HETHERINGTON ENGINEERING, INC.
SOIL & FOUNDATION ENGINEERING • ENGINEERING GEOLOGY • HYDROGEOLOGY

July 7, 2020
Project No. 8927.1
Log No. 21020

Michael P. Drogin
8060 La Jolla Shores Drive, Suite 7C
La Jolla, California 92037

Subject: GEOTECHNICAL INVESTIGATION
Proposed Single-Family Residence
6361 Hartley Drive
La Jolla, California

References: Attached

Dear Mr. Drogin:

In accordance with your request, we have performed a geotechnical investigation for a proposed single-family residence at the subject site. Our work was performed in March through July 2020. The purpose of the investigation was to evaluate the geologic and soil conditions at the site in order to provide grading and foundation recommendations for the proposed single-family residence.

Our scope of work included the following:

- Research and review of available geotechnical reports, plans and maps pertaining to the geologic conditions at the site (see References).
- Subsurface exploration consisting of two manually excavated hand-auger borings.
- Laboratory testing of samples obtained during the subsurface exploration.
- Engineering and geologic analysis.
- Preparation of this report presenting the results of our subsurface exploration, laboratory testing, analyses, and our conclusions and recommendations.

SITE DESCRIPTION

The subject property is located at 6361 Hartley Drive, La Jolla, California (see Location Map, Figure 1). The site consists of a relatively level building pad and a west gently descending front yard that supports a one-story, wood frame, single-family residence and attached covered carport. The property fronts on Hartley Drive to the west and is bounded by La Cumbre Drive to the north and similarly developed residential properties to the south and east. Two small retaining walls at the driveway entrance on Hartley Drive

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accommodate the grade change from the street to the front of the property. Other improvements include hardscape and a swimming pool.

PROPOSED DEVELOPMENT

We understand that the proposed development consists of a one-story, single-family residence with attached three car garage, guest house, swimming pool and spa. Currently only conceptual architectural plans are available. We anticipate that the proposed residence will be of wood-frame construction founded on conventional continuous/spread footings with slab-on-grade floors. Building loads are expected to be typical for this type of relatively light construction. Grading will be required to prepare the site for construction. No new slopes are anticipated.

SUBSURFACE EXPLORATION

Subsurface exploration consisted of two manually-excavated hand-auger borings. The subsurface exploration was supervised by an engineer from this office, who visually classified the soil, and obtained bulk and relatively undisturbed soil/bedrock samples for laboratory testing. The soils were visually classified according to the Unified Soil Classification System. The approximate locations of the test pits are shown on the attached Plot Plan, Figure 2. The Boring Logs are attached as Figures 3 and 4.

LABORATORY TESTING

Laboratory testing was performed on samples obtained during the subsurface exploration. Tests performed consisted of the following:

- Dry Density/Moisture Content (ASTM: D 2216)
- Maximum Dry Density/Optimum Moisture Content (ASTM: D 1557)
- Sulfate (Cal Test 417)
- Direct Shear (ASTM: D 3080)

Results of the dry density and moisture content determinations are presented on the Boring Logs, Figures 3 and 4. The remaining laboratory test results are presented on the attached Laboratory Test Results, Figure 5.

SOIL AND GEOLOGIC CONDITIONS

1. Geologic Setting

The subject site is within the Coastal Plain region of the Peninsular Ranges Geomorphic province of California. The Coastal Plain region is characterized by interbedded marine and nonmarine sedimentary bedrock deposited over the last 75-million-years. The sedimentary rocks overlie a buried topographic surface composed of plutonic crystalline rocks. Many of the level surfaces in the coastal areas, including most of the mesa tops and coastal benches, represent elevated marine terraces that are characteristic features of the Coastal Plain. The site is situated on one of these marine terraces formed within the southwestern flanks of Mount Soledad just north of the Pacific Beach Syncline. This area is within the western part of the U.S.G.S. La Jolla 7.5-minute quadrangle.

The City of San Diego Seismic Safety Study (Reference 7) indicates the site is located within Geologic Hazard Category 53, an area of neutral to unfavorable geologic structure, but is considered to have low to moderate risk due to the limited topographic relief and underlying earth materials. The northwest-trending Country Club fault, considered a branch of the Rose Canyon fault zone, is situated approximately 0.58-miles northeast of the site. The Mount Soledad fault is situated approximately 1.10-miles to the northeast of the site.

Active fault zones within the general site region include the Newport-Inglewood/Rose Canyon and the Coronado Bank, which are located 0.75-miles northeast of the site and 12-miles southwest of the site, respectively. The site is not within a mapped State of California Special Studies Earthquake Fault Zone and there are no mapped active faults underlying the site.

Based on our review of the referenced documents and our subsurface exploration, the subject lot is underlain by fill and by very old paralic deposits (terrace deposits) of early to middle Pleistocene geologic age. The paralic deposits are, in turn, underlain at depth by bedrock assigned to the Ardath Shale of middle Eocene geologic age. Bedding in the Ardath Shale is reported to strike northwest and dip between 5 to 10 degrees to the southwest.

Earth materials observed and sampled within our subsurface hand-auger borings are classified as fill and very old paralic deposits. The observed characteristics of these materials follows.

2. Geologic Units

Fill – Fill soils were observed in the hand-auger borings HA-1 and HA-2 to depths of 2.0 and 3.5-feet. The fill consists of moist, loose and medium dense, orange brown and dark brown clayey sand. The fill soils are considered to be very low in expansion potential.

Very Old Paralic Deposits (Terrace Deposits) – Very old paralic deposits were exposed beneath the fill in hand-auger borings HA-1 and HA-2. The paralic deposits consist of orange brown and red brown silty sands that are moist to wet, medium dense to dense. The very old paralic deposits are considered to be very low in expansion potential.

3. Groundwater

Groundwater was not encountered in the hand-auger borings. It should be noted, however, that fluctuations in the amount and level of groundwater may occur due to variations in rainfall, irrigation and other factors that may not have been evident at the time of our field investigation.

SEISMICITY

The site is in a moderately active seismic region. Ground shaking due to earthquakes should be anticipated during the life of the proposed improvements. The following table lists the known active faults that would have the most significant impact on the site:

Fault	**Maximum Probable Earthquake** (Moment Magnitude)	**Slip Rate** (mm/year)
Newport Inglewood/Rose Canyon (0.75-miles/1.2-kilometers northeast)	6.9	1.5
Coronado Bank (12-miles/20.4-kilometers southwest)	7.4	3.0
Elsinore (Julian Segment) (40-miles/64.5-kilometers northeast)	7.3	3.0

SEISMIC EFFECTS

1. Ground Accelerations

The most significant probable earthquake to affect the site would be a 6.9 magnitude earthquake on the Rose Canyon fault. Based on Section 1803.5.12 of the 2019

California Building Code, peak ground accelerations (PGA_M) of 0.619g are possible for the design earthquake.

2. Landsliding

Review of the referenced geologic literature indicates that the subject property has no previously mapped landslide deposits and none were observed during our site mapping and subsurface exploration. The risk of seismically induced landsliding effecting the site is considered low due to the dense, massive nature of the very old paralic deposits and generally gently sloping nature of the site.

3. Ground Cracks

The risk of fault surface rupture due to active faulting is considered low due to the absence of an active fault on site. Ground cracks due to shaking from seismic events in the region are possible, as with all southern California.

4. Liquefaction

The risk of seismically induced liquefaction within the site is considered low due to the dense nature of the very old paralic deposits and absence of shallow groundwater.

5. Tsunamis

The site is not within a mapped tsunami inundation area (Reference 5). The risk of a tsunami adversely impacting the site is considered low due to the elevation of the site above sea level and its distance from the coastline.

CONCLUSIONS AND RECOMMENDATIONS

1. General

The proposed single-family residence is considered feasible from a geotechnical standpoint. Grading and foundation plans should consider the appropriate geotechnical features of the site. Provided that the recommendations presented in this report and good construction practices are utilized during design and construction, proposed construction is not anticipated to adversely impact the adjacent properties from a geotechnical standpoint.

2. Seismic Parameters for Structural Design

Seismic considerations that may be used for structural design at the site, based on Section 1613 of the 2019 California Building Code and ASCE 7-16, include the following:

a. Ground Motion - The proposed construction should be designed and constructed to resist the effects of seismic ground motions as provided in Section 1613 of the 2019 California Building Code.

Site Address: 6361 Hartley Drive, La Jolla, California

Latitude: 32.82885°N

Longitude: 117.25966°W

The proposed one-story single-family residence has a fundamental period of vibration less than 0.5s, consequently, the exception to site response analyses in ASCE 7-16 (Section 20.3.1.1) has been used. Using the Structural Engineers Association Seismic Design Maps website, the seismic parameters F_v, S_{M1}, and S_{D1} are null and not applicable. The Simplified Alternative Structural Design Criteria provided in Section12.14 of ASCE 7-16 should be used.

b. Spectral Response Accelerations - Using the location of the property and data obtained from the Seismic Design Maps Website (Reference 12), short period Spectral Response Accelerations S_s (0.2 second period) and S_1 (1.0 second period) are:

$S_s = 1.361g$
$S_1 = 0.476g$

c. Site Class - In accordance with Chapter 20 of ASCE 7-16 and the underlying geologic conditions, a Site Class D was used consistent with Section 11.4 of ASCE 7-16.

d. Site Coefficients F_a and F_v - In accordance with Table 1613.2.3 and considering the values of S_s and S_1, site amplification factors are:

$F_a = 1.000$
$F_v =$ Null

e. Spectral Response Acceleration Parameters S_{MS} and S_{M1} - In accordance with Section 1613.2.3 and considering the values of S_s and S_1, and F_a and F_v, Spectral Response Acceleration Parameters for Maximum Considered Earthquake are:

S_{MS} = 1.361g
S_{M1} = Null

f. Design Spectral Response Acceleration Parameters S_{DS} and S_{D1} - In accordance with Section 1613.3.4 and considering the values of Sm_s and Sm_1, Design Spectral Response Acceleration Parameters for are:

S_{DS} = 0.907g
S_{D1} = Null

g. Long Period Transition Period - A Long Period Transition Period of T_L = 8 seconds is provided for use in San Diego County.

h. Seismic Design Category - In accordance with Tables 1604.5, 1613.2.5, and ASCE 7-16, a Risk Category II and a Seismic Design Category D are considered appropriate for the subject property.

3. Site Grading

Prior to grading, the area of the proposed structure should be cleared of existing improvements, surface obstructions, vegetation, and debris. Materials generated during clearing should be disposed of at an approved location off-site. Holes resulting from the removal of buried obstructions that may be encountered during grading and construction should be replaced with compacted fill or lean concrete.

Where not removed as part of planned excavation and in the areas of proposed grading and construction (including retaining walls and hardscape), existing fill and any loose or disturbed paralic deposits should be removed down to approved paralic deposits and replaced with compacted fill in order to achieve design finish grades. Removal depths on the order of 2 to 4-feet below existing grades are anticipated. Actual removal depths should be determined in the field by the Geotechnical Consultant based on conditions exposed during grading.

Following removals, the exposed subgrade should be scarified to a depth of 6 to 8-inches, moisture conditioned to about optimum moisture content and compacted to at least 90-percent relative compaction (ASTM: D 1557). The recommended removals and recompaction should extend to at least 5-feet outside the proposed improvements, where possible.

Fill should be compacted by mechanical means in uniform horizontal lifts of 6 to 8-inches in thickness. All fill should be brought to near optimum moisture content and compacted to a minimum relative compaction of 90-percent based upon ASTM: D 1557. The on-site materials are suitable for use as compacted fill provided all vegetation and debris are removed. Rock fragments over 6-inches in dimension and other perishable or unsuitable materials should be excluded from the fill.

All grading and compaction should be observed and tested as necessary by the Geotechnical Consultant.

4. Foundation and Slab Recommendations

Based on visual observation and soil classification, the onsite soils are considered to be very low in expansion potential. The following foundation and slab recommendations are considered geotechnical minimums and may be increased by structural requirements.

The proposed structure should be supported on conventional continuous/spread footings founded at least 18-inches into compacted fill and/or paralic deposits. Continuous footings should be at least 12-inches wide, and reinforced with a minimum of four #4 bars, two top and two bottom. Foundations located adjacent to utility trenches should extend below a 1:1 (horizontal to vertical) plane projected upward from the bottom of the trench.

Foundations bearing as recommended may be designed for a dead plus live load bearing value of 2000-pounds-per-square-foot. This value may be increased by one-third for loads including wind and seismic forces. A lateral bearing value of 400-pounds-per-square-foot per foot of depth to a maximum value of 2000-pounds-per-square-foot and a coefficient of friction between foundation soil and concrete of 0.40 may be assumed. These values assume that footings will be poured neat against the foundation soils. Footing excavations should be observed by the Geotechnical Consultant prior to the placement of reinforcing steel in order to verify that they are founded in suitable bearing materials.

Total and differential settlement due to foundation loads are considered to be less than 3/4 and 3/8-inch, respectively, for foundations founded as recommended.

Slab-on-grade floors should have a minimum thickness of 5-inches and should be reinforced with #4 bars spaced at 18-inches, center-to-center, in two directions, and supported on chairs so that the reinforcement is at mid-height in the slab. Floor slabs should be underlain with a minimum 15-mil moisture vapor retarder. At least 2-inches of sand should be placed over the vapor retarder to assist in concrete curing and at least 2-inches of sand should be placed below the vapor retarder. The vapor retarder should be placed in accordance with ASTM: E 1643. Prior to placing concrete, the slab subgrade soils should be thoroughly moistened.

Vapor retarders are not intended to provide a waterproofing function. Should moisture vapor sensitive floor coverings be planned, a qualified consultant/contractor should be consulted to evaluate moisture vapor transmission rates and to provide recommendations to mitigate potential adverse impacts of moisture vapor transmissions on the proposed flooring.

5. Retaining Walls

Retaining wall foundations should be designed in accordance with the previous building foundation recommendations. Retaining walls free to rotate (cantilevered walls) should be designed for an active pressure of 40-pounds-per-cubic-foot (equivalent fluid pressure) assuming level backfill consisting of onsite soils. Walls restrained from movement at the top should be designed for an at-rest earth pressure of 60-pounds-per-cubic-foot (equivalent fluid pressure). Any additional surcharge pressures behind the retaining walls should be added to these values.

Retaining walls should be provided with adequate drainage to prevent buildup of hydrostatic pressure and should be adequately waterproofed. The subdrain system behind retaining walls should consist at a minimum of 4-inch diameter Schedule 40 (or equivalent) perforated (perforations "down") PVC pipe embedded in at least 1-cubic-foot of 3/4-inch crushed rock per lineal foot of pipe all wrapped in approved filter fabric. Other subdrain systems that may be contemplated for use behind retaining walls due to the ultimate design and construction methodology will be considered on a case-by-case basis. Recommendations for wall waterproofing should be provided by the Project Architect and/or Structural Engineer.

The lateral pressure on retaining walls due to earthquake motions (dynamic lateral force) may be calculated as $P_A = 3/8\ \gamma\ H^2 k_h$ where

P_A	=	dynamic lateral force pounds/foot
γ	=	unit weight = 125 pounds/per/cubic/foot
H	=	height of wall (feet)
k_h	=	seismic coefficient = 0.20

The dynamic lateral force may also be expressed as 18.75-pounds-per-cubic-foot (equivalent fluid pressure).

The dynamic lateral force is in addition to the static force and should be applied as a triangular distribution at 1/3H above the base of the wall. The dynamic lateral force need not be applied to retaining walls 6-feet or less in height.

6. Temporary Slopes

Temporary slopes necessary to facilitate site grading and construction may be cut vertically up to 5-feet where the cuts are not influenced by existing structures or property line constraints. Any portion of temporary slopes near existing improvements, higher than 5-feet, or exposing potentially adverse geologic structure or unstable soils should be sloped at a ratio no steeper than 1:1 (horizontal to vertical), slot cut, or shored.

Field observations by the Engineering Geologist during grading of temporary slopes is recommended and considered necessary to confirm anticipated conditions and provide additional recommendations as warranted. Slot cut/shoring parameters can be provided upon request.

7. Retaining Wall and Utility Trench Backfill

All retaining wall and utility trench backfill should be compacted to at least 90-percent relative compaction (ASTM: D 1557). Backfill should be observed and tested as necessary by the Geotechnical Consultant.

8. Corrosivity

A representative sample of the on-site soils was submitted for sulfate testing. The result of the sulfate test is summarized on the Laboratory Test Results, Figure 5. The sulfate content is consistent with a not applicable (Class S_0) sulfate exposure classification per Table 4.2.1 of the American Concrete Institute Publication 318, consequently, special provisions for sulfate resistant concrete are not considered necessary. Other corrosivity testing has not been performed, consequently, the on-site soils should be assumed to be severely corrosive to buried metals unless testing is performed to indicate otherwise.

9. Site Drainage

Site drainage and choice of landscaping are important. The following recommendations are intended to minimize the potential adverse effects of water on the structure. Surface drainage issues should be addressed by the project Architect and/or Civil Engineer.

a. Consideration should be given to providing the structure with roof gutters and downspouts that discharge into appropriate and designed outlet structures.

b. All site drainage should be directed away from the structure and to designed outlet structures. This may be accomplished through area drains or through sheet drainage. Drainage should not be allowed to pond behind retaining walls or adjacent to the structure.

c. No landscaping should be allowed against the structure. Moisture accumulation or watering adjacent to foundations can result in deterioration of wood/stucco and may adversely affect footings and the performance of the structure.

d. Irrigated areas should not be over-watered. Irrigation should be limited to that required for maintaining the vegetation. Additionally, automatic systems should be seasonally adjusted.

e. All yard and roof drains should be periodically checked to verify they are not blocked and flow properly and maintained as necessary.

10. Recommended Observation and Testing During Construction

The following tests and/or observations by the Geotechnical Consultant are recommended:

a) Site grading.

b) Footing excavations prior to placement of forms and reinforcing steel.

c) Retaining wall backdrains and backfill.

d) Utility trench backfill.

e) Flatwork subgrade.

11. Grading and Foundation Plan Review

Grading and foundation plans should be reviewed by the Geotechnical Consultant to confirm conformance with the recommendations presented herein and to provide additional recommendations, as necessary.

LIMITATIONS

The analyses, conclusions and recommendations contained in this report are based on site conditions as they existed at the time of our investigation and further assume the excavations to be representative of the subsurface conditions throughout the site. If different subsurface conditions from those encountered during our exploration are observed or appear to be present in excavations during construction, the Geotechnical Consultant should be promptly notified for review and reconsideration of recommendations.

Our investigation was performed using the degree of care and skill ordinarily exercised, under similar circumstances, by reputable Geotechnical Consultants practicing in this or similar localities. No other warranty, express or implied, is made as to the conclusions and professional advice included in this report.

This opportunity to be of service is sincerely appreciated. If you have any questions, please call this office.

Sincerely,
HETHERINGTON ENGINEERING, INC.

Mark D. Hetherington
Civil Engineer 30488
Geotechnical Engineer 397
(expires 3/31/22)

PROFESSIONAL ENGINEER MARK D. HETHERINGTON No. 397 Exp. Date GEOTECHNICAL STATE OF CALIFORNIA

Paul A. Bogseth
Professional Geologist 3772
Certified Engineering Geologist 1153
Certified Hydrogeologist 591
(expires 3/31/22)

ENGINEERING GEOLOGIST PAUL A. BOGSETH E.G. 1153 Exp. CERTIFIED STATE OF CALIFORNIA

Edwin R. Cunningham
Civil Engineer 81687
(expires 3/31/22)

REGISTERED PROFESSIONAL ENGINEER EDWIN R. CUNNINGHAM No. C 81687 Exp. Date CIVIL STATE OF CALIFORNIA

Attachments:	Location Map	Figure 1
	Plot Plan	Figure 2
	Logs of Borings	Figures 3 and 4
	Laboratory Test Results	Figure 5

Distribution: 5-Addresse
1-via e-mail Michael Drogin (mike@centralmanagementine.com)

REFERENCES

1. Architectural Floor Plan "Drogin – Hartley Concept Floor Plan – A7" provided by owner, dated March 11, 2020.

2. ASCE 7-16, "Minimum Design Loads for Building and Other Structures, Supplement/Provisions", American Society of Civil Engineers/Structural Engineers Institute, dated effective February 1, 2019.

3. California Building Standards Commission, California Building Code, 2019 Edition.

4. California Division of Mines and Geology, "State of California Special Studies Zones – La Jolla Quadrangle", dated Official Map November 1, 1991.

5. California Emergency Management Agency, "Tsunami Inundation Map for Emergency Planning, La Jolla Quadrangle," dated June 1, 2009.

6. California Geological Survey, "The Uniform California Earthquake Rupture Forecast, Version 2, (UCERF2)," CGS Special Report 203, dated 2008.

7. City of San Diego, "Seismic Safety Study, Geologic Hazards and Faults," Grid Tile: 30, dated April 3, 2008.

8. ICBO, "Maps of Known Active Fault Near-Source Zones in California and Adjacent Portions of Nevada," California Division of Mines and Geology, 1998.

9. Jennings, C.W., "Fault Activity Map of California and Adjacent Areas," California Data Map Series, Map No. 6, dated 1994.

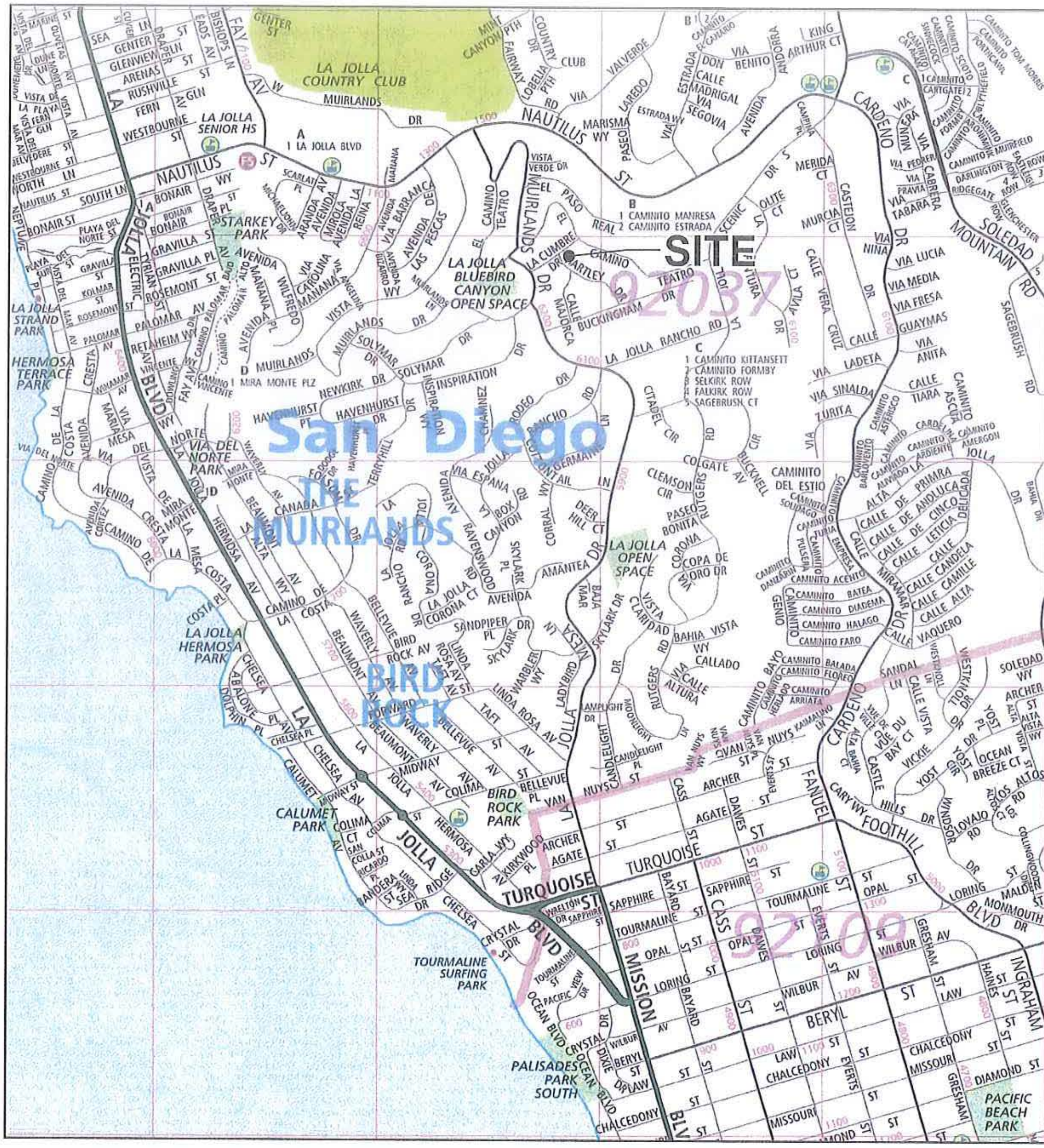
10. Kennedy, M.P., and Tan, S.S., "Geologic map of the San Diego 30' x 60' quadrangle, California," California Geological Survey Regional Geologic Map No. 3, dated 2008.

11. Peterson, M.P., et al., "Documentation for the 2008 Update of the United States National Seismic Hazards Maps," USGS Open File Report 2008-1128, dated 2008.

12. Structural Engineers Association, Seismic Design Maps Website.

13. U.S. Geological Survey, Working Group and California Earthquake Probabilities, "The Uniform California Earthquake Rupture Forecast", USGS Open File Report 2013-1165 and CGS Special Report 203, dated 2013.

14. U.S. Geological Survey, "2008 National Seismic Hazards Maps-Source Parameters", Earthquake Hazards Program.



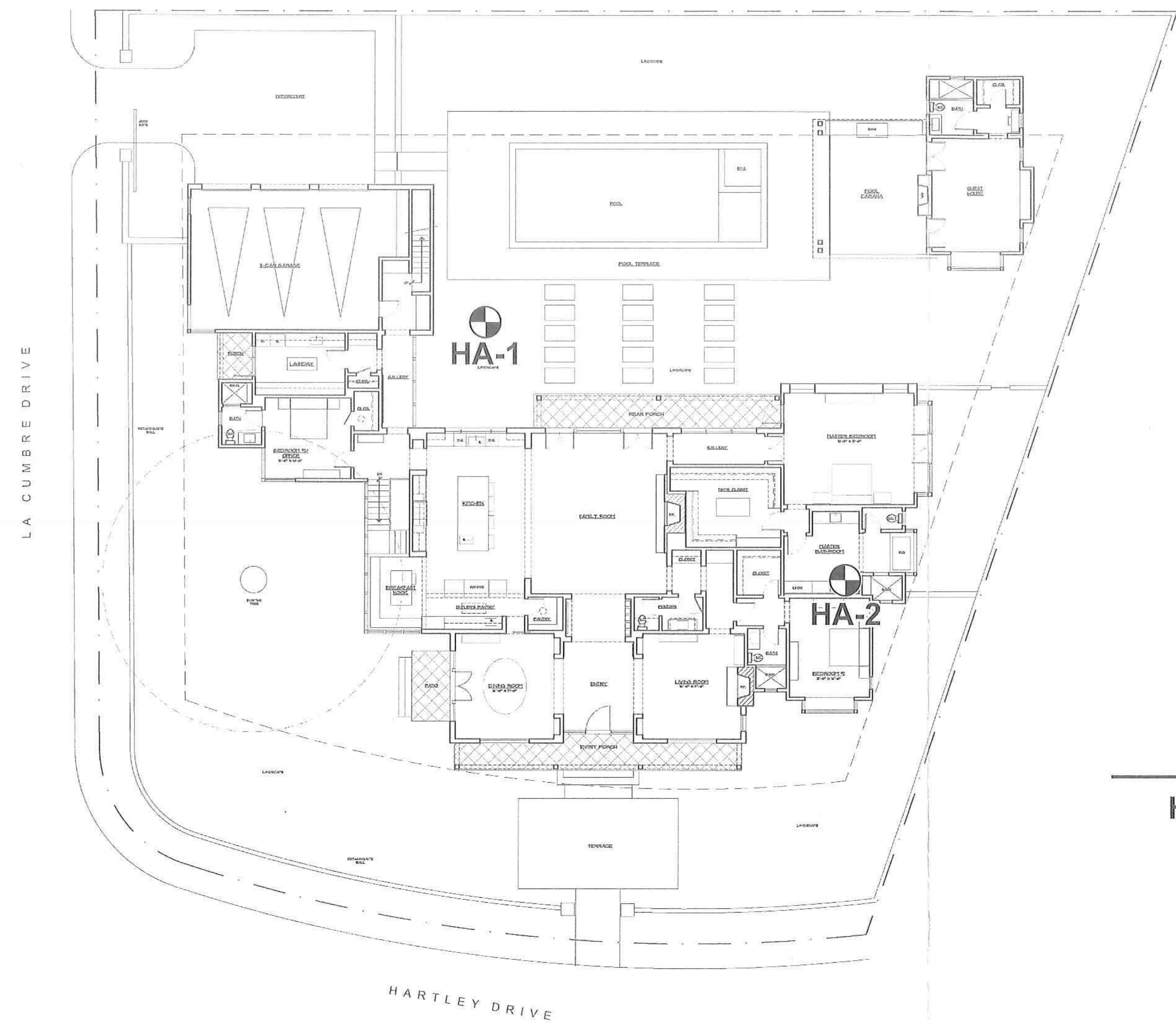
ADAPTED FROM: The Thomas Guide, San Diego County, 57th Edition, Page 1247

N

SCALE: 1" - 2000'
(1 Grid Equals: 0.5 x 0.5 miles)

LOCATION MAP

HETHERINGTON ENGINEERING, INC. GEOTECHNICAL CONSULTANTS	6361 Hartley Drive La Jolla, California PROJECT NO. 8927.1	FIGURE NO. 1



LEGEND

HA-2 APROXIMATE LOCATION OF HAND AUGER BORING

PLOT PLAN

HETHERINGTON ENGINEERING, INC.
GEOTECHNICAL CONSULTANTS

6361 Hartley Drive
La Jolla, California

PROJECT NO. 8927.1 | FIGURE NO. 2

DRILLING COMPANY: **HEI** RIG: **Hand Auger** DATE: **04/03/20**

BORING DIAMETER: **6"** DRIVE WEIGHT: **40 lb.** DROP: **30"** ELEVATION: ' ±

BORING NO. HA-1

DEPTH (FEET)	BULK SAMPLE	DRIVE SAMPLE	BLOWS/FOOT	DRY DENSITY (pcf)	MOISTURE CONTENT (%)	SOIL CLASS. (U.S.C.S.)	SOIL DESCRIPTION
0.0						SC	**FILL:** Mottled orange brown and dark brown clayey sand, most, loose, contains roots/rootlets
				108	9.9		
							PARALIC DEPOSITS: Orange brown and red brown slightly clayey sand, moist, medium dense to dense, weathered in top 1.5-feet @ 3': No recovery
				118	8.5		
5.0							
				118	10.4		
							Total Depth: 8-feet No seepage No caving
10.0							

BORING LOG

HETHERINGTON ENGINEERING, INC.

GEOTECHNICAL CONSULTANTS

6361 Hartley Drive
La Jolla, California

PROJECT NO. **8927.1** FIGURE NO. **3**

DRILLING COMPANY: **HEI**	RIG: **Hand Auger**	DATE: **04/03/20**

BORING DIAMETER: **6"** DRIVE WEIGHT: **40 lb.** DROP: **30"** ELEVATION: **' ±**

BORING NO. **HA-2**

DEPTH (FEET)	BULK SAMPLE	DRIVE SAMPLE	BLOWS/FOOT	DRY DENSITY (pcf)	MOISTURE CONTENT (%)	SOIL CLASS. (U.S.C.S.)	SOIL DESCRIPTION
0.0						SC	**FILL:** Orange brown and dark brown clayey sand, moist, loose to medium dense
				117	8.0		
				119	7.3		
							PARALIC DEPOSITS: Orange brown slightly clayey sand, moist to wet, medium dense
5.0							
				117	11.8		@ 5.5': mottled light orange brown and red brown clayey sand, moist, medium dense to dense
							Total Depth: 6.5-feet No seepage No caving
10.0							

BORING LOG

HETHERINGTON ENGINEERING, INC.
GEOTECHNICAL CONSULTANTS

6361 Hartley Drive
La Jolla, California

PROJECT NO. **8927.1** FIGURE NO. **4**

LABORATORY TEST RESULTS

MAXIMUM DRY DENSITY/OPTIMUM MOISTURE CONTENT (ASTM: D 1557A)			
Sample Location	**Description**	**Maximum Dry Density (pcf)**	**Optimum Moisture Content (%)**
HA-1 @ 0 to 3'	Brown silty sand	126.0	9.5

SOLUBLE SULFATE TEST RESULTS (Cal Test 417)	
Sample Location	**Soluble Sulfate in Soil (%)**
HA-1 @ 0 to 3'	0.0045

DIRECT SHEAR (ASTM: D 3080)			
Sample Location	**Angle of Internal Friction (°)**	**Cohesion (psf)**	**Remarks**
HA-1 @ 0 to 3'	33	0	Remolded to 90% at optimum moisture, consolidated, saturated, drained

June 16, 2021
Project No. 8927.2
Log No. 21444

Michael P. Drogin
8060 La Jolla Shores Drive, Suite 7C
La Jolla, California 92037

Subject: INFILTRATION TESTING
Proposed Single-Family Residence
6361 Hartley Drive
La Jolla, California

References:
1. "Geotechnical Investigation, Single-Family Residence, 6361 Hartley Drive, La Jolla, California", by Hetherington Engineering, Inc., dated July 7, 2020.
2. "City of San Diego Storm Water Standards Manual", by City of San Diego, dated October 1, 2018.

Dear Mr. Drogin:

In accordance with your request, we have performed infiltration testing of existing paralic deposits at the subject site. No groundwater was encountered to the maximum depth explored of 8-feet in the test pits excavated at the site (see Reference 1).

Infiltration testing was performed by this office on May 4 and 5, 2021 in accordance with the Double-Ring Infiltration Test Method (Reference 2). The approximate locations of the infiltration tests are shown on the attached Plot Plan, Figure 1 and the test results are shown on the attached Double-Ring Infiltration Test Data Sheets, Figures 2 through 5. The infiltration rates based on the infiltration testing are 0.0907 inch/hr for I-1 and 0.0129 inch/hr for I-2 (without considering factors-of-safety).

Completed worksheet Form I-8 and Form I-9 are attached to this report.

This opportunity to be of services is sincerely appreciated. If you have any questions, please call this office.

Sincerely,

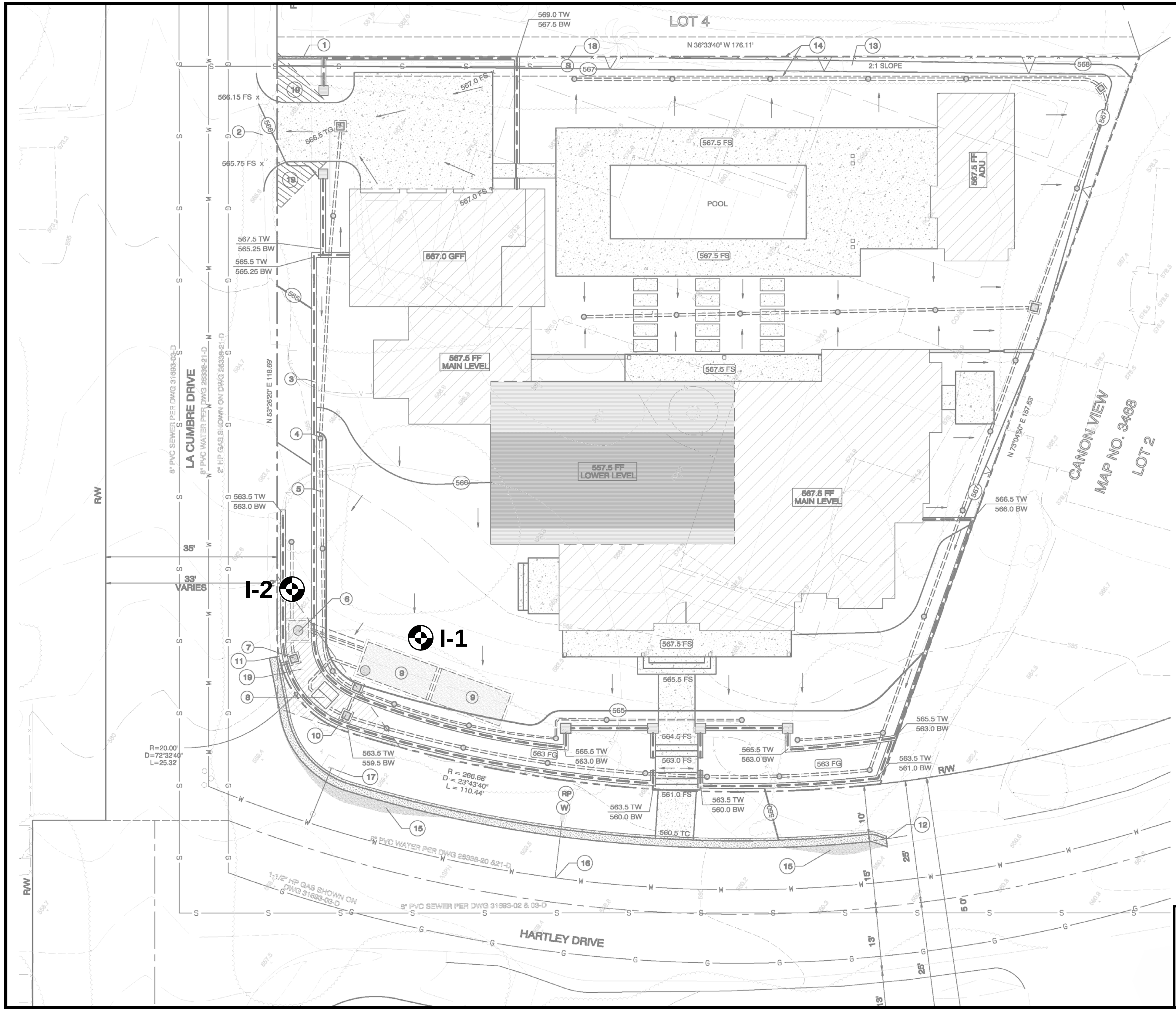
HETHERINGTON ENGINEERING, INC.

Mark D. Hetherington
Civil Engineer 30488
Geotechnical Engineer 397
(expires 3/31/22)

Edwin R. Cunningham
Civil Engineer 81687
(expires 3/31/22)

Attachments:	Plot Plan	Figure 1
	Double-Ring Infiltration Test Data Sheets	Figures 2 through 5
	Forms I-8 and I-9 Form	

Distribution: 3-Addressee
1-via e-mail Michael Drogin (mike@centralmanagementinc.com)
1-via e-mail Joshua Woods (jltw695@gmail.com)



LEGEND

I-2 APROXIMATE LOCATION OF INFILTRATION TEST

PLOT PLAN

HETHERINGTON ENGINEERING, INC.
GEOTECHNICAL CONSULTANTS

6361 Hartley Drive
La Jolla, California

PROJECT NO. 8927.2 | FIGURE NO. 1

DOUBLE RING INFILTROMETER TEST DATA

Project Name and Test Location:				Constants -	Ring Data		Liquid Containers	
Project No. 8927.1 **Project Name:** 6361 Hartley Drive **Location:** I-1					Area, A_r (cm^2)	Depth of Liquid (in)	No.	Vol., V_r (cm^3/cm)
				Inner Ring:	729	6	1	53.52
Test By:	B.R.	USCS Class:		Annular Space:	2189	6	2	167.53
Water Table Depth:		Penetration of Rings into Soil (in.):			Inner:		Outer:	
Date of Test:	5/4/2021	Liquid Used:	H20	pH:	Ground Temp (˚F):		at Depth:	
Liquid Level Maintained by using:			( ) Flow Valve ( ) Float Valve (**X**) Marriotte Tube ( ) Other:					
Additional Comments:								

Time interval	Time (hr:min)	Dt (min) & Total	Inner Ring Elev., H (cm)	Inner Ring ΔH (cm) & Q (ml)	Annular Ring Elev., H (cm)	Annular Ring ΔH (cm) & Q (ml)	Liquid Temp ˚F	Infiltration Rate, I** Inner in/hr	Infiltration Rate, I** Outer in/hr	Remarks
1 - Start	11:09	0:15	57.60	2.10	55.5	42.5				
End	11:24	0:15	55.50	112.39	13	7120		0.243	5.126	
2 - Start	11:34	0:15	55.50	4.80	57.5	41				
End	11:49	0:30	50.70	256.90	16.5	6868.7		0.555	4.945	
3 - Start	12:00	0:15	50.70	3.00	58.5	32.1				
End	12:15	0:45	47.70	160.56	26.4	5377.7		0.347	3.872	
4 - Start	12:24	0:15	47.70	15.70	58.5	36.9				
End	12:39	1:00	32.00	840.26	21.6	6181.9		1.817	4.451	
5 - Start	13:05	0:15	32.00	8.90	58.5	40.1				
End	13:20	1:15	23.10	476.33	18.4	6718		1.030	4.837	
6 - Start	13:36	0:15	58.20	15.40	58.5	43.5				
End	13:51	1:30	42.80	824.21	15	7287.6		1.782	5.247	
7 - Start	14:01	0:15	42.00	0.20	58.5	32.3				
End	14:16	1:45	41.80	10.70	26.2	5411.2		0.023	3.896	
8 - Start	14:27	0:15	41.40	0.90	58.5	38.6				
End	14:42	2:00	40.50	48.17	19.9	6466.7		0.104	4.656	
9 - Start	14:53	0:15	40.50	1.00	58.5	25.1				
End	15:08	2:15	39.50	53.52	33.4	4205		0.116	3.027	
10-Start	15:15	0:15	39.50	0.30	58	25.3				
End	15:30	2:30	39.20	16.06	32.7	4238.5		0.035	3.052	
11-Start	15:42	0:15	57.80	0.00	57.6	17.6				
End	15:57	2:45	57.80	0.00	40	2948.5		0.000	2.123	
12-Start	16:05	0:30	57.80	4.60	57.9	45.9				
End	16:35	3:15	53.20	246.19	12	7689.6		0.266	2.768	

***Flow, Qf=ΔHxVr** **Infiltration Rate, I=(Qf/Ar)/Δt**

Figure No. 2
Project No. 8927.2
Log No. 21444

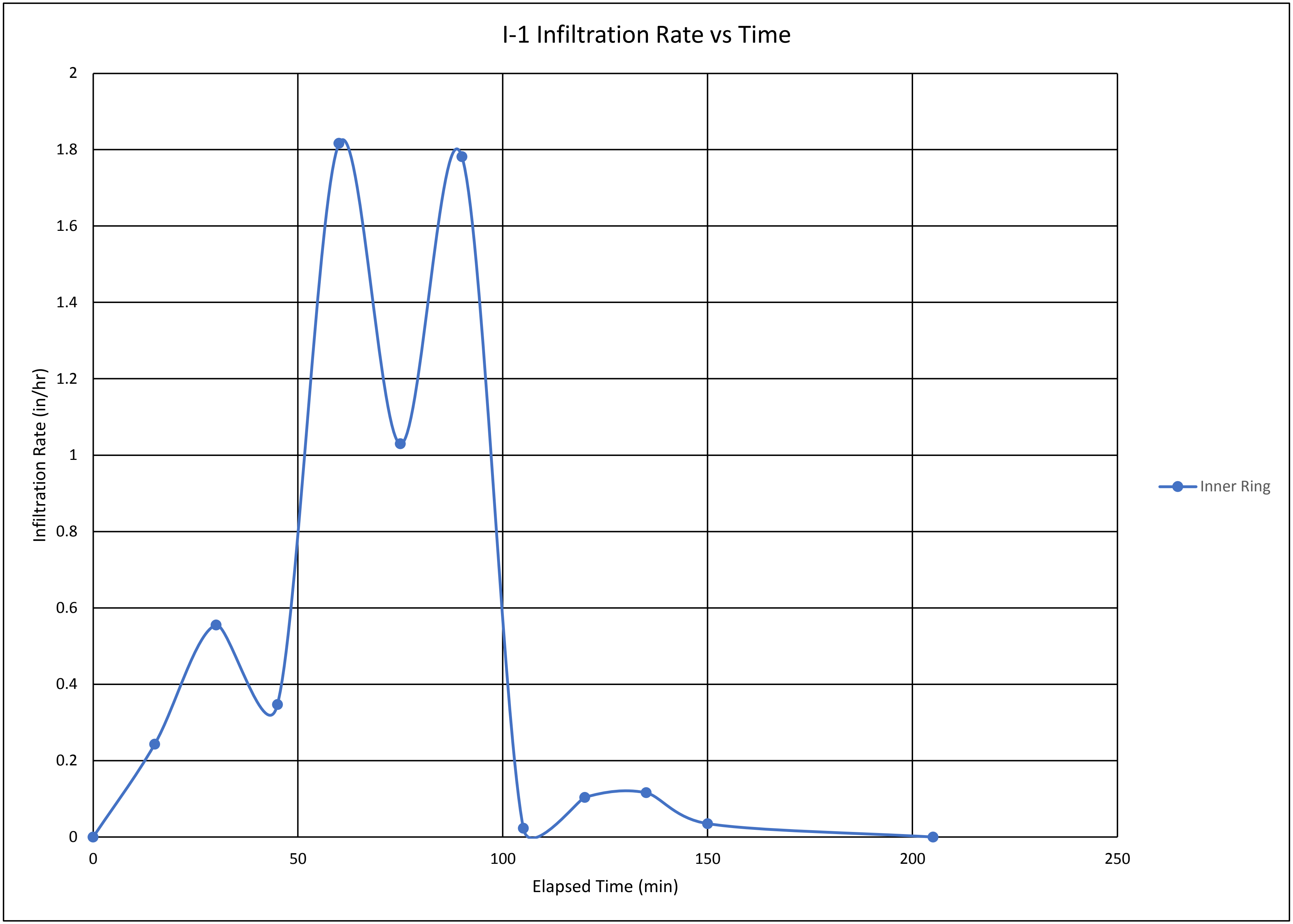


Figure No. 3
Project No. 8927.2
Log No. 21444

DOUBLE RING INFILTROMETER TEST DATA

Project Name and Test Location:				Ring Data		Liquid Containers	
Project No. 8927.1 **Project Name:** 6361 Hartley Drive **Location:** I-2			**Constants -**	Area, A_r (cm^2)	Depth of Liquid (in)	No.	Vol., V_r (cm^3/cm)
			Inner Ring:	729	6	1	53.52
Test By: B.R.	USCS Class:		Annular Space:	2189	6	2	167.53
Water Table Depth:		Penetration of Rings into Soil (in.):		Inner:		Outer:	
Date of Test: 5/4/2021	Liquid Used:	H20	pH:	Ground Temp (˚F):		at Depth:	
Liquid Level Maintained by using:		( ) Flow Valve ( ) Float Valve (**X**) Marriotte Tube ( ) Other:					
Additional Comments:							

Time interval	Time (hr:min)	Dt (min) & Total	Inner Ring Elev., H (cm)	Inner Ring ΔH (cm) & Q (ml)	Annular Ring Elev., H (cm)	Annular Ring ΔH (cm) & Q (ml)	Liquid Temp ˚F	Infiltration Rate, I** Inner in/hr	Infiltration Rate, I** Outer in/hr	Remarks
1 - Start	9:59	0:15	46.00	0.50	48.7	6.6				
End	10:14	0:15	45.50	26.76	42.1	1105.7		0.058	0.796	
2 - Start	10:15	0:15	45.50	15.00	42.1	31.7				
End	10:30	0:30	30.50	802.80	10.4	5310.7		1.736	3.824	
3 - Start	10:45	0:15	55.50	0.00	58.5	6.9				
End	11:00	0:45	55.50	0.00	51.6	1155.96		0.000	0.832	
4 - Start	11:01	0:15	55.50	0.20	51.6	21.9				
End	11:16	1:00	55.30	10.70	29.7	3668.91		0.023	2.641	
5 - Start	11:25	0:30	55.30	0.10	58.3	35.7				
End	11:55	1:30	55.20	5.35	22.6	5980.82		0.006	2.153	
6 - Start	12:03	0:30	55.20	0.20	58.5	38.6				
End	12:33	2:00	55.00	10.70	19.9	6466.66		0.012	2.328	
7 - Start	12:39	0:30	55.00	0.10	58.5	29.5				
End	13:09	2:30	54.90	5.35	29	4942.14		0.006	1.779	
8 - Start	13:14	0:30	54.90	0.40	58.5	40.5				
End	13:44	3:00	54.50	21.41	18	6784.97		0.023	2.442	
9 - Start	13:52	0:30	54.50	0.20	57.9	48.9				
End	14:22	3:30	54.30	10.70	9	8192.22		0.012	2.949	
10-Start	14:29	0:30	54.30	0.00	57.1	25.1				
End	14:59	4:00	54.30	0.00	32	4205		0.000	1.514	
11-Start	15:04	0:30	54.30	0.30	58.5	45.5				
End	15:34	4:30	54.00	16.06	13	7622.62		0.017	2.744	
12-Start	15:38	0:30	54.00	0.30	58.5	38.9				
End	16:08	5:00	53.70	16.06	19.6	6516.92		0.017	2.346	

***Flow, Qf=ΔHxVr **Infiltration Rate, I=(Qf/Ar)/Δt**

Figure No. 4
Project No. 8927.2
Log No. 21444

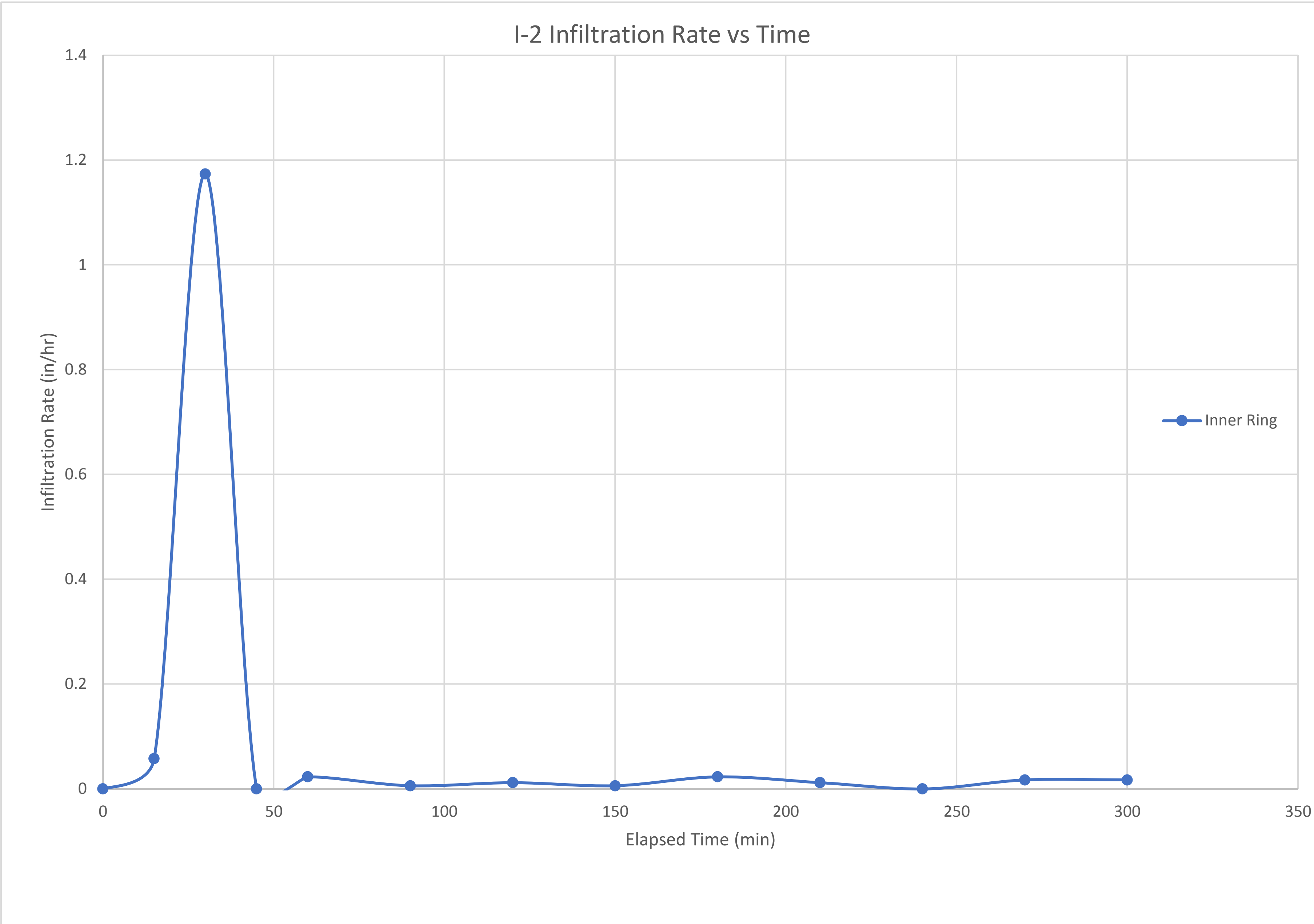


Figure No. 5
Project No. 8927.2
Log No. 21444

Worksheet C.4-1: Categorization of Infiltration Feasibility Condition Based on Geotechnical Conditions[9]

Categorization of Infiltration Feasibility Condition based on Geotechnical Conditions		Worksheet C.4-1: Form I-8A[10]
Part 1 - Full Infiltration Feasibility Screening Criteria		
DMA(s) Being Analyzed:		Project Phase:
		Design
Criteria 1: Infiltration Rate Screening		
1A	Is the mapped hydrologic soil group according to the NRCS Web Soil Survey or UC Davis Soil Web Mapper Type A or B and corroborated by available site soil data[11]? ☐ Yes; the DMA may feasibly support full infiltration. Answer “Yes” to Criteria 1 Result or continue to Step 1B if the applicant elects to perform infiltration testing. ☐ No; the mapped soil types are A or B but is not corroborated by available site soil data (continue to Step 1B). ☒ No; the mapped soil types are C, D, or “urban/unclassified” and is corroborated by available site soil data. Answer “No” to Criteria 1 Result. ☐ No; the mapped soil types are C, D, or “urban/unclassified” but is not corroborated by available site soil data (continue to Step 1B).	
1B	Is the reliable infiltration rate calculated using planning phase methods from Table D.3-1? ☒ Yes; Continue to Step 1C. ☐ No; Skip to Step 1D.	
1C	Is the reliable infiltration rate calculated using planning phase methods from Table D.3-1 greater than 0.5 inches per hour? ☐ Yes; the DMA may feasibly support full infiltration. Answer “Yes” to Criteria 1 Result. ☒ No; full infiltration is not required. Answer “No” to Criteria 1 Result.	
1D	**Infiltration Testing Method.** Is the selected infiltration testing method suitable during the design phase (see Appendix D.3)? Note: Alternative testing standards may be allowed with appropriate rationales and documentation. ☒ Yes; continue to Step 1E. ☐ No; select an appropriate infiltration testing method.	

[9] Note that it is not required to investigate each and every criterion in the worksheet, a single “no” answer in Part 1, Part 2, Part 3, or Part 4 determines a full, partial, or no infiltration condition.

[10] This form must be completed each time there is a change to the site layout that would affect the infiltration feasibility condition. Previously completed forms shall be retained to document the evolution of the site storm water design.

[11] Available data includes site-specific sampling or observation of soil types or texture classes, such as obtained from borings or test pits necessary to support other design elements.

Categorization of Infiltration Feasibility Condition based on Geotechnical Conditions	Worksheet C.4-1: Form I-8A[10]
1E	**Number of Percolation/Infiltration Tests.** Does the infiltration testing method performed satisfy the minimum number of tests specified in Table D.3-2? ☒ Yes; continue to Step 1F. ☐ No; conduct appropriate number of tests.
IF	**Factor of Safety.** Is the suitable Factor of Safety selected for full infiltration design? See guidance in D.5; Tables D.5-1 and D.5-2; and Worksheet D.5-1 (Form I-9). ☒ Yes; continue to Step 1G. ☐ No; select appropriate factor of safety.
1G	**Full Infiltration Feasibility.** Is the average measured infiltration rate divided by the Factor of Safety greater than 0.5 inches per hour? ☐ Yes; answer "Yes" to Criteria 1 Result. ☒ No; answer "No" to Criteria 1 Result.
Criteria 1 Result	Is the estimated reliable infiltration rate greater than 0.5 inches per hour within the DMA where runoff can reasonably be routed to a BMP? ☐ Yes; the DMA may feasibly support full infiltration. Continue to Criteria 2. ☒ No; full infiltration is not required. Skip to Part 1 Result.
Summarize infiltration testing methods, testing locations, replicates, and results and summarize estimates of reliable infiltration rates according to procedures outlined in D.5. Documentation should be included in project geotechnical report. See "Infiltration Testing, Proposed Single-Family Residence, 6361 Hartley Drive, La Jolla, California", by Hetherington Engineering Inc., dated June 16, 2021.	

Categorization of Infiltration Feasibility Condition based on Geotechnical Conditions		Worksheet C.4-1: Form I-8A[10]	
Criteria 2: Geologic/Geotechnical Screening			
2A	If all questions in Step 2A are answered "Yes," continue to Step 2B. For any "No" answer in Step 2A answer "No" to Criteria 2, and submit an "Infiltration Feasibility Condition Letter" that meets the requirements in Appendix C.1.1. The geologic/geotechnical analyses listed in Appendix C.2.1 do not apply to the DMA because one of the following setbacks cannot be avoided and therefore result in the DMA being in a no infiltration condition. The setbacks must be the closest horizontal radial distance from the surface edge (at the overflow elevation) of the BMP.		
2A-1	Can the proposed full infiltration BMP(s) avoid areas with existing fill materials greater than 5 feet thick below the infiltrating surface?	☐ Yes	☐ No
2A-2	Can the proposed full infiltration BMP(s) avoid placement within 10 feet of existing underground utilities, structures, or retaining walls?	☐ Yes	☐ No
2A-3	Can the proposed full infiltration BMP(s) avoid placement within 50 feet of a natural slope (>25%) or within a distance of 1.5H from fill slopes where H is the height of the fill slope?	☐ Yes	☐ No
2B	When full infiltration is determined to be feasible, a geotechnical investigation report must be prepared that considers the relevant factors identified in Appendix C.2.1. If all questions in Step 2B are answered "Yes," then answer "Yes" to Criteria 2 Result. If there are "No" answers continue to Step 2C.		
2B-1	**Hydroconsolidation.** Analyze hydroconsolidation potential per approved ASTM standard due to a proposed full infiltration BMP. Can full infiltration BMPs be proposed within the DMA without increasing hydroconsolidation risks?	☐ Yes	☐ No
2B-2	**Expansive Soils.** Identify expansive soils (soils with an expansion index greater than 20) and the extent of such soils due to proposed full infiltration BMPs. Can full infiltration BMPs be proposed within the DMA without increasing expansive soil risks?	☐ Yes	☐ No

Categorization of Infiltration Feasibility Condition based on Geotechnical Conditions		Worksheet C.4-1: Form I-8A[10]	
2B-3	**Liquefaction**. If applicable, identify mapped liquefaction areas. Evaluate liquefaction hazards in accordance with Section 6.4.2 of the City of San Diego's Guidelines for Geotechnical Reports (2011 or most recent edition). Liquefaction hazard assessment shall take into account any increase in groundwater elevation or groundwater mounding that could occur as a result of proposed infiltration or percolation facilities. Can full infiltration BMPs be proposed within the DMA without increasing liquefaction risks?	☐ Yes	☐ No
2B-4	**Slope Stability**. If applicable, perform a slope stability analysis in accordance with the ASCE and Southern California Earthquake Center (2002) Recommended Procedures for Implementation of DMG Special Publication 117, Guidelines for Analyzing and Mitigating Landslide Hazards in California to determine minimum slope setbacks for full infiltration BMPs. See the City of San Diego's Guidelines for Geotechnical Reports (2011) to determine which type of slope stability analysis is required. Can full infiltration BMPs be proposed within the DMA without increasing slope stability risks?	☐ Yes	☐ No
2B-5	**Other Geotechnical Hazards.** Identify site-specific geotechnical hazards not already mentioned (refer to Appendix C.2.1). Can full infiltration BMPs be proposed within the DMA without increasing risk of geologic or geotechnical hazards not already mentioned?	☐ Yes	☐ No
2B-6	**Setbacks.** Establish setbacks from underground utilities, structures, and/or retaining walls. Reference applicable ASTM or other recognized standard in the geotechnical report. Can full infiltration BMPs be proposed within the DMA using established setbacks from underground utilities, structures, and/or retaining walls?	☐ Yes	☐ No

Categorization of Infiltration Feasibility Condition based on Geotechnical Conditions		Worksheet C.4-1: Form I-8A[10]	
2C	**Mitigation Measures.** Propose mitigation measures for each geologic/geotechnical hazard identified in Step 2B. Provide a discussion of geologic/geotechnical hazards that would prevent full infiltration BMPs that cannot be reasonably mitigated in the geotechnical report. See Appendix C.2.1.8 for a list of typically reasonable and typically unreasonable mitigation measures. Can mitigation measures be proposed to allow for full infiltration BMPs? If the question in Step 2 is answered "Yes," then answer "Yes" to Criteria 2 Result. If the question in Step 2C is answered "No," then answer "No" to Criteria 2 Result.	☐ Yes	☐ No
Criteria 2 Result	Can infiltration greater than 0.5 inches per hour be allowed without increasing risk of geologic or geotechnical hazards that cannot be reasonably mitigated to an acceptable level?	☐ Yes	☐ No
Summarize findings and basis; provide references to related reports or exhibits.			

Part 1 Result – Full Infiltration Geotechnical Screening [12]	Result
If answers to both Criteria 1 and Criteria 2 are "Yes", a full infiltration design is potentially feasible based on Geotechnical conditions only. If either answer to Criteria 1 or Criteria 2 is "No", a full infiltration design is not required.	☐ Full infiltration Condition ☒ Complete Part 2

[12] To be completed using gathered site information and best professional judgement considering the definition of MEP in the MS4 Permit. Additional testing and/or studies may be required by City Engineer to substantiate findings.

Categorization of Infiltration Feasibility Condition based on Geotechnical Conditions		Worksheet C.4-1: Form I-8A[10]
Part 2 – Partial vs. No Infiltration Feasibility Screening Criteria		
DMA(s) Being Analyzed:		Project Phase:
		Design
Criteria 3 : Infiltration Rate Screening		
3A	**NRCS Type C, D, or "urban/unclassified":** Is the mapped hydrologic soil group according to the NRCS Web Soil Survey or UC Davis Soil Web Mapper is Type C, D, or "urban/unclassified" and corroborated by available site soil data? ☐ Yes; the site is mapped as C soils and a reliable infiltration rate of 0.15 in/hr. is used to size partial infiltration BMPS. Answer "Yes" to Criteria 3 Result. ☐ Yes; the site is mapped as D soils or "urban/unclassified" and a reliable infiltration rate of 0.05 in/hr. is used to size partial infiltration BMPS. Answer "Yes" to Criteria 3 Result. ☒ No; infiltration testing is conducted (refer to Table D.3-1), continue to Step 3B.	
3B	**Infiltration Testing Result:** Is the reliable infiltration rate (i.e. average measured infiltration rate/2) greater than 0.05 in/hr. and less than or equal to 0.5 in/hr? ☐ Yes; the site may support partial infiltration. Answer "Yes" to Criteria 3 Result. ☒ No; the reliable infiltration rate (i.e. average measured rate/2) is less than 0.05 in/hr., partial infiltration is not required. Answer "No" to Criteria 3 Result.	
Criteria 3 Result	Is the estimated reliable infiltration rate (i.e., average measured infiltration rate/2) greater than or equal to 0.05 inches/hour and less than or equal to 0.5 inches/hour at any location within each DMA where runoff can reasonably be routed to a BMP? ☐ Yes; Continue to Criteria 4. ☒ No: Skip to Part 2 Result.	
Summarize infiltration testing and/or mapping results (i.e. soil maps and series description used for infiltration rate). Two double-ring infiltration tests where performed. Test method, location and results are included in "Infiltration Testing, Proposed Single-Family Residence, 6361 Hartley Drive, La Jolla, California", by Hetherington Engineering Inc., dated June 16, 2021.		

Categorization of Infiltration Feasibility Condition based on Geotechnical Conditions			Worksheet C.4-1: Form I-8A[10]
Criteria 4: Geologic/Geotechnical Screening			
4A	If all questions in Step 4A are answered "Yes," continue to Step 2B. For any "No" answer in Step 4A answer "No" to Criteria 4 Result, and submit an "Infiltration Feasibility Condition Letter" that meets the requirements in Appendix C.1.1. The geologic/geotechnical analyses listed in Appendix C.2.1 do not apply to the DMA because one of the following setbacks cannot be avoided and therefore result in the DMA being in a no infiltration condition. The setbacks must be the closest horizontal radial distance from the surface edge (at the overflow elevation) of the BMP.		
4A-1	Can the proposed partial infiltration BMP(s) avoid areas with existing fill materials greater than 5 feet thick?	☐ Yes	☐ No
4A-2	Can the proposed partial infiltration BMP(s) avoid placement within 10 feet of existing underground utilities, structures, or retaining walls?	☐ Yes	☐ No
4A-3	Can the proposed partial infiltration BMP(s) avoid placement within 50 feet of a natural slope (>25%) or within a distance of 1.5H from fill slopes where H is the height of the fill slope?	☐ Yes	☐ No
4B	When full infiltration is determined to be feasible, a geotechnical investigation report must be prepared that considers the relevant factors identified in Appendix C.2.1 If all questions in Step 4B are answered "Yes," then answer "Yes" to Criteria 4 Result. If there are any "No" answers continue to Step 4C.		
4B-1	**Hydroconsolidation.** Analyze hydroconsolidation potential per approved ASTM standard due to a proposed full infiltration BMP. Can partial infiltration BMPs be proposed within the DMA without increasing hydroconsolidation risks?	☐ Yes	☐ No
4B-2	**Expansive Soils.** Identify expansive soils (soils with an expansion index greater than 20) and the extent of such soils due to proposed full infiltration BMPs. Can partial infiltration BMPs be proposed within the DMA without increasing expansive soil risks?	☐ Yes	☐ No

Categorization of Infiltration Feasibility Condition based on Geotechnical Conditions		Worksheet C.4-1: Form I-8A[10]	
4B-3	**Liquefaction**. If applicable, identify mapped liquefaction areas. Evaluate liquefaction hazards in accordance with Section 6.4.2 of the City of San Diego's Guidelines for Geotechnical Reports (2011). Liquefaction hazard assessment shall take into account any increase in groundwater elevation or groundwater mounding that could occur as a result of proposed infiltration or percolation facilities. Can partial infiltration BMPs be proposed within the DMA without increasing liquefaction risks?	☐ Yes	☐ No
4B-4	**Slope Stability**. If applicable, perform a slope stability analysis in accordance with the ASCE and Southern California Earthquake Center (2002) Recommended Procedures for Implementation of DMG Special Publication 117, Guidelines for Analyzing and Mitigating Landslide Hazards in California to determine minimum slope setbacks for full infiltration BMPs. See the City of San Diego's Guidelines for Geotechnical Reports (2011) to determine which type of slope stability analysis is required. Can partial infiltration BMPs be proposed within the DMA without increasing slope stability risks?	☐ Yes	☐ No
4B-5	**Other Geotechnical Hazards.** Identify site-specific geotechnical hazards not already mentioned (refer to Appendix C.2.1). Can partial infiltration BMPs be proposed within the DMA without increasing risk of geologic or geotechnical hazards not already mentioned?	☐ Yes	☐ No
4B-6	**Setbacks.** Establish setbacks from underground utilities, structures, and/or retaining walls. Reference applicable ASTM or other recognized standard in the geotechnical report. Can partial infiltration BMPs be proposed within the DMA using recommended setbacks from underground utilities, structures, and/or retaining walls?	☐ Yes	☐ No
4C	**Mitigation Measures.** Propose mitigation measures for each geologic/geotechnical hazard identified in Step 4B. Provide a discussion on geologic/geotechnical hazards that would prevent partial infiltration BMPs that cannot be reasonably mitigated in the geotechnical report. See Appendix C.2.1.8 for a list of typically reasonable and typically unreasonable mitigation measures. Can mitigation measures be proposed to allow for partial infiltration BMPs? If the question in Step 4C is answered "Yes," then answer "Yes" to Criteria 4 Result. If the question in Step 4C is answered "No," then answer "No" to Criteria 4 Result.	☐ Yes	☐ No

Categorization of Infiltration Feasibility Condition based on Geotechnical Conditions		Worksheet C.4-1: Form I-8A[10]	
Criteria 4 Result	Can infiltration of greater than or equal to 0.05 inches/hour and less than or equal to 0.5 inches/hour be allowed without increasing the risk of geologic or geotechnical hazards that cannot be reasonably mitigated to an acceptable level?	☐ Yes	☐ No
Summarize findings and basis; provide references to related reports or exhibits.			

Part 2 – Partial Infiltration Geotechnical Screening Result[13]	Result
If answers to both Criteria 3 and Criteria 4 are "Yes", a partial infiltration design is potentially feasible based on geotechnical conditions only. If answers to either Criteria 3 or Criteria 4 is "No", then infiltration of any volume is considered to be infeasible within the site.	☐ Partial Infiltration Condition ☒ No Infiltration Condition

[13] To be completed using gathered site information and best professional judgement considering the definition of MEP in the MS4 Permit. Additional testing and/or studies may be required by City Engineer to substantiate findings.

Worksheet D.5-1: Factor of Safety and Design Infiltration Rate Worksheet for Full Infiltration Designs

Factor of Safety and Design Infiltration Rate Worksheet			Worksheet D.5-1: Form I-9		
Factor Category		Factor Description	Assigned Weight (w)	Factor Value (v)	Product (p) p = w x v
A	Suitability Assessment	Soil assessment methods	0.25	2	0.5
		Predominant soil texture	0.25	3	0.75
		Site soil variability	0.25	3	0.75
		Depth to groundwater / impervious layer	0.25	1	0.25
		Suitability Assessment Safety Factor, $S_A = \Sigma p$			
B	Design	Level of pretreatment/ expected sediment loads	0.5	2	1.0
		Redundancy/resiliency	0.25	2	0.5
		Compaction during construction	0.25	3	0.75
		Design Safety Factor, $S_B = \Sigma p$			
Combined Safety Factor, $S_{total} = S_A \times S_B$ [Minimum of 2 and Maximum of 9]					5.1 / Use 2.0
Observed Infiltration Rate, inch/hr., $K_{observed}$ (corrected for test-specific bias) Note: This worksheet is only applicable when the observed infiltration rate is greater than or equal to 1 inch/hr.					I-1 = 0.091 I-2 = 0.013
Design Infiltration Rate, in/hr., $K_{design} = K_{observed} / S_{total}$ Note: If the estimated design infiltration rate is less than or equal to 0.5 inch/hr. then the applicant may choose to implement partial infiltration BMPs.					I-1 = 0.045 I-2 = 0.006
Supporting Data					
Briefly describe infiltration test and provide reference to test forms: See the discussion of Infiltration Testing in this report.					

<u>Note</u>: Worksheet D.5-1: Form I-9 is only applicable to design BMPs in "full infiltration condition". This form is not applicable for categorization of infiltration feasibility (Worksheet C.4-1: Form I-8) and/or for designing BMPs in "partial infiltration condition" or "no infiltration condition".

HETHERINGTON ENGINEERING, INC.

SOIL & FOUNDATION ENGINEERING • ENGINEERING GEOLOGY • HYDROGEOLOGY

June 22, 2021
Project No. 8927.1
Log No. 21484

Michael P. Drogin
8060 La Jolla Shores Drive, Suite 7C
La Jolla, California 92037

Subject: RESPONSE TO CITY OF SAN DIEGO GEOLOGY REVIEW
Proposed Single-Family Residence
6361 Hartley Drive
La Jolla, California

References: Attached

Dear Mr. Drogin:

In accordance with the request by Joshua Wood, Woods + Architecture, we are providing the following response to the geotechnical comment included in the "Geology Review…" (Reference 3). Our numbering corresponds to that utilized by the reviewer.

2. & 3. We have reviewed the "Development Plans…" (Reference 2). Based on our review, the proposed construction is not anticipated to adversely impact adjacent properties from a geotechnical standpoint, provided the recommendations presented in Reference 1 and good construction practices are implemented during design and construction.

4. Based on our review, the proposed development of the site is suitable for the intended use from a geotechnical standpoint.

This opportunity to be of service is appreciated. If you have any questions, please contact our office at your convenience.

Sincerely,
HETHERINGTON ENGINEERING, INC.

Mark D. Hetherington
Civil Engineer 30488
Geotechnical Engineer 397
(expires 3/31/21)

Edwin R. Cunningham
Civil Engineer 81687
(expires 3/31/21)

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1-email Michael Drogin (mike@centralmanagementine.com)
1-via email Joshua Wood (jltw695@gmail.com)

REFERENCES

1. "Geotechnical Investigation, Proposed Single Family Residence, 6361 Hartley Drive, La Jolla, California" by Hetherington Engineering, dated July 7, 2020.

2. "Development Plans for Drogin Residence, 6361 Hartley Drive, La Jolla, CA 92037" prepared by Wood + Architecture, dated November 28, 2020.

3. "Geology Review, L64A-003B, Project Number 683214", by City of San Diego, Development Services Department, dated March 31, 2021.