APPENDIX F2
WATER QUALITY MANAGEMENT PLAN

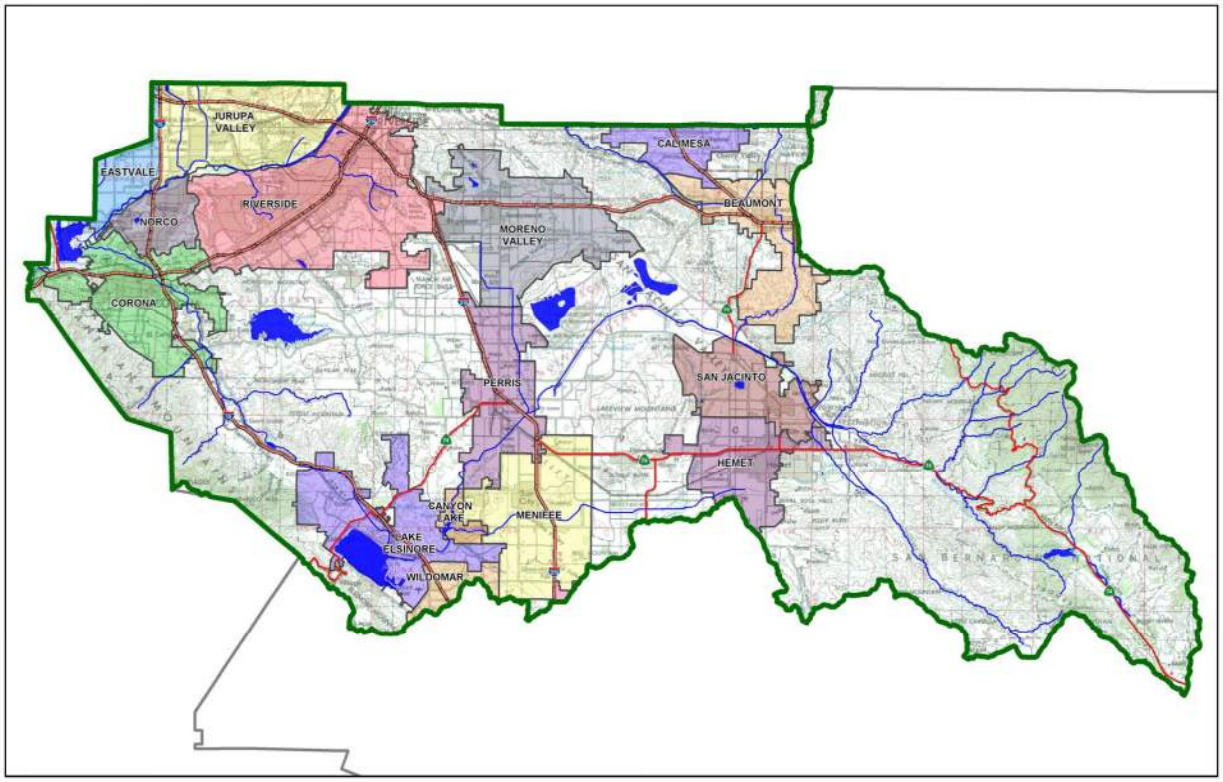
Project Specific Water Quality Management Plan

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

Project Title: LDW Menifee

Development No: TTM 38346

Design Review/Case No: DEV2022-002



☒ **Preliminary**
☐ **Final**

Original Date Prepared: December 16, 2021

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

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OWNER'S CERTIFICATION

This Project-Specific Water Quality Management Plan (WQMP) has been prepared for LDW Rancon, LP by Adkan Engineers for TTM 38346.

This WQMP is intended to comply with the requirements of City of Menifee Water Quality Ordinance #2012-1021 (Municipal Code Chapter 15.01) 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 Menifee Water Quality Ordinance #2012-1021 (Municipal Code Chapter 15.01).

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

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

PREPARER'S CERTIFICATION

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

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

Preparer's Licensure:

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Section A: Project and Site Information

PROJECT INFORMATION	
Type of Project:	High Density Residential
Planning Area:	Sun City / Menifee
Community Name:	Romoland
Development Name:	TTM 38346
PROJECT LOCATION	
Latitude & Longitude (DMS): 33.729763, 117.155203	
Project Watershed and Sub-Watershed: San Jacinto River Reach 3	
APN(s): 331-250-028, 331-250-029, 331-250-030	
Map Book and Page No.: Thomas Brothers Maps Page 838, Grid G3	
PROJECT CHARACTERISTICS	
Proposed or Potential Land Use(s)	High Density Residential
Proposed or Potential SIC Code(s)	1522
Area of Impervious Project Footprint (SF)	295,645 SF
Total Area of proposed Impervious Surfaces within the Project Limits (SF)/or Replacement	330,243 SF
Does the project consist of offsite road improvements?	☒ Y ☐ N
Does the project propose to construct unpaved roads?	☐ Y ☒ N
Is the project part of a larger common plan of development (phased project)?	☐ Y ☒ N
EXISTING SITE CHARACTERISTICS	
Total area of existing Impervious Surfaces within the project limits (SF)	3,343 SF
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)	A
What is the Water Quality Design Storm Depth for the project?	0.63

A.1 Maps and Site Plans

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

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

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

A.2 Identify Receiving Waters

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

Table A.1 Identification of Receiving Waters

Receiving Waters	Hydrologic Unit	EPA Approved 303(d) List Impairments	Designated Beneficial Uses	Proximity to RARE Beneficial Use
San Jacinto River Reach 3	802.11	Pathogens, Nutrients	MUN, AGR, GWR, REC1, REC2, WARM, WILD	5.2 miles
Canyon Lake (Railroad Canyon Reservoir)	802.11	Pathogens, Nutrients	MUN, AGR, GWR, REC1, REC2, WARM, WILD	11.3 miles
Lake Elsinore	802.31	Nutrients, Organic Enrichment/Low Dissolved Oxygen	MUN, REC1, REC2, WARM, WILD	15.8 miles

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 Menifee 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)

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 existing drainage pattern for the site flows west and all onsite and offsite flows will flow to the west onsite for treatment and then will be conveyed into an existing Flood Control Master Drainage Facility near the intersection of Rouse Road and Palomar Road via existing storm drain in Rouse Road at the southwest corner of the project site.

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

No, existing natural vegetation will not be protected. All vegetation will be removed and the entire site will be graded. Site will be re-landscaped after grading to satisfy City standards.

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

Natural infiltration rates were tested and found to be suitable for use of an infiltration basin to treat runoff. The proposed design collects runoff from impervious areas and conveys them to the southwest corner of the project site where they will flow into perforated underground CMP storage chambers that will facilitate infiltration via a gravel layer surrounding the chambers.

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

Yes, while the proposed site is high density residential and requires a significant portion of the site to be impervious, other impervious areas such as sidewalks were limited to only those required to meet design requirements in order to maximize pervious areas to the maximum extent possible.

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

Yes, site runoff will be treated using infiltration located at the southwest corner of the project site. The proposed CMP chambers are designed to hold all first flush flows to allow for infiltration, while larger storms will be outleted via a controlled orifice in the detention chamber system. Placement of the outlet orifice will allow infiltration of some flows from the larger storms while controlling the outlet to insure flows leaving the system do not exceed the capacity of the existing storm drain system adjacent to the project site.

Section C: Delineate Drainage Management Areas (DMAs)

Table C.1 DMA Classifications

DMA Name or ID	Surface Type(s)[1]	Area (Sq. Ft.)	DMA Type
D.1	Natural Soil	52,658	C
D.2	Impervious Surface	298,393	C

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

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

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

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

Self-Retaining Area				**Type 'C' DMAs that are draining to the Self-Retaining Area**		
DMA Name/ ID	Post-project surface type	Area (square feet) [A]	Storm Depth (inches) [B]	DMA Name / ID	[C] from Table C.4 = [C]	Required Retention Depth (inches) [D]

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

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

DMA					Receiving Self-Retaining DMA		
DMA Name/ ID	Area (square feet)	Post-project surface type	Runoff factor	Product		Area (square feet)	Ratio
	[A]		[B]	[C] = [A] x [B]	DMA name /ID	[D]	[C]/[D]

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

DMA Name or ID	BMP Name or ID
D.1	D.3- underground CMP
D.2	D.3- underground CMP

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

Section D: Implement LID BMPs

D.1 Infiltration Applicability

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

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

Geotechnical Report

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

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

Infiltration Feasibility

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

Table D.1 Infiltration Feasibility

Does the project site…	YES	NO
…have any DMAs with a seasonal high groundwater mark shallower than 10 feet?		X
If Yes, list affected DMAs:		
…have any DMAs located within 100 feet of a water supply well?		X
If Yes, list affected DMAs:		
…have any areas identified by the geotechnical report as posing a public safety risk where infiltration of stormwater could have a negative impact?		X
If Yes, list affected DMAs:		
…have measured in-situ infiltration rates of less than 1.6 inches / hour?		X
If Yes, list affected DMAs:		
…have significant cut and/or fill conditions that would preclude in-situ testing of infiltration rates at the final infiltration surface?		X
If Yes, list affected DMAs:		
…geotechnical report identify other site-specific factors that would preclude effective and safe infiltration?		X
Describe here:		

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

D.2 Harvest and Use Assessment

Please check what applies*:*

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

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

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

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

Irrigation Use Feasibility

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

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

Total Area of Irrigated Landscape: N/A

Type of Landscaping (Conservation Design or Active Turf): N/A

Step 2: Identify the planned total of all impervious areas on the proposed project from which runoff might be feasibly captured and stored for 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: N/A

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: N/A

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: N/A

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)
N/A	N/A

Toilet Use Feasibility

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

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

Projected Number of Daily Toilet Users: N/A

Project Type: N/A

Step 2: Identify the planned total of all impervious areas on the proposed project from which runoff might be feasibly captured and stored for 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: N/A

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: N/A

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: N/A

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)
N/A	N/A

Other Non-Potable Use Feasibility

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

N/A

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

Average Daily Demand: N/A

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

Total Area of Impervious Surfaces: N/A

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

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

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

Minimum required use: N/A

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

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

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

D.3 Bioretention and Biotreatment Assessment

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

Select one of the following:

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

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

D.4 Feasibility Assessment Summaries

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

Table D.2 LID Prioritization Summary Matrix

DMA Name/ID	LID BMP Hierarchy				No LID (Alternative Compliance)
	1. Infiltration	2. Harvest and use	3. Bioretention	4. Biotreatment	
D.1	☒	☐	☐	☐	☐
D.2	☒	☐	☐	☐	☐
	☐	☐	☐	☐	☐
	☐	☐	☐	☐	☐
	☐	☐	☐	☐	☐
	☐	☐	☐	☐	☐

D.5 LID BMP Sizing

Table D.3 DCV Calculations for LID BMPs

DMA Type/ID	DMA Area (square feet)	Post-Project Surface Type	Effective Impervious Fraction, I_f	DMA Runoff Factor	DMA Areas x Runoff Factor	*Enter BMP Name / Identifier Here*		
	[A]		[B]	[C]	[A] x [C]			
D.1	*52,658*	*Ornamental Landscaping*	*0.1*	*0.11*	*5,816.5*	*Design Storm Depth (in)*	*Design Capture Volume, V_{BMP} (cubic feet)*	*Proposed Volume on Plans (cubic feet)*
D.2	*298,393*	*Concrete or Asphalt*	*1*	*0.89*	*266,166.6*			
	A_T = 351,051				Σ= 271,983.1	0.63	14,279.1	***20,081.6***

[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.

Section F: Hydromodification

F.1 Hydrologic Conditions of Concern (HCOC) Analysis

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			
Volume (Cubic Feet)			

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

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

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

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

All runoff from this site drains to a Flood Control Master Drainage Facility (Line A-2) that is designed to capture the runoff from this site. All flows leaving this site are controlled by an orifice design limits Qs to within allowable capacity for existing tributary storm drain at Southwest corner of site.

See Appendix 7 for routing calculations to demonstrate Qs are controlled to within allowable capacity.

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.

☐ d. None of the above.

Section G: Source Control BMPs

Table G.1 Permanent and Operational Source Control Measures

Potential Sources of Runoff pollutants	Permanent Structural Source Control BMPs	Operational Source Control BMPs
Onsite Storm Drain Inlets	• Mark all drains with the words, "Only Rain Down the Storm Drain" or similar.	• Maintain and periodically repaint or replace inlet markings. • Provide stormwater pollution prevention information to new site owners, lessees, or operators. • 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."
Landscape/Outdoor Pesticide Use	• Design landscaping to minimize irrigation and runoff, to promote surface infiltration where appropriate, and to minimize the use of fertilizers or pesticides that contribute to stormwater pollution. • Consider using pest-resistant plants, especially adjacent to hardscape. • 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 BMP educational materials. • Provide IPM information to new owners, lessees, and operators.
Pools, spas, ponds, decorative fountains, and other water features		• See applicable operational BMP educational materials.
Refuse areas	• Signs shall be posted on or near dumpsters with the words "Do no dump hazardous materials here" or similar.	• 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.
Fire Sprinkler Test Water	• Provide a means to drain fire sprinkler test water to the sanitary sewer.	• See note in Fact Sheet SC-41, "Building and Grounds Maintenance," in the CASQA Stormwater Quality Handbooks
Roofing, Gutters, and Trim	• Avoid roofing, gutters, and trim made of copper or other unprotected metals that may leach into runoff.	
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

Table H.1 Construction Plan Cross-reference

BMP No. or ID	BMP Identifier and Description	Latitude/Longitude
D.3	Infiltration via Underground CMPs and gravel layer	33°43'45.1''N 117°9'27.5''W

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: HOA

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

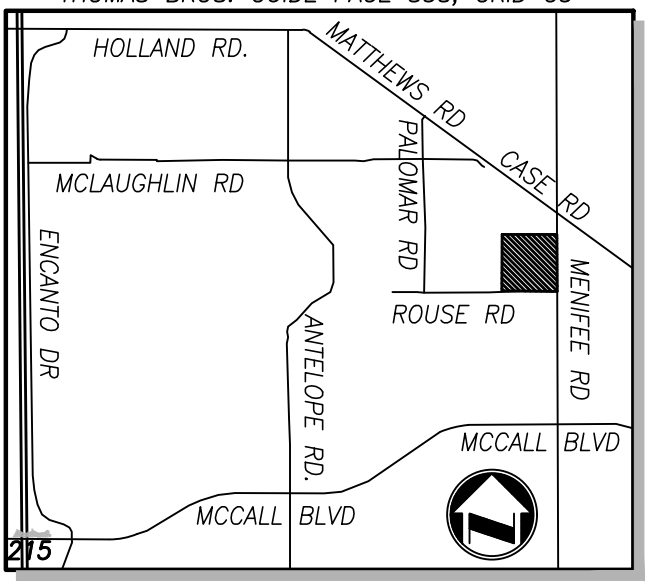
☒ Y ☐ N

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

THOMAS BROS. GUIDE PAGE 838, GRID G3

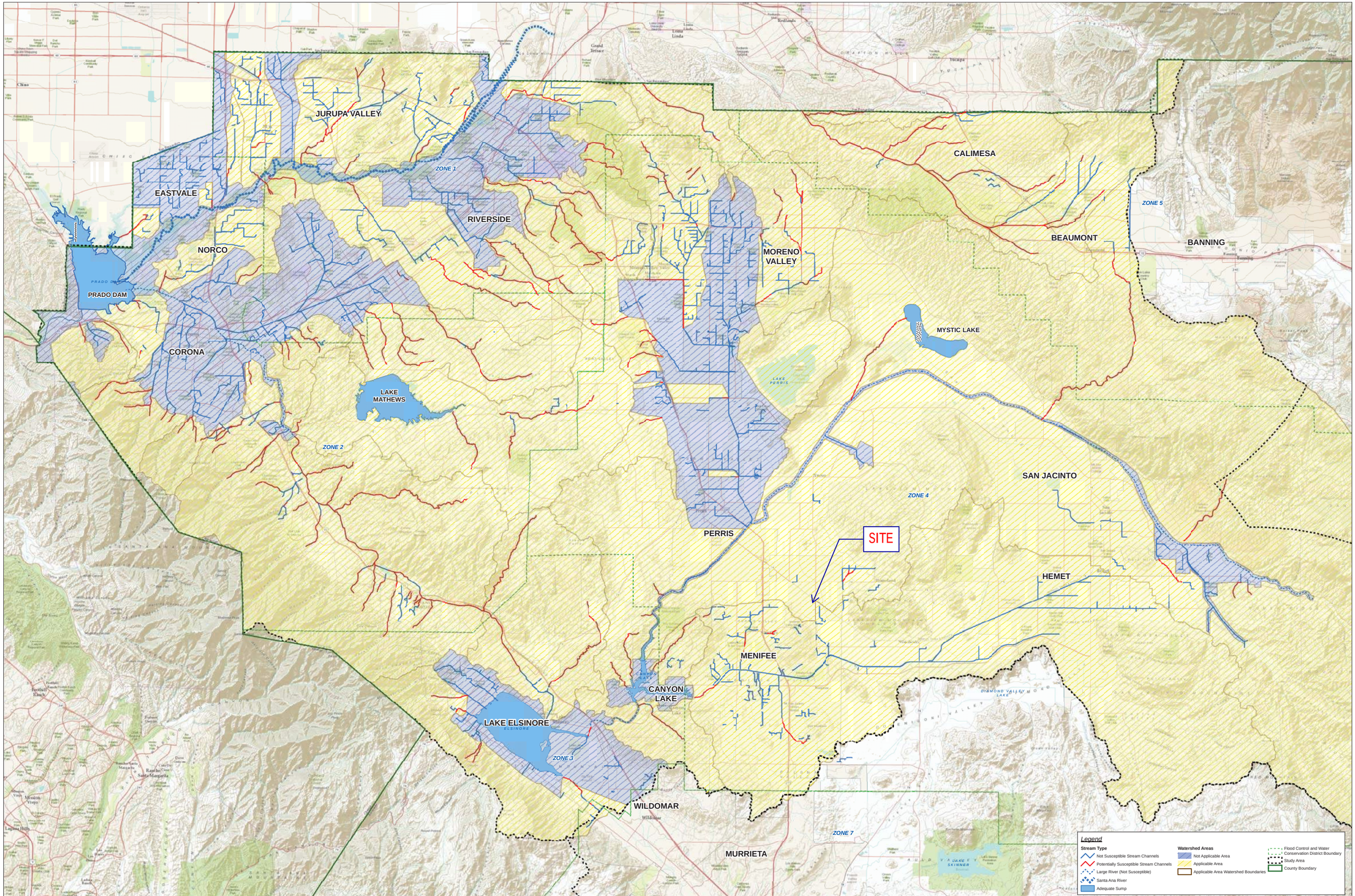


VICINITY MAP

N.T.S.

T5SR3W SEC 14 S

Valley Substation
Menifee Rd
Biscayne
Whited Cemetery Services
Palomar Rd
Forterra
B P John Recycling
Menifee Rd
Matthews Rd
Palomar Rd
Case Rd
Palomar Rd
SITE
Norwex Independent Consultant - Michelle...
Matthews Rd
Rouse Rd
Simple Media
ZUULT Corporation
Menifee Rd
Hideout Ct
Eldon Ct
W Heritage Lake Dr
Heritage Lake Dr
Mesa View
Boulder Ridge Elementary
Heritage Park, Valley-Wide Recreation and
McCall Blvd
McCall Blvd
Google Earth



HCOC Applicability Map

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

Map 2

R 07 W | R 06 W | R 05 W | R 04 W | R 03 W | R 02 W | R 01 W | R 01 E | R 02 E | R 03 E | R 04 E | R 05 E

T 01 S
T 02 S
T 03 S
T 04 S
T 05 S
T 06 S
T 07 S
T 08 S

06	05	04	03	02	01
07	08	09	10	11	12
18	17	16	15	14	13
19	20	21	22	23	24
30	29	28	27	26	25
31	32	33	34	35	36

0.85 MiraLoma
0.61 Riverside North
0.68 PigeonPass
0.54 RiversideSouth
0.66 MorenoEast
0.85 Beaumont
0.88 PradoDam
0.51 Woodcrest
0.50 LakeMathews
0.68 PerrisReservoir
0.87 VistaGrandeGS
0.70 SanJacintoNWS
1.18 Idyllwild
0.58 SunCity
0.68 Winchester
0.90 HurkeyCreek
0.70 ElsinoreNWS
1.11 ElCarisoStation
0.77 WildomarLaCresta
0.52 SkinnerLake
0.65 Anza
0.77 SantaRosaPlateau
1.00 TemeculaNWS
0.64 AguangaValley

PROJECT SITE=0.63

Santa Ana River Watershed
Santa Margarita Watershed

JURUPA VALLEY | EASTVALE | NORCO | CORONA | RIVERSIDE | MORENO VALLEY | CALIMESA | BEAUMONT | SAN JACINTO | PERRIS | HEMET | CANYON LAKE | LAKE ELSINORE | MENIFEE | WILDOMAR | MURRIETA | TEMECULA

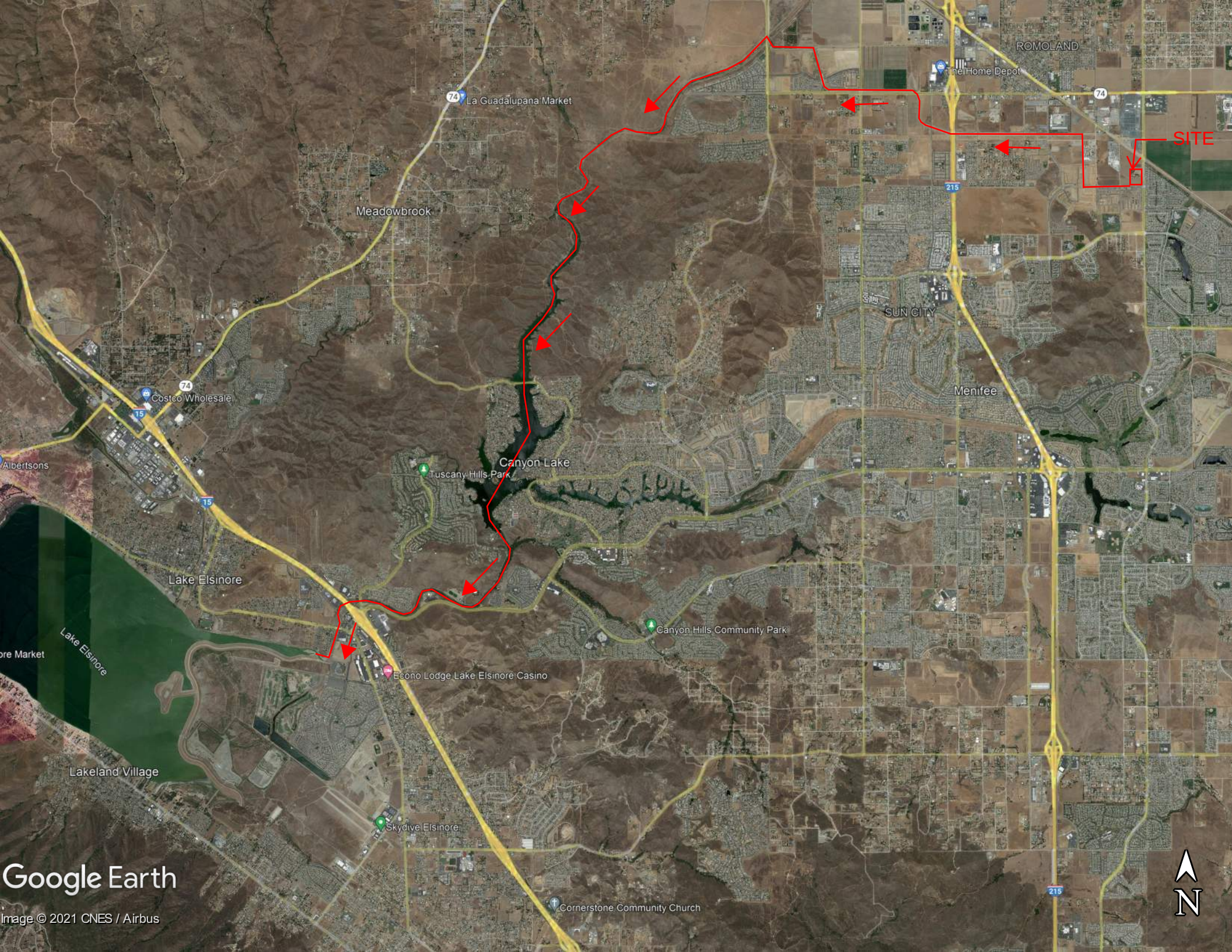
N

Rain Gage Locations

RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT

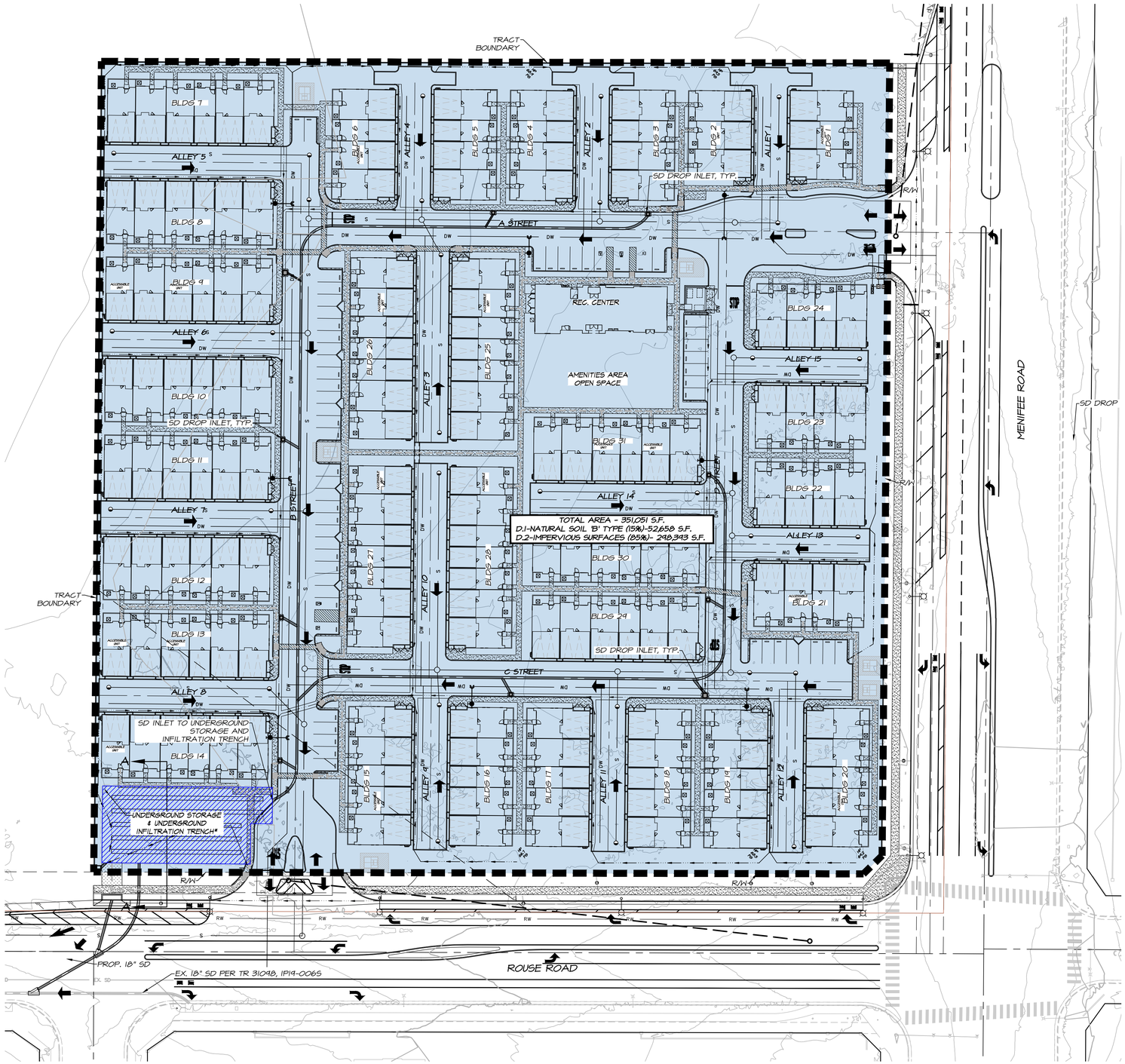
Isohyetal Map for the 85th Percentile 24 hour Storm Event

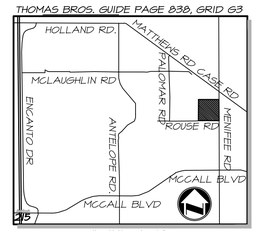
July 2011


SITE
ROMOLAND
The Home Depot
La Guadalupana Market
Meadowbrook
SUN CITY
Menifee
Costco Wholesale
Albertsons
Canyon Lake
Tuscany Hills Park
Lake Elsinore
Canyon Hills Community Park
Econo Lodge Lake Elsinore Casino
Lakeland Village
Skydive Elsinore
Cornerstone Community Church
Google Earth
Image © 2021 CNES / Airbus
N

IN THE CITY OF MENIFEE, COUNTY OF RIVERSIDE, CA

BMP MAP
TRACT 38346





VICINITY MAP

T5SR3W SEC 14 S

OWNER
LDH RANCON, LP
41391 KALMIA STREET, SUITE 200
MURRIETA, CA 92562

APPLICANT
FOREMOST PACIFIC GROUP
21271 LAS RAMBLAS, SUITE 100
MISSION VIEJO, CA 92691
949-748-6714

ENGINEER
adkan ENGINEERS
6879 AIRPORT DRIVE
RIVERSIDE, CA. 92504
951-688-0241

ASSESSORS PARCEL NUMBER
331-250-028
331-250-029
331-250-030

SITE STATISTICS

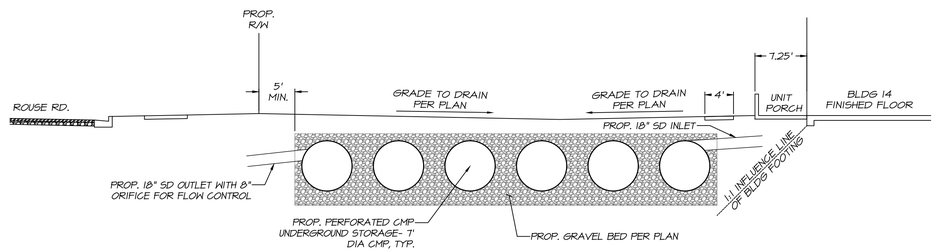
GROSS AREA:	9.54 AC
NET AREA:	8.06 AC
TOTAL UNITS:	162
DENSITY:	20.1 DUA
PARKING REQUIRED:	333
PARKING PROVIDED:	350

BMP DATA DMA 1

DMA CLASSIFICATION	NAME	AREA (SF)
D.1	NATURAL SOIL (15%)	52,658
D.2	IMPERVIOUS SURFACE (85%)	298,393
TOTAL AREA		351,051

LEGEND

- DMA BOUNDARY
- D.1 AREAS THAT DRAIN TO BMPS
- PROP. STORM DRAIN
- SURFACE DRAINAGE PATH
- CONCRETE GUTTER
- SD DROP INLET
- LIMITS OF UNDERGROUND INFILTRATION TRENCH & UNDERGROUND STORAGE CHAMBERS



CMP UNDERGROUND STORAGE & INFILTRATION TRENCH* SECTION A-A

SCALE: 1"=10'

***UNDERGROUND STORAGE AND UNDERGROUND INFILTRATION TRENCH NOTE:**

THE PROPOSED UNDERGROUND, PERFORATED CMP CHAMBERS ARE DESIGNED TO HOLD ALL FIRST FLUSH FLOWS TO ALLOW FOR INFILTRATION (INFILTRATION TRENCH CALCULATIONS), WHILE LARGER STORMS WILL OUTLET VIA A CONTROLLED ORIFICE IN THE DETENTION CHAMBER SYSTEM (STORAGE/MITIGATION). PLACEMENT OF THE OUTLET ORIFICE WILL ALLOW INFILTRATION OF SOME FLOWS FROM THE LARGER STORMS WHILE CONTROLLING THE OUTLET TO ENSURE FLOWS LEAVING THE SYSTEM DO NOT EXCEED THE CAPACITY OF THE EXISTING STORM DRAIN SYSTEM ADJACENT TO THE PROJECT SITE.

0 20 40 80 120 160

SCALE: 1" = 40'

TRACT 38346 BMP MAP
PREPARATION DATE: OCTOBER 2022

REVISIONS	
DELTA	DESCRIPTION

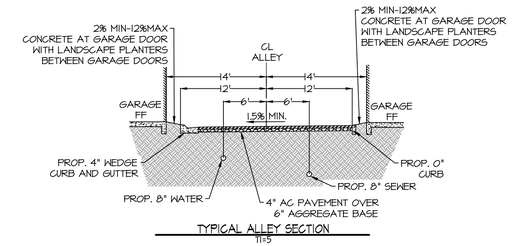
PLANS PREPARED BY:
adkan ENGINEERS
Civil Engineering · Surveying Planning
6879 Airport Drive, Riverside, CA 92504
Tel:(951) 688-0241 Fax:(951) 688-0599

Appendix 2: Construction Plans

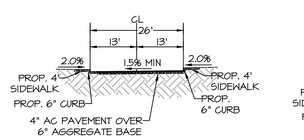
Grading and Drainage Plans

IN THE CITY OF MENIFEE, COUNTY OF RIVERSIDE, STATE OF CALIFORNIA

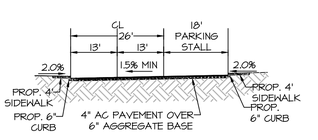
LDW
CONCEPTUAL GRADING



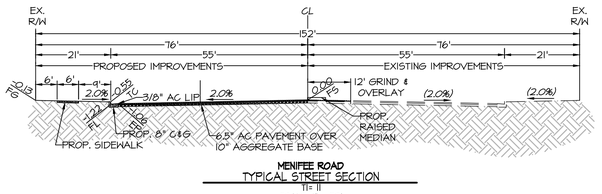
TYPICAL ALLEY SECTION
TI=5
SCALE: 1" = 10'



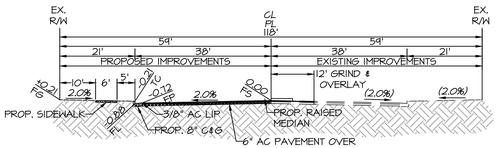
A, B, C, & D STREETS
TYPICAL STREET SECTION (W/O PARKING)
TI=5
SCALE: 1" = 20'



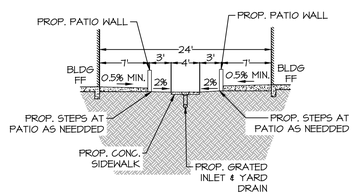
A, B, C, & D STREETS
TYPICAL STREET SECTION (W/ PARKING)
TI=5
SCALE: 1" = 20'



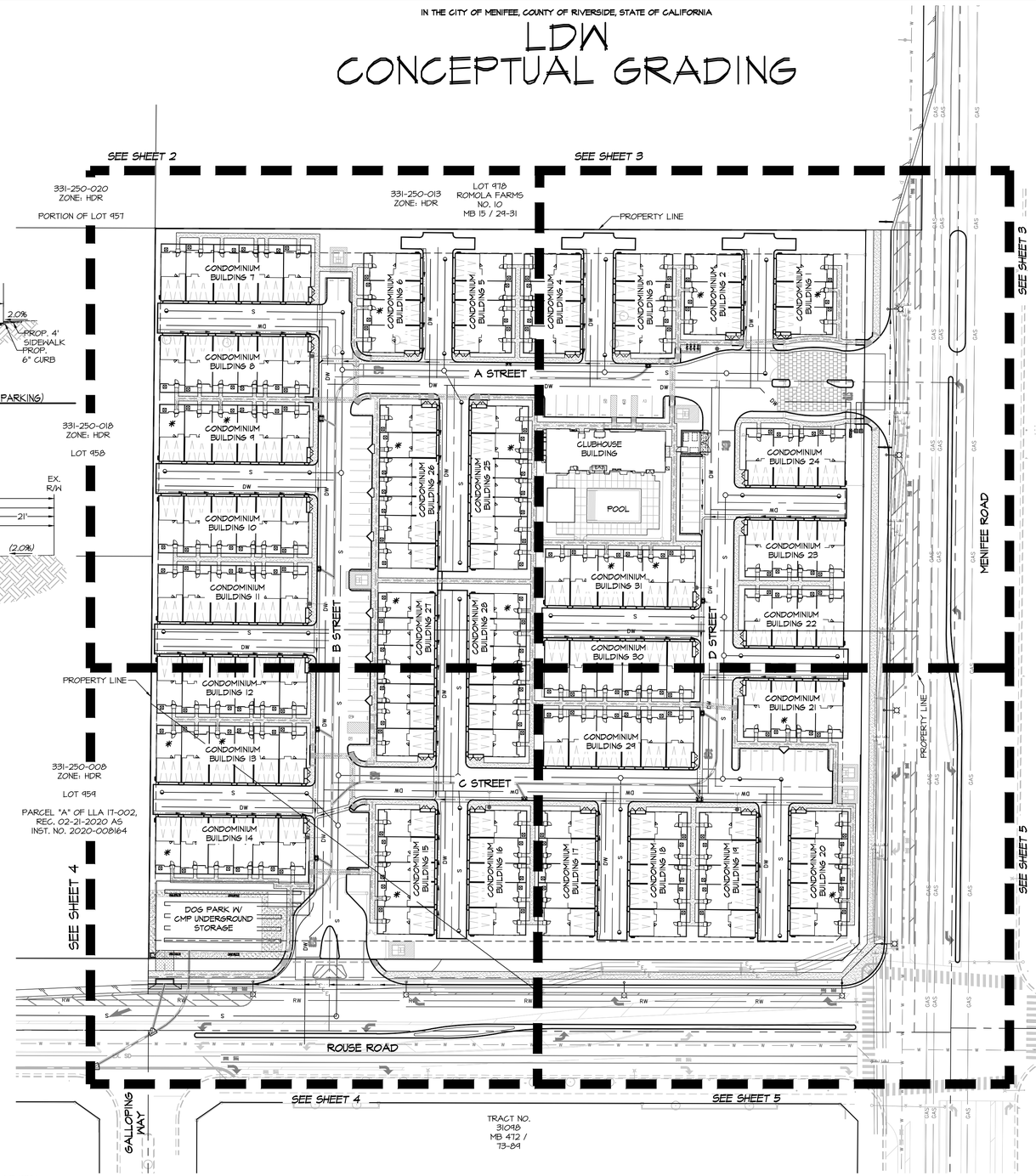
MENIFEE ROAD
TYPICAL STREET SECTION
TI= II
SCALE: 1" = 20'



ROUSE ROAD
TYPICAL STREET SECTION
TI=10
SCALE: 1" = 20'



TYPICAL PASEO SECTION
SCALE: 1" = 10'



LEGEND

- PROPERTY BOUNDARY
- PROPOSED CURB & GUTTER
- PROPOSED CROSS GUTTER
- LOT LINE
- MAJOR CONTOUR
- MINOR CONTOUR
- FLOW LINE
- CENTERLINE
- PROP WATER
- PROP SEWER
- PROP STORM DRAIN
- ADA PATH OF TRAVEL
- PROP. WATER
- PROP SEWER
- TOE OF SLOPE
- ACCESSIBLE UNIT
- PROP. AC UNIT

R/W = RIGHT OF WAY
P/L = PROPERTY LINE
RW = RETAINING WALL
EXIST. = EXISTING
PROP.= PROPOSED
C&G = CURB AND GUTTER
H = HANDICAP ACCESSIBLE PARKING
C = COMPACT PARKING STALL
SD = STORM DRAIN
TC = TOP OF CURB
FS = FINISH SURFACE
SWR = SEWER
CL = CENTER LINE
FG = FINISHED GROUND
WTR= WATER
E/P = EDGE OF PAVEMENT
PIP = PROTECTED IN PLACE
PP = POWER POLE
S/W = SIDEWALK
FS = FINISH SURFACE
FL = FLOWLINE

0 50 150
25 100 200
SCALE: 1" = 50'

OWNER
LDW RANCON, LP
41341 KALMIA STREET, SUITE 200
MURRIETA, CA 92562

ENGINEER
adkan ENGINEERS
6879 AIRPORT DRIVE
RIVERSIDE, CA. 92504
951-688-0241

APPLICANT
FOREMOST COMPANIES
27271 LAS RAMBLAS, #100
MISSION VIEJO, CA 92691

ASSESSORS PARCEL NUMBERS
331-250-028, 331-250-024, 331-250-030

ZONING/LAND USE
EXIST ZONE: HIGH DENSITY RESIDENTIAL
PROP ZONE: HIGH DENSITY RESIDENTIAL
EXIST LAND USE: 20.1-24 RESIDENTIAL
PROP LAND USE: 20.1-24 RESIDENTIAL

EARTHWORK
CUT: 2,121 CY FILL: 16,811 CY
UNDERGROUND STORAGE: 2,000 CY CUT
NET: 12,690 CY FILL
THE QUANTITY SHOWN ABOVE IS FOR DISCUSSION PURPOSES ONLY.

UTILITY PURVEYORS
SEWER: EASTERN MUNICIPAL WATER DISTRICT
WATER: EASTERN MUNICIPAL WATER DISTRICT
ELECTRIC: SOUTHERN CALIFORNIA EDISON
PHONE/CABLE: FRONTIER COMMUNICATIONS
GAS: SOUTHERN CALIFORNIA GAS COMPANY
SCHOOL DISTRICT: ROMOLAND & PERRIS UNION HIGH

PROJECT DATA
PROJECT AREA:
GROSS ACRES: 9.54
LOT A ⊄ B: 1.49 ACRES PUBLIC R/W
BASIN: 0.18 ACRES
PRIVATE ROAD: 1.02 ACRES
NET ACRES: 6.85
CALCULATION PER PLANNING AND ZONING DEVELOPMENT CODE CHAPTER 9.305: THE PORTION OF A SITE NOT RESERVED FOR PUBLIC USE, THE FOLLOWING ARE NOT INCLUDED IN THE NET ACREAGE OF A SITE: PUBLIC OR PRIVATE ROAD RIGHTS-OFWAY, COMMON OR PUBLIC OPEN SPACE, AND FLOODWAYS.
DWELLING UNITS PER ACRES: 23.65
CONDOMINIUM DATA

PLAN	SQ. FT.	LAYOUT	GARAGE	PRIVATE OS	# OF UNITS
1	917	1 BR	1 CAR	100 SF	37
2	1,204	2 BR	2 CAR	141 SF	63
3	1,316	3 BR	2 CAR	140 SF	62
TOTAL UNITS					162
ADA UNITS PROVIDED					17

PARKING COUNT:
GARAGE PARKING SPACES: 287
STANDARD STALLS: 65
ACCESSIBLE STALLS: 4
ELECTRIC VEHICLE STALLS: 1
TOTAL PARKING PROVIDED: 357

REQUIRED PARKING:
1 BR: 1 SPACE x 37 UNITS = 37 SPACES
2 BR: 1.5 SPACES x 63 UNITS = 94.5 SPACES
3 BR: 2.5 SPACES x 62 UNITS = 155 SPACES
GUEST PARKING: 1 SPACE/10 UNITS = 16.2 SPACES
TOTAL PARKING REQUIRED: 302.7

PROJECT NOTES:
1. THIS TENTATIVE MAP INCLUDES THE ENTIRE CONTIGUOUS OWNERSHIP OF THE LAND DIVIDER.
2. PER PRELIMINARY GEOTECHNICAL EVALUATION, POTENTIAL FOR LIQUEFACTION IS LOW AND SITE IS NOT LOCATED WITHIN A FAULT ZONE OR ON A FAULT LINE.

LEGAL DESCRIPTION
THE LEGAL DESCRIPTION AND SCHEDULE B EXCEPTIONS ARE REFERENCED TO A PRELIMINARY REPORT PREPARED BY FIRST AMERICAN TITLE COMPANY ORDER NO. 6551248-A, DATED DECEMBER 14, 2021.

REAL PROPERTY IN THE CITY OF MENIFEE, COUNTY OF RIVERSIDE, STATE OF CALIFORNIA, DESCRIBED AS FOLLOWS:

PARCEL 1: (APN: PORTIONS OF 331-250-028-0 AND 331-250-030)

PARCEL "B" DESCRIBED ON EXHIBIT "A" AND SHOWN ON EXHIBIT "B" OF LOT LINE ADJUSTMENT NO. LLA 17-002 RECORDED FEBRUARY 21, 2020 AS INSTRUMENT NO. 2020-0081364, OF OFFICIAL RECORDS, DESCRIBED AS FOLLOWS:

BEING A PORTION OF PARCEL 1 OF MERGER 18-001, A CERTIFIED COPY OF WHICH RECORDED FEBRUARY 21, 2020 AS INSTRUMENT NO. 2020-0080310 OF OFFICIAL RECORDS, TOGETHER WITH LOT 916 OF ROMOLA FARMS NO. 10, IN THE CITY OF MENIFEE, COUNTY OF RIVERSIDE, STATE OF CALIFORNIA, AS FILED IN BOOK 15, PAGES 29 THROUGH 31, INCLUSIVE OF MAPS, IN THE OFFICE OF THE COUNTY RECORDER OF SAID COUNTY, TOGETHER WITH THAT PORTION OF LOT "C" (ROUSE ROAD) ADJOINING SAID LOT AS SAID ROAD WAS VACATED AND ABANDONED BY RESOLUTION OF THE BOARD OF SUPERVISORS OF THE COUNTY OF RIVERSIDE, A CERTIFIED COPY OF WHICH RECORDED FEBRUARY 6, 1962 AS INSTRUMENT NO. 11656 OF OFFICIAL RECORDS, IN SECTION 14, TOWNSHIP 5 SOUTH, RANGE 3 WEST, SAN BERNARDINO BASE AND MERIDIAN, MORE PARTICULARLY DESCRIBED AS FOLLOWS:

BEGINNING AT THE INTERSECT OF SAID ROUSE ROAD (60 FEET WIDE PER MAP BOOK 15, PAGES 29-31) AND JUNIPERO ROAD (60 FEET WIDE PER MAP BOOK 15, PAGES 29-31);

THENCE ALONG SAID CENTERLINE OF ROUSE, NORTH 84°58'32" EAST, 660.23, SAID POINT BEING THE TRUE POINT OF BEGINNING;

THENCE NORTH 00°21'27" EAST, 330.06 FEET TO THE NORTHWEST CORNER OF LOT 916;

THENCE ALONG THE NORTHERLY LINE OF LOT 916, NORTH 84°58'57" EAST, 630.22 FEET TO A POINT ON THE WESTERLY RIGHT-OF-WAY LINE OF MENIFEE ROAD (60 FEET WIDE PER MAP BOOK 15, PAGES 29-31);

THENCE ALONG SAID WESTERLY RIGHT-OF-WAY LINE OF MENIFEE ROAD SOUTH 00°21'27" WEST, 329.98 FEET TO A POINT ON THE CENTERLINE OF ROUSE ROAD;

THENCE ALONG THE CENTERLINE OF ROUSE ROAD, SOUTH 84°58'32" WEST, 630.22, TO THE TRUE POINT OF BEGINNING.

PARCEL 2: (APN: PORTION OF 331-250-029)

LOT 917, OF ROMOLA FARMS NO. 10, IN THE CITY OF MENIFEE, COUNTY OF RIVERSIDE, STATE OF CALIFORNIA, AS FILED IN BOOK 15, PAGES 29 THROUGH 31, INCLUSIVE OF MAPS, IN THE OFFICE OF THE COUNTY RECORDER OF SAID COUNTY.

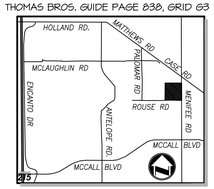
ENGINEERS NOTES
1. PROPOSED BUILDINGS WILL HAVE STEPS FROM DWELLING AREA TO GARAGE AS NEEDED TO MEET GRADES ALONG PROPOSED DRIVE AISLES AND ALLEYWAYS
2. PROPOSED BUILDINGS WILL HAVE STEPS AT FRONT PORCHES AS REQUIRED TO MEET GRADE
3. PROJECT PROPOSES A PRIMARY ENTRY WITH LEFT IN, RIGHT IN, RIGHT OUT AND A SECONDARY ENTRY WITH RIGHT IN, RIGHT OUT ONLY
4. WATER QUALITY TREATMENT ONSITE TO OCCUR USING INFILTRATION VIA UNDERGROUND DETENTION CHAMBERS AND A GRAVEL BED LAYER
5. ADA PATH OF TRAVEL LONGITUDINAL GRADE NOT TO EXCEED 4.9% AND CROSSFALL NOT TO EXCEED 1.9%

BENCHMARK
1-3/8" BRASS DISK STAMPED "MWD BM DVR 23 1991" SET IN WINGWALL. LOCATED 260 FEET SOUTH OF OLIVE AVE., AND 40 FEET EAST OF WINCHESTER ROAD.

ELEV = 1469.76' DATUM: NAVD88

BASIS OF BEARINGS
THE CENTERLINE OF ROUSE ROAD BEING NORTH OF 84°51'18" WEST PER TRACT NO. 31098, FILED IN BOOK 412 OF MAPS, AT PAGES 73 THROUGH 84, INCLUSIVE, RECORDS OF RIVERSIDE COUNTY, WAS HELD AS THE BASIS OF BEARINGS FOR THIS MAP.

THOMAS BROS. GUIDE PAGE 838, GRID G3



VICINITY MAP
T5SR3W SEC 14 S

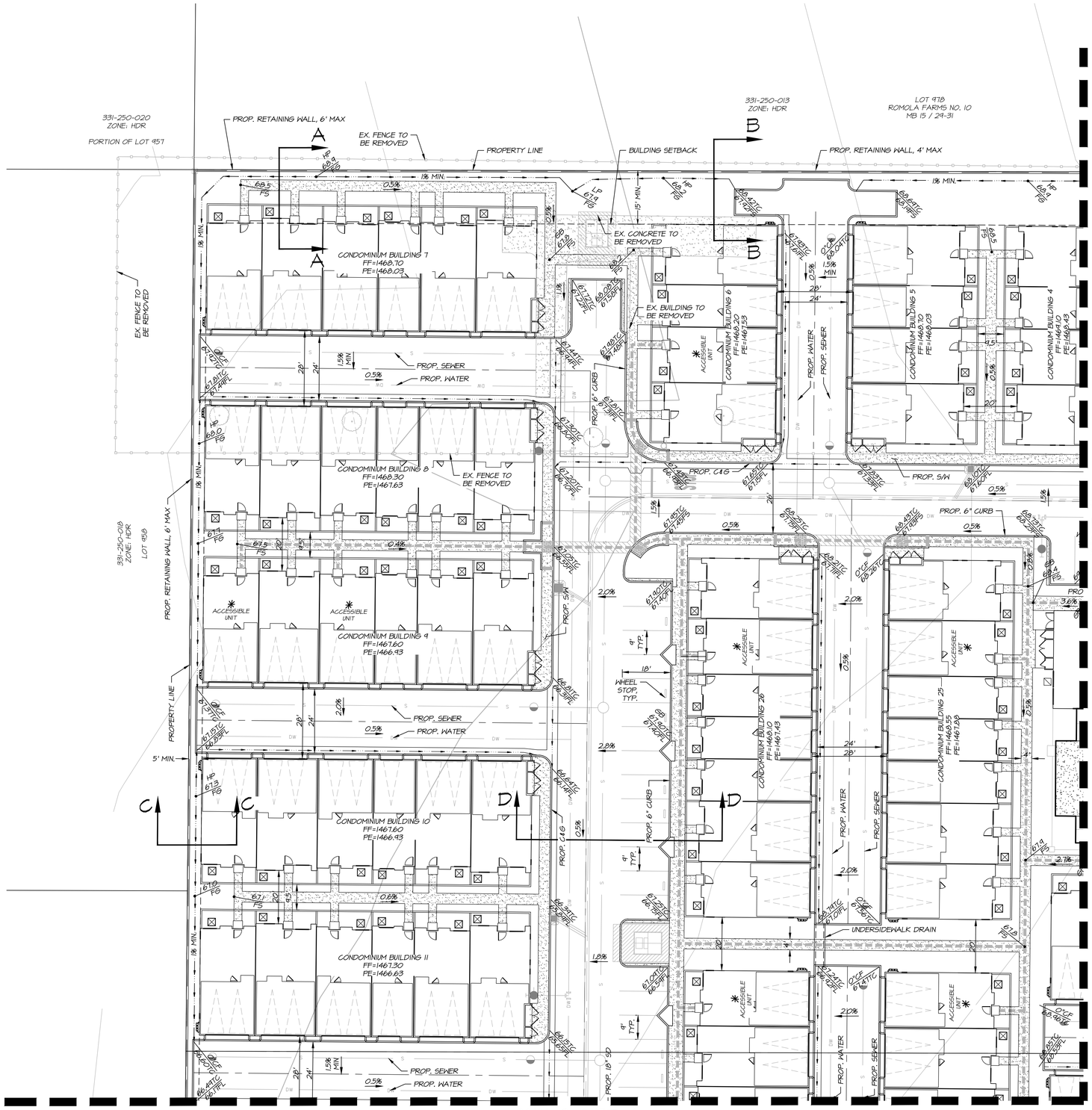
REVISIONS		
DELTA	DESCRIPTION	

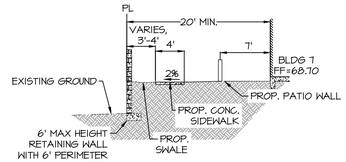
LDW
CONCEPTUAL GRADING
PREPARATION DATE: DECEMBER 2021
REVISION DATE: OCTOBER 2022

adkan ENGINEERS
Civil Engineering • Surveying • Planning
6879 Airport Drive, Riverside, CA 92504
Tel:(951) 688-0241 • Fax:(951) 688-0599

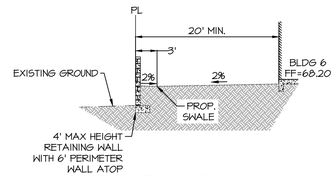
U:\PROJECTS\FOREMOST COMMUNITIES\0082\ENGINEERING\CONCEPTUAL GRADE\0082_CGOLDWG

PLOT DATE: 9/30/2022 3:45 PM

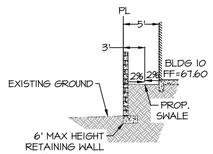




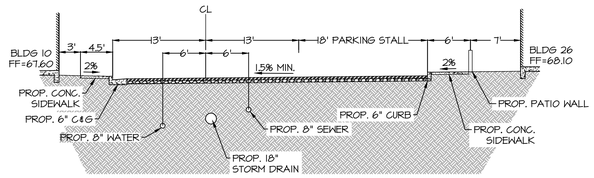
CROSS SECTION A-A
SCALE: 1" = 10'



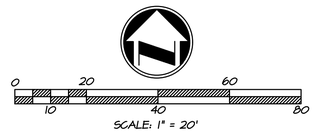
CROSS SECTION B-B
SCALE: 1" = 10'



CROSS SECTION C-C
SCALE: 1" = 10'



CROSS SECTION D-D
SCALE: 1" = 10'



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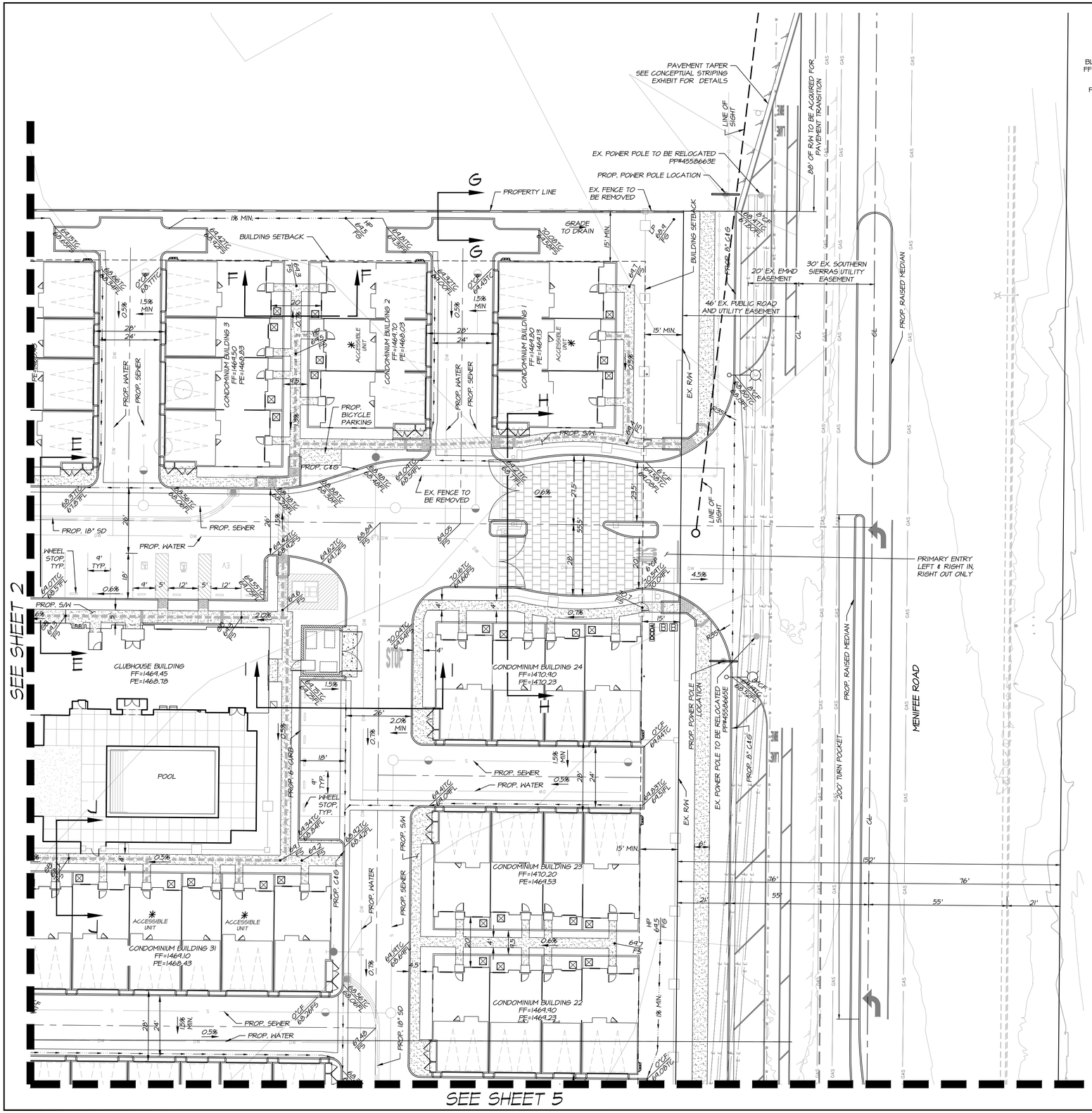

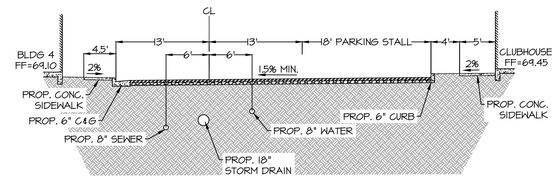

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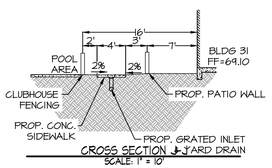

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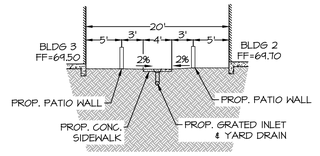

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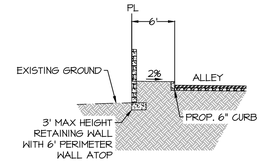

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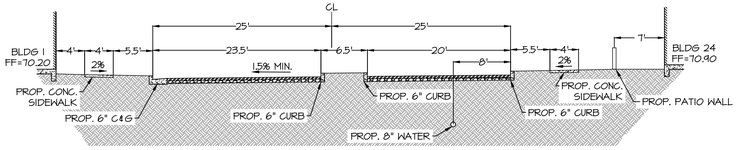

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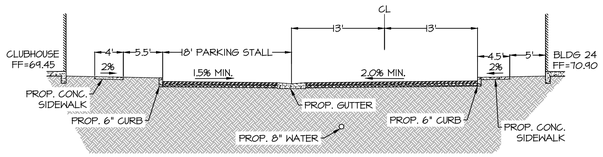

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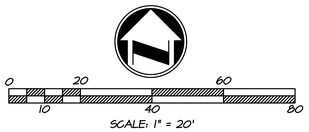

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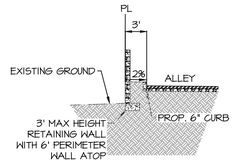
SEE SHEET 2

SEE SHEET 5

331-250-029
ZONE: HDR
LOT 169
PARCEL "A" OF LLA 17-002,
REC. 02-21-2020 AS
INST. NO. 2020-0031164

PROP. RETAINING WALL, 3' MAX
BUILDING SETBACK
5' MIN.
PROPERTY LINE
18' MIN.
END OF PROP. FULL WIDTH STREET IMPROVEMENTS
LANE DROP TAPER SEE CONCEPTUAL STRIPING EXHIBIT FOR DETAILS
CL INTERSECTION STA. 93+40.21 ROUSE RD STA. 11+99.87 GALLOPING WAY PER IP19-0065
GALLOPING WAY
ROUSE ROAD
CONDOMINIUM BUILDING 12 FF=1466.90 PE=1466.23
CONDOMINIUM BUILDING 13 FF=1466.30 PE=1465.63
CONDOMINIUM BUILDING 14 FF=1466.30 PE=1465.63
CONDOMINIUM BUILDING 15 FF=1466.80 PE=1465.93
CONDOMINIUM BUILDING 16 FF=1467.40 PE=1466.13
CONDOMINIUM BUILDING 21 FF=1467.30 PE=1466.63
CONDOMINIUM BUILDING 20 FF=1467.75 PE=1467.08
ACCESSIBLE UNIT
OPEN SPACE
PROP. CMP UNDERGROUND INFILTRATION TRENCH & STORAGE
TOP ELEV=1462.00
BOT ELEV=1455.00
54.67 INV @ 8" ORIFICE
54.25 18" INV
PROP. WATER
PROP. SEWER
PROP. S/W
PROP. C&G
PROP. 6" CURB
PROP. 18" SD
GRADEBREAK
PROP. 8" C&G
PROP. 12" RECYCLED WATER
PROP. 8" SEWER
PROP. RAISED MEDIAN
EX. 8" LOW FLOW STORM DRAIN
EX. 18" STORM DRAIN
EX. POWER POLE TO BE REMOVED AND UNDERGROUNDED PP#3164912E
EX. POWER POLE TO BE REMOVED AND UNDERGROUNDED PP#3164941E
LINE OF SIGHT
SECONDARY ENTRY RIGHT IN, RIGHT OUT ONLY
EX. R/W
30' EX. SOUTHERN SIERRAS UTILITY EASEMENT
54' EX. PUBLIC ROAD AND UTILITY EASEMENT
44' EX. SOCAL EDISON UTILITY EASEMENT
TRACT NO. 31098
MB 472 / 73-89



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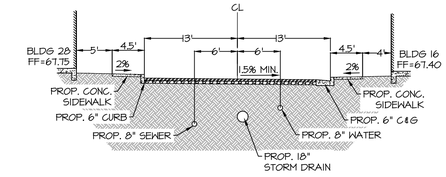

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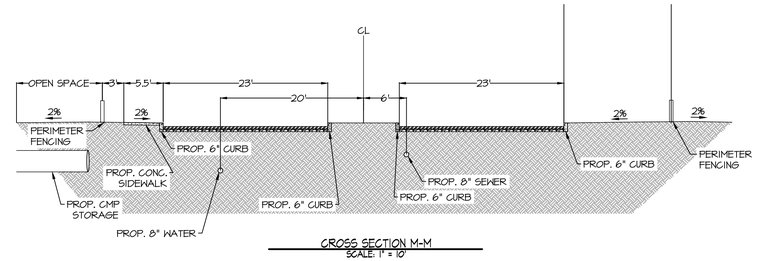

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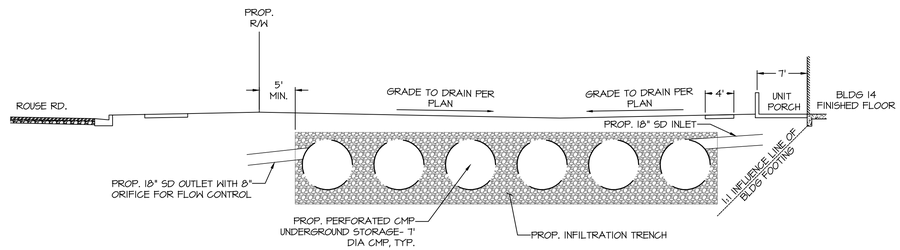

CROSS SECTION Q-Q
SCALE: 1" = 10'

NOTE: PER WQMP DESIGN, LOW FLOWS ONSITE TO INFILTRATE IN OPEN SPACE AREA VIA PERFORATED CMP, WITH HIGH FLOWS TO LEAVE SITE VIA STORM DRAIN OUTLET SHOWN HERE.

0 20 60
10 40 80
SCALE: 1" = 20'

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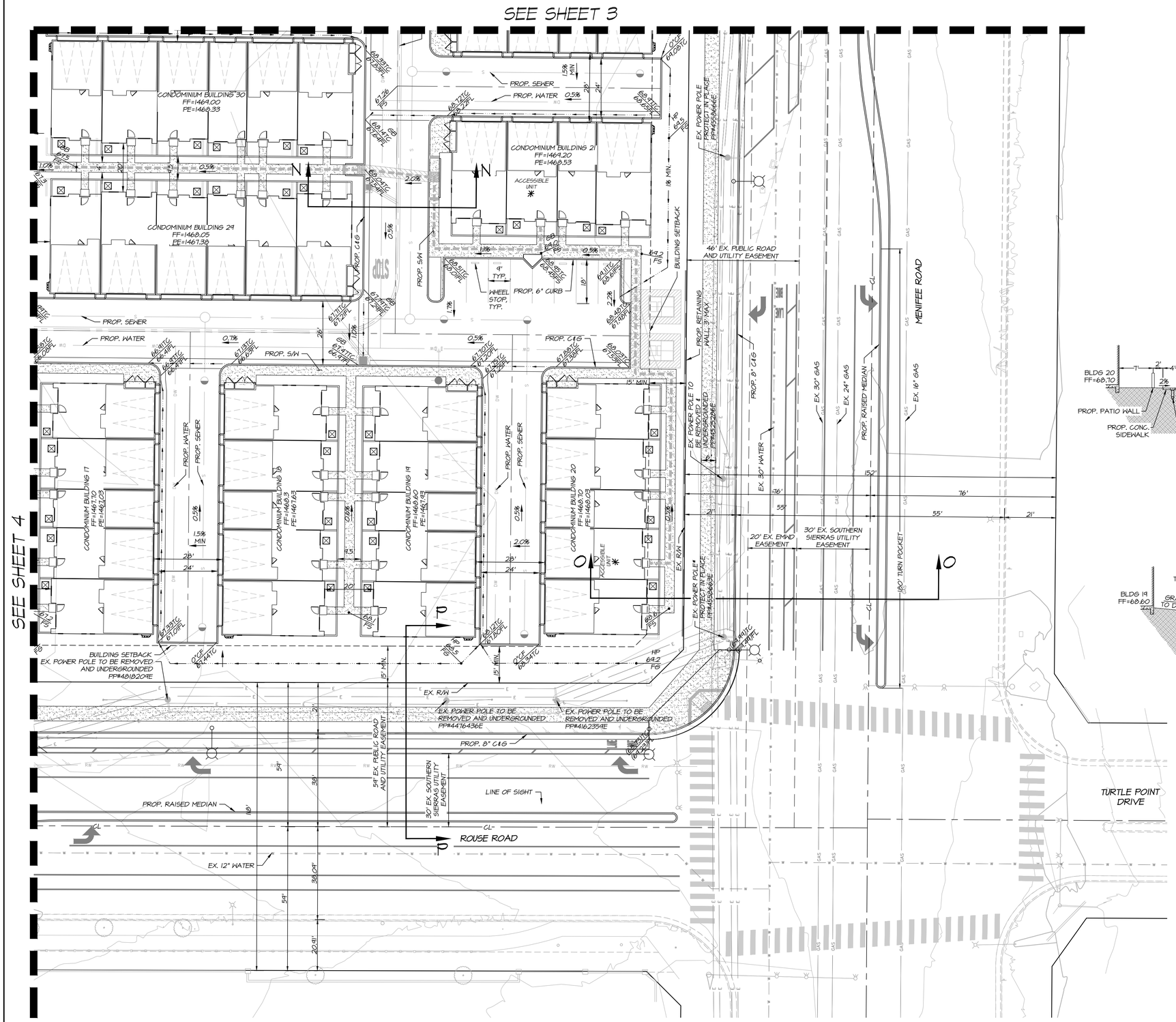

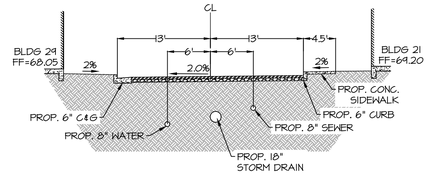

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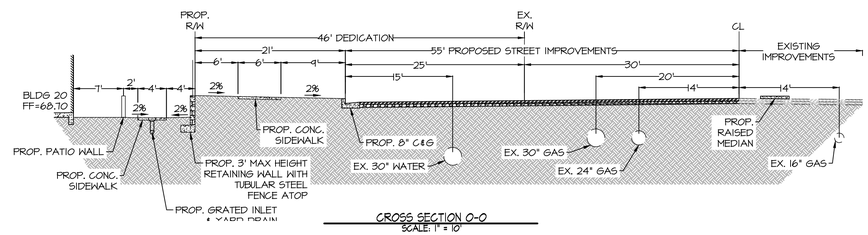

CROSS SECTION O-O
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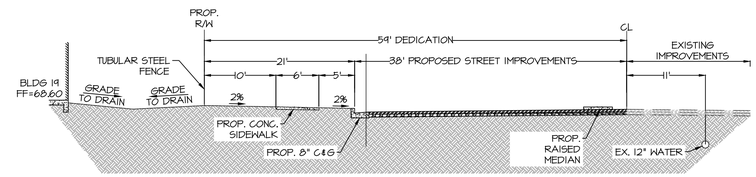

CROSS SECTION P-P
SCALE: 1" = 10'

0 10 20 40 60 80
SCALE: 1" = 20'

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Appendix 3: Soils Information

Geotechnical Study and Other Infiltration Testing Data

PRELIMINARY GEOTECHNICAL EVALUATION AND PERCOLATION/INFILTRATION FEASIBILITY TESTING, PROPOSED MULTI-FAMILY RESIDENTIAL DEVELOPMENT (LDW MENIFEE PROJECT) ±8.0-ACRE SITE, NWC OF ROUSE ROAD AND MENIFEE ROAD, CITY OF MENIFEE RIVERSIDE COUNTY, CALIFORNIA

GeoSoils, Inc.

FOR

FOREMOST PACIFIC GROUP, LLC
27271 LAS RAMBLES, SUITE 100
MISSION VIEJO, CALIFORNIA 92691

W.O. 8129-A-SC JULY 26, 2021

GeoSoils, Inc.

Geotechnical • Geologic • Coastal • Environmental

18451 Collier Avenue, Suite A • Lake Elsinore, California 92530 • (951) 677-9651 • FAX (951) 677-9301 • www.geosoilsinc.com

July 26, 2021

W.O. 8129-A-SC

Foremost Pacific Group, LLC
27271 Las Rambles, Suite 100
Mission Viejo, California 92691

Attention: Mr. Danny Molnar

Subject: Preliminary Geotechnical Evaluation and Percolation/Infiltration Feasibility Testing, Proposed Multi-Family Residential Development (LDW Menifee Project), ±8.0-Acre Site, NWC of Rouse Road and Menifee Road, City of Menifee, Riverside County, California

Dear Mr. Molnar:

In accordance with your request and authorization, GeoSoils, Inc. (GSI) is presenting the results of our preliminary geotechnical evaluation and percolation/infiltration feasibility testing for the proposed LDW Menifee project located on the NWC of Rouse Road and Menifee Road in the City of Menifee, Riverside County, California. The primary purpose of this study was to evaluate the onsite soils and geologic conditions and their effects on the proposed multi-family residential development, from a geotechnical point of view. A secondary purpose of this study was to provide percolation/infiltration feasibility testing for the proposed stormwater BMP basin, general earthwork and grading guidelines, and development criteria in light of proposed multi-family residential development and site geologic conditions.

EXECUTIVE SUMMARY

Based on our review of readily available data, our recent subsurface investigation, associated laboratory testing, and geologic and engineering analyses, the proposed development of the project site appears suitable for its intended multi-family residential use from a geotechnical viewpoint, provided the recommendations presented in the text of this report are properly implemented. The primary developmental considerations are summarized below:

- The proposed LDW Menifee project is located on the NWC of Rouse Road and Menifee Road in the City of Menifee, Riverside County, California. Based on our recent subsurface investigation, and published geologic mapping by Morton (2003), the site is underlain by mid- to late-Pleistocene-age old alluvial fan deposits (Qof). Our review indicates no known active faults are crossing the site, and the site is not

located within an Alquist-Priolo Earthquake Fault Zone (California Department of Conservation, California Geological Survey [CGS], 2018). In addition, the site is not located within a County of Riverside fault zone. Based on our review of the Riverside County Information Technology website (RCIT, 2021), the site is located within a zone of "low" liquefaction potential, and is characterized as being potentially susceptible to subsidence (RCIT, 2021). Further discussions of the low potentials for liquefaction and subsidence are provided within subsequent sections of this report.

- Our review of site conditions also indicates regional seismic shaking, ranging from moderate to severe, may occur on the site associated with nearby and/or regional faults. Based on our site specific seismic hazard analysis, current seismic design parameters per the 2019 CBC are provided herein. The seismic acceleration values and design parameters provided herein should be considered during preliminary design of the proposed development. The adverse effects of seismic shaking on the structure(s) will likely be wall cracks, some foundation/slab distress, and some seismic settlement. However, it is anticipated that the structure will be repairable in the event of the design seismic event. This potential should be disclosed to any owners and all interested/affected parties.

- Our general liquefaction screening evaluation (pursuant to Special Publication 117 [CGS, 2008 SP117]) indicates that the potential for liquefaction and associated adverse effects within the site is considered low, based on the dense/stiff to very dense/hard old alluvial fan deposits which underlie the site at shallow depths, and anticipated removal of near-surface potentially compressible soils during site grading activities.

- Based on conversations with the Client, review of the LDW site plan provided, and property offering memorandum by Rancon Group (RG, 2021), it is our understanding that the site will be prepared for the development of a 164-unit multi-family residential townhome complex, a recreation facility to include a gym, swimming pool, and multi-purpose room, along with a stormwater BMP basin, associated underground utilities and roadway/parking infrastructure improvements, including perimeter block wall improvements. Typical cut and fill grading techniques would be necessary to achieve the design grades.

- As encountered during our recent field work, the site is mantled by up to ±3 to ±5 feet of colluvium/topsoil. Due to the relatively low density and lack of uniformity, all surficial deposits of colluvium/topsoil, and near-surface weathered old alluvial fan deposits (upper ±1 foot) are considered unsuitable for the support of settlement-sensitive improvements (i.e., building foundations, concrete slab-on-grade floors, site walls, pavements, exterior hardscape, etc.) and/or additional engineered fill. Based on the available subsurface data obtained, the thickness of these potentially compressible soils is anticipated to be approximately ±4 to ±6 feet, with an average of approximately ±5 feet across the site, with the

potential for localized deeper removals. Conversely, subsequent to surficial removals as discussed above and herein, the underlying unweathered old alluvial fan deposits are considered suitable for the support of settlement-sensitive improvements and/or additional engineered fill.

- The 2019 California Building Code ([2019 CBC], California Building Standards Commission [CBSC], 2019a) indicates that removals of unsuitable soils be performed across all areas to be graded, under the purview of the grading permit, not just within the influence of the structures. Although generally not anticipated, relatively deep removals may also necessitate a special zone of consideration on perimeter/confining areas. This zone would be approximately equal to the depth of removals, if removals cannot be performed onsite or offsite. Thus, any settlement-sensitive improvements (walls, curbs, flatwork, etc.), constructed within this zone may require deepened foundations, reinforcement, etc., or will retain some potential for settlement and associated distress. This will also require proper disclosure to any owners and all interested/affected parties should this condition exist at the conclusion of grading.

- Expansion index (E.I.) testing performed on a representative sample of the onsite soils indicates very low expansive soil conditions (E.I. 0-20) across the majority of the site, on a preliminary basis. However, at the conclusion of site grading, low expansive soils (E.I. 21-50) may not be precluded from occurring onsite. Based on the general parameters outlined above, preliminary foundation recommendations for conventional and post-tension designs are provided herein. Post-tension foundations should perform better under the design seismic event. Additional E.I. testing should be conducted during, or shortly after, site grading to further evaluate the preliminary test results obtained.

- For preliminary planning purposes, based upon the soluble sulfate test results, and the latest edition of the 2019 CBC (CBSC, 2019a), the soluble sulfate content is considered Class “S0” per the ACI 318-14 (0.00 to 0.10 soil percentage by weight is considered Class “S0”), as such sulfate-resistant concrete is not required, on a preliminary basis. Based on the results of the saturated resistivity testing, the onsite soils are generally considered corrosive to ferrous metals in a saturated state (1,000 to 2,000 ohm-cm is considered corrosive).

  Although the site soils are categorized as being corrosive to ferrous metals and other than Exposure Class “S0” for soluble sulfate content, Class “W0" for contact with water, and Class “C1" for corrosion protection of reinforcement, no other exposure conditions were indicated in Table 19.3.1.1 of the ACI (2014a), and considered warranted based on our preliminary laboratory testing conducted. Additional sulfate/corrosion testing should be conducted during, or shortly after, site grading to further evaluate the preliminary test results obtained. Based on the preliminary conditions encountered, a consulting corrosion engineer may be considered to provide specific recommendations for foundations, piping, etc., as warranted.

- Seeps, springs, mottled soils, or other indications of a high regional groundwater level were not noted at the subject site during the time of our field investigation. However, perched groundwater was encountered at a depth of approximately ±35 feet below the ground surface (bgs) within boring B-1 (see Appendix B) during our recent subsurface investigation. Based on our review of the California Department of Water Resources Water Data Library (CDWR; 2021), nearby well measurements reviewed appear to be regional groundwater measurements at depths of ±50.9 and ±71.83 feet (Station No. 337289N1171635W001, and No. 337334N1171648W001, respectively) at sites with similar ground surface elevations. As such, the regional groundwater table, at depth, is not anticipated to significantly affect the planned improvements, provided the conclusions and recommendations presented herein are properly incorporated into the design and construction of the project. In general, perched groundwater and seepage may occur along fill/alluvial contacts, and/or along discontinuities (sand lenses and/or bedding planes) due to migration from adjacent drainage areas and development during and/or after periods of above normal or heavy precipitation or irrigation.

- An evaluation of storm water infiltration feasibility within the current BMP location indicates a moderate infiltration potential at this specific location. Further discussions of the test procedures used, onsite USDA soil groups, general infiltration basin siting requirements and limitations, along with the converted infiltration rates obtained are presented herein.

- Adverse geologic features that would preclude project feasibility (e.g., landslides, shallow regional groundwater, subsidence, active faulting, etc.) were not encountered.

- The recommendations presented in this report should be incorporated into preliminary planning, design, and construction considerations of the project.

The opportunity to be of service is sincerely appreciated. If you should have any questions, please do not hesitate to contact our office.

Respectfully submitted,

GeoSoils, Inc.

Todd A. Greer
Engineering Geologist, CEG 2377

David W. Skelly
Civil Engineer, RCE 47857

TAG/JPF/DWS/sh

Distribution: (3) Addressee (2 wet signed, 1 copy, and 1pdf [via email])

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PRELIMINARY GEOTECHNICAL EVALUATION
AND PERCOLATION/INFILTRATION
FEASIBILITY TESTING, PROPOSED MULTI-FAMILY
RESIDENTIAL DEVELOPMENT (LDW MENIFEE PROJECT)
±8.0-ACRE SITE, NWC OF ROUSE ROAD AND
MENIFEE ROAD, CITY OF MENIFEE
RIVERSIDE COUNTY, CALIFORNIA

SCOPE OF SERVICES

The scope of our services has included the following:

1. Review of online and in-house geologic maps and literature for the site, review of the conceptual site plan provided and offering memorandum by RG (2021), including aerial photographs provided by Google Earth Pro (GEP, 2021) and the United States Department of Agricultural (USDA, 1980, see Appendix A).

2. Geologic site reconnaissance and geologic mapping of significant surficial deposits.

3. The advancement of four (4) exploratory borings across the site for geotechnical logging and soil sample collection, and to evaluate subsurface conditions onsite. In addition, two (2) relatively shallow borings were advance within the location of the stormwater BMP basin for subsequent percolation/infiltration feasibility testing. The borings were advanced on June 21, 2021, utilizing a hollow-stem drill rig (Appendix B).

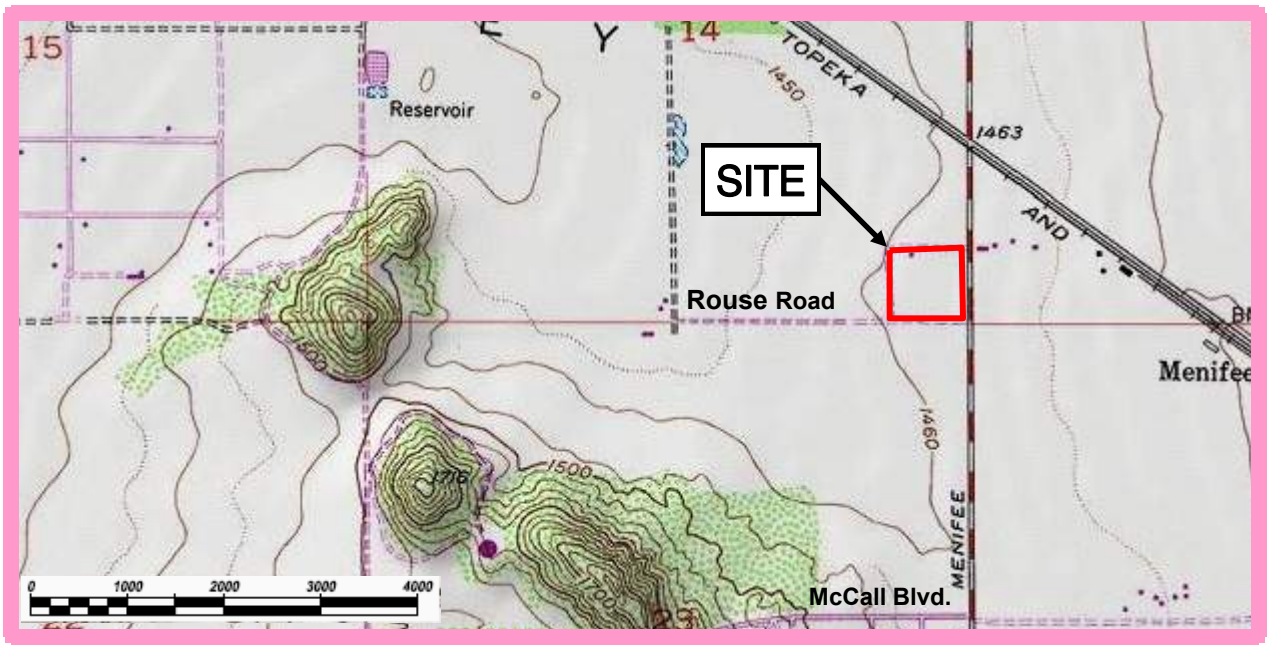
4. General areal seismicity evaluation (Appendix C).

5. Pertinent laboratory testing of representative soil samples collected during our subsurface exploration program. Testing included in-situ moisture and density, maximum density testing, expansion index, sulfate/corrosion, and R-value testing of the materials encountered during our field study. Results of our laboratory testing are provided in Appendix D.

6. Appropriate engineering and geologic analyses of data collected and preparation of this report and accompaniments.

SITE LOCATION

Based on our review of the LDW site plan provided and property offering memorandum by Rancon Group (RG, 2021), the LDW Menifee project site is generally a square-shaped ±8.0-acre parcel, located on the NWC of Rouse Road and Menifee Road in the City of Menifee, Riverside County, California (see Figure 1, Site Location Map). The site is generally flat-lying and currently covered with a sparse growth of native and invasive weeds and grasses; however, has been previously tilled for weed abatement purposes.



Base Map: TOPO! Copyright 2003 National Geographic, USGS Romoland Quadrangle, California -- Riverside Co., 7.5 Minute, dated 1953.

Base Map: Google Maps, Copyright 2021, Map Data Copyright 2021Google

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SITE LOCATION MAP

Figure 1

PROPOSED DEVELOPMENT

GSI understands that the proposed improvements for the LDW Menifee project would include the development of a 164-unit multi-family residential townhome complex, a recreation facility to include a gym, swimming pool, and multi-purpose room, along with a stormwater BMP basin, associated underground utilities and roadway/parking infrastructure improvements, including perimeter block wall improvements. Typical cut and fill grading techniques would be necessary to achieve the design grades. We further understand that the multi-family residences are proposed as one and/or two-story structures, with slab-on-grade/continuous footings utilizing typical wood-frame and stucco type construction. Building loads are assumed to be typical for these types of relatively light structures. Sewage disposal is to be accommodated by tying into the regional system.

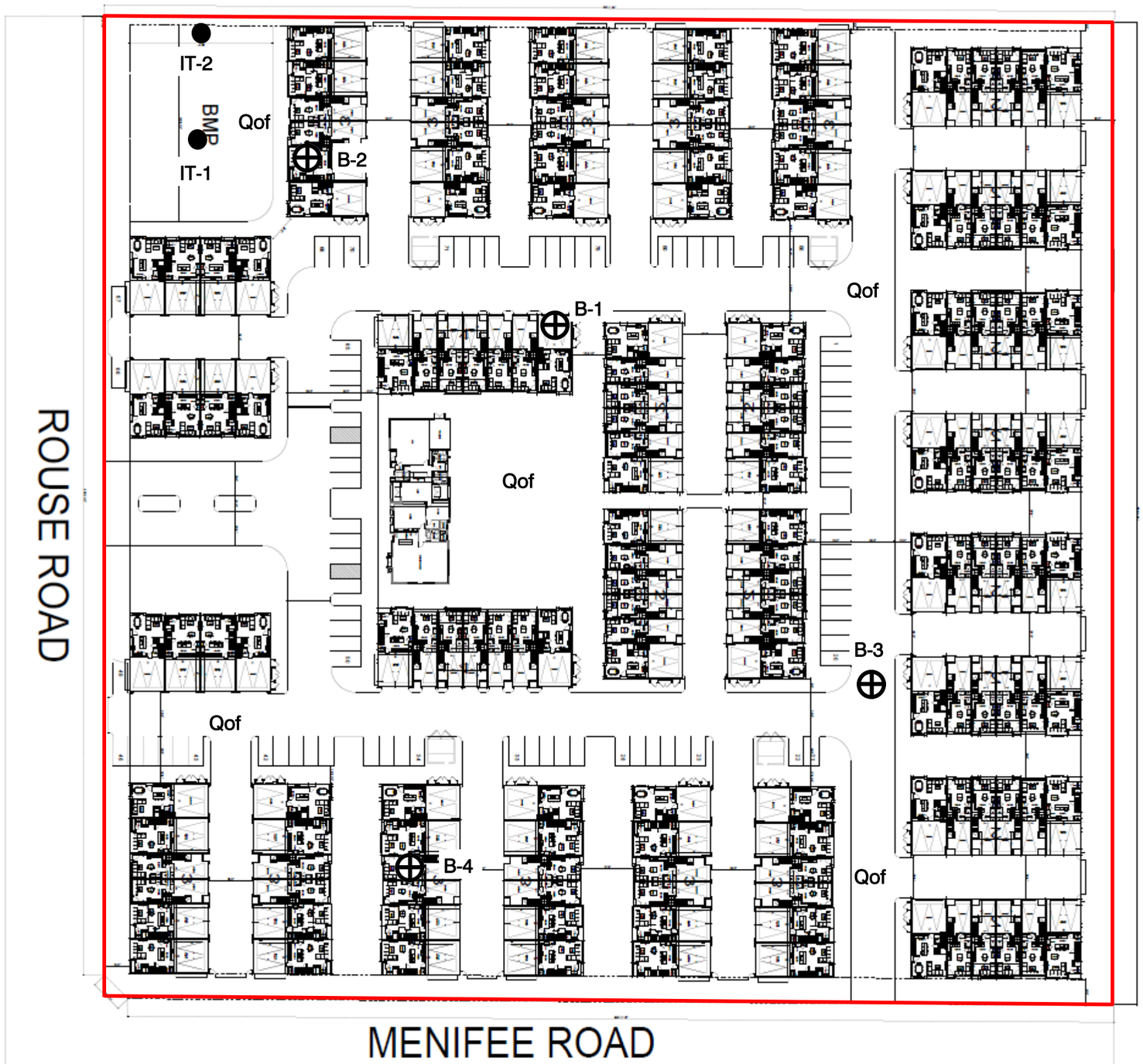
FIELD STUDIES

As indicated above, field studies conducted during our evaluation of the property for this investigation consisted of geologic reconnaissance mapping, the advancement of a total of six (6) exploratory borings across the property for evaluation of near-surface soil and geologic conditions, sample collection, and percolation/infiltration feasibility testing. Field exploration was performed on June 21, 2021, with associated percolation/infiltration testing conducted on June 22, 2021. The borings were observed and logged by an engineering geologist from our firm who also collected representative soil samples for appropriate laboratory testing. The logs of the borings are presented in Appendix B. The approximate locations of the exploratory borings and percolation/infiltration feasibility testing conducted for this study are presented on Figure 2 (Geotechnical Map) which uses undated LDW site plan provided as a base.

GEOLOGY

Regional Geologic Setting

The property lies within the Perris Block, a relatively stable area located between the Elsinore and San Jacinto fault zones, in a prominent natural geomorphic province in southwestern California known as the Peninsular Ranges. The Peninsular Ranges are characterized by steep, elongated ranges and valleys that trend northwesterly. This province is typified by plutonic and metamorphic rocks (bedrock) which comprise the majority of the mountain masses, with relatively thin volcanic and sedimentary deposits discontinuously overlying the bedrock, and with Plio/Pleistocene-age to older Quaternary-age alluvial fan deposits filling in the valleys and younger alluvium filling in the incised drainages. The alluvial deposits are derived from the water borne deposition of the products of weathering and erosion of the bedrock.



GSI LEGEND

Qof	Quaternary Old Alluvial Fan Deposits
⊕ B-4	Approximate Location of Exploratory Boring.
● IT-2	Approximate Location of Percolation/Infiltration Test.
/	Area Under the Purview of this Report

PROJECT DATA:
Lot size: 8 acres
Density: 20.5 U/A
Number of units: 164

UNIT TYPE	NUMBER OF UNIT	PARKING SPACE PER UNIT	PARKING REQUIRED
A1 (1 BEDROOM)	28	1	28
A2 (2 BEDROOMS)	52	1.5	78
B (3 BEDROOMS)	28	2.5	70
C (3 BEDROOMS)	56	2.5	140
TOTAL	164		316
	GUEST PARKING (1 SPACE PER EACH 10 DWELLING UNITS)		17
	TOTAL PARKING REQUIRED		333

PROVIDE GARAGE PARKING 248 SPACES
PROVIDE SURFACE PARKING 88 SPACES
TOTAL PROVIDED 336

ALL LOCATIONS ARE APPROXIMATE

This document or e-file is not part of the Construction Documents and should not be relied upon as being an accurate depiction of design.

Figure adapted from the LWD Site Plan provided, undated.

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GEOTECHNICAL MAP

Figure 2

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Site Geology

Based on our recent subsurface investigation, and published geologic mapping by Morton (2003), the site is underlain by mid- to late-Pleistocene-age old alluvial fan deposits (Qof). Based on our supplemental subsurface investigation and geologic reconnaissance mapping, the old alluvial fan deposits are mantled by a relatively thin layer of colluvium/topsoil on the order of approximately ±3 to ±5 feet in thickness.

Site Earth Materials

As discussed above, the earth materials encountered during our subsurface investigation included colluvium/topsoil and mid- to late-Pleistocene-age old alluvial fan deposits (Morton, 2003). Mappable geologic units are shown on Figure 2 (Geotechnical Map), and these units are described as follows, from youngest to oldest:

Colluvium/Topsoil (Unmapped)

As encountered during our recent field work, the site is mantled by up to ±3 to ±5 feet of colluvium/topsoil. These materials were observed to consist primarily of light brown to brown silty sands. The colluvium/topsoil was generally dry, with a loose consistency, likely due to previous tilling for weed abatement purposes. The colluvium/topsoil deposits typically have a very low expansion potential. However, locally low expansive soils cannot be precluded from occurring onsite. The colluvium/topsoil is deemed unsuitable for the support of new structures or additional fill placement, and will require complete removal and recompaction during rough grading. Colluvium/topsoil materials may be reused for compacted fills, provided that they have been cleansed of deleterious materials (i.e., trash, debris, weeds, grasses, and concentrations of organic matter) prior to placement onsite as engineered fill.

Quaternary - Old Alluvial Fan Deposits (Map Symbol - Qof)

As observed onsite, the old alluvial fan deposits generally consisted of light to dark brown, silty, fine- to coarse-grained sands. The alluvial sediments varied from dry to locally saturated, and were generally medium dense to very dense/hard with depth. Expansion index (E.I.) testing performed on a representative sample of the fan deposits indicates very low expansive soil conditions (E.I. 0-20) across the majority of the site, on a preliminary basis. However, at the conclusion of site grading, low expansive soils (E.I. 21-50) may not be precluded from occurring. The near-surface weathered old alluvial fan deposits (upper ±1 foot) are considered unsuitable for the support of settlement-sensitive improvements (i.e., building foundations, concrete slab-on-grade floors, site walls, pavements, exterior hardscape, etc.) and will require surficial removal and recompaction (upper ±1 foot) during rough grading. The old alluvial fan deposits may be reused for compacted fills, provided that they have been cleansed of deleterious materials (i.e., weeds, grasses, and concentrations of organic matter), prior to placement onsite as engineered fill.

GROUNDWATER

Seeps, springs, mottled soils, or other indications of a high regional groundwater level were not noted at the subject site during the time of our field investigation. However, perched groundwater was encountered at a depth of approximately ±35 feet below the ground surface (bgs) within boring B-1 (see Appendix B) during our recent subsurface investigation. Based on our review of the California Department of Water Resources Water Data Library (CDWR; 2021), nearby well measurements reviewed appear to be regional groundwater measurements at depths of ±50.9 and ±71.83 feet (Station No. 337289N1171635W001, and No. 337334N1171648W001, respectively) at sites with similar ground surface elevations. As such, the regional groundwater table, at depth, is not anticipated to significantly affect the planned improvements, provided the conclusions and recommendations presented herein are properly incorporated into the design and construction of the project. In general, perched groundwater and seepage may occur along fill/alluvial contacts, and/or along discontinuities (sand lenses and/or bedding planes) due to migration from adjacent drainage areas and development during and/or after periods of above normal or heavy precipitation or irrigation.

FAULTING AND REGIONAL SEISMICITY

Local and Regional Faults

Our review indicates that there are no known active faults crossing this site, and the site is not within an Alquist-Priolo Earthquake Fault Zone (California Geological Survey [CGS], 2018). However, the site is situated in a region subject to strong earthquakes occurring along active faults. These faults include, but are not limited to, the local Elsinore fault systems; the San Jacinto Fault; and the San Andreas Fault.

According to Blake (2000a), the closest known active fault to the site is the San Jacinto Valley/Casa Loma segment of the San Jacinto Fault Zone, and is located approximately ±10.6 miles (±17.0 km) east of the site. The San Jacinto Valley/Casa Loma segment of San Jacinto Fault Zone has demonstrated movement in the Holocene Epoch (i.e., last 11,700 years), and therefore, is considered active and is located within an Alquist-Priolo Earthquake Fault Zone (CGS, 2018). Cao, et al. (2003) indicates that the San Jacinto Valley/Casa Loma segment of the San Jacinto Fault Zone is an “A” fault and is capable of producing a maximum magnitude (M_w) 6.9 earthquake. The possibility of ground acceleration, or shaking at the site, may be considered as approximately similar to the Southern California region as a whole.

Seismicity

The acceleration-attenuation relations of Bozorgnia, Campbell, and Niazi (1999), have been incorporated into EQFAULT (Blake, 2000a). For this study, peak horizontal ground

accelerations anticipated at the site were determined based on the mean plus 1 - sigma attenuation curves developed by those authors. The EQFAULT computer program performs deterministic seismic hazard analyses using digitized California faults as earthquake sources. The program estimates the closest distance between each fault and a given site. If a fault is found to be within a user-selected radius, the program estimates peak horizontal ground acceleration that may occur at the site from an upper bound ("maximum credible") earthquake on that fault. Site acceleration (g) is computed by user-selected acceleration-attenuation relations that are contained in EQFAULT. Based on the EQFAULT program, peak horizontal ground accelerations (deterministic acceleration values) from an upper bound event at the site may be on the order of 0.3321g.

Historical Site Acceleration

Historical site seismicity was evaluated with the acceleration-attenuation relations of Bozorgnia, Campbell, and Niazi (1999) and the computer program EQSEARCH (Blake, 2000b). This program was utilized to perform a search of historical earthquake records for magnitude 5.0 to 9.0 seismic events within a 100 km radius, between the years 1800 to May 8, 2021. Based on the selected acceleration-attenuation relation, a peak horizontal ground acceleration has been estimated, which may have affected the site during the specific seismic events in the past. Based on the available data and attenuation relationship used, the estimated maximum (peak) site acceleration during the period 1800 to May 8, 2021, was 0.353g. In addition, a seismic recurrence curve is also estimated/generated from the historical data (see Appendix C).

Seismic Design Parameters

Based on the site conditions, the following table summarizes the site-specific design criteria obtained from the 2019 CBC (CBSC, 2019a), Chapter 16 Structural Design, Section 1613, Earthquake Loads. The computer program "Seismic Design Maps," provided by the California Office of Statewide Health Planning and Development (OSHPD, 2021) was utilized for design (https://seismicmaps.org/). The short spectral response utilizes a period of 0.2 seconds.

2019 CBC SEISMIC DESIGN PARAMETERS			
PARAMETER	**VALUE**	**VALUE PER ASCE 7-16**	**2019 CBC OR REFERENCE**
Risk Category	I, II, or III	I, II, or III	Table 1604.5
Site Class	D	D	Section 1613.2.2/Chap. 20 ASCE 7-16 (p. 203-204)
Spectral Response - (0.2 sec), S_s	1.417 g	1.05 g (Section 21.3)	Section 1613.2.1 Figure 1613.2.1(1)
Spectral Response - (1 sec), S_1	0.527 g	0.76 g (Section 21.3)	Section 1613.2.1 Figure 1613.2.1(2)

2019 CBC SEISMIC DESIGN PARAMETERS			
PARAMETER	**VALUE**	**VALUE PER ASCE 7-16**	**2019 CBC OR REFERENCE**
Site Coefficient, F_a	1.0	1.0	Table 1613.2.3(1)
Site Coefficient, F_v	null - see Section 11.48 ASCE 7-16	2.5 (Section 21.3)	Table 1613.2.3(2)
Maximum Considered Earthquake Spectral Response Acceleration (0.2 sec), S_{MS}	1.417	1.584 g (Section 21.4)	Section 1613.2.3 (Eqn 16-36)
Maximum Considered Earthquake Spectral Response Acceleration (1 sec), S_{M1}	null - see Section 11.48 ASCE 7-16	1.179 g (Section 21.4)	Section 1613.2.3 (Eqn 16-37)
5% Damped Design Spectral Response Acceleration (0.2 sec), S_{DS}	0.945	1.056 g (Section 21.4)	Section 1613.2.4 (Eqn 16-38)
5% Damped Design Spectral Response Acceleration (1 sec), S_{D1}	null - see Section 11.48 ASCE 7-16	0.786 g (Section 21.4)	Section 1613.2.4 (Eqn 16-39)
PGA_M - Probabilistic Vertical Ground Acceleration may be assumed as about 50% of these values.	0.55 g	0.6 g (Section 21.5.3)	ASCE 7-16 (Eqn 11.8.1)
Seismic Design Category	null - see Section 11.48 ASCE 7-16	D (Section 11.6)	Section 1613.2.5/ASCE 7-16 (p. 85: Table 11.6-1 or 11.6-2)

GENERAL SEISMIC PARAMETERS	
PARAMETER	**VALUE**
Distance to Seismic Source (A fault)[(1)]	10.6 mi (17.0 km)[(2)]
Upper Bound Earthquake San Jacinto (San Jacinto Valley/Casa Loma) Segment	$M_W = 6.9$ [(1)]
[(1)] - Cao, et al. (2003) [(2)] - USGS (2021)	

Conformance to the criteria above for seismic design does not constitute any kind of guarantee or assurance that significant structural damage or ground failure will not occur in the event of a large earthquake. The primary goal of seismic design is to protect life, not to eliminate all damage, since such design may be economically prohibitive. Cumulative effects of seismic events are not addressed in the 2019 CBC (CBSC, 2019a) and regular maintenance and repair following locally significant seismic events (i.e., M_w5.5) will likely be necessary, as is the case in all of Southern California.

It is important to keep in perspective that, in the event of a maximum probable or credible earthquake occurring on any of the nearby major faults, strong ground shaking would occur in the subject site's general area. Potential damage to any structure(s) would likely

be greatest from the vibrations and impelling force caused by the inertia of a structure's mass. This potential would be no greater than that for other existing structures and improvements in the immediate vicinity.

SECONDARY SEISMIC HAZARDS

The following list includes other geologic/seismic related hazards that have been considered during our evaluation of the site. The hazards listed are considered negligible and/or mitigated as a result of site location, soil characteristics, recommended remedial site grading, and typical site development procedures:

- Liquefaction
- Lateral Spreading
- Subsidence
- Ground Lurching or Shallow Ground Rupture
- Tsunami
- Seiche

A review of the Riverside County Information Technology (RCIT, 2021), or "Map My County v10," indicates that the site is not located within a County of Riverside fault zone. However, based on our review, the site is located within a zone of "low" liquefaction potential, and is characterized as being potentially susceptible to subsidence (RCIT, 2021). However, our general liquefaction screening evaluation (pursuant to Special Publication 117 [CGS, 2008 SP117]) indicates that the potential for liquefaction and associated adverse effects within the site is considered low, based on the dense/stiff to very dense/hard old alluvial fan deposits which underlie the site at shallow depths, and anticipated removal of near-surface potentially compressible soils during site grading activities.

The effects of areal subsidence generally occur at the transition or boundaries between low-lying areas and adjacent hillside terrain, where materials of substantially different engineering properties (i.e., thick alluvium vs. bedrock) are present, or in areas of overdraft owing to groundwater withdrawal, usually where bounded by Neogene faults. Our review of available data, as well as stereoscopic aerial photographs (USDA, 1980), showed no features generally associated with areal subsidence (i.e., radially-directed drainages flowing into a depression(s), linearity of depressions associated with mountain fronts, etc.), directly on the project site. In view of the nature of the underlying old alluvial fan deposits, and lack of onsite faulting, the potential for this phenomena to affect the site is considered very low.

In addition, ground fissures are generally associated with excessive groundwater withdrawal and associated subsidence, or active faulting. Our review did not reveal any information that active faulting or excessive groundwater withdrawal, or ground fissures, or hydroconsolidation in the specific site location, is occurring at this time. Therefore, the potential for ground fissures is also considered very low.

MASS WASTING/LANDSLIDE SUSCEPTIBILITY

Mass wasting refers to the various processes by which earth materials are moved down slope in response to the force of gravity. Examples of these processes include slope creep, surficial failures, and deep-seated landslides. Creep is the slowest form of mass wasting and generally involves the outer 5 to 10 feet of a slope surface. During heavy rains, such as those in El Niño years, creep-affected materials may become saturated, resulting in a more rapid form of downslope movement (i.e., landslides and/or surficial failures). For this relatively low relief (flat-lying) site, geomorphic expressions indicative of past mass wasting events (i.e., scarps and hummocky terrain) were not observed on the property during our field studies, nor in our review of regional geologic mapping. Further, no adverse geologic structures were encountered during our subsurface exploration. Regional geologic maps do not indicate the presence of landslides on the property. However, based on the granular nature of the onsite earth materials, the onsite soils are considered erosive. Therefore, slopes comprised of these materials may be subject to rilling, gullying, sloughing, depending on rainfall severity and surface drainage practices. Such risks can be minimized through properly designed, and regularly and periodically maintained surface drainage.

LABORATORY TESTING

Classification

Soils were classified visually according to the Unified Soils Classification System. The soil classifications are shown on the Boring Logs presented in Appendix B. The Laboratory Test Results are presented in Appendix D.

Moisture-Density

The field moisture contents and dry unit weights were determined for undisturbed ring samples for the soils encountered in the exploratory borings. The dry unit weight was determined in pounds per cubic foot (pcf) and the field moisture content was determined as a percentage of the dry unit weight. The results of these tests are shown on the Boring Logs (Appendix B).

Laboratory Standard

The maximum dry density and optimum moisture content was determined for the major soil type encountered within the exploratory borings. The laboratory standard used was ASTM D 1557. The moisture-density relationships obtained are shown below:

SOIL TYPE	BORING AND DEPTH (ft.)	MAXIMUM DRY DENSITY (pcf)	OPTIMUM MOISTURE CONTENT (%)
Silty Sand, Brown	B-3 @ 0-5	130.4	9.3

Expansion Potential

Expansion index (E.I.) testing was performed on a representative sample of site earth materials. E.I. test results are presented in the following Table. Additional E.I. testing should be conducted at the conclusion of site grading to further evaluate the preliminary test results obtained.

SOIL TYPE	LOCATION & DEPTH (FT)	EXPANSION INDEX (E.I.)	EXPANSION POTENTIAL
Brown, Silty SAND	B-1 @ 0-5	<5	Very Low

Resistance Value

Resistance value, or R-Value testing, was performed on representative soil samples in accordance with CalTrans Test Method 301, and yielded a test result of R=48. The results of R-Value testing are presented in Appendix D.

Soluble Sulfates/Corrosion

A representative sample of site soil was analyzed for soluble sulfates, chloride, pH, and resistivity. The soluble sulfate and corrosion potential results are presented in the following Table. Additional sulfate/corrosion testing should be conducted at the conclusion of site grading to further evaluate the preliminary test results obtained.

LOCATION AND DEPTH (FT.)	SOLUBLE SULFATES (PERCENTAGE BY WEIGHT)	CHLORIDE (PPM)	pH	RESISTIVITY (OHMS-CM)
B-1 @ 0-5	0.010	30	6.8	1,700

For preliminary planning purposes, and based upon the soluble sulfate test results and the latest edition of the 2019 CBC (CBSC, 2019a), the soluble sulfate content is considered Class “S0” per the ACI 318-14 (0.00 to 0.10 soil percentage by weight is considered Class “S0”). As such, sulfate-resistant concrete is currently not anticipated. Based on the results of the resistivity and pH testing, the onsite soils are generally considered neutral

(a pH of 6.6 to 7.3 is considered neutral), and are considered corrosive to ferrous metals in a saturated state (1,000 to 2,000 ohm-cm is considered corrosive). Chlorides are generally low.

Although the site soils are categorized as being corrosive toward ferrous metals, it is our understanding that ferrous metals embedded in properly poured and formed concrete with the proper mix should be adequately protected from these conditions. As stated above, the soluble sulfate content on the subject lots is considered Class "S0." Additional corrosion testing should be conducted at the conclusion of site grading to further evaluate the preliminary test results obtained. Based upon the laboratory test results obtained, a consulting corrosion engineer may be retained to provide specific recommendations for foundations, utility piping, etc, as warranted.

PERCOLATION/INFILTRATION TESTING

In general accordance with guidelines of the Riverside County Flood Control (RCFC, 2011) Design Handbook for Low Impact Development Best Management Practices, and subsequent errata (RCFC, 2016), two (2) percolation tests were conducted within the proposed stormwater BMP basin location onsite (See Geotechnical Map, Figure 1). The percolation testing was conducted within the proposed area of the BMP basin, at a depth of ±6 feet. The percolation/infiltration testing was performed to further evaluate site conditions with respect to the proposed water quality BMP basin that will retain and filter onsite storm water. The percolation testing was performed in general conformance with the RCFC (2011 and 2016) and CASQA (2003) design handbooks for such testing. The field percolation testing and geologic logging were performed by a registered engineering geologist from our firm. Logs of the borings advanced for this study are included in Appendix B. Field percolation data sheets are retained within our in-house files. Procedures for testing are outlined briefly below:

Percolation Test Procedures

Test Borings:

1. Diameter - 8 inches.
2. After the removal of loose materials, 2 inches of gravel was placed on the bottom of each test cup.
3. A perforated pipe was then installed within each test location to facilitate accurate field measurements and prevent caving during the pre-soak period and subsequent next day testing.

Pre-Soaking: After the installation of the perforated pipes, the boring was filled with clear water several times. The pre-soak period for percolation tests continued overnight, as all the water did not seep away while the tester was present.

Sandy Soil Test: During the sandy soil test period, two (2) consecutive measurements were conducted at each test location at intervals of approximately 25 minutes. More than 6 inches of water seeped away during each of the two (2) test measurements within the percolation test locations, therefore the testing began at both locations.

Testing: After required pre-soak period and sandy soil test periods, percolation testing measurements were made. A column of clear water was re-established within each of the test locations. The drop in water level was measured from a fixed reference point, refilling after each test measurement. For each test, a series of test measurements were taken for an additional hour, at time intervals of ±10 minutes.

Accuracy: All test measurements were read to the nearest ¼-inch.

Test Results: Calculations from our field testing indicate percolation rates of between ±0.5 and ±0.6 minutes/inch. Per the RCFC (2011) guidelines, the percolation rates obtained were then converted to infiltration rates utilizing the "Porchet Method," to be utilized by the design engineer for appropriate sizing of the BMP basin (RCFC, 2011). The converted infiltration rates obtained varied between 4.81 and 6.0 inches/hour, with an average of 5.41 inches/hour. Typically, the lowest infiltration rate obtained is applied to the design. The converted infiltration rates, along with the formulas utilized are presented in Figure 3.

USDA Site Soil Groups, Soil Units, Ksat Values

Our review of the United States Department of Agriculture (USDA, 2021) Web Soil Survey (https://websoilsurvey.sc.egov.usda.gov/App/HomePage.htm), indicates one (1) major soil unit underlies the site and proposed basin location in the southwest corner of the site. The Hartford coarse sandy loam, is distributed throughout the site and in the vicinity of the planned BMP basin. Based on our review, the soils onsite belong to Hydrologic Soil Group "A," with the capacity of the most limiting soil layer to transmit water classified as "high". The "K_{sat}" value (i.e., hydraulic conductivity or infiltration rate) for the soil type onsite was evaluated to be within the range of 1.98 to 5.95 inches per hour. The results of site specific infiltration testing (this study) generally appear consistent with the findings presented in the USDA data set.

Infiltration Basin Siting Requirements

Our review of the general infiltration basin siting requirements and limitations (CASQA, 2003), indicates sites characterized as belonging to Hydrologic Soil Group "A,"

Percolation Rate to Infiltration Rate Conversion

* Infiltration Rate (I_t) = $\dfrac{\Delta H\ \pi r^2\ 60}{\Delta t(\pi r^2 + 2\pi r H_{avg})} = \dfrac{\Delta H\ 60\ r}{\Delta t(r+2H_{avg})}$

Where:
- I_t = tested infiltration rate, inches/hour
- ΔH = change in head over the time interval, inches
- Δt = time interval, minutes
- r = effective radius of test hole
- H_{avg} = average head over the time interval, inches

		Δt	Init Level	Fnl Level	ΔH	H_{avg}	I_t	
Infiltration Test Numbers	IT-1 @ 6 ft.	10	48	28	20	38	6.00	
	IT-2 @ 6 ft.	10	48	31 1/2	16 3/4	39 3/4	4.81	
								Low = 4.81
								Average = 5.41

* Conversion per the "Porchet Method" (RCFWCD, 2011)

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Figure 3

"B," and "C" may be suitable for infiltration, requiring a minimum soil infiltration rate of 0.5 inches/hour (CASQA, 2003). Based on our review of historic regional groundwater levels and recent onsite subsurface investigation, and provided a relatively shallow BMP basin is constructed, a minimum 10-foot vertical separation from the bottom of the basin to the top of historic high groundwater levels will be maintained.

The design engineer will need to review basin siting requirements by CASQA (2003) and the converted rates obtained during this study with respect to the proposed water quality basins. An appropriate factor of safety (FOS), per the RCFC (2011) BMP design handbook, should also be applied by the design engineer.

Onsite Storm Water Quality Best Management Practice (BMP) Systems

Should onsite infiltration-runoff retention systems (OIRRS) be planned for Best Management Practices (BMP's) or Low Impact Development (LID) principles for the project, certain guidelines must be followed in the planning, design, and construction of such systems. Such systems, if improperly designed or implemented without consideration of the geotechnical aspects of site conditions, can contribute to flooding, saturation of bearing materials beneath site improvements, slope instability, and possible concentration and contribution of pollutants into the groundwater or storm drain and/or utility trench systems.

A key factor in these systems is the infiltration rate (often referred to as the percolation rate) which can be ascribed to, or determined for, the earth materials within which these systems are installed. Additionally, the infiltration rate of the designed system (which may include gravel, sand, mulch/topsoil, or other amendments, etc.) will need to be considered. The project infiltration testing is very site specific, any changes to the location of the proposed OIRRS and/or estimated size of the OIRRS, may require additional infiltration testing. Locally, relatively impermeable formations include: clayey surficial soils, igneous and metamorphic bedrock, as well as future fine grained fill soils.

Some of the methods which are utilized for onsite infiltration include percolation basins, dry wells, bio-swale/bio-retention, permeable pavers/pavement, infiltration trenches, filter boxes and subsurface infiltration galleries/chambers. Some of these systems are constructed using native and import soils, perforated piping, and filter fabrics while others employ structural components such as stormwater infiltration chambers and filters/separators. Every site will have characteristics which should lend themselves to one or more of these methods, but not every site is suitable for OIRRS. In practice, OIRRS are usually initially designed by the project design civil engineer. Selection of methods should include (but should not be limited to) review by licensed professionals including the geotechnical engineer, hydrogeologist, engineering geologist, project civil engineer, landscape architect, environmental professional, and industrial hygienist. Applicable governing agency requirements should be reviewed and included in design considerations.

The following geotechnical guidelines should be considered when designing onsite infiltration-runoff retention systems:

- It is not good engineering practice to allow water to saturate soils, especially near slopes or improvements; however, the controlling agency/authority is now requiring this for OIRRS purposes on many projects.

- Wherever possible, infiltration systems should not be installed within ±50 feet of the tops of slopes steeper than 15 percent or within H/3 from the tops of slopes (where "H" equals the height of slope).

- Impermeable liners used in conjunction with basins should consist of a 30-mil polyvinyl chloride (PVC) membrane that is covered by a minimum of 12 inches of clean soil, free from rocks and debris, at a maximum inclination of 4:1 (h:v), and meets the following minimum specifications:

  Specific Gravity (ASTM D792): 1.2 (g/cc [min.]); Tensile (ASTM D882): 73 (lb/in-width [min.]); Elongation at Break (ASTM D882): 380 (% [min.]); Modulus (ASTM D882): 30 (lb/in-width [min.]); and Tear Strength (ASTM D1004): 8 (lbs [min.]); Seam Shear Strength (ASTM D882) 58.4 (lb/in [min.]); Seam Peel Strength (ASTM D882) 15 (lb/in [min]).

- Wherever possible, infiltrations systems should not be placed within a distance of H/2 from the toes of slopes (where H equals the height of slope).

- The landscape architect should be notified of the location of the proposed OIRRS. If landscaping is proposed within the OIRRS, consideration should be given to the type of vegetation chosen and their potential effect upon subsurface improvements (i.e., some trees/shrubs will have an effect on subsurface improvements with their extensive root systems). Over-watering landscape areas above, or adjacent to, the proposed OIRRS could adversely affect performance of the system.

- Areas adjacent to, or within, the OIRRS that are subject to inundation should be properly protected against scouring, undermining, and erosion, in accordance with the recommendations of the design engineer.

- Infiltrations systems should not be installed within ±8 feet of building foundations utility trenches, and walls, or a 1:1 (horizontal to vertical [h:v]) slope (down and away) from the bottom elements of these improvements. Alternatively, deepened foundations and/or pile/pier supported improvements may be used.
- Infiltrations systems should not be installed adjacent to pavement and/or hardscape improvements. Alternatively, deepened/thickened edges and curbs and/or impermeable liners may be utilized in areas adjoining the OIRRS.

- As with any OIRRS, localized ponding and groundwater seepage should be anticipated. The potential for seepage and/or perched groundwater to occur after site development should be disclosed to all interested/affected parties.

- Installation of infiltrations systems should avoid expansive soils (Expansion Index [E.I.] $\geq$51) or soils with a relatively high plasticity index (P.I. > 20).

- Infiltration systems should not be installed where the vertical separation of the groundwater level is less than $\pm$10 feet from the base of the system.

- Where permeable pavements are planned as part of the system, the site Traffic Index (T.I.) Should be less than 25,000 Average Daily Traffic (ADT), as recommended in Allen, et al. (2011).

- Infiltration systems should be designed using a suitable factor of safety (FOS) to account for uncertainties in the known infiltration rates (as generally required by the controlling authorities), and reduction in performance over time.

- As with any OIRRS, proper care will need to provided. Best management practices should be followed at all times, especially during inclement weather. Provisions for the management of any siltation, debris within the OIRRS, and/or overgrown vegetation (including root systems) should be considered. An appropriate inspection schedule will need to adopted and provided to all interested/affected parties.

- Any designed system will require regular and periodic maintenance, which may include rehabilitation and/or complete replacement of the filter media (e.g., sand, gravel, filter fabrics, topsoils, mulch, etc.) or other components utilized in construction, so that the design life exceeds 15 years. Due to the potential for piping and adverse seepage conditions, a burrowing rodent control program should also be implemented onsite.

- All or portions of these systems may be considered attractive nuisances. Thus, consideration of the effects of, or potential for, vandalism should be addressed.

- Newly established vegetation/landscaping (including phreatophytes) may have root systems that will influence the performance of the OIRRS or nearby LID systems.

- The potential for surface flooding, in the case of system blockage, should be evaluated by the design engineer.
- Any proposed utility backfill materials (i.e., inlet/outlet piping and/or other subsurface utilities) located within or near the proposed area of the OIRRS may become saturated. This is due to the potential for piping, water migration, and/or seepage along the utility trench line backfill. If utility trenches cross and/or are

proposed near the OIRRS, cut-off walls or other water barriers will need to be installed to mitigate the potential for piping and excess water entering the utility backfill materials. Planned or existing utilities may also be subject to piping of fines into open-graded gravel backfill layers unless separated from overlying or adjoining OIRRS by geotextiles and/or slurry backfill.

- The use of OIRRS above existing utilities that might degrade/corrode with the introduction of water/seepage should be avoided.

PRELIMINARY CONCLUSIONS AND RECOMMENDATIONS

Based on our field exploration, laboratory testing, and geotechnical engineering analysis, it is our opinion that the subject site is suitable for the proposed multi-family residential development from a geotechnical engineering and geologic viewpoint, provided that the recommendations presented in the following sections are incorporated into the design and construction phases of site development. The primary geotechnical concerns with respect to the proposed development and improvements are:

- Earth materials characteristics and depth to competent bearing material.
- On-going expansion and corrosion potential of site soils.
- Erosiveness of site earth materials.
- Potential for perched water during and following site development.
- Regional seismic activity.

The recommendations presented herein consider these as well as other aspects of the site. The engineering analyses performed concerning site preparation and the recommendations presented herein have been completed using the information provided and obtained during our field work.

In the event that any significant changes are made to proposed site development, the conclusions and recommendations contained in this report shall not be considered valid unless the changes are reviewed and the recommendations of this report verified or modified in writing by this office. Foundation design parameters are considered preliminary until the foundation design, layout, and structural loads are provided to this office for review.

EARTHWORK CONSTRUCTION RECOMMENDATIONS

General

All earthwork should conform to the guidelines presented in the 2019 CBC (CBSC, 2019a), the requirements of the City of Menifee and County of Riverside, and the General

Earthwork and Grading Guidelines presented in Appendix E, except where specifically superceded in the text of this report. Prior to earthwork, a GSI representative should be present at the preconstruction meeting to provide additional earthwork guidelines, if needed, and review the rough grading and earthwork schedule. This office should be notified in advance of any fill placement, supplemental regrading of the site, or backfilling underground utility trenches and retaining walls after rough earthwork has been completed. This includes grading for driveway approaches, driveways, and exterior hardscape.

During earthwork construction, all site preparation and the general grading procedures of the contractor should be observed and the fill selectively tested by a representative(s) of GSI. If unusual or unexpected conditions are exposed in the field, they should be reviewed by this office and, if warranted, modified and/or additional recommendations will be offered. All applicable requirements of local and national construction and general industry safety orders, the Occupational Safety and Health Act (OSHA, 2011), and the Construction Safety Act should be met. It is the onsite general contractor and individual subcontractors' responsibility to provide a safe working environment for our field staff who are onsite. GSI does not consult in the area of safety engineering.

1. Soils engineering and compaction testing services should be provided during grading operations to assist the contractor in removing unsuitable soils and in his effort to compact the fill.

2. Geologic observations should be performed during grading to document and/or further evaluate geologic conditions. Although unlikely, if adverse geologic structures are encountered, supplemental recommendations and earthwork may be warranted.

3. In general, and based upon the available data to date, regional groundwater will not be a factor in site development or underground utility installation. However, seepage may be encountered along fill contacts or throughout the site along with seasonal perched water. Seepage and a transient perched water table can also develop along, or near, the contact between near surface fills and the underlying native soil, most likely after heavy rains, or due to irrigation practices and/or other factors not evident at the time of our review. This may occur after development. As such, the need for localized subdrainage systems for the control of seepage and perched water should be anticipated.

4. Based upon the proposed development plan and our field exploration, the old alluvial fan deposits throughout the site should be readily rippable with conventional earthwork equipment, in good working order.

5. Due to the non-cohesive nature of some of the onsite materials, some caving and sloughing should be anticipated in all subsurface excavations and trenching.

Therefore, current local and state/federal safety ordinances for subsurface trenching should be enforced.

6. General earthwork, grading guidelines, and preliminary criteria are provided at the end of this report as Appendix E. Specific recommendations are provided below.

Demolition/Grubbing

1. Any existing surficial/subsurface structures (i.e., wells, foundations, septic systems, etc.), tress and major vegetation, bushes, and any miscellaneous debris should be removed from the areas of proposed grading.

2. The project geotechnical consultant should be notified of any previous foundation, irrigation lines, storm drain lines, septic tanks, leach fields, or other subsurface structures that are uncovered during the recommended removals, so that appropriate remedial recommendations can be provided.

3. Cavities or loose soils remaining after demolition and site clearance should be cleaned out, observed by the soils engineer, processed, and replaced with fill that has been moisture conditioned to at least optimum moisture content and compacted to at least 90 percent of the laboratory standard (ASTM D 1557), if not removed by proposed cuts.

Treatment of Existing Ground

1. All colluvium/topsoil, and near surface weathered old alluvial fan deposits (upper ±1 foot) should be removed to competent old alluvial fan deposits (i.e., greater than or equal to 85 percent compaction, and/or greater than or equal to 105 pcf for in-place native materials), if not removed by proposed excavation within areas proposed for settlement-sensitive improvements. For preliminary planning purposes, removal depths are estimated to be approximately ±4 to ±6 feet, with an average of approximately ±5 feet across the site, with the potential for localized deeper removals. However, a minimum of 2 feet of compacted fill should underlie proposed building foundations. Actual depths of removals will be evaluated in the field during grading by the geotechnical consultant.

2. Subsequent to the above removals, the upper 6 inches of the exposed subsoils should be scarified, brought to at least optimum moisture content, and recompacted to a minimum relative compaction of 90 percent of the laboratory standard.

3. The existing site soils may be reused as compacted fill provided that any significant concentrations of vegetation and miscellaneous trash/debris are removed prior to or during fill placement.

4. Localized deeper removal may be necessary due to buried drainage channel meanders or dry porous materials. The project geotechnical consultant/geologist should observe all removal areas during the grading.

Fill Placement

1. Fill materials should be cleansed of significant vegetation and debris prior to fill placement.

2. Fill materials should be brought to at least optimum moisture, placed in thin 6- to 8-inch lifts and mechanically compacted to obtain a minimum relative compaction of 90 percent of the laboratory standard (ASTM D 1557).

3. Any import materials should be observed and determined suitable by the soils engineer prior to placement on the site. Foundation designs may be altered if import materials have a greater sulfate and/or expansion values than the onsite materials encountered during our preliminary investigation.

Transition and Overexcavation Areas

Although generally not anticipated based on the flat-lying nature of the project site, and in order to reduce the potential for differential settlements between cut and fill materials or materials of differing engineering properties, the entire cut portion of cut/fill transitions should be overexcavated to a minimum depth of 3 feet below finish grade, or a maximum ratio of fill thickness of 3:1 (maximum to minimum), and replaced with compacted fill. In addition, building pads located entirely in cut areas, if any, should be overexcavated and capped with at least 3 feet of fill or 2 feet below the bottom of proposed footings, whichever is greater.

Subdrains

The possibility that local seepage may be encountered at the subject site is considered very low. However, the need for subdrainage systems for the control of localized groundwater seepage cannot be precluded. If required, subdrainage for slopes and embankments should adhere to the specifications in Appendix E, which should be incorporated into the project plans and construction documents.

Preliminary Earthwork Factors

Preliminary earthwork factors (shrinkage and bulking) for the subject property have been estimated based upon our field and laboratory testing, visual site observations, and experience in the site area. It is apparent that shrinkage would vary with depth and with areal extent over the site based on previous site use. Variables include vegetation, weed control, discing, and previous filling or exploring. However, all these factors are difficult to define in a three-dimensional fashion.

Therefore, the information presented below represents average shrinkage/bulking values:

Colluvium/Topsoil	15% to 25% shrinkage
Old Alluvial Fan Deposits	5% to 10% shrinkage

An additional shrinkage factor item would include the removal of root systems of individual large plants or trees. These plants and trees vary in size, but when pulled, may result in a loss of ½ to 1 cubic yard, to locally greater than 1 cubic yard of volume, respectively. The above facts indicate that earthwork balance for the site may be difficult to define and flexibility in design is essential to achieve a balanced end product. Subsidence due to equipment loadings (dynamic compaction) may be on the order of up to 0.10 feet, but will depend on haul routes, etc.

PRELIMINARY RECOMMENDATIONS - FOUNDATIONS

General

Preliminary recommendations for foundation design and construction are provided in the following sections. These preliminary recommendations have been developed from our understanding of the currently planned site development, site observations, subsurface exploration, laboratory testing, and engineering analyses. Foundation design should be re-evaluated at the conclusion of site grading/remedial earthwork for the as-graded soil conditions. Although not anticipated, revisions to these recommendations may be necessary. In the event that the information concerning the proposed development plan is not correct, or any changes in the design, location or loading conditions of the proposed additions are made, the conclusions and recommendations contained in this report shall not be considered valid unless the changes are reviewed and conclusions of this report are modified or approved in writing by this office.

The information and recommendations presented in this section are not meant to supercede design by the project structural engineer or civil engineer specializing in structural design. Upon request, GSI could provide additional input/consultation regarding soil parameters, as related to foundation design.

Expansive/Corrosive Soils

The laboratory testing conducted for this study indicates that the majority of onsite soils do not meet the criteria of detrimentally expansive soils as defined in Section 1803.5.3 of the 2019 CBC. However, some site soils are considered expansive. With recommended site grading, the overall expansive character of site soils is anticipated to be non-detrimentally expansive. Should site grading result in areas underlain with expansive soils, foundation systems constructed within the influence of detrimentally expansive soils (i.e., E.I. > 20 and P.I. $\geq$ 15) will require specific design to resist expansive soil effects per

Sections 1808.6.1 or 1808.6.2 of the 2019 CBC, and should be reviewed by the project structural engineer.

Preliminary testing indicates that site soils present a negligible sulfate exposure (exposure Class "S0" (per Table 19.3.2.1 of ACI 318R-14) to concrete. However, reinforced concrete mix design for foundations, slab-on-grade floors, and pavements should also conform to Exposure Classes "S0", "W0", and "C1" in Table 19.3.1.1 of ACI 318R-14, as concrete would likely be exposed to moisture.

Preliminary Foundation Design

The following preliminary foundation design recommendations are presented as a minimum criteria from a soils engineering viewpoint.

1. The foundation systems should be designed and constructed in accordance with guidelines presented in the 2019 CBC.

2. An allowable bearing value of 2,000 pounds per square foot (psf) may be used for the design of footings that maintain a minimum width of 12 inches and a minimum depth of 12 inches (below the lowest adjacent grade) and are founded entirely into properly compacted, engineered fill or suitable formation. This value may be increased by 20 percent for each additional 12 inches in footing depth to a maximum value of 2,500 psf. These values may be increased by one-third when considering short duration seismic or wind loads. Isolated pad footings should have a minimum dimension of at least 24 inches square and a minimum embedment of 24 inches below the lowest adjacent grade into properly engineered fill or suitable formation. Foundation embedment depth excludes concrete slabs-on-grade, and/or slab underlayment. Foundations should not simultaneously bear on formation and engineered fill.

3. For foundations deriving passive resistance from engineered fill, a passive earth pressure may be computed as an equivalent fluid having a density of 250 pcf, with a maximum earth pressure of 2,500 psf.

4. The upper 6 inches of passive pressure should be neglected if not confined by slabs or pavement.
5. For lateral sliding resistance, a 0.35 coefficient of friction may be utilized for a concrete to soil contact when multiplied by the dead load.

6. When combining passive pressure and frictional resistance, the passive pressure component should be reduced by one-third.

7. All footing setbacks from slopes should comply with Figure 1808.7.1 of the 2019 CBC. GSI recommends a minimum horizontal setback distance of 7 feet as measured from the bottom, outboard edge of the footing to the slope face.

8. Footings for structures adjacent to retaining walls should be deepened so as to extend below a 1:1 projection from the heel of the wall. Alternatively, walls may be designed to accommodate structural loads from buildings or appurtenances as described in the "Retaining Wall" section of this report.

9. Provided that the earthwork and foundation recommendations in this reported are adhered, foundations bearing on engineered fill should be minimally designed to accommodate a differential settlement of 1 inch over a 40-foot horizontal span (angular distortion = 1/480).

Preliminary Foundation Construction Recommendations

Current laboratory testing indicates that the majority of onsite soils do not meet the criteria of detrimentally expansive soils as defined in Section 1803.5.3 of the 2019 CBC. The following foundation construction recommendations are presented as a minimum criteria from a soils engineering viewpoint. These recommendations are intended to support planned improvements underlain by at least 7 feet of non-detrimentally expansive soils (i.e., E.I.<21 and P.I. <15). Expansive soils may not be precluded from occurring locally. Should foundations be underlain by expansive soils at depths of less than 7 feet, they will require specific design modifications to mitigate expansive soil effects as required in Sections 1808.6.1 or 1808.6.2 of the 2019 CBC (CBSC, 2019a).

1. Exterior and interior footings should be founded into engineered fill, or suitable formation, at minimum depths of 12 inches, 18 inches, or 24 inches below the lowest adjacent grade, for planned one-, two-, or three-story floor loads, respectively, with footing width per Code. Isolated, exterior column and panel pads, or wall footings, should be at least 24 inches square, and founded at a minimum depth of 24 inches into properly engineered fill or suitable formation. All footings should be minimally reinforced with four No. 4 reinforcing bars, two placed near the top and two placed near the bottom of the footing. Reinforcement of pad footings should be provided by the projects structural engineer.

2. All exterior column footings, and perimeter wall footings, should be tied together via grade beams in at least one direction for very low expansive soils, and two directions for low expansive soils, if encountered. The grade beam should be at least 12 inches square in cross section, and should be provided with a minimum of one No. 4 reinforcing bar at the top, and one No. 4 reinforcing bar at the bottom of the grade beam. The base of the reinforced grade beam should be at the same elevation as the adjoining footings.

3. A grade beam, reinforced as previously recommended, and at least 12 inches square, should be provided across large (garage) entrances. The base of the reinforced grade beam should be at the same elevation as the adjoining footings.

4. Based on the very low to potentially low expansive soils that underlie the subject lots, the slab thickness, reinforcement, and concrete utilized should comply with all applicable codes, and in accordance with the foundation designers' recommendations. At minimum, concrete slabs should be reinforced with No. 3 reinforcement bars placed at 18-inch on center, in two horizontally perpendicular directions (i.e., long axis and short axis). For slab underlayment, please refer to the "Soil Moisture Transmission" section of this report.

5. All slab reinforcement should be supported to ensure proper mid-slab height positioning during placement of the concrete. "Hooking" of reinforcement is not an acceptable method of positioning.

6. The slab subgrade should be pre-soaked to at least the soils "optimum moisture content," to a depth of at least 12 inches, prior to the placement of underlayment sand and vapor retarder. Slab subgrade pre-soaking should be evaluated by the geotechnical consultant within 72 hours of the placement of the underlayment sand and vapor retarder.

7. Soils generated from footing excavations to be used onsite should be compacted to a minimum relative compaction of 90 percent of the laboratory standard (ASTM D 1557), whether the soils are to be placed inside the foundation perimeter or in the yard/right-of-way areas. This material must not alter positive drainage patterns that direct drainage away from the structural areas and toward the street.

8. Reinforced concrete mix design should conform to Exposure Classes "S0", "W0", and "C1" in Table 19.3.2.1 of ACI 318R-14.

Post-Tension Foundation Systems

Post-tension foundation systems may be used to mitigate the damaging shrink/swell effects of the onsite expansive soil conditions on the proposed building foundations and slab-on-grade floors. The post-tension foundation designer may elect to exceed the minimal recommendations, provided herein, to increase slab stiffness performance. Post-tension (PT) design may be either ribbed or mat-type. The latter is also referred to as uniform thickness foundation (UTF). The use of a UTF is an alternative to the traditional ribbed-type. The UTF offers a reduction in grade beams. That is to say a UTF typically uses a single perimeter grade beam and "shovel" footings, but has a thicker slab than the ribbed-type. UTF perimeter footings may utilize an allowable vertical bearing value of 1,500 psf, if founded into approved engineered fill overlying dense unweathered sedimentary bedrock.

The information and recommendations presented in this section are not meant to supercede design by a registered structural engineer or civil engineer qualified to perform post-tensioned design. Post-tension foundations should be designed using sound

engineering practice and be in accordance with local and 2019 CBC requirements and Post Tensioning Institute (PTI) methodologies (PTI; 2004, 2008, 2012, 2013, and 2014). Upon request, GSI can provide additional data/consultation regarding soil parameters as related to post-tension foundation design.

From a soil expansion/shrinkage standpoint, a common contributing factor to distress of structures using post-tensioned slabs is a "dishing" or "arching" of the slabs. This is caused by the fluctuation of moisture content in the soils below the perimeter of the slab primarily due to onsite and offsite irrigation practices, climatic and seasonal changes, and the presence of expansive soils. When the soil environment surrounding the exterior of the slab has a higher moisture content than the area beneath the slab, moisture tends to migrate inward, underneath the slab edges to a distance beyond the slab edges referred to as the moisture variation distance. When this migration of water occurs, the volume of the soils beneath the slab edges expands and causes the slab edges to lift in response. This is referred to as an edge-lift condition. Conversely, when the outside soil environment is drier, the moisture transmission regime is reversed and the soils underneath the slab edges lose their moisture and shrink. This process leads to dropping of the slab at the edges, which leads to what is commonly referred to as the center lift condition. A well-designed, post-tensioned slab having sufficient stiffness and rigidity provides a resistance to excessive bending that results from non-uniform swelling and shrinking slab subgrade soils, particularly within the moisture variation distance, near the slab edges. Other mitigation techniques typically used in conjunction with post-tensioned slabs consist of a combination of specific soil pre-saturation and the construction of a perimeter "cut-off" wall grade beam. Soil pre-saturation consists of moisture conditioning the slab subgrade soils prior to the post-tension slab construction. This effectively reduces soil moisture migration from the area located outside the building toward the soils underlying the post-tension slab. Perimeter cut-off walls are thickened edges of the concrete slab that impedes both outward and inward soil moisture migration.

Slab Subgrade Pre-Soaking

Pre-moistening of the slab subgrade soil is recommended to reduce the potential for post-construction soil heave. The moisture content of the subgrade soils should be equal to or greater than optimum moisture to a depth equivalent to the perimeter grade beam or cut-off wall depth in the slab areas (typically 12, or 18, inches for very low to low expansive soil conditions, respectively).

Pre-moistening and/or pre-soaking should be evaluated by the soils engineer 72 hours prior to vapor retarder placement. In summary:

EXPANSION POTENTIAL	PAD SOIL MOISTURE	CONSTRUCTION METHOD	SOIL MOISTURE RETENTION
Very Low (E.I. = 0-20)	Upper 12 inches of pad at or above soil optimum moisture	Wetting and/or reprocessing	Periodically wet or cover with plastic after trenching. Evaluation 72 hours prior to placement of concrete.
Low (E.I. = 21-50)	Upper 12 inches of pad soil moisture 2 percent over optimum (or 1.2 times)	Wetting and/or reprocessing	Periodically wet or cover with plastic after trenching. Evaluation 72 hours prior to placement of concrete.

Perimeter Cut-Off Walls

Perimeter cut-off walls should be at least 12, or 18 inches deep for very low to low expansive soil conditions, respectively. The cut-off walls may be integrated into the slab design or independent of the slab. The cut-off walls should be a minimum of 6 inches thick (wide). The bottom of the perimeter cut-off wall should be designed to resist tension, using cable or reinforcement per the structural engineer.

Post-Tension Foundation Design

The following recommendations for design of post-tensioned slabs have been prepared in general compliance with the requirements of the recent Post Tensioning Institute's (PTI's) publication titled "Standard Requirements for Design and Analysis of Shallow Post-tensioned Concrete Foundations on Expansive Soils" (PTI, 2012), together with its subsequent errata (PTI, 2013 and 2014).

Post-Tension Foundation Soil Support Parameters

The recommendations for soil support parameters have been provided based on the typical soil index properties for soils that are very low to low in expansion potential. The soil index properties are typically the upper bound values based on our experience and practice in the southern California area. Additional testing is recommended either during or following grading, and prior to foundation construction to further evaluate the soil conditions within the upper 7 to 15 feet of pad grade. The following table presents suggested minimum coefficients to be used in the Post-Tensioning Institute design method:

Thornthwaite Moisture Index	-20 inches/year
Correction Factor for Irrigation	20 inches/year
Depth to Constant Soil Suction	7 feet or overexcavation depth, whichever is greater
Constant soil Suction (pf)	3.6

Moisture Velocity	0.7 inches/month
Plasticity Index (P.I.)*	15-45
* - The effective plasticity index should be evaluated for the upper 7 to 15 feet of earth materials.	

Based on the above, the recommended post-tension soil support parameters are tabulated below:

TABLE 1 - POST-TENSION FOUNDATION DESIGN

DESIGN PARAMETER[4]	VERY LOW TO LOW EXPANSION[5] (E.I. = 0-50)
e_m center lift	9.0 feet
e_m edge lift	5.2 feet
y_m center lift	0.4 inches
y_m edge lift	0.7 inch
Bearing Value [1]	1,500 psf [1]
Lateral Pressure	250 psf
Subgrade Modulus (k)	100 pci/inch
Minimum Perimeter Footing Embedment [2]	12 inches

[1] Internal bearing values within the perimeter of the post-tension slab for very low to low expansive soil conditions may be increased to 2,000 psf for a minimum embedment of 12 inches, then by 20 percent for each additional foot of embedment to a maximum of 2,500 psf.
[2] For medium to very high expansive soil conditions, internal bearing values within the perimeter of the post-tension slab may be increased to 1,500 psf for a minimum embedment of 12 inches, then by 20 percent for each additional foot of embedment to a maximum of 2,000 psf.
[3] As measured below the lowest adjacent compacted subgrade surface (not including slab underlayment layer thickness).
[4] Post-tension slab design should also be evaluated with respect to the potential differential settlements provided in this report.
[5] Category Criteria:
Category I Expansion Index < 50 (very low to low), and/or Max fill less than 25 feet thick, or fill differential less than 10 feet.

The parameters are considered minimums and may not be adequate to represent all expansive soils and site conditions such as adverse drainage and/or improper landscaping and maintenance. The above parameters are applicable provided the structure has positive drainage that is maintained away from the structure. In addition, no trees with significant root systems are to be planted within 15 feet of the perimeter of foundations. Therefore, it is important that information regarding drainage, site maintenance, trees, settlements, and effects of expansive soils be passed on to future all interested/affected parties. The values tabulated above may not be appropriate to account for possible differential settlement of the slab due to other factors, such as excessive settlements. If a stiffer slab is desired, alternative Post-Tensioning Institute ([PTI] third edition) parameters may be recommended.

Mat Foundations

In lieu of using a post-tensioned foundation to resist differential settlement and/or expansive soil effects, the Client may consider a mat foundation which uses steel bar reinforcement instead of post-tensioned cables. The structural engineer may supercede the following recommendations based on the planned building loads and use. Wire Reinforcement Institute (WRI, 2016) methodologies for design may be used.

Mat Foundation Design

The design of mat foundations should incorporate the vertical modulus of subgrade reaction. This value is a unit value for a 1-foot square footing and should be reduced in accordance with the following equation when used with the design of larger foundations. This assumes that the bearing soils will consist of engineered fills with an average relative compaction of 90 percent of the laboratory (ASTM D 1557).

$$K_R = K_S\left[\frac{B+1}{2B}\right]^2$$

where: K_S = unit subgrade modulus
K_R = reduced subgrade modulus
B = foundation width (in feet)

The modulus of subgrade reaction (K_S) and effective plasticity index (PI) to be used in mat foundation design for various expansive soil conditions are presented in the following table:

VERY LOW TO LOW EXPANSION (E.I. = 0-50)
K_S = 100 pci/inch, PI < 15

Reinforcement bar sizing and spacing for mat slab foundations should be provided by the structural engineer. Mat slabs may be uniform thickness foundations (UTF) or may incorporate the use of edge footings for moisture cut-off barriers as recommended herein for post-tension foundations. Edge footings should be a minimum of 6 inches thick. The bottom of the edge footing should be designed to resist tension, using reinforcement per the structural engineer. The need and arrangement of interior grade beams (stiffening beams) will be in accordance with the structural consultant's recommendations. The recommendations for a mat type of foundation assume that the soils below the slab are compacted fill. The parameters herein are to mitigate the effects of expansive soils and should be modified to mitigate the effects of the total and differential settlements reported in the "Foundation and Improvement Settlements" section of this report.

Specific pre-moistening/pre-soaking and moisture testing of the slab subgrade are recommended, as previously provided in this report. Slab subgrade moisture conditioning/pre-soaking should conform to the recommendations previously provided for post-tension foundation systems.

Confirmation Testing for Final Foundation Design

Following the completion of site grading, the expansion index, subgrade modulus, and corrosion potential of soils exposed near finish pad grades should be re-evaluated. Although not anticipated, the results of the recommended testing may require amendments to these preliminary recommendations.

PRELIMINARY FOUNDATION AND IMPROVEMENT SETTLEMENTS

In addition to designing slab systems (post-tension or other) for the soil conditions described herein, the estimated settlement and angular distortion values that an individual structure could be subjected to should be evaluated by a structural engineer. The levels of angular distortion were evaluated on a 40-foot length assumed as minimum dimension of buildings; if, from a structural standpoint, a decreased or increased length over which the tilt is assumed to occur is justified, this change should be incorporated into the design. The structures should be evaluated and designed for the combination of the soil parameters presented above, and the estimated total settlement, differential settlement and angular distortions provided herein.

The footings and/or slabs should be designed to accommodate a total static settlement of up to 2 inches and a static differential settlement of 1 inch, i.e., at least 1 inch in a 40-foot span. The structural engineer should consider these settlements and the performance of the foundation as well as the overlying structure. In addition to the above, the structural engineer should also consider estimated settlements due to short duration seismic loading and applicable load combinations, as required by the controlling authorities and/or the 2019 CBC. Post-construction settlement of the fill should generally be mitigated by appropriate foundation design currently recommended, provided the design parameters presented herein are properly utilized in design of foundation systems.

These settlement estimates indicated above have been based on City of Menifee and Riverside County overexcavation requirements, and do not preclude top of slope deformation (within Code setback zones) and settlement due to fills that have been saturated from utility leaks, pool leaks, prevailing climatic conditions, or excessive landscape irrigation.

SOIL MOISTURE TRANSMISSION CONSIDERATIONS

GSI has evaluated the potential for vapor or water transmission through the concrete floor slab, in light of typical floor coverings and improvements. Please note that slab moisture emission rates range from about 2 to 27 lbs/24 hours/1,000 square feet from a typical slab (Kanare, 2005), while floor covering manufacturers generally recommend about 3 lbs/24 hours as an upper limit. The recommendations in this section are not intended to preclude the transmission of water or vapor through the foundation or slabs. Foundation systems and slabs shall not allow water or water vapor to enter into the structure so as to cause damage to another building component or to limit the installation of the type of flooring materials typically used for the particular application (State of California, 2021). These recommendations may be exceeded or supplemented by a water "proofing" specialist, project architect, or structural consultant. Thus, the client will need to evaluate the following in light of a cost versus benefit analysis (owner expectations and repairs/replacement), along with disclosure to all interested/affected parties.

It should be noted that vapor transmission will occur in new slab-on-grade floors as a result of chemical reactions taking place within the curing concrete. Vapor transmission through concrete floor slabs as a result of concrete curing has the potential to adversely affect sensitive floor coverings depending on the thickness of the concrete floor slab and the duration of time between the placement of concrete and the floor covering. It is possible that a slab moisture sealant may be needed prior to the placement of sensitive floor coverings if a thick slab-on-grade floor is used and the time frame between concrete and floor covering placement is relatively short.

Considering the E.I. test results presented herein, and known soil conditions in the region, the anticipated typical water vapor transmission rates, floor coverings, and improvements (to be chosen by the Client and/or project architect) that can tolerate vapor transmission rates without significant distress, the following alternatives are provided:

- Concrete slab-on-grade floors (including garage slabs) should be thicker.

- Concrete slab underlayment should consist of a 15-mil vapor retarder, or equivalent, with all laps sealed per the 2019 CBC and the manufacturer's recommendation. The vapor retarder should comply with the ASTM E 1745 - Class A criteria, and be installed in accordance with ACI 302.1R-04 and ASTM E 1643.

- The 15-mil vapor retarder (ASTM E 1745 - Class A) shall be installed per the recommendations of the manufacturer, including all penetrations (i.e., pipe, ducting, rebar, etc.).

- Concrete slabs, including garages, shall be underlain by 2 inches of clean, washed sand (S.E. $\geq$ 30) above a 15-mil vapor retarder (ASTM E 1745 - Class A, per Engineering Bulletin 119 [Kanare, 2005]). The vapor retarder shall in-turn, be

underlain by 2 inches of sand (S.E. $\geq$ 30) placed directly on the prepared, moisture conditioned, subgrade. The vapor retarder should be sealed to provide a continuous retarder under the entire slab and should be installed per the recommendations of the manufacturer, including all penetrations (i.e., pipe, ducting, rebar, etc.). The manufacturer shall provide instructions for lap sealing, including minimum width of lap, method of sealing, and either supply or specify suitable products for lap sealing (ASTM E 1745), and per Code.

ACI 302.1R-04 (2004) states "If a cushion or sand layer is desired between the vapor retarder and the slab, care must be taken to protect the sand layer from taking on additional water from a source such as rain, curing, cutting, or cleaning. Wet cushion or sand layer has been directly linked in the past to significant lengthening of time required for a slab to reach an acceptable level of dryness for floor covering applications." Therefore, additional observation and/or testing will be necessary for the cushion or sand layer for moisture content, and relatively uniform thicknesses, prior to the placement of concrete.

- Additional concrete mix design recommendations should be provided by the structural consultant and/or waterproofing specialist. Concrete finishing and workablity should be addressed by the structural consultant and a waterproofing specialist.

- Where concrete admixtures are utilized, the structural consultant should also make changes to the concrete in the grade beams and footings in kind, so that the concrete used in the foundation and slabs are designed and/or treated for more uniform moisture protection.

- The owner(s) should be specifically advised which areas are suitable for tile flooring, vinyl flooring, or other types of water/vapor-sensitive flooring and which are not suitable. In all planned floor areas, flooring shall be installed per the manufactures recommendations.

- Additional recommendations regarding water or vapor transmission should be provided by the architect/structural engineer/slab or foundation designer and should be consistent with the specified floor coverings indicated by the architect.

Regardless of the mitigation, some limited moisture/moisture vapor transmission through the slab should be anticipated. Construction crews may require special training for installation of certain product(s), as well as concrete finishing techniques. The use of specialized product(s) should be approved by the slab designer and water-proofing consultant. A technical representative of the flooring contractor should review the slab and moisture retarder plans and provide comment prior to the construction of the foundations or improvements. The vapor retarder contractor should have representatives onsite during the initial installation.

PRELIMINARY WALL DESIGN PARAMETERS

General

Recommendations for the design and construction of conventional masonry retaining walls are provided below. Recommendations for specialty walls (i.e., crib, earthstone, mechanically stabilized earth [MSE], gravity, etc.) can be provided upon request, and would be based on site specific conditions.

Conventional Retaining Walls

The design parameters provided below assume that either very low expansive soils (typically Class 2 permeable filter material or Class 3 aggregate base) or native onsite materials with an expansion index up to 20 are used to backfill any retaining wall. Please note that some onsite soils likely do not meet this criteria. The type of backfill (i.e., select or native), should be specified by the wall designer, and clearly shown on the plans. Building walls, below grade, should be water-proofed. Waterproofing should also be provided for site retaining walls in order to reduce the potential for efflorescence staining.

Preliminary Retaining Wall Foundation Design

Preliminary foundation design for retaining walls should incorporate the following recommendations:

Minimum Footing Embedment - 18 inches below the lowest adjacent grade (excluding landscape layer [upper 6 inches]).

Minimum Footing Width - 24 inches

Allowable Bearing Pressure - An allowable bearing pressure of 2,500 pcf may be used in the preliminary design of retaining wall foundations provided that the footing maintains a minimum width of 24 inches and extends at least 18 inches into approved engineered fill overlying dense formational materials. This pressure may be increased by one-third for short-term wind and/or seismic loads.

Passive Earth Pressure - A passive earth pressure of 250 pcf with a maximum earth pressure of 2,500 psf may be used in the preliminary design of retaining wall foundations provided the foundation is embedded into properly compacted silty to clayey sand fill.

Lateral Sliding Resistance - A 0.35 coefficient of friction may be utilized for a concrete to soil contact when multiplied by the dead load. When combining passive pressure and frictional resistance, the passive pressure component should be reduced by one-third.

Backfill Soil Density - Soil densities ranging between 125 pcf and 135 pcf may be used in the design of retaining wall foundations. This assumes an average engineered fill compaction of at least 90 percent of the laboratory standard (ASTM D 1557).

Any retaining wall footings near the perimeter of the site will likely need to be deepened into unweathered native deposits for adequate vertical and lateral bearing support. All retaining wall footing setbacks from slopes should comply with Figure 1808.7.1 of the 2019 CBC. GSI recommends a minimum horizontal setback distance of 7 feet as measured from the bottom, outboard edge of the footing to the slope face.

Restrained Walls

Any retaining walls that will be restrained prior to placing and compacting backfill material or that have re-entrant or male corners, should be designed for an at-rest equivalent fluid pressure (EFP) of 55 pcf and 65 pcf for select and very low expansive native backfill, respectively. The design should include any applicable surcharge loading. For areas of male or re-entrant corners, the restrained wall design should extend a minimum distance of twice the height of the wall (2H) laterally from the corner.

Cantilevered Walls

The recommendations presented below are for cantilevered retaining walls up to 10 feet high. Design parameters for walls less than 3 feet in height may be superceded by City of Menifee standard design. Active earth pressure may be used for retaining wall design, provided the top of the wall is not restrained from minor deflections. An equivalent fluid pressure approach may be used to compute the horizontal pressure against the wall. Appropriate fluid unit weights are given below for specific slope gradients of the retained material. These do not include other superimposed loading conditions due to traffic, structures, seismic events or adverse geologic conditions. When wall configurations are finalized, the appropriate loading conditions for superimposed loads can be provided upon request.

For preliminary planning purposes, the structural consultant/wall designer should incorporate the surcharge of traffic on the back of retaining walls where vehicular traffic could occur within horizontal distance “H” from the back of the retaining wall (where “H” equals the wall height). The traffic surcharge may be taken as 100 psf/ft in the upper 5 feet of backfill for light truck and cars traffic. This does not include the surcharge of parked vehicles which should be evaluated at a higher surcharge to account for the effects of seismic loading. Equivalent fluid pressures for the design of cantilevered retaining walls are provided in the following table:

SURFACE SLOPE OF RETAINED MATERIAL (HORIZONTAL:VERTICAL)	EQUIVALENT FLUID WEIGHT P.C.F. (SELECT BACKFILL)[2]	EQUIVALENT FLUID WEIGHT P.C.F. (NATIVE BACKFILL)[3]
Level[1]	38	50
2 to 1	55	65

[1] Level backfill behind a retaining wall is defined as compacted earth materials, properly drained, without a slope for a distance of 2H behind the wall, where H is the height of the wall.
[2] SE > 30, P.I. < 15, E.I. < 21, and < 10% passing No. 200 sieve.
[3] E.I. = 0 to 50, SE > 30, P.I. < 15, E.I. < 21, and < 15% passing No. 200 sieve.

Seismic Surcharge

For engineered retaining walls with more than 6 feet of retained materials, as measured vertically from the bottom of the wall footing at the heel to daylight , GSI recommends that the walls be evaluated for a seismic surcharge (in general accordance with 2019 CBC requirements). The site walls in this category should maintain an overturning factor-of-safety (FOS) of approximately 1.25 when the seismic surcharge (increment), is applied. For restrained walls, the seismic surcharge should be applied as a uniform surcharge load from the bottom of the footing (excluding shear keys) to the top of the backfill at the heel of the wall footing. This seismic surcharge pressure (seismic increment) may be taken as 15H where "H" for retained walls is the dimension previously noted as the height of the backfill to the bottom of the footing. The resultant force should be applied at a distance 0.6 H up from the bottom of the footing. For the evaluation of the seismic surcharge, the bearing pressure may exceed the static value by one-third, considering the transient nature of this surcharge. For cantilevered walls, the pressure should be applied as an inverted triangular distribution using 15H. For restrained walls, the pressure should be applied as a rectangular distribution. Please note this is for local wall stability only.

The 15H is derived from a Mononobe-Okabe solution for both restrained cantilever walls. This accounts for the increased lateral pressure due to shakedown or movement of the sand fill soil in the zone of influence from the wall or roughly a 45˚ - ϕ/2 plane away from the back of the wall. The 15H seismic surcharge is derived from the formula:

$$P_h = ⅜ \bullet a_h \bullet \gamma_t H$$

Where:
- P_h = Seismic increment
- a_h = Probabilistic horizontal site acceleration with a percentage of "g"
- γ_t = total unit weight (125 to 135 pcf for site soils @ 90% relative compaction).
- H = Height of the wall from the bottom of the footing or point of pile fixity.

Retaining Wall Backfill and Drainage

Positive drainage must be provided behind all retaining walls in the form of gravel wrapped in geofabric and outlets. A backdrain system is considered necessary for retaining walls that are 2 feet or greater in height. Details 1, 2, and 3, present the backdrainage options discussed below. Backdrains should consist of a 4-inch diameter perforated PVC or ABS pipe encased in either Class 2 permeable filter material or ¾-inch to 1½-inch gravel wrapped in approved filter fabric (Mirafi 140 or equivalent). For select backfill, the filter material should extend a minimum of 1 horizontal foot behind the base of the walls and upward at least 1 foot. For native backfill that has up to E.I. = 20, continuous Class 2 permeable drain materials should be used behind the wall. This material should be continuous (i.e., full height) behind the wall, and it should be constructed in accordance with the enclosed Detail 1 (Typical Retaining Wall Backfill and Drainage Detail). For limited access and confined areas, (panel) drainage behind the wall may be constructed in accordance with Detail 2 (Retaining Wall Backfill and Subdrain Detail Geotextile Drain). Materials with an expansion index (E.I.) potential of greater than 20 should not be used as backfill for retaining walls. Retaining wall backfill materials should be moisture conditioned and mixed to achieve the soil's optimum moisture content, placed in relatively thin lifts (6 to 10 inches), and compacted to at least 90 percent relative compaction. For more onerous expansive situations, backfill and drainage behind the retaining wall should conform with Detail 3 (Retaining Wall And Subdrain Detail Clean Sand Backfill).

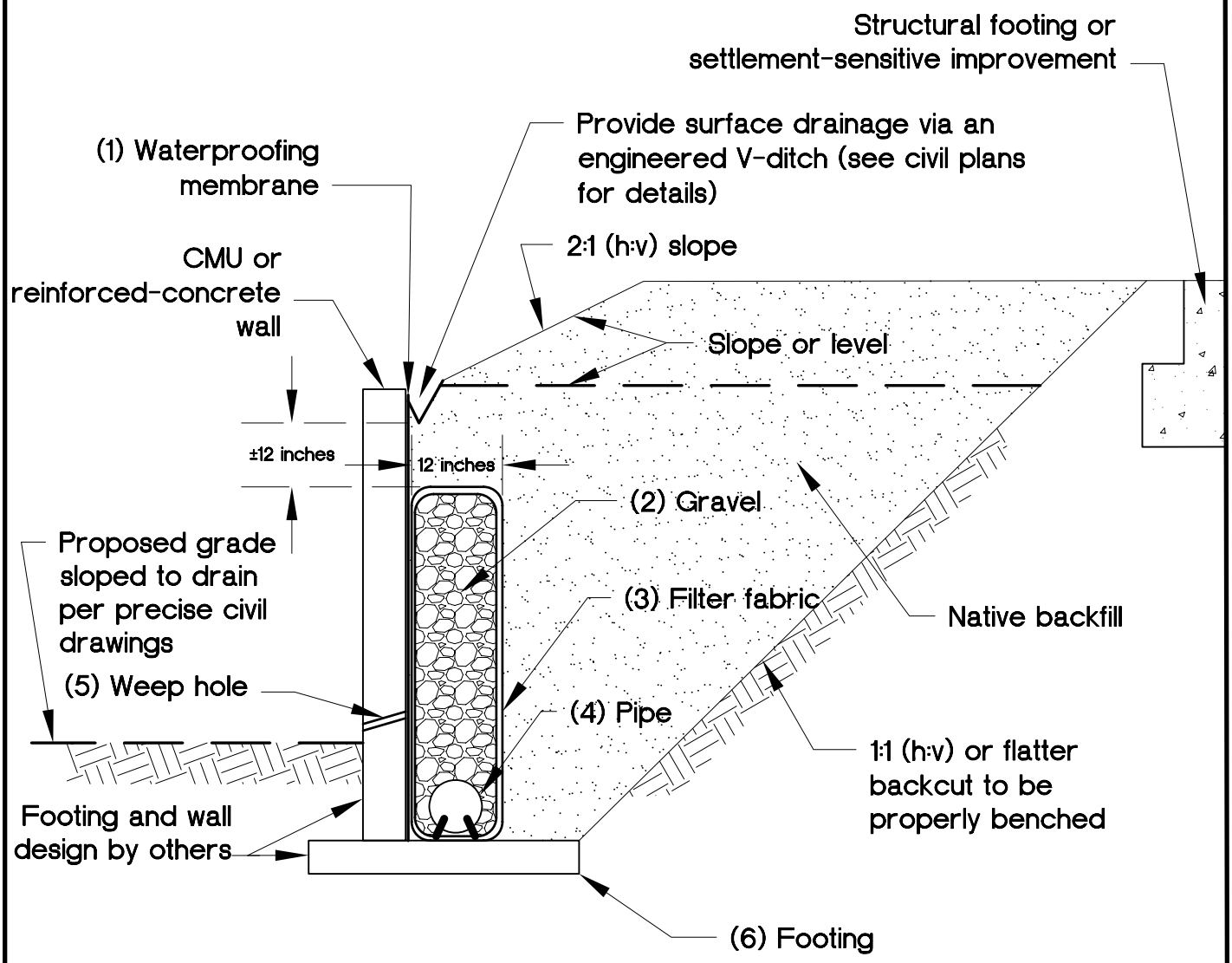
Outlets should consist of a 4-inch diameter solid PVC or ABS pipe spaced no greater than ±100 feet apart, with a minimum of two outlets, one on each end. The use of weep holes, only, in walls higher than 2 feet, is not recommended. The surface of the backfill should be sealed by pavement or the top 18 inches compacted with native soil (E.I. $\leq$ 50). Proper surface drainage should also be provided. For additional mitigation, consideration should be given to applying a water-proof membrane to the back of all retaining structures. The use of a waterstop should be considered for all concrete and masonry joints.

Wall/Retaining Wall Footing Transitions

Site walls are anticipated to be founded on footings designed in accordance with the recommendations in this report. Should wall footings transition from cut to fill, the structural consultant/wall designer may specify either:

a) A minimum of a 2-foot overexcavation and recompaction of cut materials for a distance of 2H, from the point of transition.

b) Increase of the amount of reinforcing steel and wall detailing (i.e., expansion joints or crack control joints) such that a angular distortion of 1/360 for a distance of 2H on either side of the transition may be accommodated. Expansion joints should be placed no greater than 20 feet on-center, in accordance with the structural engineer's/wall designer's recommendations, regardless of whether or not transition conditions exist. Expansion joints should be sealed with a flexible, non-shrink grout.



(1) Waterproofing membrane.

(2) Gravel: Clean, crushed, ¾ to 1½ inch.

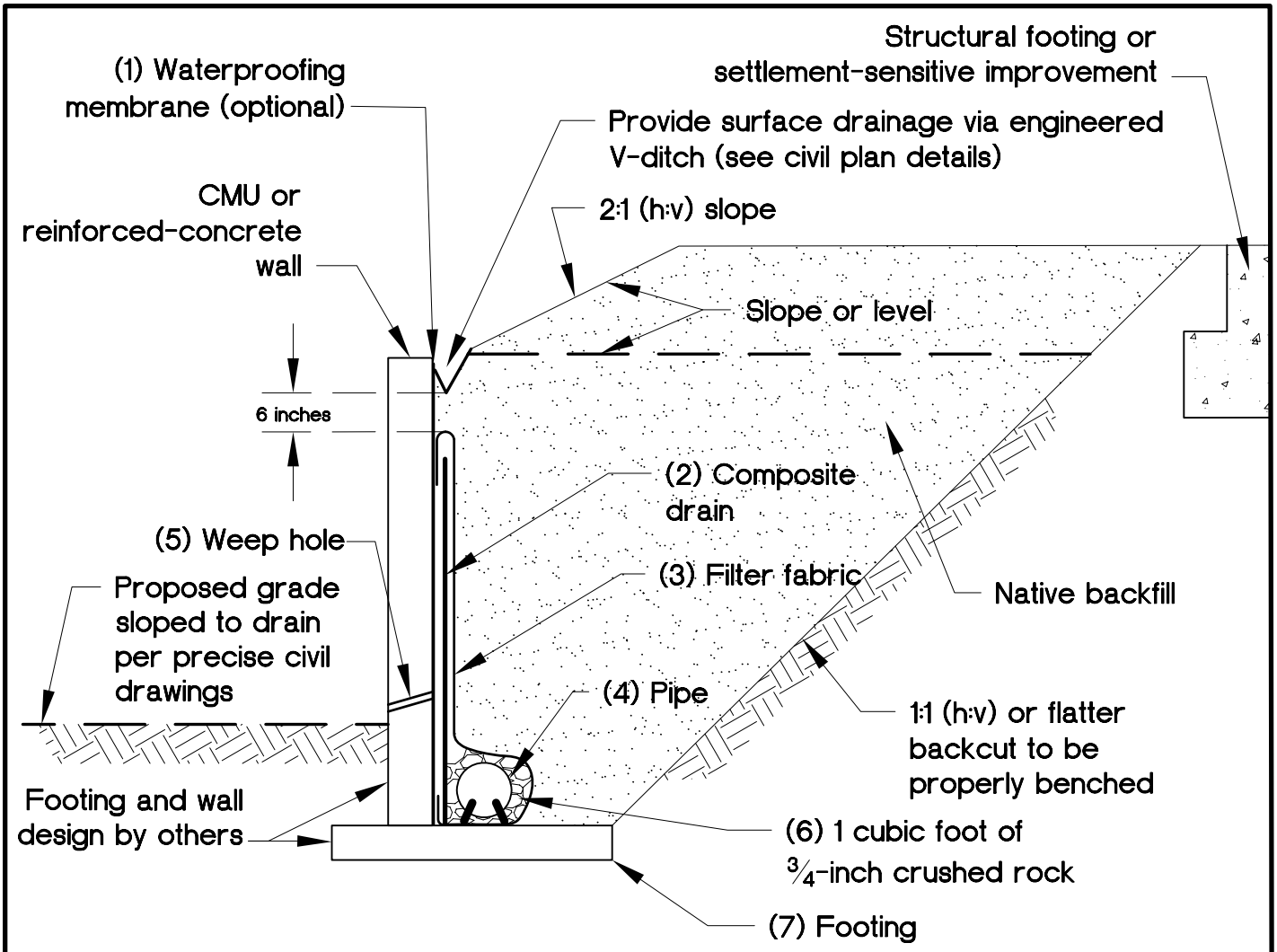
(3) Filter fabric: Mirafi 140N or approved equivalent.

(4) Pipe: 4-inch-diameter perforated PVC, Schedule 40, or approved alternative with minimum of 1 percent gradient sloped to suitable, approved outlet point (perforations down).

(5) Weep hole: Minimum 2-inch diameter placed at 20-foot centers along the wall and placed 3 inches above finished surface. Design civil engineer to provide drainage at toe of wall. No weep holes for below-grade walls.

(6) Footing: If bench is created behind the footing greater than the footing width, use level fill or cut natural earth materials. An additional "heel" drain will likely be required by geotechnical consultant.

GeoSoils, Inc.	RETAINING WALL DETAIL – ALTERNATIVE A	Detail 1



(1) Waterproofing membrane (optional): Liquid boot or approved mastic equivalent.

(2) Drain: Miradrain 6000 or J-drain 200 or equivalent for non-waterproofed walls; Miradrain 6200 or J-drain 200 or equivalent for waterproofed walls (all perforations down).

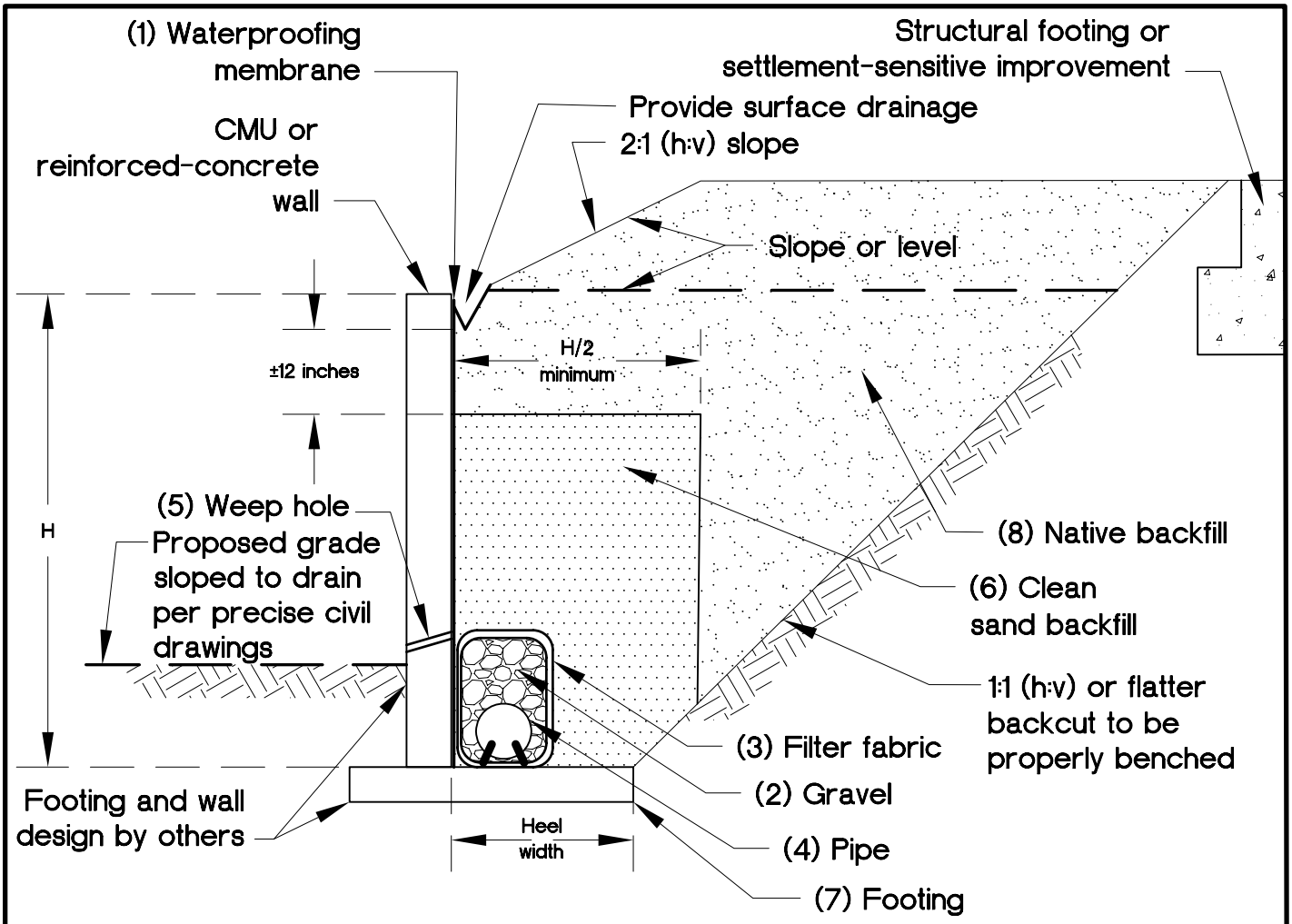
(3) Filter fabric: Mirafi 140N or approved equivalent; place fabric flap behind core.

(4) Pipe: 4-inch-diameter perforated PVC, Schedule 40, or approved alternative with minimum of 1 percent gradient to proper outlet point (perforations down).

(5) Weep hole: Minimum 2-inch diameter placed at 20-foot centers along the wall and placed 3 inches above finished surface. Design civil engineer to provide drainage at toe of wall. No weep holes for below-grade walls.

(6) Gravel: Clean, crushed, ¾ to 1½ inch.

(7) Footing: If bench is created behind the footing greater than the footing width, use level fill or cut natural earth materials. An additional "heel" drain will likely be required by geotechnical consultant.



(1) Waterproofing membrane: Liquid boot or approved masticequivalent.

(2) Gravel: Clean, crushed, ¾ to 1½ inch.

(3) Filter fabric: Mirafi 140N or approved equivalent.

(4) Pipe: 4-inch-diameter perforated PVC, Schedule 40, or approved alternative with minimum of 1 percent gradient to proper outlet point (perforations down).

(5) Weep hole: Minimum 2-inch diameter placed at 20-foot centers along the wall and placed 3 inches above finished surface. Design civil engineer to provide drainage at toe of wall. No weep holes for below-grade walls.

(6) Clean sand backfill: Must have sand equivalent value (S.E.) of 35 or greater; can be densified by water jetting upon approval by geotechnical engineer.

(7) Footing: If bench is created behind the footing greater than the footing width, use level fill or cut natural earth materials. An additional "heel" drain will likely be required by geotechnical consultant.

(8) Native backfill: If E.I. <21 and S.E. ≥ 35 then all sand requirements also may not be required and will be reviewed by the geotechnical consultant.

c) Embed the footings entirely into native formational material (i.e., deepened footings).

If transitions from cut to fill transect the wall footing alignment at an angle of less than 45 degrees (plan view), then the designer should follow recommendation "a" (above) and until such transition is between 45 and 90 degrees to the wall alignment.

PRELIMINARY PAVEMENT DESIGN AND CONSTRUCTION

General

The governing agency may retain the authority to approve the final structural design sections after subgrade elevations and actual resistance values (R-values) have been obtained at the conclusion of earthwork. Based on a general review of pavement designs for other nearby projects, and for estimation and bidding purposes, the pavement sections provided herein should be considered for preliminary design. Typically, actual pavement sections will likely vary, therefore final pavement sections should be based on actual R-value testing performed during, or shortly after, roadway grading for any proposed street and driveway/parking area improvements.

Asphaltic Concrete (AC) Pavements

The preliminary design for Asphaltic Concrete (AC), and Portland Cement Concrete Pavement (PCCP) was evaluated based on a R-value of 48, and the use of concrete shoulders (curb and/or gutter) at the edge of PCC pavement. GSI does not recommend the use of an ADTT value of less than 25 for any pavement section, unless the ADTT significantly less than 25 is certified by a civil engineer specializing in traffic engineering.

Pavement Design

The preliminary pavement sections presented in the following table are based on the preliminary R-value test results obtained, the general Traffic Indices (T.I.'s) used by the City of Menifee (Street Design Requirements - Standard Plan No. 80) for a rural (road), general local (road), and collector/enhanced local (road), and the guidelines presented in the latest revision to the California Department of Transportation (Caltrans, 2020) "Highway Design Manual" seventh edition. It is our understanding that the minimum pavement section required by the City of Menifee for a rural (road) and general local (road) is 4.0 inches of AC (asphaltic concrete) on 6.0 inches of Class 2 aggregate base for a T.I. of 5.0 to 5.5. Based on a R-value of 48 obtained (i.e., R=48), the following preliminary pavement designs are presented. Applicable sections of City ordinances should be followed during design of public roads, fire access lanes, etc.

Asphaltic Concrete Pavement (ACP)

Preliminary asphaltic concrete (AC) pavement sections are presented in the following table:

STREET CLASSIFICATION	TRAFFIC INDEX (T.I.)[1]	STANDARD PAVEMENT DESIGNS		
		R-VALUE	AC INCHES	CLASS 2 BASE ROCK[2] INCHES
Rural (Road)	5.0	48	4.0*	6.0*
General Local (Road)	5.5	48	4.0*	6.0*
Collector/Enhanced Local (Road)	8.0	48	5.0*	6.0*

[1] T.I.s are based on City street design criteria (City of Menifee, Standard Plan No. 80).
[2] Denotes standard Caltrans Class 2 aggregate base rock (R $\geq$ 78, SE $\geq$ 25).
* Denotes City of Menifee minimum asphaltic concrete or aggregate base.

The preliminary pavement sections provided above are intended as a minimum guideline. If thinner or highly variable pavement sections are constructed, increased maintenance and repair could be expected. If the ADT (average daily traffic) or ADTT (average daily truck traffic) increases beyond that intended, as reflected by the T.I. used for design, increased maintenance and repair could be required for the pavement section. Consideration should be given to the increased potential for distress from overuse of paved street areas by heavy equipment and/or construction related heavy traffic (e.g., concrete trucks, loaded supply trucks, etc.), particularly when the final section is not in place (i.e., topcoat). Best management construction practices should be followed at all times, especially during inclement weather.

Portland Concrete Cement (PCC) Pavement

The preliminary design for Portland Cement Concrete Pavement (PCCP) was evaluated utilizing a subgrade R-value of 48, a modulus of rupture (MR) of 420 and 500 psi. GSI does not recommend the use of an ADTT value of less than 25 for any pavement section, unless the ADTT significantly less than 25 is certified by a civil engineer specializing in traffic engineering. The preliminary PCCP sections are provided in the following table:

PORTLAND CONCRETE CEMENT PAVEMENTS (PCCP)*					
TRAFFIC AREAS	CONCRETE TYPE	PCCP THICKNESS (INCHES)	TRAFFIC AREAS	CONCRETE TYPE	PCCP THICKNESS (INCHES)
Light Vehicles	520-C-2500	6.0	Heavy Truck Traffic	520-C-2500	8.0
	560-C-3250	5.0		560-C-3250	7.0

NOTE: All PCCP is designed as un-reinforced and bearing directly on compacted subgrade. However, a 4-inch thick leveling course of compacted aggregate base, or crushed rock may be considered to improve performance. All PCCP should be properly detailed (jointing, etc.) per the industry standard. Pavements may be additionally reinforced with #4 reinforcing bars, placed 18 inches on center, each way, for improved performance.
* To be re-evaluated based on exposed field conditions and R-values obtained following rough grading.

The transition of the pavement from parking to traffic lanes should be made over a distance of 24 inches with crack control joints (weaken plane) or contact joints at the end of the transition. A minimum 4-inch layer of base rock in traffic and bus stop areas should be considered to improve traffic lane performance. Base rock may consist of either ¾-inch crushed rock or Caltrans Class 2 aggregate base. Crushed rock may be compacted by vibratory methods. Aggregate base should be compacted to a minimum relative compaction of 95 percent.

Weakened Plane Joints

Transverse and longitudinal weakened plane joints may be constructed per Caltrans Standard specifications, Section 40-1.08B and 40-1.08B(1). Transverse weakened plane joints should be spaced no farther than 15 feet apart and no closer than 5 feet. Longitudinal weakened plane joints should be spaced no farther than 20 feet apart, but not less than 5 feet.

Expansion Joints and Contact Joints

Transverse expansion joints should be constructed at 120-foot spacings, or in accordance with City standards. Transverse and longitudinal contact joints should be constructed in accordance with the recommendations of the design engineer. Within large slab areas, joint spacings should be no greater than 20 feet.

Slab Reinforcement

The preliminary PCC Pavements for this project are designed as unreinforced and should perform adequately, assuming proper construction. If additional control of internal slab stresses (i.e., curing shrinkage, thermal expansion and contraction), and the effects of expansive soil subgrades is desired, then the use of No. 4 reinforcing bars, 18 inches on center each way, should be considered.

Subgrade should be compacted to a minimum relative compaction of 95 percent. Aggregate base compaction should be 95 percent of the maximum dry density (ASTM D 1557). If adverse conditions (i.e., saturated ground, etc.) are encountered during preparation of subgrade, special construction methods may need to be employed. These recommendations should be considered preliminary. R-value testing and pavement design analysis should be performed upon completion of grading for the project.

Concrete/Pervious Pavers

Concrete pavers should be underlain by a minimum of 8 inches of aggregate base, overlain by a leveling-course of sand, and/or per the manufacturers guidelines. Manufacturer's guidelines should be reviewed for concordance with the intent of the geotechnical report and the underlying soil conditions. Prior to aggregate base placement the subgrade soils should be compacted to a minimum relative compaction of 95 percent.

Aggregate base compaction should also be 95 percent of the maximum dry density (ASTM D-1557), and follow the pavement grading recommendations provided below, as warranted.

PAVEMENT GRADING RECOMMENDATIONS

General

All section changes should be properly transitioned. If adverse conditions are encountered during the preparation of subgrade materials, special construction methods may need to be employed. A GSI representative should be present for the preparation of subgrade, aggregate base rock, and asphalt concrete.

Subgrade

Within access drives and parking areas, all surficial deposits of loose soil material should be removed and recompacted as recommended. After the loose soils are removed, the bottom is to be scarified to a depth of at least 6 inches, moisture conditioned as necessary and compacted to 95 percent of the maximum laboratory density or the City minimum, as evaluated by ASTM Test Method D 1557.

Deleterious material, excessively wet or dry pockets, concentrated zones of oversized rock fragments, and any other unsuitable materials encountered during grading should be removed. The compacted fill material should then be brought to the elevation of the proposed subgrade for the pavement. The subgrade should be proof-rolled in order to ensure a uniform firm and unyielding surface. All grading and fill placement should be observed by the project geotechnical consultant and/or his representative.

Aggregate Base Rock

Compaction tests are required for the recommended base section. Minimum relative compaction required will be 95 percent of the laboratory maximum density as evaluated by ASTM Test Designation D 1557. Base aggregate should be in accordance to the Caltrans Class 2 base rock (minimum R-value=78).

Drainage

Positive drainage should be provided for all surface water to drain towards the area swale, curb and gutter, catch basin, or to an approved drainage channel. Positive site drainage should be maintained at all times. Water should not be allowed to pond or seep into the ground. If planters or landscaping are adjacent to paved areas, measures should be taken to minimize the potential for water to enter the pavement section, such as thickened edges, enclosed planters, etc.

Additional Considerations

To mitigate perched groundwater, consideration should be given to installation of subgrade separators (cut-offs) between pavement subgrade and landscape areas (such as planting strips in parkways), although this is not a requirement from a geotechnical standpoint. Cut-offs, if utilized, should be 6 inches wide and at least 12 inches below the pavement/subgrade contact or 12 inches below the aggregate base rock, if utilized.

DRIVEWAYS, CONCRETE APRONS, FLATWORK, AND OTHER IMPROVEMENTS

The soil materials on site may be expansive. The effects of expansive soils are cumulative, and typically occur over the lifetime of any improvements. On relatively level areas, when the soils are allowed to dry, the dessication and swelling process tends to cause heaving and distress to flatwork and other improvements. The resulting potential for distress to improvements may be reduced, but not totally eliminated. To that end, it is recommended that the developer should notify any owners and/or interested/affected parties of this long-term potential for distress. To reduce the likelihood of distress, the following recommendations are presented for all exterior flatwork:

1. The subgrade area for sidewalk slabs should be compacted to achieve a minimum 90 percent relative compaction, the subgrade area for access drive slabs and concrete aprons should be compacted to achieve a minimum 95 percent relative compaction, and then be presoaked to 2 to 3 percentage points above (or 125 percent of) the soils' optimum moisture content, to a depth of 18 inches below subgrade elevation. If very low expansive soils are present, only optimum moisture content, or greater, is required and specific presoaking is not warranted. The moisture content of the subgrade should be proof tested within 72 hours prior to concrete placement.

2. Exterior concrete slabs should be cast over a non-yielding surface, consisting of a 4-inch layer of Class 2 base, crushed rock, gravel, or clean sand (or City minimum, whichever is greater), that should be compacted and level prior to placement of concrete. If very low expansive soils are present, the base, rock, gravel, or sand may be deleted. The layer or subgrade should be wet-down completely prior to placement of concrete, to minimize loss of concrete moisture to the surrounding earth materials.

3. Exterior sidewalk slabs should be a minimum of 4 inches thick. Access drive slabs should be a minimum of 5 inches thick. Slabs and approaches should additionally have a thickened edge (12 inches) adjacent to all landscape areas, to help impede infiltration of landscape water under the slab. Trash disposal (dumpster) area aprons should be a minimum of 6 inches thick and meet minimum City standards, as necessary.

4. Curbs next to slopes should have a thickened edge similar to drives and approaches.

5. The use of transverse and longitudinal control joints are recommended to help control slab cracking due to concrete shrinkage or expansion. Two ways to mitigate such cracking are: a) add a sufficient amount of reinforcing steel, increasing tensile strength of the slab; and, b) provide an adequate amount of control and/or expansion joints to accommodate anticipated concrete shrinkage and expansion.

   In order to reduce the potential for unsightly cracks, slabs should be reinforced at mid-height with a minimum of No. 3 bars placed at 18 inches on center, in each direction. If subgrade soils within the top 7 feet from finish grade are very low expansive soils (i.e., E.I. $\leq$20), then 6x6-W1.4xW1.4 welded-wire mesh may be substituted for the rebar, provided the reinforcement is placed on chairs, at slab mid-height. The exterior slabs should be scored or saw cut, ½ to ⅜ inches deep, often enough so that no section is greater than 10 feet by 10 feet. For sidewalks or narrow slabs, control joints should be provided at intervals of every 6 feet. The slabs should be separated from the foundations and sidewalks with expansion joint filler material. Presoaking, as indicated earlier, is recommended for slab subsoils.

6. No traffic should be allowed upon the newly placed concrete slabs until they have been properly cured to within 75 percent of design strength. Concrete compression strength should be a minimum of 2,500 psi.

7. Access drives, sidewalks, and patio/exterior slabs adjacent to the structure should be separated from the structure with thick expansion joint filler material. In areas directly adjacent to a continuous source of moisture (i.e., irrigation, planters, etc.), all joints should be additionally sealed with flexible mastic.

8. Planters and walls (sound walls or retaining walls) should not be tied to the structure.

9. Overhang structures should be supported on the slabs, or structurally designed with continuous footings tied in at least two directions. If very low expansion soils are present, footings need only be tied in one direction.

10. Any masonry landscape or sound walls that are to be constructed throughout the property should be grouted and articulated in segments no more than 20 feet long. These segments should be keyed or doweled together.

11. If settlement concerns or expansive soils are present, utilities may be enclosed within a closed utilidor (vault) or designed with flexible connections to accommodate differential settlement and expansive soil conditions.

12. Positive site drainage should be maintained at all times. Finish grade on the building pad should provide a minimum of 1 to 2 percent fall to the street, as indicated herein. It should be kept in mind that drainage reversals could occur, including post-construction settlement, if relatively flat drainage gradients are not periodically maintained by the owner and/or interested/affected parties.

13. Air conditioning (A/C) units should be supported by slabs that are incorporated into the building foundation or constructed on a rigid slab with flexible couplings for plumbing and electrical lines. A/C waste water lines should be drained to a suitable non-erosive outlet.

14. Shrinkage cracks could become excessive if proper finishing and curing practices are not followed. Finishing and curing practices should be performed per the Portland Cement Association (PCA) guidelines. Mix design should incorporate rate of curing for climate and time of year, sulfate content of soils, corrosion potential of soils, and fertilizers used on site.

DEVELOPMENT CRITERIA

Slope Deformation

Compacted fill slopes designed using customary factors of safety for gross or surficial stability and constructed in general accordance with the design specifications should be expected to undergo some differential vertical heave or settlement in combination with differential lateral movement in the out-of-slope direction, after grading. This post-construction movement occurs in two forms: slope creep, and lateral fill extension (LFE). Slope creep is caused by alternate wetting and drying of the fill soils which results in slow downslope movement. This type of movement is expected to occur throughout the life of the slope, and is anticipated to potentially affect improvements or structures (e.g., separation and/or cracking), placed near the top-of-slope, up to a maximum distance of approximately 15 feet from the top-of-slope, depending on the slope height. This movement generally results in rotation and differential settlement of improvements located within the creep zone. LFE occurs due to deep wetting from irrigation and rainfall on slopes comprised of expansive materials. Although some movement should be expected, long-term movement from this source may be minimized, but not eliminated, by placing the fill throughout the slope region, wet of the fill's optimum moisture content.

It is generally not practical to attempt to eliminate the effects of either slope creep or LFE. Suitable mitigative measures to reduce the potential of lateral deformation typically include: setback of improvements from the slope faces (per 2019 CBC), positive structural separations (i.e., joints) between improvements, and stiffening and deepening of foundations. Expansion joints in walls should be placed no greater than 20 feet on-center, and in accordance with the structural engineer's recommendations. All of these measures are recommended for design of structures and improvements. The ramifications of the

above conditions, and recommendations for mitigation, should be provided to each homeowner and/or any homeowners association.

Slope Maintenance and Planting

Water has been shown to weaken the inherent strength of all earth materials. Slope stability is significantly reduced by overly wet conditions. Positive surface drainage away from slopes should be maintained and only the amount of irrigation necessary to sustain plant life should be provided for planted slopes. Over-watering should be avoided as it adversely affects site improvements, and causes perched groundwater conditions. Graded slopes constructed utilizing onsite materials would be erosive. Eroded debris may be minimized and surficial slope stability enhanced by establishing and maintaining a suitable vegetation cover soon after construction. Compaction to the face of fill slopes would tend to minimize short-term erosion until vegetation is established. Plants selected for landscaping should be light weight, deep rooted types that require little water and are capable of surviving the prevailing climate. Jute-type matting or other fibrous covers may aid in allowing the establishment of a sparse plant cover. Utilizing plants other than those recommended above will increase the potential for perched water, staining, mold, etc., to develop. A rodent control program to prevent burrowing should be implemented. Irrigation of natural (ungraded) slope areas is generally not recommended. These recommendations regarding plant type, irrigation practices, and rodent control should be provided to each homeowner. Over-steepening of slopes should be avoided during building construction activities and landscaping.

Drainage

Adequate lot surface drainage is a very important factor in reducing the likelihood of adverse performance of foundations, hardscape, and slopes. Surface drainage should be sufficient to prevent ponding of water anywhere on a lot, and especially near structures and tops of slopes. Lot surface drainage should be carefully taken into consideration during fine grading, landscaping, and building construction. Therefore, care should be taken that future landscaping or construction activities do not create adverse drainage conditions. Positive site drainage within lots and common areas should be provided and maintained at all times. Drainage should not flow uncontrolled down any descending slope. Water should be directed away from foundations and not allowed to pond and/or seep into the ground. In general, the area within 5 feet around a structure should slope away from the structure. We recommend that unpaved lawn and landscape areas have a minimum gradient of 1 percent sloping away from structures, and whenever possible, should be above adjacent paved areas. Consideration should be given to avoiding construction of planters adjacent to structures (buildings, retaining walls, etc.). Pad drainage should be directed toward the street or other approved area(s). Although not a geotechnical requirement, roof gutters, downspouts, or other appropriate, means may be utilized to control roof drainage. Downspouts, or drainage devices, should outlet a minimum of 5 feet from structures or into a subsurface drainage system. Areas of seepage may develop due to irrigation or heavy rainfall, and should be anticipated. Minimizing irrigation will lessen

this potential. If areas of seepage develop, recommendations for minimizing this effect could be provided upon request.

Toe of Slope Drains/Toe Drains

Where significant slopes intersect pad areas, surface drainage down the slope allows for some seepage into the subsurface materials, sometimes creating conditions causing or contributing to perched and/or ponded water. Toe of slope/toe drains may be beneficial in the mitigation of this condition due to surface drainage. The general criteria to be utilized by the design engineer for evaluating the need for this type of drain is as follows:

- Is there a source of irrigation above or on the slope that could contribute to saturation of soil at the base of the slope?

- Are the slopes hard rock and/or impermeable, or relatively permeable, or; do the slopes already have or are they proposed to have subdrains (i.e., stabilization fills, etc.)?
- Are there cut-fill transitions (i.e., fill over bedrock), within the slope?

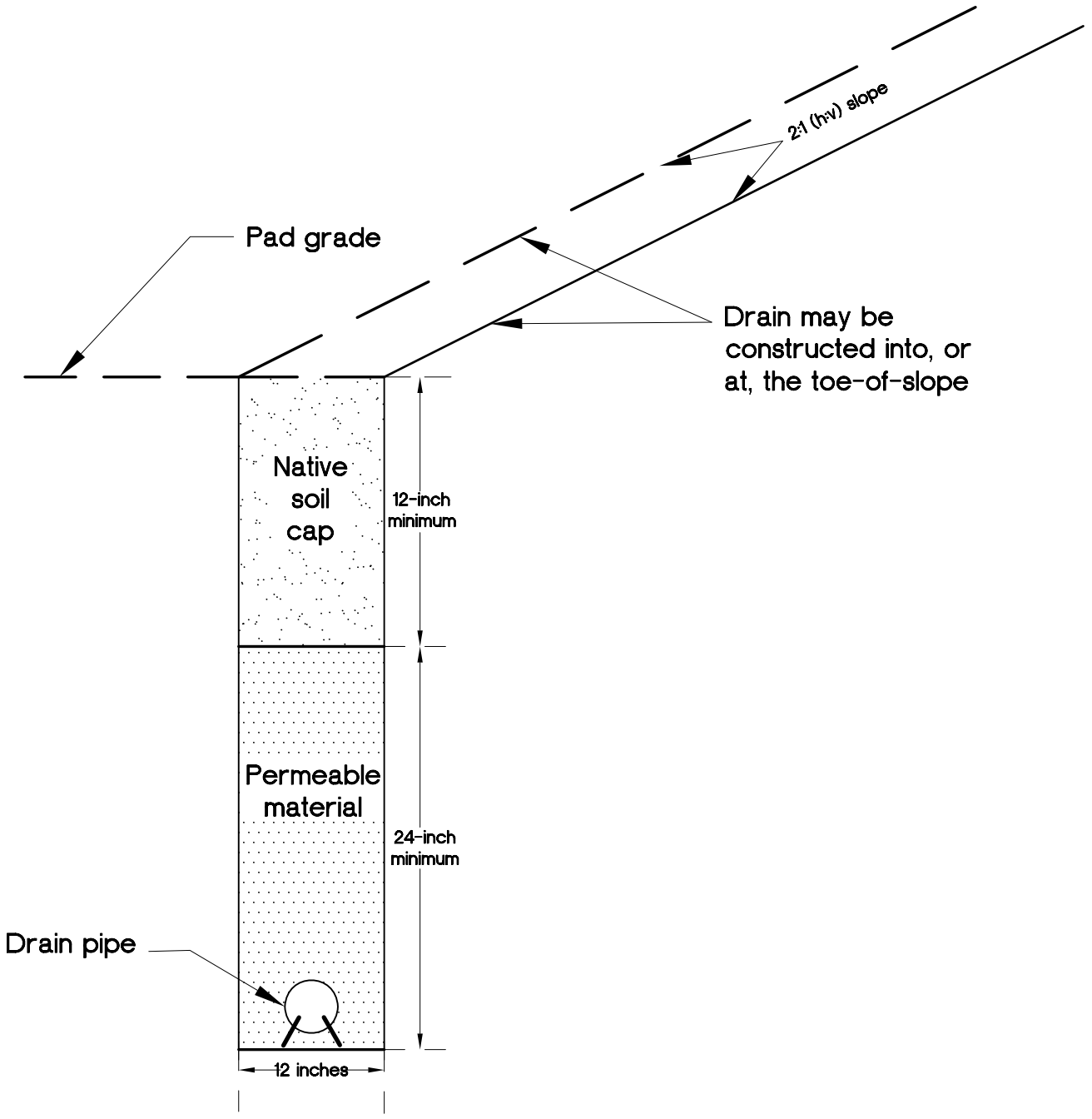
- Was the lot at the base of the slope overexcavated or is it proposed to be overexcavated? Overexcavated lots located at the base of a slope could accumulate subsurface water along the base of the fill cap.

- Are the slopes north facing? North facing slopes tend to receive less sunlight (less evaporation) relative to south facing slopes and are more exposed to the currently prevailing seasonal storm tracks.

- What is the slope height? It has been our experience that slopes with heights in excess of approximately 10 feet tend to have more problems due to storm runoff and irrigation than slopes of a lesser height.

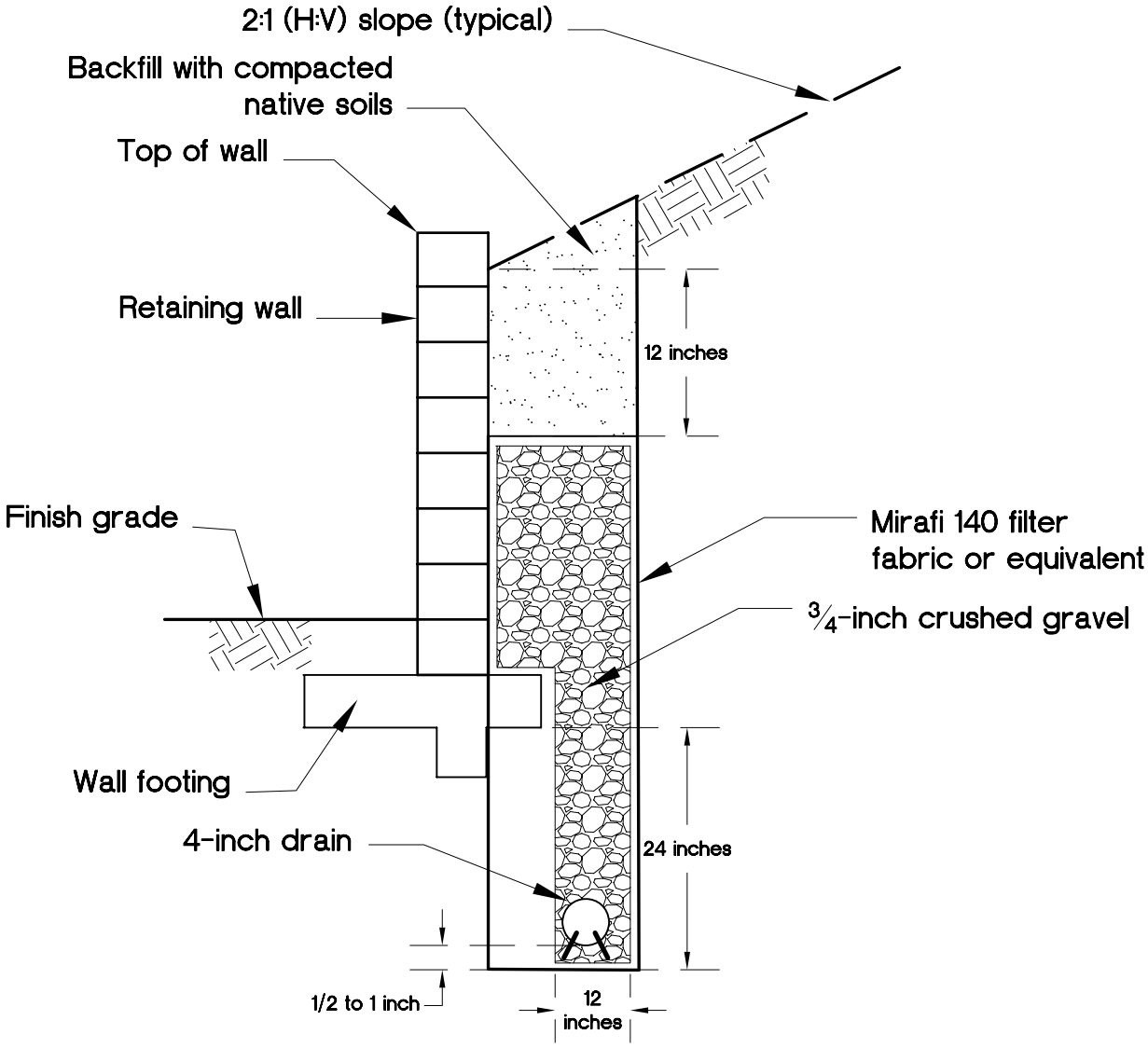
- Do the slopes “toe out” into a commercial lot or a lot where perched or ponded water may adversely impact its proposed use?

Based on these general criteria, the construction of toe drains may be considered by the design engineer along the toe of slopes, or at retaining walls in slopes, descending to the rear of such lots. Following are Detail 4 (Schematic Toe Drain Detail) and Detail 5 (Subdrain Along Retaining Wall Detail). Other drains may be warranted due to unforeseen conditions, homeowner irrigation, or other circumstances. Where drains are constructed during grading, including subdrains, the locations/elevations of such drains should be surveyed, and recorded on the final as-built grading plans by the design engineer. It is recommended that the above be disclosed to all interested parties, including homeowners and any homeowners association.



1. Soil cap compacted to 90 percent relative compaction.
2. Permeable material may be gravel wrapped in filter fabric (Mirafi 140N or equivalent).
3. 4-inch-diameter, perforated pipe (SDR-35 or equivalent) with perforations down.
4. Pipe to maintain a minimum 1 percent fall.
5. Concrete cut-off wall to be provided at transition to solid outlet pipe.
6. Solid outlet pipe to drain to approved area.
7. Cleanouts are recommended at each property line.

GeoSoils, Inc.	SCHEMATIC TOE DRAIN DETAIL	Detail 4



NOTES:

1. Soil cap compacted to 90 percent relative compaction.
2. Permeable material may be gravel wrapped in filter fabric (Mirafi 140N or equivalent).
3. 4-inch-diameter, perforated pipe (SDR-35 or equivalent) with perforations down.
4. Pipe to maintain a minimum 1 percent fall.
5. Concrete cut-off wall to be provided at transition to solid outlet pipe.
6. Solid outlet pipe to drain to approved area.
7. Cleanouts are recommended at each property line.
8. Effort to compact should be applied to drain rock.

Erosion Control

Cut and fill slopes will be subject to surficial erosion during and after grading. Onsite earth materials have a moderate to high erosion potential. Consideration should be given to providing hay bales and silt fences for the temporary control of surface water, from a geotechnical viewpoint.

Landscape Maintenance

Only the amount of irrigation necessary to sustain plant life should be provided. Over-watering the landscape areas will adversely affect proposed site improvements. We would recommend that any proposed open-bottom planters adjacent to proposed structures be eliminated for a minimum distance of 10 feet. As an alternative, closed-bottom type planters could be utilized. An outlet placed in the bottom of the planter, could be installed to direct drainage away from structures or any exterior concrete flatwork. If planters are constructed adjacent to structures, the sides and bottom of the planter should be provided with a moisture barrier to prevent penetration of irrigation water into the subgrade. Provisions should be made to drain the excess irrigation water from the planters without saturating the subgrade below or adjacent to the planters. Graded slope areas should be planted with drought resistant vegetation. Consideration should be given to the type of vegetation chosen and their potential effect upon surface improvements (i.e., some trees will have an effect on concrete flatwork with their extensive root systems). From a geotechnical standpoint leaching is not recommended for establishing landscaping. If the surface soils are processed for the purpose of adding amendments, they should be recompacted to 90 percent minimum relative compaction.

Gutters and Downspouts

As previously discussed in the drainage section, the installation of gutters and downspouts should be considered to collect roof water that may otherwise infiltrate the soils adjacent to the structures. If utilized, the downspouts should be drained into PVC collector pipes or other non-erosive devices (e.g., paved swales or ditches; below grade, solid tight-lined PVC pipes; etc.), that will carry the water away from the building, to an appropriate outlet, in accordance with the recommendations of the design civil engineer. Downspouts and gutters are not a requirement; however, from a geotechnical viewpoint, provided that positive drainage is incorporated into project design (as discussed previously).

Subsurface and Surface Water

Subsurface and surface water are not anticipated to affect site development, provided that the recommendations contained in this report are incorporated into final design and construction and that prudent surface and subsurface drainage practices are incorporated into the construction plans. Perched groundwater conditions along zones of contrasting permeabilities may not be precluded from occurring in the future due to site irrigation, poor

drainage conditions, or damaged utilities, and should be anticipated. Should perched groundwater conditions develop, this office could assess the affected area(s) and provide the appropriate recommendations to mitigate the observed groundwater conditions. Groundwater conditions may change with the introduction of irrigation, rainfall, or other factors.

Site Improvements

If in the future, any additional improvements (e.g., trash enclosures, walls, etc.) are planned for the site, recommendations concerning the geological or geotechnical aspects of design and construction of said improvements could be provided upon request. This office should be notified in advance of any fill placement, grading of the site, or trench backfilling after rough grading has been completed. This includes any grading, utility trench and retaining wall backfills, flatwork, etc.

Tile Flooring

Tile flooring can crack, reflecting cracks in the concrete slab below the tile, although small cracks in a conventional slab may not be significant. Therefore, the designer should consider additional steel reinforcement for concrete slabs-on-grade where tile will be placed. The tile installer should consider installation methods that reduce possible cracking of the tile such as slipsheets. Slipsheets or a vinyl crack isolation membrane (approved by the Tile Council of America/Ceramic Tile Institute) are recommended between tile and concrete slabs on grade.

Additional Grading

This office should be notified in advance of any fill placement, supplemental regrading of the site, or trench backfilling after rough grading has been completed. This includes completion of grading in the street, driveway approaches, driveways, parking areas, and utility trench and retaining wall backfills.

Footing Trench Excavation

All footing excavations should be observed by a representative of this firm subsequent to trenching and prior to concrete form and reinforcement placement. The purpose of the observations is to evaluate that the excavations have been made into the recommended bearing material and to the minimum widths and depths recommended for construction. If loose or compressible materials are exposed within the footing excavation, a deeper footing or removal and recompaction of the subgrade materials would be recommended at that time. Footing trench spoil and any excess soils generated from utility trench excavations should be compacted to a minimum relative compaction of 90 percent, if not removed from the site.

Trenching/Temporary Construction Backcuts

Considering the nature of the onsite earth materials, it should be anticipated that caving or sloughing could be a factor in subsurface excavations and trenching. Shoring or excavating the trench walls/backcuts at the angle of repose (typically 25 to 45 degrees [except as specifically superceded within the text of this report]), should be anticipated. All excavations should be observed by an engineering geologist or soil engineer from GSI, prior to workers entering the excavation or trench, and minimally conform to CAL-OSHA, state, and local safety codes. Given the potentially erosive nature of the low expansive (low cohesive) soils, poor drainage or heavy rain events could destabilize trenches. Should adverse conditions exist, appropriate recommendations would be offered at that time. The above recommendations should be provided to any contractors and/or subcontractors, or homeowners, etc., that may perform such work.

Utility Trench Backfill

1. All interior utility trench backfill should be brought to at least 2 percent above optimum moisture content and then compacted to obtain a minimum relative compaction of 90 percent of the laboratory standard. As an alternative for shallow (12-inch to 18-inch) under-slab trenches, sand having a sand equivalent value of 30 or greater may be utilized and jetted or flooded into place. Observation, probing and testing should be provided to evaluate the desired results.

2. Exterior trenches adjacent to, and within areas extending below a 1:1 plane projected from the outside bottom edge of the footing, and all trenches beneath hardscape features and in slopes, should be compacted to at least 90 percent of the laboratory standard. Sand backfill, unless excavated from the trench, should not be used in these backfill areas. Compaction testing and observations, along with probing, should be accomplished to evaluate the desired results.

3. All trench excavations should conform to CAL-OSHA, state, and local safety codes.

4. Utilities crossing grade beams, perimeter beams, or footings should either pass below the footing or grade beam utilizing a hardened collar or foam spacer, or pass through the footing or grade beam in accordance with the recommendations of the structural engineer.

SUMMARY OF RECOMMENDATIONS REGARDING GEOTECHNICAL OBSERVATION AND TESTING

We recommend that observation and/or testing be performed by GSI at each of the following construction stages:

- During grading/recertification.

- During excavation.

- During placement of subdrains, toe drains, or other subdrainage devices, prior to placing fill and/or backfill.

- After excavation of building footings, retaining wall footings, and free standing walls footings, prior to the placement of reinforcing steel or concrete.

- Prior to pouring any slabs or flatwork, after presoaking/presaturation of building pads and other flatwork subgrade, before the placement of concrete, reinforcing steel, capillary break (i.e., sand, pea-gravel, etc.), or vapor barriers (i.e., Stego Wrap, Husky Guard, etc.).
- During retaining wall subdrain installation, prior to backfill placement.

- During placement of backfill for area drain, interior plumbing, utility line trenches, and retaining wall backfill.

- During slope construction/repair.

- When any unusual soil conditions are encountered during any construction operations, subsequent to the issuance of this report.

- When any developer or homeowner improvements, such as flatwork, walls, etc., are constructed, prior to construction.

- A report of geotechnical observation and testing should be provided at the conclusion of each of the above stages, in order to provide concise and clear documentation of site work, and/or to comply with code requirements.

- GSI should review project sales documents to homeowners/homeowners associations for geotechnical aspects, including irrigation practices, the conditions outlined above, etc., prior to any sales. At that stage, GSI will provide homeowners maintenance guidelines which should be incorporated into such documents.

OTHER DESIGN PROFESSIONALS/CONSULTANTS

The design civil engineer, structural engineer, post-tension designer, architect, landscape architect, wall designer, etc., should review the recommendations provided herein, incorporate those recommendations into all their respective plans, and by explicit reference, make this report part of their project plans. This report presents minimum design criteria for the design of slabs, foundations and other elements possibly applicable

to the project. These criteria should not be considered as substitutes for actual designs by the structural engineer/designer. Please note that the recommendations contained herein are not intended to preclude the transmission of water or vapor through the slab or foundation. The structural engineer/foundation and/or slab designer should provide recommendations to not allow water or vapor to enter into the structure so as to cause damage to another building component, or so as to limit the installation of the type of flooring materials typically used for the particular application.

The structural engineer/designer should analyze actual soil-structure interaction and consider, as needed, bearing, expansive soil influence, and strength, stiffness and deflections in the various slab, foundation, and other elements in order to develop appropriate, design-specific details. As conditions dictate, it is possible that other influences will also have to be considered. The structural engineer/designer should consider all applicable codes and authoritative sources where needed. If analyses by the structural engineer/designer result in less critical details than are provided herein as minimums, the minimums presented herein should be adopted. It is considered likely that some, more restrictive details will be required.

If the structural engineer/designer has any questions or requires further assistance, they should not hesitate to call or otherwise transmit their requests to GSI. In order to mitigate potential distress, the foundation and/or improvement's designer should confirm to GSI and the governing agency, in writing, that the proposed foundations and/or improvements can tolerate the amount of differential settlement and/or expansion characteristics and other design criteria specified herein.

PLAN REVIEW

Final project plans (grading, precise grading, foundation, retaining wall, landscaping, etc.), should be reviewed by this office prior to construction, so that construction is in accordance with the conclusions and recommendations of this report. Based on our review, supplemental recommendations and/or further geotechnical studies may be warranted.

LIMITATIONS

The materials encountered on the project site and utilized for our analysis are believed representative of the area; however, soil and bedrock materials vary in character between excavations and natural outcrops or conditions exposed during mass grading. Site conditions may vary due to seasonal changes or other factors.

The findings of this study are valid as of the present date. However, changes in the conditions of a property can occur with the passage of time, whether they be due to natural processes or the works of man on this or adjacent properties. In addition, changes in applicable or inappropriate standards may occur, whether they result from legislation or the broadening of knowledge. Accordingly, the findings of this study may be invalidated wholly or partially by changes outside our control. Therefore, this study and the recommendations contained herein are subject to review and should not be relied upon after a period of three years.

Inasmuch as our study is based upon our review and engineering analyses and laboratory data, the conclusions and recommendations are professional opinions. These opinions have been derived in accordance with current standards of practice, and no warranty, either express or implied, is given. Standards of practice are subject to change with time. GSI assumes no responsibility or liability for work or testing performed by others, or their inaction; or work performed when GSI is not requested to be onsite, to evaluate if our recommendations have been properly implemented. Use of this report constitutes an agreement and consent by the user to all the limitations outlined above, notwithstanding any other agreements that may be in place. In addition, this report may be subject to review by the controlling authorities. Thus, this report brings to completion our scope of services for this portion of the project. All samples will be disposed of after 30 days, unless specifically requested by the client, in writing.

APPENDIX A

REFERENCES

APPENDIX A

REFERENCES

Allen, V., Connerton, A., and Carlson, C., 2011, Introduction to Infiltration Best Management Practices (BMP), Contech Construction Products, Inc., Professional Development Series, dated December.

American Concrete Institute, 2014a, Building code requirements for structural concrete (ACI 318-14), and commentary (ACI 318R-14): reported by ACI Committee 318, dated September.

_____, 2014b, Building code requirements for concrete thin shells (ACI 318.2-14), and commentary (ACI 318.2R-14), dated September.

_____, 2011, Building code requirements for structural concrete (ACI 318-14), an ACI standard and commentary: reported by ACI Committee 318; dated May 24.

_____, 2004, Guide for concrete floor and slab construction: reported by ACI Committee 302; Designation ACI 302.1R-04, dated March 23.

American Society of Civil Engineers, 2014, Supplement No. 2, Minimum design loads for buildings and other structures, ASCE Standard ASCE/SEI 7-10, dated September 18.

_____, 2013a, Expanded seismic commentary, minimum design loads for buildings and other structures, ASCE Standard ASCE/SEI 7-10 (included in third printing).

_____, 2013b, Errata No. 2, minimum design loads for buildings and other structures, ASCE Standard ASCE/SEI 7-10, dated March 31.

_____, 2013c, Supplement No. 1, minimum design loads for buildings and other structures, ASCE Standard ASCE/SEI 7-10, dated March 31.

_____, 2010, Minimum design loads for buildings and other structures, ASCE Standard ASCE/SEI 7-10.

Blake, T.F., 2000a, EQFAULT, A computer program for the estimation of peak horizontal acceleration from 3-D fault sources; Windows 95/98 version, updated to September, 2004.

_____, 2000b, EQSEARCH, A computer program for the estimation of peak horizontal acceleration from California historical earthquake catalogs; Updated through August, 2018.

Bryant, W.A., and Hart, E.W., 2007, Fault-rupture hazard zones in California, Alquist-Priolo earthquake fault zoning act with index to earthquake fault zones maps; California Geological Survey, Special Publication 42, interim revision.

California Building Standards Commission, 2019a, California Building Code, California Code of Regulations, Title 24, Part 2, Volume 2 of 2, based on the 2018 International Building Code, effective January 1, 2020.

_____, 2019b, California Building Code, California Code of Regulations, Title 24, Part 2, Volume 1 of 2, Based on the 2018 International Building Code, effective January 1, 2020.

California Code Of Regulations, 2011, CAL-OSHA State of California Construction and Safety Orders, dated February.

California Department of Conservation, California Geological Survey (CGS), 2018, Earthquake fault zones, a guide for government agencies, property owners/developers, and geoscience practitioners for assessing fault rupture hazards in California: California Geological Survey Special Publication 42 (revised 2018), 93 p.

_____, 2008, Guidelines for evaluating and mitigating seismic hazards in California: California Geological Survey Special Publication 117A (revised 2008), 102 p.

California Department of Transportation (Caltrans), 2020, Highway design manual, seventh edition, https://dot.ca.gov/programs/design/manual-highway-design-manual-hdm, dated July 1.

California Department of Water Resources, 2021, Water Data Library, interactive website, (http://wdl.water.ca.gov/waterdatalibrary/), last modified May 29.

California Office of Statewide Health Planning and Development (OSHPD), 2021, Seismic design maps, https://seismicmaps.org/.

California Regional Water Quality Control Board (RWQCB), 1995, Santa Ana Region (8), Water Quality Control Plan, Santa Ana Basin, dated January 24, updated February 2008 and June 2011.

California Stormwater Quality Association (CASQA), 2003, Stormwater best management practice handbook, new development and redevelopment, dated January.

Cao, T., Bryant, W.A., Rowshandel, B., Branum, D., and Wills, C.J., 2003, The revised 2002 California probabilistic seismic hazard maps, dated June, http://www.conservation.ca.gov/cgs/rghm/psha/fault_parameters/pdf/Documents/2002_CA_Hazard_Maps.pdf.

City of Menifee, Department of Public Works, 2018, Street Design Requirements, Standard Plan No. 80, sheet 1 of 1, approved February 15, 2016, revision 2 dated September 20.

_____, 2014, Menifee general plan, exhibit S-1, fault map, dated March 12.

County of Riverside Transportation and Land Management Agency, 2000, Technical guidelines for review of geotechnical and geologic reports.

CTL Thompson, 2005, Controlling moisture-related problems associated with basement slabs-on-grade in new residential construction.

Google Earth Pro - v7.3.3, 2021, by Google, LLC, https://www.google.com/earth/download/gep/agree.html, [accessed July 21, 2021].

Jennings, C.W., and Bryant, W.A., 2010, Fault activity map of California, scale 1:750,000, California Geological Survey, Geologic Data Map No. 6.

Kanare, Howard, M., 2005, Concrete Floors and Moisture, Engineering Bulletin 119, Portland Cement Association, pp. 35-42.

Morton, D.M., 2003, Geologic map of the Romoland 7.5' quadrangle, Riverside County, California, U.S. Geological Survey Open File Report 03-102, version 1.0.

Norris, R.M. and Webb, R.W., 1990, Geology of California, second edition, John Wiley & Sons, Inc.

Post-Tensioning Institute, 2014, Errata to standard requirements for design and analysis of shallow post-tensioned concrete foundations on expansive soils, PTI DC10.5-12, dated April 16.

_____, 2013, Errata to standard requirements for design and analysis of shallow post-tensioned concrete foundations on expansive soils, PTI DC10.5-12, dated November 12.

_____, 2012, Standard requirements for design and analysis of shallow post-tensioned concrete foundations on expansive soils, PTI DC10.5-12, dated December.

Rancon Group, 2021, offering memorandum, High density residential development opportunity, property highlights, dated March 15.

Riverside County Flood Control and Water Conservation District, 2016, Errata for September, 2011 design handbook for low impact development best management practices, posted June 30.

_____, 2011, Design handbook for low impact development best management practices, dated September.

_____, 2006, Stormwater quality best management practice design handbook, dated July 21.

Riverside County Information Technology (RCIT), Graphic Information Services (GIS), 2021, Map my County, v10, website: https://gis1.countyofriverside.us/Html5Viewer/index.html?viewer=MMC_Public.

Romanoff, M., 1957, Underground corrosion, originally issued April 1.

Sowers and Sowers, 1979, Unified soil classification system (After U. S. Waterways Experiment Station and ASTM 02487-667) in Introductory Soil Mechanics, New York.

State of California, 2021, Civil Code, Sections 895 et seq.

California Department of Transportation (Caltrans), 2013, Highway design manual, http://www.dot.ca.gov/hq/oppd/hdm/pdf/english/HDM_Complete_06-21-13.pdf, dated June 21.

____, 2010, Caltrans, standard specifications, dated May.

State of California Department of Transportation, Division of Engineering Services, Materials Engineering, and Testing Services, Corrosion Technology Branch, 2003, Corrosion Guidelines, Version 1.0, dated September.

United States Department of Agriculture, Natural Resources Conservation Services, 2021, Web soil survey, version 3.3.2, (website: https://websoilsurvey.sc.egov.usda.gov/App/HomePage.htm).

____, 1980, Aerial photographs, region 615120, flight line 180, photo numbers 22, and 23, scale 1"=±3,333 feet, dated October 10.

Weber, H.F., Jr., 1977, Seismic hazards related to geologic factors, Elsinore and Chino fault zones, northwestern Riverside County, California, California Division of Mines and Geology Open-File Report 77-4, 96p.

Wetmore, P.H., et al., 2003, Mesozoic tectonic evolution of the peninsular ranges of southern and Baja California, *in* Geological Society of America, special paper no. 374.

APPENDIX B

BORING LOGS

UNIFIED SOIL CLASSIFICATION SYSTEM

Major Divisions			Group Symbols	Typical Names
Coarse-Grained Soils More than 50% retained on No. 200 sieve	Gravels 50% or more of coarse fraction retained on No. 4 sieve	Clean Gravels	GW	Well-graded gravels and gravel-sand mixtures, little or no fines
			GP	Poorly graded gravels and gravel-sand mixtures, little or no fines
		Gravel with	GM	Silty gravels gravel-sand-silt mixtures
			GC	Clayey gravels, gravel-sand-clay mixtures
	Sands more than 50% of coarse fraction passes No. 4 sieve	Clean Sands	SW	Well-graded sands and gravelly sands, little or no fines
			SP	Poorly graded sands and gravelly sands, little or no fines
		Sands with Fines	SM	Silty sands, sand-silt mixtures
			SC	Clayey sands, sand-clay mixtures
Fine-Grained Soils 50% or more passes No. 200 sieve	Silts and Clays Liquid limit 50% or less		ML	Inorganic silts, very fine sands, rock flour, silty or clayey fine sands
			CL	Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays
			OL	Organic silts and organic silty clays of low plasticity
	Silts and Clays Liquid limit greater than 50%		MH	Inorganic silts, micaceous or diatomaceous fine sands or silts, elastic silts
			CH	Inorganic clays of high plasticity, fat clays
			OH	Organic clays of medium to high plasticity
Highly Organic Soils			PT	Peat, mucic, and other highly organic soils

CONSISTENCY OR RELATIVE DENSITY

CRITERIA

Standard Penetration Test

Penetration Resistance N (blows/ft)	Relative Density
0 - 4	Very loose
4 - 10	Loose
10 - 30	Medium
30 - 50	Dense
> 50	Very dense

Standard Penetration Test

Penetration Resistance N (blows/ft)	Consistency	Unconfined Compressive Strength (tons/ft^2)
<2	Very Soft	<0.25
2 - 4	Soft	0.25 - .050
4 - 8	Medium	0.50 - 1.00
8 - 15	Stiff	1.00 - 2.00
15 - 30	Very Stiff	2.00 - 4.00
>30	Hard	>4.00

3" 3/4" #4 #10 #40 #200 U.S. Standard Sieve

Unified Soil Classification	Cobbles	Gravel		Sand			Silt or Clay
		coarse	fine	coarse	medium	fine	

MOISTURE CONDITIONS

Dry	Absence of moisture: dusty, dry to the touch
Slightly Moist	Below optimum moisture content for compaction
Moist	Near optimum moisture content
Very Moist	Above optimum moisture content
Wet	Visible free water; below water table

MATERIAL QUANTITY

trace	0 - 5 %
few	5 - 10 %
little	10 - 25 %
some	25 - 45 %

OTHER SYMBOLS

C Core Sample
S SPT Sample
B Bulk Sample
__ Groundwater
Qp Pocket Penetrometer

BASIC LOG FORMAT:
Group name, Group symbol, (grain size), color, moisture, consistency or relative density. Additional comments: odor, presence of roots, mica, gypsum, coarse grained particles, etc.

EXAMPLE:
Sand (SP), fine to medium grained, brown, moist, loose, trace silt, little fine gravel, few cobbles up to 4" in size, some hair roots and rootlets.

File:Mgr: c;\SoilClassif.wpd

PLATE B-1

GeoSoils, Inc.

BORING LOG

PROJECT: FOREMOST PACIFIC GROUP
LDW Menifee

W.O. 8129-A-SC *BORING* B-1 *SHEET* 1 *OF* 2

DATE EXCAVATED 6-21-21 *LOGGED BY:* TAG *APPROX. ELEV.:* 1,465'

SAMPLE METHOD: 8" HSA - Cal Sampler and Standard Penetration - 140 lbs @30" drop.

Depth (ft.)	Sample: Bulk	Sample: Undisturbed	Sample: Blows/Ft.	USCS Symbol	Dry Unit Wt. (pcf)	Moisture (%)	Saturation (%)	Material Description
0				SM				**COLLUVIUM/TOPSOIL:**
			19		108.6	3.7	18.5	@0' SILTY SAND, light brown, dry, loose; few roots and rootlets, fine grained sands, few to some coarse grained sands.
				SM				@2' SILTY SAND, light brown, dry, medium dense; fine to coarse grained sand.
5								**QUATERNARY - OLD ALLUVIAL FAN DEPOSITS (Qof):**
			22		110.9	2.7	14.4	@3' SILTY SAND, light brown, dry, medium dense; fine to coarse grained sand.
								@6' SILTY SAND, brown, dry, medium dense.
10			63	SM/ SC	130.1	10.0	98.1	@10' Silty to CLAYEY SAND, dark reddish brown, wet, very dense.
15			54	SM				@15' SILTY SAND, brown, moist, dense.
20			56		117.7	4.4	28.6	@20' SILTY SAND, pale reddish yellow, damp, very dense; slightly indurated.
25			37	ML				@25' CLAYEY SILT with SAND, dark reddish brown, wet, hard to dense.
30			46/ 60-4"	SM	126.3	11.1	94.6	@30' SILTY SAND, dark reddish brown, wet, very dense; micaceous, fine to very loose grained sand, indurated.

Standard Penetration Test
Undisturbed, Ring Sample
Groundwater
Seepage

GeoSoils, Inc.

PLATE B-2

GeoSoils, Inc.

BORING LOG

PROJECT: FOREMOST PACIFIC GROUP
LDW Menifee

W.O. 8129-A-SC *BORING* B-1 *SHEET* 2 *OF* 2

DATE EXCAVATED 6-21-21 *LOGGED BY:* TAG *APPROX. ELEV.:* 1,465'

SAMPLE METHOD: 8" HSA - Cal Sampler and Standard Penetration - 140 lbs @30" drop.

Depth (ft.)	Sample: Bulk	Sample: Undisturbed	Sample: Blows/Ft.	USCS Symbol	Dry Unit Wt. (pcf)	Moisture (%)	Saturation (%)	Material Description
35			40					@35' SILTY SAND, brown, saturated to wet, dense.
40			25/ 50-5"		122.2	10.4	78.2	@40' SILTY SAND, brown, wet to saturated, very dense, micaceous.
45			38	ML				@45' CLAYEY SILT, dark reddish brown, saturated, very stiff; generally fine grained micaceous.
50			25/ 50-6"		101.4	24.0	99.2	@50' As per 45', saturated; indurated, sample disturbed.
55								Total Depth = 51½' Groundwater Encountered at ±35' No Caving Backfilled 6-21-21
60								
65								

Standard Penetration Test
Undisturbed, Ring Sample
Groundwater
Seepage

GeoSoils, Inc.

BORING LOG

PROJECT: FOREMOST PACIFIC GROUP
LDW Menifee

W.O. 8129-A-SC *BORING* B-2 *SHEET* 1 *OF* 1

DATE EXCAVATED 6-21-21 *LOGGED BY:* TAG *APPROX. ELEV.:* 1,463'

SAMPLE METHOD: 8" HSA - Cal Sampler and Standard Penetration - 140 lbs @30" drop.

Depth (ft.)	Sample: Bulk	Sample: Undisturbed	Sample: Blows/Ft.	USCS Symbol	Dry Unit Wt. (pcf)	Moisture (%)	Saturation (%)	Material Description
0			27	SM	116.3	2.7	17.1	**COLLUVIUM/TOPSOIL:** @0' SILTY SAND, light brown, dry, loose; tilled for weed abatement. @1' As per 0', medium dense.
5			15	SM				**QUATERNARY - OLD ALLUVIAL FAN DEPOSITS (Qof):** @4'SILTY SAND, brown, damp, medium dense. @5' As per 4'
10			88	SM/ SC	127.3	11.0	97.8	@10' SILTY to CLAYEY SAND, dark brown, saturated, very dense; fine to few coarse grained sands.
15			27	ML				@15' CLAYEY SILT, dark reddish brown, moist, very stiff.
20			38/ 50-5"	SM	121.7	6.1	45.3	@20' SILTY SAND, dark reddish brown, damp, very dense.
25			40	SP				@25' SAND, light gray, dry, dense; fine to very coarse grained. Total Depth = 25½' No Groundwater/Caving Backfilled 6-21-21
30								

Standard Penetration Test
Undisturbed, Ring Sample
Groundwater
Seepage

GeoSoils, Inc.

PLATE B-4

GeoSoils, Inc.

BORING LOG

PROJECT: FOREMOST PACIFIC GROUP
LDW Menifee

W.O. 8129-A-SC *BORING* B-3 *SHEET* 1 *OF* 1

DATE EXCAVATED 6-21-21 *LOGGED BY:* TAG *APPROX. ELEV.:* 1,468'

SAMPLE METHOD: 8" HSA - Cal Sampler and Standard Penetration - 140 lbs @30" drop.

Depth (ft.)	Sample: Bulk	Sample: Undisturbed	Sample: Blows/Ft.	USCS Symbol	Dry Unit Wt. (pcf)	Moisture (%)	Saturation (%)	Material Description
0				SM				**COLLUVIUM/TOPSOIL:** @0' SILTY SAND, light brown, dry, loose; few rootlets, fine grained.
			16		110.9	3.4	18.5	@3' SILTY SAND, brown, dry, medium dense.
5				SM				**QUATERNARY - OLD ALLUVIAL FAN DEPOSITS (Qof):** @4' SILTY SAND, brown, damp, medium dense.
			59	SC	127.2	8.3	73.8	@7' CLAYEY SAND, dark reddish brown, moist, dense; indurated very fine to very coarse grained snads.
10			65	SM	123.6	6.1	47.7	@12' SILTY SAND, brown, damp, dense; very fine to coarse grained sands.
15			32	SM				@15' SILTY SAND and SAND, light brown to brown, dry, dense.
20			19/	SM				@20' SILTY SAND, brown, moist, dense; fine to few coarse grained sands, disturbed sample.
			50-4"					Total Depth = 21½' No Groundwater/Caving Backfilled 6-21-21
25								
30								

Standard Penetration Test
Undisturbed, Ring Sample
Groundwater
Seepage

GeoSoils, Inc.

BORING LOG

PROJECT: FOREMOST PACIFIC GROUP
LDW Menifee

W.O. 8129-A-SC *BORING* B-4 *SHEET* 1 *OF* 1

DATE EXCAVATED 6-21-21 *LOGGED BY:* TAG *APPROX. ELEV.:* 1,467'

SAMPLE METHOD: 8" HSA - Cal Sampler and Standard Penetration - 140 lbs @30" drop.

Depth (ft.)	Sample: Bulk	Sample: Undisturbed	Sample: Blows/Ft.	USCS Symbol	Dry Unit Wt. (pcf)	Moisture (%)	Saturation (%)	Material Description
0				SM				**COLLUVIUM/TOPSOIL:** @0' SILTY SAND, light brown, dry, loose.
5			15	SM	114.0	4.0	25.7	**QUATERNARY - OLD ALLUVIAL FAN DEPOSITS (Qof):** @4' SILTY SAND, pale brown, dry, medium dense. @5' As per 4', micaceoous.
10			26	SC				@10' CLAYEY SAND, dark reddish brown to brown, damp to moist, medium dense. @12' to 15' Drill-rig chatter.
15			36 50-4"	SM	119.9	13.0	91.6	@15' SILTY SAND, brown, wet, very dense.
20			30	SM/ SC				@20' SILTY to CLAYEY SAND, brown, moist, medium dense.
25								Total Depth = 21½' No Groundwater/Caving Backfilled 6-21-21
30								

▼ *Standard Penetration Test*
⌶ *Undisturbed, Ring Sample*
▽ *Groundwater*
♀ *Seepage*

GeoSoils, Inc.

PLATE B-6

GeoSoils, Inc.

BORING LOG

PROJECT: FOREMOST PACIFIC GROUP
LDW Menifee

W.O. 8129-A-SC *BORING* IT-1 *SHEET* 1 *OF* 1

DATE EXCAVATED 6-21-21 *LOGGED BY:* TAG *APPROX. ELEV.:* 1,464'

SAMPLE METHOD: 8" HSA - No Sampling

Depth (ft.)	Sample: Bulk	Sample: Undisturbed	Sample: Blows/Ft.	USCS Symbol	Dry Unit Wt. (pcf)	Moisture (%)	Saturation (%)	Material Description
0				SM				**COLLUVIUM/TOPSOIL:** @0' SILTY SAND, brown, dry, loose.
5				SM				**QUATERNARY OLD ALLUVIAL FAN DEPOSITS (Qof):** @4' SILTY SAND, light brown to brown, dry, medium dense; fine to coarse grained sands.
								Total Depth = 6' No Groundwater/Caving Pre-soak Boring for Next-day Testing Backfilled - 6-22-21
10								
15								
20								
25								
30								

Standard Penetration Test
Undisturbed, Ring Sample
Groundwater
Seepage

GeoSoils, Inc.

PLATE B-7

GeoSoils, Inc.

BORING LOG

PROJECT: FOREMOST PACIFIC GROUP
LDW Menifee

W.O. 8129-A-SC *BORING* IT-2 *SHEET* 1 *OF* 1

DATE EXCAVATED 6-21-21 *LOGGED BY:* TAG *APPROX. ELEV.:* 1,463'

SAMPLE METHOD: 8" HSA - No Sampling

Depth (ft.)	Sample: Bulk	Sample: Undisturbed	Sample: Blows/Ft.	USCS Symbol	Dry Unit Wt. (pcf)	Moisture (%)	Saturation (%)	Material Description
0				SM				**COLLUVIUM/TOPSOIL:**
								@0' SILTY SAND, light brown, dry, loose.
5				SM				**QUATERNARY OLD ALLUVIAL FAN DEPOSITS (Qof):**
								@5' SILTY SAND, brown, damp, medium dense.
								Total Depth = 6'
								No Groundwater/Caving
								Pre-soak Boring for Next-day Testing
								Backfilled 6-22-21
10								
15								
20								
25								
30								

Standard Penetration Test
Undisturbed, Ring Sample
Groundwater
Seepage

GeoSoils, Inc.

PLATE B-8

APPENDIX C

SEISMIC DATA

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*                    *
*    E Q F A U L T   *
*                    *
*    Version 3.00    *
*                    *
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DETERMINISTIC ESTIMATION OF
PEAK ACCELERATION FROM DIGITIZED FAULTS

JOB NUMBER: 8129-A-SC

DATE: 06-28-2021

JOB NAME: LDW Menifee

CALCULATION NAME: Test Run Analysis

FAULT-DATA-FILE NAME: C:\Program Files\EQFAULT1\CGSFLTErev.DAT

SITE COORDINATES:
SITE LATITUDE: 33.7296
SITE LONGITUDE: 117.1553

SEARCH RADIUS: 62.2 mi

ATTENUATION RELATION: 11) Bozorgnia Campbell Niazi (1999) Hor.-Pleist. Soil-Cor.
UNCERTAINTY (M=Median, S=Sigma): S Number of Sigmas: 1.0
DISTANCE MEASURE: cdist
SCOND: 0
Basement Depth: 5.00 km Campbell SSR: 0 Campbell SHR: 0
COMPUTE PEAK HORIZONTAL ACCELERATION

FAULT-DATA FILE USED: C:\Program Files\EQFAULT1\CGSFLTErev.DAT

MINIMUM DEPTH VALUE (km): 3.0

EQFAULT SUMMARY

DETERMINISTIC SITE PARAMETERS

ABBREVIATED FAULT NAME	APPROXIMATE DISTANCE mi (km)	ESTIMATED MAX. EARTHQUAKE EVENT: MAXIMUM EARTHQUAKE MAG.(Mw)	PEAK SITE ACCEL. g	EST. SITE INTENSITY MOD.MERC.
SAN JACINTO-SAN J.VLY-CASA LOMA	10.6(17.0)	6.9	0.332	IX
ELSINORE (TEMECULA)	12.1(19.5)	6.8	0.276	IX
ELSINORE (GLEN IVY)	12.7(20.5)	6.8	0.264	IX
SAN JACINTO-ANZA	13.9(22.3)	7.2	0.312	IX
SAN JACINTO-SAN BERNARDINO	20.5(33.0)	6.7	0.155	VIII
SAN ANDREAS - SB-Coach. M-2b	25.1(40.4)	7.7	0.248	IX
SAN ANDREAS - Whole M-1a	25.1(40.4)	8.0	0.303	IX
SAN ANDREAS - San Bernardino M-1	25.1(40.4)	7.5	0.216	VIII
SAN ANDREAS - SB-Coach. M-1b-2	25.1(40.4)	7.7	0.248	IX
CHINO-CENTRAL AVE. (Elsinore)	25.3(40.7)	6.7	0.176	VIII
ELSINORE (JULIAN)	25.8(41.5)	7.1	0.160	VIII
WHITTIER	29.0(46.7)	6.8	0.116	VII
SAN JOAQUIN HILLS	32.5(52.3)	6.6	0.128	VIII
PINTO MOUNTAIN	33.7(54.2)	7.2	0.131	VIII
NORTH FRONTAL FAULT ZONE (West)	35.2(56.7)	7.2	0.176	VIII
CUCAMONGA	37.2(59.8)	6.9	0.135	VIII
NEWPORT-INGLEWOOD (Offshore)	38.1(61.3)	7.1	0.107	VII
CLEGHORN	38.2(61.4)	6.5	0.071	VI
NORTH FRONTAL FAULT ZONE (East)	40.1(64.5)	6.7	0.109	VII
SAN JOSE	41.1(66.2)	6.4	0.087	VII
SAN ANDREAS - Coachella M-1c-5	41.6(67.0)	7.2	0.105	VII
SAN JACINTO-COYOTE CREEK	41.8(67.2)	6.6	0.069	VI
PUENTE HILLS BLIND THRUST	43.2(69.6)	7.1	0.133	VIII
SAN ANDREAS - Mojave M-1c-3	43.4(69.9)	7.4	0.116	VII
SAN ANDREAS - Cho-Moj M-1b-1	43.4(69.9)	7.8	0.154	VIII
SAN ANDREAS - 1857 Rupture M-2a	43.4(69.9)	7.8	0.154	VIII
SIERRA MADRE	43.9(70.7)	7.2	0.140	VIII
ROSE CANYON	44.7(72.0)	7.2	0.097	VII
NEWPORT-INGLEWOOD (L.A.Basin)	45.0(72.5)	7.1	0.090	VII
BURNT MTN.	46.2(74.4)	6.5	0.058	VI
HELENDALE - S. LOCKHARDT	47.3(76.1)	7.3	0.099	VII
EUREKA PEAK	49.4(79.5)	6.4	0.051	VI
EARTHQUAKE VALLEY	50.2(80.8)	6.5	0.053	VI
LANDERS	51.4(82.8)	7.3	0.090	VII
LENWOOD-LOCKHART-OLD WOMAN SPRGS	52.5(84.5)	7.5	0.102	VII
CORONADO BANK	54.5(87.7)	7.6	0.106	VII
PALOS VERDES	54.6(87.9)	7.3	0.085	VII
CLAMSHELL-SAWPIT	54.9(88.3)	6.5	0.068	VI
JOHNSON VALLEY (Northern)	56.9(91.5)	6.7	0.053	VI
RAYMOND	56.9(91.6)	6.5	0.066	VI

DETERMINISTIC SITE PARAMETERS

ABBREVIATED FAULT NAME	APPROXIMATE DISTANCE mi (km)	ESTIMATED MAX. EARTHQUAKE EVENT: MAXIMUM EARTHQUAKE MAG.(Mw)	PEAK SITE ACCEL. g	EST. SITE INTENSITY MOD.MERC.
UPPER ELYSIAN PARK BLIND THRUST	59.2(95.2)	6.4	0.060	VI
EMERSON So. - COPPER MTN.	61.8(99.5)	7.0	0.060	VI

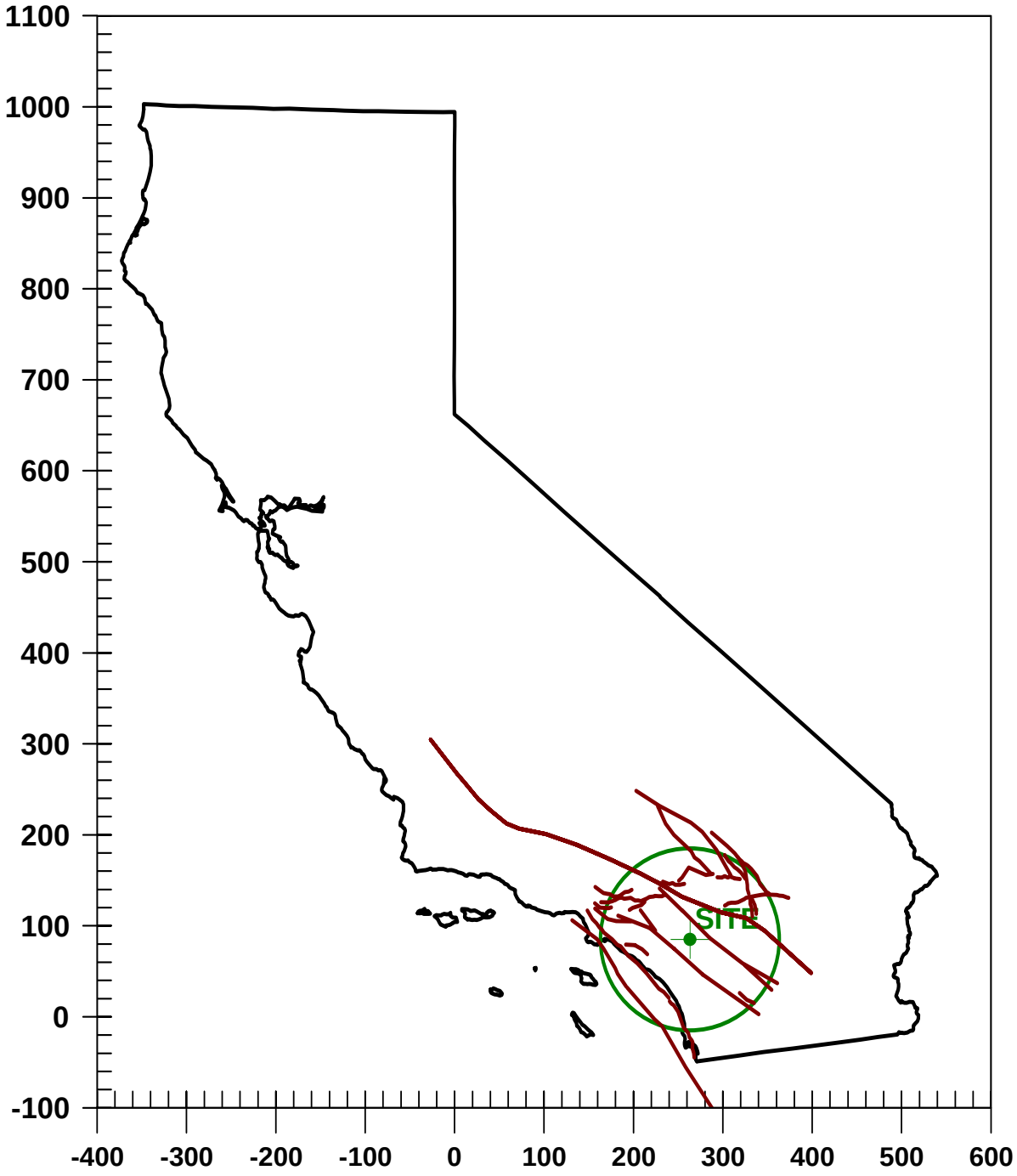
-END OF SEARCH- 42 FAULTS FOUND WITHIN THE SPECIFIED SEARCH RADIUS.

THE SAN JACINTO-SAN J.VLY-CASA LOMA FAULT IS CLOSEST TO THE SITE.
IT IS ABOUT 10.6 MILES (17.0 km) AWAY.

LARGEST MAXIMUM-EARTHQUAKE SITE ACCELERATION: 0.3321 g

CALIFORNIA FAULT MAP

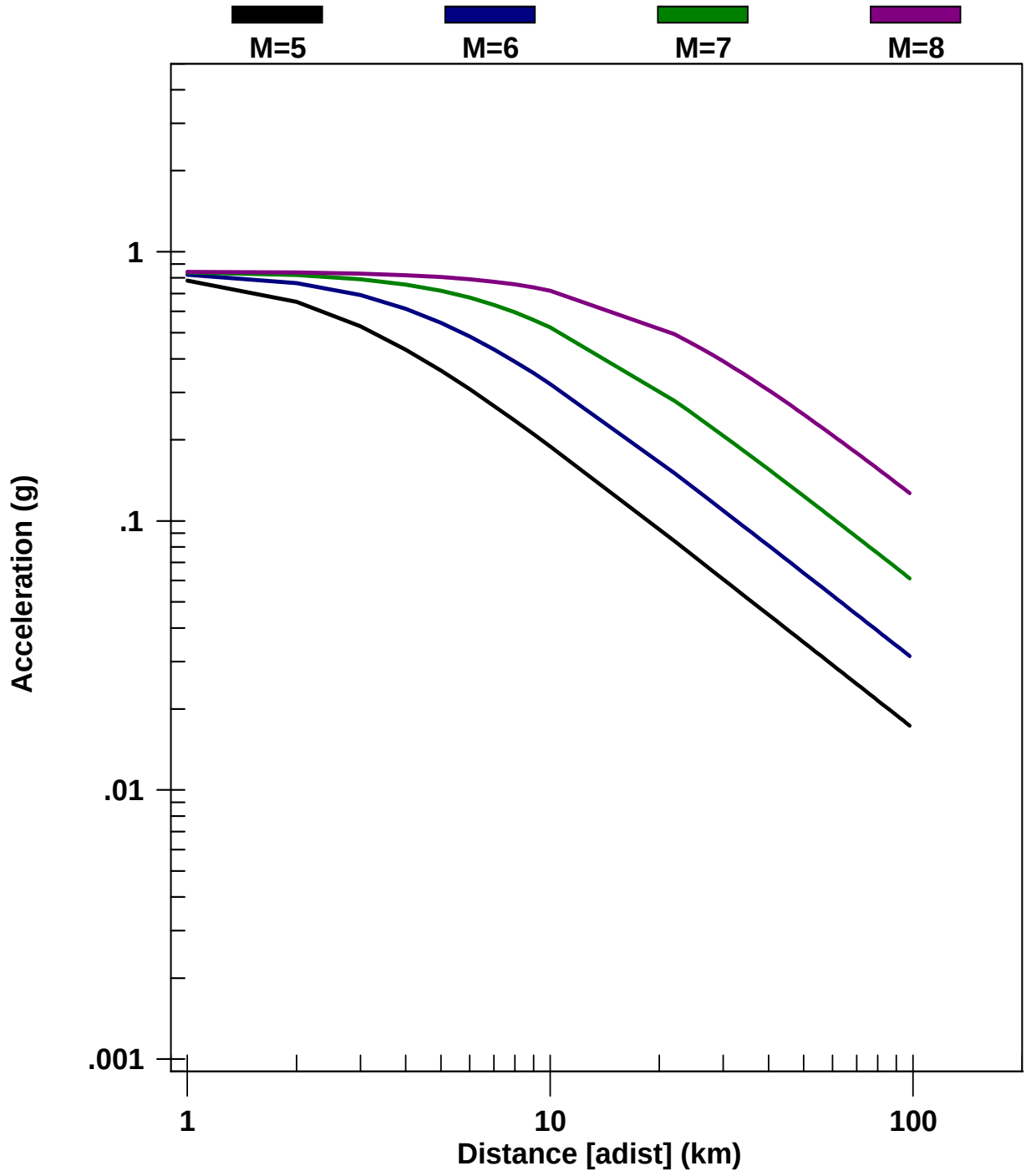
LDW Menifee



W.O. 8129-A-SC
PLATE C-3

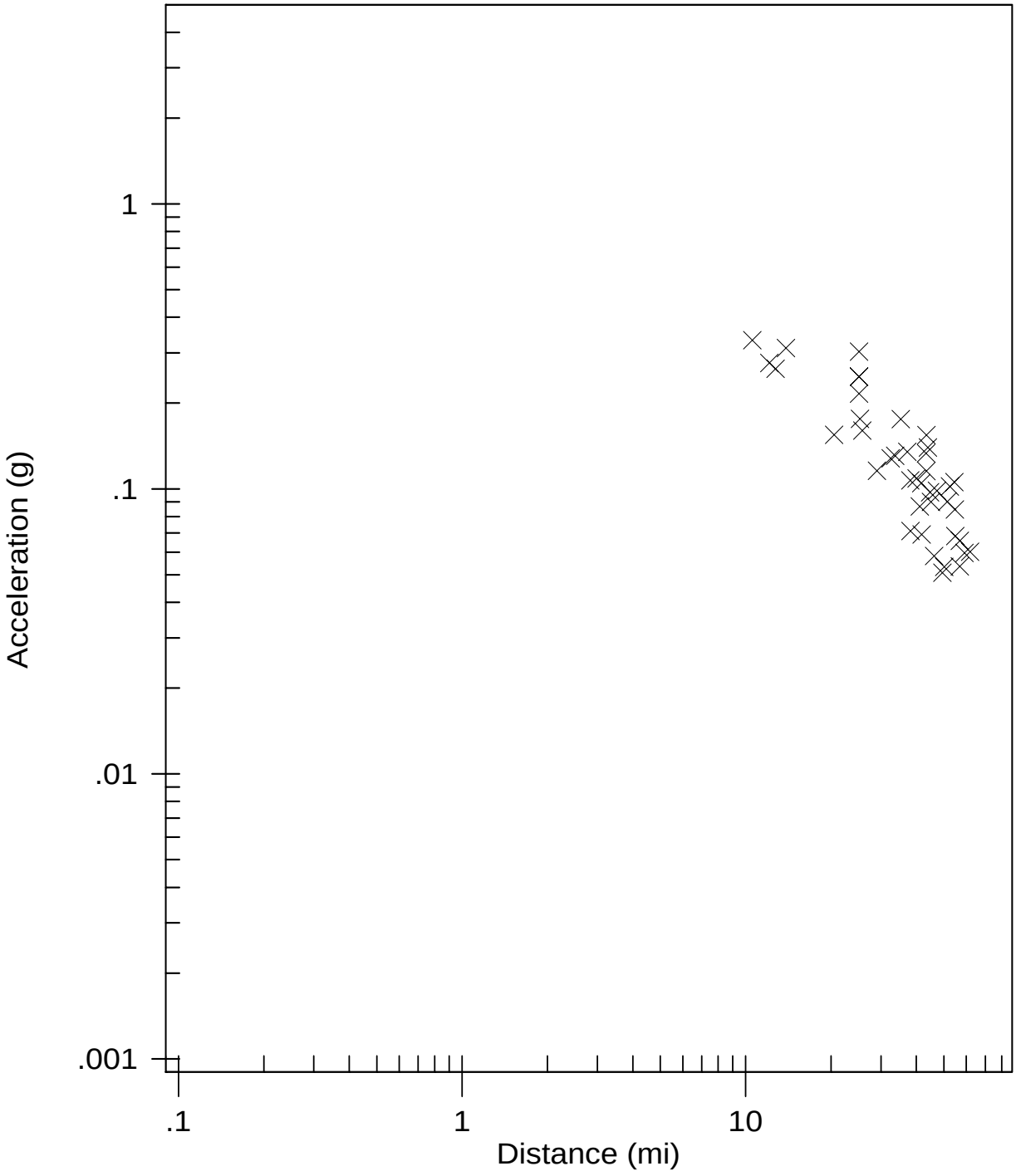
STRIKE-SLIP FAULTS

11) Bozorgnia Campbell Niazi (1999) Hor.-Pleist. Soil-Cor.



MAXIMUM EARTHQUAKES

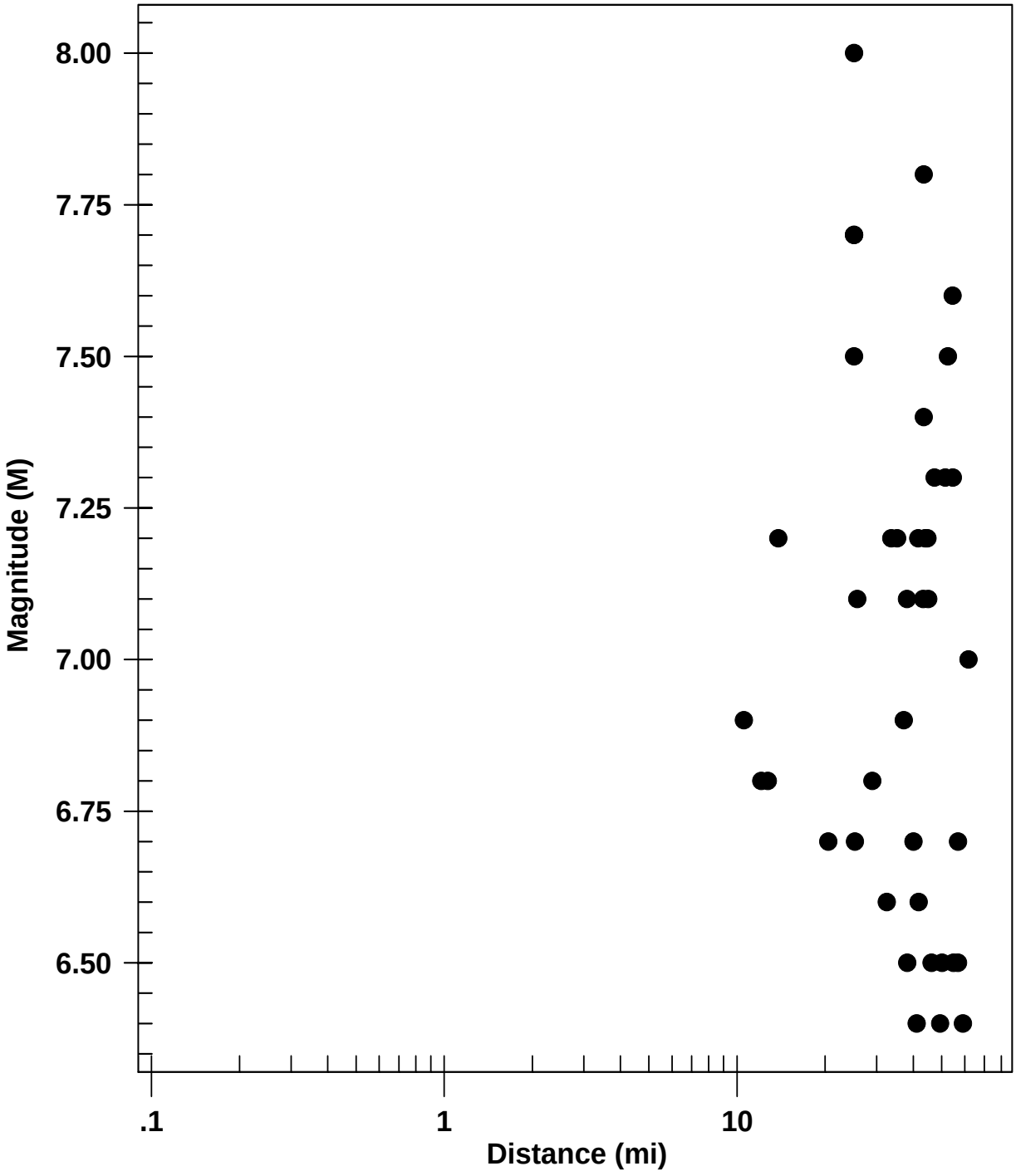
LDW Menifee



W.O. 8129-A-SC
PLATE C-5

EARTHQUAKE MAGNITUDES & DISTANCES

LDW Menifee



W.O. 8129-A-SC
PLATE C-6

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*                      *
*    E Q S E A R C H   *
*                      *
*     Version 3.00     *
*                      *
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      ESTIMATION OF
   PEAK ACCELERATION FROM
CALIFORNIA EARTHQUAKE CATALOGS


JOB NUMBER: 8129-A-SC
                                                DATE: 06-28-2021

JOB NAME: LDW Menifee

EARTHQUAKE-CATALOG-FILE NAME: ALLQUAKE.DAT


MAGNITUDE RANGE:
   MINIMUM MAGNITUDE:  5.00
   MAXIMUM MAGNITUDE:  9.00

SITE COORDINATES:
   SITE LATITUDE:  33.7296
   SITE LONGITUDE:  117.1553

SEARCH DATES:
           START DATE:   1800
           END DATE:   2021

SEARCH RADIUS:
           62.2 mi
           100.1 km

ATTENUATION RELATION:  11) Bozorgnia Campbell Niazi (1999) Hor.-Pleist. Soil-Cor.
   UNCERTAINTY (M=Median, S=Sigma): S       Number of Sigmas:  1.0
   ASSUMED SOURCE TYPE:  SS [SS=Strike-slip, DS=Reverse-slip, BT=Blind-thrust]
   SCOND:   0  Depth Source:  A
   Basement Depth:  5.00 km     Campbell SSR:  0     Campbell SHR:  0
   COMPUTE PEAK HORIZONTAL ACCELERATION

MINIMUM DEPTH VALUE (km):  3.0
```

FILE CODE	LAT. NORTH	LONG. WEST	DATE	TIME (UTC) H M Sec	DEPTH (km)	QUAKE MAG.	SITE ACC. g	SITE MM INT.	APPROX. DISTANCE mi [km]
DMG	33.7500	117.0000	06/06/1918	2232 0.0	0.0	5.00	0.115	VII	9.0(14.5)
DMG	33.7500	117.0000	04/21/1918	223225.0	0.0	6.80	0.353	IX	9.0(14.5)
DMG	33.8000	117.0000	12/25/1899	1225 0.0	0.0	6.40	0.253	IX	10.1(16.3)
DMG	33.9000	117.2000	12/19/1880	0 0 0.0	0.0	6.00	0.168	VIII	12.0(19.4)
DMG	33.7100	116.9250	09/23/1963	144152.6	16.5	5.00	0.082	VII	13.3(21.4)
DMG	33.7000	117.4000	04/11/1910	757 0.0	0.0	5.00	0.077	VII	14.2(22.8)
DMG	33.7000	117.4000	05/15/1910	1547 0.0	0.0	6.00	0.143	VIII	14.2(22.8)
DMG	33.7000	117.4000	05/13/1910	620 0.0	0.0	5.00	0.077	VII	14.2(22.8)
DMG	34.0000	117.2500	07/23/1923	73026.0	0.0	6.25	0.122	VII	19.4(31.3)
DMG	33.6990	117.5110	05/31/1938	83455.4	10.0	5.50	0.072	VI	20.5(33.0)
DMG	33.9500	116.8500	09/28/1946	719 9.0	0.0	5.00	0.047	VI	23.2(37.3)
MGI	33.8000	117.6000	04/22/1918	2115 0.0	0.0	5.00	0.042	VI	26.0(41.8)
MGI	34.1000	117.3000	07/15/1905	2041 0.0	0.0	5.30	0.048	VI	26.9(43.3)
MGI	34.0000	117.5000	12/16/1858	10 0 0.0	0.0	7.00	0.141	VIII	27.2(43.7)
DMG	33.9760	116.7210	06/12/1944	104534.7	10.0	5.10	0.038	V	30.2(48.5)
DMG	33.9940	116.7120	06/12/1944	111636.0	10.0	5.30	0.041	V	31.3(50.4)
DMG	34.2000	117.1000	09/20/1907	154 0.0	0.0	6.00	0.061	VI	32.6(52.5)
DMG	34.1000	116.8000	10/24/1935	1448 7.6	0.0	5.10	0.035	V	32.7(52.6)
DMG	34.1800	116.9200	01/16/1930	034 3.6	0.0	5.10	0.034	V	33.9(54.5)
DMG	34.1800	116.9200	01/16/1930	02433.9	0.0	5.20	0.036	V	33.9(54.5)
GSP	34.1630	116.8550	06/28/1992	144321.0	6.0	5.30	0.037	V	34.5(55.5)
DMG	34.2000	117.4000	07/22/1899	046 0.0	0.0	5.50	0.041	V	35.4(56.9)
GSP	34.1950	116.8620	08/17/1992	204152.1	11.0	5.30	0.035	V	36.3(58.3)
GSP	33.5290	116.5720	06/12/2005	154146.5	14.0	5.20	0.033	V	36.3(58.4)
DMG	34.1000	116.7000	02/07/1889	520 0.0	0.0	5.30	0.035	V	36.5(58.8)
PAS	33.9980	116.6060	07/08/1986	92044.5	11.7	5.60	0.042	VI	36.5(58.8)
GSN	34.2030	116.8270	06/28/1992	150530.7	5.0	6.70	0.082	VII	37.7(60.7)
GSG	33.9530	117.7610	07/29/2008	184215.7	14.0	5.30	0.034	V	38.0(61.2)
DMG	34.2670	116.9670	08/29/1943	34513.0	0.0	5.50	0.037	V	38.6(62.2)
GSP	34.2390	116.8370	07/09/1992	014357.6	0.0	5.30	0.032	V	39.6(63.7)
GSP	33.5080	116.5140	10/31/2001	075616.6	15.0	5.10	0.029	V	39.9(64.2)
PAS	33.5010	116.5130	02/25/1980	104738.5	13.6	5.50	0.036	V	40.2(64.6)
GSP	34.2900	116.9460	02/10/2001	210505.8	9.0	5.10	0.028	V	40.5(65.2)
DMG	33.5000	116.5000	09/30/1916	211 0.0	0.0	5.00	0.026	V	40.9(65.8)
GSP	34.1400	117.7000	02/28/1990	234336.6	5.0	5.20	0.029	V	42.1(67.8)
DMG	34.0170	116.5000	07/24/1947	221046.0	0.0	5.50	0.034	V	42.5(68.4)
DMG	34.0170	116.5000	07/26/1947	24941.0	0.0	5.10	0.027	V	42.5(68.4)
DMG	34.0170	116.5000	07/25/1947	04631.0	0.0	5.00	0.025	V	42.5(68.4)
DMG	34.0170	116.5000	07/25/1947	61949.0	0.0	5.20	0.028	V	42.5(68.4)
DMG	34.2700	117.5400	09/12/1970	143053.0	8.0	5.40	0.031	V	43.3(69.7)
GSG	34.3100	116.8480	02/22/2003	121910.6	1.0	5.20	0.027	V	43.8(70.4)
GSG	33.4200	116.4890	07/07/2010	235333.5	14.0	5.50	0.033	V	43.9(70.6)
DMG	34.3000	117.5000	07/22/1899	2032 0.0	0.0	6.50	0.061	VI	44.0(70.9)
GSP	34.3400	116.9000	11/27/1992	160057.5	1.0	5.30	0.028	V	44.6(71.8)
DMG	33.2000	116.7000	01/01/1920	235 0.0	0.0	5.00	0.024	IV	45.0(72.4)
GSP	33.9325	117.9158	03/29/2014	040942.2	5.1	5.10	0.025	V	45.8(73.7)
GSP	33.4315	116.4427	06/10/2016	080438.7	12.3	5.19	0.026	V	45.9(73.8)
DMG	33.9330	116.3830	12/04/1948	234317.0	0.0	6.50	0.058	VI	46.5(74.8)
GSP	34.3690	116.8970	12/04/1992	020857.5	3.0	5.30	0.027	V	46.6(74.9)
DMG	34.3000	117.6000	07/30/1894	512 0.0	0.0	6.00	0.041	V	46.9(75.5)
DMG	33.6170	117.9670	03/11/1933	154 7.8	0.0	6.30	0.050	VI	47.3(76.1)
MGI	33.2000	116.6000	10/12/1920	1748 0.0	0.0	5.30	0.026	V	48.6(78.2)
DMG	33.5750	117.9830	03/11/1933	518 4.0	0.0	5.20	0.024	V	48.8(78.5)

EARTHQUAKE SEARCH RESULTS

FILE CODE	LAT. NORTH	LONG. WEST	DATE	TIME (UTC) H M Sec	DEPTH (km)	QUAKE MAG.	SITE ACC. g	SITE MM INT.	APPROX. DISTANCE mi [km]
DMG	33.6170	118.0170	03/14/1933	19 150.0	0.0	5.10	0.022	IV	50.1(80.6)
GSP	34.1390	116.4310	06/28/1992	123640.6	10.0	5.10	0.022	IV	50.2(80.8)

GSP	34.1080	116.4040	06/29/1992	141338.8	9.0	5.40	0.027	V	50.4(81.0)
GSP	33.9610	116.3180	04/23/1992	045023.0	12.0	6.10	0.041	V	50.6(81.4)
GSP	34.0640	116.3610	09/15/1992	084711.3	9.0	5.20	0.023	IV	51.0(82.1)
DMG	33.0000	117.3000	11/22/1800	2130 0.0	0.0	6.50	0.052	VI	51.1(82.2)
MGI	33.0000	117.0000	09/21/1856	730 0.0	0.0	5.00	0.021	IV	51.2(82.3)
GSP	33.9020	116.2840	07/24/1992	181436.2	9.0	5.00	0.021	IV	51.4(82.7)
DMG	33.6830	118.0500	03/11/1933	658 3.0	0.0	5.50	0.028	V	51.5(82.9)
MGI	34.0000	118.0000	12/25/1903	1745 0.0	0.0	5.00	0.020	IV	51.9(83.5)
GSP	33.8760	116.2670	06/29/1992	160142.8	1.0	5.20	0.023	IV	52.0(83.6)
GSP	34.0290	116.3210	08/21/1993	014638.4	9.0	5.00	0.020	IV	52.1(83.8)
DMG	33.7000	118.0670	03/11/1933	85457.0	0.0	5.10	0.021	IV	52.4(84.3)
DMG	33.7000	118.0670	03/11/1933	51022.0	0.0	5.10	0.021	IV	52.4(84.3)
GSN	34.2010	116.4360	06/28/1992	115734.1	1.0	7.60	0.110	VII	52.5(84.5)
DMG	34.3700	117.6500	12/08/1812	15 0 0.0	0.0	7.00	0.071	VI	52.5(84.5)
DMG	34.0670	116.3330	05/18/1940	55120.2	0.0	5.20	0.023	IV	52.6(84.6)
DMG	34.0670	116.3330	05/18/1940	72132.7	0.0	5.00	0.020	IV	52.6(84.6)
DMG	33.7500	118.0830	03/11/1933	910 0.0	0.0	5.10	0.021	IV	53.3(85.7)
DMG	33.7500	118.0830	03/11/1933	2 9 0.0	0.0	5.00	0.020	IV	53.3(85.7)
DMG	33.7500	118.0830	03/13/1933	131828.0	0.0	5.30	0.024	IV	53.3(85.7)
DMG	33.7500	118.0830	03/11/1933	230 0.0	0.0	5.10	0.021	IV	53.3(85.7)
DMG	33.7500	118.0830	03/11/1933	323 0.0	0.0	5.00	0.020	IV	53.3(85.7)
DMG	34.2000	117.9000	08/28/1889	215 0.0	0.0	5.50	0.026	V	53.6(86.3)
DMG	33.3430	116.3460	04/28/1969	232042.9	20.0	5.80	0.032	V	53.7(86.4)
DMG	33.4000	116.3000	02/09/1890	12 6 0.0	0.0	6.30	0.043	VI	54.2(87.2)
DMG	34.0830	116.3000	05/18/1940	5 358.5	0.0	5.40	0.024	V	54.7(88.1)
GSP	34.3410	116.5290	06/28/1992	124053.5	6.0	5.20	0.021	IV	55.4(89.1)
DMG	33.4080	116.2610	03/25/1937	1649 1.8	10.0	6.00	0.034	V	56.0(90.2)
DMG	33.7830	118.1330	10/02/1933	91017.6	0.0	5.40	0.024	IV	56.2(90.5)
GSP	34.2680	116.4020	06/16/1994	162427.5	3.0	5.00	0.019	IV	56.9(91.6)
GSP	34.3320	116.4620	07/01/1992	074029.9	9.0	5.40	0.023	IV	57.5(92.5)
PAS	34.0610	118.0790	10/01/1987	144220.0	9.5	5.90	0.031	V	57.7(92.8)
PAS	34.3270	116.4450	03/15/1979	21 716.5	2.5	5.20	0.020	IV	57.9(93.2)
PAS	34.0730	118.0980	10/04/1987	105938.2	8.2	5.30	0.021	IV	59.0(94.9)
MGI	34.1000	118.1000	07/11/1855	415 0.0	0.0	6.30	0.039	V	59.9(96.3)
GSP	34.2620	118.0020	06/28/1991	144354.5	11.0	5.40	0.022	IV	60.8(97.9)

****

-END OF SEARCH- 90 EARTHQUAKES FOUND WITHIN THE SPECIFIED SEARCH AREA.

TIME PERIOD OF SEARCH: 1800 TO 2021

LENGTH OF SEARCH TIME: 222 years

THE EARTHQUAKE CLOSEST TO THE SITE IS ABOUT 9.0 MILES (14.5 km) AWAY.

LARGEST EARTHQUAKE MAGNITUDE FOUND IN THE SEARCH RADIUS: 7.6

LARGEST EARTHQUAKE SITE ACCELERATION FROM THIS SEARCH: 0.353 g

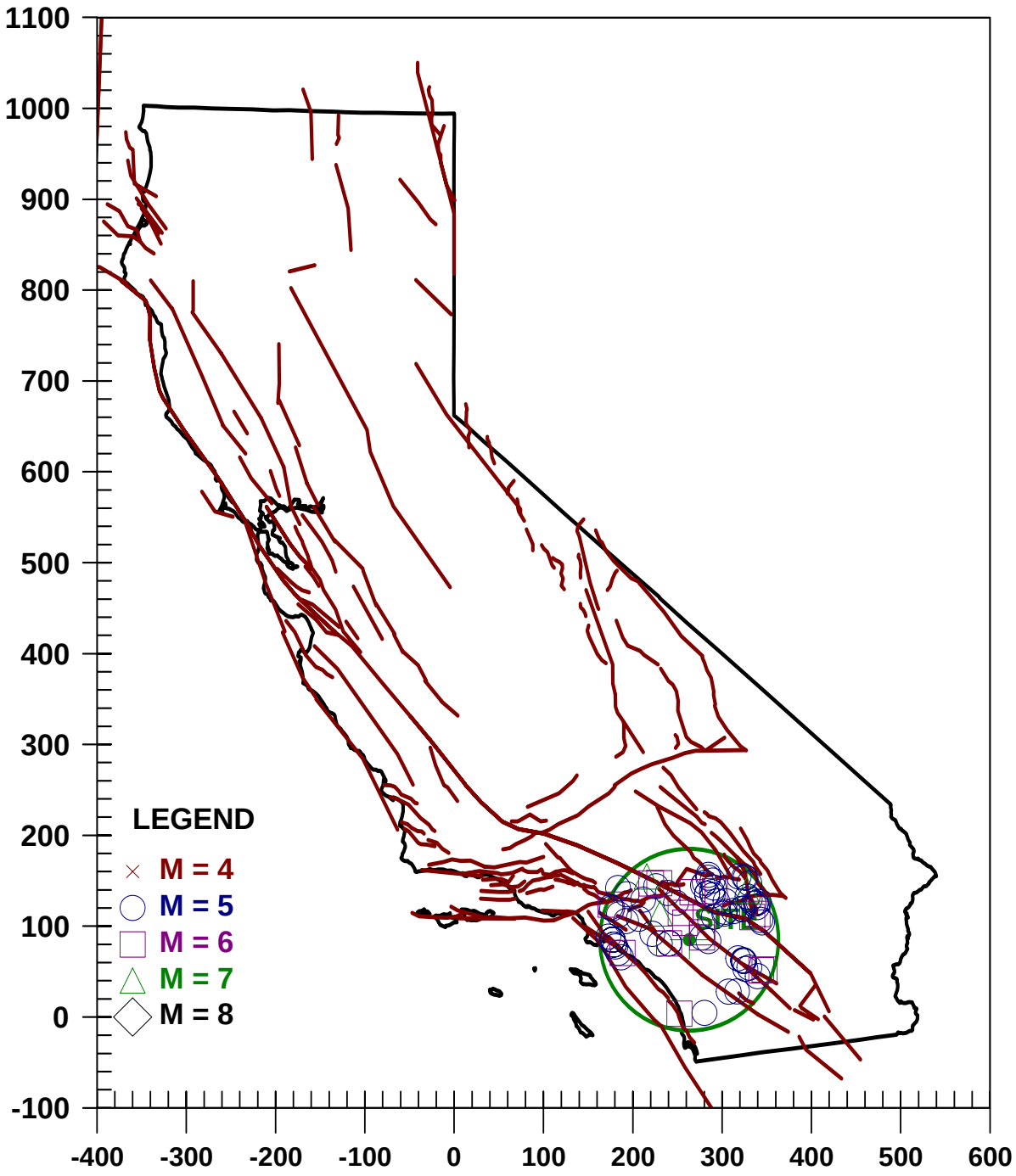
COEFFICIENTS FOR GUTENBERG & RICHTER RECURRENCE RELATION:
a-value= 1.205
b-value= 0.366
beta-value= 0.842

TABLE OF MAGNITUDES AND EXCEEDANCES:

Earthquake Magnitude	Number of Times Exceeded	Cumulative No. / Year
4.0	90	0.40541
4.5	90	0.40541
5.0	90	0.40541
5.5	30	0.13514
6.0	19	0.08559
6.5	8	0.03604
7.0	3	0.01351
7.5	1	0.00450

EARTHQUAKE EPICENTER MAP

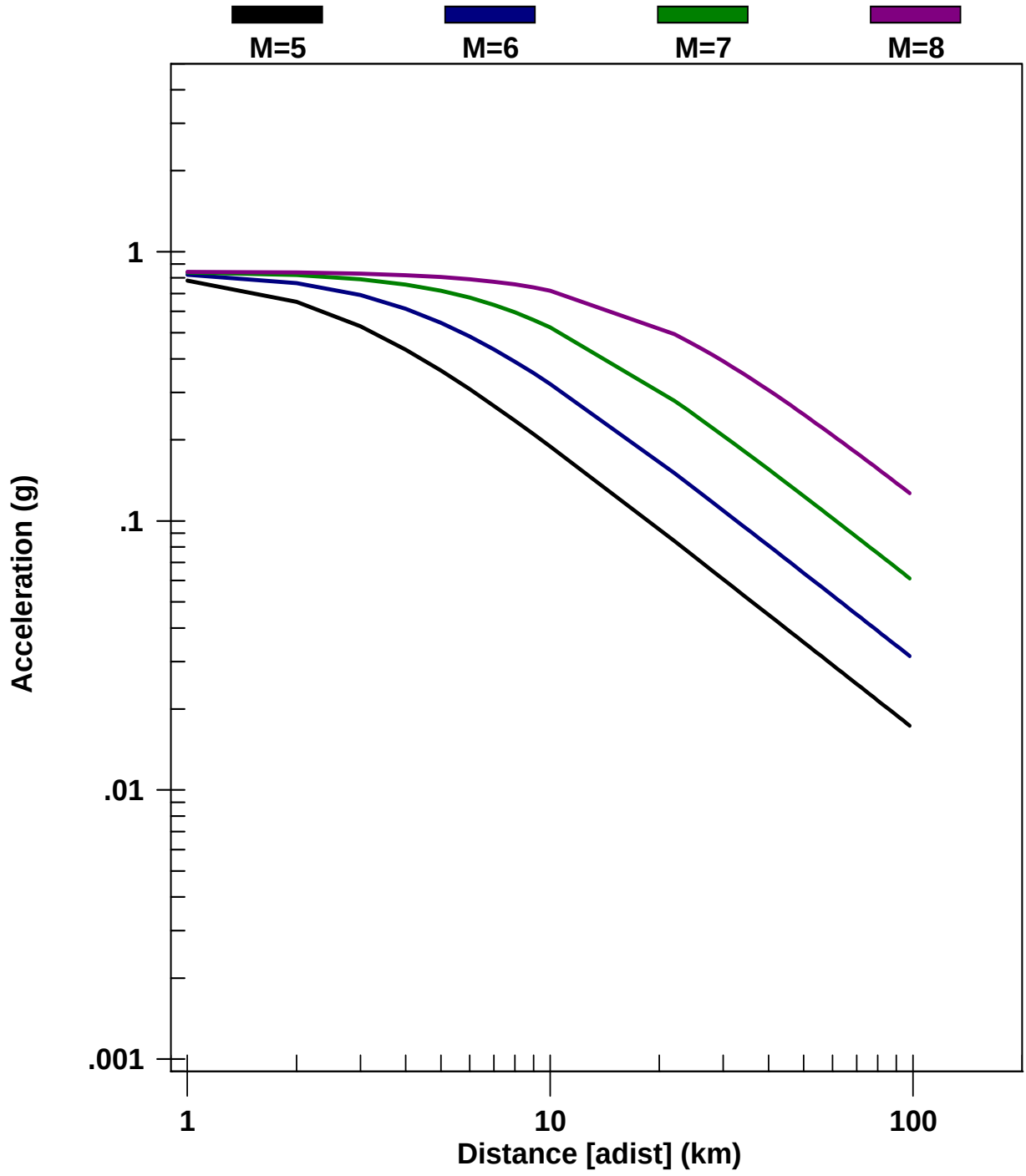
LDW Menifee



W.O. 8129-A-SC
PLATE C-10

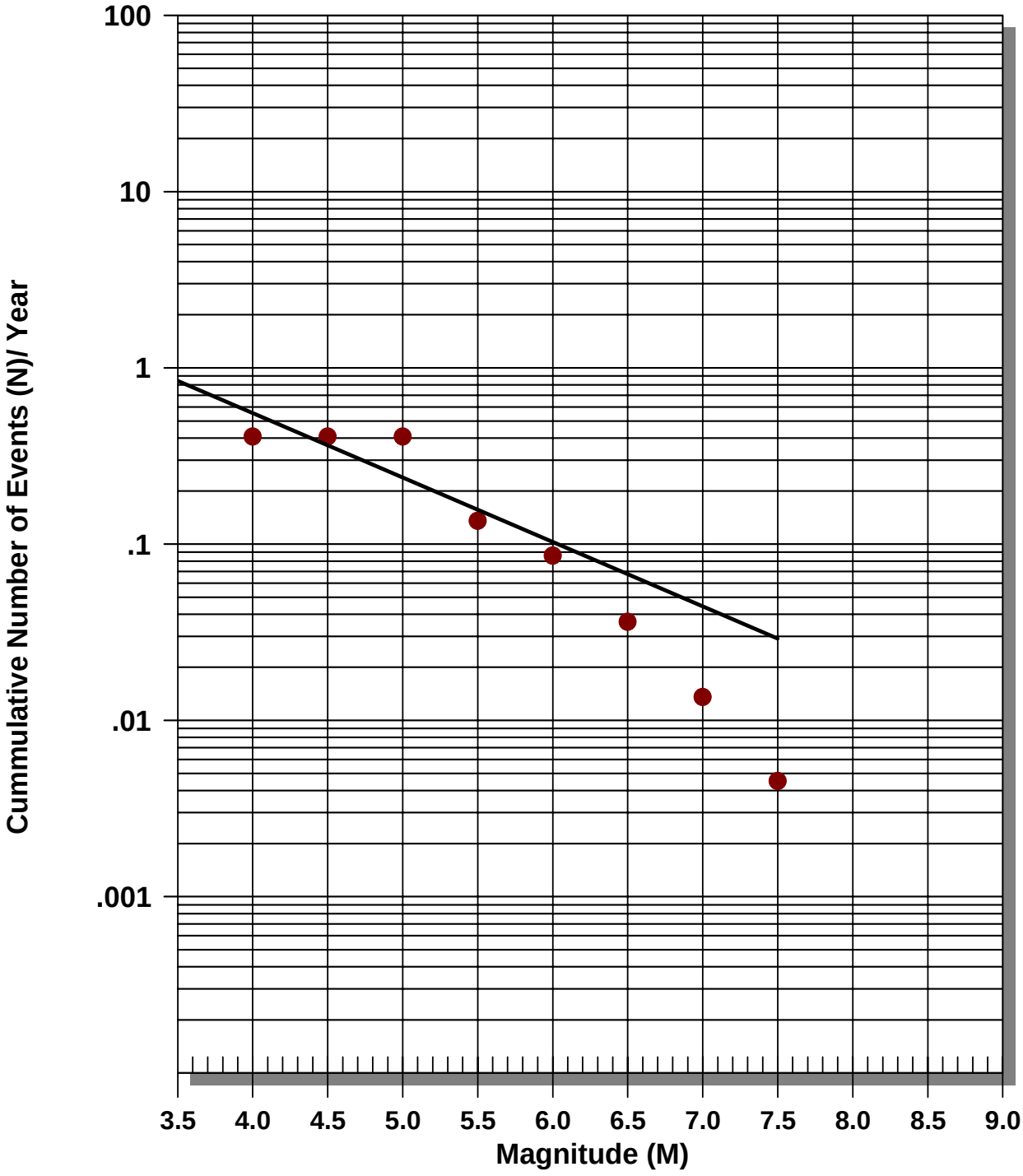
STRIKE-SLIP FAULTS

11) Bozorgnia Campbell Niazi (1999) Hor.-Pleist. Soil-Cor.



EARTHQUAKE RECURRENCE CURVE

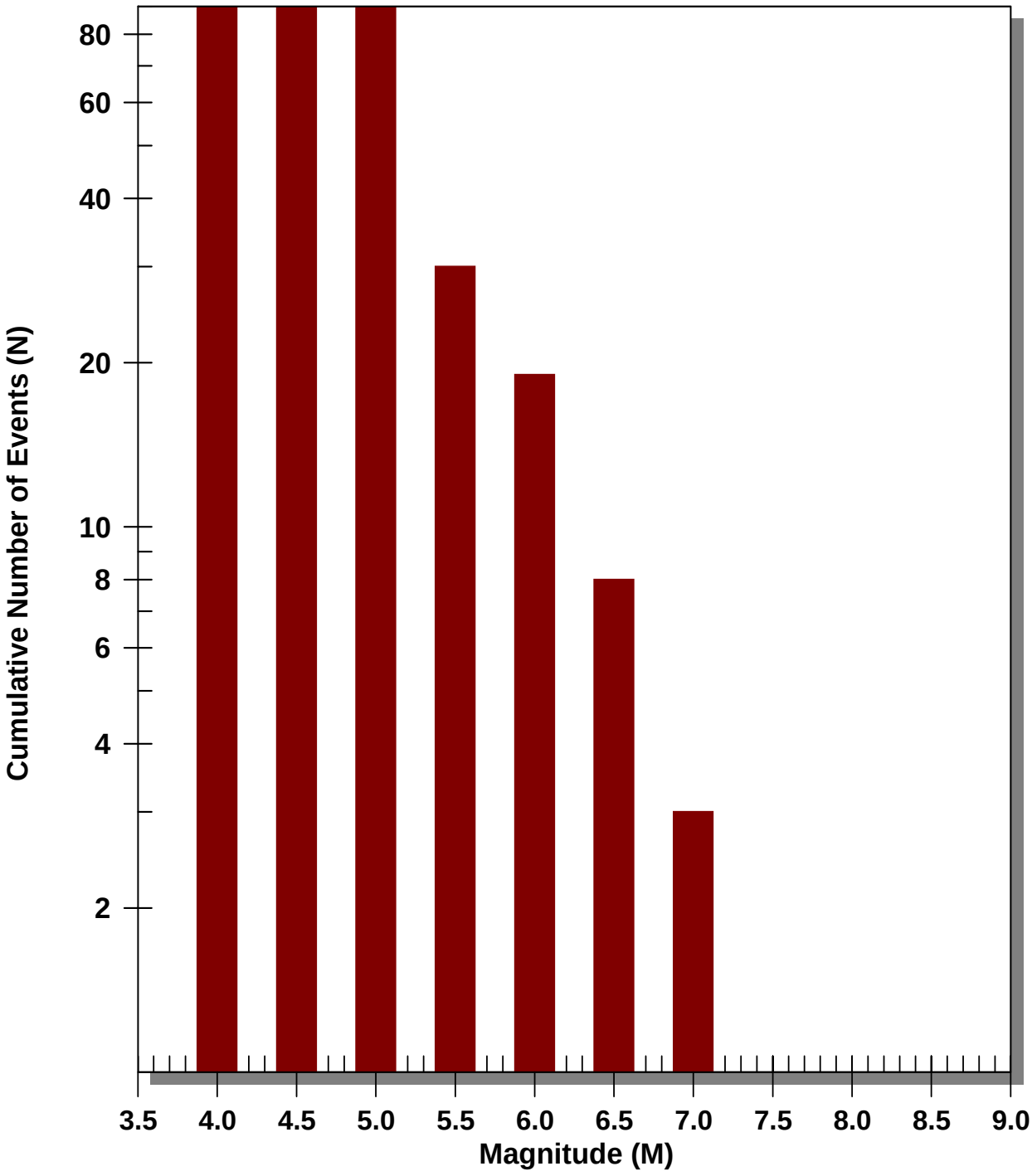
LDW Menifee



W.O. 8129-A-SC
PLATE C-12

Number of Earthquakes (N) Above Magnitude (M)

LDW Menifee



W.O. 8129-A-SC
PLATE C-13

APPENDIX D

LABORATORY TEST RESULTS

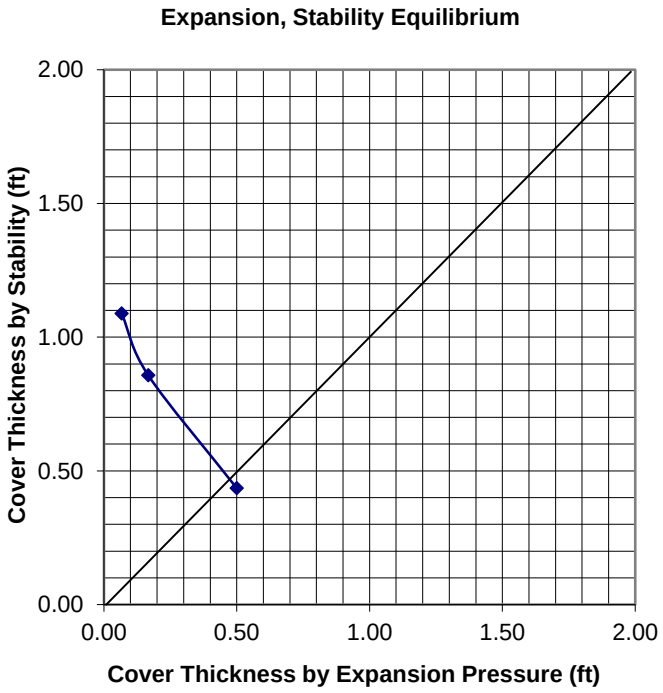
TEST SPECIMEN		A	B	C	D
Compactor air pressure	PSI	350	350	230	
Water added	%	2.1	3.6	5.3	
Moisture at compaction	%	10.1	11.6	13.3	
Height of sample	IN	2.53	2.57	2.62	
Dry density	PCF	126.2	124.5	121.1	
R-Value by exudation		66	33	15	
R-Value by exudation, corrected		66	35	15	
Exudation pressure	PSI	401	230	120	
Stability thickness	FT	0.44	0.86	1.09	
Expansion pressure thickness	FT	0.50	0.17	0.07	

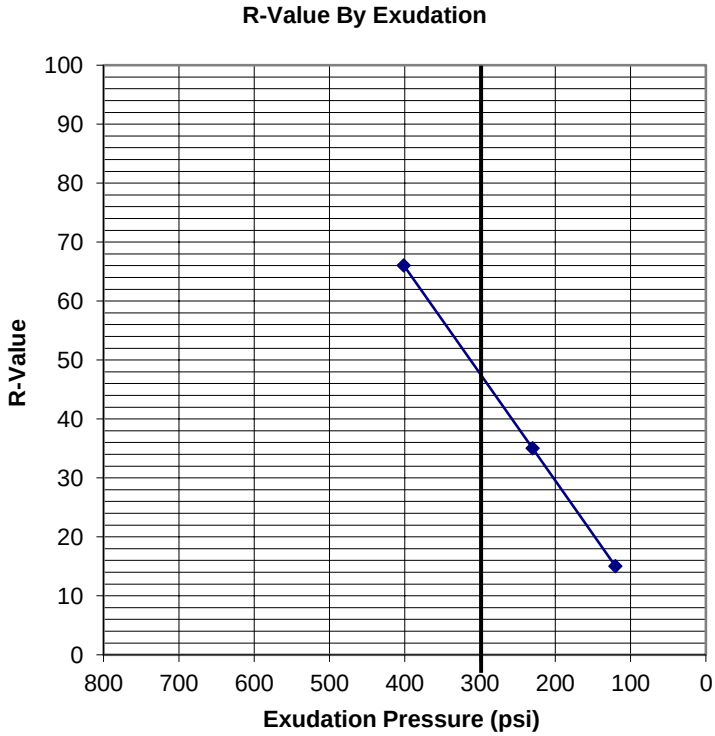
DESIGN CALCULATION DATA

Traffic index, assumed	5.0
Gravel equivalent factor, assumed	1.25
Expansion, stability equilibrium	0.46
R-Value by expansion	64
R-Value by exudation	48
R-Value at equilibrium	**48**

SAMPLE INFORMATION

Sample Location:	B-3, 0-5ft
Sample Description:	Brown Silty Sand
Notes:	-
	0% Retained on 3/4 inch sieve
Test Method:	Cal-Trans Test 301





GeoSoils, Inc.
5741 Palmer Way
Carlsbad, CA 92008
Telephone: (760) 438-3155
Fax: (760) 931-0915

9/2/2010

R - VALUE TEST RESULTS

Project: Foremost Pacific Group

Number: 8129-A-SC W.O. 8129-A-SC

Date: July 2021 Plate: PLATE D-1

SoilCor
CORROSION & THERMAL SCIENCES
42184 Remington Ave, Temecula CA 92590
ph (951) 795-3135 • fx (951) 894-2683

Work Order No.: 21G4141
Client: GeoSoils, Inc.
Project No.: 8129-A-SC
Project Name: Foremost Pacific Group
Report Date: July 23, 2021

Laboratory Test(s) Results Summary

The subject soil sample was processed with the U.S. Standard No. 10 Sieve and tested for pH (ASTM G 51-95 2012), Soil Resistivity (ASTM G 57-06 2012), Sulfate Ion Content (ASTM D 516-16) and Chloride Ion Content (ASTM D 512-12B). The test results follow:

Sample Identification	pH (H+)	As Rec'd Resistivity (ohm-cm)	Saturated Resistivity (ohm-cm)	Sulfate Content (mg/L)	Chloride Content (mg/L)
B-1 @ 0-5ft	6.8	220,000	1,700	10	30

*ND=No Detection

We appreciate the opportunity to serve you. Please do not hesitate to contact us with any questions or clarifications regarding these results or procedures.

Ahmet K. Kaya, Laboratory Manager

APPENDIX E

GENERAL EARTHWORK AND GRADING GUIDELINES

GENERAL EARTHWORK AND GRADING GUIDELINES

General

These guidelines present general procedures and requirements for earthwork and grading as shown on the approved grading plans, including preparation of areas to be filled, placement of fill, installation of subdrains, excavations, and appurtenant structures or flatwork. The recommendations contained in the geotechnical report are part of these earthwork and grading guidelines and would supercede the provisions contained hereafter in the case of conflict. Evaluations performed by the consultant during the course of grading may result in new or revised recommendations which could supercede these guidelines or the recommendations contained in the geotechnical report. Generalized details follow this text.

The contractor is responsible for the satisfactory completion of all earthwork in accordance with provisions of the project plans and specifications and latest adopted Code. In the case of conflict, the most onerous provisions shall prevail. The project geotechnical engineer and engineering geologist (geotechnical consultant), and/or their representatives, should provide observation and testing services, and geotechnical consultation during the duration of the project.

EARTHWORK OBSERVATIONS AND TESTING

Geotechnical Consultant

Prior to the commencement of grading, a qualified geotechnical consultant (soil engineer and engineering geologist) should be employed for the purpose of observing earthwork procedures and testing the fills for general conformance with the recommendations of the geotechnical report(s), the approved grading plans, and applicable grading codes and ordinances.

The geotechnical consultant should provide testing and observation so that an evaluation may be made that the work is being accomplished as specified. It is the responsibility of the contractor to assist the consultants and keep them apprised of anticipated work schedules and changes, so that they may schedule their personnel accordingly.

All remedial removals, clean-outs, prepared ground to receive fill, key excavations, and subdrain installation should be observed and documented by the geotechnical consultant prior to placing any fill. It is the contractor's responsibility to notify the geotechnical consultant when such areas are ready for observation.

Laboratory and Field Tests

Maximum dry density tests to determine the degree of compaction should be performed in accordance with American Standard Testing Materials test method ASTM designation D-1557. Random or representative field compaction tests should be performed in

accordance with test methods ASTM designation D-1556, D-2937 or D-2922, and D-3017, at intervals of approximately ±2 feet of fill height or approximately every 1,000 cubic yards placed. These criteria would vary depending on the soil conditions and the size of the project. The location and frequency of testing would be at the discretion of the geotechnical consultant.

Contractor's Responsibility

All clearing, site preparation, and earthwork performed on the project should be conducted by the contractor, with observation by a geotechnical consultant, and staged approval by the governing agencies, as applicable. It is the contractor's responsibility to prepare the ground surface to receive the fill, to the satisfaction of the geotechnical consultant, and to place, spread, moisture condition, mix, and compact the fill in accordance with the recommendations of the geotechnical consultant. The contractor should also remove all non-earth material considered unsatisfactory by the geotechnical consultant.

Notwithstanding the services provided by the geotechnical consultant, it is the sole responsibility of the contractor to provide adequate equipment and methods to accomplish the earthwork in strict accordance with applicable grading guidelines, latest adopted Code or agency ordinances, geotechnical report(s), and approved grading plans. Sufficient watering apparatus and compaction equipment should be provided by the contractor with due consideration for the fill material, rate of placement, and climatic conditions. If, in the opinion of the geotechnical consultant, unsatisfactory conditions such as questionable weather, excessive oversized rock or deleterious material, insufficient support equipment, etc., are resulting in a quality of work that is not acceptable, the consultant will inform the contractor, and the contractor is expected to rectify the conditions, and if necessary, stop work until conditions are satisfactory.

During construction, the contractor shall properly grade all surfaces to maintain good drainage and prevent ponding of water. The contractor shall take remedial measures to control surface water and to prevent erosion of graded areas until such time as permanent drainage and erosion control measures have been installed.

SITE PREPARATION

All major vegetation, including brush, trees, thick grasses, organic debris, and other deleterious material, should be removed and disposed of off-site. These removals must be concluded prior to placing fill. In-place existing alluvium or rock materials, as evaluated by the geotechnical consultant as being unsuitable, should be removed and recompacted prior to any fill placement. Depending upon the soil conditions, these materials may be reused as compacted fills. Any materials incorporated as part of the compacted fills should be approved by the geotechnical consultant.

Any underground structures such as cesspools, cisterns, mining shafts, tunnels, septic tanks, wells, pipelines, or other structures not located prior to grading, are to be removed or treated in a manner recommended by the geotechnical consultant. Soft, dry, spongy, highly fractured, or otherwise unsuitable ground, extending to such a depth that surface processing cannot adequately improve the condition, should be overexcavated down to firm ground and approved by the geotechnical consultant before compaction and filling operations continue. Overexcavated and processed soils, which have been properly mixed and moisture conditioned, should be re-compacted to the minimum relative compaction as specified in these guidelines.

Existing ground, which is determined to be satisfactory for support of the fills, should be scarified (ripped) to a minimum depth of 6 to 8 inches, or as directed by the geotechnical consultant. After the scarified ground is brought to optimum moisture content, or greater and mixed, the materials should be compacted as specified herein. If the scarified zone is greater than 6 to 8 inches in depth, it may be necessary to remove the excess and place the material in lifts restricted to about 6 to 8 inches in compacted thickness. Scarification, disc harrowing, or other acceptable forms of mixing should continue until the soils are broken down and free of large lumps or clods, until the working surface is reasonably uniform and free from ruts, hollows, hummocks, mounds, or other uneven features, which would inhibit compaction as described previously.

Where fills are to be placed on ground with slopes steeper than 5:1 (horizontal to vertical [h:v]), the ground should be stepped or benched. The lowest bench, which will act as a key, should be a minimum of 15 feet wide and should be at least 2 feet deep into firm material, and approved by the geotechnical consultant. In fill-over-cut slope conditions, the recommended minimum width of the lowest bench or key is also 15 feet, with the key founded on firm material, as designated by the geotechnical consultant. As a general rule, unless specifically recommended otherwise by the geotechnical consultant, the minimum width of fill keys should be equal to ½ the height of the slope.

Standard benching is generally 4 feet (minimum) vertically, exposing firm, acceptable material. Benching may be used to remove unsuitable materials, although it is understood that the vertical height of the bench may exceed 4 feet. Pre-stripping may be considered for unsuitable materials in excess of 4 feet in thickness.

All areas to receive fill, including processed areas, removal areas, and the toes of fill benches, should be observed and approved by the geotechnical consultant prior to placement of fill. Fills may then be properly placed and compacted until design grades (elevations) are attained.

COMPACTED FILLS

Any earth materials imported or excavated on the property may be utilized in the fill provided that each material has been evaluated to be suitable by the geotechnical

consultant. These materials should be free of roots, tree branches, other organic matter, or other deleterious materials. All unsuitable materials should be removed from the fill as directed by the geotechnical consultant. Soils of poor gradation, undesirable expansion potential, or substandard strength characteristics may be designated by the consultant as unsuitable and may require blending with other soils to serve as a satisfactory fill material.

Fill materials derived from benching operations should be dispersed throughout the fill area and blended with other approved material. Benching operations should not result in the benched material being placed only within a single equipment width away from the fill/bedrock contact.

Oversized materials defined as rock, or other irreducible materials, with a maximum dimension greater than 12 inches, should not be buried or placed in fills unless the location of materials and disposal methods are specifically approved by the geotechnical consultant. Oversized material should be taken offsite, or placed in accordance with recommendations of the geotechnical consultant in areas designated as suitable for rock disposal. GSI anticipates that soils to be utilized as fill material for the subject project may contain some rock. Appropriately, the need for rock disposal may be necessary during grading operations on the site. From a geotechnical standpoint, the depth of any rocks, rock fills, or rock blankets, should be a sufficient distance from finish grade. This depth is generally the same as any overexcavation due to cut-fill transitions in hard rock areas, and generally facilitates the excavation of structural footings and substructures. Should deeper excavations be proposed (i.e., deepened footings, utility trenching, etc.), the developer may consider increasing the hold-down depth of any rocky fills to be placed, as appropriate. In addition, some agencies/jurisdictions mandate a specific hold-down depth for oversize materials placed in fills. The hold-down depth, and potential to encounter oversize rock, both within fills, and occurring in cut or natural areas, would need to be disclosed to all interested/affected parties. Once approved by the governing agency, the hold-down depth for oversized rock (i.e., greater than 12 inches) in fills on this project is provided as 10 feet, unless specified differently in the text of this report. The governing agency may require that these materials need to be deeper, crushed, or reduced to less than 12 inches in maximum dimension, at their discretion.

To facilitate future trenching, rock (or oversized material), should not be placed within the hold-down depth feet from finish grade, the range of foundation excavations, future utilities, or underground construction unless specifically approved by the governing agency, the geotechnical consultant, and/or the developer's representative.

If import material is required for grading, representative samples of the materials to be utilized as compacted fill should be analyzed in the laboratory by the geotechnical consultant to evaluate it's physical properties and suitability for use onsite. Such testing should be performed three (3) days prior to importation. If any material other than that previously tested is encountered during grading, an appropriate analysis of this material should be conducted by the geotechnical consultant as soon as possible.

Approved fill material should be placed in areas prepared to receive fill in near horizontal layers, that when compacted, should not exceed about 6 to 8 inches in thickness. The geotechnical consultant may approve thick lifts if testing indicates the grading procedures are such that adequate compaction is being achieved with lifts of greater thickness. Each layer should be spread evenly and blended to attain uniformity of material and moisture suitable for compaction.

Fill layers at a moisture content less than optimum should be watered and mixed, and wet fill layers should be aerated by scarification, or should be blended with drier material. Moisture conditioning, blending, and mixing of the fill layer should continue until the fill materials have a uniform moisture content at, or above, optimum moisture.

After each layer has been evenly spread, moisture conditioned, and mixed, it should be uniformly compacted to a minimum of 90 percent of the maximum density as evaluated by ASTM test designation D-1557, or as otherwise recommended by the geotechnical consultant. Compaction equipment should be adequately sized and should be specifically designed for soil compaction, or of proven reliability to efficiently achieve the specified degree of compaction.

Where tests indicate that the density of any layer of fill, or portion thereof, is below the required relative compaction, or improper moisture is in evidence, the particular layer or portion shall be re-worked until the required density and/or moisture content has been attained. No additional fill shall be placed in an area until the last placed lift of fill has been tested and found to meet the density and moisture requirements, and is approved by the geotechnical consultant.

In general, per the latest adopted Code, fill slopes should be designed and constructed at a gradient of 2:1 (h:v), or flatter. Compaction of slopes should be accomplished by over-building a minimum of 3 feet horizontally, and subsequently trimming back to the design slope configuration. Testing shall be performed as the fill is elevated to evaluate compaction as the fill core is being developed. Special efforts may be necessary to attain the specified compaction in the fill slope zone. Final slope shaping should be performed by trimming and removing loose materials with appropriate equipment. A final evaluation of fill slope compaction should be based on observation and/or testing of the finished slope face. Where compacted fill slopes are designed steeper than 2:1 (h:v), prior approval from the governing agency, specific material types, a higher minimum relative compaction, special reinforcement, and special grading procedures will be recommended.

If an alternative to over-building and cutting back the compacted fill slopes is selected, then special effort should be made to achieve the required compaction in the outer 10 feet of each lift of fill by undertaking the following:

1. An extra piece of equipment consisting of a heavy, short-shanked sheepsfoot should be used to roll (horizontal) parallel to the slopes continuously as fill is placed. The sheepsfoot roller should also be used to roll perpendicular to the

slopes, and extend out over the slope to provide adequate compaction to the face of the slope.

2. Loose fill should not be spilled out over the face of the slope as each lift is compacted. Any loose fill spilled over a previously completed slope face should be trimmed off or be subject to re-rolling.

3. Field compaction tests will be made in the outer (horizontal) ±2 to ±8 feet of the slope at appropriate vertical intervals, subsequent to compaction operations.

4. After completion of the slope, the slope face should be shaped with a small tractor and then re-rolled with a sheepsfoot to achieve compaction to near the slope face. Subsequent to testing to evaluate compaction, the slopes should be grid-rolled to achieve compaction to the slope face. Final testing should be used to evaluate compaction after grid rolling.

5. Where testing indicates less than adequate compaction, the contractor will be responsible to rip, water, mix, and recompact the slope material as necessary to achieve compaction. Additional testing should be performed to evaluate compaction.

SUBDRAIN INSTALLATION

Subdrains should be installed in approved ground in accordance with the approximate alignment and details indicated by the geotechnical consultant. Subdrain locations or materials should not be changed or modified without approval of the geotechnical consultant. The geotechnical consultant may recommend and direct changes in subdrain line, grade, and drain material in the field, pending exposed conditions. The location of constructed subdrains, especially the outlets, should be recorded/surveyed by the project civil engineer. Drainage at the subdrain outlets should be provided by the project civil engineer.

EXCAVATIONS

Excavations and cut slopes should be examined during grading by the geotechnical consultant. If directed by the geotechnical consultant, further excavations or overexcavation and refilling of cut areas should be performed, and/or remedial grading of cut slopes should be performed. When fill-over-cut slopes are to be graded, unless otherwise approved, the cut portion of the slope should be observed by the geotechnical consultant prior to placement of materials for construction of the fill portion of the slope. The geotechnical consultant should observe all cut slopes, and should be notified by the contractor when excavation of cut slopes commence.

If, during the course of grading, unforeseen adverse or potentially adverse geologic conditions are encountered, the geotechnical consultant should investigate, evaluate, and make appropriate recommendations for mitigation of these conditions. The need for cut slope buttressing or stabilizing should be based on in-grading evaluation by the geotechnical consultant, whether anticipated or not.

Unless otherwise specified in geotechnical and geological report(s), no cut slopes should be excavated higher or steeper than that allowed by the ordinances of controlling governmental agencies. Additionally, short-term stability of temporary cut slopes is the contractor's responsibility.

Erosion control and drainage devices should be designed by the project civil engineer and should be constructed in compliance with the ordinances of the controlling governmental agencies, and/or in accordance with the recommendations of the geotechnical consultant.

COMPLETION

Observation, testing, and consultation by the geotechnical consultant should be conducted during the grading operations in order to state an opinion that all cut and fill areas are graded in accordance with the approved project specifications. After completion of grading, and after the geotechnical consultant has finished observations of the work, final reports should be submitted, and may be subject to review by the controlling governmental agencies. No further excavation or filling should be undertaken without prior notification of the geotechnical consultant or approved plans.

All finished cut and fill slopes should be protected from erosion and/or be planted in accordance with the project specifications and/or as recommended by a landscape architect. Such protection and/or planning should be undertaken as soon as practical after completion of grading.

JOB SAFETY

General

At GSI, getting the job done safely is of primary concern. The following is the company's safety considerations for use by all employees on multi-employer construction sites. On-ground personnel are at highest risk of injury, and possible fatality, on grading and construction projects. GSI recognizes that construction activities will vary on each site, and that site safety is the prime responsibility of the contractor; however, everyone must be safety conscious and responsible at all times. To achieve our goal of avoiding accidents, cooperation between the client, the contractor, and GSI personnel must be maintained. In an effort to minimize risks associated with geotechnical testing and observation, the following precautions are to be implemented for the safety of field personnel on grading and construction projects:

Safety Meetings: GSI field personnel are directed to attend contractor's regularly scheduled and documented safety meetings.

Safety Vests: Safety vests are provided for, and are to be worn by GSI personnel, at all times, when they are working in the field.

Safety Flags: Two safety flags are provided to GSI field technicians; one is to be affixed to the vehicle when on site, the other is to be placed atop the spoil pile on all test pits.

Flashing Lights: All vehicles stationary in the grading area shall use rotating or flashing amber beacons, or strobe lights, on the vehicle during all field testing. While operating a vehicle in the grading area, the emergency flasher on the vehicle shall be activated.

In the event that the contractor's representative observes any of our personnel not following the above, we request that it be brought to the attention of our office.

Test Pits Location, Orientation, and Clearance

The technician is responsible for selecting test pit locations. A primary concern should be the technician's safety. Efforts will be made to coordinate locations with the grading contractor's authorized representative, and to select locations following or behind the established traffic pattern, preferably outside of current traffic. The contractor's authorized representative (supervisor, grade checker, dump man, operator, etc.) should direct excavation of the pit and safety during the test period. Of paramount concern should be the soil technician's safety, and obtaining enough tests to represent the fill.

Test pits should be excavated so that the spoil pile is placed away from oncoming traffic, whenever possible. The technician's vehicle is to be placed next to the test pit, opposite the spoil pile. This necessitates the fill be maintained in a driveable condition. Alternatively, the contractor may wish to park a piece of equipment in front of the test holes, particularly in small fill areas or those with limited access.

A zone of non-encroachment should be established for all test pits. No grading equipment should enter this zone during the testing procedure. The zone should extend approximately 50 feet outward from the center of the test pit. This zone is established for safety and to avoid excessive ground vibration, which typically decreases test results.

When taking slope tests, the technician should park the vehicle directly above or below the test location. If this is not possible, a prominent flag should be placed at the top of the slope. The contractor's representative should effectively keep all equipment at a safe operational distance (e.g., 50 feet) away from the slope during this testing.

The technician is directed to withdraw from the active portion of the fill as soon as possible following testing. The technician's vehicle should be parked at the perimeter of the fill in a highly visible location, well away from the equipment traffic pattern. The contractor should inform our personnel of all changes to haul roads, cut and fill areas or other factors that may affect site access and site safety.

In the event that the technician's safety is jeopardized or compromised as a result of the contractor's failure to comply with any of the above, the technician is required, by company policy, to immediately withdraw and notify his/her supervisor. The grading contractor's representative will be contacted in an effort to affect a solution. However, in the interim, no further testing will be performed until the situation is rectified. Any fill placed can be considered unacceptable and subject to reprocessing, recompaction, or removal.

In the event that the soil technician does not comply with the above or other established safety guidelines, we request that the contractor bring this to the technician's attention and notify this office. Effective communication and coordination between the contractor's representative and the soil technician is strongly encouraged in order to implement the above safety plan.

Trench and Vertical Excavation

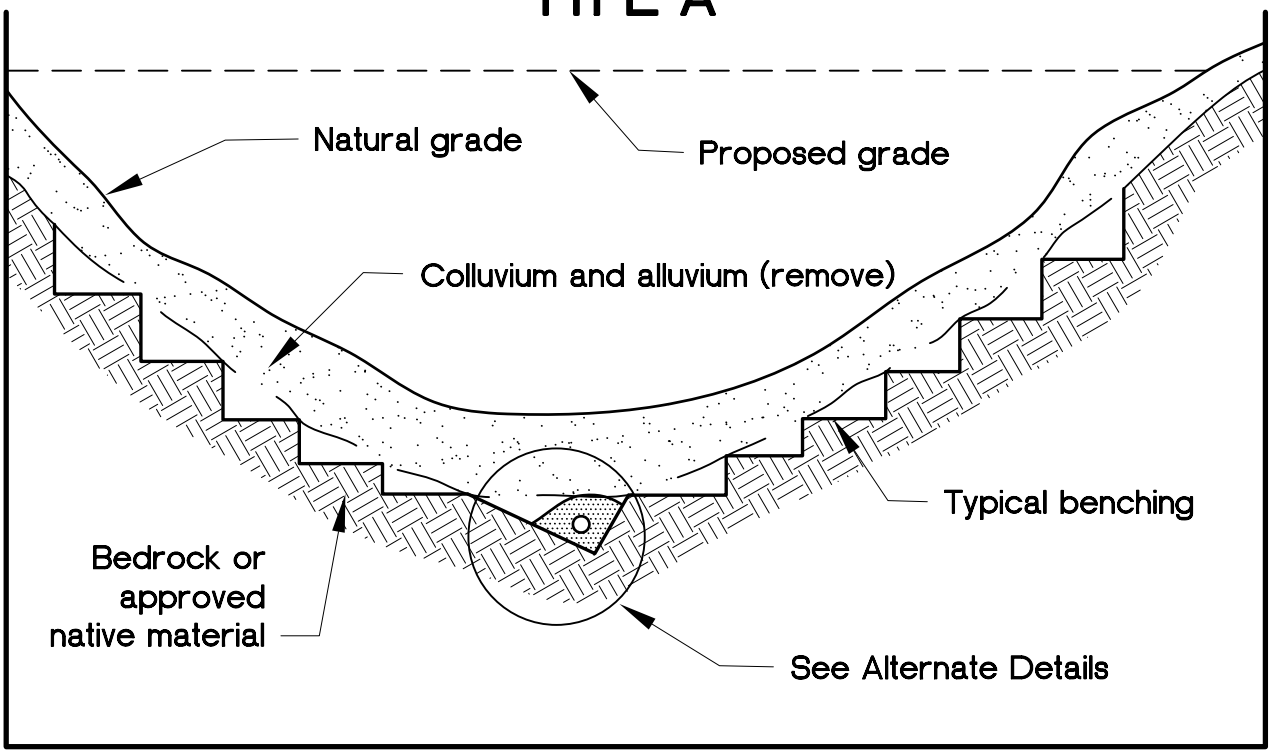
It is the contractor's responsibility to provide safe access into trenches where compaction testing is needed. Our personnel are directed not to enter any excavation or vertical cut which: 1) is 5 feet or deeper unless shored or laid back; 2) displays any evidence of instability, has any loose rock or other debris which could fall into the trench; or 3) displays any other evidence of any unsafe conditions regardless of depth.

All trench excavations or vertical cuts in excess of 5 feet deep, which any person enters, should be shored or laid back. Trench access should be provided in accordance with Cal/OSHA and/or state and local standards. Our personnel are directed not to enter any trench by being lowered or "riding down" on the equipment.

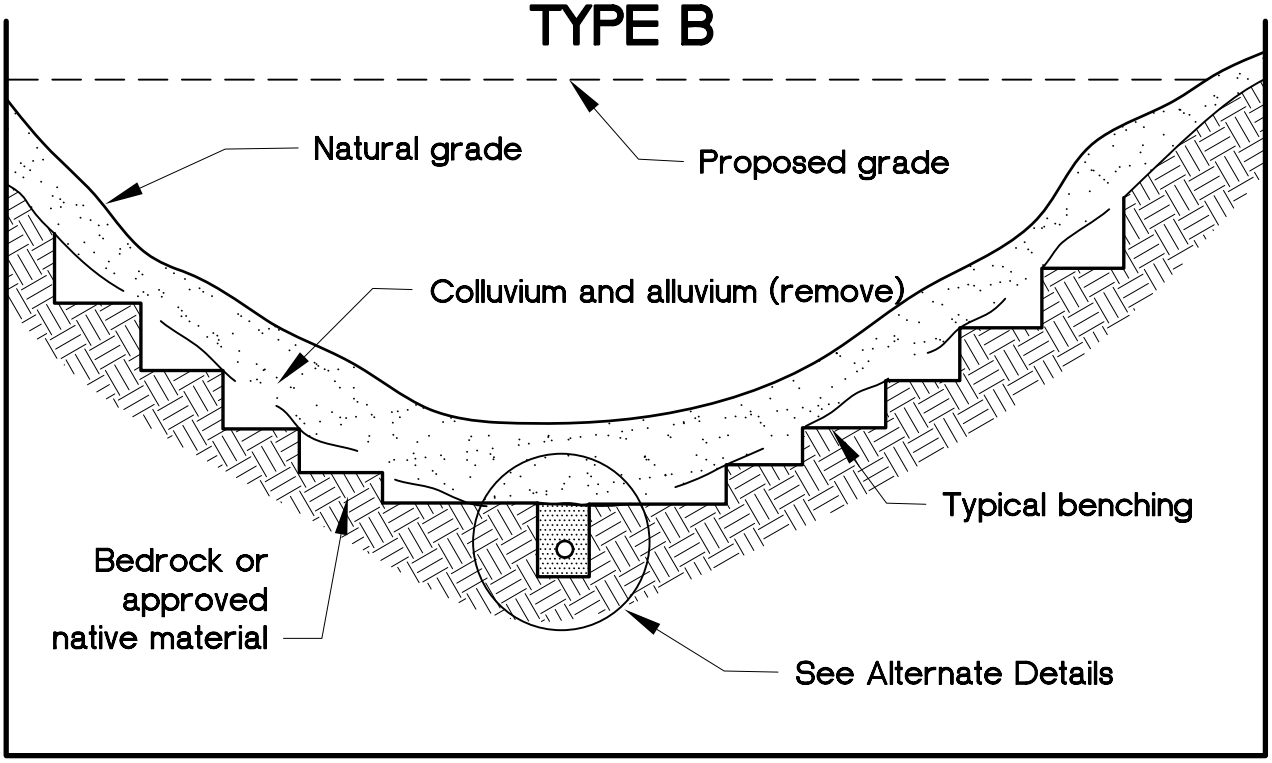
If the contractor fails to provide safe access to trenches for compaction testing, our company policy requires that the soil technician withdraw and notify his/her supervisor. The contractor's representative will be contacted in an effort to affect a solution. All backfill not tested due to safety concerns or other reasons could be subject to reprocessing and/or removal.

If GSI personnel become aware of anyone working beneath an unsafe trench wall or vertical excavation, we have a legal obligation to put the contractor and owner/developer on notice to immediately correct the situation. If corrective steps are not taken, GSI then has an obligation to notify Cal/OSHA and/or the proper controlling authorities.

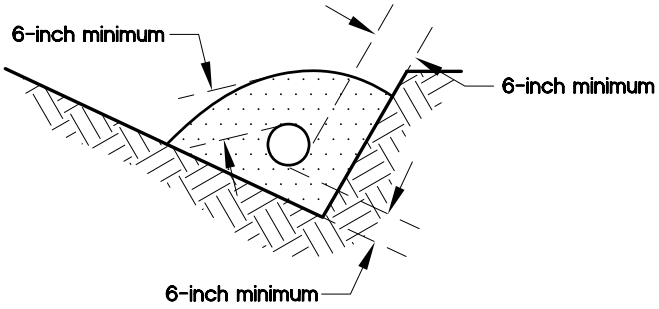
TYPE A



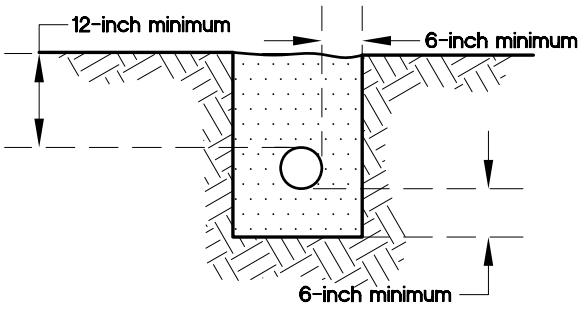
TYPE B



Selection of alternate subdrain details, location, and extent of subdrains should be evaluated by the geotechnical consultant during grading.



A-1



B-1

Filter material: Minimum volume of 9 cubic feet per lineal foot of pipe.

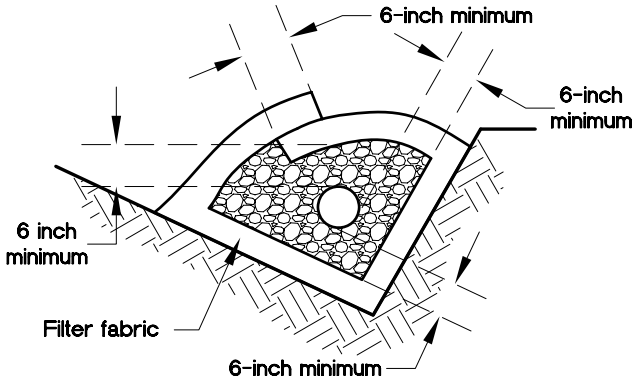
Perforated pipe: 6-inch-diameter ABS or PVC pipe or approved substitute with minimum 8 perforations (¼-inch diameter) per lineal foot in bottom half of pipe (ASTM D-2751, SDR-35, or ASTM D-1527, Schd. 40).

For continuous run in excess of 500 feet, use 8-inch-diameter pipe (ASTM D-3034, SDR-35, or ASTM D-1785, Schd. 40).

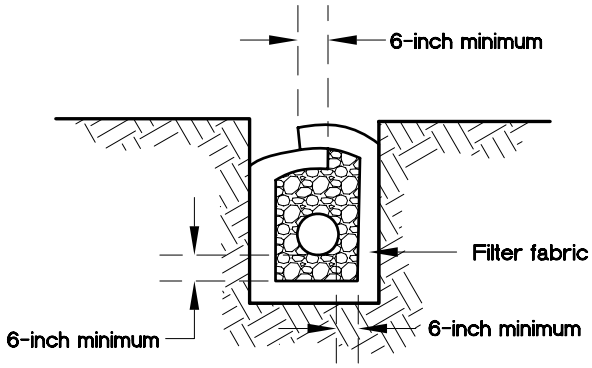
FILTER MATERIAL

Sieve Size	Percent Passing
1 inch	100
¾ inch	90-100
⅜ inch	40-100
No. 4	25-40
No. 8	18-33
No. 30	5-15
No. 50	0-7
No. 200	0-3

ALTERNATE 1: PERFORATED PIPE AND FILTER MATERIAL



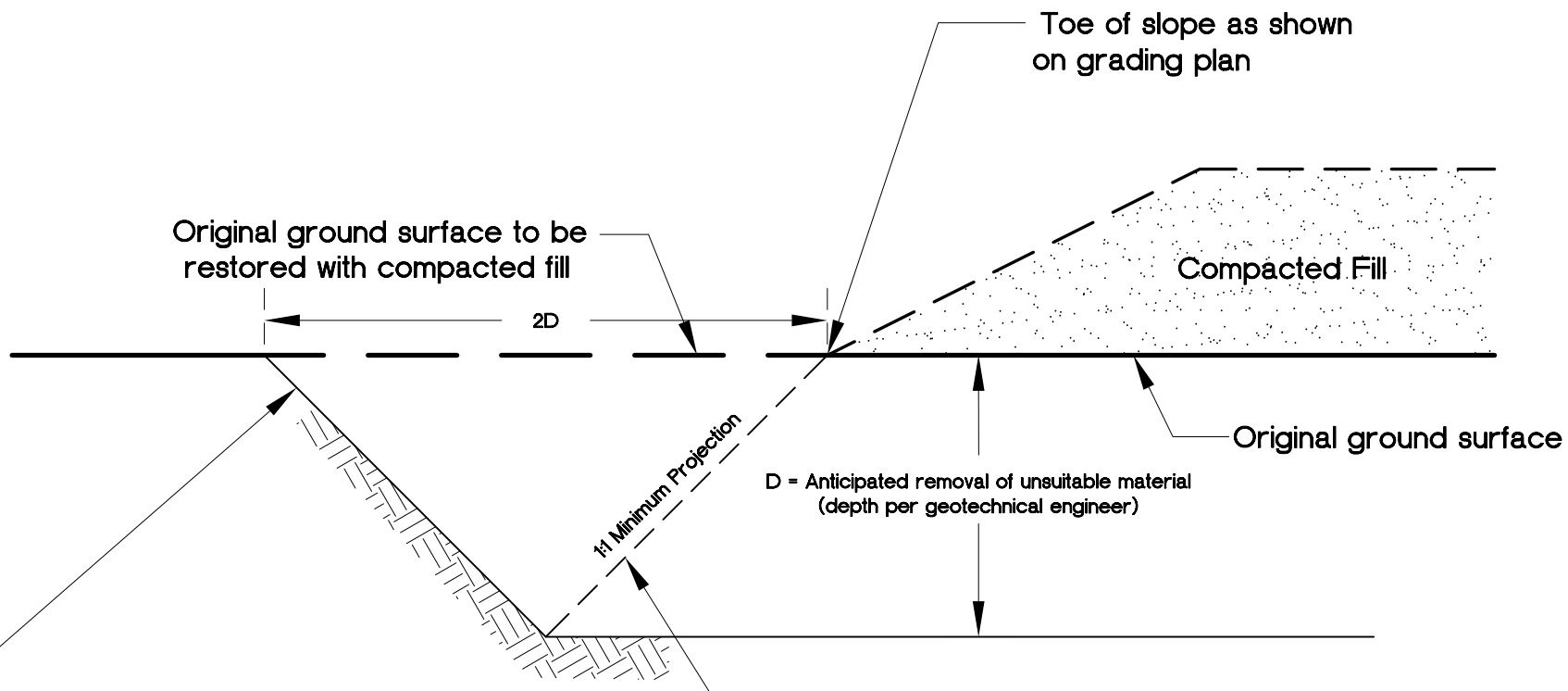
A-2



B-2

Gravel Material: 9 cubic feet per lineal foot.
Perforated Pipe: See Alternate 1
Gravel: Clean ¾-inch rock or approved substitute.
Filter Fabric: Mirafi 140 or approved substitute.

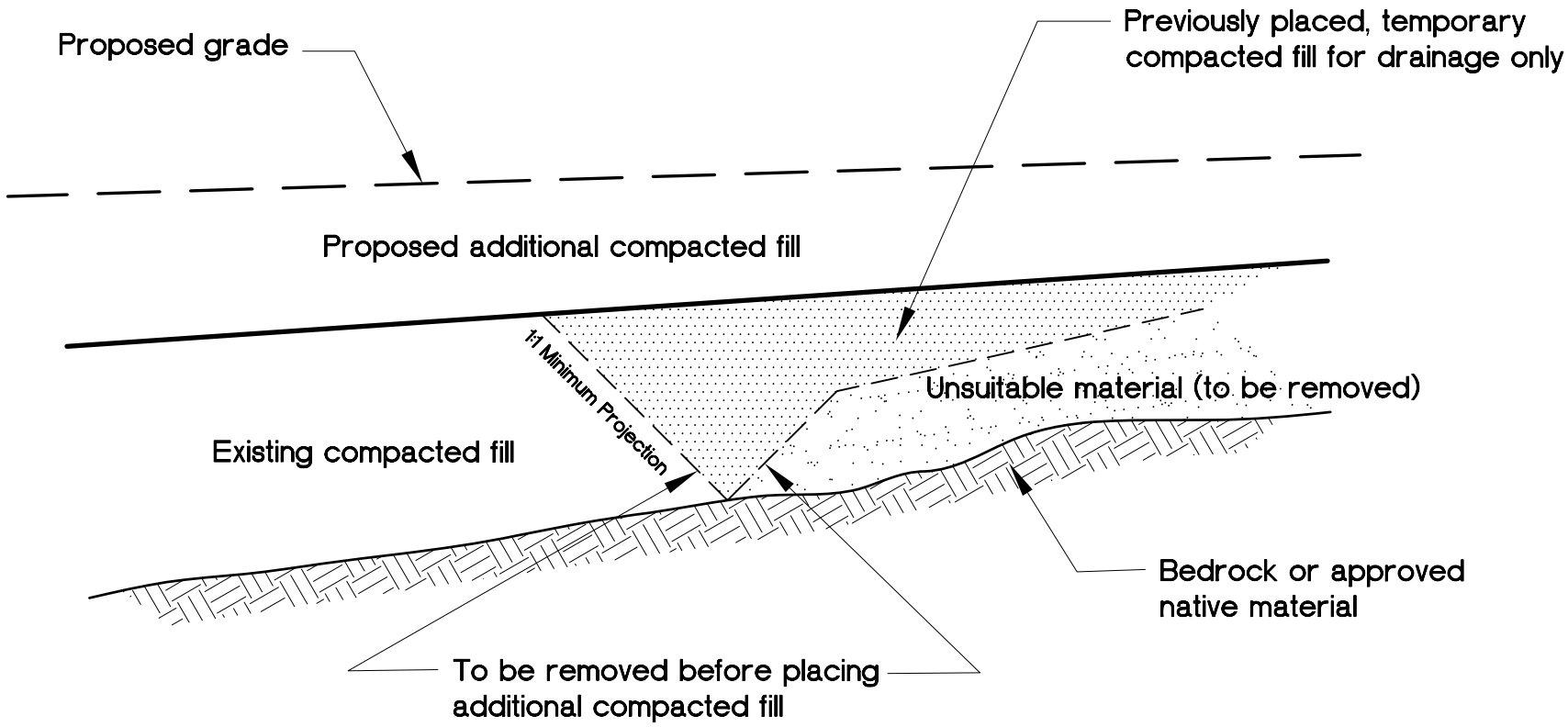
ALTERNATE 2: PERFORATED PIPE, GRAVEL, AND FILTER FABRIC



GeoSoils, Inc.

FILL SLOPE TOEING OUT ON FLAT ALLUVIATED CANYON DETAIL

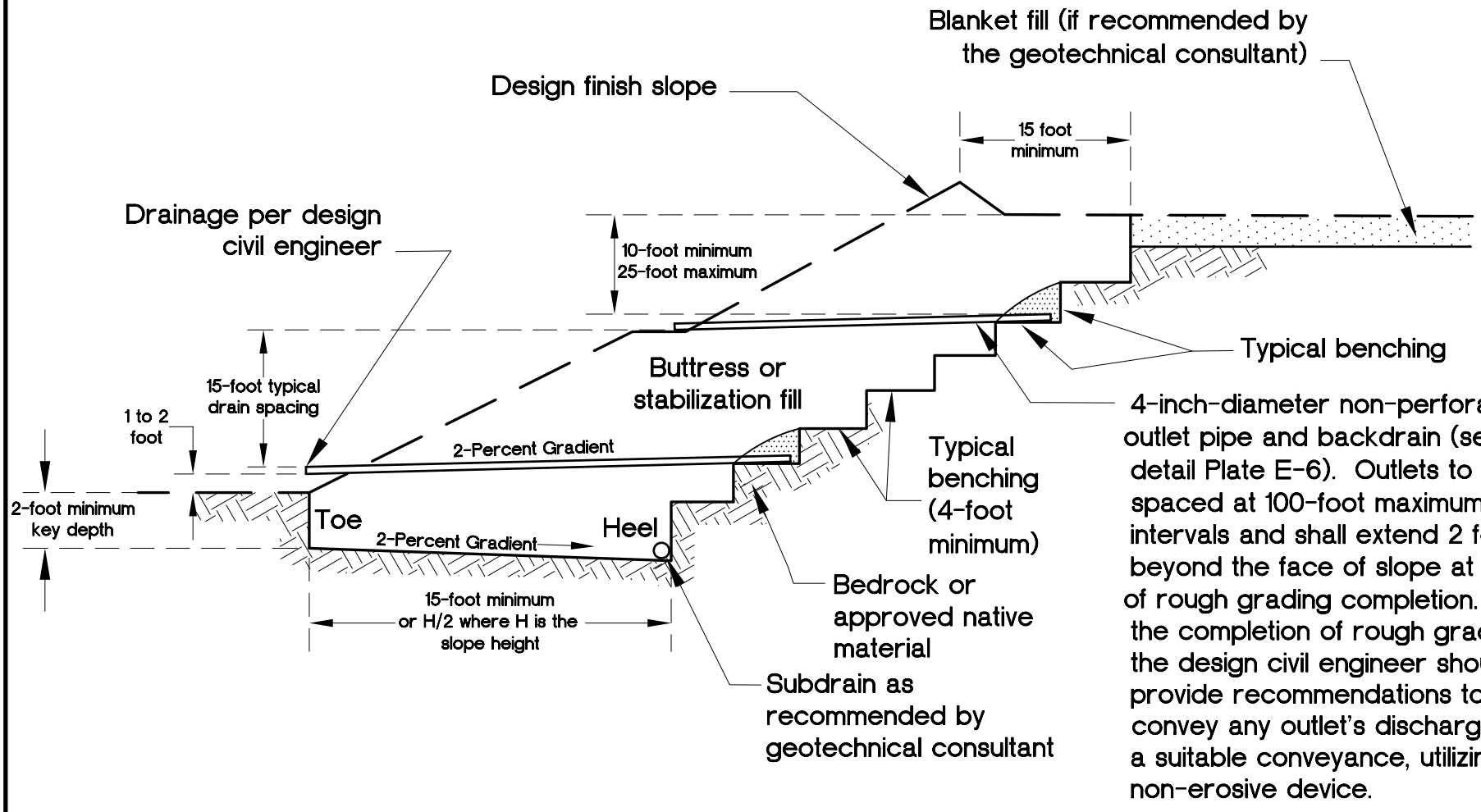
Plate E-3



GeoSoils, Inc.

REMOVAL ADJACENT TO EXISTING FILL ADJOINING CANYON FILL DETAIL

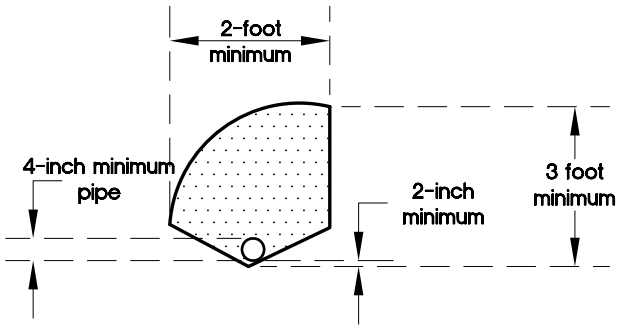
Plate E-4

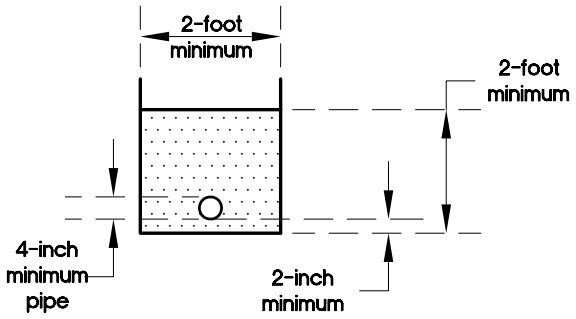


GeoSoils, Inc.

TYPICAL STABILIZATION / BUTTRESS FILL DETAIL

Plate E-5





Filter Material: Minimum of 5 cubic feet per lineal foot of pipe or 4 cubic feet per lineal feet of pipe when placed in square cut trench.

Alternative in Lieu of Filter Material: Gravel may be encased in approved filter fabric. Filter fabric shall be Mirafi 140 or equivalent. Filter fabric shall be lapped a minimum of 12 inches in all joints.

Minimum 4-Inch-Diameter Pipe: ABS-ASTM D-2751, SDR 35; or ASTM D-1527 Schedule 40, PVC-ASTM D-3034, SDR 35; or ASTM D-1785 Schedule 40 with a crushing strength of 1,000 pounds minimum, and a minimum of 8 uniformly-spaced perforations per foot of pipe. Must be installed with perforations down at bottom of pipe. Provide cap at upstream end of pipe. Slope at 2 percent to outlet pipe. Outlet pipe to be connected to subdrain pipe with tee or elbow.

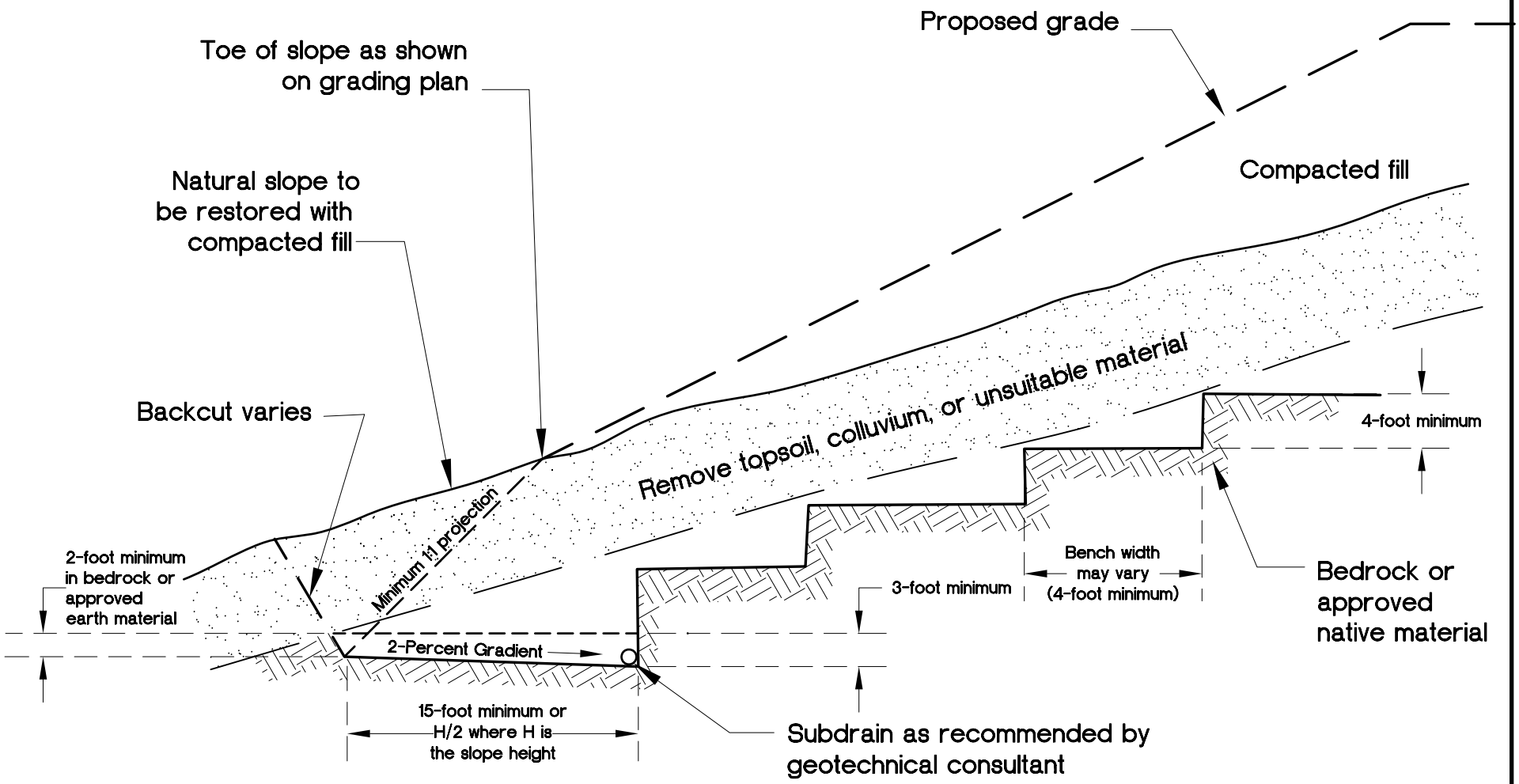
Notes:
1. Trench for outlet pipes to be backfilled and compacted with onsite soil.
2. Backdrains and lateral drains shall be located at elevation of every bench drain. First drain located at elevation just above lower lot grade. Additional drains may be required at the discretion of the geotechnical consultant.

Filter Material shall be of the following specification or an approved equivalent.

Sieve Size	Percent Passing
1 inch	100
¾ inch	90-100
⅜ inch	40-100
No. 4	25-40
No. 8	18-33
No. 30	5-15
No. 50	0-7
No. 200	0-3

Gravel shall be of the following specification or an approved equivalent.

Sieve Size	Percent Passing
1½ inch	100
No. 4	50
No. 200	8

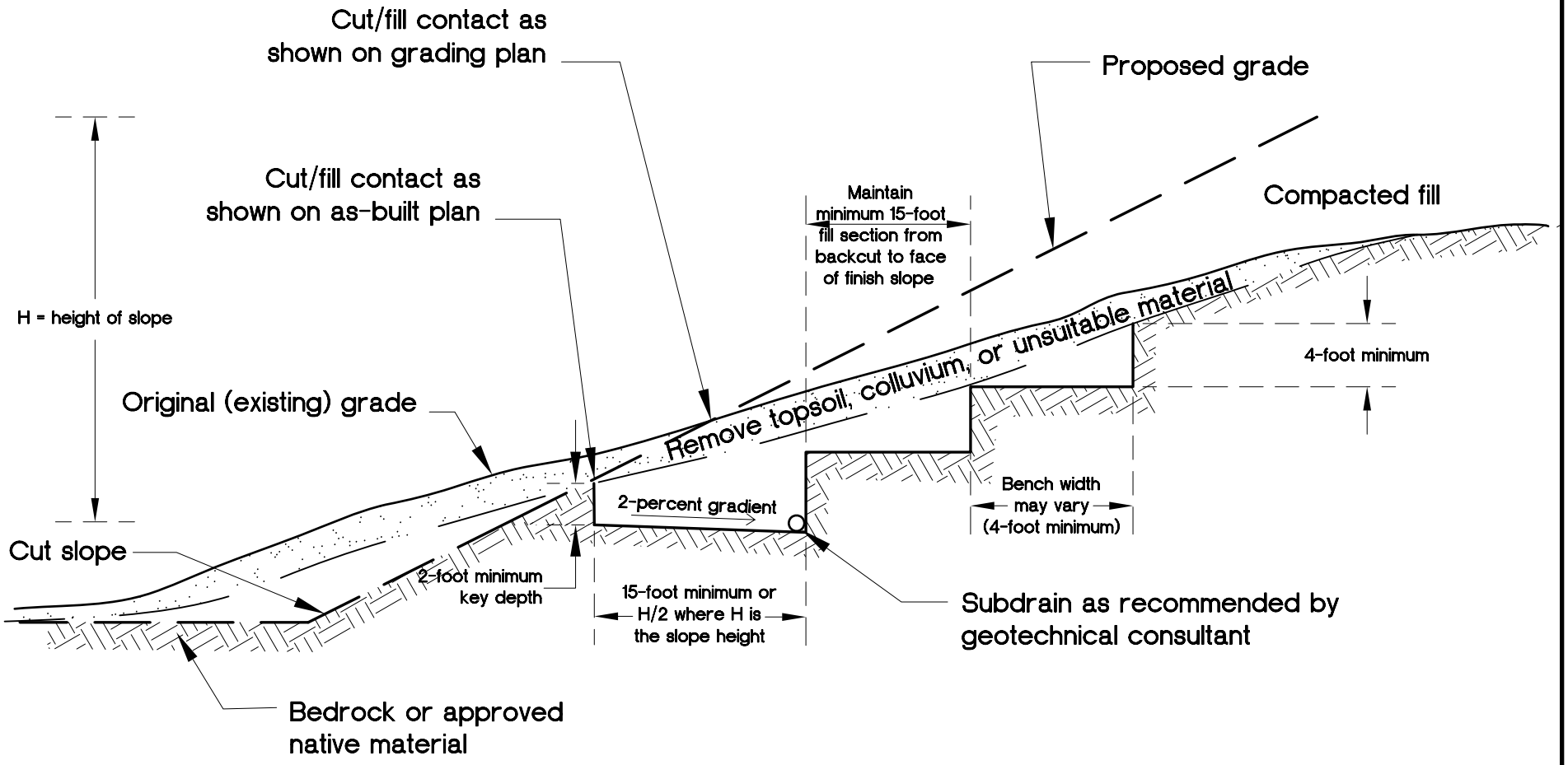


NOTES:

1. Where the natural slope approaches or exceeds the design slope ratio, special recommendations would be provided by the geotechnical consultant.

2. The need for and disposition of drains should be evaluated by the geotechnical consultant, based upon exposed conditions.

GeoSoils, Inc.	FILL OVER NATURAL (SIDEHILL FILL) DETAIL	Plate E-7

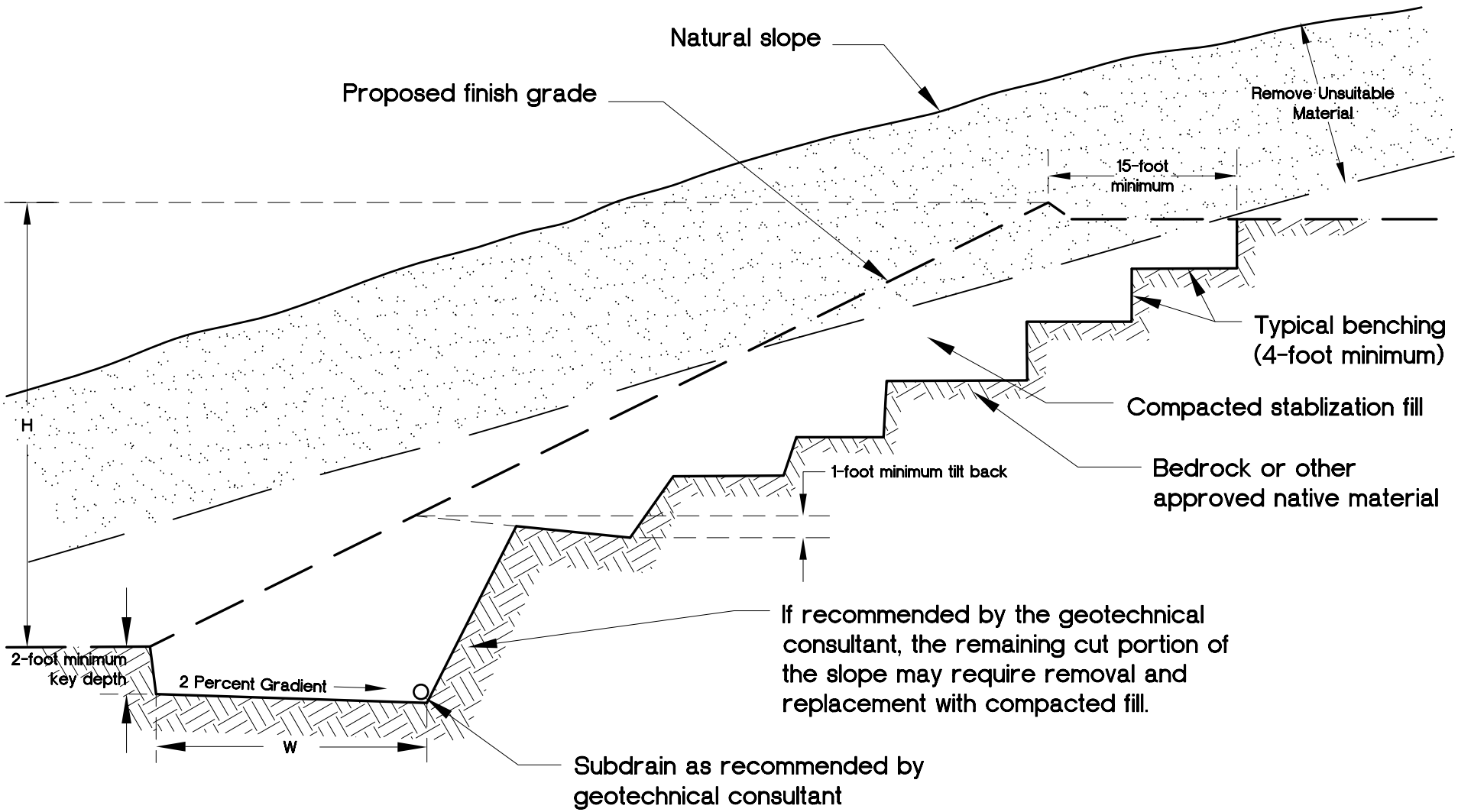


NOTE: The cut portion of the slope should be excavated and evaluated by the geotechnical consultant prior to construction of the fill portion.

GeoSoils, Inc.

FILL OVER CUT DETAIL

Plate E-8

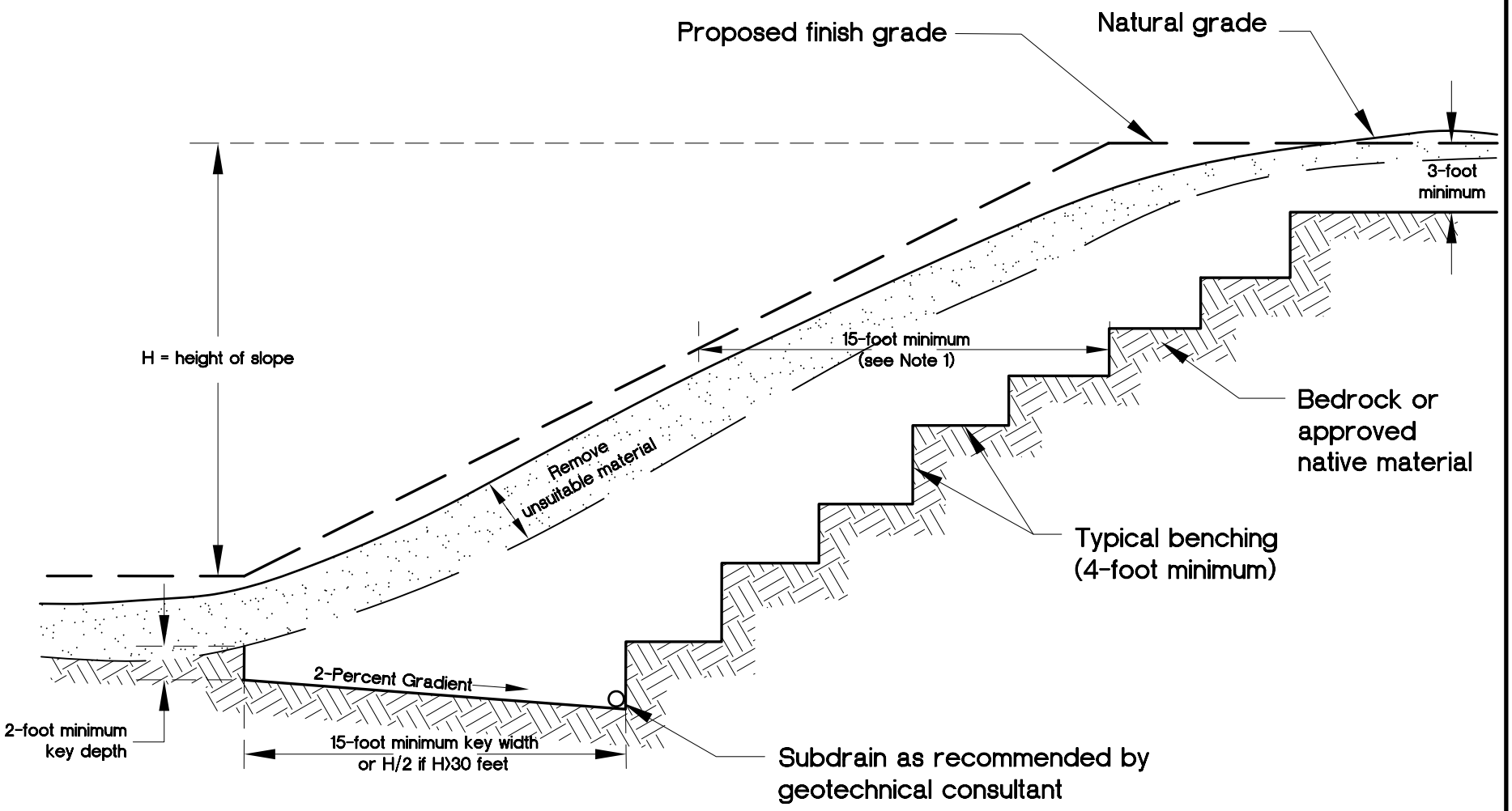


NOTES:

1. Subdrains may be required as specified by the geotechnical consultant.

2. W shall be equipment width (15 feet) for slope heights less than 25 feet. For slopes greater than 25 feet, W shall be evaluated by the geotechnical consultant. At no time, shall W be less than H/2, where H is the height of the slope.

GeoSoils, Inc.	STABLIZATION FILL FOR UNSTABLE MATERIAL EXPOSED IN CUT SLOPE DETAIL	Plate E-9



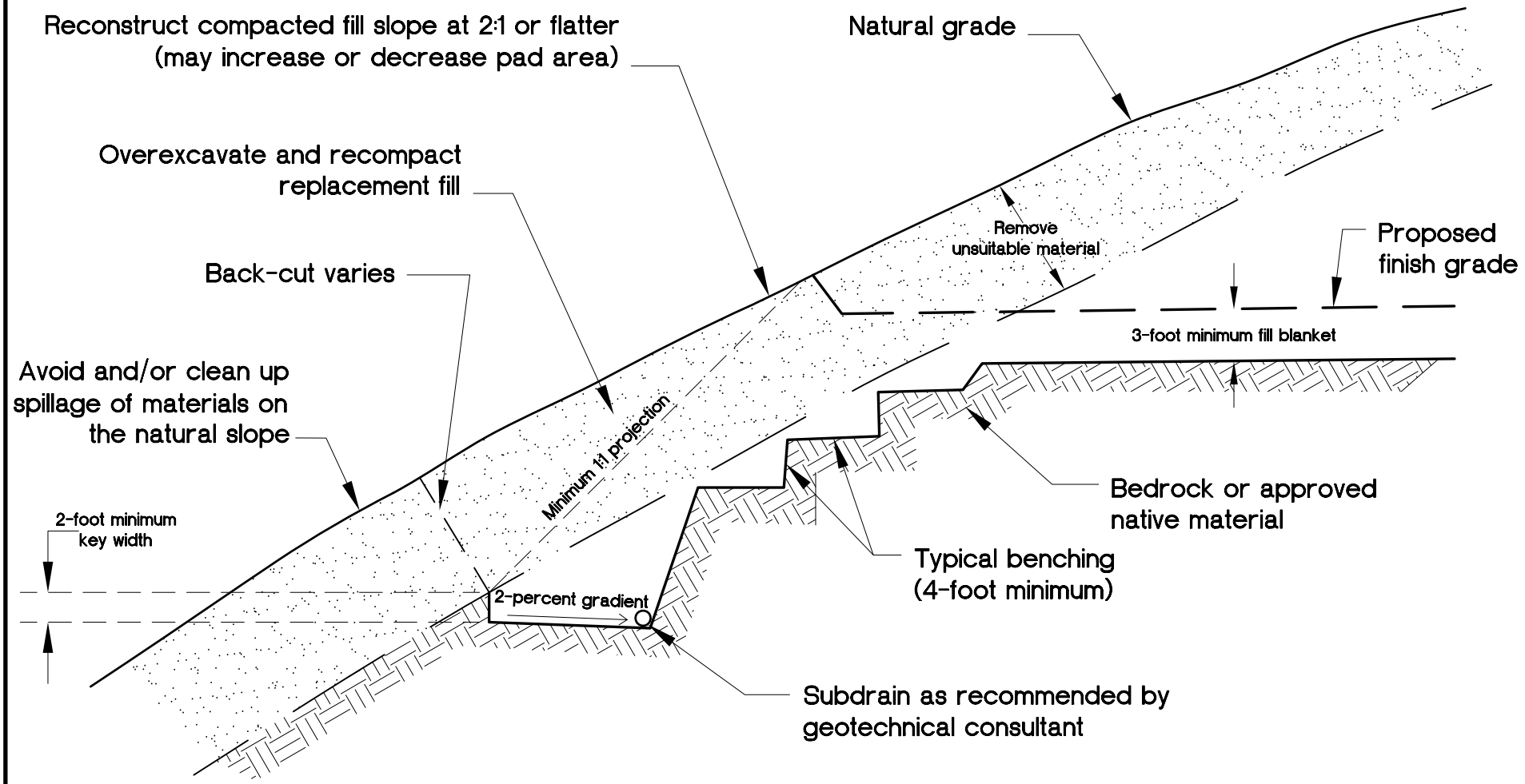
NOTES:

1. 15-foot minimum to be maintained from proposed finish slope face to backcut.
2. The need and disposition of drains will be evaluated by the geotechnical consultant based on field conditions.
3. Pad overexcavation and recompaction should be performed if evaluated to be necessary by the geotechnical consultant.

GeoSoils, Inc.

SKIN FILL OF NATURAL GROUND DETAIL

Plate E-10



NOTES:

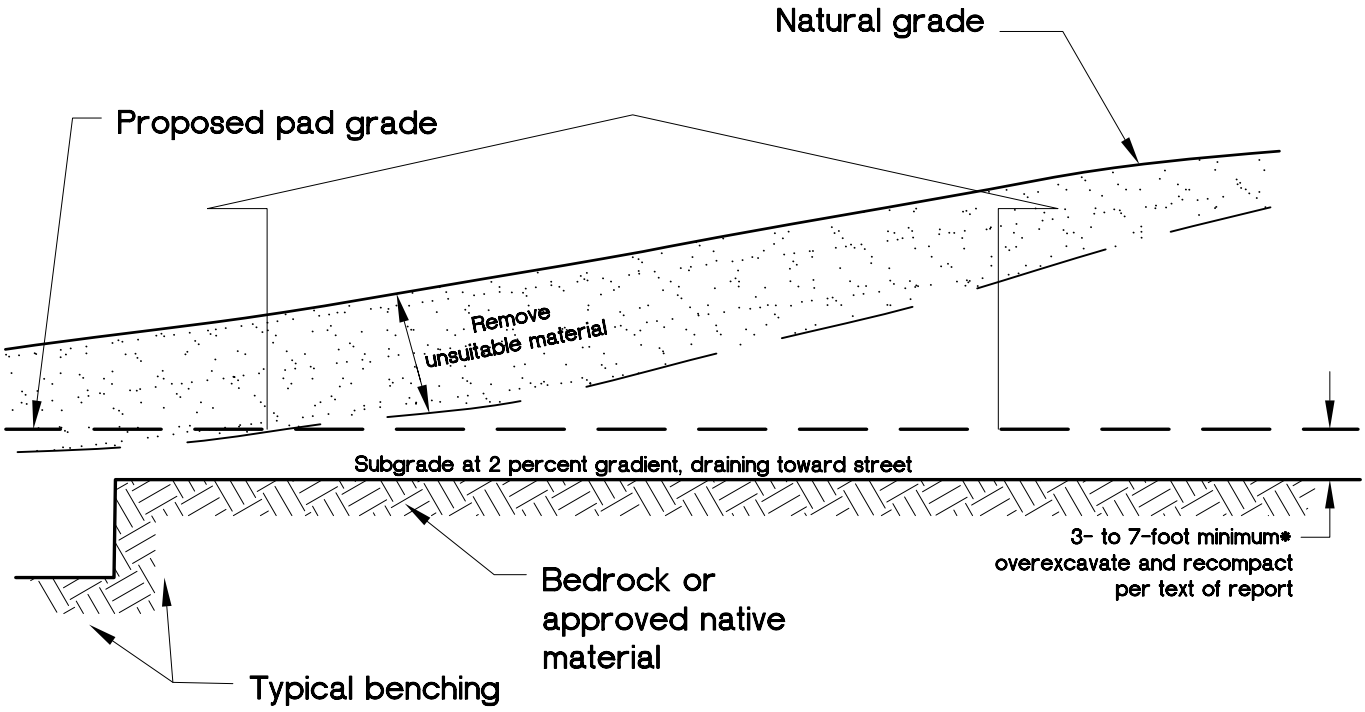
1. Subdrain and key width requirements will be evaluated based on exposed subsurface conditions and thickness of overburden.

2. Pad overexcavation and recompaction should be performed if evaluated necessary by the geotechnical consultant.

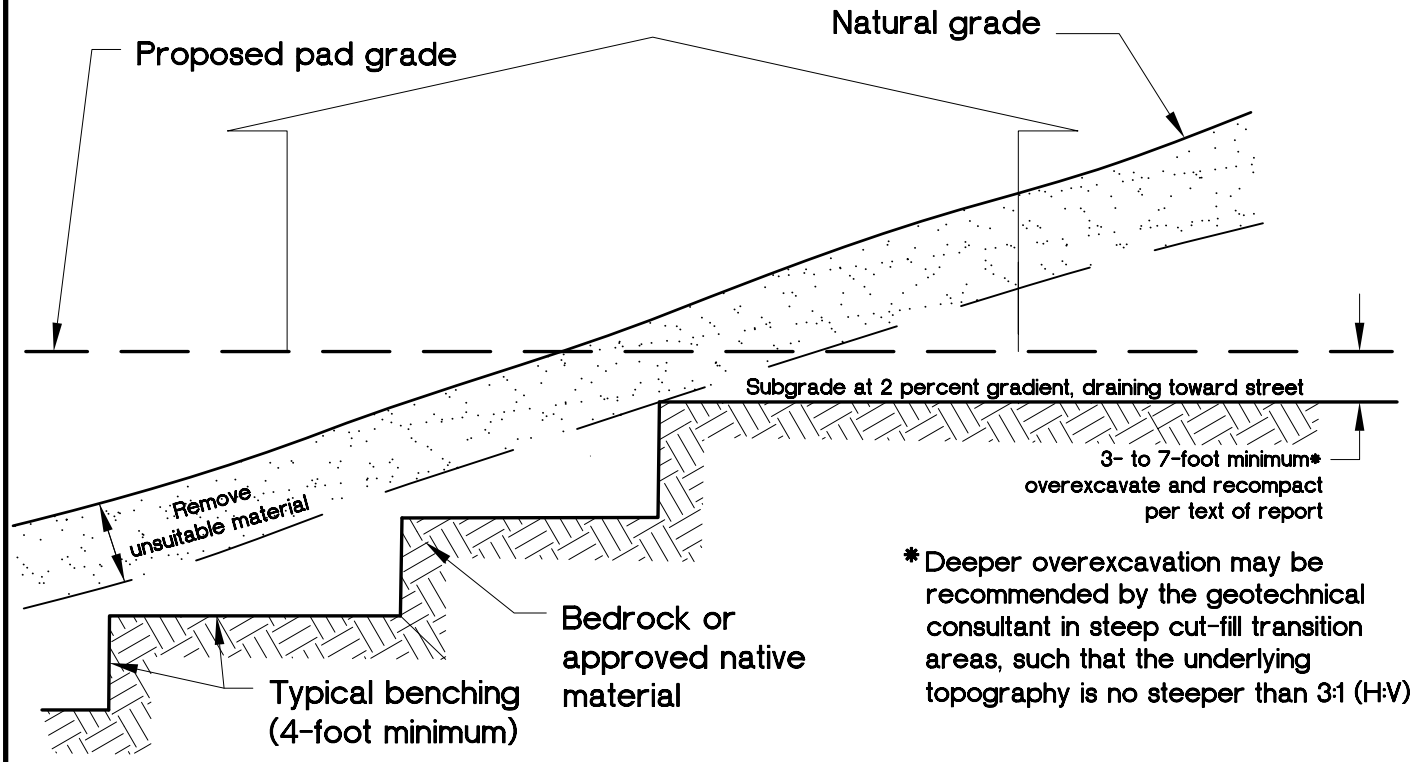
GeoSoils, Inc.

DAYLIGHT CUT LOT DETAIL

Plate E-11



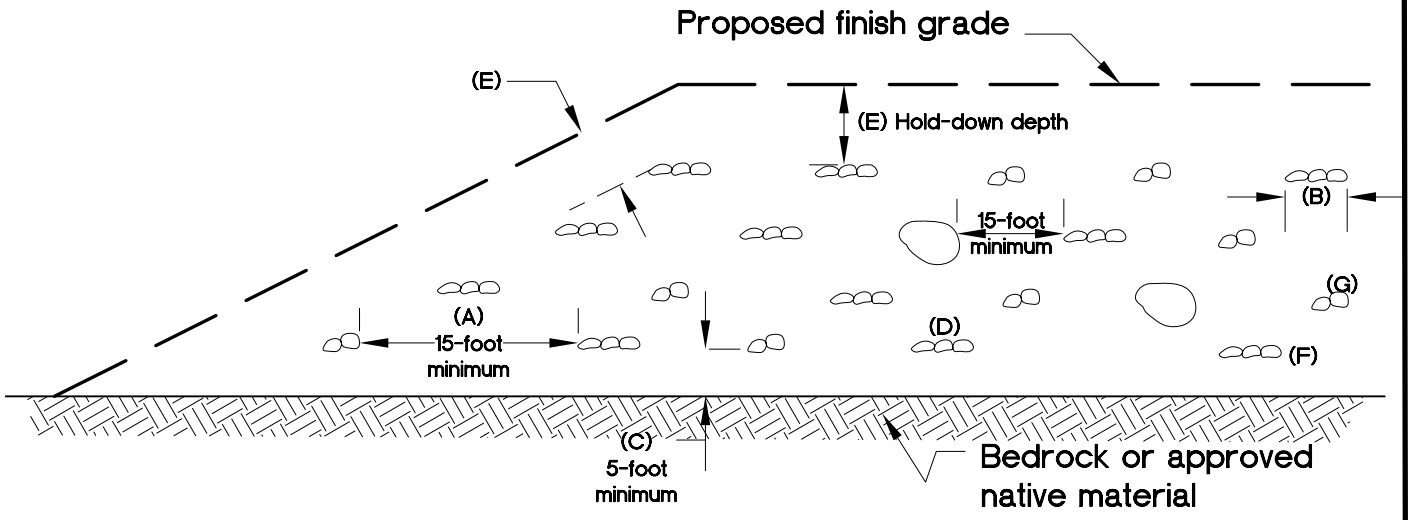
CUT LOT OR MATERIAL-TYPE TRANSITION



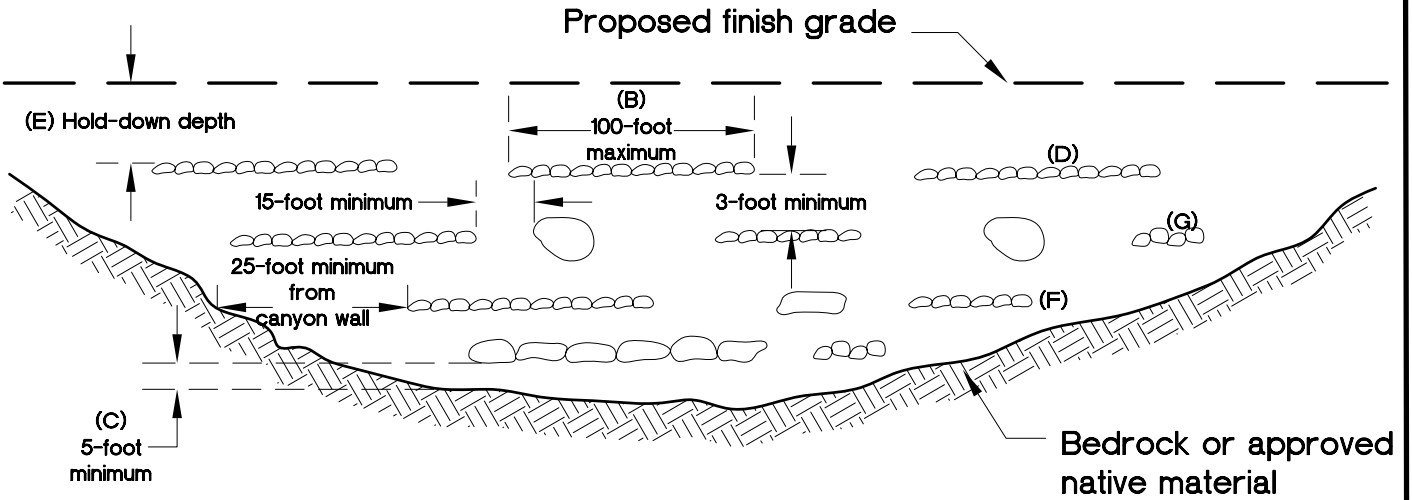
CUT-FILL LOT (DAYLIGHT TRANSITION)

GeoSoils, Inc.	TRANSITION LOT DETAILS	Plate E-12

VIEW NORMAL TO SLOPE FACE



VIEW PARALLEL TO SLOPE FACE



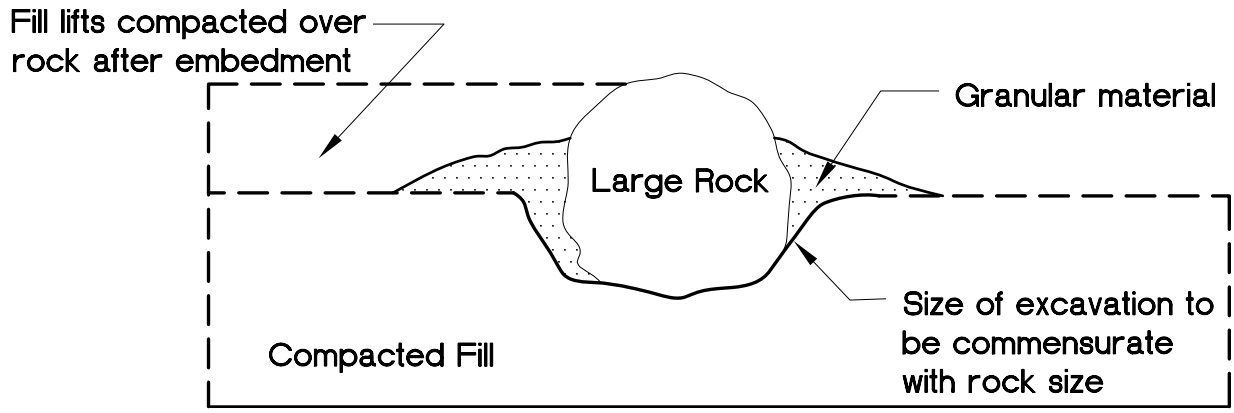
NOTES:

A. One equipment width or a minimum of 15 feet between rows (or windrows).
B. Height and width may vary depending on rock size and type of equipment. Length of windrow shall be no greater than 100 feet.
C. If approved by the geotechnical consultant, windrows may be placed directly on competent material or bedrock, provided adequate space is available for compaction.
D. Orientation of windrows may vary but should be as recommended by the geotechnical engineer and/or engineering geologist. Staggering of windrows is not necessary unless recommended.
E. Clear area for utility trenches, foundations, and swimming pools; Hold-down depth as specified in text of report, subject to governing agency approval.
F. All fill over and around rock windrow shall be compacted to at least 90 percent relative compaction or as recommended.
G. After fill between windrows is placed and compacted, with the lift of fill covering windrow, windrow should be proof rolled with a D-9 dozer or equivalent.

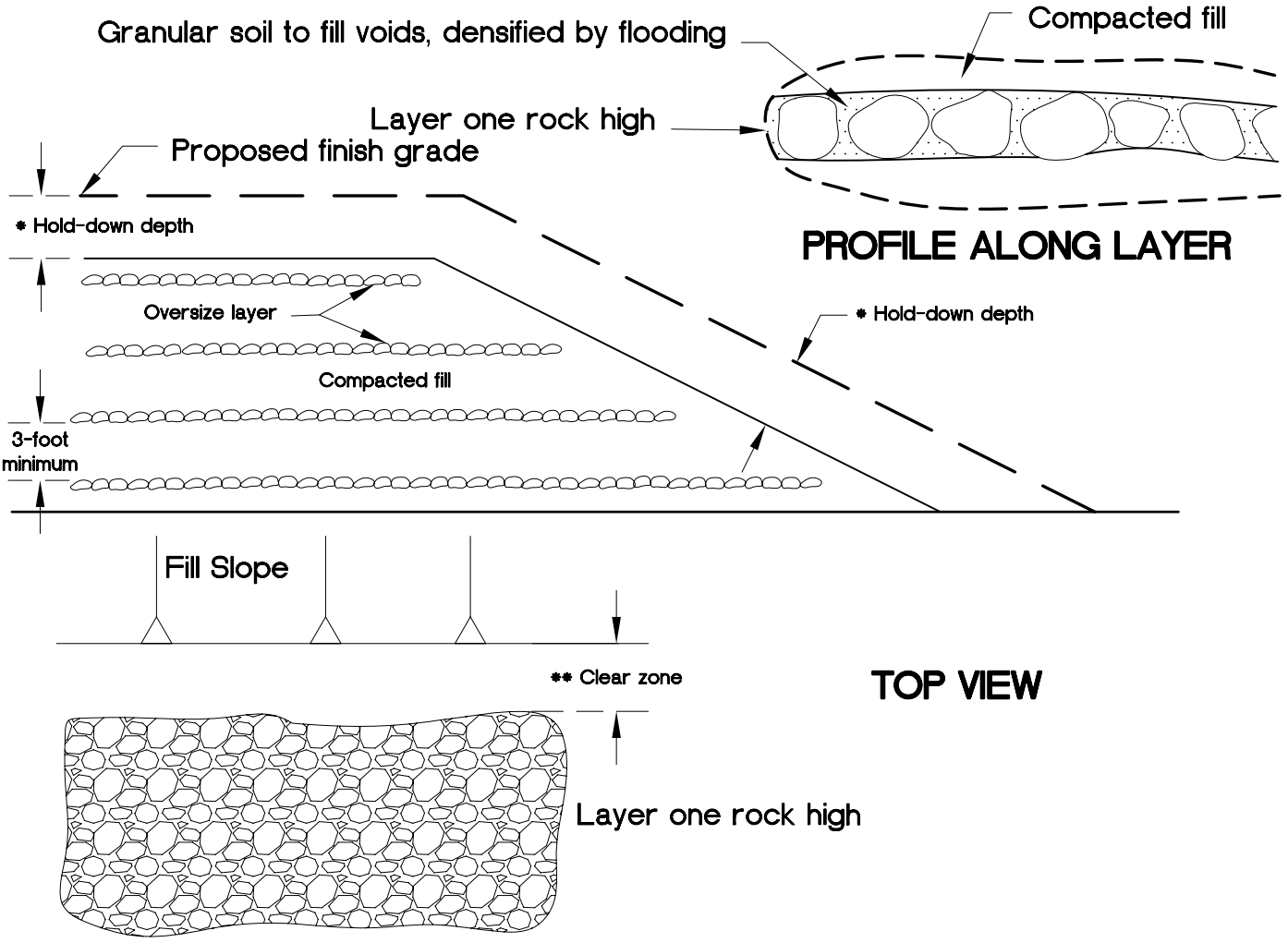
VIEWS ARE DIAGRAMMATIC ONLY AND MAY BE SUPERSEDED BY REPORT RECOMMENDATIONS OR CODE
ROCK SHOULD NOT TOUCH AND VOIDS SHOULD BE COMPLETELY FILLED

GeoSoils, Inc.	OVERSIZE ROCK DISPOSAL DETAIL	Plate E-13

ROCK DISPOSAL PITS



ROCK DISPOSAL LAYERS



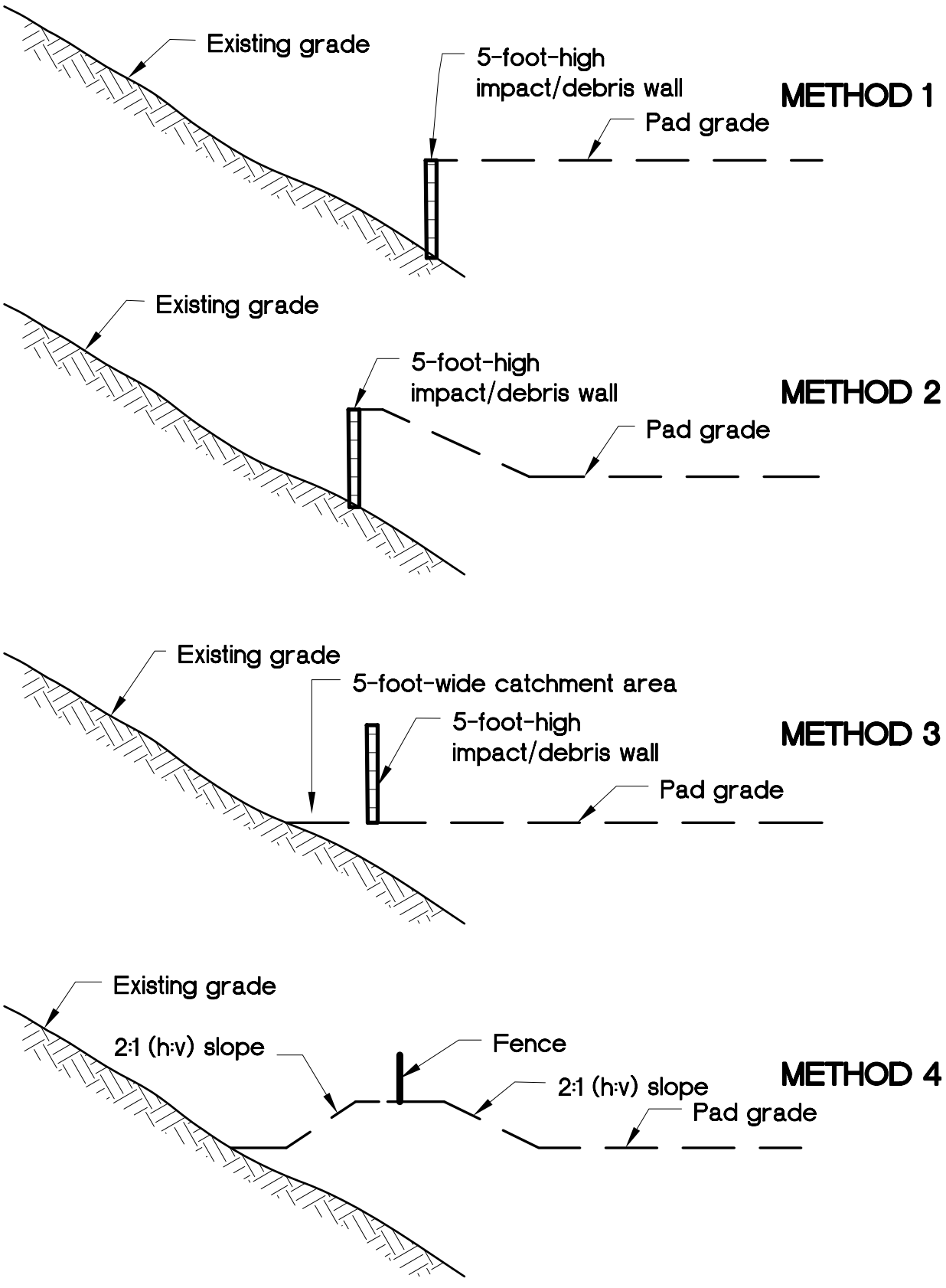
* Hold-down depth or below lowest utility as specified in text of report, subject to governing agency approval.

** Clear zone for utility trenches, foundations, and swimming pools, as specified in text of report.

VIEWS ARE DIAGRAMMATIC ONLY AND MAY BE SUPERSEDED BY REPORT RECOMMENDATIONS OR CODE

ROCK SHOULD NOT TOUCH AND VOIDS SHOULD BE COMPLETELY FILLED IN

GeoSoils, Inc.	ROCK DISPOSAL DETAIL	Plate E-14

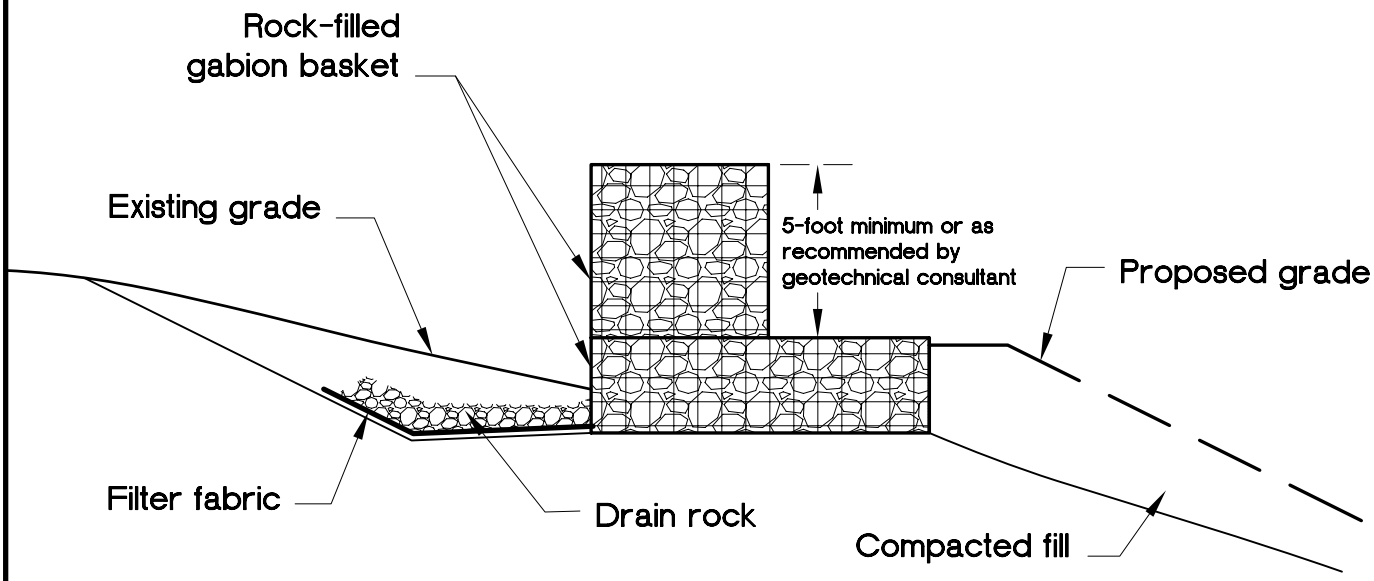


NOT TO SCALE

GeoSoils, Inc.

DEBRIS DEVICE CONTROL METHODS DETAIL

Plate E-15



Gabion impact or diversion wall should be constructed at the base of the ascending slope subject to rock fall. Walls need to be constructed with high segments that sustain impact and mitigate potential for overtopping, and low segment that provides channelization of sediments and debris to desired depositional area for subsequent clean-out. Additional subdrain may be recommended by geotechnical consultant.

From GSA, 1987

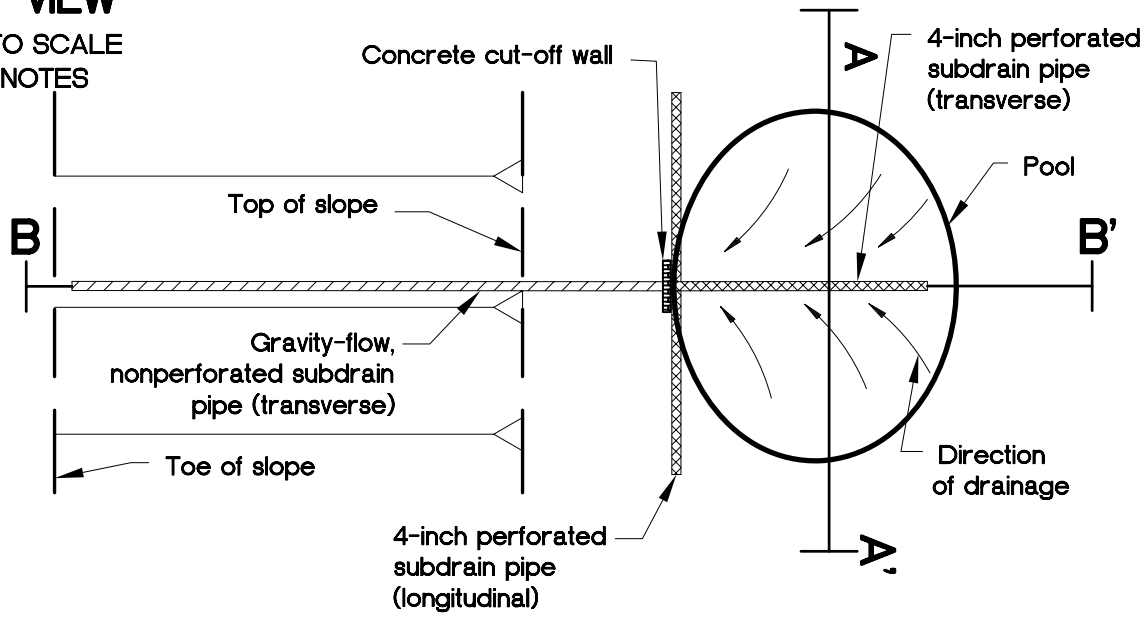
GeoSoils, Inc.

ROCK FALL MITIGATION DETAIL

Plate E-16

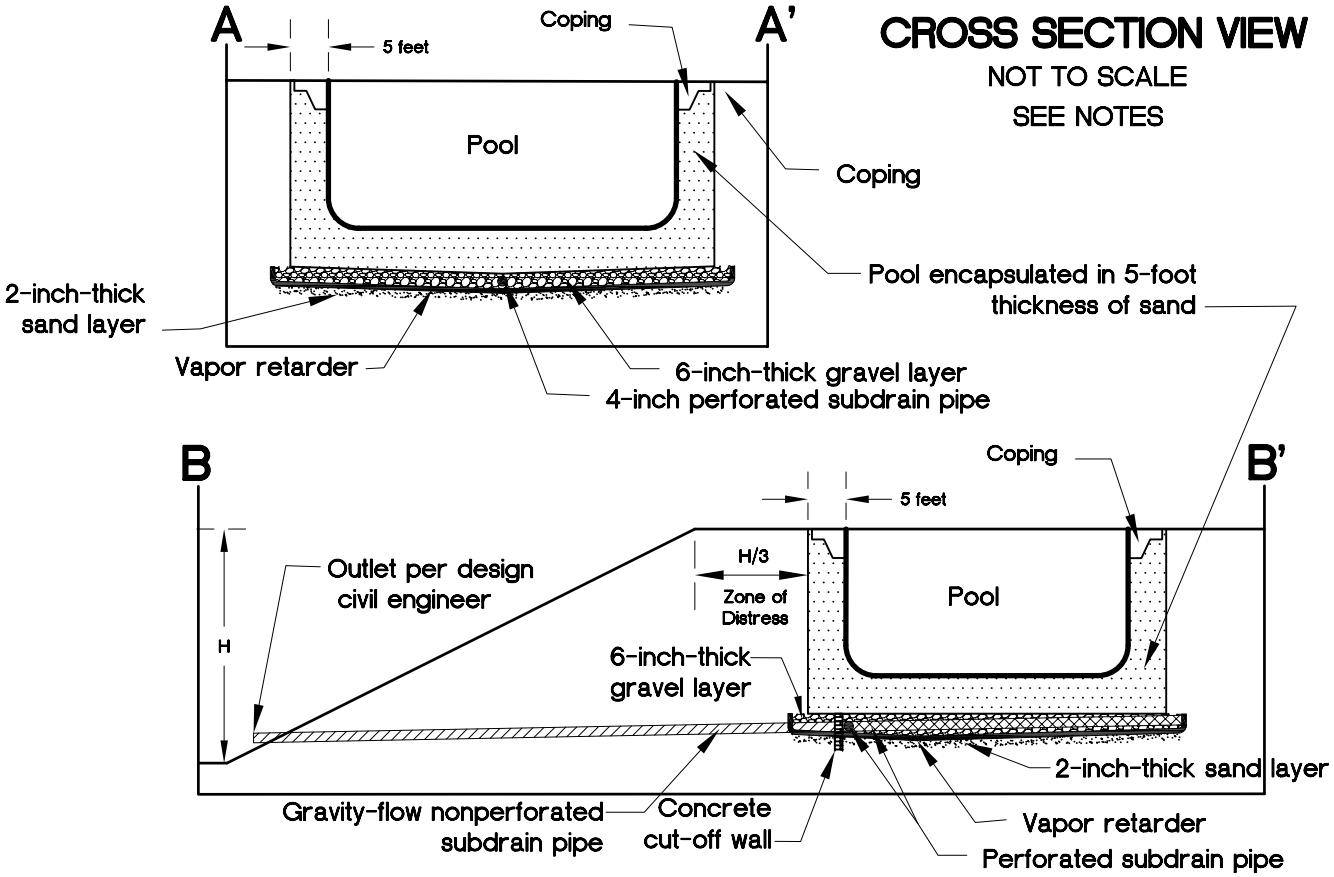
MAP VIEW

NOT TO SCALE
SEE NOTES



CROSS SECTION VIEW

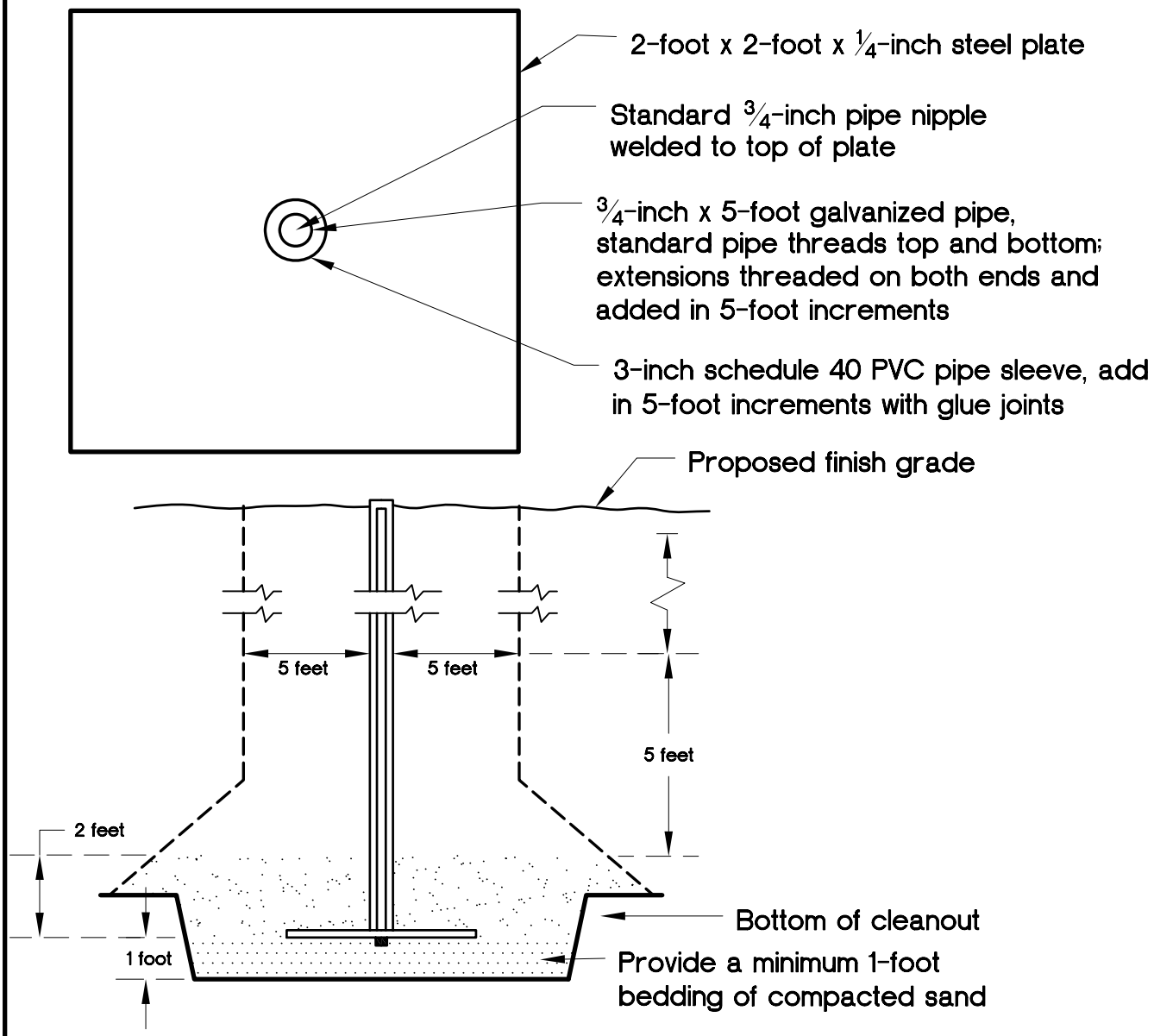
NOT TO SCALE
SEE NOTES



NOTES:

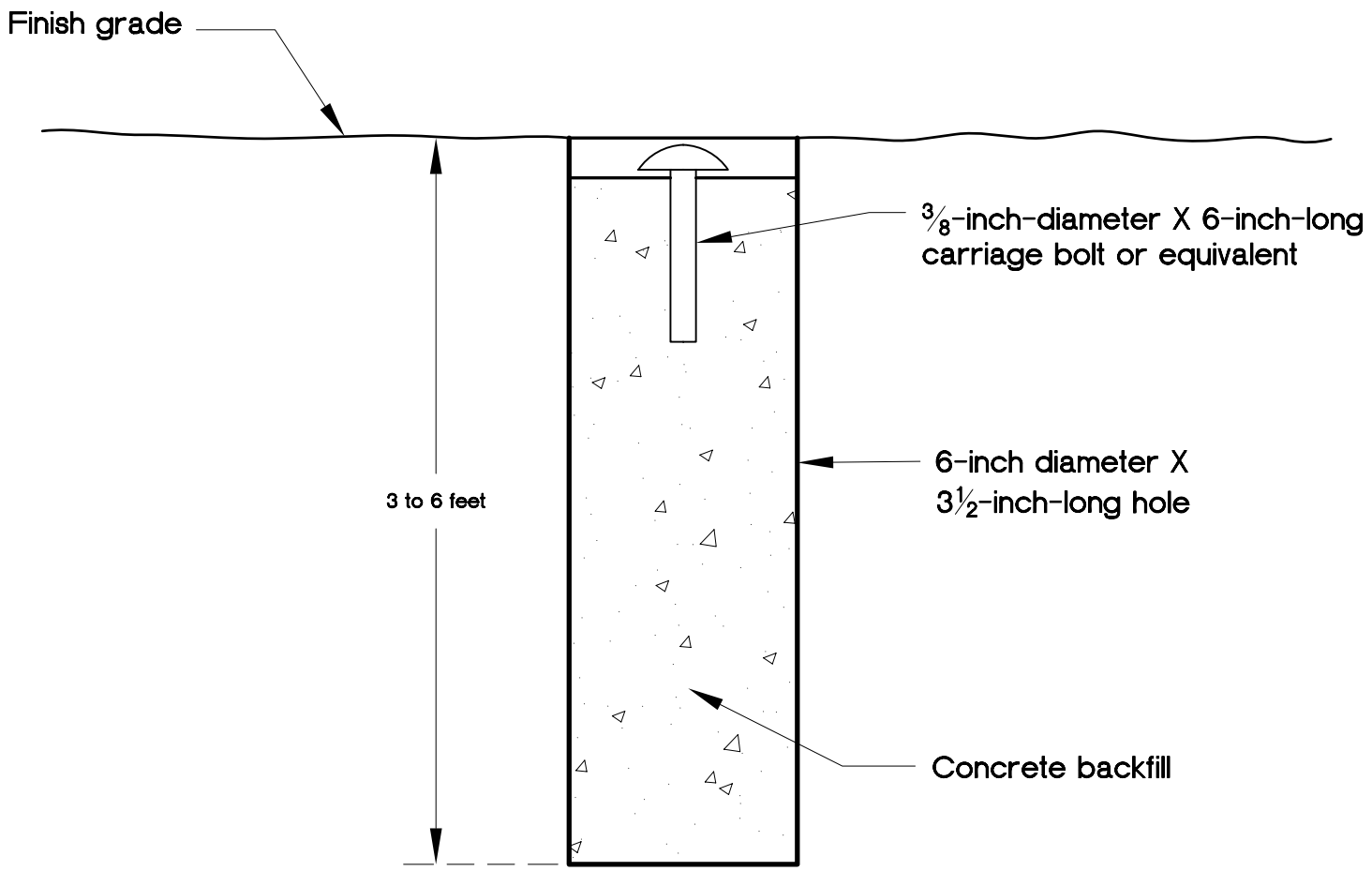
1. 6-inch-thick, clean gravel (¾ to 1½ inch) sub-base encapsulated in Mirafi 140N or equivalent, underlain by a 15-mil vapor retarder, with 4-inch-diameter perforated pipe longitudinal connected to 4-inch-diameter perforated pipe transverse. Connect transverse pipe to 4-inch-diameter nonperforated pipe at low point and outlet or to sump pump area.
2. Pools on fills thicker than 20 feet should be constructed on deep foundations; otherwise, distress (tilting, cracking, etc.) should be expected.
3. Design does not apply to infinity-edge pools/spas.

GeoSoils, Inc.	TYPICAL POOL/SPA DETAIL	Plate E–17



NOTES:

1. Locations of settlement plates should be clearly marked and readily visible (red flagged) to equipment operators.
2. Contractor should maintain clearance of a 5-foot radius of plate base and withiin 5 feet (vertical) for heavy equipment. Fill within clearance area should be hand compacted to project specifications or compacted by alternative approved method by the geotechnical consultant (in writing, prior to construction).
3. After 5 feet (vertical) of fill is in place, contractor should maintain a 5-foot radius equipment clearance from riser.
4. Place and mechanically hand compact initial 2 feet of fill prior to establishing the initial reading.
5. In the event of damage to the settlement plate or extension resulting from equipment operating within the specified clearance area, contractor should immediately notify the geotechnical consultant and should be responsible for restoring the settlement plates to working order.
6. An alternate design and method of installation may be provided at the discretion of the geotechnical consultant.

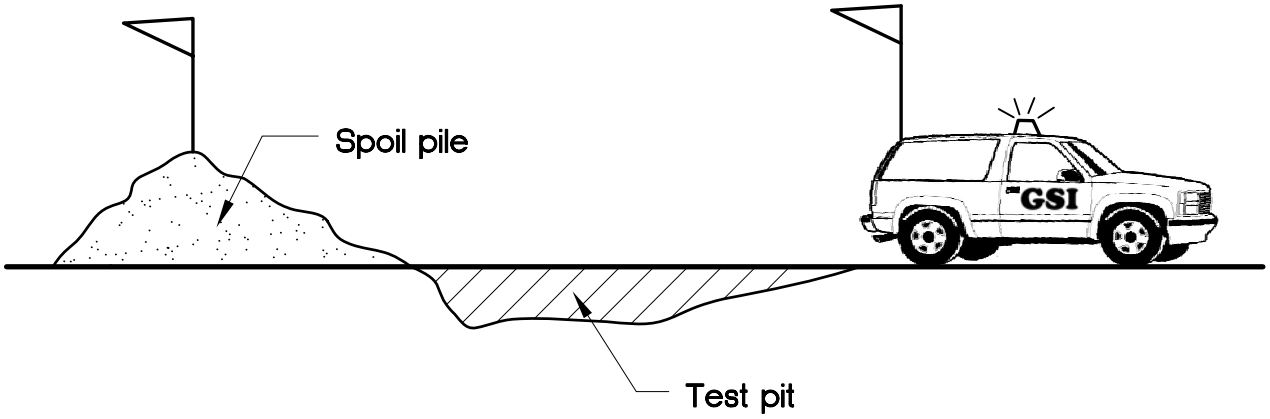


GeoSoils, Inc.

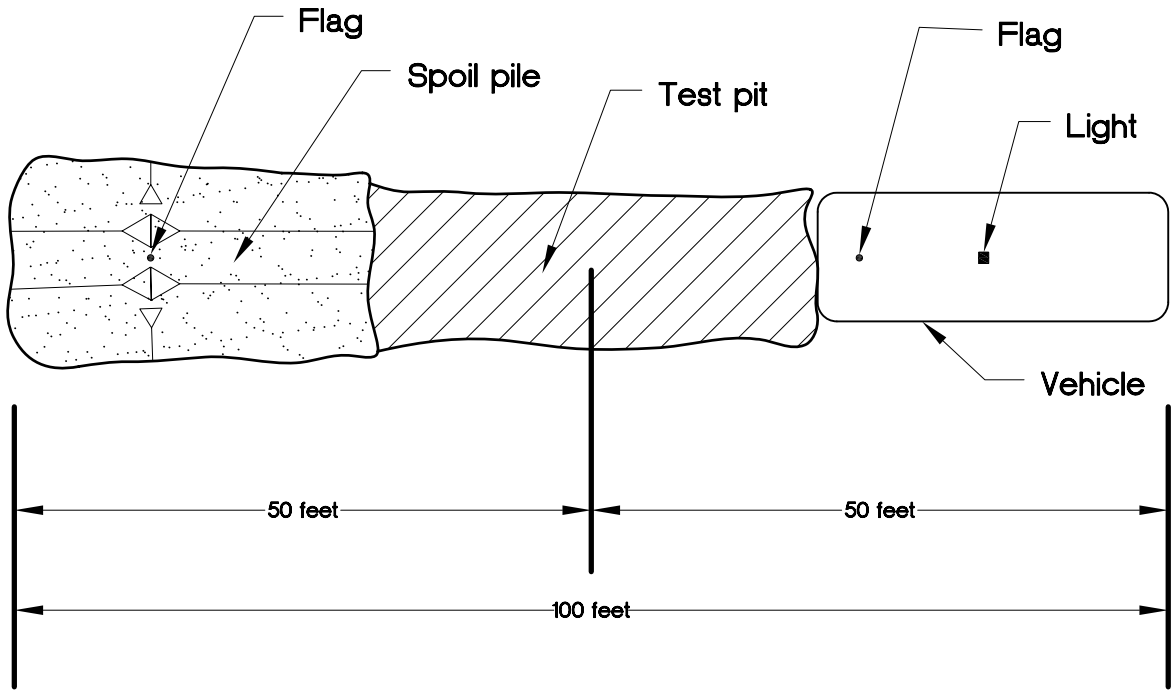
TYPICAL SURFACE SETTLEMENT MONUMENT

Plate E–19

SIDE VIEW



TOP VIEW



GeoSoils, Inc.	TEST PIT SAFETY DIAGRAM	Plate E-20

Appendix 4: Historical Site Conditions

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

McAlister
GeoScience
235E. Broadway, Suite 1120 Long Beach, California 90802 (562) 489-7908

May 3, 2021

Foremost Pacific Group, LLC
27271 Las Ramblas, Suite 100
Mission Viejo, CA 92691

Attention: Satish Lion, VP, Community Development

Subject: Phase I Environmental Site Assessment
LDW Development, Menifee, Riverside County, California 92585

Dear Mr. Lion:

Attached is one electronic copy of the Phase I Environmental Site Assessment report for the LDW development located on the northwest portion of the intersection between Menifee Road and Rouse Road at Tract Map No. 33125 in the City of Menifee, Riverside County, California 92585 consisting of approximately 8.00 acres with the Assessor's Parcel Number (APN) 331-250-011 (the Subject Property).

McAlister GeoScience appreciates the opportunity to provide this report. Please contact me should you have any questions.

Sincerely,

David McAlister

Phase I Environmental Site Assessment Report

LDW Development,
Menifee, Riverside County, California 92585

May 3, 2021

Prepared for:

Foremost Pacific Group, LLC
27271 Las Ramblas, Suite 100
Mission Viejo, CA 92691

Prepared by:

McAlister GeoScience
235 E. Broadway, Suite 1120
Long Beach, California 90802

David McAlister

Executive Summary

McAlister GeoScience was retained by Foremost Pacific Group, LLC (the Client) to conduct a Phase I Environmental Site Assessment (Phase I ESA) for the LDW Development located in the City of Menifee, Riverside County, California consisting of approximately 8.00 acres with the Assessor's Parcel Number (APN) 331-250-011 (the Subject Property). McAlister GeoScience understands the Subject Property is being purchased for residential development.

McAlister GeoScience has performed a Phase I ESA of the Subject Property in conformance with the scope and limitations of ASTM Practice E 1527. Any exceptions to, or deletions from, this practice are described in the *Limiting Factors, Project Limitations,* and *Data Gaps* sections of this report.

The Subject Property is 8.00 acres of land located on the northwestern portion of the intersection between Menifee Road and Rouse Road, in Menifee California. The Subject Property at the time of the site reconnaissance consisted of undeveloped land on the southern portion and the foundations of two semi-rural residential homes on the northern portion.

The historic aerial photographs, historical topographical maps and city directory indicate that the Subject Property was unimproved or used for agricultural practices in the 1930s. Between the late 1940s and the 1990s, the Subject Property appears to have been used for agricultural land with row crops. A small square structure and additional rectangular structures are depicted on the northwestern section of the Subject Property in the 1978 aerial photograph. The square structure appears to have been demolished by the 1989 aerial photograph however the rectangular structures are still depicted. The current semi-rural residential home (26805 Menifee Road) is first depicted in the 1997 aerial photograph and was first listed in the 1992 City Directories under the resident "Lugington, Donnie." No significant changes were identified between the 1997 and 2016 aerial photographs.

McAlister GeoScience has performed a Phase I ESA of the Subject Property in conformance with the scope and limitations of ASTM Practice E 1527. Any exceptions to, or deletions from, this practice are described in the *Limiting Factors, Project Limitations,* and *Data Gaps* sections of this report. This assessment has not revealed evidence of a recognized environmental condition(s) in connection with the Subject Property, except for the following:

- The former use of the Subject Property for agricultural use including row crops from the 1930s to the 1990s is considered a recognized environmental condition (REC);
- At least one septic system was in use and connected to the residential structure present from the 1940s to the early 2000s. Unauthorized discharge of hazardous materials to the septic system is possible;
- Due to the age of the former residential structure, a groundwater well is expected to have been utilized to provide irrigation and domestic water for the Subject Property prior to the establishment of a municipal water supply. Unused groundwater wells present a threat to groundwater in the form of a conduit from the surface; and
- Due to the age of the structures on the Subject Property, hazardous building materials are expected to be present.

Based on the information gathered during the performance of this assessment, no further action is recommended at this time, except for the following:

- If confirmed to exist, the septic tank adjacent to the residential structure should be properly abandoned if the Subject Property is to be redeveloped;
- If a groundwater well is encountered during redevelopment of the Subject Property, the well should be properly abandoned in accordance with state and local requirements;
- Soil sampling should be conducted in the areas of historic agricultural activities for the presence of agricultural chemicals including organochloride pesticides (OCPs);
- Soil sampling should be performed in areas surrounding the existing and former structures for elevated lead concentrations in soil from lead-based paint used on the structure and OCPs;
- Prior to demolition, a hazardous building material survey should be performed to identify asbestos-containing materials (ACM), lead-based paint and other hazardous building materials. These materials should also be properly abated prior to complete demolition of the structure;
- A SWPPP for the Subject Property should be prepared and implemented in accordance with applicable regulations prior to any grading activities; and
- In the event of any future construction and/or excavation activities at the Subject Property, dust suppression may be necessary during construction activities.

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1.0 Introduction

McAlister GeoScience was retained by Foremost Pacific Group, LLC (the Client) to conduct a Phase I Environmental Site Assessment (Phase I ESA) for LDW development located in the City of Menifee, Riverside County, California consisting of approximately 8.00 acres with the Assessor's Parcel Number (APN) 331-250-011 (the Subject Property). McAlister GeoScience understands the Subject Property is being purchased for residential development.

The Phase I ESA work for this project was conducted pursuant to authorization of the scope of work, assumptions, and terms and conditions set forth in the McAlister GeoScience proposal dated April 14, 2021, and in accordance with the scope of work and limitations of the ASTM Standard Practice for Environmental Site Assessments: Phase I Environmental Site Assessment Process, designation E1527-13.

The purpose of this Phase I ESA was to assess, to the extent feasible, *Recognized Environmental Conditions* in connection with the Subject Property. *Recognized Environmental Conditions* is defined as the presence or likely presence of hazardous substances or petroleum products on a property under conditions that indicate an existing release, a past release, or a material threat of a release of hazardous substances or petroleum products into structures on the property or into the ground, groundwater, or surface water of the property. The term is not intended to include *de minimis* conditions that generally do not present a material risk of harm to public health or the environment and that generally would not be the subject of an enforcement action if brought to the attention of appropriate governmental agencies.

Figures depicting the Property and vicinity are found in the "Figures" section at the end of this report. Figure 1 is a site location map showing the location of the Property. Figure 2 is a site plan showing additional detail and site features. Color copies of photographs taken during the site reconnaissance are found in Appendix A.

1.1 Limiting Factors

Limiting factors were not encountered during the course of this Phase I ESA.

1.2 Assumptions

For the purposes of this assessment, McAlister GeoScience has made the following assumptions:

- Information provided during any interview (written or oral) was accurate and correct;
- Database information reviewed was accurate and correct;
- Historical information reviewed was accurate and correct;
- Information reviewed at any governmental agency was accurate and correct;
- Groundwater flow and depth to groundwater, unless otherwise specified by on-site well data, or well data from adjacent sites are assumed based on contours depicted on the United States Geological Survey (USGS) Topographic Maps; and
- The property has been correctly and accurately identified by the client, client representatives, property contact, property owner, and/or property representatives.

1.3 Project Limitations

This assessment is limited to the standards set forth in 40 CFR Part 312. This assessment specifically excludes assessment of the following:

- Asbestos and asbestos-containing materials;
- Lead and lead-containing materials;
- Radon;
- Indoor air quality;
- Wetlands;
- Regulatory compliance;
- Cultural and historic resources;
- Air emissions;
- Industrial hygiene;
- Health and safety;
- Ecological resources;
- Endangered species;
- Biological agents, Mold; and
- Noise.

There are other limitations on completeness of information for this assessment. They are provided and documented on a case-by-case basis throughout this document.

The conclusions and findings set forth in this report are strictly limited in time and scope to the date of the evaluation. The conclusions presented in this report are based solely on the services described herein, and not on scientific tasks or procedures beyond the scope of agreed-upon services or the time and budgeting restraints imposed by the Client. No subsurface exploratory drilling or sampling of any kind was done under the scope of this work. Unless specifically stated otherwise in the report, no chemical or physical analyses have been performed during the course of this ESA.

Some of the information provided in this report is based upon personal interviews, and research of available documents, records, and maps held by the appropriate government and private agencies. This is subject to the limitations of historical documentation, availability, and accuracy of pertinent records and the personal recollections of those persons contacted. As applicable, McAlister GeoScience has relied in good faith upon representations and information furnished by individuals with respect to operations and existing property conditions, to the extent that they have not been contradicted by data obtained from other sources. Accordingly, McAlister GeoScience accepts no responsibility for any deficiencies, omissions, misrepresentations, or fraudulent acts of persons interviewed.

Property conditions, as well as local, state, tribal, and federal regulations can change significantly over time. Therefore, the recommendations and conclusions presented as a result of this study apply strictly to the environmental regulations and property conditions existing at the time the study was performed. Available information has been analyzed using currently accepted assessment techniques and it is believed that the inferences made are reasonably representative of the property. McAlister GeoScience makes no warranty, express or implied, except that the services have been performed in accordance with generally accepted environmental property assessment practices applicable at the time and location of the study.

Considerations identified by ASTM as beyond the scope of a Phase I ESA that may affect business environmental risk at a given property include the following: asbestos-containing materials, radon, lead-based paint, lead in drinking water, wetlands, regulatory compliance, cultural and historic resources, industrial hygiene, health and safety, ecological resources, endangered species, indoor air quality, mold, vapor intrusion, and high voltage lines. These environmental issues or conditions may warrant assessment based on the type of property transaction; however, they are considered non-scope issues under ASTM Standard Practice E1527-13.

This Phase I ESA is not, and should not be construed as, a warranty or guarantee about the presence or absence of environmental contaminants that may affect the property. The assessment is not intended to assure clear title to the property in question. The sole purpose of investigation into property title records is to ascertain a historical basis of prior land use and environmental liens. All findings, conclusions, and recommendations stated in this report are based upon facts, circumstances, and industry-accepted procedures for such services as they existed at the time this report was prepared (i.e., federal, state, and local laws, rules, regulations, market conditions, economic conditions, political climate, and other applicable matters). All findings, conclusions, and recommendations stated in this report are based on the data and information provided, and observations and conditions that existed on the date and time of the property visit. Responses received from local, state, or federal agencies or other secondary sources of information after the issuance of this report may change certain facts, findings, conclusions, or circumstances to the report. A change in any fact, circumstance, or industry-accepted procedure upon which this report was based may adversely affect the findings, conclusions, and recommendations expressed in this report.

1.4 Professionals

This document has been prepared by an Environmental Professional as defined by the EPA, 40 CFR Part 312.10. All work performed for this assessment was performed by or under the direct supervision of an Environmental Professional.

1.5 Data Gaps

The ASTM Standard defines a data gap as "a lack of or inability to obtain information required by the practice despite good faith efforts by the environmental professional to gather such information." A data gap is only significant if other information obtained during the ESA, or professional experience, raises reasonable concerns and affects the ability of the environmental professional to identify whether a given issue is a REC. The ASTM Standard requires that the ESA report identify and comment on significant data gaps. McAlister GeoScience did not identify any significant data gaps associated with the assessment, except for the following:

- The semi-rural residential home located on the northern portion of the Subject Property was not accessible during the site reconnaissance. Based on the residential nature of the structure, this data gap is considered insignificant and does not present an environmental concern to the Subject Property.

2.0 Property Description

2.1 Property Location and Description

Approximately 8.00 acres of land located on the northwestern portion of the intersection between Menifee Road and Rouse Road, in Menifee California 92585 with Assessor's Parcel Number (APN) 331-250-011 (the Subject Property). The Subject Property at the time of the site reconnaissance consisted of undeveloped land on the southern portion and a single-story semi-rural residential home on the northern portion. McAlister GeoScience understands the Subject Property is being purchased for residential development.

2.2 Site and Vicinity Characteristics

2.2.1 General Property Type and Use

The Subject Property consist of undeveloped land and a single-story, semi-rural residential property on the northern portion. No additional buildings were identified on the Subject Property during the site reconnaissance.

2.2.2 General Type and Use of Surrounding Areas

The Subject Property lies on the northwestern portion of the intersection between Menifee Road and Rouse Road in Menifee, California 92585. Two paved roads adjoin the Subject Property: Menifee road adjoins the Subject Property on the east and Rouse road adjoins the Subject Property on the south. A residential community is located south beyond Rouse Road and to the east beyond Menifee Road. Undeveloped land is located adjoining the Subject Property on the west and a semi-rural residential home and empty lot are located north of the Subject Property.

2.2.3 Subject Property Size

Approximately 8.00 acres of land.

2.2.4 Number and Size of Buildings on Site

The Subject Property was developed with one single-story, semi-rural residential home on the northern portion. No additional structures were observed during the site reconnaissance.

2.2.5 Construction Date

The Subject Property is currently improved with a semi-rural residential building.

2.2.6 Tenants

One residential tenant occupies the northern portion of the Subject Property. The southern portion of the

Subject Property is undeveloped.

2.2.7 Areas Assessed

The Subject Property in addition to the adjoining residential homes and undeveloped land, were all assessed to the extent practical in order to determine potential threats to the Subject Property.

2.2.8 Topography

The surface of the Subject Property is approximately 1,466 feet above mean sea level. The Subject Property is relatively flat and sloping gently to the southwest.

2.2.9 Surface Water

Surface water was not present on the Subject Property at the time of the site reconnaissance.

2.2.10 Groundwater

Depth to First Groundwater:	Depth to groundwater is approximately 25 feet below ground surface using data collected from groundwater monitoring reports on the property approximately two miles to the southwest located at 27181 McCall Blvd. Sun City, CA 92585.
Regional Flow Direction:	The regional groundwater flow direction is expected to be west/southwestward, according to groundwater monitoring reports on the property approximately two miles to the southwest located at 27181 McCall Blvd. Sun City, CA 92585.
Information Sources:	State of California Water Resources Control Board (geotracker.waterboards.ca.gov)

2.2.11 Geologic Setting

The Subject Property is located within the Lower Californian physiographic province, which consists of coastal mountain ranges underlain by severely folded, faulted, and commonly metamorphosed marine and continental sediments. The Subject Property is underlain by marine and nonmarine sedimentary rocks, Pleistocene in age, and includes alluvium, lake playa and terrace deposits.

The Subject Property is located within the San Jacinto Groundwater Basin. The San Jacinto Groundwater Basin underlies San Jacinto, Perris, Moreno, and Menifee Valleys in western Riverside County. This basin is bounded by the San Jacinto Mountains on the east, the San Timoteo Badlands on the northeast, the Box Mountains on the north, the Santa Rosa Hills and Bell Mountain on the south, and unnamed hills on the west. Lake Perris is located in the eastern part of Perris Valley. The valleys are drained by the San Jacinto River and its tributaries (DWR Bulletin 118, 2006).

2.2.12 Potable Water Supply

Potable water is supplied to the Subject Property by the Eastern Municipal Water District. A copy of the Eastern Municipal Water District's most recent 2020 Water Quality Report is included in appendix D. Due to the age of the former residential structure, a groundwater well is expected to have been utilized to provide irrigation and domestic water for the Subject Property prior to the establishment of a municipal water supply.

2.2.13 Sanitary Sewer System

The Subject Property is not connected to the main sewer line. A septic system is assumed to be on-site.

3.0 Historic Use Information

The following is a list of historical site use information sources reviewed as part of this Assessment.

- Aerial Photographs: 1938 – 2016 Provided by EDR (Appendix B);
- Topographic Maps: 1901 – 2012 Provided by EDR (Appendix B);
- Sanborn Fire Insurance Maps: No Coverage, Provided by EDR (Appendix B); and
- City Directories: 1971 – 2017 Provided by EDR (Appendix B). No listing.

3.1 Summary of Prior Uses – The Property

The historic aerial photographs, historical topographical maps and city directory indicate that the Subject Property was unimproved in the 1930s. Between the 1930s and 1990s, the Subject Property appears to have been used for agricultural land with row crops. A small square structure and additional rectangular structures are depicted on the northwestern section of the Subject Property in the 1978 aerial photograph. The square structure appears to have been demolished by the 1989 aerial photograph however the rectangular structures are still depicted. The current semi-rural residential home (26805 Menifee Road) is first depicted in the 1997 aerial photograph and was first listed in the 1992 City Directories under the resident "Lugington, Donnie." The 2006 aerial photograph depicts the northeastern portion of the Subject Property as a storage area for construction materials while the eastern adjacent property was undergoing construction. No significant changes were identified between the 1997 and 2016 aerial photographs. The former use of the Subject Property for agricultural use including row crops from the 1930s to the 1990s is considered a recognized environmental condition (REC).

3.2 Summary of Prior Uses – Adjacent and Surrounding Properties

3.2.1 Summary

The historical review of the surrounding properties revealed that the surrounding properties were primarily undeveloped or used for agricultural purposes, semi-rural residential homes between the 1930s and 1970s. By the middle to early 2000s, mass residential development begins in to the east along Menifee Road. Commercial development is depicted north in the 2012 and 2016 aerial photographs. No environmental concerns were identified during the historical review of the surrounding properties that are considered likely to cause environmental impacts at the Subject Property.

3.2.2 Aerial Photographs

The review of historic aerial photographs revealed that the surrounding properties were primarily semi-rural residential properties, undeveloped land or used for agricultural purposes between the 1930s and the 1980s. By the mid-1980s, a semi-rural residential home is depicted east beyond Menifee Road and adjacent to the north. Significant changes were not depicted in the 1989 and 1997 aerial photographs. By 2006, a mass residential development appears to have begun east, beyond Menifee Road. The northern

lot, and possibly the northeastern portion of the Subject Property appear to have to have been used to store construction materials while the eastern adjacent property was undergoing construction. By 2009, construction of the eastern adjacent residential homes appears to have finished. Commercial development is depicted to the north in the 2012 and 2016 aerial photographs.

3.2.3 Fire Insurance Maps

A search for historical fire insurance maps depicting the Subject Property and vicinity was conducted by EDR Sanborn Maps, Inc. The EDR Report indicated that coverage for the vicinity of the Subject Property was not available. A copy of the search documentation letter is presented in Appendix B.

3.2.4 Topographic Maps

The review of historic topographic maps revealed the surrounding properties were first depicted in the 1942 Topographic Map where multiple residential homes are depicted northwest of the Subject Property in a town known as "Romoland." Significant changes were not noted on the topographic maps dated between the 1940s through the 1950s. The 1973 and 1979 topographic maps show new developments and roads south of the Subject Property off Menifee Road. The 2012 topographic map did not depict any notable structures or features on the surrounding properties.

3.2.5 City Directories

A search was conducted for city directories that include coverage of the site area using the EDR City Directory Collection and other sources, if needed. Directories for the following years were identified for the site area:

- EDR Digital Archive: 1992-2017; and
- Haines Criss-Cross Directory: 1971-1985;

Based on the EDR provided City Directories, the surrounding properties in the area were previously undeveloped, agricultural land or semi-rural residential homes in the 1970s and 1980s. Between the 1990s and early 2000s, there was an increase in residential and commercial development along Menifee Road. The northern adjoining residential home (26785 Menifee Road) was first listed between 1995 and 2017 as a residential tenant. The adjacent eastern and southern residential homes were not listed in the city directories.

3.3 Previous Environmental Reports

Previous environmental reports were not provided for the Subject Property.

3.4 Other Sources of Information

3.4.1 California EPA, Department of Toxic Substances Control (Cal-EPA DTSC)

The online DTSC database, EnviroStor was reviewed. There were no sites listed within one-half of a mile of the Subject Property.

3.4.2 California Regional Water Quality Control Board – Los Angeles (RWQCB)

The online RWQCB database, GeoTracker was reviewed. There were no sites listed within one-half of a mile of the Subject Property.

3.4.3 National Pipeline Mapping System (NPMS)- California

The online National Pipeline Mapping System (NPMS) for the immediate vicinity of the Subject Property was reviewed. No pipelines are within the immediate vicinity of the Subject Property.

3.4.4 State of California CalGEM

The online mapping system maintained by the State of California Geologic Energy Management Division (CalGEM) formerly the Department of Oil, Gas, and Geothermal Resources (DOGGR) for the immediate vicinity of the Subject Property was reviewed. No wells are within the immediate vicinity of the Subject Property.

3.4.5 South Coast AQMD FIND Database

The online South Coast Air Quality Management District (AQMD), Facility Information Detail (FIND) database was reviewed for the Subject Property. The Subject Property was not listed on the AQMD FIND database.

3.4.6 City of Menifee, City Council/City Clerk

An online public records request was submitted to the City of Murrieta City Council/City Clerk. A response was not received by the date of this report.

3.4.7 City of Menifee, Department of Public Works

An online public records request was submitted to the City of Menifee, Department of Public Works. A response was not received by the date of this report.

3.4.8 City of Menifee, Building and Safety Department

An online public records request was submitted to the City of Menifee Building and Safety Department. A response was not received by the date of this report.

3.4.9 City of Menifee, Fire Department

An online public records request was submitted to the City of Menifee, Fire Department. A response was not received by the date of this report.

3.4.10 Riverside County Fire Department

An attempt was made to contact the Riverside County Fire Department for records, no response was received.

3.4.11 Riverside County Department of Environmental Health- Land Use and Water Resources

An online public records request was submitted to the Riverside County, Department of Environmental Health-Land Use and Water Resources, via email. A response was not received by the date of this report.

3.4.12 Riverside County Department of Environmental Health- Hazardous Materials/Underground Storage Tanks

An online public records request was submitted to the Riverside County, Department of Environmental Health- Hazardous Materials/Underground Storage Tanks, via email. A response was not received by the date of this report.

4.0 Interviews

Interviews were conducted in accordance with Code of Federal Regulations (CFR) 40 CFR § 312.30 requiring the Environmental Professional conducting the Phase I ESA to take into account commonly known info, including that of the user of the report. Additionally, 40 CFR §§ 312.22(a)(2) and (a)(4), and 40 CFR §§ 312.28, 312.30, and 312.31, require reviewing knowledge of the buyer. Also included in the interview, in accordance with 40 CFR §§ 312.22(a)(3) and 312.29, interviews included consideration of the relationship of the purchase price to the fair market value as an indicator of RECs. The summary of the various responses is summarized below and copies of the completed questionnaire is included in Appendix D.

4.1 Property Owner/Manager

An interview questionnaire was presented to the owner of the Subject Property. The questionnaire was not received by the date of this report. A copy of the questionnaire is included in Appendix D.

5.0 Information from site reconnaissance

The following is a summary of observations made during the site reconnaissance.

5.1 Date of Reconnaissance

April 22, 2021

5.2 Activities/Processes Conducted at the Property

The Subject Property is developed with a single-story semi-rural residential home on the northern portion and undeveloped land on the southern portion. One dirt road bisects the Subject Property, trending east to west on the northern portion, south of the residential home. Photographs taken during the site reconnaissance are included in Appendix A.

5.3 Adjacent Property Uses

The areas immediately adjacent to the Subject Property are summarized below.

North: The Subject Property is bordered on the north an empty lot. Based on aerial photographs and Google Earth imagery, this empty lot looks to have been previously used as a construction site.

West: The Subject Property is bordered to on the west by undeveloped land and an unpaved road.

East: The Subject Property is bordered to on the east by Menifee Road, beyond which are single-family residential homes (26911-26995 Menifee Road).

South: The Subject Property is bordered to the south by Rouse Road, beyond which are single-family residential homes.

At the time of the site reconnaissance, none of the surrounding properties appeared to pose a potential threat to soil and/ or groundwater at the Subject Property.

5.4 Potentially Hazardous Chemicals Observed or Known to be Present at the Subject Property

No hazardous chemicals were observed at the Subject Property during the site reconnaissance.

5.5 On-site Roads and Parking Areas

The Subject Property is bounded to the east by Menifee Road and to the south by Rouse Road. On-site parking was not available. The northern portion of the Subject Property is currently developed with a semi-rural residential home with an unpaved driveway.

5.6 Above Ground Tanks

No above ground storage tanks (AST) were observed at the Subject Property during the site reconnaissance.

5.7 Underground Tanks

There was no indication of underground storage tanks observed during the site reconnaissance.

5.8 Unusual or Noxious Odors

Unusual or noxious odors were not noticed during the site reconnaissance.

5.9 Pools of Liquid

Pools of liquid were not observed during the site reconnaissance.

5.10 Pits/Ponds/Lagoons – Exterior, On-site or Neighboring

Pits, ponds, and/or lagoons were not observed during the site reconnaissance.

5.11 Transformers or PCB-Suspect Hydraulic Systems

Polychlorinated biphenyls (PCBs) are a chemical component of many dielectric fluids, heat transfer fluids, hydraulic fluids, lubricating oils, paints, or coatings manufactured prior to July 2, 1979. Equipment that may potentially contain PCBs includes electrical equipment such as transformers or capacitors or hydraulically operated equipment, such as elevators, compaction equipment, or manufacturing equipment. The manufacture and distribution of PCBs was banned for use in 1979 by the United States Congress, which enacted the Toxic Substance and Control Act. In accordance with US Code of Federal Regulations the owner of a transformer or other PCB-containing equipment is responsible for equipment maintenance and remediation in the event of a leak or release.

Transformers or PCB-suspect hydraulic systems were not observed on or surrounding the Subject Property.

5.12 Stained Soil or Pavement

Stained soil or pavement was not observed during the site reconnaissance.

5.13 Stressed Vegetation

Stressed vegetation was not observed during the site reconnaissance.

5.14 Discharges to Drains, Ditches, or Streams

Storm water at the Subject Property will percolate into the soil or flow to the storm water inlets off Menifee Road or Rouse Road.

5.15 Wells

Wells were not observed during the site reconnaissance.

5.16 Leach Fields/Septic Tanks/Cesspools

Leach fields or cesspools were not observed during the site reconnaissance. It is expected that at least one septic system was in use and connected to the current residential structure.

5.17 Indication of Fill Sites or Dumping

Indications of fill sites or dumping were not observed during the site reconnaissance.

5.18 Sumps/Pits/Floor Drains

Sumps, pits or floor drains were not observed during the site reconnaissance.

5.19 Buildings or Portions of Buildings

A single-family, semi-rural residential home was observed on the northern portion of the Subject Property at the time of the site reconnaissance.

6.0 Regulatory Agency Search/Agency File Review

6.1 Regulatory Agency Database Review

McAlister GeoScience retained Environmental Data Resources, Inc. (EDR) to provide federal, state, and local regulatory agency databases for sites, including the Subject Property, listed within the search distances described in the ASTM Standard Practice for Environmental Site Assessments E 1527-13. These databases provide lists of facilities that use, store or dispose of hazardous substances, as well as sites with known or suspected contaminated soil or groundwater.

The regulatory agency review consisted of acquisition and review of a regulatory agency database search report of regulatory agency files for sites of interest. Selection of sites considered to have a potential to impact the Subject Property was based on the location of a reported release site with respect to its distance from the Subject Property and the reported groundwater flow direction. Generally, reported release sites within one-fourth of a mile up-gradient, or one-eighth of a mile cross-gradient or down-gradient of the Subject Property are selected for follow-up file review. Sites listed in the database search report but not identified as a release site (for example, a site listed as a hazardous waste generator but not as having had a release) are not considered to have a potential to impact the soil and/or groundwater at the Subject Property.

The database search report is presented in Appendix C and includes a description of the electronic files searched and associated search distances. Refer to Appendix C for all databases searched by EDR.

6.1.1 Federal Database Listings

The Subject Property was not listed on the databases reviewed.

No National Priorities List (NPL), Superfund, sites are listed within one mile of the Subject Property.

No Federal Comprehensive Environmental Response, Compensation, and Liability Information System (CERCLIS) or CERLIS No Further Remedial Action Planned (NFRAP) property sites are listed within one-half mile of the Subject Property.

No Resource Conservation and Recovery Act (RCRA) small quantity generator (SQG) sites are listed within one-quarter mile of the Subject Property

No RCRA Large Quantity Generator (LQG) sites are located within one-half mile of the Subject Property.

6.1.2 State and Local Database Listings

The Subject Property was not listed on the databases reviewed.

No State and Tribal leaking Underground Storage Tank (LUST) sites located within one-eighth

No Spills, Leaks, Investigations, and Cleanups (SLIC) sites are listed within one-quarter mile of the Subject Property.

There are no state and tribal registered storage tanks (USTs) sites located within one-eighth mile of the Subject Property.

There are no Historical EDR Drycleaner or Historical EDR sites located within one-eighth mile of the Subject Property.

7.0 Vapor Encroachment

7.1 Evaluation

McAlister GeoScience performed a Tier 1 vapor encroachment assessment at the Subject Property in accordance with ASTM Standard E 2600-08, *Standard Practice for Assessment of Vapor Intrusion into Structures on Property Involved in Real Estate Transactions*. The purpose of the vapor encroachment assessment is to evaluate the potential for migration of vapors into existing or planned structures on the Subject Property due to contaminated soil and/or groundwater on the property or within close proximity to the Subject Property.

The objective of a Tier 1 vapor encroachment assessment is to conduct an initial screen to determine if a potential vapor intrusion condition (pVIC) exists in connection with the Subject Property. When used as a screening tool, a Tier 1 vapor encroachment assessment uses non-numerical information designed to identify conditions and/or physical settings where a pVIC is unlikely to occur. The minimum information needed to conduct a Tier 1 screen includes:

- Existing / planned use of the Subject Property;
- Type of structures existing or planned for the Subject Property;
- Surrounding area description;
- Federal, state, local, and tribal government records on the Subject Property and surrounding areas;
- Historical records;
- General physical setting including soil type, geological, hydrological, hydrogeological, and topographical information;
- Significant natural or man-made conduits; and
- Specialized user knowledge;

A pVIC is defined as the potential for the presence or likely presence of any compound of concern (COC) in the indoor air environment of existing or planned structures on a property caused by the release of vapor from contaminated soil or groundwater either on the property or within close proximity to the property at a concentration that presents or may present an unacceptable health risk to occupants. A pVIC exists when the screening defined by the vapor encroachment assessment indicates the potential for a Vapor Intrusion Condition but where there is insufficient data to ascertain the presence or likely presence of COC in the indoor air environment of existing or planned structures on a target property. A condition determined to be *de minimis* is not a pVIC.

A vapor intrusion condition (VIC) is defined as the presence or likely presence of an COC in the indoor air environment of existing or planned structures on a property caused by the release of vapor from contaminated soil or groundwater either on the property or within close proximity to the property at a concentration that presents or may present an unacceptable health risk to occupants.

7.2 Findings

The Subject Property and adjoining properties have not been identified with a release or spill that would present a pVIC.

7.3 Opinions

No spills or releases were reported in the databases reviewed and therefore not likely to present a pVIC to the Subject Property.

7.4 Conclusions

There are no database listings that would present a pVIC at the Subject Property.

8.0 Summary, Conclusion, and Recommendations

8.1 Summary

McAlister GeoScience was retained by Foremost Pacific Group, LLC (the Client) to conduct a Phase I Environmental Site Assessment (Phase I ESA) for the LDW Development located at in the City of Menifee, Riverside County, California consisting of approximately 8.00 acres with the Assessor's Parcel Number (APN) 331-250-011 (the Subject Property). McAlister GeoScience understands the Subject Property is being purchased for residential development.

McAlister GeoScience has performed a Phase I ESA of the Subject Property in conformance with the scope and limitations of ASTM Practice E 1527. Any exceptions to, or deletions from, this practice are described in the *Limiting Factors, Project Limitations,* and *Data Gaps* sections of this report.

The Subject Property consists of 8.00 acres of land located on the northwestern section of the intersection between Menifee Road and Rouse Road, in Menifee, California 92585. The Subject Property's Assessor's Parcel Numbers (APN) is identified as 331-250-011. At the time of the site reconnaissance, the Subject Property consisted of undeveloped land on the southern portion and a semi-rural residential home on the northern portion.

The historic aerial photographs, historical topographical maps and city directory indicate that the Subject Property was unimproved or used for agricultural practices in the 1930s. Between the late 1940s and the 1990s, the Subject Property appears to have been used for agricultural land with row crops. A small square structure and additional rectangular structures are depicted on the northwestern section of the Subject Property in the 1978 aerial photograph. The square structure appears to have been demolished by the 1989 aerial photograph however the rectangular structures are still depicted. The current semi-rural residential home (26805 Menifee Road) is first depicted in the 1997 aerial photograph and was first listed in the 1992 City Directories under the resident "Lugington, Donnie." No significant changes were identified between the 1997 and 2016 aerial photographs.

8.2 Conclusion

McAlister GeoScience has performed a Phase I ESA of the Subject Property in conformance with the scope and limitations of ASTM Practice E 1527. Any exceptions to, or deletions from, this practice are described in the *Limiting Factors, Project Limitations,* and *Data Gaps* sections of this report.

This assessment has not revealed evidence of a recognized environmental condition(s) in connection with the Subject Property, except for the following:

- The former use of the Subject Property for agricultural use including row crops from the 1930s to the 1990s is considered a recognized environmental condition (REC);
- At least one septic system was in use and connected to the residential structure present from the 1940s to the early 2000s. Unauthorized discharge of hazardous materials to the septic system is possible;
- Due to the age of the former residential structure, a groundwater well is expected to have been utilized to provide irrigation and domestic water for the Subject Property prior to the establishment of a municipal water supply. Unused groundwater wells present a threat to groundwater in the form of a conduit from the surface; and
- Due to the age of the structures on the Subject Property, hazardous building materials are expected to be present.

8.3 Recommendations

Based on the information gathered during the performance of this assessment, no further action is recommended at this time, except for the following:

- If confirmed to exist, the septic tank adjacent to the residential structure should be properly abandoned if the Subject Property is to be redeveloped;
- If a groundwater well is encountered during redevelopment of the Subject Property, the well should be properly abandoned in accordance with state and local requirements;
- Soil sampling should be conducted in the areas of historic agricultural activities for the presence of agricultural chemicals including organochloride pesticides (OCPs);
- Soil sampling should be performed in areas surrounding the existing and former structures for elevated lead concentrations in soil from lead-based paint used on the structure and OCPs;
- Prior to demolition, a hazardous building material survey should be performed to identify asbestos-containing materials (ACM), lead-based paint and other hazardous building materials. These materials should also be properly abated prior to complete demolition of the structure;
- A SWPPP for the Subject Property should be prepared and implemented in accordance with applicable regulations prior to any grading activities; and
- In the event of any future construction and/or excavation activities at the Subject Property, dust suppression may be necessary during construction activities.

9.0 Signatures of Environmental Professionals

Ms. Alexis Ceballos performed the Site reconnaissance, compiled report data, and wrote portions of the Phase I ESA report. Mr. David McAlister provided technical review. The signatures of Ms. Ceballos and Mr. McAlister are included in this Section of the report.

Alexis Ceballos
Staff Scientist

David C. McAlister
Environmental Professional

We declare that, to the best of our professional knowledge and belief, we meet the definition of Environmental Professional as defined in 40 CFR § 312.10. We have the specific qualifications based on education, training, and experience to assess a property of the nature, history, and setting of the subject property. We have developed and performed the all appropriate inquiries in conformance with the standards and practices set forth in 40 CFR Part 312."

10.0 References

American Society for Testing and Materials (ASTM) 2013. Practice E 1527-13 Standard Practice for Environmental Site Assessments: Phase I Environmental Site Assessment Process.

California Department of Water Resources (DWR). *Planned Utilization of the Ground Water [sic] Basins of the Coastal Plain of Los Angeles County. CDWR Bulletin 104. Appendix A, Ground Water [sic] Geology.* 1961

Department of Water Resources (DWR). California's Groundwater, *Hydrologic Region South Coast, San Jacinto Groundwater Basin*. Bulletin No. 118. January 2006.

Environmental Data Resources, Inc,. *The EDR – Radius Map with GeoCheck®*, Inquiry No. 6456246.2, April 19, 2021.

Environmental Data Resources, Inc. *The EDR – City Directory Abstract,* Inquiry No. 6456246.5, April 21, 2021.

Environmental Data Resources, Inc. *Sanborn® Map Report,* Inquiry No. 6456246.3, April 19, 2021.

Environmental Data Resources, Inc. *The EDR – Aerial Photography Print Service*, Inquiry No. 6456246.8, April 19, 2021.

Environmental Data Resources, Inc. *The EDR –Historical Topographic Map Report (USGS Los Angeles CA 7.5 minute)*, Inquiry No. 6456246.4, April 19, 2021.

Google Earth - http://earth.google.com/

Riverside County Office of the Assessor - https://www.asrclkrec.com/

State of California Department of Conservation, Geologic Energy Management Division (CalGEM). https://www.conservation.ca.gov/calgem

State of California Department of Toxic Substances Control , EnviroStor online Database – http://envirostor.dtsc.ca.gov/

State of California Water Resources Control Board, GeoTracker Online Database - http://geotracker.swrcb.ca.gov/

State of California Water Resources Control Board, Stormwater Multiple Application and Report Tracking System (SMARTS) Online Database - https://smarts.waterboards.ca.gov/smarts/faces/SwPublicUserMenu.xhtml

South Coast Air Quality Management District (AQMD), Facility Information Detail (FIND) online Database – www3.aqmd.gov/webappl/fim/prog/

Figures

SOURCE: Google Earth, 2020

GW FLOW

N

TITLE: **Site Location Map**

LOCATION: **LDW Development**

Menifee, Riverside County, California 92585

McAlister GeoScience
235 E. Broadway, Suite 1120 Long Beach, CA 90802
562-489-7908 DirtyProperty.com

CHECKED:	D.McAlister
DRAFTED:	A. Ceballos
FILE:	
DATE:	04-28-2021

FIGURE: 1

Legend:

Approximate Subject Property Boundary

SOURCE: *Google Earth, 2020*

N

TITLE: **Site Plan**

LOCATION: **LDW Development**

Menifee, Riverside County, California 92585

McAlister GeoScience
235 E. Broadway, Suite 1120 Long Beach, CA 90802
562-489-7908 DirtyProperty.com

CHECKED:	D.McAlister
DRAFTED:	A. Ceballos
FILE:	
DATE:	04-28-2021

FIGURE: 2

Appendix A

Site Photographs

Appendix A – Photographic Log

LDW Development,
Menifee, Riverside County, California 92585

Photo: 1 **Description:** Central and southern portions of the Subject Property consist of undeveloped land with overgrown vegetation. **Orientation:** Facing northeast.	

Photo: 2 **Description:** Central and southern portions of the Subject Property consist of undeveloped land with overgrown vegetation. **Orientation:** Facing east.	

McAlister GeoScience

235 E. Broadway, Suite 1120
Long Beach, California 90802

LDW Development,
Menifee, Riverside County, California 92585

Photo: 3 **Description:** Central and southern portions of the Subject Property consist of undeveloped land with overgrown vegetation. **Orientation:** Facing north.	

Photo: 4 **Description:** Dumped materials located on the eastern portion of the Subject Property. **Orientation:** Facing east.	

McAlister GeoScience

235 E. Broadway, Suite 1120
Long Beach, California 90802

LDW Development,
Menifee, Riverside County, California 92585

Photo: 5 **Description:** An unpaved road trending east to west, bisects the Subject Property on the northern section. **Orientation:** Facing east.	

Photo: 6 **Description:** Dumped material was observed on the northern section of the Subject Property, adjacent to the residential home. **Orientation:** Facing north	

LDW Development,
Menifee, Riverside County, California 92585

Photo: 7 **Description:** A semi-rural residential property is located on the northern portion of the Subject Property. Broken up concrete was observed in the vicinity of the residential home. **Orientation:** Facing north.	

Photo: 8 **Description:** The Subject Property is bounded to the west by undeveloped land. **Orientation:** Facing west.	

McAlister GeoScience

235 E. Broadway, Suite 1120
Long Beach, California 90802

LDW Development,
Menifee, Riverside County, California 92585

Photo: 9 **Description:** The Subject Property is bounded on the south by Rouse Road, beyond which are single-family residential homes. **Orientation:** Facing west.	

Photo: 10 **Description:** The Subject Property is bounded on the south by Rouse Road, beyond which are single-family residential homes. **Orientation:** Facing south.	

McAlister GeoScience

235 E. Broadway, Suite 1120
Long Beach, California 90802

LDW Development,
Menifee, Riverside County, California 92585

Photo: 11 **Description:** An unpaved road is located east of the Subject Property. **Orientation:** Facing south.	

Photo: 12 **Description:** Brick wall surrounding property with vehicles stored. Adjacent and to the east of single-family home at the center of the southern property boundary. **Orientation:** Facing west.	

Appendix B

Historic Aerial Photographs, Topographic Maps, and Fire Insurance Maps

DWP Menifee, CA

26805 Menifee Road

Sun City, CA 92585

Inquiry Number: 6456246.8

April 19, 2021

The EDR Aerial Photo Decade Package

6 Armstrong Road, 4th floor
Shelton, CT 06484
Toll Free: 800.352.0050
www.edrnet.com

EDR Aerial Photo Decade Package

04/19/21

Site Name:

DWP Menifee, CA
26805 Menifee Road
Sun City, CA 92585
EDR Inquiry # 6456246.8

Client Name:

McAlister GeoScience
235 E Broadway
Long Beach, CA 90802
Contact: Alexis C Ceballos

Environmental Data Resources, Inc. (EDR) Aerial Photo Decade Package is a screening tool designed to assist environmental professionals in evaluating potential liability on a target property resulting from past activities. EDR's professional researchers provide digitally reproduced historical aerial photographs, and when available, provide one photo per decade.

Search Results:

Year	Scale	Details	Source
2016	1"=500'	Flight Year: 2016	USDA/NAIP
2012	1"=500'	Flight Year: 2012	USDA/NAIP
2009	1"=500'	Flight Year: 2009	USDA/NAIP
2006	1"=500'	Flight Year: 2006	USDA/NAIP
1997	1"=500'	Flight Date: October 16, 1997	USGS
1989	1"=500'	Flight Date: August 15, 1989	USDA
1985	1"=500'	Flight Date: July 28, 1985	USDA
1978	1"=500'	Flight Date: September 20, 1978	USDA
1967	1"=500'	Flight Date: May 15, 1967	USDA
1961	1"=500'	Flight Date: August 18, 1961	USDA
1953	1"=500'	Flight Date: August 28, 1953	USDA
1949	1"=500'	Flight Date: May 23, 1949	USDA
1938	1"=500'	Flight Date: June 14, 1938	USDA

When delivered electronically by EDR, the aerial photo images included with this report are for ONE TIME USE ONLY. Further reproduction of these aerial photo images is prohibited without permission from EDR. For more information contact your EDR Account Executive.

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INQUIRY #: 6456246.8
YEAR: 2016
= 500'
N
EDR

INQUIRY #: 6456246.8

YEAR: 2012

= 500'

N

EDR

INQUIRY #: 6456246.8

YEAR: 2009

= 500'

N

EDR

INQUIRY #: 6456246.8

YEAR: 2006

= 500'

N

EDR

INQUIRY #: 6456246.8

YEAR: 1997

= 500'

N

EDR

INQUIRY #: 6456246.8
YEAR: 1989
= 500'
N
EDR

INQUIRY #: 6456246.8

YEAR: 1985

= 500'

N

EDR

INQUIRY #: 6456246.8

YEAR: 1978

= 500'

N

EDR

INQUIRY #: 6456246.8
YEAR: 1967
= 500'
N
EDR

INQUIRY #: 6456246.8

YEAR: 1961

= 500'

N

EDR

INQUIRY #: 6456246.8

YEAR: 1953

= 500'

N

EDR

INQUIRY #: 6456246.8

YEAR: 1949

= 500'

N

EDR

INQUIRY #: 6456246.8

YEAR: 1938

= 500'

N

EDR

DWP Menifee, CA
26805 Menifee Road
Sun City, CA 92585

Inquiry Number: 6456246.4
April 19, 2021

EDR Historical Topo Map Report

with QuadMatch™

6 Armstrong Road, 4th floor
Shelton, CT 06484
Toll Free: 800.352.0050
www.edrnet.com

EDR Historical Topo Map Report

04/19/21

Site Name:

DWP Menifee, CA
26805 Menifee Road
Sun City, CA 92585
EDR Inquiry # 6456246.4

Client Name:

McAlister GeoScience
235 E Broadway
Long Beach, CA 90802
Contact: Alexis C Ceballos

EDR Topographic Map Library has been searched by EDR and maps covering the target property location as provided by McAlister GeoScience were identified for the years listed below. EDR's Historical Topo Map Report is designed to assist professionals in evaluating potential liability on a target property resulting from past activities. EDRs Historical Topo Map Report includes a search of a collection of public and private color historical topographic maps, dating back to the late 1800s.

Search Results:

P.O.# NA
Project: LDW Menifee, CA

Coordinates:

Latitude:	33.729652 33° 43' 47" North
Longitude:	-117.155142 -117° 9' 19" West
UTM Zone:	Zone 11 North
UTM X Meters:	485627.74
UTM Y Meters:	3732191.79
Elevation:	1466.00' above sea level

Maps Provided:

2012
1979
1973
1953
1947
1943
1942
1901

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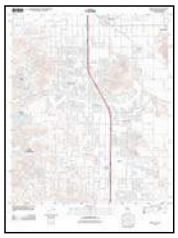
Topo Sheet Key

This EDR Topo Map Report is based upon the following USGS topographic map sheets.

2012 Source Sheets



Romoland
2012
7.5-minute, 24000

Perris
2012
7.5-minute, 24000

1979 Source Sheets

Romoland
1979
7.5-minute, 24000
Aerial Photo Revised 1976

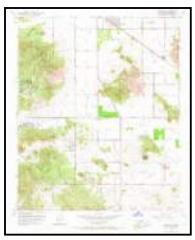
Perris
1979
7.5-minute, 24000
Aerial Photo Revised 1978

1973 Source Sheets

Romoland
1973
7.5-minute, 24000
Aerial Photo Revised 1973

Perris
1973
7.5-minute, 24000
Aerial Photo Revised 1973

1953 Source Sheets



Romoland
1953
7.5-minute, 24000
Aerial Photo Revised 1951

Perris
1953
7.5-minute, 24000
Aerial Photo Revised 1951

Topo Sheet Key

This EDR Topo Map Report is based upon the following USGS topographic map sheets.

1947 Source Sheets

MURRIETA
1947
15-minute, 50000

1943 Source Sheets

PERRIS
1943
15-minute, 62500

Murrieta
1943
15-minute, 62500
Aerial Photo Revised 1939

1942 Source Sheets

Perris
1942
15-minute, 62500
Aerial Photo Revised 1939

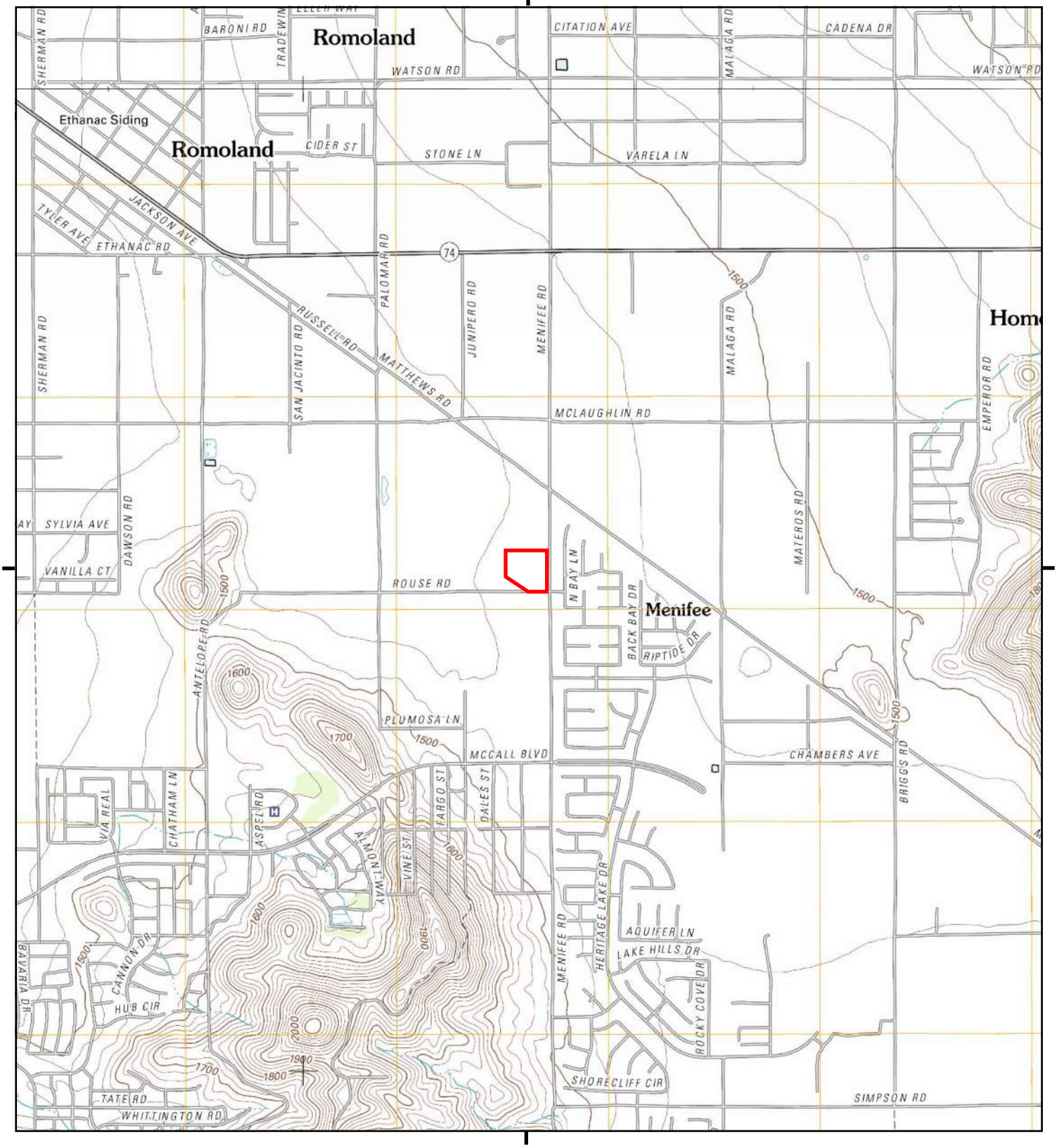
Murrieta
1942
15-minute, 62500
Aerial Photo Revised 1939

1901 Source Sheets

Elsinore
1901
30-minute, 125000

Historical Topo Map

2012



This report includes information from the following map sheet(s).

0 Miles 0.25 0.5 1 1.5

NW N NE
W E
SW S SE

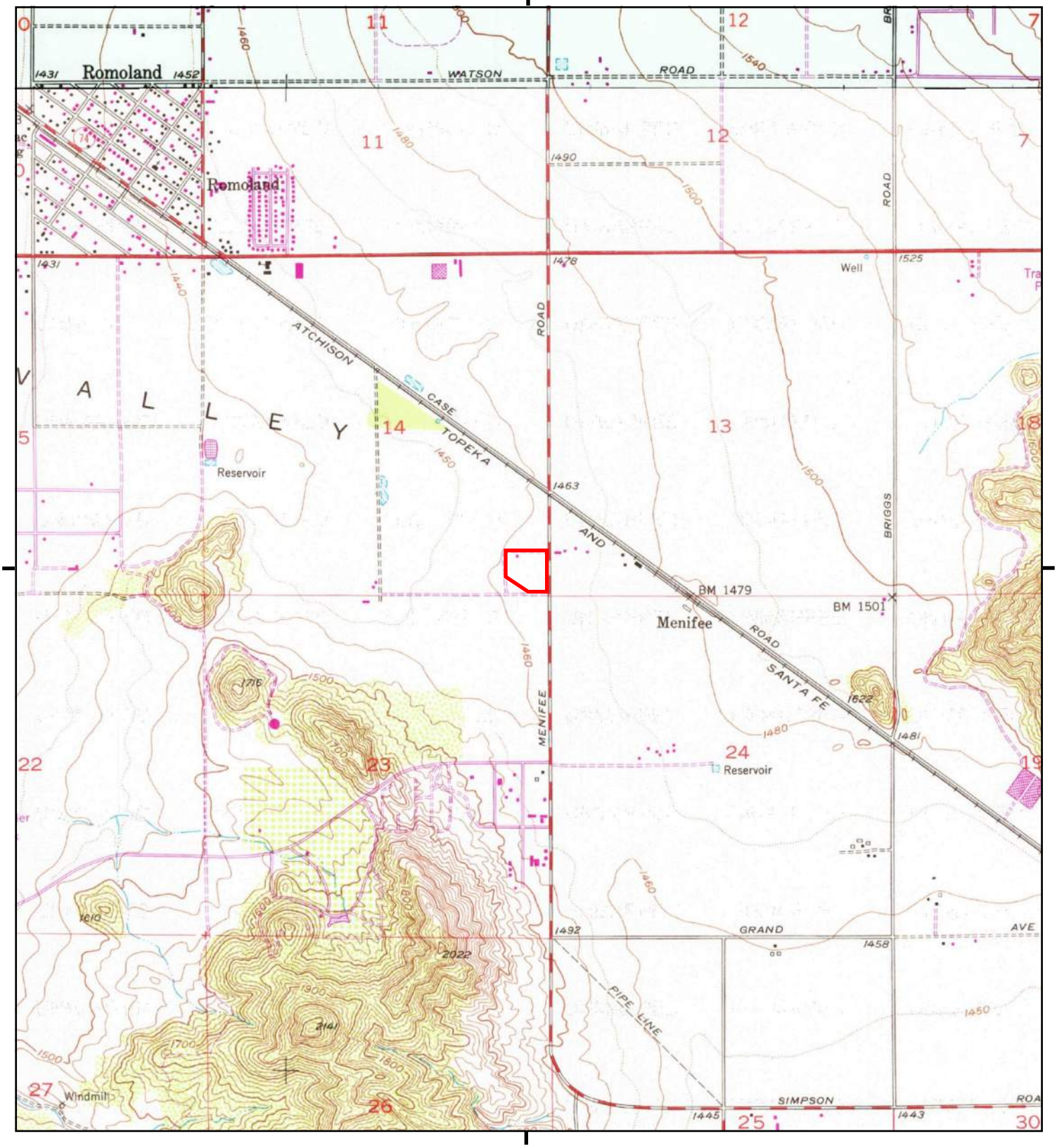
TP, Romoland, 2012, 7.5-minute
N, Perris, 2012, 7.5-minute

SITE NAME: DWP Menifee, CA
ADDRESS: 26805 Menifee Road
Sun City, CA 92585
CLIENT: McAlister GeoScience

N

Historical Topo Map

1979



This report includes information from the following map sheet(s).

0 Miles 0.25 0.5 1 1.5

NW N NE
W E
SW S SE

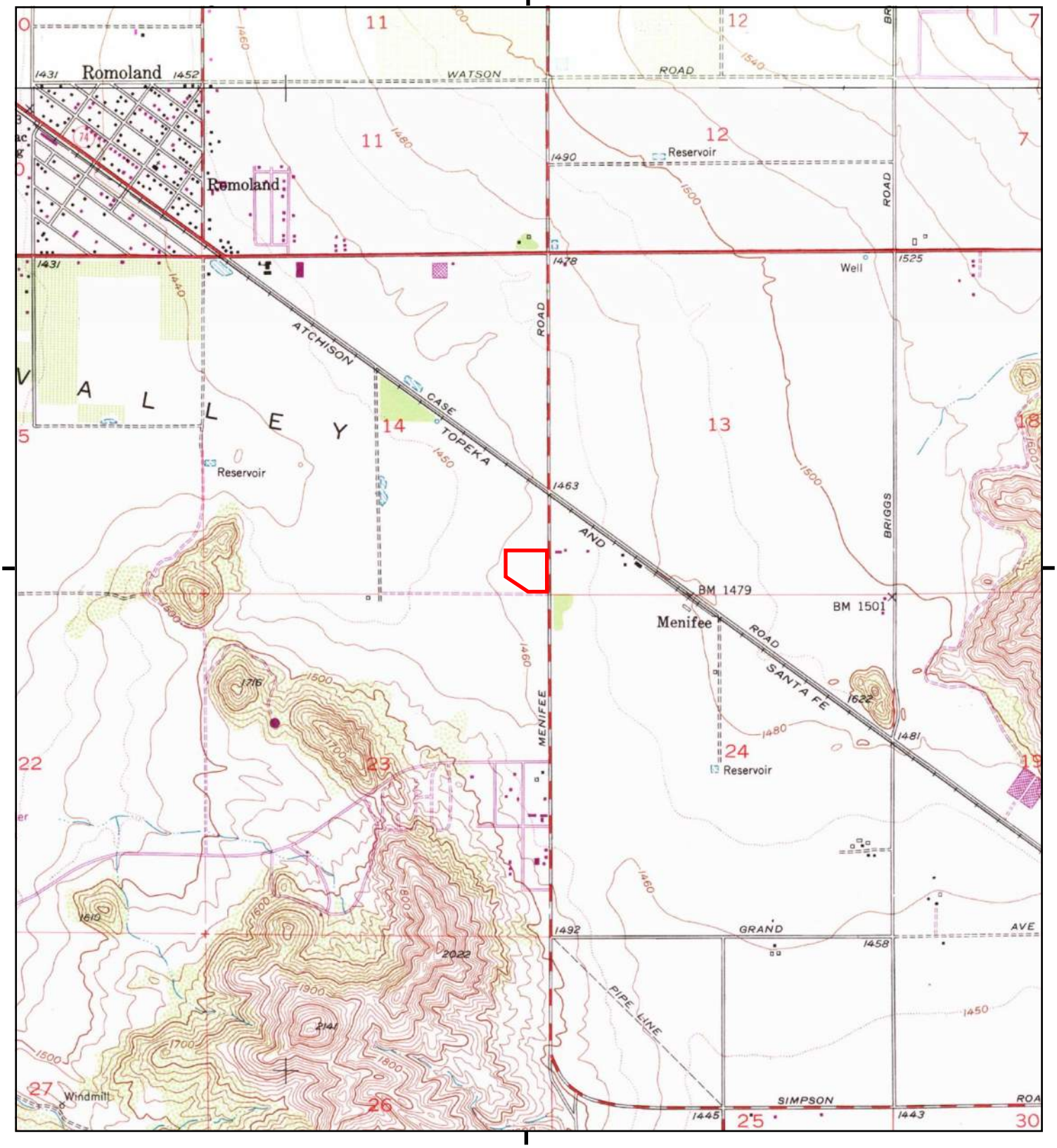
TP, Romoland, 1979, 7.5-minute
N, Perris, 1979, 7.5-minute

SITE NAME: DWP Menifee, CA
ADDRESS: 26805 Menifee Road
Sun City, CA 92585
CLIENT: McAlister GeoScience

N

Historical Topo Map

1973



This report includes information from the following map sheet(s).

0 Miles 0.25 0.5 1 1.5

NW N NE
W E
SW S SE

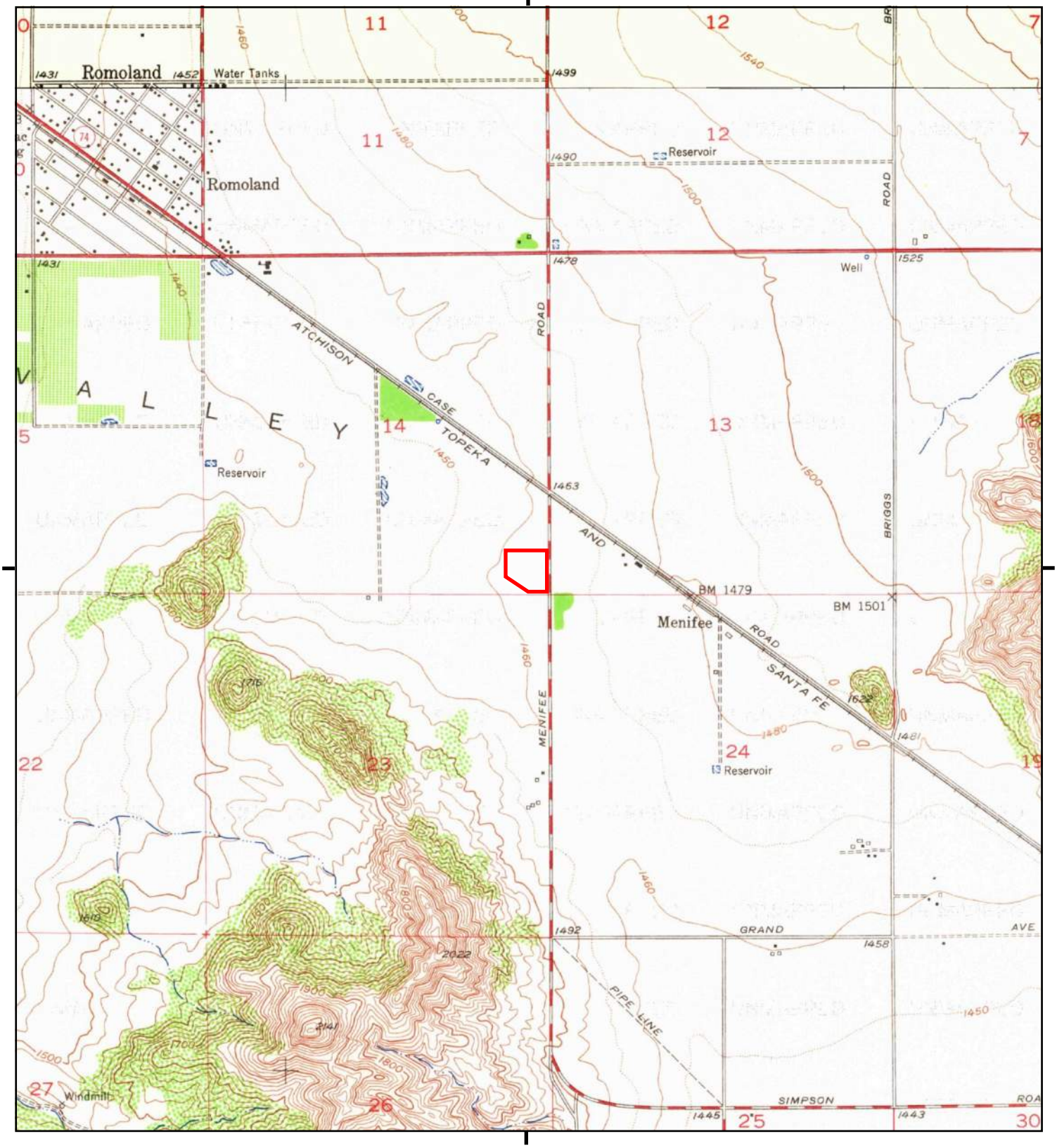
TP, Romoland, 1973, 7.5-minute
N, Perris, 1973, 7.5-minute

SITE NAME: DWP Menifee, CA
ADDRESS: 26805 Menifee Road
Sun City, CA 92585
CLIENT: McAlister GeoScience

N

Historical Topo Map

1953



This report includes information from the following map sheet(s).

0 Miles 0.25 0.5 1 1.5

NW N NE
W E
SW S SE

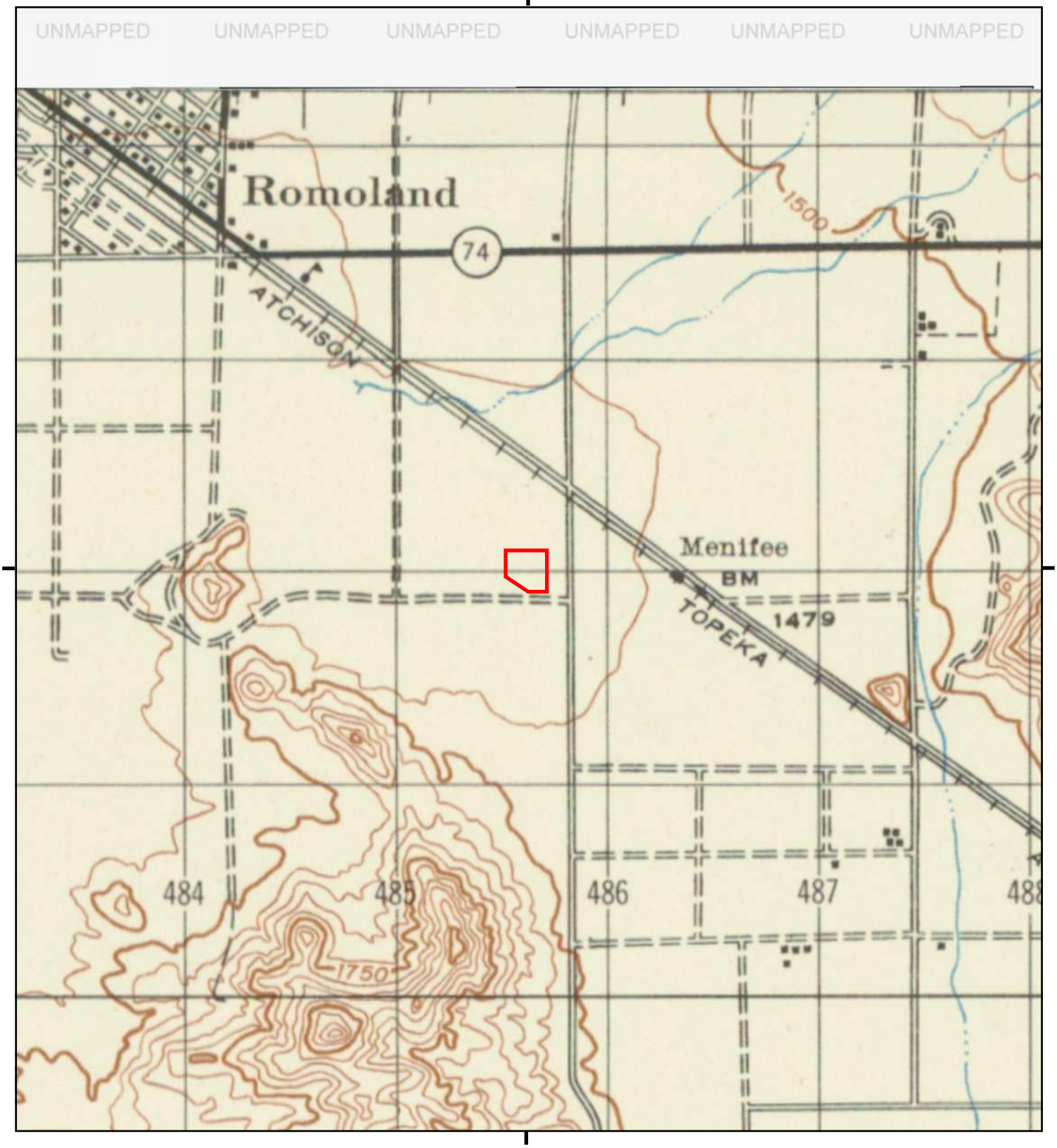
TP, Romoland, 1953, 7.5-minute
N, Perris, 1953, 7.5-minute

SITE NAME: DWP Menifee, CA
ADDRESS: 26805 Menifee Road
Sun City, CA 92585
CLIENT: McAlister GeoScience

N

Historical Topo Map

1947



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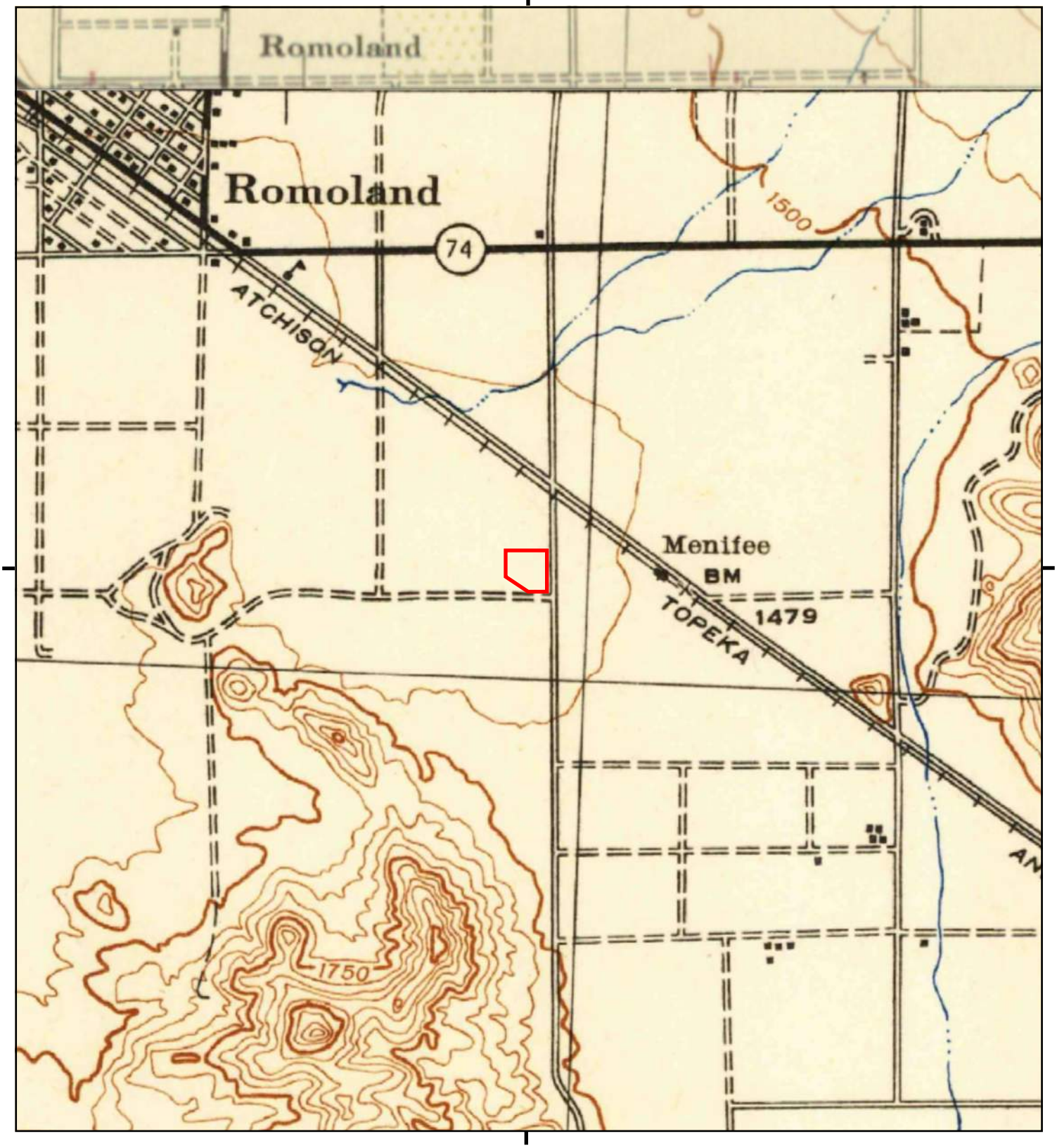
NW N NE
W E
SW S SE

TP, MURRIETA, 1947, 15-minute

SITE NAME: DWP Menifee, CA
ADDRESS: 26805 Menifee Road
Sun City, CA 92585
CLIENT: McAlister GeoScience

N



This report includes information from the following map sheet(s).

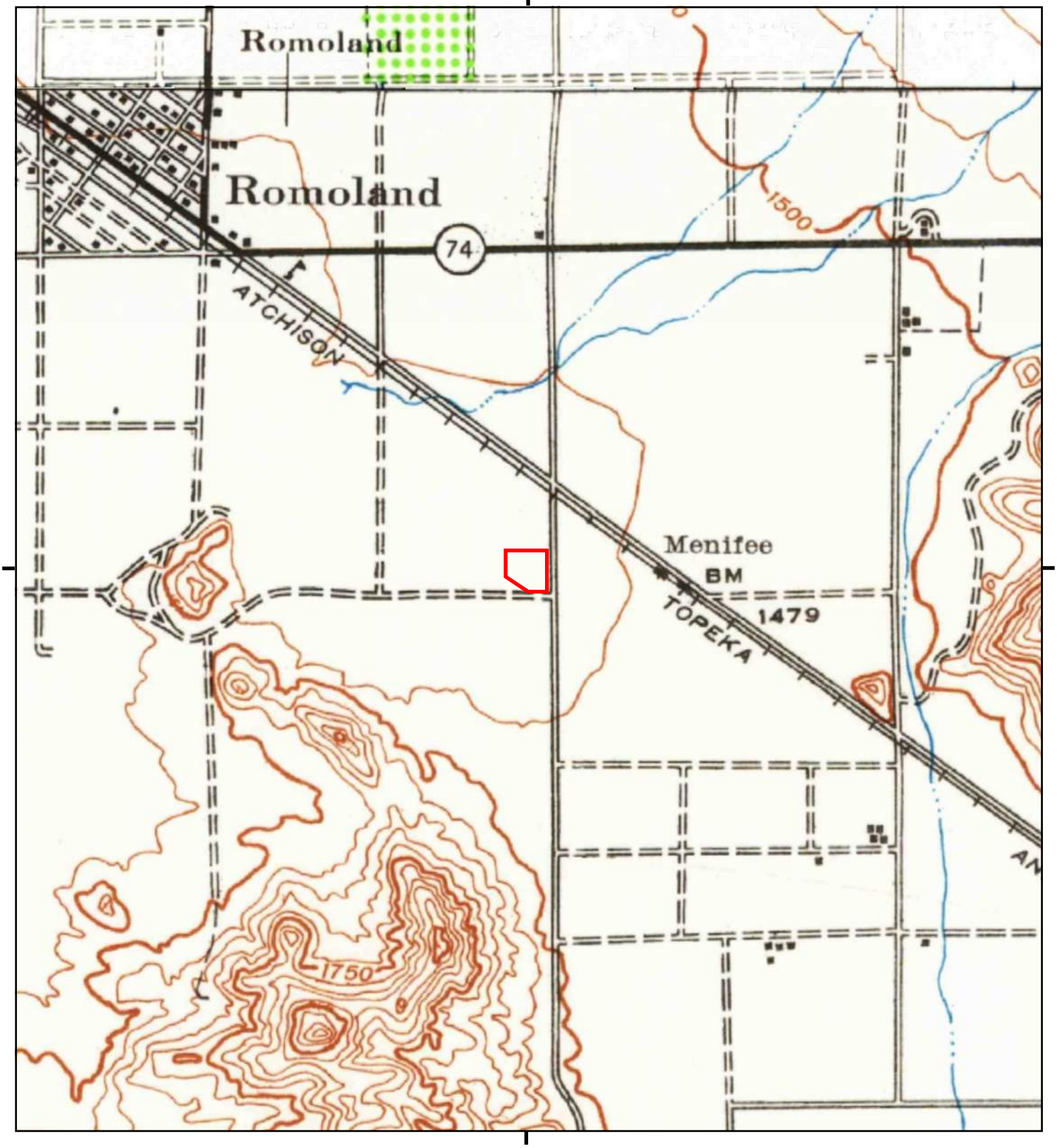
0 Miles 0.25 0.5 1 1.5

NW N NE
W E
SW S SE

TP, Murrieta, 1943, 15-minute
N, PERRIS, 1943, 15-minute

SITE NAME: DWP Menifee, CA
ADDRESS: 26805 Menifee Road
Sun City, CA 92585
CLIENT: McAlister GeoScience

N



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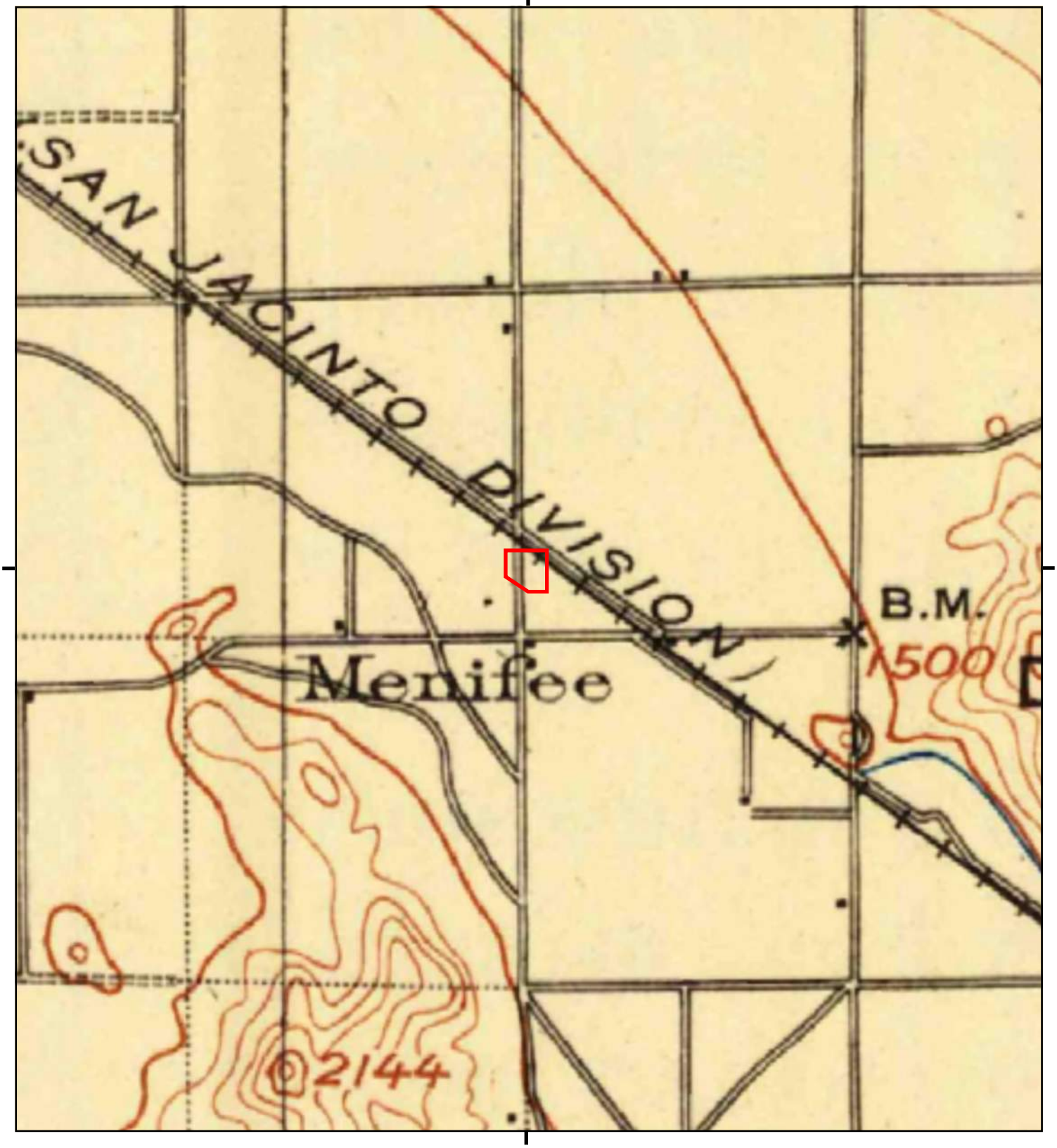
0 Miles 0.25 0.5 1 1.5

NW N NE
W E
SW S SE

TP, Murrieta, 1942, 15-minute
N, Perris, 1942, 15-minute

SITE NAME: DWP Menifee, CA
ADDRESS: 26805 Menifee Road
Sun City, CA 92585
CLIENT: McAlister GeoScience

N



This report includes information from the following map sheet(s).

0 Miles 0.25 0.5 1 1.5

NW N NE
W E
SW S SE

TP, Elsinore, 1901, 30-minute

SITE NAME: DWP Menifee, CA
ADDRESS: 26805 Menifee Road
Sun City, CA 92585
CLIENT: McAlister GeoScience

N

DWP Menifee, CA
26805 Menifee Road
Sun City, CA 92585

Inquiry Number: 6456246.3
April 19, 2021

Certified Sanborn® Map Report

6 Armstrong Road, 4th floor
Shelton, CT 06484
Toll Free: 800.352.0050
www.edrnet.com

Certified Sanborn® Map Report

04/19/21

Site Name:

DWP Menifee, CA
26805 Menifee Road
Sun City, CA 92585
EDR Inquiry # 6456246.3

Client Name:

McAlister GeoScience
235 E Broadway
Long Beach, CA 90802
Contact: Alexis C Ceballos

The Sanborn Library has been searched by EDR and maps covering the target property location as provided by McAlister GeoScience were identified for the years listed below. The Sanborn Library is the largest, most complete collection of fire insurance maps. The collection includes maps from Sanborn, Bromley, Perris & Browne, Hopkins, Barlow, and others. Only Environmental Data Resources Inc. (EDR) is authorized to grant rights for commercial reproduction of maps by the Sanborn Library LLC, the copyright holder for the collection. Results can be authenticated by visiting www.edrnet.com/sanborn.

The Sanborn Library is continually enhanced with newly identified map archives. This report accesses all maps in the collection as of the day this report was generated.

Certified Sanborn Results:

Certification # 1AAB-4AE9-8375

PO # NA

Project LDW Menifee, CA

UNMAPPED PROPERTY

This report certifies that the complete holdings of the Sanborn Library, LLC collection have been searched based on client supplied target property information, and fire insurance maps covering the target property were not found.

Sanborn® Library search results

Certification #: 1AAB-4AE9-8375

The Sanborn Library includes more than 1.2 million fire insurance maps from Sanborn, Bromley, Perris & Browne, Hopkins, Barlow and others which track historical property usage in approximately 12,000 American cities and towns. Collections searched:

- ☑ Library of Congress
- ☑ University Publications of America
- ☑ EDR Private Collection

The Sanborn Library LLC Since 1866™

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Appendix C

EDR Radius Map Report

DWP Menifee, CA
26805 Menifee Road
Sun City, CA 92585

Inquiry Number: 6456246.2s
April 19, 2021

The EDR Radius Map™ Report with GeoCheck®

6 Armstrong Road, 4th floor
Shelton, CT 06484
Toll Free: 800.352.0050
www.edrnet.com

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Detail Map	3
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Thank you for your business.
Please contact EDR at 1-800-352-0050
with any questions or comments.

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EXECUTIVE SUMMARY

A search of available environmental records was conducted by Environmental Data Resources, Inc (EDR). The report was designed to assist parties seeking to meet the search requirements of EPA's Standards and Practices for All Appropriate Inquiries (40 CFR Part 312), the ASTM Standard Practice for Environmental Site Assessments (E 1527-13), the ASTM Standard Practice for Environmental Site Assessments for Forestland or Rural Property (E 2247-16), the ASTM Standard Practice for Limited Environmental Due Diligence: Transaction Screen Process (E 1528-14) or custom requirements developed for the evaluation of environmental risk associated with a parcel of real estate.

TARGET PROPERTY INFORMATION

ADDRESS

26805 MENIFEE ROAD
SUN CITY, CA 92585

COORDINATES

Latitude (North):	33.7296520 - 33° 43' 46.74''
Longitude (West):	117.1551420 - 117° 9' 18.51''
Universal Tranverse Mercator:	Zone 11
UTM X (Meters):	485627.4
UTM Y (Meters):	3731998.2
Elevation:	1466 ft. above sea level

USGS TOPOGRAPHIC MAP ASSOCIATED WITH TARGET PROPERTY

Target Property Map:	5641314 ROMOLAND, CA
Version Date:	2012

AERIAL PHOTOGRAPHY IN THIS REPORT

Portions of Photo from:	20140530
Source:	USDA

MAPPED SITES SUMMARY

Target Property Address:
26805 MENIFEE ROAD
SUN CITY, CA 92585

Click on Map ID to see full detail.

MAP ID	SITE NAME	ADDRESS	DATABASE ACRONYMS	RELATIVE ELEVATION	DIST (ft. & mi.) DIRECTION
1	FLYING U FAMS INC	28495 ROUSE RD	HIST UST	Lower	1108, 0.210, WSW
2	BP JOHN RECYCLING	28700 MATTHEWS RD	SWF/LF, CERS HAZ WASTE, LDS, NPDES, CERS	Lower	2570, 0.487, NNW
3	B.P. JOHN RECYCLING	28700 MATHEWS ROAD	SWF/LF, CERS	Lower	2628, 0.498, NNW
4	MENIFEE VALLEY RANCH	MCCALL BOULEVARD/MEN	ENVIROSTOR, SCH	Higher	2660, 0.504, South
5	MCCALL MESA K-8 SCHO	MCCALL BOULEVARD/JUN	ENVIROSTOR, SCH	Higher	2844, 0.539, SSW

EXECUTIVE SUMMARY

TARGET PROPERTY SEARCH RESULTS

The target property was not listed in any of the databases searched by EDR.

DATABASES WITH NO MAPPED SITES

No mapped sites were found in EDR's search of available ("reasonably ascertainable ") government records either on the target property or within the search radius around the target property for the following databases:

STANDARD ENVIRONMENTAL RECORDS

Federal NPL site list

NPL ---------- National Priority List
Proposed NPL ---------- Proposed National Priority List Sites
NPL LIENS ---------- Federal Superfund Liens

Federal Delisted NPL site list

Delisted NPL ---------- National Priority List Deletions

Federal CERCLIS list

FEDERAL FACILITY ---------- Federal Facility Site Information listing
SEMS ---------- Superfund Enterprise Management System

Federal CERCLIS NFRAP site list

SEMS-ARCHIVE ---------- Superfund Enterprise Management System Archive

Federal RCRA CORRACTS facilities list

CORRACTS ---------- Corrective Action Report

Federal RCRA non-CORRACTS TSD facilities list

RCRA-TSDF ---------- RCRA - Treatment, Storage and Disposal

Federal RCRA generators list

RCRA-LQG ---------- RCRA - Large Quantity Generators
RCRA-SQG ---------- RCRA - Small Quantity Generators
RCRA-VSQG ---------- RCRA - Very Small Quantity Generators (Formerly Conditionally Exempt Small Quantity Generators)

Federal institutional controls / engineering controls registries

LUCIS ---------- Land Use Control Information System

US ENG CONTROLS ..... Engineering Controls Sites List
US INST CONTROLS ..... Institutional Controls Sites List

Federal ERNS list

ERNS ..... Emergency Response Notification System

State- and tribal - equivalent NPL

RESPONSE ..... State Response Sites

State and tribal leaking storage tank lists

LUST ..... Geotracker's Leaking Underground Fuel Tank Report
INDIAN LUST ..... Leaking Underground Storage Tanks on Indian Land
CPS-SLIC ..... Statewide SLIC Cases

State and tribal registered storage tank lists

FEMA UST ..... Underground Storage Tank Listing
UST ..... Active UST Facilities
AST ..... Aboveground Petroleum Storage Tank Facilities
INDIAN UST ..... Underground Storage Tanks on Indian Land

State and tribal voluntary cleanup sites

VCP ..... Voluntary Cleanup Program Properties
INDIAN VCP ..... Voluntary Cleanup Priority Listing

State and tribal Brownfields sites

BROWNFIELDS ..... Considered Brownfieds Sites Listing

ADDITIONAL ENVIRONMENTAL RECORDS

Local Brownfield lists

US BROWNFIELDS ..... A Listing of Brownfields Sites

Local Lists of Landfill / Solid Waste Disposal Sites

WMUDS/SWAT ..... Waste Management Unit Database
SWRCY ..... Recycler Database
HAULERS ..... Registered Waste Tire Haulers Listing
INDIAN ODI ..... Report on the Status of Open Dumps on Indian Lands
DEBRIS REGION 9 ..... Torres Martinez Reservation Illegal Dump Site Locations
ODI ..... Open Dump Inventory
IHS OPEN DUMPS ..... Open Dumps on Indian Land

Local Lists of Hazardous waste / Contaminated Sites

US HIST CDL ..... Delisted National Clandestine Laboratory Register
HIST Cal-Sites ..... Historical Calsites Database
SCH ..... School Property Evaluation Program

CDL ---------- Clandestine Drug Labs
Toxic Pits ---------- Toxic Pits Cleanup Act Sites
CERS HAZ WASTE ---------- CERS HAZ WASTE
US CDL ---------- National Clandestine Laboratory Register
PFAS ---------- PFAS Contamination Site Location Listing

Local Lists of Registered Storage Tanks

SWEEPS UST ---------- SWEEPS UST Listing
CA FID UST ---------- Facility Inventory Database
CERS TANKS ---------- California Environmental Reporting System (CERS) Tanks

Local Land Records

LIENS ---------- Environmental Liens Listing
LIENS 2 ---------- CERCLA Lien Information
DEED ---------- Deed Restriction Listing

Records of Emergency Release Reports

HMIRS ---------- Hazardous Materials Information Reporting System
CHMIRS ---------- California Hazardous Material Incident Report System
LDS ---------- Land Disposal Sites Listing
MCS ---------- Military Cleanup Sites Listing
SPILLS 90 ---------- SPILLS 90 data from FirstSearch

Other Ascertainable Records

RCRA NonGen / NLR ---------- RCRA - Non Generators / No Longer Regulated
FUDS ---------- Formerly Used Defense Sites
DOD ---------- Department of Defense Sites
SCRD DRYCLEANERS ---------- State Coalition for Remediation of Drycleaners Listing
US FIN ASSUR ---------- Financial Assurance Information
EPA WATCH LIST ---------- EPA WATCH LIST
2020 COR ACTION ---------- 2020 Corrective Action Program List
TSCA ---------- Toxic Substances Control Act
TRIS ---------- Toxic Chemical Release Inventory System
SSTS ---------- Section 7 Tracking Systems
ROD ---------- Records Of Decision
RMP ---------- Risk Management Plans
RAATS ---------- RCRA Administrative Action Tracking System
PRP ---------- Potentially Responsible Parties
PADS ---------- PCB Activity Database System
ICIS ---------- Integrated Compliance Information System
FTTS ---------- FIFRA/ TSCA Tracking System - FIFRA (Federal Insecticide, Fungicide, & Rodenticide Act)/TSCA (Toxic Substances Control Act)
MLTS ---------- Material Licensing Tracking System
COAL ASH DOE ---------- Steam-Electric Plant Operation Data
COAL ASH EPA ---------- Coal Combustion Residues Surface Impoundments List
PCB TRANSFORMER ---------- PCB Transformer Registration Database
RADINFO ---------- Radiation Information Database
HIST FTTS ---------- FIFRA/TSCA Tracking System Administrative Case Listing
DOT OPS ---------- Incident and Accident Data
CONSENT ---------- Superfund (CERCLA) Consent Decrees
INDIAN RESERV ---------- Indian Reservations

FUSRAP ---- Formerly Utilized Sites Remedial Action Program
UMTRA ---- Uranium Mill Tailings Sites
LEAD SMELTERS ---- Lead Smelter Sites
US AIRS ---- Aerometric Information Retrieval System Facility Subsystem
US MINES ---- Mines Master Index File
ABANDONED MINES ---- Abandoned Mines
FINDS ---- Facility Index System/Facility Registry System
ECHO ---- Enforcement & Compliance History Information
DOCKET HWC ---- Hazardous Waste Compliance Docket Listing
UXO ---- Unexploded Ordnance Sites
FUELS PROGRAM ---- EPA Fuels Program Registered Listing
CA BOND EXP. PLAN ---- Bond Expenditure Plan
Cortese ---- "Cortese" Hazardous Waste & Substances Sites List
CUPA Listings ---- CUPA Resources List
DRYCLEANERS ---- Cleaner Facilities
EMI ---- Emissions Inventory Data
ENF ---- Enforcement Action Listing
Financial Assurance ---- Financial Assurance Information Listing
HAZNET ---- Facility and Manifest Data
ICE ---- ICE
HIST CORTESE ---- Hazardous Waste & Substance Site List
HWP ---- EnviroStor Permitted Facilities Listing
HWT ---- Registered Hazardous Waste Transporter Database
MINES ---- Mines Site Location Listing
MWMP ---- Medical Waste Management Program Listing
NPDES ---- NPDES Permits Listing
PEST LIC ---- Pesticide Regulation Licenses Listing
PROC ---- Certified Processors Database
Notify 65 ---- Proposition 65 Records
UIC ---- UIC Listing
UIC GEO ---- UIC GEO (GEOTRACKER)
WASTEWATER PITS ---- Oil Wastewater Pits Listing
WDS ---- Waste Discharge System
WIP ---- Well Investigation Program Case List
MILITARY PRIV SITES ---- MILITARY PRIV SITES (GEOTRACKER)
PROJECT ---- PROJECT (GEOTRACKER)
WDR ---- Waste Discharge Requirements Listing
CIWQS ---- California Integrated Water Quality System
CERS ---- CERS
NON-CASE INFO ---- NON-CASE INFO (GEOTRACKER)
OTHER OIL GAS ---- OTHER OIL & GAS (GEOTRACKER)
PROD WATER PONDS ---- PROD WATER PONDS (GEOTRACKER)
SAMPLING POINT ---- SAMPLING POINT (GEOTRACKER)
WELL STIM PROJ ---- Well Stimulation Project (GEOTRACKER)
MINES MRDS ---- Mineral Resources Data System
HWTS ---- Hazardous Waste Tracking System

EDR HIGH RISK HISTORICAL RECORDS

EDR Exclusive Records

EDR MGP ---- EDR Proprietary Manufactured Gas Plants
EDR Hist Auto ---- EDR Exclusive Historical Auto Stations
EDR Hist Cleaner ---- EDR Exclusive Historical Cleaners

EXECUTIVE SUMMARY

EDR RECOVERED GOVERNMENT ARCHIVES

Exclusive Recovered Govt. Archives

RGA LF ---------- Recovered Government Archive Solid Waste Facilities List
RGA LUST ---------- Recovered Government Archive Leaking Underground Storage Tank

SURROUNDING SITES: SEARCH RESULTS

Surrounding sites were identified in the following databases.

Elevations have been determined from the USGS Digital Elevation Model and should be evaluated on a relative (not an absolute) basis. Relative elevation information between sites of close proximity should be field verified. Sites with an elevation equal to or higher than the target property have been differentiated below from sites with an elevation lower than the target property.
Page numbers and map identification numbers refer to the EDR Radius Map report where detailed data on individual sites can be reviewed.

Sites listed in ***bold italics*** are in multiple databases.

Unmappable (orphan) sites are not considered in the foregoing analysis.

STANDARD ENVIRONMENTAL RECORDS

State- and tribal - equivalent CERCLIS

ENVIROSTOR: The Department of Toxic Substances Control's (DTSC's) Site Mitigation and Brownfields Reuse Program's (SMBRP's) EnviroStor database identifes sites that have known contamination or sites for which there may be reasons to investigate further. The database includes the following site types: Federal Superfund sites (National Priorities List (NPL)); State Response, including Military Facilities and State Superfund; Voluntary Cleanup; and School sites. EnviroStor provides similar information to the information that was available in CalSites, and provides additional site information, including, but not limited to, identification of formerly-contaminated properties that have been released for reuse, properties where environmental deed restrictions have been recorded to prevent inappropriate land uses, and risk characterization information that is used to assess potential impacts to public health and the environment at contaminated sites.

A review of the ENVIROSTOR list, as provided by EDR, and dated 01/25/2021 has revealed that there are 2 ENVIROSTOR sites within approximately 1 mile of the target property.

Equal/Higher Elevation	Address	Direction / Distance	Map ID	Page
MENIFEE VALLEY RANCH Facility Id: 33010076 Status: No Further Action	***MCCALL BOULEVARD/MEN***	***S 1/2 - 1 (0.504 mi.)***	***4***	***20***
MCCALL MESA K-8 SCHO Facility Id: 33010066 Status: No Further Action	***MCCALL BOULEVARD/JUN***	***SSW 1/2 - 1 (0.539 mi.)***	***5***	***23***

State and tribal landfill and/or solid waste disposal site lists

SWF/LF: The Solid Waste Facilities/Landfill Sites records typically contain an inventory of solid waste disposal facilities or landfills in a particular state. The data come from the Integrated Waste Management Board's Solid Waste Information System (SWIS) database.

A review of the SWF/LF list, as provided by EDR, has revealed that there are 2 SWF/LF sites within approximately 0.5 miles of the target property.

Lower Elevation	Address	Direction / Distance	Map ID	Page
BP JOHN RECYCLING	***28700 MATTHEWS RD***	***NNW 1/4 - 1/2 (0.487 mi.)***	***2***	***9***
Database: LOS ANGELES CO. LF, Date of Government Version: 01/11/2021 Site ID: 2744 Status: Active				
B.P. JOHN RECYCLING	***28700 MATHEWS ROAD***	***NNW 1/4 - 1/2 (0.498 mi.)***	***3***	***17***
Database: SWF/LF (SWIS), Date of Government Version: 11/09/2020 Facility ID: 33-AA-0301 Operational Status: Active Regulation Status: Notification				

ADDITIONAL ENVIRONMENTAL RECORDS

Local Lists of Registered Storage Tanks

HIST UST: Historical UST Registered Database.

A review of the HIST UST list, as provided by EDR, and dated 10/15/1990 has revealed that there is 1 HIST UST site within approximately 0.25 miles of the target property.

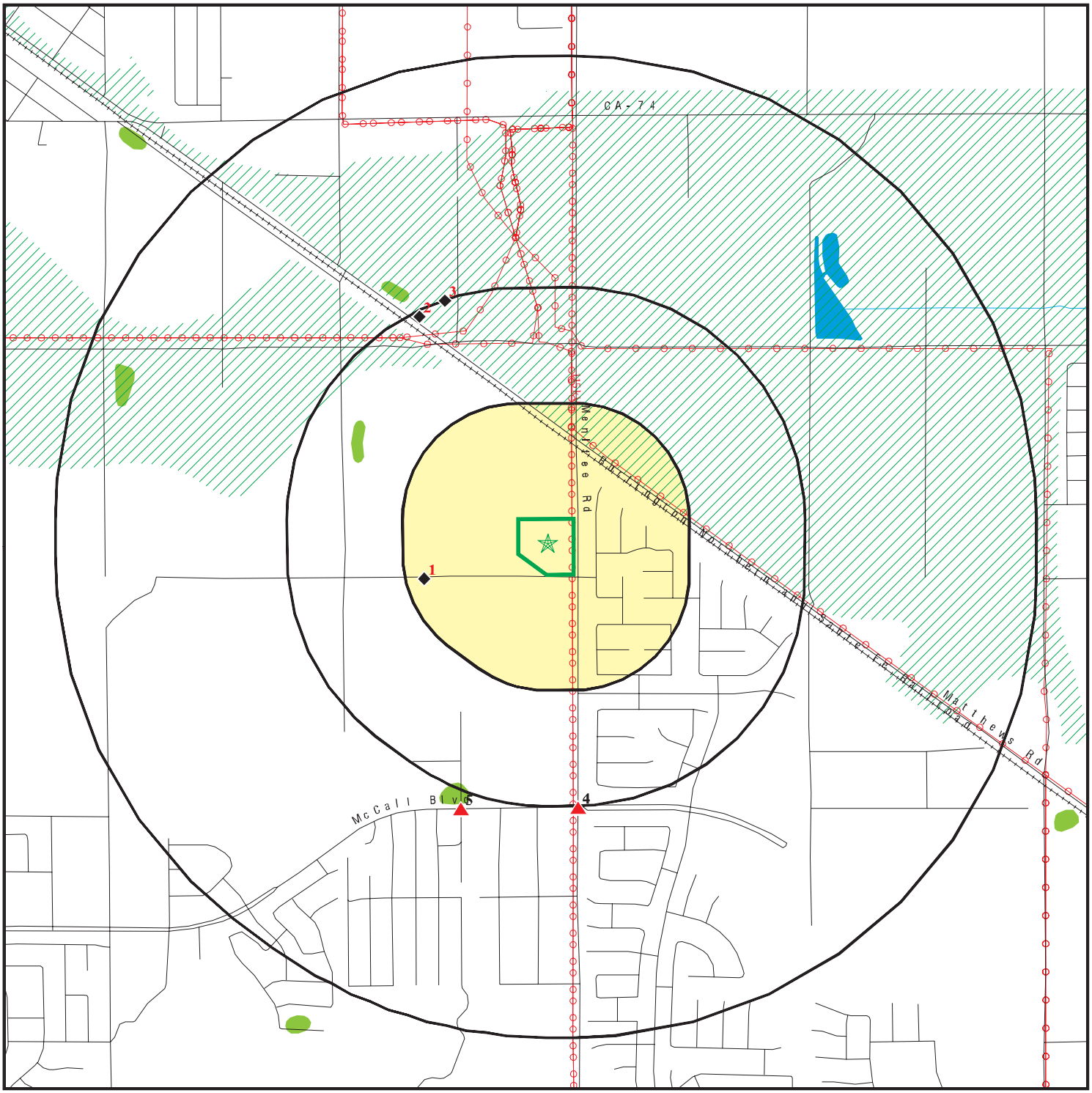
Lower Elevation	Address	Direction / Distance	Map ID	Page
FLYING U FAMS INC Facility Id: 00000015308	28495 ROUSE RD	WSW 1/8 - 1/4 (0.210 mi.)	1	9

EXECUTIVE SUMMARY

Due to poor or inadequate address information, the following sites were not mapped. Count: 1 records.

Site Name	Database(s)
	CDL

OVERVIEW MAP - 6456246.2S



- Target Property
- Sites at elevations higher than or equal to the target property
- Sites at elevations lower than the target property
- Manufactured Gas Plants
- National Priority List Sites
- Dept. Defense Sites
- Indian Reservations BIA
- Power transmission lines
- Special Flood Hazard Area (1%)
- 0.2% Annual Chance Flood Hazard
- National Wetland Inventory
- State Wetlands
- Areas of Concern

This report includes Interactive Map Layers to display and/or hide map information. The legend includes only those icons for the default map view.

SITE NAME: DWP Menifee, CA ADDRESS: 26805 Menifee Road Sun City CA 92585 LAT/LONG: 33.729652 / 117.155142	CLIENT: McAlister GeoScience CONTACT: Alexis C Ceballos INQUIRY #: 6456246.2s DATE: April 19, 2021 2:20 pm

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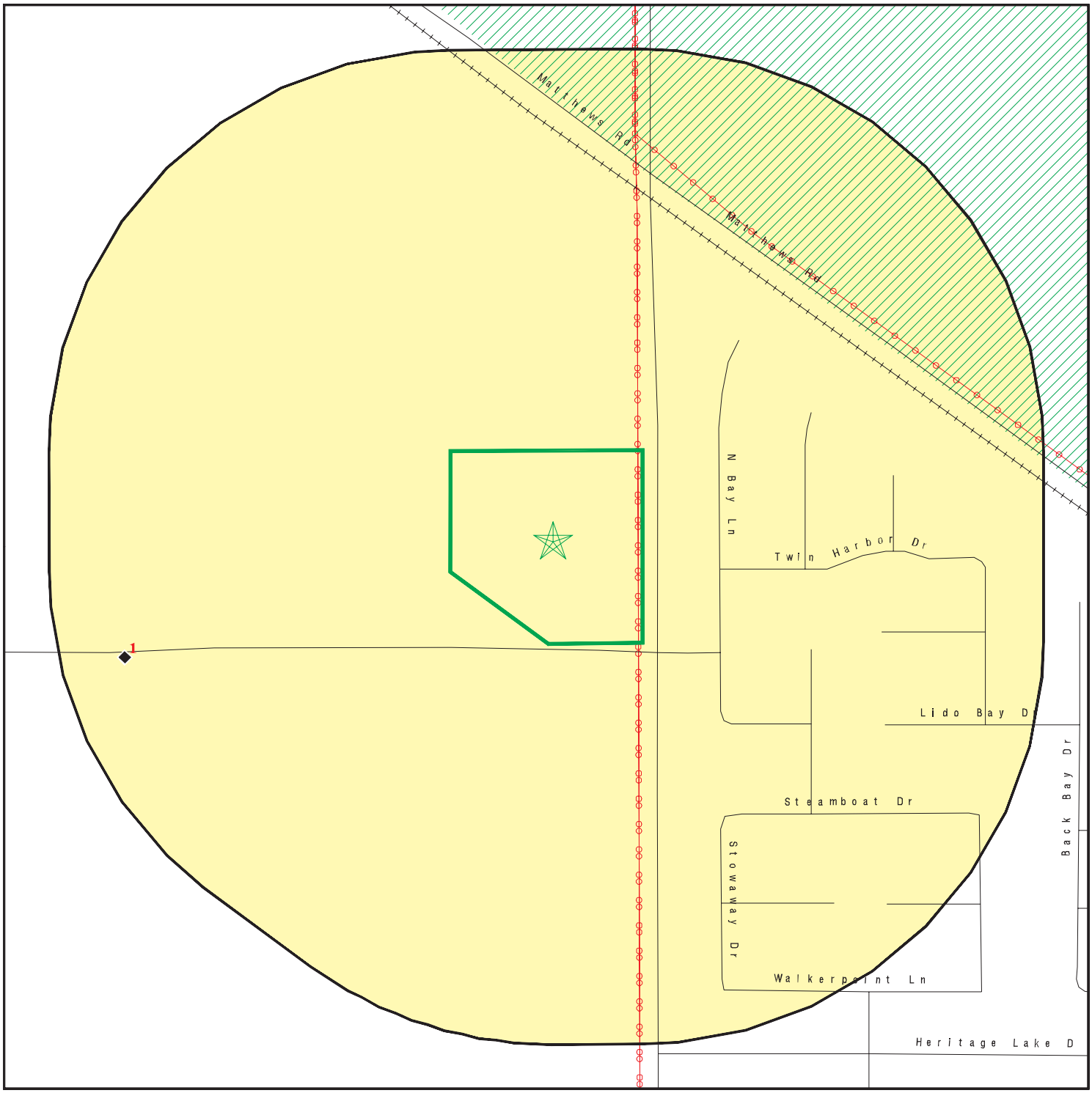
DETAIL MAP - 6456246.2S



0 1/16 1/8 1/4 Miles

- Target Property
- Sites at elevations higher than or equal to the target property
- Sites at elevations lower than the target property
- Manufactured Gas Plants
- Sensitive Receptors
- National Priority List Sites
- Dept. Defense Sites
- Indian Reservations BIA
- Power transmission lines
- Special Flood Hazard Area (1%)
- 0.2% Annual Chance Flood Hazard
- Areas of Concern

This report includes Interactive Map Layers to display and/or hide map information. The legend includes only those icons for the default map view.

SITE NAME: DWP Menifee, CA	CLIENT: McAlister GeoScience
ADDRESS: 26805 Menifee Road Sun City CA 92585	CONTACT: Alexis C Ceballos INQUIRY #: 6456246.2s
LAT/LONG: 33.729652 / 117.155142	DATE: April 19, 2021 2:22 pm

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MAP FINDINGS SUMMARY

Database	Search Distance (Miles)	Target Property	< 1/8	1/8 - 1/4	1/4 - 1/2	1/2 - 1	> 1	Total Plotted
STANDARD ENVIRONMENTAL RECORDS								
Federal NPL site list								
NPL	1.000		0	0	0	0	NR	0
Proposed NPL	1.000		0	0	0	0	NR	0
NPL LIENS	1.000		0	0	0	0	NR	0
Federal Delisted NPL site list								
Delisted NPL	1.000		0	0	0	0	NR	0
Federal CERCLIS list								
FEDERAL FACILITY	0.500		0	0	0	NR	NR	0
SEMS	0.500		0	0	0	NR	NR	0
Federal CERCLIS NFRAP site list								
SEMS-ARCHIVE	0.500		0	0	0	NR	NR	0
Federal RCRA CORRACTS facilities list								
CORRACTS	1.000		0	0	0	0	NR	0
Federal RCRA non-CORRACTS TSD facilities list								
RCRA-TSDF	0.500		0	0	0	NR	NR	0
Federal RCRA generators list								
RCRA-LQG	0.250		0	0	NR	NR	NR	0
RCRA-SQG	0.250		0	0	NR	NR	NR	0
RCRA-VSQG	0.250		0	0	NR	NR	NR	0
Federal institutional controls / engineering controls registries								
LUCIS	0.500		0	0	0	NR	NR	0
US ENG CONTROLS	0.500		0	0	0	NR	NR	0
US INST CONTROLS	0.500		0	0	0	NR	NR	0
Federal ERNS list								
ERNS	0.001		0	NR	NR	NR	NR	0
State- and tribal - equivalent NPL								
RESPONSE	1.000		0	0	0	0	NR	0
State- and tribal - equivalent CERCLIS								
ENVIROSTOR	1.000		0	0	0	2	NR	2
State and tribal landfill and/or solid waste disposal site lists								
SWF/LF	0.500		0	0	2	NR	NR	2
State and tribal leaking storage tank lists								
LUST	0.500		0	0	0	NR	NR	0

MAP FINDINGS SUMMARY

Database	Search Distance (Miles)	Target Property	< 1/8	1/8 - 1/4	1/4 - 1/2	1/2 - 1	> 1	Total Plotted
INDIAN LUST	0.500		0	0	0	NR	NR	0
CPS-SLIC	0.500		0	0	0	NR	NR	0
State and tribal registered storage tank lists								
FEMA UST	0.250		0	0	NR	NR	NR	0
UST	0.250		0	0	NR	NR	NR	0
AST	0.250		0	0	NR	NR	NR	0
INDIAN UST	0.250		0	0	NR	NR	NR	0
State and tribal voluntary cleanup sites								
VCP	0.500		0	0	0	NR	NR	0
INDIAN VCP	0.500		0	0	0	NR	NR	0
State and tribal Brownfields sites								
BROWNFIELDS	0.500		0	0	0	NR	NR	0
ADDITIONAL ENVIRONMENTAL RECORDS								
Local Brownfield lists								
US BROWNFIELDS	0.500		0	0	0	NR	NR	0
Local Lists of Landfill / Solid Waste Disposal Sites								
WMUDS/SWAT	0.500		0	0	0	NR	NR	0
SWRCY	0.500		0	0	0	NR	NR	0
HAULERS	0.001		0	NR	NR	NR	NR	0
INDIAN ODI	0.500		0	0	0	NR	NR	0
DEBRIS REGION 9	0.500		0	0	0	NR	NR	0
ODI	0.500		0	0	0	NR	NR	0
IHS OPEN DUMPS	0.500		0	0	0	NR	NR	0
Local Lists of Hazardous waste / Contaminated Sites								
US HIST CDL	0.001		0	NR	NR	NR	NR	0
HIST Cal-Sites	1.000		0	0	0	0	NR	0
SCH	0.250		0	0	NR	NR	NR	0
CDL	0.001		0	NR	NR	NR	NR	0
Toxic Pits	1.000		0	0	0	0	NR	0
CERS HAZ WASTE	0.250		0	0	NR	NR	NR	0
US CDL	0.001		0	NR	NR	NR	NR	0
PFAS	0.500		0	0	0	NR	NR	0
Local Lists of Registered Storage Tanks								
SWEEPS UST	0.250		0	0	NR	NR	NR	0
HIST UST	0.250		0	1	NR	NR	NR	1
CA FID UST	0.250		0	0	NR	NR	NR	0
CERS TANKS	0.250		0	0	NR	NR	NR	0
Local Land Records								
LIENS	0.001		0	NR	NR	NR	NR	0

MAP FINDINGS SUMMARY

Database	Search Distance (Miles)	Target Property	< 1/8	1/8 - 1/4	1/4 - 1/2	1/2 - 1	> 1	Total Plotted
LIENS 2	0.001		0	NR	NR	NR	NR	0
DEED	0.500		0	0	0	NR	NR	0
Records of Emergency Release Reports								
HMIRS	0.001		0	NR	NR	NR	NR	0
CHMIRS	0.001		0	NR	NR	NR	NR	0
LDS	0.001		0	NR	NR	NR	NR	0
MCS	0.001		0	NR	NR	NR	NR	0
SPILLS 90	0.001		0	NR	NR	NR	NR	0
Other Ascertainable Records								
RCRA NonGen / NLR	0.250		0	0	NR	NR	NR	0
FUDS	1.000		0	0	0	0	NR	0
DOD	1.000		0	0	0	0	NR	0
SCRD DRYCLEANERS	0.500		0	0	0	NR	NR	0
US FIN ASSUR	0.001		0	NR	NR	NR	NR	0
EPA WATCH LIST	0.001		0	NR	NR	NR	NR	0
2020 COR ACTION	0.250		0	0	NR	NR	NR	0
TSCA	0.001		0	NR	NR	NR	NR	0
TRIS	0.001		0	NR	NR	NR	NR	0
SSTS	0.001		0	NR	NR	NR	NR	0
ROD	1.000		0	0	0	0	NR	0
RMP	0.001		0	NR	NR	NR	NR	0
RAATS	0.001		0	NR	NR	NR	NR	0
PRP	0.001		0	NR	NR	NR	NR	0
PADS	0.001		0	NR	NR	NR	NR	0
ICIS	0.001		0	NR	NR	NR	NR	0
FTTS	0.001		0	NR	NR	NR	NR	0
MLTS	0.001		0	NR	NR	NR	NR	0
COAL ASH DOE	0.001		0	NR	NR	NR	NR	0
COAL ASH EPA	0.500		0	0	0	NR	NR	0
PCB TRANSFORMER	0.001		0	NR	NR	NR	NR	0
RADINFO	0.001		0	NR	NR	NR	NR	0
HIST FTTS	0.001		0	NR	NR	NR	NR	0
DOT OPS	0.001		0	NR	NR	NR	NR	0
CONSENT	1.000		0	0	0	0	NR	0
INDIAN RESERV	1.000		0	0	0	0	NR	0
FUSRAP	1.000		0	0	0	0	NR	0
UMTRA	0.500		0	0	0	NR	NR	0
LEAD SMELTERS	0.001		0	NR	NR	NR	NR	0
US AIRS	0.001		0	NR	NR	NR	NR	0
US MINES	0.250		0	0	NR	NR	NR	0
ABANDONED MINES	0.250		0	0	NR	NR	NR	0
FINDS	0.001		0	NR	NR	NR	NR	0
ECHO	0.001		0	NR	NR	NR	NR	0
DOCKET HWC	0.001		0	NR	NR	NR	NR	0
UXO	1.000		0	0	0	0	NR	0
FUELS PROGRAM	0.250		0	0	NR	NR	NR	0
CA BOND EXP. PLAN	1.000		0	0	0	0	NR	0
Cortese	0.500		0	0	0	NR	NR	0
CUPA Listings	0.250		0	0	NR	NR	NR	0

MAP FINDINGS SUMMARY

Database	Search Distance (Miles)	Target Property	< 1/8	1/8 - 1/4	1/4 - 1/2	1/2 - 1	> 1	Total Plotted
DRYCLEANERS	0.250		0	0	NR	NR	NR	0
EMI	0.001		0	NR	NR	NR	NR	0
ENF	0.001		0	NR	NR	NR	NR	0
Financial Assurance	0.001		0	NR	NR	NR	NR	0
HAZNET	0.001		0	NR	NR	NR	NR	0
ICE	0.001		0	NR	NR	NR	NR	0
HIST CORTESE	0.500		0	0	0	NR	NR	0
HWP	1.000		0	0	0	0	NR	0
HWT	0.250		0	0	NR	NR	NR	0
MINES	0.250		0	0	NR	NR	NR	0
MWMP	0.250		0	0	NR	NR	NR	0
NPDES	0.001		0	NR	NR	NR	NR	0
PEST LIC	0.001		0	NR	NR	NR	NR	0
PROC	0.500		0	0	0	NR	NR	0
Notify 65	1.000		0	0	0	0	NR	0
UIC	0.001		0	NR	NR	NR	NR	0
UIC GEO	0.001		0	NR	NR	NR	NR	0
WASTEWATER PITS	0.500		0	0	0	NR	NR	0
WDS	0.001		0	NR	NR	NR	NR	0
WIP	0.250		0	0	NR	NR	NR	0
MILITARY PRIV SITES	0.001		0	NR	NR	NR	NR	0
PROJECT	0.001		0	NR	NR	NR	NR	0
WDR	0.001		0	NR	NR	NR	NR	0
CIWQS	0.001		0	NR	NR	NR	NR	0
CERS	0.001		0	NR	NR	NR	NR	0
NON-CASE INFO	0.001		0	NR	NR	NR	NR	0
OTHER OIL GAS	0.001		0	NR	NR	NR	NR	0
PROD WATER PONDS	0.001		0	NR	NR	NR	NR	0
SAMPLING POINT	0.001		0	NR	NR	NR	NR	0
WELL STIM PROJ	0.001		0	NR	NR	NR	NR	0
MINES MRDS	0.001		0	NR	NR	NR	NR	0
HWTS	TP		NR	NR	NR	NR	NR	0
EDR HIGH RISK HISTORICAL RECORDS								
EDR Exclusive Records								
EDR MGP	1.000		0	0	0	0	NR	0
EDR Hist Auto	0.125		0	NR	NR	NR	NR	0
EDR Hist Cleaner	0.125		0	NR	NR	NR	NR	0
EDR RECOVERED GOVERNMENT ARCHIVES								
Exclusive Recovered Govt. Archives								
RGA LF	0.001		0	NR	NR	NR	NR	0
RGA LUST	0.001		0	NR	NR	NR	NR	0
- Totals --		0	0	1	2	2	0	5

MAP FINDINGS SUMMARY

Database	Search Distance (Miles)	Target Property	< 1/8	1/8 - 1/4	1/4 - 1/2	1/2 - 1	> 1	Total Plotted

NOTES:

TP = Target Property

NR = Not Requested at this Search Distance

Sites may be listed in more than one database

1
WSW
1/8-1/4
0.210 mi.
1108 ft.

FLYING U FAMS INC
28495 ROUSE RD
SUN CITY, CA 92381

HIST UST **U001575611**
N/A

Relative:
Lower

Actual:
1455 ft.

HIST UST:

Name:	FLYING U FAMS INC
Address:	28495 ROUSE RD
City,State,Zip:	SUN CITY, CA 92381
File Number:	0001F699
URL:	http://geotracker.waterboards.ca.gov/ustpdfs/pdf/0001F699.pdf
Region:	STATE
Facility ID:	00000015308
Facility Type:	Other
Other Type:	FARMING
Contact Name:	Not reported
Telephone:	7146796333
Owner Name:	FORD P. UNDERWOOD & SONS
Owner Address:	28495 ROUSE RD
Owner City,St,Zip:	SUN CITY, CA 92381
Total Tanks:	0002
Tank Num:	001
Container Num:	1
Year Installed:	1982
Tank Capacity:	00006500
Tank Used for:	PRODUCT
Type of Fuel:	DIESEL
Container Construction Thickness:	Not reported
Leak Detection:	Visual
Tank Num:	002
Container Num:	2
Year Installed:	1982
Tank Capacity:	00005000
Tank Used for:	PRODUCT
Type of Fuel:	UNLEADED
Container Construction Thickness:	Not reported
Leak Detection:	Visual

Click here for Geo Tracker PDF:

2
NNW
1/4-1/2
0.487 mi.
2570 ft.

BP JOHN RECYCLING
28700 MATTHEWS RD
MENIFEE, CA 92585

SWF/LF **S109287145**
CERS HAZ WASTE **N/A**
LDS
NPDES
CERS

Relative:
Lower

Actual:
1458 ft.

LOS ANGELES CO. LF:

Name:	B.P. JOHN RECYCLING, INC.
Address:	28700 MATTHEWS RD
City,State,Zip:	ROMOLAND, CA 92585
Site ID:	2744
Alt. Site Name:	N/A
Alt. Address:	N/A
Site Contact:	Not reported
Site Contact Phone:	(951) 696-1144
Site Email:	Not reported
Site Website:	N/A

BP JOHN RECYCLING (Continued) **S109287145**

Site Type:	Out-of-County Facility
Site SWIS Number:	33-AA-0301
Beginning Operation Date:	N/A
Ending Operation Date:	N/A
Local Enforcement Agency:	County of Riverside Community Health Agency
Maximun Depth Fill(Ft):	Not reported
Permitted Capacity:	1000
Present Use:	Chipping and Grinding Activity Fac./ Op.
Remaining Capacity(Million):	N/A
Status:	Active
Waste Accepted:	Green Materials;
Hours of Operation:	Monday - Friday 7 am - 4:30 pm; Saturday 7 am - 1 pm
Disposal Area (Acre):	Not reported

Detail As Of 01/2014:

Operator Name:	Unknown
Operator Address:	Not reported
Operator City/State/Zip:	Not reported
Operator Contact:	Not reported
Operator Telephone:	Not reported
Operator Email:	Not reported
Owner Name:	Unknown
Owner Address:	Not reported
Owner City/State/Zip:	Not reported
Owner Contact:	Not reported
Owner Telephone:	Not reported
Owner Email:	Not reported
District:	Not reported
Site Mailing Address:	N/A

CERS HAZ WASTE:

Name:	B P JOHN HAULING
Address:	28700 MATTHEWS RD
City,State,Zip:	MENIFEE, CA 92585
Site ID:	10467
CERS ID:	10319869
CERS Description:	Hazardous Waste Generator

LDS:

Name:	GREENWASTE, BP JOHN RECYCLING-ROMOLAND
Address:	28700 MATTHEWS
City,State,Zip:	ROMOLAND, CA
Global Id:	L10008871055
Latitude:	33.7385
Longitude:	-117.1612
Case Type:	Land Disposal Site
Status:	Completed - Case Closed
Status Date:	01/01/1965
Lead Agency:	SANTA ANA RWQCB (REGION 8)
Caseworker:	JPL
Local Agency:	Not reported
RB Case Number:	8 332717001
LOC Case Number:	Not reported
File Location:	Regional Board
Potential Media Affect:	Not reported
EDR Link ID:	L10008871055

BP JOHN RECYCLING (Continued) **S109287145**

Potential Contaminants of Concern: Not reported
Site History: The facility is still in operation. However, the site is no longer regulated by the Regional Board, pending the adoption of a general conditional waiver for composting operations. Please visit the CalRecycle website at (http://www.calrecycle.ca.gov/SWFacilities/Directory/Search.aspx) for updated facility information.

Click here to access the California GeoTracker records for this facility:

NPDES:

Name:	BP JOHN RECYCLING
Address:	28700 MATTHEWS RD
City,State,Zip:	MENIFEE, CA 92585
Facility Status:	Not reported
NPDES Number:	Not reported
Region:	Not reported
Agency Number:	Not reported
Regulatory Measure ID:	Not reported
Place ID:	Not reported
Order Number:	Not reported
WDID:	8 33NNA000491
Regulatory Measure Type:	Industrial
Program Type:	Not reported
Adoption Date Of Regulatory Measure:	Not reported
Effective Date Of Regulatory Measure:	Not reported
Termination Date Of Regulatory Measure:	Not reported
Expiration Date Of Regulatory Measure:	Not reported
Discharge Address:	Not reported
Discharge Name:	Not reported
Discharge City:	Not reported
Discharge State:	Not reported
Discharge Zip:	Not reported
Status:	Undetermined
Status Date:	05/11/2020
Operator Name:	BP John Recycling
Operator Address:	28700 Matthews Rd
Operator City:	Menifee
Operator State:	California
Operator Zip:	92585

CERS:

Name:	GREENWASTE, BP JOHN RECYCLING-ROMOLAND
Address:	28700 MATTHEWS
City,State,Zip:	ROMOLAND, CA
Site ID:	226153
CERS ID:	L10008871055
CERS Description:	Land Disposal Site

Affiliation:

Affiliation Type Desc:	Regional Board Caseworker
Entity Name:	JOANNE LEE - SANTA ANA RWQCB (REGION 8)
Entity Title:	Not reported
Affiliation Address:	3737 MAIN STREET, SUITE 500
Affiliation City:	RIVERSIDE
Affiliation State:	CA

BP JOHN RECYCLING (Continued) **S109287145**

Affiliation Country: Not reported
Affiliation Zip: Not reported
Affiliation Phone: Not reported

Name: B P JOHN HAULING
Address: 28700 MATTHEWS RD
City,State,Zip: MENIFEE, CA 92585
Site ID: 10467
CERS ID: 10319869
CERS Description: Chemical Storage Facilities

Violations:

Site ID: 10467
Site Name: B P John Hauling
Violation Date: 07-01-2015
Citation: 19 CCR 6.95 25508(a)(1) - California Code of Regulations, Title 19, Chapter 6.95, Section(s) 25508(a)(1)
Violation Description: Failure to complete and electronically submit the Business Activities Page and/or Business Owner Operator Identification Page.
Violation Notes: Returned to compliance on 03/11/2016.
Violation Division: Riverside County Department of Env Health
Violation Program: HMRRP
Violation Source: CERS

Site ID: 10467
Site Name: B P John Hauling
Violation Date: 07-01-2015
Citation: HSC 6.95 Multiple - California Health and Safety Code, Chapter 6.95, Section(s) Multiple
Violation Description: Business Plan Program - Administration/Documentation - General
Violation Notes: Returned to compliance on 03/11/2016. [LOCAL ORDINANCE VIOLATION 101C] Approved HMBP accessible on site and available for review.
Violation Division: Riverside County Department of Env Health
Violation Program: HMRRP
Violation Source: CERS

Site ID: 10467
Site Name: B P John Hauling
Violation Date: 07-01-2015
Citation: 40 CFR 1 265.33 - U.S. Code of Federal Regulations, Title 40, Chapter 1, Section(s) 265.33
Violation Description: Failure of the facility to test and maintain all communications or alarm systems, fire protection equipment, spill control equipment, and decontamination equipment.
Violation Notes: Returned to compliance on 03/11/2016.
Violation Division: Riverside County Department of Env Health
Violation Program: HW
Violation Source: CERS

Site ID: 10467
Site Name: B P John Hauling
Violation Date: 07-01-2015
Citation: HSC 6.95 25508(d) - California Health and Safety Code, Chapter 6.95, Section(s) 25508(d)
Violation Description: Failure to complete and/or electronically submit a business plan when storing/handling a hazardous material at or above reportable quantities.

BP JOHN RECYCLING (Continued) **S109287145**

Violation Notes:	Returned to compliance on 03/11/2016.
Violation Division:	Riverside County Department of Env Health
Violation Program:	HMRRP
Violation Source:	CERS
Site ID:	10467
Site Name:	B P John Hauling
Violation Date:	07-01-2015
Citation:	HSC 6.95 Multiple - California Health and Safety Code, Chapter 6.95, Section(s) Multiple
Violation Description:	Business Plan Program - Operations/Maintenance - General
Violation Notes:	Returned to compliance on 03/11/2016. [LOCAL ORDINANCE VIOLATION 104D] Emergency equipment has been posted appropriately.
Violation Division:	Riverside County Department of Env Health
Violation Program:	HMRRP
Violation Source:	CERS
Site ID:	10467
Site Name:	B P John Hauling
Violation Date:	07-01-2015
Citation:	HSC 6.95 25508(a)(1) - California Health and Safety Code, Chapter 6.95, Section(s) 25508(a)(1)
Violation Description:	Failure to complete and electronically submit a site map with all required content.
Violation Notes:	Returned to compliance on 03/11/2016.
Violation Division:	Riverside County Department of Env Health
Violation Program:	HMRRP
Violation Source:	CERS
Site ID:	10467
Site Name:	B P John Hauling
Violation Date:	07-01-2015
Citation:	40 CFR 1 265.32 - U.S. Code of Federal Regulations, Title 40, Chapter 1, Section(s) 265.32
Violation Description:	Failure of the facility to maintain the following emergency equipment or equivalents: 1) An internal communications or alarm system capable of providing immediate emergency instruction (voice or signal) to facility personnel; 2) A device, such as a telephone (immediately available at the scene of Operations/ Maintenance) or a hand-held two-way radio, capable of summoning emergency assistance from local police departments, fire departments, or State or local emergency response teams; 3) Portable fire extinguishers, fire control equipment (including special extinguishing equipment, such as that using foam, inert gas, or dry chemicals), spill control equipment, and decontamination equipment; and 4) Water at adequate volume and pressure to supply water hose streams, or foam producing equipment, or automatic sprinklers, or water spray systems.
Violation Notes:	Returned to compliance on 03/11/2016.
Violation Division:	Riverside County Department of Env Health
Violation Program:	HW
Violation Source:	CERS

Evaluation:

Eval General Type:	Other/Unknown
Eval Date:	03-11-2016
Violations Found:	No
Eval Type:	Other, not routine, done by local agency

BP JOHN RECYCLING (Continued) **S109287145**

Eval Notes:	RTC- violations corrected
Eval Division:	Riverside County Department of Env Health
Eval Program:	HW
Eval Source:	CERS
Eval General Type:	Compliance Evaluation Inspection
Eval Date:	07-01-2015
Violations Found:	Yes
Eval Type:	Routine done by local agency
Eval Notes:	Not reported
Eval Division:	Riverside County Department of Env Health
Eval Program:	HMRRP
Eval Source:	CERS
Eval General Type:	Compliance Evaluation Inspection
Eval Date:	07-01-2015
Violations Found:	Yes
Eval Type:	Routine done by local agency
Eval Notes:	Not reported
Eval Division:	Riverside County Department of Env Health
Eval Program:	HW
Eval Source:	CERS
Eval General Type:	Other/Unknown
Eval Date:	03-11-2016
Violations Found:	No
Eval Type:	Other, not routine, done by local agency
Eval Notes:	RTC- violations corrected
Eval Division:	Riverside County Department of Env Health
Eval Program:	HMRRP
Eval Source:	CERS
Eval General Type:	Compliance Evaluation Inspection
Eval Date:	09-10-2020
Violations Found:	No
Eval Type:	Routine done by local agency
Eval Notes:	Facility is a green recycling center that handles a large amount of organic materials such as tree and grass clippings. As a result, all areas of the facility are difficult to maintain clean. Manager on duty stated facility cleans hazardous materials and hazardous waste areas at least once a month.
Eval Division:	Riverside County Department of Env Health
Eval Program:	HMRRP
Eval Source:	CERS
Eval General Type:	Compliance Evaluation Inspection
Eval Date:	09-10-2020
Violations Found:	No
Eval Type:	Routine done by local agency
Eval Notes:	Facility is a green recycling center that handles a large amount of organic materials such as tree and grass clippings. As a result, all areas of the facility are difficult to maintain clean. Manager on duty stated facility cleans hazardous materials and hazardous waste areas at least once a month.
Eval Division:	Riverside County Department of Env Health
Eval Program:	HW
Eval Source:	CERS

BP JOHN RECYCLING (Continued) **S109287145**

Enforcement Action:

Site ID:	10467
Site Name:	B P John Hauling
Site Address:	28700 MATTHEWS RD
Site City:	MENIFEE
Site Zip:	92585
Enf Action Date:	07-01-2015
Enf Action Type:	Notice of Violation (Unified Program)
Enf Action Description:	Notice of Violation Issued by the Inspector at the Time of Inspection
Enf Action Notes:	Not reported
Enf Action Division:	Riverside County Department of Env Health
Enf Action Program:	HMRRP
Enf Action Source:	CERS

Site ID:	10467
Site Name:	B P John Hauling
Site Address:	28700 MATTHEWS RD
Site City:	MENIFEE
Site Zip:	92585
Enf Action Date:	07-01-2015
Enf Action Type:	Notice of Violation (Unified Program)
Enf Action Description:	Notice of Violation Issued by the Inspector at the Time of Inspection
Enf Action Notes:	Not reported
Enf Action Division:	Riverside County Department of Env Health
Enf Action Program:	HW
Enf Action Source:	CERS

Affiliation:

Affiliation Type Desc:	Operator
Entity Name:	B. P. JOHN HAULING
Entity Title:	Not reported
Affiliation Address:	Not reported
Affiliation City:	Not reported
Affiliation State:	Not reported
Affiliation Country:	Not reported
Affiliation Zip:	Not reported
Affiliation Phone:	(951) 696-1144

Affiliation Type Desc:	Facility Mailing Address
Entity Name:	Mailing Address
Entity Title:	Not reported
Affiliation Address:	38875 Avenida La Cresta
Affiliation City:	Murrieta
Affiliation State:	CA
Affiliation Country:	Not reported
Affiliation Zip:	92562-9155
Affiliation Phone:	Not reported

Affiliation Type Desc:	Identification Signer
Entity Name:	Oscar Ohnesorgen
Entity Title:	Office Manager
Affiliation Address:	Not reported
Affiliation City:	Not reported
Affiliation State:	Not reported
Affiliation Country:	Not reported
Affiliation Zip:	Not reported

BP JOHN RECYCLING (Continued) **S109287145**

Affiliation Phone:	Not reported
Affiliation Type Desc:	CUPA District
Entity Name:	Riverside Cnty Env Health
Entity Title:	Not reported
Affiliation Address:	4065 County Circle Drive, Room 104
Affiliation City:	Riverside
Affiliation State:	CA
Affiliation Country:	Not reported
Affiliation Zip:	92503
Affiliation Phone:	(951) 358-5055
Affiliation Type Desc:	Document Preparer
Entity Name:	OSCAR OHNESOGEN
Entity Title:	Not reported
Affiliation Address:	Not reported
Affiliation City:	Not reported
Affiliation State:	Not reported
Affiliation Country:	Not reported
Affiliation Zip:	Not reported
Affiliation Phone:	Not reported
Affiliation Type Desc:	Environmental Contact
Entity Name:	Edward F. Metzler
Entity Title:	Not reported
Affiliation Address:	38875 Avenida La Cresta
Affiliation City:	Murrieta
Affiliation State:	CA
Affiliation Country:	Not reported
Affiliation Zip:	92562
Affiliation Phone:	Not reported
Affiliation Type Desc:	Legal Owner
Entity Name:	BP John Hauling
Entity Title:	Not reported
Affiliation Address:	38875 Avenida La Cresta
Affiliation City:	Murrieta
Affiliation State:	CA
Affiliation Country:	United States
Affiliation Zip:	92562-9155
Affiliation Phone:	(951) 696-1143
Affiliation Type Desc:	Parent Corporation
Entity Name:	B P John Hauling
Entity Title:	Not reported
Affiliation Address:	Not reported
Affiliation City:	Not reported
Affiliation State:	Not reported
Affiliation Country:	Not reported
Affiliation Zip:	Not reported
Affiliation Phone:	Not reported
Affiliation Type Desc:	Property Owner
Entity Name:	Edward Metzler
Entity Title:	Not reported
Affiliation Address:	38875 Avenida La Cresta
Affiliation City:	Murrieta

BP JOHN RECYCLING (Continued) **S109287145**

Affiliation State:	CA
Affiliation Country:	United States
Affiliation Zip:	92562
Affiliation Phone:	(951) 696-1143

---

3 **B.P. JOHN RECYCLING INC.** **SWF/LF** **S126327278**
NNW **28700 MATHEWS ROAD** **CERS** **N/A**
1/4-1/2 **MENIFEE, CA 92585**
0.498 mi.
2628 ft.

Relative:
Lower

Actual:
1460 ft.

SWF/LF (SWIS):

Name:	B.P. JOHN RECYCLING INC.
Address:	28700 MATHEWS ROAD
City,State,Zip:	MENIFEE, CA 92585
Region:	STATE
Facility ID:	33-AA-0301
SWIS Number:	33-AA-0301
Point of Contact:	Theodore Tasiopoulos
Is Archived:	No
Is Closed Illegal Abandoned:	No
Is Site Inert Debris Engineered Fill:	No
Is Financial Assurances Responsible:	No
Absorbed On:	Not reported
Operational Status:	Active
Absorbed By:	Not reported
Closed Illegal Abandoned Category:	Not reported
EPA Federal Registry ID:	Not reported
ARB District:	South Coast
SWRCB Region:	Santa Ana
Local Government:	Menifee
Reporting Agency Legal Name:	County of Riverside
Reporting Agency Department:	Department of Environmental Health
Enforcing Agency Legal Name:	County of Riverside
Enforcing Agency Department:	Department of Environmental Health
Regulation Status:	Notification

Activity:

SWIS Number:	33-AA-0301
Site Name:	B.P. John Recycling Inc.
Activity:	Chipping and Grinding Facility/Operation
Activity Is Archived:	No
Category:	Composting
Activity Classification:	Solid Waste Facility
WDR Number:	Not reported
WDR Landfill Class:	Not reported
Cease Operation:	Not reported
Cease Operation Type:	Not reported
Inspection Frequency:	Quarterly
Throughput:	1000
Throughput Units:	Tons per day
Remaining Capacity:	Not reported
Remaining Capacity Date:	Not reported
Capacity:	312000
Capacity Units:	Tons per year
Total Acreage:	6.2
Disposal Acreage:	Not reported

B.P. JOHN RECYCLING INC. (Continued) **S126327278**

Permitted Elevation:	Not reported
Permitted Elevation Type:	Not reported
Permitted Depth:	Not reported
Permitted Depth Type:	Not reported
Point of Contact:	Theodore Tasiopoulos
Site Operational Status:	Active
Site Regulatory Status:	Notification
Site Is Archived:	No
Is Closed Illegal Abandoned:	No
Is Site Inert Debris Engineered Fill:	No
Is Financial Assurances Responsible:	No
Absorbed On:	Not reported
Absorbed By:	Not reported
Closed Illegal Abandoned Category:	Not reported
EPA Federal Registry ID:	Not reported
County:	Riverside
ARB District:	South Coast
SWRCB Region:	Santa Ana
Local Government:	Menifee
Street Address:	28700 Mathews Road
City:	Menifee
State:	CA
ZIP Code:	92585
Reporting Agency Legal Name:	County of Riverside
Reporting Agency Department:	Department of Environmental Health
Enforcing Agency Legal Name:	County of Riverside
Enforcing Agency Department:	Department of Environmental Health

Operator:

SWIS Number:	33-AA-0301
Site Name:	B.P. John Recycling Inc.
Site Operational Status:	Active
Site Type:	Non-Disposal Only
Site Regulatory Status:	Notification
Latitude:	33.73732
Longitude:	-117.15928
Is Archived:	No
Operator:	B.P. John Recycling, Inc.
Started On:	9/1/2004
Contact Name:	Not reported
Contact Title:	Not reported
Contact Email:	Not reported
Contact Phone:	(909) 696-1144
Street Address:	Edward Metzler/B.P. John Hauling 38875 Avenida La Cresta
Operator City:	Murrieta
Operator State:	CA
Operator Zip:	92562-9155

Owner:

SWIS Number:	33-AA-0301
Owner:	Metzler Investements, Calif. Lmt. Part.
Owner Address:	38875 Avenida La Cresta
Owner City:	Murrieta
Owner State:	CA
Owner Zip:	92562-9155
Site Name:	B.P. John Recycling Inc.

B.P. JOHN RECYCLING INC. (Continued) **S126327278**

Site Operational Status:	Active
Site Type:	Non-Disposal Only
Site Regulatory Status:	Notification
Latitude:	33.73732
Longitude:	-117.15928
Is Archived:	No
Started On:	9/1/2004
Contact Name:	Not reported
Contact Title:	Not reported
Contact Email:	Not reported
Contact Phone:	(909) 696-1144

Waste:

SWIS Number:	33-AA-0301
Site Name:	B.P. John Recycling Inc.
Activity:	Chipping and Grinding Facility/Operation
Waste Type:	Green Materials
Site Is Archived:	No
Site Operational Status:	Active
Site Regulatory Status:	Notification
Site Type:	Non-Disposal Only
Point of Contact:	Theodore Tasiopoulos
Activity Is Archived:	No
Activity Operational Status:	Active
Activity Regulatory Status:	Notification
Activity Category:	Composting
Activity Classification:	Solid Waste Facility

SWIS Number:	33-AA-0301
Site Name:	B.P. John Recycling Inc.
Activity:	Chipping and Grinding Facility/Operation
Waste Type:	Wood waste
Site Is Archived:	No
Site Operational Status:	Active
Site Regulatory Status:	Notification
Site Type:	Non-Disposal Only
Point of Contact:	Theodore Tasiopoulos
Activity Is Archived:	No
Activity Operational Status:	Active
Activity Regulatory Status:	Notification
Activity Category:	Composting
Activity Classification:	Solid Waste Facility

CERS:

Name:	B.P. JOHN RECYCLING INC.
Address:	28700 MATHEWS ROAD
City,State,Zip:	MENIFEE, CA
Site ID:	506899
CERS ID:	33-AA-0301
CERS Description:	Solid Waste and Recycle Sites

Affiliation:

Affiliation Type Desc:	Legal Operator
Entity Name:	B.P. John Recycling, Inc.
Entity Title:	Not reported
Affiliation Address:	Edward Metzler / B.P. John Hauling38875 Avenida La Cresta

B.P. JOHN RECYCLING INC. (Continued) **S126327278**

Affiliation City:	Murrieta
Affiliation State:	CA
Affiliation Country:	Not reported
Affiliation Zip:	92562-9155
Affiliation Phone:	9096961144
Affiliation Type Desc:	Legal Owner
Entity Name:	Metzler Investements, Calif. Lmt. Part.
Entity Title:	Not reported
Affiliation Address:	Edward F. Metzler38875 Avenida La Cresta
Affiliation City:	Murrieta
Affiliation State:	CA
Affiliation Country:	Not reported
Affiliation Zip:	92562-9155
Affiliation Phone:	9096961144

---

4 **MENIFEE VALLEY RANCH SCHOOL NO. 1** **ENVIROSTOR** **S106044339**
South **MCCALL BOULEVARD/MENIFEE LOOP W** **SCH** **N/A**
1/2-1 **ROMOLAND, CA 92585**
0.504 mi.
2660 ft.

Relative:
Higher

Actual:
1468 ft.

ENVIROSTOR:

Name:	MENIFEE VALLEY RANCH SCHOOL NO. 1
Address:	MCCALL BOULEVARD/MENIFEE LOOP W
City,State,Zip:	ROMOLAND, CA 92585
Facility ID:	33010076
Status:	No Further Action
Status Date:	12/10/2004
Site Code:	404479
Site Type:	School Investigation
Site Type Detailed:	School
Acres:	15
NPL:	NO
Regulatory Agencies:	DTSC
Lead Agency:	DTSC
Program Manager:	Amit Pathak
Supervisor:	Shahir Haddad
Division Branch:	Southern California Schools & Brownfields Outreach
Assembly:	67
Senate:	23
Special Program:	Not reported
Restricted Use:	NO
Site Mgmt Req:	NONE SPECIFIED
Funding:	School District
Latitude:	33.7214
Longitude:	-117.1540
APN:	NONE SPECIFIED
Past Use:	AGRICULTURAL - ROW CROPS
Potential COC:	Arsenic DDD DDE DDT
Confirmed COC:	NONE SPECIFIED
Potential Description:	SOIL
Alias Name:	MENIFEE VALLEY RANCH SCHOOL NO. 1
Alias Type:	Alternate Name
Alias Name:	ROMOLAND ELEMENTARY SCHOOL DISTRICT
Alias Type:	Alternate Name
Alias Name:	ROMOLAND SD-PRPSD MNIFEE VLY RNCH SCL #1

MENIFEE VALLEY RANCH SCHOOL NO. 1 (Continued) **S106044339**

Alias Type: Alternate Name
Alias Name: 404479
Alias Type: Project Code (Site Code)
Alias Name: 33010076
Alias Type: Envirostor ID Number

Completed Info:
Completed Area Name: PROJECT WIDE
Completed Sub Area Name: Not reported
Completed Document Type: Preliminary Endangerment Assessment Report
Completed Date: 09/24/2004
Comments: Not reported

Completed Area Name: PROJECT WIDE
Completed Sub Area Name: Not reported
Completed Document Type: Preliminary Endangerment Assessment Workplan
Completed Date: 04/21/2004
Comments: Not reported

Completed Area Name: PROJECT WIDE
Completed Sub Area Name: Not reported
Completed Document Type: Cost Recovery Closeout Memo
Completed Date: 12/10/2004
Comments: Not reported

Completed Area Name: PROJECT WIDE
Completed Sub Area Name: Not reported
Completed Document Type: Environmental Oversight Agreement
Completed Date: 09/18/2003
Comments: Not reported

Future Area Name: Not reported
Future Sub Area Name: Not reported
Future Document Type: Not reported
Future Due Date: Not reported
Schedule Area Name: Not reported
Schedule Sub Area Name: Not reported
Schedule Document Type: Not reported
Schedule Due Date: Not reported
Schedule Revised Date: Not reported

SCH:

Name: MENIFEE VALLEY RANCH SCHOOL NO. 1
Address: MCCALL BOULEVARD/MENIFEE LOOP W
City,State,Zip: ROMOLAND, CA 92585
Facility ID: 33010076
Site Type: School Investigation
Site Type Detail: School
Site Mgmt. Req.: NONE SPECIFIED
Acres: 15
National Priorities List: NO
Cleanup Oversight Agencies: DTSC
Lead Agency: DTSC
Lead Agency Description: * DTSC
Project Manager: Amit Pathak
Supervisor: Shahir Haddad

MENIFEE VALLEY RANCH SCHOOL NO. 1 (Continued) **S106044339**

Division Branch:	Southern California Schools & Brownfields Outreach
Site Code:	404479
Assembly:	67
Senate:	23
Special Program Status:	Not reported
Status:	No Further Action
Status Date:	12/10/2004
Restricted Use:	NO
Funding:	School District
Latitude:	33.7214
Longitude:	-117.1540
APN:	NONE SPECIFIED
Past Use:	AGRICULTURAL - ROW CROPS
Potential COC:	Arsenic, DDD, DDE, DDT
Confirmed COC:	NONE SPECIFIED
Potential Description:	SOIL
Alias Name:	MENIFEE VALLEY RANCH SCHOOL NO. 1
Alias Type:	Alternate Name
Alias Name:	ROMOLAND ELEMENTARY SCHOOL DISTRICT
Alias Type:	Alternate Name
Alias Name:	ROMOLAND SD-PRPSD MNIFEE VLY RNCH SCL #1
Alias Type:	Alternate Name
Alias Name:	404479
Alias Type:	Project Code (Site Code)
Alias Name:	33010076
Alias Type:	Envirostor ID Number

Completed Info:

Completed Area Name:	PROJECT WIDE
Completed Sub Area Name:	Not reported
Completed Document Type:	Preliminary Endangerment Assessment Report
Completed Date:	09/24/2004
Comments:	Not reported
Completed Area Name:	PROJECT WIDE
Completed Sub Area Name:	Not reported
Completed Document Type:	Preliminary Endangerment Assessment Workplan
Completed Date:	04/21/2004
Comments:	Not reported
Completed Area Name:	PROJECT WIDE
Completed Sub Area Name:	Not reported
Completed Document Type:	Cost Recovery Closeout Memo
Completed Date:	12/10/2004
Comments:	Not reported
Completed Area Name:	PROJECT WIDE
Completed Sub Area Name:	Not reported
Completed Document Type:	Environmental Oversight Agreement
Completed Date:	09/18/2003
Comments:	Not reported
Future Area Name:	Not reported
Future Sub Area Name:	Not reported
Future Document Type:	Not reported
Future Due Date:	Not reported
Schedule Area Name:	Not reported
Schedule Sub Area Name:	Not reported

MENIFEE VALLEY RANCH SCHOOL NO. 1 (Continued) **S106044339**

Schedule Document Type: Not reported
Schedule Due Date: Not reported
Schedule Revised Date: Not reported

5
SSW
1/2-1
0.539 mi.
2844 ft.

MCCALL MESA K-8 SCHOOL
MCCALL BOULEVARD/JUNIPERO ROAD
ROMOLAND, CA 92586

ENVIROSTOR SCH **S105628773 N/A**

Relative: Higher

Actual: 1497 ft.

ENVIROSTOR:

Name:	MCCALL MESA K-8 SCHOOL
Address:	MCCALL BOULEVARD/JUNIPERO ROAD
City,State,Zip:	ROMOLAND, CA 92586
Facility ID:	33010066
Status:	No Further Action
Status Date:	04/18/2003
Site Code:	404388
Site Type:	School Investigation
Site Type Detailed:	School
Acres:	30.04
NPL:	NO
Regulatory Agencies:	SMBRP
Lead Agency:	SMBRP
Program Manager:	Not reported
Supervisor:	Javier Hinojosa
Division Branch:	Southern California Schools & Brownfields Outreach
Assembly:	67
Senate:	23
Special Program:	Not reported
Restricted Use:	NO
Site Mgmt Req:	NONE SPECIFIED
Funding:	School District
Latitude:	33.71149
Longitude:	-117.1956
APN:	NONE SPECIFIED
Past Use:	AGRICULTURAL - ROW CROPS
Potential COC:	Lead Zinc
Confirmed COC:	30013-NO 30594-NO
Potential Description:	SOIL, SV
Alias Name:	MCCALL MESA K-8 SCHOOL
Alias Type:	Alternate Name
Alias Name:	ROMOLAND ELEMENTARY SCHOOL DISTRICT
Alias Type:	Alternate Name
Alias Name:	ROMOLAND SD-MCCALL-MESA K-8
Alias Type:	Alternate Name
Alias Name:	404388
Alias Type:	Project Code (Site Code)
Alias Name:	33010066
Alias Type:	Envirostor ID Number

Completed Info:

Completed Area Name:	PROJECT WIDE
Completed Sub Area Name:	Not reported
Completed Document Type:	Preliminary Endangerment Assessment Report
Completed Date:	04/17/2003
Comments:	Not reported

MCCALL MESA K-8 SCHOOL (Continued) **S105628773**

Completed Area Name:	PROJECT WIDE
Completed Sub Area Name:	Not reported
Completed Document Type:	Phase 1
Completed Date:	09/27/2002
Comments:	Not reported

Completed Area Name:	PROJECT WIDE
Completed Sub Area Name:	Not reported
Completed Document Type:	Technical Report
Completed Date:	12/24/2002
Comments:	Not reported

Completed Area Name:	PROJECT WIDE
Completed Sub Area Name:	Not reported
Completed Document Type:	Cost Recovery Closeout Memo
Completed Date:	04/18/2003
Comments:	Not reported

Completed Area Name:	PROJECT WIDE
Completed Sub Area Name:	Not reported
Completed Document Type:	Environmental Oversight Agreement
Completed Date:	10/28/2002
Comments:	Not reported

Future Area Name:	Not reported
Future Sub Area Name:	Not reported
Future Document Type:	Not reported
Future Due Date:	Not reported
Schedule Area Name:	Not reported
Schedule Sub Area Name:	Not reported
Schedule Document Type:	Not reported
Schedule Due Date:	Not reported
Schedule Revised Date:	Not reported

SCH:

Name:	MCCALL MESA K-8 SCHOOL
Address:	MCCALL BOULEVARD/JUNIPERO ROAD
City,State,Zip:	ROMOLAND, CA 92586
Facility ID:	33010066
Site Type:	School Investigation
Site Type Detail:	School
Site Mgmt. Req.:	NONE SPECIFIED
Acres:	30.04
National Priorities List:	NO
Cleanup Oversight Agencies:	SMBRP
Lead Agency:	SMBRP
Lead Agency Description:	DTSC - Site Cleanup Program
Project Manager:	Not reported
Supervisor:	Javier Hinojosa
Division Branch:	Southern California Schools & Brownfields Outreach
Site Code:	404388
Assembly:	67
Senate:	23
Special Program Status:	Not reported
Status:	No Further Action
Status Date:	04/18/2003

MCCALL MESA K-8 SCHOOL (Continued) **S105628773**

Restricted Use:	NO
Funding:	School District
Latitude:	33.71149
Longitude:	-117.1956
APN:	NONE SPECIFIED
Past Use:	AGRICULTURAL - ROW CROPS
Potential COC:	Lead, Zinc
Confirmed COC:	30013-NO, 30594-NO
Potential Description:	SOIL, SV
Alias Name:	MCCALL MESA K-8 SCHOOL
Alias Type:	Alternate Name
Alias Name:	ROMOLAND ELEMENTARY SCHOOL DISTRICT
Alias Type:	Alternate Name
Alias Name:	ROMOLAND SD-MCCALL-MESA K-8
Alias Type:	Alternate Name
Alias Name:	404388
Alias Type:	Project Code (Site Code)
Alias Name:	33010066
Alias Type:	Envirostor ID Number

Completed Info:

Completed Area Name:	PROJECT WIDE
Completed Sub Area Name:	Not reported
Completed Document Type:	Preliminary Endangerment Assessment Report
Completed Date:	04/17/2003
Comments:	Not reported
Completed Area Name:	PROJECT WIDE
Completed Sub Area Name:	Not reported
Completed Document Type:	Phase 1
Completed Date:	09/27/2002
Comments:	Not reported
Completed Area Name:	PROJECT WIDE
Completed Sub Area Name:	Not reported
Completed Document Type:	Technical Report
Completed Date:	12/24/2002
Comments:	Not reported
Completed Area Name:	PROJECT WIDE
Completed Sub Area Name:	Not reported
Completed Document Type:	Cost Recovery Closeout Memo
Completed Date:	04/18/2003
Comments:	Not reported
Completed Area Name:	PROJECT WIDE
Completed Sub Area Name:	Not reported
Completed Document Type:	Environmental Oversight Agreement
Completed Date:	10/28/2002
Comments:	Not reported
Future Area Name:	Not reported
Future Sub Area Name:	Not reported
Future Document Type:	Not reported
Future Due Date:	Not reported
Schedule Area Name:	Not reported
Schedule Sub Area Name:	Not reported
Schedule Document Type:	Not reported

MCCALL MESA K-8 SCHOOL (Continued) **S105628773**

Schedule Due Date: Not reported
Schedule Revised Date: Not reported

Count: 1 records. ORPHAN SUMMARY

City	EDR ID	Site Name	Site Address	Zip	Database(s)
NUEVO	S107539948		ON MENIFEE RD @ SAN JACINTO AV	92585	CDL

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

To maintain currency of the following federal and state databases, EDR contacts the appropriate governmental agency on a monthly or quarterly basis, as required.

Number of Days to Update: Provides confirmation that EDR is reporting records that have been updated within 90 days from the date the government agency made the information available to the public.

STANDARD ENVIRONMENTAL RECORDS

Federal NPL site list

NPL: National Priority List

National Priorities List (Superfund). The NPL is a subset of CERCLIS and identifies over 1,200 sites for priority cleanup under the Superfund Program. NPL sites may encompass relatively large areas. As such, EDR provides polygon coverage for over 1,000 NPL site boundaries produced by EPA's Environmental Photographic Interpretation Center (EPIC) and regional EPA offices.

Date of Government Version: 12/30/2020
Date Data Arrived at EDR: 01/14/2021
Date Made Active in Reports: 02/09/2021
Number of Days to Update: 26

Source: EPA
Telephone: N/A
Last EDR Contact: 04/01/2021
Next Scheduled EDR Contact: 07/12/2021
Data Release Frequency: Quarterly

NPL Site Boundaries

Sources:

EPA's Environmental Photographic Interpretation Center (EPIC)
Telephone: 202-564-7333

EPA Region 1
Telephone 617-918-1143

EPA Region 6
Telephone: 214-655-6659

EPA Region 3
Telephone 215-814-5418

EPA Region 7
Telephone: 913-551-7247

EPA Region 4
Telephone 404-562-8033

EPA Region 8
Telephone: 303-312-6774

EPA Region 5
Telephone 312-886-6686

EPA Region 9
Telephone: 415-947-4246

EPA Region 10
Telephone 206-553-8665

Proposed NPL: Proposed National Priority List Sites

A site that has been proposed for listing on the National Priorities List through the issuance of a proposed rule in the Federal Register. EPA then accepts public comments on the site, responds to the comments, and places on the NPL those sites that continue to meet the requirements for listing.

Date of Government Version: 12/30/2020
Date Data Arrived at EDR: 01/14/2021
Date Made Active in Reports: 02/09/2021
Number of Days to Update: 26

Source: EPA
Telephone: N/A
Last EDR Contact: 04/01/2021
Next Scheduled EDR Contact: 07/12/2021
Data Release Frequency: Quarterly

NPL LIENS: Federal Superfund Liens

Federal Superfund Liens. Under the authority granted the USEPA by CERCLA of 1980, the USEPA has the authority to file liens against real property in order to recover remedial action expenditures or when the property owner received notification of potential liability. USEPA compiles a listing of filed notices of Superfund Liens.

Date of Government Version: 10/15/1991
Date Data Arrived at EDR: 02/02/1994
Date Made Active in Reports: 03/30/1994
Number of Days to Update: 56

Source: EPA
Telephone: 202-564-4267
Last EDR Contact: 08/15/2011
Next Scheduled EDR Contact: 11/28/2011
Data Release Frequency: No Update Planned

Federal Delisted NPL site list

Delisted NPL: National Priority List Deletions

The National Oil and Hazardous Substances Pollution Contingency Plan (NCP) establishes the criteria that the EPA uses to delete sites from the NPL. In accordance with 40 CFR 300.425.(e), sites may be deleted from the NPL where no further response is appropriate.

Date of Government Version: 12/30/2020
Date Data Arrived at EDR: 01/14/2021
Date Made Active in Reports: 02/09/2021
Number of Days to Update: 26

Source: EPA
Telephone: N/A
Last EDR Contact: 04/01/2021
Next Scheduled EDR Contact: 07/12/2021
Data Release Frequency: Quarterly

Federal CERCLIS list

FEDERAL FACILITY: Federal Facility Site Information listing

A listing of National Priority List (NPL) and Base Realignment and Closure (BRAC) sites found in the Comprehensive Environmental Response, Compensation and Liability Information System (CERCLIS) Database where EPA Federal Facilities Restoration and Reuse Office is involved in cleanup activities.

Date of Government Version: 04/03/2019
Date Data Arrived at EDR: 04/05/2019
Date Made Active in Reports: 05/14/2019
Number of Days to Update: 39

Source: Environmental Protection Agency
Telephone: 703-603-8704
Last EDR Contact: 03/30/2021
Next Scheduled EDR Contact: 07/12/2021
Data Release Frequency: Varies

SEMS: Superfund Enterprise Management System

SEMS (Superfund Enterprise Management System) tracks hazardous waste sites, potentially hazardous waste sites, and remedial activities performed in support of EPA's Superfund Program across the United States. The list was formerly know as CERCLIS, renamed to SEMS by the EPA in 2015. The list contains data on potentially hazardous waste sites that have been reported to the USEPA by states, municipalities, private companies and private persons, pursuant to Section 103 of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). This dataset also contains sites which are either proposed to or on the National Priorities List (NPL) and the sites which are in the screening and assessment phase for possible inclusion on the NPL.

Date of Government Version: 12/30/2020
Date Data Arrived at EDR: 01/14/2021
Date Made Active in Reports: 02/18/2021
Number of Days to Update: 35

Source: EPA
Telephone: 800-424-9346
Last EDR Contact: 04/01/2021
Next Scheduled EDR Contact: 07/26/2021
Data Release Frequency: Quarterly

Federal CERCLIS NFRAP site list

SEMS-ARCHIVE: Superfund Enterprise Management System Archive

SEMS-ARCHIVE (Superfund Enterprise Management System Archive) tracks sites that have no further interest under the Federal Superfund Program based on available information. The list was formerly known as the CERCLIS-NFRAP, renamed to SEMS ARCHIVE by the EPA in 2015. EPA may perform a minimal level of assessment work at a site while it is archived if site conditions change and/or new information becomes available. Archived sites have been removed and archived from the inventory of SEMS sites. Archived status indicates that, to the best of EPA's knowledge, assessment at a site has been completed and that EPA has determined no further steps will be taken to list the site on the National Priorities List (NPL), unless information indicates this decision was not appropriate or other considerations require a recommendation for listing at a later time. The decision does not necessarily mean that there is no hazard associated with a given site; it only means that. based upon available information, the location is not judged to be potential NPL site.

Date of Government Version: 12/30/2020
Date Data Arrived at EDR: 01/14/2021
Date Made Active in Reports: 02/18/2021
Number of Days to Update: 35

Source: EPA
Telephone: 800-424-9346
Last EDR Contact: 04/01/2021
Next Scheduled EDR Contact: 07/26/2021
Data Release Frequency: Quarterly

Federal RCRA CORRACTS facilities list

CORRACTS: Corrective Action Report

CORRACTS identifies hazardous waste handlers with RCRA corrective action activity.

Date of Government Version: 12/14/2020
Date Data Arrived at EDR: 12/17/2020
Date Made Active in Reports: 12/22/2020
Number of Days to Update: 5

Source: EPA
Telephone: 800-424-9346
Last EDR Contact: 03/23/2021
Next Scheduled EDR Contact: 07/05/2021
Data Release Frequency: Quarterly

Federal RCRA non-CORRACTS TSD facilities list

RCRA-TSDF: RCRA - Treatment, Storage and Disposal

RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Transporters are individuals or entities that move hazardous waste from the generator offsite to a facility that can recycle, treat, store, or dispose of the waste. TSDFs treat, store, or dispose of the waste.

Date of Government Version: 12/14/2020
Date Data Arrived at EDR: 12/17/2020
Date Made Active in Reports: 12/22/2020
Number of Days to Update: 5

Source: Environmental Protection Agency
Telephone: (415) 495-8895
Last EDR Contact: 03/23/2021
Next Scheduled EDR Contact: 07/05/2021
Data Release Frequency: Quarterly

Federal RCRA generators list

RCRA-LQG: RCRA - Large Quantity Generators

RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Large quantity generators (LQGs) generate over 1,000 kilograms (kg) of hazardous waste, or over 1 kg of acutely hazardous waste per month.

Date of Government Version: 12/14/2020
Date Data Arrived at EDR: 12/17/2020
Date Made Active in Reports: 12/22/2020
Number of Days to Update: 5

Source: Environmental Protection Agency
Telephone: (415) 495-8895
Last EDR Contact: 03/23/2021
Next Scheduled EDR Contact: 07/05/2021
Data Release Frequency: Quarterly

RCRA-SQG: RCRA - Small Quantity Generators

RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Small quantity generators (SQGs) generate between 100 kg and 1,000 kg of hazardous waste per month.

Date of Government Version: 12/14/2020
Date Data Arrived at EDR: 12/17/2020
Date Made Active in Reports: 12/22/2020
Number of Days to Update: 5

Source: Environmental Protection Agency
Telephone: (415) 495-8895
Last EDR Contact: 03/23/2021
Next Scheduled EDR Contact: 07/05/2021
Data Release Frequency: Quarterly

RCRA-VSQG: RCRA - Very Small Quantity Generators (Formerly Conditionally Exempt Small Quantity Generators)

RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Very small quantity generators (VSQGs) generate less than 100 kg of hazardous waste, or less than 1 kg of acutely hazardous waste per month.

Date of Government Version: 12/14/2020
Date Data Arrived at EDR: 12/17/2020
Date Made Active in Reports: 12/22/2020
Number of Days to Update: 5

Source: Environmental Protection Agency
Telephone: (415) 495-8895
Last EDR Contact: 03/23/2021
Next Scheduled EDR Contact: 07/05/2021
Data Release Frequency: Quarterly

Federal institutional controls / engineering controls registries

LUCIS: Land Use Control Information System

LUCIS contains records of land use control information pertaining to the former Navy Base Realignment and Closure properties.

Date of Government Version: 02/09/2021
Date Data Arrived at EDR: 02/11/2021
Date Made Active in Reports: 03/22/2021
Number of Days to Update: 39

Source: Department of the Navy
Telephone: 843-820-7326
Last EDR Contact: 02/08/2021
Next Scheduled EDR Contact: 05/24/2021
Data Release Frequency: Varies

US ENG CONTROLS: Engineering Controls Sites List

A listing of sites with engineering controls in place. Engineering controls include various forms of caps, building foundations, liners, and treatment methods to create pathway elimination for regulated substances to enter environmental media or effect human health.

Date of Government Version: 10/28/2020
Date Data Arrived at EDR: 11/05/2020
Date Made Active in Reports: 11/18/2020
Number of Days to Update: 13

Source: Environmental Protection Agency
Telephone: 703-603-0695
Last EDR Contact: 02/23/2021
Next Scheduled EDR Contact: 06/06/2021
Data Release Frequency: Varies

US INST CONTROLS: Institutional Controls Sites List

A listing of sites with institutional controls in place. Institutional controls include administrative measures, such as groundwater use restrictions, construction restrictions, property use restrictions, and post remediation care requirements intended to prevent exposure to contaminants remaining on site. Deed restrictions are generally required as part of the institutional controls.

Date of Government Version: 10/28/2020
Date Data Arrived at EDR: 11/05/2020
Date Made Active in Reports: 11/18/2020
Number of Days to Update: 13

Source: Environmental Protection Agency
Telephone: 703-603-0695
Last EDR Contact: 02/23/2021
Next Scheduled EDR Contact: 06/06/2021
Data Release Frequency: Varies

Federal ERNS list

ERNS: Emergency Response Notification System

Emergency Response Notification System. ERNS records and stores information on reported releases of oil and hazardous substances.

Date of Government Version: 12/14/2020
Date Data Arrived at EDR: 12/15/2020
Date Made Active in Reports: 12/22/2020
Number of Days to Update: 7

Source: National Response Center, United States Coast Guard
Telephone: 202-267-2180
Last EDR Contact: 12/15/2020
Next Scheduled EDR Contact: 07/05/2021
Data Release Frequency: Quarterly

State- and tribal - equivalent NPL

RESPONSE: State Response Sites

Identifies confirmed release sites where DTSC is involved in remediation, either in a lead or oversight capacity. These confirmed release sites are generally high-priority and high potential risk.

Date of Government Version: 01/25/2021
Date Data Arrived at EDR: 01/26/2021
Date Made Active in Reports: 04/13/2021
Number of Days to Update: 77

Source: Department of Toxic Substances Control
Telephone: 916-323-3400
Last EDR Contact: 01/26/2021
Next Scheduled EDR Contact: 05/10/2021
Data Release Frequency: Quarterly

State- and tribal - equivalent CERCLIS

ENVIROSTOR: EnviroStor Database

The Department of Toxic Substances Control's (DTSC's) Site Mitigation and Brownfields Reuse Program's (SMBRP's) EnviroStor database identifes sites that have known contamination or sites for which there may be reasons to investigate further. The database includes the following site types: Federal Superfund sites (National Priorities List (NPL)); State Response, including Military Facilities and State Superfund; Voluntary Cleanup; and School sites. EnviroStor provides similar information to the information that was available in CalSites, and provides additional site information, including, but not limited to, identification of formerly-contaminated properties that have been released for reuse, properties where environmental deed restrictions have been recorded to prevent inappropriate land uses, and risk characterization information that is used to assess potential impacts to public health and the environment at contaminated sites.

Date of Government Version: 01/25/2021
Date Data Arrived at EDR: 01/26/2021
Date Made Active in Reports: 04/13/2021
Number of Days to Update: 77

Source: Department of Toxic Substances Control
Telephone: 916-323-3400
Last EDR Contact: 01/26/2021
Next Scheduled EDR Contact: 05/10/2021
Data Release Frequency: Quarterly

State and tribal landfill and/or solid waste disposal site lists

SWF/LF (SWIS): Solid Waste Information System

Active, Closed and Inactive Landfills. SWF/LF records typically contain an inve ntory of solid waste disposal facilities or landfills. These may be active or i nactive facilities or open dumps that failed to meet RCRA Section 4004 criteria for solid waste landfills or disposal sites.

Date of Government Version: 11/09/2020
Date Data Arrived at EDR: 11/10/2020
Date Made Active in Reports: 01/14/2021
Number of Days to Update: 65

Source: Department of Resources Recycling and Recovery
Telephone: 916-341-6320
Last EDR Contact: 02/09/2021
Next Scheduled EDR Contact: 05/24/2021
Data Release Frequency: Quarterly

State and tribal leaking storage tank lists

LUST: Leaking Underground Fuel Tank Report (GEOTRACKER)

Leaking Underground Storage Tank (LUST) Sites included in GeoTracker. GeoTracker is the Water Boards data management system for sites that impact, or have the potential to impact, water quality in California, with emphasis on groundwater.

Date of Government Version: 03/08/2021
Date Data Arrived at EDR: 03/09/2021
Date Made Active in Reports: 03/30/2021
Number of Days to Update: 21

Source: State Water Resources Control Board
Telephone: see region list
Last EDR Contact: 03/09/2021
Next Scheduled EDR Contact: 06/21/2021
Data Release Frequency: Quarterly

LUST REG 4: Underground Storage Tank Leak List

Los Angeles, Ventura counties. For more current information, please refer to the State Water Resources Control Board's LUST database.

Date of Government Version: 09/07/2004
Date Data Arrived at EDR: 09/07/2004
Date Made Active in Reports: 10/12/2004
Number of Days to Update: 35

Source: California Regional Water Quality Control Board Los Angeles Region (4)
Telephone: 213-576-6710
Last EDR Contact: 09/06/2011
Next Scheduled EDR Contact: 12/19/2011
Data Release Frequency: No Update Planned

LUST REG 3: Leaking Underground Storage Tank Database

Leaking Underground Storage Tank locations. Monterey, San Benito, San Luis Obispo, Santa Barbara, Santa Cruz counties.

Date of Government Version: 05/19/2003
Date Data Arrived at EDR: 05/19/2003
Date Made Active in Reports: 06/02/2003
Number of Days to Update: 14

Source: California Regional Water Quality Control Board Central Coast Region (3)
Telephone: 805-542-4786
Last EDR Contact: 07/18/2011
Next Scheduled EDR Contact: 10/31/2011
Data Release Frequency: No Update Planned

LUST REG 2: Fuel Leak List

Leaking Underground Storage Tank locations. Alameda, Contra Costa, Marin, Napa, San Francisco, San Mateo, Santa Clara, Solano, Sonoma counties.

Date of Government Version: 09/30/2004
Date Data Arrived at EDR: 10/20/2004
Date Made Active in Reports: 11/19/2004
Number of Days to Update: 30

Source: California Regional Water Quality Control Board San Francisco Bay Region (2)
Telephone: 510-622-2433
Last EDR Contact: 09/19/2011
Next Scheduled EDR Contact: 01/02/2012
Data Release Frequency: No Update Planned

LUST REG 1: Active Toxic Site Investigation

Del Norte, Humboldt, Lake, Mendocino, Modoc, Siskiyou, Sonoma, Trinity counties. For more current information, please refer to the State Water Resources Control Board's LUST database.

Date of Government Version: 02/01/2001
Date Data Arrived at EDR: 02/28/2001
Date Made Active in Reports: 03/29/2001
Number of Days to Update: 29

Source: California Regional Water Quality Control Board North Coast (1)
Telephone: 707-570-3769
Last EDR Contact: 08/01/2011
Next Scheduled EDR Contact: 11/14/2011
Data Release Frequency: No Update Planned

LUST REG 6V: Leaking Underground Storage Tank Case Listing

Leaking Underground Storage Tank locations. Inyo, Kern, Los Angeles, Mono, San Bernardino counties.

Date of Government Version: 06/07/2005
Date Data Arrived at EDR: 06/07/2005
Date Made Active in Reports: 06/29/2005
Number of Days to Update: 22

Source: California Regional Water Quality Control Board Victorville Branch Office (6)
Telephone: 760-241-7365
Last EDR Contact: 09/12/2011
Next Scheduled EDR Contact: 12/26/2011
Data Release Frequency: No Update Planned

LUST REG 6L: Leaking Underground Storage Tank Case Listing

For more current information, please refer to the State Water Resources Control Board's LUST database.

Date of Government Version: 09/09/2003
Date Data Arrived at EDR: 09/10/2003
Date Made Active in Reports: 10/07/2003
Number of Days to Update: 27

Source: California Regional Water Quality Control Board Lahontan Region (6)
Telephone: 530-542-5572
Last EDR Contact: 09/12/2011
Next Scheduled EDR Contact: 12/26/2011
Data Release Frequency: No Update Planned

LUST REG 7: Leaking Underground Storage Tank Case Listing

Leaking Underground Storage Tank locations. Imperial, Riverside, San Diego, Santa Barbara counties.

Date of Government Version: 02/26/2004
Date Data Arrived at EDR: 02/26/2004
Date Made Active in Reports: 03/24/2004
Number of Days to Update: 27

Source: California Regional Water Quality Control Board Colorado River Basin Region (7)
Telephone: 760-776-8943
Last EDR Contact: 08/01/2011
Next Scheduled EDR Contact: 11/14/2011
Data Release Frequency: No Update Planned

LUST REG 8: Leaking Underground Storage Tanks

California Regional Water Quality Control Board Santa Ana Region (8). For more current information, please refer to the State Water Resources Control Board's LUST database.

Date of Government Version: 02/14/2005
Date Data Arrived at EDR: 02/15/2005
Date Made Active in Reports: 03/28/2005
Number of Days to Update: 41

Source: California Regional Water Quality Control Board Santa Ana Region (8)
Telephone: 909-782-4496
Last EDR Contact: 08/15/2011
Next Scheduled EDR Contact: 11/28/2011
Data Release Frequency: No Update Planned

LUST REG 9: Leaking Underground Storage Tank Report

Orange, Riverside, San Diego counties. For more current information, please refer to the State Water Resources Control Board's LUST database.

Date of Government Version: 03/01/2001
Date Data Arrived at EDR: 04/23/2001
Date Made Active in Reports: 05/21/2001
Number of Days to Update: 28

Source: California Regional Water Quality Control Board San Diego Region (9)
Telephone: 858-637-5595
Last EDR Contact: 09/26/2011
Next Scheduled EDR Contact: 01/09/2012
Data Release Frequency: No Update Planned

LUST REG 5: Leaking Underground Storage Tank Database

Leaking Underground Storage Tank locations. Alameda, Alpine, Amador, Butte, Colusa, Contra Costa, Calveras, El Dorado, Fresno, Glenn, Kern, Kings, Lake, Lassen, Madera, Mariposa, Merced, Modoc, Napa, Nevada, Placer, Plumas, Sacramento, San Joaquin, Shasta, Solano, Stanislaus, Sutter, Tehama, Tulare, Tuolumne, Yolo, Yuba counties.

Date of Government Version: 07/01/2008
Date Data Arrived at EDR: 07/22/2008
Date Made Active in Reports: 07/31/2008
Number of Days to Update: 9

Source: California Regional Water Quality Control Board Central Valley Region (5)
Telephone: 916-464-4834
Last EDR Contact: 07/01/2011
Next Scheduled EDR Contact: 10/17/2011
Data Release Frequency: No Update Planned

INDIAN LUST R10: Leaking Underground Storage Tanks on Indian Land

LUSTs on Indian land in Alaska, Idaho, Oregon and Washington.

Date of Government Version: 11/12/2020
Date Data Arrived at EDR: 12/16/2020
Date Made Active in Reports: 03/12/2021
Number of Days to Update: 86

Source: EPA Region 10
Telephone: 206-553-2857
Last EDR Contact: 12/16/2020
Next Scheduled EDR Contact: 05/03/2021
Data Release Frequency: Varies

INDIAN LUST R5: Leaking Underground Storage Tanks on Indian Land

Leaking underground storage tanks located on Indian Land in Michigan, Minnesota and Wisconsin.

Date of Government Version: 10/07/2020
Date Data Arrived at EDR: 12/16/2020
Date Made Active in Reports: 03/12/2021
Number of Days to Update: 86

Source: EPA, Region 5
Telephone: 312-886-7439
Last EDR Contact: 12/16/2020
Next Scheduled EDR Contact: 05/03/2021
Data Release Frequency: Varies

INDIAN LUST R9: Leaking Underground Storage Tanks on Indian Land
LUSTs on Indian land in Arizona, California, New Mexico and Nevada

Date of Government Version: 10/01/2020
Date Data Arrived at EDR: 12/16/2020
Date Made Active in Reports: 03/12/2021
Number of Days to Update: 86

Source: Environmental Protection Agency
Telephone: 415-972-3372
Last EDR Contact: 12/16/2020
Next Scheduled EDR Contact: 05/03/2021
Data Release Frequency: Varies

INDIAN LUST R8: Leaking Underground Storage Tanks on Indian Land
LUSTs on Indian land in Colorado, Montana, North Dakota, South Dakota, Utah and Wyoming.

Date of Government Version: 10/09/2020
Date Data Arrived at EDR: 12/16/2020
Date Made Active in Reports: 03/12/2021
Number of Days to Update: 86

Source: EPA Region 8
Telephone: 303-312-6271
Last EDR Contact: 12/16/2020
Next Scheduled EDR Contact: 05/03/2021
Data Release Frequency: Varies

INDIAN LUST R7: Leaking Underground Storage Tanks on Indian Land
LUSTs on Indian land in Iowa, Kansas, and Nebraska

Date of Government Version: 09/30/2020
Date Data Arrived at EDR: 12/22/2020
Date Made Active in Reports: 03/12/2021
Number of Days to Update: 80

Source: EPA Region 7
Telephone: 913-551-7003
Last EDR Contact: 12/16/2020
Next Scheduled EDR Contact: 05/03/2021
Data Release Frequency: Varies

INDIAN LUST R4: Leaking Underground Storage Tanks on Indian Land
LUSTs on Indian land in Florida, Mississippi and North Carolina.

Date of Government Version: 10/02/2020
Date Data Arrived at EDR: 12/18/2020
Date Made Active in Reports: 03/12/2021
Number of Days to Update: 84

Source: EPA Region 4
Telephone: 404-562-8677
Last EDR Contact: 12/16/2020
Next Scheduled EDR Contact: 05/03/2021
Data Release Frequency: Varies

INDIAN LUST R1: Leaking Underground Storage Tanks on Indian Land
A listing of leaking underground storage tank locations on Indian Land.

Date of Government Version: 10/01/2020
Date Data Arrived at EDR: 12/16/2020
Date Made Active in Reports: 03/12/2021
Number of Days to Update: 86

Source: EPA Region 1
Telephone: 617-918-1313
Last EDR Contact: 12/16/2020
Next Scheduled EDR Contact: 05/03/2021
Data Release Frequency: Varies

INDIAN LUST R6: Leaking Underground Storage Tanks on Indian Land
LUSTs on Indian land in New Mexico and Oklahoma.

Date of Government Version: 04/08/2020
Date Data Arrived at EDR: 05/20/2020
Date Made Active in Reports: 08/12/2020
Number of Days to Update: 84

Source: EPA Region 6
Telephone: 214-665-6597
Last EDR Contact: 12/16/2020
Next Scheduled EDR Contact: 05/03/2021
Data Release Frequency: Varies

CPS-SLIC: Statewide SLIC Cases (GEOTRACKER)
Cleanup Program Sites (CPS; also known as Site Cleanups [SC] and formerly known as Spills, Leaks, Investigations, and Cleanups [SLIC] sites) included in GeoTracker. GeoTracker is the Water Boards data management system for sites that impact, or have the potential to impact, water quality in California, with emphasis on groundwater.

Date of Government Version: 03/08/2021
Date Data Arrived at EDR: 03/09/2021
Date Made Active in Reports: 03/30/2021
Number of Days to Update: 21

Source: State Water Resources Control Board
Telephone: 866-480-1028
Last EDR Contact: 03/09/2021
Next Scheduled EDR Contact: 06/21/2021
Data Release Frequency: Varies

SLIC REG 1: Active Toxic Site Investigations

The SLIC (Spills, Leaks, Investigations and Cleanup) program is designed to protect and restore water quality from spills, leaks, and similar discharges.

Date of Government Version: 04/03/2003
Date Data Arrived at EDR: 04/07/2003
Date Made Active in Reports: 04/25/2003
Number of Days to Update: 18

Source: California Regional Water Quality Control Board, North Coast Region (1)
Telephone: 707-576-2220
Last EDR Contact: 08/01/2011
Next Scheduled EDR Contact: 11/14/2011
Data Release Frequency: No Update Planned

SLIC REG 2: Spills, Leaks, Investigation & Cleanup Cost Recovery Listing

The SLIC (Spills, Leaks, Investigations and Cleanup) program is designed to protect and restore water quality from spills, leaks, and similar discharges.

Date of Government Version: 09/30/2004
Date Data Arrived at EDR: 10/20/2004
Date Made Active in Reports: 11/19/2004
Number of Days to Update: 30

Source: Regional Water Quality Control Board San Francisco Bay Region (2)
Telephone: 510-286-0457
Last EDR Contact: 09/19/2011
Next Scheduled EDR Contact: 01/02/2012
Data Release Frequency: No Update Planned

SLIC REG 3: Spills, Leaks, Investigation & Cleanup Cost Recovery Listing

The SLIC (Spills, Leaks, Investigations and Cleanup) program is designed to protect and restore water quality from spills, leaks, and similar discharges.

Date of Government Version: 05/18/2006
Date Data Arrived at EDR: 05/18/2006
Date Made Active in Reports: 06/15/2006
Number of Days to Update: 28

Source: California Regional Water Quality Control Board Central Coast Region (3)
Telephone: 805-549-3147
Last EDR Contact: 07/18/2011
Next Scheduled EDR Contact: 10/31/2011
Data Release Frequency: No Update Planned

SLIC REG 4: Spills, Leaks, Investigation & Cleanup Cost Recovery Listing

The SLIC (Spills, Leaks, Investigations and Cleanup) program is designed to protect and restore water quality from spills, leaks, and similar discharges.

Date of Government Version: 11/17/2004
Date Data Arrived at EDR: 11/18/2004
Date Made Active in Reports: 01/04/2005
Number of Days to Update: 47

Source: Region Water Quality Control Board Los Angeles Region (4)
Telephone: 213-576-6600
Last EDR Contact: 07/01/2011
Next Scheduled EDR Contact: 10/17/2011
Data Release Frequency: No Update Planned

SLIC REG 5: Spills, Leaks, Investigation & Cleanup Cost Recovery Listing

The SLIC (Spills, Leaks, Investigations and Cleanup) program is designed to protect and restore water quality from spills, leaks, and similar discharges.

Date of Government Version: 04/01/2005
Date Data Arrived at EDR: 04/05/2005
Date Made Active in Reports: 04/21/2005
Number of Days to Update: 16

Source: Regional Water Quality Control Board Central Valley Region (5)
Telephone: 916-464-3291
Last EDR Contact: 09/12/2011
Next Scheduled EDR Contact: 12/26/2011
Data Release Frequency: No Update Planned

SLIC REG 6V: Spills, Leaks, Investigation & Cleanup Cost Recovery Listing

The SLIC (Spills, Leaks, Investigations and Cleanup) program is designed to protect and restore water quality from spills, leaks, and similar discharges.

Date of Government Version: 05/24/2005
Date Data Arrived at EDR: 05/25/2005
Date Made Active in Reports: 06/16/2005
Number of Days to Update: 22

Source: Regional Water Quality Control Board, Victorville Branch
Telephone: 619-241-6583
Last EDR Contact: 08/15/2011
Next Scheduled EDR Contact: 11/28/2011
Data Release Frequency: No Update Planned

SLIC REG 6L: SLIC Sites
The SLIC (Spills, Leaks, Investigations and Cleanup) program is designed to protect and restore water quality from spills, leaks, and similar discharges.

Date of Government Version: 09/07/2004
Date Data Arrived at EDR: 09/07/2004
Date Made Active in Reports: 10/12/2004
Number of Days to Update: 35
Source: California Regional Water Quality Control Board, Lahontan Region
Telephone: 530-542-5574
Last EDR Contact: 08/15/2011
Next Scheduled EDR Contact: 11/28/2011
Data Release Frequency: No Update Planned

SLIC REG 7: SLIC List
The SLIC (Spills, Leaks, Investigations and Cleanup) program is designed to protect and restore water quality from spills, leaks, and similar discharges.

Date of Government Version: 11/24/2004
Date Data Arrived at EDR: 11/29/2004
Date Made Active in Reports: 01/04/2005
Number of Days to Update: 36
Source: California Regional Quality Control Board, Colorado River Basin Region
Telephone: 760-346-7491
Last EDR Contact: 08/01/2011
Next Scheduled EDR Contact: 11/14/2011
Data Release Frequency: No Update Planned

SLIC REG 8: Spills, Leaks, Investigation & Cleanup Cost Recovery Listing
The SLIC (Spills, Leaks, Investigations and Cleanup) program is designed to protect and restore water quality from spills, leaks, and similar discharges.

Date of Government Version: 04/03/2008
Date Data Arrived at EDR: 04/03/2008
Date Made Active in Reports: 04/14/2008
Number of Days to Update: 11
Source: California Region Water Quality Control Board Santa Ana Region (8)
Telephone: 951-782-3298
Last EDR Contact: 09/12/2011
Next Scheduled EDR Contact: 12/26/2011
Data Release Frequency: No Update Planned

SLIC REG 9: Spills, Leaks, Investigation & Cleanup Cost Recovery Listing
The SLIC (Spills, Leaks, Investigations and Cleanup) program is designed to protect and restore water quality from spills, leaks, and similar discharges.

Date of Government Version: 09/10/2007
Date Data Arrived at EDR: 09/11/2007
Date Made Active in Reports: 09/28/2007
Number of Days to Update: 17
Source: California Regional Water Quality Control Board San Diego Region (9)
Telephone: 858-467-2980
Last EDR Contact: 08/08/2011
Next Scheduled EDR Contact: 11/21/2011
Data Release Frequency: No Update Planned

State and tribal registered storage tank lists

FEMA UST: Underground Storage Tank Listing
A listing of all FEMA owned underground storage tanks.

Date of Government Version: 01/29/2021
Date Data Arrived at EDR: 02/17/2021
Date Made Active in Reports: 03/22/2021
Number of Days to Update: 33
Source: FEMA
Telephone: 202-646-5797
Last EDR Contact: 04/05/2021
Next Scheduled EDR Contact: 07/19/2021
Data Release Frequency: Varies

UST CLOSURE: Proposed Closure of Underground Storage Tank (UST) Cases
UST cases that are being considered for closure by either the State Water Resources Control Board or the Executive Director have been posted for a 60-day public comment period. UST Case Closures being proposed for consideration by the State Water Resources Control Board. These are primarily UST cases that meet closure criteria under the decisional framework in State Water Board Resolution No. 92-49 and other Board orders. UST Case Closures proposed for consideration by the Executive Director pursuant to State Water Board Resolution No. 2012-0061. These are cases that meet the criteria of the Low-Threat UST Case Closure Policy. UST Case Closure Review Denials and Approved Orders.

Date of Government Version: 03/05/2021
Date Data Arrived at EDR: 03/09/2021
Date Made Active in Reports: 04/01/2021
Number of Days to Update: 23

Source: State Water Resources Control Board
Telephone: 916-327-7844
Last EDR Contact: 03/09/2021
Next Scheduled EDR Contact: 06/21/2021
Data Release Frequency: Varies

MILITARY UST SITES: Military UST Sites (GEOTRACKER)
Military ust sites

Date of Government Version: 03/08/2021
Date Data Arrived at EDR: 03/09/2021
Date Made Active in Reports: 03/30/2021
Number of Days to Update: 21

Source: State Water Resources Control Board
Telephone: 866-480-1028
Last EDR Contact: 03/09/2021
Next Scheduled EDR Contact: 06/21/2021
Data Release Frequency: Varies

UST: Active UST Facilities
Active UST facilities gathered from the local regulatory agencies

Date of Government Version: 03/08/2021
Date Data Arrived at EDR: 03/09/2021
Date Made Active in Reports: 03/31/2021
Number of Days to Update: 22

Source: SWRCB
Telephone: 916-341-5851
Last EDR Contact: 03/09/2021
Next Scheduled EDR Contact: 06/21/2021
Data Release Frequency: Semi-Annually

AST: Aboveground Petroleum Storage Tank Facilities
A listing of aboveground storage tank petroleum storage tank locations.

Date of Government Version: 07/06/2016
Date Data Arrived at EDR: 07/12/2016
Date Made Active in Reports: 09/19/2016
Number of Days to Update: 69

Source: California Environmental Protection Agency
Telephone: 916-327-5092
Last EDR Contact: 03/12/2021
Next Scheduled EDR Contact: 06/28/2021
Data Release Frequency: Varies

INDIAN UST R1: Underground Storage Tanks on Indian Land
The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 1 (Connecticut, Maine, Massachusetts, New Hampshire, Rhode Island, Vermont and ten Tribal Nations).

Date of Government Version: 10/01/2020
Date Data Arrived at EDR: 12/16/2020
Date Made Active in Reports: 03/12/2021
Number of Days to Update: 86

Source: EPA, Region 1
Telephone: 617-918-1313
Last EDR Contact: 12/16/2020
Next Scheduled EDR Contact: 05/03/2021
Data Release Frequency: Varies

INDIAN UST R4: Underground Storage Tanks on Indian Land
The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 4 (Alabama, Florida, Georgia, Kentucky, Mississippi, North Carolina, South Carolina, Tennessee and Tribal Nations)

Date of Government Version: 10/02/2020
Date Data Arrived at EDR: 12/18/2020
Date Made Active in Reports: 03/12/2021
Number of Days to Update: 84

Source: EPA Region 4
Telephone: 404-562-9424
Last EDR Contact: 12/16/2020
Next Scheduled EDR Contact: 05/03/2021
Data Release Frequency: Varies

INDIAN UST R10: Underground Storage Tanks on Indian Land
The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 10 (Alaska, Idaho, Oregon, Washington, and Tribal Nations).

Date of Government Version: 11/12/2020
Date Data Arrived at EDR: 12/16/2020
Date Made Active in Reports: 03/12/2021
Number of Days to Update: 86

Source: EPA Region 10
Telephone: 206-553-2857
Last EDR Contact: 12/15/2020
Next Scheduled EDR Contact: 05/03/2021
Data Release Frequency: Varies

INDIAN UST R6: Underground Storage Tanks on Indian Land

The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 6 (Louisiana, Arkansas, Oklahoma, New Mexico, Texas and 65 Tribes).

Date of Government Version: 04/08/2020
Date Data Arrived at EDR: 05/20/2020
Date Made Active in Reports: 08/12/2020
Number of Days to Update: 84

Source: EPA Region 6
Telephone: 214-665-7591
Last EDR Contact: 12/16/2020
Next Scheduled EDR Contact: 05/03/2021
Data Release Frequency: Varies

INDIAN UST R8: Underground Storage Tanks on Indian Land

The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 8 (Colorado, Montana, North Dakota, South Dakota, Utah, Wyoming and 27 Tribal Nations).

Date of Government Version: 10/09/2020
Date Data Arrived at EDR: 12/16/2020
Date Made Active in Reports: 03/12/2021
Number of Days to Update: 86

Source: EPA Region 8
Telephone: 303-312-6137
Last EDR Contact: 12/16/2020
Next Scheduled EDR Contact: 05/03/2021
Data Release Frequency: Varies

INDIAN UST R9: Underground Storage Tanks on Indian Land

The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 9 (Arizona, California, Hawaii, Nevada, the Pacific Islands, and Tribal Nations).

Date of Government Version: 10/01/2020
Date Data Arrived at EDR: 12/16/2020
Date Made Active in Reports: 03/12/2021
Number of Days to Update: 86

Source: EPA Region 9
Telephone: 415-972-3368
Last EDR Contact: 12/16/2020
Next Scheduled EDR Contact: 05/03/2021
Data Release Frequency: Varies

INDIAN UST R7: Underground Storage Tanks on Indian Land

The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 7 (Iowa, Kansas, Missouri, Nebraska, and 9 Tribal Nations).

Date of Government Version: 09/30/2020
Date Data Arrived at EDR: 12/22/2020
Date Made Active in Reports: 03/12/2021
Number of Days to Update: 80

Source: EPA Region 7
Telephone: 913-551-7003
Last EDR Contact: 12/16/2020
Next Scheduled EDR Contact: 05/03/2021
Data Release Frequency: Varies

INDIAN UST R5: Underground Storage Tanks on Indian Land

The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 5 (Michigan, Minnesota and Wisconsin and Tribal Nations).

Date of Government Version: 10/07/2020
Date Data Arrived at EDR: 12/16/2020
Date Made Active in Reports: 03/12/2021
Number of Days to Update: 86

Source: EPA Region 5
Telephone: 312-886-6136
Last EDR Contact: 12/16/2020
Next Scheduled EDR Contact: 05/03/2021
Data Release Frequency: Varies

State and tribal voluntary cleanup sites

INDIAN VCP R1: Voluntary Cleanup Priority Listing

A listing of voluntary cleanup priority sites located on Indian Land located in Region 1.

Date of Government Version: 07/27/2015
Date Data Arrived at EDR: 09/29/2015
Date Made Active in Reports: 02/18/2016
Number of Days to Update: 142

Source: EPA, Region 1
Telephone: 617-918-1102
Last EDR Contact: 03/22/2021
Next Scheduled EDR Contact: 07/05/2021
Data Release Frequency: Varies

INDIAN VCP R7: Voluntary Cleanup Priority Lisitng

A listing of voluntary cleanup priority sites located on Indian Land located in Region 7.

Date of Government Version: 03/20/2008
Date Data Arrived at EDR: 04/22/2008
Date Made Active in Reports: 05/19/2008
Number of Days to Update: 27

Source: EPA, Region 7
Telephone: 913-551-7365
Last EDR Contact: 04/20/2009
Next Scheduled EDR Contact: 07/20/2009
Data Release Frequency: Varies

VCP: Voluntary Cleanup Program Properties

Contains low threat level properties with either confirmed or unconfirmed releases and the project proponents have request that DTSC oversee investigation and/or cleanup activities and have agreed to provide coverage for DTSC's costs.

Date of Government Version: 01/25/2021
Date Data Arrived at EDR: 01/26/2021
Date Made Active in Reports: 04/13/2021
Number of Days to Update: 77

Source: Department of Toxic Substances Control
Telephone: 916-323-3400
Last EDR Contact: 01/26/2021
Next Scheduled EDR Contact: 05/10/2021
Data Release Frequency: Quarterly

State and tribal Brownfields sites

BROWNFIELDS: Considered Brownfieds Sites Listing

A listing of sites the SWRCB considers to be Brownfields since these are sites have come to them through the MOA Process.

Date of Government Version: 12/17/2020
Date Data Arrived at EDR: 12/17/2020
Date Made Active in Reports: 03/09/2021
Number of Days to Update: 82

Source: State Water Resources Control Board
Telephone: 916-323-7905
Last EDR Contact: 03/23/2021
Next Scheduled EDR Contact: 07/05/2021
Data Release Frequency: Quarterly

ADDITIONAL ENVIRONMENTAL RECORDS

Local Brownfield lists

US BROWNFIELDS: A Listing of Brownfields Sites

Brownfields are real property, the expansion, redevelopment, or reuse of which may be complicated by the presence or potential presence of a hazardous substance, pollutant, or contaminant. Cleaning up and reinvesting in these properties takes development pressures off of undeveloped, open land, and both improves and protects the environment. Assessment, Cleanup and Redevelopment Exchange System (ACRES) stores information reported by EPA Brownfields grant recipients on brownfields properties assessed or cleaned up with grant funding as well as information on Targeted Brownfields Assessments performed by EPA Regions. A listing of ACRES Brownfield sites is obtained from Cleanups in My Community. Cleanups in My Community provides information on Brownfields properties for which information is reported back to EPA, as well as areas served by Brownfields grant programs.

Date of Government Version: 12/11/2020
Date Data Arrived at EDR: 12/11/2020
Date Made Active in Reports: 03/02/2021
Number of Days to Update: 81

Source: Environmental Protection Agency
Telephone: 202-566-2777
Last EDR Contact: 03/16/2021
Next Scheduled EDR Contact: 06/28/2021
Data Release Frequency: Semi-Annually

Local Lists of Landfill / Solid Waste Disposal Sites

WMUDS/SWAT: Waste Management Unit Database

Waste Management Unit Database System. WMUDS is used by the State Water Resources Control Board staff and the Regional Water Quality Control Boards for program tracking and inventory of waste management units. WMUDS is composed of the following databases: Facility Information, Scheduled Inspections Information, Waste Management Unit Information, SWAT Program Information, SWAT Report Summary Information, SWAT Report Summary Data, Chapter 15 (formerly Subchapter 15) Information, Chapter 15 Monitoring Parameters, TPCA Program Information, RCRA Program Information, Closure Information, and Interested Parties Information.

Date of Government Version: 04/01/2000
Date Data Arrived at EDR: 04/10/2000
Date Made Active in Reports: 05/10/2000
Number of Days to Update: 30

Source: State Water Resources Control Board
Telephone: 916-227-4448
Last EDR Contact: 01/25/2021
Next Scheduled EDR Contact: 05/10/2021
Data Release Frequency: No Update Planned

SWRCY: Recycler Database

A listing of recycling facilities in California.

Date of Government Version: 03/09/2021
Date Data Arrived at EDR: 03/09/2021
Date Made Active in Reports: 03/31/2021
Number of Days to Update: 22

Source: Department of Conservation
Telephone: 916-323-3836
Last EDR Contact: 03/09/2021
Next Scheduled EDR Contact: 06/21/2021
Data Release Frequency: Quarterly

HAULERS: Registered Waste Tire Haulers Listing

A listing of registered waste tire haulers.

Date of Government Version: 11/23/2020
Date Data Arrived at EDR: 11/23/2020
Date Made Active in Reports: 02/08/2021
Number of Days to Update: 77

Source: Integrated Waste Management Board
Telephone: 916-341-6422
Last EDR Contact: 02/08/2021
Next Scheduled EDR Contact: 05/24/2021
Data Release Frequency: Varies

INDIAN ODI: Report on the Status of Open Dumps on Indian Lands

Location of open dumps on Indian land.

Date of Government Version: 12/31/1998
Date Data Arrived at EDR: 12/03/2007
Date Made Active in Reports: 01/24/2008
Number of Days to Update: 52

Source: Environmental Protection Agency
Telephone: 703-308-8245
Last EDR Contact: 01/25/2021
Next Scheduled EDR Contact: 05/10/2021
Data Release Frequency: Varies

ODI: Open Dump Inventory

An open dump is defined as a disposal facility that does not comply with one or more of the Part 257 or Part 258 Subtitle D Criteria.

Date of Government Version: 06/30/1985
Date Data Arrived at EDR: 08/09/2004
Date Made Active in Reports: 09/17/2004
Number of Days to Update: 39

Source: Environmental Protection Agency
Telephone: 800-424-9346
Last EDR Contact: 06/09/2004
Next Scheduled EDR Contact: N/A
Data Release Frequency: No Update Planned

DEBRIS REGION 9: Torres Martinez Reservation Illegal Dump Site Locations

A listing of illegal dump sites location on the Torres Martinez Indian Reservation located in eastern Riverside County and northern Imperial County, California.

Date of Government Version: 01/12/2009
Date Data Arrived at EDR: 05/07/2009
Date Made Active in Reports: 09/21/2009
Number of Days to Update: 137

Source: EPA, Region 9
Telephone: 415-947-4219
Last EDR Contact: 04/14/2021
Next Scheduled EDR Contact: 08/02/2021
Data Release Frequency: No Update Planned

IHS OPEN DUMPS: Open Dumps on Indian Land

A listing of all open dumps located on Indian Land in the United States.

Date of Government Version: 04/01/2014
Date Data Arrived at EDR: 08/06/2014
Date Made Active in Reports: 01/29/2015
Number of Days to Update: 176

Source: Department of Health & Human Serivces, Indian Health Service
Telephone: 301-443-1452
Last EDR Contact: 01/29/2021
Next Scheduled EDR Contact: 05/10/2021
Data Release Frequency: Varies

Local Lists of Hazardous waste / Contaminated Sites

US HIST CDL: National Clandestine Laboratory Register

A listing of clandestine drug lab locations that have been removed from the DEAs National Clandestine Laboratory Register.

Date of Government Version: 12/07/2020
Date Data Arrived at EDR: 12/09/2020
Date Made Active in Reports: 03/02/2021
Number of Days to Update: 83

Source: Drug Enforcement Administration
Telephone: 202-307-1000
Last EDR Contact: 02/22/2021
Next Scheduled EDR Contact: 06/06/2021
Data Release Frequency: No Update Planned

HIST CAL-SITES: Calsites Database

The Calsites database contains potential or confirmed hazardous substance release properties. In 1996, California EPA reevaluated and significantly reduced the number of sites in the Calsites database. No longer updated by the state agency. It has been replaced by ENVIROSTOR.

Date of Government Version: 08/08/2005
Date Data Arrived at EDR: 08/03/2006
Date Made Active in Reports: 08/24/2006
Number of Days to Update: 21

Source: Department of Toxic Substance Control
Telephone: 916-323-3400
Last EDR Contact: 02/23/2009
Next Scheduled EDR Contact: 05/25/2009
Data Release Frequency: No Update Planned

SCH: School Property Evaluation Program

This category contains proposed and existing school sites that are being evaluated by DTSC for possible hazardous materials contamination. In some cases, these properties may be listed in the CalSites category depending on the level of threat to public health and safety or the environment they pose.

Date of Government Version: 01/25/2021
Date Data Arrived at EDR: 01/26/2021
Date Made Active in Reports: 04/13/2021
Number of Days to Update: 77

Source: Department of Toxic Substances Control
Telephone: 916-323-3400
Last EDR Contact: 01/26/2021
Next Scheduled EDR Contact: 05/10/2021
Data Release Frequency: Quarterly

CDL: Clandestine Drug Labs

A listing of drug lab locations. Listing of a location in this database does not indicate that any illegal drug lab materials were or were not present there, and does not constitute a determination that the location either requires or does not require additional cleanup work.

Date of Government Version: 12/31/2019
Date Data Arrived at EDR: 01/20/2021
Date Made Active in Reports: 04/08/2021
Number of Days to Update: 78

Source: Department of Toxic Substances Control
Telephone: 916-255-6504
Last EDR Contact: 04/14/2021
Next Scheduled EDR Contact: 07/19/2021
Data Release Frequency: Varies

TOXIC PITS: Toxic Pits Cleanup Act Sites

Toxic PITS Cleanup Act Sites. TOXIC PITS identifies sites suspected of containing hazardous substances where cleanup has not yet been completed.

Date of Government Version: 07/01/1995
Date Data Arrived at EDR: 08/30/1995
Date Made Active in Reports: 09/26/1995
Number of Days to Update: 27

Source: State Water Resources Control Board
Telephone: 916-227-4364
Last EDR Contact: 01/26/2009
Next Scheduled EDR Contact: 04/27/2009
Data Release Frequency: No Update Planned

CERS HAZ WASTE: CERS HAZ WASTE

List of sites in the California Environmental Protection Agency (CalEPA) Regulated Site Portal which fall under the Hazardous Chemical Management, Hazardous Waste Onsite Treatment, Household Hazardous Waste Collection, Hazardous Waste Generator, and RCRA LQ HW Generator programs.

Date of Government Version: 01/20/2021
Date Data Arrived at EDR: 01/20/2021
Date Made Active in Reports: 04/08/2021
Number of Days to Update: 78

Source: CalEPA
Telephone: 916-323-2514
Last EDR Contact: 01/20/2021
Next Scheduled EDR Contact: 05/03/2021
Data Release Frequency: Quarterly

US CDL: Clandestine Drug Labs

A listing of clandestine drug lab locations. The U.S. Department of Justice ("the Department") provides this web site as a public service. It contains addresses of some locations where law enforcement agencies reported they found chemicals or other items that indicated the presence of either clandestine drug laboratories or dumpsites. In most cases, the source of the entries is not the Department, and the Department has not verified the entry and does not guarantee its accuracy. Members of the public must verify the accuracy of all entries by, for example, contacting local law enforcement and local health departments.

Date of Government Version: 12/07/2020
Date Data Arrived at EDR: 12/09/2020
Date Made Active in Reports: 03/02/2021
Number of Days to Update: 83

Source: Drug Enforcement Administration
Telephone: 202-307-1000
Last EDR Contact: 02/22/2021
Next Scheduled EDR Contact: 06/06/2021
Data Release Frequency: Quarterly

PFAS: PFAS Contamination Site Location Listing

A listing of PFAS contaminated sites included in the GeoTracker database.

Date of Government Version: 12/07/2020
Date Data Arrived at EDR: 12/08/2020
Date Made Active in Reports: 02/22/2021
Number of Days to Update: 76

Source: State Water Resources Control Board
Telephone: 866-480-1028
Last EDR Contact: 02/24/2021
Next Scheduled EDR Contact: 06/21/2021
Data Release Frequency: Varies

Local Lists of Registered Storage Tanks

SWEEPS UST: SWEEPS UST Listing

Statewide Environmental Evaluation and Planning System. This underground storage tank listing was updated and maintained by a company contacted by the SWRCB in the early 1990's. The listing is no longer updated or maintained. The local agency is the contact for more information on a site on the SWEEPS list.

Date of Government Version: 06/01/1994
Date Data Arrived at EDR: 07/07/2005
Date Made Active in Reports: 08/11/2005
Number of Days to Update: 35

Source: State Water Resources Control Board
Telephone: N/A
Last EDR Contact: 06/03/2005
Next Scheduled EDR Contact: N/A
Data Release Frequency: No Update Planned

HIST UST: Hazardous Substance Storage Container Database

The Hazardous Substance Storage Container Database is a historical listing of UST sites. Refer to local/county source for current data.

Date of Government Version: 10/15/1990
Date Data Arrived at EDR: 01/25/1991
Date Made Active in Reports: 02/12/1991
Number of Days to Update: 18

Source: State Water Resources Control Board
Telephone: 916-341-5851
Last EDR Contact: 07/26/2001
Next Scheduled EDR Contact: N/A
Data Release Frequency: No Update Planned

SAN FRANCISCO AST: Aboveground Storage Tank Site Listing

Aboveground storage tank sites

Date of Government Version: 11/05/2020
Date Data Arrived at EDR: 11/06/2020
Date Made Active in Reports: 01/26/2021
Number of Days to Update: 81

Source: San Francisco County Department of Public Health
Telephone: 415-252-3896
Last EDR Contact: 02/01/2021
Next Scheduled EDR Contact: 05/17/2021
Data Release Frequency: Varies

CERS TANKS: California Environmental Reporting System (CERS) Tanks

List of sites in the California Environmental Protection Agency (CalEPA) Regulated Site Portal which fall under the Aboveground Petroleum Storage and Underground Storage Tank regulatory programs.

Date of Government Version: 01/20/2021
Date Data Arrived at EDR: 01/20/2021
Date Made Active in Reports: 04/08/2021
Number of Days to Update: 78

Source: California Environmental Protection Agency
Telephone: 916-323-2514
Last EDR Contact: 01/20/2021
Next Scheduled EDR Contact: 05/03/2021
Data Release Frequency: Quarterly

CA FID UST: Facility Inventory Database

The Facility Inventory Database (FID) contains a historical listing of active and inactive underground storage tank locations from the State Water Resource Control Board. Refer to local/county source for current data.

Date of Government Version: 10/31/1994
Date Data Arrived at EDR: 09/05/1995
Date Made Active in Reports: 09/29/1995
Number of Days to Update: 24

Source: California Environmental Protection Agency
Telephone: 916-341-5851
Last EDR Contact: 12/28/1998
Next Scheduled EDR Contact: N/A
Data Release Frequency: No Update Planned

Local Land Records

LIENS: Environmental Liens Listing

A listing of property locations with environmental liens for California where DTSC is a lien holder.

Date of Government Version: 11/24/2020
Date Data Arrived at EDR: 11/30/2020
Date Made Active in Reports: 02/10/2021
Number of Days to Update: 72

Source: Department of Toxic Substances Control
Telephone: 916-323-3400
Last EDR Contact: 02/26/2021
Next Scheduled EDR Contact: 06/14/2021
Data Release Frequency: Varies

LIENS 2: CERCLA Lien Information

A Federal CERCLA ('Superfund') lien can exist by operation of law at any site or property at which EPA has spent Superfund monies. These monies are spent to investigate and address releases and threatened releases of contamination. CERCLIS provides information as to the identity of these sites and properties.

Date of Government Version: 12/30/2020
Date Data Arrived at EDR: 01/14/2021
Date Made Active in Reports: 02/18/2021
Number of Days to Update: 35

Source: Environmental Protection Agency
Telephone: 202-564-6023
Last EDR Contact: 04/01/2021
Next Scheduled EDR Contact: 07/12/2021
Data Release Frequency: Semi-Annually

DEED: Deed Restriction Listing

Site Mitigation and Brownfields Reuse Program Facility Sites with Deed Restrictions & Hazardous Waste Management Program Facility Sites with Deed / Land Use Restriction. The DTSC Site Mitigation and Brownfields Reuse Program (SMBRP) list includes sites cleaned up under the program's oversight and generally does not include current or former hazardous waste facilities that required a hazardous waste facility permit. The list represents deed restrictions that are active. Some sites have multiple deed restrictions. The DTSC Hazardous Waste Management Program (HWMP) has developed a list of current or former hazardous waste facilities that have a recorded land use restriction at the local county recorder's office. The land use restrictions on this list were required by the DTSC HWMP as a result of the presence of hazardous substances that remain on site after the facility (or part of the facility) has been closed or cleaned up. The types of land use restriction include deed notice, deed restriction, or a land use restriction that binds current and future owners.

Date of Government Version: 11/30/2020
Date Data Arrived at EDR: 12/01/2020
Date Made Active in Reports: 02/12/2021
Number of Days to Update: 73

Source: DTSC and SWRCB
Telephone: 916-323-3400
Last EDR Contact: 03/03/2021
Next Scheduled EDR Contact: 06/14/2021
Data Release Frequency: Semi-Annually

Records of Emergency Release Reports

HMIRS: Hazardous Materials Information Reporting System

Hazardous Materials Incident Report System. HMIRS contains hazardous material spill incidents reported to DOT.

Date of Government Version: 12/16/2020
Date Data Arrived at EDR: 12/17/2020
Date Made Active in Reports: 03/12/2021
Number of Days to Update: 85

Source: U.S. Department of Transportation
Telephone: 202-366-4555
Last EDR Contact: 03/24/2021
Next Scheduled EDR Contact: 07/05/2021
Data Release Frequency: Quarterly

CHMIRS: California Hazardous Material Incident Report System

California Hazardous Material Incident Reporting System. CHMIRS contains information on reported hazardous material incidents (accidental releases or spills).

Date of Government Version: 12/31/2020
Date Data Arrived at EDR: 01/20/2021
Date Made Active in Reports: 04/08/2021
Number of Days to Update: 78

Source: Office of Emergency Services
Telephone: 916-845-8400
Last EDR Contact: 01/20/2021
Next Scheduled EDR Contact: 05/03/2021
Data Release Frequency: Semi-Annually

LDS: Land Disposal Sites Listing (GEOTRACKER)

Land Disposal sites (Landfills) included in GeoTracker. GeoTracker is the Water Boards data management system for sites that impact, or have the potential to impact, water quality in California, with emphasis on groundwater.

Date of Government Version: 03/08/2021
Date Data Arrived at EDR: 03/09/2021
Date Made Active in Reports: 03/31/2021
Number of Days to Update: 22

Source: State Water Qualilty Control Board
Telephone: 866-480-1028
Last EDR Contact: 03/09/2021
Next Scheduled EDR Contact: 06/21/2021
Data Release Frequency: Quarterly

MCS: Military Cleanup Sites Listing (GEOTRACKER)

Military sites (consisting of: Military UST sites; Military Privatized sites; and Military Cleanup sites [formerly known as DoD non UST]) included in GeoTracker. GeoTracker is the Water Boards data management system for sites that impact, or have the potential to impact, water quality in California, with emphasis on groundwater.

Date of Government Version: 03/08/2021
Date Data Arrived at EDR: 03/09/2021
Date Made Active in Reports: 03/31/2021
Number of Days to Update: 22

Source: State Water Resources Control Board
Telephone: 866-480-1028
Last EDR Contact: 03/09/2021
Next Scheduled EDR Contact: 06/21/2021
Data Release Frequency: Quarterly

SPILLS 90: SPILLS90 data from FirstSearch

Spills 90 includes those spill and release records available exclusively from FirstSearch databases. Typically, they may include chemical, oil and/or hazardous substance spills recorded after 1990. Duplicate records that are already included in EDR incident and release records are not included in Spills 90.

Date of Government Version: 06/06/2012
Date Data Arrived at EDR: 01/03/2013
Date Made Active in Reports: 02/22/2013
Number of Days to Update: 50

Source: FirstSearch
Telephone: N/A
Last EDR Contact: 01/03/2013
Next Scheduled EDR Contact: N/A
Data Release Frequency: No Update Planned

Other Ascertainable Records

RCRA NonGen / NLR: RCRA - Non Generators / No Longer Regulated

RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Non-Generators do not presently generate hazardous waste.

Date of Government Version: 12/14/2020
Date Data Arrived at EDR: 12/17/2020
Date Made Active in Reports: 12/22/2020
Number of Days to Update: 5

Source: Environmental Protection Agency
Telephone: (415) 495-8895
Last EDR Contact: 03/23/2021
Next Scheduled EDR Contact: 07/05/2021
Data Release Frequency: Quarterly

FUDS: Formerly Used Defense Sites

The listing includes locations of Formerly Used Defense Sites properties where the US Army Corps of Engineers is actively working or will take necessary cleanup actions.

Date of Government Version: 02/11/2021
Date Data Arrived at EDR: 02/17/2021
Date Made Active in Reports: 04/05/2021
Number of Days to Update: 47

Source: U.S. Army Corps of Engineers
Telephone: 202-528-4285
Last EDR Contact: 02/17/2021
Next Scheduled EDR Contact: 05/31/2021
Data Release Frequency: Varies

DOD: Department of Defense Sites

This data set consists of federally owned or administered lands, administered by the Department of Defense, that have any area equal to or greater than 640 acres of the United States, Puerto Rico, and the U.S. Virgin Islands.

Date of Government Version: 12/31/2005
Date Data Arrived at EDR: 11/10/2006
Date Made Active in Reports: 01/11/2007
Number of Days to Update: 62

Source: USGS
Telephone: 888-275-8747
Last EDR Contact: 04/16/2021
Next Scheduled EDR Contact: 07/26/2021
Data Release Frequency: Semi-Annually

FEDLAND: Federal and Indian Lands

Federally and Indian administrated lands of the United States. Lands included are administrated by: Army Corps of Engineers, Bureau of Reclamation, National Wild and Scenic River, National Wildlife Refuge, Public Domain Land, Wilderness, Wilderness Study Area, Wildlife Management Area, Bureau of Indian Affairs, Bureau of Land Management, Department of Justice, Forest Service, Fish and Wildlife Service, National Park Service.

Date of Government Version: 04/02/2018
Date Data Arrived at EDR: 04/11/2018
Date Made Active in Reports: 11/06/2019
Number of Days to Update: 574

Source: U.S. Geological Survey
Telephone: 888-275-8747
Last EDR Contact: 04/05/2021
Next Scheduled EDR Contact: 07/19/2021
Data Release Frequency: N/A

SCRD DRYCLEANERS: State Coalition for Remediation of Drycleaners Listing

The State Coalition for Remediation of Drycleaners was established in 1998, with support from the U.S. EPA Office of Superfund Remediation and Technology Innovation. It is comprised of representatives of states with established drycleaner remediation programs. Currently the member states are Alabama, Connecticut, Florida, Illinois, Kansas, Minnesota, Missouri, North Carolina, Oregon, South Carolina, Tennessee, Texas, and Wisconsin.

Date of Government Version: 01/01/2017
Date Data Arrived at EDR: 02/03/2017
Date Made Active in Reports: 04/07/2017
Number of Days to Update: 63

Source: Environmental Protection Agency
Telephone: 615-532-8599
Last EDR Contact: 02/09/2021
Next Scheduled EDR Contact: 05/24/2021
Data Release Frequency: Varies

US FIN ASSUR: Financial Assurance Information

All owners and operators of facilities that treat, store, or dispose of hazardous waste are required to provide proof that they will have sufficient funds to pay for the clean up, closure, and post-closure care of their facilities.

Date of Government Version: 12/14/2020
Date Data Arrived at EDR: 12/17/2020
Date Made Active in Reports: 03/12/2021
Number of Days to Update: 85

Source: Environmental Protection Agency
Telephone: 202-566-1917
Last EDR Contact: 03/23/2021
Next Scheduled EDR Contact: 07/05/2021
Data Release Frequency: Quarterly

EPA WATCH LIST: EPA WATCH LIST

EPA maintains a "Watch List" to facilitate dialogue between EPA, state and local environmental agencies on enforcement matters relating to facilities with alleged violations identified as either significant or high priority. Being on the Watch List does not mean that the facility has actually violated the law only that an investigation by EPA or a state or local environmental agency has led those organizations to allege that an unproven violation has in fact occurred. Being on the Watch List does not represent a higher level of concern regarding the alleged violations that were detected, but instead indicates cases requiring additional dialogue between EPA, state and local agencies - primarily because of the length of time the alleged violation has gone unaddressed or unresolved.

Date of Government Version: 08/30/2013
Date Data Arrived at EDR: 03/21/2014
Date Made Active in Reports: 06/17/2014
Number of Days to Update: 88

Source: Environmental Protection Agency
Telephone: 617-520-3000
Last EDR Contact: 02/02/2021
Next Scheduled EDR Contact: 05/17/2021
Data Release Frequency: Quarterly

2020 COR ACTION: 2020 Corrective Action Program List

The EPA has set ambitious goals for the RCRA Corrective Action program by creating the 2020 Corrective Action Universe. This RCRA cleanup baseline includes facilities expected to need corrective action. The 2020 universe contains a wide variety of sites. Some properties are heavily contaminated while others were contaminated but have since been cleaned up. Still others have not been fully investigated yet, and may require little or no remediation. Inclusion in the 2020 Universe does not necessarily imply failure on the part of a facility to meet its RCRA obligations.

Date of Government Version: 09/30/2017
Date Data Arrived at EDR: 05/08/2018
Date Made Active in Reports: 07/20/2018
Number of Days to Update: 73

Source: Environmental Protection Agency
Telephone: 703-308-4044
Last EDR Contact: 02/05/2021
Next Scheduled EDR Contact: 05/17/2021
Data Release Frequency: Varies

TSCA: Toxic Substances Control Act

Toxic Substances Control Act. TSCA identifies manufacturers and importers of chemical substances included on the TSCA Chemical Substance Inventory list. It includes data on the production volume of these substances by plant site.

Date of Government Version: 12/31/2016
Date Data Arrived at EDR: 06/17/2020
Date Made Active in Reports: 09/10/2020
Number of Days to Update: 85

Source: EPA
Telephone: 202-260-5521
Last EDR Contact: 03/19/2021
Next Scheduled EDR Contact: 06/28/2021
Data Release Frequency: Every 4 Years

TRIS: Toxic Chemical Release Inventory System

Toxic Release Inventory System. TRIS identifies facilities which release toxic chemicals to the air, water and land in reportable quantities under SARA Title III Section 313.

Date of Government Version: 12/31/2018
Date Data Arrived at EDR: 08/14/2020
Date Made Active in Reports: 11/04/2020
Number of Days to Update: 82

Source: EPA
Telephone: 202-566-0250
Last EDR Contact: 02/02/2021
Next Scheduled EDR Contact: 05/31/2021
Data Release Frequency: Annually

SSTS: Section 7 Tracking Systems

Section 7 of the Federal Insecticide, Fungicide and Rodenticide Act, as amended (92 Stat. 829) requires all registered pesticide-producing establishments to submit a report to the Environmental Protection Agency by March 1st each year. Each establishment must report the types and amounts of pesticides, active ingredients and devices being produced, and those having been produced and sold or distributed in the past year.

Date of Government Version: 01/20/2021
Date Data Arrived at EDR: 01/21/2021
Date Made Active in Reports: 03/22/2021
Number of Days to Update: 60

Source: EPA
Telephone: 202-564-4203
Last EDR Contact: 01/21/2021
Next Scheduled EDR Contact: 05/03/2021
Data Release Frequency: Annually

ROD: Records Of Decision

Record of Decision. ROD documents mandate a permanent remedy at an NPL (Superfund) site containing technical and health information to aid in the cleanup.

Date of Government Version: 12/30/2020
Date Data Arrived at EDR: 01/14/2021
Date Made Active in Reports: 02/18/2021
Number of Days to Update: 35

Source: EPA
Telephone: 703-416-0223
Last EDR Contact: 04/01/2021
Next Scheduled EDR Contact: 06/14/2021
Data Release Frequency: Annually

RMP: Risk Management Plans

When Congress passed the Clean Air Act Amendments of 1990, it required EPA to publish regulations and guidance for chemical accident prevention at facilities using extremely hazardous substances. The Risk Management Program Rule (RMP Rule) was written to implement Section 112(r) of these amendments. The rule, which built upon existing industry codes and standards, requires companies of all sizes that use certain flammable and toxic substances to develop a Risk Management Program, which includes a(n): Hazard assessment that details the potential effects of an accidental release, an accident history of the last five years, and an evaluation of worst-case and alternative accidental releases; Prevention program that includes safety precautions and maintenance, monitoring, and employee training measures; and Emergency response program that spells out emergency health care, employee training measures and procedures for informing the public and response agencies (e.g the fire department) should an accident occur.

Date of Government Version: 11/02/2020
Date Data Arrived at EDR: 11/12/2020
Date Made Active in Reports: 01/25/2021
Number of Days to Update: 74

Source: Environmental Protection Agency
Telephone: 202-564-8600
Last EDR Contact: 01/19/2021
Next Scheduled EDR Contact: 05/03/2021
Data Release Frequency: Varies

RAATS: RCRA Administrative Action Tracking System

RCRA Administration Action Tracking System. RAATS contains records based on enforcement actions issued under RCRA pertaining to major violators and includes administrative and civil actions brought by the EPA. For administration actions after September 30, 1995, data entry in the RAATS database was discontinued. EPA will retain a copy of the database for historical records. It was necessary to terminate RAATS because a decrease in agency resources made it impossible to continue to update the information contained in the database.

Date of Government Version: 04/17/1995
Date Data Arrived at EDR: 07/03/1995
Date Made Active in Reports: 08/07/1995
Number of Days to Update: 35

Source: EPA
Telephone: 202-564-4104
Last EDR Contact: 06/02/2008
Next Scheduled EDR Contact: 09/01/2008
Data Release Frequency: No Update Planned

PRP: Potentially Responsible Parties
A listing of verified Potentially Responsible Parties

Date of Government Version: 12/30/2020
Date Data Arrived at EDR: 01/14/2021
Date Made Active in Reports: 03/05/2021
Number of Days to Update: 50
Source: EPA
Telephone: 202-564-6023
Last EDR Contact: 03/11/2021
Next Scheduled EDR Contact: 05/17/2021
Data Release Frequency: Quarterly

PADS: PCB Activity Database System
PCB Activity Database. PADS Identifies generators, transporters, commercial storers and/or brokers and disposers of PCB's who are required to notify the EPA of such activities.

Date of Government Version: 11/19/2020
Date Data Arrived at EDR: 01/08/2021
Date Made Active in Reports: 03/22/2021
Number of Days to Update: 73
Source: EPA
Telephone: 202-566-0500
Last EDR Contact: 04/09/2021
Next Scheduled EDR Contact: 07/19/2021
Data Release Frequency: Annually

ICIS: Integrated Compliance Information System
The Integrated Compliance Information System (ICIS) supports the information needs of the national enforcement and compliance program as well as the unique needs of the National Pollutant Discharge Elimination System (NPDES) program.

Date of Government Version: 11/18/2016
Date Data Arrived at EDR: 11/23/2016
Date Made Active in Reports: 02/10/2017
Number of Days to Update: 79
Source: Environmental Protection Agency
Telephone: 202-564-2501
Last EDR Contact: 03/31/2021
Next Scheduled EDR Contact: 07/19/2021
Data Release Frequency: Quarterly

FTTS: FIFRA/ TSCA Tracking System - FIFRA (Federal Insecticide, Fungicide, & Rodenticide Act)/TSCA (Toxic Substances Control Act)
FTTS tracks administrative cases and pesticide enforcement actions and compliance activities related to FIFRA, TSCA and EPCRA (Emergency Planning and Community Right-to-Know Act). To maintain currency, EDR contacts the Agency on a quarterly basis.

Date of Government Version: 04/09/2009
Date Data Arrived at EDR: 04/16/2009
Date Made Active in Reports: 05/11/2009
Number of Days to Update: 25
Source: EPA/Office of Prevention, Pesticides and Toxic Substances
Telephone: 202-566-1667
Last EDR Contact: 08/18/2017
Next Scheduled EDR Contact: 12/04/2017
Data Release Frequency: No Update Planned

FTTS INSP: FIFRA/ TSCA Tracking System - FIFRA (Federal Insecticide, Fungicide, & Rodenticide Act)/TSCA (Toxic Substances Control Act)
A listing of FIFRA/TSCA Tracking System (FTTS) inspections and enforcements.

Date of Government Version: 04/09/2009
Date Data Arrived at EDR: 04/16/2009
Date Made Active in Reports: 05/11/2009
Number of Days to Update: 25
Source: EPA
Telephone: 202-566-1667
Last EDR Contact: 08/18/2017
Next Scheduled EDR Contact: 12/04/2017
Data Release Frequency: No Update Planned

MLTS: Material Licensing Tracking System
MLTS is maintained by the Nuclear Regulatory Commission and contains a list of approximately 8,100 sites which possess or use radioactive materials and which are subject to NRC licensing requirements. To maintain currency, EDR contacts the Agency on a quarterly basis.

Date of Government Version: 08/05/2020
Date Data Arrived at EDR: 08/10/2020
Date Made Active in Reports: 10/08/2020
Number of Days to Update: 59
Source: Nuclear Regulatory Commission
Telephone: 301-415-7169
Last EDR Contact: 04/16/2021
Next Scheduled EDR Contact: 08/02/2021
Data Release Frequency: Quarterly

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

COAL ASH DOE: Steam-Electric Plant Operation Data
A listing of power plants that store ash in surface ponds.

Date of Government Version: 12/31/2019
Date Data Arrived at EDR: 12/01/2020
Date Made Active in Reports: 02/09/2021
Number of Days to Update: 70
Source: Department of Energy
Telephone: 202-586-8719
Last EDR Contact: 03/05/2021
Next Scheduled EDR Contact: 06/14/2021
Data Release Frequency: Varies

COAL ASH EPA: Coal Combustion Residues Surface Impoundments List
A listing of coal combustion residues surface impoundments with high hazard potential ratings.

Date of Government Version: 01/12/2017
Date Data Arrived at EDR: 03/05/2019
Date Made Active in Reports: 11/11/2019
Number of Days to Update: 251
Source: Environmental Protection Agency
Telephone: N/A
Last EDR Contact: 03/02/2021
Next Scheduled EDR Contact: 06/14/2021
Data Release Frequency: Varies

PCB TRANSFORMER: PCB Transformer Registration Database
The database of PCB transformer registrations that includes all PCB registration submittals.

Date of Government Version: 09/13/2019
Date Data Arrived at EDR: 11/06/2019
Date Made Active in Reports: 02/10/2020
Number of Days to Update: 96
Source: Environmental Protection Agency
Telephone: 202-566-0517
Last EDR Contact: 02/05/2021
Next Scheduled EDR Contact: 05/17/2021
Data Release Frequency: Varies

RADINFO: Radiation Information Database
The Radiation Information Database (RADINFO) contains information about facilities that are regulated by U.S. Environmental Protection Agency (EPA) regulations for radiation and radioactivity.

Date of Government Version: 07/01/2019
Date Data Arrived at EDR: 07/01/2019
Date Made Active in Reports: 09/23/2019
Number of Days to Update: 84
Source: Environmental Protection Agency
Telephone: 202-343-9775
Last EDR Contact: 03/25/2021
Next Scheduled EDR Contact: 07/12/2021
Data Release Frequency: Quarterly

HIST FTTS: FIFRA/TSCA Tracking System Administrative Case Listing
A complete administrative case listing from the FIFRA/TSCA Tracking System (FTTS) for all ten EPA regions. The information was obtained from the National Compliance Database (NCDB). NCDB supports the implementation of FIFRA (Federal Insecticide, Fungicide, and Rodenticide Act) and TSCA (Toxic Substances Control Act). Some EPA regions are now closing out records. Because of that, and the fact that some EPA regions are not providing EPA Headquarters with updated records, it was decided to create a HIST FTTS database. It included records that may not be included in the newer FTTS database updates. This database is no longer updated.

Date of Government Version: 10/19/2006
Date Data Arrived at EDR: 03/01/2007
Date Made Active in Reports: 04/10/2007
Number of Days to Update: 40
Source: Environmental Protection Agency
Telephone: 202-564-2501
Last EDR Contact: 12/17/2007
Next Scheduled EDR Contact: 03/17/2008
Data Release Frequency: No Update Planned

HIST FTTS INSP: FIFRA/TSCA Tracking System Inspection & Enforcement Case Listing
A complete inspection and enforcement case listing from the FIFRA/TSCA Tracking System (FTTS) for all ten EPA regions. The information was obtained from the National Compliance Database (NCDB). NCDB supports the implementation of FIFRA (Federal Insecticide, Fungicide, and Rodenticide Act) and TSCA (Toxic Substances Control Act). Some EPA regions are now closing out records. Because of that, and the fact that some EPA regions are not providing EPA Headquarters with updated records, it was decided to create a HIST FTTS database. It included records that may not be included in the newer FTTS database updates. This database is no longer updated.

Date of Government Version: 10/19/2006
Date Data Arrived at EDR: 03/01/2007
Date Made Active in Reports: 04/10/2007
Number of Days to Update: 40

Source: Environmental Protection Agency
Telephone: 202-564-2501
Last EDR Contact: 12/17/2008
Next Scheduled EDR Contact: 03/17/2008
Data Release Frequency: No Update Planned

DOT OPS: Incident and Accident Data

Department of Transporation, Office of Pipeline Safety Incident and Accident data.

Date of Government Version: 01/02/2020
Date Data Arrived at EDR: 01/28/2020
Date Made Active in Reports: 04/17/2020
Number of Days to Update: 80

Source: Department of Transporation, Office of Pipeline Safety
Telephone: 202-366-4595
Last EDR Contact: 01/27/2021
Next Scheduled EDR Contact: 05/10/2021
Data Release Frequency: Quarterly

CONSENT: Superfund (CERCLA) Consent Decrees

Major legal settlements that establish responsibility and standards for cleanup at NPL (Superfund) sites. Released periodically by United States District Courts after settlement by parties to litigation matters.

Date of Government Version: 12/31/2020
Date Data Arrived at EDR: 01/13/2021
Date Made Active in Reports: 03/22/2021
Number of Days to Update: 68

Source: Department of Justice, Consent Decree Library
Telephone: Varies
Last EDR Contact: 04/05/2021
Next Scheduled EDR Contact: 07/19/2021
Data Release Frequency: Varies

BRS: Biennial Reporting System

The Biennial Reporting System is a national system administered by the EPA that collects data on the generation and management of hazardous waste. BRS captures detailed data from two groups: Large Quantity Generators (LQG) and Treatment, Storage, and Disposal Facilities.

Date of Government Version: 12/31/2017
Date Data Arrived at EDR: 06/22/2020
Date Made Active in Reports: 11/20/2020
Number of Days to Update: 151

Source: EPA/NTIS
Telephone: 800-424-9346
Last EDR Contact: 03/23/2021
Next Scheduled EDR Contact: 07/05/2021
Data Release Frequency: Biennially

INDIAN RESERV: Indian Reservations

This map layer portrays Indian administered lands of the United States that have any area equal to or greater than 640 acres.

Date of Government Version: 12/31/2014
Date Data Arrived at EDR: 07/14/2015
Date Made Active in Reports: 01/10/2017
Number of Days to Update: 546

Source: USGS
Telephone: 202-208-3710
Last EDR Contact: 04/06/2021
Next Scheduled EDR Contact: 07/19/2021
Data Release Frequency: Semi-Annually

FUSRAP: Formerly Utilized Sites Remedial Action Program

DOE established the Formerly Utilized Sites Remedial Action Program (FUSRAP) in 1974 to remediate sites where radioactive contamination remained from Manhattan Project and early U.S. Atomic Energy Commission (AEC) operations.

Date of Government Version: 08/08/2017
Date Data Arrived at EDR: 09/11/2018
Date Made Active in Reports: 09/14/2018
Number of Days to Update: 3

Source: Department of Energy
Telephone: 202-586-3559
Last EDR Contact: 02/02/2021
Next Scheduled EDR Contact: 05/17/2021
Data Release Frequency: Varies

UMTRA: Uranium Mill Tailings Sites

Uranium ore was mined by private companies for federal government use in national defense programs. When the mills shut down, large piles of the sand-like material (mill tailings) remain after uranium has been extracted from the ore. Levels of human exposure to radioactive materials from the piles are low; however, in some cases tailings were used as construction materials before the potential health hazards of the tailings were recognized.

Date of Government Version: 08/30/2019
Date Data Arrived at EDR: 11/15/2019
Date Made Active in Reports: 01/28/2020
Number of Days to Update: 74

Source: Department of Energy
Telephone: 505-845-0011
Last EDR Contact: 02/18/2021
Next Scheduled EDR Contact: 05/31/2021
Data Release Frequency: Varies

LEAD SMELTER 1: Lead Smelter Sites

A listing of former lead smelter site locations.

Date of Government Version: 12/30/2020
Date Data Arrived at EDR: 01/14/2021
Date Made Active in Reports: 02/09/2021
Number of Days to Update: 26

Source: Environmental Protection Agency
Telephone: 703-603-8787
Last EDR Contact: 04/01/2021
Next Scheduled EDR Contact: 07/12/2021
Data Release Frequency: Varies

LEAD SMELTER 2: Lead Smelter Sites

A list of several hundred sites in the U.S. where secondary lead smelting was done from 1931and 1964. These sites may pose a threat to public health through ingestion or inhalation of contaminated soil or dust

Date of Government Version: 04/05/2001
Date Data Arrived at EDR: 10/27/2010
Date Made Active in Reports: 12/02/2010
Number of Days to Update: 36

Source: American Journal of Public Health
Telephone: 703-305-6451
Last EDR Contact: 12/02/2009
Next Scheduled EDR Contact: N/A
Data Release Frequency: No Update Planned

US AIRS (AFS): Aerometric Information Retrieval System Facility Subsystem (AFS)

The database is a sub-system of Aerometric Information Retrieval System (AIRS). AFS contains compliance data on air pollution point sources regulated by the U.S. EPA and/or state and local air regulatory agencies. This information comes from source reports by various stationary sources of air pollution, such as electric power plants, steel mills, factories, and universities, and provides information about the air pollutants they produce. Action, air program, air program pollutant, and general level plant data. It is used to track emissions and compliance data from industrial plants.

Date of Government Version: 10/12/2016
Date Data Arrived at EDR: 10/26/2016
Date Made Active in Reports: 02/03/2017
Number of Days to Update: 100

Source: EPA
Telephone: 202-564-2496
Last EDR Contact: 09/26/2017
Next Scheduled EDR Contact: 01/08/2018
Data Release Frequency: Annually

US AIRS MINOR: Air Facility System Data

A listing of minor source facilities.

Date of Government Version: 10/12/2016
Date Data Arrived at EDR: 10/26/2016
Date Made Active in Reports: 02/03/2017
Number of Days to Update: 100

Source: EPA
Telephone: 202-564-2496
Last EDR Contact: 09/26/2017
Next Scheduled EDR Contact: 01/08/2018
Data Release Frequency: Annually

MINES VIOLATIONS: MSHA Violation Assessment Data

Mines violation and assessment information. Department of Labor, Mine Safety & Health Administration.

Date of Government Version: 11/24/2020
Date Data Arrived at EDR: 11/30/2020
Date Made Active in Reports: 01/25/2021
Number of Days to Update: 56

Source: DOL, Mine Safety & Health Admi
Telephone: 202-693-9424
Last EDR Contact: 03/01/2021
Next Scheduled EDR Contact: 06/14/2021
Data Release Frequency: Quarterly

US MINES: Mines Master Index File

Contains all mine identification numbers issued for mines active or opened since 1971. The data also includes violation information.

Date of Government Version: 11/03/2020
Date Data Arrived at EDR: 11/23/2020
Date Made Active in Reports: 01/25/2021
Number of Days to Update: 63

Source: Department of Labor, Mine Safety and Health Administration
Telephone: 303-231-5959
Last EDR Contact: 02/24/2021
Next Scheduled EDR Contact: 06/06/2021
Data Release Frequency: Semi-Annually

US MINES 2: Ferrous and Nonferrous Metal Mines Database Listing

This map layer includes ferrous (ferrous metal mines are facilities that extract ferrous metals, such as iron ore or molybdenum) and nonferrous (Nonferrous metal mines are facilities that extract nonferrous metals, such as gold, silver, copper, zinc, and lead) metal mines in the United States.

Date of Government Version: 05/06/2020
Date Data Arrived at EDR: 05/27/2020
Date Made Active in Reports: 08/13/2020
Number of Days to Update: 78

Source: USGS
Telephone: 703-648-7709
Last EDR Contact: 02/26/2021
Next Scheduled EDR Contact: 06/06/2021
Data Release Frequency: Varies

US MINES 3: Active Mines & Mineral Plants Database Listing

Active Mines and Mineral Processing Plant operations for commodities monitored by the Minerals Information Team of the USGS.

Date of Government Version: 04/14/2011
Date Data Arrived at EDR: 06/08/2011
Date Made Active in Reports: 09/13/2011
Number of Days to Update: 97

Source: USGS
Telephone: 703-648-7709
Last EDR Contact: 02/26/2021
Next Scheduled EDR Contact: 06/06/2021
Data Release Frequency: Varies

ABANDONED MINES: Abandoned Mines

An inventory of land and water impacted by past mining (primarily coal mining) is maintained by OSMRE to provide information needed to implement the Surface Mining Control and Reclamation Act of 1977 (SMCRA). The inventory contains information on the location, type, and extent of AML impacts, as well as, information on the cost associated with the reclamation of those problems. The inventory is based upon field surveys by State, Tribal, and OSMRE program officials. It is dynamic to the extent that it is modified as new problems are identified and existing problems are reclaimed.

Date of Government Version: 12/11/2020
Date Data Arrived at EDR: 12/11/2020
Date Made Active in Reports: 03/02/2021
Number of Days to Update: 81

Source: Department of Interior
Telephone: 202-208-2609
Last EDR Contact: 03/10/2021
Next Scheduled EDR Contact: 06/21/2021
Data Release Frequency: Quarterly

FINDS: Facility Index System/Facility Registry System

Facility Index System. FINDS contains both facility information and 'pointers' to other sources that contain more detail. EDR includes the following FINDS databases in this report: PCS (Permit Compliance System), AIRS (Aerometric Information Retrieval System), DOCKET (Enforcement Docket used to manage and track information on civil judicial enforcement cases for all environmental statutes), FURS (Federal Underground Injection Control), C-DOCKET (Criminal Docket System used to track criminal enforcement actions for all environmental statutes), FFIS (Federal Facilities Information System), STATE (State Environmental Laws and Statutes), and PADS (PCB Activity Data System).

Date of Government Version: 02/03/2021
Date Data Arrived at EDR: 03/03/2021
Date Made Active in Reports: 04/05/2021
Number of Days to Update: 33

Source: EPA
Telephone: (415) 947-8000
Last EDR Contact: 03/03/2021
Next Scheduled EDR Contact: 06/14/2021
Data Release Frequency: Quarterly

UXO: Unexploded Ordnance Sites

A listing of unexploded ordnance site locations

Date of Government Version: 12/31/2018
Date Data Arrived at EDR: 07/02/2020
Date Made Active in Reports: 09/17/2020
Number of Days to Update: 77

Source: Department of Defense
Telephone: 703-704-1564
Last EDR Contact: 04/13/2021
Next Scheduled EDR Contact: 07/26/2021
Data Release Frequency: Varies

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

ECHO: Enforcement & Compliance History Information

ECHO provides integrated compliance and enforcement information for about 800,000 regulated facilities nationwide.

Date of Government Version: 01/02/2021
Date Data Arrived at EDR: 01/08/2021
Date Made Active in Reports: 03/22/2021
Number of Days to Update: 73

Source: Environmental Protection Agency
Telephone: 202-564-2280
Last EDR Contact: 04/06/2021
Next Scheduled EDR Contact: 07/19/2021
Data Release Frequency: Quarterly

DOCKET HWC: Hazardous Waste Compliance Docket Listing

A complete list of the Federal Agency Hazardous Waste Compliance Docket Facilities.

Date of Government Version: 11/03/2020
Date Data Arrived at EDR: 11/17/2020
Date Made Active in Reports: 02/09/2021
Number of Days to Update: 84

Source: Environmental Protection Agency
Telephone: 202-564-0527
Last EDR Contact: 02/26/2021
Next Scheduled EDR Contact: 06/06/2021
Data Release Frequency: Varies

FUELS PROGRAM: EPA Fuels Program Registered Listing

This listing includes facilities that are registered under the Part 80 (Code of Federal Regulations) EPA Fuels Programs. All companies now are required to submit new and updated registrations.

Date of Government Version: 02/17/2021
Date Data Arrived at EDR: 02/17/2021
Date Made Active in Reports: 03/22/2021
Number of Days to Update: 33

Source: EPA
Telephone: 800-385-6164
Last EDR Contact: 02/17/2021
Next Scheduled EDR Contact: 05/31/2021
Data Release Frequency: Quarterly

CA BOND EXP. PLAN: Bond Expenditure Plan

Department of Health Services developed a site-specific expenditure plan as the basis for an appropriation of Hazardous Substance Cleanup Bond Act funds. It is not updated.

Date of Government Version: 01/01/1989
Date Data Arrived at EDR: 07/27/1994
Date Made Active in Reports: 08/02/1994
Number of Days to Update: 6

Source: Department of Health Services
Telephone: 916-255-2118
Last EDR Contact: 05/31/1994
Next Scheduled EDR Contact: N/A
Data Release Frequency: No Update Planned

CORTESE: "Cortese" Hazardous Waste & Substances Sites List

The sites for the list are designated by the State Water Resource Control Board (LUST), the Integrated Waste Board (SWF/LS), and the Department of Toxic Substances Control (Cal-Sites).

Date of Government Version: 12/17/2020
Date Data Arrived at EDR: 12/17/2020
Date Made Active in Reports: 03/09/2021
Number of Days to Update: 82

Source: CAL EPA/Office of Emergency Information
Telephone: 916-323-3400
Last EDR Contact: 03/23/2021
Next Scheduled EDR Contact: 07/05/2021
Data Release Frequency: Quarterly

CUPA LIVERMORE-PLEASANTON: CUPA Facility Listing

list of facilities associated with the various CUPA programs in Livermore-Pleasanton

Date of Government Version: 05/01/2019
Date Data Arrived at EDR: 05/14/2019
Date Made Active in Reports: 07/17/2019
Number of Days to Update: 64

Source: Livermore-Pleasanton Fire Department
Telephone: 925-454-2361
Last EDR Contact: 02/12/2021
Next Scheduled EDR Contact: 05/24/2021
Data Release Frequency: Varies

DRYCLEAN SOUTH COAST: South Coast Air Quality Management District Drycleaner Listing

A listing of dry cleaners in the South Coast Air Quality Management District

Date of Government Version: 11/17/2020
Date Data Arrived at EDR: 11/18/2020
Date Made Active in Reports: 02/04/2021
Number of Days to Update: 78

Source: South Coast Air Quality Management District
Telephone: 909-396-3211
Last EDR Contact: 02/22/2021
Next Scheduled EDR Contact: 06/06/2021
Data Release Frequency: Varies

DRYCLEANERS: Cleaner Facilities

A list of drycleaner related facilities that have EPA ID numbers. These are facilities with certain SIC codes: power laundries, family and commercial; garment pressing and cleaner's agents; linen supply; coin-operated laundries and cleaning; drycleaning plants, except rugs; carpet and upholster cleaning; industrial launderers; laundry and garment services.

Date of Government Version: 11/23/2020
Date Data Arrived at EDR: 11/25/2020
Date Made Active in Reports: 02/10/2021
Number of Days to Update: 77

Source: Department of Toxic Substance Control
Telephone: 916-327-4498
Last EDR Contact: 02/26/2021
Next Scheduled EDR Contact: 06/14/2021
Data Release Frequency: Annually

DRYCLEAN AVAQMD: Antelope Valley Air Quality Management District Drycleaner Listing

A listing of dry cleaners in the Antelope Valley Air Quality Management District.

Date of Government Version: 11/23/2020
Date Data Arrived at EDR: 11/24/2020
Date Made Active in Reports: 02/10/2021
Number of Days to Update: 78

Source: Antelope Valley Air Quality Management District
Telephone: 661-723-8070
Last EDR Contact: 02/26/2021
Next Scheduled EDR Contact: 06/14/2021
Data Release Frequency: Varies

EMI: Emissions Inventory Data

Toxics and criteria pollutant emissions data collected by the ARB and local air pollution agencies.

Date of Government Version: 12/31/2018
Date Data Arrived at EDR: 06/16/2020
Date Made Active in Reports: 08/28/2020
Number of Days to Update: 73

Source: California Air Resources Board
Telephone: 916-322-2990
Last EDR Contact: 03/19/2021
Next Scheduled EDR Contact: 06/28/2021
Data Release Frequency: Varies

ENF: Enforcement Action Listing

A listing of Water Board Enforcement Actions. Formal is everything except Oral/Verbal Communication, Notice of Violation, Expedited Payment Letter, and Staff Enforcement Letter.

Date of Government Version: 12/31/2020
Date Data Arrived at EDR: 01/20/2021
Date Made Active in Reports: 04/09/2021
Number of Days to Update: 79

Source: State Water Resoruces Control Board
Telephone: 916-445-9379
Last EDR Contact: 01/20/2021
Next Scheduled EDR Contact: 05/03/2021
Data Release Frequency: Varies

Financial Assurance 1: Financial Assurance Information Listing

Financial Assurance information

Date of Government Version: 01/25/2021
Date Data Arrived at EDR: 01/26/2021
Date Made Active in Reports: 04/13/2021
Number of Days to Update: 77

Source: Department of Toxic Substances Control
Telephone: 916-255-3628
Last EDR Contact: 04/14/2021
Next Scheduled EDR Contact: 08/02/2021
Data Release Frequency: Varies

Financial Assurance 2: Financial Assurance Information Listing

A listing of financial assurance information for solid waste facilities. Financial assurance is intended to ensure that resources are available to pay for the cost of closure, post-closure care, and corrective measures if the owner or operator of a regulated facility is unable or unwilling to pay.

Date of Government Version: 11/12/2020
Date Data Arrived at EDR: 11/13/2020
Date Made Active in Reports: 01/29/2021
Number of Days to Update: 77

Source: California Integrated Waste Management Board
Telephone: 916-341-6066
Last EDR Contact: 02/08/2021
Next Scheduled EDR Contact: 05/24/2021
Data Release Frequency: Varies

HAZNET: Facility and Manifest Data

Facility and Manifest Data. The data is extracted from the copies of hazardous waste manifests received each year by the DTSC. The annual volume of manifests is typically 700,000 - 1,000,000 annually, representing approximately 350,000 - 500,000 shipments. Data are from the manifests submitted without correction, and therefore many contain some invalid values for data elements such as generator ID, TSD ID, waste category, and disposal method. This database begins with calendar year 1993.

Date of Government Version: 12/31/2019
Date Data Arrived at EDR: 04/15/2020
Date Made Active in Reports: 07/02/2020
Number of Days to Update: 78

Source: California Environmental Protection Agency
Telephone: 916-255-1136
Last EDR Contact: 04/09/2021
Next Scheduled EDR Contact: 07/19/2021
Data Release Frequency: Annually

ICE: ICE

Contains data pertaining to the Permitted Facilities with Inspections / Enforcements sites tracked in Envirostor.

Date of Government Version: 11/13/2020
Date Data Arrived at EDR: 11/13/2020
Date Made Active in Reports: 02/01/2021
Number of Days to Update: 80

Source: Department of Toxic Subsances Control
Telephone: 877-786-9427
Last EDR Contact: 02/17/2021
Next Scheduled EDR Contact: 05/31/2021
Data Release Frequency: Quarterly

HIST CORTESE: Hazardous Waste & Substance Site List

The sites for the list are designated by the State Water Resource Control Board [LUST], the Integrated Waste Board [SWF/LS], and the Department of Toxic Substances Control [CALSITES]. This listing is no longer updated by the state agency.

Date of Government Version: 04/01/2001
Date Data Arrived at EDR: 01/22/2009
Date Made Active in Reports: 04/08/2009
Number of Days to Update: 76

Source: Department of Toxic Substances Control
Telephone: 916-323-3400
Last EDR Contact: 01/22/2009
Next Scheduled EDR Contact: N/A
Data Release Frequency: No Update Planned

HWP: EnviroStor Permitted Facilities Listing

Detailed information on permitted hazardous waste facilities and corrective action ("cleanups") tracked in EnviroStor.

Date of Government Version: 11/13/2020
Date Data Arrived at EDR: 11/13/2020
Date Made Active in Reports: 02/01/2021
Number of Days to Update: 80

Source: Department of Toxic Substances Control
Telephone: 916-323-3400
Last EDR Contact: 02/17/2021
Next Scheduled EDR Contact: 05/31/2021
Data Release Frequency: Quarterly

HWT: Registered Hazardous Waste Transporter Database

A listing of hazardous waste transporters. In California, unless specifically exempted, it is unlawful for any person to transport hazardous wastes unless the person holds a valid registration issued by DTSC. A hazardous waste transporter registration is valid for one year and is assigned a unique registration number.

Date of Government Version: 01/05/2021
Date Data Arrived at EDR: 01/05/2021
Date Made Active in Reports: 03/18/2021
Number of Days to Update: 72

Source: Department of Toxic Substances Control
Telephone: 916-440-7145
Last EDR Contact: 04/06/2021
Next Scheduled EDR Contact: 07/19/2021
Data Release Frequency: Quarterly

MINES: Mines Site Location Listing
A listing of mine site locations from the Office of Mine Reclamation.

Date of Government Version: 03/08/2021
Date Data Arrived at EDR: 03/09/2021
Date Made Active in Reports: 03/30/2021
Number of Days to Update: 21
Source: Department of Conservation
Telephone: 916-322-1080
Last EDR Contact: 03/09/2021
Next Scheduled EDR Contact: 06/21/2021
Data Release Frequency: Quarterly

MWMP: Medical Waste Management Program Listing
The Medical Waste Management Program (MWMP) ensures the proper handling and disposal of medical waste by permitting and inspecting medical waste Offsite Treatment Facilities (PDF) and Transfer Stations (PDF) throughout the state. MWMP also oversees all Medical Waste Transporters.

Date of Government Version: 10/30/2020
Date Data Arrived at EDR: 12/01/2020
Date Made Active in Reports: 02/12/2021
Number of Days to Update: 73
Source: Department of Public Health
Telephone: 916-558-1784
Last EDR Contact: 03/03/2021
Next Scheduled EDR Contact: 06/14/2021
Data Release Frequency: Varies

NPDES: NPDES Permits Listing
A listing of NPDES permits, including stormwater.

Date of Government Version: 11/09/2020
Date Data Arrived at EDR: 11/10/2020
Date Made Active in Reports: 01/27/2021
Number of Days to Update: 78
Source: State Water Resources Control Board
Telephone: 916-445-9379
Last EDR Contact: 02/09/2021
Next Scheduled EDR Contact: 05/24/2021
Data Release Frequency: Quarterly

PEST LIC: Pesticide Regulation Licenses Listing
A listing of licenses and certificates issued by the Department of Pesticide Regulation. The DPR issues licenses and/or certificates to: Persons and businesses that apply or sell pesticides; Pest control dealers and brokers; Persons who advise on agricultural pesticide applications.

Date of Government Version: 11/30/2020
Date Data Arrived at EDR: 12/01/2020
Date Made Active in Reports: 02/12/2021
Number of Days to Update: 73
Source: Department of Pesticide Regulation
Telephone: 916-445-4038
Last EDR Contact: 03/03/2021
Next Scheduled EDR Contact: 06/14/2021
Data Release Frequency: Quarterly

PROC: Certified Processors Database
A listing of certified processors.

Date of Government Version: 03/09/2021
Date Data Arrived at EDR: 03/09/2021
Date Made Active in Reports: 03/31/2021
Number of Days to Update: 22
Source: Department of Conservation
Telephone: 916-323-3836
Last EDR Contact: 03/09/2021
Next Scheduled EDR Contact: 06/21/2021
Data Release Frequency: Quarterly

NOTIFY 65: Proposition 65 Records
Listings of all Proposition 65 incidents reported to counties by the State Water Resources Control Board and the Regional Water Quality Control Board. This database is no longer updated by the reporting agency.

Date of Government Version: 12/07/2020
Date Data Arrived at EDR: 12/09/2020
Date Made Active in Reports: 12/10/2020
Number of Days to Update: 1
Source: State Water Resources Control Board
Telephone: 916-445-3846
Last EDR Contact: 03/12/2021
Next Scheduled EDR Contact: 06/28/2021
Data Release Frequency: No Update Planned

UIC: UIC Listing
A listing of wells identified as underground injection wells, in the California Oil and Gas Wells database.

Date of Government Version: 03/08/2021
Date Data Arrived at EDR: 03/09/2021
Date Made Active in Reports: 03/31/2021
Number of Days to Update: 22
Source: Deaprtment of Conservation
Telephone: 916-445-2408
Last EDR Contact: 03/09/2021
Next Scheduled EDR Contact: 06/21/2021
Data Release Frequency: Varies

UIC GEO: Underground Injection Control Sites (GEOTRACKER)
Underground control injection sites

Date of Government Version: 03/08/2021
Date Data Arrived at EDR: 03/09/2021
Date Made Active in Reports: 03/30/2021
Number of Days to Update: 21
Source: State Water Resource Control Board
Telephone: 866-480-1028
Last EDR Contact: 03/09/2021
Next Scheduled EDR Contact: 06/21/2021
Data Release Frequency: Varies

WASTEWATER PITS: Oil Wastewater Pits Listing
Water officials discovered that oil producers have been dumping chemical-laden wastewater into hundreds of unlined pits that are operating without proper permits. Inspections completed by the Central Valley Regional Water Quality Control Board revealed the existence of previously unidentified waste sites. The water boards review found that more than one-third of the region's active disposal pits are operating without permission.

Date of Government Version: 11/19/2019
Date Data Arrived at EDR: 01/07/2020
Date Made Active in Reports: 03/09/2020
Number of Days to Update: 62
Source: RWQCB, Central Valley Region
Telephone: 559-445-5577
Last EDR Contact: 04/09/2021
Next Scheduled EDR Contact: 07/19/2021
Data Release Frequency: Varies

WDS: Waste Discharge System
Sites which have been issued waste discharge requirements.

Date of Government Version: 06/19/2007
Date Data Arrived at EDR: 06/20/2007
Date Made Active in Reports: 06/29/2007
Number of Days to Update: 9
Source: State Water Resources Control Board
Telephone: 916-341-5227
Last EDR Contact: 02/16/2021
Next Scheduled EDR Contact: 05/31/2021
Data Release Frequency: No Update Planned

WIP: Well Investigation Program Case List
Well Investigation Program case in the San Gabriel and San Fernando Valley area.

Date of Government Version: 07/03/2009
Date Data Arrived at EDR: 07/21/2009
Date Made Active in Reports: 08/03/2009
Number of Days to Update: 13
Source: Los Angeles Water Quality Control Board
Telephone: 213-576-6726
Last EDR Contact: 03/19/2021
Next Scheduled EDR Contact: 07/05/2021
Data Release Frequency: No Update Planned

MILITARY PRIV SITES: Military Privatized Sites (GEOTRACKER)
Military privatized sites

Date of Government Version: 03/08/2021
Date Data Arrived at EDR: 03/09/2021
Date Made Active in Reports: 03/30/2021
Number of Days to Update: 21
Source: State Water Resources Control Board
Telephone: 866-480-1028
Last EDR Contact: 03/09/2021
Next Scheduled EDR Contact: 06/21/2021
Data Release Frequency: Varies

PROJECT: Project Sites (GEOTRACKER)
Projects sites

Date of Government Version: 03/08/2021
Date Data Arrived at EDR: 03/09/2021
Date Made Active in Reports: 03/30/2021
Number of Days to Update: 21

Source: State Water Resources Control Board
Telephone: 866-480-1028
Last EDR Contact: 03/09/2021
Next Scheduled EDR Contact: 06/21/2021
Data Release Frequency: Varies

WDR: Waste Discharge Requirements Listing

In general, the Waste Discharge Requirements (WDRs) Program (sometimes also referred to as the "Non Chapter 15 (Non 15) Program") regulates point discharges that are exempt pursuant to Subsection 20090 of Title 27 and not subject to the Federal Water Pollution Control Act. Exemptions from Title 27 may be granted for nine categories of discharges (e.g., sewage, wastewater, etc.) that meet, and continue to meet, the preconditions listed for each specific exemption. The scope of the WDRs Program also includes the discharge of wastes classified as inert, pursuant to section 20230 of Title 27.

Date of Government Version: 03/09/2021
Date Data Arrived at EDR: 03/09/2021
Date Made Active in Reports: 03/31/2021
Number of Days to Update: 22

Source: State Water Resources Control Board
Telephone: 916-341-5810
Last EDR Contact: 03/09/2021
Next Scheduled EDR Contact: 06/21/2021
Data Release Frequency: Quarterly

CIWQS: California Integrated Water Quality System

The California Integrated Water Quality System (CIWQS) is a computer system used by the State and Regional Water Quality Control Boards to track information about places of environmental interest, manage permits and other orders, track inspections, and manage violations and enforcement activities.

Date of Government Version: 11/30/2020
Date Data Arrived at EDR: 12/01/2020
Date Made Active in Reports: 02/12/2021
Number of Days to Update: 73

Source: State Water Resources Control Board
Telephone: 866-794-4977
Last EDR Contact: 03/03/2021
Next Scheduled EDR Contact: 06/14/2021
Data Release Frequency: Varies

CERS: CalEPA Regulated Site Portal Data

The CalEPA Regulated Site Portal database combines data about environmentally regulated sites and facilities in California into a single database. It combines data from a variety of state and federal databases, and provides an overview of regulated activities across the spectrum of environmental programs for any given location in California. These activities include hazardous materials and waste, state and federal cleanups, impacted ground and surface waters, and toxic materials

Date of Government Version: 01/20/2021
Date Data Arrived at EDR: 01/20/2021
Date Made Active in Reports: 04/08/2021
Number of Days to Update: 78

Source: California Environmental Protection Agency
Telephone: 916-323-2514
Last EDR Contact: 01/20/2021
Next Scheduled EDR Contact: 05/03/2021
Data Release Frequency: Varies

NON-CASE INFO: Non-Case Information Sites (GEOTRACKER)

Non-Case Information sites

Date of Government Version: 03/08/2021
Date Data Arrived at EDR: 03/09/2021
Date Made Active in Reports: 03/30/2021
Number of Days to Update: 21

Source: State Water Resources Control Board
Telephone: 866-480-1028
Last EDR Contact: 03/09/2021
Next Scheduled EDR Contact: 06/21/2021
Data Release Frequency: Varies

OTHER OIL GAS: Other Oil & Gas Projects Sites (GEOTRACKER)

Other Oil & Gas Projects sites

Date of Government Version: 03/08/2021
Date Data Arrived at EDR: 03/09/2021
Date Made Active in Reports: 03/30/2021
Number of Days to Update: 21

Source: State Water Resources Control Board
Telephone: 866-480-1028
Last EDR Contact: 03/09/2021
Next Scheduled EDR Contact: 06/21/2021
Data Release Frequency: Varies

PROD WATER PONDS: Produced Water Ponds Sites (GEOTRACKER)
Produced water ponds sites

Date of Government Version: 03/08/2021
Date Data Arrived at EDR: 03/09/2021
Date Made Active in Reports: 03/30/2021
Number of Days to Update: 21
Source: State Water Resources Control Board
Telephone: 866-480-1028
Last EDR Contact: 03/09/2021
Next Scheduled EDR Contact: 06/21/2021
Data Release Frequency: Varies

SAMPLING POINT: Sampling Point ? Public Sites (GEOTRACKER)
Sampling point - public sites

Date of Government Version: 03/08/2021
Date Data Arrived at EDR: 03/09/2021
Date Made Active in Reports: 03/30/2021
Number of Days to Update: 21
Source: State Water Resources Control Board
Telephone: 866-480-1028
Last EDR Contact: 03/09/2021
Next Scheduled EDR Contact: 06/21/2021
Data Release Frequency: Varies

WELL STIM PROJ: Well Stimulation Project (GEOTRACKER)
Includes areas of groundwater monitoring plans, a depiction of the monitoring network, and the facilities, boundaries, and subsurface characteristics of the oilfield and the features (oil and gas wells, produced water ponds, UIC wells, water supply wells, etc?) being monitored

Date of Government Version: 03/08/2021
Date Data Arrived at EDR: 03/09/2021
Date Made Active in Reports: 03/30/2021
Number of Days to Update: 21
Source: State Water Resources Control Board
Telephone: 866-480-1028
Last EDR Contact: 03/09/2021
Next Scheduled EDR Contact: 06/21/2021
Data Release Frequency: Varies

PCS: Permit Compliance System
PCS is a computerized management information system that contains data on National Pollutant Discharge Elimination System (NPDES) permit holding facilities. PCS tracks the permit, compliance, and enforcement status of NPDES facilities.

Date of Government Version: 07/14/2011
Date Data Arrived at EDR: 08/05/2011
Date Made Active in Reports: 09/29/2011
Number of Days to Update: 55
Source: EPA, Office of Water
Telephone: 202-564-2496
Last EDR Contact: 03/31/2021
Next Scheduled EDR Contact: 07/19/2021
Data Release Frequency: Semi-Annually

PCS INACTIVE: Listing of Inactive PCS Permits
An inactive permit is a facility that has shut down or is no longer discharging.

Date of Government Version: 11/05/2014
Date Data Arrived at EDR: 01/06/2015
Date Made Active in Reports: 05/06/2015
Number of Days to Update: 120
Source: EPA
Telephone: 202-564-2496
Last EDR Contact: 03/31/2021
Next Scheduled EDR Contact: 07/19/2021
Data Release Frequency: Semi-Annually

PCS ENF: Enforcement data
No description is available for this data

Date of Government Version: 12/31/2014
Date Data Arrived at EDR: 02/05/2015
Date Made Active in Reports: 03/06/2015
Number of Days to Update: 29
Source: EPA
Telephone: 202-564-2497
Last EDR Contact: 03/31/2021
Next Scheduled EDR Contact: 07/19/2021
Data Release Frequency: Varies

MINES MRDS: Mineral Resources Data System
Mineral Resources Data System

Date of Government Version: 04/06/2018
Date Data Arrived at EDR: 10/21/2019
Date Made Active in Reports: 10/24/2019
Number of Days to Update: 3

Source: USGS
Telephone: 703-648-6533
Last EDR Contact: 02/26/2021
Next Scheduled EDR Contact: 09/10/2018
Data Release Frequency: Varies

HWTS: Hazardous Waste Tracking System

DTSC maintains the Hazardous Waste Tracking System that stores ID number information since the early 1980s and manifest data since 1993. The system collects both manifest copies from the generator and destination facility.

Date of Government Version: 10/13/2020
Date Data Arrived at EDR: 10/14/2020
Date Made Active in Reports: 11/03/2020
Number of Days to Update: 20

Source: Department of Toxic Substances Control
Telephone: 916-324-2444
Last EDR Contact: 04/05/2021
Next Scheduled EDR Contact: 07/19/2021
Data Release Frequency: Varies

EDR HIGH RISK HISTORICAL RECORDS

EDR Exclusive Records

EDR MGP: EDR Proprietary Manufactured Gas Plants

The EDR Proprietary Manufactured Gas Plant Database includes records of coal gas plants (manufactured gas plants) compiled by EDR's researchers. Manufactured gas sites were used in the United States from the 1800's to 1950's to produce a gas that could be distributed and used as fuel. These plants used whale oil, rosin, coal, or a mixture of coal, oil, and water that also produced a significant amount of waste. Many of the byproducts of the gas production, such as coal tar (oily waste containing volatile and non-volatile chemicals), sludges, oils and other compounds are potentially hazardous to human health and the environment. The byproduct from this process was frequently disposed of directly at the plant site and can remain or spread slowly, serving as a continuous source of soil and groundwater contamination.

Date of Government Version: N/A
Date Data Arrived at EDR: N/A
Date Made Active in Reports: N/A
Number of Days to Update: N/A

Source: EDR, Inc.
Telephone: N/A
Last EDR Contact: N/A
Next Scheduled EDR Contact: N/A
Data Release Frequency: No Update Planned

EDR Hist Auto: EDR Exclusive Historical Auto Stations

EDR has searched selected national collections of business directories and has collected listings of potential gas station/filling station/service station sites that were available to EDR researchers. EDR's review was limited to those categories of sources that might, in EDR's opinion, include gas station/filling station/service station establishments. The categories reviewed included, but were not limited to gas, gas station, gasoline station, filling station, auto, automobile repair, auto service station, service station, etc. This database falls within a category of information EDR classifies as "High Risk Historical Records", or HRHR. EDR's HRHR effort presents unique and sometimes proprietary data about past sites and operations that typically create environmental concerns, but may not show up in current government records searches.

Date of Government Version: N/A
Date Data Arrived at EDR: N/A
Date Made Active in Reports: N/A
Number of Days to Update: N/A

Source: EDR, Inc.
Telephone: N/A
Last EDR Contact: N/A
Next Scheduled EDR Contact: N/A
Data Release Frequency: Varies

EDR Hist Cleaner: EDR Exclusive Historical Cleaners

EDR has searched selected national collections of business directories and has collected listings of potential dry cleaner sites that were available to EDR researchers. EDR's review was limited to those categories of sources that might, in EDR's opinion, include dry cleaning establishments. The categories reviewed included, but were not limited to dry cleaners, cleaners, laundry, laundromat, cleaning/laundry, wash & dry etc. This database falls within a category of information EDR classifies as "High Risk Historical Records", or HRHR. EDR's HRHR effort presents unique and sometimes proprietary data about past sites and operations that typically create environmental concerns, but may not show up in current government records searches.

Date of Government Version: N/A
Date Data Arrived at EDR: N/A
Date Made Active in Reports: N/A
Number of Days to Update: N/A

Source: EDR, Inc.
Telephone: N/A
Last EDR Contact: N/A
Next Scheduled EDR Contact: N/A
Data Release Frequency: Varies

EDR RECOVERED GOVERNMENT ARCHIVES

Exclusive Recovered Govt. Archives

RGA LF: Recovered Government Archive Solid Waste Facilities List

The EDR Recovered Government Archive Landfill database provides a list of landfills derived from historical databases and includes many records that no longer appear in current government lists. Compiled from Records formerly available from the Department of Resources Recycling and Recovery in California.

Date of Government Version: N/A
Date Data Arrived at EDR: 07/01/2013
Date Made Active in Reports: 01/13/2014
Number of Days to Update: 196

Source: Department of Resources Recycling and Recovery
Telephone: N/A
Last EDR Contact: 06/01/2012
Next Scheduled EDR Contact: N/A
Data Release Frequency: Varies

RGA LUST: Recovered Government Archive Leaking Underground Storage Tank

The EDR Recovered Government Archive Leaking Underground Storage Tank database provides a list of LUST incidents derived from historical databases and includes many records that no longer appear in current government lists. Compiled from Records formerly available from the State Water Resources Control Board in California.

Date of Government Version: N/A
Date Data Arrived at EDR: 07/01/2013
Date Made Active in Reports: 12/30/2013
Number of Days to Update: 182

Source: State Water Resources Control Board
Telephone: N/A
Last EDR Contact: 06/01/2012
Next Scheduled EDR Contact: N/A
Data Release Frequency: Varies

COUNTY RECORDS

ALAMEDA COUNTY:

CS ALAMEDA: Contaminated Sites

A listing of contaminated sites overseen by the Toxic Release Program (oil and groundwater contamination from chemical releases and spills) and the Leaking Underground Storage Tank Program (soil and ground water contamination from leaking petroleum USTs).

Date of Government Version: 01/09/2019
Date Data Arrived at EDR: 01/11/2019
Date Made Active in Reports: 03/05/2019
Number of Days to Update: 53

Source: Alameda County Environmental Health Services
Telephone: 510-567-6700
Last EDR Contact: 03/31/2021
Next Scheduled EDR Contact: 07/19/2021
Data Release Frequency: Semi-Annually

UST ALAMEDA: Underground Tanks

Underground storage tank sites located in Alameda county.

Date of Government Version: 03/17/2021
Date Data Arrived at EDR: 03/18/2021
Date Made Active in Reports: 03/25/2021
Number of Days to Update: 7

Source: Alameda County Environmental Health Services
Telephone: 510-567-6700
Last EDR Contact: 03/17/2021
Next Scheduled EDR Contact: 07/19/2021
Data Release Frequency: Semi-Annually

AMADOR COUNTY:

CUPA AMADOR: CUPA Facility List
Cupa Facility List

Date of Government Version: 10/19/2020
Date Data Arrived at EDR: 10/22/2020
Date Made Active in Reports: 01/12/2021
Number of Days to Update: 82

Source: Amador County Environmental Health
Telephone: 209-223-6439
Last EDR Contact: 02/01/2021
Next Scheduled EDR Contact: 05/17/2021
Data Release Frequency: Varies

BUTTE COUNTY:

CUPA BUTTE: CUPA Facility Listing
Cupa facility list.

Date of Government Version: 04/21/2017
Date Data Arrived at EDR: 04/25/2017
Date Made Active in Reports: 08/09/2017
Number of Days to Update: 106

Source: Public Health Department
Telephone: 530-538-7149
Last EDR Contact: 03/31/2021
Next Scheduled EDR Contact: 07/19/2021
Data Release Frequency: No Update Planned

CALVERAS COUNTY:

CUPA CALVERAS: CUPA Facility Listing
Cupa Facility Listing

Date of Government Version: 12/15/2020
Date Data Arrived at EDR: 12/16/2020
Date Made Active in Reports: 12/24/2020
Number of Days to Update: 8

Source: Calveras County Environmental Health
Telephone: 209-754-6399
Last EDR Contact: 04/14/2021
Next Scheduled EDR Contact: 07/05/2021
Data Release Frequency: Quarterly

COLUSA COUNTY:

CUPA COLUSA: CUPA Facility List
Cupa facility list.

Date of Government Version: 04/06/2020
Date Data Arrived at EDR: 04/23/2020
Date Made Active in Reports: 07/10/2020
Number of Days to Update: 78

Source: Health & Human Services
Telephone: 530-458-0396
Last EDR Contact: 02/26/2021
Next Scheduled EDR Contact: 05/17/2021
Data Release Frequency: Semi-Annually

CONTRA COSTA COUNTY:

SL CONTRA COSTA: Site List
List includes sites from the underground tank, hazardous waste generator and business plan/2185 programs.

Date of Government Version: 01/25/2021
Date Data Arrived at EDR: 01/26/2021
Date Made Active in Reports: 04/16/2021
Number of Days to Update: 80

Source: Contra Costa Health Services Department
Telephone: 925-646-2286
Last EDR Contact: 01/25/2021
Next Scheduled EDR Contact: 05/10/2021
Data Release Frequency: Semi-Annually

DEL NORTE COUNTY:

CUPA DEL NORTE: CUPA Facility List
Cupa Facility list

Date of Government Version: 12/17/2020
Date Data Arrived at EDR: 01/28/2021
Date Made Active in Reports: 04/16/2021
Number of Days to Update: 78

Source: Del Norte County Environmental Health Division
Telephone: 707-465-0426
Last EDR Contact: 01/25/2021
Next Scheduled EDR Contact: 05/10/2021
Data Release Frequency: Varies

EL DORADO COUNTY:

CUPA EL DORADO: CUPA Facility List
CUPA facility list.

Date of Government Version: 10/22/2020
Date Data Arrived at EDR: 11/03/2020
Date Made Active in Reports: 01/20/2021
Number of Days to Update: 78

Source: El Dorado County Environmental Management Department
Telephone: 530-621-6623
Last EDR Contact: 02/08/2021
Next Scheduled EDR Contact: 05/10/2021
Data Release Frequency: Varies

FRESNO COUNTY:

CUPA FRESNO: CUPA Resources List
Certified Unified Program Agency. CUPA's are responsible for implementing a unified hazardous materials and hazardous waste management regulatory program. The agency provides oversight of businesses that deal with hazardous materials, operate underground storage tanks or aboveground storage tanks.

Date of Government Version: 01/14/2021
Date Data Arrived at EDR: 01/15/2021
Date Made Active in Reports: 04/05/2021
Number of Days to Update: 80

Source: Dept. of Community Health
Telephone: 559-445-3271
Last EDR Contact: 04/01/2021
Next Scheduled EDR Contact: 07/12/2021
Data Release Frequency: Semi-Annually

GLENN COUNTY:

CUPA GLENN: CUPA Facility List
Cupa facility list

Date of Government Version: 01/22/2018
Date Data Arrived at EDR: 01/24/2018
Date Made Active in Reports: 03/14/2018
Number of Days to Update: 49

Source: Glenn County Air Pollution Control District
Telephone: 830-934-6500
Last EDR Contact: 04/14/2021
Next Scheduled EDR Contact: 08/02/2021
Data Release Frequency: No Update Planned

HUMBOLDT COUNTY:

CUPA HUMBOLDT: CUPA Facility List
CUPA facility list.

Date of Government Version: 11/18/2020
Date Data Arrived at EDR: 11/19/2020
Date Made Active in Reports: 02/04/2021
Number of Days to Update: 77

Source: Humboldt County Environmental Health
Telephone: N/A
Last EDR Contact: 02/16/2021
Next Scheduled EDR Contact: 05/31/2021
Data Release Frequency: Semi-Annually

IMPERIAL COUNTY:

CUPA IMPERIAL: CUPA Facility List
Cupa facility list.

Date of Government Version: 01/19/2021
Date Data Arrived at EDR: 01/20/2021
Date Made Active in Reports: 04/08/2021
Number of Days to Update: 78

Source: San Diego Border Field Office
Telephone: 760-339-2777
Last EDR Contact: 04/14/2021
Next Scheduled EDR Contact: 08/02/2021
Data Release Frequency: Varies

INYO COUNTY:

CUPA INYO: CUPA Facility List
Cupa facility list.

Date of Government Version: 04/02/2018
Date Data Arrived at EDR: 04/03/2018
Date Made Active in Reports: 06/14/2018
Number of Days to Update: 72

Source: Inyo County Environmental Health Services
Telephone: 760-878-0238
Last EDR Contact: 02/16/2021
Next Scheduled EDR Contact: 05/31/2021
Data Release Frequency: Varies

KERN COUNTY:

CUPA KERN: CUPA Facility List
A listing of sites included in the Kern County Hazardous Material Business Plan.

Date of Government Version: 10/29/2020
Date Data Arrived at EDR: 10/30/2020
Date Made Active in Reports: 01/15/2021
Number of Days to Update: 77

Source: Kern County Public Health
Telephone: 661-321-3000
Last EDR Contact: 02/01/2021
Next Scheduled EDR Contact: 05/17/2021
Data Release Frequency: Varies

UST KERN: Underground Storage Tank Sites & Tank Listing
Kern County Sites and Tanks Listing.

Date of Government Version: 01/19/2021
Date Data Arrived at EDR: 01/21/2021
Date Made Active in Reports: 01/28/2021
Number of Days to Update: 7

Source: Kern County Environment Health Services Department
Telephone: 661-862-8700
Last EDR Contact: 02/01/2021
Next Scheduled EDR Contact: 05/17/2021
Data Release Frequency: Quarterly

KINGS COUNTY:

CUPA KINGS: CUPA Facility List
A listing of sites included in the county's Certified Unified Program Agency database. California's Secretary for Environmental Protection established the unified hazardous materials and hazardous waste regulatory program as required by chapter 6.11 of the California Health and Safety Code. The Unified Program consolidates the administration, permits, inspections, and enforcement activities.

Date of Government Version: 12/03/2020
Date Data Arrived at EDR: 01/26/2021
Date Made Active in Reports: 04/14/2021
Number of Days to Update: 78

Source: Kings County Department of Public Health
Telephone: 559-584-1411
Last EDR Contact: 02/16/2021
Next Scheduled EDR Contact: 05/31/2021
Data Release Frequency: Varies

LAKE COUNTY:

CUPA LAKE: CUPA Facility List
Cupa facility list

Date of Government Version: 02/10/2021
Date Data Arrived at EDR: 02/12/2021
Date Made Active in Reports: 03/11/2021
Number of Days to Update: 27

Source: Lake County Environmental Health
Telephone: 707-263-1164
Last EDR Contact: 04/07/2021
Next Scheduled EDR Contact: 07/26/2021
Data Release Frequency: Varies

LASSEN COUNTY:

CUPA LASSEN: CUPA Facility List
Cupa facility list

Date of Government Version: 07/31/2020
Date Data Arrived at EDR: 08/21/2020
Date Made Active in Reports: 11/09/2020
Number of Days to Update: 80

Source: Lassen County Environmental Health
Telephone: 530-251-8528
Last EDR Contact: 04/14/2021
Next Scheduled EDR Contact: 08/02/2021
Data Release Frequency: Varies

LOS ANGELES COUNTY:

AOCONCERN: Key Areas of Concerns in Los Angeles County
San Gabriel Valley areas where VOC contamination is at or above the MCL as designated by region 9 EPA office. Date of Government Version: 3/30/2009 Exide Site area is a cleanup plan of lead-impacted soil surrounding the former Exide Facility as designated by the DTSC. Date of Government Version: 7/17/2017

Date of Government Version: 03/30/2009
Date Data Arrived at EDR: 03/31/2009
Date Made Active in Reports: 10/23/2009
Number of Days to Update: 206

Source: N/A
Telephone: N/A
Last EDR Contact: 03/12/2021
Next Scheduled EDR Contact: 06/28/2021
Data Release Frequency: No Update Planned

HMS LOS ANGELES: HMS: Street Number List
Industrial Waste and Underground Storage Tank Sites.

Date of Government Version: 01/11/2021
Date Data Arrived at EDR: 01/12/2021
Date Made Active in Reports: 03/25/2021
Number of Days to Update: 72

Source: Department of Public Works
Telephone: 626-458-3517
Last EDR Contact: 04/05/2021
Next Scheduled EDR Contact: 07/19/2021
Data Release Frequency: Semi-Annually

LF LOS ANGELES: List of Solid Waste Facilities
Solid Waste Facilities in Los Angeles County.

Date of Government Version: 01/11/2021
Date Data Arrived at EDR: 01/12/2021
Date Made Active in Reports: 03/26/2021
Number of Days to Update: 73

Source: La County Department of Public Works
Telephone: 818-458-5185
Last EDR Contact: 04/13/2021
Next Scheduled EDR Contact: 07/26/2021
Data Release Frequency: Varies

LF LOS ANGELES CITY: City of Los Angeles Landfills
Landfills owned and maintained by the City of Los Angeles.

Date of Government Version: 12/31/2019
Date Data Arrived at EDR: 08/17/2020
Date Made Active in Reports: 11/05/2020
Number of Days to Update: 80

Source: Engineering & Construction Division
Telephone: 213-473-7869
Last EDR Contact: 04/07/2021
Next Scheduled EDR Contact: 07/26/2021
Data Release Frequency: Varies

LOS ANGELES AST: Active & Inactive AST Inventory
A listing of active & inactive above ground petroleum storage tank site locations, located in the City of Los Angeles.

Date of Government Version: 06/01/2019
Date Data Arrived at EDR: 06/25/2019
Date Made Active in Reports: 08/22/2019
Number of Days to Update: 58
Source: Los Angeles Fire Department
Telephone: 213-978-3800
Last EDR Contact: 03/26/2021
Next Scheduled EDR Contact: 07/05/2021
Data Release Frequency: Varies

LOS ANGELES CO LF METHANE: Methane Producing Landfills
This data was created on April 30, 2012 to represent known disposal sites in Los Angeles County that may produce and emanate methane gas. The shapefile contains disposal sites within Los Angeles County that once accepted degradable refuse material. Information used to create this data was extracted from a landfill survey performed by County Engineers (Major Waste System Map, 1973) as well as historical records from CalRecycle, Regional Water Quality Control Board, and Los Angeles County Department of Public Health

Date of Government Version: 04/30/2012
Date Data Arrived at EDR: 04/17/2019
Date Made Active in Reports: 05/29/2019
Number of Days to Update: 42
Source: Los Angeles County Department of Public Works
Telephone: 626-458-6973
Last EDR Contact: 04/16/2021
Next Scheduled EDR Contact: 07/26/2021
Data Release Frequency: No Update Planned

LOS ANGELES HM: Active & Inactive Hazardous Materials Inventory
A listing of active & inactive hazardous materials facility locations, located in the City of Los Angeles.

Date of Government Version: 06/01/2019
Date Data Arrived at EDR: 06/25/2019
Date Made Active in Reports: 08/22/2019
Number of Days to Update: 58
Source: Los Angeles Fire Department
Telephone: 213-978-3800
Last EDR Contact: 03/26/2021
Next Scheduled EDR Contact: 07/05/2021
Data Release Frequency: Varies

LOS ANGELES UST: Active & Inactive UST Inventory
A listing of active & inactive underground storage tank site locations and underground storage tank historical sites, located in the City of Los Angeles.

Date of Government Version: 06/01/2019
Date Data Arrived at EDR: 06/25/2019
Date Made Active in Reports: 08/22/2019
Number of Days to Update: 58
Source: Los Angeles Fire Department
Telephone: 213-978-3800
Last EDR Contact: 03/26/2021
Next Scheduled EDR Contact: 07/05/2021
Data Release Frequency: Varies

SITE MIT LOS ANGELES: Site Mitigation List
Industrial sites that have had some sort of spill or complaint.

Date of Government Version: 10/19/2020
Date Data Arrived at EDR: 01/12/2021
Date Made Active in Reports: 03/26/2021
Number of Days to Update: 73
Source: Community Health Services
Telephone: 323-890-7806
Last EDR Contact: 04/16/2021
Next Scheduled EDR Contact: 07/26/2021
Data Release Frequency: Annually

UST EL SEGUNDO: City of El Segundo Underground Storage Tank
Underground storage tank sites located in El Segundo city.

Date of Government Version: 01/21/2017
Date Data Arrived at EDR: 04/19/2017
Date Made Active in Reports: 05/10/2017
Number of Days to Update: 21
Source: City of El Segundo Fire Department
Telephone: 310-524-2236
Last EDR Contact: 04/07/2021
Next Scheduled EDR Contact: 07/26/2021
Data Release Frequency: No Update Planned

UST LONG BEACH: City of Long Beach Underground Storage Tank
Underground storage tank sites located in the city of Long Beach.

Date of Government Version: 04/22/2019
Date Data Arrived at EDR: 04/23/2019
Date Made Active in Reports: 06/27/2019
Number of Days to Update: 65

Source: City of Long Beach Fire Department
Telephone: 562-570-2563
Last EDR Contact: 04/14/2021
Next Scheduled EDR Contact: 08/02/2021
Data Release Frequency: Varies

UST TORRANCE: City of Torrance Underground Storage Tank
Underground storage tank sites located in the city of Torrance.

Date of Government Version: 09/11/2020
Date Data Arrived at EDR: 10/07/2020
Date Made Active in Reports: 12/23/2020
Number of Days to Update: 77

Source: City of Torrance Fire Department
Telephone: 310-618-2973
Last EDR Contact: 01/19/2021
Next Scheduled EDR Contact: 05/03/2021
Data Release Frequency: Semi-Annually

MADERA COUNTY:

CUPA MADERA: CUPA Facility List
A listing of sites included in the county's Certified Unified Program Agency database. California's Secretary for Environmental Protection established the unified hazardous materials and hazardous waste regulatory program as required by chapter 6.11 of the California Health and Safety Code. The Unified Program consolidates the administration, permits, inspections, and enforcement activities.

Date of Government Version: 08/10/2020
Date Data Arrived at EDR: 08/12/2020
Date Made Active in Reports: 10/23/2020
Number of Days to Update: 72

Source: Madera County Environmental Health
Telephone: 559-675-7823
Last EDR Contact: 02/16/2021
Next Scheduled EDR Contact: 05/31/2021
Data Release Frequency: Varies

MARIN COUNTY:

UST MARIN: Underground Storage Tank Sites
Currently permitted USTs in Marin County.

Date of Government Version: 09/26/2018
Date Data Arrived at EDR: 10/04/2018
Date Made Active in Reports: 11/02/2018
Number of Days to Update: 29

Source: Public Works Department Waste Management
Telephone: 415-473-6647
Last EDR Contact: 03/25/2021
Next Scheduled EDR Contact: 07/12/2021
Data Release Frequency: Semi-Annually

MENDOCINO COUNTY:

UST MENDOCINO: Mendocino County UST Database
A listing of underground storage tank locations in Mendocino County.

Date of Government Version: 12/21/2020
Date Data Arrived at EDR: 12/21/2020
Date Made Active in Reports: 03/10/2021
Number of Days to Update: 79

Source: Department of Public Health
Telephone: 707-463-4466
Last EDR Contact: 02/22/2021
Next Scheduled EDR Contact: 06/06/2021
Data Release Frequency: Annually

MERCED COUNTY:

CUPA MERCED: CUPA Facility List
CUPA facility list.

Date of Government Version: 02/04/2021
Date Data Arrived at EDR: 02/09/2021
Date Made Active in Reports: 02/18/2021
Number of Days to Update: 9

Source: Merced County Environmental Health
Telephone: 209-381-1094
Last EDR Contact: 01/29/2021
Next Scheduled EDR Contact: 05/31/2021
Data Release Frequency: Varies

MONO COUNTY:

CUPA MONO: CUPA Facility List
CUPA Facility List

Date of Government Version: 11/16/2020
Date Data Arrived at EDR: 11/23/2020
Date Made Active in Reports: 02/08/2021
Number of Days to Update: 77

Source: Mono County Health Department
Telephone: 760-932-5580
Last EDR Contact: 02/22/2021
Next Scheduled EDR Contact: 06/06/3021
Data Release Frequency: Varies

MONTEREY COUNTY:

CUPA MONTEREY: CUPA Facility Listing
CUPA Program listing from the Environmental Health Division.

Date of Government Version: 01/08/2021
Date Data Arrived at EDR: 01/12/2021
Date Made Active in Reports: 03/25/2021
Number of Days to Update: 72

Source: Monterey County Health Department
Telephone: 831-796-1297
Last EDR Contact: 03/25/2021
Next Scheduled EDR Contact: 07/12/2021
Data Release Frequency: Varies

NAPA COUNTY:

LUST NAPA: Sites With Reported Contamination
A listing of leaking underground storage tank sites located in Napa county.

Date of Government Version: 01/09/2017
Date Data Arrived at EDR: 01/11/2017
Date Made Active in Reports: 03/02/2017
Number of Days to Update: 50

Source: Napa County Department of Environmental Management
Telephone: 707-253-4269
Last EDR Contact: 02/22/2021
Next Scheduled EDR Contact: 06/06/2021
Data Release Frequency: No Update Planned

UST NAPA: Closed and Operating Underground Storage Tank Sites
Underground storage tank sites located in Napa county.

Date of Government Version: 09/05/2019
Date Data Arrived at EDR: 09/09/2019
Date Made Active in Reports: 10/31/2019
Number of Days to Update: 52

Source: Napa County Department of Environmental Management
Telephone: 707-253-4269
Last EDR Contact: 02/22/2021
Next Scheduled EDR Contact: 06/06/2021
Data Release Frequency: No Update Planned

NEVADA COUNTY:

CUPA NEVADA: CUPA Facility List
CUPA facility list.

Date of Government Version: 10/26/2020
Date Data Arrived at EDR: 10/28/2020
Date Made Active in Reports: 01/15/2021
Number of Days to Update: 79

Source: Community Development Agency
Telephone: 530-265-1467
Last EDR Contact: 01/25/2021
Next Scheduled EDR Contact: 05/10/2021
Data Release Frequency: Varies

ORANGE COUNTY:

IND_SITE ORANGE: List of Industrial Site Cleanups
Petroleum and non-petroleum spills.

Date of Government Version: 09/01/2020
Date Data Arrived at EDR: 11/05/2020
Date Made Active in Reports: 01/26/2021
Number of Days to Update: 82

Source: Health Care Agency
Telephone: 714-834-3446
Last EDR Contact: 02/01/2021
Next Scheduled EDR Contact: 05/17/2021
Data Release Frequency: Annually

LUST ORANGE: List of Underground Storage Tank Cleanups
Orange County Underground Storage Tank Cleanups (LUST).

Date of Government Version: 09/01/2020
Date Data Arrived at EDR: 11/06/2020
Date Made Active in Reports: 01/26/2021
Number of Days to Update: 81

Source: Health Care Agency
Telephone: 714-834-3446
Last EDR Contact: 02/05/2021
Next Scheduled EDR Contact: 05/17/2021
Data Release Frequency: Quarterly

UST ORANGE: List of Underground Storage Tank Facilities
Orange County Underground Storage Tank Facilities (UST).

Date of Government Version: 09/01/2020
Date Data Arrived at EDR: 11/03/2020
Date Made Active in Reports: 01/21/2021
Number of Days to Update: 79

Source: Health Care Agency
Telephone: 714-834-3446
Last EDR Contact: 02/02/2021
Next Scheduled EDR Contact: 05/17/2021
Data Release Frequency: Quarterly

PLACER COUNTY:

MS PLACER: Master List of Facilities
List includes aboveground tanks, underground tanks and cleanup sites.

Date of Government Version: 11/24/2020
Date Data Arrived at EDR: 11/24/2020
Date Made Active in Reports: 11/25/2020
Number of Days to Update: 1

Source: Placer County Health and Human Services
Telephone: 530-745-2363
Last EDR Contact: 02/26/2021
Next Scheduled EDR Contact: 06/14/2021
Data Release Frequency: Semi-Annually

PLUMAS COUNTY:

CUPA PLUMAS: CUPA Facility List
Plumas County CUPA Program facilities.

Date of Government Version: 03/31/2019
Date Data Arrived at EDR: 04/23/2019
Date Made Active in Reports: 06/26/2019
Number of Days to Update: 64

Source: Plumas County Environmental Health
Telephone: 530-283-6355
Last EDR Contact: 04/14/2021
Next Scheduled EDR Contact: 08/02/2021
Data Release Frequency: Varies

RIVERSIDE COUNTY:

LUST RIVERSIDE: Listing of Underground Tank Cleanup Sites
Riverside County Underground Storage Tank Cleanup Sites (LUST).

Date of Government Version: 01/13/2021
Date Data Arrived at EDR: 01/14/2021
Date Made Active in Reports: 03/10/2021
Number of Days to Update: 55

Source: Department of Environmental Health
Telephone: 951-358-5055
Last EDR Contact: 03/15/2021
Next Scheduled EDR Contact: 06/28/2021
Data Release Frequency: Quarterly

UST RIVERSIDE: Underground Storage Tank Tank List
Underground storage tank sites located in Riverside county.

Date of Government Version: 01/13/2021
Date Data Arrived at EDR: 01/14/2021
Date Made Active in Reports: 03/10/2021
Number of Days to Update: 55

Source: Department of Environmental Health
Telephone: 951-358-5055
Last EDR Contact: 03/15/2021
Next Scheduled EDR Contact: 06/28/2021
Data Release Frequency: Quarterly

SACRAMENTO COUNTY:

CS SACRAMENTO: Toxic Site Clean-Up List
List of sites where unauthorized releases of potentially hazardous materials have occurred.

Date of Government Version: 02/18/2020
Date Data Arrived at EDR: 03/31/2020
Date Made Active in Reports: 06/15/2020
Number of Days to Update: 76

Source: Sacramento County Environmental Management
Telephone: 916-875-8406
Last EDR Contact: 03/31/2021
Next Scheduled EDR Contact: 07/12/2021
Data Release Frequency: Quarterly

ML SACRAMENTO: Master Hazardous Materials Facility List
Any business that has hazardous materials on site - hazardous material storage sites, underground storage tanks, waste generators.

Date of Government Version: 02/24/2020
Date Data Arrived at EDR: 03/31/2020
Date Made Active in Reports: 06/17/2020
Number of Days to Update: 78

Source: Sacramento County Environmental Management
Telephone: 916-875-8406
Last EDR Contact: 04/01/2021
Next Scheduled EDR Contact: 07/12/2021
Data Release Frequency: Quarterly

SAN BENITO COUNTY:

CUPA SAN BENITO: CUPA Facility List
Cupa facility list

Date of Government Version: 10/28/2020
Date Data Arrived at EDR: 10/30/2020
Date Made Active in Reports: 01/15/2021
Number of Days to Update: 77

Source: San Benito County Environmental Health
Telephone: N/A
Last EDR Contact: 02/01/2021
Next Scheduled EDR Contact: 05/17/2021
Data Release Frequency: Varies

SAN BERNARDINO COUNTY:

PERMITS SAN BERNARDINO: Hazardous Material Permits
This listing includes underground storage tanks, medical waste handlers/generators, hazardous materials handlers, hazardous waste generators, and waste oil generators/handlers.

Date of Government Version: 11/16/2020
Date Data Arrived at EDR: 11/18/2020
Date Made Active in Reports: 02/04/2021
Number of Days to Update: 78

Source: San Bernardino County Fire Department Hazardous Materials Division
Telephone: 909-387-3041
Last EDR Contact: 02/01/2021
Next Scheduled EDR Contact: 05/17/2021
Data Release Frequency: Quarterly

SAN DIEGO COUNTY:

HMMD SAN DIEGO: Hazardous Materials Management Division Database

The database includes: HE58 - This report contains the business name, site address, business phone number, establishment 'H' permit number, type of permit, and the business status. HE17 - In addition to providing the same information provided in the HE58 listing, HE17 provides inspection dates, violations received by the establishment, hazardous waste generated, the quantity, method of storage, treatment/disposal of waste and the hauler, and information on underground storage tanks. Unauthorized Release List - Includes a summary of environmental contamination cases in San Diego County (underground tank cases, non-tank cases, groundwater contamination, and soil contamination are included.)

Date of Government Version: 11/30/2020
Date Data Arrived at EDR: 12/01/2020
Date Made Active in Reports: 02/16/2021
Number of Days to Update: 77

Source: Hazardous Materials Management Division
Telephone: 619-338-2268
Last EDR Contact: 03/03/2021
Next Scheduled EDR Contact: 03/15/2021
Data Release Frequency: Quarterly

LF SAN DIEGO: Solid Waste Facilities

San Diego County Solid Waste Facilities.

Date of Government Version: 10/01/2020
Date Data Arrived at EDR: 11/23/2020
Date Made Active in Reports: 02/08/2021
Number of Days to Update: 77

Source: Department of Health Services
Telephone: 619-338-2209
Last EDR Contact: 04/14/2021
Next Scheduled EDR Contact: 08/02/2021
Data Release Frequency: Varies

SAN DIEGO CO LOP: Local Oversight Program Listing

A listing of all LOP release sites that are or were under the County of San Diego's jurisdiction. Included are closed or transferred cases, open cases, and cases that did not have a case type indicated. The cases without a case type are mostly complaints; however, some of them could be LOP cases.

Date of Government Version: 07/14/2020
Date Data Arrived at EDR: 07/16/2020
Date Made Active in Reports: 09/29/2020
Number of Days to Update: 75

Source: Department of Environmental Health
Telephone: 858-505-6874
Last EDR Contact: 04/14/2021
Next Scheduled EDR Contact: 08/02/2021
Data Release Frequency: Varies

SAN DIEGO CO SAM: Environmental Case Listing

The listing contains all underground tank release cases and projects pertaining to properties contaminated with hazardous substances that are actively under review by the Site Assessment and Mitigation Program.

Date of Government Version: 03/23/2010
Date Data Arrived at EDR: 06/15/2010
Date Made Active in Reports: 07/09/2010
Number of Days to Update: 24

Source: San Diego County Department of Environmental Health
Telephone: 619-338-2371
Last EDR Contact: 02/26/2021
Next Scheduled EDR Contact: 06/14/2021
Data Release Frequency: No Update Planned

SAN FRANCISCO COUNTY:

CUPA SAN FRANCISCO CO: CUPA Facility Listing

Cupa facilities

Date of Government Version: 11/05/2020
Date Data Arrived at EDR: 11/06/2020
Date Made Active in Reports: 01/27/2021
Number of Days to Update: 82

Source: San Francisco County Department of Environmental Health
Telephone: 415-252-3896
Last EDR Contact: 02/01/2021
Next Scheduled EDR Contact: 05/17/2021
Data Release Frequency: Varies

LUST SAN FRANCISCO: Local Oversite Facilities
A listing of leaking underground storage tank sites located in San Francisco county.

Date of Government Version: 09/19/2008
Date Data Arrived at EDR: 09/19/2008
Date Made Active in Reports: 09/29/2008
Number of Days to Update: 10

Source: Department Of Public Health San Francisco County
Telephone: 415-252-3920
Last EDR Contact: 02/01/2021
Next Scheduled EDR Contact: 05/17/2021
Data Release Frequency: No Update Planned

UST SAN FRANCISCO: Underground Storage Tank Information
Underground storage tank sites located in San Francisco county.

Date of Government Version: 11/05/2020
Date Data Arrived at EDR: 11/06/2020
Date Made Active in Reports: 01/26/2021
Number of Days to Update: 81

Source: Department of Public Health
Telephone: 415-252-3920
Last EDR Contact: 02/01/2021
Next Scheduled EDR Contact: 05/17/2021
Data Release Frequency: Quarterly

SAN JOAQUIN COUNTY:

UST SAN JOAQUIN: San Joaquin Co. UST
A listing of underground storage tank locations in San Joaquin county.

Date of Government Version: 06/22/2018
Date Data Arrived at EDR: 06/26/2018
Date Made Active in Reports: 07/11/2018
Number of Days to Update: 15

Source: Environmental Health Department
Telephone: N/A
Last EDR Contact: 03/12/2021
Next Scheduled EDR Contact: 06/28/2021
Data Release Frequency: Semi-Annually

SAN LUIS OBISPO COUNTY:

CUPA SAN LUIS OBISPO: CUPA Facility List
Cupa Facility List.

Date of Government Version: 11/12/2020
Date Data Arrived at EDR: 11/13/2020
Date Made Active in Reports: 02/01/2021
Number of Days to Update: 80

Source: San Luis Obispo County Public Health Department
Telephone: 805-781-5596
Last EDR Contact: 02/16/2021
Next Scheduled EDR Contact: 05/31/2021
Data Release Frequency: Varies

SAN MATEO COUNTY:

BI SAN MATEO: Business Inventory
List includes Hazardous Materials Business Plan, hazardous waste generators, and underground storage tanks.

Date of Government Version: 02/20/2020
Date Data Arrived at EDR: 02/20/2020
Date Made Active in Reports: 04/24/2020
Number of Days to Update: 64

Source: San Mateo County Environmental Health Services Division
Telephone: 650-363-1921
Last EDR Contact: 03/12/2021
Next Scheduled EDR Contact: 06/21/2021
Data Release Frequency: Annually

LUST SAN MATEO: Fuel Leak List
A listing of leaking underground storage tank sites located in San Mateo county.

Date of Government Version: 03/29/2019
Date Data Arrived at EDR: 03/29/2019
Date Made Active in Reports: 05/29/2019
Number of Days to Update: 61

Source: San Mateo County Environmental Health Services Division
Telephone: 650-363-1921
Last EDR Contact: 03/08/2021
Next Scheduled EDR Contact: 06/21/2021
Data Release Frequency: Semi-Annually

SANTA BARBARA COUNTY:

CUPA SANTA BARBARA: CUPA Facility Listing
CUPA Program Listing from the Environmental Health Services division.

Date of Government Version: 09/08/2011
Date Data Arrived at EDR: 09/09/2011
Date Made Active in Reports: 10/07/2011
Number of Days to Update: 28

Source: Santa Barbara County Public Health Department
Telephone: 805-686-8167
Last EDR Contact: 02/16/2021
Next Scheduled EDR Contact: 05/31/2021
Data Release Frequency: No Update Planned

SANTA CLARA COUNTY:

CUPA SANTA CLARA: Cupa Facility List
Cupa facility list

Date of Government Version: 11/20/2020
Date Data Arrived at EDR: 11/23/2020
Date Made Active in Reports: 02/05/2021
Number of Days to Update: 74

Source: Department of Environmental Health
Telephone: 408-918-1973
Last EDR Contact: 02/16/2021
Next Scheduled EDR Contact: 05/31/2021
Data Release Frequency: Varies

HIST LUST SANTA CLARA: HIST LUST - Fuel Leak Site Activity Report
A listing of open and closed leaking underground storage tanks. This listing is no longer updated by the county. Leaking underground storage tanks are now handled by the Department of Environmental Health.

Date of Government Version: 03/29/2005
Date Data Arrived at EDR: 03/30/2005
Date Made Active in Reports: 04/21/2005
Number of Days to Update: 22

Source: Santa Clara Valley Water District
Telephone: 408-265-2600
Last EDR Contact: 03/23/2009
Next Scheduled EDR Contact: 06/22/2009
Data Release Frequency: No Update Planned

LUST SANTA CLARA: LOP Listing
A listing of leaking underground storage tanks located in Santa Clara county.

Date of Government Version: 03/03/2014
Date Data Arrived at EDR: 03/05/2014
Date Made Active in Reports: 03/18/2014
Number of Days to Update: 13

Source: Department of Environmental Health
Telephone: 408-918-3417
Last EDR Contact: 02/22/2021
Next Scheduled EDR Contact: 06/06/2021
Data Release Frequency: No Update Planned

SAN JOSE HAZMAT: Hazardous Material Facilities
Hazardous material facilities, including underground storage tank sites.

Date of Government Version: 11/03/2020
Date Data Arrived at EDR: 11/05/2020
Date Made Active in Reports: 01/26/2021
Number of Days to Update: 82

Source: City of San Jose Fire Department
Telephone: 408-535-7694
Last EDR Contact: 04/01/2021
Next Scheduled EDR Contact: 05/17/2021
Data Release Frequency: Annually

SANTA CRUZ COUNTY:

CUPA SANTA CRUZ: CUPA Facility List
CUPA facility listing.

Date of Government Version: 01/21/2017
Date Data Arrived at EDR: 02/22/2017
Date Made Active in Reports: 05/23/2017
Number of Days to Update: 90

Source: Santa Cruz County Environmental Health
Telephone: 831-464-2761
Last EDR Contact: 02/16/2021
Next Scheduled EDR Contact: 05/31/2021
Data Release Frequency: Varies

SHASTA COUNTY:

CUPA SHASTA: CUPA Facility List
Cupa Facility List.

Date of Government Version: 06/15/2017
Date Data Arrived at EDR: 06/19/2017
Date Made Active in Reports: 08/09/2017
Number of Days to Update: 51

Source: Shasta County Department of Resource Management
Telephone: 530-225-5789
Last EDR Contact: 02/16/2021
Next Scheduled EDR Contact: 05/31/2021
Data Release Frequency: Varies

SOLANO COUNTY:

LUST SOLANO: Leaking Underground Storage Tanks
A listing of leaking underground storage tank sites located in Solano county.

Date of Government Version: 06/04/2019
Date Data Arrived at EDR: 06/06/2019
Date Made Active in Reports: 08/13/2019
Number of Days to Update: 68

Source: Solano County Department of Environmental Management
Telephone: 707-784-6770
Last EDR Contact: 02/26/2021
Next Scheduled EDR Contact: 06/14/2021
Data Release Frequency: Quarterly

UST SOLANO: Underground Storage Tanks
Underground storage tank sites located in Solano county.

Date of Government Version: 12/03/2020
Date Data Arrived at EDR: 12/03/2020
Date Made Active in Reports: 02/18/2021
Number of Days to Update: 77

Source: Solano County Department of Environmental Management
Telephone: 707-784-6770
Last EDR Contact: 03/12/2021
Next Scheduled EDR Contact: 06/14/2021
Data Release Frequency: Quarterly

SONOMA COUNTY:

CUPA SONOMA: Cupa Facility List
Cupa Facility list

Date of Government Version: 12/15/2020
Date Data Arrived at EDR: 12/16/2020
Date Made Active in Reports: 12/23/2020
Number of Days to Update: 7

Source: County of Sonoma Fire & Emergency Services Department
Telephone: 707-565-1174
Last EDR Contact: 03/19/2021
Next Scheduled EDR Contact: 07/05/2021
Data Release Frequency: Varies

LUST SONOMA: Leaking Underground Storage Tank Sites
A listing of leaking underground storage tank sites located in Sonoma county.

Date of Government Version: 01/05/2021
Date Data Arrived at EDR: 01/06/2021
Date Made Active in Reports: 03/18/2021
Number of Days to Update: 71

Source: Department of Health Services
Telephone: 707-565-6565
Last EDR Contact: 03/19/2021
Next Scheduled EDR Contact: 07/05/2021
Data Release Frequency: Quarterly

STANISLAUS COUNTY:

CUPA STANISLAUS: CUPA Facility List
Cupa facility list

Date of Government Version: 10/01/2020
Date Data Arrived at EDR: 10/06/2020
Date Made Active in Reports: 12/22/2020
Number of Days to Update: 77

Source: Stanislaus County Department of Ennvironmental Protection
Telephone: 209-525-6751
Last EDR Contact: 04/07/2021
Next Scheduled EDR Contact: 07/26/2021
Data Release Frequency: Varies

SUTTER COUNTY:

UST SUTTER: Underground Storage Tanks
Underground storage tank sites located in Sutter county.

Date of Government Version: 11/23/2020
Date Data Arrived at EDR: 11/24/2020
Date Made Active in Reports: 02/10/2021
Number of Days to Update: 78

Source: Sutter County Environmental Health Services
Telephone: 530-822-7500
Last EDR Contact: 02/26/2021
Next Scheduled EDR Contact: 06/14/2021
Data Release Frequency: Semi-Annually

TEHAMA COUNTY:

CUPA TEHAMA: CUPA Facility List
Cupa facilities

Date of Government Version: 01/13/2021
Date Data Arrived at EDR: 01/14/2021
Date Made Active in Reports: 04/06/2021
Number of Days to Update: 82

Source: Tehama County Department of Environmental Health
Telephone: 530-527-8020
Last EDR Contact: 02/01/2021
Next Scheduled EDR Contact: 05/17/2021
Data Release Frequency: Varies

TRINITY COUNTY:

CUPA TRINITY: CUPA Facility List
Cupa facility list

Date of Government Version: 01/19/2021
Date Data Arrived at EDR: 01/20/2021
Date Made Active in Reports: 04/08/2021
Number of Days to Update: 78

Source: Department of Toxic Substances Control
Telephone: 760-352-0381
Last EDR Contact: 04/14/2021
Next Scheduled EDR Contact: 08/02/2021
Data Release Frequency: Varies

TULARE COUNTY:

CUPA TULARE: CUPA Facility List
Cupa program facilities

Date of Government Version: 10/30/2020
Date Data Arrived at EDR: 11/03/2020
Date Made Active in Reports: 01/20/2021
Number of Days to Update: 78

Source: Tulare County Environmental Health Services Division
Telephone: 559-624-7400
Last EDR Contact: 02/01/2021
Next Scheduled EDR Contact: 05/17/2021
Data Release Frequency: Varies

TUOLUMNE COUNTY:

CUPA TUOLUMNE: CUPA Facility List
Cupa facility list

Date of Government Version: 04/23/2018
Date Data Arrived at EDR: 04/25/2018
Date Made Active in Reports: 06/25/2018
Number of Days to Update: 61

Source: Divison of Environmental Health
Telephone: 209-533-5633
Last EDR Contact: 04/14/2021
Next Scheduled EDR Contact: 08/02/2021
Data Release Frequency: Varies

VENTURA COUNTY:

BWT VENTURA: Business Plan, Hazardous Waste Producers, and Operating Underground Tanks
The BWT list indicates by site address whether the Environmental Health Division has Business Plan (B), Waste Producer (W), and/or Underground Tank (T) information.

Date of Government Version: 09/28/2020
Date Data Arrived at EDR: 10/22/2020
Date Made Active in Reports: 01/12/2021
Number of Days to Update: 82

Source: Ventura County Environmental Health Division
Telephone: 805-654-2813
Last EDR Contact: 01/19/2021
Next Scheduled EDR Contact: 05/02/2021
Data Release Frequency: Quarterly

LF VENTURA: Inventory of Illegal Abandoned and Inactive Sites
Ventura County Inventory of Closed, Illegal Abandoned, and Inactive Sites.

Date of Government Version: 12/01/2011
Date Data Arrived at EDR: 12/01/2011
Date Made Active in Reports: 01/19/2012
Number of Days to Update: 49

Source: Environmental Health Division
Telephone: 805-654-2813
Last EDR Contact: 03/25/2021
Next Scheduled EDR Contact: 07/12/2021
Data Release Frequency: No Update Planned

LUST VENTURA: Listing of Underground Tank Cleanup Sites
Ventura County Underground Storage Tank Cleanup Sites (LUST).

Date of Government Version: 05/29/2008
Date Data Arrived at EDR: 06/24/2008
Date Made Active in Reports: 07/31/2008
Number of Days to Update: 37

Source: Environmental Health Division
Telephone: 805-654-2813
Last EDR Contact: 02/08/2021
Next Scheduled EDR Contact: 05/24/2021
Data Release Frequency: No Update Planned

MED WASTE VENTURA: Medical Waste Program List
To protect public health and safety and the environment from potential exposure to disease causing agents, the Environmental Health Division Medical Waste Program regulates the generation, handling, storage, treatment and disposal of medical waste throughout the County.

Date of Government Version: 09/28/2020
Date Data Arrived at EDR: 10/22/2020
Date Made Active in Reports: 01/12/2021
Number of Days to Update: 82

Source: Ventura County Resource Management Agency
Telephone: 805-654-2813
Last EDR Contact: 01/20/2021
Next Scheduled EDR Contact: 05/03/2021
Data Release Frequency: Quarterly

UST VENTURA: Underground Tank Closed Sites List
Ventura County Operating Underground Storage Tank Sites (UST)/Underground Tank Closed Sites List.

Date of Government Version: 03/01/2021
Date Data Arrived at EDR: 03/09/2021
Date Made Active in Reports: 03/31/2021
Number of Days to Update: 22

Source: Environmental Health Division
Telephone: 805-654-2813
Last EDR Contact: 03/09/2021
Next Scheduled EDR Contact: 06/21/2021
Data Release Frequency: Quarterly

YOLO COUNTY:

UST YOLO: Underground Storage Tank Comprehensive Facility Report
Underground storage tank sites located in Yolo county.

Date of Government Version: 12/21/2020
Date Data Arrived at EDR: 12/23/2020
Date Made Active in Reports: 01/04/2021
Number of Days to Update: 12

Source: Yolo County Department of Health
Telephone: 530-666-8646
Last EDR Contact: 03/26/2021
Next Scheduled EDR Contact: 07/12/2021
Data Release Frequency: Annually

YUBA COUNTY:

CUPA YUBA: CUPA Facility List
CUPA facility listing for Yuba County.

Date of Government Version: 01/26/2021
Date Data Arrived at EDR: 01/28/2021
Date Made Active in Reports: 02/03/2021
Number of Days to Update: 6

Source: Yuba County Environmental Health Department
Telephone: 530-749-7523
Last EDR Contact: 02/23/2021
Next Scheduled EDR Contact: 05/10/2021
Data Release Frequency: Varies

OTHER DATABASE(S)

Depending on the geographic area covered by this report, the data provided in these specialty databases may or may not be complete. For example, the existence of wetlands information data in a specific report does not mean that all wetlands in the area covered by the report are included. Moreover, the absence of any reported wetlands information does not necessarily mean that wetlands do not exist in the area covered by the report.

CT MANIFEST: Hazardous Waste Manifest Data
Facility and manifest data. Manifest is a document that lists and tracks hazardous waste from the generator through transporters to a tsd facility.

Date of Government Version: 08/10/2020
Date Data Arrived at EDR: 10/20/2020
Date Made Active in Reports: 11/02/2020
Number of Days to Update: 13

Source: Department of Energy & Environmental Protection
Telephone: 860-424-3375
Last EDR Contact: 02/12/2021
Next Scheduled EDR Contact: 05/24/2021
Data Release Frequency: No Update Planned

NJ MANIFEST: Manifest Information
Hazardous waste manifest information.

Date of Government Version: 12/31/2018
Date Data Arrived at EDR: 04/10/2019
Date Made Active in Reports: 05/16/2019
Number of Days to Update: 36

Source: Department of Environmental Protection
Telephone: N/A
Last EDR Contact: 04/09/2021
Next Scheduled EDR Contact: 07/19/2021
Data Release Frequency: Annually

NY MANIFEST: Facility and Manifest Data
Manifest is a document that lists and tracks hazardous waste from the generator through transporters to a TSD facility.

Date of Government Version: 01/01/2019
Date Data Arrived at EDR: 04/29/2020
Date Made Active in Reports: 07/10/2020
Number of Days to Update: 72

Source: Department of Environmental Conservation
Telephone: 518-402-8651
Last EDR Contact: 01/29/2021
Next Scheduled EDR Contact: 05/10/2021
Data Release Frequency: Quarterly

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

PA MANIFEST: Manifest Information
Hazardous waste manifest information.

Date of Government Version: 06/30/2018
Date Data Arrived at EDR: 07/19/2019
Date Made Active in Reports: 09/10/2019
Number of Days to Update: 53

Source: Department of Environmental Protection
Telephone: 717-783-8990
Last EDR Contact: 04/09/2021
Next Scheduled EDR Contact: 07/26/2021
Data Release Frequency: Annually

RI MANIFEST: Manifest information
Hazardous waste manifest information

Date of Government Version: 12/31/2019
Date Data Arrived at EDR: 02/11/2021
Date Made Active in Reports: 02/24/2021
Number of Days to Update: 13

Source: Department of Environmental Management
Telephone: 401-222-2797
Last EDR Contact: 02/09/2021
Next Scheduled EDR Contact: 05/31/2021
Data Release Frequency: Annually

WI MANIFEST: Manifest Information
Hazardous waste manifest information.

Date of Government Version: 05/31/2018
Date Data Arrived at EDR: 06/19/2019
Date Made Active in Reports: 09/03/2019
Number of Days to Update: 76

Source: Department of Natural Resources
Telephone: N/A
Last EDR Contact: 03/08/2021
Next Scheduled EDR Contact: 06/21/2021
Data Release Frequency: Annually

Oil/Gas Pipelines
Source: Endeavor Business Media
Petroleum Bundle (Crude Oil, Refined Products, Petrochemicals, Gas Liquids (LPG/NGL), and Specialty Gases (Miscellaneous)) N = Natural Gas Bundle (Natural Gas, Gas Liquids (LPG/NGL), and Specialty Gases (Miscellaneous)). This map includes information copyrighted by Endeavor Business Media. This information is provided on a best effort basis and Endeavor Business Media does not guarantee its accuracy nor warrant its fitness for any particular purpose. Such information has been reprinted with the permission of Endeavor Business Media.

Electric Power Transmission Line Data
Source: Endeavor Business Media
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Sensitive Receptors: There are individuals deemed sensitive receptors due to their fragile immune systems and special sensitivity to environmental discharges. These sensitive receptors typically include the elderly, the sick, and children. While the location of all sensitive receptors cannot be determined, EDR indicates those buildings and facilities - schools, daycares, hospitals, medical centers, and nursing homes - where individuals who are sensitive receptors are likely to be located.

AHA Hospitals:
Source: American Hospital Association, Inc.
Telephone: 312-280-5991
The database includes a listing of hospitals based on the American Hospital Association's annual survey of hospitals.

Medical Centers: Provider of Services Listing
Source: Centers for Medicare & Medicaid Services
Telephone: 410-786-3000
A listing of hospitals with Medicare provider number, produced by Centers of Medicare & Medicaid Services, a federal agency within the U.S. Department of Health and Human Services.

Nursing Homes
Source: National Institutes of Health
Telephone: 301-594-6248
Information on Medicare and Medicaid certified nursing homes in the United States.

Public Schools
Source: National Center for Education Statistics
Telephone: 202-502-7300
The National Center for Education Statistics' primary database on elementary and secondary public education in the United States. It is a comprehensive, annual, national statistical database of all public elementary and secondary schools and school districts, which contains data that are comparable across all states.

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

Private Schools
Source: National Center for Education Statistics
Telephone: 202-502-7300
The National Center for Education Statistics' primary database on private school locations in the United States.
Daycare Centers: Licensed Facilities
Source: Department of Social Services
Telephone: 916-657-4041

Flood Zone Data: This data was obtained from the Federal Emergency Management Agency (FEMA). It depicts 100-year and 500-year flood zones as defined by FEMA. It includes the National Flood Hazard Layer (NFHL) which incorporates Flood Insurance Rate Map (FIRM) data and Q3 data from FEMA in areas not covered by NFHL.
Source: FEMA
Telephone: 877-336-2627
Date of Government Version: 2003, 2015

NWI: National Wetlands Inventory. This data, available in select counties across the country, was obtained by EDR in 2002, 2005 and 2010 from the U.S. Fish and Wildlife Service.

State Wetlands Data: Wetland Inventory
Source: Department of Fish and Wildlife
Telephone: 916-445-0411

Current USGS 7.5 Minute Topographic Map
Source: U.S. Geological Survey

STREET AND ADDRESS INFORMATION

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GEOCHECK ®- PHYSICAL SETTING SOURCE ADDENDUM

TARGET PROPERTY ADDRESS

DWP MENIFEE, CA
26805 MENIFEE ROAD
SUN CITY, CA 92585

TARGET PROPERTY COORDINATES

Latitude (North):	33.729652 - 33° 43' 46.75''
Longitude (West):	117.155142 - 117° 9' 18.51''
Universal Tranverse Mercator:	Zone 11
UTM X (Meters):	485627.4
UTM Y (Meters):	3731998.2
Elevation:	1466 ft. above sea level

USGS TOPOGRAPHIC MAP

Target Property Map:	5641314 ROMOLAND, CA
Version Date:	2012

EDR's GeoCheck Physical Setting Source Addendum is provided to assist the environmental professional in forming an opinion about the impact of potential contaminant migration.

Assessment of the impact of contaminant migration generally has two principle investigative components:

1. Groundwater flow direction, and
2. Groundwater flow velocity.

Groundwater flow direction may be impacted by surface topography, hydrology, hydrogeology, characteristics of the soil, and nearby wells. Groundwater flow velocity is generally impacted by the nature of the geologic strata.

GEOCHECK® - PHYSICAL SETTING SOURCE SUMMARY

GROUNDWATER FLOW DIRECTION INFORMATION

Groundwater flow direction for a particular site is best determined by a qualified environmental professional using site-specific well data. If such data is not reasonably ascertainable, it may be necessary to rely on other sources of information, such as surface topographic information, hydrologic information, hydrogeologic data collected on nearby properties, and regional groundwater flow information (from deep aquifers).

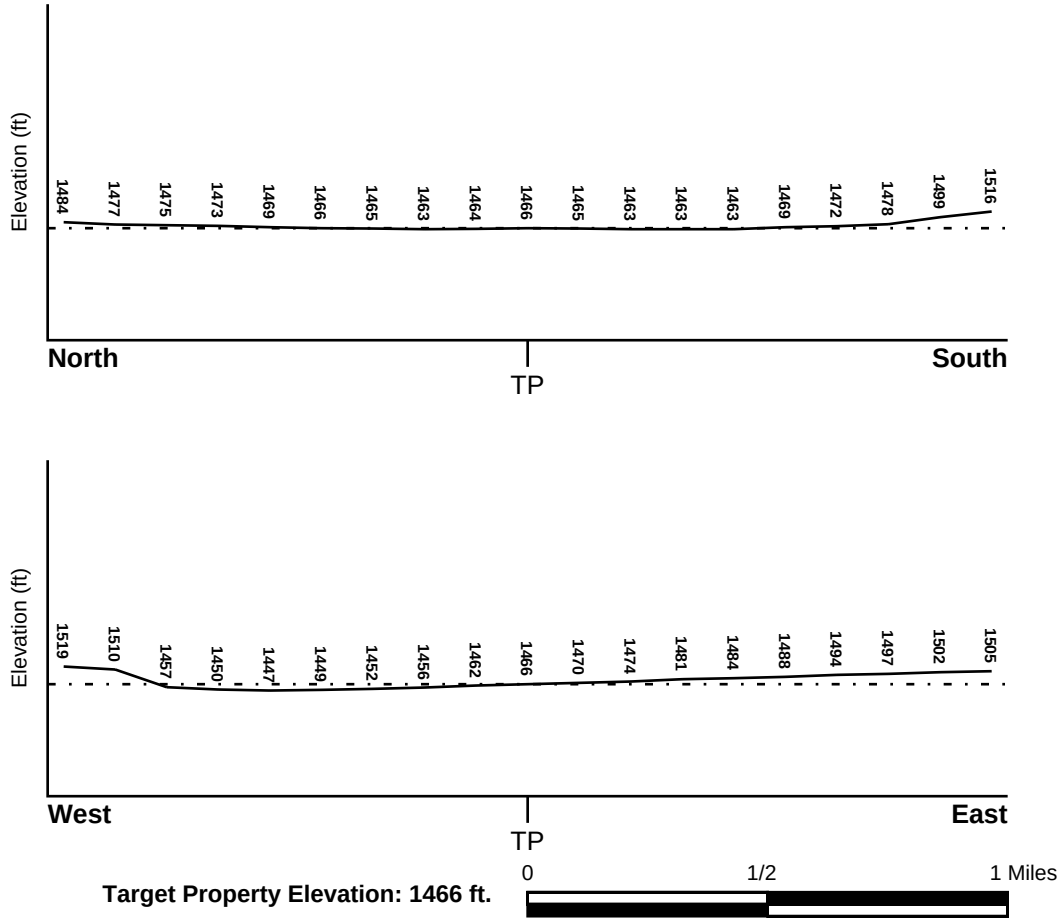
TOPOGRAPHIC INFORMATION

Surface topography may be indicative of the direction of surficial groundwater flow. This information can be used to assist the environmental professional in forming an opinion about the impact of nearby contaminated properties or, should contamination exist on the target property, what downgradient sites might be impacted.

TARGET PROPERTY TOPOGRAPHY

General Topographic Gradient: General West

SURROUNDING TOPOGRAPHY: ELEVATION PROFILES



Target Property Elevation: 1466 ft.

Source: Topography has been determined from the USGS 7.5' Digital Elevation Model and should be evaluated on a relative (not an absolute) basis. Relative elevation information between sites of close proximity should be field verified.

GEOCHECK® - PHYSICAL SETTING SOURCE SUMMARY

HYDROLOGIC INFORMATION

Surface water can act as a hydrologic barrier to groundwater flow. Such hydrologic information can be used to assist the environmental professional in forming an opinion about the impact of nearby contaminated properties or, should contamination exist on the target property, what downgradient sites might be impacted.

Refer to the Physical Setting Source Map following this summary for hydrologic information (major waterways and bodies of water).

FEMA FLOOD ZONE

Flood Plain Panel at Target Property	FEMA Source Type
06065C2060H	FEMA FIRM Flood data

Additional Panels in search area:	FEMA Source Type
Not Reported	

NATIONAL WETLAND INVENTORY

NWI Quad at Target Property	NWI Electronic Data Coverage
NOT AVAILABLE	YES - refer to the Overview Map and Detail Map

HYDROGEOLOGIC INFORMATION

Hydrogeologic information obtained by installation of wells on a specific site can often be an indicator of groundwater flow direction in the immediate area. Such hydrogeologic information can be used to assist the environmental professional in forming an opinion about the impact of nearby contaminated properties or, should contamination exist on the target property, what downgradient sites might be impacted.

Site-Specific Hydrogeological Data*:

Search Radius:	1.25 miles
Status:	Not found

AQUIFLOW®

Search Radius: 1.000 Mile.

EDR has developed the AQUIFLOW Information System to provide data on the general direction of groundwater flow at specific points. EDR has reviewed reports submitted by environmental professionals to regulatory authorities at select sites and has extracted the date of the report, groundwater flow direction as determined hydrogeologically, and the depth to water table.

MAP ID	LOCATION FROM TP	GENERAL DIRECTION GROUNDWATER FLOW
Not Reported		

* ©1996 Site−specific hydrogeological data gathered by CERCLIS Alerts, Inc., Bainbridge Island, WA. All rights reserved. All of the information and opinions presented are those of the cited EPA report(s), which were completed under a Comprehensive Environmental Response Compensation and Liability Information System (CERCLIS) investigation.

GEOCHECK® - PHYSICAL SETTING SOURCE SUMMARY

GROUNDWATER FLOW VELOCITY INFORMATION

Groundwater flow velocity information for a particular site is best determined by a qualified environmental professional using site specific geologic and soil strata data. If such data are not reasonably ascertainable, it may be necessary to rely on other sources of information, including geologic age identification, rock stratigraphic unit and soil characteristics data collected on nearby properties and regional soil information. In general, contaminant plumes move more quickly through sandy-gravelly types of soils than silty-clayey types of soils.

GEOLOGIC INFORMATION IN GENERAL AREA OF TARGET PROPERTY

Geologic information can be used by the environmental professional in forming an opinion about the relative speed at which contaminant migration may be occurring.

ROCK STRATIGRAPHIC UNIT

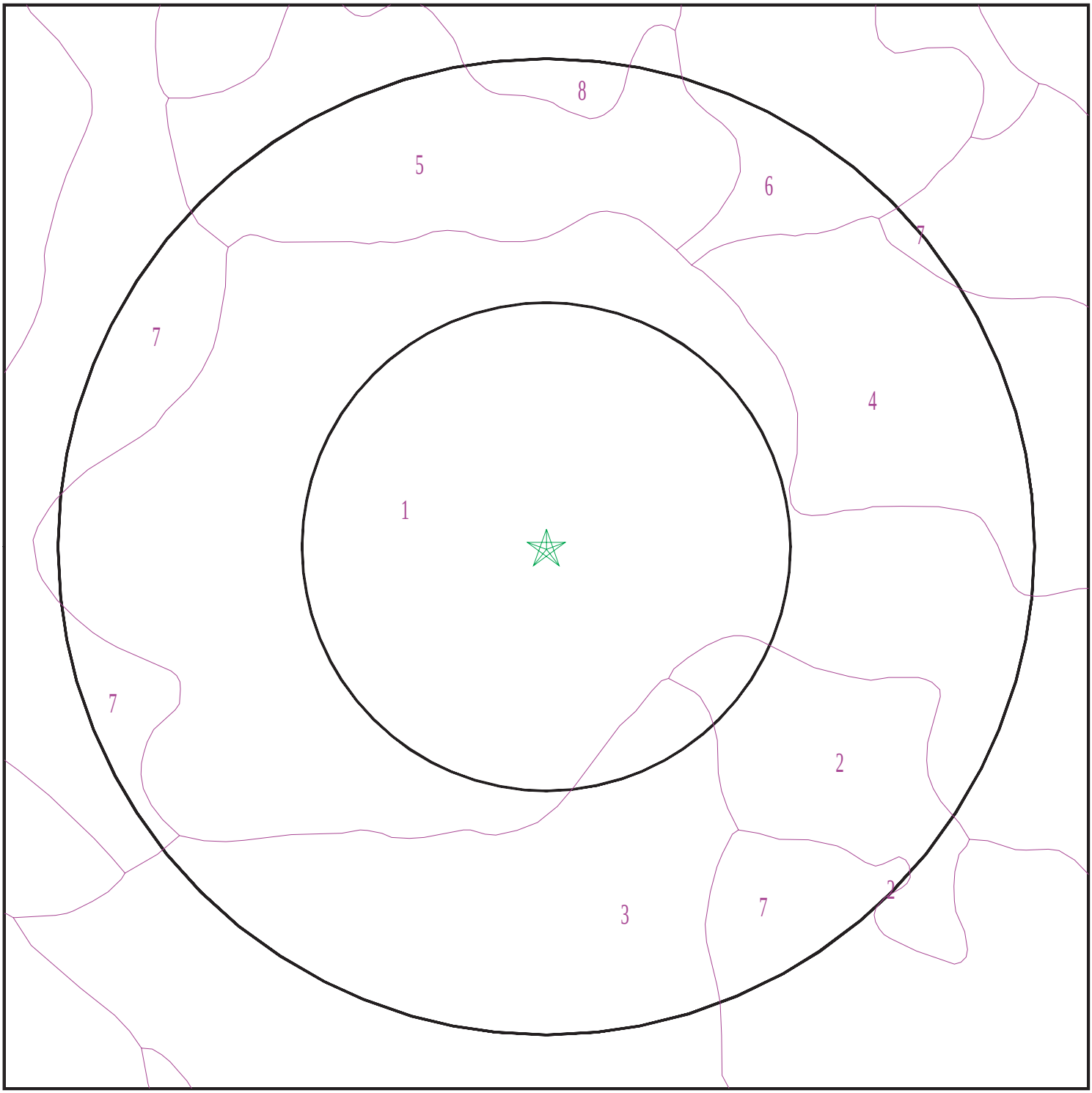
Era:	Mesozoic
System:	Cretaceous
Series:	Cretaceous granitic rocks
Code:	Kg *(decoded above as Era, System & Series)*

GEOLOGIC AGE IDENTIFICATION

Category: Plutonic and Intrusive Rocks

Geologic Age and Rock Stratigraphic Unit Source: P.G. Schruben, R.E. Arndt and W.J. Bawiec, Geology of the Conterminous U.S. at 1:2,500,000 Scale - a digital representation of the 1974 P.B. King and H.M. Beikman Map, USGS Digital Data Series DDS - 11 (1994).

SSURGO SOIL MAP - 6456246.2s



Target Property
SSURGO Soil
Water

0 1/16 1/8 1/4 Miles

N

SITE NAME:	DWP Menifee, CA	CLIENT:	McAlister GeoScience
ADDRESS:	26805 Menifee Road Sun City CA 92585	CONTACT:	Alexis C Ceballos
LAT/LONG:	33.729652 / 117.155142	INQUIRY #:	6456246.2s
		DATE:	April 19, 2021 2:22 pm

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GEOCHECK® - PHYSICAL SETTING SOURCE SUMMARY

DOMINANT SOIL COMPOSITION IN GENERAL AREA OF TARGET PROPERTY

The U.S. Department of Agriculture's (USDA) Soil Conservation Service (SCS) leads the National Cooperative Soil Survey (NCSS) and is responsible for collecting, storing, maintaining and distributing soil survey information for privately owned lands in the United States. A soil map in a soil survey is a representation of soil patterns in a landscape. The following information is based on Soil Conservation Service SSURGO data.

Soil Map ID: 1

Soil Component Name: HANFORD

Soil Surface Texture: coarse sandy loam

Hydrologic Group: Class B - Moderate infiltration rates. Deep and moderately deep, moderately well and well drained soils with moderately coarse textures.

Soil Drainage Class: Well drained

Hydric Status: Not hydric

Corrosion Potential - Uncoated Steel: Low

Depth to Bedrock Min: > 0 inches

Depth to Watertable Min: > 0 inches

Soil Layer Information							
	Boundary			Classification		Saturated hydraulic conductivity micro m/sec	Soil Reaction (pH)
Layer	Upper	Lower	Soil Texture Class	AASHTO Group	Unified Soil		
1	0 inches	7 inches	coarse sandy loam	Silt-Clay Materials (more than 35 pct. passing No. 200), Silty Soils.	COARSE-GRAINED SOILS, Sands, Sands with fines, Silty Sand.	Max: 141 Min: 42	Max: 7.8 Min: 5.6
2	7 inches	40 inches	fine sandy loam	Silt-Clay Materials (more than 35 pct. passing No. 200), Silty Soils.	COARSE-GRAINED SOILS, Sands, Sands with fines, Silty Sand.	Max: 141 Min: 42	Max: 7.8 Min: 5.6
3	40 inches	59 inches	stratified loamy sand to coarse sandy loam	Silt-Clay Materials (more than 35 pct. passing No. 200), Silty Soils.	COARSE-GRAINED SOILS, Sands, Sands with fines, Silty Sand.	Max: 141 Min: 42	Max: 7.8 Min: 5.6

Soil Map ID: 2

Soil Component Name: HANFORD

Soil Surface Texture: coarse sandy loam

Hydrologic Group: Class B - Moderate infiltration rates. Deep and moderately deep, moderately well and well drained soils with moderately coarse textures.

Soil Drainage Class: Somewhat excessively drained

Hydric Status: Not hydric

Corrosion Potential - Uncoated Steel: Low

Depth to Bedrock Min: > 0 inches

Depth to Watertable Min: > 0 inches

Soil Layer Information

	Boundary			Classification		Saturated hydraulic conductivity micro m/sec	Soil Reaction (pH)
Layer	Upper	Lower	Soil Texture Class	AASHTO Group	Unified Soil		
1	0 inches	7 inches	coarse sandy loam	Silt-Clay Materials (more than 35 pct. passing No. 200), Silty Soils.	COARSE-GRAINED SOILS, Sands, Sands with fines, Silty Sand.	Max: 141 Min: 42	Max: 7.8 Min: 5.6
2	7 inches	40 inches	fine sandy loam	Silt-Clay Materials (more than 35 pct. passing No. 200), Silty Soils.	COARSE-GRAINED SOILS, Sands, Sands with fines, Silty Sand.	Max: 141 Min: 42	Max: 7.8 Min: 5.6
3	40 inches	59 inches	stratified loamy sand to coarse sandy loam	Silt-Clay Materials (more than 35 pct. passing No. 200), Silty Soils.	COARSE-GRAINED SOILS, Sands, Sands with fines, Silty Sand.	Max: 141 Min: 42	Max: 7.8 Min: 5.6

Soil Map ID: 3

Soil Component Name: EXETER

Soil Surface Texture: sandy loam

Hydrologic Group: Class B - Moderate infiltration rates. Deep and moderately deep, moderately well and well drained soils with moderately coarse textures.

Soil Drainage Class: Well drained

GEOCHECK® - PHYSICAL SETTING SOURCE SUMMARY

Hydric Status: Not hydric

Corrosion Potential - Uncoated Steel: High

Depth to Bedrock Min: > 0 inches

Depth to Watertable Min: > 0 inches

Soil Layer Information							
	Boundary			Classification		Saturated hydraulic conductivity micro m/sec	Soil Reaction (pH)
Layer	Upper	Lower	Soil Texture Class	AASHTO Group	Unified Soil		
1	0 inches	16 inches	sandy loam	Silt-Clay Materials (more than 35 pct. passing No. 200), Silty Soils.	FINE-GRAINED SOILS, Silts and Clays (liquid limit less than 50%), silt.	Max: 4 Min: 1.4	Max: 8.4 Min: 7.4
2	16 inches	37 inches	sandy clay loam	Silt-Clay Materials (more than 35 pct. passing No. 200), Silty Soils.	FINE-GRAINED SOILS, Silts and Clays (liquid limit less than 50%), silt.	Max: 4 Min: 1.4	Max: 8.4 Min: 7.4
3	37 inches	50 inches	indurated	Silt-Clay Materials (more than 35 pct. passing No. 200), Silty Soils.	FINE-GRAINED SOILS, Silts and Clays (liquid limit less than 50%), silt.	Max: 4 Min: 1.4	Max: 8.4 Min: 7.4
4	50 inches	59 inches	stratified sandy loam to silt loam	Silt-Clay Materials (more than 35 pct. passing No. 200), Silty Soils.	FINE-GRAINED SOILS, Silts and Clays (liquid limit less than 50%), silt.	Max: 4 Min: 1.4	Max: 8.4 Min: 7.4

Soil Map ID: 4

Soil Component Name: EXETER

Soil Surface Texture: sandy loam

Hydrologic Group: Class C - Slow infiltration rates. Soils with layers impeding downward movement of water, or soils with moderately fine or fine textures.

Soil Drainage Class: Well drained

GEOCHECK® - PHYSICAL SETTING SOURCE SUMMARY

Hydric Status: Not hydric

Corrosion Potential - Uncoated Steel: High

Depth to Bedrock Min: > 0 inches

Depth to Watertable Min: > 0 inches

Soil Layer Information							
	Boundary			Classification		Saturated hydraulic conductivity micro m/sec	Soil Reaction (pH)
Layer	Upper	Lower	Soil Texture Class	AASHTO Group	Unified Soil		
1	0 inches	16 inches	sandy loam	Silt-Clay Materials (more than 35 pct. passing No. 200), Silty Soils.	COARSE-GRAINED SOILS, Sands, Sands with fines, Silty Sand.	Max: 4 Min: 1.4	Max: 8.4 Min: 7.4
2	16 inches	37 inches	sandy clay loam	Silt-Clay Materials (more than 35 pct. passing No. 200), Silty Soils.	COARSE-GRAINED SOILS, Sands, Sands with fines, Silty Sand.	Max: 4 Min: 1.4	Max: 8.4 Min: 7.4
3	37 inches	50 inches	indurated	Silt-Clay Materials (more than 35 pct. passing No. 200), Silty Soils.	COARSE-GRAINED SOILS, Sands, Sands with fines, Silty Sand.	Max: 4 Min: 1.4	Max: 8.4 Min: 7.4
4	50 inches	59 inches	stratified sandy loam to silt loam	Silt-Clay Materials (more than 35 pct. passing No. 200), Silty Soils.	COARSE-GRAINED SOILS, Sands, Sands with fines, Silty Sand.	Max: 4 Min: 1.4	Max: 8.4 Min: 7.4

Soil Map ID: 5

Soil Component Name: EXETER

Soil Surface Texture: fine sandy loam

Hydrologic Group: Class B - Moderate infiltration rates. Deep and moderately deep, moderately well and well drained soils with moderately coarse textures.

Soil Drainage Class: Well drained

GEOCHECK® - PHYSICAL SETTING SOURCE SUMMARY

Hydric Status: Not hydric

Corrosion Potential - Uncoated Steel: High

Depth to Bedrock Min: > 0 inches

Depth to Watertable Min: > 0 inches

Soil Layer Information							
	Boundary			Classification		Saturated hydraulic conductivity micro m/sec	Soil Reaction (pH)
Layer	Upper	Lower	Soil Texture Class	AASHTO Group	Unified Soil		
1	0 inches	16 inches	fine sandy loam	Silt-Clay Materials (more than 35 pct. passing No. 200), Silty Soils.	COARSE-GRAINED SOILS, Sands, Sands with fines, Silty Sand.	Max: 4 Min: 1.4	Max: 8.4 Min: 7.4
2	16 inches	37 inches	sandy clay loam	Silt-Clay Materials (more than 35 pct. passing No. 200), Silty Soils.	COARSE-GRAINED SOILS, Sands, Sands with fines, Silty Sand.	Max: 4 Min: 1.4	Max: 8.4 Min: 7.4
3	37 inches	50 inches	indurated	Silt-Clay Materials (more than 35 pct. passing No. 200), Silty Soils.	COARSE-GRAINED SOILS, Sands, Sands with fines, Silty Sand.	Max: 4 Min: 1.4	Max: 8.4 Min: 7.4
4	50 inches	59 inches	stratified sandy loam to silt loam	Silt-Clay Materials (more than 35 pct. passing No. 200), Silty Soils.	COARSE-GRAINED SOILS, Sands, Sands with fines, Silty Sand.	Max: 4 Min: 1.4	Max: 8.4 Min: 7.4

Soil Map ID: 6

Soil Component Name: EXETER

Soil Surface Texture: very fine sandy loam

Hydrologic Group: Class C - Slow infiltration rates. Soils with layers impeding downward movement of water, or soils with moderately fine or fine textures.

Soil Drainage Class: Well drained

GEOCHECK® - PHYSICAL SETTING SOURCE SUMMARY

Hydric Status: Not hydric

Corrosion Potential - Uncoated Steel: High

Depth to Bedrock Min: > 0 inches

Depth to Watertable Min: > 0 inches

Soil Layer Information							
	Boundary			Classification		Saturated hydraulic conductivity micro m/sec	Soil Reaction (pH)
Layer	Upper	Lower	Soil Texture Class	AASHTO Group	Unified Soil		
1	0 inches	16 inches	very fine sandy loam	Silt-Clay Materials (more than 35 pct. passing No. 200), Silty Soils.	FINE-GRAINED SOILS, Silts and Clays (liquid limit less than 50%), silt.	Max: 4 Min: 1.4	Max: 8.4 Min: 7.4
2	16 inches	37 inches	sandy clay loam	Silt-Clay Materials (more than 35 pct. passing No. 200), Silty Soils.	FINE-GRAINED SOILS, Silts and Clays (liquid limit less than 50%), silt.	Max: 4 Min: 1.4	Max: 8.4 Min: 7.4
3	37 inches	50 inches	indurated	Silt-Clay Materials (more than 35 pct. passing No. 200), Silty Soils.	FINE-GRAINED SOILS, Silts and Clays (liquid limit less than 50%), silt.	Max: 4 Min: 1.4	Max: 8.4 Min: 7.4
4	50 inches	59 inches	stratified sandy loam to silt loam	Silt-Clay Materials (more than 35 pct. passing No. 200), Silty Soils.	FINE-GRAINED SOILS, Silts and Clays (liquid limit less than 50%), silt.	Max: 4 Min: 1.4	Max: 8.4 Min: 7.4

Soil Map ID: 7

Soil Component Name: GREENFIELD

Soil Surface Texture: sandy loam

Hydrologic Group: Class B - Moderate infiltration rates. Deep and moderately deep, moderately well and well drained soils with moderately coarse textures.

Soil Drainage Class: Well drained

GEOCHECK® - PHYSICAL SETTING SOURCE SUMMARY

Hydric Status: Not hydric

Corrosion Potential - Uncoated Steel: Low

Depth to Bedrock Min: > 0 inches

Depth to Watertable Min: > 0 inches

Soil Layer Information							
	Boundary			Classification		Saturated hydraulic conductivity micro m/sec	Soil Reaction (pH)
Layer	Upper	Lower	Soil Texture Class	AASHTO Group	Unified Soil		
1	0 inches	25 inches	sandy loam	Granular materials (35 pct. or less passing No. 200), Silty, or Clayey Gravel and Sand.	COARSE-GRAINED SOILS, Sands, Sands with fines, Silty Sand.	Max: 42 Min: 14	Max: 8.4 Min: 6.6
2	25 inches	42 inches	fine sandy loam	Granular materials (35 pct. or less passing No. 200), Silty, or Clayey Gravel and Sand.	COARSE-GRAINED SOILS, Sands, Sands with fines, Silty Sand.	Max: 42 Min: 14	Max: 8.4 Min: 6.6
3	42 inches	59 inches	loam	Granular materials (35 pct. or less passing No. 200), Silty, or Clayey Gravel and Sand.	COARSE-GRAINED SOILS, Sands, Sands with fines, Silty Sand.	Max: 42 Min: 14	Max: 8.4 Min: 6.6
4	59 inches	72 inches	stratified loamy sand to sandy loam	Granular materials (35 pct. or less passing No. 200), Silty, or Clayey Gravel and Sand.	COARSE-GRAINED SOILS, Sands, Sands with fines, Silty Sand.	Max: 42 Min: 14	Max: 8.4 Min: 6.6

Soil Map ID: 8

Soil Component Name: EXETER

Soil Surface Texture: sandy loam

Hydrologic Group: Class C - Slow infiltration rates. Soils with layers impeding downward movement of water, or soils with moderately fine or fine textures.

Soil Drainage Class: Well drained

GEOCHECK® - PHYSICAL SETTING SOURCE SUMMARY

Hydric Status: Not hydric

Corrosion Potential - Uncoated Steel: High

Depth to Bedrock Min: > 0 inches

Depth to Watertable Min: > 0 inches

Soil Layer Information							
	Boundary			Classification		Saturated hydraulic conductivity micro m/sec	Soil Reaction (pH)
Layer	Upper	Lower	Soil Texture Class	AASHTO Group	Unified Soil		
1	0 inches	16 inches	sandy loam	Silt-Clay Materials (more than 35 pct. passing No. 200), Silty Soils.	FINE-GRAINED SOILS, Silts and Clays (liquid limit less than 50%), silt.	Max: 4 Min: 1.4	Max: 8.4 Min: 7.4
2	16 inches	37 inches	sandy clay loam	Silt-Clay Materials (more than 35 pct. passing No. 200), Silty Soils.	FINE-GRAINED SOILS, Silts and Clays (liquid limit less than 50%), silt.	Max: 4 Min: 1.4	Max: 8.4 Min: 7.4
3	37 inches	50 inches	indurated	Silt-Clay Materials (more than 35 pct. passing No. 200), Silty Soils.	FINE-GRAINED SOILS, Silts and Clays (liquid limit less than 50%), silt.	Max: 4 Min: 1.4	Max: 8.4 Min: 7.4
4	50 inches	59 inches	stratified sandy loam to silt loam	Silt-Clay Materials (more than 35 pct. passing No. 200), Silty Soils.	FINE-GRAINED SOILS, Silts and Clays (liquid limit less than 50%), silt.	Max: 4 Min: 1.4	Max: 8.4 Min: 7.4

LOCAL / REGIONAL WATER AGENCY RECORDS

EDR Local/Regional Water Agency records provide water well information to assist the environmental professional in assessing sources that may impact ground water flow direction, and in forming an opinion about the impact of contaminant migration on nearby drinking water wells.

WELL SEARCH DISTANCE INFORMATION

DATABASE	SEARCH DISTANCE (miles)
Federal USGS	1.000
Federal FRDS PWS	Nearest PWS within 1 mile
State Database	1.000

GEOCHECK® - PHYSICAL SETTING SOURCE SUMMARY

FEDERAL USGS WELL INFORMATION

MAP ID	WELL ID	LOCATION FROM TP
A2	USGS40000137521	1/4 - 1/2 Mile East
B5	USGS40000137493	1/4 - 1/2 Mile West
C6	USGS40000137484	1/2 - 1 Mile East
D7	USGS40000137600	1/2 - 1 Mile WNW
E16	USGS40000137404	1/2 - 1 Mile SE
E17	USGS40000137392	1/2 - 1 Mile SE
E18	USGS40000137393	1/2 - 1 Mile SE
E19	USGS40000137394	1/2 - 1 Mile SE

FEDERAL FRDS PUBLIC WATER SUPPLY SYSTEM INFORMATION

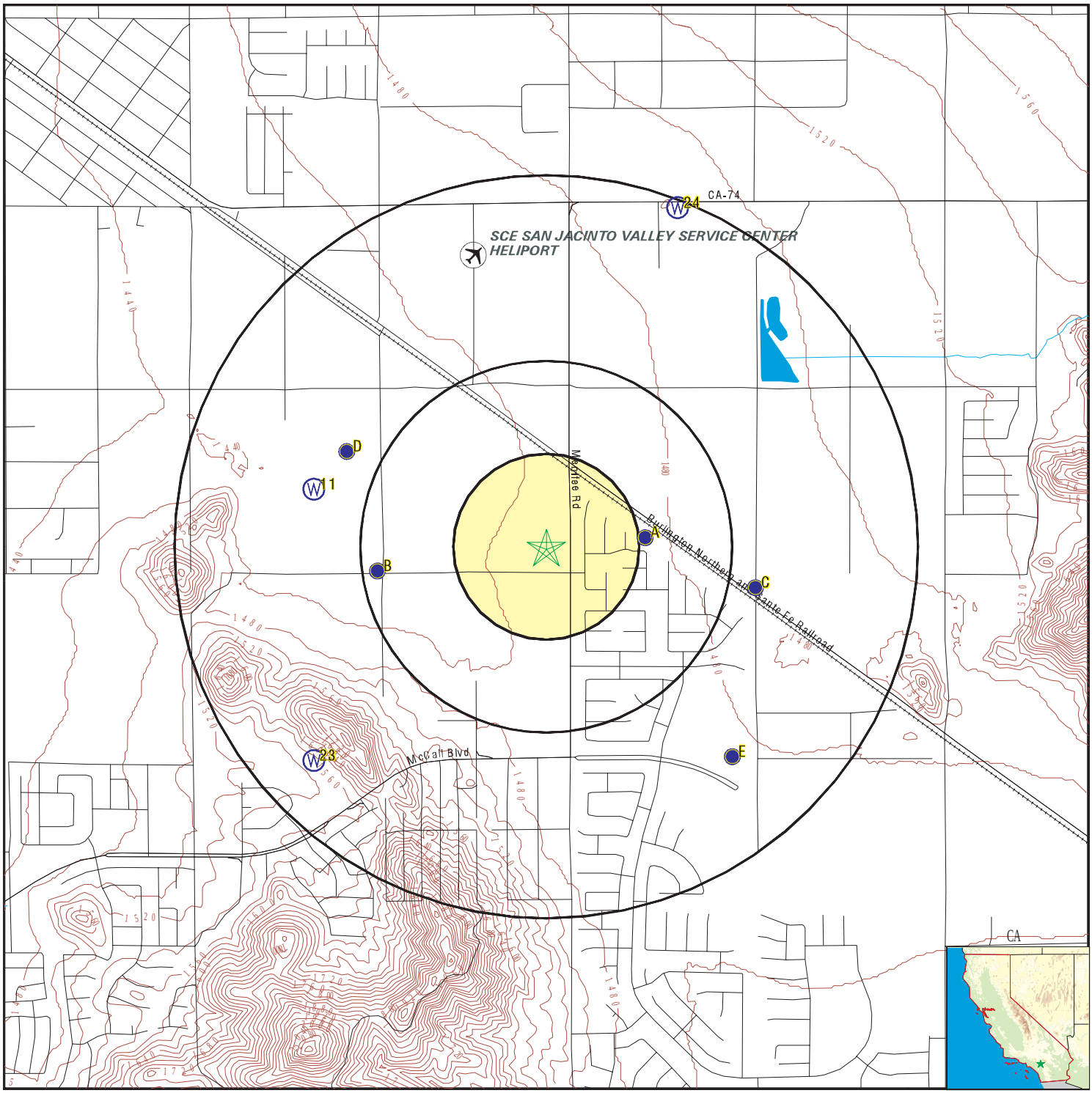
MAP ID	WELL ID	LOCATION FROM TP
No PWS System Found		

Note: PWS System location is not always the same as well location.

STATE DATABASE WELL INFORMATION

MAP ID	WELL ID	LOCATION FROM TP
A1	CADWR8000005193	1/8 - 1/4 Mile East
B3	CADWR8000005180	1/4 - 1/2 Mile West
B4	CAUSGSN00015525	1/4 - 1/2 Mile West
C8	CAUSGSN00009635	1/2 - 1 Mile ESE
C9	CADWR8000005176	1/2 - 1 Mile East
D10	CADWR8000005230	1/2 - 1 Mile WNW
11	CADWR0000036959	1/2 - 1 Mile WNW
E12	CADWR8000005153	1/2 - 1 Mile SE
E13	CADWR8000005148	1/2 - 1 Mile SE
E14	CADWR8000005147	1/2 - 1 Mile SE
E15	CADWR8000005146	1/2 - 1 Mile SE
E20	CAUSGSN00001122	1/2 - 1 Mile SE
E21	CAUSGSN00016927	1/2 - 1 Mile SE
E22	CAUSGSN00017426	1/2 - 1 Mile SE
23	CADWR0000012646	1/2 - 1 Mile SW
24	CADWR8000005265	1/2 - 1 Mile NNE

PHYSICAL SETTING SOURCE MAP - 6456246.2s



0 1/4 1/2 1 Miles

- County Boundary
- Major Roads
- Contour Lines
- Earthquake Fault Lines
- Airports
- Earthquake epicenter, Richter 5 or greater
- Water Wells
- Public Water Supply Wells
- Cluster of Multiple Icons
- Groundwater Flow Direction
- GI Indeterminate Groundwater Flow at Location
- GV Groundwater Flow Varies at Location
- HD Closest Hydrogeological Data
- Oil, gas or related wells

SITE NAME:	DWP Menifee, CA	CLIENT:	McAlister GeoScience
ADDRESS:	26805 Menifee Road Sun City CA 92585	CONTACT:	Alexis C Ceballos
		INQUIRY #:	6456246.2s
LAT/LONG:	33.729652 / 117.155142	DATE:	April 19, 2021 2:22 pm

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GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS

Map ID
Direction
Distance
Elevation | Database | EDR ID Number

A1
East
1/8 - 1/4 Mile
Higher

CA WELLS **CADWR8000005193**

State Well #:	05S03W13N001S	Station ID:	28640
Well Name:	Not Reported	Well Use:	Unknown
Well Type:	Unknown	Well Depth:	0
Basin Name:	San Jacinto	Well Completion Rpt #:	Not Reported

A2
East
1/4 - 1/2 Mile
Higher

FED USGS **USGS40000137521**

Organization ID:	USGS-CA		
Organization Name:	USGS California Water Science Center		
Monitor Location:	005S003W13N001S	Type:	Well
Description:	ORIG DPTH 433 SOUNDED DEPTH 142.0 FT AS OF 5/22/95		
HUC:	18070202	Drainage Area:	Not Reported
Drainage Area Units:	Not Reported	Contrib Drainage Area:	Not Reported
Contrib Drainage Area Unts:	Not Reported	Aquifer:	California Coastal Basin aquifers
Formation Type:	Not Reported	Aquifer Type:	Not Reported
Construction Date:	19770510	Well Depth:	142
Well Depth Units:	ft	Well Hole Depth:	433
Well Hole Depth Units:	ft		

Ground water levels,Number of Measurements:	3	Level reading date:	1995-09-28
Feet below surface:	52.10	Feet to sea level:	Not Reported
Note:	Not Reported		

Level reading date:	1995-06-23	Feet below surface:	52.01
Feet to sea level:	Not Reported		
Note:	A nearby site that taps the same aquifer was being pumped.		

Level reading date:	1995-05-22	Feet below surface:	52.02
Feet to sea level:	Not Reported	Note:	Not Reported

B3
West
1/4 - 1/2 Mile
Lower

CA WELLS **CADWR8000005180**

State Well #:	Not Reported	Station ID:	48342
Well Name:	EMWD12774	Well Use:	Irrigation
Well Type:	Single Well	Well Depth:	0
Basin Name:	San Jacinto	Well Completion Rpt #:	Not Reported

GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS

Map ID
Direction
Distance
Elevation | Database | EDR ID Number

B4
West
1/4 - 1/2 Mile
Lower

CA WELLS **CAUSGSN00015525**

Well ID:	USGS-334343117094401	Well Type:	UNK
Source:	United States Geological Survey		
Other Name:	USGS-334343117094401	GAMA PFAS Testing:	Not Reported
Groundwater Quality Data:	https://gamagroundwater.waterboards.ca.gov/gama/gamamap/public/GamaDataDisplay.asp?dataset=USGSNEW&samp_date=&global_id=&assigned_name=USGS-334343117094401&store_num=		
GeoTracker Data:	Not Reported		

B5
West
1/4 - 1/2 Mile
Lower

FED USGS **USGS40000137493**

Organization ID:	USGS-CA		
Organization Name:	USGS California Water Science Center		
Monitor Location:	005S003W14P001S	Type:	Well
Description:	WELL DEPTH IS AN APPROXIMATION		
HUC:	18070202	Drainage Area:	Not Reported
Drainage Area Units:	Not Reported	Contrib Drainage Area:	Not Reported
Contrib Drainage Area Unts:	Not Reported	Aquifer:	California Coastal Basin aquifers
Formation Type:	Not Reported	Aquifer Type:	Not Reported
Construction Date:	Not Reported	Well Depth:	250
Well Depth Units:	ft	Well Hole Depth:	Not Reported
Well Hole Depth Units:	Not Reported		

C6
East
1/2 - 1 Mile
Higher

FED USGS **USGS40000137484**

Organization ID:	USGS-CA		
Organization Name:	USGS California Water Science Center		
Monitor Location:	005S003W24C001S	Type:	Well
Description:	Not Reported	HUC:	18070202
Drainage Area:	Not Reported	Drainage Area Units:	Not Reported
Contrib Drainage Area:	Not Reported	Contrib Drainage Area Unts:	Not Reported
Aquifer:	California Coastal Basin aquifers		
Formation Type:	Not Reported	Aquifer Type:	Not Reported
Construction Date:	19770525	Well Depth:	505
Well Depth Units:	ft	Well Hole Depth:	Not Reported
Well Hole Depth Units:	Not Reported		

Ground water levels,Number of Measurements:	1	Level reading date:	1994-01-04
Feet below surface:	72.56	Feet to sea level:	Not Reported
Note:	Not Reported		

GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS

Map ID
Direction
Distance
Elevation | Database | EDR ID Number

D7
WNW
1/2 - 1 Mile
Lower

FED USGS **USGS40000137600**

Organization ID:	USGS-CA		
Organization Name:	USGS California Water Science Center		
Monitor Location:	005S003W14L001S	Type:	Well
Description:	Not Reported	HUC:	18070202
Drainage Area:	Not Reported	Drainage Area Units:	Not Reported
Contrib Drainage Area:	Not Reported	Contrib Drainage Area Unts:	Not Reported
Aquifer:	California Coastal Basin aquifers		
Formation Type:	Not Reported	Aquifer Type:	Not Reported
Construction Date:	19800120	Well Depth:	200
Well Depth Units:	ft	Well Hole Depth:	200
Well Hole Depth Units:	ft		

Ground water levels,Number of Measurements:	1	Level reading date:	1995-06-05
Feet below surface:	71.83	Feet to sea level:	Not Reported
Note:	Not Reported		

C8
ESE
1/2 - 1 Mile
Higher

CA WELLS **CAUSGSN00009635**

Well ID:	USGS-334341117084101	Well Type:	UNK
Source:	United States Geological Survey		
Other Name:	USGS-334341117084101	GAMA PFAS Testing:	Not Reported
Groundwater Quality Data:	https://gamagroundwater.waterboards.ca.gov/gama/gamamap/public/GamaDataDisplay.asp?dataset=USGSNEW&samp_date=&global_id=&assigned_name=USGS-334341117084101&store_num=		
GeoTracker Data:	Not Reported		

C9
East
1/2 - 1 Mile
Higher

CA WELLS **CADWR8000005176**

State Well #:	05S03W24C001S	Station ID:	6990
Well Name:	EMWD11157	Well Use:	Irrigation
Well Type:	Single Well	Well Depth:	415
Basin Name:	San Jacinto	Well Completion Rpt #:	Not Reported

D10
WNW
1/2 - 1 Mile
Lower

CA WELLS **CADWR8000005230**

State Well #:	05S03W14L001S	Station ID:	6313
Well Name:	Not Reported	Well Use:	Unknown
Well Type:	Unknown	Well Depth:	0
Basin Name:	San Jacinto	Well Completion Rpt #:	Not Reported

GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS

Map ID
Direction
Distance
Elevation | Database | EDR ID Number

11
WNW
1/2 - 1 Mile
Lower

CA WELLS **CADWR0000036959**

Well ID:	05S03W14P001S	Well Type:	UNK
Source:	Department of Water Resources		
Other Name:	05S03W14P001S	GAMA PFAS Testing:	Not Reported
Groundwater Quality Data:	https://gamagroundwater.waterboards.ca.gov/gama/gamamap/public/GamaDataDisplay.asp?dataset=DWR&samp_date=&global_id=&assigned_name=05S03W14P001S&store_num=		
GeoTracker Data:	Not Reported		

E12
SE
1/2 - 1 Mile
Higher

CA WELLS **CADWR8000005153**

State Well #:	05S03W24F001S	Station ID:	27788
Well Name:	Not Reported	Well Use:	Unknown
Well Type:	Unknown	Well Depth:	0
Basin Name:	San Jacinto	Well Completion Rpt #:	Not Reported

E13
SE
1/2 - 1 Mile
Higher

CA WELLS **CADWR8000005148**

State Well #:	05S03W24F004S	Station ID:	6992
Well Name:	Not Reported	Well Use:	Unknown
Well Type:	Unknown	Well Depth:	0
Basin Name:	San Jacinto	Well Completion Rpt #:	Not Reported

E14
SE
1/2 - 1 Mile
Higher

CA WELLS **CADWR8000005147**

State Well #:	05S03W24F003S	Station ID:	27789
Well Name:	Not Reported	Well Use:	Unknown
Well Type:	Unknown	Well Depth:	0
Basin Name:	San Jacinto	Well Completion Rpt #:	Not Reported

E15
SE
1/2 - 1 Mile
Higher

CA WELLS **CADWR8000005146**

State Well #:	05S03W24F002S	Station ID:	6991
Well Name:	Not Reported	Well Use:	Unknown
Well Type:	Unknown	Well Depth:	0
Basin Name:	San Jacinto	Well Completion Rpt #:	Not Reported

Map ID
Direction
Distance
Elevation | Database | EDR ID Number

E16
SE
1/2 - 1 Mile
Higher

FED USGS **USGS40000137404**

Organization ID:	USGS-CA		
Organization Name:	USGS California Water Science Center		
Monitor Location:	005S003W24F001S	Type:	Well
Description:	Not Reported	HUC:	18070202
Drainage Area:	Not Reported	Drainage Area Units:	Not Reported
Contrib Drainage Area:	Not Reported	Contrib Drainage Area Unts:	Not Reported
Aquifer:	California Coastal Basin aquifers		
Formation Type:	Not Reported	Aquifer Type:	Not Reported
Construction Date:	19931008	Well Depth:	680.9
Well Depth Units:	ft	Well Hole Depth:	690
Well Hole Depth Units:	ft		

Ground water levels,Number of Measurements:	5	Level reading date:	1995-06-23
Feet below surface:	92.40	Feet to sea level:	Not Reported
Note:	Not Reported		
Level reading date:	1994-12-15	Feet below surface:	69.21
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1994-11-18	Feet below surface:	76.03
Feet to sea level:	Not Reported	Note:	The site had been pumped recently.
Level reading date:	1994-02-10	Feet below surface:	62.86
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1993-12-03	Feet below surface:	68.34
Feet to sea level:	Not Reported	Note:	Not Reported

E17
SE
1/2 - 1 Mile
Higher

FED USGS **USGS40000137392**

Organization ID:	USGS-CA		
Organization Name:	USGS California Water Science Center		
Monitor Location:	005S003W24F002S	Type:	Well
Description:	Not Reported	HUC:	18070202
Drainage Area:	Not Reported	Drainage Area Units:	Not Reported
Contrib Drainage Area:	Not Reported	Contrib Drainage Area Unts:	Not Reported
Aquifer:	California Coastal Basin aquifers		
Formation Type:	Not Reported	Aquifer Type:	Not Reported
Construction Date:	19930930	Well Depth:	691
Well Depth Units:	ft	Well Hole Depth:	729
Well Hole Depth Units:	ft		

Ground water levels,Number of Measurements:	6	Level reading date:	1995-09-13
Feet below surface:	75.11	Feet to sea level:	Not Reported
Note:	Not Reported		
Level reading date:	1995-06-23	Feet below surface:	65.77
Feet to sea level:	Not Reported	Note:	Not Reported

Level reading date:	1994-12-15	Feet below surface:	69.25
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1994-11-18	Feet below surface:	76.47
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1994-02-10	Feet below surface:	66.58
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1993-12-03	Feet below surface:	64.22
Feet to sea level:	Not Reported	Note:	Not Reported

E18
SE
1/2 - 1 Mile
Higher

FED USGS **USGS40000137393**

Organization ID:	USGS-CA		
Organization Name:	USGS California Water Science Center		
Monitor Location:	005S003W24F003S	Type:	Well
Description:	Not Reported	HUC:	18070202
Drainage Area:	Not Reported	Drainage Area Units:	Not Reported
Contrib Drainage Area:	Not Reported	Contrib Drainage Area Unts:	Not Reported
Aquifer:	California Coastal Basin aquifers		
Formation Type:	Not Reported	Aquifer Type:	Not Reported
Construction Date:	19930930	Well Depth:	403
Well Depth Units:	ft	Well Hole Depth:	729
Well Hole Depth Units:	ft		

Ground water levels,Number of Measurements:	6	Level reading date:	1995-09-13
Feet below surface:	99.99	Feet to sea level:	Not Reported
Note:	Not Reported		
Level reading date:	1995-06-23	Feet below surface:	108.69
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1994-12-15	Feet below surface:	72.76
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1994-11-18	Feet below surface:	83.52
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1994-02-10	Feet below surface:	68.21
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1993-12-03	Feet below surface:	69.90
Feet to sea level:	Not Reported	Note:	Not Reported

E19
SE
1/2 - 1 Mile
Higher

FED USGS **USGS40000137394**

Organization ID:	USGS-CA		
Organization Name:	USGS California Water Science Center		
Monitor Location:	005S003W24F004S	Type:	Well
Description:	Not Reported	HUC:	18070202
Drainage Area:	Not Reported	Drainage Area Units:	Not Reported
Contrib Drainage Area:	Not Reported	Contrib Drainage Area Unts:	Not Reported

Aquifer:	California Coastal Basin aquifers		
Formation Type:	Not Reported	Aquifer Type:	Not Reported
Construction Date:	19930930	Well Depth:	155.1
Well Depth Units:	ft	Well Hole Depth:	729
Well Hole Depth Units:	ft		

Ground water levels,Number of Measurements:	6	Level reading date:	1995-09-13
Feet below surface:	56.86	Feet to sea level:	Not Reported
Note:	Not Reported		
Level reading date:	1995-06-23	Feet below surface:	57.00
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1994-12-15	Feet below surface:	57.06
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1994-11-18	Feet below surface:	57.44
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1994-02-10	Feet below surface:	57.40
Feet to sea level:	Not Reported	Note:	Not Reported
Level reading date:	1993-12-03	Feet below surface:	58.06
Feet to sea level:	Not Reported	Note:	Not Reported

E20
SE
1/2 - 1 Mile
Higher

CA WELLS **CAUSGSN00001122**

Well ID:	USGS-334317117084303	Well Type:	UNK
Source:	United States Geological Survey		
Other Name:	USGS-334317117084303	GAMA PFAS Testing:	Not Reported
Groundwater Quality Data:	https://gamagroundwater.waterboards.ca.gov/gama/gamamap/public/GamaDataDisplay.asp?dataset=USGSNEW&samp_date=&global_id=&assigned_name=USGS-334317117084303&store_num=		
GeoTracker Data:	Not Reported		

E21
SE
1/2 - 1 Mile
Higher

CA WELLS **CAUSGSN00016927**

Well ID:	USGS-334317117084301	Well Type:	UNK
Source:	United States Geological Survey		
Other Name:	USGS-334317117084301	GAMA PFAS Testing:	Not Reported
Groundwater Quality Data:	https://gamagroundwater.waterboards.ca.gov/gama/gamamap/public/GamaDataDisplay.asp?dataset=USGSNEW&samp_date=&global_id=&assigned_name=USGS-334317117084301&store_num=		
GeoTracker Data:	Not Reported		

E22
SE
1/2 - 1 Mile
Higher

CA WELLS **CAUSGSN00017426**

Well ID:	USGS-334317117084302	Well Type:	UNK
Source:	United States Geological Survey		

Other Name:	USGS-334317117084302	GAMA PFAS Testing:	Not Reported
Groundwater Quality Data:	https://gamagroundwater.waterboards.ca.gov/gama/gamamap/public/GamaDataDisplay.asp?dataset=USGSNEW&samp_date=&global_id=&assigned_name=USGS-334317117084302&store_num=		
GeoTracker Data:	Not Reported		

23
SW
1/2 - 1 Mile
Higher

CA WELLS **CADWR0000012646**

Well ID:	05S03W23L001S	Well Type:	UNK
Source:	Department of Water Resources		
Other Name:	05S03W23L001S	GAMA PFAS Testing:	Not Reported
Groundwater Quality Data:	https://gamagroundwater.waterboards.ca.gov/gama/gamamap/public/GamaDataDisplay.asp?dataset=DWR&samp_date=&global_id=&assigned_name=05S03W23L001S&store_num=		
GeoTracker Data:	Not Reported		

24
NNE
1/2 - 1 Mile
Higher

CA WELLS **CADWR8000005265**

State Well #:	Not Reported	Station ID:	48339
Well Name:	EMWD12759	Well Use:	Observation
Well Type:	Single Well	Well Depth:	693
Basin Name:	San Jacinto	Well Completion Rpt #:	Not Reported

GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS
RADON

AREA RADON INFORMATION

State Database: CA Radon

Radon Test Results

Zipcode	Num Tests	> 4 pCi/L
92585	6	0

Federal EPA Radon Zone for RIVERSIDE County: 2

Note: Zone 1 indoor average level > 4 pCi/L.
: Zone 2 indoor average level >= 2 pCi/L and <= 4 pCi/L.
: Zone 3 indoor average level < 2 pCi/L.

Federal Area Radon Information for RIVERSIDE COUNTY, CA

Number of sites tested: 12

Area	Average Activity	% <4 pCi/L	% 4-20 pCi/L	% >20 pCi/L
Living Area - 1st Floor	0.117 pCi/L	100%	0%	0%
Living Area - 2nd Floor	0.450 pCi/L	100%	0%	0%
Basement	1.700 pCi/L	100%	0%	0%

PHYSICAL SETTING SOURCE RECORDS SEARCHED

TOPOGRAPHIC INFORMATION

USGS 7.5' Digital Elevation Model (DEM)
Source: United States Geologic Survey
EDR acquired the USGS 7.5' Digital Elevation Model in 2002 and updated it in 2006. The 7.5 minute DEM corresponds to the USGS 1:24,000- and 1:25,000-scale topographic quadrangle maps. The DEM provides elevation data with consistent elevation units and projection.

Current USGS 7.5 Minute Topographic Map
Source: U.S. Geological Survey

HYDROLOGIC INFORMATION

Flood Zone Data: This data was obtained from the Federal Emergency Management Agency (FEMA). It depicts 100-year and 500-year flood zones as defined by FEMA. It includes the National Flood Hazard Layer (NFHL) which incorporates Flood Insurance Rate Map (FIRM) data and Q3 data from FEMA in areas not covered by NFHL.
Source: FEMA
Telephone: 877-336-2627
Date of Government Version: 2003, 2015

NWI: National Wetlands Inventory. This data, available in select counties across the country, was obtained by EDR in 2002, 2005 and 2010 from the U.S. Fish and Wildlife Service.

State Wetlands Data: Wetland Inventory
Source: Department of Fish and Wildlife
Telephone: 916-445-0411

HYDROGEOLOGIC INFORMATION

AQUIFLOW^{R} Information System
Source: EDR proprietary database of groundwater flow information
EDR has developed the AQUIFLOW Information System (AIS) to provide data on the general direction of groundwater flow at specific points. EDR has reviewed reports submitted to regulatory authorities at select sites and has extracted the date of the report, hydrogeologically determined groundwater flow direction and depth to water table information.

GEOLOGIC INFORMATION

Geologic Age and Rock Stratigraphic Unit
Source: P.G. Schruben, R.E. Arndt and W.J. Bawiec, Geology of the Conterminous U.S. at 1:2,500,000 Scale - A digital representation of the 1974 P.B. King and H.M. Beikman Map, USGS Digital Data Series DDS - 11 (1994).

STATSGO: State Soil Geographic Database
Source: Department of Agriculture, Natural Resources Conservation Service (NRCS)
The U.S. Department of Agriculture's (USDA) Natural Resources Conservation Service (NRCS) leads the national Conservation Soil Survey (NCSS) and is responsible for collecting, storing, maintaining and distributing soil survey information for privately owned lands in the United States. A soil map in a soil survey is a representation of soil patterns in a landscape. Soil maps for STATSGO are compiled by generalizing more detailed (SSURGO) soil survey maps.

SSURGO: Soil Survey Geographic Database
Source: Department of Agriculture, Natural Resources Conservation Service (NRCS)
Telephone: 800-672-5559
SSURGO is the most detailed level of mapping done by the Natural Resources Conservation Service, mapping scales generally range from 1:12,000 to 1:63,360. Field mapping methods using national standards are used to construct the soil maps in the Soil Survey Geographic (SSURGO) database. SSURGO digitizing duplicates the original soil survey maps. This level of mapping is designed for use by landowners, townships and county natural resource planning and management.

PHYSICAL SETTING SOURCE RECORDS SEARCHED

LOCAL / REGIONAL WATER AGENCY RECORDS

FEDERAL WATER WELLS

PWS: Public Water Systems
Source: EPA/Office of Drinking Water
Telephone: 202-564-3750
Public Water System data from the Federal Reporting Data System. A PWS is any water system which provides water to at least 25 people for at least 60 days annually. PWSs provide water from wells, rivers and other sources.

PWS ENF: Public Water Systems Violation and Enforcement Data
Source: EPA/Office of Drinking Water
Telephone: 202-564-3750
Violation and Enforcement data for Public Water Systems from the Safe Drinking Water Information System (SDWIS) after August 1995. Prior to August 1995, the data came from the Federal Reporting Data System (FRDS).

USGS Water Wells: USGS National Water Inventory System (NWIS)
This database contains descriptive information on sites where the USGS collects or has collected data on surface water and/or groundwater. The groundwater data includes information on wells, springs, and other sources of groundwater.

OTHER STATE DATABASE INFORMATION

Groundwater Ambient Monitoring & Assessment Program
State Water Resources Control Board
Telephone: 916-341-5577
The GAMA Program is Californias comprehensive groundwater quality monitoring program. GAMA collects data by testing the untreated, raw water in different types of wells for naturally-occurring and man-made chemicals. The GAMA data includes Domestic, Monitoring and Municipal well types from the following sources, Department of Water Resources, Department of Heath Services, EDF, Agricultural Lands, Lawrence Livermore National Laboratory, Department of Pesticide Regulation, United States Geological Survey, Groundwater Ambient Monitoring and Assessment Program and Local Groundwater Projects.

Water Well Database
Source: Department of Water Resources
Telephone: 916-651-9648

California Drinking Water Quality Database
Source: Department of Public Health
Telephone: 916-324-2319
The database includes all drinking water compliance and special studies monitoring for the state of California since 1984. It consists of over 3,200,000 individual analyses along with well and water system information.

California Oil and Gas Well Locations
Source: Dept of Conservation, Geologic Energy Management Division
Telephone: 916-323-1779
Oil and Gas well locations in the state.

California Earthquake Fault Lines
Source: California Division of Mines and Geology
The fault lines displayed on EDR's Topographic map are digitized quaternary fault lines prepared in 1975 by the United State Geological Survey. Additional information (also from 1975) regarding activity at specific fault lines comes from California's Preliminary Fault Activity Map prepared by the California Division of Mines and Geology.

RADON

State Database: CA Radon
Source: Department of Public Health
Telephone: 916-210-8558
Radon Database for California

PHYSICAL SETTING SOURCE RECORDS SEARCHED

Area Radon Information
Source: USGS
Telephone: 703-356-4020
The National Radon Database has been developed by the U.S. Environmental Protection Agency (USEPA) and is a compilation of the EPA/State Residential Radon Survey and the National Residential Radon Survey. The study covers the years 1986 - 1992. Where necessary data has been supplemented by information collected at private sources such as universities and research institutions.

EPA Radon Zones
Source: EPA
Telephone: 703-356-4020
Sections 307 & 309 of IRAA directed EPA to list and identify areas of U.S. with the potential for elevated indoor radon levels.

OTHER

Airport Landing Facilities: Private and public use landing facilities
Source: Federal Aviation Administration, 800-457-6656

Epicenters: World earthquake epicenters, Richter 5 or greater
Source: Department of Commerce, National Oceanic and Atmospheric Administration

California Earthquake Fault Lines: The fault lines displayed on EDR's Topographic map are digitized quaternary fault lines, prepared in 1975 by the United State Geological Survey. Additional information (also from 1975) regarding activity at specific fault lines comes from California's Preliminary Fault Activity Map prepared by the California Division of Mines and Geology.

STREET AND ADDRESS INFORMATION

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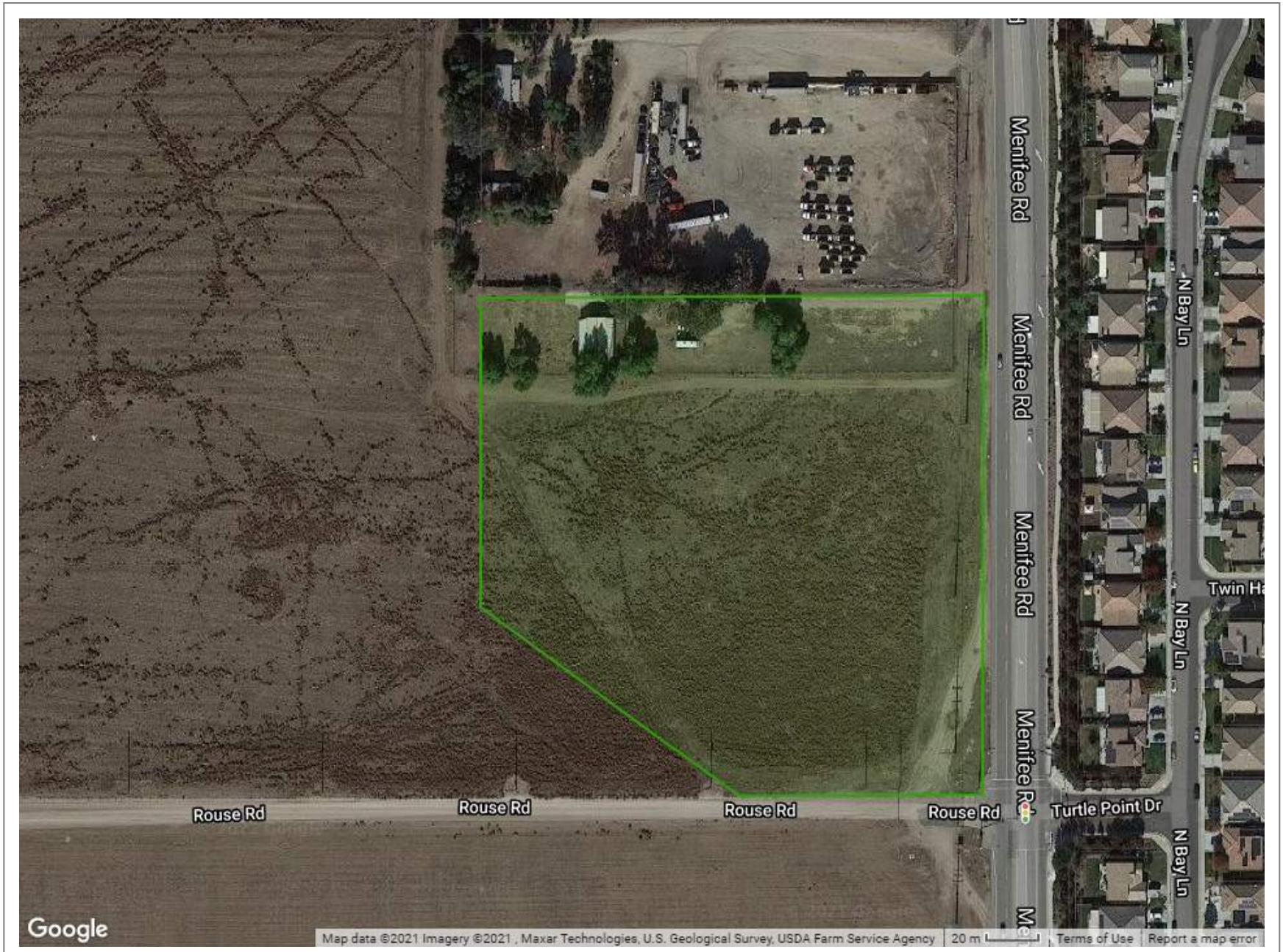
Appendix D

Other Useful Information

Riverside County, CA - Community: Property Search undefined


Menifee Rd
Menifee Rd
Menifee Rd
Menifee Rd
N Bay Ln
N Bay Ln
N Bay Ln
Twin Ha
Rouse Rd
Rouse Rd
Rouse Rd
Rouse Rd
Turtle Point Dr
Google
Map data ©2021 Imagery ©2021 , Maxar Technologies, U.S. Geological Survey, USDA Farm Service Agency
20 m
Terms of Use
Report a map error

Your search returned no results.

DWP Menifee, CA
26805 Menifee Road
Sun City, CA 92585

Inquiry Number: 6456246.5
April 21, 2021

The EDR-City Directory Image Report

Environmental Data Resources Inc

6 Armstrong Road
Shelton, CT 06484
800.352.0050
www.edrnet.com

TABLE OF CONTENTS

SECTION

Executive Summary

Findings

City Directory Images

Thank you for your business.
Please contact EDR at 1-800-352-0050
with any questions or comments.

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This Report contains certain information obtained from a variety of public and other sources reasonably available to Environmental Data Resources, Inc. It cannot be concluded from this Report that coverage information for the target and surrounding properties does not exist from other sources. **NO WARRANTY EXPRESSED OR IMPLIED, IS MADE WHATSOEVER IN CONNECTION WITH THIS REPORT. ENVIRONMENTAL DATA RESOURCES, INC. SPECIFICALLY DISCLAIMS THE MAKING OF ANY SUCH WARRANTIES, INCLUDING WITHOUT LIMITATION, MERCHANTABILITY OR FITNESS FOR A PARTICULAR USE OR PURPOSE. ALL RISK IS ASSUMED BY THE USER. IN NO EVENT SHALL ENVIRONMENTAL DATA RESOURCES, INC. BE LIABLE TO ANYONE, WHETHER ARISING OUT OF ERRORS OR OMISSIONS, NEGLIGENCE, ACCIDENT OR ANY OTHER CAUSE, FOR ANY LOSS OR DAMAGE, INCLUDING, WITHOUT LIMITATION, SPECIAL, INCIDENTAL, CONSEQUENTIAL, OR EXEMPLARY DAMAGES. ANY LIABILITY ON THE PART OF ENVIRONMENTAL DATA RESOURCES, INC. IS STRICTLY LIMITED TO A REFUND OF THE AMOUNT PAID FOR THIS REPORT.** Purchaser accepts this Report "AS IS". Any analyses, estimates, ratings, environmental risk levels or risk codes provided in this Report are provided for illustrative purposes only, and are not intended to provide, nor should they be interpreted as providing any facts regarding, or prediction orforecast of, any environmental risk for any property. Only a Phase I Environmental Site Assessment performed by an environmental professional can provide information regarding the environmental risk for any property. Additionally, the information provided in this Report is not to be construed as legal advice.

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EXECUTIVE SUMMARY

DESCRIPTION

Environmental Data Resources, Inc.'s (EDR) City Directory Report is a screening tool designed to assist environmental professionals in evaluating potential liability on a target property resulting from past activities. EDR's City Directory Report includes a search of available city directory data at 5 year intervals.

RECORD SOURCES

EDR's Digital Archive combines historical directory listings from sources such as Cole Information and Dun & Bradstreet. These standard sources of property information complement and enhance each other to provide a more comprehensive report.

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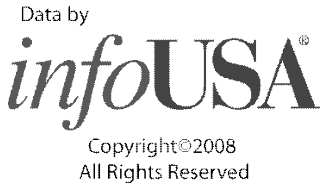


RESEARCH SUMMARY

The following research sources were consulted in the preparation of this report. A check mark indicates where information was identified in the source and provided in this report.

Year	Target Street	Cross Street	Source
2017	☑	☐	EDR Digital Archive
2014	☑	☐	EDR Digital Archive
2010	☑	☐	EDR Digital Archive
2005	☑	☐	EDR Digital Archive
2000	☑	☐	EDR Digital Archive
1995	☑	☐	EDR Digital Archive
1992	☑	☐	EDR Digital Archive
1985	☑	☐	Haines Criss-Cross Directory
1980	☑	☐	Haines Criss-Cross Directory
1976	☑	☐	Haines Criss-Cross Directory
1971	☐	☐	Haines Criss-Cross Directory

FINDINGS

TARGET PROPERTY STREET

26805 Menifee Road
Sun City, CA 92585

Year	*CD Image*	*Source*	
MENIFEE RD			
2017	pg A1	EDR Digital Archive	
2014	pg A2	EDR Digital Archive	
2010	pg A3	EDR Digital Archive	
2005	pg A4	EDR Digital Archive	
2000	pg A5	EDR Digital Archive	
1995	pg A6	EDR Digital Archive	
1992	pg A7	EDR Digital Archive	
1985	pg A8	Haines Criss-Cross Directory	
1980	pg A9	Haines Criss-Cross Directory	
1976	pg A10	Haines Criss-Cross Directory	
1971	-	Haines Criss-Cross Directory	Street not listed in Source

FINDINGS

CROSS STREETS

No Cross Streets Identified

City Directory Images

Target Street	Cross Street	Source
✓	-	EDR Digital Archive

MENIFEE RD 2017

24195 LOEB, SANDY M
24310 NORDIN, DARELYN J
24340 PADILLA, SERGIO R
24345 HONTZ, FREAS W
24433 WAGNER, JASON J
24445 NEWMON, JOE R
24473 GOSECO, JAMES G
24505 ALLEN, MARK G
24675 WALKER, CHRISTOPHER L
24689 SMITH, CAROL A
24739 DUNALAO, DAVID L
25180 HERRERA, VERONICA A
PACHECO FARM SERVICES
26050 AMPM
26785 GALLEGOS, JAVIER F
27721 PETERS, JASON T
27825 KEYES, RALPH M
27851 ACE WEED ABATEMENT
KEYES, RALPH
27925 JEHOVAHS WITNESS
27985 SONRISE CHRISTIAN CENTER

Target Street	Cross Street	Source
✓	-	EDR Digital Archive

MENIFEE RD 2014

24024	J & J PLUMBING INC J & J PLUMBING IN
24195	OCCUPANT UNKNOWN,
24310	NORDIN, MARK A
24340	PADILLA, SERGIO R
24345	HONTZ, FREAS W
24360	OCCUPANT UNKNOWN,
24433	WAGNER, JASON J
24445	OCCUPANT UNKNOWN,
24473	OCCUPANT UNKNOWN,
24505	OCCUPANT UNKNOWN,
24615	OCCUPANT UNKNOWN,
24675	OCCUPANT UNKNOWN,
24689	SMITH, CAROL A
24699	LAMBERSON, LARRY
24739	DUNALAO, DAVID L
25180	OCCUPANT UNKNOWN,
	PACHECO FARM SERVICES
25190	OCCUPANT UNKNOWN,
26050	ROMOLAND AM PM
26785	DALY, ELENA F
26805	OCCUPANT UNKNOWN,
27721	OCCUPANT UNKNOWN,
27803	DYER, MARIE
27825	KEYES, RALPH M
27851	ACE WEED ABATEMENT
	CHOU, KUNYU
27925	JEHOVAHS WITNESS
27985	CC VISION DE DIOS

Target Street	Cross Street	Source
✓	-	EDR Digital Archive

MENIFEE RD 2010

24310 OCCUPANT UNKNOWN,
24340 PADILLA, SERGIO R
24345 CAMACHO, MARIO
24360 DENNIS, EDWIN
24433 HERNANDEZ, MANUEL O
24445 OCCUPANT UNKNOWN,
24473 GOSECO, JAMES G
24503 CHASE, GERALD H
24505 ALLEN, CONRAD J
24615 OCCUPANT UNKNOWN,
24675 WALKER, CHARLES R
24689 SMITH, CAROL A
24699 OCCUPANT UNKNOWN,
25180 OCCUPANT UNKNOWN,
PACHECO FARM SVC
25190 OCCUPANT UNKNOWN,
26050 CRESTVIEW CONSOLIDATED INC
26100 EDISON INTERNATIONAL EMP
26785 BAY CONSTRUCTION
OCCUPANT UNKNOWN,
26805 OCCUPANT UNKNOWN,
27721 STARNER, MATTHEW R
27803 LEIGH, WILLIAM
27825 KEYES, RALPH M
27851 WEI, CHUNG H
27925 JEHOVAHS WITNESSES

Target Street	Cross Street	Source
✓	-	EDR Digital Archive

MENIFEE RD 2005

24195 OCCUPANT UNKNOWN,
24310 DARELYN J NORDIN
OCCUPANT UNKNOWN,
24340 PADILLA, SERGIO R
24345 CAMACHO, MARIO
24360 DENNIS, EDWIN
24473 GOSECO, BELLE B
24501 OCCUPANT UNKNOWN,
24503 CHASE, GERALD J
24505 ALLEN, CONRAD
24615 OCCUPANT UNKNOWN,
24675 GOMBER, EDWIN J
24689 SMITH, CAROL A
24699 OCCUPANT UNKNOWN,
24739 DUMLAO, DAVID L
25180 OCCUPANT UNKNOWN,
25190 COLLINS, MATTHEW A
26125 SOUTHERN CALIFORNIA EDISN C
26785 GALLEGOS, JOSE D
26805 OCCUPANT UNKNOWN,
27627 OCCUPANT UNKNOWN,
27721 OCCUPANT UNKNOWN,
27803 LEIGH, WILLIAM
27825 KEYES, RALPH M
27851 ACE WEED ABATEMENT
WEI, CHUNG H
27925 KINGDOM HALL JHOVAHS WITNESSES
27965 CHURCH OF JESUS CHRIST OF LATT
HIS WINGS WOMENS MINISTRY

Target Street	Cross Street	Source
✓	-	EDR Digital Archive

MENIFEE RD 2000

24310 NORDIN, MARK
24340 PADILLA, SERGIO R
24345 APPEL, C
24360 DENNIS, EDWIN
24445 ALDRICH, ADRIAN A
24473 GOSECO, JAMES G
24501 BRIM, WILLIAM F
24505 ALLEN, MARK
27721 STARNER, MATT
27825 KEYES, RALPH M
27851 KEYES, RALPH
27959 OCCUPANT UNKNOWN,
27985 CHRIST THE KING

Target Street	Cross Street	Source
✓	-	EDR Digital Archive

MENIFEE RD 1995

24345 PLATT, HILDA T
R J MC CORMICK CONSTRUCTION
24360 DENNIS, EDWIN
E & J SEPTIC TANK & POOL
24433 WOMACK, DONNA
24445 ALDRICH, ADRIAN
24473 GOSECO, FRANK N
24503 CHASE, GERALD H
24505 ALLEN, MARK G
24699 LICHENTHAL, GERRY
25180 KLOPPING, F A
26100 SO CALIF EDISON CO
26785 GUTIERREZ, ELENA
26805 BROOKMAN, STEVE
27627 BAILEY, JAMES
27701 MATHER, PITA L
27721 STARNER, MATT
27825 KEYES, RALPH M
27925 JEHOVAHS WITNESSES
27959 GAUTHIER, GARLAND
27965 TRINITY BIBLE CONGREGATIONAL

Target Street	Cross Street	Source
✓	-	EDR Digital Archive

MENIFEE RD 1992

24345	MCCORMICK R CONSTR
24433	RANCHO LNDSCP SPLY
26501	POUK&STEINLE INC
26805	LUDINGTON, DONNIE
27825	KEYES, RALPH M
27925	JEHOVAHS WITNESSES
27959	GAUTHIER, GARLAND
27965	TRINITY BBL CNGRGTL

Target Street	Cross Street	Source
✓	-	Haines Criss-Cross Directory

MENIFEE RD 1985

MENIFEE RD 92380
ROMOLAND

24365	DENNIS ALICE	657-9682	1
24433	XXXX	00	
24445	ALDRICH ADRIAN	943-1962	+5
24473	GOSECO JAMES G	657-5398	8
24501	BRIM WM F	657-0375	2
24689	XXXX	00	
24720	ODONNELL THARRON	657-7775	
26785	XXXX	00	
27627	NIELSEN JAS D	679-0322	4
27721	STARNER DON	679-4019	
27825	KEYES RALPH M	679-4690	
27891	CHARTER OAK IND	672-2242	+5
	KELLOGGS ORCHIDS	679-9442	+5
	LATHAM LABS	679-4441	
27925	JEHOVAHS WITNESSES	679-2730	+5
32340	SPALLER BETTY	679-1091	4
35030	PAULSON DENNIS	679-4862	2

★ 4 BUS 13 RES 4 NEW

Target Street	Cross Street	Source
✓	-	Haines Criss-Cross Directory

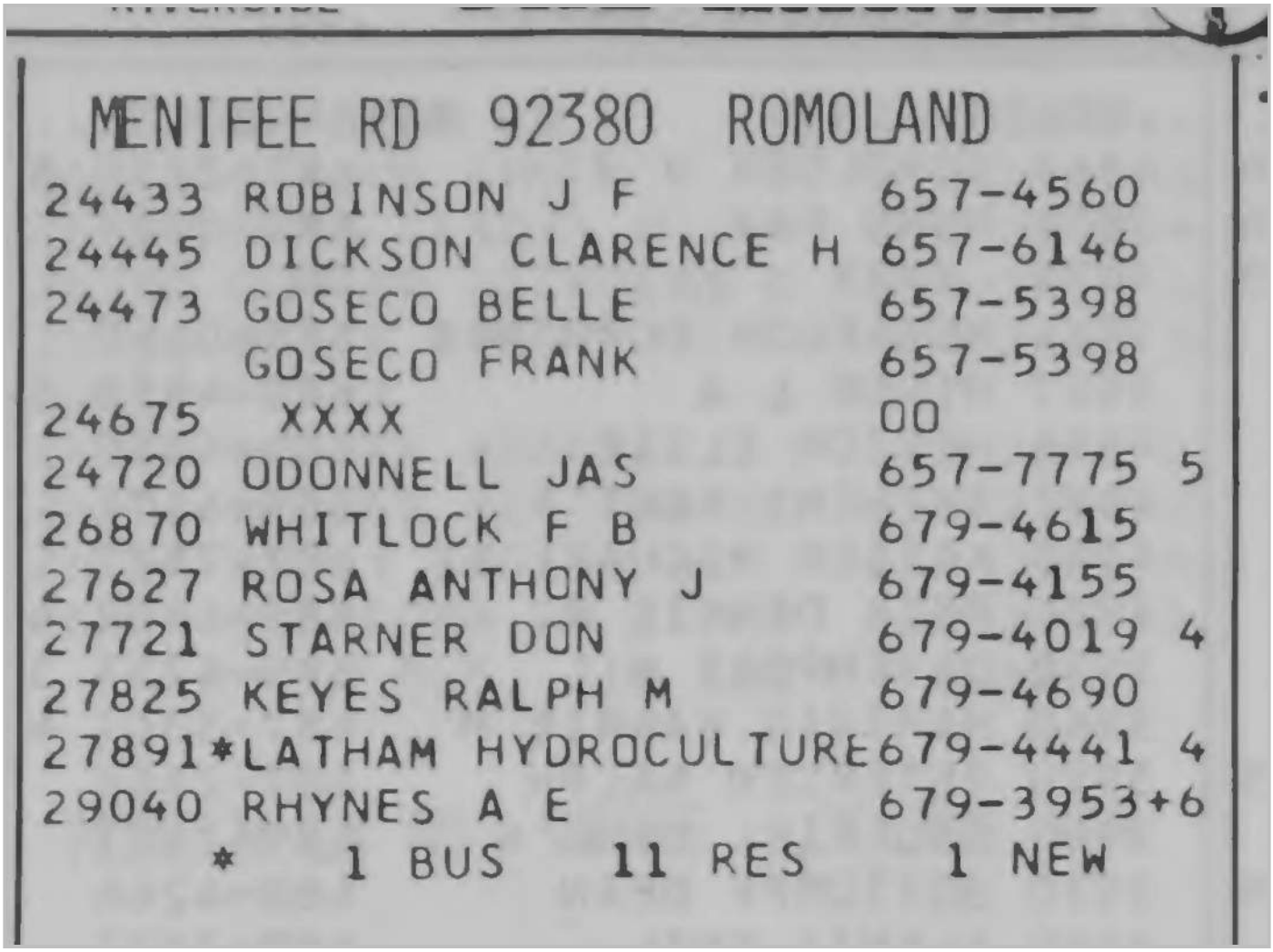
MENIFEE RD 1980

MENIFEE RD 92380
ROMOLAND

23471	SLIVA RONALD J	657-4079	+0
24433	ROBINSON J F	657-4560	
24445	DICKSON CLARENCE H	657-6146	
24473	GOSECO JAMES G	657-5398	8
24675	XXXX	00	
24689	LOWE PATRICIA	657-8357	+0
24699	EISENHAUER RICHARD	657-9703	+0
24720	ODONNELL JAS	657-7775	5
26870	WHITLOCK F B	679-4615	
27627	ROSA ANTHONY J	679-4155	
27721	STARNER DON	679-4019	4
27825	KEYES RALPH M	679-4690	
27891 ★	**DANISH GARDENCRESS**	**679-6995**	+0
★	**LATHAM HYDROCULTURE**	**679-4441**	4
29040	MARPLE ANDY	679-5406	9
	MARPLE ANDY	652-4893	+0
★	2 BUS 14 RES 5 NEW		

Target Street	Cross Street	Source
✓	-	Haines Criss-Cross Directory

MENIFEE RD 1976



MENIFEE RD 92380 ROMOLAND

24433	ROBINSON J F	657-4560	
24445	DICKSON CLARENCE H	657-6146	
24473	GOSECO BELLE	657-5398	
	GOSECO FRANK	657-5398	
24675	XXXX	OO	
24720	ODONNELL JAS	657-7775	5
26870	WHITLOCK F B	679-4615	
27627	ROSA ANTHONY J	679-4155	
27721	STARNER DON	679-4019	4
27825	KEYES RALPH M	679-4690	
27891	*LATHAM HYDROCULTURE	679-4441	4
29040	RHYNES A E	679-3953	+6

* 1 BUS 11 RES 1 NEW

Appendix E

McAlister GeoScience Statement of Qualifications

McAlister GeoScience

Environmental
Site Investigation and Remediation

multiple, creative, and technically sound solutions for challenges facing property owners and property managers.

Turn-Key Solutions for complex sub-surface challenges

Phase I Site Investigations

Phase I environmental site investigations are routinely conducted to support pre-development property transactions, developed property transfers, and site closures. Lending institutions, realty corporations, landholders, and private individuals must consider environmental contamination as a potential risk when considering properties for acquisition. Purchase of contaminated property can result in assumption of significant cost for cleanup. To address this issue, purchasers of real estate consider an environmental assessment as a routine component of an acquisition.

Phase II Site Investigations

Phase II environmental site investigations are performed to delineate horizontal and vertical extent of volatile organics, metals, petroleum hydrocarbons, and other chemicals of concern. The McAlister GeoScience team has effectively managed field activities, coordinated with analytical laboratories, evaluated data, and prepared reports associated with ongoing groundwater monitoring programs.

Agency Interaction

The regulatory framework of California is diverse. Multiple agencies including regional water quality control boards, Federal EPA, CalEPA, city, county, and numerous other local agencies may oversee the same site at any given time. You need an experienced technical practitioner.

Regional Coverage

McAlister GeoScience has strong teaming ties in several metro areas including New Jersey; New York; North Carolina; Connecticut; Montana; Seattle; Phoenix, AZ; Denver, CO; Dallas, TX; Houston, TX; and Florida. Several locations are led by personnel with over 40 years of varied experience.

McAlister GeoScience is an effective and results-focused team possessing extensive experience with the successful design and implementation of Phase I and II environmental site assessments and GeoTechnical Investigations. McAlister GeoScience is well-versed in activities associated with the implementation of remedial action including agency interaction and all aspects of project management. McAlister GeoScience has also proven to be an effective team performing data analysis and reporting, remedial action, and compliance activities obtaining regulatory closure at numerous facilities nationwide.

- Environmental Site Investigation
- Environmental Remediation
- Regulatory Closure

McAlister GeoScience

235 E. Broadway, Suite 1120
Long Beach, CA 90802
(562) 489-7908
dmcalister@mcageosci.com

dirtyproperty.com

McAlister GeoScience

McAlister GeoScience

- Environmental
- Geotechnical

Assessment

Phase I and II environmental site investigations. Characterization and rough order of magnitude (ROM) cost development. All performed on a timeframe and teaming fashion to facilitate commercial real estate transactions.

Remediation

Technically sound and legally defensible solutions performed in a teaming fashion to meet regulatory requirements, schedule, and budget.

GeoTechnical

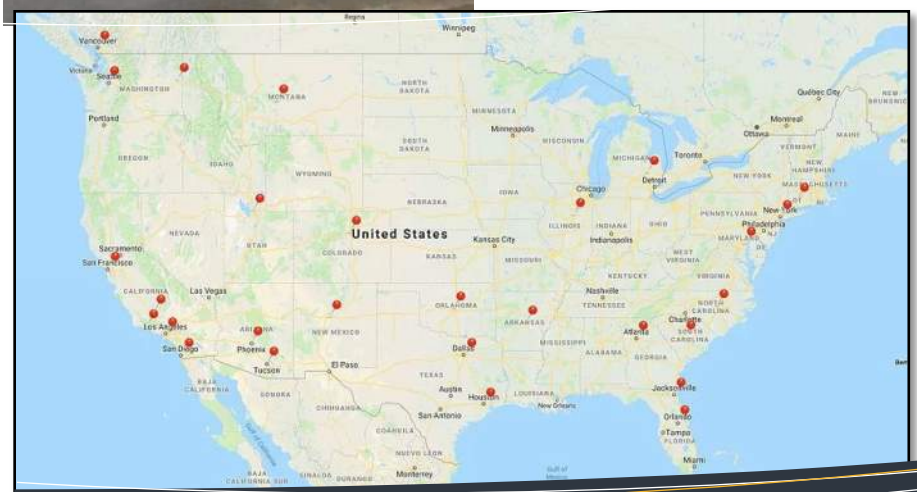
Our team is well versed and experienced in the field aspects and report of soil reports for commercial and industrial properties including foundation stability, compaction, and slope stability.

Asbestos / Lead-based Paint

Surveys and abatement performed by licensed experts in a teaming fashion. All services provided on a turn-key basis with one point of contact for ease of management.

In Situ Chemical Oxidation (ISCO)

McAlister GeoScience has managed and performed ISCO (potassium permanganate and activated persulfate) injection for the treatment of chlorinated solvents in groundwater at various facilities in Southern California including the Cities of Industry, Bell, Los Angeles, Long Beach, Huntington Beach and Costa Mesa, California. Numerous ISCO reagents have been utilized including permanganate, hydrogen peroxide, and various proprietary reagents.



235 E. Broadway, Suite 1120 Long Beach, California 90802 (562) 489-7908
DirtyProperty.com

Environmental Site Investigation & Remediation | Agency Interaction | Asbestos | Lead | Mold | GeoTechnical Investigations

Curriculum Vitae – David C. McAlister

Environmental Site Investigation and Remediation Professional

235 E Broadway Suite 1120
Long Beach, California
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Mr. McAlister is an effective and results-focused professional possessing extensive experience with the successful design and implementation of Phase I and II environmental site assessments. Mr. McAlister is well-versed in activities associated with the implementation of remedial action including agency interaction, scope, schedule, and budget management. He has performed Property Condition Assessments (PCAs) on diverse properties (mostly industrial properties) and in diverse property transaction scenarios. Mr. McAlister has also proven to be effective at the design, performance, and management of a team performing data analysis and reporting, remedial action, and compliance activities obtaining regulatory closure at numerous facilities located in Southern California.

Selected Project Descriptions:

United States Air Force Reserves – Mr. McAlister managed and performed the field tasks associated with Groundwater remediation involving *in-situ* chemical oxidation (ISCO - potassium permanganate) for the remediation of groundwater impacted with chlorinated solvents at an operating air force base in Spokane, Washington.

Gardena Business Park, LLC. – Mr. McAlister achieved regulatory closure of an industrial property that had been entered into the Spills, Leaks, Investigations, and Cleanup (SLIC) program of the Los Angeles Regional Water Quality Control Board. Contaminants of Concern included trichloroethylene (TCE) and tetrachloroethylene (PCE).

Lockheed Martin Corporation – Mr. McAlister was part of a team performing environmental due diligence reviews associated with the acquisition of a military vehicle manufacturer. Due diligence file reviews were completed on hundreds of sites located across the United States and Europe under an extremely compressed timeframe. Ultimately, two sites were identified with higher than acceptable environmental liability risk and the deal was not consummated due to these recommendations.

Various Industrial and Commercial Real Estate Clients – Mr. McAlister managed and performed ISCO injection for the treatment of chlorinated solvents in groundwater at various facilities in Southern California including the Cities of Industry, Bell, Los Angeles, Huntington Beach and Costa Mesa, California. Numerous ISCO reagents were evaluated for these projects including permanganate, hydrogen peroxide, and various proprietary reagents.

Carson Marketplace, LLC – Mr. McAlister managed the field implementation of an aquifer pump test at a former landfill in Carson, California. The goal of the project was to redevelop the landfill for residential, retail, and other purposes. Through this process, remediation of soil and groundwater was required along with the implementation of landfill gas mitigation and management practices. The scope of the aquifer pump test included a constant rate and step-flow test in three discrete areas and the management of impacted groundwater generated during the process.

Education:

B.S., Soil Science, California State Polytechnic University, San Luis Obispo, 2001

Specialized Training:

OSHA 40-hour Hazwoper Health and Safety Training

OSHA 8-hour Hazwoper refresher course (annual)

OSHA 8-hour Supervisor Training

American Red Cross First Aid and CPR Certified (annual)

Years of Experience:

Eighteen

Employment History:

ERM-West Inc. (2001-2005)
Staff Scientist

Tetra Tech, Inc. (2005-2013)
Senior Scientist

Professional Affiliations:

The International Council Shopping Centers (ICSC)

Commercial Real Estate Development Association (NAIOP)

Urban Land Institute (ULI)

Long Beach Commercial Real Estate Council (LBCREC)

Selected Project Descriptions (Continued):

Baker Hughes – Mr. McAlister performed the evaluation of effectiveness and final agency reporting of an ISCO (activated persulfate) injection conducted in Huntington Beach, California. The agency review of the report and remediation progress following Mr. McAlister's involvement resulted in significant adjustments to the remedial approach and advanced the project significantly toward regulatory closure.

Union Pacific Rail Road – Mr. McAlister achieved regulatory closure of an Underground Storage Tank (UST) site in the city of Colton, California. Contaminants of Concern included, lead, arsenic, and "Bunker C" fuel oil. The regulatory agency providing oversight was the San Bernardino County Fire Department Hazardous Materials Division.

Lockheed Martin, Torrance, CA – Mr. McAlister has held various management and technical support positions due to his extensive experience with the project, regulatory environment, and hydrogeology of the area. Mr. McAlister attended meetings with the regulatory community, neighboring property owners, and various other stakeholders on behalf of Lockheed Martin Corporation. Additionally, Mr. McAlister attended quarterly meetings and briefed Lockheed senior management on the scope, schedule, remedial options, remedial approach, risks, and opportunities associated with the remediation of a groundwater plume at a facility immediately adjacent to a federal Superfund site.

ExxonMobil Global Remediation – Mr. McAlister improved LNAPL recovery at the Torrance refinery from approximately 30,000 gallons per month to approximately 91,000 gallons of per month, a 300% improvement in extraction efficiency within eight months. Installation of five new extraction wells and associated skimming systems contributed 40% of the increase in extraction efficiency. Optimization of currently existing infrastructure contributed 60% of the increase in extraction efficiency.

Los Angeles Department of Water and Power – Mr. McAlister coordinated and performed the field implementation of a sodium permanganate ISCO injection at a maintenance facility in Silver Lake area of Los Angeles, California.

Alcoa, Inc. – Mr. McAlister performed phase II soil, soil vapor, and groundwater investigations including the planning, implementation, and reporting of investigation activities at five separate facilities located in southern California for the acquisition of an aerospace fastener company.

Various Clients – Mr. McAlister has performed numerous soil and groundwater investigations to delineate horizontal and vertical extent of VOCs, metals, TPH, and other chemicals of concern at various rail yards and manufacturing plants throughout California. Site investigation activities included monitoring well installation, soil boring advancement, and sampling using various drilling techniques. Drilling techniques utilized include hollow-stem auger, air rotary casing hammer (ARCH), mud rotary, mud rotary with reverse circulation, and hydraulic direct-push. Mr. McAlister has effectively managed field activities, coordinated with analytical laboratories, evaluated data, and prepared reports associated with ongoing groundwater monitoring programs.

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Curriculum Vitae – Dale Bodman, P.E.

Environmental Site Investigation and Remediation Professional

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Mr. Bodman has more than 30 years' experience in public and private sector environmental engineering, engineering design services, remediation, construction design, and project/construction management of construction and remedial construction projects. He has worked on projects as the owner's representative, consultant, and contractor. His experience ranges from site investigations, through advanced remediation systems to the management of complicated remedial construction projects. Mr. Bodman has been involved in the cleanup of contaminated soil and groundwater from asbestos/lead, full range petroleum products, chlorinated solvents to radioactive waste. He has experience with the following remedial technologies- Soil Vapor Extraction (SVE) (high and low vacuum), Multi-Phase Extraction (MPE), Air Sparging, Pneumatic Fracturing, Air-Stripping, Chemical Oxidation (ISCO) and In-Situ and Ex-Situ Biotechnologies.

Mr. Bodman has worked under numerous Federal and State regulatory agencies across the country. He has presented projects to the California Department of Toxic Substances Control (DTSC), California Regional Water Control Boards (RWQCB) and the Department of Environmental Health in several cities. His projects have involved the Resource Conservation and Recovery Act (RCRA) Corrective Action and Compensation and Liability Act (CERCLA) remedial investigations and action plans.

Selected Project Descriptions:

Soil and Groundwater Assessment and Remediation, Service Stations and Bulk Plants; Various Major Oil Company Sites; California

Mr. Bodman was responsible for the assessment of soil and groundwater contamination at over 80 sites in Southern California. Mr. Bodman managed environmental consulting firms in their investigative approach and remedial actions. Additionally, as an environmental consulting engineer, he provided subsurface assessment services on over 200 contaminated sites. Remediation involved groundwater treatment systems, in-situ bio, extraction, and dig and hauls. Site locations were from Southern California to Washington and Nevada.

Dual Phase Extraction/NPDES, Maintenance Yard; San Diego, CA

Mr. Bodman was the project manager for the remediation of heavy petroleum contaminated soil and groundwater at the Unocal Fuel Terminal facility located in downtown San Diego, California. Remedial actions consisted of dual phase extraction (DPE) utilizing solid and liquid phase carbon to remove petroleum contamination. Groundwater was determined to be a slow-flow zone capable of utilizing DPE technology. Project also consisted of the identification, decontamination and removal of numerous buried pipelines that impacted the major construction project. Mr. Bodman provided oversight in the completion of the Remedial Action Work Plan and Remedial Action Plan.

Education:

M.S. Engineering, California State Polytechnic University, Pomona.

B.S. Applied Science & Engineering. US Military Academy, West Point, New York

Specialized Training:

OSHA 40-hour Hazwoper Health and Safety Training

OSHA 8-hour Hazwoper refresher course (annual)

OSHA Construction Health & Safety 30-hour

Radiation Officer Qualified

Radiation Safety Training

Professional Registration:

Professional Engineer:
CA # C043241

General Contractor A & Haz

Curriculum Vitae – Dale Bodman, P.E.

Environmental Site Investigation and Remediation Professional

Selected Project Descriptions (Continued):

Large Scale Soil Removal; Former Maintenance Yard; City of Santa Ana, CA

Mr. Bodman was the senior project manager for the assessment and remediation of contaminated soil at the former maintenance yard. Assessment by drilling and hydro punch technology of this six plus acre site revealed contamination of soil and groundwater by petroleum hydrocarbons and paint thinner. Remedial action consisted of large-scale excavations and removals of contaminated soil. Mr. Bodman provided oversight in the completion of the Remedial Action Plan and Closure Plan.

Dual Phase Extraction/Above Ground Vapor Extraction; Aircraft Facility; Fullerton, CA

Mr. Bodman was the senior project manager for the remediation of TCE and PCE contaminated soil and groundwater at this aircraft facility in Fullerton, California. Remedial actions consisted of dual phase vapor extraction (DPE) utilizing solid and liquid phase carbon to remove petroleum contamination. An above ground Baker storage tank was utilized to capture the treated groundwater. Groundwater was determined to be a slow-flow zone capable of utilizing DPE technology. An above ground treatment cell connected by vapor extraction was also constructed to remediate near surface materials that had been excavated. Heating of the vapor stream before carbon polishing was implemented as a cost saving device. Mr. Bodman provided oversight in the completion of the Remedial Action Work Plan and Remedial Action Plan.

Solvent Contamination-Deep Soil Vapor Extraction; Industrial Facility; San Diego, CA

Mr. Bodman was the senior project manager for this project that involved the remediation of TCE and PCE contaminated soil at this industrial facility that stored these products for dry-cleaning businesses. Remedial actions consisted of a soil vapor extraction (SVE) system utilizing carbon to remove the contamination. The well field consisted of vertical, horizontal and angled wells. Depth to groundwater was approximately 180 feet. Groundwater monitoring wells were installed to determine the lateral extent of the contamination in the groundwater. The project was taken over from a previous consultant. Optimization of the remediation system enhanced removals and operation time. Mr. Bodman provided oversight in the completion of the Revised Remedial Action Plan, Sampling Plan, and Vapor Well Installation Work Plan.

Bioplug Technology; Waste Recycler, Multiple Sites; United States

Mr. Bodman developed the operations and marketing plans for the implementation of this new technology across the United States. Over eleven systems were installed in locations that had both petroleum and solvent contaminants in the soil and ground water. Several of these sites were located in California and were remediating contaminants more than 90 feet below the ground surface.

In-Situ Chemical Oxidation (ISCO); Rail Cleanup; Cheyenne, WY

Mr. Bodman was the technical reviewer and remediation manager for this remediation project, which involved the installation of a vapor extraction system. Some contamination existed below a building and remedial activities associated with the cleanup in this area involved ISCO technology. Several rounds of injection of in-situ chemical oxidation utilizing permanganate were completed with great success. Cleanup levels were achieved in the area of the vapor extraction system resulting in the dismantling of the system.

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Curriculum Vitae – Dale Bodman, P.E.

Environmental Site Investigation and Remediation Professional

Selected Project Descriptions (Continued):

Full Scale Remediation/Dual Phase Extraction/Sparging/Bio/Injection; Refinery/Water Treatment Plant
Mr. Bodman was the technical remediation advisor and senior project manager for this major environmental remediation construction project. The site was a former refinery with contamination over 326 acres in both the soil and groundwater. The project involved the implementation of a 4,000-ft multi-phase extraction system with air-sparging to control the offsite migration of the contaminated groundwater plume. The system included the installation of over ninety bioplugs (bio generators). Six industrial wide trailers contained the extraction equipment with a treatment building to handle the contaminated groundwater. Contaminated water was treated with biological amendments and re-injected into the groundwater. Mr. Bodman provided critical input into the design, construction, and operations of this system.

Asbestos Abatement/Vapor Extraction; Bank Site; Burbank, CA
Mr. Bodman was the project manager for the assessment of this railhead site that involved a former underground storage tank as well as the demolition of an old site building constructed with asbestos containing materials. Assessment of both soil and ground water was performed to identify the vertical and lateral extent of petroleum contamination. Remedial actions consisted of soil vapor extraction (SVE) utilizing a thermal/catalytic oxidizer to destroy petroleum contaminated vapors. Installation of the well field, header and treatment compound occurred along with the construction of the site into a parking lot for the expected City of Burbank train station. Mr. Bodman was responsible for the preparation of the Remedial Action Plan, the Remedial Action Work Plan and the Sampling and Analysis Plans.

High Vacuum Soil Vapor Extraction/Pneumatic Fracturing; Aerospace Site; Thousand Oaks, CA
Mr. Bodman was the project director for the remediation of Methyl Ethyl Ketone (MEK) contaminated soil for this aerospace site. Lithology for this site consisted of low-permeable soils. Remedial actions consisted of high vacuum soil vapor extraction (HSVE) utilizing a catalytic oxidizer and scrubber to destroy MEK contaminated vapors. Due to the low permeable soil matrix at the site, a subsurface pneumatic fracturing system was installed, forcing high-pressure air to fracture the soil matrix and increase vapor removal. Mr. Bodman provided oversight in the completion of the Remedial Action Work Plan and Remedial Action Plan.

Air Sparging/Low Vacuum Soil Vapor Extraction; Company Fueling Facility; Irvine, CA
Mr. Bodman was the senior project manager for the remediation of petroleum-contaminated soil and groundwater at this company operated fueling facility. Remedial actions consisted of low vacuum soil vapor extraction (LSVE) utilizing carbon to destroy petroleum contaminated vapors. Limited access drill rigs were utilized to drill beneath the building. Remediation of the groundwater involved the first air sparging system of its kind, approved by the Department of Health Services in Orange County. Sparging wells were installed within the capture zones of vapor extraction wells. Mr. Bodman provided oversight in the completion of the Remedial Action Work Plan and Remedial Action Plan. Closure of the site occurred within nine months of system startup for both soil and groundwater.

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Curriculum Vitae – Dale Bodman, P.E.

Environmental Site Investigation and Remediation Professional

Selected Project Descriptions (Continued):

Vapor Extraction, RCRA Site; Rail Station; Burbank, CA

Mr. Bodman was the project manager for the remediation of TCE and PCE contaminated soil and groundwater for the rail site located in Burbank, California. Remedial actions for this 400-foot long by 150-foot wide parcel consisted of ex-situ soil vapor extraction (SVE) with carbon. He was responsible for the preparation of the Closure Plan, Remedial Action Plan, the Remedial Action Work Plan and the Sampling and Analysis Plans. The remediation system consisted of over 25 vapor extraction wells drilled to depths of 60 feet below grade surface, screened in separate lithologies to remove TCE and PCE vapors from the contaminated soil zones. During remediation, the site was utilized as a major bus facility and was later converted into the Burbank train station. Soil Closure of this RCRA facility involved the installation of soil vapor probes to monitor vapor migration as well as rebound testing of the vapor extraction system to validate remediation vapor levels. A multi-dimensional risk assessment was performed for TCE and PCE vapor migration into the groundwater and the proposed train station. Mr. Bodman enhanced system performance and rebound testing to insure a critical completion date to ensure that the City of Burbank would not lose state funding for the proposed train station.

Orange County Transportation On-Call Contract; Orange County, California

Mr. Bodman was the project manager for this on-call contract for Orange County Transportation Agency (OCTA). Under this contract Mr. Bodman performed both soil assessment and underground storage tank removals along the expanded Interstate 5 route through Orange County. Investigations for petroleum and lead contaminated soils were performed. Several underground storage tanks were removed and closure sampling was conducted. Mr. Bodman provided the agency fast-track assessment and clean-up to insure no delays on property acquisition and construction for this major freeway expansion.

Service Station Outlets/Bulk Plants/Terminals; Mobil Oil Corporation; Various Sites, California

Mr. Bodman provided construction management of contractors building new ground up service stations. Work involved the construction of buildings, canopies, underground tanks and piping. Work also involved the total rebuild of existing service stations. Mr. Bodman completed over 30 new to industry and rebuild construction projects. Mr. Bodman also ran the program management for the installation of underground tanks and piping at over 300 retail outlets across California.

Low Level Radioactive Waste Facility; Compact and Federal; Andrews, TX

Mr. Bodman was responsible for all design and construction activities associated with the construction of a new low level radioactive waste facility. Work involved the construction of roads, two large low-level landfills, treatment ponds, water treatment systems, and seven large buildings used for the operation. The total project cost was over 100 Million dollars, with work completed under schedule and below budget. Mr. Bodman was also responsible for the management and oversight of all engineering contract services utilized by the company at the site. Mr. Bodman was instrumental in obtaining the certification from the State of Texas to operate the landfill. He also provided remedial technical oversight on a rail cleanup of heavy metals and radionuclide contaminated soil and groundwater.

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Curriculum Vitae – Dale Bodman, P.E.

Environmental Site Investigation and Remediation Professional

Selected Project Descriptions (Continued):

Seismic Monitoring Stations; Western United States
Mr. Bodman was responsible for the installation of over 100 seismic monitoring stations in the Western United States. A project funded by two federal agencies involved a network of monitoring stations along seismic faults. Many of the installations were in very remote areas with little or no access for drilling operations. Work involved the drilling of three 30-foot legs into bedrock and then grouting the legs. A platform and equipment capable of measuring very small movements of the bedrock were installed and tested for reliability.

Tank and Pump Farm; Huntington Beach, CA
Mr. Bodman was the project manager for the installation of a tank farm in Huntington Beach. The work involved the installation of four 20,000-gallon underground storage tanks and over one-quarter a mile of underground piping. As the prime contractor, Mr. Bodman was able to finish this project ahead of schedule and below budget.

Battery Plant; City of Industry, CA
Mr. Bodman was the senior project manager for this project that involved the decommissioning of this battery plant that had been in operation for over 50 years. Potential contamination involved both acid and lead used in the construction of batteries. Mr. Bodman provided oversight in the development of the sampling plan and the sampling conducted during demolition. Mr. Bodman established remediation goals for lead and obtained their approval from the lead regulatory agency (Los Angeles Fire Department). Areas of contaminated soil that exceeded regulatory requirements were removed from the property and disposed in accordance with regulatory guidelines.

Equipment and Tank Decommissioning; Waste Recycler; Phoenix, AZ
Mr. Bodman was the project manager for this project involving the decommissioning of equipment, an equipment room, and tanks used to recycle waste. Mr. Bodman coordinated and managed a contractor who performed decontamination cleaning of the equipment, room and tank. Both water and swipe samples were taken to validate decontamination was successful. Mr. Bodman arranged for the disposal of the tank contents, the tank, and equipment.

Stringfellow Acid Pits Superfund Site; Riverside, CA
Mr. Bodman was the senior project manager for the design, installation, and operation of a vapor extraction pilot test to determine the feasibility of this technology to remediate contamination of this superfund site. Extraction tests were performed at various depths and lithologies to predict air flow and remediation clean-up times for vapor extraction.

Air Force Facility; Phoenix, AZ
Mr. Bodman was the senior project manager for the remediation of petroleum-contaminated soil at this Air Force Plant located in Phoenix, Arizona. Work was conducted under an Air Force Center for Engineering and the Environment (AFCEE) contract. Remedial actions consisted of two large-scale soil vapor extraction (SVE) systems utilizing carbon to destroy petroleum contaminated vapors. Mr. Bodman was responsible for the design, construction, and operation of the systems.

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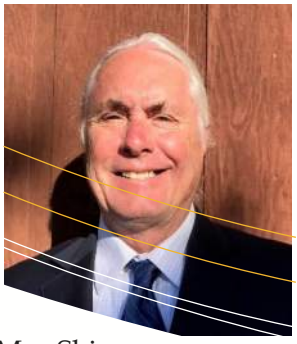

Curriculum Vitae – Brendan Shine, P.E.

Engineer, Director of Rocky Mountain Operations

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Mr. Shine possesses experience in domestic and international consulting in environmental, geotechnical, hydrogeologic, and construction management projects. Mr. Shine has successfully completed projects for clients in the aerospace, petroleum, food, waste management, mining and other business sectors, and worked with government, both as an in-house contractor for the EPA and as a liaison for commercial clients. Focused experience includes field management of large-scale, high profile environmental and civil remediation programs, emergency responses, characterizations and monitoring programs, with hands-on experience in program design, budgeting, permitting, scheduling, management and problem solving. Mr. Shine has considerable experience in report preparation, critical review and project oversight.

Selected Project Descriptions:

Confidential Aerospace Client, Southern California – Senior Engineer for a major groundwater quality characterization effort involving installation of deep multi-port monitoring wells. Acquired access permits in urban from multiple regulatory agencies and provided logistical coordination between drilling contractor to maintain the compressed project schedule. Also managed data management and organization, establishment of field protocols, QAPP, information management procedures, and health and safety and work plan preparation. Responsible for well design based on geophysical and lithologic logs. Procured NPDES permit and managed discharge tracking and reporting for disposal of more than 1,000,000 gallons of development water. Provided or supported data interpretation and reporting, quality assurance/quality control and presentation tasks.

Beazer East, Gainesville, Florida – Senior Engineer and field team leader during the demolition and reclamation of a 90-acre Superfund wood treatment facility. Participated in design and implementation of key elements of the demolition and subsequent subsurface geophysical survey of the site for reported buried drums. Prepared the final demolition report, including waste stream and sample documentation and the buried drum investigation report.

Motorola, Arcade, New York – Senior Project Engineer, Lead Field Engineer/Remedial Site Supervisor at a former automotive electrical parts manufacturing facility in Arcade, New York. Successfully directed characterization and feasibility study and provided interaction with NYSDEC. Prepared work plans and supervised mobilization and field remediation activities for this multiple operable unit site that had been impacted by TCE, TCA, cadmium, chromium, and lead in surface water, sediment, soil, and groundwater. Remediation activities included extensive dig and haul with confirmation sampling, followed by soil replacement and excavation restoration; *in-situ* soil chemical treatment; creek bed diversion, excavation and restoration with extensive confirmation sampling.

Education:

M.E., Geological Engineering, Colorado School of Mines, Golden, 1985

B.S., Geological Engineering, Colorado School of Mines, Golden, 1982

Specialized Training:

Registered Professional Engineer, Civil, #28168, CO

Registered Professional Engineer, Civil, #070187, NY

Registered Professional Engineer, Civil, #18316, CT

Registered Professional Engineer, Civil, #062 049856, IL

EPA-Credentialed Environmental Inspector (current)

OSHA 40-hour Hazwoper Health and Safety Training

OSHA 8-hour Hazwoper annual refresher course (current)

OSHA 8-hour Supervisor Training

American Red Cross First Aid and CPR Certified (bi-annual)

Employment Experience (34 Years):

McAlister GeoScience, 2017-present

NOWCC Contractor to US EPA Region 8, Environmental Engineer, 2014-present

Palmer Engineering and Forensics, Senior Engineer, 2012-present

Tetra Tech GEO/Hydro-Search, Inc., Senior Engineer, Denver, CO, 1986-2012

Dames & Moore, Golden, CO, 1985-1986

Curriculum Vitae – Brendan Shine, P.E.

Engineer, Director of Rocky Mountain Operations

Selected Project Descriptions (Continued):

Rhom & Haas, Whitmoyer Laboratories Site, Myerstown, Pennsylvania – Senior Engineer/Operable Unit Supervisor and Field Operations Supervisor at a CERCLA site in Myerstown, Pennsylvania that had been used to manufacture livestock pharmaceuticals using arsenic, arsenilic acid, and other organics. Led the groundwater and surface water operable unit field programs, including oversight and design during construction and upgrade of an interim water treatment plant. Directed plant operation and supervised all field activities including groundwater and surface water quality and flow surveys, pretreatment pilot testing for organic acid breakdown using ultraviolet, ozonation, and reagent technologies, indoor and outdoor air quality sampling, waste management/disposal, and site health and safety monitoring.

Beazer East, Former Koppers Site, Gainesville, Florida – Senior Engineer responsible for logistical planning and field implementation for the comprehensive characterization of impacts to the Upper Floridan Aquifer at the former Koppers Site, Gainesville, Florida. Impacts resulted from historic operations at wood-treating plant that had been in operation for more than 90 years. Tasked with all phases of field implementation, well design and field method development, selection and oversight of numerous contractors, and reporting over a seven-year period for the installation of numerous complex, triple- and quadruple- telescoping cased wells designed to monitor water quality for the City of Gainesville primary drinking water source. Each well was equipped with Westbay multiport monitoring systems. Also managed the off-site shallow aquifer characterization. This program also required multiple isolation casing well installations to limit potential vertical contaminant migration. Also, responsible for community notification tasks, evaluation of the effectiveness of a pilot permanganate injection program, installation of Floridan Aquifer recovery wells to limit the migration of contaminants that had been detected in the aquifer, and planning for implementation of the demonstration-scale permanganate injection project.

Confidential Client, Lowry Landfill, Colorado – Project Engineer and Site Supervisor responsible for multiple Operable Unit activities during CERCLA data acquisition. Provided critical oversight of EPA contractor during field work and interpretation activities. Major participant in design and implementation of the gas (VOC and biogenic) and leachate specific OU characterization, including VOC gas migration assessment survey and meteoric infiltration (HELP) modeling. Field data was ultimately used to guide remediation at the site. Co-authored the remedial investigation.

Leprino Foods Company, Tracy, CA Plant – Project Manager – Lead the environmental characterization and remediation of soils and groundwater impacted by a historic diesel fuel release at one of the country's largest mozzarella manufacturing facilities. Acted as liaison between the client and the Regional Water Quality Control Board. Prepared and submitted a request for no-further action based on successful cleanup to no measurable product, no residual groundwater detections and acceptable soil vapor conditions. The consent order and monitoring has been rescinded at the site and we are awaiting a no-further-action determination.

Curriculum Vitae – Charles Lee, P.G.

Environmental Site Investigation and Remediation Professional

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Mr. Lee is a senior-level geologist/hydrogeologist with extensive technical expertise, project/program management, and business development experience. Mr. Lee has directed or managed about 200 projects over a span of more than 25 years and has been a registered Professional Geologist in California for 19 years.

Mr. Lee is a detail-oriented person capable of managing multiple projects simultaneously and takes pride in being able to develop effective working relationships with clients and the regulatory community alike.

Selected Project Descriptions:

Anaconda, Montana NPL site: Performed X-ray diffraction, polished thin section, and microprobe analysis of mine tailings samples from the site. Conducted basic research and authored a report submitted as part of a Superfund Remedial Investigation which described the sequestering of anomalous metals concentrations in two distinct mineralogical horizons within the tailings pile, and related tailings mineralogy, grain textures, geochemical setting, metals transport mechanisms and the potential for ground and surface water contamination.

Various Clients: Interpretation of surface water, groundwater, soil and sediment sample analyses, data quality and data validation reviews, hydrological data collection and analysis, Phase I and II ESAs, underground storage tank investigations, and geotechnical foundation sub-base soil characterization.

Hastings, NE Superfund site, the Duluth, MN airport and a DuPont Chemical plant, Kentucky: Field investigations involving all aspects of groundwater monitor well siting, installation, development, slug testing and sampling, soil and sediment logging, and sampling at federal and industrial sites.

Berlin and Farro Site, Michigan, and Fultz Landfill Site, Ohio: Assisted with completion of a variety of contract Remedial Investigation and Feasibility Study projects with U.S. EPA's Superfund program. These projects included REM 2 Remedial Investigations.

Brooklyn Navy Yard in New York: Prepared work plans and conducted a Phase II ESA involving excavation of test pits, soil borings, installation and sampling of monitoring wells, characterization and oversight on demolition of a 15 KV PCB-containing transformer, and authored reports on a benzene- and PAH-contaminated former manufactured gas plant site located within the Brooklyn Navy Yard in New York.

Education:

Ph.D. Geology, University of Colorado, Boulder.

M.S. Geology, University of Colorado, Boulder.

B.S. Geology, High Honors. University of Michigan, Ann Arbor.

Specialized Training:

OSHA 40-hour Hazwoper Health and Safety Training

OSHA 8-hour Hazwoper refresher course (annual)

Professional Registration:

Professional Geologist:
CA # 7039

Curriculum Vitae – Charles Lee, P.G.

Environmental Site Investigation and Remediation Professional

Selected Project Descriptions (Continued):

Confidential Client: Conducted a Phase II site assessment on behalf of a real estate developer interested in transforming a former textile mill and printing plant into an urban mixed-use complex. Assisted the developer with obtaining a covenant not-to-sue and the first Brownfields Agreement granted by the NC Dept. of Environment and Natural Resources.

Greensboro, North Carolina: West Macedonia District Brownfields USEPA National Pilot Project. Project activities conducted in this economically distressed area of the city included development of a Sampling and Analysis Plan subject to Region IV EPA approval, an area-wide Phase I ESA, Phase II ESA, preliminary remedial technology screening, cost estimation and community outreach.

Ohio River Park NPL Superfund site: Project Manager for a Remedial Investigation to characterize soil, river sediment, and groundwater within a portion of the Ohio River Park NPL Superfund site, Pittsburgh, PA. Conducted data validation, prepared the Remedial Investigation report and developed specifications used to select a contractor for petroleum-contaminated soil remediation.

Smith Metal and Iron Site (SMI), Charlotte, NC: Project Manager and Technical Leader for a Remedial Investigation and cleanup of the SMI Site, a North Carolina Superfund site. The SMI site is a former scrap yard that was contaminated with PCBs and lead. Conducted the remedial investigation, contaminant transport modeling, treatability studies, assisted with feasibility study, risk assessment and remedial design and provided oversight on RAP implementation, which included chemical fixation of soils and construction of an on-site waste cell. This former Brownfield site has since been redeveloped as the National Football League Carolina Panthers' Practice Facility.

Confidential Client, Oxnard, CA: Assisted private client with ongoing assessment of a former dry cleaner site with chlorinated solvent impacts to soil and groundwater. Provided an evaluation of the existing soil vapor extraction system at the site, semi-annual groundwater monitoring and reporting services, monitoring well installation oversight and development, MIP investigation and Remedial Action Plan development.

Doubletree Investments, West-Side Dry Cleaners, Los Angeles, CA: Provided project management for three phases of investigation of soil and groundwater contamination at an active dry cleaner facility site associated with chlorinated solvent impacts. Also provided regulatory liaison, Phase II ESA work plan development, groundwater monitoring and reporting, remedial design and remedial action plan development.

Ultramar-Valero Energy: Project Manager for several phases of site investigation, quarterly and semi-annual groundwater monitoring/reporting, VES system piping construction oversight and O/M reporting and regulatory liaison for three Ultramar-Valero Energy service station sites located in Ventura County, California.

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Curriculum Vitae – Charles Lee, P.G.

Environmental Site Investigation and Remediation Professional

Selected Project Descriptions (Continued):

Lockheed-Martin International Light Metals facility in Torrance, California: Senior project geologist for soil and groundwater investigations and monitoring, triple-cluster monitoring and pilot-testing well installations, and hydrogeologic evaluations related to a chlorinated solvent-contaminated World War II era aircraft defense plant known as the Lockheed-Martin International Light Metals Site. Geologic lead on preparation of a RCRA Corrective Measures Study (CMS) and efforts to close 8 RCRA soil Hazardous Waste Management Units (HWMUs). Provided evaluations of commingled VOC-contaminated groundwater plumes associated with adjacent Boeing and Montrose Chemical sites and regulatory liaison with DTSC and Region 9 EPA.

Kinder Morgan Gaffey Street Terminal Site: Provided project management for Kinder Morgan at their Gaffey Street Terminal site, located adjacent to the Port of Los Angeles in San Pedro, California. The petroleum hydrocarbon-impacted site is a former marine terminal that included a bulk storage facility made up of 13 large ASTs primarily containing Diesel and Bunker-C fuel. Services included regulatory liaison with the State of California Department of Toxic Substances Control (DTSC) and technical leadership for soil, groundwater and soil gas assessments, groundwater monitoring and sampling, asbestos and lead-based paint surveys, free-product evaluations, dewatering-related pilot testing and cathodic-protection well abandonment related leading to development of a Remedial Action Plan to be implemented under a Voluntary Cleanup Agreement with the DTSC.

State of Hawaii, Dept. of Transportation, Harbors Division: Provided engineering services in relation to redevelopment of a 16-acre State of Hawaii Brownfield site located at Piers 36-38 in Honolulu Harbor. The redevelopment known as the Domestic Commercial Fishing Village (DCFV), which includes nine lease parcels, is intended to support the Hawaiian commercial fishing industry. Provided three phases of supplemental site investigation, soil vapor surveys, human health risk assessment, and methane mitigation services at the site.

Managed methane mitigation design and construction administration on six lease parcels at the DCFV site. Design-related services included NPDES permitting, Operation and Maintenance Manual development, preparation of engineering plans and specifications, bid-phase assistance and regulatory liaison with the State of Hawaii DOH, Hazard Evaluation and Emergency Response (HEER) Office. The main elements of the methane mitigation design include a passive sub-slab vapor barrier system composed of an impermeable membrane, a network of perforated piping and risers and a methane monitoring system. Provided methane barrier membrane installation and methane mitigation system QA/QC through smoke and material thickness testing. In addition, provided methane monitoring and reporting services at the site to assess system performance and detect possible methane intrusion into the buildings.

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Curriculum Vitae – Charles Lee, P.G.

Environmental Site Investigation and Remediation Professional

Selected Project Descriptions (Continued):

Unocal Charnock Assessment and Remediation Services: Project manager for soil and groundwater investigations of gasoline releases from three former Unocal service stations related to the MTBE contamination of the City of Santa Monica's Charnock Wellfield conducted under orders from USEPA Region 9 and the LARWQCB. Implemented soil boring and triple-nested and cluster monitoring well installation plans, using mud rotary, rotosonic and hollow-stem auger drilling methods, provided electric logging oversight, conducted quarterly groundwater monitoring and reporting at all three sites. Assisted with pump and treat/vapor extraction design, operation and maintenance and installation and conducted system performance evaluation of the treatment system at the Former Unocal 3016 site.

Project management/execution efforts conducted on behalf of Los Angeles Metro:
Between 2005 and 2013, served as Environmental Services Sector Manager for the Metro Environmental Engineering Contracts EN073 and EN076. Among other things, project responsibilities in this regard covered all aspects of environmental and geotechnical investigation, removal action and remediation oversight, and groundwater monitoring and reporting associated with new capital projects as well as existing Metro assets.

Division 7 Bus Maintenance Facility (BMF). Conducted Phase II ESAs, groundwater monitoring and reporting, CPT/ROST investigation, UST removal oversight, and developed and submitted a Closure Request to the Los Angeles Regional Water Quality Control Board (LARWQCB) under the 2012 "Low-Risk LUST Case Closure Policy" related to a hydraulic oil release at the Division 7 BMF site.

Division 10 BMF. Provided senior-level oversight on soil, bedrock and groundwater investigations at Metro's Division 10 site. These investigations established that the Puente Formation is the source of naturally-occurring tar that impacts groundwater in several wells at the site. Managed groundwater monitoring and reporting and provided regulatory interface with the Water Board. The groundwater case with the LARWQCB was closed based upon a 2010 Closure Request.

El Monte (Division 9/El Monte Transit Center and Division 13 BMFs). Provided management/oversight on utility-related potholing and CCTV/video surveys of existing storm drains and sewer lines and site-wide topographic and utility surveying to facilitate utility relocation needed for construction.

El Monte Transit Center and Division 13 BMF. Conducted Phase II environmental/geotechnical investigations and subsurface soil grid/slice mapping to facilitate large-scale excavations (100,000-150,000 CY) related to construction of these two Metro capital projects. This approach allowed pre-profiling of contaminated soils, which the contractor could direct-haul to appropriate disposal facilities, avoiding the need for on-site stockpiling at very busy, active facility sites having essentially no lay-down area space, saving Metro considerable time and expense in the process. The new El Monte Bus Terminal Facility opened on schedule in 2012. The new Division 13 facility opened in September 2015.

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Curriculum Vitae – Charles Lee, P.G.

Environmental Site Investigation and Remediation Professional

Selected Project Descriptions (Continued):

Project management/execution efforts conducted on behalf of Los Angeles Metro (Continued):
El Monte Transit Center. Developed work plans and provided oversight of the large-scale excavation, SQAQMD 1166 and dust and air monitoring for lead, and soil, drum and asbestos sampling and reporting for the El Monte site soil removal action. Authored Removal Action Summary Report that documented field activities and provided evaluation of all analytical data generated in association with the El Monte project.

Patsaouras Bridge Project. Conducted a Phase II environmental site assessment and managed a geotechnical investigation of cast-in drilled-hole (CIDH) pile locations to be associated with construction of the Patsaouras Plaza Bus Station. This project will connect the dedicated El Monte HOV lanes directly to Union Station from an expanded Vignes Street/US Highway 101 bridge. A new bus station will be constructed upon the expanded bridge along with a pedestrian walkway/overpass that will provide direct access for passengers to the Patsaouras Plaza Bus Terminal and Union Station. Also provided oversight on a geophysical seismic refraction survey to locate the existing Metro Redline subway tunnels running beneath the project site.

Crenshaw Light Rail Line. Assisted Metro with third-party review and evaluation of a linear Phase II ESA and geotechnical investigation along the alignment of the Crenshaw Light Rail Line, provided recommendations for further investigation of potential data gaps or problem segments along the alignment and in the adjacent Southwest Yard Site.

Exposition Line Rail Maintenance Facility Site. Conducted methane, asbestos, lead-based paint and universal hazardous waste surveys for the proposed Exposition Line Rail Maintenance Facility to be located in Santa Monica.

Conducted aerially-deposited lead (ADL) studies per Caltrans guidelines to characterize soils along sections of the 110 and 210 Freeways in association with Metro sound wall projects. Provided recommendations regarding the handling of California-hazardous, lead-impacted non-hazardous and non-impacted soils to be generated during wall foundation excavation and construction.

Numerous other Metro projects with similar scope and responsibility from 2005 – 2016.

Confidential Client: Prepared a CSP for a Phase II ESA at a former auto scrap yard and recycling facility dating back to 1954. The scope of work proposed called for completion of a Phase I ESA, geophysical survey, and soil and groundwater investigation of selected areas within a former auto shop, a metal crushing/baling machine and across the site. The projected end use for the property is projected to be mixed residential/commercial.

Confidential Client: Preliminary Endangerment Assessment (PEA). Participated in field investigation and led report writing effort related to a 500-acre residential development in Ventura County. Investigations included impacted soil profiling, removal action confirmation sampling, groundwater sampling, and rotosonic drilling oversight focused on diesel-contaminated soils discovered in several areas on the site. PEA efforts were conducted on behalf of a private client in accordance with DTSC guidance.

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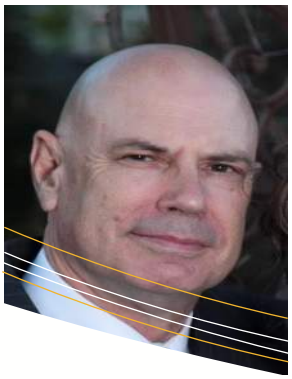

Curriculum Vitae – Mark Spute, MBA, PMP

Environmental Site Investigation and Remediation Professional

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Long Beach, California 90802

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Mr. Spute is an experienced and detail-oriented Property Condition Assessor who has assessed over 3.38 million square feet of property in 2017 and over 2.07 million square feet in 2016. Mr. Spute has experience with a broad array of property types, foreign and domestic, for leading public and private sector companies.

Selected Project Descriptions:

Brookfield Global Integrated Services – Assessed an 895,503 square foot medical research laboratory, seven 4 to 9 story buildings with 3 level underground parking structures on 7 acres. Determined corrective actions and cost estimates for associated defect conditions and provided written reports about the general condition of all building systems. Conducted site assessments on more than 90 facilities and identified deficient conditions in a wide variety of building types and site locations. Was a senior property assessor on a team managing a portfolio of over 800 retail and commercial bank facilities for TD Bank. Additionally, peer reviewed reports by other assessors.

Partner Engineering & Science – Performed Property Condition Assessments on a portfolio of 14 properties for the Catholic Archdiocese of Los Angeles. Approximately 84 buildings, 500,000+ square feet and 40+ acres of property. Additionally, performed Property Condition Assessments on retail, restaurant, shopping malls, business and industrial parks, and multi-family apartment complexes.

AEI – Performed Property Condition Assessments and construction monitoring on multi-family apartment complexes, office and industrial complexes, 100+ bed skilled nursing facilities and residential nursing homes as well as medical office buildings.

EMG – Performed Property Condition Assessments on skilled nursing facilities having more than 80 beds.

Education:

B.S., Physics. Brigham Young University. Provo, Utah

MBA. Westminster College. Salt Lake City, Utah

Specialized Training:

Certificates of Completion in Property Condition Assessment and Environmental Due Diligence through NEEDDA

ASTM-2018-15 Refresher

Certified Project Management Professional through Project Management Institute

Years of Experience:

Seven

Curriculum Vitae –
Alan Davis

Project Chemist

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dirtyproperty.com

Mr. Davis is experienced in how chemical processes are used in a commercial and industrial manufacturing environment, and how those processes can affect the environmental footprint of a property including chemical interaction with the geology of a property's surroundings. He has proven to work well under-pressure. Mr. Davis has experience conducting Phase I due diligence for numerous clients including the investigation, historical research, and hydrogeologic interpretation of subsurface soil and groundwater impacts.

Selected Project Descriptions:

Phase I Environmental Site Investigations – Los Angeles, California
Mr. Davis successfully performed the majority of field work and reporting for several properties in the Los Angeles area. The projects include gas stations, commercial warehouses and office buildings taking into consideration the current use, regulatory records, historical documents, topography, hydrology and geology of the surrounding areas.

Electroplating Facility Environmental & Process Controls - Wenatchee, Washington
Mr. Davis developed a process documentation system in the electroplating production area for more consistent and robust product. He used a Perkin Elmer atomic absorption spectroscopy for gold and nickel bath analysis to improved adhesion and yield, reduce environmental waste, and satisfy ISO 9000 requirements.

Laser Welding Facility Process and Production Controls - Wenatchee, Washington
Mr. Davis designed laser weld tooling with Pro E CAD software in coordination with a preventative maintenance program on two 400-Watt ND Yag Lasers to simplify production, improve quality, and reduce rework. The implemented process controls were verified with environmental testing to Mil-Std-883 specifications.

Published the Engineering Design Guide For Integrated Circuit Housings at Raytheon Systems Company - Fullerton, California
Mr. Davis authored the MIC Housing Design Guidelines No 630 to implement a laser welding process for hermetic sealing as an improvement over soldered joints using aluminum, Kovar and titanium substrate materials. He developed the weld parameters, wrote the NC weld programs, and qualified the process for production.

Undergraduate Research under the supervision of Dr. David A Brant, U.C. Irvine, California
Mr. Davis built a large scale gel filtration high performance liquid chromatography system (HPLC) to separate the hydrolyzed oligomers of the polymer pullulan. Once separated the oligomers were collected according to chain length, freeze dried and analyzed with a Nuclear Magnetic Resonance

Education:

B.S., Chemistry, University of California at Irvine, 1996

Specialized Training:

Electroplating - Kushner Electroplating School

Geometric Dimensioning and Tolerancing - Pacific Aerospace and Electronics Inc. Interconnect Division

Pro Engineer: Advanced Modeling, Raytheon Learning Institute: El Segundo, California, 1000+ hours

Employment History:

H3 Publications
Journalist

ASG Publications
Journalist

Pacific Aerospace & Electronics
Process Engineer

Curriculum Vitae –
Alexis Ceballos

Environmental Site Investigation and Remediation Professional

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Ms. Ceballos has experience in geological field techniques, structural geology, water resources and society and GIS. She has proven to work well under-pressure and is currently in progress to become a geologist in training. Ms. Ceballos has experience conducting Phase I due diligence for clients including banks, institutional investors, portfolio managers, and solar power developers. Ms. Ceballos possesses direct experience with the investigation, historical research, and hydrogeologic modeling of subsurface soil and groundwater impacts.

Selected Project Descriptions:

Groundwater Monitoring – Marina Del Rey, California
Experience implementing a Remedial Action Work Plan submitted to the Los Angeles Regional Water Quality Control Board (RWQCB) for the monitoring and reporting of groundwater impacts; predominantly Total Petroleum Hydrocarbons (TPH) in the gasoline and diesel range, various Volatile Organic Compounds (VOCs) including Benzene, Toluene, Ethylbenzene, and Xylenes (BTEX) and various volatile breakdown products as well as fuel oxygenates.

Phase I Environmental Site Investigations – Lancaster, California, and surrounding areas
Successfully performed the majority of field work and reporting for a portfolio for the acquisition of land in the San Joaquin Valley and Antelope Valley for the purpose of developing the properties in to photovoltaic solar power generating facilities. Projects consist of several adjoining properties with varied owners and former uses.

Phase II Environmental Site Investigations –Various Clients & Sites in California
Conducted Phase II Site Investigations at several different sites in Southern California. Previous investigations at the properties indicated that the long-term use of the Subject Property for industrial purposes including the documented use of hazardous materials and associated wastes. Ms. Ceballos supervised a Phase II Investigation of the properties including advancing boreholes and collecting soil, soil vapor, and groundwater samples. Ms. Ceballos served as lead author of the investigation reports under direct oversight of a licensed professional.

Methane Investigations – Various Clients & Sites in California
Ms. Ceballos performed several investigations overseeing and directing geophysical and drilling contractors collecting subsurface methane samples in accordance with the City of Los Angeles Department of Building and Safety site testing standards for methane reference number LABC 7104.1.

Education:

B.A., Anthropology with a Minor in Geology, California State University of Long Beach, Long Beach, CA 2019

A.A., Anthropology and Geography, Long Beach City College

Specialized Training:

OSHA 40-hour Hazwoper Health and Safety Training

OSHA Asbestos Building Inspector

Curriculum Vitae –
Joseph Landeros

Environmental Site Investigation and Remediation Professional

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Mr. Landeros has experience in geological field techniques, structural geology, geochemistry and GIS. He has proven to work well under-pressure and is currently in progress to become a geologist in training. Mr. Landeros has experience conducting Phase I due diligence for clients including banks, institutional investors, and portfolio managers. Mr. Landeros possesses direct experience with the investigation, historical research, and hydrogeologic modeling of subsurface soil and groundwater impacts.

Selected Project Descriptions:

Phase I Environmental Site Investigations – Various Commercial Lending Clients
Hands-on and in-depth involvement in the field, data acquisition, and data evaluation aspects of Phase I Environmental Site Assessments. Investigations are successfully conducted on an accelerated time frame with tight budget constraints.

Phase II Environmental Site Investigations –Various Clients & Sites in California
Conducted Phase II Site Investigations at several different sites in Southern California. Previous investigations at the properties indicated that the long-term use of the Subject Property for industrial purposes including the documented use of hazardous materials and associated wastes. Mr. Landeros supervised a Phase II Investigation of the properties including advancing boreholes and collecting soil, soil vapor, and groundwater samples. Mr. Landeros served as lead author of the investigation reports under direct oversight of a licensed professional.

Methane Investigations – Various Clients & Sites in California
Mr. Landeros performed several investigations overseeing and directing geophysical and drilling contractors collecting subsurface methane samples in accordance with the City of Los Angeles Department of Building and Safety site testing standards for methane reference number LABC 7104.1.

Education:

B.S., Geology, California State University of Long Beach, Long Beach, CA 2019

A.S., Geology, Chaffey College, Rancho Cucamonga, CA, 2017

Specialized Training:

OSHA 40-hour Hazwoper Health and Safety Training

CERTIFICATE OF LIABILITY INSURANCE

DATE (MM/DD/YYYY): 03/02/2021

THIS CERTIFICATE IS ISSUED AS A MATTER OF INFORMATION ONLY AND CONFERS NO RIGHTS UPON THE CERTIFICATE HOLDER. THIS CERTIFICATE DOES NOT AFFIRMATIVELY OR NEGATIVELY AMEND, EXTEND OR ALTER THE COVERAGE AFFORDED BY THE POLICIES BELOW. THIS CERTIFICATE OF INSURANCE DOES NOT CONSTITUTE A CONTRACT BETWEEN THE ISSUING INSURER(S), AUTHORIZED REPRESENTATIVE OR PRODUCER, AND THE CERTIFICATE HOLDER.

IMPORTANT: If the certificate holder is an ADDITIONAL INSURED, the policy(ies) must have ADDITIONAL INSURED provisions or be endorsed. If SUBROGATION IS WAIVED, subject to the terms and conditions of the policy, certain policies may require an endorsement. A statement on this certificate does not confer rights to the certificate holder in lieu of such endorsement(s).

PRODUCER	CONTACT NAME: Kerry Kiddie	
Landmark Insurance Group, LLC 2679 W Main St. Suite 300 Littleton CO 80120	PHONE (A/C, No, Ext): (720) 403-9450	FAX (A/C, No): (720) 403-9451
	E-MAIL ADDRESS: kkiddie@landmarkinsgroup.com	
	INSURER(S) AFFORDING COVERAGE	**NAIC #**
	INSURER A : Homeland Insurance Company of NY	
INSURED McAlister GeoScience, Inc. 235 E Broadway, Ste 1120 Long Beach CA 90802	INSURER B :	
	INSURER C :	
	INSURER D :	
	INSURER E :	
	INSURER F :	

COVERAGES **CERTIFICATE NUMBER:** CL2111307126 **REVISION NUMBER:**

THIS IS TO CERTIFY THAT THE POLICIES OF INSURANCE LISTED BELOW HAVE BEEN ISSUED TO THE INSURED NAMED ABOVE FOR THE POLICY PERIOD INDICATED. NOTWITHSTANDING ANY REQUIREMENT, TERM OR CONDITION OF ANY CONTRACT OR OTHER DOCUMENT WITH RESPECT TO WHICH THIS CERTIFICATE MAY BE ISSUED OR MAY PERTAIN, THE INSURANCE AFFORDED BY THE POLICIES DESCRIBED HEREIN IS SUBJECT TO ALL THE TERMS, EXCLUSIONS AND CONDITIONS OF SUCH POLICIES. LIMITS SHOWN MAY HAVE BEEN REDUCED BY PAID CLAIMS.

INSR LTR	TYPE OF INSURANCE	ADDL INSD	SUBR WVD	POLICY NUMBER	POLICY EFF (MM/DD/YYYY)	POLICY EXP (MM/DD/YYYY)	LIMITS	
A	[X] COMMERCIAL GENERAL LIABILITY [ ] CLAIMS-MADE [X] OCCUR GEN'L AGGREGATE LIMIT APPLIES PER: [ ] POLICY [ ] PRO-JECT [ ] LOC [ ] OTHER:			7930041670005	01/03/2021	01/03/2022	EACH OCCURRENCE DAMAGE TO RENTED PREMISES (Ea occurrence) MED EXP (Any one person) PERSONAL & ADV INJURY GENERAL AGGREGATE PRODUCTS - COMP/OP AGG Policy Aggregate Limit	$ 1,000,000 $ 100,000 $ 10,000 $ 1,000,000 $ $ 2,000,000 $ 2,000,000
A	AUTOMOBILE LIABILITY [ ] ANY AUTO [ ] OWNED AUTOS ONLY [ ] SCHEDULED AUTOS [X] HIRED AUTOS ONLY [X] NON-OWNED AUTOS ONLY			7930041670005	01/03/2021	01/03/2022	COMBINED SINGLE LIMIT (Ea accident) BODILY INJURY (Per person) BODILY INJURY (Per accident) PROPERTY DAMAGE (Per accident)	$ 1,000,000 $ $ $
	[ ] UMBRELLA LIAB [ ] OCCUR [ ] EXCESS LIAB [ ] CLAIMS-MADE [ ] DED [ ] RETENTION $						EACH OCCURRENCE AGGREGATE	$ $
	WORKERS COMPENSATION AND EMPLOYERS' LIABILITY ANY PROPRIETOR/PARTNER/EXECUTIVE OFFICER/MEMBER EXCLUDED? Y / N [ ] (Mandatory in NH) If yes, describe under DESCRIPTION OF OPERATIONS below	N / A					[ ] PER STATUTE [ ] OTH-ER E.L. EACH ACCIDENT E.L. DISEASE - EA EMPLOYEE E.L. DISEASE - POLICY LIMIT	$ $ $
A	Contractors Pollution Liability Professional Liability			7930041670005	01/03/2021	01/03/2022		$1,000,000 $1,000,000

DESCRIPTION OF OPERATIONS / LOCATIONS / VEHICLES (ACORD 101, Additional Remarks Schedule, may be attached if more space is required)

CERTIFICATE HOLDER

INFORMATION PURPOSES ONLY

CANCELLATION

SHOULD ANY OF THE ABOVE DESCRIBED POLICIES BE CANCELLED BEFORE THE EXPIRATION DATE THEREOF, NOTICE WILL BE DELIVERED IN ACCORDANCE WITH THE POLICY PROVISIONS.

AUTHORIZED REPRESENTATIVE

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Appendix 5: LID Infeasibility

LID Technical Infeasibility Analysis

NOT APPLICABLE

Appendix 6: BMP Design Details

BMP Sizing, Design Details and other Supporting Documentation

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

(Rev. 10-2011)

Legend: Required Entries / Calculated Cells

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

Company Name	Adkan Engineers	Date	6/13/2022
Designed by	Leandra Gaglia	Case No	
Company Project Number/Name	LDW TTM 38346, Foremost Pacific		

BMP Identification

BMP NAME / ID: Underground Infiltration

Must match Name/ID used on BMP Design Calculation Sheet

Design Rainfall Depth

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

D_{85}= 0.63 inches

Drainage Management Area Tabulation

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

DMA Type/ID	DMA Area (square feet)	Post-Project Surface Type	Effective Imperivous Fraction, I_f	DMA Runoff Factor	DMA Areas x Runoff Factor	*Design Storm Depth (in)*	*Design Capture Volume, V_{BMP} (cubic feet)*	*Proposed Volume on Plans (cubic feet)*
C.1	*52,658*	*Ornamental Landscaping*	*0.1*	*0.11*	*5816.5*			
C.2	*298,393*	*Concrete or Asphalt*	*1*	*0.89*	*266166.6*			
	351051	***Total***			**271983.1**	**0.63**	***14279.1***	***20081.6***

Notes:

Infiltration Trench - Design Procedure	BMP ID B-1	Legend:	Required Entries / Calculated Cells
Company Name:	Adkan Engineers	Date:	6/13/2022
Designed by:	Leandra Gaglia	County/City Case No.:	TTM 38346

Design Volume

Enter the area tributary to this feature, Max = 10 acres	A_t=	8	acres
Enter V_{BMP} determined from Section 2.1 of this Handbook	V_{BMP}=	14,279	ft^3

Calculate Maximum Depth of the Reservoir Layer

Enter Infiltration rate	I =	4.8	in/hr
Enter Factor of Safety, FS (unitless)	FS =	3	
Obtain from Table 1, Appendix A: "Infiltration Testing" of this BMP Handbook			
	n =	40	%
Calculate D_1. $D_1 = \frac{I\ (in/hr) \times 72\ hrs}{12\ (in/ft) \times (n/100) \times FS}$	D_1 =	24.05	ft
Enter depth to historic high groundwater mark (measured from finished grade)		35	ft
Enter depth to top of bedrock or impermeable layer (measured from finished grade)		50	ft
D_2 is the smaller of:			
Depth to groundwater - 11 ft; & Depth to impermeable layer - 6 ft	D_2 =	24.0	ft
D_{MAX} is the smaller value of D_1 and D_2, must be less than or equal to 8 feet.	D_{MAX} =	8.0	ft

Trench Sizing

Enter proposed reservoir layer depth D_R, must be ≤ D_{MAX}	D_R =	7.00	ft
Calculate the design depth of water, d_W			
Design $d_W = (D_R) \times (n/100)$	Design d_W=	2.80	ft
Minimum Surface Area, A_S $A_S = \frac{V_{BMP}}{d_W}$	A_S =	5,100	ft^2
Proposed Design Surface Area	A_D =	7,172	ft^2
Minimum Width = D_R + 1 foot pea gravel		8.00	ft
Sediment Control Provided? (Use pulldown)		Yes	
Geotechnical report attached? (Use pulldown)		Yes	

If the trench has been designed correctly, there should be no error messages on the spreadsheet.

Notes: Underground perforated CMP to act as infiltration trench, see layout/info for details.
7' dia. CMP pipe with 24" gravel layer below, 12" gravel layer on sides and above.

Appendix 7: Hydromodification

Supporting Detail Relating to Hydrologic Conditions of Concern

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

        Copyright (c) CIVILCADD/CIVILDESIGN, 1989 - 2008, Version 8.1
                Study date  06/06/22 File: EX2242.out

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

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


Program License Serial Number 5006

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

 English Units used in output format



------------------------------------------------------------------------
------------------------------------------------------------------------
Drainage Area =       8.03(Ac.)  =      0.013 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment =       8.03(Ac.)  =      0.013 Sq. Mi.
Length along longest watercourse =     609.00(Ft.)
Length along longest watercourse measured to centroid =     305.00(Ft.)
Length along longest watercourse =      0.115 Mi.
Length along longest watercourse measured to centroid =      0.058 Mi.
Difference in elevation =       6.50(Ft.)
Slope along watercourse =     56.3547 Ft./Mi.
Average Manning's 'N' = 0.030
Lag time =    0.050 Hr.
Lag time =     2.99 Min.
25% of lag time =     0.75 Min.
40% of lag time =     1.20 Min.
Unit time =     5.00 Min.
Duration of storm = 24 Hour(s)
User Entered Base Flow =     0.00(CFS)

2 YEAR Area rainfall data:


Area(Ac.)[1]       Rainfall(In)[2]      Weighting[1*2]
        8.03           1.60                 12.85

100 YEAR Area rainfall data:


Area(Ac.)[1]       Rainfall(In)[2]      Weighting[1*2]
        8.03           4.00                 32.12

STORM EVENT (YEAR) =    2.00
Area Averaged 2-Year Rainfall =    1.600(In)
Area Averaged 100-Year Rainfall =    4.000(In)

Point rain (area averaged) =    1.600(In)
Areal adjustment factor =  100.00 %
Adjusted average point rain =    1.600(In)

Sub-Area Data:
Area(Ac.)         Runoff Index   Impervious %
     8.030           69.00          0.000
 Total Area Entered =      8.03(Ac.)


RI    RI   Infil. Rate Impervious   Adj. Infil. Rate  Area%     F
AMC2 AMC-1     (In/Hr)    (Dec.%)     (In/Hr)      (Dec.)    (In/Hr)
69.0  49.8      0.574     0.000        0.574       1.000      0.574
                                                 Sum (F) =   0.574
Area averaged mean soil loss (F) (In/Hr) =  0.574
Minimum soil loss rate ((In/Hr)) =  0.287
(for 24 hour storm duration)
Soil low loss rate (decimal) =   0.900
------------------------------------------------------------------------

               U n i t  H y d r o g r a p h
                      VALLEY S-Curve
------------------------------------------------------------------
               Unit Hydrograph Data
------------------------------------------------------------------------
Unit time period   Time % of lag   Distribution   Unit Hydrograph
    (hrs)                          Graph %           (CFS)
------------------------------------------------------------------------
```

1	0.083	167.177	37.089		3.002
2	0.167	334.354	45.727		3.701
3	0.250	501.531	10.276		0.832
4	0.333	668.708	4.352		0.352
5	0.417	835.884	2.557		0.207
			Sum = 100.000	Sum=	8.093

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

Unit	Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)
1	0.08	0.07	0.013	(1.017)	0.012	0.001
2	0.17	0.07	0.013	(1.014)	0.012	0.001
3	0.25	0.07	0.013	(1.010)	0.012	0.001
4	0.33	0.10	0.019	(1.006)	0.017	0.002
5	0.42	0.10	0.019	(1.002)	0.017	0.002
6	0.50	0.10	0.019	(0.998)	0.017	0.002
7	0.58	0.10	0.019	(0.994)	0.017	0.002
8	0.67	0.10	0.019	(0.990)	0.017	0.002
9	0.75	0.10	0.019	(0.986)	0.017	0.002
10	0.83	0.13	0.026	(0.982)	0.023	0.003
11	0.92	0.13	0.026	(0.978)	0.023	0.003
12	1.00	0.13	0.026	(0.975)	0.023	0.003
13	1.08	0.10	0.019	(0.971)	0.017	0.002
14	1.17	0.10	0.019	(0.967)	0.017	0.002
15	1.25	0.10	0.019	(0.963)	0.017	0.002
16	1.33	0.10	0.019	(0.959)	0.017	0.002
17	1.42	0.10	0.019	(0.955)	0.017	0.002
18	1.50	0.10	0.019	(0.952)	0.017	0.002
19	1.58	0.10	0.019	(0.948)	0.017	0.002
20	1.67	0.10	0.019	(0.944)	0.017	0.002
21	1.75	0.10	0.019	(0.940)	0.017	0.002
22	1.83	0.13	0.026	(0.936)	0.023	0.003
23	1.92	0.13	0.026	(0.933)	0.023	0.003
24	2.00	0.13	0.026	(0.929)	0.023	0.003
25	2.08	0.13	0.026	(0.925)	0.023	0.003
26	2.17	0.13	0.026	(0.921)	0.023	0.003
27	2.25	0.13	0.026	(0.918)	0.023	0.003
28	2.33	0.13	0.026	(0.914)	0.023	0.003
29	2.42	0.13	0.026	(0.910)	0.023	0.003
30	2.50	0.13	0.026	(0.906)	0.023	0.003
31	2.58	0.17	0.032	(0.903)	0.029	0.003
32	2.67	0.17	0.032	(0.899)	0.029	0.003
33	2.75	0.17	0.032	(0.895)	0.029	0.003
34	2.83	0.17	0.032	(0.892)	0.029	0.003
35	2.92	0.17	0.032	(0.888)	0.029	0.003
36	3.00	0.17	0.032	(0.884)	0.029	0.003
37	3.08	0.17	0.032	(0.881)	0.029	0.003
38	3.17	0.17	0.032	(0.877)	0.029	0.003
39	3.25	0.17	0.032	(0.873)	0.029	0.003
40	3.33	0.17	0.032	(0.870)	0.029	0.003
41	3.42	0.17	0.032	(0.866)	0.029	0.003
42	3.50	0.17	0.032	(0.862)	0.029	0.003
43	3.58	0.17	0.032	(0.859)	0.029	0.003
44	3.67	0.17	0.032	(0.855)	0.029	0.003
45	3.75	0.17	0.032	(0.852)	0.029	0.003
46	3.83	0.20	0.038	(0.848)	0.035	0.004
47	3.92	0.20	0.038	(0.844)	0.035	0.004
48	4.00	0.20	0.038	(0.841)	0.035	0.004
49	4.08	0.20	0.038	(0.837)	0.035	0.004
50	4.17	0.20	0.038	(0.834)	0.035	0.004
51	4.25	0.20	0.038	(0.830)	0.035	0.004
52	4.33	0.23	0.045	(0.827)	0.040	0.004
53	4.42	0.23	0.045	(0.823)	0.040	0.004
54	4.50	0.23	0.045	(0.820)	0.040	0.004
55	4.58	0.23	0.045	(0.816)	0.040	0.004
56	4.67	0.23	0.045	(0.813)	0.040	0.004
57	4.75	0.23	0.045	(0.809)	0.040	0.004
58	4.83	0.27	0.051	(0.806)	0.046	0.005
59	4.92	0.27	0.051	(0.802)	0.046	0.005
60	5.00	0.27	0.051	(0.799)	0.046	0.005
61	5.08	0.20	0.038	(0.795)	0.035	0.004
62	5.17	0.20	0.038	(0.792)	0.035	0.004
63	5.25	0.20	0.038	(0.788)	0.035	0.004
64	5.33	0.23	0.045	(0.785)	0.040	0.004
65	5.42	0.23	0.045	(0.781)	0.040	0.004
66	5.50	0.23	0.045	(0.778)	0.040	0.004
67	5.58	0.27	0.051	(0.775)	0.046	0.005
68	5.67	0.27	0.051	(0.771)	0.046	0.005
69	5.75	0.27	0.051	(0.768)	0.046	0.005
70	5.83	0.27	0.051	(0.764)	0.046	0.005
71	5.92	0.27	0.051	(0.761)	0.046	0.005
72	6.00	0.27	0.051	(0.758)	0.046	0.005
73	6.08	0.30	0.058	(0.754)	0.052	0.006

74	6.17	0.30	0.058	(0.751)	0.052	0.006
75	6.25	0.30	0.058	(0.748)	0.052	0.006
76	6.33	0.30	0.058	(0.744)	0.052	0.006
77	6.42	0.30	0.058	(0.741)	0.052	0.006
78	6.50	0.30	0.058	(0.738)	0.052	0.006
79	6.58	0.33	0.064	(0.734)	0.058	0.006
80	6.67	0.33	0.064	(0.731)	0.058	0.006
81	6.75	0.33	0.064	(0.728)	0.058	0.006
82	6.83	0.33	0.064	(0.724)	0.058	0.006
83	6.92	0.33	0.064	(0.721)	0.058	0.006
84	7.00	0.33	0.064	(0.718)	0.058	0.006
85	7.08	0.33	0.064	(0.715)	0.058	0.006
86	7.17	0.33	0.064	(0.711)	0.058	0.006
87	7.25	0.33	0.064	(0.708)	0.058	0.006
88	7.33	0.37	0.070	(0.705)	0.063	0.007
89	7.42	0.37	0.070	(0.702)	0.063	0.007
90	7.50	0.37	0.070	(0.698)	0.063	0.007
91	7.58	0.40	0.077	(0.695)	0.069	0.008
92	7.67	0.40	0.077	(0.692)	0.069	0.008
93	7.75	0.40	0.077	(0.689)	0.069	0.008
94	7.83	0.43	0.083	(0.686)	0.075	0.008
95	7.92	0.43	0.083	(0.682)	0.075	0.008
96	8.00	0.43	0.083	(0.679)	0.075	0.008
97	8.08	0.50	0.096	(0.676)	0.086	0.010
98	8.17	0.50	0.096	(0.673)	0.086	0.010
99	8.25	0.50	0.096	(0.670)	0.086	0.010
100	8.33	0.50	0.096	(0.667)	0.086	0.010
101	8.42	0.50	0.096	(0.664)	0.086	0.010
102	8.50	0.50	0.096	(0.660)	0.086	0.010
103	8.58	0.53	0.102	(0.657)	0.092	0.010
104	8.67	0.53	0.102	(0.654)	0.092	0.010
105	8.75	0.53	0.102	(0.651)	0.092	0.010
106	8.83	0.57	0.109	(0.648)	0.098	0.011
107	8.92	0.57	0.109	(0.645)	0.098	0.011
108	9.00	0.57	0.109	(0.642)	0.098	0.011
109	9.08	0.63	0.122	(0.639)	0.109	0.012
110	9.17	0.63	0.122	(0.636)	0.109	0.012
111	9.25	0.63	0.122	(0.633)	0.109	0.012
112	9.33	0.67	0.128	(0.630)	0.115	0.013
113	9.42	0.67	0.128	(0.627)	0.115	0.013
114	9.50	0.67	0.128	(0.624)	0.115	0.013
115	9.58	0.70	0.134	(0.621)	0.121	0.013
116	9.67	0.70	0.134	(0.618)	0.121	0.013
117	9.75	0.70	0.134	(0.615)	0.121	0.013
118	9.83	0.73	0.141	(0.612)	0.127	0.014
119	9.92	0.73	0.141	(0.609)	0.127	0.014
120	10.00	0.73	0.141	(0.606)	0.127	0.014
121	10.08	0.50	0.096	(0.603)	0.086	0.010
122	10.17	0.50	0.096	(0.600)	0.086	0.010
123	10.25	0.50	0.096	(0.597)	0.086	0.010
124	10.33	0.50	0.096	(0.594)	0.086	0.010
125	10.42	0.50	0.096	(0.592)	0.086	0.010
126	10.50	0.50	0.096	(0.589)	0.086	0.010
127	10.58	0.67	0.128	(0.586)	0.115	0.013
128	10.67	0.67	0.128	(0.583)	0.115	0.013
129	10.75	0.67	0.128	(0.580)	0.115	0.013
130	10.83	0.67	0.128	(0.577)	0.115	0.013
131	10.92	0.67	0.128	(0.574)	0.115	0.013
132	11.00	0.67	0.128	(0.572)	0.115	0.013
133	11.08	0.63	0.122	(0.569)	0.109	0.012
134	11.17	0.63	0.122	(0.566)	0.109	0.012
135	11.25	0.63	0.122	(0.563)	0.109	0.012
136	11.33	0.63	0.122	(0.560)	0.109	0.012
137	11.42	0.63	0.122	(0.558)	0.109	0.012
138	11.50	0.63	0.122	(0.555)	0.109	0.012
139	11.58	0.57	0.109	(0.552)	0.098	0.011
140	11.67	0.57	0.109	(0.549)	0.098	0.011
141	11.75	0.57	0.109	(0.547)	0.098	0.011
142	11.83	0.60	0.115	(0.544)	0.104	0.012
143	11.92	0.60	0.115	(0.541)	0.104	0.012
144	12.00	0.60	0.115	(0.538)	0.104	0.012
145	12.08	0.83	0.160	(0.536)	0.144	0.016
146	12.17	0.83	0.160	(0.533)	0.144	0.016
147	12.25	0.83	0.160	(0.530)	0.144	0.016
148	12.33	0.87	0.166	(0.528)	0.150	0.017
149	12.42	0.87	0.166	(0.525)	0.150	0.017
150	12.50	0.87	0.166	(0.522)	0.150	0.017
151	12.58	0.93	0.179	(0.520)	0.161	0.018
152	12.67	0.93	0.179	(0.517)	0.161	0.018
153	12.75	0.93	0.179	(0.515)	0.161	0.018
154	12.83	0.97	0.186	(0.512)	0.167	0.019
155	12.92	0.97	0.186	(0.509)	0.167	0.019
156	13.00	0.97	0.186	(0.507)	0.167	0.019
157	13.08	1.13	0.218	(0.504)	0.196	0.022
158	13.17	1.13	0.218	(0.502)	0.196	0.022
159	13.25	1.13	0.218	(0.499)	0.196	0.022
160	13.33	1.13	0.218	(0.497)	0.196	0.022

161	13.42	1.13	0.218	(0.494)	0.196	0.022
162	13.50	1.13	0.218	(0.492)	0.196	0.022
163	13.58	0.77	0.147	(0.489)	0.132	0.015
164	13.67	0.77	0.147	(0.487)	0.132	0.015
165	13.75	0.77	0.147	(0.484)	0.132	0.015
166	13.83	0.77	0.147	(0.482)	0.132	0.015
167	13.92	0.77	0.147	(0.479)	0.132	0.015
168	14.00	0.77	0.147	(0.477)	0.132	0.015
169	14.08	0.90	0.173	(0.474)	0.156	0.017
170	14.17	0.90	0.173	(0.472)	0.156	0.017
171	14.25	0.90	0.173	(0.469)	0.156	0.017
172	14.33	0.87	0.166	(0.467)	0.150	0.017
173	14.42	0.87	0.166	(0.465)	0.150	0.017
174	14.50	0.87	0.166	(0.462)	0.150	0.017
175	14.58	0.87	0.166	(0.460)	0.150	0.017
176	14.67	0.87	0.166	(0.458)	0.150	0.017
177	14.75	0.87	0.166	(0.455)	0.150	0.017
178	14.83	0.83	0.160	(0.453)	0.144	0.016
179	14.92	0.83	0.160	(0.451)	0.144	0.016
180	15.00	0.83	0.160	(0.448)	0.144	0.016
181	15.08	0.80	0.154	(0.446)	0.138	0.015
182	15.17	0.80	0.154	(0.444)	0.138	0.015
183	15.25	0.80	0.154	(0.441)	0.138	0.015
184	15.33	0.77	0.147	(0.439)	0.132	0.015
185	15.42	0.77	0.147	(0.437)	0.132	0.015
186	15.50	0.77	0.147	(0.435)	0.132	0.015
187	15.58	0.63	0.122	(0.432)	0.109	0.012
188	15.67	0.63	0.122	(0.430)	0.109	0.012
189	15.75	0.63	0.122	(0.428)	0.109	0.012
190	15.83	0.63	0.122	(0.426)	0.109	0.012
191	15.92	0.63	0.122	(0.424)	0.109	0.012
192	16.00	0.63	0.122	(0.421)	0.109	0.012
193	16.08	0.13	0.026	(0.419)	0.023	0.003
194	16.17	0.13	0.026	(0.417)	0.023	0.003
195	16.25	0.13	0.026	(0.415)	0.023	0.003
196	16.33	0.13	0.026	(0.413)	0.023	0.003
197	16.42	0.13	0.026	(0.411)	0.023	0.003
198	16.50	0.13	0.026	(0.409)	0.023	0.003
199	16.58	0.10	0.019	(0.407)	0.017	0.002
200	16.67	0.10	0.019	(0.405)	0.017	0.002
201	16.75	0.10	0.019	(0.403)	0.017	0.002
202	16.83	0.10	0.019	(0.401)	0.017	0.002
203	16.92	0.10	0.019	(0.398)	0.017	0.002
204	17.00	0.10	0.019	(0.396)	0.017	0.002
205	17.08	0.17	0.032	(0.394)	0.029	0.003
206	17.17	0.17	0.032	(0.392)	0.029	0.003
207	17.25	0.17	0.032	(0.390)	0.029	0.003
208	17.33	0.17	0.032	(0.389)	0.029	0.003
209	17.42	0.17	0.032	(0.387)	0.029	0.003
210	17.50	0.17	0.032	(0.385)	0.029	0.003
211	17.58	0.17	0.032	(0.383)	0.029	0.003
212	17.67	0.17	0.032	(0.381)	0.029	0.003
213	17.75	0.17	0.032	(0.379)	0.029	0.003
214	17.83	0.13	0.026	(0.377)	0.023	0.003
215	17.92	0.13	0.026	(0.375)	0.023	0.003
216	18.00	0.13	0.026	(0.373)	0.023	0.003
217	18.08	0.13	0.026	(0.371)	0.023	0.003
218	18.17	0.13	0.026	(0.370)	0.023	0.003
219	18.25	0.13	0.026	(0.368)	0.023	0.003
220	18.33	0.13	0.026	(0.366)	0.023	0.003
221	18.42	0.13	0.026	(0.364)	0.023	0.003
222	18.50	0.13	0.026	(0.363)	0.023	0.003
223	18.58	0.10	0.019	(0.361)	0.017	0.002
224	18.67	0.10	0.019	(0.359)	0.017	0.002
225	18.75	0.10	0.019	(0.357)	0.017	0.002
226	18.83	0.07	0.013	(0.356)	0.012	0.001
227	18.92	0.07	0.013	(0.354)	0.012	0.001
228	19.00	0.07	0.013	(0.352)	0.012	0.001
229	19.08	0.10	0.019	(0.351)	0.017	0.002
230	19.17	0.10	0.019	(0.349)	0.017	0.002
231	19.25	0.10	0.019	(0.347)	0.017	0.002
232	19.33	0.13	0.026	(0.346)	0.023	0.003
233	19.42	0.13	0.026	(0.344)	0.023	0.003
234	19.50	0.13	0.026	(0.342)	0.023	0.003
235	19.58	0.10	0.019	(0.341)	0.017	0.002
236	19.67	0.10	0.019	(0.339)	0.017	0.002
237	19.75	0.10	0.019	(0.338)	0.017	0.002
238	19.83	0.07	0.013	(0.336)	0.012	0.001
239	19.92	0.07	0.013	(0.335)	0.012	0.001
240	20.00	0.07	0.013	(0.333)	0.012	0.001
241	20.08	0.10	0.019	(0.332)	0.017	0.002
242	20.17	0.10	0.019	(0.330)	0.017	0.002
243	20.25	0.10	0.019	(0.329)	0.017	0.002
244	20.33	0.10	0.019	(0.328)	0.017	0.002
245	20.42	0.10	0.019	(0.326)	0.017	0.002
246	20.50	0.10	0.019	(0.325)	0.017	0.002
247	20.58	0.10	0.019	(0.323)	0.017	0.002

248	20.67	0.10	0.019	(0.322)	0.017	0.002
249	20.75	0.10	0.019	(0.321)	0.017	0.002
250	20.83	0.07	0.013	(0.319)	0.012	0.001
251	20.92	0.07	0.013	(0.318)	0.012	0.001
252	21.00	0.07	0.013	(0.317)	0.012	0.001
253	21.08	0.10	0.019	(0.316)	0.017	0.002
254	21.17	0.10	0.019	(0.314)	0.017	0.002
255	21.25	0.10	0.019	(0.313)	0.017	0.002
256	21.33	0.07	0.013	(0.312)	0.012	0.001
257	21.42	0.07	0.013	(0.311)	0.012	0.001
258	21.50	0.07	0.013	(0.310)	0.012	0.001
259	21.58	0.10	0.019	(0.308)	0.017	0.002
260	21.67	0.10	0.019	(0.307)	0.017	0.002
261	21.75	0.10	0.019	(0.306)	0.017	0.002
262	21.83	0.07	0.013	(0.305)	0.012	0.001
263	21.92	0.07	0.013	(0.304)	0.012	0.001
264	22.00	0.07	0.013	(0.303)	0.012	0.001
265	22.08	0.10	0.019	(0.302)	0.017	0.002
266	22.17	0.10	0.019	(0.301)	0.017	0.002
267	22.25	0.10	0.019	(0.300)	0.017	0.002
268	22.33	0.07	0.013	(0.299)	0.012	0.001
269	22.42	0.07	0.013	(0.298)	0.012	0.001
270	22.50	0.07	0.013	(0.297)	0.012	0.001
271	22.58	0.07	0.013	(0.297)	0.012	0.001
272	22.67	0.07	0.013	(0.296)	0.012	0.001
273	22.75	0.07	0.013	(0.295)	0.012	0.001
274	22.83	0.07	0.013	(0.294)	0.012	0.001
275	22.92	0.07	0.013	(0.293)	0.012	0.001
276	23.00	0.07	0.013	(0.293)	0.012	0.001
277	23.08	0.07	0.013	(0.292)	0.012	0.001
278	23.17	0.07	0.013	(0.291)	0.012	0.001
279	23.25	0.07	0.013	(0.291)	0.012	0.001
280	23.33	0.07	0.013	(0.290)	0.012	0.001
281	23.42	0.07	0.013	(0.290)	0.012	0.001
282	23.50	0.07	0.013	(0.289)	0.012	0.001
283	23.58	0.07	0.013	(0.289)	0.012	0.001
284	23.67	0.07	0.013	(0.288)	0.012	0.001
285	23.75	0.07	0.013	(0.288)	0.012	0.001
286	23.83	0.07	0.013	(0.287)	0.012	0.001
287	23.92	0.07	0.013	(0.287)	0.012	0.001
288	24.00	0.07	0.013	(0.287)	0.012	0.001
		(Loss Rate Not Used)				
	Sum =	100.0			Sum =	1.9

Flood volume = Effective rainfall 0.16(In)
times area 8.0(Ac.)/[(In)/(Ft.)] = 0.1(Ac.Ft)
Total soil loss = 1.44(In)
Total soil loss = 0.964(Ac.Ft)
Total rainfall = 1.60(In)
Flood volume = 4663.8 Cubic Feet
Total soil loss = 41973.8 Cubic Feet

Peak flow rate of this hydrograph = 0.176(CFS)

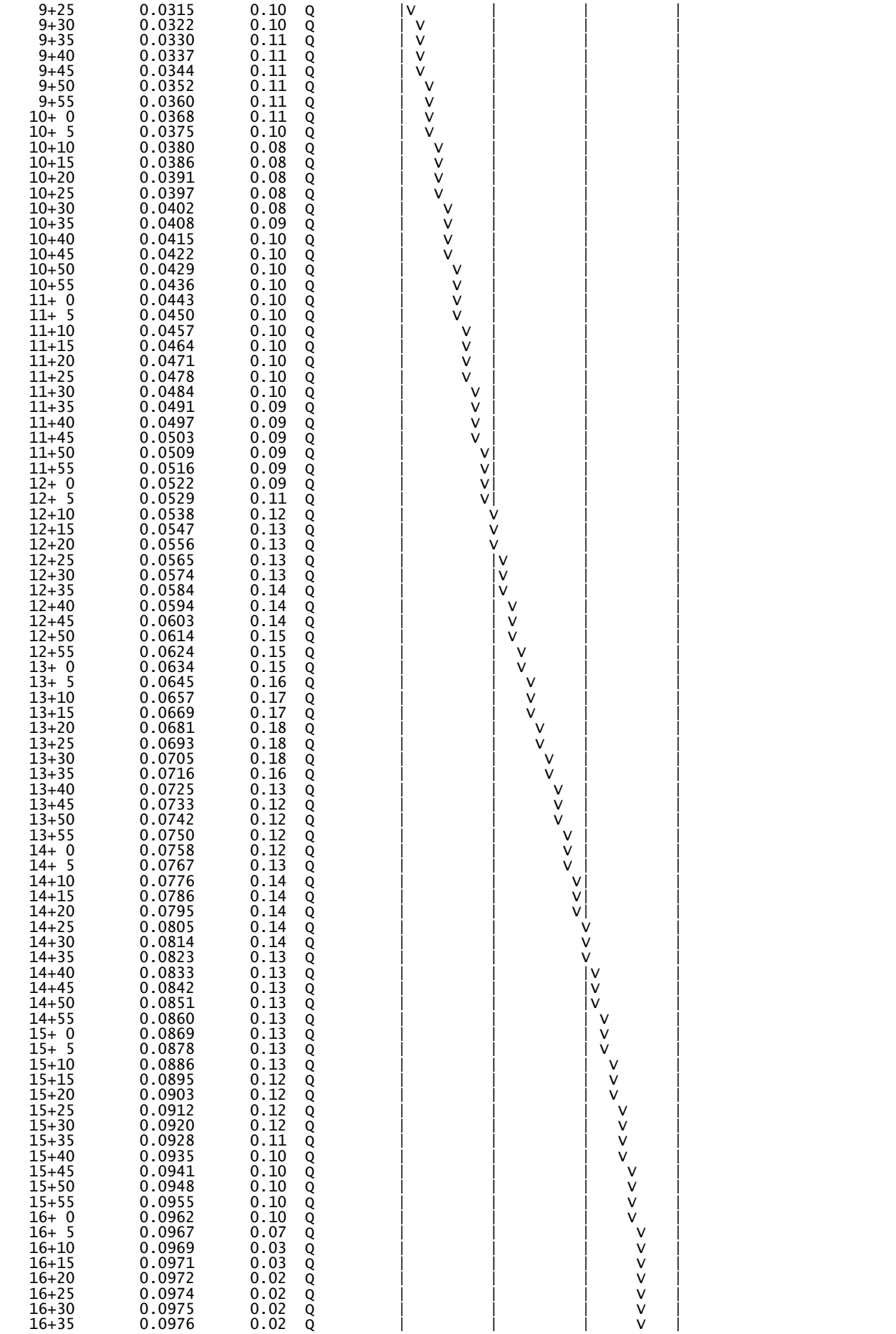
++

24 - H O U R S T O R M
R u n o f f H y d r o g r a p h

Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0	2.5	5.0	7.5	10.0
0+ 5	0.0000	0.00	Q	|	|	|	|
0+10	0.0001	0.01	Q	|	|	|	|
0+15	0.0002	0.01	Q	|	|	|	|
0+20	0.0002	0.01	Q	|	|	|	|
0+25	0.0003	0.01	Q	|	|	|	|
0+30	0.0004	0.02	Q	|	|	|	|
0+35	0.0005	0.02	Q	|	|	|	|
0+40	0.0007	0.02	Q	|	|	|	|
0+45	0.0008	0.02	Q	|	|	|	|
0+50	0.0009	0.02	Q	|	|	|	|
0+55	0.0010	0.02	Q	|	|	|	|
1+ 0	0.0012	0.02	Q	|	|	|	|
1+ 5	0.0013	0.02	Q	|	|	|	|
1+10	0.0014	0.02	Q	|	|	|	|
1+15	0.0015	0.02	Q	|	|	|	|
1+20	0.0016	0.02	Q	|	|	|	|
1+25	0.0017	0.02	Q	|	|	|	|
1+30	0.0018	0.02	Q	|	|	|	|
1+35	0.0019	0.02	Q	|	|	|	|
1+40	0.0020	0.02	Q	|	|	|	|
1+45	0.0022	0.02	Q	|	|	|	|
1+50	0.0023	0.02	Q	|	|	|	|
1+55	0.0024	0.02	Q	|	|	|	|
2+ 0	0.0025	0.02	Q	|	|	|	|
2+ 5	0.0027	0.02	QV	|	|	|	|

```
2+10       0.0028      0.02  QV        |         |         |         |
2+15       0.0030      0.02  QV        |         |         |         |
2+20       0.0031      0.02  QV        |         |         |         |
2+25       0.0033      0.02  QV        |         |         |         |
2+30       0.0034      0.02  QV        |         |         |         |
2+35       0.0036      0.02  QV        |         |         |         |
2+40       0.0037      0.03  QV        |         |         |         |
2+45       0.0039      0.03  QV        |         |         |         |
2+50       0.0041      0.03  QV        |         |         |         |
2+55       0.0043      0.03  QV        |         |         |         |
3+ 0       0.0044      0.03  QV        |         |         |         |
3+ 5       0.0046      0.03  QV        |         |         |         |
3+10       0.0048      0.03  QV        |         |         |         |
3+15       0.0050      0.03  QV        |         |         |         |
3+20       0.0052      0.03  QV        |         |         |         |
3+25       0.0053      0.03  QV        |         |         |         |
3+30       0.0055      0.03  Q V       |         |         |         |
3+35       0.0057      0.03  Q V       |         |         |         |
3+40       0.0059      0.03  Q V       |         |         |         |
3+45       0.0060      0.03  Q V       |         |         |         |
3+50       0.0062      0.03  Q V       |         |         |         |
3+55       0.0064      0.03  Q V       |         |         |         |
4+ 0       0.0067      0.03  Q V       |         |         |         |
4+ 5       0.0069      0.03  Q V       |         |         |         |
4+10       0.0071      0.03  Q V       |         |         |         |
4+15       0.0073      0.03  Q V       |         |         |         |
4+20       0.0075      0.03  Q V       |         |         |         |
4+25       0.0078      0.04  Q V       |         |         |         |
4+30       0.0080      0.04  Q V       |         |         |         |
4+35       0.0083      0.04  Q  V      |         |         |         |
4+40       0.0085      0.04  Q  V      |         |         |         |
4+45       0.0088      0.04  Q  V      |         |         |         |
4+50       0.0090      0.04  Q  V      |         |         |         |
4+55       0.0093      0.04  Q  V      |         |         |         |
5+ 0       0.0096      0.04  Q  V      |         |         |         |
5+ 5       0.0099      0.04  Q  V      |         |         |         |
5+10       0.0101      0.03  Q  V      |         |         |         |
5+15       0.0103      0.03  Q  V      |         |         |         |
5+20       0.0105      0.03  Q  V      |         |         |         |
5+25       0.0108      0.04  Q   V     |         |         |         |
5+30       0.0110      0.04  Q   V     |         |         |         |
5+35       0.0113      0.04  Q   V     |         |         |         |
5+40       0.0116      0.04  Q   V     |         |         |         |
5+45       0.0118      0.04  Q   V     |         |         |         |
5+50       0.0121      0.04  Q   V     |         |         |         |
5+55       0.0124      0.04  Q   V     |         |         |         |
6+ 0       0.0127      0.04  Q   V     |         |         |         |
6+ 5       0.0130      0.04  Q   V     |         |         |         |
6+10       0.0133      0.05  Q   V     |         |         |         |
6+15       0.0136      0.05  Q    V    |         |         |         |
6+20       0.0140      0.05  Q    V    |         |         |         |
6+25       0.0143      0.05  Q    V    |         |         |         |
6+30       0.0146      0.05  Q    V    |         |         |         |
6+35       0.0149      0.05  Q    V    |         |         |         |
6+40       0.0153      0.05  Q    V    |         |         |         |
6+45       0.0156      0.05  Q    V    |         |         |         |
6+50       0.0160      0.05  Q    V    |         |         |         |
6+55       0.0163      0.05  Q     V   |         |         |         |
7+ 0       0.0167      0.05  Q     V   |         |         |         |
7+ 5       0.0171      0.05  Q     V   |         |         |         |
7+10       0.0174      0.05  Q     V   |         |         |         |
7+15       0.0178      0.05  Q     V   |         |         |         |
7+20       0.0181      0.05  Q     V   |         |         |         |
7+25       0.0185      0.06  Q     V   |         |         |         |
7+30       0.0189      0.06  Q      V  |         |         |         |
7+35       0.0193      0.06  Q      V  |         |         |         |
7+40       0.0197      0.06  Q      V  |         |         |         |
7+45       0.0202      0.06  Q      V  |         |         |         |
7+50       0.0206      0.06  Q      V  |         |         |         |
7+55       0.0211      0.07  Q      V  |         |         |         |
8+ 0       0.0215      0.07  Q       V |         |         |         |
8+ 5       0.0220      0.07  Q       V |         |         |         |
8+10       0.0225      0.08  Q       V |         |         |         |
8+15       0.0231      0.08  Q       V |         |         |         |
8+20       0.0236      0.08  Q       V |         |         |         |
8+25       0.0241      0.08  Q        V|         |         |         |
8+30       0.0247      0.08  Q        V|         |         |         |
8+35       0.0252      0.08  Q        V|         |         |         |
8+40       0.0258      0.08  Q        V|         |         |         |
8+45       0.0264      0.08  Q        V|         |         |         |
8+50       0.0269      0.08  Q         V         |         |         |
8+55       0.0275      0.09  Q         V         |         |         |
9+ 0       0.0282      0.09  Q         V         |         |         |
9+ 5       0.0288      0.09  Q         V         |         |         |
9+10       0.0294      0.10  Q          |V        |         |         |
9+15       0.0301      0.10  Q          |V        |         |         |
9+20       0.0308      0.10  Q          |V        |         |         |
```



9+25	0.0315	0.10	Q	
9+30	0.0322	0.10	Q	
9+35	0.0330	0.11	Q	
9+40	0.0337	0.11	Q	
9+45	0.0344	0.11	Q	
9+50	0.0352	0.11	Q	
9+55	0.0360	0.11	Q	
10+ 0	0.0368	0.11	Q	
10+ 5	0.0375	0.10	Q	
10+10	0.0380	0.08	Q	
10+15	0.0386	0.08	Q	
10+20	0.0391	0.08	Q	
10+25	0.0397	0.08	Q	
10+30	0.0402	0.08	Q	
10+35	0.0408	0.09	Q	
10+40	0.0415	0.10	Q	
10+45	0.0422	0.10	Q	
10+50	0.0429	0.10	Q	
10+55	0.0436	0.10	Q	
11+ 0	0.0443	0.10	Q	
11+ 5	0.0450	0.10	Q	
11+10	0.0457	0.10	Q	
11+15	0.0464	0.10	Q	
11+20	0.0471	0.10	Q	
11+25	0.0478	0.10	Q	
11+30	0.0484	0.10	Q	
11+35	0.0491	0.09	Q	
11+40	0.0497	0.09	Q	
11+45	0.0503	0.09	Q	
11+50	0.0509	0.09	Q	
11+55	0.0516	0.09	Q	
12+ 0	0.0522	0.09	Q	
12+ 5	0.0529	0.11	Q	
12+10	0.0538	0.12	Q	
12+15	0.0547	0.13	Q	
12+20	0.0556	0.13	Q	
12+25	0.0565	0.13	Q	
12+30	0.0574	0.13	Q	
12+35	0.0584	0.14	Q	
12+40	0.0594	0.14	Q	
12+45	0.0603	0.14	Q	
12+50	0.0614	0.15	Q	
12+55	0.0624	0.15	Q	
13+ 0	0.0634	0.15	Q	
13+ 5	0.0645	0.16	Q	
13+10	0.0657	0.17	Q	
13+15	0.0669	0.17	Q	
13+20	0.0681	0.18	Q	
13+25	0.0693	0.18	Q	
13+30	0.0705	0.18	Q	
13+35	0.0716	0.16	Q	
13+40	0.0725	0.13	Q	
13+45	0.0733	0.12	Q	
13+50	0.0742	0.12	Q	
13+55	0.0750	0.12	Q	
14+ 0	0.0758	0.12	Q	
14+ 5	0.0767	0.13	Q	
14+10	0.0776	0.14	Q	
14+15	0.0786	0.14	Q	
14+20	0.0795	0.14	Q	
14+25	0.0805	0.14	Q	
14+30	0.0814	0.14	Q	
14+35	0.0823	0.13	Q	
14+40	0.0833	0.13	Q	
14+45	0.0842	0.13	Q	
14+50	0.0851	0.13	Q	
14+55	0.0860	0.13	Q	
15+ 0	0.0869	0.13	Q	
15+ 5	0.0878	0.13	Q	
15+10	0.0886	0.13	Q	
15+15	0.0895	0.12	Q	
15+20	0.0903	0.12	Q	
15+25	0.0912	0.12	Q	
15+30	0.0920	0.12	Q	
15+35	0.0928	0.11	Q	
15+40	0.0935	0.10	Q	
15+45	0.0941	0.10	Q	
15+50	0.0948	0.10	Q	
15+55	0.0955	0.10	Q	
16+ 0	0.0962	0.10	Q	
16+ 5	0.0967	0.07	Q	
16+10	0.0969	0.03	Q	
16+15	0.0971	0.03	Q	
16+20	0.0972	0.02	Q	
16+25	0.0974	0.02	Q	
16+30	0.0975	0.02	Q	
16+35	0.0976	0.02	Q	

```
16+40      0.0978      0.02  Q          |          |          |      V   |
16+45      0.0979      0.02  Q          |          |          |      V   |
16+50      0.0980      0.02  Q          |          |          |      V   |
16+55      0.0981      0.02  Q          |          |          |      V   |
17+ 0      0.0982      0.02  Q          |          |          |      V   |
17+ 5      0.0983      0.02  Q          |          |          |      V   |
17+10      0.0985      0.02  Q          |          |          |      V   |
17+15      0.0987      0.03  Q          |          |          |      V   |
17+20      0.0988      0.03  Q          |          |          |      V   |
17+25      0.0990      0.03  Q          |          |          |      V   |
17+30      0.0992      0.03  Q          |          |          |       V  |
17+35      0.0994      0.03  Q          |          |          |       V  |
17+40      0.0996      0.03  Q          |          |          |       V  |
17+45      0.0997      0.03  Q          |          |          |       V  |
17+50      0.0999      0.02  Q          |          |          |       V  |
17+55      0.1000      0.02  Q          |          |          |       V  |
18+ 0      0.1002      0.02  Q          |          |          |       V  |
18+ 5      0.1003      0.02  Q          |          |          |       V  |
18+10      0.1005      0.02  Q          |          |          |       V  |
18+15      0.1006      0.02  Q          |          |          |       V  |
18+20      0.1008      0.02  Q          |          |          |       V  |
18+25      0.1009      0.02  Q          |          |          |       V  |
18+30      0.1010      0.02  Q          |          |          |       V  |
18+35      0.1012      0.02  Q          |          |          |       V  |
18+40      0.1013      0.02  Q          |          |          |       V  |
18+45      0.1014      0.02  Q          |          |          |       V  |
18+50      0.1015      0.01  Q          |          |          |       V  |
18+55      0.1016      0.01  Q          |          |          |       V  |
19+ 0      0.1016      0.01  Q          |          |          |       V  |
19+ 5      0.1017      0.01  Q          |          |          |        V |
19+10      0.1018      0.01  Q          |          |          |        V |
19+15      0.1019      0.02  Q          |          |          |        V |
19+20      0.1021      0.02  Q          |          |          |        V |
19+25      0.1022      0.02  Q          |          |          |        V |
19+30      0.1023      0.02  Q          |          |          |        V |
19+35      0.1025      0.02  Q          |          |          |        V |
19+40      0.1026      0.02  Q          |          |          |        V |
19+45      0.1027      0.02  Q          |          |          |        V |
19+50      0.1028      0.01  Q          |          |          |        V |
19+55      0.1029      0.01  Q          |          |          |        V |
20+ 0      0.1029      0.01  Q          |          |          |        V |
20+ 5      0.1030      0.01  Q          |          |          |        V |
20+10      0.1031      0.01  Q          |          |          |        V |
20+15      0.1032      0.02  Q          |          |          |        V |
20+20      0.1033      0.02  Q          |          |          |        V |
20+25      0.1034      0.02  Q          |          |          |        V |
20+30      0.1035      0.02  Q          |          |          |        V |
20+35      0.1037      0.02  Q          |          |          |        V |
20+40      0.1038      0.02  Q          |          |          |        V |
20+45      0.1039      0.02  Q          |          |          |        V |
20+50      0.1040      0.01  Q          |          |          |        V |
20+55      0.1040      0.01  Q          |          |          |        V |
21+ 0      0.1041      0.01  Q          |          |          |        V |
21+ 5      0.1042      0.01  Q          |          |          |        V |
21+10      0.1043      0.01  Q          |          |          |        V |
21+15      0.1044      0.02  Q          |          |          |         V|
21+20      0.1045      0.01  Q          |          |          |         V|
21+25      0.1046      0.01  Q          |          |          |         V|
21+30      0.1046      0.01  Q          |          |          |         V|
21+35      0.1047      0.01  Q          |          |          |         V|
21+40      0.1048      0.01  Q          |          |          |         V|
21+45      0.1049      0.02  Q          |          |          |         V|
21+50      0.1050      0.01  Q          |          |          |         V|
21+55      0.1051      0.01  Q          |          |          |         V|
22+ 0      0.1052      0.01  Q          |          |          |         V|
22+ 5      0.1053      0.01  Q          |          |          |         V|
22+10      0.1054      0.01  Q          |          |          |         V|
22+15      0.1055      0.02  Q          |          |          |         V|
22+20      0.1056      0.01  Q          |          |          |         V|
22+25      0.1056      0.01  Q          |          |          |         V|
22+30      0.1057      0.01  Q          |          |          |         V|
22+35      0.1058      0.01  Q          |          |          |         V|
22+40      0.1059      0.01  Q          |          |          |         V|
22+45      0.1059      0.01  Q          |          |          |         V|
22+50      0.1060      0.01  Q          |          |          |         V|
22+55      0.1061      0.01  Q          |          |          |         V|
23+ 0      0.1061      0.01  Q          |          |          |         V|
23+ 5      0.1062      0.01  Q          |          |          |         V|
23+10      0.1063      0.01  Q          |          |          |         V|
23+15      0.1064      0.01  Q          |          |          |         V|
23+20      0.1064      0.01  Q          |          |          |         V|
23+25      0.1065      0.01  Q          |          |          |         V|
23+30      0.1066      0.01  Q          |          |          |         V|
23+35      0.1066      0.01  Q          |          |          |         V|
23+40      0.1067      0.01  Q          |          |          |         V|
23+45      0.1068      0.01  Q          |          |          |         V|
23+50      0.1069      0.01  Q          |          |          |         V|
```

```
   23+55       0.1069      0.01  Q          |          |          |         v|
   24+ 0       0.1070      0.01  Q          |          |          |         v|
   24+ 5       0.1070      0.01  Q          |          |          |         v|
   24+10       0.1071      0.00  Q          |          |          |         v|
   24+15       0.1071      0.00  Q          |          |          |         v|
   24+20       0.1071      0.00  Q          |          |          |         v|
------------------------------------------------------------------------------
```

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

        Copyright (c) CIVILCADD/CIVILDESIGN, 1989 - 2008, Version 8.1
                Study date  06/06/22 File: PRO2242.out

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

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


Program License Serial Number 5006

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

 English Units used in output format



------------------------------------------------------------------------
------------------------------------------------------------------------
Drainage Area =       8.03(Ac.)  =      0.013 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment =       8.03(Ac.)  =      0.013 Sq. Mi.
Length along longest watercourse =     987.00(Ft.)
Length along longest watercourse measured to centroid =     494.00(Ft.)
Length along longest watercourse =      0.187 Mi.
Length along longest watercourse measured to centroid =      0.094 Mi.
Difference in elevation =      11.42(Ft.)
Slope along watercourse =     61.0918 Ft./Mi.
Average Manning's 'N' = 0.015
Lag time =    0.035 Hr.
Lag time =     2.13 Min.
25% of lag time =     0.53 Min.
40% of lag time =     0.85 Min.
Unit time =     5.00 Min.
Duration of storm = 24 Hour(s)
User Entered Base Flow =     0.00(CFS)

2 YEAR Area rainfall data:


Area(Ac.)[1]       Rainfall(In)[2]      Weighting[1*2]
        8.03           1.60                 12.85

100 YEAR Area rainfall data:


Area(Ac.)[1]       Rainfall(In)[2]      Weighting[1*2]
        8.03           4.00                 32.12

STORM EVENT (YEAR) =    2.00
Area Averaged 2-Year Rainfall =    1.600(In)
Area Averaged 100-Year Rainfall =    4.000(In)

Point rain (area averaged) =    1.600(In)
Areal adjustment factor =  100.00 %
Adjusted average point rain =    1.600(In)

Sub-Area Data:
Area(Ac.)         Runoff Index   Impervious %
     8.030           56.00          0.800
 Total Area Entered =      8.03(Ac.)


RI    RI   Infil. Rate Impervious   Adj. Infil. Rate  Area%     F
AMC2 AMC-1     (In/Hr)    (Dec.%)     (In/Hr)      (Dec.)    (In/Hr)
56.0  36.0      0.706     0.800        0.198       1.000      0.198
                                                 Sum (F) =   0.198
Area averaged mean soil loss (F) (In/Hr) =  0.198
Minimum soil loss rate ((In/Hr)) =  0.099
(for 24 hour storm duration)
Soil low loss rate (decimal) =   0.260
------------------------------------------------------------------------

               U n i t  H y d r o g r a p h
                      VALLEY S-Curve
------------------------------------------------------------------
               Unit Hydrograph Data
------------------------------------------------------------------------
Unit time period   Time % of lag   Distribution   Unit Hydrograph
    (hrs)                          Graph %           (CFS)
------------------------------------------------------------------------
```

1	0.083	235.287	48.903	3.958
2	0.167	470.574	40.984	3.317
3	0.250	705.861	7.511	0.608
4	0.333	941.148	2.602	0.211
			Sum = 100.000 Sum=	8.093

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

Unit	Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)
1	0.08	0.07	0.013	(0.350)	0.003	0.009
2	0.17	0.07	0.013	(0.349)	0.003	0.009
3	0.25	0.07	0.013	(0.348)	0.003	0.009
4	0.33	0.10	0.019	(0.346)	0.005	0.014
5	0.42	0.10	0.019	(0.345)	0.005	0.014
6	0.50	0.10	0.019	(0.344)	0.005	0.014
7	0.58	0.10	0.019	(0.342)	0.005	0.014
8	0.67	0.10	0.019	(0.341)	0.005	0.014
9	0.75	0.10	0.019	(0.340)	0.005	0.014
10	0.83	0.13	0.026	(0.338)	0.007	0.019
11	0.92	0.13	0.026	(0.337)	0.007	0.019
12	1.00	0.13	0.026	(0.336)	0.007	0.019
13	1.08	0.10	0.019	(0.334)	0.005	0.014
14	1.17	0.10	0.019	(0.333)	0.005	0.014
15	1.25	0.10	0.019	(0.332)	0.005	0.014
16	1.33	0.10	0.019	(0.330)	0.005	0.014
17	1.42	0.10	0.019	(0.329)	0.005	0.014
18	1.50	0.10	0.019	(0.328)	0.005	0.014
19	1.58	0.10	0.019	(0.326)	0.005	0.014
20	1.67	0.10	0.019	(0.325)	0.005	0.014
21	1.75	0.10	0.019	(0.324)	0.005	0.014
22	1.83	0.13	0.026	(0.323)	0.007	0.019
23	1.92	0.13	0.026	(0.321)	0.007	0.019
24	2.00	0.13	0.026	(0.320)	0.007	0.019
25	2.08	0.13	0.026	(0.319)	0.007	0.019
26	2.17	0.13	0.026	(0.317)	0.007	0.019
27	2.25	0.13	0.026	(0.316)	0.007	0.019
28	2.33	0.13	0.026	(0.315)	0.007	0.019
29	2.42	0.13	0.026	(0.313)	0.007	0.019
30	2.50	0.13	0.026	(0.312)	0.007	0.019
31	2.58	0.17	0.032	(0.311)	0.008	0.024
32	2.67	0.17	0.032	(0.310)	0.008	0.024
33	2.75	0.17	0.032	(0.308)	0.008	0.024
34	2.83	0.17	0.032	(0.307)	0.008	0.024
35	2.92	0.17	0.032	(0.306)	0.008	0.024
36	3.00	0.17	0.032	(0.305)	0.008	0.024
37	3.08	0.17	0.032	(0.303)	0.008	0.024
38	3.17	0.17	0.032	(0.302)	0.008	0.024
39	3.25	0.17	0.032	(0.301)	0.008	0.024
40	3.33	0.17	0.032	(0.300)	0.008	0.024
41	3.42	0.17	0.032	(0.298)	0.008	0.024
42	3.50	0.17	0.032	(0.297)	0.008	0.024
43	3.58	0.17	0.032	(0.296)	0.008	0.024
44	3.67	0.17	0.032	(0.295)	0.008	0.024
45	3.75	0.17	0.032	(0.293)	0.008	0.024
46	3.83	0.20	0.038	(0.292)	0.010	0.028
47	3.92	0.20	0.038	(0.291)	0.010	0.028
48	4.00	0.20	0.038	(0.290)	0.010	0.028
49	4.08	0.20	0.038	(0.288)	0.010	0.028
50	4.17	0.20	0.038	(0.287)	0.010	0.028
51	4.25	0.20	0.038	(0.286)	0.010	0.028
52	4.33	0.23	0.045	(0.285)	0.012	0.033
53	4.42	0.23	0.045	(0.284)	0.012	0.033
54	4.50	0.23	0.045	(0.282)	0.012	0.033
55	4.58	0.23	0.045	(0.281)	0.012	0.033
56	4.67	0.23	0.045	(0.280)	0.012	0.033
57	4.75	0.23	0.045	(0.279)	0.012	0.033
58	4.83	0.27	0.051	(0.277)	0.013	0.038
59	4.92	0.27	0.051	(0.276)	0.013	0.038
60	5.00	0.27	0.051	(0.275)	0.013	0.038
61	5.08	0.20	0.038	(0.274)	0.010	0.028
62	5.17	0.20	0.038	(0.273)	0.010	0.028
63	5.25	0.20	0.038	(0.271)	0.010	0.028
64	5.33	0.23	0.045	(0.270)	0.012	0.033
65	5.42	0.23	0.045	(0.269)	0.012	0.033
66	5.50	0.23	0.045	(0.268)	0.012	0.033
67	5.58	0.27	0.051	(0.267)	0.013	0.038
68	5.67	0.27	0.051	(0.266)	0.013	0.038
69	5.75	0.27	0.051	(0.264)	0.013	0.038
70	5.83	0.27	0.051	(0.263)	0.013	0.038
71	5.92	0.27	0.051	(0.262)	0.013	0.038
72	6.00	0.27	0.051	(0.261)	0.013	0.038
73	6.08	0.30	0.058	(0.260)	0.015	0.043
74	6.17	0.30	0.058	(0.259)	0.015	0.043

75	6.25	0.30	0.058	(0.257)	0.015	0.043
76	6.33	0.30	0.058	(0.256)	0.015	0.043
77	6.42	0.30	0.058	(0.255)	0.015	0.043
78	6.50	0.30	0.058	(0.254)	0.015	0.043
79	6.58	0.33	0.064	(0.253)	0.017	0.047
80	6.67	0.33	0.064	(0.252)	0.017	0.047
81	6.75	0.33	0.064	(0.251)	0.017	0.047
82	6.83	0.33	0.064	(0.249)	0.017	0.047
83	6.92	0.33	0.064	(0.248)	0.017	0.047
84	7.00	0.33	0.064	(0.247)	0.017	0.047
85	7.08	0.33	0.064	(0.246)	0.017	0.047
86	7.17	0.33	0.064	(0.245)	0.017	0.047
87	7.25	0.33	0.064	(0.244)	0.017	0.047
88	7.33	0.37	0.070	(0.243)	0.018	0.052
89	7.42	0.37	0.070	(0.242)	0.018	0.052
90	7.50	0.37	0.070	(0.241)	0.018	0.052
91	7.58	0.40	0.077	(0.239)	0.020	0.057
92	7.67	0.40	0.077	(0.238)	0.020	0.057
93	7.75	0.40	0.077	(0.237)	0.020	0.057
94	7.83	0.43	0.083	(0.236)	0.022	0.062
95	7.92	0.43	0.083	(0.235)	0.022	0.062
96	8.00	0.43	0.083	(0.234)	0.022	0.062
97	8.08	0.50	0.096	(0.233)	0.025	0.071
98	8.17	0.50	0.096	(0.232)	0.025	0.071
99	8.25	0.50	0.096	(0.231)	0.025	0.071
100	8.33	0.50	0.096	(0.230)	0.025	0.071
101	8.42	0.50	0.096	(0.229)	0.025	0.071
102	8.50	0.50	0.096	(0.227)	0.025	0.071
103	8.58	0.53	0.102	(0.226)	0.027	0.076
104	8.67	0.53	0.102	(0.225)	0.027	0.076
105	8.75	0.53	0.102	(0.224)	0.027	0.076
106	8.83	0.57	0.109	(0.223)	0.028	0.081
107	8.92	0.57	0.109	(0.222)	0.028	0.081
108	9.00	0.57	0.109	(0.221)	0.028	0.081
109	9.08	0.63	0.122	(0.220)	0.032	0.090
110	9.17	0.63	0.122	(0.219)	0.032	0.090
111	9.25	0.63	0.122	(0.218)	0.032	0.090
112	9.33	0.67	0.128	(0.217)	0.033	0.095
113	9.42	0.67	0.128	(0.216)	0.033	0.095
114	9.50	0.67	0.128	(0.215)	0.033	0.095
115	9.58	0.70	0.134	(0.214)	0.035	0.099
116	9.67	0.70	0.134	(0.213)	0.035	0.099
117	9.75	0.70	0.134	(0.212)	0.035	0.099
118	9.83	0.73	0.141	(0.211)	0.037	0.104
119	9.92	0.73	0.141	(0.210)	0.037	0.104
120	10.00	0.73	0.141	(0.209)	0.037	0.104
121	10.08	0.50	0.096	(0.208)	0.025	0.071
122	10.17	0.50	0.096	(0.207)	0.025	0.071
123	10.25	0.50	0.096	(0.206)	0.025	0.071
124	10.33	0.50	0.096	(0.205)	0.025	0.071
125	10.42	0.50	0.096	(0.204)	0.025	0.071
126	10.50	0.50	0.096	(0.203)	0.025	0.071
127	10.58	0.67	0.128	(0.202)	0.033	0.095
128	10.67	0.67	0.128	(0.201)	0.033	0.095
129	10.75	0.67	0.128	(0.200)	0.033	0.095
130	10.83	0.67	0.128	(0.199)	0.033	0.095
131	10.92	0.67	0.128	(0.198)	0.033	0.095
132	11.00	0.67	0.128	(0.197)	0.033	0.095
133	11.08	0.63	0.122	(0.196)	0.032	0.090
134	11.17	0.63	0.122	(0.195)	0.032	0.090
135	11.25	0.63	0.122	(0.194)	0.032	0.090
136	11.33	0.63	0.122	(0.193)	0.032	0.090
137	11.42	0.63	0.122	(0.192)	0.032	0.090
138	11.50	0.63	0.122	(0.191)	0.032	0.090
139	11.58	0.57	0.109	(0.190)	0.028	0.081
140	11.67	0.57	0.109	(0.189)	0.028	0.081
141	11.75	0.57	0.109	(0.188)	0.028	0.081
142	11.83	0.60	0.115	(0.187)	0.030	0.085
143	11.92	0.60	0.115	(0.186)	0.030	0.085
144	12.00	0.60	0.115	(0.185)	0.030	0.085
145	12.08	0.83	0.160	(0.185)	0.042	0.118
146	12.17	0.83	0.160	(0.184)	0.042	0.118
147	12.25	0.83	0.160	(0.183)	0.042	0.118
148	12.33	0.87	0.166	(0.182)	0.043	0.123
149	12.42	0.87	0.166	(0.181)	0.043	0.123
150	12.50	0.87	0.166	(0.180)	0.043	0.123
151	12.58	0.93	0.179	(0.179)	0.047	0.133
152	12.67	0.93	0.179	(0.178)	0.047	0.133
153	12.75	0.93	0.179	(0.177)	0.047	0.133
154	12.83	0.97	0.186	(0.176)	0.048	0.137
155	12.92	0.97	0.186	(0.175)	0.048	0.137
156	13.00	0.97	0.186	(0.175)	0.048	0.137
157	13.08	1.13	0.218	(0.174)	0.057	0.161
158	13.17	1.13	0.218	(0.173)	0.057	0.161
159	13.25	1.13	0.218	(0.172)	0.057	0.161
160	13.33	1.13	0.218	(0.171)	0.057	0.161
161	13.42	1.13	0.218	(0.170)	0.057	0.161

162	13.50	1.13	0.218	(0.169)	0.057	0.161
163	13.58	0.77	0.147	(0.168)	0.038	0.109
164	13.67	0.77	0.147	(0.168)	0.038	0.109
165	13.75	0.77	0.147	(0.167)	0.038	0.109
166	13.83	0.77	0.147	(0.166)	0.038	0.109
167	13.92	0.77	0.147	(0.165)	0.038	0.109
168	14.00	0.77	0.147	(0.164)	0.038	0.109
169	14.08	0.90	0.173	(0.163)	0.045	0.128
170	14.17	0.90	0.173	(0.163)	0.045	0.128
171	14.25	0.90	0.173	(0.162)	0.045	0.128
172	14.33	0.87	0.166	(0.161)	0.043	0.123
173	14.42	0.87	0.166	(0.160)	0.043	0.123
174	14.50	0.87	0.166	(0.159)	0.043	0.123
175	14.58	0.87	0.166	(0.158)	0.043	0.123
176	14.67	0.87	0.166	(0.158)	0.043	0.123
177	14.75	0.87	0.166	(0.157)	0.043	0.123
178	14.83	0.83	0.160	(0.156)	0.042	0.118
179	14.92	0.83	0.160	(0.155)	0.042	0.118
180	15.00	0.83	0.160	(0.154)	0.042	0.118
181	15.08	0.80	0.154	(0.154)	0.040	0.114
182	15.17	0.80	0.154	(0.153)	0.040	0.114
183	15.25	0.80	0.154	(0.152)	0.040	0.114
184	15.33	0.77	0.147	(0.151)	0.038	0.109
185	15.42	0.77	0.147	(0.150)	0.038	0.109
186	15.50	0.77	0.147	(0.150)	0.038	0.109
187	15.58	0.63	0.122	(0.149)	0.032	0.090
188	15.67	0.63	0.122	(0.148)	0.032	0.090
189	15.75	0.63	0.122	(0.147)	0.032	0.090
190	15.83	0.63	0.122	(0.147)	0.032	0.090
191	15.92	0.63	0.122	(0.146)	0.032	0.090
192	16.00	0.63	0.122	(0.145)	0.032	0.090
193	16.08	0.13	0.026	(0.144)	0.007	0.019
194	16.17	0.13	0.026	(0.144)	0.007	0.019
195	16.25	0.13	0.026	(0.143)	0.007	0.019
196	16.33	0.13	0.026	(0.142)	0.007	0.019
197	16.42	0.13	0.026	(0.141)	0.007	0.019
198	16.50	0.13	0.026	(0.141)	0.007	0.019
199	16.58	0.10	0.019	(0.140)	0.005	0.014
200	16.67	0.10	0.019	(0.139)	0.005	0.014
201	16.75	0.10	0.019	(0.139)	0.005	0.014
202	16.83	0.10	0.019	(0.138)	0.005	0.014
203	16.92	0.10	0.019	(0.137)	0.005	0.014
204	17.00	0.10	0.019	(0.137)	0.005	0.014
205	17.08	0.17	0.032	(0.136)	0.008	0.024
206	17.17	0.17	0.032	(0.135)	0.008	0.024
207	17.25	0.17	0.032	(0.134)	0.008	0.024
208	17.33	0.17	0.032	(0.134)	0.008	0.024
209	17.42	0.17	0.032	(0.133)	0.008	0.024
210	17.50	0.17	0.032	(0.132)	0.008	0.024
211	17.58	0.17	0.032	(0.132)	0.008	0.024
212	17.67	0.17	0.032	(0.131)	0.008	0.024
213	17.75	0.17	0.032	(0.131)	0.008	0.024
214	17.83	0.13	0.026	(0.130)	0.007	0.019
215	17.92	0.13	0.026	(0.129)	0.007	0.019
216	18.00	0.13	0.026	(0.129)	0.007	0.019
217	18.08	0.13	0.026	(0.128)	0.007	0.019
218	18.17	0.13	0.026	(0.127)	0.007	0.019
219	18.25	0.13	0.026	(0.127)	0.007	0.019
220	18.33	0.13	0.026	(0.126)	0.007	0.019
221	18.42	0.13	0.026	(0.125)	0.007	0.019
222	18.50	0.13	0.026	(0.125)	0.007	0.019
223	18.58	0.10	0.019	(0.124)	0.005	0.014
224	18.67	0.10	0.019	(0.124)	0.005	0.014
225	18.75	0.10	0.019	(0.123)	0.005	0.014
226	18.83	0.07	0.013	(0.122)	0.003	0.009
227	18.92	0.07	0.013	(0.122)	0.003	0.009
228	19.00	0.07	0.013	(0.121)	0.003	0.009
229	19.08	0.10	0.019	(0.121)	0.005	0.014
230	19.17	0.10	0.019	(0.120)	0.005	0.014
231	19.25	0.10	0.019	(0.120)	0.005	0.014
232	19.33	0.13	0.026	(0.119)	0.007	0.019
233	19.42	0.13	0.026	(0.118)	0.007	0.019
234	19.50	0.13	0.026	(0.118)	0.007	0.019
235	19.58	0.10	0.019	(0.117)	0.005	0.014
236	19.67	0.10	0.019	(0.117)	0.005	0.014
237	19.75	0.10	0.019	(0.116)	0.005	0.014
238	19.83	0.07	0.013	(0.116)	0.003	0.009
239	19.92	0.07	0.013	(0.115)	0.003	0.009
240	20.00	0.07	0.013	(0.115)	0.003	0.009
241	20.08	0.10	0.019	(0.114)	0.005	0.014
242	20.17	0.10	0.019	(0.114)	0.005	0.014
243	20.25	0.10	0.019	(0.113)	0.005	0.014
244	20.33	0.10	0.019	(0.113)	0.005	0.014
245	20.42	0.10	0.019	(0.112)	0.005	0.014
246	20.50	0.10	0.019	(0.112)	0.005	0.014
247	20.58	0.10	0.019	(0.111)	0.005	0.014
248	20.67	0.10	0.019	(0.111)	0.005	0.014

249	20.75	0.10	0.019	(	0.110)	0.005	0.014
250	20.83	0.07	0.013	(	0.110)	0.003	0.009
251	20.92	0.07	0.013	(	0.110)	0.003	0.009
252	21.00	0.07	0.013	(	0.109)	0.003	0.009
253	21.08	0.10	0.019	(	0.109)	0.005	0.014
254	21.17	0.10	0.019	(	0.108)	0.005	0.014
255	21.25	0.10	0.019	(	0.108)	0.005	0.014
256	21.33	0.07	0.013	(	0.107)	0.003	0.009
257	21.42	0.07	0.013	(	0.107)	0.003	0.009
258	21.50	0.07	0.013	(	0.107)	0.003	0.009
259	21.58	0.10	0.019	(	0.106)	0.005	0.014
260	21.67	0.10	0.019	(	0.106)	0.005	0.014
261	21.75	0.10	0.019	(	0.105)	0.005	0.014
262	21.83	0.07	0.013	(	0.105)	0.003	0.009
263	21.92	0.07	0.013	(	0.105)	0.003	0.009
264	22.00	0.07	0.013	(	0.104)	0.003	0.009
265	22.08	0.10	0.019	(	0.104)	0.005	0.014
266	22.17	0.10	0.019	(	0.104)	0.005	0.014
267	22.25	0.10	0.019	(	0.103)	0.005	0.014
268	22.33	0.07	0.013	(	0.103)	0.003	0.009
269	22.42	0.07	0.013	(	0.103)	0.003	0.009
270	22.50	0.07	0.013	(	0.102)	0.003	0.009
271	22.58	0.07	0.013	(	0.102)	0.003	0.009
272	22.67	0.07	0.013	(	0.102)	0.003	0.009
273	22.75	0.07	0.013	(	0.102)	0.003	0.009
274	22.83	0.07	0.013	(	0.101)	0.003	0.009
275	22.92	0.07	0.013	(	0.101)	0.003	0.009
276	23.00	0.07	0.013	(	0.101)	0.003	0.009
277	23.08	0.07	0.013	(	0.101)	0.003	0.009
278	23.17	0.07	0.013	(	0.100)	0.003	0.009
279	23.25	0.07	0.013	(	0.100)	0.003	0.009
280	23.33	0.07	0.013	(	0.100)	0.003	0.009
281	23.42	0.07	0.013	(	0.100)	0.003	0.009
282	23.50	0.07	0.013	(	0.100)	0.003	0.009
283	23.58	0.07	0.013	(	0.099)	0.003	0.009
284	23.67	0.07	0.013	(	0.099)	0.003	0.009
285	23.75	0.07	0.013	(	0.099)	0.003	0.009
286	23.83	0.07	0.013	(	0.099)	0.003	0.009
287	23.92	0.07	0.013	(	0.099)	0.003	0.009
288	24.00	0.07	0.013	(	0.099)	0.003	0.009

(Loss Rate Not Used)

Sum = 100.0 Sum = 14.2

Flood volume = Effective rainfall 1.18(In)
times area 8.0(Ac.)/[(In)/(Ft.)] = 0.8(Ac.Ft)
Total soil loss = 0.42(In)
Total soil loss = 0.278(Ac.Ft)
Total rainfall = 1.60(In)
Flood volume = 34511.8 Cubic Feet
Total soil loss = 12125.8 Cubic Feet

Peak flow rate of this hydrograph = 1.304(CFS)

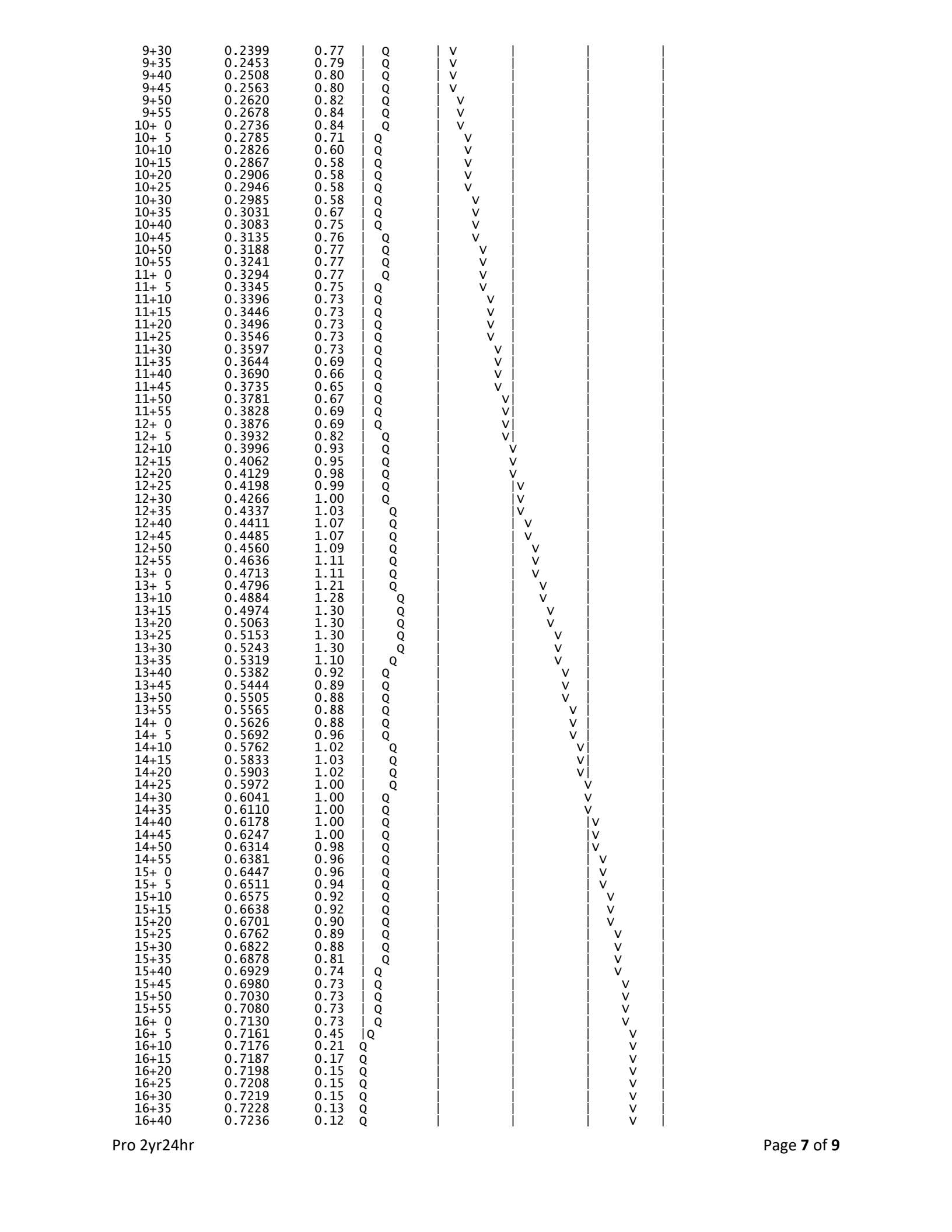
++

24 - H O U R S T O R M
R u n o f f H y d r o g r a p h

Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0	2.5	5.0	7.5	10.0
0+ 5	0.0003	0.04	Q				
0+10	0.0007	0.07	Q				
0+15	0.0012	0.07	Q				
0+20	0.0019	0.10	Q				
0+25	0.0027	0.11	Q				
0+30	0.0035	0.11	Q				
0+35	0.0042	0.12	Q				
0+40	0.0050	0.12	Q				
0+45	0.0058	0.12	Q				
0+50	0.0068	0.13	Q				
0+55	0.0078	0.15	Q				
1+ 0	0.0088	0.15	Q				
1+ 5	0.0098	0.13	Q				
1+10	0.0106	0.12	Q				
1+15	0.0114	0.12	Q				
1+20	0.0122	0.12	Q				
1+25	0.0130	0.12	Q				
1+30	0.0138	0.12	Q				
1+35	0.0145	0.12	Q				
1+40	0.0153	0.12	Q				
1+45	0.0161	0.12	Q				
1+50	0.0171	0.13	Q				
1+55	0.0181	0.15	Q				
2+ 0	0.0191	0.15	Q				
2+ 5	0.0202	0.15	QV				
2+10	0.0212	0.15	QV				

```
2+15       0.0223      0.15  QV        |         |         |         |
2+20       0.0234      0.15  QV        |         |         |         |
2+25       0.0244      0.15  QV        |         |         |         |
2+30       0.0255      0.15  QV        |         |         |         |
2+35       0.0267      0.17  QV        |         |         |         |
2+40       0.0280      0.19  QV        |         |         |         |
2+45       0.0293      0.19  QV        |         |         |         |
2+50       0.0306      0.19  QV        |         |         |         |
2+55       0.0319      0.19  QV        |         |         |         |
3+ 0       0.0332      0.19  QV        |         |         |         |
3+ 5       0.0345      0.19  QV        |         |         |         |
3+10       0.0359      0.19  QV        |         |         |         |
3+15       0.0372      0.19  QV        |         |         |         |
3+20       0.0385      0.19  QV        |         |         |         |
3+25       0.0398      0.19  Q V       |         |         |         |
3+30       0.0411      0.19  Q V       |         |         |         |
3+35       0.0425      0.19  Q V       |         |         |         |
3+40       0.0438      0.19  Q V       |         |         |         |
3+45       0.0451      0.19  Q V       |         |         |         |
3+50       0.0466      0.21  Q V       |         |         |         |
3+55       0.0481      0.23  Q V       |         |         |         |
4+ 0       0.0497      0.23  Q V       |         |         |         |
4+ 5       0.0513      0.23  Q V       |         |         |         |
4+10       0.0529      0.23  Q V       |         |         |         |
4+15       0.0544      0.23  Q V       |         |         |         |
4+20       0.0562      0.25  Q V       |         |         |         |
4+25       0.0580      0.26  |QV       |         |         |         |
4+30       0.0598      0.27  |Q V       |         |         |         |
4+35       0.0617      0.27  |Q V       |         |         |         |
4+40       0.0635      0.27  |Q V       |         |         |         |
4+45       0.0654      0.27  |Q V       |         |         |         |
4+50       0.0673      0.29  |Q V       |         |         |         |
4+55       0.0694      0.30  |Q V       |         |         |         |
5+ 0       0.0715      0.31  |Q V       |         |         |         |
5+ 5       0.0734      0.27  |Q V       |         |         |         |
5+10       0.0750      0.24  Q  V       |         |         |         |
5+15       0.0766      0.23  Q  V       |         |         |         |
5+20       0.0783      0.25  Q  V       |         |         |         |
5+25       0.0802      0.26  |Q  V       |         |         |         |
5+30       0.0820      0.27  |Q  V       |         |         |         |
5+35       0.0840      0.29  |Q  V       |         |         |         |
5+40       0.0861      0.30  |Q  V       |         |         |         |
5+45       0.0882      0.31  |Q  V       |         |         |         |
5+50       0.0903      0.31  |Q  V       |         |         |         |
5+55       0.0924      0.31  |Q  V       |         |         |         |
6+ 0       0.0945      0.31  |Q  V       |         |         |         |
6+ 5       0.0968      0.33  |Q  V       |         |         |         |
6+10       0.0991      0.34  |Q   V      |         |         |         |
6+15       0.1015      0.34  |Q   V      |         |         |         |
6+20       0.1039      0.35  |Q   V      |         |         |         |
6+25       0.1062      0.35  |Q   V      |         |         |         |
6+30       0.1086      0.35  |Q   V      |         |         |         |
6+35       0.1111      0.36  |Q   V      |         |         |         |
6+40       0.1137      0.38  |Q   V      |         |         |         |
6+45       0.1164      0.38  |Q   V      |         |         |         |
6+50       0.1190      0.38  |Q    V     |         |         |         |
6+55       0.1216      0.38  |Q    V     |         |         |         |
7+ 0       0.1243      0.38  |Q    V     |         |         |         |
7+ 5       0.1269      0.38  |Q    V     |         |         |         |
7+10       0.1296      0.38  |Q    V     |         |         |         |
7+15       0.1322      0.38  |Q    V     |         |         |         |
7+20       0.1350      0.40  |Q    V     |         |         |         |
7+25       0.1379      0.42  |Q    V     |         |         |         |
7+30       0.1408      0.42  |Q     V    |         |         |         |
7+35       0.1438      0.44  |Q     V    |         |         |         |
7+40       0.1469      0.46  |Q     V    |         |         |         |
7+45       0.1501      0.46  |Q     V    |         |         |         |
7+50       0.1534      0.48  |Q     V    |         |         |         |
7+55       0.1568      0.49  |Q     V    |         |         |         |
8+ 0       0.1602      0.50  |Q      V   |         |         |         |
8+ 5       0.1639      0.54  | Q     V   |         |         |         |
8+10       0.1678      0.57  | Q     V   |         |         |         |
8+15       0.1718      0.57  | Q     V   |         |         |         |
8+20       0.1757      0.58  | Q     V   |         |         |         |
8+25       0.1797      0.58  | Q      V  |         |         |         |
8+30       0.1837      0.58  | Q      V  |         |         |         |
8+35       0.1877      0.59  | Q      V  |         |         |         |
8+40       0.1919      0.61  | Q      V  |         |         |         |
8+45       0.1962      0.61  | Q      V  |         |         |         |
8+50       0.2005      0.63  | Q       V |         |         |         |
8+55       0.2050      0.65  | Q       V |         |         |         |
9+ 0       0.2095      0.65  | Q       V |         |         |         |
9+ 5       0.2142      0.69  | Q       V |         |         |         |
9+10       0.2192      0.72  | Q        |V         |         |         |
9+15       0.2242      0.73  | Q        |V         |         |         |
9+20       0.2293      0.75  | Q        |V         |         |         |
9+25       0.2346      0.76  |  Q       |V         |         |         |
```



9+30	0.2399	0.77	Q	V			
9+35	0.2453	0.79	Q	V			
9+40	0.2508	0.80	Q	V			
9+45	0.2563	0.80	Q	V			
9+50	0.2620	0.82	Q	V			
9+55	0.2678	0.84	Q	V			
10+ 0	0.2736	0.84	Q	V			
10+ 5	0.2785	0.71	Q	V			
10+10	0.2826	0.60	Q	V			
10+15	0.2867	0.58	Q	V			
10+20	0.2906	0.58	Q	V			
10+25	0.2946	0.58	Q	V			
10+30	0.2985	0.58	Q	V			
10+35	0.3031	0.67	Q	V			
10+40	0.3083	0.75	Q	V			
10+45	0.3135	0.76	Q	V			
10+50	0.3188	0.77	Q	V			
10+55	0.3241	0.77	Q	V			
11+ 0	0.3294	0.77	Q	V			
11+ 5	0.3345	0.75	Q	V			
11+10	0.3396	0.73	Q	V			
11+15	0.3446	0.73	Q	V			
11+20	0.3496	0.73	Q	V			
11+25	0.3546	0.73	Q	V			
11+30	0.3597	0.73	Q	V			
11+35	0.3644	0.69	Q	V			
11+40	0.3690	0.66	Q	V			
11+45	0.3735	0.65	Q	V			
11+50	0.3781	0.67	Q	V			
11+55	0.3828	0.69	Q	V			
12+ 0	0.3876	0.69	Q	V			
12+ 5	0.3932	0.82	Q	V			
12+10	0.3996	0.93	Q	V			
12+15	0.4062	0.95	Q	V			
12+20	0.4129	0.98	Q	V			
12+25	0.4198	0.99	Q	V			
12+30	0.4266	1.00	Q	V			
12+35	0.4337	1.03	Q	V			
12+40	0.4411	1.07	Q	V			
12+45	0.4485	1.07	Q	V			
12+50	0.4560	1.09	Q	V			
12+55	0.4636	1.11	Q	V			
13+ 0	0.4713	1.11	Q	V			
13+ 5	0.4796	1.21	Q	V			
13+10	0.4884	1.28	Q	V			
13+15	0.4974	1.30	Q	V			
13+20	0.5063	1.30	Q	V			
13+25	0.5153	1.30	Q	V			
13+30	0.5243	1.30	Q	V			
13+35	0.5319	1.10	Q	V			
13+40	0.5382	0.92	Q	V			
13+45	0.5444	0.89	Q	V			
13+50	0.5505	0.88	Q	V			
13+55	0.5565	0.88	Q	V			
14+ 0	0.5626	0.88	Q	V			
14+ 5	0.5692	0.96	Q	V			
14+10	0.5762	1.02	Q	V			
14+15	0.5833	1.03	Q	V			
14+20	0.5903	1.02	Q	V			
14+25	0.5972	1.00	Q	V			
14+30	0.6041	1.00	Q	V			
14+35	0.6110	1.00	Q	V			
14+40	0.6178	1.00	Q	V			
14+45	0.6247	1.00	Q	V			
14+50	0.6314	0.98	Q	V			
14+55	0.6381	0.96	Q	V			
15+ 0	0.6447	0.96	Q	V			
15+ 5	0.6511	0.94	Q	V			
15+10	0.6575	0.92	Q	V			
15+15	0.6638	0.92	Q	V			
15+20	0.6701	0.90	Q	V			
15+25	0.6762	0.89	Q	V			
15+30	0.6822	0.88	Q	V			
15+35	0.6878	0.81	Q	V			
15+40	0.6929	0.74	Q	V			
15+45	0.6980	0.73	Q	V			
15+50	0.7030	0.73	Q	V			
15+55	0.7080	0.73	Q	V			
16+ 0	0.7130	0.73	Q	V			
16+ 5	0.7161	0.45	Q	V			
16+10	0.7176	0.21	Q	V			
16+15	0.7187	0.17	Q	V			
16+20	0.7198	0.15	Q	V			
16+25	0.7208	0.15	Q	V			
16+30	0.7219	0.15	Q	V			
16+35	0.7228	0.13	Q	V			
16+40	0.7236	0.12	Q	V			

16+45	0.7244	0.12	Q	|	|	|	V |
16+50	0.7252	0.12	Q	|	|	|	V |
16+55	0.7260	0.12	Q	|	|	|	V |
17+ 0	0.7268	0.12	Q	|	|	|	V |
17+ 5	0.7279	0.15	Q	|	|	|	V |
17+10	0.7291	0.18	Q	|	|	|	V |
17+15	0.7304	0.19	Q	|	|	|	V |
17+20	0.7318	0.19	Q	|	|	|	V |
17+25	0.7331	0.19	Q	|	|	|	V |
17+30	0.7344	0.19	Q	|	|	|	V |
17+35	0.7357	0.19	Q	|	|	|	V |
17+40	0.7370	0.19	Q	|	|	|	V |
17+45	0.7384	0.19	Q	|	|	|	V |
17+50	0.7395	0.17	Q	|	|	|	V |
17+55	0.7406	0.16	Q	|	|	|	V |
18+ 0	0.7417	0.15	Q	|	|	|	V |
18+ 5	0.7427	0.15	Q	|	|	|	V |
18+10	0.7438	0.15	Q	|	|	|	V |
18+15	0.7449	0.15	Q	|	|	|	V |
18+20	0.7459	0.15	Q	|	|	|	V |
18+25	0.7470	0.15	Q	|	|	|	V |
18+30	0.7480	0.15	Q	|	|	|	V |
18+35	0.7490	0.13	Q	|	|	|	V |
18+40	0.7498	0.12	Q	|	|	|	V |
18+45	0.7506	0.12	Q	|	|	|	V |
18+50	0.7512	0.10	Q	|	|	|	V |
18+55	0.7518	0.08	Q	|	|	|	V |
19+ 0	0.7523	0.08	Q	|	|	|	V |
19+ 5	0.7530	0.10	Q	|	|	|	V |
19+10	0.7538	0.11	Q	|	|	|	V |
19+15	0.7545	0.11	Q	|	|	|	V |
19+20	0.7555	0.13	Q	|	|	|	V |
19+25	0.7565	0.15	Q	|	|	|	V |
19+30	0.7575	0.15	Q	|	|	|	V |
19+35	0.7585	0.13	Q	|	|	|	V |
19+40	0.7593	0.12	Q	|	|	|	V |
19+45	0.7601	0.12	Q	|	|	|	V |
19+50	0.7607	0.10	Q	|	|	|	V |
19+55	0.7613	0.08	Q	|	|	|	V |
20+ 0	0.7618	0.08	Q	|	|	|	V |
20+ 5	0.7625	0.10	Q	|	|	|	V |
20+10	0.7633	0.11	Q	|	|	|	V |
20+15	0.7640	0.11	Q	|	|	|	V |
20+20	0.7648	0.12	Q	|	|	|	V |
20+25	0.7656	0.12	Q	|	|	|	V |
20+30	0.7664	0.12	Q	|	|	|	V |
20+35	0.7672	0.12	Q	|	|	|	V |
20+40	0.7680	0.12	Q	|	|	|	V |
20+45	0.7688	0.12	Q	|	|	|	V |
20+50	0.7695	0.10	Q	|	|	|	V |
20+55	0.7700	0.08	Q	|	|	|	V |
21+ 0	0.7706	0.08	Q	|	|	|	V |
21+ 5	0.7712	0.10	Q	|	|	|	V |
21+10	0.7720	0.11	Q	|	|	|	V |
21+15	0.7728	0.11	Q	|	|	|	V|
21+20	0.7734	0.10	Q	|	|	|	V|
21+25	0.7740	0.08	Q	|	|	|	V|
21+30	0.7745	0.08	Q	|	|	|	V|
21+35	0.7752	0.10	Q	|	|	|	V|
21+40	0.7759	0.11	Q	|	|	|	V|
21+45	0.7767	0.11	Q	|	|	|	V|
21+50	0.7774	0.10	Q	|	|	|	V|
21+55	0.7779	0.08	Q	|	|	|	V|
22+ 0	0.7785	0.08	Q	|	|	|	V|
22+ 5	0.7791	0.10	Q	|	|	|	V|
22+10	0.7799	0.11	Q	|	|	|	V|
22+15	0.7807	0.11	Q	|	|	|	V|
22+20	0.7813	0.10	Q	|	|	|	V|
22+25	0.7819	0.08	Q	|	|	|	V|
22+30	0.7824	0.08	Q	|	|	|	V|
22+35	0.7830	0.08	Q	|	|	|	V|
22+40	0.7835	0.08	Q	|	|	|	V|
22+45	0.7840	0.08	Q	|	|	|	V|
22+50	0.7845	0.08	Q	|	|	|	V|
22+55	0.7851	0.08	Q	|	|	|	V|
23+ 0	0.7856	0.08	Q	|	|	|	V|
23+ 5	0.7861	0.08	Q	|	|	|	V|
23+10	0.7867	0.08	Q	|	|	|	V|
23+15	0.7872	0.08	Q	|	|	|	V|
23+20	0.7877	0.08	Q	|	|	|	V|
23+25	0.7882	0.08	Q	|	|	|	V|
23+30	0.7888	0.08	Q	|	|	|	V|
23+35	0.7893	0.08	Q	|	|	|	V|
23+40	0.7898	0.08	Q	|	|	|	V|
23+45	0.7904	0.08	Q	|	|	|	V|
23+50	0.7909	0.08	Q	|	|	|	V|
23+55	0.7914	0.08	Q	|	|	|	V|

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   24+ 0       0.7919      0.08  Q         |         |         |        v|
   24+ 5       0.7922      0.04  Q         |         |         |        v|
   24+10       0.7923      0.01  Q         |         |         |        v|
   24+15       0.7923      0.00  Q         |         |         |        v|
-------------------------------------------------------------------------
```

Storm Event	Existing		Proposed		Routed		
	cfs	volume ac.ft.	cfs	volume ac.ft.	cfs	volume ac.ft.	Depth (ft)
2yr1hr	4.625	0.0941	8.244	0.2619	0.000	0.2620	1.77
2yr3hr	1.197	0.0650	4.401	0.3965	0.000	0.3960	2.68
2yr6hr	0.571	0.0686	3.654	0.4952	0.000	0.4940	3.35
2yr24hr	0.176	0.1071	1.304	0.7923	0.123	0.7430	5.03
5yr1hr	7.357	0.1569	11.846	0.3678	0.000	0.3680	2.49
5yr3hr	2.814	0.1168	6.058	0.5192	0.000	0.5190	3.52
5yr6hr	1.824	0.1124	5.091	0.6713	0.000	0.6700	4.54
5yr24hr	0.238	0.1447	1.762	1.0706	1.231	0.7870	5.33
10yr1hr	11.312	0.3053	15.042	0.4651	0.000	0.4650	3.15
10yr3hr	5.642	0.2423	7.794	0.6308	0.000	0.6300	4.27
10yr6hr	4.711	0.2434	6.826	0.8235	1.286	0.7890	5.35
10yr24hr	0.285	0.1731	2.108	1.2812	1.591	0.8010	5.43
100yr1hr	19.45	0.6204	24.242	0.7741	0.700	0.7660	5.12
100yr3hr	9.85	0.5218	12.140	0.9730	3.477	0.8720	5.91
100yr6hr	8.931	0.5810	11.186	1.3176	5.181	1.0280	6.97
100yr24hr	1.807	0.4304	3.410	1.9865	3.041	0.8590	5.82

CMP Underground Storage

	BASIN PARAMETERS					OUTLET								
Basin Elevation	Depth	Area S.F.	Volume C.F.	Volume AC-FT	Effective Volume AC-FT	Q_1 Orrifice Plate (cfs)	Q_2 Orrifice Plate (cfs)	Q_3 Orrifice Plate (cfs)	Q_4 Orrifice Plate (cfs)	Q_5Orrifice Plate (cfs)	Q_6 Orrifice Plate (cfs)	Q_7Orrifice Plate (cfs)	Q Weir 1 (cfs)	Q Total (cfs)
1455.00	0.00	6,428.00	0.00	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
1456.00	1.00	6,428.00	6,428.00	0.148	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
1457.00	2.00	6,428.00	12,856.00	0.295	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
1458.00	3.00	6,428.00	19,284.00	0.443	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
1459.00	4.00	6,428.00	25,712.00	0.590	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
1460.00	5.00	6,428.00	32,140.00	0.738	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
1461.00	6.00	6,428.00	38,568.00	0.885	0.148	1.849	1.849	0.000	0.000	0.000	0.000	0.000	0.000	3.698
1462.00	7.00	6,428.00	44,996.00	1.033	0.295	2.615	2.615	0.000	0.000	0.000	0.000	0.000	0.000	5.229

SUPPORTING DESIGN PARAMETERS

Orifice Coefficient	0.66		Dia of Orrifice	8.00	8.00						
Gravimetric Constant	32.2	ft/s^2	Eff Dia of Orrifice	0.6667	0.6667	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Number of Rows	1		Area of Orrifice	0.3491	0.3491	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Minimum Orrifice Plate Height			Number of Orrifeces	1	1	1	1	1	1	1	1
Minimum Orrifice Plate Width			Elev	1460	1460						

. Weir

Sharp Crest Weir Coefficient	0
Length of Weir	0.00
Elev. at Crest of Weir	1462

Appendix 8: Source Control

Pollutant Sources/Source Control Checklist

STORMWATER POLLUTANT SOURCES/SOURCE CONTROL CHECKLIST

How to use this worksheet (also see instructions in Section G of the WQMP Template):

1. Review Column 1 and identify which of these potential sources of stormwater pollutants apply to your site. Check each box that applies.
2. Review Column 2 and incorporate all of the corresponding applicable BMPs in your WQMP Exhibit.
3. Review Columns 3 and 4 and incorporate all of the corresponding applicable permanent controls and operational BMPs in your WQMP. Use the format shown in Table G.1on page 23 of this WQMP Template. Describe your specific BMPs in an accompanying narrative, and explain any special conditions or situations that required omitting BMPs or substituting alternative BMPs for those shown here.

IF THESE SOURCES WILL BE ON THE PROJECT SITE ...	... THEN YOUR WQMP SHOULD INCLUDE THESE SOURCE CONTROL BMPs, AS APPLICABLE		
1 Potential Sources of Runoff Pollutants	2 Permanent Controls—Show on WQMP Drawings	3 Permanent Controls—List in WQMP Table and Narrative	4 Operational BMPs—Include in WQMP Table and Narrative
☑ A. **On-site storm drain inlets**	☑ **Locations of inlets.**	☑ **Mark all inlets with the words "Only Rain Down the Storm Drain" or similar. Catch Basin Markers may be available from the Riverside County Flood Control and Water Conservation District, call 951.955.1200 to verify.**	☑ **Maintain and periodically repaint or replace inlet markings.** ☑ **Provide stormwater pollution prevention information to new site owners, lessees, or operators.** ☑ **See applicable operational BMPs in Fact Sheet SC-44, "Drainage System Maintenance," in the CASQA Stormwater Quality Handbooks at www.cabmphandbooks.com** ☑ **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."**
☐ B. **Interior floor drains and elevator shaft sump pumps**		☐ **State that interior floor drains and elevator shaft sump pumps will be plumbed to sanitary sewer.**	☐ **Inspect and maintain drains to prevent blockages and overflow.**
☐ C. **Interior parking garages**		☐ **State that parking garage floor drains will be plumbed to the sanitary sewer.**	☐ **Inspect and maintain drains to prevent blockages and overflow.**

IF THESE SOURCES WILL BE ON THE PROJECT SITE ...	... THEN YOUR WQMP SHOULD INCLUDE THESE SOURCE CONTROL BMPs, AS APPLICABLE		
1 Potential Sources of Runoff Pollutants	2 Permanent Controls—Show on WQMP Drawings	3 Permanent Controls—List in WQMP Table and Narrative	4 Operational BMPs—Include in WQMP Table and Narrative
☐ D1. **Need for future indoor & structural pest control**		☐ **Note building design features that discourage entry of pests.**	☐ **Provide Integrated Pest Management information to owners, lessees, and operators.**
☑ D2. **Landscape/ Outdoor Pesticide Use**	☐ **Show locations of native trees or areas of shrubs and ground cover to be undisturbed and retained.** ☐ **Show self-retaining landscape areas, if any.** ☑ **Show stormwater treatment and hydrograph modification management BMPs. (See instructions in Chapter 3, Step 5 and guidance in Chapter 5.)**	**State that final landscape plans will accomplish all of the following.** ☐ **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/**Error! Hyperlink reference not valid.** ☑ **Provide IPM information to new owners, lessees and operators.**

IF THESE SOURCES WILL BE ON THE PROJECT SITE ...	... THEN YOUR WQMP SHOULD INCLUDE THESE SOURCE CONTROL BMPs, AS APPLICABLE		
1 Potential Sources of Runoff Pollutants	2 Permanent Controls—Show on WQMP Drawings	3 Permanent Controls—List in WQMP Table and Narrative	4 Operational BMPs—Include in WQMP Table and Narrative
☑ E. **Pools, spas, ponds, decorative fountains, and other water features.**	☑ **Show location of water feature and a sanitary sewer cleanout in an accessible area within 10 feet. (Exception: Public pools must be plumbed according to County Department of Environmental Health Guidelines.)**	**If the Co-Permittee requires pools to be plumbed to the sanitary sewer, place a note on the plans and state in the narrative that this connection will be made according to local requirements.**	☑ **See applicable operational BMPs in** "Guidelines for Maintaining Your Swimming Pool, Jacuzzi and Garden Fountain" at http://rcflood.org/stormwater/
☐ F. **Food service**	☐ **For restaurants, grocery stores, and other food service operations, show location (indoors or in a covered area outdoors) of a floor sink or other area for cleaning floor mats, containers, and equipment.** ☐ **On the drawing, show a note that this drain will be connected to a grease interceptor before discharging to the sanitary sewer.**	☐ **Describe the location and features of the designated cleaning area.** ☐ **Describe the items to be cleaned in this facility and how it has been sized to insure that the largest items can be accommodated.**	☐ **See the brochure, "**The Food Service Industry Best Management Practices for: Restaurants, Grocery Stores, Delicatessens and Bakeries" at http://rcflood.org/stormwater/ **Provide this brochure to new site 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 run-on and show locations of berms to prevent runoff from the area.** ☑ **Any drains from dumpsters, compactors, and tallow bin areas shall be connected to a grease removal device before discharge to sanitary sewer.**	☑ **State how site refuse will be handled and provide supporting detail to what is shown on plans.** ☑ **State that signs will be posted on or near dumpsters with the words "Do not dump hazardous materials here" or similar.**	☑ **State how the following will be implemented:** **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, "Waste Handling and Disposal" in the CASQA Stormwater Quality Handbooks at www.cabmphandbooks.com**

IF THESE SOURCES WILL BE ON THE PROJECT SITE ...	... THEN YOUR WQMP SHOULD INCLUDE THESE SOURCE CONTROL BMPs, AS APPLICABLE		
1 Potential Sources of Runoff Pollutants	2 Permanent Controls—Show on WQMP Drawings	3 Permanent Controls—List in WQMP Table and Narrative	4 Operational BMPs—Include in WQMP Table and Narrative
❑ H. **Industrial processes.**	❑ **Show process area.**	❑ **If industrial processes are to be located on site, state: "All process activities to be performed indoors. No processes to drain to exterior or to storm drain system."**	❑ **See Fact Sheet SC-10, "Non-Stormwater Discharges" in the CASQA Stormwater Quality Handbooks at www.cabmphandbooks.com** See the brochure "Industrial & Commercial Facilities Best Management Practices for: Industrial, Commercial Facilities" at http://rcflood.org/stormwater/

IF THESE SOURCES WILL BE ON THE PROJECT SITE ...	... THEN YOUR WQMP SHOULD INCLUDE THESE SOURCE CONTROL BMPs, AS APPLICABLE		
1 Potential Sources of Runoff Pollutants	2 Permanent Controls—Show on WQMP Drawings	3 Permanent Controls—List in WQMP Table and Narrative	4 Operational BMPs—Include in WQMP Table and Narrative
❑ I. **Outdoor storage of equipment or materials. (See rows J and K for source control measures for vehicle cleaning, repair, and maintenance.)**	❑ **Show any outdoor storage areas, including how materials will be covered. Show how areas will be graded and bermed to prevent run-on or run-off from area.** ❑ **Storage of non-hazardous liquids shall be covered by a roof and/or drain to the sanitary sewer system, and be contained by berms, dikes, liners, or vaults.** ❑ **Storage of hazardous materials and wastes must be in compliance with the local hazardous materials ordinance and a Hazardous Materials Management Plan for the site.**	**Include a detailed description of materials to be stored, storage areas, and structural features to prevent pollutants from entering storm drains.** **Where appropriate, reference documentation of compliance with the requirements of Hazardous Materials Programs for:** ▪ **Hazardous Waste Generation** ▪ **Hazardous Materials Release Response and Inventory** ▪ **California Accidental Release (CalARP)** ▪ **Aboveground Storage Tank** ▪ **Uniform Fire Code Article 80 Section 103(b) & (c) 1991** ▪ **Underground Storage Tank** **www.cchealth.org/groups/hazmat/**	❑ **See the Fact Sheets SC-31, "Outdoor Liquid Container Storage" and SC-33, "Outdoor Storage of Raw Materials " in the CASQA Stormwater Quality Handbooks at www.cabmphandbooks.com**

IF THESE SOURCES WILL BE ON THE PROJECT SITE ...	... THEN YOUR WQMP SHOULD INCLUDE THESE SOURCE CONTROL BMPs, AS APPLICABLE		
1 Potential Sources of Runoff Pollutants	2 Permanent Controls—Show on WQMP Drawings	3 Permanent Controls—List in WQMP Table and Narrative	4 Operational BMPs—Include in WQMP Table and Narrative
❑ J. **Vehicle and Equipment Cleaning**	❑ **Show on drawings as appropriate:** **(1) Commercial/industrial facilities having vehicle/equipment cleaning needs shall either provide a covered, bermed area for washing activities or discourage vehicle/equipment washing by removing hose bibs and installing signs prohibiting such uses.** **(2) Multi-dwelling complexes shall have a paved, bermed, and covered car wash area (unless car washing is prohibited on-site and hoses are provided with an automatic shut-off to discourage such use).** **(3) Washing areas for cars, vehicles, and equipment shall be paved, designed to prevent run-on to or runoff from the area, and plumbed to drain to the sanitary sewer.** **(4) Commercial car wash facilities shall be designed such that no runoff from the facility is discharged to the storm drain system. Wastewater from the facility shall discharge to the sanitary sewer, or a wastewater reclamation system shall be installed.**	❑ **If a car wash area is not provided, describe any measures taken to discourage on-site car washing and explain how these will be enforced.**	**Describe operational measures to implement the following (if applicable):** ❑ **Washwater from vehicle and equipment washing operations shall not be discharged to the storm drain system.** Refer to "Outdoor Cleaning Activities and Professional Mobile Service Providers" for many of the Potential Sources of Runoff Pollutants categories below. Brochure can be found at http://rcflood.org/stormwater/ ❑**Car dealerships and similar may rinse cars with water only.**

IF THESE SOURCES WILL BE ON THE PROJECT SITE ...	... THEN YOUR WQMP SHOULD INCLUDE THESE SOURCE CONTROL BMPs, AS APPLICABLE		
1 Potential Sources of Runoff Pollutants	2 Permanent Controls—Show on WQMP Drawings	3 Permanent Controls—List in WQMP Table and Narrative	4 Operational BMPs—Include in WQMP Table and Narrative
❑ K. **Vehicle/Equipment Repair and Maintenance**	❑ **Accommodate all vehicle equipment repair and maintenance indoors. Or designate an outdoor work area and design the area to prevent run-on and runoff of stormwater.** ❑ **Show secondary containment for exterior work areas where motor oil, brake fluid, gasoline, diesel fuel, radiator fluid, acid-containing batteries or other hazardous materials or hazardous wastes are used or stored. Drains shall not be installed within the secondary containment areas.** ❑ **Add a note on the plans that states either (1) there are no floor drains, or (2) floor drains are connected to wastewater pretreatment systems prior to discharge to the sanitary sewer and an industrial waste discharge permit will be obtained.**	❑ **State that no vehicle repair or maintenance will be done outdoors, or else describe the required features of the outdoor work area.** ❑ **State that there are no floor drains or if there are floor drains, note the agency from which an industrial waste discharge permit will be obtained and that the design meets that agency's requirements.** ❑ **State that there are no tanks, containers or sinks to be used for parts cleaning or rinsing or, if there are, note the agency from which an industrial waste discharge permit will be obtained and that the design meets that agency's requirements.**	**In the Stormwater Control Plan, note that all of the following restrictions apply to use the site:** ❑ **No person shall dispose of, nor permit the disposal, directly or indirectly of vehicle fluids, hazardous materials, or rinsewater from parts cleaning into storm drains.** ❑ **No vehicle fluid removal shall be performed outside a building, nor on asphalt or ground surfaces, whether inside or outside a building, except in such a manner as to ensure that any spilled fluid will be in an area of secondary containment. Leaking vehicle fluids shall be contained or drained from the vehicle immediately.** ❑ **No person shall leave unattended drip parts or other open containers containing vehicle fluid, unless such containers are in use or in an area of secondary containment.** Refer to "Automotive Maintenance & Car Care Best Management Practices for Auto Body Shops, Auto Repair Shops, Car Dealerships, Gas Stations and Fleet Service Operations". Brochure can be found at http://rcflood.org/stormwater/ Refer to Outdoor Cleaning Activities and Professional Mobile Service Providers for many of the Potential Sources of Runoff Pollutants categories below. Brochure can be found at http://rcflood.org/stormwater/

IF THESE SOURCES WILL BE ON THE PROJECT SITE ...	... THEN YOUR WQMP SHOULD INCLUDE THESE SOURCE CONTROL BMPs, AS APPLICABLE		
1 Potential Sources of Runoff Pollutants	2 Permanent Controls—Show on WQMP Drawings	3 Permanent Controls—List in WQMP Table and Narrative	4 Operational BMPs—Include in WQMP Table and Narrative
❑ L. **Fuel Dispensing Areas**	❑ **Fueling areas[6] shall have impermeable floors (i.e., portland cement concrete or equivalent smooth impervious surface) that are: a) graded at the minimum slope necessary to prevent ponding; and b) separated from the rest of the site by a grade break that prevents run-on of stormwater to the maximum extent practicable.** ❑ **Fueling areas shall be covered by a canopy that extends a minimum of ten feet in each direction from each pump. [Alternative: The fueling area must be covered and the cover's minimum dimensions must be equal to or greater than the area within the grade break or fuel dispensing area[1].] The canopy [or cover] shall not drain onto the fueling area.**		❑ **The property owner shall dry sweep the fueling area routinely.** ❑ **See the Fact Sheet SD-30 , "Fueling Areas" in the CASQA Stormwater Quality Handbooks at www.cabmphandbooks.com**

[6] **The fueling area shall be defined as the area extending a minimum of 6.5 feet from the corner of each fuel dispenser or the length at which the hose and nozzle assembly may be operated plus a minimum of one foot, whichever is greater.**

IF THESE SOURCES WILL BE ON THE PROJECT SITE ...	... THEN YOUR WQMP SHOULD INCLUDE THESE SOURCE CONTROL BMPs, AS APPLICABLE		
1 Potential Sources of Runoff Pollutants	2 Permanent Controls—Show on WQMP Drawings	3 Permanent Controls—List in WQMP Table and Narrative	4 Operational BMPs—Include in WQMP Table and Narrative
❑ M. **Loading Docks**	❑ **Show a preliminary design for the loading dock area, including roofing and drainage. Loading docks shall be covered and/or graded to minimize run-on to and runoff from the loading area. Roof downspouts shall be positioned to direct stormwater away from the loading area. Water from loading dock areas shall be drained to the sanitary sewer, or diverted and collected for ultimate discharge to the sanitary sewer.** ❑ **Loading dock areas draining directly to the sanitary sewer shall be equipped with a spill control valve or equivalent device, which shall be kept closed during periods of operation.** ❑ **Provide a roof overhang over the loading area or install door skirts (cowling) at each bay that enclose the end of the trailer.**		❑ **Move loaded and unloaded items indoors as soon as possible.** ❑ **See Fact Sheet SC-30, "Outdoor Loading and Unloading," in the CASQA Stormwater Quality Handbooks at www.cabmphandbooks.com**

IF THESE SOURCES WILL BE ON THE PROJECT SITE ...	... THEN YOUR WQMP SHOULD INCLUDE THESE SOURCE CONTROL BMPs, AS APPLICABLE		
1 Potential Sources of Runoff Pollutants	2 Permanent Controls—Show on WQMP Drawings	3 Permanent Controls—List in WQMP Table and Narrative	4 Operational BMPs—Include in WQMP Table and Narrative
☑ N. **Fire Sprinkler Test Water**		☑ **Provide a means to drain fire sprinkler test water to the sanitary sewer.**	☑ **See the note in Fact Sheet SC-41, "Building and Grounds Maintenance," in the CASQA Stormwater Quality Handbooks at www.cabmphandbooks.com**
O. **Miscellaneous Drain or Wash Water or Other Sources** ☐ **Boiler drain lines** ☐ **Condensate drain lines** ☐ **Rooftop equipment** ☐ **Drainage sumps** ☑ **Roofing, gutters, and trim.** ☐ **Other sources**		☐ **Boiler drain lines shall be directly or indirectly connected to the sanitary sewer system and may not discharge to the storm drain system.** ☐ **Condensate drain lines may discharge to landscaped areas if the flow is small enough that runoff will not occur. Condensate drain lines may not discharge to the storm drain system.** ☐ **Rooftop equipment with potential to produce pollutants shall be roofed and/or have secondary containment.** ☐ **Any drainage sumps on-site shall feature a sediment sump to reduce the quantity of sediment in pumped water.** ☑ **Avoid roofing, gutters, and trim made of copper or other unprotected metals that may leach into runoff.** **Include controls for other sources as specified by local reviewer.**	

STORMWATER POLLUTANT SOURCES/SOURCE CONTROL CHECKLIST

IF THESE SOURCES WILL BE ON THE PROJECT SITE ...	... THEN YOUR WQMP SHOULD INCLUDE THESE SOURCE CONTROL BMPs, AS APPLICABLE		
1 Potential Sources of Runoff Pollutants	2 Permanent Controls—Show on WQMP Drawings	3 Permanent Controls—List in WQMP Table and Narrative	4 Operational BMPs—Include in WQMP Table and Narrative
☑ 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.**

Appendix 9: O&M

Operation and Maintenance Plan and Documentation of Finance, Maintenance and Recording Mechanisms

Operations & Maintenance Responsibility for Treatment Control BMP's

BMP Required Maintenance	Frequency	Maintenance Requirements	Responsibility
Trash	Weekly	Empty Dumpsters	Home Owners Association
Roof Drains/ Gutters	Before wet season, or significant rain event, or when needed	Roof Gutters shall be visually inspected for defects and possible leakage. Damage or defects found shall be corrected as soon as possible. Owners should avoid use of gutters, roofing, and trim made of copper so as to prevent the metal from leaching into runoff.	Home Owners Association
CMP Underground Infiltration and Detention	Bi-Weekly Semi-Annually As Needed	Remove accumulation of trash debris and/or sediment at/or around the tributary inlets Inspections of the system should be completed before and after the wet season to insure system is in working order. If evidence of salting/de-icing agents are observed in the system, rinsing of the system should be completed. Systems should be unclogged when inspection finds that accumulated sediment or trash is clogging the discharge **For additional maintenance information please see Appendix 10 of the WQMP** **Grading Plans and BMP Map provided in WQMP document provide additional information on location of CMP facility and tributary areas.**	Home Owners Association
Self-Retaining/ Landscape Areas	Bi-Weekly	Mow, weed, trim and remove accumulation of trash debris and/or sediment. Retaining areas should be mowed at 4-6 inches in height if grass is proposed. **Maintain landscaping using minimal pesticides**	Home Owners Association

BMP's should start and be inspected prior to forecast rain, daily during extended rain events, after rain events, weekly during the rainy season, and at two-week intervals during the non-rainy season.

Funding

Funding for ongoing facility maintenance, including replacement costs, in perpetuity, will be provided by the Home Owner's Association.

Basin Site Maintenance Summary Form

Date:	**Inspector Name:**	**Basin:**
Maintenance Performed:		
Date:	**Inspector Name:**	**Basin:**
Maintenance Performed:		
Date:	**Inspector Name:**	**Basin:**
Maintenance Performed:		
Date:	**Inspector Name:**	**Basin:**
Maintenance Performed:		
Date:	**Inspector Name:**	**Basin:**
Maintenance Performed:		
Date:	**Inspector Name:**	**Basin:**
Maintenance Performed:		
Date:	**Inspector Name:**	**Basin:**
Maintenance Performed:		
Date:	**Inspector Name:**	**Basin:**
Maintenance Performed:		
Date:	**Inspector Name:**	**Basin:**
Maintenance Performed:		
Date:	**Inspector Name:**	**Basin:**
Maintenance Performed:		
Date:	**Inspector Name:**	**Basin:**
Maintenance Performed:		
Date:	**Inspector Name:**	**Basin:**
Maintenance Performed:		
Date:	**Inspector Name:**	**Basin:**
Maintenance Performed:		
Date:	**Inspector Name:**	**Basin:**
Maintenance Performed:		

RECORDING REQUESTED BY:

CITY OF MENIFEE

AND WHEN RECORDED MAIL TO:

CITY OF MENIFEE
CITY CLERK
29844 HAUN ROAD
MENIFEE, CA 92586-6540

SPACE ABOVE THIS LINE FOR RECORDER'S USE

WATER QUALITY MANAGEMENT PLAN AND STORMWATER BEST MANAGEMENT PRACTICES OPERATION, TRANSFER, MAINTENANCE AND RIGHT OF ENTRY AGREEMENT

PROJECT NAME: LDW, TTM 38346

PROPERTY OWNER NAME: LDW Rancon, LP

PROPERTY ADDRESS: Northwest corner of Menifee Road and Rouse Road

APN: 331-250-028, 029, 030

THIS AGREEMENT is made and entered into in

_____, California, this_____day of

_____, 202___, by and between

_____, herein after

referred to as "Owner", and the CITY OF MENIFEE, a municipal corporation, located in the County of Riverside, State of California hereinafter referred to as "CITY";

WHEREAS, the City is a Co-Permittee for discharging stormwater from its MS4 facilities pursuant to the Santa Ana Regional Water Quality Control Board Order No. R8-2010-0033, MS4 NPDES Permit No. CAS 618033. Under the terms of the permit the City is required to enforce the provisions of the permit within its jurisdiction. The requirements contained in this agreement are intended to achieve the goals of the MS4 permit;

WHEREAS, the Owner owns real property ("Property) in the City of Menifee, County of Riverside, State of California, more specifically described in Exhibit "A" and depicted in Exhibit "B", each of which exhibits is attached hereto and incorporated herein by this reference;

WHEREAS, at the time of initial approval of development project known as:

_____ within the Property described herein, the City required the project to employ Best Management Practices, hereinafter referred to as "BMPs," to minimize pollutants in urban runoff;

WHEREAS, the Owner has chosen to install and/or implement BMPs as described in the Water Quality Management Plan, on file with the City, hereinafter referred to as "WQMP," to minimize pollutants in urban runoff and to minimize other adverse impacts of urban runoff;

WHEREAS, said WQMP has been certified by the Owner and reviewed and accepted by the City;

WHEREAS, said BMPs, with installation and/or implementation on private property and draining only private property, are part of a private facility with all maintenance or replacement, therefore, the sole responsibility of the Owner in accordance with the terms of this Agreement;

WHEREAS, the Owner is aware that periodic and continuous maintenance, including, but not necessarily limited to, filter material replacement and sediment removal, is required to assure peak performance of all BMPs in the WQMP and that, furthermore, such maintenance activity will require compliance with all Local, State, or Federal laws and regulations, including those pertaining to confined space and waste disposal methods, in effect at the time such maintenance occurs;

NOW THEREFORE, it is mutually stipulated and agreed as follows:

1. Right of Access: Owner hereby provides the City of Menifee designee complete access, of any duration, to the BMPs and their immediate vicinity at any time, upon reasonable notice, or in the event of emergency, as determined by the City's Engineer, no advance notice, for the purpose of inspection, sampling, testing of the Device, and in case of emergency to direct all necessary repairs or other preventative measures at owner's expense in accordance with the procedures set forth in paragraph 3 below. City shall make every effort at all times to minimize or avoid interference with Owner's use of the Property.

2. Responsibility for Operation and Maintenance of BMPs: Owner shall use its best efforts diligently to maintain all BMPs in a manner assuring peak performance at all times. All reasonable precautions shall be exercised by Owner and Owner's representative or contractor in the removal and extraction of any material(s) from the BMPs and the ultimate disposal of the material(s) in a manner consistent with all relevant laws and regulations in effect at the time. As may be requested from time to time by the City, the Owner shall provide the City with documentation identifying the material(s) removed, the quantity, and disposal destination.

3. City Maintenance at Owner's Expense: In the event Owner, or its successors or assigns, fails to accomplish the necessary maintenance contemplated by this

Agreement, the City may cause such maintenance to be conducted on Owner's Property at Owner's expense if Owner does not commence and diligently work to perform the maintenance within five (5) days of receiving written notice from the City, in accordance with paragraph 10 below, of Owner's failure to comply with the terms of this Agreement. The City may charge the entire cost and expense of any maintenance undertaken by the City, whether performed as a response to an emergency situation or following five (5) day written notice by the City, to the Owner or Owner's successors or assigns, including administrative costs, attorney's fees and interest thereon at the maximum rate authorized by the Civil Code from the Date of the notice of expense until paid in full. The City, at its sole election, may take these costs to be a lien upon the property that may be collected at the same time and in the same manner as ordinary municipal taxes as provided in Government Code section 38773.5. Nothing in this section or this Agreement creates an obligation by the City to maintain or repair any BMP, nor does this section prohibit the City from pursuing other legal recourse against Owner.

4. Surety Bond: The City may require the owner to post security in form and for a time period satisfactory to the City to guarantee the performance of the obligations stated herein. Should the Owner fail to perform the obligations under the Agreement, the City may, in the case of a cash bond, act for the Owner using the proceeds from it, or in the case of a surety bond, require the sureties to perform the obligations of the Agreement. As an additional remedy, the City's Engineer may withdraw any previous stormwater-related approval with respect to the property on which BMPs have been installed and/or implemented until such time as Owner repays to City its reasonable costs incurred in accordance with paragraph 3 above.

5. Recording: This agreement shall be recorded in the Office of the Recorder of Riverside County, California, at the expense of the Owner and shall constitute notice to all successors and assigns of the title to said Property of the obligation herein set forth, and also a lien in such amount as will fully reimburse the City, including interest as herein above set forth, subject to foreclosure in event of default in payment.

6. Attorney's Fees: In event of legal action occasioned by any default or action of the Owner, or its successors or assigns, then the Owner and its successors or assigns agree(s) to pay all costs incurred by the City in enforcing the terms of this Agreement, including reasonable attorney's fees and costs, and that the same shall become a part of the lien against said Property.

7. Covenant: It is the intent of the parties hereto that burdens and benefits herein undertaken shall constitute covenants that run with said Property and constitute a lien there against.

8. Binding on Successors: The obligations herein undertaken shall be binding upon the heirs, successors, executors, administrators and assigns of the parties hereto. The term "Owner" shall include not only the present Owner, but also its heirs, successors, executors, administrators, and assigns. Owner shall notify any successor to title of all or part of the Property about the existence of this Agreement. Owner shall provide such notice prior to such successor obtaining an interest in all or part of the Property. Owner shall provide a copy of such notice to the City at the same time such notice is provided to the successor.

9. Time of the Essence: Time is of the essence in the performance of this Agreement.

10. Notice: Any notice to a party required or called for in this Agreement shall be served in person, or by deposit in the U.S. Mail, first class postage prepaid, to the address set forth below. Notice(s) shall be deemed effective upon receipt, or seventy-two (72) hours after deposit in the U.S. Mail, whichever is earlier. A party may change a notice address only by providing written notice thereof to the other party.

IN WITNESS THEREOF, the parties hereto have affixed their signatures as of the date first written above.

IF TO CITY:

City of Menifee

29844 Haun Road

Menifee, CA 92586

IF TO OWNER:

_____

_____

_____

_____

CITY:

By:_____
Armando G. Villa,
City Manager

APPROVED AS TO FORM:

_____
Jeffery T. Melching, City Attorney

ATTEST:

_____
Sarah Manwaring, City Clerk

OWNER:

By:_____
NAME

Title:_____

OWNER:

By:_____
NAME

Title:_____

NOTARY ACKNOWLEDGEMENTS ON FOLLOWING PAGE

EXHIBIT A

REAL PROPERTY IN THE CITY OF MENIFEE, COUNTY OF RIVERSIDE, STATE OF CALIFORNIA, DESCRIBED AS FOLLOWS:

PARCEL 1: (APN: PORTIONS OF 331-250-028-0 AND 331-250-030)

PARCEL "B" DESCRIBED ON EXHIBIT "A" AND SHOWN ON EXHIBIT "B" OF LOT LINE ADJUSTMENT NO. LLA 17-002 RECORDED FEBRUARY 21, 2020 AS INSTRUMENT NO. 2020-0081364, OF OFFICIAL RECORDS, DESCRIBED AS FOLLOWS:
BEING A PORTION OF PARCEL 1 OF MERGER 18-001, A CERTIFIED COPY OF WHICH RECORDED FEBRUARY 21, 2020 AS INSTRUMENT NO. 2020-0080310 OF OFFICIAL RECORDS, TOGETHER WITH LOT 976 OF ROMOLA FARMS NO. 10, IN THE CITY OF MENIFEE, COUNTY OF RIVERSIDE, STATE OF CALIFORNIA, AS FILED IN BOOK 15, PAGES 29 THROUGH 31, INCLUSIVE OF MAPS, IN THE OFFICE OF THE COUNTY RECORDER OF SAID COUNTY, TOGETHER WITH THAT PORTION OF LOT "C" (ROUSE ROAD) ADJOINING SAID LOT AS SAID ROAD WAS VACATED AND ABANDONED BY RESOLUTION OF THE BOARD OF SUPERVISORS OF THE COUNTY OF RIVERSIDE, A CERTIFIED COPY OF WHICH RECORDED FEBRUARY 6, 1962 AS INSTRUMENT NO. 11656 OF OFFICIAL RECORDS, IN SECTION 14, TOWNSHIP 5 SOUTH, RANGE 3 WEST, SAN BERNARDINO BASE AND MERIDIAN, MORE PARTICULARLY DESCRIBED AS FOLLOWS:
BEGINNING AT THE INTERSECT OF SAID ROUSE ROAD (60 FEET WIDE PER MAP BOOK 15, PAGES 29-31) AND JUNIPERO ROAD (60 FEET WIDE PER MAP BOOK 15, PAGES 29-31);
THENCE ALONG SAID CENTERLINE OF ROUSE, NORTH 89°58'32" EAST, 660.23, SAID POINT BEING THE TRUE POINT OF BEGINNING;
THENCE NORTH 00°21’27" EAST, 330.06 FEET TO THE NORTHWEST CORNER OF LOT 976;
THENCE ALONG THE NORTHERLY LINE OF LOT 976, NORTH 89°58’57" EAST, 630.22 FEET TO A POINT ON THE WESTERLY RIGHT-OF-WAY LINE OF MENIFEE ROAD (60 FEET WIDE PER MAP BOOK 15, PAGES 29-31);
THENCE ALONG SAID WESTERLY RIGHT-OF-WAY LINE OF MENIFEE ROAD SOUTH 00°21’27" WEST, 329.98 FEET TO A POINT ON THE CENTERLINE OF ROUSE ROAD;
THENCE ALONG THE CENTERLINE OF ROUSE ROAD, SOUTH 89°58'32" WEST, 630.22, TO THE TRUE POINT OF BEGINNING.

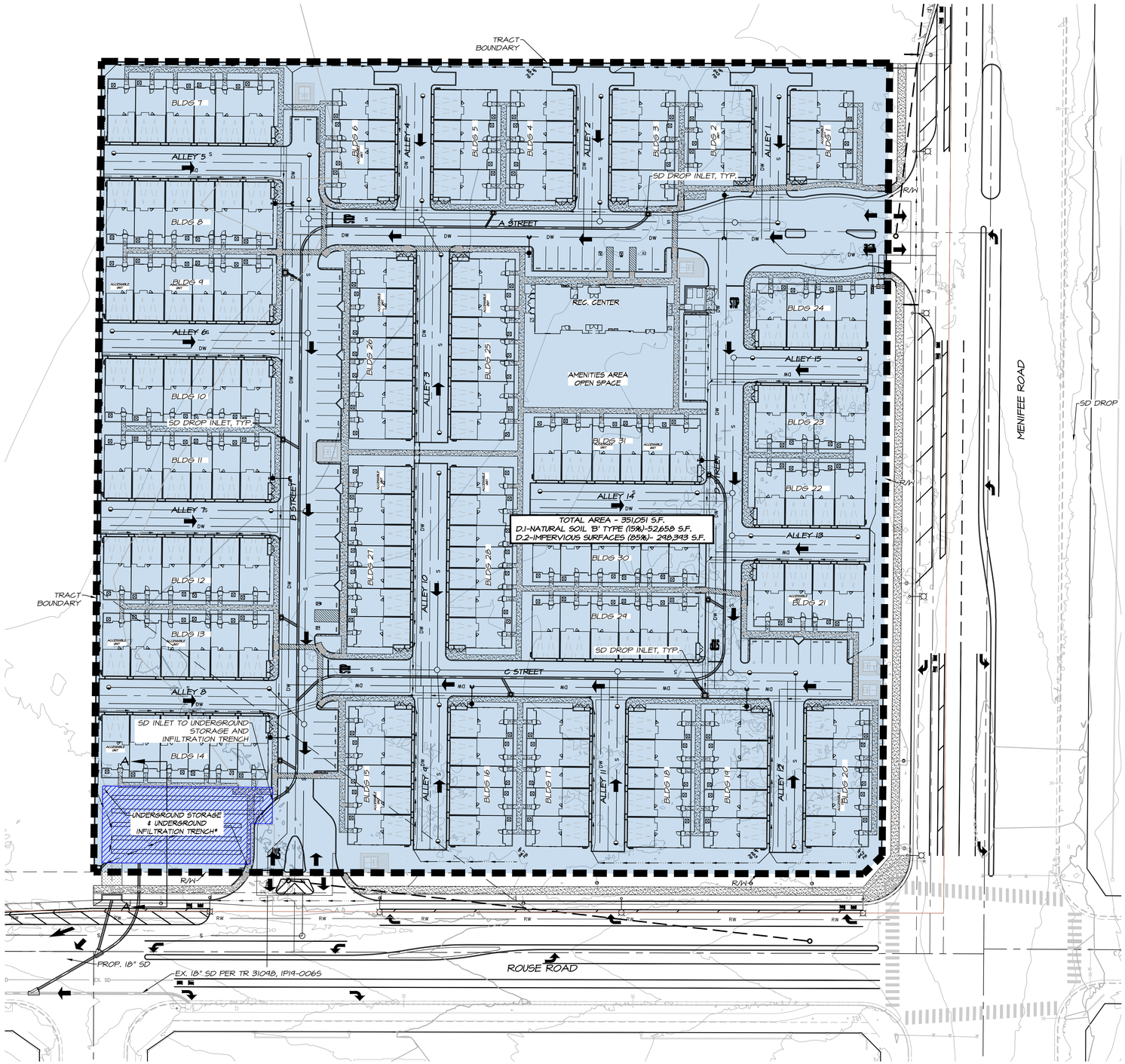
PARCEL 2: (APN: PORTION OF 331-250-029)

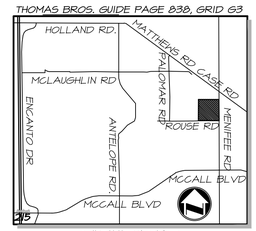
LOT 977, OF ROMOLA FARMS NO. 10, IN THE CITY OF MENIFEE, COUNTY OF RIVERSIDE, STATE OF CALIFORNIA, AS FILED IN BOOK 15, PAGES 29 THROUGH 31, INCLUSIVE OF MAPS, IN THE OFFICE OF THE COUNTY RECORDER OF SAID COUNTY.

EXHIBIT B
(Map/Illustration)

IN THE CITY OF MENIFEE, COUNTY OF RIVERSIDE, CA

BMP MAP
TRACT 38346





VICINITY MAP

T5SR3W SEC 14 S

OWNER
LDH RANCON, LP
41391 KALMIA STREET, SUITE 200
MURRIETA, CA 92562

APPLICANT
FOREMOST PACIFIC GROUP
21271 LAS RAMBLAS, SUITE 100
MISSION VIEJO, CA 92691
949-748-6714

ENGINEER
adkan ENGINEERS
6879 AIRPORT DRIVE
RIVERSIDE, CA. 92504
951-688-0241

ASSESSORS PARCEL NUMBER
331-250-028
331-250-029
331-250-030

SITE STATISTICS

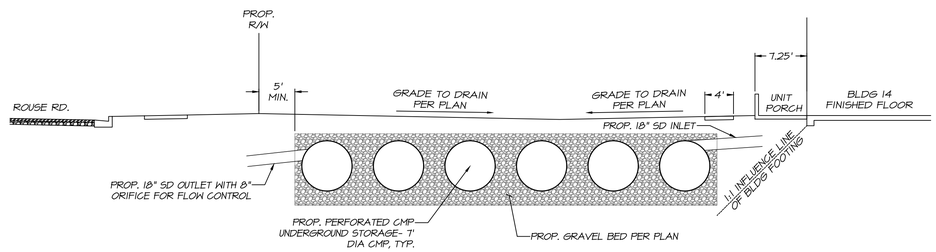
GROSS AREA:	9.54 AC
NET AREA:	8.06 AC
TOTAL UNITS:	162
DENSITY:	20.1 DUA
PARKING REQUIRED:	333
PARKING PROVIDED:	350

BMP DATA DMA 1

DMA CLASSIFICATION	NAME	AREA (SF)
D.1	NATURAL SOIL (15%)	52,658
D.2	IMPERVIOUS SURFACE (85%)	298,393
TOTAL AREA		351,051

LEGEND

- DMA BOUNDARY
- D.1 AREAS THAT DRAIN TO BMPS
- PROP. STORM DRAIN
- SURFACE DRAINAGE PATH
- CONCRETE GUTTER
- SD DROP INLET
- LIMITS OF UNDERGROUND INFILTRATION TRENCH & UNDERGROUND STORAGE CHAMBERS



CMP UNDERGROUND STORAGE & INFILTRATION TRENCH* SECTION A-A

SCALE: 1"=10'

***UNDERGROUND STORAGE AND UNDERGROUND INFILTRATION TRENCH NOTE:**

THE PROPOSED UNDERGROUND, PERFORATED CMP CHAMBERS ARE DESIGNED TO HOLD ALL FIRST FLUSH FLOWS TO ALLOW FOR INFILTRATION (INFILTRATION TRENCH CALCULATIONS), WHILE LARGER STORMS WILL OUTLET VIA A CONTROLLED ORIFICE IN THE DETENTION CHAMBER SYSTEM (STORAGE/MITIGATION). PLACEMENT OF THE OUTLET ORIFICE WILL ALLOW INFILTRATION OF SOME FLOWS FROM THE LARGER STORMS WHILE CONTROLLING THE OUTLET TO ENSURE FLOWS LEAVING THE SYSTEM DO NOT EXCEED THE CAPACITY OF THE EXISTING STORM DRAIN SYSTEM ADJACENT TO THE PROJECT SITE.

0 20 40 80 120 160

SCALE: 1" = 40'

TRACT 38346 BMP MAP
PREPARATION DATE: OCTOBER 2022

REVISIONS	
DELTA	DESCRIPTION

PLANS PREPARED BY:
adkan ENGINEERS
Civil Engineering · Surveying Planning
6879 Airport Drive, Riverside, CA 92504
Tel:(951) 688-0241 Fax:(951) 688-0599

Appendix 10: Educational Materials

BMP Fact Sheets, Maintenance Guidelines and Other End-User BMP Information

3.2 INFILTRATION TRENCH

Type of BMP	LID - Infiltration
Treatment Mechanisms	Infiltration, Evapotranspiration (when vegetated), Evaporation
Maximum Drainage Area	10-acres
Other Names	None

Description

Infiltration trenches are shallow excavated areas that are filled with rock material to create a subsurface reservoir layer. The trench is sized to store the design capture volume, V_{BMP}, in the void space between the rocks. Over a period of 72 hours, the stormwater infiltrates through the bottom of the trench into the surrounding soil. Infiltration basins are highly effective in removing all targeted pollutants from stormwater runoff.

Figure 1 shows the components of an infiltration trench. The section shows the reservoir layer and observation well, which is used to monitor water depth. An overflow pipe that is used to bypass flows once the trench fills with stormwater is also shown.

Site Considerations

Location

The use of infiltration trenches may be restricted by concerns over groundwater contamination, soil permeability, and clogging at the site. See the applicable WQMP for any specific feasibility considerations for using infiltration BMPs. Where this BMP is being used, the soil beneath the basin must be thoroughly evaluated in a geotechnical report since the underlying soils are critical to the basin's long term performance. These basins may not be appropriate for the following site conditions:

- Industrial sites or locations where spills of toxic materials may occur.
- Sites with very low soil infiltration rates.
- Sites with high groundwater tables or excessively high soil infiltration rates, where pollutants can affect groundwater quality.
- Sites with unstabilized soil or construction activity upstream.
- On steeply sloping terrain.
- Infiltration trenches located in a fill condition should refer to Appendix A of this Handbook for details on special requirements/restrictions.

This BMP has a flat surface area, so it may be challenging to incorporate into steeply sloping terrain.

Setbacks

Always consult your geotechnical engineer for site specific recommendations regarding setbacks for infiltration trenches. Recommended setbacks are needed to protect buildings, walls, onsite or nearby wells, streams, and tanks. Setbacks should be considered early in the design process as they affect where infiltration facilities may be placed and how deep they are allowed to be. For instance, depth setbacks can dictate fairly shallow facilities that will have a larger footprint and, in some cases, may make an infiltration trench infeasible. In that instance, another BMP must be selected.

In addition to setbacks recommended by the geotechnical engineer, infiltration trenches must be set back:

- 10 feet from the historic high groundwater mark (measured vertically from the bottom of the trench, as shown in Figure 1)
- 5 feet from bedrock or impermeable surface layer (measured vertically from the bottom of the trench, as shown in Figure 1)
- From all mature tree drip lines as indicated in Figure 1
- 100 feet horizontally from wells, tanks or springs

Setbacks to walls and foundations must be included as part of the Geotechnical Report.

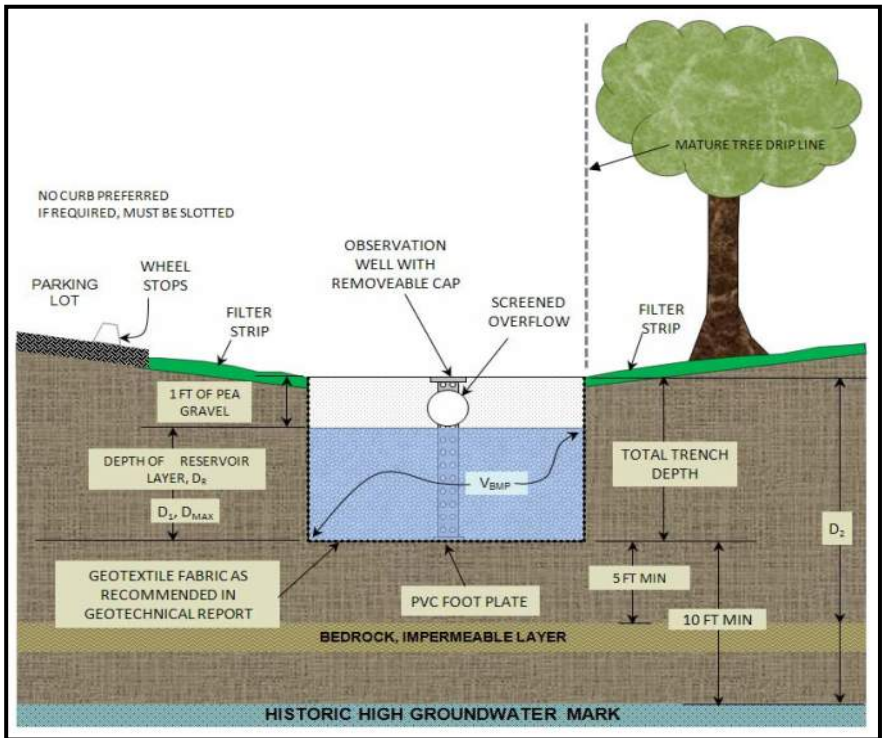


Figure 1 Section View of an Infiltration Trench

Sediment Control

Infiltration BMPs have the risk of becoming plugged over time. To prevent this, sediment must be removed before stormwater enters the trench. Both sheet and concentrated flow types have requirements that should be considered in the design of an infiltration trench.

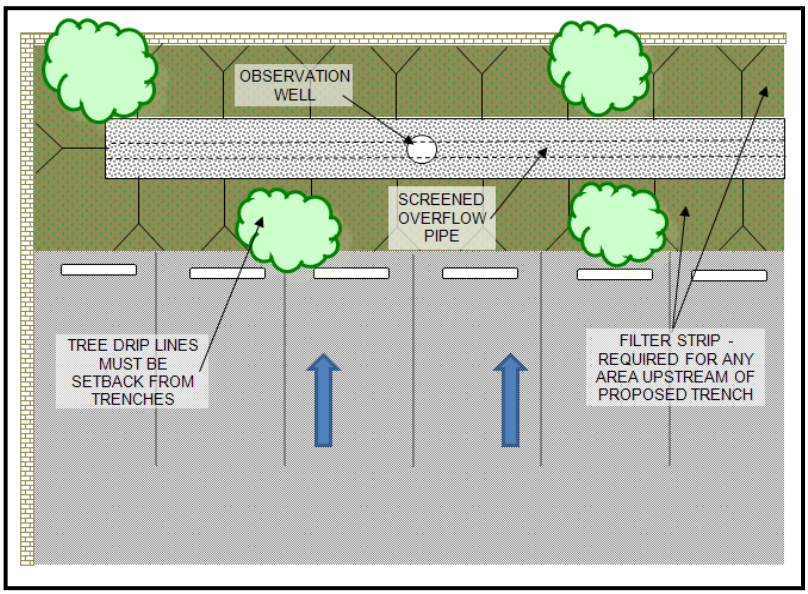


Figure 2 Plan View, Sheet Type Flows

When sheet type flows approach the trench along its length (as illustrated in Figure 2), a vegetated filter strip should be placed between the trench and the upstream drainage area. The filter strip must be a minimum of 5 feet wide and planted with grasses (preferably native) or covered with mulch.

Concentrated flows require a different approach. A 2004 Caltrans BMP Retrofit Report found that flow spreaders recommended in many water quality manuals are ineffective in distributing concentrated flows. As such, concentrated flows should either be directed toward a traditional vegetated swale (as shown on the right side of Figure 3) or to catch basin filters that can remove litter and sediment. Catch basins must discharge runoff as surface flow above the trench; they cannot outlet directly into the reservoir layer of the infiltration trench. If catch basins are used, the short and long term costs of the catch basin filters should be considered.

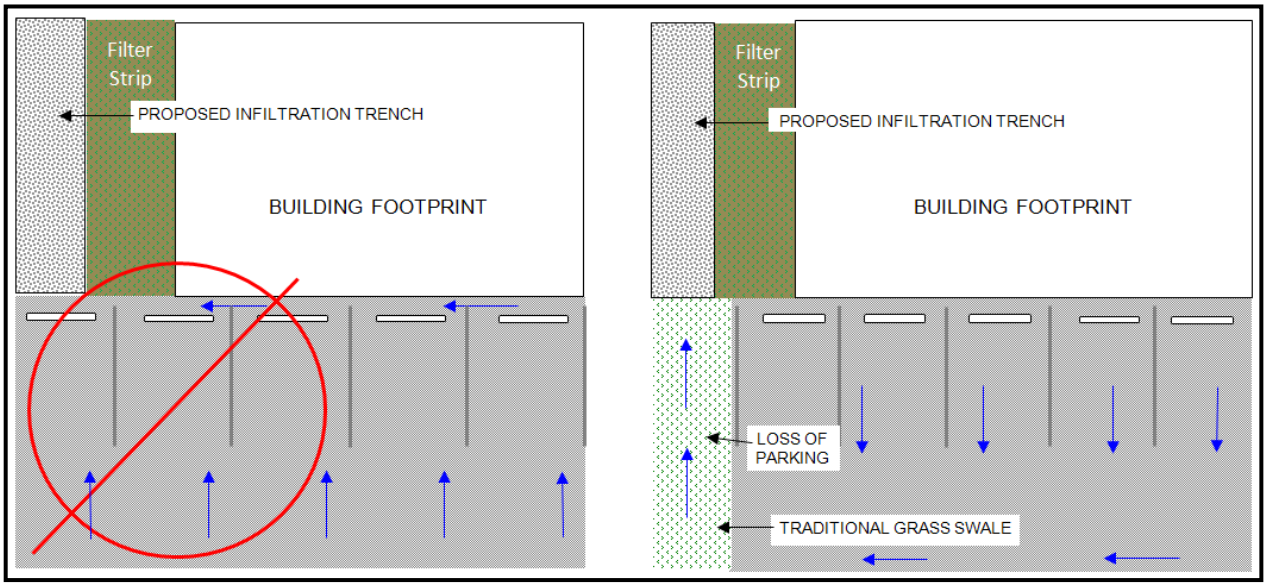


Figure 3 Plan View, Concentrated Flows

Additional Considerations

Class V Status

In certain circumstances, for example, if an infiltration trench is "deeper than its widest surface dimension," or includes an assemblage of perforated pipes, drain tiles, or other similar mechanisms intended to distribute fluids below the surface of the ground, it would probably be considered by the EPA to be a Class V injection well. Class V injection wells are subject to regulations and reporting requirements via the Underground Injection Control (UIC) Program. To ensure that infiltration trenches are not considered Class V wells, the design procedure in this manual requires that the trench not be deeper than it is wide.

Geotechnical Report

A geotechnical report must be included for all infiltration trenches. Appendix A of this Handbook entitled "Infiltration Testing Guidelines", details which types of infiltration tests are acceptable and how many tests or boring logs must be performed. A Geotechnical Report must be submitted in support of all infiltration trenches. Setbacks to walls and foundations must be included in the Geotechnical Report.

Observation Wells

One or more observation wells should be provided. The observation well consists of a vertical section of perforated pipe, 4 to 6 inches in diameter, installed flush with top of trench on a foot plate and have a locking, removable cap.

Overflow

An overflow route is needed to bypass storm flows larger than the V_{BMP} or in the event of clogging. Overflow systems must connect to an acceptable discharge point such as a downstream conveyance system.

Maintenance Access

Normal maintenance of an infiltration trench includes maintenance of the filter strip as well as debris and trash removal from the surface of the trench and filter strip. More substantial maintenance requiring vehicle access may be required every 5 to 10 years. Vehicular access along the length of the swale should be provided to all infiltration trenches. It is preferred that trenches be placed longitudinally along a street or adjacent to a parking lot area. These conditions have high visibility which makes it more likely that the trench will be maintained on a regular basis.

Inspection and Maintenance

Schedule	Inspection and Maintenance Activity
Every two weeks, or as often as necessary to maintain a pleasant appearance	- Maintain adjacent landscaped areas. Remove clippings from landscape maintenance activities. - Remove trash & debris
3 days after Major Storm Events	- Check for surface ponding. If ponding is only above the trench, remove, wash and replace pea gravel. May be needed every 5-10 years. - Check observation well for ponding. If the trench becomes plugged, remove rock materials. Provide a fresh infiltration surface by excavating an additional 2-4 inches of soil. Replace the rock materials.

Design and Sizing Criteria

Design Parameter	Design Criteria
Design Volume	V_{BMP}
Design Drawdown time	72 hrs
Maximum Tributary Drainage Area	10 acres
Maximum Trench Depth	8.0 ft
Width to Depth Ratio	Width must be greater than depth
Reservoir Rock Material	AASHTO #3 or 57 material or a clean, washed aggregate 1 to 3-in diameter equivalent
Filter Strip Width	Minimum of 5 feet in the direction of flow for all areas draining to trench
Filter Strip Slope	Max slope = 1%
Filter Strip Materials	Mulch or grasses (non-mowed variety preferred)
Historic High Groundwater Mark	10 ft or more below bottom of trench
Bedrock/Impermeable Layer Setback	5 ft or more below bottom of trench
Tree Setbacks	Mature tree drip line must not overhang the trench
Trench Lining Material	As recommended in Geotechnical Report

Infiltration Trench Design Procedure

1. Enter the area tributary to the trench, maximum drainage area is 10 acres.

2. Enter the Design Volume, $V_{BMP,}$ determined from Section 2.1 of this Handbook.

3. Enter the site infiltration rate, found in the geotechnical report.

4. Enter the factor of safety from Table 1 of Appendix A, Infiltration Testing.

5. Determine the maximum reservoir layer depth, $D_{MAX.}$ The value is obtained by taking the smaller of two depth equations but may never exceed 8 feet. The first depth, D_1 is related to the infiltration rate of the soil. The second depth, $D_{2,}$ is related to required setbacks to groundwater, bedrock/impermeable layer. These parameters are shown in Figure 1.

   Calculate D_1.

$$D_1 = \frac{I\left({}^{in}/_{hr}\right) \times 72\ (hrs)}{12\left({}^{in}/_{ft}\right) \times {}^{n}/_{100} \times FS}$$

   Where:

   I = site infiltration rate (in/hr), found in the geotechnical report
   FS = factor of safety, refer to Appendix A - Infiltration Testing
   n = porosity of the trench material, 40%

   Calculate D_2. Enter the depth to the seasonal high groundwater and bedrock/impermeable layer measured from the finished grade. The spreadsheet checks the minimum setbacks shown in Figure 1 and selects the smallest value. The equations are listed below for those doing hand calculations.

   Minimum Setbacks (includes 1 foot for pea gravel):

   = Depth to historic high groundwater mark - 11 feet
   = Depth to impermeable layer - 6 feet

   D_2 is the smaller of the two values.

   D_{MAX} is the smaller value of D_1 and $D_{2,}$ and must be less than or equal to 8 feet.

6. Enter the proposed reservoir layer depth, D_R. The value must be no greater than D_{MAX}.

7. Find the required surface area of the trench, A_S. Once D_R is entered, the spreadsheet will calculate the corresponding depth of water and the minimum surface area of the trench.

$$Design\ d_W = D_R \times \left({}^{n}/_{100}\right) \qquad A_S = \frac{V_{BMP}}{Design\ d_W}$$

Where:

A_S = minimum area required (ft^2)
V_{BMP} = BMP storage volume (ft^3)
Design d_W = Depth of water in reservoir layer (ft)

8. Enter the proposed design surface area; it must be greater than the minimum surface area.

9. Calculate the minimum trench width. This is to ensure that EPA's Class V Injection well status is not triggered. The total trench depth (shown in Figure 1) includes the upper foot where the overflow pipe is located. The minimum surface dimension is D_R + 1 foot.

Additional Items

The following items detailed in the preceding sections should also be addressed in the design.

- Sediment Control
- Geotechnical Report
- Observation well(s)
- Overflow

Reference Material

California Stormwater Quality Association. California Stormwater BMP Handbook New Development and Redevelopment. 2003.

County of Los Angeles Department of Public Works. Stormwater BMP Best Management Practice Design and Maintenance Manual for Publicly Maintained Storm Drain Systems. Los Angeles, CA, 2009.

LandSaver Stormwater Management System. Tech Sheet - Porosity of Structural Backfill. 2006.

United States Environmental Protection Agency. Office of Water, Washington D.C. Storm Water Technology Fact Sheet Vegetated Swales. 1999.

United States Environmental Protection Agency. Office of Water. Memorandum on Clarification on Which Stormwater Infiltration Practices/technologies Have the Potential to Be Regulated as "Class V" Wells by Underground Injection Control Program. By Linda Boornazian and Steve Heare. Washington D.C., 2008.

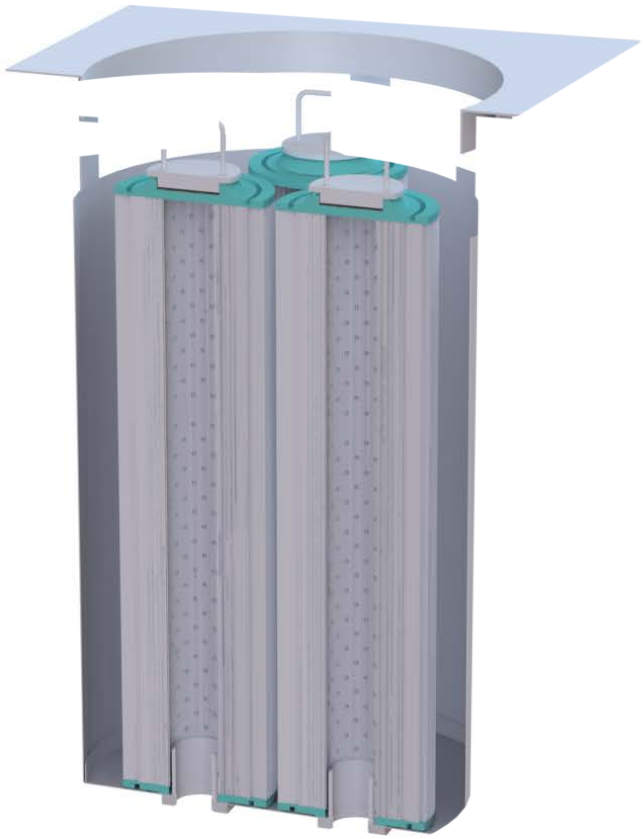
Ventura Countywide Stormwater Quality Management Program. Land Development Guidelines Biofilter Fact Sheet. Ventura, CA, 2001.

Ventura Countywide Stormwater Quality Management Program. Technical Guidance Manual for Stormwater Quality Control Measures. Ventura, CA, 2002.

Grate Inlet Filter
Kraken Type

Bio Clean
A Forterra Company

OPERATION & MAINTENANCE



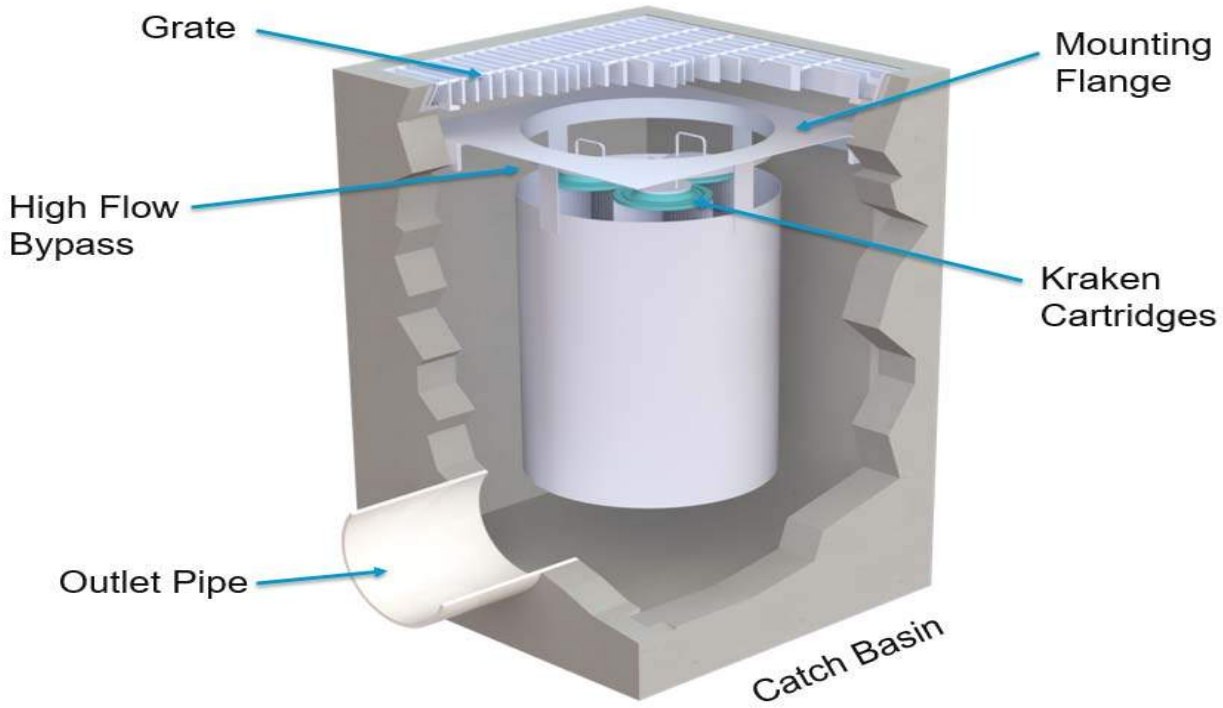
Bio Clean Environmental Services, Inc.
398 Via El Centro
Oceanside, CA 92058

www.BioCleanEnvironmental.com
p: 760.433.7640
f: 760.433.3176

OPERATION & MAINTENANCE

The Bio Clean Grate Inlet Kraken Filter is a stormwater device designed to remove high levels of trash, debris, sediments, hydrocarbons, metals, nutrients and bacteria. The Kraken filter is available in several configurations including trash full capture, multi-level screening, Kraken membrane filter and media filter variations. This manual covers maintenance procedures of the Kraken filter configurations. This filter is made of 100% stainless steel with the exception of the Kraken Cartridges, and is available and various sizes and depths allowing it to fit in any grated catch basin inlet. The filters heavy duty construction allows for cleaning with any vacuum truck. The filet can also easily be cleaned by hand and the Kraken filter cartridges with a pressure washer and/or hose attachment.

As with all stormwater BMPs, inspection and maintenance on the Grate Inlet Kraken Filter is necessary. Stormwater regulations require BMPs be inspected and maintained to ensure they are operating as designed to allow for effective pollutant removal and provide protection to receiving water bodies. It is recommended that inspections be performed multiple times during the first year to assess site-specific loading conditions. This is recommended because pollutant loading can vary greatly from site to site. Variables such as nearby soil erosion or construction sites, winter sanding of roads, amount of daily traffic and land use can increase pollutant loading on the system. The first year of inspections can be used to set inspection and maintenance intervals for subsequent years. Without appropriate maintenance a BMP can exceed its storage capacity which can negatively affect its continued performance in removing and retaining captured pollutants.



System Diagram:

Inspection Equipment

Following is a list of equipment to allow for simple and effective inspection of the Grate Inlet Kraken Filter:

- Bio Clean Environmental Inspection Form (contained within this manual).
- Manhole hook or appropriate tools to remove access hatches and covers.
- Appropriate traffic control signage and procedures.
- Protective clothing and eye protection.
- Note: entering a confined space requires appropriate safety and certification. It is generally not required for routine inspections or maintenance of the system.

Inspection Steps

The core to any successful stormwater BMP maintenance program is routine inspections. The inspection steps required on the Grate Inlet Kraken Filter are quick and easy. As mentioned above the first year should be seen as the maintenance interval establishment phase. During the first year more frequent inspections should occur in order to gather loading data and maintenance requirements for that specific site. This information can be used to establish a base for long-term inspection and maintenance interval requirements.

The Grate Inlet Kraken Filter can be inspected though visual observation. All necessary pre-inspection steps must be carried out before inspection occurs, such as safety measures to protect the inspector and nearby pedestrians from any dangers associated with an open grated inlet. Once the grate has been safely removed the inspection process can proceed:

- Prepare the inspection form by writing in the necessary information including project name, location, date & time, unit number and other info (see inspection form).
- Observe the filter with the grate removed.
- Look for any out of the ordinary obstructions on the grate or in the filter and its bypass. Write down any observations on the inspection form.
- Through observation and/or digital photographs estimate the amount of trash, foliage and sediment accumulated inside the filter basket. Record this information on the inspection form.
- Observe the condition and color of the Kraken Filter cartridges. Record this information on the inspection form.
- Finalize inspection report for analysis by the maintenance manager to determine if maintenance is required.

Maintenance Indicators

Based upon observations made during inspection, maintenance of the system may be required based on the following indicators:

- Missing or damaged internal components or Kraken Filters.
- Obstructions in the filter basket and its bypass.
- Excessive accumulation of trash, foliage and sediment in the filter basket. Maintenance is required when the basket is greater than half-full.
- Kraken Filter cartridges are clogged.
- The following chart shows the 50% and 100% storage capacity of each filter height:

Model	Filter Basket Diameter (in)	Number of Kraken Cartridges	*50% Storage Capacity (cu ft)	*100% Storage Capacity (cu ft)
BC-GRATE-12-12-30	10.00	1.00	0.27	0.54
BC-GRATE-18-18-30	16.00	1.00	1.34	2.67
BC-GRATE-24-24-30	21.00	2.00	2.19	4.37
BC-GRATE-30-30-30	27.00	4.00	3.33	6.66
BC-GRATE-36-36-30	33.00	7.00	4.56	9.11
BC-GRATE-48-48-30	44.00	13.00	7.87	15.74

*Storage capacity based on open area around cartridges for accumilation of larger sediments, debris and trash. Additional sediment storage within the each cartridge and its pleated area.

Maintenance Equipment

It is recommended that a vacuum truck be utilized to minimize the time required to maintain the Grate Inlet Kraken Filter, though it can easily cleaned by hand with a hose:

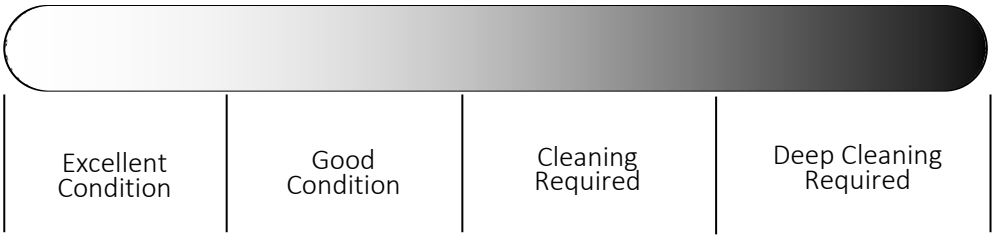
- Bio Clean Environmental Maintenance Form (contained in O&M Manual).
- Manhole hook or appropriate tools to remove the grate.
- Appropriate safety signage and procedures.
- Protective clothing and eye protection.
- Note: entering a confined space requires appropriate safety and certification. It is generally not required for routine maintenance of the system. Small or large vacuum truck (with pressure washer attachment required).

Maintenance Procedures

It is recommended that maintenance occurs at least two days after the most recent rain event to allow debris and sediments to dry out. Maintaining the system while flows are still entering it will increase the time and complexity required for maintenance. Cleaning of the Grate Inlet Kraken Filter can be performed utilizing a vacuum truck. Once all safety measures have been set up cleaning of the Grate Inlet Kraken Filter can proceed as followed:

- Remove grate (traffic control and safety measures to be completed prior).
- Unscrew each Kraken Filter cartridge and remove from the Grate Inlet Filter. Set aside for later cleaning.
- Using an extension on a vacuum truck position the hose over the opened catch basin. Insert the vacuum hose down into the filter basket and suck out trash, foliage and sediment. A pressure washer is recommended and will assist in spraying of any debris stuck on the side or bottom of the filter basket. Power wash off the filter basket sides and bottom.
- Next place each Kraken Cartridge over a trash can or container to capture water. Using a pressure washer or hose attachment carefully spray, from top to bottom, the pleated area of the cartridge on all sides. Repeat if necessary until all sediment and hydrocarbon accumulation is removed and color of membrane material is again while. Repeat process with all cartridges. Kraken Cartridges can be reused for over a 5 year period. Kraken Cartridges can be ordered directly from the manufacturer if current ones are damaged or spent (membrane material is deteriorating).

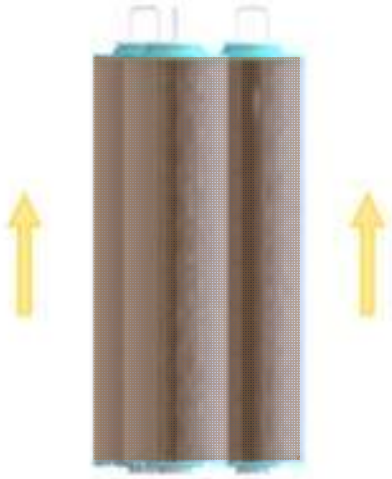
- Follow is a maintenance indication color chart for the Kraken Cartridges:



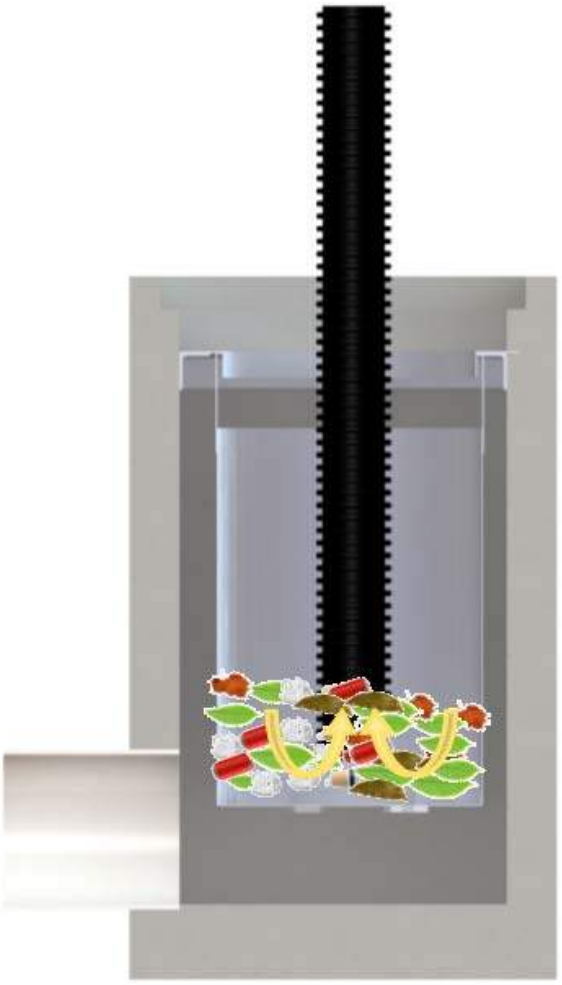
- Once all Kraken Cartridges are cleaned replace back into the filter ensuring cartridges are securely fastened to the couplers and pushed fully in place with their bottoms making contact with the floor of the filter.
- The last step is to replace the grate and remove all traffic control.
- All removed debris, filter media and pollutants shall be disposed of following local and state requirements.
- Disposal requirements for recovered pollutants may vary depending on local guidelines. In most areas the sediment, once dewatered, can be disposed of in a sanitary landfill. It is not anticipated that the sediment would be classified as hazardous waste.
- In the case of damaged components, replacement parts can be ordered from the manufacturer. Hydrocarbon booms can also be ordered directly from the manufacturer as previously noted.

Maintenance Sequence

Remove grate and set up vacuum truck to clean the filter basket.

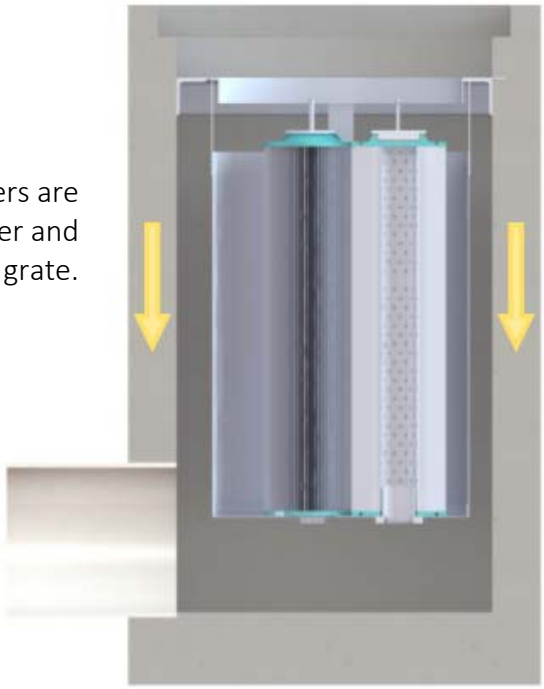


Remove filters.
Set aside for later cleaning.



Remove the hydrocarbon boom that is attached to the inside of the filter basket. Replace if necessary. Next lift out removable top screen by the handle to gain access to the media filter chamber below. Assess the condition of the media and if needed prepare the vacuum hose to suck out the spent media.

After Kraken Filters are cleaned replace in filter and replace grate.



For Maintenance Services or Information Please Contact Us At:
760-433-7640
Or Email:
info@biocleanenvironmental.com

Bio Clean
A Forterra Company

Inspection and Maintenance Report
Catch Basin Only

Project Name _____

Project Address _____
(city) (Zip Code)

Owner / Management Company _____

Contact _____ Phone ( ) –

Inspector Name _____ Date ____/____/____ Time _____ AM / PM

Type of Inspection ☐ Routine ☐ollow Up ☐omplaint ☐torm Storm Event in Last 72-hours? ☐ ☐s

Weather Condition _____ Additional Notes _____

For Office Use Only
(Reviewed By)
(Date)
Office personnel to complete section to the left.

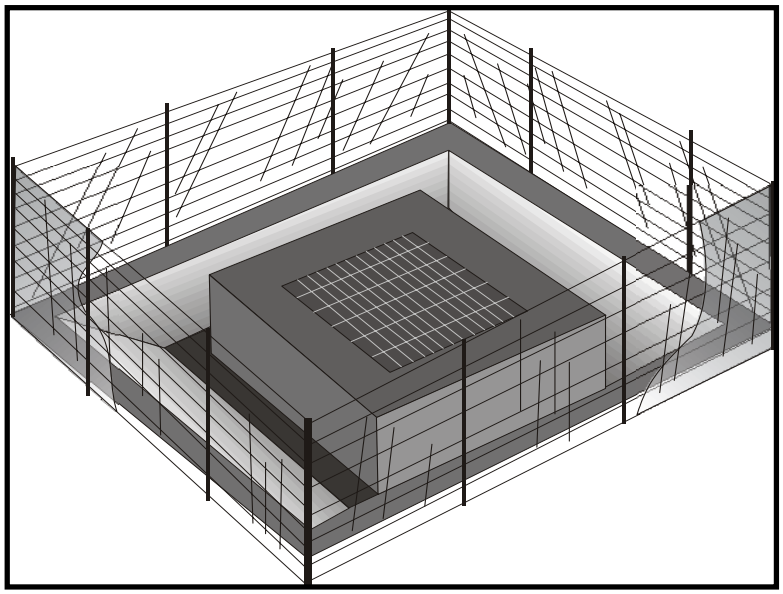
Site Map #	GPS Coordinates of Insert	Catch Basin Size	Evidence of Illicit Discharge?	Trash Accumulation	Foliage Accumulation	Sediment Accumulation	Signs of Structural Damage?	Functioning Properly or Maintenance Needed?
1	Lat: Long:							
2	Lat: Long:							
3	Lat: Long:							
4	Lat: Long:							
5	Lat: Long:							
6	Lat: Long:							
7	Lat: Long:							
8	Lat: Long:							
10	Lat: Long:							
11	Lat: Long:							
12	Lat: Long:							

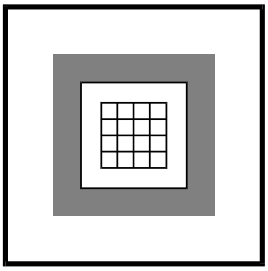
Comments:

398 Via El Centro, Oceanside, CA 92058 P. 760.433.7640 F. 760.433.3176

Storm Drain Inlet Protection

SC-10





Standard Symbol

BMP Objectives

- ○ Soil Stabilization
- ● Sediment Control
- ○ Tracking Control
- ○ Wind Erosion Control
- ○ Non-Storm Water Management
- ○ Materials and Waste Management

Definition and Purpose

Devices used at storm drain inlets that are subject to runoff from construction activities to detain and/or to filter sediment-laden runoff to allow sediment to settle and/or to filter sediment prior to discharge into storm drainage systems or watercourses.

Appropriate Applications

- Where ponding will not encroach into highway traffic.
- Where sediment laden surface runoff may enter an inlet.
- Where disturbed drainage areas have not yet been permanently stabilized.
- Where the drainage area is 0.4 ha (1 ac) or less.
- Appropriate during wet and snow-melt seasons.

Limitations

- Requires an adequate area for water to pond without encroaching upon traveled way and should not present itself to be an obstacle to oncoming traffic.
- May require other methods of temporary protection to prevent sediment-laden storm water and non-storm water discharges from entering the storm drain system.
- Sediment removal may be difficult in high flow conditions or if runoff is heavily sediment laden. If high flow conditions are expected, use other on-site sediment trapping techniques (e.g. check dams) in conjunction with inlet protection.
- Frequent maintenance is required.
- For drainage areas larger than 0.4 ha (1 ac), runoff shall be routed to a sediment trapping device designed for larger flows. See BMPs SC-2, “Sediment/Desilting Basin,” and SC-3 “Sediment Trap.”

- Filter fabric fence inlet protection is appropriate in open areas that are subject to sheet flow and for flows not exceeding 0.014 m3/s (0.5 cfs).
- Gravel bag barriers for inlet protection are applicable when sheet flows or concentrated flows exceed 0.014 m3/s (0.5 cfs), and it is necessary to allow for overtopping to prevent flooding.
- Fiber rolls and foam barriers are not appropriate for locations where they cannot be properly anchored to the surface.
- Excavated drop inlet sediment traps are appropriate where relatively heavy flows are expected and overflow capability is needed.

Standards and Specifications

Identify existing and/or planned storm drain inlets that have the potential to receive sediment-laden surface runoff. Determine if storm drain inlet protection is needed, and which method to use.

Methods and Installation

- ***DI Protection Type 1 - Filter Fabric Fence -*** The filter fabric fence (Type 1) protection is illustrated on Page 5. Similar to constructing a silt fence. See BMP SC-1, "Silt Fence." Do not place filter fabric underneath the inlet grate since the collected sediment may fall into the drain inlet when the fabric is removed or replaced.
- ***DI Protection Type 2 - Excavated Drop Inlet Sediment Trap -*** The excavated drop inlet sediment trap (Type 2) is illustrated in Page 6. Similar to constructing a temporary silt fence, See BMP SC-1, "Silt Fence." Size excavated trap to provide a minimum storage capacity calculated at the rate of 130 m3/ha (67 yd3/ac) of drainage area.
- ***DI Protection Type 3 – Gravel bag -*** The gravel bag barrier (Type 3) is illustrated in Page 7. Flow from a severe storm shall not overtop the curb. In areas of high clay and silts, use filter fabric and gravel as additional filter media. Construct gravel bags in accordance with BMP SC-6, "Gravel Bag Berm." Gravel bags shall be used due to their high permeability.
- ***DI Protection Type 4 – Foam Barriers and Fiber Rolls –*** Foam barrier or fiber roll (Type 4) is placed around the inlet and keyed and anchored to the surface. Foam barriers and fiber rolls are intended for use as inlet protection where the area around the inlet is unpaved and the foam barrier or fiber roll can be secured to the surface. RE or Construction Storm Water Coordinator approval is required.

Maintenance and Inspection

General

- Inspect all inlet protection devices before and after every rainfall event, and weekly during the rest of the rainy season. During extended rainfall events, inspect inlet protection devices at least once every 24 hours.

- Inspect the storm drain inlet after severe storms in the rainy season to check for bypassed material.
- Remove all inlet protection devices within thirty days after the site is stabilized, or when the inlet protection is no longer needed.
  - Bring the disturbed area to final grade and smooth and compact it. Appropriately stabilize all bare areas around the inlet.
  - Clean and re-grade area around the inlet and clean the inside of the storm drain inlet as it must be free of sediment and debris at the time of final inspection.

Requirements by Method

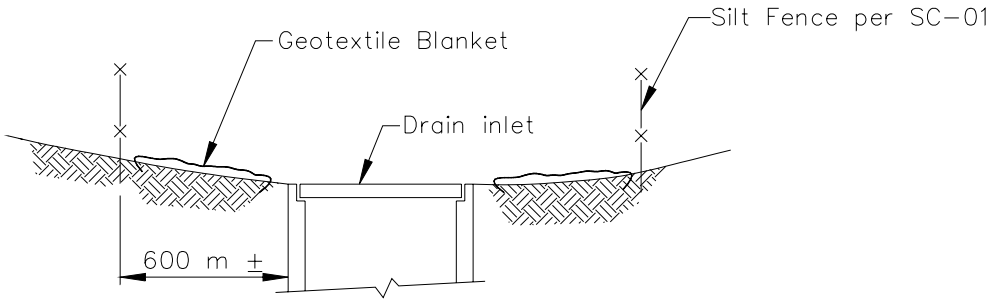
- ***Type 1 - Filter Fabric Fence***
  - This method shall be used for drain inlets requiring protection in areas where finished grade is established and erosion control seeding has been applied or is pending.
  - Make sure the stakes are securely driven in the ground and are structurally sound (i.e., not bent, cracked, or splintered, and are reasonably perpendicular to the ground). Replace damaged stakes.
  - Replace or clean the fabric when the fabric becomes clogged with sediment. Make sure the fabric does not have any holes or tears. Repair or replace fabric as needed or as directed by the RE.
  - At a minimum, remove the sediment behind the fabric fence when accumulation reaches one-third the height of the fence or barrier height. Removed sediment shall be incorporated in the project at locations designated by the RE or disposed of outside the highway right-of-way in conformance with the Standard Specifications Section 7-1.13.
- ***Type 2 – Excavated Drop Inlet Sediment Trap***
  - This method may be used for drain inlets requiring protection in areas that have been cleared and grubbed, and where exposed soil areas are subject to grading.
  - Remove sediment from basin when the volume of the basin has been reduced by one-half.
- ***Type 3 - Gravel Bag Barrier***
  - This method may be used for drain inlets surrounded by AC or paved surfaces.
  - Inspect bags for holes, gashes, and snags.

- Check gravel bags for proper arrangement and displacement. Remove the sediment behind the barrier when it reaches one-third the height of the barrier. Removed sediment shall be incorporated in the project at locations designated by the RE or disposed of outside the highway right-of-way in conformance with the Standard Specifications Section 7-1.13.

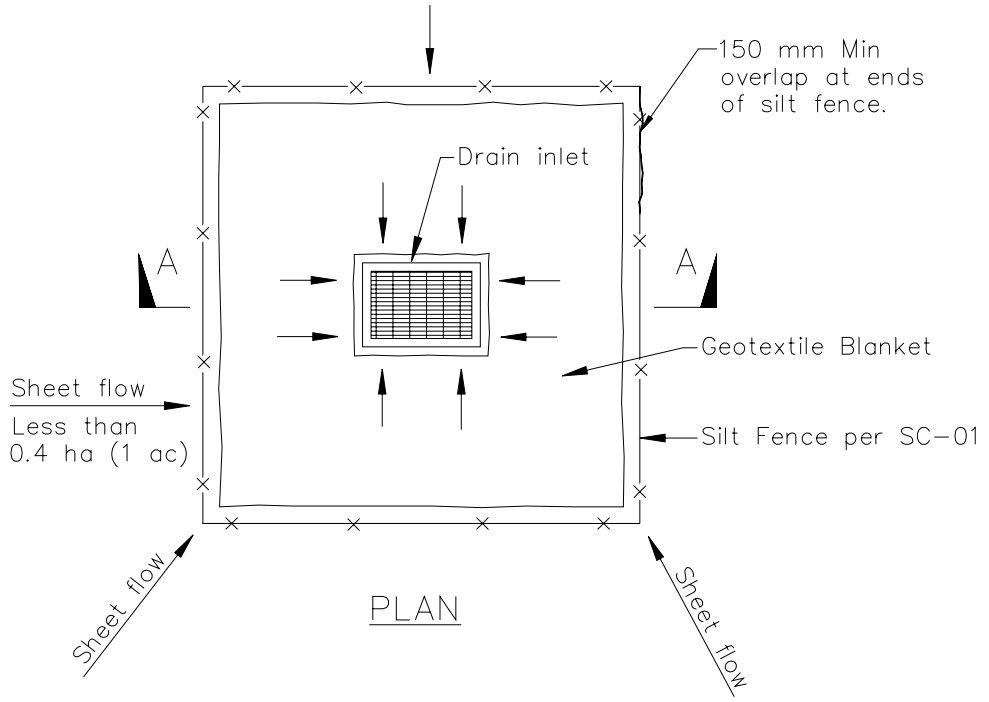
■ ***Type 4 Foam Barriers and Fiber Rolls***

- This method may be used for drain inlets requiring protection in areas that have been cleared and grubbed, and where exposed soil areas subject to grading. RE or Construction Storm Coordinator approval is required.

- Check foam barrier or fiber roll for proper arrangement and displacement. Remove the sediment behind the barrier when it reaches one-third the height of the barrier. Removed sediment shall be incorporated in the project at locations designated by the RE or disposed of outside the highway right-of-way in conformance with the Standard Specifications.



SECTION A–A

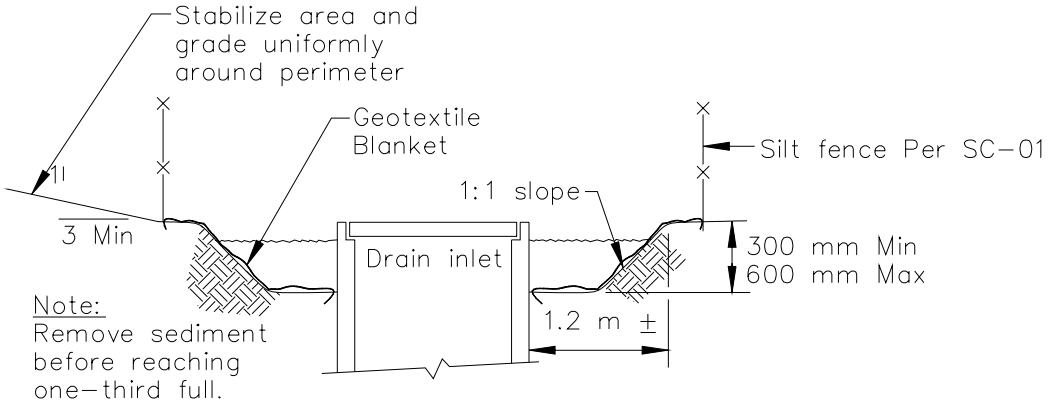


PLAN

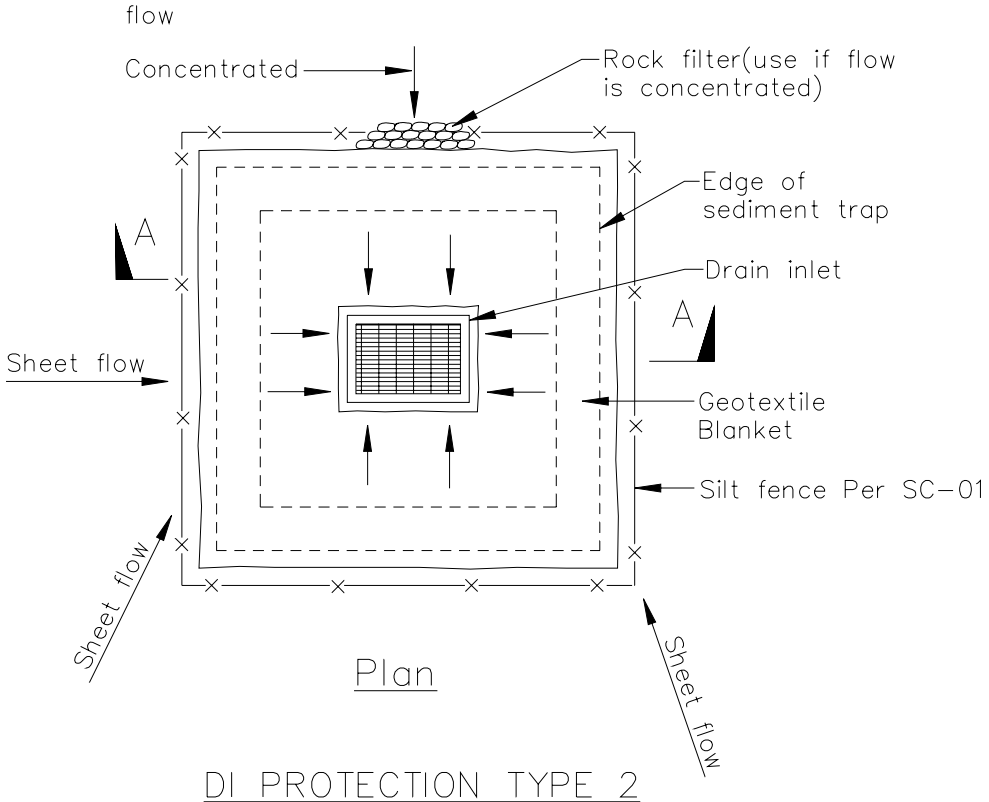
DI PROTECTION TYPE 1
NOT TO SCALE

NOTES:

1. For use in areas where grading has been completed and final soil stabilization and seeding are pending.
2. Not applicable in paved areas.
3. Not applicable with concentrated flows.



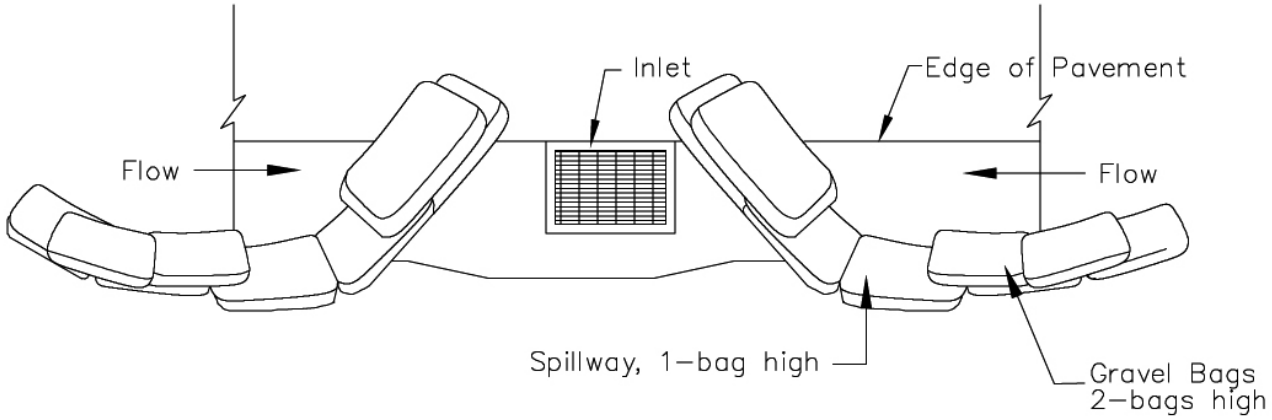
Section A–A



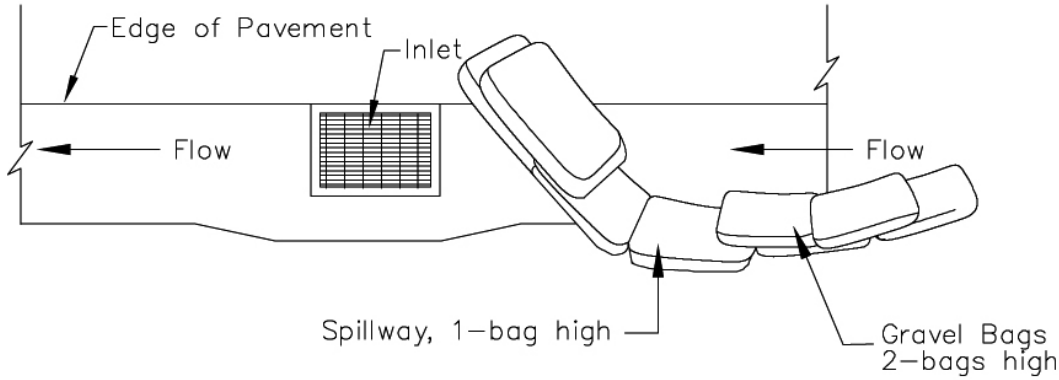
Plan

DI PROTECTION TYPE 2
NOT TO SCALE

Notes
1. For use in cleared and grubbed and in graded areas.
2. Shape basin so that longest inflow area faces longest length of trap.
3. For concentrated flows, shape basin in 2:1 ratio with length oriented towards direction of flow.



TYPICAL PROTECTION FOR INLET WITH OPOSING FLOW DIRECTIONS



TYPICAL PROTECTION FOR INLET WITH SINGLE FLOW DIRECTION

NOTES:

1. Intended for short–term use.
2. Use to inhibit non–storm water flow.
3. Allow for proper maintenance and cleanup.
4. Bags must be removed after adjacent operation is completed
5. Not applicable in areas with high silts and clays without filter fabric.

Spill Prevention, Control & Cleanup SC-11

Photo Credit: Geoff Brosseau

Objectives

- Cover
- Contain
- Educate
- Reduce/Minimize
- Product Substitution

Description

Many activities that occur at an industrial or commercial site have the potential to cause accidental or illegal spills. Preparation for accidental or illegal spills, with proper training and reporting systems implemented, can minimize the discharge of pollutants to the environment.

Spills and leaks are one of the largest contributors of stormwater pollutants. Spill prevention and control plans are applicable to any site at which hazardous materials are stored or used. An effective plan should have spill prevention and response procedures that identify potential spill areas, specify material handling procedures, describe spill response procedures, and provide spill clean-up equipment. The plan should take steps to identify and characterize potential spills, eliminate and reduce spill potential, respond to spills when they occur in an effort to prevent pollutants from entering the stormwater drainage system, and train personnel to prevent and control future spills.

Targeted Constituents

Sediment	
Nutrients	
Trash	
Metals	✓
Bacteria	
Oil and Grease	✓
Organics	✓

Approach

Pollution Prevention

- Develop procedures to prevent/mitigate spills to storm drain systems. Develop and standardize reporting procedures, containment, storage, and disposal activities, documentation, and follow-up procedures.

- Develop a Spill Prevention Control and Countermeasure (SPCC) Plan. The plan should include:

- Description of the facility, owner and address, activities and chemicals present
- Facility map
- Notification and evacuation procedures
- Cleanup instructions
- Identification of responsible departments
- Identify key spill response personnel

- Recycle, reclaim, or reuse materials whenever possible. This will reduce the amount of process materials that are brought into the facility.

Suggested Protocols (including equipment needs)

Spill Prevention

- Develop procedures to prevent/mitigate spills to storm drain systems. Develop and standardize reporting procedures, containment, storage, and disposal activities, documentation, and follow-up procedures.

- If consistent illegal dumping is observed at the facility:
  - Post "No Dumping" signs with a phone number for reporting illegal dumping and disposal. Signs should also indicate fines and penalties applicable for illegal dumping.
  - Landscaping and beautification efforts may also discourage illegal dumping.
  - Bright lighting and/or entrance barriers may also be needed to discourage illegal dumping.

- Store and contain liquid materials in such a manner that if the tank is ruptured, the contents will not discharge, flow, or be washed into the storm drainage system, surface waters, or groundwater.

- If the liquid is oil, gas, or other material that separates from and floats on water, install a spill control device (such as a tee section) in the catch basins that collects runoff from the storage tank area.

- Routine maintenance:
  - Place drip pans or absorbent materials beneath all mounted taps, and at all potential drip and spill locations during filling and unloading of tanks. Any collected liquids or soiled absorbent materials must be reused/recycled or properly disposed.
  - Store and maintain appropriate spill cleanup materials in a location known to all near the tank storage area; and ensure that employees are familiar with the site's spill control plan and/or proper spill cleanup procedures.
  - Sweep and clean the storage area monthly if it is paved, *do not hose down the area to a storm drain.*

  - Check tanks (and any containment sumps) daily for leaks and spills. Replace tanks that are leaking, corroded, or otherwise deteriorating with tanks in good condition. Collect all spilled liquids and properly dispose of them.

- Label all containers according to their contents (e.g., solvent, gasoline).
- Label hazardous substances regarding the potential hazard (corrosive, radioactive, flammable, explosive, poisonous).
- Prominently display required labels on transported hazardous and toxic materials (per US DOT regulations).
- Identify key spill response personnel.

Spill Control and Cleanup Activities

- Follow the Spill Prevention Control and Countermeasure Plan.
- Clean up leaks and spills immediately.
- Place a stockpile of spill cleanup materials where it will be readily accessible (e.g., near storage and maintenance areas).
- On paved surfaces, clean up spills with as little water as possible. Use a rag for small spills, a damp mop for general cleanup, and absorbent material for larger spills. If the spilled material is hazardous, then the used cleanup materials are also hazardous and must be sent to a certified laundry (rags) or disposed of as hazardous waste. Physical methods for the cleanup of dry chemicals include the use of brooms, shovels, sweepers, or plows.
- Never hose down or bury dry material spills. Sweep up the material and dispose of properly.
- Chemical cleanups of material can be achieved with the use of adsorbents, gels, and foams. Use adsorbent materials on small spills rather than hosing down the spill. Remove the adsorbent materials promptly and dispose of properly.
- For larger spills, a private spill cleanup company or Hazmat team may be necessary.

Reporting

- Report spills that pose an immediate threat to human health or the environment to the Regional Water Quality Control Board.
- Federal regulations require that any oil spill into a water body or onto an adjoining shoreline be reported to the National Response Center (NRC) at 800-424-8802 (24 hour).
- Report spills to local agencies, such as the fire department; they can assist in cleanup.
- Establish a system for tracking incidents. The system should be designed to identify the following:

  - Types and quantities (in some cases) of wastes

  - Patterns in time of occurrence (time of day/night, month, or year)

- Mode of dumping (abandoned containers, "midnight dumping" from moving vehicles, direct dumping of materials, accidents/spills)

- Responsible parties

Training

- Educate employees about spill prevention and cleanup.

- Well-trained employees can reduce human errors that lead to accidental releases or spills:

  - The employee should have the tools and knowledge to immediately begin cleaning up a spill should one occur.

  - Employees should be familiar with the Spill Prevention Control and Countermeasure Plan.

- Employees should be educated about aboveground storage tank requirements. Employees responsible for aboveground storage tanks and liquid transfers should be thoroughly familiar with the Spill Prevention Control and Countermeasure Plan and the plan should be readily available.

- Train employees to recognize and report illegal dumping incidents.

Other Considerations (Limitations and Regulations)

- State regulations exist for facilities with a storage capacity of 10,000 gallons or more of petroleum to prepare a Spill Prevention Control and Countermeasure (SPCC) Plan (Health & Safety Code Chapter 6.67).

- State regulations also exist for storage of hazardous materials (Health & Safety Code Chapter 6.95), including the preparation of area and business plans for emergency response to the releases or threatened releases.

- Consider requiring smaller secondary containment areas (less than 200 sq. ft.) to be connected to the sanitary sewer, prohibiting any hard connections to the storm drain.

Requirements

Costs (including capital and operation & maintenance)

- Will vary depending on the size of the facility and the necessary controls.

- Prevention of leaks and spills is inexpensive. Treatment and/or disposal of contaminated soil or water can be quite expensive.

Maintenance (including administrative and staffing)

- This BMP has no major administrative or staffing requirements. However, extra time is needed to properly handle and dispose of spills, which results in increased labor costs.

Supplemental Information

Further Detail of the BMP

Reporting

Record keeping and internal reporting represent good operating practices because they can increase the efficiency of the facility and the effectiveness of BMPs. A good record keeping system helps the facility minimize incident recurrence, correctly respond with appropriate cleanup activities, and comply with legal requirements. A record keeping and reporting system should be set up for documenting spills, leaks, and other discharges, including discharges of hazardous substances in reportable quantities. Incident records describe the quality and quantity of non-stormwater discharges to the storm sewer. These records should contain the following information:

- Date and time of the incident
- Weather conditions
- Duration of the spill/leak/discharge
- Cause of the spill/leak/discharge
- Response procedures implemented
- Persons notified
- Environmental problems associated with the spill/leak/discharge

Separate record keeping systems should be established to document housekeeping and preventive maintenance inspections, and training activities. All housekeeping and preventive maintenance inspections should be documented. Inspection documentation should contain the following information:

- The date and time the inspection was performed
- Name of the inspector
- Items inspected
- Problems noted
- Corrective action required
- Date corrective action was taken

Other means to document and record inspection results are field notes, timed and dated photographs, videotapes, and drawings and maps.

Aboveground Tank Leak and Spill Control

Accidental releases of materials from aboveground liquid storage tanks present the potential for contaminating stormwater with many different pollutants. Materials spilled, leaked, or lost from

tanks may accumulate in soils or on impervious surfaces and be carried away by stormwater runoff.

The most common causes of unintentional releases are:

- Installation problems
- Failure of piping systems (pipes, pumps, flanges, couplings, hoses, and valves)
- External corrosion and structural failure
- Spills and overfills due to operator error
- Leaks during pumping of liquids or gases from truck or rail car to a storage tank or vice versa

Storage of reactive, ignitable, or flammable liquids should comply with the Uniform Fire Code and the National Electric Code. Practices listed below should be employed to enhance the code requirements:

- Tanks should be placed in a designated area.
- Tanks located in areas where firearms are discharged should be encapsulated in concrete or the equivalent.
- Designated areas should be impervious and paved with Portland cement concrete, free of cracks and gaps, in order to contain leaks and spills.
- Liquid materials should be stored in UL approved double walled tanks or surrounded by a curb or dike to provide the volume to contain 10 percent of the volume of all of the containers or 110 percent of the volume of the largest container, whichever is greater. The area inside the curb should slope to a drain.
- For used oil or dangerous waste, a dead-end sump should be installed in the drain.
- All other liquids should be drained to the sanitary sewer if available. The drain must have a positive control such as a lock, valve, or plug to prevent release of contaminated liquids.
- Accumulated stormwater in petroleum storage areas should be passed through an oil/water separator.

Maintenance is critical to preventing leaks and spills. Conduct routine inspections and:

- Check for external corrosion and structural failure.
- Check for spills and overfills due to operator error.
- Check for failure of piping system (pipes, pumps, flanger, coupling, hoses, and valves).
- Check for leaks or spills during pumping of liquids or gases from truck or rail car to a storage facility or vice versa.

- Visually inspect new tank or container installation for loose fittings, poor welding, and improper or poorly fitted gaskets.
- Inspect tank foundations, connections, coatings, and tank walls and piping system. Look for corrosion, leaks, cracks, scratches, and other physical damage that may weaken the tank or container system.
- Frequently relocate accumulated stormwater during the wet season.
- Periodically conduct integrity testing by a qualified professional.

Vehicle Leak and Spill Control

Major spills on roadways and other public areas are generally handled by highly trained Hazmat teams from local fire departments or environmental health departments. The measures listed below pertain to leaks and smaller spills at vehicle maintenance shops.

In addition to implementing the spill prevention, control, and clean up practices above, use the following measures related to specific activities:

Vehicle and Equipment Maintenance

- Perform all vehicle fluid removal or changing inside or under cover to prevent the run-on of stormwater and the runoff of spills.
- Regularly inspect vehicles and equipment for leaks, and repair immediately.
- Check incoming vehicles and equipment (including delivery trucks, and employee and subcontractor vehicles) for leaking oil and fluids. Do not allow leaking vehicles or equipment onsite.
- Always use secondary containment, such as a drain pan or drop cloth, to catch spills or leaks when removing or changing fluids.
- Immediately drain all fluids from wrecked vehicles.
- Store wrecked vehicles or damaged equipment under cover.
- Place drip pans or absorbent materials under heavy equipment when not in use.
- Use adsorbent materials on small spills rather than hosing down the spill.
- Remove the adsorbent materials promptly and dispose of properly.
- Promptly transfer used fluids to the proper waste or recycling drums. Don't leave full drip pans or other open containers lying around.
- Oil filters disposed of in trashcans or dumpsters can leak oil and contaminate stormwater. Place the oil filter in a funnel over a waste oil recycling drum to drain excess oil before disposal. Oil filters can also be recycled. Ask your oil supplier or recycler about recycling oil filters.

- Store cracked batteries in a non-leaking secondary container. Do this with all cracked batteries, even if you think all the acid has drained out. If you drop a battery, treat it as if it is cracked. Put it into the containment area until you are sure it is not leaking.

Vehicle and Equipment Fueling

- Design the fueling area to prevent the run-on of stormwater and the runoff of spills:
  - Cover fueling area if possible.
  - Use a perimeter drain or slope pavement inward with drainage to a sump.
  - Pave fueling area with concrete rather than asphalt.
- If dead-end sump is not used to collect spills, install an oil/water separator.
- Install vapor recovery nozzles to help control drips as well as air pollution.
- Discourage "topping-off' of fuel tanks.
- Use secondary containment when transferring fuel from the tank truck to the fuel tank.
- Use adsorbent materials on small spills and general cleaning rather than hosing down the area. Remove the adsorbent materials promptly.
- Carry out all Federal and State requirements regarding underground storage tanks, or install above ground tanks.
- Do not use mobile fueling of mobile industrial equipment around the facility; rather, transport the equipment to designated fueling areas.
- Keep your Spill Prevention Control and Countermeasure (SPCC) Plan up-to-date.
- Train employees in proper fueling and cleanup procedures.

Industrial Spill Prevention Response

For the purposes of developing a spill prevention and response program to meet the stormwater regulations, facility managers should use information provided in this fact sheet and the spill prevention/response portions of the fact sheets in this handbook, for specific activities. The program should:

- Integrate with existing emergency response/hazardous materials programs (e.g., Fire Department)
- Develop procedures to prevent/mitigate spills to storm drain systems
- Identify responsible departments
- Develop and standardize reporting procedures, containment, storage, and disposal activities, documentation, and follow-up procedures
- Address spills at municipal facilities, as well as public areas

- Provide training concerning spill prevention, response and cleanup to all appropriate personnel

References and Resources

California's Nonpoint Source Program Plan http://www.swrcb.ca.gov/nps/index.html

Clark County Storm Water Pollution Control Manual
http://www.co.clark.wa.us/pubworks/bmpman.pdf

King County Storm Water Pollution Control Manual http://dnr.metrokc.gov/wlr/dss/spcm.htm

Santa Clara Valley Urban Runoff Pollution Prevention Program http://www.scvurppp.org

The Stormwater Managers Resource Center http://www.stormwatercenter.net/

Parking/Storage Area Maintenance SC-43

Objectives

- Cover
- Contain
- Educate
- Reduce/Minimize
- Product Substitution

Targeted Constituents

Sediment	✓
Nutrients	
Trash	✓
Metals	✓
Bacteria	
Oil and Grease	✓
Organics	✓

Description

Parking lots and storage areas can contribute a number of substances, such as trash, suspended solids, hydrocarbons, oil and grease, and heavy metals that can enter receiving waters through stormwater runoff or non-stormwater discharges. The protocols in this fact sheet are intended to prevent or reduce the discharge of pollutants from parking/storage areas and include using good housekeeping practices, following appropriate cleaning BMPs, and training employees.

Approach

The goal of this program is to ensure stormwater pollution prevention practices are considered when conducting activities on or around parking areas and storage areas to reduce potential for pollutant discharge to receiving waters. Successful implementation depends on effective training of employees on applicable BMPs and general pollution prevention strategies and objectives.

Pollution Prevention

- Encourage alternative designs and maintenance strategies for impervious parking lots. (See New Development and Redevelopment BMP Handbook)
- Keep accurate maintenance logs to evaluate BMP implementation.

CASQA California Stormwater Quality Association

SC-43 Parking/Storage Area Maintenance

Suggested Protocols

General

- Keep the parking and storage areas clean and orderly. Remove debris in a timely fashion.
- Allow sheet runoff to flow into biofilters (vegetated strip and swale) and/or infiltration devices.
- Utilize sand filters or oleophilic collectors for oily waste in low quantities.
- Arrange rooftop drains to prevent drainage directly onto paved surfaces.
- Design lot to include semi-permeable hardscape.
- Discharge soapy water remaining in mop or wash buckets to the sanitary sewer through a sink, toilet, clean-out, or wash area with drain.

Controlling Litter

- Post "No Littering" signs and enforce anti-litter laws.
- Provide an adequate number of litter receptacles.
- Clean out and cover litter receptacles frequently to prevent spillage.
- Provide trash receptacles in parking lots to discourage litter.
- Routinely sweep, shovel, and dispose of litter in the trash.

Surface Cleaning

- Use dry cleaning methods (e.g., sweeping, vacuuming) to prevent the discharge of pollutants into the stormwater conveyance system if possible.
- Establish frequency of public parking lot sweeping based on usage and field observations of waste accumulation.
- Sweep all parking lots at least once before the onset of the wet season.
- Follow the procedures below if water is used to clean surfaces:
  - Block the storm drain or contain runoff.
  - Collect and pump wash water to the sanitary sewer or discharge to a pervious surface. Do not allow wash water to enter storm drains.
  - Dispose of parking lot sweeping debris and dirt at a landfill.
- Follow the procedures below when cleaning heavy oily deposits:
  - Clean oily spots with absorbent materials.
  - Use a screen or filter fabric over inlet, then wash surfaces.

- Do not allow discharges to the storm drain.
- Vacuum/pump discharges to a tank or discharge to sanitary sewer.
- Appropriately dispose of spilled materials and absorbents.

Surface Repair

- Preheat, transfer or load hot bituminous material away from storm drain inlets.
- Apply concrete, asphalt, and seal coat during dry weather to prevent contamination from contacting stormwater runoff.
- Cover and seal nearby storm drain inlets where applicable (with waterproof material or mesh) and manholes before applying seal coat, slurry seal, etc. Leave covers in place until job is complete and all water from emulsified oil sealants has drained or evaporated. Clean any debris from these covered manholes and drains for proper disposal.
- Use only as much water as necessary for dust control, to avoid runoff.
- Catch drips from paving equipment that is not in use with pans or absorbent material placed under the machines. Dispose of collected material and absorbents properly.

Inspection

- Have designated personnel conduct inspections of parking facilities and stormwater conveyance systems associated with parking facilities on a regular basis.
- Inspect cleaning equipment/sweepers for leaks on a regular basis.

Training

- Provide regular training to field employees and/or contractors regarding cleaning of paved areas and proper operation of equipment.
- Train employees and contractors in proper techniques for spill containment and cleanup.

Spill Response and Prevention

- Keep your Spill Prevention Control and Countermeasure (SPCC) Plan up-to-date.
- Place a stockpile of spill cleanup materials where it will be readily accessible or at a central location.
- Clean up fluid spills immediately with absorbent rags or material.
- Dispose of spilled material and absorbents properly.

Other Considerations

Limitations related to sweeping activities at large parking facilities may include high equipment costs, the need for sweeper operator training, and the inability of current sweeper technology to remove oil and grease.

SC-43 Parking/Storage Area Maintenance

Requirements

Costs

Cleaning/sweeping costs can be quite large. Construction and maintenance of stormwater structural controls can be quite expensive as well.

Maintenance

- Sweep parking lot regularly to minimize cleaning with water.
- Clean out oil/water/sand separators regularly, especially after heavy storms.
- Clean parking facilities regularly to prevent accumulated wastes and pollutants from being discharged into conveyance systems during rainy conditions.

Supplemental Information

Further Detail of the BMP

Surface Repair

Apply concrete, asphalt, and seal coat during dry weather to prevent contamination from contacting stormwater runoff. Where applicable, cover and seal nearby storm drain inlets (with waterproof material or mesh) and manholes before applying seal coat, slurry seal, etc. Leave covers in place until job is complete and all water from emulsified oil sealants has drained or evaporated. Clean any debris from these covered manholes and drains for proper disposal. Only use only as much water as is necessary for dust control to avoid runoff.

References and Resources

California's Nonpoint Source Program Plan http://www.swrcb.ca.gov/nps/index.html

Clark County Storm Water Pollution Control Manual
http://www.co.clark.wa.us/pubworks/bmpman.pdf

King County Storm Water Pollution Control Manual http://dnr.metrokc.gov/wlr/dss/spcm.htm

Pollution from Surface Cleaning Folder. 1996. Bay Area Stormwater Management Agencies Association (BASMAA). http://www.basmaa.org/

Oregon Association of Clean Water Agencies. Oregon Municipal Stormwater Toolbox for Maintenance Practices. June 1998.

Santa Clara Valley Urban Runoff Pollution Prevention Program http://www.scvurppp.org

The Storm Water Managers Resource Center http://www.stormwatercenter.net/

Drainage System Maintenance SC-44

Objectives

- Cover
- Contain
- Educate
- Reduce/Minimize

Description

As a consequence of its function, the stormwater conveyance system collects and transports urban runoff and stormwater that may contain certain pollutants. The protocols in this fact sheet are intended to reduce pollutants reaching receiving waters through proper conveyance system operation and maintenance.

Targeted Constituents

Sediment	✓
Nutrients	
Trash	✓
Metals	
Bacteria	✓
Oil and Grease	
Organics	

Approach

Pollution Prevention

Maintain catch basins, stormwater inlets, and other stormwater conveyance structures on a regular basis to remove pollutants, reduce high pollutant concentrations during the first flush of storms, prevent clogging of the downstream conveyance system, restore catch basins' sediment trapping capacity, and ensure the system functions properly hydraulically to avoid flooding.

Suggested Protocols

Catch Basins/Inlet Structures

- Staff should regularly inspect facilities to ensure compliance with the following:
  - Immediate repair of any deterioration threatening structural integrity.
  - Cleaning before the sump is 40% full. Catch basins should be cleaned as frequently as needed to meet this standard.
  - Stenciling of catch basins and inlets (see SC34 Waste Handling and Disposal).

- Clean catch basins, storm drain inlets, and other conveyance structures before the wet season to remove sediments and debris accumulated during the summer.
- Conduct inspections more frequently during the wet season for problem areas where sediment or trash accumulates more often. Clean and repair as needed.
- Keep accurate logs of the number of catch basins cleaned.
- Store wastes collected from cleaning activities of the drainage system in appropriate containers or temporary storage sites in a manner that prevents discharge to the storm drain.
- Dewater the wastes if necessary with outflow into the sanitary sewer if permitted. Water should be treated with an appropriate filtering device prior to discharge to the sanitary sewer. If discharge to the sanitary sewer is not allowed, water should be pumped or vacuumed to a tank and properly disposed. Do not dewater near a storm drain or stream.

Storm Drain Conveyance System

- Locate reaches of storm drain with deposit problems and develop a flushing schedule that keeps the pipe clear of excessive buildup.
- Collect and pump flushed effluent to the sanitary sewer for treatment whenever possible.

Pump Stations

- Clean all storm drain pump stations prior to the wet season to remove silt and trash.
- Do not allow discharge to reach the storm drain system when cleaning a storm drain pump station or other facility.
- Conduct routine maintenance at each pump station.
- Inspect, clean, and repair as necessary all outlet structures prior to the wet season.

Open Channel

- Modify storm channel characteristics to improve channel hydraulics, increase pollutant removals, and enhance channel/creek aesthetic and habitat value.
- Conduct channel modification/improvement in accordance with existing laws. Any person, government agency, or public utility proposing an activity that will change the natural (emphasis added) state of any river, stream, or lake in California, must enter into a Steam or Lake Alteration Agreement with the Department of Fish and Game. The developer-applicant should also contact local governments (city, county, special districts), other state agencies (SWRCB, RWQCB, Department of Forestry, Department of Water Resources), and Federal Corps of Engineers and USFWS.

Illicit Connections and Discharges

- Look for evidence of illegal discharges or illicit connections during routine maintenance of conveyance system and drainage structures:
  - Is there evidence of spills such as paints, discoloring, etc?

- Are there any odors associated with the drainage system?
- Record locations of apparent illegal discharges/illicit connections?
- Track flows back to potential dischargers and conduct aboveground inspections. This can be done through visual inspection of upgradient manholes or alternate techniques including zinc chloride smoke testing, fluorometric dye testing, physical inspection testing, or television camera inspection.
- Eliminate the discharge once the origin of flow is established.

- Stencil or demarcate storm drains, where applicable, to prevent illegal disposal of pollutants. Storm drain inlets should have messages such as "Dump No Waste Drains to Stream" stenciled next to them to warn against ignorant or intentional dumping of pollutants into the storm drainage system.
- Refer to fact sheet SC-10 Non-Stormwater Discharges.

Illegal Dumping

- Inspect and clean up hot spots and other storm drainage areas regularly where illegal dumping and disposal occurs.
- Establish a system for tracking incidents. The system should be designed to identify the following:
  - Illegal dumping hot spots
  - Types and quantities (in some cases) of wastes
  - Patterns in time of occurrence (time of day/night, month, or year)
  - Mode of dumping (abandoned containers, "midnight dumping" from moving vehicles, direct dumping of materials, accidents/spills)
  - Responsible parties
- Post "No Dumping" signs in problem areas with a phone number for reporting dumping and disposal. Signs should also indicate fines and penalties for illegal dumping.
- Refer to fact sheet SC-10 Non-Stormwater Discharges.

Training

- Train crews in proper maintenance activities, including record keeping and disposal.
- Allow only properly trained individuals to handle hazardous materials/wastes.
- Have staff involved in detection and removal of illicit connections trained in the following:
  - OSHA-required Health and Safety Training (29 CFR 1910.120) plus annual refresher training (as needed).

- OSHA Confined Space Entry training (Cal-OSHA Confined Space, Title 8 and Federal OSHA 29 CFR 1910.146).

- Procedural training (field screening, sampling, smoke/dye testing, TV inspection).

Spill Response and Prevention

- Investigate all reports of spills, leaks, and/or illegal dumping promptly.
- Clean up all spills and leaks using "dry" methods (with absorbent materials and/or rags) or dig up, remove, and properly dispose of contaminated soil.
- Refer to fact sheet SC-11 Spill Prevention, Control, and Cleanup.

Other Considerations (Limitations and Regulations)

- Clean-up activities may create a slight disturbance for local aquatic species. Access to items and material on private property may be limited. Trade-offs may exist between channel hydraulics and water quality/riparian habitat. If storm channels or basins are recognized as wetlands, many activities, including maintenance, may be subject to regulation and permitting.
- Storm drain flushing is most effective in small diameter pipes (36-inch diameter pipe or less, depending on water supply and sediment collection capacity). Other considerations associated with storm drain flushing may include the availability of a water source, finding a downstream area to collect sediments, liquid/sediment disposal, and prohibition against disposal of flushed effluent to sanitary sewer in some areas.
- Regulations may include adoption of substantial penalties for illegal dumping and disposal.
- Local municipal codes may include sections prohibiting discharge of soil, debris, refuse, hazardous wastes, and other pollutants into the storm drain system.

Requirements

Costs

- An aggressive catch basin cleaning program could require a significant capital and O&M budget.
- The elimination of illegal dumping is dependent on the availability, convenience, and cost of alternative means of disposal. The primary cost is for staff time. Cost depends on how aggressively a program is implemented. Other cost considerations for an illegal dumping program include:

  - Purchase and installation of signs.

  - Rental of vehicle(s) to haul illegally-disposed items and material to landfills.

  - Rental of heavy equipment to remove larger items (e.g., car bodies) from channels.

  - Purchase of landfill space to dispose of illegally-dumped items and material.

- Methods used for illicit connection detection (smoke testing, dye testing, visual inspection, and flow monitoring) can be costly and time-consuming. Site-specific factors, such as the level of impervious area, the density and ages of buildings, and type of land use will determine the level of investigation necessary.

Maintenance

- Two-person teams may be required to clean catch basins with vactor trucks.
- Teams of at least two people plus administrative personnel are required to identify illicit discharges, depending on the complexity of the storm sewer system.
- Arrangements must be made for proper disposal of collected wastes.
- Technical staff are required to detect and investigate illegal dumping violations.

Supplemental Information

Further Detail of the BMP

Storm Drain Flushing

Flushing is a common maintenance activity used to improve pipe hydraulics and to remove pollutants in storm drainage systems. Flushing may be designed to hydraulically convey accumulated material to strategic locations, such as an open channel, another point where flushing will be initiated, or the sanitary sewer and the treatment facilities, thus preventing resuspension and overflow of a portion of the solids during storm events. Flushing prevents "plug flow" discharges of concentrated pollutant loadings and sediments. Deposits can hinder the designed conveyance capacity of the storm drain system and potentially cause backwater conditions in severe cases of clogging.

Storm drain flushing usually takes place along segments of pipe with grades that are too flat to maintain adequate velocity to keep particles in suspension. An upstream manhole is selected to place an inflatable device that temporarily plugs the pipe. Further upstream, water is pumped into the line to create a flushing wave. When the upstream reach of pipe is sufficiently full to cause a flushing wave, the inflated device is rapidly deflated with the assistance of a vacuum pump, thereby releasing the backed up water and resulting in the cleaning of the storm drain segment.

To further reduce impacts of stormwater pollution, a second inflatable device placed well downstream may be used to recollect the water after the force of the flushing wave has dissipated. A pump may then be used to transfer the water and accumulated material to the sanitary sewer for treatment. In some cases, an interceptor structure may be more practical or required to recollect the flushed waters.

It has been found that cleansing efficiency of periodic flush waves is dependent upon flush volume, flush discharge rate, sewer slope, sewer length, sewer flow rate, sewer diameter, and population density. As a rule of thumb, the length of line to be flushed should not exceed 700 feet. At this maximum recommended length, the percent removal efficiency ranges between 65-75% for organics and 55-65% for dry weather grit/inorganic material. The percent removal efficiency drops rapidly beyond that. Water is commonly supplied by a water truck, but fire hydrants can also supply water. To make the best use of water, it is recommended that reclaimed water be used or that fire hydrant line flushing coincide with storm sewer flushing.

References and Resources

California's Nonpoint Source Program Plan http://www.swrcb.ca.gov/nps/index.html

Clark County Storm Water Pollution Control Manual
http://www.co.clark.wa.us/pubworks/bmpman.pdf

Ferguson, B.K. 1991. Urban Stream Reclamation, p. 324-322, Journal of Soil and Water Conservation.

King County Storm Water Pollution Control Manual http://dnr.metrokc.gov/wlr/dss/spcm.htm

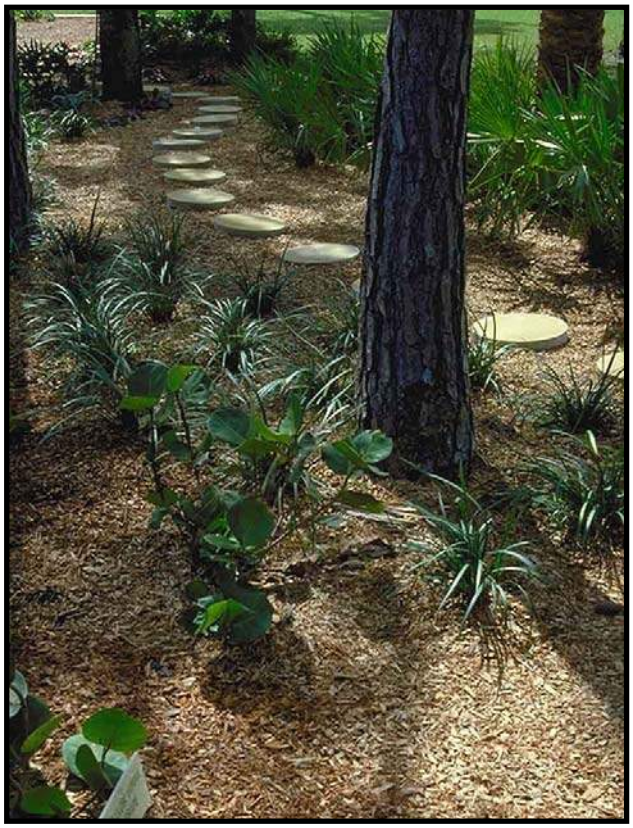
Oregon Association of Clean Water Agencies. Oregon Municipal Stormwater Toolbox for Maintenance Practices. June 1998.

Santa Clara Valley Urban Runoff Pollution Prevention Program http://www.scvurppp.org

The Storm Water Managers Resource Center http://www.stormwatercenter.net

United States Environmental Protection Agency (USEPA). 2002. Pollution Prevention/Good Housekeeping for Municipal Operations Storm Drain System Cleaning. On line:
http://www.epa.gov/npdes/menuofbmps/poll_16.htm

Site Design & Landscape Planning SD-10



Design Objectives

- ☑ Maximize Infiltration
- ☑ Provide Retention
- ☑ Slow Runoff
- ☑ Minimize Impervious Land Coverage
- Prohibit Dumping of Improper Materials
- Contain Pollutants
- Collect and Convey

Description

Each project site possesses unique topographic, hydrologic, and vegetative features, some of which are more suitable for development than others. Integrating and incorporating appropriate landscape planning methodologies into the project design is the most effective action that can be done to minimize surface and groundwater contamination from stormwater.

Approach

Landscape planning should couple consideration of land suitability for urban uses with consideration of community goals and projected growth. Project plan designs should conserve natural areas to the extent possible, maximize natural water storage and infiltration opportunities, and protect slopes and channels.

Suitable Applications

Appropriate applications include residential, commercial and industrial areas planned for development or redevelopment.

Design Considerations

Design requirements for site design and landscapes planning should conform to applicable standards and specifications of agencies with jurisdiction and be consistent with applicable General Plan and Local Area Plan policies.

Designing New Installations

Begin the development of a plan for the landscape unit with attention to the following general principles:

- Formulate the plan on the basis of clearly articulated community goals. Carefully identify conflicts and choices between retaining and protecting desired resources and community growth.
- Map and assess land suitability for urban uses. Include the following landscape features in the assessment: wooded land, open unwooded land, steep slopes, erosion-prone soils, foundation suitability, soil suitability for waste disposal, aquifers, aquifer recharge areas, wetlands, floodplains, surface waters, agricultural lands, and various categories of urban land use. When appropriate, the assessment can highlight outstanding local or regional resources that the community determines should be protected (e.g., a scenic area, recreational area, threatened species habitat, farmland, fish run). Mapping and assessment should recognize not only these resources but also additional areas needed for their sustenance.

Project plan designs should conserve natural areas to the extent possible, maximize natural water storage and infiltration opportunities, and protect slopes and channels.

Conserve Natural Areas during Landscape Planning

If applicable, the following items are required and must be implemented in the site layout during the subdivision design and approval process, consistent with applicable General Plan and Local Area Plan policies:

- Cluster development on least-sensitive portions of a site while leaving the remaining land in a natural undisturbed condition.
- Limit clearing and grading of native vegetation at a site to the minimum amount needed to build lots, allow access, and provide fire protection.
- Maximize trees and other vegetation at each site by planting additional vegetation, clustering tree areas, and promoting the use of native and/or drought tolerant plants.
- Promote natural vegetation by using parking lot islands and other landscaped areas.
- Preserve riparian areas and wetlands.

Maximize Natural Water Storage and Infiltration Opportunities Within the Landscape Unit

- Promote the conservation of forest cover. Building on land that is already deforested affects basin hydrology to a lesser extent than converting forested land. Loss of forest cover reduces interception storage, detention in the organic forest floor layer, and water losses by evapotranspiration, resulting in large peak runoff increases and either their negative effects or the expense of countering them with structural solutions.
- Maintain natural storage reservoirs and drainage corridors, including depressions, areas of permeable soils, swales, and intermittent streams. Develop and implement policies and

regulations to discourage the clearing, filling, and channelization of these features. Utilize them in drainage networks in preference to pipes, culverts, and engineered ditches.

- Evaluating infiltration opportunities by referring to the stormwater management manual for the jurisdiction and pay particular attention to the selection criteria for avoiding groundwater contamination, poor soils, and hydrogeological conditions that cause these facilities to fail. If necessary, locate developments with large amounts of impervious surfaces or a potential to produce relatively contaminated runoff away from groundwater recharge areas.

Protection of Slopes and Channels during Landscape Design

- Convey runoff safely from the tops of slopes.
- Avoid disturbing steep or unstable slopes.
- Avoid disturbing natural channels.
- Stabilize disturbed slopes as quickly as possible.
- Vegetate slopes with native or drought tolerant vegetation.
- Control and treat flows in landscaping and/or other controls prior to reaching existing natural drainage systems.
- Stabilize temporary and permanent channel crossings as quickly as possible, and ensure that increases in run-off velocity and frequency caused by the project do not erode the channel.
- Install energy dissipaters, such as riprap, at the outlets of new storm drains, culverts, conduits, or channels that enter unlined channels in accordance with applicable specifications to minimize erosion. Energy dissipaters shall be installed in such a way as to minimize impacts to receiving waters.
- Line on-site conveyance channels where appropriate, to reduce erosion caused by increased flow velocity due to increases in tributary impervious area. The first choice for linings should be grass or some other vegetative surface, since these materials not only reduce runoff velocities, but also provide water quality benefits from filtration and infiltration. If velocities in the channel are high enough to erode grass or other vegetative linings, riprap, concrete, soil cement, or geo-grid stabilization are other alternatives.
- Consider other design principles that are comparable and equally effective.

Redeveloping Existing Installations

Various jurisdictional stormwater management and mitigation plans (SUSMP, WQMP, etc.) define “redevelopment” in terms of amounts of additional impervious area, increases in gross floor area and/or exterior construction, and land disturbing activities with structural or impervious surfaces. The definition of “ redevelopment” must be consulted to determine whether or not the requirements for new development apply to areas intended for redevelopment. If the definition applies, the steps outlined under “designing new installations” above should be followed.

Redevelopment may present significant opportunity to add features which had not previously been implemented. Examples include incorporation of depressions, areas of permeable soils, and swales in newly redeveloped areas. While some site constraints may exist due to the status of already existing infrastructure, opportunities should not be missed to maximize infiltration, slow runoff, reduce impervious areas, disconnect directly connected impervious areas.

Other Resources

A Manual for the Standard Urban Stormwater Mitigation Plan (SUSMP), Los Angeles County Department of Public Works, May 2002.

Stormwater Management Manual for Western Washington, Washington State Department of Ecology, August 2001.

Model Standard Urban Storm Water Mitigation Plan (SUSMP) for San Diego County, Port of San Diego, and Cities in San Diego County, February 14, 2002.

Model Water Quality Management Plan (WQMP) for County of Orange, Orange County Flood Control District, and the Incorporated Cities of Orange County, Draft February 2003.

Ventura Countywide Technical Guidance Manual for Stormwater Quality Control Measures, July 2002.

Roof Runoff Controls SD-11

Rain Garden

Design Objectives

- ☑ Maximize Infiltration
- ☑ Provide Retention
- ☑ Slow Runoff
- Minimize Impervious Land Coverage
- Prohibit Dumping of Improper Materials
- ☑ Contain Pollutants
- Collect and Convey

Description

Various roof runoff controls are available to address stormwater that drains off rooftops. The objective is to reduce the total volume and rate of runoff from individual lots, and retain the pollutants on site that may be picked up from roofing materials and atmospheric deposition. Roof runoff controls consist of directing the roof runoff away from paved areas and mitigating flow to the storm drain system through one of several general approaches: cisterns or rain barrels; dry wells or infiltration trenches; pop-up emitters, and foundation planting. The first three approaches require the roof runoff to be contained in a gutter and downspout system. Foundation planting provides a vegetated strip under the drip line of the roof.

Approach

Design of individual lots for single-family homes as well as lots for higher density residential and commercial structures should consider site design provisions for containing and infiltrating roof runoff or directing roof runoff to vegetative swales or buffer areas. Retained water can be reused for watering gardens, lawns, and trees. Benefits to the environment include reduced demand for potable water used for irrigation, improved stormwater quality, increased groundwater recharge, decreased runoff volume and peak flows, and decreased flooding potential.

Suitable Applications

Appropriate applications include residential, commercial and industrial areas planned for development or redevelopment.

Design Considerations

Designing New Installations

Cisterns or Rain Barrels

One method of addressing roof runoff is to direct roof downspouts to cisterns or rain barrels. A cistern is an above ground storage vessel with either a manually operated valve or a permanently open outlet. Roof runoff is temporarily stored and then released for irrigation or infiltration between storms. The number of rain

barrels needed is a function of the rooftop area. Some low impact developers recommend that every house have at least 2 rain barrels, with a minimum storage capacity of 1000 liters. Roof barrels serve several purposes including mitigating the first flush from the roof which has a high volume, amount of contaminants, and thermal load. Several types of rain barrels are commercially available. Consideration must be given to selecting rain barrels that are vector proof and childproof. In addition, some barrels are designed with a bypass valve that filters out grit and other contaminants and routes overflow to a soak-away pit or rain garden.

If the cistern has an operable valve, the valve can be closed to store stormwater for irrigation or infiltration between storms. This system requires continual monitoring by the resident or grounds crews, but provides greater flexibility in water storage and metering. If a cistern is provided with an operable valve and water is stored inside for long periods, the cistern must be covered to prevent mosquitoes from breeding.

A cistern system with a permanently open outlet can also provide for metering stormwater runoff. If the cistern outlet is significantly smaller than the size of the downspout inlet (say ¼ to ½ inch diameter), runoff will build up inside the cistern during storms, and will empty out slowly after peak intensities subside. This is a feasible way to mitigate the peak flow increases caused by rooftop impervious land coverage, especially for the frequent, small storms.

Dry wells and Infiltration Trenches

Roof downspouts can be directed to dry wells or infiltration trenches. A dry well is constructed by excavating a hole in the ground and filling it with an open graded aggregate, and allowing the water to fill the dry well and infiltrate after the storm event. An underground connection from the downspout conveys water into the dry well, allowing it to be stored in the voids. To minimize sedimentation from lateral soil movement, the sides and top of the stone storage matrix can be wrapped in a permeable filter fabric, though the bottom may remain open. A perforated observation pipe can be inserted vertically into the dry well to allow for inspection and maintenance.

In practice, dry wells receiving runoff from single roof downspouts have been successful over long periods because they contain very little sediment. They must be sized according to the amount of rooftop runoff received, but are typically 4 to 5 feet square, and 2 to 3 feet deep, with a minimum of 1-foot soil cover over the top (maximum depth of 10 feet).

To protect the foundation, dry wells must be set away from the building at least 10 feet. They must be installed in solids that accommodate infiltration. In poorly drained soils, dry wells have very limited feasibility.

Infiltration trenches function in a similar manner and would be particularly effective for larger roof areas. An infiltration trench is a long, narrow, rock-filled trench with no outlet that receives stormwater runoff. These are described under Treatment Controls.

Pop-up Drainage Emitter

Roof downspouts can be directed to an underground pipe that daylights some distance from the building foundation, releasing the roof runoff through a pop-up emitter. Similar to a pop-up irrigation head, the emitter only opens when there is flow from the roof. The emitter remains flush to the ground during dry periods, for ease of lawn or landscape maintenance.

Foundation Planting

Landscape planting can be provided around the base to allow increased opportunities for stormwater infiltration and protect the soil from erosion caused by concentrated sheet flow coming off the roof. Foundation plantings can reduce the physical impact of water on the soil and provide a subsurface matrix of roots that encourage infiltration. These plantings must be sturdy enough to tolerate the heavy runoff sheet flows, and periodic soil saturation.

Redeveloping Existing Installations

Various jurisdictional stormwater management and mitigation plans (SUSMP, WQMP, etc.) define "redevelopment" in terms of amounts of additional impervious area, increases in gross floor area and/or exterior construction, and land disturbing activities with structural or impervious surfaces. The definition of " redevelopment" must be consulted to determine whether or not the requirements for new development apply to areas intended for redevelopment. If the definition applies, the steps outlined under "designing new installations" above should be followed.

Supplemental Information

Examples

- City of Ottawa's Water Links Surface –Water Quality Protection Program
- City of Toronto Downspout Disconnection Program
- City of Boston, MA, Rain Barrel Demonstration Program

Other Resources

Hager, Marty Catherine, Stormwater, "Low-Impact Development", January/February 2003. www.stormh2o.com

Low Impact Urban Design Tools, Low Impact Development Design Center, Beltsville, MD. www.lid-stormwater.net

Start at the Source, Bay Area Stormwater Management Agencies Association, 1999 Edition

Efficient Irrigation SD-12

Design Objectives

- ☑ Maximize Infiltration
- ☑ Provide Retention
- ☑ Slow Runoff
- Minimize Impervious Land Coverage
- Prohibit Dumping of Improper Materials
- Contain Pollutants
- Collect and Convey

Description

Irrigation water provided to landscaped areas may result in excess irrigation water being conveyed into stormwater drainage systems.

Approach

Project plan designs for development and redevelopment should include application methods of irrigation water that minimize runoff of excess irrigation water into the stormwater conveyance system.

Suitable Applications

Appropriate applications include residential, commercial and industrial areas planned for development or redevelopment. (Detached residential single-family homes are typically excluded from this requirement.)

Design Considerations

Designing New Installations

The following methods to reduce excessive irrigation runoff should be considered, and incorporated and implemented where determined applicable and feasible by the Permittee:

- Employ rain-triggered shutoff devices to prevent irrigation after precipitation.
- Design irrigation systems to each landscape area's specific water requirements.
- Include design featuring flow reducers or shutoff valves triggered by a pressure drop to control water loss in the event of broken sprinkler heads or lines.
- Implement landscape plans consistent with County or City water conservation resolutions, which may include provision of water sensors, programmable irrigation times (for short cycles), etc.

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- Design timing and application methods of irrigation water to minimize the runoff of excess irrigation water into the storm water drainage system.
- Group plants with similar water requirements in order to reduce excess irrigation runoff and promote surface filtration. Choose plants with low irrigation requirements (for example, native or drought tolerant species). Consider design features such as:
  - Using mulches (such as wood chips or bar) in planter areas without ground cover to minimize sediment in runoff
  - Installing appropriate plant materials for the location, in accordance with amount of sunlight and climate, and use native plant materials where possible and/or as recommended by the landscape architect
  - Leaving a vegetative barrier along the property boundary and interior watercourses, to act as a pollutant filter, where appropriate and feasible
  - Choosing plants that minimize or eliminate the use of fertilizer or pesticides to sustain growth
- Employ other comparable, equally effective methods to reduce irrigation water runoff.

Redeveloping Existing Installations

Various jurisdictional stormwater management and mitigation plans (SUSMP, WQMP, etc.) define "redevelopment" in terms of amounts of additional impervious area, increases in gross floor area and/or exterior construction, and land disturbing activities with structural or impervious surfaces. The definition of " redevelopment" must be consulted to determine whether or not the requirements for new development apply to areas intended for redevelopment. If the definition applies, the steps outlined under "designing new installations" above should be followed.

Other Resources

A Manual for the Standard Urban Stormwater Mitigation Plan (SUSMP), Los Angeles County Department of Public Works, May 2002.

Model Standard Urban Storm Water Mitigation Plan (SUSMP) for San Diego County, Port of San Diego, and Cities in San Diego County, February 14, 2002.

Model Water Quality Management Plan (WQMP) for County of Orange, Orange County Flood Control District, and the Incorporated Cities of Orange County, Draft February 2003.

Ventura Countywide Technical Guidance Manual for Stormwater Quality Control Measures, July 2002.

Storm Drain Signage SD-13

Design Objectives

- Maximize Infiltration
- Provide Retention
- Slow Runoff
- Minimize Impervious Land Coverage
- ☑ Prohibit Dumping of Improper Materials
- Contain Pollutants
- Collect and Convey

Description

Waste materials dumped into storm drain inlets can have severe impacts on receiving and ground waters. Posting notices regarding discharge prohibitions at storm drain inlets can prevent waste dumping. Storm drain signs and stencils are highly visible source controls that are typically placed directly adjacent to storm drain inlets.

Approach

The stencil or affixed sign contains a brief statement that prohibits dumping of improper materials into the urban runoff conveyance system. Storm drain messages have become a popular method of alerting the public about the effects of and the prohibitions against waste disposal.

Suitable Applications

Stencils and signs alert the public to the destination of pollutants discharged to the storm drain. Signs are appropriate in residential, commercial, and industrial areas, as well as any other area where contributions or dumping to storm drains is likely.

Design Considerations

Storm drain message markers or placards are recommended at all storm drain inlets within the boundary of a development project. The marker should be placed in clear sight facing toward anyone approaching the inlet from either side. All storm drain inlet locations should be identified on the development site map.

Designing New Installations

The following methods should be considered for inclusion in the project design and show on project plans:

- Provide stenciling or labeling of all storm drain inlets and catch basins, constructed or modified, within the project area with prohibitive language. Examples include “NO DUMPING

– DRAINS TO OCEAN" and/or other graphical icons to discourage illegal dumping.

- Post signs with prohibitive language and/or graphical icons, which prohibit illegal dumping at public access points along channels and creeks within the project area.

Note - Some local agencies have approved specific signage and/or storm drain message placards for use. Consult local agency stormwater staff to determine specific requirements for placard types and methods of application.

Redeveloping Existing Installations

Various jurisdictional stormwater management and mitigation plans (SUSMP, WQMP, etc.) define "redevelopment" in terms of amounts of additional impervious area, increases in gross floor area and/or exterior construction, and land disturbing activities with structural or impervious surfaces. If the project meets the definition of "redevelopment", then the requirements stated under " designing new installations" above should be included in all project design plans.

Additional Information

Maintenance Considerations

- Legibility of markers and signs should be maintained. If required by the agency with jurisdiction over the project, the owner/operator or homeowner's association should enter into a maintenance agreement with the agency or record a deed restriction upon the property title to maintain the legibility of placards or signs.

Placement

- Signage on top of curbs tends to weather and fade.

- Signage on face of curbs tends to be worn by contact with vehicle tires and sweeper brooms.

Supplemental Information

Examples

- Most MS4 programs have storm drain signage programs. Some MS4 programs will provide stencils, or arrange for volunteers to stencil storm drains as part of their outreach program.

Other Resources

A Manual for the Standard Urban Stormwater Mitigation Plan (SUSMP), Los Angeles County Department of Public Works, May 2002.

Model Standard Urban Storm Water Mitigation Plan (SUSMP) for San Diego County, Port of San Diego, and Cities in San Diego County, February 14, 2002.

Model Water Quality Management Plan (WQMP) for County of Orange, Orange County Flood Control District, and the Incorporated Cities of Orange County, Draft February 2003.

Ventura Countywide Technical Guidance Manual for Stormwater Quality Control Measures, July 2002.

Trash Storage Areas SD-32

Description

Trash storage areas are areas where a trash receptacle (s) are located for use as a repository for solid wastes. Stormwater runoff from areas where trash is stored or disposed of can be polluted. In addition, loose trash and debris can be easily transported by water or wind into nearby storm drain inlets, channels, and/or creeks. Waste handling operations that may be sources of stormwater pollution include dumpsters, litter control, and waste piles.

Approach

This fact sheet contains details on the specific measures required to prevent or reduce pollutants in stormwater runoff associated with trash storage and handling. Preventative measures including enclosures, containment structures, and impervious pavements to mitigate spills, should be used to reduce the likelihood of contamination.

Design Objectives

- Maximize Infiltration
- Provide Retention
- Slow Runoff
- Minimize Impervious Land Coverage
- Prohibit Dumping of Improper Materials
- ☑ Contain Pollutants
- Collect and Convey

Suitable Applications

Appropriate applications include residential, commercial and industrial areas planned for development or redevelopment. (Detached residential single-family homes are typically excluded from this requirement.)

Design Considerations

Design requirements for waste handling areas are governed by Building and Fire Codes, and by current local agency ordinances and zoning requirements. The design criteria described in this fact sheet are meant to enhance and be consistent with these code and ordinance requirements. Hazardous waste should be handled in accordance with legal requirements established in Title 22, California Code of Regulation.

Wastes from commercial and industrial sites are typically hauled by either public or commercial carriers that may have design or access requirements for waste storage areas. The design criteria in this fact sheet are recommendations and are not intended to be in conflict with requirements established by the waste hauler. The waste hauler should be contacted prior to the design of your site trash collection areas. Conflicts or issues should be discussed with the local agency.

Designing New Installations

Trash storage areas should be designed to consider the following structural or treatment control BMPs:

- Design trash container areas so that drainage from adjoining roofs and pavement is diverted around the area(s) to avoid run-on. This might include berming or grading the waste handling area to prevent run-on of stormwater.
- Make sure trash container areas are screened or walled to prevent off-site transport of trash.

- Use lined bins or dumpsters to reduce leaking of liquid waste.
- Provide roofs, awnings, or attached lids on all trash containers to minimize direct precipitation and prevent rainfall from entering containers.
- Pave trash storage areas with an impervious surface to mitigate spills.
- Do not locate storm drains in immediate vicinity of the trash storage area.
- Post signs on all dumpsters informing users that hazardous materials are not to be disposed of therein.

Redeveloping Existing Installations

Various jurisdictional stormwater management and mitigation plans (SUSMP, WQMP, etc.) define "redevelopment" in terms of amounts of additional impervious area, increases in gross floor area and/or exterior construction, and land disturbing activities with structural or impervious surfaces. The definition of " redevelopment" must be consulted to determine whether or not the requirements for new development apply to areas intended for redevelopment. If the definition applies, the steps outlined under "designing new installations" above should be followed.

Additional Information

Maintenance Considerations

The integrity of structural elements that are subject to damage (i.e., screens, covers, and signs) must be maintained by the owner/operator. Maintenance agreements between the local agency and the owner/operator may be required. Some agencies will require maintenance deed restrictions to be recorded of the property title. If required by the local agency, maintenance agreements or deed restrictions must be executed by the owner/operator before improvement plans are approved.

Other Resources

A Manual for the Standard Urban Stormwater Mitigation Plan (SUSMP), Los Angeles County Department of Public Works, May 2002.

Model Standard Urban Storm Water Mitigation Plan (SUSMP) for San Diego County, Port of San Diego, and Cities in San Diego County, February 14, 2002.

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Infiltration Basin TC-11

Maintenance Concerns, Objectives, and Goals

- Vector Control
- Clogged soil or outlet structures
- Vegetation/Landscape Maintenance
- Groundwater contamination
- Accumulation of metals
- Aesthetics

General Description

An infiltration basin is a shallow impoundment that is designed to infiltrate stormwater. Infiltration basins use the natural filtering ability of the soil to remove pollutants in stormwater runoff. Infiltration facilities store runoff until it gradually exfiltrates through the soil and eventually into the water table. This practice has high pollutant removal efficiency and can also help recharge groundwater, thus helping to maintain low flows in stream systems. Infiltration basins can be challenging to apply on many sites, however, because of soils requirements. In addition, some studies have shown relatively high failure rates compared with other management practices.

Targeted Constituents

✓	Sediment	■
✓	Nutrients	■
✓	Trash	■
✓	Metals	■
✓	Bacteria	■
✓	Oil and Grease	■
✓	Organics	■

Legend ***(Removal Effectiveness)***

- ● Low
- ■ High
- ▲ Medium

Inspection/Maintenance Considerations

Infiltration basins perform better in well-drained permeable soils. Infiltration basins in areas of low permeability can clog within a couple years, and require more frequent inspections and maintenance. The use and regular maintenance of pretreatment BMPs will significantly minimize maintenance requirements for the basin. Spill response procedures and controls should be implemented to prevent spills from reaching the infiltration system.

Scarification or other disturbance should only be performed when there are actual signs of clogging or significant loss of infiltrative capacity, rather than on a routine basis. Always remove deposited sediments before scarification, and use a hand-guided rotary tiller, if possible, or a disc harrow pulled by a light tractor. This BMP may require groundwater monitoring. Basins cannot be put into operation until the upstream tributary area is stabilized.

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TC-11 Infiltration Basin

Clogged infiltration basins with surface standing water can become a breeding area for mosquitoes and midges. Maintenance efforts associated with infiltration basins should include frequent inspections to ensure that water infiltrates into the subsurface completely (recommended infiltration rate of 72 hours or less) and that vegetation is carefully managed to prevent creating mosquito and other vector habitats.

Inspection Activities	Suggested Frequency
■ Observe drain time for a storm after completion or modification of the facility to confirm that the desired drain time has been obtained. ■ Newly established vegetation should be inspected several times to determine if any landscape maintenance (reseeding, irrigation, etc.) is necessary.	Post construction
■ Inspect for the following issues: differential accumulation of sediment, signs of wetness or damage to structures, erosion of the basin floor, dead or dying grass on the bottom, condition of riprap, drain time, signs of petroleum hydrocarbon contamination, standing water, trash and debris, sediment accumulation, slope stability, pretreatment device condition	Semi-annual and after extreme events
Maintenance Activities	**Suggested Frequency**
■ Factors responsible for clogging should be repaired immediately. ■ Weed once monthly during the first two growing seasons.	Post construction
■ Stabilize eroded banks. ■ Repair undercut and eroded areas at inflow and outflow structures. ■ Maintain access to the basin for regular maintenance activities. ■ Mow as appropriate for vegetative cover species. ■ Monitor health of vegetation and replace as necessary. ■ Control mosquitoes as necessary. ■ Remove litter and debris from infiltration basin area as required.	Standard maintenance (as needed)
■ Mow and remove grass clippings, litter, and debris. ■ Trim vegetation at the beginning and end of the wet season to prevent establishment of woody vegetation and for aesthetic and vector reasons. ■ Replant eroded or barren spots to prevent erosion and accumulation of sediment.	Semi-annual
■ Scrape bottom and remove sediment when accumulated sediment reduces original infiltration rate by 25-50%. Restore original cross-section and infiltration rate. Properly dispose of sediment. ■ Seed or sod to restore ground cover. ■ Disc or otherwise aerate bottom. ■ Dethatch basin bottom.	3-5 year maintenance

Additional Information

In most cases, sediment from an infiltration basin does not contain toxins at levels posing a hazardous concern. Studies to date indicate that pond sediments are generally below toxicity limits and can be safely landfilled or disposed onsite. Onsite sediment disposal is always preferable (if local authorities permit) as long as the sediments are deposited away from the shoreline to prevent their reentry into the pond and away from recreation areas, where they could possibly be ingested by young children. Sediments should be tested for toxicants in compliance with current disposal requirements if land uses in the catchment include commercial or industrial zones, or if visual or olfactory indications of pollution are noticed. Sediments containing high levels of pollutants should be disposed of properly.

Light equipment, which will not compact the underlying soil, should be used to remove the top layer of sediment. The remaining soil should be tilled and revegetated as soon as possible.

Sediment removal within the basin should be performed when the sediment is dry enough so that it is cracked and readily separates from the basin floor. This also prevents smearing of the basin floor.

References

King County, Stormwater Pollution Control Manual – Best Management Practices for Businesses. July, 1995 Available at: ftp://dnr metrokc.gov/wlr/dss/spcm/SPCM.HTM

Metropolitan Council, Urban Small Sites Best Management Practices Manual. Available at: http://www.metrocouncil.org/environment/Watershed/BMP/manual.htm

U.S. Environmental Protection Agency, Post-Construction Stormwater Management in New Development & Redevelopment BMP Factsheets. Available at: http://www.cfpub.epa.gov/npdes/stormwater/menuofbmps/bmp_files.cfm

Ventura Countywide Stormwater Quality Management Program, Technical Guidance Manual for Stormwater Quality Control Measures. July, 2002.