Project Specific Water Quality Management Plan

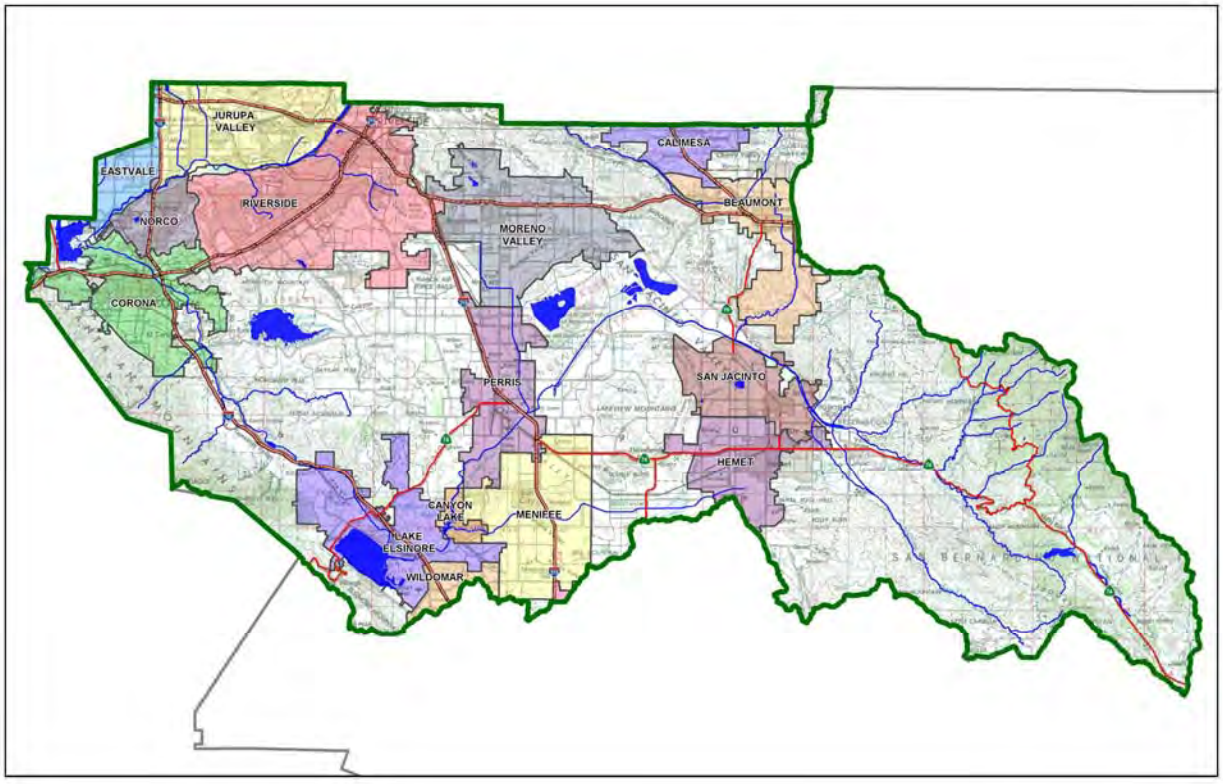
*A Template for Projects located within the **Santa Ana Watershed** Region of Riverside County*

FOR REVIEW ONLY

Project Title: Rancho Diamante

Development No: Tentative Tract Map No. 36841

Design Review/Case No: EA 1503-008



☒ **Preliminary**
☐ **Final**

Original Date Prepared: October 5, 2015

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Prepared for Compliance with
Regional Board Order No. **R8-2010-0033**

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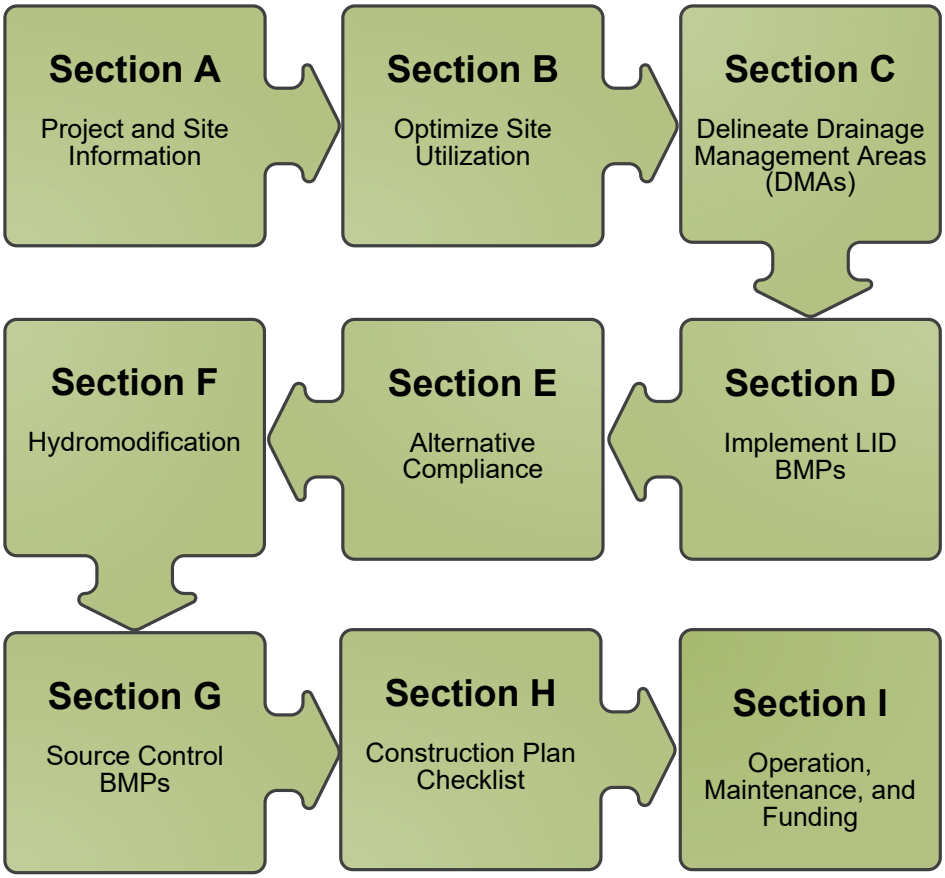
A Brief Introduction

This Project-Specific WQMP Template for the **Santa Ana Region** has been prepared to help guide you in documenting compliance for your project. Because this document has been designed to specifically document compliance, you will need to utilize the WQMP Guidance Document as your "how-to" manual to help guide you through this process. Both the Template and Guidance Document go hand-in-hand, and will help facilitate a well prepared Project-Specific WQMP. Below is a flowchart for the layout of this Template that will provide the steps required to document compliance.



OWNER'S CERTIFICATION

This Project-Specific Water Quality Management Plan (WQMP) has been prepared for Benchmark Pacific by Chang Consultants for the Tentative Tract Map No. 36841 (Rancho Diamante) project.

This WQMP is intended to comply with the requirements of the City of Hemet for their "Stormwater/Urban Runoff Management and Discharge Controls Ordinance," which includes the requirement for the preparation and implementation of a Project-Specific WQMP.

The undersigned, while owning the property/project described in the preceding paragraph, shall be responsible for the implementation and funding of this WQMP and will ensure that this WQMP is amended as appropriate to reflect up-to-date conditions on the site. In addition, the property owner accepts responsibility for interim operation and maintenance of Stormwater BMPs until such time as this responsibility is formally transferred to a subsequent owner. This WQMP will be reviewed with the facility operator, facility supervisors, employees, tenants, maintenance and service contractors, or any other party (or parties) having responsibility for implementing portions of this WQMP. At least one copy of this WQMP will be maintained at the project site or project office in perpetuity. The undersigned is authorized to certify and to approve implementation of this WQMP. The undersigned is aware that implementation of this WQMP is enforceable under the City of Hemet Stormwater/Urban Runoff Management and Discharge Controls Ordinance (Municipal Code Chapter 14, Article X).

"I, the undersigned, certify under penalty of law that the provisions of this WQMP have been reviewed and accepted and that the WQMP will be transferred to future successors in interest."

Owner's Signature	Date
Owner's Printed Name	Owner's Title/Position

PREPARER'S CERTIFICATION

"The selection, sizing and design of stormwater treatment and other stormwater quality and quantity control measures in this plan meet the requirements of Regional Water Quality Control Board Order No. **R8-2010-0033** and any subsequent amendments thereto."

Preparer's Signature	Date
Wayne W. Chang	Principal
Preparer's Printed Name	Preparer's Title/Position

Preparer's Licensure: PE 46548, Expires 6/30/2019

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List of Appendices

The following are not required for this Preliminary WQMP, so are excluded in this report, but will be provided in the Final WQMP:

Section A: Project and Site Information

PROJECT INFORMATION	
Type of Project:	Single-Family Residential with a Public Park
Planning Area:	Page Ranch Planned Development
Community Name:	City of Hemet
Development Name:	Tentative Tract Map No. 36841 (Rancho Diamante)
Narrative:	The project proposes a single-family residential development and a public park site on 245.07 acres of undeveloped land. The subdivision will contain 634 residential lots and 649 total lots. The project was originally a portion of Phase 2 (Tract 35394) of the overall Rancho Diamante Specific Plan. Based on initial percolation/infiltration testing, the project will contain 11 infiltration basins around the majority of the site and 2 bioretention basins near the northeast corner for stormwater treatment.

PROJECT LOCATION

Latitude & Longitude (DMS): 33°43'08" N, 117°02'19" W

Project Watershed and Sub-Watershed: Santa Ana River Watershed, San Jacinto Valley Hydrologic Unit (802.0), Perris Hydrologic Area (802.10), Hemet Hydrologic Subarea (802.15)

APN(s): 465-100-016, 022; 465-110-020, 021, 022, 023, 027

Map Book and Page No.: Thomas Bros. Riverside County, Page 840, Grid C-5

PROJECT CHARACTERISTICS	
Proposed or Potential Land Use(s)	634 Residential Lots, Public Park
Proposed or Potential SIC Code(s)	NAICS Code = 23721 Land Subdivision
Area of Impervious Project Footprint (ac)	Approx. 100 acres
Total Area of proposed Impervious Surfaces within the Project Limits (ac)/or Replacement	Approx. 100 acres
Does the project consist of offsite road improvements? (adjacent public streets)	☒ Y ☐ N
Does the project propose to construct unpaved roads?	☐ Y ☒ N
Is the project part of a larger common plan of development (phased project)?	☒ Y ☐ N
EXISTING SITE CHARACTERISTICS	
Total area of existing Impervious Surfaces within the project limits (SF)	0 sf
Is the project located within any MSHCP Criteria Cell?	☒ Y ☐ N
If so, identify the Cell number:	3892 and 4007
Are there any natural hydrologic features on the project site?	☐ Y ☒ N
Is a Geotechnical Report attached?	☒ Y ☐ N
If no Geotech. Report, list the NRCS soils type(s) present on the site (A, B, C and/or D)	B, C, and D
What is the Water Quality Design Storm Depth for the project?	0.67 inches

A.1 Maps and Site Plans

When completing your Project-Specific WQMP, include a map of the local vicinity and existing site. In addition, include all grading, drainage, landscape/plant palette and other pertinent construction plans in Appendix 2. At a **minimum**, your WQMP Site Plan should include the following:

- Drainage Management Areas
- Source Control BMPs

- Proposed Structural BMPs
- Drainage Path
- Drainage Infrastructure, Inlets, Overflows
- Buildings, Roof Lines, Downspouts
- Impervious Surfaces
- Standard Labeling

Use your discretion on whether or not you may need to create multiple sheets or can appropriately accommodate these features on one or two sheets. Keep in mind that the Co-Permittee plan reviewer must be able to easily analyze your project utilizing this template and its associated site plans and maps.

A.2 Identify Receiving Waters

Using Table A.1 below, list in order of upstream to downstream, the receiving waters that the project site is tributary to. Continue to fill each row with the Receiving Water's 303(d) listed impairments (if any), designated beneficial uses, and proximity, if any, to a RARE beneficial use. Include a map of the receiving waters in Appendix 1.

Table A.1 Identification of Receiving Waters

Receiving Waters	EPA Approved 303(d) List Impairments	Designated Beneficial Uses	Proximity to RARE Beneficial Use
Master Drainage Plan Line 3B	None	None	N/A
Salt Creek	None	MUN, REC1, REC2, WARM, WILD	N/A
Canyon Lake (aka: San Jacinto River Reach 2)	[Nutrients], Pathogens	MUN, AGR, GWR, REC1, REC2, WARM, WILD	N/A
Lake Elsinore	[Nutrients], PCBs, [Organic Enrichments/Low Dissolved Oxygen], Sediment Toxicity, Unknown Toxicity	REC1, REC2, WARM, WILD	N/A
Temescal Creek (Reach 5)	None	AGR, GWR, REC1, REC2, WARM, WILD, RARE	Distance from project to nearest tributary RARE waterbody is over 17 miles (Temescal Creek, Reach 5)
Temescal Creek (Reach 4)	None	AGR, GWR, REC1, REC2, WARM, WILD, RARE	Lee Lake to Mid-Sec. Line of Sec. 17
Temescal Creek (Reach 3) – Lee Lake	None	AGR, IND, GWR, REC1, REC2, WARM, WILD	N/A
Temescal Creek (Reach 2)	None	AGR, IND, GWR, REC1, REC2, WARM, LWRM	N/A
Temescal Creek (Reach 1)	pH	REC1, REC2, WARM, WILD	N/A
Santa Ana River (Reach 3)	Copper, Lead, [Pathogens]	AGR, GWR, REC1, REC2, WARM, WILD, RARE, SPWN	Prado Dam to Mission Blvd. in Riverside

Prado Basin Management Zone	None	REC1, REC2, WARM, WILD, RARE	Prado Flood Control Basin
Santa Ana River (Reach 2)	Indicator Bacteria	AGR, GWR, REC1, REC2, WARM, WILD, RARE	17th Street in Santa Ana to Prado Dam
Santa Ana River (Reach 1)	None	REC1, REC2, WARM, WILD	N/A
Tidal Prism of Santa Ana River (to within 1000' of Victoria Street) and Newport Slough	None	None	At Tidal Prism

A.3 Additional Permits/Approvals required for the Project:

Table A.2 Other Applicable Permits

Agency	Permit Required	
State Department of Fish and Game, 1602 Streambed Alteration Agreement	☒ Y	☐ N
State Water Resources Control Board, Clean Water Act (CWA) Section 401 Water Quality Cert.	☒ Y	☐ N
US Army Corps of Engineers, CWA Section 404 Permit	☒ Y	☐ N
US Fish and Wildlife, Endangered Species Act Section 7 Biological Opinion	☐ Y	☒ N
Statewide Construction General Permit Coverage, 2009-009-DWQ	☒ Y	☐ N
Statewide Industrial General Permit Coverage	☐ Y	☒ N
Western Riverside MSHCP Consistency Approval (e.g., JPR, DBESP)	☒ Y	☐ N
Other *(please list in the space below as required)* N/A	☐ Y	☐ N

If yes is answered to any of the questions above, the Co-Permittee may require proof of approval/coverage from those agencies as applicable including documentation of any associated requirements that may affect this Project-Specific WQMP.

Section B: Optimize Site Utilization (LID Principles)

Review of the information collected in Section 'A' will aid in identifying the principal constraints on site design and selection of LID BMPs as well as opportunities to reduce imperviousness and incorporate LID Principles into the site and landscape design. For example, constraints might include impermeable soils, high groundwater, groundwater pollution or contaminated soils, steep slopes, geotechnical instability, high-intensity land use, heavy pedestrian or vehicular traffic, utility locations or safety concerns. Opportunities might include existing natural areas, low areas, oddly configured or otherwise unbuildable parcels, easements and landscape amenities including open space and buffers (which can double as locations for bioretention BMPs), and differences in elevation (which can provide hydraulic head). Prepare a brief narrative for each of the site optimization strategies described below. This narrative will help you as you proceed with your LID design and explain your design decisions to others.

The 2010 Santa Ana MS4 Permit further requires that LID Retention BMPs (Infiltration Only or Harvest and Use) be used unless it can be shown that those BMPs are infeasible. Therefore, it is important that your narrative identify and justify if there are any constraints that would prevent the use of those categories of LID BMPs. Similarly, you should also note opportunities that exist which will be utilized during project design. Upon completion of identifying Constraints and Opportunities, include these on your WQMP Site plan in Appendix 1.

Site Optimization

The following questions are based upon Section 3.2 of the WQMP Guidance Document. Review of the WQMP Guidance Document will help you determine how best to optimize your site and subsequently identify opportunities and/or constraints, and document compliance.

Did you identify and preserve existing drainage patterns? If so, how? If not, why?

Under existing conditions, the site is undeveloped and supports low lying sporadic vegetation. The site has supported agricultural uses in the past and has been fully disturbed. The only uses currently at the site are a natural drainage channel along the southerly property boundary and a detention basin near the southwest corner. Storm runoff from the majority of the site sheet flows over the gently sloping ground surface in a southwesterly direction. An existing earthen channel has been graded within the southerly site boundary and represents Line 3B from the City of Hemet's *Master Flood Control and Drainage Plan.* The channel conveys off-site runoff from the east as well as on-site runoff to an existing detention basin located within the southwest corner of the site. The *Master Flood Control and Drainage Plan* indicates that the 100-year flow rate immediately downstream of the site should be 345 cubic feet per second (cfs). The detention basin was intended to provide this attenuation. Storm runoff from the detention basin is conveyed by an unnamed natural channel (continuation of Line 3B) south nearly a mile to Salt Creek.

The northerly portion of the site sheet flows northerly to the adjacent Hemet Channel. The *Master Flood Control and Drainage Plan* shows 200 cfs entering the Hemet Channel from the site (from Line 3C).

Under post-development conditions, storm runoff from the project footprint will continue to be conveyed similar to the existing drainage patterns and in accordance with the *Master Flood Control and Drainage Plan*. The proposed streets and storm drain systems will convey the majority of the project runoff to the existing earthen channel along the southerly site boundary. This on-site runoff as well as the tributary off-site runoff from the east will be detained by a detention basin within the southwesterly portion of the site. The basin will be generally at the location of the existing detention basin, but the footprint will be

modified to fit the development. The 100-year flow released from the detention basin will be less than 345 cfs.

Storm runoff from the northerly portion of the site will be conveyed to the Hemet Channel at existing culverts connecting to the channel. The project has been designed so that the proposed condition 100-year flow into the channel does not exceed the 200 cfs specified by the *Master Flood Control and Drainage Plan.*

Did you identify and protect existing vegetation? If so, how? If not, why?
The site has been previously graded so the majority does not contain vegetation other than sporadic weeds and grasses. There are a few scattered trees approximately midway along the easterly boundary that will be removed. The natural drainage channel along the southerly boundary contains vegetation. The project will avoid disturbing the channel vegetation as much as possible. Resource agency permits will be obtained, as necessary.

Did you identify and preserve natural infiltration capacity? If so, how? If not, why?

Leighton and Associates, Inc.'s April 17, 2018, *Results of Onsite Percolation/Infiltration Testing, Proposed Storm Water Infiltration Basins, Rancho Diamante, Tract Map No. 36481 City of Hemet, Riverside County, California* is included in Appendix 3. The report identifies test locations with infiltration potential and recommends that proposed basins near these locations be sized for the average of the two infiltration rates at each basin with a factor-of-safety of 3. Preliminary infiltration basin sizing has been performed for these basins, which correspond to BMPs 1 through 11. The report also determined that the soils at basin 12 do not meet the minimum infiltration rate. As a result, bioretention basins are proposed for BMP 12 and 13. The infiltration and bioretention basin design volumes have been preliminarily determined for this entitlement-level submittal according to Riverside County's low impact development guidelines. Based on the design volumes, infiltration and bioretention basin sizing has been performed using the Infiltration Basin and Bioretention Facility – Design Procedure spreadsheets (see Appendix 6). The required infiltration and bioretention basins have been sized on the tentative map per the analyses.

The *Design Handbook for LID BMPs* indicates that drainage areas contributing to infiltration and bioretention facilities are 50 and 10 acres maximum, respectively. Discussions with Riverside County Flood Control and Water Conservation District plan reviewers indicate they allow leeway with these thresholds. BMPs 2 to 13 meet the area requirements. On the other hand, DMA 1 covers 53.35 acres, so slightly exceeds the 50 acre threshold. However, this DMA contains three individual storm drain systems, so the infiltration basin can be subdivided to separate basins treating less than 50 acres, if needed, during final engineering.

Did you identify and minimize impervious area? If so, how? If not, why?

The impervious area is being minimized by the public park and buffers/bioretention basins around the site perimeter.

Did you identify and disperse runoff to adjacent pervious areas? If so, how? If not, why?

The on-site runoff will be conveyed to bioretention basins constructed along the southerly and northerly site boundaries.

Section C: Delineate Drainage Management Areas (DMAs)

Utilizing the procedure in Section 3.3 of the WQMP Guidance Document which discusses the methods of delineating and mapping your project site into individual DMAs, complete Table C.1 below to appropriately categorize the types of classification (e.g., Type A, Type B, etc.) per DMA for your project site. Upon completion of this table, this information will then be used to populate and tabulate the corresponding tables for their respective DMA classifications.

Table C.1 DMA Classifications

DMA Name or ID	Surface Type(s)[1]	Area (Acres)	DMA Type
1	Roofs, pavement, hardscape, landscaping, BMP	53.35	Type D[2]
2	Roofs, pavement, hardscape, landscaping, BMP	22.34	Type D
3	Roofs, pavement, hardscape, landscaping, BMP	14.34	Type D
4	Roofs, pavement, hardscape, landscaping, BMP	36.71	Type D
5	Roofs, pavement, hardscape, landscaping, BMP	9.97	Type D
6	Roofs, pavement, hardscape, landscaping, BMP	2.50	Type D
7	Roofs, pavement, hardscape, landscaping, BMP	4.14	Type D
8	Roofs, pavement, hardscape, landscaping, BMP	1.87	Type D
9	Roofs, pavement, hardscape, landscaping, BMP	10.55	Type D
10	Roofs, pavement, hardscape, landscaping, BMP	9.32	Type D
11	Roofs, pavement, hardscape, landscaping, BMP	29.60	Type D
12	Roofs, pavement, hardscape, landscaping, BMP	6.68	Type D
13	Roofs, pavement, hardscape, landscaping, BMP	2.63	Type D

[1]*Reference Table 2-1 in the WQMP Guidance Document to populate this column*
[2]*Type D are defined in the Santa Ana WQMP as "Areas that drain to BMPs"*

Table C.2 Type 'A', Self-Treating Areas

DMA Name or ID	Area (Sq. Ft.)	Stabilization Type	Irrigation Type (if any)
N/A. No self-treating areas proposed within disturbance area.			

Table C.3 Type 'B', Self-Retaining Areas

Self-Retaining Area				**Type 'C' DMAs that are draining to the Self-Retaining Area**		
DMA Name/ID	Post-project surface type	Area (square feet) [A]	Storm Depth (inches) [B]	DMA Name / ID	[C] from Table C.4 = [C]	Required Retention Depth (inches) [D]
N/A.	None proposed within disturbance area.					

$$[D] = [B] + \frac{[B] \cdot [C]}{[A]}$$

Table C.4 Type 'C', Areas that Drain to Self-Retaining Areas

DMA					Receiving Self-Retaining DMA		
DMA Name/ ID	Area (square feet)	Post-project surface type	Runoff factor	Product		Area (square feet)	Ratio
	[A]		[B]	[C] = [A] x [B]	DMA name /ID	[D]	[C]/[D]
N/A	None proposed with disturbance area						

Table C.5 Type 'D', Areas Draining to BMPs

DMA Name or ID	BMP Name or ID
1	Infiltration Basin 1
2	Infiltration Basin 2
3	Infiltration Basin 3
4	Infiltration Basin 4
5	Infiltration Basin 5
6	Infiltration Basin 6
7	Infiltration Basin 7
8	Infiltration Basin 8
9	Infiltration Basin 9
10	Infiltration Basin 10
11	Infiltration Basin 11
12	Bioretention Basin 12
13	Bioretention Basin 13
	See Appendix 6 for preliminary infiltration and bioretention basin sizing, and BMP Exhibit for basin footprints and drainage area tributary to each basin.

Note: More than one drainage management area can drain to a single LID BMP, however, one drainage management area may not drain to more than one BMP.

Section D: Implement LID BMPs

D.1 Infiltration Applicability

Is there an approved downstream 'Highest and Best Use' for stormwater runoff (see discussion in Chapter 2.4.4 of the WQMP Guidance Document for further details)? ☐ Y ☒ N

If yes has been checked, Infiltration BMPs shall not be used for the site. If no, continue working through this section to implement your LID BMPs. It is recommended that you contact your Co-Permittee to verify whether or not your project discharges to an approved downstream 'Highest and Best Use' feature.

Geotechnical Report

A Geotechnical Report or Phase I Environmental Site Assessment may be required by the Copermittee to confirm present and past site characteristics that may affect the use of Infiltration BMPs. In addition, the Co-Permittee, at their discretion, may not require a geotechnical report for small projects as described in Chapter 2 of the WQMP Guidance Document. If a geotechnical report has been prepared, include it in Appendix 3. In addition, if a Phase I Environmental Site Assessment has been prepared, include it in Appendix 4.

Is this project classified as a small project consistent with the requirements of Chapter 2 of the WQMP Guidance Document? ☐ Y ☒ N

Infiltration Feasibility

Table D.1 below is meant to provide a simple means of assessing which DMAs on your site support Infiltration BMPs and is discussed in the WQMP Guidance Document in Chapter 2.4.5. Check the appropriate box for each question and then list affected DMAs as applicable. If additional space is needed, add a row below the corresponding answer.

Table D.1 Infiltration Feasibility

Does the project site…	YES	NO
…have any DMAs with a seasonal high groundwater mark shallower than 10 feet?		X
If Yes, list affected DMAs:		
…have any DMAs located within 100 feet of a water supply well?		X
If Yes, list affected DMAs:		
…have any areas identified by the geotechnical report as posing a public safety risk where infiltration of stormwater could have a negative impact?		X
If Yes, list affected DMAs:		
…have measured in-situ infiltration rates of less than 1.6 inches / hour?	X	
If Yes, list affected DMAs: Geotechnical engineer stated that infiltration rates will be less than 1.6 in/hr.		
…have significant cut and/or fill conditions that would preclude in-situ testing of infiltration rates at the final infiltration surface?	X	
If Yes, list affected DMAs: Geotechnical report in Appendix 3 indicates fill has been placed over the site and the project will also involve cuts/fills. Therefore, in-situ testing of the infiltration rate at final surface is precluded.		
…geotechnical report identify other site-specific factors that would preclude effective and safe infiltration?		X
Describe here:		

If you answered "Yes" to any of the questions above for any DMA, Infiltration BMPs should not be used for those DMAs and you should proceed to the assessment for Harvest and Use below.

D.2 Harvest and Use Assessment

Please check what applies*:*

☐ Reclaimed water will be used for the non-potable water demands for the project.

☐ Downstream water rights may be impacted by Harvest and Use as approved by the Regional Board (verify with the Copermittee).

☐ The Design Capture Volume will be addressed using Infiltration Only BMPs. In such a case, Harvest and Use BMPs are still encouraged, but it would not be required if the Design Capture Volume will be infiltrated or evapotranspired.

If any of the above boxes have been checked, Harvest and Use BMPs need not be assessed for the site. If neither of the above criteria applies, follow the steps below to assess the feasibility of irrigation use, toilet use and other non-potable uses (e.g., industrial use).

Irrigation Use Feasibility

Complete the following steps to determine the feasibility of harvesting stormwater runoff for Irrigation Use BMPs on your site:

Step 1: Identify the total area of irrigated landscape on the site, and the type of landscaping used.

Total Area of Irrigated Landscape: Approximately 98 acres (pervious area within residential development. This is conservative because not all of the pervious area can be used for harvesting).

Type of Landscaping (Conservation Design or Active Turf): Conservation Design

Step 2: Identify the planned total of all impervious areas on the proposed project from which runoff might be feasibly captured and stored for irrigation use. Depending on the configuration of buildings and other impervious areas on the site, you may consider the site as a whole, or parts of the site, to evaluate reasonable scenarios for capturing and storing runoff and directing the stored runoff to the potential use(s) identified in Step 1 above.

Total Area of Impervious Surfaces: 111.16 acres

Step 3: Cross reference the Design Storm depth for the project site (see Exhibit A of the WQMP Guidance Document) with the left column of Table 2-3 in Chapter 2 to determine the minimum area of Effective Irrigated Area per Tributary Impervious Area (EIATIA).

Enter your EIATIA factor: 1.16 for design storm depth of 0.67 inches.

Step 4: Multiply the unit value obtained from Step 3 by the total of impervious areas from Step 2 to develop the minimum irrigated area that would be required.

Minimum required irrigated area: 128.95 acres

Step 5: Determine if harvesting stormwater runoff for irrigation use is feasible for the project by comparing the total area of irrigated landscape (Step 1) to the minimum required irrigated area (Step 4).

Minimum required irrigated area (Step 4)	Available Irrigated Landscape (Step 1)
128.95 acres	Approx. 98 acres (therefore, not feasible)

Toilet Use Feasibility

Complete the following steps to determine the feasibility of harvesting stormwater runoff for toilet flushing uses on your site:

Step 1: Identify the projected total number of daily toilet users during the wet season, and account for any periodic shut downs or other lapses in occupancy:

Projected Number of Daily Toilet Users: 634 single-family lots x 4 users per lot = 2,536 users

Project Type: Residential

Step 2: Identify the planned total of all impervious areas on the proposed project from which runoff might be feasibly captured and stored for toilet use. Depending on the configuration of buildings and other impervious areas on the site, you may consider the site as a whole, or parts of the site, to evaluate reasonable scenarios for capturing and storing runoff and directing the stored runoff to the potential use(s) identified in Step 1 above.

Total Area of Impervious Surfaces: 111.16 acres from single-family residential area.

Step 3: Enter the Design Storm depth for the project site (see Exhibit A) into the left column of Table 2-1 in Chapter 2 to determine the minimum number or toilet users per tributary impervious acre (TUTIA).

Enter your TUTIA factor: 111.2 for design storm depth of 0.67 inches

Step 4: Multiply the unit value obtained from Step 3 by the total of impervious areas from Step 2 to develop the minimum number of toilet users that would be required.

Minimum number of toilet users: 12,361

Step 5: Determine if harvesting stormwater runoff for toilet flushing use is feasible for the project by comparing the Number of Daily Toilet Users (Step 1) to the minimum required number of toilet users (Step 4).

Minimum required Toilet Users (Step 4)	Projected number of toilet users (Step 1)
12,361	2,536 (therefore, not feasible)

Other Non-Potable Use Feasibility – N/A

Are there other non-potable uses for stormwater runoff on the site (e.g. industrial use)? See Chapter 2 of the Guidance for further information. If yes, describe below. If no, write N/A.

N/A

Step 1: Identify the projected average daily non-potable demand, in gallons per day, during the wet season and accounting for any periodic shut downs or other lapses in occupancy or operation.

Average Daily Demand: N/A

Step 2: Identify the planned total of all impervious areas on the proposed project from which runoff might be feasibly captured and stored for the identified non-potable use. Depending on the configuration of buildings and other impervious areas on the site, you may consider the site as

a whole, or parts of the site, to evaluate reasonable scenarios for capturing and storing runoff and directing the stored runoff to the potential use(s) identified in Step 1 above.

Total Area of Impervious Surfaces: N/A

Step 3: Enter the Design Storm depth for the project site (see Exhibit A) into the left column of Table 2-3 in Chapter 2 to determine the minimum demand for non-potable uses per tributary impervious acre.

Enter the factor from Table 2-3: N/A

Step 4: Multiply the unit value obtained from Step 4 by the total of impervious areas from Step 3 to develop the minimum number of gallons per day of non-potable use that would be required.

Minimum required use: N/A

Step 5: Determine if harvesting stormwater runoff for other non-potable use is feasible for the project by comparing the Number of Daily Toilet Users (Step 1) to the minimum required number of toilet users (Step 4).

Minimum required non-potable use (Step 4)	**Projected average daily use (Step 1)**
N/A	N/A

If Irrigation, Toilet and Other Use feasibility anticipated demands are less than the applicable minimum values, Harvest and Use BMPs are not required and you should proceed to utilize LID Bioretention and Biotreatment, unless a site-specific analysis has been completed that demonstrates technical infeasibility as noted in D.3 below.

D.3 Bioretention and Biotreatment Assessment

Other LID Bioretention and Biotreatment BMPs as described in Chapter 2.4.7 of the WQMP Guidance Document are feasible on nearly all development sites with sufficient advance planning.

Select one of the following:

X LID Bioretention/Biotreatment BMPs will be used for some or all DMAs of the project as noted below in Section D.4 (note the requirements of Section 3.4.2 in the WQMP Guidance Document).

☐ A site-specific analysis demonstrating the technical infeasibility of all LID BMPs has been performed and is included in Appendix 5. If you plan to submit an analysis demonstrating the technical infeasibility of LID BMPs, request a pre-submittal meeting with the Copermittee to discuss this option. Proceed to Section E to document your alternative compliance measures.

D.4 Feasibility Assessment Summaries

From the Infiltration, Harvest and Use, Bioretention and Biotreatment Sections above, complete Table D.2 below to summarize which LID BMPs are technically feasible, and which are not, based upon the established hierarchy.

Table D.2 LID Prioritization Summary Matrix

DMA Name/ID	LID BMP Hierarchy				No LID (Alternative Compliance)
	1. Infiltration	2. Harvest and use	3. Bioretention	4. Biotreatment	
1	☒	☐	☐	☐	☐
2	☒	☐	☐	☐	☐
3	☒	☐	☐	☐	☐
4	☒	☐	☐	☐	☐
5	☒	☐	☐	☐	☐
6	☒	☐	☐	☐	☐
7	☒	☐	☐	☐	☐
8	☒	☐	☐	☐	☐
9	☒	☐	☐	☐	☐
10	☒	☐	☐	☐	☐
11	☒	☐	☐	☐	☐
12	☐	☐	☒	☐	☐
13	☐	☐	☒	☐	☐

For those DMAs where LID BMPs are not feasible, provide a brief narrative below summarizing why they are not feasible, include your technical infeasibility criteria in Appendix 5, and proceed to Section E below to document Alternative Compliance measures for those DMAs. Recall that each proposed DMA must pass through the LID BMP hierarchy before alternative compliance measures may be considered.

The preferred hierarchy has been assessed in selecting the LID BMPs for the site. Leighton's geotechnical report in Appendix 3 identifies locations where infiltration is feasible. Infiltration BMPs were selected at these locations. Section D.2 shows irrigation use and toilet use feasibility are not met, so harvest and use BMPs were excluded. The next BMP in the hierarchy, bioretention, is proposed and will be installed locations were infiltration is not feasible. See Appendix 6 for the infiltration and bioretention sizing and locations.

D.5 LID BMP Sizing

Each LID BMP must be designed to ensure that the Design Capture Volume will be addressed by the selected BMPs. First**,** calculate the Design Capture Volume for each LID BMP using the V_{BMP} worksheet in Appendix F of the LID BMP Design Handbook. Second**,** design the LID BMP to meet the required V_{BMP} using a method approved by the Copermittee. Utilize the worksheets found in the LID BMP Design Handbook or consult with your Copermittee to assist you in correctly sizing your LID BMPs. Complete Table D.3 below to document the Design Capture Volume and the Proposed Volume for each LID BMP. Provide the completed design procedure sheets for each LID BMP in Appendix 6. You may add additional rows to the table below as needed.

Table D.3 DCV Calculations for LID BMPs

DMA Type/ID	DMA Area (square feet)	Post-Project Surface Type	Effective Impervious Fraction, I_f	DMA Runoff Factor	DMA Areas x Runoff Factor	*Enter BMP Name / Identifier Here*		
	[A]		[B]	[C]	[A] x [C]			
Impervious Areas		Roofs, paving, sidewalks, hardscape, etc.	1.0	0.89		*Design Storm Depth (in)*	*Design Capture Volume, V_{BMP} (cubic feet)*	*Proposed Volume on Plans (cubic feet)*
Pervious Areas		Landscaping, natural areas, etc.	0.1	0.11				
	A_T =	See table below for values for each DMA.			Σ=	0.67		

[B], [C] is obtained as described in Section 2.3.1 of the WQMP Guidance Document

[E] is obtained from Exhibit A in the WQMP Guidance Document

[G] is obtained from a design procedure sheet, such as in LID BMP Design Handbook and placed in Appendix 6

See Appendix 6 for preliminary calculations and work map for all 13 proposed water quality basins.

DMA	Impervious DMA Area, sf	Pervious DMA Area, sf	Sum of DMA Areas x Runoff Factor	DCV, cubic feet	Min. Prop. Vol. on Plans, cubic feet
1	1,351,231	900,821	1,304,801	72,851	72,852
2	519,671	346,738	501,846	28,020	28,020
3	362,419	241,758	349,982	19,541	19,541
4	724,838	483,516	699,964	39,081	39,082
5	244,807	162,914	236,363	13,197	13,197
6	61,855	41,382	59,746	3,336	3,336
7	103,237	68,825	99,690	5,566	5,566
8	47,045	31,363	45,428	2,536	2,537
9	264,409	176,418	255,340	14,257	14,257
10	239,580	159,430	231,316	12,915	12,916
11	739,649	493,099	714,234	39,878	39,878
12	168,142	111,949	162,348	9,064	9,065
13	64,904	43,560	62,706	3,501	3,502

Table D.3 Values for Each DMA (Based on Effective Impervious Fraction, DMA Runoff Factor, and Design Storm Depth values given above)

Section E: Alternative Compliance (LID Waiver Program)

LID BMPs are expected to be feasible on virtually all projects. Wflhere LID BMPs have been demonstrated to be infeasible as documented in Section D, other Treatment Control BMPs must be used (subject to LID waiver approval by the Copermittee). Check one of the following Boxes:

X LID Principles and LID BMPs have been incorporated into the site design to fully address all Drainage Management Areas. No alternative compliance measures are required for this project and thus this Section is not required to be completed.

\- *Or* -

☐ The following Drainage Management Areas are unable to be addressed using LID BMPs. A site-specific analysis demonstrating technical infeasibility of LID BMPs has been approved by the Co-Permittee and included in Appendix 5. Additionally, no downstream regional and/or sub-regional LID BMPs exist or are available for use by the project. The following alternative compliance measures on the following pages are being implemented to ensure that any pollutant loads expected to be discharged by not incorporating LID BMPs, are fully mitigated.

E.1 Identify Pollutants of Concern

Utilizing Table A.1 from Section A above which noted your project's receiving waters and their associated EPA approved 303(d) listed impairments, cross reference this information with that of your selected Priority Development Project Category in Table E.1 below. If the identified General Pollutant Categories are the same as those listed for your receiving waters, then these will be your Pollutants of Concern and the appropriate box or boxes will be checked on the last row. The purpose of this is to document compliance and to help you appropriately plan for mitigating your Pollutants of Concern in lieu of implementing LID BMPs.

Table E.1 Potential Pollutants by Land Use Type

Priority Development Project Categories and/or Project Features (check those that apply)	General Pollutant Categories							
	Bacterial Indicators	Metals	Nutrients	Pesticides	Toxic Organic Compounds	Sediments	Trash & Debris	Oil & Grease
☒ Detached Residential Development	P	N	P	P	N	P	P	P
☐ Attached Residential Development	P	N	P	P	N	P	P	P(2)
☐ Commercial/Industrial Development	P(3)	P	P(1)	P(1)	P(5)	P(1)	P	P
☐ Automotive Repair Shops	N	P	N	N	P(4, 5)	N	P	P
☐ Restaurants (>5,000 ft²)	P	N	N	N	N	N	P	P
☐ Hillside Development (>5,000 ft²)	P	N	P	P	N	P	P	P
☐ Parking Lots (>5,000 ft²)	P(6)	P	P(1)	P(1)	P(4)	P(1)	P	P
☐ Retail Gasoline Outlets	N	P	N	N	P	N	P	P
Project Priority Pollutant(s) of Concern	☒	☒	☒	☐	☒	☒	☐	☐

P = Potential

N = Not Potential

(1) A potential Pollutant if non-native landscaping exists or is proposed onsite; otherwise not expected

(2) A potential Pollutant if the project includes uncovered parking areas; otherwise not expected

(3) A potential Pollutant is land use involving animal waste

(4) Specifically petroleum hydrocarbons

(5) Specifically solvents

(6) Bacterial indicators are routinely detected in pavement runoff

E.2 Stormwater Credits

Projects that cannot implement LID BMPs but nevertheless implement smart growth principles are potentially eligible for Stormwater Credits. Utilize Table 3-8 within the WQMP Guidance Document to identify your Project Category and its associated Water Quality Credit. If not applicable, write N/A.

Table E.2 Water Quality Credits

Qualifying Project Categories	Credit Percentage[2]
N/A	
Total Credit Percentage[1]	

[1]*Cannot Exceed 50%*
[2]*Obtain corresponding data from Table 3-8 in the WQMP Guidance Document*

E.3 Sizing Criteria

After you appropriately considered Stormwater Credits for your project, utilize Table E.3 below to appropriately size them to the DCV, or Design Flow Rate, as applicable. Please reference Chapter 3.5.2 of the WQMP Guidance Document for further information.

Table E.3 Treatment Control BMP Sizing

DMA Type/ID	**DMA Area (square feet)**	**Post-Project Surface Type**	**Effective Impervious Fraction, I_f**	**DMA Runoff Factor**	**DMA Area x Runoff Factor**		***Enter BMP Name / Identifier Here***		
	[A]		[B]	[C]	[A] x [C]				
N/A						*Design Storm Depth (in)*	*Minimum Design Capture Volume or Design Flow Rate (cubic feet or cfs)*	*Total Storm Water Credit % Reduction*	*Proposed Volume or Flow on Plans (cubic feet or cfs)*
	A_T = Σ[A]				Σ= [D]	[E]	$[F] = \frac{[D]x[E]}{[G]}$	[F] X (1-[H])	[I]

[B], [C] is obtained as described in Section 2.3.1 from the WQMP Guidance Document
[E] is obtained from Exhibit A in the WQMP Guidance Document
[G] is for Flow-Based Treatment Control BMPs [G] = 43,560, for Volume-Based Control Treatment BMPs, [G] = 12
[H] is from the Total Credit Percentage as Calculated from Table E.2 above
[I] as obtained from a design procedure sheet from the BMP manufacturer and should be included in Appendix 6

E.4 Treatment Control BMP Selection

Treatment Control BMPs typically provide proprietary treatment mechanisms to treat potential pollutants in runoff, but do not sustain significant biological processes. Treatment Control BMPs must have a removal efficiency of a medium or high effectiveness as quantified below:

- **High**: equal to or greater than 80% removal efficiency
- **Medium**: between 40% and 80% removal efficiency

Such removal efficiency documentation (e.g., studies, reports, etc.) as further discussed in Chapter 3.5.2 of the WQMP Guidance Document, must be included in Appendix 6. In addition, ensure that proposed Treatment Control BMPs are properly identified on the WQMP Site Plan in Appendix 1.

Table E.4 Treatment Control BMP Selection

Selected Treatment Control BMP Name or ID[1]	Priority Pollutant(s) of Concern to Mitigate[2]	Removal Efficiency Percentage[3]
Bioretention Basins	Bacterial Indicators, Nutrients, Pesticides, Sediments, Trash & Debris, Oil & Grease	High

[1] *Treatment Control BMPs must not be constructed within Receiving Waters. In addition, a proposed Treatment Control BMP may be listed more than once if they possess more than one qualifying pollutant removal efficiency.*
[2] *Cross Reference Table E.1 above to populate this column.*
[3] *As documented in a Co-Permittee Approved Study and provided in Appendix 6.*

Section F: Hydromodification

F.1 Hydrologic Conditions of Concern (HCOC) Analysis

Once you have determined that the LID design is adequate to address water quality requirements, you will need to assess if the proposed LID Design may still create a HCOC. Review Chapters 2 and 3 (including Figure 3-7) of the WQMP Guidance Document to determine if your project must mitigate for Hydromodification impacts. If your project meets one of the following criteria which will be indicated by the check boxes below, you do not need to address Hydromodification at this time. However, if the project does not qualify for Exemptions 1, 2 or 3, then additional measures must be added to the design to comply with HCOC criteria. This is discussed in further detail below in Section F.2.

HCOC EXEMPTION 1: The Priority Development Project disturbs less than one acre. The Copermittee has the discretion to require a Project-Specific WQMP to address HCOCs on projects less than one acre on a case by case basis. The disturbed area calculation should include all disturbances associated with larger common plans of development.

Does the project qualify for this HCOC Exemption? ☐ Y ☒ N

If Yes, HCOC criteria do not apply.

HCOC EXEMPTION 2: The volume and time of concentration[1] of storm water runoff for the post-development condition is not significantly different from the pre-development condition for a 2-year return frequency storm (a difference of 5% or less is considered insignificant) using one of the following methods to calculate:

- Riverside County Hydrology Manual
- Technical Release 55 (TR-55): Urban Hydrology for Small Watersheds (NRCS 1986), or derivatives thereof, such as the Santa Barbara Urban Hydrograph Method
- Other methods acceptable to the Co-Permittee

Does the project qualify for this HCOC Exemption? ☐ Y ☒ N

If Yes, report results in Table F.1 below and provide your substantiated hydrologic analysis in Appendix 7.

Table F.1 Hydrologic Conditions of Concern Summary

	2 year – 24 hour		
	Pre-condition	**Post-condition**	**% Difference**
Time of Concentration	N/A	N/A	N/A
Volume (Cubic Feet)	N/A	N/A	N/A

[1] Time of concentration is defined as the time after the beginning of the rainfall when all portions of the drainage basin are contributing to flow at the outlet.

HCOC EXEMPTION 3: All downstream conveyance channels to an adequate sump (for example, Prado Dam, Lake Elsinore, Canyon Lake, Santa Ana River, or other lake, reservoir or naturally erosion resistant feature) that will receive runoff from the project are engineered and regularly maintained to ensure design flow capacity; no sensitive stream habitat areas will be adversely affected; or are not identified on the Co-Permittees Hydromodification Sensitivity Maps.

Does the project qualify for this HCOC Exemption? ☒ Y ☐ N

If Yes, HCOC criteria do not apply and note below which adequate sump applies to this HCOC qualifier:

The project runoff will be conveyed by either *Master Flood Control and Drainage Plan* Line 3B or the Hemet Channel (Line 1A) to Salt Creek (see Receiving Waters Exhibit in Appendix 1). Salt Creek continues west to Canyon Lake, which is an adequate sump. Line 1A, Line 3B, and Salt Creek are engineered and maintained to ensure design flow capacity. Line 1A and 3B are master plan facilities. Andrea Gonzalez from the Riverside County Flood Control and Water Conservation District stated that Salt Creek meets the exemption criteria. This is documented in the January 18, 2017, *Hydromodification Susceptibility Documentation Report and Mapping: Santa Ana Region (http://rcflood.org/downloads/NPDES/Documents/SA_WAP/AppA_HydromodificationSusceptibilityReport.pdf).* The relevant excerpts are included in Appendix 7. A November 25, 2014 letter (see Appendix 7) from the city of Menifee confirms that the Salt Creek segment within their city also meets the exemption criteria. Therefore, the project is exempt from hydromodification and hydromodification BMPs are not being proposed.

F.2 HCOC Mitigation

If none of the above HCOC Exemption Criteria are applicable, HCOC criteria is considered mitigated if they meet one of the following conditions:

a. Additional LID BMPS are implemented onsite or offsite to mitigate potential erosion or habitat impacts as a result of HCOCs. This can be conducted by an evaluation of site-specific conditions utilizing accepted professional methodologies published by entities such as the California Stormwater Quality Association (CASQA), the Southern California Coastal Water Research Project (SCCRWP), or other Co-Permittee approved methodologies for site-specific HCOC analysis.

b. The project is developed consistent with an approved Watershed Action Plan that addresses HCOC in Receiving Waters.

c. Mimicking the pre-development hydrograph with the post-development hydrograph, for a 2-year return frequency storm. Generally, the hydrologic conditions of concern are not significant, if the post-development hydrograph is no more than 10% greater than pre-development hydrograph. In cases where excess volume cannot be infiltrated or captured and reused, discharge from the site must be limited to a flow rate no greater than 110% of the pre-development 2-year peak flow.

Be sure to include all pertinent documentation used in your analysis of the items a, b or c in Appendix 7.

This is not applicable since the project is exempt from hydromodification.

Section G: Source Control BMPs

(to be reviewed in Final WQMP)

Source control BMPs include permanent, structural features that may be required in your project plans — such as roofs over and berms around trash and recycling areas — and Operational BMPs, such as regular sweeping and "housekeeping", that must be implemented by the site's occupant or user. The MEP standard typically requires both types of BMPs. In general, Operational BMPs cannot be substituted for a feasible and effective permanent BMP. Using the Pollutant Sources/Source Control Checklist in Appendix 8, review the following procedure to specify Source Control BMPs for your site:

1. ***Identify Pollutant Sources*:** Review Column 1 in the Pollutant Sources/Source Control Checklist. Check off the potential sources of Pollutants that apply to your site.

2. ***Note Locations on Project-Specific WQMP Exhibit*:** Note the corresponding requirements listed in Column 2 of the Pollutant Sources/Source Control Checklist. Show the location of each Pollutant source and each permanent Source Control BMP in your Project-Specific WQMP Exhibit located in Appendix 1.

3. ***Prepare a Table and Narrative*:** Check off the corresponding requirements listed in Column 3 in the Pollutant Sources/Source Control Checklist. In the left column of Table G.1 below, list each potential source of runoff Pollutants on your site (from those that you checked in the Pollutant Sources/Source Control Checklist). In the middle column, list the corresponding permanent, Structural Source Control BMPs (from Columns 2 and 3 of the Pollutant Sources/Source Control Checklist) used to prevent Pollutants from entering runoff. **Add additional narrative** in this column that explains any special features, materials or methods of construction that will be used to implement these permanent, Structural Source Control BMPs.

4. ***Identify Operational Source Control BMPs:*** To complete your table, refer once again to the Pollutant Sources/Source Control Checklist. List in the right column of your table the Operational BMPs that should be implemented as long as the anticipated activities continue at the site. Copermittee stormwater ordinances require that applicable Source Control BMPs be implemented; the same BMPs may also be required as a condition of a use permit or other revocable Discretionary Approval for use of the site.

Table G.1 Permanent and Operational Source Control Measures

Potential Sources of Runoff pollutants	Permanent Structural Source Control BMPs	Operational Source Control BMPs
On-site storm drain inlets	Mark all inlets with the words "Only Rain Down the Storm Drain" or similar where feasible. Catch basin markers may be available from the RCFCWCD. Call 951-955-1200 to verify.	Maintain and periodically repaint or replace inlet markings. Provide stormwater pollution prevention information to new site owners, lessees, or operators. See applicable operational BMPs in Fact Sheet SC-44, "Drainage System Maintenance," in the CASQA Stormwater Quality

		Handbooks at www.cabmphandbooks.com
Need for future indoor & structural pest control	Building design shall exclude openings that allow pest and rodent entry. Buildings/homes will be slab on grade, which will avoid pests in crawl space.	Pest control information in Appendix 10 shall be provided to owners, lessees, and operators.
Landscape / Outdoor Pesticide Use	Existing native trees, shrubs, and ground cover shall be preserved beyond the project footprint. Landscaping shall be selected to minimize irrigation and runoff, to promote surface infiltration where appropriate, and to minimize the use of fertilizers and pesticides that can contribute to stormwater pollution. Use pest-resistant plants, especially adjacent to hardscape. To insure successful establishment, select plants appropriate to site soils, slopes, climate, sun, wind, rain, land use, air movement, ecological consistency, and plant interactions.	Maintain landscaping using minimum or no pesticides. See applicable operational BMPs in Fact Sheet SC-41, "Building and Grounds Maintenance," in Appendix 10 or the CASQA Stormwater Quality Handbooks at www.cabmphandbooks.com Provide integrated pest management information in Appendix 10 to new owners, lessees and operators.
Refuse areas	Refuse containers (dumpsters) will be stored in gated and fenced enclosures. Dumpsters shall have covers to prevent rain intrusion. Signs will be posted on or near dumpsters with the words "Do not dump hazardous materials here" or similar.	An adequate number of receptacles (dumpsters and individual trash containers) will be provided for the facilities. Inspect receptacles regularly; repair or replace leaky receptacles. Keep receptacles covered or under a covered area. Prohibit/prevent dumping of liquid or hazardous wastes. Post "no hazardous materials" signs. Inspect and pick up litter daily and clean up spills immediately. Keep spill control materials available on-site.

		See Fact Sheet SC-34, "Waste Handling and Disposal" in Appendix 10 or the CASQA Stormwater Quality Handbooks at www.cabmphandbooks.com
Fire Sprinkler Test Water	The fire sprinkler test water shall be designed with proper disposal on the architectural plans in accordance with local regulations.	See the note in Fact Sheet SC-41, "Building and Grounds Maintenance," in Appendix 10 or the CASQA Stormwater Quality Handbooks at www.cabmphandbooks.com
Condensate drain lines	Condensate drain lines will be designed on the architectural plans and may discharge to landscaped areas if the flow is small enough that runoff will not occur. Condensate drain lines may not discharge to the storm drain system.	Condensate lines shall be maintained in accordance with manufacturers and local regulations.
Roofing, gutters, and trim	Avoid roofing, gutters, and trim made of copper or other unprotected metals that may leach into runoff. Roof drain runoff will ultimately discharge to the infiltration basin for treatment.	Roofing, gutters, and trim shall be kept clear of debris to ensure proper functioning.
Plazas, sidewalks, and parking lots.		Plazas, sidewalks, and parking lots shall be swept regularly to prevent the accumulation of litter and debris. Debris from pressure washing shall be collected to prevent entry into the storm drain system. Wash water containing any cleaning agent or degreaser shall be collected and discharged to the sanitary sewer and not discharged to a storm drain.

The Source Control BMPs identified in the above table will be the responsibility of each homeowner or the Homeowner's Association, as appropriate.

Section H: Construction Plan Checklist

(to be reviewed in Final WQMP)

Populate Table H.1 below to assist the plan checker in an expeditious review of your project. The first two columns will contain information that was prepared in previous steps, while the last column will be populated with the corresponding plan sheets. This table is to be completed with the submittal of your final Project-Specific WQMP.

Table H.1 Construction Plan Cross-reference

BMP No. or ID	BMP Identifier and Description	Corresponding Plan Sheet(s)
N/A.	To be addressed in Final WQMP.	

Note that the updated table — or Construction Plan WQMP Checklist — is **only a reference tool** to facilitate an easy comparison of the construction plans to your Project-Specific WQMP. Co-Permittee staff can advise you regarding the process required to propose changes to the approved Project-Specific WQMP.

Section I: Operation, Maintenance and Funding

(to be reviewed in Final WQMP)

The Copermittee will periodically verify that Stormwater BMPs on your site are maintained and continue to operate as designed. To make this possible, your Copermittee will require that you include in Appendix 9 of this Project-Specific WQMP:

1. A means to finance and implement facility maintenance in perpetuity, including replacement cost.
2. Acceptance of responsibility for maintenance from the time the BMPs are constructed until responsibility for operation and maintenance is legally transferred. A warranty covering a period following construction may also be required.
3. An outline of general maintenance requirements for the Stormwater BMPs you have selected.
4. Figures delineating and designating pervious and impervious areas, location, and type of Stormwater BMP, and tables of pervious and impervious areas served by each facility. Geo-locating the BMPs using a coordinate system of latitude and longitude is recommended to help facilitate a future statewide database system.
5. A separate list and location of self-retaining areas or areas addressed by LID Principles that do not require specialized O&M or inspections but will require typical landscape maintenance as noted in Chapter 5, pages 85-86, in the WQMP Guidance. Include a brief description of typical landscape maintenance for these areas.

Your local Co-Permittee will also require that you prepare and submit a detailed Stormwater BMP Operation and Maintenance Plan that sets forth a maintenance schedule for each of the Stormwater BMPs built on your site. An agreement assigning responsibility for maintenance and providing for inspections and certification may also be required.

Details of these requirements and instructions for preparing a Stormwater BMP Operation and Maintenance Plan are in Chapter 5 of the WQMP Guidance Document.

Maintenance Mechanism: The BMPs will be installed by the developer and maintained by the HOA or appropriate maintenance entity (commercial and school sites)

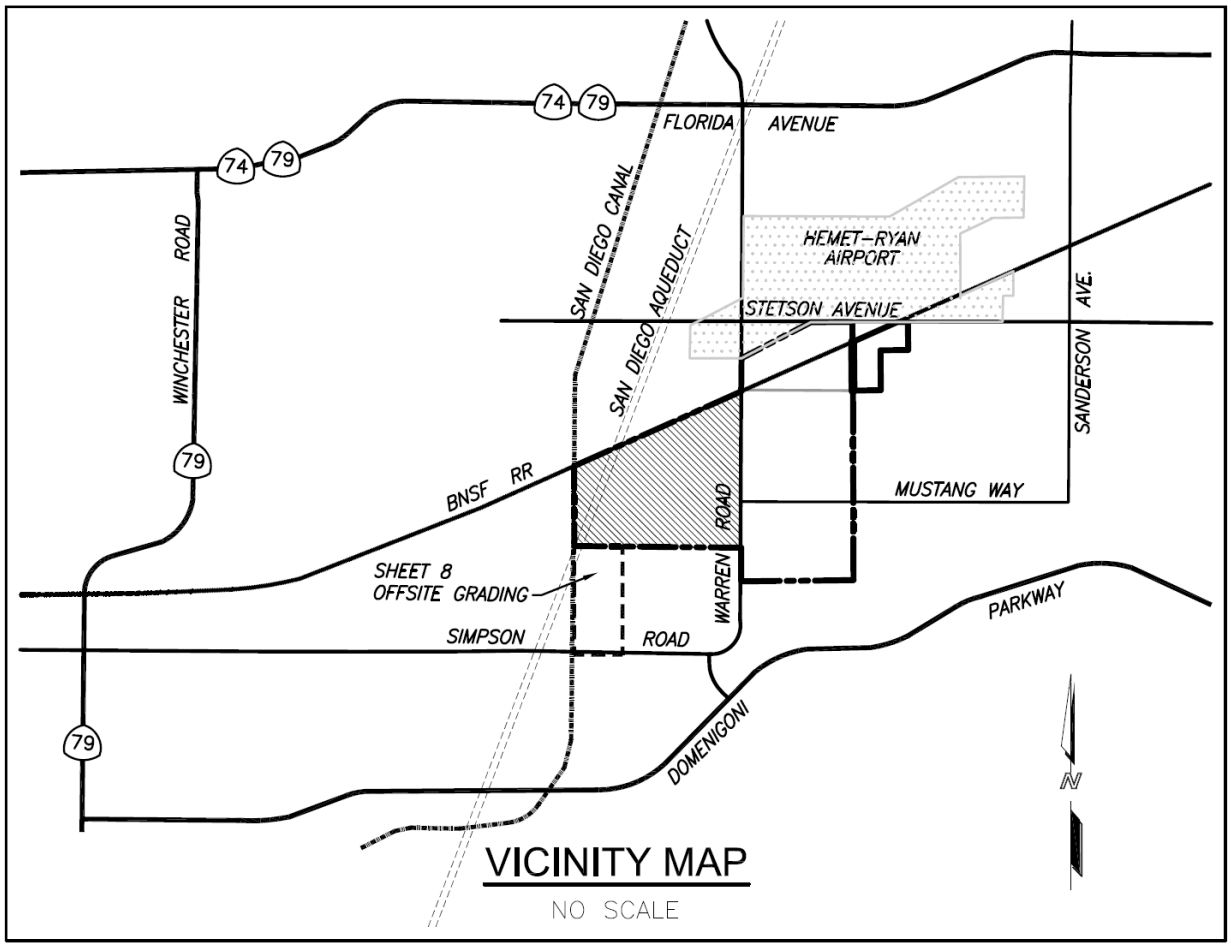
Will the proposed BMPs be maintained by a Home Owners' Association (HOA) or Property Owners Association (POA)?

☒ Y ☐ N

An Operation and Maintenance Plan and Maintenance Mechanism shall be inserted in Appendix 9 in the Final WQMP. Additionally, all pertinent forms of educational materials for those personnel that will be maintaining the proposed BMPs within the Final Project-Specific WQMP will be included in Appendix 10. Appendix 9 and 10 (and 8) are not required for this Preliminary WQMP, so are excluded.

Appendix 1: Maps and Site Plans

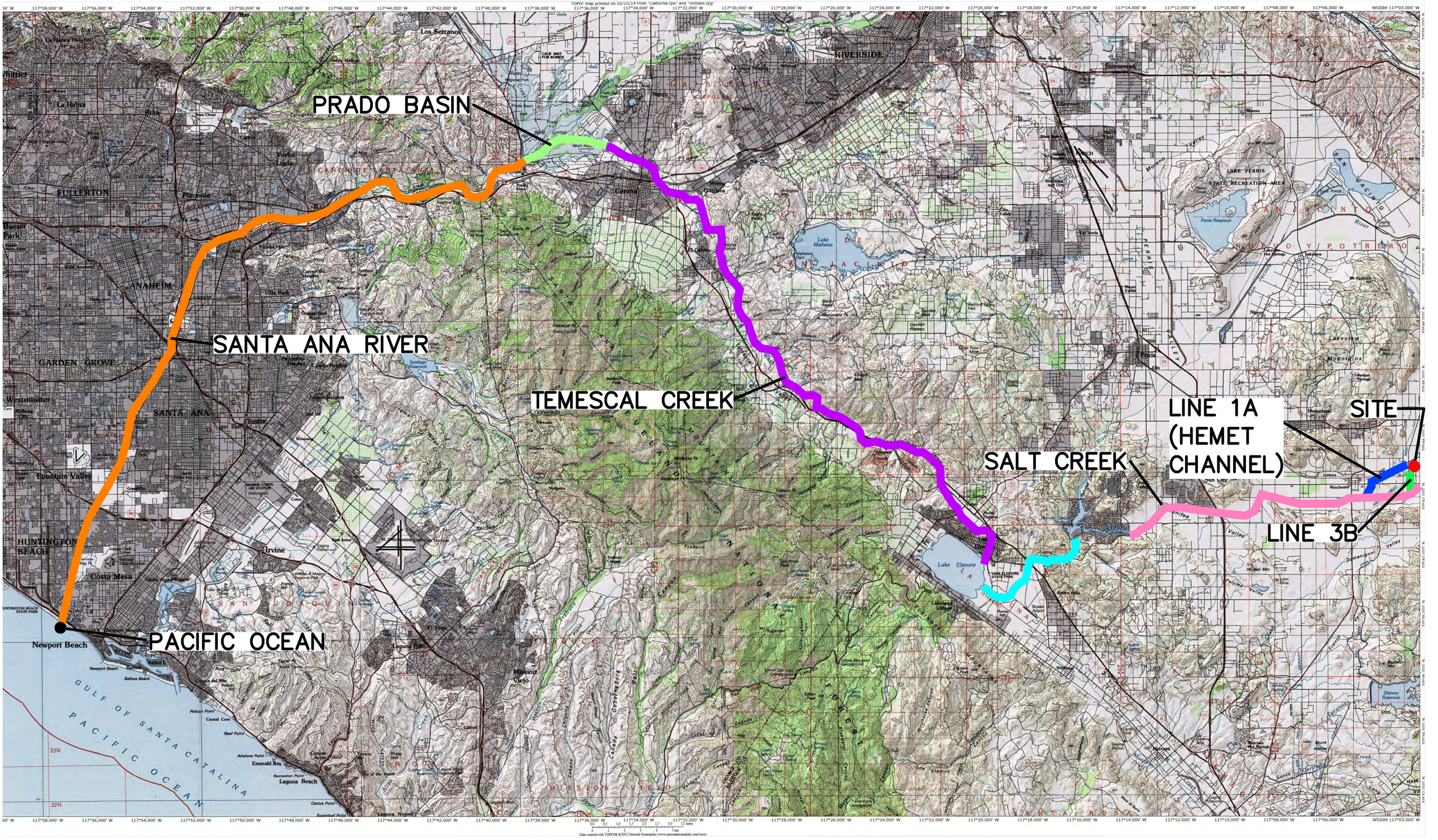
Location Map, WQMP Site Plan, and Receiving Waters Map



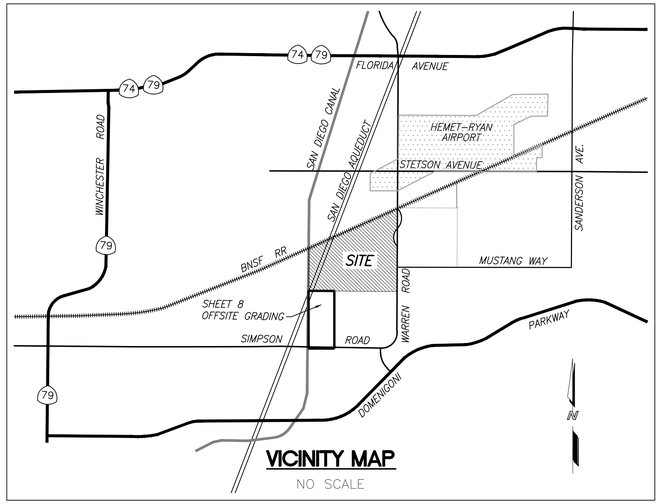
THOMAS GUIDE: PAGE 840, GRID C-5, 2004 EDITION

Location Map


SITE
PROPOSED STETSON AVENUE
STETSON AVENUE
PROPOSED WINCHESTER ROAD
MUSTANG WAY
PARK
SAN DIEGO AQUEDUCT
SAN DIEGO CANAL
WARREN ROAD
OLD WARREN ROAD
PROPOSED WARREN ROAD
SIMPSON ROAD
DOMENIGONI PARKWAY
CALIFORNIA AVENUE
OLD CALIFORNIA AVE
NEW CALIFORNIA AVE
EXISTING DRAINAGE CHANNEL
BASIN
STORAGE
BUSINESS PARK
GENERAL PLAN MIXED USE
MWD GENERAL PLAN MIXED USE
PANGAEA
DATE PREPARED 10-1-14
RANCHO DIAMANTE
CONCEPTUAL SITE PLAN



RECEIVING WATER BODIES EXHIBIT



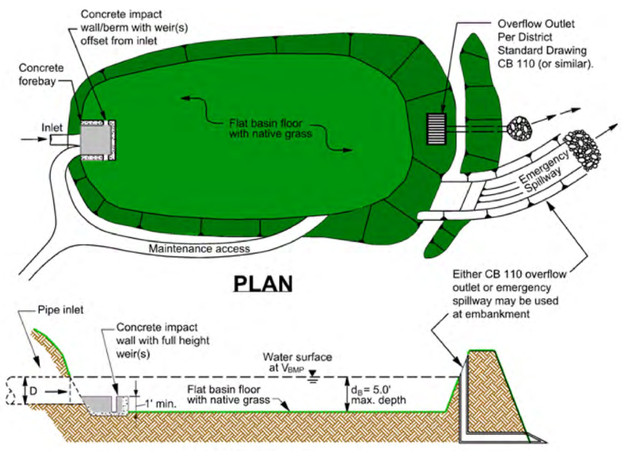
VICINITY MAP

NO SCALE

DMA/BMP	DRAINAGE AREA, AC	IMPERVIOUS AREA, AC	PERVIOUS AREA, AC	REQUIRED WQ BASIN FOOTPRINT, AC	AVAILABLE WQ BASIN FOOTPRINT, AC	ACTUAL WQ BASIN FOOTPRINT USED, AC
1	53.35	31.02	22.33	0.46	1.65	0.46
2	22.34	11.93	10.41	0.16	2.45	0.16
3	14.34	8.32	6.02	0.11	0.47	0.11
4	36.71	16.64	20.07	0.23	8.97	0.23
5	9.97	5.62	4.35	0.08	0.61	0.08
6	2.50	1.42	1.08	0.02	0.13	0.02
7	4.14	2.37	1.77	0.03	0.19	0.03
8	1.87	1.08	0.79	0.01	0.07	0.01
9	10.55	6.07	4.48	0.08	0.43	0.08
10	9.32	5.50	3.82	0.09	0.16	0.09
11	29.60	16.98	12.62	0.27	1.30	0.27
12	6.68	3.86	2.82	0.12	0.25	0.12
13	2.63	1.49	1.14	0.05	0.14	0.05

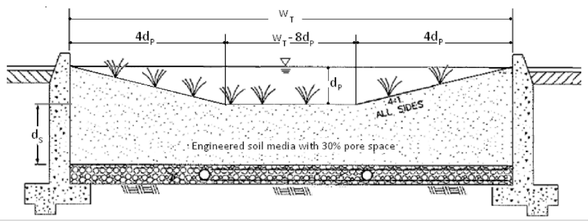
NOTE:
TABLE SHOWS THAT THE AVAILABLE INFILTRATION AND BIORETENTION BASIN FOOTPRINTS ARE GREATER THAN THE REQUIRED FOOTPRINT. THEREFORE, THE AVAILABLE FOOTPRINT IS SUFFICIENT FOR ENTITLEMENT PURPOSES.

DMA/BMP AREAS AND FOOTPRINTS



PROFILE

INFILTRATION BASIN DETAILS



NOTE:
BIORETENTION BASINS SHALL BE BASED ON "LID BMP HANDBOOK" REQUIREMENTS. THE RECOMMENDED PONDING DEPTH, Dp, IS 6 INCHES.

BIORETENTION BASIN DETAIL

LEGEND:

- DRAINAGE MANAGEMENT AREA (DMA) BOUNDARY
- 3.62 AC DMA ACREAGE
- PROPOSED DRAINAGE FACILITY
- OVERLAND FLOW PATH (FROM RATIONAL METHOD)
- 10 PROPOSED INFILTRATION (NO. 1–11) OR BIORETENTION BASIN (NO. 12–13)
- AVAILABLE INFILTRATION/BIORETENTION BASIN FOOTPRINT
- PROPOSED OVERFLOW LOCATION

GRAPHIC SCALE
200 0 100 200 400
1 INCH = 200 FEET

DMA 1 53.35 AC
DMA 2 22.34 AC
DMA 3 14.34 AC
DMA 4 36.71 AC
DMA 5 9.97 AC
DMA 6 2.50 AC
DMA 7 4.14 AC
DMA 8 1.87 AC
DMA 9 10.55 AC
DMA 10 9.32 AC
DMA 11 29.60 AC
DMA 12 6.68 AC
DMA 13 2.63 AC
FIRST SAN DIEGO AQUEDUCT

WQMP SITE PLAN – GRADING, DRAINAGE, AND BMP EXHIBIT

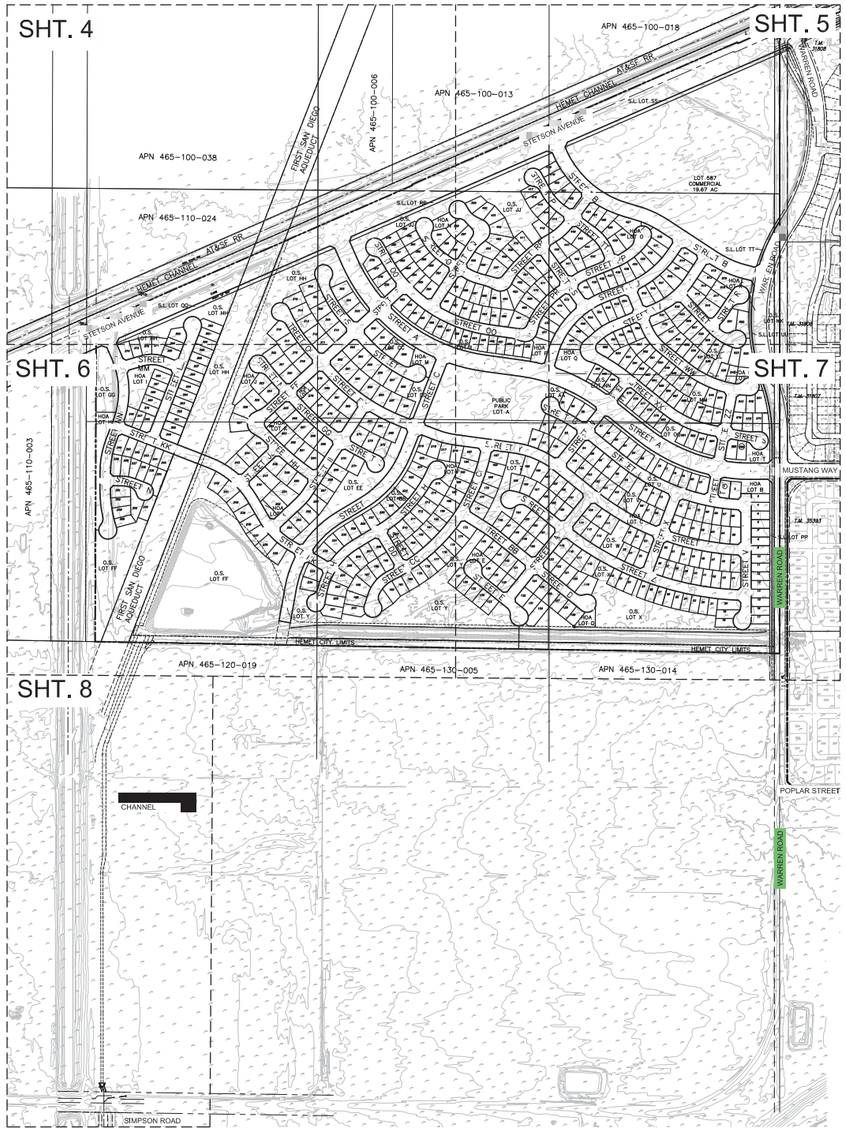
Appendix 2: Construction Plans

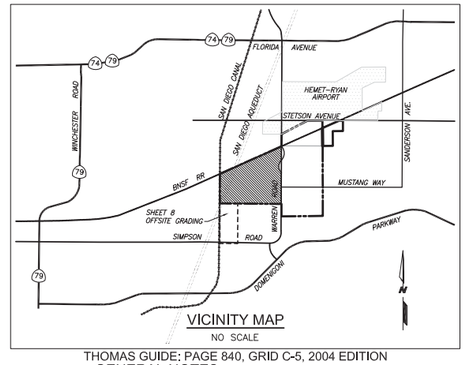
Grading and Drainage Plans

(to be reviewed in Final WQMP)

CITY OF HEMET
TENTATIVE TRACT MAP No. 36841

PORTIONS OF THE EAST HALF OF SECTION 24, TOWNSHIP 5 SOUTH, RANGE 2 WEST, SAN BERNARDINO BASE AND MERIDIAN, IN THE COUNTY OF RIVERSIDE, STATE OF CALIFORNIA





VICINITY MAP
NO SCALE

THOMAS GUIDE: PAGE 840, GRID C-5, 2004 EDITION

OWNER / APPLICANT:

RANCHO DIAMANTE INVESTMENT
550 LAGUNA DRIVE, SUITE B
CARLSBAD, CA 92008
(760) 460-0444

ENGINEER / REPRESENTATIVE:

PANGAEA LAND CONSULTANTS, INC.
2834 LA MIRADA DRIVE, SUITE H
VISTA, CA 92081
(760) 726-4232

CONTIGUOUS OWNERSHIP:

THE OWNERS REPRESENT THIS TO BE A PORTION OF THEIR CONTIGUOUS OWNERSHIP UNLESS OTHERWISE NOTED.

LEGAL DESCRIPTION:

PORTIONS OF THE EAST HALF OF SECTION 24, TOWNSHIP 5 SOUTH, RANGE 2 WEST, SAN BERNARDINO BASE AND MERIDIAN, IN THE COUNTY OF RIVERSIDE, STATE OF CALIFORNIA

PHASING:

THE SUBDIVIDER MAY FILE MULTIPLE FINAL MAPS IN ANY SEQUENCE ON THIS TENTATIVE SUBDIVISION MAP IN ACCORDANCE WITH THE SUBDIVISION MAP ACT.

SCHOOL DISTRICTS:

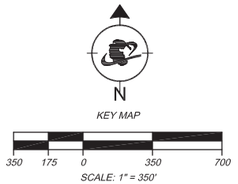
HEMET UNIFIED SCHOOL DISTRICT

UTILITIES:

CABLE T.V.:	ADELPHIA (951) 766-4270
ELECTRIC:	SOUTHERN CALIFORNIA EDISON COMPANY (951) 928-8251
GAS:	SOUTHERN CALIFORNIA GAS COMPANY (951) 928-2808
SEWER:	EASTERN MUNICIPAL WATER DISTRICT (951) 928-3777
WATER:	EASTERN MUNICIPAL WATER DISTRICT (951) 928-3777
TELEPHONE:	VERIZON CALIFORNIA (951) 929-9491

PRELIMINARY EARTHWORK QUANTITIES:

CUT.....419,000 CY
FILL.....398,700 CY
ALLUVIAL.....605,000 CY
12% ALLUVIAL SHRINKAGE..... 72,600 CY
IMPORT..... 52,300 CY
NOTE QUANTITIES BASED ON SITE LOWERED 0.5' BELOW ELEVATION SHOWN



GENERAL NOTES:

1. ASSESSORS PARCEL NOS.: 465-100-016, 465-100-022, 465-110-020, 465-110-021, 465-110-022, 465-110-023, 465-110-027

2. CURRENT ZONING: PCD 79-93 (PAGE RANCH PLANNED DEVELOPMENT)

3. PROPOSED ZONING: PCD 79-93 (PAGE RANCH PLANNED DEVELOPMENT); R-5

4. SURROUNDING ZONING:
   NORTH – A-2, C-10 AND M-2
   SOUTH – COUNTY OF RIVERSIDE
   WEST – COUNTY OF RIVERSIDE
   EAST – PCD 79-93 – (R-1) AND R-17

5. ACREAGE BEING DIVIDED: 245.07 ACRES GROSS, 245.07 ACRES NET

6. NUMBER OF LOTS – TR. 36841 = 634
   TOTAL NUMBER OF RESIDENTIAL LOTS = 586
   TOTAL NUMBER OF PUBLIC PARK LOTS = 1
   TOTAL NUMBER OF COMMERCIAL LOTS = 1
   TOTAL NUMBER OF HOA PARK LOTS = 19
   TOTAL NUMBER OF OPEN SPACE LOTS = 21
   TOTAL NUMBER OF STREET LANDSCAPE = 6

7. MINIMUM LOT SIZE: TR. 36841 – 5,000 S.F.

8. GROSS DENSITY = 586 D.U./245.07 AC. = 2.39 D.U./AC.

9. ADJACENT GENERAL PLAN LAND USE: LDR 2.1-5, MIXED USE & INDUSTRIAL

10. EXISTING GENERAL PLAN LAND USE: LDR 21-5,INDUSTRIAL

11. PROPOSED GENERAL PLAN LAND USE: LDR 21-5

12. PUBLIC STREET IMPROVEMENTS: PER CITY OF HEMET STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION

13. NO SUBSURFACE SEPTIC DISPOSAL PROPOSED.

14. ALL STREETS TO BE PUBLIC STREETS.

15. GRADING OCCURRING OUTSIDE THE SUBDIVISION BOUNDARY MAY REQUIRE PERMISSION LETTERS OR EASEMENTS FROM THE UNDERLYING PROPERTY OWNER PRIOR TO THAT GRADING.

16. NUISANCE DRAIN LAYOUT IS PRELIMINARY. NUISANCE DRAINS ARE 18"ø UNLESS OTHERWISE NOTED.

EASEMENT NOTES:

(18) *AN EASEMENT FOR EITHER OR BOTH POLE LINES, CONDUITS, OR UNDERGROUND FACILITIES AND INCIDENTAL PURPOSES, RECORDED AUGUST 4, 1934 AS BOOK 186 PAGE 44 OF DEEDS. IN FAVOR OF: PAUL E. WALKER AND HELEN H. WALKER*

(21) *AN EASEMENT FOR EITHER OR BOTH POLE LINES, CONDUITS, OR UNDERGROUND FACILITIES AND INCIDENTAL PURPOSES, RECORDED OCTOBER 11, 1963 AS INSTRUMENT 107707 OF OFFICIAL RECORDS. IN FAVOR OF: CALIFORNIA ELECTRIC POWER COMPANY*

(22) *AN EASEMENT FOR EITHER OR BOTH POLE LINES, CONDUITS OR UNDERGROUND FACILITIES AND INCIDENTAL PURPOSES, RECORDED JUNE 25, 1969 AS INSTRUMENT NO. 63844 OF OFFICIAL RECORDS. IN FAVOR OF: SOUTHERN CALIFORNIA EDISON COMPANY*

(27) *AN EASEMENT FOR PIPELINES AND INCIDENTAL PURPOSES, RECRODED APRIL 15, 1992 AS INSTRUMENT NO. 134563 OF OFFICIAL RECORDS. IN FAVOR OF: EASTERN MUNICIPAL WATER DISTRICT*

(28) *AN EASEMENT FOR PIPELINES AND INCIDENTAL PURPOSES, RECORDED APRIL 15, 1992 AS INSTRUMENT NO. 134564 OF OFFICIAL RECORDS. IN FAVOR OF: EASTERN MUNICIPAL WATER DISTRICT*

(29) *AN EASEMENT FOR PIPELINES AND INCIDENTALS, RECORDED APRIL 17, 1992 AS INSTRUMENT NO. 137029 OF OFFICIAL RECORDS. IN FAVOR OF: EASTERN MUNICIPAL WATER DISTRICT*

LEGEND OF ABBREVIATIONS AND SYMBOLS

1400	=	EXIST. CONTOUR	277	= LOT NUMBER
1400	=	PROP. CONTOUR	41.5	= PAD ELEVATION
	=	TRACT BOUNDARY	200'	= LOT LINE DIMENSION
	=	PROPERTY LINE	R=450'	= STREET RADIUS
2%	=	STREET GRADE	78	= STREET ELEVATION
	=	CENTERLINE	67.64 CL. INT	= CENTERLINE INTERSECTION
S	=	SEWER	69 PIVC	= POINT OF VERTICAL INTERSECTION
SD	=	STORM DRAIN		
W	=	WATER LINE	F.S.	= FINISHED SURFACE ELEVATION
	=	NUISANCE DRAIN	GB	= GRADE BREAK
12"W	=	EXISTING WATER	H.P.	= HIGH POINT
	=	EXISTING OVERHEAD ELECTRIC LINE	L.P.	= LOW POINT

Underground Service Alert
DIGALERT
Call: TOLL FREE 1-800 227-2600
TWO WORKING DAYS BEFORE YOU DIG

DATE	BY	REVISIONS	APPR.	DATE
	ENGINEER		COUNTY	

REGISTERED PROFESSIONAL ENGINEER
RICHARD C. BRASHER
No. 43819
Exp. 6/30/19
CIVIL
STATE OF CALIFORNIA

PANGAEA LAND CONSULTANTS, INC.
PANGAEA LAND CONSULTANTS, INC.
2834 LA MIRADA DRIVE, SUITE H
T: 760-726-4232
F: 760-727-1405

RICHARD C. BRASHER RCE 43819 EXP. 6-30-19 DATE

CITY OF HEMET

APPROVED_____ 20____

BY:_____

IN THE CITY OF HEMET

RANCHO DIAMANTE
TENTATIVE TRACT MAP No. 36841

TITLE SHEET, KEY MAP AND NOTES

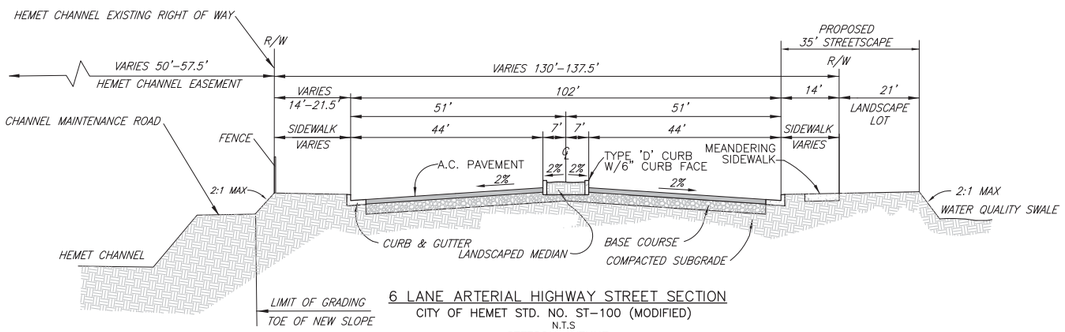
SHEET NO. 1 OF 8 SHTS.

HRD INVESTMENTS, LLC FOR:

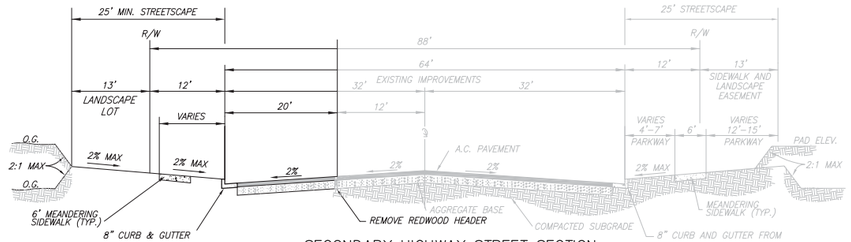
W.O.

FILE NO.

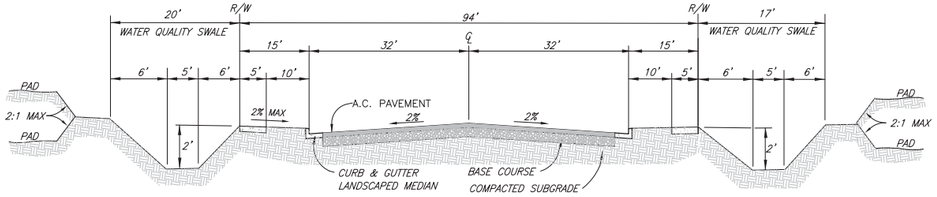
ENGINEER'S NAME: PANGAEA LAND CONSULTANTS, INC. PHONE (760) 726-4232



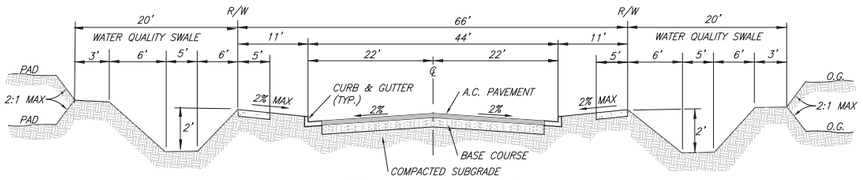
6 LANE ARTERIAL HIGHWAY STREET SECTION
CITY OF HEMET STD. NO. ST-100 (MODIFIED)
N.T.S
STETSON AVENUE



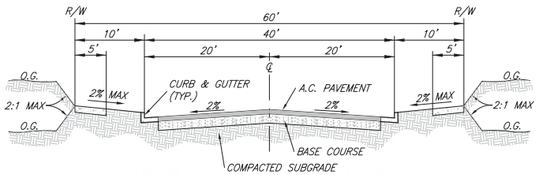
SECONDARY HIGHWAY STREET SECTION
CITY OF HEMET STD. NO. ST-102 (MODIFIED)
N.T.S
WARREN ROAD (WIDENING-SECTION IMPROVEMENTS)



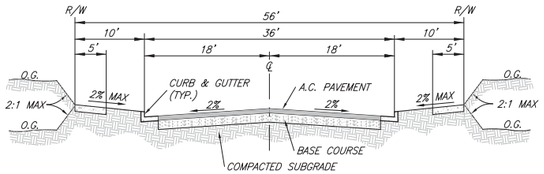
TYPICAL SECTION ENTRY
N.T.S
MUSTANG WAY - STREETS "A"



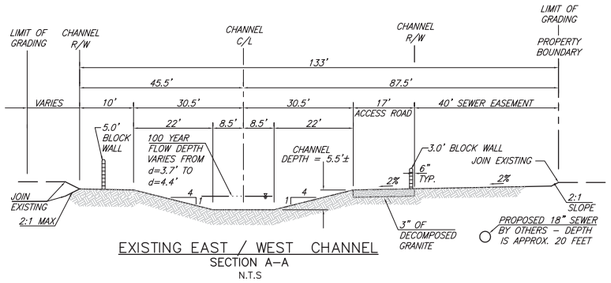
LOCAL STREET SECTION
CITY OF HEMET STD. NO. ST-103
N.T.S
STREET 'C'



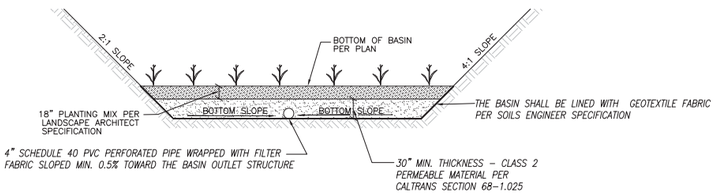
GENERAL LOCAL STREET SECTION
CITY OF HEMET STD. NO. ST-104
N.T.S
STREETS 'T' THROUGH 'ZZ'



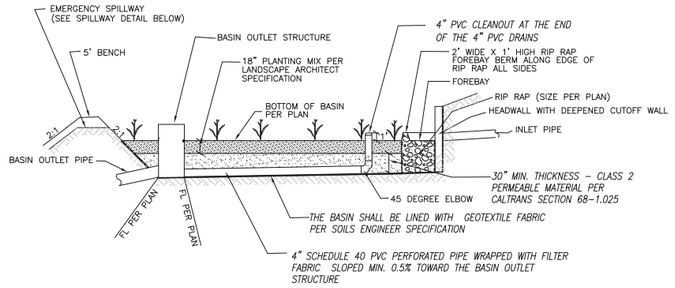
RESTRICTED LOCAL STREET SECTION
CITY OF HEMET STD. NO. ST-106
N.T.S
CUL-DE-SAC STREETS 'D' THROUGH 'S'



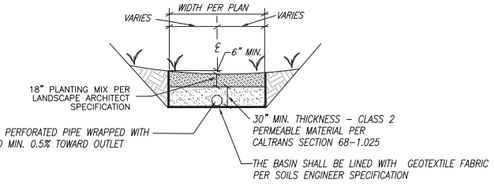
EXISTING EAST / WEST CHANNEL
SECTION A-A
N.T.S



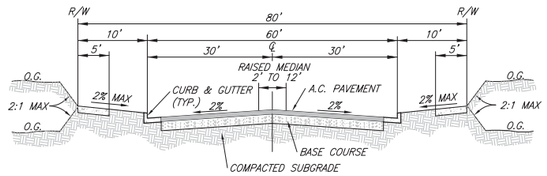
BIO-RETENTION BASIN SECTION A-A
NOT TO SCALE



BIO-RETENTION BASIN SECTION B-B
NOT TO SCALE



BIO-SWALE/BASIN
NOT TO SCALE



RESTRICTED LOCAL STREET SECTION
CITY OF HEMET STD. NO. ST-104 (MODIFIED)
N.T.S
STREET B

Underground Service Alert
DIGALERT
Call: TOLL FREE 1-800 227-2600
TWO WORKING DAYS BEFORE YOU DIG

DATE	BY	REVISIONS	APPR.	DATE
ENGINEER			COUNTY	

REGISTERED PROFESSIONAL ENGINEER
RICHARD C. BRASHER
No. 43819
Exp. 6/30/19
CIVIL
STATE OF CALIFORNIA

PANGAEA LAND CONSULTANTS, INC
PANGAEA LAND CONSULTANTS, INC.
2834 LA MIRADA DRIVE, SUITE H
T: 760-726-4232
F: 760-727-1405

RICHARD C. BRASHER RCE 43819 EXP. 6-30-19 DATE

CITY OF HEMET

APPROVED _____ 20____

BY: _____

IN THE CITY OF HEMET

RANCHO DIAMANTE
TENTATIVE TRACT MAP No. 36841

TYPICAL SECTIONS AND WATER QUALITY DETAILS

SHEET NO. 2 OF 8 SHTS.

HRD INVESTMENTS, FOR: LLC | W.O. | FILE NO.

ENGINEER'S NAME: PANGAEA LAND CONSULTANTS, INC. PHONE (760) 726-4232

LOT TABULATION			LOT TABULATION			LOT TABULATION			LOT TABULATION			LOT TABULATION			LOT TABULATION			LOT TABULATION			LOT TABULATION		
LOT NUMBER	GROSS LOT AC.	NET PAD AC.	LOT NUMBER	GROSS LOT AC.	NET PAD AC.	LOT NUMBER	GROSS LOT AC.	NET PAD AC.	LOT NUMBER	GROSS LOT AC.	NET PAD AC.	LOT NUMBER	GROSS LOT AC.	NET PAD AC.	LOT NUMBER	GROSS LOT AC.	NET PAD AC.	LOT NUMBER	GROSS LOT AC.	NET PAD AC.	LOT NUMBER	GROSS LOT AC.	NET PAD AC.
1	6,303	5,672	83	6,283	6,046	165	7,567	7,280	247	9,145	8,970	321	7,931	7,411	393	5,718	5,582	465	5,345	5,172	537	5,535	5,320
2	6,288	6,076	84	6,107	5,896	166	8,518	8,212	248	8,076	7,607	322	7,752	7,264	394	7,528	7,086	466	6,563	6,390	538	5,535	5,327
3	5,388	5,187	85	6,000	5,802	167	7,073	6,668	249	8,264	7,944	323	8,324	8,039	395	6,139	5,880	467	8,349	7,890	539	5,557	5,350
4	5,350	5,187	86	6,000	5,802	168	6,397	6,201	250	8,832	8,216	324	7,613	7,135	396	5,452	5,100	468	5,983	5,801	540	5,557	5,344
5	5,350	5,188	87	6,603	5,984	169	6,976	6,753	251	10,990	10,703	325	8,300	8,146	397	6,909	6,595	469	5,983	5,796	541	7,669	6,503
6	5,350	5,188	88	6,968	6,264	170	6,001	5,828	252	9,620	9,376	326	9,350	9,147	398	7,563	7,394	470	5,983	5,811	542	5,305	5,188
7	5,350	5,188	89	6,360	6,176	171	6,390	6,015	253	7,443	6,818	327	9,477	9,343	399	6,436	6,194	471	5,983	5,818	543	6,148	5,715
8	5,350	5,188	90	6,052	5,805	172	6,900	6,224	254	7,140	6,930	328	5,490	5,316	400	6,559	6,373	472	5,525	4,849	544	5,644	5,298
9	5,350	5,188	91	6,830	6,586	173	6,896	6,358	255	7,485	7,274	329	6,209	6,011	401	6,754	6,640	473	5,675	5,037	545	6,168	5,974
10	6,350	5,187	92	6,767	6,500	174	6,330	6,132	256	7,481	7,329	330	6,168	5,999	402	9,688	9,571	474	6,381	5,994	546	5,490	5,318
11	5,350	5,188	93	7,407	6,626	175	6,281	6,084	257	7,313	7,138	331	7,327	6,482	403	8,658	8,529	475	6,584	6,167	547	5,436	5,268
12	5,350	5,188	94	6,887	6,308	176	6,281	6,083	258	7,100	6,923	332	8,887	8,133	404	8,788	8,566	476	6,478	6,105	548	5,035	4,890
13	5,350	5,187	95	6,000	5,802	177	6,281	6,088	259	7,255	7,115	333	8,006	6,162	405	6,732	6,131	477	5,818	5,388	549	5,000	4,855
14	5,350	5,188	96	6,000	5,802	178	6,281	6,087	260	7,700	7,336	334	7,700	5,846	406	5,477	5,301	478	5,063	4,917	550	5,000	4,855
15	5,350	5,188	97	6,105	5,904	179	6,281	6,095	261	7,269	7,060	335	5,333	5,079	407	8,547	8,139	479	5,030	4,846	551	5,334	5,184
16	5,350	5,188	98	6,246	5,996	180	6,308	6,108	262	7,265	7,056	336	5,294	5,038	408	5,264	5,032	480	5,083	4,926	552	5,711	5,557
17	5,371	5,210	99	6,247	6,010	181	6,028	5,898	263	7,267	7,057	337	5,737	5,517	409	5,264	5,007	481	5,000	4,837	553	6,224	5,871
18	5,279	5,186	100	6,227	6,036	182	6,795	6,606	264	7,165	6,967	338	5,967	5,724	410	5,264	5,009	482	5,000	4,838	554	5,346	4,796
19	5,754	5,616	101	6,227	6,025	183	7,280	7,280	265	7,279	6,813	339	7,006	6,324	411	5,264	5,112	483	5,270	5,120	555	5,000	4,838
20	7,742	7,339	102	6,097	5,885	184	6,328	6,104	266	7,682	7,267	340	6,911	6,480	412	6,379	5,945	484	5,300	5,135	556	5,142	4,957
21	5,144	5,054	103	6,000	5,802	185	6,292	6,093	267	7,249	6,835	341	6,046	5,723	413	6,257	5,639	485	5,300	5,138	557	5,368	5,195
22	5,144	5,022	104	6,000	5,802	186	6,289	5,998	268	7,665	7,135	342	5,787	5,461	414	5,768	5,591	486	5,300	5,125	558	7,063	6,293
23	5,144	5,004	105	6,888	6,311	187	6,285	6,061	269	7,532	6,668	343	5,785	5,370	415	5,768	5,591	487	5,300	5,139	559	6,827	6,537
24	5,144	5,002	106	7,294	6,513	188	6,281	6,072	270	7,912	7,542	344	5,258	5,080	416	5,520	5,381	488	5,300	5,150	560	6,104	5,950
25	5,144	4,981	107	6,570	5,959	189	6,277	6,077	271	7,354	7,182	345	6,308	5,302	417	5,036	4,839	489	5,300	5,150	561	5,398	5,244
26	5,144	4,987	108	6,570	6,199	190	6,273	6,071	272	7,412	6,579	346	5,732	5,322	418	5,302	4,827	490	5,300	5,150	562	5,000	4,838
27	5,144	4,989	109	6,385	5,837	191	6,268	6,052	273	7,478	6,676	347	5,172	5,010	419	5,256	4,858	491	5,300	5,141	563	5,000	4,837
28	5,144	4,986	110	6,505	6,322	192	6,263	6,039	274	8,045	7,196	348	5,887	5,481	420	6,314	5,908	492	5,300	5,137	564	5,000	4,838
29	5,086	4,940	111	6,189	6,003	193	6,258	6,055	275	7,004	6,323	349	6,213	5,681	421	7,297	6,856	493	5,908	5,422	565	5,000	4,837
30	5,144	4,987	112	6,204	5,744	194	6,146	5,829	276	7,306	6,840	350	5,980	5,630	422	5,601	5,020	494	5,779	5,253	566	5,000	4,838
31	5,144	4,987	113	6,508	6,006	195	6,226	5,682	277	7,302	6,772	351	5,750	5,444	423	5,526	5,063	495	5,245	5,043	567	5,394	5,212
32	5,144	4,987	114	6,401	5,827	196	6,773	6,278	278	7,266	6,855	352	5,750	5,414	424	5,545	5,348	496	5,218	5,048	568	5,846	5,647
33	5,158	4,978	115	8,931	6,530	197	7,514	6,878	279	7,484	7,285	353	5,750	5,294	425	7,578	7,140	497	7,476	6,810	569	5,283	5,106
34	5,158	4,978	116	6,701	6,438	198	9,226	8,642	280	7,727	7,495	354	5,750	5,360	426	6,210	5,367	498	5,962	5,383	570	5,959	5,729
35	5,650	5,219	117	7,649	7,246	199	8,205	7,945	281	7,895	7,686	355	5,750	5,364	427	9,652	8,563	499	6,500	5,826	571	5,364	5,059
36	5,650	5,127	118	7,242	6,750	200	7,194	6,977	282	7,909	7,337	356	5,702	5,394	428	7,251	6,956	500	6,612	5,889	572	6,243	5,762
37	5,517	5,323	119	8,835	8,472	201	7,572	7,461	283	7,853	7,263	357	5,750	5,334	429	6,990	6,004	501	6,674	6,014	573	6,313	6,119
38	5,517	5,323	120	7,109	6,903	202	6,633	6,481	284	7,292	7,089	358	5,750	5,344	430	7,701	6,914	502	5,988	5,467	574	5,982	5,829
39	5,517	5,204	121	6,455	6,252	203	7,901	7,673	285	7,216	7,005	359	5,750	5,474	431	6,729	6,411	503	5,691	5,241	575	5,388	4,955
40	5,517	5,149	122	6,300	6,100	204	8,061	7,813	286	8,696	8,324	360	5,750	5,544	432	6,576	6,212	504	5,932	5,276	576	5,000	4,838
41	5,517	5,169	123	6,713	6,293	205	8,313	8,092	287	7,730	7,211	361	5,754	5,594	433	6,422	6,056	505	6,973	6,029	577	5,000	4,838
42	5,516	5,234	124	6,363	5,879	206	7,703	7,513	288	8,223	7,622	362	6,315	6,193	434	6,257	5,892	506	6,471	6,117	578	5,000	4,838
43	5,516	5,202	125	6,000	5,805	207	6,231	6,079	289	8,224	7,563	363	6,722	6,547	435	6,085	5,719	507	7,704	7,241	579	5,176	5,018
44	5,721	5,219	126	6,000	5,805	208	6,973	6,069	290	8,643	7,986	364	4,991	4,869	436	5,190	4,875	508	7,579	7,118	580	5,249	5,085
45	5,787	5,307	127	6,000	5,805	209	6,801	6,069	291	7,736	7,315	365	5,902	5,513	437	5,183	4,860	509	6,469	6,073	581	5,347	5,167
46	5,830	5,657	128	6,000	5,802	210	6,649	6,450	292	7,971	7,379	366	5,775	5,603	438	5,101	4,778	510	5,787	5,441	582	5,481	5,297
47	5,830	5,657	129	6,041	5,838	211	6,648	6,454	293	7,905	7,473	367	5,250	5,100	439	5,526	5,175	511	5,916	5,294	583	5,668	5,508
48	5,830	5,657	130	9,102	8,697	212	6,645	6,463	294	7,832	7,601	368	5,250	5,094	440	6,006	5,296	512	5,720	5,266	584	7,515	7,004
49	5,830	5,657	131	6,357	5,956	213	6,641	6,439	295	7,825	7,617	369	5,250	5,094	441	5,984	5,385	513	5,500	5,363	585	6,797	6,261
50	5,830	5,657	132	6,518	5,971	214	6,635	6,421	296	7,813	7,587	370	5,250	5,094	442	6,532	6,350	514	5,396	5,275	586	5,820	5,653
51	5,830	5,657	133	6,000	5,802	215	6,555	6,293	297	7,795	7,557	371	7,112	6,819	443	8,231	7,625	515	6,480	5,777	TOTAL:	86.55 AC	83.14 AC
52	5,680	5,242	134	6,000	5,802	216	6,377	6,051	298	7,773	7,515	372	6,469	6,288	444	6,781	6,577	516	8,422	7,492			
53	5,680	5,374	135	6,000	5,802	217	6,561	6,285	299	9,591	9,167	373	5,595	5,428	445	6,883	6,609	517	6,402	6,066			
54	5,169	5,013	136	6,000	5,802	218	6,496	6,187	300	8,341	8,051	374	6,473	5,937	446	5,734	5,251	518	6,531	6,317			
55	5,169	5,013	137	6,580	6,445	219	6,000	5,736	301	8,105	7,813	375	5,908	5,569	447	7,058	6,543	519	8,937	8,504			
56	5,169	5,005	138	6,352	5,952	220	6,987	6,722	302	7,662	6,928	376	5,300	5,150	448	6,343	5,605	520	9,285	6,530			
57	5,189	5,005	139	6,000	5,720	221	6,595	6,324	303	7,747	7,278	377	5,300	5,150	449	7,065	6,267	521	9,603	8,833			
58	5,082	4,8003	140	6,387	5,857	222	6,677	6,452	304	8,505	8,174	378	6,076	5,773	450	5,977	5,660	522	10,723	8,164			
59	5,702	5,280	141	6,388	5,897	223	6,677	6,443	305	8,248	7,958	379	5,021	4,865	451	5,780	5,477	523	5,777	5,649			
60	5,831	5,619	142	6,000	5,797	224	6,677	6,450	306	7,473	7,221	380	5,000	4,825	452	5,431	5,169	524	6,061	5,886			
61	5,831	5,643	143	6,000	5,791	225	6,569	6,325	307	7,742	7,532	381	5,383	5,181	453	7,467	7,119	525	6,099	5,932			
62	5,831	5,637	144	6,000	5,787	226	6,569	6,336	308	7,907	7,681	382	5,371	5,165	454	6,400	5,987	526	6,226	6,063			
63	5,831	4,957	145	6,010	5,815	227	6,271	6,100	309	7,907	7,676	383	5,371	5,162	455	6,066	5,712	527	5,743	5,581			
64	5,831	5,622	146	6,400	6,203	228	6,099	5,947	310	7,821	7,472	384	5,371	5,160	456	6,128	5,869	528	5,895	5,733			
65	5,791	5,273	147	6,000	5,803	229	6,100	5,948	311	8,261	7,846	385	5,371	5,549	457	6,355	6,098	529	6,249	6,070			
66	5,847	5,333	148	6,000	5,810	230	6,833	6,635	312	8,078	7,775	386	6,005	5,549	458	6,284	6,033	530	6,440	6,182			
67	5,100	4,949	149	6,000	5,807	231	6,676	6,518	313	8,072	7,767	387	7,336	6,917	459	7,263	6,479	531	5,739	5,512			
68	5,100	4,949	150	6,387	6,064	232	7,483	6,937	314	8,042	7,740	388	6,021	5,853	460	6,005	5,422	532	6,883	6,620			
69	5,100	4,949	151	7,168	6,813	233	7,483	6,961	315	8,012	7,824	389	5,748	5,587	461	5,741	5,536	533	6,500	6,259			
70	5,100	4,949	152	6,720	6,519	234	6,731	6,580	316	9,067	8,685	390	5,598	5,435	462	5,741	5,540	534	6,768	6,519			
71	5,100	4,949	153	6,720	6,516	235	8,113	7,864	317	7,086	6,854	391	5,431	5,276	463	5,741	5,552	535	5,222	5,059			
72	5,743	5,261	154	7,964	7,511	236	8,153	7,893	318	7,876	7,657	392	5,149	4,980	464	5,761	5,574	536	5,065	4,905			
73	5,743	5,340	155	6,844	6,672	237	8,158	7,881	319	7,296	6,794												
74	5,205	5,050	156	6,831	6,638	238	7,458	7,215	320	7,786	7,186												
75	5,223	5,069	157	6,850	6,656	239	7,350	7,210															
76	5,337	5,144	158	6,005	5,805	240	8,351	8,017															
77	5,235	5,063	159	6,000	5,802	241	8,499	8,332															
78	5,235	5,071	160	6,387	6,059	242	8,499	8,149															
79	5,235	5,054	161	6,518	5,988	243	8,819	8,217															
80	5,235	5,053	162	6,120	5,919	244	8,426	8,235															
81	6,303	5,725	163	6,120	5,914	245	9,149	8,477															
82	6,283	6,079	164	6,536	6,329	246	9,684	9,157															

NET PAD IS 96.1% OF GROSS LOT AREA

COMMERCIAL LOT		
LOT NUMBER	GROSS LOT AC.	NET PAD AC.
587	19.67	16.40

SINGLE FAMILY
SINGLE FAMILY: 586 LOTS
TOTAL LOT AREA: 86.55 AC.
TOTAL PAD AREA: 83.14 AC.
AVERAGE LOT AREA: 6,434 S.F.
AVERAGE PAD AREA: 6.180 S.F.
TOTAL SINGLE FAMILY 86.55 AC

COMMERCIAL SITE
COMMERCIAL LOT: 19.67 AC

PUBLIC PARK
PUBLIC PARK "A" AREA: 5.62 AC

HOA PARKS
HOA PARK "B" AREA: 00.35 AC
HOA PARK "C" AREA: 00.06 AC
HOA PARK "D" AREA: 00.19 AC
HOA PARK "E" AREA: 00.16 AC
HOA PARK "F" AREA: 00.21 AC
HOA PARK "G" AREA: 00.10 AC
HOA PARK "H" AREA: 00.70 AC
HOA PARK "I" AREA: 00.67 AC
HOA PARK "J" AREA: 00.31 AC
HOA PARK "K" AREA: 00.08 AC
HOA PARK "L" AREA: 00.11 AC
HOA PARK "M" AREA: 00.28 AC
HOA PARK "N" AREA: 00.20 AC
HOA PARK "O" AREA: 00.03 AC
HOA PARK "P" AREA: 00.28 AC
HOA PARK "Q" AREA: 00.59 AC
HOA PARK "R" AREA: 00.17 AC
HOA PARK "S" AREA: 00.22 AC
HOA PARK "T" AREA: 00.41 AC
TOTAL HOA PARKS = 5.12 AC

OPEN SPACE
O.S. LOT "U" AREA: 00.36 AC
O.S. LOT "V" AREA: 00.31 AC
O.S. LOT "W" AREA: 00.42 AC
O.S. LOT "X" AREA: 07.62 AC
O.S. LOT "Y" AREA: 08.35 AC
O.S. LOT "Z" AREA: 00.71 AC
O.S. LOT "AA" AREA: 00.08 AC
O.S. LOT "BB" AREA: 00.43 AC
O.S. LOT "CC" AREA: 00.11 AC
O.S. LOT "DD" AREA: 00.26 AC
O.S. LOT "EE" AREA: 01.62 AC
O.S. LOT "FF" AREA: 19.03 AC
O.S. LOT "GG" AREA: 00.97 AC
O.S. LOT "HH" AREA: 8.57 AC
O.S. LOT "II" AREA: 00.35 AC
O.S. LOT "JJ" AREA: 03.20 AC
O.S. LOT "KK" AREA: 00.66 AC
O.S. LOT "LL" AREA: 00.29 AC
O.S. LOT "MM" AREA: 00.30 AC
O.S. LOT "NN" AREA: 00.06 AC
O.S. LOT "OO" AREA: 00.45 AC
TOTAL OPEN SPACE = 54.15 AC

STREET LANDSCAPE LOT
S.L. LOT "PP" AREA: 00.29 AC
S.L. LOT "QQ" AREA: 00.65 AC
S.L. LOT "RR" AREA: 00.60 AC
S.L. LOT "SS" AREA: 00.64 AC
S.L. LOT "TT" AREA: 00.09 AC
S.L. LOT "UU" AREA: 00.31 AC
TOTAL LANDSCAPE = 2.58 AC

PUBLIC STREETS
PUBLIC STREETS = 71.37 AC

SUMMARY	
SINGLE FAMILY	86.55 AC
COMMERCIAL	19.67 AC
PUBLIC PARK	5.62 AC
HOA PARKS	5.12 AC
OPEN SPACE	54.15 AC
STREET LANDSCAPE	2.58 AC
PUBLIC STREETS	71.38 AC
TOTAL	245.07 AC

Underground Service Alert
DIGALERT
Call: TOLL FREE
1-800
227-2600
TWO WORKING DAYS BEFORE YOU DIG

DATE	BY	REVISIONS	APPR.	DATE
ENGINEER			COUNTY	

REGISTERED PROFESSIONAL ENGINEER
RICHARD C. BRASHER
No. 43819
Exp. 6/30/19
CIVIL
STATE OF CALIFORNIA

PANGAEA LAND CONSULTANTS, INC.
PANGAEA LAND CONSULTANTS, INC.
2834 LA MIRADA DRIVE, SUITE H
T: 760-726-4232
F: 760-727-1405

RICHARD C. BRASHER RCE 43819 EXP. 6-30-19 DATE

CITY OF HEMET

APPROVED _____ 20 _____

BY: _____

IN THE CITY OF HEMET

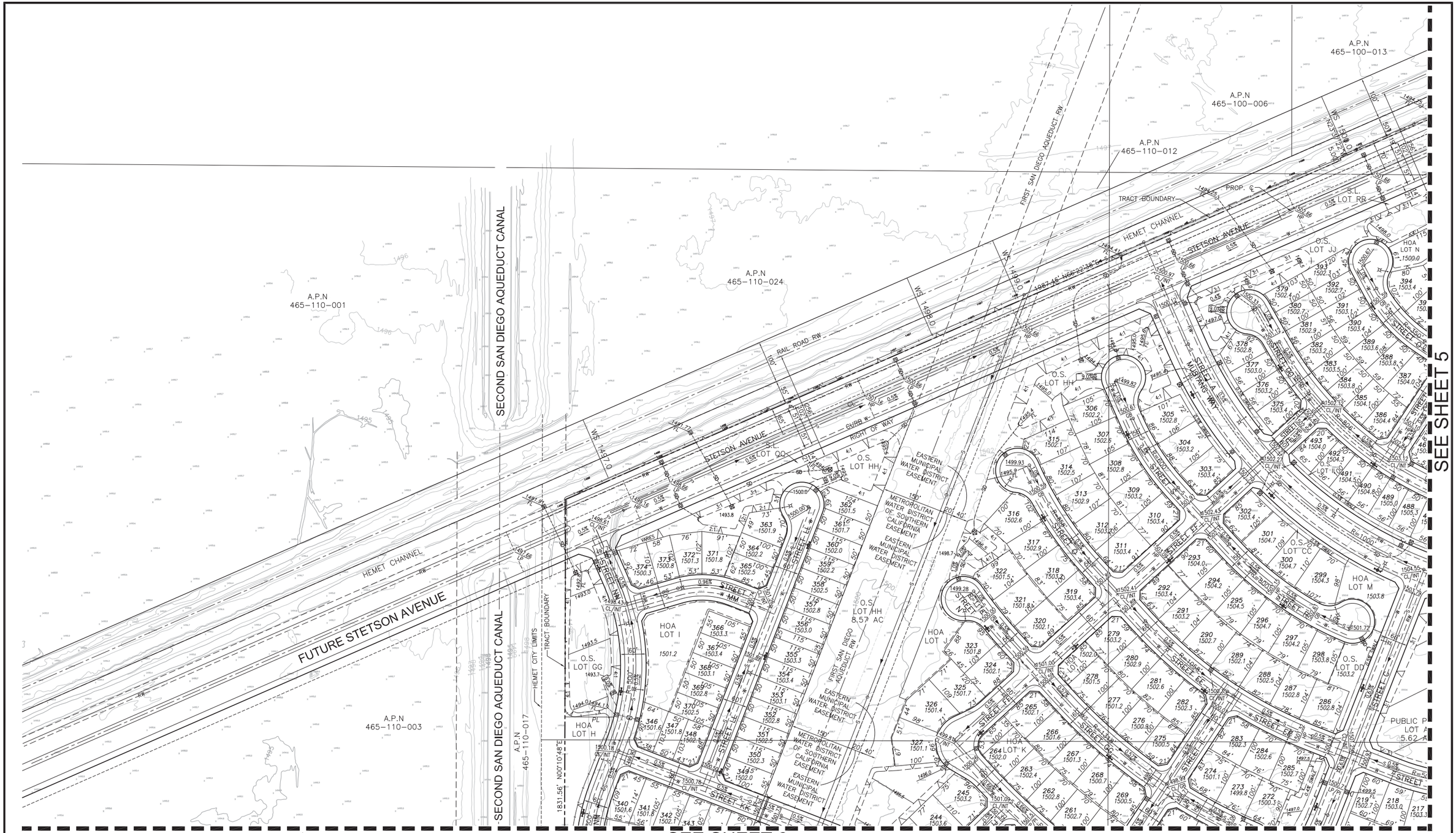
RANCHO DIAMANTE
TENTATIVE TRACT MAP No. 36841

LOT AREA TABULATION

SHEET NO. 3 OF 8 SHTS.

HRD INVESTMENTS, LLC FOR: | W.O. | FILE NO.

ENGINEER'S NAME: PANGAEA LAND CONSULTANTS, INC. PHONE (760) 726-4232



Underground Service Alert
DIGALERT
Call: TOLL FREE
1–800
227–2600
TWO WORKING DAYS BEFORE YOU DIG

DATE	BY	REVISIONS	APPR.	DATE
	ENGINEER		COUNTY	

REGISTERED PROFESSIONAL ENGINEER
RICHARD C. BRASHER
RCE No. 43819
Exp. 6/30/19
CIVIL
STATE OF CALIFORNIA

PANGAEA LAND CONSULTANTS, INC.
PANGAEA LAND CONSULTANTS, INC.
2834 LA MIRADA DRIVE, SUITE H
T: 760–726–4232
F: 760–727–1405

RICHARD C. BRASHER RCE 43819 EXP. 6–30–19 DATE

CITY OF HEMET

APPROVED _____ 20____

BY: _____

IN THE CITY OF HEMET

RANCHO DIAMANTE
TENTATIVE TRACT MAP No. 36841

SHEET NO. 4 OF 8 SHTS.

HRD INVESTMENTS, FOR: LLC | W.O. | FILE NO.

ENGINEER'S NAME: PANGAEA LAND CONSULTANTS, INC. PHONE (760) 726-4232

SEE SHEET 3

SEE SHEET 7

A.P.N 465-100-001

A.P.N 465-100-038

A.P.N 465-100-013

A.P.N 465-100-018

A.P.N 460-060-001

A.P.N 460-060-004

FIRST SAN DIEGO AQUEDUCT R/W

HEMET CHANNEL

STETSON AVENUE

WARREN ROAD

TEMPORARY CONNECTION WARREN ROAD

TRACT BOUNDARY

PROP. C

S.L. LOT RR

S.L. LOT SS

S.L. LOT UU

O.S. LOT JJ 3.20 AC

O.S. LOT HH

O.S. LOT II

O.S. LOT CC

O.S. LOT KK

O.S. LOT LL

HOA LOT N

HOA LOT P

HOA LOT Q

HOA LOT R

LOT 587 COMMERCIAL 19.67 AC

ENVIRONMENTALLY SENSITIVE AREA (PROTECT IN PLACE)

RETAINING WALL

TRACT 31808

STREET A

STREET B

STREET BB

STREET CC

STREET DD

STREET EE

STREET FF

STREET GG

STREET HH

STREET II

STREET JJ

STREET KK

STREET LL

STREET MM

STREET NN

STREET OO

STREET PP

STREET QQ

STREET RR

STREET SS

STREET UU

STREET VV

MUSTANG WAY

N23°37'22"W 5.00'

N66°22'38"E 1087.46'

2045.16' N66°22'29"E

N00°00'05"E 29.76'

S00°00'04"W 154.32'

S23°37'56"E 230.00'

N66°22'29"E

2516.95' S00°00'04"W

N

100 50 0 100 200

SCALE: 1" = 100'

Underground Service Alert
DIGALERT
Call: TOLL FREE 1-800 227-2600
TWO WORKING DAYS BEFORE YOU DIG

DATE	BY	REVISIONS	APPR.	DATE
ENGINEER			COUNTY	

REGISTERED PROFESSIONAL ENGINEER
RICHARD C. BRASHER
No. 43819
Exp. 6/30/19
CIVIL
STATE OF CALIFORNIA

PANGAEA LAND CONSULTANTS INC

PANGAEA LAND CONSULTANTS, INC.
2834 LA MIRADA DRIVE, SUITE H
T: 760-726-4232
F: 760-727-1405

RICHARD C. BRASHER RCE 43819 EXP. 6-30-19 DATE

CITY OF HEMET

APPROVED _____ 20____

BY: _____

IN THE CITY OF HEMET

RANCHO DIAMANTE
TENTATIVE TRACT MAP No. 36841

SHEET NO. 5 OF 8 SHTS.

HRD INVESTMENTS, FOR: LLC | W.O. | FILE NO.

ENGINEER'S NAME: PANGAEA LAND CONSULTANTS, INC. PHONE (760) 726-4232

P:\Active Projects\Rancho Diamante TM 35394 Expansion TM 2014-1114\Drawing\TM\TM35394-5.dwg Jan 16, 2019 - 1:37pm

SEE SHEET 4

SEE SHEET 7

SEE SHEET 8

A.P.N 465-110-001

A.P.N 465-110-003

A.P.N 465-120-001

A.P.N 465-120-019

A.P.N 465-120-004

A.P.N 465-130-005

A.P.N 465-110-021

FUTURE STETSON AVENUE

HEMET CHANNEL

SECOND SAN DIEGO AQUEDUCT CANAL

FIRST SAN DIEGO AQUEDUCT R/W

TRACT BOUNDARY

HEMET CITY LIMIT

HOA LOT H

HOA LOT I

HOA LOT J

HOA LOT K

HOA LOT G

HOA LOT F

HOA LOT M

O.S. LOT GG

O.S. LOT FF 19.03 AC

O.S. LOT CC

O.S. LOT DD 1503.2

O.S. LOT EE 1.62 AC

O.S. LOT BB

O.S. LOT Y 8.35 AC

PUBLIC PARK LOT A 5.62 AC

OPEN SPACE

EASTERN MUNICIPAL WATER DISTRICT EASEMENT

METROPOLITAN WATER DISTRICT OF SOUTHERN CALIFORNIA EASEMENT

5' BLOCK WALL

3' BLOCK WALL

1494.0 TOP BERM

1495.0 TOP BERM

3942.42' N89°00'47"W

N00°10'48"E 1831.56'

SCALE: 1" = 100'

Underground Service Alert DIGALERT Call: TOLL FREE 1-800 227-2600 TWO WORKING DAYS BEFORE YOU DIG

DATE	BY	REVISIONS	APPR.	DATE
ENGINEER			COUNTY	

REGISTERED PROFESSIONAL ENGINEER RICHARD C. BRASHER No. 43819 Exp. 6/30/19 CIVIL STATE OF CALIFORNIA

PANGAEA LAND CONSULTANTS, INC

PANGAEA LAND CONSULTANTS, INC.
2834 LA MIRADA DRIVE, SUITE H
T: 760-726-4232
F: 760-727-1405

RICHARD C. BRASHER RCE 43819 EXP. 6-30-19 DATE

CITY OF HEMET

APPROVED _____ 20 ____

BY: _____

IN THE CITY OF HEMET

RANCHO DIAMANTE
TENTATIVE TRACT MAP No. 36841

SHEET NO. 6 OF 8 SHTS.

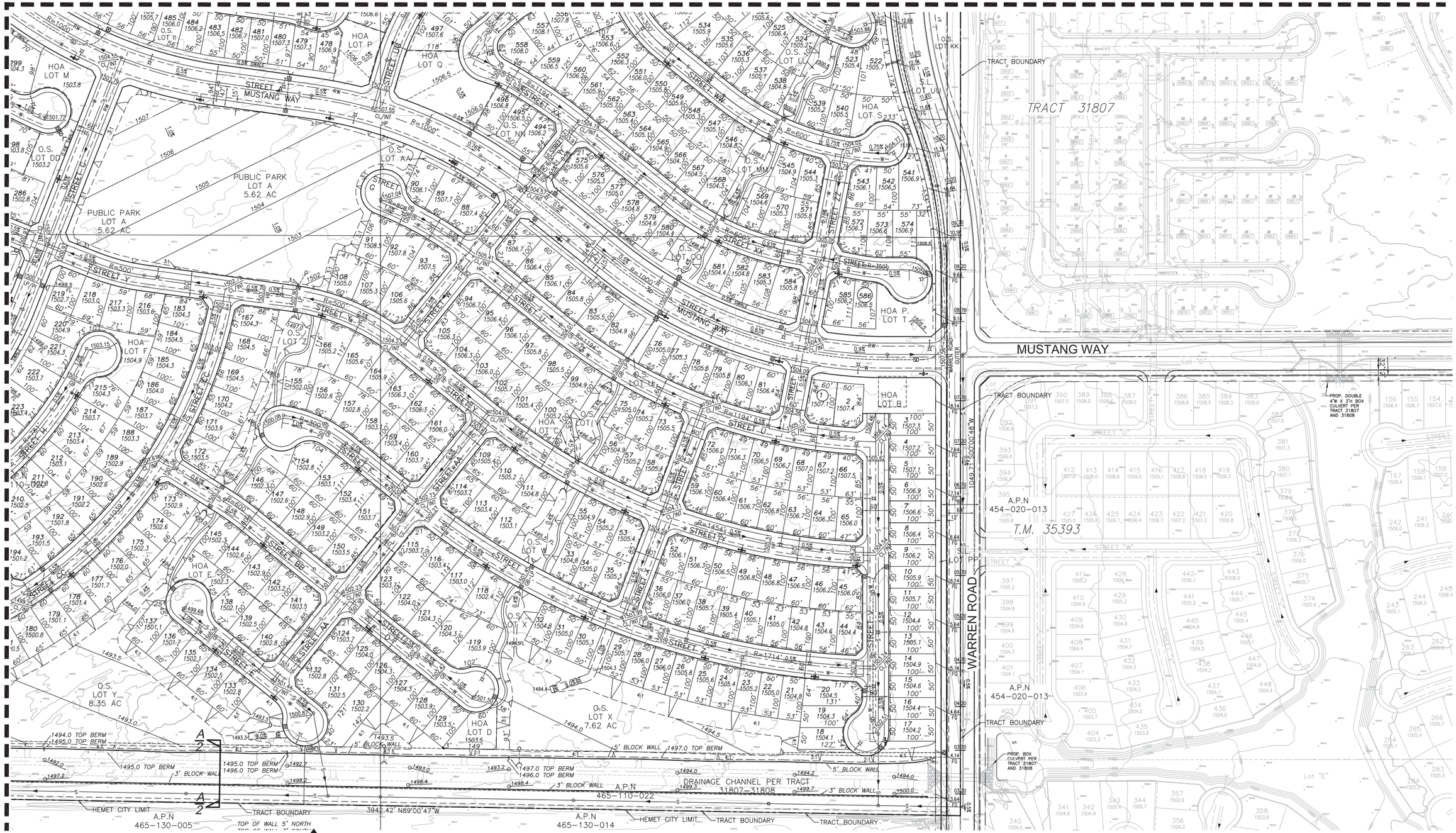
HRD INVESTMENTS, FOR: LLC | W.O. | FILE NO.

ENGINEER'S NAME: PANGAEA LAND CONSULTANTS, INC. PHONE (760) 726-4232

P:\Active Projects\Rancho Diamante, TM -16304 Expiration, TM_2014-114\Drawing\TM\16304-6.dwg Jan 16, 2019 - 1:40pm

SEE SHEET 5

SEE SHEET 6



Underground Service Alert
DIGALERT
Call: TOLL FREE 1-800 227-2600
TWO WORKING DAYS BEFORE YOU DIG

DATE	BY	REVISIONS	APPR.	DATE
ENGINEER			COUNTY	

REGISTERED PROFESSIONAL ENGINEER
RICHARD C. BRASHER
R.C.E. No. 43819
Exp. 6/30/19
CIVIL
STATE OF CALIFORNIA

PANGAEA LAND CONSULTANTS INC
PANGAEA LAND CONSULTANTS, INC.
2834 LA MIRADA DRIVE, SUITE H
T: 760-726-4232
F: 760-727-1405

RICHARD C. BRASHER RCE 43819 EXP. 6-30-19 DATE

CITY OF HEMET

APPROVED _____ 20____

BY: _____

IN THE CITY OF HEMET

RANCHO DIAMANTE
TENTATIVE TRACT MAP No. 36841

SHEET NO. 7 OF 8 SHTS.

HRD INVESTMENTS, LLC FOR: | W.O. | FILE NO.

P:\Active Projects\Rancho Diamante TM 35394 - Expansion TM 2014-114\Drawing\TM\TM35394-7.dwg Jan 16, 2019 - 1:42pm

ENGINEER'S NAME: PANGAEA LAND CONSULTANTS, INC. PHONE (760) 726-4232

SEE SHEET 6

TRACT BOUNDARY

A/2 — A/2

HEMET CITY LIMITS

TRACT BOUNDARY

RANCHO DIAMANTE, LLC
A.P.N
465–120–019

RANCHO DIAMANTE, LLC
A.P.N
465–120–021

LOT D

CHEN
A.P.N
465–130–016

LOT C

LOT A

SIMPSON ROAD

DRAINAGE CHANNEL PER TRACT 31807–31808

HEMET CITY LIMITS

A.P.N
465–140–034

105 LF CHANNEL TRANSITION BOTTOM WIDTH 20' TO 13' AND SIDE SLOPE 4:1 TO 2:1

BOTTOM WIDTH 20' SLOPES 4:1

BOTTOM WIDTH 13' SLOPES 2:1

METROPOLITAN WATER DISTRICT
A.P.N
465–130–007

RIVERSIDE COUNTY FLOOD CONTROL
A.P.N
465–130–017

WARPED HEADWALL

LOT B

A.P.N
465–140–035

FIRST SAN DIEGO AQUEDUCT

TRACT BOUNDARY

TRACT BOUNDARY

MAINT. ROAD

MAINT. ROAD

METROPOLITAN WATER DISTRICT R/W

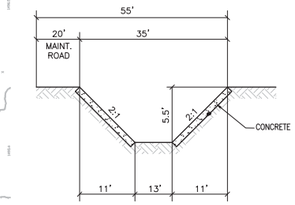
NEW BOX CULVERT EXT.

EXISTING BOX CULVERT

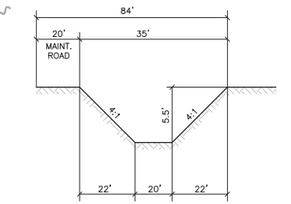
EXISTING BOX CULVERT

SECOND SAN DIEGO AQUEDUCT CANAL

METROPOLITAN WATER DISTRICT
A.P.N
465–130–013



OFFSITE DRAINAGE CHANNEL
SECTION C–C



OFFSITE DRAINAGE CHANNEL
SECTION D–D

N

100 50 0 100 200

SCALE: 1" = 100'

Underground Service Alert
DIGALERT
Call: TOLL FREE
1–800
227–2600
TWO WORKING DAYS BEFORE YOU DIG

DATE	BY	REVISIONS	APPR.	DATE
	ENGINEER		COUNTY	

REGISTERED PROFESSIONAL ENGINEER
RICHARD C. BRASHER
No. 43819
Exp. 6/30/19
CIVIL
STATE OF CALIFORNIA

PANGAEA LAND CONSULTANTS, INC.
PANGAEA LAND CONSULTANTS, INC.
2834 LA MIRADA DRIVE, SUITE H
T: 760–726–4232
F: 760–727–1405

RICHARD C. BRASHER RCE 43819 EXP. 6–30–19 DATE

CITY OF HEMET

APPROVED _____ 20____

BY: _____

IN THE CITY OF HEMET

RANCHO DIAMANTE
TENTATIVE TRACT MAP No. 36841

SHEET NO. 8 OF 8 SHTS.

HRD INVESTMENTS, LLC FOR: | W.O. | FILE NO.

P:\Active Projects\Rancho Diamante TM 35394 Expansion TM 2014–114\Drawing\DWG\TM35394–8.dwg Jan 16, 2019 – 1:49pm

ENGINEER'S NAME: PANGAEA LAND CONSULTANTS, INC. PHONE (760) 726–4232

Appendix 3: Soils Information

Geotechnical Study and Other Infiltration Testing Data

Leighton and Associates, Inc.
A LEIGHTON GROUP COMPANY

April 17, 2018

Project No. 11061.002

RANCHO DIAMANTE INVESTMENTS, LLC
C/O Benchmark Pacific
550 Laguna Drive, Suite B
Carlsbad, California 92008

Attention: Mr. Rick Robotta

Subject: **Results of Onsite Percolation/Infiltration Testing**
Proposed Storm Water Infiltration Basins
Rancho Diamante, Tract Map No. 36481
City of Hemet, Riverside County, California

References: *Design Handbook for Low Impact Development Best Management Practices, Riverside County Flood Control and Water Conservation District (District), dated September 2011.*

City of Hemet, Rancho Diamante, Tentative Tract Map No. 36841 plans, by Pangaea Land Consultants, Inc., not dated.

Supplemental Geotechnical Exploration, Rancho Diamante Residential Development, Tentative Tract Map No. 36841, City of Hemet, California, by Leighton and Associates, Inc., PN 11061.001, dated August 25, 2015.

In accordance with your request and authorization, we are pleased to provide this update report presenting the results of field percolation testing for the selected proposed storm water infiltration basins associated with the subject Tract. According to provided site plans, thirteen basins are proposed throughout the site. Four BMP basins were selected for testing (BMP# 1, 4, 8 & 12).

PURPOSE AND SCOPE OF WORK

The purpose of our testing was to evaluate infiltration rates of onsite soils with respect to the proposed storm water retention basins as depicted on the referenced rough grading plans. Services provided for this study consisted of the following:

- Drilling, sampling and logging of 4 exploratory borings within four proposed storm water basin areas (one boring for each selected basin).
- Field percolation testing at 2 locations within each of the selected basins (2 tests per basin) in accordance with the procedures outlined in District's Design Handbook,

referenced above. Percolation/infiltration tests ranged from 3 to 11 feet below the existing grade to represent planned basin elevations.

- Compilation of this report that presents the results of our field percolation/infiltration testing.

SITE DESCRIPTION

The proposed residential development (Tract 36481) is located west of Mustang Way and Warren Road in the City of Hemet, California (See Figure 1). The site is generally undeveloped and appeared to be used for agricultural purposes.

Topographically, the site is relatively flat or gently sloping to the southwest. The site is bordered by drainage channels on the north and south, with the San Diego Aqueduct bisecting the site on the west. Warren Road borders the site to the east. A previously constructed retention basin located in the southwestern portion of the site (Basin No. 4). Site elevations range from approximately 1,507 feet above mean sea level (msl) in the northeastern corner of the site to approximately 1,495 feet (msl) in the western portion of the site.

FIELD EXPLORATION

Our field exploration consisted of excavating four deep geotechnical borings and eight percolation tests on April 6, 2018 utilizing a truck mounted CME 75 drill rig equipped with an 8-inch hollow-stem auger. The exploratory borings were logged and sampled to depths of approximately 15 to 25 feet below existing surface. Representative samples were collected for further field and laboratory classification. A staff geologist from our office logged and observed all excavations. The locations of the exploratory borings and percolation test holes are shown on Figures 2 and 3. The logs of the exploratory borings are included in Appendix A.

SOILS AND GROUNDWATER CONDITIONS

Based on the results of this exploration and review of our previous geotechnical investigation reports, the site is expected to be underlain by older alluvial materials at depth which is in turn mantled with a variable thickness of alluvial deposits. Based on this exploration and previous investigations it is our opinion that historic groundwater does not exist within 10 feet below bottom of the proposed basins.

TEST RESULTS

The percolation/infiltration tests were performed in accordance with the procedures of Section 2.3 of the Riverside County Flood Control and Water Conservation District Design Handbook (RCFC&WCD, 2011). Results reported below are the most conservative tested reading in minutes per inch drop. The infiltration rates were estimated using the "Porchet Method". Field test data are included in Appendix A.

Summary of Infiltration Test Results

Basin No.	Test Hole #	Ex. Ground Surface Elev. (ft)	Depth BGS (ft)	Infiltration Rate (in/hr)	Soil Description
1	P-1	1501	7.0	2.94	Poorly Graded SAND with SILT (SP-SM) / Alluvium
	P-2	1501	8.0	2.30	Silty SAND (SM) / Alluvium
4	P-3	1491	4.0	1.71	Silty SAND (SM) / Alluvium
	P-4	1491	3.0	5.76	Well-Graded SAND with SILT (SW-SM) / Alluvium
8	P-5	1502	8.0	3.69	Well-Graded SAND with SILT (SW-SM) / Alluvium
	P-6	1502	7.0	1.33	Silty SAND (SM) / Alluvium
12	P-7	1506	11.0	0.79	Silty SAND (SM) / Alluvium
	P-8	1505	10.0	1.30	Silty SAND (SM) / Alluvium

CONCLUSIONS AND RECOMMENDATIONS

Based on the above, we recommend for preliminary design purposes, the proposed basins be sized/designed using the average of the two infiltration rates that correspond to each basin. For other basins not specifically tested, the lower infiltration rate may be applied for preliminary design purposes. We understand that an average infiltration rate of 1.6 inches per hour is required for this site. The soils underlying Basin 12 do not meet the minimum requirement. No factor of safety was applied to these tested infiltration rates. The Design Handbook for LODBMP recommends a Factor of Safety of 3 (App. A, Table 1)

LIMITATIONS

This report was based in part on data obtained from a limited number of observations, soil excavations, samples and tests. Such information is, by necessity, incomplete.

The nature of many sites is such that differing soil or geologic conditions can be present within small distances and under varying climatic conditions. Changes in subsurface conditions can and do occur over time. Please notify the engineer if event conditions encountered during construction are different than those described or reflected in this report.

This report was prepared for the sole use of Client and their design team, for application to design of the proposed infiltration basins, in accordance with generally accepted geotechnical engineering practices at this time in California. In addition, since this is subject to review by Riverside County, we recommend that data in this report be only used in the design of this project after review and approval by County, where applicable. Any premature (before County approval) or unauthorized use of or reliance on this report constitutes an agreement to defend and indemnify Leighton from and against any liability which may arise as a result of such use or reliance, regardless of any fault, negligence, or strict liability of Leighton.

If you have any question, please do not hesitate to contact this office. We appreciate this opportunity to be of service.

Respectfully submitted,

LEIGHTON AND ASSOCIATES, INC.

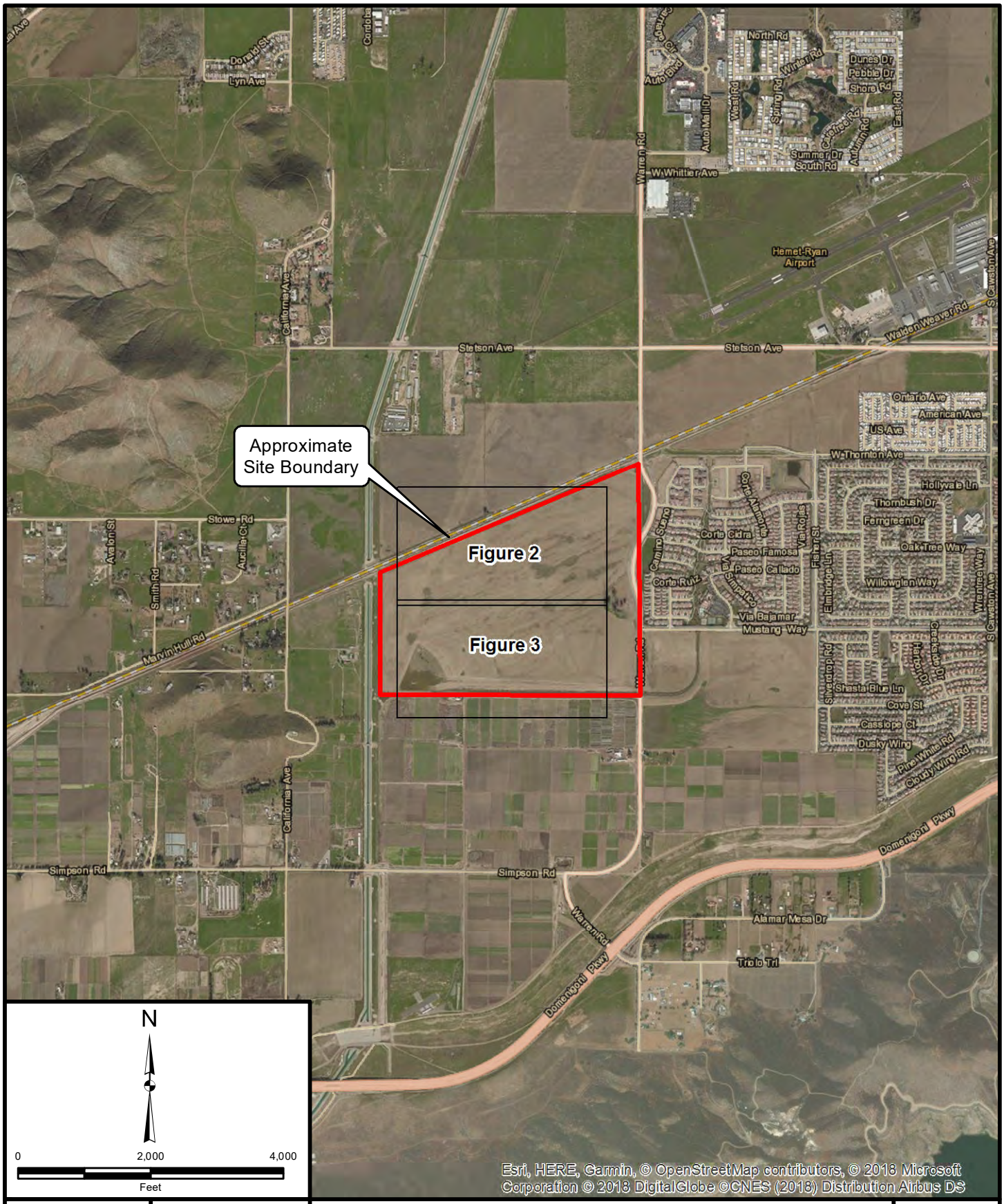
Simon I. Saiid, GE 2641
Principal Engineer

Robert F. Riha, CEG 1921
Sr. Vice President / Sr. Principal Geologist

Attachments: Figure 1 – Site Location Map
Figures 2 and 3 – Boring/Perc Test Location Maps
Appendix A – Perc Data Test Sheets & Log of Exploratory Borings

Distribution: (1) Addressee (one PDF copy via email)
(1) Hunsaker & Associates

Leighton



N

0 2,000 4,000

Feet

Project: 11061.002	Eng/Geol: SIS/RFR
Scale: 1 " = 2,000 '	Date: April 2018

Base Map: Bing Maps 2018
Thematic Information: Leighton
Author: Leighton Geomatics (mmurphy)

SITE LOCATION MAP

Rancho Diamante TTM 36841
Hemet, California

Figure 1

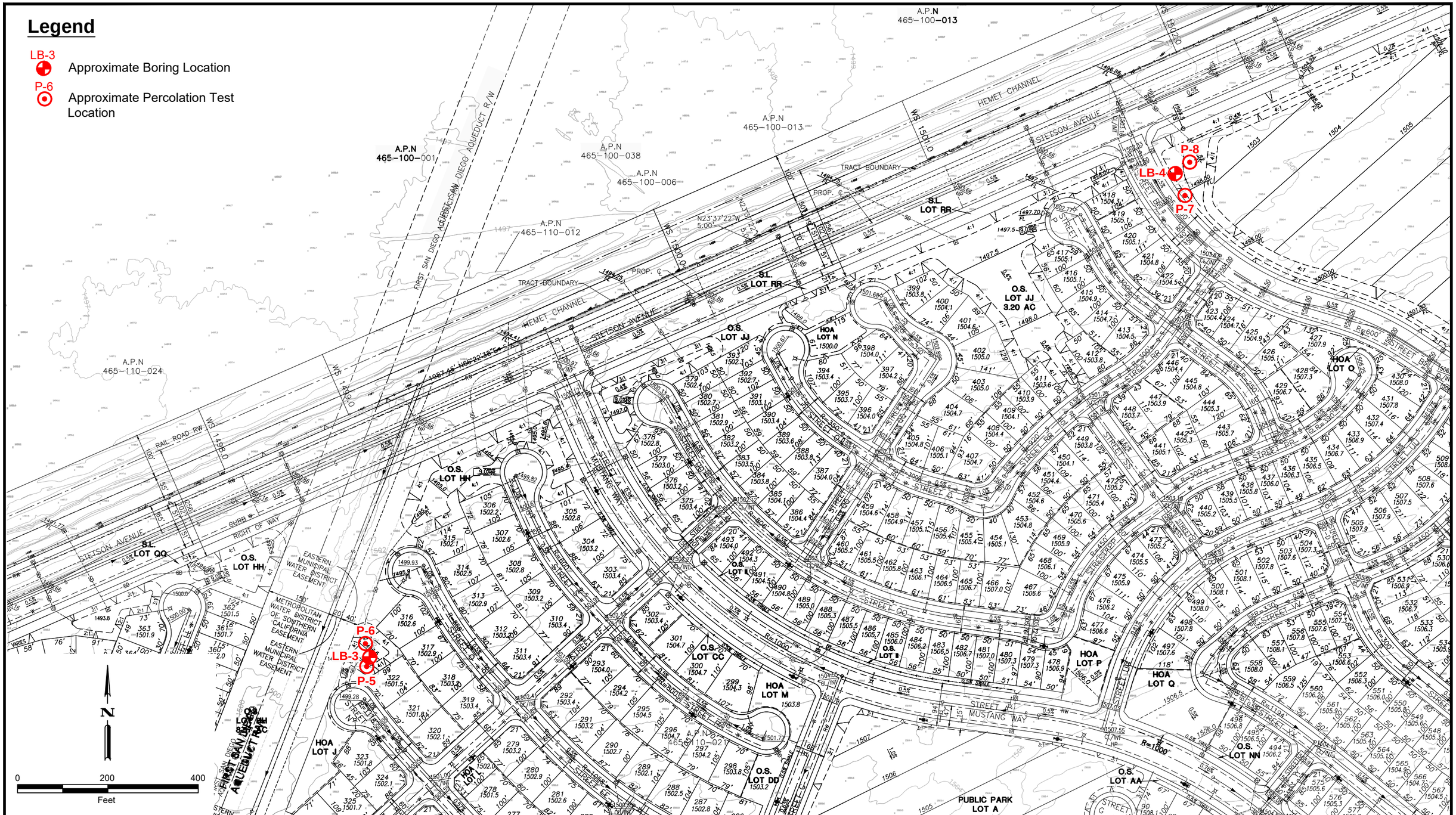
Leighton

Map Saved as P:\Drafting\11061\002\Maps\11061-002_F01_SLM_2018-04-16.mxd on 4/16/2018 12:11:38 PM

Legend

LB-3 — Approximate Boring Location

P-6 — Approximate Percolation Test Location



Project: 11061.002	Eng/Geol: SIS/RFR
Scale: 1"=200'	Date: April 2018

Reference: Sheets 4 through 7, Tentative Tract Map by Pangea Land Consultants, Inc.

Author: MAM

BORING AND PERCOLATION LOCATION MAP

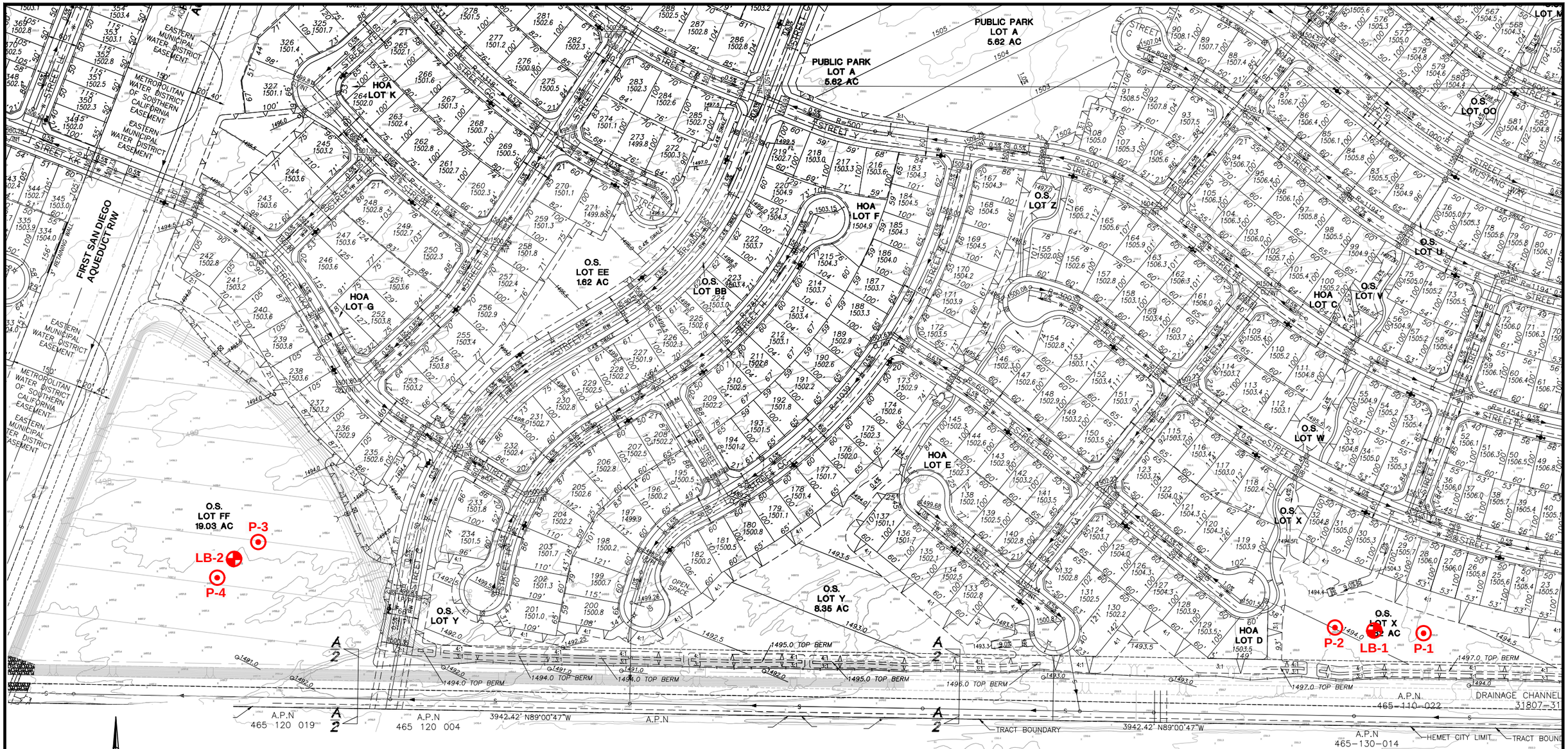
Rancho Diamante TTM 36841

Hemet, California

Figure 2

Leighton

P:\DRAFTING\11061\002\CAD\11061-002_F02-F03_BLM_2018-04-16.DWG (04-16-18 2:34:54PM) Plotted by: mmurphy



Legend

LB-2 — Approximate Boring Location

P-4 — Approximate Percolation Test Location

Project: 11061.002	Eng/Geol: SIS/RFR
Scale: 1"=200'	Date: April 2018

Reference: Sheets 4 through 7, Tentative Tract Map by Pangea Land Consultants, Inc.

Author: MAM

BORING AND PERCOLATION LOCATION MAP

Rancho Diamante TTM 36841

Hemet, California

Figure 3

Leighton

P:\DRAFTING\11061\002\CAD\11061-002_F02-F03_BLM_2018-04-16.DWG (04-16-18 2:34:17PM) Plotted by: mmurphy

APPENDIX A

Percolation Data Sheets

Log of Exploratory Borings

GEOTECHNICAL BORING LOG LB-1

Project No.	11061.002	**Date Drilled**	4-6-18
Project	Rancho Diamante Percolation Testing	**Logged By**	JTD
Drilling Co.	2R Drilling	**Hole Diameter**	8"
Drilling Method	Hollow Stem Auger - 140lb - Autohammer - 30" Drop	**Ground Elevation**	~1501'
Location	See Figure 2	**Sampled By**	JTD

Elevation Feet	Depth Feet	Graphic Log (N / S)	Attitudes	Sample No.	Blows Per 6 Inches	Dry Density pcf	Moisture Content, %	Soil Class. (U.S.C.S.)	SOIL DESCRIPTION	Type of Tests
	0							SM	**Quaternary Alluvium (Qal)**; SILTY SAND, light brownish gray, dry to moist, fine to coarse grained sand with trace fine gravel	
									SILTY SAND, dark brown, moist, fine to medium grained sand	
	5			S-1	8 13 13			SP-SM	Poorly graded SAND with SILT, medium dense, brown, moist, fine grained sand	
									Poorly graded SAND with SILT, brown, moist, fine grained sand	
	10			S-2	6 7 8			SM	SILTY SAND, medium dense, dark yellowish brown, moist, fine to medium grained sand	
	15			S-3	3 3 4			SC	CLAYEY SAND, loose, dark grayish brown, moist, fine to coarse grained sand	
	20			S-4	3 3 7			SC-SM	SILTY, CLAYEY SAND, medium dense, dark grayish brown, moist, fine to medium grained sand	
									Drilled to 21.5' Sampled to 21.5' Groundwater not encountered Backfilled with cuttings	
	25									
	30									

SAMPLE TYPES:
- B BULK SAMPLE
- C CORE SAMPLE
- G GRAB SAMPLE
- R RING SAMPLE
- S SPLIT SPOON SAMPLE
- T TUBE SAMPLE

TYPE OF TESTS:
- -200 % FINES PASSING
- AL ATTERBERG LIMITS
- CN CONSOLIDATION
- CO COLLAPSE
- CR CORROSION
- CU UNDRAINED TRIAXIAL
- DS DIRECT SHEAR
- EI EXPANSION INDEX
- H HYDROMETER
- MD MAXIMUM DENSITY
- PP POCKET PENETROMETER
- RV R VALUE
- SA SIEVE ANALYSIS
- SE SAND EQUIVALENT
- SG SPECIFIC GRAVITY
- UC UNCONFINED COMPRESSIVE STRENGTH

*** This log is a part of a report by Leighton and should not be used as a stand-alone document. ***

GEOTECHNICAL BORING LOG LB-2

Project No.	11061.002	**Date Drilled**	4-6-18
Project	Rancho Diamante Percolation Testing	**Logged By**	JTD
Drilling Co.	2R Drilling	**Hole Diameter**	8"
Drilling Method	Hollow Stem Auger - 140lb - Autohammer - 30" Drop	**Ground Elevation**	~1491'
Location	See Figure 2	**Sampled By**	JTD

Elevation Feet	Depth Feet	Graphic Log (N S)	Attitudes	Sample No.	Blows Per 6 Inches	Dry Density pcf	Moisture Content, %	Soil Class. (U.S.C.S.)	SOIL DESCRIPTION	Type of Tests
	0							SM	**Quaternary Alluvium (Qal)**; SILTY SAND, light gray, dry to moist, fine to medium grained sand	
								SW-SM	Well-graded SAND with SILT, brown, dry to moist, fine to medium grained sand	
	5			S-1	3 6 8			SM	SILTY SAND, medium dense, dark grayish brown, moist, fine to medium grained sand	
								SC-SM	SILTY, CLAYEY SAND, dark grayish brown, moist, fine to medium grained sand	
	10			S-2	3 3 7			CL	SANDY Lean CLAY, stiff, dark grayish brown, moist, fine to medium grained sand	
	15			S-3	5 6 5			SM	SILTY SAND, medium dense, dark grayish brown, moist, fine to medium grained sand	
									Drilled to 16.5' Sampled to 16.5' Groundwater not encountered Backfilled with cuttings	
	20									
	25									
	30									

This Soil Description applies only to a location of the exploration at the time of sampling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.

SAMPLE TYPES:
- B BULK SAMPLE
- C CORE SAMPLE
- G GRAB SAMPLE
- R RING SAMPLE
- S SPLIT SPOON SAMPLE
- T TUBE SAMPLE

TYPE OF TESTS:
- -200 % FINES PASSING
- AL ATTERBERG LIMITS
- CN CONSOLIDATION
- CO COLLAPSE
- CR CORROSION
- CU UNDRAINED TRIAXIAL
- DS DIRECT SHEAR
- EI EXPANSION INDEX
- H HYDROMETER
- MD MAXIMUM DENSITY
- PP POCKET PENETROMETER
- RV R VALUE
- SA SIEVE ANALYSIS
- SE SAND EQUIVALENT
- SG SPECIFIC GRAVITY
- UC UNCONFINED COMPRESSIVE STRENGTH

GEOTECHNICAL BORING LOG LB-3

Project No.	11061.002	**Date Drilled**	4-6-18
Project	Rancho Diamante Percolation Testing	**Logged By**	JTD
Drilling Co.	2R Drilling	**Hole Diameter**	8"
Drilling Method	Hollow Stem Auger - 140lb - Autohammer - 30" Drop	**Ground Elevation**	~1502'
Location	See Figure 2	**Sampled By**	JTD

Elevation Feet	Depth Feet	Graphic Log (N / S)	Attitudes	Sample No.	Blows Per 6 Inches	Dry Density pcf	Moisture Content, %	Soil Class. (U.S.C.S.)	SOIL DESCRIPTION	Type of Tests
	0							SM	**Quaternary Alluvium (Qal)**; SILTY SAND, light brownish gray, dry to moist, fine to coarse grained sand	
									SILTY SAND, dark yellowish brown, moist, fine to medium grained sand	
	5			S-1	12 23 18				SILTY SAND, dense, dark grayish brown, moist, fine to medium grained sand	
									SILTY SAND, dark grayish brown, moist, fine to medium grained sand	
	10			S-2	6 7 10				SILTY SAND, medium dense, dark grayish brown, moist, fine to medium grained sand	
	15			S-3	7 9 12			ML	SANDY SILT, stiff, dark grayish brown, moist, fine grained sand	
	20			S-4	10 11 13			SW-SM	Well-graded SAND with SILT, medium dense, brown, dry to moist, fine to medium grained sand	
									Drilled to 21.5' Sampled to 21.5' Groundwater not encountered Backfilled with cuttings	
	25									
	30									

This Soil Description applies only to a location of the exploration at the time of sampling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.

SAMPLE TYPES:
- B BULK SAMPLE
- C CORE SAMPLE
- G GRAB SAMPLE
- R RING SAMPLE
- S SPLIT SPOON SAMPLE
- T TUBE SAMPLE

TYPE OF TESTS:
- -200 % FINES PASSING
- AL ATTERBERG LIMITS
- CN CONSOLIDATION
- CO COLLAPSE
- CR CORROSION
- CU UNDRAINED TRIAXIAL
- DS DIRECT SHEAR
- EI EXPANSION INDEX
- H HYDROMETER
- MD MAXIMUM DENSITY
- PP POCKET PENETROMETER
- RV R VALUE
- SA SIEVE ANALYSIS
- SE SAND EQUIVALENT
- SG SPECIFIC GRAVITY
- UC UNCONFINED COMPRESSIVE STRENGTH

GEOTECHNICAL BORING LOG LB-4

Project No.	11061.002	**Date Drilled**	4-6-18
Project	Rancho Diamante Percolation Testing	**Logged By**	JTD
Drilling Co.	2R Drilling	**Hole Diameter**	8"
Drilling Method	Hollow Stem Auger - 140lb - Autohammer - 30" Drop	**Ground Elevation**	~1505'
Location	See Figure 2	**Sampled By**	JTD

Elevation Feet	Depth Feet	Graphic Log (N / S)	Attitudes	Sample No.	Blows Per 6 Inches	Dry Density pcf	Moisture Content, %	Soil Class. (U.S.C.S.)	SOIL DESCRIPTION	Type of Tests
	0							SM	**Quaternary Alluvium (Qal)**; SILTY SAND, light brownish gray, dry to moist, fine to coarse grained sand	
									SILTY SAND, dark yellowish brown, moist, fine to medium grained sand	
	5			S-1	12 16 23				SILTY SAND, dense, dark grayish brown, moist, fine to medium grained sand	
								ML	SANDY SILT, light brown, moist, fine to medium grained sand	
	10			S-2	8 14 21			SM	SILTY SAND, dense, dark grayish brown, moist, fine to medium grained sand	
	15			S-3	12 15 18				SILTY SAND, dense, dark grayish brown, moist, fine to medium grained sand	
	20			S-4	6 11 15			SW	Well-graded SAND, dense, brown, dry to moist, fine to coarse grained sand	
	25			S-5	10 14 16				Well-graded SAND with GRAVEL, dense, brown, dry to moist, fine to coarse grained sand with fine gravel	
									Drilled to 26.5' Sampled to 26.5' Groundwater not encountered Backfilled with Cuttings	
	30									

This Soil Description applies only to a location of the exploration at the time of sampling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.

SAMPLE TYPES:
- B BULK SAMPLE
- C CORE SAMPLE
- G GRAB SAMPLE
- R RING SAMPLE
- S SPLIT SPOON SAMPLE
- T TUBE SAMPLE

TYPE OF TESTS:
- -200 % FINES PASSING
- AL ATTERBERG LIMITS
- CN CONSOLIDATION
- CO COLLAPSE
- CR CORROSION
- CU UNDRAINED TRIAXIAL
- DS DIRECT SHEAR
- EI EXPANSION INDEX
- H HYDROMETER
- MD MAXIMUM DENSITY
- PP POCKET PENETROMETER
- RV R VALUE
- SA SIEVE ANALYSIS
- SE SAND EQUIVALENT
- SG SPECIFIC GRAVITY
- UC UNCONFINED COMPRESSIVE STRENGTH

GEOTECHNICAL BORING LOG P-1

Project No.	11061.002	**Date Drilled**	4-6-18
Project	Rancho Diamante Percolation Testing	**Logged By**	JTD
Drilling Co.	2R Drilling	**Hole Diameter**	8"
Drilling Method	Hollow Stem Auger - 140lb - Autohammer - 30" Drop	**Ground Elevation**	~1501'
Location	See Figure 2	**Sampled By**	JTD

Elevation Feet	Depth Feet	Graphic Log	Attitudes	Sample No.	Blows Per 6 Inches	Dry Density pcf	Moisture Content, %	Soil Class. (U.S.C.S.)	SOIL DESCRIPTION	Type of Tests
		N S							*This Soil Description applies only to a location of the exploration at the time of sampling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.*	
	0							SM	**Quaternary Alluvium (Qal)**; SILTY SAND, light brownish gray, dry to moist, fine to medium grained sand with trace fine gravel	
								SP-SM	Poorly graded SAND with SILT, brown, dry to moist, fine grained sand	
	5			S-1	5 4 6				Poorly graded SAND with SILT, medium dense, brown, dry to moist, fine grained sand	
									Drilled to 7' Sampled to 7' Groundwater not encountered Backfilled with cuttings	
	10									
	15									
	20									
	25									
	30									

SAMPLE TYPES:

- B BULK SAMPLE
- C CORE SAMPLE
- G GRAB SAMPLE
- R RING SAMPLE
- S SPLIT SPOON SAMPLE
- T TUBE SAMPLE

TYPE OF TESTS:

- -200 % FINES PASSING
- AL ATTERBERG LIMITS
- CN CONSOLIDATION
- CO COLLAPSE
- CR CORROSION
- CU UNDRAINED TRIAXIAL
- DS DIRECT SHEAR
- EI EXPANSION INDEX
- H HYDROMETER
- MD MAXIMUM DENSITY
- PP POCKET PENETROMETER
- RV R VALUE
- SA SIEVE ANALYSIS
- SE SAND EQUIVALENT
- SG SPECIFIC GRAVITY
- UC UNCONFINED COMPRESSIVE STRENGTH

GEOTECHNICAL BORING LOG P-2

Project No.	11061.002	**Date Drilled**	4-6-18
Project	Rancho Diamante Percolation Testing	**Logged By**	JTD
Drilling Co.	2R Drilling	**Hole Diameter**	8"
Drilling Method	Hollow Stem Auger - 140lb - Autohammer - 30" Drop	**Ground Elevation**	~1501'
Location	See Figure 2	**Sampled By**	JTD

Elevation Feet	Depth Feet	Graphic Log	Attitudes	Sample No.	Blows Per 6 Inches	Dry Density pcf	Moisture Content, %	Soil Class. (U.S.C.S.)	SOIL DESCRIPTION	Type of Tests
		N S							*This Soil Description applies only to a location of the exploration at the time of sampling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.*	
	0							SM	**Quaternary Alluvium (Qal)**; SILTY SAND, light brown, dry to moist, fine to coarse grained sand with trace fine gravel	
									SILTY SAND, brown, moist, fine to medium grained sand	
	5			S-1	7 16 17				SILTY SAND, dense, dark grayish brown, moist, fine to medium grained sand	
									Drilled to 8' Sampled to 8' Groundwater not encountered Backfilled with cuttings	
	10									
	15									
	20									
	25									
	30									

SAMPLE TYPES:

- B BULK SAMPLE
- C CORE SAMPLE
- G GRAB SAMPLE
- R RING SAMPLE
- S SPLIT SPOON SAMPLE
- T TUBE SAMPLE

TYPE OF TESTS:

- -200 % FINES PASSING
- AL ATTERBERG LIMITS
- CN CONSOLIDATION
- CO COLLAPSE
- CR CORROSION
- CU UNDRAINED TRIAXIAL
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- PP POCKET PENETROMETER
- RV R VALUE
- SA SIEVE ANALYSIS
- SE SAND EQUIVALENT
- SG SPECIFIC GRAVITY
- UC UNCONFINED COMPRESSIVE STRENGTH

GEOTECHNICAL BORING LOG P-3

Project No.	11061.002	**Date Drilled**	4-6-18
Project	Rancho Diamante Percolation Testing	**Logged By**	JTD
Drilling Co.	2R Drilling	**Hole Diameter**	8"
Drilling Method	Hollow Stem Auger - 140lb - Autohammer - 30" Drop	**Ground Elevation**	~1491'
Location	See Figure 2	**Sampled By**	JTD

Elevation Feet	Depth Feet	Graphic Log (N / S)	Attitudes	Sample No.	Blows Per 6 Inches	Dry Density pcf	Moisture Content, %	Soil Class. (U.S.C.S.)	SOIL DESCRIPTION	Type of Tests
	0							SM	**Quaternary Alluvium (Qal)**; SILTY SAND with GRAVEL, brown, dry to moist, fine to coarse grained sand with fine gravel	
				S-1	4 8 8				SILTY SAND, medium dense, dark grayish brown, moist, fine to medium grained sand	
	5								Drilled to 4' Sampled to 4' Groundwater not encountered Backfilled with cuttings	
	10									
	15									
	20									
	25									
	30									

This Soil Description applies only to a location of the exploration at the time of sampling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.

SAMPLE TYPES:

- B BULK SAMPLE
- C CORE SAMPLE
- G GRAB SAMPLE
- R RING SAMPLE
- S SPLIT SPOON SAMPLE
- T TUBE SAMPLE

TYPE OF TESTS:

- -200 % FINES PASSING
- AL ATTERBERG LIMITS
- CN CONSOLIDATION
- CO COLLAPSE
- CR CORROSION
- CU UNDRAINED TRIAXIAL
- DS DIRECT SHEAR
- EI EXPANSION INDEX
- H HYDROMETER
- MD MAXIMUM DENSITY
- PP POCKET PENETROMETER
- RV R VALUE
- SA SIEVE ANALYSIS
- SE SAND EQUIVALENT
- SG SPECIFIC GRAVITY
- UC UNCONFINED COMPRESSIVE STRENGTH

GEOTECHNICAL BORING LOG P-4

Project No.	11061.002	**Date Drilled**	4-6-18
Project	Rancho Diamante Percolation Testing	**Logged By**	JTD
Drilling Co.	2R Drilling	**Hole Diameter**	8"
Drilling Method	Hollow Stem Auger - 140lb - Autohammer - 30" Drop	**Ground Elevation**	~1491'
Location	See Figure 2	**Sampled By**	JTD

Elevation Feet	Depth Feet	Graphic Log	Attitudes	Sample No.	Blows Per 6 Inches	Dry Density pcf	Moisture Content, %	Soil Class. (U.S.C.S.)	SOIL DESCRIPTION	Type of Tests
		N S							*This Soil Description applies only to a location of the exploration at the time of sampling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.*	
	0							SM	**Quaternary Alluvium (Qal)**; SILTY SAND, light gray, dry to moist, fine grained sand	
				S-1	3 6 12			SW-SM	Well-graded SAND with SILT, medium dense, dark grayish brown, moist, fine to coarse grained sand	
	5								Drilled to 3' Sampled to 3' Groundwater not encountered Backfilled with cuttings	
	10									
	15									
	20									
	25									
	30									

SAMPLE TYPES:

- B BULK SAMPLE
- C CORE SAMPLE
- G GRAB SAMPLE
- R RING SAMPLE
- S SPLIT SPOON SAMPLE
- T TUBE SAMPLE

TYPE OF TESTS:

- -200 % FINES PASSING
- AL ATTERBERG LIMITS
- CN CONSOLIDATION
- CO COLLAPSE
- CR CORROSION
- CU UNDRAINED TRIAXIAL
- DS DIRECT SHEAR
- EI EXPANSION INDEX
- H HYDROMETER
- MD MAXIMUM DENSITY
- PP POCKET PENETROMETER
- RV R VALUE
- SA SIEVE ANALYSIS
- SE SAND EQUIVALENT
- SG SPECIFIC GRAVITY
- UC UNCONFINED COMPRESSIVE STRENGTH

GEOTECHNICAL BORING LOG P-5

Project No.	11061.002	**Date Drilled**	4-6-18
Project	Rancho Diamante Percolation Testing	**Logged By**	JTD
Drilling Co.	2R Drilling	**Hole Diameter**	8"
Drilling Method	Hollow Stem Auger - 140lb - Autohammer - 30" Drop	**Ground Elevation**	~1502'
Location	See Figure 2	**Sampled By**	JTD

Elevation Feet	Depth Feet	Graphic Log	Attitudes	Sample No.	Blows Per 6 Inches	Dry Density pcf	Moisture Content, %	Soil Class. (U.S.C.S.)	SOIL DESCRIPTION	Type of Tests
		N S							*This Soil Description applies only to a location of the exploration at the time of sampling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.*	
	0							SM	**Quaternary Alluvium (Qal)**; SILTY SAND, light brownish gray, dry to moist, fine to coarse grained sand	
									SILTY SAND, dark yellowish brown, moist, fine to medium grained sand	
	5			S-1	6 8 8			SW-SM	Well-graded SAND with SILT, medium dense, brown, moist, fine to medium grained sand	
	10								Drilled to 8' Sampled to 8' Groundwater not encountered Backfilled with cuttings	
	15									
	20									
	25									
	30									

SAMPLE TYPES:

- B BULK SAMPLE
- C CORE SAMPLE
- G GRAB SAMPLE
- R RING SAMPLE
- S SPLIT SPOON SAMPLE
- T TUBE SAMPLE

TYPE OF TESTS:

- -200 % FINES PASSING
- AL ATTERBERG LIMITS
- CN CONSOLIDATION
- CO COLLAPSE
- CR CORROSION
- CU UNDRAINED TRIAXIAL
- DS DIRECT SHEAR
- EI EXPANSION INDEX
- H HYDROMETER
- MD MAXIMUM DENSITY
- PP POCKET PENETROMETER
- RV R VALUE
- SA SIEVE ANALYSIS
- SE SAND EQUIVALENT
- SG SPECIFIC GRAVITY
- UC UNCONFINED COMPRESSIVE STRENGTH

GEOTECHNICAL BORING LOG P-6

Project No.	11061.002	**Date Drilled**	4-6-18
Project	Rancho Diamante Percolation Testing	**Logged By**	JTD
Drilling Co.	2R Drilling	**Hole Diameter**	8"
Drilling Method	Hollow Stem Auger - 140lb - Autohammer - 30" Drop	**Ground Elevation**	~1502'
Location	See Figure 2	**Sampled By**	JTD

Elevation Feet	Depth Feet	Graphic Log (N / S)	Attitudes	Sample No.	Blows Per 6 Inches	Dry Density pcf	Moisture Content, %	Soil Class. (U.S.C.S.)	SOIL DESCRIPTION	Type of Tests
	0							SM	**Quaternary Alluvium (Qal)**; SILTY SAND, light brownish gray, dry to moist, fine to coarse grained sand	
									SILTY SAND, light yellowish brown, moist, fine to medium grained sand	
	5			S-1	9 10 10				SILTY SAND, medium dense, dark brown, moist, fine to medium grained sand	
									Drilled to 7' Sampled to 7' Groundwater not encountered Backfilled with cuttings	
	10									
	15									
	20									
	25									
	30									

SAMPLE TYPES:

- B BULK SAMPLE
- C CORE SAMPLE
- G GRAB SAMPLE
- R RING SAMPLE
- S SPLIT SPOON SAMPLE
- T TUBE SAMPLE

TYPE OF TESTS:

- -200 % FINES PASSING
- AL ATTERBERG LIMITS
- CN CONSOLIDATION
- CO COLLAPSE
- CR CORROSION
- CU UNDRAINED TRIAXIAL
- DS DIRECT SHEAR
- EI EXPANSION INDEX
- H HYDROMETER
- MD MAXIMUM DENSITY
- PP POCKET PENETROMETER
- RV R VALUE
- SA SIEVE ANALYSIS
- SE SAND EQUIVALENT
- SG SPECIFIC GRAVITY
- UC UNCONFINED COMPRESSIVE STRENGTH

*** This log is a part of a report by Leighton and should not be used as a stand-alone document. ***

GEOTECHNICAL BORING LOG P-7

Project No.	11061.002	**Date Drilled**	4-6-18
Project	Rancho Diamante Percolation Testing	**Logged By**	JTD
Drilling Co.	2R Drilling	**Hole Diameter**	8"
Drilling Method	Hollow Stem Auger - 140lb - Autohammer - 30" Drop	**Ground Elevation**	~1506'
Location	See Figure 2	**Sampled By**	JTD

Elevation Feet	Depth Feet	Graphic Log (N / S)	Attitudes	Sample No.	Blows Per 6 Inches	Dry Density pcf	Moisture Content, %	Soil Class. (U.S.C.S.)	SOIL DESCRIPTION	Type of Tests
	0							SM	**Quaternary Alluvium (Qal)**; SILTY SAND, light brownish gray, dry to moist, fine to coarse grained sand	
									SILTY SAND, grayish brown, moist, fine to medium grained sand	
	5								SILTY SAND, dark grayish brown, moist, fine to medium grained sand	
	10			S-1	10 11 10				SILTY SAND, medium dense, dark grayish brown, moist, fine to medium grained sand	
									Drilled to 11' Sampled to 11' Groundwater not encountered Backfilled with cuttings	
	15									
	20									
	25									
	30									

SAMPLE TYPES:

- B BULK SAMPLE
- C CORE SAMPLE
- G GRAB SAMPLE
- R RING SAMPLE
- S SPLIT SPOON SAMPLE
- T TUBE SAMPLE

TYPE OF TESTS:

- -200 % FINES PASSING
- AL ATTERBERG LIMITS
- CN CONSOLIDATION
- CO COLLAPSE
- CR CORROSION
- CU UNDRAINED TRIAXIAL
- DS DIRECT SHEAR
- EI EXPANSION INDEX
- H HYDROMETER
- MD MAXIMUM DENSITY
- PP POCKET PENETROMETER
- RV R VALUE
- SA SIEVE ANALYSIS
- SE SAND EQUIVALENT
- SG SPECIFIC GRAVITY
- UC UNCONFINED COMPRESSIVE STRENGTH

*** This log is a part of a report by Leighton and should not be used as a stand-alone document. ***

GEOTECHNICAL BORING LOG P-8

Project No.	11061.002	**Date Drilled**	4-6-18
Project	Rancho Diamante Percolation Testing	**Logged By**	JTD
Drilling Co.	2R Drilling	**Hole Diameter**	8"
Drilling Method	Hollow Stem Auger - 140lb - Autohammer - 30" Drop	**Ground Elevation**	~1505'
Location	See Figure 2	**Sampled By**	JTD

Elevation Feet	Depth Feet	Graphic Log	Attitudes	Sample No.	Blows Per 6 Inches	Dry Density pcf	Moisture Content, %	Soil Class. (U.S.C.S.)	SOIL DESCRIPTION	Type of Tests
		N S							*This Soil Description applies only to a location of the exploration at the time of sampling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.*	
	0							SM	**Quaternary Alluvium (Qal)**; SILTY SAND, light gray, dry to moist, fine to coarse grained sand	
									SILTY SAND, dark brown, moist, fine to medium grained sand	
	5								SILTY SAND, grayish brown, moist, fine to medium grained sand	
				S-1	9 9 7				SILTY SAND, medium dense, dark grayish brown, moist, fine to medium grained sand	
	10								Drilled to 10' Sampled to 10' Groundwater not encountered Backfilled with cuttings	
	15									
	20									
	25									
	30									

SAMPLE TYPES:

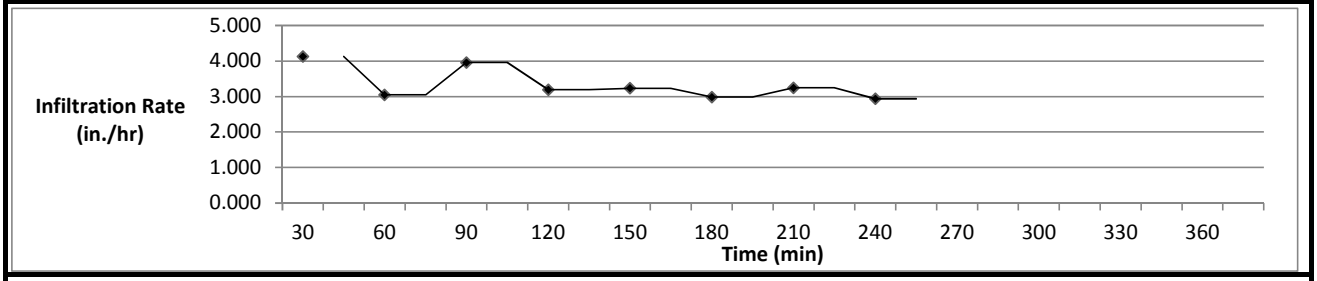
- B BULK SAMPLE
- C CORE SAMPLE
- G GRAB SAMPLE
- R RING SAMPLE
- S SPLIT SPOON SAMPLE
- T TUBE SAMPLE

TYPE OF TESTS:

- -200 % FINES PASSING
- AL ATTERBERG LIMITS
- CN CONSOLIDATION
- CO COLLAPSE
- CR CORROSION
- CU UNDRAINED TRIAXIAL
- DS DIRECT SHEAR
- EI EXPANSION INDEX
- H HYDROMETER
- MD MAXIMUM DENSITY
- PP POCKET PENETROMETER
- RV R VALUE
- SA SIEVE ANALYSIS
- SE SAND EQUIVALENT
- SG SPECIFIC GRAVITY
- UC UNCONFINED COMPRESSIVE STRENGTH

Test Hole Number:	P-1	Project	Rancho Diamante	
Date Excavated:	4/6/2018	Project Number	11061.002	
Tested by:	CA	Date Tested	4/9/2018	
Soil Unit:	Quaternary Alluvium	Depth of Test Hole (in.)	84	
USCS Soil Type:	Poorly Graded SAND (SP-SM)	Diameter (in.)	8	Clear ~90 °

Time	Δt (min)	Initial Water Depth (inches)	Final Water Depth (inches)	Change In Water Level (inches)	Infiltration/Percolation Rate	
					inches/hour*	minute/inch
8:10:00	10.00	59.44	67.24	7.80	4.131	1.282
8:20:00						
8:21:00	10.00	55.84	62.64	6.80	3.049	1.471
8:31:00						
8:31:00	10.00	61.84	68.68	6.84	3.958	1.462
8:41:00						
8:43:00	10.00	61.48	67.24	5.76	3.194	1.736
8:53:00						
8:55:00	10.00	61.24	67.12	5.88	3.234	1.701
9:05:00						
9:06:00	10.00	59.44	65.32	5.88	2.987	1.701
9:16:00						
9:17:00	10.00	62.32	67.96	5.64	3.244	1.773
9:27:00						
9:28:00	10.00	61.24	66.64	5.40	2.937	1.852
9:38:00						



* Based on Prochet Method

Percolation Test Data

P- 1

Project Number: 11061.002

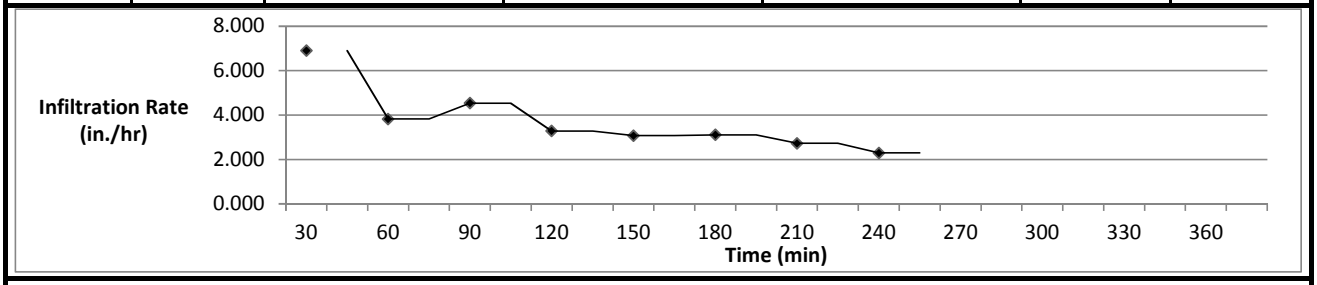
Project Name: *Rancho Diamante*

Date: Apr-18

Leighton

Test Hole Number:	P-2	Project	Rancho Diamante	
Date Excavated:	4/6/2018	Project Number	11061.002	
Tested by:	CA	Date Tested	4/9/2018	
Soil Unit:	Quaternary Alluvium	Depth of Test Hole (in.)	96	
USCS Soil Type:	Silty SAND	Diameter (in.)	8	Clear ~90 °

Time	Δt (min)	Initial Water Depth (inches)	Final Water Depth (inches)	Change In Water Level (inches)	Infiltration/Percolation Rate	
					inches/hour*	minute/inch
8:12:00	10.00	68.44	81.64	13.20	6.899	0.758
8:22:00						
8:23:00	10.00	69.64	77.44	7.80	3.827	1.282
8:33:00						
8:33:00	10.00	71.20	79.72	8.52	4.536	1.174
8:43:00						
8:46:00	10.00	74.56	80.20	5.64	3.282	1.773
8:56:00						
8:57:00	10.00	75.28	80.44	5.16	3.074	1.938
9:07:00						
9:09:00	10.00	74.44	79.84	5.40	3.106	1.852
9:19:00						
9:21:00	10.00	75.64	80.20	4.56	2.725	2.193
9:31:00						
9:33:00	10.00	76.00	79.84	3.84	2.295	2.604
9:43:00						



* Based on Prochet Method

Percolation Test Data

P-2

Project Number: 11061.002

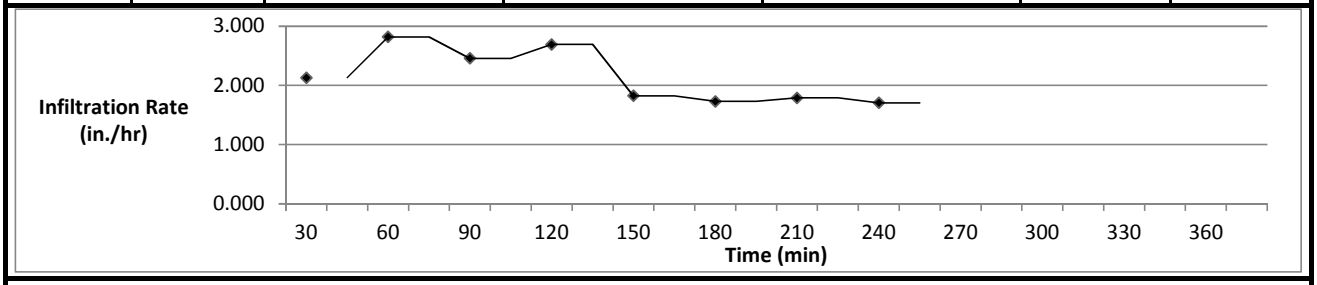
Project Name: *Rancho Diamante*

Date: Apr-18

Leighton

Test Hole Number:	P-3	Project	Rancho Diamante	
Date Excavated:	4/6/2018	Project Number	11061.002	
Tested by:	CA	Date Tested	4/9/2018	
Soil Unit:	Quaternary Alluvium	Depth of Test Hole (in.)	48	
USCS Soil Type:	Silty SAND	Diameter (in.)	8	Clear ~90 °

Time	Δt (min)	Initial Water Depth (inches)	Final Water Depth (inches)	Change In Water Level (inches)	Infiltration/Percolation Rate	
					inches/hour*	minute/inch
9:49:00	20.00	26.92	33.88	6.96	2.131	2.874
10:09:00						
10:09:00	20.00	27.40	36.00	8.60	2.820	2.326
10:29:00						
10:30:00	10.00	27.40	31.60	4.20	2.459	2.381
10:40:00						
10:40:00	10.00	26.80	31.48	4.68	2.692	2.137
10:50:00						
10:51:00	10.00	26.80	30.08	3.28	1.826	3.049
11:01:00						
11:03:00	10.00	27.40	30.44	3.04	1.731	3.289
11:13:00						
11:15:00	10.00	27.52	30.64	3.12	1.790	3.205
11:25:00						
11:26:00	10.00	27.40	30.40	3.00	1.706	3.333
11:36:00						



* Based on Prochet Method

Percolation Test Data

P-3

Project Number: 11061.002

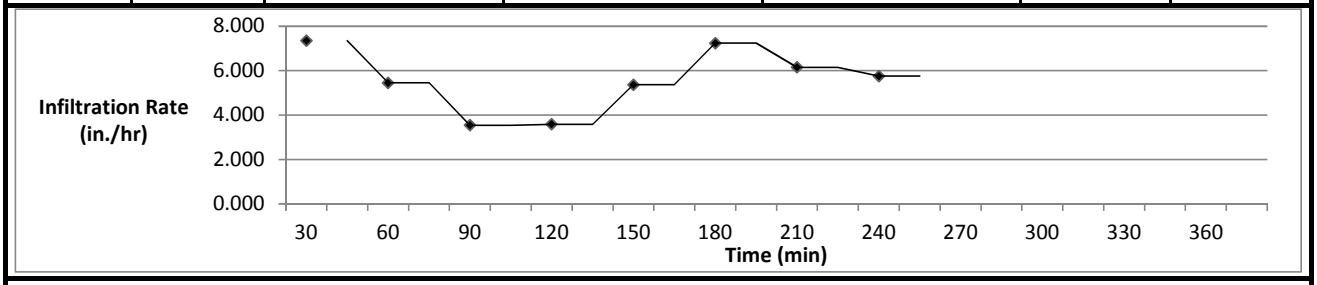
Project Name: *Rancho Diamante*

Date: Apr-18

Leighton

Test Hole Number:	P-4	Project	Rancho Diamante	
Date Excavated:	4/6/2018	Project Number	11061.002	
Tested by:	CA	Date Tested	4/9/2018	
Soil Unit:	Quaternary Alluvium	Depth of Test Hole (in.)	36	
USCS Soil Type:	Well Graded SAND (SW-SM)	Diameter (in.)	8	Clear ~90 °

Time	Δt (min)	Initial Water Depth (inches)	Final Water Depth (inches)	Change In Water Level (inches)	Infiltration/Percolation Rate	
					inches/hour*	minute/inch
9:51:00	14.00	10.00	26.80	16.80	7.347	0.833
10:05:00						
10:07:00	17.00	10.00	25.60	15.60	5.451	1.090
10:24:00						
10:28:00	10.00	10.00	17.20	7.20	3.541	1.389
10:38:00						
10:43:00	10.00	10.00	17.28	7.28	3.586	1.374
10:53:00						
10:55:00	10.00	16.00	24.04	8.04	5.366	1.244
11:05:00						
11:07:00	10.00	16.00	26.20	10.20	7.243	0.980
11:17:00						
11:18:00	10.00	13.00	23.20	10.20	6.151	0.980
11:28:00						
11:29:00	10.00	10.08	20.88	10.80	5.755	0.926
11:39:00						



* Based on Prochet Method

Percolation Test Data

P-4

Project Number: 11061.002

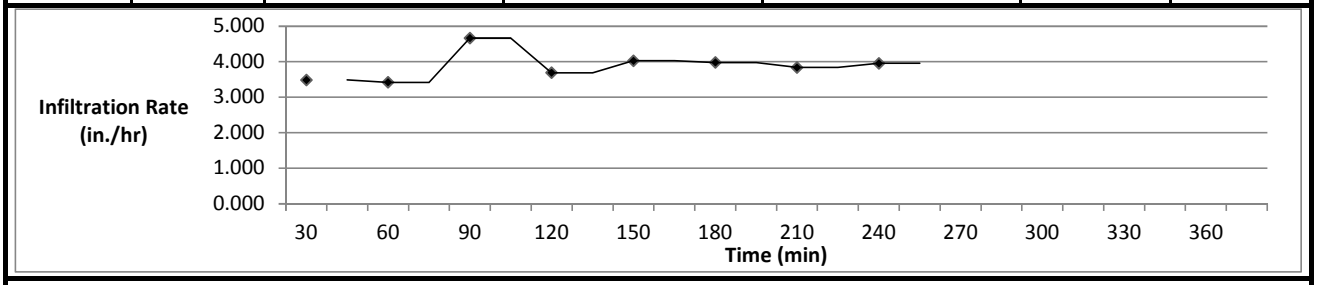
Project Name: *Rancho Diamante*

Date: Apr-18

Leighton

Test Hole Number:	P-5	Project	Rancho Diamante	
Date Excavated:	4/6/2018	Project Number	11061.002	
Tested by:	CA	Date Tested	4/9/2018	
Soil Unit:	Quaternary Alluvium	Depth of Test Hole (in.)	96	
USCS Soil Type:	Well Graded SAND (SW-SM)	Diameter (in.)	8	Clear ~90 °

Time	Δt (min)	Initial Water Depth (inches)	Final Water Depth (inches)	Change In Water Level (inches)	Infiltration/Percolation Rate	
					inches/hour*	minute/inch
11:40:00	20.00	75.52	85.64	10.12	3.486	1.976
12:00:00						
12:00:00	20.00	75.64	85.56	9.92	3.421	2.016
12:20:00						
12:21:00	10.00	75.52	82.84	7.32	4.667	1.366
12:31:00						
2:50:00	10.00	73.24	79.84	6.60	3.691	1.515
3:00:00						
3:01:00	10.00	75.04	81.64	6.60	4.028	1.515
3:11:00						
3:14:00	10.00	74.80	81.40	6.60	3.980	1.515
3:24:00						
3:25:00	10.00	74.44	80.94	6.50	3.840	1.538
3:35:00						
3:36:00	10.00	75.04	81.54	6.50	3.957	1.538
3:46:00						



* Based on Prochet Method

Percolation Test Data

P-5

Project Number: 11061.002

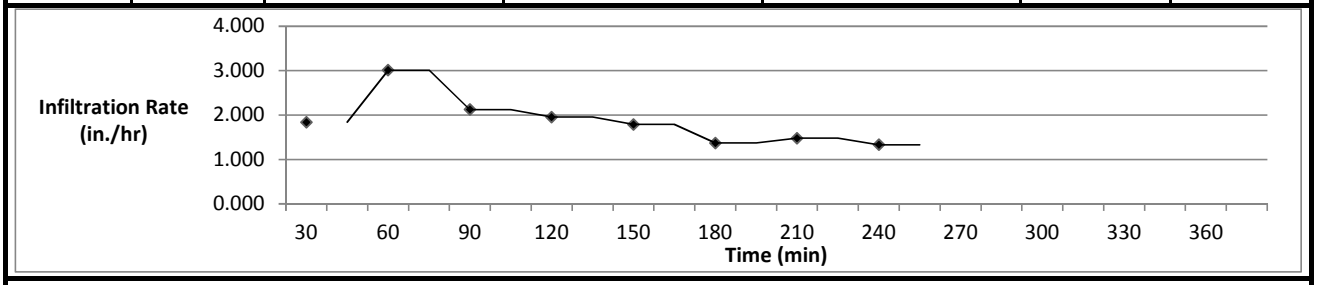
Project Name: *Rancho Diamante*

Date: Apr-18

Leighton

Test Hole Number:	P-6	Project	Rancho Diamante	
Date Excavated:	4/6/2018	Project Number	11061.002	
Tested by:	CA	Date Tested	4/9/2018	
Soil Unit:	Quaternary Alluvium	Depth of Test Hole (in.)	84	
USCS Soil Type:	Silty SAND	Diameter (in.)	8	Clear ~90 °

Time	Δt (min)	Initial Water Depth (inches)	Final Water Depth (inches)	Change In Water Level (inches)	Infiltration/Percolation Rate	
					inches/hour*	minute/inch
11:43:00	20.00	62.68	68.88	6.20	1.840	3.226
12:03:00						
2:53:00	20.00	59.08	69.88	10.80	3.011	1.852
3:13:00						
3:16:00	10.00	60.16	64.36	4.20	2.123	2.381
3:26:00						
3:29:00	10.00	62.08	65.68	3.60	1.953	2.778
3:39:00						
3:39:00	10.00	62.92	66.12	3.20	1.788	3.125
3:49:00						
3:50:00	10.00	63.76	66.16	2.40	1.369	4.167
4:00:00						
4:01:00	10.00	63.28	65.92	2.64	1.480	3.788
4:11:00						
4:12:00	10.00	61.24	63.84	2.60	1.330	3.846
4:22:00						



* Based on Prochet Method

Percolation Test Data

P-6

Project Number: 11061.002

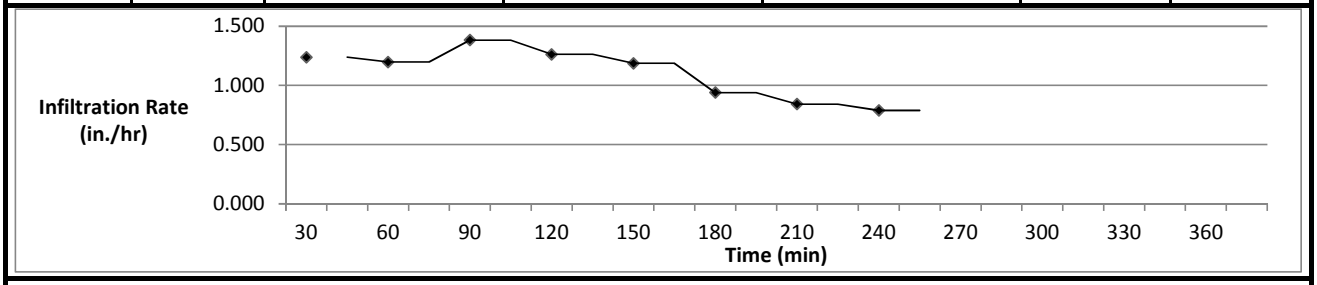
Project Name: *Rancho Diamante*

Date: Apr-18

Leighton

Test Hole Number:	P-7	Project	Rancho Diamante	
Date Excavated:	4/6/2018	Project Number	11061.002	
Tested by:	CA	Date Tested	4/9/2018	
Soil Unit:	Quaternary Alluvium	Depth of Test Hole (in.)	132	
USCS Soil Type:	Silty SAND	Diameter (in.)	8	Clear ~90 °

Time	Δt (min)	Initial Water Depth (inches)	Final Water Depth (inches)	Change In Water Level (inches)	Infiltration/Percolation Rate	
					inches/hour*	minute/inch
4:33:00	25.00	103.36	110.36	7.00	1.238	3.571
4:58:00						
4:58:00	25.00	101.56	108.76	7.20	1.198	3.472
5:23:00						
5:23:00	10.00	100.96	104.56	3.60	1.383	2.778
3:33:00						
5:34:00	10.00	102.40	105.56	3.16	1.263	3.165
5:44:00						
5:46:00	10.00	102.16	105.16	3.00	1.187	3.333
5:56:00						
5:56:00	10.00	102.16	104.56	2.40	0.940	4.167
6:06:00						
6:07:00	10.00	101.56	103.76	2.20	0.842	4.545
6:17:00						
6:17:00	10.00	103.84	105.76	1.92	0.789	5.208
6:27:00						



* Based on Prochet Method

Percolation Test Data

P-7

Project Number: 11061.002

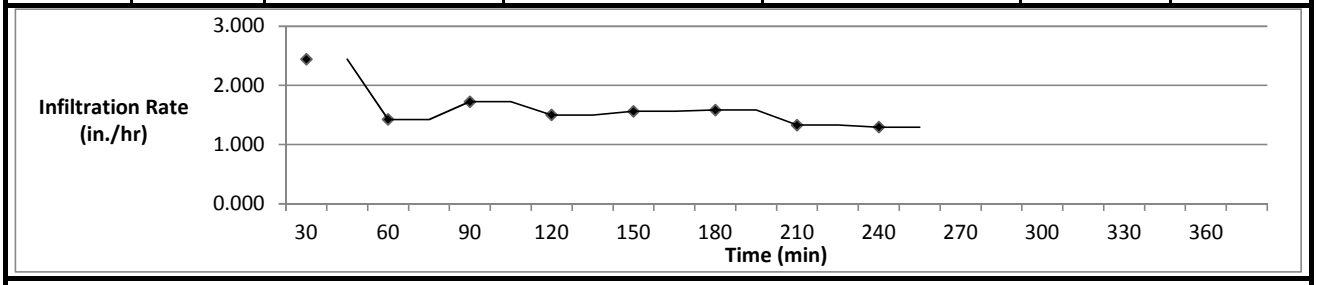
Project Name: *Rancho Diamante*

Date: Apr-18

Leighton

Test Hole Number:	P-8	Project	Rancho Diamante	
Date Excavated:	4/6/2018	Project Number	11061.002	
Tested by:	CA	Date Tested	4/9/2018	
Soil Unit:	Quaternary Alluvium	Depth of Test Hole (in.)	120	
USCS Soil Type:	Silty SAND	Diameter (in.)	8	Clear ~90 °

Time	Δt (min)	Initial Water Depth (inches)	Final Water Depth (inches)	Change In Water Level (inches)	Infiltration/Percolation Rate	
					inches/hour*	minute/inch
4:35:00	25.00	97.60	107.50	9.90	2.443	2.525
5:00:00						
5:00:00	25.00	98.80	104.80	6.00	1.426	4.167
5:25:00						
5:26:00	10.00	99.64	102.64	3.00	1.726	3.333
3:36:00						
5:37:00	10.00	98.56	101.32	2.76	1.501	3.623
5:47:00						
5:48:00	10.00	97.48	100.48	3.00	1.564	3.333
5:58:00						
6:00:00	10.00	99.40	102.20	2.80	1.585	3.571
6:10:00						
6:11:00	10.00	97.24	99.84	2.60	1.330	3.846
6:21:00						
6:21:00	10.00	97.60	100.10	2.50	1.296	4.000
6:31:00						



* Based on Prochet Method

Percolation Test Data

P-8

Project Number: 11061.002

Project Name: *Rancho Diamante*

Date: Apr-18

Leighton

RELEVANT EXCERPTS

SUPPLEMENTAL GEOTECHNICAL EXPLORATION
RANCHO DIAMANTE RESIDENTIAL DEVELOPMENT
TENTATIVE TRACT MAP NO. 36841
CITY OF HEMET, CALIFORNIA

Prepared for

RANCHO DIAMANTE INVESTMENTS

550 Laguna Drive, Suite B
Carlsbad, California 92008

Project No. 11061.001

August 25, 2015

Leighton and Associates, Inc.
A LEIGHTON GROUP COMPANY

Leighton and Associates, Inc.
A LEIGHTON GROUP COMPANY

August 25, 2015
Project No. 11061.001

Rancho Diamante Investments
C/O Benchmark Pacific
550 Laguna Drive, Suite B
Carlsbad, California 92008

Attention: Mr. Richard T. Robotta

Subject: Supplemental Geotechnical Exploration
Rancho Diamante Residential Development
Tentative Tract Map No. 36841
City of Hemet, California

In accordance with your request, we are pleased to present herewith the results of our supplemental geotechnical evaluation for the subject project. This report summarizes our findings and conclusions, and provides preliminary geotechnical recommendations for the proposed residential development. Based on the results of this exploration, it is our opinion that the overall site appears suitable for the intended use provided our recommendations included herein are properly incorporated during design and construction phases of development.

If you have any questions regarding this report, please do not hesitate to contact the undersigned. We appreciate this opportunity to be of service on this project.

Respectfully submitted,

LEIGHTON AND ASSOCIATES, INC.

Simon I. Saiid
GE 2641 (Exp. 09/30/15)
Principal Engineer

Robert F. Riha
CEG 1921 (Exp. 02/29/16)
Senior Principal Geologist

Distribution: (3) Addressee (plus pdf on CD)

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951.296.0530 ▪ Fax 951.296.0534

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Accompanying Tables, Figures, Plates and Appendices

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property is bordered on the north and south by existing drainage channels. The site is currently vacant with light to moderate vegetative growth observed throughout.

Existing nearby improvements include paved Warren Road along the eastern boundary. The San Diego County Aqueduct is located immediately west of the site. The properties to the north and south of the site are currently vacant and dry farmed.

1.3 Proposed Development

Based on the provided tentative tract map (Pangea Land Consultants, Inc., 2015), we understand that the proposed residential development will consist of 634 residential lots, open space lots and a public park along with associated site roadway improvements. Each residential lot is to host a one- or two-story single-family residential home consisting of typical wood-frame structure with conventional slab-on-grade foundation. The foundation loads are not expected to exceed 2,500 pounds per lineal foot (plf) for continuous footings.

It is anticipated that site grading will generally involve cuts and fills on the order of 6 feet or less. If final site development significantly differs from the assumptions made herein, the recommendations included in this report should be subject to further review and evaluation.

3.0 GEOTECHNICAL AND GEOLOGIC FINDINGS

3.1 Regional Geology

The proposed development site is located in the southwestern margin of the San Jacinto Valley southwest of the San Jacinto River and southeast of the Lakeview Mountains. The San Jacinto Valley is a relatively flat-lying depositional surface surrounded by hills and mountains. The valley is divided on the east by an alluvial filled, down dropped, rotated along its lengthwise axis, fault bounded graben (trough), and on the west by a broad, gently sloping (to the east) alluvial mesa (bajada). The northwest trending graben is bounded on the east by the main trace of the San Jacinto Fault, which forms the east margin of the valley and on the west by the Casa-Loma segment of the San Jacinto Fault. Each fault is a portion of the San Jacinto Fault Zone Complex.

Sediments derived from the San Jacinto River and Bautista Creek have been deposited across the valley. The sediment thickness is thought to be highly variable with a minimum thickness of 500 ± feet in the southwest portion of the valley. Paleo-estuary silts and sands, Quaternary-aged terrace deposits, and fanglomerates flank major abandoned drainage channels, and the base of mountain slopes. Mesozoic-aged metamorphic country rock intruded by Cretaceous aged granitics dominate the hills and mountains surrounding the site.

3.2 Site Specific Geology

Based on the results of our field exploration and review of the referenced reports (References), the site subsurface materials consist of fill soils, topsoil, young alluvial-valley deposits and older alluvial-fan deposits (See Figure 2-Regional Geologic Map). These units are discussed in the following sections in order of increasing age and further described on the logs of geotechnical borings in Appendix A.

3.2.1 Artificial Fill

Based on our field observations and previous explorations (Leighton, 2007), previously place artificial fill was observed within the project boundaries. We understand these fill soils were imported as a result of grading the nearby flood control channel, old Warren road, and storm water basin. The artificial fill generally consists of approximately 2 to 7 feet of dark brown to red brown silty sands and sandy silts with scattered gravel/cobble.

The results of our field observation and previous study indicate that the existing fill should be suitable for use on this site pending further verification during construction.

3.2.2 Topsoil

Topsoil is expected to mantle the majority of the site. The topsoil generally consists of a thin surface layer (6 to 12 inches) of brown to light brown, dry, loose silty sand with rootlets from surface vegetation. Topsoil materials cleared of significant amounts of debris and organic materials are suitable for use as compacted fills.

3.2.3 Young Alluvial-Valley Deposits

Young alluvial deposits generally underlie the entire site and consist generally of dry to moist, loose to very dense, silty and clayey sands (SC-SM) with interbedded layers of poorly graded sand (SP-SM) and sandy silt (ML). The alluvial soils were deposited as part of a complex fluvial/channel depositional environment that included interbedded sands and silts. Alluvial materials cleared of significant amounts of debris and organic materials are suitable for use as compacted fills.

3.2.4 Older Alluvium

Although not specifically encountered in our borings, older alluvial deposits are expected to underlie the younger alluvium.

3.3 Groundwater and Surface Water

Groundwater was not encountered in any of our borings in this or previous explorations; however, a previous investigation (Geocon, 2003) encountered perched groundwater at 36 feet in a single boring. No standing or surface water was observed on the site at the time of our field subsurface exploration. However, surface runoff from the adjacent elevated portions of the site and adjacent properties should be anticipated. In addition, saturated soils condition may be encountered along eastern boundary due to potential groundwater seepage from the existing aqueduct. In general, we do not anticipate that groundwater or surface water will be a significant constraint during the grading of the subject site.

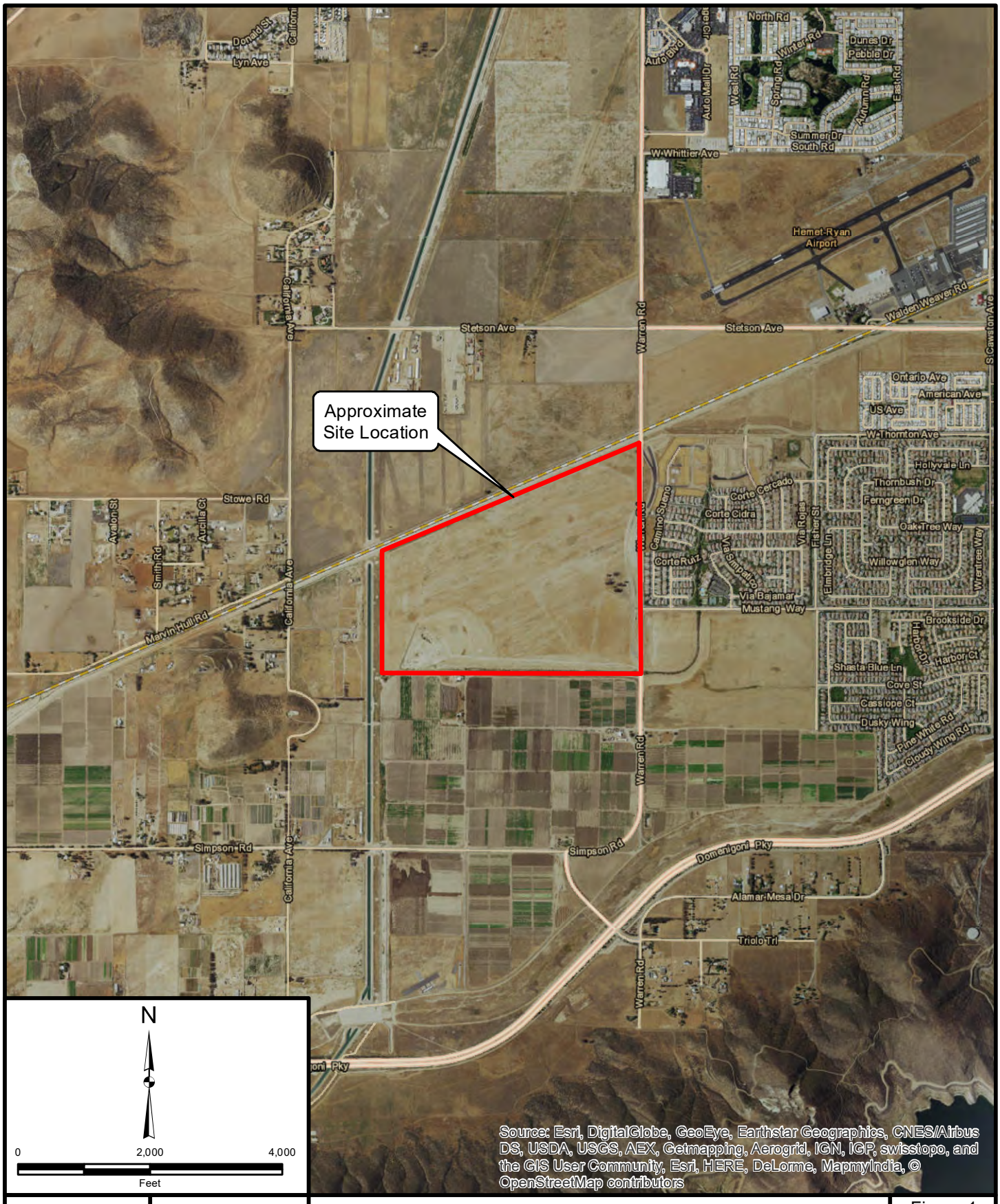
3.4 Landslides/Debris Flow and Rockfalls

No evidence of on-site landslides/debris flow or rock fall was observed during our field investigation or in review of California Geologic Survey landslide inventory maps (CGS,

4.0 SUMMARY OF FINDINGS AND CONCLUSIONS

Based on the results of this geologic/geotechnical exploration, it is our professional opinion that the proposed development is feasible from a geotechnical standpoint. The following is a summary of the geotechnical findings or factors that may affect development of the site.

- The existing onsite soils appear to be suitable for reuse as fill during proposed grading provided they are relatively free of organic material, debris, and any oversize rock (greater than 12 inches). While not anticipated, oversize rock will require special handling and placement at depths of at least 10 feet below finish grade.
- Topsoil, artificial fill and near surface alluvium are considered to be potentially compressible if subjected to additional loads. These materials should be removed and recompacted. Deeper removals may be required locally in younger alluvium.
- Based on laboratory testing and visual classification, onsite earth materials generally possess a very low to low expansion potential; however moderately expansive clayey lenses may be encountered locally during rough-grading. Additional testing should be performed during site grading to verify these observations and limited laboratory data.
- Although fill slopes onsite are anticipated to be less than 10 feet in height and will likely meet minimum factors of safety for stability, there may be a potential for significant erosion if granular fill soils are used on slope faces.
- Based on our subsurface explorations, it is our opinion that the onsite earth materials in most areas can be excavated with heavy-duty conventional grading equipment in good working condition.
- Evidence of active faulting was not identified within or immediately adjacent to the subject site. However, strong ground shaking may occur at this site due to local earthquake activity.
- Perched groundwater was not encountered during our investigation. However, perched water may develop in areas adjacent to the existing aqueduct or soils with contrasting permeabilities or geologic contact, depending on seasonal variation and site irrigation practices prior to grading. In general, groundwater is not expected to be a major constraint during grading.



Project: 11061.001	Eng/Geol: SIS/RFR
Scale: 1 " = 2,000 '	Date: August 2015

Base Map: ESRI ArcGIS Online 2015
Thematic Information: Leighton
Author: Leighton Geomatics (mmurphy)

SITE LOCATION MAP

Rancho Diamante TTM 36841
Hemet, California

Figure 1

Leighton

Map Saved as V:\Drafting\11061\001\Maps\11061-001-F01_SLM_2015-07-02.mxd on 8/26/2015 10:25:35 AM

Legend

- LB-8 — Approximate Boring Location (This Study)
- LB-5 — Approximate Boring Location (Leighton, 2004)
- GB-7 — Approximate Boring Location (Geocon, 2003)
- GB-12 — Approximate Test Pit Location (Leighton, 2007)
- GTP-33 — Approximate Test Pit Location (Geocon, 2003)

N

0 400 800

Feet

Project: 11061.001	Eng/Geol: SIS/RFR
Scale: 1 " = 400 '	Date: August 2015

Reference: Pangaea Land Consultants, Inc., 2015, Rancho Diamante, TM35394, Site Plan, Scale 1"=100', dated May 6, 2015.

Author: Leighton Geomatics (mmurphy)

BORING LOCATION MAP

Rancho Diamante TTM 36841
Hemet, California

Figure 4

Leighton

Map Saved as V:\Drafting\11061\001\Maps\11061-001-F04_BLP_2015-07-15_MAM.mxd on 8/26/2015 10:29:37 AM

APPENDIX A

FIELD EXPLORATION
LOGS OF EXPLORATORY BORINGS

GEOTECHNICAL BORING LOG B-1

Project No.	11061.001	**Date Drilled**	7-14-15
Project	Rancho Diamante	**Logged By**	BSS
Drilling Co.	Martini Drilling	**Hole Diameter**	8"
Drilling Method	Hollow Stem Auger - 140lb - Auto Hammer - 30" Drop	**Ground Elevation**	1502'
Location	See Boring Location Map	**Sampled By**	BSS

Elevation Feet	Depth Feet	Graphic Log (N S)	Attitudes	Sample No.	Blows Per 6 Inches	Dry Density pcf	Moisture Content, %	Soil Class. (U.S.C.S.)	SOIL DESCRIPTION	Type of Tests
									This Soil Description applies only to a location of the exploration at the time of sampling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.	
1500	0			B-1				SM	**Quaternary Alluvium (Qal):** SILTY SAND, medium dense, brown, dry to moist, fine sand	SA, MD, EI, CR
				R-1	19 38 50-5"	122	6	SP-SC	Poorly graded SAND with CLAY, dense, olive brown, moist, fine sand, micaceous, trace clay	
1495	5			R-2	14 35 43				dense, grayish brown, dry to moist, fine sand, some mica (CO=1.5%)	CO
1490	10			R-3	16 43 50-4"	125	9		very dense, grayish brown, moist, fine to medium sand	
1485	15			R-4	6 13 22	120	11	SC-SM	SILTY, CLAYEY SAND, medium dense, brown, moist, fine sand, some mica	
1480	20			R-5	13 26 42			SM	SILTY SAND, dense, brown, moist, fine to medium sand	
1475	25			R-6	8 20 30	125	11		dense, light brown, moist, fine to medium sand, some clay, micaceous	
	30									

SAMPLE TYPES:
- B BULK SAMPLE
- C CORE SAMPLE
- G GRAB SAMPLE
- R RING SAMPLE
- S SPLIT SPOON SAMPLE
- T TUBE SAMPLE

TYPE OF TESTS:
- -200 % FINES PASSING
- AL ATTERBERG LIMITS
- CN CONSOLIDATION
- CO COLLAPSE
- CR CORROSION
- CU UNDRAINED TRIAXIAL
- DS DIRECT SHEAR
- EI EXPANSION INDEX
- H HYDROMETER
- MD MAXIMUM DENSITY
- PP POCKET PENETROMETER
- RV R VALUE
- SA SIEVE ANALYSIS
- SE SAND EQUIVALENT
- SG SPECIFIC GRAVITY
- UC UNCONFINED COMPRESSIVE STRENGTH

GEOTECHNICAL BORING LOG B-1

Project No.	11061.001	**Date Drilled**	7-14-15
Project	Rancho Diamante	**Logged By**	BSS
Drilling Co.	Martini Drilling	**Hole Diameter**	8"
Drilling Method	Hollow Stem Auger - 140lb - Auto Hammer - 30" Drop	**Ground Elevation**	1502'
Location	See Boring Location Map	**Sampled By**	BSS

Elevation Feet	Depth Feet	Graphic Log (N / S)	Attitudes	Sample No.	Blows Per 6 Inches	Dry Density pcf	Moisture Content, %	Soil Class. (U.S.C.S.)	SOIL DESCRIPTION	Type of Tests
	30			R-7	19 40 50-4"			SP-SM	Poorly graded SAND with SILT, very dense, light brown, moist, fine to medium sand, some gravel	
1470										
	35			R-8	12 26 28	124	9		dense, brown, moist, fine to medium sand, some mica	
1465										
	40			R-9	12 12 15			SC	CLAYEY SAND, medium dense, dark grayish brown, moist, fine to medium sand, more sand in the top of sample	
1460										
	45			R-10	5 12 22	115	15		medium dense, dark brown, moist, fine sand, some mica	
1455										
	50			R-11	6 15 28			SP-SC	Poorly graded SAND with CLAY, medium dense, dark grayish brown, moist, fine to medium sand, some silt	
1450									Drilled to 50' Sampled to 51.5' Groundwater not encountered Backfilled with soil cuttings (7/14/15)	
	55									
1445										
	60									

SAMPLE TYPES:

- B BULK SAMPLE
- C CORE SAMPLE
- G GRAB SAMPLE
- R RING SAMPLE
- S SPLIT SPOON SAMPLE
- T TUBE SAMPLE

TYPE OF TESTS:

- -200 % FINES PASSING
- AL ATTERBERG LIMITS
- CN CONSOLIDATION
- CO COLLAPSE
- CR CORROSION
- CU UNDRAINED TRIAXIAL
- DS DIRECT SHEAR
- EI EXPANSION INDEX
- H HYDROMETER
- MD MAXIMUM DENSITY
- PP POCKET PENETROMETER
- RV R VALUE
- SA SIEVE ANALYSIS
- SE SAND EQUIVALENT
- SG SPECIFIC GRAVITY
- UC UNCONFINED COMPRESSIVE STRENGTH

GEOTECHNICAL BORING LOG B-2

Project No.	11061.001	**Date Drilled**	7-14-15
Project	Rancho Diamante	**Logged By**	BSS
Drilling Co.	Martini Drilling	**Hole Diameter**	8"
Drilling Method	Hollow Stem Auger - 140lb - Auto Hammer - 30" Drop	**Ground Elevation**	1503'
Location	See Boring Location Map	**Sampled By**	BSS

Elevation Feet	Depth Feet	Graphic Log (N / S)	Attitudes	Sample No.	Blows Per 6 Inches	Dry Density pcf	Moisture Content, %	Soil Class. (U.S.C.S.)	SOIL DESCRIPTION	Type of Tests
	0							SM	**Quaternary Alluvium (Qal):** SILTY SAND, loose, brown, dry to moist, fine to medium sand	
1500				R-1	16 50-5"	122	5		dense, light brown, dry to moist, fine sand, few gravel	
	5			R-2	22 46 47	127	4	SP-SM	Poorly graded SAND with SILT, dense, dark brown, dry to moist, fine to medium sand, some clay	
1495										
	10			R-3	9 14 18				medium dense, light brown, moist, fine to medium sand, some gravel and mica	
1490										
	15			R-4	17 20 26	114	3	SP	Poorly graded SAND, dense, light yellowish brown, dry to moist, fine to coarse sand with fine gravel, micaceous	
1485										
	20			R-5	10 21 28	121	12	SC-SM	SILTY, CLAYEY SAND, dense, dark brown, moist, fine sand, some mica, few gravel	
1480										
	25			R-6	8 18 24			SM	SILTY SAND, medium dense, brown, moist, fine to medium sand, micaceous, trace clay	
1475									Drilled to 25' Sampled to 26.5' Groundwater not encountered Backfilled with soil cuttings (7/14/15)	
	30									

This Soil Description applies only to a location of the exploration at the time of sampling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.

SAMPLE TYPES:
- B BULK SAMPLE
- C CORE SAMPLE
- G GRAB SAMPLE
- R RING SAMPLE
- S SPLIT SPOON SAMPLE
- T TUBE SAMPLE

TYPE OF TESTS:
- -200 % FINES PASSING
- AL ATTERBERG LIMITS
- CN CONSOLIDATION
- CO COLLAPSE
- CR CORROSION
- CU UNDRAINED TRIAXIAL
- DS DIRECT SHEAR
- EI EXPANSION INDEX
- H HYDROMETER
- MD MAXIMUM DENSITY
- PP POCKET PENETROMETER
- RV R VALUE
- SA SIEVE ANALYSIS
- SE SAND EQUIVALENT
- SG SPECIFIC GRAVITY
- UC UNCONFINED COMPRESSIVE STRENGTH

GEOTECHNICAL BORING LOG B-3

Project No.	11061.001	**Date Drilled**	7-14-15
Project	Rancho Diamante	**Logged By**	BSS
Drilling Co.	Martini Drilling	**Hole Diameter**	8"
Drilling Method	Hollow Stem Auger - 140lb - Auto Hammer - 30" Drop	**Ground Elevation**	1502'
Location	See Boring Location Map	**Sampled By**	BSS

Elevation Feet	Depth Feet	Graphic Log (N / S)	Attitudes	Sample No.	Blows Per 6 Inches	Dry Density pcf	Moisture Content, %	Soil Class. (U.S.C.S.)	SOIL DESCRIPTION	Type of Tests
	0							SM	**Quaternary Alluvium (Qal):** SILTY SAND, medium dense, brown, moist, fine sand	
1500				R-1	27 42 50	128	6		very dense, dark brown, dry to moist, fine sand	
	5			R-2	16 20 25	123	6	SM	dense, brown, moist, fine to medium sand, some clay (CO=1.7%)	CO
1495										
	10			R-3	6 10 13	105	13	SC-SM	SILTY, CLAYEY SAND, medium dense, light olive brown, moist, fine sand, micaceous (CO=2.3%)	CO
1490										
	15			R-4	4 7 11	111	17	ML	SANDY SILT, stiff, olive brown, moist, fine sand, some mica	
1485										
	20			R-5	10 16 23	121	10	SM	SILTY SAND, medium dense, brown, moist, fine to medium sand, some mica, trace clay	
1480										
	25			R-6	7 18 30			SC-SM	SILTY, CLAYEY SAND, dense, grayish brown, moist, fine to medium sand, micaceous	
1475									Drilled to 25' Sampled to 26.5' Groundwater not encountered Backfilled with soil cuttings (7/14/15)	
	30									

SAMPLE TYPES:

B	BULK SAMPLE
C	CORE SAMPLE
G	GRAB SAMPLE
R	RING SAMPLE
S	SPLIT SPOON SAMPLE
T	TUBE SAMPLE

TYPE OF TESTS:

-200	% FINES PASSING	DS	DIRECT SHEAR	SA	SIEVE ANALYSIS
AL	ATTERBERG LIMITS	EI	EXPANSION INDEX	SE	SAND EQUIVALENT
CN	CONSOLIDATION	H	HYDROMETER	SG	SPECIFIC GRAVITY
CO	COLLAPSE	MD	MAXIMUM DENSITY	UC	UNCONFINED COMPRESSIVE STRENGTH
CR	CORROSION	PP	POCKET PENETROMETER		
CU	UNDRAINED TRIAXIAL	RV	R VALUE		

GEOTECHNICAL BORING LOG B-4

Project No.	11061.001	**Date Drilled**	7-14-15
Project	Rancho Diamante	**Logged By**	BSS
Drilling Co.	Martini Drilling	**Hole Diameter**	8"
Drilling Method	Hollow Stem Auger - 140lb - Auto Hammer - 30" Drop	**Ground Elevation**	1500'
Location	See Boring Location Map	**Sampled By**	BSS

Elevation Feet	Depth Feet	Graphic Log (N / S)	Attitudes	Sample No.	Blows Per 6 Inches	Dry Density pcf	Moisture Content, %	Soil Class. (U.S.C.S.)	SOIL DESCRIPTION	Type of Tests
1500	0			B-1				SM	**Quaternary Alluvium (Qal):** SILTY SAND, medium dense, brown, dry to moist, fine sand	
				R-1	13 19 37	113	7		dense, dark brown, dry to moist, fine sand, some clay	
1495	5			R-2	11 22 27	118	7		dense, brown, moist, fine to medium sand, some mica	
1490	10			R-3	4 10 16	105	11		medium dense, brown, moist, fine sand, some mica, few thin clay layers	
1485	15			R-4	7 11 15	119	13	SC	CLAYEY SAND, medium dense, dark brown, moist, fine sand, some mica	
1480	20			R-5	8 15 26			SC-SM	SILTY, CLAYEY SAND, medium dense, brown, moist, fine sand, micaceous	
1475	25			R-6	8 8 11				medium dense, grayish brown, moist, fine to medium sand	
								CL	SANDY Lean CLAY, stiff, dark grayish brown, moist, very fine sand, some mica	
1470	30								Drilled to 25' Sampled to 26.5' Groundwater not encountered Backfilled with soil cuttings (7/14/15)	

This Soil Description applies only to a location of the exploration at the time of sampling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.

SAMPLE TYPES:

B	BULK SAMPLE
C	CORE SAMPLE
G	GRAB SAMPLE
R	RING SAMPLE
S	SPLIT SPOON SAMPLE
T	TUBE SAMPLE

TYPE OF TESTS:

-200	% FINES PASSING	DS	DIRECT SHEAR	SA	SIEVE ANALYSIS
AL	ATTERBERG LIMITS	EI	EXPANSION INDEX	SE	SAND EQUIVALENT
CN	CONSOLIDATION	H	HYDROMETER	SG	SPECIFIC GRAVITY
CO	COLLAPSE	MD	MAXIMUM DENSITY	UC	UNCONFINED COMPRESSIVE STRENGTH
CR	CORROSION	PP	POCKET PENETROMETER		
CU	UNDRAINED TRIAXIAL	RV	R VALUE		

GEOTECHNICAL BORING LOG B-5

Project No.	11061.001	**Date Drilled**	7-14-15
Project	Rancho Diamante	**Logged By**	BSS
Drilling Co.	Martini Drilling	**Hole Diameter**	8"
Drilling Method	Hollow Stem Auger - 140lb - Auto Hammer - 30" Drop	**Ground Elevation**	1500'
Location	See Boring Location Map	**Sampled By**	BSS

Elevation Feet	Depth Feet	Graphic Log (N / S)	Attitudes	Sample No.	Blows Per 6 Inches	Dry Density pcf	Moisture Content, %	Soil Class. (U.S.C.S.)	SOIL DESCRIPTION	Type of Tests
1500	0							SM	**Quaternary Alluvium (Qal):** SILTY SAND, medium dense, light brown, dry to moist, fine sand	
				R-1	20 38 35	121	3		dense, dark brown, moist, fine to medium sand	
1495	5			R-2	15 50-6"	107	11		very dense, brown, moist, fine sand, some mica	
1490	10			R-3	4 12 15			SC-SM	SILTY, CLAYEY SAND, medium dense, grayish brown, moist, fine to medium sand, (CO=1.3%)	CO
1485	15			R-4	6 16 26	122	11		medium dense, brown, moist, fine sand, micaceous	
1480	20			R-5	5 9 11	109	18	SC	CLAYEY SAND, medium dense, dark grayish brown, moist, fine sand, micaceous	
1475	25			R-6	5 9 12				medium dense, dark grayish brown, moist, very fine to fine sand, micaceous	
1470	30								Drilled to 25' Sampled to 26.5' Groundwater not encountered Backfilled with soil cuttings (7/14/15)	

SAMPLE TYPES:
- B BULK SAMPLE
- C CORE SAMPLE
- G GRAB SAMPLE
- R RING SAMPLE
- S SPLIT SPOON SAMPLE
- T TUBE SAMPLE

TYPE OF TESTS:
- -200 % FINES PASSING
- AL ATTERBERG LIMITS
- CN CONSOLIDATION
- CO COLLAPSE
- CR CORROSION
- CU UNDRAINED TRIAXIAL
- DS DIRECT SHEAR
- EI EXPANSION INDEX
- H HYDROMETER
- MD MAXIMUM DENSITY
- PP POCKET PENETROMETER
- RV R VALUE
- SA SIEVE ANALYSIS
- SE SAND EQUIVALENT
- SG SPECIFIC GRAVITY
- UC UNCONFINED COMPRESSIVE STRENGTH

GEOTECHNICAL BORING LOG B-6

Project No.	11061.001	**Date Drilled**	7-14-15
Project	Rancho Diamante	**Logged By**	BSS
Drilling Co.	Martini Drilling	**Hole Diameter**	8"
Drilling Method	Hollow Stem Auger - 140lb - Auto Hammer - 30" Drop	**Ground Elevation**	1501'
Location	See Boring Location Map	**Sampled By**	BSS

Elevation Feet	Depth Feet	Graphic Log (N / S)	Attitudes	Sample No.	Blows Per 6 Inches	Dry Density pcf	Moisture Content, %	Soil Class. (U.S.C.S.)	SOIL DESCRIPTION	Type of Tests
1500	0							SC-SM	**Quaternary Alluvium (Qal):** SILTY, CLAYEY SAND, medium dense, brown, dry to moist, fine sand	
				R-1	11 25 45	124	3	SP-SM	Poorly graded SAND with SILT, dense, light brown, dry to moist, fine to medium sand, some gravel	
1495	5			R-2	16 26 50-5"	125	7		very dense, brown, moist, fine to medium sand, some clay	
1490	10			R-3	13 19 27	118	14	SC	CLAYEY SAND, dense, olive brown, moist, fine to medium sand, some mica	
1485	15			R-4	9 19 28			SP-SC	Poorly graded SAND with CLAY (or SILTY CLAY), dense, grayish brown, moist, fine to medium sand, micaceous	
1480	20			R-5	13 18 26			SP	Poorly graded SAND, medium dense, light yellowish brown, moist, fine to coarse sand with fine gravel, micaceous	
1475	25			R-6	15 20 32				dense, light brown, moist, fine to coarse sand, micaceous, some silt	
	30								Drilled to 25' Sampled to 26.5' Groundwater not encountered Backfilled with soil cuttings (7/14/15)	

SAMPLE TYPES:
- B BULK SAMPLE
- C CORE SAMPLE
- G GRAB SAMPLE
- R RING SAMPLE
- S SPLIT SPOON SAMPLE
- T TUBE SAMPLE

TYPE OF TESTS:
- -200 % FINES PASSING
- AL ATTERBERG LIMITS
- CN CONSOLIDATION
- CO COLLAPSE
- CR CORROSION
- CU UNDRAINED TRIAXIAL
- DS DIRECT SHEAR
- EI EXPANSION INDEX
- H HYDROMETER
- MD MAXIMUM DENSITY
- PP POCKET PENETROMETER
- RV R VALUE
- SA SIEVE ANALYSIS
- SE SAND EQUIVALENT
- SG SPECIFIC GRAVITY
- UC UNCONFINED COMPRESSIVE STRENGTH

GEOTECHNICAL BORING LOG B-7

Project No.	11061.001	**Date Drilled**	7-14-15
Project	Rancho Diamante	**Logged By**	BSS
Drilling Co.	Martini Drilling	**Hole Diameter**	8"
Drilling Method	Hollow Stem Auger - 140lb - Auto Hammer - 30" Drop	**Ground Elevation**	1502'
Location	See Boring Location Map	**Sampled By**	BSS

Elevation Feet	Depth Feet	Graphic Log (N / S)	Attitudes	Sample No.	Blows Per 6 Inches	Dry Density pcf	Moisture Content, %	Soil Class. (U.S.C.S.)	SOIL DESCRIPTION	Type of Tests
	0			B-1				SM	**Quaternary Alluvium (Qal):** SILTY SAND, medium dense, light brown, dry, fine sand, some roots	SA, H, MD, CR
1500				R-1	22 32 43	123	1	SP	Poorly graded SAND, dense, light brown, dry to moist, fine to medium sand, some silt and gravel, micaceous	
	5			R-2	8 12 21	116	2		medium dense, light brown, moist, fine to coarse sand, micaceous	
1495										
	10			R-3	6 10 11	113	3		medium dense, light brown, dry to moist, fine to coarse sand with fine gravel, micaceous	
1490										
	15			R-4	12 19 22				medium dense, brown, moist, fine to medium sand, some silt, micaceous	
1485										
	20			R-5	11 15 23	111	8		medium dense, light brown, moist, fine to medium sand, some silt and gravel, micaceous	
1480										
	25			R-6	10 20 28				dense, brown, moist, fine to coarse sand, some gravel, micaceous	
1475									Drilled to 25' Sampled to 26.5' Groundwater not encountered Backfilled with soil cuttings (7/14/15)	
	30									

SAMPLE TYPES:
- B BULK SAMPLE
- C CORE SAMPLE
- G GRAB SAMPLE
- R RING SAMPLE
- S SPLIT SPOON SAMPLE
- T TUBE SAMPLE

TYPE OF TESTS:
- -200 % FINES PASSING
- AL ATTERBERG LIMITS
- CN CONSOLIDATION
- CO COLLAPSE
- CR CORROSION
- CU UNDRAINED TRIAXIAL
- DS DIRECT SHEAR
- EI EXPANSION INDEX
- H HYDROMETER
- MD MAXIMUM DENSITY
- PP POCKET PENETROMETER
- RV R VALUE
- SA SIEVE ANALYSIS
- SE SAND EQUIVALENT
- SG SPECIFIC GRAVITY
- UC UNCONFINED COMPRESSIVE STRENGTH

GEOTECHNICAL BORING LOG B-8

Project No.	11061.001	**Date Drilled**	7-14-15
Project	Rancho Diamante	**Logged By**	BSS
Drilling Co.	Martini Drilling	**Hole Diameter**	8"
Drilling Method	Hollow Stem Auger - 140lb - Auto Hammer - 30" Drop	**Ground Elevation**	1502'
Location	See Boring Location Map	**Sampled By**	BSS

Elevation Feet	Depth Feet	Graphic Log (N / S)	Attitudes	Sample No.	Blows Per 6 Inches	Dry Density pcf	Moisture Content, %	Soil Class. (U.S.C.S.)	SOIL DESCRIPTION	Type of Tests
1500	0							SP-SM	**Quaternary Alluvium (Qal):** Poorly graded SAND with SILT, medium dense, light brown, dry to moist, fine to medium sand	
	5			R-1	14 20 27	122	8	SM	SILTY SAND, dense, dark olive brown, moist, fine to medium sand, some mica	
1495										
	10			R-2	5 10 16	113	16	SC-SM	SILTY, CLAYEY SAND, medium dense, olive brown, moist, fine sand, some mica	
1490										
	15			R-3	9 19 23	119	11		medium dense, olive brown, moist, fine to medium sand, some mica	
1485									Drilled to 15' Sampled to 16.5' Groundwater not encountered Backfilled with soil cuttings (7/14/15)	
	20									
1480										
	25									
1475										
	30									

This Soil Description applies only to a location of the exploration at the time of sampling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.

SAMPLE TYPES:
- B BULK SAMPLE
- C CORE SAMPLE
- G GRAB SAMPLE
- R RING SAMPLE
- S SPLIT SPOON SAMPLE
- T TUBE SAMPLE

TYPE OF TESTS:

-200	% FINES PASSING	DS	DIRECT SHEAR	SA	SIEVE ANALYSIS
AL	ATTERBERG LIMITS	EI	EXPANSION INDEX	SE	SAND EQUIVALENT
CN	CONSOLIDATION	H	HYDROMETER	SG	SPECIFIC GRAVITY
CO	COLLAPSE	MD	MAXIMUM DENSITY	UC	UNCONFINED COMPRESSIVE STRENGTH
CR	CORROSION	PP	POCKET PENETROMETER		
CU	UNDRAINED TRIAXIAL	RV	R VALUE		

GEOTECHNICAL BORING LOG B-5

Date 12-29-03 **Sheet** 1 **of** 2

Project Pulte Rancho Diamante **Project No.** 111116-001

Drilling Co. Cal Pac **Type of Rig** B53

Hole Diameter 8" **Drive Weight** 140 lbs **Drop** 30"

Elevation Top of Hole +/- 1507' **Location** See Map

Logged By SER

Sampled By SER

Elevation Feet	Depth Feet	Graphic Log (N S)	Notes	Sample No.	Blows Per Foot	Dry Density pcf	Moisture Content, %	Soil Class. (U.S.C.S.)	DESCRIPTION	Type of Tests
	0							SM	DISCED/TILLED ZONE @ Surface: Brown, very moist, loose, silty, fine to coarse SAND; abundant rootlets	
			Bulk 3 @0-5'							MD
1505								SM	QUATERNARY ALLUVIUM (Qal) @ 1.5': Yellow-brown, moist, medium dense, silty, fine to medium SAND	
				1	36	90.6	15.1		@ 2.5': Yellow-brown, moist, medium dense to dense, silty, fine to medium SAND; non-porous	
	5			2	41	124.7	5.5		@ 5': Dark brown to brown, moist, dense, silty, very fine to medium SAND; non-porous, scattered root hairs, mottling present	HCO, -200
1500				4	30	121.3	3.6		@ 7.5': Dark brown to brown, moist, medium dense, silty, very fine to medium SAND	HCO
	10				20				@ 10': Yellow-brown, damp to moist, medium dense, silty, very fine to medium SAND	
1495				5	17			SM	@ 12.5': Brown, damp, medium dense, fine to coarse, silty SAND; friable	-200
	15				51				@ 15': Yellow-brown, moist, very dense, silty, fine to medium SAND	
1490										
	20			6	15			SP	@ 20': Brown, damp, medium dense, fine to coarse SAND; friable	-200
1485										
	25			7	27	102.6	5.4		@ 25': Yellow-brown to brown, damp, medium dense, fine to medium SAND; friable	
1480										
	30									

SAMPLE TYPES:

- S SPLIT SPOON
- R RING SAMPLE
- B BULK SAMPLE
- T TUBE SAMPLE
- G GRAB SAMPLE
- C CORE SAMPLE

TYPE OF TESTS:

- SU SULFATE
- DS DIRECT SHEAR
- MD MAXIMUM DENSITY
- CN CONSOLIDATION
- CR CORROSION
- HCO HYDROCOLLAPSE
- HD HYDROMETER
- SA SIEVE ANALYSIS
- AL ATTERBERG LIMITS
- EI EXPANSION INDEX
- RV R-VALUE
- CS CORROSION SUITE
- MC MOISTURE CONTENT
- SE SAND EQUIVALENT
- -200 200 WASH
- RDS Remolded DS

LEIGHTON AND ASSOCIATES, INC.

GEOTECHNICAL BORING LOG B-5

Date 12-29-03 | Sheet 2 of 2

Project Pulte Rancho Diamante | Project No. 111116-001

Drilling Co. Cal Pac | Type of Rig B53

Hole Diameter 8" | Drive Weight 140 lbs | Drop 30"

Elevation Top of Hole +/- 1507' | Location See Map

Logged By SER

Sampled By SER

Elevation Feet	Depth Feet	Graphic Log (N S)	Notes	Sample No.	Blows Per Foot	Dry Density pcf	Moisture Content, %	Soil Class. (U.S.C.S.)	DESCRIPTION	Type of Tests
	30			8	19			SP/SM	@ 30': Light brown, damp, medium dense, fine to coarse SAND with silt; highly friable	-200
1475										
	35			9	27	114.3	7.4	SM	@ 35': Gray-brown, damp, medium dense, silty, fine to medium SAND	
1470										
	40			10	18			SC/SM	@ 40': Brown, moist, stiff, silty, clayey SAND	AL, -200
1465										
	45			11	21	117.5	14.5		@ 45': Gray-brown, moist, stiff, sandy SILT	
1460										
	50			12	19				@ 50': Gray-brown, moist, stiff, sandy SILT	
1455										
	55								Total Depth 52' No Groundwater Encountered Backfilled with Native 12-29-03	
1450										
	60									

SAMPLE TYPES:

- S SPLIT SPOON
- R RING SAMPLE
- B BULK SAMPLE
- T TUBE SAMPLE
- G GRAB SAMPLE
- C CORE SAMPLE

TYPE OF TESTS:

- SU SULFATE
- DS DIRECT SHEAR
- MD MAXIMUM DENSITY
- CN CONSOLIDATION
- CR CORROSION
- HCO HYDROCOLLAPSE
- HD HYDROMETER
- SA SIEVE ANALYSIS
- AL ATTERBERG LIMITS
- EI EXPANSION INDEX
- RV R-VALUE
- CS CORROSION SUITE
- MC MOISTURE CONTENT
- SE SAND EQUIVALENT
- -200 200 WASH
- RDS Remolded DS

LEIGHTON AND ASSOCIATES, INC.

GEOTECHNICAL TEST PIT LOG TP-8

Date 5-8-07 **Sheet** 1 **of** 1

Project Rancho Diamante - Geotechnical Investigation **Project No.** 112177-001

Equipment Co. **Type of Rig** Cat 4200 Backhoe

Bucket Size " **Drive Weight** **Drop** "

Elevation Top of Hole +/- ' **Location** See Geotechnical Map

Elevation Feet	Depth Feet	Graphic Log (N / S)	Notes	Sample No.	Blows Per Foot	Dry Density pcf	Moisture Content, %	Soil Class. (U.S.C.S.)	DESCRIPTION (Logged By ELM; Sampled By ELM)	Type of Tests
	0							SP	TOPSOIL @ 0-1.5': SAND, tan, dry, loose; roots	
								SM	QUATERNARY ALLUVIUM (Qal) @ 1.5-6': Silty SAND with clay, tan, moist, dense	
	5			R10		117.0	7.0			MD
									Total Depth 6 ft No Groundwater Encountered Backfilled 5/8/07	
	10									
	15									
	20									
	25									
	30									

SAMPLE TYPES:

- S SPT
- R RING SAMPLE
- B BULK SAMPLE
- T TUBE SAMPLE
- G GRAB SAMPLE
- C CORE SAMPLE

TYPE OF TESTS:

- SU SULFATE
- DS DIRECT SHEAR
- MD MAXIMUM DENSITY
- CN CONSOLIDATION
- CR CORROSION
- HCO HYDROCOLLAPSE
- HD HYDROMETER
- SA SIEVE ANALYSIS
- AL ATTERBERG LIMITS
- EI EXPANSION INDEX
- RV R-VALUE
- CS CORROSION SUITE
- MC MOISTURE CONTENT
- SE SAND EQUIVALENT
- -200 200 WASH
- RDS REMOLDED DS
- SC SAND CONE

Leighton

GEOTECHNICAL TEST PIT LOG TP-9

Date 5-8-07 **Sheet** 1 **of** 1

Project Rancho Diamante - Geotechnical Investigation **Project No.** 112177-001

Equipment Co. **Type of Rig** Cat 4200 Backhoe

Bucket Size " **Drive Weight** **Drop** "

Elevation Top of Hole +/- ' **Location** See Geotechnical Map

Elevation Feet	Depth Feet	Graphic Log (N S)	Notes	Sample No.	Blows Per Foot	Dry Density pcf	Moisture Content, %	Soil Class. (U.S.C.S.)	DESCRIPTION (Logged By ELM; Sampled By ELM)	Type of Tests
	0							SP	TOPSOIL @ 0-1': Fine SAND, tan, dry, loose to medium dense; roots	
								SM	QUATERNARY ALLUVIUM (Qal) @ 1-7': Silty, fine SAND with clay, tan, moist, dense	
	5									
	10								Total Depth 7 ft No Groundwater Encountered Backfilled 5/8/07	
	15									
	20									
	25									
	30									

SAMPLE TYPES:

- S SPT
- R RING SAMPLE
- B BULK SAMPLE
- T TUBE SAMPLE
- G GRAB SAMPLE
- C CORE SAMPLE

TYPE OF TESTS:

- SU SULFATE
- DS DIRECT SHEAR
- MD MAXIMUM DENSITY
- CN CONSOLIDATION
- CR CORROSION
- HCO HYDROCOLLAPSE
- HD HYDROMETER
- SA SIEVE ANALYSIS
- AL ATTERBERG LIMITS
- EI EXPANSION INDEX
- RV R-VALUE
- CS CORROSION SUITE
- MC MOISTURE CONTENT
- SE SAND EQUIVALENT
- -200 200 WASH
- RDS REMOLDED DS
- SC SAND CONE

Leighton

GEOTECHNICAL TEST PIT LOG TP-10

Date 5-8-07 **Sheet** 1 **of** 1

Project Rancho Diamante - Geotechnical Investigation **Project No.** 112177-001

Equipment Co. **Type of Rig** Cat 4200 Backhoe

Bucket Size " **Drive Weight** **Drop** "

Elevation Top of Hole +/- ' **Location** See Geotechnical Map

Elevation Feet	Depth Feet	Graphic Log	Notes	Sample No.	Blows Per Foot	Dry Density pcf	Moisture Content, %	Soil Class. (U.S.C.S.)	DESCRIPTION	Type of Tests
		N S							**Logged By** ELM **Sampled By** ELM	
	0							ML	TOPSOIL @ 0-1': Sandy SILT, tan, dry, loose; roots	
								SP/SM	QUATERNARY ALLUVIUM (Qal) @ 1-9.5': Fine to coarse SAND, tan, moist, dense; trace silt	
	5			B12						HD, SA
	10								Total Depth 9.5 ft No Groundwater Encountered Backfilled 5/8/07	
	15									
	20									
	25									
	30									

SAMPLE TYPES:

- S SPT
- R RING SAMPLE
- B BULK SAMPLE
- T TUBE SAMPLE
- G GRAB SAMPLE
- C CORE SAMPLE

TYPE OF TESTS:

- SU SULFATE
- DS DIRECT SHEAR
- MD MAXIMUM DENSITY
- CN CONSOLIDATION
- CR CORROSION
- HCO HYDROCOLLAPSE
- HD HYDROMETER
- SA SIEVE ANALYSIS
- AL ATTERBERG LIMITS
- EI EXPANSION INDEX
- RV R-VALUE
- CS CORROSION SUITE
- MC MOISTURE CONTENT
- SE SAND EQUIVALENT
- -200 200 WASH
- RDS REMOLDED DS
- SC SAND CONE

Leighton

GEOTECHNICAL TEST PIT LOG TP-11

Date 5-8-07 **Sheet** 1 **of** 1

Project Rancho Diamante - Geotechnical Investigation **Project No.** 112177-001

Equipment Co. **Type of Rig** Cat 4200 Backhoe

Bucket Size " **Drive Weight** **Drop** "

Elevation Top of Hole +/- ' **Location** See Geotechnical Map

Elevation Feet	Depth Feet	Graphic Log (N / S)	Notes	Sample No.	Blows Per Foot	Dry Density pcf	Moisture Content, %	Soil Class. (U.S.C.S.)	DESCRIPTION (Logged By ELM; Sampled By ELM)	Type of Tests
	0							ML	TOPSOIL @ 0-1': Sandy SILT, tan, dry, loose to medium dense; roots	
								SM	QUATERNARY ALLUVIUM (Qal) @ 1-5': Silty, fine SAND with clay, tan, moist, very dense	
				R13		109.0*	5.1			HCO
	5								Refusal @ 5 ft No Groundwater Encountered Backfilled 5/8/07 *Field dry density by Nuclear Gauge corrected for moisture content	
	10									
	15									
	20									
	25									
	30									

SAMPLE TYPES:
- S SPT
- R RING SAMPLE
- B BULK SAMPLE
- T TUBE SAMPLE
- G GRAB SAMPLE
- C CORE SAMPLE

TYPE OF TESTS:
- SU SULFATE
- DS DIRECT SHEAR
- MD MAXIMUM DENSITY
- CN CONSOLIDATION
- CR CORROSION
- HCO HYDROCOLLAPSE
- HD HYDROMETER
- SA SIEVE ANALYSIS
- AL ATTERBERG LIMITS
- EI EXPANSION INDEX
- RV R-VALUE
- CS CORROSION SUITE
- MC MOISTURE CONTENT
- SE SAND EQUIVALENT
- -200 200 WASH
- RDS REMOLDED DS
- SC SAND CONE

Leighton

GEOTECHNICAL TEST PIT LOG TP-12

Date 5-8-07 **Sheet** 1 **of** 1

Project Rancho Diamante - Geotechnical Investigation **Project No.** 112177-001

Equipment Co. **Type of Rig** Cat 4200 Backhoe

Bucket Size " **Drive Weight** **Drop** "

Elevation Top of Hole +/- ' **Location** See Geotechnical Map

Elevation Feet	Depth Feet	Graphic Log (N S)	Notes	Sample No.	Blows Per Foot	Dry Density pcf	Moisture Content, %	Soil Class. (U.S.C.S.)	DESCRIPTION	Type of Tests
	0							ML	TOPSOIL @ 0-1.5': SILT, tan, dry, loose; roots	
								ML	QUATERNARY ALLUVIUM (Qal) @ 1.5-9': SILT, tan, moist, stiff	
	5									
	10								Total Depth 9 ft No Groundwater Encountered Backfilled 5/8/07	
	15									
	20									
	25									
	30									

Logged By ELM

Sampled By ELM

SAMPLE TYPES:

- S SPT
- R RING SAMPLE
- B BULK SAMPLE
- T TUBE SAMPLE
- G GRAB SAMPLE
- C CORE SAMPLE

TYPE OF TESTS:

- SU SULFATE
- DS DIRECT SHEAR
- MD MAXIMUM DENSITY
- CN CONSOLIDATION
- CR CORROSION
- HCO HYDROCOLLAPSE
- HD HYDROMETER
- SA SIEVE ANALYSIS
- AL ATTERBERG LIMITS
- EI EXPANSION INDEX
- RV R-VALUE
- CS CORROSION SUITE
- MC MOISTURE CONTENT
- SE SAND EQUIVALENT
- -200 200 WASH
- RDS REMOLDED DS
- SC SAND CONE

Leighton

PROJECT NO. 20106-12-01

BORING B 6

ELEV. (MSL.) 1509 DATE COMPLETED 8/2/02

EQUIPMENT CME 55 8" HOLLOW STM

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0	B6-1				**ALLUVIUM** Dense to very dense, dry, light brown, very Sandy SILT to Silty, very fine to fine SAND, micaceous			
2					-Becomes very dense, dry to damp at 2 feet			
4	B6-2			ML/SM		50/6"	135.2	7.8
6	B6-3				-Becomes medium dense	27	115.3	3.1
8					Medium dense, dry to damp, light brown, fine to			
10	B6-4				medium SAND, trace silt, coarse sand	22	112.9	2.1
12								
14								
16	B6-5			SP	-Loose	8		
18								
20	B6-6					18	110.2	6.5
22					-Damp, medium dense			
24								
26	B6-7					25		
28					-Becomes damp to moist			

Figure A-8, Log of Boring B 6

BD

SAMPLE SYMBOLS

☐ ... SAMPLING UNSUCCESSFUL ◧ ... STANDARD PENETRATION TEST ■ ... DRIVE SAMPLE (UNDISTURBED)

▨ ... DISTURBED OR BAG SAMPLE ◪ ... CHUNK SAMPLE ▼ ... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

PROJECT NO. 20106-12-01

BORING B 6

ELEV. (MSL.) 1509 DATE COMPLETED 8/2/02

EQUIPMENT CME 55 8" HOLLOW STM

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
30	B6-8			SM	Medium dense, damp, medium brown, Silty, fine to medium SAND	24		
32	B6-9							
34				SP/SM	Becomes moist to damp, silt content increases slightly Silty SAND			
36	B6-10					40	111.0	10.4
38								
40	B6-11					42		
42								
44								
46	B6-12					33		
48				ML	Stiff, damp to moist, medium brown, SILT, micaceous, trace fine sand			
50	B6-13					20		
					BORING TERMINATED AT 51.5 FEET			

Figure A-9, Log of Boring B 6

BD

SAMPLE SYMBOLS

☐ ... SAMPLING UNSUCCESSFUL ◧ ... STANDARD PENETRATION TEST ■ ... DRIVE SAMPLE (UNDISTURBED)

⊠ ... DISTURBED OR BAG SAMPLE ◥ ... CHUNK SAMPLE ▼ ... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

PROJECT NO. 20106-12-01

BORING B 7

ELEV. (MSL.) 1504 DATE COMPLETED 8/6/02

EQUIPMENT CME 55 8" HOLLOW STM

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0								
2	B7-1				**ALLUVIUM** Very dense, dry, medium brown, Silty, very fine to fine SAND	72/11"		
4					-Becomes dense, damp			
6	B7-2				-Some medium sand in few lenses	53	121.5	2.5
8	B7-3			SM	-Becomes medium dense	21	119.5	9.1
10	B7-4					25	118.0	5.4
12								
14								
16	B7-5					12		
18								
20	B7-6			SP	-At 20 feet <1 foot thick lense of dense, moist, light brown, fine to medium SAND, trace silt	37	119.1	5.7
					BORING TERMINATED AT 21 FEET			

Figure A-10, Log of Boring B 7

BD

SAMPLE SYMBOLS

☐ ... SAMPLING UNSUCCESSFUL ◧ ... STANDARD PENETRATION TEST ■ ... DRIVE SAMPLE (UNDISTURBED)

⊠ ... DISTURBED OR BAG SAMPLE ◥ ... CHUNK SAMPLE ▼ ... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

PROJECT NO. 20106-12-01

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	TRENCH T 26 ELEV. (MSL.) 1504 DATE COMPLETED 8/8/02 EQUIPMENT CASE 580 W/24" BUCKT	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
					MATERIAL DESCRIPTION			
0					**ALLUVIUM** Medium stiff, dry, brown, very fine Sandy SILT			
2				ML	-At 2 feet becomes medium dense to dense, damp			
4					-Sand content increases, becomes hard to excavate			
					TRENCH TERMINATED AT 5 FEET			

Figure A-44, Log of Trench T 26

BD

SAMPLE SYMBOLS

☐ ... SAMPLING UNSUCCESSFUL ◧ ... STANDARD PENETRATION TEST ■ ... DRIVE SAMPLE (UNDISTURBED)

⊠ ... DISTURBED OR BAG SAMPLE ◥ ... CHUNK SAMPLE ▼ ... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

PROJECT NO. 20106-12-01

TRENCH T 32

ELEV. (MSL.) 1503 DATE COMPLETED 8/8/02

EQUIPMENT CASE 580 W/24" BUCKT

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0				ML	**ALLUVIUM** Stiff, dry, brown, SILT, some very fine to fine sand, rootlets			
2				ML/SM	Dense, damp, brown, Silty, very fine to fine SAND to a very fine to fine Sandy SILT			
4								
6					TRENCH TERMINATED AT 6 FEET			

Figure A-50, Log of Trench T 32

BD

SAMPLE SYMBOLS

☐ ... SAMPLING UNSUCCESSFUL ◧ ... STANDARD PENETRATION TEST ■ ... DRIVE SAMPLE (UNDISTURBED)

⊠ ... DISTURBED OR BAG SAMPLE ◣ ... CHUNK SAMPLE ▼ ... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

PROJECT NO. 20106-12-01

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	TRENCH T 33 ELEV. (MSL.) 1504 DATE COMPLETED 8/8/02 EQUIPMENT CASE 580 W/24" BUCKT	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
					MATERIAL DESCRIPTION			
0				ML/SM	**ALLUVIUM** Loose, dry, Silty, very fine to fine SAND to very fine to fine Sandy SILT, rootlets -At 1 foot becomes damp, dense			
2								
4				SM/SP	Dense, damp, brown to olive brown, Silty, very fine to fine SAND, trace medium to coarse sand			
6					-Becomes harder to excavate with depth			
					TRENCH TERMINATED AT 7 FEET			

Figure A-51, Log of Trench T 33

BD

SAMPLE SYMBOLS

☐ ... SAMPLING UNSUCCESSFUL ◧ ... STANDARD PENETRATION TEST ■ ... DRIVE SAMPLE (UNDISTURBED)

▨ ... DISTURBED OR BAG SAMPLE ◥ ... CHUNK SAMPLE ⧩ ... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

Appendix 4: Historical Site Conditions

Phase I Environmental Site Assessment or Other Information on Past Site Use

NOT APPLICABLE

Appendix 5: LID Infeasibility

LID Technical Infeasibility Analysis

NOT APPLICABLE

LID BMPS ARE BEING USED

Appendix 6: BMP Design Details

BMP Sizing, Design Details and other Supporting Documentation

SUMMARY

There are currently 11 infiltration basins and 2 bioretention basins proposed for the site per the Grading, Drainage, and BMP Exhibit in Appendix 2. The Exhibit delineates the drainage area tributary to each infiltration and bioretention basin. Preliminary BMP design volumes for each of the 13 basins have been calculated using the volume-based sizing criteria from the Riverside County Flood Control and Water Conservation District's September 2011, *Design Handbook for Low Impact Development Best Management Practices*. Each volume was then entered into either the Infiltration Facility – Design Procedure worksheet or the Bioretention Facility – Design Procedure spreadsheet to estimate the approximate basin areas. The calculations are attached. The pervious and impervious area tributary to each basin was estimated from the proposed land use in the tributary area and the Riverside County *Hydrology Manual's* Impervious Cover for Developed Areas table (the impervious area was conservatively selected to be 60 percent). The infiltration and bioretention basins were designed to meet the minimum sizing on the attached sheets for entitlement purposes.

The *Design Handbook for LID BMPs* indicates that typically drainage areas contributing to infiltration and bioretention facilities are 50 and 10 acres maximum, respectively. Discussions with Riverside County Flood Control and Water Conservation District plan reviewers indicate they allow leeway with these thresholds. BMPs 2 to 13 meet the area requirements. On the other hand, DMA 1 covers 53.35 acres, so slightly exceeds the 50 acre threshold. However, this DMA contains three individual storm drain systems, so the infiltration basin can be subdivided to separate basins treating less than 50 acres, if needed, during final engineering. Alternatively, the drainage area can be adjusted to be less than 50 acres, if needed.

ACTUAL IMPERVIOUS COVER

Land Use (1)	Range-Percent	Recommended Value For Average Conditions-Percent(2)
Natural or Agriculture	0 - 10	0
Single Family Residential: (3)		
40,000 S. F. (1 Acre) Lots	10 - 25	20
20,000 S. F. (½ Acre) Lots	30 - 45	40
7,200 - 10,000 S. F. Lots	45 - 55	50
		Use 60%
Multiple Family Residential:		
Condominiums	45 - 70	65
Apartments	65 - 90	80
Mobile Home Park	60 - 85	75
Commercial, Downtown Business or Industrial	80 -100	90

Notes:

1. Land use should be based on ultimate development of the watershed. Long range master plans for the County and incorporated cities should be reviewed to insure reasonable land use assumptions.

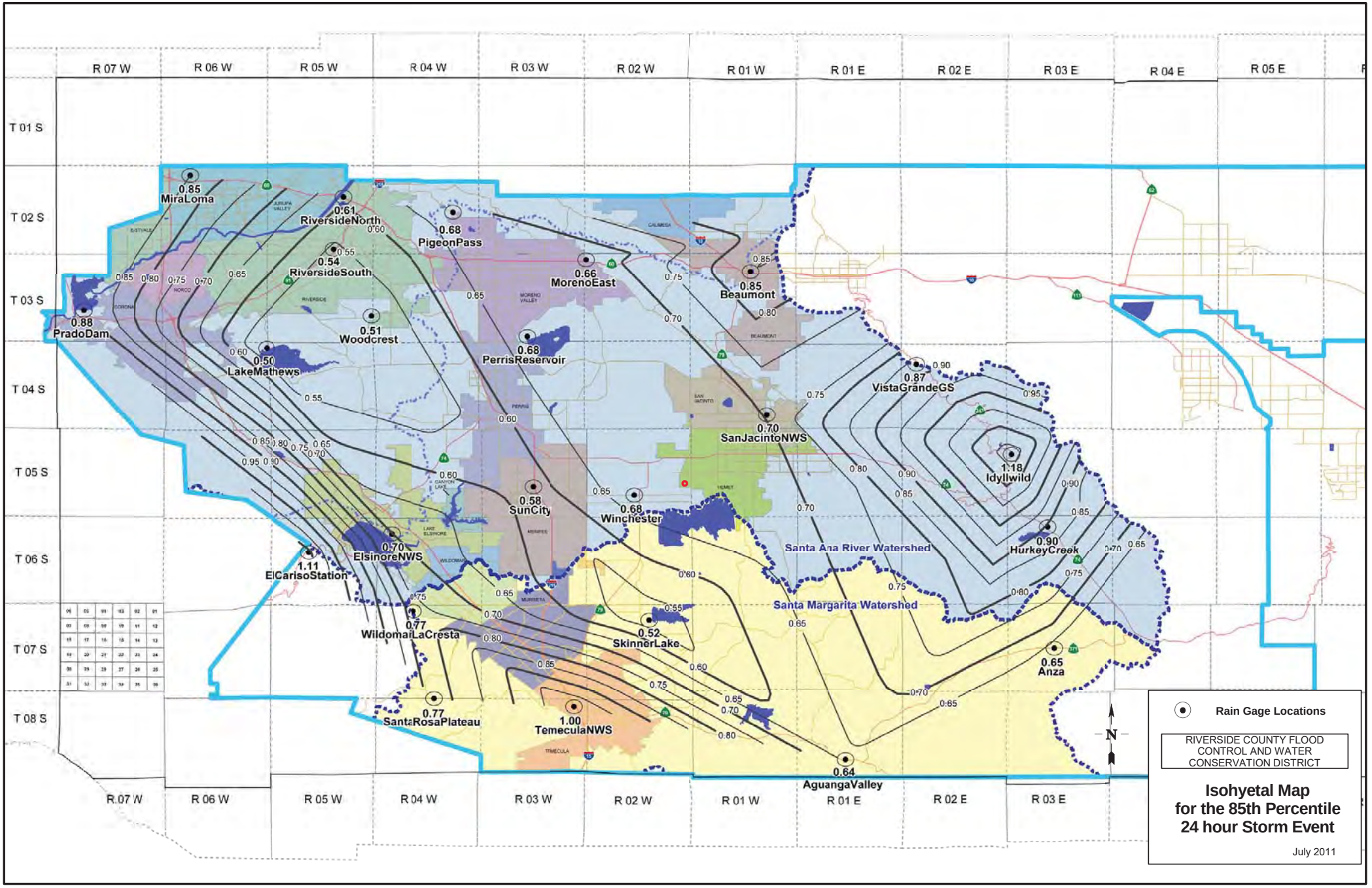
2. Recommended values are based on average conditions which may not apply to a particular study area. The percentage impervious may vary greatly even on comparable sized lots due to differences in dwelling size, improvements, etc. Landscape practices should also be considered as it is common in some areas to use ornamental gravels underlain by impervious plastic materials in place of lawns and shrubs. A field investigation of a study area should always be made, and a review of aerial photos, where available may assist in estimating the percentage of impervious cover in developed areas.

3. For typical horse ranch subdivisions increase impervious area 5 percent over the values recommended in the table above.

RCFC & WCD
HYDROLOGY MANUAL

IMPERVIOUS COVER FOR DEVELOPED AREAS

PLATE E-6.3


R 07 W
R 06 W
R 05 W
R 04 W
R 03 W
R 02 W
R 01 W
R 01 E
R 02 E
R 03 E
R 04 E
R 05 E
T 01 S
T 02 S
T 03 S
T 04 S
T 05 S
T 06 S
T 07 S
T 08 S
0.85 MiraLoma
0.61 RiversideNorth
0.68 PigeonPass
0.54 RiversideSouth
0.66 MorenoEast
0.85 Beaumont
0.88 PradoDam
0.51 Woodcrest
0.68 PerrisReservoir
0.50 LakeMathews
0.87 VistaGrandeGS
0.70 SanJacintoNWS
1.18 Idyllwild
0.58 SunCity
0.68 Winchester
0.70 ElsinoreNWS
1.11 ElCarisoStation
0.90 HurkeyCreek
Santa Ana River Watershed
Santa Margarita Watershed
0.77 WildomarLaCresta
0.52 SkinnerLake
0.65 Anza
0.77 SantaRosaPlateau
1.00 TemeculaNWS
0.64 AguangaValley
N
Rain Gage Locations
RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT
Isohyetal Map for the 85th Percentile 24 hour Storm Event
July 2011

Santa Ana Watershed

V_{BMP} and Q_{BMP} worksheets

These worksheets are to be used to determine the required

Design Capture Volume (V_{BMP})
or the
Design Flow Rate (Q_{BMP})

for BMPs in the Santa Ana Watershed

To verify which watershed your project is located within, visit

www.rcflood.org/npdes

and use the 'Locate my Watershed' tool

If your project is not located in the Santa Ana Watershed,

Do not use these worksheets! Instead visit

www.rcflood.org/npdes/developers.aspx

To access worksheets applicable to your watershed

Use the tabs across the bottom
to access the worksheets for the Santa Ana Watershed

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

(Rev. 10-2011)

Legend: Required Entries / Calculated Cells

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

Company Name: Chang Consultants — Date: 2/1/2018

Designed by: WWC — Case No:

Company Project Number/Name: Rancho Diamante

BMP Identification

BMP NAME / ID: BMP 1

Must match Name/ID used on BMP Design Calculation Sheet

Design Rainfall Depth

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

D_{85}= 0.67 inches

Drainage Management Area Tabulation

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

DMA Type/ID	DMA Area (square feet)	Post-Project Surface Type	Effective Imperivous Fraction, I_f	DMA Runoff Factor	DMA Areas x Runoff Factor	*Design Storm Depth (in)*	*Design Capture Volume, V_{BMP} (cubic feet)*	*Proposed Volume on Plans (cubic feet)*
DMA 1	*1351231.2*	*Roofs*	*1*	*0.89*	*1205298.2*			
DMA 2	*900820.8*	*Ornamental Landscaping*	*0.1*	*0.11*	*99502.9*			
	2252052		***Total***		**1304801.1**	**0.67**	***72851.4***	***72852***

#REF!

Notes:

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

(Rev. 10-2011)

Legend: Required Entries / Calculated Cells

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

Company Name: Chang Consultants
Date: 2/1/2018
Designed by: WWC
Case No:
Company Project Number/Name: Rancho Diamante

BMP Identification

BMP NAME / ID: BMP 2

Must match Name/ID used on BMP Design Calculation Sheet

Design Rainfall Depth

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

D_{85}= 0.67 inches

Drainage Management Area Tabulation

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

DMA Type/ID	DMA Area (square feet)	Post-Project Surface Type	Effective Imperivous Fraction, I_f	DMA Runoff Factor	DMA Areas x Runoff Factor	*Design Storm Depth (in)*	*Design Capture Volume, V_{BMP} (cubic feet)*	*Proposed Volume on Plans (cubic feet)*
DMA 1	*519670.8*	*Roofs*	*1*	*0.89*	*463546.4*			
DMA 2	*346737.6*	*Ornamental Landscaping*	*0.1*	*0.11*	*38299.9*			
	866408.4	***Total***			501846.3	0.67	*28019.8*	*28020*

#REF!

Notes:

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

(Rev. 10-2011)

Legend: Required Entries / Calculated Cells

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

Company Name	Chang Consultants	Date	2/1/2018
Designed by	WWC	Case No	
Company Project Number/Name	Rancho Diamante		

BMP Identification

BMP NAME / ID: BMP 3

Must match Name/ID used on BMP Design Calculation Sheet

Design Rainfall Depth

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

D_{85}= 0.67 inches

Drainage Management Area Tabulation

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

DMA Type/ID	DMA Area (square feet)	Post-Project Surface Type	Effective Imperivous Fraction, I_f	DMA Runoff Factor	DMA Areas x Runoff Factor	*Design Storm Depth (in)*	*Design Capture Volume, V_{BMP} (cubic feet)*	*Proposed Volume on Plans (cubic feet)*
DMA 1	*362419.2*	*Roofs*	*1*	*0.89*	*323277.9*			
DMA 2	*241758*	*Ornamental Landscaping*	*0.1*	*0.11*	*26704.1*			
	604177.2		*Total*		349982	0.67	*19540.7*	*19541*

#REF!

Notes:

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

(Rev. 10-2011)

Legend: Required Entries / Calculated Cells

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

Company Name: Chang Consultants | Date: 2/1/2018

Designed by: WWC | Case No:

Company Project Number/Name: Rancho Diamante

BMP Identification

BMP NAME / ID: BMP 4

Must match Name/ID used on BMP Design Calculation Sheet

Design Rainfall Depth

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

D_{85}= 0.67 inches

Drainage Management Area Tabulation

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

DMA Type/ID	DMA Area (square feet)	Post-Project Surface Type	Effective Imperivous Fraction, I_f	DMA Runoff Factor	DMA Areas x Runoff Factor	*Design Storm Depth (in)*	*Design Capture Volume, V_{BMP} (cubic feet)*	*Proposed Volume on Plans (cubic feet)*
DMA 1	*724838.4*	*Roofs*	*1*	*0.89*	*646555.9*			
DMA 2	*483516*	*Ornamental Landscaping*	*0.1*	*0.11*	*53408.2*			
	1208354.4		*Total*		699964.1	0.67	*39081.3*	*39082*

#REF!

Notes:

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

(Rev. 10-2011)

Legend: Required Entries | Calculated Cells

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

Company Name: Chang Consultants
Date: 2/1/2018
Designed by: WWC
Case No:
Company Project Number/Name: Rancho Diamante

BMP Identification

BMP NAME / ID: BMP 5

Must match Name/ID used on BMP Design Calculation Sheet

Design Rainfall Depth

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

D_{85}= 0.67 inches

Drainage Management Area Tabulation

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

DMA Type/ID	DMA Area (square feet)	Post-Project Surface Type	Effective Impervious Fraction, I_f	DMA Runoff Factor	DMA Areas x Runoff Factor	*Design Storm Depth (in)*	*Design Capture Volume, V_{BMP} (cubic feet)*	*Proposed Volume on Plans (cubic feet)*
DMA 1	*244807.2*	*Roofs*	*1*	*0.89*	*218368*			
DMA 2	*162914.4*	*Ornamental Landscaping*	*0.1*	*0.11*	*17995.2*			
	407721.6	***Total***			**236363.2**	**0.67**	***13196.9***	***13197***

#REF!

Notes:

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

(Rev. 10-2011)

Legend: Required Entries / Calculated Cells

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

Company Name: Chang Consultants | Date: 2/1/2018

Designed by: WWC | Case No:

Company Project Number/Name: Rancho Diamante

BMP Identification

BMP NAME / ID: BMP 6

Must match Name/ID used on BMP Design Calculation Sheet

Design Rainfall Depth

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

D_{85}= 0.67 inches

Drainage Management Area Tabulation

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

DMA Type/ID	DMA Area (square feet)	Post-Project Surface Type	Effective Imperivous Fraction, I_f	DMA Runoff Factor	DMA Areas x Runoff Factor	*Design Storm Depth (in)*	*Design Capture Volume, V_{BMP} (cubic feet)*	*Proposed Volume on Plans (cubic feet)*
DMA 1	*61855.2*	*Roofs*	*1*	*0.89*	*55174.8*			
DMA 2	*41382*	*Ornamental Landscaping*	*0.1*	*0.11*	*4571*			
	103237.2	***Total***			59745.8	0.67	*3335.8*	*3336*

#REF!

Notes:

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

(Rev. 10-2011)

Legend: Required Entries | Calculated Cells

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

Company Name: Chang Consultants
Date: 2/1/2018
Designed by: WWC
Case No:
Company Project Number/Name: Rancho Diamante

BMP Identification

BMP NAME / ID: BMP 7

Must match Name/ID used on BMP Design Calculation Sheet

Design Rainfall Depth

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

D_{85}= 0.67 inches

Drainage Management Area Tabulation

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

DMA Type/ID	DMA Area (square feet)	Post-Project Surface Type	Effective Imperious Fraction, I_f	DMA Runoff Factor	DMA Areas x Runoff Factor	*Design Storm Depth (in)*	*Design Capture Volume, V_{BMP} (cubic feet)*	*Proposed Volume on Plans (cubic feet)*
DMA 1	*103237.2*	*Roofs*	*1*	*0.89*	*92087.6*			
DMA 2	*68824.8*	*Ornamental Landscaping*	*0.1*	*0.11*	*7602.2*			
	172062	***Total***			**99689.8**	**0.67**	***5566***	***5566***

#REF!

Notes:

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

(Rev. 10-2011)

Legend: Required Entries / Calculated Cells

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

Company Name: Chang Consultants — Date: 2/1/2018

Designed by: WWC — Case No:

Company Project Number/Name: Rancho Diamante

BMP Identification

BMP NAME / ID: BMP 8

Must match Name/ID used on BMP Design Calculation Sheet

Design Rainfall Depth

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

D_{85}= 0.67 inches

Drainage Management Area Tabulation

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

DMA Type/ID	DMA Area (square feet)	Post-Project Surface Type	Effective Imperivous Fraction, I_f	DMA Runoff Factor	DMA Areas x Runoff Factor	*Design Storm Depth (in)*	*Design Capture Volume, V_{BMP} (cubic feet)*	*Proposed Volume on Plans (cubic feet)*
DMA 1	*47044.8*	*Roofs*	*1*	*0.89*	*41964*			
DMA 2	*31363.2*	*Ornamental Landscaping*	*0.1*	*0.11*	*3464.3*			
	78408		*Total*		*45428.3*	*0.67*	*2536.4*	*2537*

#REF!

Notes:

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

(Rev. 10-2011)

Legend: Required Entries | Calculated Cells

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

Company Name: Chang Consultants — Date: 2/1/2018

Designed by: WWC — Case No:

Company Project Number/Name: Rancho Diamante

BMP Identification

BMP NAME / ID: BMP 9

Must match Name/ID used on BMP Design Calculation Sheet

Design Rainfall Depth

85th Percentile, 24-hour Rainfall Depth, from the Isohyetal Map in Handbook Appendix E — D_{85}= 0.67 inches

Drainage Management Area Tabulation

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

DMA Type/ID	DMA Area (square feet)	Post-Project Surface Type	Effective Imperivous Fraction, I_f	DMA Runoff Factor	DMA Areas x Runoff Factor	*Design Storm Depth (in)*	*Design Capture Volume, V_{BMP} (cubic feet)*	*Proposed Volume on Plans (cubic feet)*
DMA 1	*264409.2*	*Roofs*	*1*	*0.89*	*235853*			
DMA 2	*176418*	*Ornamental Landscaping*	*0.1*	*0.11*	*19486.8*			
	440827.2	***Total***			**255339.8**	**0.67**	***14256.5***	***14257***

#REF!

Notes:

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

(Rev. 10-2011)

Legend: Required Entries / Calculated Cells

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

Company Name	Chang Consultants	Date	2/1/2018
Designed by	WWC	Case No	
Company Project Number/Name	Rancho Diamante		

BMP Identification

BMP NAME / ID: BMP 10

Must match Name/ID used on BMP Design Calculation Sheet

Design Rainfall Depth

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

D_{85}= 0.67 inches

Drainage Management Area Tabulation

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

DMA Type/ID	DMA Area (square feet)	Post-Project Surface Type	Effective Imperivous Fraction, I_f	DMA Runoff Factor	DMA Areas x Runoff Factor	*Design Storm Depth (in)*	*Design Capture Volume, V_{BMP} (cubic feet)*	*Proposed Volume on Plans (cubic feet)*
DMA 1	*239580*	*Roofs*	*1*	*0.89*	*213705.4*			
DMA 2	*159429.6*	*Ornamental Landscaping*	*0.1*	*0.11*	*17610.3*			
	399009.6	*Total*			231315.7	*0.67*	*12915.1*	*12916*

#REF!

Notes:

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

(Rev. 10-2011)

Legend: Required Entries / Calculated Cells

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

Company Name	Chang Consultants	Date	2/1/2018
Designed by	WWC	Case No	
Company Project Number/Name	Rancho Diamante		

BMP Identification

BMP NAME / ID BMP 11

Must match Name/ID used on BMP Design Calculation Sheet

Design Rainfall Depth

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

D_{85}= 0.67 inches

Drainage Management Area Tabulation

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

DMA Type/ID	DMA Area (square feet)	Post-Project Surface Type	Effective Impervious Fraction, I_f	DMA Runoff Factor	DMA Areas x Runoff Factor	*Design Storm Depth (in)*	*Design Capture Volume, V_{BMP} (cubic feet)*	*Proposed Volume on Plans (cubic feet)*
DMA 1	*739648.8*	*Roofs*	*1*	*0.89*	*659766.7*			
DMA 2	*493099.2*	*Ornamental Landscaping*	*0.1*	*0.11*	*54466.8*			
	1232748	*Total*			714233.5	0.67	*39878*	*39878*

#REF!

Notes:

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

(Rev. 10-2011)

Legend: Required Entries / Calculated Cells

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

Company Name: Chang Consultants | Date: 2/1/2018
Designed by: WWC | Case No:
Company Project Number/Name: Rancho Diamante

BMP Identification

BMP NAME / ID: BMP 12

Must match Name/ID used on BMP Design Calculation Sheet

Design Rainfall Depth

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

D_{85}= 0.67 inches

Drainage Management Area Tabulation

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

DMA Type/ID	DMA Area (square feet)	Post-Project Surface Type	Effective Imperivous Fraction, I_f	DMA Runoff Factor	DMA Areas x Runoff Factor	*Design Storm Depth (in)*	*Design Capture Volume, V_{BMP} (cubic feet)*	*Proposed Volume on Plans (cubic feet)*
DMA 1	168141.6	Roofs	1	0.89	149982.3			
DMA 2	111949.2	Ornamental Landscaping	0.1	0.11	12365.7			
	280090.8	Total			162348	0.67	9064.4	9065

#REF!

Notes:

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

(Rev. 10-2011)

Legend: Required Entries / Calculated Cells

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

Company Name: Chang Consultants — Date: 2/1/2018

Designed by: WWC — Case No:

Company Project Number/Name: Rancho Diamante

BMP Identification

BMP NAME / ID: BMP 13

Must match Name/ID used on BMP Design Calculation Sheet

Design Rainfall Depth

85th Percentile, 24-hour Rainfall Depth, from the Isohyetal Map in Handbook Appendix E — D_{85}= 0.67 inches

Drainage Management Area Tabulation

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

DMA Type/ID	DMA Area (square feet)	Post-Project Surface Type	Effective Imperivous Fraction, I_f	DMA Runoff Factor	DMA Areas x Runoff Factor	*Design Storm Depth (in)*	*Design Capture Volume, V_{BMP} (cubic feet)*	*Proposed Volume on Plans (cubic feet)*
DMA 1	*64904.4*	*Roofs*	*1*	*0.89*	*57894.7*			
DMA 2	*43560*	*Ornamental Landscaping*	*0.1*	*0.11*	*4811.6*			
	108464.4	**Total**			**62706.3**	**0.67**	**3501.1**	**3502**

#REF!

Notes:

Infiltration Basin - Design Procedure (Rev. 03-2012)	BMP ID: BMP 1	Legend:	Required Entries / Calculated Cells
Company Name: Chang Consultants			Date: 1/20/2019
Designed by: Wayne W. Chang			County/City Case No.:

Design Volume

a) Tributary area (BMP subarea)	A_T =	50	acres
b) Enter V_{BMP} determined from Section 2.1 of this Handbook	V_{BMP}=	72,852	ft^3

Maximum Depth

a) Infiltration rate	I =	2.62	in/hr
b) Factor of Safety (See Table 1, Appendix A: "Infiltration Testing" from this BMP Handbook)	FS =	3	
c) Calculate D_1 $D_1 = \frac{I\ (in/hr) \times 72\ hrs}{12\ (in/ft) \times FS}$	D_1 =	5.2	ft
d) Enter the depth of freeboard (at least 1 ft)		1	ft
e) Enter depth to historic high ground water (measured from **top** of basin)		20	ft
f) Enter depth to top of bedrock or impermeable layer (measured from **top** of basin)		10	ft
g) D_2 is the smaller of: Depth to groundwater - (10 ft + freeboard) and Depth to impermeable layer - (5 ft + freeboard)	D_2 =	4.0	ft
h) D_{MAX} is the smaller value of D_1 and D_2 but shall not exceed 5 feet	D_{MAX} =	4.0	ft

Basin Geometry

a) Basin side slopes (no steeper than 4:1)	z =	4	:1
b) Proposed basin depth (excluding freeboard)	d_B =	4	ft
c) Minimum bottom surface area of basin ($A_S = V_{BMP}/d_B$)	A_S =	18213	ft^2
d) Proposed Design Surface Area	A_D =	18213	ft^2

Forebay

a) Forebay volume (minimum 0.5% V_{BMP})	Volume =	364	ft^3
b) Forebay depth (height of berm/splashwall. 1 foot min.)	Depth =	1	ft
c) Forebay surface area (minimum)	Area =	364	ft^2
d) Full height notch-type weir	Width (W) =	6.0	in

Notes: The actual tributary area is 53.35 acres, but spreadsheet only allows up to 50 acres. For this preliminary WQMP, increase required areas by 53.35/50 = 1.07 percent. The available area is 72,060 sf.

Infiltration Basin - Design Procedure (Rev. 03-2012)	BMP ID: BMP 2	Legend:	Required Entries / Calculated Cells
Company Name: Chang Consultants			Date: 1/20/2019
Designed by: Wayne W. Chang			County/City Case No.:

Design Volume

a) Tributary area (BMP subarea)	A_T =	22.34	acres
b) Enter V_{BMP} determined from Section 2.1 of this Handbook	V_{BMP} =	28,020	ft^3

Maximum Depth

a) Infiltration rate	I =	3.1775	in/hr
b) Factor of Safety (See Table 1, Appendix A: "Infiltration Testing" from this BMP Handbook)	FS =	3	
c) Calculate D_1 $D_1 = \frac{I\ (in/hr) \times 72\ hrs}{12\ (in/ft) \times FS}$	D_1 =	6.4	ft
d) Enter the depth of freeboard (at least 1 ft)		1	ft
e) Enter depth to historic high ground water (measured from **top** of basin)		20	ft
f) Enter depth to top of bedrock or impermeable layer (measured from **top** of basin)		10	ft
g) D_2 is the smaller of: Depth to groundwater - (10 ft + freeboard) and Depth to impermeable layer - (5 ft + freeboard)	D_2 =	4.0	ft
h) D_{MAX} is the smaller value of D_1 and D_2 but shall not exceed 5 feet	D_{MAX} =	4.0	ft

Basin Geometry

a) Basin side slopes (no steeper than 4:1)	z =	4	:1
b) Proposed basin depth (excluding freeboard)	d_B =	4	ft
c) Minimum bottom surface area of basin ($A_S = V_{BMP}/d_B$)	A_S =	7005	ft^2
d) Proposed Design Surface Area	A_D =	7005	ft^2

Forebay

a) Forebay volume (minimum 0.5% V_{BMP})	Volume =	140	ft^3
b) Forebay depth (height of berm/splashwall. 1 foot min.)	Depth =	1	ft
c) Forebay surface area (minimum)	Area =	140	ft^2
d) Full height notch-type weir	Width (W) =	6.0	in

Notes: The available area is 106,519 sf.

Infiltration Basin - Design Procedure (Rev. 03-2012)	BMP ID: BMP 3	Legend:	Required Entries / Calculated Cells
Company Name: Chang Consultants			Date: 1/20/2019
Designed by: Wayne W. Chang			County/City Case No.:

Design Volume

a) Tributary area (BMP subarea)	A_T =	14.34	acres
b) Enter V_{BMP} determined from Section 2.1 of this Handbook	V_{BMP}=	19,541	ft^3

Maximum Depth

a) Infiltration rate	I =	3.1775	in/hr
b) Factor of Safety (See Table 1, Appendix A: "Infiltration Testing" from this BMP Handbook)	FS =	3	
c) Calculate D_1 $D_1 = \frac{I\ (in/hr) \times 72\ hrs}{12\ (in/ft) \times FS}$	D_1 =	6.4	ft
d) Enter the depth of freeboard (at least 1 ft)		1	ft
e) Enter depth to historic high ground water (measured from **top** of basin)		20	ft
f) Enter depth to top of bedrock or impermeable layer (measured from **top** of basin)		10	ft
g) D_2 is the smaller of: Depth to groundwater - (10 ft + freeboard) and Depth to impermeable layer - (5 ft + freeboard)	D_2 =	4.0	ft
h) D_{MAX} is the smaller value of D_1 and D_2 but shall not exceed 5 feet	D_{MAX} =	4.0	ft

Basin Geometry

a) Basin side slopes (no steeper than 4:1)	z =	4	:1
b) Proposed basin depth (excluding freeboard)	d_B =	4	ft
c) Minimum bottom surface area of basin ($A_S = V_{BMP}/d_B$)	A_S =	4885	ft^2
d) Proposed Design Surface Area	A_D =	4886	ft^2

Forebay

a) Forebay volume (minimum 0.5% V_{BMP})	Volume =	98	ft^3
b) Forebay depth (height of berm/splashwall. 1 foot min.)	Depth =	1	ft
c) Forebay surface area (minimum)	Area =	98	ft^2
d) Full height notch-type weir	Width (W) =	6.0	in

Notes: The available area is 20,327 sf.

Infiltration Basin - Design Procedure (Rev. 03-2012)	BMP ID: BMP 4	Legend:	Required Entries / Calculated Cells
Company Name: Chang Consultants			Date: 1/20/2019
Designed by: Wayne W. Chang			County/City Case No.:

Design Volume

a) Tributary area (BMP subarea)	A_T =	36.71	acres
b) Enter V_{BMP} determined from Section 2.1 of this Handbook	V_{BMP} =	39,082	ft^3

Maximum Depth

a) Infiltration rate	I =	3.735	in/hr
b) Factor of Safety (See Table 1, Appendix A: "Infiltration Testing" from this BMP Handbook)	FS =	3	
c) Calculate D_1 $D_1 = \frac{I\ (in/hr) \times 72\ hrs}{12\ (in/ft) \times FS}$	D_1 =	7.5	ft
d) Enter the depth of freeboard (at least 1 ft)		1	ft
e) Enter depth to historic high ground water (measured from **top** of basin)		20	ft
f) Enter depth to top of bedrock or impermeable layer (measured from **top** of basin)		10	ft
g) D_2 is the smaller of: Depth to groundwater - (10 ft + freeboard) and Depth to impermeable layer - (5 ft + freeboard)	D_2 =	4.0	ft
h) D_{MAX} is the smaller value of D_1 and D_2 but shall not exceed 5 feet	D_{MAX} =	4.0	ft

Basin Geometry

a) Basin side slopes (no steeper than 4:1)	z =	4	:1
b) Proposed basin depth (excluding freeboard)	d_B =	4	ft
c) Minimum bottom surface area of basin ($A_S = V_{BMP}/d_B$)	A_S =	9771	ft^2
d) Proposed Design Surface Area	A_D =	9771	ft^2

Forebay

a) Forebay volume (minimum 0.5% V_{BMP})	Volume =	195	ft^3
b) Forebay depth (height of berm/splashwall. 1 foot min.)	Depth =	1	ft
c) Forebay surface area (minimum)	Area =	195	ft^2
d) Full height notch-type weir	Width (W) =	6.0	in

Notes: The available area is 390,702 sf.

Infiltration Basin - Design Procedure (Rev. 03-2012)	BMP ID: BMP 5	Legend:	Required Entries / Calculated Cells
Company Name: Chang Consultants			Date: 1/20/2019
Designed by: Wayne W. Chang			County/City Case No.:

Design Volume

a) Tributary area (BMP subarea)	A_T =	9.97	acres
b) Enter V_{BMP} determined from Section 2.1 of this Handbook	V_{BMP}=	13,197	ft^3

Maximum Depth

a) Infiltration rate	I =	2.51	in/hr
b) Factor of Safety (See Table 1, Appendix A: "Infiltration Testing" from this BMP Handbook)	FS =	3	
c) Calculate D_1 $D_1 = \frac{I\ (in/hr) \times 72\ hrs}{12\ (in/ft) \times FS}$	D_1 =	5.0	ft
d) Enter the depth of freeboard (at least 1 ft)		1	ft
e) Enter depth to historic high ground water (measured from **top** of basin)		20	ft
f) Enter depth to top of bedrock or impermeable layer (measured from **top** of basin)		10	ft
g) D_2 is the smaller of: Depth to groundwater - (10 ft + freeboard) and Depth to impermeable layer - (5 ft + freeboard)	D_2 =	4.0	ft
h) D_{MAX} is the smaller value of D_1 and D_2 but shall not exceed 5 feet	D_{MAX} =	4.0	ft

Basin Geometry

a) Basin side slopes (no steeper than 4:1)	z =	4	:1
b) Proposed basin depth (excluding freeboard)	d_B =	4	ft
c) Minimum bottom surface area of basin ($A_S = V_{BMP}/d_B$)	A_S =	3299	ft^2
d) Proposed Design Surface Area	A_D =	3300	ft^2

Forebay

a) Forebay volume (minimum 0.5% V_{BMP})	Volume =	66	ft^3
b) Forebay depth (height of berm/splashwall. 1 foot min.)	Depth =	1	ft
c) Forebay surface area (minimum)	Area =	66	ft^2
d) Full height notch-type weir	Width (W) =	6.0	in

Notes: The available areas is 26,753 sf.

Infiltration Basin - Design Procedure (Rev. 03-2012)	BMP ID: BMP 6	Legend:	Required Entries / Calculated Cells
Company Name: Chang Consultants			Date: 1/20/2019
Designed by: Wayne W. Chang			County/City Case No.:

Design Volume

a) Tributary area (BMP subarea)	A_T =	2.5	acres
b) Enter V_{BMP} determined from Section 2.1 of this Handbook	V_{BMP}=	3,336	ft^3

Maximum Depth

a) Infiltration rate	I =	2.51	in/hr
b) Factor of Safety (See Table 1, Appendix A: "Infiltration Testing" from this BMP Handbook)	FS =	3	
c) Calculate D_1 $D_1 = \frac{I\ (in/hr) \times 72\ hrs}{12\ (in/ft) \times FS}$	D_1 =	5.0	ft
d) Enter the depth of freeboard (at least 1 ft)		1	ft
e) Enter depth to historic high ground water (measured from **top** of basin)		20	ft
f) Enter depth to top of bedrock or impermeable layer (measured from **top** of basin)		10	ft
g) D_2 is the smaller of: Depth to groundwater - (10 ft + freeboard) and Depth to impermeable layer - (5 ft + freeboard)	D_2 =	4.0	ft
h) D_{MAX} is the smaller value of D_1 and D_2 but shall not exceed 5 feet	D_{MAX} =	4.0	ft

Basin Geometry

a) Basin side slopes (no steeper than 4:1)	z =	4	:1
b) Proposed basin depth (excluding freeboard)	d_B =	4	ft
c) Minimum bottom surface area of basin ($A_S = V_{BMP}/d_B$)	A_S =	834	ft^2
d) Proposed Design Surface Area	A_D =	834	ft^2

Forebay

a) Forebay volume (minimum 0.5% V_{BMP})	Volume =	17	ft^3
b) Forebay depth (height of berm/splashwall. 1 foot min.)	Depth =	1	ft
c) Forebay surface area (minimum)	Area =	17	ft^2
d) Full height notch-type weir	Width (W) =	6.0	in

Notes: The available area is 5,631 sf.

Infiltration Basin - Design Procedure (Rev. 03-2012)	BMP ID: BMP 7	Legend:	Required Entries / Calculated Cells
Company Name: Chang Consultants			Date: 1/20/2019
Designed by: Wayne W. Chang			County/City Case No.:

Design Volume

a) Tributary area (BMP subarea)	A_T =	4.14	acres
b) Enter V_{BMP} determined from Section 2.1 of this Handbook	V_{BMP}=	5,566	ft^3

Maximum Depth

a) Infiltration rate	I =	2.51	in/hr
b) Factor of Safety (See Table 1, Appendix A: "Infiltration Testing" from this BMP Handbook)	FS =	3	
c) Calculate D_1 $D_1 = \frac{I\ (in/hr) \times 72\ hrs}{12\ (in/ft) \times FS}$	D_1 =	5.0	ft
d) Enter the depth of freeboard (at least 1 ft)		1	ft
e) Enter depth to historic high ground water (measured from **top** of basin)		20	ft
f) Enter depth to top of bedrock or impermeable layer (measured from **top** of basin)		10	ft
g) D_2 is the smaller of: Depth to groundwater - (10 ft + freeboard) and Depth to impermeable layer - (5 ft + freeboard)	D_2 =	4.0	ft
h) D_{MAX} is the smaller value of D_1 and D_2 but shall not exceed 5 feet	D_{MAX} =	4.0	ft

Basin Geometry

a) Basin side slopes (no steeper than 4:1)	z =	4	:1
b) Proposed basin depth (excluding freeboard)	d_B =	4	ft
c) Minimum bottom surface area of basin ($A_S = V_{BMP}/d_B$)	A_S =	1392	ft^2
d) Proposed Design Surface Area	A_D =	1392	ft^2

Forebay

a) Forebay volume (minimum 0.5% V_{BMP})	Volume =	28	ft^3
b) Forebay depth (height of berm/splashwall. 1 foot min.)	Depth =	1	ft
c) Forebay surface area (minimum)	Area =	28	ft^2
d) Full height notch-type weir	Width (W) =	6.0	in

Notes: The available area is 8,365 sf.

Infiltration Basin - Design Procedure (Rev. 03-2012)	BMP ID: BMP 8	Legend:	Required Entries / Calculated Cells
Company Name: Chang Consultants			Date: 1/20/2019
Designed by: Wayne W. Chang			County/City Case No.:

Design Volume

a) Tributary area (BMP subarea)	A_T =	1.87	acres
b) Enter V_{BMP} determined from Section 2.1 of this Handbook	V_{BMP} =	2,537	ft^3

Maximum Depth

a) Infiltration rate	I =	2.51	in/hr
b) Factor of Safety (See Table 1, Appendix A: "Infiltration Testing" from this BMP Handbook)	FS =	3	
c) Calculate D_1 $D_1 = \frac{I\ (in/hr) \times 72\ hrs}{12\ (in/ft) \times FS}$	D_1 =	5.0	ft
d) Enter the depth of freeboard (at least 1 ft)		1	ft
e) Enter depth to historic high ground water (measured from **top** of basin)		20	ft
f) Enter depth to top of bedrock or impermeable layer (measured from **top** of basin)		10	ft
g) D_2 is the smaller of: Depth to groundwater - (10 ft + freeboard) and Depth to impermeable layer - (5 ft + freeboard)	D_2 =	4.0	ft
h) D_{MAX} is the smaller value of D_1 and D_2 but shall not exceed 5 feet	D_{MAX} =	4.0	ft

Basin Geometry

a) Basin side slopes (no steeper than 4:1)	z =	4	:1
b) Proposed basin depth (excluding freeboard)	d_B =	4	ft
c) Minimum bottom surface area of basin ($A_S = V_{BMP}/d_B$)	A_S =	634	ft^2
d) Proposed Design Surface Area	A_D =	635	ft^2

Forebay

a) Forebay volume (minimum 0.5% V_{BMP})	Volume =	13	ft^3
b) Forebay depth (height of berm/splashwall. 1 foot min.)	Depth =	1	ft
c) Forebay surface area (minimum)	Area =	13	ft^2
d) Full height notch-type weir	Width (W) =	6.0	in

Notes: The available area is 3,025 sf.

Infiltration Basin - Design Procedure (Rev. 03-2012)	BMP ID: BMP 9	Legend:	Required Entries / Calculated Cells
Company Name: Chang Consultants			Date: 1/20/2019
Designed by: Wayne W. Chang			County/City Case No.:

Design Volume

a) Tributary area (BMP subarea)	A_T =	10.55	acres
b) Enter V_{BMP} determined from Section 2.1 of this Handbook	V_{BMP}=	14,257	ft^3

Maximum Depth

a) Infiltration rate	I =	2.51	in/hr
b) Factor of Safety (See Table 1, Appendix A: "Infiltration Testing" from this BMP Handbook)	FS =	3	
c) Calculate D_1 $D_1 = \frac{I\ (in/hr) \times 72\ hrs}{12\ (in/ft) \times FS}$	D_1 =	5.0	ft
d) Enter the depth of freeboard (at least 1 ft)		1	ft
e) Enter depth to historic high ground water (measured from **top** of basin)		20	ft
f) Enter depth to top of bedrock or impermeable layer (measured from **top** of basin)		10	ft
g) D_2 is the smaller of: Depth to groundwater - (10 ft + freeboard) and Depth to impermeable layer - (5 ft + freeboard)	D_2 =	4.0	ft
h) D_{MAX} is the smaller value of D_1 and D_2 but shall not exceed 5 feet	D_{MAX} =	4.0	ft

Basin Geometry

a) Basin side slopes (no steeper than 4:1)	z =	4	:1
b) Proposed basin depth (excluding freeboard)	d_B =	4	ft
c) Minimum bottom surface area of basin ($A_S = V_{BMP}/d_B$)	A_S =	3564	ft^2
d) Proposed Design Surface Area	A_D =	3565	ft^2

Forebay

a) Forebay volume (minimum 0.5% V_{BMP})	Volume =	71	ft^3
b) Forebay depth (height of berm/splashwall. 1 foot min.)	Depth =	1	ft
c) Forebay surface area (minimum)	Area =	71	ft^2
d) Full height notch-type weir	Width (W) =	6.0	in

Notes: The available area is 18,802 sf.

Infiltration Basin - Design Procedure (Rev. 03-2012)	BMP ID: BMP 10	Legend:	Required Entries / Calculated Cells
Company Name: Chang Consultants			Date: 1/20/2019
Designed by: Wayne W. Chang			County/City Case No.:

Design Volume

a) Tributary area (BMP subarea)	A_T =	9.32	acres
b) Enter V_{BMP} determined from Section 2.1 of this Handbook	V_{BMP}=	12,916	ft^3

Maximum Depth

a) Infiltration rate	I =	1.7775	in/hr
b) Factor of Safety (See Table 1, Appendix A: "Infiltration Testing" from this BMP Handbook)	FS =	3	
c) Calculate D_1 $D_1 = \frac{I\ (in/hr) \times 72\ hrs}{12\ (in/ft) \times FS}$	D_1 =	3.6	ft
d) Enter the depth of freeboard (at least 1 ft)		1	ft
e) Enter depth to historic high ground water (measured from **top** of basin)		20	ft
f) Enter depth to top of bedrock or impermeable layer (measured from **top** of basin)		10	ft
g) D_2 is the smaller of: Depth to groundwater - (10 ft + freeboard) and Depth to impermeable layer - (5 ft + freeboard)	D_2 =	4.0	ft
h) D_{MAX} is the smaller value of D_1 and D_2 but shall not exceed 5 feet	D_{MAX} =	3.6	ft

Basin Geometry

a) Basin side slopes (no steeper than 4:1)	z =	4	:1
b) Proposed basin depth (excluding freeboard)	d_B =	3.5	ft
c) Minimum bottom surface area of basin ($A_S = V_{BMP}/d_B$)	A_S =	3690	ft^2
d) Proposed Design Surface Area	A_D =	3691	ft^2

Forebay

a) Forebay volume (minimum 0.5% V_{BMP})	Volume =	65	ft^3
b) Forebay depth (height of berm/splashwall. 1 foot min.)	Depth =	1	ft
c) Forebay surface area (minimum)	Area =	65	ft^2
d) Full height notch-type weir	Width (W) =	6.0	in

Notes: The available area is 7,146 sf.

Infiltration Basin - Design Procedure (Rev. 03-2012)	BMP ID: BMP 11	Legend:	Required Entries / Calculated Cells
Company Name: Chang Consultants			Date: 1/20/2019
Designed by: Wayne W. Chang			County/City Case No.:

Design Volume

a) Tributary area (BMP subarea)	A_T =	29.6	acres
b) Enter V_{BMP} determined from Section 2.1 of this Handbook	V_{BMP}=	39,878	ft^3

Maximum Depth

a) Infiltration rate	I =	1.7775	in/hr
b) Factor of Safety (See Table 1, Appendix A: "Infiltration Testing" from this BMP Handbook)	FS =	3	
c) Calculate D_1 $D_1 = \frac{I\ (in/hr) \times 72\ hrs}{12\ (in/ft) \times FS}$	D_1 =	3.6	ft
d) Enter the depth of freeboard (at least 1 ft)		1	ft
e) Enter depth to historic high ground water (measured from **top** of basin)		20	ft
f) Enter depth to top of bedrock or impermeable layer (measured from **top** of basin)		10	ft
g) D_2 is the smaller of: Depth to groundwater - (10 ft + freeboard) and Depth to impermeable layer - (5 ft + freeboard)	D_2 =	4.0	ft
h) D_{MAX} is the smaller value of D_1 and D_2 but shall not exceed 5 feet	D_{MAX} =	3.6	ft

Basin Geometry

a) Basin side slopes (no steeper than 4:1)	z =	4	:1
b) Proposed basin depth (excluding freeboard)	d_B =	3.5	ft
c) Minimum bottom surface area of basin ($A_S = V_{BMP}/d_B$)	A_S =	11394	ft^2
d) Proposed Design Surface Area	A_D =	11394	ft^2

Forebay

a) Forebay volume (minimum 0.5% V_{BMP})	Volume =	199	ft^3
b) Forebay depth (height of berm/splashwall. 1 foot min.)	Depth =	1	ft
c) Forebay surface area (minimum)	Area =	199	ft^2
d) Full height notch-type weir	Width (W) =	6.0	in

Notes: The available area is 56,832 sf.

Bioretention Facility - Design Procedure	BMP ID 12	Legend:	Required Entries / Calculated Cells

Company Name: Chang Consultants — Date: 2/1/2018

Designed by: WWC — County/City Case No.:

Design Volume

Enter the area tributary to this feature — A_T = 6.68 acres

Enter V_{BMP} determined from Section 2.1 of this Handbook — V_{BMP} = 9,065 ft^3

Type of Bioretention Facility Design

(●) Side slopes required (parallel to parking spaces or adjacent to walkways)

( ) No side slopes required (perpendicular to parking space or Planter Boxes)

Bioretention Facility Surface Area

Depth of Soil Filter Media Layer — d_S = 3.0 ft

Top Width of Bioretention Facility, excluding curb — w_T = 60.0 ft

Total Effective Depth, d_E

$d_E = (0.3) \times d_S + (0.4) \times 1 - (0.7/w_T) + 0.5$ — d_E = 1.79 ft

Minimum Surface Area, A_m

$$A_M\,(ft^2) = \frac{V_{BMP}\,(ft^3)}{d_E\,(ft)}$$

A_M = 5,069 ft^2

Proposed Surface Area — A= 5,069 ft^2

Bioretention Facility Properties

Side Slopes in Bioretention Facility — z = 4 :1

Diameter of Underdrain — 6 inches

Longitudinal Slope of Site (3% maximum) — 1 %

6" Check Dam Spacing — 25 feet

Describe Vegetation: Natural Grasses

Notes: The available area is 10,904 sf.

Bioretention Facility - Design Procedure	BMP ID 13	Legend:	Required Entries / Calculated Cells

Company Name: Chang Consultants Date: 2/1/2018

Designed by: WWC County/City Case No.:

Design Volume

Enter the area tributary to this feature A_T = 2.63 acres

Enter V_{BMP} determined from Section 2.1 of this Handbook V_{BMP} = 3,502 ft^3

Type of Bioretention Facility Design

(●) Side slopes required (parallel to parking spaces or adjacent to walkways)

( ) No side slopes required (perpendicular to parking space or Planter Boxes)

Bioretention Facility Surface Area

Depth of Soil Filter Media Layer d_S = 3.0 ft

Top Width of Bioretention Facility, excluding curb w_T = 10.0 ft

Total Effective Depth, d_E

$d_E = (0.3) \times d_S + (0.4) \times 1 - (0.7/w_T) + 0.5$ d_E = 1.73 ft

Minimum Surface Area, A_m

$$A_M\ (ft^2) = \frac{V_{BMP}\ (ft^3)}{d_E\ (ft)}$$

A_M = 2,025 ft^2

Proposed Surface Area A= 2,025 ft^2

Bioretention Facility Properties

Side Slopes in Bioretention Facility z = 4 :1

Diameter of Underdrain 6 inches

Longitudinal Slope of Site (3% maximum) 1 %

6" Check Dam Spacing 25 feet

Describe Vegetation: Natural Grasses

Notes: The available area is 5,950 sf.

Appendix 7: Hydromodification

Supporting Detail Relating to Hydrologic Conditions of Concern

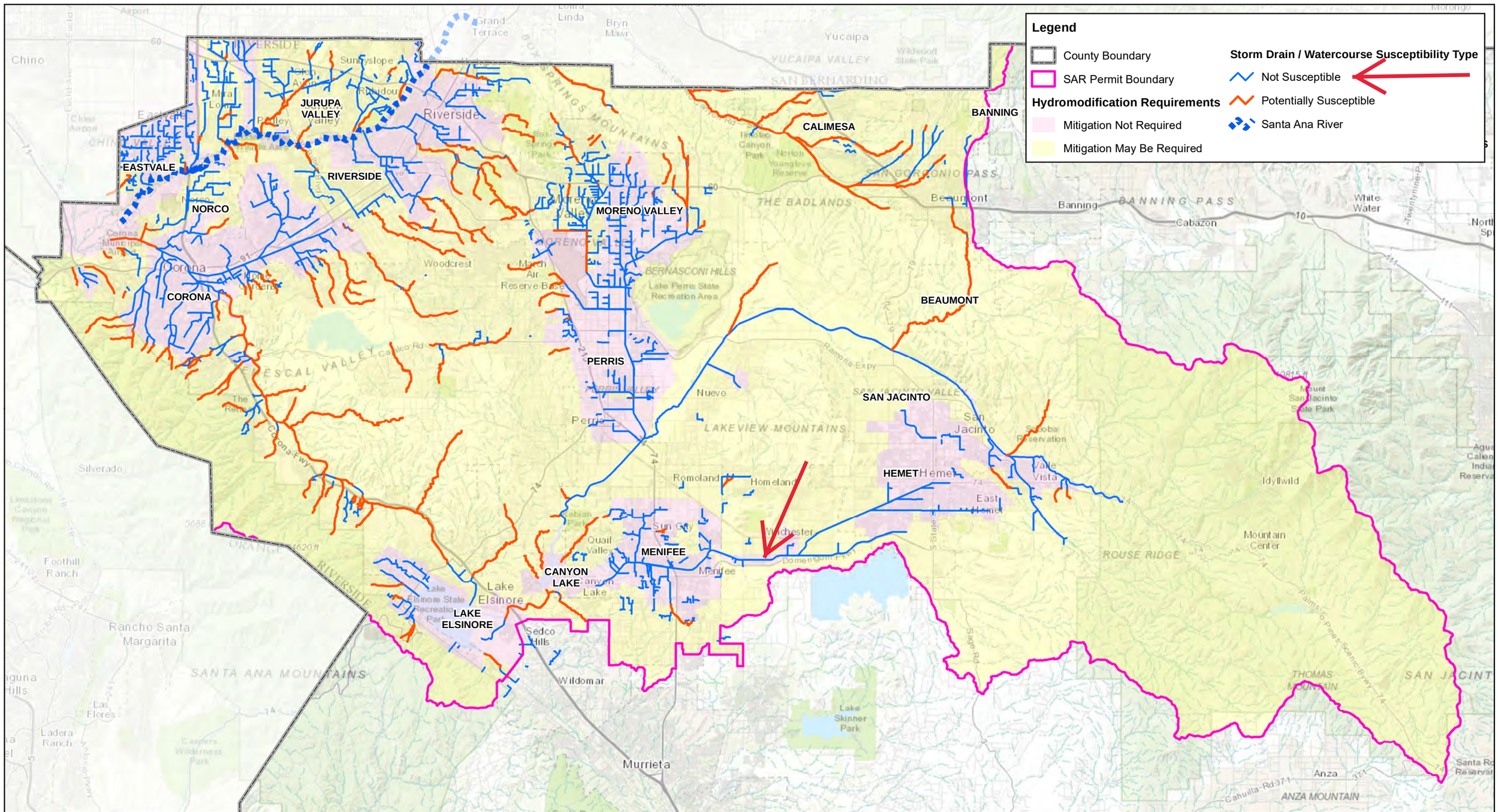
Summary

The project runoff will be conveyed by either *Master Flood Control and Drainage Plan* Line 3B or the Hemet Channel (Line 1A) to Salt Creek (see the Receiving Waters Exhibit in Appendix 1). Salt Creek continues west to Canyon Lake, which is an adequate sump that is exempt from hydromodification. Line 1A, Line 3B, and Salt Creek are engineered channels and maintained to ensure design flow capacity. Line 1A and 3B are master plan facilities, so have been engineered. Line 1A has been constructed between the site and Salt Creek. A portion of Line 3B has been constructed and the remainder downstream of the site will be constructed by the project.

Andrea Gonzalez from the Riverside County Flood Control and Water Conservation District stated that Salt Creek meets the exemption criteria. This is documented in the January 18, 2017, *Hydromodification Susceptibility Documentation Report and Mapping: Santa Ana Region* (http://rcflood.org/downloads/NPDES/Documents/SA_WAP/AppA_HydromodificationSusceptibilityReport.pdf). The relevant excerpts are attached. A letter (attached) from the city of Wildomar confirms that their segment of Salt Creek also meets the exemption criteria. Therefore, the project is exempt from hydromodification and hydromodification BMPs are not being proposed.

Hydromodification Susceptibility Documentation Report and Mapping: Santa Ana Region

January 18, 2017


Legend
County Boundary
SAR Permit Boundary
Hydromodification Requirements
Mitigation Not Required
Mitigation May Be Required
Storm Drain / Watercourse Susceptibility Type
Not Susceptible
Potentially Susceptible
Santa Ana River
JURUPA VALLEY
EASTVALE
RIVERSIDE
NORCO
CORONA
MORENO VALLEY
PERRIS
CANYON LAKE
LAKE ELSINORE
MENIFEE
HEMET
SAN JACINTO
BEAUMONT
BANNING
CALIMESA
Riverside
Corona
Lake Elsinore
Murrieta
Temecula
Perris
Hemet
San Jacinto
Beaumont
Banning
Yucaipa
Chino
Norco
Woodcrest
Romoland
Homeland
Nuevo
Sun City
Menifee
Winchester
Wildomar
Sedco Hills
Foothill Ranch
Rancho Santa Margarita
Las Flores
Ladera Ranch
Silverado
Cabazon
White Water
Idyllwild
Mountain Center
Anza
SANTA ANA MOUNTAINS
LAKEVIEW MOUNTAINS
BERNASCONI HILLS
THE BADLANDS
ROUSE RIDGE
ANZA MOUNTAIN
SAN JACINTO MOUNTAINS
SAN GORGONIO PASS
BANNING PASS
N
0 2.5 5 10 Miles
Updated February 2017
Salt Creek downstream of site is designated "not susceptible" to HCOC (see arrows).
HCOC Applicability Map
SAR Permittees
Map 2

November 25, 2014

Mr. Stephen J. Volk
Adams Streeter Civil Engineers, Inc.
15 Corporate Park
Irvine, CA 92606

Subject: Tract 28559 Hydrologic Condition of Concern (HCOC) Exemption
Reference: Your Letter dated July 17, 2014

Dear Mr. Volk,

In response to your request for a clarification regarding the applicability of the Hydrologic Condition of Concern (HCOC) on Tract Map 28559, this letter is issued to provide the City's opinion on the matter.

The City of Menifee as a Co-Permittte with the Riverside County Flood Control and Water Conservation District along with fourteen other public agencies, are responsible for implementing and carrying out the various requirements of our MS4 Permit. One such requirement is ensuring that new developments are incorporating low impact development designs and techniques that preserve the integrity of downstream receiving waters from potential hydromodification that could result from upstream alteration of natural landscape.

To guide in the implementation of this component of the MS4 Permit, the Permittees developed a Hydromodification Management Plan (HMP) that includes an assessment and categorization of existing channels within each Permittee's jurisdiction in the Santa Ana River Watershed. The categorization took into consideration the make-up traits of the stream channels, and based on these traits determined each segment's susceptibility to hydromodification.

Your Tract Map 28559 is upstream of Salt Creek in Menifee, and Canyon Lake in the City of Canyon Lake (a defined sump in the HMP). The Salt Creek segments downstream of your tract are engineered and maintained including the last segment immediately upstream of Canyon Lake. This last segment has been improved in some level as part of the development of the Audie Murphy Ranch community in the City of Menifee. A FEMA issued LOMR (Case No. 13-09-0376P) revised the City's FIRM for this vicinity.

29714 Haun Road
Menifee, CA 92586
Phone 951.672.6777
Fax 951.679.3843
www.cityofmenifee.us

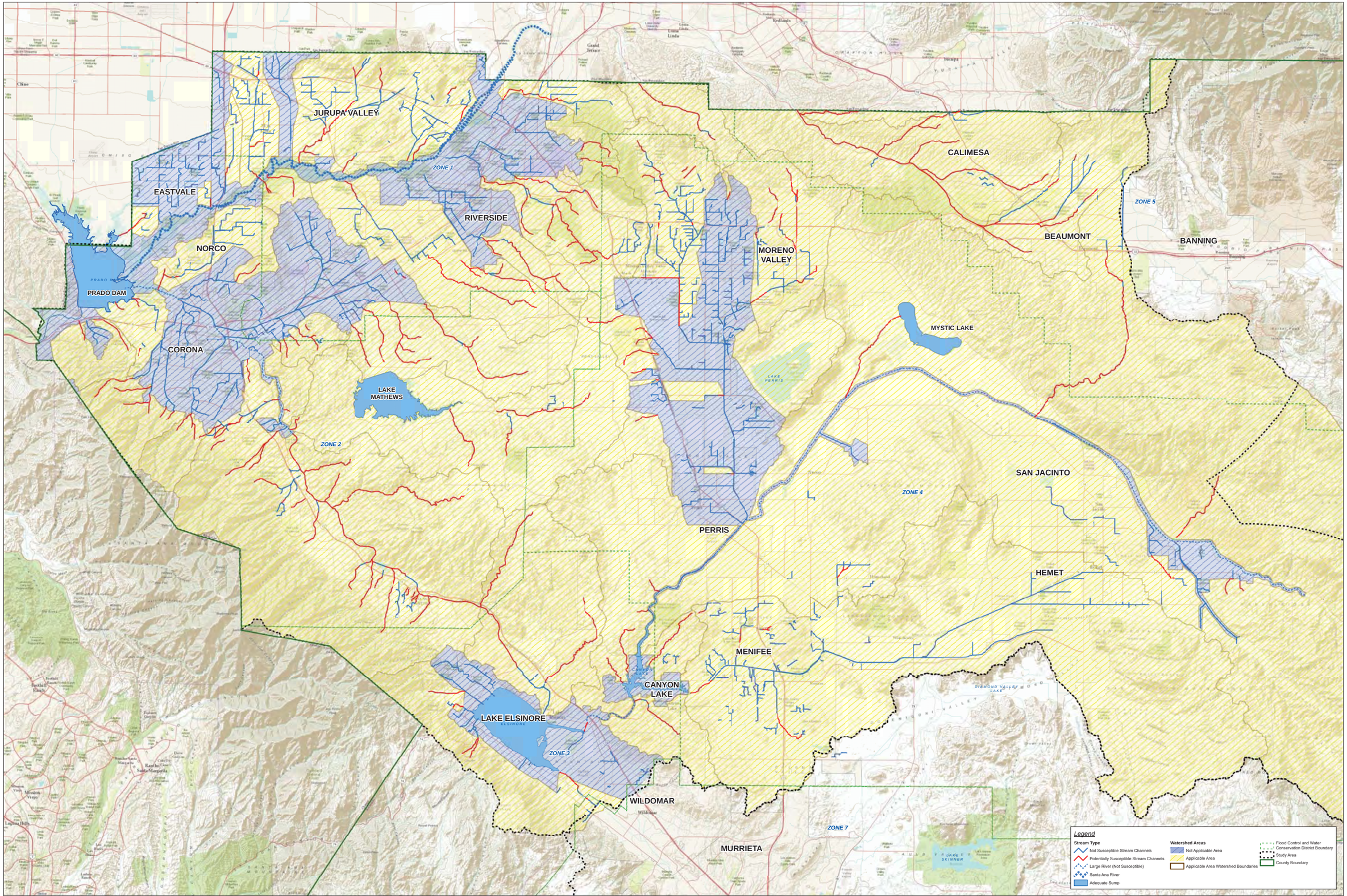
Following the guidelines of segment categorization detailed in the Permittees' HMP, the past determinations made by the Riverside County Flood Control District for projects with similar design constraints as TR28559, and the improvements made to the last segment of Salt Creek immediately upstream of Canyon Lake, the City determined that your Tract Map 28559 can proceed with developing a Water Quality Management Plan that exempts addressing HCOC for Salt Creek.

If you have any questions or need additional information with regards to this letter, please contact me at 951-672-6777 or Yolanda Macalalad, Senior Engineer for Land Development, at 951-639-1368, x-169.

Sincerely,

Jonathan G. Smith, P.E., QSD
Public Works Director/City Engineer

CC: Yolanda Macalalad, P.E., Senior Engineer – Land Development



HCOC Applicability Map

Hydromodification Susceptibility Documentation Report and Mapping
Riverside County Flood Control and Water Conservation District

Map 2