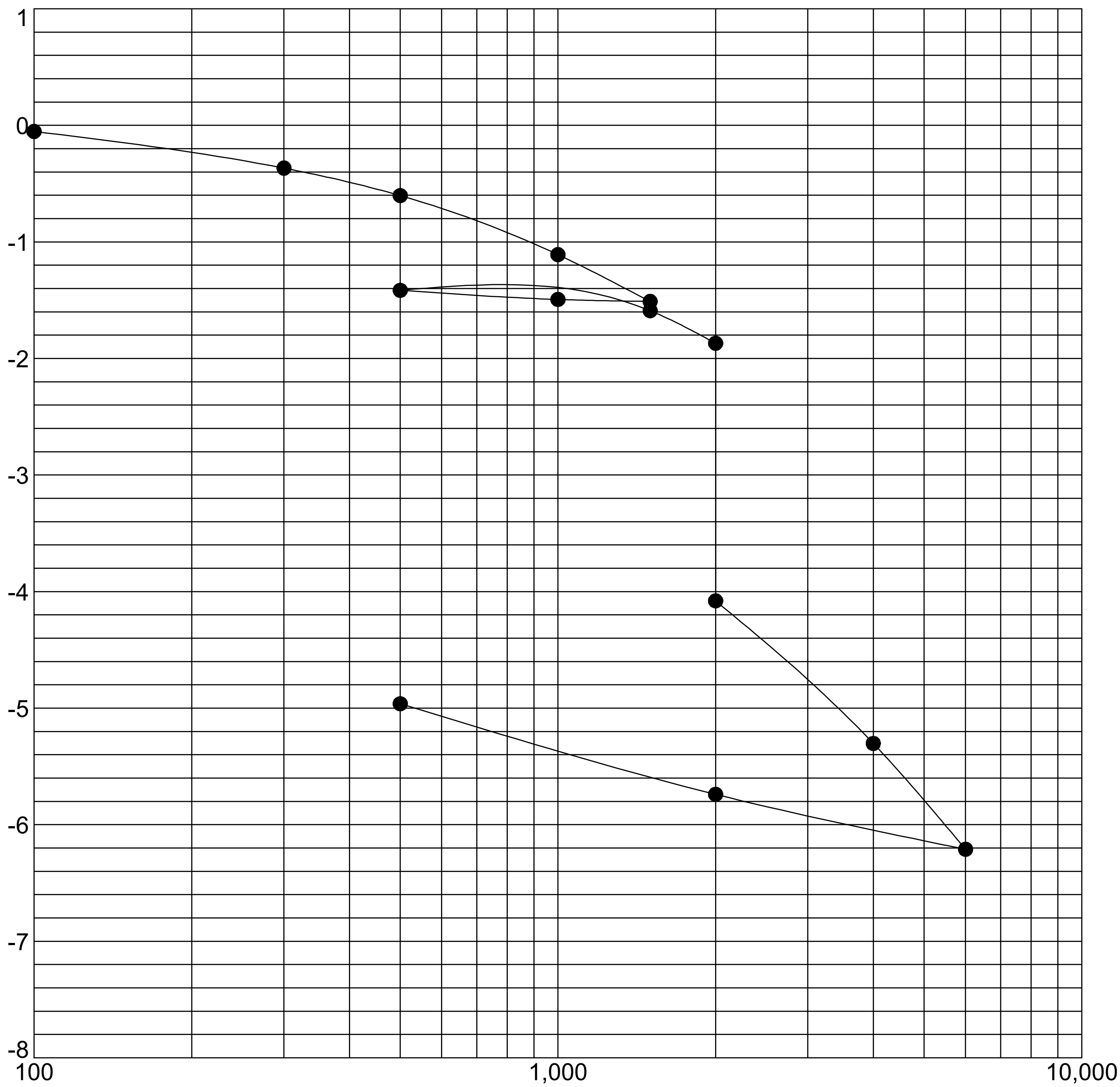
Terracon
1355 E Cooley Dr, Ste C
Colton, CA

PROJECT NUMBER: CB215163

CLIENT: Newland Capital Group LLC
Irvine, CA

SWELL CONSOLIDATION TEST

ASTM D2435

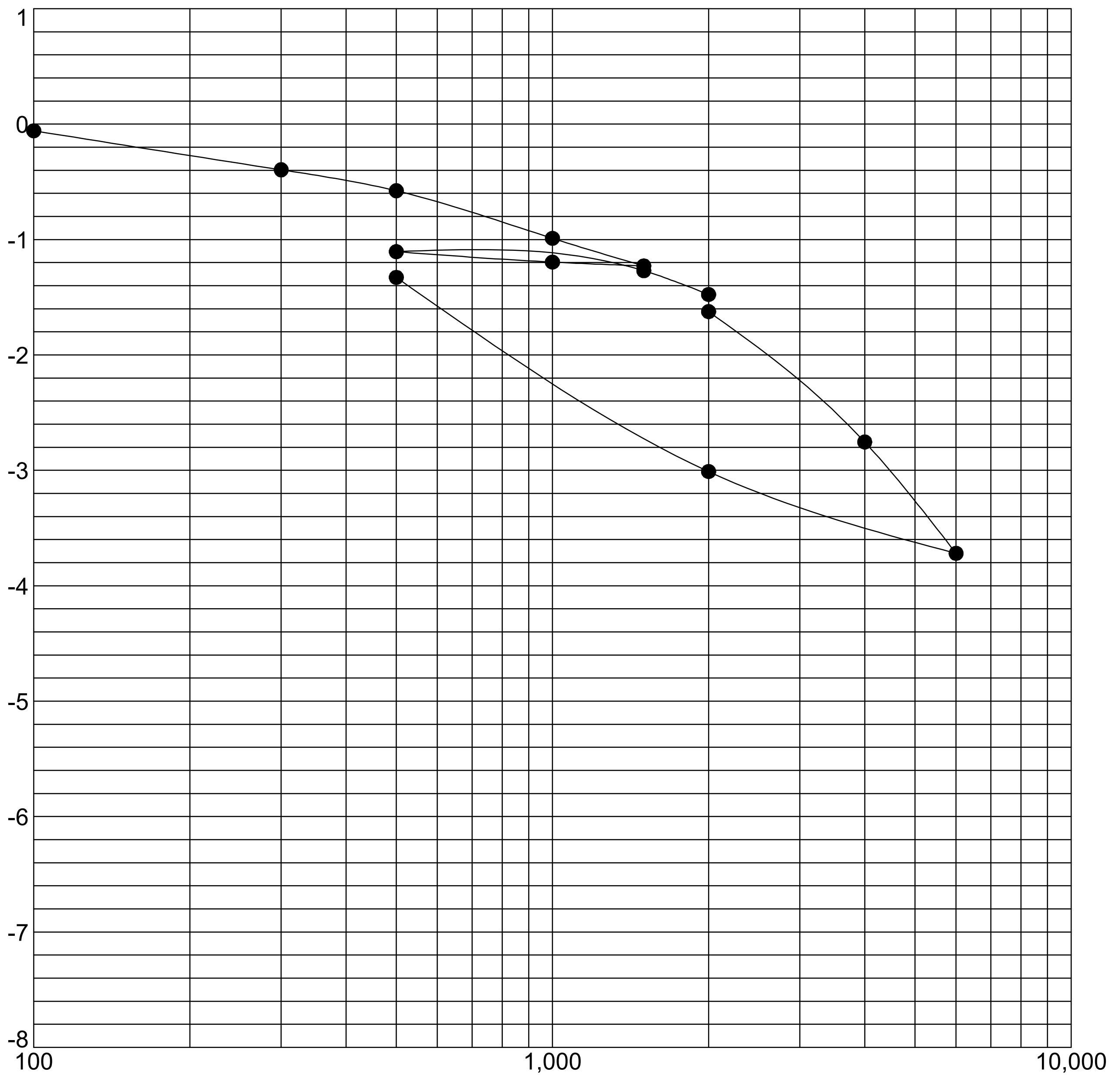


Specimen Identification		Classification	γ_d, pcf	WC, %
●	B-3 10 - 11.5 ft		108	2.4

NOTES:

PROJECT: Proposed Industrial Development	Terracon 1355 E Cooley Dr, Ste C Colton, CA	PROJECT NUMBER: CB215163
SITE: S. Kirby Street Hemet, CA		CLIENT: Newland Capital Group LLC Irvine, CA

SWELL CONSOLIDATION TEST
ASTM D2435



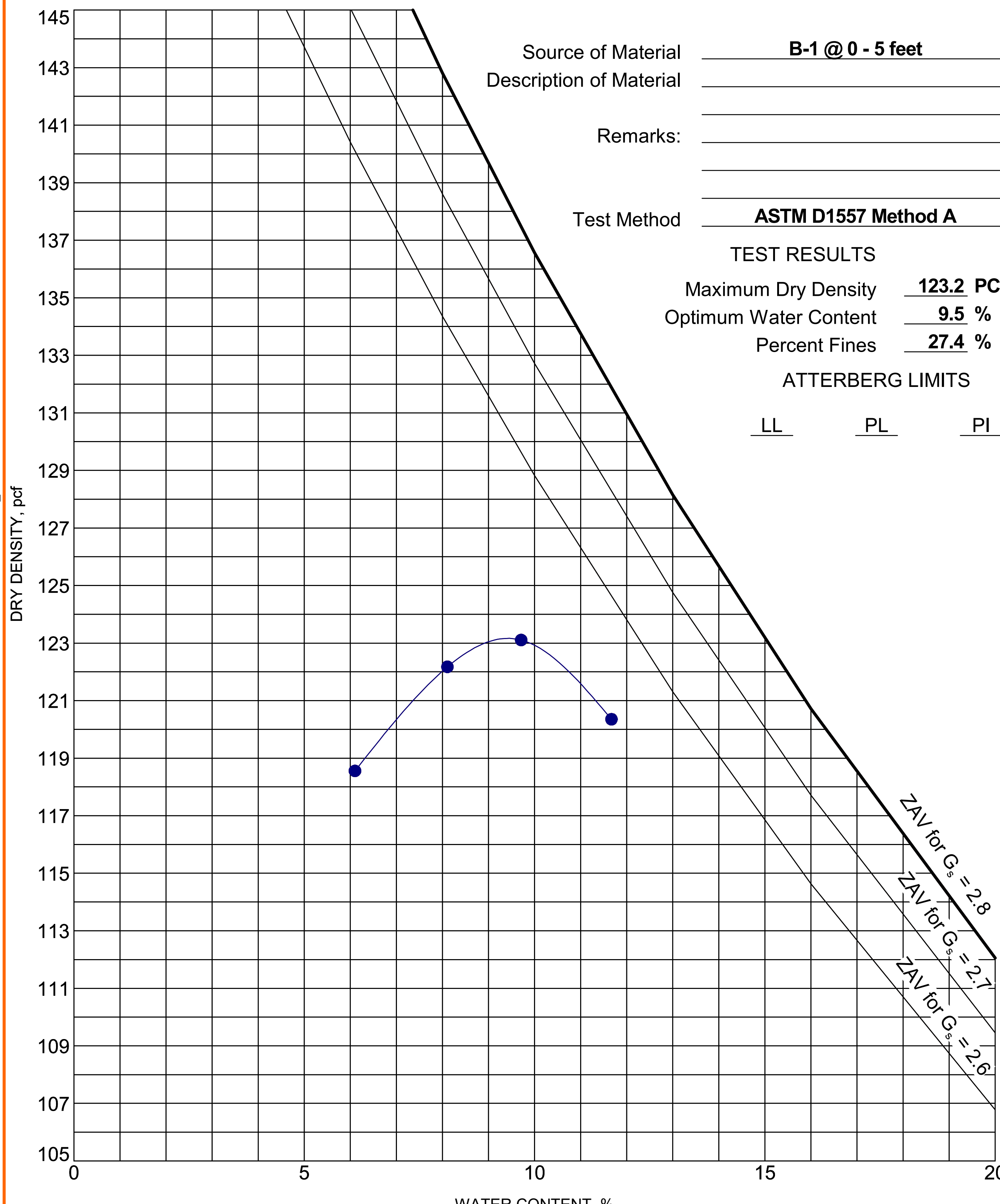
Specimen Identification		Classification	γ_d, pcf	WC, %
●	B-4 7.5 - 9 ft		106	3.9

NOTES:

PROJECT: Proposed Industrial Development	Terracon 1355 E Cooley Dr, Ste C Colton, CA	PROJECT NUMBER: CB215163
SITE: S. Kirby Street Hemet, CA		CLIENT: Newland Capital Group LLC Irvine, CA

MOISTURE-DENSITY RELATIONSHIP

ASTM D698/D1557



Source of Material: **B-1 @ 0 - 5 feet**

Description of Material:

Remarks:

Test Method: **ASTM D1557 Method A**

TEST RESULTS

Maximum Dry Density **123.2 PCF**

Optimum Water Content **9.5 %**

Percent Fines **27.4 %**

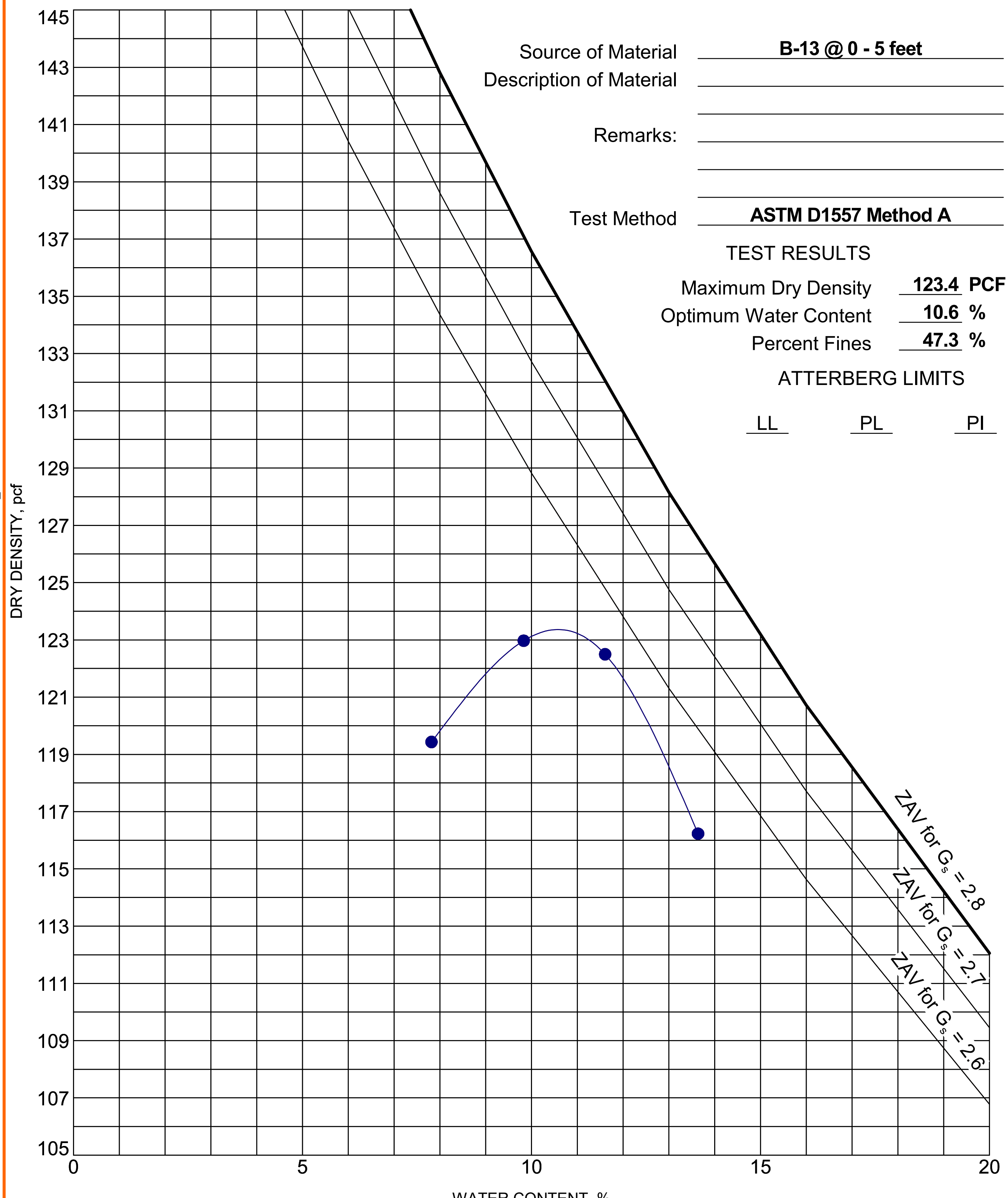
ATTERBERG LIMITS

LL	PL	PI

PROJECT: Proposed Industrial Development	Terracon 1355 E Cooley Dr, Ste C Colton, CA	PROJECT NUMBER: CB215163
SITE: S. Kirby Street Hemet, CA		CLIENT: Newland Capital Group LLC Irvine, CA

MOISTURE-DENSITY RELATIONSHIP

ASTM D698/D1557



Source of Material: **B-13 @ 0 - 5 feet**

Description of Material:

Remarks:

Test Method: **ASTM D1557 Method A**

TEST RESULTS

Maximum Dry Density **123.4 PCF**

Optimum Water Content **10.6 %**

Percent Fines **47.3 %**

ATTERBERG LIMITS

LL	PL	PI

LABORATORY TESTS ARE NOT VALID IF SEPARATED FROM ORIGINAL REPORT. COMPACTION - V1 CB215163 PROPOSED INDUSTRI.GPJ TERRACON_DATATEMPLATE.GDT 1/19/22

PROJECT: Proposed Industrial Development	Terracon 1355 E Cooley Dr, Ste C Colton, CA	PROJECT NUMBER: CB215163
SITE: S. Kirby Street Hemet, CA		CLIENT: Newland Capital Group LLC Irvine, CA

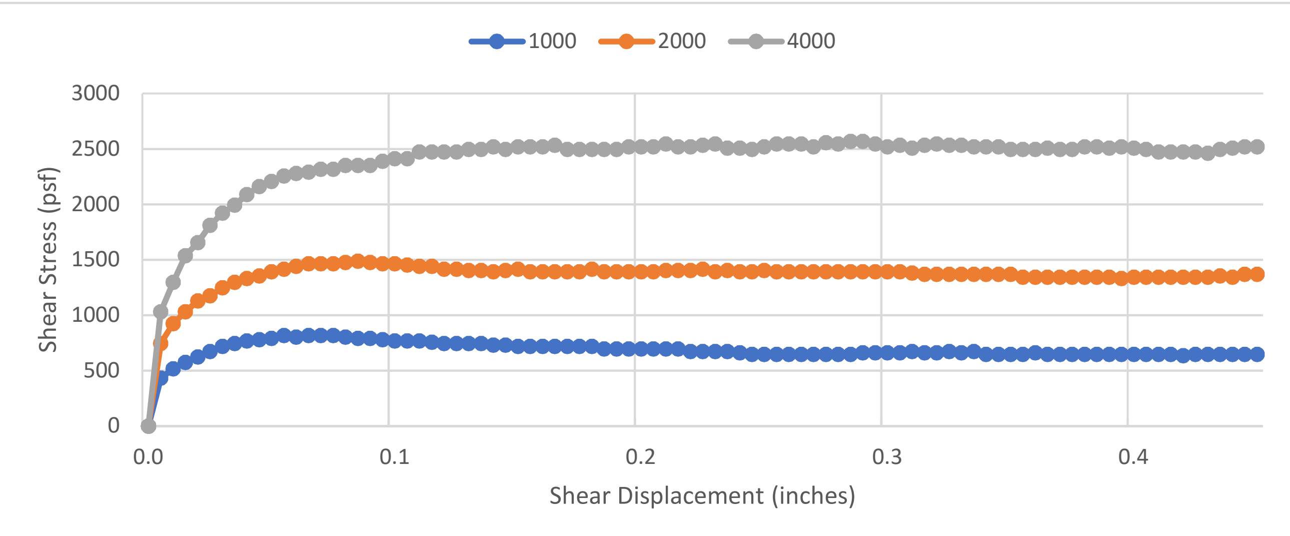
Direct Shear Test Results
ASTM D3080

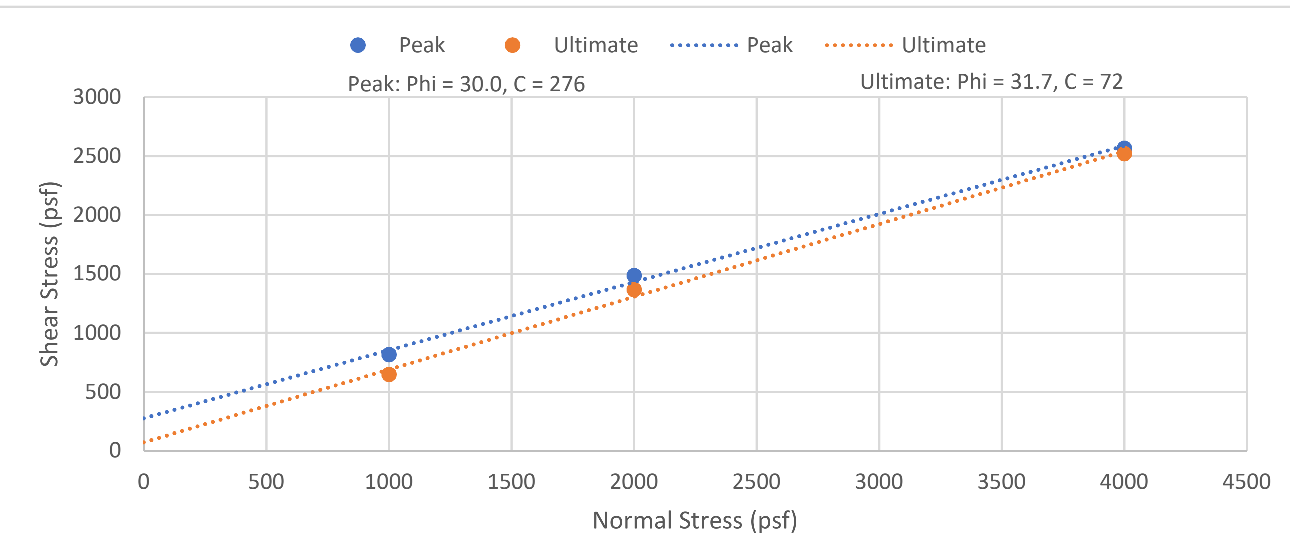
Client: Newland Capital Group LLC
Project Name: Proposed Industrial Development
Project No.: CB215163
Boring No.: B-1
Sample No.: 1-A **Depth:** 0 ft
Soil Description: Silty Sand (SM)

Terracon

Test Date: 1/9/2022

Wet Unit Weight (pcf)	Dry Unit Weight (pcf)	Moisture (%)	Normal Stress (psf)	Peak Shear Stress (psf)	Ultimate Shear Stress (psf)
129	117	9.5	1000	816	648
			2000	1488	1368
			4000	2568	2520



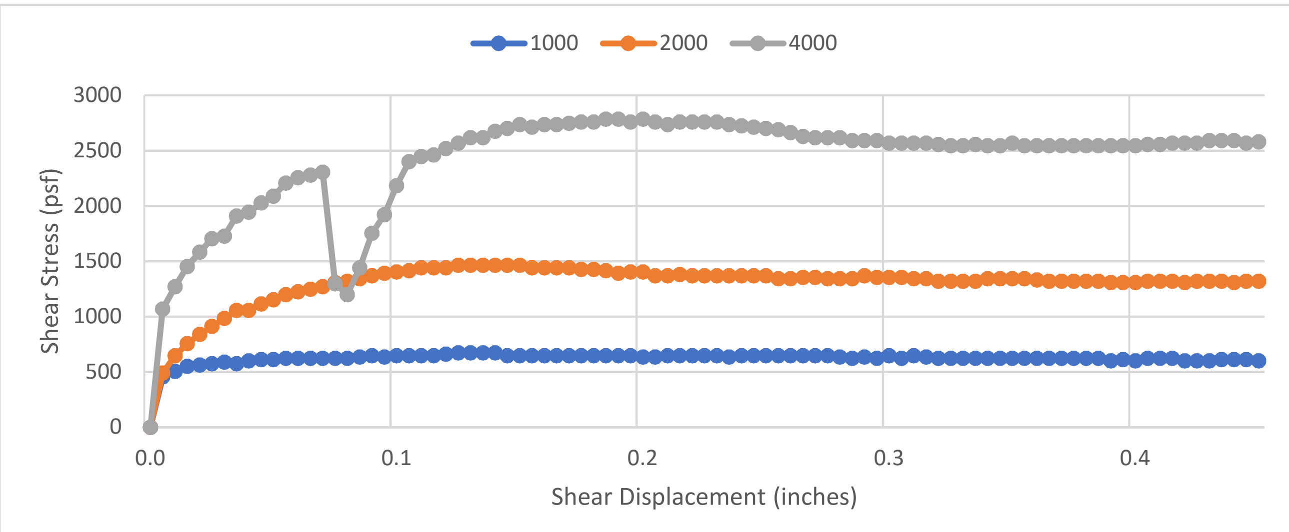


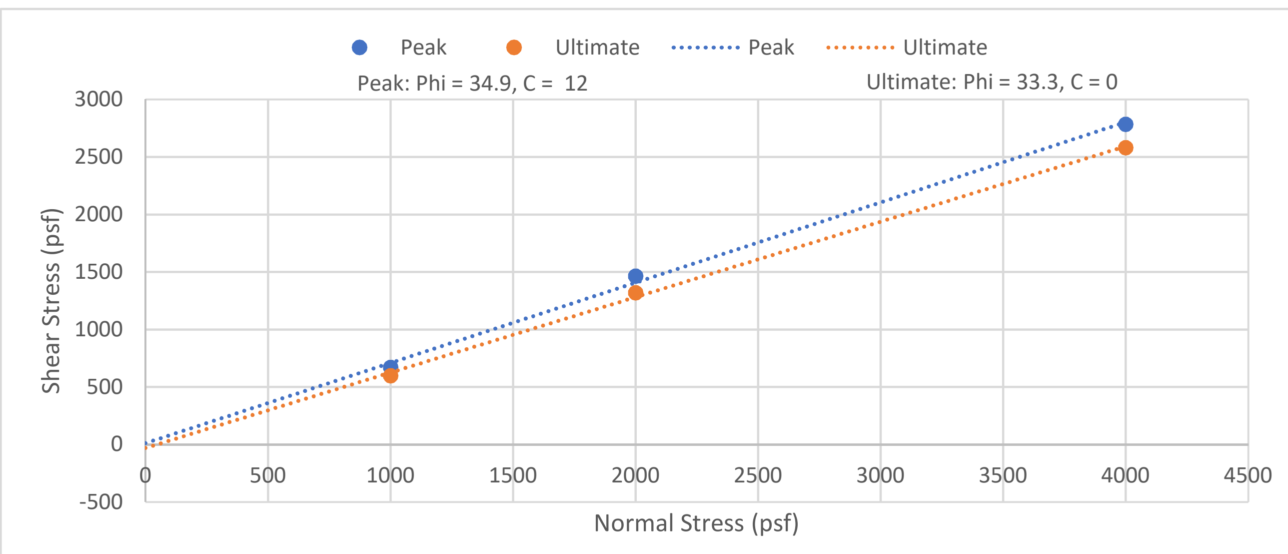
Direct Shear Test Results
ASTM D3080

Client: Newland Capital Group LLC
Project Name: Proposed Industrial Development
Project No.: CB215163
Boring No.: B-7
Sample No.: 7-2 **Depth:** 5 ft
Soil Description: Silty Sand (SM) **Test Date:** 1/7/2022

Terracon

Wet Unit Weight (pcf)	Dry Unit Weight (pcf)	Moisture (%)	Normal Stress (psf)	Peak Shear Stress (psf)	Ultimate Shear Stress (psf)
129	117	9.5	1000	672	600
			2000	1464	1320
			4000	2784	2580



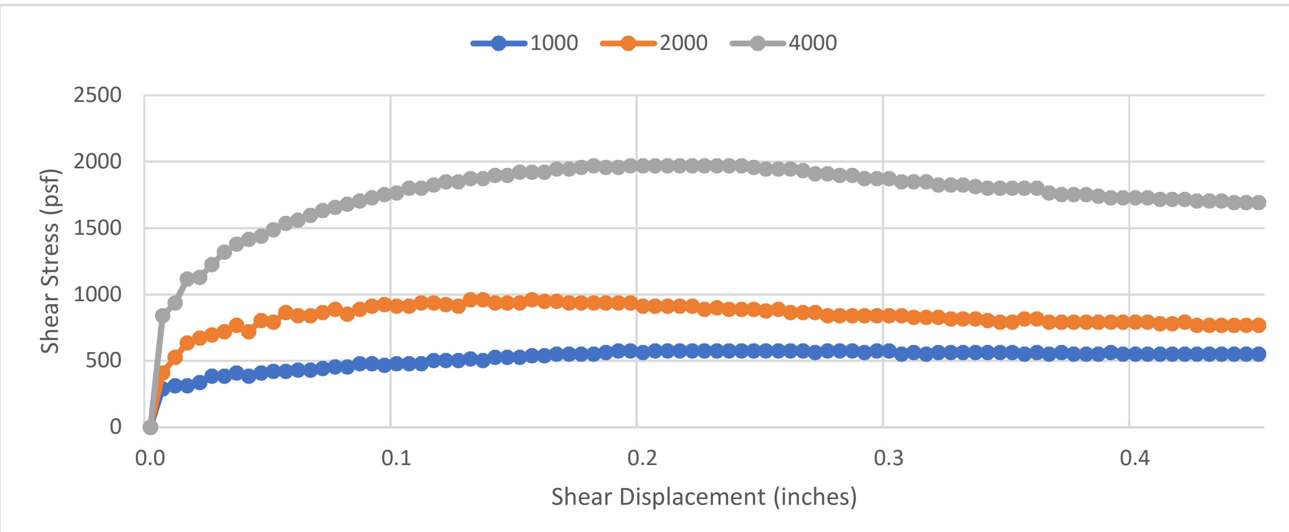


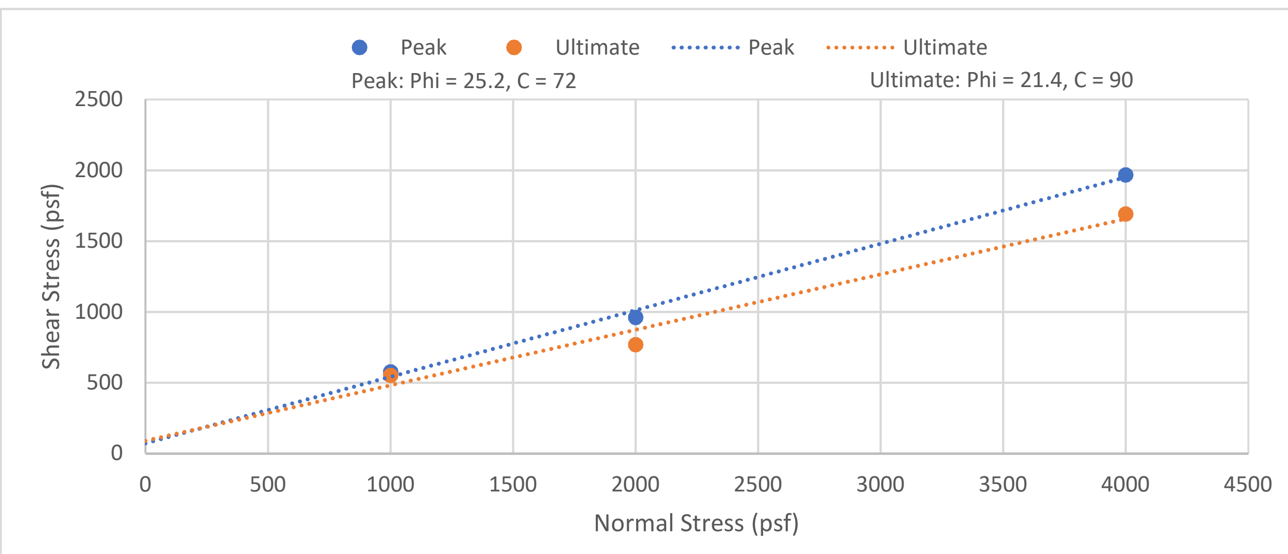
Direct Shear Test Results
ASTM D3080

Client:	Newland Capital Group LLC
Project Name:	Proposed Industrial Development
Project No.:	CB215163
Boring No.:	B-8
Sample No.:	8-3 **Depth:** 7.5 ft
Soil Description:	Sandy Silt (ML)

Test Date: 1/19/2022

Wet Unit Weight (pcf)	Dry Unit Weight (pcf)	Moisture (%)	Normal Stress (psf)	Peak Shear Stress (psf)	Ultimate Shear Stress (psf)
			1000	576	552
			2000	960	768
			4000	1968	1692

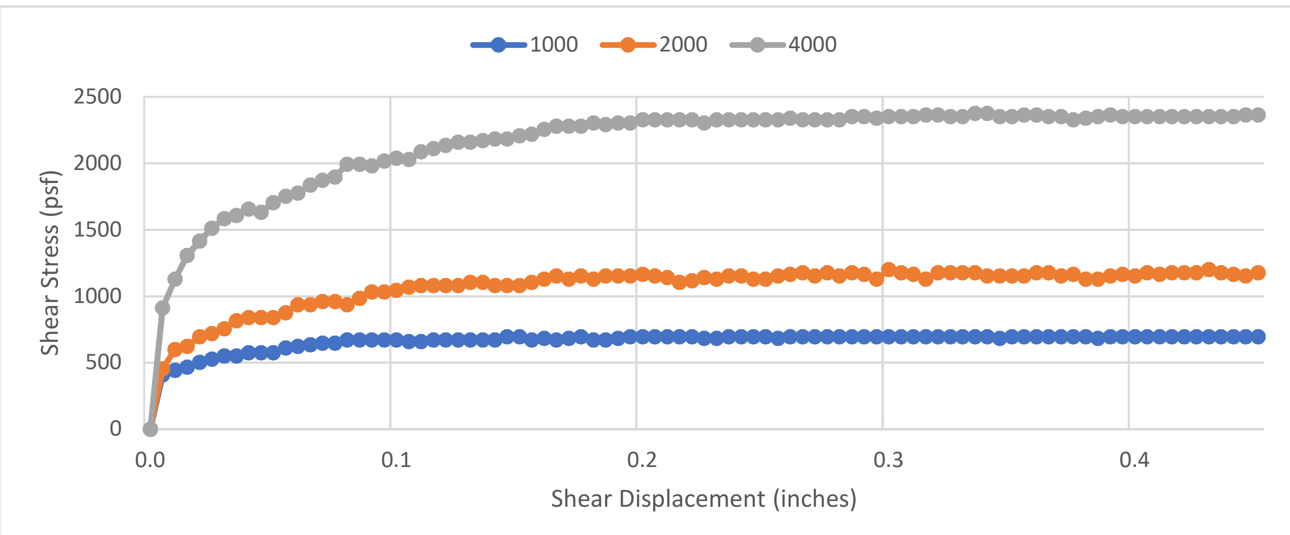


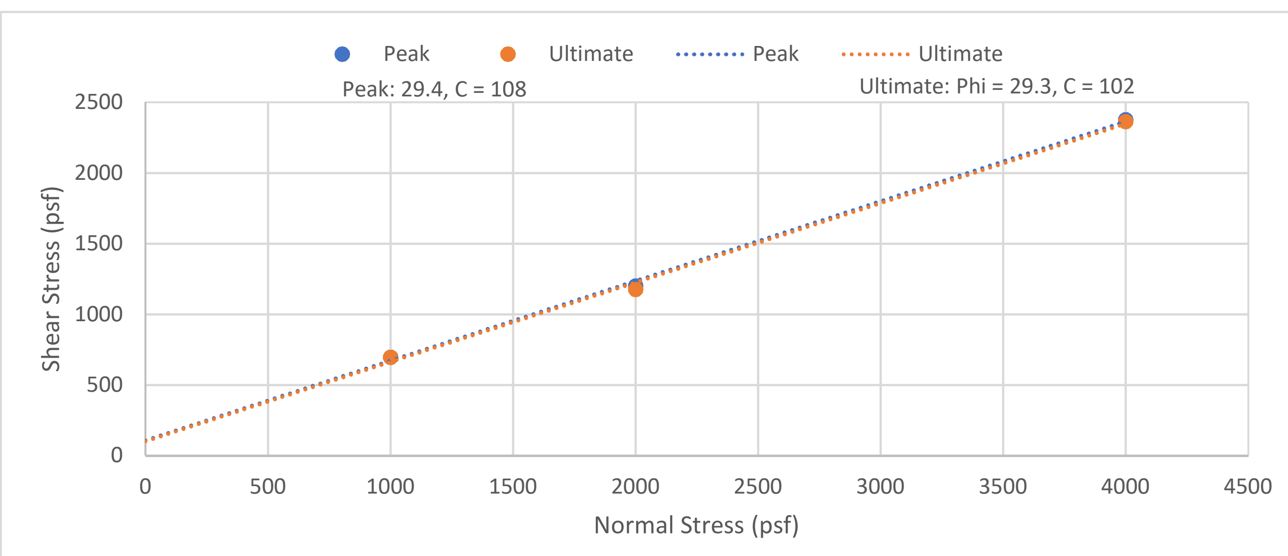


Direct Shear Test Results
ASTM D3080

Client: Newland Capital Group LLC
Project Name: Proposed Industrial Development
Project No.: CB215163
Boring No.: B-13
Sample No.: 13-A **Depth:** 0 ft
Soil Description: Silty Sand (SM)/Sandy Lean Clay (CL)
Test Date: 1/19/2022

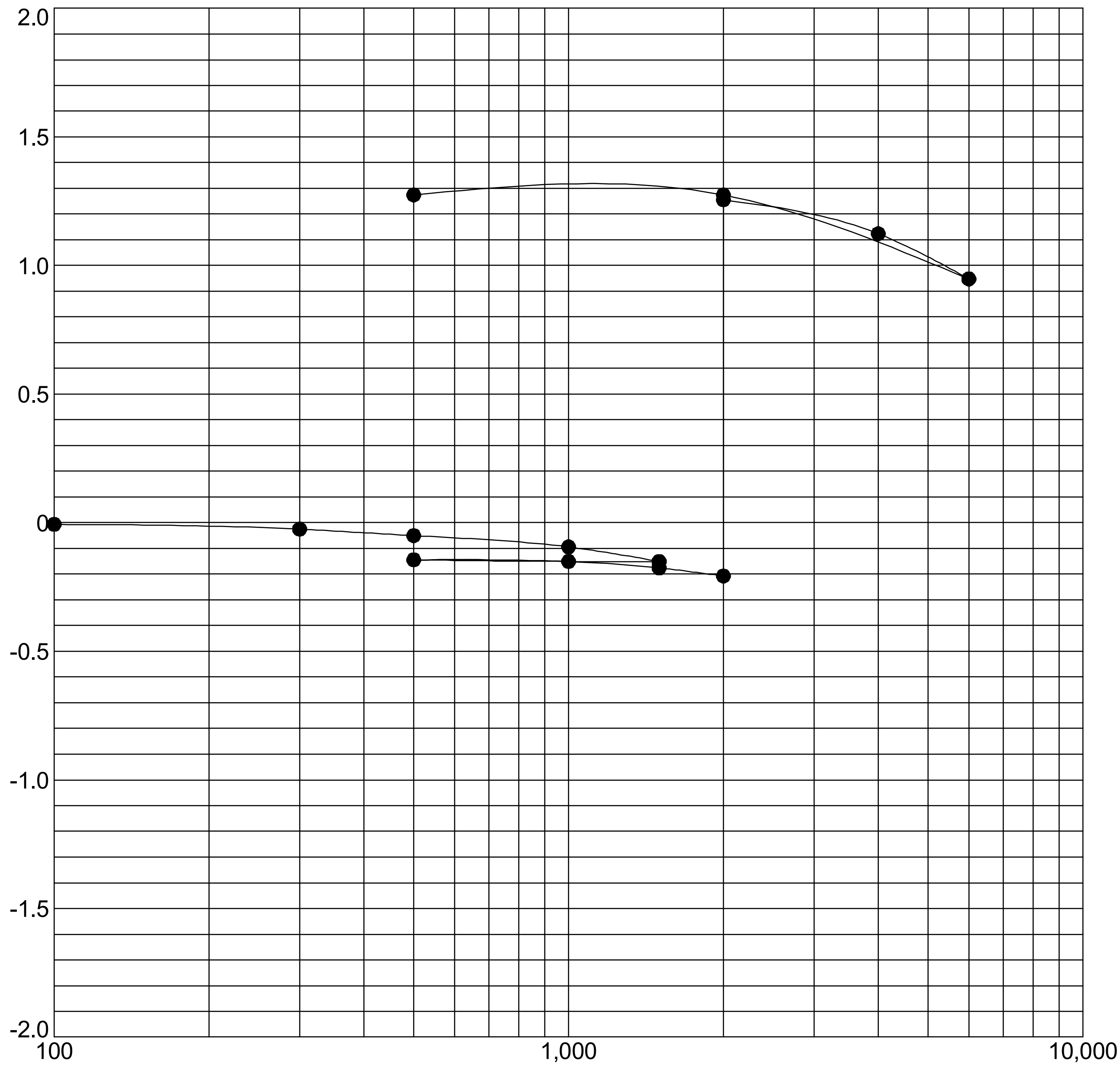
Wet Unit Weight (pcf)	Dry Unit Weight (pcf)	Moisture (%)	Normal Stress (psf)	Peak Shear Stress (psf)	Ultimate Shear Stress (psf)
131	117	10.6	1000	696	696
			2000	1200	1176
			4000	2376	2364





SWELL CONSOLIDATION TEST

ASTM D2435

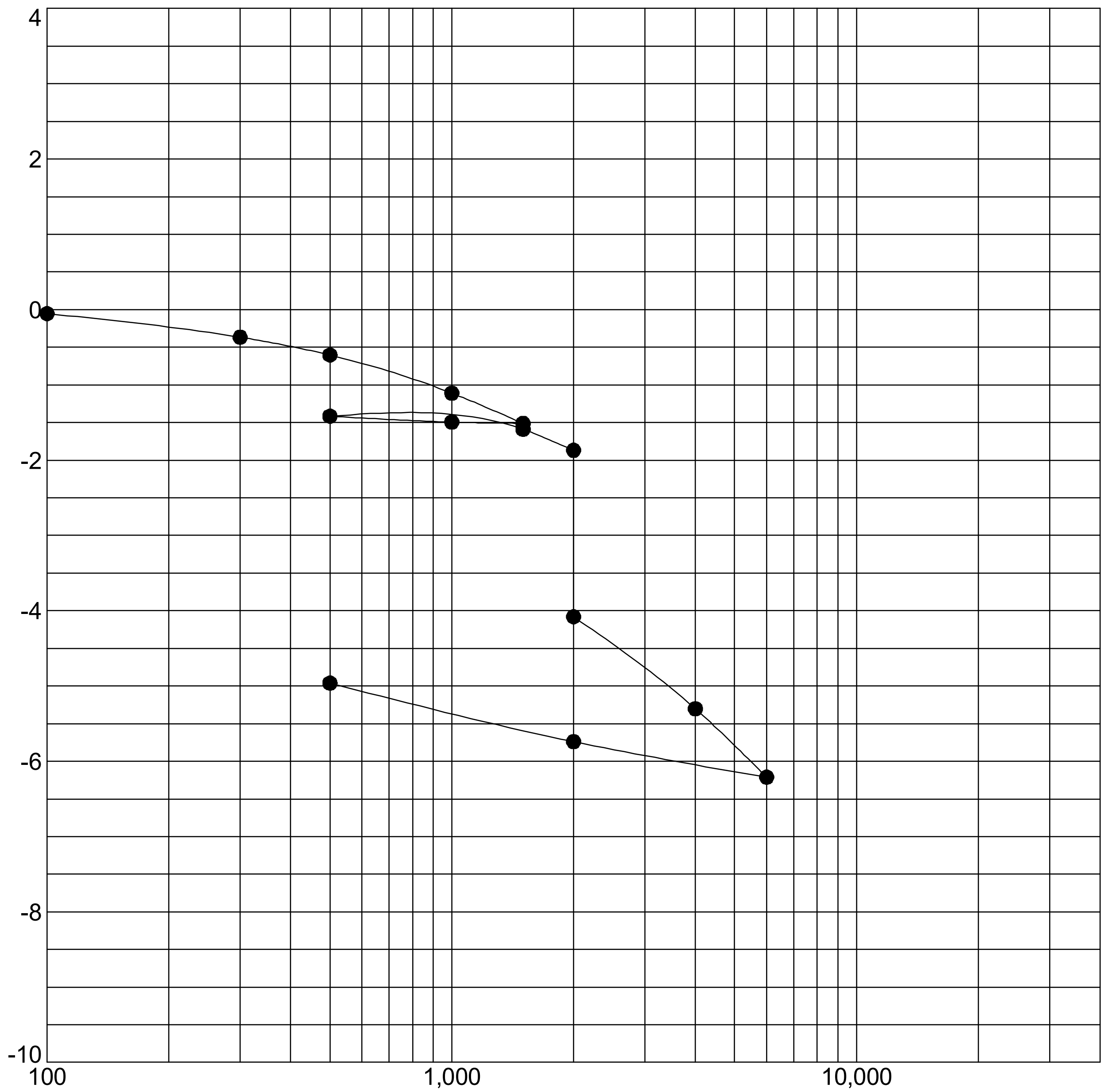


Specimen Identification		Classification	γ_d, pcf	WC, %
●	B-2 15 - 16.5 ft			

NOTES: sample was saturated at pressure of 2,000 psf

SWELL CONSOLIDATION TEST

ASTM D2435



Specimen Identification		Classification	γ_d, pcf	WC, %
●	B-3 10 - 11.5 ft		108	2

NOTES:

PROJECT: Proposed Industrial Development

SITE: S. Kirby Street
Hemet, CA

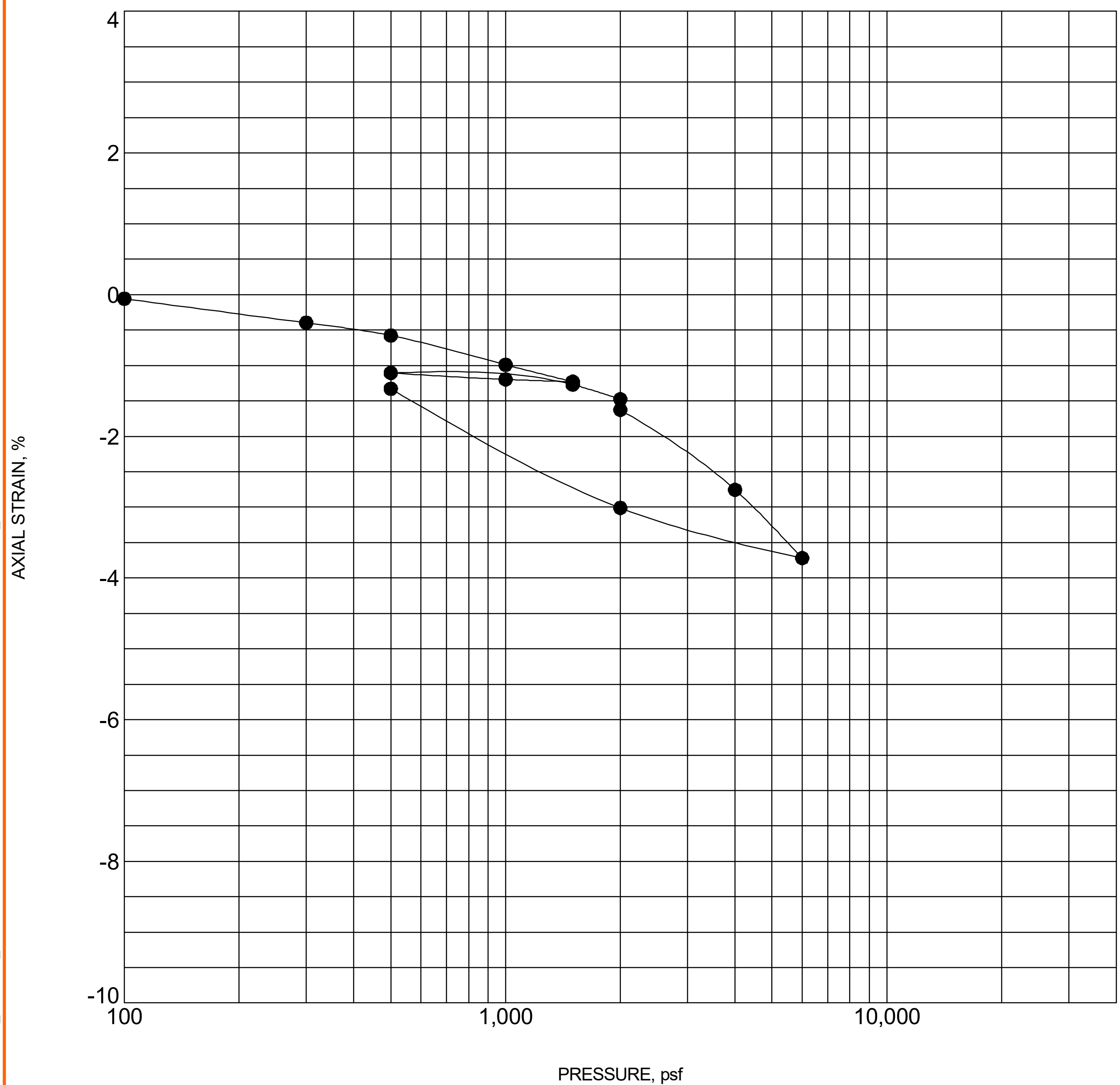
Terracon
1355 E Cooley Dr, Ste C
Colton, CA

PROJECT NUMBER: CB215163

CLIENT: Newland Capital Group LLC
Irvine, CA

SWELL CONSOLIDATION TEST

ASTM D2435



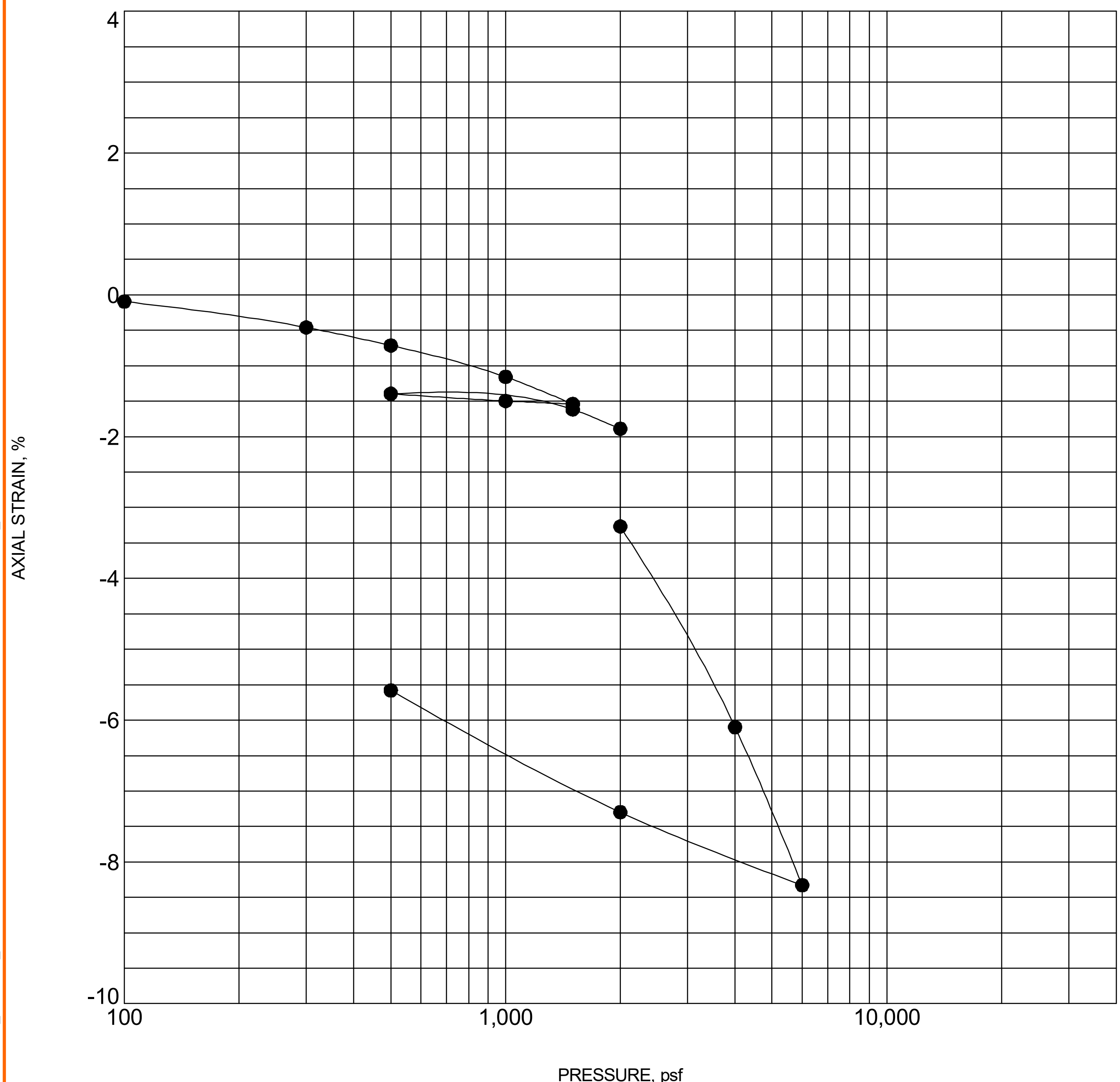
Specimen Identification			Classification	γ_d, pcf	WC, %
●	B-4	7.5 - 9 ft		106	4

NOTES:

PROJECT: Proposed Industrial Development	Terracon 1355 E Cooley Dr, Ste C Colton, CA	PROJECT NUMBER: CB215163
SITE: S. Kirby Street Hemet, CA		CLIENT: Newland Capital Group LLC Irvine, CA

SWELL CONSOLIDATION TEST

ASTM D2435



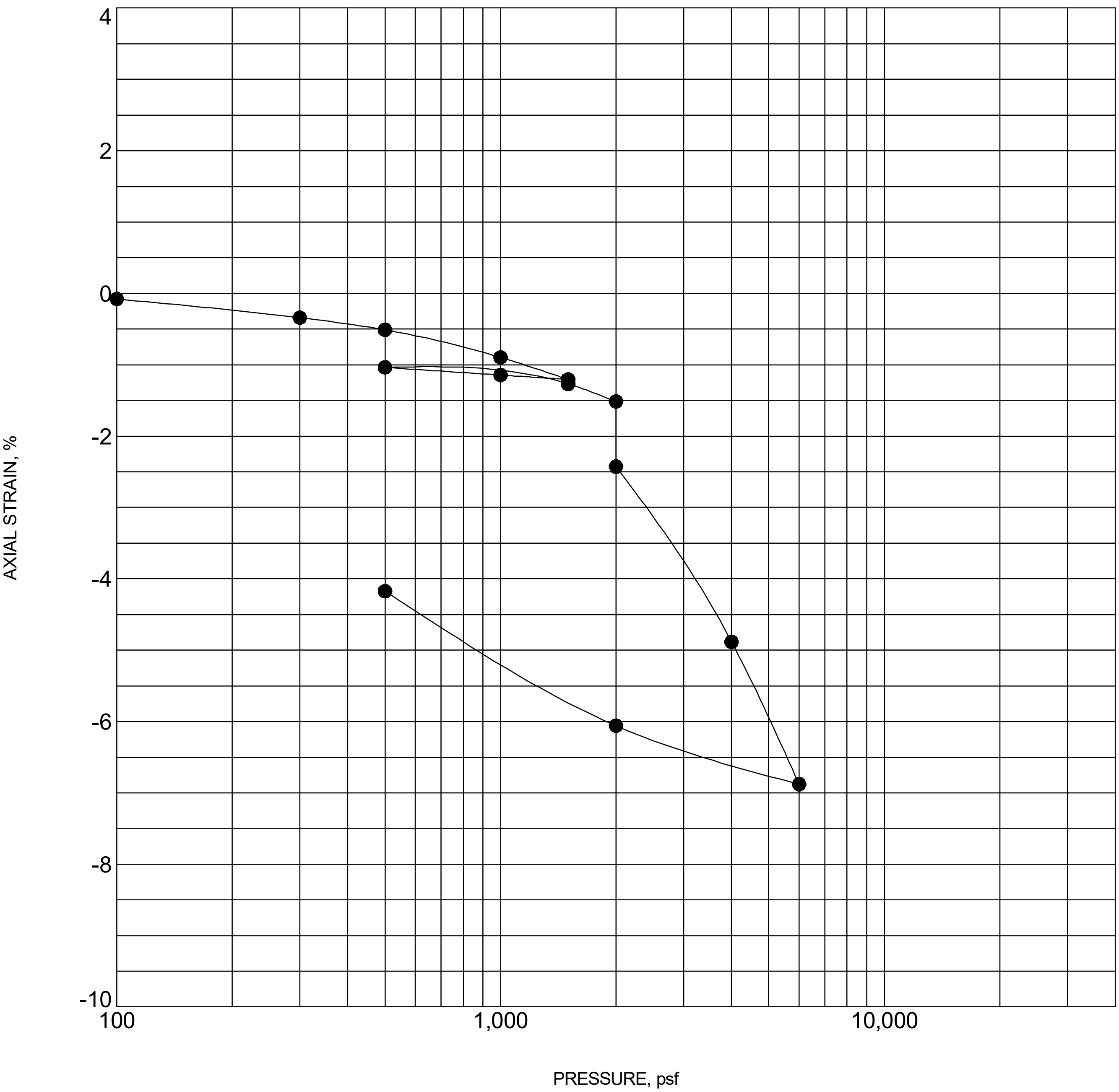
Specimen Identification		Classification	γ_d, pcf	WC, %
●	B-9 10 - 11.5 ft			

NOTES: Sample was saturated at pressure of 2,000 psf

PROJECT: Proposed Industrial Development	Terracon 1355 E Cooley Dr, Ste C Colton, CA	PROJECT NUMBER: CB215163
SITE: S. Kirby Street Hemet, CA		CLIENT: Newland Capital Group LLC Irvine, CA

SWELL CONSOLIDATION TEST

ASTM D2435

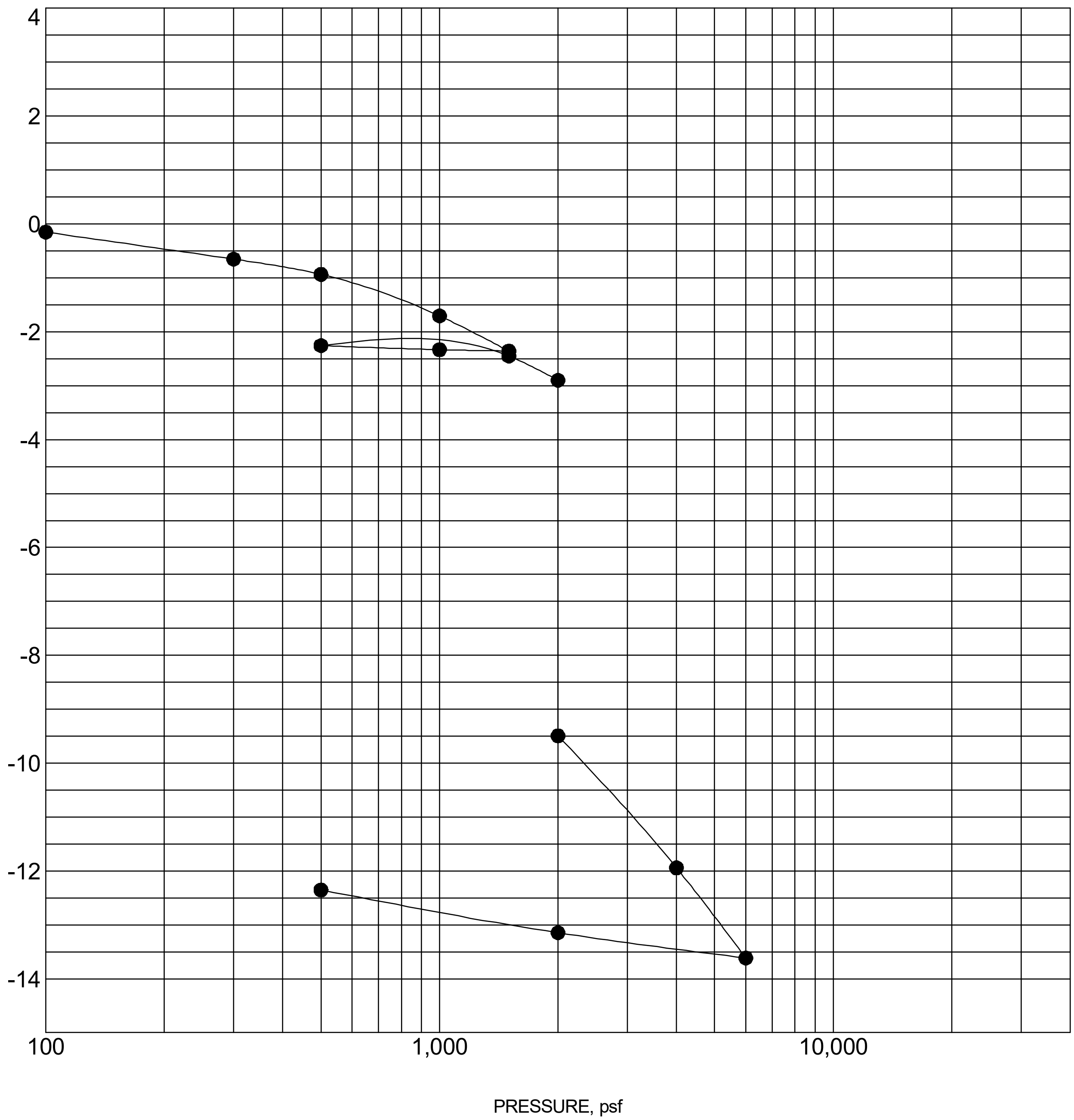


Specimen Identification		Classification	γ_d, pcf	WC, %
●	B-11 10 - 11.5 ft			

NOTES: sample was saturated at pressure of 2,000 psf

PROJECT: Proposed Industrial Development	Terracon 1355 E Cooley Dr, Ste C Colton, CA	PROJECT NUMBER: CB215163
SITE: S. Kirby Street Hemet, CA		CLIENT: Newland Capital Group LLC Irvine, CA

SWELL CONSOLIDATION TEST
ASTM D2435



Specimen Identification		Classification	γ_d, pcf	WC, %
●	B-12 7.5 - 9 ft			

NOTES: sample was saturated at pressure of 2,000 psf

PROJECT: Proposed Industrial Development	Terracon 1355 E Cooley Dr, Ste C Colton, CA	PROJECT NUMBER: CB215163
SITE: S. Kirby Street Hemet, CA		CLIENT: Newland Capital Group LLC Irvine, CA

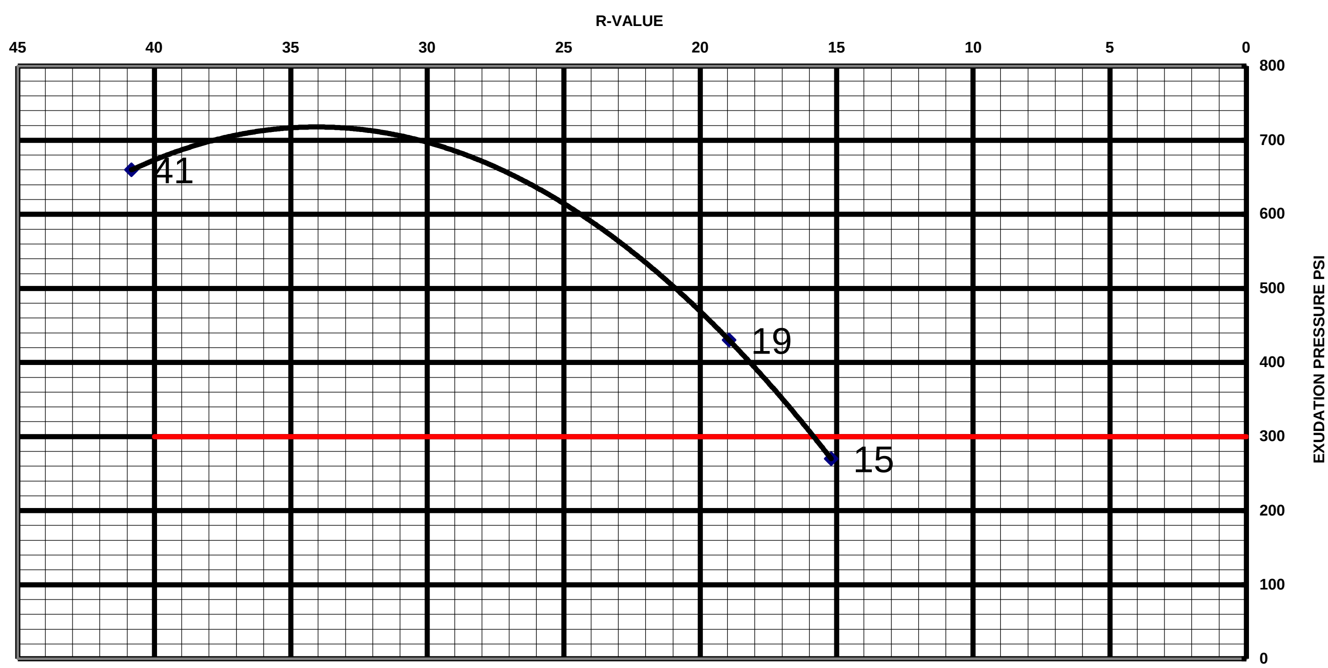
Job No. CB215163
Date. 1/21/2022

LABORATORY RECORD OF TESTS MADE ON BASE, SUBBASE, AND BASEMENT SOILS

CLIENT: **Newland Capital Group LLC**
PROJECT **Proposed Industrial Development**
LOCATION:
R-VALUE # : **15A**
T.I. :

	A	B	C	D
COMPACTOR AIR PRESSURE P.S.I.	150	250	350	
INITIAL MOISTURE %	4.9	4.9	4.9	
WATER ADDED, ML	110	100	90	
WATER ADDED %	10.3	9.3	8.5	
MOISTURE AT COMPACTION %	15.2	14.2	13.4	
HEIGHT OF BRIQUETTE	2.55	2.55	2.46	
WET WEIGHT OF BRIQUETTE	1119	1128	1116	
DENSITY LB. PER CU.FT.	115.4	117.4	121.3	
STABILOMETER PH AT 1000 LBS.	52	48	34	
2000 LBS.	113	107	68	
DISPLACEMENT	5.80	5.30	4.90	
R-VALUE	15	19	41	
EXUDATION PRESSURE	270	430	660	
THICK. INDICATED BY STAB.	0.00	0.00	0.00	
EXPANSION PRESSURE	35	50	88	
THICK. INDICATED BY E.P.	1.17	1.67	2.93	

EXUDATION CHART



R-Value: **16**

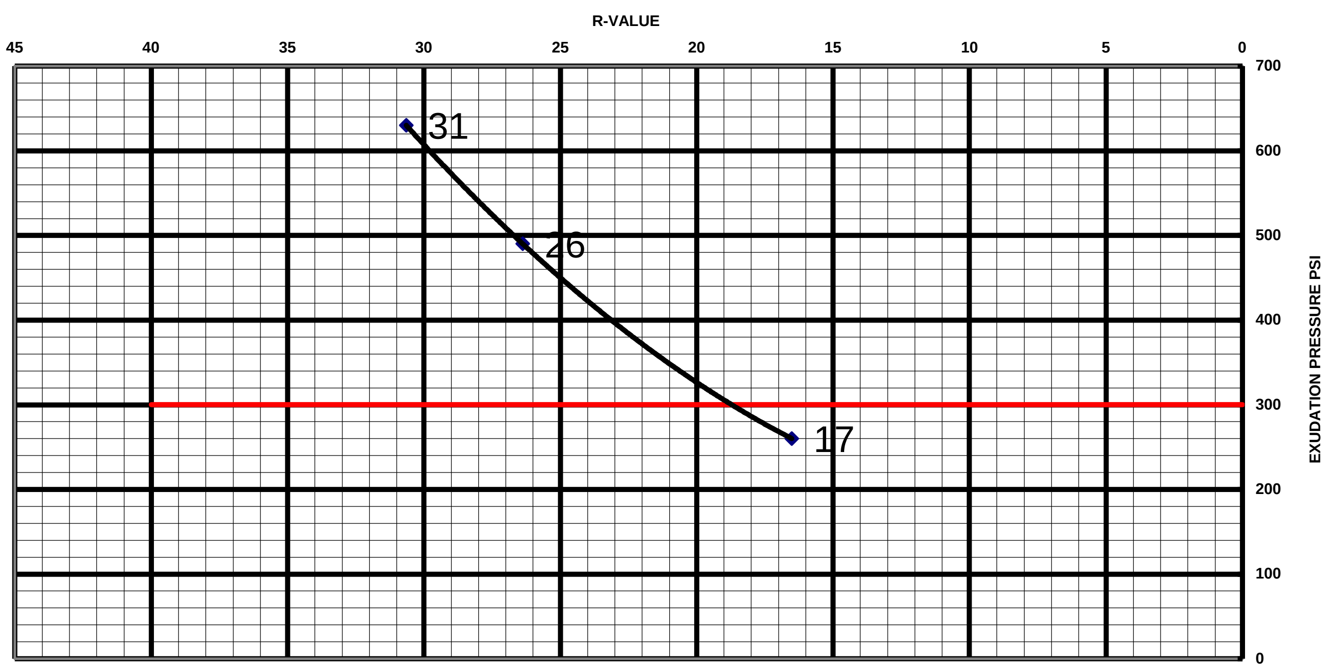
Job No. CB215163
Date. 1/21/2022

LABORATORY RECORD OF TESTS MADE ON
BASE, SUBBASE, AND BASEMENT SOILS

CLIENT: **Newland Capital Group LLC**
PROJECT **Proposed Industrial Development**
LOCATION:
R-VALUE # : **16A**
T.I. :

	A	B	C	D
COMPACTOR AIR PRESSURE P.S.I.	175	275	350	
INITIAL MOISTURE %	4.2	4.2	4.2	
WATER ADDED, ML	105	90	80	
WATER ADDED %	9.7	8.3	7.4	
MOISTURE AT COMPACTION %	13.9	12.5	11.6	
HEIGHT OF BRIQUETTE	2.52	2.48	2.47	
WET WEIGHT OF BRIQUETTE	1123	1128	1127	
DENSITY LB. PER CU.FT.	118.5	122.5	123.9	
STABILOMETER PH AT 1000 LBS.	49	41	29	
2000 LBS.	114	94	90	
DISPLACEMENT	5.10	4.90	4.40	
R-VALUE	17	26	31	
EXUDATION PRESSURE	260	490	630	
THICK. INDICATED BY STAB.	0.00	0.00	0.00	
EXPANSION PRESSURE	32	37	47	
THICK. INDICATED BY E.P.	1.07	1.23	1.57	

EXUDATION CHART



R-Value: **19**

Job No.: CB215163

PERCOLATION TEST DATA

BORING NUMBER: P-1
LOT No: N/A
TRACT No: N/A

CLIENT: Newland Capital
PROJECT: Proposed Industrial Development

DATE OF DRILLING: December 3, 2021
DATE OF PRESOAK: December 12, 2021
DATE OF TEST: December 13, 2021
TESTED BY: GA

DEPTH BEFORE (ft.): 10.0
DEPTH AFTER (ft.): 10.0
PVC PIPE DIA. (in.): 3.0
PERC HOLE DIA. (in.): 8.0

Time Interval (min.)	Total Elapsed Time (min.)	Initial Water Level (in.)	Final Water Level (in.)	Change in Water Level (in.)	Initial Hole Depth (in.)	Final Hole Depth (in.)	Percolation Rate (in/hr)	Infiltration rate (Porchet Method) (in/hr)
1535	1535	54.0	122.4	68.4	120.0	120.0	2.7	0.16
25	1560	60.0	65.7	5.7	120.0	120.0	13.7	0.46
25	1585	60.0	66.0	6.0	120.0	120.0	14.4	0.49
30	1615	60.0	67.5	7.5	120.0	120.0	15.0	0.52
30	1645	60.0	68.7	8.7	120.0	120.0	17.4	0.60
30	1675	60.0	69.6	9.6	120.0	120.0	19.2	0.67
30	1705	60.0	70.2	10.2	120.0	120.0	20.4	0.72
30	1735	60.0	71.1	11.1	120.0	120.0	22.2	0.79
30	1765	60.0	70.8	10.8	120.0	120.0	21.6	0.76
30	1795	60.0	70.8	10.8	120.0	120.0	21.6	0.76
30	1825	60.0	70.5	10.5	120.0	120.0	21.0	0.74
30	1855	60.0	70.5	10.5	120.0	120.0	21.0	0.74
30	1885	60.0	70.2	10.2	120.0	120.0	20.4	0.72
30	1915	60.0	70.2	10.2	120.0	120.0	20.4	0.72
30	1945	60.0	70.2	10.2	120.0	120.0	20.4	0.72

Job No.: CB215163

PERCOLATION TEST DATA

BORING NUMBER: P-2
LOT No: N/A
TRACT No: N/A

CLIENT: Newland Capital
PROJECT: Proposed Industrial Development

DATE OF DRILLING: December 3, 2021
DATE OF PRESOAK: December 12, 2021
DATE OF TEST: December 13, 2021
TESTED BY: GA

DEPTH BEFORE (ft.): 9.9
DEPTH AFTER (ft.): 9.9
PVC PIPE DIA. (in.): 3.0
PERC HOLE DIA. (in.): 8.0

Time Interval (min.)	Total Elapsed Time (min.)	Initial Water Level (in.)	Final Water Level (in.)	Change in Water Level (in.)	Initial Hole Depth (in.)	Final Hole Depth (in.)	Percolation Rate (in/hr)	Infiltration rate (Porchet Method) (in/hr)
1525	1525	54.0	119.1	65.1	119.1	119.1	2.6	0.15
25	1550	60.0	62.7	2.7	119.1	119.1	6.5	0.22
25	1575	60.0	63.0	3.0	119.1	119.1	7.2	0.24
30	1605	60.0	63.0	3.0	119.1	119.1	6.0	0.20
30	1635	60.0	63.3	3.3	119.1	119.1	6.6	0.22
30	1665	60.0	63.0	3.0	119.1	119.1	6.0	0.20
30	1695	60.0	62.7	2.7	119.1	119.1	5.4	0.18
30	1725	60.0	62.7	2.7	119.1	119.1	5.4	0.18
30	1755	60.0	62.7	2.7	119.1	119.1	5.4	0.18
30	1785	60.0	63.0	3.0	119.1	119.1	6.0	0.20
30	1815	60.0	62.7	2.7	119.1	119.1	5.4	0.18
30	1845	60.0	62.7	2.7	119.1	119.1	5.4	0.18
30	1875	60.0	62.7	2.7	119.1	119.1	5.4	0.18
30	1905	60.0	62.4	2.4	119.1	119.1	4.8	0.16
30	1935	60.0	62.7	2.7	119.1	119.1	5.4	0.18

Job No.: CB215163

PERCOLATION TEST DATA

BORING NUMBER: P-3
LOT No: N/A
TRACT No: N/A

CLIENT: Newland Capital
PROJECT: Proposed Industrial Development

DATE OF DRILLING: December 3, 2021
DATE OF PRESOAK: December 12, 2021
DATE OF TEST: December 13, 2021
TESTED BY: GA

DEPTH BEFORE (ft.): 4.8
DEPTH AFTER (ft.): 4.8
PVC PIPE DIA. (in.): 3.0
PERC HOLE DIA. (in.): 8.0

Time Interval (min.)	Total Elapsed Time (min.)	Initial Water Level (in.)	Final Water Level (in.)	Change in Water Level (in.)	Initial Hole Depth (in.)	Final Hole Depth (in.)	Percolation Rate (in/hr)	Infiltration rate (Porchet Method) (in/hr)
1530	1530	0.0	57.0	57.0	57.0	57.0	2.2	0.15
25	1555	0.0	5.7	5.7	57.0	57.0	13.7	0.49
25	1580	0.0	5.7	5.7	57.0	57.0	13.7	0.49
30	1610	0.0	6.3	6.3	57.0	57.0	12.6	0.45
30	1640	0.0	6.6	6.6	57.0	57.0	13.2	0.47
30	1670	0.0	6.6	6.6	57.0	57.0	13.2	0.47
30	1700	0.0	6.6	6.6	57.0	57.0	13.2	0.47
30	1730	0.0	6.6	6.6	57.0	57.0	13.2	0.47
30	1760	0.0	6.3	6.3	57.0	57.0	12.6	0.45
30	1790	0.0	6.3	6.3	57.0	57.0	12.6	0.45
30	1820	0.0	6.6	6.6	57.0	57.0	13.2	0.47
30	1850	0.0	6.3	6.3	57.0	57.0	12.6	0.45
30	1880	0.0	6.3	6.3	57.0	57.0	12.6	0.45
30	1910	0.0	6.3	6.3	57.0	57.0	12.6	0.45
30	1940	0.0	6.3	6.3	57.0	57.0	12.6	0.45

750 Pilot Road, Suite F
Las Vegas, Nevada 89119
(702) 597-9393

Client
Newland Capital Group LLC

Project
Proposed Industrial Development

Sample Submitted By: Terracon (CB) **Date Received:** 12/27/2021 **Lab No.: 22-0018**

Results of Corrosion Analysis

Sample Number	7-A	16-A
Sample Location	B-7	B-16
Sample Depth (ft.)	0.0-5.0	0.0-5.0
pH Analysis, ASTM G 51	8.59	8.64
Water Soluble Sulfate (SO4), ASTM C 1580 (mg/kg)	135	88
Chlorides, ASTM D 512, (mg/kg)	70	78
Total Salts, AWWA 2540, (mg/kg)	465	579
As-Received Resistivity, ASTM G 57, (ohm-cm)	47045	67900
Saturated Minimum Resistivity, ASTM G 57, (ohm-cm)	4171	3395

Analyzed By: N. Campo

Nathan Campo
Engineering Technician II

The tests were performed in general accordance with applicable ASTM and AWWA test methods. This report is exclusively for the use of the client indicated above and shall not be reproduced except in full without the written consent of our company. Test results transmitted herein are only applicable to the actual samples tested at the location(s) referenced and are not necessarily indicative of the properties of other apparently similar or identical materials.

SUPPORTING INFORMATION

Contents:

Note: All attachments are one page unless noted above.

GENERAL NOTES
DESCRIPTION OF SYMBOLS AND ABBREVIATIONS

Terracon GeoReport

SAMPLING	WATER LEVEL	FIELD TESTS
Auger Cuttings	Water Initially Encountered	**N** Standard Penetration Test Resistance (Blows/Ft.)
Modified California Ring Sampler	Water Level After a Specified Period of Time	**(HP)** Hand Penetrometer
Grab Sample	Water Level After a Specified Period of Time	**(T)** Torvane
Standard Penetration Test	Cave In Encountered	**(DCP)** Dynamic Cone Penetrometer
	Water levels indicated on the soil boring logs are the levels measured in the borehole at the times indicated. Groundwater level variations will occur over time. In low permeability soils, accurate determination of groundwater levels is not possible with short term water level observations.	**UC** Unconfined Compressive Strength
		(PID) Photo-Ionization Detector
		(OVA) Organic Vapor Analyzer

DESCRIPTIVE SOIL CLASSIFICATION

Soil classification as noted on the soil boring logs is based Unified Soil Classification System. Where sufficient laboratory data exist to classify the soils consistent with ASTM D2487 "Classification of Soils for Engineering Purposes" this procedure is used. ASTM D2488 "Description and Identification of Soils (Visual-Manual Procedure)" is also used to classify the soils, particularly where insufficient laboratory data exist to classify the soils in accordance with ASTM D2487. In addition to USCS classification, coarse grained soils are classified on the basis of their in-place relative density, and fine-grained soils are classified on the basis of their consistency. See "Strength Terms" table below for details. The ASTM standards noted above are for reference to methodology in general. In some cases, variations to methods are applied as a result of local practice or professional judgment.

LOCATION AND ELEVATION NOTES

Exploration point locations as shown on the Exploration Plan and as noted on the soil boring logs in the form of Latitude and Longitude are approximate. See Exploration and Testing Procedures in the report for the methods used to locate the exploration points for this project. Surface elevation data annotated with +/- indicates that no actual topographical survey was conducted to confirm the surface elevation. Instead, the surface elevation was approximately determined from topographic maps of the area.

STRENGTH TERMS

RELATIVE DENSITY OF COARSE-GRAINED SOILS (More than 50% retained on No. 200 sieve.) Density determined by Standard Penetration Resistance			CONSISTENCY OF FINE-GRAINED SOILS (50% or more passing the No. 200 sieve.) Consistency determined by laboratory shear strength testing, field visual-manual procedures or standard penetration resistance			
Descriptive Term (Density)	**Standard Penetration or N-Value Blows/Ft.**	**Ring Sampler Blows/Ft.**	**Descriptive Term (Consistency)**	**Unconfined Compressive Strength Qu, (tsf)**	**Standard Penetration or N-Value Blows/Ft.**	**Ring Sampler Blows/Ft.**
Very Loose	0 - 3	0 - 6	Very Soft	less than 0.25	0 - 1	< 3
Loose	4 - 9	7 - 18	Soft	0.25 to 0.50	2 - 4	3 - 4
Medium Dense	10 - 29	19 - 58	Medium Stiff	0.50 to 1.00	4 - 8	5 - 9
Dense	30 - 50	59 - 98	Stiff	1.00 to 2.00	8 - 15	10 - 18
Very Dense	> 50	> 99	Very Stiff	2.00 to 4.00	15 - 30	19 - 42
			Hard	> 4.00	> 30	> 42

RELEVANCE OF SOIL BORING LOG

The soil boring logs contained within this document are intended for application to the project as described in this document. Use of these soil boring logs for any other purpose may not be appropriate.

UNIFIED SOIL CLASSIFICATION SYSTEM

Terracon GeoReport

Criteria for Assigning Group Symbols and Group Names Using Laboratory Tests [A]				Soil Classification: Group Symbol	Soil Classification: Group Name [B]
Coarse-Grained Soils: More than 50% retained on No. 200 sieve	**Gravels:** More than 50% of coarse fraction retained on No. 4 sieve	**Clean Gravels:** Less than 5% fines [C]	$Cu \geq 4$ and $1 \leq Cc \leq 3$ [E]	GW	Well-graded gravel [F]
			$Cu < 4$ and/or [$Cc<1$ or $Cc>3.0$] [E]	GP	Poorly graded gravel [F]
		Gravels with Fines: More than 12% fines [C]	Fines classify as ML or MH	GM	Silty gravel [F, G, H]
			Fines classify as CL or CH	GC	Clayey gravel [F, G, H]
	Sands: 50% or more of coarse fraction passes No. 4 sieve	**Clean Sands:** Less than 5% fines [D]	$Cu \geq 6$ and $1 \leq Cc \leq 3$ [E]	SW	Well-graded sand [I]
			$Cu < 6$ and/or [$Cc<1$ or $Cc>3.0$] [E]	SP	Poorly graded sand [I]
		Sands with Fines: More than 12% fines [D]	Fines classify as ML or MH	SM	Silty sand [G, H, I]
			Fines classify as CL or CH	SC	Clayey sand [G, H, I]
Fine-Grained Soils: 50% or more passes the No. 200 sieve	**Silts and Clays:** Liquid limit less than 50	**Inorganic:**	PI > 7 and plots on or above “A” line	CL	Lean clay [K, L, M]
			PI < 4 or plots below “A” line [J]	ML	Silt [K, L, M]
		Organic:	Liquid limit - oven dried / Liquid limit - not dried < 0.75	OL	Organic clay [K, L, M, N]
					Organic silt [K, L, M, O]
	Silts and Clays: Liquid limit 50 or more	**Inorganic:**	PI plots on or above “A” line	CH	Fat clay [K, L, M]
			PI plots below “A” line	MH	Elastic Silt [K, L, M]
		Organic:	Liquid limit - oven dried / Liquid limit - not dried < 0.75	OH	Organic clay [K, L, M, P]
					Organic silt [K, L, M, Q]
Highly organic soils:	Primarily organic matter, dark in color, and organic odor			PT	Peat

[A] Based on the material passing the 3-inch (75-mm) sieve.

[B] If field sample contained cobbles or boulders, or both, add “with cobbles or boulders, or both” to group name.

[C] Gravels with 5 to 12% fines require dual symbols: GW-GM well-graded gravel with silt, GW-GC well-graded gravel with clay, GP-GM poorly graded gravel with silt, GP-GC poorly graded gravel with clay.

[D] Sands with 5 to 12% fines require dual symbols: SW-SM well-graded sand with silt, SW-SC well-graded sand with clay, SP-SM poorly graded sand with silt, SP-SC poorly graded sand with clay.

[E] $Cu = D_{60}/D_{10}$ $\quad Cc = \dfrac{(D_{30})^2}{D_{10} \times D_{60}}$

[F] If soil contains ≥ 15% sand, add “with sand” to group name.

[G] If fines classify as CL-ML, use dual symbol GC-GM, or SC-SM.

[H] If fines are organic, add “with organic fines” to group name.

[I] If soil contains ≥ 15% gravel, add “with gravel” to group name.

[J] If Atterberg limits plot in shaded area, soil is a CL-ML, silty clay.

[K] If soil contains 15 to 29% plus No. 200, add “with sand” or “with gravel,” whichever is predominant.

[L] If soil contains ≥ 30% plus No. 200 predominantly sand, add “sandy” to group name.

[M] If soil contains ≥ 30% plus No. 200, predominantly gravel, add “gravelly” to group name.

[N] PI ≥ 4 and plots on or above “A” line.

[O] PI < 4 or plots below “A” line.

[P] PI plots on or above “A” line.

[Q] PI plots below “A” line.