Project Specific Water Quality Management Plan

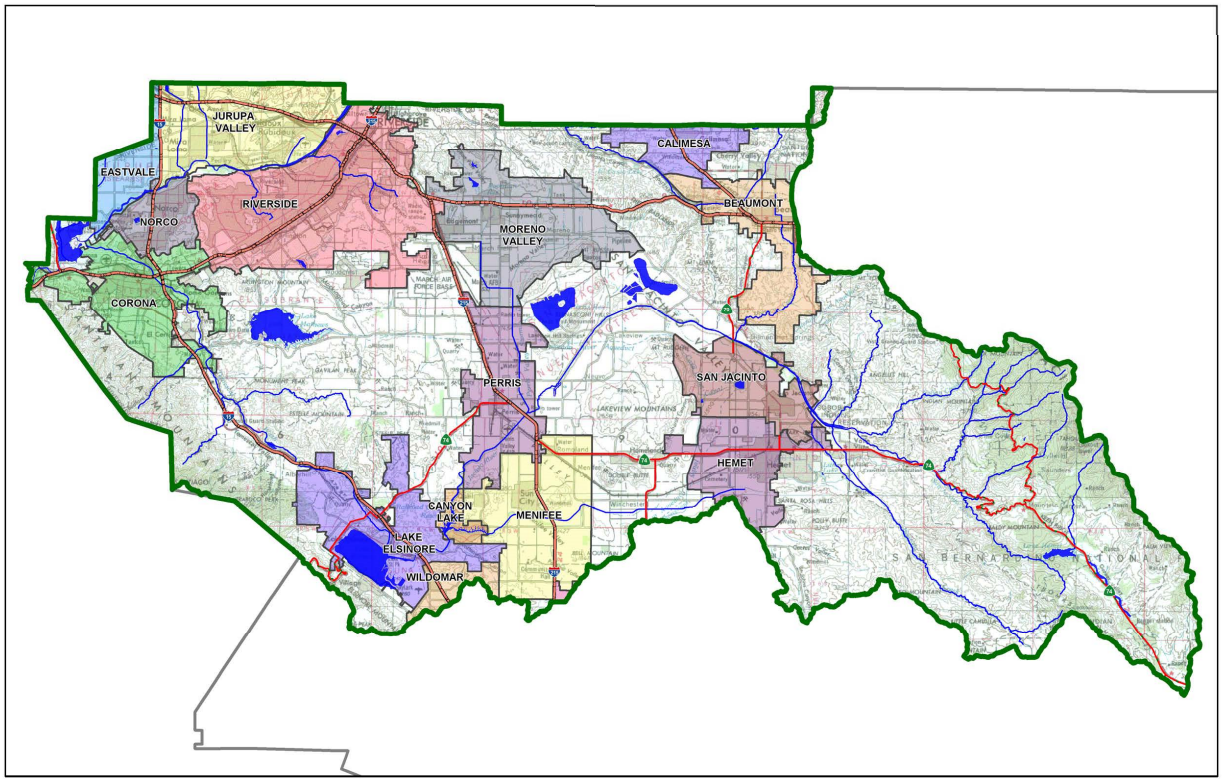
*A Template for Projects located within the **Santa Ana Watershed** Region of Riverside County*

Project Title: Central Plaza Retail Center

Development No: Insert text here

Design Review/Case No: Insert text here

PRELIMINARY



☒ **Preliminary**
☐ **Final**

Original Date Prepared: 12/21/2015

Revision Date(s): Insert text here

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

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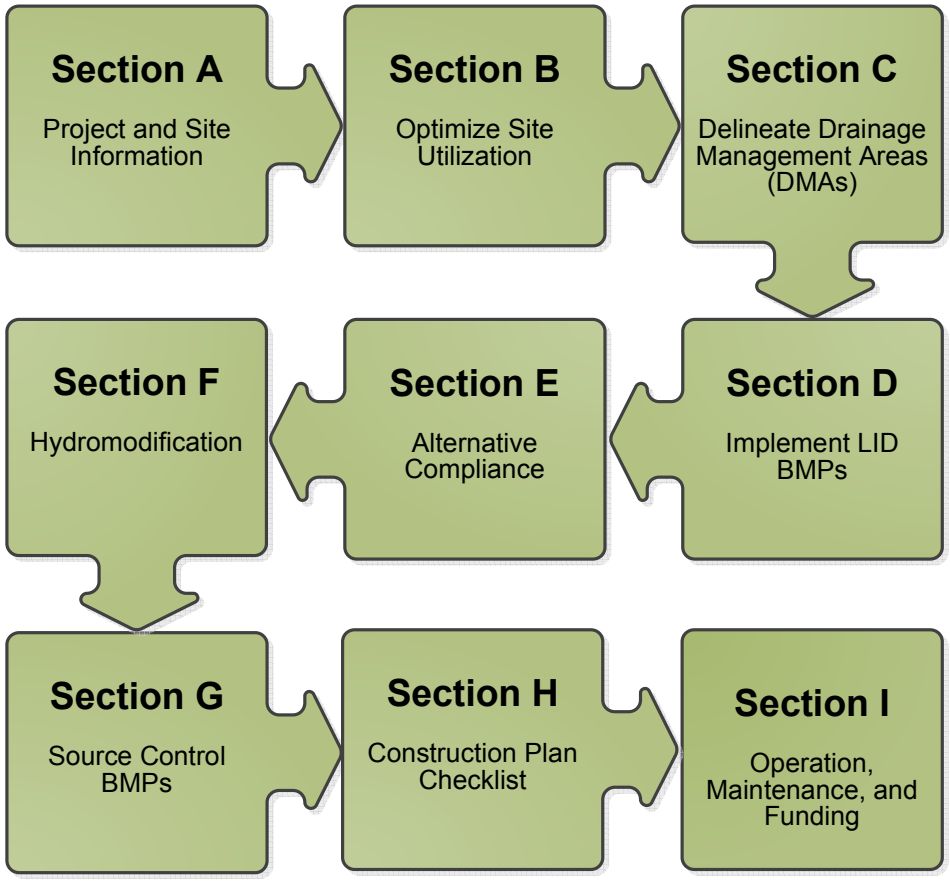
A Brief Introduction

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 Trammel Crow Company by Hall & Foreman, Inc. for the Knox Logistic Center Phase II project.

This WQMP is intended to comply with the requirements of Riverside County for Ordinance No. 754 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 Rivderside County Water Quality Ordinance (Municipal Code Section 754).

"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
Preparer's Printed Name	Preparer's Title/Position

Preparer's Licensure:

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Section A: Project and Site Information

PROJECT INFORMATION			
Type of Project:	Commercial		
Planning Area:	Lake Elsinore		
Community Name:	Riverside County		
Development Name:	Central Plaza		
PROJECT LOCATION			
Latitude & Longitude (DMS): 33°41'24.81"N & 117°20'17.25"W			
Project Watershed and Sub-Watershed:, Santa Ana River, Temescal Creek			
APN(s): 377-080-014 & 031-034			
Map Book and Page No.: Insert text here			
PROJECT CHARACTERISTICS			
Proposed or Potential Land Use(s)	Retail		
Proposed or Potential SIC Code(s)	5812 & 5600		
Area of Impervious Project Footprint (SF)	322,669		
Total Area of proposed Impervious Surfaces within the Project Limits (SF)/or Replacement	287,545		
Does the project consist of offsite road improvements?	☒ 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)	6,045		
Is the project located within any MSHCP Criteria Cell?	☐ Y	☒ N	
If so, identify the Cell number:	NA		
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)	C		
What is the Water Quality Design Storm Depth for the project?	0.68		

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
- Proposed Structural BMPs
- Drainage Path
- Drainage Infrastructure, Inlets, Overflows
- Source Control BMPs
- 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
Temescal Creek	Bacteria, pH	Recreational, aquatic life, domestic water supply, public water supply	N/A

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	☒ 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)*	☐ 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?

Existing drainage patterns were identified but due to the large footprint of the building unable to be preserved. The site will continue to discharge at historic points to maintain downstream drainage patterns.

Did you identify and protect existing vegetation? If so, how? If not, why?

Where feasible the existing ground and cover will remain undisturbed. Do to the large footprint of the proposed development the portion of the site that is undisturbed is fairly small.

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

All pervious areas shall maintain natural infiltration capacity by avoiding compaction and limiting construction traffic in these areas.

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

The project utilizes the minimum impervious area possible. The proposed development consists of a large industrial warehouse, loading docks, and trailer and auto parking areas. The development requires a large amount of impervious area to make the project feasible.

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

All pervious areas are routed to BMPs which are pervious to maximize infiltration.

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 (Sq. Ft.)	DMA Type
Landscape	Landscape	35,125	Self-Treating
Building	Building	71,175	Draining to BMP
Pave	Pave	216,365	Draining to BMP

[1] *Reference Table 2-1 in the WQMP Guidance Document to populate this column*

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

DMA Name or ID	Area (Sq. Ft.)	Stabilization Type	Irrigation Type (if any)
Landscape	35,125	Landscaping	Sprinkler

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]
Landscape	Landscape	35,125	0.68			

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

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	DMA name /ID	Area (square feet)	Ratio
	[A]		[B]	[C] = [A] x [B]		[D]	[C]/[D]

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

DMA Name or ID	BMP Name or ID
Building	BMP – Bioretention
Pave	BMP – Bioretention
BMP	BMP – Bioretention

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:	ALL	
…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:	ALL	
…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: 0.8 acres

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: 6.60 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: 0.72

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: 4.75 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)
4.75 acres	0.8 acres

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: 150

Project Type: Industrial

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: 6.60 acres

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: 150

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: 990

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)**
990 Users	150 Users

Other Non-Potable Use Feasibility

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:

☒ 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	
DMA	☐	☐	☒	☒	☐
	☐	☐	☐	☐	☐
	☐	☐	☐	☐	☐
	☐	☐	☐	☐	☐
	☐	☐	☐	☐	☐

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 native soils are not suitable for infiltration and the proposed land use does not allow for high enough usage rates to make harvest and use feasible therefor we are left with Bioretention and Biotreatment for the WQ Volume.

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	*BMP D - Infiltration*		
	[A]		[B]	[C]	[A] x [C]			
Pave	*216,368*	*Pave*	*1.0*	*0.89*	*63,490*	*Design Storm Depth (in)*	*Design Capture Volume,* $\mathbf{V_{BMP}}$ *(cubic feet)*	*Proposed Volume on Plans (cubic feet)*
Building	*71,177*	*Building*	*1.0*	*0.89*	*193,001*			
Landscape	*35,124*	*Pervious*	*0.1*	*0.11*	*3,880*			
	A_T = Σ[A] 322,669				Σ= [D] 260,370	[E] 0.68	$[F] = \frac{[D]x[E]}{12}$ 14,754	[G] 12,995

[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

Section E: Alternative Compliance (LID Waiver Program)

LID BMPs are expected to be feasible on virtually all projects. Where 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:

☐ 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.

The site will utilize Filterra Biofiltration Units as well as Bioretention Planters to treat storm water runoff before it leaves the site. These BMP's will provide treatment through evapotranspiration, evaporation and biofiltration.

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 ft^2)	P	N	N	N	N	N	P	P
☐ Hillside Development (>5,000 ft^2)	P	N	P	P	N	P	P	P
☒ Parking Lots (>5,000 ft^2)	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	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**		***BMP D - Infiltration***		
	[A]		[B]	[C]	[A] x [C]				
Pave	216,368	Pave	1.0	0.89	63,490	*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)*
Building	71,177	Roof	1.0	0.89	193,001				
Pervious	35,124	Pervious	0.1	0.11	3,880				
	A_T= Σ[A] 322,669				Σ= [D] 260,370	[E] 0.68	$[F] = \frac{[D]x[E]}{[G]}$ 14,754	[F] X (1-[H]) 56,490	[I] 60,000

[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]
Biofiltration	Bacteria	High
Biofiltration	Metals	High
Biofiltration	Trash	High
Biofiltration	Organic Compounds	Medium
Biofiltration	Oil and Grease	Medium

[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	17.6 min	14 min	18%
Volume (Cubic Feet)	51,856	119,889	131%

[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:

Perris Valley MDP – LN F

Lake Elsinore

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.

Section G: Source Control BMPs

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	Stenciling "Only Rain Down the Storm Drain"	Maintain and periodically repaint or replace inlet markings. Provide stormwater pollution prevention information to building operators.
Loading Docks		Move loaded and unloaded items indoors as soon as possible

Section H: Construction Plan Checklist

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)

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

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: Ongoing – before annual storm seasons and following rainfall events

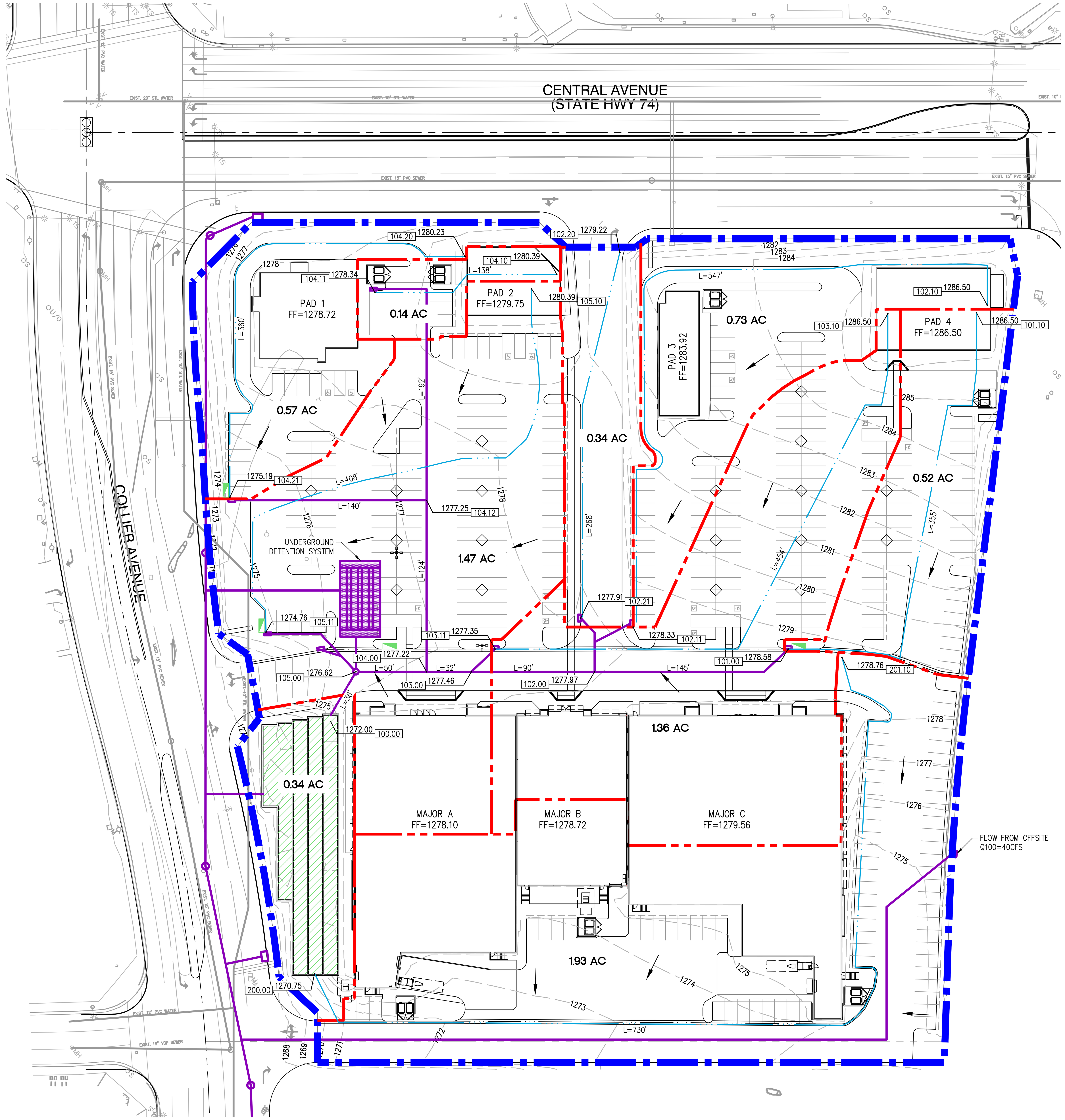
Will the proposed BMPs be maintained by a Home Owners' Association (HOA) or Property Owners Association (POA)?

☒ Y ☐ N

Include your Operation and Maintenance Plan and Maintenance Mechanism in Appendix 9. Additionally, include all pertinent forms of educational materials for those personnel that will be maintaining the proposed BMPs within this Project-Specific WQMP in Appendix 10.

Appendix 1: Maps and Site Plans

Location Map, WQMP Site Plan and Receiving Waters Map



Know what's below. Call 811 before you dig

NO.	DESCRIPTION	DATE	BY
	REVISONS		

REGISTERED PROFESSIONAL ENGINEER GLENN MATTHEW CHUNG No. 62794 Exp. 06/30/16 CIVIL STATE OF CALIFORNIA

DAVID EVANS AND ASSOCIATES INC.

PREPARED UNDER THE SUPERVISION OF:

GLENN M. CHUNG RCE 62794 DATE:

HANOVER-PRP PROPERTIES

CENTRAL PLAZA

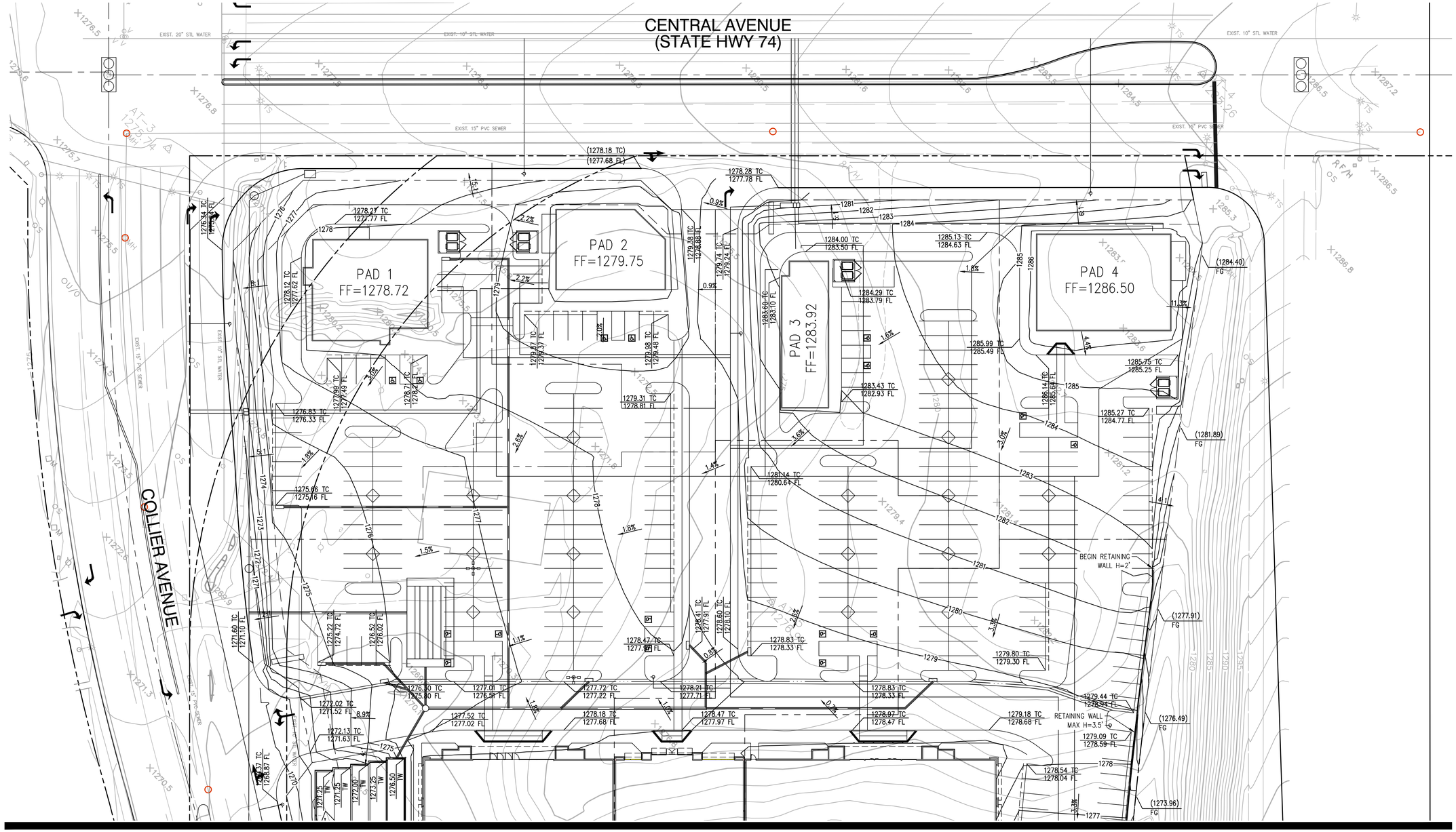
CONCEPTUAL
PROPOSED DRAINAGE MAP

DRAWN BY: OER
DESIGNED BY: LWG
CHECKED BY: GMC
APPROVED BY:
CITY ENGINEER DATE

SCALE: 1"=40'
DATE: 12-21-2015
SHT NO.: 1 OF 1

Appendix 2: Construction Plans

Grading and Drainage Plans



ARCHITECT

GK PIERCE ARCHITECTS
3 OVERTURE
ALISO VIEJO, CA 92656

GLENN PIERCE, AIA
949-344-2710

OWNER/DEVELOPER

HFC-PRP ELSINORE, LLC
417 29TH STREET
NEWPORT BEACH, CA 92663

GREG LUKOSKY
949-723-9500
949-433-8595

ENGINEER

DAVID EVANS AND ASSOCIATES
17782 17TH STREET
SUITE 200
TUSTIN, CA 92780

GLENN M. CHUNG, PE
714-665-4510
714-665-4501 FAX

30 0 30 60
scale 1" = 30' feet

Know what's below. Call 811 before you dig

NO.	DESCRIPTION	DATE	BY
	REVISONS		

REGISTERED PROFESSIONAL ENGINEER
GLENN MATTHEW CHUNG
No. 62794
Exp. 06/30/16
CIVIL
STATE OF CALIFORNIA

DAVID EVANS AND ASSOCIATES INC.
PREPARED UNDER THE SUPERVISION OF:
GLENN M. CHUNG RCE 62794 DATE:

HANOVER-PRP PROPERTIES

CENTRAL PLAZA

CONCEPTUAL GRADING PLAN

DRAWN BY: OER		SCALE: AS SHOWN
DESIGNED BY: LWG		DATE: 12-21-15
CHECKED BY: GMC	APPROVED BY: CITY ENGINEER DATE	SHT NO.: 1 OF 2

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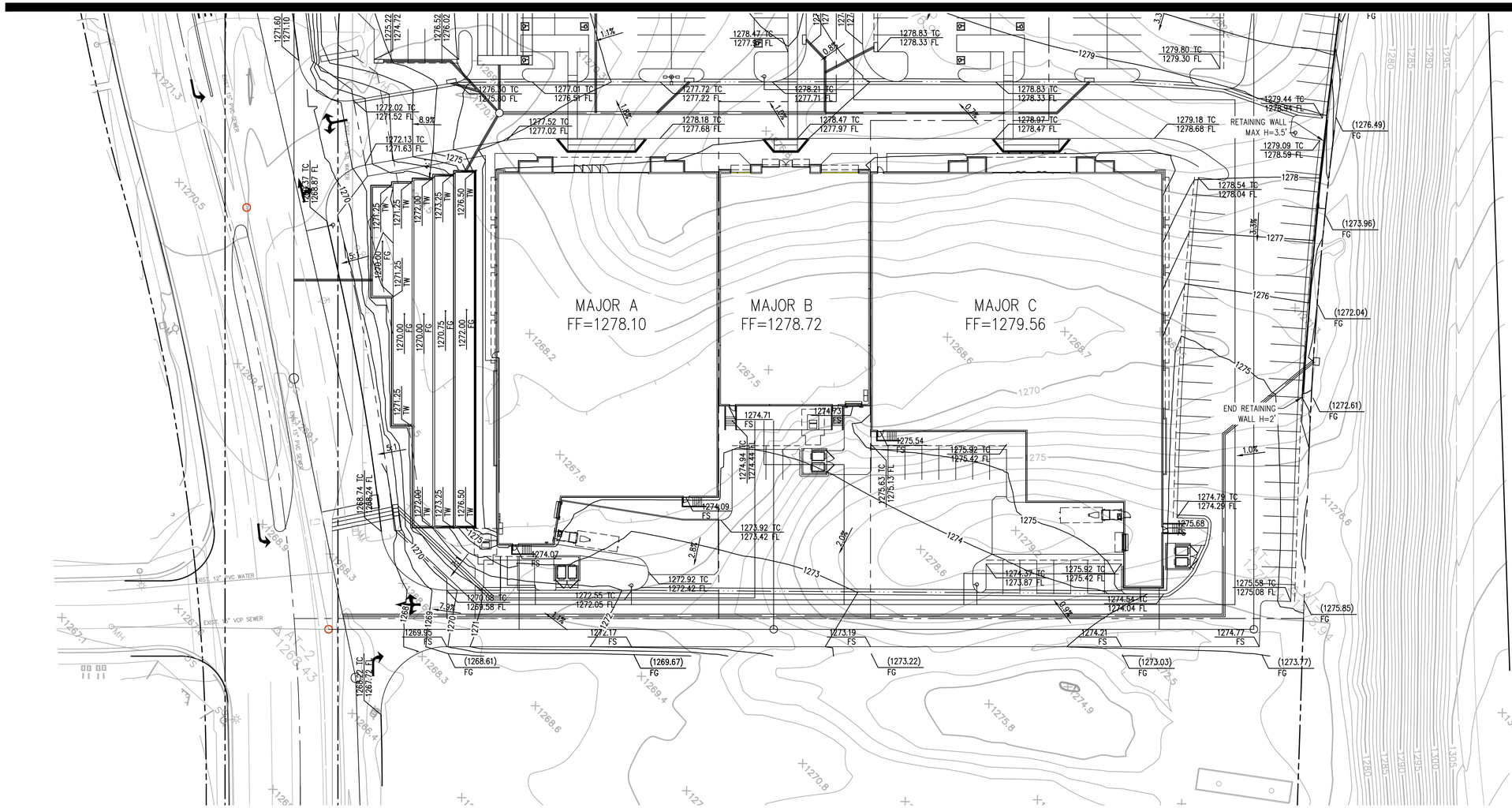
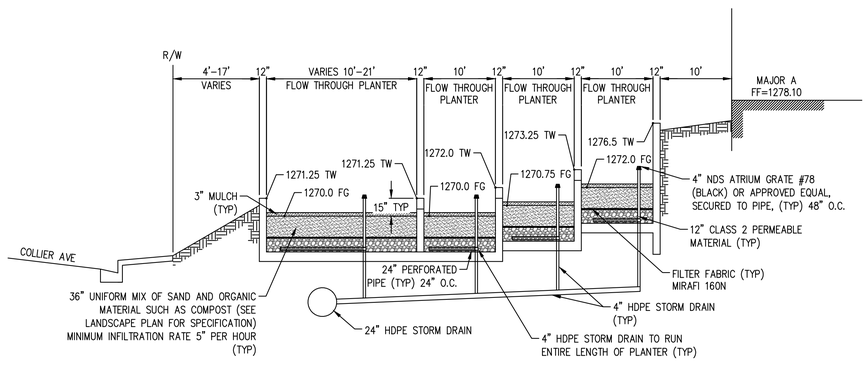
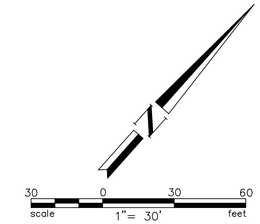
SEE SHEET 1





FLOW THROUGH PLANTER DETAIL

NTS



Know what's below. Call 811 before you dig

NO.	DESCRIPTION	DATE	BY

REVISONS

REGISTERED PROFESSIONAL ENGINEER GLENN MATTHEW CHUNG No. 62794 Exp. 06/30/16 CIVIL STATE OF CALIFORNIA

DAVID EVANS AND ASSOCIATES INC.

PREPARED UNDER THE SUPERVISION OF:

GLENN M. CHUNG RCE 62794 DATE:

HANOVER-PRP PROPERTIES

CENTRAL PLAZA

CONCEPTUAL GRADING PLAN

DRAWN BY: OER	SCALE: AS SHOWN
DESIGNED BY: LWG	DATE: 12–21–15
CHECKED BY: GMC	APPROVED BY: CITY ENGINEER DATE
	SHT NO.: 2 OF 2

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Last Opened: Dec 22, 2015 – 6:58am by: lwg

Appendix 3: Soils Information

Geotechnical Study and Other Infiltration Testing Data

SALEM
engineering group, inc.

11650 Mission Park Drive, Suite 108
Rancho Cucamonga, California
(909) 980-6455 Office
(909) 980-6435 Fax

July 23, 2015 Job No. 3-215-0645

Mr. Greg Lukosky
Peninsula Retail Partners
417 29th Street
Newport Beach, CA 90014

SUBJECT: **PERCOLATION TEST RESULTS**
PROPOSED COMMERCIAL DEVELOPMENT
SEC CENTRAL AVENUE & COLLIER AVENUE
LAKE ELSINORE, CALIFORNIA

Dear Mr. Lukosky:

As requested, we have performed three (3) percolation tests to obtain percolation rates for use in design of the proposed infiltration system at the subject site. This report documents the services provided and the results of our field studies.

PURPOSE AND SCOPE

This study was conducted to measure the percolation rates within the near-surface strata of the site. It is our understanding that the data will be used by the project design team in their development of the onsite infiltration system. Specifically, our scope of services included the following:

- Drilling three (3) borings to a depth of approximately 8 to 13 feet below existing ground surface for evaluation of the subsurface conditions at the project site.
- Conducting percolation testing at the drilled holes (P-1 through P-3).
- Preparation of this report summarizing the results of our investigation.

SITE LOCATION AND SITE DESCRIPTION

The subject site is located on the southeastern corner of Central Avenue and Collier Avenue in the City of Lake Elsinore, California. (See Vicinity Map, Figure 1). The site is currently undeveloped and covered with trees on the central and eastern portions.

PERCOLATION TESTING

A total of three percolation tests (P-1 through P-3) have been performed at the proposed infiltration system area and were conducted in accordance the guidelines established by the County of Riverside. Results of the falling head tests are presented in the attachments to this report.

The approximate locations of the percolation tests are shown on the attached Site Plan, Figure 2. The holes were pre-saturated a minimum of 18 hours and maximum of 24 hours before percolation testing commenced.

Percolation rates were measured by filling the test holes with clean water and measuring the water drops at a certain time interval. The percolation rate data are presented in tabular format at the end of this Appendix. The difference in the percolation rates are reflected by the varied type of soil materials at the bottom of the test holes. The test results are as follows:

Test No.	Depth (feet)	Measured Percolation Rate (min/inch)	Tested Infiltration Rate* (inch/hour)	Soil Type
P-1	12	35.7	0.24	Silty Sand (SM) w/trace clay
P-2	13	35.7	0.22	Silty Sand (SM) w/trace clay
P-3	8	50.0	0.17	Silty Sand (SM) w/trace clay

Please be advised that when performing percolation testing services in relatively small diameter borings, that the testing may not fully model the actual full scale long term performance of a given site. This is particularly true where percolation test data is to be used in the design of large infiltration system such as may be proposed for the site. The measured percolation rate includes dispersion of the water at the sidewalls of the boring as well as into the underlying soils. Subsurface conditions, including percolation rates, can change over time as fine-grained soils migrate.

It is not warranted that such information and interpretation cannot be superseded by future geotechnical engineering developments. We emphasize that this report is valid for the project outlined above and should not be used for any other sites. The soil absorption or percolation rates are based on tests conducted with clear water. The percolation rates may vary with time as a result of soil clogging from water impurities. The percolation rates will deteriorate over time due to the soil conditions and a factor of safety (FS) may be applied. The owner or civil engineer may elect to use a lower factor of safety for the design; however, more frequent maintenance will be expected. The soils may also become less permeable to impermeable if the soil is compacted. Thus, periodic maintenance consisting of clearing the bottom of the drainage basin of clogged soils should be expected.

The percolation rate may become slower if the surrounding soil is wet or saturated due to prolonged rainfalls. The owner or civil engineer may elect to use a lower factor of safety for the design; however, more frequent maintenance consisting of clearing the bottom of the drainage basin of clogged soils will be expected. Additional percolation tests may be conducted at bottom of the drainage basin during construction to determine the actual percolation rate. Groundwater, if closer to the bottom of the drainage basin, will also reduce the percolation rate.

The infiltration system shall be located at minimum distances of 10 feet from any foundations and 10 feet from property lines. Infiltration in compacted fill is not allowed. Provided that the infiltration system is located at a minimum distance of 10 feet away from any foundations, the infiltration would not result in distress to the adjacent buildings.

LIMITATIONS

The scope of our services did not include a groundwater study and was limited to the performance of percolation testing and the submitted of the data only. Our services did not include those associated with an Environmental Site Assessment for the presence or absence of hazardous and/or toxic materials in the soil, groundwater, or atmosphere; or the presence of wetlands. Any statements, or absence of statements, in this report or on any boring logs regarding odors, unusual or suspicious items, or conditions observed, are strictly for descriptive purposes and are not intended to convey engineering judgment regarding potential hazardous and/or toxic assessment.

The geotechnical engineering information presented herein is based upon professional interpretation utilizing standard engineering practices. The work conducted through the course of this investigation, including the preparation of this report, have been performed in accordance with the generally accepted standards of geotechnical engineering practice, which existed in the geographic area at the time the report was written. No other warranty, express or implied, is made.

Please be advised that when performing percolation testing services in relatively small diameter borings, that the testing may not fully model the actual full scale long term performance of a given site. This is particularly true where percolation test data is to be used in the design of large infiltration system such as those proposed for the site. The measure percolation rate includes dispersion of the water at the sidewalls of the boring as well as into the underlying soils. Subsurface conditions, including percolation rates, can change over time as fine-grained soils migrate. It is not warranted that such information and interpretation cannot be superseded by future geotechnical engineering developments. We emphasize that this report is valid for the project outlined above and should not be used for any other sites.

If you have any questions, or if we may be of further assistance, please do not hesitate to contact our office at (909) 980-6455.

Respectfully Submitted,

SALEM ENGINEERING GROUP, INC.

Ibrahim Ibrahim, MS, EIT
Geotechnical Staff Engineer

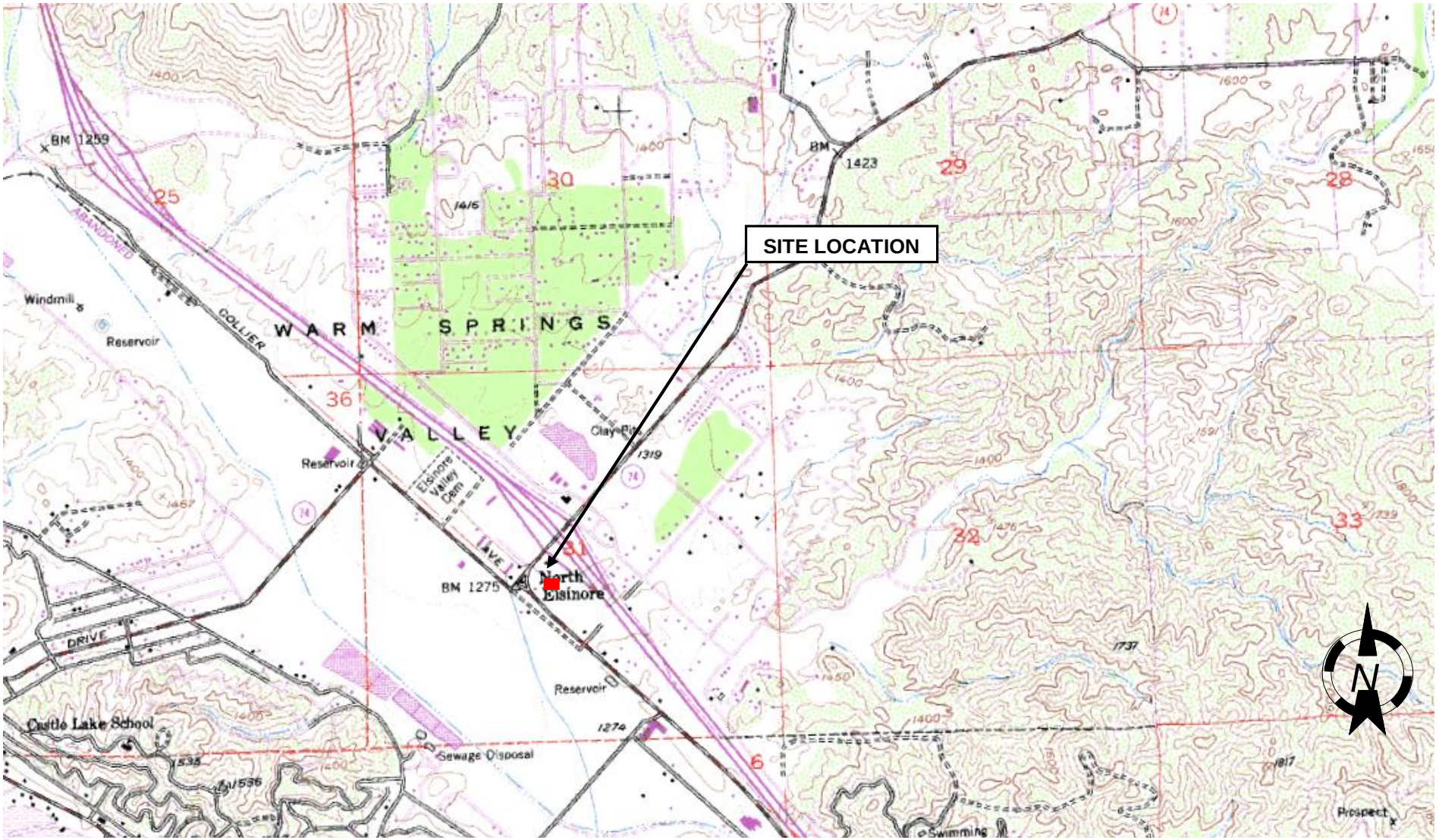
Clarence Jiang, GE
Senior Geotechnical Engineer
RGE 2477

REGISTERED PROFESSIONAL ENGINEER
CLARENCE T. JIANG
No. 2477
Exp. 6/30/17
GEOTECHNICAL
STATE OF CALIFORNIA

R. Sammy Salem, MS, PE, GE
Principal Engineer
RCE 52762 / RGE 2549

REGISTERED PROFESSIONAL ENGINEER
R. SAMMY SALEM
No. 2549
Exp. Dec. 31, 2016
GEOTECHNICAL
STATE OF CALIFORNIA

Attachments: Vicinity Map, Figure 1
Site Plan, Figure 2
Results of Percolation Tests (P-1 through P-3)



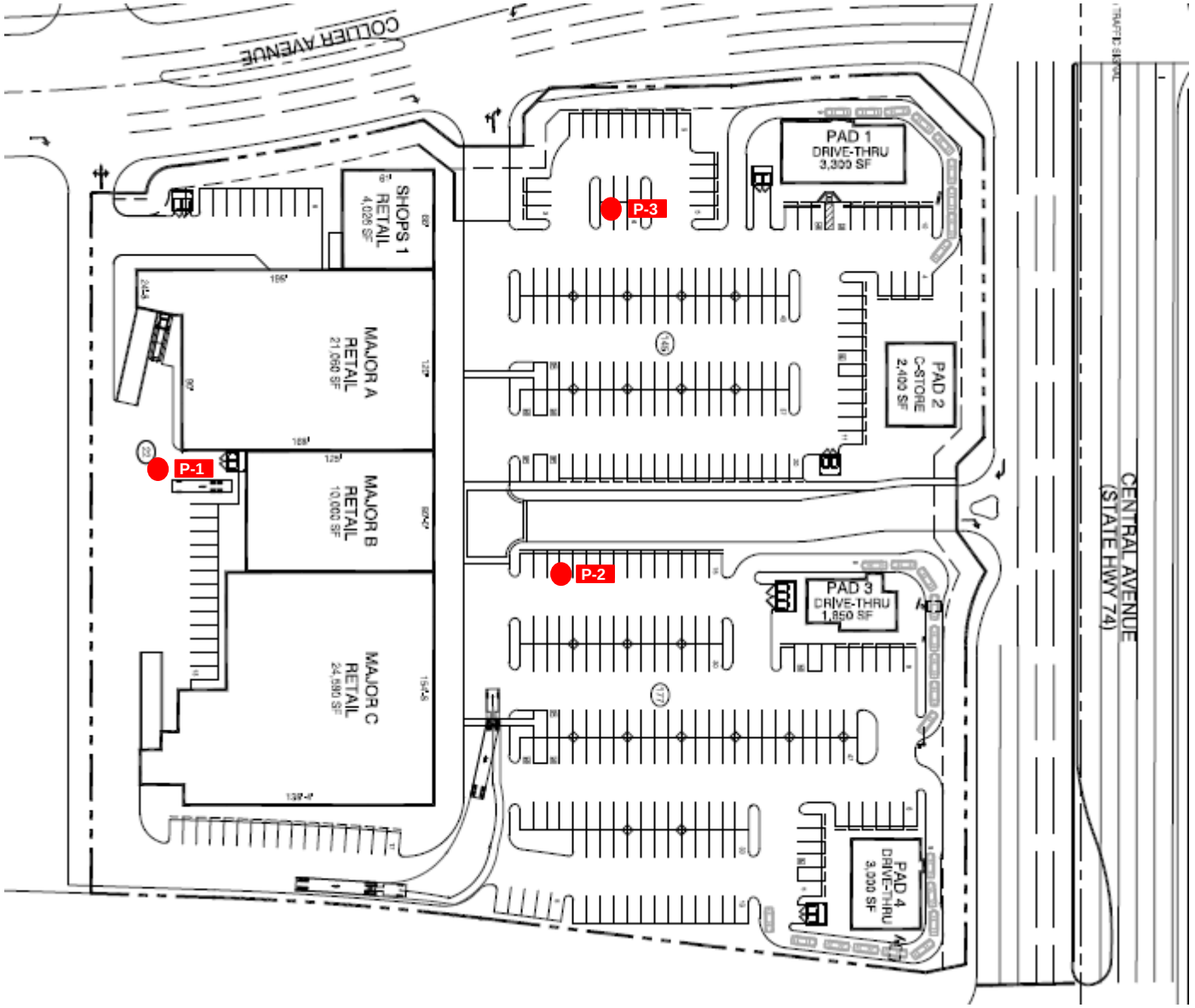
Source Image: U.S. Geological Survey, Lake Elsinore, Calif. 7.5' Quadrangle, 1953 (Photorevised 1988)

VICINITY MAP

PERCOLATION TESTING
Proposed Commercial Development
SEC Central Avenue & Collier Avenue
Lake Elsinore, California

SCALE:	DATE:
NOT TO SCALE	07/2015
DRAWN BY:	APPROVED BY:
II	CJ
PROJECT NO.	FIGURE NO.
3-215-0645	1

SALEM engineering group, inc.



SITE PLAN

PERCOLATION TESTING
Proposed Commercial Development
SEC Central Avenue & Collier Avenue
Lake Elsinore, California

SCALE: NOT TO SCALE	DATE: 07/2015
DRAWN BY: II	APPROVED BY: CJ
PROJECT NO. 3-215-0645	FIGURE NO. 2

LEGEND:

P-1 Percolation Test Locations

All Locations Approximate

SALEM engineering group, inc.

Percolation Test Worksheet

Project: **Proposed Commercial Development**
SEC Central Avenue & Collier Avenue
Lake Elsinore CA

Job No.: **3-215-0645**
Date Drilled: **7/14/2015**
Soil Classification: **Silty Sand (SM) w/trace clay**

Hole Radius: 2 in.
Pipe Dia.: 3 in.
Totoal Depth of Hole: 144 in.

Test Hole No.: **P-1**
Tested by: **SK**
Drilled Hole Depth: **12** ft.

Presoaking Date: **7/14/2015**
Test Date: **7/15/2015**

Time Start	Time Finish	Depth of Test Hole (ft)#	Refill-Yes or No	Elapsed Time (hrs:min)	Initial Water Level# (ft)	Final Water Level# (ft)	Δ Water Level (in.)	Δ Min.	Meas. Perc Rate (min/in)	Initial Height of Water (in)	Final Height of Water (in)	Average Height of Water (in)	Tested Infiltration Rate, It (in/hr)
10:10	10:40	12.0	N	0:30	9.80	10.18	4.56	30	6.6	26.4	21.8	24.1	0.36
10:40	11:10	12.0	N	0:30	10.18	10.42	2.88	30	10.4	21.8	19.0	20.4	0.27
11:10	11:40	12.0	N	0:30	10.42	10.61	2.28	30	13.2	19.0	16.7	17.8	0.24
11:40	12:10	12.0	N	0:30	10.61	10.78	2.04	30	14.7	16.7	14.6	15.7	0.24
12:10	12:40	12.0	N	0:30	10.78	10.93	1.80	30	16.7	14.6	12.8	13.7	0.24
12:40	13:10	12.0	N	0:30	10.93	11.07	1.68	30	17.9	12.8	11.2	12.0	0.26
13:10	13:40	12.0	N	0:30	11.07	11.19	1.44	30	20.8	11.2	9.7	10.4	0.25
13:40	14:10	12.0	N	0:30	11.19	11.30	1.32	30	22.7	9.7	8.4	9.1	0.26
14:10	14:40	12.0	N	0:30	11.30	11.39	1.08	30	27.8	8.4	7.3	7.9	0.24
14:40	15:10	12.0	N	0:30	11.39	11.47	0.96	30	31.3	7.3	6.4	6.8	0.24
15:10	15:40	12.0	N	0:30	11.47	11.54	0.84	30	35.7	6.4	5.5	5.9	0.24
Recommended for Design:										**Infiltration Rate**			**0.24**

Percolation Test Worksheet

Project: **Proposed Commercial Development**
SEC Central Avenue & Collier Avenue
Lake Elsinore CA

Job No.: **3-215-0645**
Date Drilled: **7/14/2015**
Soil Classification: **Silty Sand (SM) w/trace clay**

Hole Radius: 2 in.
Pipe Dia.: 3 in.
Totoal Depth of Hole: 156 in.

Test Hole No.: **P-2**
Tested by: **SK**
Drilled Hole Depth: **13** ft.

Presoaking Date: **7/14/2015**
Test Date: **7/15/2015**

Time Start	Time Finish	Depth of Test Hole (ft)#	Refill-Yes or No	Elapsed Time (hrs:min)	Initial Water Level# (ft)	Final Water Level# (ft)	Δ Water Level (in.)	Δ Min.	Meas. Perc Rate (min/in)	Initial Height of Water (in)	Final Height of Water (in)	Average Height of Water (in)	Tested Infiltration Rate, It (in/hr)
10:00	10:30	13.0	N	0:30	11.00	11.30	3.60	30	8.3	24.0	20.4	22.2	0.31
10:30	11:00	13.0	N	0:30	11.30	11.51	2.52	30	11.9	20.4	17.9	19.1	0.25
11:00	11:30	13.0	N	0:30	11.51	11.68	2.04	30	14.7	17.9	15.8	16.9	0.23
11:30	12:00	13.0	N	0:30	11.68	11.83	1.80	30	16.7	15.8	14.0	14.9	0.23
12:00	12:30	13.0	N	0:30	11.83	11.96	1.56	30	19.2	14.0	12.5	13.3	0.22
12:30	13:00	13.0	N	0:30	11.96	12.08	1.44	30	20.8	12.5	11.0	11.8	0.23
13:00	13:30	13.0	N	0:30	12.08	12.19	1.32	30	22.7	11.0	9.7	10.4	0.23
13:30	14:00	13.0	N	0:30	12.19	12.29	1.20	30	25.0	9.7	8.5	9.1	0.24
14:00	14:30	13.0	N	0:30	12.29	12.38	1.08	30	27.8	8.5	7.4	8.0	0.24
14:30	15:00	13.0	N	0:30	12.38	12.46	0.96	30	31.3	7.4	6.5	7.0	0.24
15:00	15:30	13.0	N	0:30	12.46	12.53	0.84	30	35.7	6.5	5.6	6.1	0.24
Recommended for Design:										**Infiltration Rate**			**0.22**

Percolation Test Worksheet

Project: **Proposed Commercial Development**
SEC Central Avenue & Collier Avenue
Lake Elsinore CA

Job No.: **3-215-0645**
Date Drilled: **7/14/2015**
Soil Classification: **Silty Sand (SM) w/trace clay**

Hole Radius: 2 in.
Pipe Dia.: 3 in.
Totoal Depth of Hole: 96 in.

Test Hole No.: **P-3**
Tested by: **SK**
Drilled Hole Depth: **8** ft.

Presoaking Date: **7/14/2015**
Test Date: **7/15/2015**

Time Start	Time Finish	Depth of Test Hole (ft)#	Refill-Yes or No	Elapsed Time (hrs:min)	Initial Water Level# (ft)	Final Water Level# (ft)	Δ Water Level (in.)	Δ Min.	Meas. Perc Rate (min/in)	Initial Height of Water (in)	Final Height of Water (in)	Average Height of Water (in)	Tested Infiltration Rate, It (in/hr)
10:10	10:40	8.0	N	0:30	6.40	6.61	2.52	30	11.9	19.2	16.7	17.9	0.27
10:40	11:10	8.0	N	0:30	6.61	6.77	1.92	30	15.6	16.7	14.8	15.7	0.23
11:10	11:40	8.0	N	0:30	6.77	6.90	1.56	30	19.2	14.8	13.2	14.0	0.21
11:40	12:10	8.0	N	0:30	6.90	7.01	1.32	30	22.7	13.2	11.9	12.5	0.19
12:10	12:40	8.0	N	0:30	7.01	7.11	1.20	30	25.0	11.9	10.7	11.3	0.20
12:40	13:10	8.0	N	0:30	7.11	7.20	1.08	30	27.8	10.7	9.6	10.1	0.19
13:10	13:40	8.0	N	0:30	7.20	7.28	0.96	30	31.3	9.6	8.6	9.1	0.19
13:40	14:10	8.0	N	0:30	7.28	7.35	0.84	30	35.7	8.6	7.8	8.2	0.18
14:10	14:40	8.0	N	0:30	7.35	7.41	0.72	30	41.7	7.8	7.1	7.4	0.17
14:40	15:10	8.0	N	0:30	7.41	7.47	0.72	30	41.7	7.1	6.4	6.7	0.19
15:10	15:40	8.0	N	0:30	7.47	7.52	0.60	30	50.0	6.4	5.8	6.1	0.17
Recommended for Design:										**Infiltration Rate**			**0.17**

Appendix 4: Historical Site Conditions

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

THE EXISTING SITE IS PRIMARLY VACANT LAND WITH ONE RESIDENCE ON IT.

Appendix 5: LID Infeasibility

LID Technical Infeasibility Analysis

PLEASE SEE INFILTRATION REPORT

Appendix 6: BMP Design Details

BMP Sizing, Design Details and other Supporting Documentation

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

Company Name: David Evans and Associates, Inc. Date: 12/21/2015

Designed by: County/City Case No.:

Design Volume

Enter the area tributary to this feature A_T= 7.41 acres

Enter V_{BMP} determined from Section 2.1 of this Handbook V_{BMP}= 14,754 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 = 40.0 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 = 1.78 ft

Minimum Surface Area, A_m

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

A_M = 8,278 ft^2

Proposed Surface Area A= 7,300 ft^2

ERROR, the proposed surface area must be equal to or greater than the minimum surface area

Bioretention Facility Properties

Side Slopes in Bioretention Facility z = 4 :1

Diameter of Underdrain 6 inches

Longitudinal Slope of Site (3% maximum) 0 %

6" Check Dam Spacing 0 feet

Describe Vegetation:

Notes:

Appendix 7: Hydromodification

Supporting Detail Relating to Hydrologic Conditions of Concern

THE BIOFILTRATION AND BIORETETION FACILITIES WILL REDUCE THE PEAK FLOW TO A LEVEL BELOW THE EXISTING FOR THE 2YEAR - 24HOUR DESIGN STORM. HOWEVER BECAUSE OF THE VERY LOW INFILTRATION RATES IT IS NOT FEASIBLE TO REDUCE THE INCREASED RUNOFF TO A LEVEL SIMILAR WITH EXISTING.