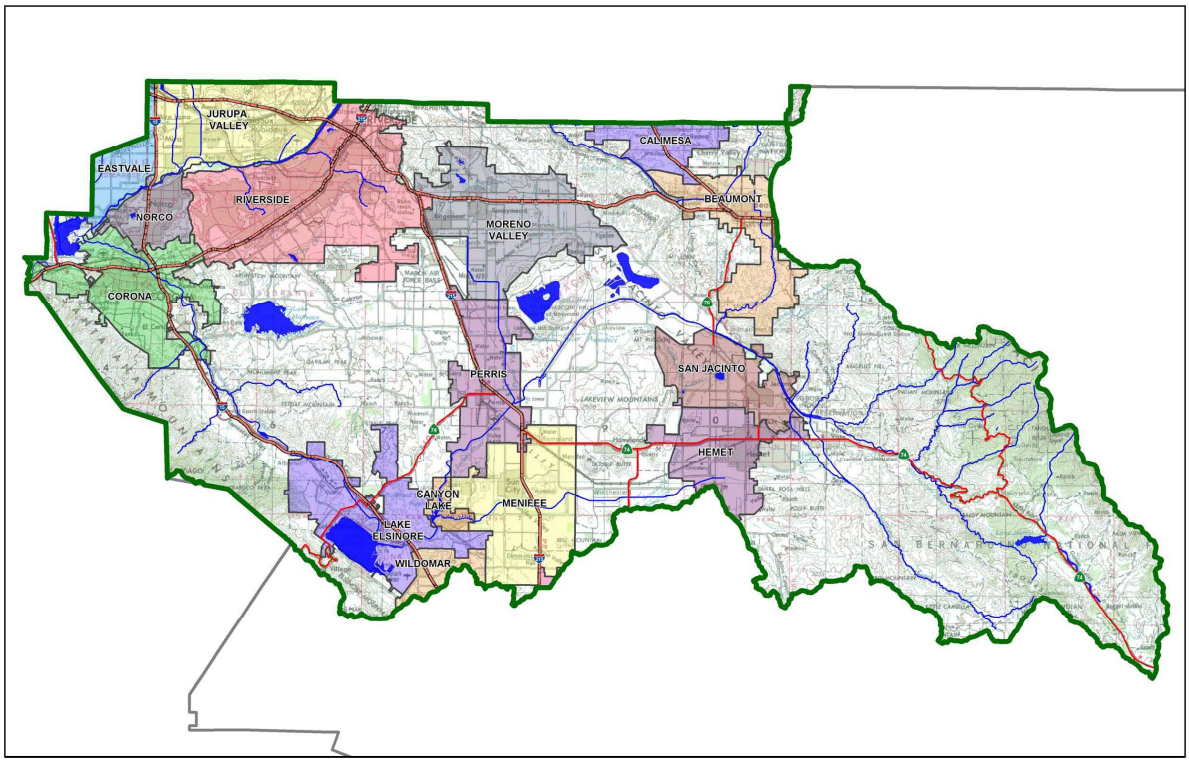
Project Specific Water Quality Management Plan

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

Project Title: Skyline Heights

Development No: TTM 36544

Design Review/Case No: DPR 13-002, TTM 36544, WQ16-002P



☒ **Preliminary**
☐ **Final**

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

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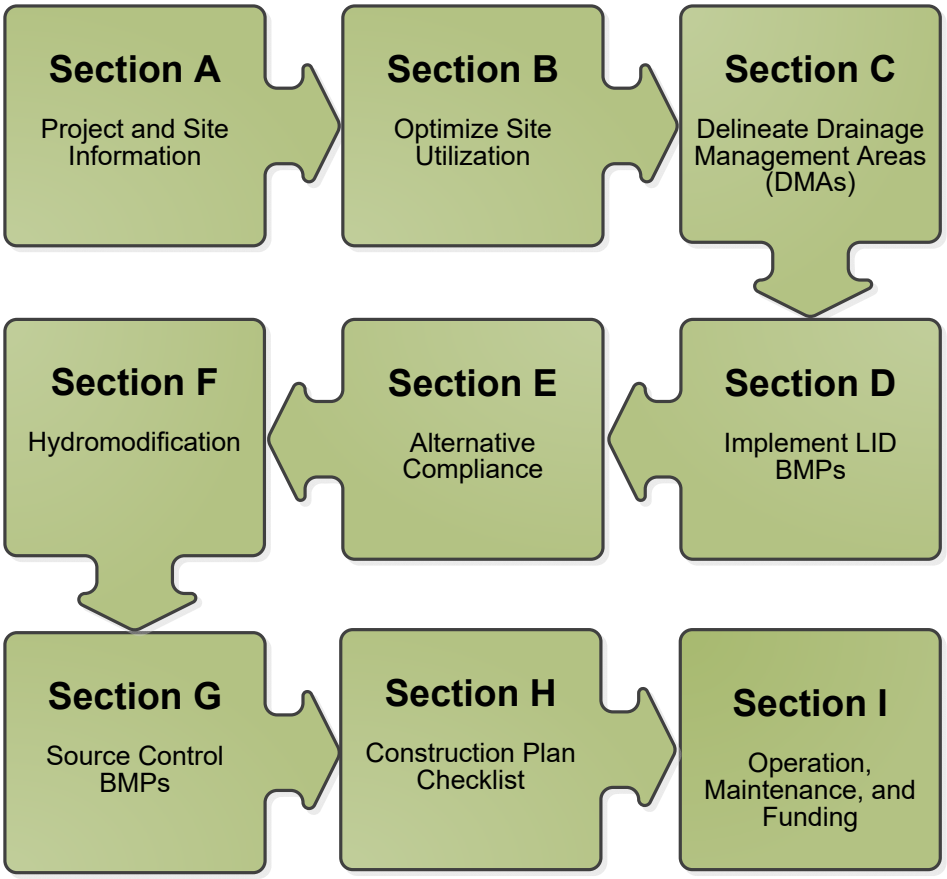
A Brief Introduction

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



OWNER'S CERTIFICATION

This Project-Specific Water Quality Management Plan (WQMP) has been prepared for Richland Communities, Inc. by KWC Engineers for the Skyline Heights project.

This WQMP is intended to comply with the requirements of City of Corona for Storm Water Quality Ordinance (Corona Municipal Code Section 15.36, Titla 13 Chapter 13.27 and City Council Ordinance No. 2291 and 2828) 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 Corona Water Quality Ordinance (Corona Municipal Code Section 15.36, Title 13 Chapter 13.27 and City Council Ordinance No. 2291 and 2828).

"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:	Single Family Residential (R1-7.2)
Planning Area:	Temescal Canyon Area Plan
Community Name:	City of Corona
Development Name:	Skyline Heights

PROJECT LOCATION

Latitude & Longitude (DMS): 33°50'44''N, 117°36'26''W

Project Watershed and Sub-Watershed: Santa Ana River Reach 3, Temescal Creek, Mabey Canyon, Kroonen Channel, and Oak Street Channel.

APN(s): 275-040-012, 275-040-015, 275-050-004, 275-080-010, 275-070-003, 275-040-006, and 275-040-011

Map Book and Page No.: N/A

PROJECT CHARACTERISTICS	
Proposed or Potential Land Use(s)	Single Family Residential
Proposed or Potential SIC Code(s)	N/A
Area of Impervious Project Footprint (SF)	1,464,777 sf
Total Area of proposed Impervious Surfaces within the Project Limits (SF)/or Replacement	1,464,777 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)	0 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)	N/A
What is the Water Quality Design Storm Depth for the project?	0.95

Project Description:

The Skyline Heights project is comprised of 249.5 gross acres of vacant land situated in the hills to the southwest of the City of Corona in Western Riverside County, California adjacent to Foothill Parkway. The site is located approximately 3 miles south of the 71 and 91 Freeways and approximately 4 miles west of Interstate 15 (I-15). The site is within the City of Corona's Sphere of Influence and is proposed to be annexed to the City during the entitlement process. Foothill Parkway borders the northeastern portion of the project and will be the primary access to the site. Figure 1 in Appendix A shows a vicinity map of the area.

The Skyline Heights project is generally bounded to the north and east by single-family residences and on the south and west by the Cleveland National Forest and large privately owned parcels. Within the general boundaries of the project is an undeveloped 10.0 acre parcel which is considered "Not a Part" and is owned by the U.S. Forest Service. Adjacent to the southeast portion of the project site is a single-family residential community (Tract Map

31955). The immediate surrounding area consists of Low Density Residential (2-6 du/ac) as well as undeveloped open space within the City of Corona. Skyline Drive, a graded forest service access road, is located just to the south of the project. This road provides recreational hiking and mountain biking opportunities to residents on a local and regional level.

The project site consists of sparsely vegetated and otherwise undeveloped land with the exception of dirt roads. The site is characterized by steep topography, generally increasing in elevation from the northeast to the southwest. Several canyons and ravines are present which will convey natural drainage across the project site.

As proposed by the Skyline Heights project, the site consists of 276 single family and multifamily residential. The project site is comprised of approximately 280.8 acres of undeveloped vacant land. It is proposed that approximately 126.8 acres will be graded based on the conceptual grading plan. Figure 2 in Appendix 1 shows a vicinity map of the area illustrating the location of the project and the developments in the area.

A.1 Maps and Site Plans

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

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

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

A.2 Identify Receiving Waters

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

Table A.1 Identification of Receiving Waters

Receiving Waters	EPA Approved 303(d) List Impairments	Designated Beneficial Uses	Proximity to RARE Beneficial Use
Temescal Creek Reach 1	pH	REC 1, REC 2, WARM, WILD	-
Santa Ana River Reach 3	Bacteria & Viruses (Pathogens), Copper (wet season) and Lead	AGR, GWR, REC 1, REC 2, WARM, WILD, RARE	6.5 miles
Prado Dam	N/A	N/A	N/A

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

Table A.2 Other Applicable Permits

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

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

Section B: Optimize Site Utilization (LID Principles)

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

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

Site Optimization

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

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

The existing drainage pattern of the site were identified and preserved. In the existing condition the site drains easterly across the site along several valleys and stream channels. There are two major drainage channels that bisect the site, Mabey Canyon on the north and Kroonen Channel to the south. The existing and proposed drainage patterns are identified on the WQMP Site Plan (as well as identified in the project Preliminary Hydrology Report). Using a system of flow-by basins, detention basin, and MWS units which will then flow into storm drain piping. Offsite flow will by-pass the site and will not be co-mingled with development runoff which needs to be treated at the proposed designated BMP treatment areas.

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

The project site borders the Cleveland National Forest. The site consists of sparsely vegetated and otherwise undeveloped land except for dirt roads. The site is characterized by steep topography, generally increasing in elevation from the northeast to the southwest. Several canyons and ravines are present which will convey natural drainage across the project site. As a result, portions of the property are left as open space undisturbed areas. The natural open space areas comprise of approximately 146.97 acres. The existing vegetation and drainage patterns will be protected and are identified in the WQMP Site Plan.

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

As proposed by the development, the site will be subject to fill of up to 140 feet in some of the canyon bottoms and cuts of up to 155 feet along some of the ridgelines. The site consists of alluvium and colluvium deposits, artificial fill, and Silverado and Ladd formations. The large depths of proposed fill

material expected within the site may reduce the infiltration capabilities of the soil. The infiltration rate after the grading of the site cannot be determined at this time. Infiltration tests may be conducted prior to grading to determine the percolation rate of the soil and its suitability for infiltration type BMPs.

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

The impervious area has been minimized in relation to the size of the site and the relative density of the development. The site design proposes public roadways, residential lots, landscaped slopes, and natural open space. The proposed roadway widths are designed to meet City of Corona Standards.

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

Yes, roof runoff has been designed to drain into pervious landscape areas with each residential lot prior to discharge onto streets or connection to proposed on-site storm drain systems. The 2-yr storm runoff from development will be collected and conveyed to proposed WQMP treatment areas for treatment prior to discharge or connection to proposed on-site storm drain system.

Section C: Delineate Drainage Management Areas (DMAs)

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

Table C.1 DMA Classifications

DMA Name or ID	Surface Type(s)[1]	Area (Sq. Ft.)	DMA Type
DMA A	Roofs, concrete/asphalt, landscaping	651,029 sf	Type D
DMA B	Roofs, concrete/asphalt, landscaping	2,027,859 sf	Type D
DMA C	Roofs, concrete/asphalt, landscaping	1,175,819 sf	Type D
DMA D1	Concrete/asphalt, landscaping	19,191 sf	Type D
DMA D2	Concrete/asphalt, landscaping	58,165 sf	Type D
DMA D3	Roofs, concrete/asphalt, landscaping	111,129 sf	Type D
DMA D4	Roofs, concrete/asphalt, landscaping	98,703 sf	Type D
DMA D5	Roofs, concrete/asphalt, landscaping	168,964 sf	Type D
DMA D6	Concrete/asphalt, landscaping, natural (D soil)	31,072 sf	Type D
DMA D7	Concrete/asphalt, landscaping	105,469 sf	Type D

[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)
Natural Open Space	2,027,786	Existing	N/A

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

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

DMA Name or ID	BMP Name or ID
DMA A1	Bio-Retention Basin
DMA B1	Extended Detention Basin
DMA C1	Extended Detention Basin
DMA D1	Bio-Treatment MWS
DMA D2	Bio-Treatment MWS
DMA D3	Bio-Treatment MWS
DMA D4	Bio-Treatment MWS
DMA D5	Bio-Treatment MWS
DMA D6	Bio-Treatment MWS
DMA D7	Bio-Treatment MWS

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: Underlying soil material is bedrock does not infiltrate very well. A geotechnical report will be attached to Appendix 3 of the Preliminary Project Specific WQMP Report for reference.		

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:

Type of Landscaping (Conservation Design or Active Turf):

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:

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:

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:

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)

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:

Project Type:

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:

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:

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:

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)**

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:

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:

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:

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:

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)**

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

D.3 Bioretention and Biotreatment Assessment

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

Select one of the following:

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

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

D.4 Feasibility Assessment Summaries

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

Table D.2 LID Prioritization Summary Matrix

DMA Name/ID	LID BMP Hierarchy				No LID (Alternative Compliance)
	1. Infiltration	2. Harvest and use	3. Bioretention	4. Biotreatment	
DMA A1	☐	☐	☒	☐	☐
DMA B1	☐	☐	☐	☒	☐
DMA C1	☐	☐	☐	☒	☐
DMA D1	☐	☐	☐	☒	☐
DMA D2	☐	☐	☐	☒	☐
DMA D3	☐	☐	☐	☒	☐
DMA D4	☐	☐	☐	☒	☐
DMA D5	☐	☐	☐	☒	☐
DMA D6	☐	☐	☐	☒	☐
DMA D7	☐	☐	☐	☒	☐

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

No alternative compliance measures were studied or used for this project.

D.5 LID BMP Sizing

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

Refer to Appendix 6 for DCV calculations sheets corresponding to the proposed LID BMPs. All proposed BMPs are designed to handle and treat the minimum design capture volumes as identified on the DCV calculations.

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			
DMA A	[A]		[B]	[C]	[A] x [C]			
Roofs	*54,000*	*Roofs*	*1*	0.89	48,168	*Design Storm Depth (in)*	*Design Capture Volume,* V_{BMP} *(cubic feet)*	*Proposed Volume on Plans (cubic feet)*
Dwy	*5,760*	*Concrete or Asphalt*	*1*	0.892	5,137.9			
Street	*143,743*	*Concrete or Asphalt*	*1*	0.892	128,218.8			
Open	*0*	*Natural (D Soil)*	*0.4*	0.279712	0			
Landscape	*447,526*	*Ornamental Landscaping*	*0.1*	0.110458	49,432.8			
	A_T = **651,029**				Σ= **230,957.5**	0.95	**18,284.1**	**18,770**

[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

DMA Type/ID	DMA Area (square feet)	Post-Project Surface Type	Effective Impervious Fraction, I_f	DMA Runoff Factor	DMA Areas x Runoff Factor			
DMA B	[A]		[B]	[C]	[A] x [C]			
Roofs	*258,000*	*Roofs*	*1*	*0.89*	*230,136*	*Design Storm Depth (in)*	*Design Capture Volume, V_{BMP} (cubic feet)*	*Proposed Volume on Plans (cubic feet)*
Dwy	*27,520*	*Concrete or Asphalt*	*1*	*0.892*	*24,547.8*			
Street	*419,902*	*Concrete or Asphalt*	*1*	*0.892*	*374,552.6*			
Open	*0*	*Natural (D Soil)*	*0.4*	*0.279712*	*0*			
Landscape	*1,322,437*	*Ornamental Landscaping*	*0.1*	*0.110458*	*146,073.7*			
	A_T = **2,027,859**				Σ= **775,310.1**	**0.95**	**61,378.7**	**72,111**

[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

DMA Type/ID	DMA Area (square feet)	Post-Project Surface Type	Effective Impervious Fraction, I_f	DMA Runoff Factor	DMA Areas x Runoff Factor			
DMA C	[A]		[B]	[C]	[A] x [C]			
Roofs	*69,000*	*Roofs*	*1*	*0.89*	*61,548*	*Design Storm Depth (in)*	*Design Capture Volume, V_{BMP} (cubic feet)*	*Proposed Volume on Plans (cubic feet)*
Dwy	*7,360*	*Concrete or Asphalt*	*1*	*0.892*	*6,565.1*			
Street	*260,496*	*Concrete or Asphalt*	*1*	*0.892*	*232,362.4*			
Open	*0*	*Natural (D Soil)*	*0.4*	*0.279712*	*0*			
Landscape	*838,963*	*Ornamental Landscaping*	*0.1*	*0.110458*	*92,670.2*			
	A_T = **1,175,819**				Σ= **393,145.7**	**0.95**	**31,124**	**37,249**

[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

DMA Type/ID	DMA Area (square feet)	Post-Project Surface Type	Effective Impervious Fraction, I_f	DMA Runoff Factor	DMA Areas x Runoff Factor			
DMA D1	[A]		[B]	[C]	[A] x [C]			
Street	*17,131*	*Concrete or Asphalt*	*1*	*0.89*	*15,280.9*	*Design Rainfall Intensity (in/hr)*	*Design Flow Rate, Q_{BMP} (cfs)*	*Proposed Flow Rate on Plans (cfs)*
Landscape	*2,060*	*Ornamental Landscaping*	*0.1*	*0.110458*	*227.5*			
	A_T = **19,191**				Σ= **15,508.4**	**0.20**	**0.1**	**0.115**

[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

DMA Type/ID	DMA Area (square feet)	Post-Project Surface Type	Effective Impervious Fraction, I_f	DMA Runoff Factor	DMA Areas x Runoff Factor			
DMA D2	[A]		[B]	[C]	[A] x [C]			
Street	*23,580*	*Concrete or Asphalt*	*1*	*0.89*	*21,033.4*	*Design Rainfall Intensity (in/hr)*	*Design Flow Rate, Q_{BMP} (cfs)*	*Proposed Volume on Plans (cfs)*
Landscape	*34,585*	*Ornamental Landscaping*	*0.1*	*0.110458*	*3,820.2*			
	A_T = **58,165**				Σ= **24,853.6**	**0.20**	**0.1**	**0.115**

[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

DMA Type/ID	DMA Area (square feet)	Post-Project Surface Type	Effective Impervious Fraction, I_f	DMA Runoff Factor	DMA Areas x Runoff Factor			
DMA D3	[A]		[B]	[C]	[A] x [C]			
Roofs	*6,000*	*Roofs*	*1*	*0.89*	*5,352*	*Design Rainfall Intensity (in/hr)*	*Design Flow Rate, Q_{BMP} (cfs)*	*Proposed Volume on Plans (cfs)*
Driveway	*640*	*Concrete or Asphalt*	*1*	*0.892*	*570.9*			
Street	*33,645*	*Concrete or Asphalt*	*1*	*0.892*	*30,011.3*			
Landscape	*70,844*	*Ornamental Landscaping*	*0.1*	*0.110458*	*7,825.3*			
	A_T = **111,129**				Σ= **43,759.5**	**0.20**	**0.2**	**0.206**

[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

DMA Type/ID	DMA Area (square feet)	Post-Project Surface Type	Effective Impervious Fraction, I_f	DMA Runoff Factor	DMA Areas x Runoff Factor			
DMA D4	[A]		[B]	[C]	[A] x [C]			
Roofs	*12,000*	*Roofs*	*1*	*0.89*	*10,704*	*Design Rainfall Intensity (in/hr)*	*Design Flow Rate, Q_{BMP} (cfs)*	*Proposed Volume on Plans (cfs)*
Driveway	*1,280*	*Concrete or Asphalt*	*1*	*0.892*	*1,141.8*			
Street	*22,623*	*Concrete or Asphalt*	*1*	*0.892*	*20,179.7*			
Landscape	*62,800*	*Ornamental Landscaping*	*0.1*	*0.110458*	*6,936.8*			
	A_T = **98,703**				Σ= **38,962.3**	**0.20**	**0.2**	**0.206**

[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

DMA Type/ID	DMA Area (square feet)	Post-Project Surface Type	Effective Impervious Fraction, I_f	DMA Runoff Factor	DMA Areas x Runoff Factor			
DMA D5	[A]		[B]	[C]	[A] x [C]			
Roofs	*18,000*	*Roofs*	*1*	*0.89*	*16,056*	*Design Rainfall Intensity (in/hr)*	*Design Flow Rate, Q_{BMP} (cfs)*	*Proposed Volume on Plans (cfs)*
Driveway	*1,920*	*Concrete or Asphalt*	*1*	*0.892*	*1,712.6*			
Street	*44,571*	*Concrete or Asphalt*	*1*	*0.892*	*39,757.3*			
Landscape	*104,473*	*Ornamental Landscaping*	*0.1*	*0.110458*	*11,539.9*			
	A_T = **168,964**				Σ= **69,065.8**	**0.20**	**0.3**	**0.346**

[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

DMA Type/ID	DMA Area (square feet)	Post-Project Surface Type	Effective Impervious Fraction, I_f	DMA Runoff Factor	DMA Areas x Runoff Factor			
DMA D6	[A]		[B]	[C]	[A] x [C]			
Street	*18,362*	*Roofs*	*1*	*0.89*	*16,378.9*	*Design Rainfall Intensity (in/hr)*	*Design Flow Rate, Q_{BMP} (cfs)*	*Proposed Volume on Plans (cfs)*
Landscape	*9,080*	*Ornamental Landscaping*	*0.1*	*0.110458*	*1,003*			
Open	*3,630*	*Natural (D Soil)*	*0.4*	*0.279712*	*1,015.4*			
	A_T = **31,072**				Σ= **18,397.3**	**0.20**	**0.1**	**0.115**

[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

DMA Type/ID	DMA Area (square feet)	Post-Project Surface Type	Effective Impervious Fraction, I_f	DMA Runoff Factor	DMA Areas x Runoff Factor			
DMA D7	[A]		[B]	[C]	[A] x [C]			
Roofs	*6,000*	*Roofs*	*1*	*0.89*	*5,352*	*Design Rainfall Intensity (in/hr)*	*Design Flow Rate, Q_{BMP} (cfs)*	*Proposed Volume on Plans (cfs)*
Driveway	*640*	*Concrete or Asphalt*	*1*	*0.892*	*570.9*			
Street	*21,016*	*Concrete or Asphalt*	*1*	*0.892*	*18,746.3*			
Landscape	*77,813*	*Ornamental Landscaping*	*0.1*	*0.110458*	*8,595.1*			
	A_T = **105,469**				Σ= **33,264.3**	**0.20**	**0.2**	**0.206**

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

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

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

Section E: Alternative Compliance (LID Waiver Program)

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

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

- *Or* -

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

E.1 Identify Pollutants of Concern

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

Table E.1 Potential Pollutants by Land Use Type

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

P = Potential

N = Not Potential

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

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

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

(4) Specifically petroleum hydrocarbons

(5) Specifically solvents

(6) Bacterial indicators are routinely detected in pavement runoff

E.2 Stormwater Credits

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

Table E.2 Water Quality Credits

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

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

E.3 Sizing Criteria

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

Table E.3 Treatment Control BMP Sizing

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

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

E.4 Treatment Control BMP Selection

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

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

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

Table E.4 Treatment Control BMP Selection

Selected Treatment Control BMP Name or ID[1]	Priority Pollutant(s) of Concern to Mitigate[2]	Removal Efficiency Percentage[3]
DMA A1 (bio-retention basin)	Bacteria, Metals	Medium
DMA B1 (extended det. basin)	Bacteria, Metals	Medium
DMA C1 (extended det. basin)	Bacteria, Metals	Medium
DMA D1 (MWS Unit)	Bacteria, Metals	Medium
DMA D2 (MWS Unit)	Bacteria, Metals	Medium
DMA D3 (MWS Unit)	Bacteria, Metals	Medium
DMA D4 (MWS Unit)	Bacteria, Metals	Medium
DMA D5 (MWS Unit)	Bacteria, Metals	Medium
DMA D6 (MWS Unit)	Bacteria, Metals	Medium
DMA D7 (MWS Unit)	Bacteria, Metals	Medium

[1] Treatment Control BMPs must not be constructed within Receiving Waters. In addition, a proposed Treatment Control BMP may be listed more than once if they possess more than one qualifying pollutant removal efficiency.

[2] Cross Reference Table E.1 above to populate this column.

[3] As documented in a Co-Permittee Approved Study and provided in Appendix 6.

Section F: Hydromodification

F.1 Hydrologic Conditions of Concern (HCOC) Analysis

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

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

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

If Yes, HCOC criteria do not apply.

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

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

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

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

Table F.1 Hydrologic Conditions of Concern Summary

	2 year – 24 hour		
	Pre-condition	**Post-condition**	**% Difference**
Time of Concentration			
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:

The runoff from the proposed project site (WQMP Areas A, B, C, and E) discharges directly to City/County maintained MS4 Storm Drain System and the Mabey Canyon Debris Basin which drains to the Santa Ana River Reach 3. These facilities have been identified by Riverside County Flood Control and Water Conservation District to be within a watershed not susceptible to HCOC according to the HCOC Applicability Map. This map is included in Appendix 7.

However, the runoff from proposed WQMP drainage area D1, D2, and D3 does not fall into HCOC Exemption 3 criteria and is required to mitigate the HCOC. The project site is proposing a series of privately maintained Detention Basins within the project site to mitigate not only the HCOC requirements but also the increased runoff mitigation requirements for the site. For WQMP Area D1, D2, and D3, the project hydrology report will show that the HCOC runoff and velocity is mitigated for this drainage area with the proposed onsite Detention Basins located upstream of the discharge point. The project hydrology report and Detention Basin sizing calculations is referenced and made part of this document, however, due to the complexity of the analysis only sections of the analysis is included in Appendix 7 of this report.

F.2 HCOC Mitigation

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

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

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

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

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

Section G: Source Control BMPs

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

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

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

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

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

Table G.1 Permanent and Operational Source Control Measures

Potential Sources of Runoff pollutants	Permanent Structural Source Control BMPs	Operational Source Control BMPs
On-site Storm Drain Inlets	• Mark all inlets with the words "Only Rain Down the Storm Drain" or similar. Catch Basin Markers shall be per local agency requirements	• Maintain and periodically repaint or replace inlet markings. • Provide Stormwater pollution prevention informations 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

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		• 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	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/ • Provide IPM information to new owners, lessees and operators.
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
Roofing, gutters, and trim.	• Avoid roofing, gutters, and trim made of copper or other unprotected metals that may leach into runoff.	

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Section H: Construction Plan Checklist

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

Table H.1 Construction Plan Cross-reference

BMP No. or ID	BMP Identifier and Description	Corresponding Plan Sheet(s)
DMA A1	Bio-Retention Basin	
DMA B1	Extended Detention Basin	
DMA C1	Extended Detention Basin	
DMA D1	Modular Wetland System Unit (MWS-L-4-8)	
DMA D2	Modular Wetland System Unit (MWS-L-4-8)	
DMA D3	Modular Wetland System Unit (MWS-L-4-17)	
DMA D4	Modular Wetland System Unit (MWS-L-4-17)	
DMA D5	Modular Wetland System Unit (MWS-L-8-12)	
DMA D6	Modular Wetland System Unit (MWS-L-4-8)	
DMA D7	Modular Wetland System Unit (MWS-L-4-17)	

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

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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: Privately maintained and funded by development HOA, approved CC&Rs

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.

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Appendix 1: Maps and Site Plans

Location Map, WQMP Site Plan and Receiving Waters Map

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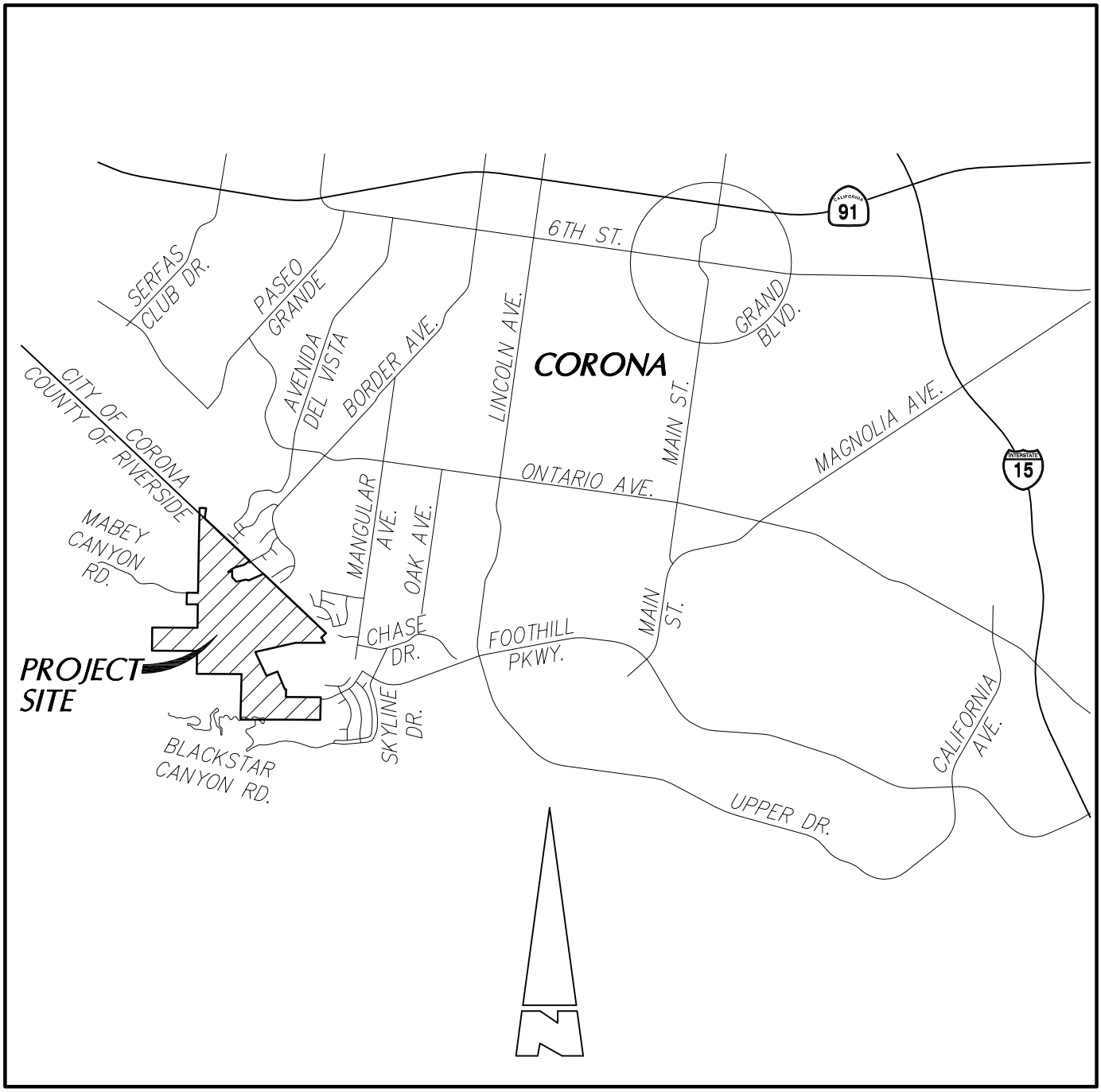


LOCATION MAP

NOT TO SCALE

KWC ENGINEERS
CIVIL ENGINEERS • PLANNERS • SURVEYORS
1880 COMPTON AVENUE, SUITE 100 • CORONA, CA. 92881-3370 • 951-734-2130

FIGURE 1

J.N. 2012.1344.1 / R:\12\1344\PRELIM\REPORTS\PRELIM WQMP\Location Map.dwg 04/17/2013 13:25

FIGURE 2
VICINITY MAP

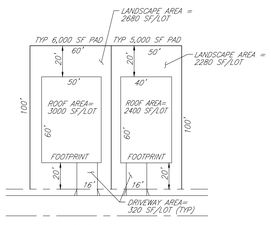
KWC ENGINEERS
CIVIL ENGINEERS • PLANNERS • SURVEYORS
3990 COMPTON AVENUE, SUITE 100 • CORONA, CA. 92881-3370 • 951-734-2130

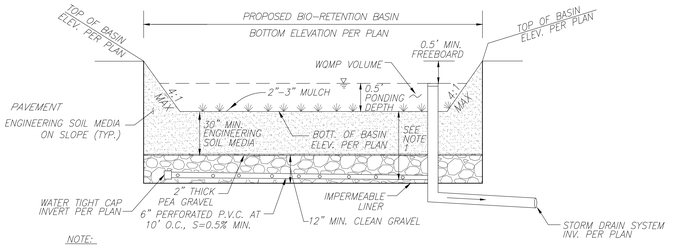
J.N. 12.1344.1.17 R:\12\1344\PRELIM\REPORTS\PRELIM WQMP\vicinity.dwg 04/19/2013 07:44

SKYLINE HEIGHTS PROJECT

PRELIMINARY WQMP SITE PLAN

WQMP BASIN SUMMARY TABLE			
BASIN	AREA (AC)	OWNERSHIP	MAINTENANCE
A	0.26	HOME OWNERS ASSOCIATION	HOME OWNERS ASSOCIATION
B	0.30	HOME OWNERS ASSOCIATION	HOME OWNERS ASSOCIATION
C	0.28	HOME OWNERS ASSOCIATION	HOME OWNERS ASSOCIATION



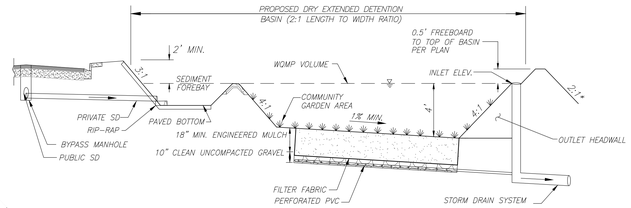


NOTE:

1. INVERT OF PERFORATED PIPE SHALL NOT BE LESS THAN 46" FROM BASIN BOTTOM. MINIMUM 2" GRAVEL SECTION ABOVE TOP OF PIPE AND BELOW BOTTOM OF PIPE.
2. CLEANOUT ON UNDERDRAIN NOT SHOWN FOR CLARITY.
3. COUNTY RECOMMENDED PLANT LIST FOR THE BASIN IS INCLUDED IN THE REPORT.

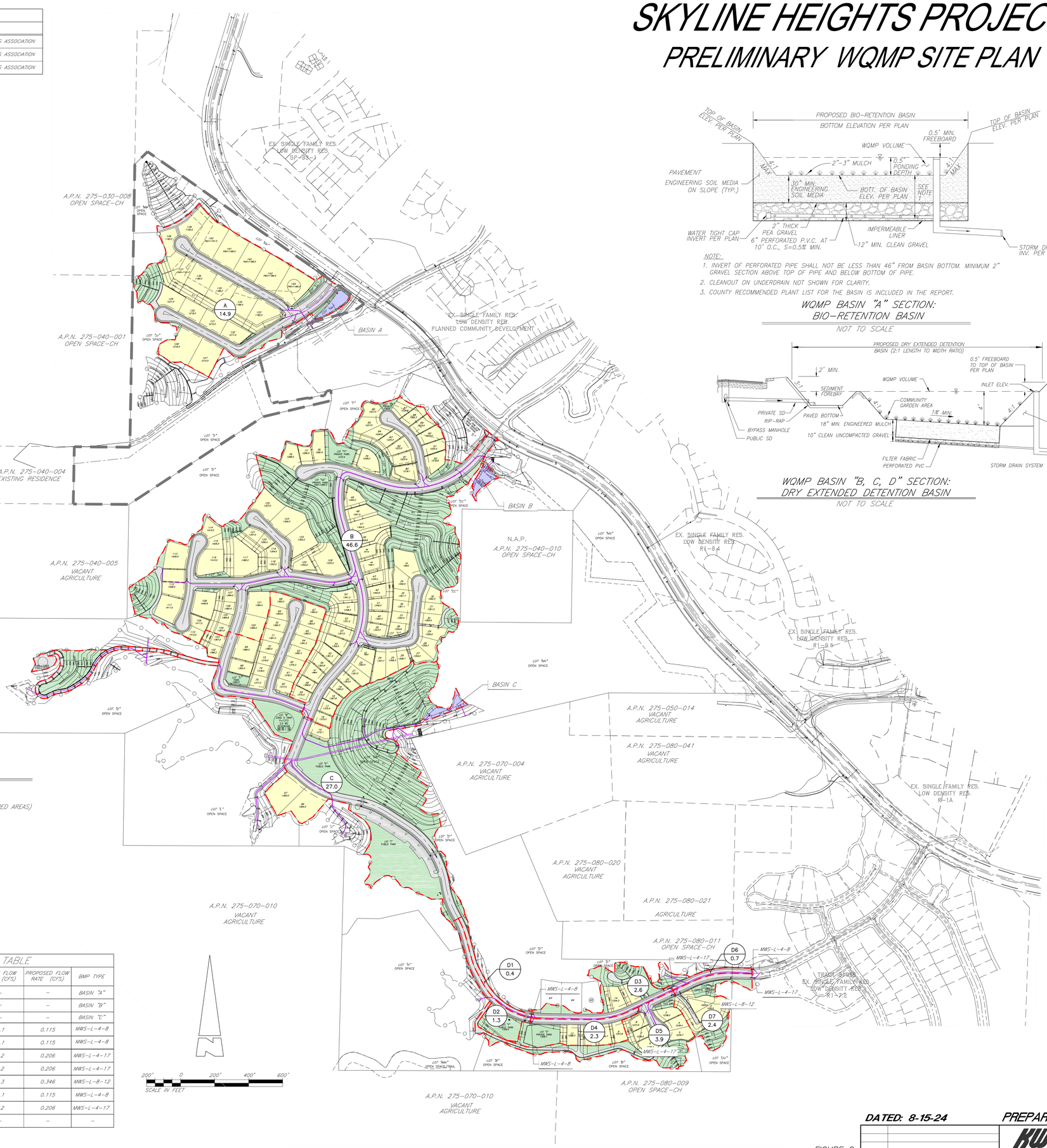
WQMP BASIN "A" SECTION: BIO-RETENTION BASIN

NOT TO SCALE



WQMP BASIN "B, C, D" SECTION: DRY EXTENDED DETENTION BASIN

NOT TO SCALE



LEGEND

- LOT AREA (INCLUDES IMPERVIOUS AND LANDSCAPED AREAS)
- STREET AREA
- LANDSCAPING AREA
- WQMP BASIN TRIBUTARY AREA BOUNDARY
- A1 / 4.7 — BASIN NUMBER / TRIBUTARY AREA (ACRES)
- PROPOSED WQMP BASINS
- A1 — PROPOSED WQMP BASIN NUMBER
- PROPOSED STORM DRAIN

WQMP TREATMENT SUMMARY TABLE								
DMA	DMA AREA (AC)	IMPERVIOUS (AC)	PERVIOUS (AC)	DESIGN CAPTURE VOLUME (CU-FT)	PROPOSED CAPTURE VOLUME (CU-FT)	DESIGN FLOW RATE (CFS)	PROPOSED FLOW RATE (CFS)	BMP TYPE
A	14.9	4.7	10.2	18,284	18,770	–	–	BASIN "A"
B	46.6	16.2	30.4	61,379	72,111	–	–	BASIN "B"
C	27.0	7.7	19.3	31,124	37,249	–	–	BASIN "C"
D1	0.4	0.4	0.0	–	–	0.1	0.115	MWS-L-4-8
D2	1.3	0.5	0.8	–	–	0.1	0.115	MWS-L-4-8
D3	2.6	0.9	1.7	–	–	0.2	0.206	MWS-L-4-17
D4	2.3	0.8	1.5	–	–	0.2	0.206	MWS-L-4-17
D5	3.9	1.5	2.4	–	–	0.3	0.346	MWS-L-8-12
D6	0.7	0.4	0.3	–	–	0.1	0.115	MWS-L-4-8
D7	2.4	0.6	1.8	–	–	0.2	0.206	MWS-L-4-17
TOTAL	102.1	33.7	68.4	110,787	128,130	–	–	–

DATED: 8-15-24

FIGURE 2

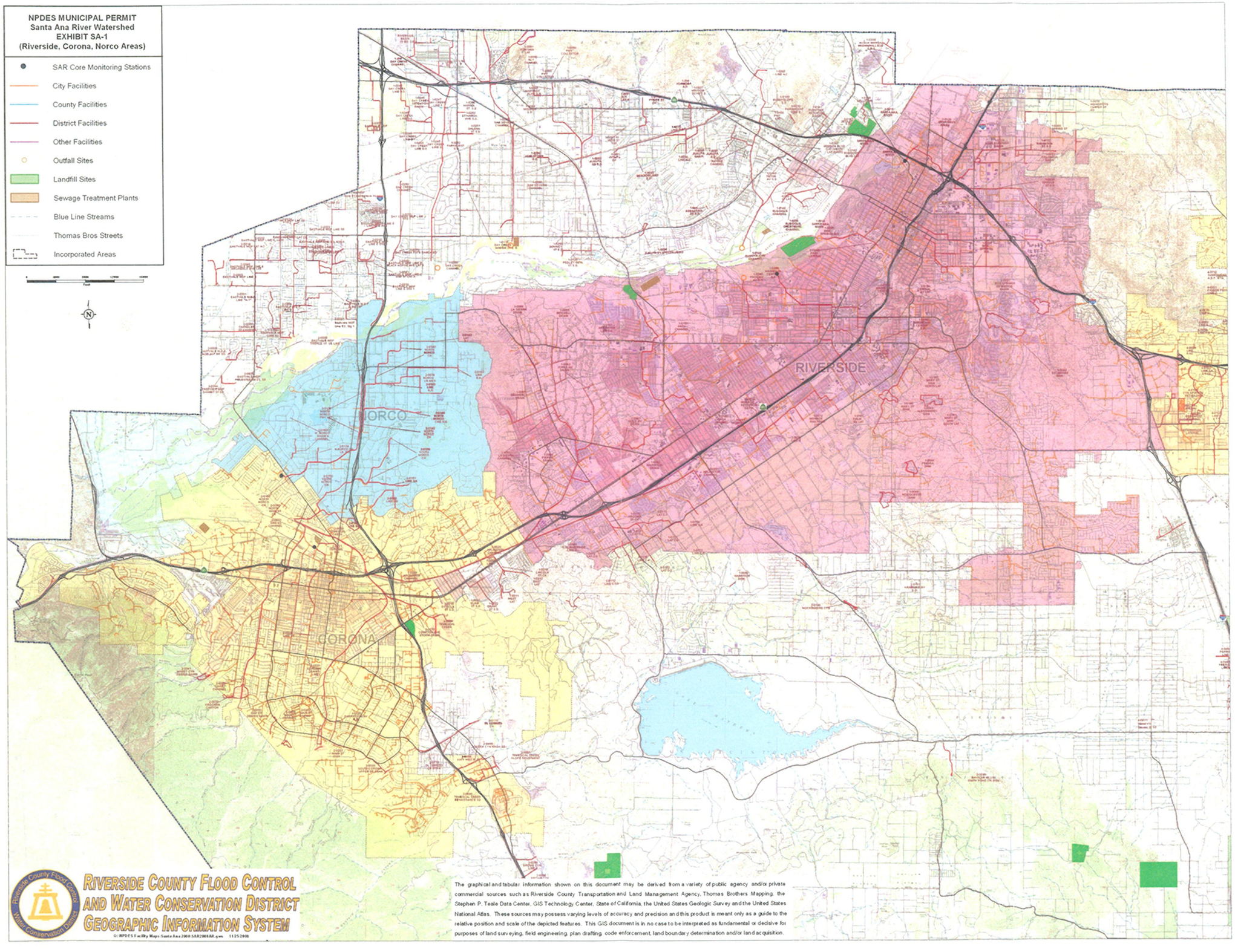
PREPARED BY:

DATE	REVISION

KWC ENGINEERS
CIVIL ENGINEERS ● PLANNERS ● SURVEYORS
1880 COMPTON AVENUE, SUITE 100 ● CORONA, CA. 92881-3370 ● 951-734-2130

NPDES MUNICIPAL PERMIT
Santa Ana River Watershed
EXHIBIT SA-1
(Riverside, Corona, Norco Areas)

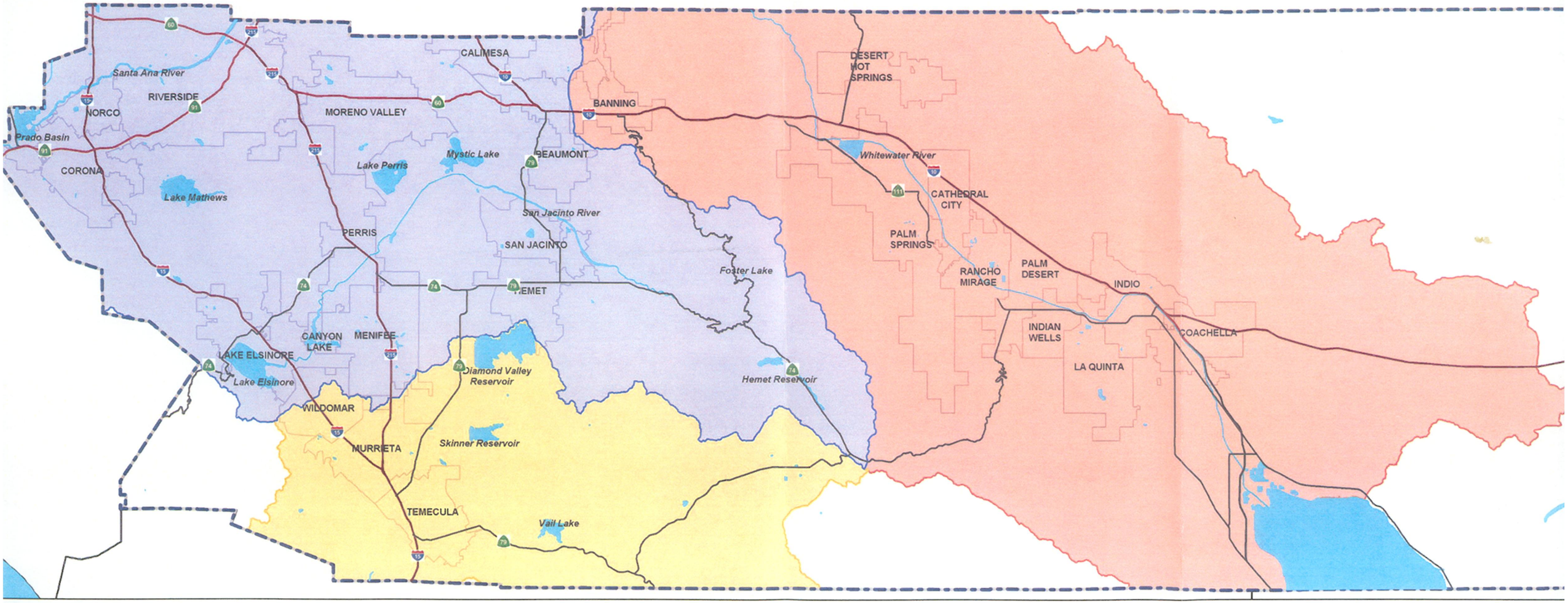
- SAR Core Monitoring Stations
- City Facilities
- County Facilities
- District Facilities
- Other Facilities
- Outfall Sites
- Landfill Sites
- Sewage Treatment Plants
- Blue Line Streams
- Thomas Bros Streets
- Incorporated Areas



RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT GEOGRAPHIC INFORMATION SYSTEM

G:\RPDES\Facility Maps\Santa Ana\2008\SAR2008AE.gwm 11/25/2008

The graphical and tabular information shown on this document may be derived from a variety of public agency and/or private commercial sources such as Riverside County Transportation and Land Management Agency, Thomas Brothers Mapping, the Stephen P. Teale Data Center, GIS Technology Center, State of California, the United States Geologic Survey and the United States National Atlas. These sources may possess varying levels of accuracy and precision and this product is meant only as a guide to the relative position and scale of the depicted features. This GIS document is in no case to be interpreted as fundamental or decisive for purposes of land surveying, field engineering, plan drafting, code enforcement, land boundary determination and/or land acquisition.


Santa Ana River
RIVERSIDE
NORCO
Prado Basin
CORONA
Lake Mathews
Lake Perris
MORENO VALLEY
CALIMESA
Mystic Lake
BEAUMONT
BANNING
San Jacinto River
PERRIS
SAN JACINTO
TEMECULA
CANYON LAKE
MENIFEE
LAKE ELSINORE
Lake Elsinore
WILDOMAR
MURRIETA
Skinner Reservoir
Diamond Valley Reservoir
Foster Lake
Hemet Reservoir
Vail Lake
DESERT HOT SPRINGS
Whitewater River
CATHEDRAL CITY
PALM SPRINGS
RANCHO MIRAGE
PALM DESERT
INDIO
INDIAN WELLS
LA QUINTA
COACHELLA

Appendix 2: Construction Plans

Grading and Drainage Plans

DPR13-002

SKYLINE HEIGHTS - REVISED TTM NO. 36544

IN THE CITY OF CORONA

"FOR CONDOMINIUM PURPOSES" (PHASE 1 & 2)

LEGAL DESCRIPTION:

PARCEL 1: (APN: 275-040-012-3)
ALL THAT PORTION OF THE NORTHWEST 1/4 OF THE SOUTHEAST 1/4 OF FRACTIONAL SECTION 4, TOWNSHIP 4 SOUTH, RANGE 7 WEST, SAN BERNARDINO BASE AND MERIDIAN, AS SHOWN UNITED STATES GOVERNMENT SURVEY; AND MORE PARTICULARLY DESCRIBED AS FOLLOWS:

BEGINNING AT A 2" IRON PIPE SET IN CONCRETE, AT THE CENTER OF SAID SECTION 4; THENCE ON THE 1/4 SECTION LINE OF SAID SECTION 4, SOUTH 00° 06' WEST, 1054 FEET TO A 2" PIPE SET IN CONCRETE ON THE SOUTH LINE OF THE ROAD TO CORONA; THENCE ON THE SOUTHERLY LINE OF SAID ROAD TO CORONA, NORTH 77° 05' EAST, 38.80 FEET TO A 2" IRON PIPE SET IN CONCRETE; THENCE NORTH 56° 31' EAST, 62.60 FEET TO A 2" IRON PIPE SET IN CONCRETE; THENCE NORTH 46° 12' EAST, 124.70 FEET TO A 2" IRON PIPE SET IN CONCRETE; THENCE NORTH 50° 34' EAST, 102.80 FEET TO A 2" IRON PIPE SET IN CONCRETE; THENCE NORTH 37° 57' EAST, 177.10 FEET TO A 2" IRON PIPE SET IN CONCRETE; THENCE NORTH 46° 29' EAST, 171.70 FEET TO A 2" IRON PIPE SET IN CONCRETE; THENCE NORTH 55° 21' EAST 213.10 FEET TO A 1-1/4 INCH IRON PIPE SET IN CONCRETE; THENCE NORTH 61° 19' EAST, 187.50 FEET TO A 1-3/4 INCH IRON PIPE SET IN CONCRETE; THENCE NORTH 01° 41' 40" EAST, 200 FEET TO A 2-INCH IRON PIPE SET IN CONCRETE; SAID POINT BEING POINT "A" LYING DISTANT SOUTH 303.80 FEET FROM A 2-INCH IRON PIPE WITH CAP SET IN CONCRETE, WHICH IS ON THE EAST AND WEST 1/4 SECTION LINE OF SAID SECTION 4 AND LYING DISTANT SOUTH 89° 42' EAST, 1013.40 FEET FROM THE BEFORE SAID 2-INCH IRON PIPE SET FOR THE CENTER OF SAID SECTION 4; THENCE NORTH 68° 45' 00" EAST TO A POINT ON THE EASTERLY LINE OF A 2-INCH IRON PIPE SET IN CONCRETE, SAID POINT LYING ON THE NATIONAL FOREST GRANT BOUNDARY LINE, SAID LINE BEING COINCIDENT WITH THE NORTHEASTERLY BOUNDARY LINE OF BEFORESAID LOT 5, SAID POINT LYING DISTANT 537.21 FEET MORE OR LESS FROM SAID POINT "A";

ALSO EXCEPTING THEREFROM THAT PORTION LYING WITHIN PARCEL 2041-1, AS SHOWN ON RECORD OF SURVEY ON FILE IN BOOK 58, PAGE 66 OF RECORDS OF SURVEY, RECORDS OF RIVERSIDE COUNTY, CALIFORNIA, AS CONVEYED TO RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT BY FINAL ORDER OF CONDEMNATION, RECORDED JUNE 19, 1974, AS INSTRUMENT NO. 76072 OF OFFICIAL RECORDS OF RIVERSIDE COUNTY, CALIFORNIA.

ALSO EXCEPTING THEREFROM THOSE PORTIONS CONVEYED TO THE CITY OF CORONA, A CALIFORNIA MUNICIPAL CORPORATION, IN GRANT DEED RECORDED AUGUST 21, 2018 AS INSTRUMENT NO. 2018-0334712 OF OFFICIAL RECORDS DESCRIBED AS FOLLOWS:

COMMENCING AT LS 16 AS SHOWN ON THE MAP FILED IN BOOK 121, PAGES 47 THROUGH 49, INCLUSIVE, OF RECORDS OF SURVEY IN THE OFFICE OF THE COUNTY RECORDER OF SAID COUNTY OF RIVERSIDE; THENCE ALONG THE GENERAL NORTHEASTERLY LINE OF SAID FRACTIONAL SECTION 4 THE FOLLOWING COURSES:

SOUTH 46° 53' 18" EAST 1387.02 FEET; THENCE SOUTH 46° 32' 40" EAST 399.19 FEET TO THE NORTHWESTERLY LINE OF RIVERSIDE COUNTY FLOOD CONTROL DISTRICT PARCEL NO. 2041-1 AS SHOWN ON THE RECORD OF SURVEY FILED IN BOOK 58, PAGE 66 OF SAID RECORDS OF SURVEY; THENCE LEAVING SAID GENERAL NORTHEASTERLY LINE ALONG SAID NORTHWESTERLY LINE THE FOLLOWING COURSES:

SOUTH 54° 47' 48" WEST 211.68 FEET; THENCE SOUTH 74° 33' 01" WEST 269.81 FEET; THENCE SOUTH 01° 14' 41" WEST 62.00 FEET; THENCE SOUTH 66° 35' 32" WEST 82.37 FEET TO THE SOUTHEASTERLY LINE OF PARCEL 1 OF THAT CERTAIN GRANT DEED RECORDED DECEMBER 1, 2000 AS INSTRUMENT NO. 2000-479181 OF OFFICIAL RECORDS OF SAID COUNTY RECORDER; THENCE ALONG SAID SOUTHEASTERLY LINE THE FOLLOWING COURSES: SOUTHWESTERLY CONTINUING SOUTH 66° 35' 32" WEST 117.40 FEET; THENCE SOUTH 63° 50' 33" WEST 85.21 FEET TO THE TRUE POINT OF BEGINNING; THENCE LEAVING SAID SOUTHEASTERLY LINE SOUTH 14° 37' 37" EAST 294.98 FEET TO A POINT HEREINAFTER REFERRED TO AS POINT A; THENCE SOUTH 76° 51' 45" WEST 28.07 FEET TO THE BEGINNING OF A TANGENT CURVE CONCAVE NORTHERLY HAVING A RADIUS OF 15.00 FEET; THENCE ALONG SAID CURVE WESTERLY AND NORTHWESTERLY 23.18 FEET THROUGH A CENTRAL ANGLE OF 88° 32' 28"; THENCE TANGENT TO SAID CURVE; NORTH 14° 35' 47" WEST 270.85 FEET TO SAID SOUTHEASTERLY LINE OF PARCEL 1; THENCE ALONG SAID SOUTHEASTERLY LINE NORTH 63° 50' 33" WEST 43.40 FEET TO THE TRUE POINT OF BEGINNING;

PARCEL B:

COMMENCING AT POINT A AS DESCRIBED IN PARCEL A ABOVE; THENCE SOUTH 14° 37' 37" EAST 7.45 FEET; THENCE NORTH 80° 03' 58" EAST 170.13 FEET TO THE TRUE POINT OF BEGINNING; THENCE CONTINUING NORTH 80° 03' 58" EAST 47.44 FEET TO A POINT HEREINAFTER REFERRED TO AS POINT B; THENCE SOUTH 71° 06' 50" WEST 213.32 FEET TO THE BEGINNING OF A TANGENT CURVE CONCAVE NORTHERLY HAVING A RADIUS OF 40.00 FEET; THENCE ALONG SAID CURVE WESTERLY 20.76 FEET THROUGH A CENTRAL ANGLE OF 29° 44' 19"; THENCE NORTH 79° 08' 51" WEST 4.26 FEET TO THE TRUE POINT OF BEGINNING.

AND

PARCEL C:

COMMENCING AT POINT B AS DESCRIBED IN PARCEL B ABOVE; THENCE NORTH 80° 03' 58" EAST 16.88 FEET; THENCE NORTH 11° 51' 13" WEST 7.10 THE TRUE POINT OF BEGINNING; THENCE CONTINUING NORTH 11° 51' 13" WEST 16.21 FEET TO THE SOUTHERLY LINE OF SAID RIVERSIDE COUNTY FLOOD CONTROL DISTRICT PARCEL NO. 2041-1; THENCE ALONG SAID SOUTHERLY LINE NORTH 78° 15' 44" EAST 52.69 FEET; THENCE LEAVING SAID SOUTHERLY LINE SOUTH 28° 11' 47" WEST 31.08 FEET; THENCE NORTH 88° 37' 14" WEST 33.58 FEET TO THE TRUE POINT OF BEGINNING.

ALSO EXCEPTING THEREFROM THAT PORTION CONVEYED TO THE RIVERSIDE COUNTY TRANSPORTATION COMMISSION IN FINAL ORDER OF CONDEMNATION; CASE NO. RIC1108550, SUPERIOR COURT OF THE STATE OF CALIFORNIA, RECORDED AUGUST 21, 2018 AS INSTRUMENT NO. 2018-0334712 OF OFFICIAL RECORDS DESCRIBED AS FOLLOWS:

COMMENCING AT LS 16 AS SHOWN ON THE MAP FILED IN BOOK 121, PAGES 47 THROUGH 49, INCLUSIVE, OF RECORDS OF SURVEY IN THE OFFICE OF THE COUNTY RECORDER OF SAID COUNTY OF RIVERSIDE; THENCE ALONG THE GENERAL NORTHEASTERLY LINE OF SAID FRACTIONAL SECTION 4 THE FOLLOWING COURSES:

SOUTH 46° 53' 18" EAST 1387.02 FEET; THENCE SOUTH 46° 32' 40" EAST 399.19 FEET TO THE NORTHWESTERLY LINE OF RIVERSIDE COUNTY FLOOD CONTROL DISTRICT PARCEL NO. 2041-1 AS SHOWN ON THE RECORD OF SURVEY FILED IN BOOK 58, PAGE 66 OF SAID RECORDS OF SURVEY; THENCE LEAVING SAID GENERAL NORTHEASTERLY LINE ALONG SAID NORTHWESTERLY LINE THE FOLLOWING COURSES:

SOUTH 54° 47' 48" WEST 211.68 FEET; THENCE SOUTH 74° 33' 01" WEST 269.81 FEET; THENCE SOUTH 01° 14' 41" WEST 62.00 FEET; THENCE SOUTH 66° 35' 32" WEST 82.37 FEET TO THE SOUTHEASTERLY LINE OF PARCEL 1 OF THAT CERTAIN GRANT DEED RECORDED DECEMBER 1, 2000 AS INSTRUMENT NO. 2000-479181 OF OFFICIAL RECORDS OF SAID COUNTY RECORDER; THENCE ALONG SAID SOUTHEASTERLY LINE THE FOLLOWING COURSES:

CONTINUING SOUTH 66° 35' 32" WEST 117.40 FEET; THENCE SOUTH 63° 50' 33" WEST 85.21 FEET; THENCE LEAVING SAID SOUTHEASTERLY LINE SOUTH 14° 37' 37" EAST 302.43 FEET; THENCE NORTH 80° 03' 58" EAST 236.45 FEET; THENCE NORTH 11° 51' 13" WEST 18.07 FEET TO THE WESTERLY LINE OF SAID PARCEL 2041-1; THENCE ALONG SAID WESTERLY LINE THE FOLLOWING COURSES:

NORTH 40° 40' 55" WEST 180.55 FEET; THENCE NORTH 01° 09' 15" WEST 181.48 FEET TO THE TRUE POINT OF BEGINNING.

ALSO EXCEPTING THEREFROM THAT PORTION CONVEYED TO THE RIVERSIDE COUNTY TRANSPORTATION COMMISSION IN FINAL ORDER OF CONDEMNATION, CASE NO. RIC1108550, SUPERIOR COURT OF THE STATE OF CALIFORNIA, RECORDED AUGUST 21, 2018 AS INSTRUMENT NO. 2018-0334712 OF OFFICIAL RECORDS DESCRIBED AS FOLLOWS:

THAT CERTAIN PARCEL OF LAND SITUATED IN THE UNINCORPORATED TERRITORY OF THE COUNTY
OF RIVERSIDE, STATE OF CALIFORNIA, BEING THAT PORTION OF GOVERNMENT LOT 5, FRACTIONAL SECTION 4, TOWNSHIP 4 SOUTH, RANGE 7 WEST, SAN BERNARDINO MERIDIAN, ACCORDING TO THE
OFFICIAL GOVERNMENT PLAT THEREOF, DESCRIBED AS FOLLOWS:

COMMENCING AT LS 18 AS SHOWN ON THE MAP FILED IN BOOK 121, PAGES 47 THROUGH 49, INCLUSIVE, OF RECORDS OF SURVEY IN THE OFFICE OF THE COUNTY RECORDER OF SAID COUNTY OF RIVERSIDE; THENCE ALONG THE GENERAL NORTHEASTERLY LINE OF SAID FRACTIONAL SECTION 4 THE FOLLOWING COURSES: SOUTH 45°53'18" EAST 1387.02 FEET; THENCE SOUTH 46°32'40" EAST 924.93 FEET TO THE SOUTHEASTERLY LINE OF RIVERSIDE COUNTY FLOOD CONTROL DISTRICT PARCEL NO. 2041-1 AS SHOWN ON THE RECORD OF SURVEY FILED IN BOOK 58, PAGE 66 OF SAID RECORDS OF SURVEY; SAID POINT BEING THE TRUE POINT OF BEGINNING; THENCE CONTINUING SOUTH 46°32'40" EAST 1011.07 FEET TO THE EASTERLY LINE OF SAID SECTION 4; THENCE LEAVING SAID GENERAL NORTHEASTERLY LINE ALONG SAID EASTERLY LINE SOUTH 00°55'45" WEST 47.04 FEET TO A POINT ON A NON-TANGENT CURVE CONCAVE SOUTHWESTERLY AND HAVING A RADIUS OF 1139.00 FEET, A RADIAL LINE OF SAID CURVE FROM SAID POINT BEARS SOUTH 31°11'51" WEST; THENCE ALONG SAID CURVE NORTHWESTERLY 218.26 FEET THROUGH A CENTRAL ANGLE OF 10° 52' 44" TO A POINT OF REVERSE CURVATURE WITH A CURVE CONCAVE NORTHEASTERLY AND HAVING A RADIUS OF 1161.00 FEET, A RADIAL LINE OF SAID CURVE FROM SAID POINT BEARS SOUTH 20°19'07" EAST; THENCE ALONG SAID CURVE NORTHWESTERLY 401.16 FEET THROUGH CENTRAL ANGLE OF 19°47'50"; THENCE RADIALLY FROM SAID CURVE NORTH 40°06'57" EAST 2.00 FEET TO A POINT ON A NON-TANGENT CURVE CONCAVE NORTHEASTERLY AND HAVING A RADIUS OF 1159.00 FEET, SAID CURVE BEING CONCENTRIC WITH AND 2.00 FEET NORTHEASTERLY OF LAST SAID CURVE, A RADIAL LINE OF SAID CONCENTRIC CURVE FROM SAID POINT BEARS NORTH 40° 06' 57" EAST; THENCE ALONG SAID CURVE NORTHWESTERLY 327.41 FEET THROUGH A CENTRAL ANGLE OF 16° 11' 09" TO THE TRUE POINT OF BEGINNING; THENCE CONTINUING ALONG SAID CURVE NORTHWESTERLY 64.24 FEET THROUGH A CENTRAL ANGLE OF 03° 10' 33" TO A POINT OF REVERSE CURVATURE WITH A CURVE CONCAVE SOUTHWESTERLY AND HAVING A RADIUS OF 1041.00 FEET, A RADIAL LINE OF SAID CURVE FROM SAID POINT BEARS SOUTH 59° 28' 39" WEST; THENCE ALONG SAID CURVE NORTHWESTERLY 89.25 FEET THROUGH CENTRAL ANGLE OF 04° 54' 45" TO SAID SOUTHEASTERLY LINE OF PARCEL 2041-1; THENCE ALONG SAID SOUTHEASTERLY LINE NON-TANGENT FROM SAID CURVE NORTH 66° 15' 26" EAST 132.29 FEET; THENCE LEAVING SAID SOUTHEASTERLY LINE SOUTH 69° 32' 58" EAST 217.51 FEET TO THE TRUE POINT OF BEGINNING.

LEGAL DESCRIPTION CONT'D:

AND

PARCEL A:

COMMENCING AT LS 16 AS SHOWN ON THE MAP FILED IN BOOK 121, PAGES 47 THROUGH 49, INCLUSIVE, OF RECORDS OF SURVEY IN THE OFFICE OF THE COUNTY RECORDER OF SAID COUNTY OF RIVERSIDE; THENCE ALONG THE GENERAL NORTHEASTERLY LINE OF SAID FRACTIONAL SECTION 4 THE FOLLOWING COURSES:

SOUTH 46° 53' 18" EAST 1387.02 FEET; THENCE SOUTH 46° 32' 40" EAST 399.19 FEET TO THE NORTHWESTERLY LINE OF RIVERSIDE COUNTY FLOOD CONTROL DISTRICT PARCEL NO. 2041-1 AS SHOWN ON THE RECORD OF SURVEY FILED IN BOOK 58, PAGE 66 OF SAID RECORDS OF SURVEY; THENCE LEAVING SAID GENERAL NORTHEASTERLY LINE ALONG SAID NORTHWESTERLY LINE THE FOLLOWING COURSES:

SOUTH 54° 47' 48" WEST 211.68 FEET; THENCE SOUTH 74° 33' 01" WEST 269.81 FEET; THENCE SOUTH 01° 14' 41" WEST 62.00 FEET; THENCE SOUTH 66° 35' 32" WEST 82.37 FEET TO THE SOUTHEASTERLY LINE OF PARCEL 1 OF THAT CERTAIN GRANT DEED RECORDED DECEMBER 1, 2000 AS INSTRUMENT NO. 2000-479181 OF OFFICIAL RECORDS OF SAID COUNTY RECORDER; THENCE ALONG SAID SOUTHEASTERLY LINE THE FOLLOWING COURSES:

CONTINUING SOUTH 66° 35' 32" WEST 117.40 FEET; THENCE SOUTH 63° 50' 33" WEST 85.21 FEET; THENCE LEAVING SAID SOUTHEASTERLY LINE SOUTH 14° 37' 37" EAST 302.43 FEET; THENCE NORTH 80° 03' 58" EAST 236.45 FEET; THENCE NORTH 11° 51' 13" WEST 18.07 FEET TO THE WESTERLY LINE OF SAID PARCEL 2041-1; THENCE ALONG SAID WESTERLY LINE THE FOLLOWING COURSES:

NORTH 40° 40' 55" WEST 180.55 FEET; THENCE NORTH 01° 09' 15" WEST 181.48 FEET TO THE TRUE POINT OF BEGINNING.

ALSO EXCEPTING THEREFROM THAT PORTION CONVEYED TO THE RIVERSIDE COUNTY TRANSPORTATION COMMISSION IN FINAL ORDER OF CONDEMNATION, CASE NO. RIC1108550, SUPERIOR COURT OF THE STATE OF CALIFORNIA, RECORDED AUGUST 21, 2018 AS INSTRUMENT NO. 2018-0334712 OF OFFICIAL RECORDS DESCRIBED AS FOLLOWS:

THAT CERTAIN PARCEL OF LAND SITUATED IN THE UNINCORPORATED TERRITORY OF THE COUNTY
OF RIVERSIDE, STATE OF CALIFORNIA, BEING THAT PORTION OF GOVERNMENT LOT 5, FRACTIONAL SECTION 4, TOWNSHIP 4 SOUTH, RANGE 7 WEST, SAN BERNARDINO MERIDIAN, ACCORDING TO THE
OFFICIAL GOVERNMENT PLAT THEREOF, DESCRIBED AS FOLLOWS:

COMMENCING AT LS 16 AS SHOWN ON THE MAP FILED IN BOOK 121, PAGES 47 THROUGH 49, INCLUSIVE, OF RECORDS OF SURVEY IN THE OFFICE OF THE COUNTY RECORDER OF SAID COUNTY OF RIVERSIDE; THENCE ALONG THE GENERAL NORTHEASTERLY LINE OF SAID FRACTIONAL SECTION 4 THE FOLLOWING COURSES: SOUTH 46°53'18" EAST 1387.02 FEET; THENCE SOUTH 46°32'40" EAST 1936.00 FEET TO THE EASTERLY LINE OF SAID SECTION 4; THENCE LEAVING SAID GENERAL NORTHEASTERLY LINE ALONG SAID EASTERLY LINE SOUTH 00°55'45" WEST 47.04 FEET TO A POINT ON A NON-TANGENT CURVE CONCAVE SOUTHWESTERLY AND HAVING A RADIUS OF 1139.00 FEET, A RADIAL LINE OF SAID CURVE FROM SAID POINT BEARS SOUTH 31°11'51" WEST; THENCE ALONG SAID CURVE NORTHWESTERLY 218.26 FEET THROUGH A CENTRAL ANGLE OF 10°52'44" TO A POINT OF REVERSE CURVATURE WITH A CURVE CONCAVE NORTHEASTERLY AND HAVING A RADIUS OF 1161.00 FEET, A RADIAL LINE OF SAID CURVE FROM SAID POINT BEARS NORTH 20°19'07" EAST; THENCE ALONG SAID CURVE NORTHWESTERLY 401.16 FEET THROUGH CENTRAL ANGLE OF 19°47'50"; THENCE RADIALLY FROM SAID CURVE NORTH 40°06'57" EAST 2.00 FEET TO A POINT ON A NON-TANGENT CURVE CONCAVE NORTHEASTERLY AND HAVING A RADIUS OF 1159.00 FEET, SAID CURVE BEING CONCENTRIC WITH AND 2.00 FEET NORTHEASTERLY OF LAST SAID CURVE, A RADIAL LINE OF SAID CONCENTRIC CURVE FROM SAID POINT BEARS NORTH 40°06'57" EAST; THENCE ALONG SAID CURVE NORTHWESTERLY 89.25 FEET THROUGH A CENTRAL ANGLE OF 04°54'45" TO A POINT OF REVERSE CURVATURE WITH A CURVE CONCAVE SOUTHWESTERLY AND HAVING A RADIUS OF 1041.00 FEET, A RADIAL LINE OF SAID CURVE FROM SAID POINT BEARS SOUTH 59°28'39" WEST; THENCE ALONG SAID CURVE NORTHWESTERLY 89.25 FEET THROUGH CENTRAL ANGLE OF 04°54'45" TO SAID SOUTHEASTERLY LINE OF PARCEL 2041-1; THENCE ALONG SAID SOUTHEASTERLY LINE THE FOLLOWING COURSES: NON-TANGENT FROM SAID CURVE NORTH 66°15'26" EAST 83.15 FEET; THENCE NORTH 35°50'52" EAST 49.52 FEET TO THE TRUE POINT OF BEGINNING.

LEGAL DESCRIPTION CONT'D:

PARCEL 3: (APN: 275-030-010-0)

THAT PORTION OF SECTION 4, TOWNSHIP 4 SOUTH, RANGE 7 WEST, SAN BERNARDINO BASE AND MERIDIAN, IN THE COUNTY OF RIVERSIDE, STATE OF CALIFORNIA, DESCRIBED AS FOLLOWS:

LOT 4 AS SHOWN BY THE UNITED STATES GOVERNMENT SURVEY; AND THOSE PORTIONS OF THE NORTHWEST 1/4 OF THE SOUTHEAST 1/4 AND OF LOT 5 OF SAID SECTION 4, AS SHOWN BY THE UNITED STATES GOVERNMENT SURVEY, LYING NORTH AND EASTERLY OF THE LINE DESCRIBED AS FOLLOWS:

COMMENCING AT A 2-INCH IRON PIPE SET IN CONCRETE, SET FOR THE CENTER OF SAID SECTION 4; THENCE ALONG THE 1/4 SECTION LINE OF SAID SECTION 4, SOUTH 89° 42' EAST, 1013.40 FEET TO A 2-INCH IRON PIPE WITH CAP SET IN CONCRETE, TO THE TRUE OF BEGINNING; THENCE SOUTH 303.80 FEET TO A 2-INCH IRON PIPE SET IN CONCRETE, SAID POINT BEING POINT "A"; THENCE NORTH 68° 45' 00" EAST, TO A POINT WHICH SET A 2-INCH IRON PIPE WITH CAP SET IN CONCRETE, SAID POINT LYING ON THE NATIONAL FOREST GRANT BOUNDARY LINE, SAID LINE BEING COINCIDENT WITH THE NORTHEASTERLY BOUNDARY LINE OF BEFORESAID LOT 5, SAID POINT LYING DISTANT 537.21 FEET MORE OR LESS FROM SAID POINT "A";

ALSO EXCEPTING THEREFROM THAT PORTION LYING WITHIN PARCEL 2041-1, AS SHOWN ON RECORD OF SURVEY ON FILE IN BOOK 58, PAGE 66 OF RECORDS OF SURVEY, RECORDS OF RIVERSIDE COUNTY, CALIFORNIA, AS CONVEYED TO RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT BY FINAL ORDER OF CONDEMNATION, RECORDED JUNE 19, 1974, AS INSTRUMENT NO. 76072 OF OFFICIAL RECORDS OF RIVERSIDE COUNTY, CALIFORNIA.

ALSO EXCEPTING THEREFROM THAT PORTION CONVEYED TO THE CITY OF CORONA, A CALIFORNIA MUNICIPAL CORPORATION, IN GRANT DEED RECORDED MARCH 20, 2014, AS INSTRUMENT NO. 2014-0103287 OF OFFICIAL RECORDS DESCRIBED AS FOLLOWS:

COMMENCING AT LS 16 AS SHOWN ON THE MAP FILED IN BOOK 121, PAGES 47 THROUGH 49, INCLUSIVE, OF RECORDS OF SURVEY IN THE OFFICE OF THE COUNTY RECORDER OF SAID COUNTY OF RIVERSIDE; THENCE ALONG THE GENERAL NORTHEASTERLY LINE OF SAID FRACTIONAL SECTION 4 THE FOLLOWING COURSES: SOUTH 46° 53' 18" EAST 1387.02 FEET; THENCE SOUTH 46° 32' 40" EAST 924.93 FEET TO THE SOUTHEASTERLY LINE OF RIVERSIDE COUNTY FLOOD CONTROL DISTRICT PARCEL NO. 2041-1 AS SHOWN ON THE RECORD OF SURVEY FILED IN BOOK 58, PAGE 66 OF SAID RECORDS OF SURVEY; THENCE LEAVING SAID GENERAL NORTHEASTERLY LINE ALONG SAID SOUTHEASTERLY LINE THE FOLLOWING COURSES: SOUTH 54° 47' 48" WEST 211.68 FEET; THENCE SOUTH 74° 33' 01" WEST 269.81 FEET; THENCE SOUTH 01° 14' 41" WEST 62.00 FEET; THENCE SOUTH 66° 35' 32" WEST 82.37 FEET TO THE TRUE POINT OF BEGINNING, SAID POINT BEING ON THE SOUTHEASTERLY LINE OF PARCEL 1 OF THAT CERTAIN GRANT DEED RECORDED DECEMBER 1, 2000 AS INSTRUMENT NO. 2000-479181 OF OFFICIAL RECORDS OF SAID COUNTY RECORDER; THENCE ALONG SAID SOUTHEASTERLY LINE THE FOLLOWING COURSES:

CONTINUING SOUTH 66° 35' 32" WEST 117.40 FEET; THENCE SOUTH 63° 50' 33" WEST 85.21 FEET; THENCE LEAVING SAID SOUTHEASTERLY LINE SOUTH 14° 37' 37" EAST 302.43 FEET; THENCE NORTH 80° 03' 58" EAST 236.45 FEET; THENCE NORTH 11° 51' 13" WEST 18.07 FEET TO THE WESTERLY LINE OF SAID PARCEL 2041-1; THENCE ALONG SAID WESTERLY LINE THE FOLLOWING COURSES:

NORTH 40° 40' 55" WEST 180.55 FEET; THENCE NORTH 01° 09' 15" WEST 181.48 FEET TO THE TRUE POINT OF BEGINNING.

EXCEPTING THEREFROM THAT PORTION CONVEYED TO THE RIVERSIDE COUNTY TRANSPORTATION COMMISSION IN FINAL ORDER OF CONDEMNATION, CASE NO. RIC1108550, SUPERIOR COURT OF THE STATE OF CALIFORNIA, RECORDED AUGUST 21, 2018 AS INSTRUMENT NO. 2018-0334712 OF OFFICIAL RECORDS DESCRIBED AS FOLLOWS:

THAT CERTAIN PARCEL OF LAND SITUATED IN THE UNINCORPORATED TERRITORY OF THE COUNTY OF RIVERSIDE, STATE OF CALIFORNIA, BEING THAT PORTION OF GOVERNMENT LOT 2, FRACTIONAL SECTION 3, TOWNSHIP 4 SOUTH, RANGE 7 WEST, SAN BERNARDINO MERIDIAN, ACCORDING TO THE OFFICIAL GOVERNMENT PLAT THEREOF, DESCRIBED AS FOLLOWS:

COMMENCING AT LS 16 AS SHOWN ON THE MAP FILED IN BOOK 121, PAGES 47 THROUGH 49, INCLUSIVE, OF RECORDS OF SURVEY IN THE OFFICE OF THE COUNTY RECORDER OF SAID COUNTY OF RIVERSIDE; THENCE ALONG THE GENERAL NORTHEASTERLY LINE OF SAID FRACTIONAL SECTION 4 THE FOLLOWING COURSES: SOUTH 46°53'18" EAST 1387.02 FEET; THENCE SOUTH 46°32'40" EAST 924.93 FEET TO THE SOUTHEASTERLY LINE OF RIVERSIDE COUNTY FLOOD CONTROL DISTRICT PARCEL NO. 2041-1 AS SHOWN ON THE RECORD OF SURVEY FILED IN BOOK 58, PAGE 66 OF SAID RECORDS OF SURVEY; SAID POINT BEING THE TRUE POINT OF BEGINNING; THENCE CONTINUING SOUTH 46°32'40" EAST 1011.07 FEET TO THE EASTERLY LINE OF SAID SECTION 4; THENCE LEAVING SAID GENERAL NORTHEASTERLY LINE ALONG SAID EASTERLY LINE SOUTH 00°55'45" WEST 47.04 FEET TO A POINT ON A NONTANGENT CURVE CONCAVE SOUTHWESTERLY AND HAVING A RADIUS OF 1139.00 FEET, A RADIAL LINE OF SAID CURVE FROM SAID POINT BEARS SOUTH 31°11'51" WEST; THENCE ALONG SAID CURVE NORTHWESTERLY 218.26 FEET THROUGH A CENTRAL ANGLE OF 10°52'44" TO A POINT OF REVERSE CURVATURE WITH A CURVE CONCAVE NORTHEASTERLY AND HAVING A RADIUS OF 1161.00 FEET, A RADIAL LINE OF SAID CURVE FROM SAID POINT BEARS NORTH 20°19'07" EAST; THENCE ALONG SAID CURVE NORTHWESTERLY 401.16 FEET THROUGH CENTRAL ANGLE OF 19°47'50"; THENCE RADIALLY FROM SAID CURVE NORTH 40°06'57" EAST 2.00 FEET TO A POINT ON A NON-TANGENT CURVE CONCAVE NORTHEASTERLY AND HAVING A RADIUS OF 1159.00 FEET, SAID CURVE BEING CONCENTRIC WITH AND 2.00 FEET NORTHEASTERLY OF LAST SAID CURVE, A RADIAL LINE OF SAID CONCENTRIC CURVE FROM SAID POINT BEARS NORTH 40°06'57" EAST; THENCE ALONG SAID CURVE NORTHWESTERLY 327.41 FEET THROUGH A CENTRAL ANGLE OF 16°11'09" TO A POINT OF REVERSE CURVATURE WITH A CURVE CONCAVE SOUTHWESTERLY AND HAVING A RADIUS OF 1041.00 FEET, A RADIAL LINE OF SAID CURVE FROM SAID POINT BEARS SOUTH 59°28'39" WEST; THENCE ALONG SAID CURVE NORTHWESTERLY 89.25 FEET THROUGH CENTRAL ANGLE OF 04°54'45" TO SAID SOUTHEASTERLY LINE OF PARCEL 2041-1; THENCE ALONG SAID SOUTHEASTERLY LINE THE FOLLOWING COURSES: NON-TANGENT FROM SAID CURVE NORTH 66°15'26" EAST 83.15 FEET; THENCE NORTH 35°50'52" EAST 49.52 FEET TO THE TRUE POINT OF BEGINNING.

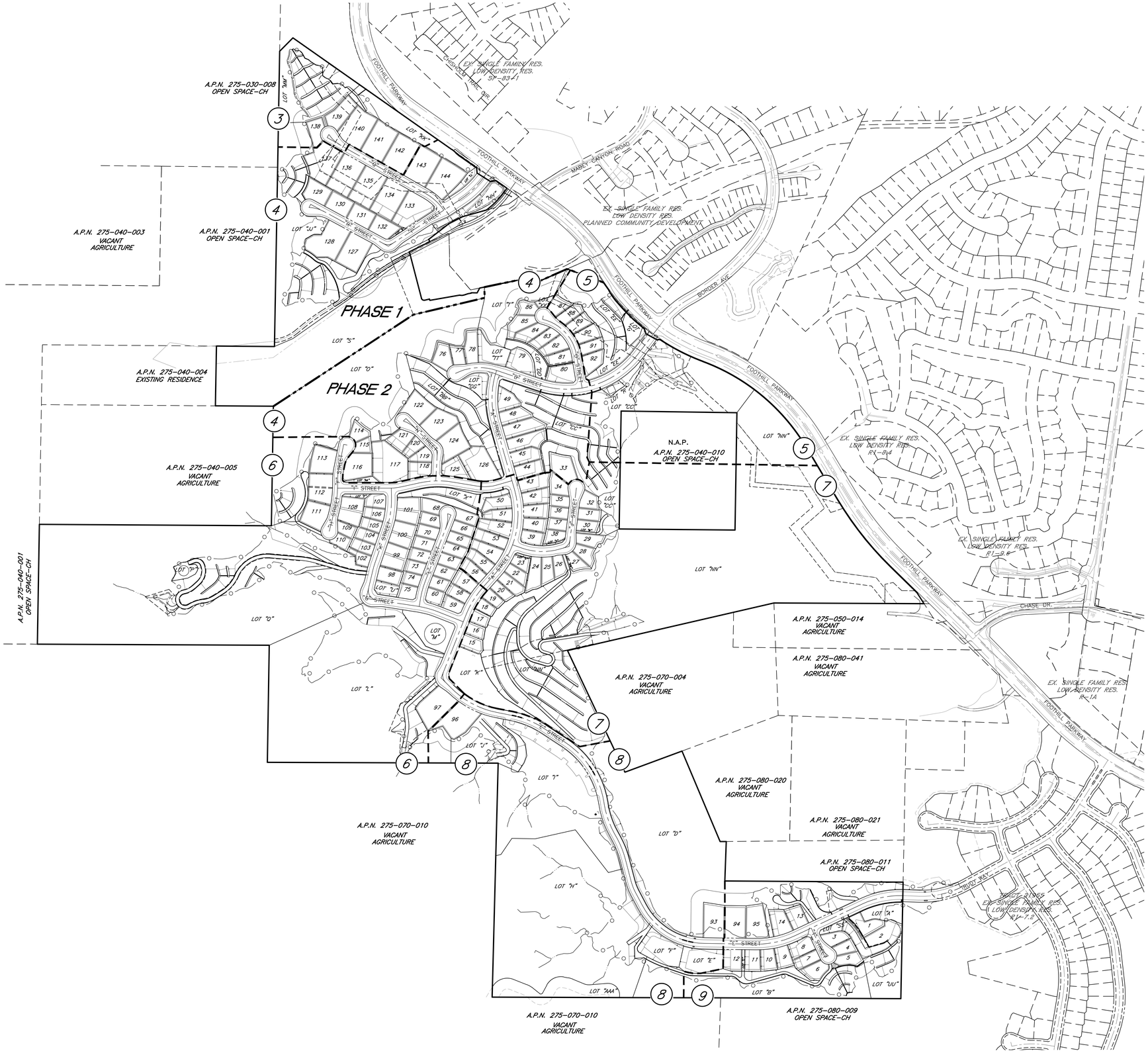
GENERAL NOTES:

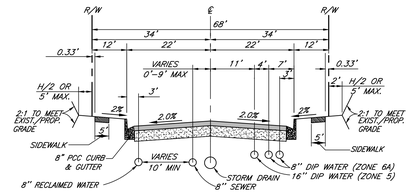
1. PREPARED: FEBRUARY 2025
2. TOTAL PROJECT GROSS ACREAGE IS 249.39 AC.
3. ACREAGE SUMMARY

ITEM	ACREAGE	PERCENT
A. LOT GROSS AREA (1-144 LOTS)	45.75	18.3%
B. OPEN SPACE/DRAINAGE/HOA MAINTAINED SLOPE	171.06	68.6%
C. STREETS (ROW-ROW)	19.66	7.9%
D. PUMP STATION/TANK SITE (LOTS G,M,P,R)	1.50	0.6%
E. PUBLIC PARKS (LOTS F,I,K)	9.25	3.7%
F. PRIVATE PARKS (LOTS E,U,QQ,TT,XX)	2.17	0.9%
TOTAL	249.39	100%

4. PROPOSED NO. OF DWELLING UNITS: 276 DU.
5. PROPOSED PROJECT DENSITY: 1.2 DU/AC.
6. EXISTING GENERAL PLAN DESIGNATION: LOW DENSITY RESIDENTIAL
7. PROPOSED GENERAL PLAN DESIGNATION: SKYLINE HEIGHTS SPECIFIC PLAN
8. EXISTING LAND USE: LOW DENSITY RESIDENTIAL
9. PROPOSED LAND USE: SKYLINE HEIGHTS SPECIFIC PLAN
10. EXISTING ZONING: R-1-7.2
11. PROPOSED ZONING: SKYLINE HEIGHTS SPECIFIC PLAN
12. ADJACENT LAND USE:
    NORTH:
    GENERAL PLAN – OPEN SPACE GENERAL, LDR
    ZONING – OPEN SPACE-CH, PCD, LDR
    EXISTING USE – RESIDENTIAL
    SOUTH:
    GENERAL PLAN – OPEN SPACE GENERAL, RESIDENTIAL
    ZONING – OPEN SPACE-CH, AGRICULTURE
    EXISTING USE – CLEVELAND NATIONAL FOREST, VACANT
    EAST:
    GENERAL PLAN – OPEN SPACE GENERAL, LDR
    ZONING – OPEN SPACE, AGRICULTURE, PCD, R1-7.2, R1-8.4, R1-9.6
    EXISTING USE – RESIDENTIAL
    WEST:
    GENERAL PLAN – OPEN SPACE GENERAL, RESIDENTIAL
    ZONING – OPEN SPACE-CH, AGRICULTURE
    EXISTING USE – CLEVELAND NATIONAL FOREST, VACANT
13. SOURCE OF TOPOGRAPHY IS AERIAL TOPOGRAPHY FLOWN ON AUGUST 2012 BY ARROWHEAD MAPPING CORPORATION.
14. ALL LOT LINES AND DIMENSIONS ARE APPROXIMATE.
15. ALL EXISTING EASEMENTS AND IRREVOCABLE OFFERS OF DEDICATION THAT AFFECT THE PROPERTY BEING SUBDIVIDED ARE SHOWN ON THIS TENTATIVE TRACT MAP.
16. ALL EXISTING EASEMENTS ARE TO REMAIN IN THEIR DESIGNATED LOCATIONS UNLESS NOTED OTHERWISE.
17. SCHOOL DISTRICT: CORONA-NORCO SCHOOL DISTRICT
18. ACCESS TO THE SITE IS PROPOSED VIA: A CONNECTION TO FOOTHILL PARKWAY AND TRUDY WAY.
19. STREETS GRADES: 0.6% MINIMUM, 12% MAXIMUM.
20. ALL CONC. GUTTERS AND SWALES SHALL HAVE A MINIMUM GRADE OF: 0.6%
21. ALL A.C. PAVING SHALL HAVE A MINIMUM GRADE OF: 1.0%
22. CURB FRONTAGE AT CUL-DE-SACS AND KNUCKLES SHALL BE A MINIMUM OF 45 FEET.
23. ESTIMATED DISTURBED AREA FOR THE PROJECT SITE IS 123.5 ACRES, COMPRISING OF 49.5% OF THE TOTAL PROJECT AREA.
24. ALL SLOPES ADJACENT TO STREET R.O.W. TO BE MAINTAINED BY H.O.A.
25. ALL SLOPES SHOWN HEREON ARE 2:1 MAXIMUM UNLESS OTHERWISE NOTED.
26. ALL SLOPES ARE PRIVATE UNLESS THEY ARE WITHIN A LETTERED H.O.A. MAINTAINED LOT.
27. ALL MAJOR SLOPES OR COMMON AREAS, OPEN SPACE, PRIVATE DRAINAGE FACILITIES, FUEL MODIFICATION, ROAD ACCESS EASEMENTS, AND ANY OTHER COMMON AMENITIES SHALL BE MAINTAINED BY A HOMEOWNERS ASSOCIATION OR ESTABLISHED SUBJECT TO CURRENT STATE LAWS AND BE SUBJECT TO THE APPROVAL OF THE CITY OF CORONA WHO SHALL REVIEW ALL CC & R'S AND RULES FOR THEIR CC & R'S, HOMEOWNERS ASSOCIATION DOCUMENTS AND ALL DOCUMENTS TO CONVEY TITLE TO THE HOMEOWNERS ASSOCIATION.
28. FENCING SHALL BE INSTALLED ON SITE AS NECESSARY TO RESTRICT PUBLIC ACCESS TO PROPOSED OPEN SPACE AREAS. REFER TO WALL AND FENCE PLAN FOR LOCATIONS.
29. PORTIONS OF SLOPE EASEMENTS DEDICATED TO THE CITY OF CORONA AS PART OF THE FOOTHILL PARKWAY WESTERLY EXTENSION PLANS WHICH FRONT THE PROJECT SITE SHALL BE QUITCLAIMED TO ACCOMM

DPR13-002

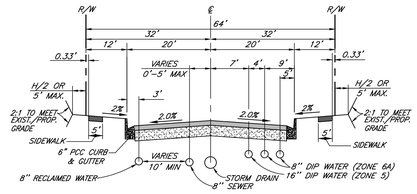




"B" STREET (PUBLIC), TRUDY WAY (OFFSITE PUBLIC)

68' ROAD SECTION – COLLECTOR

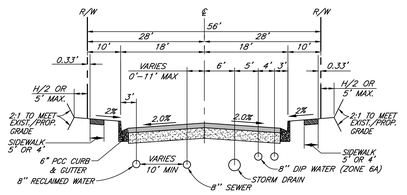
COLLECTOR PER MODIFIED COC STD. 105
NOT TO SCALE



PORTION OF "A","E","G","J","L","N" STREETS (PUBLIC)

64' ROAD SECTION – LOCAL STREET

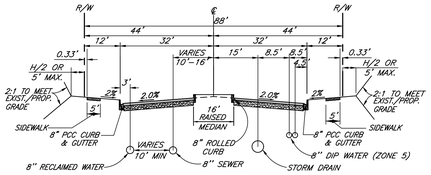
LOW VOLUME LOCAL PER MODIFIED COC STD. 107
NOT TO SCALE



PORTION OF "B","F","H","J","L","N","O","T" STREETS (PUBLIC)
PORTION OF "P","Q","R" STREETS (PRIVATE)

56' ROAD SECTION – CUL-DE-SAC STREET

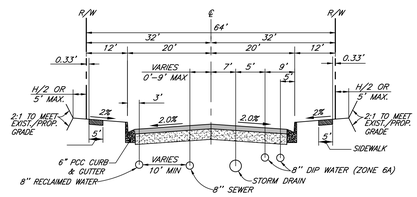
CUL-DE-SAC STREET PER COC STD. 109
NOT TO SCALE



PORTION OF "P" STREET (PRIVATE)

88' ROAD SECTION – MODIFIED SECONDARY ARTERIAL

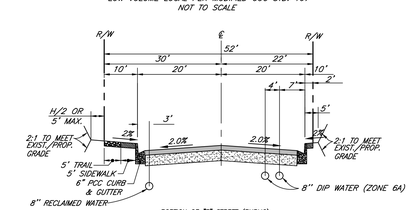
MODIFIED SECONDARY ARTERIAL PER COC STD. 104
NOT TO SCALE



PORTION OF "E" STREETS (PUBLIC)

64' ROAD SECTION – MODIFIED LOCAL STREET

LOW VOLUME LOCAL PER MODIFIED COC STD. 107
NOT TO SCALE



PORTION OF "E" STREET (PUBLIC)

52' ROAD SECTION – MODIFIED LOCAL STREET

MODIFIED LOCAL STREET
NOT TO SCALE

UTILITY LEGEND:

- PHASE BOUNDARY
- SHEET LIMIT
- (1) SHEET NUMBER
- PROPOSED WATER
- PROPOSED SEWER
- PROPOSED RECLAIMED WATER
- PROPOSED STORM DRAIN
- EXISTING WATER
- EXISTING SEWER
- EXISTING RECLAIMED WATER
- EXISTING STORM DRAIN
- 1200 = EXISTING CONTOUR ELEVATION
- —1200— = PROPOSED SURFACE ELEVATION
- 1378.3 = PROPOSED PAD ELEVATION
- ELEV. = ELEVATION
- FG = FINISH GRADE
- FL = FLOWLINE
- FS = FINISHED SURFACE
- D.G. = DECOMPOSED GRANITE
- L= = LENGTH
- W= = WIDTH
- MIN. = MINIMUM
- PL = PROPERTY LINE
- R/W = RIGHT OF WAY
- GB = GRADE BREAK
- TC = TOP OF CURB
- 45 = LOT NUMBER
- TOE OF SLOPE (2:1 UNLESS OTHERWISE NOTED)
- TOP OF SLOPE
- DAYLIGHT LINE

REAR YARD SLOPE NOTE:
55 LOTS IDENTIFIED WITH * WILL HAVE HOME OWNER MAINTAINED REAR YARDS THAT EXCEED 15 FEET HEIGHT (RANGING 15 FEET TO 29 FEET HIGH MAX)

REVISED TENTATIVE TRACT MAP NO. 36544 SKYLINE HEIGHTS CITY OF CORONA

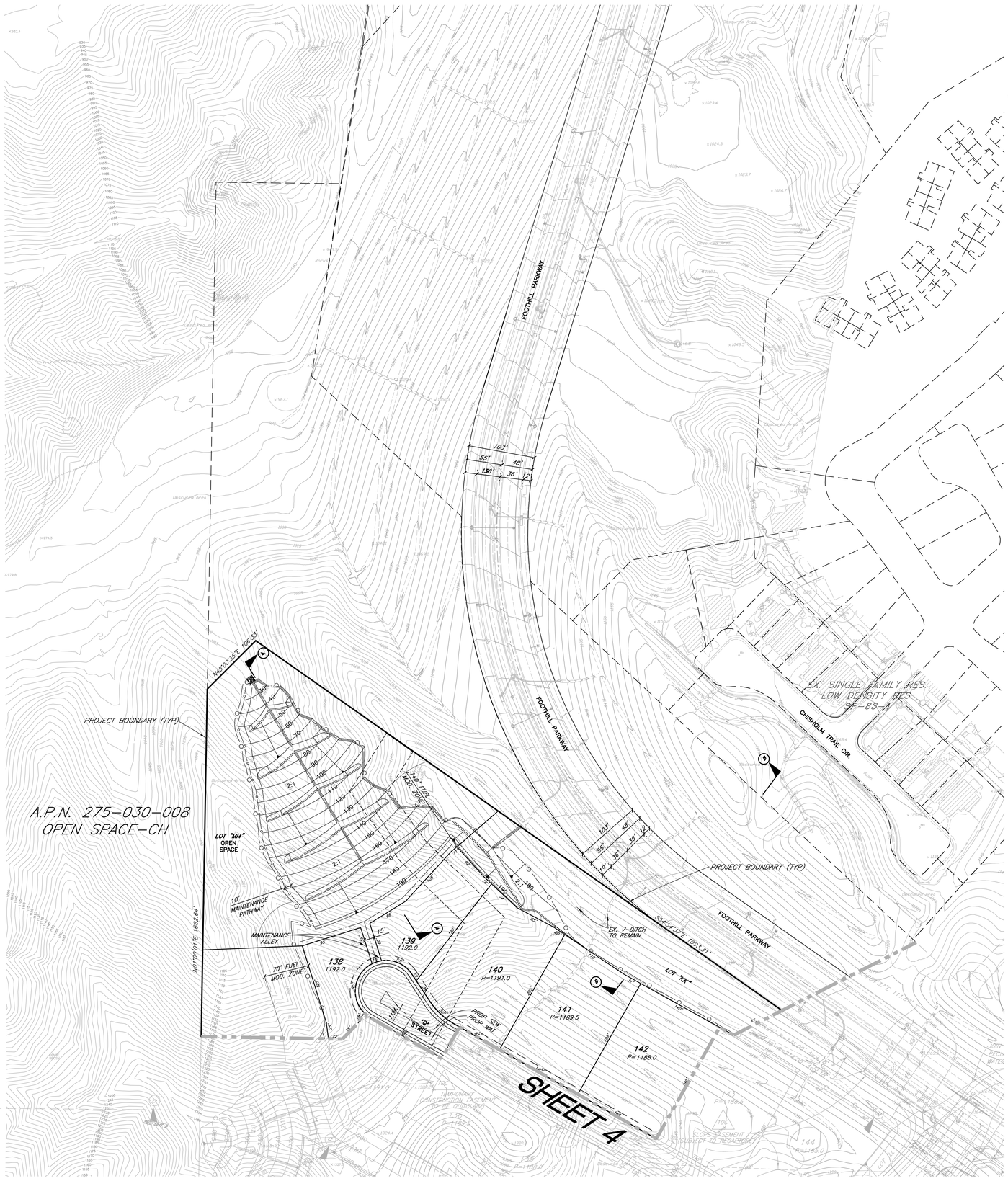
PREPARED FOR:
RICHLAND DEVELOPERS, INC.
3161 MICHELSON DRIVE, SUITE 425
IRVINE, CA 92612
949-261-7010

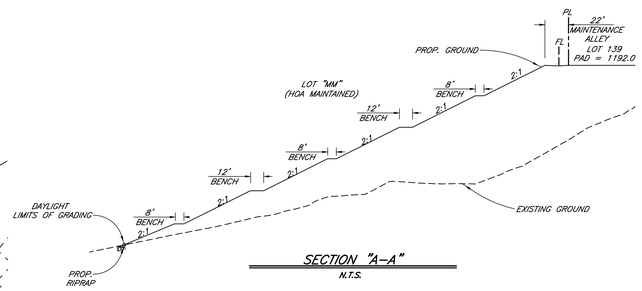
PREPARED BY:
KWC ENGINEERS
CIVIL ENGINEERS • PLANNERS • SURVEYORS
1880 COMPTON AVENUE, SUITE 100 CORONA, CA. 92881-3370 951-734-2130

SHEET 2 OF 12 SHEETS

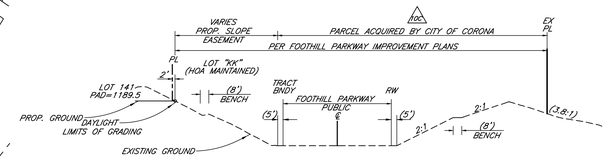
3961.01\EXHIBITS\3961-01-EX-TTM13-002.dwg 11/21/2013 8:13:17 AM

DPR13-002





SECTION "A-A"
N.T.S.



SECTION "B-B"
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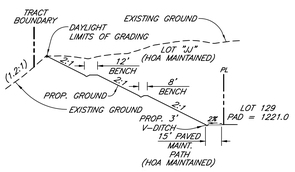
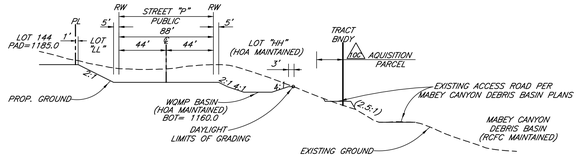
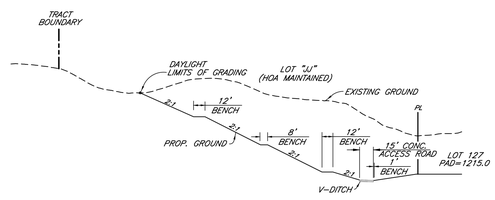


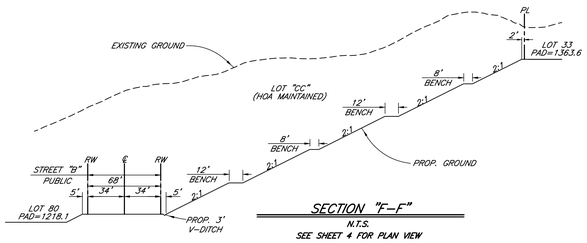
SECTION "C-C"
N.T.S.
SEE SHEET 4 FOR PLAN VIEW



SECTION "D-D"
N.T.S.
SEE SHEET 4 FOR PLAN VIEW



SECTION "E-E"
N.T.S.
SEE SHEET 4 FOR PLAN VIEW



SECTION "F-F"
N.T.S.
SEE SHEET 4 FOR PLAN VIEW

60' 0 60' 120' 180'
SCALE IN FEET

REVISED TENTATIVE TRACT MAP NO. 36544 SKYLINE HEIGHTS CITY OF CORONA

PREPARED FOR:
RICHLAND DEVELOPERS, INC.
3161 MICHELSON DRIVE, SUITE 425
IRVINE, CA 92612
949-261-7010

PREPARED BY:
KWC ENGINEERS
CIVIL ENGINEERS • PLANNERS • SURVEYORS
1880 COMPTON AVENUE, SUITE 100 CORONA, CA. 92881-3370 951-734-2130

SHEET 3 OF 12 SHEETS

36544-2-17-13 | 13-17-2-17 | 36544-2-17-13 | 13-17-2-17 | 36544-2-17-13 | 13-17-2-17 |

DPR13-002

SHEET 3

SHEET 5

SHEET 6

SEE SHT. 2

SEE SHT. 3

SEE SHT. 5

PROJECT BOUNDARY (TYP)

A.P.N. 275-040-001
OPEN SPACE-CH

LOT "U"
OPEN SPACE

18' MAX. HEIGHT RETAINING WALL

15' MAX. HEIGHT RETAINING WALL

5' PAVED MAINT. PATH

70' FUEL MOD. ZONE

28' PAVED ACCESS

PROPOSED RETAINING WALL 7' MAX HEIGHT

PROPOSED EMERGENCY FIRE ACCESS ONLY (16' WIDE PAVED ROADWAY).

END PROPOSED PAVED ACCESS

EXISTING RESIDENTIAL ACCESS ONLY (DIRT ROADWAY).

ACCESS TO EXISTING RESIDENTIAL PROPERTIES APN: 275-04-002 & 275-04-004 LOCATED WEST OF PROJECT SITE
N89°54'55"W 326.74'

N89°36'06"W 326.68'

20' PVMT. ACCESS ESMT.

CENTERLINE OF EASEMENT FOR POWER POLES (TO REMAIN)

MABEY CANYON

LOT "S"
OPEN SPACE

LOT "O"
OPEN SPACE

TEMPORARY CONSTRUCTION EASEMENT (TO BE QUITCLAIM)

SLOPE EASEMENT (SUBJECT TO RECAPTURE)

"G" STREET

"F" STREET

"R" STREET

"B" STREET

"H" STREET

"J" STREET

"N" STREET

"P" STREET

LOT "L"

LOT "HH"

LOT "TT"
PRIVATE PARK
P=1272.4

LOT "XX"
PRIVATE PARK

LOT "Y"
OPEN SPACE

LOT "Z"
PRIVATE PARK

LOT "CC"
PRIVATE PARK
P=1285.0

LOT "BB"

LOT "AA"

WQMP BASIN
(CITY MAINTAINED)
BOT=1160.0

DRAINAGE SWALE

PROP. GATE

JOIN EXIST. RECLAIMED WATER LINE

JOIN EXIST. WATER LINE

FOOTHILL PARKWAY

JOIN EXIST. SEWER LINE

SEWER LINE

EX. SINGLE FAMILY RES.
LOW DENSITY RES.
PLANNED COMMUNITY DEVELOPMENT

PAVED ACCESS ROAD PER FOOTHILL PARKWAY PLANS C.O.C. DWG NO. 10-056S

PAVED ACCESS ROAD PER MABEY CANYON DEBRIS BASIN STAGE 1 PLANS R.C.F.C&W.C.D. DWG NO. 2-0438

*SLOPES STEEPER THAN 2:1 ARE TO BE STABILIZED PER SOILS ENGINEER RECOMMENDATIONS

MABEY CANYON DEBRIS BASIN (RCFC MAINTAINED)

PARCEL OWNED BY CITY OF CORONA

TEMPORARY CONSTRUCTION EASEMENT (TO BE QUITCLAIM)

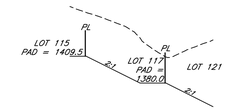
MAINTENANCE ACCESS ROAD

PROP. RET. WALL PROP. SWR. PROP. WAT.

EX. EXISTING DRIVEWAY ACCESS

JOIN EXISTING PAVED ACCESS

ZONE VAR.



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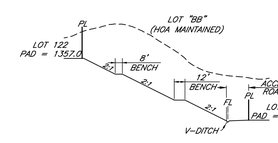

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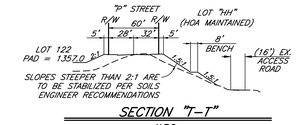

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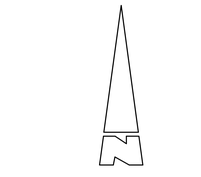


60' 0 60' 120' 180'
SCALE IN FEET

REVISED TENTATIVE TRACT MAP NO. 36544 SKYLINE HEIGHTS CITY OF CORONA

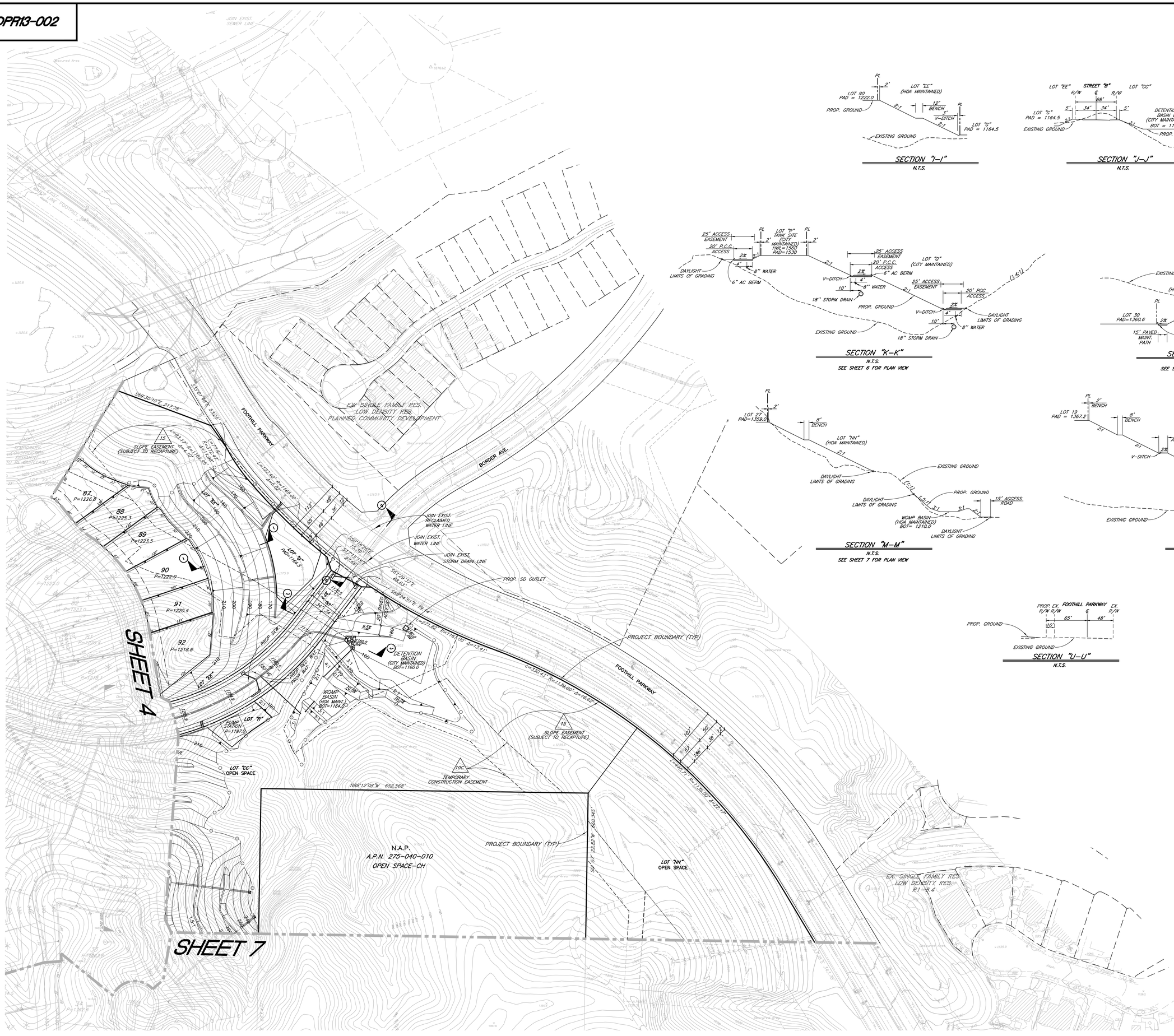
PREPARED FOR:
RICHLAND DEVELOPERS, INC.
3161 MICHELSON DRIVE, SUITE 425
IRVINE, CA 92612
949-261-7010

PREPARED BY:
KWC ENGINEERS
CIVIL ENGINEERS • PLANNERS • SURVEYORS
1880 COMPTON AVENUE, SUITE 100 CORONA, CA. 92881-3370 951-734-2130

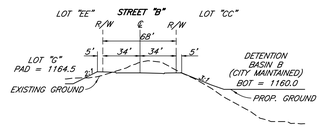
SHEET 4 OF 12 SHEETS

DATE PLOTTED: 12-11-13 13:21
FILE NAME: P:\1341\EXHIBITS\1341EXH.DWG

DPR13-002

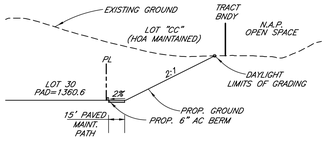


SECTION "I-I"
N.T.S.



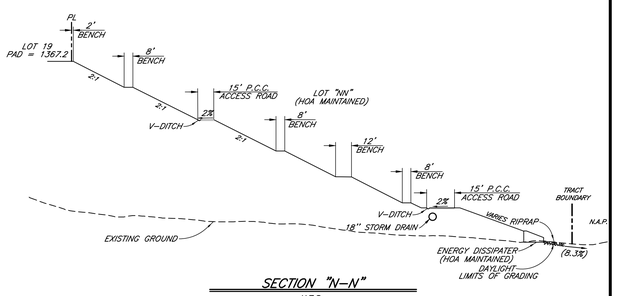
SECTION "J-J"
N.T.S.

SECTION "K-K"
N.T.S.
SEE SHEET 6 FOR PLAN VIEW



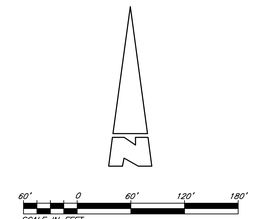
SECTION "L-L"
N.T.S.
SEE SHEET 7 FOR PLAN VIEW

SECTION "M-M"
N.T.S.
SEE SHEET 7 FOR PLAN VIEW



SECTION "N-N"
N.T.S.
SEE SHEET 7 FOR PLAN VIEW

SECTION "U-U"
N.T.S.



REVISED TENTATIVE TRACT MAP NO. 36544 SKYLINE HEIGHTS CITY OF CORONA

PREPARED FOR:
RICHLAND DEVELOPERS, INC.
3161 MICHELSON DRIVE, SUITE 425
IRVINE, CA 92612
949-261-7010

PREPARED BY:
KWC ENGINEERS
CIVIL ENGINEERS • PLANNERS • SURVEYORS
1880 COMPTON AVENUE, SUITE 100 CORONA, CA. 92881-3370 951-734-2130

SHEET 5 OF 12 SHEETS

DWG: 13441PRELIM.DWG LAST XREF: 12-11-13 LAST PLOT: 12-12-13 BY: JM

DPR13-002

SHEET 4

SHEET 7

SHEET 8

PROJECT BOUNDARY (TYP)

A.P.N. 275-040-005
VACANT
AGRICULTURE

N89°39'48"W 1306.21'

N00°57'22"E 674.27'

N89°43'31"W 1305.71'

N00°56'17"E 659.20'

N89°46'32"W 1299.84'

N00°10'01"W 621.81'

"I" STREET

"G" STREET

"H" STREET

"K" STREET

"L" STREET

LOT "Z"
OPEN SPACE

LOT "Y"
OPEN SPACE

LOT "X"
OPEN SPACE

LOT "V"
PARK
P=1383.0

LOT "W"
ZONE 5 TANK
ZONE 6A BOOSTER
PUMP STATION
P=1371
2.5 MG RESERVOIR
TANK BOT = 1350
TANK TOP = 1384

ZONE 6A
TANK SITE
0.6 MG RESERVOIR
HWL=1560
PAD=1520

FLOWBY
BASIN
(CITY MAINTAINED)
BOT=1485.0

FLOWBY
BASIN
(CITY MAINTAINED)

FLOWBY
DEBRIS
BASIN 3
(CITY MAINTAINED)
BOT=1335.0

FLOWBY/DEBRIS
BASIN
(CITY MAINTAINED)

PROPOSED HELI
HYDRANT

FUEL MOD ZONE

PROP. REC. MAINT. ROAD W/ GATE

PROP. MAINT. ROAD

10' SETBACK

15' PAVED MAINT. PATH

20' PAVED MAINT. PATH

20' PAVED ACCESS

20' PAVED MAINT. ROAD

20' PAVED MAINT. PATH W/ FUEL MOD ZONE

DRAINAGE ESMT

VARIES

113 P=1409.0
112 P=1408.0
111 P=1411.5
110 P=1412.0
109 P=1411.5
108 P=1409.6
107 P=1384.5
106 P=1385.4
105 P=1386.8
104 P=1387.2
103 P=1387.2
102 P=1386.2
101 P=1384.0
100 P=1385.0
99 P=1386.0
98 P=1385.6
97 P=1383.0
75 P=1377.3
74 P=1378.0
73 P=1379.0
72 P=1380.0
71 P=1381.0
70 P=1382.0
69 P=1383.0
68 P=1383.2
67 P=1383.2
66 P=1383.0
65 P=1382.0
64 P=1381.2
63 P=1380.3
62 P=1379.3
61 P=1378.3
60 P=1377.5
59 P=1370.5
58 P=1368.6
57 P=1366.5

60' 0 60' 120' 180'
SCALE IN FEET

REVISED TENTATIVE TRACT MAP NO. 36544
SKYLINE HEIGHTS
CITY OF CORONA

PREPARED FOR:
RICHLAND DEVELOPERS, INC.
3161 MICHELSON DRIVE, SUITE 425
IRVINE, CA 92612
949-261-7010

PREPARED BY:
KWC ENGINEERS
CIVIL ENGINEERS • PLANNERS • SURVEYORS
1880 COMPTON AVENUE, SUITE 100 CORONA, CA. 92881-3370 951-734-2130

SHEET 6 OF 12 SHEETS

SHEET2TOMAP11-17-21.DGN 11-17-21 R 11-17-21.dgn

DPR13-002

SHEET 4

SHEET 6

SHEET 8

N.A.P.
A.P.N. 275-040-010
OPEN SPACE-CH

LOT "CC"
70' FUEL MOD. ZONE

LOT "NW"
OPEN SPACE

LOT "K"
PUBLIC PARK

LOT "MM"
OPEN SPACE

LOT "JJ"
OPEN SPACE

A.P.N. 275-070-004
VACANT
AGRICULTURE

A.P.N. 275-050-014
VACANT
AGRICULTURE

A.P.N. 275-080-041
VACANT
AGRICULTURE

EX. SINGLE FAMILY RES.
LOW DENSITY RES.
R1-8.4

FOOTHILL PARKWAY

1" STREET

2ND STREET

3RD STREET

4TH STREET

5TH STREET

PROP. 8" SEW.

PROP. REC. WAT.

10' PAVED FIRE ACCESS

15' PAVED ACCESS

10' SETBACK

10C STORM DRAIN EASEMENT

10C TEMPORARY CONSTRUCTION EASEMENT

15 SLOPE EASEMENT (SUBJECT TO RECAPTURE)

DRAINAGE EASEMENT

WQMP BASIN (CITY MAINTAINED) BOT=1210.0

ENERGY DISSIPATOR (CITY MAINTAINED)

TRANSITION

PROJECT BOUNDARY (TYP)

N00°58'41"E 663.47'

N89°28'37"W 652.85'

S07°53'38"E 442.78'

N77°00'33"E 1192.59'

N25°14'16"W 757.01'

N89°44'22"W 845.51'

S35°58'30"E 211.00'

S32°43'44"E 73.32'

R=250'

R=350'

R=300'

R=1400'

Δ=29.01°

T=361.00'

L=709.14'

SCALE IN FEET
60' 0 60' 120' 180'

REVISED TENTATIVE TRACT MAP NO. 36544
SKYLINE HEIGHTS
CITY OF CORONA

PREPARED FOR:
RICHLAND DEVELOPERS, INC.
3161 MICHELSON DRIVE, SUITE 425
IRVINE, CA 92612
949-261-7010

PREPARED BY:
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CIVIL ENGINEERS • PLANNERS • SURVEYORS
1880 COMPTON AVENUE, SUITE 100 CORONA, CA. 92881-3310 951-734-2130

SHEET 7 OF 12 SHEETS

DATE PREPARED: 12/17/13

DPR13-002

SHEET 6

SHEET 7

SHEET 9

96
P=1384.0

20' PAVED ACCESS

LOT "J"
OPEN SPACE

FLOWBY BASIN
(CITY MAINTAINED)

LOT "I"
PUBLIC PARK

LOT "D"
OPEN SPACE

PROJECT BOUNDARY (TYP)

PUBLIC TRAIL

N69°41'23"E 342.64'

N22°22'37"W 552.93'

PROJECT BOUNDARY (TYP)
N69°37'41"E
34.40'

N27°01'03"E 222.48'

A.P.N. 275-070-010
VACANT
AGRICULTURE

N01°28'30"E 161.33'

LOT "H"
OPEN SPACE

10' FUEL MOD. ZONE

PROP WAT.

PROP REC WAT.

LOT "D"
OPEN SPACE

PROJECT BOUNDARY (TYP)

FLOWBY/DEBRIS
BASIN
(CITY MAINTAINED)
BOT=1330.0

20' PAVED MAINT. PATH

LOT "I"
PUBLIC PARK
P=1326.5

PROP MWS UNIT

PROP SEW.

PROP REC. WAT.

LOT "E"
PRIVATE PARK
P=1308.7

15' PAVED MAINT. PATH

108
60 FT R.O.W.
FOR SKYLINE DRIVE

LOT "AA"
OPEN SPACE/TRAIL

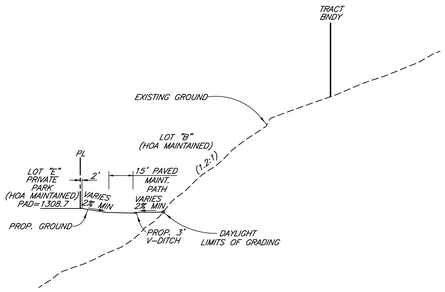
LOT "B"
OPEN SPACE

A.P.N. 275-070-010
VACANT
AGRICULTURE

PROJECT BOUNDARY (TYP)

N89°41'W 1014.27'

60' 0 60' 120' 180'
SCALE IN FEET



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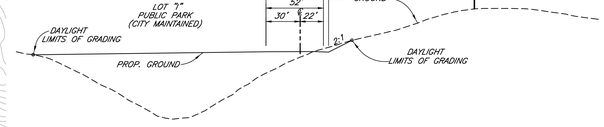

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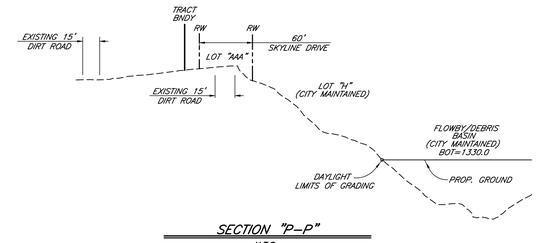

SECTION "P-P"
N.T.S.

REVISED TENTATIVE TRACT MAP NO. 36544 SKYLINE HEIGHTS CITY OF CORONA

PREPARED FOR:
RICHLAND DEVELOPERS, INC.
3161 MICHELSON DRIVE, SUITE 425
IRVINE, CA 92612
949-261-7010

PREPARED BY:
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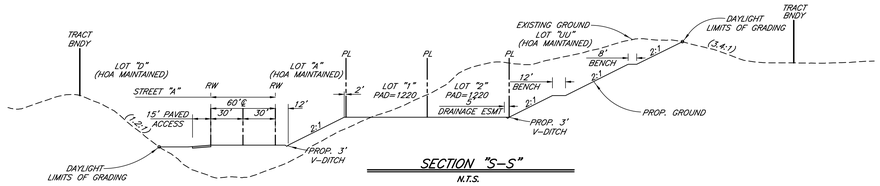
CIVIL ENGINEERS • PLANNERS • SURVEYORS
1880 COMPTON AVENUE, SUITE 100 CORONA, CA. 92881-3370 951-734-2130

SHEET 8 OF 12 SHEETS

JOB 13.144.1 R:\13_144\PREMAP\MAPS\13_144_PREMAP.MXD 2015-12-17 13:44:17 MARTINEZ

DPR13-002



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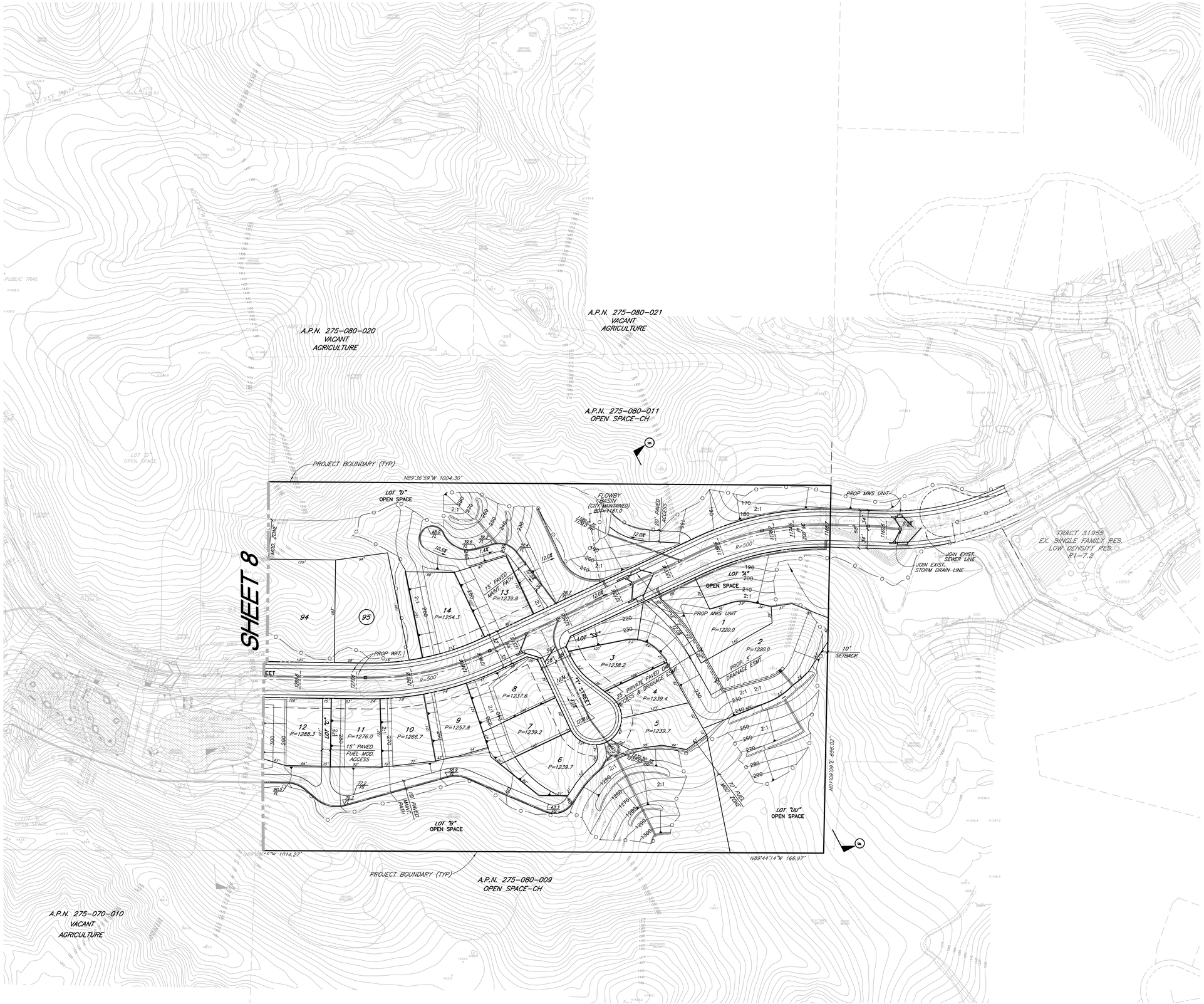

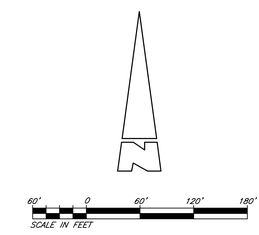

REVISED TENTATIVE TRACT MAP NO. 36544 SKYLINE HEIGHTS CITY OF CORONA

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IRVINE, CA 92612
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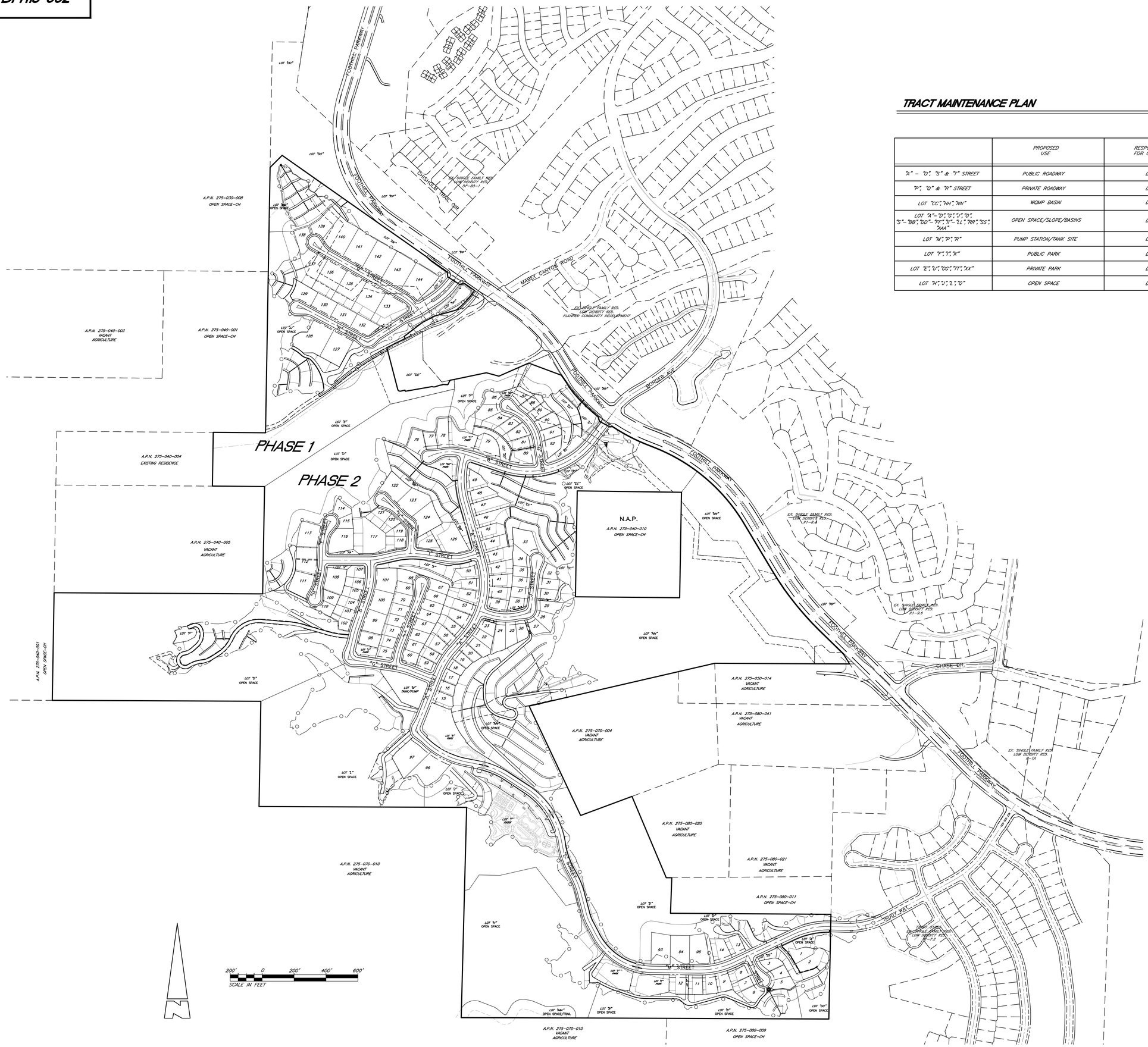
SHEET 9 OF 12 SHEETS

SHEET2.dgn 11/11/2021 8:41:12 AM PST

DPR13-002



TRACT MAINTENANCE PLAN

	PROPOSED USE	RESPONSIBLE PARTY FOR CONSTRUCTION	RESPONSIBLE PARTY FOR OWNERSHIP	RESPONSIBLE PARTY FOR MAINTENANCE
"A" – "D", "S" & "T" STREET	PUBLIC ROADWAY	DEVELOPER	CITY OF CORONA	CITY OF CORONA
"P", "Q" & "R" STREET	PRIVATE ROADWAY	DEVELOPER	PROJECT HOA	PROJECT H.O.A.
LOT "CC", "HH", "NN"	WQMP BASIN	DEVELOPER	PROJECT HOA	PROJECT H.O.A.
LOT "A"– "D", "G", "J", "O", "S"– "BB", "DD"– "FF", "JJ"– "LL", "RR", "SS", "AAA"	OPEN SPACE/SLOPE/BASINS	DEVELOPER	PROJECT HOA	PROJECT H.O.A.
LOT "M", "P", "R"	PUMP STATION/TANK SITE	DEVELOPER	CITY OF CORONA	CITY OF CORONA
LOT "F", "I", "K"	PUBLIC PARK	DEVELOPER	CITY OF CORONA	CITY OF CORONA
LOT "E", "U", "GG", "II", "KK"	PRIVATE PARK	DEVELOPER	PROJECT HOA	PROJECT H.O.A.
LOT "H", "J", "L", "O"	OPEN SPACE	DEVELOPER	CITY OF CORONA	CITY OF CORONA

REVISED TENTATIVE TRACT MAP
NO. 36544
SKYLINE HEIGHTS
CITY OF CORONA

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SHEET 10 OF 12 SHEETS

3867.036\PLOT\TM36544 SHT 10.DWG 7/24/2014 8:51:57 AM PDT

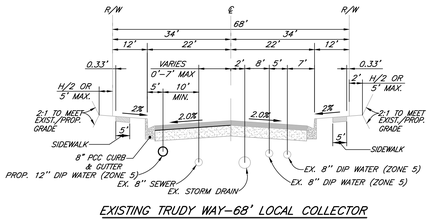
DPR13-002

PRESSURE ZONE SUMMARY	
ZONE	MAX. PROPOSE SERVICE ELEV.
ZONE 5 (1380 HWL)	1222
ZONE 6A (1560 HWL)	1416

UTILITY LEGEND:

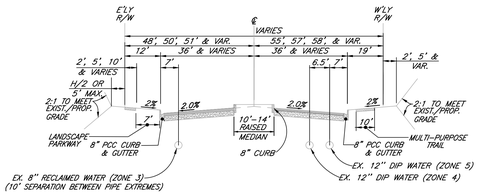
- ~~W (ZONE 6A)~~ PROPOSED WATER
- ~~S~~ PROPOSED SEWER
- ~~RW (ZONE 3A)~~ PROPOSED RECLAIMED WATER
- SD PROPOSED STORM DRAIN
- EXISTING WATER
- EXISTING SEWER
- EXISTING RECLAIMED WATER
- EXISTING STORM DRAIN

100' 0 100' 200' 300'
SCALE IN FEET



EXISTING TRUDY WAY-68' LOCAL COLLECTOR

NOT TO SCALE



EXISTING FOOTHILL PARKWAY-107' DIVIDED MAJOR ARTERIAL

NOT TO SCALE

SEE CROSS SECTIONS ON SHEET 1
FOR PROPOSED ONSITE UTILITY LOCATIONS

GENERAL INFRASTRUCTURE IMPROVEMENT NOTES:

DOMESTIC WATER SYSTEM:

1) ALL DOMESTIC WATER DESIGN CRITERIA SHALL BE PER CITY OF CORONA DEPARTMENT OF WATER AND POWER STANDARDS AND RIVERSIDE COUNTY DEPARTMENT OF HEALTH SERVICES STANDARD UNLESS OTHERWISE APPROVED.
2) MINIMUM STATIC PRESSURE SHALL BE 60 PSI AT PEAK HOUR.
2) MINIMUM FIRE FLOW SHALL BE 1500 GPM.
3) ONSITE FIRE HYDRANTS SHALL BE SPACED A MAXIMUM OF 300 FEET APART.
4) ALL PROPOSED PUMP STATIONS AND WATER RESERVOIR SITES SHALL BE PUBLICLY MAINTAINED.

RECLAIMED WATER SYSTEM:

1) ALL RECLAIMED WATER DESIGN CRITERIA SHALL BE PER CITY OF CORONA DEPARTMENT OF WATER AND POWER STANDARDS AND RIVERSIDE COUNTY DEPARTMENT OF HEALTH SERVICES STANDARD UNLESS OTHERWISE APPROVED.
2) ALL LANDSCAPED LOTS SHALL BE IRRIGATED WITH RECLAIMED WATER.
3) ALL PROPOSED PUMP STATIONS SITES SHALL BE PRIVATELY MAINTAINED.

SEWER SYSTEM:

1) ALL SEWER DESIGN CRITERIA SHALL BE PER CITY OF CORONA DEPARTMENT OF WATER AND POWER STANDARDS AND RIVERSIDE COUNTY DEPARTMENT OF HEALTH SERVICES STANDARD UNLESS OTHERWISE APPROVED.
2) PROJECT DOWNSTREAM SEWER IMPACTS SHALL BE DETERMINED AND MITIGATED AS DIRECTED OR AGREED UPON WITH THE CITY OF CORONA DEPARTMENT OF WATER AND POWER.

INFRASTRUCTURE IMPROVEMENT SUMMARY:

WATER SYSTEM:

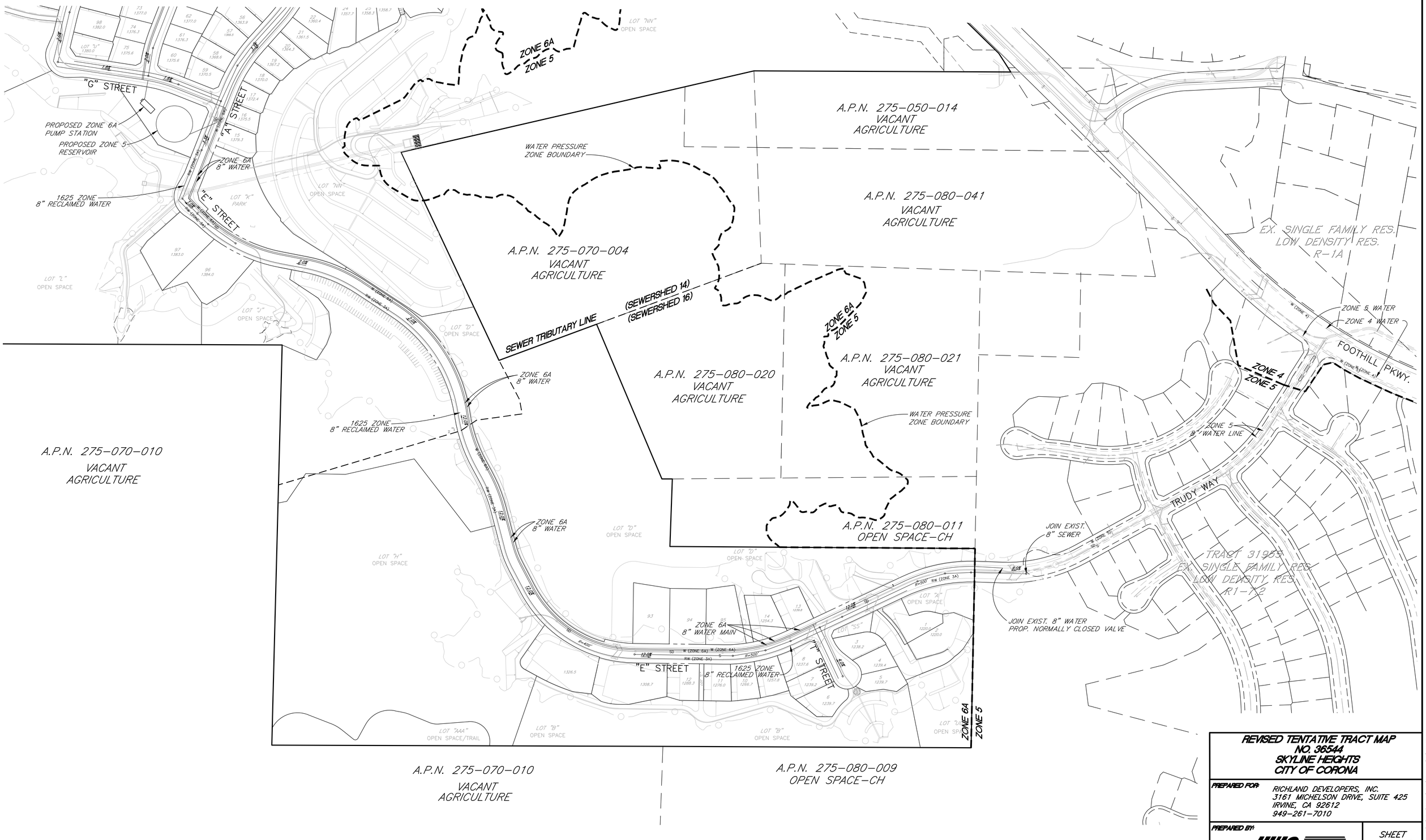
1) THE SKYLINE HEIGHTS PROJECT WILL BE SERVICED BY TWO PRESSURE ZONES, THE EXISTING ZONE 5 (1380 HWL) AND THE INTERMEDIATE ZONE 6A (1540 HWL). IT IS PROPOSED TO CONSTRUCT A NEW 12-INCH LINE FROM THE PROPOSED ONSITE BOOSTER PUMP STATION AT THE ZONE 5 RESERVOIR SITE.
2) THERE IS A 12-INCH ZONE 6A ONSITE LOOPED WATERLINE FROM THE BOOSTER STATION TO THE PROPOSED 0.6 MG ZONE 6A RESERVOIR AT 1540' HWL.
3) PROPOSED ZONE 6A BOOSTER PUMP STATION SHALL BE DESIGNED FOR 500 GPM FIRM CAPACITY.
4) A NETWORK OF ONSITE 8-INCH DISTRIBUTION PIPELINES ARE ALSO PROPOSED FOR THE TWO WATER PRESSURE ZONES TO SERVE THE PROPOSED RESIDENTIAL LOTS.

RECLAIMED WATER SYSTEM:

1) PROPOSED ONSITE 1380 ZONE AND 1650 ZONE RECLAIMED WATER SYSTEM CONSISTS OF A 8-INCH AND 12-INCH DISTRIBUTION PIPELINES. THESE LINES WILL BE PRIVATELY MAINTAINED.
2) PROPOSED 1650 ZONE HYDRO-PNEUMATIC PUMP STATION WITH AN TOTAL FIRM CAPACITY OF 1450 GPM.

SEWER SYSTEM:

1) THE ONSITE SEWER SYSTEM CONSISTS OF 8-INCH GRAVITY SEWER LINES. THERE WILL ALSO BE OFFSITE 8-INCH SEWER LINES CONSTRUCTED TO CONNECT TO THE EXISTING SEWER SYSTEM.
2) SEVERAL DOWNSTREAM GRAVITY SEWER LINES TRIBUTARY TO SEWERSHED 14 HAVE BEEN IDENTIFIED AS DEFICIENT PER THE OFFSITE SEWER ANALYSIS CONDUCTED BY THE CITY AND INCORPORATED INTO THE PRELIMINARY WASTEWATER REPORT FOR THE PROJECT. THESE SEGMENTS WILL REQUIRE UPGRADES/REPLACEMENT AS DETERMINED BY THE CITY OF CORONA.



REVISED TENTATIVE TRACT MAP NO. 36544
SKYLINE HEIGHTS
CITY OF CORONA

PREPARED FOR: RICHLAND DEVELOPERS, INC.
3161 MICHELSON DRIVE, SUITE 425
IRVINE, CA 92612
949-261-7010

PREPARED BY: KWC ENGINEERS
CIVIL ENGINEERS • PLANNERS • SURVEYORS
1880 COMPTON AVENUE, SUITE 100 CORONA, CA. 92881-3370 951-734-2130

SHEET 11 OF 12 SHEETS

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DPR13-002

A.P.N. 275-030-008
OPEN SPACE-CH

A.P.N. 275-040-001
OPEN SPACE-CH

A.P.N. 275-040-004
EXISTING RESIDENCE

A.P.N. 275-040-005
VACANT
AGRICULTURE

MATCHLINE – SEE BELOW

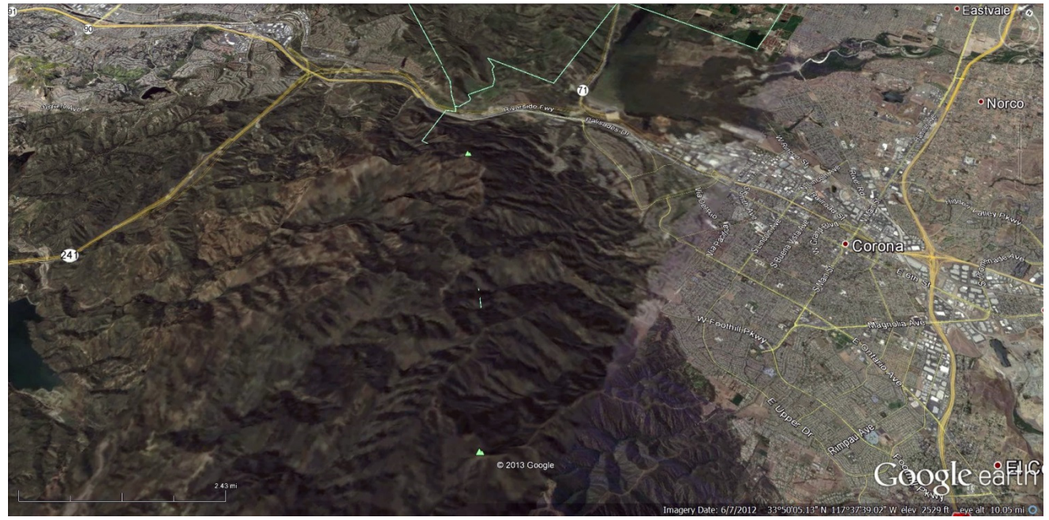
ZONE 5 WATER
ZONE 3 RECLAIMED WATER
JOIN EXIST. RECLAIMED WATER LINE
AVENIDA DEL VISTA TANK ZONE 4 (1220 HWL)
JOIN EXIST. 8" SEWER
JOIN EXIST. 12" WATER LINE
ZONE 5 WATER
FOOTHILL PARKWAY
MABEY CANYON ROAD
JOIN EXIST. 16" WATER LINE
EX. SINGLE FAMILY RES.
LOW DENSITY RES.
PLANNED COMMUNITY DEVELOPMENT
JOIN EXIST. 8" SEWER
ZONE 5 WATER 1380 HWL
BORDER AVE.
JOIN EXIST. 12" RECLAIMED WATER LINE
WATER PRESSURE ZONE BOUNDARY
ZONE 6A 8" WATER
ZONE 5
ZONE 6A
ZONE 3A 8" RECLAIMED WATER
ZONE 6A 8" WATER
ZONE 5 16" WATER
PROPOSED RECLAIMED WATER BOOSTER STATION (ZONE 3A) 350 GPM
N.A.P.
A.P.N. 275-040-010
OPEN SPACE-CH
ZONE 6A 8" WATER
ZONE 6A 8" WATER
ZONE 6A 8" WATER
ZONE 3A 8" RECLAIMED WATER
ZONE 6A 8" WATER
ZONE 6A 8" WATER
ZONE 6A 8"

Appendix 3: Soils Information

Geotechnical Study and Other Infiltration Testing Data

REVISED

PRELIMINARY GEOTECHNICAL INVESTIGATION AND GRADING PLAN REVIEW FOR TTM# 36544, SKYLINE HEIGHTS EIR, CITY OF CORONA, CALIFORNIA



Prepared for: **Richland Development Corporation**

3161 Michelson, Suite 425

Irvine, CA 92612

Prepared by: **GINTER AND ASSOCIATES, INC.**

27631 Durazno

Mission Viejo, CA 92692

PROJECT # 134-02 **APRIL 25, 2014**

Richland Developers, Inc.
3161 Michelson, Suite 425
Irvine, CA 92612

April 25, 2014
Project # 134-02

Attn: Mr. Mike Byer

REVISED

SUBJECT: **Preliminary Geotechnical Investigation**
And Grading Plan Review for
Tentative Tract Map No. 36544, Skyline Heights EIR
City of Corona, County of Riverside, California

References: See Appendix I

Gentlemen:

In accordance with your request, Ginter & Associates, Inc. (G&A) presents the results of a preliminary geotechnical investigation and EIR level grading plan review for the subject site. G&A bases this report on its experience with similar projects in the area and information predominately contained in Pacific Soils Engineering, Inc. (PSE) referenced reports.

This firm has retained the services of Mr. Mike Mills, Consulting Engineering Geologist, who has authored all of PSE's referenced reports. Mr. Mills was instrumental in providing the synthesis of PSE's data and especially the Alquist-Priolo Earthquake Fault Zone Investigations.

This document will be suitable for inclusion into the EIR and for submittal to the reviewing agencies. G&A's review of the data and Tentative Tract Map No 36544 indicates that the proposed development is feasible from a geotechnical standpoint, provided the recommendations presented herein are adhered to during site development.

Our firm appreciates the opportunity to provide our services and look forward to working with you and the other team consultants. If you have any questions or require additional information, please contact the undersigned.

Thank you.
GINTER & ASSOCIATES, INC.

Dave Ginter

Dave Ginter
President

GINTER & ASSOCIATES, INC.

27631 DURAZNO
MISSION VIEJO, CA 92692
OFC (949) 581-2363 CELL (714) 478-1167

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1.0 Introduction:

1.1 PURPOSE:

This report has been prepared to provide a preliminary geologic and geotechnical engineering evaluation and grading plan review, suitable for inclusion as an appendix for the EIR, for the Skyline Heights development site, in the city of Corona, California.

This EIR-level document presents the data and analyses regarding the geology, soil properties geologic hazards and associated mitigation measure and general grading/foundation considerations and incorporates the data and findings from previous investigations by others.

The Tentative Tract Map (TTM) No. 36544 was prepared by KWC dated April 8, 2014, at a scale of 1"=60'. Data developed during previous subsurface investigations and referenced reports by others were transferred to the TT base (Figures 1 through 7, in pockets) which provides the basis for this review.

1.2 SCOPE OF WORK:

The scope of this evaluation consisted of the following:

- Review the referenced site and adjacent development reports
- Review available laboratory data to evaluate engineering properties of the on-site subsurface materials
- Review and synthesize Alquist-Priolo Earthquake Fault Zone investigation reports by Pacific Soils Engineering, Inc. (PSE) for the subject site
- Transfer geologic and geotechnical information generated from previous site investigations to the 1"=60' scale TTM plans prepared by KWC Engineers
- Delineate buttress keys, stabilization keys, fill keys, sub-drain locations and settlement monument locations
- Delineate fill areas below 50 ft. from finish grade requiring 93% relative compaction
- Delineate cut areas where potentially heavy ripping and/or blasting may be required

- Prepare this report, which characterizes the site's geological and geotechnical engineering aspects and provides geotechnical recommendations suitable for inclusion into the EIR

2.0 Project Description:

2.1 SITE LOCATION AND EXISTING CONDITIONS:

The Skyline Heights project consists of two spheres of development separated by Mabey Canyon. The northern portion is triangle-shaped, consisting of approximately 12 acres bounded on the west by Cleveland National Forest, on the northeast by the proposed extension of Foothill Parkway and on the south by Mabey Canyon (Plates I and II). The southern portion consists of 400 acres±, is irregular in shape and is situated near the mouths of Mabey, Tin Mine and Kroonen Canyons, in the city of Corona, California (Figure 1). Undeveloped land borders this portion of the site on the west, northwest and much of the south. An existing residential community abuts part of the east boundary and the northeast boundary.

North Portion of Development

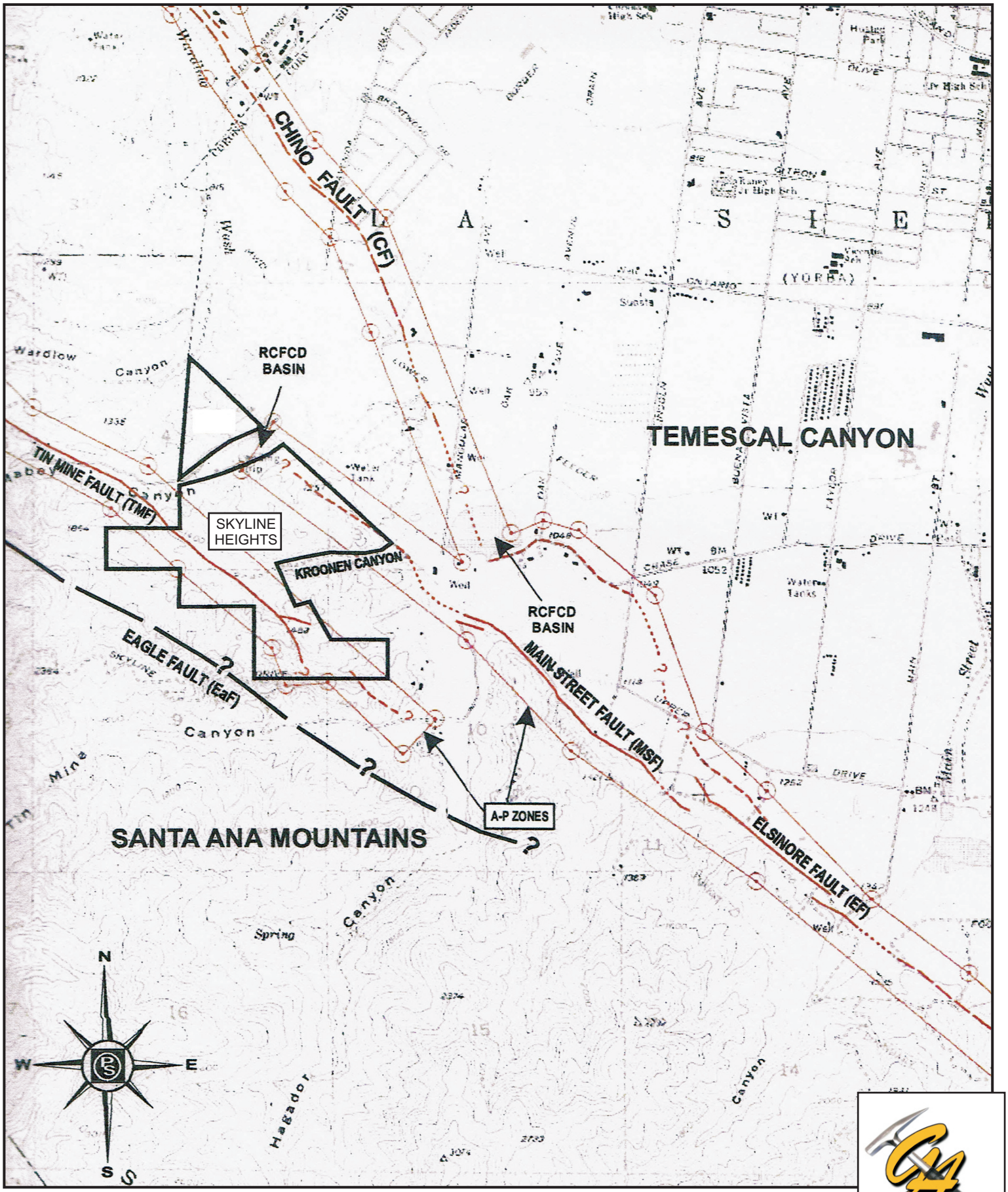
An unimproved road emanating from Mabey Canyon provides access to this area. Vehicular access however, is limited, owing to the steep topography and non-maintenance of the road..

This area is in an almost natural state. Steep topography with a thin soil mantle has precluded agricultural development common elsewhere in the general area. Very dense chaparral punctuated by sporadic stands of scrub oak covers most slopes.

Clay mining occurred in the Temescal Canyon area from the early 1900's (Gray, 1961). Scattered bulldozer trenches and access roads were cleared for the previous subsurface investigations and remnants of clay exploration roads are evident. No large-scale mining appears to have been carried out in this area.

This portion of the development generally consists of steep-sided northeast trending "main" ridges with similar steep-sided "spur" ridges on the northeastern flank of the Santa Ana Mountains. Side-slope ratios vary from 2:1 to 1:1 with local gentler and steeper sections. Consequently, v-shaped canyons and narrow, spine-like ridges abound.

Four large canyons drain this area; three low-order canyons drain northwesterly into Wardlow Canyon and the fourth drains the center of this area into high-order Mabey Canyon to the south. These major drainages are v-shaped in their upper and middle reaches, where



SOURCE MAP:
CORONA SOUTH
A-P ZONE QUAD
SCALE: 1"=2200'
and PSE 11/30/07

Plate I
LOCATION MAP
SHOWING A-P ZONES AND LOCAL GEOGRAPHIC FEATURES

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DATE :
April 25, 2014

incised into bedrock and flat in their lower reaches, where emanating onto plains of high-order Mabey and Wardlow Canyons.

The Mabey Canyon drainage flows into a large flood control basin near its mouth (Plate I), which intercepts flow and directs it northeast via lined channels into Temescal Canyon and eventually, the Santa Ana River system.

South Portion of Development

Unimproved roads emanating from Mabey Canyon Road and Mangular Avenue provide access to this area however, vehicular access is limited because of steep topography and environmental issues.

This portion consists of approximately 400 acres and was subjected to clay prospects and mines in the early 1900's. One successful clay prospect was the McKnight Clay Mine (Gray, 1961) southeast adjacent to the area (Plate V) that is now a tree nursery. Other poorly-preserved and undeveloped prospects and related access roads are scattered over the site. For example, an exploration trench (PSE 2005) encountered a small adit near proposed Lot 116.

Northwest trending "main" ridges and "spur" ridges with steep sides dominate the geomorphology. Low-order drainages feed three high-order drainages that extend over large areas of the northeastern Santa Ana Mountains. These high-order drainages are, from north to south, Mabey, Kroonen and Tin Mine Canyons (Plate I). Both following and breaching the local geologic structures and lithologies, these major drainage are commonly v-shaped in their upper and middle reaches, where incised into bedrock and flat in their lower reaches.

2.2 PROPOSED DEVELOPMENT

The proposed development involves two spheres of development – one north of Mabey Canyon, consisting of 44 lots and a larger one, south of Mabey Canyon, consisting of 246 lots for single-family homes. Access to the project will be from Foothill Parkway, which is proposed along the northeast side of the project. It is our understanding that the grading for the extension of Foothill Parkway will be completed prior to the subject site grading.

Cuts and fills to approximate maximum design depths of 130 ft. (vicinity of Lot 123), excluding utility excavation, and 138 ft. (vicinity of Lot 223), respectively are proposed. Cut slopes range from small 2 ft. high side yard split slopes to 140 ft. at 2:1 slope ratios. One 1.5:1 cut slope approximately 80 ft. high is proposed (Figure 6). Fill slopes range from small, less than 2 ft. high

side yard split slopes to 160 ft. at 2:1 slope ratios. One 1.5:1 slope approximately 130ft. high is proposed on the northern perimeter (see Sheet 2).

3.0 Site Geological/Geotechnical Investigations:

3.1 PREVIOUS REGIONAL INVESTIGATIONS:

The California Division of Mines and Geology (CDMG) published several geological reports pertaining to the geologic setting of the northern Santa Ana Mountains and Temescal Canyon, including the separating Whittier-Elsinore Fault Zone (WEFZ) (Gray, 1961; "Jenkins Edition" CDMG, 1965). These deal mainly with regional-scale mapping or local economic geology. Weber (1977), however, published detailed geologic fault maps and fault activity analyses of the WEFZ and unnamed local faults. He identified and named three NW-trending local segments of the WEFZ: The Tine Mine Fault (TMF), Main Street Fault (MSF) and Eagle Fault (EaF). Weber mapped the MSF near and almost parallel to the northeast site boundary (Plate 1); the TMF as bisecting Skyline Heights (Plate I); and the EaF about 200 ft. to the south. Gray et al. (2002) later incorporated the work of Weber and Gray into one map. The Gray (1961), Weber (1977) and Gray et al. (2002) maps are similar, but differ in the location and number of minor mapped faults.

Owing to increasing urbanization of the Corona and Temescal Canyon areas, the CDMG (1980) studied local faults and concluded that major strands of the WEFZ are likely active (Holocene) as exemplified by youthful geomorphic features such as right-laterally-displaced Holocene channels. Likewise, apparent fault scarps, displaced Holocene alluvium and a sag pond at "Glen Ivy Marsh" about 10 miles to the southeast. Accordingly, the CDMG (1980) placed the MSF in an Alquist-Priolo (A-P) Zone that requires site-specific fault rupture hazards investigation prior to development. Recently, the CGS (2003) expanded the local A-P Zones and included both the MSF and elements of the TMF (Plate I).

In 2003, the Riverside County Planning Department (2002), Temescal Canyon Area Plan) included the TMF, MSF and associated faults as seismic hazards.

3.2 SITE-SPECIFIC INVESTIGATIONS:

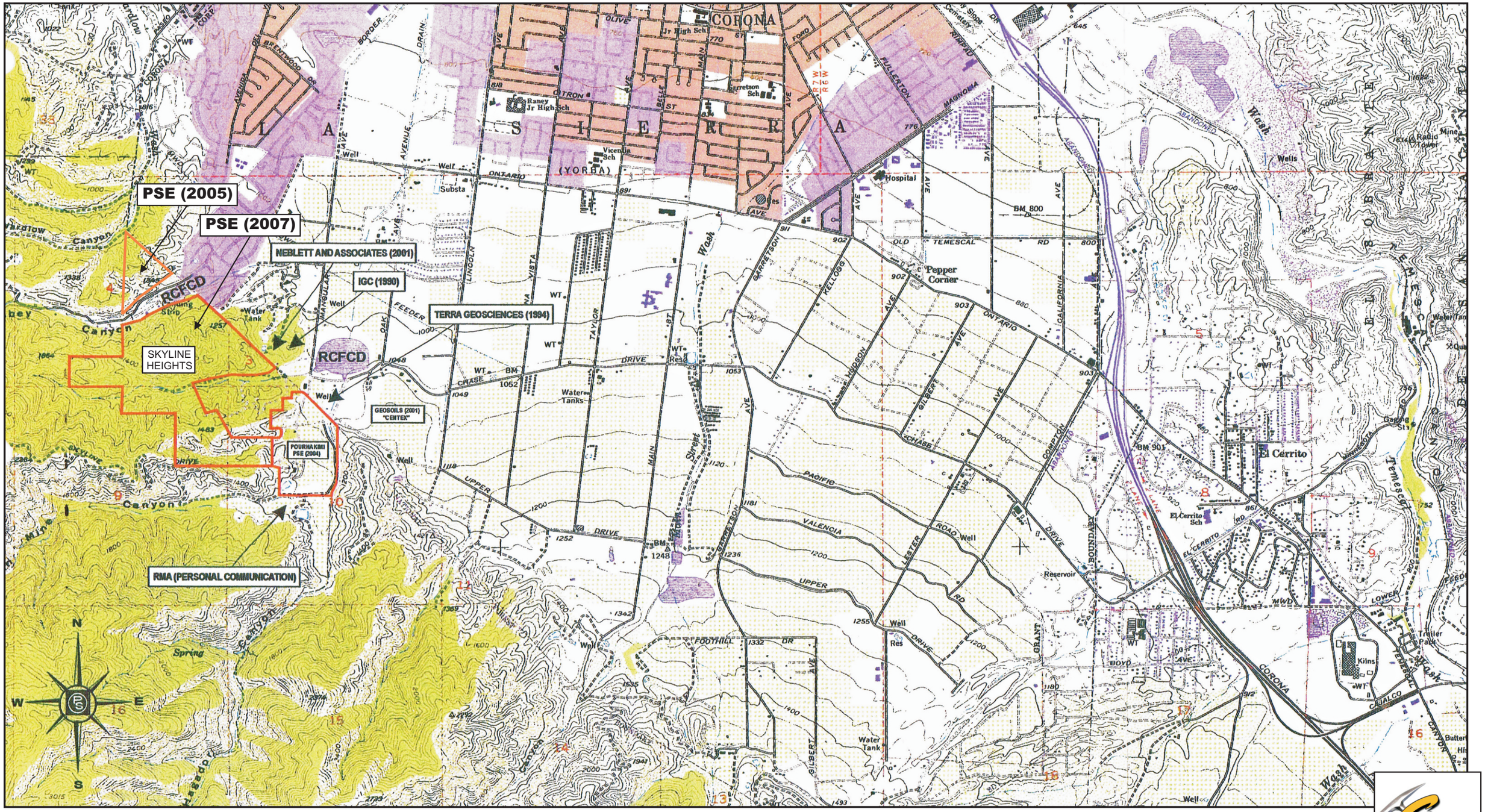
Between 2004 and 2007, Pacific Soils Engineering, Inc. (PSE) carried out a variety of field investigations within and adjacent to the Skyline Heights property limits. Most dealt with the

presence or absence of active faults within several adjacent parcels. For detailed descriptions and analyses, the reader is referred to the full reports as listed in Appendix A. For reference and contest, key documents are summarized as follows:

1. An A-P-level investigation of the "Pourhakimi" property along the east margin of the Skyline Heights project (PSE, 2004; Plate II) that concluded that active elements of the WEFZ are not present in the areas that were to be, and that are now, occupied by habitable structures. PSE did, for conservatism, impose a provisional setback along the northeast boundary of that site that is about parallel to the fault zone. Also completed, was a preliminary geotechnical investigation of the site. The site was then developed using another firm as geologists and geotechnical engineers of record.
2. An A-P-level investigation (PSE, 2005) focused on the Tin Mine (TMF) and related faults mapped on the Skyline Heights property, that encompasses the part south of Mabey Canyon. Based on aerial photograph and literature review, geologic mapping and logging of 13-excavator trenches up to 1170 ft. long and 17 excavator "pits", PSE concluded and reported that, with the exception of a small "un-dateable" fault, the TMF and related faults are not active within the investigated areas using A-P Act criteria. Such will be summarized in detail later in this document.
3. An A-P-level investigation (PSE, 2007) of the "Lot 84" property that comprises the area of Skyline Heights north of Mabey Canyon (Plate I). PSE concluded, based on the presence of overlying un-displaced pre-Holocene sediments, that faults mapped onsite are not active according to A-P. Further, a fault interpreted as the extension of the aforementioned "un-dateable" fault encountered in the southern part of Skyline Heights is in fact, overlain by un-faulted pre-Holocene sediments, as reported by PSE.

4. Apparently, in a preliminary geotechnical investigation (unpublished) of the southern Skyline Heights property PSE undertook 16 seismic lines; drilling, logging and sampling of fifteen 30-inch diameter bucket auger borings using a truck-mounted drill rig; and excavating of and logging 35 trenches and one fault trench (FT-1) using a track-mounted backhoe. The borings ranged in depth from 4 to 75 feet below existing ground surface and were logged by an engineering geologist. Relatively "undisturbed" ring and bulk samples were obtained from the borings and transported to PSE's laboratory for testing.

   Unfortunately, owing a great deal to the closing of PSE, the field data and test results are not available for review and assessment. Only summaries within the text of the unpublished report are now available.



SOURCE MAP:
CORONA SOUTH
QUADRANGLE
SCALE: 1"=2200'
and PSE 11/30/07

Plate II
SITE RELATIVE TO RECENT FAULT INVESTIGATIONS

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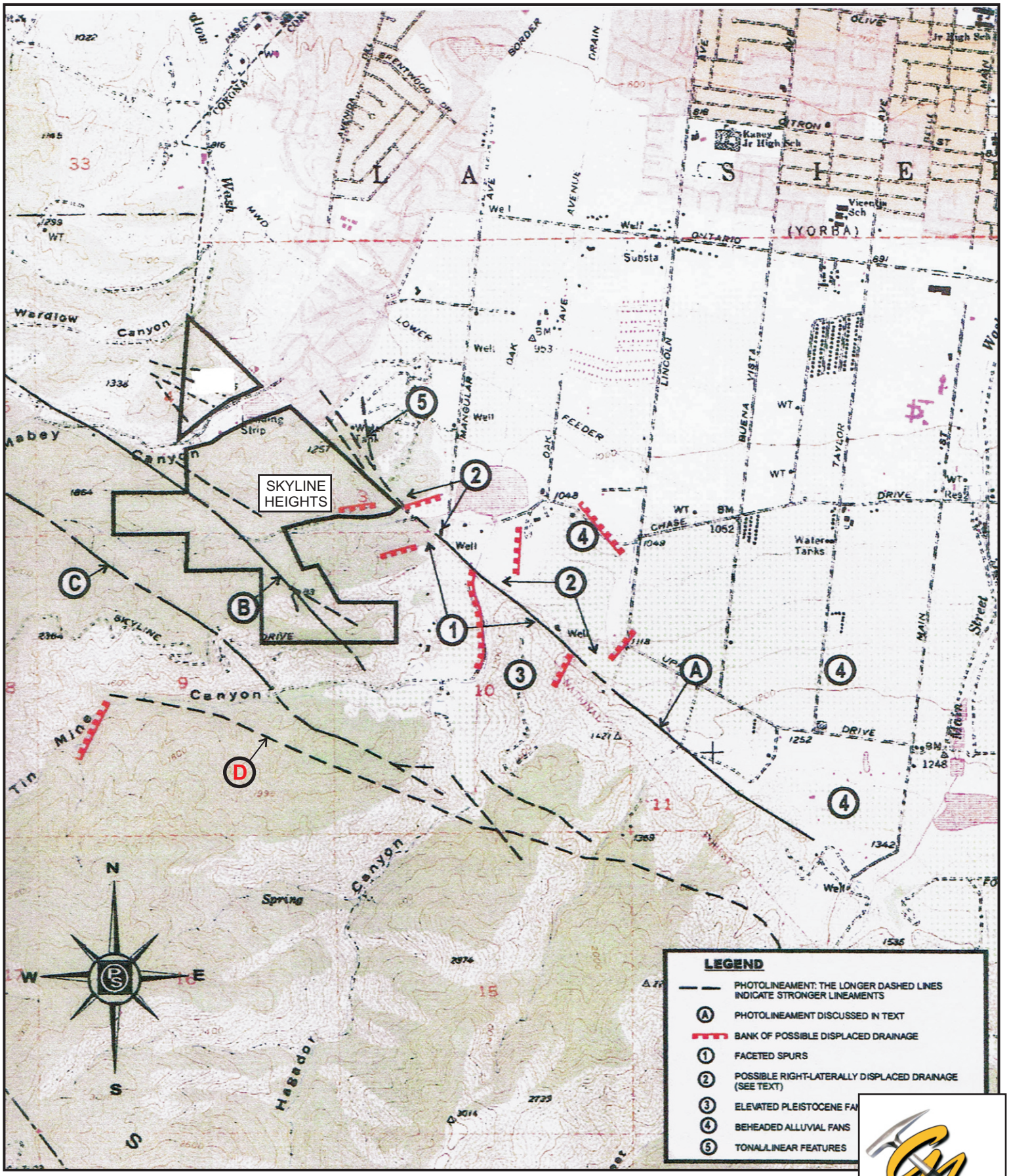
The unpublished geotechnical review by PSE further notes, A D-6 bulldozer created both access pathways and pads for the drill rig, where environmental constraints allowed. It should be noted that the boring locations were limited by site physical constraints including steep topography and environmentally sensitive areas. Detailed evaluation of geologic conditions and possible remedial measures should be based upon additional exploration (perhaps at the Grading Plan Review stage) when environmental clearances can be obtained in a timely manner and, finally, during grading.

3.3 ADJACENT GEOLOGICAL INVESTIGATIONS:

Since the imposition of the aforementioned A-P Zones, several nearby site-specific A-P investigations have taken place (Plate I), as discussed in the PSE (2005) report. Terra Geosciences (1994) investigated the property northeast of the southern Skyline Heights area by placing three trenches in essence perpendicular to the CDMG (1980) MSF. That company found no displacement of "older alluvium" and concluded that the fault probably passes south of its trenches. Neblett and Associates, Inc. (N&A) further delineated the MSF near the northeast border of the Skyline Heights parcel near the mouth of Kroonen Canyon based mainly on small offsets of probable Holocene alluvium. That firm concluded that the trace of the MSF is likely active.

IGC, Inc. (1990, 1991) explored a northeast-trending fault mapped by Weber (1977) northerly adjacent to the Skyline Heights parcel. IGC concluded that the fault is not active on the basis of limited dateable sediments. It is not clear, however, if the IGC feature is a likely fault or, rather, merely a typical clay bed within the Silverado Formation. According to PSE (2005), the descriptions of the lithologies and colors of the features in the IGC trench log suggest that the features are probably clay beds.

Further, according to PSE (2004) in a report of its fault investigation of the Pourhakimi property, geological investigations of the Centex property east of the "Pourhakimi" property (Plate II) identified the active MSF and a pre-Holocene splay of the fault northeasterly offsite to "Pourhakimi" (GeoSoils, Inc., 2001; Shlemon, 2003, personal communication). The active strand was mapped in part at the base of a northeast-facing faceted spur ridge southeast of the study site. Based on field observations, much if not all, of the MSF setback imposed along the northeastern "Pourhakimi" site likely falls within the Foothill Parkway right-of-way. In sum, the 2003 PSE investigation, as well others, demonstrated that the main MSF lies northeast of the southern part of the Skyline Heights parcel.



SOURCE MAP:
CORONA SOUTH
QUADRANGLE
SCALE: 1"=2200'
and PSE 11/30/07

Plate III
REGIONAL PHOTOLINEMATIC/-TECTONIC GEOMORPHIC MAP

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134-02

DATE :
April 25, 2014

Of importance is a fault investigation of the TMF carried out by RMA (personal communication with representative of RMA and field observation by PSE personnel, 2005). RMA trenched the TMF as projected southeast from the Skyline Heights property and exposed un-faulted alluvium. Further, RMA mapped then-recent cut slopes and encountered no TMF, but rather, only un-faulted Pleistocene sediments and bedrock across the inferred trace of the fault. Thus, the TMF, if extant at that site, is not active according to A-P standards.

3.4 ADJACENT DEVELOPMENT:

Foothill Parkway has been completed to the northeast Skyline Heights border. As shown on Figures 1 through 7, when completed, the parkway will border north of the proposed Skyline Heights development. Typical cuts and fills are planned to accommodate the road. Thus, cut and fill slopes and fill prisms will border the proposed development. Coordination with the Foothill Parkway authorities will be required to afford adequate disposal of subdrains, adequate bearing qualities of parkway soils interfacing with the Skyline Heights development and adequate stability of cut slopes; or implementation of mitigating design and construction where unfavorable geologic/geotechnical features would affect construction of Skyline Heights.

4.0 Regional Geology:

The following discussion is in essence a synthesis of the PSE reports (2004, 2005, 2007 and unpublished 2008) pertaining to the geological setting of the site and its environs.. The PSE reports focus mainly on fault rupture issues rather than general geotechnical issues, but a great deal of geological information in the reports is quite useful for EIR-level assessment. Where applicable, this firm updates or expands on the aforementioned reports.

Pertinent references describing the regional geology are provided in Appendix I. In brief, the study site occupies a part of the northeastern slope of the Santa Ana Mountains near their boundary with Temescal Canyon (Plate I; Elsinore-Chino Trough). These mountains are one of many northwest-trending southern California ranges separated by broad valleys within the Peninsular Ranges Geomorphic (and structural) Province of southern California (Woodford et al., 1971; Gray, 1961). The province extends from the Transverse Ranges on the north to Baja California on the south.

The Santa Ana Mountains have a Jurassic and Cretaceous metamorphic and igneous core on which Cretaceous through Pliocene marine and non-marine rocks have been deposited (McColloh et al., 2000;, 1961). Along the northeast flank of the mountains, the Cretaceous and Tertiary rocks were strongly tilted and folded during later regional deformation (Plate IV). Pleistocene to modern sediments derived

mainly from the upper reaches of the Santa Ana Mountains locally mantle those rocks. These sediments are mainly elevated Pleistocene river terrace and alluvial fan deposits and Holocene fans on valley floors (Temescal, Santa Ana Canyons, modern alluvium in incised drainages and toe-slope colluvium).

The northwest-trending Peninsular Ranges blocks parallel regional continental borderland faults that extend from the Mojave Desert in the east to the Channel Islands on the west. These fault zones are typically exhibit right-lateral strike-slip with associated reverse and normal dip-slip components. The approximately 150-mile long Whittier-Elsinore (WEFZ) that parallels the northeast Santa Ana Mountains, with elements mapped on the Skyline Heights site, is a classic example.

About 2000 feet east of Skyline Heights, the WEFZ splays into three major strands (Plates I and IV). The easternmost strand, the Chino Fault (CF) trends north-northwest across the Santa Ana River and along the east side of the Puente Hills, northeast of the study site. The center strand is mapped as the Main Street Fault (MSF) that, traditionally, is the northern continuation of the Elsinore Fault (EF). The MSF, based on mapping by Weber, (1977) and CGS, (2003), seemingly dies out southeast of Wardlow Canyon, near Mabey Canyon and the study site (Plates I and IV). The westernmost splay is the traditionally mapped Whittier Fault (WF). Near Fresno Canyon, the WF "bends" west-northwest across Santa Ana Canyon and then resumes a northwest trend along the west flank of the Puente Hills. The southernmost strand (s) of the WF is seemingly the Eagle Fault (EaF) of Weber (1977). According to most investigators, the study site thus lies within a tectonic wedge formed by the branching of the WEFZ into three identifiable stands.

Many WEFZ segments are active according to A-P standards. PSE (2002a, 2002b), Millman (1988) and Rockwell et al. (1986) documented surface displacements on the WEFZ in the last 11,000 years (Holocene) and the CGS (2003) has therefore, placed many of these segments in A-P Zones based on the foregoing and the presence of tectonic geomorphic features such as faceted spurs, displaced drainages and linear troughs. Among the faults so zoned, are the MSF and TMF mapped near and on-site, which gave rise to a many local A-P-level investigations as noted in this document and which bear heavily on local geological assessments.

5.0 Local Geology:

5.1 STRATIGRAPHY:

In general, the project highlands are underlain by resistantCretaceous and Paleocene sedimentary rocks that are locally mantled by older Pleistocene alluvial "terrace" deposits. Whereas the lowland surfaces support mainly Holocene alluvial channel and fan deposits (Figures 1 through7). The ages, distributions and geometries of the sedimentary bedrock are useful for assessing the presence/absence, style and locations of faults within and near the project. In turn,

the characteristics of the Pleistocene and Holocene alluvial deposits are useful indicators for constraining locations, slip geometries and ages (time of last movement) of local faults. Accordingly, the distinguishing and salient characteristics, distribution and ages of the various deposits are discussed in detail herein. Additionally, information relevant to the engineering characteristics and analyses thereof the onsite soils is included herein.

5.1.1 Cretaceous Trabuco Formation (Kt):

The Trabuco Formation is mainly brown, weakly to moderately lithified cobble to boulder conglomerate, marked by occasional lenses and beds of distinctive maroon silty conglomerate that crops out in the southwest corner of the site (See Plate I of the PSE 2005 report). Clasts are mainly metamorphic, igneous and volcanic fragments that are usually more weathered than clasts within the overlying Ladd Formation. Following the regional structural grain, this formation extends from northwest to southeast south of Tin Mine Canyon (RMA, 2005; personal communication; PSE, 2005).

Important to Skyline Heights development, RMA (personal communication and field observations by senior PSE personnel) trenches placed during an A-P investigation south of Skyline Heights (Plate II) exposed distinct Trabuco "maroon beds" on the south flank of Tin Mine Canyon, thereby documenting formational continuity across Tin Mine Canyon. This contradicts previous geologic maps (Gray, 1961; Weber, 1977; Gray et al., 2002) that depict the formation "fault-truncated" north of the canyon.

The Trabuco Formation grades upward into the Cretaceous Ladd Formation (Gray, 1961). The contact between the two formations is thus arbitrary and herein taken to be the top of the uppermost Trabuco "maroon bed".

5.1.2 Cretaceous Ladd Formation:

Two formal members of the Ladd Formation crop-out northwest and south of Kroonen Canyon (Figures 1 through 7). These are the Baker Canyon Conglomerate and Holz Shale members that usually were readily identifiable in PSE trenches and, locally, in outcrop. In contrast, north and east of the canyon, massive conglomerates and sandstones are deemed "undifferentiated Ladd Formation" (Gray, 1961; Gray et al., 2002), which may also encompass Williams Formation sandstone. Figures 2, 4 and 5) identify these units as "Ladd Formation Conglomerate" (Klc). Clearly identifiable and mappable Williams Formation does crop out in the northern part of the site, northwest of Mabey Canyon.

5.1.2.1 Baker Canyon Conglomerate (Klbe):

Thick-bedded to massive pebble and cobble conglomerate interspersed with buff to gray arkosic to lithic marine sandstone typify the Baker Canyon Conglomerate at and near Skyline Heights. As noted by Gray (1961) and as observable in many natural and anthropic exposures, the lower part of the member consists mainly of distinctly bedded, volcanic and metamorphic cobble conglomerate. Distinctly inter-bedded buff conglomerate and buff to gray thick-bedded sandstone characterize the upper part of the formation exposed onsite. This unit is generally well-indurated (cemented) below a weathered halo and therefore, supports steep anti-dip and dip slopes and is a major "ridge former".

The Baker Canyon Conglomerate is conformable with, and grades into, both the underlying Trabuco Formation and the overlying Holz Shale Member of the Ladd Formation (PSE, 2005)--Trench T-1 of the 2005 investigation clearly exposed a gradational contact between those two members. The transition zone, based on PSE investigations, varies from about 50 to about 100-feet thick. The contacts shown on the enclosed plates are thus arbitrary and could change as extensive in-grading exposures might dictate.

5.1.2.2 Holz Shale (Klh):

Locally fossiliferous, gray to bluish gray where fresh and gray to yellowish brown where weathered shale, claystone, siltstone and silty sandstone comprise the Holz Shale. Generally, the unit is thin-bedded and has well-developed bedding plane parting (PSE, 2005; Schoellhamer et al., 1981). Calcareous concretions up to three feet in diameter occur throughout the Holz Shale. Despite the presence of concretions, the unit is poorly resistant to weathering and forms subdued topography relative to the underlying Cretaceous conglomerate and the overlying Tertiary sandstone.

Where observed by PSE (2005), the Holz Shale is usually fractured (squeezed) and is replete with small-scale "flow" folds symptomatic of plastic deformation. This contrasts with the brittle behavior of the overlying and underlying Silverado Formation and Baker Conglomerate where faults, fractures and similar brittle deformation predominate.

Holz Shale forms a narrow V-shaped band typified by subdued, linear topography in the western part of the subject site (Figures 4 and 6). The outcrop pattern

describes a regional, closed, locally overturned, southeast-plunging syncline (Plate IV).

PSE mapping of the Holz Shale varies markedly from published regional geologic maps (Gray, 1961; Weber, 1977; Gray et al., 2002; Morton and Miller, 2006). This disparity likely stems from the new trench and road cut exposures that are now available, but were not to the earlier investigators.

Most importantly, PSE identified local ridges of Baker Canyon Conglomerate and topographic lows carved in previously unidentified Holz Shale, rather than the Silverado Formation depicted by the earlier investigators. The absence of Tertiary Silverado and the presence of "Cretaceous-against-Cretaceous" relationships suggest limited structural relief and stratigraphic separation. Accordingly, large-scale fault displacements are therefore, not necessary to explain local bedrock geometry and distribution.

Ladd Formation Conglomerate (Klc)

A large lithesome of well-indurated conglomerate interspersed with scattered sandstone beds underlies most of the area south of Mabey Canyon and north of Kroonen Canyon (Figures 2, 4 and 5) Based on its stratigraphic position, Gray (1961) concluded that it as part of the Ladd Formation. In many respects it is similar to the Baker Conglomerate, except that it is typically massive with few plane partings. Many measured attitudes represent textural changes rather than planar partings. Accordingly, the geological structural pattern is not particularly well-defined. Thus, PSE (unpublished) took a conservative approach in it slope stability analyses. Additional geological information could lead to different structural interpretations, as noted above.

Refractive seismic lines summarized in PSE (unpublished) suggest that at depth, this unit is well lithified. For reference, Section 8.1, herein, is an initial assessment of rippability of site bedrock south of Mabey Canyon.

5.1.2.3 Cretaceous Williams Formation (Kw):

Buff to brown, generally massive conglomerate and scattered claystone beds compose the local Williams Formation, as mapped by Gray (1961) and Morton and Miller (2006). Abundant, at least partly "grussified" granitoid cobbles and boulders and, at least local absence of stratification characterize this formation. According to Schoellhamer et al. (1981), the granitoid clasts differentiate this

formation from the Ladd Formation that supports mainly volcanic and metamorphic cobbles. This formation underlies the northern part of the study property and possibly crops out along the ridge northwest of Kroonen Canyon.

5.1.2.4 Paleocene Silverado Formation (Tsi):

Non-marine and locally marine light buff, to light gray, to yellow silty sandstone, intercalated red and gray/white claystone and scattered cobble conglomerate characterize the Silverado Formation. PSE (2005) identified well-cemented fossiliferous beds scattered throughout the on-site Silverado Formation.

Bedding varies from thin to massive, but is usually identifiable in natural and anthropic outcrops. The sandstone is moderately resistant, the limy fossiliferous beds are very resistant and the claystones are poorly resistant. Consequently, differential erosion of the red clay beds imparts steep, linear strike-parallel ridges and ravines. Hard limy beds form particularly evident spines along some ridgelines.

Red, white and gray mottled clay beds locally mark the base of the Silverado Formation. A few to a few tens of feet thick, these are likely sedimentary clays derived from nearby clay-rich saprolites that formed on an erosion surface prior to deposition of the remainder of the Silverado Formation (Gray, 1961; Schoellhamer et al., 1981; McCulloh et al., 2000).

These clays were probably therefore transported short distances into topographic lows on the Ladd Formation surface. These beds, which may be the lateral equivalent of the Claymont clay bed, were mined for clay at the McKnight Clay Mine and at the Kroonen Clay Prospect (Gray, 1961). These beds often are composed of commercial quality clay, but lack the volume to be commercially viable.

The contact between the basal red bed sequence and the underlying Ladd Formation is depositional, based on exposures in trenches excavated by PSE in 2005. Here, the contact is undulatory and rip-up clasts of the underlying Holz Shaleare intercalated.

One particular limy, fossiliferous bed is depicted on the geologic map Figures 6 and 7, along with two smaller, discontinuous ones. Composed of *Ostrea, sp.* and other mollusks, this bed is traceable from the northeast property line westward to

near the south-center where it is tightly folded into a synform, as attested to by V-shaped outcrop pattern.

In sum, the red and limy beds are readily identifiable and often laterally continuous and are thus, excellent local and regional key beds to determine the presence or absence of bedrock faults.

5.2 QUATERNARY ALLUVIUM:

Based on studies by PSE, regional and local Quaternary alluvium consists of: 1) Older (Pleistocene) alluvial fan and "terrace" deposits elevated above the modern (Holocene) drainage; and 2) Holocene alluvium occupying the floors of active channels and swales, where detritus is seasonally transported, deposited and eroded. PSE (2004, 2005, 2007) provided detailed discussions of the relative ages of the various alluvial units. For this EIR document this firm provides the following summary/synthesis of the earlier PSE assessments.

5.2.1 Ages of Alluvial Deposits:

Lamar (1986), Millman (1986, 1988) set forth soil and morpho-stratigraphic chronosequences for northern Temescal Canyon alluvial deposits based on relative soil development, geomorphic position, radiocarbon dates and on comparsons with other numerically dated southern California soils (at Ventura and Norco). Vaughan and et al. (1999) developed as similar soil stratigraphy along the EF south of the study site, near Temecula and Pala, California. In brief, nine *geomorphic surfaces* were identified and the underlying deposits were inferred to be up to perhaps 200,000 to perhaps 300,000 years old. The age of each surface is deduced from relative soil development that provides a minimum age for the deposit on which it forms. The actual deposits are therefore, older. In general, the ages of the fan/stream/valley fill surfaces (and thus, usually the underlying deposits) increase with elevation; that is, the modern lowlands are the youngest and the highest elevated, the oldest.

As noted by PSE (2005), both soil-stratigraphic and morpho-stratigraphic hierarchies are thus useful to assess the age of the Quaternary deposits in the Corona area. PSE (2002a, 2002b) developed a modified version of the Millman and Rockwell (1986) and Millman (1988) chronology for an investigation similar to this.

Figures 1 through 7 reflect the adoption of the Millman (1988) nomenclature. Relative ages of the deposits are depicted where feasible and where reasonably inferred. Their boundaries are not "precise" and hence, for this study, were generalized.

5.2.1.1 Older Alluvium, Pleistocene Age (Qoa)

Two principal areas of older alluvium that strongly impact dating of last slip along the TMF and MSF occur in the northern and central parts of Skyline Heights. A greater than 18-ft. thick cap of older alluvium sits as an elevated "terrace" along the south side of Mabey Canyon. PSE informally named this deposit the "Mabey Fanglomerate" (PSE 2005). PSE (2005) trenches also exposed more than 20 feet of older alluvium (Kroonen Deposit) near the head of a major tributary to Kroonen Canyon, where PSE (unpublished) Boring BH-6 penetrated 35 feet of older alluvium before encountering bedrock.

5.2.1.1.1 Mabey Fanglomerate

The Mabey Faglomerate is more than 18 feet thick where it underlies an extensive Pleistocene terrace above Mabey Canyon (Figure 2). These deposits are typically poorly sorted, arkosic to lithic, subanglular to well-rounded sand and gravels, replete with ubiquitous cut-and-fill structures. Also common, are well-sorted, current-laminated sands and moderately sorted basal cobble and boulder beds.

Regionally, this deposit occurs at elevations similar to other high elevation fanglomerates along the east flank of the Santa Ana Mountains adjacent to or near the WEFZ; namely, at least several tens of feet above active Temescal Canyon drainages and alluvial fans. Uplift along the Eagle Fault and associated "beheading" of the proximal parts of the fans by erosion has now both cut off these fans from their original source areas and elevated them above Temescal Canyon.

5.2.1.1.2 Kroonen Canyon Older Allluvium:

Another deposit of older alluvium occurs near the head of Kroonen Canyon (Figure 4) near PSE's 2005 Trench T-11. This deposit overlies the Ladd Formation in depositional contact. The aforementioned BA-6 revealed depth to bedrock to be approximately 35 feet at this location.

The Kroonen deposits are mainly sand, silty sand and clayey sand. Abundant gravel typical of most regionally extensive alluvial fan deposits is absent, although occasional gravel stringers and "stone lines" are scattered throughout the section.

5.2.1.2 Younger Holocene Alluvium (Qal):

Unconsolidated sediments occupying active channels in the major canyons and low order swales are shown as Holocene alluvium (Q_{1-2} on the various Figures). These deposits vary in thickness from a few to more than 20 feet. These deposits are generally of low density and compressible.

5.2.1.3 Surficial Cover:

Although unmapped, prisms of compressible soils likely lie at the base of onsite slopes, or occupy swales on those slopes. These accumulations stem from weathering, dislodgement and downslope transport (by either water or creep) of debris derived from local bedrock. Although colluvium was encountered in a few of the exploratory trenches (PSE, unpublished), the steep nature of most of the slopes and heavy vegetative growth prevented exploration of these soils; therefore, a detailed distribution and depths of colluvium must await further subsurface exploration or be determined at the time of grading. Colluvium is estimated to range from approximately 5 to 15 feet in depth, as estimated by PSE (unpublished).

5.2.1.4 Landslides:

During the current study, PSE mapped several relatively small, surficial onsite landslides or suspected landslides. Most are concentrated in the northern part of the site on steep slopes comprised of Ladd Formation.

A moderately large landslide is mapped easterly subjacent to Lots 58 through 64. Most of the mapped limits of the feature are off-site. Nonetheless, as shown on the Tentative Plan, proposed development will be affected by the slide. For instance, removal of slide debris in the process of providing adequate support of the planned fill in this area could prove difficult near a property line that is within the slide limits. As noted, the offsite part of the landslide might need to be investigated in light of the current development plans.

Per the unpublished PSE geotechnical review of the study site, that firm reported that their BA-15 encountered 12.5 feet of landslide debris and trenches TP-22 through TP25 and TP33 aided identification of the southwest landslide limit. As a caveat, these logs are not currently available for G&A review. The offsite limits are thus estimated and therefore, questioned on the geotechnical map. Based on the PSE field investigation, the entire slide, if as shown mostly offsite, is seemingly a composite of relatively shallow failures associated with fractured and clay-rich Silverado Formation. Indeed, the currently mapped landslides are seemingly related to the presence of steep natural slopes, colluviated swales and fractured or clay-rich rock. Seepage (i.e. springs) may also contribute to local zones of instability. The generally lithified and steeply dipping bedrock is not usually amenable to deep-seated landslides.

5.2.1.5 Artificial Fill (afu):

Non-engineered fill exists at the Kroonen Clay Prospect near the center of the project. It is anticipated that artificial fill in this region locally reaches a depth ranging from 5 to 20 feet. Also, PSE (2005) fault trenches that for the most part are in areas of planned cut were backfilled with non-engineered fill.

Of importance, engineered fill has been placed near along the eastern margin of Skyline Heights development must therefore, be designed and constructed in a manner that affords adequate and code-compliant subsurface and surface drainage from the study site.

6.0 Groundwater:

Perched groundwater was encountered in one of the PSE borings at 39 feet below ground surface. No groundwater was encountered during PSE's fault investigations. Groundwater could potentially be trapped seasonally along alluvium/bedrock contacts and bedrock fractures. Weber (1977) estimated the regional groundwater surface to be 100 ft. to 200 ft. below the existing ground surface.

6.1 GEOLOGIC STRUCTURE:

6.1.1 Regional:

The Whittier-Elsinore Fault Zone (WEFZ) has been mapped by many investigators (Gray, 1961; Gray et al., 2002; Weber, 1977). Recent geological studies show the fault zone as active (Rockwell et al., 1986; Millman, 1988; Lamar, 1992). Recently, PSE

(2002, 2003) has identified active traces of the fault zone along the west margin of Temescal Canyon southeast of Skyline Heights.

The Skyline Heights site is northwest of where the CF and WF *senso stricto* branch from the classic EF (Plate I). The CF trends north-northwest into Temescal Canyon and then along the east flank of the Puente Hills. The WF trends northwest from the "split". Near Fresno Canyon, it "turns" west-northwest across Santa Ana Canyon and then resumes a northwest trend along the west flank of the Puente Hills.

Near Skyline Heights, the WF has been presumed to have two branches, the EaF and TMF (Plates I and IV). Weber (1977) and Gray et al. (2003) mapped the TMF from about Santa Ana and Wardlow Canyons in the northwest across Skyline Heights to Hagador Canyon in the southeast where it either dies out or merges with the EaF. Conversely, the EaF, off-site to the south is typically mapped as the southernmost trace of the WF *senso stricto* (Dibblee, 2003).

The MSF named and mapped by Weber (1977) is the northernmost active segment of the EF. However, the fault apparently terminates near Mabey Canyon (Weber, 1977; CGS, 2003) as reflected by a lack of geomorphic expression and by the presence of unbroken pre-Holocene sediments. Here slip is inferentially transferred to the CF, WF or regional warping.

The subject region has been subject to transpression since at least Pliocene time (last 5,000,000 years) and perhaps earlier (Wright, 1991; Lamar, 1992; McCulloh et al., 2000). Geologic structure between the EaF and MSF (Figure 4) reflects that transpression. Specifically, the Cretaceous and Paleogene bedrock dips steeply and in many places is overturned (Tan, 1991; Dibblee, 2003). For example, this study identified a previously unmapped "Kroonen syncline" between the EaF and MSF (Figures 5 and 6) that apparently reflects northeast-vergent compression along the MSF, TMF or EaF. Further, a PSE investigation about two to three miles northwest, exposed a northeast-vergent thrust separating overlying Cretaceous rocks on the southwest from Pleistocene older alluvium on the northeast, a clear indicator of local compression where the WF deflects the west-northwest near Santa Ana Narrows.

Because Skyline Heights is between major faults, the local structural patterns are inherently complex. Accordingly, the simple, northeast dipping homocline shown by Dibblee (2003) is initially deceiving, particularly near the site where several folds and dip reversals occur (Tan, 1991; Weber, 1977; PSE, 2005). Also present are other faults both sub-parallel to and antithetic to the EaF, TMF, MSF and CF. In light of the regional and

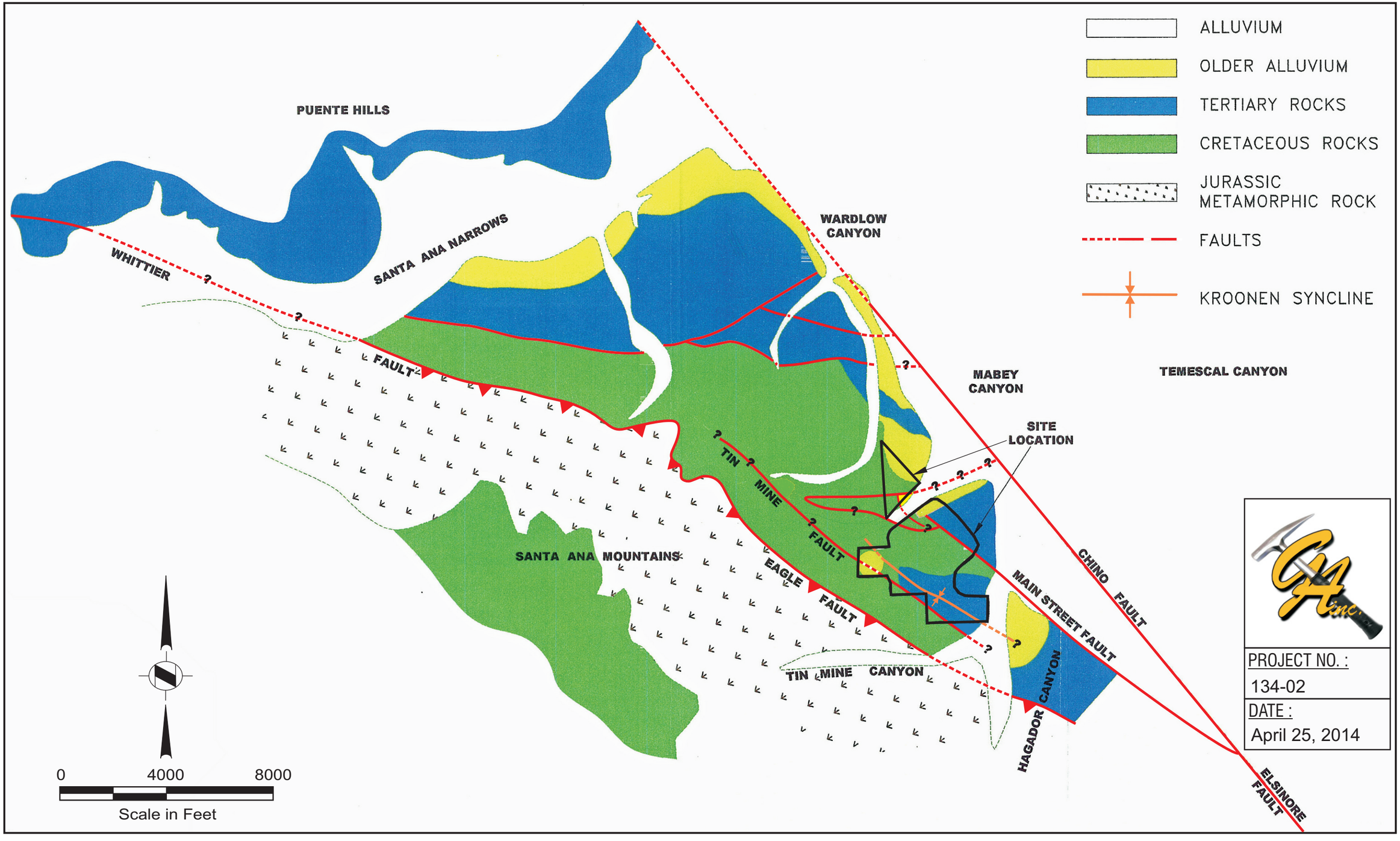


Plate IV
STYLIZED REGIONAL
STRUCTURAL MAP

local structural complexity, and because the MSF and TMF are in A-P Zones, PSE set forth the following interpretation of local geologic structure as it pertains to the location, character and activity levels of on-site faults.

6.1.2 Local Structure:

Rockwell et al. (1986) suggested that 5 to 7 mm/yr. of right slip takes place along the EF segment of the WEFZ. About 2 to 3 mm/yr. slip is transferred to the WF, or is manifested as regional up-warping in the eastern Los Angeles Basin, (Santa Ana Mountains and Puente Hills), with the remainder portioned to the CF (Rockwell et al., 1982). The EF to WF slip is left stepping. According to Weber, 1977; Dolan et al., undated; Gath, 1997; Rockwell et al., 1992; the WF slip component is reflected by displacements of postulated 140,000 year-old fluvial terraces in Santa Ana Canyon northwest and at the Brea Oil Field to the north.

The TMF and EaF segments of the WF are traditionally judged to transfer the slip from the EF to the WF. As, Dibblee, 2003; Tan, 1991; Morton, 1994; Weber, 1977; depict the EaF as the southern segment of the WF. The TMF is typically mapped as an "intermediate" strand, between the northern terminus of the MSF and the southern end of the EaF.

Previous regional geological mapping (Gray, 1961; Gray et al., 2003; Weber, 1977; Tan, 1991) shows different interpretations for fault locations and patterns.

6.1.2.1 Kroonen Syncline:

This previously unrecognized regional syncline trends northwest across the central part of Skyline Heights (Plate IV; Figure 6). The fold is locally overturned to the northeast and plunges to the southeast. It is readily identified by many measurements of attitude (strike and dip), by mapped outcrop patterns, by a particularly evident fossiliferous bed in the Silverado Formation and by the well-defined Holz Shale – Silverado contact (Figure 6). Additionally, PSE (2005) Trenches T3 and T-11 (Plates 2, 5 and 12 through 12b) exposed the hinge line or "core" of the syncline.

The fossiliferous bed(s) marks continuous north and south limbs both on and near the site. The continuous fossiliferous beds are demonstrably unbroken, thus

documenting the absence of northwest-trending faults east of PSE (2005) Trench T-2.

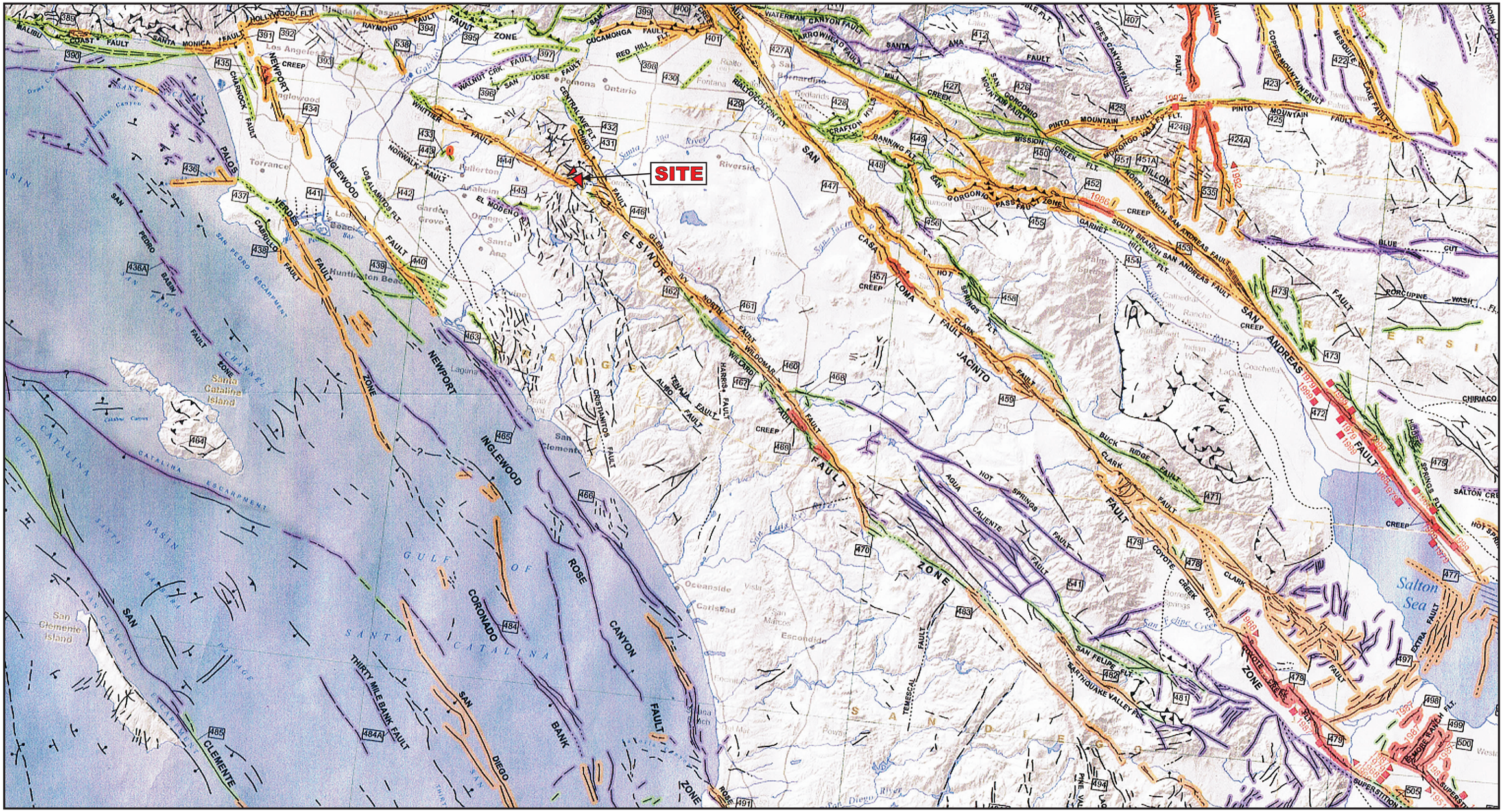
The geometry and stratigraphic position of the Kroonen syncline suggest that considerable compression took place between the EaF and MSF rather than the TMF and the MSF. Much of the south limb of the Kroonen syncline is south of the TMF and adjacent to the EaF, suggesting that, at most, the TMF played only a minor role in syncline formation. The Kroonen syncline is likely an old structure, later exhumed by uplift along the MSF or related faults, or by regional warping. Weber, 1997; Wright, 2001; Lamar, 1992; and McCulloh and other, 2000; demonstrate or posit post-Paleogene and pre-Quaternary deformation, including transpression, in the area now occupied by the Santa Ana Mountains and Puente Hills. Pleistocene-aged older alluvium near the hingeline of the Kroonen syncline (Kroonen deposit) is not folded (PSE T-5 and T-11), and the Mabey Fanglomerate does not exhibit evidence of compressional folding. Therefore, intense folding occurred prior to their deposition.

The aforementioned "anticline" north of Kroonen Canyon is not mapped, but postulated, for massive conglomerate in the Ladd Formation north of Kroonen Canyon yielded few bedding attitudes useful for delineating geological structures. Alternatively, the well-indurated conglomerate north of the canyon may be less amenable to folding than the Holz Shale and Baker Canyon.

Hence, the small faults exposed in Trench T-6 (2005), for example, may attest to brittle deformation rather than the more plastic deformation exhibited by the Holz Shale, Baker Canyon Conglomerate and the Silverado Formation.

6.1.2.2 Holz Shale Geometry

The PSE (2005) geologic map (Figures 1 through 7) differs in the distribution of the Holz Shale and Silverado Formation from earlier maps that depicted a fault bounded "slice" of Silverado Formation "wedged" between the conglomerates and sandstone of the Ladd Formation on the ridge where PSE (2005) Trenches T-3, T-4 and T-11 were placed (Figures 4 and 6)). Likewise, previous investigators interpreted the Holz Shale as locally missing, thereby requiring large horizontal and/or vertical displacement along faults such as the TMF and the "Whittier Fault" as portrayed by Gray et al. (2002). The recent PSE trenching, however based on abundant fossil (Photograph 1) and lithologic evidence, exposed Holz Shale and Baker Canyon Conglomerate underlying most of the ridge; as well as



Source: Portion of C.G.S. Fault Activivty Map
from C.W. Jennings and W.A. Bryant, 2010

Plate V
REGIONAL FAULT MAP OF SOUTHERN CALIFORNIA

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134-02
DATE :
April 25, 2014

the hingeline of the Kroonen syncline (T-11, Station 11+70). Thus presence of the Cretaceous sedimentary rock and Kroonen syncline, and the absence of the Silverado Formation reduce the need for significant slip along the TMF or related faults. Rather, the structural relationships are better explained as normal stratigraphic sequences, as observed in the field. Likewise, similar "basal" clays in the Silverado Formation at clearly depositional contact (McKnight Clay Mine, T-3, T-11) are also present where the TMF is mapped as separating the Silverado Formation from the Holz Shale (T-1, M-11). This relationship also strongly suggests minimal slip, for the basal Silverado is not "faulted out".

A Kroonen syncline and a TMF with small vertical displacement are consistent with mapped geology (Figures 4 and 5). Likewise, an anticline at Kroonen Canyon is also plausible. In sum, the Silverado Formation does not daylight on the north slope of Kroonen Canyon; rather, it crops out north of the canyon, near the MSF.

Additionally, differential erosion of a poorly resistant band of Holz Shale between Cretaceous and Paleocene sand stone and conglomerate apparently gives rise to the strong lineament heretofore usually attributed to Holocene movement on the TMF near and northwest of Kroonen Canyon.

6.1.2.3 Local Faults

Main Street Fault (MSF), as named and mapped by Weber (1977) generally parallels the northeast site boundary (Plate I). The MSF characteristically separates Paleocene sedimentary rocks on the southwest from Pleistocene alluvium on the northeast. Owing to youthful slip along the fault, overlying Holocene deposits are likewise displaced (Weber, 1977; GeoSoils, 2001; Shlemon, 2003, personal communication; Treiman, 2004, personal communication; hence the CGS (2003) placed the MSF in an A-P Zone (Plate I).

The MSF is typified by right-lateral strike slip and "south-side-up" vertical separation (Weber, 1977; Lamar, 1992). PSE (2004) notes stratigraphic and geomorphologic evidence for MSF Holocene slip such as right-lateral deflected drainages, including Bedford and Main Street Canyons. Additionally, northeast-facing spurs (scarps) also mark the fault trace. Two reasonably distinct scarps are particularly evident east of Skyline Heights near Mangular Avenue (Plate III). Pleistocene alluvial fans that emanate from the high order canyons along the mountain front are beheaded by right lateral slip along the MSF, are now cut-off

from their source canyons Plate III) and are elevated above Temescal Canyon floor.

The MSF terminates at or near Mabey Canyon (Weber, 1977) in the northeast corner of Skyline Heights, where both stratigraphic and geomorphic evidence for the fault are "lost" (Plate I; Lineament F, Plate III).

The CGS (2003) maps the "main" branch of the MSF as trending into and terminating near the mesa in the northwest corner of Skyline Heights (similar to Plate I) with the corresponding A-P enclosing the entire mesa. Accordingly, PSE (2005) placed their Trench T-7 on the mesa where it exposed 18 ft. of upper to middle Pleistocene alluvium informally deemed the "Mabey Fanglomerate". The fanglomerate, as logged by PSE (2005), is stratified and capped by a pre-Holocene, unbroken relict paleosol.

The southern contact between the Mabey Fanglomerate and the Ladd Formation is a buttress unconformity of the 2005 PSE report as indicated by the "stepped" contact, lack of shears and presence of Ladd Formation rip-up clasts in the fanglomerate. Therefore, based on the PSE investigation, the "A-P Zoned" MSF is not active at T-7 or passes off-site to the north.

Additionally, PSE's (2005) Trench T-12 (Figure 2) intercepted a fault juxtaposing Ladd and Silverado Formations south of T-7 (PSE Plate 1; Plate 17; Station 4+90). According to PSE (2007). The T-12 fault is traceable across Mabey Canyon based on similar geological characteristics. North of Mabey Canyon, the fault is overlain by un-faulted pre-Holocene deposits and PSE (2007) judged the T-12 fault to be not active according to A-P standards.

Tin Mine Fault (TMF) - Weber, 1977; Gray, 1961; and Gray et al., 2002; mapped the TMF and related faults from about Santa Ana and Wardlow Canyons in the northwest, across Skyline Heights, to Hagador Canyon in the southeast where they die out or "merge" with the EaF (Plate I). The TMF is traditionally identified by the inferred juxtaposition of Mesozoic sedimentary rock on the southwest against Paleocene Silverado Formation on the northeast; and as a bold aerial photographic lineament (Plate III). High-order regional drainages, such as Wardlow, Mabey and Kroonen Canyons seemingly have strong right-lateral deflections usually attributed to slip along the fault. Therefore, the CGS (2003) placed elements of the TMF in an A-P Zone (Plate III).

In order to locate and date last displacement of the TMF, PSE (2005) placed Trenches T-1, T-2, T-3, T-4, T-5, much of T-6, T-8, T-9, T-10, T-11 and T-13, as well as other "checkpoint" backhoe pits, across the mapped or projected trace(s) of the fault. The exploration showed the aerial extent of the Silverado Formation at Kroonen Canyon is less than previously recognized; that a major (Kroonen) syncline sub-parallels the mapped trace of the TMF and that a bed of previously unrecognized Holz Shale extends across the southern part of Skyline Heights, forming the bold northwest-trending lineament usually attributed to the TMF. Importantly, the TMF proved to be less well-defined than previously thought and at Skyline Heights it does not displace upper Pleistocene deposits.

PSE's 2005 Trench T-11 exposed a thick section of Baker Canyon Conglomerate and Holz Shale in its westernmost 1130 ft. (PSE Plates 12A and 12B of 2005)). The contact between the Holz Shale and the Silverado Formation (Station 11+30) is depositional rather than tectonic. Trench T-3 exposed a similar contact (Figure 6; PSE Plate 4 of 2005).

The TMF is identified as a relatively narrow fault dipping steeply to the southwest near Station 7+50 in PSE (2005) T-11 (Plate 12A & Photograph 6). Here, Holz Shale, siltstone and sandstone are probably juxtaposed with the sheared surfaces filled with carbonate. The fault zone, however, has no surface expression, attesting to the likely antiquity.

PSE's Trench T-10 was placed to constrain the location of the TMF (Figure 6; Plate 2 of PSE 2005). Here too, a thick easily recognizable fault zone is absent. Near Station 2+70, however, a sheared zone may be the TMF. Additionally, an overturned local anticline and syncline are identifiable in T-2 and T-11.

PSE (2005) Trenches T-5, T-8, T-9 and T-13 overlap and intersect any reasonable projection of the TMF (Figure 2; Plate 1 of 2005) These trends expose stratified pre-Holocene and unbroken Kroonen deposits (2005 Appendix B), providing positive evidence of the lack of Holocene or latest Pleistocene surface rupture on the TMF.

Eagle Fault (EaF) – Weber (1977) identified the northeast-vergent Eagle Fault (EaF) that characteristically thrusts Jurassic and Cretaceous rocks over Cretaceous and Tertiary sediments along the northeast flank of the Santa Ana Mountains (Plate IV). Gray, 1961 and Gray, et al., 2002 mapped a similar fault south of C-4, south of Tin Mine Canyon. Weber (1977) suggested that most fault movement occurred in Pliocene time, the earliest displacements along the WEFZ. CGS

(2003) did not place the EaF in an A-P Zone. However, local and regional stratigraphic and structural relationships suggest that the EaF has contributed to slip along the WEFZ. For example, basement rock elevation in the Santa Ana Mountains (southwest block up) points to major structural relief. Also, compression in a block between the EaF (rather than the TMF) and the MSF probably gave rise to the Kroonen syncline. And finally, many investigators (Dibblee, 2003; Tan, 1991; Shoellhamer et al., 1981) "connected" the EaF to the south end of the clearly active WF.

Other Faults – Several investigators (Gray, 1961; Weber, 1977; Gray et al., 2002) have either inferred or mapped several other faults on, or near, Skyline Heights. Based on the present site-specific investigation, these faults either do not exist or are pre-Holocene in age. *Evidence points to bedding parallel differential erosion of sandstone and claystone beds in the Silverado Formation as the genesis of lineaments in the Silverado Formation (PSE, 2004, 2005, 2007).*

PSE (2005) demonstrated that the "Whittier Fault" of Gray et al. (2002) does not exist on or near the site. Specifically, the absence of Silverado Formation north of Kroonen Canyon precludes the presence of such a fault. Further, PSE Trenches T-6, T-8 and T-12 that would have intercepted the "Whittier Fault", exposed no significant faults. The Ladd-Silverado contact and key fossiliferous and mudstone beds within the Silverado Formation are unbroken across the mapped trace of the "Whittier Fault". Also, at the McKnight Clay Mine, as exposed in a road cut, the Silverado is in depositional contact with the Ladd Formation.

The 2005 and 2007 PSE trenches intersected many small faults and shears. These however, are not the "so-called" "Whittier Fault", but rather occur near the axial (hinge) trace of the Kroonen syncline. As a class, these faults have displacements less than about one to two feet, are carbonate-filled and healed, and in many places capped by unbroken late Pleistocene soils or weathered surfaces.

Similar small faults and shears, as exposed in the trenches, occur in the hard, brittle conglomerate of the Ladd Formation north of Kroonen Canyon (Figure 5; Plate I of 2005). PSE (2005) T-12 exposes these faults that have small displacements, no obvious lateral continuity, are healed and do not displace late Pleistocene weathered surfaced. Further, they have no surface expression and many "die-out" upward and downward within the bedrock.

6.1.2.4 Age of the Main Street (MSF) and Tin Mine Faults (TMF)

The MSF and faults southeast of Skyline Heights that compose the classic EF segment of the WEFZ are well-documented Holocene (active) structures. For example, at Glen Ivy March, 10 to the southeast, Rockwell et al. (1986) documented five episodes of fault slip in the last 1,000 years, including a large (30-50 cm of vertical separation), post-1660 AD event. Similarly, Vaughan et al. (1999) reported at least four surface fault displacements in the last 3,500 to 4,500 years along the Temecula segment of the EF, about 45 miles southeast of Skyline Heights. Those investigators surmise that the last event was post 1660 AD, and perhaps was the same event as recorded at the Glen Ivy Marsh. PSE (2002, 2003) documented multiple latest Pleistocene and Holocene slip events along the EF at Indian and Horsethief Canyons southeast of Skyline Heights. At those sites, the active fault extended upwards from pre-Holocene sediments through Holocene sediments and finally through modern (Q_{1-2}) alluvium. Hence, one to two feet high scarps mark the active fault. Additionally, flowering upward zone, perhaps 25 to 37 feet wide in upper Pleistocene alluvium, narrowed to 1 to 5 feet wide "active zones". These and similar studies (GeoSoils, 2001; Petra, 1999) southeast of Skyline Heights show that the active splays of the MSF are generally narrow zones that deform upper Holocene strata and even the ground surface. For example, linear scarps and faceted spurs south of Skyline Heights (Plate I) are aligned with and coincident with the mapped MSF. Local tectonic geomorphology thus well marks the MSF.

PSE notes that, in contrast, tectonic geomorphic features indicative of active faulting are absent near Mabey Canyon. This strongly suggests low to nil activity of the MSF in this area. The CGS (2003) thus terminated the MSF and PSE (2005) Trench T-7 clearly supports that conclusion, for it exposed un-faulted upper Pleistocene deposits that cross the mapped trace MSF of CGS (2003), Gray (1961) and Weber (1977). At Skyline Heights the "main" MSF is therefore pre-Holocene according to A-P definition.

The activity level of the TMF near Skyline Heights has been less well documented and thus traditionally more enigmatic than the MSF. PSE (2005) and RMA in a southeast adjacent parcel (Figure 2) demonstrated that the last local displacement of the TMF occurred in pre-Holocene time. These site-specific trench observations are supported by lack of geomorphic evidence for fault "recency"; for example, the ridge immediately east of Tin Mine Canyon is clearly not displaced (Plate III). The apparent linear ridges near the head of Kroonen Canyon result from differential erosion of the erodible Holz Shale that is bounded

by resistant sandstone and conglomerate. Also, the apparent right-lateral deflection of Kroonen Canyon near the mapped TMF appears to be more likely the confluence of three tributaries that follow shale/conglomerate contacts.

Further, the on-site trench exposures and absence of Kroonen and Tin Mine Canyon deflections strongly support the impression that the traditionally presumed large, right-lateral displacement of Mabey Canyon stems from erosion of the Holz Shale rather than recurrent, active faulting.

RMA (2005, personal communication) investigated the TMF in and along the south slope of Tin Mine Canyon (Plate II) and concluded that there is no evidence for a through-going active TMF in either Tin Mine Canyon alluvium or in the canyon wall. Although the RMA "alluvial: trenches did not expose a full Holocene section, <3,500 years bp radiocarbon dates and an underlying slightly developed, buried paleosol document no displacement in at least the past 5-6 ka; time sufficient to have recorded multiple recurrent events characteristic of the active WEFZ as depicted by Rockwell et al. (1986). RMA cuts along the south canyon wall exposed unbroken Ladd and Trabuco Formations and locally overlying Pleistocene terrace deposits, thus stratigraphically verifying either termination of the TMF or its lack of Holocene activity at and new Skyline Heights.

In sum, the Skyline Heights area, the on-site PSE (2004, 2005, 2007) and the near-site RMA investigations demonstrate that the TMF and much of the MSF are not active according to present State of California A-P definition.

6.1.2.5 Local Slip Partitioning

Decreasing slip along the north part of the MSF, including its cessation near Mabey Canyon and the lack of Holocene slip along the southern TMF, create an enigma regarding Holocene surface slip along the local segments of the WEFZ, for the zone is clearly active to the north and south. Skyline Heights is located at or near the zone where slip from the active EF that has included historical and latest Holocene surface rupture (Rockwell, 1995; PSE, 2002, 2003) is transferred to the northwest along the CF and WF. Numerous investigators, including the State of California (Peterson, et al., 1996) suggest that the long-term slip rate along the EF zone is about 5 mm/yr. south of partition to the WF and CF. Rockwell et al. (1992), The Working Group (1995) and Peterson et al. (1996) set forth a slip rate of about 2.5 mm/yr for the WF north of the Santa Ana River. The State of California (Peterson et al., 1996) suggests at least a 1.5 to 2 mm/yr slip

rate for the fault, with the remaining slip being transferred as regional-scale folding or warping in the east and north Los Angeles Basin. Transfer of slip to the WF from the EF traditionally has been judged to be via the TMF and the EaF. Based on the PSE investigations, however, it is not occurring along the TMF.
An academic analysis of this issue is beyond the scope of the PSE investigations and this summary , but information gathered during by PSE and in referenced documents, suggests several explanations.

The presence of a currently unidentified and unstudied active step-over of the MSF east of Skyline Heights in Temescal Canyon cannot be discounted; or perhaps the fault exposed in PSE (2005) Trench T-12 transfered slip from the MSf to westerly faults such as the EaF. However, as deduced by PSE (2007) soil-stratigraphic evidence indicates that slip along that fault ceased before Holocene time. A series of west-northwest faults mapped by Weber (1977), Gray (1961) and Gray et al. (2002) between Mabey and Wardlow Canyons could act as the conduits of surface slip between the MSF and EaF.

Most investigators, including Tan (1991), Dibblee (2003) and McCulloh et al. (2000) identify a nearly west-trending "north branch" of the WF between the CF and the Santa Ana Narrows immediately south of the Santa Ana River. McCulloh et al. (2000) deduce that this branch is more recently active than the traditional "south branch" that ties into the EaF. Similarly, a series of so related west-northwest faults mapped by Weber (1977), Gray (1961), et al. (2002) north of Mabey and Wardlow Canyons could act as the conduits of youthful slip between the EF and WF. This would accommodate reversal of dip slip from northeast-side down south of the Narrows to northeast-side down northwest of the Narrows.

Alternatively, Gray, et al. (2002), Gath (1997, 2002) and Gath et al. (2002) suggest part of the strain deficit between the EF, CF and WF is consumed by up-warping of the Santa Ana Mountains, rather than by discrete fault slip. The phenomenon may be occurring at the EF-WF step-over area near Skyline Heights. It is also possible that northeast-vergent, possibly active thrust faults like that exposed near Fresno Canyon north of Skyline Heights are manifestations of that uplift.

The TMF in essence may therefore be a local fault related to compression between the EaF and MSF, as indicated by the Kroonen syncline, that ceased before the latest Pleistocene time. Possible stratigraphic mismatches along the mapped TMF, such as the differences in the Ladd Formation north and south of

Kroonen Canyon and truncation of the Holz Shale at Tin Mine Canyon, seemingly point to some slip along the fault. Conversely, stratigraphic facies changes and pinch-outs could account for same.

6.2 SUMMARY OF RESULTS OF A-P EFZ INVESTIGATIONS

- Skyline Heights is underlain by bedrock of the Cretaceous Ladd and Paleocene Silverado Formations. These are locally capped with Quaternary alluvium and landslides.

- The California Geological Survey (2003) placed A-P Zones encompassing both Tin Mine and Main Street Faults, both of which encroach onto Skyline Heights.

- Based on literature review, aerial photographic analyses, field mapping and logging of about 6000 lineal feet of fault trenches, PSE assessed that the on-site part of the Tin Mine Fault is *not active* according to A-P definitions.

- In their 2005 investigation, PSE at the time, concluded that the age of last movement along a fault exposed in their Trench T-12 (Figure 2) was unknown, owing to lack of dateable overlying sediments. Accordingly, PSE provisionally placed a habitable structures setback zone for the fault. Later, based on its 2007 investigation, PSE concluded that the fault was traceable across Mabey Canyon where it was overlain by un-displaced pre-Holocene deposts.

- PSE thus recommended removal of the provisional setback zone.

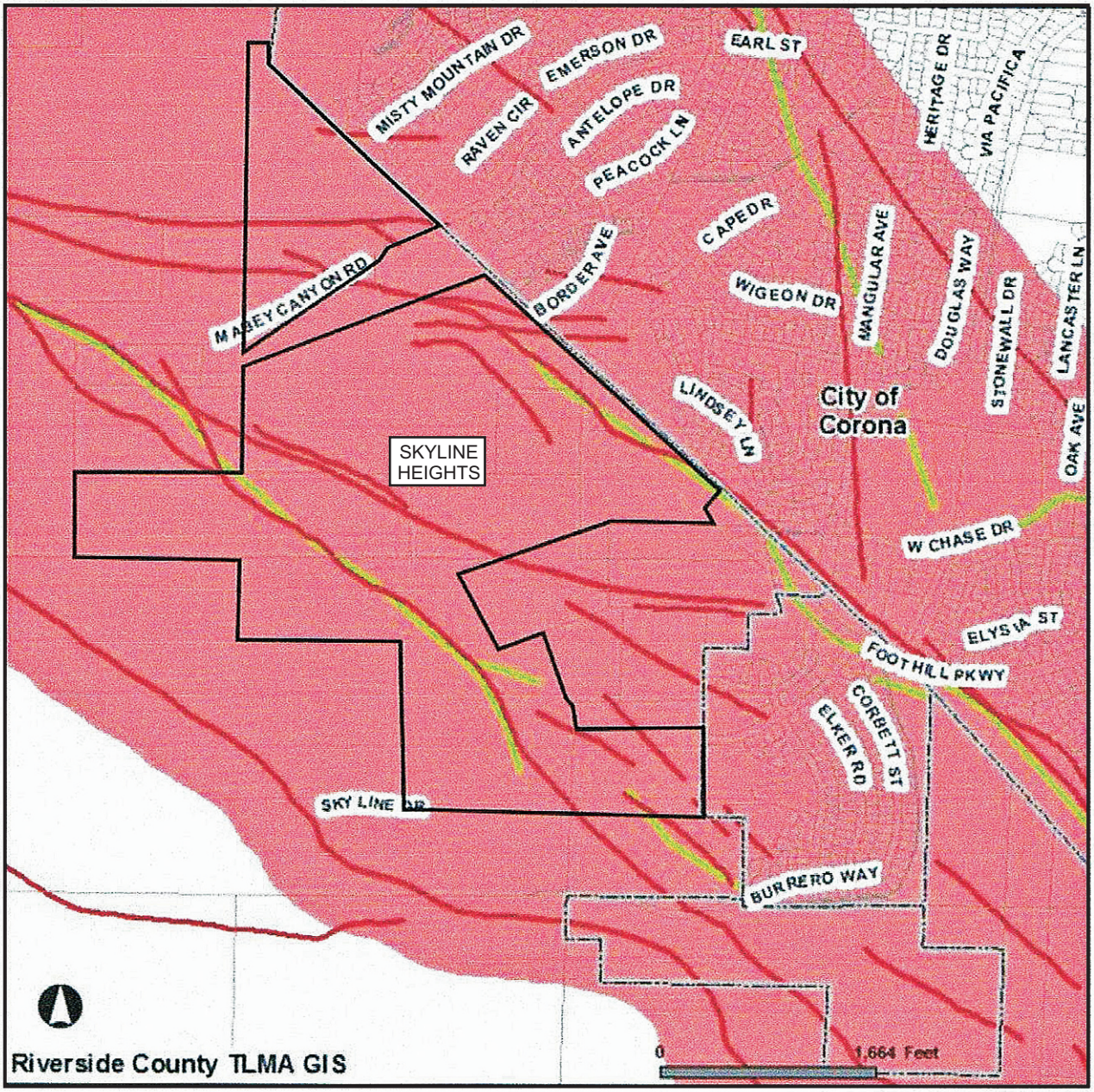
- The A-P trace of the MSF is overlain by un-faulted upper Pleistocene sediments and is thus *not active* at Skyline Heights, thereby precluding habitable structures setbacks.

- Bedding plane faulting associated with the Kroonen syncline is considered remote, because the near-parallel-limbed fold is not actively deforming, but rather is a relic of pre-Holocene deformation and because upper Pleistocene older alluvium is intact where it was observed overlying the bedrock in PSE trenches.

- Skyline Heights is in a region of active uplift and seismogenic faults capable of imparting strong ground motions at the site. Accordingly, to reduce the potential of resultant structural damage, PSE preliminarily recommends post-tensions slabs or some similar foundation reinforcements for design of proposed structures.

- All engineered structures must be designed in accordance with prevailing seismic codes. Likewise, this report is not intended to preclude site-specific geotechnical investigations.

- For future reference, the project geologist should observe and map the site during grading in order to document the absence of active faults; or if same are observed, make recommendations regarding appropriate mitigation.



FAULT ZONES

INTERSTATES
HIGHWAYS
PARCELS
ALQUIST-PRIOLO
RIVERSIDE COUNTY
COUNTY FAULT ZONE
ELSINORE FAULT ZONE
CITY

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Version 111212

Plate VII
RIVERSIDE COUNTY FAULT ZONES SKYLINE HEIGHTS

PROJECT NO. :
134-02
DATE :
April 25, 2014

7.0 Earthquake Hazards

The site is located in southern California, which is a tectonically active area. The type and magnitude of seismic hazards affecting a site are dependent on the distance to the causative fault, as well as the magnitude of the seismic event. The site is similar to most of southern California with respect to hazards associated with earthquakes. A detailed seismic hazard evaluation of the CBC Seismic Design Parameters and Peak Ground Acceleration Data determined utilizing USGS Earthquake Ground Motion Parameters Version 5.1.0 (Revised 2/10/2011) for the subject site is presented in Appendix III. The study reviewed the hazards associated with earthquakes that include primary hazards such as ground-shaking and surface rupture, as well as secondary seismic hazards such as liquefaction, seismic settlement and earthquake induced landsliding and are discussed in the following:

7.1 SEISMICITY

The potential for strong ground motion that affects future improvements is substantial due to the proximity of major active faults.

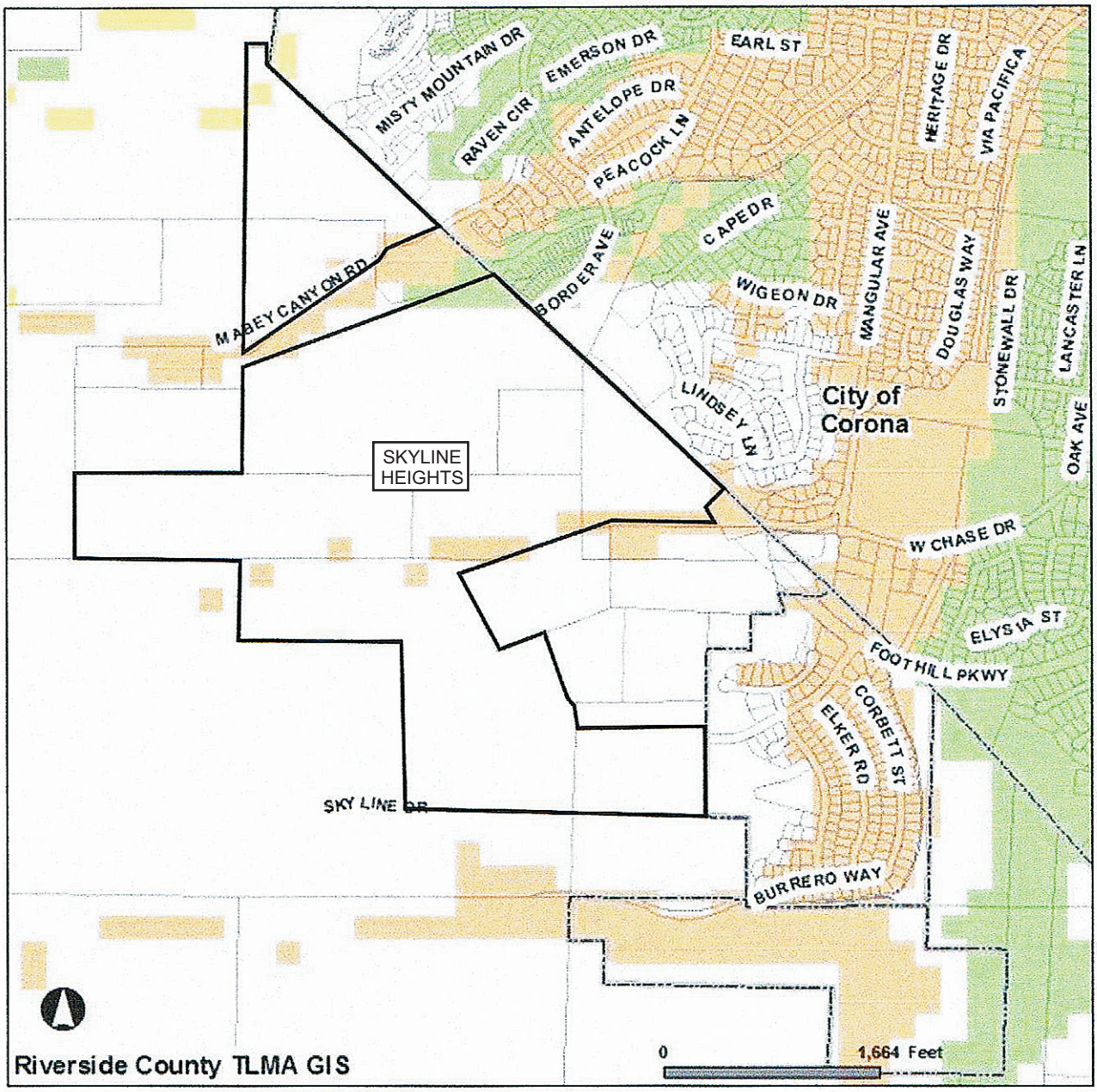
The horizontal ground motion representing 10% probability of exceedance in 50 years (475-year return period) as calculated from the USGS program (Appendix III) is 0.6436 Seismic Design Parameters are also included in Appendix III.

7.2 DYNAMIC SETTLEMENT

The following is a discussion of liquefaction and "dry sand" settlement, which can be associated with large seismic activity.

7.2.1 Liquefaction

Liquefaction is a phenomenon which tends to occur in saturated cohesionless soils during relatively severe earthquake ground motions. In general, during ground motion, saturated sands tend to compact and decrease in volume and if drainage is unable to occur, an increase in pore water pressure may result. If the pore water pressure becomes equivalent to the overburden pressure, the effective stress becomes zero and consequently, the soil loses its strength and is considered to be in a liquefied state. Post-liquefaction effects at a



LIQUEFACTION

INTERSTATES | HIGHWAYS | CITY | PARCELS

Low | Moderate | Very low

"IMPORTANT"
Maps and data are to be used for reference purposes only. Map features are approximate, and are not necessarily accurate to surveying or engineering standards. The County of Riverside makes no warranty or guarantee as to the content (the source is often third party), accuracy, timeliness, or completeness of any of the data provided, and assumes no legal responsibility for the information contained on this map. Any use of this product with respect to accuracy and precision shall be the sole responsibility of the user.

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Plate VIII
RIVERSIDE COUNTY LIQUEFACTION ZONES SKYLINE HEIGHTS

PROJECT NO. :
134-02
DATE :
April 25, 2014

site can manifest in several ways and may include ground deformations, loss of shear strength, lateral spread, dynamic settlement and flow failure.

Liquefaction potential is greatest in loose, poorly graded sands and silty sands with mean grain size in the range of 0.1 to 0.2 millimeters. Other factors that need to be considered are groundwater, confining stresses, relative density, intensity and duration of ground shaking. It is generally accepted that soils possessing clay content (particle size <0.005 mm.) greater than 15 to 20% may be considered non-liquefiable (Southern California Earthquake Center, 1999 and Blake, 1986).

The state of California has not studied the subject area relative to the potential for secondary seismic hazards such as liquefaction or earthquake-induced landsliding. Liquefaction requires relatively shallow groundwater and owing that groundwater is greater than several hundred feet in depth, the likelihood of liquefaction at the site is remote.

The Silverado and Ladd Formations, as well as un-weathered Pleistocene alluvium that underlie the site, are not considered susceptible to liquefaction. Holocene alluvium (Qal_{1-2}), landslide debris (Qls), topsoil and undocumented fills (Af) are potentially liquefiable, if saturated. Considering the recommended removal and replacement of those materials within the proposed development with drained, engineered fills, the susceptibility to liquefaction will be minimal upon completion of grading.

7.2.2 Dry Sand Settlement

Dry sand settlement is a result of earthquake-induced stresses creating strains within partially saturated soils. These strains cause a rearrangement of the soil structure, decreasing the void ratio of the soil, and ultimately creating settlement. The soils that typically are susceptible to dry sand settlement are loose, poorly graded sands and silty sands with mean grain size in the range of 0.1 to 0.2 mm. It is generally held that soils possessing clay content (particle size <0.005mm) greater than fifteen (15) to twenty (20) percent are typically not susceptible to dry sand settlement (Martin and Lew, 1999). Other factors that must be considered are confining stresses, relative density, intensity and duration of ground shaking, previous stress history and the age of the deposits. Based on a review of the data from PSE's subsurface investigation, the potential is considered

remote, provided the proposed design and remedial grading are accomplished as outlined herein.

7.2.3 Fault Rupture Potential

PSE conducted site-specific fault investigations of the Main Street, Tin Mine and seemingly associated faults (PSE 2004, 2005). Those investigations concluded that active faults as defined by Hart and Bryant (1997) do not exist in areas to be developed onsite. However, the age of last movement along a fault exposed in Trench T-12, in the northwest corner of the site is presently unknown owing to lack of dateable overlying sediments. Accordingly, PSE and this firm provisionally placed a habitable structures setback zone for the fault until such time when additional investigation may be undertaken. This is a conservative interpretation because the fault has no surface expression and its length is limited based on the un-faulted strata observed in the north-central part of the site south of Mabey Canyon. PSE (2005) also concluded that the A-P trace of the MSF is clearly overlain by un-faulted upper Pleistocene sediments near Mabey Canyon and is thus, not active at least in the northwest part of the site south of Mabey Canyon, thereby precluding the need for habitable structures setbacks there.

7.2.4 Earthquake Induced Landsliding

Owing to the steep natural slopes and, very locally, adverse bedding angles, the potential for earthquake-induced landsliding exists. Upon accomplishment of the remedial grading recommended in this report, seismically induced landsliding is not anticipated to negatively impact improvements on this project.

7.2.5 Seiches

A seiche is a free or standing wave oscillation on the surface of water in an enclosed or semi-enclosed basin. The wave can be initiated by an earthquake and can vary in height from several centimeters to a few meters. Because of the lack of elevated large basins in the project's vicinity, the potential for a seiche impacting the property is considered to be non-existent.

7.2.6 Other Potential Seismic Hazards

Other potential water-related hazards stemming from seismic activity include tsunamis and flooding resulting from dam failure. These are not considered likely, owing to the location of the site relative to potential sources.

7.3 MINERAL RESOURCES:

Previous prospecting of potential clay resources was carried out in the central portion of the site. The last date when prospecting or extraction took place on-site is not precisely know, but it was prior to 1950 (Gray, 1961), with most near the beginning of or before the 20th century. No active oil or gas wells exist and no mining of the gravels and/or sand has occurred to date. No other mineable resources are known to exist at the site. This firm understands that aggregate companies have explored on-site conglomerates, but found no evidence of mining development for sand or gravel.

7.4 OTHER POTENTIAL GEOLOGIC HAZARDS:

This portion of southern California is not susceptible to volcanic hazards such as lava flow. Land subsidence as a result of groundwater extraction would not affect this site, which is underlain by bedrock.

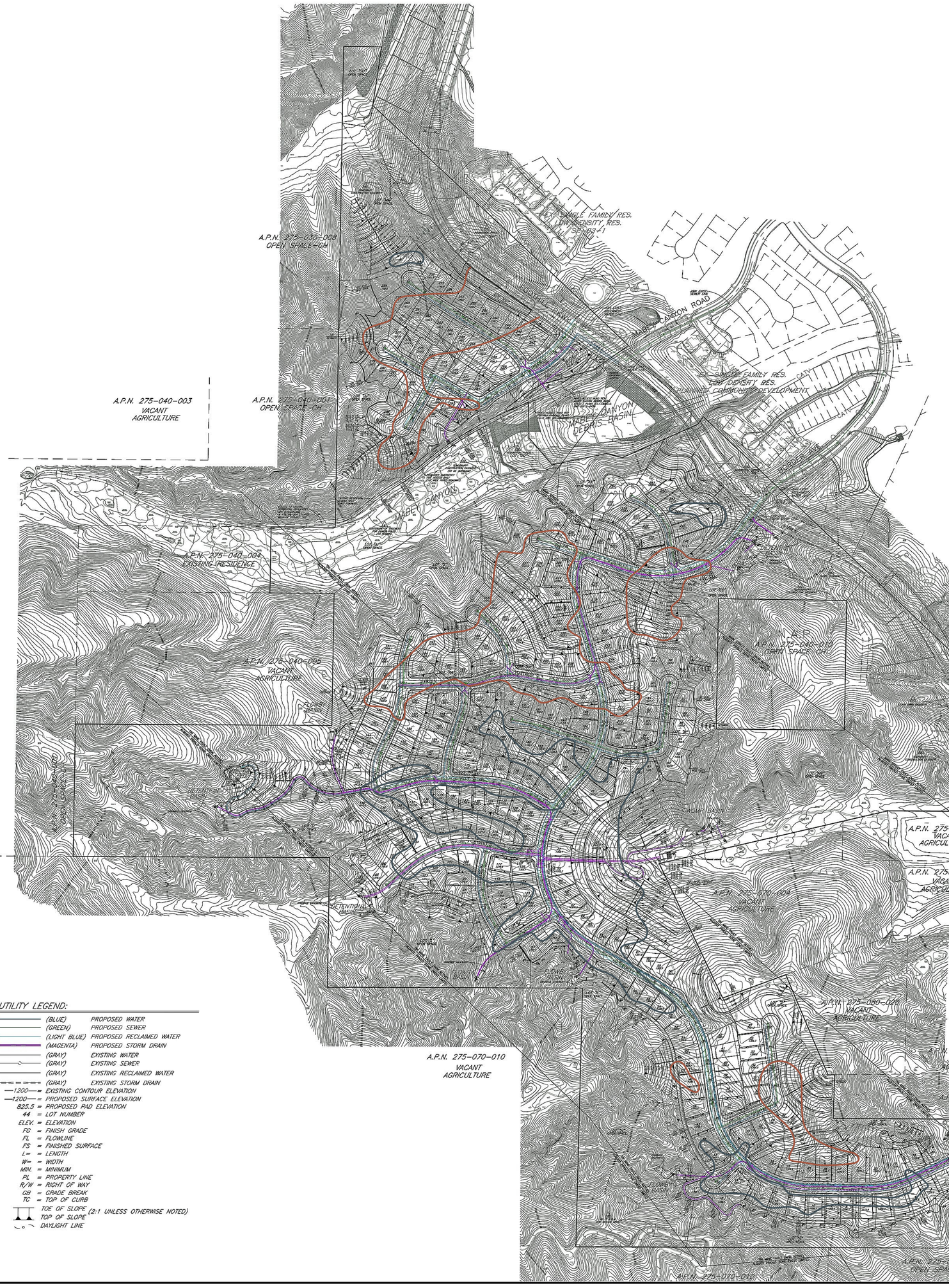
8.0 Material Properties:

8.1 RIPPABILITY:

The topsoil, undocumented artificial fill, landslide material, alluvium and older alluvium should be readily excavatable with conventional earth-moving.

The Silverado and Ladd formations underlying Skyline Heights are indurated, but have a seemingly upper weathered zone that yields rock amenable to dislodgement with a Caterpillar D-9 or equivalent bulldozer. However, the seismic refraction survey revealed that excavation difficulty is expected to increase with depth and very heavy ripping should be anticipated to attain design grades, especially in the northwesterly portion of the tract underlain by Ladd Foundation conglomerate (Klc). Sixteen (16) shallow seismic refraction lines were conducted for the PSE's investigation. Preliminarily, this data suggest that the rock is rippable to a depth of at

SKYLINE HEIGHTS - TENTATIVE TRACT MAP NO. 36544
IN THE CITY OF CORONA



EXPLANATION

AREAS OF FILL GREATER THAN 50' IN DEPTH

AREAS OF CUT GREATER THAN 50' IN DEPTH REQUIRING HEAVY RIPPING AND/OR BLASTING

UTILITY LEGEND:

———	(BLUE)	PROPOSED WATER
———	(GREEN)	PROPOSED SEWER
———	(LIGHT BLUE)	PROPOSED RECLAIMED WATER
———	(MAGENTA)	PROPOSED STORM DRAIN
———	(GRAY)	EXISTING WATER
———	(GRAY)	EXISTING SEWER
———	(GRAY)	EXISTING RECLAIMED WATER
- - -	(GRAY)	EXISTING STORM DRAIN
—1200—	= EXISTING CONTOUR ELEVATION	
—1200—	= PROPOSED SURFACE ELEVATION	
825.5	= PROPOSED PAD ELEVATION	
44	= LOT NUMBER	
ELEV.	= ELEVATION	
FG	= FINISH GRADE	
FL	= FLOWLINE	
FS	= FINISHED SURFACE	
L=	= LENGTH	
W=	= WIDTH	
MIN.	= MINIMUM	
PL	= PROPERTY LINE	
R/W	= RIGHT OF WAY	
GB	= GRADE BREAK	
TC	= TOP OF CURB	

TOE OF SLOPE (2:1 UNLESS OTHERWISE NOTED)
TOP OF SLOPE
DAYLIGHT LINE

REVISED
February, 2018
Plate VI
AREAS OF DEEP FILLS AND CUTS

PROJECT NO. :
134-02
DATE :
May 20, 2013

PREPARED BY:

KWC ENGINEERS
CIVIL ENGINEERS • PLANNERS • SURVEYORS
1880 COMPTON AVENUE, SUITE 100 CORONA, CA. 92881-3370 951-734-2130

JN 13.134.1 R:\13134.1\PRELIM\GRADING EXHIBIT\SITE GRADING EXHIBIT-36-11.DWG

least 45 to 50 feet. Some of the borings encountered refusal or difficult coring. Cuts up to 130 feet, not including utility trenches, are proposed. Therefore, it is likely that excavating during grading will also encounter ledges and zones of extremely hard rock that may require blasting, particularly in the areas designated on Plate VI. Both the boring and seismic line information indicate that trenching with conventional trenching equipment will be extremely difficult in bedrock.

It should be anticipated that oversize rocks will be generated in the deeper cuts and locally in shallow cuts. Special disposal will likely be required. Typically, deep fills have been used to accommodate oversize rocks and boulders. Onsite rock crushing operations have been employed on similar developments producing large quantities of oversized rock.

8.2 HYDRO-CONSOLIDATION

The hydro-consolidation process is a response to the introduction of water into collapse prone alluvial/colluvial soils or landslide materials. Upon initial wetting, the soils structure and apparent strength are altered and a virtually immediate settlement response occurs. Given that all loose, dry, alluvial and landslide materials will be removed within the project limits and replaced as compacted fill as discussed in Section 9, it is our opinion that hydro-collapse will not significantly affect the subject site.

8.3 COMPRESSIBILITY

The onsite materials that are compressible include weathered surficial soils, existing non-engineered artificial fill, colluvium/alluvium, weathered landslide deposits and weathered bedrock. Compressible materials, will require removal from fill areas prior to placement of fill and where exposed at grade in cut areas. Recommended removal depths are presented in Section 9, and earthwork adjustment estimates are presented in Section 9, below.

8.4 EXPANSION POTENTIAL

Based on the laboratory tests performed during this investigation by PSE, it is anticipated that the majority of onsite soils would classify as "very low" to "medium" in expansion potential according to Table 18-I-B of the 1997 UBC. However, portions of the Silverado Formation could produce materials ranging from very high to critical in expansion potential.

8.5 SHEAR STRENGTH CHARACTERISTICS

The following table presents a summary of "averaged" shear strength parameters obtained from the data collected during the subsurface investigation by PSE.

TABLE 9.1		
Material Description	***Cohesion (PSF)***	***Friction Angle, Φ (Degree)***
Compacted Fill	300	35
Bedrock-Silverado Formation (Tsi)	800	32
Bedrock-Ladd Formation (Kle, Klbe, Klh)	250	40
Along Bedding (Residual Strength)	100	20

8.6 EARTHWORK ADJUSTMENTS

The onsite materials are anticipated to shrink and bulk to varying degrees when removed and re-compacted as structural fill. The values presented in Table 9.2 are deemed appropriate for estimating purposes and may be used in an effort to balance earthwork quantities. these values may be used in conjunction with the enclosed geotechnical maps when evaluating the various geologic units. These shrinkage estimates should be applied to the cut volume, as well as the materials removed, as part of the remedial grading. In addition, subsidence of 0.1 feet should be used to estimate the consequences of processing removal bottoms. As is the case with every project, contingencies should be made to adjust the earthwork balance when grading is in progress and actual conditions are better defined.

TABLE 9.2		
Geologic Unit	***Approximate Range (90% fill zone)***	***Approximate Range (93% fill zone)***
Alluvium/Colluvium (Qal/Qcol)	12% shrinkage	
Silverado Formation (Tsi)	5 to 7% bulk	
Ladd Formation (Kle, Klbe, Klb) Rippable Blasting	 12 to 15% bulk 18 to 20% bulk	 10 to 12% bulk 15 to 18% bulk
Existing Fill (afu)	10% shrinkage	12% shrinkage
Landslide (Qls)	10% shrinkage	10% shrinkage

8.7 CHEMICAL ANALYSES

Soluble sulfate tests presented by PSE indicate that the soluble sulfate concentrations of the onsite materials are less than 0.1%. As such, soluble sulfate potential for the majority of onsite soils in this phase can be classified as "negligible" in accordance with Table 19-A-4 of the 1997 UBC. Resistivity and pH tests by PSE indicate that the onsite soils are "mildly corrosive" to "corrosive" to buried ferrous metals when classified by the criteria presented by the National Association of Corrosion Engineers (NACE, 1984).

9.0 Earthwork Conclusions and Recommendations

Based on the data compiled from recent exploratory studies and from the referenced reports with respect to the subject 100-scale Tentative Tract Map, it is our opinion that the subject site is suitable for the proposed development, provided the recommendations presented herein are incorporated in the design and construction of the proposed improvement.

9.1 SITE PREPARATION AND REMOVALS

All grading shall be accomplished under the observation and testing of the Project Geotechnical Engineer and Engineering Geologist in accordance with the recommendations contained herein,

the current codes practiced by the City of Corona and this firm's **Earthwork Specifications** (Appendix IV).

Loose, compressible residual soil, non-engineered onsite fill, colluvium, alluvium, landslide debris, older alluvium and weathered bedrock should be removed from fill areas prior to placement of fill and should be removed from shallow cut areas, where exposed at finish grades. Guidelines to determine the depth of removals are presented below; however, the exact extent of the removals must be determined in the field during grading, when observation and evaluation of the greater detail afforded by those exposures can be performed by the Geotechnical engineer and/or Engineering Geologist.

The minimum backcut ratio is 1:1 (horizontal to vertical). The bottoms of all removal areas should be observed, mapped and approved by the Engineering Geologist prior to fill placement. It is recommended the bottoms of removals be surveyed and documented by the Project Civil Engineer.

Groundwater, if encountered during grading, should be evaluated by the Geotechnical Engineer and/or Engineering Geologist. In general, groundwater is not anticipated to adversely affect grading although saturated soils and free water may be encountered along canyons and within alluvium removals. If groundwater is excessive, remedial measures such as horizontal drains or under drains may need to be installed. Further, settlement monuments and plates (see Plate VI) will need to be installed during and after completion of grading to monitor settlement monuments and plates will be used to determine when the majority of the primary settlement has been completed to allow for the release of affected lots for construction.

9.1.1 Stripping:

Vegetation, debris and other deleterious materials are unsuitable as structural fill material and should be disposed of offsite prior to commencing removals and placement of compacted fills. The thick, natural vegetative growth onsite is significant and will require consideration for removal. An onsite mulching operation may be considered. The mulched materials could then be used in future landscape areas.

9.1.2 Soil and Weathered Bedrock (unmapped):

Loose, compressible onsite soils and underlying weathered bedrock should be removed to expose the underlying competent bedrock materials prior to placement of compacted fill and when exposed in shallow cut area. An average removal depth of 5 feet is anticipated

for removal of topsoil and weathered bedrock. In general, onsite soils and weathered bedrock are suitable to be re-used as structural fill when properly moisture-conditioned.

9.1.3 Undocumented Artificial Fill (locally mapped as afu):

Fills associated with "recreational" grading, construction of unpaved access roads, mining operations and existing trench backfill should be removed prior to fill placement. Generally, these artificial fills range from a depth of 3 to 20 feet. Local areas of undocumented fill associated with previous geotechnical investigations are not plotted on the map. Other fills, including roadway fills and trench backfill, are not mapped due to their localized extent and minor thickness. Removals should extend below the undocumented fill until competent materials are encountered.

9.1.4 Alluvium/Colluvium (map symbol Qal)

All alluvium deposits exposed at existing or cut grades should be entirely removed prior to fill placement. These deposits range in thickness from approximately 5 feet to 35 feet. G & A recommends that all alluvial and colluvial soils below proposed fill areas and in cut areas, be removed to expose competent bedrock or terrace deposits. Anticipated average removal depths for alluvium/colluvium areas are expected to vary to an estimated maximum thickness of 35 feet.

Groundwater was not encountered during PSE's subsurface investigation within the alluvium onsite. However, access was limited and certain alluvial areas could not be investigated such as within Krooner Canyon. If "saturated" alluvium is encountered that possesses a degree of saturation of 85% of more and is consistent with depth to bedrock, consideration may be given to leaving the saturated alluvium in-place, provided that settlement time-delay consequences are acceptable to the owner. If saturated alluvium is encountered and is going to remain in-place, an additional liquefaction investigation may be required and dynamic settlement recommendations for those areas will likely change.

9.1.5 Older Alluvium (Qoa)

All older alluvium should be removed to expose the underlying competent bedrock. Generally, these deposits range in depth from 10 to about 20 feet.

9.1.6 Landslide Debris (Qls)

All landslide debris that could adversely affect the proposed development should be removed to expose the underlying competent bedrock. Generally, these deposits range in depth from 10 to about 29 feet, but may range up to around 35 feet in depth.

9.1.7 Removals Along Grading Limits

Removals of unsuitable soils will be required prior to fill placement along the grading limit. A 1:1 projection, from toe of slope or grading limit, outward to competent materials should be established, when possible. Where removals are not possible due to grading limits, property line or easement restrictions, removals should be initiated at the grading boundary (property line easement, grading limit or outside the improvement) at a 1:1 ratio inward to competent materials. Where this reduced removal criterion is implemented, special maintenance zones may be necessary. Affected areas will be established, minimally, as a 1:1 projection from suitable removal bottom to finish ground surface. This condition is mainly expected in the slope areas. Where the projection intersects the face of the slope, the potential for distortion of the slope in response to post-grading settlements exists and provisions for future maintenance of such slopes should be provided.

9.2 SLOPE STABILITY AND REMEDIATION:

9.2.1 Analytical Methods:

Slope stability analyses were performed for the proposed highest cut slope (Section 1-1'), highest fill slope (Section 2-2'), buttressed slope (Section 3-3'), highest ascending natural slope (Section 4-4'), highest descending natural slope (Section 5-5'). Temporary backcut conditions for buttressed slopes as shown on Section 3-3' was also analyzed. Shear strength parameters established and used in 2006 analyses by previous consultant Pacific Soils Engineering, Inc. were utilized in our analyses. The slopes were analyzed by calculating the factors of safety for circular-type failures using the Modified Bishop's Method and block-type failure surfaces using Modified Janbu Method. GSTABL7, a computer program developed by Mr. Garry H. Gregory was utilized to evaluate slope stability factors of safety under static and pseudo-static conditions. For pseudo-static analyses, a horizontal seismic coefficient of 0.15g was utilized for the critical failure surfaces on each cross-section analyzed.

The shear strength parameters used in the analyses and the results of the stability analyses are provided in Appendix II. The results of the stability analyses indicate that the proposed slopes will provide factors of safety greater than 1.5 and 1.1 under static and pseudo-static conditions, respectively, conforming to the City of Corona standards and are acceptable as planned. Similarly, the factors of safety for the temporary back-cut conditions also meet the required safety factor of 1.25 or greater.

Surficial stability analyses were also performed for the cut and fill slopes at 2H:1V gradient. The surficial stability analyses are based on the Infinite Slope Method considering submerged slope condition to a depth of 4 feet and the results are included in Appendix II. The factors of safety for surficial stability are greater than the required safety factor of 1.5 and the proposed slopes are considered surficially stable.

9.2.2 Cut Slopes

The majority of cut slopes have been designed at a slope ratio of 2:1. The following is an analysis of cut slopes within the various geologic units onsite. The Engineering Geologist should observe cut slopes and cut slope stabilization backcuts during grading. Modifications to the recommendations presented herein will likely be required based upon conditions exposed by grading.

9.2.2.1 Williams Formation (KW)

Cut slopes within the Williams Formation may expose adverse bedding that will require remediation. The cut slope superjacent to Lots 278 and 279 is anticipated to require replacement with a buttress fill. Calculations for this buttress are presented in Appendix II (cross section 3-3').

Probable buttresses are anticipated for the cut slope above Lots 261 through 267 and the cut slope below the WQMP Basin and Lots 247 through 255, as depicted on Figure 1 and Figure 2 (pocket).

9.2.2.2 Ladd Formation

Cut slopes within the Ladd Formation may expose adverse bedding that will require remediation. The majority of the cut slopes should expose bedding dipping into the slope or at an angle steeper than the proposed cut slopes (greater than 60 degrees). G & A has analyzed the highest 2:1 cut slope for a cross-bedding condition (approximately 160 feet) and the results are present in Appendix II. Cut slopes within the Ladd Formation that expose bedding dipping into the slope or at an angle steeper than the proposed cut slopes are expected to

be grossly stable; however, the final determination should be made based on exposed conditions during grading.

Cut slopes within the Ladd Formation may expose conglomerate resulting in poorly cemented sands, cobbles and boulders at finish grade, producing a rough uneven surface. These cut slopes should be evaluated in the field by the Project Engineering Geologist or Geotechnical Engineer. Replacement of those slopes with compacted stabilization fills may be required.

Future exploration and in-grading observation could reveal more favorable geology in these specific areas.

9.2.2.3 Alluvium/Colluvium:

Cut slopes exposing alluvial/colluvial soils (Qal) will require replacement with a drained stabilization fill. Typically, such corrective grading will be constructed with a minimum key width corresponding to one-half the full height of the superjacent slope, but not less than 15 feet. Minimum key depths at the toe will be 2 feet. All stabilization fills should be provided with a backdrain and outlet system as detailed in Appendix IV.

9.2.2.4 Silverado Formation:

Cut slopes within the Silverado Formation are expected to be grossly stable; however the final determination should be made based on exposed conditions during grading. Cut slopes within the Silverado Formation may expose poorly cemented sands, cobbles and boulders at finish grade, which would produce a rough uneven surface. These cut slopes should be evaluated in the filed by the Project Engineering Geologist or Geotechnical Engineer. Replacement of those slopes with compacted stabilization fills may be required.

9.2.3 Fill Slopes:

The majority of fill slopes on the project are designed at a maximum slope ratio of 2:1. The highest fill slope is approximately 160 feet in height and located subjacent to Lot 68. G&A performed a slope stability analysis of this slope and the results are present in Appendix II. Based on the results of the calculations, the 2:1 fill slopes 160 feet and less in height, when properly constructed with onsite materials, are expected to be grossly stable, as designed.

Keys should be constructed at the toe of all fill slopes where unsuitable soil removals do not accomplish a minimum key width of one-half the slope height plus bench widths or twenty (20) feet, whichever is greater. Minimum key depths at the toe should be 2 feet. Due to grading limit restrictions, removals of unsuitable soils beyond the proposed toe may be limited; therefore, additional slope maintenance should be expected in the areas where a 1:1 projection into approved materials cannot be achieved.

9.2.4 Natural Slopes:

Ascending and descending natural slopes exist within the site that range in height up to approximately 200 feet with slope ratios from 2:1 to locally 1.2:1. Stability analyses of the highest ascending slope of 160 feet above Lot 4 indicates a factor-of-safety in excess of the code minimums (see Appendix II).

9.3 SUBSURFACE DRAINAGE:

Canyon subdrains are proposed as depicted on Figures 1 through 7 and will consist of 6" and 8" diameter pipes and will be constructed in accordance with the details shown in Appendix IV. Final determination of drain locations will be made in the field. Outletting of subdrain systems will require coordination with the Project Civil Engineer in determining suitable facilities to accept to drain water.

9.4 OVEREXCAVATION:

Where a transition of cut and fill occurs across a finished lot, it will be necessary to overexcavate the bedrock portions and replace it with compacted fill. The depth of bedrock overecavation should be equal to 1/3 the maximum fill depth (after removals) on the fill side of the transition. Anticipated transition lots are shown on Figures 1-7.

We recommend the cut pads be overexcavated a minimum of 5 feet to provide a uniform foundation material. Some highly expansive soils of the Silverado Formation may be encountered at grade in some areas. Consideration should be given to increasing the overexcavation depth to mitigate for highly expansive soils, if warranted.

Difficult excavation with a backhoe can be expected in some street areas. We recommend street overexcavation and replacement with compacted fill to facilitate utility emplacement in these street areas and driveways. Depths of overexcavation should extend one (1) foot below the deepest utility line.

9.5 FILL MATERIALS:

a) The excavated on-site soils may be used as compacted fill. The fill materials to be used as compacted engineered fill should be free of organics, debris, deleterious materials, and rocks over 6 inches maximum dimension, and must be approved by the Project Geotechnical Engineer or Project Geologist prior to use.

b) Import soils, if required, should be evaluated by the Project Geotechnical Engineer for suitability prior to delivery. Import soils should be free of trash, debris or other objectionable materials. All import fill should have engineering characteristics similar to the on-site soils.

9.6 FILL PLACEMENT, MOISTURE CONDITIONING, AND COMPACTION:

After approval of the over-excavation and prior to placement of any compacted engineered fill materials, the exposed removal bottoms should be scarified to a minimum depth of six (6) inches. The area should then be moisture conditioned approximately 1 to 2 percentage points above the optimum moisture content, and compacted to a minimum of 90 (or 93) percent of the applicable maximum density.

The planned development will involve deep fills in the canyon areas and side-hill fill slopes. In order to reduce the amount of fill settlement, the fill should be compacted to the minimum relative compaction shown below:

Fill Depth (Feet)	Minimum Relative Compaction (ASTM: D1557) (%)
0 – 50	90
Below 50	93

Fill slopes should also be constructed at the minimum relative compactions shown above, with the exception of the outer 3 feet of the slope face which can be placed at 90% relative compaction. Deep fill areas requiring 93% relative compaction are delineated in Plate VI.

Generation of oversized rock (over 8 inches in maximum dimension) from excavations in the bedrocks should be anticipated. Oversize rock may be placed in single file windrows not exceeding three feet in height and six (6) feet in width with a minimum equipment width (15 feet) separating each windrow or a rock blanket fill not exceeding two (2) to three (3) feet in height. Large erratic rocks should be buried individually. Granular fill should be thoroughly flooded in the rock voids and covered with a minimum two feet compacted fill blanket. Successive windrows should be staggered and none should be placed within 10 feet of finished grade or closer than 15 feet to compacted fill slope surfaces. Typical rock placement construction detail is provided in Appendix IV. Placement of rock windrows must be performed under the observation and recommendations of the Project Geotechnical Engineer.

Fill materials should be spread in thin lifts, moisture conditioned to about 1 to 2 percentage points over optimum moisture content and compacted to a minimum of 90 (or 93) percent of the laboratory maximum dry density as determined in accordance with ASTM Test Method D-1557. Each lift should be treated in a like manner until the desired finished grades are achieved. The grading contractor should have suitable and sufficient compaction equipment in operation to achieve the required compaction. When necessary, earthmoving equipment may be utilized for compaction or temporarily halted in order to permit adequate compaction of fills.

9.7 SLOPE CONSTRUCTION:

1. Care should be taken during grading to prevent spillage of loose materials over slopes to remain natural. Should loose soil be spilled onto natural slopes by the grading contractor, removal of the loose fill will be required.

2. Fill should be properly benched into firm bedrock or compacted fill as directed by the Project Engineering Geologist and/or Geotechnical Engineer during grading. Typical benching should include 4-foot verticals exposing approved, competent material (see Appendix D – Typical Benching Detail).

3. In order to minimize surficial slumps on compacted fill slopes, the following grading procedures should be used:

a) Where possible, fill slopes should be constructed by overfilling a minimum of three (3) horizontal feet and then trimming back to expose the dense inner core of the slope surface. Compacted fill slopes should be back-rolled during construction at intervals not exceeding four (4) vertical feet. Care should be taken to construct the slope in a workmanlike manner so that it is positioned at its designed orientation and slope ratio.

Achieving a uniform slope surface by subsequent thin wedge filling must be avoided. Any add-on correction to a fill slope should be done by overfilling the affected area in horizontal, compacted lifts which must be benched into the existing fill prism. The overfilled slope may then be trimmed to the design gradient.

b) Where fill slopes are planned above natural slopes and cannot be overfilled and trimmed back, the slopes should be rolled for the entire height of the slope with a sheepsfoot roller and then finished with a grid roller. If the desired compaction is not obtained in this manner, a vibratory sheepsfoot roller may be required. To be most effective, this equipment should be anchored and manipulated from a side-boom tractor. In lieu of a grid roller, the slope may be track rolled with a John Deere 450, Caterpillar D-8 dozer or equivalent. To obtain the required compaction and appearance of the slope face, the soil moisture should be maintained at above optimum from the time of mass filling to the completion of grid rolling.

c) The grading contractor must take proper care to avoid spillage of loose material down the face of the slopes during grading and during drainage terrace and down-drain construction. Fine grading operations for benches and down-drains should not deposit loose trimmed soils on the finished slope surfaces. Loose soil materials will require removal.

d) Seeding and planting of slopes should proceed as rapidly as possible to achieve a well-established and deep-rooted vegetal cover requiring minimal watering. The type of vegetation and watering schedule should be established by a landscape architect familiar with hillside maintenance.

9.8 EARTHWORK OBSERVATIONS AND TESTING:

a) The site preparation, over-excavation, and earthwork should be performed under the observation and testing by a representative of the Project Geotechnical Engineer or Project Geologist.
b) The fill should be tested at the time of placement to verify that the required compaction is achieved.
c) The fill compaction should be determined in the field by the Sand Cone Method (ASTM: D 1556) or Nuclear Gauge Method (ASTM: D 2216), or other test method approved by the Project Geotechnical Engineer.
d) During grading, an adequate number of field density tests should be performed using approved test procedures in order to determine compliance of earthwork to the project requirements. The frequency of field density testing should be in accordance with the recommendations of the Project Geotechnical Engineer.
e) Quality control testing performed to determine the acceptability of the fill compaction should be based on the laboratory maximum dry density and optimum moisture content determined in accordance with ASTM: D 1557 test procedure.
f) Any surface or subsurface obstructions, or questionable materials encountered during grading should be brought immediately to the attention of the Project Geotechnical Engineer. Deeper excavations may be required, should unsuitable soils be encountered locally, as determined by the Project Geotechnical Engineer and/or Project Geologist.

9.9 DEEP FILL SETTLEMENT MONITORING:

The planned development involves grade cuts in the higher elevations and fill placement in the lower portions of the site area. The maximum depth of proposed canyon fill is approximately 138 vertical feet. The areal loading from fill placement will cause settlement due to the compressibility of the fill materials. The magnitude of settlements would depend on the thickness of fill and the compressibility characteristics of fill materials. Considering the maximum fill depth and anticipated consolidation characteristics of the fill materials, the compacted fill may settle on the order of 6 to 8-inches. Due to the granular nature of the site soils, the majority of this settlement will occur during grading operations and long-term secondary settlement would be negligible.

In deep fill areas, settlement monuments should be installed and periodically surveyed by the Project Civil Engineer to evaluate the magnitude and progress of settlements. *We propose positioning settlement monuments at strategic locations in the deeper fill areas as shown on Figure VI. These will be monitored on a regular basis until the primary settlement has stabilized before those areas released for construction*

9.10 FOUNDATION DESIGN:

The compacted engineered fill at the project site is anticipated to be low to medium soil expansion potential. Presented below are preliminary geotechnical criteria for design of building foundations, based on medium soil expansion potential for the on-site soils:

Option 1 - Conventional Footing

Allowable Bearing Pressure (1)	=	1,500 psf
Minimum Footing Depth (2)	=	24 inches
Minimum Footing Width	=	Continuous: 12 inches Isolated: 24 inches
Passive Soil Pressure (3)	=	250 psf/ft.
Friction Coefficient	=	0.30 (ultimate)
Minimum Footing Reinforcement	=	Four No. 4 bars, 2 each at top and bottom
Garage Door Grade Beam	=	18 inches deep, Four No. 4 bars, Two each at top and bottom, tied into foundation elements.

(1) The above value may be increased 250 lbs./sq.ft. for each additional foot exceeding the minimum embedment depth and/or width, subject to a maximum of 2,500 psf. Allowable bearing pressures may be increased by one-third for short term loading due to wind or seismic forces.

(2) Footing depth is from lowest adjacent finished soil grade. Footings should be deepened, as necessary, to provide setback distance from adjacent slope in conformance with CBC criteria.

(3) Value applies to level soil condition, and is subject to a maximum of 2000 psf.

Option 2 – Post-Tensioned Foundation

If post-tensioned slab/footing system is selected for the subject project, the design may be based on the geotechnical criteria shown below for medium soil expansion potential. These are based on the guidelines presented in the PTI, Third Edition design manual.

Thornthwaite Moisture Index	=	-20	
Equilibrium Suction	=	3.6	
Edge Lift Moisture Variation Distance, e_m	=	5.1	Ft.
Edge Lift, y_m	=	1.1	In.
Center Lift Moisture Variation Distance, e_m	=	9.0	Ft.
Center Lift, y_m	=	0.47	In.
Minimum Footing Depth (Exterior)	=	18 Inches below adjacent grade	

The above foundation criteria are based on medium soil expansion consideration only. Foundation design should consider anticipated post-construction settlements, as appropriate.

Foundation design details such as slab thickness, concrete strength, reinforcements, etc. should be established by the Project Structural Engineer considering medium soil expansion and settlement potential provided below.

9.11 FOUNDATION SETTLEMENT:

Total static and differential post-construction settlements for footings designed and constructed in accordance with the criteria given below and supporting loads not exceeding the typical loadings for residential construction (column and wall loads on the order of 30 kips and 3 kips/lineal foot, respectively) are not anticipated to exceed the values shown below. The settlement estimates should be confirmed based on review of the foundation plans.

Structures should be designed for the following post-construction settlements:

- Total settlement = 1 inch
- Differential settlement = ¾-inch (*)

(*) Between similarly loaded column footings and for continuous footings and slabs over a distance of approximately 30 feet.

General Remarks

(i) Footing depths should not be allowed to be affected adversely, such as through erosion softening, digging, landscaping, etc.

(ii) Where foundations encroach closer than five (5) feet horizontally from the flow line of drainage swales, the footing should be deepened sufficiently to maintain the required embedment depth below the adjacent flow line.

(iii) Foundation details such as concrete strength, reinforcements, etc. should be established by the Project Structural Engineer, considering the loading and medium soil expansion potential. The footing and slab reinforcements recommended in this report are minimum requirements. More restrictive criteria based on structural design considerations or Code requirements shall govern.

(iv) Foundation excavations should be observed and approved by the Project Geotechnical Engineer prior to the placement of reinforcement or concrete. Forming of footing excavations may be required. Excavations should be free of slough and debris and thoroughly moisture conditioned prior to placing concrete.

(v) Excavated material from footing and utility trenches should not be placed in slab-on-grade areas unless properly compacted and tested.

9.12 SLAB-ON-GRADE:

Recommended minimum criteria for slab-on-grade are shown below:

Concrete Floor Slabs

Concrete floor slabs should be 5 inches thick (minimum) and should be reinforced with No. 3 bars at 18 inches on center, each way at mid height. No. 3 bars at 18 inches on center should be provided connecting floor slabs to footings. In order to minimize migration of moisture up the concrete slab from soil subgrade and damage to floor coverings, a moisture barrier/water vapor retarder recommended beneath floor slabs as discussed hereinafter.

Moisture/Water Vapor Retarder for Concrete Slab-on-Grade

In order to reduce the potential for moisture/water vapor migration up through the slab and possibly affecting floor covering, a moisture/vapor retarder is recommended under concrete floor slab-on-grade. The moisture barrier should be properly installed, lapped and sealed in accordance with the manufacturer's specifications. Punctures and rips should be repaired prior to placement of sand.

As a minimum, this moisture/water vapor retarder should consist of 10-mil thick polyethylene ("Visqueen"), lapped and sealed, and placed mid-height within a 4-inch coarse sand layer. This moisture/water vapor retarder should be installed in accordance with manufacturer's specifications.

The following recommendations are based on the tentative guidelines by the American Concrete Institute (ACI, April 2001) to reduce the potential moisture/water vapor intrusion in concrete slab-on-grade. Based on our review of available literature, it appears that the ACI procedure would be more effective to help reduce potential moisture/water vapor migration up through concrete slab-on-grade.

Recommendations based on the ACI guidelines are presented below:

- The moisture/water vapor retarder should consist of high strength polyethylene membrane and should meet or exceed the ASTM: E-1745-97 Class C material requirements for water vapor permeance, tensile strength and puncture resistance. The vapor retarder should consist of "Moistop Plus" (Fortifiber Building Products Systems) or "Vapor Block" VB 15 (Americover, Inc.), or approved equal. The vapor retarder should be underlain by a capillary break comprised of minimum 4 inches thick pea gravel layer. The gravel layer should be placed and compacted on approved soil sub-grade.

- The membrane should be placed on approved gravel layer and properly lapped and sealed. Membranes intersecting utility pipes, sewer lines, ducts or drains must be properly wrapped around the penetrations and sealed. All punctures and rips in the membrane should be repaired prior to placement of concrete, following manufacturer's recommendations. The vapor retarder should be installed in general accordance with the procedures outlined in ASTM: E-1643, and in conformance with the installation procedures recommended by the manufacturer.

- To minimize slab curling, a low slump concrete (low shrinkage mix design) should be used for the slab construction, as determined by the Project Structural Engineer.

The moisture/water vapor protection for concrete slab-on-grade should be selected based on cost and construction considerations, and considering potential future problems resulting from improper and uncontrolled landscape irrigation practices. Regardless of the moisture/water vapor retarder option selected, it should be emphasized that proper control of irrigation and landscape water adjacent to the structure is of paramount importance.

9.13 DRIVEWAY:

Driveway concrete slabs should be 5 inches thick (minimum) with No. 3 bars at 18 inches on center, each way at mid-height. The slab may be placed directly on properly prepared sub-grade. No moisture barrier is required under driveway slabs.

9.14 EXTERIOR FLATWORK:

Exterior concrete flatwork (e.g. sidewalks, walkways) should be 4 inches thick (minimum), with No. 3 bars at 24 inches on center, each way at mid-height and placed on properly prepared sub-

grade. Hardscape areas within two feet of the descending slopes should include a thickened edge deepened to provide a minimum five (5) feet horizontal setback between the bottom outside face of the thickened edge and slope face.

9.15 SUB-GRADE PRE-SATURATION:

Prior to concrete placement, the soil sub-grade should be thoroughly wetted to about 12 inches in depth at a moisture condition of about 2 to 3 percentage points above the optimum moisture content.

9.16 GENERAL:

Interior floor slabs and exterior concrete flatwork, including driveway, should be properly designed for the construction and service loading conditions, potential settlements and soil expansion. The structural details, such as slab thickness, concrete strength, reinforcing criteria, joint spacing, etc. should be established by the Project Structural Engineer. The recommended minimum reinforcements for concrete slabs provided above are intended for preliminary design only. More restrictive criteria as dictated by structural design or regulatory requirements shall govern.

9.17 RETAINING WALLS:

9.17.1 Foundations:

Retaining wall foundations may be supported on either compacted engineered fill or competent bedrock. If a bedrock/fill transition is encountered, the bedrock portion should be over-excavated minimum 2 feet and replaced with approved compacted fill. Alternatively, a cold joint should be constructed in both the footing and the wall.

Footings may be designed in accordance with the foundation design criteria presented in this report when embedded at least two feet below lowest adjacent grade. Footings located on or at top of slopes should be deepened, as necessary, to provide minimum lateral setback between footing and slope faces in accordance with CBC requirements.

9.17.2 Lateral Earth Pressures:

The earth pressures acting on retaining walls depend primarily on allowable wall movement, type of backfill materials, backfill slopes, wall inclination, surcharges, and any hydrostatic pressure. The following lateral earth pressures are recommended for vertical walls with no hydrostatic pressure and no surcharge loading:

Wall Condition	Backfill Type	Lateral Earth Pressure (Equivalent Fluid Pressure) (pcf)	
		Level	2:1 (H:V)
Active (Cantilever)	Sandy Soils	40	65

The surcharge effect of anticipated loads on the wall backfill (i.e. traffic, construction equipment, footings, etc.) should be included in the wall design. If the wall is free to deflect, 33 percent of the maximum surcharge load located within a distance equal to the height of wall should be used in the design.

9.17.3 Backfill

Retaining wall backfill should consist of predominantly granular non-expansive soils. The backfill should extend within a 45-degree plane from the wall footing.

Retaining wall backfill should be mechanically compacted to minimum 90 percent of the applicable laboratory maximum density and performed under the observation and testing of the Project Geotechnical Engineer. No jetting, ponding, or flooding should be permitted. No backfill should be placed against concrete until minimum design strengths are attained.

9.17.4 Backfill Drainage

The wall design should include waterproofing and weep holes or sub-drains or back-drains, as appropriate, for relieving possible hydrostatic pressures. If on-site soils are utilized for wall backfill, the design should include a prefabricated drainage blanket (such as Miradrain 2000, or equivalent).

As a minimum, sub-drains should consist of 4-inch diameter, perforated Schedule 40, PVC pipe or equivalent, embedded in approximately 3 cubic feet per lineal foot of ¾-inch (maximum) rock, or approved alternate. This permeable material should be enveloped in Geofabric consisting of Mirafi 140 or equivalent. The pipe and trench bottom should be sloped at a gradient of 2± percent to a suitable discharge outlet. Sub-drains placed behind retaining walls should be approved by the Project Geotechnical Engineer prior to backfill placement.

9.18 SOIL CORROSION:

The previous geotechnical consultants, Pacific Soils Engineering, Inc., performed preliminary testing and indicated that the site soils are corrosive to metals. We recommend that representative finished grade samples be tested for corrosion suites (Sulfate, Chloride, pH and resistivity) upon completion of grading. It may be necessary to retain a Corrosion Engineer for consultation.

9.19 UTILITY TRENCH BACKFILL:

Bedding material should consist of on-site sandy or imported materials exhibiting a San Equivalent (S.E.) value of 30 or greater.

The on-site soils are considered suitable for trench backfill, provided they are free of organic materials and oversize rocks.

Backfill of all exterior and interior trenches should be placed in thin lifts not exceeding 4 inches and mechanically compacted to achieve a relative compaction of not less than 90% based on ASTM: D1157. Care should be taken not to damage utility lines.

Utility trenches should not be located within the influence of footings. This is defined as a zone located below the footing and a line sloping at an inclination of 1:1 (horizontal to vertical) outward from the outside edge of footings. If utility lines are located within the zone of footings, the backfill should be compacted to a minimum 95 percent relative compaction or slurry backfilled (minimum 1-1/2 sack cemented sand mix.

To reduce potential water migration into building sub-grade through the granular bedding/shading layer and/trench backfill, utility trenches should be backfilled with the onsite finer grained materials or sand-cement slurry for minimum 3 feet length at their entry points.

Trenches in fill soils and alluvial deposits greater than 4 feet in depth should be shored or sloped back as required by the local regulatory agency, the state of California Division of Industrial Safety Construction Safety Orders, and Federal OSHA requirements.

9.20 ASPHALT CONCRETE PAVEMENT:

Preliminary asphalt concrete pavement sections for the planned streets in the development were developed utilizing the Cal Trans Method of Design and the Structural Section Design Guide for

California Cities and Counties. The traffic index for the proposed streets are not known at this time. Therefore, we are providing pavement sections for various traffic indices so that appropriate section can be chosen once the traffic index for the proposed streets become known.

The following recommended pavement sections were computed assuming an "R" value of 30 for site soils compacted as sub-grade material, and assumed traffic indices. The actual "R" value will depend on the soil conditions exposed at the planned street sub-grade elevations.

During rough grading, "R" value testing should be performed on the pavement sub-grade soils to confirm the pavement design basis. Further analysis and evaluation are necessary, if the design traffic index and the sub-grade "R" value are different from those used in our analyses.

Traffic Index	Recommended Minimum Pavement Section		
	Asphalt Concrete (inches)	Aggregate Base (inches)	Total (inches)
5.0	3.0	6.0	9.0
6.0	4.0	8.0	12.0
7.0	4.0	10.0	14.0
8.0	5.0	12.0	16.0

Note: AC = Asphalt Concrete, AB = Aggregate Base

Aggregate base should consist of crushed aggregate base (CAB) or crushed miscellaneous base (CMB) and should comply with the specifications outlined in the "Standard Specifications for Public Works Construction", ("Green Book"). The base material should be compacted to minimum 95 percent of the maximum laboratory density, determined in accordance with ASTM: D-1557.

The soil sub-grade should be compacted to minimum 90 percent relative compaction. The subgrade soils should exhibit a firm and unyielding surface, in addition to the recommended minimum compaction. Final compaction and testing of pavement sub-grade should be performed just prior to placement of aggregate base.

9.21 SITE DRAINAGE:

All roof and surface drainage should be directed away from structures and their appurtenances and slope s to approved drainage facilities. Ponding of water should be avoided. For graded soil areas, a minimum gradient of 2 percent away from structures should be maintained.

The drainage patterns designed by Project Civil Engineer should be established at the time of fine grading and maintained throughout the life of the structure or, if altered, should be replaced with a properly designed area drain system.

Irrigation activities at the site should be monitored and controlled to prevent overwatering. Planter areas adjacent to structures should be avoided. If utilized, such planters should include measures to contain irrigation water and prevent moisture migration into walls and under foundations and slabs-on-grade.

9.22 SLOPE PLANTING, IRRIGATION AND MAINTENANCE:

General guidelines for slope planting, irrigation and maintenance are shown below:

a) Slope planting should consist of appropriate drought resistant vegetation as recommended by the Landscape Architect. Landscaping of slopes should be completed as soon as possible and properly maintained.

b) The property owner is responsible for proper irrigation and for maintenance and repair of installed irrigation systems. Leaks should be repaired immediately. Sprinklers should be adjusted to provide maximum coverage with a minimum of water usage and overlap. **Over-watering with consequent excessive runoff and ground saturation must be avoided.**

c) If automatic sprinkler systems are installed, their use must be adjusted to account for natural rainfall conditions.

d) All interceptor ditches, drainage terraces, down-drains, and any other drainage devices that have been installed must be maintained and cleaned.

e) If rodent activity is present, the property owner must undertake a program for the elimination of burrowing animals. This must be an ongoing program in order to promote slope stability.

f) Water must not be allowed to flow over the constructed or natural slopes. This may require the construction of berms or ditches along the top of slopes, if such devices are not in place.

9.23 ADDITIONAL INVESTIGATION:

Additional geologic and geotechnical investigation may be necessary during the 40-Scale Grading Plan Review phase to obtain supplemental information relative to the site geologic conditions and engineering properties of on-site materials and to confirm the preliminary recommendations provided herein.

10.0 Limitations:

This report has been prepared for the exclusive use of Richland Development Corporation relative to the design and construction of the proposed plan. This report is not intended for other parties, and it may not contain sufficient information for other purposes. The recommendations presented herein are of a general/conceptual nature and will be refined and detailed in forthcoming reports specific to various aspects of development. As such, the current recommendations may be subject to revision as additional detail of the project is made and additional data is developed, as well as in response to jurisdictional review requirements. This report is based on the plan as described and the information obtained as described herein.

The Owner or Owner Representative should make sure that the information and preliminary recommendations presented in this report are brought to the attention of the Project Architect and Project Engineer and incorporated into the project plans.

The findings contained in this report are based upon our evaluation and interpretation of the information obtained from the infiltration test pits and boring, as well as the geotechnical engineering analyses. The opinions and recommendations provided were based on the assumption that the geotechnical conditions, which exist across the site, are similar to those observed in the test excavations. The condition and characteristics of the sub-surface materials at locations and depths other than those excavated and observed my be different and no representations are made as to their quality and engineering properties. Should any conditions encountered during constuction differ from those described herein, this office should be contacted immediately for evaluation of the actual conditions and for appropriate recommendations prior to continuation of work.

The finding and recommendations presented herein were obtained in accordance with currently accepted professional engineering principles and practice in the field of geologic and geotechnical engineering and reflect our best professional judgment. We make no other warranty, either expressed or implied.

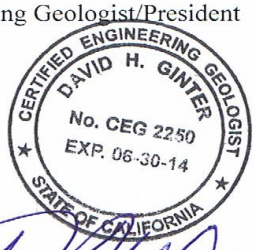
This report is subject to review by the controlling authorities. If you have any questions or require additional information, please contact the undersigned.

We appreciate the opportunity to be of service and look forward to working with you and the other project consultants.

{Signatures on following page}

Respectfully submitted,
GINTER & ASSOCIATES, INC.

By:_____
Dave Ginter R.G., C.E.G.
Principal Engineering Geologist/President



By:_____
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APPENDIX I

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*** GSTABL7 ***

** GSTABL7 by Dr. Garry H. Gregory, Ph.D.,P.E.,D.GE **

** Original Version 1.0, January 1996; Current Ver. 2.005.2, Jan. 2011 **

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****
SLOPE STABILITY ANALYSIS SYSTEM
Modified Bishop, Simplified Janbu, or GLE Method of Slices.
(Includes Spencer & Morgenstern-Price Type Analysis)
Including Pier/Pile, Reinforcement, Soil Nail, Tieback,
Nonlinear Undrained Shear Strength, Curved Phi Envelope,
Anisotropic Soil, Fiber-Reinforced Soil, Boundary Loads, Water
Surfaces, Pseudo-Static & Newmark Earthquake, and Applied Forces.
****

Analysis Run Date:	5/10/2013
Time of Run:	10:39AM
Run By:	Username
Input Data Filename:	C:\SLOPE\Skyline\1-1\1-1.in
Output Filename:	C:\SLOPE\Skyline\1-1\1-1.OUT
Unit System:	English
Plotted Output Filename:	C:\SLOPE\Skyline\1-1\1-1.PLT

PROBLEM DESCRIPTION: Skyline Height, PN:134-02, Section 1-1', Highest Cut Slope, Static

BOUNDARY COORDINATES

14 Top Boundaries
14 Total Boundaries

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	6.00	1218.00	78.00	1200.00	3
2	78.00	1200.00	132.00	1200.00	3
3	132.00	1200.00	189.00	1232.00	3
4	189.00	1232.00	195.00	1232.00	3
5	195.00	1232.00	258.00	1259.00	3
6	258.00	1259.00	264.00	1259.00	3
7	264.00	1259.00	324.00	1286.00	3
8	324.00	1286.00	330.00	1286.00	3
9	330.00	1286.00	392.00	1316.00	3
10	392.00	1316.00	398.00	1316.00	3
11	398.00	1316.00	462.00	1343.00	3
12	462.00	1343.00	468.00	1343.00	3
13	468.00	1343.00	510.00	1371.00	3
14	510.00	1371.00	660.00	1371.00	3

User Specified Y-Origin = 1000.00(ft)

Default X-Plus Value = 0.00(ft)

Default Y-Plus Value = 0.00(ft)

1

ISOTROPIC SOIL PARAMETERS

3 Type(s) of Soil

Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Piez. Constant (psf)	Surface No.
1	120.0	120.0	300.0	35.0	0.00	0.0	0
2	125.0	125.0	800.0	32.0	0.00	0.0	0
3	125.0	125.0	250.0	40.0	0.00	0.0	0

1

A Critical Failure Surface Searching Method, Using A Random Technique For Generating Circular Surfaces, Has Been Specified.

2500 Trial Surfaces Have Been Generated.

100 Surface(s) Initiate(s) From Each Of 25 Points Equally Spaced
Along The Ground Surface Between X = 78.00(ft)
and X = 250.00(ft)

Each Surface Terminates Between X = 350.00(ft)
and X = 650.00(ft)

Unless Further Limitations Were Imposed, The Minimum Elevation
At Which A Surface Extends Is Y = 0.00(ft)

50.00(ft) Line Segments Define Each Trial Failure Surface.

Following Are Displayed The Ten Most Critical Of The Trial
Failure Surfaces Evaluated. They Are
Ordered - Most Critical First.

* * Safety Factors Are Calculated By The Modified Bishop Method * *

Total Number of Trial Surfaces Attempted = 2500

Number of Trial Surfaces With Valid FS = 2500

Statistical Data On All Valid FS Values:
FS Max = 6.631 FS Min = 2.292 FS Ave = 3.614
Standard Deviation = 0.768 Coefficient of Variation = 21.25 %

Failure Surface Specified By 11 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	135.333	1201.871
2	184.996	1207.672
3	234.145	1216.855
4	282.552	1229.378
5	329.989	1245.180

6	376.234	1264.189
7	421.072	1286.316
8	464.292	1311.456
9	505.692	1339.493
10	545.077	1370.295
11	545.862	1371.000

Circle Center At X = 75.421 ; Y = 1930.255 ; and Radius = 730.843

Factor of Safety
*** 2.292 ***

Individual data on the 21 slices

Slice No.	Width (ft)	Weight (lbs)	Water Force Top (lbs)	Water Force Bot (lbs)	Tie Force Norm (lbs)	Tie Force Tan (lbs)	Earthquake Force Hor (lbs)	Earthquake Force Ver (lbs)	Surcharge Load (lbs)
1	49.7	68532.8	0.0	0.0	0.	0.	0.0	0.0	0.0
2	4.0	11427.1	0.0	0.0	0.	0.	0.0	0.0	0.0
3	6.0	17264.2	0.0	0.0	0.	0.	0.0	0.0	0.0
4	39.1	133043.1	0.0	0.0	0.	0.	0.0	0.0	0.0
5	23.9	101225.9	0.0	0.0	0.	0.	0.0	0.0	0.0
6	6.0	26398.1	0.0	0.0	0.	0.	0.0	0.0	0.0
7	18.6	83937.7	0.0	0.0	0.	0.	0.0	0.0	0.0
8	41.4	209276.6	0.0	0.0	0.	0.	0.0	0.0	0.0
9	6.0	31304.7	0.0	0.0	0.	0.	0.0	0.0	0.0
10	0.0	57.0	0.0	0.0	0.	0.	0.0	0.0	0.0
11	46.2	245613.4	0.0	0.0	0.	0.	0.0	0.0	0.0
12	15.8	86920.6	0.0	0.0	0.	0.	0.0	0.0	0.0
13	6.0	31912.7	0.0	0.0	0.	0.	0.0	0.0	0.0

14	23.1	116063.8	0.0	0.0	0.	0.	0.0	0.0	0.0
15	40.9	184929.4	0.0	0.0	0.	0.	0.0	0.0	0.0
16	2.3	9227.9	0.0	0.0	0.	0.	0.0	0.0	0.0
17	3.7	14038.9	0.0	0.0	0.	0.	0.0	0.0	0.0
18	37.7	135847.6	0.0	0.0	0.	0.	0.0	0.0	0.0
19	4.3	15287.2	0.0	0.0	0.	0.	0.0	0.0	0.0
20	35.1	63232.7	0.0	0.0	0.	0.	0.0	0.0	0.0
21	0.8	34.6	0.0	0.0	0.	0.	0.0	0.0	0.0

Failure Surface Specified By 10 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	156.833	1213.942
2	206.078	1222.599
3	254.701	1234.253
4	302.520	1248.858
5	349.357	1266.361
6	395.035	1286.695
7	439.384	1309.786
8	482.238	1335.545
9	523.436	1363.877
10	532.545	1371.000

Circle Center At X = 41.140 ; Y = 2018.615 ; and Radius = 812.948

Factor of Safety
*** 2.332 ***

1

Failure Surface Specified By 10 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	149.667	1209.918
2	198.902	1218.627
3	247.635	1229.814

4	295.739	1243.451
5	343.092	1259.504
6	389.573	1277.931
7	435.062	1298.684
8	479.444	1321.712
9	522.604	1346.955
10	559.320	1371.000

Circle Center At X = 2.805 ; Y = 2184.852 ; and Radius = 985.934

Factor of Safety
*** 2.343 ***

Failure Surface Specified By 10 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	171.167	1221.988
2	220.629	1229.305
3	269.504	1239.850
4	317.582	1253.581
5	364.655	1270.436
6	410.521	1290.343
7	454.982	1313.217
8	497.846	1338.959
9	538.929	1367.458
10	543.380	1371.000

Circle Center At X = 85.078 ; Y = 1976.405 ; and Radius = 759.313

Factor of Safety
*** 2.346 ***

1

Failure Surface Specified By 9 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	207.000	1237.143
2	256.874	1240.693

3	306.146	1249.195
4	354.325	1262.565
5	400.932	1280.670
6	445.503	1303.328
7	487.594	1330.316
8	526.787	1361.364
9	536.729	1371.000

Circle Center At X = 196.400 ; Y = 1738.161 ; and Radius = 501.130

Factor of Safety
*** 2.354 ***

Failure Surface Specified By 10 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	171.167	1221.988
2	220.680	1228.946
3	269.644	1239.070
4	317.857	1252.319
5	365.119	1268.638
6	411.235	1287.960
7	456.014	1310.204
8	499.272	1335.280
9	540.829	1363.082
10	551.160	1371.000

Circle Center At X = 88.741 ; Y = 1991.196 ; and Radius = 773.611

Factor of Safety
*** 2.354 ***

1

Failure Surface Specified By 9 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	185.500	1230.035
2	235.440	1232.485

3	284.903	1239.795
4	333.416	1251.896
5	380.518	1268.673
6	425.758	1289.965
7	468.704	1315.569
8	508.948	1345.241
9	537.556	1371.000

Circle Center At X = 185.421 ; Y = 1741.912 ; and Radius = 511.876

Factor of Safety
*** 2.355 ***

Failure Surface Specified By 10 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	156.833	1213.942
2	206.623	1218.518
3	255.793	1227.593
4	303.937	1241.090
5	350.658	1258.899
6	395.571	1280.872
7	438.305	1306.829
8	478.509	1336.555
9	515.851	1369.806
10	516.969	1371.000

Circle Center At X = 131.501 ; Y = 1763.456 ; and Radius = 550.098

Factor of Safety
*** 2.355 ***

1

Failure Surface Specified By 11 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	135.333	1201.871
2	185.317	1203.157

3	235.016	1208.632
4	284.081	1218.258
5	332.165	1231.967
6	378.929	1249.661
7	424.044	1271.216
8	467.192	1296.481
9	508.067	1325.277
10	546.382	1357.401
11	560.082	1371.000

Circle Center At X = 145.025 ; Y = 1797.204 ; and Radius = 595.412

Factor of Safety
*** 2.356 ***

Failure Surface Specified By 10 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	149.667	1209.918
2	199.286	1216.080
3	248.225	1226.323
4	296.150	1240.578
5	342.732	1258.747
6	387.652	1280.706
7	430.603	1306.303
8	471.290	1335.365
9	509.435	1367.691
10	512.741	1371.000

Circle Center At X = 100.473 ; Y = 1810.521 ; and Radius = 602.614

Factor of Safety
*** 2.358 ***

**** END OF GSTABL7 OUTPUT ****

*** GSTABL7 ***

** GSTABL7 by Dr. Garry H. Gregory, Ph.D.,P.E.,D.GE **

** Original Version 1.0, January 1996; Current Ver. 2.005.2, Jan. 2011 **

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****
SLOPE STABILITY ANALYSIS SYSTEM
Modified Bishop, Simplified Janbu, or GLE Method of Slices.
(Includes Spencer & Morgenstern-Price Type Analysis)
Including Pier/Pile, Reinforcement, Soil Nail, Tieback,
Nonlinear Undrained Shear Strength, Curved Phi Envelope,
Anisotropic Soil, Fiber-Reinforced Soil, Boundary Loads, Water
Surfaces, Pseudo-Static & Newmark Earthquake, and Applied Forces.
****

Analysis Run Date: 5/10/2013
Time of Run: 10:40AM
Run By: Username
Input Data Filename: C:\SLOPE\Skyline\1-1\1-1 Surface #1.in
Output Filename: C:\SLOPE\Skyline\1-1\1-1 Surface #1.OUT
Unit System: English

Plotted Output Filename: C:\SLOPE\Skyline\1-1\1-1 Surface #1.PLT

PROBLEM DESCRIPTION: Skyline Height, PN:134-02, Section 1-1', Highest Cut Slope, Pseudostatic

BOUNDARY COORDINATES

14 Top Boundaries

14 Total Boundaries

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Below Bnd	Type
1	6.00	1218.00	78.00	1200.00	3	
2	78.00	1200.00	132.00	1200.00	3	
3	132.00	1200.00	189.00	1232.00	3	
4	189.00	1232.00	195.00	1232.00	3	
5	195.00	1232.00	258.00	1259.00	3	
6	258.00	1259.00	264.00	1259.00	3	
7	264.00	1259.00	324.00	1286.00	3	
8	324.00	1286.00	330.00	1286.00	3	
9	330.00	1286.00	392.00	1316.00	3	
10	392.00	1316.00	398.00	1316.00	3	
11	398.00	1316.00	462.00	1343.00	3	
12	462.00	1343.00	468.00	1343.00	3	
13	468.00	1343.00	510.00	1371.00	3	
14	510.00	1371.00	660.00	1371.00	3	

User Specified Y-Origin = 1000.00(ft)

Default X-Plus Value = 0.00(ft)

Default Y-Plus Value = 0.00(ft)

1

ISOTROPIC SOIL PARAMETERS

3 Type(s) of Soil

Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
1	120.0	120.0	300.0	35.0	0.00	0.0	0
2	125.0	125.0	800.0	32.0	0.00	0.0	0
3	125.0	125.0	250.0	40.0	0.00	0.0	0

Specified Peak Ground Acceleration Coefficient (A) = 0.800(g)
Specified Horizontal Earthquake Coefficient (kh) = 0.150(g)
Specified Vertical Earthquake Coefficient (kv) = 0.000(g)

Specified Seismic Pore-Pressure Factor = 0.000
1

Trial Failure Surface Specified By 11 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	135.333	1201.871
2	184.996	1207.672
3	234.145	1216.855
4	282.552	1229.378
5	329.989	1245.180
6	376.234	1264.189
7	421.072	1286.316
8	464.292	1311.456
9	505.692	1339.493
10	545.077	1370.295
11	545.862	1371.000

DEFLECTION ANGLE & SEGMENT DATA FOR SPECIFIED SURFACE(Excluding Last Segment)

Angle/Segment No.	Deflection(Deg)	Segment Length(ft)
1	3.92	50.00
2	3.92	50.00
3	3.92	50.00
4	3.92	50.00
5	3.92	50.00
6	3.92	50.00
7	3.92	50.00
8	3.92	50.00

Circle Center At X = 75.423(ft) ; Y = 1930.249(ft); and Radius = 730.837(ft)

* * Factor Of Safety Is Calculated By The Modified Bishop Method * *

Factor Of Safety For The Preceding Specified Surface = 1.599

Table 1 - Individual Data on the 21 Slices

Slice No.	Width (ft)	Weight (lbs)	Water Force Top (lbs)	Water Force Bot (lbs)	Tie Force Norm (lbs)	Tie Force Tan (lbs)	Earthquake Force Hor (lbs)	Earthquake Force Ver (lbs)	Surcharge Load (lbs)
1	49.7	68535.9	0.0	0.0	0.0	0.0	10280.4	0.0	0.0
2	4.0	11426.6	0.0	0.0	0.0	0.0	1714.0	0.0	0.0
3	6.0	17264.6	0.0	0.0	0.0	0.0	2589.7	0.0	0.0
4	39.1	133044.4	0.0	0.0	0.0	0.0	19956.7	0.0	0.0
5	23.9	101226.9	0.0	0.0	0.0	0.0	15184.0	0.0	0.0
6	6.0	26398.1	0.0	0.0	0.0	0.0	3959.7	0.0	0.0
7	18.6	83938.1	0.0	0.0	0.0	0.0	12590.7	0.0	0.0
8	41.4	209274.6	0.0	0.0	0.0	0.0	31391.2	0.0	0.0
9	6.0	31305.6	0.0	0.0	0.0	0.0	4695.8	0.0	0.0
10	0.0	56.2	0.0	0.0	0.0	0.0	8.4	0.0	0.0
11	46.2	245611.8	0.0	0.0	0.0	0.0	36841.8	0.0	0.0
12	15.8	86923.0	0.0	0.0	0.0	0.0	13038.4	0.0	0.0
13	6.0	31912.6	0.0	0.0	0.0	0.0	4786.9	0.0	0.0
14	23.1	116062.5	0.0	0.0	0.0	0.0	17409.4	0.0	0.0
15	40.9	184929.1	0.0	0.0	0.0	0.0	27739.4	0.0	0.0
16	2.3	9228.4	0.0	0.0	0.0	0.0	1384.3	0.0	0.0
17	3.7	14038.6	0.0	0.0	0.0	0.0	2105.8	0.0	0.0
18	37.7	135850.8	0.0	0.0	0.0	0.0	20377.6	0.0	0.0
19	4.3	15286.0	0.0	0.0	0.0	0.0	2292.9	0.0	0.0
20	35.1	63232.4	0.0	0.0	0.0	0.0	9484.9	0.0	0.0

21	0.8	34.6	0.0	0.0	0.0	0.0	5.2	0.0
0.0								

Table 2 - Base Stress Data on the 21 Slices

Slice No.	Alpha (deg)	X-Coord. Slice Cntr (ft)	Base Leng. (ft)	Available Shear Strength (psf)	Mobilized Shear Stress * (psf)
1	6.66	160.16	50.00	1326.66	361.68
2	10.58	187.00	4.07	2408.44	922.28
3	10.58	192.00	6.10	2426.51	929.87
4	10.58	214.57	39.82	2824.90	1096.91
5	14.50	246.07	24.64	3355.14	1611.19
6	14.50	261.00	6.20	3470.59	1669.98
7	14.50	273.28	19.16	3562.78	1716.89
8	18.42	303.28	43.69	3819.05	2175.79
9	18.42	326.99	6.31	3946.27	2251.82
10	22.35	329.99	0.01	3727.24	2429.07
11	22.35	353.12	49.99	3872.28	2528.27
12	26.27	384.12	17.58	3873.15	2830.59
13	26.27	395.00	6.69	3743.49	2731.47
14	26.27	409.54	25.73	3551.32	2584.47
15	30.19	441.54	47.35	3096.23	2455.73
16	30.19	463.15	2.65	2779.89	2189.69
17	34.11	466.15	4.48	2528.31	2137.41
18	34.11	486.85	45.52	2415.75	2035.21
19	38.03	507.85	5.47	2288.22	2043.97
20	38.03	527.54	44.53	1249.71	1040.45
21	41.93	545.47	1.06	195.04	25.56

Sum of the Resisting Forces (including Pier/Pile, Tieback, Reinforcing
Soil Nail, and Applied Forces if applicable) = 1289039.00 (lbs)

Average Available Shear Strength (including Tieback, Pier/Pile, Reinforcing,
Soil Nail, and Applied Forces if applicable) = 2857.83(psf)

Sum of the Driving Forces = 806200.94 (lbs)

Average Mobilized Shear Stress = 1787.37(psf)

Total length of the failure surface = 451.06(ft)

CAUTION - Factor Of Safety Is Calculated By The Modified Bishop
Method. This Method Is Valid Only If The Failure Surface
Approximates A Circular Arc.

*** SEISMIC SLOPE DISPLACEMENT DATA ***
(Note: kv is set = zero for displacement calculations)
Seismic Yield Coefficient (ky) = 0.4075(g)
Calculated Newmark Seismic Displacement = 0.299(ft)

Non-Symmetrical Sliding Resistance Has Been Specified
for Downhill Sliding.

**** END OF GSTABL7 OUTPUT ****

*** GSTABL7 ***

** GSTABL7 by Dr. Garry H. Gregory, Ph.D.,P.E.,D.GE **

** Original Version 1.0, January 1996; Current Ver. 2.005.2, Jan. 2011 **

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****
SLOPE STABILITY ANALYSIS SYSTEM
Modified Bishop, Simplified Janbu, or GLE Method of Slices.
(Includes Spencer & Morgenstern-Price Type Analysis)
Including Pier/Pile, Reinforcement, Soil Nail, Tieback,
Nonlinear Undrained Shear Strength, Curved Phi Envelope,
Anisotropic Soil, Fiber-Reinforced Soil, Boundary Loads, Water
Surfaces, Pseudo-Static & Newmark Earthquake, and Applied Forces.
****

Analysis Run Date: 5/10/2013
Time of Run: 10:40AM
Run By: Username
Input Data Filename: C:\SLOPE\Skyline\1-1\1-1 Surface #1.in
Output Filename: C:\SLOPE\Skyline\1-1\1-1 Surface #1.OUT
Unit System: English

Plotted Output Filename: C:\SLOPE\Skyline\1-1\1-1 Surface #1.PLT

PROBLEM DESCRIPTION: Skyline Height, PN:134-02, Section 1-1', Highest Cut Slope, Pseudostatic

BOUNDARY COORDINATES

14 Top Boundaries

14 Total Boundaries

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Below Bnd	Type
1	6.00	1218.00	78.00	1200.00	3	
2	78.00	1200.00	132.00	1200.00	3	
3	132.00	1200.00	189.00	1232.00	3	
4	189.00	1232.00	195.00	1232.00	3	
5	195.00	1232.00	258.00	1259.00	3	
6	258.00	1259.00	264.00	1259.00	3	
7	264.00	1259.00	324.00	1286.00	3	
8	324.00	1286.00	330.00	1286.00	3	
9	330.00	1286.00	392.00	1316.00	3	
10	392.00	1316.00	398.00	1316.00	3	
11	398.00	1316.00	462.00	1343.00	3	
12	462.00	1343.00	468.00	1343.00	3	
13	468.00	1343.00	510.00	1371.00	3	
14	510.00	1371.00	660.00	1371.00	3	

User Specified Y-Origin = 1000.00(ft)

Default X-Plus Value = 0.00(ft)

Default Y-Plus Value = 0.00(ft)

1

ISOTROPIC SOIL PARAMETERS

3 Type(s) of Soil

Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
1	120.0	120.0	300.0	35.0	0.00	0.0	0
2	125.0	125.0	800.0	32.0	0.00	0.0	0
3	125.0	125.0	250.0	40.0	0.00	0.0	0

Specified Peak Ground Acceleration Coefficient (A) = 0.800(g)
Specified Horizontal Earthquake Coefficient (kh) = 0.150(g)
Specified Vertical Earthquake Coefficient (kv) = 0.000(g)

Specified Seismic Pore-Pressure Factor = 0.000
1

Trial Failure Surface Specified By 11 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	135.333	1201.871
2	184.996	1207.672
3	234.145	1216.855
4	282.552	1229.378
5	329.989	1245.180
6	376.234	1264.189
7	421.072	1286.316
8	464.292	1311.456
9	505.692	1339.493
10	545.077	1370.295
11	545.862	1371.000

DEFLECTION ANGLE & SEGMENT DATA FOR SPECIFIED SURFACE(Excluding Last Segment)

Angle/Segment No.	Deflection(Deg)	Segment Length(ft)
1	3.92	50.00
2	3.92	50.00
3	3.92	50.00
4	3.92	50.00
5	3.92	50.00
6	3.92	50.00
7	3.92	50.00
8	3.92	50.00

Circle Center At X = 75.423(ft) ; Y = 1930.249(ft); and Radius = 730.837(ft)

* * Factor Of Safety Is Calculated By The Modified Bishop Method * *

Factor Of Safety For The Preceding Specified Surface = 1.599

Table 1 - Individual Data on the 21 Slices

Slice No.	Width (ft)	Weight (lbs)	Water Force Top (lbs)	Water Force Bot (lbs)	Tie Force Norm (lbs)	Tie Force Tan (lbs)	Earthquake Force Hor (lbs)	Earthquake Force Ver (lbs)	Surcharge Load (lbs)
1	49.7	68535.9	0.0	0.0	0.0	0.0	10280.4	0.0	0.0
2	4.0	11426.6	0.0	0.0	0.0	0.0	1714.0	0.0	0.0
3	6.0	17264.6	0.0	0.0	0.0	0.0	2589.7	0.0	0.0
4	39.1	133044.4	0.0	0.0	0.0	0.0	19956.7	0.0	0.0
5	23.9	101226.9	0.0	0.0	0.0	0.0	15184.0	0.0	0.0
6	6.0	26398.1	0.0	0.0	0.0	0.0	3959.7	0.0	0.0
7	18.6	83938.1	0.0	0.0	0.0	0.0	12590.7	0.0	0.0
8	41.4	209274.6	0.0	0.0	0.0	0.0	31391.2	0.0	0.0
9	6.0	31305.6	0.0	0.0	0.0	0.0	4695.8	0.0	0.0
10	0.0	56.2	0.0	0.0	0.0	0.0	8.4	0.0	0.0
11	46.2	245611.8	0.0	0.0	0.0	0.0	36841.8	0.0	0.0
12	15.8	86923.0	0.0	0.0	0.0	0.0	13038.4	0.0	0.0
13	6.0	31912.6	0.0	0.0	0.0	0.0	4786.9	0.0	0.0
14	23.1	116062.5	0.0	0.0	0.0	0.0	17409.4	0.0	0.0
15	40.9	184929.1	0.0	0.0	0.0	0.0	27739.4	0.0	0.0
16	2.3	9228.4	0.0	0.0	0.0	0.0	1384.3	0.0	0.0
17	3.7	14038.6	0.0	0.0	0.0	0.0	2105.8	0.0	0.0
18	37.7	135850.8	0.0	0.0	0.0	0.0	20377.6	0.0	0.0
19	4.3	15286.0	0.0	0.0	0.0	0.0	2292.9	0.0	0.0
20	35.1	63232.4	0.0	0.0	0.0	0.0	9484.9	0.0	0.0

21	0.8	34.6	0.0	0.0	0.0	0.0	5.2	0.0
0.0								

Table 2 - Base Stress Data on the 21 Slices

Slice No.	Alpha (deg)	X-Coord. Slice Cntr (ft)	Base Leng. (ft)	Available Shear Strength (psf)	Mobilized Shear Stress * (psf)
1	6.66	160.16	50.00	1326.66	361.68
2	10.58	187.00	4.07	2408.44	922.28
3	10.58	192.00	6.10	2426.51	929.87
4	10.58	214.57	39.82	2824.90	1096.91
5	14.50	246.07	24.64	3355.14	1611.19
6	14.50	261.00	6.20	3470.59	1669.98
7	14.50	273.28	19.16	3562.78	1716.89
8	18.42	303.28	43.69	3819.05	2175.79
9	18.42	326.99	6.31	3946.27	2251.82
10	22.35	329.99	0.01	3727.24	2429.07
11	22.35	353.12	49.99	3872.28	2528.27
12	26.27	384.12	17.58	3873.15	2830.59
13	26.27	395.00	6.69	3743.49	2731.47
14	26.27	409.54	25.73	3551.32	2584.47
15	30.19	441.54	47.35	3096.23	2455.73
16	30.19	463.15	2.65	2779.89	2189.69
17	34.11	466.15	4.48	2528.31	2137.41
18	34.11	486.85	45.52	2415.75	2035.21
19	38.03	507.85	5.47	2288.22	2043.97
20	38.03	527.54	44.53	1249.71	1040.45
21	41.93	545.47	1.06	195.04	25.56

Sum of the Resisting Forces (including Pier/Pile, Tieback, Reinforcing
Soil Nail, and Applied Forces if applicable) = 1289039.00 (lbs)

Average Available Shear Strength (including Tieback, Pier/Pile, Reinforcing,
Soil Nail, and Applied Forces if applicable) = 2857.83(psf)

Sum of the Driving Forces = 806200.94 (lbs)

Average Mobilized Shear Stress = 1787.37(psf)

Total length of the failure surface = 451.06(ft)

CAUTION - Factor Of Safety Is Calculated By The Modified Bishop
Method. This Method Is Valid Only If The Failure Surface
Approximates A Circular Arc.

*** SEISMIC SLOPE DISPLACEMENT DATA ***
(Note: kv is set = zero for displacement calculations)
Seismic Yield Coefficient (ky) = 0.4075(g)
Calculated Newmark Seismic Displacement = 0.299(ft)

Non-Symmetrical Sliding Resistance Has Been Specified
for Downhill Sliding.

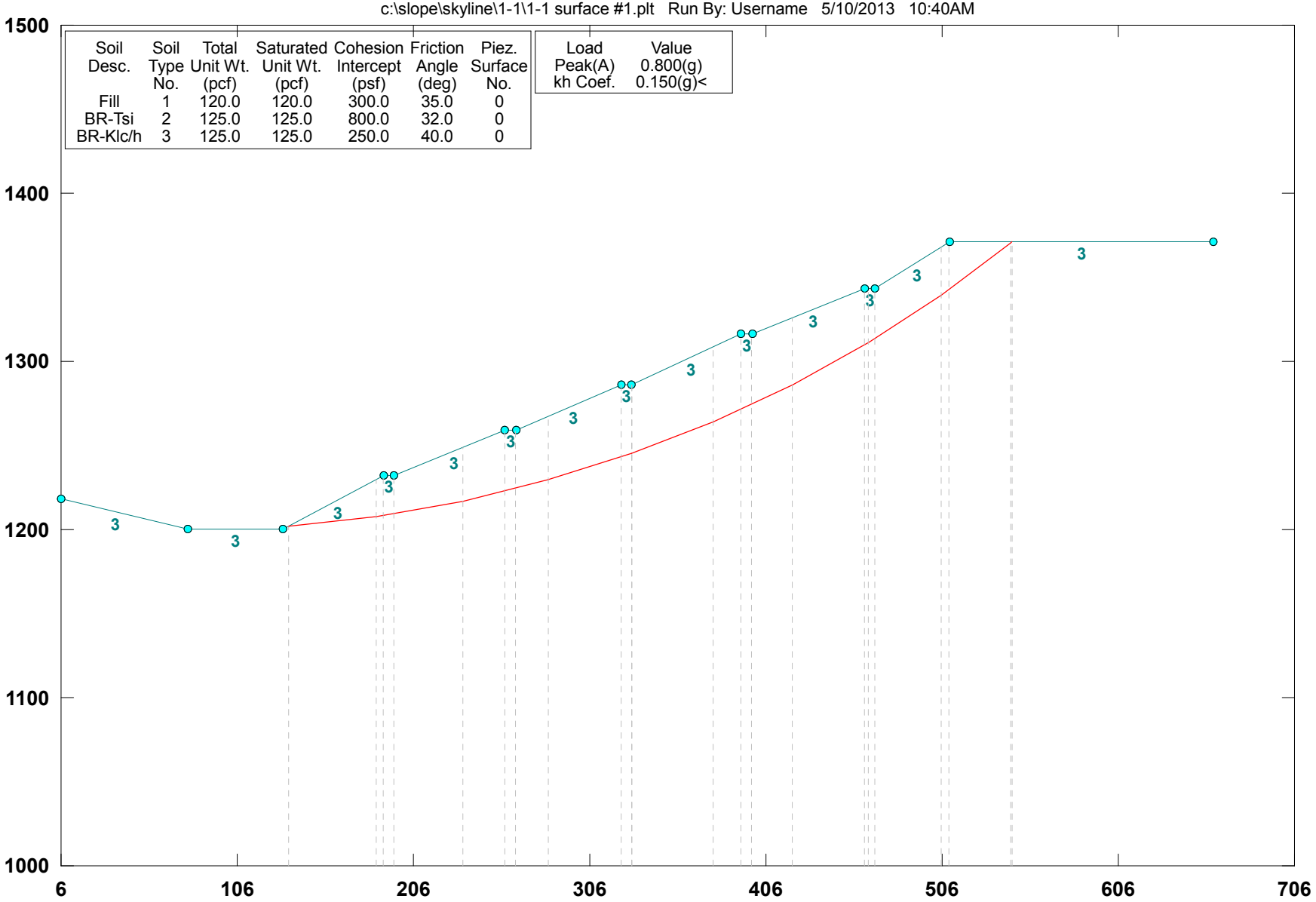
**** END OF GSTABL7 OUTPUT ****

Skyline Height, PN:134-02, Section 1-1',Highest Cut Slope, Pseudostatic

c:\slope\skyline\1-1\1-1 surface #1.plt Run By: Username 5/10/2013 10:40AM

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface No.
Fill	1	120.0	120.0	300.0	35.0	0
BR-Tsi	2	125.0	125.0	800.0	32.0	0
BR-Klc/h	3	125.0	125.0	250.0	40.0	0

Load	Value
Peak(A)	0.800(g)
kh Coef.	0.150(g)<



GSTABL7 v.2 FSmin=1.60

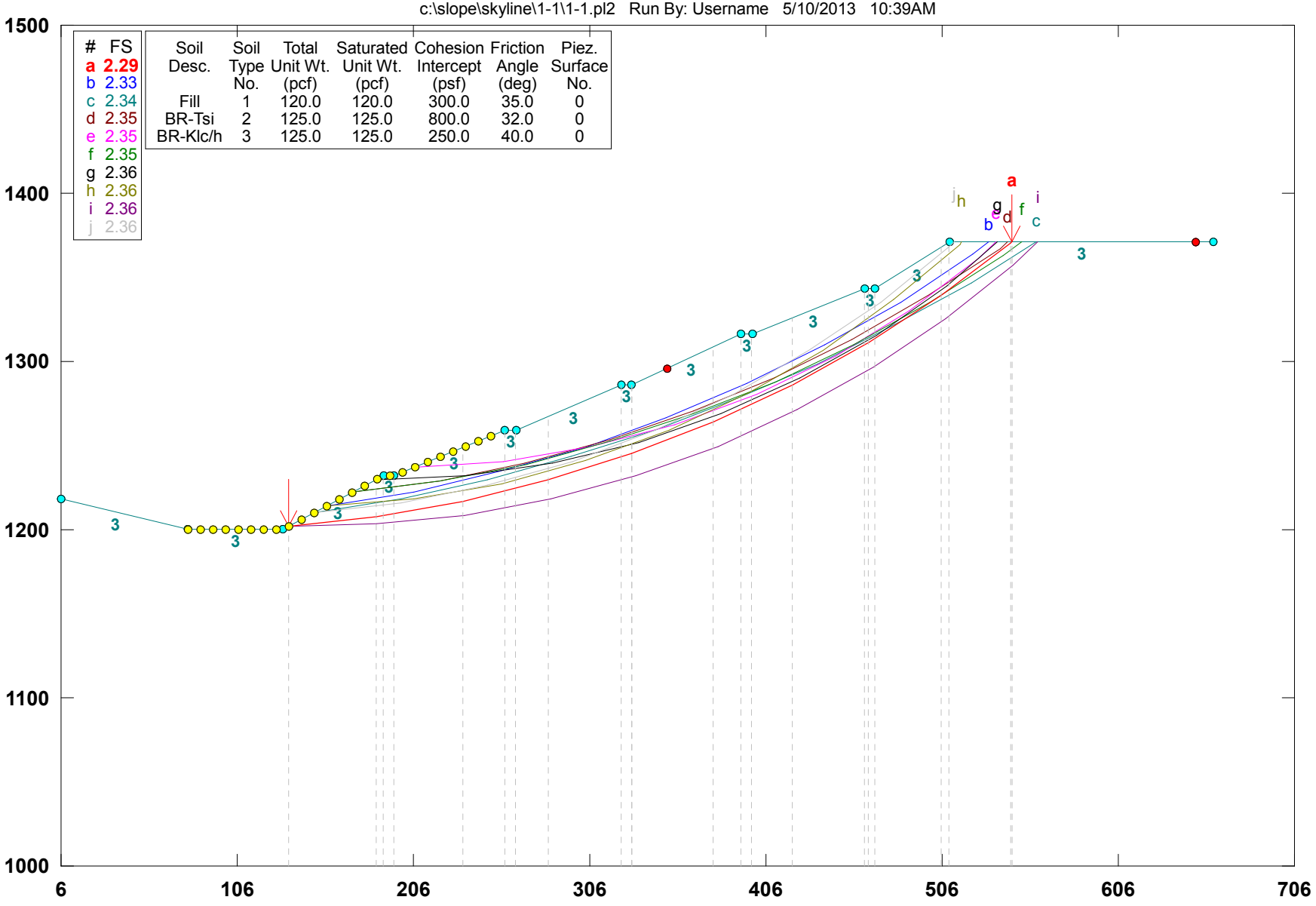
Factor Of Safety Is Calculated By The Modified Bishop Method

Skyline Height, PN:134-02, Section 1-1',Highest Cut Slope, Static

c:\slope\skyline\1-1\1-1.pl2 Run By: Username 5/10/2013 10:39AM

#	FS
a	2.29
b	2.33
c	2.34
d	2.35
e	2.35
f	2.35
g	2.36
h	2.36
i	2.36
j	2.36

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface No.
Fill	1	120.0	120.0	300.0	35.0	0
BR-Tsi	2	125.0	125.0	800.0	32.0	0
BR-Klc/h	3	125.0	125.0	250.0	40.0	0



GSTABL7 v.2 FSmin=2.29

Safety Factors Are Calculated By The Modified Bishop Method

*** GSTABL7 ***

** GSTABL7 by Dr. Garry H. Gregory, Ph.D.,P.E.,D.GE **

** Original Version 1.0, January 1996; Current Ver. 2.005.2, Jan. 2011 **

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****
SLOPE STABILITY ANALYSIS SYSTEM
Modified Bishop, Simplified Janbu, or GLE Method of Slices.
(Includes Spencer & Morgenstern-Price Type Analysis)
Including Pier/Pile, Reinforcement, Soil Nail, Tieback,
Nonlinear Undrained Shear Strength, Curved Phi Envelope,
Anisotropic Soil, Fiber-Reinforced Soil, Boundary Loads, Water
Surfaces, Pseudo-Static & Newmark Earthquake, and Applied Forces.
****

Analysis Run Date:	5/10/2013
Time of Run:	10:47AM
Run By:	Username
Input Data Filename:	C:\SLOPE\Skyline\2-2\2-1.in
Output Filename:	C:\SLOPE\Skyline\2-2\2-1.OUT
Unit System:	English
Plotted Output Filename:	C:\SLOPE\Skyline\2-2\2-1.PLT

PROBLEM DESCRIPTION: Skyline Height, PN:134-02, Section 2-2', Highest Fill Slope, Static

BOUNDARY COORDINATES

13 Top Boundaries
20 Total Boundaries

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Below Bnd	Type
1	0.00	1200.00	102.00	1206.00	3	
2	102.00	1206.00	198.00	1236.00	1	
3	198.00	1236.00	204.00	1236.00	1	
4	204.00	1236.00	270.00	1257.00	1	
5	270.00	1257.00	276.00	1257.00	1	
6	276.00	1257.00	338.00	1286.00	1	
7	338.00	1286.00	344.00	1284.00	1	
8	344.00	1284.00	402.00	1313.00	1	
9	402.00	1313.00	408.00	1313.00	1	
10	408.00	1313.00	471.00	1341.00	1	
11	471.00	1341.00	479.00	1341.00	1	
12	479.00	1341.00	540.00	1368.00	1	
13	540.00	1368.00	780.00	1368.00	1	
14	102.00	1206.00	102.10	1200.00	3	
15	102.10	1200.00	204.00	1199.00	3	
16	204.00	1199.00	225.00	1218.00	3	
17	225.00	1218.00	312.00	1212.00	3	
18	312.00	1212.00	330.00	1224.00	3	
19	330.00	1224.00	540.00	1236.00	3	
20	540.00	1236.00	780.00	1272.00	3	

User Specified Y-Origin = 1000.00(ft)

Default X-Plus Value = 0.00(ft)

Default Y-Plus Value = 0.00(ft)

1

ISOTROPIC SOIL PARAMETERS

3 Type(s) of Soil

Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
1	120.0	120.0	300.0	35.0	0.00	0.0	0
2	125.0	125.0	800.0	32.0	0.00	0.0	0
3	125.0	125.0	250.0	40.0	0.00	0.0	0

1

A Critical Failure Surface Searching Method, Using A Random Technique For Generating Circular Surfaces, Has Been Specified.

2500 Trial Surfaces Have Been Generated.

100 Surface(s) Initiate(s) From Each Of 25 Points Equally Spaced
Along The Ground Surface Between X = 50.00(ft)
and X = 300.00(ft)

Each Surface Terminates Between X = 350.00(ft)
and X = 700.00(ft)

Unless Further Limitations Were Imposed, The Minimum Elevation At Which A Surface Extends Is Y = 0.00(ft)

50.00(ft) Line Segments Define Each Trial Failure Surface.

Following Are Displayed The Ten Most Critical Of The Trial Failure Surfaces Evaluated. They Are
Ordered - Most Critical First.

* * Safety Factors Are Calculated By The Modified Bishop Method * *

Total Number of Trial Surfaces Attempted = 2500

Number of Trial Surfaces With Valid FS = 2500

Statistical Data On All Valid FS Values:
FS Max = 6.963 FS Min = 2.171 FS Ave = 3.734
Standard Deviation = 0.909 Coefficient of Variation = 24.35 %

Failure Surface Specified By 8 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)

1	237.500	1246.659
2	287.465	1248.524
3	336.876	1256.177
4	385.064	1269.517
5	431.377	1288.361
6	475.188	1312.455
7	515.906	1341.474
8	545.216	1368.000

Circle Center At X = 246.914 ; Y = 1673.635 ; and Radius = 427.080

Factor of Safety
*** 2.171 ***

Individual data on the 16 slices

Slice No.	Width (ft)	Weight (lbs)	Water Force Top (lbs)	Water Force Bot (lbs)	Tie Force Norm (lbs)	Tie Force Tan (lbs)	Earthquake Force Hor (lbs)	Earthquake Force Ver (lbs)	Surcharge Load (lbs)
1	32.5	17799.9	0.0	0.0	0.	0.	0.0	0.0	0.0
2	6.0	6491.6	0.0	0.0	0.	0.	0.0	0.0	0.0
3	11.5	15645.6	0.0	0.0	0.	0.	0.0	0.0	0.0
4	49.4	127882.9	0.0	0.0	0.	0.	0.0	0.0	0.0
5	1.1	3966.0	0.0	0.0	0.	0.	0.0	0.0	0.0
6	6.0	19930.3	0.0	0.0	0.	0.	0.0	0.0	0.0
7	41.1	149963.3	0.0	0.0	0.	0.	0.0	0.0	0.0
8	16.9	72765.7	0.0	0.0	0.	0.	0.0	0.0	0.0
9	6.0	25467.5	0.0	0.0	0.	0.	0.0	0.0	0.0
10	23.4	97031.5	0.0	0.0	0.	0.	0.0	0.0	0.0
11	39.6	156614.9	0.0	0.0	0.	0.	0.0	0.0	0.0

12	4.2	14925.3	0.0	0.0	0.	0.	0.0	0.0	0.0
13	3.8	12435.0	0.0	0.0	0.	0.	0.0	0.0	0.0
14	36.9	92315.0	0.0	0.0	0.	0.	0.0	0.0	0.0
15	24.1	29754.8	0.0	0.0	0.	0.	0.0	0.0	0.0
16	5.2	1477.6	0.0	0.0	0.	0.	0.0	0.0	0.0

Failure Surface Specified By 9 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	216.667	1240.030
2	266.655	1238.930
3	316.422	1243.742
4	365.273	1254.400
5	412.523	1270.754
6	457.510	1292.575
7	499.605	1319.558
8	538.217	1351.324
9	554.192	1368.000

Circle Center At X = 250.942 ; Y = 1661.158 ; and Radius = 422.521

Factor of Safety
*** 2.171 ***

1

Failure Surface Specified By 9 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	195.833	1235.323
2	245.833	1235.559
3	295.543	1240.931
4	344.439	1251.382
5	392.002	1266.801
6	437.729	1287.026
7	481.136	1311.842
8	521.764	1340.986
9	552.242	1368.000

Circle Center At X = 218.542 ; Y = 1720.792 ; and Radius = 486.000

Factor of Safety
*** 2.177 ***

Failure Surface Specified By 8 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	258.333	1253.288
2	308.101	1258.107
3	357.196	1267.576
4	405.186	1281.610
5	451.647	1300.087
6	496.168	1322.843
7	538.358	1349.677
8	561.943	1368.000

Circle Center At X = 233.015 ; Y = 1779.439 ; and Radius = 526.760

Factor of Safety
*** 2.180 ***

1

Failure Surface Specified By 9 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	216.667	1240.030
2	266.602	1237.490
3	316.450	1241.385
4	365.385	1251.653
5	412.595	1268.121
6	457.298	1290.518
7	498.754	1318.472
8	536.274	1351.520
9	550.725	1368.000

Circle Center At X = 261.328 ; Y = 1625.856 ; and Radius = 388.402

Factor of Safety
*** 2.183 ***

Failure Surface Specified By 10 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	185.417	1232.068
2	235.417	1231.951
3	285.190	1236.703
4	334.265	1246.277
5	382.175	1260.583
6	428.464	1279.485
7	472.694	1302.803
8	514.443	1330.316
9	553.316	1361.763
10	559.650	1368.000

Circle Center At X = 211.936 ; Y = 1742.173 ; and Radius = 510.794

Factor of Safety
*** 2.184 ***

1

Failure Surface Specified By 10 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	195.833	1235.323
2	245.815	1233.971
3	295.665	1237.836
4	344.842	1246.875
5	392.807	1260.992
6	439.041	1280.030
7	483.038	1303.784
8	524.319	1331.995
9	562.436	1364.355
10	565.918	1368.000

Circle Center At X = 233.936 ; Y = 1711.528 ; and Radius = 477.727

Factor of Safety
*** 2.185 ***

Failure Surface Specified By 9 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	216.667	1240.030
2	266.605	1242.519
3	316.001	1250.265
4	364.304	1263.182
5	410.973	1281.126
6	455.487	1303.896
7	497.349	1331.238
8	536.090	1362.847
9	541.195	1368.000

Circle Center At X = 218.129 ; Y = 1713.017 ; and Radius = 472.989

Factor of Safety
*** 2.189 ***

1

Failure Surface Specified By 8 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	227.083	1243.345
2	276.988	1246.439
3	326.277	1254.836
4	374.391	1268.440
5	420.780	1287.097
6	464.915	1310.594
7	506.293	1338.662
8	540.923	1368.000

Circle Center At X = 223.351 ; Y = 1710.139 ; and Radius = 466.809

Factor of Safety
*** 2.192 ***

Failure Surface Specified By 8 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	247.917	1249.974
2	297.802	1253.360
3	346.954	1262.529
4	394.705	1277.356
5	440.406	1297.640
6	483.436	1323.104
7	523.210	1353.402
8	536.926	1366.640

Circle Center At X = 244.733 ; Y = 1674.167 ; and Radius = 424.205

Factor of Safety
*** 2.193 ***

**** END OF GSTABL7 OUTPUT ****

*** GSTABL7 ***

** GSTABL7 by Dr. Garry H. Gregory, Ph.D.,P.E.,D.GE **

** Original Version 1.0, January 1996; Current Ver. 2.005.2, Jan. 2011 **

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****
SLOPE STABILITY ANALYSIS SYSTEM
Modified Bishop, Simplified Janbu, or GLE Method of Slices.
(Includes Spencer & Morgenstern-Price Type Analysis)
Including Pier/Pile, Reinforcement, Soil Nail, Tieback,
Nonlinear Undrained Shear Strength, Curved Phi Envelope,
Anisotropic Soil, Fiber-Reinforced Soil, Boundary Loads, Water
Surfaces, Pseudo-Static & Newmark Earthquake, and Applied Forces.
****

Analysis Run Date: 5/10/2013
Time of Run: 10:48AM
Run By: Username
Input Data Filename: C:\SLOPE\Skyline\2-2\2-1 Surface #1.in
Output Filename: C:\SLOPE\Skyline\2-2\2-1 Surface #1.OUT
Unit System: English

Plotted Output Filename: C:\SLOPE\Skyline\2-2\2-1 Surface #1.PLT

PROBLEM DESCRIPTION: Skyline Height, PN:134-02, Section 2-2', Highest Fill Slope, Pseudostatic

BOUNDARY COORDINATES

13 Top Boundaries

20 Total Boundaries

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Below Bnd	Type
1	0.00	1200.00	102.00	1206.00	3	
2	102.00	1206.00	198.00	1236.00	1	
3	198.00	1236.00	204.00	1236.00	1	
4	204.00	1236.00	270.00	1257.00	1	
5	270.00	1257.00	276.00	1257.00	1	
6	276.00	1257.00	338.00	1286.00	1	
7	338.00	1286.00	344.00	1284.00	1	
8	344.00	1284.00	402.00	1313.00	1	
9	402.00	1313.00	408.00	1313.00	1	
10	408.00	1313.00	471.00	1341.00	1	
11	471.00	1341.00	479.00	1341.00	1	
12	479.00	1341.00	540.00	1368.00	1	
13	540.00	1368.00	780.00	1368.00	1	
14	102.00	1206.00	102.10	1200.00	3	
15	102.10	1200.00	204.00	1199.00	3	
16	204.00	1199.00	225.00	1218.00	3	
17	225.00	1218.00	312.00	1212.00	3	
18	312.00	1212.00	330.00	1224.00	3	
19	330.00	1224.00	540.00	1236.00	3	
20	540.00	1236.00	780.00	1272.00	3	

User Specified Y-Origin = 1000.00(ft)

Default X-Plus Value = 0.00(ft)

Default Y-Plus Value = 0.00(ft)

1

ISOTROPIC SOIL PARAMETERS

3 Type(s) of Soil

Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
1	120.0	120.0	300.0	35.0	0.00	0.0	0
2	125.0	125.0	800.0	32.0	0.00	0.0	0

3 125.0 125.0 250.0 40.0 0.00 0.0
0

Specified Peak Ground Acceleration Coefficient (A) = 0.800(g)
Specified Horizontal Earthquake Coefficient (kh) = 0.150(g)
Specified Vertical Earthquake Coefficient (kv) = 0.000(g)

Specified Seismic Pore-Pressure Factor = 0.000
1

Trial Failure Surface Specified By 8 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	237.500	1246.659
2	287.465	1248.524
3	336.876	1256.177
4	385.064	1269.517
5	431.377	1288.361
6	475.188	1312.455
7	515.906	1341.474
8	545.216	1368.000

DEFLECTION ANGLE & SEGMENT DATA FOR SPECIFIED SURFACE(Excluding Last Segment)

Angle/Segment No.	Deflection(Deg)	Segment Length(ft)
1	6.67	50.00
2	6.67	50.00
3	6.67	50.00
4	6.67	50.00
5	6.67	50.00

Circle Center At X = 246.913(ft) ; Y = 1673.637(ft); and Radius = 427.082(ft)

* * Factor Of Safety Is Calculated By The Modified Bishop Method * *

Factor Of Safety For The Preceding Specified Surface = 1.515

Table 1 - Individual Data on the 16 Slices

Slice No.	Width (ft)	Weight (lbs)	Water Force Top (lbs)	Water Force Bot (lbs)	Tie Force Norm (lbs)	Tie Force Tan (lbs)	Earthquake Force Hor (lbs)	Earthquake Force Ver (lbs)	Surcharge Load (lbs)
1	32.5	17799.5	0.0	0.0	0.0	0.0	2669.9	0.0	0.0
2	6.0	6491.4	0.0	0.0	0.0	0.0	973.7	0.0	0.0
3	11.5	15644.5	0.0	0.0	0.0	0.0	2346.7	0.0	0.0
4	49.4	127883.6	0.0	0.0	0.0	0.0	19182.5	0.0	0.0
5	1.1	3966.1	0.0	0.0	0.0	0.0	594.9	0.0	0.0
6	6.0	19930.6	0.0	0.0	0.0	0.0	2989.6	0.0	0.0
7	41.1	149964.0	0.0	0.0	0.0	0.0	22494.6	0.0	0.0
8	16.9	72764.1	0.0	0.0	0.0	0.0	10914.6	0.0	0.0
9	6.0	25467.4	0.0	0.0	0.0	0.0	3820.1	0.0	0.0
10	23.4	97032.1	0.0	0.0	0.0	0.0	14554.8	0.0	0.0
11	39.6	156614.0	0.0	0.0	0.0	0.0	23492.1	0.0	0.0
12	4.2	14924.2	0.0	0.0	0.0	0.0	2238.6	0.0	0.0
13	3.8	12436.2	0.0	0.0	0.0	0.0	1865.4	0.0	0.0
14	36.9	92316.0	0.0	0.0	0.0	0.0	13847.4	0.0	0.0
15	24.1	29754.2	0.0	0.0	0.0	0.0	4463.1	0.0	0.0
16	5.2	1477.3	0.0	0.0	0.0	0.0	221.6	0.0	0.0

Table 2 - Base Stress Data on the 16 Slices

Slice No.	Alpha (deg)	X-Coord. Slice Cntr (ft)	Base Leng. (ft)	Available Shear Strength (psf)	Mobilized Shear Stress * (psf)

1	2.14	253.75	32.52	671.89	102.01
2	2.14	273.00	6.00	1039.62	200.68
3	2.14	281.73	11.47	1234.17	252.54
4	8.80	312.17	50.00	1971.14	760.91
5	15.47	337.44	1.17	2456.42	1381.35
6	15.47	341.00	6.23	2328.04	1301.36
7	15.47	364.53	42.61	2533.01	1429.01
8	22.14	393.53	18.28	2784.68	2027.74
9	22.14	405.00	6.48	2754.11	2003.57
10	22.14	419.69	25.24	2698.83	1959.82
11	28.81	451.19	45.22	2445.91	2104.15
12	28.81	473.09	4.78	2228.72	1898.83
13	35.48	477.09	4.68	1943.98	1853.73
14	35.48	497.45	45.32	1543.16	1423.59
15	42.15	527.95	32.50	821.19	714.58
16	42.15	542.61	7.03	351.35	164.18

Sum of the Resisting Forces (including Pier/Pile, Tieback, Reinforcing
Soil Nail, and Applied Forces if applicable) = 632288.25 (lbs)

Average Available Shear Strength (including Tieback, Pier/Pile, Reinforcing,
Soil Nail, and Applied Forces if applicable) = 1862.24(psf)

Sum of the Driving Forces = 417376.72 (lbs)

Average Mobilized Shear Stress = 1229.27(psf)

Total length of the failure surface = 339.53(ft)

CAUTION - Factor Of Safety Is Calculated By The Modified Bishop
Method. This Method Is Valid Only If The Failure Surface
Approximates A Circular Arc.

*** SEISMIC SLOPE DISPLACEMENT DATA ***
(Note: kv is set = zero for displacement calculations)
Seismic Yield Coefficient (ky) = 0.3786(g)
Calculated Newmark Seismic Displacement = 0.347(ft)

Non-Symmetrical Sliding Resistance Has Been Specified
for Downhill Sliding.

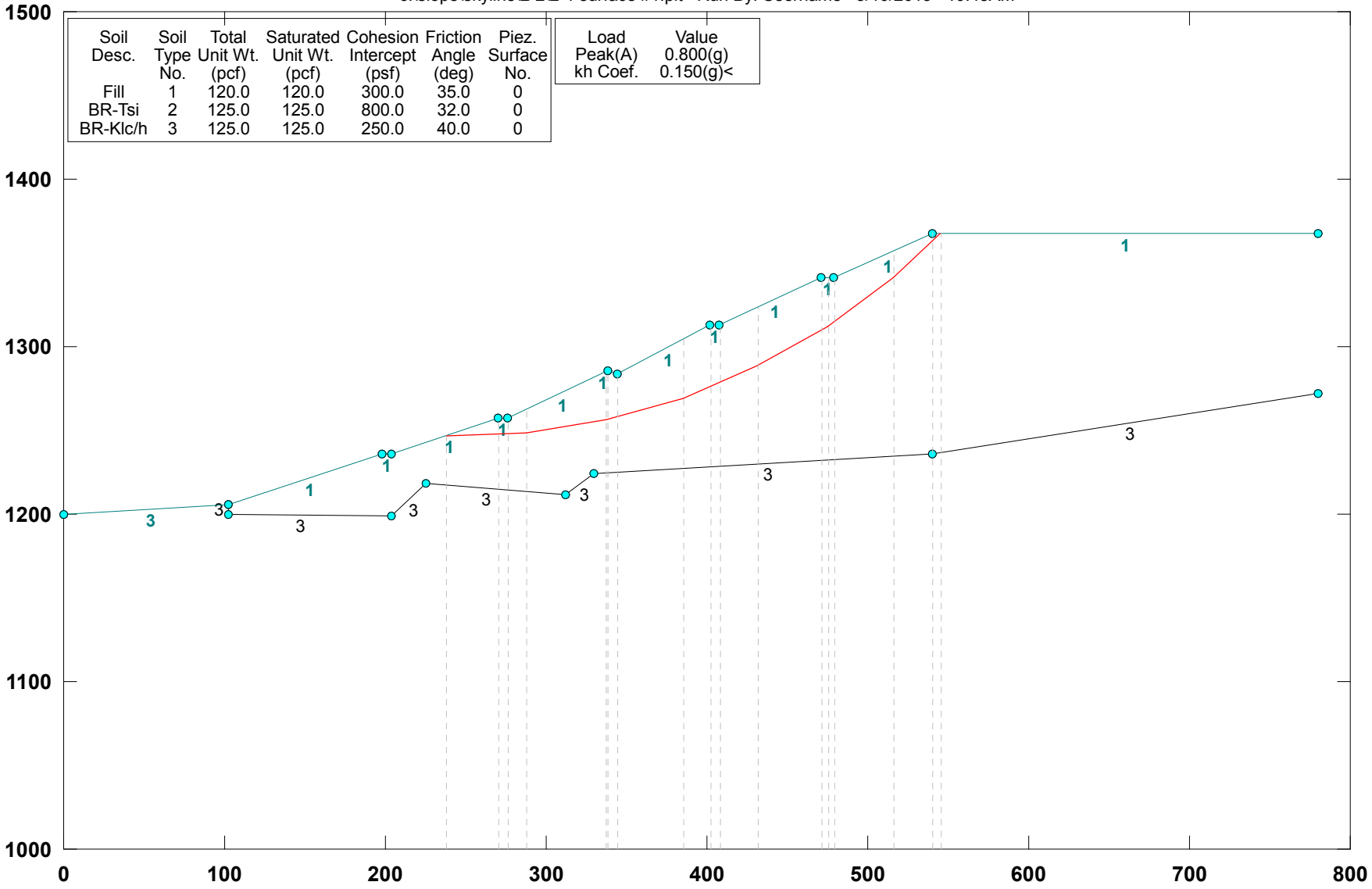
**** END OF GSTABL7 OUTPUT ****

Skyline Height, PN:134-02, Section 2-2',Highest Fill Slope, Pseudostatic

c:\slope\skyline\2-2\2-1 surface #1.plt Run By: Username 5/10/2013 10:48AM

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface No.
Fill	1	120.0	120.0	300.0	35.0	0
BR-Tsi	2	125.0	125.0	800.0	32.0	0
BR-Klc/h	3	125.0	125.0	250.0	40.0	0

Load	Value
Peak(A)	0.800(g)
kh Coef.	0.150(g)<

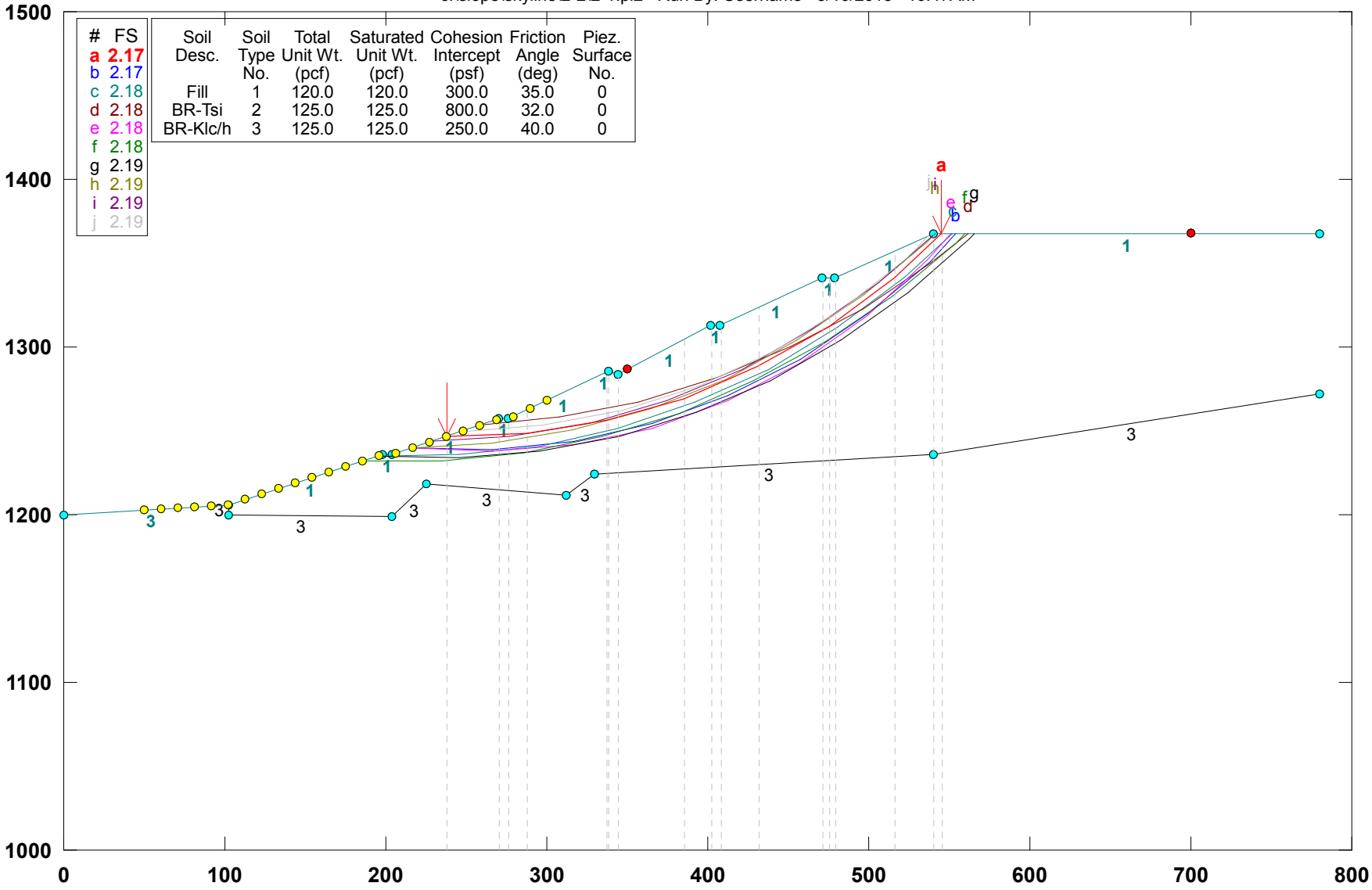


GSTABL7 v.2 FSmin=1.52

Factor Of Safety Is Calculated By The Modified Bishop Method

Skyline Height, PN:134-02, Section 2-2',Highest Fill Slope, Static

c:\slope\skyline\2-2\2-1.pl2 Run By: Username 5/10/2013 10:47AM



#	FS
a	2.17
b	2.17
c	2.18
d	2.18
e	2.18
f	2.18
g	2.19
h	2.19
i	2.19
j	2.19

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface No.
Fill	1	120.0	120.0	300.0	35.0	0
BR-Tsi	2	125.0	125.0	800.0	32.0	0
BR-Klc/h	3	125.0	125.0	250.0	40.0	0

GSTABL7 v.2 FSmin=2.17

Safety Factors Are Calculated By The Modified Bishop Method

*** GSTABL7 ***

** GSTABL7 by Dr. Garry H. Gregory, Ph.D.,P.E.,D.GE **

** Original Version 1.0, January 1996; Current Ver. 2.005.2, Jan. 2011 **

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****
SLOPE STABILITY ANALYSIS SYSTEM
Modified Bishop, Simplified Janbu, or GLE Method of Slices.
(Includes Spencer & Morgenstern-Price Type Analysis)
Including Pier/Pile, Reinforcement, Soil Nail, Tieback,
Nonlinear Undrained Shear Strength, Curved Phi Envelope,
Anisotropic Soil, Fiber-Reinforced Soil, Boundary Loads, Water
Surfaces, Pseudo-Static & Newmark Earthquake, and Applied Forces.
****

Analysis Run Date:	5/10/2013
Time of Run:	11:09AM
Run By:	Username
Input Data Filename:	C:\SLOPE\Skyline\3-3\3-1.in
Output Filename:	C:\SLOPE\Skyline\3-3\3-1.OUT
Unit System:	English
Plotted Output Filename:	C:\SLOPE\Skyline\3-3\3-1.PLT

PROBLEM DESCRIPTION: Skyline Height, PN:134-02, Section 3-3', Buttressed Slope, Static

BOUNDARY COORDINATES

7 Top Boundaries
9 Total Boundaries

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	0.00	1222.00	222.00	1220.00	3
2	222.00	1220.00	282.00	1248.00	1
3	282.00	1248.00	292.00	1246.00	1
4	292.00	1246.00	355.00	1282.00	1
5	355.00	1282.00	378.00	1285.00	1
6	378.00	1285.00	420.00	1252.00	3
7	420.00	1252.00	480.00	1210.00	3
8	222.00	1220.00	272.00	1216.00	3
9	272.00	1216.00	378.00	1285.00	3

User Specified Y-Origin = 1000.00(ft)

Default X-Plus Value = 0.00(ft)

Default Y-Plus Value = 0.00(ft)

1

ISOTROPIC SOIL PARAMETERS

3 Type(s) of Soil

Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Piez. Constant (psf)	Surface No.
1	120.0	120.0	300.0	35.0	0.00	0.0	0
2	125.0	125.0	800.0	32.0	0.00	0.0	0
3	125.0	125.0	250.0	40.0	0.00	0.0	0

ANISOTROPIC STRENGTH PARAMETERS
1 soil type(s)

Soil Type 3 Is Anisotropic

Number Of Direction Ranges Specified = 3

Direction Range No.	Counterclockwise Direction Limit (deg)	Cohesion Intercept (psf)	Friction Angle (deg)
1	16.0	250.00	40.00
2	20.0	100.00	20.00
3	90.0	250.00	40.00

ANISOTROPIC SOIL NOTES:
(1) An input value of 0.01 for C and/or Phi will cause Aniso C and/or Phi to be ignored in that range.
(2) An input value of 0.02 for Phi will set both Phi and C equal to zero, with no water weight in the tension crack.
(3) An input value of 0.03 for Phi will set both Phi and C equal to zero, with water weight in the tension crack.

Janbus Empirical Coef is being used for the case of c & phi both > 0
1

A Critical Failure Surface Searching Method, Using A Random Technique For Generating Sliding Block Surfaces, Has Been Specified.

1500 Trial Surfaces Have Been Generated.

2 Boxes Specified For Generation Of Central Block Base

Length Of Line Segments For Active And Passive Portions Of Sliding Block Is 25.0

Box No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Height (ft)
1	220.00	1180.00	280.00	1210.00	60.00
2	350.00	1250.00	400.00	1235.00	50.00

Following Are Displayed The Ten Most Critical Of The Trial Failure Surfaces Evaluated. They Are Ordered - Most Critical First.

* * Safety Factors Are Calculated By The Simplified Janbu Method * *

Total Number of Trial Surfaces Attempted = 1500

Number of Trial Surfaces With Valid FS = 1500

Statistical Data On All Valid FS Values:
FS Max = 16.684 FS Min = 1.798 FS Ave = 4.029
Standard Deviation = 1.497 Coefficient of Variation = 37.16 %

Failure Surface Specified By 4 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	223.904	1220.888
2	243.024	1206.640
3	382.150	1255.086
4	392.884	1273.305

Factor of Safety
*** 1.798 ***

Individual data on the 10 slices

Slice No.	Width (ft)	Weight (lbs)	Water Force Top (lbs)	Water Force Bot (lbs)	Tie Force Norm (lbs)	Tie Force Tan (lbs)	Earthquake Force Hor (lbs)	Earthquake Force Ver (lbs)	Surcharge Load (lbs)
1	1.6	178.0	0.0	0.0	0.	0.	0.0	0.0	0.0
2	17.6	26916.2	0.0	0.0	0.	0.	0.0	0.0	0.0
3	27.3	81911.8	0.0	0.0	0.	0.	0.0	0.0	0.0
4	4.1	13160.0	0.0	0.0	0.	0.	0.0	0.0	0.0
5	7.6	24939.5	0.0	0.0	0.	0.	0.0	0.0	0.0
6	10.0	30246.8	0.0	0.0	0.	0.	0.0	0.0	0.0

7	63.0	226469.1	0.0	0.0	0.	0.	0.0	0.0	0.0
8	23.0	96670.3	0.0	0.0	0.	0.	0.0	0.0	0.0
9	4.2	15048.0	0.0	0.0	0.	0.	0.0	0.0	0.0
10	10.7	17881.1	0.0	0.0	0.	0.	0.0	0.0	0.0

Failure Surface Specified By 4 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	223.904	1220.888
2	243.024	1206.640
3	382.150	1255.086
4	392.884	1273.305

Factor of Safety
*** 1.798 ***

1

Failure Surface Specified By 4 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	223.904	1220.888
2	243.024	1206.640
3	382.150	1255.086
4	392.884	1273.305

Factor of Safety
*** 1.798 ***

Failure Surface Specified By 6 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	214.495	1220.068
2	223.125	1214.636

3	246.202	1205.021
4	377.475	1249.225
5	382.127	1273.788
6	382.754	1281.265

Factor of Safety
*** 1.834 ***

1

Failure Surface Specified By 6 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	214.495	1220.068
2	223.125	1214.636
3	246.202	1205.021
4	377.475	1249.225
5	382.127	1273.788
6	382.754	1281.265

Factor of Safety
*** 1.834 ***

Failure Surface Specified By 6 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	214.495	1220.068
2	223.125	1214.636
3	246.202	1205.021
4	377.475	1249.225
5	382.127	1273.788
6	382.754	1281.265

Factor of Safety
*** 1.834 ***

1

Failure Surface Specified By 6 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	210.455	1220.104
2	220.579	1216.252
3	242.218	1203.732
4	353.842	1242.838
5	359.649	1267.155
6	373.674	1284.436

Factor of Safety

*** 1.839 ***

Failure Surface Specified By 6 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	210.455	1220.104
2	220.579	1216.252
3	242.218	1203.732
4	353.842	1242.838
5	359.649	1267.155
6	373.674	1284.436

Factor of Safety

*** 1.839 ***

1

Failure Surface Specified By 6 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	210.455	1220.104
2	220.579	1216.252
3	242.218	1203.732
4	353.842	1242.838
5	359.649	1267.155
6	373.674	1284.436

Factor of Safety
*** 1.839 ***

Failure Surface Specified By 6 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	205.879	1220.145
2	209.550	1216.478
3	233.883	1210.742
4	357.346	1246.316
5	368.214	1268.830
6	381.565	1282.199

Factor of Safety
*** 1.840 ***

**** END OF GSTABL7 OUTPUT ****

*** GSTABL7 ***

** GSTABL7 by Dr. Garry H. Gregory, Ph.D.,P.E.,D.GE **

** Original Version 1.0, January 1996; Current Ver. 2.005.2, Jan. 2011 **

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SLOPE STABILITY ANALYSIS SYSTEM
Modified Bishop, Simplified Janbu, or GLE Method of Slices.
(Includes Spencer & Morgenstern-Price Type Analysis)
Including Pier/Pile, Reinforcement, Soil Nail, Tieback,
Nonlinear Undrained Shear Strength, Curved Phi Envelope,
Anisotropic Soil, Fiber-Reinforced Soil, Boundary Loads, Water
Surfaces, Pseudo-Static & Newmark Earthquake, and Applied Forces.
****

Analysis Run Date: 5/10/2013
Time of Run: 11:10AM
Run By: Username
Input Data Filename: C:\SLOPE\Skyline\3-3\3-1 Surface #1.in
Output Filename: C:\SLOPE\Skyline\3-3\3-1 Surface #1.OUT
Unit System: English

Plotted Output Filename: C:\SLOPE\Skyline\3-3\3-1 Surface #1.PLT

PROBLEM DESCRIPTION: Skyline Height, PN:134-02, Section 3-3', Buttressed Slope, Pseudostatic

BOUNDARY COORDINATES

7 Top Boundaries

9 Total Boundaries

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Below Bnd Type
1	0.00	1222.00	222.00	1220.00	3
2	222.00	1220.00	282.00	1248.00	1
3	282.00	1248.00	292.00	1246.00	1
4	292.00	1246.00	355.00	1282.00	1
5	355.00	1282.00	378.00	1285.00	1
6	378.00	1285.00	420.00	1252.00	3
7	420.00	1252.00	480.00	1210.00	3
8	222.00	1220.00	272.00	1216.00	3
9	272.00	1216.00	378.00	1285.00	3

User Specified Y-Origin = 1000.00(ft)

Default X-Plus Value = 0.00(ft)

Default Y-Plus Value = 0.00(ft)

1

ISOTROPIC SOIL PARAMETERS

3 Type(s) of Soil

Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
1	120.0	120.0	300.0	35.0	0.00	0.0	0
2	125.0	125.0	800.0	32.0	0.00	0.0	0
3	125.0	125.0	250.0	40.0	0.00	0.0	0

ANISOTROPIC STRENGTH PARAMETERS

1 soil type(s)

Soil Type 3 Is Anisotropic

Number Of Direction Ranges Specified = 3

Direction Range No.	Counterclockwise Direction Limit (deg)	Cohesion Intercept (psf)	Friction Angle (deg)
1	16.0	250.00	40.00
2	20.0	100.00	20.00
3	90.0	250.00	40.00

ANISOTROPIC SOIL NOTES:
(1) An input value of 0.01 for C and/or Phi will cause Aniso C and/or Phi to be ignored in that range.
(2) An input value of 0.02 for Phi will set both Phi and C equal to zero, with no water weight in the tension crack.
(3) An input value of 0.03 for Phi will set both Phi and C equal to zero, with water weight in the tension crack.

Specified Peak Ground Acceleration Coefficient (A) = 0.800(g)
Specified Horizontal Earthquake Coefficient (kh) = 0.150(g)
Specified Vertical Earthquake Coefficient (kv) = 0.000(g)

Specified Seismic Pore-Pressure Factor = 0.000

Janbu's Empirical Coef. is being used for the case of c & phi both > 0
1

Trial Failure Surface Specified By 4 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	223.904	1220.889
2	243.024	1206.640
3	382.150	1255.086
4	392.884	1273.305

Janbu's Empirical Coefficient (fo) = 1.046

* * Factor Of Safety Is Calculated By The Simplified Janbu Method * *

Factor Of Safety For The Preceding Specified Surface = 1.280

Table 1 - Individual Data on the 10 Slices

Slice No.	Width (ft)	Weight (lbs)	Water Force Top (lbs)	Water Force Bot (lbs)	Tie Force Norm (lbs)	Tie Force Tan (lbs)	Earthquake Force Hor (lbs)	Earthquake Force Ver (lbs)	Surcharge Load (lbs)
1	1.6	178.0	0.0	0.0	0.0	0.0	26.7	0.0	0.0
2	17.6	26916.4	0.0	0.0	0.0	0.0	4037.5	0.0	0.0
3	27.3	81911.4	0.0	0.0	0.0	0.0	12286.7	0.0	0.0
4	4.1	13159.7	0.0	0.0	0.0	0.0	1974.0	0.0	0.0
5	7.6	24939.7	0.0	0.0	0.0	0.0	3741.0	0.0	0.0
6	10.0	30246.8	0.0	0.0	0.0	0.0	4537.0	0.0	0.0
7	63.0	226468.1	0.0	0.0	0.0	0.0	33970.2	0.0	0.0
8	23.0	96669.6	0.0	0.0	0.0	0.0	14500.4	0.0	0.0
9	4.1	15047.0	0.0	0.0	0.0	0.0	2257.0	0.0	0.0
10	10.7	17881.0	0.0	0.0	0.0	0.0	2682.2	0.0	0.0

Table 2 - Base Stress Data on the 10 Slices

Slice No.	Alpha (deg)	X-Coord. Slice Cntr (ft)	Base Leng. (ft)	Available Shear Strength (psf)	Mobilized Shear Stress * (psf)
1	-36.69	224.69	1.95	799.36	-54.30
2	-36.69	234.25	21.89	3746.54	-731.76
3	19.20	256.66	28.88	1149.65	1413.19
4	19.20	272.35	4.36	2258.23	1504.41

5	19.20	278.21	8.04	1248.82	1546.26
6	19.20	287.00	10.59	1157.05	1423.13
7	19.20	323.50	66.71	1356.96	1691.35
8	19.20	366.50	24.35	1570.28	1977.55
9	19.20	380.08	4.39	1367.85	1705.95
10	59.50	387.52	21.15	1536.53	1562.10

Sum of the Resisting Forces (including Pier/Pile, Tieback, Reinforcing
Soil Nail, and Applied Forces if applicable) = 318429.09 (lbs)

Average Available Shear Strength (including Tieback, Pier/Pile, Reinforcing,
Soil Nail, and Applied Forces if applicable) = 1655.80(psf)

Sum of the Driving Forces = 260255.58 (lbs)

Average Mobilized Shear Stress = 1353.30(psf)

Total length of the failure surface = 192.31(ft)

*** SEISMIC SLOPE DISPLACEMENT DATA ***
(Note: kv is set = zero for displacement calculations)
Seismic Yield Coefficient (ky) = 0.3376(g)
Calculated Newmark Seismic Displacement = 0.436(ft)

Non-Symmetrical Sliding Resistance Has Been Specified
for Downhill Sliding.

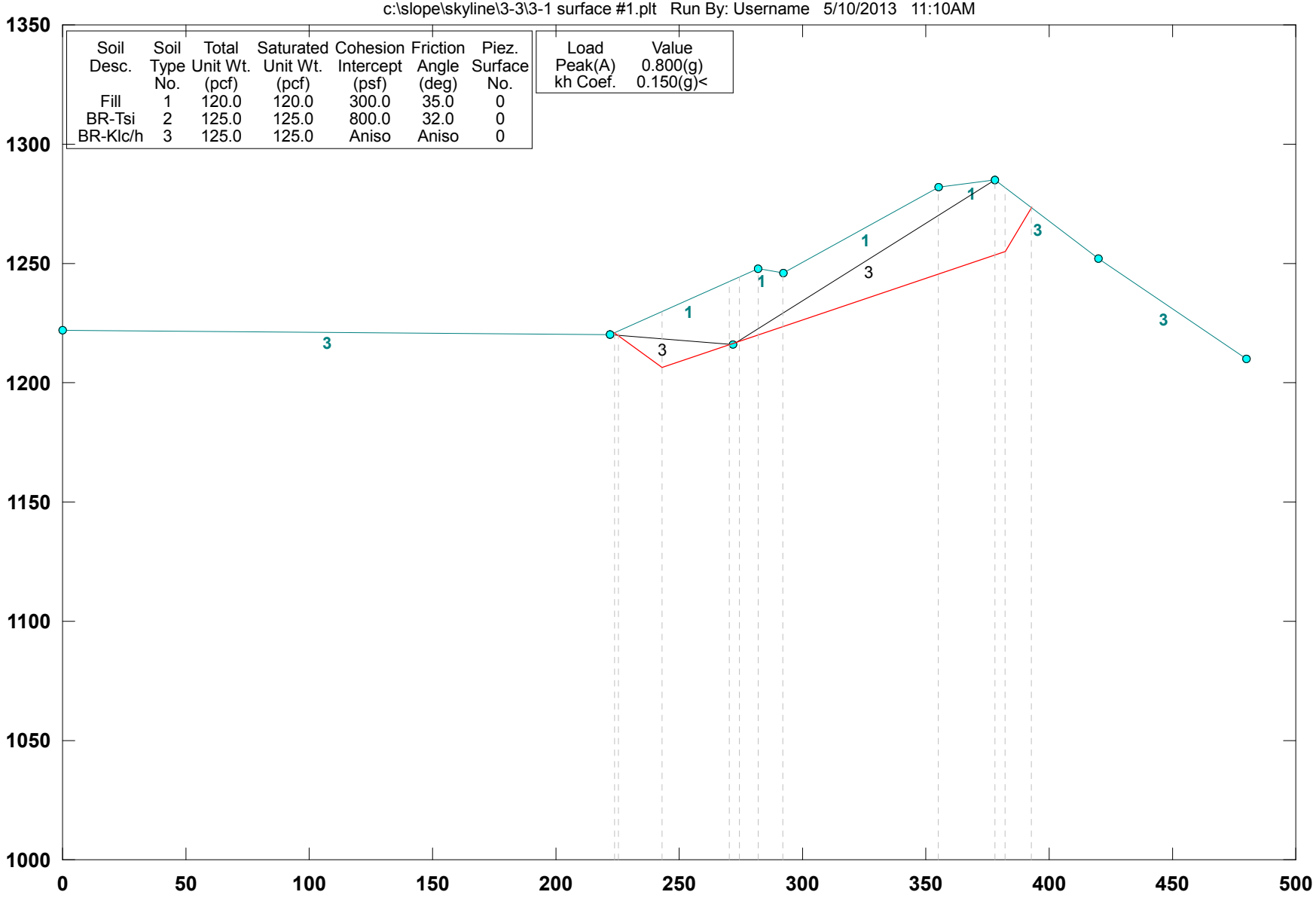
**** END OF GSTABL7 OUTPUT ****

Skyline Height, PN:134-02, Section 3-3',Buttressed Slope, Pseudostatic

c:\slope\skyline\3-3\3-1 surface #1.plt Run By: Username 5/10/2013 11:10AM

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface No.
Fill	1	120.0	120.0	300.0	35.0	0
BR-Tsi	2	125.0	125.0	800.0	32.0	0
BR-Klc/h	3	125.0	125.0	Aniso	Aniso	0

Load	Value
Peak(A)	0.800(g)
kh Coef.	0.150(g)<

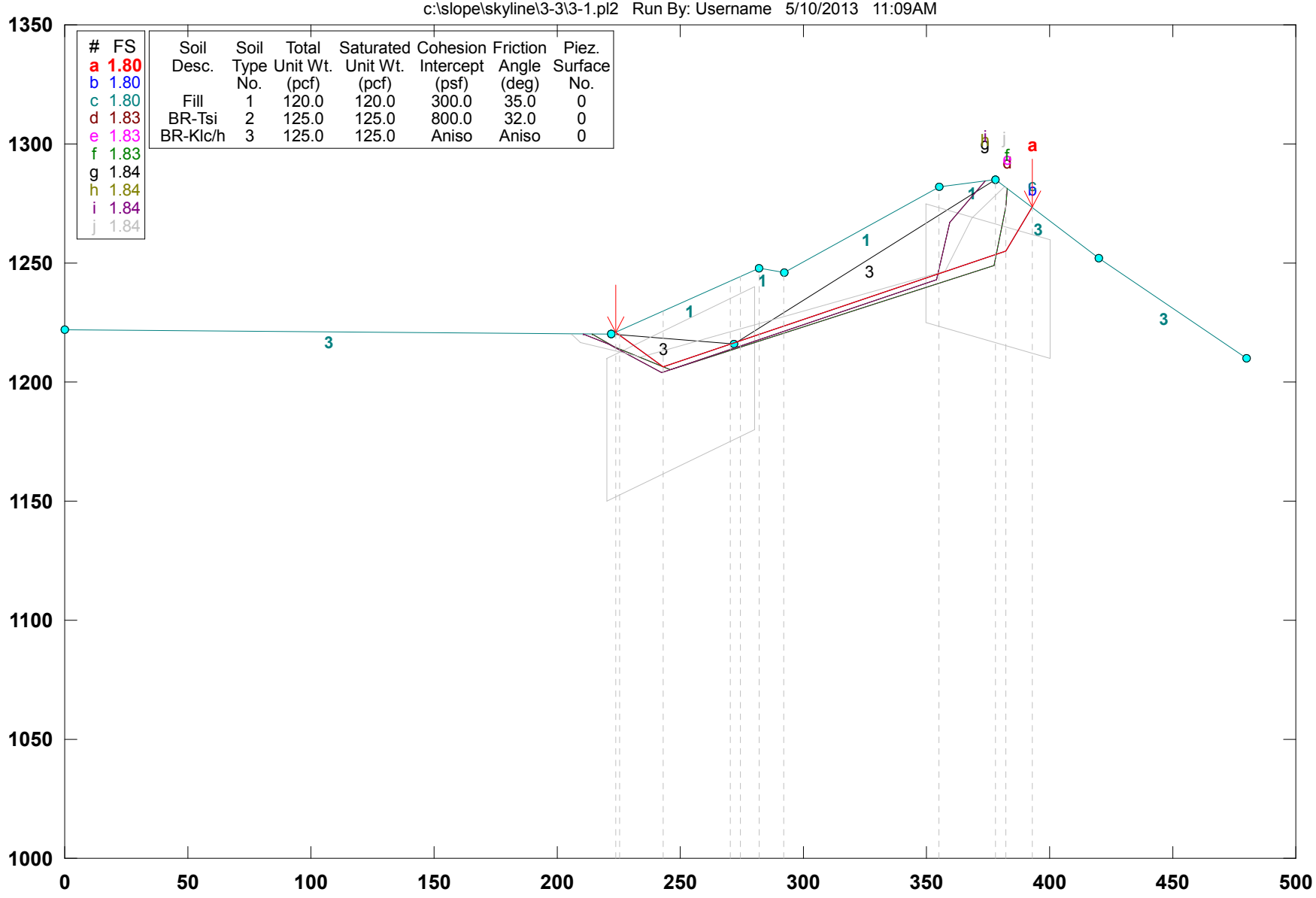


GSTABL7 v.2 FSmin=1.28

Factor Of Safety Is Calculated By The Simplified Janbu Method

Skyline Height, PN:134-02, Section 3-3',Buttressed Slope, Static

c:\slope\skyline\3-3\3-1.pl2 Run By: Username 5/10/2013 11:09AM



#	FS
a	1.80
b	1.80
c	1.80
d	1.83
e	1.83
f	1.83
g	1.84
h	1.84
i	1.84
j	1.84

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface No.
Fill	1	120.0	120.0	300.0	35.0	0
BR-Tsi	2	125.0	125.0	800.0	32.0	0
BR-Klc/h	3	125.0	125.0	Aniso	Aniso	0

GSTABL7 v.2 FSmin=1.80

Safety Factors Are Calculated By The Simplified Janbu Method for the case of c & phi both > 0

*** GSTABL7 ***

** GSTABL7 by Dr. Garry H. Gregory, Ph.D.,P.E.,D.GE **

** Original Version 1.0, January 1996; Current Ver. 2.005.2, Jan. 2011 **

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SLOPE STABILITY ANALYSIS SYSTEM
Modified Bishop, Simplified Janbu, or GLE Method of Slices.
(Includes Spencer & Morgenstern-Price Type Analysis)
Including Pier/Pile, Reinforcement, Soil Nail, Tieback,
Nonlinear Undrained Shear Strength, Curved Phi Envelope,
Anisotropic Soil, Fiber-Reinforced Soil, Boundary Loads, Water
Surfaces, Pseudo-Static & Newmark Earthquake, and Applied Forces.
****

Analysis Run Date:	5/10/2013
Time of Run:	11:22AM
Run By:	Username
Input Data Filename:	C:\SLOPE\Skyline\3-3\3-bac.in
Output Filename:	C:\SLOPE\Skyline\3-3\3-bac.OUT
Unit System:	English
Plotted Output Filename:	C:\SLOPE\Skyline\3-3\3-bac.PLT

PROBLEM DESCRIPTION: Skyline Height, PN:134-02, Section 3-3', Temporary Backcut, Static

BOUNDARY COORDINATES

5 Top Boundaries
5 Total Boundaries

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	0.00	1222.00	222.00	1220.00	3
2	222.00	1220.00	272.00	1216.00	3
3	272.00	1216.00	378.00	1285.00	1
4	378.00	1285.00	420.00	1252.00	3
5	420.00	1252.00	480.00	1210.00	3

User Specified Y-Origin = 1000.00(ft)

Default X-Plus Value = 0.00(ft)

Default Y-Plus Value = 0.00(ft)

1

ISOTROPIC SOIL PARAMETERS

3 Type(s) of Soil

Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Piez. Constant (psf)	Surface No.
1	120.0	120.0	300.0	35.0	0.00	0.0	0
2	125.0	125.0	800.0	32.0	0.00	0.0	0
3	125.0	125.0	250.0	40.0	0.00	0.0	0

ANISOTROPIC STRENGTH PARAMETERS

1 soil type(s)

Soil Type 3 Is Anisotropic

Number Of Direction Ranges Specified = 3

Direction Range No.	Counterclockwise Direction Limit (deg)	Cohesion Intercept (psf)	Friction Angle (deg)

1	16.0	250.00	40.00
2	20.0	100.00	20.00
3	90.0	250.00	40.00

ANISOTROPIC SOIL NOTES:
(1) An input value of 0.01 for C and/or Phi will cause Aniso C and/or Phi to be ignored in that range.
(2) An input value of 0.02 for Phi will set both Phi and C equal to zero, with no water weight in the tension crack.
(3) An input value of 0.03 for Phi will set both Phi and C equal to zero, with water weight in the tension crack.

Janbus Empirical Coef is being used for the case of c & phi both > 0
1

A Critical Failure Surface Searching Method, Using A Random Technique For Generating Sliding Block Surfaces, Has Been Specified.

1500 Trial Surfaces Have Been Generated.

2 Boxes Specified For Generation Of Central Block Base

Length Of Line Segments For Active And Passive Portions Of Sliding Block Is 30.0

Box No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Height (ft)
1	272.00	1200.00	300.00	1215.00	30.00
2	325.00	1220.00	380.00	1245.00	60.00

Following Are Displayed The Ten Most Critical Of The Trial Failure Surfaces Evaluated. They Are
Ordered - Most Critical First.

* * Safety Factors Are Calculated By The Simplified Janbu Method * *

Total Number of Trial Surfaces Attempted = 1500

WARNING! The Factor of Safety Calculation for one or More Trial Surfaces
Did Not Converge in 20 Iterations.

Number of Trial Surfaces with Non-Converged FS = 5

Number of Trial Surfaces With Valid FS = 1495

Percentage of Trial Surfaces With Non-Valid FS Solutions
of the Total Attempted = 0.3 %

Statistical Data On All Valid FS Values:
FS Max = 8.314 FS Min = 1.690 FS Ave = 2.510
Standard Deviation = 0.704 Coefficient of Variation = 28.06 %

Failure Surface Specified By 5 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	272.152	1216.099
2	286.737	1212.939
3	345.004	1242.668
4	365.889	1264.205
5	381.158	1282.519

Factor of Safety
*** 1.690 ***

Individual data on the 5 slices

Slice No.	Width (ft)	Weight (lbs)	Water Force Top (lbs)	Water Force Bot (lbs)	Tie Force Norm (lbs)	Tie Force Tan (lbs)	Earthquake Force Hor (lbs)	Earthquake Force Ver (lbs)	Surcharge Load (lbs)
1	14.6	11073.2	0.0	0.0	0.	0.	0.0	0.0	0.0
2	58.3	117140.5	0.0	0.0	0.	0.	0.0	0.0	0.0

3	20.9	42310.7	0.0	0.0	0.	0.	0.0	0.0	0.0
4	12.1	13938.1	0.0	0.0	0.	0.	0.0	0.0	0.0
5	3.2	1237.4	0.0	0.0	0.	0.	0.0	0.0	0.0

Failure Surface Specified By 5 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	272.152	1216.099
2	286.737	1212.939
3	345.004	1242.668
4	365.889	1264.205
5	381.158	1282.519

Factor of Safety
*** 1.690 ***

1

Failure Surface Specified By 5 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	272.152	1216.099
2	286.737	1212.939
3	345.004	1242.668
4	365.889	1264.205
5	381.158	1282.519

Factor of Safety
*** 1.690 ***

Failure Surface Specified By 5 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	268.827	1216.254
2	276.886	1210.848

3	343.164	1237.774
4	364.295	1259.070
5	382.043	1281.823

Factor of Safety
*** 1.721 ***

1

Failure Surface Specified By 5 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	268.827	1216.254
2	276.886	1210.848
3	343.164	1237.774
4	364.295	1259.070
5	382.043	1281.823

Factor of Safety
*** 1.721 ***

Failure Surface Specified By 5 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	268.827	1216.254
2	276.886	1210.848
3	343.164	1237.774
4	364.295	1259.070
5	382.043	1281.823

Factor of Safety
*** 1.721 ***

1

Failure Surface Specified By 5 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	278.680	1220.348
2	296.601	1219.447
3	359.976	1245.709
4	377.424	1270.113
5	385.950	1278.754

Factor of Safety

*** 1.751 ***

Failure Surface Specified By 5 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	278.680	1220.348
2	296.601	1219.447
3	359.976	1245.709
4	377.424	1270.113
5	385.950	1278.754

Factor of Safety

*** 1.751 ***

1

Failure Surface Specified By 5 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	278.680	1220.348
2	296.601	1219.447
3	359.976	1245.709
4	377.424	1270.113
5	385.950	1278.754

Factor of Safety

*** 1.751 ***

Failure Surface Specified By 5 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	274.024	1217.318
2	283.490	1214.020
3	361.077	1247.762
4	382.077	1269.186
5	388.933	1276.410

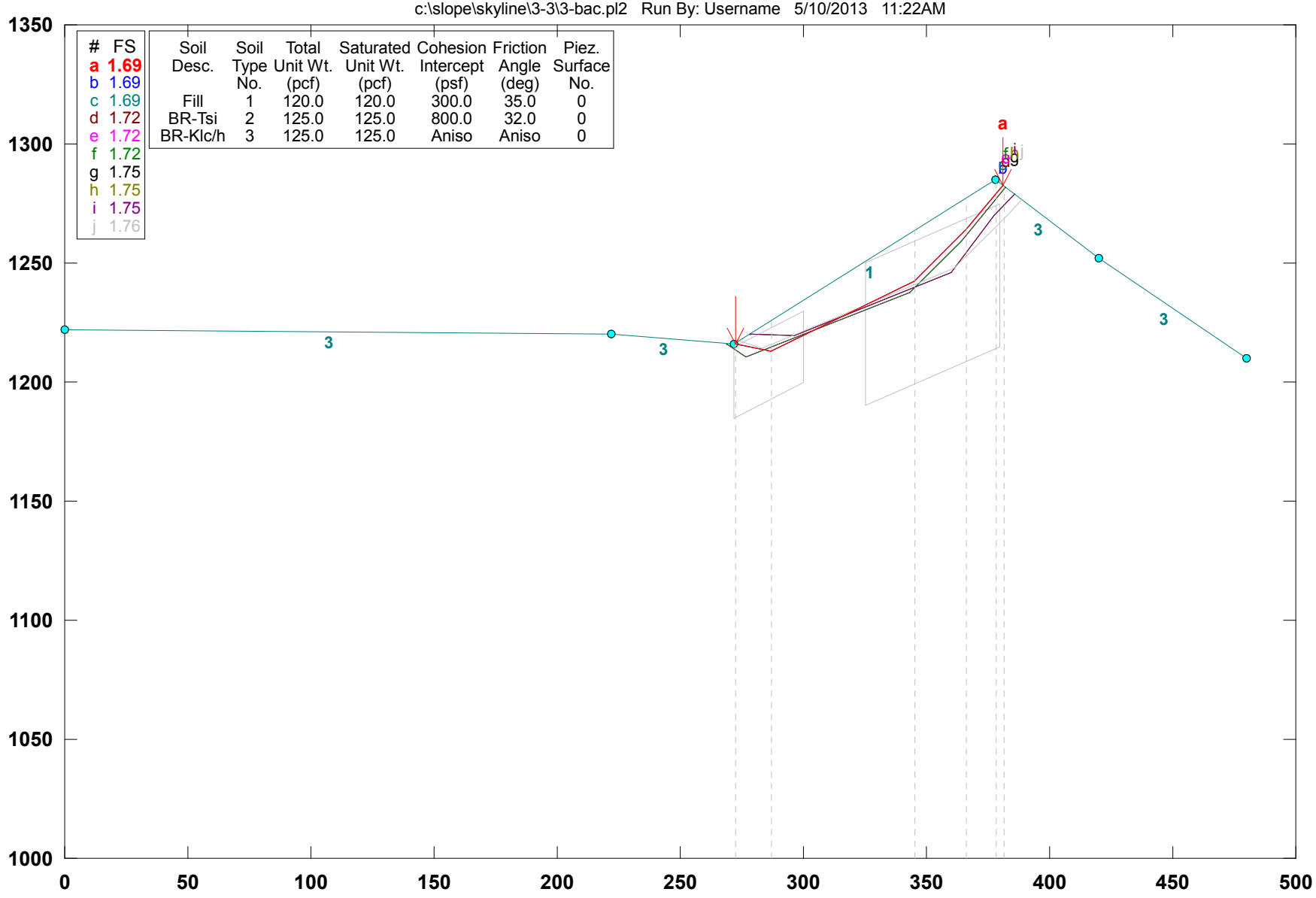
Factor of Safety

*** 1.756 ***

**** END OF GSTABL7 OUTPUT ****

Skyline Height, PN:134-02, Section 3-3',Temporary Backcut, Static

c:\slope\skyline\3-3\3-bac.pl2 Run By: Username 5/10/2013 11:22AM



GSTABL7 v.2 FSmin=1.69

Safety Factors Are Calculated By The Simplified Janbu Method for the case of c & phi both > 0

*** GSTABL7 ***

** GSTABL7 by Dr. Garry H. Gregory, Ph.D.,P.E.,D.GE **

** Original Version 1.0, January 1996; Current Ver. 2.005.2, Jan. 2011 **

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****
SLOPE STABILITY ANALYSIS SYSTEM
Modified Bishop, Simplified Janbu, or GLE Method of Slices.
(Includes Spencer & Morgenstern-Price Type Analysis)
Including Pier/Pile, Reinforcement, Soil Nail, Tieback,
Nonlinear Undrained Shear Strength, Curved Phi Envelope,
Anisotropic Soil, Fiber-Reinforced Soil, Boundary Loads, Water
Surfaces, Pseudo-Static & Newmark Earthquake, and Applied Forces.
****

Analysis Run Date:	5/10/2013
Time of Run:	11:37AM
Run By:	Username
Input Data Filename:	C:\SLOPE\Skyline\4-4\4-1.in
Output Filename:	C:\SLOPE\Skyline\4-4\4-1.OUT
Unit System:	English
Plotted Output Filename:	C:\SLOPE\Skyline\4-4\4-1.PLT

PROBLEM DESCRIPTION: Skyline Height, PN:134-02, Section 4-4', Highest Natural Slope, Static

BOUNDARY COORDINATES

10 Top Boundaries
11 Total Boundaries

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Below Bnd Type
1	0.00	1247.00	18.00	1240.00	1
2	18.00	1240.00	36.00	1240.00	1
3	36.00	1240.00	138.00	1258.00	1
4	138.00	1258.00	147.00	1268.00	2
5	147.00	1268.00	270.00	1340.00	2
6	270.00	1340.00	285.00	1349.00	2
7	285.00	1349.00	366.00	1412.00	2
8	366.00	1412.00	390.00	1424.00	2
9	390.00	1424.00	408.00	1426.00	2
10	408.00	1426.00	540.00	1400.00	2
11	0.00	1217.00	138.00	1258.00	2

User Specified Y-Origin = 1000.00(ft)

Default X-Plus Value = 0.00(ft)

Default Y-Plus Value = 0.00(ft)

1

ISOTROPIC SOIL PARAMETERS

3 Type(s) of Soil

Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Piez. Constant (psf)	Surface No.
1	120.0	120.0	300.0	35.0	0.00	0.0	0
2	125.0	125.0	800.0	32.0	0.00	0.0	0
3	125.0	125.0	250.0	40.0	0.00	0.0	0

0

1

A Critical Failure Surface Searching Method, Using A Random Technique For Generating Circular Surfaces, Has Been Specified.

2500 Trial Surfaces Have Been Generated.

100 Surface(s) Initiate(s) From Each Of 25 Points Equally Spaced
Along The Ground Surface Between X = 75.00(ft)
and X = 175.00(ft)

Each Surface Terminates Between X = 275.00(ft)
and X = 540.00(ft)

Unless Further Limitations Were Imposed, The Minimum Elevation
At Which A Surface Extends Is Y = 0.00(ft)

25.00(ft) Line Segments Define Each Trial Failure Surface.

Following Are Displayed The Ten Most Critical Of The Trial
Failure Surfaces Evaluated. They Are
Ordered - Most Critical First.

* * Safety Factors Are Calculated By The Modified Bishop Method * *

Total Number of Trial Surfaces Attempted = 2500

Number of Trial Surfaces With Valid FS = 2500

Statistical Data On All Valid FS Values:
FS Max = 9.175 FS Min = 1.559 FS Ave = 2.539
Standard Deviation = 0.577 Coefficient of Variation = 22.73 %

Failure Surface Specified By 16 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	125.000	1255.706
2	149.977	1256.784
3	174.828	1259.510
4	199.444	1263.873
5	223.718	1269.854
6	247.544	1277.426
7	270.817	1286.557
8	293.435	1297.206

9	315.301	1309.326
10	336.317	1322.866
11	356.392	1337.765
12	375.439	1353.958
13	393.374	1371.375
14	410.118	1389.939
15	425.598	1409.570
16	433.438	1420.990

Circle Center At X = 121.412 ; Y = 1632.833 ; and Radius = 377.144

Factor of Safety
*** 1.559 ***

Individual data on the 23 slices

Slice No.	Width (ft)	Weight (lbs)	Water Force Top (lbs)	Water Force Bot (lbs)	Tie Force Norm (lbs)	Tie Force Tan (lbs)	Earthquake Force Hor (lbs)	Earthquake Force Ver (lbs)	Surcharge Load (lbs)
1	6.2	304.9	0.0	0.0	0.	0.	0.0	0.0	0.0
2	6.8	1076.2	0.0	0.0	0.	0.	0.0	0.0	0.0
3	9.0	7356.2	0.0	0.0	0.	0.	0.0	0.0	0.0
4	3.0	4521.5	0.0	0.0	0.	0.	0.0	0.0	0.0
5	24.9	58613.6	0.0	0.0	0.	0.	0.0	0.0	0.0
6	24.6	91703.1	0.0	0.0	0.	0.	0.0	0.0	0.0
7	24.3	118153.2	0.0	0.0	0.	0.	0.0	0.0	0.0
8	23.8	137716.4	0.0	0.0	0.	0.	0.0	0.0	0.0
9	22.5	144832.1	0.0	0.0	0.	0.	0.0	0.0	0.0
10	0.8	5497.5	0.0	0.0	0.	0.	0.0	0.0	0.0
11	14.2	97243.1	0.0	0.0	0.	0.	0.0	0.0	0.0
12	8.4	60166.0	0.0	0.0	0.	0.	0.0	0.0	0.0

13	21.9	166171.4	0.0	0.0	0.	0.	0.0	0.0	0.0
14	21.0	169822.9	0.0	0.0	0.	0.	0.0	0.0	0.0
15	20.1	166639.1	0.0	0.0	0.	0.	0.0	0.0	0.0
16	9.6	79761.2	0.0	0.0	0.	0.	0.0	0.0	0.0
17	9.4	76001.7	0.0	0.0	0.	0.	0.0	0.0	0.0
18	14.6	107990.2	0.0	0.0	0.	0.	0.0	0.0	0.0
19	3.4	22962.9	0.0	0.0	0.	0.	0.0	0.0	0.0
20	14.6	83560.6	0.0	0.0	0.	0.	0.0	0.0	0.0
21	2.1	9802.4	0.0	0.0	0.	0.	0.0	0.0	0.0
22	15.5	47029.3	0.0	0.0	0.	0.	0.0	0.0	0.0
23	7.8	6352.1	0.0	0.0	0.	0.	0.0	0.0	0.0

Failure Surface Specified By 16 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	108.333	1252.765
2	133.246	1254.849
3	157.996	1258.375
4	182.500	1263.332
5	206.675	1269.703
6	230.439	1277.465
7	253.713	1286.594
8	276.417	1297.058
9	298.477	1308.822
10	319.816	1321.846
11	340.364	1336.087
12	360.050	1351.496
13	378.809	1368.021
14	396.578	1385.608
15	413.296	1404.196
16	427.636	1422.132

Circle Center At X = 84.977 ; Y = 1682.466 ; and Radius = 430.336

Factor of Safety

*** 1.562 ***

1

Failure Surface Specified By 16 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	120.833	1254.971
2	145.830	1255.349
3	170.742	1257.445
4	195.451	1261.250
5	219.840	1266.745
6	243.793	1273.905
7	267.197	1282.694
8	289.941	1293.073
9	311.917	1304.990
10	333.022	1318.392
11	353.155	1333.212
12	372.221	1349.383
13	390.130	1366.826
14	406.797	1385.459
15	422.144	1405.195
16	432.845	1421.106

Circle Center At X = 127.969 ; Y = 1617.626 ; and Radius = 362.725

Factor of Safety
*** 1.562 ***

Failure Surface Specified By 16 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	100.000	1251.294
2	124.970	1252.528
3	149.806	1255.379
4	174.406	1259.836
5	198.664	1265.880
6	222.479	1273.485
7	245.751	1282.620
8	268.380	1293.246
9	290.273	1305.318
10	311.335	1318.784
11	331.480	1333.590
12	350.621	1349.671

13	368.679	1366.960
14	385.577	1385.385
15	401.243	1404.868
16	415.103	1424.601

Circle Center At X = 93.521 ; Y = 1636.183 ; and Radius = 384.944

Factor of Safety
*** 1.569 ***

1

Failure Surface Specified By 17 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	91.667	1249.823
2	116.663	1249.384
3	141.633	1250.597
4	166.469	1253.458
5	191.062	1257.953
6	215.303	1264.064
7	239.088	1271.764
8	262.312	1281.018
9	284.874	1291.787
10	306.674	1304.023
11	327.619	1317.674
12	347.616	1332.678
13	366.577	1348.971
14	384.420	1366.482
15	401.067	1385.133
16	416.445	1404.844
17	428.118	1422.037

Circle Center At X = 110.810 ; Y = 1627.444 ; and Radius = 378.106

Factor of Safety
*** 1.571 ***

Failure Surface Specified By 17 Coordinate Points

Point	X-Surf	Y-Surf

No.	(ft)	(ft)
1	116.667	1254.235
2	141.667	1254.197
3	166.612	1255.854
4	191.387	1259.199
5	215.878	1264.215
6	239.974	1270.881
7	263.561	1279.164
8	286.533	1289.028
9	308.784	1300.426
10	330.210	1313.307
11	350.714	1327.610
12	370.201	1343.271
13	388.581	1360.217
14	405.770	1378.370
15	421.689	1397.647
16	436.265	1417.958
17	437.631	1420.164

Circle Center At X = 129.724 ; Y = 1622.545 ; and Radius = 368.542

Factor of Safety
*** 1.574 ***

1

Failure Surface Specified By 17 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	87.500	1249.088
2	112.490	1248.380
3	137.471	1249.362
4	162.328	1252.030
5	186.948	1256.372
6	211.218	1262.368
7	235.028	1269.991
8	258.268	1279.206
9	280.832	1289.970
10	302.617	1302.234
11	323.523	1315.943
12	343.455	1331.033
13	362.321	1347.436
14	380.036	1365.076
15	396.518	1383.874
16	411.692	1403.742
17	424.297	1422.790

Circle Center At X = 110.465 ; Y = 1618.069 ; and Radius = 369.694

Factor of Safety
*** 1.574 ***

Failure Surface Specified By 16 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	100.000	1251.294
2	124.999	1251.135
3	149.941	1252.840
4	174.687	1256.398
5	199.098	1261.791
6	223.040	1268.988
7	246.379	1277.949
8	268.985	1288.625
9	290.732	1300.955
10	311.501	1314.872
11	331.174	1330.298
12	349.643	1347.147
13	366.805	1365.326
14	382.565	1384.733
15	396.835	1405.260
16	408.956	1425.812

Circle Center At X = 114.656 ; Y = 1586.085 ; and Radius = 335.111

Factor of Safety
*** 1.575 ***

1

Failure Surface Specified By 15 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	141.667	1262.074
2	166.665	1261.758
3	191.598	1263.585

4	216.283	1267.541
5	240.538	1273.596
6	264.186	1281.707
7	287.052	1291.814
8	308.968	1303.842
9	329.774	1317.703
10	349.316	1333.296
11	367.450	1350.505
12	384.044	1369.203
13	398.975	1389.255
14	412.133	1410.512
15	418.887	1423.856

Circle Center At X = 157.844 ; Y = 1553.224 ; and Radius = 291.599

Factor of Safety
*** 1.575 ***

Failure Surface Specified By 16 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	100.000	1251.294
2	124.945	1252.956
3	149.734	1256.199
4	174.267	1261.008
5	198.445	1267.365
6	222.171	1275.244
7	245.349	1284.613
8	267.886	1295.434
9	289.690	1307.664
10	310.674	1321.253
11	330.753	1336.147
12	349.846	1352.286
13	367.877	1369.603
14	384.771	1388.031
15	400.462	1407.493
16	412.859	1425.043

Circle Center At X = 86.419 ; Y = 1644.297 ; and Radius = 393.238

Factor of Safety
*** 1.577 ***

**** END OF GSTABL7 OUTPUT ****

*** GSTABL7 ***

** GSTABL7 by Dr. Garry H. Gregory, Ph.D.,P.E.,D.GE **

** Original Version 1.0, January 1996; Current Ver. 2.005.2, Jan. 2011 **

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****
SLOPE STABILITY ANALYSIS SYSTEM
Modified Bishop, Simplified Janbu, or GLE Method of Slices.
(Includes Spencer & Morgenstern-Price Type Analysis)
Including Pier/Pile, Reinforcement, Soil Nail, Tieback,
Nonlinear Undrained Shear Strength, Curved Phi Envelope,
Anisotropic Soil, Fiber-Reinforced Soil, Boundary Loads, Water
Surfaces, Pseudo-Static & Newmark Earthquake, and Applied Forces.
****

Analysis Run Date:	5/10/2013
Time of Run:	11:39AM
Run By:	Username
Input Data Filename:	C:\SLOPE\Skyline\4-4\4-1 Surface #1.in
Output Filename:	C:\SLOPE\Skyline\4-4\4-1 Surface #1.OUT
Unit System:	English
Plotted Output Filename:	C:\SLOPE\Skyline\4-4\4-1 Surface #1.PLT

PROBLEM DESCRIPTION: Skyline Height, PN:134-02, Section 4-4', Highest Natural Slope, Pseudostatic

BOUNDARY COORDINATES

10 Top Boundaries

11 Total Boundaries

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Below Bnd	Type
1	0.00	1247.00	18.00	1240.00	1	
2	18.00	1240.00	36.00	1240.00	1	
3	36.00	1240.00	138.00	1258.00	1	
4	138.00	1258.00	147.00	1268.00	2	
5	147.00	1268.00	270.00	1340.00	2	
6	270.00	1340.00	285.00	1349.00	2	
7	285.00	1349.00	366.00	1412.00	2	
8	366.00	1412.00	390.00	1424.00	2	
9	390.00	1424.00	408.00	1426.00	2	
10	408.00	1426.00	540.00	1400.00	2	
11	0.00	1217.00	138.00	1258.00	2	

User Specified Y-Origin = 1000.00(ft)

Default X-Plus Value = 0.00(ft)

Default Y-Plus Value = 0.00(ft)

1

ISOTROPIC SOIL PARAMETERS

3 Type(s) of Soil

Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Piez. Constant (psf)	Surface No.
1	120.0	120.0	300.0	35.0	0.00	0.0	0
2	125.0	125.0	800.0	32.0	0.00	0.0	0
3	125.0	125.0	250.0	40.0	0.00	0.0	0

Specified Peak Ground Acceleration Coefficient (A) = 0.800(g)
Specified Horizontal Earthquake Coefficient (kh) = 0.150(g)
Specified Vertical Earthquake Coefficient (kv) = 0.000(g)

Specified Seismic Pore-Pressure Factor = 0.000

1

Trial Failure Surface Specified By 16 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	125.000	1255.706
2	149.977	1256.784
3	174.828	1259.510
4	199.444	1263.873
5	223.718	1269.854
6	247.544	1277.426
7	270.817	1286.557
8	293.435	1297.206
9	315.301	1309.326
10	336.317	1322.866
11	356.392	1337.765
12	375.439	1353.958
13	393.374	1371.375
14	410.118	1389.939
15	425.598	1409.570
16	433.438	1420.990

DEFLECTION ANGLE & SEGMENT DATA FOR SPECIFIED SURFACE(Excluding Last Segment)

Angle/Segment No.	Deflection(Deg)	Segment Length(ft)
1	3.79	25.00
2	3.79	25.00
3	3.79	25.00
4	3.79	25.00
5	3.79	25.00
6	3.79	25.00
7	3.79	25.00
8	3.79	25.00
9	3.79	25.00
10	3.79	25.00
11	3.79	25.00
12	3.79	25.00
13	3.79	25.00

Circle Center At X = 121.410(ft) ; Y = 1632.837(ft); and Radius = 377.148(ft)

* * Factor Of Safety Is Calculated By The Modified Bishop Method * *

Factor Of Safety For The Preceding Specified Surface = 1.182

Table 1 - Individual Data on the 23 Slices

Slice No.	Width (ft)	Weight (lbs)	Water Force Top (lbs)	Water Force Bot (lbs)	Tie Force Norm (lbs)	Tie Force Tan (lbs)	Earthquake Force Hor (lbs)	Earthquake Force Ver (lbs)	Surcharge Load (lbs)
1	6.2	305.0	0.0	0.0	0.0	0.0	45.7	0.0	0.0
2	6.8	1076.2	0.0	0.0	0.0	0.0	161.4	0.0	0.0
3	9.0	7356.2	0.0	0.0	0.0	0.0	1103.4	0.0	0.0
4	3.0	4521.9	0.0	0.0	0.0	0.0	678.3	0.0	0.0
5	24.9	58614.6	0.0	0.0	0.0	0.0	8792.2	0.0	0.0
6	24.6	91702.9	0.0	0.0	0.0	0.0	13755.4	0.0	0.0
7	24.3	118153.2	0.0	0.0	0.0	0.0	17723.0	0.0	0.0
8	23.8	137719.0	0.0	0.0	0.0	0.0	20657.9	0.0	0.0
9	22.5	144830.6	0.0	0.0	0.0	0.0	21724.6	0.0	0.0
10	0.8	5499.2	0.0	0.0	0.0	0.0	824.9	0.0	0.0
11	14.2	97241.2	0.0	0.0	0.0	0.0	14586.2	0.0	0.0
12	8.4	60162.7	0.0	0.0	0.0	0.0	9024.4	0.0	0.0
13	21.9	166176.0	0.0	0.0	0.0	0.0	24926.4	0.0	0.0
14	21.0	169820.5	0.0	0.0	0.0	0.0	25473.1	0.0	0.0

15	20.1	166634.3	0.0	0.0	0.0	0.0	24995.1	0.0	0.0
16	9.6	79763.6	0.0	0.0	0.0	0.0	11964.5	0.0	0.0
17	9.4	76000.4	0.0	0.0	0.0	0.0	11400.1	0.0	0.0
18	14.6	107990.6	0.0	0.0	0.0	0.0	16198.6	0.0	0.0
19	3.4	22964.6	0.0	0.0	0.0	0.0	3444.7	0.0	0.0
20	14.6	83559.5	0.0	0.0	0.0	0.0	12533.9	0.0	0.0
21	2.1	9802.8	0.0	0.0	0.0	0.0	1470.4	0.0	0.0
22	15.5	47027.6	0.0	0.0	0.0	0.0	7054.1	0.0	0.0
23	7.8	6352.2	0.0	0.0	0.0	0.0	952.8	0.0	0.0

Table 2 - Base Stress Data on the 23 Slices

Slice No.	Alpha (deg)	X-Coord. Slice Cntr (ft)	Base Leng. (ft)	Available Shear Strength (psf)	Mobilized Shear Stress * (psf)
1	2.47	128.09	6.18	326.23	9.52
2	2.47	134.59	6.83	878.50	30.37
3	2.47	142.50	9.01	1281.50	156.52
4	2.47	148.49	2.98	1710.12	289.19
5	6.26	162.40	25.00	2149.20	596.45
6	10.05	187.14	25.00	2859.86	1160.22
7	13.84	211.58	25.00	3398.78	1782.43
8	17.63	235.63	25.00	3777.23	2405.28
9	21.42	258.77	24.12	4000.33	2969.64
10	21.42	270.41	0.88	4146.02	3096.46
11	25.21	277.91	15.68	4070.90	3416.45
12	25.21	289.22	9.32	4209.16	3551.31
13	29.00	304.37	25.00	4291.29	4014.09

14	32.79	325.81	25.00	4363.11	4448.19
15	36.58	346.35	25.00	4299.69	4687.22
16	40.37	361.20	12.61	4130.82	4736.09
17	40.37	370.72	12.39	4023.03	4595.88
18	44.16	382.72	20.30	3590.74	4216.38
19	44.16	391.69	4.70	3338.85	3874.28
20	47.95	400.69	21.84	2755.03	3191.04
21	47.95	409.06	3.16	2327.68	2590.49
22	51.74	417.86	25.00	1615.32	1642.73
23	55.53	429.52	13.85	737.98	416.40

Sum of the Resisting Forces (including Pier/Pile, Tieback, Reinforcing
Soil Nail, and Applied Forces if applicable) = 1165468.50 (lbs)

Average Available Shear Strength (including Tieback, Pier/Pile, Reinforcing,
Soil Nail, and Applied Forces if applicable) = 3203.14(psf)

Sum of the Driving Forces = 986084.81 (lbs)

Average Mobilized Shear Stress = 2710.13(psf)

Total length of the failure surface = 363.85(ft)

CAUTION - Factor Of Safety Is Calculated By The Modified Bishop
Method. This Method Is Valid Only If The Failure Surface
Approximates A Circular Arc.

*** SEISMIC SLOPE DISPLACEMENT DATA ***
(Note: kv is set = zero for displacement calculations)
Seismic Yield Coefficient (ky) = 0.2538(g)
Calculated Newmark Seismic Displacement = 0.771(ft)

Non-Symmetrical Sliding Resistance Has Been Specified

for Downhill Sliding.

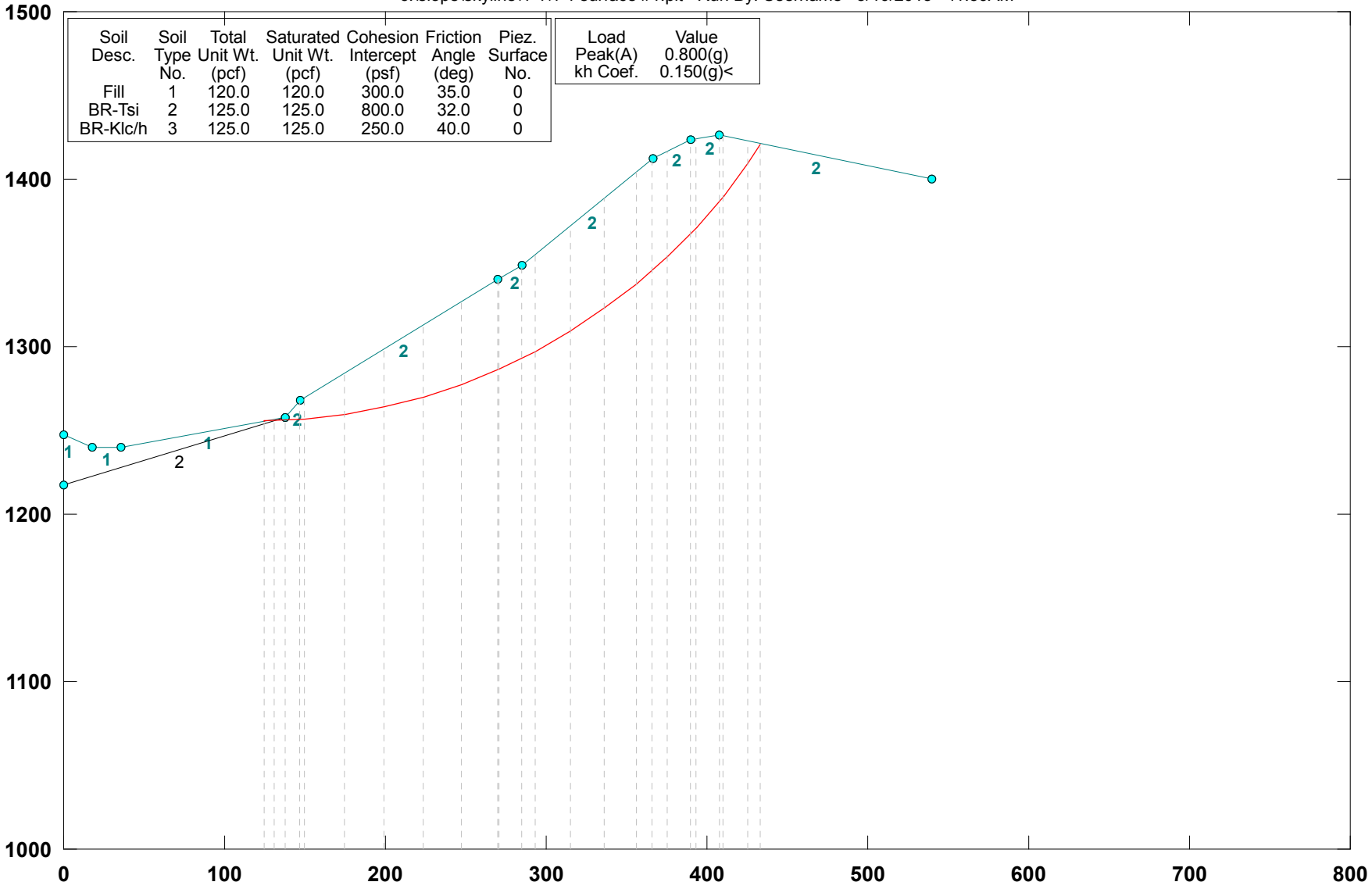
**** END OF GSTABL7 OUTPUT ****

Skyline Height, PN:134-02, Section 4-4',Highest Natural Slope, Pseudostatic

c:\slope\skyline\4-4\4-1 surface #1.plt Run By: Username 5/10/2013 11:39AM

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface No.
Fill	1	120.0	120.0	300.0	35.0	0
BR-Tsi	2	125.0	125.0	800.0	32.0	0
BR-Klc/h	3	125.0	125.0	250.0	40.0	0

Load	Value
Peak(A)	0.800(g)
kh Coef.	0.150(g)<

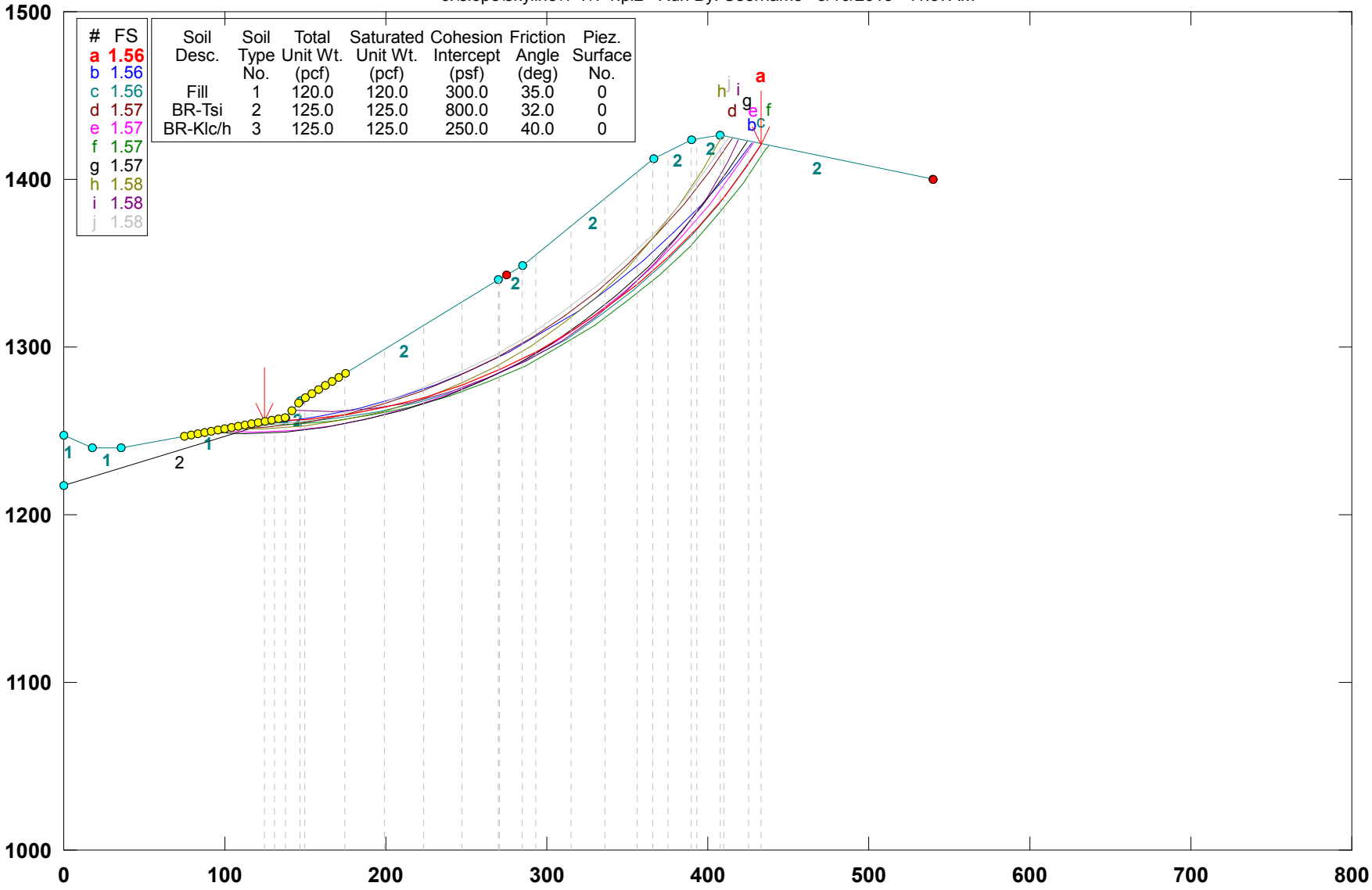


GSTABL7 v.2 FSmin=1.18

Factor Of Safety Is Calculated By The Modified Bishop Method

Skyline Height, PN:134-02, Section 4-4',Highest Natural Slope, Static

c:\slope\skyline\4-4\4-1.pl2 Run By: Username 5/10/2013 11:37AM



GSTABL7 v.2 FSmin=1.56

Safety Factors Are Calculated By The Modified Bishop Method

*** GSTABL7 ***

** GSTABL7 by Dr. Garry H. Gregory, Ph.D.,P.E.,D.GE **

** Original Version 1.0, January 1996; Current Ver. 2.005.2, Jan. 2011 **

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****
SLOPE STABILITY ANALYSIS SYSTEM
Modified Bishop, Simplified Janbu, or GLE Method of Slices.
(Includes Spencer & Morgenstern-Price Type Analysis)
Including Pier/Pile, Reinforcement, Soil Nail, Tieback,
Nonlinear Undrained Shear Strength, Curved Phi Envelope,
Anisotropic Soil, Fiber-Reinforced Soil, Boundary Loads, Water
Surfaces, Pseudo-Static & Newmark Earthquake, and Applied Forces.
****

Analysis Run Date:	5/19/2013
Time of Run:	02:16PM
Run By:	Username
Input Data Filename:	C:\SLOPE\Skyline\5-5\5-1.in
Output Filename:	C:\SLOPE\Skyline\5-5\5-1.OUT
Unit System:	English
Plotted Output Filename:	C:\SLOPE\Skyline\5-5\5-1.PLT

PROBLEM DESCRIPTION: Skyline Height, PN:134-02, Section 5-5', Highest Descending Natural Slope, Static

BOUNDARY COORDINATES

8 Top Boundaries
11 Total Boundaries

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	0.00	1190.00	90.00	1190.00	1
2	90.00	1190.00	168.00	1196.00	1
3	168.00	1196.00	177.00	1200.00	3
4	177.00	1200.00	282.00	1292.00	3
5	282.00	1292.00	336.00	1319.00	3
6	336.00	1319.00	459.00	1370.00	3
7	459.00	1370.00	543.00	1410.00	3
8	543.00	1410.00	780.00	1410.00	3
9	0.00	1157.00	60.00	1160.00	3
10	60.00	1160.00	150.00	1187.00	3
11	150.00	1187.00	168.00	1196.00	3

User Specified Y-Origin = 1000.00(ft)

Default X-Plus Value = 0.00(ft)

Default Y-Plus Value = 0.00(ft)

1

ISOTROPIC SOIL PARAMETERS

3 Type(s) of Soil

Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
1	120.0	120.0	300.0	35.0	0.00	0.0	0
2	125.0	125.0	800.0	32.0	0.00	0.0	0
3	125.0	125.0	250.0	40.0	0.00	0.0	0

0

1

A Critical Failure Surface Searching Method, Using A Random Technique For Generating Circular Surfaces, Has Been Specified.

2500 Trial Surfaces Have Been Generated.

100 Surface(s) Initiate(s) From Each Of 25 Points Equally Spaced
Along The Ground Surface Between X = 75.00(ft)
and X = 240.00(ft)

Each Surface Terminates Between X = 540.00(ft)
and X = 780.00(ft)

Unless Further Limitations Were Imposed, The Minimum Elevation
At Which A Surface Extends Is Y = 0.00(ft)

25.00(ft) Line Segments Define Each Trial Failure Surface.

Following Are Displayed The Ten Most Critical Of The Trial
Failure Surfaces Evaluated. They Are
Ordered - Most Critical First.

* * Safety Factors Are Calculated By The Modified Bishop Method * *

Total Number of Trial Surfaces Attempted = 2500

Number of Trial Surfaces With Valid FS = 2500

Statistical Data On All Valid FS Values:
FS Max = 5.719 FS Min = 1.737 FS Ave = 3.430
Standard Deviation = 0.908 Coefficient of Variation = 26.49 %

Failure Surface Specified By 18 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	185.000	1207.010
2	207.900	1217.040
3	230.667	1227.368
4	253.297	1237.991
5	275.788	1248.908
6	298.134	1260.116
7	320.333	1271.615
8	342.381	1283.401

9	364.273	1295.473
10	386.006	1307.829
11	407.576	1320.467
12	428.981	1333.384
13	450.215	1346.579
14	471.276	1360.049
15	492.160	1373.792
16	512.863	1387.805
17	533.382	1402.087
18	544.441	1410.000

Circle Center At X = -572.851 ; Y = 2968.688 ; and Radius = 1917.772

Factor of Safety
*** 1.737 ***

Individual data on the 21 slices

Slice No.	Width (ft)	Weight (lbs)	Water Force Top (lbs)	Water Force Bot (lbs)	Tie Force Norm (lbs)	Tie Force Tan (lbs)	Earthquake Force Hor (lbs)	Earthquake Force Ver (lbs)	Surcharge Load (lbs)
1	22.9	14360.4	0.0	0.0	0.	0.	0.0	0.0	0.0
2	22.8	42243.9	0.0	0.0	0.	0.	0.0	0.0	0.0
3	22.6	68619.4	0.0	0.0	0.	0.	0.0	0.0	0.0
4	22.5	93489.1	0.0	0.0	0.	0.	0.0	0.0	0.0
5	6.2	30138.9	0.0	0.0	0.	0.	0.0	0.0	0.0
6	16.1	80598.4	0.0	0.0	0.	0.	0.0	0.0	0.0
7	22.2	110304.6	0.0	0.0	0.	0.	0.0	0.0	0.0
8	15.7	76925.7	0.0	0.0	0.	0.	0.0	0.0	0.0
9	6.4	30808.1	0.0	0.0	0.	0.	0.0	0.0	0.0
10	21.9	100559.1	0.0	0.0	0.	0.	0.0	0.0	0.0
11	21.7	91218.2	0.0	0.0	0.	0.	0.0	0.0	0.0

12	21.6	81046.5	0.0	0.0	0.	0.	0.0	0.0
0.0								
13	21.4	70072.6	0.0	0.0	0.	0.	0.0	0.0
0.0								
14	21.2	58324.8	0.0	0.0	0.	0.	0.0	0.0
0.0								
15	8.8	20634.5	0.0	0.0	0.	0.	0.0	0.0
0.0								
16	12.3	25778.6	0.0	0.0	0.	0.	0.0	0.0
0.0								
17	20.9	36279.2	0.0	0.0	0.	0.	0.0	0.0
0.0								
18	20.7	25674.6	0.0	0.0	0.	0.	0.0	0.0
0.0								
19	20.5	14333.2	0.0	0.0	0.	0.	0.0	0.0
0.0								
20	9.6	2623.2	0.0	0.0	0.	0.	0.0	0.0
0.0								
21	1.4	92.8	0.0	0.0	0.	0.	0.0	0.0
0.0								

Failure Surface Specified By 18 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	185.000	1207.010
2	208.109	1216.547
3	231.075	1226.424
4	253.893	1236.639
5	276.558	1247.189
6	299.065	1258.072
7	321.409	1269.286
8	343.584	1280.829
9	365.588	1292.697
10	387.413	1304.889
11	409.057	1317.401
12	430.514	1330.231
13	451.779	1343.376
14	472.848	1356.834
15	493.716	1370.601
16	514.378	1384.674
17	534.831	1399.050
18	549.931	1410.000

Circle Center At X = -449.052 ; Y = 2776.418 ; and Radius = 1692.650

Factor of Safety

*** 1.742 ***

1

Failure Surface Specified By 19 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	171.250	1197.444
2	195.344	1204.115
3	219.246	1211.440
4	242.940	1219.415
5	266.408	1228.034
6	289.631	1237.290
7	312.593	1247.176
8	335.277	1257.685
9	357.666	1268.810
10	379.742	1280.541
11	401.490	1292.871
12	422.894	1305.790
13	443.937	1319.288
14	464.603	1333.355
15	484.878	1347.981
16	504.747	1363.155
17	524.193	1378.866
18	543.204	1395.101
19	559.714	1410.000

Circle Center At X = -61.048 ; Y = 2083.389 ; and Radius = 915.893

Factor of Safety
*** 1.744 ***

Failure Surface Specified By 18 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	178.125	1200.986
2	200.086	1212.933
3	222.021	1224.927
4	243.930	1236.968
5	265.813	1249.056
6	287.671	1261.191
7	309.502	1273.372
8	331.307	1285.601
9	353.086	1297.876

10	374.838	1310.198
11	396.564	1322.567
12	418.264	1334.982
13	439.937	1347.443
14	461.583	1359.951
15	483.202	1372.506
16	504.794	1385.106
17	526.359	1397.753
18	547.139	1410.000

Circle Center At X = -5380.958 ; Y = 11445.780 ; and Radius = 11655.866

Factor of Safety
*** 1.745 ***

1

Failure Surface Specified By 18 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	178.125	1200.986
2	199.941	1213.195
3	221.745	1225.426
4	243.536	1237.678
5	265.316	1249.953
6	287.083	1262.249
7	308.837	1274.567
8	330.580	1286.907
9	352.310	1299.268
10	374.027	1311.651
11	395.733	1324.056
12	417.425	1336.483
13	439.106	1348.931
14	460.774	1361.401
15	482.429	1373.893
16	504.072	1386.406
17	525.703	1398.941
18	544.742	1410.000

Circle Center At X = ********* ; Y = 23007.461 ; and Radius = 24982.035

Factor of Safety
*** 1.751 ***

Failure Surface Specified By 19 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	171.250	1197.444
2	195.851	1201.892
3	220.248	1207.352
4	244.398	1213.816
5	268.260	1221.272
6	291.794	1229.707
7	314.959	1239.108
8	337.716	1249.458
9	360.026	1260.739
10	381.851	1272.932
11	403.153	1286.017
12	423.897	1299.970
13	444.046	1314.769
14	463.567	1330.388
15	482.426	1346.800
16	500.590	1363.977
17	518.029	1381.890
18	534.714	1400.508
19	542.239	1409.637

Circle Center At X = 75.952 ; Y = 1794.833 ; and Radius = 604.942

Factor of Safety
*** 1.761 ***

1

Failure Surface Specified By 18 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	185.000	1207.010
2	207.153	1218.596
3	229.265	1230.261
4	251.336	1242.002
5	273.366	1253.820
6	295.355	1265.716
7	317.302	1277.688
8	339.207	1289.736
9	361.070	1301.861

10	382.891	1314.062
11	404.668	1326.339
12	426.403	1338.693
13	448.094	1351.122
14	469.742	1363.626
15	491.346	1376.207
16	512.906	1388.862
17	534.422	1401.593
18	548.517	1410.000

Circle Center At X = -3116.615 ; Y = 7546.556 ; and Radius = 7147.763

Factor of Safety

*** 1.768 ***

Failure Surface Specified By 18 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	191.875	1213.033
2	215.727	1220.521
3	239.383	1228.608
4	262.828	1237.289
5	286.046	1246.559
6	309.022	1256.411
7	331.743	1266.840
8	354.194	1277.839
9	376.360	1289.400
10	398.227	1301.517
11	419.782	1314.182
12	441.010	1327.386
13	461.899	1341.122
14	482.434	1355.380
15	502.603	1370.151
16	522.394	1385.427
17	541.792	1401.197
18	552.079	1410.000

Circle Center At X = -92.316 ; Y = 2160.595 ; and Radius = 989.261

Factor of Safety

*** 1.779 ***

1

Failure Surface Specified By 18 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	185.000	1207.010
2	206.912	1219.045
3	228.812	1231.103
4	250.700	1243.183
5	272.575	1255.285
6	294.438	1267.410
7	316.289	1279.556
8	338.128	1291.725
9	359.954	1303.916
10	381.768	1316.128
11	403.570	1328.363
12	425.359	1340.620
13	447.136	1352.899
14	468.900	1365.200
15	490.652	1377.523
16	512.391	1389.868
17	534.118	1402.236
18	547.726	1410.000

Circle Center At X = ********* ; Y = 22818.020 ; and Radius = 24649.498

Factor of Safety		
***	1.782	***

Failure Surface Specified By 19 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	185.000	1207.010
2	207.649	1217.594
3	230.228	1228.327
4	252.736	1239.208
5	275.171	1250.237
6	297.534	1261.414
7	319.822	1272.737
8	342.036	1284.207
9	364.173	1295.823
10	386.234	1307.584
11	408.217	1319.491

12	430.121	1331.541
13	451.945	1343.736
14	473.688	1356.074
15	495.350	1368.554
16	516.929	1381.177
17	538.425	1393.942
18	559.836	1406.848
19	564.989	1410.000

Circle Center At X = -1412.010 ; Y = 4653.974 ; and Radius = 3798.948

Factor of Safety

*** 1.782 ***

**** END OF GSTABL7 OUTPUT ****

*** GSTABL7 ***

** GSTABL7 by Dr. Garry H. Gregory, Ph.D.,P.E.,D.GE **

** Original Version 1.0, January 1996; Current Ver. 2.005.2, Jan. 2011 **

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****
SLOPE STABILITY ANALYSIS SYSTEM
Modified Bishop, Simplified Janbu, or GLE Method of Slices.
(Includes Spencer & Morgenstern-Price Type Analysis)
Including Pier/Pile, Reinforcement, Soil Nail, Tieback,
Nonlinear Undrained Shear Strength, Curved Phi Envelope,
Anisotropic Soil, Fiber-Reinforced Soil, Boundary Loads, Water
Surfaces, Pseudo-Static & Newmark Earthquake, and Applied Forces.
****

Analysis Run Date:	5/19/2013
Time of Run:	02:18PM
Run By:	Username
Input Data Filename:	C:\SLOPE\Skyline\5-5\5-1 Surface #1.in
Output Filename:	C:\SLOPE\Skyline\5-5\5-1 Surface #1.OUT
Unit System:	English
Plotted Output Filename:	C:\SLOPE\Skyline\5-5\5-1 Surface #1.PLT

PROBLEM DESCRIPTION: Skyline Height, PN:134-02, Section 5-5', Highest Descending Natural Slope, Pseudo

BOUNDARY COORDINATES

8 Top Boundaries

11 Total Boundaries

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Below Bnd	Type
1	0.00	1190.00	90.00	1190.00	1	
2	90.00	1190.00	168.00	1196.00	1	
3	168.00	1196.00	177.00	1200.00	3	
4	177.00	1200.00	282.00	1292.00	3	
5	282.00	1292.00	336.00	1319.00	3	
6	336.00	1319.00	459.00	1370.00	3	
7	459.00	1370.00	543.00	1410.00	3	
8	543.00	1410.00	780.00	1410.00	3	
9	0.00	1157.00	60.00	1160.00	3	
10	60.00	1160.00	150.00	1187.00	3	
11	150.00	1187.00	168.00	1196.00	3	

User Specified Y-Origin = 1000.00(ft)

Default X-Plus Value = 0.00(ft)

Default Y-Plus Value = 0.00(ft)

1

ISOTROPIC SOIL PARAMETERS

3 Type(s) of Soil

Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
1	120.0	120.0	300.0	35.0	0.00	0.0	0
2	125.0	125.0	800.0	32.0	0.00	0.0	0
3	125.0	125.0	250.0	40.0	0.00	0.0	0

Specified Peak Ground Acceleration Coefficient (A) = 0.800(g)
Specified Horizontal Earthquake Coefficient (kh) = 0.150(g)
Specified Vertical Earthquake Coefficient (kv) = 0.000(g)

Specified Seismic Pore-Pressure Factor = 0.000

1

Trial Failure Surface Specified By 18 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	185.000	1207.010
2	207.900	1217.040
3	230.667	1227.368
4	253.297	1237.991
5	275.788	1248.908
6	298.134	1260.116
7	320.333	1271.615
8	342.381	1283.401
9	364.273	1295.473
10	386.006	1307.829
11	407.576	1320.467
12	428.981	1333.384
13	450.215	1346.579
14	471.276	1360.049
15	492.160	1373.792
16	512.863	1387.805
17	533.382	1402.087
18	544.441	1410.000

DEFLECTION ANGLE & SEGMENT DATA FOR SPECIFIED SURFACE(Excluding Last Segment)

Angle/Segment No.	Deflection(Deg)	Segment Length(ft)
1	0.75	25.00
2	0.74	25.00
3	0.75	25.00
4	0.74	25.00
5	0.75	25.00
6	0.74	25.00
7	0.75	25.00
8	0.75	25.00
9	0.75	25.00
10	0.74	25.00
11	0.75	25.00
12	0.74	25.00

13	0.75	25.00
14	0.75	25.00
15	0.75	25.00

Circle Center At X = -572.843(ft) ; Y = 2968.674(ft); and Radius = 1917.756(ft)

* * Factor Of Safety Is Calculated By The Modified Bishop Method * *

Factor Of Safety For The Preceding Specified Surface = 1.269

Table 1 - Individual Data on the 21 Slices

Slice No.	Width (ft)	Weight (lbs)	Water Force Top (lbs)	Water Force Bot (lbs)	Tie Force Norm (lbs)	Tie Force Tan (lbs)	Earthquake Force Hor (lbs)	Earthquake Force Ver (lbs)	Surcharge Load (lbs)
1	22.9	14361.4	0.0	0.0	0.0	0.0	2154.2	0.0	0.0
2	22.8	42245.2	0.0	0.0	0.0	0.0	6336.8	0.0	0.0
3	22.6	68617.2	0.0	0.0	0.0	0.0	10292.6	0.0	0.0
4	22.5	93490.6	0.0	0.0	0.0	0.0	14023.6	0.0	0.0
5	6.2	30138.0	0.0	0.0	0.0	0.0	4520.7	0.0	0.0
6	16.1	80596.6	0.0	0.0	0.0	0.0	12089.5	0.0	0.0
7	22.2	110304.5	0.0	0.0	0.0	0.0	16545.7	0.0	0.0
8	15.7	76926.6	0.0	0.0	0.0	0.0	11539.0	0.0	0.0
9	6.4	30810.1	0.0	0.0	0.0	0.0	4621.5	0.0	0.0
10	21.9	100559.2	0.0	0.0	0.0	0.0	15083.9	0.0	0.0
11	21.7	91217.5	0.0	0.0	0.0	0.0	13682.6	0.0	0.0

12	21.6	81043.9	0.0	0.0	0.0	0.0	12156.6	0.0	0.0
13	21.4	70074.4	0.0	0.0	0.0	0.0	10511.2	0.0	0.0
14	21.2	58323.9	0.0	0.0	0.0	0.0	8748.6	0.0	0.0
15	8.8	20634.2	0.0	0.0	0.0	0.0	3095.1	0.0	0.0
16	12.3	25779.0	0.0	0.0	0.0	0.0	3866.8	0.0	0.0
17	20.9	36279.9	0.0	0.0	0.0	0.0	5442.0	0.0	0.0
18	20.7	25675.0	0.0	0.0	0.0	0.0	3851.2	0.0	0.0
19	20.5	14333.8	0.0	0.0	0.0	0.0	2150.1	0.0	0.0
20	9.6	2623.3	0.0	0.0	0.0	0.0	393.5	0.0	0.0
21	1.4	92.9	0.0	0.0	0.0	0.0	13.9	0.0	0.0

Table 2 - Base Stress Data on the 21 Slices

Slice No.	Alpha (deg)	X-Coord. Slice Cntr (ft)	Base Leng. (ft)	Available Shear Strength (psf)	Mobilized Shear Stress * (psf)
1	23.65	196.45	25.00	601.87	309.29
2	24.40	219.28	25.00	1389.95	927.94
3	25.15	241.98	25.00	2132.27	1536.42
4	25.89	264.54	25.00	2829.56	2132.72
5	26.64	278.89	6.95	3244.62	2519.14
6	26.64	290.07	18.05	3335.27	2593.64
7	27.38	309.23	25.00	3291.67	2610.16
8	28.13	328.17	17.77	3228.58	2607.58
9	28.13	339.19	7.24	3177.95	2564.32
10	28.87	353.33	25.00	3007.46	2464.91
11	29.62	375.14	25.00	2741.12	2274.35
12	30.37	396.79	25.00	2452.38	2054.56

13	31.11	418.28	25.00	2142.05	1805.29
14	31.86	439.60	25.00	1810.62	1526.58
15	32.60	454.61	10.43	1560.69	1314.71
16	32.60	465.14	14.57	1413.95	1175.56
17	33.35	481.72	25.00	1189.84	978.78
18	34.09	502.51	25.00	891.51	702.85
19	34.84	523.12	25.00	572.58	398.00
20	35.59	538.19	11.83	325.04	156.12
21	35.59	543.72	1.77	206.39	36.89

Sum of the Resisting Forces (including Pier/Pile, Tieback, Reinforcing
Soil Nail, and Applied Forces if applicable) = 830985.44 (lbs)

Average Available Shear Strength (including Tieback, Pier/Pile, Reinforcing,
Soil Nail, and Applied Forces if applicable) = 2009.16(psf)

Sum of the Driving Forces = 654998.00 (lbs)

Average Mobilized Shear Stress = 1583.66(psf)

Total length of the failure surface = 413.60(ft)

CAUTION - Factor Of Safety Is Calculated By The Modified Bishop
Method. This Method Is Valid Only If The Failure Surface
Approximates A Circular Arc.

*** SEISMIC SLOPE DISPLACEMENT DATA ***
(Note: kv is set = zero for displacement calculations)
Seismic Yield Coefficient (ky) = 0.2790(g)
Calculated Newmark Seismic Displacement = 0.638(ft)

Non-Symmetrical Sliding Resistance Has Been Specified
for Downhill Sliding.

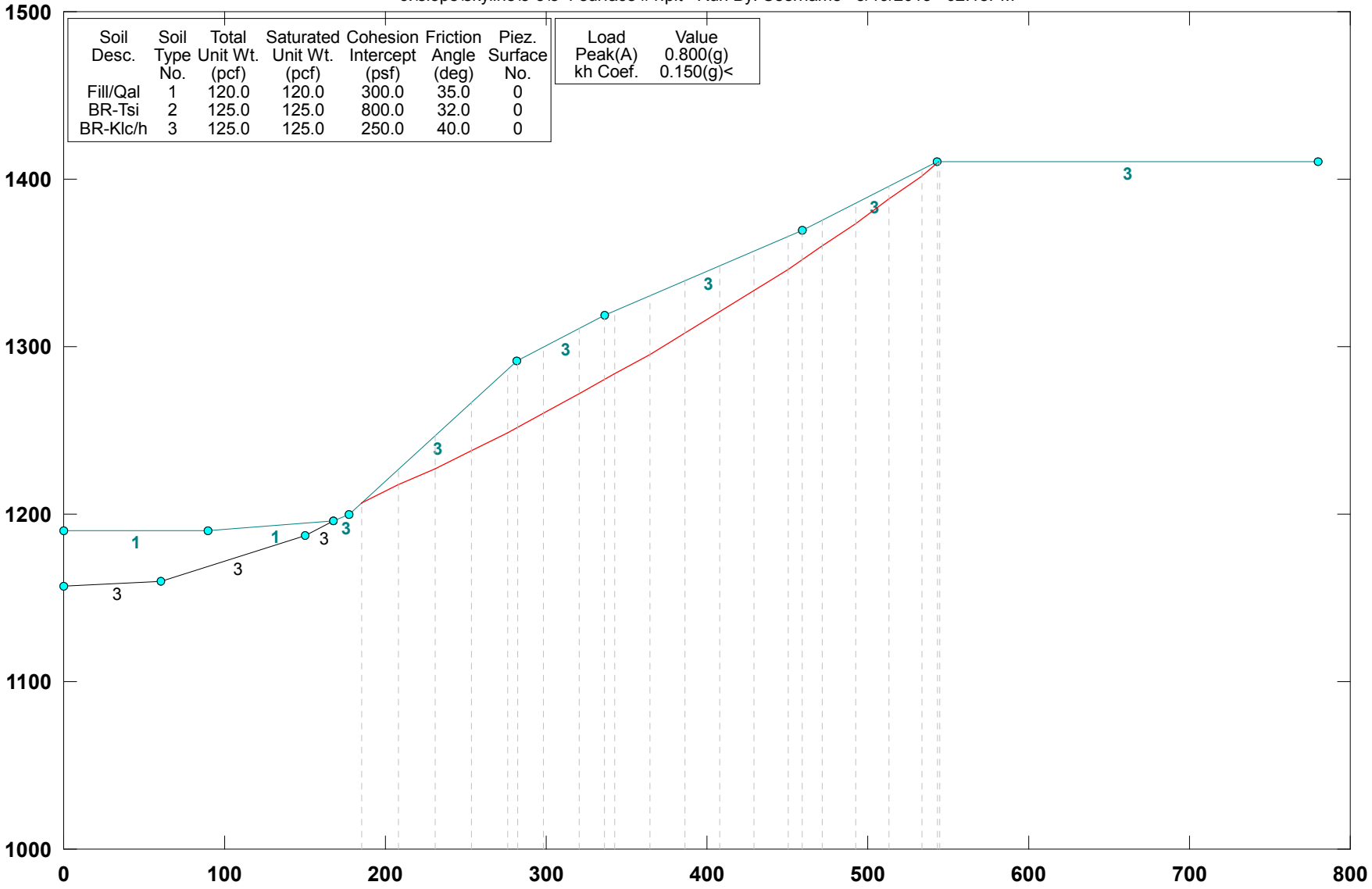
**** END OF GSTABL7 OUTPUT ****

Skyline Height, PN:134-02, Section 5-5',Highest Descending Natural Slope, Pseudo

c:\slope\skyline\5-5\5-1 surface #1.plt Run By: Username 5/19/2013 02:18PM

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface No.
Fill/Qal	1	120.0	120.0	300.0	35.0	0
BR-Tsi	2	125.0	125.0	800.0	32.0	0
BR-Klc/h	3	125.0	125.0	250.0	40.0	0

Load	Value
Peak(A)	0.800(g)
kh Coef.	0.150(g)<

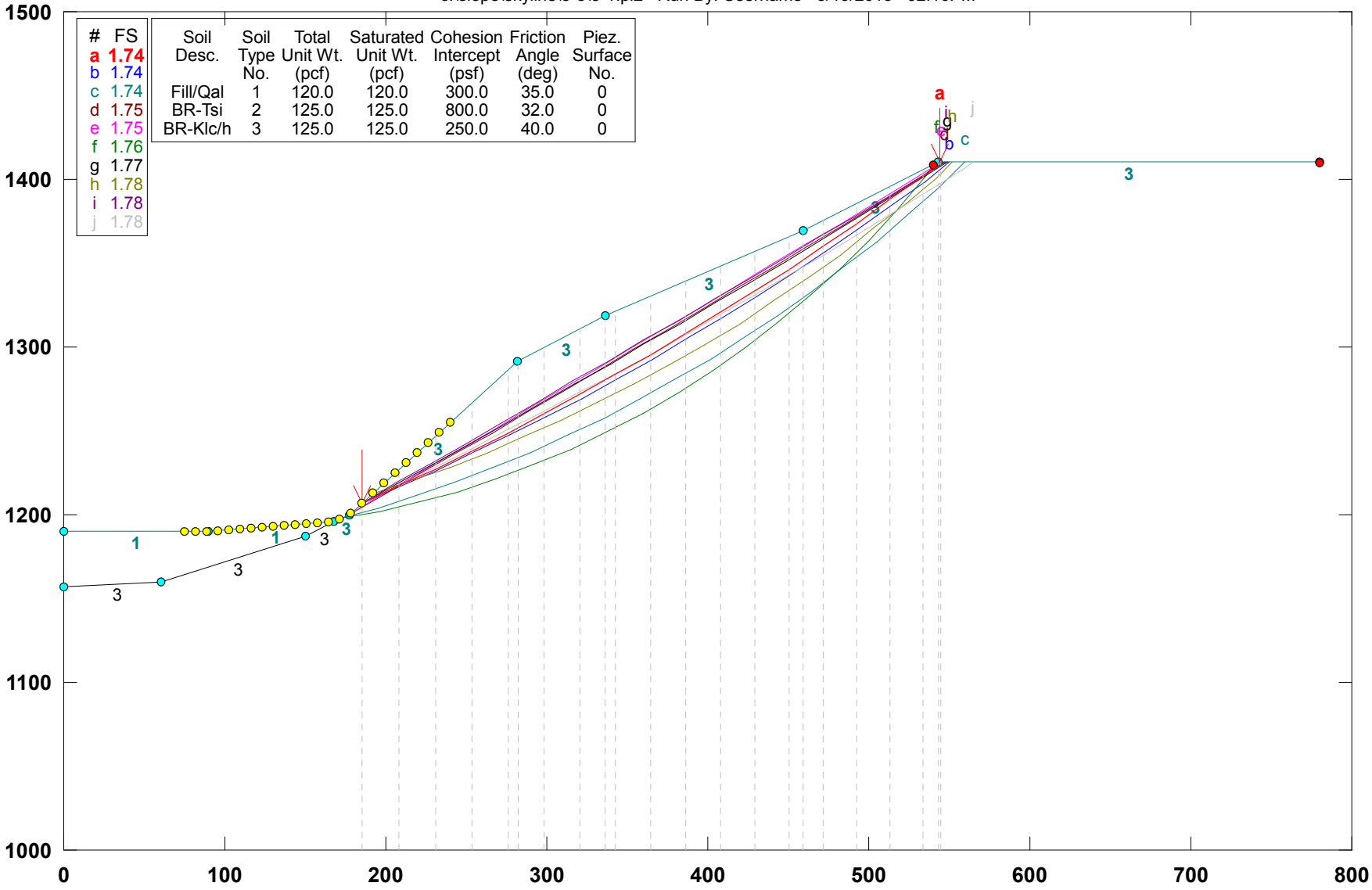


GSTABL7 v.2 FSmin=1.27

Factor Of Safety Is Calculated By The Modified Bishop Method

Skyline Height, PN:134-02, Section 5-5',Highest Descending Natural Slope, Static

c:\slope\skyline\5-5\5-1.pl2 Run By: Username 5/19/2013 02:16PM



GSTABL7 v.2 FSmin=1.74

Safety Factors Are Calculated By The Modified Bishop Method

*** GSTABL7 ***

** GSTABL7 by Dr. Garry H. Gregory, Ph.D.,P.E.,D.GE **

** Original Version 1.0, January 1996; Current Ver. 2.005.2, Jan. 2011 **

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****
SLOPE STABILITY ANALYSIS SYSTEM
Modified Bishop, Simplified Janbu, or GLE Method of Slices.
(Includes Spencer & Morgenstern-Price Type Analysis)
Including Pier/Pile, Reinforcement, Soil Nail, Tieback,
Nonlinear Undrained Shear Strength, Curved Phi Envelope,
Anisotropic Soil, Fiber-Reinforced Soil, Boundary Loads, Water
Surfaces, Pseudo-Static & Newmark Earthquake, and Applied Forces.
****

Analysis Run Date:	5/19/2013
Time of Run:	03:42PM
Run By:	Username
Input Data Filename:	C:\SLOPE\Skyline\6-6\6-1.in
Output Filename:	C:\SLOPE\Skyline\6-6\6-1.OUT
Unit System:	English
Plotted Output Filename:	C:\SLOPE\Skyline\6-6\6-1.PLT

PROBLEM DESCRIPTION: Skyline Height, PN:134-02, Section 6-6', Fill Slope with Geogrids, Static

BOUNDARY COORDINATES

4 Top Boundaries
10 Total Boundaries

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Below Bnd
1	0.00	1060.00	33.00	1060.00	3
2	33.00	1060.00	39.00	1060.00	1
3	39.00	1060.00	291.00	1191.00	1
4	291.00	1191.00	420.00	1191.00	1
5	33.00	1060.00	36.00	1056.00	3
6	36.00	1056.00	120.00	1056.00	3
7	120.00	1056.00	156.00	1085.00	3
8	156.00	1085.00	228.00	1100.00	3
9	228.00	1100.00	288.00	1110.00	3
10	288.00	1110.00	420.00	1164.00	3

User Specified Y-Origin = 1000.00(ft)

Default X-Plus Value = 0.00(ft)

Default Y-Plus Value = 0.00(ft)

1

ISOTROPIC SOIL PARAMETERS

3 Type(s) of Soil

Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Piez. Constant (psf)	Surface No.
1	120.0	120.0	300.0	35.0	0.00	0.0	0
2	125.0	125.0	800.0	32.0	0.00	0.0	0
3	125.0	125.0	250.0	40.0	0.00	0.0	0

0

1

REINFORCING LAYER(S)

13 REINFORCING LAYER(S) SPECIFIED

REINFORCING LAYER NO. 1

10 POINTS DEFINE THIS LAYER

POINT NO.	X-COORD	Y-COORD	FORCE	INCLINATION FACTOR
1	39.00	1060.00	0.00	0.000
2	44.00	1060.00	1150.00	0.000
3	48.29	1060.00	1150.00	0.000
4	52.57	1060.00	1150.00	0.000
5	56.86	1060.00	1150.00	0.000
6	61.14	1060.00	1150.00	0.000
7	65.43	1060.00	1150.00	0.000
8	69.71	1060.00	1150.00	0.000
9	74.00	1060.00	1150.00	0.000
10	79.00	1060.00	0.00	0.000

REINFORCING LAYER NO. 2

10 POINTS DEFINE THIS LAYER

POINT NO.	X-COORD	Y-COORD	FORCE	INCLINATION FACTOR
1	58.24	1070.00	0.00	0.000
2	63.24	1070.00	1150.00	0.000
3	67.52	1070.00	1150.00	0.000
4	71.81	1070.00	1150.00	0.000
5	76.09	1070.00	1150.00	0.000
6	80.38	1070.00	1150.00	0.000
7	84.67	1070.00	1150.00	0.000
8	88.95	1070.00	1150.00	0.000
9	93.24	1070.00	1150.00	0.000
10	98.24	1070.00	0.00	0.000

REINFORCING LAYER NO. 3

10 POINTS DEFINE THIS LAYER

POINT NO.	X-COORD	Y-COORD	FORCE	INCLINATION FACTOR
1	77.47	1080.00	0.00	0.000
2	82.47	1080.00	1150.00	0.000
3	86.76	1080.00	1150.00	0.000
4	91.04	1080.00	1150.00	0.000
5	95.33	1080.00	1150.00	0.000
6	99.62	1080.00	1150.00	0.000
7	103.90	1080.00	1150.00	0.000
8	108.19	1080.00	1150.00	0.000
9	112.47	1080.00	1150.00	0.000

10	117.47	1080.00	0.00	0.000

REINFORCING LAYER NO. 4

10 POINTS DEFINE THIS LAYER

POINT NO.	X-COORD	Y-COORD	FORCE	INCLINATION FACTOR
1	96.71	1090.00	0.00	0.000
2	101.71	1090.00	1150.00	0.000
3	106.00	1090.00	1150.00	0.000
4	110.28	1090.00	1150.00	0.000
5	114.57	1090.00	1150.00	0.000
6	118.85	1090.00	1150.00	0.000
7	123.14	1090.00	1150.00	0.000
8	127.42	1090.00	1150.00	0.000
9	131.71	1090.00	1150.00	0.000
10	136.71	1090.00	0.00	0.000

REINFORCING LAYER NO. 5

10 POINTS DEFINE THIS LAYER

POINT NO.	X-COORD	Y-COORD	FORCE	INCLINATION FACTOR
1	115.95	1100.00	0.00	0.000
2	120.95	1100.00	1150.00	0.000
3	125.23	1100.00	1150.00	0.000
4	129.52	1100.00	1150.00	0.000
5	133.80	1100.00	1150.00	0.000
6	138.09	1100.00	1150.00	0.000
7	142.38	1100.00	1150.00	0.000
8	146.66	1100.00	1150.00	0.000
9	150.95	1100.00	1150.00	0.000
10	155.95	1100.00	0.00	0.000

REINFORCING LAYER NO. 6

10 POINTS DEFINE THIS LAYER

POINT NO.	X-COORD	Y-COORD	FORCE	INCLINATION FACTOR
1	135.18	1110.00	0.00	0.000
2	140.18	1110.00	1150.00	0.000
3	144.47	1110.00	1150.00	0.000

4	148.75	1110.00	1150.00	0.000
5	153.04	1110.00	1150.00	0.000
6	157.33	1110.00	1150.00	0.000
7	161.61	1110.00	1150.00	0.000
8	165.90	1110.00	1150.00	0.000
9	170.18	1110.00	1150.00	0.000
10	175.18	1110.00	0.00	0.000

REINFORCING LAYER NO. 7

10 POINTS DEFINE THIS LAYER

POINT NO.	X-COORD	Y-COORD	FORCE	INCLINATION FACTOR
1	154.42	1120.00	0.00	0.000
2	159.42	1120.00	1150.00	0.000
3	163.71	1120.00	1150.00	0.000
4	167.99	1120.00	1150.00	0.000
5	172.28	1120.00	1150.00	0.000
6	176.56	1120.00	1150.00	0.000
7	180.85	1120.00	1150.00	0.000
8	185.13	1120.00	1150.00	0.000
9	189.42	1120.00	1150.00	0.000
10	194.42	1120.00	0.00	0.000

REINFORCING LAYER NO. 8

10 POINTS DEFINE THIS LAYER

POINT NO.	X-COORD	Y-COORD	FORCE	INCLINATION FACTOR
1	173.66	1130.00	0.00	0.000
2	178.66	1130.00	1150.00	0.000
3	182.94	1130.00	1150.00	0.000
4	187.23	1130.00	1150.00	0.000
5	191.51	1130.00	1150.00	0.000
6	195.80	1130.00	1150.00	0.000
7	200.08	1130.00	1150.00	0.000
8	204.37	1130.00	1150.00	0.000
9	208.66	1130.00	1150.00	0.000
10	213.66	1130.00	0.00	0.000

REINFORCING LAYER NO. 9

10 POINTS DEFINE THIS LAYER

POINT NO.	X-COORD	Y-COORD	FORCE	INCLINATION FACTOR
1	192.89	1140.00	0.00	0.000
2	197.89	1140.00	1150.00	0.000
3	202.18	1140.00	1150.00	0.000
4	206.46	1140.00	1150.00	0.000
5	210.75	1140.00	1150.00	0.000
6	215.04	1140.00	1150.00	0.000
7	219.32	1140.00	1150.00	0.000
8	223.61	1140.00	1150.00	0.000
9	227.89	1140.00	1150.00	0.000
10	232.89	1140.00	0.00	0.000

REINFORCING LAYER NO. 10

10 POINTS DEFINE THIS LAYER

POINT NO.	X-COORD	Y-COORD	FORCE	INCLINATION FACTOR
1	212.13	1150.00	0.00	0.000
2	217.13	1150.00	1150.00	0.000
3	221.42	1150.00	1150.00	0.000
4	225.70	1150.00	1150.00	0.000
5	229.99	1150.00	1150.00	0.000
6	234.27	1150.00	1150.00	0.000
7	238.56	1150.00	1150.00	0.000
8	242.84	1150.00	1150.00	0.000
9	247.13	1150.00	1150.00	0.000
10	252.13	1150.00	0.00	0.000

REINFORCING LAYER NO. 11

10 POINTS DEFINE THIS LAYER

POINT NO.	X-COORD	Y-COORD	FORCE	INCLINATION FACTOR
1	231.37	1160.00	0.00	0.000
2	236.37	1160.00	1150.00	0.000
3	240.65	1160.00	1150.00	0.000
4	244.94	1160.00	1150.00	0.000
5	249.22	1160.00	1150.00	0.000
6	253.51	1160.00	1150.00	0.000
7	257.79	1160.00	1150.00	0.000
8	262.08	1160.00	1150.00	0.000
9	266.37	1160.00	1150.00	0.000
10	271.37	1160.00	0.00	0.000

REINFORCING LAYER NO. 12

10 POINTS DEFINE THIS LAYER

POINT NO.	X-COORD	Y-COORD	FORCE	INCLINATION FACTOR
1	250.60	1170.00	0.00	0.000
2	255.60	1170.00	1150.00	0.000
3	259.89	1170.00	1150.00	0.000
4	264.17	1170.00	1150.00	0.000
5	268.46	1170.00	1150.00	0.000
6	272.75	1170.00	1150.00	0.000
7	277.03	1170.00	1150.00	0.000
8	281.32	1170.00	1150.00	0.000
9	285.60	1170.00	1150.00	0.000
10	290.60	1170.00	0.00	0.000

REINFORCING LAYER NO. 13

10 POINTS DEFINE THIS LAYER

POINT NO.	X-COORD	Y-COORD	FORCE	INCLINATION FACTOR
1	269.84	1180.00	0.00	0.000
2	274.84	1180.00	1150.00	0.000
3	279.13	1180.00	1150.00	0.000
4	283.41	1180.00	1150.00	0.000
5	287.70	1180.00	1150.00	0.000
6	291.98	1180.00	1150.00	0.000
7	296.27	1180.00	1150.00	0.000
8	300.55	1180.00	1150.00	0.000
9	304.84	1180.00	1150.00	0.000
10	309.84	1180.00	0.00	0.000

1

A Critical Failure Surface Searching Method, Using A Random Technique For Generating Circular Surfaces, Has Been Specified.

2000 Trial Surfaces Have Been Generated.

100 Surface(s) Initiate(s) From Each Of 20 Points Equally Spaced

Along The Ground Surface Between X = 0.00(ft)
and X = 100.00(ft)

Each Surface Terminates Between X = 200.00(ft)
and X = 420.00(ft)

Unless Further Limitations Were Imposed, The Minimum Elevation
At Which A Surface Extends Is Y = 0.00(ft)

25.00(ft) Line Segments Define Each Trial Failure Surface.

Following Are Displayed The Ten Most Critical Of The Trial
Failure Surfaces Evaluated. They Are
Ordered - Most Critical First.

* * Safety Factors Are Calculated By The Modified Bishop Method
* *

Total Number of Trial Surfaces Attempted = 2000

Number of Trial Surfaces With Valid FS = 2000

Statistical Data On All Valid FS Values:
FS Max = 5.030 FS Min = 1.770 FS Ave = 3.262
Standard Deviation = 0.864 Coefficient of Variation =
26.48 %

Failure Surface Specified By 13 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	52.632	1067.086
2	77.518	1069.470
3	102.191	1073.501
4	126.542	1079.160
5	150.464	1086.423
6	173.851	1095.257
7	196.600	1105.624
8	218.611	1117.477
9	239.787	1130.766
10	260.034	1145.430
11	279.264	1161.406
12	297.391	1178.623
13	308.800	1191.000

Circle Center At X = 29.189 ; Y = 1442.850 ; and Radius = 376.495

Factor of Safety
*** 1.770 ***

Individual data on the 13 slices

Slice No.	Width (ft)	Weight (lbs)	Water Force Top (lbs)	Water Force Bot (lbs)	Tie Force Norm (lbs)	Tie Force Tan (lbs)	Earthquake Force Hor (lbs)	Earthquake Force Ver (lbs)	Surcharge Load (lbs)
1	24.9	15756.6	0.0	0.0	0.	0.	0.0	0.0	0.0
2	24.7	44264.2	0.0	0.0	0.	0.	0.0	0.0	0.0
3	24.4	66764.6	0.0	0.0	0.	0.	0.0	0.0	0.0
4	23.9	83059.5	0.0	0.0	0.	0.	0.0	0.0	0.0
5	23.4	93124.8	0.0	0.0	0.	0.	0.0	0.0	0.0
6	22.7	97113.2	0.0	0.0	0.	0.	0.0	0.0	0.0
7	22.0	95345.7	0.0	0.0	0.	0.	0.0	0.0	0.0
8	21.2	88307.9	0.0	0.0	0.	0.	0.0	0.0	0.0
9	20.2	76637.3	0.0	0.0	0.	0.	0.0	0.0	0.0
10	19.2	61110.1	0.0	0.0	0.	0.	0.0	0.0	0.0
11	11.7	29532.9	0.0	0.0	0.	0.	0.0	0.0	0.0
12	6.4	11819.2	0.0	0.0	0.	0.	0.0	0.0	0.0
13	11.4	8472.9	0.0	0.0	0.	0.	0.0	0.0	0.0

Failure Surface Specified By 13 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)

1	52.632	1067.086
2	77.532	1069.310
3	102.204	1073.349
4	126.514	1079.183
5	150.332	1086.779
6	173.530	1096.098
7	195.985	1107.089
8	217.575	1119.693
9	238.185	1133.843
10	257.705	1149.463
11	276.029	1166.469
12	293.061	1184.770
13	298.060	1191.000

Circle Center At X = 34.731 ; Y = 1408.099 ; and Radius = 341.482

Factor of Safety
*** 1.775 ***

1

Failure Surface Specified By 13 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	57.895	1069.822
2	82.746	1072.542
3	107.374	1076.842
4	131.676	1082.705
5	155.555	1090.108
6	178.913	1099.020
7	201.654	1109.404
8	223.686	1121.220
9	244.919	1134.417
10	265.266	1148.943
11	284.644	1164.738
12	302.975	1181.737
13	311.764	1191.000

Circle Center At X = 27.763 ; Y = 1460.112 ; and Radius = 391.451

Factor of Safety
*** 1.775 ***

Failure Surface Specified By 13 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	57.895	1069.822
2	82.685	1073.055
3	107.231	1077.797
4	131.441	1084.031
5	155.225	1091.734
6	178.493	1100.877
7	201.158	1111.426
8	223.136	1123.341
9	244.345	1136.578
10	264.704	1151.086
11	284.138	1166.813
12	302.573	1183.699
13	309.626	1191.000

Circle Center At X = 17.482 ; Y = 1476.456 ; and Radius = 408.637

Factor of Safety
*** 1.777 ***

1

Failure Surface Specified By 13 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	57.895	1069.822
2	82.797	1072.033
3	107.497	1075.892
4	131.887	1081.380
5	155.859	1088.475
6	179.308	1097.144
7	202.130	1107.350
8	224.225	1119.048
9	245.495	1132.185
10	265.846	1146.705
11	285.189	1162.543
12	303.439	1179.629
13	314.074	1191.000

Circle Center At X = 37.053 ; Y = 1445.869 ; and Radius = 376.624

Factor of Safety
*** 1.780 ***

Failure Surface Specified By 12 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	63.158	1072.558
2	87.969	1075.627
3	112.502	1080.434
4	136.637	1086.954
5	160.253	1095.156
6	183.234	1104.999
7	205.466	1116.434
8	226.838	1129.404
9	247.245	1143.845
10	266.586	1159.686
11	284.765	1176.848
12	297.785	1191.000

Circle Center At X = 32.256 ; Y = 1425.386 ; and Radius = 354.178

Factor of Safety
*** 1.794 ***

1

Failure Surface Specified By 13 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	52.632	1067.086
2	77.625	1067.661
3	102.473	1070.416
4	126.985	1075.332
5	150.973	1082.371
6	174.255	1091.478
7	196.653	1102.585
8	217.994	1115.606

9	238.116	1130.441
10	256.865	1146.978
11	274.098	1165.090
12	289.682	1184.638
13	293.901	1191.000

Circle Center At X = 58.568 ; Y = 1352.904 ; and Radius = 285.880

Factor of Safety
*** 1.798 ***

Failure Surface Specified By 12 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	47.368	1064.350
2	72.236	1066.920
3	96.840	1071.354
4	121.040	1077.627
5	144.699	1085.703
6	167.684	1095.537
7	189.864	1107.072
8	211.113	1120.243
9	231.310	1134.976
10	250.342	1151.188
11	268.100	1168.785
12	284.395	1187.566

Circle Center At X = 25.702 ; Y = 1395.617 ; and Radius = 331.975

Factor of Safety
*** 1.799 ***

1

Failure Surface Specified By 12 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	42.105	1061.614
2	67.033	1063.518

3	91.718	1067.474
4	115.992	1073.455
5	139.689	1081.420
6	162.647	1091.316
7	184.710	1103.073
8	205.726	1116.612
9	225.553	1131.841
10	244.054	1148.655
11	261.103	1166.940
12	272.488	1181.377

Circle Center At X = 31.794 ; Y = 1362.921 ; and Radius = 301.483

Factor of Safety
*** 1.800 ***

Failure Surface Specified By 13 Coordinate Points

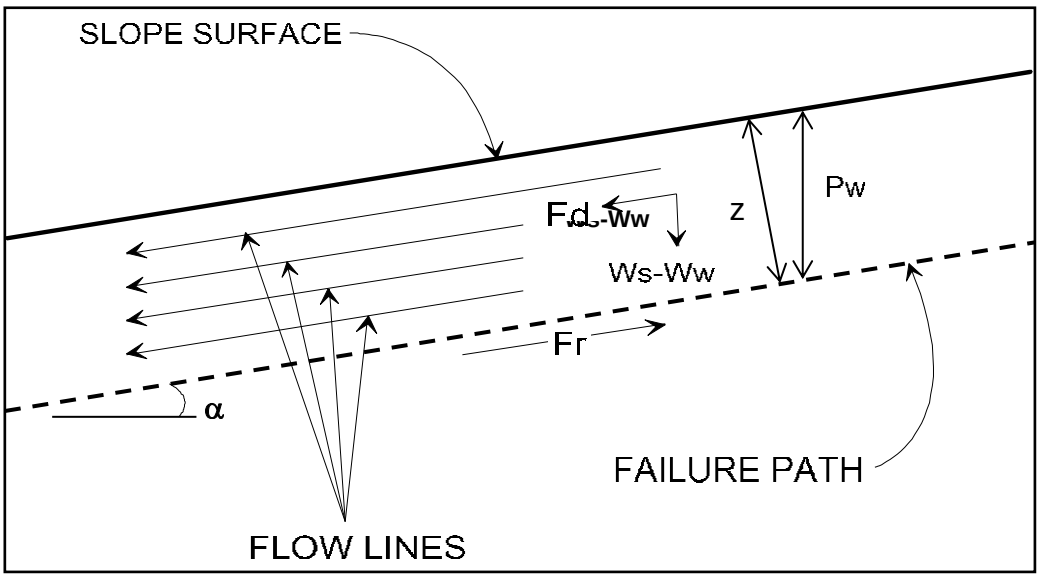
Point No.	X-Surf (ft)	Y-Surf (ft)
1	57.895	1069.822
2	82.529	1074.081
3	106.933	1079.509
4	131.050	1086.095
5	154.825	1093.824
6	178.205	1102.677
7	201.136	1112.636
8	223.565	1123.677
9	245.443	1135.775
10	266.719	1148.903
11	287.345	1163.031
12	307.273	1178.126
13	322.683	1191.000

Circle Center At X = -19.026 ; Y = 1588.197 ; and Radius = 524.051

Factor of Safety
*** 1.808 ***

**** END OF GSTABL7 OUTPUT ****

SURFICIAL SLOPE STABILITY



Assume: (1) Saturation To Slope Surface
(2) Sufficient Permeability To Establish Water Flow

P_w = Water Pressure Head=(z)(cos^2(α))
W_s = Saturated Soil Unit Weight
W_w = Unit Weight of Water (62.4 lb/cu.ft.)
u = Pore Water Pressure=(W_w)(z)(cos^2(α))
z = Layer Thickness
α = Angle of Slope
phi = Angle of Friction
c = Cohesion
F_d = (0.5)(z)(W_s)(sin(2α))
F_r = (z)(W_s-W_w)(cos^2(α))(tan(phi)) + c
Factor of Safety = F_r/F_d

Cut Slope in Bedrock (Klc)

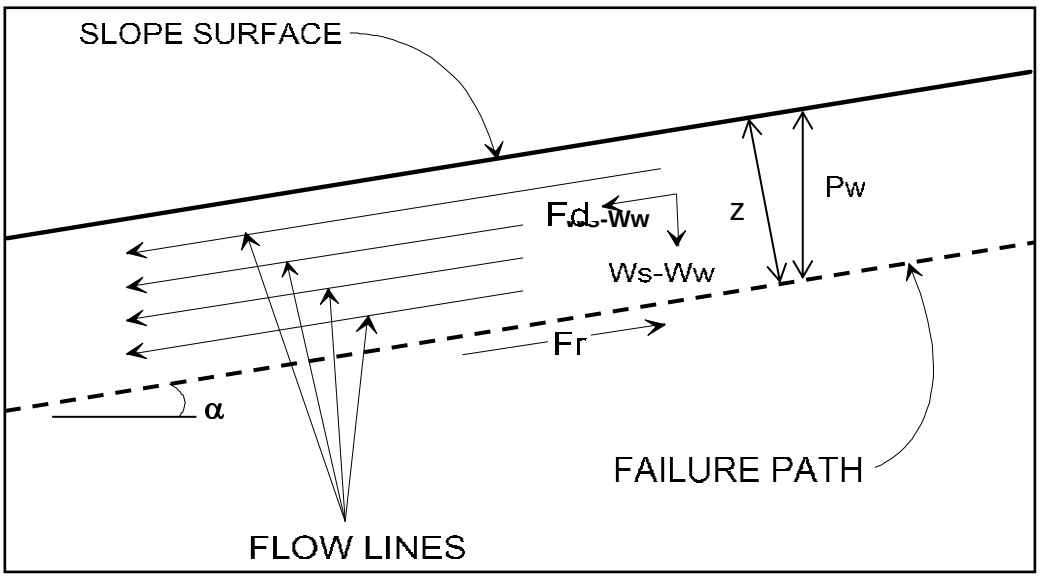
Given:

W_s (pcf)	c (psf)	ϕ (degrees)	z (ft)	Slope Ratio:	α (degrees)
125	250	40	4	2.0 :1	26.5

Calculations:

P_w	u	F_d	F_r	**Factor of Safety**
3.20	199.97	199.56	418.34	**2.10**

SURFICIAL SLOPE STABILITY



Assume: (1) Saturation To Slope Surface
(2) Sufficient Permeability To Establish Water Flow

P_w = Water Pressure Head=(z)(cos^2(α))
W_s = Saturated Soil Unit Weight
W_w = Unit Weight of Water (62.4 lb/cu.ft.)
u = Pore Water Pressure=(W_w)(z)(cos^2(α))
z = Layer Thickness
α = Angle of Slope
phi = Angle of Friction
c = Cohesion
F_d = (0.5)(z)(W_s)(sin(2α))
F_r = (z)(W_s-W_w)(cos^2(α))(tan(phi)) + c
Factor of Safety = F_r/F_d

Engineered Fill Slope

Given:

W_s (pcf)	c (psf)	ϕ (degrees)	z (ft)	Slope Ratio:	α (degrees)
120	300	35	4	2.0 :1	26.5

Calculations:

P_w	u	F_d	F_r	**Factor of Safety**
3.20	199.97	191.58	429.25	**2.24**

CBC SEISMIC DESIGN PARAMETERS
SkylineHeights
Project No. 134-02
Determined Utilizing
USGS EARTHQUAKE GROUND MOTION PARAMETERS
Version 5.1.0 (Revised 2/10/2011)

Conterminous 48 States
2005 ASCE 7 Standard
Latitude = 33.845853
Longitude = -117.609005
Spectral Response Accelerations Ss and S1
Ss and S1 = Mapped Spectral Acceleration Values
Site Class B - Fa = 1.0 ,Fv = 1.0
Data are based on a 0.01 deg grid spacing

Period (sec)	Sa (g)
0.2	1.947 (Ss, Site Class B)
1.0	0.725 (S1, Site Class B)

Conterminous 48 States
2005 ASCE 7 Standard
Latitude = 33.845853
Longitude = -117.609005
Spectral Response Accelerations SMs and SM1
SMs = Fa x Ss and SM1 = Fv x S1
Site Class D - Fa = 1.0 ,Fv = 1.5

Period (sec)	Sa (g)
0.2	1.947 (SMs, Site Class D)
1.0	1.088 (SM1, Site Class D)

Conterminous 48 States
2005 ASCE 7 Standard
Latitude = 33.845853
Longitude = -117.609005
Design Spectral Response Accelerations SDs and SD1
SDs = 2/3 x SMs and SD1 = 2/3 x SM1
Site Class D - Fa = 1.0 ,Fv = 1.5

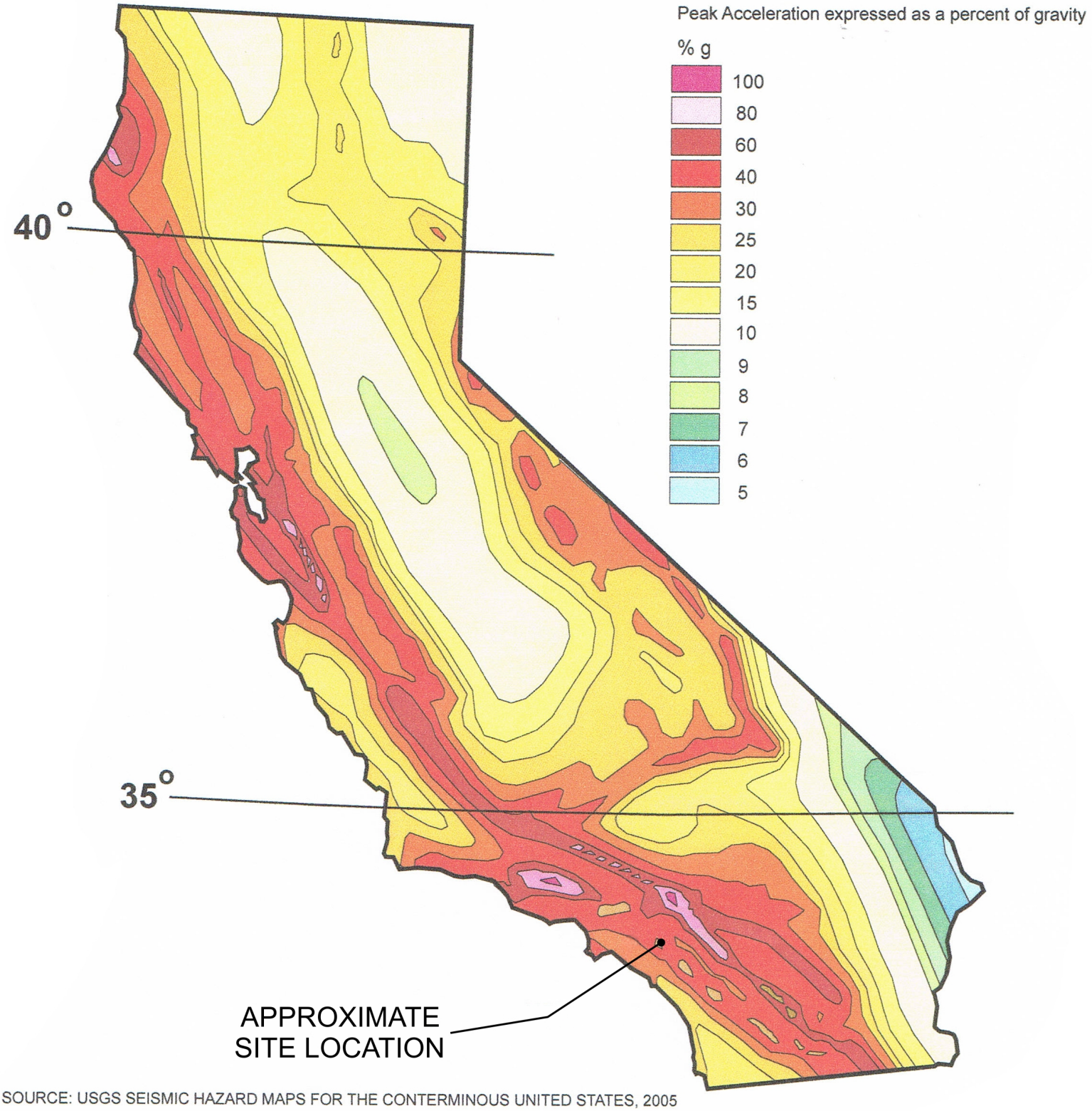
Period (sec)	Sa (g)
0.2	1.298 (SDs, Site Class D)
1.0	0.725 (SD1, Site Class D)

Peak Ground Acceleration Data
Skyline Heights
Project No. 134-02
Dertermined Utilizing
EARTHQUAKE GROUND MOTION PARAMETERS
Version 5.1.0 (Revised 2/10/2011)

Conterminous 48 States
2002 Data
Hazard Curve for PGA
Latitude = 33.845853
Longitude = -117.609005
Data are based on a 0.05 deg grid spacing
Frequency of Exceedance values less than
1E-4 should be used with caution.

Ground Motion (g)	Frequency of Exceedance (per year)
0.005	8.5281E-01
0.007	7.5955E-01
0.010	6.458E-01
0.014	5.1889E-01
0.019	3.9094E-01
0.027	2.7837E-01
0.038	1.9025E-01
0.053	1.2539E-01
0.074	7.9083E-02
0.103	4.6593E-02
0.145	2.4861E-02
0.203	1.3253E-02
0.284	7.8225E-03
0.397	4.9755E-03
0.556	2.9205E-03
0.778	1.3776E-03
1.090	4.7144E-04
1.520	1.0924E-04
2.130	1.4089E-05

Ground Motion (g)	Freq. of Exceed. (per year)	Return Pd. (years)	P.E. %	Exp. Time (years)
0.6436	2.1053E-03	475.00	10.00	50.0



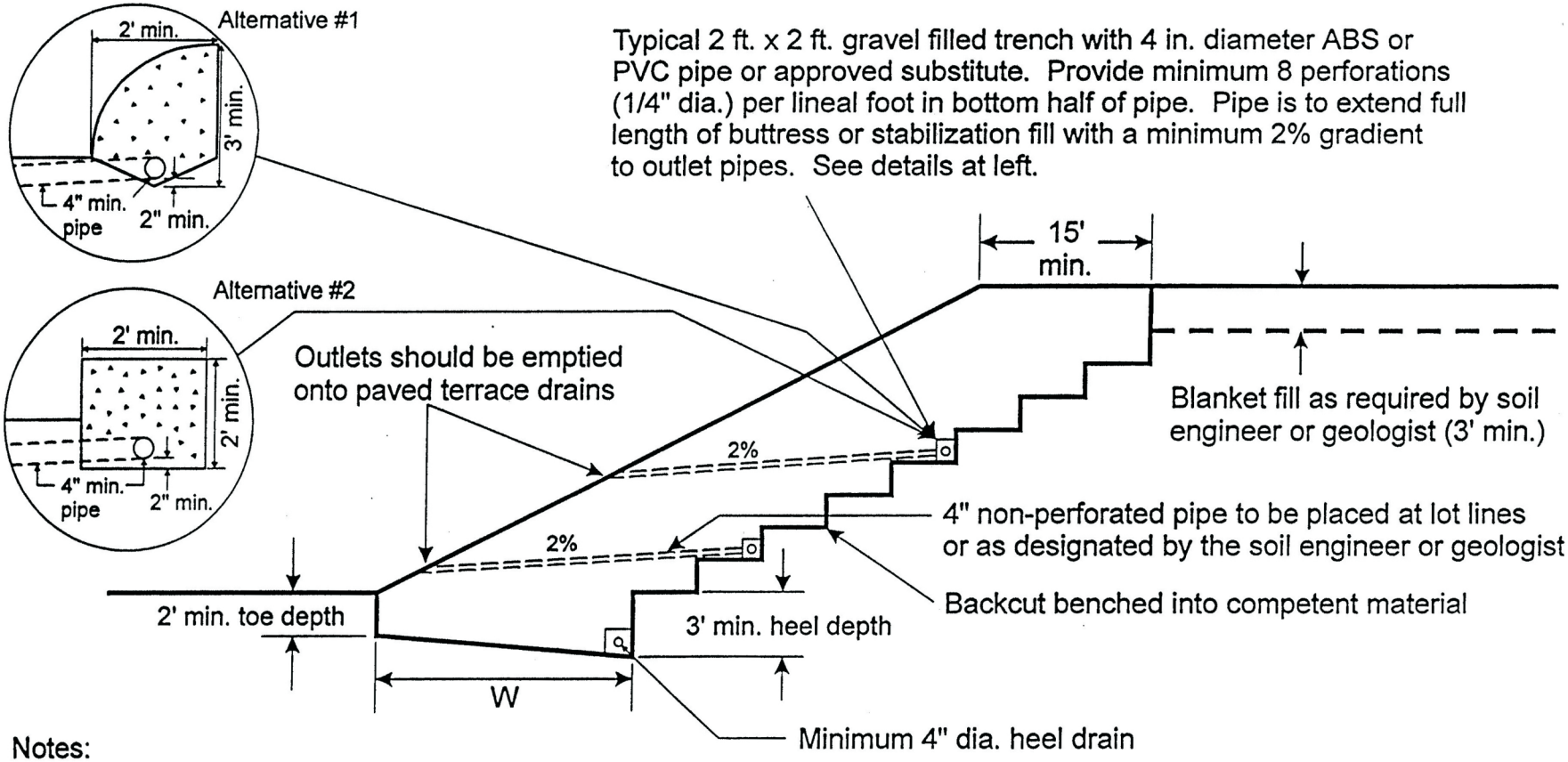
SOURCE: USGS SEISMIC HAZARD MAPS FOR THE CONTERMINOUS UNITED STATES, 2005

PEAK HORIZONTAL ACCELERATION
10 PERCENT PROBABILITY OF EXCEEDANCE IN 50 YEARS

GINTER & ASSOCIATES
27631 Durazno Mission Viejo, CA 92692
PHONE: 714-478-1167

PROJECT #: 134-02	DATE:

BACKDRAIN DETAIL



Notes:

1. ABS-ASTM D 2751, SDR 35 or ASTM D 1527 Sched. 40
   PVC-ASTM D 3034, SDR 35 or ASTM D 1785 Sched. 40
2. Outlets to be provided every 100 ft. and joined to perforated backdrain pipe by L's or T's Min. 2% gradient.
3. Gravel trench to be filled with 3/8" gravel or equal mixture of No. 2 and No. 3 rock.
4. Backdrains and lateral drains located at elevation of each bench drain. The necessity for additional backdrains shall be determined in the field by the soil engineer of geologist.
5. Detail depicts two separate fill key conditions. In both cases, the keyway "W" shall be no less than H/2 and/or the width of equipment.

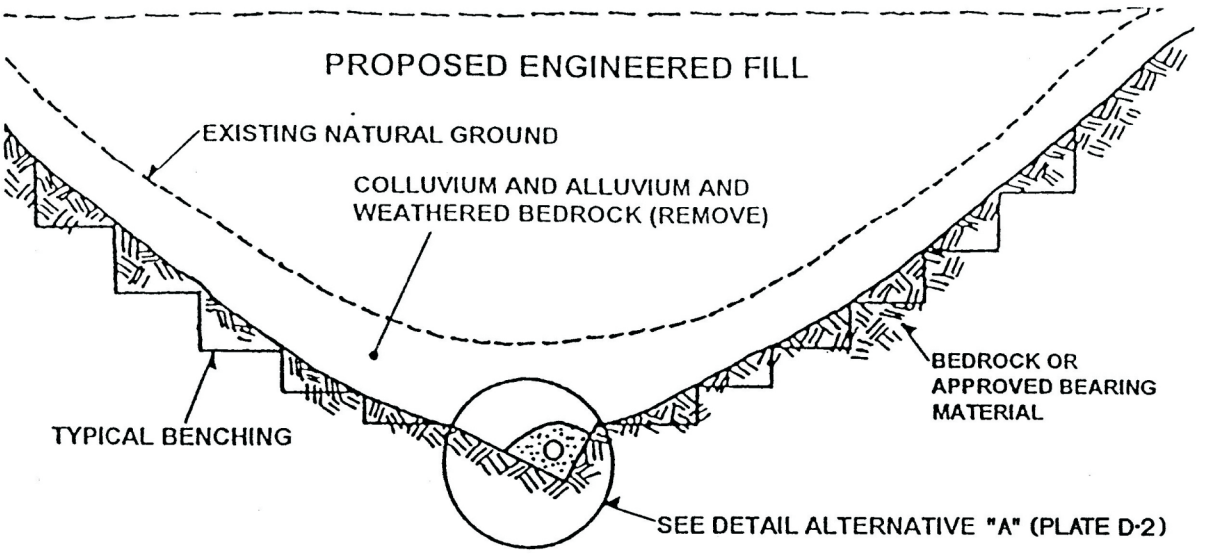
PROJECT NO. :
105-03

DATE :

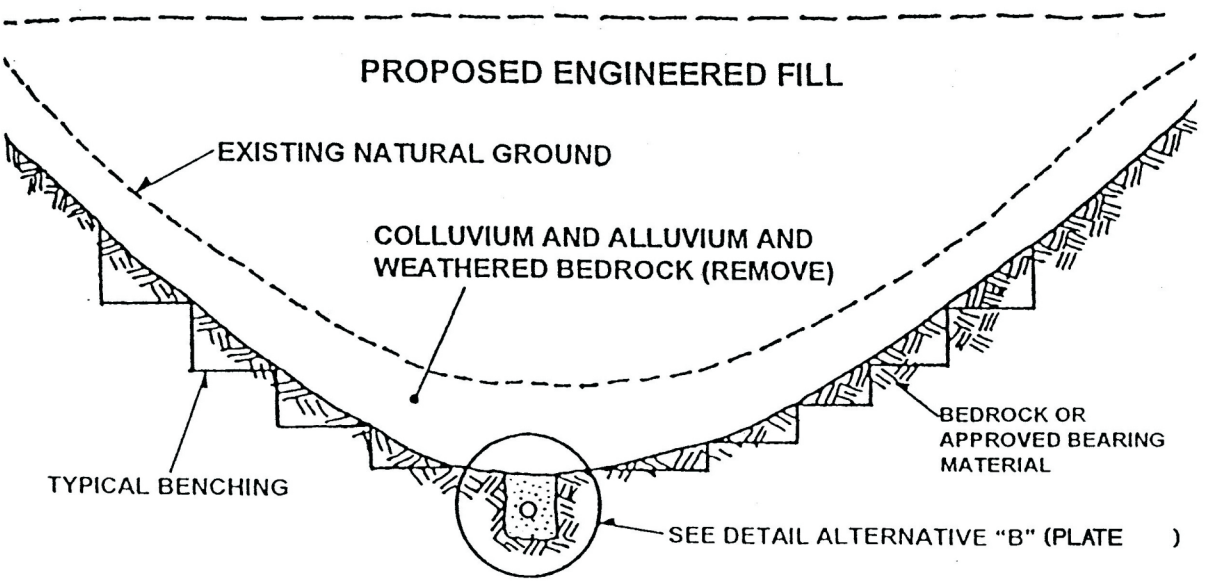
CANYON SUBDRAIN DETAIL

TYPE A

NOT TO BE USED FOR FILLS EXCEEDING 60 FEET

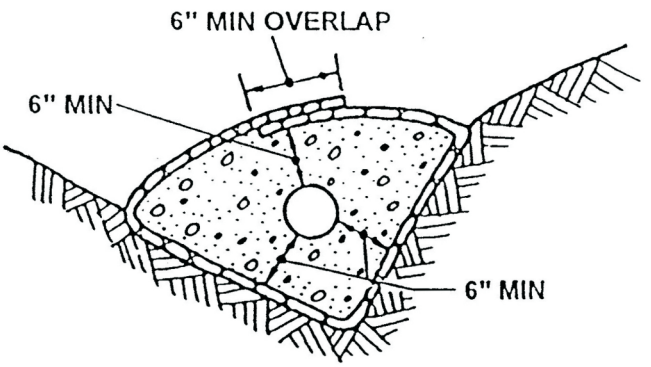


TYPE B

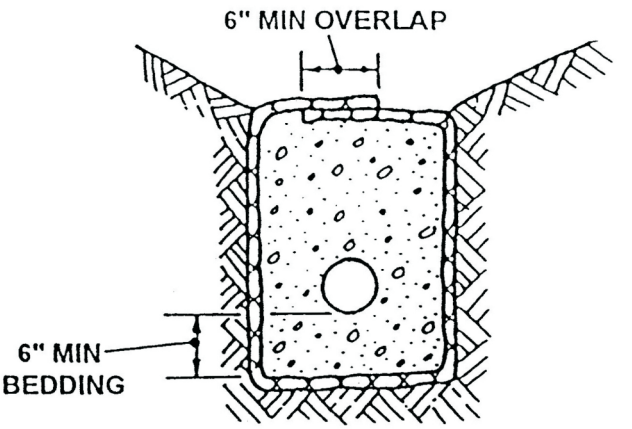


PROJECT NO. : 105-03
DATE :

CANYON SUBDRAIN DETAIL



ALTERNATIVE "A"



ALTERNATIVE "B"

Perforated Pipe Surrounded with Rock & Filter Fabric

FILTER MATERIAL: Minimum volume of 9 cu. ft. per lineal ft. of ¾ in. maximum rock.

PIPE: ABS or PVC pipe or approved substitute with a minimum of 8 ¼ in. perforations per lineal ft. in bottom half of pipe.

ASTM D2751, SDR 35 or ASTM D1527, SCHD. 40	ASTM D3034, SDR 35 or ASTM D1785, SCHD. 40

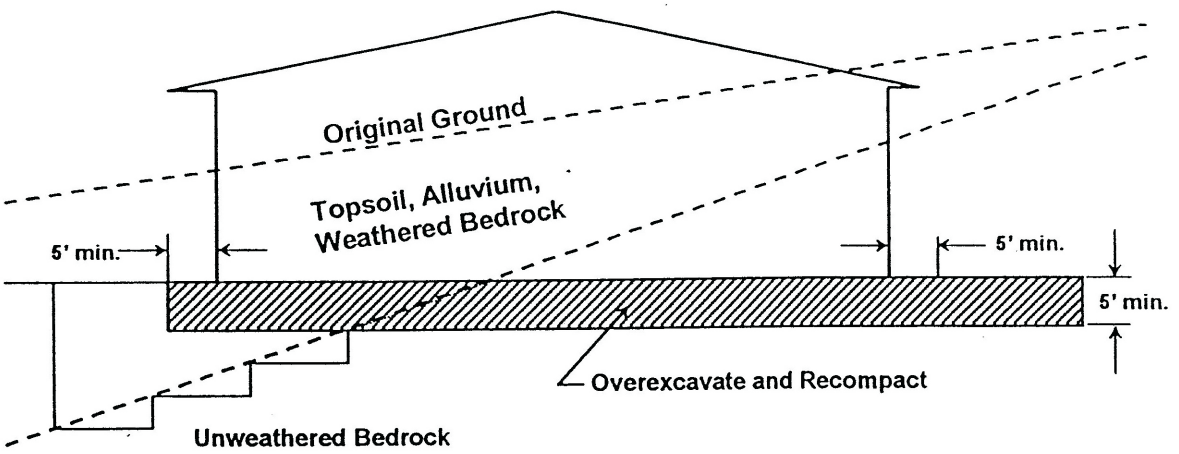
NOTE: For continuous run less than 500 ft. use 6 in. dia. pipe
For contiuous run in excess of 500 ft. use 8 in. dia. pipe
For continuous run in excess of 1000 ft. use 10 in. dia. pipe

FILTER FABRIC: Mirafi 140 filter fabric or approved equivalent.

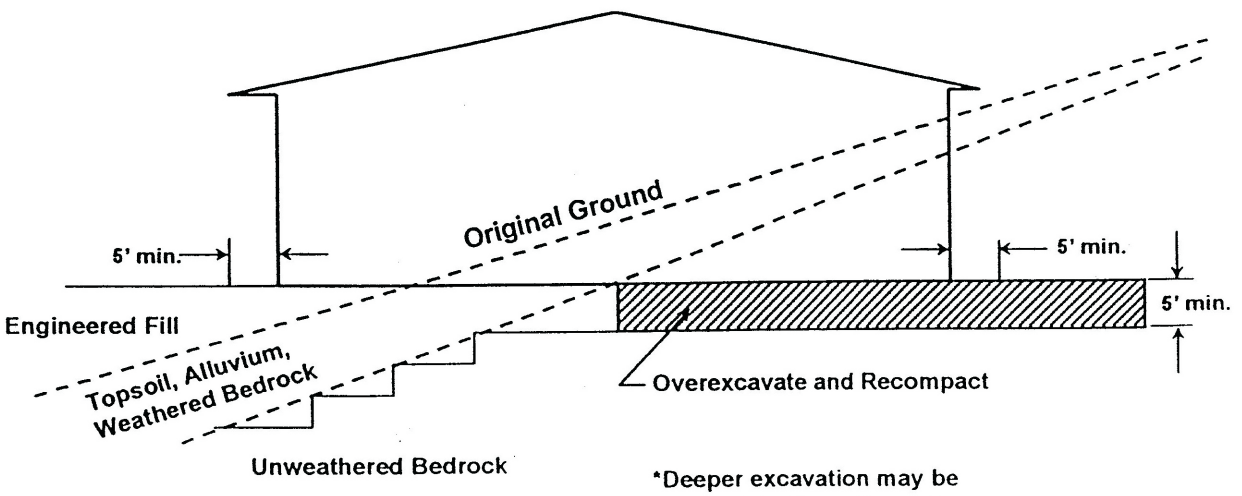
PROJECT NO. :
105-03

DATE :

CUT LOT



CUT-FILL LOT (Transition)

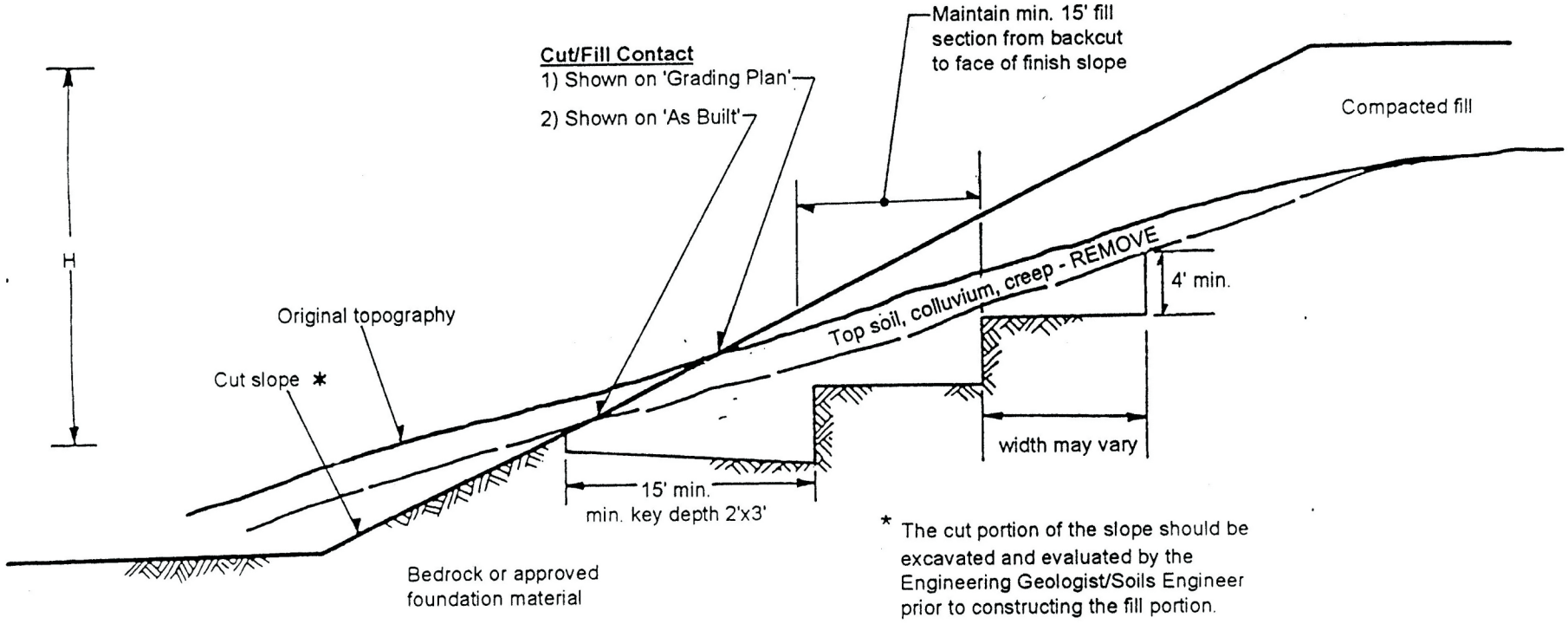


*Deeper excavation may be required by the soils engineer

PROJECT NO. :
105-03

DATE :

FILL OVER CUT DETAIL

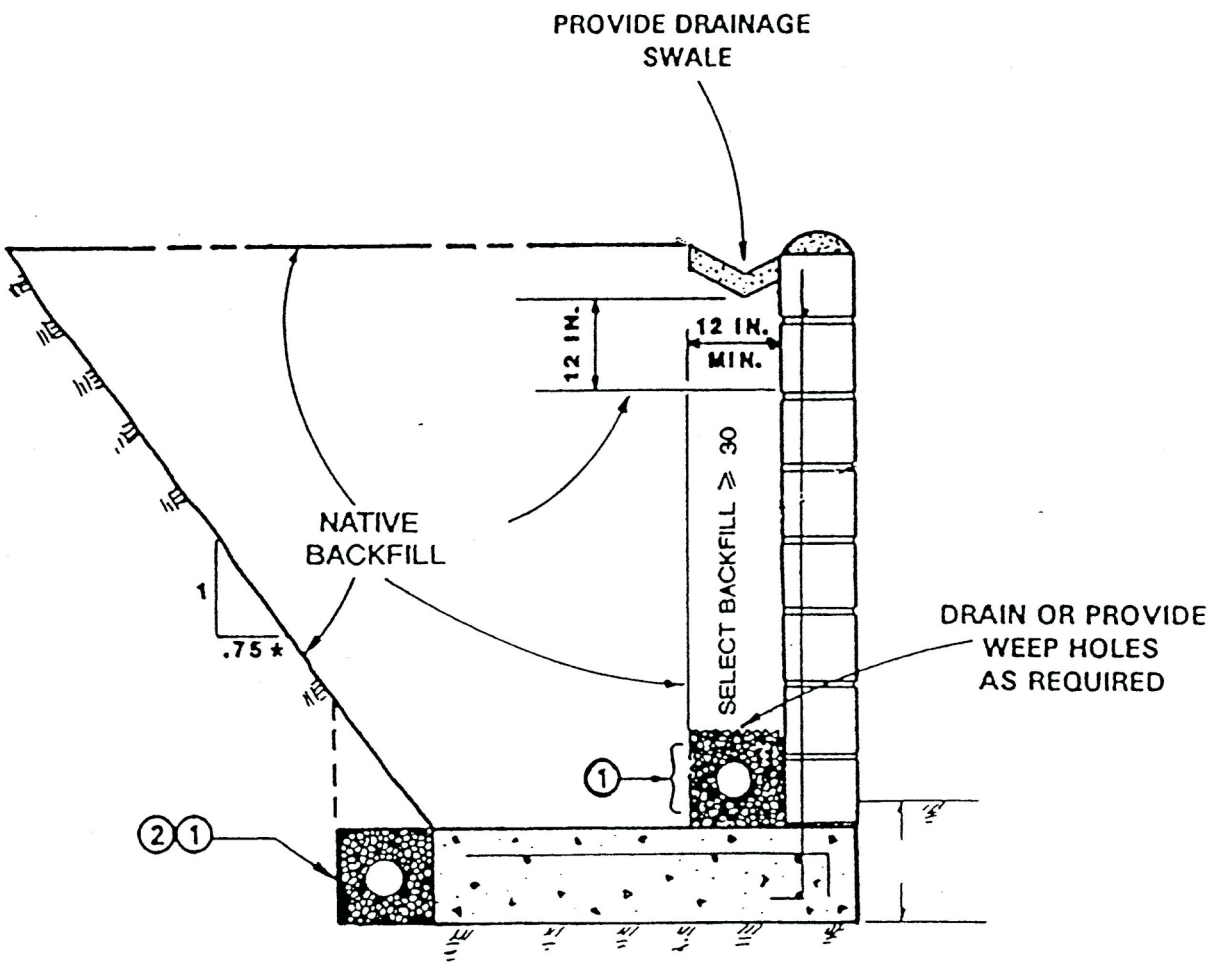


PROJECT NO. :
105-03

DATE :

TYPICAL

RETAINING WALL BACKFILL



* OR AS REQUIRED FOR SAFETY

(1) 4-INCH PERFORATED PVC, SCHEDULE 40 OR APPROVED ALTERNATE. PLACE PERFORATION DOWN AND SURROUND WITH A MINIMUM OF 1 CUBIC FOOT PER LINEAL FOOT(1 FT.^{3}/FT.) OF 3/4 INCH ROCK OR APPROVED ALTERNATE AND WRAPPED IN FILTER FABRIC.

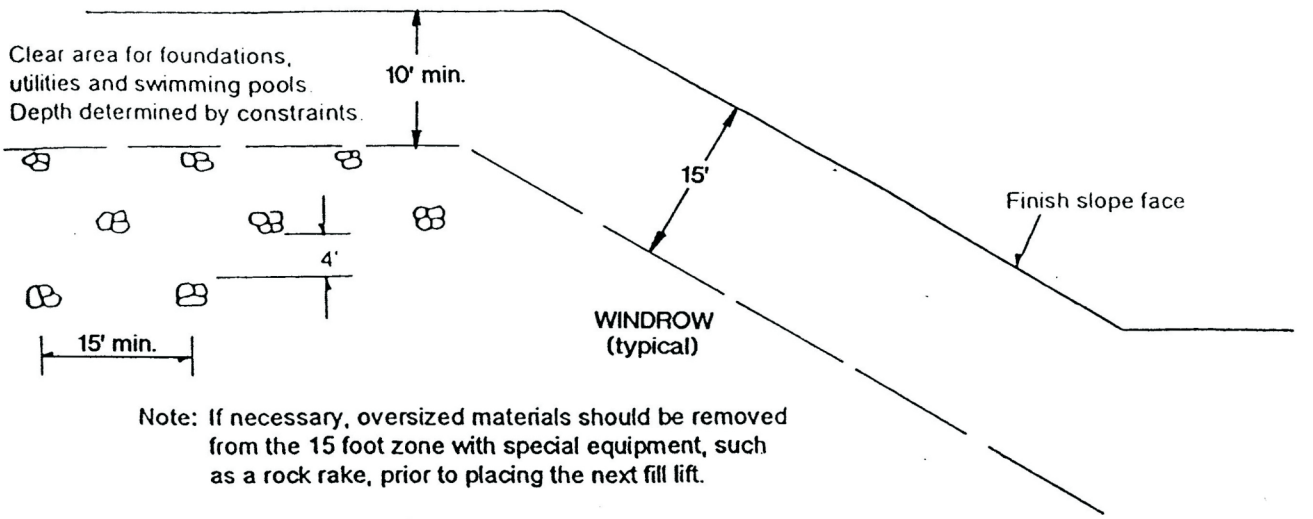
(2) PLACE DRAIN AS SHOWN WHERE MOISTURE MIGRATION THROUGH THE WALL IS UNDESIRABLE.

NOT TO SCALE

PROJECT NO. :
105-03

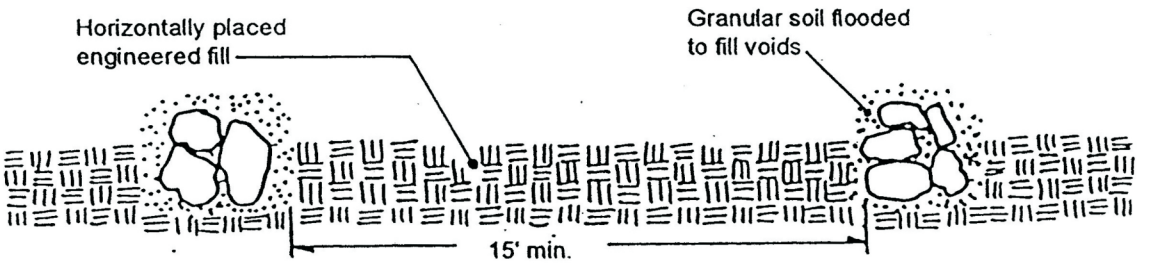
DATE :

ROCK DISPOSAL DETAIL



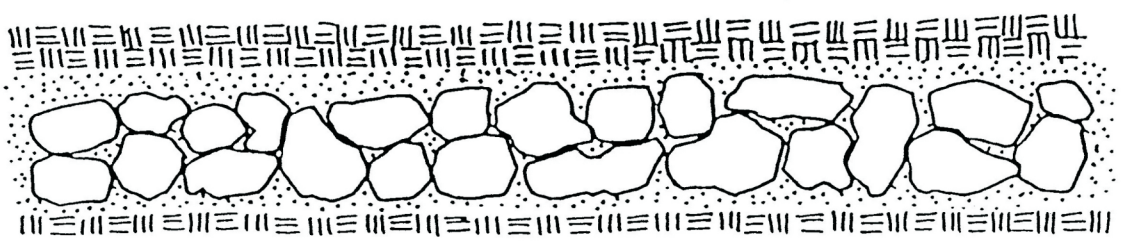
Note: If necessary, oversized materials should be removed from the 15 foot zone with special equipment, such as a rock rake, prior to placing the next fill lift.

TYPICAL WINDROW DETAIL (END VIEW)



Note: Engineered fill shall be brought up at a higher elevation along windrow so granular soil can be flooded in a "trench condition".

PROFILE VIEW



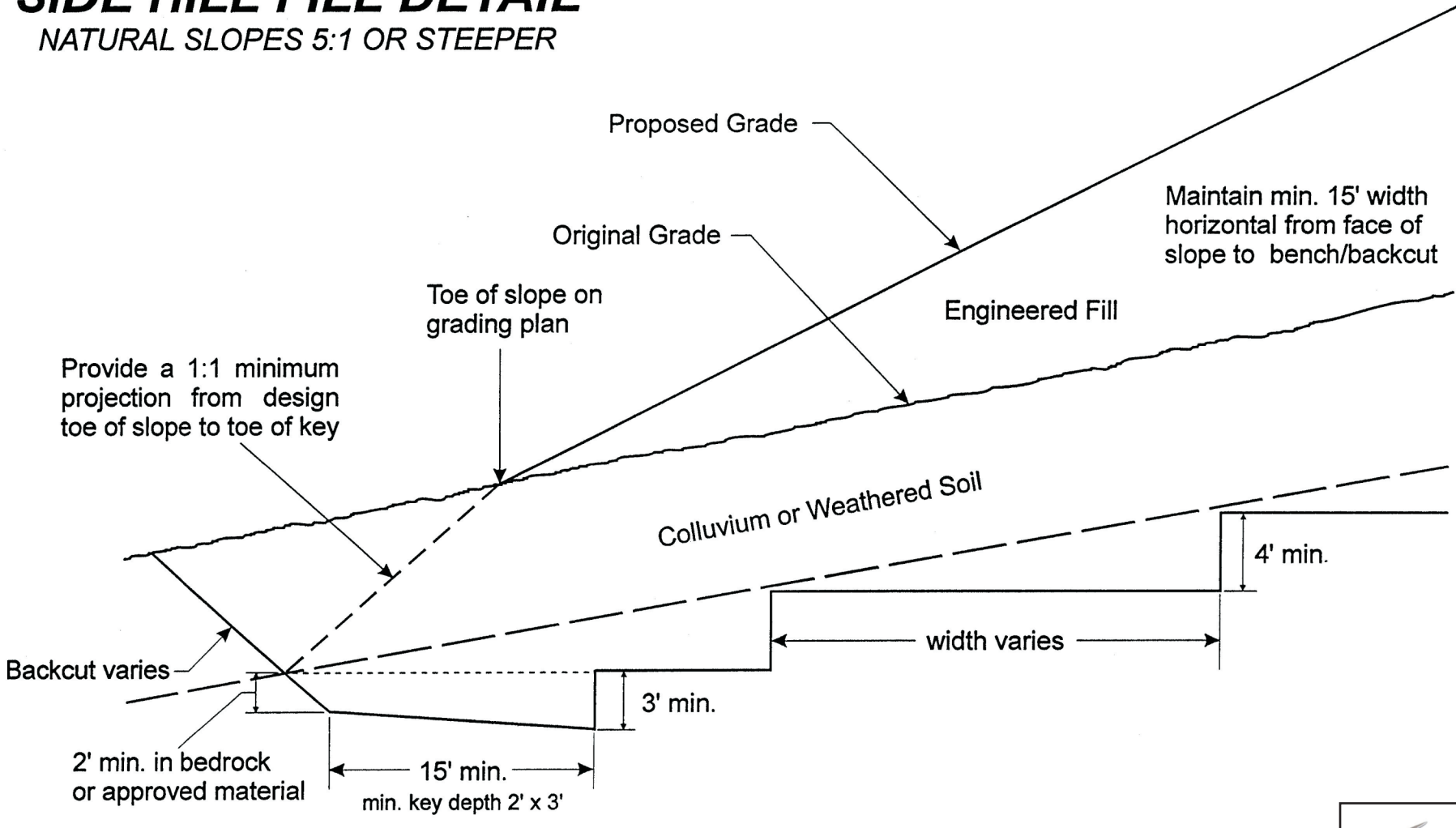
Note: In some situations, rock blankets may be utilized.

PROJECT NO. :
105-03

DATE :

SIDE HILL FILL DETAIL

NATURAL SLOPES 5:1 OR STEEPER

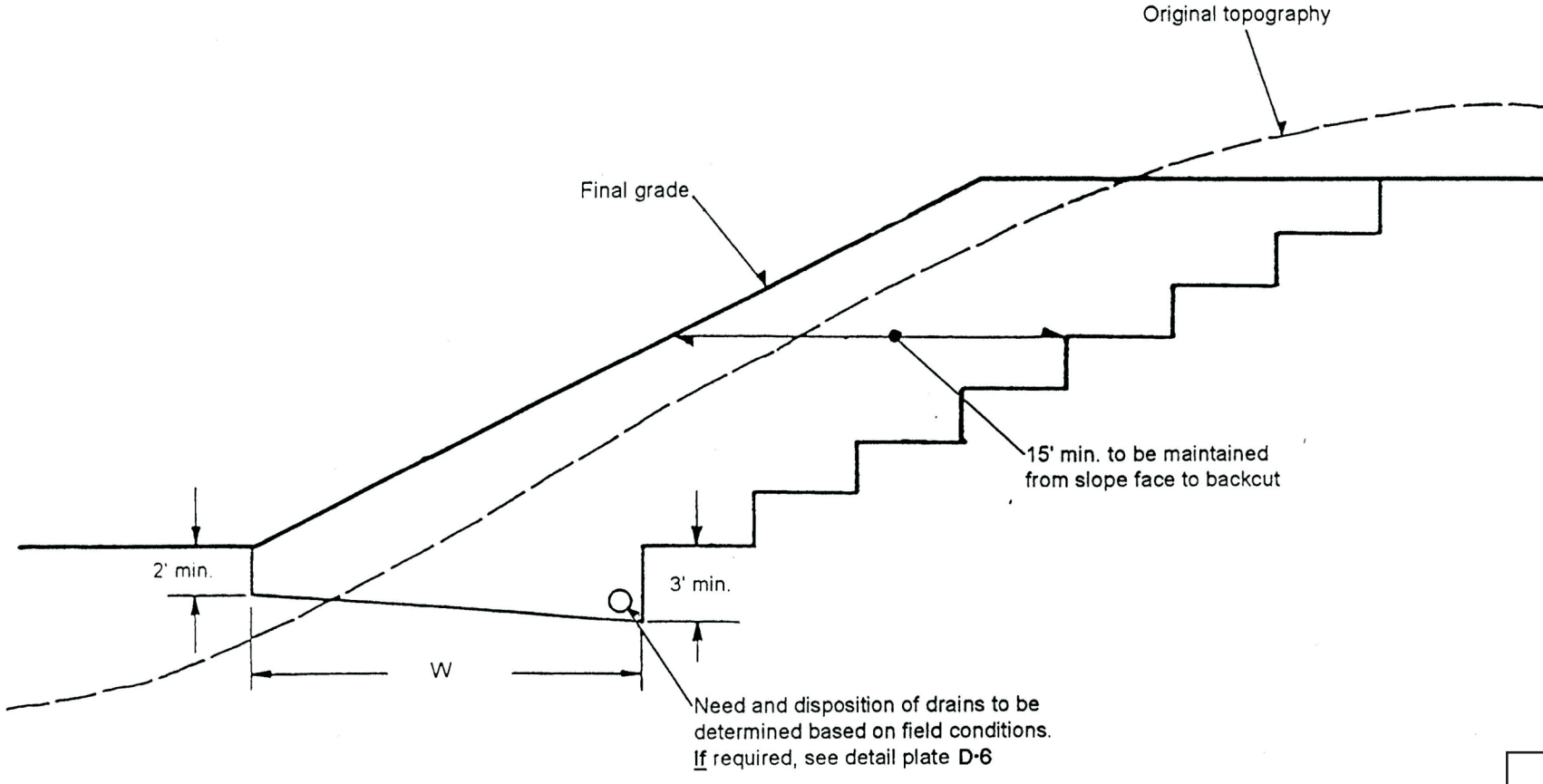


1) Where the natural slope approaches or exceeds the design slope ratio, special recommendations will be provided by the soil engineer.

2) The need for and disposition of drains will be determined by the soil engineer based upon exposed conditions.

PROJECT NO. : 105-03
DATE :

SKIN FILL ON NATURAL GROUND

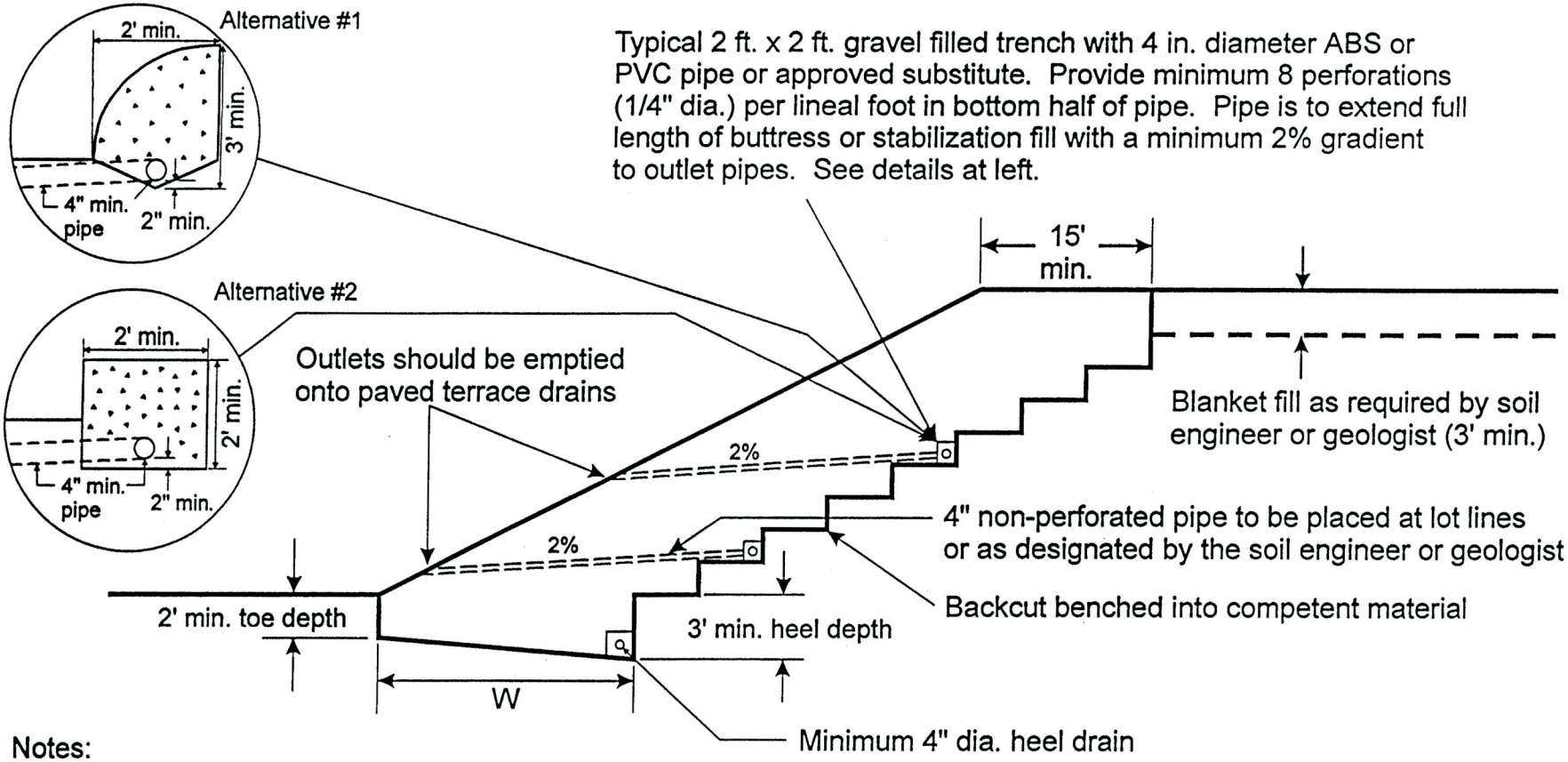


Note
1) The keyway "W" shall be no less than H/L and/or the width of equipment.
2) Bottom if keyway evaluation may need reconditioning.

PROJECT NO. :
105-03

DATE :

STABILIZATION / BUTTRESS FILL DETAIL



Notes:

1. ABS-ASTM D 2751, SDR 35 or ASTM D 1527 Sched. 40
   PVC-ASTM D 3034, SDR 35 or ASTM D 1785 Sched. 40
2. Outlets to be provided every 100 ft. and joined to perforated backdrain pipe by L's or T's Min. 2% gradient.
3. Gravel trench to be filled with 3/8" gravel or equal mixture of No. 2 and No. 3 rock.
4. Backdrains and lateral drains located at elevation of each bench drain. The necessity for additional backdrains shall be determined in the field by the soil engineer of geologist.
5. Detail depicts two separate fill key conditions. In both cases, the keyway "W" shall be no less than H/2 and/or the width of equipment.

PROJECT NO. :
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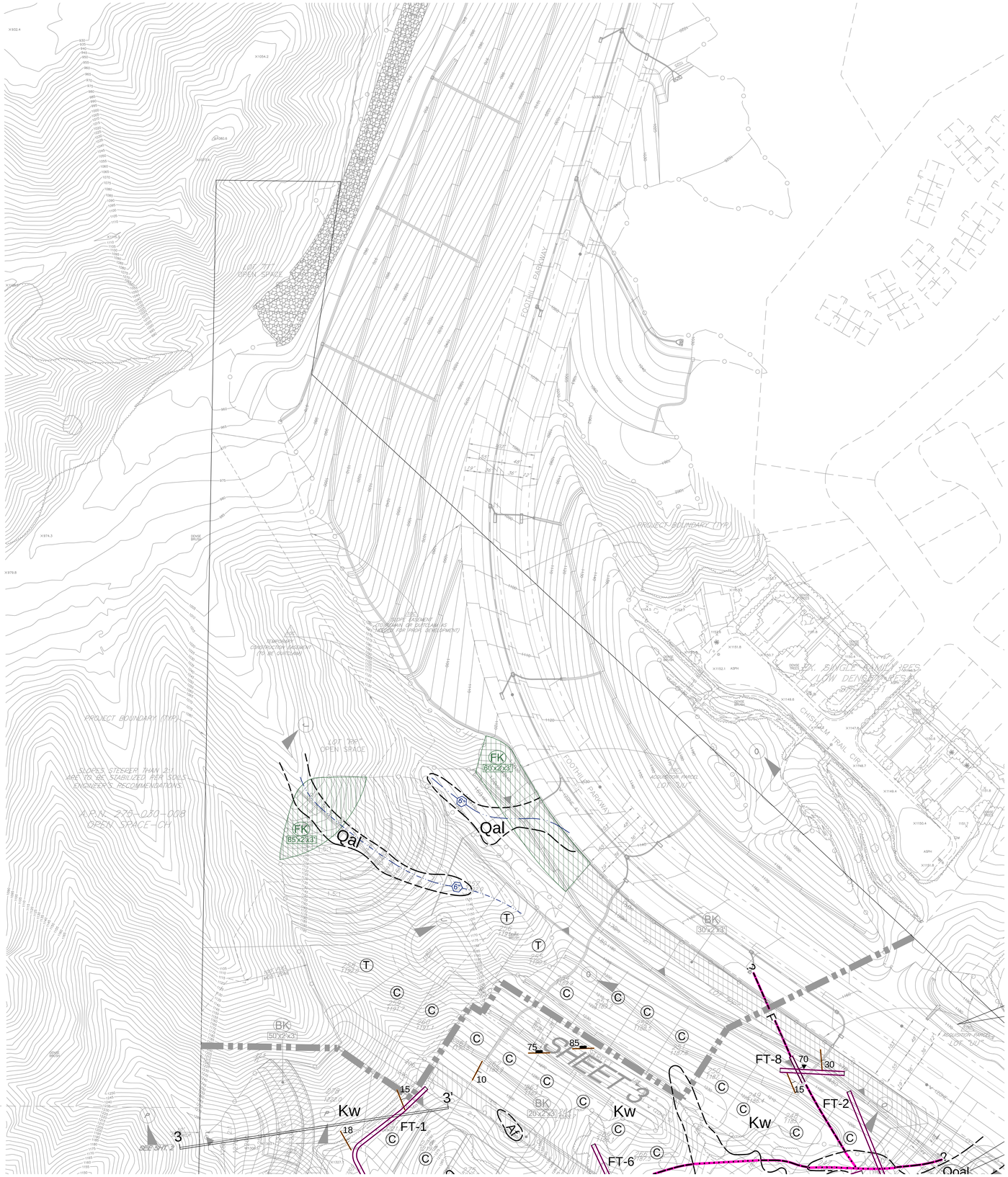
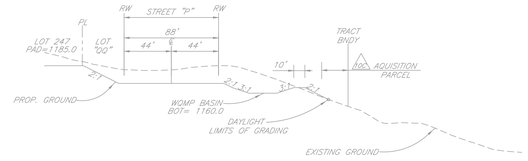
DATE :

DPR13-002





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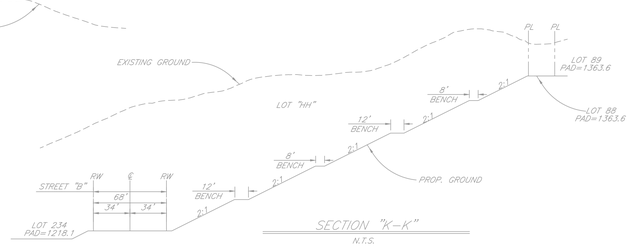

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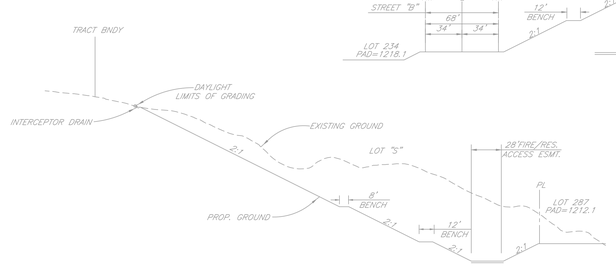

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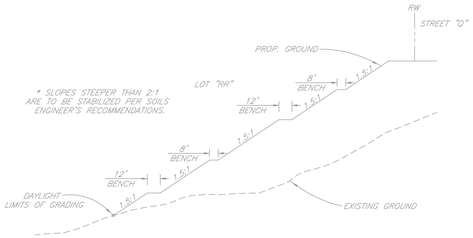

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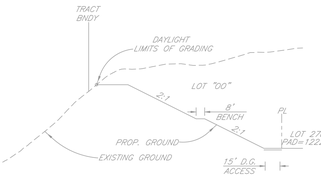

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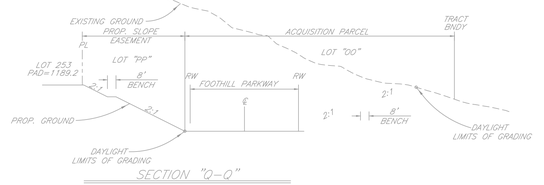

SECTION "Q–Q"
N.T.S.
2X

LEGEND

SURFICIAL UNITS

- Af — UNCERTIFIED FILL
- Qls — LANDSLIDE
- Qal — HOLOCENE ALLUVIUM
- Qoal — PLEISTOCENE OLDER ALLUVIUM

BEDROCK UNITS

TERTIARY

- Tsi — SILVERADO FORMATIOM; MAINLY NON-MARINE, COMMON "RED BEDS"

CRETACEOUS

- Klh — LADD FORMATION- HOLZ SHALE
- Klb — LADD FORMATION- BAKER CONGLOMERATE
- Klc — LADD FORMATION- CONGLOMERATE
- Kt — TRABUCO FORMATION

SYMBOLS

- GEOLOGIC CONTACT APPROXIMATELY LOCATED; QUESTIONED WHERE SURMISED, DOTTED WHERE CONCEALED
- FAULT APPROXIMATELY LOCATED; QUESTIONED WHERE SURMISED, DOTTED WHERE CONCEALED, BARB INDICATES DIRECTION AND AMOUNT OF DIP. U= UPTHROWN D= DOWNTHROWN BLOCK
- STRIKE AND DIP OF BEDDING
- STRIKE AND DIP OF OVERTURNED BEDDING
- STRIKE AND DIP OF JOINTS
- STRIKE AND DIP OF FAULTS OR SHEARS
- POSSIBLE BURIED ANTICLINE
- SYNCLINE
- T-12 — FAULT TRENCHES FROM PSE (11-30-2005)
- FT-8 — FAULT TRENCHES FROM PSE (11-30-2007)
- B-10 — BUCKET AUGER BORING (BY OTHERS, UNPUBLISHED)
- FILL KEY SHOWING APPROXIMATE DIMENSIONS
- BUTTRESS KEY SHOWING APPROXIMATE DIMENSIONS
- PROPOSED SUBDRAIN SHOWING PIPE DIAMETER
- Ⓒ — CAP LOTS
- Ⓣ — TRANSITION LOTS

N

60' 0 60' 120' 180'
SCALE IN FEET

Figure 1
GEOTECHNICAL MAP

PROJECT NO.: 134-02

DATE: May 20, 2013

TENTATIVE TRACT MAP NO. 36544
SKYLINE HIEGHTS
CITY OF CORONA

PREPARED FOR:
RICHLAND DEVELOPERS, INC.
3161 MICHELSON DRIVE, SUITE 425
IRVINE, CA 92612
949-261-7010

PREPARED BY:
KWC ENGINEERS
CIVIL ENGINEERS • PLANNERS • SURVEYORS
1880 COMPTON AVENUE, SUITE 100 CORONA, CA. 92881-3370 951-734-2130

SHEET 2 OF 11 SHEETS

SHEET1.DWG 11-21-13 13:13:13 AM

DPR13-002

B-10
Kw? to 80'
22 @ 5'
58 @ 6'
20 @ 20'
58 @ 22'
18 @ 27'
24 @ 45'
T.D. 80'

B-9
Klc to 64'
23 @ 25'
22 @ 5'
12 @ 28'
23 @ 32'
56 @ 45'
27 @ 57'
T.D. 64'

SCALE IN FEET
60' 0' 60' 120' 180'

Figure 2
GEOTECHNICAL MAP

PROJECT NO. : 134-02
DATE : May 20, 2013

TENTATIVE TRACT MAP NO. 36544
SKYLINE HIEGHTS
CITY OF CORONA

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949-261-7010

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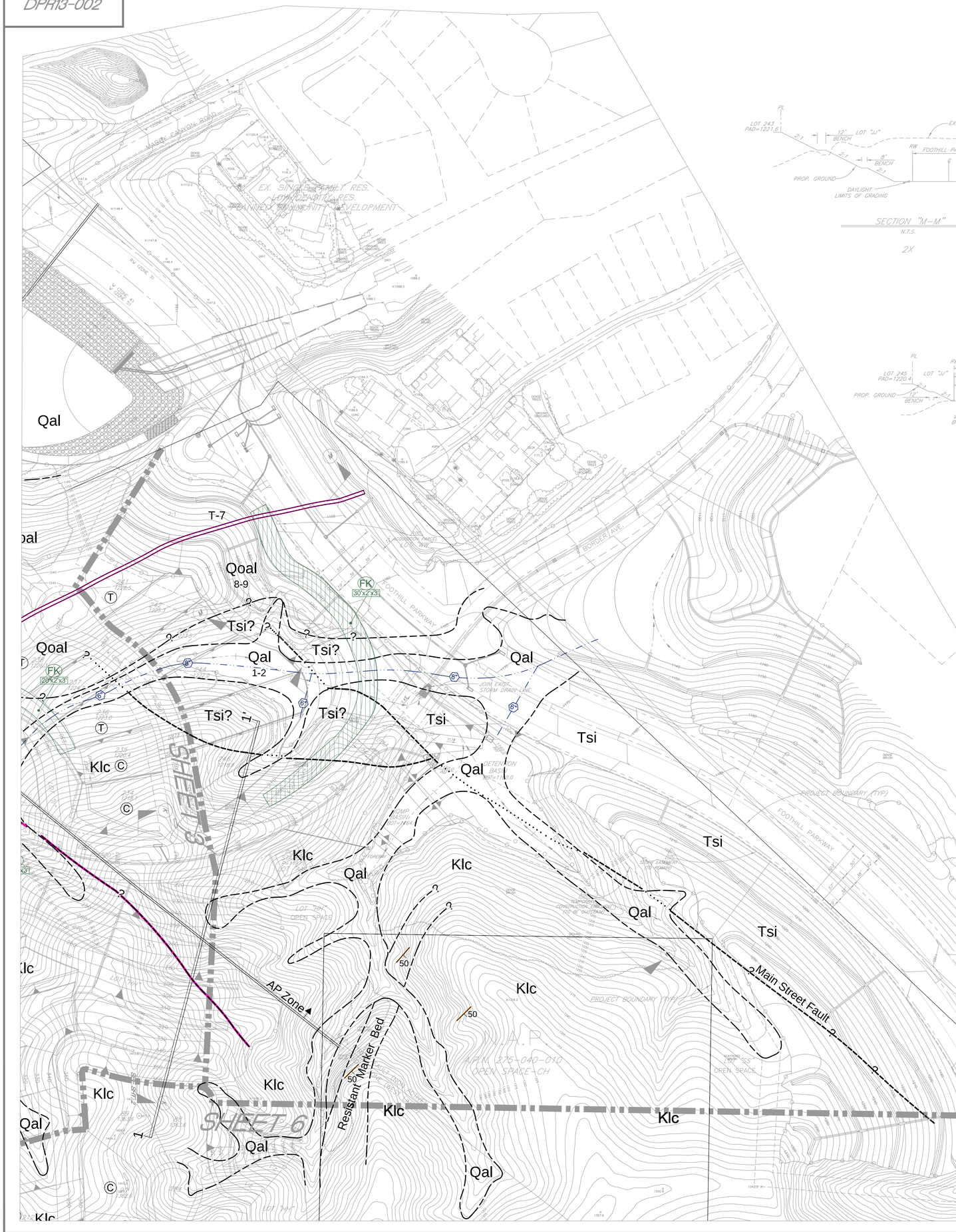
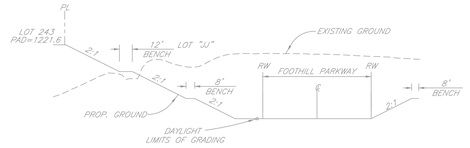
1880 COMPTON AVENUE, SUITE 100 CORONA, CA. 92881-3370 951-734-2130

SHEET 3 OF 11 SHEETS

DPR13-002





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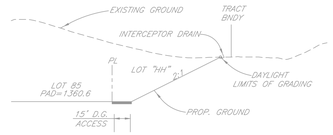

SECTION "C–C"
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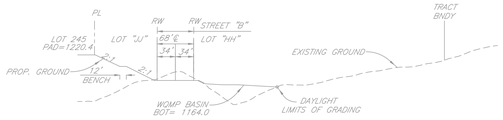
SEE SHEET 6 FOR PLAN VIEW



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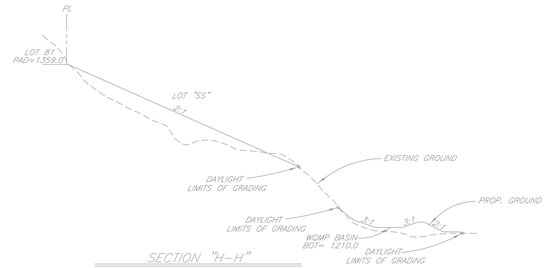

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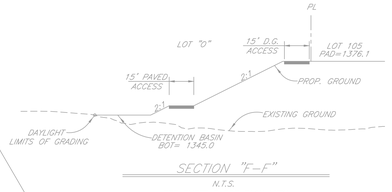

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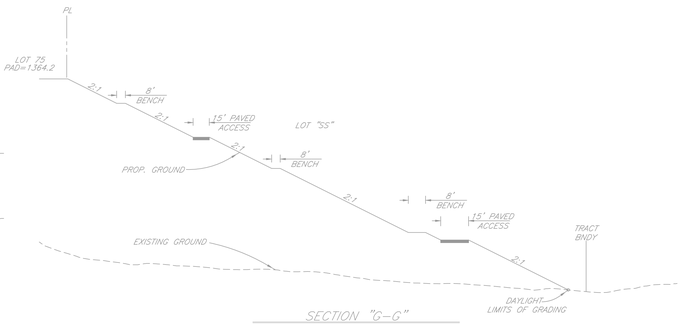

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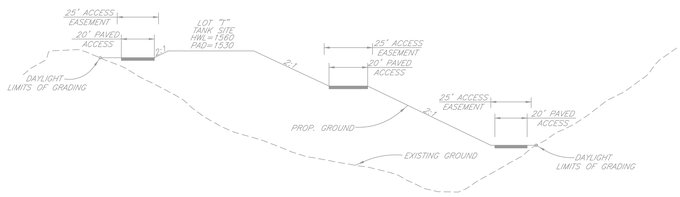

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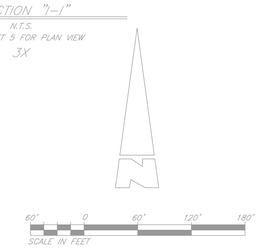

Figure 3
GEOTECHNICAL MAP

PROJECT NO. : 134-02
DATE : May 20, 2013

TENTATIVE TRACT MAP NO. 36544
SKYLINE HIEGHTS
CITY OF CORONA

PREPARED FOR:
RICHLAND DEVELOPERS, INC.
3161 MICHELSON DRIVE, SUITE 425
IRVINE, CA 92612
949-261-7010

PREPARED BY:
KWC ENGINEERS
CIVIL ENGINEERS • PLANNERS • SURVEYORS
1880 COMPTON AVENUE, SUITE 100 CORONA, CA. 92881-3370 951-734-2130

SHEET 4 OF 11 SHEETS

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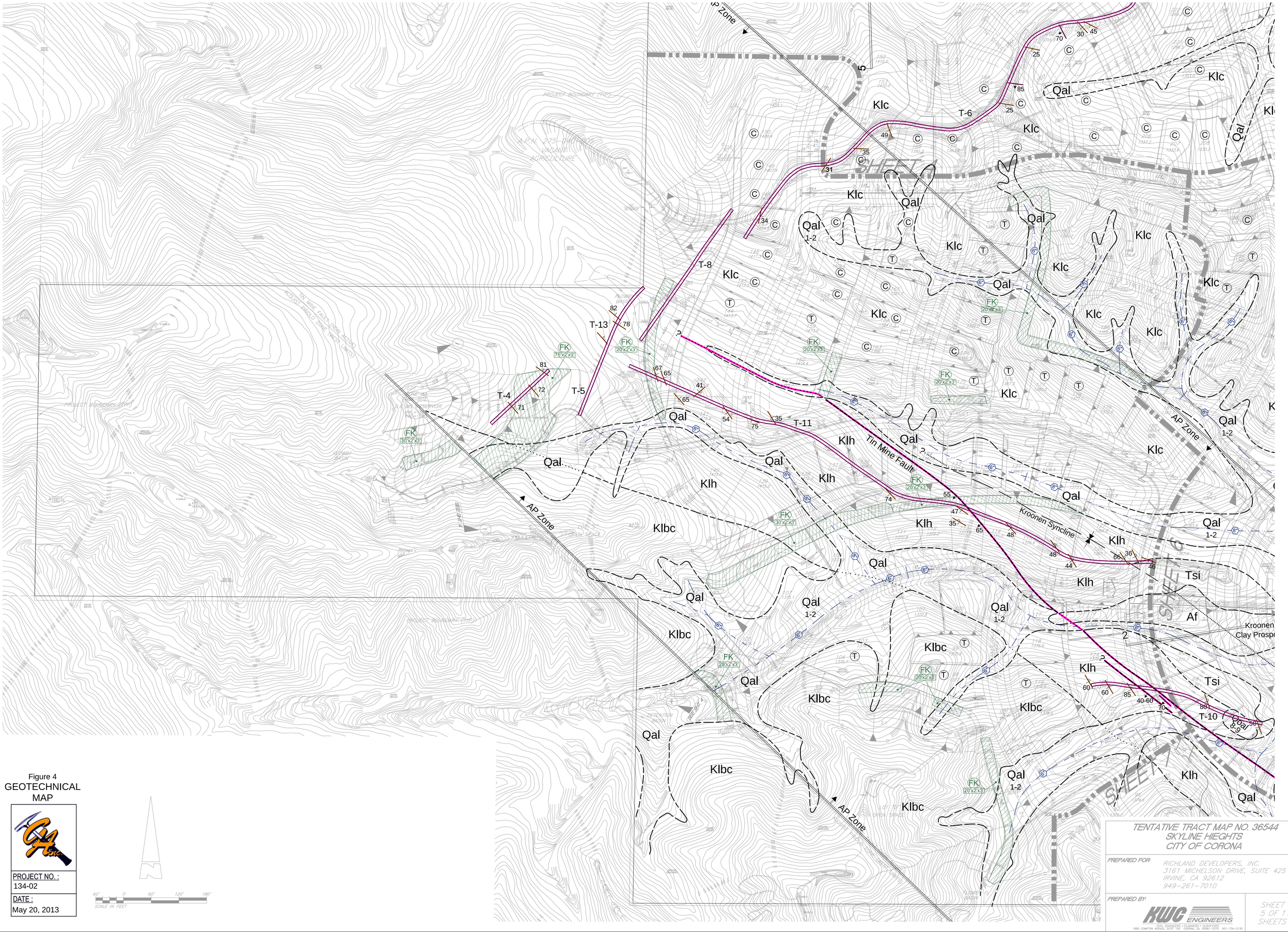

Figure 4
GEOTECHNICAL MAP

PROJECT NO. :	134-02
DATE :	May 20, 2013

TENTATIVE TRACT MAP NO. 36544
SKYLINE HIEGHTS
CITY OF CORONA

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949-261-7010

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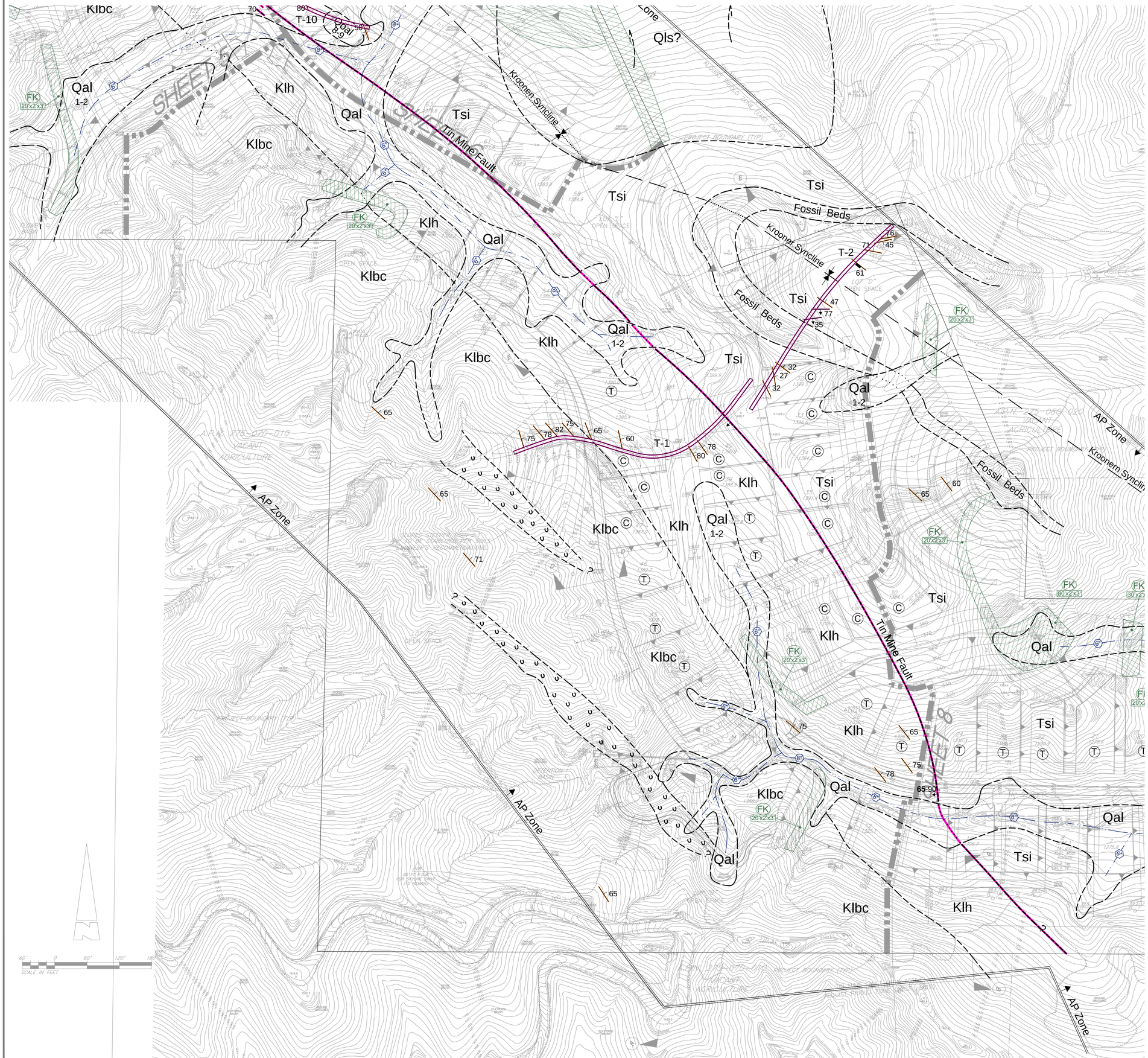
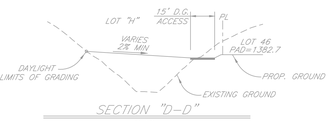
SHEET 5 OF 11 SHEETS

DPR13-002

Klc
Qal
Qal 1-2
Resistant Marker Bed
Klc
Qal
Klc
Klc
Klc
Klc
Klc
Klc
Klc
Qal
Klc
Qal
Klc
Qal
Qal 1-2
Klc
Qal
Klc
Qal
Qal
Qal

DPR13-002





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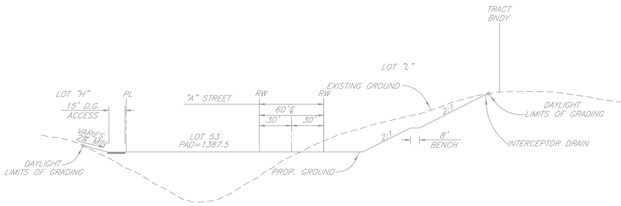

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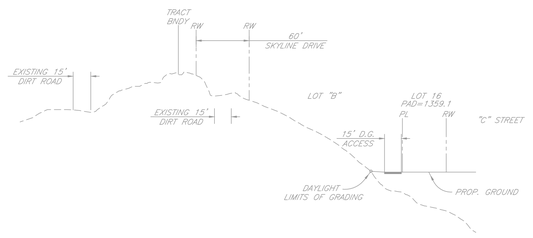

SECTION "R–R"
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Figure 6
GEOTECHNICAL MAP

PROJECT NO. : 134-02
DATE : May 20, 2013

TENTATIVE TRACT MAP NO. 36544
SKYLINE HIEGHTS
CITY OF CORONA

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IRVINE, CA 92612
949-261-7010

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SHEET 7 OF 11 SHEETS

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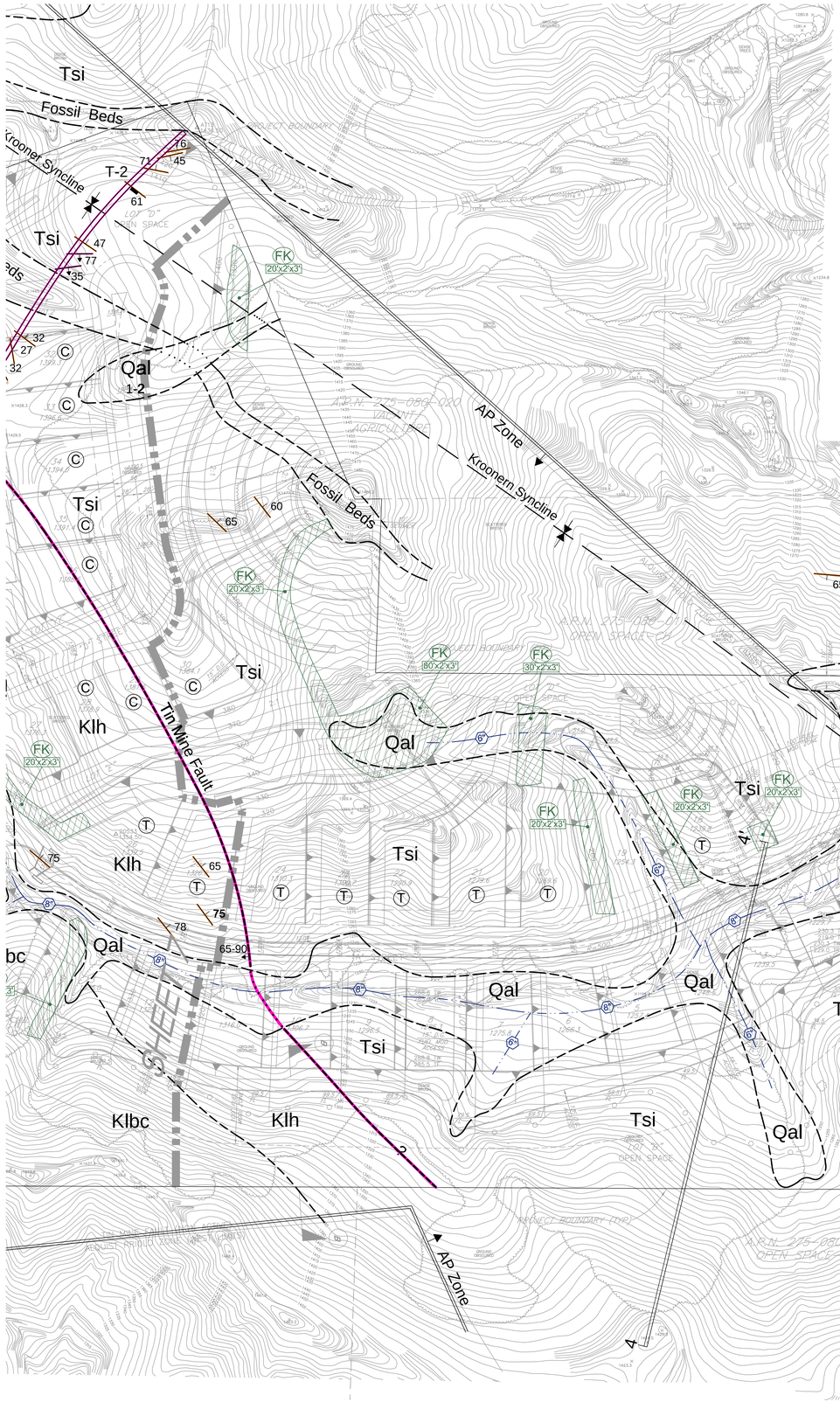

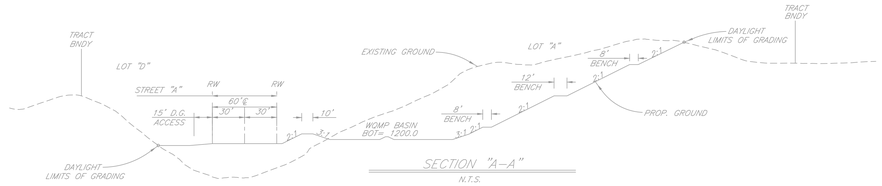

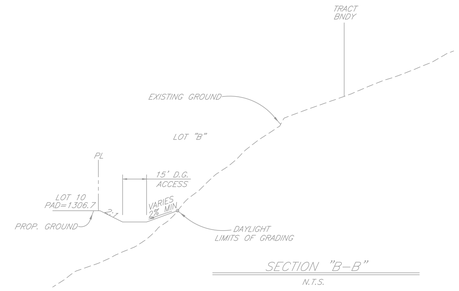

Figure 7
GEOTECHNICAL MAP

PROJECT NO. :	134-02
DATE :	May 20, 2013

TENTATIVE TRACT MAP NO. 36544
SKYLINE HIEGHTS
CITY OF CORONA

PREPARED FOR:
RICHLAND DEVELOPERS, INC.
3161 MICHELSON DRIVE, SUITE 425
IRVINE, CA 92612
949-261-7010

PREPARED BY:
KWC ENGINEERS
CIVIL ENGINEERS · PLANNERS · SURVEYORS
1880 COMPTON AVENUE, SUITE 100 · CORONA, CA 92881-3376 951-734-2130

SHEET 8 OF 11 SHEETS

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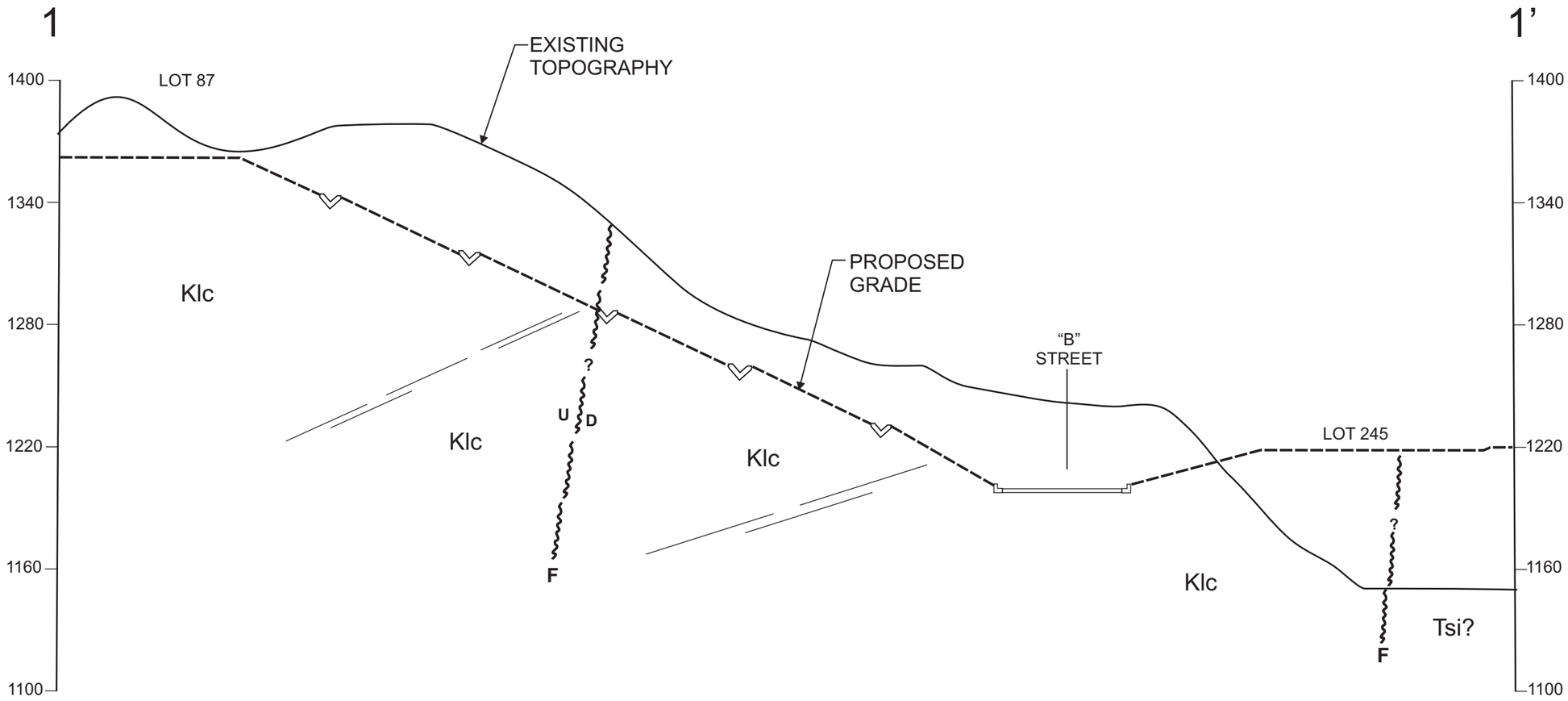

CROSS-SECTION 1-1'

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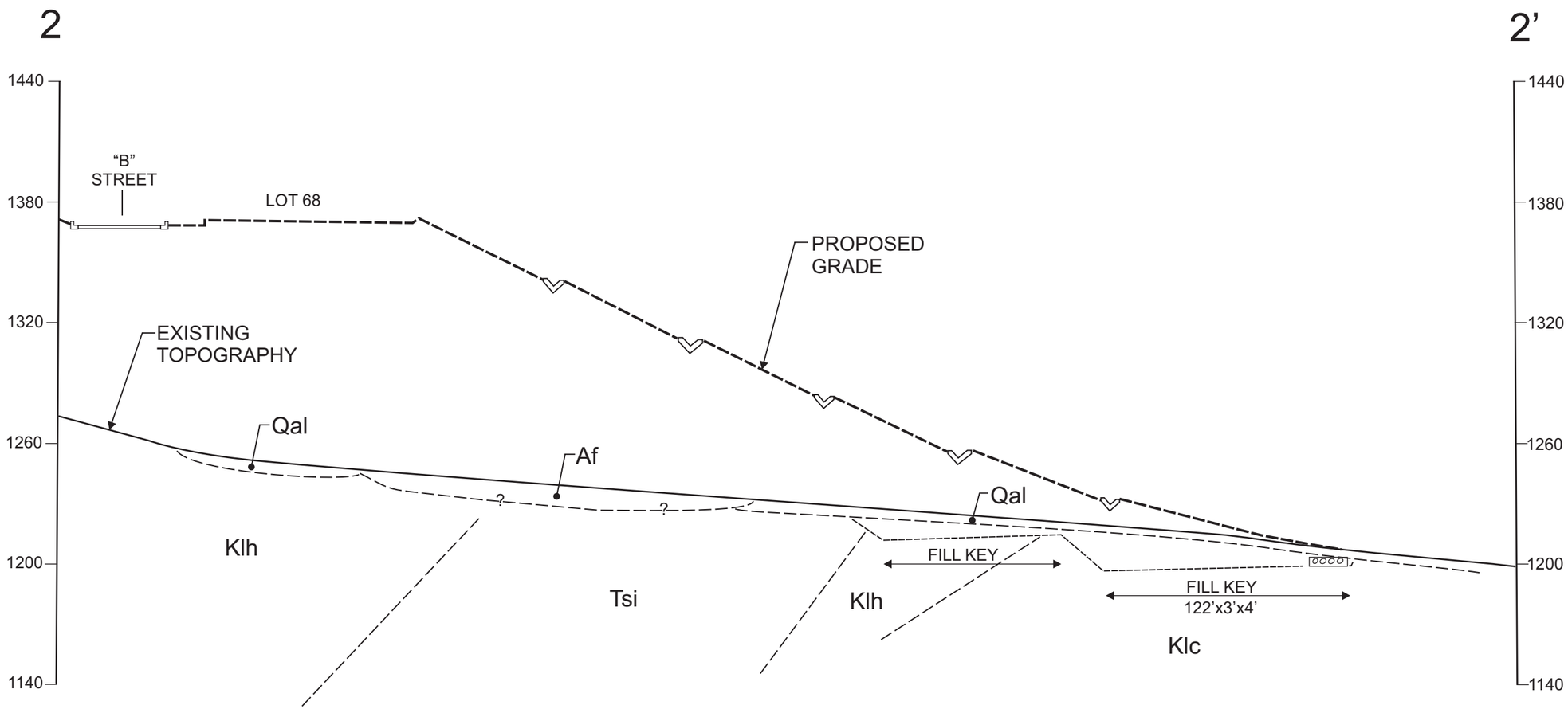
PROJECT NO. :
134-02
DATE :
April 25, 2014



CROSS-SECTION 2-2'

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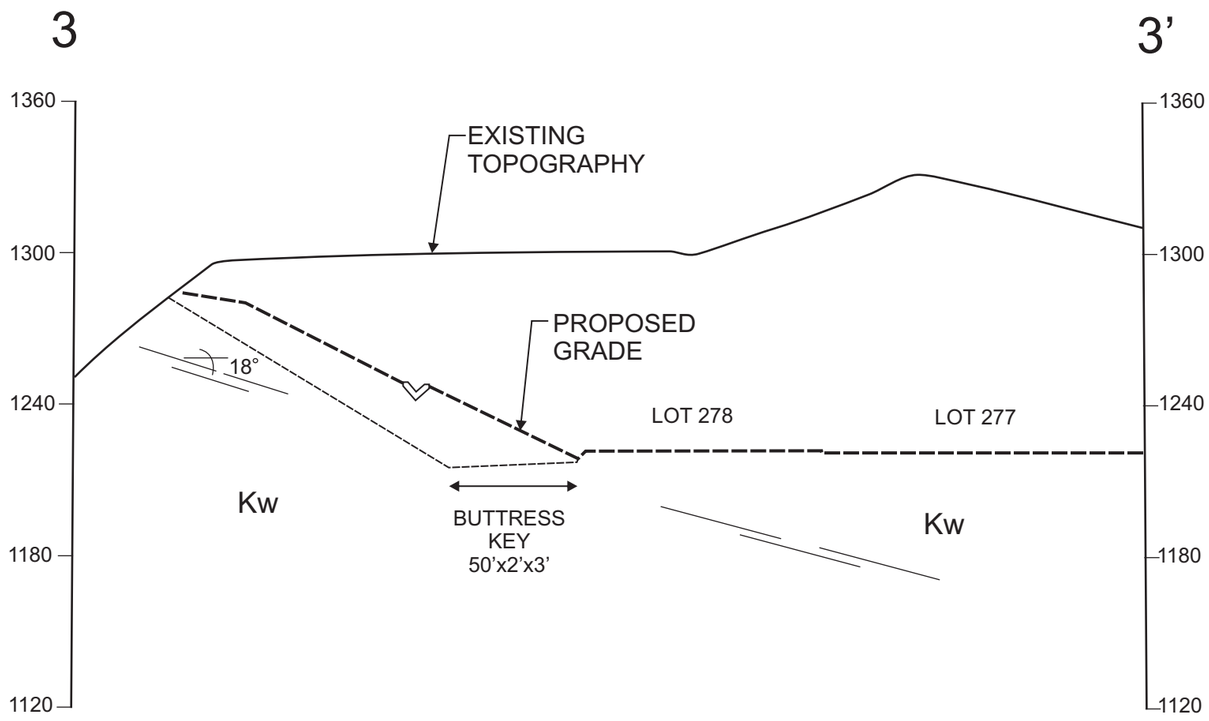
PROJECT NO. :
134-02

DATE :
April 25, 2014



CROSS-SECTION 3-3’

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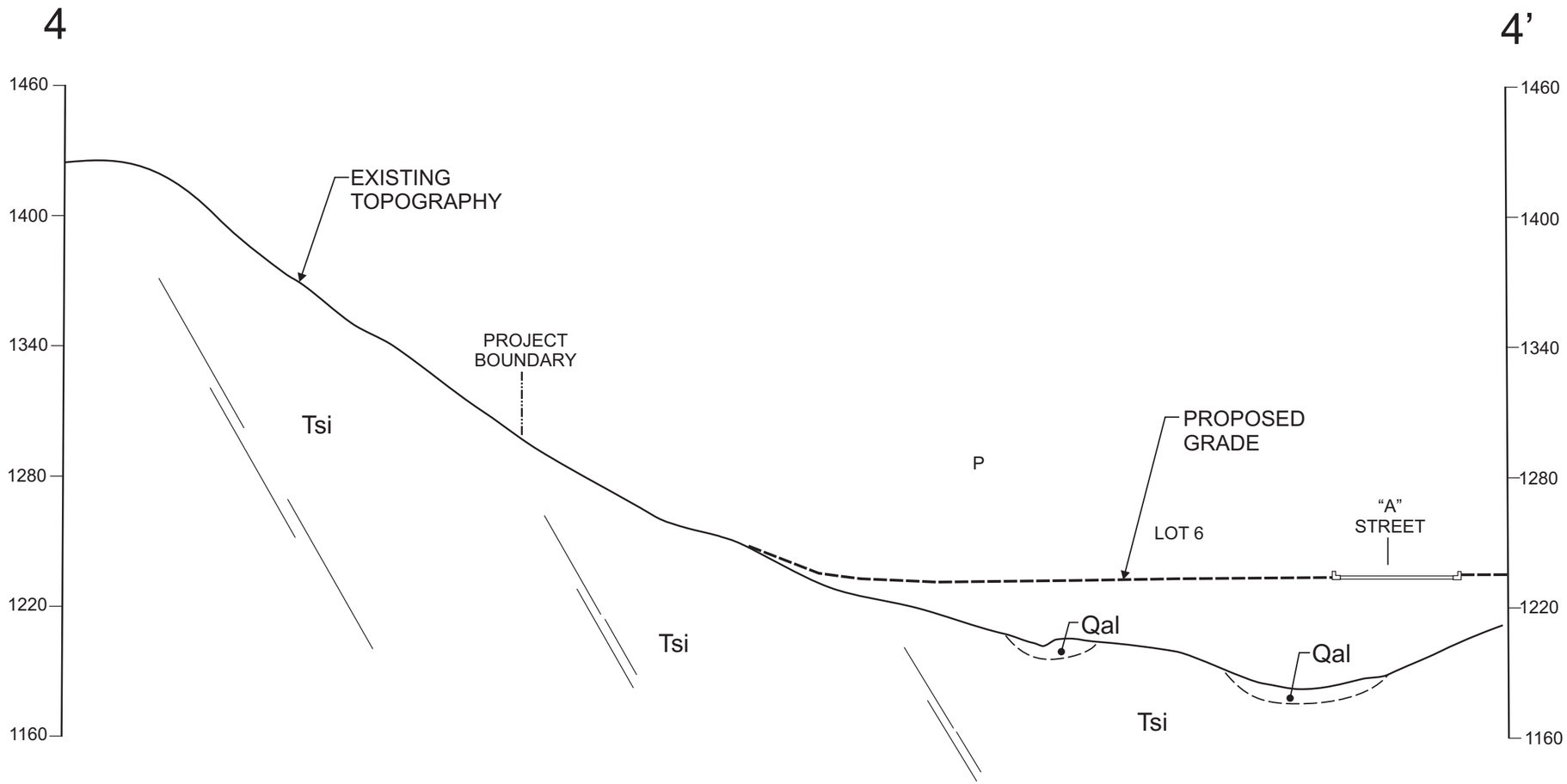
PROJECT NO. :
134-02

DATE :
April 25, 2014

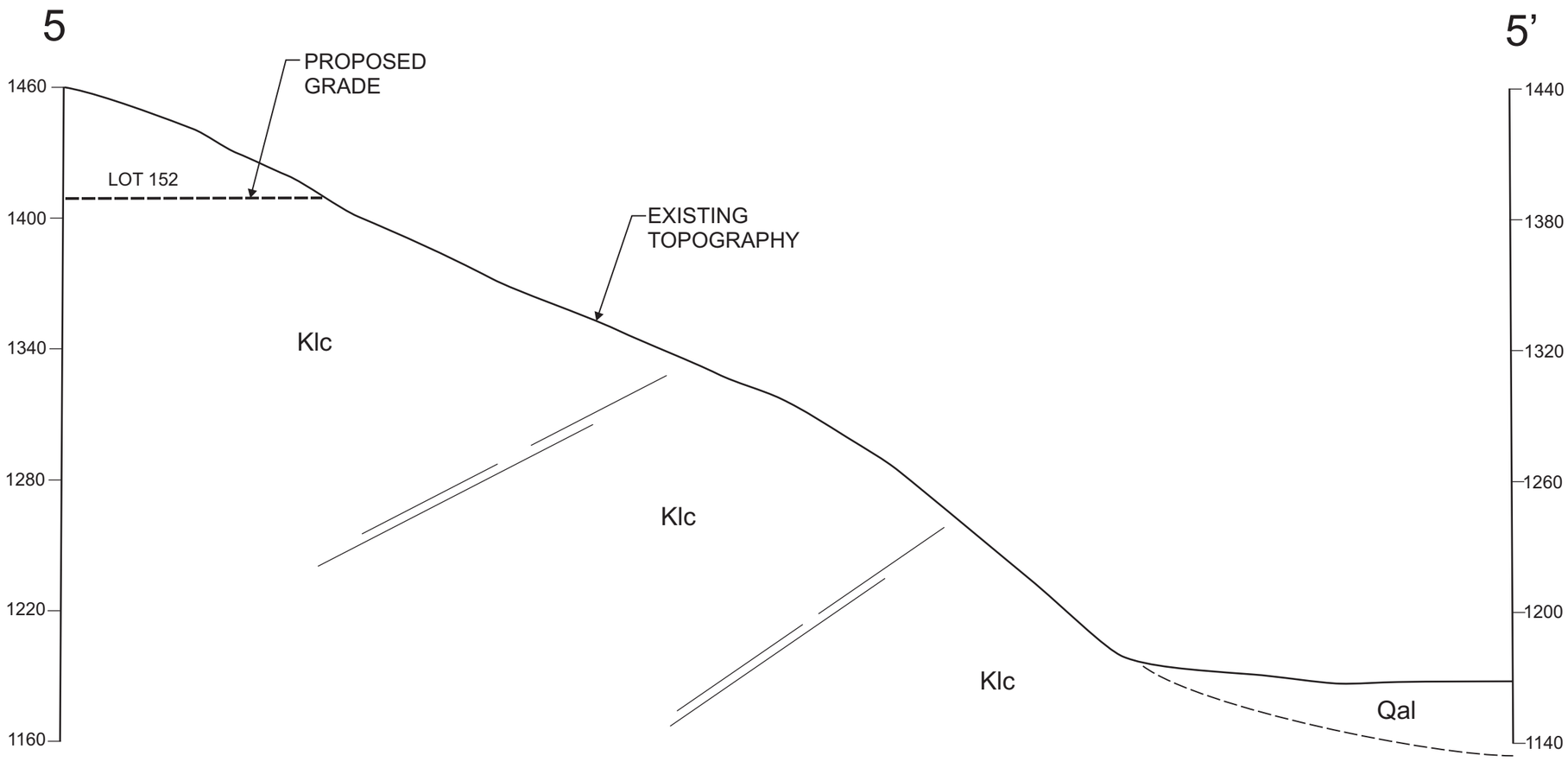


CROSS-SECTION 4-4’

SCALE: 1”=60’ H&V

PROJECT NO. :
134-02

DATE :
April 25, 2014

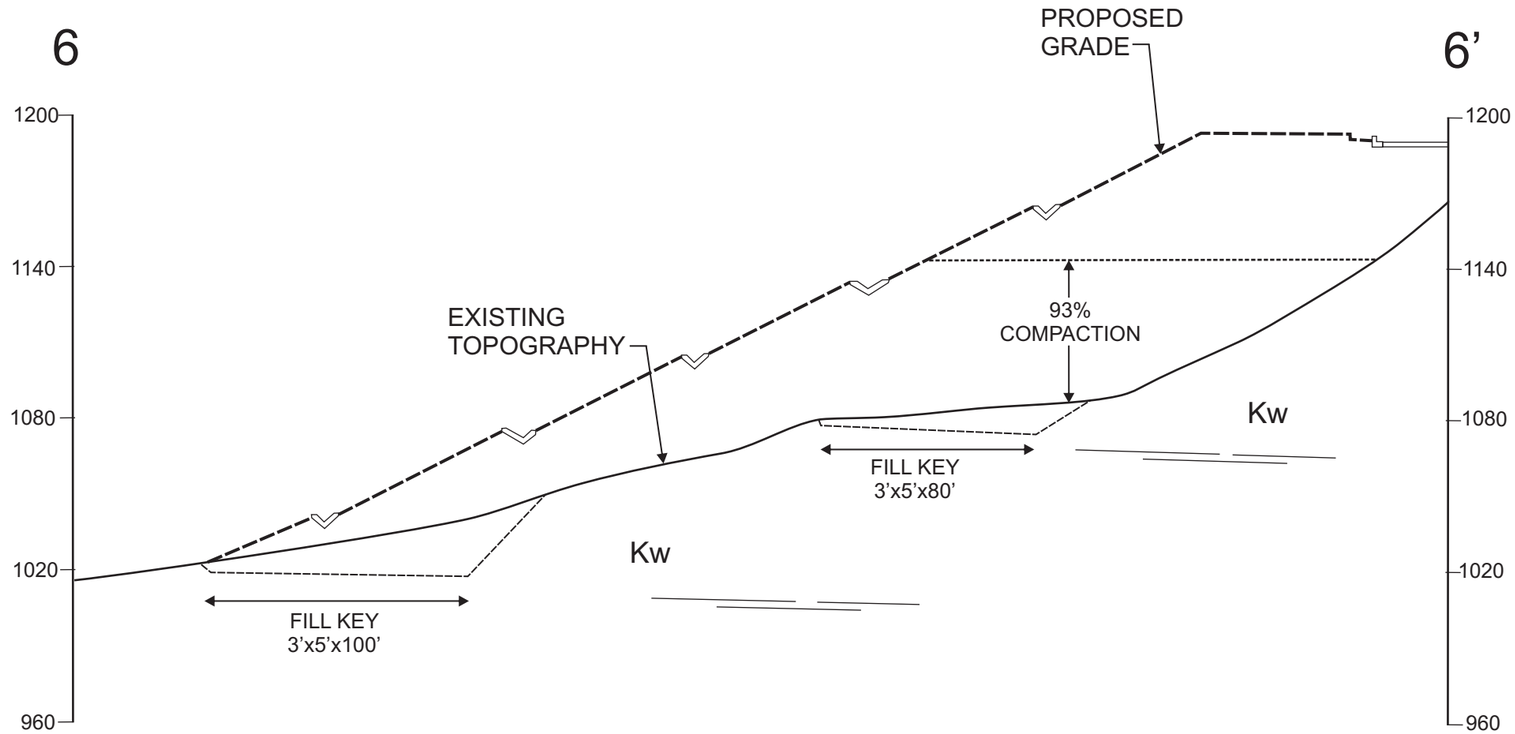


CROSS-SECTION 5-5’

SCALE: 1”=60’ H&V

PROJECT NO. :
134-02

DATE :
April 25, 2014



CROSS-SECTION 6-6’

SCALE: 1”=60’ H&V

PROJECT NO. :
134-02
DATE :
April 25, 2014

INFILTRATION OPPORTUNITIES, CONSTRAINTS AND RECOMMENDATIONS FOR WATER QUALITY TREATMENT PURPOSES, FOR SKYLINE HEIGHTS TENTATIVE TRACT MAP # 36544, CITY OF CORONA, CALIFORNIA

Prepared for: RICHLAND DEVELOPMENT CORPORATION
3161 Michelson Drive, Suite 425
Irvine, CA 92612

Prepared by: GINTER & ASSOCIATES, INC.
27631 Durazno
Mission Viejo, CA 92692

PROJECT # 134-03 MAY 20, 2013

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Appendix I References

1.0 INTRODUCTION

1.1 Purpose

The purpose of this report is to summarize technical opportunities and constraints and limitations for infiltration type best management practices within the proposed Skyline Heights development plan. Infiltration is the highest priority for water quality treatment (2011 Model WQMP; Technical Guidance Document), based on the most recent water quality requirements for storm water management.

The water quality regulation assume 100% infiltration of the water quality design storm event (85^{th} percentile 24-hour storm event) is feasible on-site within the development footprint, unless site specific analysis indicates full infiltration or partial infiltration is not feasible. Sub-surface conditions such as depth of compacted fill, soil types, infiltration rates, depth to groundwater, constructability and maintenance all factor into the ability to safely infiltrate storm water into the ground within the proposed development areas.

1.2 Site Description

The Skyline Heights project consists of two spheres of development separated by Mabey Canyon. The northern portion is triangularly shaped consisting of approximately 12 acres bounded on the west by Cleveland National Forest, on the northeast by the proposed extension of Foothill Parkway and on the south by Mabey Canyon (Plate I). The southern portion consists of 400 acres±, is irregular in shape and situated near the mouths of Mabey, Tin Mine and Kroonen Canyons, in the city of Corona, California (Plate I). Undeveloped land borders this portion of the site on the west, northwest and much of the south. An existing residential community abuts part of the east boundary and the northeast boundary.

North Portion of Development

An unimproved road emanating from Mabey Canyon provides access to this area however; vehicular access is limited due to the steep topography.

This area is in an almost natural state. Steep topography with a thin soil mantle has precluded agricultural development common elsewhere in the general area. Very dense chaparral covers most slopes with sporadic stands of scrub oak.

Clay mining occurred in the Temescal Canyon area from the early 1900's (Gray, 1961). Scattered bulldozer trenches and access roads were cleared for the previous subsurface investigations and are remnants of clay exploration. No large-scale mining appears to have been carried out in this area.

This portion of the development generally consists of steep-sided northeast trending "main" ridges with similar steep-sided "spur" ridges on the northeastern flank of the Santa Ana Mountains. Side-slope ratios vary from 2:1 to 1:1 with local gentler and steeper sections. Consequently, v-shaped canyons and narrow, spine-like ridges abound.

Four large canyons drain this area; three low-order canyons that drain northwesterly into Wardlow Canyon and a fourth that drains the center of this area into high-order Mabey Canyon to the south. These major drainages are v-shaped in their upper and middle reaches, where incised into bedrock and flat in their lower reaches, where emanating onto plains of high-order Mabey and Wardlow Canyons.

The Mabey Canyon drainage flows into a large flood control basin near its mouth, which intercepts flow and directs it northeast via lined channels into Temescal Canyon and eventually, the Santa Ana River system.

South Portion of Development

Unimproved roads emanating from Mabey Canyon Road and Mangular Avenue provide access to this area however, vehicular access is limited due to steep topography and environmental issues.

This portion consists of approximately 400 acres and was subjected to clay prospects and mines in the early 1900's. One successful clay prospect was the McKnight Clay Mine (Gray, 1961) southeast adjacent to the area that is now a tree nursery. Other poorly-preserved and undeveloped prospects and access roads are scattered over the site.

Northwest trending "main" ridges and "spur" ridges with steep sides dominate the geomorphology. The low-order drainages feed three high-order drainages that extend over large areas of the northeastern Santa Ana Mountains, namely Mabey Canyon, which lies to the north (Plate I). Both following and breaching the local geologic structures and lithologies, these major drainage are commonly v-shaped in their upper and middle reaches, where incised into bedrock and flat in their lower reaches, where debouching onto the apex of a large composite alluvial fan.

2.0 Site Geological/Geotechnical Investigations

2.1 Previous Site-Specific Investigations

Between 2004 and 2007, Pacific Soils Engineering, Inc. (PSE) carried out a variety of field investigations within and adjacent to the Skyline Heights property limits. Most dealt with the presence or absence of active faults within several adjacent parcels. These are summarized—the reader is referred to the full reports in Appendix A, herein—as follows:

1. An A-P-level investigation of the "Pourhakimi" property along the east margin of the Skyline Heights project (PSE, 2004; Plate II) that concluded that active elements of the WEFZ are not present in the areas that were to be, and that are now, occupied by habitable structures. PSE did, for conservatism, impose a provisional setback along the northeast boundary of that site that is about parallel to the fault zone. Also completed, was a preliminary geotechnical investigation of the site. The site was then developed using another firm as geologists and geotechnical engineers of record.
2. An A-P-level investigation (PSE, 2005) focused on the Tin Mine (TMF) and related faults mapped on the Skyline Heights property, which encompasses the part of Skyline Heights south of Mabey Canyon. Based on aerial photograph and literature review, geologic mapping and logging of 13-excavator trenches up to 1170 ft. long and 17 excavator "pits", PSE concluded and reported that, with the exception of a small "un-dateable" fault, the TMF and related faults are not active according to A-P regulations. Such will be summarized in detail later in this document.
3. An A-P-level investigation (PSE, 2007) of the "Lot 84" property that comprises the area of Skyline Heights north of Mabey Canyon (Plate II). PSE concluded that faults mapped onsite are not active according to A-P. Further, a fault interpreted as the extension of the aforementioned "un-dateable" fault encountered in Skyline Heights is in fact, overlain by un-faulted pre-Holocene sediments.
4. Apparently, in a preliminary geotechnical investigation (unpublished) of the Skyline Heights property, it included placement of 16 seismic lines, drilling, logging and sampling of 15 30-inch diameter bucket auger borings using a truck-mounted drill rig and of excavating and logging 35 backhoe trenches and one fault trench (FT-1) using a track-mounted backhoe. The borings ranged in depth from 4 to 75 feet below existing ground surface and were logged by an engineering geologist. Relatively "undisturbed" ring and bulk samples were obtained from the borings and transported to PSE's laboratory for testing. The approximate locations of the exploratory borings and excavations are shown on Figures 1 thru 8.

The report further notes, A D-6 bulldozer created both access pathways and pads for the drill rig, where environmental constraints allowed. It should be noted that the boring locations were limited by site physical constraints including steep topography and environmentally sensitive areas. Detailed evaluation of geologic conditions and possible remedial measures should be based upon additional exploration (perhaps Grading Plan Review stage) when environmental clearances can be obtained in a timely manner and, finally, during grading.

UNFORTUNATELY, OWING A GREAT DEAL TO THE SHUTDOWN OF PSE, THE FIELD DATA AND TEST RESULTS ARE NOT AVAILABLE FOR REVIEW AND ASSESSMENT.

2.2 Adjacent Geological Investigations

Since the imposition of the aforementioned A-P Zones, several nearby site-specific A-P investigations have taken place (Plate II), as discussed in the PSE (2005) report. Terra Geosciences (1994) investigated the property northeast of the Skyline Heights by placing three trenches in essence perpendicular to the CDMG (1980) MSF. That company found no displacement of "older alluvium" and concluded that the fault probably passes south of its trenches. Neblett and Associates, Inc. (N&A) further delineated the MSF near the northeast border of the Skyline Heights parcel near the mouth of Kroonen Canyon based mainly on small offsets of probable Holocene alluvium. That firm concluded that the trace of the MSF is likely active.

The east-adjacent tract ("Pourhakimi") was purchased by Centex and has since been graded. Relative to Skyline , Street "A" and subdrains required for the fill in the unnamed canyon that will accommodate the road and adjacent residential pads will interface with the margin of the Centex project, as will the future Foothill Parkway (Plates 1, 2 and 3) in the northeast.

IGC, Inc. (1990, 1991) explored a northeast-trending fault mapped by Weber (1977) northerly adjacent to the Skyline Heights parcel. IGC concluded that the fault is not actie on the basis of limited dateable sediments. It is not clear, however, if the IGC feature is a likely fault or, rather, merely a typical clay bed within the Silverado Formation. According to PSE (2005), the descriptions of the lithologies and colors of the features in the IGC trench log suggest that the features are probably clay beds.

Further, according to PSE (2005), geological investigations of the Centex property east of the "Pourhakimi" property (Plate II) identified the active MSF and a pre-Holocene splay of the fault northeasterly offsite to "Pourhakimi" (GeoSils, Inc., 2001; Shlemon, 2003 and personal communication). The active strand was mapped in part at the base of a northeast-facing faceted spur ridge southeast of the study site. Based on field observations and according to the Foothill Parkway location, much if not all, of the MSF setback imposed along the northeastern "Pourhakimi" site likely

falls within the Foothill Parkway right-of-way. In sum, the 2003 PSE investigation, as well others, demonstrated that the main MSF lies northeast of the southern part of the Skyline Heights parcel.

Of importance is a fault investigation of the TMF carried out by RMA (personal communication with representative of RMA and field observation by PSE personnel, 2005). RMA trenched the TMF as projected southeast from the Skyline Heights property and exposed un-faulted alluvium. Further, RMA mapped then-recent cut slopes and encountered no TMF, but rather, only un-faulted Pleistocene sediments and bedrock across the inferred trace of the fault. Thus, the TMF, if extant at that site, is not active according to A-P standards.

3.0 Proposed Development

The proposed development involves two spheres of development – one north of Mabey Canyon, consisting of 44 lots and a larger sphere, south of Mabey Canyon, consisting of 246 lots for single-family homes. Access to the project will be from Foothill Parkway, which is proposed along the northeast side of the project. It is our understanding that the grading for the extension of Foothill Parkway will be completed prior to the subject site grading.

Cuts and fills to approximate maximum design depths of 130 ft. (vicinity of Lot 123), excluding utility excavation, and 138 ft. (vicinity of Lot 223), respectively are proposed. Cut slopes range from small 2 ft. high side yard split slopes to 140 ft. at 2:1 slope ratios. One 1.5:1 cut slope approximately 80 ft. high is proposed (see Figure 6). Fill slopes range from small, less than 2 ft. high side yard split slopes to 155 ft. at 2:1 slope ratios. One 1.5:1 slope approximately 130ft. high is proposed on the northern perimeter (see Sheet 2).

3.2 Adjacent Development

Foothill Parkway is scheduled to be completed to the northeast of Skyline Heights border in the near future. As shown on Figures 1, 2 and 3), when completed, the parkway will border the proposed Skyline Heights development on the north. Typical cuts and fills are planned to accommodate the road. Thus, cut and fill slopes and fill prisms will border the proposed development. Coordination with the Foothill Parkway authorities will be required to afford adequate disposal of subdrains, adequate bearing qualities of parkway soils interfacing with the Skyline Heights development and adequate stability of cut slopes or implementation of mitigating design and construction of the parkway and the adjacent Skyline Heights development.

4.0 Regional Geology

The following discussion is in essence a synthesis of the PSE reports (2004, 2005, 2007 and unpublished 2008) pertaining to the geological setting of the site. The PSE reports focus mainly on fault rupture issues rather than general geotechnical issues, but a great deal of geological information in the reports is quite useful for EIR-level assessment. Where applicable, G&A updates or expands on the aforementioned reports.

Pertinent references describing the regional geology are provided in Appendix I. In brief, the study site occupies a part of the northeastern slope of the Santa Ana Mountains near their boundary with Temescal Canyon (Elsinore-Chino Trough). These mountains are one of many northwest-trending southern California ranges separated by broad valleys within the Peninsular Ranges Geomorphic (and structural) Province of southern California (Woodford et al., 1971; Gray, 1961). The province extends from the Transverse Ranges on the north to Baja California on the south.

The Santa Ana Mountains have a Jurassic and Cretaceous metamorphic igneous core on which Cretaceous through Pliocene marine and non-marine rocks have been deposited (McColloh et al., 2000 and Gray, 1961). Along the northeast flank of the mountains, the Cretaceous and Tertiary rocks were strongly tilted and folded during later regional deformation. Pleistocene to modern sediments derived mainly from the upper reaches of the Santa Ana Mountains locally mantle those rocks. These sediments are mainly elevated Pleistocene river terrace and alluvial fan deposits and Holocene fans on valley floors (Temescal, Santa Ana Canyons, modern alluvium in incised drainages and toe-slope colluvium).

The northwest-trending Peninsular Ranges blocks parallel regional continental borderland faults that extend from the Mojave Desert in the east to the Channel Islands on the west. These fault zones are typically exhibit right-lateral strike-slip with associated reverse and normal dip-slip components. The approximately 150-mile long Whittier-Elsinore (WEFZ) that parallels the northeast Santa Ana Mountains, with elements mapped on the Skyline Heights site, is a classic example.

About 2000 feet east of Skyline Heights, the WEFZ splays into three major strands (Plate IV). The easternmost strand, the Chino Fault (CF) trends north-northwest across the Santa Ana River and along the east side of the Puente Hills, northeast of the study site. The center strand is mapped as the Main Street Fault (MSF) that, traditionally, is the northern continuation of the Elsinore Fault (EF). The MSF, based on recent mapping (Weber, 1997; CGS, 2003), seemingly dies out southeast of Wardlow Canyon, near Mabey Canyon and the study site (Plate I). The westernmost splay is the Whittier Fault (WF) (Plate IV). Traditionally, near Fresno Canyon, the WF "bends" west-northwest across Santa Ana Canyon and then resumes a northwest trend along the west flank of the Puente Hills. The southernmost strand (s) of the WF is near the Eagle Fault (EaF) of Weber (1977). According to most investigators, the study site thus lies within a tectonic wedge formed by the branching of the WEFZ into three identifiable stands.

Many WEFZ segments are certainly active according to A-P standards. PSE (2002a, 2002b), Millman (1988) and Rockwell et al. (1986) documented surface displacements on the WEFZ in the last 11,000 years (Holocene) and the CGS (2003) has therefore, placed many of these segments in A-P Zones based on the foregoing and the presence of tectonic geomorphic features such as faceted spurs, displaced drainages and linear troughs. Among the faults so zoned, are the MSF and TMF mapped near and on-site, which gave rise to a many local A-P-level investigations as set forth elsewhere in this document and which bear heavily on local geological assessments.

5.0 Local Geology

5.1 Stratigraphy

In general, the project highlands are underlain by Cretaceous and Paleocene sedimentary rocks that are locally mantled by older Pleistocene alluvial "terrace" deposits. Whereas the lowland surfaces support mainly Holocene alluvial channel and fan deposit (Plate IV). The ages, distributions and geometries of the sedimentary bedrock are useful for assessing the presence/absence, style and locations of faults within and near the project. In turn, the characteristics of the Pleistocene and Holocene alluvial deposits are useful indicators for constraining locations, slip geometries and ages (time of last movement) of local faults. Accordingly, the distinguishing and salient characteristics, distribution and ages of the various deposits are discussed in detail herein. Additionally, information relevant to the engineering characteristics of the onsite soils is included herein.

5.1.1 Cretaceous Trabuco Formation (Kt)

The Trabuco Formation is mainly brown, weakly to moderately lithified cobble to boulder conglomerate, marked by occasional lenses and beds of distinctive maroon silty conglomerate that crops out in the southwest corner of the site (Figure 6). Clasts are mainly metamorphic, igneous and volcanic fragments that are usually more weathered than clasts within the overlying Ladd Formation. Following the regional structural grain, this formation extends from northwest to southeast to south of Tin Mine Canyon (RMA, 2005;personal ommunication; Plate IV).

Important to Skyline Heights development, RMA (personal communication and field observations by senior PSE personnel) trenches placed during an A-P investigation south of Skyline Heights (Plate II) exposed distinct Trabuco "maroon" beds on the south flank of Tin Mine Canyon, thereby documenting formational continuity across Tin Mine Canyon. This contradicts previous geologic maps (Gray, 1961; Weber, 1977; Gray et al., 2002) that depict the formation truncated north of the canyon.

The Trabuco Formation grades upward into the Cretaceous Ladd Formation (Gray, 1961). The contact between the two formations is thus arbitrary and herein taken to be the top of the uppermost Trabuco "maroon" bed.

5.1.2 Cretaceous Ladd Formation

Two formal members of the Ladd Formation crop-out northwest and south of Kroonen Canyon (Figures 3 and 5). These are the Baker Canyon Conglomerate and Holz Shale members that usually were readily identifiable in PSE trenches and, locally, in outcrop. In contrast, north and east of the canyon, massive conglomerates and sandstones are deemed "undifferentiated Ladd Formation" (Gray, 1961; Gray et al., 2002), which may also encompass Williams Formation sandstone. Figures 1 thru 8 identify these nits as "Ladd Formation Conglomerate" (Klc). Clearly identifiable Williams Formation does crop out in the northern part of the site, northwest of Mabey Canyon.

5.1.2.1 Baker Canyon Conglomerate (Klbe)

Thick-bedded to massive pebble and cobble conglomerate interspersed with buff to gray arkosic to lithic marine sandstone typify the Baker Canyon Conglomerate at and near Skyline Heights. As noted by Gray (1961) and as observable in many natural and anthropic exposures, the lower part of the member consists mainly of distinctly bedded, volcanic and metamorphic cobble conglomerate. Distinctly inter-bedded buff conglomerate and buff to gray thick- bedded sandstone characterize the upper part of the formation exposed onsite. This unit is generally well-indurated cemented) below a weathered halo and therefore, supports steep anti-dip and dip slopes and is a major "ridge former".

The Baker Canyon Conglomerate is conformable with, and grades into, both the underlying Trabuco Formation and the overlying Holz Shale Member of the Ladd Formation (PSE, 2005)--Trench T-1 of the 2005 investigation clearly exposed a gradational contact between those two members. The transition zone, based on PSE investigations, varies from about 50 to about 100-feet thick. The contacts shown on the enclosed plates are thus arbitrary and could change as extensive in- grading exposures might dictate.

5.1.2.2 Holz Shale (Klh)

Locally fossiliferous, gray to bluish gray where fresh and gray to yellowish brown where weathered shale, claystone, siltstone and silty sandstone comprise the Holz Shale.

Generally, the unit is thin-bedded and has well-developed bedding plane parting (PSE, 2005; Schoellhamer et al., 1981). Calcareous concretions up to three feet in diameter occur throughout the Holz Shale. Despite the presence of concretions, the unit is poorly resistant to weathering and forms subdued topography relative to the underlying Cretaceous conglomerate and the overlying Tertiary sandstone.

Where observed by PSE (2005), the Holz Shale is usually fractured (squeezed) and is replete with small-scale "flow" folds symptomatic of plastic deformation. This contrasts with the brittle behavior of the overlying and underlying Silverado Formation and Baker Conglomerate where faults, fractures and similar brittle deformation predominate.

Holz Shale forms a narrow V-shaped band typified by subdued, linear topography in the western part of the subject site (Figures 5 and 7). The outcrop pattern describes a regional, closed, locally overturned, southeast-plunging syncline (Figures 5 and 7).

PSE mapping of the Holz Shale varies markedly from published regionalgeologic maps (Gray, 1961; Weber, 1977; Gray et al., 2002; Morton and Miller, 2006). This disparity likely stems from the new tranch and road cut exposure that are now available, but were not to the earlier investigators.

Most importantly, PSE identified local ridges of Baker Canyon Conglomerate and topographic lows carved in Holz Shale, rather than the Silverado Formation depicted by the earlier investigators. The absence of Tertiary Silverado and the presence of "Cretaceous-against-Cretaceous" relationships suggest limited structural relief and stratigraphic separation. Accordingly, large-scale fault displacements are therefore, not necessary to explain bedrock geometry and distribution.

Ladd Formation Conglomerate (Klc)

A large lithesome of well-indurated conglomerate interspersed with scattered sandstone beds underlies most of the area south of Mabey Canyon and Kroonen Canyon (Figures 2, 3, 5 and 7). Based on its stratigraphic position, Gray (1961) mapped it as part of the Ladd Formation. In many respects it is similar to the Baker Conglomerate member, except that it is typically massive with few actual bedding plane partings. Many measured attitudes represent textural changes rather than planar partings. Accordingly, the geological structural pattern is not particularly well-defined. Thus, PSE (unpublished) took a conservative approach in it slope stability analyses. Additional geological information could lead to different structural interpretations, as noted above.

Refractive seismic lines summarized in PSE (unpublished) suggest that at depth, this unit is well lithified.

5.1.2.3 Cretaceous Williams Formation (Kw)

Buff to brown, generally massive conglomerate and scattered claystone beds compose the local Williams Formation, as mapped by Gray (1961) and Morton and Miller (2006). Abundant, at least partly "grussified" granitoid cobbles and boulders and, at least local absence of stratification characterize this formation. According to Schoellhamer et al. (1981), the granitoid clasts differentiate this formation from the Ladd Formation that supports mainly volcanic and metamorphic cobbles. This formation underlies the northern part of the study property and possibly crops out along the ridge northwest of Kroonen Canyon.

5.1.2.4 Paleocene Silverado Formation (Tsi)

Non-marine and locally marine light buff, to light gray, to yellow silty sandstone, intercalated red and gray/white claystone and scattered cobble conglomerate characterize the Silverado Formation. PSE (2005) identified well-cemented fossiliferous beds scattered throughout the on-site Silverado Formation.

Bedding varies from thin to massive, but is usually identifiable in natural and anthropic outcrops. The sandstone is moderately resistant, the limy fossiliferous beds are very resistant and the claystones are poorly resistant. Consequently, differential erosion of the red clay beds imparts steep, linear strike-parallel ridges and ravines. Hard limy beds form particularly evident spines along some ridgelines.

Red and re-stained white and gray mottled clay beds locally mark the base of the Silverado Formation. A few to a few tens of feet thick, these are likely sedimentary clays derived from nearby clay-rich saprolites that formed on an erosion surface prior to deposition of the remainder of the Silverado Formation (Gray, 1961; Schoellhamer et al., 1981; McCulloh et al., 2000).

These clays were probably therefore transported short distances into topographic lows on the Ladd Formation surface. These beds, which may be the lateral equivalent of the Claymont clay bed, were mined for clay at the McKnight Clay Mine and at the Kroonen Clay Prospect (Gray, 1961; Figure 5). These beds often are composed of commercial quality clay, but lack the volume to be commercially viable.

The contact between the basal red bed sequence and the underlying Ladd Formation is depositional, based on exposures in trenches excavated by PSE in 2005.

Here, the contact is undulatory and rip-up clasts of the underlying Holz Shale are intercalated.

One particular limy, fossiliferous bed is depicted on the geologic map (Figure 6), along with two smaller, discontinuous ones. Composed of *Ostrea, sp.* And other mollusks, this bed is traceable from the northeast property line westward to near the south-center where it is tightly folded into a synform, as attested to by V-shaped outcrop pattern.

In sum, the red and limy beds are readily identifiable and often laterally continuous and are thus, excellent local and regional key beds to determine the presence or absence of bedrock faults.

5.2 Quaternary Alluvium

Regional and local Quaternary alluvium consists of: 1) Older (Pleistocene) alluvial fan and "terrace" deposits elevated above the modern (Holocene) drainage; and 2) Holocene alluvium occupying the floors of active channels and swales, where detritus is seasonally transported, deposited and eroded. PSE (2004, 2005, 2007) provided detailed discussions of the relative ages of the various alluvial units.

5.2.1 Older Alluvium, Pleistocene Age (Qoa)

Two principal areas of older alluvium that strongly impact dating of last slip along the TMF and MSF occur in the northern and central parts of Skyline Heights. A greater than 18-ft. thick cap of older alluvium sits as an elevated "terrace" along the south side of Mabey Canyon. PSE informally named this deposit the "Mabey Fanglomerate" (PSE 2005). PSE (2005) trenches also exposed more than 20 feet of older alluvium (Kroonen Deposit) near the head of a major tributary to Kroonen Canyon, where PSE (unpublished) Boring BH-6 penetrated 35 feet of older alluvium before encountering bedrock.

5.2.1.1 Mabey Fanglomerate

The Mabey Faglomerate is more than 18 feet thick where it underlies an extensive Pleistocene terrace above Mabey Canyon (Figure 1). These deposits are typically poorly sorted, arkosic to lithic, subanglular to well- rounded sand and gravels, replete with ubiquitous cut-and-fill structures. Also common, are well-sorted, current-laminated sands and moderately sorted basal cobble and boulder beds.

Regionally, this deposit occurs at elevations similar to other high elevation fanglomerates along the east flank of the Santa Ana Mountains adjacent to or near the WEFZ; namely, at least several tens of feet above active Temescal Canyon drainages and alluvial fans. Uplift along the EaF (?/EF) and associated "beheading" of the proximal parts of the fans by erosion has now both cut off these fans from their original source areas and elevated them above Temescal Canyon.

5.2.1.2 Kroonen Canyon Older Alluvium

Another area of older alluvium occurs near the head of Kroonen Canyon (Figure 4) near PSE's 2005 Trench T-11. This deposit overlies the Ladd Formation in depositional contact. The aforementioned BA-6 revealed depth to bedrock to be approximately 35 feet at this location.

The Kroonen deposits are mainly sand, silty sand and clayey sand. Abundant gravel typical of most regionally extensive alluvial fan deposits is absent, although occasional gravel stringers and "stone lines" are scattered throughout the section.

5.2.2 Younger Holocene Alluvium (Qal)

Unconsolidated sediments occupying active channels in the major canyons and low order swales are shown as Holocene alluvium (Q_{1-2} on Figures 1 thru 8). These deposits vary in thickness from a few to more than 20 feet. These deposits are generally of low density and compressible.

5.2.3 Surficial Cover

Although unmapped, prisms of compressible soils likely lie at the base of onsite slopes, or occupy swales on those slopes. These accumulations stem from weathering, dislodgement and downslope transport (by either water or creep) of debris derived from local bedrock. Although colluvium was encountered in a few of the exploratory trenches (PSE, unpublished), the steep nature of most of the slopes and heavy vegetative growth prevented exploration of these soils; therefore, a detailed distribution and depths of colluvium must await further subsurface exploration or be determined at the time of grading. Colluvium is estimated to range from approximately 5 to 15 feet in depth, as estimated by PSE (unpublished).

5.2.4 Landslides

During the current study, PSE mapped several relatively small, surficial onsite landslides or suspected landslides (Figure 5). Most are concentrated in the northern part of the site on steep slopes comprised of Ladd Formation.

A moderately large landslide is mapped easterly subjacent to Lots 58 through 64. Most of the mapped limits of the feature are off-site. Nonetheless, as shown on the Tentative Plan, proposed development will be affected by the slide. For example, removal of slide debris in the process of providing adequate support of the planned fill in this area could prove difficult near a property line that is within the slide limits. As noted, the offsite part of the landslide might need to be investigated in light of the current development plans.

Per the unpublished PSE geotechnical review of the study site, that firm reported that their BA-15 encountered 12.5 feet of landslide debris and trenches TP-22 through TP25 and TP33 aided identification of the southwest landslide limit. As a caveat, these logs are not currently available for G&A review. The offsite limits are thus estimated and therefore, questioned on the geotechnical map. Based on the PSE field investigation, the entire slide, if as shown mostly offsite, is seemingly a composite of relatively shallow failures associated with fractured and clay-rich Silverado Formation. Indeed, the currently mapped landslides are seemingly related to the presence of steep natural slopes, colluviated swales and fractured or clay-rich rock. Seepage (i.e. springs) may also contribute to local zones of instability. The generally lithified and steeply dipping bedrock is not usually amenable to deep-seated landslides.

5.2.5 Artificial Fill (afu)

Non-engineered fill exists at the Kroonen Clay Prospect near the center of the project. It is anticipated that artificial fill in this region locally reaches a depth ranging from 5 to 20 feet. Also, PSE (2005) fault trenches that for the most part are in areas of planned cut were backfilled with non-engineered fill.

Of importance, engineered fill has been placed near along the eastern margin of Skyline Heights development must therefore, be designed and constructed in a manner that affords adequate and code-compliant subsurface and surface drainage from the study site.

6.0 Groundwater

Perched groundwater was encountered in one of the PSE borings at 39 feet below ground surface. No groundwater was encountered during PSE's fault investigations. Groundwater could potentially be trapped seasonally along alluvium/bedrock contacts and bedrock fractures. Weber (1977) estimated the regional groundwater surface to be 100 ft. to 200 ft. below the existing ground surface.

6.2 Geologic Structure

6.2.1 Regional

The Whittier-Elsinore Fault Zone (WEFZ) has been mapped by many investigators Gray, 1961; Gray et al., 2002; Weber, 1977). Recent geological studies show the fault zone as active (Rockwell et al., 1986; Millman, 1988; Lamar, 1992). Recently, PSE (2002, 2003) has identified active traces of the fault zone along the west margin of Temescal Canyon southeast of Skyline Heights.

The Skyline Heights site is northwest of where the CF and WF *senso stricto* branch from the classic EF (Plate I). The CF trends north-northwest into Temescal Canyon and then along the east flank of the Puente Hills. The WF trends northwest from the "split". Near Fresno Canyon, it "turns" west-northwest across Santa Ana Canyon and then resumes a northwest trend along the west flank of the Puente Hills.

Near Skyline Heights, the WF has been presumed to have two branches, the EaF and TMF (Plate I). Weber (1977) and Gray et al. (2003) mapped the TMF from about Santa Ana and Wardlow Canyons in the northwest across Skyline Heights to Hagador Canyon in the southeast where it either dies out or merges with the EaF. Conversely, the EaF, off-site to the south is typically mapped as the southernmost trace of the WF *senso stricto* (Dibblee, 2003).

The MSF named and mapped by Weber (1977) is the northernmost active segment of the EF. However, the fault apparently terminates near Mabey Canyon (Weber, 1977; CGS, 2003) as reflected by a lack of geomorphic expression and by the presence of unbroken pre-Holocene sediments. Here slip is inferentially transferred to the CF, WF or regional warping.

The subject region has been subject to transpression since at least Pliocene time (last 5,000,000 years) and perhaps earlier (Wright, 1991; Lamar, 1992; McCulloh et al., 2000). Geologic structure between the EaF and MSF (Plates III and IV reflects that transpression. Specifically, the Cretaceous and Paleogene bedrock dips steeply and in many places is overturned (Tan, 1991; Dibblee, 2003). For example, this study identified a previously unmapped "Kroonen syncline" between the EaF and MSF (Figure 6) that apparently reflects northeast-vergent compression along the MSF, TMF or EaF. Further, a PSE investigation about two to three miles northwest, exposed a northeast-vergent thrust separating overlying Cretaceous rocks on the southwest from Pleistocene older alluvium on the northeast, a clear indicator of local compression where the WF deflects the west-northwest near Santa Ana Narrows.

Because Skyline Heights is between major faults, the local structural patterns are inherently complex. Accordingly, the simple, northeast dipping homocline shown by Dibblee (2003) is initially deceiving, particularly near the site where several folds and dip reversals occur

(Tan, 1991; Weber, 1977; PSE reports). Also present are other faults both sub-parallel to and antithetic to the EaF, TMF, MSF and CF. In light of the regional and local structural complexity, and because the MSF and TMF are in A-P Zones, PSE set forth the following interpretation of local geologic structure as it pertains to the location, character and activity levels of on-site faults.

6.2.2 Local Structure

Rockwell et al. (1986 suggested that 5 to 7 mm/yr. of right slip takes place along the EF segment of the WEFZ. About 2 to 3 mm/yr. slip is transferred to the WF, or is manifested as regional up-warping in the eastern Los Angeles Basin, (Santa Ana Mountains and Puente Hills), with the remainder portioned to the CF (Rockwell et al., 1982). The EF to WF slip is left stepping. According to Weber, 1977; Dolan et al., undated; Gath, 1997; Rockwell et al., 1992; the WF slip component is reflected by displacements of postulated 140,000 year-old fluvial terraces in Santa Ana Canyon northwest and at the Brea Oil Field to the north.

The TMF and EaF segments of the WF are traditionally judged to transfer the slip from the EF to the WF. As, Dibblee, 2003; Tan, 1991; Morton, 1994; Weber, 1977; depict the EaF as the southern segment of the WF. The TMF is typically mapped as an "intermediate" strand, between the northern terminus of the MSF and the southern end of the EaF.

Previous regional geological mapping (Gray, 1961; Gray et al., 2003; Weber, 1977; Tan, 1991) shows different interpretations for fault locations and patterns.

6.2.2.1 Kroonen Syncline

This previously unrecognized regional syncline trends northwest across the central part of Skyline Heights (Plate IV; Figure 6). The fold is locally overturned to the northeast and plunges to the southeast. It is readily identified by many measurements of attitude (strike and dip), by mapped outcrop patterns, by a particularly evident fossiliferous bed in the Silverado Formation and by the well-defined Holz Shale – Silverado contact (Figures 6 and 7). Additionally, PSE (2005) Trenches T3 and T-11 (Figures 4 and 5) exposed the hinge line or "core" of the syncline.

The fossiliferous bed(s) marks continuous north and south limbs both on and near the site. The continuous fossiliferous beds are demonstrably unbroken, thus documenting the absence of northwest-trending faults east of PSE (2005) Trench T-2.

The geometry and stratigraphic position of the Kroonen syncline suggest that considerable compression took place between the EaF and MSF rather than the TMF and

the MSF. Much of the south limb of the Kroonen syncline is south of the TMF and adjacent to the EaF, suggesting that, at most, the TMF played only a minor role in syncline formation. The Kroonen syncline is likely an old structure, later exhumed by uplift along the MSF or related faults, or by regional warping. Weber, 1997; Wright, 2001; Lamar, 1992; and McCulloh and other, 2000; demonstrate or posit post-Paleogene and pre-Quaternary deformation, including transpression, in the area now occupied by the Santa Ana Mountains and Puente Hills. Pleistocene-aged older alluvium near the hingeline of the Kroonen syncline (Kroonen deposit) is not folded (PSE T-5 and T-11), and the Mabey Fanglomerate does not exhibit evidence of compressional folding. Therefore, intense folding occurred prior to their deposition.

The aforementioned "anticline" north of Kroonen Canyon is not mapped, but Postulated, for massive conglomerate in the Ladd Formation north of Kroonen Canyon yielded few bedding attitudes useful for delineating geological structures. Alternatively, the well-indurated conglomerate north of the canyon may be less amenable to folding than the Holz Shale and Baker Canyon bedrock units.

Hence, the small faults exposed in Trench T-6 (2005), for example, may attest to brittle deformation rather than the more plastic deformation exhibited by the Holz Shale, Baker Canyon Conglomerate and the Silverado Formation.

6.2.2.2 Holz Shale Geometry

The PSE (2005) geologic map (Figures 2, 3, 4 and 5) differs in the distribution of the Holz Shale and Silverado Formation from earlier maps that depicted a fault bounded "slice" of Silverado Formation "wedged" between the conglomerates and sandstone of the Ladd Formation on the ridge where PSE (2005) Trenches T-3, T-4 and T-11 were place (Figure 4). Likewise, previous investigators interpreted the Holz Shale as locally missing, thereby requiring large horizontal and/or vertical displacement along faults such as the TMF and the "Whittier Fault" as portrayed by Gray et al. (2002). The PSE trenching, however based on abundant fossil and lithologic evidence, exposed Holz Shale and Baker Canyon Conglomerate underlying most of the ridge; as well as the hingeline of the Kroonen syncline (T-11, Station 11+70). Thus presence of the Cretaceous sedimentary rock and Kroonen syncline, and the absence of the Silverado Formation reduce the need for significant slip along the TMF or related faults. Rather, the structural relationships are better explained as normal stratigraphic sequences, as observed in the field. Likewise, similar "basal" clays in the Silverado Formation at clearly depositional contact (McKnight Clay Mine, T-3, T-11) are also present where the TMF is mapped as separating the Silverado Formation from the Holz Shale (T-1, M-11). This relationship also strongly suggests minimal slip, for the basal Silverado is not "faulted out".

A Kroonen syncline and a TMF with small vertical displacement are consistent with mapped geology (Figures 6 and 7). Likewise, an anticline at Kroonen Canyon is also plausible. In sum, the Silverado Formation does not daylight on the north slope of Kroonen Canyon; rather, it crops out north of the canyon, near the MSF.

Additionally, differential erosion of a poorly resistant band of Holz Shale between Cretaceous and Paleocene sand stone and conglomerate apparently gives rise to the strong lineament heretofore usually attributed to Holocene movement on the TMF near and northwest of Kroonen Canyon.

6.2.2.3 Local Faults

Main Street Fault (MSF) - as named and mapped by Weber (1977) generally parallels the northeast site boundary (Plate I). The MSF characteristically separates Paleocene sedimentary rocks on the southwest from Pleistocene alluvium on the northeast. Owing to youthful slip along the fault, overlying Holocene deposits are likewise displaced (Weber, 1977; GeoSoils, 2001; Shlemon, 2003, personal communication; Treiman, 2004, personal communication; hence the CGS (2003) placed the MSF in an A-P Zone (Plate I).

The MSF is typified by right-lateral strike slip and "south-side-up" vertical separation (Weber, 1977; Lamar, 1992). PSE (2004) notes stratigraphic and geomorphologic evidence for MSF Holocene slip such as right-lateral deflected drainages, including Bedford and Main Street Canyons. Additionally, northeast-facing spurs (scarps) also mark the fault trace. Two reasonably distinct scarps are particularly evident east of Skyline Heights near Mangular Avenue (Plate III) Pleistocene alluvial fans that emanate from the high order canyons along the mountain front are beheaded by right lateral slip along the MSF, are now cut-off from their source canyons (Plate III) and are elevated above Temescal Canyon floor.

The MSF terminates at or near Mabey Canyon (Weber, 1977) in the northeast corner of Skyline Heights, where both stratigraphic and geomorphic evidence for the fault are "lost" (Plate I; Lineament F, Plate III; Figures 3 and 4).

The CGS (2003) maps the "main" branch of the MSF as trending into and terminating near the mesa in the northwest corner of Skyline Heights (Plate I), with the corresponding A-P enclosing the entire mesa. Accordingly, PSE (2005) placed their Trench T-7 on the mesa where it exposed 18 ft. of upper to middle Pleistocene alluvium

informally deemed the "Mabey Fanglomerate". The fanglomerate is stratified and capped by a pre-Holocene, unbroken relict paleosol.

The southern contact between the Mabey Fanglomerate and the Ladd Formation is a buttress unconformity, indicated by the "stepped" contact, lack of shears and presence of Ladd Formation rip-up clasts in the fanglomerate. Therefore, the "A-P Zoned" MSF is not active at T-7 or passes off-site to the north. Alternatively, PSE's (2005) Trench T-12 (Figures 2 and 3) intercepted a fault juxtaposing Ladd and Silverado Formations south of T-7 (Plate 1; Plate 17; Station 4+90), according to PSE (2007). The T-12 fault is traceable across Mabey Canyon based on similar geological characteristics. North of Mabey Canyon, the fault is overlain by un-faulted pre-Holocene deposits and PSE (2007) judged the T-12 fault to be not active according to A-P standards.

Tin Mine Fault (TMF) - Weber, 1977; Gray, 1961; and Gray et al., 2002; mapped the TMF and related faults from about Santa Ana and Wardlow Canyons in the northwest, across Skyline Heights, to Hagador Canyon in the southeast where they die out or "merge" with the EaF (Plates I and IV). The TMF is traditionally identified by the inferred juxtaposition of Mesozoic sedimentary rock on the southwest against Paleocene Silverado Formation on the northeast; and as a bold aerial photographic lineament (Plate III). High-order regional drainages, such as Wardlow, Mabey and Kroonen Canyons seemingly have strong right-lateral deflections usually attributed to slip along the fault. Therefore, the CGS (2003) placed elements of the TMF in an A-P Zone (Plate I).

In order to locate and date last displacement of the TMF, PSE (2005) placed Trenches T-1, T-2, T-3, T-4, T-5, much of T-6, T-8, T-9, T-10, T-11 and T-13, as well as other "checkpoint" backhoe pits, across the mapped or projected trace(s) of the fault. The exploration showed the aerial extent of the Silverado Formation at Kroonen Canyon is less than previously recognized; that a major (Kroonen) syncline sub-parallels the mapped trace of the TMF and that a bed of previously unrecognized Holz Shale extends across the southern part of Skyline Heights, forming the bold northwest-trending lineament usually attributed to the TMF. Importantly, the TMF proved to be less well-defined than previously thought and at Skyline Heights it does not displace upper Pleistocene deposits.

PSE's Trench T-11 exposed a thick section of Baker Canyon Conglomerate and Holz Shale in its westernmost 1130 ft. (Figure 4). The contact between the Holz Shale and the Silverado Formation (Station 11+30) is depositional rather than tectonic. Trench T-3 exposed a similar contact (Figure 6).

The TMF is identified as a relatively narrow fault dipping steeply to the southwest near Station 7+50 in T-11 (Figures 4 and 5). Here, Holz Shale, siltstone and sandstone are

probably juxtaposed with the sheared surfaces filled with carbonate. The fault zone, however, has no surface expression, attesting to the likely antiquity.

PSE's Trench T-10 was placed to constrain the location of the TMF (Figure 4). Here too, a thick easily recognizable fault zone is absent. Near Station 2+70, however, a sheared zone may be the TMF. Additionally, an overturned local anticline and syncline are identifiable in T-2 and T-11 (Plates 4 and 12 through 12b).

Trenches T-5, T-8, T-9 and T-13 overlap and intersect any reasonable projection of the TMF (Figure 4). These trends expose stratified pre-Holocene and unbroken Kroonen deposits, providing positive evidence of the lack of Holocene or latest Pleistocene surface rupture on the TMF.

Eagle Fault (EaF) – Weber (1977) identified the northeast-vergent Eagle Fault (EaF) that characteristically thrusts Jurassic and Cretaceous rocks over Cretaceous and Tertiary sediments along the northeast flank of the Santa Ana Mountains (Plates I and IV). Gray, 1961 and Gray, et al., 2002 mapped a similar fault south of Skyline Heights, south of Tin Mine Canyon. Weber (1977) suggested that most fault movement occurred in Pliocene time, the earliest displacements along the WEFZ. CGS (2003) did not place the EaF in an A-P Zone. However, local and regional stratigraphic and structural relationships suggest that the EaF has contributed to slip along the WEFZ. For example, basement rock elevation in the Santa Ana Mountains (southwest block up) points to major structural relief. Also, compression in a block between the EaF (rather than the TMF) and the MSF probably gave rise to the Kroonen syncline. And finally, many investigators (Dibblee, 2003; Tan, 1991; Shoellhamer et al., 1981) "connected" the EaF to the south end of the clearly active WF.

Other Faults – Several investigators (Gray, 1961; Weber, 1977; Gray et al., 2002) have either inferred or mapped several other faults on, or near, Skyline Heights. Based on the present site-specific investigation, these faults either do not exist or are pre-Holocene in age. *Evidence points to bedding parallel differential erosion of sandstone and claystone beds in the Silverado Formation as the genesis of lineaments in the Silverado Formation (PSE, 2004, 2005, 2007).*

PSE (2005) demonstrated that the "Whittier Fault" of Gray et al. (2002) does not exist on or near the site. Specifically, the absence of Silverado Formation north of Kroonen Canyon precludes the presence of such a fault. Further, PSE Trenches T-6, T-8 and T-12 that would have intercepted the "Whittier Fault", exposed no significant faults. The Ladd-Silverado contact and key fossiliferous and mudstone beds within the Silverado Formation are unbroken across the mapped trace of the "Whittier Fault". Also,

at the McKnight Clay Mine site (Figure 5), as exposed in a road cut, the Silverado is in depositional contact with the Ladd Formation.

The 2005 and 2007 PSE trenches intersected many small faults and shears. These however, are not the "so-called" "Whittier Fault", but rather occur near the axial (hinge) trace of the Kroonen syncline. As a class, these faults have displacements less than about one to two feet, are carbonate-filled and healed, and in many places capped by unbroken late Pleistocene soils or weathered surfaces.

Similar small faults and shears, as exposed in the trenches, occur in the hard, brittle conglomerate of the Ladd Formation north of Kroonen Canyon (Figures 3 and 5). PSE's (2005) T-12 shows these faults have small displacements, no obvious lateral continuity, are healed and do not displace late Pleistocene weathered surfaced. Further, they have no surface expression and many "die-out" upward and downward within the bedrock.

6.2.2.4 Age of the Main Street (MSF) and Tin Mine Faults (TMF)

The MSF and faults southeast of Skyline Heights that compose the classic DF segment of the WEFZ are well-documented Holocene (active) structures. For instance, at Glen Ivy March, 10 to the southeast, Rockwell et al. (1986) documented five episodes of fault slip in the last 1,000 years, including a large (30-50 cm of vertical separation), post-1660 AD event. Similarly, Vaughan et al. (1999) reported at least four surface fault displacements in the last 3,500 to 4,500 years along the Temecula segment of the EF, about 45 miles southeast of Skyline Heights. Those investigators surmise that the last event was post 1660 AD, and perhaps was the same event as recorded at the Glen Ivy Marsh. PSE (2002, 2003) documented multiple latest Pleistocene and Holocene slip events along the EF at Indian and Horsethief Canyons southeast of Skyline Heights. At those sites, the active fault extended upwards from pre-Holocene sediments through Holocene sediments and finally through modern ($Q_{1-2)}$ alluvium. Hence, one to two feet high scarps mark the active fault. Additionally, flowering upward zone, perhaps 25 to 37 feet wide in upper Pleistocene alluvium, narrowed to 1 to 5 feet wide "active zones". These and similar studies (GeoSoils, 2001; Petra, 1999) southeast of Skyline Heights show that the active splays of the MSF are generally narrow zones that deform upper Holocene strata and even the ground surface. For example, linear scarps and faceted spurs south of Skyline Heights (Plate III) are aligned with and coincident with the mapped MSF. Local tectonic geomorphology thus well marks the MSF.

PSE notes that, in contrast, tectonic geomorphic features indicative of active faulting are absent near Mabey Canyon. This strongly suggests low to nil activity of the

MSF in this area. The CGS (2003) thus terminated the MSF and Plate I clearly supports that conclusion, for it exposed un-faulted upper Pleistocene deposits that cross the MSF of the CGS (2003); and Gray (1961) and Weber (1977). At Skyline Heights the "main" MSF is therefore pre-Holocene according to A-P definition. However, a fault parallel to the MSF, exposed in T-12, is provisionally "zoned" owing to the lack of overlying dateable materials.

The activity level of the TMF near Skyline Heights has been less well documented and thus traditionally more enigmatic than the MSF. PSE (2005) and RMA in a southeast adjacent parcel (Plate II) demonstrate that the last local displacement of the TMF demonstrably occurred in pre-Holocene time. These site-specific trench observations are supported by lack of geomorphic evidence for fault "recency"; for example, the ridge immediately north of Tin Mine Canyon is clearly not displaced (Plate II). The apparent linear ridges near the head of Kroonen Canyon result from differential erosion of the Holz Shale. Also, the apparent right-lateral deflection of Kroonen Canyon near the mapped TMF appears to be more likely the confluence of three tributaries that follow shale conglomerate contacts.

The on-site trench exposures and absence of Kroonen and Tin Mine Canyon deflections strongly support the notion that presumed large, right-lateral displacement of Mabey Canyon resulted from erosion in the Holz Shale and not from recurrent, active faulting.

RMA (2004, personal communication) investigated the TMF in and along the south slope of Tin Mine Canyon (Plate II) and concluded that there is no evidence for a through-going active TMF in either Tin Mine Canyon alluvium or in the canyon wall. Although the RMA "alluvial: trenches did not expose a full Holocene section, <3,500 years bp radiocarbon dates and an underlying slightly developed, buried paleosol document no displacement in at least the past 5-6 ka; time sufficient to have recorded multiple recurrent events characteristic of the active WEFZ as depicted by Rockwell et al. (1986). RMA cuts along the south canyon wall exposed unbroken Ladd and Trabuco Formations and locally overlying Pleistocene terrace deposits, thus stratigraphically verifying either termination of the TMF or its lack of Holocene activity at and new Skyline Heights.

In sum, in the Skyline Heights area, the on-site PSE (2004, 2005, 2007) and the near-site RMA investigations demonstrate that the TMF and the MSF are not active according to present State of California A-P definition.

6.2.2.5 Local Slip Partitioning

Decreasing slip along the north part of the MSF, including its cessation near Mabey Canyon and the lack of Holocene slip along the southern TMF, create an enigma regarding Holocene surface slip along the local segments of the WEFZ, for the zone is clearly active to the north and south. Skyline Heights is located at or near the zone where slip from the active EF that has included historical and latest Holocene surface rupture (Rockwell, 1995; PSE, 2002, 2003) is transferred to the northwest along the CF and WF. Numerous investigators, including the State of California (Peterson et al., 1996) suggest that the long-term slip rate along the EF zone s about 5 mm/yr. south of partition to the WF and CF. Rockwell et al. (1992), The Working Group (1995) and Peterson et al. (1996) set forth a slip rate of about 2.5 mm/yr for the WF north of the Santa Ana River. The State of California (Peterson et al., 1996) suggests at least a 1.5 to 2 mm/yr slip rate for the fault, with the remaining slip being transferred as regional-scale folding or warping in the east and north Los Angeles Basin. Transfer of slip to the WF from the EF traditionally has been judged to be via the TMF and the EaF. Based on PSE's investigation, however it is not occurring along the TMF.

The presence of a currently unidentified and unstudied active step-over of the MSF east of Skyline Heights in Temescal Canyon cannot be discounted; or perhaps the fault exposed in PSE Trench T-12 actively transfers slip from the MSf to westerly faults such as the EaF, however, the T-12 fault lacks tectonic geomorphic evidence of significant recent slip. A series of west-northwest faults mapped by Weber (1977), Gray (1961) and Gray et al. (2002) between Mabey and Wardlow Canyons could act as the conduits of surface slip between the MSF and EaF.

Most investigators, including Tan (1991), Dibblee (2003) and McCulloh et al. (2000) identify a nearly west-trending "north branch" of the WF between the CF and the Santa Ana Narrows immediately south of the Santa Ana River. McCulloh et al. (2000) deduce that this branch is more recently active than the traditional "south branch" that ties into the EaF. Perhaps some slip is transferred to that "north branch" via currently unidentified faults in Temescal Canyon between the MSF and CF; or the EaF is more youthful than currently thought.

Alternatively, Grant et al. (2003), Gath (1997, 2002) and Gath et al. (2002) suggest part of the strain deficit between the EF, CF and WF is consumed by up-warping of the Santa Ana Mountains, rather than by discrete fault slip. The phenomenon may be occurring at the EF-WF step-over area near Skyline Heights. It is also possible that Northeast-vergent, possibly active thrust faults like that exposed near Fresno Canyon north of Skyline Heights, are manifestations of that uplift.

The TMF in essence may therefore be a local fault related to compression between the EaF and MSF, as indicated by the Kroonen syncline, that ceased before the latest Pleistocene time. Possible stratigraphic mismatches along the Mapped TMF, such as the differences in the Ladd Formation north and south of Kroonen Canyon and truncation of the Holz Shale at Tin Mine Canyon, seemingly point to some slip along the fault. Conversely, stratigraphic facies changes and pinch-outs could account for same.

6.3 Summary of Results of A-P EFZ Investigation

- Skyline Heights is underlain by bedrock of the Cretaceous Ladd and Paleocene Silverado Formations. These are locally capped with Quaternary alluvium and landslides.

- The California Geological Survey (2003) placed A-P Zones encompassing both Tin Mine and Main Street Faults, both of which encroach onto Skyline Heights.

- Based on literature review, aerial photographic analyses, field mapping and logging of about 6000 lineal feet of fault trenches, PSE assesses that the on-site part of the Tin Mine Fault is *not active* according to A-P definitions.

- The age of last movement along a fault exposed n Trench T-12, in the northwest corner of the site is presently unknown owing to lack of dateable overlying sediments. Accordingly, PSE provisionally places a habitable structures setback zone for the fault until such time when additional investigation may be undertaken. This is a conservative interpretation because the fault has no recent surface displacement and its length is limited, based on the un-faulted strata observed in the north-central part of Skyline Heights.

- Owing to topographic constraints and the lack of proposed development in the eastern part of Skyline Heights, the extent and width of the T-12 fault and associated zone are not well constrained. Accordingly, future supplemental exploration may be required if habitable structures is eventually planned.

- The A-P trace of the MSF is clearly overlain by un-faulted upper Pleistocene sediments and is thus *not active* at Skyline Heights, thereby precluding habitable structures setbacks.

- Bedding plane faulting associated with the Kroonen syncline is considered remote, because the near-parallel-limbed fold is not actively deforming, but rather is a relic of pre-Holocene deformation and because upper Pleistoncene older alluvium is intact where observed in PSE trenches.

- Skyline Heights is in a region of active uplift and seismogenic faults capable of imparting strong ground motions at the site. Accordingly, to reduce the potential of resultant structural damage, PSE preliminarily recommends post-tensions slabs or some similar foundation reinforcements for design of proposed structures.

- All engineered structures must be designed in accordance with prevailing seismic codes. Likewise, this report is not intended to preclude site-specific geotechnical investigations.

- For future reference, the project geologist should observe and map the site during grading in order to document the absence of active faults; or if same are observed, make recommendations regarding appropriate mitigation.

7.0 Groundwater

Perched groundwater was encountered in one of the PSE borings at 39 feet below ground surface. No groundwater was encountered during PSE's fault investigations. Groundwater could potentially be trapped seasonally along alluvium/bedrock contacts and bedrock fractures. Weber (1977) estimated the regional groundwater surface to be 100 ft. to 200 ft. below the existing ground surface.

8.0 Rippability

The topsoil, undocumented artificial fill, landslide material, alluvium and older alluvium should be readily excavatable with conventional earth-moving.

The Silverado and Ladd Formations underlying Skyline Heights are indurated, but have a seemingly upper weathered zone that yields rock amenable to dislodgement with a Caterpillar D-9 or equivalent bulldozer. However, the seismic refraction survey revealed that excavation difficulty is expected to increase with depth and very heavy ripping should be anticipated to attain design grades, especially in the northwesterly portion of the tract underlain by Ladd Foundation conglomerate (Klc). Sixteen (16) shallow seismic refraction lines were conducted for the PSE's investigation. Preliminarily, this data suggest that the rock is rippable to a depth of at least 45 to 50 feet. Some of the borings encountered refusal or difficult coring. Cuts up to 130 feet, not including utility trenches, are proposed. Therefore, it is likely that excavating during grading will also encounter ledges and zones of extremely hard rock that may require blasting, particularly in the areas designated on Plate VII. Bothe the boring and seismic line information indicate that trenching with conventional trenching equipment will be extremely difficult in bedrock.

It should be anticipated that oversize rocks will be generated in the deeper cuts and locally in shallow cuts. Special disposal will likely be required. Typically, deep fills have been used to accommodate oversize rocks and boulders. Onsite rock crushing operations have been employed on similar developments producing large quantities of oversized rock.

9.0 Infiltration Analyses and Conclusions

The Skyline Heights project is not suitable for infiltration within the footprint of the proposed development, for the followings reasons:

1. In the cut areas of the project, very hard cemented conglomerates and sandstones will be exposed especially in the deeper cuts. These bedrock materials are impermeable.

2. The compacted engineered fill will predominately consist of a sandy clay to clayey sand matrix with clasts of pebble to cobble size of igneous, metamorphic and sedimentary rocks. This mixture will not provide a permeability rate suitable for infiltration (0.3" per hour in accordance with the 2011 Technical Guidance Document), especially within the deeper fills requiring 93% relative compaction.

3. Alternative options for manufacturing an infiltration medium to be placed within cut and/or fill areas is not recommended since this would result in differential settlement within a sphere of influence of the proposed residential structures and other improvements.

In summary, significant constraints to infiltration are present with respect to the Skyline Heights development plan. Based on the existing and proposed soil conditions, the site is not suitable for infiltration.

10.0 Limitations

This report has been prepared for the exclusive use of Richland Developers, LLC relative to the design and construction of the proposed plan. This report is not intended for other parties, and it may not contain sufficient information for other purposes. The recommendations presented herein are of a general/conceptual nature and will be refined and detailed in forthcoming reports specific to various aspects of development. As such, the current recommendations may be subject to revision as additional detail of the project is made and additional data is developed, as well as in response to jurisdictional review requirements. This report is based on the plan as described and the information obtained as described herein.

The Owner or Owner Representative should make sure that the information and preliminary recommendations presented in this report are brought to the attention of the Project Architect and Project Engineer and incorporated into the project plans.

The findings contained in this report are based upon our evaluation and interpretation of the information obtained from fault trenches and borings, as well as the geotechnical engineering analyses. The opinions and recommendations provided were based on the assumption that the geotechnical conditions, which exist across the site, are similar to those observed in the test excavations. The condition and characteristics of the sub-surface materials at locations and depths other than those excavated and observed my be different and no representations are made as to their quality and engineering properties. Should any conditions encountered during constuction differ from those described herein, this office should be contacted immediately for evaluation of the actual conditions and for appropriate recommendations prior to continuation of work.

The findings and recommendations presented herein were obtained in accordance with currently accepted professional engineering principles and practice in the field of geologic and geotechnical engineering and reflect our best professional judgment. We make no other warranty, either expressed or implied.

This report is subject to review by the controlling authorities. If you have any questions or require additional information, please contact the undersigned.

We appreciate the opportunity to be of service and look forward to working with you and the other project consultants.

{Signatures on following page}

Respectfully submitted,
GINTER & ASSOCIATES, INC.

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Appendix 4: Historical Site Conditions

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

HILLMANN
CONSULTING

PHASE I ENVIRONMENTAL SITE ASSESSMENT

"Skyline Heights"-271 acres SW of Corona
Riverside County, California

Prepared For:

Richland Developers, Inc.
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Hillmann Project Number C3-5564

May 10, 2013

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HILLMANN
CONSULTING

May 10, 2013

Mr. Mike Byer
Richland Developers, Inc.
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RE: Phase I Environmental Site Assessment
"Skyline Heights"- 271 acres SW of Corona
Riverside County, California
Hillmann Project Number: C3-5564

Hillmann Consulting, LLC, is pleased to provide the results of our Phase I Environmental Site Assessment of the above referenced property. This assessment was performed in accordance with the scope and limitations of ASTM Practice E 1527-05.

This report is for the exclusive use of the entities named on the front cover, its affiliates, designates and assignees, rating agencies, prospective bond holders and bond holders, and no other party shall have any right to rely on any service provided by Hillmann Consulting, LLC, without prior written consent.

We appreciate the opportunity to provide environmental due diligence services. If you have any questions concerning this report, or if we can assist you in any other matter, please contact the Project Manager at 714-634-9500.

Very Truly Yours,
Hillmann Consulting, LLC

Kenneth A. Thornburgh, Ph.D.
Project Manager

David Rutherford
Director of Due Diligence

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1.0 EXECUTIVE SUMMARY

At the request of Richland Developers, Inc., Hillmann Consulting, LLC (Hillmann) performed a Phase I Environmental Site Assessment (ESA) of the Property located SW of Corona in Riverside County, California (the Property). This assessment has been conducted utilizing generally accepted Phase I ESA industry standards in accordance with the ASTM Standard Practice E 1527-05 for Phase I Environmental Site Assessments.

1.1 Property Summary Table

A summary of the pertinent details of the project is provided below:

PROJECT SUMMARY TABLE						
Name of Client			Richland Developers, Inc.			
Client Project No.:			N/A			
Client Contact:			Mr. Mike Byer			
Description of Project			Phase I Environmental Site Assessment			
Property Name:			Skyline Heights			
Property Address:			Vacant land-3 miles south of the 71 and 91 freeways and 4 miles west of Interstate (I-15)			
City:	Corona	**County:**	Riverside	**State:**	CA	
Tax Map designation:		**APN's**:	275070003, 275080010, 275040006, 275040011, 275050004, 275040015, & 275030006			
Property Area:			271 acres			
Building Area:			N/A – vacant land			
Assessor Designated Site Use:			N/A (Proposed Single Family Residential with 7,200 square feet minimum lots)			
Year Built:			NA			
Property Owner:			Richland Developers, Inc.			
Assessment Personnel:			Mr. Kenneth A. Thornburgh and Mr. Ryan Terwilliger			
Accompanied/Escorted By:			Unaccompanied			
Property Contact:			Mr. Mike Byer			
Inspection Date:			April 3 and May 9, 2013			
Weather Conditions:			Clear, 71 degrees F			

1.2 Summary of Findings

The following table summarizes the individual sections of this assessment. This table, alone, does not constitute the complete assessment. The report must be reviewed in its entirety.

FINDINGS SUMMARY					
ASSESSMENT SECTION	ACCEPTABLE	O&M RECOM'D	REC	FURTHER ACTION/ PHASE II RECOM'D	REF. SECTION
Historical Review	X		X	If the area of the former landing strip and the west side of the drainage culvert in Mabey Canyon are to be redeveloped, an investigation into potential impacts is recommended	5.0
Regulatory Review	X				8.0
Site Use			X	See above	3.3/6.2
Hazardous Materials	X				6.3
USTs	X				6.6
ASTs	X				6.6
PCBs	X				6.7
Waste / Discharges	X				6.4/6.5
ACM	X				7.1
Lead Paint	X				7.2
Drinking Water	X				6.11
Radon	X				7.3
Mold	X				7.4
Adjoining/Surrounding Area	X				3.6/3.7/8.2

1.3 Conclusions

Hillmann has performed a Phase I Environmental Site Assessment in accordance with the scope and limitations of ASTM Practice E 1527-05 of the Property as described in Section 2 of this report. Any additions to, exceptions to, or deletions from this practice are also described in Section 2 of this report. This assessment has revealed evidence of *recognized environmental conditions* in connection with the Property, with the exception of the following:

- Hillmann observed an abandoned landing strip, including a concrete pad that may have been used for a hanger and a drainage ditch constructed with old vehicles located on the

southern side of Mabey Canyon, south of Mabey Canyon Road and west of the Mabey canyon Debris Basin. According to historical sources the landing strip has been located on the Property since at least the 1950s. No visual evidence of a release of hazardous materials or petroleum products was noted in the vicinity of the landing strip during the site reconnaissance. However, the area around the landing strip was observed to be overgrown with vegetation. The former landing strip and associated operations raise an environmental concern based on the potential historic use of petroleum products in the fueling and maintenance of air-craft and related vehicles. In addition, there is potential for impact of the Property from the old vehicles used in the construction of the drainage ditch/berm. According to Mike Byer of Richland Developers, Inc., the Property is scheduled for redevelopment; however the area of the former landing strip and drainage culvert in Mabey Canyon will not be part of the planned redevelopment. No significant concerns or references to the former landing strip were identified by review of state and federal environmental regulatory databases. Given the lack of any known areas of concern, no further investigation appears to be warranted at this time with regard to the former landing strip. However, if future redevelopment of the Property is planned in the area of former landing strip and drainage culvert in Mabey Canyon, a subsurface investigation to determine the potential impact to soil and groundwater from historic operations would be recommended.

Hillmann has also performed cursory evaluations for ASTM "Non-Scope" items, such as asbestos-containing materials, lead-based paint, radon and mold. Our observations and research did not reveal any concerns

1.4 Recommendations

Based on information collected from the site investigation, record review, interviews and site reconnaissance, Hillmann makes no further recommendations at this time.

2.0 PURPOSE AND LIMITATIONS

2.1 Purpose and Scope

This assessment was conducted utilizing generally accepted Phase I ESA industry standards in accordance with the ASTM Standard Practice E 1527-05. The ASTM describes these methodologies as representing good commercial and customary practice for conducting an Environmental Site Assessment of a property for the purpose of identifying recognized environmental conditions.

The term *recognized environmental conditions (RECs)* is defined by the ASTM as the presence or likely presence of any 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 any hazardous substances or petroleum products into structures on the property or into the ground, ground water or surface water of the property. The term includes hazardous substances or petroleum products even under conditions in compliance with laws. 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. Conditions determined to be *de minimis* are not *REC*s.

The chief components of this assessment are described as follows:

- Review and discussion of current Property conditions regarding the presence or absence of hazardous chemicals/petroleum products; generation, treatment, storage or disposal of hazardous, regulated or medical wastes; electrical equipment that utilizes oils which potentially contain PCBs; and bulk storage tanks (above or below ground).

- Review and discussion of the usage of adjacent and nearby properties to identify the potential for contamination (if present and/or suspected) to migrate onto the Property.

- Summary of physical characteristics of the Property through a review of available topographic, geologic and groundwater data.

- Research of the historic uses of the Property through a review of reasonably ascertainable standard sources, such as fire insurance maps, city directories, aerial photographs, prior reports and interviews.

- A regulatory review of federal and state environmental databases, and other local environmental records, within specific search distances defined by the ASTM.

These methodologies are described as representing good commercial and customary practice for conducting an Environmental Site Assessment of a property for the purpose of identifying recognized environmental conditions.

A cursory evaluation for the following "Non-ASTM" concerns, such as the following:

- ♦ Suspect Asbestos-containing Materials

- Lead-based Paint
- USEPA Designated Radon Potential
- Mold

2.2 Inaccessible Locations

Due to the presence of thick vegetation and brush, surface water bodies, the lack of access roads or trails, and steep terrain Hillmann was not able to fully access portions of the Property.

2.3 Limitations and Exceptions

Historic research data gaps are detailed in Section 5, if applicable. No other exceptions or deletions from the ASTM Standard E 1527-05 are reported.

2.4 Abbreviations/Acronyms

Hillmann may use the following abbreviations and acronyms for common terminology described in our report. Not all abbreviations or acronyms may be applicable to this report:

ACM – Asbestos-containing Material
AST – Aboveground Storage Tank
ASTM – American Standard for Testing Materials
FOIA – Freedom of Information Act
HVAC – Heating Ventilation & Air Conditioning
HREC – Historic Recognized Environmental Condition
IAQ – Indoor Air Quality
LBP – Lead-based Paint
LUST – Leaking Underground Storage Tank
MSDS – Material Safety Data Sheet
REC – Recognized Environmental Condition
UST – Underground Storage Tank

2.5 Special Terms and Conditions

Hillmann has prepared this Phase I Environmental Site Assessment using reasonable efforts in each phase of its work to identify recognized environmental conditions associated with hazardous substances, wastes and petroleum products at the Property. The methodology of this Phase I Environmental Site Assessment was consistent with the ASTM Standard Practice for E 1527-05. Findings within this report are based on information collected from observations made on the day of the site investigation and from reasonably ascertainable information obtained from governing public agencies and private sources.

This report is not definitive and should not be assumed to be a complete or specific definition of the conditions above or below grade. Information in this report is not intended to be used as a construction document and should not be used for demolition, renovation or other construction purposes. Hillmann makes no representation or warranty that the past or current operations at the Property are, or have been, in compliance with all applicable federal, state and local laws, regulations and codes.

Findings, conclusions and recommendations presented in this report are based on our visual observations of the Property, the municipal research findings reasonably obtained, information provided by the Client, and/or a review of readily available and supplied drawings and documents. Hillmann relies completely on the information, whether written, graphic or verbal, provided by the subject Property contact(s) or as shown on any documents reviewed or received from the subject Property contact, owner or agent, or municipal source, and assumes that information to be true and correct. Although there may have been some degree of overlap in the information provided by these various sources, Hillmann did not attempt to independently verify the accuracy or completeness of all information reviewed or received during the course of this assessment.

Regardless of the findings stated in this report, Hillmann is not responsible for consequences or conditions arising from facts that were concealed, withheld or not fully disclosed at the time the assessment was conducted.

This report does not warrant against future operations or conditions, nor does it warrant against operations or conditions present of a type or at a location not investigated.

The regulatory database report provided is based on an evaluation of the data collected and compiled by a contracted data research company. The report focuses on the Property and neighboring properties that could impact the Property. Neighboring properties listed in governmental environmental records are identified within specific search distances. The search distance varies depending upon the particular government record being checked. The regulatory research is designed to meet the requirements of ASTM Standard E 1527-05. The information provided in the regulatory database report is assumed to be correct and complete.

Subsurface conditions may differ from the conditions implied by the surface observations and can only be reliably evaluated through intrusive techniques.

Reasonable efforts have been made during this assessment to identify aboveground and underground storage tanks and ancillary equipment. "Reasonable efforts" are limited to information gained from visual observation of largely unobstructed areas, recorded database information held in public record and available information gathered from interviews. Such methods may not identify subsurface equipment that may have been hidden from view due to parked automobiles and other vehicles, snow cover, vegetative growth, pavement, construction or debris pile storage or incorrect information from sources.

Hillmann is not a professional title insurance firm and makes no guarantee, explicit or implied, that the records which were reviewed represent a comprehensive or precise delineation of past Property ownership or tenancy for legal purposes.

3.0 PROPERTY DESCRIPTION

3.1 Property Location

The Property is located in the hills to the southwest of the City of Corona in Western Riverside County, California adjacent to Foothill Parkway. The Property is located approximately three (3) miles south of the 71 and 91 Freeways and approximately 4 miles west of Interstate 15 (I-15). The legal designation of the Property is APN #'s: 275070003, 275080010, 275040006, 275040011, 275050004, 275040015, & 275030006. The latitude and longitude of the Property is approximately north 33.8440 degrees, and west 117.6072 degrees.

3.2 Site and Vicinity Characteristics

The Property consists of vacant land. The site consists of sparsely vegetated and otherwise undeveloped land with the exception of dirt roads. The site is characterized by steep topography, generally increasing in elevation from the northeast to the southwest. Several canyons and ravines are present which will convey natural drainage across the site.

The Property is generally bounded to the north and east by single-family residences and on the south and west by the Cleveland National Forest and large privately owned parcels. One (1) ten 10 acre parcel located within the Property is owned by the U.S. Forest Service and is not a part of this transaction.

3.3 Current Use of the Property

The Property primarily consists of vacant, undeveloped land.

3.4 Description of Property Improvements

The Property currently consists of vacant, undeveloped land. Hillmann did observe an abandoned landing strip, including a concrete pad that may have been used for a hanger and a drainage ditch with old vehicles was located on the southern side of Mabey Canyon, south of Mabey Canyon Road and west of the Mabey canyon Debris Basin.

3.5 Utilities/Source of Heating

According to information provided by the property owner there are currently no utilities provided to the Property.

3.6 Current Uses of the Adjoining Properties

The following describes adjacent and abutting properties to the Property:

DIRECTION	DESCRIPTION
North	Single-family residences
East	Single-family residences
South	Cleveland National Forest
West	Cleveland National Forest

3.7 Surrounding Area

The vicinity of the Property in Corona, California is characterized by a mix of residential single-family homes, undeveloped land, and the Cleveland National Forest.

3.8 Physical Setting

3.8.1 Topography

According to the United States Geological Survey (USGS) 7.5-Minute Series Topographic Map, Corona South, CA Quadrangle (1988), the Property is located at approximately 1,202 feet above mean sea level. The topographic gradient at the Property is slopes in a general north/northeast direction. Copies of the topographic maps are included in Appendix C.

3.8.2 Soils

Based on the United States Department of Agriculture - Soil Conservation Service data, soils at the Property are classified as "Cieneba". This soil has a texture of sandy loam and is somewhat excessively drained with very slow infiltration rates.

3.8.3 Geology

According to the EDR Geo-Check report, the bedrock geologic formation in the area within the vicinity of the Property is identified to be Plutonic Rocks of the Mesozoic Era.

3.8.4 Hydrology

Based on the drainage/topography, groundwater is estimated to flow to the north/northeast. Groundwater levels and/or flow direction(s) may vary due to seasonal fluctuations in precipitation, local usage demands, geology, underground structures or dewatering operations.

Based on the U.S. Fish & Wildlife Service's National Wetlands Inventory, wetlands are not suspected to be present on the Property.

According to the Federal Emergency Management Agency (FEMA) Flood Insurance Rate Map (FIRM) covering the area of the Property, the Property is located outside of the 100 and 500 year flood zones.

4.0 USER PROVIDED INFORMATION

4.1 Title Records/Environmental Liens/Activity and Use Limitations

Review of title records is not included in the scope of work for this assessment project. No information regarding environmental liens or activity and use limitations was provided to Hillmann by the Client.

4.2 Specialized Knowledge or Experience

No indication of any specialized knowledge or experience regarding the Property was reported to Hillmann by the Client.

4.3 Commonly Known or Reasonably Ascertainable Information

No commonly known or specialized knowledge of the Property was reported to Hillmann by the Client.

4.4 Property Value Reduction due to Environmental Conditions

No information was provided by the Client to Hillmann regarding a reduction of the Property value due to environmental problems or conditions.

4.5 Reason for Performing Phase I ESA

It is Hillmann's understanding that the Phase I ESA was being performed in conjunction with a pending real estate or bank financing transaction involving the Property.

5.0 HISTORICAL USE RESEARCH

5.1 Sanborn Fire Insurance Maps

Fire insurance maps were created for insurance underwriters and often contain information regarding the uses of individual structures, and the locations of fuel and/or chemical storage tanks that may have been on a particular property. These maps were generally prepared for urban areas beginning in the middle to late 1880s and continuing generally into the 2000s.

A search of Sanborn Fire Insurance Maps for the Property and surrounding area was conducted by Environmental Data Resources, Inc. (EDR) of Milford, Connecticut. EDR provided a Sanborn report that stated fire insurance maps covering the target property were not found.

5.2 Historic City Directories

A search of City Directories for the Property and surrounding area was conducted by EDR. The City Directory Abstract report provided data from directories dated 1921 through 2012 in approximately four to six year intervals. According to the report, the Property was not identified in any of the directories searched.

5.3 Historical Topographic Map Review

A search of historical topographic maps for the Property was conducted by EDR. Topographic maps of the Property and vicinity for the years 1901, 1902, 1947, 1954, 1967, 1973, 1982, 1988, and 1997 were provided for review. The following pertinent details were obtained from review of the topographic maps:

YEAR(S)	DESCRIPTION	
1901, 1902	**Property**	The Property appears as undeveloped land.
	Adjacent Properties	The adjacent properties to the north, south, east and west appear as undeveloped land. The Cleveland National Forest is adjacent the Property to the east. A railroad line runs south of the Property in a northwest to southeasterly direction. The Santa Ana canyon and Santa Ana River run north of the Property in a northeast to southwesterly direction.
1947, 1954	**Property**	The Property appears as undeveloped land. Three small structures appear on the 1954 map in the northwest portion of the Property in the vicinity of the landing strip.
	Adjacent Properties	The adjacent properties to the north, south, east and west appear as undeveloped land. The Cleveland National Forest is adjacent the Property to the east. The city of Corona appears to the northeast. Roads and residential structures appear to the northeast.
1967, 1973, 1982, 1988, 1997	**Property**	The Property appears as undeveloped land. A landing strip is depicted on the northwest portion of the Property. Several small structures appear in the area of the landing strip.
	Adjacent Properties	The adjacent properties to the north, south, east and west appear as undeveloped land. The Cleveland National Forest is adjacent the Property to the east. The city of Corona appears to the northeast. Roads and residential structures appear to the northeast. Additional structures appear along roads to the northeast.

5.4 Aerial Photograph Review

A search of Aerial Photographs for the Property and surrounding area was conducted by EDR. EDR provided an Aerial Photography report of several historic photographs of the Property area from the years 1938, 1946, 1953, 1960, 1968, 1977, 1989, 1994, 2005, 2009, and 2010. The following pertinent details were obtained from review of the report:

YEAR(S)	DESCRIPTION	
1938, 1946, 1953, 1960, 1968	**Property**	The Property appears to be undeveloped.
	Adjacent Properties	The adjacent property to the north appears as cultivated agricultural land. A river is visible to the north east running in a north west to southeasterly direction. A highway is depicted west of the Property.
1977, 1989, 1994, 2005, 2009, & 2010	**Property**	The Property appears to be undeveloped.
	Adjacent Properties	The adjacent properties to the east and north appear with residential and commercial structures on them. A major interstate highway appears to the west of the Property.

5.5 Prior Investigation Reports

Phase I Environmental Site Assessment, for Approximately 400-Acre Annexation to the City of Corona for Frawest Housing, LLC, Located Along Mabey Canyon And Wardlow Canyon, Unicorporated Riverside County, California, prepared by LSA Associates, Inc., dated May 30, 2006. The previous Phase I identified the following findings:

- *An abandoned asphalt landing strip was observed approximately 1,400 feet in length, located on the southern side of Mabey canyon, south of Mabey Canyon Road and west of Mabey Canyon Debris Basin. The landing strip also contained a large concrete foundation, and several smaller foundations. Running approximately parallel to the north of the landing strip, between the landing strip and Mabey canyon Road, is a drainage channel partially constructed of old vehicles.*

The previous Phase I identified the following RECs:

- *The potential for the Site to have been impacted by vehicles buried in the central west portion of the Site for the purpose of creating a drainage channel.*

- *The potential for the Site to have been impacted by historical use as a landing strip. This potential impact comes from the potential for re-fueling and maintenance of aircraft at the Site, as well as from visual evidence of possible excavations of the northern side of the landing strip.*

- *A groundwater well may be located on the Site, north of the landing Strip.*

- *Several foundations for structures are located in the landing strip area of the Site. Because these former structures are likely to have been constructed prior to the ban of lead-based paints, the potential for the Site to have been impacted by lead-based paints in the areas of the former structures is considered high.*

5.6 Interviews

Hillmann was unable to interview a knowledgeable party associated with the Property's current or historical operations. This constitutes a data gap according to ASTM Standard E 1527-05 guidelines. However, due to the Property consisting of undeveloped land-residential lots, this data gap is not expected to result in any significant changes to the findings of this assessment.

5.7 Summary and Conclusion of Historic Use Research

The Property has been primarily undeveloped since at least at least the early 1900s. The northwest portion of the Property was used as landing strip from approximately the 1950s until at least the 1990s.

5.8 Data Gaps

Historic land use data prior to 1901 was not readily available at the time of the assessment. . It is Hillmann's opinion that further investigation would not result in any significant changes to the findings of this assessment.

6.0 SITE RECONNAISSANCE/INTERVIEWS

6.1 Interviews

Hillmann was unaccompanied onsite during the site reconnaissance. Any pertinent information obtained is referenced in the appropriate sections of this report.

6.2 Property Use

The Property consists of mostly undeveloped land. A historical landing strip is located on the southern side of Mabey Canyon. A concrete pad that may have been a plane hangar was present to the south of the landing strip.

6.3 Hazardous Substance/Petroleum Products Storage/Handling

No storage of hazardous substances or petroleum products was identified on the Property. Some evidence of spills or releases was observed in the area of the abandoned landing strip during the site reconnaissance.

6.4 Waste Generation, Storage and Disposal

Some isolated areas of nuisance dumping was observed visually during the site reconnaissance. Specifically, construction debris, car parts, chunks of concrete, and trash were observed in several locations on the Property. No other evidence of solid waste generation, storage or disposal was observed.

6.5 Waste Discharges

No waste discharges were identified at the Property.

6.6 Bulk Petroleum Storage Tanks

No evidence of active and/or inactive bulk petroleum storage tanks was noted at the Property. The Property was not listed on the regulatory databases of registered or leaking petroleum storage tanks.

6.7 Polychlorinated Biphenyls (PCBs)

No suspected PCB containing electrical or hydraulic equipment was identified on the Property.

6.8 Drains/Sumps

No interior floor drains were noted at the Property

6.9 Exterior Pits/Ponds/Lagoons

No evidence of exterior pits, ponds or lagoons was identified on the Property in connection with waste treatment or disposal. A drainage culvert was located on the south side of Mabey Canyon Road. The west portion of the culvert in the southern berm, multiple cars were observed to have been laid on their sides to construct the berm. The vehicles appeared to be from the 1940's-60's.

6.10 Stained Soil, Pavement/Stressed Vegetation

No evidence of stained soils or stressed vegetation was identified on the Property.

6.11 Drinking Water/Wells/Septic Systems

No evidence of wells or septic systems was identified at the Property.

7.0 NON-ASTM SCOPE CONCERNS

7.1 Asbestos-Containing Material (ACM)

There are no buildings on the Property. Therefore, a screening for ACM is not applicable to this assessment.

7.2 Lead-Based Paint

There are no buildings on the Property. Therefore, a screening for lead-based paint is not applicable to this assessment.

7.3 Radon

Radon is a naturally occurring, colorless, odorless gas that is a byproduct of the decay of radioactive materials potentially present in bedrock and soil. Radon gas may enter the lowest level of a building through floor cracks, structural joints or plumbing conduits. The United States Environmental Protection Agency (USEPA) guidance level for annual residential exposure to radon is 4.0 picocuries per liter of air (pCi/L). The guidance level is not a regulatory requirement for private owners of commercial real estate, but is commonly used for comparison purposes to suggest whether further action at a building may be prudent.

Based on information obtained from data obtained by the USEPA, the Property is located in an area with a low potential for radon concentrations that exceed current USEPA action guidelines. The County of Riverside is classified as Zone 3, or 'low risk' area for radon.

7.4 Mold

No structures are present on the Property. Therefore, a cursory screening for evidence of excessive or amplified mold growth or for conditions favorable for mold growth is not applicable to this assessment.

8.0 REGULATORY RECORD REVIEWS

A search of environmental regulatory databases, by service from Environmental Data Resources of Milford, CT, was conducted in accordance with the requirements of the ASTM. Hillmann also reviewed the "unmappable" listings within the database report, cross-referencing available address information and facility names. Unmappable sites are listings that cannot be plotted with confidence, but are identified as being located within the general area of the Property based on the partial street address, city name or zip code. In general, a listing cannot be mapped due to inaccurate or incomplete address information in the database that was supplied by the corresponding regulatory agency. Any listings from the unmappable summary that were identified by Hillmann as a result of the area reconnaissance and/or cross-referencing to mapped listings are included in the corresponding database discussion within this section.

REGULATORY DATABASE	SEARCH DISTANCE	ON-SITE LISTINGS	ADJ. PROPERTY LISTINGS	TOTAL WITHIN SEARCH DISTANCE
Fed. NPL	1-mile	0	0	0
Fed. Delisted NPL	½-mile	0	0	0
Fed. CERCLIS	½-mile	0	0	0
Fed. CERCLIS-NFRAP	½-mile	0	0	0
Fed. RCRA CORRACTS	1-mile	0	0	0
Fed. RCRA TSD	½-mile	0	0	0
Fed. RCRA LQG & SQG (Generators)	Site & Adj.	0	0	
Fed. ERNS	Site	0		
State & Tribal SHWS equiv. NPL & CERCLIS	1-mile	0	0	0
State & Tribal SWF/LF	½-mile	0	0	0
State & Tribal LUST	½-mile	0	0	0
State & Tribal Registered Stor. Tank	Site & Adj.	0	0	
State & Tribal ENG. Control List	½-mile	0	0	0
State & Tribal INST. Control List (AUL)	½-mile	0	0	0
State & Tribal VCP	½-mile	0	0	0
State & Tribal Eng. Brownfields (BF)	½-mile	0	0	0
Spills	Site	0		

- *The results of the review for each database are discussed below. The locations for the facilities discussed in this section are shown on the figures in the EDR report, included as Appendix E.*

- *According to the EPA Policy Toward Owners of Property Containing Contaminated Aquifers, dated July 3, 1995, the EPA will not take enforcement action against a property owner who owns property under which is an aquifer contaminated by subsurface migration from an off-site source or sources. Therefore, the Subject Property owner would not be liable for any contamination of the underlying aquifer that was attributed to an off-site source.*

8.1 On-Site Database Listings

The Property was not identified on any of the regulatory databases searched.

8.2 Adjoining Property Database Listings

No adjoining properties were identified on the regulatory databases searched.

8.3 Federal Agency Record Review

EPA - The National Priorities List (NPL), also known as the Superfund list, is the United States Environmental Protection Agency (EPA) listing of uncontrolled or abandoned hazardous waste sites. These sites are targeted for possible long-term remedial action under the Superfund Act of 1980. The list is primarily based on the EPA's Hazardous Ranking System.

- No NPL listings were identified within a one-mile radius of the subject property.

EPA – Delisted NPL Site List (DNPL) provides a list of sites formerly listed on the NPL that have since been "de-listed" after the EPA has determined that no further response is appropriate.

- No DNPL listings were identified within a ½-mile radius of the Property.

EPA - The Comprehensive Environmental Response, Compensation, and Liability Information System (CERCLIS) is the EPA database of known or suspected uncontrolled or abandoned hazardous waste sites. These sites have either been investigated, or are currently under investigation by the EPA for the release or threatened release of hazardous substances.

- No CERCLIS listings were identified within a ½-mile radius of the Property.

EPA – CERCLIS-NFRAP (No Further Remedial Action Planned) is the EPA database of archived sites that have been removed and archived from the inventory of CERCLIS sites. Archived status indicates that, to the best of EPA's knowledge, assessment at a site has been completed and that the EPA has determined no further steps will be taken to list this 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.

- No CERCLIS-NFRAP listings were identified within a ½-mile radius of the Property.

EPA - The Resource Conservation and Recovery Information System (RCRIS) is a database of facilities, which generate or treat, store or dispose of EPA regulated hazardous waste, or meet other applicable requirements of the Resource Conservation and Recovery Act (RCRA). Inclusion on this database does not imply that mishandling or a release of hazardous waste has occurred at the facility. RCRIS categories are as follows:

Corrective Action (CORRACTS) list is a list of hazardous waste treatment, storage or disposal facilities and other RCRIS facilities (due to past interim status or storage of hazardous waste

beyond 90 days) that have been notified by the US EPA to undertake corrective action under RCRA.

- No CORRACTS listings were identified within a one-mile radius of the subject Property.

Treatment, Storage, and Disposal Facilities (TSD). Facilities listed under TSD are sites that treat, store, and/or dispose of EPA regulated hazardous waste.

- No TSD listings were identified within a ½-mile radius of the Property.

Large Quantity Generators (LQG). Facilities listed under LQG either generate more than 1000 Kilograms (kg) of EPA regulated hazardous waste per month, or meet other applicable requirements of RCRA.

- No adjoining properties were identified on the LQG database.

Small Quantity Generators (SQG). Facilities listed under SQG either generate from 100 kilograms (kg) to 1000 kg of EPA regulated hazardous waste per month, or meet other applicable requirements of RCRA.

- No adjoining properties were identified on the SQG database.

EPA - The Emergency Response Notification System (ERNS) is a national database used to store information concerning the sudden and/or accidental release of hazardous substances, including petroleum in quantities greater than the reportable quantity, as maintained at the National Response Center. The database contains preliminary information from spill reports made to various federal departments including the EPA.

- No listings were identified for the Property.

8.4 State Agency Record Review

State Hazardous Waste Sites (SHWS) database contains potential or confirmed hazardous substance release properties.

- No SHWS listings were identified within a one-mile radius of the subject Property.

Solid Waste Facility/Landfill (SWF/LF) list provides information on the location of registered state landfills and associated transfer facilities.

- No SWF/LF listings were identified within a ½-mile radius of the subject Property.

Leaking Underground Storage Tank's (LUST) is a comprehensive listing of all reported active and inactive leaking storage tank sites.

- No LUST listings were identified within a ½-mile radius of the Property.

Registered Storage Tank Database is the listing of registered storage tank sites. This

includes the UST database.

- The Property and adjoining properties were not identified on the UST database.

Engineering Controls Site Listing (ENG Controls) list provides information on the location of remediation sites using engineering controls as part of the response action. 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.

- No ENG Controls listings were identified within a ½-mile radius of the subject Property.

Institutional Controls Site Listing (INST Controls) list provides information on the location of remediation sites using institutional controls as part of the response action. 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.

- No INST Controls listings were identified within a ½-mile radius of the Property.

Voluntary Cleanup Program (VCP) and **Independent Cleanup Report (ICR)** lists provide information on the location of sites involved in a Voluntary Cleanup or similar program. Under a Voluntary Cleanup Program, a property owner will voluntarily enter into an agreement with a state or local environmental regulatory agency to conduct an investigation and remediation for specific area(s) of concern.

- No VCP or ICR sites were identified within a ½-mile radius of the Property.

Brownfields (BF) list provides information on the location of sites involved in a state or local Brownfields program.

- No Brownfield listings were identified within a ½-mile radius of the Property.

Review of the remaining sites identified within the ASTM search parameters did not identify any site that is considered to be a REC in connection with the Property.

8.5 Local Government Agencies

City of Corona

Fire Department

Hillmann contacted the City of Corona Fire Department to determine if any records were on file for the Property's addresses. As of the date of this report, Hillmann has not received a response from the City of Corona Fire Department. A photocopy of the request is located in Appendix D.

Riverside County

Fire Department

Hillmann contacted the Riverside County Fire Department to determine if any records were on file for the Property's addresses. As of the date of this report, Hillmann has not received a response from the Riverside County Fire Department. A photocopy of the request is located in Appendix D.

Riverside County

Tax Assessor's Office

Property information was researched at the Riverside County Tax Assessor's Office in Riverside, California during the site assessment. The current Assessor's Parcel Numbers (APN) for the Property includes the following: 275070003, 275080010, 275040006, 275040011, 275050004, 275040015, & 275030006. According to Tax Assessor's records, the current Property building owner is Richland Communities, Inc.

Riverside County Department of Environmental Health

Hillmann contacted the Riverside County Department of Environmental Health in order to determine if any UST or hazardous materials records were on file for the Property's addresses. As of the date of this report, no response has been received by the Riverside County Department of Environmental Health.

State of California

South County Air Quality Management District

Hillmann contacted the South County Air Quality Management District (SCAQMD) in order to determine if there are any records of applications, permits to operate, equipment list reports, notices of violations, notices to comply, complaints, site inspection reports, emissions summaries, source test reports, air monitoring data, asbestos notifications, facility potential to emit, facility positive balance or toxic health risk assessments were on file for the Property's address. As of the date of this report, no response has been received by the SCAQMD.

State of California

Department of Toxic Substances Control- Chatsworth & Cypress Regional Offices

Hillmann contacted the State of California Department of Toxic Substances Control (DTSC) in order to determine if any records were on file for the property's address. According to the DTSC no such records exist for the Property.

State of California

Regional Water Quality Control Board – Santa Ana & San Diego Regional Offices

Hillmann contacted the State of California Regional Water Quality Control Board (RWQCB) in order to determine if any records of underground storage tanks (USTs) or groundwater contamination were on file for the Property's address. As of the date of this report, no response has been received by the RWQCB. According to the online geotracker, no records exist for the Property.

9.0 ENVIRONMENTAL PROFESSIONAL STATEMENT

I declare that, to the best of my professional knowledge and belief, I meet the definition of *Environmental Professional* as defined in §312.10 of 40 CFR 312. I have the specific qualifications based on education, training and experience to assess a *property* of the nature, history and setting of the subject Property. Hillmann has developed and performed all appropriate inquiries in conformance with the standards and practices set forth in 40 CFR Part 312.

_____

David Rutherford
Environmental Professional

10.0 REFERENCES

EDR City Directory Abstract Report, Environmental Data Resources, 2013

EDR Radius Map Report with GeoCheck, Environmental Data Resources, 2013

EDR Sanborn Map Report, Environmental Data Resources, 2013

EDR Historical Topographic Map Report, Environmental Data Resources, 2013

EDR Aerial Photography Print Service, Environmental Data Resources, 2013

11.0 APPENDICES

Appendix A	Site Photographs
Appendix B	Maps/Diagrams
Appendix C	Historical Land Use Documentation/Maps
Appendix D	Reference Documents / Laboratory Results (if applicable)
Appendix E	Regulatory Database Report

APPENDIX A

SITE PHOTOGRAPHS

PHOTO LOG
"Skyline Heights"- SW of Corona
Riverside County, CA
C3-5564

1. Viewing northwest from E. Foothill

2. Trash on trail near Trudy Way

3. Entrance to Skyline Trail-end of E. Foothill

4. Bee hives-north of Trudy Way

5. Trash on trail

6. Trash near entrance to Skyline Trail

PHOTO LOG
"Skyline Heights"- SW of Corona
Riverside County, CA
C3-5564

7. Metal culvert pipe near center of Property

8. View of E. Foothill from site

9. View of Property from top of hill near Entrance to Skyline Trail

10. View of Standard Pacific's construction trailer on Trudy way

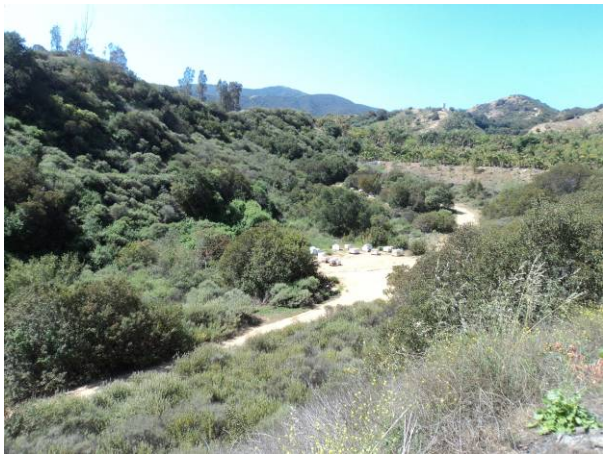
11. View of Property from end of Trudy Way

12. View of E. Foothill from top of Property

PHOTO LOG
"Skyline Heights"- SW of Corona
Riverside County, CA
C3-5564

13. View of the Property near Meadowcrest Road

14. View of drainage channel along perimeter of Property & Meadowcrest Road


15. Interior of Property

16. Dirt road along hill by Quality Growers

17. Interior of Property

18. Quality Growers barn near Meadowcrest Road

PHOTO LOG
"Skyline Heights"- SW of Corona
Riverside County, CA
C3-5564

19. Viewing from Property towards Mangular Ave.

20. Dirt road from Quality Growers to top of hill on Property

21. View of entrance to Quality Growers (perimeter of Property)

22. View of interior of Property (viewing north)

23. View of entrance to Quality Growers dirt road (runs to top of hill)

24. Interior of Property (concrete water run-off channel)

APPENDIX B

MAPS/DIAGRAMS

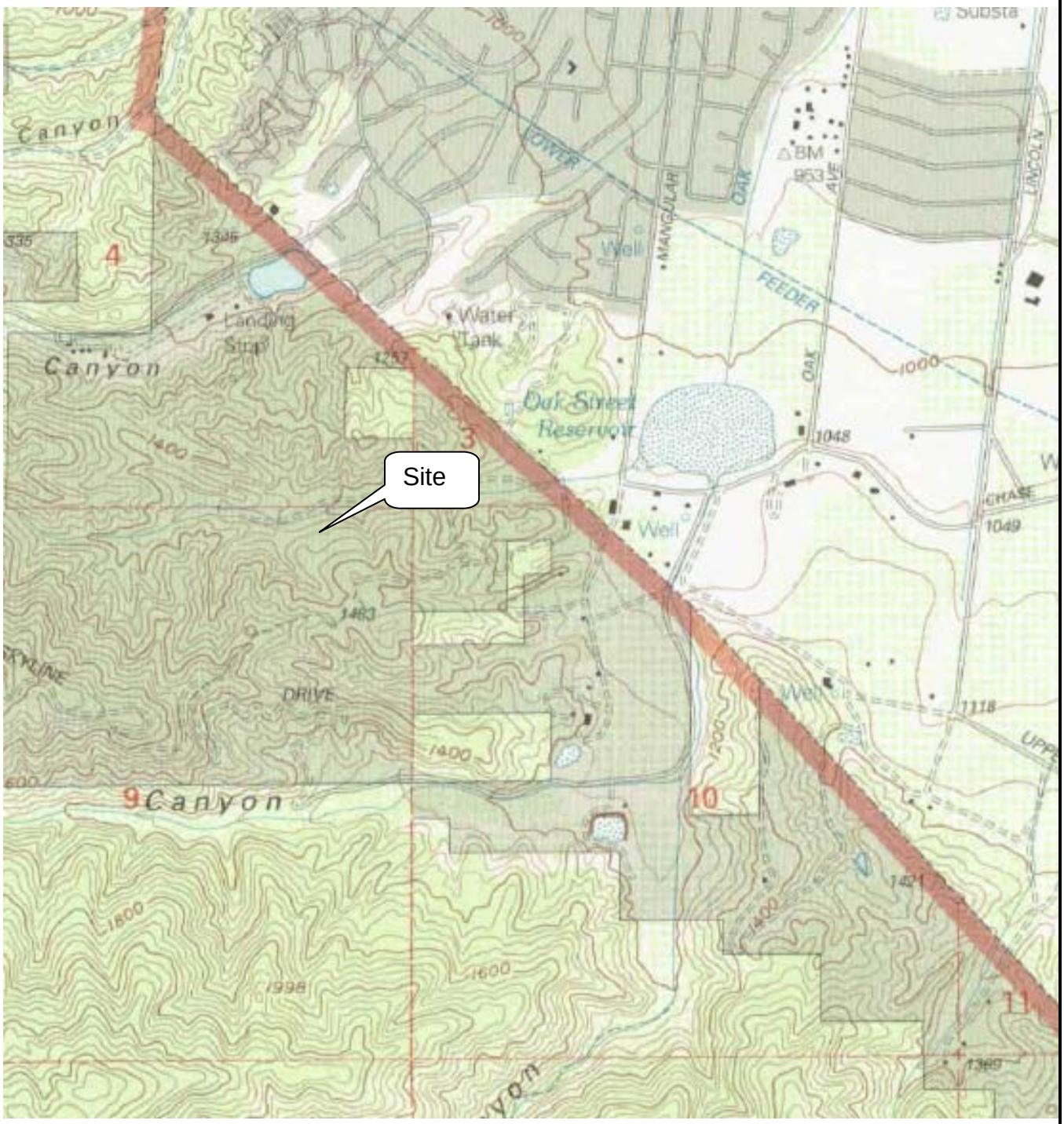


Figure 1: SITE VICINITY MAP	SCALE: (Not to Scale)	N ↑

HILLMANN CONSULTING

Project Location:	"Skyline Heights"- SW of Corona Riverside County, CA
Project No.:	C3-5564

Figure 2: SITE DIAGRAM	SCALE: (Not to Scale)	N ↑
HILLMANN CONSULTING	**Project Location:**	"Skyline Heights"- SW of Corona Riverside County, CA
	Project No.:	C3-5564

APPENDIX C

HISTORICAL LAND USE DOCUMENTATION/MAPS

Skyline Heights
Skyline Heights
Corona, CA 92882

Inquiry Number: 3552619.5
March 25, 2013

The EDR Aerial Photo Decade Package

EDR® Environmental Data Resources Inc

440 Wheelers Farms Road
Milford, CT 06461
800.352.0050
www.edrnet.com

EDR Aerial Photo Decade Package

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.

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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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Date EDR Searched Historical Sources:

Aerial Photography March 25, 2013

Target Property:

Skyline Heights

Corona, CA 92882

Year	***Scale***	***Details***	***Source***
1931	Aerial Photograph. Scale: 1"=500'	Flight Year: 1931 Best Copy Available from original source	Fairchild
1938	Aerial Photograph. Scale: 1"=500'	Flight Year: 1938	Laval
1953	Aerial Photograph. Scale: 1"=500'	Flight Year: 1953	Pacific Air
1960	Aerial Photograph. Scale: 1"=500'	Flight Year: 1960	Fairchild
1968	Aerial Photograph. Scale: 1"=500'	Flight Year: 1968	Teledyne
1977	Aerial Photograph. Scale: 1"=500'	Flight Year: 1977	Teledyne
1989	Aerial Photograph. Scale: 1"=500'	Flight Year: 1989	USGS
1994	Aerial Photograph. Scale: 1"=500'	/DOQQ - acquisition dates: 1994	EDR
1994	Aerial Photograph. Scale: 1"=500'	/DOQQ - acquisition dates: 1994	EDR
1994	Aerial Photograph. Scale: 1"=500'	/DOQQ - acquisition dates: 1994	EDR
1994	Aerial Photograph. Scale: 1"=500'	/DOQQ - acquisition dates: 1994	EDR
2005	Aerial Photograph. Scale: 1"=500'	Flight Year: 2005	EDR
2005	Aerial Photograph. Scale: 1"=500'	Flight Year: 2005	EDR
2005	Aerial Photograph. Scale: 1"=500'	Flight Year: 2005	EDR
2005	Aerial Photograph. Scale: 1"=500'	Flight Year: 2005	EDR
2006	Aerial Photograph. Scale: 1"=500'	Flight Year: 2006	EDR
2006	Aerial Photograph. Scale: 1"=500'	Flight Year: 2006	EDR
2006	Aerial Photograph. Scale: 1"=500'	Flight Year: 2006	EDR
2006	Aerial Photograph. Scale: 1"=500'	Flight Year: 2006	EDR

Year	*Scale*	*Details*	*Source*
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2009	Aerial Photograph. Scale: 1"=500'	Flight Year: 2009	EDR
2009	Aerial Photograph. Scale: 1"=500'	Flight Year: 2009	EDR
2009	Aerial Photograph. Scale: 1"=500'	Flight Year: 2009	EDR
2010	Aerial Photograph. Scale: 1"=500'	Flight Year: 2010	EDR
2010	Aerial Photograph. Scale: 1"=500'	Flight Year: 2010	EDR
2010	Aerial Photograph. Scale: 1"=500'	Flight Year: 2010	EDR
2010	Aerial Photograph. Scale: 1"=500'	Flight Year: 2010	EDR

INQUIRY #: 3552619.5
YEAR: 1931
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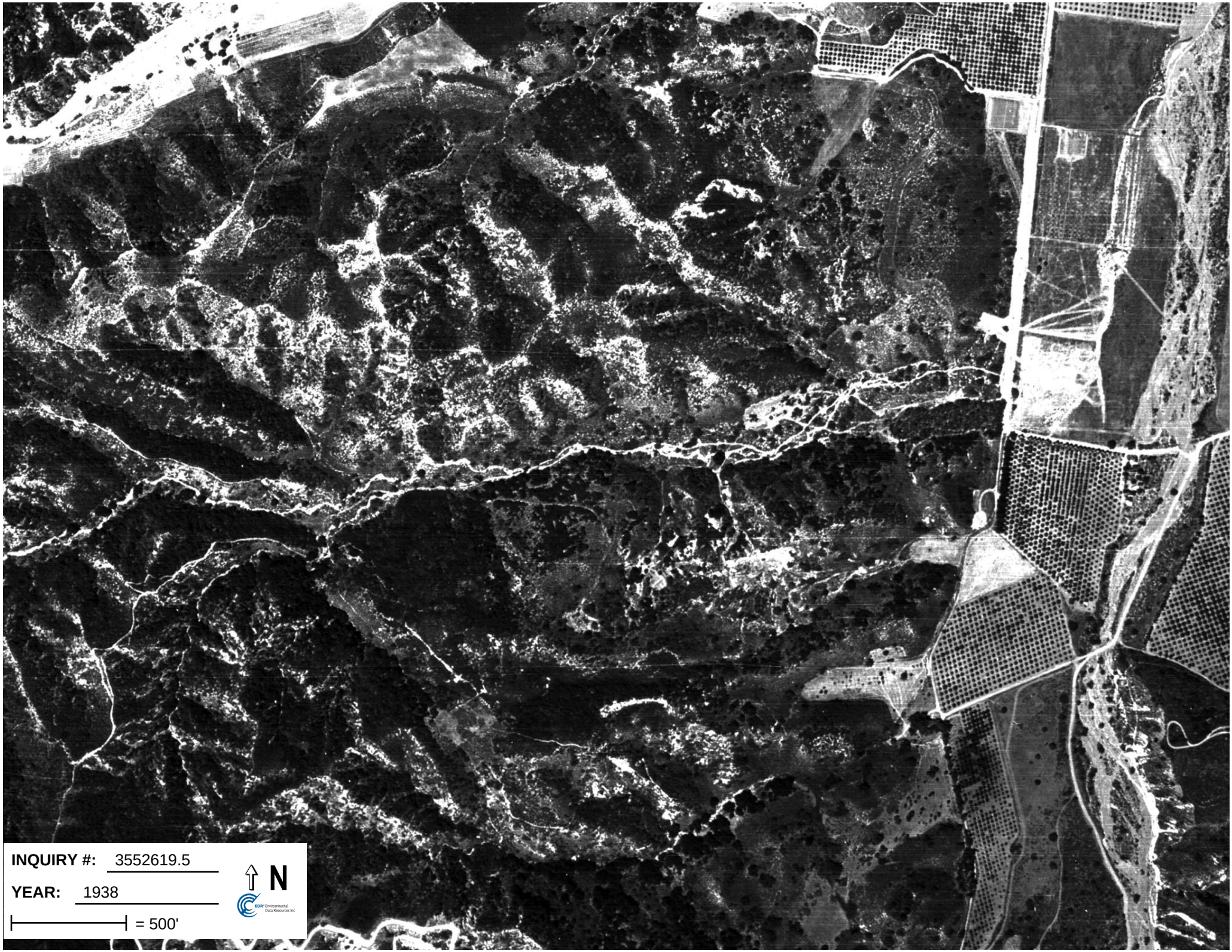
EDR Environmental Data Resources Inc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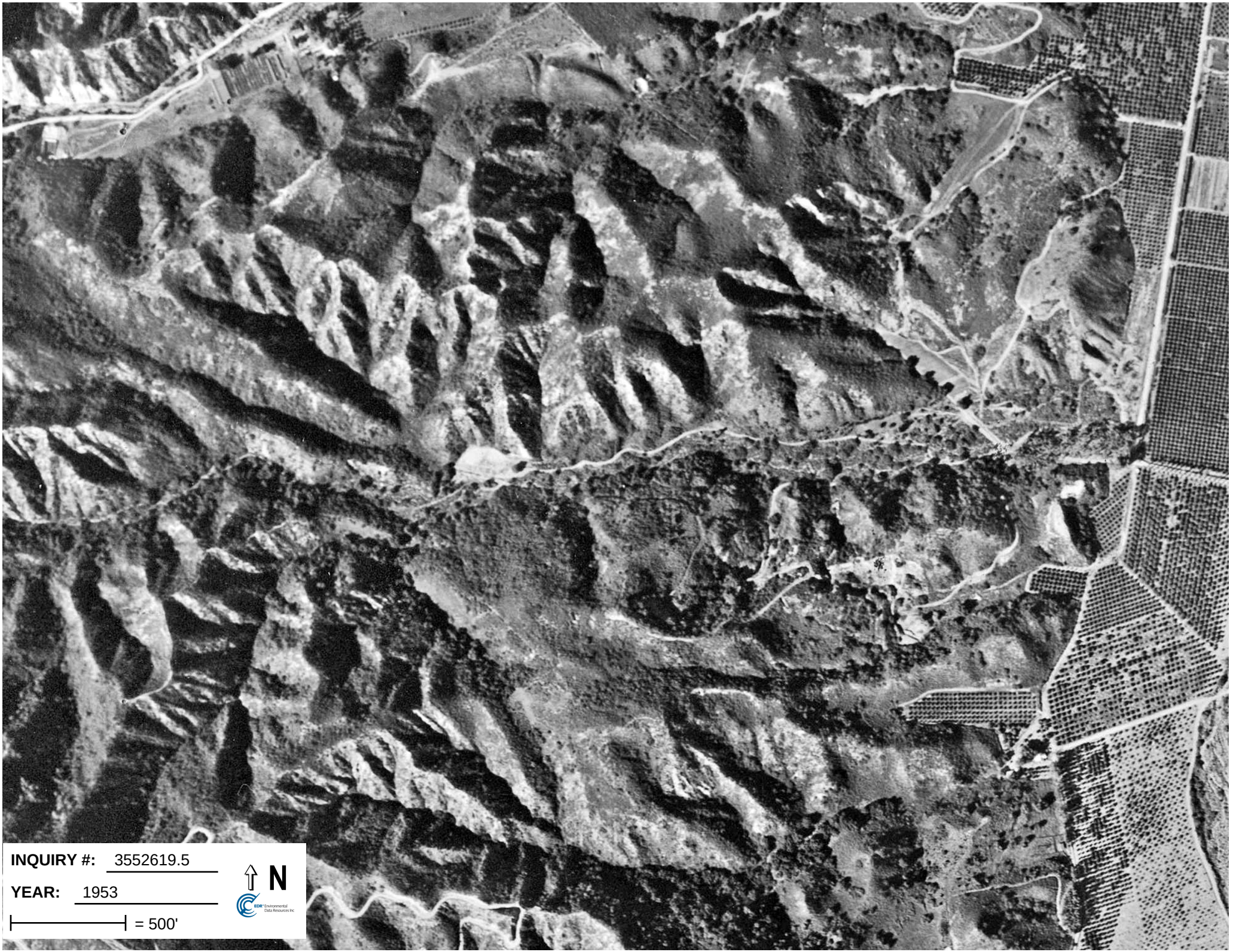
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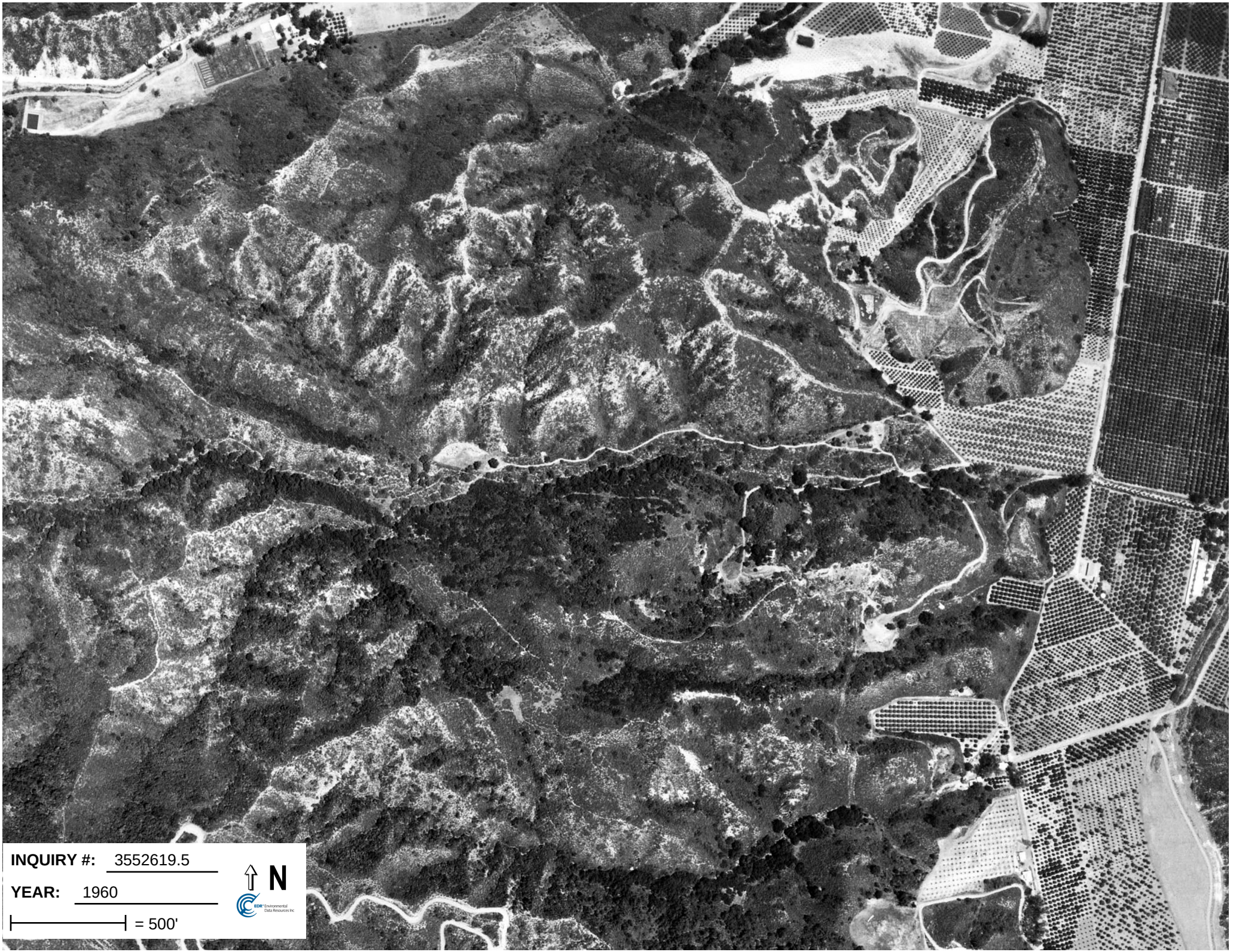
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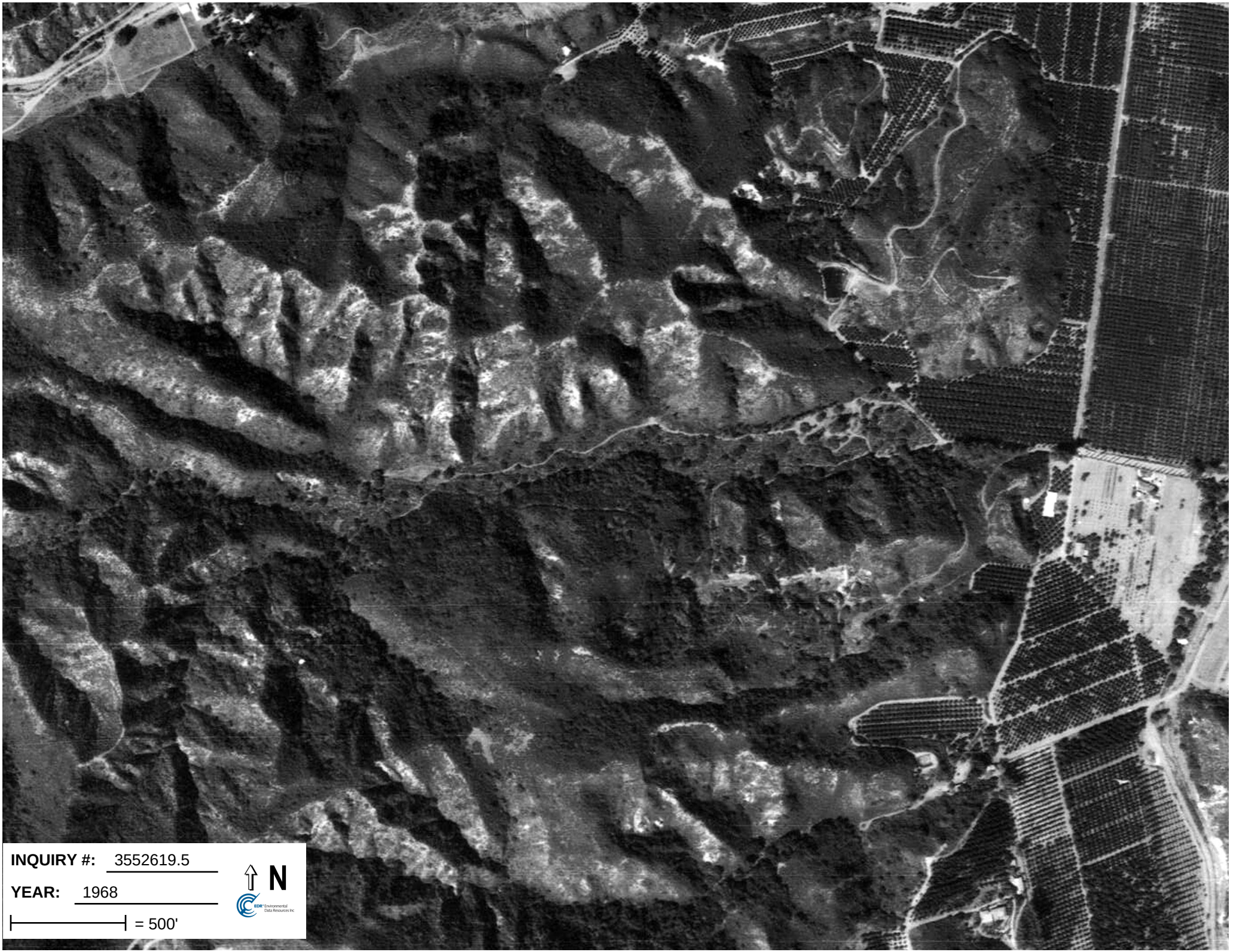
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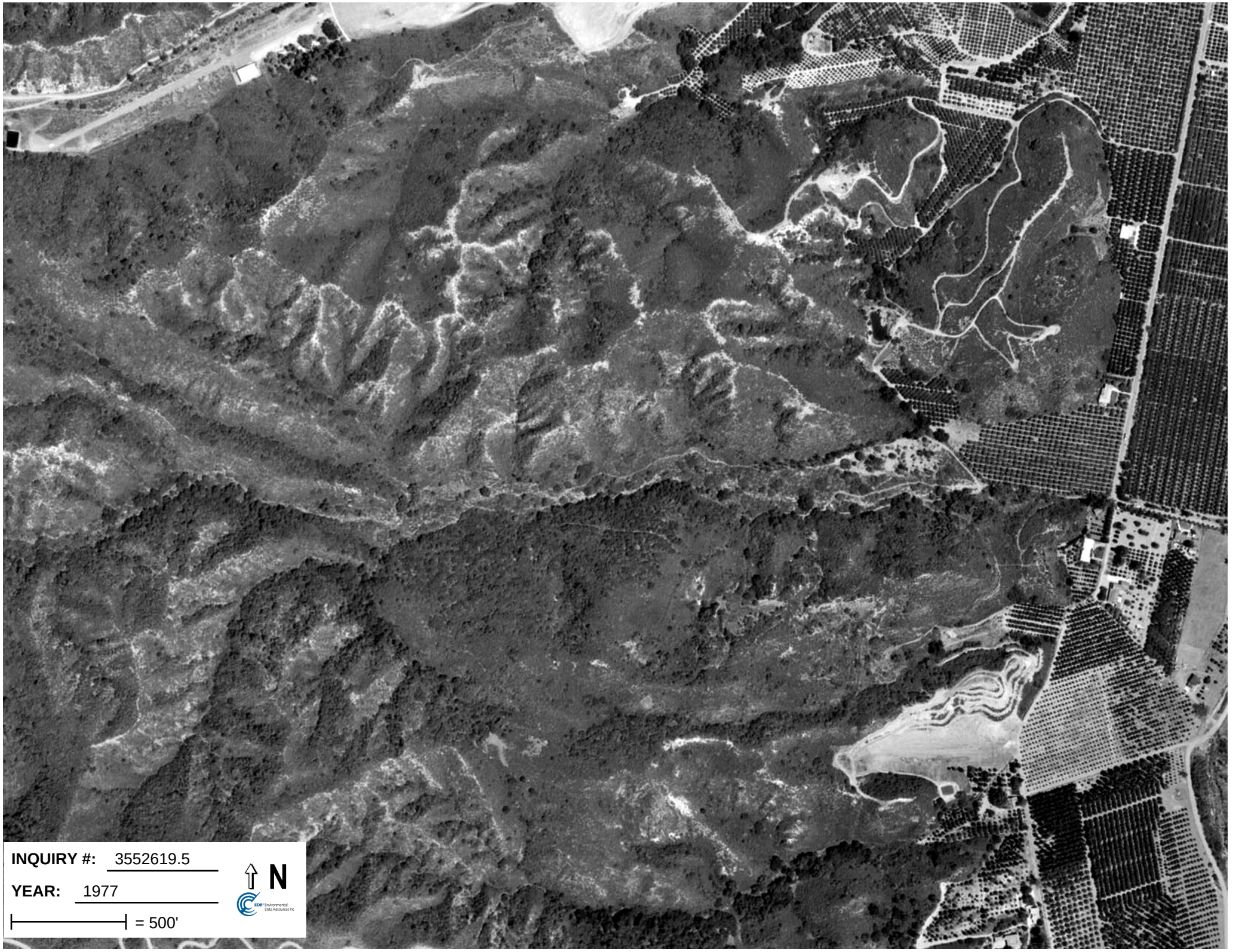
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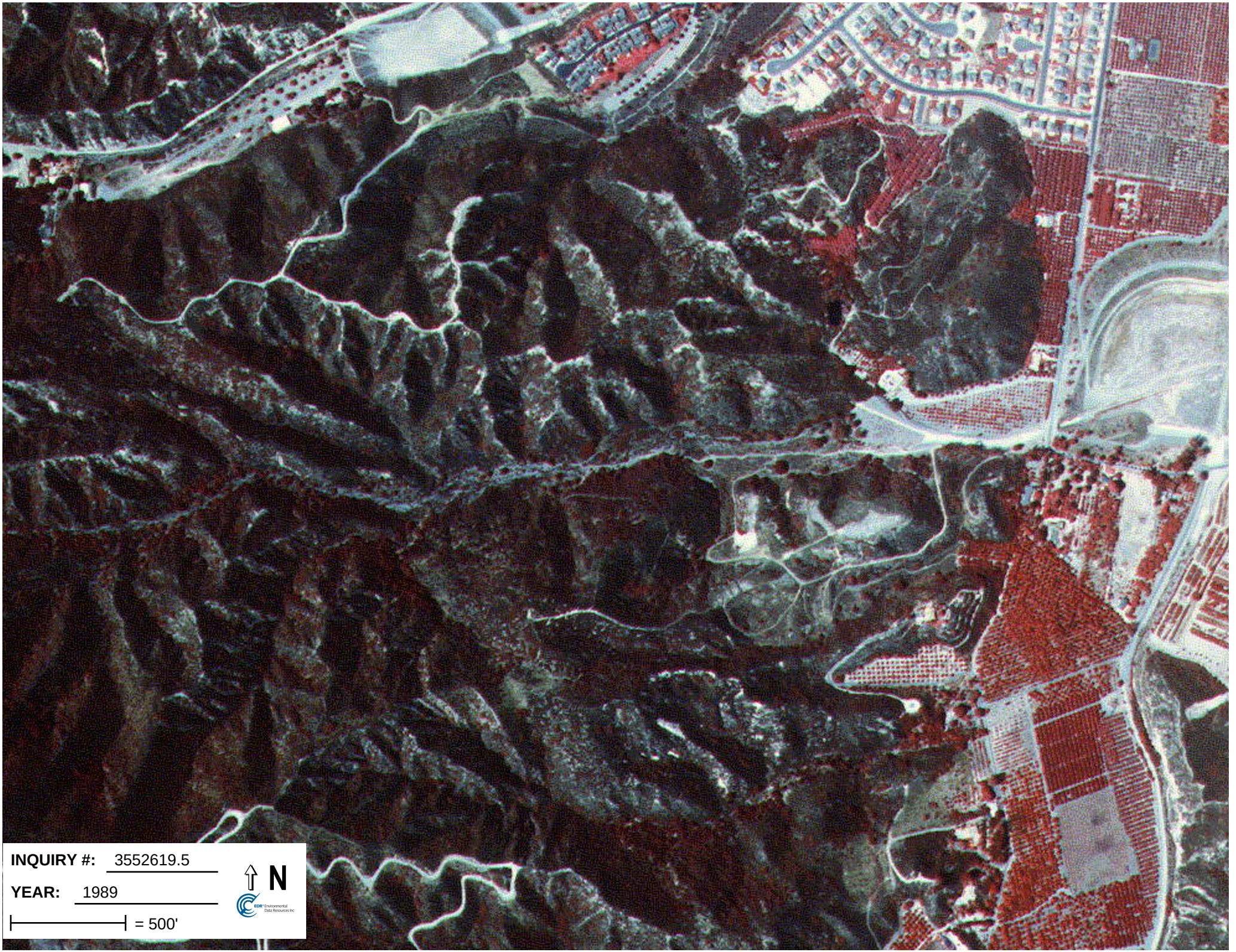
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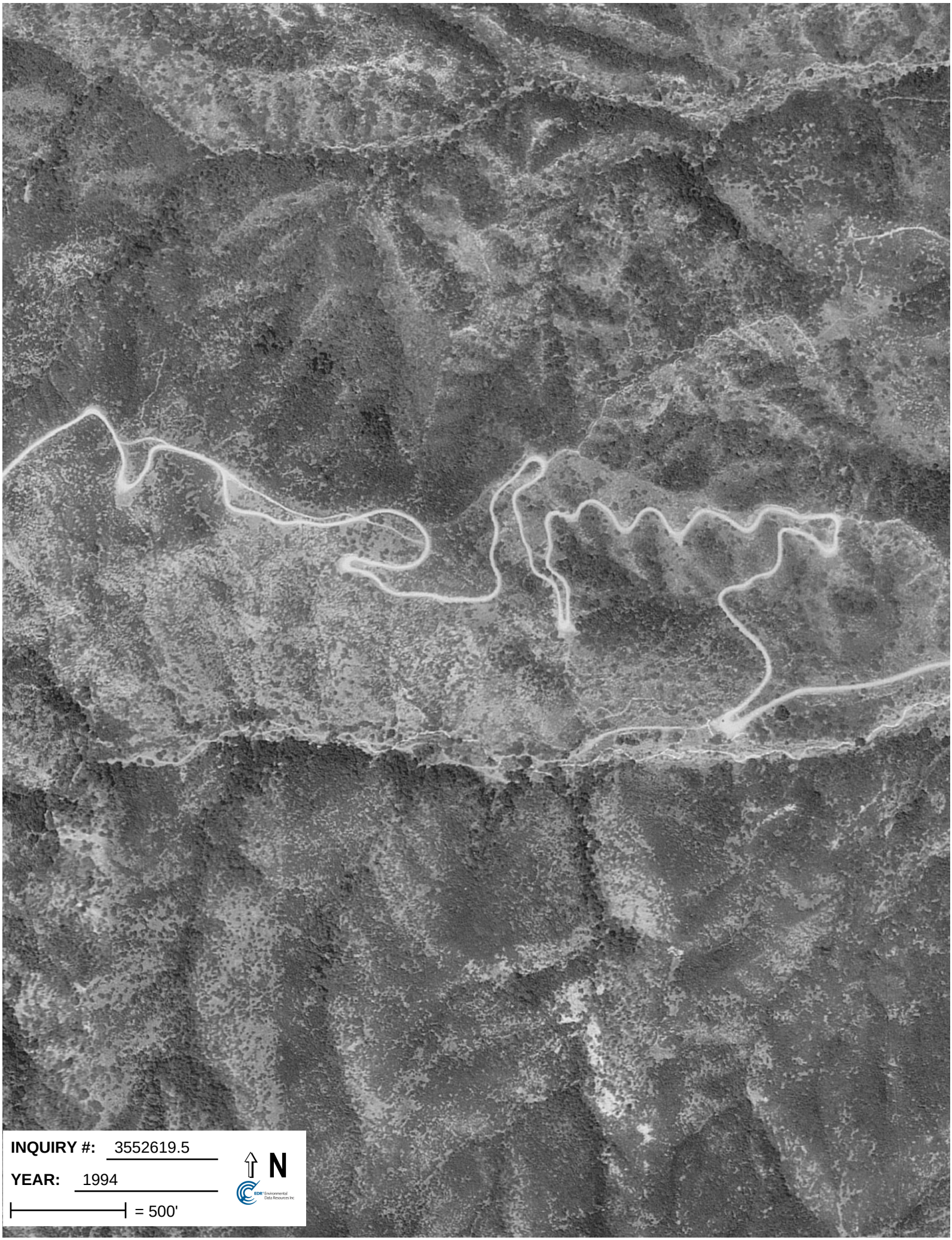
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EDR Environmental Data Resources Inc

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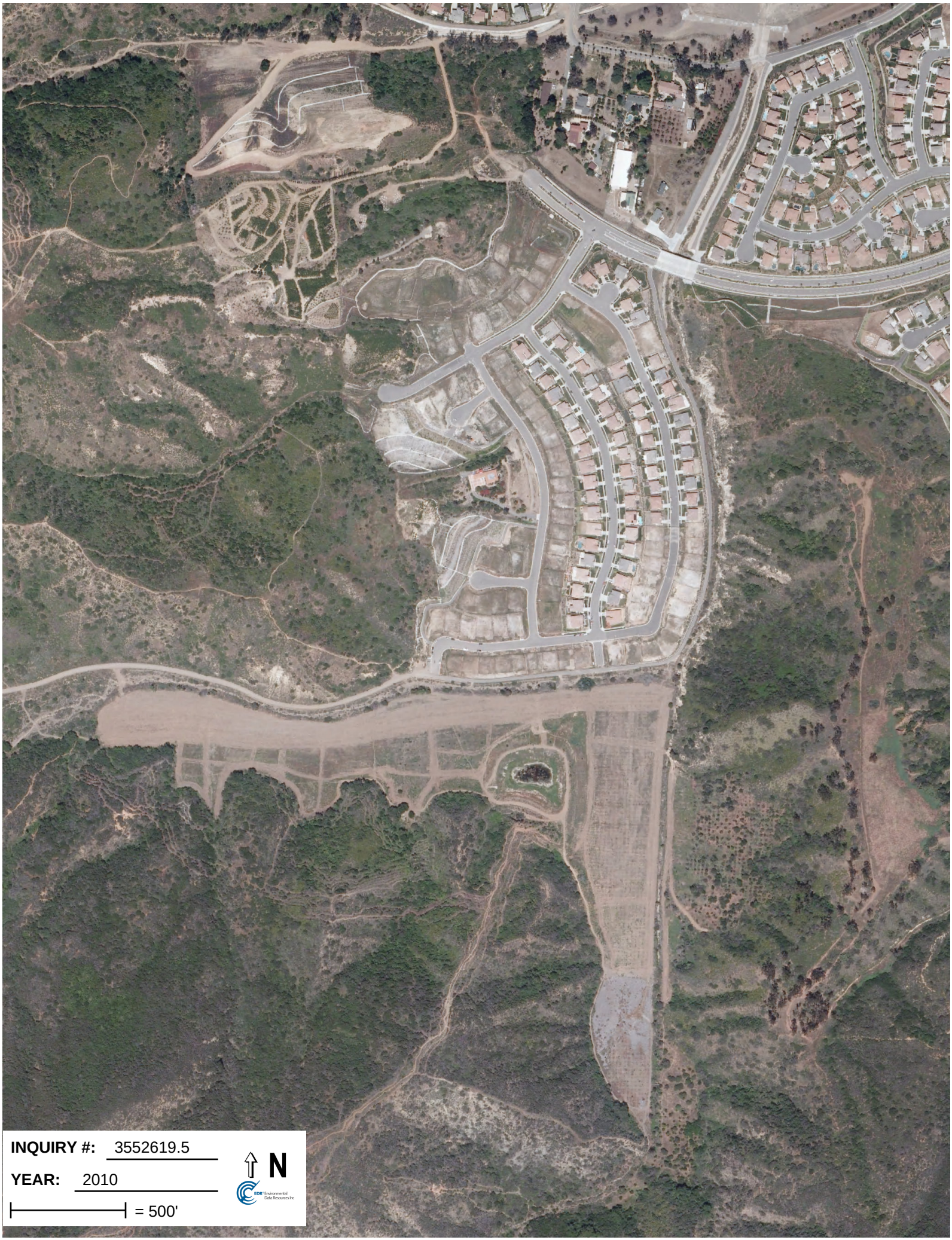
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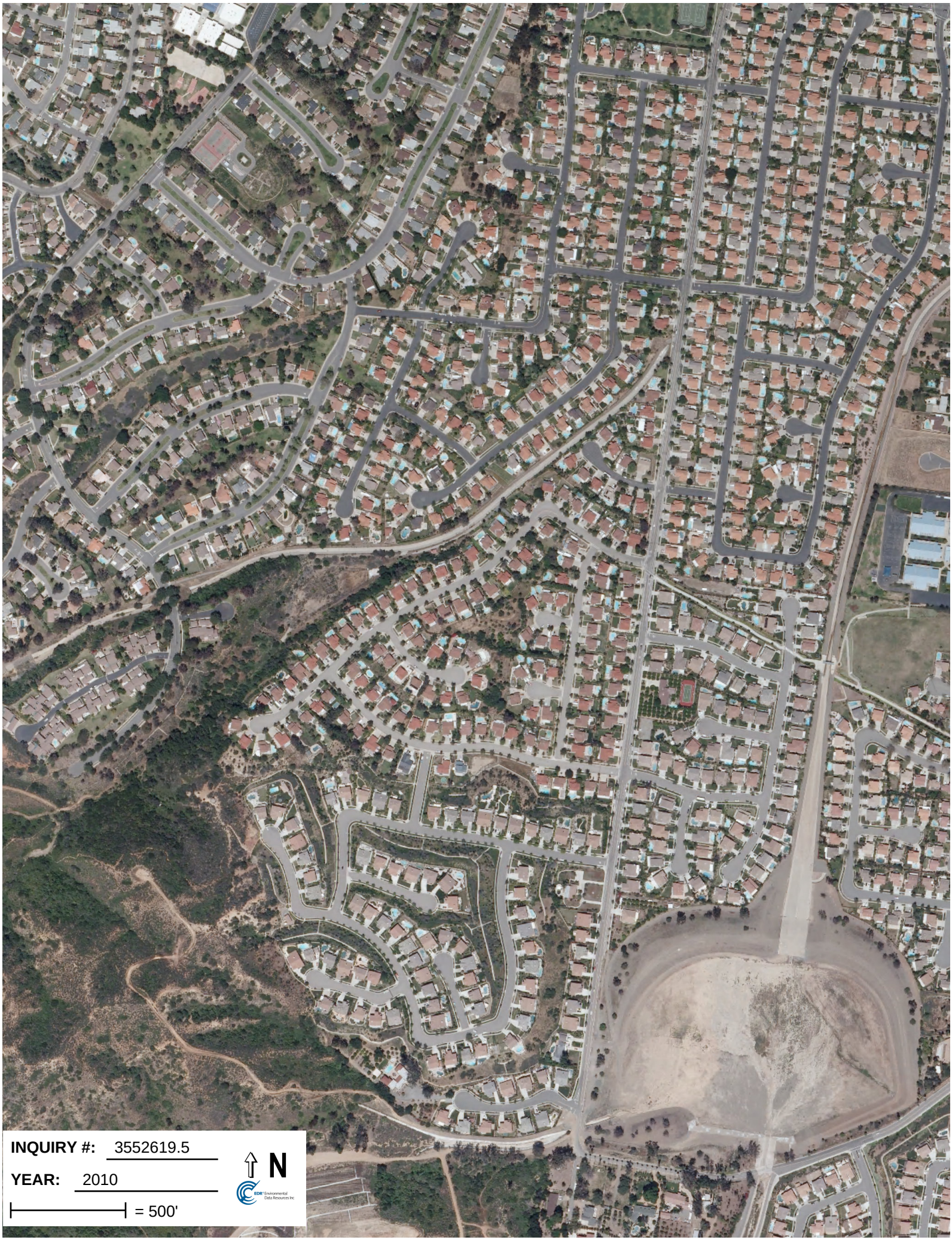
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YEAR: 2010
= 500'
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Skyline Heights
1431 Browning Circle
Corona, CA 92882

Inquiry Number: 3552619.6
March 20, 2013

The EDR-City Directory Abstract

Environmental Data Resources Inc

440 Wheelers Farms Road
Milford, CT 06461
800.352.0050
www.edrnet.com

TABLE OF CONTENTS

SECTION

Executive Summary

Findings

City Directory Images

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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 Abstract 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 Abstract includes a search and abstract of available city directory data. For each address, the directory lists the name of the corresponding occupant at five year intervals.

Business directories including city, cross reference and telephone directories were reviewed, if available, at approximately five year intervals for the years spanning 1921 through 2012. This report compiles information gathered in this review by geocoding the latitude and longitude of properties identified and gathering information about properties within 660 feet of the target property.

A summary of the information obtained is provided in the text of this report.

RESEARCH SUMMARY

The following research sources were consulted in the preparation of this report. An "X" indicates where information was identified in the source and provided in this report.

Year	Source	TP	Adjoining	Text Abstract	Source Image
2012	Cole Information Services	-	X	X	-
2007	Cole Information Services	-	X	X	-
2002	SBC PACIFIC BELL	-	X	X	-
2001	Haines & Company, Inc.	-	X	X	-
1996	Pacific Bell	-	-	-	-
1993	Pacific Bell	-	-	-	-
1990	Pacific Bell	-	-	-	-
1986	Pacific Bell Yellow Pages	-	-	-	-
1981	Pacific Telephone	-	-	-	-
1977	Pacific Telephone	-	-	-	-
1970	Pacific Telephone	-	-	-	-
1967	Luskey Brothers & Co.	-	-	-	-
1966	Luskey Brothers & Company Inc.	-	-	-	-
1961	Luskey Brothers & Co.	-	-	-	-
1960	Luskeys Brothers & Co., Publishers	-	-	-	-
1956	Luskey Brothers & Co.	-	-	-	-
1955	Luskeys Brothers & Co., Publishers	-	-	-	-
1951	Los Angeles Directory Co.	-	-	-	-
1946	Southern California Telephone Company	-	-	-	-
1945	Los Angeles Directory Co.	-	-	-	-
1941	Pacific Directory Co.	-	-	-	-
1939	Los Angeles Directory Co.	-	-	-	-
1936	Los Angeles Directory Co.	-	-	-	-
1931	Southern California Telephone Co.	-	-	-	-
1930	Los Angeles Directory Co.	-	-	-	-

EXECUTIVE SUMMARY

Year	Source	TP	Adjoining	Text Abstract	Source Image
1927	Los Angeles Directory Co.	-	-	-	-
1925	Los Angeles Directory Co.	-	-	-	-
1924	Kaasen Directory Co.	-	-	-	-
1921	Riverside Directory Co.	-	-	-	-

FINDINGS

TARGET PROPERTY INFORMATION

ADDRESS

1431 Browning Circle
Corona, CA 92882

FINDINGS DETAIL

Target Property research detail.

FINDINGS

ADJOINING PROPERTY DETAIL

The following Adjoining Property addresses were researched for this report. Detailed findings are provided for each address.

BROWNING CIR

2132 BROWNING CIR

Year	Uses	Source
2012	SERVPRO	Cole Information Services

2142 BROWNING CIR

Year	Uses	Source
2002	Daniel Jim	SBC PACIFIC BELL
	Daniell Jim	SBC PACIFIC BELL

2143 BROWNING CIR

Year	Uses	Source
2002	Jessamy Shaundala & Tyrone	SBC PACIFIC BELL

BROWNING ST

2122 BROWNING ST

Year	Uses	Source
2001	LISCHi James	Haines & Company, Inc.

2123 BROWNING ST

Year	Uses	Source
2001	HUTTONJeffeiy	Haines & Company, Inc.

2133 BROWNING ST

Year	Uses	Source
2001	LOWE Ronald	Haines & Company, Inc.

2142 BROWNING ST

Year	Uses	Source
2001	DANIELLJim	Haines & Company, Inc.
	DANIELLJim	Haines & Company, Inc.

2143 BROWNING ST

Year	Uses	Source
2001	OJESSAMYTyrone	Haines & Company, Inc.

FINDINGS

Year	Uses	Source
2001	JESSAMYShau	Haines & Company, Inc.

2152 BROWNING ST

Year	Uses	Source
2001	LALIBERTEJames	Haines & Company, Inc.

2153 BROWNING ST

Year	Uses	Source
2001	THOMASDavrd	Haines & Company, Inc.

CORNERSTONE CIR

911 CORNERSTONE CIR

Year	Uses	Source
2002	Thornton Martin	SBC PACIFIC BELL
	Thornton Martin	SBC PACIFIC BELL

915 CORNERSTONE CIR

Year	Uses	Source
2002	Huelsman David	SBC PACIFIC BELL

CORNERSTONE WAY

935 CORNERSTONE WAY

Year	Uses	Source
2007	APPLE DRUM WORKS	Cole Information Services

936 CORNERSTONE WAY

Year	Uses	Source
2002	Shirley Steve	SBC PACIFIC BELL

939 CORNERSTONE WAY

Year	Uses	Source
2002	Giddings Emmit	SBC PACIFIC BELL

943 CORNERSTONE WAY

Year	Uses	Source
2002	Moore Donald R	SBC PACIFIC BELL
	Moore Donald R	SBC PACIFIC BELL

FINDINGS

951 CORNERSTONE WAY

Year	*Uses*	*Source*
2002	Rollins Stanford	SBC PACIFIC BELL

954 CORNERSTONE WAY

Year	*Uses*	*Source*
2002	Valadez J	SBC PACIFIC BELL

955 CORNERSTONE WAY

Year	*Uses*	*Source*
2007	CORNERSTONE MFG G & DISTRIBUTION I	Cole Information Services
	CAL SPRING & FASTENER CO	Cole Information Services

967 CORNERSTONE WAY

Year	*Uses*	*Source*
2002	Opp Aleta	SBC PACIFIC BELL

975 CORNERSTONE WAY

Year	*Uses*	*Source*
2002	Williams John F	SBC PACIFIC BELL

979 CORNERSTONE WAY

Year	*Uses*	*Source*
2002	Cisneros C	SBC PACIFIC BELL

987 CORNERSTONE WAY

Year	*Uses*	*Source*
2007	BLUE COAST CAPITAL & REALTY	Cole Information Services
2002	Hunt Kenneth & Patricia	SBC PACIFIC BELL

DICKINSON LN

2146 DICKINSON LN

Year	*Uses*	*Source*
2007	CALIFORNIA DAIRY INDUSTRIES ASSOCIAT	Cole Information Services

2149 DICKINSON LN

Year	*Uses*	*Source*
2002	Ramirez Leonardo & Marlene	SBC PACIFIC BELL

FINDINGS

2154 DICKINSON LN

Year	*Uses*	*Source*
2002	Mc Bride Gregory S	SBC PACIFIC BELL

2178 DICKINSON LN

Year	*Uses*	*Source*
2002	Panjiabi Gobind	SBC PACIFIC BELL

DICKINSON RD

2154 DICKINSON RD

Year	*Uses*	*Source*
2001	MCBRIDEGregory S	Haines & Company, Inc.

2162 DICKINSON RD

Year	*Uses*	*Source*
2001	WEALTH CODE	Haines & Company, Inc.
	MORENO VALLEY	Haines & Company, Inc.
	OBUS ORES ONEW	Haines & Company, Inc.
	NEUBAUER Dennis	Haines & Company, Inc.

HEMINGWAY DR

917 HEMINGWAY DR

Year	*Uses*	*Source*
2002	Mohrmann Mark	SBC PACIFIC BELL
2001	MOHRMAN	Haines & Company, Inc.

932 HEMINGWAY DR

Year	*Uses*	*Source*
2002	Pitts Michael	SBC PACIFIC BELL
2001	PITTS Mi	Haines & Company, Inc.

936 HEMINGWAY DR

Year	*Uses*	*Source*
2002	Park Kwang S	SBC PACIFIC BELL
2001	PARKKwang S	Haines & Company, Inc.

940 HEMINGWAY DR

Year	*Uses*	*Source*
2002	Cabrera Encka	SBC PACIFIC BELL
2001	CABRERA	Haines & Company, Inc.

FINDINGS

948 HEMINGWAY DR

Year	Uses	Source
2002	Spencer W R III	SBC PACIFIC BELL
2001	SPENCER WR 03D	Haines & Company, Inc.

955 HEMINGWAY DR

Year	Uses	Source
2002	Garcia Rafael W	SBC PACIFIC BELL
	Garcia Rafael W	SBC PACIFIC BELL
2001	GARCIARalael W	Haines & Company, Inc.
	GARCIARafael W	Haines & Company, Inc.

959 HEMINGWAY DR

Year	Uses	Source
2002	Garnrido Dave	SBC PACIFIC BELL
2001	GA 9 RID	Haines & Company, Inc.

960 HEMINGWAY DR

Year	Uses	Source
2002	Bremer Frederick	SBC PACIFIC BELL
2001	BREMER Fred	Haines & Company, Inc.

963 HEMINGWAY DR

Year	Uses	Source
2001	CHURCHMAN	Haines & Company, Inc.

964 HEMINGWAY DR

Year	Uses	Source
2002	Finnerty Daniel	SBC PACIFIC BELL

976 HEMINGWAY DR

Year	Uses	Source
2002	Alexander Ruby N	SBC PACIFIC BELL
2001	ALEXANDER Ruby N	Haines & Company, Inc.

980 HEMINGWAY DR

Year	Uses	Source
2002	Rummell T	SBC PACIFIC BELL

992 HEMINGWAY DR

Year	Uses	Source
2002	Williams Billie	SBC PACIFIC BELL

FINDINGS

Year	Uses	Source
2002	Williams Rether	SBC PACIFIC BELL
2001	WILLIAMSRe Iher	Haines & Company, Inc.
	WILLIAMS B	Haines & Company, Inc.

996 HEMINGWAY DR

Year	Uses	Source
2002	Steele C	SBC PACIFIC BELL

SHELLEY CIR

2111 SHELLEY CIR

Year	Uses	Source
2007	ABEL REALTY SERVICES	Cole Information Services

2148 SHELLEY CIR

Year	Uses	Source
2007	JOSEPH E & SUSAN E HOPPER LAUREL S	Cole Information Services

2151 SHELLEY CIR

Year	Uses	Source
2002	Way M	SBC PACIFIC BELL
	Way M	SBC PACIFIC BELL

WHITMAN CIR

2103 WHITMAN CIR

Year	Uses	Source
2001	OWALLAUCH Dave	Haines & Company, Inc.

2110 WHITMAN CIR

Year	Uses	Source
2001	MILLON Danrel 00 I	Haines & Company, Inc.

2115 WHITMAN CIR

Year	Uses	Source
2001	OTOWLESLeroy	Haines & Company, Inc.

2120 WHITMAN CIR

Year	Uses	Source
2001	OTRANDrane	Haines & Company, Inc.

FINDINGS

2127 WHITMAN CIR

Year	Uses	Source
2001	WELLMAN Laura	Haines & Company, Inc.
	OSPALDING Fred	Haines & Company, Inc.

2130 WHITMAN CIR

Year	Uses	Source
2001	OZEGERSKevrn	Haines & Company, Inc.

2139 WHITMAN CIR

Year	Uses	Source
2001	COLACECCHIJoseph	Haines & Company, Inc.

2140 WHITMAN CIR

Year	Uses	Source
2001	SEMAAN Raymond	Haines & Company, Inc.

2150 WHITMAN CIR

Year	Uses	Source
2001	HAROJose	Haines & Company, Inc.

2151 WHITMAN CIR

Year	Uses	Source
2001	SMITH Johnalhan	Haines & Company, Inc.

2160 WHITMAN CIR

Year	Uses	Source
2001	0 RUSSELLLany	Haines & Company, Inc.

2163 WHITMAN CIR

Year	Uses	Source
2001	006 AZ Thomas	Haines & Company, Inc.

2170 WHITMAN CIR

Year	Uses	Source
2001	CEN 006 ASRa	Haines & Company, Inc.
	CENDEJ	Haines & Company, Inc.

2180 WHITMAN CIR

Year	Uses	Source
2001	FRIAR Bren IW	Haines & Company, Inc.

FINDINGS

2187 WHITMAN CIR

Year	Uses	Source
2001	FRAGAS	Haines & Company, Inc.

2199 WHITMAN CIR

Year	Uses	Source
2001	MCGROARTYMichael	Haines & Company, Inc.

WHITMAN WAY

2127 WHITMAN WAY

Year	Uses	Source
2002	Spalding Laura	SBC PACIFIC BELL

2140 WHITMAN WAY

Year	Uses	Source
2002	Kirby Robin	SBC PACIFIC BELL

2170 WHITMAN WAY

Year	Uses	Source
2002	Cendejas Con & Raeleen	SBC PACIFIC BELL

2180 WHITMAN WAY

Year	Uses	Source
2002	Friar Brent W	SBC PACIFIC BELL

2199 WHITMAN WAY

Year	Uses	Source
2002	Mc Groarty Michael	SBC PACIFIC BELL

FINDINGS

TARGET PROPERTY: ADDRESS NOT IDENTIFIED IN RESEARCH SOURCE

The following Target Property addresses were researched for this report, and the addresses were not identified in the research source.

Address Researched	Address Not Identified in Research Source
1431 Browning Circle	2012, 2007, 2002, 2001, 1996, 1993, 1990, 1986, 1981, 1977, 1970, 1967, 1966, 1961, 1960, 1956, 1955, 1951, 1946, 1945, 1941, 1939, 1936, 1931, 1930, 1927, 1925, 1924, 1921

ADJOINING PROPERTY: ADDRESSES NOT IDENTIFIED IN RESEARCH SOURCE

The following Adjoining Property addresses were researched for this report, and the addresses were not identified in research source.

Address Researched	Address Not Identified in Research Source
2103 WHITMAN CIR	2012, 2007, 2002, 1996, 1993, 1990, 1986, 1981, 1977, 1970, 1967, 1966, 1961, 1960, 1956, 1955, 1951, 1946, 1945, 1941, 1939, 1936, 1931, 1930, 1927, 1925, 1924, 1921
2110 WHITMAN CIR	2012, 2007, 2002, 1996, 1993, 1990, 1986, 1981, 1977, 1970, 1967, 1966, 1961, 1960, 1956, 1955, 1951, 1946, 1945, 1941, 1939, 1936, 1931, 1930, 1927, 1925, 1924, 1921
2111 SHELLEY CIR	2012, 2002, 2001, 1996, 1993, 1990, 1986, 1981, 1977, 1970, 1967, 1966, 1961, 1960, 1956, 1955, 1951, 1946, 1945, 1941, 1939, 1936, 1931, 1930, 1927, 1925, 1924, 1921
2115 WHITMAN CIR	2012, 2007, 2002, 1996, 1993, 1990, 1986, 1981, 1977, 1970, 1967, 1966, 1961, 1960, 1956, 1955, 1951, 1946, 1945, 1941, 1939, 1936, 1931, 1930, 1927, 1925, 1924, 1921
2120 WHITMAN CIR	2012, 2007, 2002, 1996, 1993, 1990, 1986, 1981, 1977, 1970, 1967, 1966, 1961, 1960, 1956, 1955, 1951, 1946, 1945, 1941, 1939, 1936, 1931, 1930, 1927, 1925, 1924, 1921
2122 BROWNING ST	2012, 2007, 2002, 1996, 1993, 1990, 1986, 1981, 1977, 1970, 1967, 1966, 1961, 1960, 1956, 1955, 1951, 1946, 1945, 1941, 1939, 1936, 1931, 1930, 1927, 1925, 1924, 1921
2123 BROWNING ST	2012, 2007, 2002, 1996, 1993, 1990, 1986, 1981, 1977, 1970, 1967, 1966, 1961, 1960, 1956, 1955, 1951, 1946, 1945, 1941, 1939, 1936, 1931, 1930, 1927, 1925, 1924, 1921
2127 WHITMAN CIR	2012, 2007, 2002, 1996, 1993, 1990, 1986, 1981, 1977, 1970, 1967, 1966, 1961, 1960, 1956, 1955, 1951, 1946, 1945, 1941, 1939, 1936, 1931, 1930, 1927, 1925, 1924, 1921
2127 WHITMAN WAY	2012, 2007, 2001, 1996, 1993, 1990, 1986, 1981, 1977, 1970, 1967, 1966, 1961, 1960, 1956, 1955, 1951, 1946, 1945, 1941, 1939, 1936, 1931, 1930, 1927, 1925, 1924, 1921
2130 WHITMAN CIR	2012, 2007, 2002, 1996, 1993, 1990, 1986, 1981, 1977, 1970, 1967, 1966, 1961, 1960, 1956, 1955, 1951, 1946, 1945, 1941, 1939, 1936, 1931, 1930, 1927, 1925, 1924, 1921
2132 BROWNING CIR	2007, 2002, 2001, 1996, 1993, 1990, 1986, 1981, 1977, 1970, 1967, 1966, 1961, 1960, 1956, 1955, 1951, 1946, 1945, 1941, 1939, 1936, 1931, 1930, 1927, 1925, 1924, 1921

FINDINGS

Address Researched	Address Not Identified in Research Source
2133 BROWNING ST	2012, 2007, 2002, 1996, 1993, 1990, 1986, 1981, 1977, 1970, 1967, 1966, 1961, 1960, 1956, 1955, 1951, 1946, 1945, 1941, 1939, 1936, 1931, 1930, 1927, 1925, 1924, 1921
2139 WHITMAN CIR	2012, 2007, 2002, 1996, 1993, 1990, 1986, 1981, 1977, 1970, 1967, 1966, 1961, 1960, 1956, 1955, 1951, 1946, 1945, 1941, 1939, 1936, 1931, 1930, 1927, 1925, 1924, 1921
2140 WHITMAN CIR	2012, 2007, 2002, 1996, 1993, 1990, 1986, 1981, 1977, 1970, 1967, 1966, 1961, 1960, 1956, 1955, 1951, 1946, 1945, 1941, 1939, 1936, 1931, 1930, 1927, 1925, 1924, 1921
2140 WHITMAN WAY	2012, 2007, 2001, 1996, 1993, 1990, 1986, 1981, 1977, 1970, 1967, 1966, 1961, 1960, 1956, 1955, 1951, 1946, 1945, 1941, 1939, 1936, 1931, 1930, 1927, 1925, 1924, 1921
2142 BROWNING CIR	2012, 2007, 2001, 1996, 1993, 1990, 1986, 1981, 1977, 1970, 1967, 1966, 1961, 1960, 1956, 1955, 1951, 1946, 1945, 1941, 1939, 1936, 1931, 1930, 1927, 1925, 1924, 1921
2142 BROWNING ST	2012, 2007, 2002, 1996, 1993, 1990, 1986, 1981, 1977, 1970, 1967, 1966, 1961, 1960, 1956, 1955, 1951, 1946, 1945, 1941, 1939, 1936, 1931, 1930, 1927, 1925, 1924, 1921
2143 BROWNING CIR	2012, 2007, 2001, 1996, 1993, 1990, 1986, 1981, 1977, 1970, 1967, 1966, 1961, 1960, 1956, 1955, 1951, 1946, 1945, 1941, 1939, 1936, 1931, 1930, 1927, 1925, 1924, 1921
2143 BROWNING ST	2012, 2007, 2002, 1996, 1993, 1990, 1986, 1981, 1977, 1970, 1967, 1966, 1961, 1960, 1956, 1955, 1951, 1946, 1945, 1941, 1939, 1936, 1931, 1930, 1927, 1925, 1924, 1921
2146 DICKINSON LN	2012, 2002, 2001, 1996, 1993, 1990, 1986, 1981, 1977, 1970, 1967, 1966, 1961, 1960, 1956, 1955, 1951, 1946, 1945, 1941, 1939, 1936, 1931, 1930, 1927, 1925, 1924, 1921
2148 SHELLEY CIR	2012, 2002, 2001, 1996, 1993, 1990, 1986, 1981, 1977, 1970, 1967, 1966, 1961, 1960, 1956, 1955, 1951, 1946, 1945, 1941, 1939, 1936, 1931, 1930, 1927, 1925, 1924, 1921
2149 DICKINSON LN	2012, 2007, 2001, 1996, 1993, 1990, 1986, 1981, 1977, 1970, 1967, 1966, 1961, 1960, 1956, 1955, 1951, 1946, 1945, 1941, 1939, 1936, 1931, 1930, 1927, 1925, 1924, 1921
2150 WHITMAN CIR	2012, 2007, 2002, 1996, 1993, 1990, 1986, 1981, 1977, 1970, 1967, 1966, 1961, 1960, 1956, 1955, 1951, 1946, 1945, 1941, 1939, 1936, 1931, 1930, 1927, 1925, 1924, 1921
2151 SHELLEY CIR	2012, 2007, 2001, 1996, 1993, 1990, 1986, 1981, 1977, 1970, 1967, 1966, 1961, 1960, 1956, 1955, 1951, 1946, 1945, 1941, 1939, 1936, 1931, 1930, 1927, 1925, 1924, 1921
2151 WHITMAN CIR	2012, 2007, 2002, 1996, 1993, 1990, 1986, 1981, 1977, 1970, 1967, 1966, 1961, 1960, 1956, 1955, 1951, 1946, 1945, 1941, 1939, 1936, 1931, 1930, 1927, 1925, 1924, 1921
2152 BROWNING ST	2012, 2007, 2002, 1996, 1993, 1990, 1986, 1981, 1977, 1970, 1967, 1966, 1961, 1960, 1956, 1955, 1951, 1946, 1945, 1941, 1939, 1936, 1931, 1930, 1927, 1925, 1924, 1921
2153 BROWNING ST	2012, 2007, 2002, 1996, 1993, 1990, 1986, 1981, 1977, 1970, 1967, 1966, 1961, 1960, 1956, 1955, 1951, 1946, 1945, 1941, 1939, 1936, 1931, 1930, 1927, 1925, 1924, 1921
2154 DICKINSON LN	2012, 2007, 2001, 1996, 1993, 1990, 1986, 1981, 1977, 1970, 1967, 1966, 1961, 1960, 1956, 1955, 1951, 1946, 1945, 1941, 1939, 1936, 1931, 1930, 1927, 1925, 1924, 1921

FINDINGS

Address Researched	Address Not Identified in Research Source
2154 DICKINSON RD	2012, 2007, 2002, 1996, 1993, 1990, 1986, 1981, 1977, 1970, 1967, 1966, 1961, 1960, 1956, 1955, 1951, 1946, 1945, 1941, 1939, 1936, 1931, 1930, 1927, 1925, 1924, 1921
2160 WHITMAN CIR	2012, 2007, 2002, 1996, 1993, 1990, 1986, 1981, 1977, 1970, 1967, 1966, 1961, 1960, 1956, 1955, 1951, 1946, 1945, 1941, 1939, 1936, 1931, 1930, 1927, 1925, 1924, 1921
2162 DICKINSON RD	2012, 2007, 2002, 1996, 1993, 1990, 1986, 1981, 1977, 1970, 1967, 1966, 1961, 1960, 1956, 1955, 1951, 1946, 1945, 1941, 1939, 1936, 1931, 1930, 1927, 1925, 1924, 1921
2163 WHITMAN CIR	2012, 2007, 2002, 1996, 1993, 1990, 1986, 1981, 1977, 1970, 1967, 1966, 1961, 1960, 1956, 1955, 1951, 1946, 1945, 1941, 1939, 1936, 1931, 1930, 1927, 1925, 1924, 1921
2170 WHITMAN CIR	2012, 2007, 2002, 1996, 1993, 1990, 1986, 1981, 1977, 1970, 1967, 1966, 1961, 1960, 1956, 1955, 1951, 1946, 1945, 1941, 1939, 1936, 1931, 1930, 1927, 1925, 1924, 1921
2170 WHITMAN WAY	2012, 2007, 2001, 1996, 1993, 1990, 1986, 1981, 1977, 1970, 1967, 1966, 1961, 1960, 1956, 1955, 1951, 1946, 1945, 1941, 1939, 1936, 1931, 1930, 1927, 1925, 1924, 1921
2178 DICKINSON LN	2012, 2007, 2001, 1996, 1993, 1990, 1986, 1981, 1977, 1970, 1967, 1966, 1961, 1960, 1956, 1955, 1951, 1946, 1945, 1941, 1939, 1936, 1931, 1930, 1927, 1925, 1924, 1921
2180 WHITMAN CIR	2012, 2007, 2002, 1996, 1993, 1990, 1986, 1981, 1977, 1970, 1967, 1966, 1961, 1960, 1956, 1955, 1951, 1946, 1945, 1941, 1939, 1936, 1931, 1930, 1927, 1925, 1924, 1921
2180 WHITMAN WAY	2012, 2007, 2001, 1996, 1993, 1990, 1986, 1981, 1977, 1970, 1967, 1966, 1961, 1960, 1956, 1955, 1951, 1946, 1945, 1941, 1939, 1936, 1931, 1930, 1927, 1925, 1924, 1921
2187 WHITMAN CIR	2012, 2007, 2002, 1996, 1993, 1990, 1986, 1981, 1977, 1970, 1967, 1966, 1961, 1960, 1956, 1955, 1951, 1946, 1945, 1941, 1939, 1936, 1931, 1930, 1927, 1925, 1924, 1921
2199 WHITMAN CIR	2012, 2007, 2002, 1996, 1993, 1990, 1986, 1981, 1977, 1970, 1967, 1966, 1961, 1960, 1956, 1955, 1951, 1946, 1945, 1941, 1939, 1936, 1931, 1930, 1927, 1925, 1924, 1921
2199 WHITMAN WAY	2012, 2007, 2001, 1996, 1993, 1990, 1986, 1981, 1977, 1970, 1967, 1966, 1961, 1960, 1956, 1955, 1951, 1946, 1945, 1941, 1939, 1936, 1931, 1930, 1927, 1925, 1924, 1921
911 CORNERSTONE CIR	2012, 2007, 2001, 1996, 1993, 1990, 1986, 1981, 1977, 1970, 1967, 1966, 1961, 1960, 1956, 1955, 1951, 1946, 1945, 1941, 1939, 1936, 1931, 1930, 1927, 1925, 1924, 1921
915 CORNERSTONE CIR	2012, 2007, 2001, 1996, 1993, 1990, 1986, 1981, 1977, 1970, 1967, 1966, 1961, 1960, 1956, 1955, 1951, 1946, 1945, 1941, 1939, 1936, 1931, 1930, 1927, 1925, 1924, 1921
917 HEMINGWAY DR	2012, 2007, 1996, 1993, 1990, 1986, 1981, 1977, 1970, 1967, 1966, 1961, 1960, 1956, 1955, 1951, 1946, 1945, 1941, 1939, 1936, 1931, 1930, 1927, 1925, 1924, 1921
932 HEMINGWAY DR	2012, 2007, 1996, 1993, 1990, 1986, 1981, 1977, 1970, 1967, 1966, 1961, 1960, 1956, 1955, 1951, 1946, 1945, 1941, 1939, 1936, 1931, 1930, 1927, 1925, 1924, 1921
935 CORNERSTONE WAY	2012, 2002, 2001, 1996, 1993, 1990, 1986, 1981, 1977, 1970, 1967, 1966, 1961, 1960, 1956, 1955, 1951, 1946, 1945, 1941, 1939, 1936, 1931, 1930, 1927, 1925, 1924, 1921

FINDINGS

Address Researched	Address Not Identified in Research Source
936 CORNERSTONE WAY	2012, 2007, 2001, 1996, 1993, 1990, 1986, 1981, 1977, 1970, 1967, 1966, 1961, 1960, 1956, 1955, 1951, 1946, 1945, 1941, 1939, 1936, 1931, 1930, 1927, 1925, 1924, 1921
936 HEMINGWAY DR	2012, 2007, 1996, 1993, 1990, 1986, 1981, 1977, 1970, 1967, 1966, 1961, 1960, 1956, 1955, 1951, 1946, 1945, 1941, 1939, 1936, 1931, 1930, 1927, 1925, 1924, 1921
939 CORNERSTONE WAY	2012, 2007, 2001, 1996, 1993, 1990, 1986, 1981, 1977, 1970, 1967, 1966, 1961, 1960, 1956, 1955, 1951, 1946, 1945, 1941, 1939, 1936, 1931, 1930, 1927, 1925, 1924, 1921
940 HEMINGWAY DR	2012, 2007, 1996, 1993, 1990, 1986, 1981, 1977, 1970, 1967, 1966, 1961, 1960, 1956, 1955, 1951, 1946, 1945, 1941, 1939, 1936, 1931, 1930, 1927, 1925, 1924, 1921
943 CORNERSTONE WAY	2012, 2007, 2001, 1996, 1993, 1990, 1986, 1981, 1977, 1970, 1967, 1966, 1961, 1960, 1956, 1955, 1951, 1946, 1945, 1941, 1939, 1936, 1931, 1930, 1927, 1925, 1924, 1921
948 HEMINGWAY DR	2012, 2007, 1996, 1993, 1990, 1986, 1981, 1977, 1970, 1967, 1966, 1961, 1960, 1956, 1955, 1951, 1946, 1945, 1941, 1939, 1936, 1931, 1930, 1927, 1925, 1924, 1921
951 CORNERSTONE WAY	2012, 2007, 2001, 1996, 1993, 1990, 1986, 1981, 1977, 1970, 1967, 1966, 1961, 1960, 1956, 1955, 1951, 1946, 1945, 1941, 1939, 1936, 1931, 1930, 1927, 1925, 1924, 1921
954 CORNERSTONE WAY	2012, 2007, 2001, 1996, 1993, 1990, 1986, 1981, 1977, 1970, 1967, 1966, 1961, 1960, 1956, 1955, 1951, 1946, 1945, 1941, 1939, 1936, 1931, 1930, 1927, 1925, 1924, 1921
955 CORNERSTONE WAY	2012, 2002, 2001, 1996, 1993, 1990, 1986, 1981, 1977, 1970, 1967, 1966, 1961, 1960, 1956, 1955, 1951, 1946, 1945, 1941, 1939, 1936, 1931, 1930, 1927, 1925, 1924, 1921
955 HEMINGWAY DR	2012, 2007, 1996, 1993, 1990, 1986, 1981, 1977, 1970, 1967, 1966, 1961, 1960, 1956, 1955, 1951, 1946, 1945, 1941, 1939, 1936, 1931, 1930, 1927, 1925, 1924, 1921
959 HEMINGWAY DR	2012, 2007, 1996, 1993, 1990, 1986, 1981, 1977, 1970, 1967, 1966, 1961, 1960, 1956, 1955, 1951, 1946, 1945, 1941, 1939, 1936, 1931, 1930, 1927, 1925, 1924, 1921
960 HEMINGWAY DR	2012, 2007, 1996, 1993, 1990, 1986, 1981, 1977, 1970, 1967, 1966, 1961, 1960, 1956, 1955, 1951, 1946, 1945, 1941, 1939, 1936, 1931, 1930, 1927, 1925, 1924, 1921
963 HEMINGWAY DR	2012, 2007, 2002, 1996, 1993, 1990, 1986, 1981, 1977, 1970, 1967, 1966, 1961, 1960, 1956, 1955, 1951, 1946, 1945, 1941, 1939, 1936, 1931, 1930, 1927, 1925, 1924, 1921
964 HEMINGWAY DR	2012, 2007, 2001, 1996, 1993, 1990, 1986, 1981, 1977, 1970, 1967, 1966, 1961, 1960, 1956, 1955, 1951, 1946, 1945, 1941, 1939, 1936, 1931, 1930, 1927, 1925, 1924, 1921
967 CORNERSTONE WAY	2012, 2007, 2001, 1996, 1993, 1990, 1986, 1981, 1977, 1970, 1967, 1966, 1961, 1960, 1956, 1955, 1951, 1946, 1945, 1941, 1939, 1936, 1931, 1930, 1927, 1925, 1924, 1921
975 CORNERSTONE WAY	2012, 2007, 2001, 1996, 1993, 1990, 1986, 1981, 1977, 1970, 1967, 1966, 1961, 1960, 1956, 1955, 1951, 1946, 1945, 1941, 1939, 1936, 1931, 1930, 1927, 1925, 1924, 1921
976 HEMINGWAY DR	2012, 2007, 1996, 1993, 1990, 1986, 1981, 1977, 1970, 1967, 1966, 1961, 1960, 1956, 1955, 1951, 1946, 1945, 1941, 1939, 1936, 1931, 1930, 1927, 1925, 1924, 1921

FINDINGS

Address Researched	Address Not Identified in Research Source
979 CORNERSTONE WAY	2012, 2007, 2001, 1996, 1993, 1990, 1986, 1981, 1977, 1970, 1967, 1966, 1961, 1960, 1956, 1955, 1951, 1946, 1945, 1941, 1939, 1936, 1931, 1930, 1927, 1925, 1924, 1921
980 HEMINGWAY DR	2012, 2007, 2001, 1996, 1993, 1990, 1986, 1981, 1977, 1970, 1967, 1966, 1961, 1960, 1956, 1955, 1951, 1946, 1945, 1941, 1939, 1936, 1931, 1930, 1927, 1925, 1924, 1921
987 CORNERSTONE WAY	2012, 2007, 2001, 1996, 1993, 1990, 1986, 1981, 1977, 1970, 1967, 1966, 1961, 1960, 1956, 1955, 1951, 1946, 1945, 1941, 1939, 1936, 1931, 1930, 1927, 1925, 1924, 1921
987 CORNERSTONE WAY	2012, 2002, 2001, 1996, 1993, 1990, 1986, 1981, 1977, 1970, 1967, 1966, 1961, 1960, 1956, 1955, 1951, 1946, 1945, 1941, 1939, 1936, 1931, 1930, 1927, 1925, 1924, 1921
992 HEMINGWAY DR	2012, 2007, 1996, 1993, 1990, 1986, 1981, 1977, 1970, 1967, 1966, 1961, 1960, 1956, 1955, 1951, 1946, 1945, 1941, 1939, 1936, 1931, 1930, 1927, 1925, 1924, 1921
996 HEMINGWAY DR	2012, 2007, 2001, 1996, 1993, 1990, 1986, 1981, 1977, 1970, 1967, 1966, 1961, 1960, 1956, 1955, 1951, 1946, 1945, 1941, 1939, 1936, 1931, 1930, 1927, 1925, 1924, 1921

Skyline Heights
Skyline Heights
Corona, CA 92882

Inquiry Number: 3552619.3
March 20, 2013

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EDR® Environmental Data Resources Inc

440 Wheelers Farms Road
Milford, CT 06461
800.352.0050
www.edrnet.com

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3/20/13

Site Name:
Skyline Heights
Skyline Heights
Corona, CA 92882

Client Name:
Hillmann Environmental Co.
1745 W Orangewood Avenue
Orange, CA 92868-0000

EDR Inquiry # 3552619.3

Contact: Kristi Hill

EDR® Environmental Data Resources Inc

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Site Name: Skyline Heights
Address: Skyline Heights
City, State, Zip: Corona, CA 92882
Cross Street:
P.O. # NA
Project: C3-5564
Certification # 4D89-4588-9E57

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Skyline Heights
Skyline Heights
Corona, CA 92882

Inquiry Number: 3552619.4
March 20, 2013

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EDR® Environmental Data Resources Inc

440 Wheelers Farms Road
Milford, CT 06461
800.352.0050
www.edrnet.com

EDR Historical Topographic Map Report

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with any questions or comments.

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Historical Topographic Map

N	TARGET QUAD NAME: SOUTHERN CA SHEET 1 MAP YEAR: 1901 SERIES: 60 SCALE: 1:250000	SITE NAME: Skyline Heights ADDRESS: Skyline Heights Corona, CA 92882 LAT/LONG: 33.844 / -117.6072	CLIENT: Hillmann Environmental Co. CONTACT: Kristi Hill INQUIRY#: 3552619.4 RESEARCH DATE: 03/20/2013

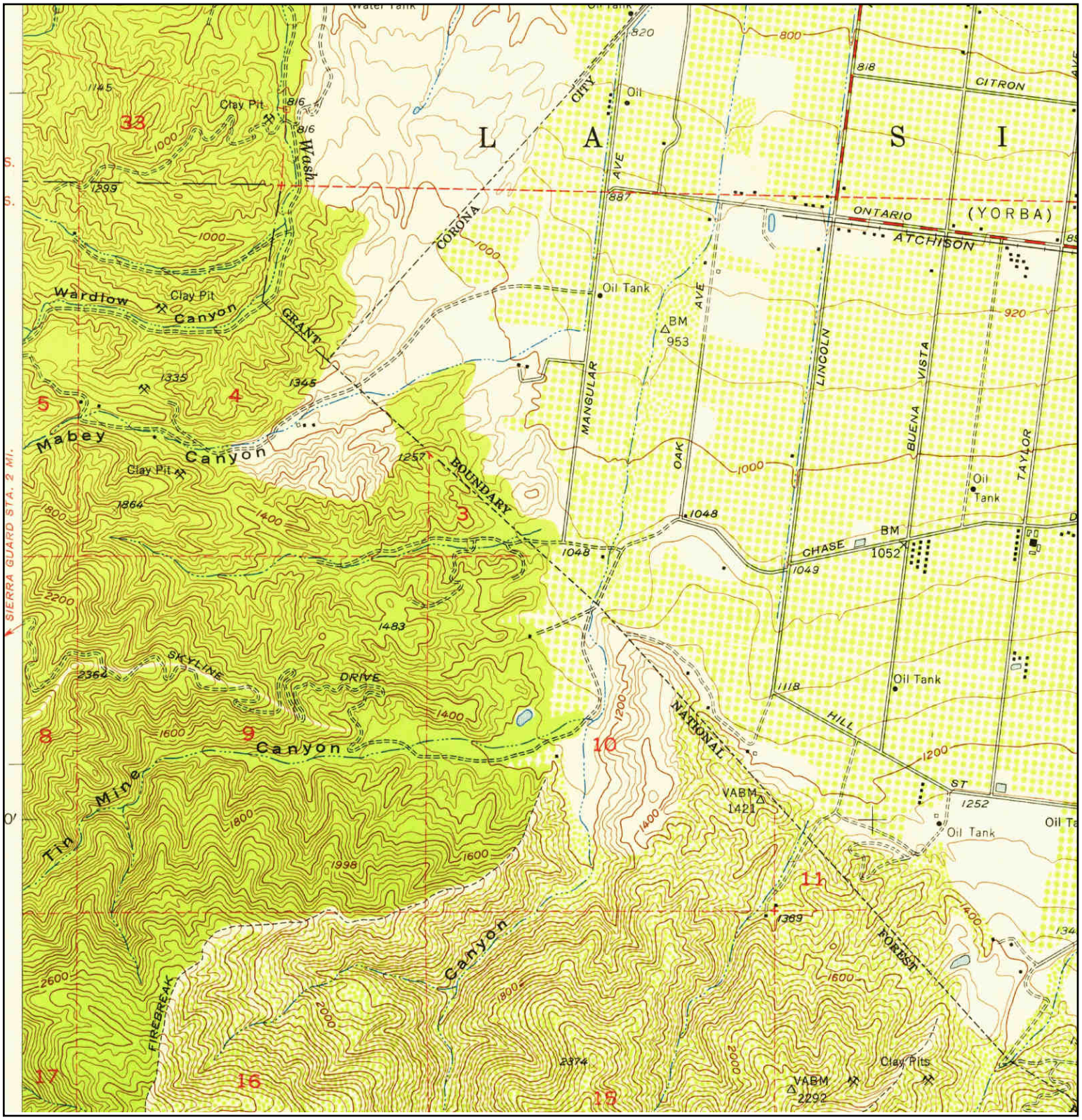
Historical Topographic Map

N	TARGET QUAD NAME: CORONA MAP YEAR: 1902 SERIES: 30 SCALE: 1:125000	SITE NAME: Skyline Heights ADDRESS: Skyline Heights Corona, CA 92882 LAT/LONG: 33.844 / -117.6072	CLIENT: Hillmann Environmental Co. CONTACT: Kristi Hill INQUIRY#: 3552619.4 RESEARCH DATE: 03/20/2013

Historical Topographic Map

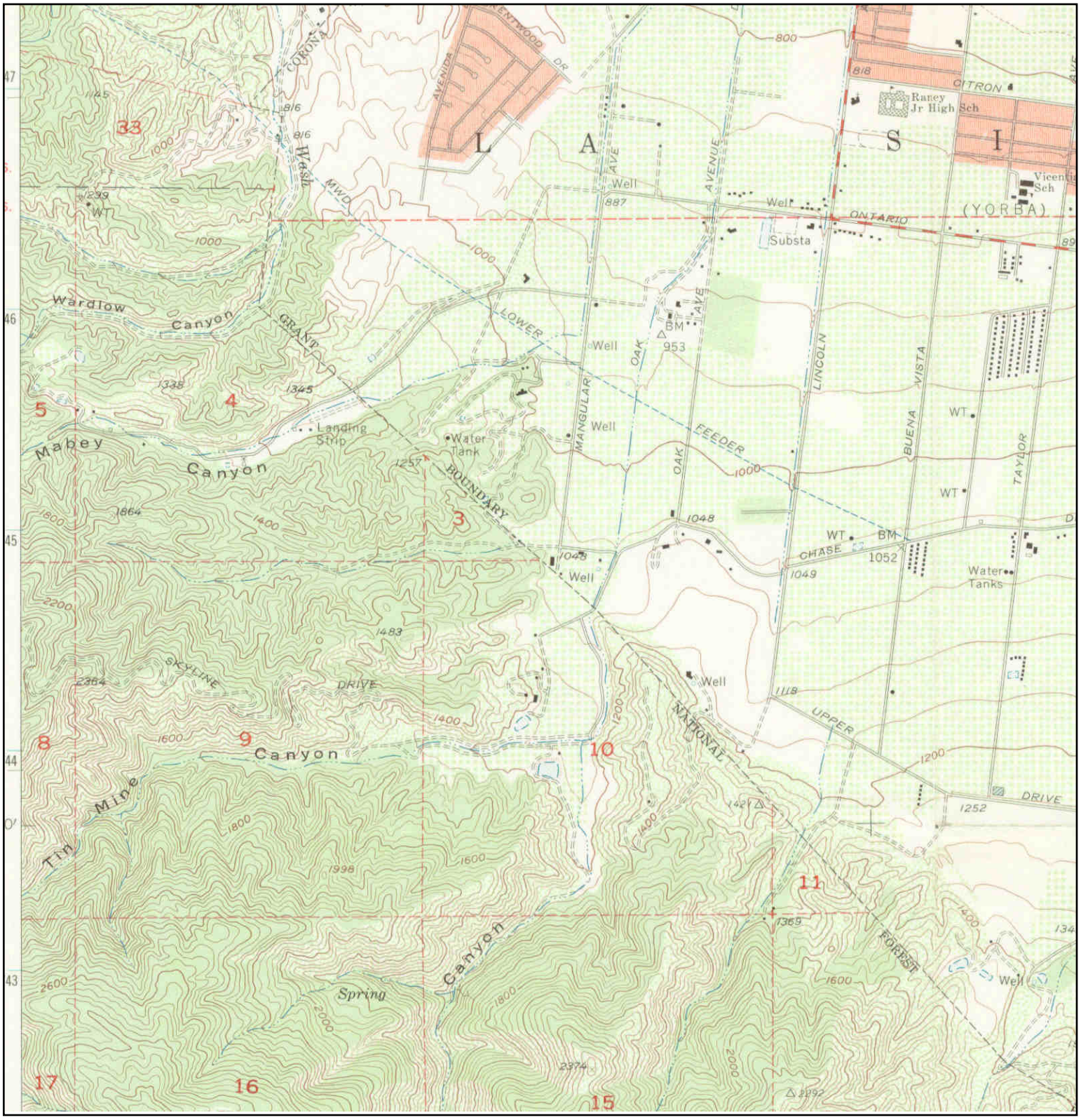
N	TARGET QUAD NAME: CORONA MAP YEAR: 1947 SERIES: 15 SCALE: 1:50000	SITE NAME: Skyline Heights ADDRESS: Skyline Heights Corona, CA 92882 LAT/LONG: 33.844 / -117.6072	CLIENT: Hillmann Environmental Co. CONTACT: Kristi Hill INQUIRY#: 3552619.4 RESEARCH DATE: 03/20/2013

Historical Topographic Map



N	TARGET QUAD NAME: CORONA SOUTH MAP YEAR: 1954 SERIES: 7.5 SCALE: 1:24000	SITE NAME: Skyline Heights ADDRESS: Skyline Heights Corona, CA 92882 LAT/LONG: 33.844 / -117.6072	CLIENT: Hillmann Environmental Co. CONTACT: Kristi Hill INQUIRY#: 3552619.4 RESEARCH DATE: 03/20/2013

Historical Topographic Map

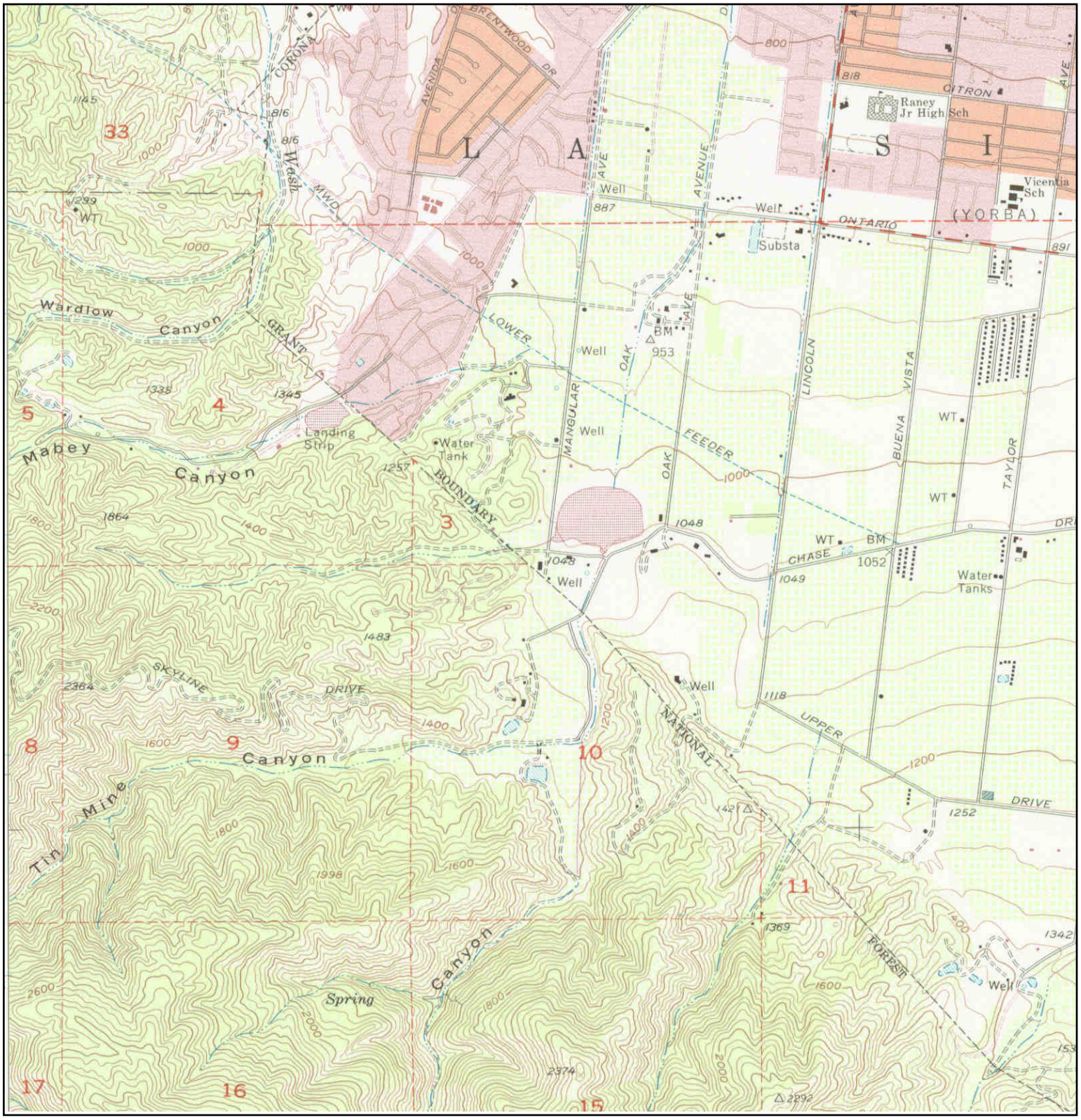


N	TARGET QUAD NAME: CORONA SOUTH MAP YEAR: 1967 SERIES: 7.5 SCALE: 1:24000	SITE NAME: Skyline Heights ADDRESS: Skyline Heights Corona, CA 92882 LAT/LONG: 33.844 / -117.6072	CLIENT: Hillmann Environmental Co. CONTACT: Kristi Hill INQUIRY#: 3552619.4 RESEARCH DATE: 03/20/2013

Historical Topographic Map

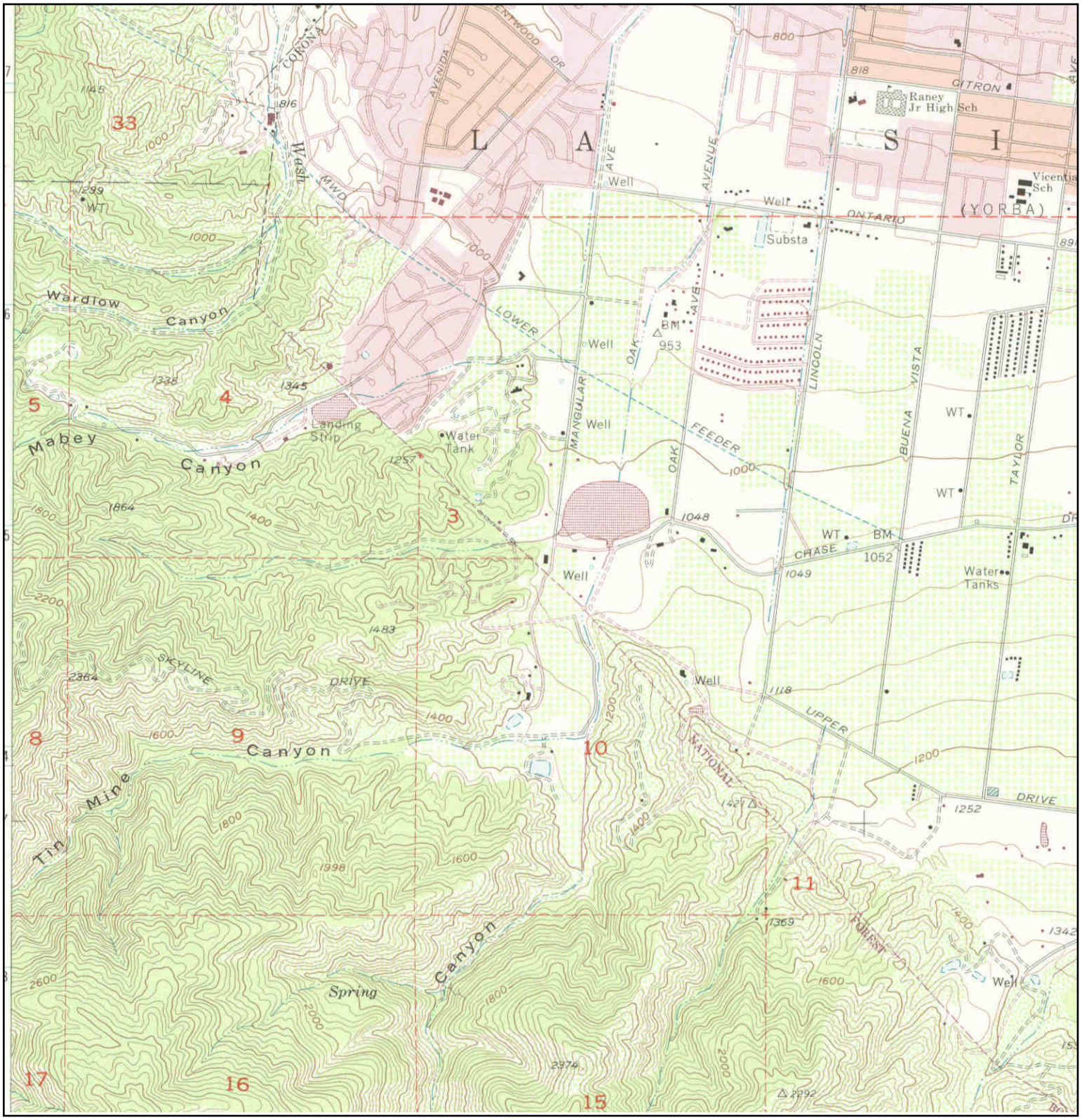
N	TARGET QUAD NAME: CORONA SOUTH MAP YEAR: 1973 PHOTOREVISED FROM :1967 SERIES: 7.5 SCALE: 1:24000	SITE NAME: Skyline Heights ADDRESS: Skyline Heights Corona, CA 92882 LAT/LONG: 33.844 / -117.6072	CLIENT: Hillmann Environmental Co. CONTACT: Kristi Hill INQUIRY#: 3552619.4 RESEARCH DATE: 03/20/2013

Historical Topographic Map



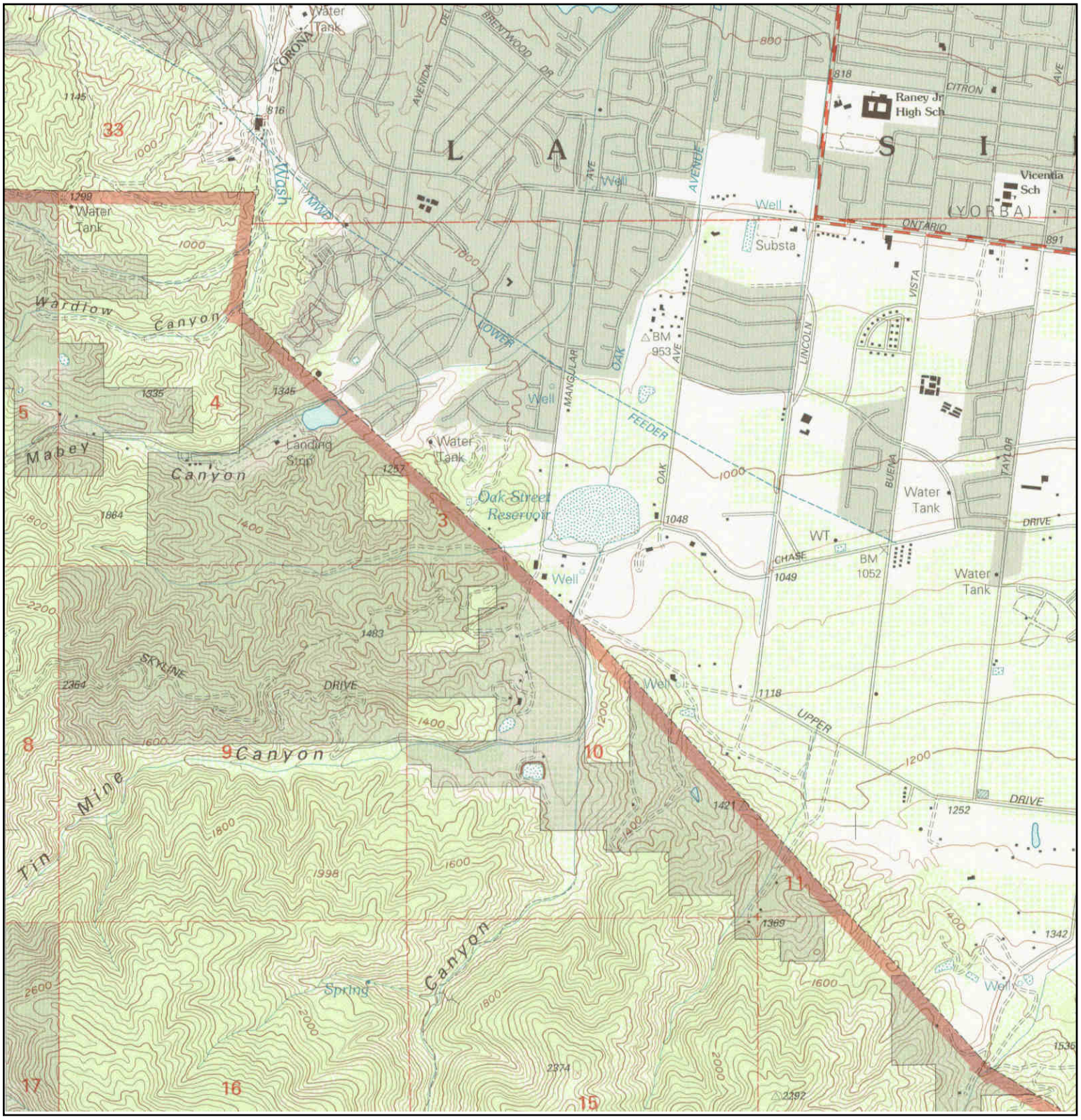
N	TARGET QUAD NAME: CORONA SOUTH MAP YEAR: 1982 PHOTOREVISED FROM :1967 SERIES: 7.5 SCALE: 1:24000	SITE NAME: Skyline Heights ADDRESS: Skyline Heights Corona, CA 92882 LAT/LONG: 33.844 / -117.6072	CLIENT: Hillmann Environmental Co. CONTACT: Kristi Hill INQUIRY#: 3552619.4 RESEARCH DATE: 03/20/2013

Historical Topographic Map



N	TARGET QUAD NAME: CORONA SOUTH MAP YEAR: 1988 PHOTOREVISED FROM :1967 SERIES: 7.5 SCALE: 1:24000	SITE NAME: Skyline Heights ADDRESS: Skyline Heights Corona, CA 92882 LAT/LONG: 33.844 / -117.6072	CLIENT: Hillmann Environmental Co. CONTACT: Kristi Hill INQUIRY#: 3552619.4 RESEARCH DATE: 03/20/2013

Historical Topographic Map



N	TARGET QUAD NAME: CORONA SOUTH MAP YEAR: 1997 SERIES: 7.5 SCALE: 1:24000	SITE NAME: Skyline Heights ADDRESS: Skyline Heights Corona, CA 92882 LAT/LONG: 33.844 / -117.6072	CLIENT: Hillmann Environmental Co. CONTACT: Kristi Hill INQUIRY#: 3552619.4 RESEARCH DATE: 03/20/2013

APPENDIX D

REFERENCE DOCUMENTATION / LABORATORY RESULTS (if applicable)

HILLMANN
CONSULTING

April 1, 2013

State of California
Regional Water Quality Control Board – Santa Ana Region (8)
Underground Storage Tank (UST) File Review Division
3737 Main Street, Suite #500
Riverside, CA 92501-3339
Phone (951) 782-4130
Fax (951) 781-6288

RE: Environmental Files:

Skyline Heights Project Area
Southwest of Corona in West Riverside County
APNs: 275030006, 275040006, 275040010, 275040011, 275040012, 275040015, 275040016, 275050004, 275070003, 275080010

Dear Sir/Madam:

I would like to know if you have any environmental files (UST, groundwater, wells, etc.) for the above referenced properties. Please let me know whether or not you locate any records. If you locate any records for the properties, I would like to either obtain copies or schedule a file review. My office number is (714) 634-9500 and fax number is (714) 634-9507.

Sincerely,

Kristine Savona
Hillmann Consulting, LLC
ksavona@hillmanngroup.com

HILLMANN
CONSULTING

April 1, 2013

State of California
Regional Water Quality Control Board – San Diego Region (9)
Underground Storage Tank (UST) File Review Division
9771 Clairemont Mesa Boulevard, Suite A
San Diego, CA 92124
Phone (858) 467-2952
Fax (858) 571-6972

RE: Environmental Files:

Skyline Heights Project Area
Southwest of Corona in West Riverside County
APNs: 275030006, 275040006, 275040010, 275040011, 275040012, 275040015, 275040016, 275050004, 275070003, 275080010

Dear Sir/Madam:

I would like to know if you have any environmental files (UST, groundwater, wells, etc.) for the above referenced properties. Please let me know whether or not you locate any records. If you locate any records for the properties, I would like to either obtain copies or schedule a file review. My office number is (714) 634-9500 and fax number is (714) 634-9507.

Sincerely,

Kristine Savona
Hillmann Consulting, LLC
ksavona@hillmanngroup.com

HILLMANN
CONSULTING

April 1, 2013

Attn: Julie Johnson
State of California
Department of Toxic Substances Control
Region 4 – Cypress Regional Office
5796 Corporate Avenue
Cypress, CA 90630-4732
Phone (714) 484-5337
Fax (714) 484-5318

RE: DTSC Files:

Skyline Heights Project Area
Southwest of Corona in West Riverside County
APNs: 275030006, 275040006, 275040010, 275040011, 275040012, 275040015, 275040016, 275050004, 275070003, 275080010

Dear Sir/Madam:

I would like to know if you have any environmental files (UST, groundwater, wells, etc.) for the above referenced properties. Please call me and let me know whether or not you locate any records. If you locate any records for the properties, I would like to either obtain copies or schedule a file review. My office number is (714) 634-9500 and fax number is (714) 634-9507.

Sincerely,

Kristine Savona
Hillmann Consulting, LLC
ksavona@hillmanngroup.com

HILLMANN
CONSULTING

April 1, 2013

State of California
Department of Toxic Substances Control
Chatsworth Regional Office
9211 Oakdale Avenue
Chatsworth, CA 91311-6505
Phone (818) 717-6521
Fax (818) 717-6526

RE: DTSC Files:

Skyline Heights Project Area
Southwest of Corona in West Riverside County
APNs: 275030006, 275040006, 275040010, 275040011, 275040012, 275040015, 275040016, 275050004, 275070003, 275080010

Dear Sir/Madam:

I would like to know if you have any environmental files (UST, groundwater, wells, etc.) for the above referenced properties. Please call me and let me know whether or not you locate any records. If you locate any records for the properties, I would like to either obtain copies or schedule a file review. My office number is (714) 634-9500 and fax number is (714) 634-9507.

Sincerely,

Kristine Savona
Hillmann Consulting, LLC
ksavona@hillmanngroup.com

HILLMANN
CONSULTING

April 1, 2013

Attn: File Review
Riverside County Department of Environmental Health
4065 County Circle Drive
P. O. Box 7600
Riverside, CA 92513-7600
Phone (951) 358-5055
Fax (951) 358-5017

RE: Records of Violations/Environmental Concerns:

Skyline Heights Project Area
Southwest of Corona in West Riverside County
APNs: 275030006, 275040006, 275040010, 275040011, 275040012, 275040015, 275040016, 275050004, 275070003, 275080010

Dear Sir/Madam:

I would like to know if you have any environmental files (UST, hazardous materials, groundwater, wells, etc.) for the above referenced properties. Please call me and let me know whether or not you locate any records. If you locate any records for the properties, I would like to either obtain copies or schedule a file review. My office number is (714) 634-9500 and fax number is (714) 634-9507.

Sincerely,

Kristine Savona
Hillmann Consulting, LLC
ksavona@hillmanngroup.com

HILLMANN
CONSULTING

April 1, 2013

Riverside County Fire Department
210 West San Jacinto Avenue
Perris, CA 92570
Phone (951) 940-6900
Fax (951) 940-6910

RE: Underground Storage Tank/Hazardous Materials Files:

Skyline Heights Project Area
Southwest of Corona in West Riverside County
APNs: 275030006, 275040006, 275040010, 275040011, 275040012, 275040015, 275040016, 275050004, 275070003, 275080010

Dear Sir/Madam:

I am currently conducting a Phase I Environmental Site Assessment (ESA) at the above referenced property and would like to know if you have any records of underground storage tanks (USTs) or hazardous materials on file for the above referenced property. If you locate any records for the property, I would like to either obtain copies or schedule a file review. My office number is (714) 634-9500.

Sincerely,

Kristine Savona
Hillmann Consulting, LLC
ksavona@hillmanngroup.com

HILLMANN
CONSULTING

May 2, 2012

City of Corona Fire Department
Fire Prevention Branch
815 West Sixth Street
Corona, CA 92882
Phone (909) 736-2220
Fax (909) 736-2497

RE: Underground Storage Tanks/Hazardous Materials Files:

Skyline Heights Project Area
Southwest of Corona in West Riverside County
APNs: 275030006, 275040006, 275040010, 275040011, 275040012, 275040015, 275040016, 275050004, 275070003, 275080010

Dear Sir/Madam:

I would like to know if you have any environmental files (UST, groundwater, wells, etc.) for the above referenced properties. Please call me and let me know whether or not you locate any records. If you locate any records for the properties, I would like to either obtain copies or schedule a file review. My office number is (714) 634-9500 and fax number is (714) 634-9507.

Sincerely,

Kristine Savona
Hillmann Consulting, LLC
ksavona@hillmanngroup.com

Information Management
Public Records Unit

Direct Dial: (909) 396-3700
FAX: (909) 396-3330

PUBLIC RECORDS REQUEST FORM

PRU Office Use Only
CONTROL NUMBER

ATTENTION REQUESTOR: To expedite your request for District records, please fill out this form completely, and identify specifically the type of records you are requesting. Please limit your request to one facility or one site address for each request form filed, and three requested items per form. Additional forms or pages can be used if requesting information for more than one facility or for records not identified on this form. Requests should reasonably describe identifiable records prepared, owned, used, or retained by the District. Public Records Unit staff is available to assist you in identifying those records in the District's possession. The District is not required by law to create a new record or list from an existing record.

REQUESTOR INFORMATION

NAME: Kristine Savona		DATE: 4/1/13
COMPANY: Hillmann Consulting, LLC		
MAILING ADDRESS: 1745 W. Orangewood Avenue, Suite 110		
CITY: Orange	STATE: CA	ZIP CODE: 92868
PHONE NUMBER: (714) 634-9500	FAX NUMBER: (714) 634-9507	

REQUESTED RECORDS (*3 items per form*)

☑ Applications (APPLS)	☑ Complaints	☑ Asbestos Notifications/Records
☑ Permits to Operate (P/O)	☑ Site Inspection Reports (I/R)	☑ Facility Potential to Emit (PTE)
☑ Equipment List Report (EQL)	☑ Emissions Summary	☑ Facility Positive Balance (NSR)
☑ Notices of Violation (NOV)	☑ Source Test Reports (S/T RPTS)	☑ Toxic-Health Risk Assessment (HRA)
☑ Notices to Comply (N/C)	☑ Air Monitoring Data	☐ Other (describe below or on additional pages):

TIME PERIOD OF DOCUMENTS REQUESTED From: 1900 To: 2013

REQUESTED FACILITY INFORMATION (If Applicable)

FACILITY NAME: Skyline Heights Project Area

Southwest of Corona in West Riverside County
APNs: 275030006, 275040006, 275040010, 275040011, 275040012, 275040015, 275040016, 275050004, 275070003, and 275080010

CITY: Corona	STATE: CA	ZIP CODE:
FACILITY I.D. NO. (if known):	APPL. AND/OR PERMIT NO. (if known):	

***Direct cost of duplication**: $.15 per page for paper copies (first 10 pages free) and $5.00 per copied audio tape. No charge for copied Diskettes or CDs. Transfer of gathered electronic records onto CD or Diskette typically costs $10.00 each, but costs will vary (see Instructions for Requesting Records).*

☐ I wish to inspect the requested records, where applicable, and do not want copies produced at this time.
☐ I request that the SCAQMD contact me prior to copying the requested records if the cost exceeds $20.00.
☐ I would like copies of the requested records and I hereby agree to reimburse the SCAQMD for the direct cost of duplicating the requested records in accordance with Gov. Code Sec. 6253(b).

Signature of Requestor

Matthew Rodriquez
Secretary for
Environmental Protection

Department of Toxic Substances Control

Deborah O. Raphael, Director
5796 Corporate Ave
Cypress, California 90630

Edmund G. Brown Jr.
Governor

April 5, 2013

Mrs. Kristine Savona
Hillmann Consulting
1745 W. Orangewood Ave, Suite 110
Orange, California 92868

PR40404136

Dear Mrs. Savona:

We have received your Public Records Act Request for records from the Department of Toxic Substances Control. After a thorough review of our files we have found that, **no such records** exist at this office pertaining to the sites/facility referenced.

SEE ATTACHED:

If you have any questions, would like further information regarding your request, please contact our Regional Records Coordinator at (714) 484-5336.

We would like to inform you about Envirostor, a database that provides information and documents on over 5,000 DTSC cleanup sites. Envirostor can be accessed at: http://www.envirostor.dtsc.ca.gov/public. Also, a computer is available in the Central Files of each DTSC Regional Office for use by community members to view Envirostor.

Sincerely,

Jone Barrio
Regional Records Coordinator
Cypress Administrative Services
Department of Toxic Substances Control

Printed on Recycled Paper

Kristine Savona

From: WB-RB8-FileReview8 [FileReview8@waterboards.ca.gov]
Sent: Friday, April 05, 2013 11:08 AM
To: Kristine Savona
Subject: RIVERSIDE File Review

Hi Kristine,

I show no records for Southwest of Corona in West Riverside County
APNs: 275030006, 275040006, 275040010, 275040011, 275040012, 275040015, 275040016, 275050004, 275070003, 275080010. If you have any questions you can call me at 951 782 4499.

Thanks,
Mary

Information Management
Public Records Unit

Direct Dial (909) 396-3700
Fax:(909) 396-3330

April 05, 2013

KRISTINE SAVONA
HILLMAN CONSULTING LLC
1745 W. ORANGEWOOD AVE., # SUITE 110
ORANGE, CA 92868

Ref.: CONTROL NO: 72281

APPL'S, P/O'S, EQL'S, NOV'S, N/C'S, COMPLAINTS, I/R'S, EMISSIONS SUMMARY, S/T RPTS, AIR MONITORING DATA, ASBESTOS NOTIFICATIONS/RECORDS, PTE'S, NSR'S, HRA'S FOR SKYLINE HEIGHTS PROJECT AREA SOUTHWEST OF CORONA IN WEST RIVERSIDE COUNTY.

This is in regard to your public records request dated April 05, 2013. The District is unable to process your request as submitted because the record you have requested:
CANNOT BE SEARCHED BY TRACT, LOT OR PARCEL NUMBERS. PLEASE SUBMIT WITH SPECIFICS (I.E. FACILITY I.D. NUMBER, FACILITY NAME, FACILITY ADDRESS, PERMIT OR APPLICATION NUMBER).
If you have any questions, please do not hesitate to contact me at (909) 396-2311.

Sincerely,

LORA TRAPP x2854
For Colleen Paine
Public Records Coordinator

:lt

NO LABORATORY RESULTS

APPENDIX E

REGULATORY DATABASE REPORT

Skyline Heights
Skyline Heights
Corona, CA 92882

Inquiry Number: 03552619.2r
March 20, 2013

The EDR Radius Map™ Report with GeoCheck®

EDR® Environmental Data Resources Inc

440 Wheelers Farms Road
Milford, CT 06461
Toll Free: 800.352.0050
www.edrnet.com

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Detail Map	3
Map Findings Summary	4
Map Findings	8
Orphan Summary	9
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GEOCHECK ADDENDUM

Physical Setting Source Addendum	A-1
Physical Setting Source Summary	A-2
Physical Setting SSURGO Soil Map	A-5
Physical Setting Source Map	A-8
Physical Setting Source Map Findings	A-10
Physical Setting Source Records Searched	A-11

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 1527-05) or custom requirements developed for the evaluation of environmental risk associated with a parcel of real estate.

TARGET PROPERTY INFORMATION

ADDRESS

SKYLINE HEIGHTS
CORONA, CA 92882

COORDINATES

Latitude (North):	33.8440000 - 33° 50' 38.40''
Longitude (West):	117.6072000 - 117° 36' 25.92''
Universal Tranverse Mercator:	Zone 11
UTM X (Meters):	443822.4
UTM Y (Meters):	3744831.0
Elevation:	1202 ft. above sea level

USGS TOPOGRAPHIC MAP ASSOCIATED WITH TARGET PROPERTY

Target Property Map:	33117-G5 CORONA SOUTH, CA
Most Recent Revision:	1988

AERIAL PHOTOGRAPHY IN THIS REPORT

Photo Year:	2010
Source:	USDA

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

EXECUTIVE SUMMARY

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

CERCLIS ---------- Comprehensive Environmental Response, Compensation, and Liability Information System
FEDERAL FACILITY ---------- Federal Facility Site Information listing

Federal CERCLIS NFRAP site List

CERC-NFRAP ---------- CERCLIS No Further Remedial Action Planned

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-CESQG ---------- RCRA - Conditionally Exempt Small Quantity Generator

Federal institutional controls / engineering controls registries

US ENG CONTROLS ---------- Engineering Controls Sites List
US INST CONTROL ---------- Sites with Institutional Controls
LUCIS ---------- Land Use Control Information System

Federal ERNS list

ERNS ---------- Emergency Response Notification System

State- and tribal - equivalent NPL

RESPONSE ---------- State Response Sites

State- and tribal - equivalent CERCLIS

ENVIROSTOR ---------- EnviroStor Database

State and tribal landfill and/or solid waste disposal site lists

SWF/LF ---------- Solid Waste Information System

State and tribal leaking storage tank lists

LUST ---------- Geotracker's Leaking Underground Fuel Tank Report

SLIC ---------- Statewide SLIC Cases
INDIAN LUST ---------- Leaking Underground Storage Tanks on Indian Land

State and tribal registered storage tank lists

UST ---------- Active UST Facilities
AST ---------- Aboveground Petroleum Storage Tank Facilities
INDIAN UST ---------- Underground Storage Tanks on Indian Land
FEMA UST ---------- Underground Storage Tank Listing

State and tribal voluntary cleanup sites

VCP ---------- Voluntary Cleanup Program Properties
INDIAN VCP ---------- Voluntary Cleanup Priority Listing

ADDITIONAL ENVIRONMENTAL RECORDS

Local Brownfield lists

US BROWNFIELDS ---------- A Listing of Brownfields Sites

Local Lists of Landfill / Solid Waste Disposal Sites

ODI ---------- Open Dump Inventory
DEBRIS REGION 9 ---------- Torres Martinez Reservation Illegal Dump Site Locations
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

Local Lists of Hazardous waste / Contaminated Sites

US CDL ---------- Clandestine Drug Labs
HIST Cal-Sites ---------- Historical Calsites Database
SCH ---------- School Property Evaluation Program
Toxic Pits ---------- Toxic Pits Cleanup Act Sites
CDL ---------- Clandestine Drug Labs
US HIST CDL ---------- National Clandestine Laboratory Register

Local Lists of Registered Storage Tanks

CA FID UST ---------- Facility Inventory Database
HIST UST ---------- Hazardous Substance Storage Container Database
SWEEPS UST ---------- SWEEPS UST Listing

Local Land Records

LIENS 2 ---------- CERCLA Lien Information
LIENS ---------- Environmental Liens Listing
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

Other Ascertainable Records

RCRA NonGen / NLR	RCRA - Non Generators
DOT OPS	Incident and Accident Data
DOD	Department of Defense Sites
FUDS	Formerly Used Defense Sites
CONSENT	Superfund (CERCLA) Consent Decrees
ROD	Records Of Decision
UMTRA	Uranium Mill Tailings Sites
US MINES	Mines Master Index File
TRIS	Toxic Chemical Release Inventory System
TSCA	Toxic Substances Control Act
FTTS	FIFRA/ TSCA Tracking System - FIFRA (Federal Insecticide, Fungicide, & Rodenticide Act)/TSCA (Toxic Substances Control Act)
HIST FTTS	FIFRA/TSCA Tracking System Administrative Case Listing
SSTS	Section 7 Tracking Systems
ICIS	Integrated Compliance Information System
PADS	PCB Activity Database System
MLTS	Material Licensing Tracking System
RADINFO	Radiation Information Database
FINDS	Facility Index System/Facility Registry System
RAATS	RCRA Administrative Action Tracking System
RMP	Risk Management Plans
CA BOND EXP. PLAN	Bond Expenditure Plan
UIC	UIC Listing
NPDES	NPDES Permits Listing
Cortese	"Cortese" Hazardous Waste & Substances Sites List
HIST CORTESE	Hazardous Waste & Substance Site List
CUPA Listings	CUPA Resources List
Notify 65	Proposition 65 Records
DRYCLEANERS	Cleaner Facilities
WIP	Well Investigation Program Case List
ENF	Enforcement Action Listing
HAZNET	Facility and Manifest Data
EMI	Emissions Inventory Data
INDIAN RESERV	Indian Reservations
SCRD DRYCLEANERS	State Coalition for Remediation of Drycleaners Listing
COAL ASH DOE	Steam-Electric Plant Operation Data
COAL ASH EPA	Coal Combustion Residues Surface Impoundments List
HWT	Registered Hazardous Waste Transporter Database
HWP	EnviroStor Permitted Facilities Listing
Financial Assurance	Financial Assurance Information Listing
2020 COR ACTION	2020 Corrective Action Program List
US AIRS	Aerometric Information Retrieval System Facility Subsystem
PRP	Potentially Responsible Parties
WDS	Waste Discharge System
EPA WATCH LIST	EPA WATCH LIST
US FIN ASSUR	Financial Assurance Information
PCB TRANSFORMER	PCB Transformer Registration Database
PROC	Certified Processors Database
MWMP	Medical Waste Management Program Listing

EXECUTIVE SUMMARY

EDR HIGH RISK HISTORICAL RECORDS

EDR Exclusive Records

EDR MGP---------- EDR Proprietary Manufactured Gas Plants
EDR US Hist Cleaners------- EDR Exclusive Historic Dry Cleaners

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.

EDR HIGH RISK HISTORICAL RECORDS

EDR Exclusive Records

EDR US Hist Auto Stat: 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.

A review of the EDR US Hist Auto Stat list, as provided by EDR, has revealed that there are 2 EDR US Hist Auto Stat sites within approximately 0.25 miles of the target property.

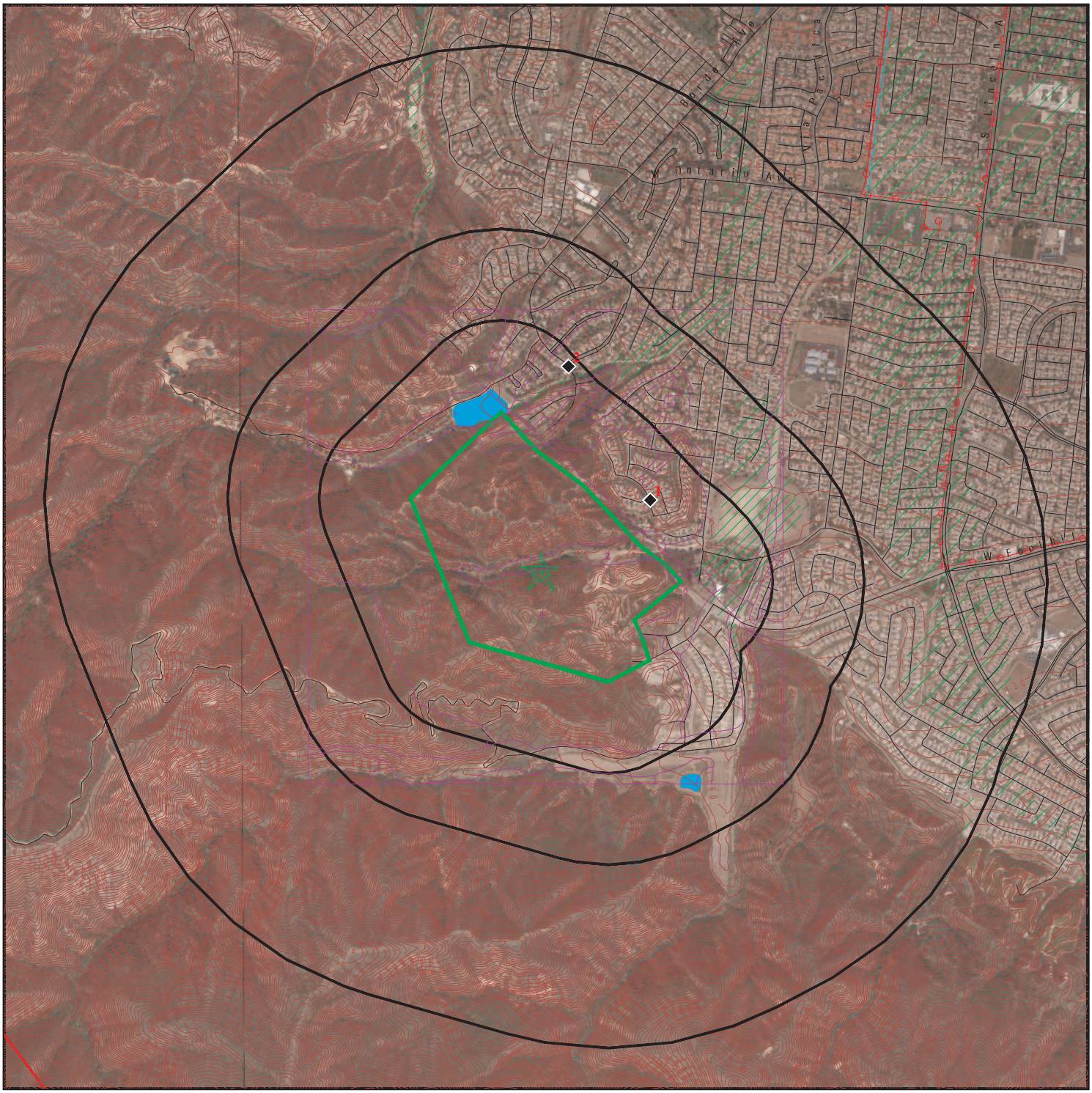
Lower Elevation	Address	Direction / Distance	Map ID	Page
Not reported	3175 LINDSEY LN	ENE 0 - 1/8 (0.105 mi.)	1	8
Not reported	2636 BORDER AVE	N 1/8 - 1/4 (0.219 mi.)	2	8

EXECUTIVE SUMMARY

Due to poor or inadequate address information, the following sites were not mapped. Count: 2 records.

Site Name	Database(s)
WILD ROSE DEVELOPMENT	LUST
WHITEWATER ROCK & SUPPLY	AST

OVERVIEW MAP - 03552619.2r



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

0 1/4 1/2 1 Miles

Indian Reservations BIA

County Boundary

Power transmission lines

Oil & Gas pipelines from USGS

100-year flood zone

500-year flood zone

Areas of Concern

N

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: Skyline Heights	CLIENT: Hillmann Environmental Co.
ADDRESS: Skyline Heights Corona CA 92882	CONTACT: Kristi Hill
LAT/LONG: 33.844 / 117.6072	INQUIRY #: 03552619.2r DATE: March 20, 2013 2:29 pm

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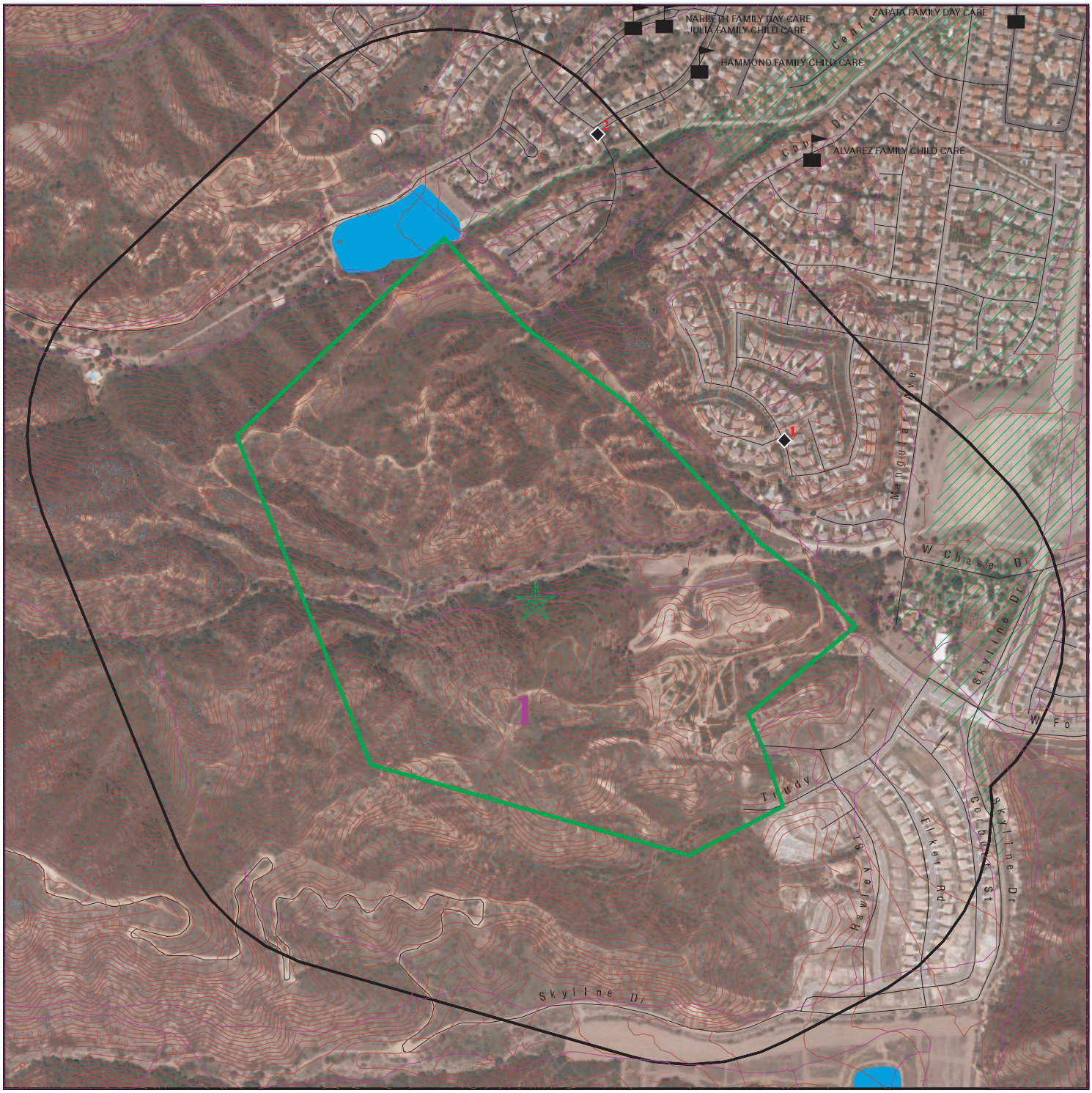
DETAIL MAP - 03552619.2r



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

0 1/8 1/4 1/2 Miles

Indian Reservations BIA

Oil & Gas pipelines from USGS

100-year flood zone

500-year flood zone

Areas of Concern

N

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:	Skyline Heights	CLIENT:	Hillmann Environmental Co.
ADDRESS:	Skyline Heights Corona CA 92882	CONTACT:	Kristi Hill
		INQUIRY #:	03552619.2r
LAT/LONG:	33.844 / 117.6072	DATE:	March 20, 2013 2:32 pm

Copyright © 2013 EDR, Inc. © 2010 Tele Atlas Rel. 07/2009.

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	TP		NR	NR	NR	NR	NR	0
Federal Delisted NPL site list								
Delisted NPL	1.000		0	0	0	0	NR	0
Federal CERCLIS list								
CERCLIS	0.500		0	0	0	NR	NR	0
FEDERAL FACILITY	0.500		0	0	0	NR	NR	0
Federal CERCLIS NFRAP site List								
CERC-NFRAP	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-CESQG	0.250		0	0	NR	NR	NR	0
Federal institutional controls / engineering controls registries								
US ENG CONTROLS	0.500		0	0	0	NR	NR	0
US INST CONTROL	0.500		0	0	0	NR	NR	0
LUCIS	0.500		0	0	0	NR	NR	0
Federal ERNS list								
ERNS	TP		NR	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	0	NR	0
State and tribal landfill and/or solid waste disposal site lists								
SWF/LF	0.500		0	0	0	NR	NR	0
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
SLIC	0.500		0	0	0	NR	NR	0
INDIAN LUST	0.500		0	0	0	NR	NR	0
State and tribal registered storage tank lists								
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
FEMA 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
ADDITIONAL ENVIRONMENTAL RECORDS								
Local Brownfield lists								
US BROWNFIELDS	0.500		0	0	0	NR	NR	0
Local Lists of Landfill / Solid Waste Disposal Sites								
ODI	0.500		0	0	0	NR	NR	0
DEBRIS REGION 9	0.500		0	0	0	NR	NR	0
WMUDS/SWAT	0.500		0	0	0	NR	NR	0
SWRCY	0.500		0	0	0	NR	NR	0
HAULERS	TP		NR	NR	NR	NR	NR	0
INDIAN ODI	0.500		0	0	0	NR	NR	0
Local Lists of Hazardous waste / Contaminated Sites								
US CDL	TP		NR	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
Toxic Pits	1.000		0	0	0	0	NR	0
CDL	TP		NR	NR	NR	NR	NR	0
US HIST CDL	TP		NR	NR	NR	NR	NR	0
Local Lists of Registered Storage Tanks								
CA FID UST	0.250		0	0	NR	NR	NR	0
HIST UST	0.250		0	0	NR	NR	NR	0
SWEEPS UST	0.250		0	0	NR	NR	NR	0
Local Land Records								
LIENS 2	TP		NR	NR	NR	NR	NR	0
LIENS	TP		NR	NR	NR	NR	NR	0
DEED	0.500		0	0	0	NR	NR	0
Records of Emergency Release Reports								
HMIRS	TP		NR	NR	NR	NR	NR	0
CHMIRS	TP		NR	NR	NR	NR	NR	0
LDS	TP		NR	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
MCS	TP		NR	NR	NR	NR	NR	0
Other Ascertainable Records								
RCRA NonGen / NLR	0.250		0	0	NR	NR	NR	0
DOT OPS	TP		NR	NR	NR	NR	NR	0
DOD	1.000		0	0	0	0	NR	0
FUDS	1.000		0	0	0	0	NR	0
CONSENT	1.000		0	0	0	0	NR	0
ROD	1.000		0	0	0	0	NR	0
UMTRA	0.500		0	0	0	NR	NR	0
US MINES	0.250		0	0	NR	NR	NR	0
TRIS	TP		NR	NR	NR	NR	NR	0
TSCA	TP		NR	NR	NR	NR	NR	0
FTTS	TP		NR	NR	NR	NR	NR	0
HIST FTTS	TP		NR	NR	NR	NR	NR	0
SSTS	TP		NR	NR	NR	NR	NR	0
ICIS	TP		NR	NR	NR	NR	NR	0
PADS	TP		NR	NR	NR	NR	NR	0
MLTS	TP		NR	NR	NR	NR	NR	0
RADINFO	TP		NR	NR	NR	NR	NR	0
FINDS	TP		NR	NR	NR	NR	NR	0
RAATS	TP		NR	NR	NR	NR	NR	0
RMP	TP		NR	NR	NR	NR	NR	0
CA BOND EXP. PLAN	1.000		0	0	0	0	NR	0
UIC	TP		NR	NR	NR	NR	NR	0
NPDES	TP		NR	NR	NR	NR	NR	0
Cortese	0.500		0	0	0	NR	NR	0
HIST CORTESE	0.500		0	0	0	NR	NR	0
CUPA Listings	0.250		0	0	NR	NR	NR	0
Notify 65	1.000		0	0	0	0	NR	0
DRYCLEANERS	0.250		0	0	NR	NR	NR	0
WIP	0.250		0	0	NR	NR	NR	0
ENF	TP		NR	NR	NR	NR	NR	0
HAZNET	TP		NR	NR	NR	NR	NR	0
EMI	TP		NR	NR	NR	NR	NR	0
INDIAN RESERV	1.000		0	0	0	0	NR	0
SCRD DRYCLEANERS	0.500		0	0	0	NR	NR	0
COAL ASH DOE	TP		NR	NR	NR	NR	NR	0
COAL ASH EPA	0.500		0	0	0	NR	NR	0
HWT	0.250		0	0	NR	NR	NR	0
HWP	1.000		0	0	0	0	NR	0
Financial Assurance	TP		NR	NR	NR	NR	NR	0
2020 COR ACTION	0.250		0	0	NR	NR	NR	0
US AIRS	TP		NR	NR	NR	NR	NR	0
PRP	TP		NR	NR	NR	NR	NR	0
WDS	TP		NR	NR	NR	NR	NR	0
EPA WATCH LIST	TP		NR	NR	NR	NR	NR	0
US FIN ASSUR	TP		NR	NR	NR	NR	NR	0
PCB TRANSFORMER	TP		NR	NR	NR	NR	NR	0
PROC	0.500		0	0	0	NR	NR	0
MWMP	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
EDR HIGH RISK HISTORICAL RECORDS								
EDR Exclusive Records								
EDR MGP	1.000		0	0	0	0	NR	0
EDR US Hist Auto Stat	0.250		1	1	NR	NR	NR	2
EDR US Hist Cleaners	0.250		0	0	NR	NR	NR	0

NOTES:

TP = Target Property

NR = Not Requested at this Search Distance

Sites may be listed in more than one database

1
ENE
< 1/8
0.105 mi.
556 ft.

3175 LINDSEY LN
CORONA, CA 92882

EDR US Hist Auto Stat **1015419670**
N/A

Relative:
Lower

Actual:
1153 ft.

EDR Historical Auto Stations:
Name: COLLISION AUTO
Year: 2005
Address: 3175 LINDSEY LN

2
North
1/8-1/4
0.219 mi.
1157 ft.

2636 BORDER AVE
CORONA, CA 92882

EDR US Hist Auto Stat **1015374842**
N/A

Relative:
Lower

Actual:
1065 ft.

EDR Historical Auto Stations:
Name: TAMMS MOBILE SERVICE
Year: 2002
Address: 2636 BORDER AVE

Count: 2 records. ORPHAN SUMMARY

City	EDR ID	Site Name	Site Address	Zip	Database(s)
CORONA	S106117708	WILD ROSE DEVELOPMENT	HWY 15 NEARCLAY CANYON		LUST
WHITEWATER	A100337156	WHITEWATER ROCK & SUPPLY	58645 OLD HWY 60	92882	AST

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: 02/01/2013
Date Data Arrived at EDR: 03/01/2013
Date Made Active in Reports: 03/13/2013
Number of Days to Update: 12

Source: EPA
Telephone: N/A
Last EDR Contact: 03/01/2013
Next Scheduled EDR Contact: 04/22/2013
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: 02/01/2013
Date Data Arrived at EDR: 03/01/2013
Date Made Active in Reports: 03/13/2013
Number of Days to Update: 12

Source: EPA
Telephone: N/A
Last EDR Contact: 03/01/2013
Next Scheduled EDR Contact: 04/22/2013
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

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

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: 02/01/2013
Date Data Arrived at EDR: 03/01/2013
Date Made Active in Reports: 03/13/2013
Number of Days to Update: 12

Source: EPA
Telephone: N/A
Last EDR Contact: 03/01/2013
Next Scheduled EDR Contact: 04/22/2013
Data Release Frequency: Quarterly

Federal CERCLIS list

CERCLIS: Comprehensive Environmental Response, Compensation, and Liability Information System

CERCLIS 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). CERCLIS contains sites which are either proposed to or on the National Priorities List (NPL) and sites which are in the screening and assessment phase for possible inclusion on the NPL.

Date of Government Version: 02/04/2013
Date Data Arrived at EDR: 03/01/2013
Date Made Active in Reports: 03/13/2013
Number of Days to Update: 12

Source: EPA
Telephone: 703-412-9810
Last EDR Contact: 03/01/2013
Next Scheduled EDR Contact: 06/10/2013
Data Release Frequency: Quarterly

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: 07/31/2012
Date Data Arrived at EDR: 10/09/2012
Date Made Active in Reports: 12/20/2012
Number of Days to Update: 72

Source: Environmental Protection Agency
Telephone: 703-603-8704
Last EDR Contact: 01/11/2013
Next Scheduled EDR Contact: 04/22/2013
Data Release Frequency: Varies

Federal CERCLIS NFRAP site List

CERCLIS-NFRAP: CERCLIS No Further Remedial Action Planned

Archived sites are sites that have been removed and archived from the inventory of CERCLIS 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 this 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. This 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 a potential NPL site.

Date of Government Version: 02/05/2013
Date Data Arrived at EDR: 03/01/2013
Date Made Active in Reports: 03/13/2013
Number of Days to Update: 12

Source: EPA
Telephone: 703-412-9810
Last EDR Contact: 01/04/2013
Next Scheduled EDR Contact: 03/11/2013
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: 02/12/2013
Date Data Arrived at EDR: 02/21/2013
Date Made Active in Reports: 02/27/2013
Number of Days to Update: 6

Source: EPA
Telephone: 800-424-9346
Last EDR Contact: 02/08/2013
Next Scheduled EDR Contact: 05/27/2013
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: 02/12/2013
Date Data Arrived at EDR: 02/15/2013
Date Made Active in Reports: 02/27/2013
Number of Days to Update: 12

Source: Environmental Protection Agency
Telephone: (415) 495-8895
Last EDR Contact: 02/15/2013
Next Scheduled EDR Contact: 04/15/2013
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: 02/12/2013
Date Data Arrived at EDR: 02/15/2013
Date Made Active in Reports: 02/27/2013
Number of Days to Update: 12

Source: Environmental Protection Agency
Telephone: (415) 495-8895
Last EDR Contact: 02/15/2013
Next Scheduled EDR Contact: 04/15/2013
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: 02/12/2013
Date Data Arrived at EDR: 02/15/2013
Date Made Active in Reports: 02/27/2013
Number of Days to Update: 12

Source: Environmental Protection Agency
Telephone: (415) 495-8895
Last EDR Contact: 02/15/2013
Next Scheduled EDR Contact: 04/15/2013
Data Release Frequency: Quarterly

RCRA-CESQG: RCRA - 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). Conditionally exempt small quantity generators (CESQGs) generate less than 100 kg of hazardous waste, or less than 1 kg of acutely hazardous waste per month.

Date of Government Version: 02/12/2013
Date Data Arrived at EDR: 02/15/2013
Date Made Active in Reports: 02/27/2013
Number of Days to Update: 12

Source: Environmental Protection Agency
Telephone: (415) 495-8895
Last EDR Contact: 02/15/2013
Next Scheduled EDR Contact: 04/15/2013
Data Release Frequency: Varies

Federal institutional controls / engineering controls registries

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: 12/19/2012
Date Data Arrived at EDR: 12/26/2012
Date Made Active in Reports: 02/27/2013
Number of Days to Update: 63

Source: Environmental Protection Agency
Telephone: 703-603-0695
Last EDR Contact: 03/11/2013
Next Scheduled EDR Contact: 06/24/2013
Data Release Frequency: Varies

US INST CONTROL: Sites with Institutional Controls

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: 12/19/2012
Date Data Arrived at EDR: 12/26/2012
Date Made Active in Reports: 02/27/2013
Number of Days to Update: 63

Source: Environmental Protection Agency
Telephone: 703-603-0695
Last EDR Contact: 03/11/2013
Next Scheduled EDR Contact: 06/24/2013
Data Release Frequency: Varies

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: 12/09/2005
Date Data Arrived at EDR: 12/11/2006
Date Made Active in Reports: 01/11/2007
Number of Days to Update: 31

Source: Department of the Navy
Telephone: 843-820-7326
Last EDR Contact: 02/18/2013
Next Scheduled EDR Contact: 06/03/2013
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: 12/31/2012
Date Data Arrived at EDR: 01/17/2013
Date Made Active in Reports: 02/15/2013
Number of Days to Update: 29

Source: National Response Center, United States Coast Guard
Telephone: 202-267-2180
Last EDR Contact: 01/17/2013
Next Scheduled EDR Contact: 04/15/2013
Data Release Frequency: Annually

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: 12/05/2012
Date Data Arrived at EDR: 12/06/2012
Date Made Active in Reports: 01/15/2013
Number of Days to Update: 40

Source: Department of Toxic Substances Control
Telephone: 916-323-3400
Last EDR Contact: 03/14/2013
Next Scheduled EDR Contact: 05/20/2013
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: 12/05/2012
Date Data Arrived at EDR: 12/06/2012
Date Made Active in Reports: 01/15/2013
Number of Days to Update: 40

Source: Department of Toxic Substances Control
Telephone: 916-323-3400
Last EDR Contact: 03/14/2013
Next Scheduled EDR Contact: 05/20/2013
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: 02/18/2013
Date Data Arrived at EDR: 02/18/2013
Date Made Active in Reports: 03/20/2013
Number of Days to Update: 30

Source: Department of Resources Recycling and Recovery
Telephone: 916-341-6320
Last EDR Contact: 02/18/2013
Next Scheduled EDR Contact: 06/03/2013
Data Release Frequency: Quarterly

State and tribal leaking storage tank lists

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: Varies

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 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 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

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: Quarterly

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: Geotracker's Leaking Underground Fuel Tank Report

Leaking Underground Storage Tank Incident Reports. LUST records contain an inventory of reported leaking underground storage tank incidents. Not all states maintain these records, and the information stored varies by state. For more information on a particular leaking underground storage tank sites, please contact the appropriate regulatory agency.

Date of Government Version: 01/30/2013
Date Data Arrived at EDR: 01/31/2013
Date Made Active in Reports: 03/19/2013
Number of Days to Update: 47

Source: State Water Resources Control Board
Telephone: see region list
Last EDR Contact: 03/19/2013
Next Scheduled EDR Contact: 07/01/2013
Data Release Frequency: Quarterly

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

SLIC: Statewide SLIC Cases

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: 12/17/2012
Date Data Arrived at EDR: 12/17/2012
Date Made Active in Reports: 01/25/2013
Number of Days to Update: 39

Source: State Water Resources Control Board
Telephone: 866-480-1028
Last EDR Contact: 03/19/2013
Next Scheduled EDR Contact: 07/01/2013
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: Quarterly

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: Semi-Annually

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: Varies

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: Semi-Annually

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: Semi-Annually

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: Semi-Annually

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: Annually

INDIAN LUST R10: Leaking Underground Storage Tanks on Indian Land
LUSTs on Indian land in Alaska, Idaho, Oregon and Washington.

Date of Government Version: 08/01/2012
Date Data Arrived at EDR: 08/02/2012
Date Made Active in Reports: 10/16/2012
Number of Days to Update: 75

Source: EPA Region 10
Telephone: 206-553-2857
Last EDR Contact: 10/30/2012
Next Scheduled EDR Contact: 05/13/2013
Data Release Frequency: Quarterly

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: 04/12/2012
Date Data Arrived at EDR: 05/09/2012
Date Made Active in Reports: 07/10/2012
Number of Days to Update: 62

Source: EPA Region 1
Telephone: 617-918-1313
Last EDR Contact: 02/01/2013
Next Scheduled EDR Contact: 05/13/2013
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: 08/27/2012
Date Data Arrived at EDR: 08/28/2012
Date Made Active in Reports: 10/16/2012
Number of Days to Update: 49

Source: EPA Region 8
Telephone: 303-312-6271
Last EDR Contact: 01/28/2013
Next Scheduled EDR Contact: 05/13/2013
Data Release Frequency: Quarterly

INDIAN LUST R6: Leaking Underground Storage Tanks on Indian Land
LUSTs on Indian land in New Mexico and Oklahoma.

Date of Government Version: 09/12/2011
Date Data Arrived at EDR: 09/13/2011
Date Made Active in Reports: 11/11/2011
Number of Days to Update: 59

Source: EPA Region 6
Telephone: 214-665-6597
Last EDR Contact: 01/28/2013
Next Scheduled EDR Contact: 05/13/2013
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: 12/14/2011
Date Data Arrived at EDR: 12/15/2011
Date Made Active in Reports: 01/10/2012
Number of Days to Update: 26

Source: EPA Region 4
Telephone: 404-562-8677
Last EDR Contact: 01/28/2013
Next Scheduled EDR Contact: 05/13/2013
Data Release Frequency: Semi-Annually

INDIAN LUST R7: Leaking Underground Storage Tanks on Indian Land
LUSTs on Indian land in Iowa, Kansas, and Nebraska

Date of Government Version: 08/17/2012
Date Data Arrived at EDR: 08/28/2012
Date Made Active in Reports: 10/16/2012
Number of Days to Update: 49

Source: EPA Region 7
Telephone: 913-551-7003
Last EDR Contact: 01/28/2013
Next Scheduled EDR Contact: 05/13/2013
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: 09/06/2012
Date Data Arrived at EDR: 09/07/2012
Date Made Active in Reports: 10/16/2012
Number of Days to Update: 39

Source: Environmental Protection Agency
Telephone: 415-972-3372
Last EDR Contact: 01/28/2013
Next Scheduled EDR Contact: 05/13/2013
Data Release Frequency: Quarterly

State and tribal registered storage tank lists

UST: Active UST Facilities
Active UST facilities gathered from the local regulatory agencies

Date of Government Version: 12/17/2012
Date Data Arrived at EDR: 12/18/2012
Date Made Active in Reports: 01/25/2013
Number of Days to Update: 38

Source: SWRCB
Telephone: 916-341-5851
Last EDR Contact: 03/19/2013
Next Scheduled EDR Contact: 07/01/2013
Data Release Frequency: Semi-Annually

AST: Aboveground Petroleum Storage Tank Facilities
Registered Aboveground Storage Tanks.

Date of Government Version: 08/01/2009
Date Data Arrived at EDR: 09/10/2009
Date Made Active in Reports: 10/01/2009
Number of Days to Update: 21

Source: State Water Resources Control Board
Telephone: 916-327-5092
Last EDR Contact: 01/07/2013
Next Scheduled EDR Contact: 04/22/2013
Data Release Frequency: Quarterly

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: 08/01/2012
Date Data Arrived at EDR: 08/02/2012
Date Made Active in Reports: 10/16/2012
Number of Days to Update: 75

Source: EPA Region 10
Telephone: 206-553-2857
Last EDR Contact: 01/28/2013
Next Scheduled EDR Contact: 05/13/2013
Data Release Frequency: Quarterly

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: 09/06/2012
Date Data Arrived at EDR: 09/07/2012
Date Made Active in Reports: 10/16/2012
Number of Days to Update: 39

Source: EPA Region 9
Telephone: 415-972-3368
Last EDR Contact: 01/28/2013
Next Scheduled EDR Contact: 05/13/2013
Data Release Frequency: Quarterly

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: 08/27/2012
Date Data Arrived at EDR: 08/28/2012
Date Made Active in Reports: 10/16/2012
Number of Days to Update: 49

Source: EPA Region 8
Telephone: 303-312-6137
Last EDR Contact: 01/28/2013
Next Scheduled EDR Contact: 05/13/2013
Data Release Frequency: Quarterly

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: 08/17/2012
Date Data Arrived at EDR: 08/28/2012
Date Made Active in Reports: 10/16/2012
Number of Days to Update: 49

Source: EPA Region 7
Telephone: 913-551-7003
Last EDR Contact: 01/28/2013
Next Scheduled EDR Contact: 05/13/2013
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: 05/10/2011
Date Data Arrived at EDR: 05/11/2011
Date Made Active in Reports: 06/14/2011
Number of Days to Update: 34

Source: EPA Region 6
Telephone: 214-665-7591
Last EDR Contact: 01/28/2013
Next Scheduled EDR Contact: 05/13/2013
Data Release Frequency: Semi-Annually

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: 08/02/2012
Date Data Arrived at EDR: 08/03/2012
Date Made Active in Reports: 11/05/2012
Number of Days to Update: 94

Source: EPA Region 5
Telephone: 312-886-6136
Last EDR Contact: 03/19/2013
Next Scheduled EDR Contact: 05/13/2013
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: 12/14/2011
Date Data Arrived at EDR: 12/15/2011
Date Made Active in Reports: 01/10/2012
Number of Days to Update: 26

Source: EPA Region 4
Telephone: 404-562-9424
Last EDR Contact: 01/28/2013
Next Scheduled EDR Contact: 05/13/2013
Data Release Frequency: Semi-Annually

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: 04/12/2012
Date Data Arrived at EDR: 05/02/2012
Date Made Active in Reports: 07/16/2012
Number of Days to Update: 75

Source: EPA, Region 1
Telephone: 617-918-1313
Last EDR Contact: 02/01/2013
Next Scheduled EDR Contact: 05/13/2013
Data Release Frequency: Varies

FEMA UST: Underground Storage Tank Listing

A listing of all FEMA owned underground storage tanks.

Date of Government Version: 01/01/2010
Date Data Arrived at EDR: 02/16/2010
Date Made Active in Reports: 04/12/2010
Number of Days to Update: 55

Source: FEMA
Telephone: 202-646-5797
Last EDR Contact: 01/14/2013
Next Scheduled EDR Contact: 04/29/2013
Data Release Frequency: Varies

State and tribal voluntary cleanup sites

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: 12/05/2012
Date Data Arrived at EDR: 12/06/2012
Date Made Active in Reports: 01/15/2013
Number of Days to Update: 40
Source: Department of Toxic Substances Control
Telephone: 916-323-3400
Last EDR Contact: 03/14/2013
Next Scheduled EDR Contact: 05/20/2013
Data Release Frequency: Quarterly

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: 09/28/2012
Date Data Arrived at EDR: 10/02/2012
Date Made Active in Reports: 10/16/2012
Number of Days to Update: 14
Source: EPA, Region 1
Telephone: 617-918-1102
Last EDR Contact: 01/04/2013
Next Scheduled EDR Contact: 04/15/2013
Data Release Frequency: Varies

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: 12/10/2012
Date Data Arrived at EDR: 12/11/2012
Date Made Active in Reports: 12/20/2012
Number of Days to Update: 9
Source: Environmental Protection Agency
Telephone: 202-566-2777
Last EDR Contact: 02/14/2013
Next Scheduled EDR Contact: 04/08/2013
Data Release Frequency: Semi-Annually

Local Lists of Landfill / Solid Waste Disposal Sites

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: 01/28/2013
Next Scheduled EDR Contact: 05/13/2013
Data Release Frequency: No Update Planned

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: 02/11/2013
Next Scheduled EDR Contact: 05/27/2013
Data Release Frequency: No Update Planned

SWRCY: Recycler Database
A listing of recycling facilities in California.

Date of Government Version: 12/18/2012
Date Data Arrived at EDR: 12/20/2012
Date Made Active in Reports: 01/25/2013
Number of Days to Update: 36
Source: Department of Conservation
Telephone: 916-323-3836
Last EDR Contact: 03/19/2013
Next Scheduled EDR Contact: 07/01/2013
Data Release Frequency: Quarterly

HAULERS: Registered Waste Tire Haulers Listing
A listing of registered waste tire haulers.

Date of Government Version: 11/15/2012
Date Data Arrived at EDR: 11/20/2012
Date Made Active in Reports: 01/04/2013
Number of Days to Update: 45
Source: Integrated Waste Management Board
Telephone: 916-341-6422
Last EDR Contact: 03/04/2013
Next Scheduled EDR Contact: 06/03/2013
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: 02/05/2013
Next Scheduled EDR Contact: 05/20/2013
Data Release Frequency: Varies

Local Lists of Hazardous waste / Contaminated Sites

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: 11/14/2012
Date Data Arrived at EDR: 12/11/2012
Date Made Active in Reports: 02/15/2013
Number of Days to Update: 66

Source: Drug Enforcement Administration
Telephone: 202-307-1000
Last EDR Contact: 03/04/2013
Next Scheduled EDR Contact: 06/17/2013
Data Release Frequency: Quarterly

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: 12/05/2012
Date Data Arrived at EDR: 12/06/2012
Date Made Active in Reports: 01/15/2013
Number of Days to Update: 40

Source: Department of Toxic Substances Control
Telephone: 916-323-3400
Last EDR Contact: 03/14/2013
Next Scheduled EDR Contact: 05/20/2013
Data Release Frequency: Quarterly

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

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: 06/30/2012
Date Data Arrived at EDR: 09/12/2012
Date Made Active in Reports: 10/03/2012
Number of Days to Update: 21

Source: Department of Toxic Substances Control
Telephone: 916-255-6504
Last EDR Contact: 12/28/2012
Next Scheduled EDR Contact: 04/15/2013
Data Release Frequency: Varies

US HIST CDL: National Clandestine Laboratory Register

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: 09/01/2007
Date Data Arrived at EDR: 11/19/2008
Date Made Active in Reports: 03/30/2009
Number of Days to Update: 131

Source: Drug Enforcement Administration
Telephone: 202-307-1000
Last EDR Contact: 03/23/2009
Next Scheduled EDR Contact: 06/22/2009
Data Release Frequency: No Update Planned

Local Lists of Registered Storage Tanks

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

UST MENDOCINO: Mendocino County UST Database

A listing of underground storage tank locations in Mendocino County.

Date of Government Version: 09/23/2009
Date Data Arrived at EDR: 09/23/2009
Date Made Active in Reports: 10/01/2009
Number of Days to Update: 8

Source: Department of Public Health
Telephone: 707-463-4466
Last EDR Contact: 03/04/2013
Next Scheduled EDR Contact: 06/17/2013
Data Release Frequency: Annually

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

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

Local Land Records

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: 02/16/2012
Date Data Arrived at EDR: 03/26/2012
Date Made Active in Reports: 06/14/2012
Number of Days to Update: 80

Source: Environmental Protection Agency
Telephone: 202-564-6023
Last EDR Contact: 01/28/2013
Next Scheduled EDR Contact: 05/13/2013
Data Release Frequency: Varies

LIENS: Environmental Liens Listing

A listing of property locations with environmental liens for California where DTSC is a lien holder.

Date of Government Version: 12/17/2012
Date Data Arrived at EDR: 12/18/2012
Date Made Active in Reports: 01/21/2013
Number of Days to Update: 34

Source: Department of Toxic Substances Control
Telephone: 916-323-3400
Last EDR Contact: 03/11/2013
Next Scheduled EDR Contact: 06/24/2013
Data Release Frequency: Varies

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: 12/10/2012
Date Data Arrived at EDR: 12/11/2012
Date Made Active in Reports: 01/15/2013
Number of Days to Update: 35

Source: Department of Toxic Substances Control
Telephone: 916-323-3400
Last EDR Contact: 03/12/2013
Next Scheduled EDR Contact: 06/24/2013
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: 12/31/2012
Date Data Arrived at EDR: 01/03/2013
Date Made Active in Reports: 02/27/2013
Number of Days to Update: 55

Source: U.S. Department of Transportation
Telephone: 202-366-4555
Last EDR Contact: 01/03/2013
Next Scheduled EDR Contact: 04/15/2013
Data Release Frequency: Annually

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: 12/06/2012
Date Data Arrived at EDR: 01/29/2013
Date Made Active in Reports: 03/19/2013
Number of Days to Update: 49

Source: Office of Emergency Services
Telephone: 916-845-8400
Last EDR Contact: 01/29/2013
Next Scheduled EDR Contact: 05/13/2013
Data Release Frequency: Varies

LDS: Land Disposal Sites Listing

The Land Disposal program regulates of waste discharge to land for treatment, storage and disposal in waste management units.

Date of Government Version: 01/30/2013
Date Data Arrived at EDR: 01/31/2013
Date Made Active in Reports: 03/20/2013
Number of Days to Update: 48

Source: State Water Qualilty Control Board
Telephone: 866-480-1028
Last EDR Contact: 03/19/2013
Next Scheduled EDR Contact: 07/01/2013
Data Release Frequency: Quarterly

MCS: Military Cleanup Sites Listing

The State Water Resources Control Board and nine Regional Water Quality Control Boards partner with the Department of Defense (DoD) through the Defense and State Memorandum of Agreement (DSMOA) to oversee the investigation and remediation of water quality issues at military facilities.

Date of Government Version: 01/30/2013
Date Data Arrived at EDR: 01/31/2013
Date Made Active in Reports: 03/20/2013
Number of Days to Update: 48

Source: State Water Resources Control Board
Telephone: 866-480-1028
Last EDR Contact: 03/19/2013
Next Scheduled EDR Contact: 07/01/2013
Data Release Frequency: Quarterly

Other Ascertainable Records

RCRA NonGen / NLR: RCRA - Non 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). Non-Generators do not presently generate hazardous waste.

Date of Government Version: 02/12/2013
Date Data Arrived at EDR: 02/15/2013
Date Made Active in Reports: 02/27/2013
Number of Days to Update: 12

Source: Environmental Protection Agency
Telephone: (415) 495-8895
Last EDR Contact: 02/15/2013
Next Scheduled EDR Contact: 04/15/2013
Data Release Frequency: Varies

DOT OPS: Incident and Accident Data

Department of Transporation, Office of Pipeline Safety Incident and Accident data.

Date of Government Version: 07/31/2012
Date Data Arrived at EDR: 08/07/2012
Date Made Active in Reports: 09/18/2012
Number of Days to Update: 42

Source: Department of Transporation, Office of Pipeline Safety
Telephone: 202-366-4595
Last EDR Contact: 02/05/2013
Next Scheduled EDR Contact: 05/20/2013
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: 01/17/2013
Next Scheduled EDR Contact: 04/29/2013
Data Release Frequency: Semi-Annually

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: 12/31/2011
Date Data Arrived at EDR: 02/26/2013
Date Made Active in Reports: 03/13/2013
Number of Days to Update: 15

Source: U.S. Army Corps of Engineers
Telephone: 202-528-4285
Last EDR Contact: 03/11/2013
Next Scheduled EDR Contact: 06/24/2013
Data Release Frequency: Varies

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: 12/31/2011
Date Data Arrived at EDR: 01/15/2013
Date Made Active in Reports: 03/13/2013
Number of Days to Update: 57

Source: Department of Justice, Consent Decree Library
Telephone: Varies
Last EDR Contact: 12/28/2012
Next Scheduled EDR Contact: 04/15/2013
Data Release Frequency: Varies

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: 11/02/2012
Date Data Arrived at EDR: 12/11/2012
Date Made Active in Reports: 03/13/2013
Number of Days to Update: 92

Source: EPA
Telephone: 703-416-0223
Last EDR Contact: 03/13/2013
Next Scheduled EDR Contact: 06/24/2013
Data Release Frequency: Annually

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: 09/14/2010
Date Data Arrived at EDR: 10/07/2011
Date Made Active in Reports: 03/01/2012
Number of Days to Update: 146

Source: Department of Energy
Telephone: 505-845-0011
Last EDR Contact: 02/25/2013
Next Scheduled EDR Contact: 06/10/2013
Data Release Frequency: Varies

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: 08/18/2011
Date Data Arrived at EDR: 09/08/2011
Date Made Active in Reports: 09/29/2011
Number of Days to Update: 21

Source: Department of Labor, Mine Safety and Health Administration
Telephone: 303-231-5959
Last EDR Contact: 03/06/2013
Next Scheduled EDR Contact: 06/17/2013
Data Release Frequency: Semi-Annually

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: 12/31/2009
Date Data Arrived at EDR: 09/01/2011
Date Made Active in Reports: 01/10/2012
Number of Days to Update: 131

Source: EPA
Telephone: 202-566-0250
Last EDR Contact: 02/26/2013
Next Scheduled EDR Contact: 06/10/2013
Data Release Frequency: Annually

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: 12/31/2006
Date Data Arrived at EDR: 09/29/2010
Date Made Active in Reports: 12/02/2010
Number of Days to Update: 64

Source: EPA
Telephone: 202-260-5521
Last EDR Contact: 12/28/2012
Next Scheduled EDR Contact: 04/08/2013
Data Release Frequency: Every 4 Years

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: 02/25/2013
Next Scheduled EDR Contact: 06/10/2013
Data Release Frequency: Quarterly

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: 02/25/2013
Next Scheduled EDR Contact: 06/10/2013
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

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: 12/31/2009
Date Data Arrived at EDR: 12/10/2010
Date Made Active in Reports: 02/25/2011
Number of Days to Update: 77

Source: EPA
Telephone: 202-564-4203
Last EDR Contact: 01/28/2013
Next Scheduled EDR Contact: 05/13/2013
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: 07/20/2011
Date Data Arrived at EDR: 11/10/2011
Date Made Active in Reports: 01/10/2012
Number of Days to Update: 61

Source: Environmental Protection Agency
Telephone: 202-564-5088
Last EDR Contact: 01/17/2013
Next Scheduled EDR Contact: 04/29/2013
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: 11/01/2010
Date Data Arrived at EDR: 11/10/2010
Date Made Active in Reports: 02/16/2011
Number of Days to Update: 98

Source: EPA
Telephone: 202-566-0500
Last EDR Contact: 01/16/2013
Next Scheduled EDR Contact: 04/29/2013
Data Release Frequency: Annually

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: 06/21/2011
Date Data Arrived at EDR: 07/15/2011
Date Made Active in Reports: 09/13/2011
Number of Days to Update: 60

Source: Nuclear Regulatory Commission
Telephone: 301-415-7169
Last EDR Contact: 03/11/2013
Next Scheduled EDR Contact: 06/24/2013
Data Release Frequency: Quarterly

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: 10/02/2012
Date Data Arrived at EDR: 10/02/2012
Date Made Active in Reports: 11/05/2012
Number of Days to Update: 34

Source: Environmental Protection Agency
Telephone: 202-343-9775
Last EDR Contact: 01/09/2013
Next Scheduled EDR Contact: 04/22/2013
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: 10/23/2011
Date Data Arrived at EDR: 12/13/2011
Date Made Active in Reports: 03/01/2012
Number of Days to Update: 79

Source: EPA
Telephone: (415) 947-8000
Last EDR Contact: 03/12/2013
Next Scheduled EDR Contact: 06/24/2013
Data Release Frequency: Quarterly

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

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: 05/08/2012
Date Data Arrived at EDR: 05/25/2012
Date Made Active in Reports: 07/10/2012
Number of Days to Update: 46

Source: Environmental Protection Agency
Telephone: 202-564-8600
Last EDR Contact: 01/28/2013
Next Scheduled EDR Contact: 05/13/2013
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: 12/31/2009
Date Data Arrived at EDR: 03/01/2011
Date Made Active in Reports: 05/02/2011
Number of Days to Update: 62

Source: EPA/NTIS
Telephone: 800-424-9346
Last EDR Contact: 02/26/2013
Next Scheduled EDR Contact: 06/10/2013
Data Release Frequency: Biennially

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

NPDES: NPDES Permits Listing

A listing of NPDES permits, including stormwater.

Date of Government Version: 02/18/2013
Date Data Arrived at EDR: 02/18/2013
Date Made Active in Reports: 03/20/2013
Number of Days to Update: 30

Source: State Water Resources Control Board
Telephone: 916-445-9379
Last EDR Contact: 02/18/2013
Next Scheduled EDR Contact: 06/03/2013
Data Release Frequency: Quarterly

UIC: UIC Listing

A listing of underground control injection wells.

Date of Government Version: 10/17/2012
Date Data Arrived at EDR: 12/21/2012
Date Made Active in Reports: 01/25/2013
Number of Days to Update: 35

Source: Deaprtment of Conservation
Telephone: 916-445-2408
Last EDR Contact: 03/19/2013
Next Scheduled EDR Contact: 12/31/2012
Data Release Frequency: Varies

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: 01/02/2013
Date Data Arrived at EDR: 01/03/2013
Date Made Active in Reports: 02/22/2013
Number of Days to Update: 50

Source: CAL EPA/Office of Emergency Information
Telephone: 916-323-3400
Last EDR Contact: 01/03/2013
Next Scheduled EDR Contact: 04/15/2013
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

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: 10/21/1993
Date Data Arrived at EDR: 11/01/1993
Date Made Active in Reports: 11/19/1993
Number of Days to Update: 18

Source: State Water Resources Control Board
Telephone: 916-445-3846
Last EDR Contact: 12/18/2012
Next Scheduled EDR Contact: 04/08/2013
Data Release Frequency: No Update Planned

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: 12/11/2012
Date Data Arrived at EDR: 12/12/2012
Date Made Active in Reports: 01/04/2013
Number of Days to Update: 23

Source: Department of Toxic Substance Control
Telephone: 916-327-4498
Last EDR Contact: 03/11/2013
Next Scheduled EDR Contact: 12/24/2012
Data Release Frequency: Annually

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: 12/28/2012
Next Scheduled EDR Contact: 04/15/2013
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: 01/08/2013
Date Data Arrived at EDR: 01/29/2013
Date Made Active in Reports: 03/19/2013
Number of Days to Update: 49

Source: State Water Resoruces Control Board
Telephone: 916-445-9379
Last EDR Contact: 01/08/2013
Next Scheduled EDR Contact: 05/13/2013
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.

Date of Government Version: 12/31/2011
Date Data Arrived at EDR: 06/22/2012
Date Made Active in Reports: 07/06/2012
Number of Days to Update: 14

Source: California Environmental Protection Agency
Telephone: 916-255-1136
Last EDR Contact: 01/14/2013
Next Scheduled EDR Contact: 04/29/2013
Data Release Frequency: Annually

EMI: Emissions Inventory Data

Toxics and criteria pollutant emissions data collected by the ARB and local air pollution agencies.

Date of Government Version: 12/31/2008
Date Data Arrived at EDR: 09/29/2010
Date Made Active in Reports: 10/18/2010
Number of Days to Update: 19

Source: California Air Resources Board
Telephone: 916-322-2990
Last EDR Contact: 12/28/2012
Next Scheduled EDR Contact: 04/08/2013
Data Release Frequency: Varies

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: 12/31/2005
Date Data Arrived at EDR: 12/08/2006
Date Made Active in Reports: 01/11/2007
Number of Days to Update: 34

Source: USGS
Telephone: 202-208-3710
Last EDR Contact: 01/17/2013
Next Scheduled EDR Contact: 04/29/2013
Data Release Frequency: Semi-Annually

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: 03/07/2011
Date Data Arrived at EDR: 03/09/2011
Date Made Active in Reports: 05/02/2011
Number of Days to Update: 54

Source: Environmental Protection Agency
Telephone: 615-532-8599
Last EDR Contact: 01/21/2013
Next Scheduled EDR Contact: 05/06/2013
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: 11/20/2012
Date Data Arrived at EDR: 11/30/2012
Date Made Active in Reports: 02/27/2013
Number of Days to Update: 89

Source: Environmental Protection Agency
Telephone: 202-566-1917
Last EDR Contact: 02/19/2013
Next Scheduled EDR Contact: 06/03/2013
Data Release Frequency: Quarterly

PCB TRANSFORMER: PCB Transformer Registration Database

The database of PCB transformer registrations that includes all PCB registration submittals.

Date of Government Version: 02/01/2011
Date Data Arrived at EDR: 10/19/2011
Date Made Active in Reports: 01/10/2012
Number of Days to Update: 83

Source: Environmental Protection Agency
Telephone: 202-566-0517
Last EDR Contact: 02/01/2013
Next Scheduled EDR Contact: 05/13/2013
Data Release Frequency: Varies

PROC: Certified Processors Database

A listing of certified processors.

Date of Government Version: 12/18/2012
Date Data Arrived at EDR: 12/20/2012
Date Made Active in Reports: 01/25/2013
Number of Days to Update: 36

Source: Department of Conservation
Telephone: 916-323-3836
Last EDR Contact: 03/19/2013
Next Scheduled EDR Contact: 07/01/2013
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: 12/07/2012
Date Data Arrived at EDR: 12/12/2012
Date Made Active in Reports: 01/15/2013
Number of Days to Update: 34

Source: Department of Public Health
Telephone: 916-558-1784
Last EDR Contact: 03/11/2013
Next Scheduled EDR Contact: 06/24/2013
Data Release Frequency: Varies

COAL ASH DOE: Sleam-Electric Plan Operation Data

A listing of power plants that store ash in surface ponds.

Date of Government Version: 12/31/2005
Date Data Arrived at EDR: 08/07/2009
Date Made Active in Reports: 10/22/2009
Number of Days to Update: 76

Source: Department of Energy
Telephone: 202-586-8719
Last EDR Contact: 01/15/2013
Next Scheduled EDR Contact: 04/29/2013
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: 08/17/2010
Date Data Arrived at EDR: 01/03/2011
Date Made Active in Reports: 03/21/2011
Number of Days to Update: 77

Source: Environmental Protection Agency
Telephone: N/A
Last EDR Contact: 03/15/2013
Next Scheduled EDR Contact: 06/24/2013
Data Release Frequency: Varies

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: 01/15/2013
Date Data Arrived at EDR: 01/15/2013
Date Made Active in Reports: 02/22/2013
Number of Days to Update: 38

Source: Department of Toxic Substances Control
Telephone: 916-440-7145
Last EDR Contact: 01/15/2013
Next Scheduled EDR Contact: 04/29/2013
Data Release Frequency: Quarterly

HWP: EnviroStor Permitted Facilities Listing

Detailed information on permitted hazardous waste facilities and corrective action ("cleanups") tracked in EnviroStor.

Date of Government Version: 11/26/2012
Date Data Arrived at EDR: 11/28/2012
Date Made Active in Reports: 01/09/2013
Number of Days to Update: 42

Source: Department of Toxic Substances Control
Telephone: 916-323-3400
Last EDR Contact: 02/26/2013
Next Scheduled EDR Contact: 06/10/2013
Data Release Frequency: Quarterly

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: 02/19/2013
Date Data Arrived at EDR: 02/20/2013
Date Made Active in Reports: 03/20/2013
Number of Days to Update: 28

Source: California Integrated Waste Management Board
Telephone: 916-341-6066
Last EDR Contact: 02/18/2013
Next Scheduled EDR Contact: 06/03/2013
Data Release Frequency: Varies

Financial Assurance 1: Financial Assurance Information Listing
Financial Assurance information

Date of Government Version: 03/01/2007
Date Data Arrived at EDR: 06/01/2007
Date Made Active in Reports: 06/29/2007
Number of Days to Update: 28

Source: Department of Toxic Substances Control
Telephone: 916-255-3628
Last EDR Contact: 02/01/2013
Next Scheduled EDR Contact: 05/13/2013
Data Release Frequency: Varies

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: 11/11/2011
Date Data Arrived at EDR: 05/18/2012
Date Made Active in Reports: 05/25/2012
Number of Days to Update: 7

Source: Environmental Protection Agency
Telephone: 703-308-4044
Last EDR Contact: 02/15/2013
Next Scheduled EDR Contact: 05/27/2013
Data Release Frequency: Varies

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: 12/31/2005
Date Data Arrived at EDR: 02/06/2006
Date Made Active in Reports: 01/11/2007
Number of Days to Update: 339

Source: U.S. Geological Survey
Telephone: 888-275-8747
Last EDR Contact: 01/17/2013
Next Scheduled EDR Contact: 04/29/2013
Data Release Frequency: N/A

PRP: Potentially Responsible Parties
A listing of verified Potentially Responsible Parties

Date of Government Version: 12/02/2012
Date Data Arrived at EDR: 01/03/2013
Date Made Active in Reports: 03/13/2013
Number of Days to Update: 69

Source: EPA
Telephone: 202-564-6023
Last EDR Contact: 01/03/2013
Next Scheduled EDR Contact: 04/15/2013
Data Release Frequency: Quarterly

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: 02/25/2013
Next Scheduled EDR Contact: 06/10/2013
Data Release Frequency: Quarterly

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: 11/15/2012
Date Data Arrived at EDR: 11/16/2012
Date Made Active in Reports: 02/15/2013
Number of Days to Update: 91

Source: EPA
Telephone: 202-564-5962
Last EDR Contact: 12/28/2012
Next Scheduled EDR Contact: 04/15/2013
Data Release Frequency: Annually

US AIRS MINOR: Air Facility System Data
A listing of minor source facilities.

Date of Government Version: 11/15/2012
Date Data Arrived at EDR: 11/16/2012
Date Made Active in Reports: 02/15/2013
Number of Days to Update: 91

Source: EPA
Telephone: 202-564-5962
Last EDR Contact: 12/28/2012
Next Scheduled EDR Contact: 04/15/2013
Data Release Frequency: Annually

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: 07/31/2012
Date Data Arrived at EDR: 08/13/2012
Date Made Active in Reports: 09/18/2012
Number of Days to Update: 36

Source: Environmental Protection Agency
Telephone: 617-520-3000
Last EDR Contact: 02/12/2013
Next Scheduled EDR Contact: 05/27/2013
Data Release Frequency: Quarterly

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 US Hist Auto Stat: EDR Exclusive Historic Gas 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 US Hist Cleaners: EDR Exclusive Historic Dry 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 US Hist Cleaners: EDR Proprietary Historic Dry Cleaners - Cole

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: N/A
Telephone: N/A
Last EDR Contact: N/A
Next Scheduled EDR Contact: N/A
Data Release Frequency: Varies

EDR US Hist Auto Stat: EDR Proprietary Historic Gas Stations - Cole

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: N/A
Telephone: N/A
Last EDR Contact: N/A
Next Scheduled EDR Contact: N/A
Data Release Frequency: Varies

COUNTY RECORDS

ALAMEDA COUNTY:

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: 01/16/2013
Date Data Arrived at EDR: 01/17/2013
Date Made Active in Reports: 02/22/2013
Number of Days to Update: 36

Source: Alameda County Environmental Health Services
Telephone: 510-567-6700
Last EDR Contact: 12/28/2012
Next Scheduled EDR Contact: 04/15/2013
Data Release Frequency: Semi-Annually

Underground Tanks

Underground storage tank sites located in Alameda county.

Date of Government Version: 01/16/2013
Date Data Arrived at EDR: 01/17/2013
Date Made Active in Reports: 01/31/2013
Number of Days to Update: 14

Source: Alameda County Environmental Health Services
Telephone: 510-567-6700
Last EDR Contact: 12/28/2012
Next Scheduled EDR Contact: 04/15/2013
Data Release Frequency: Semi-Annually

AMADOR COUNTY:

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

CUPA Facility List
Cupa Facility List

Date of Government Version: 12/20/2012
Date Data Arrived at EDR: 01/04/2013
Date Made Active in Reports: 02/22/2013
Number of Days to Update: 49

Source: Amador County Environmental Health
Telephone: 209-223-6439
Last EDR Contact: 03/11/2013
Next Scheduled EDR Contact: 06/24/2013
Data Release Frequency: Varies

BUTTE COUNTY:

CUPA Facility Listing
Cupa facility list.

Date of Government Version: 10/16/2012
Date Data Arrived at EDR: 10/17/2012
Date Made Active in Reports: 11/13/2012
Number of Days to Update: 27

Source: Public Health Department
Telephone: 530-538-7149
Last EDR Contact: 01/28/2013
Next Scheduled EDR Contact: 04/29/2013
Data Release Frequency: Varies

CALVERAS COUNTY:

CUPA Facility Listing
Cupa Facility Listing

Date of Government Version: 12/21/2012
Date Data Arrived at EDR: 01/04/2013
Date Made Active in Reports: 02/22/2013
Number of Days to Update: 49

Source: Calveras County Environmental Health
Telephone: 209-754-6399
Last EDR Contact: 12/20/2012
Next Scheduled EDR Contact: 04/15/2013
Data Release Frequency: Quarterly

COLUSA COUNTY:

CUPA Facility List
Cupa facility list.

Date of Government Version: 01/04/2013
Date Data Arrived at EDR: 01/14/2013
Date Made Active in Reports: 03/01/2013
Number of Days to Update: 46

Source: Health & Human Services
Telephone: 530-458-0396
Last EDR Contact: 02/11/2013
Next Scheduled EDR Contact: 05/27/2013
Data Release Frequency: Varies

CONTRA COSTA COUNTY:

Site List
List includes sites from the underground tank, hazardous waste generator and business plan/2185 programs.

Date of Government Version: 11/27/2012
Date Data Arrived at EDR: 11/28/2012
Date Made Active in Reports: 01/15/2013
Number of Days to Update: 48

Source: Contra Costa Health Services Department
Telephone: 925-646-2286
Last EDR Contact: 02/04/2013
Next Scheduled EDR Contact: 05/20/2013
Data Release Frequency: Semi-Annually

DEL NORTE COUNTY:

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

CUPA Facility List
Cupa Facility list

Date of Government Version: 01/09/2013
Date Data Arrived at EDR: 01/10/2013
Date Made Active in Reports: 02/25/2013
Number of Days to Update: 46

Source: Del Norte County Environmental Health Division
Telephone: 707-465-0426
Last EDR Contact: 01/08/2013
Next Scheduled EDR Contact: 05/20/2013
Data Release Frequency: Varies

EL DORADO COUNTY:

CUPA Facility List
CUPA facility list.

Date of Government Version: 11/19/2012
Date Data Arrived at EDR: 11/20/2012
Date Made Active in Reports: 01/15/2013
Number of Days to Update: 56

Source: El Dorado County Environmental Management Department
Telephone: 530-621-6623
Last EDR Contact: 02/04/2013
Next Scheduled EDR Contact: 05/20/2013
Data Release Frequency: Varies

FRESNO COUNTY:

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: 02/07/2013
Date Data Arrived at EDR: 02/08/2013
Date Made Active in Reports: 03/01/2013
Number of Days to Update: 21

Source: Dept. of Community Health
Telephone: 559-445-3271
Last EDR Contact: 02/08/2013
Next Scheduled EDR Contact: 04/29/2013
Data Release Frequency: Semi-Annually

HUMBOLDT COUNTY:

CUPA Facility List
CUPA facility list.

Date of Government Version: 12/21/2012
Date Data Arrived at EDR: 12/21/2012
Date Made Active in Reports: 01/22/2013
Number of Days to Update: 32

Source: Humboldt County Environmental Health
Telephone: N/A
Last EDR Contact: 02/25/2013
Next Scheduled EDR Contact: 06/10/2013
Data Release Frequency: Varies

IMPERIAL COUNTY:

CUPA Facility List
Cupa facility list.

Date of Government Version: 05/01/2012
Date Data Arrived at EDR: 05/02/2012
Date Made Active in Reports: 06/11/2012
Number of Days to Update: 40

Source: San Diego Border Field Office
Telephone: 760-339-2777
Last EDR Contact: 01/28/2013
Next Scheduled EDR Contact: 05/13/2013
Data Release Frequency: Varies

INYO COUNTY:

CUPA Facility List
Cupa facility list.

Date of Government Version: 06/26/2012
Date Data Arrived at EDR: 06/27/2012
Date Made Active in Reports: 08/17/2012
Number of Days to Update: 51

Source: Inyo County Environmental Health Services
Telephone: 760-878-0238
Last EDR Contact: 02/25/2013
Next Scheduled EDR Contact: 06/10/2013
Data Release Frequency: Varies

KERN COUNTY:

Underground Storage Tank Sites & Tank Listing
Kern County Sites and Tanks Listing.

Date of Government Version: 08/31/2010
Date Data Arrived at EDR: 09/01/2010
Date Made Active in Reports: 09/30/2010
Number of Days to Update: 29

Source: Kern County Environment Health Services Department
Telephone: 661-862-8700
Last EDR Contact: 02/11/2013
Next Scheduled EDR Contact: 05/27/2013
Data Release Frequency: Quarterly

KINGS COUNTY:

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: 07/10/2012
Date Data Arrived at EDR: 07/12/2012
Date Made Active in Reports: 09/06/2012
Number of Days to Update: 56

Source: Kings County Department of Public Health
Telephone: 559-584-1411
Last EDR Contact: 02/12/2013
Next Scheduled EDR Contact: 06/10/2013
Data Release Frequency: Varies

LAKE COUNTY:

CUPA Facility List
Cupa facility list

Date of Government Version: 01/23/2013
Date Data Arrived at EDR: 01/25/2013
Date Made Active in Reports: 02/27/2013
Number of Days to Update: 33

Source: Lake County Environmental Health
Telephone: 707-263-1164
Last EDR Contact: 01/22/2013
Next Scheduled EDR Contact: 05/06/2013
Data Release Frequency: Varies

LOS ANGELES COUNTY:

San Gabriel Valley Areas of Concern
San Gabriel Valley areas where VOC contamination is at or above the MCL as designated by region 9 EPA office.

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: EPA Region 9
Telephone: 415-972-3178
Last EDR Contact: 12/18/2012
Next Scheduled EDR Contact: 04/01/2013
Data Release Frequency: No Update Planned

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

HMS: Street Number List
Industrial Waste and Underground Storage Tank Sites.

Date of Government Version: 10/31/2012
Date Data Arrived at EDR: 12/28/2012
Date Made Active in Reports: 01/25/2013
Number of Days to Update: 28

Source: Department of Public Works
Telephone: 626-458-3517
Last EDR Contact: 07/16/2012
Next Scheduled EDR Contact: 10/26/2012
Data Release Frequency: Semi-Annually

List of Solid Waste Facilities
Solid Waste Facilities in Los Angeles County.

Date of Government Version: 01/21/2013
Date Data Arrived at EDR: 01/22/2013
Date Made Active in Reports: 03/19/2013
Number of Days to Update: 56

Source: La County Department of Public Works
Telephone: 818-458-5185
Last EDR Contact: 01/22/2013
Next Scheduled EDR Contact: 05/06/2013
Data Release Frequency: Varies

City of Los Angeles Landfills
Landfills owned and maintained by the City of Los Angeles.

Date of Government Version: 03/05/2009
Date Data Arrived at EDR: 03/10/2009
Date Made Active in Reports: 04/08/2009
Number of Days to Update: 29

Source: Engineering & Construction Division
Telephone: 213-473-7869
Last EDR Contact: 02/18/2013
Next Scheduled EDR Contact: 06/03/2013
Data Release Frequency: Varies

Site Mitigation List
Industrial sites that have had some sort of spill or complaint.

Date of Government Version: 12/29/2011
Date Data Arrived at EDR: 02/02/2012
Date Made Active in Reports: 02/21/2012
Number of Days to Update: 19

Source: Community Health Services
Telephone: 323-890-7806
Last EDR Contact: 01/21/2013
Next Scheduled EDR Contact: 05/06/2013
Data Release Frequency: Annually

City of El Segundo Underground Storage Tank
Underground storage tank sites located in El Segundo city.

Date of Government Version: 10/23/2012
Date Data Arrived at EDR: 10/25/2012
Date Made Active in Reports: 11/30/2012
Number of Days to Update: 36

Source: City of El Segundo Fire Department
Telephone: 310-524-2236
Last EDR Contact: 01/21/2013
Next Scheduled EDR Contact: 05/06/2013
Data Release Frequency: Semi-Annually

City of Long Beach Underground Storage Tank
Underground storage tank sites located in the city of Long Beach.

Date of Government Version: 03/28/2003
Date Data Arrived at EDR: 10/23/2003
Date Made Active in Reports: 11/26/2003
Number of Days to Update: 34

Source: City of Long Beach Fire Department
Telephone: 562-570-2563
Last EDR Contact: 01/29/2013
Next Scheduled EDR Contact: 05/13/2013
Data Release Frequency: Annually

City of Torrance Underground Storage Tank
Underground storage tank sites located in the city of Torrance.

Date of Government Version: 01/14/2013
Date Data Arrived at EDR: 01/15/2013
Date Made Active in Reports: 01/31/2013
Number of Days to Update: 16

Source: City of Torrance Fire Department
Telephone: 310-618-2973
Last EDR Contact: 01/14/2013
Next Scheduled EDR Contact: 04/29/2013
Data Release Frequency: Semi-Annually

MADERA COUNTY:

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: 12/18/2012
Date Data Arrived at EDR: 12/20/2012
Date Made Active in Reports: 02/08/2013
Number of Days to Update: 50

Source: Madera County Environmental Health
Telephone: 559-675-7823
Last EDR Contact: 02/25/2013
Next Scheduled EDR Contact: 06/10/2013
Data Release Frequency: Varies

MARIN COUNTY:

Underground Storage Tank Sites

Currently permitted USTs in Marin County.

Date of Government Version: 11/26/2012
Date Data Arrived at EDR: 11/28/2012
Date Made Active in Reports: 01/21/2013
Number of Days to Update: 54

Source: Public Works Department Waste Management
Telephone: 415-499-6647
Last EDR Contact: 01/21/2013
Next Scheduled EDR Contact: 04/22/2013
Data Release Frequency: Semi-Annually

MERCED COUNTY:

CUPA Facility List

CUPA facility list.

Date of Government Version: 12/18/2012
Date Data Arrived at EDR: 12/21/2012
Date Made Active in Reports: 03/05/2013
Number of Days to Update: 74

Source: Merced County Environmental Health
Telephone: 209-381-1094
Last EDR Contact: 02/25/2013
Next Scheduled EDR Contact: 06/10/2013
Data Release Frequency: Varies

MONO COUNTY:

CUPA Facility List

CUPA Facility List

Date of Government Version: 12/26/2012
Date Data Arrived at EDR: 01/08/2013
Date Made Active in Reports: 02/25/2013
Number of Days to Update: 48

Source: Mono County Health Department
Telephone: 760-932-5580
Last EDR Contact: 03/04/2013
Next Scheduled EDR Contact: 06/17/2013
Data Release Frequency: Varies

MONTEREY COUNTY:

CUPA Facility Listing

CUPA Program listing from the Environmental Health Division.

Date of Government Version: 12/18/2012
Date Data Arrived at EDR: 12/20/2012
Date Made Active in Reports: 02/08/2013
Number of Days to Update: 50

Source: Monterey County Health Department
Telephone: 831-796-1297
Last EDR Contact: 02/25/2013
Next Scheduled EDR Contact: 06/10/2013
Data Release Frequency: Varies

NAPA COUNTY:

Sites With Reported Contamination
A listing of leaking underground storage tank sites located in Napa county.

Date of Government Version: 12/05/2011
Date Data Arrived at EDR: 12/06/2011
Date Made Active in Reports: 02/07/2012
Number of Days to Update: 63
Source: Napa County Department of Environmental Management
Telephone: 707-253-4269
Last EDR Contact: 03/04/2013
Next Scheduled EDR Contact: 06/17/2013
Data Release Frequency: No Update Planned

Closed and Operating Underground Storage Tank Sites
Underground storage tank sites located in Napa county.

Date of Government Version: 01/15/2008
Date Data Arrived at EDR: 01/16/2008
Date Made Active in Reports: 02/08/2008
Number of Days to Update: 23
Source: Napa County Department of Environmental Management
Telephone: 707-253-4269
Last EDR Contact: 03/04/2013
Next Scheduled EDR Contact: 06/17/2013
Data Release Frequency: No Update Planned

NEVADA COUNTY:

CUPA Facility List
CUPA facility list.

Date of Government Version: 11/05/2012
Date Data Arrived at EDR: 11/06/2012
Date Made Active in Reports: 11/30/2012
Number of Days to Update: 24
Source: Community Development Agency
Telephone: 530-265-1467
Last EDR Contact: 03/08/2013
Next Scheduled EDR Contact: 05/20/2013
Data Release Frequency: Varies

ORANGE COUNTY:

List of Industrial Site Cleanups
Petroleum and non-petroleum spills.

Date of Government Version: 02/04/2013
Date Data Arrived at EDR: 02/26/2013
Date Made Active in Reports: 03/20/2013
Number of Days to Update: 22
Source: Health Care Agency
Telephone: 714-834-3446
Last EDR Contact: 02/13/2013
Next Scheduled EDR Contact: 05/27/2013
Data Release Frequency: Annually

List of Underground Storage Tank Cleanups
Orange County Underground Storage Tank Cleanups (LUST).

Date of Government Version: 02/04/2013
Date Data Arrived at EDR: 02/19/2013
Date Made Active in Reports: 03/20/2013
Number of Days to Update: 29
Source: Health Care Agency
Telephone: 714-834-3446
Last EDR Contact: 02/12/2013
Next Scheduled EDR Contact: 05/27/2013
Data Release Frequency: Quarterly

List of Underground Storage Tank Facilities
Orange County Underground Storage Tank Facilities (UST).

Date of Government Version: 11/05/2012
Date Data Arrived at EDR: 11/15/2012
Date Made Active in Reports: 12/03/2012
Number of Days to Update: 18
Source: Health Care Agency
Telephone: 714-834-3446
Last EDR Contact: 02/12/2013
Next Scheduled EDR Contact: 05/27/2013
Data Release Frequency: Quarterly

PLACER COUNTY:

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

Master List of Facilities
List includes aboveground tanks, underground tanks and cleanup sites.

Date of Government Version: 12/11/2012
Date Data Arrived at EDR: 12/12/2012
Date Made Active in Reports: 01/15/2013
Number of Days to Update: 34

Source: Placer County Health and Human Services
Telephone: 530-745-2363
Last EDR Contact: 03/11/2013
Next Scheduled EDR Contact: 06/24/2013
Data Release Frequency: Semi-Annually

RIVERSIDE COUNTY:

Listing of Underground Tank Cleanup Sites
Riverside County Underground Storage Tank Cleanup Sites (LUST).

Date of Government Version: 02/04/2013
Date Data Arrived at EDR: 02/05/2013
Date Made Active in Reports: 03/20/2013
Number of Days to Update: 43

Source: Department of Environmental Health
Telephone: 951-358-5055
Last EDR Contact: 12/26/2012
Next Scheduled EDR Contact: 04/08/2013
Data Release Frequency: Quarterly

Underground Storage Tank Tank List
Underground storage tank sites located in Riverside county.

Date of Government Version: 10/16/2012
Date Data Arrived at EDR: 10/18/2012
Date Made Active in Reports: 11/07/2012
Number of Days to Update: 20

Source: Department of Environmental Health
Telephone: 951-358-5055
Last EDR Contact: 12/26/2012
Next Scheduled EDR Contact: 04/08/2013
Data Release Frequency: Quarterly

SACRAMENTO COUNTY:

Toxic Site Clean-Up List
List of sites where unauthorized releases of potentially hazardous materials have occurred.

Date of Government Version: 11/29/2012
Date Data Arrived at EDR: 01/10/2013
Date Made Active in Reports: 02/22/2013
Number of Days to Update: 43

Source: Sacramento County Environmental Management
Telephone: 916-875-8406
Last EDR Contact: 01/07/2013
Next Scheduled EDR Contact: 04/22/2013
Data Release Frequency: Quarterly

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: 11/02/2012
Date Data Arrived at EDR: 01/15/2013
Date Made Active in Reports: 02/22/2013
Number of Days to Update: 38

Source: Sacramento County Environmental Management
Telephone: 916-875-8406
Last EDR Contact: 01/07/2013
Next Scheduled EDR Contact: 04/22/2013
Data Release Frequency: Quarterly

SAN BERNARDINO COUNTY:

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: 12/12/2012
Date Data Arrived at EDR: 12/18/2012
Date Made Active in Reports: 01/25/2013
Number of Days to Update: 38

Source: San Bernardino County Fire Department Hazardous Materials Division
Telephone: 909-387-3041
Last EDR Contact: 02/11/2013
Next Scheduled EDR Contact: 05/27/2013
Data Release Frequency: Quarterly

SAN DIEGO COUNTY:

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: 08/17/2012
Date Data Arrived at EDR: 08/20/2012
Date Made Active in Reports: 10/03/2012
Number of Days to Update: 44

Source: Hazardous Materials Management Division
Telephone: 619-338-2268
Last EDR Contact: 03/08/2013
Next Scheduled EDR Contact: 06/24/2013
Data Release Frequency: Quarterly

Solid Waste Facilities

San Diego County Solid Waste Facilities.

Date of Government Version: 10/31/2012
Date Data Arrived at EDR: 11/06/2012
Date Made Active in Reports: 11/30/2012
Number of Days to Update: 24

Source: Department of Health Services
Telephone: 619-338-2209
Last EDR Contact: 01/28/2013
Next Scheduled EDR Contact: 05/13/2013
Data Release Frequency: Varies

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: 03/12/2013
Next Scheduled EDR Contact: 06/24/2013
Data Release Frequency: No Update Planned

SAN FRANCISCO COUNTY:

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: 02/11/2013
Next Scheduled EDR Contact: 05/27/2013
Data Release Frequency: Quarterly

Underground Storage Tank Information

Underground storage tank sites located in San Francisco county.

Date of Government Version: 11/29/2010
Date Data Arrived at EDR: 03/10/2011
Date Made Active in Reports: 03/15/2011
Number of Days to Update: 5

Source: Department of Public Health
Telephone: 415-252-3920
Last EDR Contact: 02/11/2013
Next Scheduled EDR Contact: 05/27/2013
Data Release Frequency: Quarterly

SAN JOAQUIN COUNTY:

San Joaquin Co. UST
A listing of underground storage tank locations in San Joaquin county.

Date of Government Version: 12/18/2012
Date Data Arrived at EDR: 12/21/2012
Date Made Active in Reports: 01/30/2013
Number of Days to Update: 40
Source: Environmental Health Department
Telephone: N/A
Last EDR Contact: 01/22/2013
Next Scheduled EDR Contact: 04/08/2013
Data Release Frequency: Semi-Annually

SAN LUIS OBISPO COUNTY:

CUPA Facility List
Cupa Facility List.

Date of Government Version: 11/26/2012
Date Data Arrived at EDR: 11/26/2012
Date Made Active in Reports: 01/17/2013
Number of Days to Update: 52
Source: San Luis Obispo County Public Health Department
Telephone: 805-781-5596
Last EDR Contact: 02/25/2013
Next Scheduled EDR Contact: 06/10/2013
Data Release Frequency: Varies

SAN MATEO COUNTY:

Business Inventory
List includes Hazardous Materials Business Plan, hazardous waste generators, and underground storage tanks.

Date of Government Version: 01/02/2013
Date Data Arrived at EDR: 01/03/2013
Date Made Active in Reports: 02/22/2013
Number of Days to Update: 50
Source: San Mateo County Environmental Health Services Division
Telephone: 650-363-1921
Last EDR Contact: 03/18/2013
Next Scheduled EDR Contact: 07/01/2013
Data Release Frequency: Annually

Fuel Leak List
A listing of leaking underground storage tank sites located in San Mateo county.

Date of Government Version: 12/12/2012
Date Data Arrived at EDR: 12/17/2012
Date Made Active in Reports: 01/22/2013
Number of Days to Update: 36
Source: San Mateo County Environmental Health Services Division
Telephone: 650-363-1921
Last EDR Contact: 03/18/2013
Next Scheduled EDR Contact: 07/01/2013
Data Release Frequency: Semi-Annually

SANTA BARBARA COUNTY:

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: 03/12/2013
Next Scheduled EDR Contact: 06/10/2013
Data Release Frequency: Varies

SANTA CLARA COUNTY:

Cupa Facility List
Cupa facility list

Date of Government Version: 01/08/2013
Date Data Arrived at EDR: 01/10/2013
Date Made Active in Reports: 02/08/2013
Number of Days to Update: 29

Source: Department of Environmental Health
Telephone: 408-918-1973
Last EDR Contact: 03/04/2013
Next Scheduled EDR Contact: 06/17/2013
Data Release Frequency: Varies

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

LOP Listing
A listing of leaking underground storage tanks located in Santa Clara county.

Date of Government Version: 12/03/2012
Date Data Arrived at EDR: 12/05/2012
Date Made Active in Reports: 01/15/2013
Number of Days to Update: 41

Source: Department of Environmental Health
Telephone: 408-918-3417
Last EDR Contact: 03/04/2013
Next Scheduled EDR Contact: 06/17/2013
Data Release Frequency: Annually

Hazardous Material Facilities
Hazardous material facilities, including underground storage tank sites.

Date of Government Version: 02/12/2013
Date Data Arrived at EDR: 02/14/2013
Date Made Active in Reports: 03/20/2013
Number of Days to Update: 34

Source: City of San Jose Fire Department
Telephone: 408-535-7694
Last EDR Contact: 02/11/2013
Next Scheduled EDR Contact: 05/27/2013
Data Release Frequency: Annually

SANTA CRUZ COUNTY:

CUPA Facility List
CUPA facility listing.

Date of Government Version: 02/26/2013
Date Data Arrived at EDR: 02/26/2013
Date Made Active in Reports: 03/20/2013
Number of Days to Update: 22

Source: Santa Cruz County Environmental Health
Telephone: 831-464-2761
Last EDR Contact: 02/25/2013
Next Scheduled EDR Contact: 06/10/2013
Data Release Frequency: Varies

SHASTA COUNTY:

CUPA Facility List
Cupa Facility List.

Date of Government Version: 11/27/2012
Date Data Arrived at EDR: 11/28/2012
Date Made Active in Reports: 01/17/2013
Number of Days to Update: 50

Source: Shasta County Department of Resource Management
Telephone: 530-225-5789
Last EDR Contact: 02/25/2013
Next Scheduled EDR Contact: 06/10/2013
Data Release Frequency: Varies

SOLANO COUNTY:

Leaking Underground Storage Tanks
A listing of leaking underground storage tank sites located in Solano county.

Date of Government Version: 12/12/2012
Date Data Arrived at EDR: 12/17/2012
Date Made Active in Reports: 01/22/2013
Number of Days to Update: 36

Source: Solano County Department of Environmental Management
Telephone: 707-784-6770
Last EDR Contact: 03/18/2013
Next Scheduled EDR Contact: 07/01/2013
Data Release Frequency: Quarterly

Underground Storage Tanks
Underground storage tank sites located in Solano county.

Date of Government Version: 12/12/2012
Date Data Arrived at EDR: 12/17/2012
Date Made Active in Reports: 01/25/2013
Number of Days to Update: 39

Source: Solano County Department of Environmental Management
Telephone: 707-784-6770
Last EDR Contact: 03/18/2013
Next Scheduled EDR Contact: 07/01/2013
Data Release Frequency: Quarterly

SONOMA COUNTY:

Cupa Facility List
Cupa Facility list

Date of Government Version: 01/10/2013
Date Data Arrived at EDR: 01/16/2013
Date Made Active in Reports: 02/27/2013
Number of Days to Update: 42

Source: County of Sonoma Fire & Emergency Services Department
Telephone: 707-565-1174
Last EDR Contact: 01/08/2013
Next Scheduled EDR Contact: 04/15/2013
Data Release Frequency: Varies

Leaking Underground Storage Tank Sites
A listing of leaking underground storage tank sites located in Sonoma county.

Date of Government Version: 01/02/2013
Date Data Arrived at EDR: 01/02/2013
Date Made Active in Reports: 01/25/2013
Number of Days to Update: 23

Source: Department of Health Services
Telephone: 707-565-6565
Last EDR Contact: 12/28/2012
Next Scheduled EDR Contact: 04/15/2013
Data Release Frequency: Quarterly

SUTTER COUNTY:

Underground Storage Tanks
Underground storage tank sites located in Sutter county.

Date of Government Version: 12/10/2012
Date Data Arrived at EDR: 12/11/2012
Date Made Active in Reports: 01/15/2013
Number of Days to Update: 35

Source: Sutter County Department of Agriculture
Telephone: 530-822-7500
Last EDR Contact: 03/11/2013
Next Scheduled EDR Contact: 06/24/2013
Data Release Frequency: Semi-Annually

TUOLUMNE COUNTY:

CUPA Facility List
Cupa facility list

Date of Government Version: 01/14/2013
Date Data Arrived at EDR: 01/16/2013
Date Made Active in Reports: 02/27/2013
Number of Days to Update: 42

Source: Divison of Environmental Health
Telephone: 209-533-5633
Last EDR Contact: 01/04/2013
Next Scheduled EDR Contact: 04/29/2013
Data Release Frequency: Varies

VENTURA COUNTY:

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: 03/30/2012
Date Data Arrived at EDR: 05/25/2012
Date Made Active in Reports: 07/06/2012
Number of Days to Update: 42

Source: Ventura County Environmental Health Division
Telephone: 805-654-2813
Last EDR Contact: 02/21/2013
Next Scheduled EDR Contact: 06/03/2013
Data Release Frequency: Quarterly

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: 01/07/2013
Next Scheduled EDR Contact: 04/22/2013
Data Release Frequency: Annually

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: 02/18/2013
Next Scheduled EDR Contact: 06/03/2013
Data Release Frequency: Quarterly

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: 01/28/2013
Date Data Arrived at EDR: 02/01/2013
Date Made Active in Reports: 03/20/2013
Number of Days to Update: 47

Source: Ventura County Resource Management Agency
Telephone: 805-654-2813
Last EDR Contact: 01/29/2013
Next Scheduled EDR Contact: 05/13/2013
Data Release Frequency: Quarterly

Underground Tank Closed Sites List

Ventura County Operating Underground Storage Tank Sites (UST)/Underground Tank Closed Sites List.

Date of Government Version: 12/04/2012
Date Data Arrived at EDR: 12/20/2012
Date Made Active in Reports: 01/25/2013
Number of Days to Update: 36

Source: Environmental Health Division
Telephone: 805-654-2813
Last EDR Contact: 03/18/2013
Next Scheduled EDR Contact: 07/01/2013
Data Release Frequency: Quarterly

YOLO COUNTY:

Underground Storage Tank Comprehensive Facility Report

Underground storage tank sites located in Yolo county.

Date of Government Version: 12/19/2012
Date Data Arrived at EDR: 12/28/2012
Date Made Active in Reports: 01/30/2013
Number of Days to Update: 33

Source: Yolo County Department of Health
Telephone: 530-666-8646
Last EDR Contact: 12/18/2012
Next Scheduled EDR Contact: 04/08/2013
Data Release Frequency: Annually

YUBA COUNTY:

CUPA Facility List
CUPA facility listing for Yuba County.

Date of Government Version: 08/16/2012
Date Data Arrived at EDR: 08/16/2012
Date Made Active in Reports: 10/03/2012
Number of Days to Update: 48

Source: Yuba County Environmental Health Department
Telephone: 530-749-7523
Last EDR Contact: 02/18/2013
Next Scheduled EDR Contact: 05/20/2013
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: 11/19/2012
Date Data Arrived at EDR: 11/19/2012
Date Made Active in Reports: 01/03/2013
Number of Days to Update: 45

Source: Department of Energy & Environmental Protection
Telephone: 860-424-3375
Last EDR Contact: 02/18/2013
Next Scheduled EDR Contact: 06/03/2013
Data Release Frequency: Annually

NJ MANIFEST: Manifest Information
Hazardous waste manifest information.

Date of Government Version: 12/31/2011
Date Data Arrived at EDR: 07/19/2012
Date Made Active in Reports: 08/28/2012
Number of Days to Update: 40

Source: Department of Environmental Protection
Telephone: N/A
Last EDR Contact: 01/15/2013
Next Scheduled EDR Contact: 04/29/2013
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: 02/01/2013
Date Data Arrived at EDR: 02/07/2013
Date Made Active in Reports: 03/15/2013
Number of Days to Update: 36

Source: Department of Environmental Conservation
Telephone: 518-402-8651
Last EDR Contact: 02/07/2013
Next Scheduled EDR Contact: 05/20/2013
Data Release Frequency: Annually

PA MANIFEST: Manifest Information
Hazardous waste manifest information.

Date of Government Version: 12/31/2011
Date Data Arrived at EDR: 07/23/2012
Date Made Active in Reports: 09/18/2012
Number of Days to Update: 57

Source: Department of Environmental Protection
Telephone: 717-783-8990
Last EDR Contact: 01/21/2013
Next Scheduled EDR Contact: 05/06/2013
Data Release Frequency: Annually

RI MANIFEST: Manifest information
Hazardous waste manifest information

Date of Government Version: 12/31/2011
Date Data Arrived at EDR: 06/22/2012
Date Made Active in Reports: 07/31/2012
Number of Days to Update: 39

Source: Department of Environmental Management
Telephone: 401-222-2797
Last EDR Contact: 02/25/2013
Next Scheduled EDR Contact: 06/10/2013
Data Release Frequency: Annually

WI MANIFEST: Manifest Information
Hazardous waste manifest information.

Date of Government Version: 12/31/2011
Date Data Arrived at EDR: 07/19/2012
Date Made Active in Reports: 09/27/2012
Number of Days to Update: 70

Source: Department of Natural Resources
Telephone: N/A
Last EDR Contact: 03/18/2013
Next Scheduled EDR Contact: 07/01/2013
Data Release Frequency: Annually

Oil/Gas Pipelines: This data was obtained by EDR from the USGS in 1994. It is referred to by USGS as GeoData Digital Line Graphs from 1:100,000-Scale Maps. It was extracted from the transportation category including some oil, but primarily gas pipelines.

Electric Power Transmission Line Data
Source: Rextag Strategies Corp.
Telephone: (281) 769-2247
U.S. Electric Transmission and Power Plants Systems Digital GIS Data

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.

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, available in select counties across the country, was obtained by EDR in 2003 & 2011 from the Federal Emergency Management Agency (FEMA). Data depicts 100-year and 500-year flood zones as defined by FEMA.

NWI: National Wetlands Inventory. This data, available in select counties across the country, was obtained by EDR in 2002 and 2005 from the U.S. Fish and Wildlife Service.

Scanned Digital USGS 7.5' Topographic Map (DRG)
Source: United States Geologic Survey
A digital raster graphic (DRG) is a scanned image of a U.S. Geological Survey topographic map. The map images are made by scanning published paper maps on high-resolution scanners. The raster image is georeferenced and fit to the Universal Transverse Mercator (UTM) projection.

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

STREET AND ADDRESS INFORMATION

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GEOCHECK ®- PHYSICAL SETTING SOURCE ADDENDUM

TARGET PROPERTY ADDRESS

SKYLINE HEIGHTS
SKYLINE HEIGHTS
CORONA, CA 92882

TARGET PROPERTY COORDINATES

Latitude (North):	33.844 - 33° 50' 38.40''
Longitude (West):	117.6072 - 117° 36' 25.92''
Universal Tranverse Mercator:	Zone 11
UTM X (Meters):	443822.4
UTM Y (Meters):	3744831.0
Elevation:	1202 ft. above sea level

USGS TOPOGRAPHIC MAP

Target Property Map:	33117-G5 CORONA SOUTH, CA
Most Recent Revision:	1988

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 principal 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).

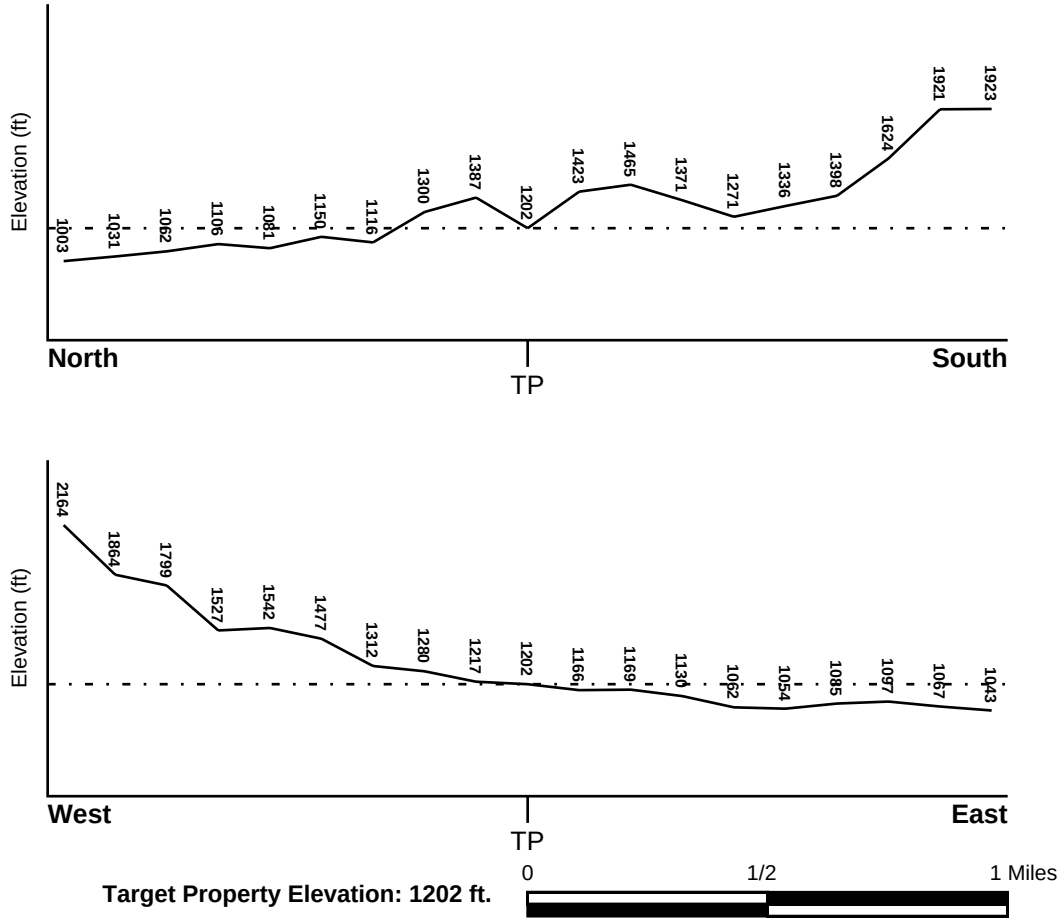
TOPOGRAPHIC INFORMATION

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 NNE

SURROUNDING TOPOGRAPHY: ELEVATION PROFILES



Target Property Elevation: 1202 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

Target Property County	FEMA Flood Electronic Data
RIVERSIDE, CA	YES - refer to the Overview Map and Detail Map

Flood Plain Panel at Target Property: 06065C - FEMA DFIRM Flood data

Additional Panels in search area: 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

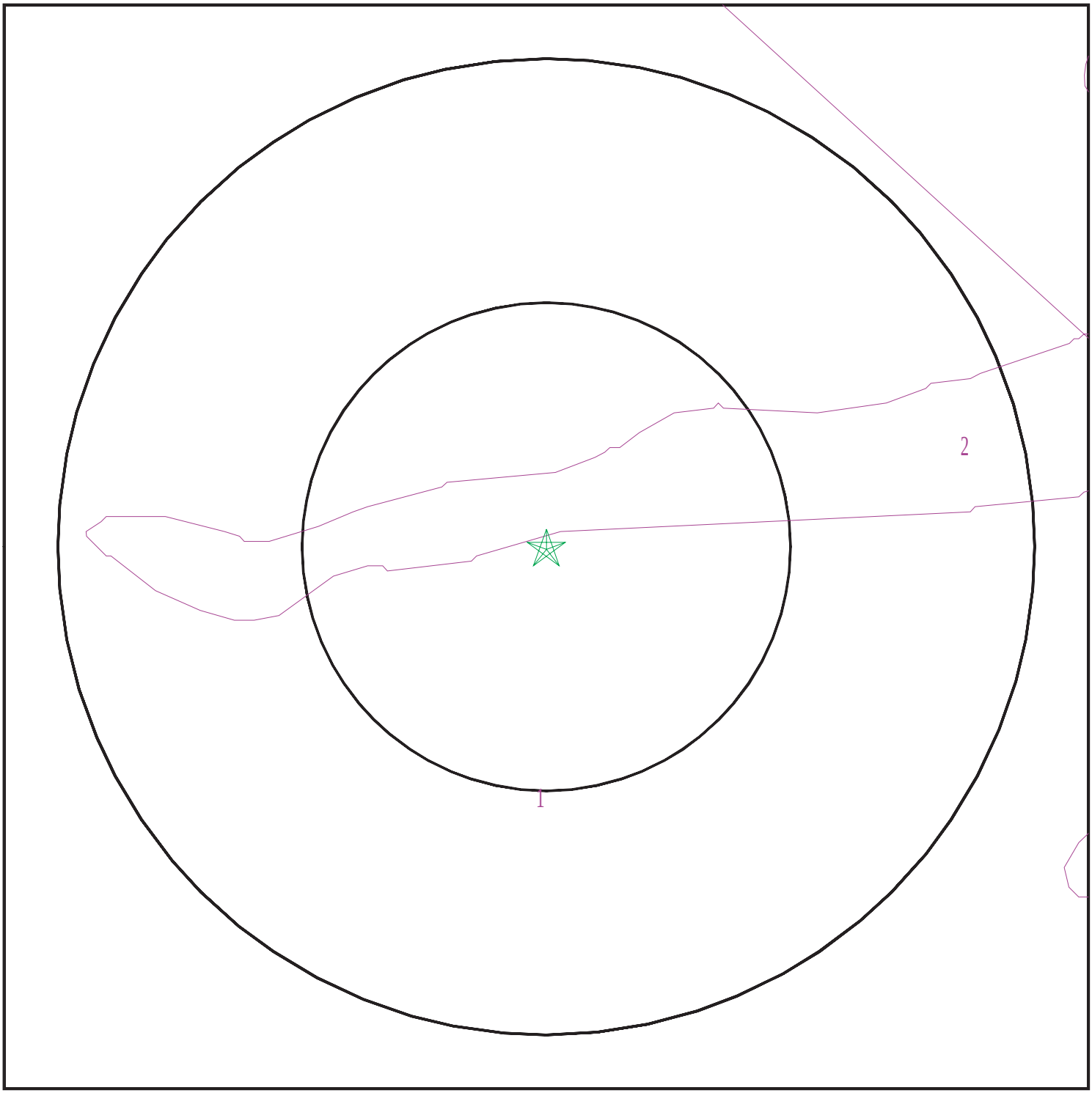
Era:	Mesozoic
System:	Cretaceous
Series:	Cretaceous granitic rocks
Code:	Kg *(decoded above as Era, System & Series)*

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 - 03552619.2r



Target Property
SSURGO Soil
Water

0 1/16 1/8 1/4 Miles

N

SITE NAME:	Skyline Heights	CLIENT:	Hillmann Environmental Co.
ADDRESS:	Skyline Heights Corona CA 92882	CONTACT:	Kristi Hill
		INQUIRY #:	03552619.2r
LAT/LONG:	33.844 / 117.6072	DATE:	March 20, 2013 2:32 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: CIENEBA

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: 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	sandy loam	Silt-Clay Materials (more than 35 pct. passing No. 200), Silty Soils.	Not reported	Max: 0.42 Min: 0	Max: Min:
2	7 inches	11 inches	weathered bedrock	Silt-Clay Materials (more than 35 pct. passing No. 200), Silty Soils.	Not reported	Max: 0.42 Min: 0	Max: Min:

Soil Map ID: 2

Soil Component Name: SOBOBA

Soil Surface Texture: gravelly loamy sand

Hydrologic Group: Class A - High infiltration rates. Soils are deep, well drained to excessively drained sands and gravels.

Soil Drainage Class: Excessively 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	9 inches	gravelly loamy sand	Granular materials (35 pct. or less passing No. 200), Stone Fragments, Gravel and Sand.	COARSE-GRAINED SOILIS, Gravels, Clean Gravels, Well-graded gravel.	Max: 141 Min: 141	Max: 7.8 Min: 6.1
2	9 inches	59 inches	very gravelly sand	Granular materials (35 pct. or less passing No. 200), Stone Fragments, Gravel and Sand.	COARSE-GRAINED SOILIS, Gravels, Clean Gravels, Well-graded gravel.	Max: 141 Min: 141	Max: 7.8 Min: 6.1

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

FEDERAL USGS WELL INFORMATION

MAP ID	WELL ID	LOCATION FROM TP
No Wells Found		

GEOCHECK® - PHYSICAL SETTING SOURCE SUMMARY

FEDERAL FRDS PUBLIC WATER SUPPLY SYSTEM INFORMATION

MAP ID	WELL ID	LOCATION FROM TP

No PWS System Found

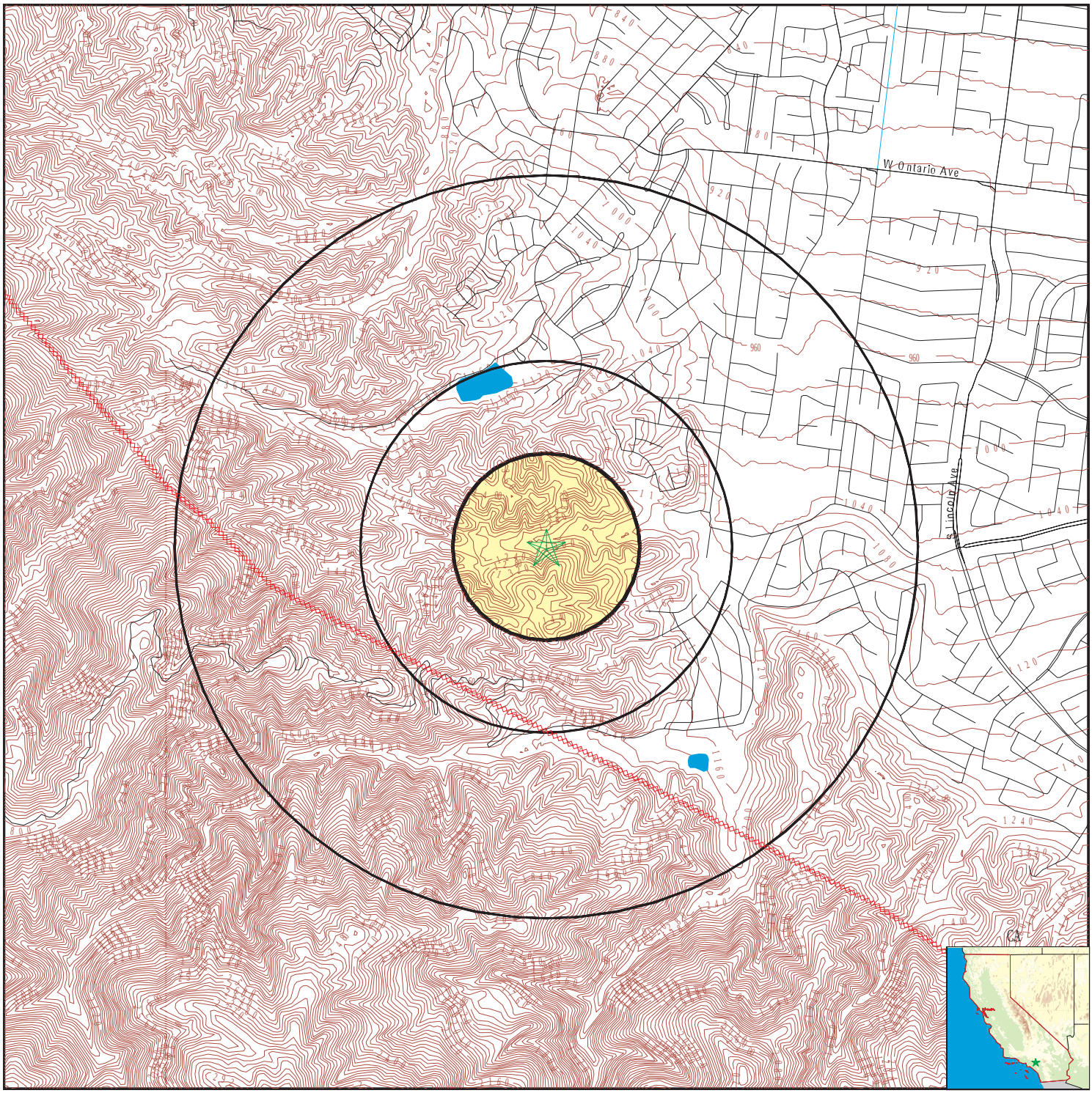
Note: PWS System location is not always the same as well location.

STATE DATABASE WELL INFORMATION

MAP ID	WELL ID	LOCATION FROM TP

No Wells Found

PHYSICAL SETTING SOURCE MAP - 03552619.2r



0 1/4 1/2 1 Miles

- County Boundary
- Major Roads
- Contour Lines
- Earthquake Fault Lines
- 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

N

SITE NAME: Skyline Heights	CLIENT: Hillmann Environmental Co.
ADDRESS: Skyline Heights Corona CA 92882	CONTACT: Kristi Hill
LAT/LONG: 33.844 / 117.6072	INQUIRY #: 03552619.2r DATE: March 20, 2013 2:32 pm

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GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS
RADON

AREA RADON INFORMATION

State Database: CA Radon

Radon Test Results

Zipcode	Num Tests	> 4 pCi/L
92882	30	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.

Scanned Digital USGS 7.5' Topographic Map (DRG)
Source: United States Geologic Survey
A digital raster graphic (DRG) is a scanned image of a U.S. Geological Survey topographic map. The map images are made by scanning published paper maps on high-resolution scanners. The raster image is georeferenced and fit to the Universal Transverse Mercator (UTM) projection.

HYDROLOGIC INFORMATION

Flood Zone Data: This data, available in select counties across the country, was obtained by EDR in 2003 & 2011 from the Federal Emergency Management Agency (FEMA). Data depicts 100-year and 500-year flood zones as defined by FEMA.

NWI: National Wetlands Inventory. This data, available in select counties across the country, was obtained by EDR in 2002 and 2005 from the U.S. Fish and Wildlife Service.

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 Services
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 Services (NRCS)
Telephone: 800-672-5559
SSURGO is the most detailed level of mapping done by the Natural Resources Conservation Services, 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.

STATE RECORDS

Water Well Database
Source: Department of Water Resources
Telephone: 916-651-9648

California Drinking Water Quality Database
Source: Department of Health Services
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.

OTHER STATE DATABASE INFORMATION

California Oil and Gas Well Locations
Source: Department of Conservation
Telephone: 916-323-1779
Oil and Gas well locations in the state.

RADON

State Database: CA Radon
Source: Department of Health Services
Telephone: 916-324-2208
Radon Database for California

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.

PHYSICAL SETTING SOURCE RECORDS SEARCHED

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 5: LID Infeasibility

LID Technical Infeasibility Analysis

Appendix 6: BMP Design Details

BMP Sizing, Design Details and other Supporting Documentation

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

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	KWC Engineers	Date	8/15/2024
Designed by	Andrew Burror	Case No	
Company Project Number/Name	2012.1344.4 Skyline Heights		

BMP Identification

BMP NAME / ID: DMA A

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}= 0.95 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)*
Roofs	*54000*	*Roofs*	*1*	*0.89*	*48168*			
Dwy	*5760*	*Concrete or Asphalt*	*1*	*0.892*	*5137.9*			
Street	*143743*	*Concrete or Asphalt*	*1*	*0.892*	*128218.8*			
Landscape	*447526*	*Ornamental Landscaping*	*0.1*	*0.110458*	*49432.8*			
	651029	***Total***			**230957.5**	**0.95**	***18284.1***	***18,770***

Notes:

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

Company Name: KWC Engineers Date: 12/6/2023

Designed by: Andrew Burror County/City Case No.:

Design Volume

Enter the area tributary to this feature — A_T = 15.1 acres

Enter V_{BMP} determined from Section 2.1 of this Handbook — V_{BMP} = 18,602 ft^3

Type of Bioretention Facility Design

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

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

Bioretention Facility Surface Area

Depth of Soil Filter Media Layer — d_S = 2.5 ft

Top Width of Bioretention Facility, excluding curb — w_T = 200.0 ft

Total Effective Depth, d_E

$d_E = (0.3) \times d_S + (0.4) \times 1 - (0.7/w_T) + 0.5$ — d_E = 1.65 ft

Minimum Surface Area, A_m

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

A_M = 11,298 ft^2

Proposed Surface Area — A= 11,376 ft^2

Bioretention Facility Properties

Side Slopes in Bioretention Facility — z = 4 :1

Diameter of Underdrain — 6 inches

Longitudinal Slope of Site (3% maximum) — 0.5 %

6" Check Dam Spacing — 0 feet

Describe Vegetation: Other

Notes:

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

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	KWC Engineers	Date	8/15/2024
Designed by	Andrew Burror	Case No	
Company Project Number/Name	2012.1344.4 Skyline Heights		

BMP Identification

BMP NAME / ID: DMA B

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}= 0.95 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)*
Roofs	*258000*	*Roofs*	*1*	*0.89*	*230136*			
Dwy	*27520*	*Concrete or Asphalt*	*1*	*0.892*	*24547.8*			
Street	*419902*	*Concrete or Asphalt*	*1*	*0.892*	*374552.6*			
Landscape	*1322437*	*Ornamental Landscaping*	*0.1*	*0.110458*	*146073.7*			
	2027859	***Total***			**775310.1**	**0.95**	***61378.7***	***72111***

Notes:

Extended Detention Basin Design Procedure	BMP Subarea No. B	Legend:	Required Entries / Calculated Cells

Company Name: KWC Engineers — Date: 12/6/2023

Designed by: Andrew Burror — County/City Case No.:

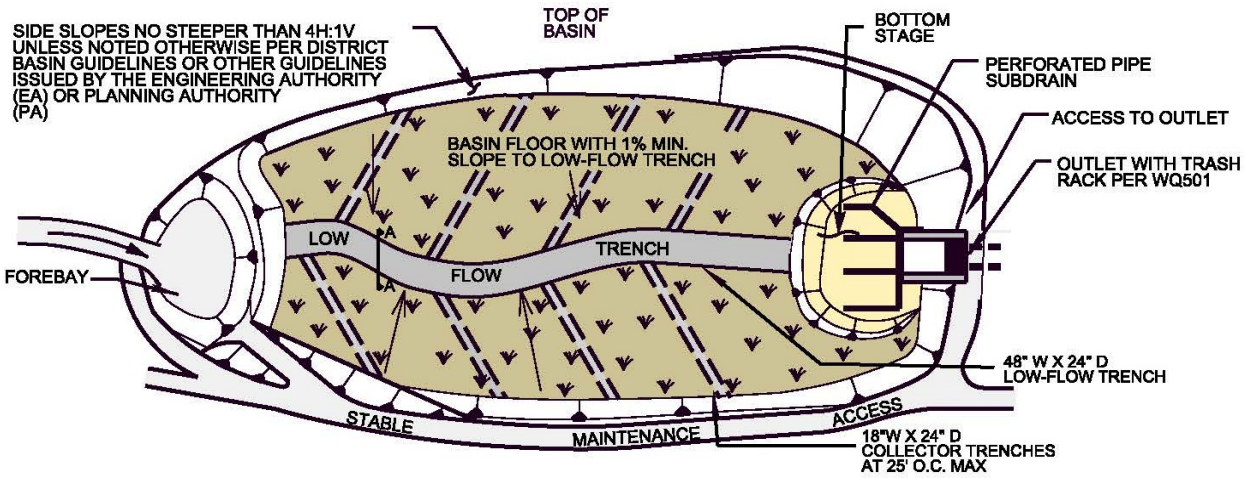
Design Volume

Tributary Area (BMP Subarea)	A_T =	41.1	acres
Enter V_{BMP}, determined from Section 2.1 of this Handbook	V_{BMP}=	54,453	ft^3

Basin Footprint

Overall Geometry

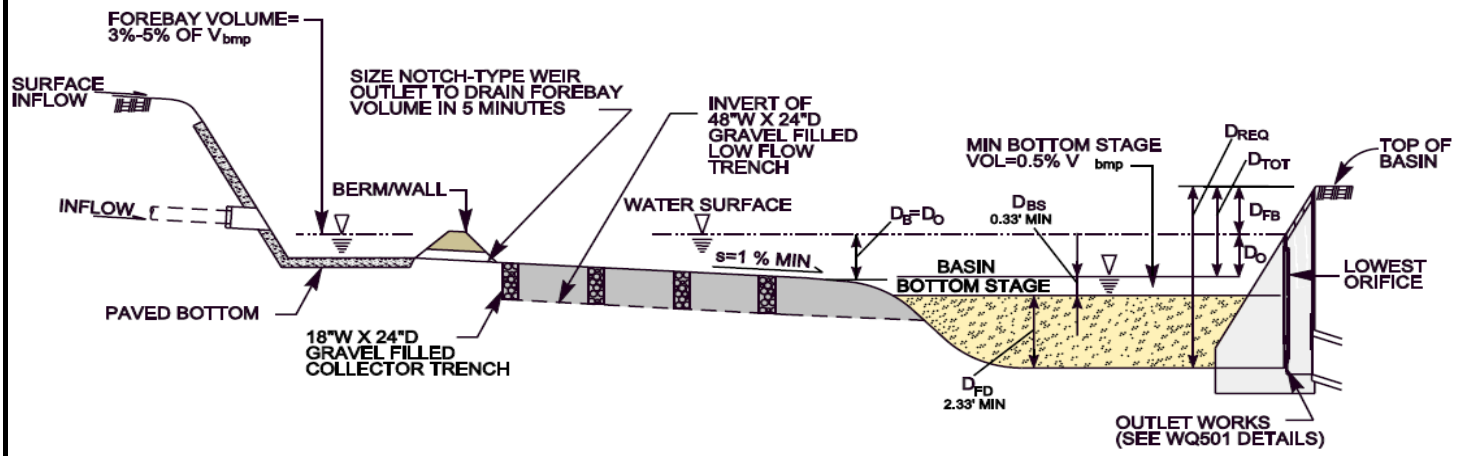
Length at Basin Bottom Surface	Length =	130	ft
Width at Basin Bottom Surface	Width =	70	ft
	Meets 1.5 : 1 requirement?	✓	
Side Slopes per "Basin Guidelines", Sect. 1.2	z =	4	:1
Proposed Basin Depth (with no freeboard)	D_B =	6.00	ft
Depth of freeboard (if used)	D_{FB} =	1.00	ft
Minimum Required Allowance for Total Depth (including proposed basin depth, freeboard, minimum depth of bottom stage (D_{BS}=0.33') and minimum filter depth (D_{FD}=2.33'))	D_{REQ} =	9.7	ft
Depth from design water surface elevation to lowest orifice	D_O =	6.0	ft



Basin Design

Basin Design

Proposed Total Basin Depth (proposed depth plus freeboard)	D_{TOT} =	7.00	ft
Basin Invert Longitudinal Slope	Slope =	1.00	%
Basin Invert Transverse Slope (1% min)	Slope =	1	%
Basin Volume	V_{Basin} =	72111	ft^3



Forebay Design

Forebay Volume (3 - 5% V_{BMP})	V_{FB} =	1634	ft^3
Forebay Depth (height of berm)	D_{FBY} =	2	ft
Minimum Forebay Surface Area	A_{FB} =	817	ft^2
Rectangular weir (notch)	W =	12.00	in

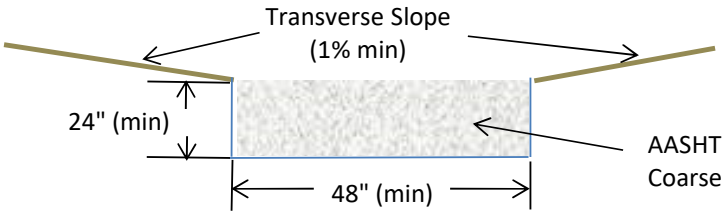
Dry Weather and Low-Flow Management

Low-Flow Trench (see graphic below)

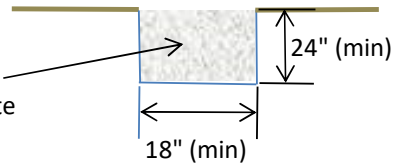
Depth (24 inches minimum, gravel filled)	Depth =	24	inches
Width (48 inches minimum)	Width =	48	inches
Trench Invert Longitudinal Slope	Slope =	1	%

Collector Trenches (see graphic below)

Depth (24 inches minimum)	Depth =	24	inches
Width (18 inches minimum)	Width =	18	inches
Trench Invert Longitudinal Slope	Slope =	1	%
Spacing (25 feet on center maximum)	S =	25	feet



Low-Flow Trench



Collector Trench

Bottom Stage (Sand Filter) Design

Depth of the Bottom Stage (4" minimum ponding)	D_{BS} =	6	in
Surface Area of Bottom Stage	A_{BS} =	1000	ft^2
Dry Weather Ponded Volume (above sand layer)	V_{BS} =	500	ft^3

Is V_{BS} no less than 0.5% V_{BMP}? OK

Depth of ASTM-C33 sand (18 inch minimum)

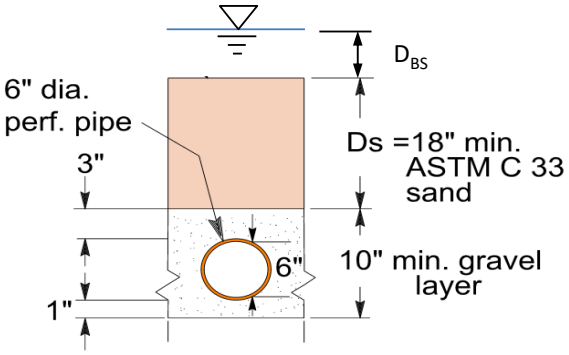
Ds = 18 inches

Diameter of Subdrains

ϕ = 6 in

Subdrain Spacing

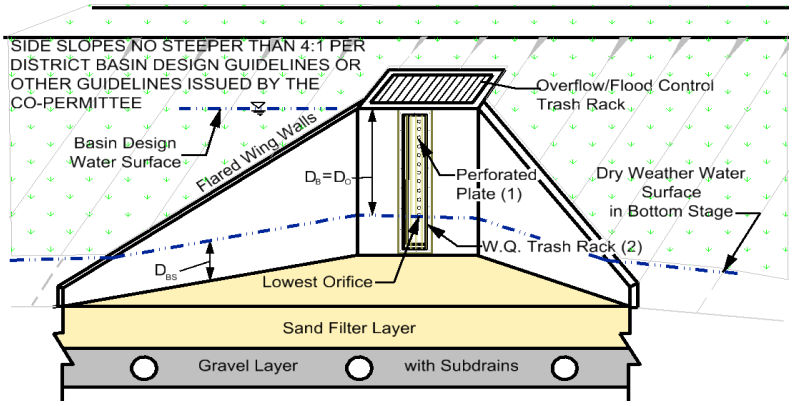
s = 10 ft. on center



Basin Outlet Design

Outlet Design

Assume an orifice area. Based on the information provided above, the spreadsheet provides discharge vs. stage data. Enter the volume vs. stage data for each interval. This information is used to route the volume through the basin. The size of the orifice is acceptable when the data shows that less than 50% of V_{BMP} has drained in 24 hours, and that 100% drawdown occurs within 72 hours.



Flow Rate, Q (cfs)

$$Q=CA[2g(H-H_o)]^{0.5}$$

Discharge Coefficient,

Default, C = 0.66

Other, C =

Orifice Area (ft^2)

Orifice Diameter, d; number of orifices per row, n; and number of orifice rows, N (from the bottom up).

d = 0.67 inches

n = 14 per row

N = 1 rows

Aeff = 0.034 ft^2 per row

or

Aeff = 4.933 in^2 per row

From outflow hydrograph, the time where 50% of V_{BMP} has drained from the basin (24 hour minimum):

Time (50%) = 22.53 hrs

Redesign. 24 hour minimum

From outflow hydrograph, the time where 100% V_{BMP} has drained from the basin(within 72 hours):

Time (100 %) = 70.80 hrs

OK

Headwater Elev. / Stage (ft)	Discharge (cfs)	Volume (acre-ft)	Δt (hrs.)
0	0.0000	0.0000	
0.33	0.1047	0.067	15.48
0.67	0.1482	0.136	6.60
1.00	0.1815	0.211	5.51
1.33	0.2095	0.285	4.58
1.67	0.2343	0.362	4.20
2.00	0.2566	0.444	4.04
2.33	0.2772	0.526	3.72
2.67	0.2963	0.610	3.54
3.00	0.3143	0.700	3.57
3.33	0.3313	0.790	3.37
3.67	0.3475	0.882	3.28
4.00	0.3629	0.980	3.34
4.33	0.3777	1.078	3.20
4.67	0.3920	1.178	3.14
5.00	0.4057	1.284	3.22
5.33	*0.4190*	*1.390*	
5.67	*0.4320*	*1.500*	
6.00	*0.4445*	*1.616*	
6.33			
6.67			
7.00			
7.33			
7.67			
8.00			
8.33			
8.67			
9.00			
9.33			
9.67			
10.00			
		∑ =	70.80

Notes:

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

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	KWC Engineers	Date	8/15/2024
Designed by	Andrew Burror	Case No	
Company Project Number/Name	2012.1344.4 Skyline Heights		

BMP Identification

BMP NAME / ID: DMA C

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}= 0.95 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)*
Roofs	*69000*	*Roofs*	*1*	*0.89*	*61548*			
Dwy	*7360*	*Concrete or Asphalt*	*1*	*0.892*	*6565.1*			
Street	*260496*	*Concrete or Asphalt*	*1*	*0.892*	*232362.4*			
Landscape	*838963*	*Ornamental Landscaping*	*0.1*	*0.110458*	*92670.2*			
	1175819		***Total***		**393145.7**	**0.95**	***31124***	***37249***

Notes:

Extended Detention Basin Design Procedure	BMP Subarea No. C	Legend:	Required Entries / Calculated Cells
Company Name: KWC Engineers			Date: 12/6/2023
Designed by: Andrew Burror			County/City Case No.:

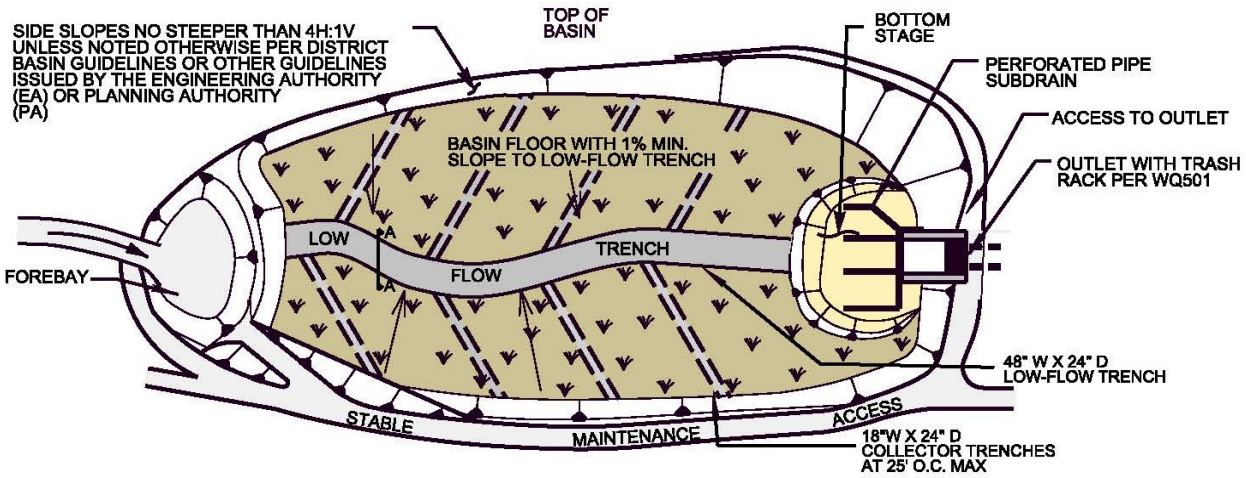
Design Volume

Tributary Area (BMP Subarea)	A_T =	22.4	acres
Enter $V_{BMP,}$ determined from Section 2.1 of this Handbook	V_{BMP}=	29,373	ft^3

Basin Footprint

Overall Geometry

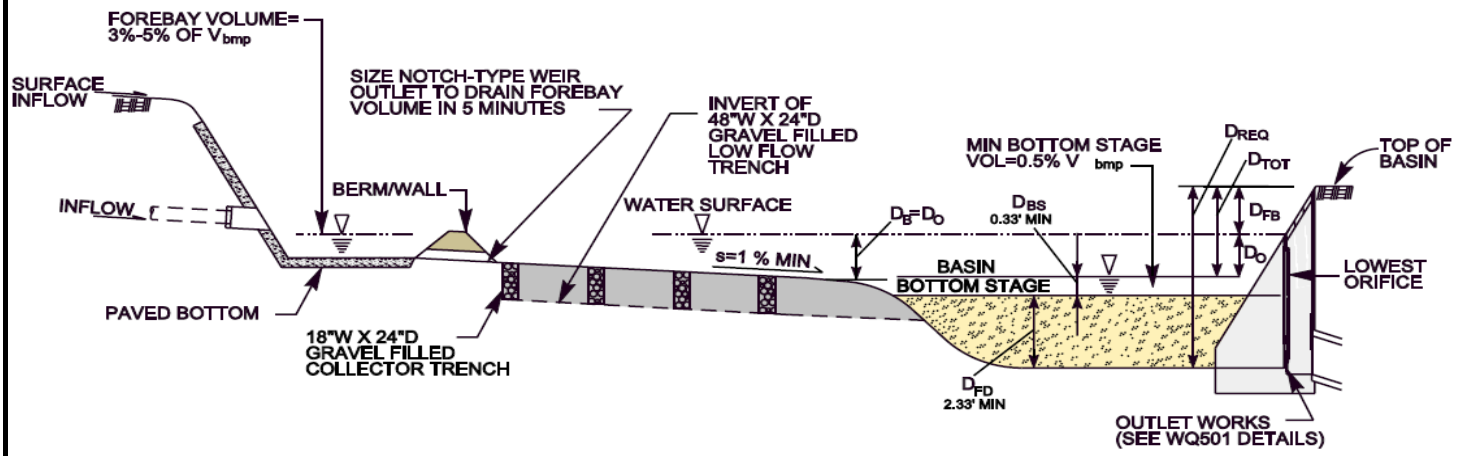
Length at Basin Bottom Surface	Length =	180	ft
Width at Basin Bottom Surface	Width =	22	ft
	Meets 1.5 : 1 requirement?	✓	
Side Slopes per "Basin Guidelines", Sect. 1.2	z =	4	:1
Proposed Basin Depth (with no freeboard)	D_B =	5.00	ft
Depth of freeboard (if used)	D_{FB} =	1.00	ft
Minimum Required Allowance for Total Depth (including proposed basin depth, freeboard, minimum depth of bottom stage (D_{BS}=0.33') and minimum filter depth (D_{FD}=2.33'))	D_{REQ} =	8.7	ft
Depth from design water surface elevation to lowest orifice	D_O =	5.0	ft



Basin Design

Basin Design

Proposed Total Basin Depth (proposed depth plus freeboard)	D_{TOT} =	6.00	ft
Basin Invert Longitudinal Slope	Slope =	1.00	%
Basin Invert Transverse Slope (1% min)	Slope =	1	%
Basin Volume	V_{Basin} =	37249	ft^3



Forebay Design

Forebay Volume (3 - 5% V_{BMP})	V_{FB} =	882	ft^3
Forebay Depth (height of berm)	D_{FBY} =	2	ft
Minimum Forebay Surface Area	A_{FB} =	441	ft^2
Rectangular weir (notch)	W =	12.00	in

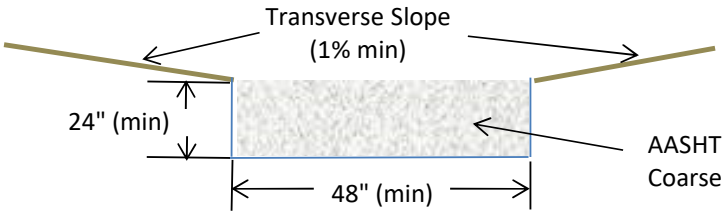
Dry Weather and Low-Flow Management

Low-Flow Trench (see graphic below)

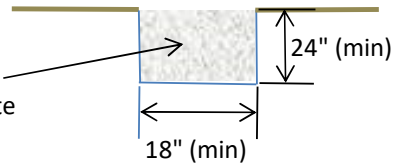
Depth (24 inches minimum, gravel filled)	Depth =	24	inches
Width (48 inches minimum)	Width =	48	inches
Trench Invert Longitudinal Slope	Slope =	1	%

Collector Trenches (see graphic below)

Depth (24 inches minimum)	Depth =	24	inches
Width (18 inches minimum)	Width =	18	inches
Trench Invert Longitudinal Slope	Slope =	1	%
Spacing (25 feet on center maximum)	S =	25	feet



Low-Flow Trench



Collector Trench

Bottom Stage (Sand Filter) Design

Depth of the Bottom Stage (4" minimum ponding)	D_{BS} =	6	in
Surface Area of Bottom Stage	A_{BS} =	1000	ft^2
Dry Weather Ponded Volume (above sand layer)	V_{BS} =	500	ft^3

Is V_{BS} no less than 0.5% V_{BMP}? OK

Depth of ASTM-C33 sand (18 inch minimum)

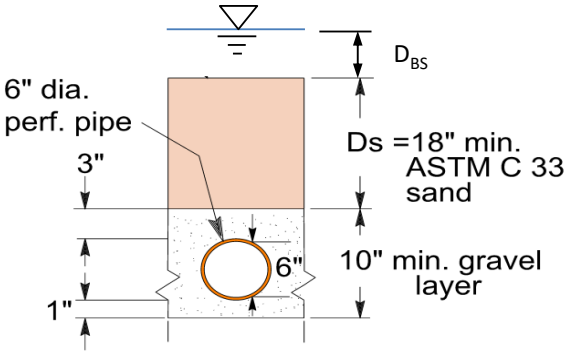
Ds = 18 inches

Diameter of Subdrains

ϕ = 6 in

Subdrain Spacing

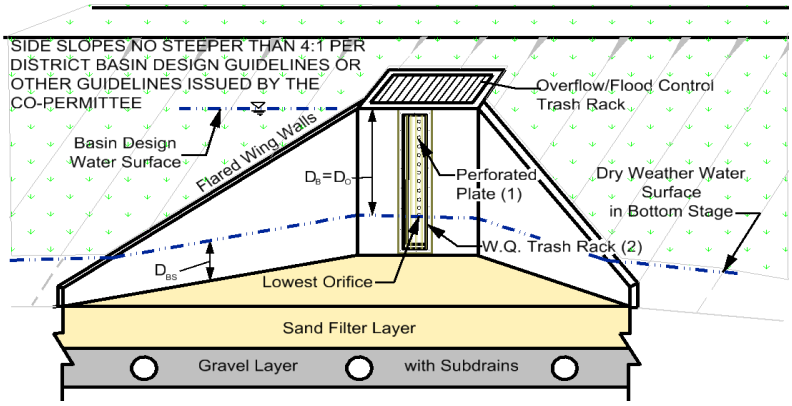
s = 10 ft. on center



Basin Outlet Design

Outlet Design

Assume an orifice area. Based on the information provided above, the spreadsheet provides discharge vs. stage data. Enter the volume vs. stage data for each interval. This information is used to route the volume through the basin. The size of the orifice is acceptable when the data shows that less than 50% of V_{BMP} has drained in 24 hours, and that 100% drawdown occurs within 72 hours.



Flow Rate, Q (cfs)

$$Q=CA[2g(H-H_o)]^{0.5}$$

Discharge Coefficient,

Default, C = 0.66

Other, C =

Orifice Area (ft^2)

Orifice Diameter, d; number of orifices per row, n; and number of orifice rows, N (from the bottom up).

d = 0.67 inches

n = 7 per row

N = 1 rows

Aeff = 0.017 ft^2 per row

or

Aeff = 2.467 in^2 per row

From outflow hydrograph, the time where 50% of V_{BMP} has drained from the basin (24 hour minimum):

Time (50%) = 24.17 hrs

OK

From outflow hydrograph, the time where 100% V_{BMP} has drained from the basin(within 72 hours):

Time (100 %) = 71.92 hrs

OK

Headwater Elev. / Stage (ft)	Discharge (cfs)	Volume (acre-ft)	Δt (hrs.)
0	0.0000	0.0000	
0.33	0.0524	0.027	12.48
0.67	0.0741	0.059	6.12
1.00	0.0907	0.094	5.14
1.33	0.1048	0.132	4.70
1.67	0.1171	0.175	4.69
2.00	0.1283	0.221	4.54
2.33	0.1386	0.272	4.62
2.67	0.1482	0.328	4.73
3.00	0.1571	0.388	4.76
3.33	0.1656	0.452	4.80
3.67	0.1737	0.524	5.13
4.00	0.1815	0.598	5.04
4.33	0.1889	0.677	5.16
4.67	*0.1960*	*0.765*	
5.00	*0.2029*	*0.855*	
5.33			
5.67			
6.00			
6.33			
6.67			
7.00			
7.33			
7.67			
8.00			
8.33			
8.67			
9.00			
9.33			
9.67			
10.00			
		∑ =	71.92

Notes:

Santa Ana Watershed - BMP Design Flow Rate, Q_{BMP}

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	KWC Engineers	Date	8/15/2024
Designed by	Daniella Ginocchio	Case No	
Company Project Number/Name	2012.1344.4 Skyline Heights		

BMP Identification

BMP NAME / ID: DMA D1

Must match Name/ID used on BMP Design Calculation Sheet

Design Rainfall Depth

Design Rainfall Intensity: I = 0.20 in/hr

Drainage Management Area Tabulation

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

DMAs

DMA Type/ID	DMA Area (square feet)	Post-Project Surface Type (use pull-down menu)	Effective Imperivous Fraction, I_f	DMA Runoff Factor	DMA Areas x Runoff Factor	*Design Rainfall Intensity (in/hr)*	*Design Flow Rate (cfs)*	*Proposed Flow Rate (cfs)*
Street	*17131*	*Concrete or Asphalt*	*1*	*0.89*	*15280.9*			
Landscape	*2060*	*Ornamental Landscaping*	*0.1*	*0.11046*	*227.5*			

Santa Ana Watershed - BMP Design Flow Rate, Q_{BMP}

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	KWC Engineers	Date	8/15/2024
Designed by	Daniella Ginocchio	Case No	
Company Project Number/Name	2012.1344.4 Skyline Heights		

BMP Identification

BMP NAME / ID: DMA D2

Must match Name/ID used on BMP Design Calculation Sheet

Design Rainfall Depth

Design Rainfall Intensity: I = 0.20 in/hr

Drainage Management Area Tabulation

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

DMAs

DMA Type/ID	DMA Area (square feet)	Post-Project Surface Type (use pull-down menu)	Effective Imperivous Fraction, I_f	DMA Runoff Factor	DMA Areas x Runoff Factor	*Design Rainfall Intensity (in/hr)*	*Design Flow Rate (cfs)*	*Proposed Flow Rate (cfs)*
Street	*23580*	*Concrete or Asphalt*	*1*	*0.89*	*21033.4*			
Landscape	*34585*	*Ornamental Landscaping*	*0.1*	*0.11046*	*3820.2*			

Santa Ana Watershed - BMP Design Flow Rate, Q_{BMP}

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	KWC Engineers	Date	8/15/2024
Designed by	Daniella Ginocchio	Case No	
Company Project Number/Name	2012.1344.4 Skyline Heights		

BMP Identification

BMP NAME / ID: DMA D3

Must match Name/ID used on BMP Design Calculation Sheet

Design Rainfall Depth

Design Rainfall Intensity: I = 0.20 in/hr

Drainage Management Area Tabulation

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

DMAs

DMA Type/ID	DMA Area (square feet)	Post-Project Surface Type (use pull-down menu)	Effective Imperivous Fraction, I_f	DMA Runoff Factor	DMA Areas x Runoff Factor	*Design Rainfall Intensity (in/hr)*	*Design Flow Rate (cfs)*	*Proposed Flow Rate (cfs)*
Roofs	*6000*	*Roofs*	*1*	*0.89*	*5352*			
Dwy	*640*	*Concrete or Asphalt*	*1*	*0.892*	*570.9*			
Street	*33645*	*Concrete or Asphalt*	*1*	*0.892*	*30011.3*			
Landscape	*70844*	*Ornamental Landscaping*	*0.1*	*0.110458*	*7825.3*			
	111129	***Total***			***43759.5***	***0.20***	***0.2***	***0.206***

Notes:

Santa Ana Watershed - BMP Design Flow Rate, Q_{BMP}

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	KWC Engineers	Date	8/15/2024
Designed by	Daniella Ginocchio	Case No	
Company Project Number/Name	2012.1344.4 Skyline Heights		

BMP Identification

BMP NAME / ID: DMA D4

Must match Name/ID used on BMP Design Calculation Sheet

Design Rainfall Depth

Design Rainfall Intensity: I = 0.20 in/hr

Drainage Management Area Tabulation

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

DMAs

DMA Type/ID	DMA Area (square feet)	Post-Project Surface Type (use pull-down menu)	Effective Imperivous Fraction, I_f	DMA Runoff Factor	DMA Areas x Runoff Factor	*Design Rainfall Intensity (in/hr)*	*Design Flow Rate (cfs)*	*Proposed Flow Rate (cfs)*
Roofs	*12000*	*Roofs*	*1*	*0.89*	*10704*			
Dwy	*1280*	*Concrete or Asphalt*	*1*	*0.892*	*1141.8*			
Street	*22623*	*Concrete or Asphalt*	*1*	*0.892*	*20179.7*			
Landscape	*62800*	*Ornamental Landscaping*	*0.1*	*0.110458*	*6936.8*			
	98703		***Total***		**38962.3**	**0.20**	***0.2***	***0.206***

Notes:

Santa Ana Watershed - BMP Design Flow Rate, Q_{BMP}

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	KWC Engineers	Date	8/15/2024
Designed by	Daniella Ginocchio	Case No	
Company Project Number/Name	2012.1344.4 Skyline Heights		

BMP Identification

BMP NAME / ID: DMA D5

Must match Name/ID used on BMP Design Calculation Sheet

Design Rainfall Depth

Design Rainfall Intensity: I = 0.20 in/hr

Drainage Management Area Tabulation

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

DMAs

DMA Type/ID	DMA Area (square feet)	Post-Project Surface Type (use pull-down menu)	Effective Imperivous Fraction, I_f	DMA Runoff Factor	DMA Areas x Runoff Factor	*Design Rainfall Intensity (in/hr)*	*Design Flow Rate (cfs)*	*Proposed Flow Rate (cfs)*
Roofs	*18000*	*Roofs*	*1*	*0.89*	*16056*			
Dwy	*1920*	*Concrete or Asphalt*	*1*	*0.892*	*1712.6*			
Street	*44571*	*Concrete or Asphalt*	*1*	*0.892*	*39757.3*			
Landscape	*104473*	*Ornamental Landscaping*	*0.1*	*0.110458*	*11539.9*			
	168964	***Total***			***69065.8***	***0.20***	***0.3***	***0.346***

Notes:

Santa Ana Watershed - BMP Design Flow Rate, Q_{BMP}

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	KWC Engineers	Date	8/15/2024
Designed by	Daniella Ginocchio	Case No	
Company Project Number/Name	2012.1344.4 Skyline Heights		

BMP Identification

BMP NAME / ID: DMA D6

Must match Name/ID used on BMP Design Calculation Sheet

Design Rainfall Depth

Design Rainfall Intensity I = 0.20 in/hr

Drainage Management Area Tabulation

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

DMAs

DMA Type/ID	DMA Area (square feet)	Post-Project Surface Type (use pull-down menu)	Effective Imperivous Fraction, I_f	DMA Runoff Factor	DMA Areas x Runoff Factor	*Design Rainfall Intensity (in/hr)*	*Design Flow Rate (cfs)*	*Proposed Flow Rate (cfs)*
Street	*18362*	*Concrete or Asphalt*	*1*	*0.89*	*16378.9*			
Landscape	*9080*	*Ornamental Landscaping*	*0.1*	*0.11046*	*1003*			
Open	*3630*	*Natural (D Soil)*	*0.4*	*0.27971*	*1015.4*			

Santa Ana Watershed - BMP Design Flow Rate, Q_{BMP}

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	KWC Engineers	Date	8/15/2024
Designed by	Daniella Ginocchio	Case No	
Company Project Number/Name	2012.1344.4 Skyline Heights		

BMP Identification

BMP NAME / ID: DMA D7

Must match Name/ID used on BMP Design Calculation Sheet

Design Rainfall Depth

Design Rainfall Intensity: I = 0.20 in/hr

Drainage Management Area Tabulation

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

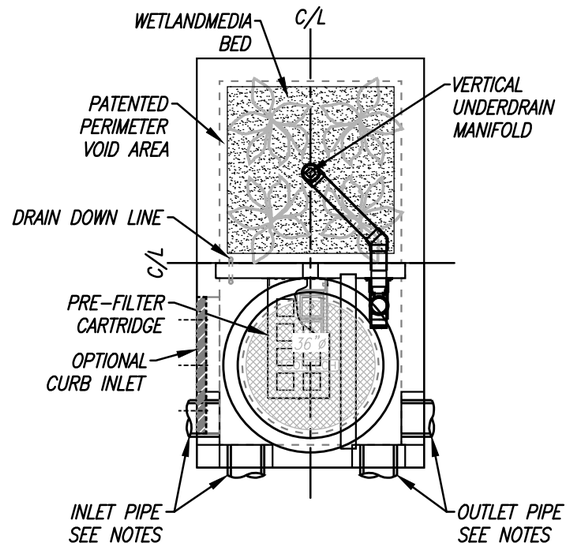
DMAs

DMA Type/ID	DMA Area (square feet)	Post-Project Surface Type (use pull-down menu)	Effective Imperivous Fraction, I_f	DMA Runoff Factor	DMA Areas x Runoff Factor	*Design Rainfall Intensity (in/hr)*	*Design Flow Rate (cfs)*	*Proposed Flow Rate (cfs)*
Roofs	*6000*	*Roofs*	*1*	*0.89*	*5352*			
Dwy	*640*	*Concrete or Asphalt*	*1*	*0.892*	*570.9*			
Street	*21016*	*Concrete or Asphalt*	*1*	*0.892*	*18746.3*			
Landscape	*77813*	*Ornamental Landscaping*	*0.1*	*0.110458*	*8595.1*			
	105469	***Total***			**33264.3**	**0.20**	***0.2***	***0.206***

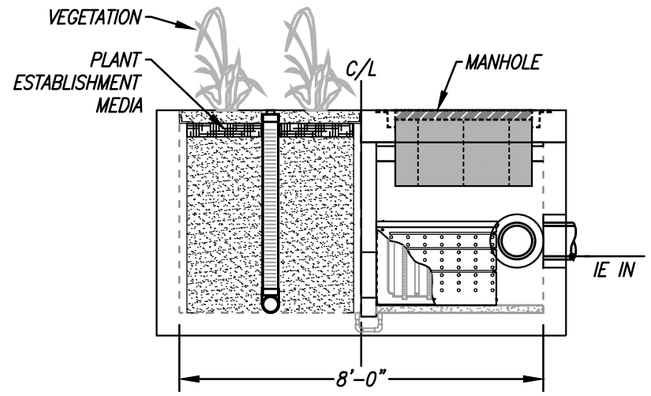
Notes:

SITE SPECIFIC DATA			
PROJECT NUMBER		12.1344.4	
PROJECT NAME		Skyline Heights	
PROJECT LOCATION		Corona	
STRUCTURE ID			
TREATMENT REQUIRED			
TREATMENT FLOW (CFS)			0.115
PRETREATMENT LOADING RATE (GPM/SF)			2.1 GPM/SF
WETLAND MEDIA LOADING RATE (GPM/SF)			1.0
PEAK BYPASS REQUIRED (CFS) – IF APPLICABLE			_____ (CFS)
PIPE DATA	I.E.	MATERIAL	DIAMETER
INLET PIPE 1			
INLET PIPE 2			
OUTLET PIPE			
	PRETREATMENT	BIOFILTRATION	DISCHARGE
RIM ELEVATION			
SURFACE LOAD	PEDESTRIAN		
NOTES:			

* PRELIMINARY ONLY - NOT FOR CONSTRUCTION



PLAN VIEW



LEFT END VIEW

INSTALLATION NOTES

1. CONTRACTOR TO PROVIDE ALL LABOR, EQUIPMENT, MATERIALS AND INCIDENTALS REQUIRED TO OFFLOAD AND INSTALL THE SYSTEM AND APPURTENANCES IN ACCORDANCE WITH THIS DRAWING AND THE MANUFACTURER'S SPECIFICATIONS, UNLESS OTHERWISE STATED IN MANUFACTURER'S CONTRACT.
2. UNIT MUST BE INSTALLED ON LEVEL BASE. MANUFACTURER RECOMMENDS A MINIMUM 6" LEVEL ROCK BASE UNLESS SPECIFIED BY THE PROJECT ENGINEER. CONTRACTOR IS RESPONSIBLE FOR VERIFYING PROJECT ENGINEER'S RECOMMENDED BASE SPECIFICATIONS.
3. CONTRACTOR TO SUPPLY AND INSTALL ALL EXTERNAL CONNECTING PIPES. ALL PIPES MUST BE FLUSH WITH INSIDE SURFACE OF CONCRETE (PIPES CANNOT INTRUDE BEYOND FLUSH). INVERT OF OUTFLOW PIPE MUST BE FLUSH WITH DISCHARGE CHAMBER FLOOR. ALL PIPES SHALL BE SEALED WATERTIGHT PER MANUFACTURER'S STANDARD CONNECTION DETAIL.
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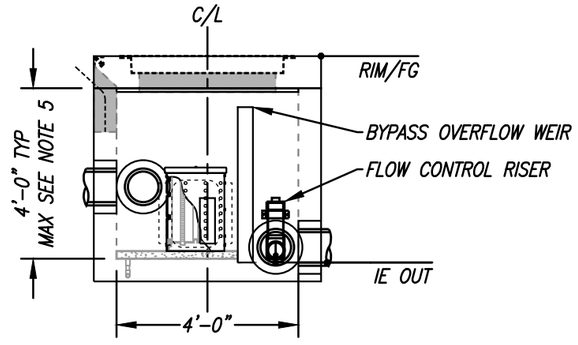
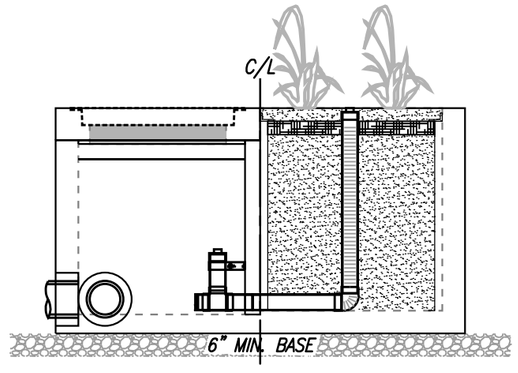


ELEVATION VIEW



RIGHT END VIEW

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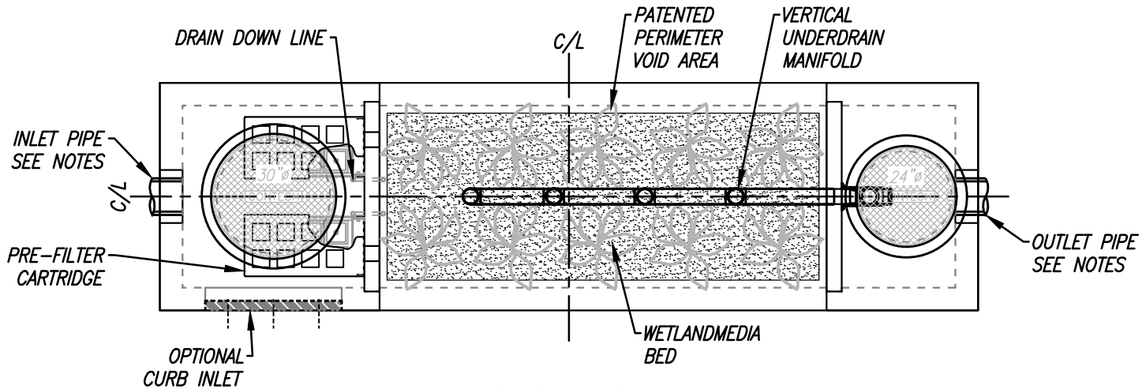
MWS-L-4-8-V
STORMWATER BIOFILTRATION SYSTEM
STANDARD DETAIL

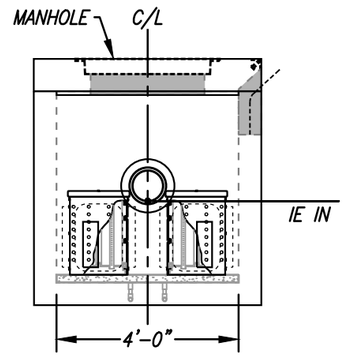
8/15/23SCOTT.SERTICH

SITE SPECIFIC DATA			
PROJECT NUMBER		12.1344.4	
PROJECT NAME		Skyline Heights	
PROJECT LOCATION		Corona	
STRUCTURE ID			
TREATMENT REQUIRED			
TREATMENT FLOW (CFS)			0.206
PRETREATMENT LOADING RATE (GPM/SF)			2.1 GPM/SF
WETLAND MEDIA LOADING RATE (GPM/SF)			1.0
PEAK BYPASS REQUIRED (CFS) – IF APPLICABLE			_____ (CFS)
PIPE DATA	I.E.	MATERIAL	DIAMETER
INLET PIPE 1			
INLET PIPE 2			
OUTLET PIPE			
	PRETREATMENT	BIOFILTRATION	DISCHARGE
RIM ELEVATION			
SURFACE LOAD	PEDESTRIAN		
NOTES:			

* PRELIMINARY ONLY - NOT FOR CONSTRUCTION



PLAN VIEW



LEFT END VIEW

INSTALLATION NOTES

1. CONTRACTOR TO PROVIDE ALL LABOR, EQUIPMENT, MATERIALS AND INCIDENTALS REQUIRED TO OFFLOAD AND INSTALL THE SYSTEM AND APPURTENANCES IN ACCORDANCE WITH THIS DRAWING AND THE MANUFACTURER'S SPECIFICATIONS, UNLESS OTHERWISE STATED IN MANUFACTURER'S CONTRACT.
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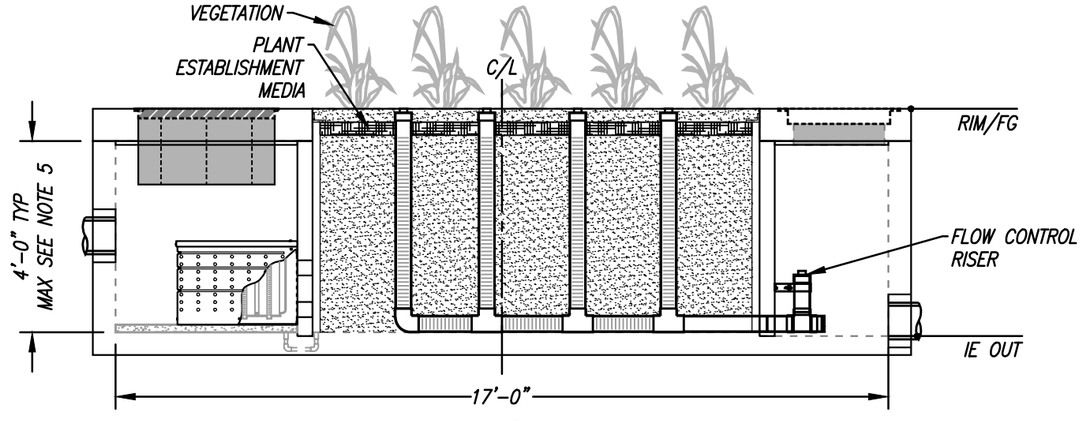
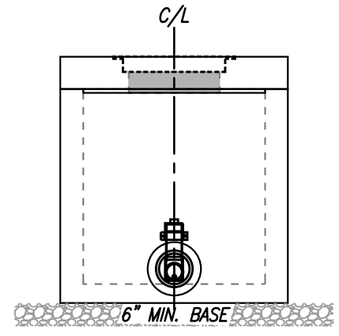


ELEVATION VIEW



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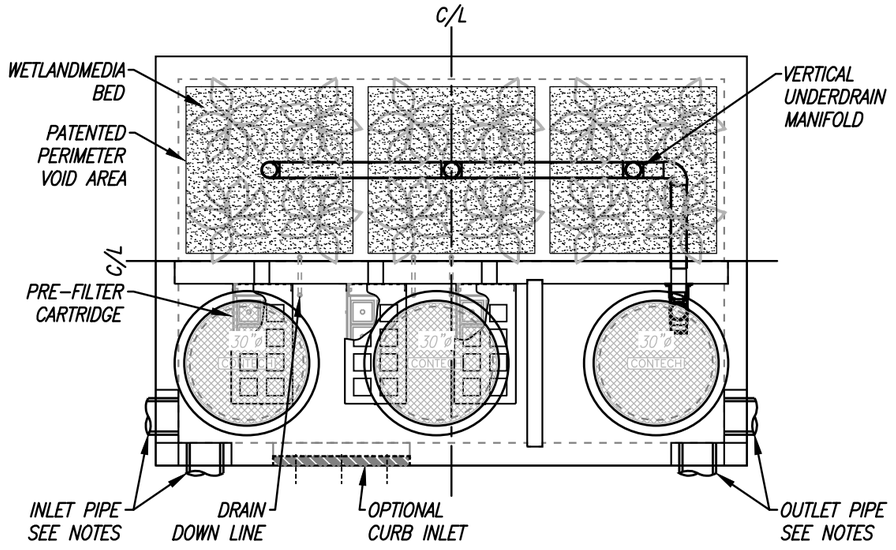
MWS-L-4-17-V
STORMWATER BIOFILTRATION SYSTEM
STANDARD DETAIL

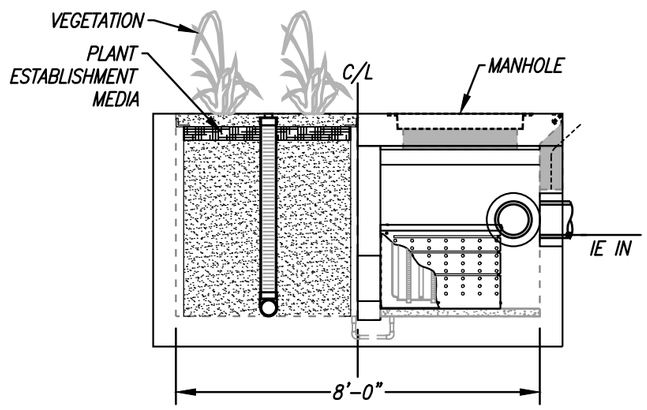
1/12/24TIM.GIRARD

SITE SPECIFIC DATA			
PROJECT NUMBER		12.1344.4	
PROJECT NAME		Skyline Heights	
PROJECT LOCATION		Corona	
STRUCTURE ID			
TREATMENT REQUIRED			
TREATMENT FLOW (CFS)			0.346
PRETREATMENT LOADING RATE (GPM/SF)			2.1 GPM/SF
WETLAND MEDIA LOADING RATE (GPM/SF)			1.0
PEAK BYPASS REQUIRED (CFS) – IF APPLICABLE			_____ (CFS)
PIPE DATA	I.E.	MATERIAL	DIAMETER
INLET PIPE 1			
INLET PIPE 2			
OUTLET PIPE			
	PRETREATMENT	BIOFILTRATION	DISCHARGE
RIM ELEVATION			
SURFACE LOAD	PEDESTRIAN		
NOTES:			

* PRELIMINARY ONLY - NOT FOR CONSTRUCTION



PLAN VIEW



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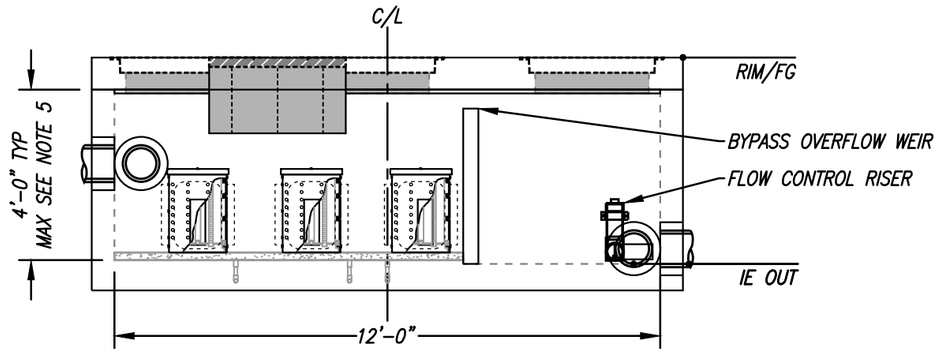
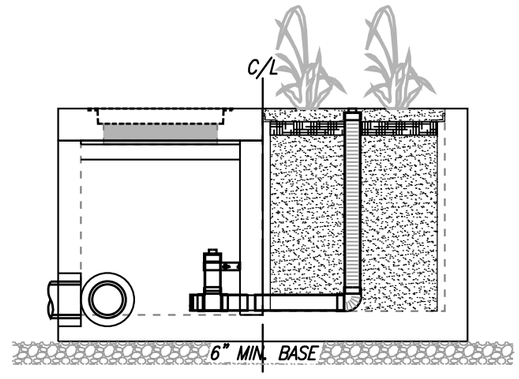


ELEVATION VIEW



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MWS-L-8-12-V
STORMWATER BIOFILTRATION SYSTEM
STANDARD DETAIL

8/14/23SCOTT.SERTICH

Flow Based Sizing

The MWS Linear can be used in stand alone applications to meet treatment flow requirements. Since the MWS Linear is the only biofiltration system that can accept inflow pipes several feet below the surface it can be used not only in decentralized design applications but also as a large central end-of-the-line application for maximum feasibility.

Treatment Flow Sizing Table

Model #	Dimensions	WetlandMedia Surface Area	Treatment Flow Rate (cfs)
MWS-L-4-4	4' x 4'	23 ft^2	0.052
MWS-L-4-6	4' x 6'	32 ft^2	0.073
MWS-L-4-8	4' x 8'	50 ft^2	0.115
MWS-L-4-13	4' x 13'	63 ft^2	0.144
MWS-L-4-15	4' x 15'	76 ft^2	0.175
MWS-L-4-17	4' x 17'	90 ft^2	0.206
MWS-L-4-19	4' x 19'	103 ft^2	0.237
MWS-L-4-21	4' x 21'	117 ft^2	0.268
MWS-L-8-8	8' x 8'	100 ft^2	0.230
MWS-L-8-12	8' x 12'	151 ft^2	0.346
MWS-L-8-16	8' x 16'	201 ft^2	0.462

Volume Based Sizing

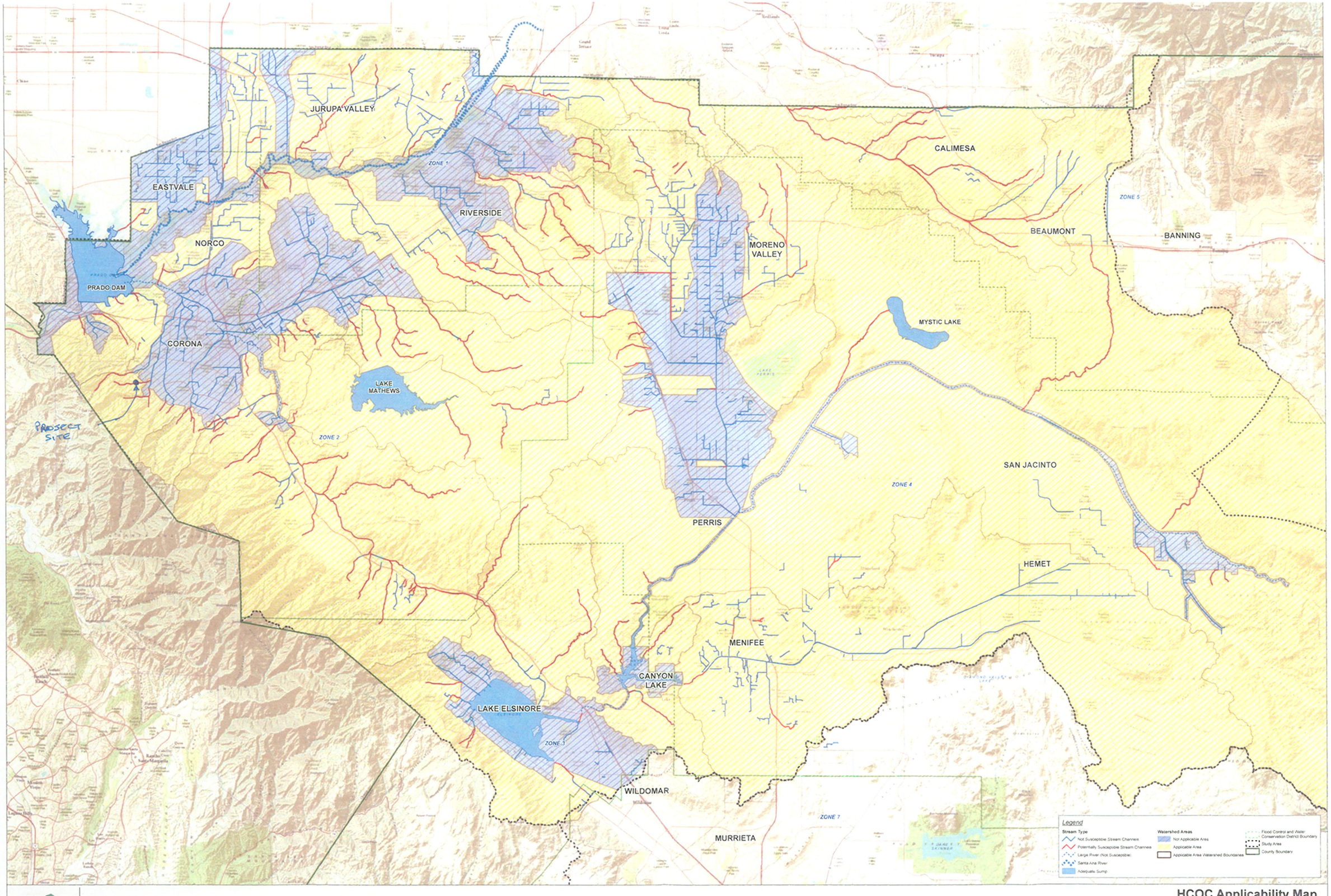
Many states require treatment of a water quality volume and do not offer the option of flow based design. The MWS Linear and its unique horizontal flow makes it the only biofilter that can be used in volume based design installed downstream of ponds, detention basins, and underground storage systems.

Treatment Volume Sizing Table

Model #	Treatment Capacity (cu. ft.) @ 24-Hour Drain Down	Treatment Capacity (cu. ft.) @ 48-Hour Drain Down
MWS-L-4-4	1140	2280
MWS-L-4-6	1600	3200
MWS-L-4-8	2518	5036
MWS-L-4-13	3131	6261
MWS-L-4-15	3811	7623
MWS-L-4-17	4492	8984
MWS-L-4-19	5172	10345
MWS-L-4-21	5853	11706
MWS-L-8-8	5036	10072
MWS-L-8-12	7554	15109
MWS-L-8-16	10073	20145

Appendix 7: Hydromodification

Supporting Detail Relating to Hydrologic Conditions of Concern



HCOC Applicability Map

Hydromodification Susceptibility Documentation Report and Mapping

RBF CONSULTING
PLANNING ▌ DESIGN ▌ CONSTRUCTION

FOOTHILL PARKWAY

MABEY CANYON
HYDROLOGY AND HYDRAULICS STUDY

Riverside County, California

Prepared For:

Riverside County Flood Control and Water Conservation District

1995 Market Street
Riverside, CA 92501

Consultant:

RBF CONSULTING
14725 Alton Parkway
Irvine, California 92618

Contact: John McCarthy, P.E.
Jeremy Hohnbaum

October 2007

JN 10-104629

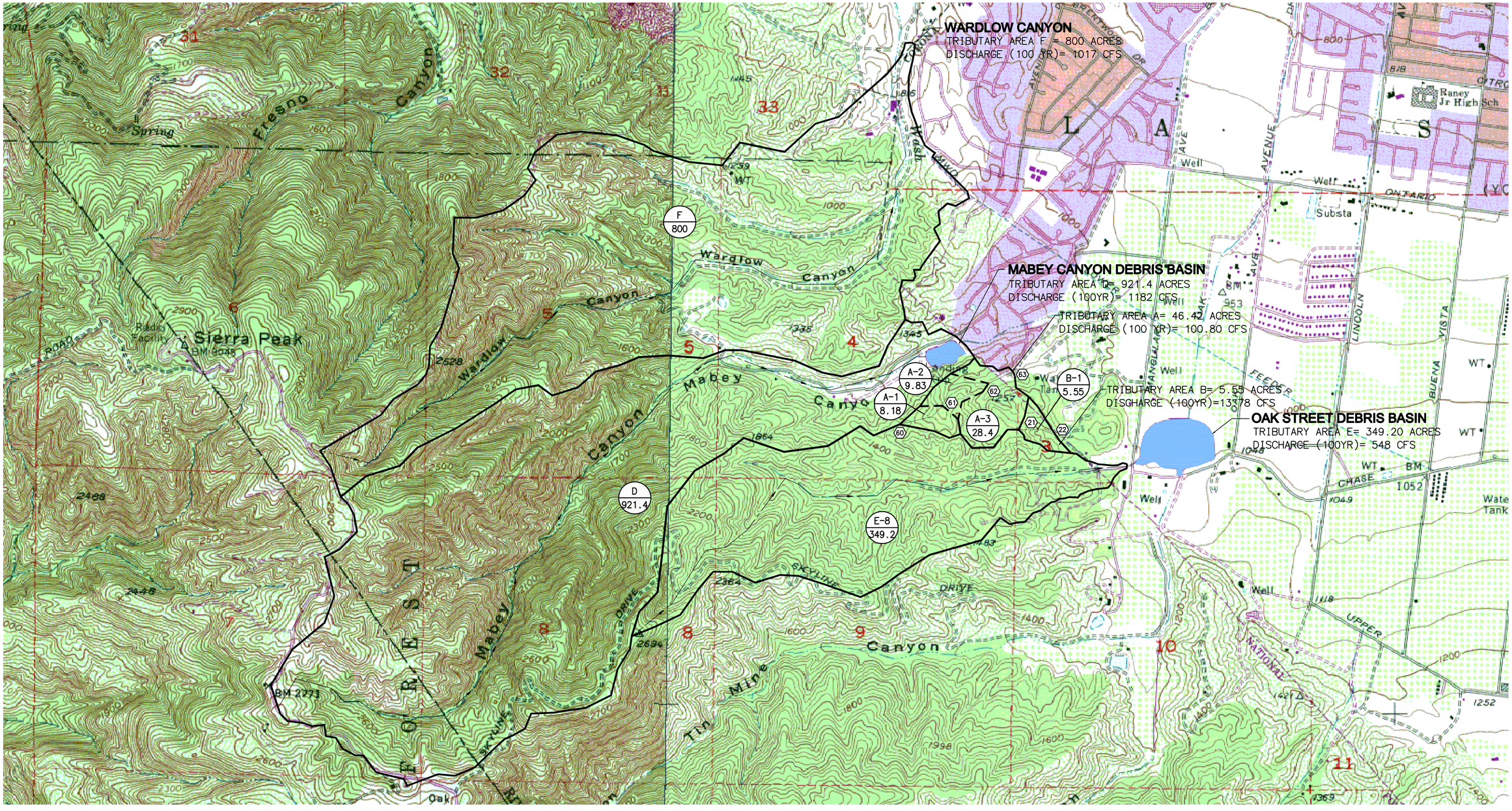
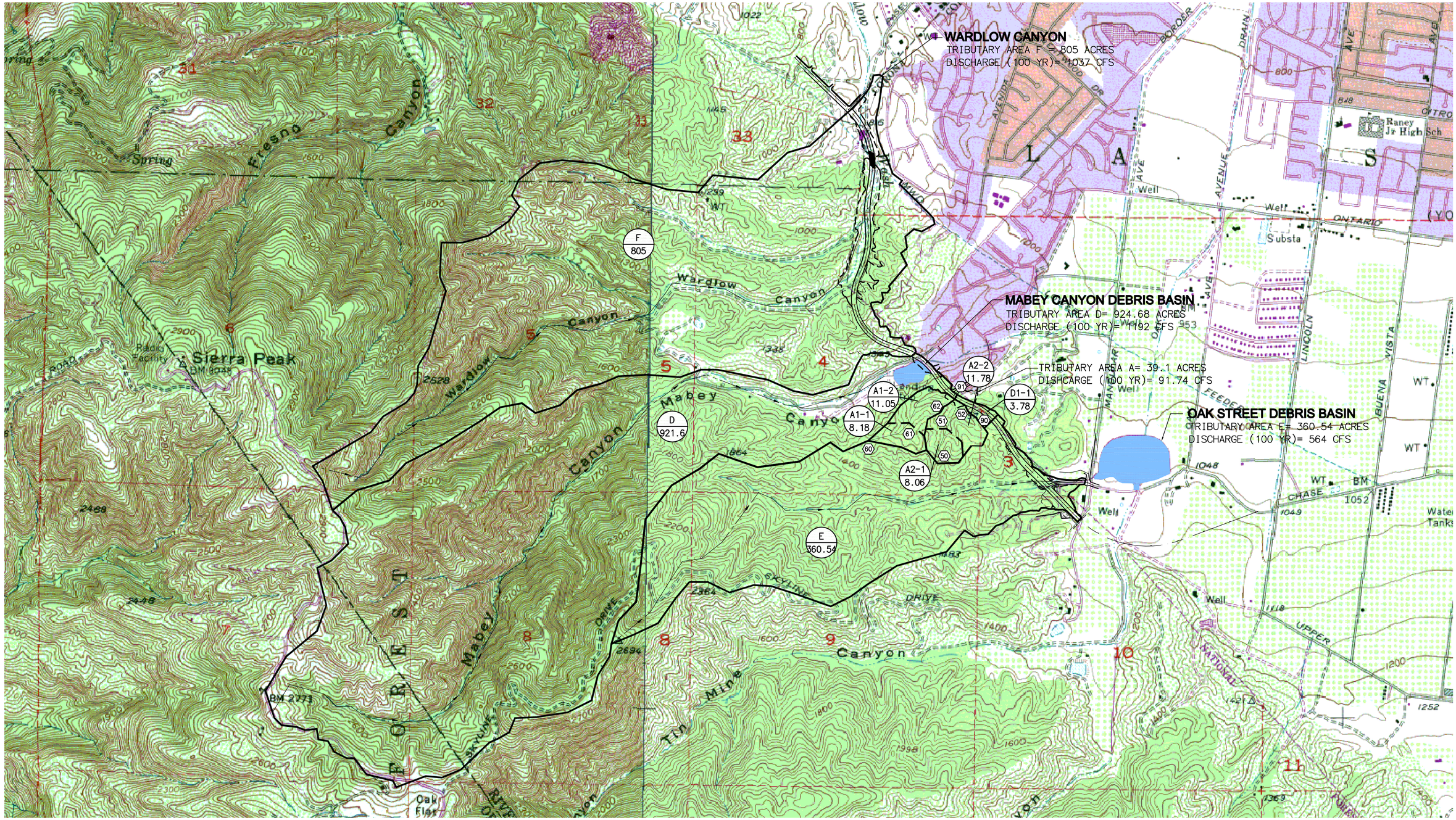


EXHIBIT 1
CORONA/FOOTHILL PKWY
EXISTING CONDITION HYDROLOGY MAP

RBF CONSULTING
PLANNING ■ DESIGN ■ CONSTRUCTION
14725 ALTON PARKWAY
IRVINE, CALIFORNIA 92618-2027
949.472.3505 ▪ FAX 949.472.8373 ▪ www.RBF.com

H:\PDATA\10104629\CADD\STRMWATER\EXHIBITS\HYDROLOGY\MOUNTAIN S-GRAPH\4629-EX_HYD-001.DWG JHOHNBAUM 2/8/07 8:31 pm



SCALE: 1"=800'

800 0 800 1600 2400
GRAPHIC SCALE

LEGEND

- DRAINAGE BOUNDARY
- SUBAREA BOUNDARY
- FLOW PATH
- A-1 / 1.0 — SUBAREA DESIGNATION / SUBAREA (ACRES)
- 1 — HYDROLOGY NODE

RBF CONSULTING
PLANNING ■ DESIGN ■ CONSTRUCTION
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IRVINE, CALIFORNIA 92618-2027
949.472.3505 ▪ FAX 949.472.8373 ▪ www.RBF.com

EXHIBIT 2
CORONA/FOOTHILL PKWY
PROJECT CONDITION HYDROLOGY MAP

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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.**	

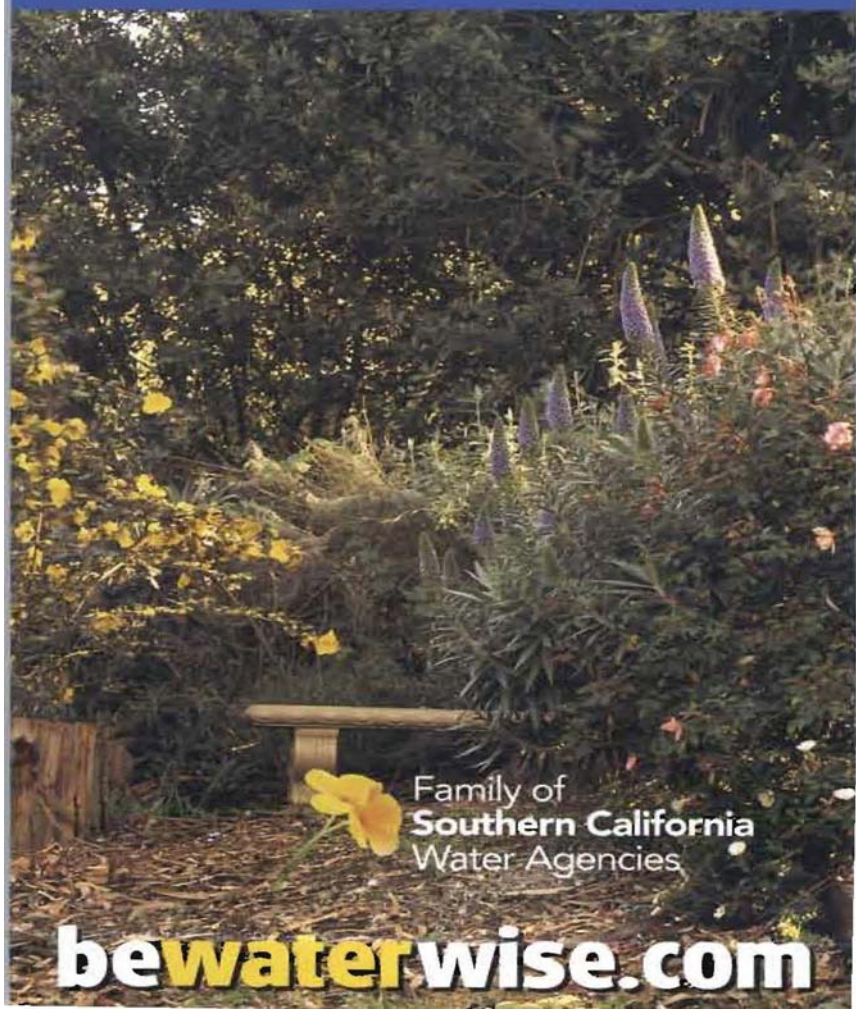
STORMWATER POLLUTANT SOURCES/SOURCE CONTROL CHECKLIST

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 10: Educational Materials

BMP Fact Sheets, Maintenance Guidelines and Other End-User BMP Information

10 Ways to Save Water Outdoors



TIP #1 The average homeowner uses twice the amount of water needed to keep plants healthy. Use the watering calculator and index at **bewaterwise.com** to know exactly how much water your plants need.

TIP #2 Check your sprinkler system for leaks, overspray and broken sprinkler heads. Update with drip or other more water-efficient sprinklers where appropriate.

TIP #3 This fall, plant a portion of your garden with beautiful native and California Friendly plants. Browse the plant database at **bewaterwise.com** to find just the right look for your outdoor spaces.

TIP #4 Reduce the amount of water-thirsty grass. Keep only what you need and replace the rest with less-thirsty plants or permeable paving.

TIP #5 For the grass you keep, set your lawnmower blade higher.

TIP #6 Adjust your sprinkler timer downward in September. Plants need less water when days are shorter.

TIP #7 Use a broom instead of the hose for cleaning sidewalks and patios.

TIP #8 Mulch! A layer of bark, gravel, compost, sawdust or low-growing groundcover evens out soil temperature and allows better water retention.

TIP #9 Check the list of invasive plants that hurt our environment at **caleppc.org** and remove any from your garden.

TIP #10 Share these tips with your gardener, neighbors and friends. Water conservation should be a part of every Southern Californian's lifestyle, but that doesn't mean we can't have lush and beautiful outdoor spaces.

bewaterwise.com

Central California Coast
Technical Assistance Memo (TAM)

LID Plant Guidance for Bioretention

Low Impact Development

This Technical Assistance Memo (TAM) provides plant guidance for bioretention stormwater control measures. Bioretention systems are low impact development (LID) features that use a combination of soil, plants, and other design elements to slow, treat, retain, and infiltrate stormwater runoff to mimic the natural, pre-development hydrology of a site.

While bioretention systems may look like regular landscaped areas, they are designed (engineered) to manage stormwater runoff volumes and pollutants created by urbanization. Specifying the appropriate plants and soil for a bioretention system is critical to its performance and community acceptance.

Which Bioretention Facility Type?

There are two basic bioretention design types: planter and slope-sided. The flat-bottom planter type has a level soil surface, which allows stormwater to pond across the entire area. All plants in the planter type of bioretention must be able to tolerate stormwater inundation (Figure 1, Zone A). In comparison, the slope-sided type has two landscape conditions: the area that functions for stormwater management (Figure 2, Zone A) and the area above the ponding level. Similar to the planter type, plants in Zone A of a slope-sided bioretention type must be able to survive periodic ponding conditions. Plants in Zone B, however, are not located in the stormwater management area and the plants/trees can be selected from conventional plant palettes. For each project, it is important that the landscape designer understand where the delineation between Zone A and Zone Be occurs in order to develop a proper plant design.

Source: Kevin Robert Perry

Slope-sided: This facility type has a lower area that ponds and conventional landscape on the side-slopes. Only plants in the functional, ponding area (Zone A) must be tolerant of periodic inundation.

Source: Cannon

Flat-bottom Planter: This design type has a flat surface with consistent depth of ponding across the structure. The entire area functions for stormwater management and all plants in this facility must be tolerant of periodic inundation (Zone A).

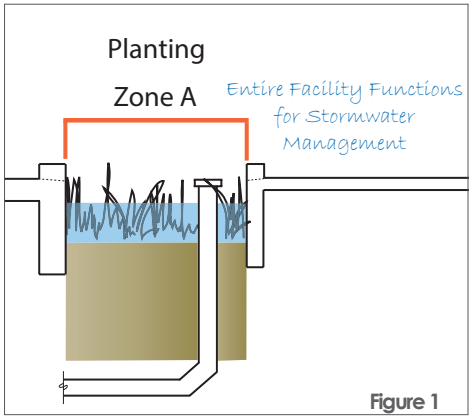


Figure 1

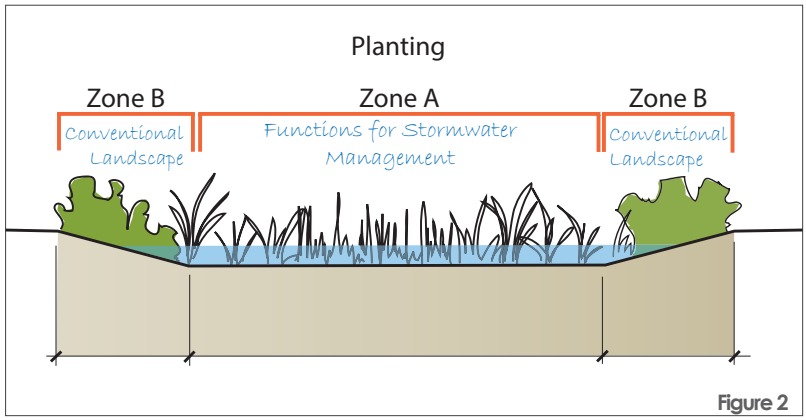


Figure 2

Choosing the Plants

With the bioretention facility type known and ponding areas identified, the plants can be selected. A list of plants appropriate for Zone A conditions (periodic ponding) is available on the Central Coast Low Impact Development Initiative (LIDI) website.

The LIDI Bioretention plant list was developed using the following criteria:

- Tolerant of varied moisture conditions (wet and dry)
- Tolerant of varied soil types and growing conditions
- Low maintenance requirements
- Not invasive weeds
- Do not have aggressive/invasive root systems
- Exhibit an attractive appearance.

centralcoastlidi.org/plants

The bioretention plants provided on the LIDI website represent a basic bioretention plant palette. When selecting plants, the landscape designer should determine whether a plant species is appropriate for the site considering proximity to cars, pedestrians, height limits, and anticipated levels of maintenance. Drought tolerant native plants are strongly encouraged to support water conservation, provide wildlife habitat, and for their ability to survive in local climate conditions.

While plant selection for Zone B areas is at the discretion of the landscape designer, selection should take into account the sandy, free draining bioretention soil mix and the potentially erosive conditions where stormwater enters the facility.

Source: Las Pilitas Nursery

Plant Selection and Maintenance: Anticipating the level of maintenance a facility will receive informs plant selection and may improve long-term system function. Where irrigation levels and maintenance are expected to be low, select a tough plant palette using species with similar requirements. For example, on a road-side bioretention swale that will receive little or no irrigation and minimal maintenance after establishment, a planting of *Juncus patens*, *Achillea millefolium* and *Muhlenbergia rigens* could survive on rainfall once established. These tough plants, which look best when given supplemental water and cut back annually, will also tolerate mowing.

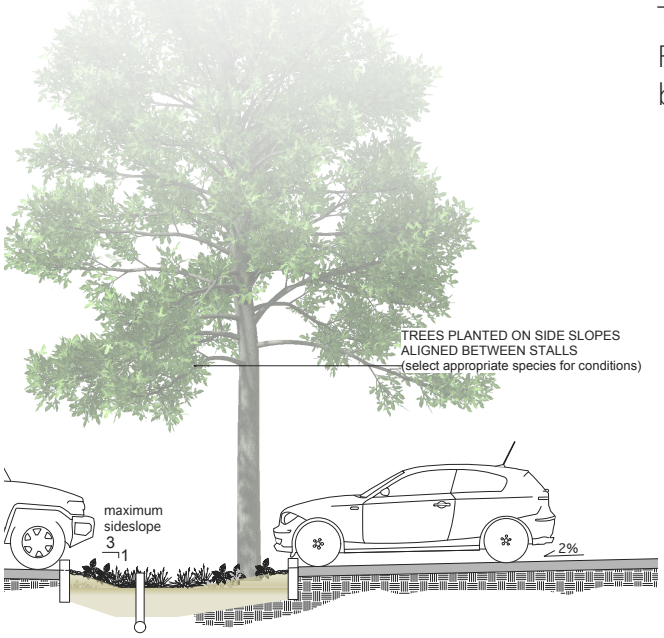
About Plant Substitutions

Selection of different plant species may be appropriate based on the specific project objectives. However, the designer must ensure that plants selected for the Zone A location of a bioretention facility can tolerate periodic stormwater inundation. During construction, designers and/or construction managers should carefully review substitution requests. In the case of substitutions sought due to supplier availability, the contractor may need to broaden their search to locate a different supplier.

Source: William Cullina

Bioretention Workhorse: *Juncus* is a genus of plants, commonly known as rushes. They are found across the globe and frequently on bioretention plant lists because of their tolerance for inundation. Some *Juncus* perform better than others in arid environments. *Juncus patens* is an easy to grow California native rush. It tolerates poor drainage, flooding, drought, and shade. A strong bioretention performer, it is more drought tolerant than the commonly available *Juncus effusus*. Additional *Juncus* cultivars and varieties may also be available at nurseries. Ask growers which *Juncus* will perform well with both seasonal inundation and drought.

Trees in Bioretention Areas



Trees provide additional aesthetic and performance benefits. Following these guidelines will maximize their success in bioretention areas:

- Provide sufficient facility width (a rule of thumb is 8' min.)
- Trees should be located at least five feet from facility inlets to avoid erosion of soils around the root ball
- Select trees that will tolerate seasonally wet soils and potential ponding
- Typically, locate trees on side-slopes; not at the bottom of Zone A
- Some trees may tolerate periodic shallow ponding, especially if native soils are highly infiltrative
- Do not specify trees with invasive roots
- Securely stake trees planted in bioretention areas

Soils for Bioretention

Specifying the correct soils for bioretention areas is critical in order to achieve stormwater objectives and plant health. Soils must balance three primary design objectives:

- High enough infiltration rates to meet surface water draw down requirements
- Infiltration rates that are not so high that they preclude pollutant removal function of soils
- Soil composition that supports plant establishment and long-term health

Bioretention Soil Mix: Construction documents for any LID project should include a bioretention soil specification that defines the ratio of materials in the mix (approximately 35% aged compost to 65% concrete sand), and the gradation, quality analysis, and other requirements for the materials. Specifications should also include guidelines for blending and placement of the bioretention soil mix.

Plant Installation

Landscape installation for bioretention areas is similar to that of traditional landscapes with a few added considerations:

- Conditions differ greatly between the ponding area (Zone A) and side-slopes (Zone B); plant installation must accurately follow landscape plans. After planting, an inspection should ensure correct placement.
- Plants should not block stormwater flows at inlets. The mature, full-size of plants should be estimated to determine proper setback from inlets, with adjustments made after installation, if plants are too close.
- A two-inch layer of compost may be applied to retain moisture, prevent erosion, and suppress weed growth. Use the same compost from the bioretention soil mix specification and avoid bark mulches that can float during storm events.
- Landscape installers should be aware to avoid compaction of the soil with machinery, or never working wet soils.

Plant Establishment and Care

Like traditional landscapes, bioretention planting areas require care and ongoing maintenance for optimal health. Due to their functional nature as stormwater management facilities the following guidelines should be followed:

Irrigation is typically needed for two to three years following installation. After that period, native plants will need little to no supplemental irrigation to survive, however they may enter a dormant stage and appear dried up until rejuvenated by rains or supplemental irrigation. Because bioretention soils are formulated to infiltrate, irrigation application rates must be properly designed to avoid overwatering, and for systems with an underdrain prevent potential discharges through the underdrain.

Compost Mulch (1" - 2") may be reapplied to bioretention areas annually, or as the mulch layer breaks down. Use compost mulch (the same compost used in the bioretention soil mix) and avoid bark mulches that can float during storm events. Do not apply mulch just prior to the rainy season.

Fertilizer should not be used in bioretention areas. Instead, a compost top dressing or application of compost tea can be used to introduce nutrients and beneficial microorganisms to the soil.

Synthetic herbicides and pesticides should **not be used** in bioretention areas because of their potential toxicity risk to aquatic organisms. There are a variety of natural methods and products that can be used to control weeds and pests.

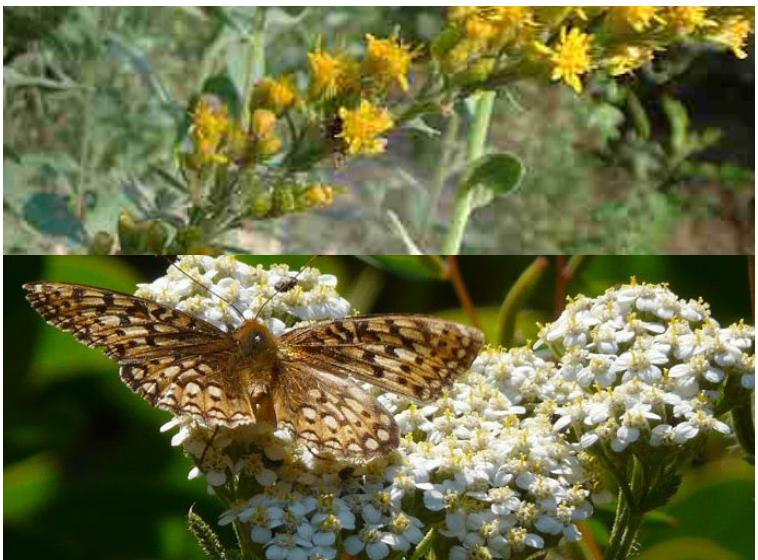
Weeds compete with plants for nutrients, water, and sunlight. They should be regularly removed, with their roots, by hand pulling or with manual pincer-type weeding tools. Care should be given to avoid unnecessary compaction of soils while weeding.

Replace plants that die due to unsuitable plant conditions, disease, underwatering, or other unforeseen issues. Dead and dying plants must be removed and replaced to avoid spreading disease, establishment of weeds in bare areas, and reduced LID function. Before replacing with the same species, determine if another species may be better suited to the conditions.

Check tree staking, especially in high wind areas. Trees in bioretention areas may be more easily impacted by storms because of side-slope and saturated soil conditions. They should be inspected once or twice a year and following storm events to ensure they maintain a vertical, upright position during establishment. Stakes should be removed once they are no longer needed to encourage self supporting root systems (between one and two years).

Plant Nurseries

Check with your local nursery for availability of plants on the LIDI Bioretention plant list. Additionally, LIDI's Bioretention Vendor List, while it may not be inclusive of all suppliers, provides contact information for Central Coast nurseries that stock plants from the Bioretention plant list.



Source: Las Pilitas Nursery

For additional technical resources:
www.centralcoastlidi.org
For questions or to contact the
Central Coast Low Impact Development Initiative:
info@centralcoastlidi.org

Central Coast Water Board

central coast LIDI

UC Davis LID Initiative

LEGAL DISCLAIMER: This Technical Assistance Memo (TAM) is intended as guidance only and should not be used as a substitute for site specific design and engineering. Applicants are responsible for compliance with all code and rule requirements, whether or not described in this TAM.

Central Coast Low Impact Development Initiative
Bioretention Plant List
Plants for Zone A: Periodic inundation, area ponds following storm events (6" to 12" depth for 24 - 72 hours) and compost amended sand soil.

Scientific & Common Name	Height / Width	Light Preferences			Water Tolerances		CA Native	Sunset Climate Zones[1]	Notes
		Sun	Part	Shade	Drought	Inundation			
GRASS / GRASSLIKE									
Carex barbarae Santa Barbara Sedge/ Basket Sedge	1-2' / 1'-2'	X	X	X		X	X	4 - 9, 14 - 23	Attracts butterflies, deer resistant, good for erosion control, can spread agressively and should be sited carefully.
Carex divulsa Berkeley Sedge	1' / spreading	X	X	X	X	X		all, but 1A-3A	Attractive blue-grey leaves. Can be mowed 4 in high to keep clean look.
Carex flacca Blue Sedge	1' / spreading	X	X		X	X		3A - 9, 14 - 23	Attractive blue-grey leaves. Can be mowed 4 in high to keep clean look.
Carex praegracilis California Field Sedge	1' / spreading	X	X			X	X	all, but 1A -3A	Mounding, drought deciduous during summer months.
Carex spissa San Diego sedge	3 - 4' / 2 - 3'	X	X		X	X	X	all, but 1A-3A	Can handle foot traffic and is deer resistant.
Chondropetalum tectorum Small Cape Rush	2 - 3' / 3 - 4'	X	X	X	X	X		all, but 1A-3A and 7	Needs very little maintenance. If trimmed too much plant will loose visual integrity.
Leymus condensatus 'Canyon Prince' Canyon Prince Wild Rye	3'/3'	X	X			X	X	all, but 1A-3A	Tolerant of drought, poor soils, part shade and seasonal wet. Spreads by rhizomes, so nice planted in masses. Cut back annually in spring before new growth emerges.
Juncus effusus Common Rush	2 - 3' / clumping	X	X			X	X	all	Easy to grow & very reliable. Needs more water than *Juncus patens* .
Juncus patens 'Elk Blue' Elk Blue California Gray Rush	2' / clumping	X	X		X	X	X	all	Very little maintenance, handles dry summers and wet winters.
Muhlenbergia rigens Deer Grass	2 - 3' / 3 - 6'	X	X		X	X	X	all, but 1A-3A	Can handle no watering, will stay green year round with watering, trim annually.
Scirpus cernus Low Bulrush	1' / spreading	X	X			X		7 - 24	Grow individually or in mass, cut back once a year, very attractive.

1 Refers to Sunset Western Garden Book Zones. The Central Coast includes the following Climate Zones: 1A, 2A, 3A, 7, 9, 14-24 www.sunset.com/garden/climate-zones/

Central Coast Low Impact Development Initiative
Bioretention Plant List
Plants for Zone A: Periodic inundation, area ponds following storm events (6" to 12" depth for 24 - 72 hours) and compost amended sand soil.

Scientific & Common Name	Height / Width	Light Preferences			Water Tolerances		CA Native	Sunset Climate Zones[1]	Notes
		Sun	Part	Shade	Drought	Inundation			
PERENNIALS									
Achillea millefolium californica Yarrow	1 - 3' / 2'	X	X		X	X	X	all	Tolerates regular to no watering, foot traffic, attracts butterflies, stress deciduous.
Anemopsis californica Yerba Mansa	1 - 2'/ spreading	X	X			X	X	all, but 1A-3A	Mat forming ground cover, interesting white flowers, prune back in late summer, likes moist conditions.
Bidens laevis Joaquin Sunflower	2 - 3' / 1 - 2'	X				X	X	all but 1A	Attracts beneficial insects, stress deciduous in summer, likes water but will survive drought if pruned back.
Calliandra eriophylla Fairy Duster	1 - 3' / 1 - 3'	X			X	X	X	10 - 24	Very attractive 1 - 2 inch pink flowers , little water after established, semi-evergreen, attracts butterflies and hummingbirds.
Epipactis gigantea Stream Orchid	1 - 2' / 2 - 3'	X	X			X	X	all	Will go dormant during drought, interesting muted pink and yellow flowers.
Eschscholzia californica California Poppy	1 - 3 ' / 1 - 3"	X			X	X	X	all	Can handle periodic inundation, cut back yearly to prevent it from becoming weedy.
Iris douglasiana Douglas Iris	1 - 2' / spreading	X	X			X	X	all, but 1A-3A	Needs moisture or shade inland, does well on coast, evergreen leaves, attractive lanvendar-blue flowers in Spring.
Lilium pardalinum Leopard Lily	3 - 8' / 6"	X	X			X	X	2-7, 14-17	Attractive red-orange spotted blossoms in spring, needs regular water, will get large in moist, partial shade conditions.
Lobelia cardinalis Cardinal Flower	2 - 3' / 2'	X	X	X		X	X	1-7, 14-17	A bog plant, attracts hummingbirds, showy scarlet flowers.
Mimulus cardinalis Scarlet Monkey Flower	1 - 3' / 1 - 3'	X	X	X		X	X	all but 1A	Year round red color with regular water, attracts hummingbirds, reseeds itself & should not be used for small spaces.
Mimulus guttatus Seep Monkey Flower	1 - 3' / 1 - 3'	X	X			X	X	all but 1A	Yellow flowers are abundant in spring-summer, attracts butterflies, will die back in drought and come back following year.
Rudbeckia californica California Coneflower	2 - 5' / 1 - 2'		X		X	X	X	all	Yellow showy flowers late summer and fall, cut back in winter, can get large under ideal conditions and may require pruning.
Salvia spathacea Hummingbird Sage	1 - 3' / spreading		X	X	X	X	X	all, but 1A-3A	Very attractive foliage and flowers, fragrant, attracts hummingbirds, deer resistant, likes to grow in understory of trees.
Sisyrinchium bellum Blue-Eyed Grass	6" - 1' / 6" - 1	X			X	X	X	all, but 1A-3A	Requires little to no maintenance. Summer dormant, will come back during wetter months on it's own. Can irrigate to prolong flowering.
Solidago californica California Goldenrod	1 - 3' / 2 - 3'	X	X	X	X	X	X	all, but 24	Attracts beneficial insects and butterflies. Attractive yellow flowering inflorescents in summer and fall. Dormant in winter, cut back to ground.

1 Refers to Sunset Western Garden Book Zones. The Central Coast includes the following Climate Zones: 1A, 2A, 3A, 7, 9, 14-24 www.sunset.com/garden/climate-zones/

Central Coast Low Impact Development Initiative
Bioretention Plant List
Plants for Zone A: Periodic inundation, area ponds following storm events (6" to 12" depth for 24 - 72 hours) and compost amended sand soil.

Scientific & Common Name	Height / Width	Light Preferences			Water Tolerances		CA Native	Sunset Climate Zones[1]	Notes
		Sun	Part	Shade	Drought	Inundation			
SHRUBS/SUBSHRUBS									
Baccharis pilularis Coyote Brush	wide variation	X			X	X	X	all, but 1A-3A	Adaptable evergreen shrub, provides quick cover and bank stabilization, tolerant of coastal conditions, alkaline soil, sand, clay and seasonal wet, dwarf (low growing) varieties available.
Zauschneria californica 'Catalina' Island California Fuchsia	1 - 3' / 2 - 3'	X	X		X	X	X	All but 1A	Likes moisture but will survive through drought, attractive red flowers that hummingbirds like. This species is hardier and flowers last longer.
Zauschneria californica 'Uvas Canyon' San Jose California Fuchsia	2 - 3' / spreading	X	X		X	X	X	All but 1A	Grey foliage, attractive red- orange flowers, very showy in late fall. Full sun with regular watering or along coast. Can be mowed to look like lawn.
LARGE SHRUBS / TREES									
Aesculus californica California Buckeye	15'	X	X		X	X	X	all but 1A-2A	Small tree that has fragrant white panicles April - May.. Needs regular water for the first 2 years. Interesting form throughout all seasons. Good for native bee population.
Amorpha californica California False Indigo Bush	6' / spreading		X	X	X	X	X	all, but 1A -3A	Large shrub, with fragrant purple flowers. Needs no water after established. Provides larval food for California State butterfly.
Cercis occidentalis Western Redbud	3 - 16' / 3 - 16'	X	X		X	X	X	all but 1A	Needs winter chill to set flowers properly. Abundant amount of flowering purple-pink flowers in spring. Can be pruned to tree or left as shrub.
Cornus californica California Dogwood	3 - 10'/ 3 - 10'		X		X	X	X	all, but 1A -3A	Attractive red branching stems with red deciduous leaves in winter. Good for erosion control. Showy white blooms in spring.
Garrya elliptica 'James Roof' Silk Tassel	10 - 15'	X	X		X	X	X	all, but 1A -3A	Drought tolerant where rainfall exceeds 20." Evergreen shrub - tree with hanging white catkins.
Sambucus mexicana Tapiro, Blue Elderberry	6 - 15'	X	X		X	X	X	all but 1A	Deciduous shub that can be pruned to a tree. Can handle extreme drought after first years. Needs maintenance to upkeep appearance. Attractive yellow flowers and edible blue berries. Great for ecosystem rehabilitation.
Spiraea douglasii Western Spiraea	4 - 5'	X	X		X	X	X	all	Deciduous shrub, fast growing. Attractive pink clustered flowers summer to early fall. Drought tolerant once established. Very adaptable.

1 Refers to Sunset Western Garden Book Zones. The Central Coast includes the following Climate Zones: 1A, 2A, 3A, 7, 9, 14-24 www.sunset.com/garden/climate-zones/

Stormwater and the Construction Industry

Protect Natural Features

Bad

Good

- Minimize clearing.
- Minimize the amount of exposed soil.
- Identify and protect areas where existing vegetation, such as trees, will not be disturbed by construction activity.
- Protect streams, stream buffers, wild woodlands, wetlands, or other sensitive areas from any disturbance or construction activity by fencing or otherwise clearly marking these areas.

Construction Phasing

- Sequence construction activities so that the soil is not exposed for long periods of time.
- Schedule or limit grading to small areas.
- Install key sediment control practices before site grading begins.
- Schedule site stabilization activities, such as landscaping, to be completed immediately after the land has been graded to its final contour.

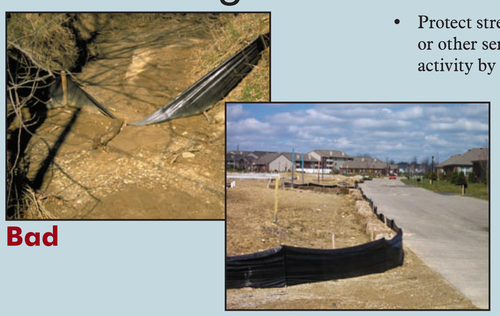
Vegetative Buffers

Bad

Good

- Protect and install vegetative buffers along waterbodies to slow and filter stormwater runoff.
- Maintain buffers by mowing or replanting periodically to ensure their effectiveness.

Silt Fencing



Bad

Good

- Inspect and maintain silt fences after each rainstorm.
- Make sure the bottom of the silt fence is buried in the ground.
- Securely attach the material to the stakes.
- Don't place silt fences in the middle of a waterway or use them as a check dam.
- Make sure stormwater is not flowing around the silt fence.

Maintain your BMPs!

IN RIVERSIDE COUNTY....Call 1-800-506-2555

TO REPORT ILLEGAL STORMDRAIN DISPOSAL

E-mail: Flood.fcnpdes@co.riverside.ca.us

Visit our website: www.floodcontrol.co.riverside.ca.us

Brought to you by the Storm Water/Clean Water Pollution Protection Program.....

REMEMBER, ONLY RAIN IN THE STORMDRAIN!

Site Stabilization

Bad

Good

- Vegetate, mulch, or otherwise stabilize all exposed areas as soon as land alterations have been completed.

Construction Entrances

Bad

Good

- Remove mud and dirt from the tires of construction vehicles before they enter a paved roadway.
- Properly size entrance BMPs for all anticipated vehicles.
- Make sure that the construction entrance does not become buried in soil.

Slopes

Bad

Good

- Rough grade or terrace slopes.
- Break up long slopes with sediment barriers, or under drain, or divert stormwater away from slopes.

Dirt Stockpiles

Bad

Good

- Cover or seed all dirt stockpiles.

Storm Drain Inlet Protection

Bad

Good

- Use rock or other appropriate material to cover the storm drain inlet to filter out trash and debris.
- Make sure the rock size is appropriate (usually 1 to 2 inches in diameter).
- If you use inlet filters, maintain them regularly.

www.epa.gov/npdes/menuofbmps

Stormwater and the Construction Industry

Planning and Implementing Erosion and Sediment Control Practices

The construction industry is a critical participant in the nation's efforts to protect streams, rivers, lakes, wetlands, and oceans. Through the use of best management practices (BMPs), construction site operators are the key defense against erosion and sedimentation.

As stormwater flows over a construction site, it picks up pollutants like sediment, debris, and chemicals. High volumes of stormwater can also cause stream bank erosion, and destroy downstream aquatic habitat. Preventing soil erosion and sedimentation is an important responsibility at all construction sites.

In addition to the environmental impact, uncontrolled erosion can have a significant financial impact on a construction project. It costs money and time to repair gullies, replace vegetation, clean sediment-clogged storm drains, replace poorly installed BMPs, and mitigate damage to other people's property or to natural resources.

Best Management Practice (BMP)
A BMP is a method used to prevent or control stormwater runoff and the discharge of pollutants, including sediment, into local waterbodies. Silt fences, inlet protection, and site-stabilization techniques are typical BMPs on a construction site.

Operator
An operator is someone who has control over and the ability to modify construction plans and specifications (e.g. owner, general contractor)

or

Someone who has control over the day-to-day operations at a site (e.g., owner, general contractor) that are necessary to ensure compliance with the permit requirements. It is the responsibility of a construction site owner or operator to contain stormwater runoff and prevent erosion during **all** stages of a project.

There may be more than one person at a site who meets these definitions and must apply for permit coverage. (States may have different definitions of the term "operator.")

So what's being done about polluted runoff?

The Clean Water Act includes the National Pollutant Discharge Elimination System (NPDES) permitting program. As of January 2003, 44 states and territories are authorized to issue NPDES stormwater permits. If your state isn't authorized to operate the NPDES stormwater permit program, EPA issues the permits. Permits vary from state to state, so contact your state or EPA for specific information. Your permitting authority has specific information on your state's NPDES stormwater permit program. In general, construction permits require construction operators to do all of the following:

- Develop and implement a stormwater pollution prevention plan
- Submit a permit application or notice of intent (NOI)
- Comply with the permit, including maintaining BMPs and inspecting the site

Under the NPDES program, construction activities that disturb 1 or more acres are required to obtain stormwater permit coverage. States have different names for the plans that construction operators must develop, such as

- Stormwater pollution prevention plan
- Erosion and sediment control plan
- Erosion control and stormwater management plan
- Stormwater management plan
- Water pollution control plan
- Pollution prevention plan

This document uses the term "*Plan*."

I think I need a permit... Where do I start?

All land-disturbing activities, including clearing, grading, and excavation, that disturb **1 or more acres** are required to be covered under a state or EPA-issued NPDES construction stormwater permit **prior to land disturbance**. Permit requirements vary by state. Begin by researching the specific requirements in your state. You might already be subject to local erosion and sediment control requirements, but that doesn't release you from the requirements of the NPDES program at the state or EPA level. Although you must comply with both sets of requirements, in most cases they have been designed to be complementary. Contact your permitting authority to find out exactly what you need to do. A good place to start your search is the Construction Industry Compliance Assistance web site at http://www.envcap.org/cica.

The NPDES permit requirements include small construction activities that are part of a larger common plan of development or sale, such as a single lot within a larger subdivision. For developments with multiple operators, all operators must have permit coverage for their individual parts of the larger development, no matter how large or small each operation happens to be. When there are multiple operators at one site, they're encouraged to develop and share one comprehensive Plan and obtain permit coverage as co-permitees.

The **owner or operator** of the construction site is responsible for complying with the requirements of the permit. Responsibilities include developing a Plan, obtaining permit coverage, implementing BMPs, and stabilizing the site at the end of the construction activity.

Construction sites that discharge unpermitted stormwater are in violation of the Clean Water Act and may be subject to fines of up to $27,500 a day per violation.

Determine your eligibility

All construction activity that disturbs 1 or more acres of land, as well as activity that disturbs less than 1 acre but is part of a larger common plan of development, must obtain permit coverage.

Read and understand your stormwater permit requirements

Get a copy of the permit for construction activities and a permit application (or notice of intent form) from your state or EPA permitting authority.

Develop a Plan

Most states do not require you to submit your Plan. However, you do need to keep the Plan on site. If that's impractical, you may post a notice that tells where the Plan is kept so it can be accessed by the permitting authority and other interested parties.

You'll need to post a copy of your completed application on site. Put it in a place where the public can see it so they'll know your site is covered by an NPDES permit!

Apply for permit coverage

Once you understand your permit requirements and have developed a Plan, you can submit a stormwater permit application (or notice of intent) to your permitting authority. This must be done before beginning any land disturbance on the site. Some states require a few days of lead time, so check with your permitting authority. Once you've submitted the application, you must satisfy the conditions of the permit.

Implement the Plan

Be prepared to implement the BMPs in your Plan before construction begins. Ensure that BMPs are properly maintained, and upgrade and repair them as necessary.

Developing and Implementing a Plan

You must have a Plan that includes erosion and sediment control and pollution prevention BMPs. These Plans require

- Advance planning and training to ensure proper implementation of the BMPs
- Erosion and sediment control BMPs in place until the area is permanently stabilized
- Pollution prevention BMPs to keep the construction site "clean"
- Regular inspection of the construction site to ensure proper installation and maintenance of BMPs

Fortunately, the practices and measures that must be included in your Plan are already part of the standard operating procedures at many construction sites.

Six steps are associated with developing and implementing a stormwater Plan. There's a wealth of information available on developing pollution prevention plans. Please contact your permitting authority for help in finding additional guidance materials, or visit www.epa.gov/npdes/stormwater. A sample construction plan is available at www.epa.gov/npdes/pubs/sample_swppp.pdf.

1. *Site Evaluation and Design Development*

- **Collect site information**
- **Develop site plan design**
- **Prepare pollution prevention site map**

The first step in preparing a Plan is to define the characteristics of the site and the type of construction that will occur. This involves collecting site information, identifying natural features that should be protected, developing a site plan design, describing the nature of the construction activity, and preparing a pollution prevention site map.

2. *Assessment*

- **Measure the site area**
- **Determine the drainage areas**
- **Calculate the runoff coefficient**

The next step is assessing the impact the project will have on stormwater runoff. Determine the drainage areas and estimate the runoff amounts and velocities. For more information on calculatng the runoff coefficient, go to www.epa.gov/npdes/pubs/chap02_conguide.pdf, page 11.

3. *Control Selection and Plan Design*

- **Review and incorporate state or local requirements**
- **Select erosion and sediment controls**
- **Select other controls**
- **Select stormwater management controls**
- **Indicate the location of controls on the site map**
- **Prepare an inspection and maintenance plan**
- **Coordinate controls with construction activity**
- **Prepare sequence of major activities**

In the third step you'll actually document your procedures to prevent and control polluted stormwater runoff. You must delineate areas that will not be disturbed, including critical natural areas like streamside areas, floodplains, and trees. You must also identify the measures (or BMPs) you'll use to protect these areas.

Phasing your project to minimize the amount of exposed soil at any given time is a highly effective way to prevent erosion. Erosion control measures designed to prevent soil from being mobilized include diversions to route stormwater away from exposed soils and stabilization with vegetation, mulch, and geotextiles. Sedimentation control measures designed to remove sediment from stormwater or prevent it from leaving the site include silt fences, sediment traps, and diversions.

You'll need to select erosion and sediment controls—including stabilization measures for protecting disturbed areas and structural controls for diverting run-off and removing sediment—that are appropriate for your particular site. The appropriateness of the control measures will depend on several factors, but will be influenced most directly by the site characteristics. Some stabilization measures you might consider are temporary seeding, permanent seeding, and mulching. Structural control measures include earth dikes, silt fences, and sediment traps. No single BMP will meet all of the erosion and sedimentation control needs of a construction site. A combination of BMPs is necessary. For more information on the types of BMPs appropriate for your construction site, see the BMP fact sheet series available at www.epa.gov/npdes/menuofbmps.

Soil erosion control tips...

- Design the site to infiltrate stormwater into the ground and to keep it out of storm drains. Eliminate or minimize the use of stormwater collection and conveyance systems while maximizing the use of stormwater infiltration and bioretention techniques.
- Minimize the amount of exposed soil on site.
  - To the extent possible, plan the project in stages to minimize the amount of area that is bare and subject to erosion. The less soil exposed, the easier and cheaper it will be to control erosion.
  - Vegetate disturbed areas with permanent or temporary seeding immediately upon reaching final grade.
  - Vegetate or cover stockpiles that will not be used immediately.
- Reduce the velocity of stormwater both onto and away from the project area.
  - Interceptors, diversions, vegetated buffers, and check dams are a few of the BMPs that can be used to slow down stormwater as it travels across and away from the project site.
  - Diversion measures can also be used to direct flow away from exposed areas toward stable portions of the site.
  - Silt fences and other types of perimeter filters should never be used to reduce the velocity of runoff.
- Protect defined channels immediately with measures adequate to handle the storm flows expected.
  - Sod, geotextile, natural fiber, riprap, or other stabilization measures should be used to allow the channels to carry water without causing erosion. Use softer measures like geotextile or vegetation where possible to prevent downstream impacts.
- Keep sediment on site.
  - Place aggregate or stone at construction site vehicle exits to accommodate at least two tire revolutions of large construction vehicles. Much of the dirt on the tires will fall off before the vehicle gets to the street.
  - Regular street sweeping at the construction entrance will prevent dirt from entering storm drains. Do not hose paved areas.
  - Sediment traps and basins are temporary structures and should be used in conjunction with other measures to reduce the amount of erosion.
- Maintaining all BMPs is critical to ensure their effectiveness during the life of the project.
  - Regularly remove collected sediment from silt fences, berms, traps, and other BMPs.
  - Ensure that geotextiles and mulch remain in place until vegetation is well established.
  - Maintain fences that protect sensitive areas, silt fences, diversion structures, and other BMPs.

Other BMPs and Activities to Control Polluted Runoff

You'll need to select other controls to address potential pollutant sources on your site. Construction materials, debris, trash, fuel, paint, and stockpiles become pollution sources when it rains. Basic pollution prevention practices can significantly reduce the amount of pollution leaving construction sites. The following are some simple practices that should be included in the Plan and implemented on site:

- Keep potential sources of pollution out of the rain as practicable (e.g., inside a building, covered with plastic or tarps, or sealed tightly in a leak-proof container).
- Clearly identify a protected, lined area for concrete truck washouts. This area should be located away from streams, storm drain inlets, or ditches and should be cleaned out periodically.
- Park, refuel, and maintain vehicles and equipment in one area of the site to minimize the area exposed to possible spills and fuel storage. This area should be well away from streams, storm drain inlets, or ditches. Keep spill kits close by and clean up any spills or leaks immediately, including spills on pavement or earthen surfaces.
- Practice good housekeeping. Keep the construction site free of litter, construction debris, and leaking containers. Keep all waste in one area to minimize cleaning.
- Never hose down paved surfaces to clean dust, debris, or trash. This water could wash directly into storm drains or streams. Sweep up materials and dispose of them in the trash. Never bury trash or debris!
- Dispose of hazardous materials properly.

4. *Certification and Notification*

- **Certify the Plan**
- **Submit permit application or notice of intent**

Once the Plan has been developed, an authorized representative must sign it. Now is the time to submit the permit application or notice of intent. Your permit might require that the Plan be kept on site, so be sure to keep it available for the staff implementing the Plan.

Erosion and sedimentation control practices are only as good as their installation and maintenance.

5. *Implementing and Maintaining a Plan*

- **Implement controls**
- **Inspect and maintain controls**
- **Update/change the Plan**
- **Report releases of hazardous materials**

A Plan describes the practices and activities you'll use to prevent stormwater contamination and meet the NPDES permit requirements. Make sure that the Plan is implemented and that the Plan is updated as necessary to reflect changes on the site.

Erosion and sedimentation control practices are only as good as their installation and maintenance. Train the contractors that will install the BMPs and inspect immediately to ensure that the BMPs have been installed correctly.

Regularly inspect the BMPs (especially before and after rain events) and perform any necessary repairs or maintenance immediately. Many BMPs are designed to handle a limited amount of sediment. If not maintained, they'll become ineffective and a source of sediment pollution.

It's also important to keep records of BMP installation, implementation, and maintenance. Keep track of major grading activities that occur on the site, when construction activities cease (temporarily or permanently), and when a site is temporarily or permanently stabilized.

If construction plans change at any time, or if more appropriate BMPs are chosen for the site, update the Plan accordingly.

6. *Completing the Project: Final Stabilization and Termination of the Permit*

- **Final stabilization**
- **Notice of Termination**
- **Record retention**

Many states and EPA require a Notice of Termination (NOT) or other notification signifying that the construction activity is completed. An NOT is required when

- Final stabilization has been achieved on all portions of the site for which the permittee is responsible.
- Another operator has assumed control over all areas of the site that have not been finally stabilized. That operator would need to submit a new permit application to the permitting authority.
- For residential construction only, temporary stabilization of a lot has been completed prior to transference of ownership to the homeowner, with the homeowner being made aware of the need to perform final stabilization.

Permittees must keep a copy of their permit application and their Plan for at least 3 years following final stabilization. This period may be longer depending on state and local requirements.

Preconstruction Checklist

- A site description, including
  - Nature of the activity
  - Intended sequence of major construction activities
  - Total area of the site
  - Existing soil type and rainfall runoff data
  - A site map with:
    - Drainage patterns
    - Approximate slopes after major grading
    - Area of soil disturbance
    - Outline of areas which will not be disturbed
    - Location of major structural and nonstructural soil erosion controls
    - Areas where stabilization practices are expected to occur
    - Surface waters
    - Stormwater discharge locations
  - Name of the receiving water(s)
- A description of controls:
  - Erosion and sediment controls, including
    - Stabilization practices for all areas disturbed by construction
    - Structural practices for all drainage/discharge locations
  - Stormwater management controls, including
    - Measures used to control pollutants occurring in stormwater discharges after construction activities are complete
    - Velocity dissipation devices to provide nonerosive flow conditions from the discharge point along the length of any outfall channel
  - Other controls, including
    - Waste disposal practices that prevent discharge of solid materials
    - Measures to minimize offset tracking of sediments by construction vehicles
    - Measures to ensure compliance with state or local waste disposal, sanitary sewer, or septic system regulations
  - Description of the timing during the construction when measures will be implemented
- State or local requirements incorporated into the Plan
- Inspection and maintenance procedures for control measures identified in the Plan
- Contractor certification and Plan certification

Implementation Checklist

- Maintain records of construction activities, including
  - Dates when major grading activities occur
  - Dates when construction activities temporarily cease on the site or a portion of the site
  - Dates when construction activities permanently cease on the site or a portion of the site
  - Dates when stabilization measures are completed on the site
- Prepare inspection reports summarizing
  - Name of person conducting BMP inspections
  - Qualifications of person conducting BMP inspections
  - BMPs/areas inspected
  - Observed conditions
  - Necessary changes to the Plan
- Report releases of reportable quantities of oil or hazardous materials
  - Notify the National Response Center at 800-424-8802 immediately
  - Report releases to your permitting authority immediately, or as specified in your permit. You must also provide a written report within 14 days.
  - Modify the Plan to include
    - The date of release
    - Circumstances leading to the release
    - Steps taken to prevent reoccurrence of the release
- Modify Plan as necessary
  - Incorporate requests of the permitting authority to bring the Plan into compliance
  - Address changes in design, construction operation, or maintenance that affect the potential for discharge of pollutants

An ounce of prevention is worth a pound of cure! It's far more efficient and cost-effective to prevent pollution than it is to try to correct problems later. Installing and maintaining simple BMPs and pollution prevention techniques on site can greatly reduce the potential for stormwater pollution and can also save you money!

Visit www.epa.gov/npdes/stormwater for more information.

StormWater CleanWater PROTECTION PROGRAM

Why is stormwater runoff a problem?

Stormwater can pick up debris, chemicals, dirt, and other pollutants and flow into a storm sewer system or directly to a lake, stream, river, wetland, or coastal water. Anything that enters a storm sewer system is discharged untreated into the waterbodies we use for swimming, fishing, and providing drinking water.

What is stormwater runoff?

Stormwater runoff occurs when precipitation from rain or snowmelt flows over the ground. Impervious surfaces like driveways, sidewalks, and streets prevent stormwater from naturally soaking into the ground.

The effects of pollution

Polluted stormwater runoff can have many adverse effects on plants, fish, animals, and people.

- Sediment can cloud the water and make it difficult or impossible for aquatic plants to grow. Sediment also can destroy aquatic habitats.
- Excess nutrients can cause algae blooms. When algae die, they sink to the bottom and decompose in a process that removes oxygen from the water. Fish and other aquatic organisms can't exist in water with low dissolved oxygen levels.
- Bacteria and other pathogens can wash into swimming areas and create health hazards, often making beach closures necessary.
- Debris—plastic bags, six-pack rings, bottles, and cigarette butts—washed into waterbodies can choke, suffocate, or disable aquatic life like ducks, fish, turtles, and birds.
- Household hazardous wastes like insecticides, pesticides, paint, solvents, used motor oil, and other auto fluids can poison aquatic life. Land animals and people can become sick or die from eating diseased fish and shellfish or ingesting polluted water.
- Polluted stormwater often affects drinking water sources. This, in turn, can affect human health and increase drinking water treatment costs.

After the Storm

For more information contact:

or visit
www.epa.gov/npdes/stormwater
www.epa.gov/nps

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A Citizen's Guide to Understanding Stormwater

Stormwater Pollution Solutions

Residential

Recycle or properly dispose of household products that contain chemicals, such as insecticides, pesticides, paint, solvents, and used motor oil and other auto fluids. Don't pour them onto the ground or into storm drains.

Lawn care

Excess fertilizers and pesticides applied to lawns and gardens wash off and pollute streams. In addition, yard clippings and leaves can wash into storm drains and contribute nutrients and organic matter to streams.

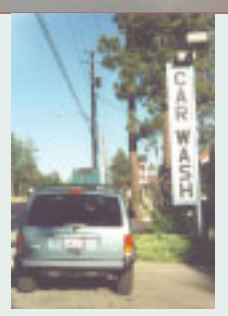
- Don't overwater your lawn. Consider using a soaker hose instead of a sprinkler.
- Use pesticides and fertilizers sparingly. When use is necessary, use these chemicals in the recommended amounts. Use organic mulch or safer pest control methods whenever possible.
- Compost or mulch yard waste. Don't leave it in the street or sweep it into storm drains or streams.
- Cover piles of dirt or mulch being used in landscaping projects.

Septic systems

Leaking and poorly maintained septic systems release nutrients and pathogens (bacteria and viruses) that can be picked up by stormwater and discharged into nearby waterbodies. Pathogens can cause public health problems and environmental concerns.

- Inspect your system every 3 years and pump your tank as necessary (every 3 to 5 years).
- Don't dispose of household hazardous waste in sinks or toilets.

Auto care



Washing your car and degreasing auto parts at home can send detergents and other contaminants through the storm sewer system. Dumping automotive fluids into storm drains has the same result as dumping the materials directly into a waterbody.

- Use a commercial car wash that treats or recycles its wastewater, or wash your car on your yard so the water infiltrates into the ground.
- Repair leaks and dispose of used auto fluids and batteries at designated drop-off or recycling locations.

Pet waste

Pet waste can be a major source of bacteria and excess nutrients in local waters.

- When walking your pet, remember to pick up the waste and dispose of it properly. Flushing pet waste is the best disposal method. Leaving pet waste on the ground increases public health risks by allowing harmful bacteria and nutrients to wash into the storm drain and eventually into local waterbodies.

Education is essential to changing people's behavior. Signs and markers near storm drains warn residents that pollutants entering the drains will be carried untreated into a local waterbody.

Residential landscaping

Permeable Pavement—Traditional concrete and asphalt don't allow water to soak into the ground. Instead these surfaces rely on storm drains to divert unwanted water. Permeable pavement systems allow rain and snowmelt to soak through, decreasing stormwater runoff.

Rain Barrels—You can collect rainwater from rooftops in mosquito-proof containers. The water can be used later on lawn or garden areas.

Rain Gardens and Grassy Swales—Specially designed areas planted with native plants can provide natural places for rainwater to collect and soak into the ground. Rain from rooftop areas or paved areas can be diverted into these areas rather than into storm drains.

Vegetated Filter Strips—Filter strips are areas of native grass or plants created along roadways or streams. They trap the pollutants stormwater picks up as it flows across driveways and streets.

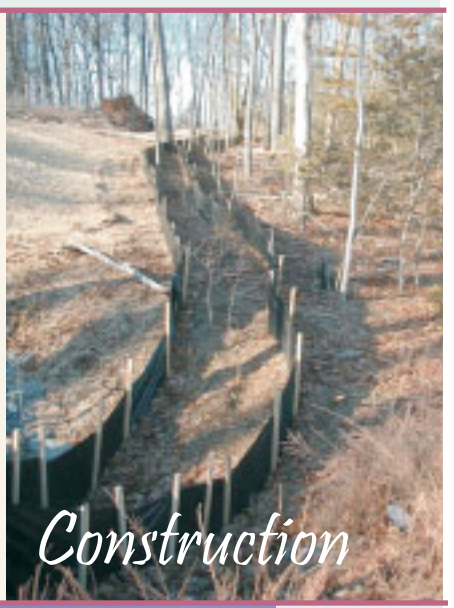
Commercial

Dirt, oil, and debris that collect in parking lots and paved areas can be washed into the storm sewer system and eventually enter local waterbodies.

- Sweep up litter and debris from sidewalks, driveways and parking lots, especially around storm drains.
- Cover grease storage and dumpsters and keep them clean to avoid leaks.
- Report any chemical spill to the local hazardous waste cleanup team. They'll know the best way to keep spills from harming the environment.

Erosion controls that aren't maintained can cause excessive amounts of sediment and debris to be carried into the stormwater system. Construction vehicles can leak fuel, oil, and other harmful fluids that can be picked up by stormwater and deposited into local waterbodies.

- Divert stormwater away from disturbed or exposed areas of the construction site.
- Install silt fences, vehicle mud removal areas, vegetative cover, and other sediment and erosion controls and properly maintain them, especially after rainstorms.
- Prevent soil erosion by minimizing disturbed areas during construction projects, and seed and mulch bare areas as soon as possible.



Construction

Agriculture

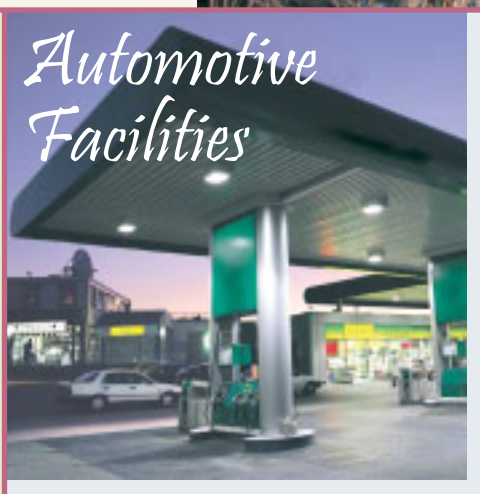
Lack of vegetation on streambanks can lead to erosion. Overgrazed pastures can also contribute excessive amounts of sediment to local waterbodies. Excess fertilizers and pesticides can poison aquatic animals and lead to destructive algae blooms. Livestock in streams can contaminate waterways with bacteria, making them unsafe for human contact.

- Keep livestock away from streambanks and provide them a water source away from waterbodies.
- Store and apply manure away from waterbodies and in accordance with a nutrient management plan.
- Vegetate riparian areas along waterways.
- Rotate animal grazing to prevent soil erosion in fields.
- Apply fertilizers and pesticides according to label instructions to save money and minimize pollution.

Forestry

Improperly managed logging operations can result in erosion and sedimentation.

- Conduct preharvest planning to prevent erosion and lower costs.
- Use logging methods and equipment that minimize soil disturbance.
- Plan and design skid trails, yard areas, and truck access roads to minimize stream crossings and avoid disturbing the forest floor.
- Construct stream crossings so that they minimize erosion and physical changes to streams.
- Expedite revegetation of cleared areas.



Automotive Facilities

Uncovered fueling stations allow spills to be washed into storm drains. Cars waiting to be repaired can leak fuel, oil, and other harmful fluids that can be picked up by stormwater.

- Clean up spills immediately and properly dispose of cleanup materials.
- Provide cover over fueling stations and design or retrofit facilities for spill containment.
- Properly maintain fleet vehicles to prevent oil, gas, and other discharges from being washed into local waterbodies.
- Install and maintain oil/water separators.

Landscaping and garden maintenance activities can be major contributors to water pollution. Soils, yard wastes, over-watering and garden chemicals become part of the urban runoff mix that winds its way through streets, gutters and storm drains before entering lakes, rivers, streams, etc. Urban runoff pollution contaminates water and harms aquatic life!

In Riverside County, report illegal discharges into the storm drain, call
1-800-506-2555
"Only Rain Down the Storm Drain"

Important Links:

Riverside County Household Hazardous Waste Collection Information
1-800-304-2226 or www.rivcowm.org

Riverside County Backyard Composting Program
1-800-366-SAVE

Integrated Pest Management (IPM) Solutions
www.ipm.ucdavis.edu

California Master Gardener Programs
www.mastergardeners.org
www.camastergardeners.ucdavis.edu

California Native Plant Society
www.cnps.org

The Riverside County "Only Rain Down the Storm Drain" Pollution Prevention Program gratefully acknowledges Orange County's Storm Water Program for their contribution to this brochure.

...Only Rain Down ...the Storm Drain

What you should know for... Landscape and Gardening

Best Management tips for:

- Professionals
- Novices
- Landscapers
- Gardeners
- Cultivators

Tips for Landscape & Gardening

This brochure will help you to get the most of your lawn and gardening efforts and keep our waterways clean. Clean waterways provide recreation, establish thriving fish habitats, secure safe sanctuaries for wildlife, and add beauty to our communities. NEVER allow gardening products or waste water to enter the street, gutter or storm drain.

General Landscaping Tips

- Protect stockpiles and materials from wind and rain by storing them under tarps or secured plastic sheeting.
- Prevent erosion of slopes by planting fast-growing, dense ground covering plants. These will shield and bind the soil.

- Plant native vegetation to reduce the amount of water, fertilizers and pesticides applied to the landscape.
- Never apply pesticides or fertilizers when rain is predicted within the next 48 hours.

Garden & Lawn Maintenance

- Do not overwater. Use irrigation practices such as drip irrigation, soaker hoses or micro-spray systems. Periodically inspect and fix leaks and misdirected sprinklers.
- Do not rake or blow leaves, clippings or pruning waste into the street, gutter or storm drain. Instead, dispose of green waste by composting, hauling it to a permitted landfill, or recycling it through your city's program.

- Consider recycling your green waste and adding "nature's own fertilizer" to your lawn or garden.
- Read labels and use only as directed. Do not over-apply pesticides or fertilizers. Apply to spots as needed, rather than blanketing an entire area.
- Store pesticides, fertilizers and other chemicals in a dry covered area to prevent exposure that may result in the deterioration of containers and packaging.
- Rinse empty pesticide containers and re-use rinse water as you would use the product. Do not dump rinse water down storm drains or sewers. Dispose of empty containers in the trash.
- When available, use non-toxic alternatives to traditional pesticides, and use pesticides specifically designed to control the pest you are targeting.
- Try natural long-term common sense solutions first. Integrated Pest Management (IPM) can provide landscaping guidance and solutions, such as:
  - **Physical Controls** - Try hand picking, barriers, traps or caulking holes to control weeds and pests.
  - **Biological Controls** - Use predatory insects to control harmful pests.
  - **Chemical Controls** - Check out www.ipm.ucdavis.edu before using chemicals. Remember, all chemicals should be used cautiously and in moderation.
- If fertilizer is spilled, sweep up the spill before irrigating. If the spill is liquid, apply an absorbent material such as cat litter, and then sweep it up and dispose of it in the trash.
- Take unwanted pesticides to a Household Waste Collection Center to be recycled.
- *Dumping toxics into the street, gutter or storm drain is illegal!*

www.bewaterwise.com Great water conservation tips and drought tolerant garden designs.

www.ourwaterourworld.com Learn how to safely manage home and garden pests.

Additional information can also be found on the back of this brochure.

Helpful telephone numbers and links:

Riverside County Stormwater Protection Partners

Flood Control District	(951) 955-1200
County of Riverside	(951) 955-1000
City of Banning	(951) 922-3105
City of Beaumont	(951) 769-8520
City of Calimesa	(909) 795-9801
City of Canyon Lake	(951) 244-2955
Cathedral City	(760) 770-0327
City of Coachella	(760) 398-4978
City of Corona	(951) 736-2447
City of Desert Hot Springs	(760) 329-6411
City of Eastvale	(951) 361-0900
City of Hemet	(951) 765-2300
City of Indian Wells	(760) 346-2489
City of Indio	(760) 391-4000
City of Lake Elsinore	(951) 674-3124
City of La Quinta	(760) 777-7000
City of Menifee	(951) 672-6777
City of Moreno Valley	(951) 413-3000
City of Murrieta	(951) 304-2489
City of Norco	(951) 270-5607
City of Palm Desert	(760) 346-0611
City of Palm Springs	(760) 323-8299
City of Perris	(951) 943-6100
City of Rancho Mirage	(760) 324-4511
City of Riverside	(951) 361-0900
City of San Jacinto	(951) 654-7337
City of Temecula	(951) 694-6444
City of Wildomar	(951) 677-7751

REPORT ILLEGAL STORM DRAIN DISPOSAL
1-800-506-2555 or e-mail us at
fcnpdes@rcflood.org

- Riverside County Flood Control and Water Conservation District
  www.rcflood.org

Online resources include:

- California Storm Water Quality Association
  www.casqa.org
- State Water Resources Control Board
  www.waterboards.ca.gov
- Power Washers of North America
  www.thepwna.org

Stormwater Pollution

What you should know for...

Outdoor Cleaning Activities and Professional Mobile Service Providers

Storm drain pollution prevention information for:

- Car Washing / Mobile Detailers
- Window and Carpet Cleaners
- Power Washers
- Waterproofers / Street Sweepers
- Equipment cleaners or degreasers and all mobile service providers

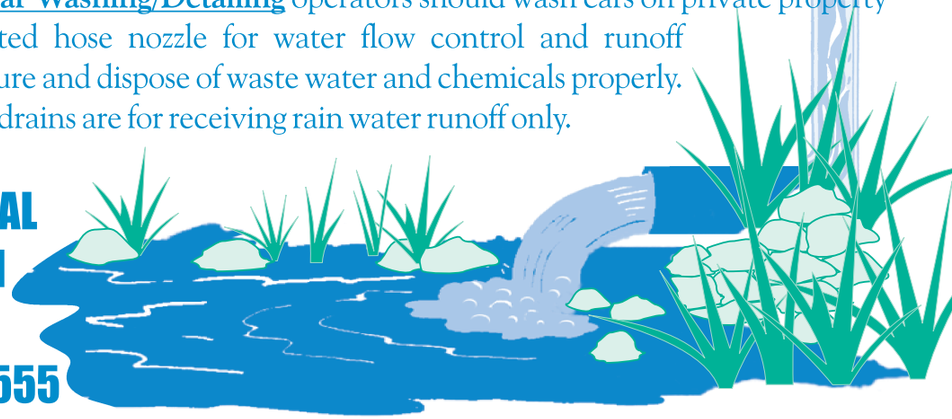
Do you know where street flows actually go?

Storm drains are NOT connected to sanitary sewer systems and treatment plants!

The primary purpose of storm drains is to carry *rain* water away from developed areas to prevent flooding. Pollutants discharged to storm drains are transported directly into rivers, lakes and streams. Soaps, degreasers, automotive fluids, litter and a host of materials are washed off buildings, sidewalks, plazas and parking areas. Vehicles and equipment must be properly managed to prevent the pollution of local waterways.

Unintentional spills by mobile service operators can flow into storm drains and pollute our waterways. **Avoid mishaps.** *Always* have a **Spill Response Kit** on hand to clean up unintentional spills. Only emergency **Mechanical** repairs should be done in City streets, using drip pans for spills. **Plumbing** should be done on private property. Always store chemicals in a leak-proof container and keep covered when not in use. **Window/Power Washing** waste water shouldn't be released into the streets, but should be disposed of in a sanitary sewer, landscaped area or in the soil. Soiled **Carpet Cleaning** wash water should be filtered before being discharged into the sanitary sewer. Dispose of all filter debris properly. **Car Washing/Detailing** operators should wash cars on private property and use a regulated hose nozzle for water flow control and runoff prevention. Capture and dispose of waste water and chemicals properly. Remember, storm drains are for receiving rain water runoff only.

REPORT ILLEGAL STORM DRAIN DISPOSAL 1-800-506-2555



Help Protect Our Waterways!

Use these guidelines for Outdoor Cleaning Activities and Wash Water Disposal

Did you know that disposing of pollutants into the street, gutter, storm drain or body of water is *PROHIBITED* by law and can result in stiff penalties?

Best Management Practices

Waste wash water from Mechanics, Plumbers, Window/Power Washers, Carpet Cleaners, Car Washing and Mobile Detailing activities may contain significant quantities of motor oil, grease, chemicals, dirt, detergents, brake pad dust, litter and other materials.

Best Management Practices, or BMPs as they are known, are guides to prevent pollutants from entering the storm drains. ***Each of us*** can do our part to keep stormwater clean by using the suggested BMPs below:

Simple solutions for both light and heavy duty jobs:

Do...consider dry cleaning methods first such as a mop, broom, rag or wire brush. Always keep a spill response kit on site.

Do...prepare the work area before power cleaning by using sand bags, rubber mats, vacuum booms, containment pads or temporary berms to keep wash water away from the gutters and storm drains.

Do...use vacuums or other machines to remove and collect loose debris or litter before applying water.

Do...obtain the property owner's permission to dispose of ***small amounts*** of power washing waste water on to landscaped, gravel or unpaved surfaces.

Do...check your local sanitary sewer agency's policies on wash water disposal regulations before disposing of wash water into the sewer. (See list on reverse side)

Do...be aware that if discharging to landscape areas, soapy wash water may damage landscaping. Residual wash water may remain on paved surfaces to evaporate. Sweep up solid residuals and dispose of properly. Vacuum booms are another option for capturing and collecting wash water.

Do...check to see if local ordinances prevent certain activities.

Do not let...wash or waste water from sidewalk, plaza or building cleaning go into a street or storm drain.

Report illegal storm drain disposal
Call Toll Free
1-800-506-2555

Using Cleaning Agents

Try using biodegradable/phosphate-free products. They are easier on the environment, but don't confuse them with being toxic free. Soapy water entering the storm drain system can impact the delicate aquatic environment.

When cleaning surfaces with a ***high-pressure washer*** or ***steam cleaner***, additional precautions should be taken to prevent the discharge of pollutants into the storm drain system. These two methods of surface cleaning can loosen additional material that can contaminate local waterways.

Think Water Conservation

Minimize water use by using high pressure, low volume nozzles. Be sure to check all hoses for leaks. Water is a precious resource, don't let it flow freely and be sure to shut it off in between uses.

Screening Wash Water

Conduct thorough dry cleanup before washing exterior surfaces, such as buildings and decks ***with loose paint***, sidewalks or plaza areas. Keep debris from entering the storm drain after cleaning by first passing the wash water through a "20 mesh" or finer screen to catch the solid materials, then dispose of the mesh in a refuse container. Do not let the remaining wash water enter a street, gutter or storm drain.

Drain Inlet Protection & Collection of Wash Water

- Prior to any washing, block all storm drains with an impervious barrier such as sandbags or berms, or seal the storm drain with plugs or other appropriate materials.
- Create a containment area with berms and traps or take advantage of a low spot to keep wash water contained.
- Wash vehicles and equipment on grassy or gravel areas so that the wash water can seep into the ground.
- Pump or vacuum up all wash water in the contained area.

Concrete/Coring/Saw Cutting and Drilling Projects

Protect any down-gradient inlets by using dry activity techniques whenever possible. If water is used, minimize the amount of water used during the coring/drilling or saw cutting process. Place a barrier of sandbags and/or absorbent berms to protect the storm drain inlet or watercourse. Use a shovel or wet vacuum to remove the residue from the pavement. Do not wash residue or particulate matter into a storm drain inlet or watercourse.

Saltwater Pools

- Salt water pools, although different from regular pools, are in fact, sanitized using chlorine. A salt-chlorine generator separates the chlorine and sodium molecules in salt and reintroduces them into the pool water. The same harmful effects of chlorine still apply.
- A salt water pool is still maintained with chemicals such as Muriatic acid, soda ash and sodium carbonate to help keep a proper pH, total Alkalinity, Calcium Hardness and Stabilizer levels.

- It may be illegal to discharge salt water to land. The salt may kill plants and the build-up of salt in soil puts animals, plants, and groundwater at risk. Consult your city representatives to determine local requirements regarding salt water drainage.

NEVER put unused chemicals into the trash, onto the ground or down a storm drain.

IMPORTANT: The discharge of pollutants into the street, gutter, storm drain system or waterways - without a permit or waiver - is strictly prohibited by local ordinances, state and federal law. Violations may result in monetary fines and enforcement actions.

Helpful telephone numbers and links

Riverside County Water Agencies:

City of Banning	(951) 922-3130
City of Beaumont/Cherry Valley	(951) 845-9581
City of Blythe	(760) 922-6161
City of Coachella	(760) 398-3502
City of Corona	(951) 736-2263
City of Hemet	(951) 765-3710
City of Norco	(951) 270 5607
City of Riverside Public Works	(951) 351-6140
City of San Jacinto	(951) 654-4041
Coachella Valley Water District	(760) 398-2651
Desert Water Agency (Palm Springs)	(760) 323-4971
Eastern Municipal Water District	(951) 928-3777
Elsinore Valley Municipal Water District	(951) 674 3146
Elsinore Water District	(951) 674-2168
Farm Mutual Water Company	(951) 244-4198
Idyllwild Water District	(951) 659-2143
Indio Water Authority	(760) 391-4129
Jurupa Community Services District	(951) 685-7434
Lee Lake Water	(951) 658-3241
Mission Springs Water	(760) 329-6448
Rancho California Water District	(951) 296-6900
Ripley, CSA #62	(760) 922-4951
Riverside Co. Service Area #51	(760) 227-3203
Rubidoux Community Services District	(951) 684-7580
Valley Sanitary District	(760) 347-2356
Western Municipal Water District	(951) 789-5000
Yucaipa Valley Water District	(909) 797-5117

CALL 1-800-506-2555 to:

- Report clogged storm drains or illegal storm drain disposal from residential, industrial, construction and commercial sites into public streets, storm drains and/or water bodies.
- Find out about our various storm drain pollution prevention materials.
- Locate the dates and times of Household Hazardous Waste (HHW) Collection Events.
- Request adult, neighborhood, or classroom presentations.
- Locate other County environmental services.
- Receive grasscycling information and composting workshop information.

Or visit our
Riverside County Flood Control and Water Conservation District
website at: www.rcflood.org

Other links to additional storm drain pollution information:

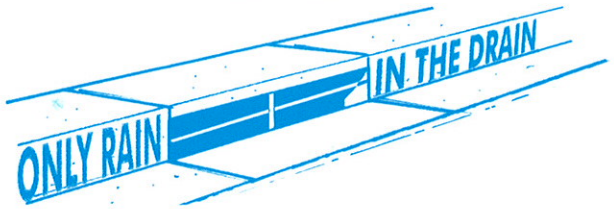
- County of Riverside Environmental Health: www.rivcoeh.org
- State Water Resources Control Board: www.waterboards.ca.gov
- California Stormwater Quality Association: www.casqa.org
- United States Environmental Protection Agency (EPA): www.epa.gov/compliance/assistance (compliance assistance information)

Riverside County's, "Only Rain Down the Storm Drain" Pollution Prevention Program gratefully acknowledges the Bay Area Stormwater Management Agencies Association and the Cleaning Equipment Trade Association for information provided in this brochure.

Guidelines for Maintaining your...

Swimming Pool, Jacuzzi and Garden Fountain

Where does the water go?



Pool, Jacuzzi and Fountain wastewater and rain water runoff (also called stormwater) that reach streets can enter the storm drain and be conveyed directly into local streams, rivers and lakes.

A storm drain's purpose is to prevent flooding by carrying rain water away from developed areas. Storm drains are not connected to sanitary sewers systems and treatment plants!

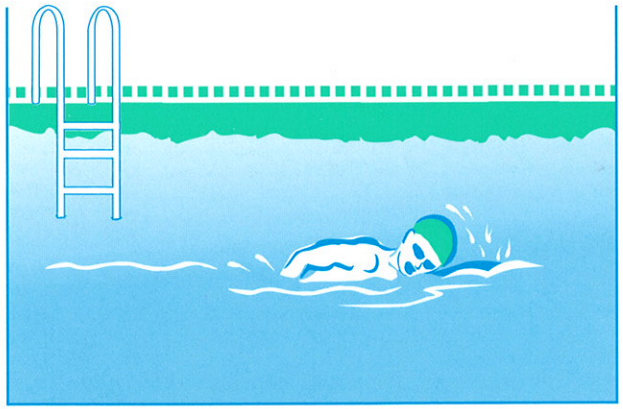
Wastewater, from residential swimming pools, Jacuzzis, fishponds and fountains, often contains chemicals used for sanitizing or cleansing purposes. Toxic chemicals (such as chlorine or copper-based algaecides) may pollute the environment when discharged into a storm drain system.

The Cities and County of Riverside have adopted ordinances that prohibit the discharge of wastewater to the street and storm drain system.

Discharge Regulations

Regulatory requirements for discharging wastewater from your pool may differ from city to city. Chlorinated water should not be discharged into the street, storm drain or surface waters. Check with your water agency to see if disposal to the sanitary sewer line is allowed for pool discharges (see reverse for Riverside County sewer agencies).

If allowed, a hose can be run from the pool Jacuzzi, or fountain to the private sewer cleanout, washing machine drain or a sink or bathtub.

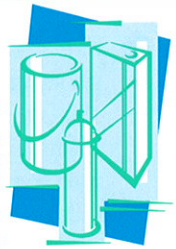


If you cannot discharge to the sewer, you may drain your fountain, pool, or jacuzzi to your landscaping by following these guidelines:

First, reduce or eliminate solids (e.g. debris, leaves or dirt) in the pool water and allow the chemicals in the pool water to dissipate before draining the pool (this could take up to 7 days, verify using a home pool test kit).

Second, slowly drain to a landscaped area away from buildings or structures. Control the flow to prevent soil erosion; it may take more than one day to empty. Do not allow sediment to enter the street, gutter or storm drain.

Maintenance & Chemicals



Cleaning Filters

Filter rinse water and backwash must be discharged to the sanitary sewer, on-site septic tank and drain field system (if properly designed and adequately sized), or a seepage pit. Alternatively, rinse water or backwash may be diverted to landscaped or dirt areas. Filter media and other non-hazardous solids should be picked up and disposed of in the trash.

Algaecides

Avoid using copper-based algaecides unless absolutely necessary. Control algae with chlorine, organic polymers or other alternatives to copper-based pool chemicals. Copper is a heavy metal that can be toxic to aquatic life when you drain your pool.

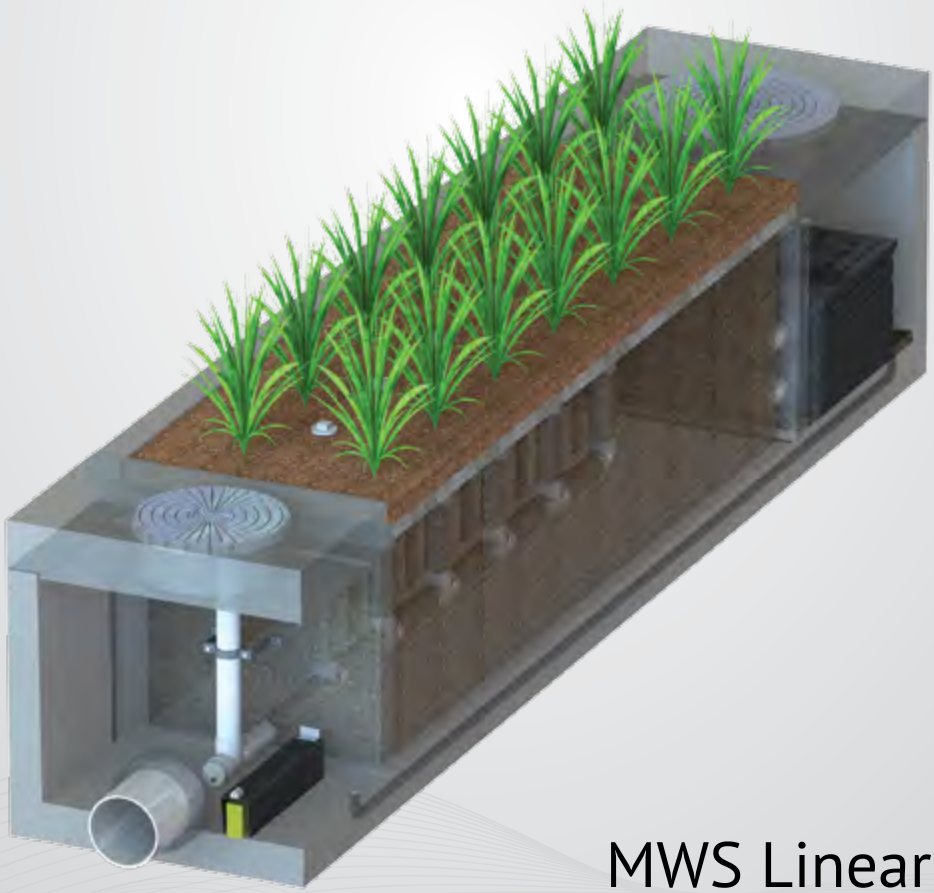
Chemical Storage and Handling

- Use only the amount indicated on product labels
- Store chlorine and other chemicals in a covered area to prevent runoff. Keep out of reach of children and pets.
- Chlorine kits, available at retail swimming pool equipment and supply stores, should be used to monitor the chlorine and pH levels before draining your pool.
- Chlorine and other pool chemicals should never be allowed to flow into the gutter or storm drain system.

Take unwanted chemicals to a Household Hazardous Waste (HHW) Collection Event. There's no cost for taking HHW items to collection events – it's FREE! Call **1-800-506-2555** for a schedule of HHW events in your community.

MODULAR WETLANDS™

*Advanced **Stormwater** Biofiltration*



MWS Linear

Contents

1 Introduction

2 Applications

3 Configurations

4 Advantages

5 Operation

6 Orientations | Bypass

7 Performance | Approvals

8 Sizing

9 Installation | Maintenance | Plants

The Urban Impact

For hundreds of years natural wetlands surrounding our shores have played an integral role as nature's stormwater treatment system. But as our cities grow and develop, these natural wetlands have perished under countless roads, rooftops, and parking lots.

Plant A Wetland

Without natural wetlands our cities are deprived of water purification, flood control, and land stability. Modular Wetlands and the MWS Linear re-establish nature's presence and rejuvenate water ways in urban areas.

MWS Linear

The Modular Wetland System Linear represents a pioneering breakthrough in stormwater technology as the only biofiltration system to utilize patented horizontal flow, allowing for a smaller footprint and higher treatment capacity. While most biofilters use little or no pre-treatment, the MWS Linear incorporates an advanced pre-treatment chamber that includes separation and pre-filter cartridges. In this chamber sediment and hydrocarbons are removed from runoff before it enters the biofiltration chamber, in turn reducing maintenance costs and improving performance.

Applications

The MWS Linear has been successfully used on numerous new construction and retrofit projects. The system's superior versatility makes it beneficial for a wide range of stormwater and waste water applications - treating rooftops, streetscapes, parking lots, and industrial sites.

Industrial

Many states enforce strict regulations for discharges from industrial sites. The MWS Linear has helped various sites meet difficult EPA mandated effluent limits for dissolved metals and other pollutants.

Residential

Low to high density developments can benefit from the versatile design of the MWS Linear. The system can be used in both decentralized LID design and cost-effective end-of-the-line configurations.

Streets

Street applications can be challenging due to limited space. The MWS Linear is very adaptable, and offers the smallest footprint to work around the constraints of existing utilities on retrofit projects.

Parking Lots

Parking lots are designed to maximize space and the MWS Linear's 4 ft. standard planter width allows for easy integration into parking lot islands and other landscape medians.

Commercial

Compared to bioretention systems, the MWS Linear can treat far more area in less space - meeting treatment and volume control requirements.

Mixed Use

The MWS Linear can be installed as a raised planter to treat runoff from rooftops or patios, making it perfect for sustainable "live-work" spaces.

More applications are available on our website: www.ModularWetlands.com/Applications

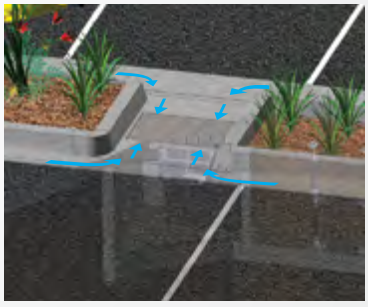
- Agriculture
- Reuse
- Low Impact Development
- Waste Water

Configurations

The MWS Linear is the preferred biofiltration system of Civil Engineers across the country due to its versatile design. This highly versatile system has available "pipe-in" options on most models, along with built-in curb or grated inlets for simple integration into your stormdrain design.

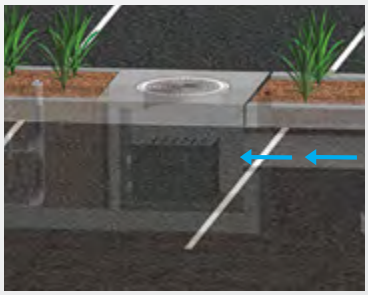
Curb Type

The *Curb Type* configuration accepts sheet flow through a curb opening and is commonly used along road ways and parking lots. It can be used in sump or flow by conditions. Length of curb opening varies based on model and size.



Grate Type

The *Grate Type* configuration offers the same features and benefits as the *Curb Type* but with a grated/drop inlet above the systems pre-treatment chamber. It has the added benefit of allowing for pedestrian access over the inlet. ADA compliant grates are available to assure easy and safe access. The *Grate Type* can also be used in scenarios where runoff needs to be intercepted on both sides of landscape islands.



Vault Type

The system's patented horizontal flow biofilter is able to accept inflow pipes directly into the pre-treatment chamber, meaning the MWS Linear can be used in end-of-the-line installations. This greatly improves feasibility over typical decentralized designs that are required with other biofiltration/bioretention systems. Another benefit of the "pipe in" design is the ability to install the system downstream of underground detention systems to meet water quality volume requirements.

Downspout Type

The *Downspout Type* is a variation of the *Vault Type* and is designed to accept a vertical downspout pipe from roof top and podium areas. Some models have the option of utilizing an internal bypass, simplifying the overall design. The system can be installed as a raised planter and the exterior can be stuccoed or covered with other finishes to match the look of adjacent buildings.

Advantages & Operation

The MWS Linear is the most efficient and versatile biofiltration system on the market, and the only system with horizontal flow which improves performance, reduces footprint, and minimizes maintenance. Figure-1 and Figure-2 illustrate the invaluable benefits of horizontal flow and the multiple treatment stages.

Featured Advantages

- Horizontal Flow Biofiltration
- Greater Filter Surface Area
- Pre-Treatment Chamber
- Patented Perimeter Void Area
- Flow Control
- No Depressed Planter Area

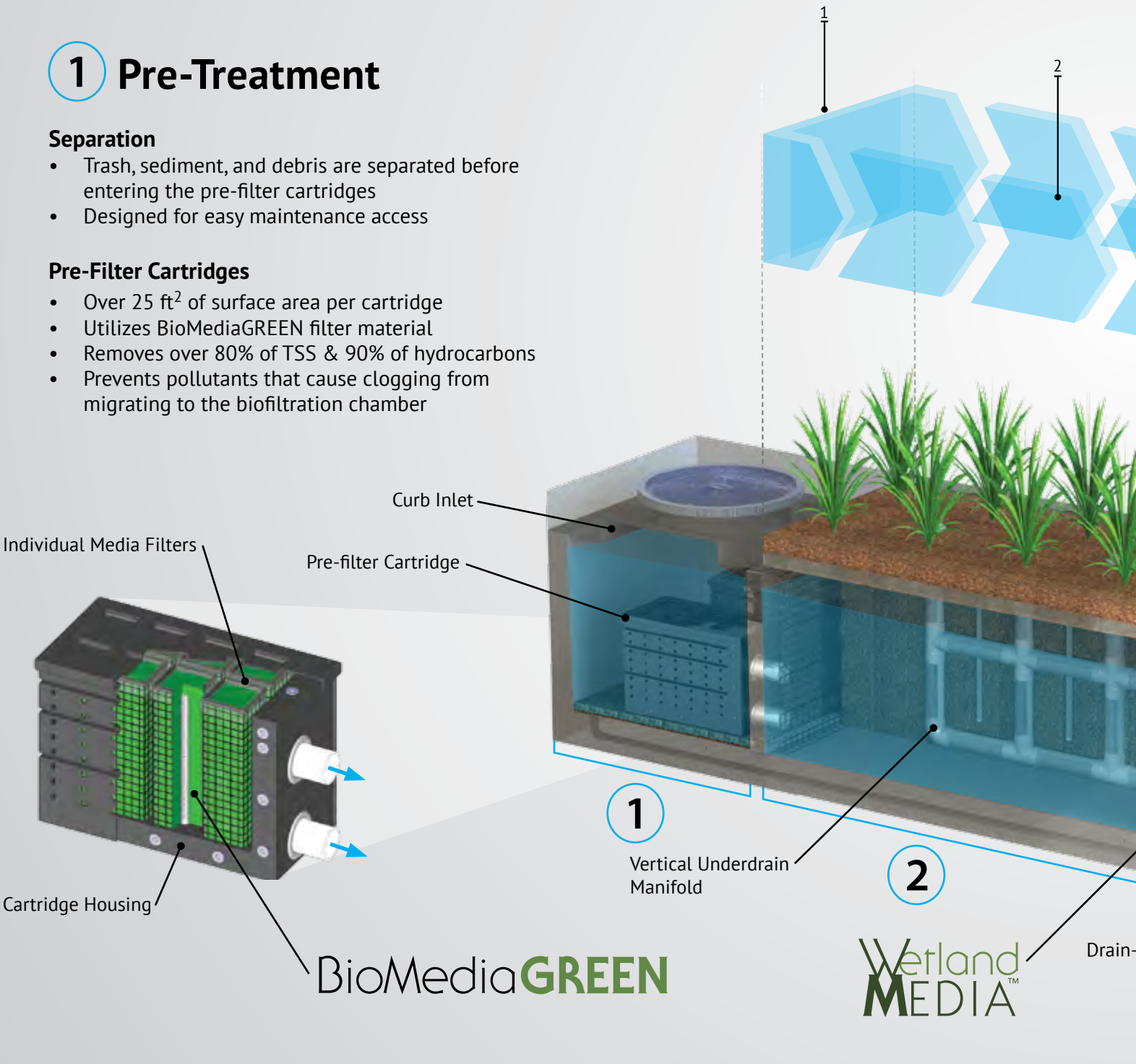
1 Pre-Treatment

Separation

- Trash, sediment, and debris are separated before entering the pre-filter cartridges
- Designed for easy maintenance access

Pre-Filter Cartridges

- Over 25 ft^2 of surface area per cartridge
- Utilizes BioMediaGREEN filter material
- Removes over 80% of TSS & 90% of hydrocarbons
- Prevents pollutants that cause clogging from migrating to the biofiltration chamber



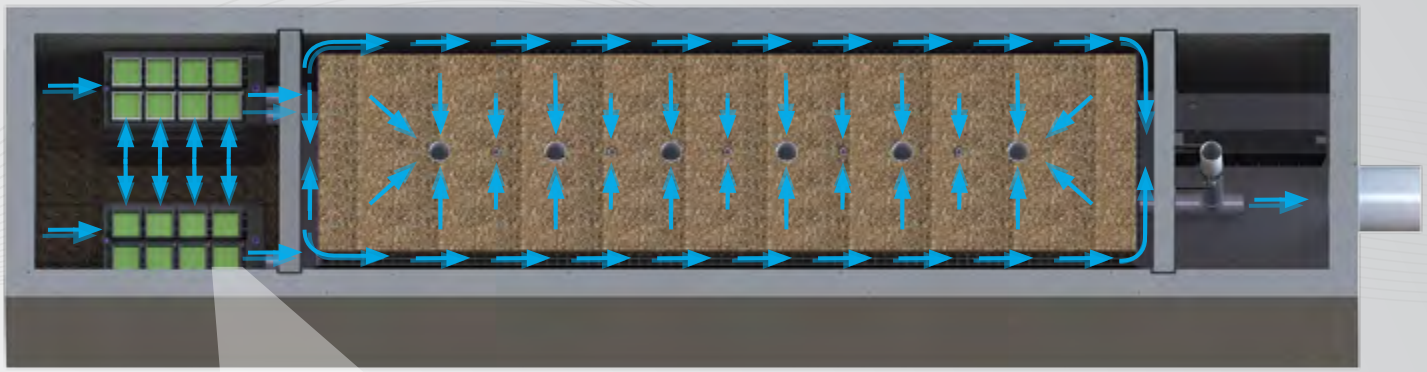


Fig. 2 - Top View

2x to 3x More Surface Area Than Traditional Downward Flow Bioretention Systems.

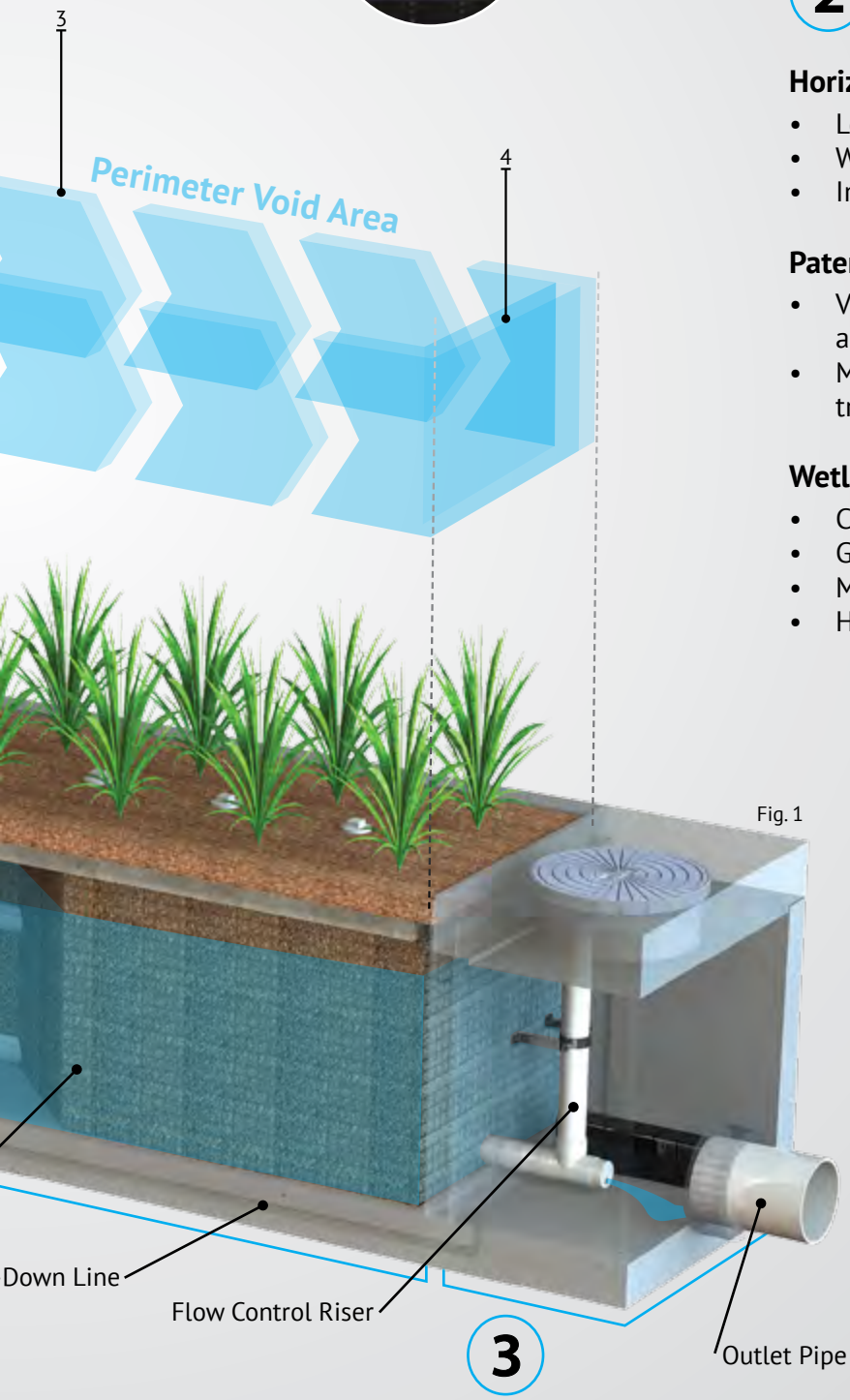


Fig. 1

2 Biofiltration

Horizontal Flow

- Less clogging than downward flow biofilters
- Water flow is subsurface
- Improves biological filtration

Patented Perimeter Void Area

- Vertically extends void area between the walls and the WetlandMEDIA on all four sides.
- Maximizes surface area of the media for higher treatment capacity

WetlandMEDIA

- Contains no organics and removes phosphorus
- Greater surface area and 48% void space
- Maximum evapotranspiration
- High ion exchange capacity and light weight

3 Discharge

Flow Control

- Orifice plate controls flow of water through WetlandMEDIA to a level lower than the media's capacity.
- Extends the life of the media and improves performance

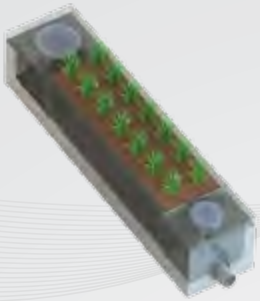
Drain-Down Filter

- The Drain-Down is an optional feature that completely drains the pre-treatment chamber
- Water that drains from the pre-treatment chamber between storm events will be treated

Orientations

Side-By-Side

The *Side-By-Side* orientation places the pre-treatment and discharge chamber adjacent to one another with the biofiltration chamber running parallel on either side. This minimizes the system length, providing a highly compact footprint. It has been proven useful in situations such as streets with directly adjacent sidewalks, as half of the system can be placed under that sidewalk. This orientation also offers internal bypass options as discussed below.



End-To-End

The *End-To-End* orientation places the pre-treatment and discharge chambers on opposite ends of the biofiltration chamber therefore minimizing the width of the system to 5 ft (outside dimension). This orientation is perfect for linear projects and street retrofits where existing utilities and sidewalks limit the amount of space available for installation. One limitation of this orientation is bypass must be external.

Bypass

Internal Bypass Weir (Side-by-Side Only)

The *Side-By-Side* orientation places the pre-treatment and discharge chambers adjacent to one another allowing for integration of internal bypass. The wall between these chambers can act as a bypass weir when flows exceed the system's treatment capacity, thus allowing bypass from the pre-treatment chamber directly to the discharge chamber.

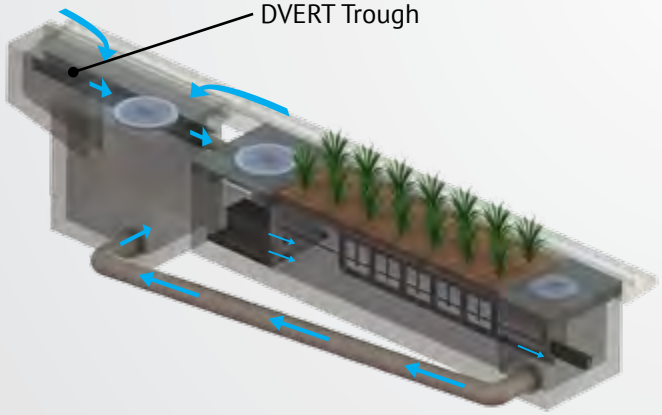
External Diversion Weir Structure

This traditional offline diversion method can be used with the MWS Linear in scenarios where runoff is being piped to the system. These simple and effective structures are generally configured with two outflow pipes. The first is a smaller pipe on the upstream side of the diversion weir - to divert low flows over to the MWS Linear for treatment. The second is the main pipe that receives water once the system has exceeded treatment capacity and water flows over the weir.

Flow By Design

This method is one in which the system is placed just upstream of a standard curb or grate inlet to intercept the first flush. Higher flows simply pass by the MWS Linear and into the standard inlet downstream.

DVERT Low Flow Diversion



This simple yet innovative diversion trough can be installed in existing or new curb and grate inlets to divert the first flush to the MWS Linear via pipe. It works similar to a rain gutter and is installed just below the opening into the inlet. It captures the low flows and channels them over to a connecting pipe exiting out the wall of the inlet and leading to the MWS Linear. The DVERT is perfect for retrofit and green street applications that allows the MWS Linear to be installed anywhere space is available.

Performance

The MWS Linear continues to outperform other treatment methods with superior pollutant removal for TSS, heavy metals, nutrients, hydrocarbons and bacteria. Since 2007 the MWS Linear has been field tested on numerous sites across the country. With it's advanced pre-treatment chamber and innovative horizontal flow biofilter, the system is able to effectively remove pollutants through a combination of physical, chemical, and biological filtration processes. With the same biological processes found in natural wetlands, the MWS Linear harnesses natures ability to process, transform, and remove even the most harmful pollutants.

Approvals

The MWS Linear has successfully met years of challenging technical reviews and testing from some of the most prestigious and demanding agencies in the nation, and perhaps the world.

Washington State DOE Approved

The MWS Linear is approved for General Use Level Designation (GULD) for Basic, Enhanced, and Phosphorus treatment at 1 gpm/ft^2 loading rate. The highest performing BMP on the market for all main pollutant categories.

TSS	Total Phosphorus	Ortho Phosphorus	Nitrogen	Dissolved Zinc	Dissolved Copper	Total Zinc	Total Copper	Motor Oil
85%	64%	67%	45%	66%	38%	69%	50%	95%

DEQ Assignment

The Virginia Department of Environmental Quality assigned the MWS Linear, the highest phosphorus removal rating for manufactured treatment devices to meet the new Virginia Stormwater Management Program (VSMP) Technical Criteria.

MASTEP Evaluation

The University of Massachusetts at Amherst – Water Resources Research Center, issued a technical evaluation report noting removal rates up to 84% TSS, 70% Total Phosphorus, 68.5% Total Zinc, and more.

Rhode Island DEM Approved

Approved as an authorized BMP and noted to achieve the following minimum removal efficiencies: 85% TSS, 60% Pathogens, 30% Total Phosphorus for discharges to freshwater systems, and 30% Total Nitrogen for discharges to saltwater or tidal systems.

Flow Based Sizing

The MWS Linear can be used in stand alone applications to meet treatment flow requirements. Since the MWS Linear is the only biofiltration system that can accept inflow pipes several feet below the surface it can be used not only in decentralized design applications but also as a large central end-of-the-line application for maximum feasibility.

Treatment Flow Sizing Table

Model #	Dimensions	WetlandMedia Surface Area	Treatment Flow Rate (cfs)
MWS-L-4-4	4' x 4'	23 ft^2	0.052
MWS-L-4-6	4' x 6'	32 ft^2	0.073
MWS-L-4-8	4' x 8'	50 ft^2	0.115
MWS-L-4-13	4' x 13'	63 ft^2	0.144
MWS-L-4-15	4' x 15'	76 ft^2	0.175
MWS-L-4-17	4' x 17'	90 ft^2	0.206
MWS-L-4-19	4' x 19'	103 ft^2	0.237
MWS-L-4-21	4' x 21'	117 ft^2	0.268
MWS-L-8-8	8' x 8'	100 ft^2	0.230
MWS-L-8-12	8' x 12'	151 ft^2	0.346
MWS-L-8-16	8' x 16'	201 ft^2	0.462

Volume Based Sizing

Many states require treatment of a water quality volume and do not offer the option of flow based design. The MWS Linear and its unique horizontal flow makes it the only biofilter that can be used in volume based design installed downstream of ponds, detention basins, and underground storage systems.

Treatment Volume Sizing Table

Model #	Treatment Capacity (cu. ft.) @ 24-Hour Drain Down	Treatment Capacity (cu. ft.) @ 48-Hour Drain Down
MWS-L-4-4	1140	2280
MWS-L-4-6	1600	3200
MWS-L-4-8	2518	5036
MWS-L-4-13	3131	6261
MWS-L-4-15	3811	7623
MWS-L-4-17	4492	8984
MWS-L-4-19	5172	10345
MWS-L-4-21	5853	11706
MWS-L-8-8	5036	10072
MWS-L-8-12	7554	15109
MWS-L-8-16	10073	20145

Installation

The MWS Linear is simple, easy to install, and has a space efficient design that offers lower excavation and installation costs compared to traditional tree-box type systems. The structure of the system resembles pre-cast catch basin or utility vaults and is installed in a similar fashion.

The system is delivered fully assembled for quick installation. Generally, the structure can be unloaded and set in place in 15 minutes. Our experienced team of field technicians are available to supervise installations and provide technical support.

Maintenance

Reduce your maintenance costs, man hours, and materials with the MWS Linear. Unlike other biofiltration systems that provide no pre-treatment, the MWS Linear is a self-contained treatment train which incorporates simple and effective pre-treatment.

Maintenance requirements for the biofilter itself are almost completely eliminated, as the pre-treatment chamber removes and isolates trash, sediments, and hydrocarbons. What's left is the simple maintenance of an easily accessible pre-treatment chamber that can be cleaned by hand or with a standard vac truck. Only periodic replacement of low-cost media in the pre-filter cartridges is required for long term operation and there is absolutely no need to replace expensive biofiltration media.

Plant Selection

Abundant plants, trees, and grasses bring value and an aesthetic benefit to any urban setting, but those in the MWS Linear do even more - they increase pollutant removal. What's not seen, but very important, is that below grade the stormwater runoff/flow is being subjected to nature's secret weapon: a dynamic physical, chemical, and biological process working to break down and remove non-point source pollutants. The flow rate is controlled in the MWS Linear, giving the plants more "contact time" so that pollutants are more successfully decomposed, volatilized and incorporated into the biomass of The MWS Linear's micro/macro flora and fauna.

A wide range of plants are suitable for use in the MWS Linear, but selections vary by location and climate. View suitable plants by selecting the list relative to your project location's hardy zone.

Please visit www.ModularWetlands.com/Plants for more information and various plant lists.

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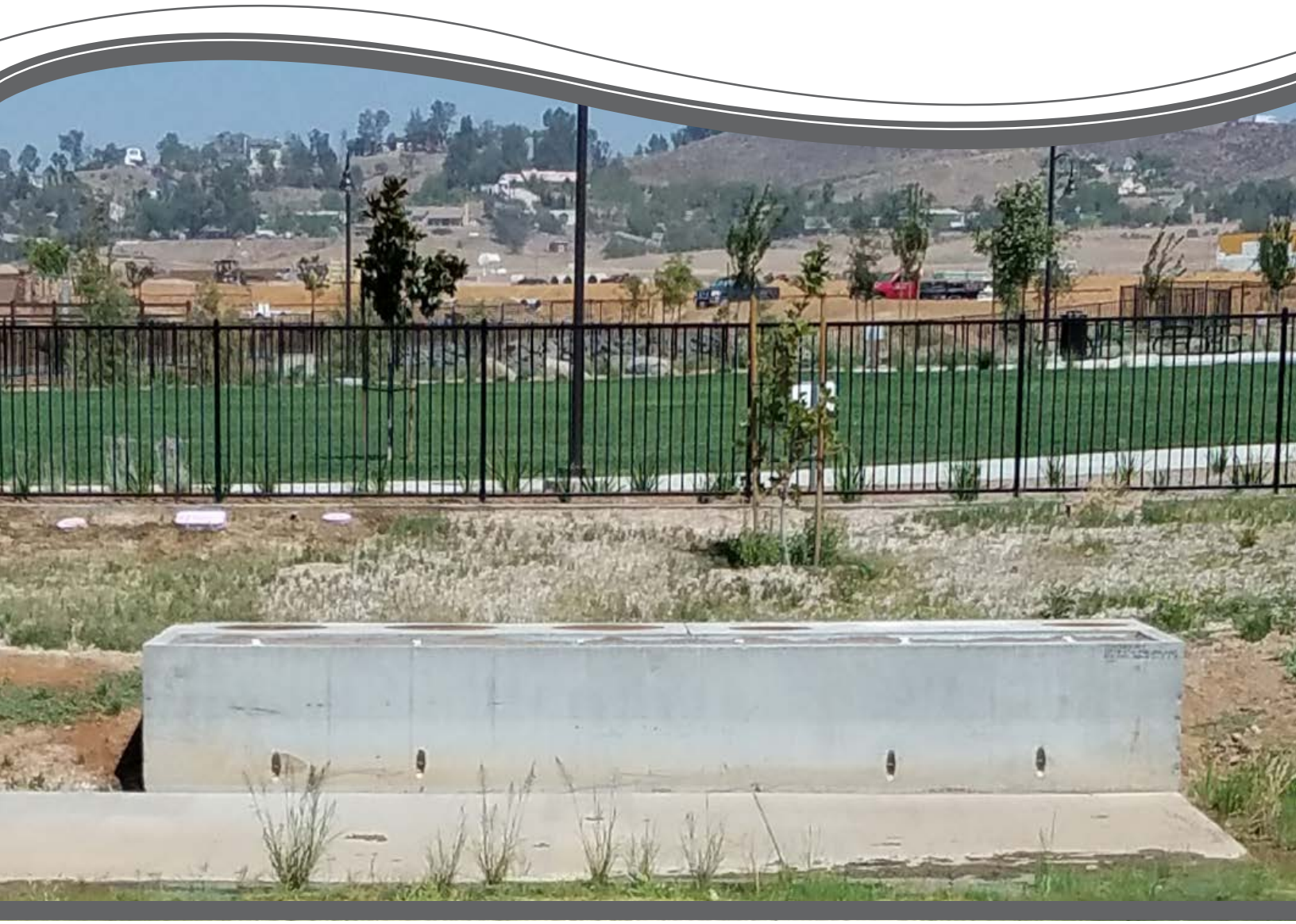
Modular Wetlands® Linear Operatons & Maintenance Manual



MODULAR WETLANDS®

MODULAR WETLANDS LINEAR
OPERATION & MAINTENANCE MANUAL

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OVERVIEW

This operation and maintenance (O&M) manual is for the Modular Wetlands Linear Biofilter (MWL). Please read the instructions and equipment lists closely prior to starting. It is important to follow all necessary safety procedures associated with state and local regulations. Please contact Contech for more information on pre-authorized third-party service providers who can provide inspection and maintenance services in your area. For a list of service providers in your area, please visit www.conteches.com/maintenance.

WARNING

Confined space entry may be required. Contractor to obtain all equipment and training to meet applicable local and OSHA regulations regarding confined space entry. It is the Contractor's or entry personnel's responsibility to always proceed safely.

SAFETY NOTICE & PERSONAL SAFETY EQUIPMENT

Job site safety is a topic and a practice addressed comprehensively by others. The inclusions here are merely reminders to whole areas of Safety Practice that are the responsibility of the Owner(s), Manager(s), and Service Provider(s). OSHA and Canadian OSH, Federal, State/Provincial, and Local Jurisdiction Safety Standards apply on any given site or project. The knowledge and applicability of those responsibilities is the Service Provider's responsibility and outside the scope of Contech Engineered Solutions.

Safety Boots

Gloves

Hard Hat

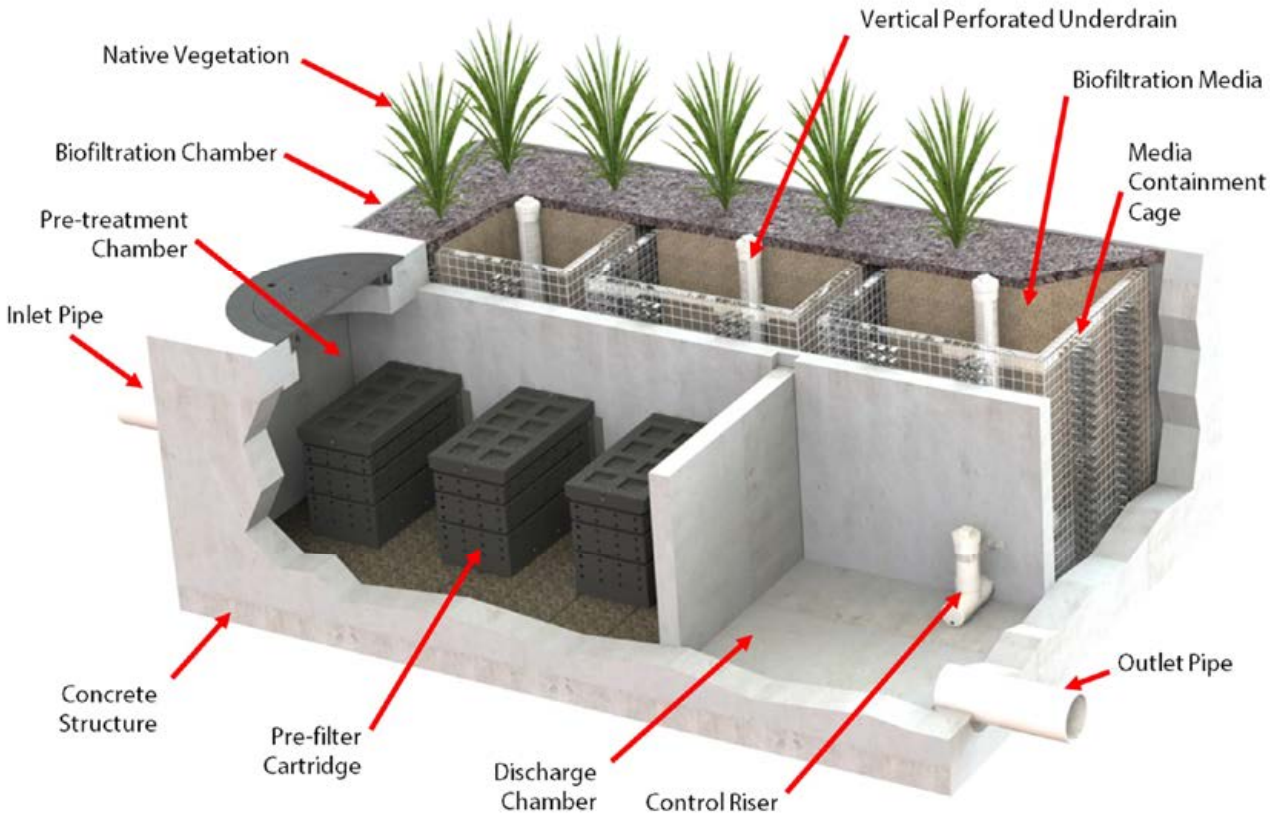
Eye Protection

Maintenance and Protection of Traffic Plan

MODULAR WETLANDS LINEAR COMPONENTS LIST

The MWL system comes in multiple sizes and configurations, including side by side or end to end layouts, both as open planters or underground systems. See shop drawings (plans) for project specific details.

The standard MWL system is comprised of the following components:



INSPECTION SUMMARY & EQUIPMENT LIST

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 the site-specific loading conditions. The first year of inspections can be used to set inspection and maintenance intervals for subsequent years to ensure appropriate maintenance is provided.

- Inspect pre-treatment, biofiltration, and discharge chambers an average of once every six to twelve months. Varies based on site specific and local conditions.
- Average inspection time is approximately 15 minutes. Always ensure appropriate safety protocol and procedures are followed.

The following is a list of equipment required to allow for simple and effective inspection of the MWL:

Modular Wetlands Linear Inspection Form

Flashlight

Tape Measure

Access Cover Hook

Ratchet
& 7/16" Socket
(if required for older pre-filter cartridges that have two bolts holding the lids on)

INSPECTION & MAINTENANCE NOTES

1. Following maintenance and/or inspection, it is recommended that the maintenance operator prepare a maintenance/inspection record. The record should include any maintenance activities performed, amount and description of debris collected, and condition of the system and its various filter mechanisms.
2. The owner should keep maintenance/inspection record(s) for a minimum of five years from the date of maintenance. These records should be made available to the governing municipality for inspection upon request at any time.
3. Transport all debris, trash, organics, and sediments to approved facility for disposal in accordance with local and state requirements.
4. Entry into chambers may require confined space training based on state and local regulations.
5. No fertilizer shall be used in the biofiltration chamber.
6. Irrigation should be provided as recommended by manufacturer and/or landscape architect. Amount of irrigation required is dependent on plant species. Some plants may not require irrigation after initial establishment.

INSPECTION PROCESS

1. Prepare the inspection form by writing in the necessary information including project name, location, date & time, unit number and other information (see inspection form).
2. Observe the inside of the system through the access covers. If minimal light is available and vision into the unit is impaired, utilize a flashlight to see inside the system and all chambers.
3. Look for any out of the ordinary obstructions in the inflow pipe, pre-treatment chamber, biofiltration chamber, discharge chamber or outflow pipe. Write down any observations on the inspection form.
4. Through observation and/or digital photographs, estimate the amount of trash, debris accumulated in the pre-treatment chamber. Utilizing a tape measure or measuring stick, estimate the amount of sediment in this chamber. Record this depth on the inspection form.
5. Through visual observation, inspect the condition of the pre-filter cartridges. Look for excessive build-up of sediment on the cartridges, any build-up on the tops of the cartridges, or clogging of the holes. Record this information on the inspection form. The pre-filter cartridges can be further inspected by removing the cartridge tops and assessing the color of the BioMediaGREEN filter cubes (requires entry into pre-treatment chamber - see notes previous notes regarding confined space entry). Record the color of the material. New material is a light green color. As the media becomes clogged, it will turn darker in color, eventually becoming dark brown or black. The closer to black the media is the higher percentage that the media is exhausted and in need of replacement.

6. The biofiltration chamber is generally maintenance-free due to the system's advanced pre-treatment chamber. For units which have open planters with vegetation, it is recommended that the vegetation be inspected. Look for any plants that are dead or showing signs of disease or other negative stressors. Record the general health of the plants on the inspection form and indicate through visual observation or digital photographs if trimming of the vegetation is required.

7. The discharge chamber houses the control riser (if applicable), drain down filter (only in California - older models), and is connected to the outflow pipe. It is important to check to ensure the orifice is in proper operating condition and free of any obstructions. It is also important to assess the condition of the drain down filter media which utilizes a block form of the BioMediaGREEN. Assess in the same manner as the cubes in the pre-filter cartridge as mentioned above.

8. Finalize the inspection report for analysis by the maintenance manager to determine if maintenance is required.

MAINTENANCE INDICATORS

Based upon the observations made during inspection, maintenance of the system may be required based on the following indicators:

- Missing or damaged internal components or cartridges.
- Obstructions in the system or its inlet and/or outlet pipes.
- Excessive accumulation of floatables in the pre-treatment chamber in which the length and width of the chamber is fully impacted more than 18".
- Excessive accumulation of sediment in the pre-treatment chamber of more than 6" in depth.
- Excessive accumulation of sediment on the BioMediaGREEN media housed within the pretreatment cartridges. When media is more than 85% clogged, replacement is required. The darker the BioMediaGREEN, the more clogged it is and in need of replacement.
- Excessive accumulation of sediment on the BioMediaGREEN media housed within the drain down filter (California only - older models).
- Overgrown vegetation.

MAINTENANCE SUMMARY & EQUIPMENT LIST

The time has come to maintain your MWL. All necessary pre-maintenance steps must be carried out before maintenance occurs. Once traffic control has been set up per local and state regulations and access covers have been safely opened, the maintenance process can begin. It should be noted that some maintenance activities require confined space entry. All confined space requirements must be strictly followed before entry into the system. In addition, the following is recommended:

- Prepare the maintenance form by writing in the necessary information including project name, location, date & time, unit number and other info (see maintenance form).
- Set up all appropriate safety and maintenance equipment.
- Ensure traffic control is set up and properly positioned.
- Prepared pre-checks (OSHA, safety, confined space entry) are performed.
    - A gas meter should be used to detect the presence of any hazardous gases prior to entering the system. If hazardous gases are present, do not enter the vault. Following appropriate confined space procedures, take steps such as utilizing a venting system to address the hazard. Once it is determined to be safe, enter the system utilizing appropriate entry equipment such as a ladder and tripod with harness.

The following is a list of equipment required for maintenance of the MWL:

Modular Wetlands Linear Maintenance Form

Flashlight

Access Cover Hook

Ratchet
& 7/16" Socket
(if required for older pre-filter cartridges that have two bolts holding the lids on)

Vacuum Assisted Truck with Pressure Washer

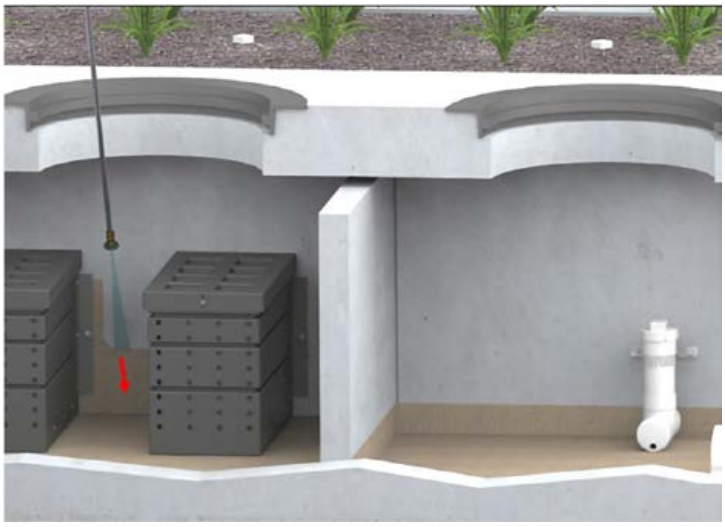
Replacement
BioMediaGREEN
(If Required)

(order BioMediaGREEN from Contech's Maintenance Team members at https://www.conteches.com/maintenance)

MAINTENANCE INSTRUCTIONS

1. ACCESS COVER REMOVAL

Upon determining that the vault is safe for entry, remove all access cover(s) and position the vacuum truck accordingly.



2. PRESSURE WASH SYSTEM CHAMBERS

With the pressure washer, spray down pollutants accumulated on the walls and floors of the pre-treatment and discharge chambers. Then wash any accumulated sediment from the pre-filter cartridge(s).

3. VACUUM SYSTEM CHAMBERS

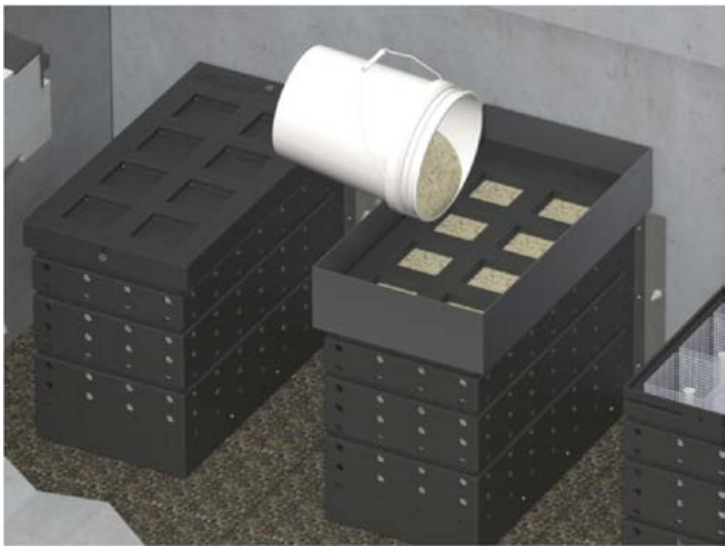
Vacuum out pre-treatment and discharge chambers and remove all accumulated pollutants including trash, debris, and sediments. Be sure to vacuum the pre-treatment floor until the pervious pavers are visible and clean. **(MWL systems outside of California may or may not have pervious pavers on the floor in the pre-treatment chamber)** If pre-filter cartridges require media replacement, proceed to **Step 4**. If not, replace the access cover(s) and proceed to **Step 7**.

4. PRE-FILTER CARTRIDGE LID REMOVAL

After successfully cleaning out the pre-treatment chamber, enter the chamber and remove the lid(s) from the pre-filter cartridge(s) by removing the two thumb screws. (Older pre-filter cartridges have two bolts holding the lids on that require a 7/16" socket to remove)

5. VACUUM EXISTING PRE-FILTER MEDIA

Utilize the vacuum truck hose or hose extension to remove the filter media from each of the individual media cages. Once filter media has been sucked out, use a pressure washer to spray down the inside of the cartridge and its media cages. Remove cleaned media cages and place to the side. Once removed, the vacuum hose can be inserted into the cartridge to vacuum out any remaining material near the bottom of the cartridge.



6. PRE-FILTER MEDIA REPLACEMENT

Reinstall media cages and fill with new media from the manufacturer or outside supplier. Manufacturer will provide specification of media and sources to purchase. The easiest way to fill the media cages is to utilize a refilling tray that can also be sourced from the manufacturer. Place the refilling tray on top of the cartridge and fill with new bulk media shaking it down into the cages. Using your hands, lightly compact the media into each filter cage. Once the cages are full (each cartridge will hold five heaping 5gal buckets of bulk media), remove the refilling tray and replace the cartridge top, ensuring fasteners are properly tightened.

7. MAINTAINING VEGETATION

In general, the biofiltration chamber is maintenance-free with the exception of maintaining the vegetation. The MWL utilizes vegetation similar to surrounding landscape areas, therefore, trim vegetation to match surrounding vegetation. If any plants have died, replace them with new ones.

8. INSPECT UNDERDRAIN SYSTEM

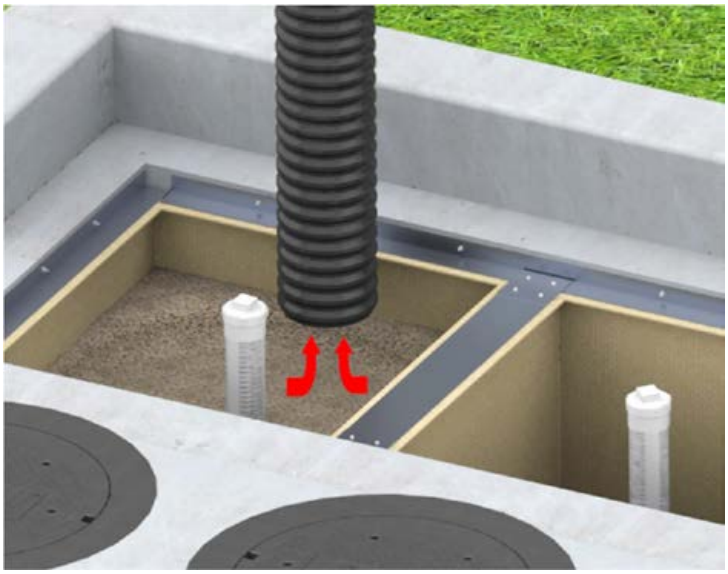
Each vertical under drain on the biofiltration chamber has a removable threaded cap that can be taken off to check for any blockages or root growth. Once removed, a jetting attachment to the pressure washer can be used to clean out the under drain and orifice riser if needed.

9. REPLACE ACCESS COVERS

Once maintenance is complete, replace all access cover(s)

REPLACING BIOFILTRATION MEDIA IF REQUIRED

As with all biofilter systems, at some point the biofiltration media will need to be replaced, either due to physical clogging or sorptive exhaustion (for dissolved pollutants) of the media ion exchange capacity (to remove dissolved metals and phosphorous). The general life of this media is 10 to 20 years based on site specific conditions and pollutant loading, so replacing the biofiltration media should not be a common occurrence. In the event that the biofiltration media requires replacement, contact one of Contech's Maintenance Team members at https://www.conteches.com/maintenance to order new biofiltration media. The quantity of media needed can be determined by providing the model number and unit depth. Media will be provided in super sacks for easy installation. Each sack will weigh between 1,000 and 2,000 lbs. Biofiltration media replacement can be done following the steps below:



1. VACUUM EXISTING BIOFILTRATION MEDIA

Remove the mulch and vegetation to access the biofiltration media, and then position the vacuum truck accordingly. Utilize the vacuum truck to vacuum out all the media. Once all media is removed, use the pressure washer to spray down all the netting and underdrain systems on the inside of the media containment cage. Vacuum out any remaining debris after spraying down netting. Inspect the netting for any damage or holes. If the netting is damaged, it can be repaired or replaced with guidance by the manufacturer.

2. INSTALLING NEW BIOFILTRATION MEDIA

Ensure that the chamber is fully cleaned prior to installation of new media into the media containment cage(s). Media will be provided in super sacks for easy installation. A lifting apparatus (forklift, backhoe, boom truck, or other) is recommended to position the super sack over the biofiltration chamber. Add media in lifts to ensure that the riser pipes remain vertical. Be sure to only fill the media cage(s) up to the same level as the old media.

3. REPLANT VEGETATION

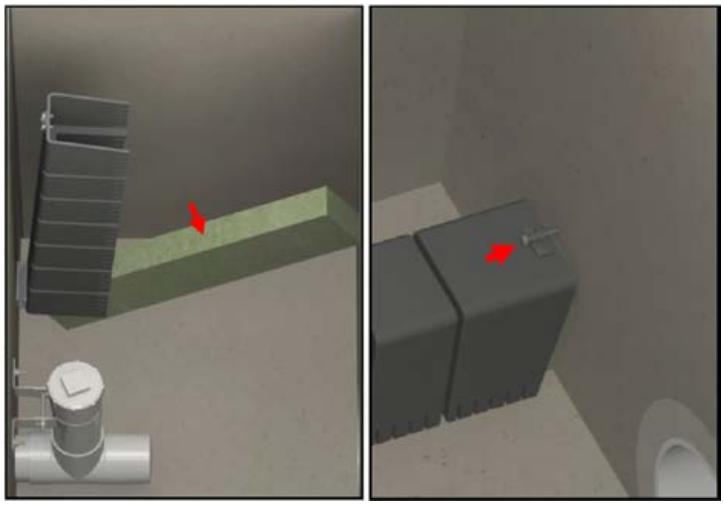
Once the media has been replaced, replant the vegetation and cover biofiltration chamber with approved mulch (if applicable). If the existing vegetation is not being reused, and new vegetation is being planted, you will need to acquire new plant establishment media that will be installed just below the mulch layer at each plant location. (see plan drawings for details). Contact one of Contech's Maintenance Team members at https://www.conteches.com/maintenance to order new plant establishment media.

REPLACING DRAIN DOWN FILTER MEDIA (ONLY ON OLDER CALIFORNIA MODELS)

NOTE: The drain down filter is only found on units installed in California prior to 2023
If during inspection it was determined that the drain down filter media requires replacement, contact one of Contech's Maintenance Team members at https://www.conteches.com/maintenance to order new media.

1. REMOVE EXISTING DRAIN DOWN MEDIA

Pull knob back to unlock the locking mechanism and lift the drain down filter housing to remove the used BioMediaGREEN filter block.



2. INSTALL NEW DRAIN DOWN MEDIA

Ensure that the chamber and housing are fully cleaned prior to installation of new media, and then insert the new BioMediaGREEN filter block. The media filter block should fit snugly between the chamber walls and be centered under the filter housing. Lower the housing over the filter block and secure the locking mechanism.

NOTES

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Inspection Report
Modular Wetlands Linear

Project Name _____

Project Address _____
(city) (Zip Code)

Owner / Management Company _____

Contact _____ Phone ( ) –

For Office Use Only
(Reviewed By)
(Date)
Office personnel to complete section to the left.

Inspector Name _____ Date ____/____/____ Time _____ AM / PM

Type of Inspection ☐ Routine ☐ Follow Up ☐ Complaint ☐ Storm Storm Event in Last 72-hours? ☐ No ☐ Yes

Weather Condition _____ Additional Notes _____

Inspection Checklist

Modular Wetland System Type (Curb, Grate or UG Vault): _____ Size (22', 14' or etc.): _____

Structural Integrity:	**Yes**	**No**	**Comments**
Damage to pre-treatment access cover (manhole cover/grate) or cannot be opened using normal lifting pressure?			
Damage to discharge chamber access cover (manhole cover/grate) or cannot be opened using normal lifting pressure?			
Does the MWS unit show signs of structural deterioration (cracks in the wall, damage to frame)?			
Is the inlet/outlet pipe or drain down pipe damaged or otherwise not functioning properly?			
Working Condition:			
Is there evidence of illicit discharge or excessive oil, grease, or other automobile fluids entering and clogging the unit?			
Is there standing water in inappropriate areas after a dry period?			
Is the filter insert (if applicable) at capacity and/or is there an accumulation of debris/trash on the shelf system?			
Does the depth of sediment/trash/debris suggest a blockage of the inflow pipe, bypass or cartridge filter? If yes, specify which one in the comments section. Note depth of accumulation in in pre-treatment chamber.			Depth:
Does the cartridge filter media need replacement in pre-treatment chamber and/or discharge chamber?			Chamber:
Any signs of improper functioning in the discharge chamber? Note issues in comments section.			
Other Inspection Items:			
Is there an accumulation of sediment/trash/debris in the wetland media (if applicable)?			
Is it evident that the plants are alive and healthy (if applicable)? Please note Plant Information below.			
Is there a septic or foul odor coming from inside the system?			

Waste:	**Yes**	**No**
Sediment / Silt / Clay		
Trash / Bags / Bottles		
Green Waste / Leaves / Foliage		

Recommended Maintenance	
No Cleaning Needed	
Schedule Maintenance as Planned	
Needs Immediate Maintenance	

Plant Information	
Damage to Plants	
Plant Replacement	
Plant Trimming	

Additional Notes: _____

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Cleaning and Maintenance Report
Modular Wetlands Linear

Project Name _____

Project Address _____
(city) (Zip Code)

Owner / Management Company _____

Contact _____ Phone ( ) –

Inspector Name _____ Date ____/____/____ Time _____ AM / PM

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(Reviewed By)
(Date)
Office personnel to complete section to the left.

Type of Inspection ☐ Routine ☐ Follow Up ☐ Complaint ☐ Storm Storm Event in Last 72-hours? ☐ No ☐ Yes

Weather Condition _____ Additional Notes _____

Site Map #	GPS Coordinates of Insert	Manufacturer / Description / Sizing	Trash Accumulation	Foliage Accumulation	Sediment Accumulation	Total Debris Accumulation	Condition of Media 25/50/75/100 (will be changed @ 75%)	Operational Per Manufactures' Specifications (If not, why?)
	Lat: Long:	MWS Catch Basins						
		MWS Sedimentation Basin						
		Media Filter Condition						
		Plant Condition						
		Drain Down Media Condition						
		Discharge Chamber Condition						
		Drain Down Pipe Condition						
		Inlet and Outlet Pipe Condition						

Comments:

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DRAWINGS AND SPECIFICATIONS ARE AVAILABLE AT WWW.CONTECHES.COM

ModWetLinear OM Manual 03/24