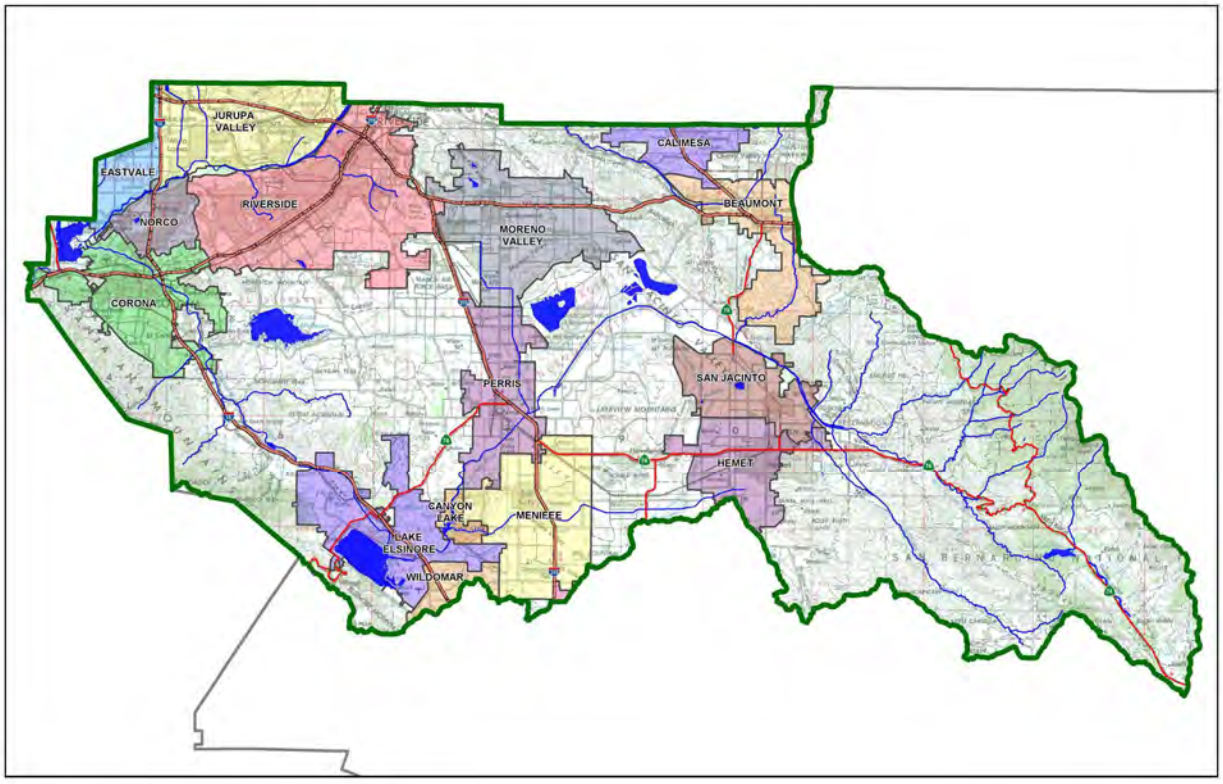
Project Specific Water Quality Management Plan

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

Project Title: 114 E. Markham Street. Perris CA 92571

Development No: TBD

Design Review/Case No: TBD



☒ **Preliminary**
☐ **Final**

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Regional Board Order No. **R8-2010-0033**
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STATE OF CALIFORNIA

OWNER'S CERTIFICATION

This Project-Specific Water Quality Management Plan (WQMP) has been prepared for Truck Terminal Properties by Joseph E. Bonadiman & Associates, Inc. for the **Error! Reference source not found.** project.

This WQMP is intended to comply with the requirements of City of Perris for the County of Riverside Ordinance No. 754 and 754.1 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 City of Perris Water Quality Ordinance (Municipal Code Section14.22).

"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
Bobby Nasir	
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
J.T. Stanton	P.E.
Preparer's Printed Name	Preparer's Title/Position

Preparer's Licensure: R.C.E. No. C-70944

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Section A: Project and Site Information

PROJECT INFORMATION	
Type of Project:	NEW TRAILER TRUCK PARKING LOT
Planning Area:	PERRIS VALLEY COMMERCE CENTER (PVCC) SPECIFIC PLAN AREA
Community Name:	PERRIS VALLEY
Development Name:	114 E. MARKHAM STREET
PROJECT LOCATION	
Latitude & Longitude (DMS): 33.8528 / -117.2228	
Project Watershed and Sub-Watershed: Santa Ana	
Gross Acres: 9.52 ACRES	
APN(s): 302-110-031 and -032	
Map Book and Page No.: N/A	
PROJECT CHARACTERISTICS	
Proposed or Potential Land Use(s)	TRUCK PARKING
Proposed or Potential SIC Code(s)	4212
Area of Impervious Project Footprint (SF)	0 S.F.
Total Area of proposed Impervious Surfaces within the Project Footprint (SF)/or Replacement	355,567 S.F.
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 Footprint (SF)	0
Is the project located within any MSHCP Criteria Cell?	☐ Y ☒ N
If so, identify the Cell number:	N/A
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)	D
What is the Water Quality Design Storm Depth for the project?	0.639"

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
- BMP Locations (Lat/Long)

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
Line E-13	NONE	NONE	WATER BODY CLASSIFIED AS RARE
Perris Valley Channel	NONE	NONE	NOT A WATER BODY
San Jacinto River (Reach3) (HU#802.11)	NONE	AGR, GWR, WILD, MUN, REC1, REC2, WARM, WILD,	NOT A WATER BODY CLASSIFIED AS RARE
San Jacinto River (Reach 2) (HU#802.11)	NONE	AGR, GWR, WILD, MUN, REC1, REC2, WARM	NOT A WATER BODY CLASSIFIED AS RARE
Canyon Lake (HU#802.11, 802.12) N	NUTRIENTS, PATHOGENS	WILD, REC2, WARM, GWR, MUN, REC1, AGR	NOT A WATER BODY CLASSIFIED AS RARE
San Jacinto River (Reach 1) (HU#802.11, 802.32, 802.31)	NONE	AGR, GWR, MUN, REC1, REC2, WARM, WILD	NOT A WATER BODY CLASSIFIED AS RARE
Lake Elsinore (HU#802.31)	Nutrients, Organic Enrichment/Low Dissolved Oxygen, PCBs, Sediment Toxicity, Unknown Toxicity	MUN, REC1, REC2, WARM, WILD	NOT A WATER BODY CLASSIFIED AS RARE

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)* CITY OF PERRIS GRADING PERMIT	☒ 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.

Consideration of "highest and best use" of the discharge should also be considered. For example, Lake Elsinore is evaporating faster than runoff from natural precipitation can recharge it. Requiring infiltration of 85% of runoff events for projects tributary to Lake Elsinore would only exacerbate current water quality problems associated with Pollutant concentration due to lake water evaporation. In cases where rainfall events have low potential to recharge Lake Elsinore (i.e. no hydraulic connection between groundwater to Lake Elsinore, or other factors), requiring infiltration of Urban Runoff from projects is counterproductive to the overall watershed goals. Project proponents, in these cases, would be allowed to discharge Urban Runoff, provided they used equally effective filtration-based BMPs.

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?

Yes, the identified drainage patterns preserved as much as posible for the proposed development.

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

Yes, exisitng vegitation will be designated for protection where possible.

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

Yes, project limits and BMP locations will be marked during construction.

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

Yes, impervious area has been minimized by grouping the proposed site improvements close together.

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

Yes, runoff will drain to adjacent pervious areas.

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][2]	Area (Sq. Ft.)	DMA Type
DA-1,DMA-A	Ornamental Landscaping	23,966 S.F.	D
DA-1, DMA-B	Concrete or Asphalt	178,713 S.F.	D
DA-1, DMA-C	Roofs	0 S.F.	D
DA-2,DMA-A	Ornamental Landscaping	25,418 S.F.	D
DA-2,DMA-B	Concrete or Asphalt	176,854 S.F.	D
DA-2,DMA-C	Roofs	470 S.F.	D

[1]Reference Table 2-1 in the WQMP Guidance Document to populate this column
[2]If multi-surface provide back-up

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

DMA Name or ID	Area (Sq. Ft.)	Stabilization Type	Irrigation Type (if any)

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)	Storm Depth (inches)	DMA Name / ID	[C] from Table C.4 =	Required Retention Depth (inches)
		[A]	[B]		[C]	[D]

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

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	Impervious fraction	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
DA-1,DMA-A	BMP-1
DA-1,DMA-B	BMP-1
DA-1,DMA-C	BMP-1
DA-2,DMA-A	BMP-2
DA-2,DMA-B	BMP-2
DA-2,DMA-C	BMP-2

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; proceed to section D.3

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?	☐	☒
If Yes, list affected DMAs:		
…have any DMAs located within 100 feet of a water supply well?	☐	☒
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?	☐	☒
If Yes, list affected DMAs:		
…have measured in-situ infiltration rates of less than 1.6 inches / hour?	☐	☒
If Yes, list affected DMAs:		
…have significant cut and/or fill conditions that would preclude in-situ testing of infiltration rates at the final infiltration surface?	☐	☒
If Yes, list affected DMAs:		
…geotechnical report identify other site-specific factors that would preclude effective and safe infiltration?	☐	☒
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 none 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: 0.90 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: 8.16 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: 0.26

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: 2.12 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)
2.12 Acres	1.13 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 shutdowns or other lapses in occupancy:

Projected Number of Daily Toilet Users: 2

Project Type: Commercial

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: 8.16 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: 132.00

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: 1110

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)
1110	2

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: Projected Average Daily Use gpd

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: Insert Area Acres

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: Enter Value

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: Minimum use required gpd

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)**
Minimum use required gpd	Projected Average Daily Use gpd

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 per Section 3.4.2 of the WQMP Guidance Document.

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	
DA-1	☐	☐	☒	☐	☐
DA-2	☐	☐	☒	☐	☐
	☐	☐	☐	☐	☐
	☐	☐	☐	☐	☐
	☐	☐	☐	☐	☐
	☐	☐	☐	☐	☐

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.

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-1		
	[A]		[B]	[C]	[A] x [C]			
DA-1, DMA-A	23,966	ornamental landscaping	0.1	0.11	2647	*Design Storm Depth (in)*	*Design Capture Volume,* $\mathbf{V_{BMP}}$ *(cubic feet)*	*Proposed Volume on Plans (cubic feet)*
DA-1, DMA-B	178,713	concrete or asphalt	1	0.89	159412			
DA-1, DMA-C	0	roofs	1	0.89	0			
	202679				162059	0.64	8643	8643
	A_T = Σ[A]				Σ= [D]	[E]	$[F] = \frac{[D]x[E]}{12}$	[G]

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-2		
	[A]		[B]	[C]	[A] x [C]			
DA-2, DMA-A	25,418	ornamental landscaping	0.1	0.11	2808	*Design Storm Depth (in)*	*Design Capture Volume, V_{BMP} (cubic feet)*	*Proposed Volume on Plans (cubic feet)*
DA-2, DMA-B	176,854	concrete or asphalt	1	0.89	157754			
DA-2, DMA-C	470	roofs	1	0.89	419			
	202742				160981	0.64	8586	8586
	$A_T = \Sigma[A]$				$\Sigma = [D]$	[E]	$[F] = \frac{[D]x[E]}{12}$	[G]

[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.

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]
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]				
						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 for Flow-Based Treatment Control BMPs [E] = .2, for Volume-Based Control Treatment BMPs, [E] 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 BMP-1	Bacterial Indicators, Nutrients, Pesticides, Sediments, Trash & Debris, Oil & Grease	High
Bioretention BMP-2	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 Susceptibility Maps. See HCOC Applicability Map, from Riverside County Flood Control and Water Conservation District, in Appendix 7.

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:

Discharge from the site is on E. Markham Street which has been improved with storm drain as part of the Perris Valley Storm Drain (PVSD), having adequate capacity and will be maintained by the City of Perris. The flows will be conveyed by the PVSD, which discharges into the San Jacinto River, which is considered a natural HCOC resistant feature, and ultimately into an adequate sump, Canyon Lake.

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
Concrete/Asphalt	Site Design & Landscape Planning	Maintain impervious areas and clean by sweeping/vacuuming
Landscaping	Efficient Irrigation, Site Design & Landscape Planning	Limit use of pesticides
Roof	Roof Runoff Controls	Maintain roof drains
On-Site drain Inlets	Mark all inlets "Only Rain Water"	Markers may be avalible from RCFCWCD call 951-955-1200
Refuse Areas	Post sign reading "Do not dump hazardous materials here"	Keep clean per industry standards
A. On-site storm drain inlets	• Mark all inlets with the words "Only Rain Down the Storm Drain" or similar. Catch Basin	• Maintain and periodically repaint or replace inlet markings.

	Markers may be available from the Riverside County Flood Control and Water Conservation District, call 951.955.1200 to verify.	• 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 • Include the following in lease agreements: "Tenant shall not allow anyone to discharge anything to storm drains or to store or deposit materials so as to create a potential discharge to storm drains."
D2. Landscape/ Outdoor Pesticide Use	• Preserve existing native trees, shrubs, and ground cover to the maximum extent possible. • Design landscaping 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. • Where landscaped areas are used to retain or detain stormwater, specify plants that are tolerant of saturated soil conditions. • Consider using 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 "What you should know for…..Landscape and Gardening" at http://rcflood.org/stormwater • Provide IPM information to new owners, lessees and operators.
G. Refuse areas	• Show where site refuse and recycled materials will be handled and stored for pickup. See local municipal requirements for sizes and other details of refuse areas. • If dumpsters or other receptacles are outdoors, show how the designated area will be covered, graded, and paved to prevent runon and show locations of berms to prevent	• Provide adequate number of receptacles. Inspect receptacles regularly; repair or replace leaky receptacles. Keep receptacles covered. 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,

	runoff from the area.	"Waste Handling and Disposal" in the CASQA Stormwater Quality Handbooks at www.cabmphandbooks.com
O. Miscellaneous Drain or Wash Water or Other (SourcesCondensate drain lines)	• Condensate drain lines may discharge to landscaped areas if the flow is small enough that runoff will not occur. Condensate drain	
O. Miscellaneous Drain or Wash Water or Other (Roofing, gutters, and trim.)	• Avoid roofing, gutters, and trim made of copper or other unprotected metals that may leach into runoff.	
P. Plazas, sidewalks, and parking lots.		• Sweep plazas, sidewalks, and parking lots regularly to prevent accumulation of litter and debris. Collect debris from pressure washing to prevent entry into the storm drain system. Collect washwater containing any cleaning agent or degreaser and discharge to the sanitary sewer not to a storm drain.

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)
BMP-1	Bioretention BMP-1	
BMP-2	Bioretention BMP-2	

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: The Owner will be responsible for maintenance of the BMPs.

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

SITE

PERRIS VALLEY STORM DRAIN

SAN JACINTO RIVER (REACH 3)

SAN JACINTO RIVER (REACH 2)

CANYON LAKE

LAKE ELSINORE

SAN JACINTO RIVER (REACH 1)

4000 0 4000 8000 12000

SCALE: 1" = 4000'

RECEIVING WATERS - WQMP

APNs: 302-110-031 & 032
PERRIS, CA 92571

BONADIMAN
JOSEPH T. BONADIMAN & ASSOCIATES, INC.
ENGINEERS - C.I.C. - SURVEYING - PLANNING
TEL. (909) 885-3806
384 NORTH ARROWHEAD AVE.
SAN BERNARDINO, CA 92408
FAX (909) 381-1721
www.bonadiman.com

PREPARED FOR: TRUCK TERMINAL PROPERTIES					
DRAWN BY: C.R.	SCALE: 1" = 4000'	SHEET: 1 OF 1			
CHECKED BY: J.T.S.	JOB NO: 174462				
DISREGARD PRINTS BEARING EARLIER REVISION DATES →	05-22-20				

PROPERTY OWNER

APN: 302-110-031
ASHLEY MELLIE LAURA
723702 CEDAR CREEK TERRACE
MORENO VALLEY CA 92557

APN: 302-110-032
RICHARD R KINNEY; LAURAINE J L KINNEY;
RICHARD K CIRCUIT
7979 IVANHOE AVE., NO 400
LA JOLLA CA 92037

PROPERTY ADDRESS

114 E. MARKHAM STREET
PERRIS, CA 92571

APPLICANT

TRUCK TERMINAL PROPERTIES
ATTN: BOB NASSIR
1820 SAN VICENTE BOULEVARD
SANTA MONICA, CA 90402
PHONE: (310) 466-7225

PROJECT COVERAGE

SUBJECT	PROPOSED	%
BUILDING(S)	470 SF.	0.1%
IMPERVIOUS	355,567 SF.	87.7%
PERVIOUS	49,384 SF.	12.2%
TOTALS	405,421 SF.	100% (9.31 AC.)

W.Q.M.P. NOTES:

1.) THIS WQMP EXHIBIT SHALL NOT BE USED FOR CONSTRUCTION. SEE APPROVED GRADING PLANS FOR CONSTRUCTIONS DETAILS AND CROSS-SECTIONS.

2.) STRUCTURAL BMPS MAY BE SUBSTITUTED FOR EQUIVALENT PRODUCTS WITH WRITTEN APPROVAL FROM THE ENGINEER OF RECORD, BASED ON AVAILABILITY AT TIME OF CONSTRUCTION.

3.) TREATMENT CONTROL BMPS MAY BE SUBSTITUTED FOR EQUIVALENT PRODUCTS WITH WRITTEN APPROVAL FROM THE ENGINEER OF RECORD.

LEGEND:

- W.Q.M.P DRAINAGE AREA
- PROPERTY LIMITS
- FLOW LINE
- PROPOSED LANDSCAPING AREAS (DMA-A)
- PROPOSED CONCRETE PAVING AREAS (DMA-B)
- PROPOSED A/C PAVING AREAS (DMA-B)
- PROPOSED STRUCTURES (DMA-C)

NON-STRUCTURAL SOURCE CONTROL BMPs:

- (-) EDUCATION FOR PROPERTY OWNERS, OPERATORS, TENANTS, OCCUPANTS, OR EMPLOYEES
- (-) ACTIVITY RESTRICTIONS
- (1) IRRIGATION SYSTEM AND LANDSCAPE MAINTENANCE (SC-44) (SC-73)
- (2) COMMON AREA LITTER CONTROL
- (3) STREET SWEEPING PRIVATE STREETS AND PARKING LOTS (SC-70)
- (4) DRAINAGE FACILITY INSPECTION AND MAINTENANCE (SC-74)

STRUCTURAL SOURCE CONTROL BMPs:

- [1] LANDSCAPE AND IRRIGATION SYSTEM DESIGN

PROPERLY DESIGN:

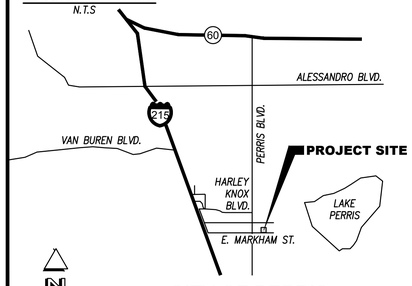
- <1> TRASH STORAGE AREAS (SD-32)

PROPOSED TREATMENT CONTROL BMP'S:

- <1> BIORETENTION (TC-32)

40 0 40 80 120
SCALE: 1"=40'

VICINITY MAP



CITY OF PERRIS

PRELIMINARY W.Q.M.P.

A.P.N. 302-110-031 & 032
PERRIS, CA 92571

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PREPARED FOR: TRUCK TERMINAL PROPERTIES

DRAWN BY:	C.R.	SCALE:	1" = 40'	SHEET: 1 OF 1	
CHECKED BY:	J.T.S.	JOB NO:	194696		
DISREGARD PRINTS BEARING EARLIER REVISION DATES →		09-10-2020			

Appendix 2: Construction Plans

Grading and Drainage Plans
Provided for reference only,
See approved plans for construction

Appendix 3: Soils Information

Geotechnical Study and Other Infiltration Testing Data

SOILS SOUTHWEST, INC.

SOILS, MATERIALS AND ENVIRONMENTAL ENGINEERING CONSULTANTS

897 VIA LATA, SUITE N • COLTON, CA 92324 • (909) 370-0474 • (909) 370-0481 • FAX (909) 370-3156

Report of Geotechnical Investigations &
Soil Infiltration Testing for WQMP-BMP Design

Proposed Truck Terminal /Truck Storage Facility with an Office
114 E. Markham Street, Perris, California
A.P.N. (s) 302-110-032 & 042

Project No. 20016-F/BMP

June 19, 2020

Prepared for:

Truck Terminal Properties
1820 San Vincente Blvd.
Santa Monica, CA 90402

soilssouthwest@aol.com
Established 1984

SOILS SOUTHWEST, INC.

SOILS, MATERIALS AND ENVIRONMENTAL ENGINEERING CONSULTANTS

897 VIA LATA, SUITE N • COLTON, CA 92324 • (909) 370-0474 • (909) 370-0481 • FAX (909) 370-3156

June 19, 20016 Project No. 20016-F

Truck Terminal Properties
1820 San Vicente Boulevard
Santa Monica, California 90402

Attention: Mr. Bobby Nassir

Subject: Report of Geotechnical Investigations & Soil Infiltration Testing for WQMP-BMP Design
Proposed Truck Terminal /Truck Storage Facility with a minor Office
114 E. Markham Street, Perris, California
A.P.N. (s) 302-110-032 & 042

Reference: Proposed Site Plan provided by Bonadiman & Associates

Gentlemen:

Presented herewith is the Report of Soils and Foundation Evaluations for the site of the proposed Truck Parking/Truck Storage Facility with a minor office to be located on 114 E. Markham Street, Perris, California. In absence of precise grading and development plans the recommendations included should be considered as "preliminary", subject to revision following detailed development plan review.

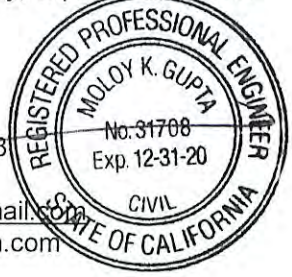
The soils encountered primarily consist of upper fine stiff silty sands with scattered pebbles and rock fragments overlying slightly clayey silty sands to the maximum 26 feet depth explored. No free groundwater was encountered. Shallowest groundwater is estimated to about 10 feet below grade. Descriptions of the soils encountered are provided in the Log of Borings B-1 to B-3 and infiltration test borings P-1 and P-2, attached.

Based on the State of California Department of Conservation San Bernardino South Quadrangle Special Studies Zone map, the site is considered not situated with an A-P Special Study Zone. However, considering the State of California Department of Water Resources Water Data Library shallowest groundwater table is reported in between 8 to 10 feet below the existing grade surface. The site is identified as susceptible to soils liquefaction in event of an earthquake.

Based on the geotechnical evaluations described, it is our opinion that, when adequately designed and constructed, the site should be considered suitable for the development proposed.

We offer no other warranty, express or implied.

Respectfully submitted,
Soils Southwest, Inc.



Moloy Gupta, RCE 31708 John Flippin, Field Representative

dist/ 1-bobnass5@gmail.com
cc: JTS@bonadiman.com

1.0 Introduction

1.1 Purpose and Scope of Services

This report presents geotechnical recommendations for the site of the proposed truck parking/truck storage facility with a minor office structure to be constructed on the vacant parcel located at 114 E Markham Street, City of Perris, California.

The recommendations contained reflect our best estimate of the soil's conditions as encountered as described. It is not to be considered as a warranty of the soils for other areas, or for the depths beyond the explorations completed at this time.

The recommendations supplied should be considered valid and applicable when the following conditions, in minimum, are observed:

i. Pre-grade meeting with contractor, public agency and soils engineer,
ii. Excavated bottom inspections and verifications by soils engineer prior to backfill placement,
iii. Continuous observations and testing during site preparation and structural fill soils placement,
iv. Observation and inspection of footing trench prior to steel and concrete placement,
v. Plumbing trench backfill placement prior to concrete slab-on-grade placement,
vi. On and off-site utility trench backfill testing and verifications, and
vii. Consultations as required during construction, or upon your request

In absence of precise grading plan, the geotechnical recommendations supplied should be considered as 'preliminary'. Supplemental recommendations may be warranted following grading plan review.

1.2 Site Description

The near level rectangular shaped parcels are currently vacant and undeveloped. I general, the site is bounded by a tractor trailer yard and vacant undeveloped property on the north, by East Markham Street on the south, by a new industrial warehouse on the east, and by vacant undeveloped property on the west. Overall vertical relief is currently unknown, but sheet-flow from incidental rainfall appears to flow towards the west. With the exception of scattered debris stockpiles, scattered mature trees, and wire fencing separating the two parcels, no other significant features pertinent are noted.

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1.3 Proposed Development

No detailed development plans are available for review. However, based on the preliminary project information supplied, it is understood that the subject development will primarily include open-air commercial truck parking/truck storage facility with a minor office structure. Supplemental improvements are anticipated to include installation of an underground WQMP-BMP infiltration chambers and drive approaches and others. Moderate site preparations and grading should be anticipated with the development proposed.

2.0 Scope of Services

Geotechnical evaluations included review of the available publications for the site and its adjacent, along with necessary sub-surface explorations, soil sampling, necessary laboratory testing, engineering analyses and the preparation of this report. In general, our Scope of Services included the following:

o **Field Explorations**

For geotechnical evaluations, three (3) exploratory test borings (B-1, B-2 and B-3) are made using a limited access hollow-stem auger drilling rig advanced to 6 to 26 feet below existing grade. Supplemental two (2) explorations (BMP-1and BMP-2) are made for WQMP-BMP testing advanced to maximum 13 feet below grade as suggested by the project design engineer. Prior to test excavations, an underground utility clearance was established with Underground Service Alert (USA) of Southern California to avoid possible subsurface life-line obstruction and rupture. Following necessary soil sampling and in-situ testing, the test excavations were backfilled with local soils using minimum compaction effort. Collected samples were subsequently transferred to our laboratory for necessary geotechnical testing. Approximate test excavation locations are shown on the attached Plate 1.

During excavations, the soils encountered were continuously logged and bulk and undisturbed samples were procured. Collected samples were subsequently transferred to our laboratory for necessary geotechnical testing. Description of the soils encountered is shown on the Test Exploration Logs in Appendix A.

o **Laboratory Testing**

Representative bulk and undisturbed site soils were tested in laboratory to aid in the soils classification and to evaluate relevant engineering properties pertaining to the project requirements. The laboratory tests completed include the following:

- In-situ moisture contents and dry density (ASTM Standard D2216),
- Maximum Dry Density and Optimum Moisture Content (ASTM Standard D1557),
- Direct Shear (ASTM Standard D3080),
- Soil consolidation (ASTM Standard D2435),
- Soils Gradation evaluations (ASTM D422),
- Soils Sand Equivalent, SE (ASTM D 2419). and
- Expansion Potential Index (ASTMD4829)

No soils chemical analysis is currently included. Post-grading soil chemical analysis analyses, including pH, sulfate, chloride and resistivity will be performed prior to actual construction and concrete pour.

Description of the test results and test procedures used are provided in Appendix B.

- Based on the field investigation and laboratory testing, engineering analyses and evaluations were made on which to base our preliminary recommendations for design of foundations, slab-on-grade, paving and parking, site preparations and grading monitoring during construction, and preparation of this report for initial use by the project design professionals.

3.0 Geotechnical Descriptions

3.1 Soils Conditions

Based on the geotechnical investigation completed as described, it is our opinion that the site soils encountered primarily consist of upper stiff silty sands with scattered pebbles and rock, overlying deposits of lightly clayey silty sands to the maximum 25 feet depth explored. No free groundwater was encountered. Descriptions of the soils encountered are provided in the Log of Borings, B-1 to B-3 and infiltration borings P-1 and P-2, attached.

Laboratory shear tests conducted on the upper bulk samples remolded to higher density indicate moderate shear strengths under increased soil moisture conditions. Results of the laboratory shear tests are provided in Appendix B of this report.

Sandy silty in nature, the site soils are considered "very low" in expansion characteristics with Expansion Index, EI, less than 20 thereby requiring no special construction requirements other than those as described herein.

3.2 Subsurface Variations

During site preparations and grading, presence of buried irrigation, debris, organic and others non-structural materials may be anticipated. In addition, variations in soil strata and their continuity and orientations may be expected. Due to the nature and depositional characteristics of the natural soils existing as described, care should be exercised in interpolating or extrapolating the subsurface soils conditions existing in between and beyond the test explorations conducted.

3.3 Excavatibility

It is our opinion that the grading required for the project may be accomplished using conventional heavy-duty construction equipment. However, some difficulty may be expected during deep trenching due to soil caving. No blasting or jack-hammering, however, should be anticipated.

3.4 Soil Corrosivity

Since change in soils chemical compositions are expected following site preparations and grading, no laboratory soil corrosivity potential evaluations are currently initiated. Following mass grading completion, results of such, in minimum, the pH, sulfate, chloride and resistivity will be supplied on request.

3.5 Groundwater

Groundwater was not encountered within the maximum depth of 26 feet explored and none such is anticipated during grading and construction. The following table lists the historical groundwater table based on the information as supplied by the local reporting agency.

GROUNDWATER TABLE	
Reporting Agency	California Department of Water Resources website, Montagna 2008 maps
Well Number	03S03W-32Q001S- EMWD25517
Well Monitoring Agency	5035
Well Location: Township/Range/Section	T03N-R03W-Section 32
Current Depth to Water (Measured in feet)	8.5 to 10
Current Date Water was Measured	March 23, 2020
Depth to Water (Measured in feet) (Shallowest)	8.5 to 10
Date Water was Measured (Shallowest)	March 23, 2020

4.1 Faulting and Seismicity

Based on the information published by the Department of Conservation, State of California, it is understood that the subject site is not situated within an A-P Special Study Zone, where a fault(s) runs through or its immediate adjacent. However, considering Southern California being in a seismically risky area, it is our opinion that with the conventional design/construction knowhow it is not possible to develop a site economically that are totally resistant to earthquake-related hazards. Although implementation of the current design and construction knowhow using the current CBC may benefit to the structure planned.

4.2 Direct or Primary Seismic Hazards

Surface ground rupture along with active fault zones and ground shaking represent primary or direct seismic hazards to structures. There are no known active or potentially active faults that pass through or towards the subject site, and the site is not situated within an AP Special Studies Zone. According to the current CBC, the site is considered within Seismic Zone 4. As a result, it is likely that moderate to severe ground shaking may be experiences for the development proposed.

4.3 Induced or Secondary Seismic Hazards

In addition to ground shaking, effects of seismic activity may include flooding, land-sliding, lateral spreading, settlements and subsidence. Potential effects of such are discussed as below.

4.3.1 Flooding

Flooding hazards include tsunamis (seismic sea waves), Seiches, and failure of manmade reservoirs, tanks and aqueducts. In absence of such nearby, such potential is considered remote.

4.3.2 Land Sliding

Considering the subject site being near level with developed surrounding, potential for seismically induced land sliding is considered "remote".

4.3.3 Lateral Spreading

Structures or facilities proposed are expected to withstand predicted ground softening and/or predicted vertical and lateral ground spreading/displacements, to *an acceptable level of risk*. Seismically induced lateral spreading involves lateral movement of soils due to ground shaking.

The topography of the site being near level, it is our opinion that the potential for seismically induced lateral ground spreading should be considered "remote".

4.4 Site Specific Seismic Effects

The site is situated at about 7.04 miles from the San Jacinto Fault capable of generating an earthquake magnitude of M=7.5 and PGA of 0.486g. Considering the project involving no major construction other than the asphaltic paving/parking and a guard shack, no site soils liquefaction evaluation is included and none such should be considered necessary for the project described.

4.5 Seismic Design Coefficients

Using s Site Coordinates of 33.852683°N, -117.222862W and considering the site being situated at about 7.04 miles from the San Jacinto Fault. For foundation and structural design, the following seismic parameters are suggested based on the current 2019 CBC:

Recommended values are based upon the USGS ASCE 7-Hazard Reports Parameters and the California Geologic Survey: PSHA Ground Motion Interpolator Supplemental seismic parameters are provided in Appendix C of this report. The following presents the seismic design parameters as based on the available publications as currently published by the California Geological Survey and 2019 CBC

The following presents the seismic design parameters as based on available publications as currently published by the California Geological Survey and 2019 CBC.

TABLE 4.5.1 Seismic Design Parameters

CBC Chapter 16	2019 ASCE 7-16 Standard Seismic Design Parameters	Recommended Values
1613A.5.2	Site Class	C
1613.5.1	The mapped spectral accelerations at short period	S_s
1613.5.1	The mapped spectral accelerations at 1.0-second period	S_1
1613A5.3(1)	Site Class B / Seismic Coefficient, S_s	1.5 g
1613A5.3(2)	Site Class B / Seismic Coefficient, S_1	0.592 g
1613A5.3(1)	Site Class C / Seismic Coefficient, F_a	1.000 g
1613A5.3(2)	Site Class C / Seismic Coefficient, F_v	NA
16A-37 Equation	Spectral Response Accelerations, $S_{Ms} = F_a S_s$	1.5 g
16A-38 Equation	Spectral Response Accelerations, $S_{M1} = F_v S_1$	NA
16A-39 Equation	Design Spectral Response Accelerations, $S_{Ds} = 2/3 \times S_{Ms}$	1.000 g
16A-40 Equation	Design Spectral Response Accelerations, $S_{D1} = 2/3 \times S_{Ms}$	NA

TABLE 4.5A.2 Seismic Source Type

Based on California Geological Survey-Probabilistic Seismic Hazard Assessment Peak Horizontal Ground Acceleration (PHGA) having a 10 percent probability of exceedance in a 50-year period is described as below:

Seismic Source Type / Appendix C	
Nearest Maximum Fault Magnitude	M>\=7.5
Peak Horizontal Ground Acceleration	0.486g

In design, vertical acceleration may be assumed to about 1/3 to 2/3 of the estimated horizontal ground accelerations described.

It should be noted that lateral force requirement in design by structural engineer should be intended to resist total structural collapse during an earthquake. During lifetime use of the structure built, it is our opinion that some structural damage may be anticipated requiring some structural repairs. Adequate structural design and implementation of such in construction should be strictly observed.

5.0 Evaluations and Recommendations

5.1 General Evaluations

Based on field explorations, laboratory testing and subsequent engineering analysis, the following conclusions and recommendations are presented for the site under study:

(I) From geotechnical viewpoint, the proposed development conventional on-grade open-air paving/parking should be considered feasible provided the recommendations included are incorporated in design and construction.
(II) Post-earthquake some paving distress may occur requiring minor to moderate repair/reconstruction.
(III) The recommended subexcavation depths are for estimation purposes. Supplemental deeper subexcavations may be warranted within areas underlain by buried debris, utilities, presence of deeper undocumented fills and others. It will be the responsibility of the grading contractor to inform the project soils engineer the presence of such fills, debris or utilities such as septic tank and others.
(IV) In structural design, if any, use of the described peak horizontal ground acceleration (PGA) along with the design procedures as outlined in the current CBC should be considered in order to minimize adverse effects of ground shaking.
(V) Provisions should be maintained during construction to divert incidental rainfall away from the structural pads, once constructed.
(VI) When developed, it is our opinion that proposed development will not adversely affect the stability of the site or it's adjacent.
(Vii) Use of flexible utility connections are recommended.

5.1 Alternative Load Bearing Surface for Paving/Parking and Truck Storage

5.1.1 Flexible Asphalt Concrete Surface

Based on the Soils Sand Equivalent, SE, of 56, estimated soil R-value of 65 and Traffic Index, TI, of 8.5, it is our opinion that for the paving/storage yard planned may be constructed of 6-inch of asphalt concrete with thickened edges compacted to 95%, directly bearing on minimum 6-inch thick Class II or 6-inch of CMB base similarly compacted to 95%, overlying 18" thick engineered subgrades of local gravelly sandy soils similarly compacted to 95%.

The paving materials used, including the asphalt and aggregate base should meet the minimum gradation and quality requirements of the Green Book and the requirements of the Caltrans Standard Specifications. It should be noted that with repeated use of the paving by heavy trucks etc., regular maintenance should be expected. Use of thickened edge should be considered to protect paving from accidental edge-loading an/or lateral sliding.

5.1.2 Alternative Rigid Concrete Paving

If selected, Rigid Concrete Paving may be considered as described as follows:

Materials	Autos/Light Trucks (TI=6.0)	Truck Traffic TI= 8.5
Portland Cement Concrete, PCC, over	6" (net)*	6" (net) *
Class II Base, or Miscellaneous Base compacted to min. 95%, over	-0-	8"
local soils compacted to min. 95%	18"	18"

Note: *- use of paving reinforcing may be omitted provided the subgrades *prepared are compacted to minimum 95% and construction/expansion joint spacings are limited to within 24 to 30-times the pcc thickness, or to within 12 to 15 feet,* both-ways, with joint depth to minimum 1/3 of paving thickness.

Use of thickened edge should be considered to protect concrete paving from accidental edge-loading and/or lateral sliding. Regular maintenance should be expected.

Actual concrete paving thickness, construction/expansion joints and reinforcing requirements should be supplied by the project structural engineer using an Annual Daily Traffic (ADT), and a Soil Subgrade Reaction, ks, of 200 kcf.

5.2 Spread Foundations for Office

The proposed minor office structure may be supported by conventional load bearing footings sized to minimum 12-inch wide, embedded to minimum 12-inch into the lowest adjacent final grade surface. Actual foundation dimensions should be supplied by structural engineer based upon 1800 psf soils vertical bearing and the seismic design parameters and the horizontal Peak Horizontal Ground Acceleration (PGA) as described.

The above soil bearing capacity may be increased for each additional footing depth and width in excess of the minimum recommended. Total maximum vertical bearing capacity is recommended not to exceed 3000 psf. If normal code requirements are applied, the above capacities may further be increased by an additional 1/3 for short duration of loading which includes the effect of wind and seismic forces. Actual foundation dimensions (b & d) should be determined by the project structural engineer based on the static and seismic design parameters described.

From geotechnical view point, load bearing footing should be reinforced using minimum 2-#4 rebar placed near the top and 2-#4 rebar near bottom of continuous footings.

Based on the laboratory determined soils consolidation characteristics, settlements to properly designed and constructed foundations supported exclusively into engineered fills of site soils or its equivalent or better, and carrying the maximum anticipated vertical structural loadings are expected to be within tolerable limits. Under static loading conditions over a 40-ft. span the estimated total and differential settlements are about 1 and 1/2-inch, respectively. Most of the elastic deformations, however, are expected to occur during construction.

It is recommended that excavated footing trenches should be verified, tested and certified by soils engineer prior to actual concrete placement. Soils Southwest. will assume no responsibility for any structural distress in event excavated footings are not verified prior to concrete placement.

5.2.1 Concrete Slab-on-Grade for Office Structure

The prepared subgrades to receive footings should be adequate for concrete slab-on-grade placement. For conventional loadings, structural slabs placed should be a minimum 4-inch thick, reinforced with #3 rebar at 18-inch o/c.

Within moisture sensitive areas concrete slabs should be underlain by 2-inch of clean sand, followed by commercially available 6-mil thick Stego Wrap or Visqueen or other similar commercially available vapor barrier, or as suggested by the project structural engineer. The sand used should be free of rock, with a minimum Sand Equivalent, SE of 30.

Subgrades to receive concrete should be moistened as would be expected in any such concrete placement. Use of low-slump concrete is recommended.

In addition, prior to surfacing, it is recommended that, utility trenches underlying concrete slabs and driveways, if any, should be thoroughly backfilled with gravelly sandy soils and mechanically compacted to minimum 90%.
No jetting should be allowed as a means for soil compaction within utility trenches.

5.3 Active Pressure and Passive Resistance

With compacted level backfills using local gravelly sandy soils equivalent active lateral fluid pressures of 30 pcf and 45 pcf may be considered for "unrestrained" and "restrained" structural conditions, respectively.

Resistance to lateral loads can be provided by friction acting at the base of foundation and by passive earth pressures. A coefficient of friction of 0.3 may be assumed with normal dead load forces for footings when established into compacted engineered fills.

For design, an allowable passive lateral earth resistance of 230 lb/ft2./ft depths may be assumed for sides of foundations poured against the grade as described above. Maximum passive earth resistance is recommended not to exceed 2300 lb/ft2.

The above values may be increased by 1/3 when designing for short duration wind or seismic forces. The above values are based on footings placed on compacted engineered fills. In the case where footing sides are formed, all backfill placed against the footings should be compacted to at least 90 percent of maximum dry density.

5.4 Shrinkage and Subsidence

With the presence of upper loose and compressible local soils as described; it is our opinion that such soils may be subjected to volume change during grading. In average, such volume change due to shrinkage is estimated to about 15 percent, or more.

Further volume change may be expected following removal of undetected buried utilities etc. Supplemental shrinkage is anticipated during preparation of the underlying natural soils prior to compacted fills placement. Such subsoil subsidence may be approximated to about 2.5-inch when conventional construction equipments are used.

5.5 Construction Consideration

5.5.1 Unsupported Excavation

Temporary construction excavations up to an approximate depth of 5 feet may be made without any lateral support. It is recommended that no surcharge loads such as construction equipment may be allowed within a line drawn upward at 45 degree from the toe of temporary excavations. Use of sloping for deep excavation may be considered where plan excavation dimensions are not constrained by any existing structure.

5.5.2 Supported Excavations

If vertical excavations exceeding 5 feet become warranted, for the excavation adjacent to existing development, such should be achieved using shoring to support side walls. Alternatively, excavations with a combination of sloping and vertical may be considered. Further recommendations on such will be supplied on request.

5.6 Utility Trench Backfill

Utility trench backfill below interior concrete slabs or within structural pad and beyond should be placed in accordance with the following recommendations:

- Trench backfill for wet and dry utilities should be placed in 6 to 8-inch thick lifts and mechanically compacted to minimum 90 percent. Jetting is not recommended.
- Exterior trenches along foundations or a toe of a slope extending below a 1:1 imaginary line projected from outside bottom edge of the footing or toe of the slope, should be compacted to 90 percent of the Maximum Dry Density for the soils used as backfill. All trench excavations should conform to the requirements and safety as specified by the Cal-Osha

5.7 Soil Caving

With the dry silty nature of the local soils, some caving may be expected. Temporary excavations in excess of 5 feet should be feasible at 2 to 1 (h:v) slope ration or flatter, and as per the construction guidelines provided by Cal-Osha.

5.8 Pre-Construction Meeting

It is suggested that no site clearance and grading should be commenced without the presence of a representative of this office. On-site pre-grading meeting should be arranged between the soils engineer and grading contractor. Over-night pre-moistening is recommended.

5.9 Seasonal Limitations

No fill shall be placed, spread or rolled during unfavorable weather conditions. Where the work is interrupted by heavy rains, fill operations shall not be resumed until moisture conditions are considered favorable by the soils engineer.

5.10 Observations and Testing During Construction

Recommendations provided are based on the assumption that structural footings and slab-on-grade be established exclusively into engineered fill of local sandy soils compacted to minimum 90%. Excavated footings and slab subgrades should be inspected, verified and certified by soils engineer prior to steel and concrete placement. Structural backfills discussed, should be placed under direct observations and testing by this facility.

Excess soils generated from footing excavations should be removed from pad areas and such should not be allowed on subgrades underlying concrete slab.

In event other geotechnical consultants are retained during grading, Soils Southwest, Inc. will not be held responsible for any distress that may occur during life-time use of the structures constructed.

5.11 Plan Review

No precise grading plans are available at this time for review. Precise grading plans, when prepared, should be available to verify applicability of the assumptions and the recommendations supplied. If during construction, conditions are observed different from those as presented, revised and/or supplemental recommendations will be required.

6.0 General Recommendations for Site Preparations and Grading

Site preparations and grading should involve over-excavation and replacement of local soils as structural fill compacted to the minimum relative compactions as described earlier.

Structural Backfill:

Local soils free of debris, large rocks and organic should be considered suitable for reuse as backfill. Loose soils, formwork and debris should be removed prior to backfilling retaining walls. On-site sand backfill should be placed and compacted in accordance with the recommended specifications provided below. Where space limitations do not allow conventional backfilling operations, special backfill materials and procedures may be required. Pea gravel or other select backfill can be used in limited space areas. Recommendations for placement and densification of pea gravel or other special backfill can be provided during construction.

Site Drainage:

Adequate positive drainage should be provided away from the structure to prevent water from ponding and to reduce percolation of water into backfill. A desirable slope for surface drainage is 2 percent in landscape areas and 1 percent in paved areas. Planters and landscaped areas adjacent to building perimeter should be designed to minimize water filtration into sub-soils. Considerations should be given to the use of closed planter bottoms, concrete slabs and perimeter sub-drains where applicable.

Utility Trenches:

Buried utility conduits should be bedded and backfilled around the conduit in accordance with the project specifications. Where conduit underlies concrete slab-on-grade and pavement, the remaining trench backfill above the pipes should be placed and compacted in accordance with the following grading specifications.

General Grading Recommendations:

Recommended general specifications for surface preparation to receive fill and compaction for structural and utility trench backfill and others are presented below.

1. Areas to be graded or paved, shall be grubbed, stripped and cleaned of all buried and undetected debris, structures, concrete, vegetation and other deleterious materials prior to grading.

2. Where compacted fill is to provide vertical support for foundations, all loose, soft and other incompetent soils should be removed to full depth as approved by soils engineer, or at least up to the depth as previously described in this report. The areas of such removal should extend at least 5 feet beyond the perimeter of exterior foundation limit or to the extent as approved by soils engineer during grading.

3. The recommended compaction for fill to support foundations and slab-on-grade is 95% of the maximum dry density at or near optimum moisture content. To minimize any potential differential settlement for foundations and slab-on-grade straddling over cut and fill, the cut portion should be over-excavated and replaced as compacted fill, compacted to the maximum dry density as described in this report.

4. All utility trenches within the building pad areas and beyond, should be backfilled with granular material and such should be compacted to at least 95% of the maximum density for the material used.

5. Compaction for all fill soils shall be determined relative to the maximum dry density as determined by ASTM D1557 compaction method. In-situ field density of compacted fill shall be determined by ASTM Standard D1556, or by other approved procedures.

6. Imported soils if required shall be clean, granular, non-expansive in nature as approved by soils engineer.

7. During grading, fill soils shall be placed as thin layers, thickness of which following compaction, shall not exceed 6 inches.

8. No rocks over six inches in diameter shall be permitted to use as a grading material without prior approval of soils engineer.

9. No jetting and/or water tampering be considered for backfill compaction for utility trenches without prior approval of the soils engineer. For such backfill, hand tampering with fill layers of 8 to 12 inches in thickness, or as approved by the soils engineer is recommended.

10. Any and all utility trenches at depth as well as cesspool and abandoned septic tank within building pad area and beyond, should either be completely excavated and removed from the site, or should be backfilled with gravel, slurry or by other material, as approved by soils engineer.

11. Any and all grading required for pavement, side-walk or other facilities to be used by general public, should be constructed under direct supervision of soils engineer or as required by the local public agency.

12. A site meeting should be held between the grading contractor and soils engineer prior to actual construction. Two days of notice will be required by soils engineer for such meeting.

7.0 WQMP-BMP Stormwater Disposal Design Water Infiltration Rate Using Porchet Method

Presented herewith are the preliminary results of soils infiltration testing performed for the planned storm water disposal design system proposed for the project site described. Considering the relatively homogenous silty sand during preliminary site explorations, no known changes are anticipated during site grading, however test results should be considered tentative given the potential for changes to site finish grade(s) or changes in soil conditions during grading.

Two (2) infiltration tests were performed at about 13 feet below the current grades as suggested by the project engineer within the approximate location of the proposed underground stormwater chamber as supplied by the project engineering proposed site plan using the standardized "falling-head" test converted using the Porchet Method to infiltration rate as per the guidelines in accordance with the Table 1, Infiltration Basin Option 2 of Appendix A of the Riverside County-Low Impact Development (LID) BMP design Handbook/ Approximate test locations are shown on Plate 1, attached.

The soils encountered consist in general of upper fine silty sands overlying silts with traces of clay along with trace deposits of white calcium deposits to the maximum 13 feet depth explored and proposed chamber bottom (P-1&P-2). For the purposes of determining the presence/or lack of presence of groundwater or any impermeable soils, soils encountered below thirteen (13) feet to maximum depth of twenty-six (26) feet consists, in general of, silty fine damp sands overlying very moist gravely coarse sands with pebbles and rock fragments, test boring (B-1),

No free groundwater was encountered. Descriptions of the soils encountered are provided in the Log of Borings, P-1, and P-2 attached.

Based on the field infiltration testing completed, it is our opinion that for the infiltration system design proposed at about 10 feet below grade, the average observed soils infiltration rate is 1.21 in/hr.

For design, it is suggested that, use of an appropriate factor of safety as determined by the design engineer should considered to the observed rate to account for long-term saturation, inconsistencies in subsoil conditions, potential for silting and lack of maintenance. The observed soils percolation rates are provided in Table7.4.1 in Section 7.4 of this report.

7.1 EXCAVATED TEST BORINGS

For BMP soil infiltration testing at the location as shown on the accompanying Plate 1, two (2) tests borings (P-1 and P-2) were made using a 8-inch diameter hollow-stem auger drilling rig, advanced to approximately 13 feet below the current grade as suggested the project engineer. Water used during infiltration percolation testing was supplied by using water jugs and a water tank.

7.2 METHODOLOGY AND TEST PROCEDURES:

EQUIPMENT SET-UP (POST EXCAVATION) PROCEDURES

Following test boring completion, each of the test holes were fitted with perforated pvc pipes backfilled with 2-inch thick crushed rock at the bottom to minimize potentials for scouring and caving. For testing, each test hole was initially filled using water supplied by water jugs.

Prior to actual testing, in order to determine test intervals, as per the Section 2.3 for deep percolation testing of the referenced handbook guideline, one to two consecutive readings were performed to determine if six (6) or more inches of water seeped in 25 minutes. Since 6 inches or more of water seeped away in less than 25 minutes for both P-1 and P-2, subsequent ten percolation testing were performed at 10-minute time intervals for at least the minimum one hour or until the rates were consistent.

Testing included water placement at about 10-11 feet below existing grade surface (inlet depth or 24 inches above infiltration system bottom).

The final 10-mfinute recorded percolation test rate was converted into an Infiltration Rate (I_t) for inches per hour using the "Porchet Method" equation as described in the Reference 2, Riverside County Low Impact Development BMP Design Handbook.

7.3 INFILTRATION TEST RESULT

Based on the soils infiltration testing completed at the test locations and at the test depth as described, the observed soil percolation rates are 1.21"/hr for the test locations P-1 and P-2 respectively.

Calculations to convert the percolation test rate to infiltration test rates in accordance with Section 2.3 of the County Handbook are presented in Table I and II below. For design, it is suggested that, use of a factor of safety of 2.0 to 3.0, or an appropriate Factor of Safety as selected by the design engineer should be considered to the observed field percolation rate described.

7.3.1. Conversion Calculations & Summary:

TABLE I
Conversion Table (Porchet Method)

Test No.	*Depth Test Hole (inches)*	*Time Interval*	*Initial Depth (inch)*	*Final Depth (inch)*	*Initial Water Height (inch)*	*Final Water Height (inch)*	*Change Height/ Time*	*Average Head Height/Time*
	D_T	ΔT (Min)	D_o (in)	D_f (in)	$H_o=D_t-D_o$	$H_f=D_t-D_f$	$\Delta H= H_f-H_O$	$H_{avg} = (H_o+H_f)/2$
P-1	145	10	121	123.5	24.0	21.5	2.5	22.75
P-2	143	10	119	121.5	24.0	21.5	2.5	22.75

	Infiltration Rate (It)=ΔH60r/Δt(r+2Havg)		
	A	B	C
Test No.	ΔH60r	Δt(r+2Havg)	A/B=in/hr
P-1	600	495	1.21
P-2	600	495	1.21

TABLE II

For WQMP-BMP design, based on the soils infiltration testing completed and on the calculations as described, the following infiltration rates may be considered. Actual field test data are attached.

Observed Infiltration Rate for Design

Test Date Test No. (6-10-2020)	Relative Site Location	Test Depth (ft.) Below Grade	Observed Rate (inch/hour.) Field	Observed Rate (inch/hour) Porchet Method
P-1	West	12.08	2.5	1.21
P-2	East	11.92	2.5	1.21

Average observed infiltration rate: 1.21 in/hr.

Use of safety factor should be considered to account for long-term saturation, inconsistencies in subsoil conditions, along with the potential for silting of percolating soils.

The infiltration rate described is based on the in-situ testing completed at the locations as suggested by the project civil engineer. In event the final chamber location and depth vary considerably from those as described herein, supplemental soils infiltration testing may be warranted.

It should be noted that over prolong use and lack of maintenance the detention/infiltration basins or deep chambers constructed based on the suggested design rate may experience much lower infiltration rate due to the accumulation of silts, fines, oils and others. Regular maintenance of the chambers in form of removal of debris, oil and fines are strongly recommended. A maintenance record of such is suggested for future use, if any.

Suggested Site Requirements for Stormwater BMP installation

The invert of stormwater infiltration shall be at least 10 feet above the groundwater elevation. Stormwater infiltration BMPs shall not be placed on steep slopes and shall not create the condition or potential for slopes instability.

Stormwater infiltration shall not increase the potential for static or seismic settlement of structures on or its adjacent.

Stormwater infiltration shall not place an increased surcharge on structures or foundations on or its adjacent. The pore-water pressure shall not be increased on soil retaining structures on or adjacent to the site.

The invert of stormwater infiltration shall be set back at least 15 feet, and outside a 1:1 plan drawn up from the bottom of adjacent foundations.

Stormwater infiltration shall not be located near utility lines where the introduction of stormwater could cause damage to utilities or settlement of trench backfill.

Stormwater infiltration is not allowed within 100 feet of any potable groundwater production well.

Once installed, regular maintenance of the detention basin is recommended.

8.0 Closure

The conclusions and recommendations presented are based on the findings and observations as made during subsurface test explorations. In absence of site-specific grading plan, finished floor grades are assumed at or near grade existing surface. The recommendations included should be considered "preliminary" and thus may require supplemental investigations including additional borings, laboratory testing and engineering evaluations. If during construction, the subsoil conditions appear to be different from those as described, this office should be notified to consider modification of the geotechnical recommendations included in this report.

Recommendations provided are based on assumptions that structural loadings will be established exclusively into compacted fills of local gravelly sandy soils or its equivalent or better. No footings and/or load bearing paved surface should be allowed straddling over cut/fill transition interface.

Final grading and foundation plans should be reviewed by this office when they become available. As the project Geotechnical Consultant, Soils Southwest, Inc. should be provided with the opportunity to verify footing excavations and slab subgrades prior to steel and concrete placement. Soils Southwest, Inc. will assume no responsibility in event concrete is poured without the required verifications described.

A pre-grading meeting between grading contractor and soils engineer is recommended prior to construction preferably at the site, to discuss the grading procedures to be implemented and other requirements described in this report to be fulfilled.

This report has been prepared exclusively for the use of the addressee for the project referenced in the context. It shall not be transferred or be used by other parties without a written consent by Soils Southwest, Inc. We cannot be responsible for use of this report by others without the necessary inspection and testing by our personnel.

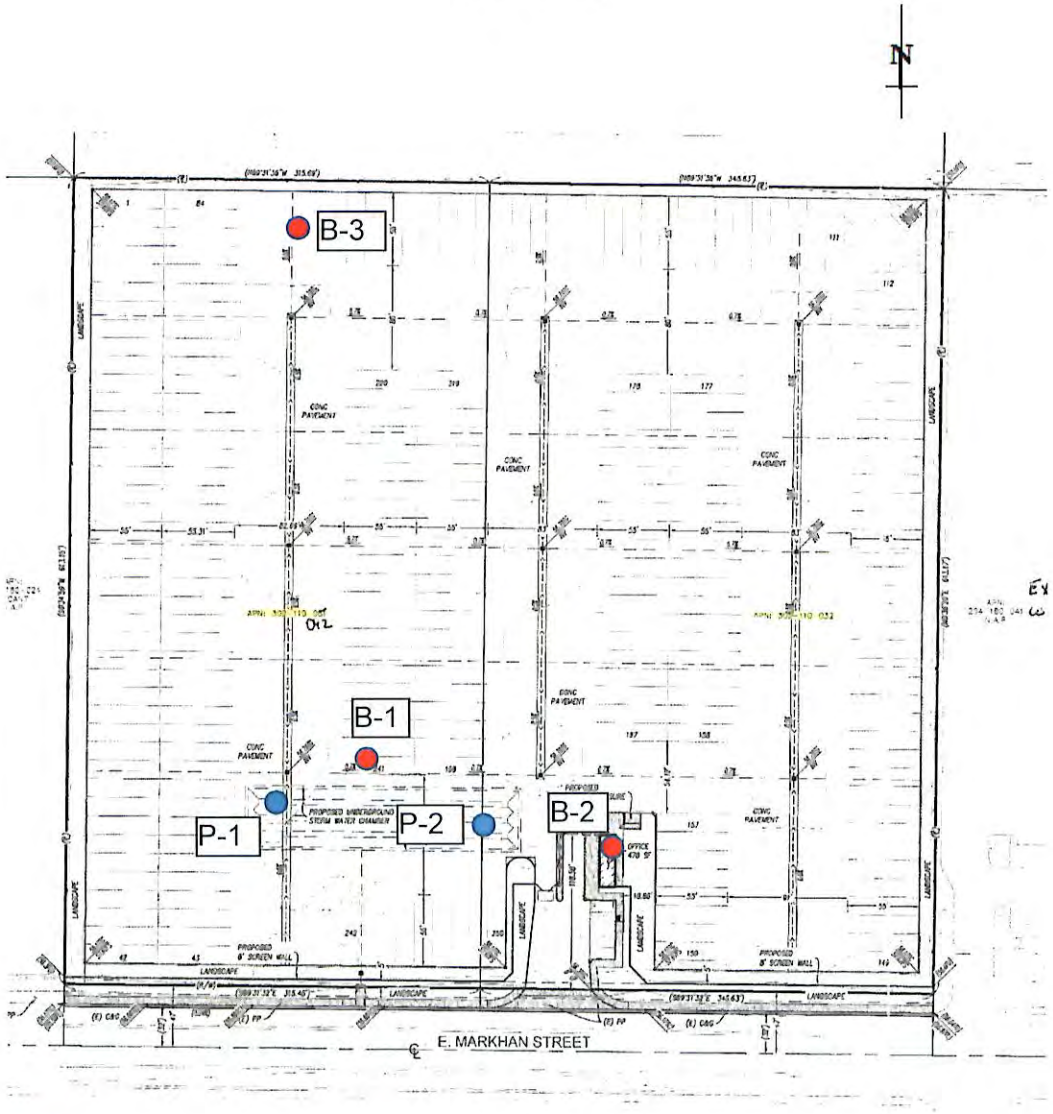
Should the project be delayed beyond one year after the date of this report; the recommendations presented shall be reviewed to consider any possible change in site conditions.

The recommendations presented are based on the assumption that the geotechnical observations and testing required for the project shall be performed by a representative of Soils Southwest, Inc.

The field observations are considered as a continuation of the geotechnical investigation performed. If another firm is retained for geotechnical observations and testing, our professional liability and responsibility shall be limited to the extent that Soils Southwest, Inc. would not be the geotechnical engineer of record. A letter of Transfer of Responsibility shall be supplied by the new geotechnical engineer clearly describing Soils Southwest, Inc. as 'harmless and non-responsible" for any distress that may occur to the structure during life-time use.

PLOT PLAN AND TEST LOCATIONS
Proposed Minor Office Structure
Planned Truck Parking/Truck Storage Facility
North side, E. Markham Street, Perris, California
A.P.N. (s) 302-110-032 & 042

(Not to Scale)



Legend:
- B-1 Approximate Location of Exploratory Test Borings
- P-1 Approximate Location of WQMP-BMP Infiltration Test Borings

Plate 1

9.0 APPENDIX A

Field Explorations

For geotechnical evaluations field evaluations included three (3) exploratory test borings (B-1 to B-3) along with two (2) infiltration test borings (P-1 & P-2) using a limited access hollow-stem auger drilling rig advanced to maximum 26 feet below existing the grade surface. Approximate test exploration locations are shown on attached Plate 1.

Soils encountered during explorations were logged and such were classified by visual observations in accordance with the generally accepted classification system. The field descriptions were modified, where appropriate, to reflect laboratory test results.

In addition to undisturbed soils sampling during test borings, within areas of excavated test pits portable nuclear gauge is used for determining relative soil density and moisture content (ASTM D2261). The bulk and undisturbed soil samples procured were sent to our laboratory for geotechnical analyses as described in the attached Log of Boring.

Logs of test explorations are presented in the following summary sheets that include the description of the soils and/or fill materials encountered.

LOG OF BORING

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LOG OF BORING BMP-1

Project: Truck Terminal Properties/Bobby Nassir		**Job No.:** 20016-F/BMP
Logged By: John F.	**Boring Diam.:** 8" HSA	**Date:** June 4,2020

Standard Penetration (Blows per Ft.)	Sample Type	Water Content in %	Dry Density in PCF	Percent Compaction	Unified Classification System	Graphic	Depth in Feet	Description and Remarks
					SM			WEST SIDE knee-high weeds and scattered debris SAND - light gray-brown, silty, fine, dry
							5	
					ML			SILT - color change to light gray, soft, powdery, dry
							10	
					SM-ML			- color change to light greenish gray, scattered rock fragments, damp
							15	- End of infiltration test boring @ 13.0 ft. - no bedrock - no groundwater - 3" PVC pipe installed with gravel at bottom
							20	
							25	
							30	

Groundwater: n/a **Approx. Depth of Bedrock:** n/a **Datum:** n/a **Elevation:** n/a	**Site Location** Proposed Tractor Trailer Parking Facility 114. E. Marham Street Perris, California	**Plate #**